

**West Susitna Access Reconnaissance Study
West Susitna Access to Resource Development**

Transportation Analysis Report

1 INTRODUCTION

Prepared for:



Alaska Department of Transportation and Public Facilities
Division of Program Development

Prepared by:



HDR Alaska, Inc.
2525 C Street, Suite 305
Anchorage, AK 99503

In Association with:
Shannon & Wilson, Inc.
Sisyphus Consulting

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Acronyms

AAC	Alaska Administrative Code
AASHTO	American Association of State Highway and Transportation Officials
ADF&G	Alaska Department of Fish and Game
ADL	Alaska Division of Land
AEA	Alaska Energy Authority
AIDEA	Alaska Industrial Development and Export Authority
AMHT	Alaska Mental Health Trust
ANCSA	Alaska Native Claims Settlement Act
ARDF	Alaska Resource Data File
ARTEC	Alaska Railbelt Transmission and Electric Company
AS	Alaska Statute
ASCMCRA	Alaska Surface Coal Mining Control and Reclamation Act
ATV	all-terrain vehicle
bbf	barrels
BIF	best interest finding
BLM	U.S. Bureau of Land Management
bpd	barrels per day
CEA	Chugach Electric Association
CBM	Coalbed Methane
CIE	Cook Inlet Energy, LLC
CIRI	Cook Inlet Region, Inc.
CWA	Clean Water Act
DEM	digital elevation model
DGGS	Division of Geologic and Geophysical Surveys
DNR	Alaska Department of Natural Resources
DOF	Division of Forestry
DOG	Division of Oil and Gas
DOT&PF	Alaska Department of Transportation and Public Facilities
DPOR	Department of Parks and Outdoor Recreation
EIS	environmental impact statement
FAA	Federal Aviation Administration
FERC	Federal Energy Regulatory Commission
FHWA	Federal Highway Administration
FMU	Forest Management Unit
GIS	Geographic Information System
GMU	Game Management Unit
KPB	Kenai Peninsula Borough

KPEDD	Kenai Peninsula Economic Development District
LNG	liquid natural gas
mcf	million cubic feet
MEA	Matanuska Electric Association
Mgal	million gallons
ML&P	Municipal Light and Power
MLW	Mining, Land and Water
MOA	Municipality of Anchorage
MSB	Matanuska-Susitna Borough
MW	megawatt
NHCC	National Highway Construction Cost Index
NPR-A	National Petroleum Reserve – Alaska
NWI	National Wetlands Inventory
OPMP	Office of Project Management and Permitting
PGDHS	A Policy on Geometric Design of Highways and Streets
PGE	platinum group elements
ROD	Record of Decision
RM	river mile
SRR	State Recreation River
SRS	State Recreational Site
syngas	synthetic gas
UCG	underground coal gasification
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USGS	U.S. Geological Survey

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EXECUTIVE SUMMARY

The Alaska Department of Transportation and Public Facilities' (DOT&PF) Roads to Resources Initiative originated the West Susitna Access Reconnaissance Study in early 2013. The purpose of this reconnaissance-level study is to evaluate and consider the need for surface access to resource development opportunities west of the Susitna River in Southcentral Alaska.

The Study Area is located in Southcentral Alaska, generally west of the Parks Highway, south of Denali National Park and Preserve, east of the Alaska Range, and north of Cook Inlet (including the Beluga/Tyonek area). The area covers nearly 6.2 million acres.

While nearly the size of Vermont, the Study Area has a diverse natural resources base. These natural resources include hardrock minerals, placer gold, coal, oil and gas, forestry/timber, agriculture, alternative energy options, and recreational resource opportunities, such as sportfishing and hunting. Surface access to most of this area, however, is minimal or non-existent.

This study aims to identify locations that may benefit from a proposed surface connection and evaluates the potential access routes. The objectives of this study report are to:

- Identify resource development opportunities west of the Susitna River.
- Identify one or more potential crossings of the Susitna River.
- Identify one or more potential transportation corridors to access identified resources.

The majority of the Study Area is not accessible by the existing road network. Access within most of the Study Area occurs primarily by air or river travel, or by snowmachine or ice roads during the winter months. Other types of travel modes include skiing and foot travel. Providing surface access to some of these natural resource-dense areas could facilitate further exploration, development, and use of these resources. Natural resource development in Alaska helps to create jobs and stimulate the economy. Creating access to resources also enables residents and visitors to use the land recreationally.

