City of New Stuyahok
Hazard Mitigation Plan

Prepared by
The City of New Stuyahok
Mitigation Planning Team

January 2012

U.S. Department of Homeland Security
Region X
130 228th Street, SW
Bothell, WA 98021-9796

FEMA

January 25, 2012

Honorable Randal Hastings
Mayor, City of New Stuyahok
P.O. Box 10
New Stuyahok, Alaska 99636

Dear Mayor Hastings:

The U.S. Department of Homeland Security's Federal Emergency Management Agency (FEMA) has approved the ***City of New Stuyahok Local Hazard Mitigation Plan*** as a local plan as outlined in 44 CFR Part 201. With approval of this plan, the City of New Stuyahok is now eligible to apply for the Robert T. Stafford Disaster Relief and Emergency Assistance Act's hazard mitigation project grants through January 25, 2017.

The plan's approval provides eligibility to apply for hazard mitigation projects through your State. All requests for funding will be evaluated individually according to the specific eligibility and other requirements of the particular program under which the application is submitted. For example, a specific mitigation activity or project identified in the plan may not meet the eligibility requirements for FEMA funding, and even eligible mitigation activities are not automatically approved for FEMA funding under any of the aforementioned programs. Approved mitigation plans may be eligible for points under the National Flood Insurance Program's Community Rating System (CRS).

Over the next five years, we encourage your community to follow the plan's schedule for its monitoring and updating, and to develop further mitigation actions. The plan must be reviewed, revised as appropriate, and resubmitted for approval within five years in order to continue project grant eligibility.

If you have questions regarding your plan's approval or FEMA's mitigation grant programs, please contact our State counterpart, Alaska Division of Homeland Security and Emergency Management, which coordinates and administers these efforts for local entities.

Sincerely,

Mark Carey, Director
Mitigation Division

cc: Mark Roberts, Alaska Division of Homeland Security and Emergency Management

Enclosure

BH:bb

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Acronyms/Abbreviations

°F	Degrees Fahrenheit
ACWF	Alaska Clean Water Fund
ADWF	Alaska Drinking Water Fund
AEA	Alaska Energy Authority
AFG	Assistance to Firefighters Grant
AHFC	Alaska Housing Finance Corporation
AICC	Alaska Interagency Coordination Center
ANA	Administration for Native Americans
ANTHC	Alaska Native Tribal Health Consortium
APA	American Planning Association
ARC	American Red Cross
ATV	all-terrain vehicle
AVEC	Alaska Village Electric Cooperative
BF	Bulk Fuel
BIA	Bureau of Indian Affairs
Boutet	Boutet Company, Inc.'s
CCP	Citizen Corps Program
CDBG	Community Development Block Grant
CFP	Community Forestry Program
CFR	Code of Federal Regulations
CGP	Comprehensive Grant Program
City	City of New Stuyahok
CWSRF	Clean Water State Revolving Fund
DCCED	Department of Commerce, Community, and Economic Development
DCRA	Division of Community and Regional Affairs
DEC	Department of Environmental Conservation
DEED	Department of Education and Early Development
Denali	Denali Commission
DHSS	Department of Health and Social Services
DHS	Department of Homeland Security
DHS&EM	Division of Homeland Security and Emergency Management
DGGS	Division of Geological and Geophysical Survey
DMA 2000	Disaster Mitigation Act of 2000
DMVA	Department of Military and Veterans Affairs
DNR	Department of Natural Resources
DOE	Department of Energy
DOF	Division of Forestry
DOI	Division of Insurance
DOL	Department of Labor

DOT/PF	Department of Transportation and Public Facilities
DSS	Division of Senior Services
EF&S	Emergency Food and Shelter
EOC	Emergency Operations Center
EPA	Environmental Protection Agency
EWP	Emergency Watershed Protection
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
FMA	Flood Mitigation Assistance
FP&S	Fire Prevention and Safety
ft	feet
FY	Fiscal Year
g	gravity as a measure of peak ground acceleration
HMA	Hazard Mitigation Assistance
HMGP	Hazard Mitigation Grant Program
HMP	Hazard Mitigation Plan
HSGP	Homeland Security Grant Program
HUD	U. S. Department of Housing and Urban Development
IBHS	Institute for Business and Home Safety
ICDBG	Indian Community Development Block Grant
INAP	Indian and Native American Programs
IHBG	Indian Housing Block Grant
IHS	Indian Health Service
IRS	Internal Revenue Service
Km	Kilometers
Kts	knots
LU&E	Land Use and Environment
M	Magnitude
MMI	Modified Mercalli Intensity
mph	miles per hour
NAHASDA	Native American Housing Assistance and Self Determination Act
NFIP	National Flood Insurance Program
NIMS	National Incident Management System
NOAA	National Oceanic and Atmospheric Administration
NRCS	Natural Resources Conservation Service
NWS	National Weather Service
NRF	National Response Framework
PDM	Pre-Disaster Mitigation
PF	Public Facilities
PGA	peak ground acceleration
PNPs	private non-profits

RCASP	Remote Community Alert Systems
RD	US Division of Rural Development
RDA	Rural Development Assistance
RL	repetitive loss
RFC	Repetitive Flood Claim
SAFER	Staffing for Adequate Fire and Emergency Response
SBA	U.S. Small Business Administration
SHMP	Alaska State Hazard Mitigation Plan
Sq.	Square
SRL	Severe Repetitive Loss
SRE	Snow Removal Equipment
Stafford Act	Robert T. Stafford Disaster Relief and Emergency Assistance Act
STAPLEE	Social, Technical, Administrative, Political, Legal, Economic, and Environmental
SWRSD	Southwest Region School District
TEP	Tribal Energy Program
TPS	Total Project Snapshot
URS	URS Corporation
US or U.S.	United States
USACE	United States Army Corps of Engineers
USC	United States Code
USDA	United States Department of Agriculture
USFA	United State Fire Administration
USGS	United States Geological Survey
VFA-RFA	Volunteer Fire Assistance and Rural Fire Assistance Grant
VPSO	Village Public Safety Officer
VSW	Village Safe Water
WARN	Warning, Alert, and Response Network
WHIP	Wildlife Habitat Incentive Program
Wx	Weather

Definitions

Connex	A large metal cargo container used for shipping supplies via truck, train, barge, and ocean vessels to distant locations.

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This section provides a brief introduction to hazard mitigation planning, the grants associated with these requirements, and a description of this Hazard Mitigation Plan (HMP).

1.1 HAZARD MITIGATION PLANNING

Hazard mitigation, as defined in Title 44 of the Code of Federal Regulations (CFR), Part 201.2, is "any action taken to reduce or eliminate the long-term risk to human life and property from natural hazards." Many areas have expanded this definition to also include human-caused hazards. As such, hazard mitigation is any work done to minimize the impacts of any type of hazard event before it occurs. It aims to reduce losses from future disasters. Hazard mitigation is a process in which hazards are identified and profiled, people and facilities at risk are analyzed, and mitigation actions are developed. The implementation of the mitigation actions, which include long-term strategies that may include planning, policy changes, programs, projects, and other activities, is the end result of this process.

1.2 PLANNING REQUIREMENTS

1.2.1 Local Mitigation Plans

In recent years, local hazard mitigation planning has been driven by a new Federal law. On October 30, 2000, Congress passed the Disaster Mitigation Act of 2000 (DMA 2000) (P.L. 106-390) which amended the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act) (Title 42 of the United States Code [USC] 5121 et seq.) by repealing the act's previous mitigation planning section (409) and replacing it with a new mitigation planning section (322). This new section emphasized the need for State, Tribal, and local entities to closely coordinate mitigation planning and implementation efforts. In addition, it provided the legal basis for the Federal Emergency Management Agency's (FEMA) mitigation plan requirements for mitigation grant assistance.

To implement these planning requirements, FEMA published an Interim Final Rule in the Federal Register on February 26, 2002 (FEMA 2002a), 44 CFR Part 201 with subsequent updates. The planning requirements for local entities are described in detail in Section 2 and are identified in their appropriate sections throughout this HMP.

FEMA's October 31, 2007 and July 2008 changes to 44 CFR Part 201 combined and expanded flood mitigation planning requirements with local hazard mitigation plans (44 CFR §201.6). Furthermore, all hazard mitigation assistance program planning requirements were combined eliminating duplicated mitigation plan requirements. This change also required participating National Flood Insurance Program (NFIP) communities' risk assessments and mitigation strategies to identify and address repetitively flood damaged properties. Local hazard mitigation plans now qualify communities for several Federal Hazard Mitigation Assistance (HMA) grant programs.

This HMP complies with Title 44 CFR dated December 31, 2010 and applicable guidance documents.

1.3 GRANT PROGRAMS WITH MITIGATION PLAN REQUIREMENTS

FEMA HMA grant programs provide funding to States, Tribes, and local entities that have a FEMA-approved State, Tribal, or Local Mitigation Plan. Two of the grants are authorized under the Stafford Act and DMA 2000, while the remaining three are authorized under the National Flood Insurance Act and the Bunning-Bereuter-Blumenauer Flood Insurance Reform Act. The Hazard Mitigation Grant Program (HMGP) is a directly funded competitive disaster grant

program. Whereas the Unified Mitigation Assistance Programs: Pre-Disaster Mitigation (PDM), Flood Mitigation Assistance (FMA), Repetitive Flood Claims (RFC), and Severe Repetitive Loss (SRL) programs although competitive, rely on specific grant pre-disaster grant funding sources, sharing several common elements.

> *"Hazard mitigation is any sustained action taken to reduce or eliminate long-term risk to people and property from natural hazards and their effects. This definition distinguishes actions that have a long-term impact from those that are more closely associated with immediate preparedness, response, and recovery activities. Hazard mitigation is the only phase of emergency management specifically dedicated to breaking the cycle of damage, reconstruction, and repeated damage. As such, States, Territories, Indian Tribal governments, and communities are encouraged to take advantage of funding provided by HMA programs in both the pre- and post-disaster timeframes.*
>
> *Together, these programs provide significant opportunities to reduce or eliminate potential losses to State, Tribal, and local assets through hazard mitigation planning and project grant funding. Each HMA program was authorized by separate legislative action, and as such, each program differs slightly in scope and intent.*
>
> *The Hazard Mitigation Grant Program (HMGP) may provide funds to States, Territories, Indian Tribal governments, local governments, and eligible private non-profits (PNPs) following a Presidential major disaster declaration. The Pre-Disaster Mitigation (PDM), Flood Mitigation Assistance (FMA), Repetitive Flood Claims (RFC), and Severe Repetitive Loss Pilot (SRL) programs may provide funds annually to States, Territories, Indian Tribal governments, and local governments. While the statutory origins of the programs differ, all share the common goal of reducing the risk of loss of life and property due to natural hazards" (FEMA 2010).*

1.3.1 Hazard Mitigation Assistance (HMA) Unified Programs

The purpose of the HMGP is to reduce the loss of life and property due to natural disasters and to enable mitigation measures to be implemented during the immediate recovery from a disaster. Projects must provide a long-term solution to a problem, for example, elevation of a home to reduce the risk of flood damages as opposed to buying sandbags and pumps to fight the flood. In addition, a project's potential savings must be more than the cost of implementing the project. Funds may be used to protect either public or private property or to purchase property that has been subjected to, or is in danger of, repetitive damage. The amount of funding available for the HMGP under a particular disaster declaration is limited. FEMA may provide a State or Tribe with up to 20 percent of the total aggregate disaster damage costs to fund HMGP project or planning grants. In Fiscal Year (FY) 2006 was approximately $232 million, FY 2007 was $316 million, FY 2008 was $1.246 billion, FY 2009 was $359 million, and FY 2010 was $23 million. The cost-share for these grants is 75 percent Federal/25 percent non-Federal. Communities that fulfill "Impoverished Community" criteria and receive FEMA Regional Administrator approval may be funded at percent 90 percent Federal/10 percent non-Federal.

The PDM grant program provides funds to State, Tribes, and local entities, including universities, for hazard mitigation planning and mitigation project implementation prior to a disaster event. PDM grants are awarded on a nationally competitive basis. Like HMGP funding, a PDM project's potential savings must be more than the cost of implementing the project. In addition, funds may be used to protect either public or private property or to purchase property that has been subjected to, or is in danger of, repetitive damage. The total amount of PDM funding available is appropriated by Congress on an annual basis. In FY 2008, PDM program

funding totaled approximately $114 million, FY 2009 was $90 million, and FY 2010 was $100 million. The cost-share for these grants is 75 percent Federal/25 percent non-Federal.

The goal of the FMA grant program is to reduce or eliminate flood insurance claims under the NFIP. Particular emphasis for this program is placed on mitigating repetitive loss (RL) properties. The primary source of funding for this program is the National Flood Insurance Fund. Grant funding is available for three types of grants, including Planning, Project, and Technical Assistance. Project grants, which use the majority of the program's total funding, are awarded to States, Tribes, and local entities to apply mitigation measures to reduce flood losses to properties insured under the NFIP. In FY 2010, FMA funding totaled $32.3 million. The cost-share for these grants is 75 percent Federal/25 percent non-Federal. However, 90 percent Federal/10 percent non-Federal to mitigate SRL properties is available in certain situations.

The City of New Stuyahok does not currently participate in the NFIP and is therefore ineligible for National Flood Insurance Act Grant programs until they become a NFIP participant.

The City considered this as a possible Mitigation Action item.

The SRL program provides funding to reduce or eliminate the long-term risk of flood damage to residential structures insured under the NFIP. Structures considered for mitigation must have at least four NFIP claim payments over $5,000 each, when at least two such claims have occurred within any 10-year period, and the cumulative amount of such claim payments exceeds $20,000; or for which at least two separate claim payments have been made with the cumulative amount of the building portion of such claims exceeding the value of the property, when two such claims have occurred within any 10-year period. Congress authorized $40 million for FY 2006 and FY 2007, $80 million for FY 2008, $80 million for FY 2009, and $70 million for FY 2010. The cost-share for these grants is 75 percent Federal/25 percent non-Federal. However, 90 percent Federal/10 percent non-Federal to mitigate SRL properties is available when the State or Tribal plan addresses ways to mitigate SRL properties.

The RFC program provides funding to reduce or eliminate the long-term flood damage risk to residential and nonresidential structures insured under the NFIP. Up to $10 million is available annually to assist States and communities with reducing flood damages to structures which have had one or more claim payments for flood damages. All RFC grants are eligible for up to 100 percent Federal assistance.

1.4 HMP DESCRIPTION

The remainder of this HMP consists of the following sections and appendices:

Prerequisites

Section 2 addresses the prerequisites of plan adoption, which include adoption by the City of New Stuyahok (City). The adoption resolution is included in Appendix B.

Community Description

Section 3 provides a general history and background of the City, including historical trends for population and the demographic and economic conditions that have shaped the area. Trends in land use and development are also discussed. A location figure of the area is included.

Planning Process

Section 4 describes the planning process and identifies the Project Team Members, the meetings held as part of the planning process, the Boutet Company, Inc.'s (Boutet) consultants, URS

Corporation (URS), and the key stakeholders within the City and the surrounding area. In addition, this section documents public outreach activities (Appendix C) and the review and incorporation of relevant plans, reports, and other appropriate information.

Hazard Analysis

Section 5 describes the process through which the Project Team identified, screened, and selected the hazards to be profiled in this version of the HMP. The hazard analysis includes the nature, history, location, extent, impact, and probability of future events for each hazard. In addition, historical and hazard location figures are included.

Vulnerability Analysis

Section 6 identifies potentially vulnerable assets—people, residential and nonresidential buildings dwelling units (where available), critical facilities, and critical infrastructure—in the City. The resulting information identifies the full range of hazards that the City could face and potential social impacts, damages, and economic losses.

Mitigation Strategy

Section 7 defines the mitigation strategy which provides a blueprint for reducing the potential losses identified in the vulnerability analysis. The Project Team developed a list of mitigation goals and potential actions to address the risks facing the City. Mitigation actions include preventive actions, property protection techniques, natural resource protection strategies, structural projects, emergency services, and public information and awareness activities. In the spirit of the new requirements, mitigation strategies were developed encouraging participation with the NFIP and the reduction of flood damage to flood-prone structures.

Plan Maintenance

Section 8 describes the Project Team's formal plan maintenance process to ensure that the HMP remains an active and applicable document. The process includes monitoring, evaluating (Appendix E), and updating the HMP; implementation through existing planning mechanisms; and continued public involvement.

References

Section 9 lists the reference materials used to prepare this HMP.

Appendix A

Appendix A provides the FEMA crosswalk, which documents compliance with FEMA criteria.

Appendix B

Appendix B provides the adoption resolution for the City.

Appendix C

Appendix C provides public outreach information, including newsletters.

Appendix D

Appendix D contains the Benefit-Cost Analysis Fact Sheet used to prioritize mitigation actions.

Appendix E

Appendix E provides the plan maintenance documents, such as an annual review sheet and the progress report form.

2.1 ADOPTION BY LOCAL GOVERNING BODIES AND SUPPORTING DOCUMENTATION

The requirements for the adoption of this HMP by the local governing body, as stipulated in the DMA 2000 and its implementing regulations are described below.

DMA 2000 REQUIREMENTS: PREREQUISITES

Local Plan Adoption

Requirement §201.6(c)(5): The local hazard mitigation plan shall include documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval of the plan (e.g., City Council, Commissioner, Tribal Council).

Element

- Has the local governing body adopted the new or updated plan?
- Is supporting documentation, such as a resolution, included?

Source: FEMA, July 2008.

The City of New Stuyahok is the local jurisdiction represented in this HMP and meets the requirements of Section 409 of the Stafford Act and Section 322 of DMA 2000.

The local governing body of the City adopted the HMP by resolution on December 12, 2012. A scanned copy of the resolution is included in Appendix B.

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This section describes the location, geography, and history; demographics; and land use development trends of the City of New Stuyahok.

3.1 LOCATION, GEOGRAPHY, AND HISTORY

"New Stuyahok is located on the Nushagak River, about 12 miles upriver from Ekwok and 52 miles northeast of Dillingham. The village has been constructed at two elevations -- one 25 feet above river level and one about 40 feet above river level. It lies at approximately 59.452780 North Latitude and -157.311940 West Longitude. (Sec. 29, T008S, R047W, Seward Meridian.) New Stuyahok is located in the Bristol Bay Recording District" (Department of Community, Commerce, and Economic Development [DCCED], Division of Community and Regional Affairs [DCRA] 2011).

Figure 3-1 New Stuyakok Location Map

The City covers 32.6 square (sq.) miles of land and 2.0 sq. miles of water. Weather is primarily influenced by the ocean with continental influences. The City's average summer temperature is 56 degrees Fahrenheit (°F) with an average winter low of 11°F. The area receives approximately 26 inches of rain and seven inches of snow annually. Fog and low clouds are common during the summer; strong winds often preclude access during the winter. The river is ice-free from June through mid-November. (DCRA 2011, UAF 2011)

The following is the City's brief historical sketch:

1918	The village moved downriver to the Mulchatna area from the "Old Village"
1920s & 30s	Reindeer herding income for the U.S. government
1942	Extensive village flooding caused the herd to decrease beyond viability. Village was too far inland to receive barge service
1942	The village moved downriver again to its present location. Stuyahok appropriately means "going downriver place"
1961	The first school was built and a post office and airstrip were built
1960s	A 40% increase in the village population
1972	City became incorporated

"New Stuyahok is a southern Yup'ik Eskimo village with Russian Orthodox influences. Residents practice a fishing and subsistence lifestyle" (DCRA 2011).

3.2 DEMOGRAPHICS

The 2000 census recorded 471 residents, of which the median age was 24.5 indicating a relatively young population. The historical population depicts a steadily climbing rate as each age group is relatively evenly dispersed between those aged 4 (and under) to 54 with more than half the population under 44 years of age.

The City is a blended Yup'ik Eskimo and Russian Orthodox community, and about 95.9 percent of residents recognize themselves as Alaska Native. The male and female composition is approximately 54.9 and 45.1 percent respectively. The 2000 census revealed that there were 107

households with the average household having approximately 4.49 individuals. The most recent 2009 DCCED/DCRA certified population is 510. Figure 3-2 illustrates the historic population of the City since 1940.

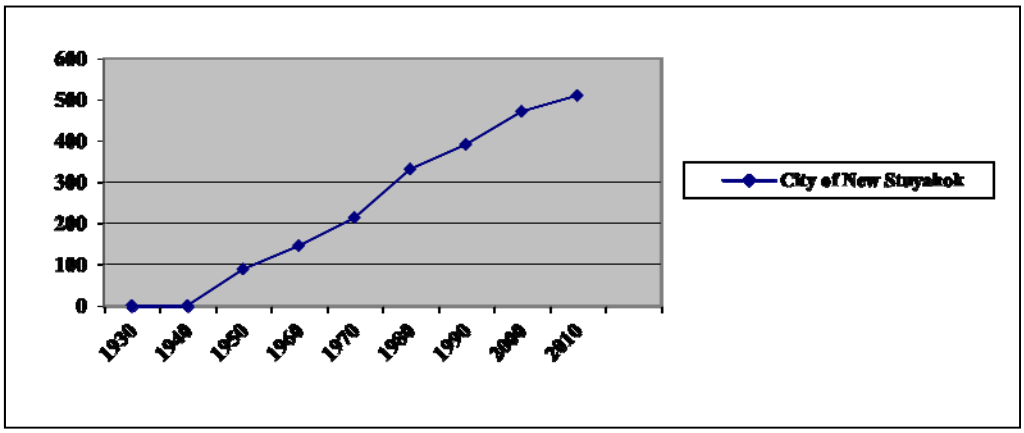

Figure 3-2 New Stuyahok Historic Population

3.3 ECONOMY

The primary economic base in New Stuyahok is the salmon fishery; in 2009, 25 residents held commercial fishing permits. Many trap as well. The entire community relies upon subsistence foods. Subsistence items are often traded between communities. Salmon, moose, caribou, rabbit, ptarmigan, duck, and geese are the primary sources of meat.

Commercial salmon fishing is the prime income source for the City with are limited employment opportunities with established government such as the City, State, and Federal agencies, the school district, the health clinic, and other commercial enterprises along with trapping. The summer months bring fire-fighting and outside construction job opportunities. However the entire community relies heavily on subsistence food. These items are bartered between communities to fill other needs. Subsistence food sources include salmon, moose, caribou, rabbit, ptarmigan, duck, and geese (DCRA 2011).

According to the 2000 census, the median household income was $26,042. Approximately 152 individuals (31.7 percent) were reported to be living below the poverty level. The potential work force (those aged 16 years or older) was estimated at 295, of which 132 were actively employed. In 2000 the unemployment rate was 9.2 percent; however, this rate included part-time and seasonal jobs, and practical unemployment or underemployment is likely to be significantly higher.

Figure 3-3 is a copy of the City's Community Profile aerial photograph depicting the community's layout and terrain (DCRA 2004).

Figure 3-3 Aerial Photograph of the City of New Stuyahok (DCRA 2004).

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This section provides an overview of the planning process; identifies the Project Team Members and key stakeholders; documents public outreach efforts; and summarizes the review and incorporation of existing plans, studies, and reports used to develop this HMP. Additional information regarding the Project Team and public outreach efforts is provided in Appendix C.

The requirements for the planning process, as stipulated in DMA 2000 and its implementing regulations are described below.

DMA 2000 Requirements: Planning Process

Local Planning Process

Requirement §201.6(b): An open public involvement process is essential to the development of an effective plan.

In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process shall include:

Element

- An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval;
- An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia and other private and nonprofit interests to be involved in the planning process; and
- Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.

Requirement §201.6(c)(1): [The plan shall document] the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.

Element

- Does the plan provide a narrative description of the process followed to prepare the new or updated plan?
- Does the new or updated plan indicate who was involved in the planning process?
- Does the new or updated plan indicate how the public was involved?
- Does the new or updated plan discuss the opportunity for neighboring communities, agencies, businesses, academia, nonprofits, and other interested parties to be involved in the planning process?
- Does the planning process describe the review and incorporation, if appropriate, of existing plans, studies, reports, and technical information?
- *Does the updated plan document how the planning team reviewed and analyzed each section of the plan and whether each section was revised as part of the update process? (Not applicable until 2013 update)*

Source: FEMA, July 2008.

4.1 OVERVIEW OF PLANNING PROCESS

The State of Alaska, Division of Homeland Security and Emergency Management (DHS&EM) provided funding and project oversight to The Boutet Co. Inc. URS, Boutet's subcontractor, guided development of a Project Team to assist the City with HMP development.

The first step in the planning process began via teleconference on April 27, 2011 with the Mayor and the Water Treatment Plant Operator. During the teleconference the Mayor identified resources, capabilities, and set the date for the City Council meeting. The Project Team's roles were discussed to include: local members acting as advocates for the planning process, assisting with gathering information, and providing support for the public process and other public participation opportunities. There was also a brief discussion about hazards that affect the community such as erosion and floods, which are increasing in intensity.

The Project Team presented the planning activity to the City Council on May 10, 2011. The hazard mitigation planning process was described and participants were asked to help identify hazards that affect the City and to also identify critical facilities. Mr. Jim Galanes was introduced

to describe Boutet's responsibility for assisting the Project Team with identifying mitigation actions and to develop a project for potential funding. These projects will then be prioritized and the top project selected for Boutet to prepare a separately funded Division of Homeland Security and Emergency Management (DHS&EM) HMGP Project Grant Application.

In summary, the following five-step process took place from April 2011 through June 2011.

1. Organize resources: Members of the Project Team identified resources, including staff, agencies, and local community members, who could provide technical expertise and historical information needed in the development of the hazard mitigation plan.
2. Assess risks: The Project Team identified the hazards specific to New Stuyahok, and with the assistance of a hazard mitigation planning consultant (URS), developed the risk assessment for the eight identified hazards. The Project Team reviewed the risk assessment, including the vulnerability analysis, prior to and during the development of the mitigation strategy.
3. Assess capabilities: The Project Team reviewed current administrative and technical, legal and regulatory, and fiscal capabilities to determine whether existing provisions and requirements adequately address relevant hazards.
4. Develop a mitigation strategy: After reviewing the risks posed by each hazard, the Project Team developed a comprehensive range of potential mitigation goals and actions. Subsequently, the Project Team identified and prioritized the actions to be implemented.
5. Monitor, evaluate, and update the plan: The Project Team developed a process to ensure the plan was monitored to ensure it was used as intended while fulfilling community needs. The team then developed a process to evaluate the plan to compare how their decisions affected hazard impacts. They then outlined a method to share their successes with community members to encourage support for mitigation activities and to provide data for incorporating mitigation actions into existing planning mechanisms and to provide data for the plans five year update.

4.2 HAZARD MITIGATION PROJECT TEAM

Mayor Randal Hastings (Team Leader), William Peterson (City Administrator), and the City Council comprise the City's Project Team. Table 4-1 identifies the hazard mitigation Project Team.

Table 4-1 Hazard Mitigation Project Team

NAME	TITLE	ORGANIZATION	PHONE
Randal Hastings	Mayor, Project Team Leader	City of New Stuyahok	693.3171
William C. Peterson	City Administrator	City of New Stuyahok	693.3171
City Council	Members	City of New Stuyahok	693.3171
Scott Simmons	Hazard Mitigation Planner	URS Corporation	261.9706
Jim Galanes	HMGP Project Development	The Boutet Company	522.6776

4.3 PUBLIC INVOLVEMENT & OPPORTUNITY FOR INTERESTED PARTIES TO PARTICIPATE

Table 4-2 lists the community's public involvement initiatives focused to encourage participation and insight for the HMP effort.

Table 4-2 Public Involvement Mechanisms

Mechanism	Description
Newsletter Distribution (April, 2011)	In April, 2011, the jurisdiction distributed a newsletter describing the upcoming Project activity. The newsletter encouraged the whole community to provide hazard and critical facility information. It was posted at the City and Tribal Offices and the Post Office to ensure everyone was aware of the meeting.
Newsletter Distribution (June, 2011)	In June, 2011, the jurisdiction distributed a newsletter describing the HMPs availability and present potential HMP projects for review. The newsletter encouraged the whole community to provide comments or input. It was posted at the City and Tribal Offices and the Post Office to ensure everyone was aware of the meeting.

On May 1, 2011, a newsletter was distributed to introduce the hazard mitigation planning project to the community and other interested parties describing the planning process and announcing the upcoming City Council Meeting. An invitation was extended to all individuals and entities identified on the project mailing list via a project newsletter. The newsletter was either faxed or emailed to relevant academia, nonprofits, and local, state, and federal agencies in May 2011. The newsletter was placed on the DSH&EM website and posted throughout the community announcing planning activity.

During the meeting, the Project Team led the attending public through a hazard identification and screening exercise. The attendees identified eight hazards: earthquake, erosion, flood, permafrost, severe weather, and wildland fire which periodically impact the City.

Following the hazard screening process, the Project Team led the attendees through the process of identifying critical facilities in the community. URS also described the specific information needed from the Project Team and public to complete the risk assessment including the location, value, and population of residents and critical facilities in the community.

After the community asset data was collected by the Project Team over the spring of 2011, a risk assessment was completed that illustrated the assets that are exposed and vulnerable to specific hazards.

A Project Team meeting was held on May 4, 2011 to review and prioritize the mitigation actions identified based on the results of the risk assessment. Mr. Jim Galanes, The Boutet' Company Inc. (Boutet) participated in the meeting and to assist the Project Team with identifying mitigation actions and projects. These projects will then be prioritized and the top project selected for Boutet to prepare a separately DHS&EM funded HMGP Project Grant Application.

A second newsletter was prepared and delivered on June 10, 2011 describing the process to date, presenting the prioritized mitigation actions, and announcing the availability of the draft HMP for public review and comment.

4.4 INCORPORATION OF EXISTING PLANS AND OTHER RELEVANT INFORMATION

During the planning process, the Project Team reviewed and incorporated information from existing plans, studies, reports, and technical reports into the HMP. The following were reviewed and used as references for the jurisdiction information and hazard profiles in the risk assessment of the HMP for the City:

- *The New Stuyahok Comprehensive Plan, 2005: explains the City's land use initiatives and natural hazard impacts.*
- *U.S. Army Corps of Engineers, Alaska Baseline Erosion Assessment, Erosion Information Paper –New Stuyahok, Alaska, January 9, 2008, defined the City's erosion threat.*
- *U.S. Army Corps of Engineers, Floodplain Manager's Report 2011 defines whether the City has a flood threat.*
- *New Stuyahok Wind Resource Report, March 2007, reported wind data needed to determine wind turbine efficiency and project viability.*
- *State of Alaska, Department of Commerce, Community and Economic Development Community Profile, provided historical and demographic information.*

A complete list of references consulted is provided in Section 9.

This section identifies and profiles the hazards that could affect the City of New Stuyahok.

5.1 OVERVIEW OF A HAZARD ANALYSIS

A hazard analysis includes the identification, screening, and profiling of each hazard. Hazard identification is the process of recognizing the natural events that threaten an area. Natural hazards result from unexpected or uncontrollable natural events of sufficient magnitude. Human and Technological, and Terrorism related hazards are beyond the scope of this plan. Even though a particular hazard may not have occurred in recent history in the study area, all natural hazards that may potentially affect the study area are considered; the hazards that are unlikely to occur or for which the risk of damage is accepted as being very low, are eliminated from consideration.

Hazard profiling is accomplished by describing hazards in terms of their nature, history, magnitude, frequency, location, extent, and probability. Hazards are identified through the collection of historical and anecdotal information, review of existing plans and studies, and preparation of hazard maps of the study area. Hazard maps are used to determine the geographic extent of the hazards and define the approximate boundaries of the areas at risk.

5.2 HAZARD IDENTIFICATION AND SCREENING

The requirements for hazard identification, as stipulated in DMA 2000 and its implementing regulations are described below.

DMA 2000 Requirements: Risk Assessment: Identifying Hazards

Identifying Hazards

Requirement §201.6(c)(2)(i): [The risk assessment shall include a] description of the type of all natural hazards that can affect the jurisdiction.

Element

- Does the new or updated plan include a description of the types of all natural hazards that affect the jurisdiction?

Source: FEMA, July 2008.

For the first step of the hazard analysis, on April 27, 2011 the Project Team reviewed nine possible hazards that could affect the Bristol Bay Recording District. They then evaluated and screened the comprehensive list of potential hazards based on a range of factors, including prior knowledge or perception of their threat and the relative risk presented by each hazard, the ability to mitigate the hazard, and the known or expected availability of information on the hazard (see Table 5-1). The Project Team determined that six hazards pose the greatest threat to the City: earthquake, erosion, flood, ground failure, severe weather, and wildland fire. The remaining hazards excluded through the screening process were considered to pose a lower threat to life and property in the City due to the low likelihood of occurrence or the low probability that life and property would be significantly affected.

Table 5-1 Identification and Screening of Hazards

Hazard Type	Should It Be Profiled?	Explanation
Avalanche	No	This hazard does not exist for the City.
Earthquake	Yes	Periodic, unpredictable occurrences. Earthquakes damage could threaten approximately 7 houses on the north end of town. Cracks form on the runway. The City experienced no damage from the 11/2002 Denali EQ, but felt the 1964 Good Friday Earthquake.
Erosion	Yes	Riverine erosion by high water flow, ice flows, wind, and surface runoff occur "periodically" along the embankment of the Nushagak River. Erosion occurs at the lower end of town below the dock and barge landing; 1 foot (ft.) along a 2,000 ft. stretch per year.
Flood	Yes	Flood potential exists for the City. Snowmelt and ice jam flooding occurs during spring thaw. Fall flooding rainy season events occur from soil saturation. Several minor flood events cause damage. Severe damages could potentially occur from major floods.
Ground Failure (Landslide, Permafrost, Subsidence)	Yes	Permafrost is present throughout Alaska and periodically causes houses to shift due to permafrost thawing and upheaval. The City has numerous refrigerant rods used to maintain frozen ground reducing melting permafrost damage.
Tsunami & Seiche	No	This hazard does not exist for the City.
Volcano	No	This hazard does not exist for the City.
Weather (Severe)	Yes	Annual weather patterns, severe cold, freezing rain, snow accumulations are the predominate threats. Severe weather events cause fuel price increases and frozen pipes. Heavy snow loads potentially damage house roofs. Winds potentially remove or damage roofs. -72ºF occurred in 1989. The City experiences -68ºF annually, causing # 2 heating oil freezing.
Wildland Fires	Yes	The City and the surrounding area become very dry in summer months with weather and human caused incidents igniting dry vegetation (i.e., lightning, trash burning, and campfires).

5.3 HAZARD PROFILE

The requirements for hazard profiles, as stipulated in DMA 2000 and its implementing regulations are described below.

DMA 2000 Requirements: Risk Assessment – Profiling Hazards

Profiling Hazards

Requirement §201.6(c)(2)(i): [The risk assessment shall include a] description of the location and extent of all natural hazards that can affect the jurisdiction. The plan shall include information on previous occurrences of hazard events and on the probability of future hazard events.

Element

- Does the risk assessment identify the location (i.e., geographic area affected) of each natural hazard addressed in the new or updated plan?
- Does the risk assessment identify the extent (i.e., magnitude or severity) of each hazard addressed in the new or updated plan?
- Does the plan provide information on previous occurrences of each hazard addressed in the new or updated plan?
- Does the plan include the probability of future events (i.e., chance of occurrence) for each hazard addressed in the new or updated plan?

