Memo

Date:	January 7, 2020
Project:	10195855 - AIDEA NTP9 - West Susitna Access Study, Phase 1
To:	Alan Weitzner, AIDEA
From:	Wescott Bott, PE
Subject:	Field Reconnaissance Report for West Susitna Access Study, Phase 1

This field reconnaissance study is a continuation of the West Susitna Access Reconnaissance Study - Transportation Analysis Report prepared in 2014 by HDR for the Alaska Department of Transportation and Public Facilities. That 2014 work, known as a “Roads to Resources” study, identified and evaluated mineral, energy, forestry/timber, agriculture, and recreation resources. The 2014 report also identified and evaluated access route alternatives to these resources with a western terminus at the Whistler Mining District.

The following information documents field reconnaissance work on AIDEA’s West Susitna Access Study by HDR on November 3 and 4, 2019. A summary of field work activities for each day is as follows:

NOVEMBER 3, 2019

Pollux Aviation provided helicopter transport. HDR arrived at the Pollux Aviation hangar in the Palmer-Wasilla area at approximately 8:15 am. HDR’s team on November 3 consisted of Wescott Bott (Project Manager/Engineer), Bob Butera (Senior Civil Engineer), and Ashley Hovis (Wetland Scientist). While waiting for morning fog to burn off, the team discussed field work logistics and the areas of interest. Sam Maxwell, the manager at Pollux Aviation, provided insight on the terrain from many years of flying experience and his volunteer work in the area doing Iditarod Trail maintenance. The team was airborne in a Robinson R44 helicopter at 9:45 am. After passing through minor fog over the Willow area, the rest of the weather conditions were clear and sunny with negligible wind and temperatures in the middle 30’s Fahrenheit.

The team began following the proposed Port Mackenzie Route (PMR) starting at the end of the existing railroad embankment near the west end of Ayrshire Road. An overview map of all routes is attached as Figure 1 at the end of this report. The team followed the PMR in a westward direction by helicopter at 200 to 300 feet of altitude taking photographs and noting terrain features, major waterway crossings, environmental considerations, and potential route modifications along the way. Additional focus was devoted to the following areas along the PMR:

- the proposed Susitna River crossing location
- the segment of the PMR that parallels the northeast slope of Mount Susitna, Little Mount Susitna, and Beluga Mountain
- the proposed Talachulitna River crossing location

The team landed at Skwentna Roadhouse to refuel and then continued flight up the south side of the Skwentna River valley to the end of the proposed PMR in the vicinity of the “Whiskey Bravo” airstrip at the exploration camp in the Whistler Mining District. On the return flight the team followed the north side of the Skwentna River valley for comparison purposes. The team viewed potential Skwentna River crossing locations and then returned to Skwentna Roadhouse to refuel again. After refueling the team spent additional time flying around the area of the confluence of the Skwentna River and Talachulitna River evaluating potential route improvements and river crossing locations.

Around 3:00 pm the team headed southeast toward the Palmer-Wasilla area, flying over and viewing the proposed East-West Route (EWR) from the Susitna River to the point of tie-in just west of Big Lake. A thick fog bank over the Palmer-Wasilla area forced the helicopter to divert south and land at Lake Hood Airport in Anchorage at about 4:30 pm. The helicopter stayed at Lake Hood Airport that night.

NOVEMBER 4, 2019

HDR’s team on November 4 consisted of Bob Butera and Ashley Hovis. Since the helicopter was already in Anchorage the morning of November 4, the team departed directly from Anchorage. The focus on November 4 was the South Route. With one less passenger the helicopter was able to carry more fuel to cover the longer flying distances required to get to the South Route. The team departed Anchorage at about 11:00 am and headed west to the Tyonek / Ladd Landing area where the South Route begins. The weather conditions were partly cloudy with light to moderate winds.

The team followed the proposed South Route from the Ladd Landing area north to the area where the South Route merges with the proposed PMR near the Skwentna River. The team flew at 200 to 300 feet of altitude taking photographs and noting terrain features, major waterway crossings, environmental considerations, and route modifications along the way. The team made two landings near milepost 5 for the purpose of performing wetland verification.

At about 3:00 pm the team returned to the Pollux Aviation facility in the Palmer-Wasilla area.

