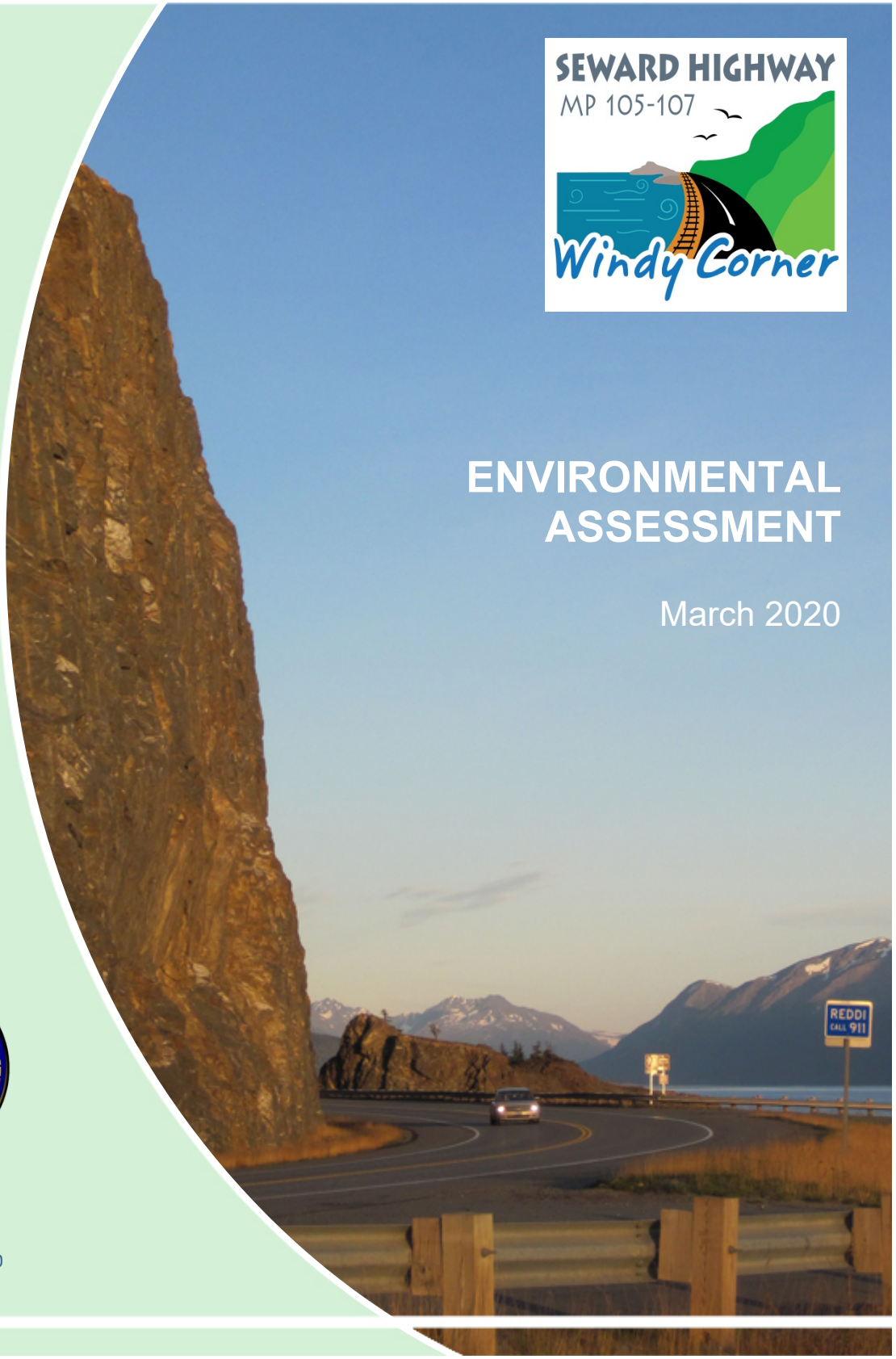
SEWARD HIGHWAY
MP 105-107
Windy Corner

ENVIRONMENTAL ASSESSMENT

March 2020



DOT&PF
Project Number:
0A31034/Z566310000

SEWARD HIGHWAY: MP 105 - 107
WINDY CORNER

Environmental Assessment

DOT&PF Project No.: 0A31034/Z566310000

State of Alaska Department of Transportation & Public Facilities
Central Region
4111 Aviation Drive
Anchorage, Alaska 99519

March 2020

The environmental review, consultation, and other actions required by applicable Federal environmental laws for this project are being, or have been, carried out by DOT&PF pursuant to 23 U.S.C. 327 and a Memorandum of Understanding dated November 3, 2017, and executed by FHWA and DOT&PF.

THIS PAGE INTENTIONALLY LEFT BLANK

SEWARD HIGHWAY: MP 105 - 107
WINDY CORNER

Federal Project Number: 0A31034
State Project Number: Z566310000

ENVIRONMENTAL ASSESSMENT

Submitted Pursuant to 42 USC 4332(2)(c)
By the State of Alaska Department of Transportation and Public Facilities

Cooperating Agencies: U.S. Army Corps of Engineers, Alaska Railroad Corporation, Alaska Department of Fish and Game, and Alaska Department of Natural Resources

This action complies with:
Executive Order 11593, Protection and Enhancement of the Cultural Environment; Executive Order 11988, Floodplain Management; Executive Order 11990, Protection of Wetlands; Executive Order 12898, Environmental Justice; Executive Order 13007, Indian Sacred Sites; Executive Order 13045, Protection of Children from Environmental Health Risks and Safety Risks; Executive Order 13175, Consultation and Coordination with Indian Tribal Governments; and Executive Order 13112, Invasive Species.

Recommended for Public Availability by:

3/2/2020
Date

John Linnell, Central Regional Preconstruction Engineer
Alaska Department of Transportation and Public Facilities

Approved for Public Availability by:

3/2/2020
Date

Douglas Kolwaite, Statewide Environmental Program Manager
Alaska Department of Transportation and Public Facilities

The following individual(s) may be contacted for additional information concerning the document:

Brian Elliott, Central Region Environmental Manager, Alaska Department of Transportation and Public Facilities, Central Region, 4111 Aviation Drive, Anchorage, Alaska 99519

The Preferred Alternative includes: improving safety, improving roadway geometry, realigning the highway and railroad between MP 105 and MP 107, separating recreational uses in the highway right-of-way from through traffic, and providing parking and pedestrian improvements for wildlife viewing and access to Chugach State Park.

LIMITATIONS ON CLAIMS NOTICE

Per Section 1308 of the Federal Highway Administration Moving Ahead for Progress in the 21st Century Act (MAP-21), a Federal agency may publish a notice in the Federal Register, pursuant to 23 U.S.C. 139(I)(1), indicating that one or more Federal agencies have taken final action on permits, licenses, or approvals for a transportation project. If such notice is published, claims seeking judicial review of those Federal agency actions shall be barred unless such claims are filed within 180 days after the date of publication of the notice or within such shorter time period as is specified in the Federal laws pursuant to which judicial review of the Federal agency action is allowed. If no notice is published, then the periods of time that otherwise are provided by the Federal laws governing such claims would apply.

TABLE OF CONTENTS

FIGURES

TABLES

PHOTOGRAPHS

APPENDICES

ACRONYMS

ADCM ..... Anchorage Debit-Credit Methodology
AADT ..... Annual Average Daily Traffic
ADEC ..... Alaska Department of Environmental Conservation
ADF&G ..... Alaska Department of Fish and Game
APDES ..... Alaska Pollutant Discharge Elimination System
APE ..... area of potential effect
ARRC ..... Alaska Railroad Corporation
BA ..... Biological Assessment
BMPs ..... Best Management Practices
CAP ..... Chugach Access Plan
CFR ..... Code of Federal Regulations
CGP ..... Construction General Permit
CIBW ..... Cook Inlet beluga whale
CPP ..... Corridor Partnership Plan
CSP ..... Chugach State Park
CWA ..... Clean Water Act
CZMA ..... Coast Zone Management Act
DNR ..... Alaska Department of Natural Resources
DNR-DPOR ..... Alaska Department of Natural Resources, Division of Parks and Outdoor Recreation
DOI ..... Department of Interior
DOT&PF ..... Department of Transportation & Public Facilities
EA ..... Environmental Assessment
EFH ..... Essential Fish Habitat
E.O. ..... Executive Order
ESCP ..... Erosion and Sediment Control Plan
High severity ..... fatal and major injury
HSIP ..... Highway Safety Improvement Program
FHWA ..... Federal Highway Administration
LOS ..... Level of Service
LWCF ..... Land and Water Conservation Funds
MBTA ..... Migratory Bird Treaty Act
MOA ..... Memorandum of Agreement
MP ..... Milepost
mph ..... miles per hour
NEPA ..... National Environmental Policy Act
NMFS ..... National Marine Fisheries Service
NOAA ..... National Oceanic and Atmospheric Administration
NPS ..... National Park Service
NRHP ..... National Register of Historic Places
Project Area ..... Windy Corner Project
ROW ..... Right-of-Way
SHPO ..... State Historic Preservation Officer
SWPPP ..... Stormwater Pollution Prevention Plan
U.S. ..... United States
USACE ..... United States Army Corps of Engineers
USCG ..... United States Coast Guard
USFWS ..... United States Fish and Wildlife Service

EXECUTIVE SUMMARY

Introduction

The State of Alaska Department of Transportation and Public Facilities is proposing to construct safety improvements to the Seward Highway from Milepost 105 to Milepost 107.

The purpose of this Environmental Assessment is to present and analyze the environmental consequences of reasonable alternatives in accordance with the National Environmental Policy Act. **The environmental review, consultation, and other actions required by applicable Federal environmental laws for this project are being carried out by State of Alaska Department of Transportation and Public Facilities pursuant to 23 United States Code 327 and a Memorandum of Understanding dated November 3, 2017 and executed by Federal Highway Administration and State of Alaska Department of Transportation and Public Facilities.**

Existing Conditions

Seward Highway, between Potter Marsh and Girdwood, is constrained by the steep slopes of the Chugach Mountains on one side and the Alaska Railroad tracks and Turnagain Arm on the other. The existing highway functions as a Rural Principal Arterial roadway, consisting of two 12-foot-wide travel lanes and 8-foot-wide paved shoulders. See Figure 3. The highway sits within a 300-foot-wide right-of-way, much of which overlaps the railroad's 200-foot-wide right-of-way. The posted speed limit within the Windy Corner Project is 55 miles per hour, with no passing lanes or zones.

The Annual Average Daily Traffic is 7,756 vehicles per day (2017) and the highway operates at a Level of Service D under current peak-hour conditions. Traffic demands vary substantially depending on the season of the year, with daily traffic volumes exceeding 22,000 vehicles during peak summer weekends. These seasonal fluctuations result in the highway frequently operating at a Level of Service E or F during the summer months (Photograph 5).

Motorists slowing and stopping along the highway shoulder to view wildlife frequently disrupt traffic operations. This creates a high differential in speeds between motorists transiting through the corridor and those that are sightseeing. This differential in speeds and the uncontrolled movement of traffic entering and exiting the highway contributes to the elevated crash rate and severity of crashes in the corridor.

The existing curves between Mileposts 105 and Milepost 107 do not meet the minimum radius for a posted or design speed of 65 miles per hour; some do not meet the minimum radius for a posted or design speed of 55 miles per hour. The substandard curve radii and closely spaced curves reduce the margin for driver error. The combined effects of the disrupted traffic operations and roadway geometry results in a two-mile segment of highway that has the highest number of fatal crashes and the second highest rate of high-severity crashes of any two-mile segment of the Seward Highway between Potter Station and Girdwood over the last forty years.

Purpose and Need

The purpose of the proposed project is to implement safety upgrades and improve traffic operations between Milepost 105 and Milepost 107. Specifically, the project would:

- Implement safety upgrades to decrease high-severity crashes by providing separation of northbound and southbound lanes to diminish the risk of head-on crashes; and

- Improve traffic operations to alleviate traffic congestion by:
  - improving curves to a degree that meets recommended design speed for rural principal arterial on level terrain.
  - improving access for vehicles entering or exiting the highway, and

Alternatives

The State of Alaska Department of Transportation and Public Facilities has evaluated options to improve safety and traffic operations along this segment of the Seward Highway. Seven alternatives were considered for this Environmental Assessment. Two of these (Alternatives 1 and 4) were considered unreasonable and not advanced for detailed study. The No Action alternative and four reasonable alternatives (Alternatives 2A, 2B, 2C, and 3) were advanced for detailed study. Of the reasonable alternatives described below, Alternative 2A was selected as the Preferred Alternative. The rationale for selection can be found in Chapter 7.0 of the Environmental Assessment.

- **No Action**

  The No Action alternative must be carried forward for analysis under National Environmental Policy Act regulations. It is described in Section 4.3.1 of the Environmental Assessment with environmental consequences covered in Section 5.0 of the Environmental Assessment.

  The No Action alternative consists of maintaining the existing roadway and railroad alignments.

  This alternative would not meet the project's purpose and need. Curves within the Windy Corner Project would meet criteria for a design speed of 50 miles per hour, much less than the selected design speed of 65 miles per hour. Auxiliary or turn lanes would not be constructed to improve access for vehicles on an off the highway. There would be no increase in separation of opposing traffic. As a result, safety upgrades to the roadway would not be implemented and traffic operations would not improve.

  Access to wildlife viewing and recreational parking would be unchanged as no improvements or modifications to park facilities would be made under this alternative.

- **Alternative 2A (Preferred Alternative) –Shift Into Turnagain Arm – CSP Material Locations**

  Alternative 2A shifts the Seward Highway alignment into the Turnagain Arm and would include the following design features. See Figure 9.

  Typical Highway Section. The proposed typical highway section for the realigned highway is for a two-lane divided highway consisting of:

  - 12-foot-wide through (travel) lanes
  - 12-foot-wide auxiliary lanes
  - 24-foot-wide vegetated median
  - 4-foot-wide inside shoulders
  - 8-foot-wide outside shoulders
  - Appropriately-sized rock catchment widths based on wall heights for the northbound edge of pavement and toe of slope

  Design Speed. A design speed of 65 miles per hour is applied to this alternative.

  Auxiliary and Turn Lanes. Alternative 2A would include an auxiliary lane in each direction and a dedicated southbound left-turn lane for passing and turning to improve access for vehicles entering or exiting the highway.

Traffic Separation. A median separating northbound and southbound traffic to diminish the risk of head-on crashes.

Railroad Realignment. Alternative 2A would include realignment of the Alaska Railroad Corporation track to make space for the highway alignment. Horizontal curves would be flattened which would allow track speeds to increase from 40 to 50 miles per hour throughout the Windy Corner Project. The railroad structural section includes:

- 10-foot top width for ballast; and
- 24-foot top width for sub-ballast.

Emergency Response Access. Alternative 2A would include a controlled-access emergency response access ramp to Turnagain Arm to facilitate water rescues.

Material Extraction. Extract nearly 2 million cubic yards of aggregate, riprap, and armor stone proposed to come from areas near Milepost 109 and possibly Milepost 104 within Chugach State Park.

Park Facilities Improvements. As mitigation for material extraction within the park, State of Alaska Department of Transportation and Public Facilities proposes to use the space created by the new highway alignment to construct new controlled access mountainside park facilities including a scenic parking area and pedestrian facilities that would improve sightseeing, wildlife viewing, and access to Chugach State Park.

Future Amenity Accommodations. Additional amenities that are not proposed for construction at this time, but which could be accommodated in the future, include a pedestrian underpass connecting the north and south sides of the highway and an improved parking area and viewing area on the waterside of the highway. Space for a potential future pedestrian pathway along the mountainside has been accommodated.

- **Alternative 2B –Shift Into Turnagain Arm – Existing Right-of-Way Material Locations**

Alternative 2B maintains the identical design criteria and alignment as that described in Alternative 2A with the following differences. See Figure 15.

Material Extraction. Alternative 2B evaluates multiple material sites within State of Alaska Department of Transportation and Public Facilities Seward Highway Right-of-Way from MP 104 to MP 113. These material extraction sites are anticipated to provide similar quantity of material as Alternative 2A material locations proposed within Chugach State Park at Milepost 109 and Milepost 104. Seven material sites within the Seward Highway Right-of-Way were selected based on the availability of large quantities of material and proximity to the project site (within six miles). At the seven sites, vertical rock cut slopes would extend to the edge of the Seward Highway Right-of-Way (designed at a 0.5 Horizontal:1 Vertical slope per State of Alaska Department of Transportation and Public Facilities geotechnical recommendations elsewhere in the corridor).

Parking Area. Alternative 2B would provide an improved mountainside off-shoulder paved parking area approximately 38 feet deep by 325 feet long instead of the new mountainside park facility proposed with Alternative 2A.

- **Alternative 2C – Construct Proposed Improvements with Material from a Distant Source**

Alternative 2C maintains the identical design criteria and location as described in Alternative 2A, with the following differences. See Figure 16.

Material Extraction. Alternative 2C imports materials from outside the project corridor and outside of Chugach State Park lands. The range of potential material sources includes: existing commercial sources in Anchorage, Eklutna, and Palmer; formerly used material sites in Portage; and material sources accessible via Cook Inlet. These material sources are anticipated to provide similar quantity and quality of material as Alternative 2A. Alternative 2C evaluated different material transport methods: truck haul, train, and barge. Details of the material site analysis are located under Section 6.0 of the Environmental Assessment.

Parking Area. Alternative 2B would provide an improved mountainside off-shoulder paved parking area approximately 38 feet deep by 325 feet long instead of the new controlled access mountainside park facility proposed with Alternative 2A.

- **Alternative 3 – Shift Proposed Alignment Inland at Windy Corner**

  Alternative 3 maintains the same design criteria as Alternative 2A with the following differences. See Figure 17.

  Shift Alignment Inland. Alternative 3 attempts to balance cut and fill quantities by shifting the alignment inland at Windy Corner. This design would require 005 Horizontal:1 Vertical rock cuts extending into Chugach State Park at Windy Corner, with design features for the highway remaining the same as Alternative 2A.

  Material from Windy Corner Cut. By moving the design alignment inland, fill quantities would be reduced and could then be satisfied with the material cut from the slopes and faces for the highway construction. The material generated from the Windy Corner slope cuts are anticipated to provide sufficient quantity and similar quality of material as Alternative 2A material locations proposed within Chugach State Park at Milepost 109 and Milepost 104.

  Parking Area. Alternative 3 would provide an improved mountainside off-shoulder paved parking area approximately 38 feet deep by 325 feet long instead of the new controlled access mountainside park facility proposed with Alternative 2A.

- **Other Alternatives**

  Alternatives 1 and 4 were considered but do not meet the purpose and need of the project and have therefore been eliminated as part of the evaluation process under both the National Environmental Policy Act and Section 4(f) of the Department of Transportation Act. These alternatives are discussed in Section 4.2 of the Environmental Assessment.

Environmental Consequences

Resources Not Impacted

Environmental resources not present in the proposed Windy Corner Project and not affected by the proposed project; and therefore not evaluated in this environmental document are:

- Economics;
- Wetlands (other Waters of the United States are addressed in Section 5.2.8);
- Alaska Coastal Management Program;
- Hazardous Waste;
- Air Quality;
- Floodplains;

- Noise;
- Farmland;
- Title VI and Environmental Justice; and
- Wild and Scenic Rivers and Wilderness Areas.

Resources Impacted

Environmental resources present in the proposed Windy Corner Project and potentially affected by the proposed project are listed below. An evaluation of the Preferred Alternative's effects to these resources are summarized in Table ES-1.

- Right-of-Way;
- Social Considerations;
- Local Land Use and Transportation Plans;
- Cultural Resources;
- Anadromous or Resident Fish and Essential Fish Habitat;
- Wildlife and Birds;
- Threatened and Endangered Species;
- Waterbody Involvement and Water Quality;
- Vegetation and Invasive Species;
- Bicycle and Pedestrian Issues;
- Section 4(f);
- Section 6(f);
- Visual Resources;
- Irreversible and Irretrievable Commitment of Resources; and
- Construction Impacts.

Table ES-1: Preferred Alternative Summary of Environmental Consequences

Environmental Impact Category	*No Action*	*Alternative 2A (Preferred Alternative)*
Right-of-Way	Would require no right-of-way acquisition.	Would require the Department of Transportation and Public Facilities and the Alaska Railroad Corporation to acquire 26.3 acres of Chugach State Park and relinquish 14.7 acres of existing right-of-way to Chugach State Park.
Social Considerations	• Would leave traffic and safety issues to persist: ○ Two of the five curves do not meet 55 miles per hour design speed criteria; ○ High speed differential between commuters, recreation, and tourist motorists; and ○ Access to recreational areas not improved. • Would not improve the reliability and efficiency for commuter, freight, and emergency response vehicles. • Would not provide emergency responder access to Turnagain Arm.	• Would improve traffic safety issues by: ○ Upgrading curves to meet a 65 miles per hour design standard; ○ Adding north and southbound auxiliary lanes; ○ Adding southbound dedicated left-turn lane; ○ Improving parking and recreational access and facilities; and ○ Separating north and southbound traffic. • Would provide access to Turnagain Arm for water rescue operations to improve public safety by adding a controlled-access emergency response access ramp. • Would improve safety, reliability, and efficiency of commuter, freight, and emergency vehicle travel. • Would affect water recreation in the direct vicinity of the project where highway and railroad track are realigned onto mudflats.
Local Land Use and Transportation Plans	• Would not meet goals for improved safety and transportation upgrades identified in local land use and transportation plans. • Would not provide park facilities at recreational sites identified in the park management plan.	• Would meet goals to improve safety and provide transportation upgrades identified in local land use and transportation plans. • Would meet the Chugach State Park purpose to provide recreational opportunities for the people by: ○ providing areas for specified uses, and ○ constructing necessary facilities in the area. • The project includes construction of new controlled access mountainside park facilities identified in the park management plan.
Cultural Resources	Would not affect cultural historic properties.	Would not adversely affect cultural or historic properties.
Anadromous or Resident Fish and Essential Fish Habitat	Would not affect essential fish habitat.	Would require no additional essential fish habitat consultation if previously accepted mitigation is implemented.
Wildlife and Birds	Would not affect wildlife or birds.	Would not fragment habitat, change migratory routes, or substantially diminish available wildlife or bird habitat.
Threatened and Endangered Species	Would not affect the federally endangered Cook Inlet beluga whales or their critical habitat.	Would be unlikely to adversely affect the endangered Cook Inlet beluga whales or their critical habitat if National Marine Fisheries Service required mitigation is implemented.
Waterbody Involvement and Water Quality	Would not affect waterbodies or stormwater flow pathways. Culverts for three unnamed streams would remain at 24- and 36-inch diameters.	• Would fill 26.3 acres of intertidal mudflats. • Would provide credits from a permittee responsible site as compensatory mitigation to offset proposed project waterbody impacts. • Would increase impervious area contributing to storm water flows.

Environmental Impact Category	*No Action*	*Alternative 2A (Preferred Alternative)*
Waterbody Involvement and Water Quality, Continued		• Would increase culvert diameters for three unnamed streams to 36 and 42 inches.
Vegetation and Invasive Species	Would not affect vegetation and invasive species composition.	Would disturb 104.7 acres of total ground including 43.0 acres of previously disturbed uplands, 35.4 acres of undisturbed upland, and 26.3 acres of intertidal waters). Disturbance may increase the risk of introduction of invasive species and potentially change the composition of vegetation within or adjacent to the Windy Corner Project.
Bicycle and Pedestrian Issues	Would not improve access to recreational and wildlife viewing areas. Traffic safety issues would remain between commuters and recreationists/ tourists.	• Would improve safe access to recreational and wildlife viewing areas. • Would improve safety of pedestrians and recreationalists by providing a buffer between the highway and parking area.
Section 4(f)	Would not affect Section 4(f) resources.	Would require the permanent acquisition of 26.3 intertidal acres of Chugach State Park along Turnagain Arm, and temporary Section 4(f) use of 39.56 acres of undeveloped Chugach State Park lands.
Section 6(f)	Would not affect Section 6(f) resources.	Would require the Section 6(f) conversion of 35.4 acres of undisturbed parkland for material extraction, 4.16 acres Section 6(f) lands on we water side of the highway. The Section 6(f) conversion would be mitigated through replacement lands of 14.7 acres for construction of the new mountainside park facilities.
Visual Resources	Would not affect visual resources.	• Would impact the sinuosity of the Turnagain Arm shoreline. • Would expose a total rock cut face area of approximate 79,900 square yards for material extraction and road cut. To minimize the potential effects, a topographic buffer would be maintained at the Milepost 109 location so that only approximately 300-foot wide portion of the rock face would be directly visible from the highway at the access point. Material extraction at Milepost 109 would be visible to northbound travelers for approximately 0.25 miles (approximately 15 seconds), to southbound travelers for 0.5 miles (approximately 30 seconds), and to observers from across Turnagain Arm. Material extraction at Milepost 104 would be visible to northbound travelers for approximately 0.9 miles (approximately 42 seconds) and to southbound travelers for approximately 0.7 miles (approximately 54 seconds). Turnagain Arm Trail users may occasionally be able to view the extraction area at Milepost 109 from some off-trail viewpoints.
Irreversible and Irretrievable Commitment of Resources	Would not change the existing commitment of natural resources.	Would disturb 104.7 acres in total and require the extraction and placement of nearly 2 million cubic yards of materials for project components.

Environmental Impact Category	*No Action*	*Alternative 2A (Preferred Alternative)*
Construction Impacts	Would not have construction-related impacts to resources.	Would result in the following temporary construction impacts: • Reduce water, stream, and air quality; • Disrupt traffic patterns; • Increase travel time; • Increase noise levels; • Alter wildlife movements; and • Close trail access.

Permits and Authorizations

- Right-of-Entry permit administered by the Alaska Railroad Corporation.
- Clean Water Act Section 401 Certificate of Reasonable Assurance administered by the Alaska Department of Environmental Quality.
- Clean Water Act Section 404/10 Individual Permit administered by the United States Army Corps of Engineers.
- Clean Water Act Section 402 and 18 AAC 83 administered by the Alaska Department of Environmental Conservation.
- Non-Domestic Storm Water Disposal Plan Approval administered by Alaska Department of Environmental Conservation.
- Noise Permit administered by the Municipality of Anchorage.
- Conditional Use Permit administered by the Municipality of Anchorage.
- Endangered Species Act, Section 7 Consultation administered by National Marine Fisheries Service.
- Magnuson Stevens Fishery Conservation and Management Act, Essential Fish Habitat Consultation administered by National Marine Fisheries Service.
- Section 106 National Historic Preservation Act and the Alaska Historic Preservation Act administered by Alaska Department of Natural Resources, State Historic Preservation Officer.
- Alaska Department of Natural Resources Commissioner's Finding.
- Section 4(f) administered by the official having jurisdiction of Chugach State Park lands, Alaska Department of Natural Resources.
- Section 6(f) Land and Water Conservation Fund Program administered by the Department of Interior.
- Bald and Golden Eagle Protection Act administered by United States Fish and Wildlife Service.

Public Involvement and Agency Coordination

Starting in 2013, Department of Transportation & Public Facilities conducted public and agency coordination with interested stakeholders to inform them of the project and to solicit comments. Information was provided on the project scope and potential environmental impacts, including use of the Chugach State Park lands for material extraction.

Agency Scoping letters were sent out on March 5, 2013 to collect agency comments. Meetings were held with Community Councils, State Agencies and an agency Technical Advisory Group. The project has been presented at nine local Transportation Fairs between 2015 and 2019.

Public meetings and open houses were held on March 4, 2013; April 24, 2014; April 19, 2016; and April 20, 2016. Appendix G of the Environmental Assessment includes information on these meetings including a summary of comments received and Department of Transportation & Public Facilities responses to those comments.

Public comments received resulted in the following design changes:

- Comments concerning the highway and railroad extending too far into Turnagain Arm, resulted in design shifting the highway and railroad inland through Gorilla Rock.
- Comments concerning the new material location and visibility from the highway, design included a natural buffer to minimize visual impacts at Milepost 109.
- Comments concerning a lack of emergency response access to Turnagain Arm, resulted in the addition of an emergency response access ramp and at-grade railroad crossing.
- Comments requesting less use of Chugach State Park, resulted in commitment to not use material location at Milepost 104 for extraction unless the material location at Milepost 109 does not have sufficient quantity or quality of materials for this project.

Department of Transportation & Public Facilities continues to engage the public and agencies by way of a dedicated website and an additional public meeting is planned as part of the Environmental Assessment process.

THIS PAGE INTENTIONALLY LEFT BLANK

1.0 INTRODUCTION

The State of Alaska Department of Transportation and Public Facilities (DOT&PF) is proposing to realign and construct safety improvements to the Seward Highway from Milepost (MP) 105 to MP 107. The proposed project is being developed with a combination of DOT&PF and Federal Highway Administration (FHWA) funds.

Proposed Project Location. The proposed project is located in Sections 2 and 3, Township 10 North, Range 2 West, Seward Meridian; Latitude 60.986° North, Longitude 149.552° West. See within the Municipality of Anchorage, between the communities of Indian and Rainbow, Alaska Figure 1. The material location at MP 109 is located in Section 32 and 33, Township 11 North Range 2 West, Seward Meridian; the material location at MP 104 is located in Sections 6, Township 10 North, Range 1 West and Section 1, Township 10 North, Range 2 West, Seward Meridian.

Figure 1: Project Location

2.0 EXISTING CONDITIONS

2.1 Project Setting

The Windy Corner Project (project area) is situated on the southern terrestrial boundary of Chugach State Park (CSP), between MP 105 and MP 107. See Figure 2. This area is characterized by the steep slopes of the Chugach Mountains to the north and east of the Seward Highway and the Alaska Railroad tracks and Turnagain Arm (Cook Inlet) on the south and west (Photograph 1).

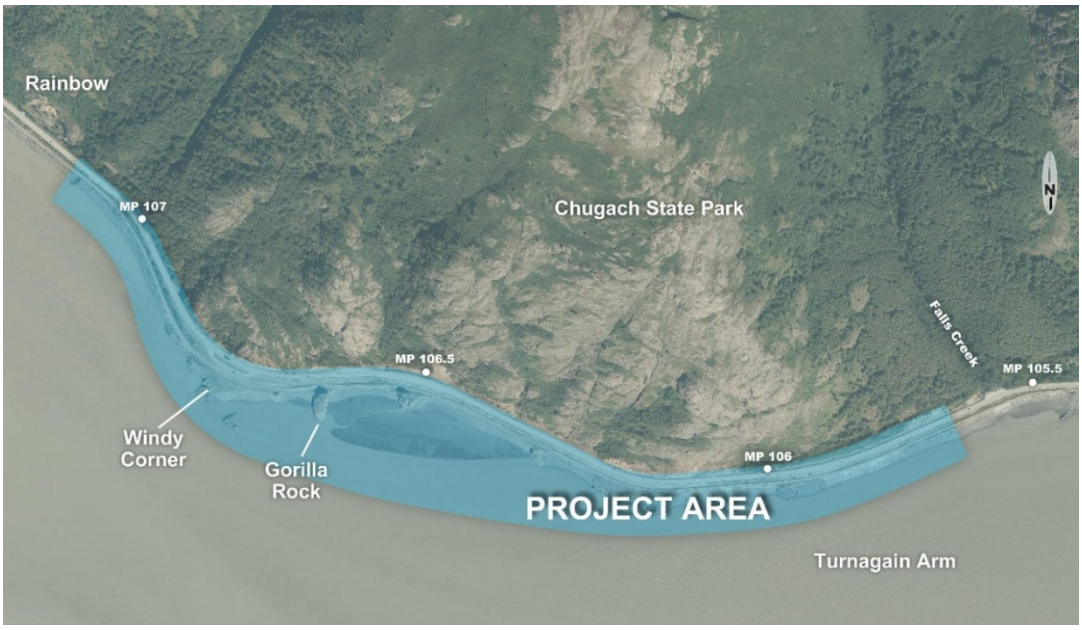


Figure 2: Proposed Project Area

Photograph 1: View southeast from Windy Corner above Seward Highway

2.2 Seward Highway

Originally completed in 1951, the Seward Highway extends north from Seward, Alaska approximately 127 miles to Anchorage, Alaska. The Seward Highway is the only highway transportation route providing access between Anchorage and communities to the south along Turnagain Arm, the Kenai Peninsula, and the Alaska Marine Highway System ports at Whittier, Seward, and Homer. As such, the Seward Highway supports recreational, industrial, commercial, and residential traffic and vehicle types range from passenger cars to slow moving recreational vehicles and commercial freight vehicles.

The Seward Highway is recognized for its scenic, natural, historical, and recreational values, and it has been designated as a National Scenic Byway, United States (U.S.) Department of Agriculture Forest Service Scenic Byway, Alaska Scenic Byway, and All-American Road (Photograph 2). In addition to the scenery, it frequently provides motorists with views of local wildlife, such as beluga whales and Dall sheep (Photograph 3).

Photograph 2: Seward Highway near MP 106.7

Photograph 3: Dall Sheep near Windy Corner

The existing highway is designated as a Rural Principal Arterial roadway, consisting of two 12-foot-wide travel lanes and 8-foot-wide paved shoulders with rumble strips. See Figure 3. The highway sits within a 300-foot-wide right-of-way (ROW), much of which overlaps the railroad's 200-foot-wide ROW. Posted speeds vary between Anchorage and Girdwood from 55- to 65-miles per hour (mph). The posted speed limit within the project area is 55-mph, with no passing lanes or zones. Limited parking and pedestrian facilities along the highway (Photograph 4) provide access to recreational activities including photography, hiking, rock climbing, and watersports.

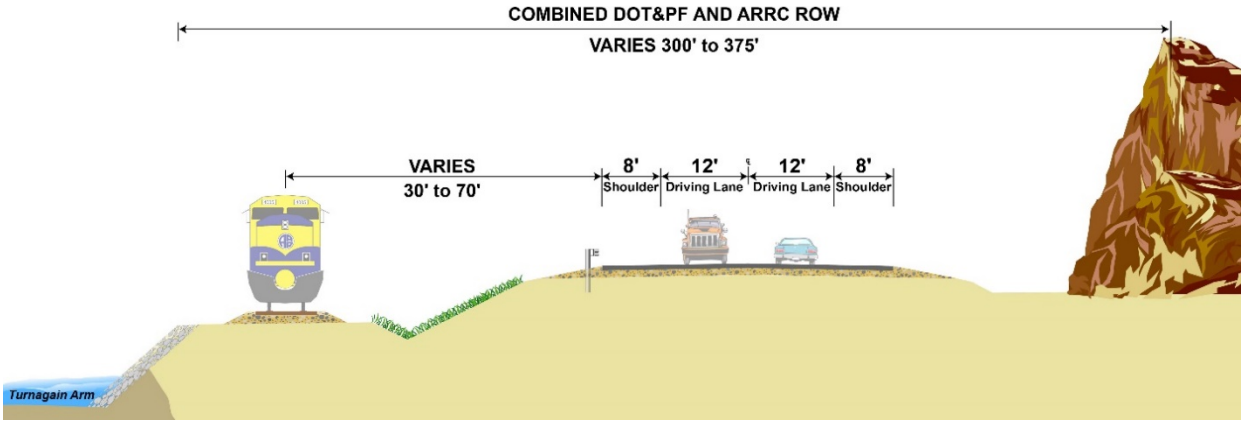


Figure 3: Existing Typical Section

Some of the existing curves between MP 105 and MP 107 do not meet the minimum radius for a posted or design speed of 55-mph. Recent Seward Highway projects south of Anchorage trend toward a 65-mph design speed to accommodate 85th percentile speeds that are typically between 60- and 65-mph.

Photograph 4: Windy Corner Trailhead for Turnagain Arm Trail

The substandard curve radii and closely spaced curves reduce the margin for driver error. Vehicles approaching and slowing for these lower speed curves cause traffic backups. The combined effects of the disrupted traffic operations and roadway geometry results in a two-mile segment of highway that has the highest number of fatal crashes and the second highest rate of high-severity crashes of any two-mile segment of the Seward Highway between Potter Station and Girdwood over the last forty years. See Section 3.2 for further discussion.

2.3 Traffic

The current (2017) Annual Average Daily Traffic (AADT) is 7,756 vehicles per day and the highway operates at a Level of Service (LOS) of D. During peak summer periods, increased volumes regularly result in a high level of traffic congestion (LOS E or F) as daily traffic volumes range between 6,000 and 22,000 vehicles (Photograph 5).

Photograph 5: Seward Highway Summer Traffic at Windy Corner

Traffic operations in the project area are frequently disrupted by motorists slowing and stopping along the highway shoulder to view wildlife. This creates a high speed-differential between motorists traveling through the corridor and those that are sightseeing (Photograph 6). This speed differential and the uncontrolled movement of traffic entering and exiting the travel lanes both contribute to the elevated rate and severity of crashes.

Photograph 6: Wildlife Viewers on Highway Shoulder at Windy Corner with Traffic

2.4 Parking and Pedestrian Facilities

Parking and pedestrian facilities within or adjacent to the project area are indicated in Figure 4.

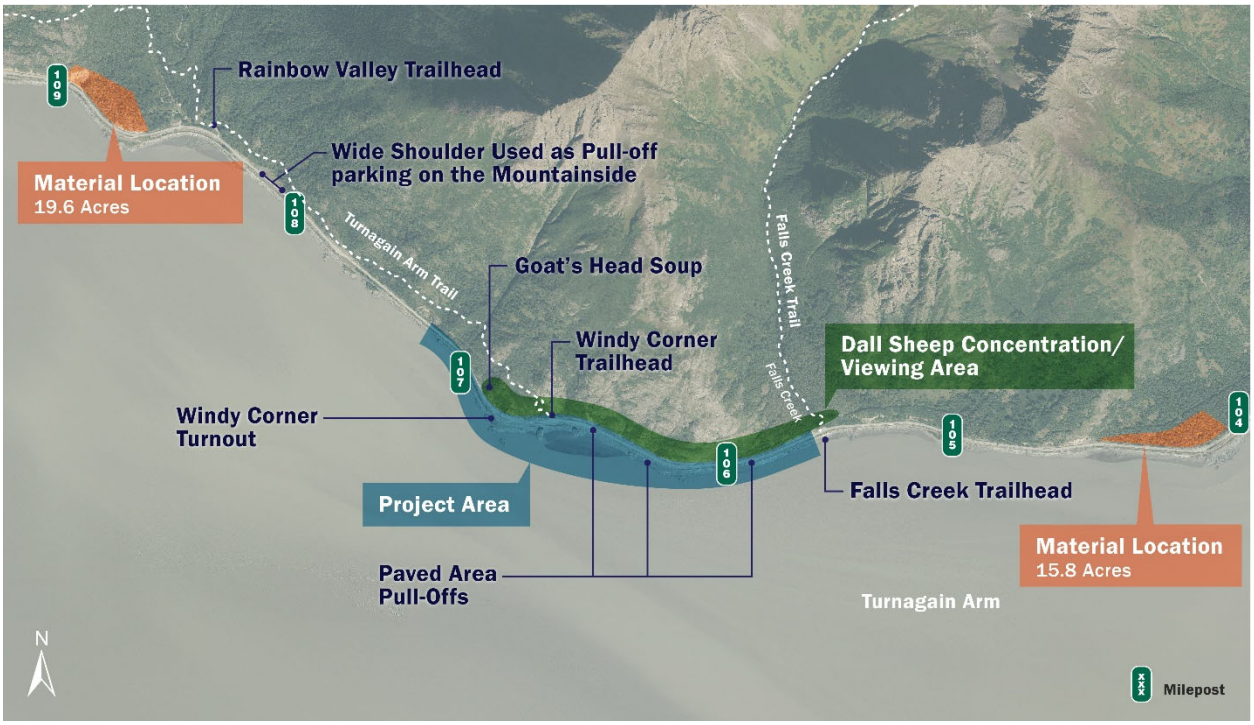


Figure 4: Existing Parking and Pedestrian Facilities in Vicinity of Windy Corner

The trailhead parking areas, turnouts, and pull-offs are described as follows:

- The Rainbow Valley trailhead parking, located near MP 108.2, consists of a 54-foot by 160-foot parking area, separated from the highway by a vegetated strip between 70 and 105 feet in width, and with a 150-foot driveway connection to the highway. The trailhead provides access to the Turnagain Arm Trail. The trail is primitive with no State park facilities (e.g. toilets, etc.).
- The Windy Corner trailhead parking, located near MP 106.7, consists of a 30-foot by 220-foot asphalt area with no defined parking spaces and is immediately adjacent to the shoulder of the Seward Highway. The trail is primitive with no State park facilities (e.g. toilets, etc.). The trailhead is the southernmost terminus for the Turnagain Arm Trail.
- The Falls Creek trailhead parking, located near MP 105.5, consists of a 40-foot by 200-foot asphalt area with no defined parking spaces and is immediately adjacent to the shoulder of the Seward Highway. The trail is primitive with no State park facilities (e.g. toilets, etc.). The trailhead is not connected with any other pedestrian facilities along the highway.
- The Windy Corner turnout, located on the south side of the highway near MP 106.8, consists of a 350-foot-long asphalt vehicle turnout with no defined parking. It is separated from the highway by an approximately 30-foot-wide median.
- Widened shoulders (three locations) – Widened shoulders occur southbound at MP 105.9, MP 106.2, and MP 106.6 southbound. Each consists of shoulder widths of either 18 feet or 30 feet, and with lengths of 300, 230, and 550 feet, respectively.

2.5 Emergency Response Access

During public involvement and agency meetings, commenters noted that Turnagain Arm has seen an increase in the number of recreational users (e.g., paddle boarders, wind and kite surfers, kayaking, etc.) in the past 10 years, leading to an intensified desire for improved access to Turnagain Arm. Of concern with the increasing use of Turnagain Arm, is that emergency responders have no access (e.g. ramps or boat launches) to Turnagain Arm between Anchorage and Bird Point. Existing access points (Twenty-Mile River and Port of Anchorage) are influenced by the dynamic tidal conditions and channel fluctuations in Turnagain Arm and response times are delayed and unpredictable as emergency responders maneuver up or down Turnagain Arm. The current projection for recreation use of Turnagain Arm to increase generates the need for an access ramp for emergency responders to safely access Turnagain Arm for water rescue operations.

2.6 Alaska Railroad Corporation

The Alaska Railroad Corporation (ARRC) completed a mainline track in 1923, stretching 470 miles from Seward to Fairbanks. The segment from Anchorage to Seward affords views of picturesque landscapes along Turnagain Arm and through the backcountry of the Kenai Peninsula (ARRC 2017). From MP 100 to MP 115, the track is located on the southwest side of the Seward Highway, between the highway and Turnagain Arm (Photograph 7).

The ARRC track structure consists of continuously welded rail, type 115RE rail, which indicates a rail weight of 115 pounds per linear yard. The RE denotes a specific rail cross-section developed by the American Railway Engineering and Maintenance-of-Way Association. The ballast is 10 feet wide and the sub-ballast is 24 feet wide. Track grades are generally flat (0.00

to 0.10 percent). The ARRC track is in a 200-foot-wide ROW and is adjacent to and typically overlapping the DOT&PF 300-foot-wide ROW. The ARRC and DOT&PF ROWs typically have more than 100 feet of overlap from MP 104 to MP 114. Due to issues of overlapping ROW and maintenance needs, in 1989, ARRC issued a Blanket Permit to DOT&PF for highway use and maintenance. This Blanket Permit was extended to 2036 under a 2001 Memorandum of Agreement (MOA) between DOT&PF, Alaska Department of Natural Resources (DNR), and ARRC (Appendix A).

Photograph 7: Alaska Railroad Track along Turnagain Arm

2.7 Chugach State Park

In 1970 the Alaska legislature restricted the State-owned land and water described in Alaska Statutes (AS 41.21.120-41.21.125) to use as CSP. These lands and water were designated a special purpose area in accordance with Article 8, Section 7 of the Alaska Constitution (DNR 2011). Containing approximately 495,000 acres, CSP is one of the largest State parks in the U.S. The park contains diverse land forms and rugged topography with mountains, ocean shoreline, rivers, lakes, glaciers, and ice fields. CSP is one of Alaska's most accessible parks, with the western boundary adjacent to the State's largest city. DNR manages CSP through the Division of Parks and Outdoor Recreation (DNR-DPOR).

CSP is within the Chugach-St. Elias ecoregion and consists of terrestrial and marine ecosystems. A range of habitats may be found along the north side of Turnagain Arm, located within or adjacent to the project area. Riparian corridors along upper perennial streams, intertidal mudflats, subtidal marine, scrub-shrub upland, rock outcrops, and forested uplands are all found near the project area.

The entire project area lies within the Turnagain Arm Unit of CSP. The highway is located between steep mountainous terrain to the north and limited vegetation or Turnagain Arm mudflats that are heavily influenced by fluctuating tides to the south. Dall sheep are frequently spotted near the highway at Windy Corner, presenting viewing and photography opportunities for tourists who often pull onto highway shoulders to access.