Source: FEMA, July 2008.

The specific hazards selected by the Project Team for profiling have been examined in a methodical manner based on the following factors:

- Nature
- History
- Location
- Extent (to include magnitude and severity)
- Impact (general impacts associated with each hazard are described in the following profiles – detailed impacts to the City's residents and critical facilities are further described in Section 6 as part of the overall vulnerability summary for each hazard)
- Probability of future events

Each hazard is assigned a rating based on the following criteria for probability (Table 5-2) and magnitude/severity (Table 5-3).

Table 5-2 Hazard Probability Criteria

Probability	Criteria
4 - Highly Likely	Event is probable within the calendar year. Event has up to 1 in 1 year chance of occurring (1/1=100 percent). History of events is greater than 33 percent likely per year. Event is "Highly Likely" to occur.
3 - Likely	Event is probable within the next three years. Event has up to 1 in 3 years chance of occurring (1/3=33 percent). History of events is greater than 20per cent but less than or equal to 33 percent likely per year. Event is "Likely" to occur.
2 - Possible	Event is probable within the next five years. Event has up to 1 in 5 years chance of occurring (1/5=20 percent). History of events is greater than 10 percent but less than or equal to 20 percent likely per year. Event could "Possibly" occur.
1 - Unlikely	Event is possible within the next ten years. Event has up to 1 in 10 years chance of occurring (1/10=10 percent). History of events is less than or equal to 10 percent likely per year. Event is "Unlikely" but is possible of occurring.

Probability is determined based on historic events, using the criteria identified above, to provide the likelihood of a future event.

Table 5-3 Hazard Magnitude/Severity Criteria

Magnitude / Severity	Criteria
4 - Catastrophic	Multiple deaths Complete shutdown of facilities for 30 or more days More than 50 percent of property is severely damaged
3 - Critical	Injuries and/or illnesses result in permanent disability Complete shutdown of critical facilities for at least two weeks More than 25 percent of property is severely damaged
2 - Limited	Injuries and/or illnesses do not result in permanent disability Complete shutdown of critical facilities for more than one week More than 10 percent of property is severely damaged
1 - Negligible	Injuries and/or illnesses are treatable with first aid Minor quality of life lost Shutdown of critical facilities and services for 24 hours or less Less than 10 percent of property is severely damaged

Similar to estimating probability, magnitude, and severity are determined based on historic events using the criteria identified above.

The hazards profiled for the City are presented in the rest of Section 5.3. The order of presentation does not signify the level of importance or risk.

5.3.1 Earthquake

5.3.1.1 Nature

An earthquake is a sudden motion or trembling caused by a release of strain accumulated within or along the edge of the earth's tectonic plates. The effects of an earthquake can be felt far beyond the site of its occurrence. Earthquakes usually occur without warning and after only a few seconds can cause massive damage and extensive casualties. The most common effect of earthquakes is ground motion, or the vibration or shaking of the ground during an earthquake.

Ground motion generally increases with the amount of energy released and decreases with distance from the fault or epicenter of the earthquake. An earthquake causes waves in the earth's interior (i.e., seismic waves) and along the earth's surface (i.e., surface waves). Two kinds of seismic waves occur: P (primary) waves are longitudinal or compressional waves similar in character to sound waves that cause back and forth oscillation along the direction of travel (vertical motion), and S (secondary) waves, also known as shear waves, are slower than P waves and cause structures to vibrate from side to side (horizontal motion). There are also two types of surface waves: Raleigh waves and Love waves. These waves travel more slowly and typically are significantly less damaging than seismic waves.

In addition to ground motion, several secondary natural hazards can occur from earthquakes such as:

- **Surface Faulting** is the differential movement of two sides of a fault at the earth's surface. Displacement along faults, both in terms of length and width, varies but can be significant (e.g., up to 20 feet [ft]), as can the length of the surface rupture (e.g., up to 200 miles). Surface faulting can cause severe damage to linear structures, including railways, highways, pipelines, and tunnels.
- **Liquefaction** occurs when seismic waves pass through saturated granular soil, distorting its granular structure, and causing some of the empty spaces between granules to collapse. Pore water pressure may also increase sufficiently to cause the soil to behave

like a fluid for a brief period and cause deformations. Liquefaction causes lateral spreads (horizontal movements of commonly 10 to 15 ft, but up to 100 ft), flow failures (massive flows of soil, typically hundreds of ft, but up to 12 miles), and loss of bearing strength (soil deformations causing structures to settle or tip). Liquefaction can cause severe damage to property.

- **Landslides/Debris Flows** occur as a result of horizontal seismic inertia forces induced in the slopes by the ground shaking. The most common earthquake-induced landslides include shallow, disrupted landslides such as rock falls, rockslides, and soil slides. Debris flows are created when surface soil on steep slopes becomes totally saturated with water. Once the soil liquefies, it loses the ability to hold together and can flow downhill at very high speeds, taking vegetation and/or structures with it. Slide risks increase after an earthquake during a wet winter.

The severity of an earthquake can be expressed in terms of intensity and magnitude. Intensity is based on the damage and observed effects on people and the natural and built environment. It varies from place to place depending on the location with respect to the earthquake epicenter, which is the point on the earth's surface that is directly above where the earthquake occurred. The severity of intensity generally increases with the amount of energy released and decreases with distance from the fault or epicenter of the earthquake. The scale most often used in the U.S. to measure intensity is the Modified Mercalli Intensity (MMI) Scale. As shown in Table 5-4, the MMI Scale consists of 12 increasing levels of intensity that range from imperceptible to catastrophic destruction. Peak ground acceleration (PGA) is also used to measure earthquake intensity by quantifying how hard the earth shakes in a given location. PGA can be measured as acceleration due to gravity (g) (see Table 5-4) (MMI 2006).

Magnitude (M) is the measure of the earthquake strength. It is related to the amount of seismic energy released at the earthquake's hypocenter, the actual location of the energy released inside the earth. It is based on the amplitude of the earthquake waves recorded on instruments, known as the Richter magnitude test scales, which have a common calibration (see Table 5-4).

Table 5-4 Magnitude / Intensity / Ground-Shaking Comparisons

Magnitude	Intensity	PGA (% *g*)	Perceived Shaking
0 – 4.3	I	<0.17	Not Felt
	II-III	0.17 – 1.4	Weak
4.3 – 4.8	IV	1.4 – 3.9	Light
	V	3.9 – 9.2	Moderate
4.8 – 6.2	VI	9.2 – 18	Strong
	VII	18 – 34	Very Strong
6.2 – 7.3	VIII	34 – 65	Severe
	IX	65 – 124	Violent
	X	124 +	Extreme
7.3 – 8.9	XI		
	XII		

(MMI 2006)

5.3.1.2 History

The Project Team determined that the City of New Stuyahok has not experienced damaging effects from their historical earthquake events and only needed to be concerned with earthquakes

with a magnitude > M5.0. Table 5-5 lists the US Geological Survey's (USGS) identified historical earthquake events spanning from 1973 to present which exceeded M5.0 located within 100 miles (150 kilometers) of the City. These earthquakes did not induce any major damage due primarily to their community structure types and foundation support system designs.

Table 5-5 Historical Earthquakes for New Stuyahok
(Highlight is earthquake of record)

Year	Month	Day	Time(24 hr)	Latitude	Longitude	Magnitude	Depth (Miles)
1989	03	17	17:2621.41	58.598	-155.690	5.0	93
1990	05	01	161221.44	58.840	-156.858	6.3	131
2001	07	28	073243.01	59.025	-155.116	6.8	81
2003	02	27	153530.65	58.706	-156.867	5.5	125
2010	06	13	134303.49	58.120	-157.049	5.4	8.7

(USGS 2007)

Since 1973, 171 earthquakes have been recorded within a 100 mile radius of the City. The average magnitude of these earthquakes is M2.2. The largest recorded earthquakes within 100 miles of the City measured M6.8 occurring on July 28, 2001. It did not cause any damage to critical facilities, residences, non-residential buildings, or infrastructure.

North America's strongest recorded earthquake occurred on March 27, 1964 in Prince William Sound, measuring M9.2 and was felt by many residents throughout Alaska. New Stuyahok felt ground motion resulting from this historic event; however, no local damage occurred.

5.3.1.3 Location, Extent, Impact, and Probability of Future Events

Location

The entire geographic area of Alaska, and thus the City of New Stuyahok, is prone to earthquake effects. The Denali Fault is located about 74 miles (Figure 5-2) from the City. The Denali Fault comprises a fault system of smaller faults running along the crest of the Kuskokwim Mountains. Another unnamed fault runs south from the Mulchatna intersecting the Nushagak River north of the City. The City lies west and south respectively of these faults and can expect to be impacted by future earthquake events (DGGS 2011).

Of the 171 recorded earthquakes since 1973, only five exceeded M5.0 and two were above 6.3 (USGS 2007). The M6.8 epicenter was located 78.45 miles east/southeast and the M6.3 epicenter was 47.74 miles south/southeast from the City. Figure 5-1 shows the locations of active and potentially active faults in Alaska.

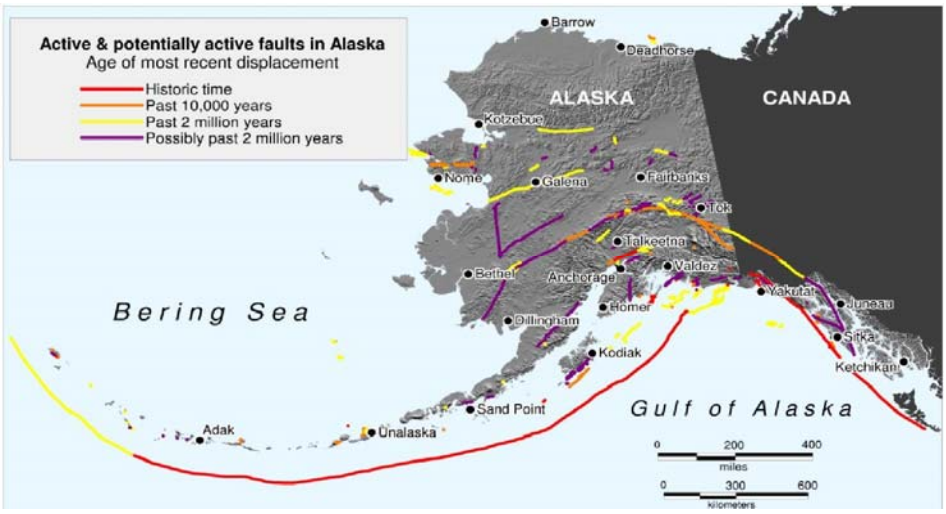

Figure 5-1 Active and Potentially Active Faults in Alaska

The Department of Geological and Geophysical Survey (DGGS) Neotectonic Map of Alaska depicts Alaska's known earthquake fault locations. DGGS states,

> *"The Neotectonic Map of Alaska is the most comprehensive overview of Alaskan Neotectonics published to date; however, users of this map should be aware of the fact the map represents the author's understanding of Alaskan Neotectonics at the time of publication. Since publication of the Neotectonic map, our understanding of Alaskan Neotectonics has changed and earthquakes have continued to occur. For example, M7.9 Denali fault earthquake ruptured three faults, including the Susitna Glacier fault, which was previously undiscovered..."* (DGGS 2009).

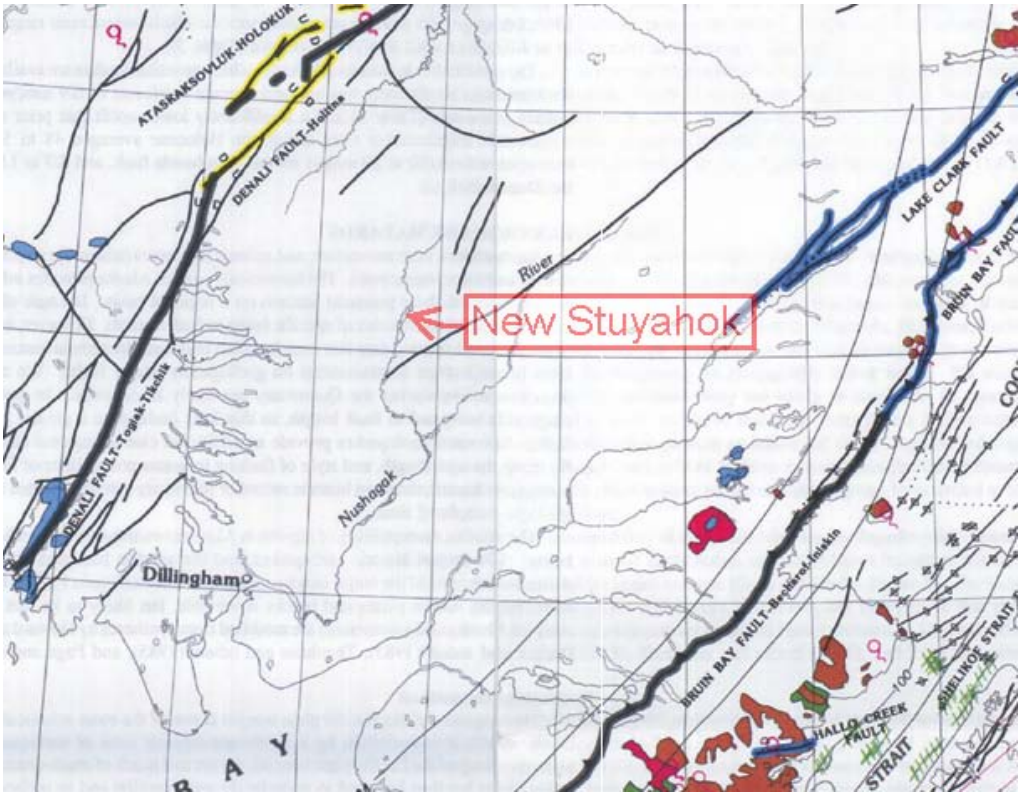

Figure 5-2 Image from the "Neotechtonic Map of Alaska" – New Stuyahok Area (DGGS 2009)

Extent

Earthquakes felt in the New Stuyahok area have not exceeded M6.8 in the past 50 years, and damage has never been reported due to an earthquake event.

Based on historic earthquake events and the criteria identified in Table 5-3, the magnitude and severity of earthquake impacts in the City are considered negligible with minor injuries, the potential for critical facilities to be shut down for less than 24 hours, less than 10 percent of property or critical infrastructure being severely damaged, and little to no permanent damage to transportation or infrastructure or the economy.

Impact

The City is located in an area that is less active than others in the State, although the effects of earthquakes centered elsewhere are expected to be felt in the City. Impacts to the community such as significant ground movement that may result in infrastructure damage are not expected. Minor shaking may be seen or felt based on past events. Impacts to future populations, residences, critical facilities, and infrastructure are anticipated to remain the same.

Probability of Future Events

The City of New Stuyahok has no official record of significant earthquake activity resulting in damage or injuries. While it is not possible to predict when an earthquake will occur, Figure 5-3 was generated using the USGS Earthquake Mapping model and indicates approximately a three to four percent probability of a M5.0 or greater earthquake occurring within 50 years and 33 miles of the City.

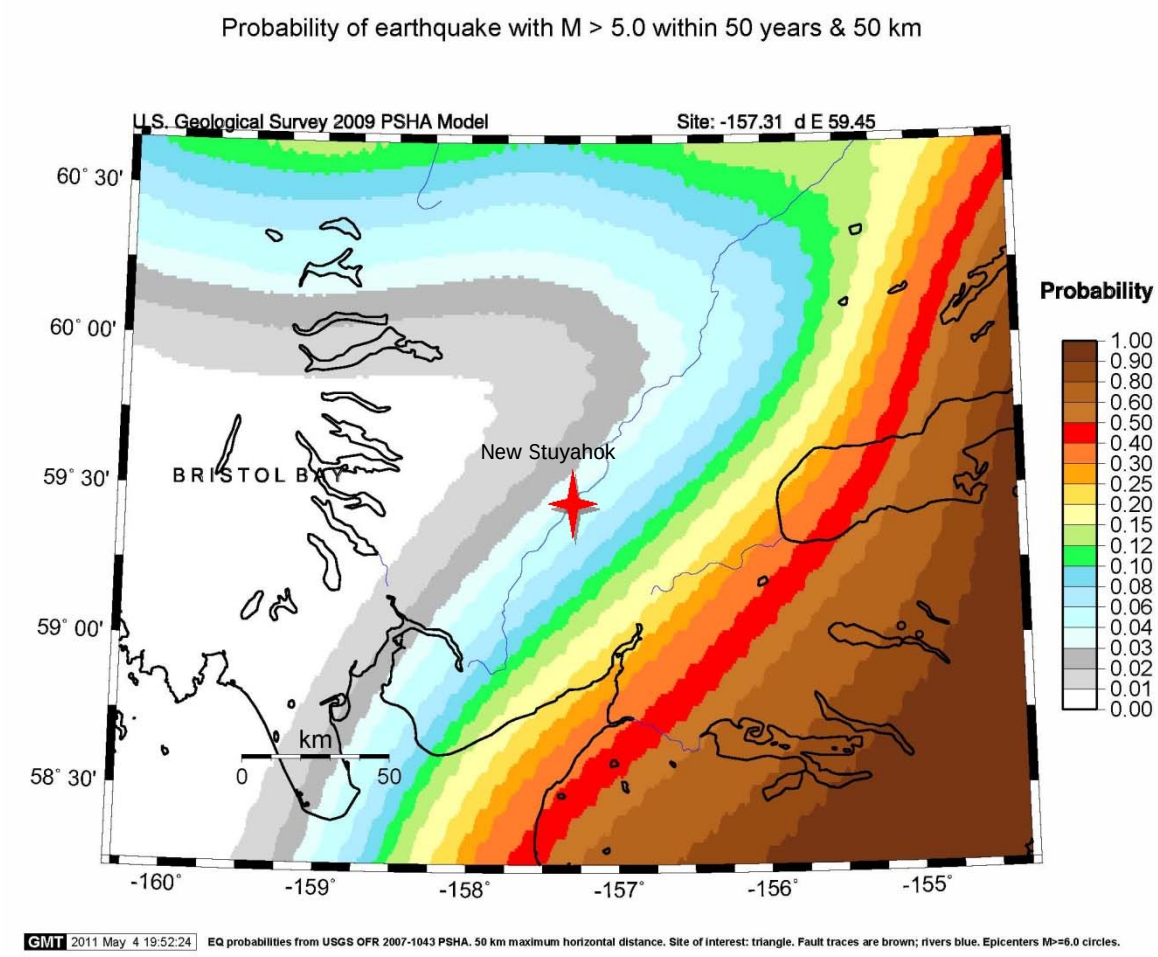

Figure 5-3 New Stuyahok's Earthquake Probability (USGS 2009)

This 2009 shake map is the most current map available for this area. However, it is a viable representation to support probability inquiries. According to Peter Haeussler, USGS Alaska Region:

> *"The occurrence of various small earthquakes does not change earthquake probabilities. In fact, in the most dramatic case, the probability of an earthquake on the Denali fault was/is the same the day before the 2002 earthquake as the day afterward. Those are time-independent probabilities. The things that change the hazard maps is changing the number of active faults or changing their slip rate" (Haeussler, 2009).*

5.3.2 Erosion

5.3.2.1 Nature

Erosion rarely causes death or injury. However, erosion causes property damages and destruction to development and infrastructure. Erosion is the wearing away, transportation, and movement of land. It is usually gradual but can occur rapidly as the result of floods, storms or other event or slowly as the result of long-term environmental changes. Erosion is a natural process, but its effects can be exacerbated by human activity.

Riverine erosion is a problem in developed areas where disappearing land threatens development and infrastructure. Riverine erosion is a major threat to the City as it threatens the embankment, structures, and the subsistence livelihood of New Stuyakok's residents.

Riverine erosion results from the force of flowing water and ice formations in and adjacent to river channels. This erosion affects the bed and banks of the channel and can alter or preclude any channel navigation or riverbank development. In less stable braided channel reaches, erosion, and deposition of material are a constant issue. In more stable meandering channels, episodes of erosion may only occur occasionally.

The US Army Corps of Engineers' (USACE) Alaska Baseline Erosion Assessment, Erosion Information Paper – New Stuyahok, Alaska, January 9, 2009 reported,

> *"New Stuyahok is periodically eroded along the banks of the Nushagak River, primarily during spring break up. High water levels, ice jams, and greater susceptibility to bank sloughing as soil along the bank dries out all contribute to erosion" (USACE 2009b).*

5.3.2.2 History

The City received $50,000 in Housing and Urban Development/Community Grant Program funds in 1995 to modernize and implement erosion protection to homes.

The City's 2005 Comprehensive Plan sites their concern for erosion and flooding to include desiring to develop mitigation goals, community concerns, such as "…limiting erosion and locating new development in a manner that protects important areas and maintains a compact development pattern…Slopes, drainage ditches and downhill trails in the village all need special attention in order to minimize the effects of erosion" (CP 2005). The Comprehensive plan stated the following erosion specific goals:

- Use new housing & facility development to stabilize erosion-prone areas by preventing ATV traffic from traveling down the slopes. Re-route trails to limit erosion.
- Flooding occurs in the lower village during spring and fall. Limit development in floodprone areas.

In addition to the actions identified in the City's Comprehensive Plan, the USACE erosion assessment stated,

> *"The 1983 U.S. Department of Agriculture Floodplain Management Study Nushagak and Wood Rivers reported that New Stuyahok had relocated to its present site to avoid frequent flood damage, however the present site also has flood damage and erosion. Ice jams caused significant flood events in 1957 and 2002 according to a Corps 2002 Trip Report. The water level reportedly rose about 10 feet above normal during the 1957 event and about 8 feet above normal during the May 2002 event. No structures were flooded and no damage was reported."*

(USACE 2009b).

5.3.2.3 Location, Extent, Impact, and Probability of Future Events

Location

Factors that influence erosion include flooding, spring break-up, and snowmelt run-off. According to the USACE, the riverbanks adjacent to the City are essential to the lives of the residents; activities include "barge access, boat launching and storage, fishing, swimming, and other community activities…Bank erosion is approximately 100 feet from some buildings and facilities, including the school complex and a community sewage lagoon. Native allotments down river and 2 community roads that terminate at the river bank are also threatened by erosion." (USACE 2009b).

Figure 5-4 Aerial Photo of New Stuyahok (DCRA 2011)

Extent

A variety of natural and human-induced factors influence the erosion process within the community. River orientation and proximity to up and downstream river bends can influence erosion rates. Embankment composition also influences erosion rates, as sand and silt will erode easily, whereas boulders or large rocks are more erosion resistant. Other factors that may influence riverine erosion include:

- Geomorphology
- Amount of encroachment in the high hazard zone
- Proximity to erosion inducing structures
- Nature of the topography
- Density of development
- Structure types along the embankment
- Embankment elevation

The USACE lists the City of New Stuyahok's erosion threat as "*Minimal*." This classification is applied to communities that "in general, erosion impacts are not serious and are not affecting the viability of the community … A Minimal Erosion Community has little threat of erosion-related damages. Unless the situation were to change significantly, no action is deemed necessary for this community to address erosion" (USACE 2009a). The USACE erosion assessment describes the City's erosion threat as including "[a]bout 2,000 feet of the river bank … with the bank height estimated at 30 to 50 feet above the river. Approximately 20 feet of bank has eroded within the last 20 years, and approximately 3 feet of bank was lost during 2007" (USACE 2009b).

The red dotted line in Figure 5-4 depicts community provided erosion impact location data for the USACE erosion assessment.

Figure 5-5 New Stuyahok Aerial Map (USACE 2009b)

Based on the City's assessment of past erosion events, the 2009 USACE Alaska Erosion Assessment, and the criteria identified in Table 5-3, the magnitude and severity of erosion impacts in the City are considered "negligible" with potential for critical facilities to be shut down for less than a week, and less than 10 percent of property or critical infrastructure being severely damaged.

Impact

Impacts from erosion include loss of land and any development on that land. Erosion can cause increased sedimentation of river deltas and hinder channel navigation—affecting marine transport. Other impacts include reduction in water quality due to high sediment loads, loss of native aquatic habitats, damage to public utilities (fuel headers and electric and water/wastewater

utilities), and economic impacts associated with the costs of trying to prevent or control erosion sites. The USACE has not verified community supplied data which describes the City's potential impact as:

> *"Bank erosion is approximately 100 feet from some buildings and facilities, including the school complex and a community sewage lagoon. Native allotments down river and 2 community roads that terminate at the river bank are also threatened by erosion" (USACE 2009b).*

Probability of Future Events

Based on historical impacts, the USACE Baseline Erosion Assessment, and the criteria identified in Table 5-2, it is possible that erosion will occur in the next five years (event has up to 1 in 5 years chance of occurring) as the history of events is greater than 20 percent likely per year.

5.3.3 Flood

5.3.3.1 Nature

Flooding is the accumulation of water where usually none occurs or the overflow of excess water from a stream, river, lake, reservoir, glacier, or coastal body of water onto adjacent floodplains. Floodplains are lowlands adjacent to water bodies that are subject to recurring floods. Floods are natural events that are considered hazards only when people and property are affected.

Four primary types of flooding occur in the City including: rainfall-runoff floods; snowmelt floods; ice jam floods; and ice overflow (aufeis) flooding.

- **Rainfall-runoff flooding** occurs in late summer and early fall. The rainfall intensity, duration, distribution, and geomorphic characteristics of the watershed all play a role in determining the magnitude of the flood. Rainfall runoff flooding is the most common type of flood. This type of flood event generally results from weather systems that have associated prolonged rainfall.
- **Snowmelt floods** typically occur from April through June. The depths of the snowpack and spring weather patterns influence the magnitude of flooding.
- **Ice jam floods** occur after an ice jam develops; thus, this type of flood can occur any time of the year that a river has ice on it. Ice jams restrict water flow on a river or stream and form during April through June under the following three situations:
  - fall freeze up
  - midwinter when stream channels freeze forming anchor ice
  - spring break-up (i.e., when the existing ice cover is broken into pieces that block flowing water at bridges or other constrictions)

  Ice jams commonly develop in areas where the channel slope decreases, becomes shallower, or where constrictions occur such as at bridges, bends in the river, headwaters, and reservoirs. Ice jams frequently impede water along big rivers during spring break-up.

  Water levels increase upstream behind the location of the ice jam. The result is flooding of an area by creating a lake-like effect covering a large area. Little damage typically occurs from the water current upstream of the ice jam, but significant damage can result from flooding. However, the downstream effect is very different. As soon as the ice jam is breached there is usually rapid draining of the dammed water. Downstream water levels rise substantially after the ice jam is breached and strong water currents are created, which can cause erosion and other significant damages. Additionally, the rising

water causes the ice to float while increased velocities of water move the ice further downstream. The motion of large solid ice blocks is often destructive to natural and material property in the vicinities. When ice jams cause flood events during spring break-up, snowmelt can contribute to the flood. Notable large floods in recent years on the, Kuskokwim, Koyukuk, and Yukon Rivers (and locally the Porcupine River) were all caused by ice jams and snowmelt.

- **Ice Overflow (Aufeis) Flood** is a glaciation or icing of streams and rivers, affecting road surfaces and infrastructure. Aufeis forms during the winter when emerging ground water freezes. Stream glacial flooding occurs when ice forms from the bottom up not from the top down forcing water out of the stream channel. If aufeis occurs on a roadway, it makes travel difficult. For example, the Steese Highway frequently has an aufeis problem in the winter months. In the mid-1980s, several homes in Fox suffered from an aufeis event occurring at the wellhead. The homes flooded 6 ft deep, then froze.

Timing of events

Many floods are predictable based on rainfall patterns. Most of the annual precipitation is received from April through October with August being the wettest. This rainfall leads to flooding in early/late summer and/or fall. Spring snowmelt increases runoff, which can cause flooding. It also breaks the winter ice cover, which causes localized ice-jam floods.

The *GAO Report to Congressional Committees December 2003 Alaska Native Villages, Most are Affected by Flooding and Erosion, but Few Qualify for Federal Assistance*, states:

> *"According to federal and state officials in Alaska, 184 out of 213, or 86.4 percent of Alaska Native villages experience some level of flooding and erosion, but it is difficult to assess the severity of the problem because quantifiable data are not available for remote locations. Native villages on the coast or along rivers are subject to both annual and episodic flooding and erosion.…*
>
> *In addition, villages in low-lying areas along riverbanks or in river deltas are susceptible to flooding and erosion caused by ice jams, snow and glacial melts, rising sea levels, and heavy rainfall. For many villages, ice jams that form in the Kuskokwim and Yukon Rivers during the spring ice breakup cause the most frequent and severe floods by creating a buildup of water behind the jam. The resulting accumulation of water can flood entire villages. While flooding and erosion affect most Alaska Native villages, federal and state officials noted that Alaska has significant data gaps because of a lack of monitoring equipment in remote locations. This lack of baseline data makes it difficult to assess the severity of the problem.…*
>
> *The Continuing Authorities Program, administered by the U.S. Army Corps of Engineers, and the Watershed Protection and Flood Prevention Program, administered by the Department of Agriculture's Natural Resources Conservation Service, are the principal federal programs that provide assistance for the prevention or control of flooding and erosion. However, small and remote Alaska Native villages often fail to qualify for assistance under these programs because they do not meet program criteria. For example, according to the Corps' guidelines for evaluating water resource projects, the Corps generally cannot undertake a project when the economic costs exceed the expected benefits. With few exceptions, Alaska Native villages' requests for assistance under this program are denied because the project costs usually outweigh expected benefits. Even villages that meet the Corps' cost/benefit criteria may still fail to qualify if they cannot meet cost-share requirements for the project. The Department of Agriculture's Natural*

Resources Conservation Service's Watershed Protection and Flood Prevention Program also requires a cost/benefit analysis similar to that of the Corps. As a result, few Alaska Native villages qualify for assistance under this program" (GAO 2003).

5.3.3.2 History

According to the City's Comprehensive Plan, Villagers moved from the "Old Village" to want is now called "Old Stuyahok" at the confluence of the Mulchatna and Stuyahok Rivers in 1919…The present location is their third Village move because "Old Stuyahok" was subjected to flooding during the 1920s and 1930s…"(CP 2005). Erosion and flooding still plague the City in the lower village during spring snowmelt and the fall rainy season. The City strives to reduce future development in the flood prone areas of the lower village (CP 2005).

The recently updated DHS&EM Disaster Cost Index states,

*"Flooding occurred in various interior and western Alaska river drainages, including the Tanana, Kuskokwim, Nushagak, Susitna and Yukon River drainages beginning on April 27, 2002 and continuing[until June 26, 2002]. The floods caused widespread damage to and loss of property in… **New Stuyahok (Nushagak River drainage)**…; The following conditions exist as a result of this disaster: widespread damage to public facilities and infrastructure, including damage to public airports, roads, and buildings; to public utilities, including water, sewer, and electrical utilities; to personal residences, in some areas requiring evacuation and sheltering of residents; to commercial operations; and to other public and private real and personal property" (DHS&EM 2011).*

Table 5-6 lists only five NWS identified flood events which potentially affected the Kuskokwim Delta and the New Stuyahok area.

Table 5-6 Historical Flood Events

AK Zone(s)	Date(s)	Event	Description
AKZ 161	2/24-25/ 2009	Coastal Flood	Hurricane force wind storm produced blizzard conditions along the Bering Sea coast from Bristol Bay north across the Kuskokwim Delta. Wind gusts were reported in excess of 100 mph in the Pribilof Islands and in Bristol Bay. Extensive damage occurred to many homes and buildings.
8AKZ155 - 161	10/17/2005	Flood	The combination of the strong wind during high tides produced a surge. Flooding occurred in the Bristol Bay area north to Kipnuk along the Kuskokwim Delta.
AKZ155	10/18/2004	Flood	Bering Sea storm with hurricane force wind produced a storm surge along the Kuskokwim Delta. The surge coupled with high tides resulted in coastal flooding and beach erosion.
AKZ155	11/19/2004	Flood	A west to southwest fetch across the Bering Sea, combined with high astronomical tide, resulted in coastal flooding across the west coast of the state.
AKZ155	9/9/2004	Flood	A strong storm in the Bering Sea created a long fetch with high wind. This produced a coastal storm surge resulting in minor coastal flooding along the Kuskokwim Delta.
AKZ 161	5/29/2002-6/26/2002	Flood	Flooding occurred in various interior and western Alaska river drainages, including the Tanana, Kuskokwim, Nushagak, Susitna and Yukon River drainages... New Stuyahok (Nushagak River drainage).

(Albanese 2011, NWS 2011, DHS&EM 2011)

5.3.3.3 Location, Extent, Impact, and Probability of Future Events

Location

DCRA's Community Profile states, "The present location is the third site that villagers can remember. The village moved downriver to the Mulchatna area from the "Old Village" in 1918… the site was too far inland to receive barge service. So, in 1942, the village moved downriver again to its present location…The village has been constructed at two elevations -- one 25 feet above river level and one about 40 feet above river level? (DCRA 2011).

The City's Comprehensive Plan states,

> *"New Stuyahok is located along the banks of the Nushagak River. Erosion and flooding are concerns for the village. Slopes, drainage ditches and downhill trails in the village all need special attention in order to minimize the effects of erosion. In planning future development, flood-prone areas in the lower village should also be carefully considered or avoided" (NSCP 2005).*

The Comprehensive Plan further states within their prioritized goals and priority action list that flooding potentially impacts the lower section of the village,

> *"Flooding occurs in the lower village during spring and fall. Limit development in floodprone areas" (NSCP 2005)*

Figure 5-8 displays a Federal Aviation Administration (FAA) aerial photo of the City. The City has identified the area within the red bracket as the City's potential flood impact area and the location where sediment deposition occurs.

Figure 5-6 City of New Stuyahok's Flood and Soil Deposition Area

Extent

Floods are described in terms of their extent (including the horizontal area affected and the vertical depth of floodwaters) and the related probability of occurrence.

The following factors contribute to riverine flooding frequency and severity:

- Rainfall intensity and duration.
- Antecedent moisture conditions.
- Watershed conditions, including terrain steepness, soil types, amount, vegetation type, and development density.
- The attenuating feature existence in the watershed, including natural features such as swamps and lakes and human-built features such as dams.
- The flood control feature existence, such as levees and flood control channels.
- Flow velocity.
- Availability of sediment for transport, and the bed and embankment watercourse erodibility.
- City location related to the base flood elevation as indicated with their certified high water mark.

Based on the elevated location of the majority of the City's infrastructure, limited flood impact history, and the criteria identified in Table 5-3, the extent of flood impacts in the City are considered negligible where injuries are treatable with first aid, minor quality of life is lost, complete shutdown of critical facilities will last for 24 hours or less, and less than 10 percent of property is severely damaged.

Impact

Nationwide, floods result in more deaths than any other natural hazard. Physical damage from floods includes the following:

- Structure flood inundation, causing water damage to structural elements and contents.
- Erosion or scouring of stream banks, roadway embankments, foundations, footings for bridge piers, and other features.
- Damage to structures, roads, bridges, culverts, and other features from high-velocity flow and debris carried by floodwaters. Such debris may also accumulate on bridge piers and in culverts, increasing loads on these features or causing overtopping or backwater damages.
- Sewage and hazardous or toxic materials release as wastewater treatment plants or sewage lagoons are inundated, storage tanks are damaged, and pipelines are severed.