Key Observations and Recommendations

The following sections describe key observations, environmental considerations, and route adjustment recommendations.

Port Mackenzie Route - Ayrshire Road to the base of Mount Susitna

- This segment offers flexibility in terms of access mode tie-in options. If the selected mode of access is by rail then the PMR offers connection to the existing Port Mackenzie Railroad embankment. If the selected mode of access is by road, then the PMR offers connection to either Little Su River Road or Ayrshire Road.
- Stream crossings were generally well sited at locations where valleys are narrow and where wetland impacts are minimized. See Figure 2, Figure 3, and Figure 4.
- A minor alignment change was noted at the approach to the base of Mount Susitna. The alignment continued to a higher elevation than necessary up the side of Mount Susitna before turning northwest and following the contour. See Figure 5 showing the recommended alignment change.
- Private cabins, airstrips, and other recreational properties were observed along this segment.
- This segment parallels and in some places crosses Iditarod Trail Historic Routes.

Figure 2: Fish Creek looking upstream and showing the approximate crossing location (looking north)

Figure 3: Susitna River crossing

Figure 4: Alexander Creek showing the approximate crossing location (looking west)

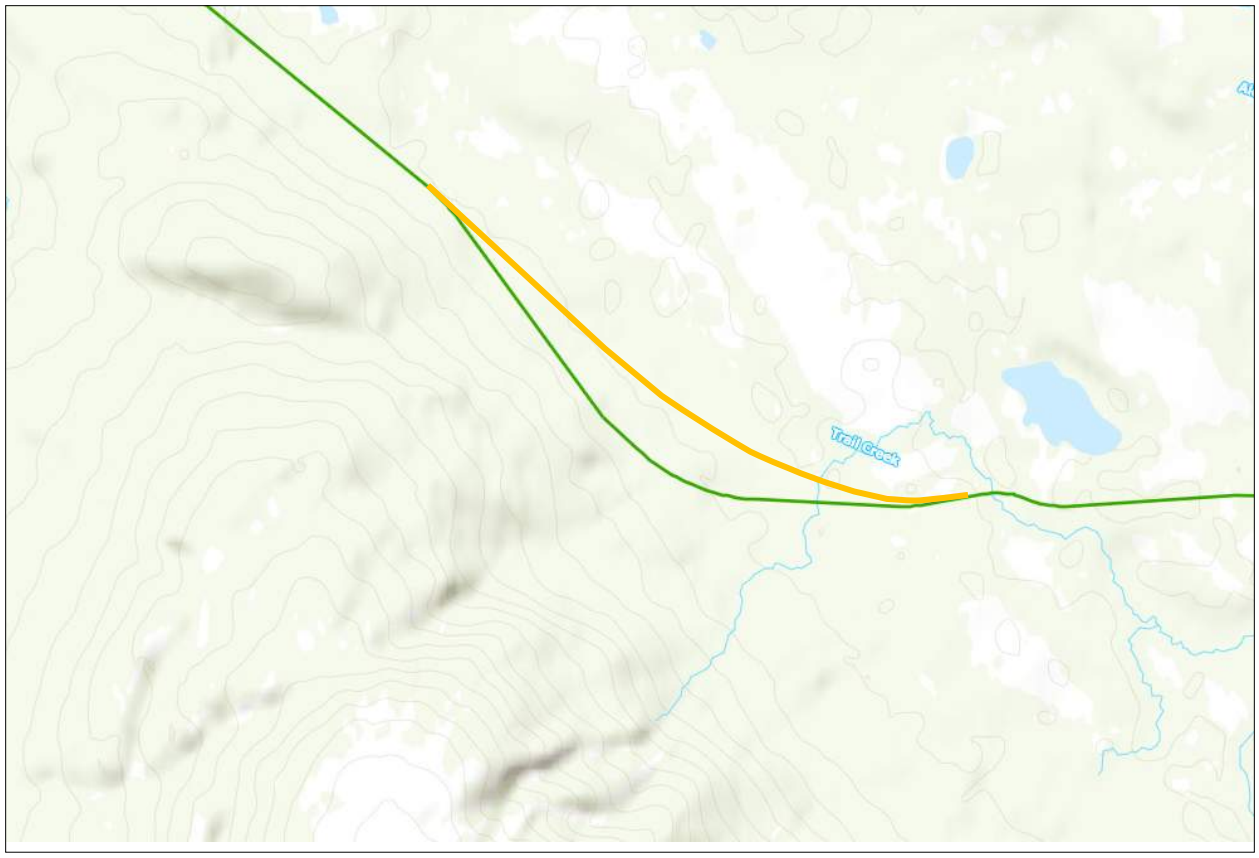


Figure 5: Recommended alignment change (orange line) at the north base of Mount Susitna