The Turnagain Arm Unit provides local residents and tourists with diverse recreational opportunities like hiking, skiing, camping, wildlife viewing, rock and ice climbing, fishing, hunting, and water activities (i.e., wind and kite surfing, bore tide surfing, kayaking). Rock climbers pull off the highway and park their vehicles on the shoulder within the project area where they can access a climbing face known as Goat's Head Soup; this hosts several climbing routes near MP 106.8 (Sieling 1998).

The Seward Highway and ARRC corridors are located within the boundaries of CSP. Within the project area, the total DOT&PF/ARRC ROW width ranges from 310 to 375 feet wide. The 2001 MOA (Appendix A) established the desire of these three agencies to work together in planning, developing, and operating the transportation facilities within the Seward Highway corridor for public benefit, while recognizing the diverse missions of each entity.

In the MOA the three entities (DOT&PF, DNR, and ARRC) recognized:

- the essential role of the Seward Highway and the ARRC track as critical State transportation infrastructure,
- the importance of considering CSP purposes and policies in the design and construction of transportation projects in the corridor,
- realignment of the highway and track would be needed to improve traffic operations, congestion, and public safety, and
- changes in land ownership and/or management authority would be needed to accommodate realignment.

2.8 Cook Inlet

Cook Inlet is a tidal estuary approximately 220 miles in length, located in southcentral Alaska. The tidal fluctuation is the fourth largest in the world, with a differential as great as 39.4 feet (National Oceanic and Atmospheric Administration [NOAA] 2018). Large areas of mudflats are exposed at low tide. Tidally-driven turbulence suspends large volumes of sediment in the water from glacial outflow and coastal erosion. Ice presence in Cook Inlet is typically from January to March and is particularly concentrated in areas such as Knik Arm and Turnagain Arm due to the freshwater input from the numerous rivers in the area. In 2008, the Cook Inlet population of beluga whales (CIBW) were listed as endangered by National Marine Fisheries Service (NMFS) under the Endangered Species Act of 1973, and in 2011, upper Cook Inlet including Turnagain Arm was designated as critical habitat.

2.9 Turnagain Arm

Turnagain Arm is about 30 miles long and three to four miles wide at the project area. Two main, deep-water channels are located along the north and south shores of the arm. Glacial silt and sand compose the Turnagain Arm seafloor. Tidal range is the largest in the U.S. and fourth highest in the world, with a mean of 30 feet. This tidal fluctuation produces a tidal phenomenon called a tidal bore, which may be more than 6 feet high and travel at 15-mph on high spring tides (DNR 2011; Seward Highway All-American Road Partnership 2017).

2.10 Material Sources

No developed material sources are located within the project corridor. DOT&PF has conducted a number of geotechnical investigations evaluating potential material sources along the Seward Highway but there are no material sites in operation currently.

Production and transport of aggregate material to a project site is typically one of the most expensive components of a road construction project. The cost of materials for this project may vary by more than fourfold depending on which source and delivery method is selected. The substantial costs of some options could result in the project being abandoned.

DOT&PF conducted preliminary geotechnical investigation of potential material sources within three miles of the project area. Given the intense public interest expressed regarding material sourcing for this project, DOT&PF hired a third-party contractor to provide cost estimates for obtaining and transporting approximately 2 million cubic yards of materials (aggregate, riprap, and armor stone) to the project area. The sources varied from within the project vicinity to the Portage Valley, Eklutna, Chugiak, Kodiak and Iliamna Bay; transportation methods included truck, train and barge. The preliminary cost estimates for material acquisition and transport varied from $24 million to $110 million; these estimates do not include placing the material during construction. (Granite 2017).

3.0 PURPOSE AND NEED

3.1 Project Purpose

The purpose of the proposed Windy Corner project on the Seward Highway from MP 105 to MP 107 is to:

- Implement safety upgrades to decrease high-severity crashes by providing separation of northbound and southbound lanes to diminish the risk of head-on crashes.
- Improve traffic operations to alleviate traffic congestion by:
  - improving curves to a degree that meets recommended design speed for rural principal arterial on level terrain. See Design Speed Considerations below, and
  - improving access for vehicles entering or exiting the highway.

Design Speed Considerations: A speed of 65-mph meets the recommended design speed for rural principal arterials on level terrain; it improves safety and traffic operations as follows:

- Flattens the roadway alignment to lessen or eliminate sharp reverse S-curves that are common locations of accidents for motorists and locations of traffic back-ups caused by vehicles slowing for lower speed curves;
- Increases the sight distance, for motorist approaching the sheep viewing area where there are potential hazards of slowing, stopping, entering, existing, and parked vehicles;
- Provides a roadway that is designed to accommodate the speed that up to 85% of drivers travel regardless of the posted speed;
- Improves traffic flow by separating through and slower traffic to reduce driver frustration from following slower traffic in an area with few passing opportunities; and
- Provides a consistent design speed to neighboring segments of the highway which either have a 65-mph design speed or will have the goal of a 65-mph design speed with future projects.

3.2 Project Need

The project is needed because of the following conditions along the 2-mile project segment:

1. Important transportation route
2. High-severity crash history
3. Traffic congestion

3.2.1 Important Transportation Route (Contributing to need for Safety Upgrades and Traffic Operation Improvements)

The Seward Highway is designated as an Alaska Scenic Byway, U.S. Department of Agriculture Forest Service Scenic Byway and FHWA All-American Road. It is the only road access connecting Anchorage to the Kenai Peninsula, communities to the south, and the Alaska Marine Highway System, which stops at Whittier, Seward and Homer. As such, the highway supports heavy commercial, recreational, and residential traffic. Annual average daily traffic volumes within the corridor were estimated at 7,756 vehicles for 2017 (Alaska DOT&PF Traffic Counts

AADT GIS Map), with heaviest traffic volumes exceeding 22,000 vehicles per day during peak summer weekends.

3.2.2 High-Severity Crashes (Generating Need for Safety Upgrades)

Safety upgrades are needed along the Seward Highway between MP 105 and MP 107 to address the elevated rate of fatal and major injury (high severity) motor vehicle crashes in the project area. The Seward Highway is one of five designated safety corridors in Alaska. Since 2007, DOT&PF has embarked on efforts to provide physical safety improvements along segments of the corridor with historically high rates of high severity crashes (DOT&PF 2017d). The Seward Highway between MP 105 to MP 107 has been selected for a project and prioritized for improvements in part because it has the highest number of fatal crashes and the second highest number of major injury crashes over the past 40 years of any two-mile segment of the Seward Highway between Potter Station and Girdwood. See Figure 5.

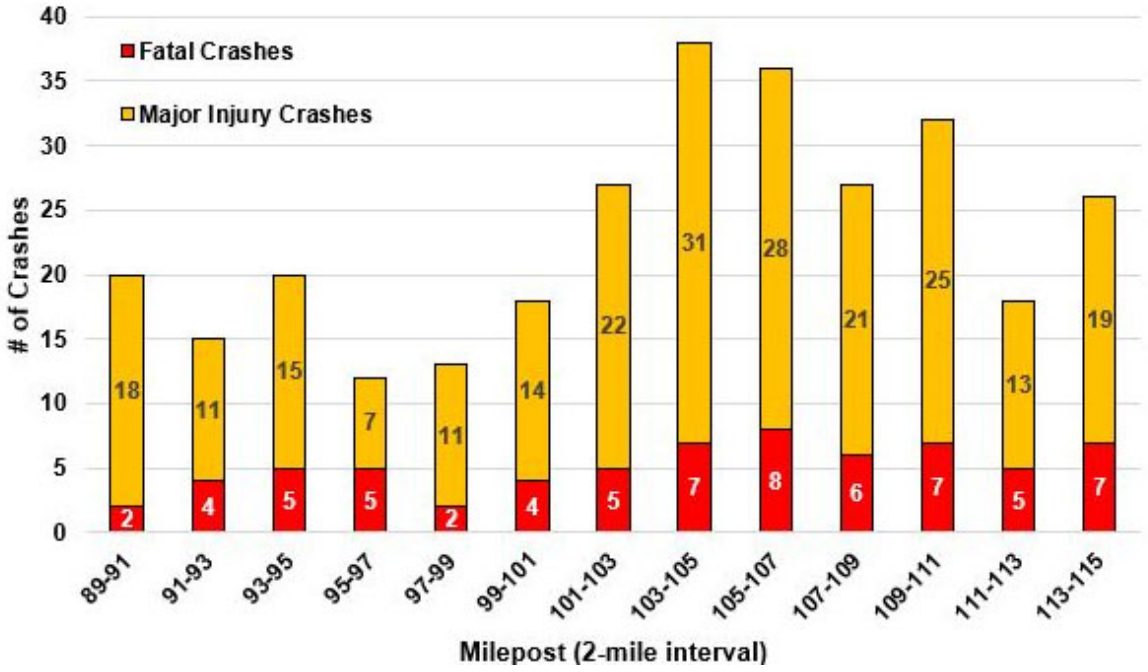


Figure 5: Seward Highway Fatal & Major Injury Crashes, 1977 to 2015 (DOT&PF 2018b)

The Seward Highway between MP 105 to MP 107 has a unique combination of roadway conditions that increase the likelihood of crashes. The likelihood of crashes increases where motorists travel at high speeds particularly when combined with the following conditions.

- sharp curves,
- limited sight distance,
- shoulder-parked vehicles (Photograph 8),
- frequently slowing and stopping vehicles,
- frequently entering and exiting traffic with uncontrolled access,
- high speed differential between through traffic and stopping traffic, and
- the lack of a traffic separation barrier between north and southbound traffic

Between MP 105 and MP 107 all of the above conditions exist and most vehicles travel through the project area at 60-mph to 65-mph, exceeding the posted speed of 55-mph.

3.2.3 Traffic Congestion (Generating Need for Traffic Operation Improvements)

Traffic Operation Improvements are needed along the Seward Highway between MP 105 and MP 107 to address the problem of traffic congestion in the project area. The following conditions in the project area contribute to traffic congestion.

- Vehicle Pullouts. Five pullouts within the project limits serve visitors recreating in the CSP. Park users use these pullouts to access the trailheads and rock climbing areas, and to enjoy the views of sheep, bore tides, and/or beluga whales. The number of vehicles needing parking often exceed the capacity of the current pullouts. Traffic flow on the Seward Highway in the project area is frequently disrupted by motorists slowing to enter or exit parking facilities or stopping along the highway shoulder to sight see and/or access recreation areas.
- Unique Dall Sheep Viewing. No other 2-mile segment of the Seward Highway has a similar sheep viewing area that draws substantial visitors yielding traffic congestion (Photograph 3).
- Other Recreational Opportunities. Beyond sheep viewing, the Windy Corner area has a large variety of other recreational opportunities to attract visitors and generate traffic congestion including hiking, photography, rock and ice climbing, water sports, whale watching, bore-tide watching, and cycling.
- Lack of Traffic Separation. The project area lacks auxiliary and dedicated turn lanes that would improve traffic flow by separating turning and through traffic. The project area also lacks adequate parking capacity and separation of parked vehicles from through traffic. Separation would improve traffic flow by lessening through-traffic slowing to navigate around stopped vehicles on highway shoulders.
- Sharp Curves. Traffic flow on the Seward Highway in the project area is disrupted by sharp curves. Vehicles slow to navigate a series of four sharp reverse curves. The project area lacks flatter curves that would reduce curve-induced slowing and provide conditions for a more consistent traffic flow.

3.3 Logical Termini

The Seward Highway project limits between MP 105 and MP 107 were chosen because of the unique combination of conditions and problems (listed below) occurring within the project length and because the project length includes the necessary highway length to resolve the described problems.

3.3.1 Unique Combination of Conditions

The following unique combination of conditions within the project's two-mile segment of the Seward Highway contribute to the selection of the termini for the project.

- Crash within Limits. The project's two mile stretch of the Seward Highway is the segment with the most fatal accidents and second most major injury accidents between 1977 and 2015. See Figure 5.

Photograph 8: Wildlife Viewers on Seward Highway Shoulder

- High Concentration of Visitors. The project highway segment is in an area with a high concentration of visitors that stop for a variety of recreational attractions. Visitors exit and enter the highway or park on the shoulder to:
  - view Dall sheep,
  - view bore tide,
  - watch whales,
  - access hiking and climbing routes
  - participate in water activities, kite boarding, etc.

  The current parking capacity and access conditions to attractions do not adequately serve the high concentration of visitors.
- Substandard Roadway Conditions. The project highway segment has four substandard and reverse curves that limit sight distance approaching Windy Corner and cause traffic congestion for vehicles slowing to navigate these curves.

3.3.2 Termini Rationale

The termini for the project were selected for the following reasons:

- Limits of Unique Accident-Related Problems. MP 105 to MP 107 encompasses the composite limits of the conditions noted above including the limits of the elevated accidents, concentration of stopped vehicles, and limits of the substandard curves.
- Southern Terminus, Adjacent Projects. The southern terminus at MP 105 is adjacent to two ongoing projects to the south: Seward Highway MP 100 to MP 105 Improvements and Highway Safety Improvement Program (HSIP): Central Region Traffic Safety Corridor Left Turn Lanes. These two projects provide improved traffic flow leading into and out of Windy Corner area. The improved traffic flow conditions south of Windy Corner diminishes the probability of driver frustration, which can lead to unsafe maneuvers as they traverse the Windy Corner area.

- Northern Terminus, Curve Limit. The northern terminus at MP 107 lies at the north end of a series of substandard curves that do not meet the 65-mph design speed criteria. Southbound motorists approach the sharp curves of Windy Corner at a high rate of speed after traversing over one mile of straight highway. See Photograph 9 and Figure 6. When commercial and commuter vehicles traverse straight stretches of the sinuous highway, they tend to increase their speed and maneuver around (pass) the slower moving recreational traffic. The combination of higher speeds and reduced sight distance associated with the sharp curves results in increased safety concerns due to limited margin of error for drivers as they enter the Windy Corner area. Visitors and recreationalists using this unique area with a high concentration of recreational activities are largely hidden from drivers until they have entered the series of sharp curves. Selecting the north end of the curves as a terminus allows flattening of these curves, lessening the abrupt change in alignment that compromises safety of all roadway users and slow drivers unfamiliar with the highway.

Photograph 9: Southbound Approach to Northern Terminus Curve

Figure 6: Straight Stretch Approach to Northern Terminus Curve

4.0 ALTERNATIVES

4.1 Introduction

This section discusses alternatives considered and the process used to determine which alternatives are advanced or not advanced for detailed analysis.

1. Alternatives Considered

Seven alternatives (six build and one no action) were considered by DOT&PF as part of the evaluation process under the National Environmental Policy Act (NEPA). The screening process for selecting these alternatives consolidated similar alternatives in order to present a range of reasonable alternatives that represent larger spectrum of alternatives. The range of alternatives considered for the purposes of NEPA, based on agency coordination, would be sufficient to satisfy the alternative analyses that are required for Section 4(f) and Section 404.

2. Alternatives Advanced

For the purposes of this Environmental Assessment (EA), either of two screening criteria have been used to determine if any of the seven alternatives considered would be advanced for detailed analysis.

- The No Action alternative must be advanced for analysis under the NEPA regulations.
- All alternatives that meet the purpose and need of the project have been advanced for detailed analysis.

Based on these criteria the no action alternative and Alternatives 2A, 2B, 2C, and 3 were advanced for detailed analysis.

3. Alternatives Not Advanced

Alternatives 1 and 4 do not meet the purpose and need: based on this they were not advanced for detailed study.

Table 1 below summarizes the seven alternatives considered and whether they were or were not advanced for detailed analysis.

Table 1: Build Alternatives Considered

Alternative	*Description*	*Status*
1	This alternative would construct improvements within existing ROW: Section 4(f) impact avoidance. Design speed would be 55-mph for curve 4 and would be 60-mph for curves 2, 3, and 5. See Table 2.	Not Advanced
2A	This alternative would shift the alignment into Turnagain Arm to improve the Seward Highway to meet 65-mph design criteria. The typical highway section is for a two-lane divided highway consisting of (in each direction) 12-foot-wide through lanes, 12-foot-wide auxiliary lanes, 24-foot-wide vegetated median, 8-foot-wide outside shoulders, and 4-foot-wide inside shoulders. Material locations would be within the CSP at MP 109 and MP 104.	Advanced
2B	Maintains the same design criteria and location as 2A but evaluates multiple material sites within DOT&PF Seward Highway ROW where material could be excavated as close as possible to project area. These within ROW material sites would replace Alternative 2A material locations proposed within CSP at MP 109 and MP 104.	Advanced
2C	Maintains the same design criteria and location as 2A but imports materials from outside the project corridor and outside of CSP lands. Outside material sources would replace Alternative 2A material locations proposed within CSP at MP 109 and MP 104.	Advanced
3	Maintains the same design criteria as 2A, while shifting the roadway alignment inland at Windy Corner to balance cut and fill quantities.	Advanced
4	This alternative moves the roadway alignment inland and includes the construction of a 2,250-foot long tunnel through Windy Corner.	Not Advanced

Sections 4.2 gives detailed descriptions of Alternatives 1 and 4, both of which are build alternatives that were not advanced. Section 4.3 gives detailed descriptions of the four build alternatives advanced; Alternatives 2A, 2B, 2C, and 3. Each description evaluates whether the alternative meets the purpose and need of the project.

4.2 Build Alternative Considered and Not Advanced (Alternatives 1 and 4)

*4.2.1 **Alternative 1** Improvements Within the Existing ROW*

This alternative would limit any improvements, cut, and fill slopes to within the existing ROW. See Figure 7.

The typical section for Alternative 1 consists of a two-lane, undivided highway with 12-foot lanes and 8-foot shoulders similar to the existing roadway. The design speed of 65-mph was applied to this alternative, but due to constraints in ROW, horizontal separation from railroad tracks, curve lengths, and rock catchment width, the design speed can only be met for curve #1; the design speed must be lowered to 55-mph for curve #4 and to 60-mph for curves #2, #3, and #5 as shown in Table 2.

Table 2: Alternative 1 Design Speed for Proposed Curve Improvements

Curve Number	Exiting Radius (ft)	Existing Design Speed (mph)	Alternative 1 Radius at inside Shoulder (ft)	Design Speed (mph)
C1	2,865	65	3,010	65
C2	1,206	55	1,530	60
C3	1,432	60	1,680	60
C4	996	50	1,060	55
C5	996	50	1,990	60

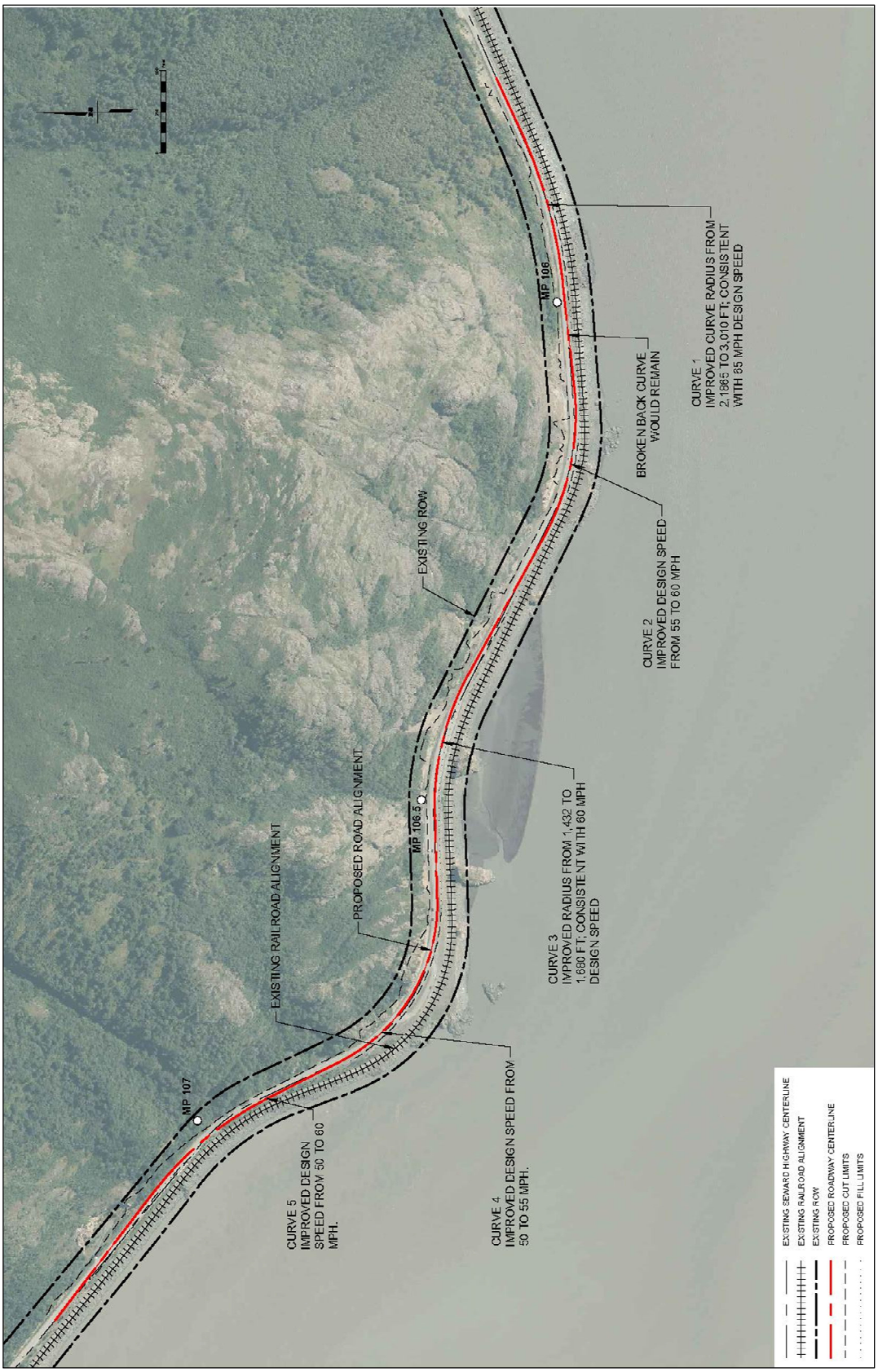


Figure 7: Alternative 1 - Stay Within Existing ROW

4.2.1.1 Benefits

- Roadway Geometry. Alternative 1 would slightly improve the highway alignment and geometry and increase the design speed for three of the five curves.
- Rock Catchment. Alternative 1 increases rock catchment compared to existing highway cross-section.
- Construction Cost. Alternative 1 would substantially reduce construction costs ($38.3 million) in comparison to the proposed alternative ($90.6 million).
- Visual Effects. - Alternative 1 would eliminate material extraction beyond the project area. However, due to the larger cuts within the project limits Alternative 1 would result in second greatest exposed rock cut face area (129,500 square yards) of all the alternatives considered. Only Alternative 3 has a greater exposed rock cut face with 130,000 square yards. See Table 7.
- Section 4(f). Alternative 1 would not use Section 4(f) property resulting in:
  - less impact on Turnagain Arm Trail;
  - no material extraction at MP 109 or MP 104;
  - no changes to access to shorelines for water activities; and
  - no impact the historic ARRC railroad.
- Section 6(f). Alternative 1 would not convert Section 6(f) property from recreational use to transportation or material extraction use.
- CSP Maintenance Cost. Recreation access to wildlife viewing areas, shorelines, climbing areas, and the Turnagain Arm Trail would remain as they are and there would be no additional management and maintenance costs to CSP.

4.2.1.2 Disadvantages

- Purpose and Need. Alternative 1 does not meet the identified transportation purpose and need, improving safety and traffic operations, because Alternative 1 would not include the design improvements needed to substantially improve safety and improve traffic operations as follows:

Roadway Geometry. Given the limited amount of ROW available, Alternative 1 only results in minor improvements to horizontal geometry as noted below. As a result the elevated crash rate would likely continue in this area.

- A 65-mph design speed upgrades safety and improves traffic operations as noted in the previous Section 3.1.1. However, Alternative 1 design speed varies (55- to 65-mph) from curve to curve through the corridor, which is not intuitive for motorists. See Table 2. The posted speed would be limited to 55-mph, to prevent changing the speed limits from curve to curve.
- Maintains a substantial gap between the speed the highway is designed for and the speed that up to 85% of drivers would travel regardless of the posted speed.
- The reverse curve would remain between curve 1 and curve 2
- Minor improvements to line of sight
- Minor flattening of sharp curves

Traffic Separation. Alternative 1 would have no median separation of northbound and southbound traffic to diminish the risk of head-on crashes.

Auxiliary/Turn Lanes. Alternative 1 would have no addition of an auxiliary lane in each direction and a dedicated southbound left-turn lane to improve access for vehicles entering or exiting the highway.

Parking Facilities. Alternative 1 would have no off-shoulder parking provided by a new mountainside park facility resulting in no safe location for pedestrians to view wildlife.

Emergency Response Access. Alternative 1 would have no emergency response access ramp for water rescue operations;

Public Controversy. Alternative 1 would have substantial potential for public and agency opposition due to reduced safety improvements in comparison to other alternatives.

Visual Effects. Alternative 1 would result in one of the greater exposed rock cut face areas (129,500 square yards) of all the alternatives. This area is 62% greater than Alternative 2A. Alternative 1 rock cuts would result in visual changes on the northbound side of highway throughout the project limits.

Dall Sheep Habitat Impacts. Alternative 1 would result in the greatest impact to Dall sheep habitat of all alternatives considered. Alternative 1 would impact 9.4 acres of Dall sheep habitat above Windy Corner compared to 2.4 acres with Alternative 2A. The substantial Dall sheep habitat impact with Alternative 1 would go against the strong public and agency sentiment to minimize adverse impacts to the iconic Dall sheep habitat and would be inconsistent with the 2011 CSP Management Plan guidance to preserve and enhance sheep viewing.

Park Facility Improvements – Alternative 1 would not construct any mountainside park facilities with improved parking and wildlife viewing amenities. Alternative 1 would therefore not be consistent with the goals of the 2011 CSP Management Plan and the 2010 draft Chugach Access Plan (CAP) recommendations for safer and enhanced wildlife viewing opportunities and expanded parking at this location.

Maintenance. Excavation further into the slopes at Windy Corner may lead to increased DOT&PF maintenance costs and safety issues, as some adjacent slopes are comprised of loose, friable material, and may have a higher rate of sliding towards the highway requiring more dangerous maintenance response operations and more safety hazards related to rockfall on the highway.

4.2.1.3 Alternative 1 Not Advanced

This alternative was not advanced for detailed study for the following reasons.

Alternative 1 does **not** meet the project's purpose and need as described in Chapter 3. Due to constraints in ROW, horizontal separation from railroad tracks, curve lengths, and rock catchment width, the following items of the project's purpose cannot be met;

- the design speed of 65-mph,
- improving access for vehicles entering or exiting the highway, and
- providing separation of northbound and southbound lanes to diminish the risk of head-on crashes.

Therefore, the elevated crash rate, crash severity, and the traffic operation problems would likely continue in the project area.

*4.2.2 **Alternative 4** - Tunnel Under Windy Corner*

Alternative 4 would depart from the existing Seward Highway ROW near MP 107, pushing the alignment inland and constructing a 2,250-foot tunnel under Windy Corner. See Figure 8. An analysis was conducted assuming a 'Drill and Blast' construction method for tunneling. The design speed of 65-mph was applied to Alternative 4. The typical section for Alternative 4 includes two 12-foot-wide travel lanes with 8-foot shoulders, curb and gutter, and 3-foot sidewalks on both sides. The tunnel would have portals at either end, each requiring substantial rock cuts up to 224 feet high by 312 feet long north of the tunnel and 916 feet long south of the tunnel. The tunnel would also require specific design elements not found in the other 'open road' alternatives, such as structural support, power, lighting, ventilation, drainage, and ice control. There would be limited vertical and horizontal clearance in the tunnel, so the existing Seward Highway alignment would need to be maintained as a bypass route for permitted vehicles with large loads.

4.2.2.1 Benefits

- Section 4(f) and Section 6(f) Effects – By tunneling beneath the surface of the CSP, the only Section 4(f) and Section 6(f) uses with Alternative 4 would be for the portals at either end of the tunnel. Alternative 4 would reduce the permanent Section 4(f) use of CSP from 26.3 acres for Alternative 2A to 0.75 acres for Alternative 4. Alternative 4 would not remove Section 6(f) protection from material extraction locations, unlike Alternative 2A. However, the material site locations would remain protected under Section 4(f) for both alternatives.
- Turnagain Arm Effects – Alternative 4 eliminates environmental impacts as a result of fill placed in Turnagain Arm versus impacting 26.3 acres with Alternative 2A including reduction in impacts to:
    - Essential Fish Habitat;
    - Cook Inlet beluga whale critical habitat; and
    - Waters of the U.S.
- Visual and Park Effects - Alternative 4 would eliminate material extraction at MP 109 and MP 104. This would reduce visual effects and eliminate use/conversion of 35.4 acres of CSP lands for material extraction.
- Temporary Construction Effects. Alternative 4 would reduce the temporary construction impacts to the public by curtailing the need for material hauling to the site. Excess material (approximately 22,000 loads or 15 percent of the loads hauled in Alternative 2A) would need to be hauled off site using the existing highway corridor.
- CSP Costs - Alternative 4 would not increase CSP management or maintenance costs associated with MP 109, MP 104, or the proposed new wildlife viewing area.

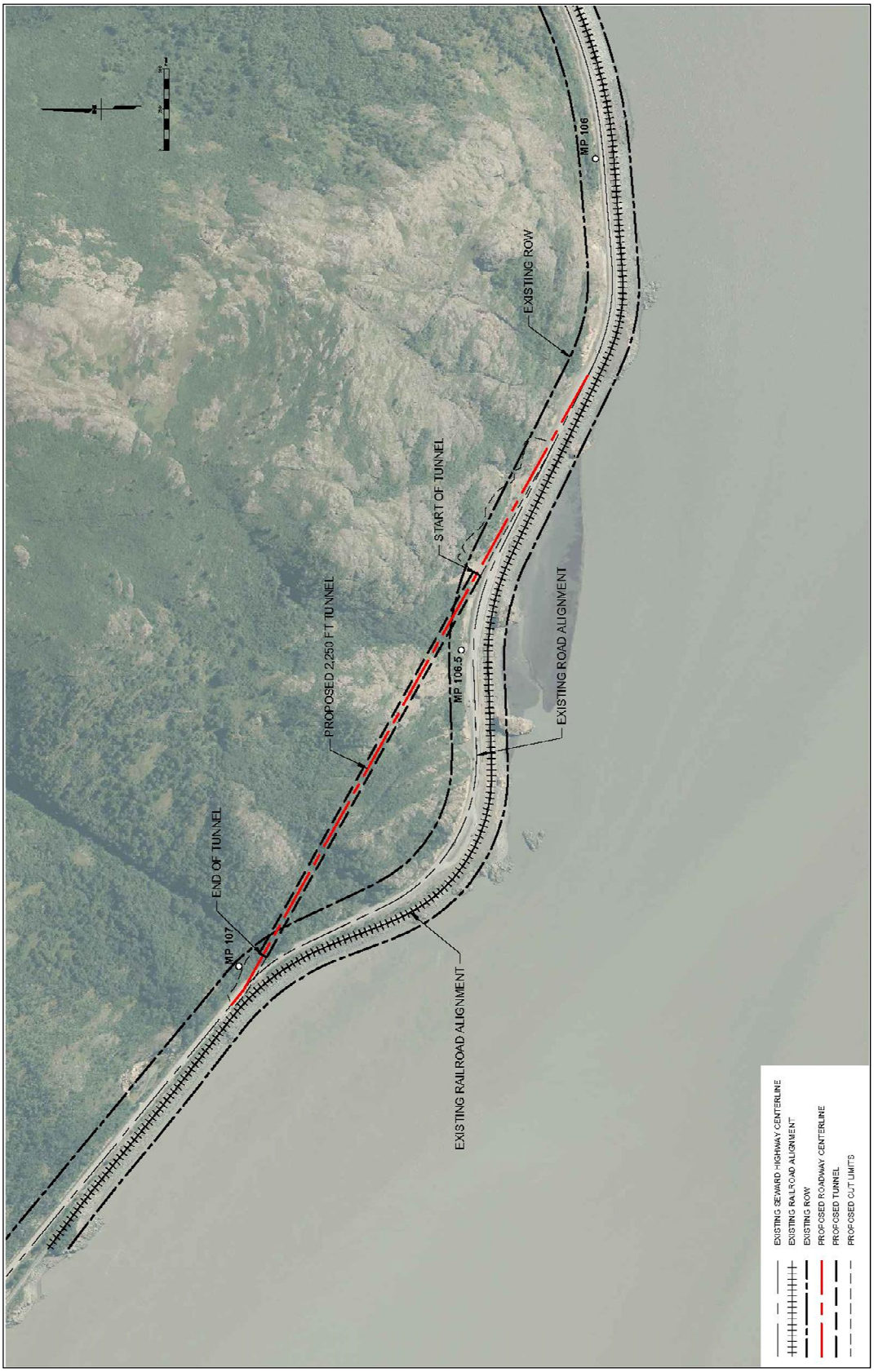


Figure 8: Alternative 4 – Tunnel

4.2.2.2 Disadvantages

- Purpose and Need - Alternative 4 does not meet the transportation purpose and need of the project to improve safety because:
  - Alternative 4 does not provide separation of northbound and southbound traffic;
  - Alternative 4 does not provide auxiliary lanes for passing or turning;
- Visual Effects - Alternative 4 would require two portals with very high cut faces at either tunnel end having substantial visual effects. Rock cuts approximately 224 feet high and 916 linear-feet long south of tunnel and 312 linear-feet long north of tunnel resulting in visual impacts for motorists for about one mile in each direction.
- Dall Sheep Effects - Alternative 4 would impact 3.0 acres of high-value Dall sheep habitat on the hillslope directly above Windy Corner compared to 2.4 acres for Alternative 2A.
- Construction Costs - Alternative 4 would cost substantially more to construct (between $139.8 million and $167.7 million) than the proposed alternative ($90.6 million) and costs could be higher due to the difficult and unknown nature of tunnel construction.
- Maintenance Costs - Alternative 4 would result in far greater maintenance costs associated with electrical and emergency requirements in addition to maintaining the existing road to allow bypass of over-sized vehicles. The average annual cost for tunnel maintenance and electricity is estimated at $60,000 per year. Oversized vehicles would be restricted from using the tunnel requiring them to bypass the tunnel on the old highway alignment. Avoiding this restriction and associated maintenance costs by building a tunnel large enough to accommodate the infrequent use of permitted oversized loads would be cost prohibitive.
- Management Costs - Alternative 4 would result in increased management costs for managing the bypass route as well as the tunnel.
- Park Facility Improvements – Alternative 4 would not construct the new controlled access mountainside park facility with improved parking and wildlife viewing amenities as proposed with Alternative 2A. Alternative 4 would therefore not be consistent with the goals of the 2011 CSP Management Plan and the draft CAP recommendations for safer and enhanced wildlife viewing opportunities and expanded parking at this location.

4.2.2.3 Alternative 4 Not Advanced

This alternative was not advanced for detailed study for the following reasons.

- Purpose and Need. Alternative 4 does **not** meet the project's purpose and need as described in Chapter 3. The following items of the project's purpose cannot be met;
  - improving access for vehicles entering or exiting the highway, and
  - providing separation of northbound and southbound lanes to diminish the risk of head-on crashes.

  Therefore, the elevated crash rate, crash severity, and the traffic operation problems would likely continue in the project area.
- Public Sentiment/Substantial Impacts - Alternative 4 would have greater impacts on resources for which there has been strong public sentiment about avoiding and minimizing including the visual setting and the iconic Dall sheep habitat.
- Costs - Alternative 4 would result in substantial increased management, maintenance, and construction costs as noted under disadvantages above.

4.3 Alternatives Considered and Advanced (No Action, 2A, 2B, 2C, and 3)

4.3.1 No Action

4.3.1.1 Alternative Description

The No Action alternative consists of the following:

- The existing roadway and railroad alignments would be maintained at their current locations.
- Curves within the project area would not meet 65-mph design speed. See Table 2.
- No separation of northbound and southbound traffic.
- Access to wildlife viewing and recreational parking would be unchanged as no CSP improvements or modifications would be made under this alternative.
- No controlled-access emergency response access ramp to Turnagain Arm would be provided.
- No material extraction activities or locations would be needed for construction work.
- The highway within the project limits would continue to operate with a high level of traffic congestion projected out to 2035 as well as during seasonally high traffic times

4.3.1.2 Purpose and Need Analysis

The No Action Alternative does **not** meet the project's purpose and need as described in Chapter 3. The following items of the project's purpose cannot be met;

- improvement of curves to a design speed of 65-mph,
- improving access for vehicles entering or exiting the highway, and
- providing separation of northbound and southbound lanes to diminish the risk of head-on crashes.

Therefore, the elevated crash rate, crash severity, and the traffic operation problems would likely continue in the project area.

Although the No Action Alternative does not meet the purpose and need of the project, the No Action alternative must be advanced for detailed analysis under the NEPA regulations.

*4.3.2 **Alternative 2A** Construct Proposed Improvements with Material MP 109 and MP 104 Material Locations*

4.3.2.1 Alternative Description

Alternative 2A shifts the Seward Highway alignment into the Turnagain Arm and would include the following design features. See Figure 9.

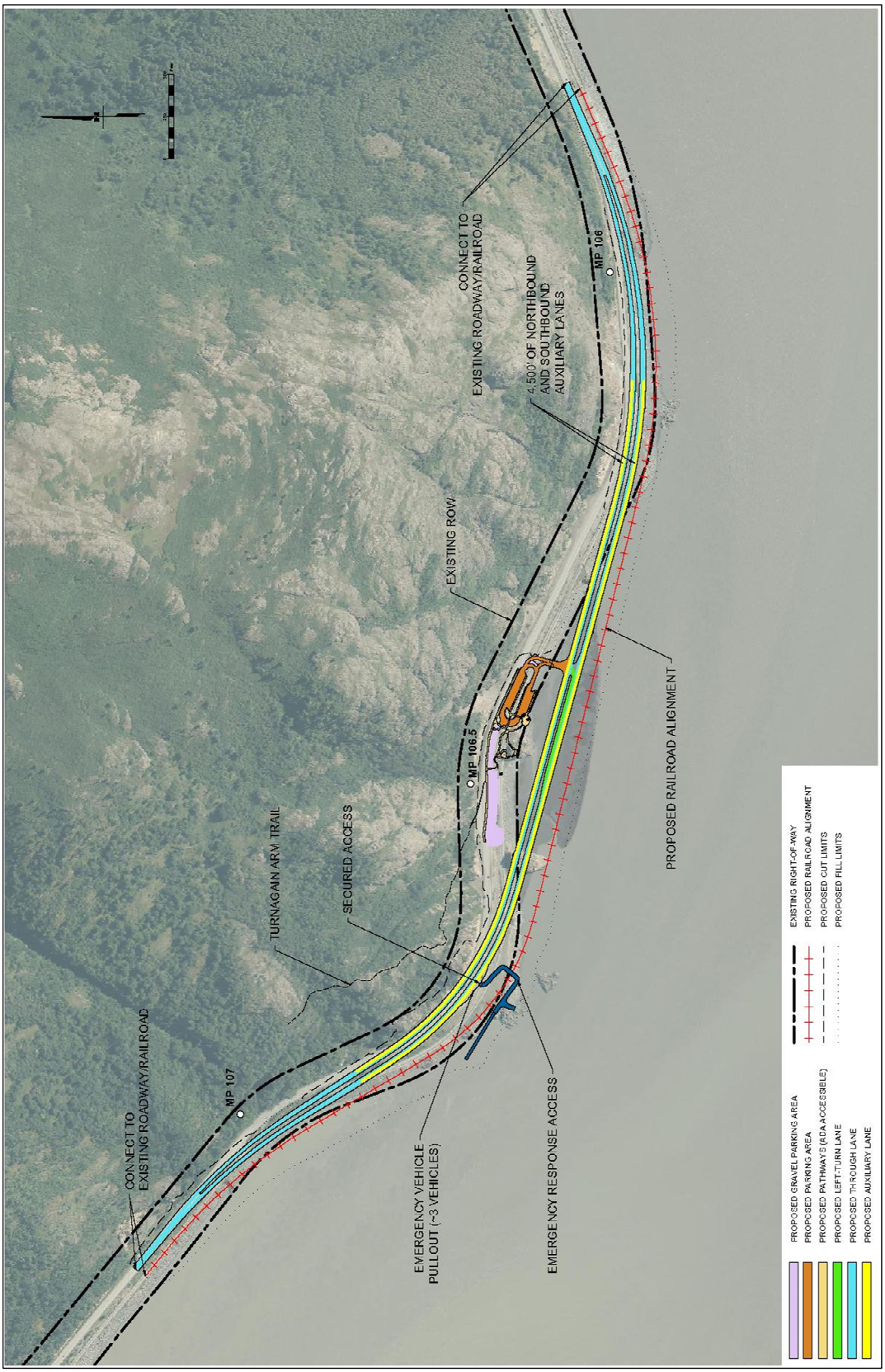


Figure 9: Alternative 2A - Shift Into Turnagain Arm

Typical Highway Section. The typical highway section for the realigned highway is for a two-lane divided highway consisting of (in each direction). See Figure 10.

- 12-foot-wide through (travel) lanes
- 12-foot-wide auxiliary lanes
- 24-foot-wide vegetated median
- 4-foot-wide inside shoulders
- 8-foot-wide outside shoulders
- Appropriately-sized rock catchment widths based on wall heights for the northbound edge of pavement and toe of slope

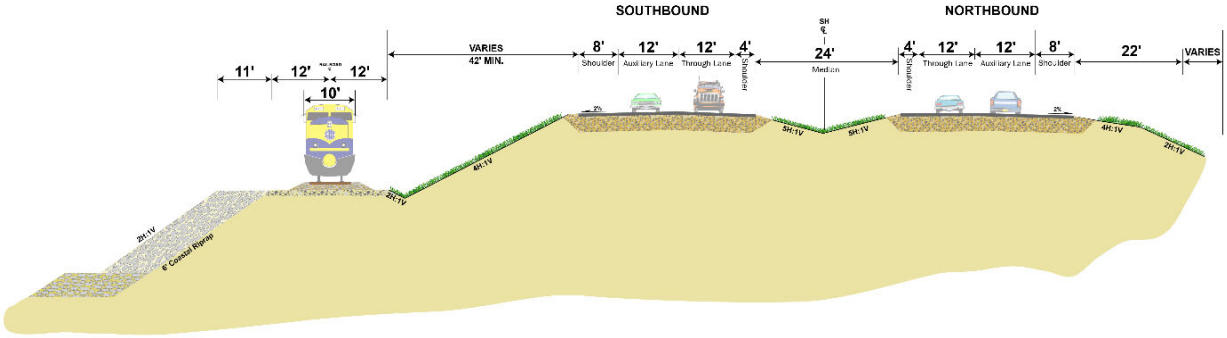


Figure 10: Alternative 2A - Typical Section

Design Speed. The design speed of 65-mph was applied to this alternative.

Auxiliary and Turn Lanes. Alternative 2A would include an auxiliary lane in each direction and a dedicated southbound left-turn lane for passing and turning to improve access for vehicles entering or exiting the highway. These features would improve the safe flow of traffic by:

- separating recreational uses in the ROW from through traffic movements,
- reducing time spent following in an area of the highway with few passing opportunities, and
- reducing conflicts caused by motorists slowing and stopping along the highway shoulder to view wildlife.

Traffic Separation. Alternative 2A would include a median separation of northbound and southbound traffic to diminish the risk of head-on crashes.

Railroad Realignment. Alternative 2A would include the realignment of the ARRC railroad tracks. See Figure 9 for a plan view. The realignment would make space for the highway alignment and would include any utilities located within the ARRC rail alignment. See Figure 10 for a cross section view. The realignment would maintain a minimum of 42 feet from the track centerline and the new edge of highway pavement, similar to the existing alignment. This would maintain ARRC's ability to install a future second track without having to revise either the rail or highway alignments. The design accommodates 16 feet from the existing track centerline to a second track centerline with 26 feet remaining between the second track centerline and the new edge of highway pavement. The railroad structural section includes:

- 10-foot top width for ballast; and
- 24-foot top width for sub-ballast

The proposed track configuration features flattened horizontal curves, which would allow track speeds to increase from 40- to 50-mph throughout the project area. To improve safety for pedestrians by deterring access to ARRC property, Alternative 2A would also include:

- A drainage swale between the tracks and the highway; and
- An abrupt elevation change, using a retaining wall, between the railroad tracks and highway on the north end of the project at the Windy Corner curve.

Emergency Response Access. Alternative 2A would include a controlled-access emergency response access ramp to Turnagain Arm. See Figure 11.

