

Infrastructure and Erosion Control

An Overview of the Alaska Department of Transportation and Public Facilities Projects in the Northern Region

Alaska Department of Transportation and Public Facilities
Northern Region
January - 2009

Presentation Overview

- Erosion Control funding
- Current DOT&PF projects at the Communities of Shishmaref, Kivalina, Shaktoolik, Unalakleet and Koyukuk
- Other Communities with erosion related DOT&PF projects.
- Summary

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Infrastructure and Erosion Control Project

- Funding Authorized in 2008
- Funding allows DOT&PF to begin early coordination with the effected communities, as well as State and Federal Agencies.
- Allows DOT&PF to collect available engineering data that may be useful for future investigations.
- Also allows for preliminary engineering investigations to help accelerate project development

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Infrastructure and Erosion Control Project

- Contacts for information
 - Mike Coffey, Statewide Maintenance & Operations
 - Michael Lukshin, Statewide Ports and Harbors
 - Cindie Little, Design Group Chief, Northern Region
 - Ryan Anderson, Engineering Manager, Northern Region

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Northern Region DOT&PF What are the Boundaries?



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Current Northern Region DOT&PF Erosion Control Related Projects

Kivalina, Koyukuk, Shaktoolik, Shishmaref, Unalakleet



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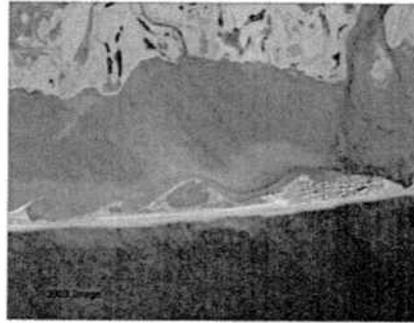
Kivalina



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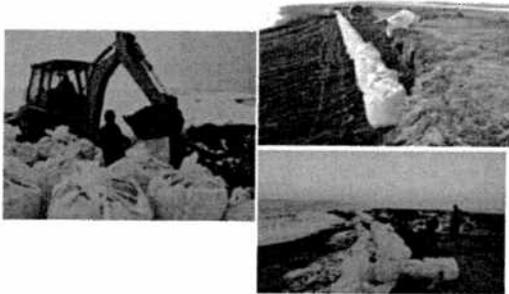
Kivalina

DOT&PF owns and operates the Airport.



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Kivalina Airport Emergency Repairs

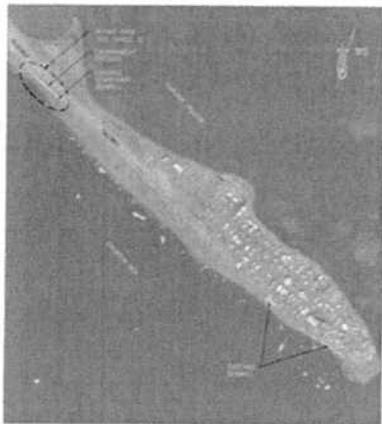


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Kivalina Airport Emergency Repairs

- Completed in 2005
- FEMA funded
- Repaired Taxiway embankment – added Super Sacks for protection
- Still in place today
- Used Local Labor and materials for repairs

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Kivalina Airport Emergency Repairs



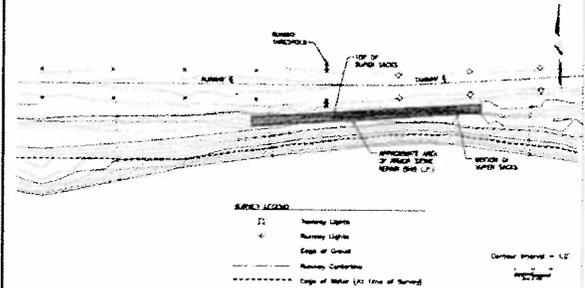
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Kivalina Airport Permanent Repairs

- Currently in Design
- FEMA funded
- Scope: Repair 725 Lineal feet of Taxiway Safety Area, Construct Rip Rap Revetment for future protection. (9,000 CY of Rip Rap to be barged in)
- Status: Requires additional funding – original estimates in 2005 was \$1.2M
- Current Estimate is \$5.3M for Construction
- Scheduled to Construct in 2009 if FEMA approves

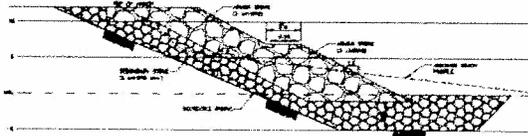
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Kivalina Airport Permanent Repairs



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Kivalina Airport Permanent Repairs