Port Mackenzie Route - Base of Mount Susitna to the Talachulitna River

- This segment follows the hillside contours along the base of Mount Susitna, Little Mount Susitna, and Beluga Mountain. The terrain is generally smooth and forested as shown in Figure 6.
- Groundwater seepage out of the hillside was evident while flying over. The embankment design will need to carefully consider groundwater seepage.
- Though this segment was heavily forested and is generally indicated in NWI mapping as upland, small creeks and ponds with standing water could be seen throughout. Since a portion of this segment follows the same alignment as the proposed Donlin gas pipeline, Donlin wetland mapping in this area could be used to confirm the wetland classification. Additional wetland field work could be needed in portions of this segment that do not overlap the proposed Donlin gas pipeline.
- Terrain gradually becomes hillier from approximately Eightmile Creek to the Talachulitna River.
- Private cabins, airstrips, and other recreational properties were observed along this segment.

Figure 6: Smooth and gently sloping terrain along the base of Beluga Mountain (looking northwest)

Port Mackenzie Route - Talachulitna River Crossing to Canyon Creek

- The Talachulitna River crossing location should be further evaluated. As shown in Figure 7 the current alignment crosses at a location where the river flows through a deep narrow canyon, which would require a large single-span bridge. The approaching alignment from the southeast bisects a large pond. A tradeoff study should consider moving the crossing further downstream where the river is in a shallower valley and where the alignment would avoid the ponds.

Figure 7: Talachulitna River (looking upstream [south]) at the approximate crossing location.

- Approximately 2 miles of the alignment between Quartz Creek and Canyon Creek is through what appears to be Skwentna River floodplain. An embankment in this area may need to consider flood events. High groundwater is also evident in the flood plain from the ponds and vegetation as shown in Figure 8. A trade off study should consider the potential wetlands, fish, wildlife, constructability, and flood hazard impacts associated with the floodplain alignment versus moving the alignment above the bluff where additional cuts and fills would be required to manage the rougher terrain.
- Private cabins, airstrips, and other recreational properties were observed along this segment.

Figure 8: Skwentna River floodplain on the right and the adjacent bluff on the left. The proposed alignment at this location is through the floodplain at the toe of the bluff.

Port Mackenzie Route - Along the South Side of the Skwentna River Valley
Construction of a road or railroad along the south side of the Skwentna River Valley would be difficult and expensive, primarily from the Hayes River to the terminus. Maintenance of a route in this area would be challenging and costly as well.

- The PMR follows the south side of the Skwentna River for approximately the next 37 miles. This segment of the alignment parallels the toe of the north face of the Tordrillo Mountains. The north face of the Tordrillo Mountains slopes down to the Skwentna River, steeply in places. Much of the route would need to be cut into steep side slopes.
- West of the Hayes River the terrain along this segment is rugged.
- Groundwater seepage and a myriad of streams on these slopes were evident while flying over much of this segment.
- The Hayes River crossing will require two major bridges and will require extensive hydrological and geotechnical study.
    - The bridge over the main channel of the Hayes River (shown in Figure 9) would be approximately 3,000 feet in length, making it one of the longest bridges in Alaska (the longest in Alaska is the Northern Rail bridge over the Tanana River at 3,300 feet).
    - The bridge over the Hayes River overflow channel would be approximately 2,000 feet in length.

Figure 9: Hayes River crossing location (looking upstream)

- The steep slope from the mountains has caused numerous creeks to carve out deep canyons as seen in Figure 10. At least four of these canyons will need to be crossed with bridges ranging in length from 200 to 1,000 feet.

Figure 10: Old Man Creek (looking downstream). Note the steep canyon where the proposed bridge crossing would be located. This bridge would be approximately 1,000 feet long.