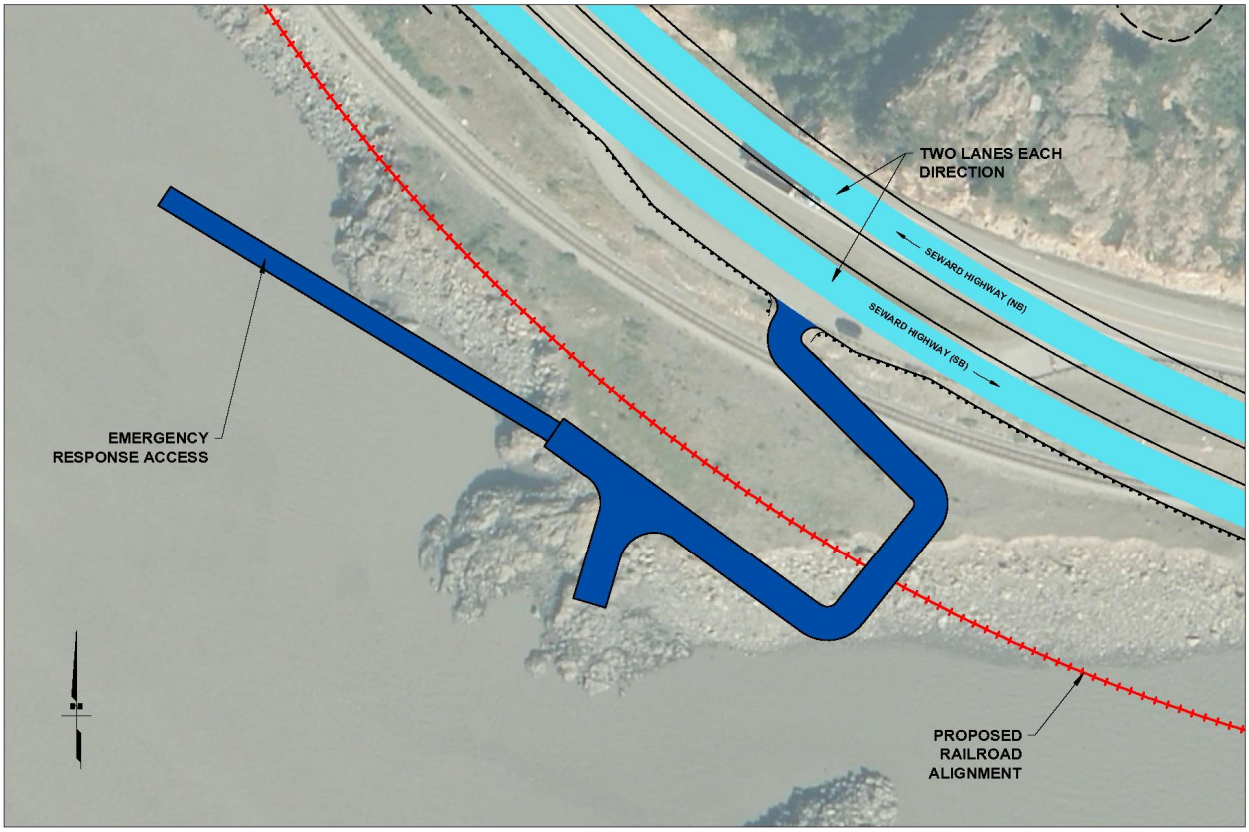


Figure 11: Proposed Emergency Response Access Ramp

Material Extraction. Alternative 2A would require the extraction of nearly 2 million cubic yards of material (aggregate, riprap, and armor stone). Proposed extraction areas are located at MP 109 and MP 104. See Figure 12. Blasting is anticipated to extract the necessary material. The extraction area at MP 109 is expected to produce sufficient quality and quantity of materials for this project. Material extraction at MP 104 would only occur if the Construction Contractor demonstrates that material available at MP 109 is not sufficient in quantity or quality. Given the reconnaissance completed at MP 109, this situation is unlikely, but possible. If required, extraction would occur at MP 104 to obtain the remainder of material needed to construct Alternative 2A Material extraction at these locations would be limited to material needed for this improvement project only. The Construction Contractor would submit a reclamation plan consistent with AS 27.19 to DNR for review prior to material excavation.

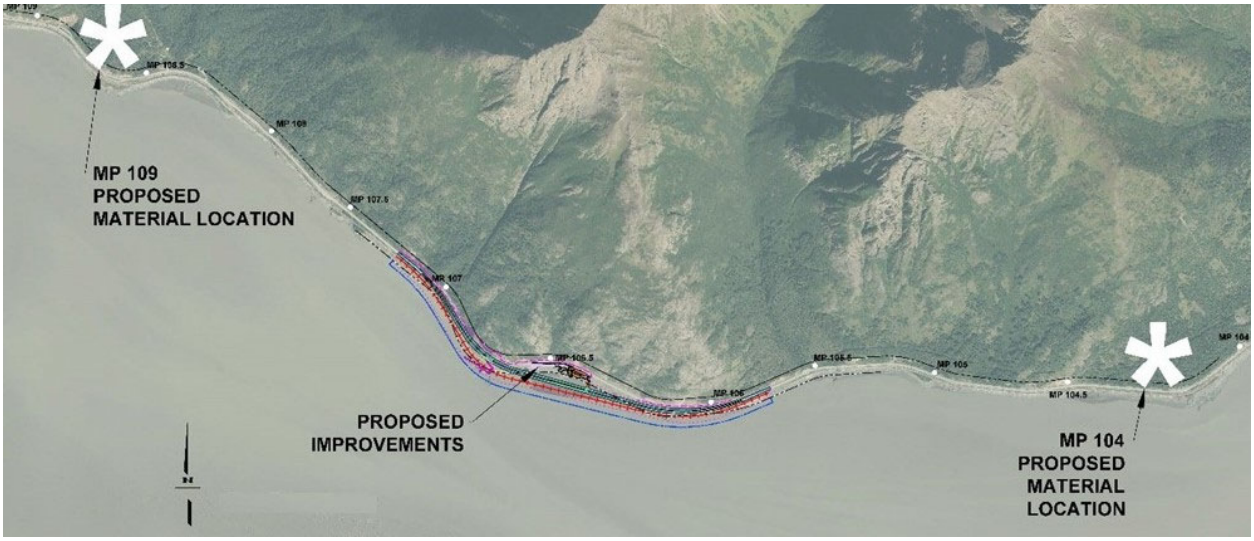


Figure 12: Proposed Material Locations in Relation to Proposed Improvements

Park Facilities Improvements. Alternative 2A would include features intended to improve CSP access and facilities in this area utilizing the space created by the revised alignment.

Proposed park improvements include:

- Expanded parking capacity with at least 130 feet of separation between the parking area and the highway;
- A parking capacity of 33 total parking spaces, consisting of 24 standard parking spaces, 2 handicap accessible spaces, and 7 recreational vehicles (RVs) or large vehicle spaces;
- Walkways connecting the parking area to wildlife viewing areas;
- Improved trail head access including a foot path connection to the existing Turnagain Arm Trail;
- A sheep viewing area with viewing platforms maintaining appropriate distance between wildlife and observers;
- Wildlife educational panels and spotting scopes;
- Pathways and benches; and
- Toilet facilities.
- Figure 13 is a conceptual cross-section view of the proposed park facility improvements adjacent to the highway.

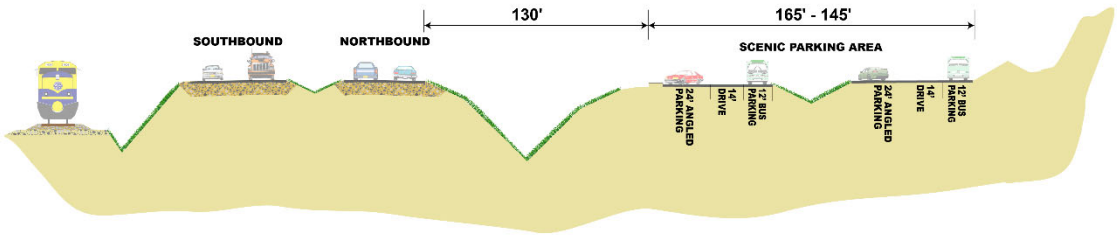


Figure 13: Proposed Mountainside Park Facilities - Cross-Section

Figure 14 is a plan view of the proposed mountainside park facility improvements adjacent to the highway.

Future Amenity Accommodations. Alternative 2A would be designed to allow additional amenities that are not proposed for construction at this time, but which could be accommodated in the future. These include a pedestrian underpass connecting the north and south sides of the highway and an improved parking and viewing area on the waterside of the highway. These were eliminated from the project to improve safety and reduce access issues associated with trespass on the ARRC ROW. Space for a potential future pedestrian pathway along the mountainside has been accommodated.

4.3.2.2 Purpose & Need Analysis

Alternative 2A meets the identified transportation purpose and need, improving safety and traffic operations, because Alternative 2A would include the design improvements needed to substantially improve safety and improve traffic operations as follows:

- Improving Curves. Alternative 2A would substantially improve roadway curves by:
  - Flattening sharp curves,
  - Providing for a 65-mph design speed which upgrades safety and improves traffic operations as noted in Section 3.1.2, Design Speed Considerations,
  - Providing a roadway that is designed to accommodate the speed that up to 85% of drivers travel regardless of the posted speed,
  - Eliminating the four reverse curves, and
  - Improving driver sight distance.
- Improving Access. Alternative 2A would add an auxiliary lane in each direction and a dedicated southbound left-turn lane for passing and turning to improve access for vehicles entering or exiting the highway. These features would improve the safe flow of traffic by:
  - Separating recreational uses in the ROW from through traffic movements,
  - Reducing time spent following slower vehicles in an area of the highway with few passing opportunities, and
  - Reducing conflicts caused by motorists slowing and stopping along the highway shoulder to view wildlife
  - Providing Traffic Separation. Alternative 2A would provide a median separating northbound and southbound traffic to diminish the risk of head-on crashes. (Photograph 10)

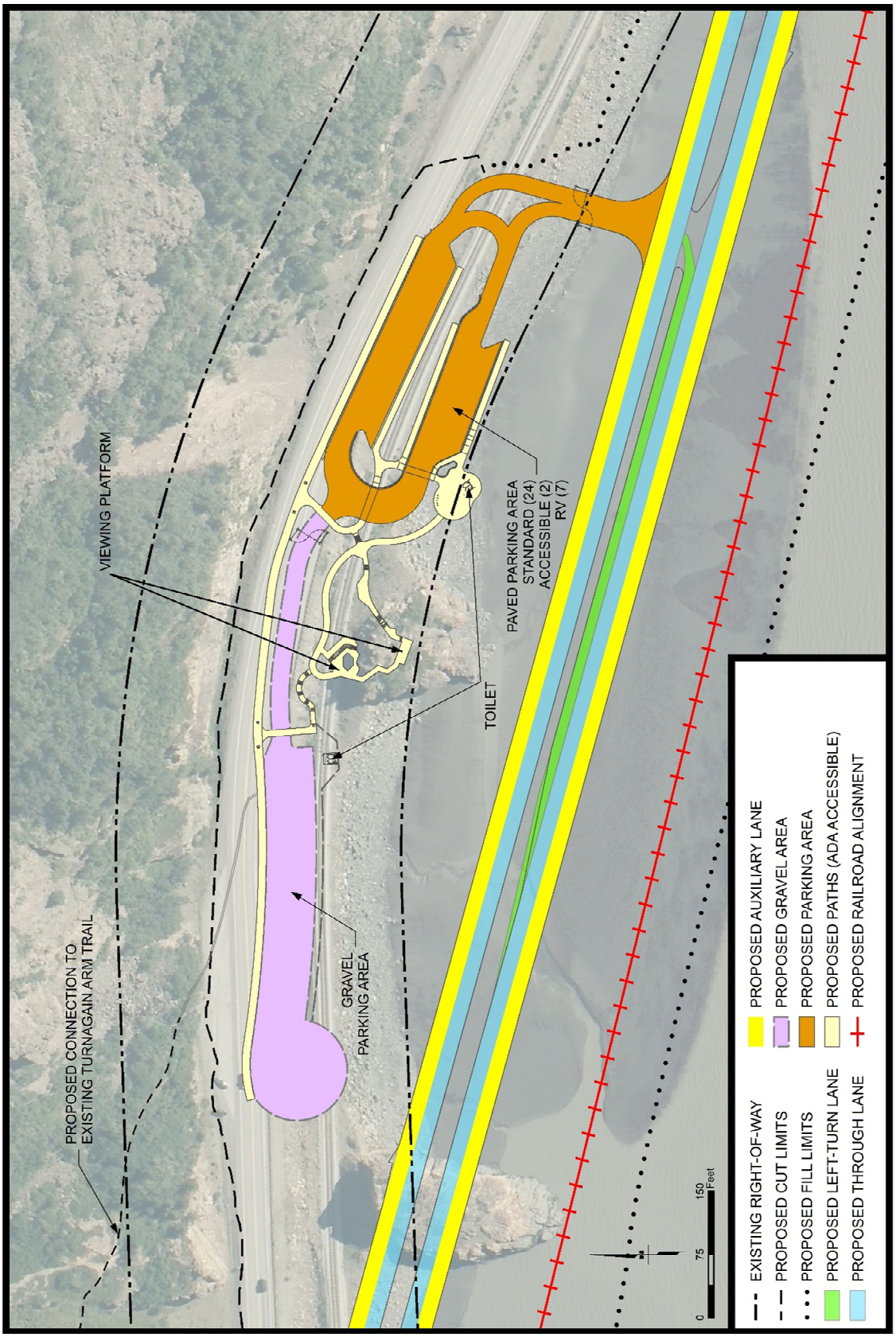
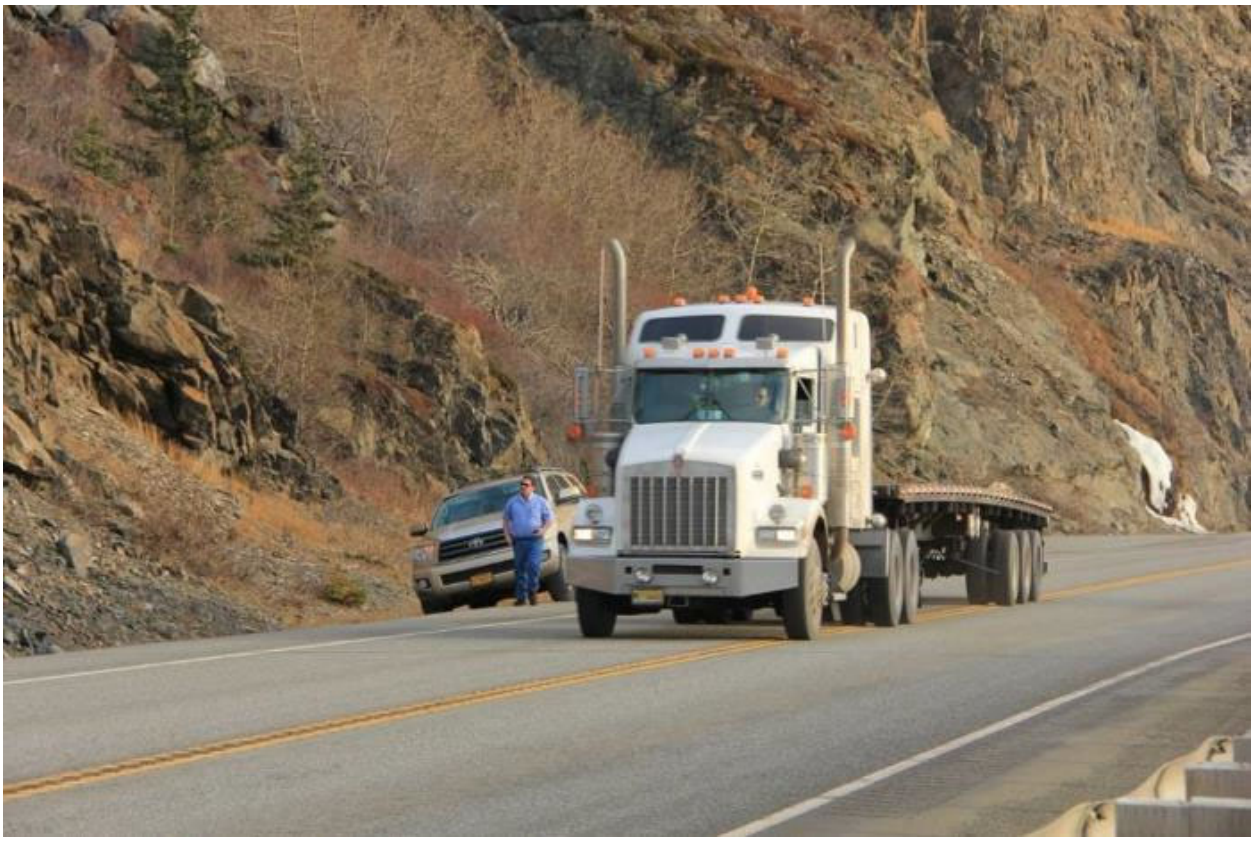


Figure 14: Alternative 2A – Proposed Mountainside Park Facilities



Photograph 10: Seward Highway - No Current Traffic Separation

*4.3.3 **Alternative 2B** Construct Proposed Improvements with Material from the Seward Highway ROW*

4.3.3.1 Alternative Description

Alternative 2B maintains the identical design criteria and alignment as that described in Alternative 2A (Section 4.3.2), with the following exceptions. See Figure 15.

- Multiple Material Sites Within ROW. Alternative 2B utilizes multiple material sites within DOT&PF Seward Highway ROW. These material extraction sites are anticipated to provide similar quantity of material as Alternative 2A material locations proposed within CSP at MP 109 and MP 104. Seven material sites within the Seward Highway ROW were selected based on the availability of large quantities of material and proximity to the project site (within six miles). At the seven sites, vertical rock cut slopes would extend to the edge of the Seward Highway ROW (designed at an assumed 0.5H:1V slope per DOT&PF geotechnical recommendations elsewhere in the corridor).
- Parking Area. Alternative 2B would provide an improved mountainside off-shoulder paved parking area approximately 38 feet deep by 325 feet long instead of the new mountainside park facility proposed with Alternative 2A.

4.3.3.2 Purpose and Need Analysis

Alternative 2B meets the identified transportation purpose and need, improving safety and traffic operations, because Alternative 2B would include the design improvements needed to substantially improve safety and improve traffic operations as follows:

- Improving Curves. Alternative 2B would substantially improve roadway curves by:
  - Flattening sharp curves,
  - Providing for a 65-mph design speed which upgrades safety and improves traffic operations as noted in Section 3.1.2, Design Speed Considerations,
  - Providing a roadway that is designed to accommodate the speed that up to 85% of drivers travel regardless of the posted speed,
  - Eliminating the four reverse curves, and
  - Improving driver sight distance.
- Improving Access. Alternative 2B would add an auxiliary lane in each direction and a dedicated southbound left-turn lane for passing and turning to improve access for vehicles entering or exiting the highway. These features would improve the safe flow of traffic by:
  - Separating recreational uses in the ROW from through traffic movements
  - Reducing time spent following slower vehicles in an area of the highway with few passing opportunities, and
  - Reducing conflicts caused by motorists slowing and stopping along the highway shoulder to view wildlife
- Providing Traffic Separation. Alternative 2B would provide a median separating northbound and southbound traffic to diminish the risk of head-on crashes.

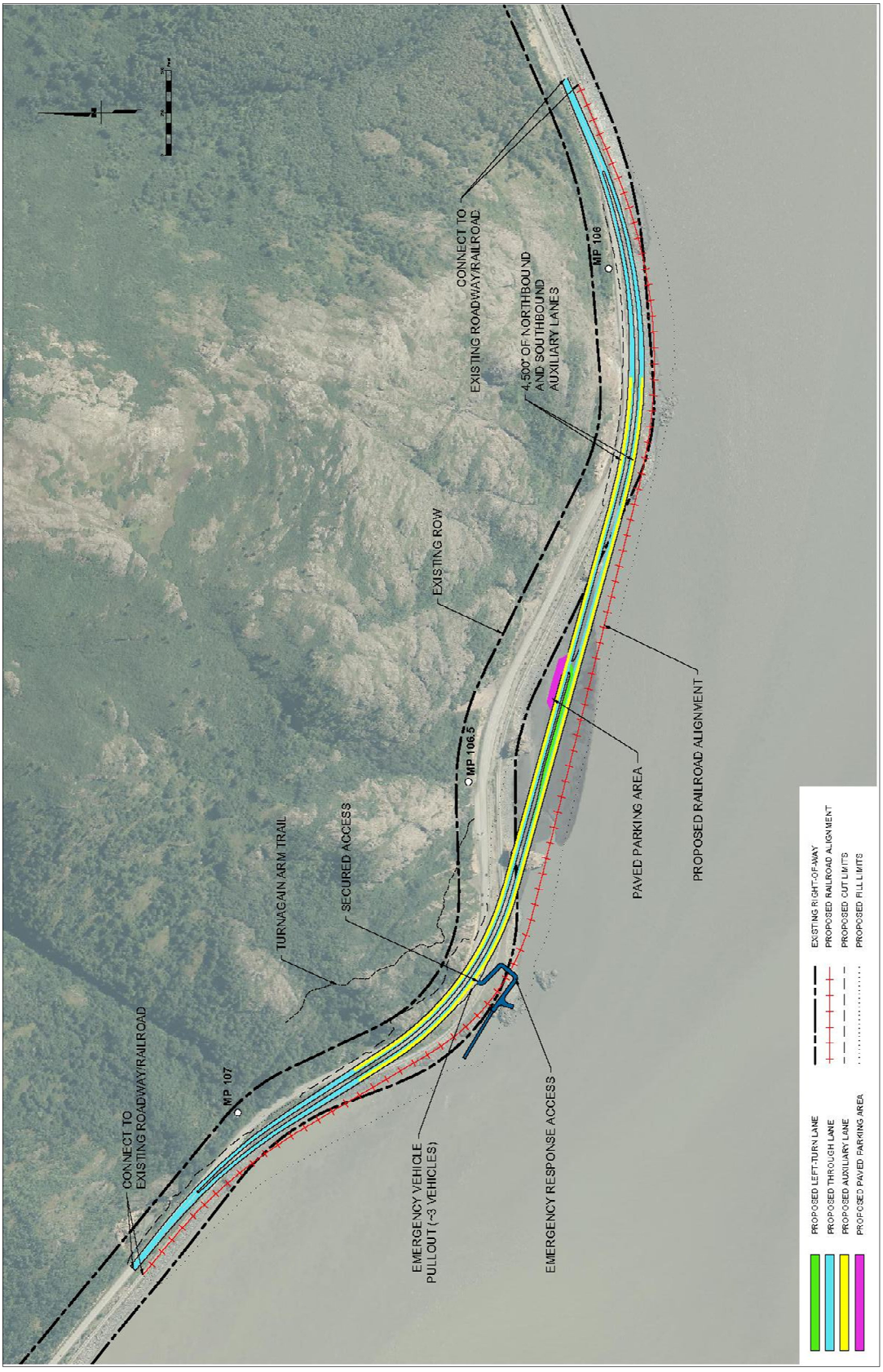


Figure 15: Alternative 2B - Shift Into Turnagain Arm

*4.3.4 **Alternative 2C** Construct Proposed Improvements with Material from a Distant Source*

4.3.4.1 Alternative Description

Alternative 2C maintains the identical design criteria and location as described in Alternative 2A with the following exceptions. See Figure 16.

- Materials from Outside Project Corridor. Alternative 2C imports materials from outside the project corridor and outside of CSP lands. Fill material to construct the proposed improvements in Turnagain Arm would come from material sources outside of Seward Highway corridor. These material sources are anticipated to provide similar quantity and quality of material as Alternative 2A material locations proposed within CSP at MP 109 and MP 104.
- Parking Area. Alternative 2C would provide an improved mountainside off-shoulder paved parking area approximately 38 feet deep by 325 feet long instead of the new controlled access mountainside park facility proposed with Alternative 2A.

To evaluate Alternative 2C, DOT&PF solicited an experienced independent contractor (Granite Construction, Inc.) to evaluate probable construction costs for purchasing and transporting material from outside the corridor. The range of material sources includes: existing commercial sources in Anchorage, Eklutna, and Palmer; formerly used material sites in Portage; and material sources accessible via Cook Inlet.

In addition, Alternative 2C evaluated different material transport methods: truck haul, train, and barge. The two sites in lower Cook Inlet were both evaluated for barge haul only, while other sites were considered for train and/or truck haul.

Details of the material site analysis are located under Section 2.10.

4.3.4.2 Purpose and Need Analysis

Alternative 2C meets the identified transportation purpose and need, improving safety and traffic operations, because Alternative 2C would include the design improvements needed to substantially improve safety and improve traffic operations as follows:

- Improving Curves. Alternative 2C would substantially improve roadway curves by:
  - Flattening sharp curves,
  - Providing for a 65-mph design speed which upgrades safety and improves traffic operations as noted in Section 3.1.2, Design Speed Considerations,
  - Providing a roadway that is designed to accommodate the speed that up to 85% of drivers travel regardless of the posted speed,
  - Eliminating the four reverse curves, and
  - Improving driver sight distance.

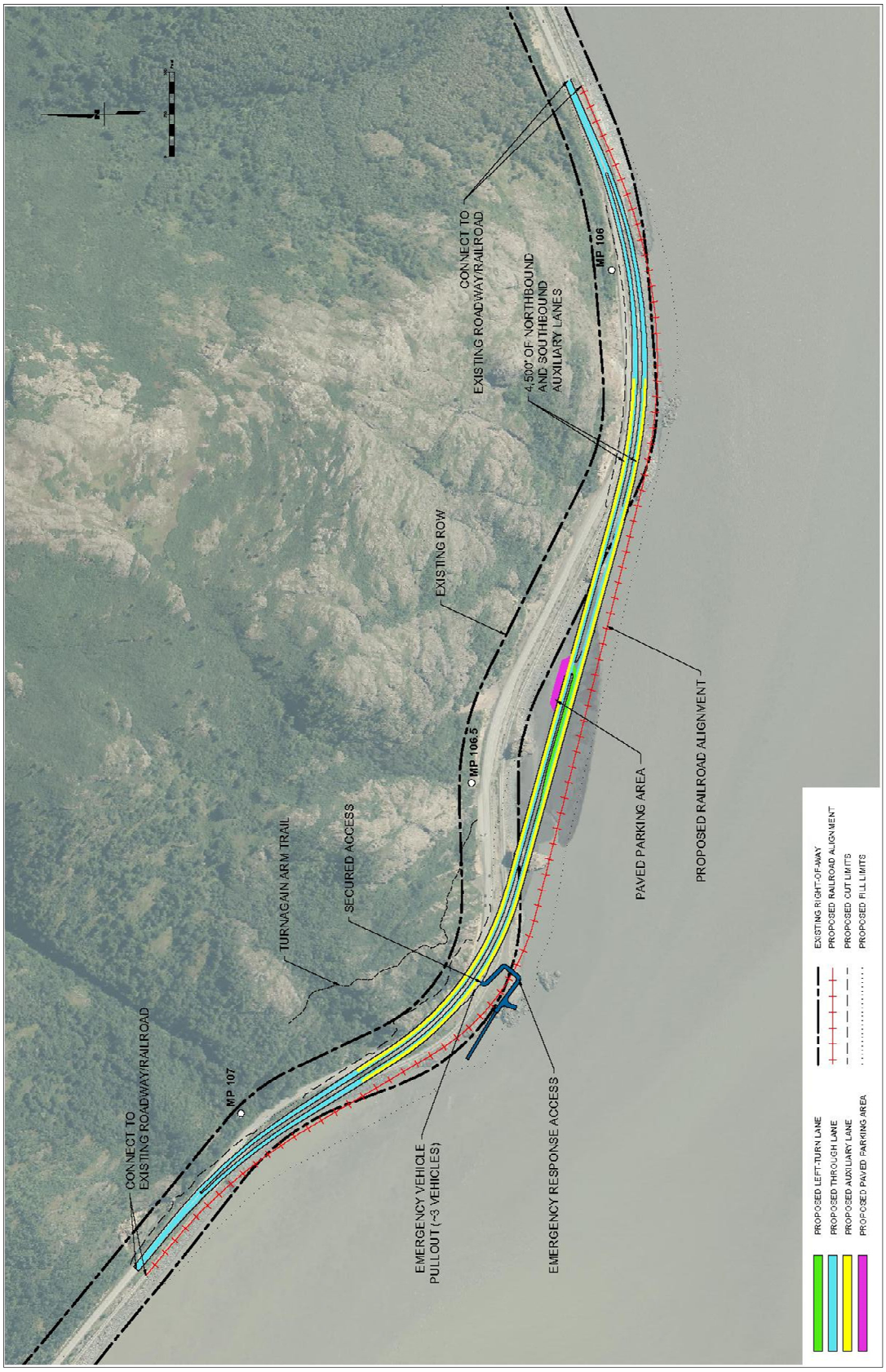


Figure 16: Alternative 2C - Shift Into Turnagain Arm

- Improving Access. Alternative 2C would add an auxiliary lane in each direction and a dedicated southbound left-turn lane for passing and turning to improve access for vehicles entering or exiting the highway. These features would improve the safe flow of traffic by:
  - Separating recreational uses in the ROW from through traffic movements
  - Reducing time spent following slower vehicles in an area of the highway with few passing opportunities, and
  - Reducing conflicts caused by motorists slowing and stopping along the highway shoulder to view wildlife
- Providing Traffic Separation. Alternative 2C would provide a median separating northbound and southbound traffic to diminish the risk of head-on crashes.

*4.3.5 **Alternative 3** Shift Proposed Alignment Inland at Windy Corner*

4.3.5.1 Alternative Description

Alternative 3 maintains the same design criteria as Alternative 2A with the following differences. See Figure 17.

- Shift Alignment Inland. Alternative 3 attempts to balance cut and fill quantities by shifting the alignment inland at Windy Corner. This design would require 0.5H:1V rock cuts extending into CSP at Windy Corner, with design features for the highway remaining the same as Alternative 2A.
- Material from Windy Corner Cut. By moving the design alignment inland, fill quantities would be reduced and could then be satisfied with the material cut from the slopes and rock faces for the highway construction. The material generated from the Windy Corner slope cuts are anticipated to provide sufficient quantity and similar quality of material as Alternative 2A material locations proposed within CSP at MP 109 and MP 104.
- Parking Area. Alternative 3 would provide an improved mountainside off-shoulder paved parking area approximately 38 feet deep by 325 feet long instead of the new controlled access mountainside park facility proposed with Alternative 2A.

4.3.5.2 Purpose and Need Analysis

Alternative 3 meets the identified transportation purpose and need, improving safety and traffic operations, because Alternative 3 would include the design improvements needed to substantially improve safety and improve traffic operations as follows:

- Improving Curves. Alternative 3 would substantially improve roadway curves by:
  - Flattening sharp curves,
  - Providing for a 65-mph design speed which upgrades safety and improves traffic operations as noted in Section 3.1.2, Design Speed Considerations,
  - Providing a roadway that is designed to accommodate the speed that up to 85% of drivers travel regardless of the posted speed,
  - Eliminating the four reverse curves, and
  - Improving driver sight distance.

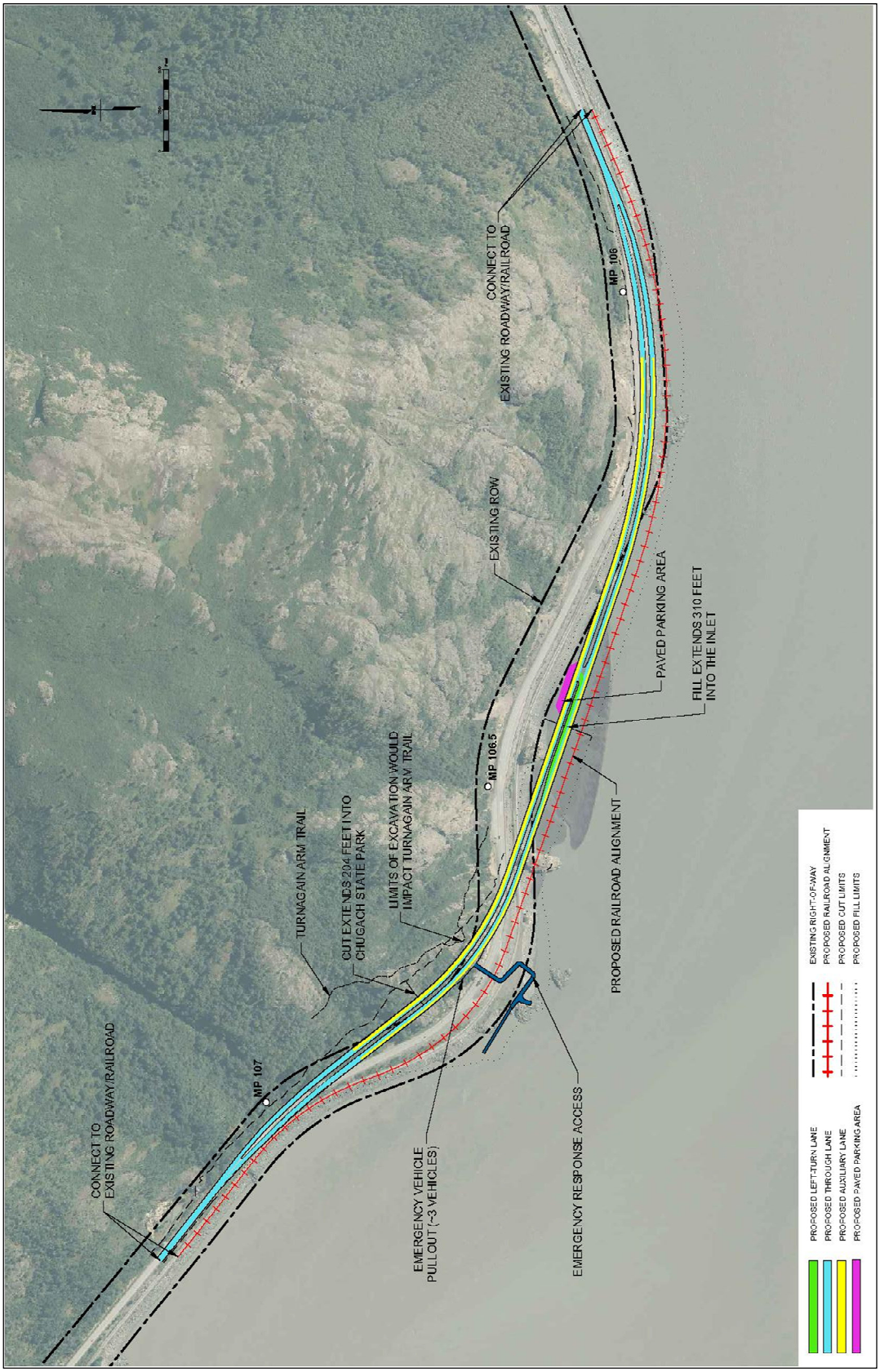


Figure 17: Alternative 3 - Shift Inland at Windy Corner

- Improving Access. Alternative 3 would add an auxiliary lane in each direction and a dedicated southbound left-turn lane for passing and turning to improve access for vehicles entering or exiting the highway. These features would improve the safe flow of traffic by:
  - Separating recreational uses in the ROW from through traffic movements
  - Reducing time spent following slower vehicles in an area of the highway with few passing opportunities, and
  - Reducing conflicts caused by motorists slowing and stopping along the highway shoulder to view wildlife
- Providing Traffic Separation. Alternative 3 would provide a median separating northbound and southbound traffic to diminish the risk of head-on crashes.

5.0 ENVIRONMENTAL CONSEQUENCES

This section briefly describes the affected environment and details the anticipated environmental effects, including direct and indirect effects, of the following advanced alternatives: No Action, Alternative 2A, Alternative 2B, Alternative 2C, and Alternative 3. DOT&PF guidance recommends 17 main impact categories be analyzed (DOT&PF 2014). In addition to these, FHWA NEPA guidance recommends several additional impact categories be analyzed (FHWA 2018). This is an issue-based EA, which means only the environmental impact categories applicable to the project have been addressed, as summarized in Table 3.

Table 3: Affected Environmental Impact Categories

Environmental Impact Categories Affected	Environmental Impact Categories Not Affected
Right-of Way	Economic Considerations
Social Considerations	Wetlands
Local Land Use and Transportation Plan	Alaska Coastal Management Program
Cultural Resources	Contaminated Sites
Anadromous or Resident Fish and EFH	Air Quality
Wildlife and Birds	Floodplains
Threatened and Endangered Species	Traffic Noise
Waterbody Involvement and Water Quality	Farmland
Vegetation and Invasive Species	Title VI & Environmental Justice
Bicycle and Pedestrian Issues	Wild & Scenic Rivers and Wilderness Areas
Section 4(f)	
Section 6(f)	
Visual Resources	
Irreversible and Irretrievable Commitment of Resources	
Construction Impacts	
Cumulative Impacts	

5.1 Environmental Impact Categories Not Affected

The following environmental impact categories are not present within the proposed project area or would not be affected by the advanced alternatives. Therefore, these impact categories are briefly described below but otherwise not addressed in the EA.

5.1.1 Economic Considerations

Within the project area, the Seward Highway and ARRC ROW are bordered on either side by CSP. There are no established businesses or business districts within the project area. No businesses or commercial interests would be directly affected.

The new pedestrian and recreational facilities within CSP would require additional maintenance expenditures by DNR. The final maintenance agreement between DOT&PF and DNR is being developed. Initial discussions indicate that DNR would be responsible for maintenance and

operations of the scenic pullouts, vault toilets, trash receptacles, and other amenities not related to Seward Highway.

The advanced alternatives would not have any further adverse economic impacts on the regional or local economy or established businesses.

5.1.2 Wetlands

Wetlands are, by definition, a “Water of the U.S.” and are protected under the Clean Water Act (CWA) Section 404. Executive Order (E.O.) 11990, sets for policy for directing the Federal agencies to avoid, to the extent possible, any adverse impacts associated with the destruction or modification of wetlands, and to avoid new construction in wetlands whenever there is a practicable alternative.

The proposed project does not affect wetlands, as defined by the U.S. Army Corps of Engineers (USACE). However, it does affect other Waters of the U.S. (Turnagain Arm and unnamed streams). These effects are discussed in Section 5.2.8. A Department of the Army Section 404/10 Individual Permit is required for this project.

5.1.3 Alaska Coastal Management Program

The federally approved Alaska Coastal Management Program expired on July 1, 2011, resulting in a withdrawal from participation in the Coastal Zone Management Act (CZMA) National Coastal Management Program. The CZMA Federal consistency provision, section 307, no longer applies in Alaska.

5.1.4 Contaminated Sites

An initial site assessment queried the Alaska Department of Environmental Conservation (ADEC) Contaminated Sites Database (ADEC, 2018). The nearest known contaminated site is located at Indian, approximately MP 103. The query did not identify contamination or a “high” potential for contamination (e.g. businesses such as service stations, dry cleaners, or buildings or residences with asbestos) within or in close proximity to the project area.

5.1.5 Air Quality

The proposed project is located on Turnagain Arm between Anchorage and Girdwood; this area is considered to be in attainment of the National Ambient Air Quality Standards. Thus, the State Implementation Plan for air quality does not contain any transportation control measures applicable to the project area and the conformity procedures in 40 Code of Federal Regulations (CFR) 93 do not apply.

5.1.6 Floodplains

E.O. 11988, directs Federal agencies to reduce the risk of flood loss, minimize the impacts of floods on human safety, health, and welfare, and to restore and preserve the natural and beneficial values served by floodplains. The Project Area is within Zone D; “areas in which flood hazards are undetermined, but possible” (Federal Emergency Management Agency 2009). Follow-up conversations with Municipality of Anchorage Watershed Management personnel indicate that the area is not considered to be within a regulated floodplain above the mean high tide.

The proposed project would require placement of approximately 2 million cubic yards of fill in 26.3 acres of intertidal mudflats, with much of this fill falling below the mean high tide line. The Municipality of Anchorage has indicated this fill would not change the tidal floodplain elevation and that they do not require a flood hazard permit for this project (Steve Ellis, Municipality of Anchorage, personal communication). Per 23 CFR Part 650, Subpart A the advanced alternatives would not significantly encroach on the floodplain.

5.1.7 Traffic Noise

The proposed project would involve both "substantial alteration in vertical and horizontal alignment" and "addition of an auxiliary lane." Due to the proposed project, the ARRC track requires realignment. Each of these is sufficient to require a noise analysis.

DOT&PF conducted a noise analysis for the proposed project using FHWA's Traffic Noise Model version 2.5. The analysis found that the proposed project would not result in highway traffic noise impacts (Appendix B). Predicted future noise levels would not approach or exceed the FHWA Noise Abatement Criteria, or substantially exceed existing highway traffic noise levels.

5.1.8 Farmland

There is no 'prime or unique farmland', 'farmland of statewide importance', or 'farmland of local importance' within the proposed Project Area under the Federal definitions (Natural Resources Conservation Service 2018).

5.1.9 Title VI & Environmental Justice

E.O. 12898, Federal Actions to Address Environmental Justice in Minority and Low-Income Populations (February 11, 1994), requires each Federal agency to "make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations." DOT Order 5610.2(a), Department of Transportation Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, sets forth procedures and guidance to implement E.O. 12898.

The lands adjacent to the Project Area are mostly undeveloped CSP lands. The project area occupies part of Census Tract 29, which ranges from south of Potter Marsh through to Portage. Focusing on the nearby communities of Rainbow, Indian and Bird, the project area has a population of approximately 400 people, of which 294 (74 percent) are non-minority (Caucasian). Per capita income in this area is listed as $37,256, and 67 percent of households earn $50,000 or more (U.S. Environmental Protection Agency 2017a, 2017b).

No minority or low-income populations have been identified that would be adversely impacted by the proposed project as determined above. Therefore, in accordance with the provisions of E.O. 12898 and FHWA Order 6640.23, no further environmental justice analysis is required.

5.1.10 Wild & Scenic Rivers and Wilderness Areas

The Project Area neither contains nor is adjacent to designated Wild & Scenic Rivers or Wilderness Areas (U.S. Fish and Wildlife Service [USFWS] 2018).

5.2 Environmental Impact Categories Affected

A comparison of the environmental impacts associated with each of the seven alternatives considered (No Action, 1, 2A, 2B, 2C, 3, and 4) is summarized in Table 4 below and in the narrative that follows. The visual impacts are summarized in Tables 5, 6, and 7; separate from environmental impact categories included in Table 4.