Floods also result in economic losses through business and government facility closure, communications, utility (such as water and sewer), and transportation services disruptions. Floods result in excessive expenditures for emergency response, and generally disrupt the normal function of a community.

Impacts and problems also related to flooding are deposition and stream bank erosion (erosion is discussed in detail in Section 5.3.2). Deposition is the accumulation of soil, silt, and other particles on a river bottom or delta. Deposition leads to the destruction of fish habitat, presents a challenge for navigational purposes, and prevents access to historical boat and barge landing areas. Deposition also reduces channel capacity, resulting in increased flooding or bank erosion.

Stream bank erosion involves the removal of material from the stream bank. When bank erosion is excessive, it becomes a concern because it results in loss of streamside vegetation, loss of fish habitat, and loss of land and property (BKP 1988).

Probability of Future Events

Based on the elevated location of the majority of the City's infrastructure, limited flood impact history, and the criteria identified in Table 5-3, the extent of flood impacts in the City are considered as possible. An event has 1 in 5 year chance of occurring (1/5 = 20 percent). History of events is greater than 10 percent likely but less than or equal to 20 percent likely per year.

5.3.4 Ground Failure (Landslide, Subsidence, Unstable Soils)

5.3.4.1 Nature

Ground failure describes gravitational soil movement. Soil movement influences can include rain snow and/or water saturation, seismic activity, melting permafrost, river or coastal embankment undercutting, or a combination of conditions on steep slopes.

Landslides are a dislodgment and fall of a mass of soil or rocks along a sloped surface, or for the dislodged mass itself. The term is used for varying phenomena, including mudflows, mudslides, debris flows, rock falls, rockslides, debris avalanches, debris slides, and slump-earth flows. The susceptibility of hillside and mountainous areas to landslides depends on variations in geology, topography, vegetation, and weather. Landslides may also be triggered or exacerbated by indiscriminate development of sloping ground, or the creation of cut-and-fill slopes in areas of unstable or inadequately stable geologic conditions.

Additionally, landslides often occur with other natural hazards, thereby exacerbating conditions, such as:

- Earthquake ground movement can trigger events ranging from rock falls and topples to massive slides.
- Intense or prolonged precipitation that causes flooding can also saturate slopes and cause failures leading to landslides.
- Wildfires can remove vegetation from hillsides significantly increasing runoff and landslide potential.

Development, construction, and other human activities can also provoke ground failure events. Increased runoff, excavation in hillsides, shocks and vibrations from construction, non-engineered fill places excess load to the top of slopes, and changes in vegetation from fire, timber harvesting and land clearing have all led to landslide events. Broken underground water mains can also saturate soil and destabilize slopes, initiating slides. Something as simple as a blocked culvert can increase and alter water flow, thereby increasing the potential for a landslide event in an area with high natural risk. Weathering and decomposition of geologic material, and alterations in flow of surface or ground water can further increase the potential for landslides.

The USGS identifies six landslide types, distinguished by material type and movement mechanism including:

- **Slides,** the more accurate and restrictive use of the term landslide, refers to a mass movement of material, originating from a discrete weakness area that slides from

stable underlying material. A *rotational slide* occurs when there is movement along a concave surface; a *translational slide* originates from movement along a flat surface.

- **Debris flows** arise from saturated material that generally moves rapidly down a slope. A debris flow usually mobilizes from other types of landslide on a steep slope, then flows through confined channels, liquefying and gaining speed. Debris flows can travel at speeds of more than 35 miles per hour (mph) for several miles. Other types of flows include debris avalanches, mudflows, creeps, earth flows, debris flows, and lahars.
- **Lateral Spreads** is a type of landslide generally occurs on gentle slope or flat terrain. Lateral spreads are characterized by liquefaction of fine-grained soils. The event is typically triggered by an earthquake or human-caused rapid ground motion.
- **Falls** are the free-fall movement of rocks and boulders detached from steep slopes or cliffs.
- **Topples** are rocks and boulders that rotate forward and may become falls.
- **Complex** are any combination of landslide types.

In Alaska, earthquakes, seasonally frozen ground, and permafrost are often agents of ground failure. Permafrost is defined as soil, sand, gravel, or bedrock that has remained below 32°F for two or more years. Permafrost can exist as massive ice wedges and lenses in poorly drained soils or as relatively dry matrix in well-drained gravel or bedrock. During the summer, the surficial soil material thaws to a depth of a few feet, but the underlying frozen materials prevent drainage. The surficial material that is subject to annual freezing and thawing is referred to as the "active layer".

Permafrost melting (or degradation) occurs naturally as a result of climate change, although this is usually a very gradual process. Thermokarst is the process by which characteristic land forms result from the melting of ice-rich permafrost. As a result of thermokarst, subsidence often creates depressions that fill with melt water, producing water bodies referred to as thermokarst lakes or thaw lakes.

Human induced ground warming can often degrade permafrost much faster than natural degradation caused by a warming climate. Permafrost degradation can be caused by constructing warm structures on the ground surface allowing heat transfer to the underlying ground. Under this scenario, improperly designed and constructed structures can settle as the ground subsides, resulting in loss of the structure or expensive repairs. Permafrost is also degraded by damaging the insulating vegetative ground cover, allowing the summer thaw to extend deeper into the soil causing subsidence of ice-rich permafrost, often leading to creation of thermokarst water bodies. Evidence of this type of degradation can be seen where thermokarst water bodies are abundant in the ruts of an old trail used by heavy equipment (cat trails) or where roads or railroads constructed by clearing and grubbing have settled unevenly. (Subsidence, liquefaction, and surface faulting are described in Section 5.3.1.1.)

Seasonal freezing can cause frost heaves and frost jacking. Frost heaves occur when ice forms in the ground and separates sediment pores, causing ground displacement. Frost jacking causes unheated structures to move upwards. Permafrost is frozen ground in which a naturally occurring temperature below 32ºF has existed for two or more years. Permafrost can form a stable

foundation if kept frozen but when thawed; the soil weakens and can fail. Approximately 85 percent of Alaska is underlain by continuous or discontinuous permafrost (DHS&EM 2010).

Indicators of a possible ground failure include:

- Springs, seeps, or wet ground that is not typically wet
- New cracks or bulges in the ground or pavement
- Soil subsiding from a foundation
- Secondary structures (decks, patios) tilting or moving away from main structures
- Broken water line or other underground utility
- Leaning structures that were previously straight
- Offset fence lines
- Sunken or dropped-down road beds
- Rapid increase in stream levels, sometimes with increased turbidity
- Rapid decrease in stream levels even though it is raining or has recently stopped and
- Sticking doors and windows, visible spaces indicating frames out of plumb

The State of Alaska 2010 State Hazard Mitigation Plan provides additional ground failure information defining mass movement types, topographic and geologic factors which influence ground failure which pertain to New Stuyahok.

5.3.4.2 History

The City of New Stuyahok stated they do not have a significant ground failure impact history, however their Comprehensive Plan repeatedly states their concern about ensuring ATV users limit off-road and downslope travel and that all city development and structures are properly sited to avoid ground failure induced slope erosion.

5.3.4.3 Location, Extent, Impact, and Probability of Future Events

Location

The City has minor discontinuous permafrost deposits according to the permafrost map (Figure 5-7) completed by the Department of Natural Resources, Division of Geological and Geophysical Survey (DNR/DGGS) and comments received from the Project Team.

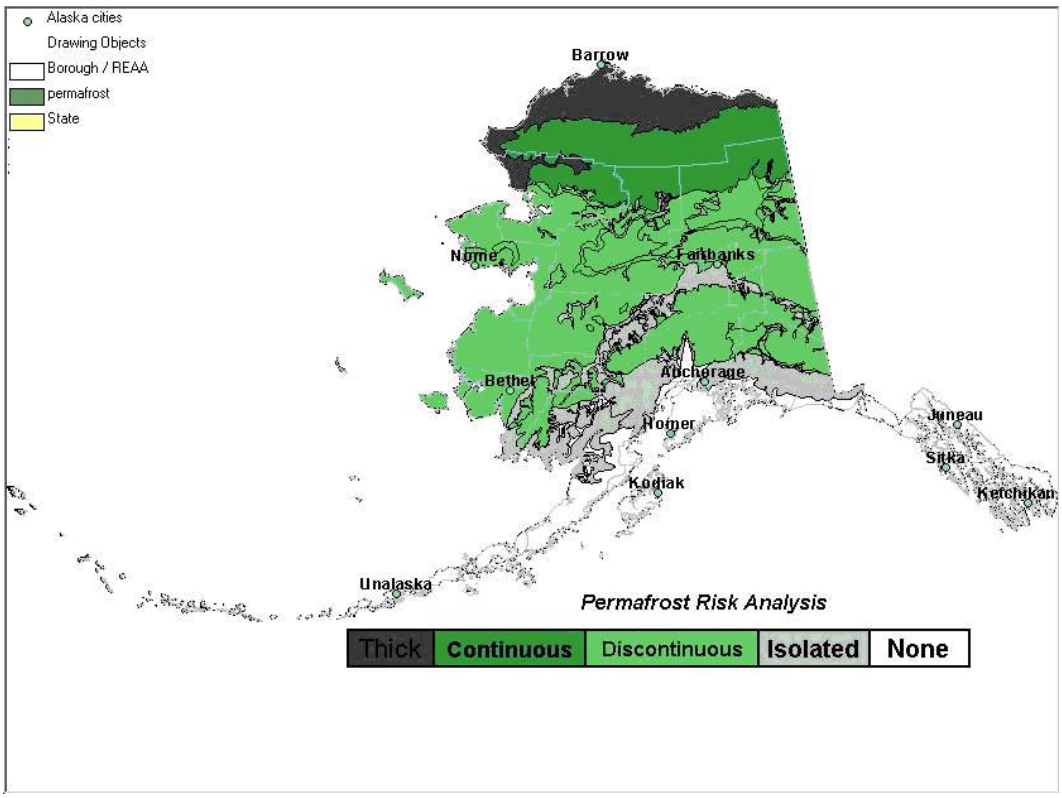

Figure 5-7 DGGS Permafrost Map of Alaska (DHS&EM 2007)

Extent

The ground failure damage magnitude could range from minor with some repairs required and little to no damage to transportation, infrastructure, or the economy to major if a critical facility (such as the airport) were damaged and transportation was effected.

Based on research and the Project Team's knowledge of past ground failure events and the criteria identified in Table 5-3, the extent of ground failure impacts, specifically permafrost degradation, in the City are considered limited. Impacts would not occur quickly but over time with warning signs. Therefore this hazard would not likely cause injuries or death, neither would it shutdown critical facilities and services. However, 10 percent of property is could be severely damaged.

Impact

Impacts associated with ground failure include surface subsidence, infrastructure, structure, road damage, and degrading permafrost. Ground failure incidents do not pose a sudden and catastrophic hazard but improperly designed and constructed buildings and infrastructures can settle as the ground subsides, resulting in loss of the structure or expensive repairs. Permafrost restricts use of the ground surface, and affects the location and design of roads, buildings, communities, pipelines, airfields, and bridges. To avoid costly damage to these facilities, careful planning and design in the location and construction of facilities is warranted.

Probability of Future Events

There is no written record defining ground failure impacts for the City. However, the Project Team stated that soil and slope failure periodically occurs throughout the community. The Project Team further stated the probability for ground failure occurring follows the criteria in

Table 5-2, the probability of future damage resulting from ground failure is unlikely in the next ten years (event has up to 1 in 10 years chance of occurring) as the history of events is less than or equal to 10 percent likely per year (New Stuyahok 2011).

5.3.5 Weather (Severe)

5.3.5.1 Nature

Severe weather (Wx) occurs throughout Alaska with extremes experienced by the City of New Stuyahok that includes thunderstorms, lightning, hail, heavy and drifting snow, freezing rain/ice storm, extreme cold, and high winds. The City experiences periodic severe weather events such as the following:

- **Heavy snow** generally means snowfall accumulating to four inches or more in depth in 12 hours or less or six inches or more in depth in 24 hours or less.
- **Drifting Snow** is the uneven distribution of snowfall and snow depth caused by strong surface winds. Drifting snow may occur during or after a snowfall.
- **Freezing Rain and Ice Storms** occur when rain or drizzle freezes on surfaces, accumulating 12 inches in less than 24 hours. Ice accumulations can damage trees, utility poles, and communication towers which disrupts transportation, power, and communications.
- **Extreme Cold** definitions vary according to the normal climate of a region. In areas unaccustomed to winter weather, near freezing temperatures are considered "extreme". In Alaska, extreme cold usually involves temperatures between -20 to -50°F. Excessive cold may accompany winter storms, be left in their wake, or can occur without storm activity. Extreme cold accompanied by wind exacerbates exposure injuries such as frostbite and hypothermia.
- **High Winds** occur in Alaska when there are winter low-pressure systems in the North Pacific Ocean and the Gulf of Alaska. Alaska's high wind can equal hurricane force but fall under a different classification because they are not cyclonic nor possess other characteristics of hurricanes. In Alaska, high winds (winds in excess of 60 mph) occur rather frequently over the coastal areas along the Bering Sea and the Gulf of Alaska. (NWS 2011).

  "As expected, higher winds occur during the winter and spring months of October through April while lower winds occur during the summer and autumn months, although the seasonal differential in New Stuyahok is more pronounced than observed in coastal villages" (Wind 2007).

5.3.5.2 History

The National Weather Services (NWS) has changed weather (Wx) zone designations during its weather reporting history. Table 5-7 lists New Stuyahok's Wx Zone (Bristol Bay AKZ161) and others in effect during the respective reporting periods. Each weather event may not have specifically impacted the City but they were listed due to their close proximity or by location within the identified zone.

Table 5-7 Severe Weather Events

AK Weather Zones	Date	Type Event	Magnitude	Property Damage ($)
AKZ155 - 161 - 171 - 181 - 185 - 191	2/16/2001	High Wind	72.5 miles per hour (mph) 63 knots (kts)	0
AKZ161 - 171	4/2/2001	High Wind	66.7 (58 kts)	0
AKZ155 - 161	9/4/2001	Flood	N/A	7K
AKZ161	10/4/2001	High Wind	64.4 mph (56 kts)	0
AKZ161	10/17/2001	Flood	N/A	50K
AKZ161	1/13/2002	High Wind	63.3 mph (55 kts)	0
AKZ161	1/14/2002	High Wind	69 mph (60 kts)	0
AKZ161	1/16/2002	High Wind	67.9 (59 kts)	0
AKZ161	1/28/2002	Heavy Snow	N/A	0
AKZ121 - 161 - 171	2/8/2002	Heavy Snow	N/A	0
AKZ161 - 181 - 185 - 195	2/20/2002	High Wind	72.5 mph (63 kts)	0
AKZ101 - 125 - 161 - 171	2/27/2002	High Wind	105.8 mph (92 kts)	2K
AKZ161	3/15/2002	High Wind	59.8 mph (52 kts)	0
Countywide	9/12/2002	Storm Surge	N/A	2K
AKZ161 - 171	10/27/2002	High Wind	89.7 mph (78 kts)	0
AKZ161 - 171	11/3/2002	High Wind	71.4 mph (62 kts)	0
AKZ155 - 161 - 181 - 191 - 195	1/6/2003	Blizzard	N/A	0
AKZ161	5/13/2003	Heavy Snow	N/A	0
AKZ161 - 181	12/2/2003	Blizzard	N/A	0
AKZ155 - 161	12/9/2003	Storm Surge	N/A	0
AKZ161	1/6/2004	Strong Wind	48 mph (42 kts)	40K
AKZ101 - 161 - 181	2/8/2004	High Wind	81 mph (73 kts)	0
AKZ101 - 125 - 161	3/9/2004	Blizzard	N/A	0
AKZ155 - 161	10/10/2004	Blizzard	N/A	0
AKZ125 - 131 - 135 - 155 - 161	11/2/2004	Blizzard	N/A	0
AKZ161 - 185	2/17/2005	High Wind	81.7 mph (71 kts)	0
AKZ161	8/23/2005	Flood	N/A	1.0M
AKZ155 - 161	10/17/2005	Flood	N/A	0
AKZ161	12/4/2005	Blizzard	N/A	0
AKZ161 - 181 - 185 -	2/13/2006	High Wind	141.5 mph	0

Table 5-7 Severe Weather Events

AK Weather Zones	Date	Type Event	Magnitude	Property Damage ($)
191 - 195			(123 kts)	
AKZ155 - 161	9/6/2006	Coastal Flood	N/A	0
AKZ155 - 161	10/10/2006	Coastal Flood	N/A	0K
AKZ155 - 161	12/15/2006	Blizzard	N/A	0K
AKZ161	12/27/2006	Blizzard	N/A	0K
AKZ161	12/27/2006	Blizzard	N/A	0K
AKZ161	1/9/2007	Blizzard	N/A	0K
AKZ161	1/25/2007	Blizzard	N/A	0K
AKZ161	1/30/2007	High Wind	95.5 mph (83 kts)	0K
AKZ161	12/24/2007	Blizzard	N/A	0K
AKZ161	12/27/2007	Storm Surge/tide	N/A	0K
AKZ155 - 161	1/19/2008	High Wind	79.4 mph (69 kts)	0K
AKZ161	1/23/2008	Blizzard	N/A	0K
AKZ161	3/29/2008	Blizzard	N/A	0K
AKZ161	5/23/2008	High Wind	84 mph (73 kts)	25K
AKZ161	1/16/2009	High Wind	85 mph (74 kts)	0K
AKZ161	2/12/2009	Blizzard	N/A	0K
AKZ161	2/24/2009	Coastal Flood	N/A	10K
AKZ161	2/25/2009	Blizzard	N/A	0K
AKZ161	2/25/2009	Blizzard	N/A	0K
AKZ161	2/25/2009	High Wind	107 mph (93 kts)	100K
AKZ161	3/25/2009	Blizzard	N/A	0K
AKZ155 - 161	3/28/2009	Blizzard	N/A	0K
AKZ161	10/9/2009	High Wind	87 mph (76 kts)	0K
AKZ161	11/29/2009	Blizzard	N/A	0K
AKZ161	12/5/2009	High Wind	85 mph (74 kts)	0K
AKZ155 - 161	12/20/2009	High Wind	78 mph (68 kts)	0K
AKZ161	3/4/2010	Blizzard	N/A	0K
AKZ161	3/8/2010	Blizzard	N/A	0K
			TOTALS:	$2.236M

(Albanese 2010, NWS 2011, DHS&EM 2011)

The City experiences moderate wind speeds throughout the year. The following chart depicts the results from the New Stuyahok, Alaska Wind Resource Report, and determined wind turbine installation feasibility for the City (Wind 2007).

5.3.5.3 Location, Extent, Impact, and Probability of Future Events

Location

The City experiences periodic severe weather impacts. The National Weather Service has continued to modify their system for assigning weather zones to facilitate and more accurately confine weather patterns to relevant geographic areas. Consequently the data in Table 5-7 reflects different zone numbering patterns and should be used to depict weather events that have historically impacted the area; some of which may not have impacted the City s as severely as other areas within the same zone.

Extent

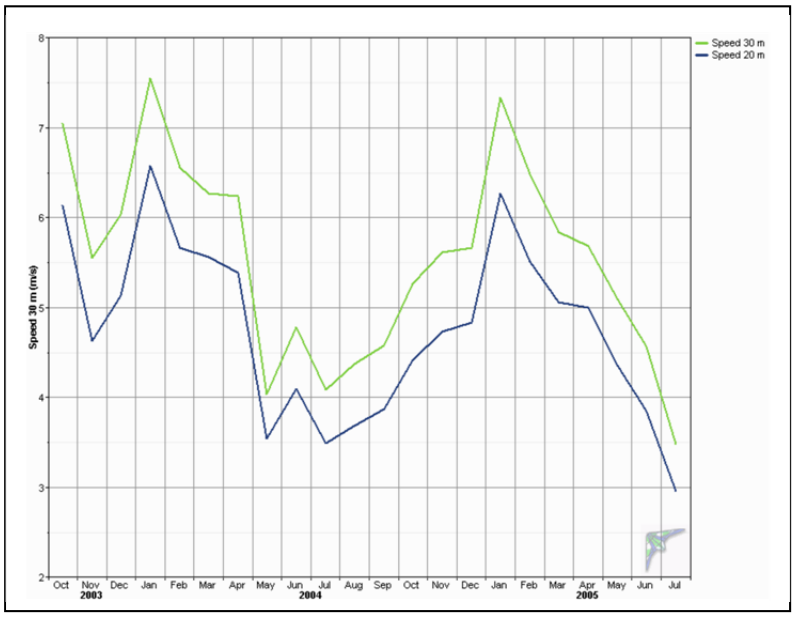

Figure 5-8 New Stuyahok Wind Chart

The entire City is equally vulnerable to the effects of severe weather which includes blizzard conditions and heavy rain for the area; wind speed can exceed 85 mph; and extreme low temperatures have reached -50ºF.

Based on past severe weather events and the criteria identified in Table 5-3, the extent of severe weather in the City are considered limited where injuries do not result in permanent disability, complete shutdown of critical facilities occurs for more than one week, and more than 10 percent of property is severely damaged.

Impact

The intensity, location, and the land's topography influence the impact of severe weather conditions on a community.

Heavy snow can immobilize a community by bringing transportation to a halt. Until the snow can be removed, airports and roadways are impacted, even closed completely, stopping the flow of supplies and disrupting emergency and medical services. Accumulations of snow can cause roofs to collapse and knock down trees and power lines. Heavy snow can also damage light

aircraft and sink small boats. A quick thaw after a heavy snow can cause substantial flooding. The cost of snow removal, repairing damages, and the loss of business can have severe economic impacts on cities and towns.

Injuries and deaths related to heavy snow usually occur as a result of vehicle and or snow machine accidents. Casualties also occur due to overexertion while shoveling snow and hypothermia caused by overexposure to the cold weather.

Extreme cold can also bring transportation to a halt. Aircraft may be grounded due to extreme cold and ice fog conditions, cutting off access as well as the flow of supplies to communities. Long cold spells can cause rivers to freeze, disrupting shipping and increasing the likelihood of ice jams and associated flooding.

Extreme cold also interferes with the proper functioning of a community's infrastructure by causing fuel to congeal in storage tanks and supply lines, stopping electric generation. Without electricity, heaters and furnaces do not work, causing water and sewer pipes to freeze or rupture. If extreme cold conditions are combined with low or no snow cover, the ground's frost depth can increase, disturbing buried pipes. The greatest danger from extreme cold is its effect on people. Prolonged exposure to the cold can cause frostbite or hypothermia and become life-threatening. Infants and elderly people are most susceptible. The risk of hypothermia due to exposure greatly increases during episodes of extreme cold, and carbon monoxide poisoning is possible as people use supplemental heating devices.

Probability of Future Events

Based on previous occurrences and the criteria identified in Table 5-2, it is likely a severe storm event will occur in the next three years (event has up to 1 in 3 years chance of occurring) as the history of events is greater than 20 percent but less than or equal to 33 percent likely per year.

5.3.6 Wildland Fire

5.3.6.1 Nature

A wildland fire is a type of wildfire that spreads through consumption of vegetation. It often begins unnoticed, spreads quickly, and is usually signaled by dense smoke that may be visible from miles around. Wildland fires can be caused by human activities (such as arson or campfires) or by natural events such as lightning. Wildland fires often occur in forests or other areas with ample vegetation. In addition to wildland fires, wildfires can be classified as urban fires, interface or intermix fires, and prescribed fires.

The following three factors contribute significantly to wildland fire behavior and can be used to identify wildland fire hazard areas.

- **Topography** describes slope increases, which influences the rate of wildland fire spread increases. South-facing slopes are also subject to more solar radiation, making them drier and thereby intensifying wildland fire behavior. However, ridge tops may mark the end of wildland fire spread since fire spreads more slowly or may even be unable to spread downhill.
- **Fuel** is the type and condition of vegetation plays a significant role in the occurrence and spread of wildland fires. Certain types of plants are more susceptible to burning or will burn with greater intensity. Dense or overgrown vegetation increases the amount of combustible material available to fuel the fire (referred to as the “fuel load”). The ratio of living to dead plant matter is also important. The risk of fire is increased significantly during periods of prolonged drought as the moisture content of both living and dead plant

matter decreases. The fuel load continuity, both horizontally and vertically, is also an important factor.

- **Weather** is the most variable factor affecting wildland fire behavior is weather. Temperature, humidity, wind, and lightning can affect chances for ignition and spread of fire. Extreme weather, such as high temperatures and low humidity, can lead to extreme wildland fire activity. By contrast, cooling and higher humidity often signal reduced wildland fire occurrence and easier containment.

The frequency and severity of wildland fires is also dependent on other hazards, such as lightning, drought, and infestations (such as the damage caused by spruce-bark beetle infestations). If not promptly controlled, wildland fires may grow into an emergency or disaster. Even small fires can threaten lives and resources and destroy improved properties. In addition to affecting people, wildland fires may severely affect livestock and pets. Such events may require emergency water/food, evacuation, and shelter.

The indirect effects of wildland fires can be catastrophic. In addition to stripping the land of vegetation and destroying forest resources, large, intense fires can harm the soil, waterways, and the land itself. Soil exposed to intense heat may lose its capability to absorb moisture and support life. Exposed soils erode quickly and enhance rivers and stream siltation, thereby enhancing flood potential, harming aquatic life, and degrading water quality. Lands stripped of vegetation are also subject to increased debris flow hazards.

5.3.6.2 History

Wildland fires have not been documented within the boundaries of the City; however, wildland fires have occurred in the City's vicinity. The Alaska Interagency Coordination Center (AICC) maintains a website (http://fire.ak.blm.gov/aicc.php) to consolidate Alaska's wildland fire information. Information in Table 5-8 and Figure 5-12 were obtained from this site.

Over 51 wildland fires occurred within 50 miles of the City caused by lightning and human activity such as land clearing, children and cooking fires, trash and structure burning. Table 5-8 lists fifteen wildfires that exceeded 300 acres burned for the most recent 70 year historical period (i.e., from 1939 to 2010).

Table 5-8 Wildfire Locations Since 1939 within 50 Miles of New Stuyahok

Fire Name	Fire Year	Estimated Acres	Latitude	Longitude	Specific Cause
Nuyakuk	1997	20280	59.93333	-157.9666595	Lightning
Klut Creek	1997	1000	59.4	-157.5333405	Lightning
Lodge	1991	330	59.98333	-158.0333405	Lightning
Koliganek	1963	2500	60.05	-156.9666595	Lightning
Stuyahok	1941	5000	59.81667	-156.7166595	Unknown
Mulchatna	1954	37000	60	-156.5	Lightning
Lower Nushagak	1959	750	59.21667	-157.5500031	Lightning
Cormick	1957	4500	59.51667	-157	Lightning
Dillingham	1957	5000	58.95	-157.8666687	Lightning
Koktuli	1957	3200	59.68333	-156.25	Lightning

Table 5-8 Wildfire Locations Since 1939 within 50 Miles of New Stuyahok

Fire Name	Fire Year	Estimated Acres	Latitude	Longitude	Specific Cause
Naknek	1945	100000	58.85	-156.6666718	Smoking
Koggiung-Naknek	1943	192000	58.8	-156.9499969	Miscellaneous
Kvichak	1952	10000	59.21667	-156.7833405	Smoke Bomb
Dillingham	1952	45000	59.21667	-158	Miscellaneous
Okstakuk	1980	1164	59.58333	-158.1833344	Lightning

(AICC 2011)

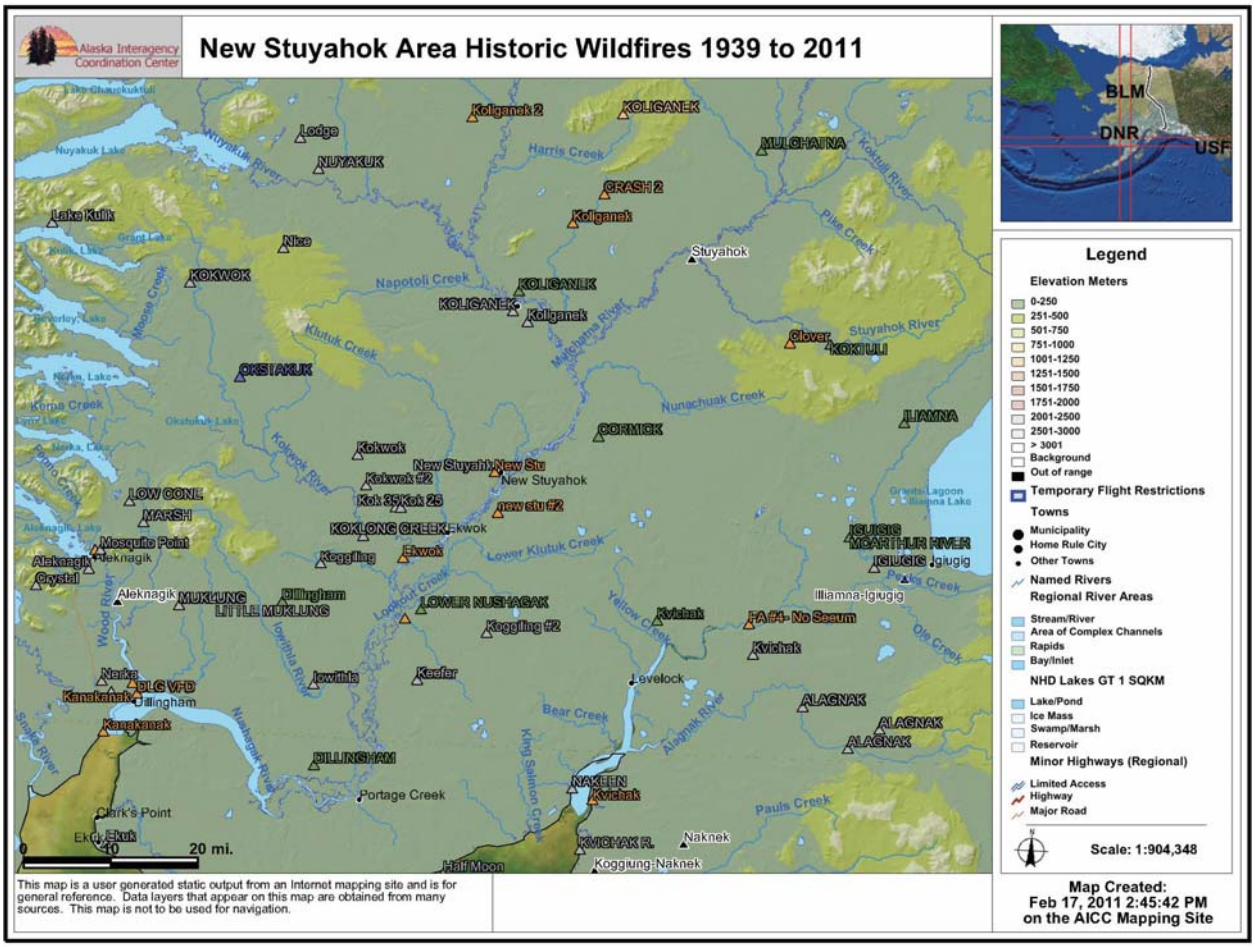

Figure 5-9 New Stuyahok's Historical Wildfires (AICC 2011)

5.3.6.3 Location, Extent, Impact, and Probability of Future Events

Location

Under certain conditions wildland fires may occur in any area with fuel surrounding the City of New Stuyahok. Since fuels data is not readily available, for the purposes of this plan, all areas outside City limits are considered to be vulnerable to wildland fire impacts. Since 1939, 51 wildland fire events have occurred within 50 miles of the City (Figure 5-11).

Figure 5-9 historic fire locations and 5-10 depicts the City's critical facilities and their relation to the City's Wildland fire threat.

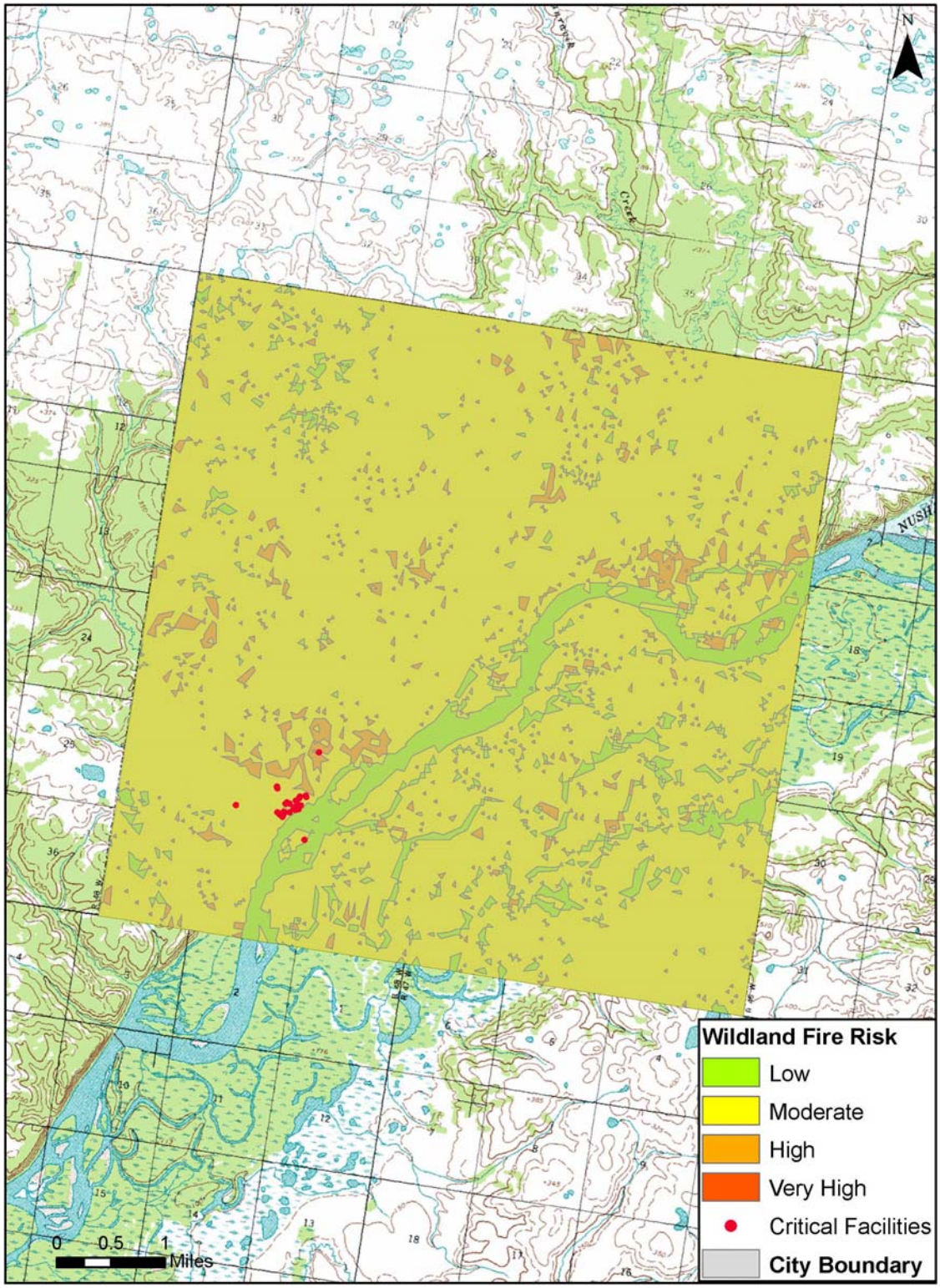

Figure 5-10 New Stuyahok's Wildland Fire Risk

Extent

Generally, fire vulnerability dramatically increases in the late summer and early fall as vegetation dries out, decreasing plant moisture content and increasing the ratio of dead fuel to living fuel. However, various other factors, including humidity, wind speed and direction, fuel load and fuel type, and topography can contribute to the intensity and spread of wildland fires. The common causes of wildland fires in Alaska include lightning strikes and human negligence.