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Kivalina Studies

- Past Studies from DOT&PF include Geotechnical, Environmental and mainly focused on Airport.
- We have been providing comments to the Corp regarding the relocation studies.
- Climate Change paper by UAF – FHWA funded - In progress

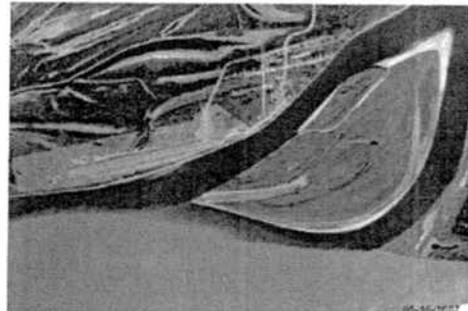
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Kivalina

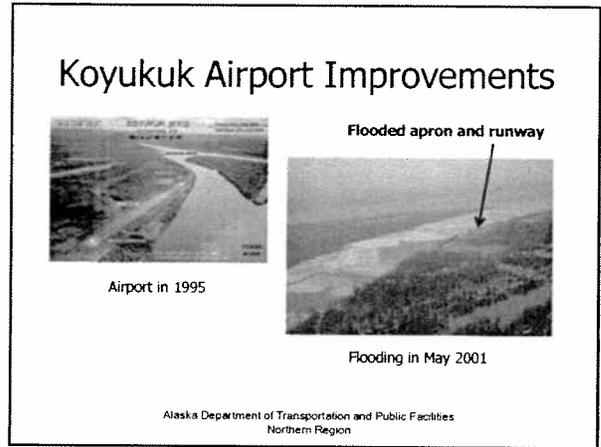
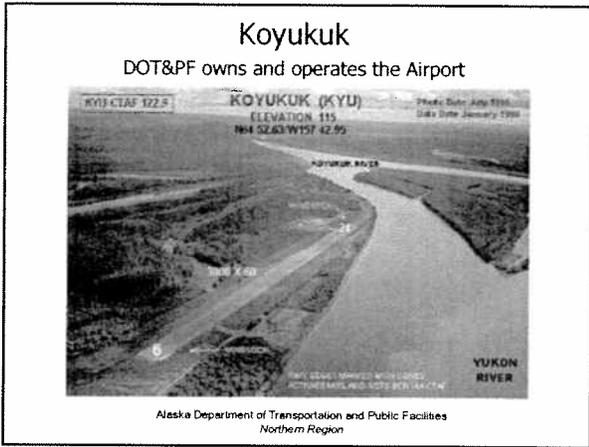
Embankment Stability Analysis

- Prepared by the Permafrost Lab, Geophysical Institute, UAF
- For FHWA – Western Federal Lands
- "Develop a numerical model for long term permafrost dynamics for sites near Kivalina"
- Model for Embankment thickness – to determine optimum – assist with cost estimates