- Numerous other creeks and ravines will require culverts. Some of these culverts will need to be designed for fish passage.
- Avalanches could be a potential issue along this segment due to the steep mountain slopes immediately adjacent to the route. Avalanche potential should be studied and avalanche mitigation may need to be considered in the design.
- A few private cabins, airstrips, and other recreational properties were observed along east end of this segment.

North side of the Skwentna River Valley

On the return flight to Skwentna Roadhouse to refuel, the team flew along the north side of the Skwentna River. The team started this flight near the exploration camp in the Whistler Mining District, identifying a potential corridor that connects with and follows the proposed Donlin gas pipeline alignment.

- The team identified two deep canyon stream crossings that would require bridges, Portage Creek and Happy River. Additional investigation will be required to determine if

these bridges would need to be long single span crossings, or if it is possible to construct culverts lower in the canyons.

- In comparison to the south side of the river, the north side of the Skwentna River is relatively smooth terrain as shown in Figure 11, Figure 12, and Figure 13.

Figure 11: Typical terrain on the on the north side of the Skwentna River

Figure 12: Typical terrain on the on the north side of the Skwentna River

Figure 13: Typical terrain on the on the north side of the Skwentna River

- The alignment is generally located at a distance from the base of the mountains to the north and groundwater seeps were less evident from the air.
- An alignment along the north side of the river would avoid the Skwentna River floodplain.
- An alignment along the north side of the river would pass through small areas of wetlands.
- An alignment along the north side of the Skwentna River would require a bridge crossing over the Skwentna River. There appears to be a suitable bridge crossing location where the river passes through a narrow canyon just upstream of the proposed Donlin gas pipeline crossing. A bridge at this location would need to be approximately 700 feet long.
- An alignment along the north side of the Skwentna River would avoid having to cross the Talachulitna River, but would require a bridge over the Skwentna River.
- Private cabins, airstrips, and other recreational properties were observed along the eastern half of this segment.
- An alignment along the north side of the Skwentna River would parallel and in some places cross Iditarod Trail Historic Routes.

East-West Route

The East-West Route (EWR) is a variant of the east end of the PMR and provides alternative routes to interconnect with existing transportation links. One of these existing transportation links is a timber access route that the State of Alaska Division of Forestry and the Matanuska-Susitna Borough (MSB) recently cleared. This joint project resulted in the clearing of 6.7 miles of trail starting at the end of West Susitna Parkway, continuing west across the Little Susitna River, and then continuing generally north through an area of timber resources between Fish Creek and the Little Susitna River. Based on topography, this clearing follows an alignment that could be constructed into a road. There is no bridge over the Little Susitna River where the clearing

approaches the river; however the intended crossing location appears to be suitable for a bridge from a geometric perspective. If the selected West Susitna Access project mode of transportation is by road, then the EWR could follow this existing trail clearing, eventually connecting to the existing road system at the end of West Susitna Parkway. If the MSB is able to advance a project to bridge the Little Susitna River and build a road to the end of the existing clearing, then the EWR offers an advantage of being about 5 miles shorter than the PMR. However, if West Susitna Access traffic is actually going to Port Mackenzie, then the overall travel distance of this alternative would actually be about 12 miles longer.

Another existing transportation link in the area is the partially completed Port Mackenzie Rail embankment between Houston and Port Mackenzie. If the selected mode of transportation is by rail, then the EWR would tie into the existing Port Mackenzie Rail embankment near East Papoose Lake. There is no apparent advantage between the PMR rail option and the EWR rail option in terms of constructed route length; again however, the overall travel distance to Port Mackenzie via the EWR rail option would be about 8 miles longer than the PMR. One disadvantage of the EWR rail option that became apparent from the air is the existence of an abrupt bluff along the west side of the Little Susitna River valley at the location of the proposed EWR river crossing. See Figure 14. Based on available topographic maps this bluff appears to be about 100 feet high. This bluff would require a large cut and possibly a longer bridge in order to meet standard railroad grades. Such an abrupt bluff does not exist at the proposed Little Susitna River crossing locations associated with the PMR or the EWR road option.

Figure 14: Hillshade map of the EWR Rail crossing of the Little Susitna River. Note the bluff on the west side of the river.