Fuel, weather, and topography influence wildland fire behavior. Fuel determines how much energy the fire releases, how quickly the fire spreads, and how much effort is needed to contain the fire. Weather is the most variable factor. High temperatures and low humidity encourage fire activity while low temperatures and high humidity retard fire spread. Wind affects the speed and direction of fire spread. Topography directs the movement of air, which also affects fire behavior. When the terrain funnels air, as happens in a canyon, it can lead to faster spreading. Fire also spreads up slope faster than down slope.

Table 5-8 depicts wildland fires exceeding 300 acres burned; this averages approximately 28,514 acres burned during each of the 15 wildland fire events over the 70 year historic period identified.

Recent wildland fires have burned much smaller acreage per event. This may be due to the fact that the State's Division of Forestry (DOF) much more efficiently manage wildland fires using a four tiered suppression methodology based on infrastructure criticality while using more modern available resources as the respond to wildland fires which potentially threaten populated areas (DOF 2009).

Based on past wildland fire events and the criteria identified in Table 5-3, the magnitude and severity of impacts in the City of New Stuyahok are considered negligible with minor injuries, the potential for critical facilities to be shut down for less than 24 hours, less than 10 percent of property or critical infrastructure being severely damaged, and little to no permanent damage to transportation or infrastructure or the economy.

Impact

Impacts of a wildland fire that interfaces with the population center of the City could grow into an emergency or disaster if not properly controlled. A small fire can threaten lives and resources and destroy property. In addition to impacting people, wildland fires may severely impact livestock and pets. Such events may require emergency watering and feeding, evacuation, and alternative shelter.

Indirect impacts of wildland fires can be catastrophic. In addition to stripping the land of vegetation and destroying forest resources, large, intense fires can harm the soil, waterways, and the land itself. Soil exposed to intense heat may lose its capability to absorb moisture and support life. Exposed soils erode quickly and enhance siltation of rivers and streams, thus increasing flood potential, harming aquatic life, and degrading water quality.

Probability of Future Events

Fire is recognized as a critical feature of the natural history of many ecosystems. It is essential to maintain the biodiversity and long-term ecological health of the land. The role of wildland fire as an essential ecological process and natural change agent has been incorporated into the fire management planning process and the full range of fire management activities is exercised in Alaska, to help achieve ecosystem sustainability, including its interrelated ecological, economic, and social consequences on firefighters, public safety and welfare; natural and cultural resources

threatened; and the other values to be protected dictate the appropriate management response to the fire. In Alaska, the natural fire regime is characterized by a return interval of 50 to 200 years, depending on the vegetation type, topography, and location. Recorded wildland fires occurring within 50 miles of New Stuyahok have an average recurrence rate of approximately 5 years.

Based on the history of wildland fires in the New Stuyahok area applying the criteria identified in Table 5-2, it is possible a wildland fire event will occur in the next five years. The event has up to 1 in 5 years chance of occurring and the history of events is greater than 10 percent but less than or equal to 20 percent likely each year.

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This section provides an overview of the vulnerability analysis and describes the five specific steps: asset inventory, methodology, data limitations, and exposure analysis for current assets, and areas of future development.

6.1 OVERVIEW OF A VULNERABILITY ANALYSIS

A vulnerability analysis predicts the extent of exposure that may result from a hazard event of a given intensity in a given area. The analysis provides quantitative data that may be used to identify and prioritize potential mitigation measures by allowing communities to focus attention on areas with the greatest risk of damage. A vulnerability analysis is divided into five steps:

1. Asset Inventory
2. Methodology
3. Data Limitations
4. Exposure Analysis For Current Assets
5. Areas of Future Development

The requirements for a vulnerability analysis as stipulated in DMA 2000 and its implementing regulations are described here.

- A summary of the community's vulnerability to each hazard that addresses the impact of each hazard on the community.

DMA 2000 Requirements: Risk Assessment, Assessing Vulnerability, Overview

Assessing Vulnerability: Overview

Requirement §201.6(c)(2)(ii): [The risk assessment shall include a] description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description **shall** include an overall summary of each hazard and its impact on the community.

Element

- Does the new or updated plan include an overall summary description of the jurisdiction's vulnerability to each hazard?
- Does new or updated the plan address the impact of each hazard on the jurisdiction?

Source: FEMA, July 2008.

- Identification of the types and numbers of RL properties in the identified hazard areas.

DMA 2000 Requirements: Risk Assessment, Assessing Vulnerability, Addressing Repetitive Loss Properties

Assessing Vulnerability: Addressing Repetitive Loss Properties

Requirement §201.6(c)(2)(ii): [The risk assessment] **must** also address National Flood Insurance Program (NFIP) Insured structures that have been repetitively damaged floods.

Element

- Does the new or updated plan describe vulnerability in terms of the types and numbers of repetitive loss properties in the identified hazard areas?

Source: FEMA, July 2008.

- An identification of the types and numbers of existing vulnerable buildings, infrastructure, and critical facilities and, if possible, the types and numbers of vulnerable future development.

DMA 2000 Recommendations: Risk Assessment, Assessing Vulnerability, Identifying Structures

Assessing Vulnerability: Identifying Structures

Requirement §201.6(c)(2)(ii)(A): The plan should describe vulnerability in terms of the types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard area.

Element

- Does the new or updated plan describe vulnerability in terms of the types and numbers of existing buildings, infrastructure, and critical facilities located in the identified hazard areas?
- Does the new or updated plan describe vulnerability in terms of the types and numbers of future buildings, infrastructure, and critical facilities located in the identified hazard areas?

Source: FEMA, July 2008.

- Estimate of potential dollar losses to vulnerable structures and the methodology used to prepare the estimate.

DMA 2000 Recommendations: Risk Assessment, Assessing Vulnerability, Estimating Potential Losses

Assessing Vulnerability: Estimating Potential Losses

Requirement §201.6(c)(2)(ii)(B): [The plan should describe vulnerability in terms of an] estimate of the potential dollar losses to vulnerable structures identified in paragraph (c)(2)(ii)(A) of this section and a description of the methodology used to prepare the estimate.

Element

- Does the new or updated plan estimate potential dollar losses to vulnerable structures?
- Does the new or updated plan describe the methodology used to prepare the estimate?

Source: FEMA, July 2008.

6.2 VULNERABILITY ANALYSIS: SPECIFIC STEPS

6.2.1 Asset Inventory

Asset inventory is the first step of a vulnerability analysis. Assets that may be affected by hazard events include population (for community-wide hazards), residential buildings (where data is available), and critical facilities and infrastructure. The assets and associated values throughout the City of New Stuyahok are identified and discussed in detail in the following sections.

6.2.1.1 Population and Building Stock

Population data for the City were obtained from the 2000 U.S. Census. The City's total population for 2000 was 471 and 2009 DCCED/DCRA data reported a population of 510 (Table 6-1).

Table 6-1 Estimated Population and Housing Inventory

Population		Residential Buildings	
2000 Census	DCCED 2010 Data	Total Building Count	Total Value of Buildings[1]
471	510	107	$21,400,000

Sources: The City of New Stuyahok, U.S. Census 2000, and 2010 DCCED/DCRA Certified population data.

[1] The City of New Stuyahok has determined that the average structural value of all single-family residential buildings is $200,000 per structure due to excessive materials transportation costs.

Estimated replacement values for those structures, as shown in Table 6-1, were obtained from the 2000 U.S. Census, and DCCED/DCRA. A total of 107 single-family residential buildings were

considered in this analysis. However the City stated that residential replacement values are generally understated as the cost for materials, shipping, and labor exceed the US Census determined value.

6.2.1.2 Repetitive Loss Properties

This section estimating the number and type of structures at risk to repetitive flooding. (Properties which have experienced RL, and the extent of flood depth and damage potential.)

RL properties have had at least two $1,000 claims within any 10-year period since 1978.

SRL properties are most at risk for repeat flooding. These properties include every property that has experienced: four or more separate building and content claims since 1978 each exceeding $5,000 with cumulative claims exceeding $20,000; or at least two separate building claims with cumulative losses exceeding the value of the main living structure.

The City of New Stuyahok does not participate in the NFIP neither do they have a repetitive flood property inventory that meets the RL or SRL criteria as the loss thresholds are substantially below FEMA values. However the City has identified in Table 6-2, 20 residential structures that are prone to annual spring snowmelt run-off flooding. Randal Hastings home experiences 2 feet of flood water spreading under his house. His highest damage was $3,500 where the water destroyed insulation and soaked the support timbers, posts, and beams. Residential replacement cost is expected to exceed $200,000 per structure. The total value of the 20 threatened structures would exceed $4,000,000.

Table 6-2 New Stuyahok Properties Located within the Historical Floodplain

Type (RL/ SRL)	Occupant Name	Structure Address	Occupancy (#)	Number of Losses	Flood Insurance (Yes/No)	Value ($)[1]	Total Claims ($)[2]
RL	Randy Hastings	3rd & Salmon Street	7	Annually	No: Not Available	200,000	N/A
RL	Phil Christopher	2nd Street	5	Annually water in yard	No: Not Available	200,000	N/A
RL	Anna Acovak	First Street	4	Annually water in yard	No: Not Available	200,000	N/A
RL	Evan Acovak	First Street	1	Annually water in yard	No: Not Available	200,000	N/A
RL	Victor Dull	Front Street	5	Annually water in yard	No: Not Available	200,000	N/A
RL	Victor Kuhcluk	Second & First Street	1	Annually water in yard	No: Not Available	200,000	N/A
RL	John Eneyuk	Front Street	1	Annually water in yard	No: Not Available	200,000	N/A
RL	Nick Gumlickpuk	3rd Street	1	Annually water in yard	No: Not Available	200,000	N/A
RL	Crystal Gumlickpuk	3rd Street	4	Annually water in yard	No: Not Available	200,000	N/A
RL	William Gumlickpuk	Birch Street	0	Annually water in yard	No: Not Available	200,000	N/A
RL	Elia Gumlickpuk	Birch Street	3	Annually water	No: Not Available	200,000	N/A

Table 6-2 New Stuyahok Properties Located within the Historical Floodplain

Type (RL/ SRL)	Occupant Name	Structure Address	Occupancy (#)	Number of Losses	Flood Insurance (Yes/No)	Value ($)[1]	Total Claims ($)[2]
				in yard			
RL	Sophie Wonhola	3rd Street	5	Annually water in yard	No: Not Available	200,000	N/A
RL	Elena Olson	3rd Street	1	Annually water in yard	No: Not Available	200,000	N/A
RL	Nick Gust Sr.	Salmon & First Street	6	Annually water in yard	No: Not Available	200,000	N/A
RL	Moxie Wyagon	Front Street	2	Annually water in yard	No: Not Available	200,000	N/A
RL	Gregory Chunak	First Street	1	Annually water in yard	No: Not Available	200,000	N/A
RL	Glady Yukluk	First Street	5	Annually water in yard	No: Not Available	200,000	N/A
RL	Father Alexie Askoak	Salmon & Second Street	9	Annually water in yard	No: Not Available	200,000	N/A
RL	Tim Wonhola	2nd Street	4	Annually water in yard	No: Not Available	200,000	N/A
RL	Peter Acovak	2nd & First Street	4	Annually water in yard	No: Not Available	200,000	N/A

Type includes: RL or SRL

[1]Estimated structural value ($).
[2]Content and building loss ($).

6.2.1.3 Existing Critical Facilities and Infrastructure

A critical facility is defined as a facility that provides essential products and services to the general public, such as preserving the quality of life in the City and fulfilling important public safety, emergency response, and disaster recovery functions. The critical facilities profiled in this plan include the following:

- Government facilities, such as city and tribal administrative offices, departments, or agencies
- Emergency response facilities, including police, Village Public Safety Officer (VPSO), and fire departments and firefighting equipment
- Educational facilities, including K-12
- Care facilities, such as medical clinics, congregate living health, residential and continuing care, and retirement facilities
- Community gathering places, such as community and youth centers
- Utilities, such as electric generation, communications, water and waste water treatment, sewage lagoons, landfills

The total number of critical facilities is listed in Table 6-32.

Table 6-3 New Stuyahok's Critical Facilities

Type Facility	Facilities	Address	Latitude	Longitude	Estimated Value	Occupants (Occ.)	Building Type (HAZUS Codes)	Earthquake	Erosion	Flood	Ground Failure	Weather (Severe)	Tundra / Wildland Fire
Government	City Hall	Third Street	59.451551	-157.31128	$250,000	6 Occ.	W1	X		X	X	X	X
	Tribal Office	Fox Street	59.453318	-157.315084	$250,000	5 Occ.	W1	X			X	X	X
	Post Office	Airport Road	59.45156	-157.30837	$50,000	2 Occ.	W1	X			X	X	X
Transportation	Airport, gravel surface, 3,281 ft. by 98 ft., 2006	Airport Road	59.45028	-157.3251	$13,767,590	0 Occ.	ARW	X			X	X	X
	City Equipment Shed	Third Street	59.451684	-157.312119	$50,000	1 Occ.	S2L	X		X	X	X	X
	City Garage	Third Street	N/A	N/A	$100,000	1 Occ.	S2L	X		X	X	X	X
	City Maintenance Building	Third Street	N/A	N/A	$150,000	1 Occ.	S2L	X		X	X	X	X
	Barge Landing	Front Street	59.450878	-157.309609	$45,582	15 Occ.	FMF	X	X	X	X	X	X
Emergency Response	Public Safety Bldg, VPSO Office	Front Street	59.451186	-157.310073	$200,000	4 Occ.	W1	X	X	X	X	X	X
	Old Clinic (Future Police Station)	Airport Road	59.451481	-157.312443	$250,000	0 Occ.	W1	X	X		X	X	X
Educational	Chief Ivan Blunka School (K-12)	Birch Street	59.45101	-157.31009	$28,624,287	189 Occ.	W1, S2L	X	X		X	X	X
	Head Start	Fox Street	59.453564	-157.315232	$150,000	20 Occ.	W4	X			X	X	X
	School Sheds	Birch Street	59.449947	-157.313494	$3,000	0 Occ.	W2	X			X	X	X
	School Storage Shed	Main Street	59.450431	157.311015	$1,000	0 Occ.	W1	X			X	X	X
Medical	New Stuyahok Clinic	Airport Road	59.45209	-157.30986	$4,852,000	8 Occ.	W0	X	X	X	X	X	X
Community	Cemetery	N/A	59.45299	-157.30753	$0	N/A	N/A	X			X	X	X
	Russian Orthodox Church	Second Street	59.45281	-157.30733	$1,000,000	60 Occ.	W1	X		X	X	X	X
	Sunday School Building	Second Street	59.452054	-157.309598	$30,000	0 Occ.	W1	X			X	X	X
	Boys and Girls Club	Third Street	59.45245	-157.30912	$3,583,650	70 Occ.	W1	X		X	X	X	X
	Panorqukuk Store	Alder Street	59.44714	-157.30606	$1,000,000	10 Occ.	W1	X			X	X	X
	Teachers Quarters (fourplex)	Birch Street	59.449689	-157.312722	$2,745,223	8 Occ.	W1	X			X	X	X
	Teachers	Birch	59.449953	-157.312534	$2,745,223	8 Occ.	W1	X			X	X	X

Table 6-3 New Stuyahok's Critical Facilities

Type Facility	Facilities	Address	Latitude	Longitude	Estimated Value	Occupants (Occ.)	Building Type (HAZUS Codes)	Earthquake	Erosion	Flood	Ground Failure	Weather (Severe)	Tundra/Wildland Fire
	Quarters (fourplex)	Street											
	Community Center Old Gym	Birch Street	N/A	N/A	$498,000	0-300 Occ.	W1	X			X	X	X
	Adak Building (Old High School)	Birch Street	59.450092	-157.312761	$150,000	0 Occ.	W3	X			X	X	X
	City Housing (2 Duplexes)	Birch Street	59.450177	-157.314094	$500,000	0 Occ.	W1	X			X	X	X
Roads	Roads (Community) 12 miles @ $500,000/mile	Citywide	N/A	N/A	$5,930,000	0 Occ.	HRD2	X			X	X	X
	Airport Road	N/A	N/A	N/A	$1,600,000	3.2 miles 0 Occ.	HRD2	X			X	X	X
	Alder Road	N/A	N/A	N/A	$180,500	0.361 miles 0 Occ.	HRD2	X			X	X	X
	Birch Street	N/A	N/A	N/A	$126,500	0.253 miles 0 Occ.	HRD2	X			X	X	X
	First Street	N/A	N/A	N/A	$473,000	0.946 miles 0 Occ.	HRD2	X	X	X	X	X	X
	Fourth Street	N/A	N/A	N/A	$93,500	0.187 miles 0 Occ.	HRD2	X	X	X	X	X	X
	Fox Street	N/A	N/A	N/A	$256,500	0.513 miles 0 Occ.	HRD2	X			X	X	X
	Front Street	N/A	N/A	N/A	$244,000	0.488 miles 0 Occ.	HRD2	X	X	X	X	X	X
	Ikviar Street	N/A	N/A	N/A	$436,000	0.872 miles 0 Occ.	HRD2	X			X	X	X
	Landfill Road	N/A	N/A	N/A	$988,500	1.977 miles 0 Occ.	HRD2	X	X	X	X	X	X
	Main Street	N/A	N/A	N/A	$87,500	0.175 miles 0 Occ.	HRD2	X	X	X	X	X	X
	Pike Street	N/A	N/A	N/A	$11,750	0.0235 miles 0 Occ.	HRD2	X			X	X	X
	Salmon Street (Future)	N/A	N/A	N/A	$125,500	0.251 miles 0 Occ.	HRD2	X			X	X	X
	Second Street	N/A	N/A	N/A	$157,000	0.314 miles 0 Occ.	HRD2	X	X	X	X	X	X
	Spruce Street	N/A	N/A	N/A	$641,000	1.282	HRD2	X	X	X	X	X	X

Table 6-3 New Stuyahok's Critical Facilities

Type Facility	Facilities	Address	Latitude	Longitude	stimated Value	Occupants (Occ.)	Building Type (HAZUS Codes)	Earthquake	Erosion	Flood	Ground Failure	Weather (Severe)	Tundra/Wildland Fire
						miles 0 Occ.							
	Third Street	N/A	N/A	N/A	$289,000	0.578 miles 0 Occ.	HRD2	X	X	X	X	X	X
	Wallace Street	N/A	N/A	N/A	$483,500	0.967 miles 0 Occ.	HRD2	X			X	X	X
Utility	AVEC Fuel Storage Tanks (243,000 gals diesel)	Fourth Street	59.45035	-157.31225	$4,143,732	0 Occ.	OTF	X			X	X	X
	School Fuel Storage Tanks (57,850 gals diesel)	Birch Street	59.45139	-157.30946	$46,000	0 Occ.	OTF	X			X	X	X
	Stuyahok, Ltd (167,000 gals diesel, 86,000 gals gasoline)	Fourth Street	N/A	N/A	$500,000	0 Occ.	OTF	X			X	X	X
	School Generator	Fourth Street	59.45105	-157.30883	$150,000	0 Occ.	EOOS	X			X	X	X
	New Stuyahok Landfill, Class III, unpermitted	Landfill Road	59.45893	-157.30589	$66,000	0		X			X	X	X
	AVEC Generator Building (1,718,115 kWh)	Fourth Street	59.4504	-157.31258	$92,280	0	EPPM	X			X	X	X
	Water Treatment Plant	Fox Street	N/A	N/A	$1,633,000	2	PWTM	X	X		X	X	X
	New Stuyahok Water System (50 miles of piping), permit # 260367	Citywide	59.4527	-157.309	$5,000,000	0	PWP1	X			X	X	X
	Water Storage Tank (100,000 gals)	Airport Road	N/A	N/A	$1,800,000	0	PSTGS	X			X	X	X
	Sewage Lagoon	Fourth Street	59.45245	-157.30912	$493,000	0		X			X	X	X
	Piped Sewer (~50 miles piping)	Citywide	N/A	N/A	$500,000	0	WWP1	X			X	X	X
	Sewer Lift Stations	Citywide	N/A	N/A	$50,000	0	WLSM	X			X	X	X

**DCRA 2008 Pop: 510 or Number of residents based on Census average of 4.49 per household.*
*** Value of residential structures based on 2000 Census 107 structures with $97,700 average cost. However, HUD constructed 13 new housing units @ $2,538,794 (13 homes @ $195,292 each). City requested we use an estimate of $200,000 for average residential structure replacement value.*
**** Value of Critical Facilities (and Occupancy) based on information provided by the City for each structure.*

(New Stuyahok 2011, DCRA 2011, DHS&EM 2010)

6.2.1.4 Future Critical Facilities and Infrastructure

Immediate plans for future development in the City includes potentially constructing a new sewage lagoon and expanding existing infrastructure, and new teacher housing. No future buildings will be constructed in known hazard areas.

Extensive airport rehabilitation, snow removal equipment building, a community building, and plumbing upgrade projects, sewer collection and water service projects were recently funded.

6.2.2 Methodology

A conservative exposure-level analysis was conducted to assess the risks of the identified hazards. This analysis is a simplified assessment of the potential effects of the hazards on values at risk without consideration of probability or level of damage.

The methodology used a two pronged effort. First, The Project Team used the State's Critical Facility Inventory and locally obtained GPS coordinate data to identify critical facility locations in relation to potential hazard's threat exposure and vulnerability. Second, this data was used to develop a vulnerability assessment for those hazards where GIS based hazard mapping information was available.

Replacement structure and contents values were developed for physical assets. These value estimates were provided by the Project Team. For each physical asset located within a hazard area, exposure was calculated by assuming the worst-case scenario (that is, the asset would be completely destroyed and would have to be replaced). Finally, the aggregate exposure, in terms of replacement value or insurance coverage, for each category of structure or facility was estimated. A similar analysis was used to evaluate the proportion of the population at risk. However, the analysis simply represents the number of people at risk; no estimate of the number of potential injuries or deaths was prepared.

6.2.3 Data Limitations

The vulnerability estimates provided herein use the best data currently available, and the methodologies applied result in a risk approximation. These estimates may be used to understand relative risk from hazards and potential losses. However, uncertainties are inherent in any loss estimation methodology, arising in part from incomplete scientific knowledge concerning hazards and their effects on the built environment as well as the use of approximations and simplifications that are necessary for a comprehensive analysis.

It is also important to note that the quantitative vulnerability assessment results are limited to the exposure of people, buildings, and critical facilities and infrastructure to the identified hazards. It was beyond the scope of this HMP to develop a more detailed or comprehensive assessment of risk (including annualized losses, people injured or killed, shelter requirements, loss of facility/system function, and economic losses). Such impacts may be addressed with future updates of the HMP.

6.2.4 Exposure Analysis

There is limited GIS data available for the City of New Stuyahok. The results of the GIS based exposure analysis for loss estimations in the City are summarized in Tables 6-4 and 6-5. The following discussion contains data from GIS analysis and information obtained from the Project Team.

Table 6-4 Potential Hazard Exposure Analysis – Critical Facilities

			Government and Emergency Response		Educational		Care		Community	
Hazard Type	Hazard Area	Methodology	* # Bldgs / # Occ	Value ($)	* # Bldgs / # Occ	Value ($)	* # Bldgs / # Occ	Value ($)	* # Bldgs / # Occ	Value ($)
Earthquake	--	Descriptive	5/17	1,000,000	4/209	28,778,287	1/8	4,852,000	10/200	12,252,096
Erosion		Descriptive	-	-	1/189	28,624,287	1/8	4,852,000	--	--
Flood	--	Descriptive	2/10	450,000	--	--	1/8	4,852,000	1/70	3,583,650
Ground Failure	--	Descriptive	5/17	1,000,000	4/209	28,778,287	1/8	4,852,000	10/200	12,252,096
Weather, Severe	--	Descriptive	5/17	1,000,000	4/209	28,778,287	1/8	4,852,000	10/200	12,252,096
Wildland Fire	Low	Low fuel rank	1/2	50,000	--	--	--	--	--	--
	Moderate	Moderate fuel rank	4/15	950,000	4/209	28,778,287	1/8	4,582,000	9/156	11,754,096
	High	High fuel rank	--	--	--	--	--	--	--	--
	Extreme	Extreme fuel rank	--	--	--	--	--	--	--	--

Table 6-5 Potential Hazard Exposure Analysis – Critical Infrastructure

			Highway (Roads)		Transportation Facilities		Utilities	
Hazard Type	Hazard Area	Methodology	Miles	Value ($)	# Bldgs / # Occ	Value ($)	# Bldgs / # Occ	Value ($)
Earthquake	--	Descriptive	16/0	5,930,000	3/16	13,863,172	1/2	14,474,012
Erosion	--	Descriptive	8/0	2,973,500	1/15	45,582	1/2	1,633,000
Flood	--	Descriptive	8/0	2,973,500	1/15	45,582	-	-
Ground Failure	--	Descriptive	16/0	5,930,000	3/16	13,863,172	1/2	14,474,012
Weather, Severe	--	Descriptive	16/0	5,930,000	3/16	13,863,172	1/2	14,474,012
Wildland Fire	Low	Low fuel rank	--	--	1/15	45,582	1/0	150,000
	Moderate	Moderate fuel rank	--	--	2/1	13,817,590	6/0	9,841,012
	High	High fuel rank	--	--	--	--	--	--
	Extreme	Extreme fuel rank	--	--	--	--	--	--
Note, The Project Team stated there are no bridge located within the community.								

Earthquake

Based on earthquake probability (PGA) maps produced by the USGS, the entire City area is at risk of experiencing moderate earthquake impacts a result of its proximity to the Denali Fault that comprises a fault system of smaller faults running along the crest of the Kuskokwim Mountains and the unnamed fault which runs south from the Mulchatna intersecting the Nushagak River north of the City. However, the probability is low (see Section 5.3.1.3). Impacts to the community such as significant ground movement that may result in infrastructure damage are not expected. The entire existing and future New Stuyahok population, residences, and critical facilities are exposed to the effects of an earthquake. This includes 510 people in 107 residences (worth $21,400,000) and 422 people in all 52 critical facilities (worth approximately $87,593,317).

Impacts to the community such as significant ground movement that may result in infrastructure damage are not expected. Minor shaking may be seen or felt based on past events. Although all structures are exposed to earthquakes, buildings within the City constructed with wood have slightly less vulnerability to the effects of earthquakes than those with masonry.

Impacts to future populations, residences, critical facilities, and infrastructure are anticipated at the same low impact level as the City is located in an area with a high probability of strong shaking (i.e., >5.0M).

Erosion

Based on local knowledge, areas within the City affected by erosion are located adjacent to the River (see Section 5.3.2.3). There are approximately 265 people in 60 residences (worth $12,000,000) located in areas exposed and historically prone to erosion. There are 14 critical facilities (worth approximately $38,578,369): the barge landing (worth $45,582), the public safety building (worth $200,000), the Chief Ivan Blunka School (worth $28,624,287), the new medical clinic (worth $4,852,000), eight streets (worth approximately $2,973,500), and the community water treatment plant (worth $1,633,000), are located in historically erosion prone areas.

Impacts from erosion include loss of land and any development on that land. Erosion can cause increased sedimentation of harbors and river deltas and hinder channel navigation, reduction in water quality due to high sediment loads, loss of native aquatic habitats, damage to public utilities (docks, harbors, electric and water/wastewater utilities), and economic impacts associated with costs trying to prevent or control erosion sites. In the City of New Stuyahok, only the building location can lessen its vulnerability to erosion.

Impacts to future populations, residences, critical facilities, and infrastructure are anticipated at the same impact level until the City institutes land use controls prohibiting new construction in erosion prone areas. Impacts could also be lessened if affected properties could be relocated.

Flood

Impacts associated with flooding in the City include levee, and finger dike damage, water damage to structures and contents, roadbed erosion and damage, boat strandings, areas of standing water in roadways, and damage or displacement of fuel tanks, power lines, or other infrastructure. Buildings on slab foundations, not located on raised foundations, and/or not constructed with materials designed to withstand flooding events (e.g., cross vents to allow water to pass through an open area under the main floor of a building) are more vulnerable to the impacts of flooding (see Section 5.3.3.3).

There are approximately 90 people in 20 residences (worth $4,000,000) located in areas exposed and historically prone to flood impacts. There are 17 critical facilities: the government and emergency response facilities (worth $450,000), transportation facilities (worth $2,973,500), medical care facilities (worth approximately $45,582), community facilities (worth approximately $3,583,650), and eight streets (worth approximately $2,973,500) located in historically flood prone areas.

There is no data indicating that residential structures or critical facilities are located within the boundaries of the 500-year floodplain, and therefore considered at moderate risk.

Ground Failure

Ground Failure occurs throughout New Stuyahok from landslides, land subsidence, and melting permafrost. These hazards periodically cause houses to shift and other facilities to be impacted from ground shifting, sinking, and upheaval. According to Project Team and mapping completed by the DGGS, the entire City is underlain by and exposed to permafrost as well as other ground failure impacts (see Section 5.3.4.3). This includes 510 people in 107 residences (worth $21,400,000) and 422 people in all 52 critical facilities (worth approximately $87,593,317).

Impacts associated with ground failure include surface subsidence, infrastructure, structure, and/or road damage. Buildings that are built on slab foundations and/or not constructed with materials designed to accommodate the ground movement associated with building on permafrost and other land subsidence and impacts are more vulnerable damage.

Impacts to future populations, residences, critical facilities, and infrastructure are anticipated at the same impact level. To lessen future impacts the City could institute and enforce land use controls, building codes, and to prohibit new construction in ground failure prone areas.

Weather (Severe)

Using information provided by the City of New Stuyahok and the National Weather Service, the entire existing and future City's population, residences, and critical facilities are equally exposed to the effects of a severe weather event. This includes 510 people in 107 residences (worth $21,400,000) and 422 people in all 52 critical facilities (worth approximately $87,593,317).

Impacts associated with severe weather events includes roof collapse, trees and power lines falling, damage to light aircraft and sinking small boats, injury and death resulting from snow machine or vehicle accidents, overexertion while shoveling all due to heavy snow. A quick thaw after a heavy snow can also cause substantial flooding. Impacts from extreme cold include hypothermia, halting transportation from fog and ice, congealed fuel, frozen pipes, utility disruptions, frozen pipes, and carbon monoxide poisoning. Section 5.3.5.3 provides additional detail regarding the impacts of severe weather. Buildings that are older and/or not constructed with materials designed to withstand heavy snow and wind (e.g., hurricane ties on crossbeams) are more vulnerable to the impacts of severe weather.

Impacts to future populations, residences, critical facilities, and infrastructure are anticipated at the same impact level. To lessen future impacts the City could institute and enforce building codes to accommodate the effects of severe weather on structures.

Wildland Fire

Impacts associated with a wildland fire event include the potential for loss of life and property. It can also impact livestock and pets and destroy forest resources and contaminate water supplies. Buildings closer to the outer edge of town, those with a lot of vegetation surrounding the

structure, and those constructed with wood are some of the buildings that are more vulnerable to the impacts of wildland fire.

Impacts to future populations, residences, critical facilities, and infrastructure are anticipated at the same impact level. Community education, building materials, and prepared response personnel are some things that could lessen future impacts.

According to the Alaska Fire Service, there are no wildland fire areas within New Stuyahok's boundaries. However, seven wildland fires have occurred within a 50-mile radius of the City (see Section 5.3.6.3). There is potential for wildland fire to interface with the population center of the City.

Wildland fire hazard areas were identified using a model incorporating slope, aspect, and fuel load. (See Figure 5-12) South-facing, steep, and heavily vegetated areas were assigned the highest fuel values while areas with little slope and natural vegetation were assigned the lowest fuel risk values. Risk levels of low, moderate, high, and extreme were assigned to the entire region based on the results of this modeling. There are approximately 510 people in 107 residences (worth $21,400,000) located in the City that are potentially threatened by wildfire events.

New Stuyahok has critical facilities and infrastructure located within areas of low, moderate, high, and extreme risk. Low risk areas contain two people in one government facility (worth approximately $50,000), 15 people in one transportation facility (worth $45,582), and one utility facility ($worth approximately $150,000)

Moderate risk areas has 11 people in two government facilities (worth approximately $500,000), four people in two emergency response facilities (worth approximately $450,000), 209 people in four educational facilities (worth approximately $28,778,287), eight people in one care facilities (worth approximately $4,852,000), 156 people in nine community facilities (worth approximately $11,754,096), one person in two transportation facilities (worth approximately $13,817,590), and six utilities (worth approximately $9,841,012).

There are no residences or critical facilities located in High or Extreme wildfire hazard areas.

DMA 2000 Recommendations: Risk Assessment, Assessing Vulnerability, Analyzing Development Trends

Assessing Vulnerability: Analyzing Development Trends

Requirement §201.6(c)(2)(ii)(C): [The plan should describe vulnerability in terms of] providing a general description of land uses and development trends within the community so that mitigation options can be considered in future land use decisions.

Element

- Does the new or updated plan describe land uses and development trends?

Source: FEMA, July 2008.

6.3 LAND USE AND DEVELOPMENT TRENDS

Land use in the City is predominately residential with limited area for commercial services and community (or institutional) facilities. Suitable developable vacant land is in short supply within the boundaries of the City, and open space and various hydrological bodies surround the community. One area of town is classified as airport land use.

The 2005 Comprehensive Plan states,

> *"The location of new development has a significant impact on the cost to deliver public services to residents. For example, when development occurs at a significant distance from the existing village, utilities need to be extended to serve the new site. This increases the cost for operating and maintaining the system, as compared to locating development close-by. In addition, increased travel increases demand for road maintenance and increases fuel consumption. Subsistence resources near the village also need to be considered as the village develops…, berry-picking areas can be put at risk when new housing areas and public facilities are developed. In order to ensure that the village develops a land use pattern that protects important resources and creates cost-effective development, both a land use plan and [ordinance] code[s] are required. One constraining factor on future development in New Stuyahok is the adjoining tracts of private Native allotments. The City may need to investigate negotiating land swaps with individual landowners to ensure that future development of the village remains compact" (NSCP 2005).*

There are few areas of commercial land uses within New Stuyahok. The City has proposed establishing a few long range economic development projects:

- Small business operations development
- Marketing tours and lodging
- Arts and crafts
- Certification for mechanics, plumbers, and heavy equipment maintenance

Community facilities are classified under institutional land uses such as schools and government facilities.