Koyukuk



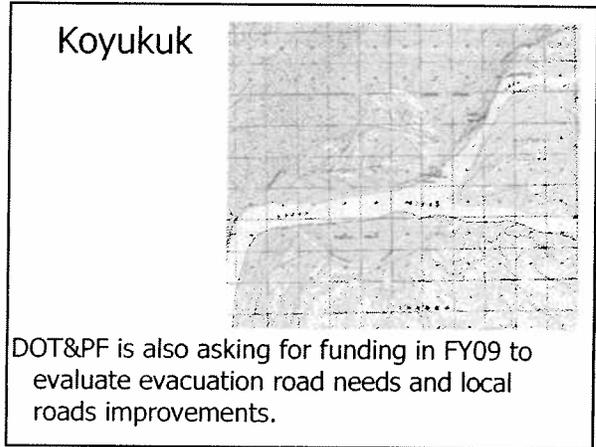
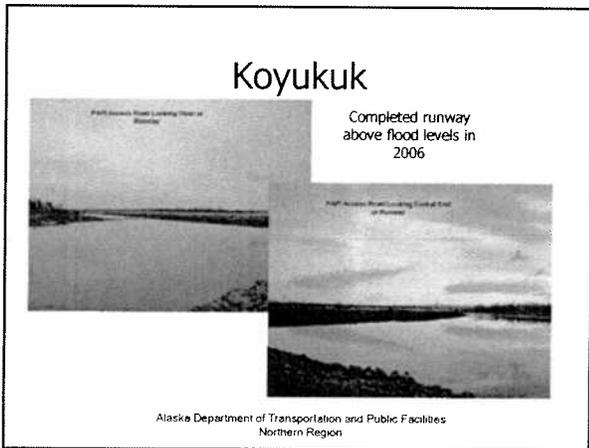
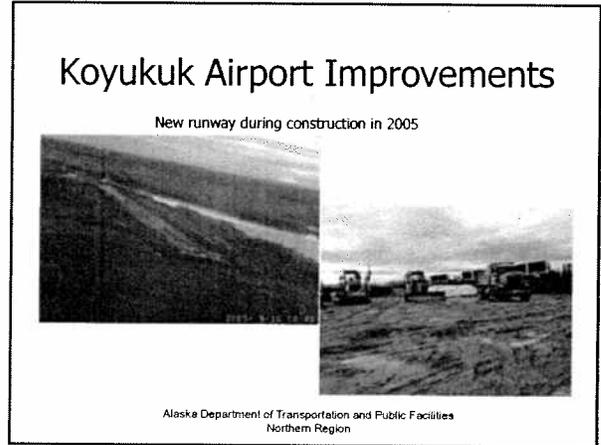
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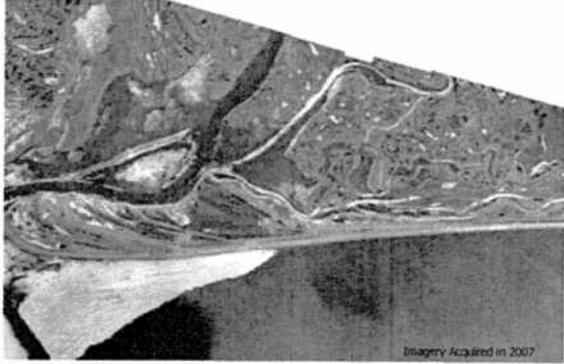
Koyukuk Airport Improvements

- Airport project completed in 2006
- Lengthened and widened runway.
- Raised grade of the Airport above the 100 year flood levels
- Total Cost: \$9.2 Million

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Shaktoolik



Imagery Acquired in 2007
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Shaktoolik

DOT&PF owns and operates the airport.



Shaktoolik Airport Emergency Repairs

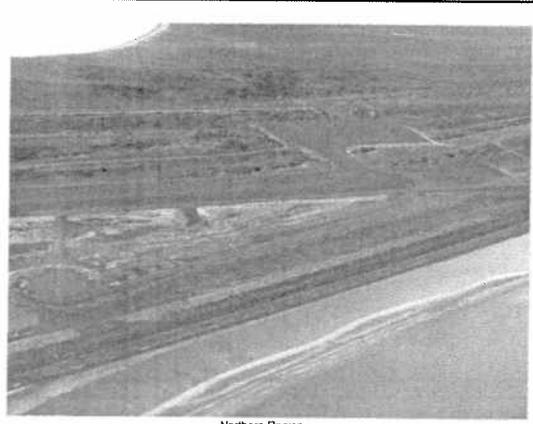
- Debris removal after the 2005 Fall Storm
- Completed shortly after the storm by Local M&O forces



Shaktoolik Airport Permanent Repairs

- FEMA funded project
- Completed in 2008
- Repaired damages to the Runway Safety Area and Nav-Aids.

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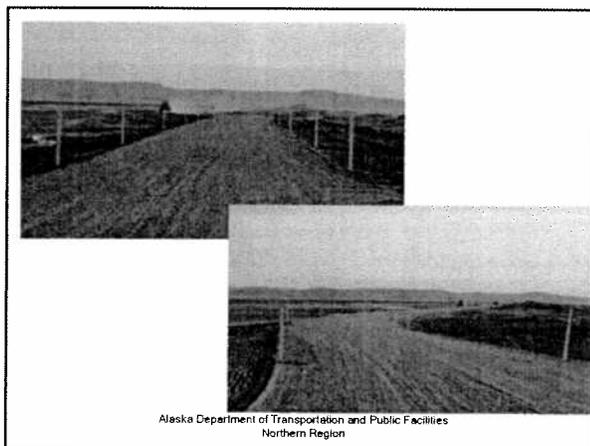
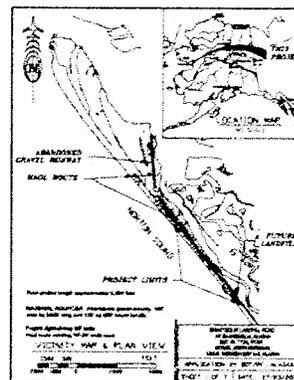


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Shaktoolik Landfill Road

- FHWA Funded project
- Completed in 2008
- Constructed drainage improvements to existing road through town, and a new section of road to a future landfill site.