South Route

- If the South Route were to be constructed as a road, then it could connect to existing Beluga area roads in the vicinity of Pretty Creek, thereby avoiding the construction of the southernmost 16 miles of new road, a major bridge over the Beluga River, and numerous culverts (both fish passage and drainage). See Figure 15. The existing road length is about 20 miles from the Pretty Creek crossing to Ladd Landing and some of this existing road would need to be improved and widened to handle the additional traffic.

Figure 15: Beluga area roads for potential South Route connection

- From the crossing of upper Pretty Creek to Talachulitna Creek (approximately 20 miles) the terrain is flat and a near continuous stretch of wetland with interspersed areas of forest as show in Figure 16 and Figure 17. Many of these interspersed forest areas are potentially forested wetland as well. Numerous small creeks are visible from the air throughout this segment. Many of these creeks are not visible on available maps or aerial photographs.
- Constructing an embankment or structure in these predominately wetland areas could be challenging from a geotechnical perspective.
- Gravel sources along the South Route are unknown.

Figure 16: Typical intermixed wetland and forested wetland from Pretty Creek to Talachulitna Creek

Figure 17: Typical wetland near upper Talachulitna River

- Near Talachulitna Creek the terrain of the South Route changes to mostly upland hills as shown in Figure 18.
- There are a number of smaller creek crossings through relatively flat terrain that could be accomplished with culverts.
- As the South Route begins to follow the base of the mountain to the west much of the route would need to be cut into side slopes. Groundwater seepage and many streams on these slopes were evident while flying over this area.
- Terrain along the South Route becomes more rugged as shown in Figure 19 from Friday Creek to the tie-in with the PMR. There are numerous deep ravines and some larger creeks in steep canyons.
- The alignment of the the South Route should be revisited to determine if it is possible to better avoid wetlands, rugged terrain, and other features described above.

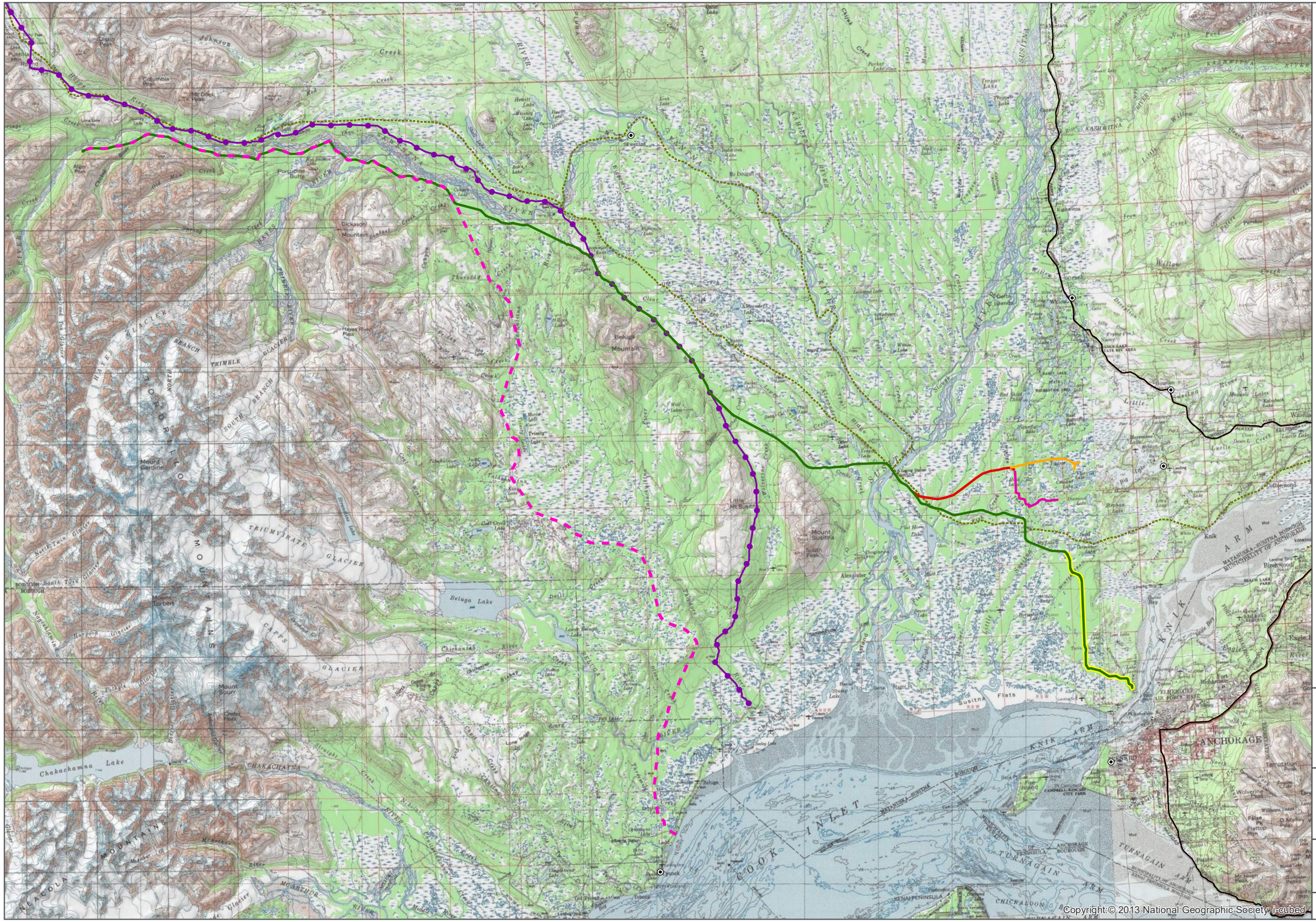
Figure 18: Hilly upland terrain begins near Talachulitna Creek