The first part of this study consisted of inventorying natural resources and existing infrastructure in the Study Area. Based on a constraints and opportunities analysis approach, ten broad preliminary corridor segments were delineated based on the locations of identified resource opportunities, environmental constraints, Susitna River crossing locations, and previously identified alignments. Initial centerlines were laid out within these corridor segments. Through a refinement process, several segments were dismissed for a variety of reasons, including redundancy, engineering challenges, prohibitive costs, etc. The remaining alignments were refined and combined to create four different access routes and one variant for consideration for providing access into the Susitna basin. Features of the proposed access routes are summarized in Table ES-1. The proposed access routes were evaluated based on a number of considerations, including “strengths” (e.g., acreages of resources made accessible) and “weaknesses” (e.g., engineering challenges). Both quantitative and qualitative measures were used to compare the access routes.

The study team also collected additional existing information to help quantify the resource potential of the areas to be accessed. Potential resource values have been incorporated into the respective resource sections of this report, primarily in Section 2. There are some limitations to the assumed resource values. For instance, the use of lease acreage and claims as a proxy for resource potential should not be taken to imply that all of that acreage would be developed, as most of the holdings are for exploration at this time. Likewise, acreages designated by DNR as potential for agricultural use may not be fully utilized for crops. In terms of mineral potential, a caveat is that this runs the risk of

under- or over-stating the actual potential of other areas that are not currently leased for exploration. A thorough economic benefits and impacts analysis has not been completed for this project. However, a separate document has also been prepared that considers the economic benefits of proposed access into the West Susitna Study Area (see Appendix F).

Given the wide variety of potential resource development opportunities within the Study Area, there is no single target point (destination) for the proposed access routes. As such, several possible routes have been identified, each having different origins and destinations, as indicated in the following table. Depending on the priority, availability of funding, and timing of access needs, multiple routes could be chosen and combined or added to other routes in subsequent phases. For example, for the routes destined for the mining area in the Tordrillo Mountains, another one of the alignments could be added to provide access to the Beluga area if both locations are shown to warrant access.

Table ES-1. Proposed Access Routes Summary

	North Petersville Road	North Skwentna	Middle Susitna-Skwentna River	Beluga	Deshka Variant
General origin	Petersville Rd	Oil Well Rd	Little Su River Rd	Little Su River Rd	Willow area
General destination	Upper Skwentna mineralized area	Upper Skwentna mineralized area	Upper Skwentna mineralized area	Beluga/ Tyonek	Oil Well Rd
Amount of resources accessed					
<i>Hardrock minerals</i>	Medium	High	Highest	Lowest	Low
<i>Placer gold mining</i>	Medium	High	Highest	Lowest	Lowest
<i>Coal</i>	Medium	Medium	High	Highest	Lowest
<i>Oil and gas</i>	Lowest	Medium	Medium	High	Highest
<i>Forestry/timber</i>	Low	High	Highest	Low	Medium
<i>Agriculture</i>	Lowest	Lowest	Medium	Lowest	Highest
<i>Recreation</i>	Low	Lowest	Medium	Highest	Low
Length (miles)	78.8	71.6	107.9	63.8	33.5
New Bridges (#)					
<i>Conventional</i> ¹	9	12	20	11	1
<i>Long Span</i> ²	4	6	4	2	2
<i>Total</i>	13	18	24	13	3
New bridge crossings greater than 1,000 feet	1,150 (Yentna)	1,200 (Yentna) 1,200 (Hayes)	1,200 (Hayes) 1,640 (Susitna)	1,640 (Susitna)	1,200 (Susitna)
New Culverts (#)					
<i>Large</i> ³	12	12	14	6	2
<i>Small</i> ⁴	37	26	40	12	11
<i>Minor Drainage</i> ⁵	316	292	440	260	136
Cost Estimate (millions)					
<i>Subtotal</i> ⁶	\$147.6	\$188.3	\$187.4	\$106.9	\$72.2
<i>Total</i> ⁷	\$376.4	\$504.3	\$453.2	\$257.8	\$216.9
<i>Total per mile</i> ⁸	\$4.6	\$6.3	\$4.2	\$4.0	\$5.2

* A Goeller scorecard is a commonly used method of comparatively displaying pros and cons. The Goeller scorecard was used in this reconnaissance study to display the impacts of the reconnaissance-level proposed access routes. This method displays the impacts of each option, which is expressed in its 'natural' units. In this study, examples of natural units are feet, miles, number of creek crossings, acreages, and monetary value. In the tables, each row represents one impact and each column represents an access route option. Colored shading is used to comparatively indicate the more or less favorable metrics. The color shading was intended to make it easier for a decision-maker or reader to identify patterns or to come to conclusions. In some cases, values were relatively similar so there may be more than one option shaded the same color within the same row. No behind-the-scenes normalization or ranking was applied.