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Shishmaref



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Shishmaref

- Several projects in planning/design
- The last DOT&PF Construction project was in 1992 to reconstruct the Airport.
- 1 FAA funded Master Plan Project
- 1 FHWA funded Reconnaissance Study

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Shishmaref Airport Master Plan – Stage I

- FAA funding
- Started in 2006
- Purpose of a Master Plan:
 - Develop short, medium, and long term development plans to meet future aviation demand
- How do we get there?

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Shishmaref Airport Master Plan – Stage I

- Collect and compile existing engineering information
- Develop a GIS database for easy access to all of the information
- Internet searches, library searches, agency interviews, etc
- The GIS database is complete – but still adding more information
- Data Collection plan has been developed
- This information will assist with alternatives analysis in the future

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Shishmaref Airport Masterplan, Stage II

- FAA funded
- Began in November, 2008
- Collect wind and climate data – representative areas on the mainland
- FAA requires 2 years of wind data for airport siting.
- This information will allow further evaluation of acceptable airport alternatives.

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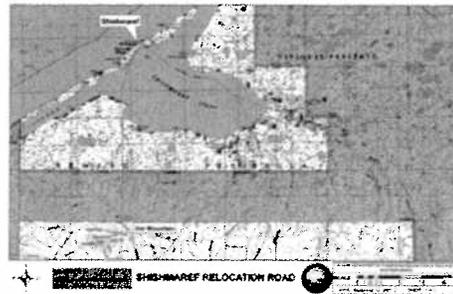
Shishmaref Relocation Road *Reconnaissance Study*

- FHWA funded
- Reconnaissance studies are broad in scope – provide overview of challenges and issues
- Major issue at Shishmaref is materials costs
- Scope: Evaluate the possibilities of a road from Ear Mountain to a barge site on the coast.
- Started in 2007

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Shishmaref Relocation Road *Reconnaissance Study*

Ear Mountain to the Coast – Project Study Area



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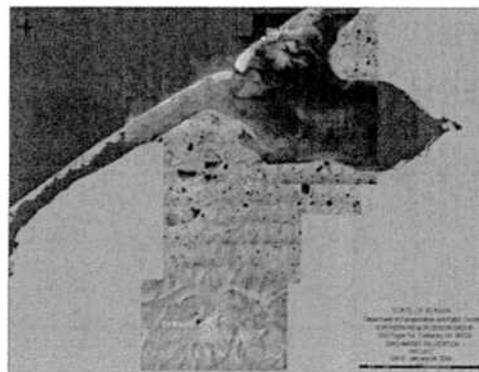
Shishmaref Relocation Road *Reconnaissance Study*

Aerial Photography and Topographic Mapping

- Flew in Late July of 2008
- Controlled Photography
- Orthophoto and Topographic Mapping is Deliverable
- Limited amount of Bathymetry was also performed

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Shishmaref Relocation Road Aerial Photography and Topographic Mapping



Shishmaref Relocation Road

Reconnaissance Study
Geotechnical Studies



Shishmaref Relocation Road

Reconnaissance Study

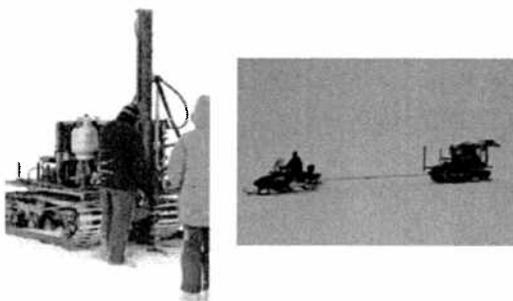
Geotechnical Studies

- In cooperation with the National Park Service
- Unique approaches for remote areas
- Field work started in 2007
- 2 objectives:
 - Find quality materials of sufficient quantity to construct a road from Ear Mountain to the coast, as well as for other projects that may be ongoing in the region.
 - Ensure the material is "safe" – Ear Mountain has been explored for Uranium in the past – UAF assisted

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Shishmaref Relocation Road

Reconnaissance Study



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Shishmaref Relocation Road

Reconnaissance Study

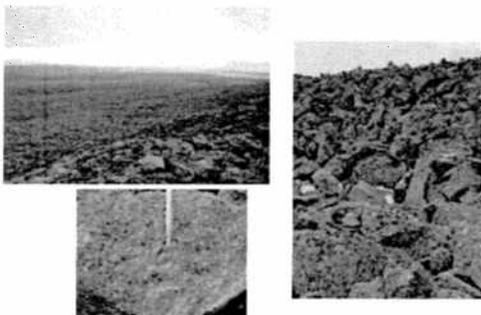
Geotechnical Studies

- Currently have drilled along one potential road alignment, including within Park, to characterize subsurface conditions.
- Have drilled several holes on Ear Mountain to prove up material
- This information is combined with detailed Geologic mapping for added confidence.
- Also have found granite material suitable for large rip rap.