Figure 19: South Route terrain becomes rougher from Friday Creek until tie-in with the PMR

Conclusions

HDR offers the following key conclusions from the field reconnaissance effort and considerations for future work to advance the West Susitna Access project.

- The eastern portion of the Port Mackenzie Route (PMR) from Ayrshire Road to the Talachulitna River would be a large and challenging project, but appears to be feasible in terms of terrain, minimization of wetland impacts and viable crossing locations of the Susitna River and other significant waterways.
- The western portion of the PMR will need to follow the Skwentna River Valley. Project planning up to this point has placed the route along the south side of the Skwentna River. HDR considers the route on the south side of the Skwentna River unfeasible from the Hayes River west due to the rugged terrain, numerous waterway crossings that will require major bridges, and other factors as described in this report. A route on the north side of the Skwentna River would have workable terrain with a limited number of significant waterway crossings.
- AIDEA's recent LIDAR data collection effort did not include the north side of the Skwentna River. If the decision is made to consider placing the PMR along the north side of the Skwentna River, then LIDAR information will need to be collected. If the PMR follows the proposed Donlin gas pipeline route, then it is possible that Donlin may share their LIDAR information. If Donlin is willing to share their LIDAR information along the north side of the Skwentna River, then the only area where additional LIDAR would need to be collected is the westernmost 6 miles where the PMR diverges from the gas pipeline alignment.
- The South Route may be challenging in terms of environmental impacts, geotechnical engineering, and areas of rugged terrain. Some segments of the South Route would benefit from additional engineering and environmental refinement to minimize impacts and risks associated with these challenges. Availability of material sources also needs to be determined.
- AIDEA should consider a usage and traffic study to compare the PMR Ayrshire Road tie-in against the EWR. If the study shows that the ultimate destination for most traffic is Port Mackenzie, then the EWR could possibly be eliminated.
- Private cabins, lodges, airstrips, and other recreational properties in the project area were observed from the air. The project will need to consider land ownership, right-of-way acquisition, subsistence, and similar issues.
- The project will need to consider and avoid impacts to cultural and historical resources in the area. Notable resources that could be impacted by the project are the Iditarod Trail and the Iditarod Trail Historic Routes.



LEGEND

Project Features

- South Route
- Port Mackenzie Route
- Port Mackenzie Railroad Corridor
- Existing MSB Clearing
- EWR Rail Connection
- East-West Route

Existing Features

- Iditarod Trail Historic Routes
- Proposed Donlin Pipeline
- Highway

Routes shown on this map are adapted from the 2014 Roads To Resources study.

WEST SUSITNA ACCESS PROJECT

OVERVIEW

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MILES

HDR

FIGURE 1