Table 4: Environmental Effects and Mitigation Summary

Environmental Resource	Alternative # →	No Action	1	2A	2B	2C	3	4
	Impact or Mitigation ↓	No Improve-ments	Stay within ROW	Shift into Turnagain Arm			Shift Inland into CSP	Tunnel
		Material From:↓						
		No Material Extraction	Cuts Within ROW Limits	MP 109 and 104 Locations	Cuts Within ROW Limits	Distant Sources Outside Project	Mostly within Project Limits	No Material Extraction
ROW	Permanent ROW (acres)	0	0	26.3	26.3	26.3	19.5	0.75
Social	Emergency Access to Turnagain Arm	None	None	Emer-gency Ramp	Emer-gency Ramp	Emer-gency Ramp	Emer-gency Ramp	None
Land Use	See Sections 1.0, 3.2.1 to 3.2.5, and 3.3.1	No changes	Inconsistent with CSPMP	**Consistent with CSPMP**	Inconsistent with CSPMP	Inconsistent with CSPMP	Inconsistent with CSPMP	Inconsistent with CSPMP
Cultural	NRHP Eligible Properties in APE & Effect	None	All alternatives have only one NRHP-eligible property (Alaska Railroad) in the APE. The proposed project's effects to the Alaska Railroad with Alternative 2A were coordinated with SHPO and consulting parties. The Alaska Railroad was found to be eligible and the project was found to have no adverse effects. The same Section 106 determinations would be anticipated for the other alternatives.					
Fish	Anadro-mous Fish Habitat (acres)	0	0	26.3	26.3	26.3	14.9	0
Wildlife	Dall Sheep Habitat (acres)	0	9.4	2.4	2.4	2.4	7.4	3.0
T & E Species	CI Beluga Whale Critical Habitat (acres)	0	0	26.3	26.3	26.3	14.9	0
Water-bodies	Turnagain Arm fill below HTL (acres)	0	0	26.3	26.3	26.3	14.9	0

Table 4: Environmental Effects and Mitigation Summary (Continued)								
Environmental Resource	Alternative # →	No Action	1	2A	2B	2C	3	4
	Impact/ Mitigation ↓	No Improve-ments	Stay within ROW	Shift into Turnagain Arm			Shift Inland into CSP	Tunnel
	Material From →	No Material Extraction	Cuts Within ROW Limits	MP 109 and 104 Locations	Cuts Within ROW Limits	Distant Sources Outside Project	Mostly within Project Limits	No Material Extraction
4(f) and 6(f)	Permanent Section 4(f) Use (acres)	0	0	26.3	26.3	26.3	19.5	0.75
	Section 6(f) Conversion (acres)	0	0	39.56	4.16	4.16	8.5	0.75
	Replace-ment 4(f) / 6(f) lands (acres)	0	0	14.7	14.7	14.7	11.0	0.5
	Pullouts Removed	0	0	5	5	5	5	5
	Pullout Replace-ment	None	None	Parking & Park Amenities	Minimal Pullout	Minimal Pullout	Minimal Pullout	None
	Turnagain Arm Trail (feet)	0	0	Extend 230	Extend 850	Extend 850	Realign 210 & Extend 750	0
	Rock Climbing Routes	0	13	5	56	5	13	0
Bicycle and Pedestrian Facilities	New facilities or space for future facilities. (No current formally designated facilities)	None	None	New pedestrian pathways, access and parking area. Space for future mulit-use pathway	Space for future mulit-use pathway.	Space for future mulit-use pathway.	Space for future mulit-use pathway	None
Vegetation and Invasive Species	Ground Disturbance (acres)	0	17.5	104.7	112.3	69.3	51.4	7.4
Construction (Chapter 9.0)	Degree of Construc-tion Safety and Traffic Disruption Impacts	None	Low	Moderate	High	High	Low	Low

Table 5: Visual Effects Within Project Limits

Alternative # →	No Action	1	2A	2B	2C	3	4
Alternative Description→	No Action	Stay within ROW	Shift into Turnagain Arm			Shift Inland into CSP	Tunnel
Length of Rock Cut for Alignment (miles)	0	1.4	0.2	0.2	0.2	0.7	0.2
Maximum Rock Cut Height (feet)	0	180	142	142	142	200	224
Rock Cut Face Area (square yards)	0	129,500	33,300	33,300	33,300	130,000	75,800

Table 6: Visual Effects at Material Locations

Alternative # →	No Action	1	2A			2B	2C	3	4
Alternative → Description		Stay within ROW	Shift into Turnagain Arm					Shift Inland into CSP	Tunnel
Material From →	No Mat-erial needs	Cuts Within ROW Limits	MP 109	MP 104	MP 109 & 104	Cuts Within ROW Limits	Distant Sources Outside Project	Within Project Limits *	None
Rock Face Length (miles)	0	NA	0.06	0.51	0.57	3	NA	NA	NA
Maximum Cut Height (feet)	0	NA	238	82	238	217	NA	NA	NA
Exposed Rock Face (sq.yards.)	0	NA	34,000	12,600	46,600	172,100	NA	NA	NA
Visible Northbound (miles)	0	NA	0.25	0.9	1.15	5.5	NA	NA	NA
Visible Southbound (miles)	0	NA	0.5	0.7	1.2	5	NA	NA	NA

*Material obtained within project limits except for armor rock and riprap

Table 7: Visual Effects Combined (Within Project Limits and at Material Locations)

Alternative # →	No Action	1	2A	2B	2C	3	4
Alternative Description→		Stay within ROW	Shift into Turnagain Arm			Shift Inland into CSP	Tunnel
Length of Cut/Rock Face (miles)	0	1.4	0.59	3.2	0.2	0.7	0.2
Maximum Rock Cut Height (feet)	0	180	238	217	142	200	224
Rock Cut Face Area (square yards)	0	129,500	79,900	205,400	33,300	130,000	75,800

5.2.1 Right-of-Way

5.2.1.1 Affected Environment

Land ownership and associated ROW within the project area consists of DOT&PF, ARRC, and DNR. Seward Highway lies within a 300-foot ROW (150 feet to either side of centerline), dating back to the highway's construction and completion in 1951 by Federal authorities. The highway ROW overlaps with ARRC's 200-foot ROW and both traverse the Turnagain Arm Unit of CSP.

5.2.1.2 Environmental Consequences

5.2.1.2.1 No Action

The No Action alternative would not affect existing ROW. The Seward Highway and ARRC tracks would remain within their present ROW.

5.2.1.2.2 Alternative 2A

Alternative 2A extends outside of the existing DOT&PF and ARRC ROW into DNR lands within Turnagain Arm. See Figure 9. The realignment of the highway would require the ARRC tracks and any collocated utilities to be realigned. Alternative 2A would require the permanent acquisition of **26.3** acres of CSP lands. In addition, permission is being obtained from DNR to temporarily use, for material extraction, an additional **35.4** acres of CSP lands located outside the project area near MP 104 and MP 109. It is likely that the project would only require material extraction at MP 109 (19.6 acres); however, an agreement to temporarily use an area at MP 104 (15.8 acres) is being made in the unlikely event that additional material is required. See Figure 18 for the project area permanent acquisition and Figure 24 for temporary use areas.

5.2.1.2.3 Alternative 2B

Alternative 2B extends outside of the existing DOT&PF and ARRC ROW into DNR lands within Turnagain Arm. See Figure 15. The realignment of the highway would require the ARRC tracks and any collocated utilities to be realigned. Alternative 2B would require the permanent acquisition of **26.3** acres of CSP lands. See Figure 18. Material extraction would occur from within the existing ROW therefore temporary use of CSP lands from DNR at MP 109 or MP 104 for material extraction is not needed.

5.2.1.2.4 Alternative 2C

Alternative 2C extends outside of the existing DOT&PF and ARRC ROW into DNR lands within Turnagain Arm. See Figure 16. The realignment of the highway would require the ARRC tracks and any collocated utilities to be realigned. Alternative 2C would require the permanent acquisition of **26.3** acres of CSP lands. See Figure 18. Temporary use of CSP lands from DNR for material extraction is not required. Material extraction would occur off the project site. The off-site locations are expected to be under private ownership and likely in previously disturbed extraction locations. The contractor would obtain any necessary environmental permits and approvals.

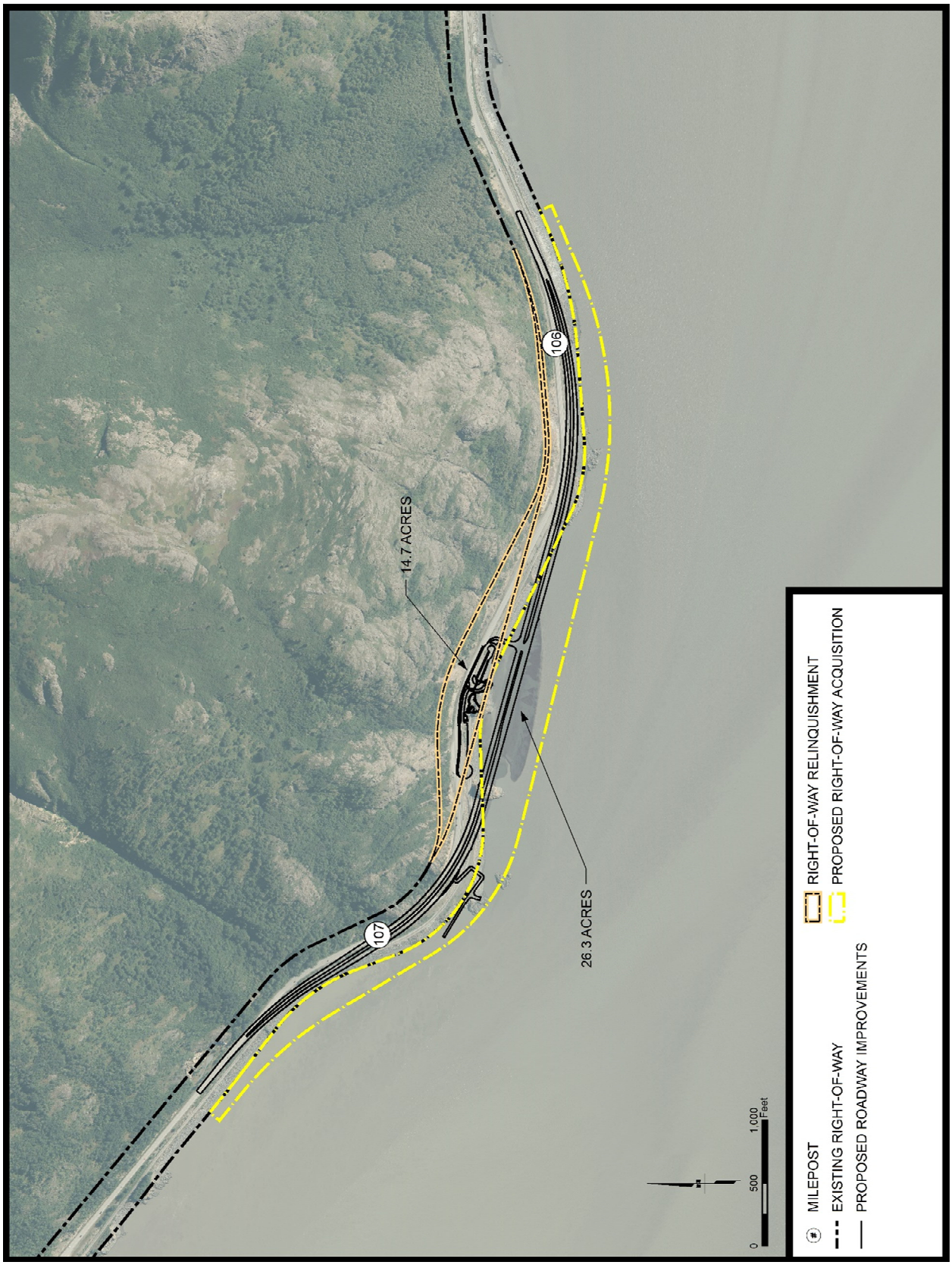


Figure 18: Proposed Acquisition and ROW Changes

5.2.1.2.5 Alternative 3

Alternative 3 would shift the road alignment inland into DNR lands at Windy Corner and extend beyond the existing DOT&PF and ARRC ROW into Turnagain Arm. See Figure 17. The realignment of the highway would still require the ARRC tracks and any collocated utilities to be realigned. Extension into the Turnagain Arm would be to a lesser degree than Alternatives 2A, 2B, and 2C. Alternative 3 would require the permanent acquisition of **19.5** acres of CSP lands, 14.9 acres in Turnagain Arm and 4.6 acres at Windy Corner. Temporary use of CSP lands from DNR for material extraction is not required. Material would be generated from the inland rock cut at Windy Corner therefore temporary use of CSP lands at MP 109 and MP 104 for material extraction would not be needed.

5.2.2 Social Considerations

The Council on Environmental Quality regulations require Federally-funded projects to address potential social impacts. This section describes social characteristics of the project area in terms of neighborhood and community cohesion, recreation resources, community facilities, travel patterns, and public safety.

5.2.2.1 Affected Environment

5.2.2.1.1 Neighborhoods and Community Cohesion

The project area is located within the Municipality of Anchorage, in Census Tract 29, block group 020200029001. There are no neighborhoods or communities within the project area, although the community of Rainbow is near the proposed MP 109 material location. The nearest residence is approximately 400 feet from the proposed material location, and the next closest home is approximately 1,900 feet away. The community of Indian is near the proposed MP 104 material location. The nearest residence is greater than 900 feet from the proposed material location.

5.2.2.1.2 Recreational Resources

Recreational resources within or adjacent to the project area include the Windy Corner turnout, Windy Corner Trailhead, Goat's Head Soup rock-climbing area, and three waterside pull-off areas. These areas are used to view and photograph scenery and wildlife, to access the rock-climbing area, and to access Turnagain Arm Trail (connecting to Rainbow, McHugh Creek, and Potter Creek). There are no developed facilities for recreational access to Turnagain Arm for water activities. This currently requires informal passage across ARRC tracks.

5.2.2.1.3 Community Facilities

Community facilities generally include, but are not limited to, schools, parks, trails, law-enforcement facilities, fire stations, and government offices. The only such facilities within the project area are CSP, and more specifically the Windy Corner Trailhead which provides access to the Turnagain Arm Trail.

5.2.2.1.4 Travel Patterns

Seward Highway is the sole road connecting Turnagain Arm communities (Rainbow, Indian, Bird, Girdwood and Portage), Whittier, and the Kenai Peninsula with Anchorage. Annual average daily traffic is 7,756 vehicles, while peak-season traffic can exceed 22,000 vehicles per day. Congestion in the summer months leads to conflicts with commuters, recreationists, freight transport, and wildlife viewers, as travel speeds vary greatly between these groups.

5.2.2.1.5 Public Safety

There are no locations providing emergency response access to Turnagain Arm between Twenty Mile River at MP 92 and Potters Marsh at MP 115. The Anchorage Fire Department maintains rescue vessels at the Port of Anchorage and access to Turnagain Arm requires a lengthy trip around the west side of Fire Island, or otherwise driving to and launching from the access ramp at Twenty-Mile River.

5.2.2.2 Environmental Consequences

5.2.2.2.1 No Action

The No Action alternative would not change the current social conditions in the area. Seward Highway would retain its current configuration between MP 105 and MP 107.

- Adverse safety and traffic operation issues would persist.
- Access to recreational resources would not be improved.
- Emergency responder access improvements to Turnagain Arm would not be provided.
- Conflicts between recreationists, wildlife viewers, commuters, and freight operations would persist.
- Curves would continue to not meet the design speed for the currently posted speed of 55-mph.

5.2.2.2.2 Alternative 2A

Alternative 2A would result in the follow social condition changes.

- Alternative 2A would improve traffic safety and operations through the area.
- Alternative 2A would improve access to recreational trails and parking facilities for wildlife viewers on the mountain side of the highway.
- Alternative 2A would improve emergency services by providing controlled-access emergency response staging area and an access ramp on the water side. See Figures 9 and 11.
- Alternative 2A would make changes on the southbound side of the highway that would eliminate public parking and partially fill a mudflat area used by some for water recreation in Turnagain Arm. ARRC's concerns regarding public access across the track drives the desire to limit public access on the southbound side of the highway.
- Alternative 2A would eliminate three widened shoulders and one turnout in the project area but would replace these with new mountainside park facilities with a wildlife viewing area at the Windy Corner Trailhead.

- Alternative 2A would extract material from the CSP at the MP 109 and if needed at MP 104 locations. Some residents of Rainbow and Indian closest to the material excavation areas would experience short-term construction-related effects from material production. These effects include noise and possibly decreased air quality from fugitive dust during rock blasting and excavation. Any such effects would be temporary.
- Alternative 2A would not affect community cohesion in Rainbow or Indian.

5.2.2.2.3 Alternative 2B

Alternative 2B would result in the follow social condition changes.

- Alternative 2B would improve traffic safety and operations through the area.
- Alternative 2B would improve emergency services by providing controlled-access emergency response staging area and an access ramp on the water side. See Figures 11 and 15.
- Alternative 2B would make changes on the southbound side of the highway that would eliminate public parking and partially fill a mudflat area used by some for water recreation in Turnagain Arm. ARRC's concerns regarding public access across the track drives the desire to limit public access on the southbound side of the highway.
- Alternative 2B would eliminate three widened shoulders and one turnout in the project area but would replace these with a new minimal mountainside off-shoulder paved parking area approximately 38 feet deep by 325 feet long. The much larger mountainside park facilities were uniquely developed to mitigate the extraction of material from within the 35.4 acres of the CSP proposed with Alternative 2A and would not be constructed with Alternative 2B.
- Alternative 2B would extract material from within the existing ROW near the communities of Rainbow and Indian. Residents of Rainbow and Indian would experience short-term construction-related effects from material extraction near these communities. These effects include noise and possibly decreased air quality from fugitive dust during rock blasting and excavation. Any such effects would be temporary. Material extraction impacts on residents at Rainbow and Indian with Alternative 2B would be reduced from Alternative 2A but not eliminated since material extraction would still occur in highway ROW near these communities.
- Alternative 2B would not affect community cohesion in Rainbow or Indian.

5.2.2.2.4 Alternative 2C

Alternative 2C would result in the follow social condition changes.

- Alternative 2C would improve traffic safety and operations through the area.
- Alternative 2C would improve emergency services by providing controlled-access emergency response staging area and an access ramp on the water side of the highway. See Figures 11 and 16.
- Alternative 2C would make changes on the southbound side of the highway that would eliminate public parking and partially fill a mudflat area used by some for water recreation in Turnagain Arm. ARRC's concerns regarding public access across the track drives the desire to limit public access on the southbound side of the highway.

- Alternative 2C would eliminate three widened shoulders and one turnout in the project area but would replace these with a new minimal mountainside off-shoulder paved parking area approximately 38 feet deep by 325 feet long. The much larger mountainside park facilities were uniquely developed to mitigate the extraction of material from within the 35.4 acres of the CSP proposed with Alternative 2A and would not be construction with Alternative 2C.
- Alternative 2C would use material sources distant from the highway which would reduce the aesthetic, noise, and other potential material extraction effects on CSP and residents of Indian and Rainbow compared to Alternatives 2A and 2B.
- Alternative 2B would not affect community cohesion in Rainbow or Indian.

5.2.2.2.5 Alternative 3

Alternative 3 would result in the follow social condition changes.

- Alternative 3 would improve traffic safety and operations through the area.
- Alternative 3 would improve emergency services by providing controlled-access emergency response staging area and an access ramp on the water side. See Figures 11 and 17.
- Alternative 3 would make changes on the southbound side of the highway that would eliminate public parking and partially fill a mudflat area used by some for water recreation in Turnagain Arm. ARRC's concerns regarding public access across the track drives the desire to limit public access on the southbound side of the highway.
- Alternative 3 would eliminate three widened shoulders and one turnout in the project area but would replace these with a new minimal mountainside off-shoulder paved parking area approximately 38 feet deep by 325 feet long. The much larger mountainside park facilities were uniquely developed to mitigate the extraction of material from within the 35.4 acres of the CSP proposed with Alternative 2A and would not be construction with Alternative 3.
- Alternative 3 would extract material mostly from the Windy Corner vicinity distant from the communities of Indian and Rainbow which would reduce the aesthetic, noise, and other potential material extraction effects on residents of Indian and Rainbow compared to Alternative 2A and 2B.
- Alternative 3 would not affect community cohesion in Rainbow or Indian.

5.2.3 Local Land Use and Transportation Plans

5.2.3.1 Affected Environment

Several entities have management directives or jurisdiction over land and water within the project area and have developed specific plans and goals to manage land use and transportation therein. The predominant land use is public recreation on dedicated public parkland, as CSP occupies land and water on either side of the Seward Highway. The other major land use in the project area is transportation use, as represented by both the highway and the ARRC track. The Seward Highway Corridor Partnership Plan (CPP) also provides guidance for development along the National Scenic Byway to encourage growth and development that enhances and sustains its physical, recreational, and scenic features (DOT&PF 1998).

5.2.3.1.1 Land Use Plans

DNR-DPOR published a revised CSP Management Plan in 2016. The revised plan specifies a management strategy of coordinating transportation issues and integrated facilities between DNR-DPOR and DOT&PF. In addition, the revised plan denotes areas within the designated Recreation Development Zone where highway safety improvements are anticipated and expected and proposes management of the park facilities based on proposed highway improvements. See Table 8.

Table 8: Chugach State Park Management Plan Facility Recommendations

Proposal	Scope/Management Objective	Justification
Seward Highway Mile 107 Pullout-Mountainside	Depending on the highway upgrades and reclamation area at this site, the area could be suitable to relocate the current Windy Corner mountainside trailhead and trail from the sheep habitat area.	This area may be used as a materials site for highway upgrades to the Windy Corner area. If so, the reclamation area could serve to provide trailhead parking to the current trail.
Windy Corner Sheep Viewing Area	Upgrade existing pullout to create a safe sheep viewing area. Expand parking to a large lot with a buffer between the highway and parking area. Include interpretive displays and spotting scopes. Coordinate development with highway upgrades. Consult with ADF&G and Board of Game to establish management practices that may lead to enhanced wildlife viewing.	This area of the highway poses safety concerns as visitors try to view the sheep that congregate in the area. Parking is limited and there is substantial traffic congestion when animals are present.

Reference: CSP 2016, Chapter 6, page 116

DNR-DPOR has produced a CSP Trail Management Plan, which went out to public review in 2009. The Public Review Draft along with the List of Recommended Revisions make up the final plan adopted by the DNR Commissioner on February 29, 2016. This plan designates the Turnagain Arm Trail between Windy Corner Trailhead and Potter Creek Trailhead a Class 4 trail, managed primarily for pedestrian use. A new Class 3 pedestrian trail is proposed to connect Windy Corner and Falls Creek.

DNR-DPOR also produced a draft CAP which went out for public comment in 2010. The draft CAP calls out three areas with specific management goals within the project area. See Table 9.

The Municipality of Anchorage produced an updated Turnagain Arm Comprehensive Plan in 2009, to replace the 1987 plan. The 2009 plan indicates Municipality of Anchorage support for Seward Highway upgrades, although it does specify that highway improvements should not negatively impact current or future adjacent land use. A

DNR's Division of Mining, Land and Water produced a Turnagain Arm Management Plan for State Lands in 1994. The plan states the goals of protecting wildlife habitat values, providing for habitat needs of fish and wildlife, and enhancing public use including viewing of wildlife.

Table 9: Chugach Access Plan Management Goals within Project Area (DNR-DPOR 2010)

Name	Uses	Current Condition	Justification/Actions
Seward Highway Mile 107 Pullout	This site provides access for climbing and bouldering within the park.	This small pullout is located within the Seward Highway ROW *(right-of-way)* along Turnagain Arm.	Work with ADOT/PF to ensure climbing access continues when this portion of the Seward Highway is improved.
Windy Corner-Oceanside	This popular site provides opportunities for sightseeing and scenic viewing of the Turnagain Arm, the Chugach Mountains, and wildlife. The site provides one of the best sheep viewing opportunities in Alaska.	This pullout is within the Seward Highway and Alaska Railroad ROW. This site is a substantial traffic hazard with sheep viewing and through traffic moving at substantially different speeds.	Work with ADOT/PF to enlarge and build a safer facility in this area for wildlife viewing when this portion of the Seward Highway is improved.
Windy Corner Trailhead	This site provides one of the best sheep viewing opportunities in Alaska. The site also provides access to the Turnagain Arm Trail, which runs from Potter to Windy Corner.	This trailhead located along the rocky headlands of Turnagain Arm contains a small pullout within the Seward Highway ROW and provides access to the Turnagain Arm Trail. This site is a substantial traffic hazard with sheep viewing and through traffic moving at substantially different speeds.	Work with ADOT/PF to enlarge and build a safer facility in this area for wildlife viewing when this portion of the Seward Highway is improved.

Reference: CSP CAP 2010, Access Specific Recommendations pages 67 to 68

DOT&PF produced a Seward Highway CPP in 1998. This plan was created as a requirement for the highway's nomination to the National Scenic Byways Program. This plan does not require, mandate, or regulate actions along the Seward Highway, but outlines the nature of the corridor and strategies for collaboratively addressing future growth and development while maintaining the highway's scenic values. A keystone strategy of the CPP is to provide a safe, aesthetic, and world-class driving experience. Critical actions associated with this strategy include developing a design theme for the highway, establishing a greater role for landscape architects early in the design process, and avoiding Jersey barrier medians or similar highway structures that would detract from the scenic nature of the highway.

5.2.3.1.2 Transportation Plans

The Municipality of Anchorage is currently producing the Anchorage Non-Motorized Plan, which would eventually replace the Areawide Trails Plan from 1997. However, this revision or replacement is still in production. The 1997 plan recommends a separated multi-use trail along this segment of Seward Highway, as well as new parking and pedestrian facilities at Windy Corner (Municipality of Anchorage 1997).

5.2.3.2 Environmental Consequences

5.2.3.2.1 No Action

The No Action alternative would not change the existing land use within the project area. This alternative does not meet the proposed goals and objectives of many of the land use and transportation plans. The safety issues and roadway deficiencies would remain, and would not provide the safety, transportation, or recreational upgrades identified in these plans.

5.2.3.2.2 Alternative 2A

Alternative 2A would improve safety and provide transportation upgrades and is consistent with State and local land use and transportation plans. Alternative 2A:

- Is consistent with the 2016 CSP Management Plans, which anticipated Seward Highway improvements in this area and the potential for material excavation areas to be converted to recreational use areas, and which call for improvements to parking and visitor amenities and improved safety for wildlife viewers;
- Is consistent with the CSP Trail Management Plan, and includes trailhead improvements, including expanded parking and signage, at the southern terminus of the Turnagain Arm Trail at Windy Corner;
- Is consistent with the CAP management goals for this area by:
    - Addressing the safety and operational hazards of differential speeds between wildlife viewers, recreationalists, and through traffic,
    - Improving trail and rock-climbing access within the Project Area, and
    - Coordinating with CSP on design of scenic pullouts and safety improvements;
- Is consistent with the Municipality of Anchorage's Areawide Trails Plan, as the proposed design includes capacity to add a future separated multi-use trail;
- Is consistent with the Seward Highway CPP by incorporating a landscape architect into improvement development and design to enhance the scenic values of the highway;
- Is consistent with the goals of DNR's Turnagain Arm Management Plan for State Lands by enhancing public viewing of wildlife; and
- Does not conflict with the Municipality of Anchorage's Turnagain Arm Comprehensive Plan, which includes highway improvements.

Land use itself would change within the project area, as 26.3 acres would no longer be parkland, while 14.7 acres of highway ROW would become new parkland with developed facilities. CSP lands are Section 4(f) and 6(f) resources and would be converted from recreational use to natural resource extraction use or relinquished to DOT&PF and ARRC as ROW for transportation use. See Sections 5.2.11 and 5.2.12 for more detail on these effects.

5.2.3.2.3 Alternative 2B

- Is not consistent with the 2016 CSP Management Plan recommendation to expanded parking with a buffer from the highway at this location during future Seward Highway improvements.

- Is consistent with the CSP Trail Management Plan, although the improvements are not as extensive as with Alternative 2A, Alternative 2B does provides trailhead improvements with an expanded paved parking at the southern terminus of the Turnagain Arm Trail at Windy Corner;
- Is consistent with the CAP management goals for this area by:
    - Addressing the safety and operational hazards of differential speeds between wildlife viewers, recreationalists, and through traffic,
    - Improving trail and rock-climbing access within the Project Area, and
    - Coordinating with CSP on design of scenic pullouts and safety improvements;

  However, Alternative 2B does not accomplish these goals to the degree of Alternative 2A.
- Is consistent with the Municipality of Anchorage's Areawide Trails Plan, as the proposed design includes capacity to add a future separated multi-use trail;
- Is not consistent with the Seward Highway CPP by incorporating a landscape architect into improvement development and design to enhance the scenic values of the highway;
- Is consistent with the goals of DNR's Turnagain Arm Management Plan for State Lands by enhancing public viewing of wildlife; and
- Does not conflict with the Municipality of Anchorage's Turnagain Arm Comprehensive Plan, which includes highway improvements.

5.2.3.2.4 Alternative 2C

- Is not consistent with the 2016 CSP Management Plan recommendation to expanded parking with a buffer from the highway at this location during future Seward Highway improvements.
- Is consistent with the CSP Trail Management Plan, although the improvements are not as extensive as with Alternative 2A, Alternative 2C does provides trailhead improvements with an expanded paved parking at the southern terminus of the Turnagain Arm Trail at Windy Corner;
- Is consistent with the CAP management goals for this area by:
    - Addressing the safety and operational hazards of differential speeds between wildlife viewers, recreationalists, and through traffic,
    - Improving trail and rock-climbing access within the Project Area, and
    - Coordinating with CSP on design of scenic pullouts and safety improvements;

  However, Alternative 2C does not accomplish these goals to the degree of Alternative 2A.
- Is consistent with the Municipality of Anchorage's Areawide Trails Plan, as the proposed design includes capacity to add a future separated multi-use trail;
- Is not consistent with the Seward Highway CPP by incorporating a landscape architect into improvement development and design to enhance the scenic values of the highway;
- Is consistent with the goals of DNR's Turnagain Arm Management Plan for State Lands by enhancing public viewing of wildlife; and

- Does not conflict with the Municipality of Anchorage's Turnagain Arm Comprehensive Plan, which includes highway improvements.

5.2.3.2.5 Alternative 3

- Is not consistent with the 2016 CSP Management Plan recommendation to expanded parking with a buffer from the highway at this location during future Seward Highway improvements.
- Is consistent with the CSP Trail Management Plan, although the improvements are not as extensive as with Alternative 2A, Alternative 3 does provides trailhead improvements with an expanded paved parking at the southern terminus of the Turnagain Arm Trail at Windy Corner;
- Is consistent with the CAP management goals for this area by:
    - Addressing the safety and operational hazards of differential speeds between wildlife viewers, recreationalists, and through traffic,
    - Improving trail and rock-climbing access within the Project Area, and
    - Coordinating with CSP on design of scenic pullouts and safety improvements;

  However, Alternative 3 does not accomplish these goals to the degree of Alternative 2A.
- Is consistent with the Municipality of Anchorage's Areawide Trails Plan, as the proposed design includes capacity to add a future separated multi-use trail;
- Is not consistent with the Seward Highway CPP by incorporating a landscape architect into improvement development and design to enhance the scenic values of the highway;
- Is consistent with the goals of DNR's Turnagain Arm Management Plan for State Lands by enhancing public viewing of wildlife; and
- Does not conflict with the Municipality of Anchorage's Turnagain Arm Comprehensive Plan, which includes highway improvements.

5.2.4 Cultural Resources

5.2.4.1 Affected Environment

Efforts to identify cultural resources were completed within the project's area of potential effect (APE). As a result four cultural sites where identified within the APE. These are:

- 36.6-mile Turnagain Arm District of the Alaska Railroad (ANC-4057);
- Windy Point (SEW-131);
- MP 104 Can Dump (SEW-1579); and
- Seward Highway (SEW-1557).

According to the Alaska Heritage Resource Survey,

- Windy Point (SEW-131) was previously evaluated and determined to not be eligible for the National Register of Historic Places (NRHP).
- Seward Highway (SEW-01557) is exempt from consideration as a historic property through the Interstate Exemption (2005 Advisory Council for Historic Preservation

Exemption Regarding Historic Preservation Review Process for Effects to the Interstate Highway System).

As a result of agency coordination, the State Historic Preservation Officer (SHPO) concurred:

- on February 6, 2015, that ANC-4057 is eligible for the NRHP, and
- on January 4, 2016, that SEW-1579 is not eligible for the NRHP.

The project was coordinated in accordance with Section 106 of the National Historic Preservation Act. Appendix C contains Section 106 initiation (September 26, 2013) and findings letters (January 15, 2015 and December 16, 2015) and SHPO response letters (February 6, 2015 and January 4, 2016).

5.2.4.2 Environmental Consequences

5.2.4.2.1 No Action

The No Action alternative would not impact cultural resources.

5.2.4.2.2 Alternative 2A

The proposed project would realign approximately 2.0 miles of the 36.6 miles of Turnagain Arm District of the Alaska Railroad (ANC-4057) historic railbed, shifting the corridor up to 425 feet from its current alignment near MP 106.5. See Figure 9. The grade of the railroad would remain below and parallel to the existing highway, and continue along the shoreline of Turnagain Arm. The reconstructed single-track railroad would contain the same basic features as before, with replacement of in-kind materials.

As a result of agency coordination, the SHPO concurred on February 6, 2015 that the Seward Highway MP 105-107, Windy Corner Safety Improvements Project would result in no historic properties adversely affected. After further evaluation of the project to incorporate an additional material location, on January 4, 2016, SHPO concurred again with a project finding of no historic properties adversely affected. Appendix C contains DOT&PF's Section 106 findings letters and SHPO response letters.

5.2.4.2.3 Alternative 2B

Alternative 2B, like all the advanced alternatives (2A, 2B, 2C, and 3) realigns the Alaska Railroad and has only one NRHP-eligible property (Alaska Railroad) in the APE. The proposed project's effects to the Alaska Railroad with Alternative 2A were coordinated with SHPO and consulting parties. The Alaska Railroad was found to be eligible and the project was found to have no adverse effects. Since effects to the Alaska Railroad are the same as Alternative 2A, the same Section 106 conclusion would be anticipated for Alternative 2B.

5.2.4.2.4 Alternative 2C

Alternative 2C, like all the advanced alternatives (2A, 2B, 2C, and 3) realigns the Alaska Railroad and has only one NRHP-eligible property (Alaska Railroad) in the APE. The proposed project's effects to the Alaska Railroad with Alternative 2A were coordinated with SHPO and consulting parties. The Alaska Railroad was found to be eligible and the project was found to have no adverse effects. Since effects to the Alaska Railroad are the same as Alternative 2A, the same Section 106 conclusion would be anticipated for Alternative 2C.

5.2.4.2.5 Alternative 3

Alternative 3, like all the advanced alternatives (2A, 2B, 2C, and 3) realigns the Alaska Railroad and has only one NRHP-eligible property (Alaska Railroad) in the APE. The proposed project's

effects to the Alaska Railroad with Alternative 2A were coordinated with SHPO and consulting parties. The Alaska Railroad was found to be eligible and the project was found to have no adverse effects. Since effects to the Alaska Railroad are the similar but less due to a shorter rail realignment, the same Section 106 conclusion would be anticipated for Alternative 3.

5.2.5 *Anadromous or Resident Fish and Essential Fish Habitat*

5.2.5.1 Affected Environment

According to Alaska Department of Fish and Game's (ADF&G) online database, there are no anadromous streams in or adjacent to the project area, and the waterways are too steep for resident fish habitat (ADF&G 2018). Approximately 26.3 acres of intertidal mudflats and embankment are located within the project area. See Figure 19.

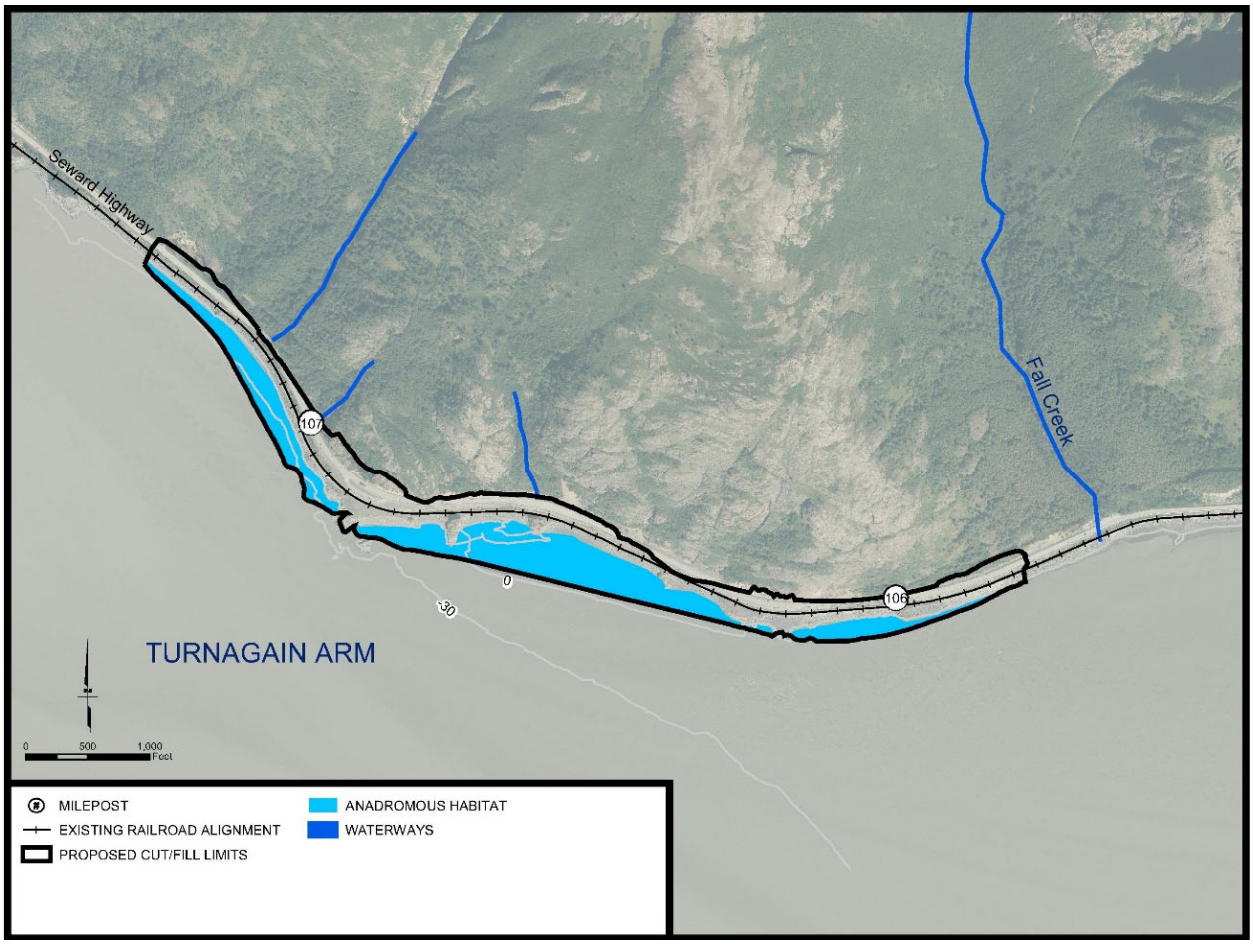


Figure 19: Anadromous Fish Habitat in Project Area

Young salmonids are known to use the shoreline, where present, as forage and shelter on their way out to the ocean. Shoreline areas within the project area are listed by NMFS as Essential Fish Habitat (EFH) for all five species of Pacific salmon.

5.2.5.2 Environmental Consequences

5.2.5.2.1 No Action

The No Action alternative would not affect anadromous waterways or intertidal mudflats, determined to be EFH.

5.2.5.2.2 Alternative 2A

Alternative 2A would not affect anadromous freshwaters. However, it would require fill in approximately 26.3 acres of intertidal mudflats in Turnagain Arm within the same footprint as Alternatives 2B and 2C. While the proposed project would place fill in EFH areas along the existing shoreline, it would also recreate similar habitat by placing coastal armor stone and riprap on the new embankment.

Communication with NMFS indicates no further consultation with NMFS is required and there would be **no adverse effect** on anadromous fish or their EFH as long as DOT&PF abides by the conservation recommendations located in Chapter 11.0, Environmental Commitments Summary.

5.2.5.2.3 Alternative 2B

Alternative 2B would have the same environmental consequences to fish and EFH as Alternative 2A. Alternative 2B would not affect anadromous freshwaters. However, it would require fill in approximately 26.3 acres of intertidal mudflats in Turnagain Arm with the same footprint as Alternatives 2A and 2C. While the proposed project would place fill in EFH areas along the existing shoreline, it would also recreate similar habitat by placing coastal armor stone and riprap on the new embankment. There would be **no adverse effect** on anadromous fish or their EFH as long as DOT&PF abides by the conservation recommendations listed under 2A above.

5.2.5.2.4 Alternative 2C

Alternative 2C would have the same environmental consequences to fish and EFH as Alternatives 2A and 2B. Alternative 2C would not affect anadromous freshwaters. However, it would require fill in approximately 26.3 acres of intertidal mudflats in Turnagain Arm with the same footprint as Alternatives 2A and 2B. While Alternative 2C would place fill in EFH areas along the existing shoreline, it would also recreate similar habitat by placing coastal armor stone and riprap on the new embankment. There would be **no adverse effect** on anadromous fish or their EFH as long as DOT&PF abides by the conservation recommendations listed under 2A above:

5.2.5.2.5 Alternative 3

Alternative 3 would not affect anadromous freshwaters. However, Alternative 3 would shift the highway alignment into the mountainside at Windy Corner reducing the required fill into the intertidal mudflats in Turnagain Arm to approximately 14.9 acres. That is 11.4 acres less filled area than Alternatives 2A, 2B, and 2C. While Alternative 3 would place fill in EFH areas along the existing shoreline, it would also recreate similar habitat by placing coastal armor stone and riprap on the new embankment. There would be **no adverse effect** on anadromous fish or their EFH as long as DOT&PF abides by the conservation recommendations listed under 2A above.

5.2.6 Wildlife and Birds

5.2.6.1 Affected Environment

5.2.6.1.1 Habitat

A range of habitats are located within the project area, including riparian corridors along steep, upper perennial streams, intertidal mudflats, subtidal marine, scrub-shrub upland, rock outcrops, and forested uplands. High-value lambing and mineral licks for Dall sheep were identified within the project area.

5.2.6.1.2 Wildlife

Habitats in or adjacent to the project area provide shelter, food, and water for wildlife. Wildlife either reside atop the steep Turnagain hillside or traverse through the area moving between habitats. Terrestrial mammals include: moose, brown bear, black bears, mountain goats, and Dall sheep.

5.2.6.1.3 Migratory Birds

Migratory birds are protected under the Migratory Bird Treaty Act (MBTA). The project area may provide nesting, rearing, wintering, and migratory habitat for a variety of waterbirds and land birds (USFWS 2016) as shown in Table 10.

Bald eagles are protected under the Bald and Golden Eagle Protection Act and the MTBA. Bald eagles forage along the shorelines of Turnagain Arm and occasionally perch on rock outcrops or dead or dying snags adjacent to the project area. Nest surveys conducted in 2013 and 2015 found no bald eagle nests within the project area. Another bald eagle nest survey would be conducted prior to construction.

Table 10: Migratory Birds of Conservation Concern Occurring Near the Project Area

Common Name	*Scientific Name*	*Season*
Aleutian Tern	*Sterna aleutica*	Breeding
Fox Sparrow	*Passerella iliaca*	Breeding
Kittlitz's Murrelet	*Brachyramphus brevirostris*	Breeding
Lesser Yellowlegs	*Tringa flavipes*	Breeding
Olive-sided Flycatcher	*Contopus cooperi*	Breeding
Pink-footed Shearwater	*Puffinus creatopus*	Year-round
Rufous Hummingbird	*Selasphorus rufus*	Breeding
Short-eared Owl	*Asio flammeus*	Breeding
Solitary Sandpiper	*Tringa solitaria*	Breeding

5.2.6.2 Environmental Consequences

5.2.6.2.1 No Action

The No Action alternative would not impact wildlife, birds, or habitat in the project area.

5.2.6.2.2 Alternative 2A

Construction would disturb up to 104.7 acres of ground including approximately:

- 43.0 acres of developed or disturbed habitat (existing highway, highway embankment, railroad embankment, and the rock face at Windy Corner);
- 26.3 acres of intertidal mudflats; and
- Up to 35.4 acres of forest and shrub habitat (19.6 acres of uplands from material extraction at MP 109 and, if needed, material extraction on 15.8 acres at MP 104).

Alternative 2A (like Alternatives 2B and 2C) would move the highway and railroad away from high-value Dall sheep habitat on the hillside above Windy Corner and into Turnagain Arm minimizing habitat impact. Alternative 2A would result in the lowest acres of Dall sheep habitat impact (2.4 acres) of all build alternatives considered. This impact is the same as Alternatives 2B and 2C. The minimization of impacts to the iconic Dall sheep habitat would be consistent with the strong public and agency sentiment and the CSP management plan guidance to do so.

Alternative 2A mitigates impacts to Dall sheep by providing improved parking and amenities on the northbound side of the highway for those who wish to stop and view the local wildlife, such as the iconic Dall sheep. The existing highway footprint would be reclaimed as a multi-purpose facility offering parking, rest stops, improved trailhead access, and signage. The design would maintain a more appropriate distance between wildlife and those interested in watching and photographing the wildlife.

Alternative 2A would not fragment habitat, change migratory routes, or substantially diminish available wildlife or bird habitat. The proposed project is consistent with the MBTA; vegetative clearing would be conducted outside of the bird nesting window as described by USFWS for this region.

5.2.6.2.3 Alternative 2B

Construction would disturb a total of 112.3 acres of ground including approximately:

- 43.0 acres of developed or disturbed habitat (existing highway, highway embankment, railroad embankment, and the rock face at Windy Corner);
- 26.3 acres of intertidal mudflats; and
- 43.0 acres of exposed rock cliffs within the ROW from which material would be extracted.

Alternative 2B (like Alternatives 2A and 2C) would move the highway and railroad away from high-value Dall sheep habitat on the hillside above Windy Corner and into Turnagain Arm minimizing habitat impact. Alternative 2B would result in the lowest acres of Dall sheep habitat impact (2.4 acres) of all build alternatives considered. This impact is the same as Alternatives 2A and 2C. The minimization of impacts to the iconic Dall sheep habitat would be consistent with the strong public and agency sentiment and the CSP management plan guidance to do so.

Alternative 2B would not disturb the 35.4 acres of forest and shrub habitat for material extraction near MP 109 and MP 104. Material extraction within the CSP would not occur with Alternative 2B. As a result, Alternative 2B would not include the improved mountainside parking and amenities for wildlife viewers that are proposed with Alternative 2A. These CSP improvements were uniquely developed to mitigate the extraction of material from within the 35.4 acres of the CSP proposed with Alternative 2A.

Alternative 2B would not fragment habitat, change migratory routes, or substantially diminish available wildlife or bird habitat. The proposed project is consistent with the MBTA; vegetative clearing would be conducted outside of the bird nesting window as described by USFWS for this region.

5.2.6.2.4 Alternative 2C

Construction would disturb a total of 69.3 acres of ground including approximately:

- 43.0 acres of developed or disturbed habitat (existing highway, highway embankment, railroad embankment, and the rock face at Windy Corner); and
- 26.3 acres of intertidal mudflats.