Green = Proposed access route(s) with the fewest number of roadway miles, bridges, culverts, and/or costs. Also, indicates highest amount of resources made accessible.

Red = Proposed access route(s) with the greatest number of roadway miles, bridges, culverts, and/or costs. Also, indicates least amount of resources made accessible.

Assumptions:

¹ Conventional bridges are considered less than 300 feet in length.

² Long span bridges are 300 feet or longer.

³ A culvert approximately 96 feet or longer.

⁴ Small culverts and minor drainage culverts have an assumed length of approximately 50 feet.

⁵ An additional four culverts per mile to accommodate minor drainage patterns.

⁶ Subtotal cost estimate for new proposed access roadways includes clearing, earthwork, structures, stream and river crossings (including culverts), guardrail and retaining walls, and miscellaneous items such as topsoil, seeding, geotextile and signing.

⁷ Total cost estimate includes drainage measures, erosion and pollution, surveying, environmental studies and permits, existing road upgrades, construction, mobilization, right-of-way (ROW) acquisition, contingency, design, and utilities.

⁸ Total per mile includes only the proposed access routes and does not include existing roadways or cost to upgrade them.

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1 INTRODUCTION

1.1 Study Overview

In January 2013, the Alaska Department of Transportation and Public Facilities (DOT&PF) contracted with HDR Alaska, Inc. and its consultant team to conduct the *West Susitna Access Reconnaissance Study*. The purpose of this study is to evaluate and consider the need for surface access to resource development opportunities west of the Susitna River in Southcentral Alaska. The Study Area is natural-resources dense, and this study aims to identify locations that may benefit from a proposed surface connection. The objectives of this study are to:

- Identify resource development opportunities west of the Susitna River.
- Identify one or more potential crossing(s) of the Susitna River.
- Identify one or more potential transportation corridor(s) to access identified resources.

This report is intended to be a reconnaissance-level study based on existing, available information. No field investigations were performed. While agencies and other resource-industry stakeholders were contacted to supplement existing information, a public involvement and stakeholder engagement process was not a part of this reconnaissance-level study at this time. Should this project move forward, a public involvement and stakeholder engagement process would be implemented and subsequent environmental processes and analyses would be pursued.