Land Use

The DCCED Community Map's (Figure 6-1) text box marked with a red "X" states:

> *"Community Map – Maps are useful in illustrating land use patterns, ownership, location of utilities and also in planning for future village improvements. These maps can be prepared by surveying the land and/or enlarging aerial photographs.*
>
> *The Community Map shown here was prepared from a BLM aerial photograph taken in 1974 at a height of 8,400 feet, and enlarged to a scale of 1:2400 (1 inch=200 feet). This map has been used to display the present utilities, public facilities, and residential and commercial development. In addition, other information has been portrayed which will aid in evaluating the area for new construction and for potential village expansion.*
>
> *…New Stuyahok is located along the rising slope of the west bank of the Nushagak River, south of the mouth of a small creek. The developed areas are primarily on 2 levels, one about 25 feet above the river level and the other about 40 feet above the river level. The creek valley broadens as it reaches the river, and the village is situated in a wide, flat area between two hills.*
>
> *This kind of data is very important in developing plans for community growth and expansion. It is useful in gaining an understanding of some of the natural and manmade features that affect the community including, flood hazards, erosion, source of water supply and location of waste disposal sites" (DCCED 1981).*

Figure 6-1 Displays the Community of New Stuyahok 1981 Community Profile Map. This map depicts the City's natural terrain, and provides a list of the City's infrastructure as well as their public and residential building location layout.

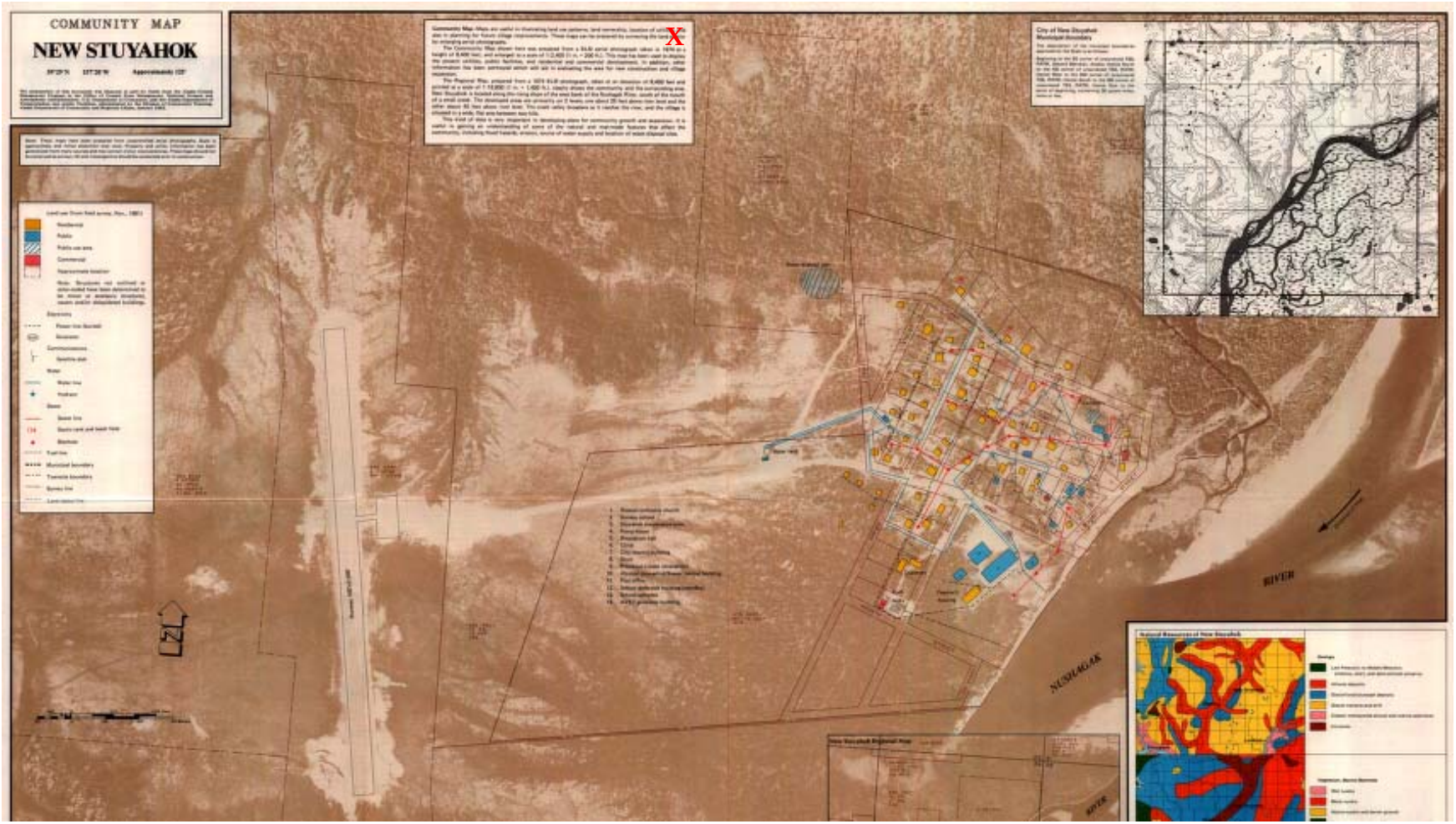

Figure 6-1 Community Map of New Stuyahok *(DCCED 1981)*

Tables 6-6 and 6-7 list DCRA's identified infrastructure improvement projects for the City. They provide a depiction of the community's ongoing development trends and focus on improving aging infrastructure. Table 6-6 lists projects in various stages of completion:

Table 6-6 Planned and Funded Projects

Lead Agency	Fiscal Year	Project Status	Project Description/Comments	Project Stage	Total Cost
US Department of Agriculture/ Rural Development (USDA/RD)	2004	Funded	Family Resource Center - Comments: Funding: RD grant $647,000, Indian Community Development Block Grant (ICDBG) $500,000, BBNA $10,000, Denali Commission $670,000	Preliminary	$1,932,000
Housing and Urban Development (HUD)	2009	Funded	Indian Housing Block Grant (IHBG) - Comments: Native American Housing Assistance and Self Determination Act (NAHASDA) administration, operating & construction funds	Contract	$303,437
Denali	2008	Funded	Solid Waste Equipment Purchase – burn box.	Contract	$66,000
Federal Aviation Administration (FAA)	2006	Funded	Construct New Airport - Comments: OTHER FUNDING: Alaska Department of Transportation/ Public Facilities (DOT/PF)	Contract	$4,711,823
FAA	2006	Funded	Construct Snow Removal Equipment Building - Comments: OTHER FUNDING: DOT/PF	Contract	$945,000
Housing and Urban Development (HUD)	2003	Funded	Resource Center - Comments: Indian Community Development Block Grant (ICDBG) Program.	Contract	$500,000
HUD	2008	Funded	IHBG-NAHASDA administration, operating & construction funds	Design	$273,149
Department of Education and Early Development (DEED)	2007	Funded	K-12 School Improvement - Comments: Design funded; see EED #03-013	Design	$27,787,373
Alaska Native Tribal Consortium (ANTHC)	2005	Funded	Design and Construction Planning For a New Multi-Use Building - Comments: OTHER FUNDING: Denali Commission $215,562; Other $245,000.	Design	$460,562
DEED	2003	Funded	School Improvement - Planning/Design - Comments: Funded by State GO Bond School Improvement - Planning/Design	Design	$2,050,182
ANTHC	2002	Funded	Utility Master Plan - Comments: OTHER FUNDING: DEC $18,800 Fed $56,200 Review and evaluate water and sewer needs	Design	$75,000
Division of Community and Regional Affairs (DCRA)	2009	Funded	Community Health Clinic & Family Resource Center - Comments: Legislative Grant - Contingent on the community providing an equal match from sources other than State or federal government.	Construction	$850,000
ANTHC	2009	Funded	Completion of sewage lagoon.	Construction	$536,253
HUD	2007	Funded	IHBG-NAHASDA administration, operating & construction funds	Construction	$319,151

Table 6-6 Planned and Funded Projects

Lead Agency	Fiscal Year	Project Status	Project Description/Comments	Project Stage	Total Cost
ANTHC	2007	Funded	Sewage Lagoon Upgrade	Construction	$1,028,881
ANTHC	2006	Funded	Design and Construct a Water Treatment Plant.	Construction	$1,633,000
ANTHC	2005	Funded	Water Storage Tank	Construction	$940,000
ANTHC	2001	Funded	Modifications to the lagoon system and construction of sewer main. - Comments: OTHER FUNDING: Indian Health Service (IHS) $369.7; Department of Environmental Conservation (DEC) $123.3. Construct auxiliary percolation lagoon and install 280' sewer main	Construction	$493,000

(DCRA 2011)

The City of New Stuyahok has benefited from numerous funding opportunities since 1989 to upgrade their infrastructure. The City had several new home construction grants, electric efficiency improvements, bulk fuel storage and piping repairs, erosion control to protect housing and new teacher housing construction.

A new clinic was funded in 2009 to provide diverse health treatment benefits to the City. The project was made possible through multiple funding sources as described by DCCED's Grants to Municipalities Total Project Snapshot (TPS) report for capital expenditures,

> *"The New Center will provide a full continuum of prevention, intervention and treatment for both physical and behavioral health. This new multi-purpose facility will consolidate a variety of crucial health, human and social services into a single, centrally located building. In addition to providing for the basic health care needs of the community, the new facility will house eleven different services ranging from a family learning center to a suicide prevention program" (DCRA 2009).*

The 1990's brought a new airport and substantial airport improvements such as acquiring land, construct new 3,200' runway, safety area, parking area, taxiway, lighting, access road, and snow removal equipment building; major housing renovations and modernizations, health clinic expansion, 1.13 miles of roads reconstruction; a new Community well, water and sewer piping and a new sewage lagoon and other heavy equipment purchases. The City also received funding to conduct a feasibility study for installing innovative wind turbines to help defray electrical energy costs. Location discussions are ongoing to determine best location away from the airport.

Table 6-7 lists DCRA identified completed projects for the City.

Table 6-7 Completed Projects

Lead Agency	Fiscal Year	Project Status	Project Description/Comments	Project Stage	Total Cost
Alaska Native Tribal Health Consortium (ANTHC)	2008	Funded	Unknown	Completed	$529,000
Alaska Housing Finance Corporation (AHFC)	2008	Funded	Rural Teacher Housing- Phase II - Comments: Rural Teacher Housing	Completed	$746,582
AHFC	2007	Funded	Teacher Housing - Traditional Council of New Stuyahok - Comments: Rural Teacher Housing. OTHER FUDING: Denali Commission (Denali) $2,019,478. New construction of three teacher housing fourplexes at 13,402 square feet total.	Completed	$4,214,864
Division of Community and Regional Affairs (DCRA)	2007	Funded	Case Backhoe - Comments: Legislative Grant	Completed	$89,000
U.S. Department of Housing and Urban Development (HUD)	2006	Funded	Indian Housing Block Grant (IHBG)/Native American Housing Assistance and Self Determination Act (NAHASDA) administration, operating & construction funds	Completed	$320,253
Department of Health and Social Services (DHSS)	2006	Funded	Multi-Use Clinic and Domestic Violence Facility - Planning and Design of a New Facility - Comments: Other Funding: Denali Commission $245,000; ANTHC $56,650	Completed	$301,650
Denali	2006	Funded	Wind Design Geotechnical	Completed	$92,399
DCRA	2005	Funded	Community Projects & Improvements - Comments: Capital Matching	Completed	$10,000
HUD	2005	Funded	IHBG/NAHASDA administration, operating & construction funds	Completed	$319,096
HUD	2004	Funded	Construct New Housing - Comments: Indian Community Development Block Grant (ICDBG) Program.	Completed	$300,000
Federal Aviation Administration (FAA)	2004	Funded	New Stuyahok Airport Improvements, Phase II - Comments: OTHER FUNDING: Alaska Department of Transportation/Public Facilities (DOT/PF) Construct embankment for future relocation (Phase III) of the New Stuyahok Airport. New Stuyahok Airport Improvements, Phase II	Completed	$7,222,898
HUD	2004	Funded	IHBG/NAHASDA administration, operating & construction funds	Completed	$344,690
HUD	2003	Funded	IHBG/NAHASDA administration, operating & construction funds	Completed	$367,663
DCRA	2003	Funded	Water and Sewer Improvements - Comments: Capital Matching	Completed	$26,316
United States Department	2003	Funded	Fire Response Equipment & Training	Completed	$66,025

Table 6-7 Completed Projects

Lead Agency	Fiscal Year	Project Status	Project Description/Comments	Project Stage	Total Cost
of Agriculture/Rural Development (USDA/RD)					
HUD	2002	Funded	IIHBG/NAHASDA administration, operating & construction funds	Completed	$311,673
DCRA	2002	Funded	Fire Truck and Equipment Purchase - Comments: Capital Matching	Completed	$26,316
FAA	2002	Funded	Construct New Airport - Comments: OTHER FUNDING: DOT/PF Acquire land, construct new 3,200' runway, safety area, parking area, taxiway, lighting, access road, snow removal equipment (SRE) building, and equipment.	Completed	$1,832,869
DCRA	2001	Funded	Heavy Equipment Repair - Comments: Capital Matching	Completed	$26,316
DCRA	2000	Funded	City Survey Townsite - Comments: Capital Matching	Completed	$26,316
HUD	2000	Funded	IHBG/NAHASDA administration, operating & construction funds	Completed	$294,104
DCRA	1999	Funded	City Multi-Purpose Building Expansion - Comments: Capital Matching	Completed	$26,316
Bureau of Indian Affairs (BIA)	1999	Funded	Reconstruct Streets - Comments: 1.81 kilometers (km)	Completed	$2,400,000
HUD	1999	Funded	IHBG/NAHASDA administration, operating & construction funds	Completed	$294,104
HUD/AHFC	1999	Funded	Construct 39 mutual help units - Comments: HUD/NAHASDA	Completed	$1,000,000
DCRA	1998	Funded	Public Safety Vehicles - Comments: Capital Matching	Completed	$26,316
DCRA	1998	Funded	Multi-Office Building; Boat Storage/Ramp - Comments: Magnuson-Stevens Act 1997 Fish Disaster Grant	Completed	$195,582
ANTHC	1998	Funded	Water Quality & Corrosion Study - Comments: Department of Environmental Conservation (DEC) $20,000	Completed	$20,000
HUD	1998	Funded	IHBG/NAHASDA administration, operating & construction funds	Completed	$302,444
FAA	1998	Funded	Stuyahok Airport: Conduct Master Plan Study - Comments: OTHER FUNDING: DOT/PF	Completed	$341,333
DCRA	1997	Funded	Health Clinic Expansion Plan - Comments: Rural Development Assistance (RDA) Grant Health Clinic Expansion Plan	Completed	$5,200
DCRA	1997	Funded	Heavy Equipment Building - Comments: Capital Matching	Completed	$26,316
ANTHC	1996	Funded	New Community Well, water and sewer 2 homes - Comments: Indian Health Service (IHS) $68.0	Completed	$356,000

Table 6-7 Completed Projects

Lead Agency	Fiscal Year	Project Status	Project Description/Comments	Project Stage	Total Cost
ANTHC	1996	Funded	Sanitation services for 13 new homes.	Completed	$356,000
DCRA	1996	Funded	Water & Sewer Renovations - Comments: Capital Matching	Completed	$26,316
HUD/Comprehensive Grant Program (CGP)	1995	Funded	Housing Modernization - Comments: Erosion control	Completed	$50,000
DCRA	1995	Funded	Ambulance Purchase - Comments: RDA	Completed	$25,000
DCRA	1995	Funded	Public Safety Building Renovation - Comments: Capital Matching	Completed	$26,316
Alaska Energy Authority /Bulk Fuel (AEA/BF)	1994	Funded	School Bulk Fuel Repair - Comments: Replace existing fuel line and piping manifold for the Southwest Region School District (SWRSD) tank farm. Match Purchase	Completed	$46,000
DCRA	1994	Funded	Community Building Repairs & Improvements - Comments: Legislative Grant	Completed	$36,187
AEA-BF	1994	Funded	Electric Utility Bulk Fuel Repair - Comments: Replace existing fuel line and piping manifold for the AVEC tank farm. Match Purchase Electric Utility Bulk Fuel Repair	Completed	$54,000
DEED	1994	Funded	School Roof & Wall Replacement - Comments: Closed May 95.	Completed	$836,914
DCRA	1994	Funded	City Shop & Storage Renovation - Comments: Capital Matching	Completed	$26,316
DCRA	1994	Funded	Community Center Design & Construction - Comments: Legislative Grant & HUD/ICDBG $291,750	Completed	$498,000
HUD/CGP	1993	Funded	Housing Modernization - Comments: Entrance ramps - 5 units	Completed	$15,500
AEA	1993	Funded	AVEC Electric Efficiency Improvements - Comments: Replace generator for efficiency improvement; anticipated savings are several thousand gals. fuel per year	Completed	$92,280
DCRA	1993	Funded	Heavy Equipment & Fire Truck Acquisition - Comments: Legislative Grant	Completed	$80,000
HUD/AHFC	1992	Funded	Construct 13 Housing Units	Completed	$2,538,794
DOT/PF	1992	Funded	Sanitation Road	Completed	$314,000
ANTHC	1991	Funded	Water & Sewer services to 14 homes, Landfill, Sewage Lagoon - Comments: IHS $475,000, DEC $527,000	Completed	$1,002,000
DOT&PF	1990	Funded	Unknown	Completed	$242,802

Table 6-7 Completed Projects

Lead Agency	Fiscal Year	Project Status	Project Description/Comments	Project Stage	Total Cost
ANTHC	1989	Funded	Access Road to Solid Waste Site - Comments: OTHER FUNDING: DEC $50,000. Construct gravel access road to solid waste disposal site	Completed	$50,000

(DCRA 2011)

Development Needs

The City's 1996 Comprehensive Plan's Goal 4 and subsequent actions identifies the need to *"[c]omplete a land use plan to identify future development areas for housing and public facilities [and to [s]pecify requirements for subdivision development to ensure that housing and infrastructure does not overextend the village's resources and ability to maintain them….Train and hire a land use planner…Use the land use plan to initiate negotiations for voluntary land swaps with private landowners, if needed" (CP 2005).*

Land Use and Environment (LU&E) Mitigation Priorities

The Comprehensive plan noted that the City should focus efforts to ensure their water resources remain clean and available for their future. The Comprehensive Plan has well defined LU&E priorities such as Goal 2 which states, "Protect natural beauty, maintain clean environment and protect water and air quality." The pertinent subsequent action items stressed the need "mitigate waterway contamination from traditional dog team lots and contamination from landfill snowmelt run-off."

The Plan's LU&E Goal 5 states, "Improve village landfill to mitigate runoff into streams and improve waste disposal methods through improved equipment and community education, with subsequent actions to purchase and use an incinerator for waste oil and animal carcasses and to acquire a connex container to collect and store hazardous materials such as batteries and oil drums for backhaul recycling."

LU&E Goal 6 states, "Mitigate erosion and flooding in the village site with subsequent action items to support this goal. They desire to design future development locations to eliminate down-slope all-terrain vehicle (ATV) traffic to reduce erosion impacts and to limit development in flood prone areas such as the City's lower village"
(CP 2005)

The City's 2005 Comprehensive Plan Map (Figure 6-2) depicts proposed future locations for some of their critical facilities.

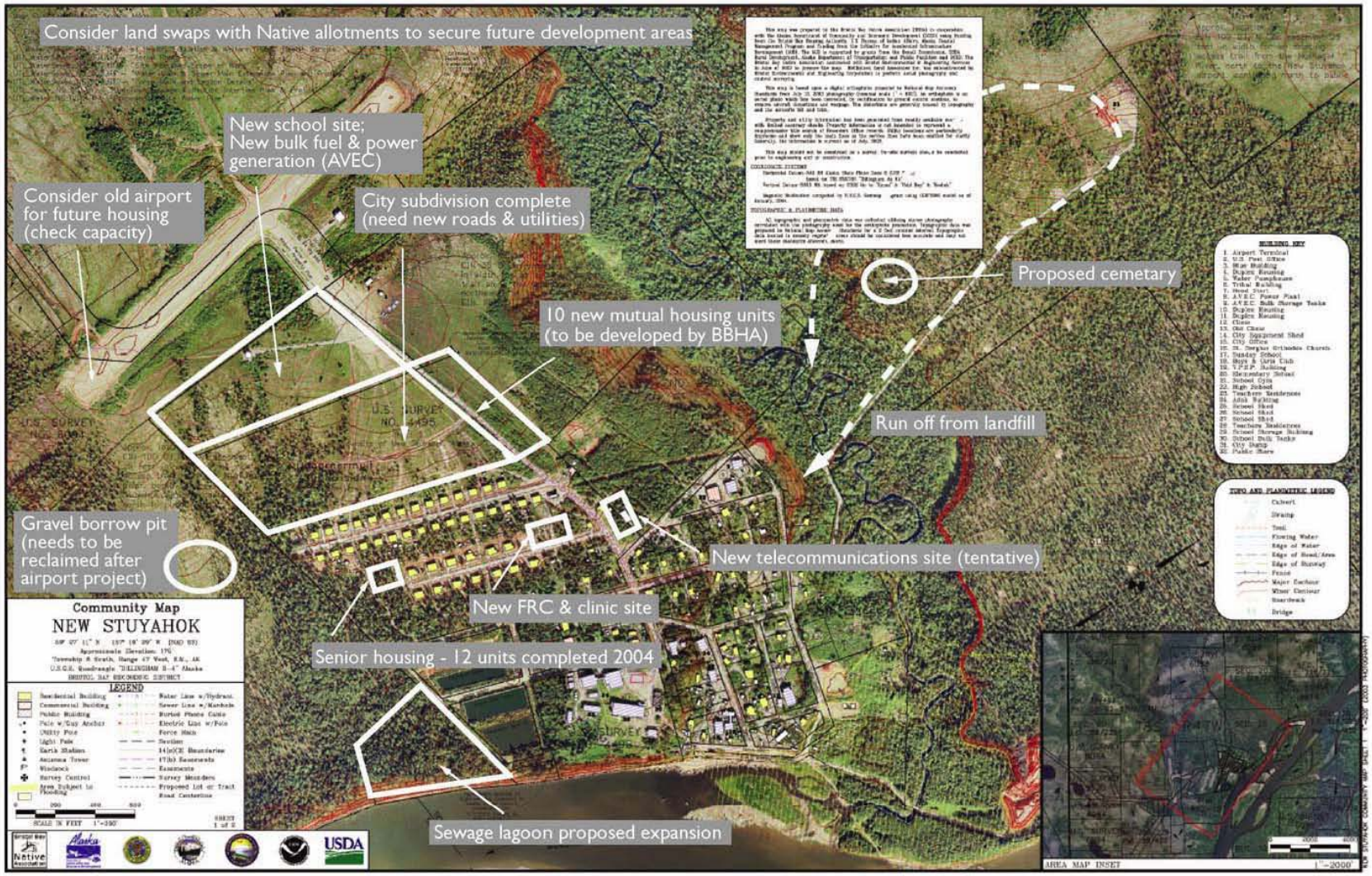

Figure 6-2 Future Location of City Critical Facilities (NSCP 2005)

This section outlines the four-step process for preparing a mitigation strategy including:

1. Developing Mitigation Goals
2. Identifying Mitigation Actions
3. Evaluating Mitigation Actions
4. Implementing Mitigation Action Plans

Within this section the Project Team developed the mitigation goals and potential mitigation actions for the City of New Stuyahok.

7.1 DEVELOPING MITIGATION GOALS

The requirements for the local hazard mitigation goals, as stipulated in DMA 2000 and its implementing regulations are described below.

DMA 2000 Requirements: Mitigation Strategy – Local Hazard Mitigation Goals

Local Hazard Mitigation Goals

Requirement §201.6(c)(3)(i): [The hazard mitigation strategy shall include a] description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.

Element

- Does the new or updated plan include a description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards?

Source: FEMA, July 2008.

The exposure analysis results were used as a basis for developing the mitigation goals and actions. Mitigation goals are defined as general guidelines that describe what a community wants to achieve in terms of hazard and loss prevention. Goal statements are typically long-range, policy-oriented statements representing community-wide visions. As such, nine goals were developed to reduce or avoid long-term vulnerabilities to the identified hazards (Table 7-1).

Table 7-1 Mitigation Goals

No.	Goal Description
1	Promote recognition and mitigation of all natural hazards that affect the City.
2	Promote cross-referencing mitigation goals and actions with other City planning mechanisms and projects.
3	Reduce vulnerability and possibility of losses from all natural hazards that affect the City.
4	Reduce vulnerability and possibility of losses from earthquake damage.
5	Reduce vulnerability and possibility of losses from erosion.
6	Reduce vulnerability and possibility of losses from flooding.
7	Reduce vulnerability and possibility of losses from ground failure.
8	Reduce vulnerability and possibility of losses from severe weather damage.
9	Reduce vulnerability and possibility of losses from wildland fires.

7.2 IDENTIFYING MITIGATION ACTIONS

The requirements for the identification and analysis of mitigation actions, as stipulated in DMA 2000 and its implementing regulations are described below.

DMA 2000 Requirements: Mitigation Strategy - Identification and Analysis of Mitigation Actions

Identification and Analysis of Mitigation Actions

Requirement §201.6(c)(3)(ii): [The mitigation strategy shall include a] section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure.

Element

- Does the new or updated plan identify and analyze a comprehensive range of specific mitigation actions and projects for each hazard?
- Do the identified actions and projects address reducing the effects of hazards on new buildings and infrastructure?
- Do the identified actions and projects address reducing the effects of hazards on existing buildings and infrastructure?

Source: FEMA, July 2008.

DMA 2000 Requirements: Mitigation Strategy - Identification and Analysis of Mitigation Actions: National Flood Insurance Program (NFIP) Compliance

Identification and Analysis of Mitigation Actions: NFIP Compliance

Requirement §201.6(c)(3)(ii): [The mitigation strategy] must also address the jurisdiction's participation in the National Flood Insurance Program (NFIP), and continued compliance with NFIP requirements, as appropriate.

Element

- Does the new or updated plan describe the jurisdiction(s) participation in the NFIP?
- Does the mitigation strategy identify, analyze and prioritize actions related to continued compliance with the NFIP?

Source: FEMA, July 2008.

After mitigation goals and actions were developed, the Project Team assessed the potential mitigation actions to carry forward into the mitigation strategy. Mitigation actions are activities, measures, or projects that help achieve the goals of a mitigation plan. Mitigation actions are usually grouped into three broad categories: property protection, public education and awareness, and structural projects. On May 4, 2011, the Project Team considered 52 potential mitigation actions and selected fifteen mitigation actions for potential implantation during the five-year life cycle of this HMP. The Project Team placed particular emphasis on projects and programs that reduce the effects of hazards on both new and existing buildings and infrastructure. These potential projects are listed in Table 7-2 below.

Table 7-2 Mitigation Goals and Potential Actions

(Bold ID items were selected for implantation by the Project Team)

Goals		Actions	
No.	**Description**	**ID**	**Description**
1	Promote recognizing and mitigating all natural hazards that affect the City of New Stuyahok (City).	A	Develop, produce, and distribute information materials concerning mitigation, preparedness, and safety procedures for all jurisdictional identified natural hazards.
		B	Develop and implement strategies and educational outreach programs for debris management from natural hazard events.
		C	Disseminate FEMA pamphlets to educate and encourage homeowners concerning structural and non-structural retrofit benefits.
		D	Develop outreach program with school district contests having students develop, display, and explain mitigation projects or initiatives.
		E	Update public emergency notification procedures and develop an outreach program for potential hazard impacts or events.
		F	Identify and pursue funding opportunities to implement mitigation actions.
		G	Join the National Flood Insurance Program to reduce monetary losses to individuals and the community.
		H	Identify critical facilities and vulnerable populations based on mapped high hazard areas.
		I	Identify evacuation routes away from high hazard areas and develop outreach program to educate the public concerning warnings and evacuation procedures.
2	Cross reference Mitigation goals and actions with other City planning mechanisms and projects.	**A**	The City will strive to manage their existing plans to ensure they incorporate mitigation planning provisions into all community planning processes such as comprehensive, capital improvement, and land use plans, etc. to demonstrate multi-benefit considerations and facilitate using multiple funding source consideration.
		B	Review ordinances and develop outreach programs to assure fuel tanks (fuel oil, propane, etc.) are properly anchored and hazardous materials are properly stored and protected from known natural hazards such as flood or seismic events.
		C	Integrate the Mitigation Plan findings for enhanced emergency planning.
		D	Develop and incorporate mitigation provisions and recommendations into zoning ordinances and community development processes to maintain the floodway and protect critical infrastructure and private residences from other hazard areas.
		E	Update or develop, implement, and maintain jurisdictional debris management plans.
		F	Prohibit new construction in identified mitigatable hazard impact areas (avalanche, flood, erosion, etc.) or require building to applicable building codes for other hazard impacts (earthquake, volcanic ash, weather, etc.).

Table 7-2 Mitigation Goals and Potential Actions

(Bold ID items were selected for implantation by the Project Team)

Goals		Actions	
No.	**Description**	**ID**	**Description**
3	Reduce vulnerability and possibility of losses from all natural hazards that affect the City.	A	Increase power line wire size and incorporate quick disconnects (break away devices) to reduce ice load and wind storm power line failure during severe wind or winter ice storm events.
		B	Acquire (buy-out), demolish, or relocate structures from hazard prone area. Property deeds shall be restricted for open space uses in perpetuity to keep people from rebuilding in hazard areas.
		C	Purchase and install generators with main power distribution disconnect switches for identified and prioritized critical facilities susceptible to short term power disruption. (i.e. first responder and medical facilities, schools, correctional facilities, and water and sewage treatment plants, etc.)
		D	Develop vegetation projects to restore clear-cut and riverine erosion damage and to increase landslide susceptible slope stability.
		E	Identify and list repetitively flooded structures and infrastructures, analyze the threat to these facilities, and prioritize mitigation actions to protect the threatened population.
		F	Perform hydrologic and hydraulic engineering, and drainage studies and analyses. Use information obtained for feasibility determination and project design. This information should be a key component, directly related to a proposed project.
4	Reduce vulnerability and possibility of losses from earthquake damage.	A	Inspect, prioritize, and retrofit any critical facility or public infrastructure that does not meet current State Adopted Building Codes.
		B	Evaluate critical public facility seismic performance for fire stations, public works buildings, potable water systems, wastewater systems, electric power systems, and bridges within the jurisdiction.
		C	Encourage utility companies to evaluate and harden vulnerable infrastructure elements for sustainability.
		D	Install non-structural seismic restraints for large furniture such as bookcases, filing cabinets, and appliances to prevent toppling damage and resultant injuries.
5	Reduce vulnerability and possibility of losses from erosion.	A	Maintain and update erosion hazard locations, identify critical facilities potentially impacted and develop mitigation initiatives such as bank stabilization or facility relocation to prevent or reduce the threat.
		B	Install bank protection such as rip-rap (large rocks), sheet pilings, gabion baskets, articulated matting, concrete, asphalt, vegetation, or other armoring or protective materials to provide river bank protection.
		C	Harden culvert entrance bottoms with asphalt, concrete, rock, or similar material to reduce erosion or scour.
		D	Install walls at the end of a drainage structure to prevent embankment erosion at its entrance or outlet. (end or wing walls).

Table 7-2 Mitigation Goals and Potential Actions

(Bold ID items were selected for implantation by the Project Team)

Goals		Actions	
No.	**Description**	**ID**	**Description**
		E	Construct transportation corridors for ATV's to reduce erosion impacts.
		F	Implement culvert ice thawing capability to redirect snowmelt water flow through culverts to reduce road damage.
		G	Harden road surfaces to prevent snowmelt and rain run-off erosion damage.
6	Reduce vulnerability and possibility of losses from flooding.	**A**	Develop and maintain critical facility inventory for all structures located within 100-year floodplains.
		B	Establish flood mitigation priorities for critical facilities and residential and commercial buildings located within the 100-year floodplain using survey elevation data.
		C	Develop and maintain an inventory of locations subject to frequent storm water flooding based on most current USACE flood data.
		D	Determine and implement most cost beneficial and feasible mitigation actions for locations with repetitive flooding and significant damages or road closures.
		E	Increase culvert size to increase its drainage efficiency.
		F	Create relief drainage ditch openings using a culverts or bridges to relieve rapid water accumulation during high water flow events.
		G	Provide flood protection to mitigate damage and contamination of wastewater treatment systems (sewage lagoons).
7	Reduce vulnerability and possibility of losses from ground failure.	**A**	Update the storm water management plan to identify methods control runoff, both for flood reduction and to minimize ground failure or landslides from saturated soils on steep slopes.
		B	Develop, implement, and enforce property development ground failure risk assessment procedures to identify potential facility vulnerability.
		C	Identify and map existing permafrost areas to assist in new critical facility siting and existing facility relocation siting
		D	Promote permafrost sensitive construction practices in permafrost areas.
8	Reduce vulnerability and possibility of losses from severe weather damage.	A	Develop and implement programs to coordinate maintenance and mitigation activities to reduce risk to public infrastructure from severe winter storms.
		B	Develop critical facility list needing emergency back-up power systems, prioritize, seek funding, and implement mitigation actions.
		C/ Ongoing	Develop and implement tree clearing mitigation programs to keep trees from threatening lives, property, and public infrastructure from severe weather events.
9	Reduce vulnerability and possibility of losses from wildland fires.	A	Develop Community Wildland Fire Protection Plans for all at-risk communities.
		B	Hold FireWise workshop to educate residents and contractors concerning fire resistant landscaping.

Table 7-2 Mitigation Goals and Potential Actions

(Bold ID items were selected for implantation by the Project Team)

Goals		Actions	
No.	**Description**	**ID**	**Description**
		C	Promote FireWise building siting, design, and construction materials.
		D	Provide wildland fire information in an easily distributed format for all residents.
		E / Ongoing	Develop, adopt, and enforce burn ordinances that require burn permits, restrict campfires, and controls outdoor burning.
		F / Ongoing	Identify, develop, implement, and enforce mitigation actions such as fuel breaks and reduction zones for potential wildland fire hazard areas.

7.3 EVALUATING AND PRIORITIZING MITIGATION ACTIONS

The requirements for the evaluation and implementation of mitigation actions, as stipulated in DMA 2000 and its implementing regulations are described below.

DMA 2000 Requirements: Mitigation Strategy - Implementation of Mitigation Actions

Implementation of Mitigation Actions

Requirement: §201.6(c)(3)(iii): [The mitigation strategy section shall include] an action plan describing how the actions identified in section (c)(3)(ii) will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.

Element

- Does the new or updated mitigation strategy include how the actions are prioritized?
- Does the new or updated mitigation strategy address how the actions will be implemented and administered?
- Does the new or updated prioritization process include an emphasis on the use of a cost-benefit review to maximize benefits?
- *Does the updated plan identify the completed, deleted or deferred mitigation actions as a benchmark for progress, and if activities are unchanged (i.e., deferred), does the updated plan describe why no changes occurred? (Not applicable until 2014 update)*

Source: FEMA, July 2008.

The Project Team evaluated and prioritized each of the mitigation actions on May 4, 2011 to determine which actions would be included in the Mitigation Action Plan. The Mitigation Action Plan represents mitigation projects and programs to be implemented through the cooperation of multiple entities in the City. To complete this task, the Project Team first prioritized the hazards that were regarded as the most significant within the community (earthquake, erosion, flood, ground failure, severe weather, and wildland fire).