Alternative 2C (like Alternatives 2A and 2B) would move the highway and railroad away from high-value Dall sheep habitat on the hillside above Windy Corner and into Turnagain Arm minimizing habitat impact. . Alternative 2C would result in the lowest acres of Dall sheep habitat impact (2.4 acres) of all build alternatives considered. This impact is the same as Alternatives 2A and 2B. The minimization of impacts to the iconic Dall sheep habitat would be consistent with the strong public and agency sentiment and the CSP management plan guidance to do so.

Alternative 2C would not disturb the 35.4 acres of forest and shrub habitat for material extraction near MP 109 and MP 104. Material extraction within the CSP would not occur with Alternative 2C. As a result, Alternative 2C would not include the improved mountainside parking and amenities for wildlife viewers that is proposed with Alternative 2A. These CSP improvements were uniquely developed to mitigate the extraction of material from within the 35.4 acres of the CSP proposed with Alternative 2A.

Alternative 2C would not fragment habitat, change migratory routes, or substantially diminish available wildlife or bird habitat. The proposed project is consistent with the MBTA; vegetative clearing would be conducted outside of the bird nesting window as described by USFWS for this region.

5.2.6.2.5 Alternative 3

Construction would disturb a total of 51.4 acres of ground including approximately:

- 31.9 acres of developed or disturbed habitat (existing highway, highway embankment, railroad embankment, and the rock face at Windy Corner);
- 14.9 acres of intertidal mudflats; and
- 4.6 acres of CSP uplands.

Alternative 3 (unlike Alternatives 2A, 2B, and 2C) would move the highway and railroad inland into the high-value Dall sheep habitat on the mountainside above Windy Corner. Alternative 3 increases the impact to high-value Dall sheep habitat by over three times, from 2.4 acres with Alternatives 2A, 2B, and 2C, to 7.4 acres with Alternative 3. This is the highest impact to Dall sheep habitat of the advanced alternatives. It would compromise a substantial portion of, or eliminate, the mineral lick area. The substantial Dall sheep habitat impact with Alternative 3 would go against the strong public and agency sentiment to minimize adverse impacts to the iconic Dall sheep habitat and would be inconsistent with the CSP management plan guidance.

Alternative 3 would not disturb the 35.4 acres of forest and shrub habitat for material extraction near MP 109 and MP 104. Material extraction within the CSP would not occur with Alternative 3. As a result, Alternative 3 would not include the improved mountainside parking and amenities for wildlife viewers that are proposed with Alternative 2A. These CSP improvements were uniquely developed to mitigate the extraction of material from within the 35.4 acres of the CSP proposed with Alternative 2A.

Alternative 3 would not fragment habitat, change migratory routes, or substantially diminish available wildlife or bird habitat. The proposed project is consistent with the MBTA; vegetative clearing would be conducted outside of the bird nesting window as described by USFWS for this region.

5.2.7 *Threatened and Endangered Species*

5.2.7.1 Affected Environment

In 2008, NMFS listed the CIBW as an endangered species. Upper Cook Inlet, including Turnagain Arm, was identified as critical habitat for this species in 2011. Critical habitat for the CIBW is located within and adjacent to the proposed project. See Figure 20.

A biological assessment (BA) was prepared to determine the potential effects of the proposed project on the CIBW population (LGL Alaska Research Associates, Inc. 2015). The BA indicated that the project area is within and adjacent to Critical Habitat 1, described as an area of seasonal use from April to November.

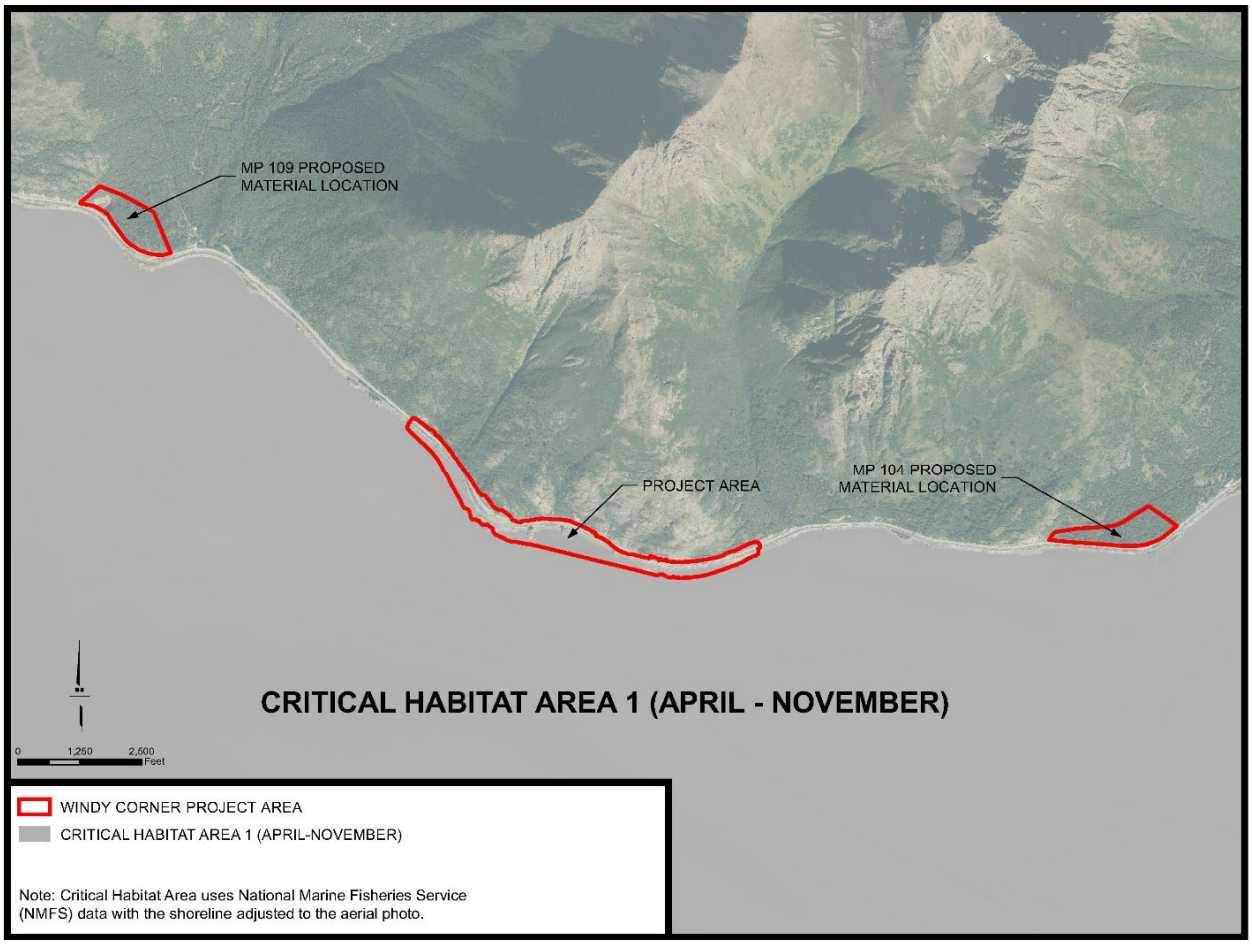


Figure 20: Cook Inlet Beluga Whale Critical Habitat (NMFS 2011)

5.2.7.2 Environmental Consequences

5.2.7.2.1 No Action

The No Action alternative would not impact threatened and endangered species or their critical habitat, including the CIBW.

5.2.7.2.2 Alternative 2A

Alternative 2A would involve placement of approximately 2 million cubic yards of fill in 26.3 acres of intertidal mudflats within CIBW critical habitat.

It would also involve rock blasting and demolition to produce the raw material required for the fill placement. NMFS initially indicated some concern about the potential for blasting noise to affect the CIBW in Turnagain Arm. Following these concerns, a baseline in-water acoustic assessment was conducted to understand background noise levels in Turnagain Arm. DOT&PF then directed modeling to be conducted to simulate percussive noise from rock blasts. Together, these studies provided a spatial range of anticipated in-water noise effects from blasting.

Blasting noise would be mitigated through use of protected species observers to determine presence of beluga whales within a 4,800-foot radius of a blast location. Should observers notice beluga whales within this range prior to a blast, blasting activities would be paused until the whales are outside of the 4,800-foot radius. Additional mitigation is listed in Appendix D.

The BA found that, with appropriate mitigation, Alternative 2A is **not likely to adversely affect** the CIBW. NMFS concurred with this finding on October 28, 2015. The Letter of Concurrence from NMFS may be found in Appendix D. All mitigation measures related to the beluga whales are located in Chapter 11.0, Environmental Commitments Summary.

5.2.7.2.3 Alternative 2B

Alternative 2B (like Alternative 2A and 2C) would involve placement of approximately 2 million cubic yards of fill in 26.3 acres of intertidal mudflats within CIBW critical habitat.

Alternative 2B (like Alternative 2A and 2C) would also involve rock blasting and demolition to produce the raw material required for the fill placement. As with Alternative 2A, blasting noise would be mitigated through use of the same measures to be implemented with Alternative 2A. All mitigation measures related to the beluga whales are located in Chapter 11.0, Environmental Commitments Summary. The resulting conclusion under Section 7 of the Endangered Species act would remain the same as for Alternative 2A. With implementation of the mitigation measures specified by NMFS, Alternative 2B is **not likely to adversely affect** the CIBW.

5.2.7.2.4 Alternative 2C

Alternative 2C (like Alternatives 2A and 2B) would involve placement of approximately 2 million cubic yards of fill in 26.3 acres of intertidal mudflats within CIBW critical habitat.

Alternative 2C (like Alternative 2A and 2B) would also involve rock blasting and demolition to produce the raw material required for the fill placement. As with Alternative 2A, blasting noise would be mitigated through use of the same measures to be implemented with Alternative 2A. All mitigation measures related to the beluga whales are located in Chapter 11.0, Environmental Commitments Summary. The resulting conclusion under Section 7 of the Endangered Species act would remain the same as for Alternative 2A. With implementation of the mitigation measures specified by NMFS, Alternative 2C is **not likely to adversely affect** the CIBW.

5.2.7.2.5 Alternative 3

Alternative 3 would involve placement of approximately 1.5 million cubic yards of fill in 14.9 acres of intertidal mudflats within CIBW critical habitat.

Alternative 3 (like Alternative 2A, 2B and 2C) would also involve rock blasting and demolition to produce the raw material required for the fill placement. As with Alternative 2A, blasting noise would be mitigated through use of the same measures to be implemented with Alternative 2A. All mitigation measures related to the beluga whales are located in Chapter 10.0, Environmental Commitments Summary. The resulting conclusion under Section 7 of the Endangered Species act would remain the same as for Alternative 2A. With implementation of the mitigation measures specified by NMFS, Alternative 3 is **not likely to adversely affect** the CIBW.

5.2.8 Waterbody Involvement and Water Quality

5.2.8.1 Affected Environment

Waters of the U.S. are protected under multiple Federal regulations, including Section 10, and Section 404 of the CWA, and Section 9 of the Rivers and Harbors Act. Waters of the U.S. are waterbodies and wetlands as defined in 40 CFR 230.3. Waterbodies within the project area include Turnagain Arm and three unnamed streams. See Figure 19. These waterways flow through 24-inch or 36-inch culverts under the Seward Highway and ARRC track.

Navigable waters are defined by the U.S. Coast Guard (USCG) and USACE as: 'those which are subject to the ebb and flow of tides or which are presently or susceptible to use in interstate and/or foreign commerce.' Authorization to impact navigable waters requires the authorization of the USCG (Section 9) and the USACE (Section 10 and 404). Turnagain Arm is the only navigable water within the project area.

Stormwater from impervious surfaces can carry debris, sediment, and chemicals into waterbodies, diminishing their water quality. Construction and maintenance activities have the potential to affect nearby waterbodies. Water Quality is regulated by the U.S. Environmental Protection Agency through the CWA Sections 401, 402, and 404. Water quality is also regulated by the ADEC Division of Water and Division of Environmental Health. Projects discharging into Waters of the U.S. must obtain a Section 401 certification, Section 402 Alaska Pollutant Discharge Elimination System (APDES) Construction General Permit (CGP), and a Section 404 Department of the Army Permit.

The CWA mandates each state characterize the quality of all waterbodies within the state and compile a 303(d) list of all waterbodies that do not meet specified water quality standards (ADEC 2010). There are no waterbodies on the 303(d) list within or adjacent to the project area.

The Safe Drinking Water Act protects public drinking water supplies. ADEC manages a database of drinking water protection areas (ADEC 2017). There are no community water systems or identified drinking water protection areas within or adjacent to the project area or proposed material extraction locations.

5.2.8.2 Environmental Consequences

5.2.8.2.1 No Action

The No Action alternative would not affect any of the three unnamed streams under the Seward Highway and ARRC track. The existing 24-inch and 36-inch culverts would remain. There would be no direct impacts to Waters of the U.S. or navigable waters, and stormwater flow paths would be unchanged.

5.2.8.2.2 Alternative 2A

Alternative 2A would include placement of approximately 2 million cubic yards fill in 26.3 acres of intertidal mudflats in Turnagain Arm. This is the same as Alternatives 2B and 2C.

DOT&PF would provide compensatory mitigation to offset the project's 26.3 acres of unavoidable permanent loss of waters of the U.S. (intertidal mudflats). This mitigation would be by way of restoration and preservation of similar nearby habitat. The Anchorage Debit-Credit

Methodology (ADCM) was applied to calculate the impacts in terms of debits and provide a guide to the mitigation required to offset the impacts. The ADCM indicates that 21.52 credits are needed to offset proposed project impacts. DOT&PF has submitted a USACE Section 10/404 permit application for Alternative 2A with a compensatory mitigation plan. On 10/1/2019, the USACE notified DOT&PF that they would accept the compensatory mitigation plan included with the application.

Alternative 2A includes replacing and improving the culverts for the three unnamed streams. Existing 24-inch culverts would be replaced with 36-inch culverts, and 36-inch culverts with 42-inch culverts to address potential icing issues and peak flow water movement.

Alternative 2A would disturb up to 104.7 acres of developed land, undeveloped forest and shrub, and tidelands; 43.0 acres of previously disturbed uplands, 35.4 acres of undisturbed upland, and 26.3 acres of intertidal waters.

Alternative 2A would discharge stormwater to Waters of the U.S. in compliance with the APDES CGP requirements. Water quality impacts to Turnagain Arm are expected to be negligible. Due to the high energy system and silty substrate, Turnagain Arm has naturally high levels of background sediment. The proposed project design has been revised to reduce the amount of disturbance to the intertidal mudflats by shifting the southbound alignment inland.

DOT&PF would prepare an Erosion and Sediment Control Plan (ESCP) as part of the construction contract package. Prior to commencement of construction activities, the Construction Contractor would prepare and submit a Stormwater Pollution Prevention Plan (SWPPP). The SWPPP would identify best management practices (BMPs) including erosion prevention and control measures, and a schedule for earth-disturbing activities. The project would be constructed in compliance with the ADEC's APDES CGP. Section 10, 401, 402, and 404 authorizations would be required.

5.2.8.2.3 Alternative 2B

Alternative 2B would include placement of approximately 2 million cubic yards fill in 26.3 acres of intertidal mudflats in Turnagain Arm. This is the same as Alternatives 2A and 2C.

DOT&PF would provide compensatory mitigation to offset the project's 26.3 acres of unavoidable permanent loss of waters of the U.S. (intertidal mudflats) under Section 404 of the Clean Water Act. Alternative 2B would propose the same mitigation plan as Alternative 2A. This mitigation would be by way of restoration and preservation of similar nearby habitat. On October 1, 2019, the USACE notified DOT&PF that they would accept such a mitigation plan.

Alternative 2B includes replacing and improving the culverts for the three unnamed streams. Existing 24-inch culverts would be replaced with 36-inch culverts, and 36-inch culverts with 42-inch culverts to address potential icing issues and peak flow water movement.

Alternative 2B would disturb 112.3 acres of land including 26.3 acres of fill into the intertidal areas of Turnagain Arm and 43.0 acres of developed highway footprint with the ROW, and 43.0 acres of material sites along the Seward Highway ROW. Alternative 2B would not disturb the 35.4 acres of land within the CSP needed by Alternative 2A for material extraction.

Alternative 2B would discharge stormwater to Waters of the U.S. in compliance with the APDES CGP requirements. Water quality impacts to Turnagain Arm are expected to be negligible. Due

to the high energy system and silty substrate, Turnagain Arm has naturally high levels of background sediment. The proposed project design has been revised to reduce the amount of disturbance to the intertidal mudflats by shifting the southbound alignment inland.

DOT&PF would prepare an ESCP as part of the construction contract package. Prior to commencement of construction activities, the Construction Contractor would prepare and submit a SWPPP. The SWPPP would identify BMPs including erosion prevention and control measures, and a schedule for earth-disturbing activities. The project would be constructed in compliance with the ADEC's APDES CGP. Section 10, 401, 402, and 404 authorizations would be required.

5.2.8.2.4 Alternative 2C

Alternative 2C would include placement of approximately 2 million cubic yards fill in 26.3 acres of intertidal mudflats in Turnagain Arm. This is the same as Alternatives 2A and 2B.

DOT&PF would provide compensatory mitigation to offset the project's 26.3 acres of unavoidable permanent loss of waters of the U.S. (intertidal mudflats) under Section 404 of the Clean Water Act. Alternative 2C would propose the same mitigation plan as Alternative 2A. This mitigation would be by way of restoration and preservation of similar nearby habitat. On October 1, 2019, the USACE notified DOT&PF that they would accept such a mitigation plan.

Alternative 2C includes replacing and improving the culverts for the three unnamed streams. Existing 24-inch culverts would be replaced with 36-inch culverts, and 36-inch culverts with 42-inch culverts to address potential icing issues and peak flow water movement.

Alternative 2C would disturb 69.3 acres of land including 26.3 acres of fill into the intertidal flats of Turnagain Arm and 43.0 acres of developed highway footprint. Alternative 2C would not disturb the 35.4 acres of land within the CSP needed by Alternative 2A for material extraction. Alternative 2C would not disturb the 43.0 acres of material sites along the Seward Highway ROW needed by Alternative 2B for material extraction.

Alternative 2C would discharge stormwater to Waters of the U.S. in compliance with the APDES CGP requirements. Water quality impacts to Turnagain Arm are expected to be negligible. Due to the high energy system and silty substrate, Turnagain Arm has naturally high levels of background sediment. The proposed project design has been revised to reduce the amount of disturbance to the intertidal mudflats by shifting the southbound alignment inland.

DOT&PF would prepare an ESCP as part of the construction contract package. Prior to commencement of construction activities, the Construction Contractor would prepare and submit a SWPPP. The SWPPP would identify BMPs including erosion prevention and control measures, and a schedule for earth-disturbing activities. The project would be constructed in compliance with the ADEC's APDES CGP. Section 10, 401, 402, and 404 authorizations would be required.

5.2.8.2.5 Alternative 3

Alternative 3 would include placement of approximately 1.5 million cubic yards fill in 14.9 acres of intertidal mudflats in Turnagain Arm. This is 11.4 acres less than Alternatives 2A, 2B, and 2C.

DOT&PF would provide compensatory mitigation to offset the project's 14.9 acres of unavoidable permanent loss of waters of the U.S. (intertidal mudflats). Alternative 3 would propose the same mitigation plan as Alternative 2A but would mitigate a lower acreage (14.9) of wetland loss. This mitigation would be by way of restoration and preservation of similar nearby habitat. On October 1, 2019, the USACE notified DOT&PF that they would accept such a mitigation plan.

Alternative 3 includes replacing and improving the culverts for the three unnamed streams. Existing 24-inch culverts would be replaced with 36-inch culverts, and 36-inch culverts with 42-inch culverts to address potential icing issues and peak flow water movement.

Alternative 3 would disturb 51.4 acres of land including 14.9 acres of fill into the intertidal flats of Turnagain Arm, 31.9 acres of developed highway footprint, and 4.6 acres of undisturbed uplands. Alternative 3 would not disturb the 35.4 acres of land within the CSP needed by Alternative 2A for material extraction. Alternative 3 would not disturb the 43.0 acres of material sites along the Seward Highway ROW needed by Alternative 2B for material extraction.

The proposed project would discharge stormwater to Waters of the U.S. in compliance with the APDES CGP requirements. Water quality impacts to Turnagain Arm are expected to be negligible. Due to the high energy system and silty substrate, Turnagain Arm has naturally high levels of background sediment. The proposed project design has been revised to reduce the amount of disturbance to the intertidal mudflats by shifting the southbound alignment inland.

DOT&PF would prepare an ESCP as part of the construction contract package. Prior to commencement of construction activities, the Construction Contractor would prepare and submit a SWPPP. The SWPPP would identify BMPs including erosion prevention and control measures, and a schedule for earth-disturbing activities. The project would be constructed in compliance with the ADEC's APDES CGP. Section 10, 401, 402, and 404 authorizations would be required.

5.2.9 Vegetation and Invasive Species

5.2.9.1 Affected Environment

5.2.9.1.1 Vegetation

Vegetation along Turnagain Arm includes a range of habitat types between sea level and lower elevations of the surrounding mountain slopes. Vegetation in this area transitions from a coastal forest mix represented by Sitka spruce, hemlock, and cottonwood towards a spruce-birch-poplar mix more closely associated with interior ecosystems (DNR 2011). Spruce, birch and poplar form the majority of tree cover in the Project Area. Shrub habitat occurs either at elevations above the forested zone, or where natural disturbance such as avalanche, landslide, or fire has created an opening for vegetation succession. Alder and willow species dominate the shrub layer. Herbaceous and low-growing species are widely varied and include dwarf dogwood, bluejoint reedgrass, and lowbush cranberry. Mosses and lichens are also prevalent.

5.2.9.1.2 Invasive Plant Species

E.O. 13112 sets the policy for Federal agencies to prevent and control the introduction of invasive species to minimize economic, ecological, and human health effects that invasive species may cause.

Invasive species are defined as: “With regard to a particular ecosystem, a non-native organism whose introduction causes or is likely to cause economic or environmental harm, or harm to human, animal, or plant health.” (E.O. 13112)

Typically introduced from another continent or region, invasive species may become established, outcompete native species for resources, and diminish habitat values for wildlife. Highway corridors provide opportunities for the movement of invasive plant species from region to region. Invasive plant species are opportunistic and often establish after disturbance to the soil (e.g. fire, vegetation removal, etc.).

A review of the Alaska Exotic Plant Information Clearinghouse database indicates at least nine invasive or nonnative plant species occur within or adjacent to the Project Area. See Table 11. Most of the invasive species occur in previously disturbed areas along the highway or pullouts.

Table 11: Invasive, Nonnative Plant Species Observed within or Adjacent to Project Area

Scientific Name	***Common Name***	***Invasiveness Category***
Tragopogon dubius	Yellow salsify	Modest Invasive
Trifolium repens	White clover	Modest Invasive
Taraxacum officinale	Common dandelion	Modest Invasive
Linaria vulgaris	Butter and eggs	Moderate Invasive
Trifolium pretense	Red clover	Modest Invasive
Elymus repens	Quackgrass	Modest Invasive
Plantago major	Common plantain	Weak Invasive
Astragalus cicer	Chickpea milkvetch	Not Yet Ranked
Silene vulgaris	Bladder campion	Weak Invasive

5.2.9.2 Environmental Consequences

5.2.9.2.1 No Action

The No Action alternative would **not change** the vegetation or invasive species composition within or adjacent to the Project Area.

5.2.9.2.2 Alternative 2A

Alternative 2A would disturb up to approximately 104.7 acres, of which approximately 43.0 acres is previously disturbed highway footprint, 26.3 acres are intertidal mudflats and 35.4 acres are undeveloped and vegetated. All of the vegetation affected is common in the area.

Construction activities could potentially provide disturbed areas where invasive species could be introduced. The contractor would prepare a SWPPP in accordance with obtaining an APDES CGP. The SWPPP would identify BMPs to minimize disturbance areas, and stabilize disturbed areas as soon as practicable, reducing the risk of introducing or spreading invasive species. Hydroseed and mulch, clean fill material, native plants, and certified native seed mixes meeting DOT&PF’s Standard Specifications would be used where appropriate.

Areas proposed for material excavation at MP 109 and if necessary, MP 104, would be reclaimed to DNR's specifications. Exposed rock faces are expected to remain; however, soils may be stabilized upon reclamation. Rock faces are not expected to facilitate propagation or spread of invasive species.

5.2.9.2.3 Alternative 2B

Alternative 2B would disturb 112.3 acres of land including 26.3 acres of fill into the intertidal areas of Turnagain Arm and 43.0 acres of developed highway footprint with the ROW, and 43.0 acres of material sites along the Seward Highway ROW. Alternative 2B would not disturb the 35.4 acres of land within the CSP needed by Alternative 2A for material extraction.

Construction activities could potentially provide disturbed areas where invasive species could be introduced. The contractor would prepare a SWPPP in accordance with obtaining an APDES CGP. The SWPPP would identify BMPs to minimize disturbance areas, and stabilize disturbed areas as soon as practicable, reducing the risk of introducing or spreading invasive species. Hydroseed and mulch, clean fill material, native plants, and certified native seed mixes meeting DOT&PF's Standard Specifications would be used where appropriate.

5.2.9.2.4 Alternative 2C

Alternative 2C would disturb 69.3 acres of land including 26.3 acres of fill into the intertidal areas of Turnagain Arm and 43.0 acres of developed highway footprint. Alternative 2C would not disturb the 35.4 acres of land within the CSP needed by Alternative 2A for material extraction MP 104 and 109. Alternative 2C would not disturb the 43.0 acres of material sites along the Seward Highway ROW needed by Alternative 2B for material extraction.

Construction activities could potentially provide disturbed areas where invasive species could be introduced. The contractor would prepare a SWPPP in accordance with obtaining an APDES CGP. The SWPPP would identify BMPs to minimize disturbance areas, and stabilize disturbed areas as soon as practicable, reducing the risk of introducing or spreading invasive species. Hydroseed and mulch, clean fill material, native plants, and certified native seed mixes meeting DOT&PF's Standard Specifications would be used where appropriate.

5.2.9.2.5 Alternative 3

Alternative 3 would disturb 51.4 acres of land, of which approximately 31.9 acres is previously disturbed highway footprint, 14.9 acres are intertidal mudflats, and 4.6 acres of undisturbed uplands. Alternative 3 would not disturb the 35.4 acres of land within the CSP needed by Alternative 2A for material extraction. Alternative 3 would not disturb the 43.0 acres of material sites along the Seward Highway ROW needed by Alternative 2B for material extraction.

Construction activities could potentially provide disturbed areas where invasive species could be introduced. The contractor would prepare a SWPPP in accordance with obtaining an APDES CGP. The SWPPP would identify BMPs to minimize disturbance areas, and stabilize disturbed areas as soon as practicable, reducing the risk of introducing or spreading invasive species. Hydroseed and mulch, clean fill material, native plants, and certified native seed mixes meeting DOT&PF's Standard Specifications would be used where appropriate.

5.2.10 Bicycle and Pedestrian Issues

5.2.10.1 Affected Environment

Bicycle use in the area is typically limited to recreational and transportation use on the Seward Highway itself. Pedestrian use in the area is limited to existing facilities for wildlife viewing, or access to recreational areas within or adjacent to the Project Area. Parking and pedestrian facilities are located at Falls Creek Trailhead, Windy Corner Trailhead, Turnagain Arm Trail, Windy Corner turnout, and three areas with widened shoulders. See Figure 4 in Section 2.4. As no formal or designated bicycle facilities exist within the project area, bicyclists typically use the 8-foot-wide shoulders of the Seward Highway.

The Falls Creek Trailhead, located near MP 105.5, consists of a 40-foot by 200-foot asphalt area, with no defined parking spaces, adjacent to the shoulder of the Seward Highway. Falls Creek Trail is approximately 1.9 miles long and is not connected with any other pedestrian facilities along the highway.

The Windy Corner Trailhead (Photograph 4), located near MP 106.7, consists of a 30-foot by 220-foot asphalt area, with no defined parking spaces, adjacent to the shoulder of the Seward Highway. The Windy Corner Trailhead is the southernmost terminus of the Turnagain Arm Trail, extending approximately 9.4 miles from Potter Creek Trailhead to Windy Corner.

The existing 350-foot-long Windy Corner vehicle turnout, located on the southbound side of the highway near MP 106.8, is separated from the highway by a 30-foot-wide median.

The three areas with widened shoulders occur southbound at MP 105.9, MP 106.2, and MP 106.6. These have lengths of 300, 230, and 550 feet, respectively, with shoulder widths of either 18 or 30 feet. The existing pullouts have limited horizontal visibility. To mitigate the limited sight distance, some of the pullouts have “No Left Turn” restrictions/signage for traffic on the north legs of the pullouts on the inside of the curve.

The closest Seward Highway pedestrian pathway outside the project area is a 10-foot-wide paved asphalt trail (Indian to Girdwood National Recreation Trail) on the south side of the highway, starting at Indian Creek Bridge (MP 103) and continuing to Girdwood (MP 90).

5.2.10.2 Environmental Consequences

5.2.10.2.1 No Action

The No Action alternative would not improve bicycle or pedestrian access to existing facilities for wildlife viewing or access to recreational areas. Conflicts would continue to occur near the Windy Corner vehicle turnout and Windy Corner Trailhead, as motorists slow and park along the highway and walk along the shoulders when sheep and other wildlife are present.

5.2.10.2.2 Alternative 2A

Alternative 2A would provide new mountainside park facilities which include new pedestrian access and parking areas at Windy Corner (MP 106.5). See Figure 14 in Section 4.3.2. The new controlled access mountainside park facilities would be accessible to both northbound and southbound traffic, and would replace the existing Windy Corner Trailhead pullout, two of the three areas with widened shoulders (MP 106.3 and MP 106.5), and the existing vehicle turnout

on the southbound side. Southbound traffic would decelerate in a left-turn lane prior to entering the parking area. A paved parking area would accommodate 26 cars and seven oversized vehicles, and a gravel parking area would accommodate an additional 29 cars and six oversized vehicles. The parking areas would be separated from the highway by a 130-foot-wide median. Pedestrian facilities would connect the parking area to the main wildlife viewing area with seating, scenic overlooks, an interpretive Americans with Disabilities Act-compliant trail, and access to the Windy Corner Trailhead. An earthen berm would also be installed at the base of the two rockslide areas to prevent falling rocks from reaching the pedestrian pathways or parking area.

No bicycle facilities are included with this project; however, the proposed design includes space to add a future multi-use pathway on the northbound side without having to again realign the road or railroad. The future separated multi-use pathway would allow cyclists to transit the area without using the highway shoulders.

5.2.10.2.3 Alternative 2B

Alternative 2B would not provide the new mountainside park facilities with pedestrian access and parking areas Windy Corner (MP 106.5) that would substantially improve access to Turnagain Arm Trailhead. Instead a minimal mountainside off-shoulder pullout approximately 38 feet deep by 325 feet long would be constructed. The much larger mountainside park facilities were uniquely developed to mitigate the extraction of material from within the 35.4 acres of the CSP proposed with Alternative 2A and would not be constructed with Alternative 2B.

No bicycle facilities are included with Alternative 2B; however, the proposed design includes space to add a future multi-use pathway on the northbound side without having to again realign the road or railroad. The future separated multi-use pathway would allow cyclists to transit the area without using the highway shoulders.

5.2.10.2.4 Alternative 2C

Alternative 2C would not provide the new mountainside park facilities with pedestrian access and parking areas Windy Corner (MP 106.5) that would substantially improve access the Turnagain Arm Trailhead. Instead a minimal mountainside off-shoulder pullout approximately 38 feet deep by 325 feet long would be constructed. The much larger mountainside park facilities were uniquely developed to mitigate the extraction of material from within the 35.4 acres of the CSP proposed with Alternative 2A and would not be constructed with Alternative 2C.

No bicycle facilities are included with Alternative 2C; however, the proposed design includes space to add a future multi-use pathway on the northbound side without having to again realign the road or railroad. The future separated multi-use pathway would allow cyclists to transit the area without using the highway shoulders

5.2.10.2.5 Alternative 3

Alternative 3 would not provide the new mountainside park facilities with pedestrian access and parking areas Windy Corner (MP 106.5) that would substantially improve access the Turnagain Arm Trailhead. Instead a minimal mountainside off-shoulder pullout approximately 38 feet deep by 325 feet long would be constructed. The much larger mountainside park facilities were

uniquely developed to mitigate the extraction of material from within the 35.4 acres of the CSP proposed with Alternative 2A and would not be constructed with Alternative 3.

No bicycle facilities are included with Alternative 3; however, the proposed design includes space to add a future multi-use pathway on the northbound side without having to again realign the road or railroad. The future separated multi-use pathway would allow cyclists to transit the area without using the highway shoulders

***5.2.11** Section 4(f)*

5.2.11.1 Affected Environment

Section 4(f) of the U.S. Department of Transportation Act of 1966 prohibits use of certain parks, recreation areas, wildlife refuges, or historic properties for transportation projects unless there is "no prudent and feasible alternative" and the project includes "all possible planning to minimize harm", or the impacts to these resources are "de minimis."

CSP. The park is eligible for protection under Section 4(f) and DOT&PF has conducted a Section 4(f) Programmatic Evaluation for the project's proposed use of the park (Appendix E). Elements of the CSP affected by the project are listed in Sections 5.2.11.1.1 to 5.2.11.1.7.

Alaska Railroad. DOT&PF has determined that the 36.6-mile Turnagain Arm District segment of the Alaska Railroad from Portage to Potter (ANC-4057) is eligible for the NRHP and therefore eligible for protection under Section 4(f) as a historic property. DOT&PF has found that the proposed project would have No Adverse Effect on historic properties including the Alaska Railroad (ANC-4057). SHPO, as the Section 4(f) official with jurisdiction over historic properties, has concurred with DOT&PF's findings on 2/6/2015 (Appendix E). The 23 CFR 774.13(a)(3) Section 4(f) exception for use of historic transportation facilities applies to the realignment of the railroad as it would not adversely affect the historic qualities of this segment of the railroad that caused it to be eligible for the National Register and the official with jurisdiction has not objected to this conclusion. A DOT&PF Statewide Environmental Office NEPA Manger made the determination that the 23 CFR 774.13(a)(3) exception was appropriate. Documentation of this determination is located in Appendix E.

5.2.11.1.1 Undeveloped Lands (CSP)

Undeveloped parkland that is part of CSP is the primary land surrounding the project. The only development that occurs within the project area are narrow vehicle pullout areas that are entirely within the highway ROW and the Turnagain Arm trail that begins at the Windy Corner Trailhead pullout. With the exception of the Turnagain Arm trail, all lands that would be affected by the project on the mountainside of the Seward Highway and outside of the existing ROW are undeveloped CSP uplands. These undeveloped lands are either forest, shrub lands, or unvegetated exposed rock. See photographs 1, 9, and 11. These uplands would be affected by the project alternatives to various degrees. In some cases this would involve cutting into the mountainside near MP 106.7 (Photograph 2) to make room for the new highway realignment. In other cases this would involve extracting material from the undeveloped lands near MP 109 and, if needed, MP 104 to obtain material for the project. See Figures 25 and 26. A portion of these undeveloped lands are noted as iconic habitat for Dall sheep. This land contains a unique mineral lick that attracts the sheep (Photograph 3).

5.2.11.1.2 Turnagain Arm Intertidal Mudflats (CSP)

The limits of CSP in the vicinity of the project includes parts of the Turnagain Arm intertidal mudflats. The realignments of the Seward Highway with the advanced alternatives would impact these intertidal mudflats within the CSP along Turnagain Arm. Intertidal mudflats are un-vegetated bottoms of estuaries that lie between high and low tide lines. At low tide, stream channels cut through the intertidal mudflats in the project area. Marine organisms adapted to stressful conditions survive in the mudflats and provide a valuable food source to creatures higher on the food chain making the mudflats valuable marine habitat. In addition to providing valuable marine habitat, the intertidal mudflats experience bore tide activity as well as being within the boundaries of designated critical habitat for the Cook Inlet beluga whale. Both bore tide and Beluga whale viewing are tourist attractions.

The project proposes to mitigate the habitat loss through the regulatory permit processes by restoring and/or preserving similar habitat near the project.

5.2.11.1.3 Dall Sheep Viewing (CSP)

High-value Dall sheep habitat is located on the hillslope directly above Windy Corner, part of which is located within the CSP. This rugged area is suitable to raise and shelter Dall sheep lambs from predators and to provide a high value mineral lick. Dall sheep are frequently spotted near the highway at Windy Corner, presenting viewing and photographing opportunities for tourists that often pull onto highway shoulders to access the area. The advanced alternatives would encroach on high-value Dall sheep habitat to various degrees.

5.2.11.1.4 Pullouts (CSP)

Five pullouts in the project area serve visitors recreating in the CSP. These pullouts include the 350-foot-long Windy Corner pullout, the 30-foot wide by 220-foot long Turnagain Arm (Windy Corner) Trailhead pullout, and three areas with widened shoulders (300', 230', and 550' long) at mileposts 105.9, 106.2, and 106.6, respectively. See Figure 4. These pullouts are further described under Sections 2.4 Parking and Pedestrian Facilities and 5.2.10 Bicycle and Pedestrian Facilities. CSP users utilize these pullouts to access the trailheads and to enjoying the views of sheep, bore tides, or beluga whales. All advanced alternatives would impact these five pullouts. Paved parking to provide access to recreational opportunities in the project vicinity would be provided with the advanced alternatives.

5.2.11.1.5 Trails (CSP)

Two trails extending into CSP are located along the highway in the project vicinity. These provide access to recreational activities in CSP including photography, hiking, and rock climbing. The Turnagain Arm trailhead is located within the project area. See Figure 4. The Falls Creek Trailhead would remain unaffected by the project. All advanced alternatives would impact the Turnagain Arm Trail and Trailhead. Access to the Turnagain Arm Trail would vary among the advanced alternatives which would all connect it to a new mountainside parking area and thereby provide greater parking capacity and safer access.

5.2.11.1.6 Rock Climbing (CSP)

The Goat's Head Soup rock climbing ridge located at approximately MP 106.8 of the Seward Highway near Windy Corner contains thirteen climbing routes. Twelve of these routes are within

DOT&PF right-of-way. One route is out of the right-of-way and within the CSP. See Figure 21. There aremany other climbing routes along the Seward Highway beyond the immediate project area (MP 105-107). These climbing routes would be affected by the advanced alternatives to various degrees as described in Section 5.2.11.2 Environmental Consequences. Rock climbers currently pull their vehicles off on the shoulder of the highway in the project area to access Goat's Head Soup climbing routes. This contributes to unsafe conditions in the area by having parked vehicles in close proximity to high-speed through traffic. In the project area the advanced alternatives improve these unsafe conditions for climbers to various degrees.

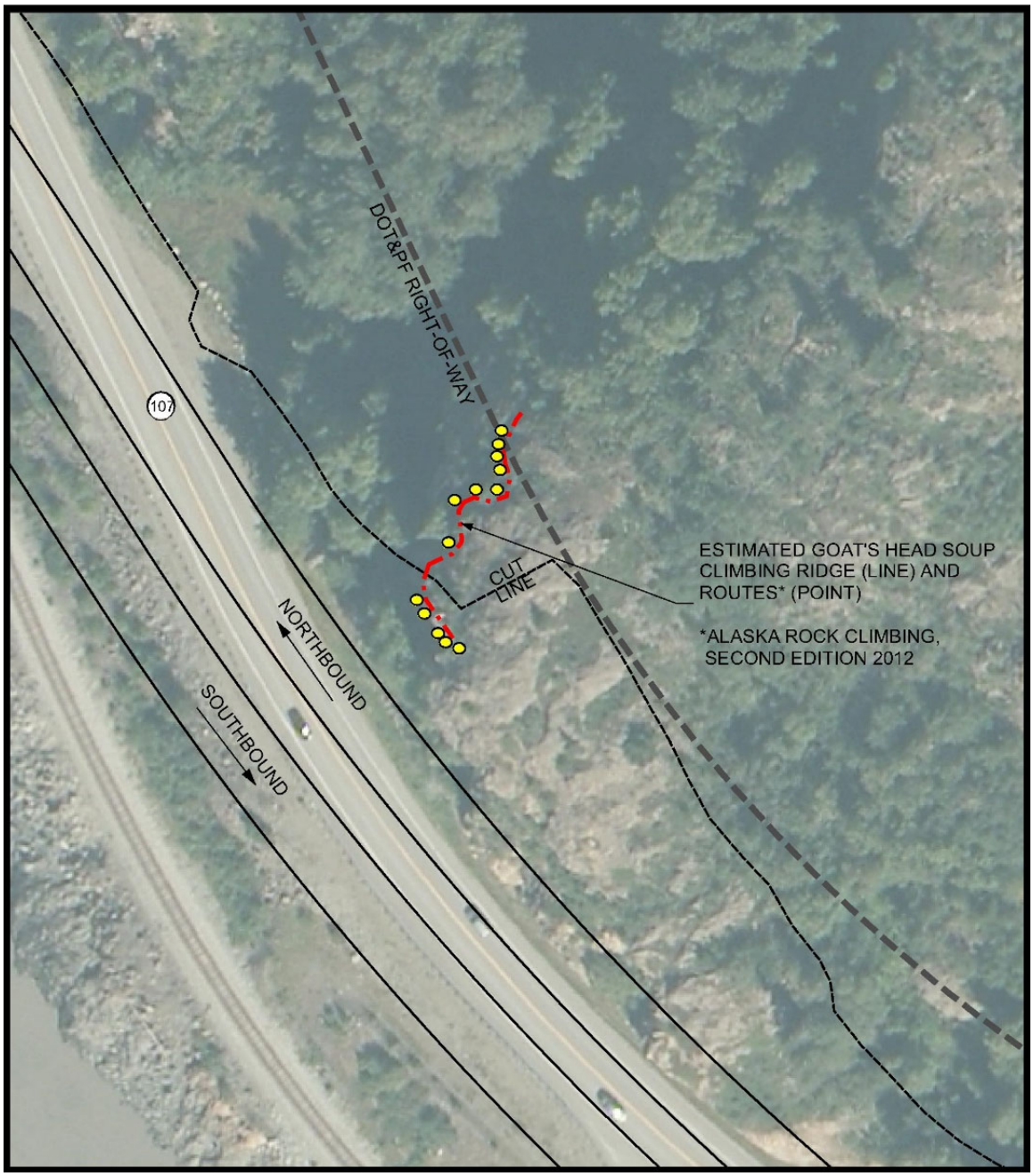


Figure 21: Goat's Head Soup Climbing Ridge and Routes

5.2.11.1.7 Water Activities (CSP)

There are currently no developed facilities for recreational access to Turnagain Arm for water activities including windsurfing. Water activities currently require informal passage across ARRC track.

5.2.11.1.8 Alaska Railroad

As stated in Section 5.2.4.1 and 5.2.11.1, Cultural Resources, the 36.6-mile Turnagain Arm District segment of the Alaska Railroad from Portage to Potter (ANC-4057) is eligible for the NRHP and therefore eligible for protection under Section 4(f) as a historic property.

5.2.11.2 Environmental Consequences

5.2.11.2.1 No Action

The No Action alternative would not impact Section 4(f) resources.

5.2.11.2.2 Alternative 2A

Chugach State Park

ROW Effects. Alternative 2A would require the use of Section 4(f) CSP lands outside of existing highway and ARRC ROW as follows:

- The permanent acquisition of **26.3** acres on the waterside of the highway within CSP for permanent transportation use. This is the same amount as for Alternatives 2B and 2C and 6.8 acres more than Alternative 3 (19.5 acres).
- The temporary use of up to **35.4** acres of undeveloped vegetated parkland adjacent to the highway for material extraction at MP 109 and MP 104.

As mitigation for the permanent use of CSP lands for transportation purposes, DOT&PF would relinquish 14.7 acres of ROW to CSP, which would convert from transportation to recreational use. The 14.7 acres of replacement lands are of at least equal fair market value and equivalent recreational utility.

In addition, to mitigate for the temporary extraction of material from within the park. Alternative 2A would construct $2.5 million worth of mountainside park facilities as described in Section 4.3.2 and shown on Figure 14. These park improvements include a new controlled access scenic parking area and pedestrian facilities that would improve sightseeing, wildlife viewing, and access to CSP consistent with the CSP Management Plan.

Turnagain Arm Effects. The Alternative 2A realignment of the Seward Highway would impact 26.3 acres of intertidal mudflats within the CSP along Turnagain Arm. This impact is the same as Alternatives 2B and 2C and 11.4 acres greater than Alternative 3. DOT&PF would provide compensatory mitigation to offset the project's 26.3 acres of unavoidable permanent loss of waters of the U.S. (intertidal mudflats) under Section 404 of the Clean Water Act. This mitigation would be by way of restoration and preservation of similar nearby habitat. On October 1, 2019, the USACE notified DOT&PF that they would accept the mitigation plan for Alternative 2A.

Alternative 2A would provide an emergency response access ramp for water rescue operations like Alternative 2B, 2C, and 3. See Figure 11.