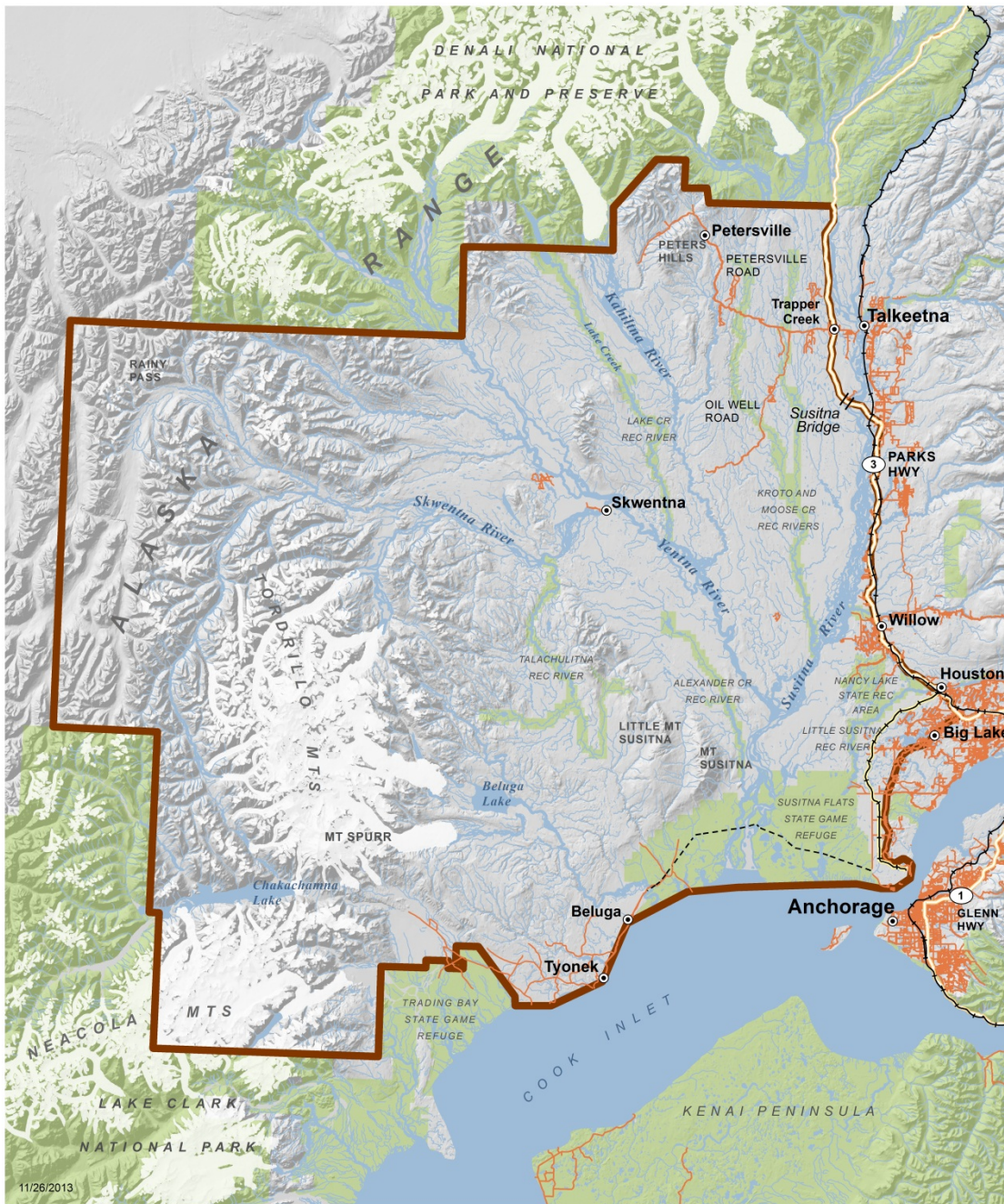
1.2 Study Setting

The Study Area, depicted in Figure 1-1 and Figure 1-2, is located in Southcentral Alaska, generally west of the Parks Highway, south of Denali National Park and Preserve, east of the Alaska Range, and north of Cook Inlet (including the Beluga/ Tyonek area). At nearly 6.2 million acres, the Study Area is roughly the size of Vermont.

Figure 1-1. Study Area in State Context



Figure 1-2. Study Area



Study Area

West Susitna Access to Resource Development



A diverse natural resources base is found in the Study Area, particularly west of the Susitna River. The study team identified the following opportunities for resource exploration, development and access in the Study Area: hardrock minerals, placer gold mining, coal, oil and gas, forestry/timber, agriculture, alternative energy, and recreation. These resources and activities are further discussed in the Resources Inventory, Section 2.

Surface access to most of this area is minimal or non-existent. The majority of the Study Area is not accessible by the existing road network. Access within the Study Area occurs mostly by air, river, or by snowmachine or ice roads during the winter months. Other types of travel modes include skiing and foot travel. Providing surface access to some of these natural resource-dense areas could facilitate further exploration, development, and use of these resources. Natural resource

development in Alaska helps to create jobs and stimulate the economy. Creating access to resources also enables residents and visitors to use the land recreationally.

“Economic growth and stability in Alaska hinges partially, if not primarily, on the availability of a mix of affordable and sustainable energy sources.”

–Fossil Fuel and Geothermal Energy Sources for Local Use in Alaska (DNR- DGGS 2012)

A number of previous studies have identified corridor alignments into and through the Study Area. These studies and alignments were reviewed as part of this study.

1.3 Background Information

1.3.1 Use of Public Lands

Alaska Statute (AS) 38.04.065 Land Use Planning and Classification and 11 Alaska Administrative Code (AAC) 55.010-.030 requires that the Alaska Department of Natural Resources (DNR) “shall, with local governmental and public involvement under AS 38.05.945, adopt, maintain, and, when appropriate, revise regional land use plans that provide for the use and management of State of Alaska-owned lands.” One of DNR’s purposes is to identify important land resources and determine how their lands can be used for the “maximum public benefit.” Often, multiple uses are allowed on these public lands.

Why Plan for the Use of Public Land?

“Through the management of public lands, the state, borough, and federal governments greatly influence the physical development patterns and the general quality of life in the Susitna Area. Major development projects such as mining, timber harvests, or agriculture influence local job opportunities. Land sold for residential or private recreational use clearly affects the character of community life, as does land retained for hunting, fishing, and other public uses.”