The Project Team reviewed the simplified social, technical, administrative, political, legal, economic, and environmental (STAPLEE) evaluation criteria (shown in Table 7-3) and the Benefit-Cost Analysis Fact Sheet (Appendix D) to consider the opportunities and constraints of implementing each particular mitigation action. They determined they had sufficient staff experience to select and prioritize those actions which would most benefit the community and positively impact its sustainability.

A qualitative statement is provided in table 7-4 regarding the benefits and costs and the technical feasibility. For each action considered for implementation. A detailed cost-benefit analysis is anticipated as part of the application process for those projects the City chooses to implement.

The hazard mitigation Project Team considered the STAPLEE criteria as well as each hazard's history, extent, and probability to determine each potential actions priority. A rating system based on high, medium, or low was used.

- High priorities are associated with actions for hazards that impact the community on an annual or near annual basis and generate impacts to critical facilities and/or people.
- Medium priorities are associated with actions for hazards that impact the community less frequently, and do not typically generate impacts to critical facilities and/or people.
- Low priorities are associated with actions for hazards that rarely impact the community and have rarely generated documented impacts to critical facilities and/or people.

Table 7-3 Evaluation Criteria for Mitigation Actions
Social, Technical, Administrative, Political, Legal, Economic, and Environmental (STAPLEE)

Evaluation Category	Discussion "It is important to consider…"	Considerations
Social	The public support for the overall mitigation strategy and specific mitigation actions.	Community acceptance Adversely affects population
Technical	If the mitigation action is technically feasible and if it is the whole or partial solution.	Technical feasibility Long-term solutions Secondary impacts
Administrative	If the community has the personnel and administrative capabilities necessary to implement the action or whether outside help will be necessary.	Staffing Funding allocation Maintenance/operations
Political	What the community and its members feel about issues related to the environment, economic development, safety, and emergency management.	Political support Local champion Public support
Legal	Whether the community has the legal authority to implement the action, or whether the community must pass new regulations.	Local, State, and Federal authority Potential legal challenge
Economic	If the action can be funded with current or future internal and external sources, if the costs seem reasonable for the size of the project, and if enough information is available to complete a Federal Emergency Management Agency (FEMA) Benefit-Cost Analysis.	Benefit/cost of action Contributes to other economic goals Outside funding required FEMA Benefit-Cost Analysis
Environmental	The impact on the environment because of public desire for a sustainable and environmentally healthy community.	Effect on local flora and fauna Consistent with community environmental goals Consistent with local, state, and Federal laws

Prioritizing the mitigation actions in the Mitigation Action Plan Matrix was completed to provide the City with an approach to implementing the Mitigation Action Plan. Table 7-4 defines the mitigation action priorities.

7.4 IMPLEMENTING A MITIGATION ACTION PLAN

Table 7-4 shows the City's Mitigation Action Plan Matrix that shows how the mitigation actions were prioritized, how the overall benefit/costs were taken into consideration, and how each mitigation action will be implemented and administered by the Project Team.

Table 7-4 City of New Stuyahok Mitigation Action Plan Matrix

(See acronym and abbreviations list for complete titles)

Action ID	Description	Priority	Responsible Department	Potential Funding	Timeframe	Benefit/Costs (B/C) - Technical Feasibility (TF)
1E	Update public emergency notification procedures and develop an outreach program for potential hazard impacts or events.	High	City of New Stuyahok, New Stuyahok Tribal Council (The Native Council is included as a viable responsible entity in order to obtain Administration for Native Americans (ANA) funding. The Tribe would need to be the applicant for those projects.)	City of New Stuyahok, New Stuyahok Tribal Council, Federal Emergency Management Agency (FEMA) Hazard Mitigation Assistance (HMA) programs, Fire Prevention and Safety Grant (FP&S), Remote Community Alert Systems (RCASP), Lindbergh Grants, ANA	1-3 years	B/C: Successful emergency hazard notification enables the community to save lives and to provide rapid response to reduce losses. Sustained mitigation outreach programs have minimal cost and will help build and support area-wide capacity. TF: This project is feasible using existing staff skills, equipment, and materials.
1F	Identify and pursue funding opportunities to implement mitigation actions.	High	City of New Stuyahok, New Stuyahok Tribal Council	City of New Stuyahok, New Stuyahok Tribal Council, (See Section 8.4)	Ongoing	B/C: This ongoing activity is essential for the City as there are limited funds available to accomplish effective mitigation actions. TF: This activity is ongoing demonstrating its feasibility.
2A	The City will strive to manage their existing plans to ensure they incorporate mitigation planning provisions into all community planning processes such as comprehensive, capital improvement, and land use plans, etc. to demonstrate multi-benefit considerations and facilitate using multiple funding source consideration.	Medium	City of New Stuyahok, New Stuyahok Tribal Council	City of New Stuyahok, New Stuyahok Tribal Council, Denali Commission, Division of Community and Regional Affairs (DCRA)	Ongoing	B/C: Coordinated planning ensures effective damage abatement and ensures proper attention is assigned to reduce losses and damage to structures and City residents. TF: This is technically feasible because it requires application of knowledge of the hazard mitigation plan and other planning efforts. Feasibility is reliant on technical skills already possessed by employees holding positions that would implement this action.

Table 7-4 City of New Stuyahok Mitigation Action Plan Matrix

(See acronym and abbreviations list for complete titles)

Action ID	Description	Priority	Responsible Department	Potential Funding	Timeframe	Benefit/Costs (B/C) - Technical Feasibility (TF)
2B	Review ordinances and develop outreach programs to assure fuel tanks (fuel oil, propane, etc.) are properly anchored and hazardous materials are properly stored and protected from known natural hazards such as flood or seismic events.	Medium	City of New Stuyahok, New Stuyahok Tribal Council	City of New Stuyahok, New Stuyahok Tribal Council, US Department of Agriculture (USDA), Department of Energy (DOE), Alaska Department of Conservation (DEC), Denali Commission.	Ongoing	B/C: Sustained mitigation outreach programs have minimal cost and will help build and support area-wide capacity. This type activity enables the public to prepare for, respond to, and recover from disasters. TF: This low cost activity can be combined with recurring community meetings where hazard specific information can be presented in small increments. This activity is ongoing demonstrating its feasibility.
3C	Purchase and install generators with main power distribution disconnect switches for identified and prioritized critical facilities susceptible to short term power disruption. (i.e. first responder and medical facilities, schools, correctional facilities, and water and sewage treatment plants, etc.)	Medium	City of New Stuyahok, New Stuyahok Tribal Council	Lindbergh Grants Program, HMA, Assistance to Fire Fighters Grant (AFG), Fire Prevention and Safety (FP&S), Staffing for Adequate Fire and Emergency Response Grants (SAFER), Administration for Native Americans (ANA), Emergency Food and Shelter (EF&S)	1-5 years	B/C: Emergency power generation is a minor cost to ensure their availability for use after a hazard strikes. TF: Installing emergency generators is technically feasible for this community as they already have staff to maintain existing community power generation facilities. (*Note: generators are not eligible stand-alone projects but must be associated with Critical Facility upgrade projects.)
5B	Install bank protection such as rip-rap (large rocks), sheet pilings, gabion baskets, articulated matting, concrete, asphalt, vegetation, or other armoring or protective materials to provide sewage lagoon, road, and river bank protection.	High	City of New Stuyahok, New Stuyahok Tribal Council	City of New Stuyahok, New Stuyahok Tribal Council, HMA, Natural Resources Conservation Service (NRCS), ANA, Denali Commission, US Army Corps of Engineers (USACE), US Department of Agriculture (USDA) Emergency Watershed Protection (EWP)	1-5 years	B/C: Improving slope stability will greatly reduce potential infrastructure and residential losses. Project costs would outweigh replacement costs of lost facilities. TF: The community has the skill to implement this action. Specialized skills may need to be contracted-out with materials and equipment barged in depending on the method selected.

Table 7-4 City of New Stuyahok Mitigation Action Plan Matrix

(See acronym and abbreviations list for complete titles)

Action ID	Description	Priority	Responsible Department	Potential Funding	Timeframe	Benefit/Costs (B/C) - Technical Feasibility (TF)
5E	Construct transportation corridors for ATV's to reduce erosion impacts	High	City of New Stuyahok, New Stuyahok Tribal Council	City of New Stuyahok, New Stuyahok Tribal Council, Natural Resources Conservation Service (NRCS), ANA, Denali Commission, USACE, USDA EWP	1-2 years	B/C: Improving slope stability will greatly reduce potential infrastructure and residential losses. Project costs would outweigh replacement costs of lost facilities. TF: The community has the skill to implement this action.
5F	Implement culvert ice thawing capability to redirect snowmelt water flow through culverts to reduce road damage	Medium	City of New Stuyahok, New Stuyahok Tribal Council	City of New Stuyahok, New Stuyahok Tribal Council, Natural Resources Conservation Service (NRCS), ANA, Denali Commission, USACE, USDA/EWP), Department of Transportation and Public Facilities (DOT/PF), HMA	2-4 years	B/C: Flood hazard mitigation is among FEMA's highest national priorities. FEMA desires communities focus on repetitive flood losses. This activity will ensure the City and Tribal Councils focus on priority flood locations and projects. TF: Potential low cost makes this activity very feasible depending on the method selected.
6A	Develop and maintain critical facility inventory for all structures located within 100-year floodplains.	Low	City of New Stuyahok, New Stuyahok Tribal Council	City of New Stuyahok, New Stuyahok Tribal Council, Denali Commission, DCRA	3-5 years	B/C: Identifying threatened infrastructure proximity to natural hazards is vital to their sustainability. There are no currently mapped hazard areas. This is a vital first step. This knowledge will help the community focus on activities to protect their vital infrastructure. TF: The project is technically feasible as the community has staff and resources they have used to relocate and elevate buildings.
6C	Develop and maintain an inventory of locations subject to frequent storm water flooding based on most current USACOE flood data.	Medium	City of New Stuyahok, New Stuyahok Tribal Council	City of New Stuyahok, New Stuyahok Tribal Council, Denali Commission, DCRA, NRCS/WP	2-4 years	B/C: Identifying threatened infrastructure proximity to natural hazards is vital to their sustainability. There are no currently mapped hazard areas. This is a vital first step. This knowledge will help the community focus on activities to protect their vital infrastructure.

Table 7-4 City of New Stuyahok Mitigation Action Plan Matrix

(See acronym and abbreviations list for complete titles)

Action ID	Description	Priority	Responsible Department	Potential Funding	Timeframe	Benefit/Costs (B/C) - Technical Feasibility (TF)
						TF: The project is technically feasible as the community has staff and resources they have used to relocate and elevate buildings.
6D	Determine and implement most cost beneficial and feasible mitigation actions for locations with repetitive flooding and significant damages or road closures.	Medium	City of New Stuyahok, New Stuyahok Tribal Council	City of New Stuyahok, New Stuyahok Tribal Council, NRCS, Denali Commission, DCRA, DOT/PF, ANA, NRCS/WP, USACE	2-4 years	B/C: Flood hazard mitigation is among FEMA's highest national priorities. FEMA desires communities focus on repetitive flood loss properties. This activity will ensure the City and Tribal Councils focus on priority flood locations and projects. TF: Low to no cost makes this outreach activity very feasible.
7A	Update the storm water management plan to identify methods control runoff, both for flood reduction and to minimize ground failure or landslides from saturated soils on steep slopes.	Medium	City of New Stuyahok, New Stuyahok Tribal Council	City of New Stuyahok, New Stuyahok Tribal Council, USACE, NRCS, USDA/EWP, Denali Commission, DCRA, DOT/PF, ANA, USACE	2-4 years	B/C: Stormwater management plans are an essential disaster management tool. Focused and coordinated planning enables effective damage abatement and ensures proper attention is assigned to reduce losses, damage, and materials management. TF: This action is feasible with limited fund expenditures.
8C	Develop and implement tree clearing mitigation programs to keep trees from threatening lives, property, and public infrastructure from severe weather events.	Medium	City of New Stuyahok, New Stuyahok Tribal Council	City of New Stuyahok, New Stuyahok Tribal Council, DOT/PF, USDA/ECP, USDA (RUS), DOE/Tribal Energy Program (TEP), HMA	Ongoing	B/C: Implementing this mitigation activity will potentially reduce ancillary damage from severe winter storms caused by heavy snow loads, icy rain, and wind. TF: This type activity is technically feasible within the community typically using existing labor, equipment, and materials.
9E	Develop, adopt, and enforce burn ordinances that require burn permits, restrict campfires, and controls outdoor burning.	Medium	City of New Stuyahok, New Stuyahok Tribal Council	City of New Stuyahok, New Stuyahok Tribal Council, DOF	Ongoing	B/C: Ordinance development, implementation, and enforcement can effectively reduce future losses to hazardous events.

Table 7-4 City of New Stuyahok Mitigation Action Plan Matrix

(See acronym and abbreviations list for complete titles)

Action ID	Description	Priority	Responsible Department	Potential Funding	Timeframe	Benefit/Costs (B/C) - Technical Feasibility (TF)
						TF: This project is technically feasible and enforceable.
9F	Identify, develop, implement, and enforce mitigation actions such as fuel breaks and reduction zones for potential wildland fire hazard areas.	Medium	City of New Stuyahok, New Stuyahok Tribal Council	City of New Stuyahok, New Stuyahok Tribal Council, USDA/Forest Service, DNR/DOF Firewise, DNR/DOF Community Forestry	Ongoing	B/C: This sustainable mitigation activity will greatly reduce the wildland/urban interface, have minimal cost, and will help build and support community capacity to respond to wildland fire disasters. TF: This project is technically feasible using existing Tribal Council staff.

Designates potential FEMA fundable projects

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This section describes a formal plan maintenance process to ensure that the HMP remains an active and applicable document. It includes an explanation of how the City's Project Team intends to organize their efforts to ensure that improvements and revisions to the HMP occur in a well-managed, efficient, and coordinated manner.

The following three process steps are addressed in detail here:

1. Monitoring, evaluating, and updating the HMP
2. Implementation through existing planning mechanisms
3. Continued public involvement

8.1 MONITORING, EVALUATING, AND UPDATING THE HMP

The requirements for monitoring, evaluating, and updating the HMP, as stipulated in the DMA 2000 and its implementing regulations are described below.

DMA 2000 Requirements: Plan Maintenance Process - Monitoring, Evaluating, and Updating the Plan

Monitoring, Evaluating and Updating the Plan

Requirement §201.6(c)(4)(i): [The plan maintenance process shall include a] section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.

Element

- Does the new or updated plan describe the method and schedule for monitoring the plan, including the responsible department?
- Does the new or updated plan describe the method and schedule for evaluating the plan, including how, when and by whom (i.e., the responsible department?
- Does the new or updated plan describe the method and schedule for updating the plan within the five-year cycle?

Source: FEMA, July 2008.

The HMP was prepared as a collaborative effort among the Project Team, URS and Boutet. To maintain momentum and build upon previous hazard mitigation planning efforts and successes, the City will use the Project Team to monitor, evaluate, and update the HMP. Each authority identified in Table 7-4 will be responsible for implementing the Mitigation Action Plan. The City Mayor, the hazard mitigation Project Team Leader, (or designee), will serve as the primary point of contact and will coordinate local efforts to monitor, evaluate, and revise the HMP.

Each member of the Project Team will conduct an annual review during the anniversary week of the plan's official FEMA approval date to monitor the progress in implementing the HMP, particularly the Mitigation Action Plan. As shown in Appendix E, the Annual Review Worksheet will provide the basis for possible changes in the HMP Mitigation Action Plan by refocusing on new or more threatening hazards, adjusting to changes to or increases in resource allocations, and engaging additional support for the HMP implementation. The Project Team Leader will initiate the annual review two months prior to the scheduled planning meeting date to ensure that all data is assembled for discussion with the Project Team. The findings from these reviews will be presented at the annual Project Team Meeting. Each review, as shown on the Annual Review Worksheet, will include an evaluation of the following:

- Participation of authorities and others in the HMP implementation
- Notable changes in the risk of natural or human-caused hazards
- Impacts of land development activities and related programs on hazard mitigation

- Progress made with the Mitigation Action Plan (identify problems and suggest improvements as necessary)
- The adequacy of local resources for implementation of the HMP

A system of reviewing the progress on achieving the mitigation goals and implementing the Mitigation Action Plan activities and projects will also be accomplished during the annual review process. During each annual review, each authority administering a mitigation project will submit a Progress Report to the Project Team. As shown in Appendix E, the report will include the current status of the mitigation project, including any changes made to the project, the identification of implementation problems and appropriate strategies to overcome them, and whether or not the project has helped achieved the appropriate goals identified in the plan.

In addition to the annual review, the Project Team will update the HMP every five years. To ensure that this update occurs, in the fourth year following adoption of the HMP, the Project Team will undertake the following activities:

- Request grant assistance for DHS&EM to update the HMP (this can take up to one year to obtain and one year to update the plan)
- Thoroughly analyze and update the risk of natural and human-made hazards
- Provide a new annual review (as noted above), plus a review of the three previous annual reviews
- Provide a detailed review and revision of the mitigation strategy
- Prepare a new Mitigation Action Plan for the City of New Stuyahok
- Prepare a new draft HMP
- Submit an updated HMP to the DH&EM and FEMA for approval
- Submit the FEMA approved plan for adoption by the City of New Stuyahok
- Return adoption resolution to DH&EM and FEMA to receive formal approval

8.2 IMPLEMENTATION THROUGH EXISTING PLANNING MECHANISMS

The requirements for implementation through existing planning mechanisms, as stipulated in the DMA 2000 and its implementing regulations, are described below.

DMA 2000 Requirements: Plan Maintenance Process - Incorporation into Existing Planning Mechanisms

Incorporation into Existing Planning Mechanisms

Requirement §201.6(c)(4)(ii): [The plan shall include a] process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvement plans, when appropriate.

Element

- Does the new or updated plan identify other local planning mechanisms available for incorporating the mitigation requirements of the mitigation plan?
- Does the new or updated plan include a process by which the local government will incorporate the mitigation strategy and other information contained in the plan (e.g., risk assessment) into other planning mechanisms, when appropriate?
- *Does the updated plan explain how the local government incorporated the mitigation strategy and other information contained in the plan (e.g., risk assessment) into other planning mechanisms, when appropriate? (Not applicable until 2014 update)*

Source: FEMA, July 2008.

After the adoption of the HMP, each Project Team Member will ensure that the HMP, in particular each Mitigation Action Project, is incorporated into existing planning mechanisms. Each member of the Project Team will achieve this incorporation by undertaking the following activities.

- Conduct a review of the community-specific regulatory tools to assess the integration of the mitigation strategy. These regulatory tools are identified in the following capability assessment section.
- Work with pertinent community departments to increase awareness of the HMP and provide assistance in integrating the mitigation strategy (including the Mitigation Action Plan) into relevant planning mechanisms. Implementation of these requirements may require updating or amending specific planning mechanisms.

8.3 CITY OF NEW STUYAHOK CAPABILITY ASSESSMENT

The City's capability assessment reviews the technical and fiscal resources available to the community. This section outlines the resources available to the City of New Stuyahok for mitigation and mitigation related funding and training.

Table 8-1 New Stuyahok's Regulatory Resources

Regulatory Tools (ordinances, codes, plans)	Existing?	Comments (Year of most recent update; problems administering it, etc.)
New Stuyahok Comprehensive Plan, 2005	Yes	Describes City historical, environmental, land use, transportation, and cultural descriptions.
Land Use Plan	Yes	2005 (Referenced in Comprehensive Plan)
Wildland Fire Protection Plan	No	
Wind Resource Report, March 2007	Yes	Describes the City's wind availability for alternative renewable energy resource; the study considered alternatives for recommended facilities
U.S. Army Corps of Engineers, Alaska Baseline Erosion Assessment, Erosion Information Paper –New Stuyahok, Alaska, January 9, 2008,	Yes	Defined the City's erosion threat.
U.S. Army Corps of Engineers, Floodplain Manager's Report 2011	Yes	Defines whether the City has a flood threat.
Transportation Plan	No	

Table 8-1 New Stuyahok's Regulatory Resources

Regulatory Tools (ordinances, codes, plans)	Existing?	Comments (Year of most recent update; problems administering it, etc.)
Emergency Response Plan	No	
Building code	No	The City can exercise this authority.
Zoning ordinances	No	The City can exercise this authority.
Subdivision ordinances or regulations	No	The City can exercise this authority.
Special purpose ordinances	No	The City can exercise this authority.
Land Use Regulation	Yes	2005, Guides land use to protect safety and welfare of residents

8.4 AGENCY RESOURCES

Federal Resources

The Federal government requires local governments to have a HMP in place to be eligible for mitigation funding opportunities through FEMA such as the UHMA Programs and the HMGP. The Mitigation Technical Assistance Programs available to local governments are also a valuable resource. FEMA may also provide temporary housing assistance through rental assistance, mobile homes, furniture rental, mortgage assistance, and emergency home repairs. The Disaster Preparedness Improvement Grant also promotes educational opportunities with respect to hazard awareness and mitigation.

- FEMA, through its Emergency Management Institute, offers training in many aspects of emergency management, including hazard mitigation. FEMA has also developed a large number of documents that address implementing hazard mitigation at the local level. Five key resource documents are available from FEMA Publication Warehouse (1-800-480-2520) and are briefly described here:
  - How-to Guides. FEMA has developed a series of how-to guides to assist states, communities, and tribes in enhancing their hazard mitigation planning capabilities. The first four guides describe the four major phases of hazard mitigation planning. The last five how-to guides address special topics that arise in hazard mitigation planning such as conducting cost-benefit analysis and preparing multi-jurisdictional plans. The use of worksheets, checklists, and tables make these guides a practical source of guidance to address all stages of the hazard mitigation planning process. They also include special tips on meeting DMA 2000 requirements. (http://www.fema.gov/plan/mitplanning/resources.shtm#1)
  - A Guide to Recovery Programs FEMA 229(4), September 2005. The programs described in this guide may all be of assistance during disaster incident recovery. Some are available only after a Presidential declaration of disaster, but others are available without a declaration. Please see the individual program descriptions for details. (http://www.fema.gov/txt/rebuild/ltrc/recoveryprograms229.txt)
  - The Emergency Management Guide for Business and Industry. FEMA 141, October 1993. This guide provides a step-by-step approach to emergency management planning, response, and recovery. It also details a planning process that businesses can follow to better prepare for a wide range of hazards and emergency events. This effort can enhance a business's ability to recover from financial losses, loss of market

share, damages to equipment, and product or business interruptions. This guide could be of great assistance to a community's industries and businesses located in hazard prone areas. (http://www.fema.gov/business/guide/index.shtm)

- The FEMA Hazard Mitigation Assistance (HMA Unified Guidance, June, 2009. The guidance introduces the five HMA grant programs, funding opportunities, award information, eligibility, application and submission information, application review process, administering the grant, contracts, additional program guidance, additional project guidance, and contains information and resource appendices (FEMA 2009).

- FEMA also administers emergency management grants which may be found on (http://www.fema.gov/help/site.shtm). Various firefighter grant programs can be found at (http://www.firegrantsupport.com/):
  - Emergency Management Performance Grant (EMPG). This is a pass through grant. The amount is determined by the State. The grant is intended to support critical assistance to sustain and enhance State and local emergency management capabilities at the State and local levels for all-hazard mitigation, preparedness, response, and recovery including coordination of inter-governmental (Federal, State, regional, local, and tribal) resources, joint operations, and mutual aid compacts state-to-state and nationwide. Sub-recipients must be compliant with NIMS implementation as a condition for receiving funds. Requires 50% match.
  - Assistance to Fire Fighters Grant (AFG), Fire Prevention and Safety (FP&S), Staffing for Adequate Fire and Emergency Response Grants (SAFER), and Assistance to Firefighters Station Construction Grant programs . Information can be found at (http://forestry.alaska.gov/fire/vfarfa.htm)..
- Department of Homeland Security provides the following grants:
  - Homeland Security Grant Program (HSGP), State Homeland Security Program (SHSP) are 80% pass through grants. SHSP supports implementing the State Homeland Security Strategies to address identified planning, organization, equipment, training, and exercise needs for acts of terrorism and other catastrophic events. In addition, SHSP supports implementing the National Preparedness Guidelines, the National Incident Management System (NIMS), and the National Response Framework (NRF). Must ensure at least 25% of funds are dedicated towards law enforcement terrorism prevention-oriented activities.
  - Citizen Corps Program (CCP). The Citizen Corps mission is to bring community and government leaders together to coordinate involving community members in emergency preparedness, planning, mitigation, response, and recovery activities.
  - Emergency Operations Center (EOC) This program is intended to improve emergency management and preparedness capabilities by supporting flexible, sustainable, secure, strategically located, and fully interoperable EOCs with a focus on addressing identified deficiencies and needs. Fully capable emergency operations facilities at the State and local levels are an essential element of a comprehensive national emergency management system and are necessary to ensure continuity of operations and continuity of government in major disasters or emergencies caused by any hazard. Requires 25% match.
- U.S. Department of Commerce’s grant programs include:

  - Remote Community Alert Systems (RCASP) grant for outdoor alerting technologies in remote communities effectively underserved by commercial mobile service for the purpose of enabling residents of those communities to receive emergency messages. This program is a contributing element of the Warning, Alert, and Response Network (WARN) Act.
  - National Oceanic and Atmospheric Administration (NOAA), provides funds to the State of Alaska due to Alaska's high threat for tsunami. The allocation supports the promotion of local, regional, and state level tsunami mitigation and preparedness; installation of warning communications systems; installation of warning communications systems; installation of tsunami signage; promotion of the Tsunami Ready Program in Alaska; development of inundation models; and delivery of inundation maps and decision-support tools to communities in Alaska.
- Department of Agriculture (USDA). Disaster assistance programs include: Emergency Conservation Program, Non-Insured Assistance, Emergency Forest Restoration Program, Emergency Watershed Protection, Rural Housing Service, Rural Utilities Service, and Rural Business and Cooperative Service. (http://www.fsa.usda.gov/FSA/webapp?area=home&subject=diap&topic=landing)
- Department of Energy (DOE), Office of Energy Efficiency and Renewable Energy, Weatherization Assistance Program (http://www1.eere.energy.gov/wip/wap.html). This program minimizes the adverse effects of high energy costs on low-income, elderly, and handicapped citizens through client education activities and weatherization services such as an all-around safety check of major energy systems, including heating system modifications and insulation checks.
  - The Tribal Energy Program offers financial and technical assistance to Indian tribes to help them create sustainable renewable energy installations on their lands. This program promotes tribal energy self-sufficiency and fosters employment and economic development on America's tribal lands. (http://www1.eere.energy.gov/wip/tribal.html)
- US Environmental Protection Agency (EPA). Under EPA's Clean Water State Revolving Fund (CWSRF) program, each state maintains a revolving loan fund to provide independent and permanent sources of low-cost financing for a wide range of water quality infrastructure projects, including: municipal wastewater treatment projects; non-point source projects; watershed protection or restoration projects; and estuary management projects. (http://yosemite.epa.gov/R10/ecocomm.nsf/6da048b9966d22518825662d00729a35/7b68c420b668ada5882569ab00720988!OpenDocument)
  - Public Works and Development Facilities Program. This program provides assistance to help distressed communities attract new industry, encourage business expansion, diversify local economies, and generate long-term, private sector jobs. Among the types of projects funded are water and sewer facilities, primarily serving industry and commerce; access roads to industrial parks or sites; port improvements; business incubator facilities; technology infrastructure; sustainable development activities; export programs; brownfields redevelopment; aquaculture facilities; and other infrastructure projects. Specific activities may include demolition, renovation, and construction of public facilities; provision of water or sewer infrastructure; or the

development of stormwater control mechanisms (e.g., a retention pond) as part of an industrial park or other eligible project. (http://cfpub.epa.gov/fedfund/program.cfm?prog_num=51)

- Department of Health and Human Services, Administration of Children & Families, Administration for Native Americans (ANA). The ANA awards funds through grants to American Indians, Native Americans, Native Alaskans, Native Hawaiians, and Pacific Islanders. These grants are awarded to individual organizations that successfully apply for discretionary funds. ANA publishes in the Federal Register an announcement of funds available, the primary areas of focus, review criteria, and the method of application. (http://www.acf.hhs.gov/programs/ana/programs/program_information.html)
- Department of Housing and Urban Development (HUD). HUD provides a variety of disaster resources. They also partner with Federal and state agencies to help implement disaster recovery assistance. Under the *National Response Framework* the FEMA and the Small Business Administration (SBA) offer initial recovery assistance. (http://www.hud.gov/info/disasterresources_dev.cfm)
  - Department of Housing and Urban Development (HUD), Office of Homes and Communities, Section 108 Loan Guarantee Programs. This program provides loan guarantees as security for Federal loans for acquisition, rehabilitation, relocation, clearance, site preparation, special economic development activities, and construction of certain public facilities and housing. (http://www.hud.gov/offices/cpd/communitydevelopment/programs/108/index.cfm)
  - Department of Housing and Urban Development (HUD), Office of Homes and Communities, Section 184 Indian Home Loan Guarantee Programs. The Section 184 Indian Home Loan Guarantee Program is a home mortgage specifically designed for American Indian and Alaska Native families, Alaska Villages, Tribes, or Tribally Designated Housing Entities. Section 184 loans can be used, both on and off native lands, for new construction, rehabilitation, purchase of an existing home, or refinance.

    Because of the unique status of Indian lands being held in Trust, Native American homeownership has historically been an underserved market. Working with an expanding network of private sector and tribal partners, the Section 184 Program endeavors to increase access to capital for Native Americans and provide private funding opportunities for tribal housing agencies with the Section 184 Program. (http://www.hud.gov/offices/pih/ih/homeownership/184/)
  - Department of Housing and Urban Development, Community Development Block Grants (HUD/CDBG). Provides grant assistance and technical assistance to aid communities in planning activities that address issues detrimental to the health and safety of local residents, such as housing rehabilitation, public services, community facilities, and infrastructure improvements that would primarily benefit low-and moderate-income persons. (http://www.hud.gov/offices/cpd/communitydevelopment/programs/)
- Department of Labor (DOL), Employment and Training Administration, Disaster Unemployment Assistance. Provides weekly unemployment subsistence grants for those who become unemployed because of a major disaster or emergency. Applicants must have exhausted all benefits for which they would normally be eligible. (http://www.workforcesecurity.doleta.gov/unemploy/disaster.asp)

  - The Workforce Investment Act contains provisions aimed at supporting employment and training activities for Indian, Alaska Native, and Native Hawaiian individuals. The Department of Labor's Indian and Native American Programs (INAP) funds grant programs that provide training opportunities at the local level for this target population. (http://www.dol.gov/dol/topic/training/indianprograms.htm)
- U.S. Department of Transportation, Hazardous Materials Emergency Preparedness Grant. To increase State, Territorial, Tribal and local effectiveness in safely and efficiently handling hazardous materials accidents and incidents, enhance implementation of the Emergency Planning and Community Right-to-Know Act of 1986, and encourage a comprehensive approach to emergency training and planning by incorporating the unique challenges of responses to transportation situations, through planning and training. Requires a 20% local match.
- Federal Financial Institutions. Member banks of Federal Deposit Insurance Corporation, Financial Reporting Standards or Federal Home Loan Bank Board may be permitted to waive early withdrawal penalties for Certificates of Deposit and Individual Retirement Accounts.
- Internal Revenue Service (IRS), Disaster Tax Relief. Provides extensions to current year's tax return, allows deductions for disaster losses, and allows amendment of previous year's tax returns. (http://www.irs.gov/newsroom/article/0,,id=108362,00.html)
- Natural Resources Conservation Service (NRCS) has several funding sources to fulfill mitigation needs (http://www.ak.nrcs.usda.gov/sitemap.html).
  - The Emergency Watershed Protection Program (EWP). This funding source is designed is to undertake emergency measures, including the purchase of flood plain easements, for runoff retardation and soil erosion prevention to safeguard lives and property from floods, drought, and the products of erosion on any watershed whenever fire, flood or any other natural occurrence is causing or has caused a sudden impairment of the watershed.
  - Wildlife habitat Incentives Program (WHIP). This is a voluntary program for conservation-minded landowners who want to develop and improve wildlife habitat on agricultural land, nonindustrial private forest land, and Indian land.
  - Watershed Planning. NRCS watershed activities in Alaska are voluntary efforts requested through conservation districts and units of government and/or tribes. The watershed activities are lead locally by a "watershed management committee" that is comprised of local interest groups, local units of government, local tribal representatives and any organization that has a vested interest in the watershed planning activity. This committee provides direction to the process as well as provides the decision-making necessary to implement the process. Technical assistance is provided to the watershed management committee through a "technical advisory committee" comprised of local, state and federal technical specialist. These specialists provide information to the watershed management committee as needed to make sound decisions. NRCS also provides training on watershed planning organization and process.
- U.S. Small Business Administration (SBA) Disaster Assistance (http://www.sba.gov/category/navigation-structure/starting-managing-

business/managing-business/running-business/emergency-preparedness-and-disaster-) provides information concerning disaster assistance, preparedness, planning, cleanup, and recovery planning.

  - May provide low-interest disaster loans to individuals and businesses that have suffered a loss due to a disaster. (http://www.sba.gov/category/navigation-structure/loans-grants/small-business-loans/disaster-loans). Requests for SBA loan assistance should be submitted to DHS&EM.

- USACE Alaska District's Civil Works Branch studies potential water resource projects in Alaska. These studies analyze and solve water resource issues of concern to the local communities. These issues may involve navigational improvements, flood control or ecosystem restoration. The agency also tracks flood hazard data for over 300 Alaskan communities on floodplains or the sea coast. These data help local communities assess the risk of floods to their communities and prepare for potential future floods (http://www.poa.usace.army.mil/en/cw/index.htm). The USACE is a member and co-chair of the Alaska Climate Change Sub-Cabinet.

State Resources

- DHS&EM is responsible for improving hazard mitigation technical assistance for local governments for the State of Alaska. Providing hazard mitigation training, current hazard information and communication facilitation with other agencies will enhance local hazard mitigation efforts. DHS&EM administers FEMA mitigation grants to mitigate future disaster damages such as those that may affect infrastructure including elevating, relocating, or acquiring hazard-prone properties. (http://www.ak-prepared.com/plans/mitigation/mitigati.htm)

  DHS&EM also provides mitigation funding resources for mitigation planning on their Web site at http://www.ak-prepared.com/plans/mitigation/localhazmitplan.htm.