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Shishmaref Relocation Road

Reconnaissance Study



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Shishmaref Relocation Road

Reconnaissance Study

Geotechnical Studies

- UAF professor specializing in radioactive materials visited the site and evaluated potential for hazardous materials.
- Determination was made that material can be safely mined from Ear Mountain.

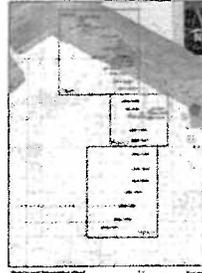


Shishmaref Relocation Road *Reconnaissance Study*

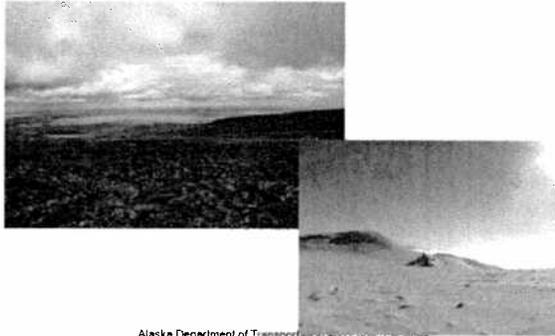
- Reconnaissance engineering work in progress
- Potential road alignments currently being evaluated.
- Cost Estimates
- Alternatives to standard construction methods (Ice Roads, etc)

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Shishmaref Relocation Road *Reconnaissance Study*



Shishmaref Relocation Road *Reconnaissance Study*



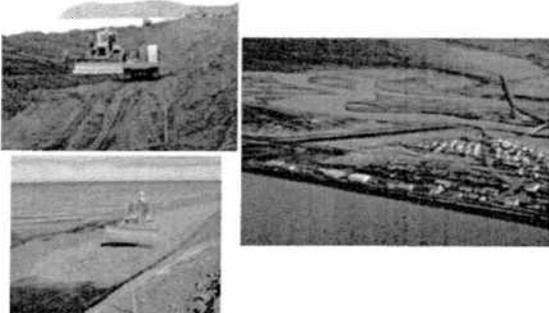
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Unalakleet



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Northern Region 2007 Image

Unalakleet Beach Road Permanent Repairs



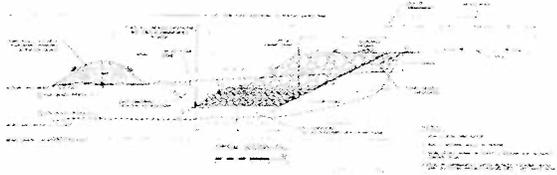
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Unalakleet Beach Road Permanent Repairs

- FHWA funded (Emergency Repairs)
- Repaired the embankment and constructed a seawall using local materials
- 9200 CY Rip Rap – \$130/CY
- 1073 lineal feet of shore protection along Beach Road
- Project Cost: \$2.2 Million

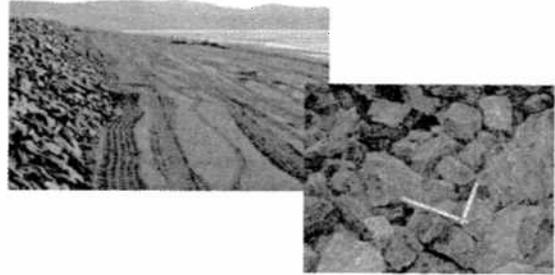
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Unalakleet Beach Road Permanent Repairs



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Unalakleet Beach Road Permanent Repairs



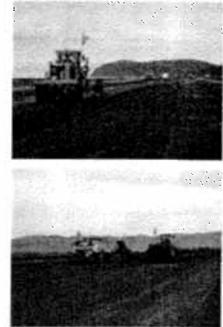
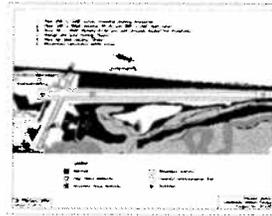
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Unalakleet Airport Improvements

- FAA funded - \$22M for Construction
- Construction to be complete in 2009
- Pave Runway, taxiways and Aprons
- Borrow Embankment: 100,000 CY Local Source (\$30/cy)
- Crushed Material: 60,000 CY barged from Stebbins (\$120/CY)

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Unalakleet



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