Dall sheep Effects. Alternative 2A impacts to Dall sheep habitat would be 2.4 acres. This impact is equal to Alternatives 2B and 2C and is the lowest impact of all build and advanced alternatives. The minimization of impacts to the iconic Dall sheep habitat is consistent with the strong public and agency sentiment and the CSP management plan guidance to do so. Overall, Alternative 2A would improve conditions for sheep by consolidating five existing pullouts into one controlled access mountainside park facility that would consolidate visitors and maintain a more appropriate distance between wildlife and those interested in viewing the wildlife.

Trail Effects. Alternative 2A would require a 230-foot extension the Turnagain Arm Trail to connect to the new mountainside parking lot and facilities.

Rock Climbing Route Effects. The Goat's Head Soup rock climbing ridge located at approximately MP 106.8 of the Seward Highway near Windy Corner contains thirteen climbing routes. Twelve of these routes are within DOT&PF right-of-way. One route is out of the right-of-way and within the CSP. See Figure 21. The five routes closest to the highway would be encroached on and eliminated by the rock cut necessary to construct Alternative 2A. Eight of the thirteen climbing routes would remain. Rock climbers currently pull their vehicles off on the shoulder of the highway in the project area to access Goat's Head Soup climbing routes. This contributes to unsafe conditions in the area by having parked vehicles in close proximity to high-speed through traffic. With Alternative 2A, the remaining eight routes would be accessed by way of walking approximately 0.35 miles along the Turnagain Arm Trail which would have a new trailhead off the new mountainside parking facilities. The new pullout would provide greater parking capacity, safer parking, safer access, and improved facilities for rock climbers.

The Section 4(f) Programmatic Evaluation (Appendix E) preliminarily found that:

- there is no feasible or prudent avoidance alternatives to the use of CSP land,
- Alternative 2A results in the least overall harm of those alternatives affecting CSP, and
- Alternative 2A meets the criteria and conditions for use of the Final Nationwide Section 4(f) Evaluation and Approval for Federally-Aided Highway Projects with Net Benefit to a Section 4(f) Resource.

DNR has preliminarily concurred with these findings.

Visual Effects. Visual effects to the CSP, as further described in Section 5.2.13.2.2, Alternative 2A would result in an exposed rock cut face areas (79,900 square yards). This translates into a moderate level of visual impact compared to the other advanced alternatives. The 79,900 square yards is 61% less than the greatest impact (Alternative 2B) and 58% greater than the lowest impact (Alternative 2C). See Table 7.

Visual effects to the CSP, would be minimized at the MP 109 material location by including a topographic buffer, approximately 100 feet wide, between the material extraction area and the highway to help maintain the existing natural view along the Chugach Mountains. See Figure 22. The buffer would obscure the view of the extraction area from the highway except for select vantage points.

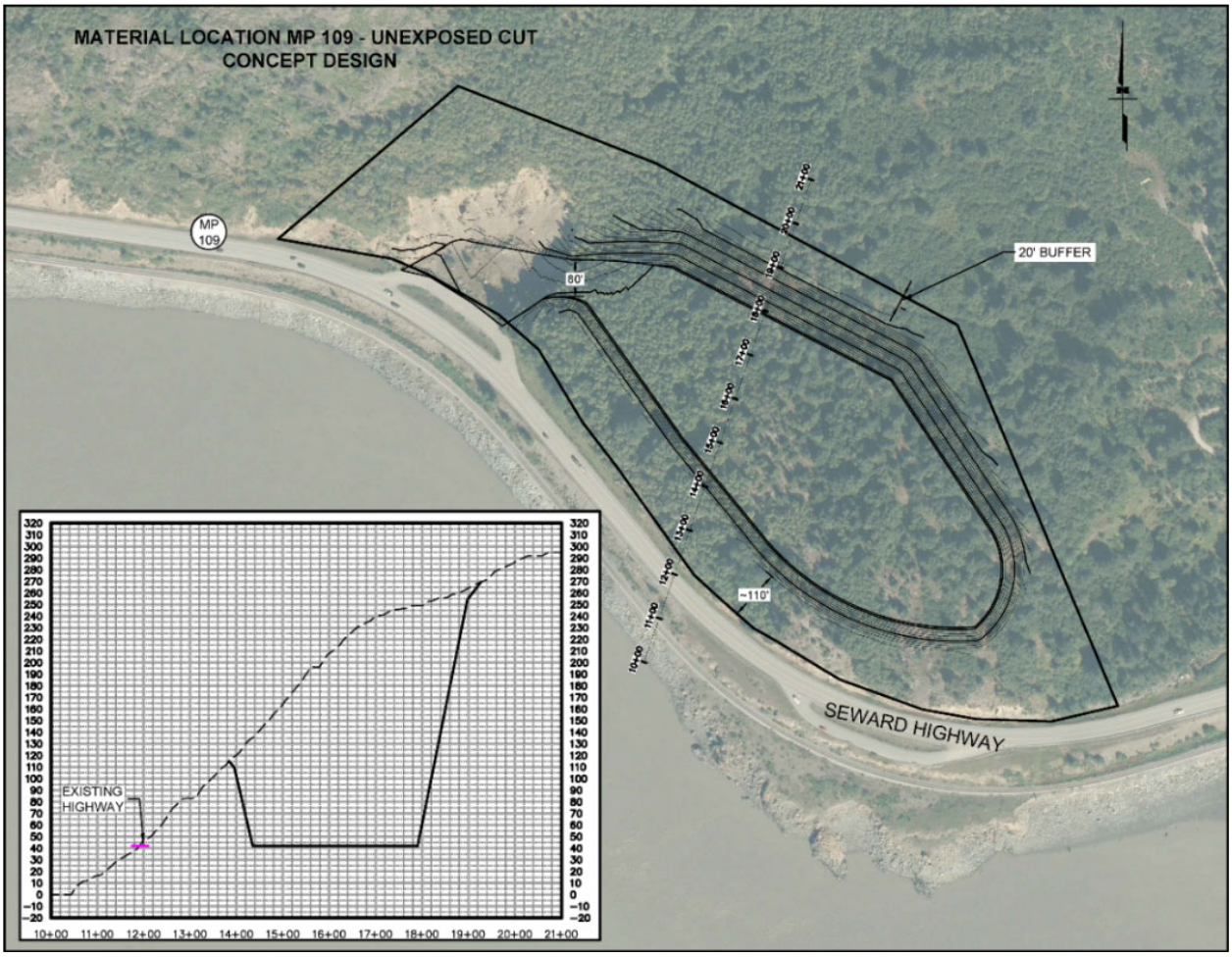


Figure 22: MP 109 Material Location Plan View and Cross-Section

Alaska Railroad

DOT&PF has determined that the 36.6-mile segment from Portage to Potter is eligible for the NRHP, under Criterion A. DOT&PF has found that the proposed project would have No Adverse Effect on historic properties. SHPO concurred with DOT&PF's findings on February 6, 2015. The concurrence may be found in Appendix E. 23 The CFR 774.13(a)(3) Section 4(f) exception for use of historic transportation facilities applies to the realignment of the railroad as it would not adversely affect the historic qualities of this segment of the railroad that caused it to be eligible for the National Register.

5.2.11.2.3 Alternative 2B

Chugach State Park

ROW Effects. Alternative 2B would require the permanent acquisition of **26.3** acres of Section 4(f) CSP lands outside of existing highway and ARRC ROW. The 26.3 acres consists of intertidal mudflats. DOT&PF would relinquish 14.7 acres of ROW to CSP which would convert from transportation to recreational use as mitigation for the permanent acquisition of 26.3 acres. The 14.7 acres of replacement lands are of at least equal fair market value and equivalent recreational utility.

Turnagain Arm Effects. Alternative 2B realignment of the Seward Highway would impact 26.3 acres of intertidal mudflats within the CSP along Turnagain Arm. This impact is the same as Alternatives 2A and 2C and 11.4 acres greater than Alternative 3. DOT&PF would provide compensatory mitigation to offset the project's 26.3 acres of unavoidable permanent loss of waters of the U.S. (intertidal mudflats) under Section 404 of the Clean Water Act. Alternative 2B would propose the same mitigation plan as Alternative 2A. This mitigation would be by way of restoration and preservation of similar nearby habitat. On October 1, 2019, the USACE notified DOT&PF that they would accept such a mitigation plan.

Alternative 2B would provide an emergency response access ramp for water rescue operations as would Alternative 2A, 2C, and 3. See Figure 11.

Dall Sheep Effects. Alternative 2B impacts to Dall sheep habitat would be 2.4 acres. This impact is equal to Alternatives 2A and 2C and is the lowest impact of all build and advanced alternatives. There is a strong public and agency sentiment to minimize impacts to the iconic Dall sheep habitat in this area. Overall, Alternative 2B would not improve conditions for sheep provided by the mountainside park facilities proposed with Alternative 2A. The mountainside park facilities were uniquely developed to mitigate the extraction of material from within the 35.4 acres of the CSP proposed with Alternative 2A.

Parking Area. Alternative 2B (along with Alternatives 2C and 3) would provide a new off-shoulder paved parking area approximately 38 feet deep by 325 feet long instead of the larger new mountainside park facility proposed with Alternative 2A. See Figure 15. This would not be consistent with the goals of the 2016 CSP Management Plan and the draft CAP recommendations for expanded parking with a buffer from the highway at this location. Though it would not expand the existing available parking capacity, provide a buffer, or be as extensive as the new mountainside park facility proposed with Alternative 2A, it would result in a safer location for pedestrians to view wildlife and access recreational areas.

Trail Effects. Alternative 2B would require an 850-foot extension of the Turnagain Arm Trail to connect to the new mountainside parking area.

Rock Climbing Route Effects. Alternative 2B would impact or eliminate 56 climbing routes between MP 104 to MP 113 to extract material needed to construct the project from rock cuts within the existing ROW. This is the highest impact among the advanced alternatives impacting 5 to 10 times the number of climbing routes.

Visual Effects. Alternative 2B rock blasting of cliff walls for material extraction would result in visual changes on the inland side of highway from MP 104 to MP 113. As further described in Section 5.2.13.2.2, Alternative 2B would result in the greatest exposed rock cut face areas (205,400 square yards) of all Alternatives. This area is 516% greater than Alternative 2C, 157% greater than Alternative 2A and 58% greater than Alternative 3. See Table 7. Tables 5 and 6 describe a fuller range of visual effect dimensions in detail. For Alternative 2B the visual effects in the highway ROW would not be amendable to screening with existing topography as proposed with Alternative 2A material location at MP 109.

Alaska Railroad

DOT&PF has determined that the 36.6-mile segment from Portage to Potter is eligible for the NRHP, under Criterion A. DOT&PF has found that Alternative 2A would have No Adverse Effect on historic properties. SHPO concurred with DOT&PF's findings on February 6, 2015. The

concurrence may be found in Appendix E. 23 CFR 774.13(a)(3) Section 4(f) exception for use of historic transportation facilities applies to the realignment of the railroad as it would not adversely affect the historic qualities of this segment of the railroad that caused it to be eligible for the National Register.

5.2.11.2.4 Alternative 2C

Chugach State Park

ROW Effects. Alternative 2C would require the permanent acquisition of **26.3** acres of Section 4(f) CSP lands outside of existing highway and ARRC ROW. The 26.3 acres consists of intertidal mudflats. DOT&PF would relinquish 14.7 acres of ROW to CSP which would convert from transportation to recreational use as mitigation for the permanent acquisition of 26.3 acres. The 14.7 acres of replacement lands are of at least equal fair market value and equivalent recreational utility.

Turnagain Arm Effects. Alternative 2C realignment of the Seward Highway would impact 26.3 acres of intertidal mudflats within the CSP along Turnagain Arm. This impact is the same as Alternatives 2A and 2B and 11.4 acres greater than Alternative 3. DOT&PF would provide compensatory mitigation to offset the project's 26.3 acres of unavoidable permanent loss of waters of the U.S. (intertidal mudflats) under Section 404 of the Clean Water Act. Alternative 2C would propose the same mitigation plan as Alternative 2A. This mitigation would be by way of restoration and preservation of similar nearby habitat. On October 1, 2019, the USACE notified DOT&PF that they would accept such a mitigation plan.

Alternative 2C would provide an emergency response access ramp for water rescue operations as would Alternative 2A, 2B, and 3. See Figure 11.

Dall Sheep Effects. Impact to the Dall sheep habitat would be 2.4 acres. This impact is equal to Alternatives 2A and 2B and is the lowest impact of all build and advanced alternatives. There is a strong public and agency sentiment to minimize impacts to the iconic Dall sheep habitat in this area. Alternative 2C would not include the improved conditions for sheep provided by the mountainside park facilities proposed with Alternative 2A. The mountainside park facilities were uniquely developed to mitigate the extraction of material from within the 35.4 acres of the CSP proposed with Alternative 2A.

Parking Area. Alternative 2C (along with Alternatives 2B and 3) would provide a new off-shoulder paved parking area approximately 38 feet deep by 325 feet long instead of the larger new mountainside park facility proposed with Alternative 2A. See Figure 16. This would not be consistent with the goals of the 2016 CSP Management Plan and the draft CAP recommendations for expanded parking with a buffer from the highway at this location. Though it would not expand the existing available parking capacity, provide a buffer, or be as extensive as the new mountainside park facility proposed with Alternative 2A, it would result in a safer location for pedestrians to view wildlife and access recreational areas.

Trail Effects. Alternative 2C would require an 850-foot extension of the Turnagain Arm Trail to connect to the new mountainside parking area.

Rock Climbing Route Effects. Alternative 2B would eliminate 56 climbing routes between MP 104 to MP 113 to extract material needed to construct the project from rock cuts within the existing ROW. This is the highest impact among the advanced alternatives impacting 5 to 10 times the number of climbing routes.

Visual Effects. Visual effects to the CSP, as further described in Section 5.2.13.2.2. Alternative 2C would result in the least exposed rock cut face areas (33,300 square yards) of the advanced alternatives. This area is 58% less than Alternative 2A, 517% less than Alternative 2B and 290% less than Alternative 3. See Table 7. Tables 5 and 6 describe a fuller range of visual effect dimensions in detail.

Alaska Railroad

DOT&PF has determined that the 36.6-mile segment from Portage to Potter is eligible for the NRHP, under Criterion A. DOT&PF has found that Alternative 2A would have No Adverse Effect on historic properties. SHPO concurred with DOT&PF's findings on February 6, 2015. The concurrence may be found in Appendix E. 23 CFR 774.13(a)(3) Section 4(f) exception for use of historic transportation facilities applies to the realignment of the railroad as it would not adversely affect the historic qualities of this segment of the railroad that caused it to be eligible for the National Register.

5.2.11.2.5 Alternative 3

Chugach State Park

ROW Effects. Alternative 3 would require the permanent acquisition of **19.5 acres** of Section 4(f) CSP lands outside of existing highway and ARRC ROW. The Section 4(f) CSP lands consists of 14.9 acres of intertidal mudflats and 4.6 acres of undisturbed uplands. DOT&PF would relinquish 11.0 acres of ROW to CSP, which would convert from transportation to recreational use as mitigation for the permanent acquisition of 19.5 acres. The 11.0 acres of replacement lands are of at least equal fair market value and equivalent recreational utility.

Turnagain Arm Effects. Alternative 3 reduces environmental impacts as a result of fill placed in Turnagain Arm. The realignment of the railroad into Turnagain Arm would reduce from 435 feet from existing highway centerline with Alternative 2A to 340-feet with Alternative 3. The realigned Seward Highway would impact 14.9 acres of these intertidal mudflats within the CSP along Turnagain Arm. This impact is 11.4 less than Alternatives 2A, 2B, and 2C.

DOT&PF would provide compensatory mitigation to offset the project's 14.9 acres of unavoidable permanent loss of waters of the U.S. (intertidal mudflats). Alternative 3 would propose the same mitigation plan as Alternative 2A but would mitigate a lower acreage (14.9) of wetland loss. This mitigation would be by way of restoration and preservation of similar nearby habitat. DOT&PF has submitted a USACE Section 10/404 permit application with the mitigation plan for Alternative 2A. On October 1, 2019, the USACE notified DOT&PF that they would accept the mitigation plan included with the application. The same mitigation plan for a lower acreage of impact and mitigation would be anticipated to be approved by the USACE for Alternative 3.

Alternative 3 would provide an emergency response access ramp for water rescue operations as would Alternatives 2A, 2B, and 2C. See Figure 11.

Dall Sheep Effects. Impact to the Dall sheep habitat would be 7.4 acres. The 7.4 acres is approximately 3 times greater than the other advanced alternatives and is the highest impact of the advanced alternatives. There is a strong public and agency sentiment to minimize impacts to the iconic Dall sheep habitat in this area. Alternative 3 impacts would compromise a substantial portion of or eliminate the mineral lick area that is completely avoided in Alternatives 2A, 2B, and 2C. Alternative 3 would not include the improved conditions for sheep provided by the mountainside park facilities proposed with Alternative 2A. The mountainside park facilities were uniquely developed to mitigate the extraction of material from within the 35.4 acres of the CSP proposed with Alternative 2A.

Parking Area. Alternative 3 (along with Alternatives 2B and 2C) would provide a new off-shoulder paved parking area approximately 38 feet deep by 325 feet long instead of the larger new mountainside park facility proposed with Alternative 2A. See Figure 17. This would not be consistent with the goals of the 2016 CSP Management Plan and the draft CAP recommendations for expanded parking with a buffer from the highway at this location. Though it would not expand the existing available parking capacity, provide a buffer, or be as extensive as the new mountainside park facility proposed with Alternative 2A, it would result in a safer location for pedestrians to view wildlife and access recreational areas.

Trail Effects. Alternative 3 would require the realignment of 210 feet and a 750-foot extension of the Turnagain Arm Trail which would be impacted by the new alignment that is shifted inland into the Windy Corner hillside.

Rock Climbing Route Effects. Alternative 3 would eliminate 13 climbing routes at the Goat's Head Soup climbing area near Windy Corner to extract material needed to construct the project. This is compared to 5 routes impacted by Alternatives 2A and 2C and 56 routes impacted by Alternative 2B.

Visual Effects. Alternative 3 would shift the highway alignment into the Windy Corner rock cliff. The visibility of the rock cut at Windy Corner was raised as one of the most concerning impacts during public meetings for this project. The visual effects to the CSP of Alternative 3, as further described in Section 5.2.13.2.2, would result in the second highest exposed rock cut face areas (130,000 square yards) of the advanced alternatives. The 130,000 square yards is 37% less than the greatest impact (Alternative 2B) and 290% greater than the lowest impact (Alternative 2C). See Table 7.

Alaska Railroad

DOT&PF has determined that the 36.6-mile segment from Portage to Potter is eligible for the NRHP, under Criterion A. DOT&PF has found that Alternative 2A would have No Adverse Effect on historic properties. SHPO concurred with DOT&PF's findings on February 6, 2015. The concurrence may be found in Appendix E. 23 CFR 774.13(a)(3) Section 4(f) exception for use of historic transportation facilities applies to the realignment of the railroad as it would not adversely affect the historic qualities of this segment of the railroad that caused it to be eligible for the National Register.

5.2.12 *Section 6(f)*

5.2.12.1 Affected Environment

Section 6(f) of the Land and Water Conservation Act (LWCF) requires the conversion of lands or facilities that have previously been acquired or improved with LWCF be coordinated with the Department of Interior (DOI). The DOI database identifies CSP as a Section 6(f) resource, having received LWCF grant funding for improvements within the park. See Figure 23. National Park Service (NPS) is the lead agency for Section 6(f) processes and approvals for CSP (DNR 2017b).

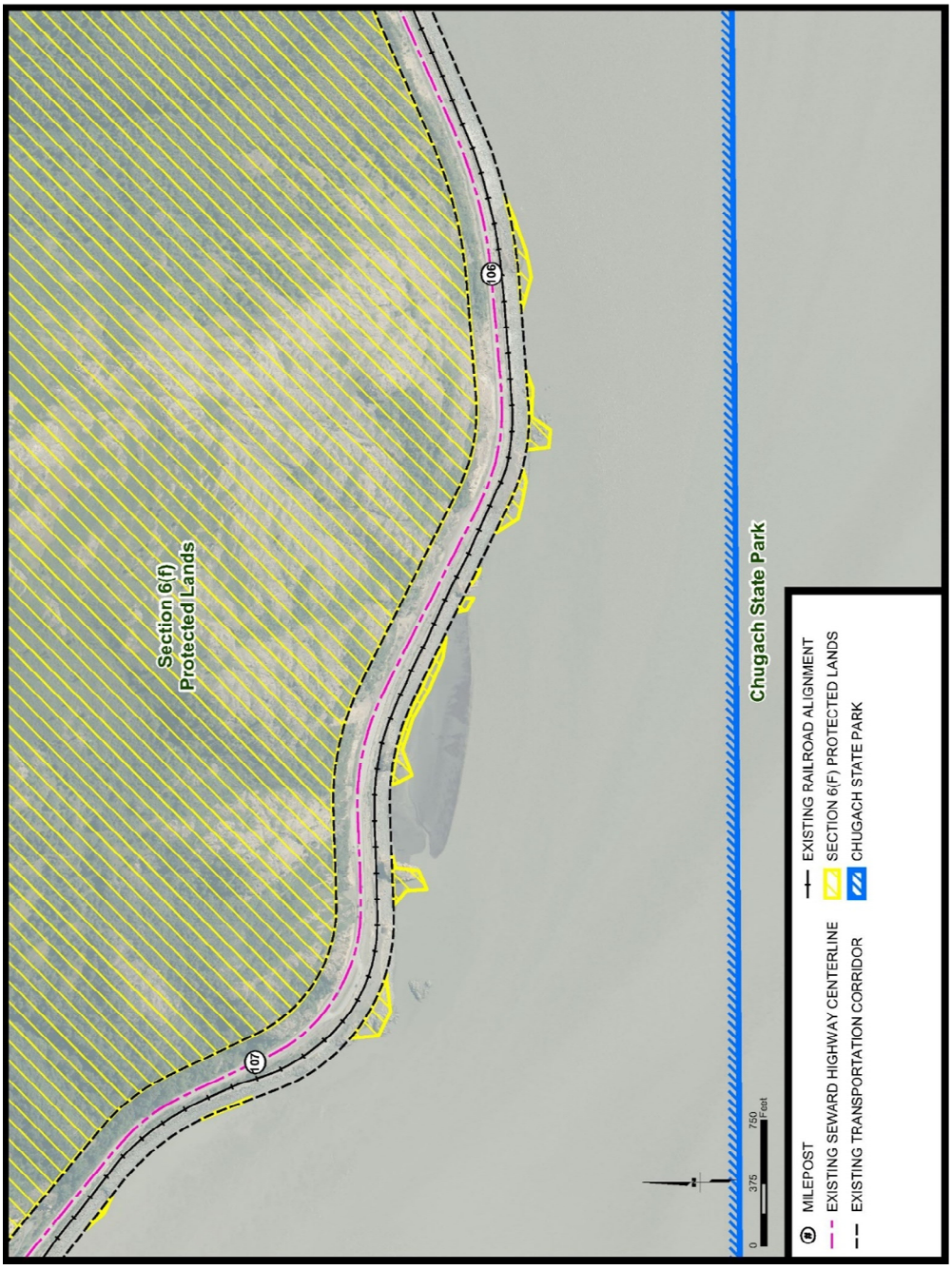


Figure 23: Section 6(f) Lands Near Windy Corner

5.2.12.2 Environmental Consequences

5.2.12.2.1 No Action

The No Action alternative would not impact Section 6(f) resources.

5.2.12.2.2 Alternative 2A

Alternative 2A would require:

- Temporary use and removal of Section 6(f) protection from the **35.4** acres of Section 6(f)-protected CSP lands. These lands near MP 109 and MP104 would temporarily be used to extract material from the proposed material locations only for the project and then reclaimed. See Figure 12. The 35.4 acres would remain under ownership by DNR for future park uses and would remain protected by Section 4(f).
- Permanent acquisition and conversion of **26.3** acres from parkland to transportation use would occur, of which 4.16 acres of CSP lands that are located on the waterside of the highway are protected under Section 6(f).

As mitigation for the removal of Section 6(f) protection from 39.56 acres of CSP lands, (35.4 acres for Material Location 109 and 104 plus 4.16 acres of remnant lands on the waterside of the highway), DOT&PF would relinquish 14.7 acres of ROW to CSP which would convert from transportation to recreational use. The 14.7 acres of replacement lands are of at least equal fair market value and equivalent recreational utility. See Figure 24.

NPS approved a Finding of No Significant Impact (FONSI) on May 30, 2019. The FONSI states that, “NPS approves the AKDNR’s request to convert LWCF requirements from 39.56 acres of Chugach State Park to 14.7 acres that would be added to Chugach State Park.” As noted in the FONSI, the NPS approval review includes “assessing equivalency between the area proposed for removal from LWCF-related public outdoor recreation use restrictions and the proposed replacement properties as further described in 36 CFR 59.3.” NPS approval in the FONSI confirms that DOT&PF’s proposed replacement parcel (14.7 acres) provides at least equal fair market value and equivalent recreational utility for the LWCF protected parcels (39.56 acres) being 4.16 acres permanently acquired and the 35.4 acres being temporarily used for transportation purposes (See Appendix F).

5.2.12.2.3 Alternative 2B

Alternative 2B would require permanent acquisition and conversion of **26.3** acres from parkland to transportation use would occur, of which 4.16 acres of CSP lands that are located on the waterside of the highway are protected under Section 6(f).

Since material needs would be generated from rock cuts within the existing ROW between MP 104 and 113, Alternative 2B (unlike Alternative 2A) would not require temporary use of Section 6(f) property or permanent removal of Section 6(f) protection from 35.4 acres of CSP at the MP 109 and MP 104 material extraction locations.

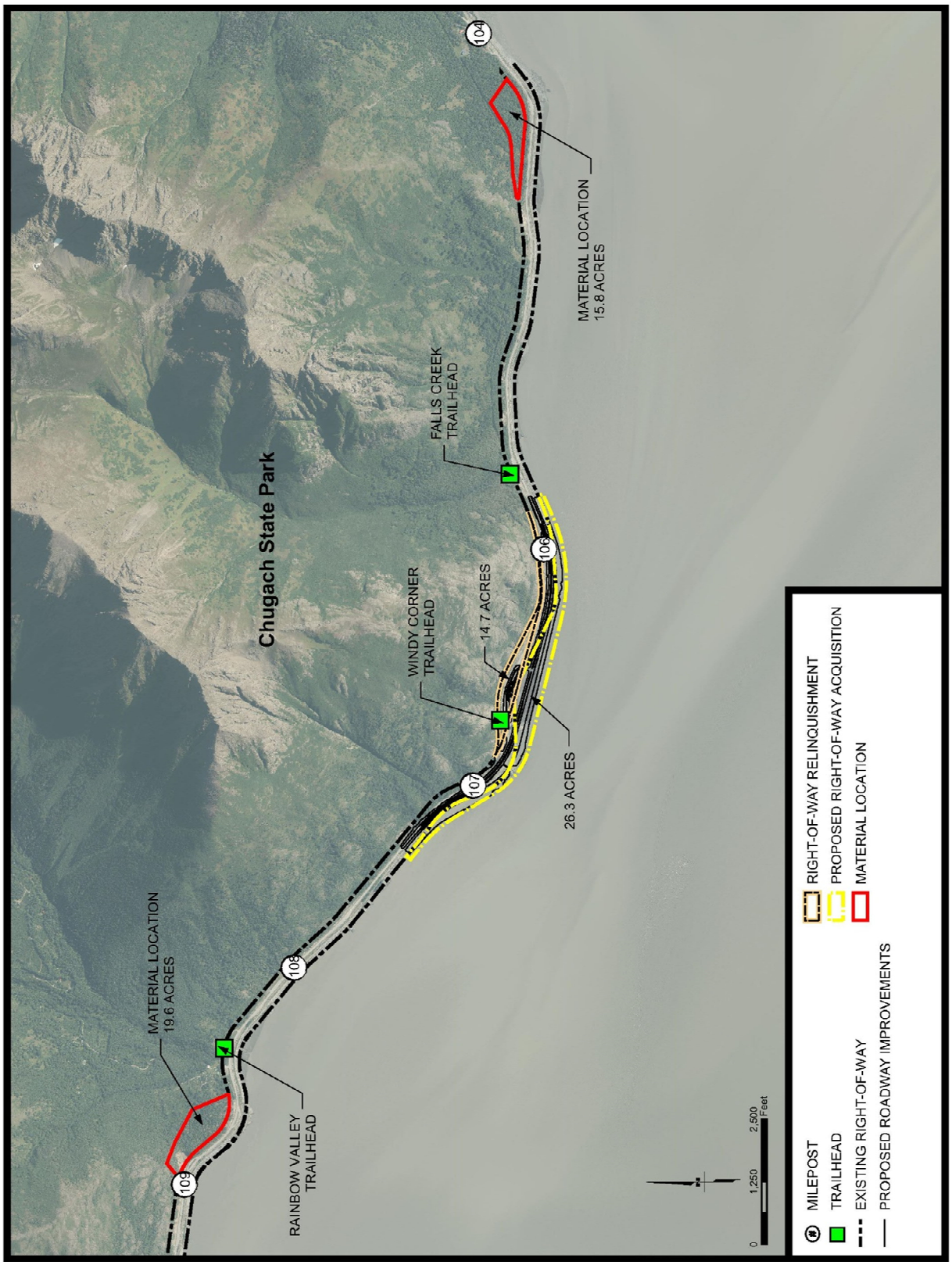


Figure 24: Alternative 2A -
ROW or Easement - Acquisition and Relinquishment

As mitigation for the permanent removal of Section 6(f) protection from 4.16 of CSP lands, DOT&PF would relinquish 14.7 acres of ROW to CSP which would convert from transportation to recreational use. The 14.7 acres of replacement lands would be of at least equal fair market value and equivalent recreational utility. No other improvements on the 14.7 acres would be proposed with this project.

5.2.12.2.4 Alternative 2C

Alternative 2C would require permanent acquisition and conversion of **26.3** acres from parkland to transportation use would occur, of which 4.16 acres of CSP lands that are located on the waterside of the highway are protected under Section 6(f).

Since material need would be generated from off-site locations, Alternative 2C (unlike Alternatives 2A) would not require temporary use of Section 6(f) property or removal of Section 6(f) protection at the MP 109 and MP 104 material extraction locations.

As mitigation for the permanent removal of Section 6(f) protection from 4.16 of CSP lands, DOT&PF would relinquish 14.7 acres of ROW to CSP which would convert from transportation to recreational use. The 14.7 acres of replacement lands would be of at least equal fair market value and equivalent recreational utility. No other improvements on the 14.7 acres would be proposed with this project.

5.2.12.2.5 Alternative 3

Alternative 3 would shift inland cutting into the rock face at Windy Corner but would still extend outside of the existing DOT&PF and ARRC ROW into DNR lands within Turnagain Arm. See Figure 17. The realignment of the highway would still require the ARRC tracks and any collocated utilities to be realigned. Extension into the Turnagain Arm would be to a lesser degree than Alternatives 2A, 2B, and 2C.

Alternative 3 would require the permanent acquisition and removal from 6(f) protection of 8.5 acres of CSP lands protected under Section 6(f) to construct the proposed project. In comparison to Alternatives 2A, Alternative 3 would increase permanent use of Section 6(f) lands (CSP) from 4.16 acres to 8.5 acres. Since material needs would be generated from the inland rock cut at Windy Corner, Alternative 3 (unlike Alternative 2A) would not require temporary use of Section 6(f) property or removal of Section 6(f) protection at material extraction locations near MP 104 and MP 109.

As mitigation for the permanent removal of Section 6(f) protection from 8.5 of CSP lands, DOT&PF would relinquish 11 acres of ROW to CSP which would convert from transportation to recreational use. The 11 acres of replacement lands would be of at least equal fair market value and equivalent recreational utility. No other improvements on the 11 acres would be proposed with this project.

5.2.13 Visual Effects and Aesthetics

5.2.13.1 Affected Environment

The Seward Highway is recognized for its scenic and natural beauty. It supports breathtaking views of Turnagain Arm, and the Kenai and Chugach Mountains. Motorists traveling the Seward Highway stop at Windy Corner for its unique opportunity to view wildlife and bore tides. This

scenery is part of the reason the Seward Highway is designated as an Alaska Scenic Byway, a U.S. Department of Agriculture Forest Service Scenic Byway, and an All-American Road. Landscape features that can be seen from the highway include natural Chugach Mountain slopes, Turnagain Arm, and the Kenai Mountains across the inlet, and rock faces excavated and blasted during prior highway construction, most of which have 'naturalized' with weathering and vegetation over the years. Examples of the naturalized rock faces may be found in Photographs 11 and 12.

Photograph 11: Seward Highway MP 113 - Former Construction Rock Cut Face

Visual impacts related to highway projects typically occur within the highway's existing view shed. Anticipated impacts are determined by selecting locations to describe the changes to the view because of an alternative. Selected locations include the material excavation areas at MP 109 and MP 104, the Windy Corner vehicle turnout, and the Windy Corner Trailhead.

5.2.13.2 Environmental Consequences

5.2.13.2.1 No Action

The No Action alternative would have no visual impacts. Motorists would still have opportunities to view nature, wildlife, and bore tide. Conflicts would continue between motorists traveling through the project area and those slowing and stopping along the highway to view scenery or wildlife.

Photograph 12: Seward Highway MP 111 - Former Construction Rock Cut Face

5.2.13.2.2Alternative 2A

Visual changes would occur in the vicinity of the project area and as well as near the MP 109 and MP 104 material locations.

- Project Vicinity. Alternative 2A would impact the sinuosity of the Turnagain Arm shoreline, and view of Gorilla Rock. The highway and railroad would be more visible from the southern extent of the Turnagain Arm Trail, as they are realigned further from shore and away from the base of the hill slopes. Gorilla Rock would be removed as part of Alternative 2A, changing some views from the highway and CSP.

  Alternative 2A would result in an exposed rock cut face areas (79,900 square yards). This translates into a moderate level of visual impact compared to the other advanced alternatives. The 79,900 square yards is 61% less than the greatest impact (Alternative 2B) and 58% greater than the lowest impact (Alternative 2C). Additional visual effect dimensions are summarized in Tables 5, 6, and 7.

- MP 109 Material Location. Material extraction at MP 109 would cover an area of approximately 19.6 acres Disturbed areas at Milepost 109 would be visible to northbound travelers for approximately 0.25 miles (approximately 15 seconds), to southbound travelers for 0.5 miles (approximately 30 seconds) as shown in Figure 25, and to observers from across Turnagain Arm. Turnagain Arm Trail users may occasionally be able to view the extraction area at MP 109 from some off-trail viewpoints.

  Visual effects to the CSP, would be minimized at the MP 109 material location by including a topographic buffer, approximately 100 feet wide, between the material extraction area and the highway to help maintain the existing natural view along the Chugach Mountains. The buffer would obscure the view of the extraction area from the

highway except for select vantage points. To minimize the potential effects, a topographic buffer would be maintained so that only an approximately 300-foot wide portion of the rock face would be directly visible from the highway at the access driveway.

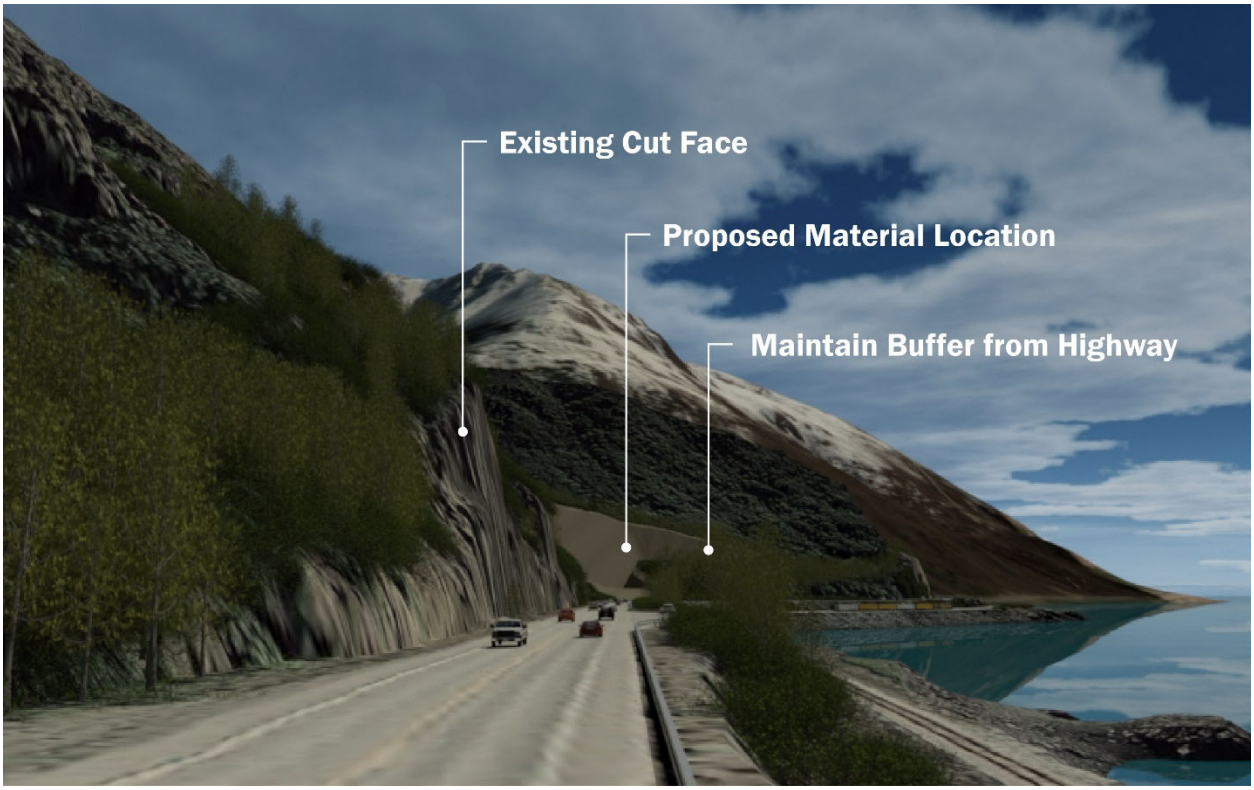


Figure 25: Visual Simulation of Proposed MP 109 Material Location - Traveling Southbound

- MP 104 Material Location. Material extraction at MP 104 would only occur if the Construction Contractor demonstrates that materials at MP 109 are insufficient in quantity or quality of materials for the proposed project. Extraction at MP 104 would potentially impact 15.8 acres of undeveloped land. Due to the geometry of the proposed MP 104 location, a topographic screen would not be possible at this location.

  Material extraction at Milepost 104 would be visible to northbound travelers for approximately 0.9 miles (approximately 42 seconds) and to southbound travelers for approximately 0.7 miles (approximately 54 seconds). See Figure 26.

- Mitigation. The proposed project would provide motorists with improved mountainside park facilities for viewing nature, wildlife, and bore tides in the project area.

5.2.13.2.3 Alternative 2B

Alternative 2B would result in the same visual changes near Windy Corner as described for Alternative 2A. In addition, Alternative 2B rock blasting of cliff walls for material extraction would result in visual changes on the northbound side of highway from MP 104 to MP 113. Overall, Alternative 2B would result in the greatest exposed rock cut face areas (205,400 square yards)

Figure 26: Visual Simulation of Proposed MP 104 Material Location

of all the alternatives. This area is 516% greater than Alternative 2C, 157% greater than Alternative 2A and 58% greater than Alternative 3, and. See Table 7.
Alternative 2B would not have the visual impacts associated with the MP 109 and MP 104 material locations, yet overall the surface area of exposed rock cut by mining along the highway within the ROW would be substantially greater than with Alternative 2A.

5.2.13.2.4 Alternative 2C

Alternative 2C would result in the same visual changes near Windy Corner as described for Alternative 2A. Overall, Alternative 2C would result in the lowest exposed rock cut face area (33,300 square yards) of all the advanced alternatives. This area is 140% less than Alternative 2A because Alternative 2C would eliminate material extraction and the visual impacts associated with the MP 109 and MP 104 material locations. This area is 516% less than Alternative 2B because Alternative 2C would eliminate material extraction and the visual impacts associated rock blasting of cliff walls on the northbound side of highway from MP 104 to MP 113. The visual impacts Alternative 2C would be 290% less than Alternative 3. See Table 7.

Material extraction would occur off the project site for Alternative 2C. The off-site locations are expected to be under private ownership and likely in previously disturbed extraction locations. The contractor would obtain any necessary environmental permits and approvals.

5.2.13.2.5 Alternative 3

Alternative 3 would shift the highway alignment into the Windy Corner rock cliff increasing the visual impact there. The visibility of the rock cut at Windy Corner was raised as one of the most concerning impacts during public meetings for this project. Overall, Alternative 3 would result in the second highest exposed rock cut face area (130,000 square yards) of the advanced alternatives. See Table 7. The 130,000 square yards is 37% less than the greatest impact (Alternative 2B) and 290% greater than the lowest impact (Alternative 2C).

Alternative 3 would avoid the material extraction and the visual impacts at MP 109 and MP 104 associated with Alternative 2A. It would also avoid the extensive rock cuts within the ROW associated with Alternative 2B. However, visual effects related to Alternative 3 alignment at Windy Corner would be greater than with Alternatives 2A and 2C.

5.2.14 Irreversible and Irretrievable Commitment of Resources

5.2.14.1 Affected Environment

NEPA requires a review of irreversible and irretrievable commitments of resources from the development of the advanced alternatives. Irretrievable effects apply to losses of production, use, or commitment of renewable natural resources. Irreversible effects apply primarily to the use of nonrenewable resources, such as minerals or cultural resources, or to those factors only renewable over long periods of time, such as soil productivity. Irreversible effects also include the loss of future options.

5.2.14.2 Environmental Consequences

5.2.14.2.1 No Action

The No Action alternative would not change the existing commitment of natural resources.

5.2.14.2.2 Alternative 2A

Alternative 2A would involve disturbance of up to **104.7** total acres and require the commitment of natural resources to construct the Seward Highway MP 105 to MP 107 and ARRC rail alignments. Disturbance consists of:

- 43.0 acres of developed and disturbed lands to construct the highway and ARRC track;
- 26.3 acres of intertidal mudflats to construct the highway and ARRC track; and
- 35.4 acres of undeveloped, vegetated habitat for material extraction at MP 109 and, if necessary, MP 104.

The total quantities of materials needed for construction Alternative 2A is 2 million cubic yards.

Alternative 2A would require the conversion of CSP lands from recreational use to transportation use, as discussed in Sections 5.2.11.2.2 and 5.2.12.2.2.

The material extraction at MP 109 would require expansion of an area previously used as a material source. This site is anticipated to produce both the quality and quantities of material necessary to construct the proposed improvements. Material extraction from near MP 109 would impact up to 19.6 acres. If material extraction at MP 109 proves insufficient, DOT&PF proposes to extract material from MP 104. This would impact an additional 15.8 acres. The material extraction areas would remain CSP land, and upon closure and reclamation could be redeveloped for park use.

5.2.14.2.3 Alternative 2B

Alternative 2B would involve disturbance of up to **112.3** total acres and require the commitment of natural resources to construct the Seward Highway MP 105 to MP 107 and ARRC rail alignments. Disturbance consists of:

- 43.0 plus acres of developed and disturbed lands to construct the highway and ARRC track;
- 26.3 acres of intertidal mudflats to construct the highway and ARRC track; and
- 43.0 acres of exposed rock cliffs within the ROW from which material would be extracted.

The total quantities of materials needed for construction Alternative 2B is approximately 2 million cubic yards.

The proposed project would require the conversion of CSP lands from recreational use to transportation use, as discussed in Sections 5.2.11.2.3 and 5.2.12.2.3.

5.2.14.2.4 Alternative 2C

Alternative 2C would involve disturbance of up to **69.3** total acres and require the commitment of natural resources to construct the Seward Highway MP 105 to MP 107 and ARRC rail alignments. Disturbance consists of:

- 43.0 acres of developed and disturbed lands to construct the highway and ARRC track;
- 26.3 acres of intertidal mudflats to construct the highway and ARRC track; and

The total quantities of materials needed for construction Alternative 2C is 2 million cubic yards.

The proposed project would require the conversion of CSP lands from recreational use to transportation use, as discussed in Sections 5.2.11.2.4 and 5.2.12.2.4.

5.2.14.2.5 Alternative 3

Alternative 3 would involve disturbance of up to **51.4** total acres and require the commitment of natural resources to construct the Seward Highway MP 105 to MP 107 and ARRC rail alignments. Disturbance consists of:

- 31.9 acres of developed and disturbed lands to construct the highway and ARRC track;
- 14.9 acres of intertidal mudflats to construct the highway and ARRC track; and
- 4.6 acres of undisturbed uplands

The total quantities of materials needed for construction Alternative 3 is approximately 1.5 million cubic yards.

The proposed project would require the conversion of CSP lands from recreational use to transportation use, as discussed in Sections 5.2.11.2.5 and 5.2.12.2.5.