- Division of Senior Services (DSS): Provides special outreach services for seniors, including food, shelter and clothing. (http://www.hss.state.ak.us/dsds/seniorInfoResources.htm)
- Division of Insurance (DOI): Provides assistance in obtaining copies of policies and provides information regarding filing claims. (http://www.dced.state.ak.us/insurance/)
- Department of Military and Veterans Affairs (DMVA): Provides damage appraisals and settlements for VA-insured homes, and assists with filing of survivor benefits. (http://veterans.alaska.gov/links.htm)
- DCRA within the DCCED. DCRA administers the HUD/CDBG, FMA Program, and the Climate Change Sub-Cabinet's Interagency Working Group's program funds and administers various flood and erosion mitigation projects, including the elevation, relocation, or acquisition of flood-prone homes and businesses throughout the State. This department also administers programs for State "distressed" and "targeted" communities. (http://www.commerce.state.ak.us/dca/)
- Department of Environmental Conservation (DEC). The DEC primary roles and responsibilities concerning hazards mitigation are ensuring safe food and safe water, and pollution prevention and pollution response. DEC ensures water treatment plants, landfills, and bulk fuel storage tank farms are safely constructed and operated in

communities. Agency and facility response plans include hazards identification and pollution prevention and response strategies. (http://dec.alaska.gov/)

- The Division of Water's Village Safe Water Program works with rural communities to develop sustainable sanitation facilities. Communities apply each year to VSW for grants for sanitation projects. Federal and state funding for this program is administered and managed by the State of Alaska's Village Safe Water (VSW) program. VSW provides technical and financial support to Alaska's smallest communities to design and construct water and wastewater systems. In some cases, funding is awarded by VSW through the Alaska Native Tribal Health Consortium, who in turn assist communities in design and construct of sanitation projects.
- Municipal Grants and Loans Program. The Department of Environmental Conservation / Division of Water administer the Alaska Clean Water Fund (ACWF) and the Alaska Drinking Water Fund (ADWF). The division is fiscally responsible to the Environmental Protection Agency (EPA) to administer the loan funds as the EPA provides capitalization grants to the division for each of the loan funds. In addition, it is prudent upon the division to administer the funds in a manner that ensures their continued viability.
- Under EPA's CWSRF program, each state maintains a revolving loan fund to provide independent and permanent sources of low-cost financing for a wide range of water quality infrastructure projects, including: municipal wastewater treatment projects; non-point source projects; watershed protection or restoration projects; and estuary management, [and stormwater management] projects. (http://yosemite.epa.gov/R10/ecocomm.nsf/6da048b9966d22518825662d00729a35/7b68c420b668ada5882569ab00720988!OpenDocument)

  Alaska's Revolving Loan Fund Program, prescribed by Title VI of the Clean Water Act as amended by the Water Quality Act of 1987, Public Law 100-4. DEC will use the ACWF account to administer the loan fund. This Agreement will continue from year-to-year and will be incorporated by reference into the annual capitalization grant agreement between EPA and the DEC. DEC will use a fiscal year of July 1 to June 30 for reporting purposes. (http://www.epa.gov/region10/pdf/water/srf/cwsrf_alaska_operating_agreement.pdf)

- Department of Transportation and Public Facilities (DOT/PF) personnel provide technical assistance to the various emergency management programs, to include mitigation. This assistance is addressed in the DHS&EM-DOT/PF Memorandum of Agreement and includes but is not limited to: environmental reviews, archaeological surveys, and historic preservation reviews.
  - DOT/PF and DHS&EM coordinate buy-out projects to ensure that there are no potential right-of-way conflicts with future use of land for bridge and highway projects, and collaborate on earthquake mitigation.
  - Additionally, DOT/PF provides the safe, efficient, economical, and effective State highway, harbor, and airport operation. DOT/PF uses it's Planning, Design and Engineering, Maintenance and Operations, and Intelligent Transportation Systems resources to identify hazards, plan and initiate mitigation activities to meet the transportation needs of Alaskans, and make Alaska a better place to live and work.

DOT/PF budgets for temporary bridge replacements and materials necessary to make the multi-modal transportation system operational following natural disaster events.

- DNR administers various projects designed to reduce stream bank erosion, reduce localized flooding, improve drainage, and improve discharge water quality through the stormwater grant program funds. Within DNR,
  - The Division of Geological and Geophysical Survey (DGGS) is responsible Alaska's mineral, land, and water resources use, development, and earthquake mitigation collaboration.

    Their geologists and support staff are leaders in researching Alaska's geology and implementing technological tools to most efficiently collect, interpret, publish, archive, and disseminate information to the public. Information is available at: (http://www.dggs.dnr.state.ak.us/index.php?menu_link=publications&link=publications_search#).
  - The DNR's DOF participates in a statewide wildfire control program in cooperation with the forest industry, rural fire departments and other agencies. Prescribed burning may increase the risks of fire hazards; however, prescribed burning reduces the availability of fire fuels and therefore the potential for future, more serious fires. (http://forestry.alaska.gov/pdfs/08FireSuppressionMediaGuide.pdf)
  - DOF also manages various wildland fire programs, activities, and grant programs such as the FireWise Program (http://forestry.alaska.gov/fire/firewise.htm), Community Forestry Program (CFP) (http://forestry.alaska.gov/community/), Assistance to Fire Fighters Grant (AFG), Fire Prevention and Safety (FP&S), Staffing for Adequate Fire and Emergency Response Grants (SAFER), and Volunteer Fire Assistance and Rural Fire Assistance Grant (VFA-RFA) programs (http://forestry.alaska.gov/fire/vfarfa.htm). Information can be found at http://forestry.alaska.gov/fire/current.htm.

Other Funding Sources and Resources

The following provide focused access to valuable planning resources for communities interested in sustainable development activities.

- FEMA, http://www.fema.gov - includes links to information, resources, and grants that communities can use in planning and implementation of sustainable measures.
- American Planning Association (APA), http://www.planning.org - a non-profit professional association that serves as a resource for planners, elected officials, and citizens concerned with planning and growth initiatives.
- Institute for Business and Home Safety (IBHS), http://ibhs.org - an initiative of the insurance industry to reduce deaths, injuries, property damage, economic losses, and human suffering caused by natural disasters.
- American Red Cross (ARC). Provides for the critical needs of individuals such as food, clothing, shelter, and supplemental medical needs. Provides recovery needs such as furniture, home repair, home purchasing, essential tools, and some bill payment may be provided.
- Crisis Counseling Program. Provides grants to State and Borough Mental Health Departments, which in turn provide training for screening, diagnosing and counseling

techniques. Also provides funds for counseling, outreach, and consultation for those affected by disaster. (http://dialoguemakers.org/Resourses4states+Nonprofits.htm)

- Denali Commission. Introduced by Congress in 1998, the Denali Commission is an independent federal agency designed to provide critical utilities, infrastructure, and economic support throughout Alaska. With the creation of the Denali Commission, Congress acknowledged the need for increased inter-agency cooperation and focus on Alaska's remote communities. Since its first meeting in April 1999, the Commission is credited with providing numerous cost-shared infrastructure projects across the State that exemplifies effective and efficient partnership between federal and state agencies, and the private sector. (http://www.denali.gov/index.php?option=com_content&view=section&id=1&Itemid=3)
  - The Energy Program primarily funds design and construction of replacement bulk fuel storage facilities, upgrades to community power generation and distribution systems, alternative-renewable energy projects, and some energy cost reduction projects. The Commission works with the Alaska Energy Authority (AEA), Alaska Village Electric Cooperative (AVEC), Alaska Power and Telephone and other partners to meet rural communities' fuel storage and power generation needs.
  - The goal of the solid waste program at the Denali Commission is to provide funding to address deficiencies in solid waste disposal sites which threaten to contaminate rural drinking water supplies.
- Lindbergh Foundation Grants. Each year, The Charles A. and Anne Morrow Lindbergh Foundation provides grants of up to $10,580 (a symbolic amount representing the cost of the Spirit of St. Louis) to men and women whose individual initiative and work in a wide spectrum of disciplines furthers the Lindberghs' vision of a balance between the advance of technology and the preservation of the natural/human environment. (http://www.lindberghfoundation.org/docs/index.php/our-grants)
- Rasmuson Foundation Grants. The Rasmuson foundation invests both in individuals and well-managed 501(c)(3) organizations dedicated to improving the quality of life for Alaskans.

  The Foundation seeks to support not-for-profit organizations that are focused and effective in the pursuit of their goals, with special consideration for those organizations that demonstrate strong leadership, clarity of purpose and cautious use of resources.

  The Foundation trustees believe successful organizations can sustain their basic operations through other means of support and prefer to assist organizations with specific needs, focusing on requests which allow the organizations to become more efficient and effective. The trustees look favorably on organizations which demonstrate broad community support, superior fiscal management and matching project support. (http://www.rasmuson.org/index.php)

Local Resources

The City has a number of planning and land management tools that will allow it to implement hazard mitigation activities. The resources available in these areas have been assessed by the hazard mitigation Project Team, and are summarized below.

Table 8-2 New Stuyahok's Administrative and Technical Resources

Staff/Personnel Resources	Y/N	Department/Agency and Position
Planner or engineer with knowledge of land development and land management practices	No	The City hires consultants with land development and land management knowledge
Engineer or professional trained in construction practices related to buildings and/or infrastructure	No	The City hires engineering consulting services
Planner or engineer with an understanding of natural and/or human-caused hazards	No	The City hires consultants with hazard mitigation knowledge
Floodplain Manager	No	Taunnie Boothby, State Floodplain Manager
Surveyors	No	The City hires surveying consulting services
Staff with education or expertise to assess the jurisdiction's vulnerability to hazards	Yes	Project Team
Personnel skilled in Geospatial Information System (GIS) and/or HAZUS-MH	No	The City hires consultants with this knowledge
Scientists familiar with the hazards of the jurisdiction	No	U.S. Fish & Wildlife Service local office; Alaska Dept. of Fish & Game local office
Emergency Manager	Yes	City Mayor or Tribal Chief (Situation dependent)
Finance (Grant writers)	Yes	City or Tribal Administrator (Situation dependent)
Public Information Officer	Yes	City Mayor or Tribal Chief (Situation dependent)

Table 8-3 New Stuyahok's Financial Resources for Hazard Mitigation

Financial Resource	Accessible or Eligible to Use for Mitigation Activities
General funds	Limited funding, can exercise this authority with voter approval
Community Development Block Grants	Limited funding, can exercise this authority with voter approval
Capital Improvement Projects Funding	Limited funding, can exercise this authority with voter approval
Authority to levy taxes for specific purposes	Limited funding, can exercise this authority with voter approval
Incur debt through general obligation bonds	Can exercise this authority with voter approval
Incur debt through special tax and revenue bonds	Can exercise this authority with voter approval
Incur debt through private activity bonds	Can exercise this authority with voter approval
Hazard Mitigation Grant Program (HMGP)	FEMA funding which is available to local communities after a Presidentially-declared disaster. It can be used to fund both pre- and post-disaster mitigation plans and projects.
Pre-Disaster Mitigation (PDM) grant program	FEMA funding which available on an annual basis. This grant can only be used to fund pre-disaster mitigation plans and projects only
Flood Mitigation Assistance (FMA) grant program	FEMA funding which is available on an annual basis. This grant can be used to mitigate repetitively flooded structures and infrastructure to protect repetitive flood structures.

Table 8-3 New Stuyahok's Financial Resources for Hazard Mitigation

Financial Resource	Accessible or Eligible to Use for Mitigation Activities
United State Fire Administration (USFA) Grants	The purpose of these grants is to assist state, regional, national or local organizations to address fire prevention and safety. The primary goal is to reach high-risk target groups including children, seniors and firefighters.

8.4 CONTINUED PUBLIC INVOLVEMENT

The requirements for continued public involvement, as stipulated in the DMA 2000 and its implementing regulations are described below.

DMA 2000 Requirements: Plan Maintenance Process - Continued Public Involvement

Continued Public Involvement

Requirement §201.6(c)(4)(iii): [The plan maintenance process shall include a] discussion on how the community will continue public participation in the plan maintenance process.

Element

- Does the new or updated plan explain how continued public participation will be obtained?

Source: FEMA, July 2010.

The City is dedicated to involving the public directly in the continual reshaping and updating of the HMP. A paper copy of the HMP and any proposed changes will be available at the City Office. An address and phone number of the Project Team Leader to whom people can direct their comments or concerns will also be available at the City Office.

The Project Team will continue to identify opportunities to raise community awareness about the HMP and the hazards that affect the area. This effort could include attendance and provision of materials at City-sponsored events, outreach programs, and public mailings. Any public comments received regarding the HMP will be collected by the Project Team Leader, included in the annual report, and considered during future HMP updates.

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Appendix A
Crosswalk

LOCAL MITIGATION PLAN REVIEW SUMMARY

The plan cannot be approved if the plan has not been formally adopted. Each requirement includes separate elements. All elements of the requirement must be rated "Satisfactory" in order for the requirement to be fulfilled and receive a score of "Satisfactory." Elements of each requirement are listed on the following pages of the Plan Review Crosswalk. A "Needs Improvement" score on elements shaded in gray (recommended but not required) will not preclude the plan from passing. Reviewer's comments must be provided for requirements receiving a **"Needs Improvement"** score.

Prerequisite(s) (Check Applicable Box)	**NOT MET**	**MET**
1. Adoption by the Local Governing Body: §201.6(c)(5) OR		**X**
2. Multi-Jurisdictional Plan Adoption: §201.6(c)(5) **AND**		**N/A**
3. Multi-Jurisdictional Planning Participation: §201.6(a)(3)		**N/A**

Planning Process	**N**	**S**
4. Documentation of the Planning Process: §201.6(b) and §201.6(c)(1)		**X**

Risk Assessment	**N**	**S**
5. Identifying Hazards: §201.6(c)(2)(i)		**X**
6. Profiling Hazards: §201.6(c)(2)(i)		**X**
7. Assessing Vulnerability: Overview: §201.6(c)(2)(ii)		**X**
8. Assessing Vulnerability: Addressing Repetitive Loss Properties. §201.6(c)(2)(ii)		**X**
9. Assessing Vulnerability: Identifying Structures, Infrastructure, and Critical Facilities: §201.6(c)(2)(ii)(B)		**X**
10. Assessing Vulnerability: Estimating Potential Losses: §201.6(c)(2)(ii)(B)		**X**
11. Assessing Vulnerability: Analyzing Development Trends: §201.6(c)(2)(ii)(C)		**X**
12. Multi-Jurisdictional Risk Assessment: §201.6(c)(2)(iii)		**N/A**

*States that have additional requirements can add them in the appropriate sections of the *Local Multi-Hazard Mitigation Planning Guidance* or create a new section and modify this Plan Review Crosswalk to record the score for those requirements.

SCORING SYSTEM

Please check one of the following for each requirement.

N – Needs Improvement: The plan does not meet the minimum for the requirement. Reviewer's comments must be provided.

S – Satisfactory: The plan meets the minimum for the requirement. Reviewer's comments are encouraged, but not required.

Mitigation Strategy	**N**	**S**
13. Local Hazard Mitigation Goals: §201.6(c)(3)(i)		**X**
14. Identification and Analysis of Mitigation Actions: §201.6(c)(3)(ii)		**X**
15. Identification and Analysis of Mitigation Actions: NFIP Compliance. §201.6(c)(3)(ii)		**X**
16. Implementation of Mitigation Actions: §201.6(c)(3)(iii)		**X**
17. Multi-Jurisdictional Mitigation Actions: §201.6(c)(3)(iv)		**N/A**

Plan Maintenance Process	**N**	**S**
18. Monitoring, Evaluating, and Updating the Plan: §201.6(c)(4)(ii)		**X**
19. Incorporation into Existing Planning Mechanisms: §201.6(c)(4)(ii)		**X**
20. Continued Public Involvement: §201.6(c)(4)(iii)		**X**

Additional State Requirements*	**N**	**S**
Insert State Requirement		**N/A**
Insert State Requirement		**N/A**
Insert State Requirement		**N/A**

LOCAL MITIGATION PLAN APPROVAL STATUS

PLAN NOT APPROVED	
See Reviewer's Comments	
PLAN APPROVED	**X**

LOCAL MITIGATION PLAN REVIEW CROSSWALK

Local Mitigation Plan Review and Approval Status

Jurisdiction: City of New Stuyahok	**Title of Plan:** City of New Stuyahok Hazard Mitigation Plan	**Date of Plan:** August 2011
Local Point of Contact: Randall Hastings	**Address:** City of New Stuyahok P.O. Box 10 New Stuyahok, AK 99636	
Title: Mayor		
Agency: City of New Stuyahok		
Phone Number: 907.693.3171	**E-Mail:** Randalwolf_knw@yahoo.com	

State Reviewer:	**Title:**	**Date:**

FEMA Reviewer: Brett Holt	**Title:** Mitigation Planner	**Date:** December 1, 2011
Date Received in FEMA Region X	November 2, 2011	
Plan Not Approved		
Plan Approved	Pending Adoption	
Date Approved		

Jurisdiction:	**NFIP Status***			
	Y	**N**	**N/A**	**CRS Class**
1. City of New Stuyahok		X		
2.				
3.				
4.				
5. [ATTACH PAGE(S) WITH ADDITIONAL JURISDICTIONS]				

*** Notes:** **Y = Participating** **N = Not Participating** **N/A = Not Mapped**

LOCAL MITIGATION PLAN REVIEW CROSSWALK

PREREQUISITE(S)

1. Adoption by the Local Governing Body

***Requirement §201.6(c)(5)*:** *[The local hazard mitigation plan **shall** include] documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval of the plan (e.g., City Council, County Commissioner, Tribal Council).*

Element	**Location in the Plan** (section or annex and page #)	Reviewer's Comments	SCORE NOT MET	SCORE MET
A. Has the local governing body adopted **new** or updated plan?	p. 2-1	The jurisdiction adopted the plan.		X
B. Is supporting documentation, such as a resolution, included?	Appendix B	The jurisdiction submitted a resolution to FEMA.		X
		SUMMARY SCORE		X

2. Multi-Jurisdictional Plan Adoption

***Requirement §201.6(c)(5)*:** *For multi-jurisdictional plans, each jurisdiction requesting approval of the plan **must** document that it has been formally adopted.*

Element	**Location in the Plan** (section or annex and page #)	Reviewer's Comments	SCORE NOT MET	SCORE MET
A. Does the **new** or updated plan indicate the specific jurisdictions represented in the plan?	N/A			N/A
B. For each jurisdiction, has the local governing body adopted the **new or updated** plan?	N/A			N/A
C. Is supporting documentation, such as a resolution, included for each participating jurisdiction?	N/A			N/A
		SUMMARY SCORE		N/A

3. Multi-Jurisdictional Planning Participation

***Requirement §201.6(a)(3)*:** *Multi-jurisdictional plans (e.g., watershed plans) may be accepted, as appropriate, as long as each jurisdiction has participated in the process … Statewide plans will not be accepted as multi-jurisdictional plans.*

Element	**Location in the Plan** (section or annex and page #)	Reviewer's Comments	SCORE NOT MET	SCORE MET
A. Does the **new or updated** plan describe **how** each jurisdiction participated in the plan's development?	N/A			N/A
B. Does the updated plan identify all participating jurisdictions, including new, continuing, and the jurisdictions that no longer participate in the plan?	N/A			N/A
		SUMMARY SCORE		N/A

PLANNING PROCESS: *§201.6(b): An open public involvement process is essential to the development of an effective plan.*

4. Documentation of the Planning Process

Requirement §201.6(b): *In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process **shall** include:*
(1) An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval;
(2) An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia and other private and non-profit interests to be involved in the planning process; and
(3) Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.

Requirement §201.6(c)(1): *[The plan **shall** document] the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.*

Element	**Location in the Plan** (section or annex and page #)	**Reviewer's Comments**	SCORE N	SCORE S
A. Does the plan provide a narrative description of the process followed to prepare the **new** or updated plan?	pp. 4-1 to 4-3	The planning process is described.		X
B. Does the **new** or updated plan indicate who was involved in the **current** planning process? (For example, who led the development at the staff level and were there any external contributors such as contractors? Who participated on the plan committee, provided information, reviewed drafts, *etc*.?)	p. 4-2	The planning team is listed.		X
C. Does the **new** or updated plan indicate how the public was involved? (Was the public provided an opportunity to comment on the plan during the drafting stage and prior to the plan approval?)	p. 4-3	The plan indicates how the public was involved.		X
D. Does the **new** or updated plan discuss the opportunity for neighboring communities, agencies, businesses, academia, nonprofits, and other interested parties to be involved in the planning process?	p. 4-3	The plan discusses opportunities for other organizations and agencies.		X
E. Does the planning process describe the review and incorporation, if appropriate, of existing plans, studies, reports, and technical information?	pp. 4-4, 9-1 to 9-3	The plan incorporates a variety of sources.		X
F. Does the updated plan document how the planning team reviewed and analyzed each section of the plan and whether each section was revised as part of the update process?	N/A			N/A
		SUMMARY SCORE		X

RISK ASSESSMENT: *§201.6(c)(2): The plan shall include a risk assessment that provides the factual basis for activities proposed in the strategy to reduce losses from identified hazards. Local risk assessments must provide sufficient information to enable the jurisdiction to identify and prioritize appropriate mitigation actions to reduce losses from identified hazards.*

5. Identifying Hazards

Requirement §201.6(c)(2)(i): *[The risk assessment **shall** include a] description of the type … of all natural hazards that can affect the jurisdiction.*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the **new** or updated plan include a description of the types of all natural hazards that affect the jurisdiction?	p. 5-2	The plan identifies all natural hazards that can affect the area.		X
		SUMMARY SCORE		X

6. Profiling Hazards

Requirement §201.6(c)(2)(i): *[The risk assessment **shall** include a] description of the … location and extent of all natural hazards that can affect the jurisdiction. The plan **shall** include information on previous occurrences of hazard events and on the probability of future hazard events.*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the risk assessment identify the **location** (*i.e.*, geographic area affected) of each natural hazard addressed in the **new** or updated plan?	Section 5	The location of each natural hazard is identified.		X
B. Does the risk assessment identify the **extent** (*i.e.*, magnitude or severity) of each hazard addressed in the **new** or updated plan?	Section 5	The extent of each natural hazard is addressed.		X
C. Does the plan provide information on **previous occurrences** of each hazard addressed in the **new** or updated plan?	Section 5	The plan provides information on previous occurrences of each natural hazard.		X
D. Does the plan include the **probability of future events** (*i.e.*, chance of occurrence) for each hazard addressed in the **new** plan?	Section 5	The plan includes the probability of future events for each natural hazard.		X
		SUMMARY SCORE		X

7. Assessing Vulnerability: Overview

Requirement §201.6(c)(2)(ii): *[The risk assessment **shall** include a] description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description **shall** include an overall summary of each hazard and its impact on the community.*

Element	**Location in the Plan** (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the **new** or updated plan include an **overall summary** description of the jurisdiction's **vulnerability** to each hazard?	pp. 6-2 to 6-14	The plan includes an overall summary description of the jurisdiction's vulnerability.		X
B. Does the **new** or updated plan address the **impact** of each hazard on the jurisdiction?	Section 5, pp. 6-12 to 6-14	The impact of each natural hazard is addressed.		X
		SUMMARY SCORE		X

8. Assessing Vulnerability: Addressing Repetitive Loss Properties

Requirement §201.6(c)(2)(ii): *[The risk assessment] **must** also address National Flood Insurance Program (NFIP) insured structures that have been repetitively damaged floods.*

Element	**Location in the Plan** (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the **new** or updated plan describe vulnerability in terms of the types and numbers of *repetitive loss properties* located in the identified hazard areas?	p. 6-3	The City does not participate in the NFIP, nor do they have repetitive loss properties.		X
		SUMMARY SCORE		X

9. Assessing Vulnerability: Identifying Structures

Requirement §201.6(c)(2)(ii)(A): *The plan **should** describe vulnerability in terms of the types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard area … .*

Element	**Location in the Plan** (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the **new** or updated plan describe vulnerability in terms of the **types and numbers** of **existing** buildings, infrastructure, and critical facilities located in the identified hazard areas?	pp. 6-3 to 6-7	The plan describes vulnerability in terms of the types and numbers of existing buildings, infrastructure, and critical facilities located in the identified hazard areas.		X
B. Does the **new** or updated plan describe vulnerability in terms of the **types and numbers** of **future** buildings, infrastructure, and critical facilities located in the identified hazard areas?	Section 6.2.1.4, pp. 6-17 to 6-18	The plan describes vulnerability in terms of the types and numbers of future buildings, infrastructure, and critical facilities located in the identified hazard areas.		X

SUMMARY SCORE		X

10. Assessing Vulnerability: Estimating Potential Losses

Requirement §201.6(c)(2)(ii)(B): *[The plan **should** describe vulnerability in terms of an] estimate of the potential dollar losses to vulnerable structures identified in paragraph (c)(2)(ii)(A) of this section and a description of the methodology used to prepare the estimate … .*

Element	**Location in the Plan** (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the **new** or updated plan estimate **potential dollar losses** to vulnerable structures? *Note: A "Needs Improvement" score on this requirement will not preclude the plan from passing.*	pp. 6-9 to 6-12	The plan estimates potential dollar losses to vulnerable structures using an exposure analysis.		X
B. Does the **new** or updated plan describe the **methodology** used to prepare the estimate? *Note: A "Needs Improvement" score on this requirement will not preclude the plan from passing.*	p. 6-8	The plan describes the methodology.		X
		SUMMARY SCORE		X

11. Assessing Vulnerability: Analyzing Development Trends

Requirement §201.6(c)(2)(ii)(C): *[The plan **should** describe vulnerability in terms of] providing a general description of land uses and development trends within the community so that mitigation options can be considered in future land use decisions.*

Element	**Location in the Plan** (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the **new** or updated plan describe land uses and development trends?	pp. 6-14 to 23	The plan describes land uses and development trends.		X
		SUMMARY SCORE		X

12. Multi-Jurisdictional Risk Assessment

Requirement §201.6(c)(2)(iii): *For multi-jurisdictional plans, the risk assessment **must** assess each jurisdiction's risks where they vary from the risks facing the entire planning area.*

Element	**Location in the Plan** (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the **new** or updated plan include a risk assessment for each participating jurisdiction as needed to reflect unique or varied risks?	N/A			N/A
		SUMMARY SCORE		N/A

LOCAL MITIGATION PLAN REVIEW CROSSWALK

MITIGATION STRATEGY: *§201.6(c)(3): The plan shall include a mitigation strategy that provides the jurisdiction's blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs and resources, and its ability to expand on and improve these existing tools.*

13. Local Hazard Mitigation Goals

Requirement §201.6(c)(3)(i): *[The hazard mitigation strategy **shall** include a] description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.*

Element	**Location in the Plan** (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A Does the **new** or updated plan include a description of mitigation **goals** to reduce or avoid long-term vulnerabilities to the identified hazards?	p. 7-1	9 goals are identified.		X
		SUMMARY SCORE		X

14. Identification and Analysis of Mitigation Actions

Requirement §201.6(c)(3)(ii): *[The mitigation strategy **shall** include a] section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure.*

Element	**Location in the Plan** (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the **new** or updated plan identify and analyze a **comprehensive range** of specific mitigation actions and projects for each hazard?	pp. 7-9 to 7-13	The plan identifies a range of mitigation actions.		X
B Do the identified actions and projects address reducing the effects of hazards on **new** buildings and infrastructure?	pp. 7-9 to 7-13	The plan addresses reducing the effects of hazards on new buildings and infrastructure.		X
C. Do the identified actions and projects address reducing the effects of hazards on **existing** buildings and infrastructure?	pp. 7-9 to 7-13	The plan addresses reducing the effects of hazards on existing buildings and infrastructure.		X
		SUMMARY SCORE		X

15. Identification and Analysis of Mitigation Actions: National Flood Insurance Program (NFIP) Compliance

Requirement: §201.6(c)(3)(ii): *[The mitigation strategy] must also address the jurisdiction's participation in the National Flood Insurance Program (NFIP), and continued compliance with NFIP requirements, as appropriate.*

Element	**Location in the Plan** (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the **new** or updated plan describe the jurisdiction (s) participation in the NFIP?	p. 1-3	The City of Stuyahok does not participate in the NFIP.		X
B. Does the mitigation strategy identify, analyze and prioritize actions related to continued compliance with the NFIP?	p. 1-3	The City of Stuyahok does not participate in the NFIP.		X

SUMMARY SCORE		X

16. Implementation of Mitigation Actions

Requirement: §201.6(c)(3)(iii): *[The mitigation strategy section **shall** include] an action plan describing how the actions identified in section (c)(3)(ii) will be prioritized, implemented, and administered by the local jurisdiction. Prioritization **shall** include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.*

Element	**Location in the Plan** (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the **new** or updated mitigation strategy include how the actions are **prioritized**? (For example, is there a discussion of the process and criteria used?)	pp. 7-7 to 7-8	The plan includes how the actions are prioritized.		X
B. Does the **new** or updated mitigation strategy address how the actions will be implemented and administered, including the responsible department, existing and potential resources and the timeframe to complete each action?	pp. 7-9 to 7-13	Each mitigation action has an identified "Responsible Department", "Potential Funding", and "Timeframe".		X
C. Does the **new** or updated prioritization process include an emphasis on the use of a **cost-benefit review** to maximize benefits?	pp. 7-9 to 7-13	The Benefit-Costs are identified for each action.		X
D. Does the **updated** plan identify the completed, deleted or deferred mitigation actions as a benchmark for progress, and if activities are unchanged (*i.e.*, deferred), does the updated plan describe why no changes occurred?	N/A			N/A
		SUMMARY SCORE		X

17. Multi-Jurisdictional Mitigation Actions

Requirement §201.6(c)(3)(iv): *For multi-jurisdictional plans, there **must** be identifiable action items specific to the jurisdiction requesting FEMA approval or credit of the plan.*

Element	**Location in the Plan** (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A Does the **new** or updated plan include identifiable **action items** for each jurisdiction requesting FEMA approval of the plan?	N/A			N/A
B. Does the **updated** plan identify the completed, deleted or deferred mitigation actions as a benchmark for progress, and if activities are unchanged (*i.e.*, deferred), does the updated plan describe why no changes occurred?	N/A			N/A
		SUMMARY SCORE		N/A

PLAN MAINTENANCE PROCESS

18. Monitoring, Evaluating, and Updating the Plan

Requirement §201.6(c)(4)(i): *[The plan maintenance process **shall** include a] section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.*

Element	**Location in the Plan** (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the **new** or updated plan describe the method and schedule for **monitoring** the plan, including the responsible department?	pp. 8-1 to 8-2; Appendix E	The plan describes how it will be monitored.		X
B. Does the **new** or updated plan describe the method and schedule for **evaluating** the plan, including how, when and by whom (*i.e.* the responsible department)?	pp. 8-1 to 8-2; Appendix E	The plan describes how it will be evaluated.		X
C. Does the **new** or updated plan describe the method and schedule for **updating** the plan within the five-year cycle?	p. 8-2	The plan describes how it will be updated.		X
		SUMMARY SCORE		X

19. Incorporation into Existing Planning Mechanisms

Requirement §201.6(c)(4)(ii): *[The plan **shall** include a] process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvement plans, when appropriate.*

Element	**Location in the Plan** (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the **new** or updated plan identify other local planning mechanisms available for incorporating the mitigation requirements of the mitigation plan?	pp. 4-4, pp. 8-2 to 8-3	The plan identifies local planning mechanisms.		X
B. Does the **new** or updated plan include a process by which the local government will incorporate the mitigation strategy and other information contained in the plan (*e.g.*, risk assessment) into other planning mechanisms, when appropriate?	pp. 8-3 to 8-4	The plan includes a process by which the local government will incorporate the mitigation strategy and other information contained in the plan.		X
C. Does the **updated** plan explain how the local government incorporated the mitigation strategy and other information contained in the plan (*e.g.*, risk assessment) into other planning mechanisms, when appropriate?	N/A			N/A
		SUMMARY SCORE		X

LOCAL MITIGATION PLAN REVIEW CROSSWALK

20. Continued Public Involvement

Requirement §201.6(c)(4)(iii): *[The plan maintenance process **shall** include a] discussion on how the community will continue public participation in the plan maintenance process.*

Element	**Location in the Plan** (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the **new** or updated plan explain how **continued public participation** will be obtained? (For example, will there be public notices, an on-going mitigation plan committee, or annual review meetings with stakeholders?)	pp. 8-14 to 8-15	The plan explains continued public participation.		X
		SUMMARY SCORE		X

MATRIX A: PROFILING HAZARDS

This matrix can assist FEMA and the State in scoring each hazard. Local jurisdictions may find the matrix useful to ensure that their plan addresses each natural hazard that can affect the jurisdiction. **Completing the matrix is not required**.

Note: First, check which hazards are identified in requirement §201.6(c)(2)(i). Then, place a checkmark in either the N or S box for each** applicable **hazard. An "N" for any element of any identified hazard will result in a "Needs Improvement" score for this requirement. List the hazard and its related shortcoming in the comments section of the Plan Review Crosswalk.

Hazard Type	Hazards Identified Per Requirement §201.6(c)(2)(i)	A. Location		B. Extent		C. Previous Occurrences		D. Probability of Future Events	
	Yes	N	S	N	S	N	S	N	S
Avalanche	☐	☐	☐	☐	☐	☐	☐	☐	☐
Coastal Erosion	☐	☐	☐	☐	☐	☐	☐	☐	☐
Coastal Storm	☐	☐	☐	☐	☐	☐	☐	☐	☐
Dam Failure	☐	☐	☐	☐	☐	☐	☐	☐	☐
Drought	☐	☐	☐	☐	☐	☐	☐	☐	☐
Earthquake	☒	☐	☒	☐	☒	☐	☒	☐	☒
Expansive Soils	☐	☐	☐	☐	☐	☐	☐	☐	☐
Levee Failure	☐	☐	☐	☐	☐	☐	☐	☐	☐
Flood	☒	☐	☒	☐	☒	☐	☒	☐	☒
Hailstorm	☐	☐	☐	☐	☐	☐	☐	☐	☐
Hurricane	☐	☐	☐	☐	☐	☐	☐	☐	☐
Land Subsidence	☐	☐	☐	☐	☐	☐	☐	☐	☐
Landslide	☐	☐	☐	☐	☐	☐	☐	☐	☐
Severe Winter Storm	☐	☐	☐	☐	☐	☐	☐	☐	☐
Tornado	☐	☐	☐	☐	☐	☐	☐	☐	☐
Tsunami	☐	☐	☐	☐	☐	☐	☐	☐	☐
Volcano	☐	☐	☐	☐	☐	☐	☐	☐	☐
Wildfire	☒	☐	☒	☐	☒	☐	☒	☐	☒
Windstorm	☐	☐	☐	☐	☐	☐	☐	☐	☐
Other Erosion	☒	☐	☒	☐	☒	☐	☒	☐	☒
Other Ground Failure	☒	☐	☒	☐	☒	☐	☒	☐	☒
Other Weather, Severe	☒	☐	☒	☐	☒	☐	☒	☐	☒

To check boxes, double click on the box and change the default value to "checked."

Legend:

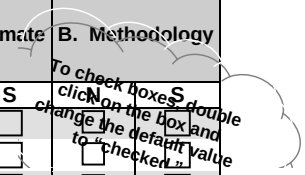
§201.6(c)(2)(i) Profiling Hazards
A. Does the risk assessment identify the location (*i.e.*, geographic area affected) of each hazard addressed in the **new or updated** plan?
B. Does the risk assessment identify the extent (*i.e.*, magnitude or severity) of each hazard addressed in the **new or updated** plan?
C. Does the plan provide information on previous occurrences of each natural hazard addressed in the **new or updated** plan?
D. Does the plan include the probability of future events (*i.e.*, chance of occurrence) for each hazard addressed in the plan?