– Susitna Area Plan (DNR 1985)

DNR has prepared a number of management plans applicable to the Study Area; some of these include: the *Susitna Matanuska Area Plan* (2011), the *Southeast Susitna Area Plan* (2008), the *Susitna Basin Recreation Rivers Management Plan* (1991), the *Susitna Forestry Guidelines* (1991), and the *Susitna Area Plan* (1985). Access is addressed in these plans. For instance, the 1985 *Susitna Area Plan* addresses transportation and access as follows:

“The final major goal of the plan is to open more land in the region to a variety of public and private uses. This is achieved in part by the pattern of land use designations in the plan. This pattern is specifically arranged to combine designated uses in a manner that makes benefits of road construction greater than the cost. For example, in the region south of Petersville Road, forestry

areas are designated to encourage construction of pioneer roads that will open adjacent land to use for public and private recreation and agriculture.” (p.11)

In furtherance of its DNR’s mission relative to the Susitna Basin a number of detailed resource investigations are ongoing. The DNR-Division of Geological and Geophysical Surveys (DGGS) is currently conducting a mapping project in the Beluga/Tyonek area and another mapping project in the Susitna River basin that will help to determine resource potential.¹ For this effort, baseline geologic data for potential energy systems from surface rock exposures is being collected. The product of this work will be a geologic map and series of technical reports on their field findings. An overview report of the fieldwork in the Susitna basin was published in April 2013, which summarizes the ten reconnaissance field trips that were conducted in the Susitna basin in June 2011.² The work has been done in partnership with Alaska DNR-Division of Oil and Gas (DOG), U.S. Geological Survey (USGS), and the University of Alaska Fairbanks. According to the April 2013 report, the information is intended to increase the understanding of the basin’s hydrocarbon potential, a “key component of DGGS’s multi-year In-State Gas Program.” The 2011 summer reconnaissance fieldwork and subsequent analysis is part of a multi-year, multi-agency research effort to investigate the resource potential of the Susitna sedimentary basin. As the data is developed, interpretive technical reports will be produced addressing the stratigraphy, reservoir quality, coal quality and gas potential, hydrocarbon seal integrity, subsurface structure, and uplift history of the basin. The intent is to promote new exploration investment and support responsible resource and land-use management.³

Of the nearly 6 million acres of land in the Study Area, a majority of the land is classified as State land and considered an opportunity for access route locations.⁴ Land status is addressed in a number of sections in this document: specifically in Section 4.4 in terms of both constraints and opportunities for access route locations and in Section 6.2, as part of the land type located within the proposed access route corridors. Utilizing State lands would be preferable for access route locations because of its lower cost to the state, fewer impacts to private property, and less bureaucratic requirements for using federal property. At this reconnaissance-level of study, the access routes were aligned based on a constraints and opportunities analysis. At this time, access routes were not realigned and re-routed based on a detailed analysis of land ownership. Should this project move forward, a more detailed consideration of land status is warranted.

1.3.2 Roads to Resources Initiative Overview

Alaska has a diverse natural resource base. Some of the natural resource deposits or prospects in Alaska are world-renowned and are considered to be some of the largest in the world. However, surface access to most of these resource development opportunities around the State is minimal or non-existent. Providing access to these natural resources increases the opportunity for job creation and economic growth, which in turn supports funding for essential State programs and boosts the state’s treasury.

¹ DNR-DGGS. March 26, 2013. Personal communication with DNR-DGGS Geologist Robert Gillis.

² DNR-DGGS. April 2013. Status of A Reconnaissance Field Study of the Susitna Basin, 2011. By Robert Gillis et al.

³ DNR-DGGS. January 2012. *Annual Report 2011*.

⁴ Land ownership is generalized, based on spatial data from the DNR 2013 General Land Status database, which approximates land status at the section level. Data limitations exist and ownership types are aggregated for planning purposes only. An in-depth analysis of land status and ownership has not been conducted at this reconnaissance-level study. Due to limitations of the data, actual status and ownership of any land should be verified in subsequent project development.

In 2003, to facilitate resource exploration and development of minerals, coal, and oil and gas, the State of Alaska initiated its Industrial Roads Program, also known as the “Roads to Resources” program. This initiative was created to help identify possible partnerships between the State and the resource industry to identify possible surface access needs and opportunities. Encouraging resource development and making exploration, development, and production opportunities more accessible, would in turn increase financial feasibility. This would ultimately benefit Alaska’s economic development by providing increased revenue and employment opportunities.

In recent years, the larger Roads to Resources initiatives have generally focused on roads in Alaska’s arctic region: the roads to Umiat, Ambler, and Tanana. These projects are much further along in the project development process compared to the *West Susitna Access Reconnaissance Study*, which was initiated in early 2013.

- The proposed road to Umiat, also known as the *Footbills West Transportation Access Project*, would facilitate oil and gas exploration and development in the northern foothills of the Brooks Range and improve access to the National Petroleum Reserve-Alaska (NPR-A) via Umiat. An approximate 75-mile road from the Dalton Highway to the Gubik Gas fields is proposed. Eventually the road would be extended across the Colville River to the State airport in Umiat.
- The road to Ambler, also known as the *Ambler Mining District Access Project*, would consist of a 200 to 370 mile road from the mining district to either a port in western Alaska or to a Dalton Highway connection. The road would provide access primarily to mining resources. A number of corridors were identified several years ago, and subsequent environmental baseline studies are occurring. During its 2013 session, the Alaska State Legislature appropriated \$8.5 million for this industrial road to connect with the Dalton Highway. Management of this project shifted from DOT&PF to the Alaska Industrial Development and Export Authority (AIDEA) in 2013.
- A road has been proposed to Tanana from the existing Elliott Highway. The proposed road would extend from the existing road network near Manley Hot Springs and follow along the existing Tofty Road to the Yukon River near the village of Tanana. The road would provide access between remote villages and larger hub communities. The DOT&PF submitted an easement application to DNR in December 2012 for a 300-foot wide approximately 36 mile corridor.⁵

One other non-arctic Roads to Resources initiative proposes to upgrade the existing Klondike Highway near Skagway to accommodate increased industrial uses. It is the only Roads to Resources roadway that was previously already in existence, and its intent is to enhance the pavement and bridge structures to accommodate an anticipated large increase in the transport of ore from Canadian mines to the Port of Skagway.

Other smaller-scale Roads to Resources initiatives⁶ include:

- Niblack Mine access – Prince of Wales
- Bokan Mountain Mine access – Prince of Wales
- Granduc Mine – Hyder Salmon Road

⁵ State of Alaska. Online Public Notices. <http://aws.state.ak.us/OnlinePublicNotices/Notices/View.aspx?id=168193> (accessed July 16, 2013).

⁶ http://dnr.alaska.gov/commis/priorities/Slides/Ed_Fogels.pdf

- Katlian Quarry – Baranof Island
- Miscellaneous access roads in southeast Alaska
- Nome and Seward Peninsula – access for several mine prospects

This West Susitna Access Study report will provide a foundation for subsequent work, should funding become available and if the project were to move forward. Other project development activities would include field studies, agency consultation, public involvement, alignment refinement, and an environmental review process.

1.4 General Study Methodology

This study was prepared using the following approach:

- **Review existing literature and relevant** studies to identify resources and access opportunities in the Study Area. Information was obtained based on a cursory literature search of available, existing information and industry knowledge.
- **Conduct interviews** with a variety of industry organizations, land owners and other stakeholders, such as relevant State divisions, to verify and yield additional information and data.
- **Inventory natural resources** in the Study Area.
- **Inventory existing infrastructure** in the Study Area.
- **Identify Susitna River crossing location options and possible transportation corridors** based on identified opportunities and constraints related to the identified resources
- **Identify next steps** for further project development.


1.5 Report Contents

This report is generally structured in a way that depicts the methodology used for this study.

- **Section 1** of this report provides background information and explains the general approach methodology used to conduct the study.
- **Section 2** presents an inventory of known natural resources in the Study Area.
- **Section 3** identifies the existing transportation and energy infrastructure in the Study Area.
- **Section 4** describes previously-identified alignments and explains the methodology for developing the access routes through an opportunity and constraints analysis.
- **Section 5** presents the proposed access routes, and **Section 6** evaluates them.
- **Section 7** summarizes the findings of the study and suggests the next steps for further project development.

The following documentation has supported the development of this study:

- Appendix A Preliminary Design Criteria Report
- Appendix B Proposed Access Routes Map Index
- Appendix C Geotechnical Reconnaissance Report
- Appendix D Cost Estimate Details
- Appendix E Annotated Bibliography
- Appendix F Economic Considerations



Murray Walsh, Roads to Resources Manager

Alaska Department of Transportation & Public Facilities

DOT&PF, Commissioner's Office

PO BOX 112500; Juneau, AK 99811-2500

Telephone: 907-465-6973

e-mail: Murray.Walsh@alaska.gov