6.0 CONSTRUCTION IMPACTS

6.1 Affected Environment

The project area is situated on the southern terrestrial boundary of CSP, between MP 105 and MP 107. This area is characterized by the steep slopes of the Chugach Mountains to the north and east of the Seward Highway and the Alaska Railroad tracks and Turnagain Arm (Cook Inlet) on the south and west (Photograph 7).

Resources in the surrounding environment that may be impacted by construction activities include waters of the Turnagain Arm, three unnamed streams, Dall sheep, beluga whales, recreational trails, climbing routes, traffic flow, tourists, air quality, vegetation, and the small communities of Indian and Rainbow.

6.2 Environmental Consequences

6.2.1 No Action

The No Action alternative would have no construction-related impacts.

6.2.2 Alternative 2A

Water Quality. Alternative 2A would disturb up to approximately 104.7 acres of land. Temporary water degradation is anticipated from disturbance to uplands and to mudflats during construction. The water quality effects would be minimal given the high background turbidity and sediment loads in Turnagain Arm. Disturbance of Turnagain Arm waters would continue for approximately 4 months until riprap base is placed. To minimize water quality effects the contractor would implement BMPs in accordance with both an ESCP prepared by DOT&PF and a SWPPP to be developed by the contractor and approved by DOT&PF.

Stream Diversion. All advanced alternatives, would replace and improve the culverts for three unnamed streams. Stream diversions would occur during culvert replacements. Each waterway is expected to be diverted for approximately 2 to 3 days, depending upon the construction method and sequencing. There are no known resident or anadromous fish species in the waterways. To minimize effects to streams, stream diversion would be limited to the time required to replace the existing culverts with the new, larger culverts.

Air Quality. All advanced alternatives would have minimal impacts air quality. Dust emissions may increase during construction operations, particularly during dry months. Blasting and excavation of material are likely to generate fugitive dust. To minimize air quality effects, the contractor would implement BMPs in accordance with both an ESCP prepared by DOT&PF and a SWPPP to be developed by the contractor and approved by DOT&PF.

Vegetation and Invasive Species. Alternative 2A would disturb up to approximately 104.7 acres of ground. The contractor would prepare a SWPPP in accordance with the APDES CGP. The SWPPP would identify BMPs to minimize disturbance areas and stabilize disturbed areas as soon as practicable, reducing the risk of introducing or spreading invasive species. Hydroseed and mulch, clean fill material, native plants, and certified native seed mixes meeting DOT&PF's Standard Specifications would be used where appropriate.

Trails and Climbing Routes. With all advanced alternatives, access to the Turnagain Arm Trail and the Goat's Head Soup climbing areas would temporarily and intermittently be closed during construction for weeks at a time. Closures would be for the safety of the public and construction workers and would be publicized in order to minimize inconvenience for recreational users.

Traffic Disruption.
General Construction Traffic. With all advanced alternatives, traffic delays would occur throughout entire construction phase. A traffic control plan would be developed to address access, congestion, and construction scheduling.

Truck Transport. All of the advanced alternatives would have safety hazards and traffic disruption caused by material transport trucks and equipment entering and leaving the highway and sharing the highway with traffic along their transport route. Alternatives 2A has fewer potential truck-related traffic disruption since truck activity to and from the material extraction areas is confined to the project vicinity, from MP 104 to MP 109. Alternative 2A would result in the second least truck traffic operations of the advanced alternatives.

Blasting Operations. All of the advanced alternatives would have safety hazards and traffic disruption caused by blasting operations. Driver frustration will likely be associated with driver time spent in traffic lines during each blasting period. Each traffic control zone is anticipated to be approximately 3 miles long and would create traffic disruption from construction vehicles and activities that would directly impact traffic flow during blasting operations. All excess material would need to be cleared from the highway and railroad embankment before traffic flow is resumed. The more blasting locations close the roadway, the more traffic delays would occur. Alternative 2A is expected to have a moderate traffic disruption since blasting is limited to the project area and two material locations. There would be a buffer strip of land between the MP 109 extraction area and the highway that would reduce the traffic disruption at that location.

Other Transportation Modes. With Alternative 2A all material sources are within 1 to 2 miles from the project area. Train and barge options are not economical for material sources this close to the project area. As a result, analysis of transport modes (barge, train) is not needed with Alternative 2A.

Length of Construction Season*.* Alternatives 2A is anticipated to limit the project construction timeframe to two seasons. This minimizes the period of time traffic disruption would occur and traveler safety would be compromised due to construction activities.

Blasting Safety. All of the advanced alternatives would require blasting within the project area. Alternative 2A has the second highest potential for safety hazards related to blasting areas to provide material for construction of the project. Alternative 2A has two material extraction locations near the Seward Highway in the vicinity of the project were blasting would occur to provide material for construction.

Wildlife Disruption. The potential for wildlife disruption is related to the extent of the blasting areas as well as their proximity to the wildlife concentration areas; blasting is anticipated to have the most substantial impacts to wildlife of all the construction activities. All alternatives advanced would require blasting within the project area. Wildlife disruption is expected to be minor with Alternatives 2A. Alternative 2A proposes two material extraction blasting sites that are one to two miles from the valuable sheep habitat.

With implementation of the following mitigation measures, none of the alternatives advanced are expected to have an adverse effect on the federally endangered CIBW populations or on the Windy Corner Dall sheep populations. The contractor would use protected species observers to monitor for CIBW within 4,800 feet prior to blasting operations. If whales are detected within 4,800 feet, blasting would be paused until the whales exit the 4,800-foot radius clear zone. Blasting operations would not be allowed between May 10th and July 15th to protect Dall sheep during lambing. Observers would also be used to monitor for Dall sheep within 0.25 miles prior to blasting operations. If Dall sheep are detected within 0.25 miles, blasting would be paused until sheep are greater than 0.25 miles from blasting operations

Community Disruption. Construction and blasting activities at the proposed MP 109 and MP 104 material locations would be near the communities of Rainbow (located near MP 108.5) and Indian (located near MP 103), respectively. Construction activities, blasting in particular, are expected to increase local noise levels over the existing conditions. Blasting and material excavation are likely to be audible for some of the residences at Rainbow and possibly Indian. Blasting is expected to occur once or twice per day until sufficient material is generated. The contractor would follow the stipulations of the Municipality of Anchorage Noise permit.

Emergency and Recreation Access. All advanced alternatives would impact emergency response access and recreation access along the Seward Highway due to construction-related traffic congestion and delays. Alternative 2A would adversely impact emergency and recreation access along five miles of the Seward Highway between MP 104 and MP 109.

Construction Cost. Alternative 2A would have a relatively low construction cost of $90.6 million. This compares with $104.6 million (Alternative 2B), $129.7 million (Alternative 2C), and $92.1 million (Alternative 3).

6.2.3 Alternative 2B

Water Quality. Alternative 2B would disturb up to approximately 112.3 acres of land. Temporary water degradation is anticipated from disturbance to uplands and to mudflats during construction. The water quality effects would be minimal given the high background turbidity and sediment loads in Turnagain Arm. Disturbance of Turnagain Arm waters would continue for approximately 4 months until riprap base is placed. To minimize water quality effects the contractor would implement BMPs in accordance with both an ESCP prepared by DOT&PF and a SWPPP to be developed by the contractor and approved by DOT&PF.

Stream Diversion. All advanced alternatives, would replace and improve the culverts for three unnamed streams. Stream diversions would occur during culvert replacements. Each waterway is expected to be diverted for approximately 2 to 3 days, depending upon the construction method and sequencing. There are no known resident or anadromous fish species in the waterways. To minimize effects to streams, stream diversion would be limited to the time required to replace the existing culverts with the new, larger culverts.

Air Quality. All advanced alternatives would have minimal impacts air quality. Dust emissions may increase during construction operations, particularly during dry months. Blasting and excavation of the material locations are likely to generate fugitive dust. To minimize air quality effects, the contractor would implement BMPs in accordance with both an ESCP prepared by DOT&PF and a SWPPP to be developed by the contractor and approved by DOT&PF.

Vegetation and Invasive Species. Alternative 2B would disturb up to approximately 112.3 acres of ground. The contractor would prepare a SWPPP in accordance with the APDES CGP. The SWPPP would identify BMPs to minimize disturbance areas and stabilize disturbed areas as soon as practicable, reducing the risk of introducing or spreading invasive species. Hydroseed and mulch, clean fill material, native plants, and certified native seed mixes meeting DOT&PF's Standard Specifications would be used where appropriate.

Trails and Climbing Routes. With all advanced alternatives, access to the Turnagain Arm Trail and the Goat's Head Soup climbing areas would temporarily and intermittently be closed during construction for weeks at a time. Closures would be for the safety of the public and construction workers and would be publicized in order to minimize inconvenience for recreational users.

Traffic Disruption.
General Construction Traffic. With all advanced alternatives, traffic delays would occur throughout the entire construction phase. A traffic control plan would be developed to address access, congestion, and construction scheduling.

Truck Transport. All of the advanced alternatives would have safety hazards and traffic disruption caused by material transport trucks and equipment entering and leaving the highway and sharing the highway with traffic along their transport route. Alternative 2B expands the truck activity area to the seven material sites between MP 104 and MP 113. Alternative 2B would result in the second highest truck traffic operations of the advanced alternatives.

Blasting Operations. All of the advanced alternatives would have safety hazards and traffic disruption caused by blasting operations. Driver frustration will likely be associated with driver time spent in traffic lines during each blasting period. Each traffic control zone is anticipated to be approximately 3 miles long and would create traffic disruption from construction vehicles and activities that would directly impact traffic flow during blasting operations. All excess material would need to be cleared from the highway and railroad embankment before traffic flow is resumed. The more blasting locations close the roadway, the more traffic delays would occur. Alternative 2B is expected to have the greatest degree of traffic disruption related to blasting operations since blasting is proposed at the most number of sites (7) that are close to the highway. The blasting activities for Alternative 2B are anticipated to extend construction for an additional season.

Other Transportation Modes. With Alternative 2B all material sources are within 6 miles from the project area. Train and barge options are not economical for material sources this close to the project area. As a result, analysis of transport modes (barge, train) is not needed with Alternative 2B.

Length of Construction Season. Alternative 2B is anticipated to take three seasons to construct due to the additional blasting operations adjacent to the highway. This lengthens the period of compromised traveler safety and traffic disruption. This increases the period of time traffic disruption would occur and traveler safety would be compromised due to construction activities.

Wildlife Disruption. The potential for wildlife disruption is related to the extent of the blasting areas as well as their proximity to the wildlife concentration areas; blasting is anticipated to have the most substantial impacts to wildlife of all the construction activities. All alternatives advanced would require blasting within the project area. Alternative 2B would have greater potential for wildlife disruption due to the higher number of material extraction blasting sites along the

highway near CIBW habitat. Alternative 2B would cause the greatest potential impact to CIBW population in Turnagain Arm of all the alternatives advanced because the blasting activities along the Seward Highway would occur over nine miles (MP 104 to MP 113) of highway. Potential impacts to Dall Sheep habitat for Alternative 2B would be from blasting activities at seven sites between MP 104 and MP 113 in addition to blasting within the project area.

With implementation of the following mitigation measures none of the alternatives advanced are expected to have an adverse effect on the federally endangered CIBW populations or on the Windy Corner Dall sheep populations. The contractor would use protected species observers to monitor for CIBW within 4,800 feet prior to blasting operations. If whales are detected within 4,800 feet, blasting would be paused until the whales exit the 4,800-foot radius clear zone. Blasting operations would not be allowed between May 10th and July 15th to protect Dall sheep during lambing. Observers would also be used to monitor for Dall sheep within 0.25 miles prior to blasting operations. If Dall sheep are detected within 0.25 miles, blasting would be paused until sheep are greater than 0.25 miles from blasting operations.

Community Disruption. Construction and blasting activities at the seven proposed material sites along the highway between MP 104 and MP 113 material locations would occur near the McHugh Creek recreation area (located near MP 112) and the communities of Rainbow (located near MP 108.5) and Indian (located near MP 103). Construction activities, blasting in particular, are expected to increase local noise levels over the existing conditions. Alternative 2B blasting and material excavation are likely to be audible for some of the residences at Rainbow and possibly Indian. Alternative 2B includes two material sites near the Rainbow, one to the north in the same area as the MP 109 material location and one to the south that is not included in Alternative 2A. The blasting for both material sites near Rainbow are anticipated to generate approximately sixteen times less material than that anticipated for the MP 109 location in Alternative 2A; therefore, blasting and excavation of material near Rainbow would occur for a substantially shorter timeframe for Alternative 2B than Alternative 2A. The impacts of blasting on the community of Indian would be the same for Alternatives 2A and 2B. Blasting is expected to occur once or twice per day until sufficient material is generated. The contractor would follow the stipulations of the Municipality of Anchorage Noise permit.

Emergency and Recreation Access. All advanced alternatives would impact emergency response access and recreation access along the Seward Highway due to construction-related traffic congestion and delays. Alternative 2B would adversely impact emergency and recreation access along nine miles of the Seward Highway between MP 104 and MP 113.

Cost. Alternative 2B would have a moderate construction cost of $104.6 million. This compares with $90.6 million (Alternative 2A), $92.1 million (Alternative 3), and $129.7 million (Alternative 2C).

6.2.4 Alternative 2C

Water Quality. Alternative 2C would disturb up to approximately 69.3 acres of land. Temporary water degradation is anticipated from disturbance to uplands and to mudflats during construction. The water quality effects would be minimal given the high background turbidity and sediment loads in Turnagain Arm. Turnagain Arm disturbance would continue for approximately 4 months until riprap base is placed. To minimize water quality effects the contractor would implement BMPs in accordance with both an ESCP and a SWPPP, to be developed and approved by DOT&PF

Stream Diversion. All advanced alternatives, would replace and improve the culverts for the three unnamed streams. Stream diversions would occur during culvert replacements. Each waterway is expected to be diverted for approximately 2 to 3 days, depending upon the construction method and sequencing. There are no known resident or anadromous fish species in the waterways. To minimize effects to streams, stream diversion would be limited to the time required to replace the existing culverts with the new, larger culverts.

Air Quality. All advanced alternatives would have minimal impacts air quality. Dust emissions may increase during construction operations, particularly during dry months. Blasting and excavation of the material locations are likely to generate fugitive dust. To minimize air quality effects, the contractor would implement BMPs in accordance with both an ESCP and a SWPPP, to be developed and approved by DOT&PF.

.

Vegetation and Invasive Species. Alternative 2C would disturb up to approximately 69.3 acres of ground. The contractor would prepare a SWPPP in accordance with obtaining an APDES CGP. The SWPPP would identify BMPs to minimize disturbance areas, and stabilize disturbed areas as soon as practicable, reducing the risk of introducing or spreading invasive species. Hydroseed and mulch, clean fill material, native plants, and certified native seed mixes meeting DOT&PF's Standard Specifications would be used where appropriate.

Trails and Climbing Routes. With all advanced alternatives, access to the Turnagain Arm Trail and the Goat's Head Soup climbing areas would temporarily and intermittently be closed during construction for weeks at a time. Closures would be for the safety of the public and construction workers and would be publicized in order to minimize inconvenience for recreational users.

Traffic Disruption.

General Construction Traffic. With all advanced alternatives, traffic delays would occur during the entire construction phase. A traffic control plan would be developed to address access, congestion, and construction scheduling.

Blasting Operations. All of the advanced alternatives would have safety hazards and traffic disruption caused by blasting operations. Driver frustration will likely be associated with driver time spent in traffic lines during each blasting period. Each traffic control zone is anticipated to be approximately 3 miles long and would create traffic disruption from construction vehicles and activities that would directly impact traffic flow during blasting operations. All excess material would need to be cleared from the highway and railroad embankment before traffic flow is resumed. The more blasting locations close the roadway, the more traffic delays would occur. Alternative 2C is expected to have the least traffic disruption related to blasting activities as blasting is limited to the 2-mile project area between MP 105 and MP 107.

Truck Transport. All of the advanced alternatives would have safety hazards and traffic disruption caused by material transport trucks and equipment entering and leaving the highway and sharing the highway with traffic along their transport route. Alternative 2C expands the truck activity area to a range of potential distant locations including: Anchorage, Eklutna, Palmer; Portage; and the Cook Inlet.

Other Transportation Modes. With Alternative 2C the potential sources of material are distant from the project area. Even the closest sources are between 15 to 50 miles from the project area. This makes it worthwhile to consider alternative material transport mode such as barge

and train rather than truck. Train and barge options are economical and worth consideration for material sources distant from the project area.

The analysis of traffic disruption impacts between the alternatives in the paragraph above assumes all advanced alternatives would utilize truck traffic only to transport materials. However, other material transportation modes for long-distance transport are available for Alternative 2C and where therefore evaluated.

DOT&PF solicited an experienced independent contractor (Granite Construction, Inc.) to evaluate other modes for transporting material from outside the project area for Alternative 2C.

The contractor identified the following:

- A range of potential material sources including existing commercial sources in Anchorage, Eklutna, and Palmer; formerly used material sites in Portage; and material sources accessible via Cook Inlet.
- Different transport modes including truck haul, train, and barge. The two sites in lower Cook Inlet were both evaluated for barge haul only, while other sites were considered for train and/or truck haul.
- Probable construction costs for purchasing and transporting material from outside the corridor for each location and transport mode

The environmental consequences of each Alternative 2C material transportation mode are summarized below.

All Material Modes (Truck, Train, Barge)

- Material Costs - Sourcing material from a distant site under Alternative 2C would substantially increase construction costs compared to other advanced alternatives. The cost of material alone from a distant source, under a variety of transport options (truck/train/barge), would cost between $50 Million and $110 Million. This is compared to $28 million (Alternative 2A), $39 million (Alternative 2B), and $32 million (Alternative 3). Train and barge options range from 28% to 300% greater in cost than truck options. Using the least expensive option for Alternative 2C, Train Haul from Eklutna, would increase the total project cost by 28 to 43% compared to Alternatives 2A, 2B, and 3.
- Staging Area Impacts – All Alternative 2C options would require a staging area for material delivery to the site located on the inlet side of the railroad tracks. This would be located within the project footprint and is not anticipated to have additional environmental impacts.

Truck Options

- Traffic and Safety Problems - Alternative 2C truck transport options would result in unique traffic and safety problems during construction. Alternative 2C truck options would result in an approximately 15% increase in trucks and a 1% increase in all vehicles above the proposed Alternative 2A.

  This would increase safety issues along the truck transportation route with trucks travelling longer distances in the traffic stream with other roadway users. Truck haul would require 150,000 total truckloads to deliver the material during the project duration.

  This would also lead to secondary effects on traffic congestion. Effects on road traffic and safety would occur along the entire haul route, not just along the Seward Highway.

- Maintenance Problems - Alternative 2C truck transport options would result in unique maintenance problems during construction.

  Alternative 2C would increase highway maintenance related to the large volume of heavy loaded vehicles traveling extra-long distances on the highway. This would lead to high levels of roadway wear-and-tear.

  Effects on road maintenance would occur along the entire haul route, not just along the Seward Highway.

Train Options

- Traffic and Safety Problems - Alternative 2C train transport options would still require transport of material to get to the construction site by truck so it would not totally eliminate the unique traffic and safety problems during construction. Alternative 2C train options would result in an increase in trucks from the material source origin to the railroad loading area.

  This would increase safety issues along the truck transportation route with trucks travelling longer distances in the traffic stream with other roadway users. Truck haul would require 150,000 total truckloads to deliver the material during the project duration.

  This would also lead to secondary effects on traffic congestion.

  Effects on road traffic and safety would occur along the haul route from the material source origin to the railroad loading area.

- Train Traffic Problems – Alternative 2C train transport options would result in unique train traffic problems.

  Train transport of materials would be limited by existing train schedules and availability of material storage and off-loading areas at Windy Corner. Train transport would require 1,700 train trips of 30 air dump rail cars. Although there are small rail sidings near Indian and Rainbow, these would not be sufficient to accommodate the needed trains without expansion. In addition, existing train schedules require the use of the existing sidings to allow trains to pass when traveling in opposite directions.

  As the temperatures get cold in the fall, moisture would cause operational challenges for the dump car air systems. Material would also start to freeze in the car beds requiring additional time and cost to continue working, limiting the anticipated train hauling season from April to November.

  Material dumping from the train cars would occur from the main line over an estimated two hour period that would require careful scheduling between regularly scheduled train traffic. If the contractor is not able to work within these narrow windows, a temporary siding would have to be constructed adjacent to the existing alignment.

  The contractor's pace of work would be substantially restricted due to the inability to bring in material at a sufficient quantity to get the work done in two seasons. This is expected to result in an extra 1 ½ to 2 years of construction duration.

  Truck traffic is still a substantial consideration for most material locations due to the need to transport material along public roadways from a borrow source to a track siding at Eklutna and Portage for loading.

  Train transport would also require additional material handling to move material from the rail car dump site to final placement.

- Environmental Impacts– All Alternative 2C options could result in substantial adverse impacts if a staging area for material delivery to the site is required. The length of new rail siding to accommodate 40 air dump rail cars and the sizing of the staging/storage area have not been determined. However, these facilities would likely be constructed within CSP resulting Section 4(f) and Section 6(f) impacts and approvals.

Barge Options

- Engineering Problems and Cost– Barging materials to the project area presents challenges due to the extreme tides in Turnagain Arm and ice conditions. Using large barges, almost 500 barge loads would be required. A tug would be required onsite full-time to assist barge navigation at arrival and departure. Temporary offloading facilities would be required at Windy Corner, including pilings, mooring dolphins, and sheet pile bulkhead. Bringing the barged material to the project area would cost an additional $22 to $82 million; these costs do not include construction of the required offloading facilities and tug. The substantially increased roadway cost associated with barging materials and the safety concerns of operating in Turnagain Arm (i.e., shallow depths, extreme tides, and ice conditions) make this alternative not prudent.
- Traffic and Safety Problems - Alternative 2C barge transport options would still require transport of material to the construction site by truck so it would not eliminate the unique traffic and safety problems during construction.

  This would increase safety issues along the truck transportation route with trucks travelling longer distances in the traffic stream with other roadway users. Truck haul would require 150,000 total truckloads to deliver the material during the project duration.

  This would also lead to secondary effects on traffic congestion.
- In Water Safety Problems– Barge transport would have safety problems associated with shallow depths, extreme tides, and ice conditions. These conditions would make it difficult for the barge to navigate the tidally influenced waters even with the assistance of a tug. Barge deliveries would have to be coordinated with the tides meaning any delays in the process could cause a barge to miss the high tide and be delayed until the next available tide.
- Environmental Impacts – Barging would also increase environmental impacts from construction of temporary offloading facilities and adding industrial marine traffic in Turnagain Arm, which could adversely affect the CIBW population and conflict with recreational water activities.

Length of Construction Season. Alternative 2C is anticipated to take three seasons to construct due to the additional hauling distances associated with material sources beyond CSP. This lengthens the period of compromised traveler safety and traffic disruption. This increases the period of time traffic disruption would occur and traveler safety would be compromised due to construction activities.

Wildlife Disruption. The potential for wildlife disruption is related to the extent of the blasting areas as well as their proximity to the wildlife concentration areas; blasting is anticipated to have the most substantial impacts to wildlife of all the construction activities. All alternatives advanced would require blasting within the project area. Alternative 2C would have less potential for CIBW disruption due to any material extraction blasting sites being located 15 miles or more from the

project. Alternative 2C would have potential to disrupt Dall sheep from construction related activities within the project area.

With implementation of the following mitigation measures none of the alternatives is expected to have an adverse effect on the federally endangered CIBW populations or on the Windy Corner Dall sheep populations. The contractor would use protected species observers to monitor for CIBW within 4,800 feet prior to blasting operations. If whales are detected within 4,800 feet, blasting would be paused until the whales exit the 4,800-foot radius clear zone. Blasting operations would not be allowed between May 10th and July 15th to protect Dall sheep during lambing. Observers would also be used to monitor for Dall sheep within 0.25 miles prior to blasting operations. If Dall sheep are detected within 0.25 miles, blasting would be paused until sheep are greater than 0.25 miles from blasting operations.

Community Disruption. Construction activities, blasting in particular, are expected to increase local noise levels. Blasting for Alternative 2C would be limited to the Windy Corner project area from MP 105 to MP 107. Alternative 2C blasting and material excavation within the project area may be audible for some residences at Rainbow which is located one mile north of the project area and Indian which is located two miles south of the project area. Potential noise impacts to Rainbow and Indian from Alternative 2C would be substantially less than that of Alternatives 2A or 2B where blasting to obtain material would occur closer to the communities. Blasting is expected to occur once or twice per day until sufficient material is generated. The contractor would follow the stipulations of the Municipality of Anchorage Noise permit.

Emergency and Recreation Access. All advanced alternatives would impact emergency response access and recreation access along the Seward Highway due to construction-related traffic congestion and delays. Alternative 3 would adversely impact emergency and recreation access along two miles of the Seward Highway between MP 105 and MP 107.

Construction Cost. Alternative 2C would have a high construction cost of $129.7. This compares with $90.6 million (Alternative 2A), $104.6 million (Alternative 2B), and $92.1 million (Alternative 3).

6.2.5 Alternative 3

Water Quality. Alternative 3 would disturb up to approximately 51.4 acres of land. Temporary water degradation is anticipated from disturbance to uplands and to mudflats during construction. The water quality effects would be minimal given the high background turbidity and sediment loads in Turnagain Arm. Disturbance of Turnagain Arm waters would continue for approximately 4 months until riprap base is placed. To minimize water quality effects the contractor would implement BMPs in accordance with both an ESCP prepared by DOT&PF and a SWPPP to be developed by the contractor and approved by DOT&PF.

Stream Diversion. All advanced alternatives, would replace and improve the culverts for three unnamed streams. Stream diversions would occur during culvert replacements. Each waterway is expected to be diverted for approximately 2 to 3 days, depending upon the construction method and sequencing. There are no known resident or anadromous fish species in the waterways. To minimize effects to streams, stream diversion would be limited to the time required to replace the existing culverts with the new, larger culverts.

Air Quality. All advanced alternatives would have minimal impacts air quality. Dust emissions may increase during construction operations, particularly during dry months. Blasting and

excavation of the material locations are likely to generate fugitive dust. . To minimize air quality effects, the contractor would implement BMPs in accordance with both an ESCP prepared by DOT&PF and a SWPPP to be developed by the contractor and approved by DOT&PF.

Vegetation and Invasive Species. Alternative 3 would disturb up to approximately 51.4 acres of ground. The contractor would prepare a SWPPP in accordance with the APDES CGP. The SWPPP would identify BMPs to minimize disturbance areas, and stabilize disturbed areas as soon as practicable, reducing the risk of introducing or spreading invasive species. Hydroseed and mulch, clean fill material, native plants, and certified native seed mixes meeting DOT&PF's Standard Specifications would be used where appropriate.

Trails and Climbing Routes. With all advanced alternatives, access to the Turnagain Arm Trail and the Goat's Head Soup climbing areas would temporarily and intermittently be closed during construction for weeks at a time. Closures would be for the safety of the public and construction workers and would be publicized in order to minimize inconvenience for recreational users

Traffic Disruption.
General Construction Traffic. With all advanced alternatives, traffic delays would occur throughout entire construction phase. A traffic control plan would be developed to address access, congestion, and construction scheduling.

Truck Transport. All of the advanced alternatives would have safety hazards and traffic disruption caused by material transport trucks and equipment entering and leaving the highway and sharing the highway with traffic along their transport route. Alternatives 3 has the least potential truck-related traffic disruption since truck activity to and from the material extraction areas is confined to the project area between MP 105 and MP 107.

Blasting Operations. All of the advanced alternatives would have safety hazards and traffic disruption caused by blasting operations. Driver frustration will likely be associated with driver time spent in traffic lines during each blasting period. Each traffic control zone is anticipated to be approximately 3 miles long and would create traffic disruption from construction vehicles and activities that would directly impact traffic flow during blasting operations. All excess material would need to be cleared from the highway and railroad embankment before traffic flow is resumed. The more blasting locations close the roadway, the more traffic delays would occur. Alternative 3 is expected to have the least traffic disruption related to blasting activities as blasting is limited to the project area.

Other Transportation Modes. With Alternative 3 the source of material is within the project limits adjacent to the highway. Sources are primarily from cuts into the mountainside at Windy Corner.

Length of Construction Season*.* Alternative 3, is anticipated to limit the project construction timeframe to two seasons. This minimizes the period of time traffic disruption would occur and traveler safety would be compromised due to construction activities.

Blasting Safety. All of the advanced alternatives would require blasting within the project area. Alternatives 3 has the lowest potential for safety hazards related to blasting as blasting is limited to the project area for both of these alternatives. Alternative 3 would require more blasting within the project area than Alternative 2C because the alignment for Alternative 3 is pushed further into the mountain than Alternative 2C. Alternative 3 has the second lowest potential for safety hazards related to blasting.

Wildlife Disruption. The potential for wildlife disruption is related to the extent of the blasting areas as well as their proximity to the wildlife concentration areas; blasting is anticipated to have the most substantial impacts to wildlife of all the construction activities. All alternatives advanced would require blasting within the project area. Wildlife disruption is expected to be the greatest with Alternative 3 would have potential for CIBW disruption due to blasting activities near CIBW habitat. Alternative 3 would have the greatest potential for Dall sheep disruption due the blasting locations being closer to the Dall sheep concentrations at Windy Corner.

With implementation of the following mitigation measures none of the alternatives is expected to have an adverse effect on the federally endangered CIBW populations or on the Windy Corner Dall sheep populations. The contractor would use protected species observers to monitor for CIBW within 4,800 feet prior to blasting operations. If whales are detected within 4,800 feet, blasting would be paused until the whales exit the 4,800-foot radius clear zone. Blasting operations would not be allowed between May 10th and July 15th to protect Dall sheep during lambing. Observers would also be used to monitor for Dall sheep within 0.25 miles prior to blasting operations. If Dall sheep are detected within 0.25 miles, blasting would be paused until sheep are greater than 0.25 miles from blasting operations.

Community Disruption. Construction activities, blasting in particular, are expected to increase local noise levels. Blasting for Alternative 3 would be limited to the Windy Corner area from MP 105 to MP 107 to shift the highway alignment into the mountain. Blasting and material excavation may be audible for some residences at Rainbow which is located one mile north of the project area and Indian which is located two miles south of the project area. Potential noise impacts to Rainbow and Indian from Alternative 3 would be substantially less than that of Alternatives 2A or 2B where blasting to obtain material would occur closer to the communities. Potential noise impacts to the communities of Rainbow and Indian from Alternative 3 would be similar to Alternative 2C where blasting also occurs only within the project area. Blasting is expected to occur once or twice per day until sufficient material is generated. The contractor would follow the stipulations of the Municipality of Anchorage Noise permit.

Emergency and Recreation Access. All advanced alternatives would impact emergency response access and recreation access along the Seward Highway due to construction-related traffic congestion and delays. Alternative 3 would adversely impact emergency and recreation access along two miles of the Seward Highway between MP 105 and MP 107.

Construction Cost. Alternative 3 would have a relatively low construction cost of $92.1 million. This compares with $90.6 million (Alternative 2A), $104.6 million (Alternative 2B), and $129.7 million (Alternative 2C).

7.0 PREFERRED ALTERNATIVE

7.1 Decision Factors

DOT&PF used five factors to determine which alternative is the Preferred Alternative. A decision factor comparison table below summarizes DOT&PF's rationale for making a determination on a Preferred Alternative. See Table 12. The decision factors are as follows:

1. Alternative meets the project purpose and need:
   Only alternatives that meet the project purpose and need would be considered for selection as the Preferred Alternative. The No Action, Alternative 1 and Alternative 4 where not selected since these alternatives do not meet the project purpose and need. See Section 3.0 for a discussion of the project purpose and need.
2. A lower degree of environmental impacts relative to other advanced alternatives or a net resource benefit after mitigation is applied:
   Many environmental resource impacts when adequately mitigated result in a relatively low adverse effects, no adverse effect, or a net benefit to environmental resources. The more an alternative reflects these characteristics, the more likely the alternative would be selected as the Preferred Alternative.
3. A high degree of environmental impacts that cannot be reasonably mitigated:
   Some environmental resource impacts are high and cannot be reasonably mitigated to a lower level. The more unmitigated highly adverse impacts an alternative has, the less likely the alternative would be selected as the Preferred Alternative.
4. Economics.
   The relative cost of an alternative compared to that of others is one consideration in selecting the Preferred Alternative. The lower the cost of an alternative, combined with other favorable decision factors, the more likely an alternative would be selected as the Preferred Alternative.
5. Technical Problems
   A number of technical construction-related issues can arise that can determine if an alternative can be constructed using sound engineering judgement without:
   - unreasonable construction timetables or delays,
   - inefficient construction techniques,
   - extreme construction costs,
   - substantial safety concerns, or
   - excessive maintenance commitments

   The fewer number of technical problems associated with an alternative, the more likely it would be selected a Preferred Alternative.

Table 12 below compares the five decision factors; the key Preferred Alternative decision-making factors are highlighted.

Table 12 Legend:

favorable	The key favorable factors
unfavorable	The key unfavorable factors

Table 12: Comparison of Preferred Alternative Decision Factors

Alternative	Meets Purpose and Need	Number of Resources that receive a Net Benefit after mitigation	Number of Low Adverse or No Adverse Impacts after mitigation	Number of Moderate Impacts after mitigation	Number of Impacts that are high and cannot be reasonably mitigated	Relative Cost	Degree of Technical Problem Issues
No Action	No	Not Applicable – Does Not Meet Project Purpose & Need					
Alternative 1	No	Not Applicable – Does Not Meet Project Purpose & Need					
Alternative 2A	Yes	4	8	2	0	Low	Low
Alternative 2B	Yes	1	10	0	**3**	Moderate	Low
Alternative 2C	Yes	1	12	0	**1**	**High**	**High**
Alternative 3	Yes	1	10	0	**3**	Low	Low
Alternative 4	No	Not Applicable – Does Not Meet Project Purpose & Need					

Environmentally Preferred Alternative. Decision factors two and three have been used to determine the environmentally preferred alternative defined as the alternative that best protects, preserves, and enhances historic, cultural, and natural resources.

Based on the comparison of decision factors 2 and 3, Alternative 2A has the most favorable and least unfavorable decision factors. As a result, DOT&PF has concluded that Alternative 2A is the environmentally preferred alternative. The remaining three advanced alternatives (2B, 2C, and 3) have high environmental resource impacts that cannot be reasonably mitigated to a lower level. Alternative 2A does not have high impacts after reasonable mitigation is applied and has a net benefit to some environmental resources.

Agency Preferred Alternative. All five decision factors are used to determine the agency's Preferred Alternative defined as the alternative that the agency believes would fulfill its statutory mission and responsibilities, giving consideration to economic, environmental, technical and other factors.

Based on the comparison of decision factors 1 through 5, Alternative 2A has the most favorable decision factors and least unfavorable decision factors. As a result, DOT&PF has concluded that Alternative 2A is the agency's preferable alternative.

A detailed comparison of environmental decision factors is in Table 13 below. Key Preferred Alternative decision –making environmental factors are highlighted according to the following legend.

Table 13 Legend:

favorable	The key favorable environmental factors, net benefits to environmental resources
unfavorable	The key unfavorable environmental factors, high impacts that cannot be reasonably mitigated

Table 13: Detailed Preferred Alternative Decision Factors

Environmental Resource	Alternative →	No Action	1	Alternatives Advanced for Detailed Study				4
				2A	2B	2C	3	
	Impact or Mitigation ↓	No Improve-ments	Stay within ROW	Shift into Turnagain Arm			Shift Inland into CSP	Tunnel
		Material From:						
		No Material Extraction	Cuts Within ROW Limits	MP 109 and 104 Locations	Cuts Within ROW Limits	Distant Sources Outside Project	Mostly within Project Limits	No Material Extraction
ROW	Permanent ROW (acres)	Alternative Does Not Meet Purpose and Need	Alternative Does Not Meet Purpose and Need	All #2 alternative require 26.3 acres of ROW. Alternative #3 requires 19.5 acres of ROW. All alternatives would return land of equal fair market value and usefulness to the park owner.				Alternative Does Not Meet Purpose and Need
Social	Emergency Access to Turnagain Arm			All advanced alternatives provide an emergency response access ramp (Net Benefit)				
Land Use	See Sections 1.0, 3.2.1 to 3.2.5, and 3.3.1			**Consistent** with **CSP** management plan – Net Benefit to Park	Inconsistent with the CSP management plan			
Cultural	NRHP Eligible Properties in APE & Effect			All alternatives have only one NRHP-eligible property (Alaska Railroad) in the APE. All would result in a Section 106 finding of no adverse effect.				
Fish	Anadro-mous Fish Habitat (ac)			All #2 alternatives require 26.3 acres of fill in Turnagain Arm. Alternative #3 14,9 acres of fill in Turnagain Arm. All alternatives mitigate losses with replacement habitat at an already USACE-approved site in proportion with the impacts.				
Wildlife	Dall Sheep Habitat (acres)			2.4	2.4	2.4	**Substantial unmitigated habitat impacts 7.4**	
T & E	CI Beluga Whale Critical Habitat (acres)			NMFS determined the project with implementation of recommended mitigation measures would not likely adversely affect CIBW or their critical habitat.				
Water-	Turnagain Arm fill below HTL (acres)			All #2 alternatives require 26.3 acres of fill in Turnagain Arm. Alternative #3 14,9 acres of fill in Turnagain Arm. All alternatives mitigate losses with replacement habitat at an already USACE-approved site in proportion with the impacts.				

Table 13: Detailed Preferred Alternative Decision Factors (Continued)

Environmental Resource	Alternative	No Action	1	2A	2B	2C	3	4
	Impact/ Mitigation ↓	No Improve-ments	Stay within ROW	Shift into Turnagain Arm			Shift Inland into CSP	Tunnel
	Material From →	No Material Extraction	Cuts Within ROW Limits	MP 109 and 104 Locations	Cuts Within ROW Limits	Distant Sources Outside Project	Mostly within Project Limits	No Material Extraction
4(f) and 6(f)	Permanent Section 4(f) Use (acres)	Alternative Does Not Meet Purpose and Need	Alternative Does Not Meet Purpose and Need	26.3	26.3	26.3	19.5	Alternative Does Not Meet Purpose and Need
				Each advanced alternative would replace acquired land acreage with land of equal fair market value and usefulness, In addition, Alternative 2A would construct $2.5 million of park improvements consistent with the CSP management plan and as mitigation for material extraction in the CSP. Alternative 2A is viewed as a net benefit to the park by DNR, the park owner.				
	Section 6(f) Conversion (acres)			39.56	4.16	4.16	8.5	
				Each alternative would remove parkland from 6(f) protection. All alternatives would provide replacement land of equal fair market value and usefulness proportional to the 6(f) lands removed.				
	Replace-ment 4(f) / 6(f) lands			All #2 alternatives require 14.7 acres of replacement lands. Alternative 3 requires 11.0 acres of replacement lands. All alternative would return land of equal fair market value and usefulness to the park in proportion with their impacts.				
	Pullouts Removed			All advanced alternatives remove 5 existing pullouts to be replaced as noted below				
	Pullout Replace-ment			Proposed Amenities Net Benefit to Park	Minimal Pullout	Minimal Pullout	Minimal Pullout	
	Turnagain Arm Trail (feet)			All advanced alternatives extend and/or realign 210 – 850 feet of trail				
	Rock Climbing Routes Removed			5	**(56 routes) Substantial unmitigated impacts**	**5**	**(13 routes) Substantial unmitigated impacts**	
Bicycle Pedestrian Facilities	Proposed Bicycle and Pedestria n Facilities			Pedestrian Pathways, Access, and Parking (Net Benefit)	Space for future multi -use pathway	Space for future multi -use pathway	Space for future multi -use pathway	
Vegetation and Invasive	Ground Disturbance			104.7	112.3	69.3	51.4	
				With the implementation of the proposed best management practices to minimize ground disturbance and stabilize disturbed areas, the risk of introducing or spreading invasive species is expected to be low for all advanced alternatives.				

Table 13: Detailed Preferred Alternative Decision Factors (Continued)

Environmental Resource	Alternative →	No Action	1	2A	2B	2C	3	4
	Impact/ Mitigation↓	No Improve-ments	Stay within ROW	Shift into Turnagain Arm			Shift Inland into CSP	Tunnel
	Material From →	No Material Extraction	Cuts Within ROW Limits	MP 109 and 104 Locations	Cuts Within ROW Limits	Distant Sources Outside Project	Mostly within Project Limits	No Material Extraction
Visual Impacts	Exposed Rock Face Area (square yards)	Alternative Does Not Meet Purpose and Need	Alternative Does Not Meet Purpose and Need	79,900 Moderate	**205,400 High**	33,300 Low	**130,000 High**	Alternative Does Not Meet Purpose and Need
Construction	Degree of Construc-tion and Safety Concerns			Moderate construc-tion safety and traffic disruption Impacts	**High Construc-tion Safety and Traffic Disruption Impacts**	**Highest Construc-tion Safety and Traffic Disruption Impacts**	Low Construc-tion Safety and Traffic Disruption Impacts	
Cost	Economics			$90.6 M	$104.6 M	**$**129.7 M	$92.1M	
				PREFERRED ALTERNATIVE	**ALTERNATIVES NOT PROPOSED**			
Overall Assessment	Alternative 2A was selected as the PREFERRED ALTERNATIVE Of the Advanced Alternatives, Alternative 2A has the least unmitigated high impacts and proposes mitigation that results in a net benefit to the park.			Moderate impacts after reasonable mitigation: • Moderate visual impact • Moderate construc-tion safety and traffic disruption impacts Mitigation Proposed results in a net benefit to CSP.	**High Impacts after reasonable mitigation:** • **Highest visual impact from rock cuts** • **Highest impact to rock climbing routes** • **2nd highest construc-tion safety and traffic disruption impacts**	**High Impacts after reasonable mitigation:** • **Highest construc-tion safety and traffic disruption impacts**	**High Impacts after reasonable mitigation:** • **Highest Dall sheep habitat impact** • **2nd highest visual impact** • **2nd highest impact to rock climbing routes**	

The rationale for selecting the Preferred Alternative (Alternative 2A) is presented Section 7.2 below. A detailed summary of the rationale for not proposing the remaining alternatives advanced (2B, 2C, and 3) is presented in Section 7.3 below.

7.2 Alternative 2A (Preferred Alternative)

Alternative 2A is **selected** from among the advanced alternatives as the Preferred Alternative because,

No High Environmental Impacts

- With Alternative 2A, after reasonable minimization and mitigation measures are applied, no environmental resources were found to have high adverse impacts. In contrast, each of the other advance alternatives (2B, 2C, and 3) retained high adverse impacts even after reasonable mitigation is applied.

Net Benefit to Environmental Resources

- Alternative 2A, after reasonable mitigation is applied, would result in a net benefit to some environmental resources. These resources are Section 4(f) property, Section 6(f) property, bicycle and pedestrian facilities, and emergency water rescue services.

Consistent With Park Management Plan

- Alternative 2A's plan to create new mountainside park facilities is consistent with the stated goals of the Chugach State Park Management Plan (2016) that specifically states a goal of expanding and upgrading parking at Windy Corner to create a safe sheep viewing area with a buffer between the highway and parking area. See Table 8. Alternative 2A presented the unique opportunity to propose the mountainside park facilities as a reasonable way to mitigate for the extraction of materials from within the 35.4 acres of the CSP proposed only with Alternative 2A.

Most Economical

- Alternative 2A has the lowest estimated cost ($90.6 million) of the advanced alternatives. The cost of the other advance alternatives are: Alternative 2B ($104.6 million), Alternative 2C ($129.7 million), and Alternative 3 ($92.1 million).

7.3 Alternatives Not Proposed

7.3.1 Alternative 2B Not Proposed

Alternative 2B is **not** the Preferred Alternative because,

1. Alternative 2B has a high degree of environmental impacts after reasonable mitigation is applied.
2. Alternative 2B has a high degree of construction-related impacts after reasonable mitigation are applied.

High Environmental Impacts

Visual Impacts

- Alternative 2B would result in the greatest impact to visual resources of all the advanced alternatives as measured by exposed rock cut face areas (205,400 square yards). This area is 517% greater than Alternative 2C, 157% greater than Alternative 2A and 58% greater than Alternative 3. See Table 7. Minimizing impacts to the visual setting is of special concern to the public based on input received.

Rock Climbing Impacts

- Alternative 2B would eliminate 56 climbing routes between MP 104 to MP 113 to extract material needed to construct the project from rock cuts within the existing ROW. This is the highest impact among the advanced alternatives. Alternative 2B impacts 5 to 10 times the number of climbing routes than the other advanced alternatives. Rock climbing routes are resources of special concern based on public input.

High Degree of Construction-Related Impacts

Construction Impacts

- Overall Alternative 2B has the 2nd highest construction safety and traffic disruption impacts.
- Alternative 2B is expected to have the greatest degree of traffic disruption related to blasting operations since blasting is proposed at a much greater number of sites (7), the sites are close to the highway, and the construction would extend to three rather than two seasons. Blasting for Alternative 2B would occur adjacent to the highway requiring traffic to be stopped for each blasting operation. All stray material from each blasting operation would have to be cleared from the highway and railroad before traffic flow could resume.
- Alternative 2B would have the second highest safety hazards and traffic disruption caused by material transport trucks and equipment entering and leaving the highway and sharing the highway with traffic along their transport route. Alternative 2B expands the truck activity area over 7 miles of highway (MP 104 to MP 113). This is more that than the 5 miles for Alternative 2A and 2 miles for Alternative 3 but much less that the 15 to 50 miles of highway for Alternative 2C.

7.3.2 Alternative 2C Not Proposed

Alternative 2C is **not** the Preferred Alternative because,

1. Alternative 2C has a high degree of construction-related impacts after reasonable mitigation are applied.
2. Alternative 2C has substantial construction-related technical problems.
3. Alternative 2C has a substantially higher cost.

Construction-Related Traffic Disruption Impacts

- Truck Options. Overall Alternative 2C has the highest construction safety and traffic disruption impacts of the advanced alternatives. Alternative 2C would have the highest safety hazards and traffic disruption caused by material transport trucks and equipment

entering and leaving the highway and sharing the highway with traffic along their transport route. Alternative 2C would have material transport truck activity over 15 to 50 miles of highway, far greater than the 7 miles of highway (MP 104 to MP 113) for Alternative 2B, the 5 miles for Alternative 2A, and the 2 miles for Alternative 3.

Construction-Related Technical Issues

Barge and train material transportation modes were considered as alternatives to truck transport but have technical construction issues that make barge and train options inefficient and costly.

- Train Options.
  Alternative 2C train transport options would result in unique train traffic problems.
  - Truck Traffic Issues Remain. Alternative 2C train transport options would still require transport of material to get to the construction site by truck so it would not totally eliminate the unique traffic and safety problems during construction. Alternative 2C train options would result in an increase in trucks from the material source origin to the railroad loading area. Truck traffic is still a significant consideration for most material locations due to the need to transport material along public roadways from a borrow source to a track siding at Eklutna and Portage for loading. This would increase safety issues along the truck transportation route with trucks travelling longer distances in the traffic stream with other roadway users. Truck haul would require 150,000 total truckloads to deliver the material during the project duration. This would also lead to secondary effects on traffic congestion. Effects on road traffic and safety would occur well beyond the immediate project vicinity to the entire haul route from the material source origin to the railroad loading area.
  - Limited Transport Schedule and Train Infrastructure. Train transport of materials would be limited by existing train schedules and availability of material storage and off-loading areas at Windy Corner. Train transport would require 1,700 train trips of 30 air dump rail cars. Although there are small rail sidings near Indian and Rainbow, these would not be sufficient to accommodate the needed trains without expansion. In addition, existing train schedules require the use of the existing sidings to allow trains to pass when traveling in opposite directions.

    Material dumping from the train cars would occur from the main line over an estimated two hour period that would require careful scheduling between regularly scheduled train traffic. If the contractor is not able to work within these narrow windows, a temporary siding would have to be constructed adjacent to the existing alignment.
  - Limited Hauling Season. As the temperatures get cold in the fall, moisture would cause operational challenges for the dump car air systems. Material would also start to freeze in the car beds requiring additional time and cost to continue working, limiting the anticipated train hauling season from April to November.
  - Extended Construction Duration. The contractor's pace of work would be significantly restricted due to the inability to bring in material at a sufficient quantity to get the work done in two seasons. This is expected to result in an extra 1 ½ to 2 years of construction duration.
  - Additional Material Handling. Train transport would also require additional material handling to move material from the rail car dump site to final placement.

- Staging Areas Additional 4(f) Impacts. Staging areas for material delivery to the site would likely be needed. The length of new rail siding to accommodate 40 air dump rail cars and the sizing of the staging/storage area have not been determined. However, these facilities would likely be constructed within CSP resulting Section 4(f) and Section 6(f) park impacts.

- Barge Options.
  - Engineering Problems and Cost– Barging materials to the project area presents challenges due to the extreme tides in Turnagain Arm and ice conditions. Using large barges, almost 500 barge loads would be required. A tug would be required onsite full-time to assist barge navigation at arrival and departure. Temporary offloading facilities would be required at Windy Corner, including pilings, mooring dolphins, and sheet pile bulkhead. Bringing the barged material to the project area would cost an additional $22 to $82 million; these costs do not include construction of the required offloading facilities and tug. The substantially increased roadway cost associated with barging materials and the safety concerns of operating in Turnagain Arm (i.e., shallow depths, extreme tides, and ice conditions) make this alternative not prudent.
  - Traffic and Safety Problems - Alternative 2C barge transport options would still require transport of material to the construction site by truck so it would not eliminate the unique traffic and safety problems during construction.

    This would increase safety issues along the truck transportation route with trucks travelling longer distances in the traffic stream with other roadway users. Truck haul would require 150,000 total truckloads to deliver the material during the project duration.

    This would also lead to secondary effects on traffic congestion.
  - In Water Safety Problems– Barge transport would have safety problems associated with shallow depths, extreme tides, and ice conditions. These conditions would make it difficult for the barge to navigate the tidally influenced waters even with the assistance of a tug. Barge deliveries would have to be coordinated with the tides meaning any delays in the process could cause a barge to miss the high tide and be delayed until the next available tide.
  - Environmental Impacts – Barging would also increase environmental impacts from construction of temporary offloading facilities and adding industrial marine traffic in Turnagain Arm, which could adversely affect the CIBW population and conflict with recreational water activities.

Least Economical

Alternative 2C has the highest estimated cost ($129.7 million) of the advanced alternatives. The cost of the other advanced alternatives are: Alternative 2A ($90.6 million), Alternative 2B, ($104.6 million), and Alternative 3 ($92.1 million)

7.3.3 Alternative 3 Not Proposed

Alternative 3 is **not** the Preferred Alternative because,

High Environmental Impacts.
Alternative 3 has a high degree of environmental impacts in three categories after reasonable mitigation is applied.

Dall Sheep Impacts.

- Alternative increases by over three times the impact to high-value Dall sheep habitat compared with other advanced alternatives. The impact increase is from 2.4 acres to 7.4. This is the highest impact to Dall sheep habitat of the advanced alternatives. It would compromise a substantial portion of the scarce mineral lick area. The high Dall sheep habitat impact with Alternative 3 would go against the strong public and agency sentiment to minimize adverse impacts to the iconic Dall sheep habitat and would be inconsistent with the CSP management plan guidance to do likewise.

Visual Impacts.

- Alternative 3 would shift the highway alignment into the Windy Corner rock cliff increasing the visual impact there. Alternative 3 would result in the second greatest impact to visual resources of all the advanced alternatives as measured by exposed rock cut face area (130,000 square yards). The visibility of the rock cut at Windy Corner was raised as one of the most concerning impacts during public meetings for this project. The 130,000 square yards is 58% less than the greatest impact (Alternative 2B) and 290% greater than the lowest impact (Alternative 2C).

- ***Rock Climbing Impacts.***
  - Alternative 3 would have the second greatest impact to rock climbing routes of the advanced alternatives. It would eliminate thirteen climbing routes at the Goat's Head Soup climbing area near Windy Corner to extract material needed to construct the project. This is compared to 5 routes impacted by Alternatives 2A and 2C and 56 routes impacted by Alternative 2B. Rock climbing routes are resources of special concern based on public input.

8.0 PERMITS AND AUTHORIZATIONS

Construction of Alternative 2A (Preferred Alternative) would require the permits and authorizations identified in Table 14.

Table 14: Permits and Authorizations Required for Preferred Alternative

Permit	Agency	Purpose
Right of Entry Permit	ARRC	Authorizes work within the ARRC ROW, to ensure safety and to minimize impact to rail operations. 2001 MOA extended a blanket permit for DOT&PF to conduct work on the Seward Highway located within the ARRC ROW
Section 401 Certificate of Reasonable Assurance	ADEC	Authorizes the placement of dredged or fill material in waters of the U.S. from the Preferred Alternative. Complies with applicable CWA Section 401 and 18 AAC 70 Alaska Water Quality Standards
Section 404/10 Individual Permit	USACE	Authorizes discharge of dredge or fill material into Waters of the U.S.
CWA Section 402	ADEC	Authorizes the discharge of storm water associated with construction activities to waters of the U.S. Permit coverage is required from the “commencement of construction activities” until “final stabilization”. APDES CGP is required with the development and implementation of a SWPPP.
Non-Domestic Storm Water Disposal Plan Approval	ADEC	Authorizes the discharge of storm water
Noise Permit	Municipality of Anchorage	Authorizes a temporary increase in allowable noise levels for construction and extraction of resources using explosives
Endangered Species Act, Section 7 Consultation	NMFS	Requires consultation with NOAA NMFS to determine if the Preferred Alternative would result in “taking” of a listed species or adversely affecting its habitat
Magnuson Stevens Fishery Conservation and Management Act, EFH Consultation	NMFS	Requires the consultation with NOAA NMFS to determine if the Preferred Alternative would result in adversely affecting EFH.
Section 106 National Historic Preservation Act;	DNR-SHPO	Requires Federal agencies to complete a consultation process with SHPO and other consulting parties regarding potential impacts to properties on or eligible for the NRHP
Section 4(f), Department of Transportation Act	FHWA, DNR	Requires DOT&PF to avoid use of parks, recreation areas, wildlife/waterfowl refuges, and historic sites, unless there is no feasible and prudent alternative, or the impacts are found to be de minimis.
Section 6(f), Land and Water Conservation Fund Act	NPS	Requires that areas receiving LWCF assistance are continually maintained in public recreation use, unless DOI approves substitution property of reasonably equivalent usefulness and location and of at least equal fair market value
Bald and Golden Eagle Protection Act	USFWS	Requires a permit be obtained to “take” bald eagles, including their parts, nests, or eggs. “Take” is defined as “pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb

As stated in Section 5.1.6 Floodplains, the Municipality of Anchorage has indicated that they would not require a Flood Hazard Permit.

Other Federal, State, or Municipality of Anchorage permits and authorizations may be obtained by the contractor to address conditional land use, tidelands, material extraction, temporary water use, noise, and air quality permits associated with construction activities.

9.0 CUMULATIVE IMPACTS

Per 40 CFR 1508.7, cumulative impacts result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

9.1 Method for Determining Cumulative Impacts

Analyzing cumulative impacts is based on defined spatial (geographic) and temporal (time frame) boundaries. The geographic area of the analysis includes the Project Area and proposed material locations (Section 2.0, Figure 2 and Section 4.0, Figure 12), as well as three miles in either direction along Seward Highway, thus extending from Seward Highway MP 102 to MP 110. The time frame used for the cumulative impact analysis is 1970, which includes the creation of CSP and the timeframe used for safety corridor crash data and extends to 2023 to included proposed developments in the reasonably foreseeable future.

9.1.1 Past Actions

Existing facilities within the Project Area include: CSP, the Seward Highway, the ARRC track, overhead utility lines, Windy Corner vehicle turnout, Windy Corner Trailhead, Turnagain Arm Trail, and multiple vehicle pull-outs. Routine maintenance of existing facilities includes removal of trash and clearing of vegetation within ROW and utility corridors.

Highway traffic in 1977 was approximately 3,500 AADT; it grew to approximately 9,000 AADT in 2002. It has remained near 9,000 AADT since 2002. The highest number of recorded fatalities and major injury crashes were reported in 1977 and 1979.

Past actions include:

- Establishment of CSP: In 1970 the Alaska legislature restricted the State-owned land and water described in Alaska Statutes (AS 41.21.120-41.21.125) to use as Chugach State Park. Lands and waters to either side of the highway and rail corridor ROWs became reserved for a newly created park. This has likely reduced potential development along the highway, and in inholding communities of Indian, Bird, and Rainbow.
- The 2001 MOA between CSP, DOT&PF, and ARRC (Appendix A): The MOA between the three parties has served to improve coordination of maintenance and management of the highway, railway, and State park facilities.
- Designation of CIBW as Endangered, and designation of critical habitat: The CIBW population was listed as an endangered species in 2008. The designation of upper Cook Inlet, including Turnagain Arm, as critical habitat for the CIBW population occurred in 2011.
- Slow Vehicle Turnouts (MP 94, MP 108, MP 111, MP 115), completed 2013 to 2014: Construction of additional slow vehicle turnouts, including one within a mile of the project area, have expanded the physical footprint of the highway facility marginally. These turnouts are likely to have provided incremental reductions in vehicle delays and traffic, as each provides an additional opportunity for slow vehicles to exit the travel lane to allow faster vehicles to safely pass.

9.1.2 Present Actions

There are no Federal or other development actions proposed within the cumulative impact area.

DOT&PF plans improvements to the Seward Highway MP 100 to MP 105 in spring of 2020. This project would provide highway improvements along approximately five miles of Seward Highway, including its frontage through the communities of both Bird and Indian.

The HSIP Seward Highway Rockfall Mitigation project from Girdwood to Anchorage is in design. Construction is planned to begin in summer of 2020.

9.1.3 Reasonably Foreseeable Future Actions

Reasonably foreseeable future actions include those actions which are planned, designed, or budgeted for construction within the next five years.

Natural occurrences typical for this area are rock falls and would require maintenance as needed.

There are no other reasonably foreseeable future actions at this time.

9.1.4 Resources Assessed for Cumulative Impacts

Resources assessed for Cumulative Impacts include:

- Aesthetic Effects;
- Threatened and Endangered Species; and
- Social Considerations.

The remaining resources discussed in Chapter 5 do not have any identifiable cumulative effects in the area defined or within the timeframe described in Section 9.1

9.1.4.1 Aesthetic Effects

Cumulative impacts to aesthetics since 1970 are minimal. The Seward Highway and ARRC track were already present and close to their current alignment. Additional cuts to the steep, close faces along the highway have been conducted in the intervening years, for both minor road realignment and to reduce the risk of rockfall damage to the public.

The aesthetic effects of the Preferred Alternative, combined with the minimal present HSIP Seward Highway Rockfall Mitigation project and potential future maintenance activities, would contribute slightly to the cumulative changes since 1970.

9.1.4.2 Threatened and Endangered Species

Cumulative impacts to threatened and endangered species since 1970 include the designation of upper Cook Inlet as critical habitat for the CIBW population. The population was first listed by NMFS as endangered in 2008 and the critical habitat was designated in 2011.

Prior to this designation, there likely have been very minor highway and rail maintenance, reconstruction and realignment efforts in the project area. The designation of all surrounding

land and waters as State parkland likely reduced additional land and infrastructure development and disturbance.

The effects of the Preferred Alternative contribute to the cumulative effects on CIBW. However, NMFS has indicated that with the proposed conservation recommendations implemented, the Preferred Alternative is not likely to adversely affect CIBW.

Reasonably foreseeable future effects are not expected to occur with the proposed design and construction of the neighboring Seward Highway MP 100 to MP 105 project. Effects of the project on CIBW was considered and discussed with NMFS. NMFS staff indicated the dimensions of Indian Creek and its distance from Turnagain Arm at the site of the bridge "clearly eliminates any obvious concern for direct noise impact to Cook Inlet belugas." Based on discussions with NMFS, DOT&PF, acting as the non-Federal representative of the FHWA, has determined the project would have no effect on CIBW or the designated Turnagain Arm Critical Habitat.

The HSIP Seward Highway Rockfall Mitigation project would not involve in-water work or blasting so is expected to have no effect on Cook Inlet beluga whales.

9.1.4.3 Social Considerations

Social considerations include socioeconomics, public health and safety, recreation, and access. Setting aside 495,000 acres of State-owned land and water to use as CSP in 1970 improved recreation opportunities in the area. Incremental improvements by DNR-DPOR in the intervening years, such as trail construction, trailhead improvements, parking, and other amenities, have also increased recreational opportunities and access.

Highway improvements, including pullouts, passing lanes, and parking areas within the highway ROW, have improved recreational access. Improvements to Seward Highway also contributed positively to socioeconomics and public health and safety, by improving crash-prone curves and providing passing areas and turnouts to relieve traffic congestion due to speed differentials.

The Seward Highway MP 100 to MP 105 Improvements project is also expected to improve socioeconomics and public health and safety, by relieving traffic flow and congestion related to access and egress issues in the Bird and Indian communities and businesses. The MP 100 to 105 project may also provide improvements to recreational access, such as at the Falls Creek Trailhead. Thus, the cumulative social effects of this project with previous and future projects would be beneficial.

The HSIP Seward Highway Rockfall Mitigation project is expected to improve socioeconomics and public health by reducing rockfall potential and the related safety threat to the public.

10.0 PUBLIC INVOLVEMENT AND AGENCY COORDINATION

Public and agency scoping is a critical part of project development and environmental documentation under NEPA. Federal, State, and local agencies, and the public were consulted to obtain pertinent information used in developing reasonable alternatives and identifying issues. This section summarizes the information obtained and issues raised by the public and government agencies.

Starting in 2013, DOT&PF conducted public and agency coordination with interested stakeholders to inform them of the project scope and potential environmental impacts. Information was provided on the project scope and potential environmental impacts, including use of the CSP lands for material extraction.

Public outreach has included sending scoping letters, holding public meetings, attending transportation fairs, participating in community planning meetings, sending project updates through mailers, and hosting a dedicated project website. DOT&PF continues to engage the public and agencies by way of the dedicated website and an additional public meeting planned in 2020 as part of the Environmental Assessment process.

Agency Scoping Letters - Agency scoping letters were sent to relevant resource agencies on March 5, 2013. A copy of the letter and distributing emails can be found in Appendix G. Also in Appendix G is are scoping replies received from agencies.

Agency and Local Government Meetings - Project meetings with agencies and local governments have also been held. A list of these meetings is below. These include meetings with Community Councils, State Agencies, and the project Technical Advisory Group. The Technical Advisory Group was created in 2013 to maintain a consistent exchange of pertinent information with agencies. Information on agency and local government meetings is included in Appendix G.

2013

- February 18, 2013, Girdwood Board of Supervisors
- March 6, 2013, Alaska Department of Natural Resources
- March 12, 2013 Alaska Department of Natural Resources
- March 20, 2013, Multiple Agencies
- April 15, 2013, Girdwood Board of Supervisors
- May 28, 2013, Technical Advisory Group Meeting #1
- July 24, 2013, Alaska Railroad Corporation (ARRC) Coordination Meeting
- August 8, 2013, Technical Advisory Group Meeting #2
- August 27, 2013, Alaska Department of Fish and Game and DNR
- November 1, 2013, Technical Advisory Group Meeting #3
- December 16, 2013, Alaska Railroad

2014

- April 9, 2014, Technical Advisory Group Meeting #4
- May 21, 2014, Girdwood Board of Supervisors
- October 13, 2014, Municipality of Anchorage, Planning & Zoning Commission

2015
- March 18, 2015, Alaska Department of Natural Resources
- June 4, 2015, Technical Advisory Group Meeting #5
- October 15, 2015, Alaska Department of Natural Resources

2016
- August 1, 2016, Municipality of Anchorage
- December 14, 2016, Municipality of Anchorage Urban Design Commission

2017
- June 1, 2017, Alaska Department of Natural Resources

Public Transportation Fairs - The project has been presented at nine annual local transportation fairs between 2015 and 2019.
- February 4, 2015, Anchorage Transportation Fair
- February 4, 2016, Anchorage Transportation Far
- September 22, 2016, Mat-Su Transportation Fair
- February 15, 2017, Anchorage Transportation Fair
- February 8 2018, Anchorage Transportation Fair
- September 13 2018, Anchorage Transportation Fair
- October 13, 2018, Homer Transportation Fair
- February 6, 2019, Anchorage Transportation Fair
- September 12, 2019, Mat-Su Transportation Fair

Public Meetings and Involvement Efforts - Four public meetings/open houses were held for this project along with an online open house, a newsletter to stakeholders, and five community meetings. These efforts are listed below. Appendix G includes documentation from the public meetings including project website notices, newspaper meeting notices, sign-in lists, Title IV reports, comment sheets, a summary table of public comments received, and DOT&PF responses to comments.
- March 4, 2013 Public Meeting #1, Girdwood Community Center
- May 9, 2013, Turnagain Arm Community Council
- November 2, 2013, Girdwood 2020
- December 19, 2013, Girdwood Rotary
- April 24, 2014, Public Meeting #2, Girdwood
- May 8, 2014, Turnagain Arm Community Council
- December 18, 2014, Turnagain Arm Community Council
- January 23, 2015, Newsletter to Stakeholders
- April 05, 2016 to May 13, 2016, Online Open House
- April 19, 2016, Public Meeting #3, Anchorage Open House
- April 20, 2016, Public Meeting #4, Girdwood Open House

Comments received from public involvement efforts resulted in the following design changes:.

- Comments influenced the design of parking areas, access locations, and auxiliary lanes
- Comments concerning the highway and railroad extending too far into Turnagain Arm, resulted in design shifting the highway and railroad inland through Gorilla Rock.
- Comments concerning the new material location and visibility from the highway, design included a natural buffer to minimize visual impacts at MP 109.
- Comments concerning a lack of emergency response access to Turnagain Arm, resulted in the addition of a controlled-access emergency response access ramp.
- Comments requesting less use of CSP, resulted in commitment to not use material location at MP 104 for extraction unless MP 109 does not have sufficient quantity or quality of materials for this project

11.0 ENVIRONMENTAL COMMITMENTS SUMMARY

Land Use

- **Consistency with Land Use Plan** - Proposed Section 6(f) mitigation regarding park improvement is consistent with CSP Management Plan recommendations to enhance the wildlife viewing opportunities in this area (DNR 2011, 2016). DOT&PF is proposing to construct a new parking and wildlife viewing area on the mountainside of the highway to mitigate for the extraction of material [Section 6(f) conversion] from the MP 109 and MP 104 material locations. This mitigation is discussed further under the Section 6(f) commitments.

Cultural Resources

- No cultural resource-related mitigation measures are proposed. On January 4, 2016, SHPO concurred that there would be no historic properties adversely affected as a result of the project.

Anadromous or Resident Fish and Essential Fish Habitat (EFH)

- **Fishery Resource Preservation/Restoration -** DOT&PF would provide compensatory mitigation to offset the project's 26.3 acres of unavoidable permanent loss of EFH in Turnagain Arm. This mitigation plan consists of restoration and preservation of similar nearby habitat. DOT&PF has submitted a USACE Section 10/404 permit application for the Preferred Alternative, which includes this mitigation plan. On 10/1/2019, the USACE notified DOT&PF that they could accept the mitigation plan included with the application.

Wildlife and Birds

- **Bald Eagles** - Nest surveys conducted in 2013 and 2015 found no bald eagle nests within the project area. Another bald eagle nest survey would be conducted prior to construction to confirm eagle nest status. In the event that bald eagle nesting or other activity is discovered during the construction season within one-quarter mile of blasting operations (Category H, National Bald Eagle Management Guidelines) or within 660 feet of other project road construction activities (Category B, National Bald Eagle Management Guidelines), the USFWS would be consulted concerning the need for any mitigation measures. Measures may include, monitoring the birds for disturbances, work timing restrictions during the nesting season (February 1 to August 1) and/or maintaining a work-restricted buffer zone around an eagle activity zone.

- **Nesting Birds -** Vegetative clearing would be conducted outside of the bird-nesting window as described by USFWS for this region.

- **Habitat Impact Reduction -** The proposed highway and railroad realignments were shifted 110 feet inland and the fill placement within the Turnagain Arm tidal flats habitat was reduced by 7 acres (originally proposed to fill 45 acres).

Waterbody Involvement and Water Quality

- **Water Resource Impact Minimization -** The Preferred Alternative design has been refined to reduce the amount of disturbance to the intertidal mudflats by shifting the southbound alignment inland.

- **Water Resource Preservation/Restoration -** DOT&PF would provide compensatory mitigation to offset the project's 26.3 acres of unavoidable permanent loss of waters of the U.S. (intertidal mudflats). This mitigation would be by way of restoration and preservation of similar nearby habitat. DOT&PF has submitted a USACE Section 10/404 permit application for the Preferred Alternative with such a mitigation plan. On 10/1/2019, the USACE notified DOT&PF that they could accept the mitigation plan included with the application.

Vegetation and Invasive Species

- **Material Site Reclamation -** Areas proposed for material excavation at MP 109 and if necessary, MP 104, would be reclaimed to DNR's specifications. Exposed rock faces are expected to remain; however, soils may be stabilized upon reclamation. Rock faces are not expected to facilitate propagation or spread of invasive species.

Bicycle and Pedestrian Facilities

- **Space for Future Pathway** - No formal or designated bicycle facilities exist within the project area. However, the proposed design has provided space to add a future multi-use pathway on the mountainside without having to realign the road or railroad. The separated multi-use pathway would allow cyclists to transit the area without using the highway shoulders.

- **Pedestrian Facility Improvements** - The Preferred Alternative would provide new pedestrian access, parking areas, and facilities at Windy Corner (MP 106.5). Pedestrian facilities would connect the parking area to the main wildlife viewing area with seating, scenic overlooks, an interpretive Americans with Disabilities Act-compliant trail, and access to the Windy Corner Trailhead.

- **Rock Fall Safety Improvement** - An earthen berm would be installed at the base of two rockslide areas to prevent falling rocks from reaching the pedestrian pathways or parking area.

Section 4(f)

Alaska Railroad - No mitigation is proposed. DOT&PF has determined that the 36.6-mile Turnagain Arm District segment of the Alaska Railroad from Portage to Potter (ANC-4057) is eligible for the NRHP and therefore eligible for protection under Section 4(f) as a historic property. However, DOT&PF has found, and SHPO has concurred, under Section 106 of the National Historic Preservation Act, that the proposed project would have No Adverse Effect on historic properties including the Alaska Railroad (ANC-4057). As a result, the project's involvement with ANC-4057 falls under an exception to the requirements of Section 4(f).

- **Dall Sheep Habitat** - The highway and railroad centerlines have been designed to move away from high-value Dall sheep habitat in CSP in order to minimizing impacts. Impact to the Dall sheep habitat by the Preferred Alternative would be minimized to 2.4 acres. This is the lowest impact of the build alternatives considered. To mitigate these impacts, the Preferred Alternative would improve conditions for recreational sheep viewing by utilizing the existing highway embankment to construct a mountainside park facility that would consolidate visitors at one prime viewing location while providing, greater parking capacity, safer access, and improved facilities. The park facility design would also improve conditions for sheep by maintaining a more appropriate distance between wildlife and those interested in watching and photographing the wildlife.

- **Park Access** - The five pullouts (three widened shoulders and two turnouts) within the project limits utilized by visitors to access CSP would be eliminated and mitigated by consolidating these into one proposed controlled access mountainside park facility at the Windy Corner Trailhead. The new facility would have greater parking capacity, safer access, and improved amenities for park users. In addition, an improved Turnagain Arm Trailhead would be incorporated into the new mountainside park facility. These visitor access improvements to CSP are further discussed in the Section 4(f) and Section 6(f) commitments.

- **Rock Climbing** - Eight of the Goat's Head Soup's thirteen climbing routes would remain for use. To mitigate the loss of some routes, the remaining eight routes would be provided safer and more convenient access by way of walking approximately 0.35 miles along the Turnagain Arm Trail, which would have a new trailhead off the new mountainside park facility. The new facility would provide greater parking capacity, safer parking, safer access, and improved facilities for rock climbers.

- **Replacement Lands** - DOT&PF would relinquish 14.7 acres of ROW to CSP, which would be converted from transportation to recreational use as mitigation for the project's use of CSP lands.

- **Visual Effects** – Visual effects related to the Section 4(f) use of the CSP for material location extraction would be mitigated as described under the Visual Effects section below.

Section 6(f)

- **Replacement Lands** - DOT&PF would replace the 39.56 acres of lands protected under Section 6(f) and proposed to be converted to transportation use with property of at least equal fair market value and equivalent recreational utility. The proposed replacement lands consists of 14.7 acres of lands within the abandoned DOT&PF and ARRC ROW at Windy Corner (MP 106.5) on the mountainside of the Seward Highway and construction of park improvements within the 14.7-acre parcel.
- **Park Improvements** - The park improvements would include a new controlled access parking area with new pedestrian access and facilities. The new facilities would be accessible to both northbound and southbound traffic, and would replace the existing Windy Corner Trailhead pullout, two of the three areas with widened shoulders (MP

106.3 and MP 106.5), and the existing vehicle turnout on the southbound side. Southbound traffic would decelerate in a left-turn lane prior to entering the parking area. A paved parking area would accommodate 26 cars and seven oversized vehicles, and a gravel parking area would accommodate an additional 29 cars and six oversized vehicles. The parking areas would be separated from the highway by a 130-foot-wide median. Pedestrian facilities would connect the parking area to the main wildlife viewing area with seating, scenic overlooks, an interpretive Americans with Disabilities Act-compliant trail, and access to the Windy Corner Trailhead. An earthen berm would also be installed at the base of the two rockslide areas to prevent falling rocks from reaching the pedestrian pathways or parking area.

- **Temporary Park Use** - The material extraction areas (MP 109 and 104) would remain CSP land, and upon closure and reclamation could be developed for park use.

Visual Effects

- **Visual Buffer -** To minimize the potential visual effects and to maintain the existing natural view along the Chugach Mountains, plans for material extraction from the MP 109 material site location would include an intact topographic buffer, approximately 100 feet wide between the material extraction area and the highway. The buffer would obscure the view of the extraction area from the highway except for select vantage points. Only a portion of the rock face would be visible from most angles.

- **Minimize Material Extraction Footprint -** Material extraction at MP 104 would only occur if the Construction Contractor demonstrates that materials at MP 109 are insufficient in quantity or quality for the proposed project.

Construction-Related Commitments

- **Permits –** The contractor would comply with all permit stipulations and special conditions

- **Traffic Safety –** A traffic control plan would be developed and implemented to address access, congestion, and construction scheduling. This plan would ensure the safety and efficiency of Seward Highway facility users during material hauling operations. Advanced public notice of detours and delays would be issued.

- **Waterbody Involvement and Water Quality -** DOT&PF would prepare an ESCP as part of the construction contract package. Prior to commencement of construction activities, the Construction Contractor would prepare and submit a SWPPP. The SWPPP would identify BMPs including erosion prevention and control measures, and a schedule for earth-disturbing activities. The contractor would implement BMPs in accordance with both an ESCP and a SWPPP, to be developed and approved by DOT&PF. The project would be constructed in compliance with the ADEC's APDES CGP. Section 10, 401, 402, and 404 authorizations would be required.

Construction-Related Commitments, Continued

- **Anadromous or Resident Fish and Essential Fish Habitat (EFH) -**
    - In-water construction work would be avoided from April 1 through June 15 to avoid disturbance of out-migrating salmonid fry and smolts;
    - In-water and intertidal work would be conducted at low tide to the extent possible, to reduce sedimentation in the water column;
    - All dredge and/or fill material must be free of contaminants prior to disposal within the proposed fill area or any offsite location; and
    - Fill below the high tide line would be clean shot rock and would be placed when the site is dewatered by lower tide stages.
    - During construction, the fill site would be graded to prevent ponding on the fill surface that could trap fishes between high tides.
- **Temporary Stream Diversion -** Stream diversion would be limited to the time required to replace the existing culverts with the new, larger culverts.
- **Cultural Resources –** Should archaeological resources be discovered during project-related work, activity at this location would cease and the Project Engineer would contact the SHPO before resuming work.
- **Contaminated Sites –**
    - The contractor would be required to develop a Hazardous Materials Control Plan to address containment, cleanup, and disposal of all construction related discharges of petroleum fuels, oils, and/or other hazardous substances.
    - Wastes generated during construction would be properly handled, contained, and disposed of at an appropriately permitted disposal facility, in accordance with State and Federal laws.
    - Should contamination be discovered within the ROW, DOT&PF would stop work at the discovery location, identify the nature of the contamination, and coordinate the appropriate response with the ADEC.
- **Trails & Climbing Routes** – Temporary and intermittent closures of the Turnagain Arm Trail and the Goat's Head Soup climbing areas may occur during construction for weeks up to a month for the safety of users and would be publicized in order to minimize inconvenience for recreational users. The contractor would be required to submit a traffic control plan to include pedestrians. Sufficient notice would be provided to trail users of temporary detours and delays.
- **Air Quality** - The contractor would implement BMPs to minimize temporary impacts to air quality during construction. Implementing BMPs would be in accordance with both an ESCP and a SWPPP, to be developed and approved by DOT&PF.

Construction-Related Commitments, Continued

- **Noise** –
  - The contractor would follow the stipulations of the Municipality of Anchorage Noise permit.
  - See the Sections below on beluga whales and Dall sheep for wildlife-related noise commitments.
- **Beluga Whales** –
  - Blasting noise would be mitigated as follows. The contractor would use protected species observers to determine presence of beluga whales within a 4,800-foot radius of a blast location. Should observers notice beluga whales within this range prior to a blast, blasting activities would be paused until the whales are outside of the 4,800-foot radius.
  - In-water fill placement would not occur from April 1 through June 15.
  - Fill placement would only occur during daylight hours, and would be restricted to within six hours of low tide (three hours before and/or after local low tide).
  - On-shore blasting would only occur during daylight hours, and would be restricted to within six hours of low tide (three hours before and/or after local low tide).
  - Blasting activities would not occur at or below the intertidal zone.
- **Dall Sheep** - Blasting operations would not be allowed between May 10th through July 15th to protect Dall sheep during lambing. Observers would be used to monitor for Dall sheep within 0.25 miles prior to blasting operations. Blasting would be paused until sheep are greater than 0.25 miles from blasting operations.
- **Vegetation and Invasive Species -** The contractor would prepare a SWPPP in accordance with obtaining an APDES CGP. The SWPPP would identify BMPs to minimize disturbance areas, and stabilize disturbed areas as soon as practicable, reducing the risk of introducing or spreading invasive species. Hydroseed, mulch, clean fill material, native plants, and certified native seed mixes meeting DOT&PF's Standard Specifications would be used where appropriate.

12.0 LIST OF PREPARERS

Name	*Affiliation*	*Role*
Tom Schmid, P.E.	DOT&PF	Project Manager
Brian Elliott	DOT&PF	Regional Environmental Manager / QA/QC
Carol Roadifer, P.E.	DOT&PF	Consultant Coordinator / Author
Bob Effinger	DOT&PF	Environmental Team Leader / Lead Author
Steve Noble, P.E.	DOWL	Project Manager
Aaron Christie, P.E.	DOWL	Project Engineer
Lucy Flynn O'Quinn	DOWL	Cultural Resources
Adam Morrill	DOWL	Environmental Support
Maryellen Tuttell, AICP	DOWL	Document QC
Anne Brooks, P.E.	Brooks and Associates	Public Participation Coordinator
Camden Yehle	Brooks and Associates	Public Involvement Associate

13.0 REFERENCES

Alaska Department of Environmental Conservation

2010 *Alaska's Impaired Waters – 2010*.

2017 Division of Water. *Alaska DEC Drinking Water Protection Areas Mapper*, accessed on December 19, 2017: http://www.arcgis.com/home/webmap/viewer.html?webmap=13ed2116e4094f9994775af9a62a1e85

2018 Division of Spill Prevention and Response. *Alaska DEC Contaminated Sites Mapper* accessed on January 2, 2018: http://www.arcgis.com/home/webmap/viewer.html?webmap=315240bfbaf84aa0b8272ad1cef3cad3

Alaska Department of Fish and Game

2018 *Anadromous Waters Catalog Interactive Mapping* accessed on January 2, 2018: http://extra.sf.adfg.state.ak.us/FishResourceMonitor/?mode=awc

Alaska Department of Natural Resources

1994 *Turnagain Arm Management Plan for State Lands*.

2009 *Public Review Draft Chugach State Park Trail Management Plan*.

2010 *Chugach Access Plan: Public Review Draft*.

2011 *Public Review Draft Chugach State Park Management Plan*.

2016 *Recommended Revisions to the Public Review Draft Chugach State Park Management Plan*.

2017a *Public Review Draft Chugach State Park Management Plan*. Accessed December 19, 2017: http://dnr.alaska.gov/parks/units/chugach/manageplanchug.htm

2017b *Environmental Assessment Seward Highway Mileposts 105-107, Windy Corner Improvements, 0A3134/AK 56631*.

Alaska Department of Transportation and Public Facilities

1998 *Seward Highway Corridor Partnership Plan, A Strategy for Management, Economic Development, and Conservation.* Prepared by the National Trust for Historic Preservation, Rural Heritage and Heritage Tourism Programs, with Whiteman and Taintor, Planning Consultants

2004 *Categorical Exclusion Checklist* for *Seward Highway Safety Improvements Indian to Potter Marsh, MP 105 to MP 115*.

2006 *Seward Highway: Girdwood to Potter Marsh Fatal Collision & Possible Mitigation Strategies for Collisions Involving Vehicles Traveling in Opposite Directions*

2009 *Seward Highway Corridor Partnership Plan.*

2011a *2011 Alaska Traffic Crashes*.

2011b *Historic Windy Corner Options DOT&PF Evaluation 2006-2011.*

2011c *Value Engineering Study Report. Prepared for the Department of Transportation and Public Facilities*.

2013a *Scoping Summary Report* for *Seward Highway MP 105 – 107, Windy Corner*.
2013b *Memorandum of Cost Comparison of Borrow Material Sources*
2018 *Alaska Environmental Procedures Manual*.
2016 *Draft Section 404 Permit Application*.
2017a *Design Study Report* for *Seward Highway: MP 105-107, Windy Corner Anchorage, Alaska*
2017b *Draft Seward Highway Milepost 105-107 Windy Corner Special Use Permit Application for Material Development and Use.*
2017c *Policy and Procedure(s)*.
2017d *Safety Corridors Audit 2017*.
2017e *Revised Environmental Assessment Seward Highway Milepost 75-90 Road & Bridge Rehabilitation*.
2017f *Traffic Noise Analysis Report*.
2018a *Alaska's Scenic Byways: Seward Highway All American Road* accessed on January 5, 2018: http://www.dot.state.ak.us/stwdplng/scenic/byways-seward.shtml
2018b Seward Highway MP 99-115 accident data, 2013-2015 (unpublished)

Alaska Department of Transportation and Public Facilities, Alaska Department of Natural Resources, and Alaska Railroad Corporation
2001 *Memorandum of Agreement*.

Alaska Exotic Plants Information Clearinghouse
2018 *Alaska Exotic Plants Information Clearinghouse Data Portal* accessed on January 5, 2018: http://aknhp.uaa.alaska.edu/apps/akepic/

Alaska Railroad Corporation
2017 *Coastal Classic*. Accessed December 5, 2017: https://www.alaskarailroad.com/ride-a-train/route-map/coastal-classic

Anchorage Daily News
2017 *Seward Highway reopened after landslide*. Published December 18, 2017.

DOWL
2013 *Bald Eagle Survey Letter*.

Federal Emergency Management Agency
2009 *Flood Insurance Rate Map 0200051500D*.

Federal Highway Administration
2018 *Environmental Review Toolkit* accessed on January 17, 2018 https://www.environment.fhwa.dot.gov/about/topic_list.aspx

Granite Construction
2017 Cost Analysis for Seward Highway MP 105 to MP 107 Material site and Transport Options

LGL Alaska Research Associates, Inc.
2015 *Biological Assessment of the Cook Inlet Beluga Whale (Delphinapterus leucas) for the Seward Highway MP 105—107 Windy Corner Project, Municipality of Anchorage, Upper Cook Inlet, Alaska*. Prepared for the Department of Transportation and Public Facilities.

Municipality of Anchorage
1997 *Areawide Trails Plan*.
2009 *Turnagain Arm Comprehensive Plan*.

National Marine Fisheries Services
2008 *Conservation Plan for the Cook Inlet Beluga Whale*.
2011 *Final Rule to Designate Critical Habitat for the Cook Inlet Beluga Whale.*

National Oceanic Atmospheric Administration
2008 Federal Register Document E8-25100 filed October 17, 2008. 73 Federal Register 62919. Published October 22, 2008.
2011 Federal Register Document 2011-16987 filed July 6, 2011. 76 Federal Register 39857. Published July 7, 2011.
2018 *FAQ – Tide Predictions and Data*. 9. Where are the highest tides? Accessed on February 26, 2018: https://tidesandcurrents.noaa.gov/faq2.html

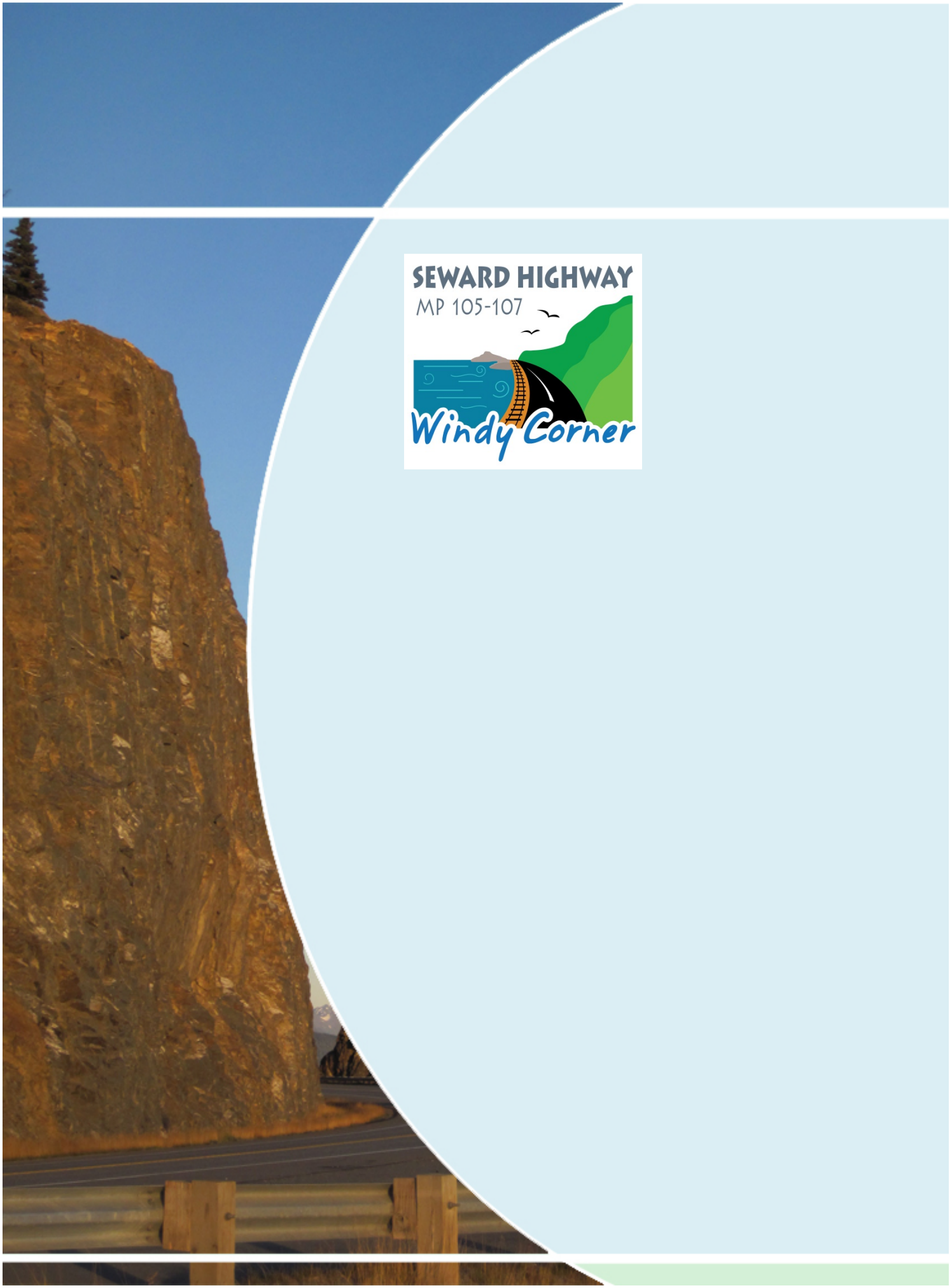
Natural Resources Conservation Service
2018 *Prime and Important Farmlands NRCS Alaska*.

Sieling, Kristian.
1998 *The Scar: Southcentral Alaska Rock Climbing*.

Seward Highway All-American Road Partnership
2017 *The Seward Highway Road Guide: Journey Deep into Alaska & Out of This World*.

United States Environmental Protection Agency
2017a *EJSCREEN ACS Summary Report*.
2017b *EJSCREEN Census 2010 Summary Report*.

United States Fish and Wildlife Services
2017 *Timing Recommendations for Land Disturbance & Vegetation Clearing, Planning Ahead to Protect Nesting Birds*.
2016 *Windy Corner IPaC Trust Resource Report*.
2018 *National Wild and Scenic Rivers System Mapper* accessed on January 4, 2018: https://www.rivers.gov/alaska.php



SEWARD HIGHWAY

MP 105-107

Windy Corner