MATRIX B: ASSESSING VULNERABILITY

This matrix can assist FEMA and the State in scoring each hazard. Local jurisdictions may find the matrix useful to ensure that the new or updated plan addresses each requirement. **Completing the matrix is not required**.

*Note: First, check which hazards are identified in requirement §201.6(c)(2)(i). Then, place a checkmark in either the N or S box for each **applicable** hazard. An "N" for any element of any identified hazard will result in a "Needs Improvement" score for this requirement. List the hazard and its related shortcoming in the comments section of the Plan Review Crosswalk. Note: Receiving an N in the shaded columns will not preclude the plan from passing.*

Hazard Type	Hazards Identified Per Requirement §201.6(c)(2)(i)	§201.6(c)(2)(ii) Assessing Vulnerability: Overview					§201.6(c)(2)(ii) Assessing Vulnerability: Identifying Structures				§201.6(c)(2)(ii) Assessing Vulnerability: Estimating Potential Losses					
		A. Overall Summary Description of Vulnerability		B. Hazard Impact			A. Types and Number of Existing Structures in Hazard Area (Estimate)		B. Types and Number of Future Structures in Hazard Area (Estimate)		A. Loss Estimate		B. Methodology			
	Yes	N	S	N	S		N	S	N	S	N	S	N	S		
Avalanche	☐	☐	☐	☐	☐		☐	☐	☐	☐	☐	☐	☐	☐		
Coastal Erosion	☐	☐	☐	☐	☐		☐	☐	☐	☐	☐	☐	☐	☐		
Coastal Storm	☐	☐	☐	☐	☐		☐	☐	☐	☐	☐	☐	☐	☐		
Dam Failure	☐	☐	☐	☐	☐		☐	☐	☐	☐	☐	☐	☐	☐		
Drought	☐	☐	☐	☐	☐		☐	☐	☐	☐	☐	☐	☐	☒		
Earthquake	☒	☐	☒	☐	☒		☐	☒	☐	☒	☐	☒	☐	☒		
Expansive Soils	☐	☐	☐	☐	☐		☐	☐	☐	☐	☐	☐	☐	☐		
Levee Failure	☐	☐	☐	☐	☐		☐	☐	☐	☐	☐	☐	☐	☐		
Flood	☒	☐	☒	☐	☒		☐	☒	☐	☒	☐	☒	☐	☒		
Hailstorm	☐	☐	☐	☐	☐		☐	☐	☐	☐	☐	☐	☐	☐		
Hurricane	☐	☐	☐	☐	☐		☐	☐	☐	☐	☐	☐	☐	☐		
Land Subsidence	☐	☐	☐	☐	☐		☐	☐	☐	☐	☐	☐	☐	☐		
Landslide	☐	☐	☐	☐	☐		☐	☐	☐	☐	☐	☐	☐	☐		
Severe Winter Storm	☐	☐	☐	☐	☐		☐	☐	☐	☐	☐	☐	☐	☐		
Tornado	☐	☐	☐	☐	☐		☐	☐	☐	☐	☐	☐	☐	☐		
Tsunami	☐	☐	☐	☐	☐		☐	☐	☐	☐	☐	☐	☐	☐		
Volcano	☐	☐	☐	☐	☐		☐	☐	☐	☐	☐	☐	☐	☐		
Wildfire	☒	☐	☒	☐	☒		☐	☒	☐	☒	☐	☒	☐	☒		
Windstorm	☐	☐	☐	☐	☐		☐	☐	☐	☐	☐	☐	☐	☐		
Other Erosion	☒	☐	☒	☐	☒		☐	☒	☐	☒	☐	☒	☐	☒		
Other Ground Failure	☒	☐	☒	☐	☒		☐	☒	☐	☒	☐	☒	☐	☒		
Other Weather, Severe	☒	☐	☒	☐	☒		☐	☒	☐	☒	☐	☒	☐	☒		



Legend:

§201.6(c)(2)(ii) Assessing Vulnerability: Overview

A. Does the **new or updated** plan include an overall summary description of the jurisdiction's vulnerability to each hazard?

B. Does the **new or updated** plan address the impact of each hazard on the jurisdiction?

§201.6(c)(2)(ii)(A) Assessing Vulnerability: Identifying Structures

A. Does the **new or updated** plan describe vulnerability in terms of the types and numbers of existing buildings, infrastructure, and critical facilities located in the identified hazard areas?

B. Does the **new or updated** plan describe vulnerability in terms of the types and numbers of future buildings, infrastructure, and critical facilities located in the identified hazard areas?

§201.6(c)(2)(ii)(B) Assessing Vulnerability: Estimating Potential Losses

A. Does the **new or updated** plan estimate potential dollar losses to vulnerable structures?

B. Does the **new or updated** plan describe the methodology used to prepare the estimate?

MATRIX C: IDENTIFICATION AND ANALYSIS OF MITIGATION ACTIONS

This matrix can assist FEMA and the State in scoring each hazard. Local jurisdictions may find the matrix useful to ensure consideration of a range of actions for each hazard. **Completing the matrix is not required.**

*Note: First, check which hazards are identified in requirement §201.6(c)(2)(i). Then, place a checkmark in either the N or S box for each **applicable** hazard. An "N" for any identified hazard will result in a "Needs Improvement" score for this requirement. List the hazard and its related shortcoming in the comments section of the Plan Review Crosswalk.*

Hazard Type	Hazards Identified Per Requirement §201.6(c)(2)(i)	A. Comprehensive Range of Actions and Projects	
	Yes	N	S
Avalanche	☐	☐	☐
Coastal Erosion	☐	☐	☐
Coastal Storm	☐	☐	☐
Dam Failure	☐	☐	☐
Drought	☐	☐	☐
Earthquake	☒	☐	☒
Expansive Soils	☐	☐	☐
Levee Failure	☐	☐	☐
Flood	☒	☐	☒
Hailstorm	☐	☐	☐
Hurricane	☐	☐	☐
Land Subsidence	☐	☐	☐
Landslide	☐	☐	☐
Severe Winter Storm	☐	☐	☐
Tornado	☐	☐	☐
Tsunami	☐	☐	☐
Volcano	☐	☐	☐
Wildfire	☒	☐	☒
Windstorm	☐	☐	☐
Other Erosion	☒	☐	☒
Other Ground Failure	☒	☐	☒
Other Weather, Severe	☒	☐	☒

To check boxes, double click on the box and change the default value to "checked."

Legend:
§201.6(c)(3)(ii) Identification and Analysis of Mitigation Actions
A. Does the **new or updated** plan identify and analyze a comprehensive range of specific mitigation actions and projects for each hazard?

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Appendix B
Adoption Resolution

RESOLUTION OF ADOPTION

"City of New Stuyahok" Alaska Hazard Mitigation Plane

WHEREAS the **"City of New Stuyahok"** is vulnerable to damages from natural hazard events which pose a threat to public health and safety and could result in property loss and economic hardship;

WHEREAS a hazard Mitigation Plane (the plane) has been developed through the work of the **"City of New Stuyahok"** Planning Team, and interested parties within the **"City of New Stuyahok";**

WHEREAS the plan recommends hazard mitigation actions that will protect people and property affected by natural hazards that face the **"City of New Stuyahok",** that will reduce future public, private, community, and personal cost of disaster response and recovery; and that will reinforce the **"City of New Stuyahok"'s,** leadership in emergency preparedness efforts;

WHEREAS the Disaster Mitigation Act of 2000 (P.L. 106-390) (DMA 2000) and associated Federal regulations published under 44 CFR Part 201 require the **"City of New Stuyahok"** to formally adopt a Hazard Mitigation Plan subject to the approval of the Federal Emergency Management Agency to be eligible for federal hazard mitigation projects and activities funds;

WHEREAS public meetings were held to receive comment on the plan as required by DMA 2000;

NOW THEREFORE BE IT RESOLVED by the City Council of **"New Stuyahok"** that:

1. The Plan is hereby adopted as an official plan of the **"City of New Stuyahok".**
2. The **"City of New Stuyahok"** officials identified in the Mitigation Action Plan (Section 8) are hereby directed to implement the recommended actions assigned to them. These officials will report quarterly on their activities, accomplishments, and progress to the city council.
3. The **"City of New Stuyahok"** Hazard Action Planning Team will provide annual progress reports on the status of the implemented Mitigation Action Plan's and progress to the Planning Team Leader. This report shall be submitted to the City Council annually by the plan's adoption anniversary date.
4. **The "City of New Stuyahok"** Planning Team, will complete periodic updates of the Plan as indicated in the Plan Maintenance Section (Section8), but no less frequently than every five years.

NOW THEREFORE, BE IT RESOLVED by the City Council that the **"City of New Stuyahok"** adopts the **"City of New Stuyahok" Hazard Mitigation Plan,** date, "12" 20 11 as this jurisdiction's Hazard Mitigation Plan, and resolves to execute the actions in the plan.

ADOPTED this 12th, 2011 at the meeting of the City Council.

Ronald A. Hawkings

Appendix C
Public Outreach

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Memorandum

700 G Street, Suite 500
Anchorage, AK 99503
Phone: 907.261.9706
Fax: 907.562.1297

SUBJECT: Division of Homeland Security and Emergency Management (DHS&EM) Hazard Mitigation Plan (HMP) /Hazard Mitigation Grant Program (HMGP) Project – New Stuyahok Kick-Off – Team Meeting

Community: New Stuyahok, 693.3171

Date/Time: April 27, 2011, 1:30 P.M.

From: R. Scott Simmons

Attendees:

- Mayor Randall Hastings and Reuben Hastings (Utility Manager)
- Community Members

- **Subjects covered included:**
  - Discussed planning activities with the Mayor and the Utility Manager who determined to forgoe a public meeting for expediency with the project. They determined that they would distribute Newsletter #1 and present the HMP project to the City and Tribal councils.
  - I explained that The Boutet Company Inc. received a grant to develop hazard mitigation plans and to develop one DHS&EM eligible HMGP project application based on the City's mitigatable natural hazard threats, potential impacts, population threatened, and their priorities.
  - I explained that Mr. Galanas, The Boutet' Company Inc., will assist the Planning Team with identifying mitigation actions and projects. These projects will then be prioritized to determine the most important for the community while meeting FEMA's strict eligibility criteria. The top project will be developed for The Boutet' Company to prepare a separately DHS&EM funded HMGP Project Grant Application.
  - It is URS' responsibility to write the plan and take on the bulk of the work to guarantee FEMA compliance, but we need several critical items that only the community can provide:
    - The attendees identified and screened hazards that impact the community and provided brief histories. Attendees also screened which hazards need to be profiled and included in the plan.
    - URS explained the Data Sheets (homework) and how they would be used
    - The Critical Facilities Inventory Spreadsheet needs to list any facilities not on the list. The list needs additional information such as facilities' physical locations (GPS coordinates and street addresses), estimated values, and estimated number of occupants to enable URS to complete a usable risk assessment and vulnerability analysis.
    - The Capability Assessment Data Sheet lists community resources for implementing and administering projects
    - Mayor Hastings mentioned a few concerns about flooding in the lower part of the community and erosion impacts that are approaching the sewage lagoon which are caused by pedestrian and ATV traffic.
  - A mitigation plan ensures community eligibility for FEMA and potentially other federal agency funding, which they are not currently eligible for... the more the information gathered, the better the plan. The HMP along with The Boutet Company's HMGP application prepares the community to potentially obtain funding to implement projects.
  - Public meetings and newsletters provide the public opportunities to contribute to the process and lets the public know where a copy of the plan is available for review, etc.

- **City of Gambell Planning Team**
  - Prior telephonic discussion occurred to encourage the team to take-on HMP data gathering – to spread the work among the team members reducing the workload on the Team Leader, and to have periodic meetings to check progress and to obtain guidance from URS which can save time for everyone. Teams

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are far more successful than any individual as one idea can lead to several – increasing the success of the Team.

- Public Involvement will help the team:
  - Identify known natural hazards
  - Identify critical facilities
  - Provide historic event and damage information
  - Provide location information
- URS and the Boutet Co., Inc. encourages public meeting during development to fulfill FEMA requirements, to ensure public awareness of the hazards that potentially threaten the community, and to gain public support for projects to protect infrastructure and the population.
- The Mayor determined it to be in the best interest of the community to have the entire City Council act as the planning team.
- The Mayor wanted to begin work on defining their critical facilities so we thoroughly reviewed and identified locations and estimated replacement values.

CITY OF NEW STUYAHOK HAZARD MITIGATION PLAN

April 2011

This newsletter discusses the preparation of the New Stuyahok Hazard Mitigation Plan. It has been prepared to inform interested agencies, stakeholders, and the public about the project and to solicit comments. This newsletter can also be viewed on the State of Alaska Division of Homeland Security and Emergency Management Website at http://www.ready.alaska.gov.

The State of Alaska, Department of Military and Veterans Affairs, Division of Homeland Security and Emergency Management (DHS&EM) was awarded a Pre-Disaster Mitigation Program grant from the Federal Emergency Management Agency (FEMA) to prepare Hazard Mitigation Plans (HMP) for six Alaskan Communities. New Stuyahok was selected for participation in this effort.

DHS&EM, and their contractor The Boutet Company, Inc. and URS Corporation are sharing information to assist the community with preparing a FEMA approvable hazard mitigation plan and subsequent hazard mitigation grant program application during 2011 and 2012.

The New Stuyahok Hazard Mitigation Plan will identify all natural hazards, such as earthquake, erosion, flood, severe weather, and wildland fire hazards and others. The plan will also identify the people and facilities potentially at risk and ways to mitigate damage from future hazard impacts. The public participation and planning process is documented as part of these projects.

The Hazard Mitigation Grant Program project application development process will focus on determining the most essential and FEMA eligible project for the City to develop with The Boutet Company, Inc. The completed project application will then be presented to DHS&EM for statewide competitive grant prioritization and potential FEMA funding.

What is Hazard Mitigation?

Across the United States, natural and human-caused disasters have increasingly caused injury, death, property damage, and business and government service interruptions. The toll on individuals, families, and businesses can be very high. The time, money, and emotional effort required to respond to and recover from these disasters takes public resources and attention away from other important programs and problems.

The people and property in the State of Alaska are at risk from a variety of natural hazards that can potentially cause human injury, property damage, or environmental harm.

Hazard mitigation projects eliminate the risk or reduce the hazard impact severity to people and property. Projects may include short- or long-term activities to reduce exposure to or the effects of known hazards. Hazard mitigation activities include relocating or elevating buildings, replacing insufficiently sized culverts, using alternative construction techniques, or developing, implementing, or enforcing building codes, and education.

Why Do We Need A Hazard Mitigation Plan?

Communities must have a State, FEMA approved, and community adopted mitigation plan to receive a project grant from FEMA's pre- and post- disaster grants identified in their Hazard Mitigation Assistance and other agency's mitigation grant programs. The City of New Stuyahok plans to apply for mitigation funds after our plan is complete.

The rules have changed. The Local government HMP and Flood Mitigation Assistance (FMA) plans' requirements were consolidated into one planning mechanism. Additionally the Pre-Disaster Mitigation (PDM), Flood Mitigation Assistance (FMA), Repetitive Flood Loss (RL), Severe Repetitive Flood Loss (SRL) grant programs were also consolidated under FEMA's newly developed Hazard Mitigation Assistance (HMA) program. Each of these programs must use the same application process and eligibility requirements for nationally competitive funding.

The Hazard Mitigation Grant Program (HMGP) is a disaster related assistance program. Applicants typically compete on a statewide basis.

The Planning Process

There are very specific federal requirements that must be met when preparing a hazard mitigation plan. These requirements are commonly referred to as the Disaster Mitigation Act of 2000, or DMA2000 criteria. Information about the criteria and other applicable laws and regulations may be found at: http://www.fema.gov/plan/mitplanning/guidance.shtm

The DMA2000 requires the plan to include and document the following topics:

- Plan development process
- Identify hazards specific to the jurisdiction
- Identify the population and structures' risks
- Define the jurisdiction's mitigation goals
- List the jurisdiction's mitigation programs, selected actions, and implemented projects
- Provide a copy of the jurisdiction's resolution adopting the plan

FEMA has prepared Planning Guidance which is available at: http://www.fema.gov/library/viewRecord.do?id=4225; and "How to" Guides that explain in detail how each of the DMA2000 requirements are met. These guides are available at http://www.fema.gov/plan/mitplanning/resources.shtm. The City's Hazard Mitigation Plan will follow those guidelines.

We are currently in the very beginning stages of preparing the plan. We will be conducting a public meeting to introduce the project and planning team, and to gather comments from our community residents. Specifically we will complete the hazard identification task, and collect data to conduct the risk assessment.

DHS&EM has previously identified natural hazards that occur in the Dillingham Census Area that may also occur specifically in New Stuyahok.

We Need Your Help

Please use the following table to identify any hazards you have observed in your area that DHS&EM is not aware of AND any additional natural hazards that may not be on the list.

New Stuyahok Hazard Worksheet		
Hazard	Dillingham Census Area*	New Stuyahok
Avalanche	Yes	No
Earthquake	Yes	Yes
Erosion	Yes	Yes
Flood	Yes	Yes
Ground Failure (Landslide, Permafrost, Subsidence)	No	Yes
Tsunami & Seiche	Yes	No
Volcano	Unknown	No
Weather (Severe)	Yes	Yes
Wildland Fire	Yes	Yes
*Hazard Matrix from the State of Alaska Hazard Mitigation Plan for the Dillingham Census Area		

DHS&EM identified critical facilities within the City of New Stuyahok as part of the Alaska Critical Facilities Inventory, but the list of critical facilities needs to be updated and the estimated value and location (latitude/longitude) determined.

In addition, the number and value of structures, and the number of people living in each structure will need to be documented. Once this information is collected we will determine which critical facilities, residences, and populations are vulnerable to specific hazards in New Stuyahok. Please add additional facilities if needed.

New Stuyahok Critical Facilities*	
Facility Type	Facility Name
Airport	15/33
Port/Dock/Landing	Barge Landing
Port/Dock/Landing	Ferry Terminal and Dock
Cemetery	NA
Church	Russian Orthodox Church
Church	Sunday School Building
Community Hall	Boys & Girls Club
Fire Station	NA
Fuel Storage Tanks (>500gal)	AVEC Fuel Storage
Fuel Storage Tanks (>500gal)	School Fuel Storage
Fuel Storage Tanks (>500gal)	Stuyahok, Ltd
Generator	AVEC Generator Building
Generator	School Generator
Highways	Community Roads
Hospital/Clinic/ER	Clinic
Landfill/Incinerator	New Stuyahok Class III Muni Landfill
Landfill/Incinerator	Waste Disposal Site
Offices	Alcohol Counseling/Beaver Festival Building
Offices	City Council Building
Police Station	NA
Post Office	NA
Power Generation Facility	AVEC Generator Building
Reservoir/Water Supply	New Stuyahok Water System
Sanitation Plant	N/A
Sanitation Piping	Piped Sewer
School	Chief Ivan Blunka School (K-12)
School	HeadStart
Sewage Lagoon	Sewage Lagoon
Sewer Lift Stations/Controls	Sewer Lift Stations
Store	Store
Store	Panorqukuk Store
Teachers Quarters	Teachers Housing
Tribal Office	Tribal Office
Washateria	NA
Water Plant	Water Treatment Plant
Water Tank	Water Storage Tank
* Alaska Critical Facilities Inventory	

The Planning Team

The planning team is being led by Mayor Randal Hastings with assistance from the City Council. URS Corporation has been contracted by DHS&EM to provide assistance and guidance to the planning team throughout the planning process.

Public Participation

Public involvement will continue throughout the project. The goal is to receive comments, identify key issues or concerns, and improve ideas for mitigation. When the Draft New Stuyahok Hazard Mitigation Plan is complete, the results will be presented to the community before DHS&EM and FEMA approval, and community adoption.

Please email or fax updated hazard and critical facility information directly to URS or provide it to your community planning & project team leader.

We encourage you to take an active part in preparing the City of New Stuyahok's Hazard Mitigation Plan and the Mitigation Project Application Development effort. The purpose of this newsletter is to keep you informed and to allow you every opportunity to voice your opinion regarding these important projects. Please contact your community representative, URS planning coordinators, or The Boutet Company Inc. if you have any questions, comments, or requests for more information:

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URS

Memo for Record

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SUBJECT: DHSEM HMP – Mitigation Strategy Teleconference Minutes

Community: New Stuyahok

Date/Time: May 4, 2011/9:30 a.m.

From: R. Scott Simmons

Attendees:

- URS: Scott Simmons
- DHSEM: Mark Roberts, Chris Tomsen
- Jim Galanes
- Mayor Randal Hastings

Comments:

- **Subjects covered included:**
  - Section Seven (7) Mitigation Strategy
- **Participant Introduction**
- **Mitigation Strategy Development:**
  - Explained the Mitigation Strategy development process
  - Introduced Mitigation Goals purpose and reached consensus on suggested goals for the City
  - Reviewed the Mitigation Project Consideration Sheet,
  - Identified ongoing or existing City mitigation initiatives
  - Selected mitigation initiatives for implementation and refinement within the Mitigation Action Plan Matrix.
  - Explained how the information discussed would be implemented and expanded within the Mitigation Action Plan Matrix and returned to the community for review.
    - Matrix will include:
      - Initiative Priority
      - Responsible Entity
      - Potential Funding Sources
      - Timeframe for implementation
      - Benefit /Cost and Technical Feasibility narrative description
  - Teleconference Follow-up
  - A second newsletter will be developed once the Mitigation Strategy is finalized and incorporated into the Draft HMP. The newsletter should be posted or distributed throughout the community to inform the community that the HMP is available for public review and comment.

CITY OF NEW STUYAHOK HAZARD MITIGATION PLAN

June 2011 **Newsletter 2**

This newsletter discusses the preparation of the City of New Stuyahok Hazard Mitigation Plan. It has been prepared to inform interested agencies, stakeholders, and the public about the project and to solicit comments. This newsletter can also be viewed on the State of Alaska Division of Homeland Security and Emergency Management Website at http://www.ready.alaska.gov.

The City of New Stuyahok was one of six communities selected by the State of Alaska, Division of Homeland Security and Emergency Management (DHS&EM) for a Hazard Mitigation Planning (HMP) development project. The plan identifies natural hazards that affect the community including earthquake, erosion, flood, ground failure, severe weather, and wildland fire. The HMP also identifies the people and facilities potentially at risk and ways to mitigate hazards. The public participation and planning process has been documented as part of the project. The Boutet Co. Inc. contracted with URS Corporation (URS) to assist in preparing the HMP. The Boutet Co. Inc. will prepare a Hazard Mitigation Grant Program project application for an eligible project identified within the City's Mitigation Strategy.

What is Hazard Mitigation?

Across the United States, natural disasters have increasingly caused injury, death, property damage, and business and government service interruptions. The toll on individuals, families, and businesses can be very high. The time, money, and emotional effort required to respond to and recover from these disasters take public resources and attention away from other important programs and problems.

The people and property in the State of Alaska are at risk from a variety of hazards that have the potential for causing human injury, property damage, or environmental harm.

The purpose of hazard mitigation is to implement projects that eliminate the risk or reduce the severity of hazards on people and property. Mitigation programs may include short-term and long-term activities to reduce the hazards, reduce exposure to hazards, or reduce the effects of hazards. Mitigation could include education, and construction projects. Hazard mitigation activity examples include relocating buildings, developing or strengthening building codes, and educating residents and building owners.

Why Do We Need A Hazard Mitigation Plan?

A community is only eligible to receive grant money for mitigation programs by preparing and adopting a HMP. Communities must have an approved mitigation plan to receive grant funding from the Federal Emergency Management Agency (FEMA) for eligible mitigation projects. The Boutet Co. Inc. will work with the City of New Stuyahok to develop an eligible project grant application after the HMP is approved by DHS&EM and FEMA and adopted by the City.

The Planning Process

There are very specific federal requirements that must be met when preparing a hazard mitigation plan. These requirements are commonly referred to as the Disaster Mitigation Act of 2000, or DMA2000 criteria. Information about the criteria may be found on the Internet at: http://www.fema.gov/plan/mitplanning/guidance.shtm

The DMA2000 requires the plan to document the following topics:

- Planning process
- Hazard identification
- Risk and vulnerability assessments
- Goals
- Mitigation programs, actions, and projects
- A resolution from the community adopting the plan

FEMA has prepared Planning Guidance which is available at: http://www.fema.gov/library/viewRecord.do?id=4225; and "How to" Guides that explain in detail how each of the DMA2000 requirements is met. These guides are available at http://www.fema.gov/plan/mitplanning/resources.shtm. The New Stuyahok Hazard Mitigation Plan will follow those guidelines.

In April 2011 the planning process kicked-off by establishing a local planning committee and holding a public meeting. The planning committee examined the full spectrum of hazards listed in the State Hazard Mitigation Plan and identified six hazards the HMP would address.

After the first public meeting, City staff and URS began identifying critical facilities, compiling the hazard profiles, assessing capabilities, and conducting the risk assessment for the identified hazards. Critical facilities are facilities that are critical to the recovery of a community in the event of a disaster. After collection of this information, URS helped to determine which critical facilities and estimated populations are vulnerable to the identified hazards in New Stuyahok.

A mitigation strategy was the next component of the plan to be developed. Understanding the community's local capabilities and using information gathered from the public and the local planning committee and the expertise of the consultants and agency staff, a mitigation strategy was developed. The mitigation strategy is based on an evaluation of the hazards, and the assets at risk from those hazards. Mitigation goals and a list of potential actions/projects were developed as the foundation of the mitigation strategy. Mitigation goals are defined as general guidelines that explain what a community wants to achieve in terms of hazard and loss prevention. Goals are positively stated future situations that are typically long-range, policy-oriented statements representing community-wide visions. Mitigation actions/projects are undertaken in order to achieve your stated objectives. In April 2011, the local planning committee identified projects/actions for each hazard that focus on six categories: prevention, property protection, public education and awareness, natural resource protection, emergency services, and structural projects. The mitigation actions identified as a high priority by the planning team are listed below, and explained in more detail in the plan.

The selected actions/projects will potentially be implemented over the next five years. A maintenance plan has also been developed for the hazard mitigation plan. It outlines how the community will monitor progress on achievement of the actions/projects that will help meet the stated goals and objectives, as well as an outline for continued public involvement.

The draft HMP is available in the City office and on the State website (http://www.ready.alaska.gov) for public review and comment. Comments should be made via email, fax, or phone to the contact person below and be received no later than May 20, 2011. The plan will be provided to DHS&EM and FEMA for their approval prior to formal adoption by the City Council of New Stuyahok.

The Planning Committee

The plan was developed with the assistance from a planning committee consisting of a cross section of the community. Mayor Randal Hastings with assistance from the City Council helped with developing the plan, The Boutet Co. Inc., URS Corporation, and DHS&EM are also providing assistance to the planning committee.

Sample of the City of New Stuyahok's Mitigation Actions. Review the draft HMP for a complete list.

The City will aggressively manage their existing plans to ensure they incorporate mitigation planning provisions into all community planning processes such as comprehensive, capital improvement, and land use plans, etc. to demonstrate multi-benefit considerations and facilitate using multiple funding source consideration.	Purchase and install generators with main power distribution disconnect switches for identified and prioritized critical facilities susceptible to short term power disruption. (i.e. first responder and medical facilities, schools, correctional facilities, and water and sewage treatment plants, etc.)	Review ordinances and develop outreach programs to assure fuel tanks (fuel oil, propane, etc.) are properly anchored and hazardous materials are properly stored and protected from known natural hazards such as flood or seismic events.
Identify and pursue funding opportunities to implement mitigation actions.	Construct transportation corridors for ATV's to reduce erosion impacts.	Implement culvert ice thawing capability to redirect snowmelt water flow through culverts to reduce road damage
Update public emergency notification procedures and develop an outreach program for potential hazard impacts or events.	Install bank protection such as rip-rap (large rocks), sheet pilings, gabion baskets, articulated matting, concrete, asphalt, vegetation, or other armoring or protective materials to provide river bank protection.	Develop and maintain critical facility inventory for all structures located within 100-year floodplains.
Develop and maintain an inventory of locations subject to frequent storm water flooding based on most current USACOE flood data.	Update the storm water management plan to identify methods control runoff, both for flood reduction and to minimize ground failure or landslides from saturated soils on steep slopes.	Determine and implement most cost beneficial and feasible mitigation actions for locations with repetitive flooding and significant damages or road closures.
Develop and implement tree clearing mitigation programs to keep trees from threatening lives, property, and public infrastructure from severe weather events.	Develop, adopt, and enforce burn ordinances that require burn permits, restrict campfires, and controls outdoor burning.	Identify, develop, implement, and enforce mitigation actions such as fuel breaks and reduction zones for potential wildland fire hazard areas.

We encourage you to learn more about the City of New Stuyahok's Hazard Mitigation Plan. The purpose of this newsletter is to keep you informed and to allow you every opportunity to voice your opinion regarding this important project. If you have any questions, comments, or requests for more information, please contact:

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Appendix D
Benefit–Cost Analysis Fact Sheet

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Benefit-Cost Analysis Fact Sheet

Hazard mitigation projects are specifically aimed at reducing or eliminating future damages. Although hazard mitigation projects may sometimes be implemented in conjunction with the repair of damages from a declared disaster, the focus of hazard mitigation projects is on strengthening, elevating, relocating, or otherwise improving buildings, infrastructure, or other facilities to enhance their ability to withstand the damaging impacts of future disasters. In some cases, hazard mitigation projects may also include training or public-education programs if such programs can be demonstrated to reduce future expected damages.

A Benefit-Cost Analysis (BCA) provides an estimate of the "benefits" and "costs" of a proposed hazard mitigation project. The benefits considered are avoided future damages and losses that are expected to accrue as a result of the mitigation project. In other words, benefits are the reduction in expected future damages and losses (i.e., the difference in expected future damages before and after the mitigation project). The costs considered are those necessary to implement the specific mitigation project under evaluation. Costs are generally well determined for specific projects for which engineering design studies have been completed. Benefits, however, must be estimated probabilistically because they depend on the improved performance of the building or facility in future hazard events, the timing and severity of which must be estimated probabilistically.

All Benefit-Costs must be:

- Credible and well documented
- Prepared in accordance with accepted BCA practices
- Cost-effective (BCR $\geq$ 1.0)

General Data Requirements:

- All data entries (other than Federal Emergency Management Agency [FEMA] standard or default values) MUST be documented in the application.
- Data MUST be from a credible source.
- Provide complete copies of reports and engineering analyses.
- Detailed cost estimate.
- Identify the hazard (flood, wind, seismic, etc.).
- Discuss how the proposed measure will mitigate against future damages.
- Document the Project Useful Life.
- Document the proposed Level of Protection.
- The Very Limited Data (VLD) BCA module cannot be used to support cost-effectiveness (screening purposes only).
- Alternative BCA software MUST be approved in writing by FEMA HQ and the Region prior to submittal of the application.

Damage and Benefit Data

- Well documented for each damage event.
- Include estimated frequency and method of determination per damage event.
- Data used in place of FEMA standard or default values MUST be documented and justified.

- The Level of Protection MUST be documented and readily apparent.
- When using the Limited Data (LD) BCA module, users cannot extrapolate data for higher frequency events for unknown lower frequency events.

Building Data

- Should include FEMA Elevation Certificates for elevation projects or projects using First Floor Elevations (FFEs).
- Include data for building type (tax records or photos).
- Contents claims that exceed 30 percent of building replacement value (BRV) MUST be fully documented.
- Method for determining BRVs MUST be documented. BRVs based on tax records MUST include the multiplier from the County Tax Assessor.
- Identify the amount of damage that will result in demolition of the structure (FEMA standard is 50 percent of pre-damage structure value).
- Include the site location (i.e., miles inland) for the Hurricane module.

Use Correct Occupancy Data

- Design occupancy for Hurricane shelter portion of Tornado module.
- Average occupancy per hour for the Tornado shelter portion of the Tornado module.
- Average occupancy for Seismic modules.

Questions to Be Answered

- Has the level of risk been identified?
- Are all hazards identified?
- Is the BCA fully documented and accompanied by technical support data?
- Will residual risk occur after the mitigation project is implemented?

Common Shortcomings

- Incomplete documentation.
- Inconsistencies among data in the application, BCA module runs, and the technical support data.
- Lack of technical support data.
- Lack of a detailed cost estimate.
- Use of discount rate other than FEMA-required amount of 7 percent.
- Overriding FEMA default values without providing documentation and justification.
- Lack of information on building type, size, number of stories, and value.
- Lack of documentation and credibility for FFEs.
- Use of incorrect Project Useful Life (not every mitigation measure = 100 years).

Appendix E

Plan Maintenance Documents

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Annual Review Questionnaire

PLAN SECTION	QUESTIONS	YES	NO	COMMENTS
PLANNING PROCESS	Are there internal or external organizations and agencies that have been invaluable to the planning process or to mitigation action			
	Are there procedures (e.g., meeting announcements, plan updates) that can be done more efficiently?			
	Has the Task Force undertaken any public outreach activities regarding the MHMP or implementation of mitigation actions?			
HAZARD PROFILES	Has a natural and/or human-caused disaster occurred in this reporting period?			
	Are there natural and/or human-caused hazards that have not been addressed in this HMP and should be?			
	Are additional maps or new hazard studies available? If so, what have they revealed?			
VULNERABILITY ANALYSIS	Do any new critical facilities or infrastructure need to be added to the asset lists?			
	Have there been changes in development patterns that could influence the effects of hazards or create additional risks?			
MITIGATION STRATEGY	Are there different or additional resources (financial, technical, and human) that are now available for mitigation planning within the			
	Are the goals still applicable?			
	Should new mitigation actions be added to the a community's Mitigation Action Plan?			
	Do existing mitigation actions listed in a community's Mitigation Action Plan need to be reprioritized?			
	Are the mitigation actions listed in a community's Mitigation Action Plan appropriate for available resources?			

Mitigation Action Progress Report

Progress Report Period: _____ (date) to _____ (date)

Project Title: _____ Project ID# _____

Responsible Agency: _____

Address: _____

City: _____

Contact Person: _____ Title: _____

Phone #(s): _____ email address: _____

List Supporting Agencies and Contacts:

_____

_____

Total Project Cost: _____

Anticipated Cost Overrun/Underrun: _____

Date of Project Approval: _____ Start date of the project: _____

Anticipated completion date: _____

Description of the Project (include a description of each phase, if applicable, and the time frame for completing each phase): _____

_____

_____

_____

Milestones	Complete	Projected Date of Completion

Plan Goal (s) Addressed:

Goal: _____

Indicator of Success: _____

_____

_____

_____

Project Status

☐ Project on schedule

☐ Project completed

☐ Project delayed*

*explain: _____

_____

☐ Project canceled

Project Cost Status

☐ Cost unchanged

☐ Cost overrun*

*explain: _____

_____

☐ Cost underrun*

*explain: _____

_____

Summary of progress on project for this report:

A. What was accomplished during this reporting period?

_____

_____

_____

_____

B. What obstacles, problems, or delays did you encounter, if any?

_____

_____

_____

_____

C. How was each problem resolved?

_____

_____

_____

_____

Next Steps: What is/are the next step(s) to be accomplished over the next reporting period?

Other Comments: