

STERLING HIGHWAY, MILEPOST 45-60  
Supplemental Draft Environmental Impact Statement  
Alternatives Evaluation

Evaluation Criteria and Alternatives Analysis



*Prepared for:*



**State of Alaska  
Department of Transportation and  
Public Facilities**

*Prepared by:*

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

**May 2003**

## Table of Contents

<b>1.0 Introduction</b> .....	2
<b>2.0 Project History: Alternatives Considered but Rejected</b> .....	3
3.1 Purpose and Need Criteria .....	4
3.2 Physical Environmental Criteria .....	6
3.3 Social Environment Criteria .....	8
3.4 Transportation Criteria.....	11
3.5 Cost .....	11
3.6 Other factors.....	12
<b>4.0 Alternatives Analysis</b> .....	13
4.1 Introduction.....	13
4.2 Analysis of Alternatives.....	13
4.2.1 No Build Alternative.....	13
4.2.2 Kenai River Wall Alternative .....	14
4.2.3 Kenai River Alternative .....	17
4.2.4 Cooper Creek Alternative .....	20
4.2.5 Russian River Alternative .....	23
4.2.6 “G” South Alternative and “G” North Alternative .....	26
4.2.7 Juneau Creek “F” Wilderness and Forest Alternatives.....	29
4.2.8 Juneau Creek Wilderness and Forest Alternatives.....	33
<b>5.0 References</b> .....	37

### List of Tables

Table 1. Facts Summary.....	39
-----------------------------	----

### List of Figures

Figure 1. Project Alternatives.....	52
-------------------------------------	----

### Appendices

Appendix A: Historical and Archaeological Properties Draft Impact Analysis	
Appendix B: Kenai River Special Management Area and Cooper Landing Land Use Plan Draft Impact Analysis	
Appendix C: Chugach National Forest Plan and Kenai National Wildlife Refuge Plan Draft Impact Analysis	
Appendix D: Preliminary List of Private Property Impacts and Potential Relocations	
Appendix E: Traffic Analysis Memorandum	
Appendix F: Life Cycle Cost Memorandum	

## **1.0 Introduction**

The project team is assessing alternatives to improve the segment of the Sterling Highway between milepost (MP) 45 and MP 60. These alternatives are based on previous studies and environmental analyses, engineering analysis, objectives in the purpose and need statement, and agency and stakeholder input. The purpose of the Supplemental Draft Environmental Impact Statement (SDEIS) is to consider a full range of reasonable alternatives and disclose the potential impacts of those alternatives on the natural, social, and economic environment. Currently, there are eight build alternatives being evaluated as part of the Sterling Highway MP 45-60 SDEIS process. The SDEIS will ultimately be the document used by the Alaska Department of Transportation and Public Facilities (ADOT&PF) to base their recommendation to the Federal Highway Administration (FHWA) on the appropriate means to improve this portion of the Sterling Highway.

Evaluation criteria were developed by ADOT&PF with input from agencies and community and interest group stakeholders over a several month period. This input was supplemented by communication with the broader community through a web-based survey instrument. The criteria were finalized after review and discussion by the Agency Consultation Committee (ACC) and the Stakeholders Sounding Board (SSB). This document examines each alternative in terms of: (1) consistency with the objectives outlined in the purpose and need statement; (2) potential environmental effects, which include social and economic effects; (3) potential transportation-related effects; (4) projected costs; and (5) engineering feasibility.

This document provides the rationale for determining which alternatives are reasonable and which should be eliminated from further evaluation in the SDEIS. The reasonable alternatives remaining will be carried forward and evaluated along with the No Build Alternative to determine compliance with the National Environmental Policy Act (NEPA). The requirement to comply with NEPA results principally from the federal funding for the project.

## 2.0 Project History: Alternatives Considered but Rejected

The section of the Sterling Highway through the Cooper Landing area has long been acknowledged as needing improvements to address traffic delays and to upgrade the highway to current standards. The project was first evaluated in the early 1980s and again in the early 1990s as the Sterling Highway MP 37 – 60 Project. In 1995, the proposal to split the Sterling Highway MP 37 – 60 project into two separate projects was approved. The improvement of the segment between MP 37 – 45 was thus expedited and completed in 2001, leaving the segment between MP 45-60 for the current evaluation process.

A number of alternatives were identified for the Sterling Highway MP 37 – 60 Project during both the 1980s and 1990s NEPA processes (see *Sterling Highway MP 37 – 60 DEIS/Section 4 (f) Evaluation*, 1982 and 1994). Most of these were rejected for further consideration in both DEISs because of the engineering, environmental, financial, and traffic constraints of the time. In 1982, the reasonable alternatives included two partial realignment alternatives (a Juneau Creek Alternative and a Bean Creek Alternative) and a basic reconstruction, “B” Alternative. A Juneau Creek Alternative again was considered reasonable along with a 3R Alternative (reconstruction), in 1994.

Due to engineering advancements, changing community needs and perceptions, and changing volumes and projections of traffic, several alternatives rejected during the previous analyses appear here for reconsideration and some alternatives previously carried to the DEIS phase have been rejected. Basic reconstruction of the existing alignment (3R alternative) is no longer a viable alternative because it would not improve highway geometrics to current standards or adequately improve traffic flow through the Cooper Landing Area. The original traffic analysis conducted on the 3R Alternative for the 1994 DEIS only examined average annual traffic without consideration for peak season traffic volumes. After reanalyzing the 3R Alternative with peak season (summer) traffic data, it was determined that the 3R Alternative would not alleviate peak season traffic conditions. Conversely, advancements in engineering allow the consideration of some realignment alternatives formerly rejected due to costs and engineering infeasibility, such as the Juneau Creek “F” Alternative, which is discussed in following sections.

### **3.0 Evaluation Criteria**

The evaluation criteria were first introduced to the ACC and SSB in December of 2001 and January of 2002, respectively. The criteria presented were developed largely around issues identified in a series of four previous ACC and SSB meetings, beginning in March 2001, six Listening Posts, which were local community informational meetings held in March and August 2001, input received through the project website, and public/agency comment submitted during the 1994 Draft EIS for the Sterling Highway MP 37-60 EIS process. The criteria also include elements of the project purpose and need, and ADOT&PF's goals for capacity and demand, highway characteristics, and system linkage. The criteria were amended and refined after agency and public meetings in January and February 2002, and SSB meetings in January 2002. The criteria were made available in a draft form on the project website from January 2002 through March 2002. A web-based survey on the criteria was made available to the public from mid-March 2002 to mid-April 2002. The draft criteria were refined based on input received from the ACC, SSB, and 230 participants of the web-based survey. The top six criteria emerged as follows:

- Minimize impacts to water quality and fish habitat.
- Minimize impacts to the Kenai River.
- Improve driver and pedestrian safety.
- Move both through and local traffic efficiently within Cooper Landing.
- Minimize impacts to wildlife habitat.
- Maintain the scenic quality of the corridor.

The criteria were finalized at the April 2002 meetings of the ACC and SSB.

#### **3.1 Purpose and Need Criterion**

This criterion evaluates the alternatives relative to the adopted statement of purpose and need. Alternatives are evaluated on specific measures to help determine their consistency with the project purpose and, in turn, their reasonableness for further evaluation in the NEPA document. Generally, alternatives that do not satisfy the project's purpose and need are not considered reasonable.

The purpose and need for the Sterling Highway MP 45-60 Project is as follows:

The ADOT&PF has identified a need to improve the Sterling Highway in the Cooper Landing and Kenai River area (MP 45-60) to "rural principal arterial" standards. The purpose is to serve through-traffic, local community traffic, and traffic bound for recreation destinations in the area efficiently and safely, now and in the future. The ADOT&PF recognizes the need to serve the traveling public while doing its part to protect the Kenai River corridor.

**MP 45-60 Highway Problems.** There are three interrelated problems with the existing road that improvements would address:

- **Capacity and Demand.** Designated by Congress as a National Highway System (NHS) route and by ADOT&PF as a rural principal arterial, the Sterling Highway between Mileposts 45-60 should operate at Level of Service C (LOS C) or better. Current and projected vehicle trips during the summer recreation season result in operations at LOS E. Projected LOS has been modeled for each of the alternatives to reflect the seasonal variation in summer and winter. The summer or peak season is defined as the period from June through August.
- **Highway Characteristics.** It is the ADOT&PF's goal to bring Alaska's segments of the NHS up to current national design standards. Existing characteristics of the Sterling Highway do not meet current "rural principal arterial" standards. From MP 45-60, the curves, shoulders, guardrail and clear zones, driveways and intersections all contribute to the substandard nature of the roadway. Although all alternatives can and would be built to "rural principal arterial" standards, the degree to which each efficiently and safely moves traffic and improves traffic flow may vary.
- **System Linkage.** The NHS serves as the essential connector between the population centers, economic centers, military bases, and intermodal centers (such as airports, shipping ports, and ferry terminals) of the state. The Sterling Highway is a NHS route and the only road link between southcentral Alaska and the western portion of the Kenai Peninsula. Given its current highway characteristics and an LOS below current standards, the Cooper Landing and Kenai River section (MP 45-60) does not provide consistent system linkage. Consistent system linkage requires an effective flow of through-traffic. Through-traffic flow can be enhanced by upgrades that would meet current highway standards and by improving highway routing. Each alternative is evaluated on how well it contributes to improved traffic flow and, therefore, system linkage (consistency with NHS).

The purpose and need statement emphasizes accommodation of traffic, as this a basic function of the Sterling Highway. Analysis of traffic volumes is useful in understanding the general ability of a road to handle traffic, in this case, the seasonal peak traffic that occurs during the summer months. However, traffic volumes alone do not provide insight into the ability of the road network to carry additional traffic nor the quality of service associated with the road facilities. To do this, the concept of LOS has been employed to describe traffic performance.

A thorough explanation of this concept, which can be found in Appendix E, Traffic Analysis Memorandum, is necessary to understanding the importance of this factor in the purpose and need criterion. In brief, LOS can be measured at intersections and along key roadway segments. Categories are similar to report card ratings for traffic performance.

Levels of Service A, B and C indicate conditions where traffic moves without significant delays over periods of peak travel demand. Levels of service D and E are progressively worse peak hour operating conditions, and the F condition represents traffic flow that breaks down, causing severe congestion.

The LOS concept, in conjunction with other traffic information and highway characteristics data, has been factored into the need for the project and objectives for improving the existing conditions.

The goal for highway capacity in the design year 2025, as stated in the project purpose and need, is to achieve LOS C for the entire length of the project. The current configurations of the proposed alternatives do not, in all cases, achieve LOS C or better. As a result, a review was conducted to determine, conceptually, what additional roadway improvements would be needed to obtain LOS C or better for each of the alternatives. In most cases, additional lanes in both directions would be needed, which would not be consistent with adjoining sections of the Sterling Highway that are primarily two lane segments with periodic passing lanes or segments with adequate sight distance to allow passing with just two opposing lanes of traffic. While alternatives with four lanes may provide a desirable LOS, they would not be consistent with driver expectation and would have substantially greater right-of-way (ROW) and community impact. A related discussion and graphic depiction of what changes would be required with LOS C in 2025 can be found in the Traffic Analysis Memorandum, Appendix E.

### 3.2 Physical Environmental Criteria

**Natural Resources Impacts from Construction:** The impacts of construction (determined by existing preliminary design information) on natural resources are summarized in terms of impacts to the Kenai River (including drainages and tributaries), wetlands, fish and wildlife habitat, and vegetation. Specific measures are described as follows:

***Kenai River:*** The extent to which the Kenai River would be affected by the alternatives is assessed, based on the *Affected Environment* technical memorandum. The potential for construction impacts is expected along the length of highway where the alignment is adjacent to or crosses the river, its drainages, tributaries, or floodplain. The proximity of the highway to the river, number of crossings, and length of highway within the floodplain are reported.

***Wetlands:*** Types of wetlands that would be affected by the alternatives are reported based on the *Preliminary Wetlands Analysis* memorandum. Construction impacts to wetlands are assumed to occur along the length of highway where the alignment crosses wetlands. For each alternative, the area of wetlands (by type) that would be affected by construction is described. The areas of wetlands potentially filled were calculated using the length of highway through mapped wetlands and average width of the proposed highway [i.e., 131 ft].

**Essential Fish Habitat:** Essential fish habitat (EFH) includes those waters and substrate identified by the National Marine Fisheries Service (NMFS) that are necessary for anadromous and marine fish for spawning, breeding, feeding, or growth to maturity. Construction impacts to EFH are assumed to occur where construction requires “in-water” work (below ordinary high water, OHW) or where a structure would be placed in an anadromous stream or riparian wetland.

**Anadromous Streams:** The number of anadromous streams crossed by the alignment is considered. Information regarding anadromous streams comes from the Alaska Department of Fish and Game (ADF&G) *Anadromous Waters Catalogue*.

**Vegetation:** The construction impacts to native plants in the proximity of the alternative are considered. Vegetation community types included in the analysis are:

- Needle-leaved forests (includes black, white, and Lutz spruce and western hemlock).
- Broad-leaved forests (includes paper birch, cottonwoods, and some taller willows).
- Scrub-shrub communities (includes alders and willows, short black spruce, dwarf birch, sweet gale, and prickly rose).
- Herbaceous vegetation (includes grasses, sedges, horsetails, and a variety of herbs).

An evaluation of Chugach National Forest (CNF) designated sensitive plant species and Kenai National Wildlife Refuge (KNWR) designated plants of special consideration will likely be done if an alternative is selected that affects CNF or KNWR lands. The survey would provide information for a biological evaluation of project impacts on CNF and KNWR lands.

**Wildlife Habitat:** Wildlife (bird and mammal) habitat primarily includes areas used for foraging, breeding, nesting, traveling, and wintering. Habitat fragmentation and displacement are critical issues for bald eagles, dall sheep, moose, and brown bears. Impacts are assumed to occur along the length of the highway where the alignment crosses, runs parallel to, or is within the habitat areas outlined above. Historical collision data along with habitat information provided by the ADF&G and U.S. Fish and Wildlife Service (USF&WS) is reported.

**Aesthetics:** The visibility of proposed alternatives from Cooper Landing, the Kenai River, and area trails are generally described, based on feedback received during recent project scoping efforts.

**Natural Resources Impacts from Operation:** This factor addresses maintenance and long-term use of the project facilities and considers the effects of highway storm water runoff and the physical presence of on-land and in-water structures with respect to fish and wildlife habitat. The types of impacts assessed include migration interruption, displacement, and increased human access and disturbance. Because of the vulnerability of the project area and its resources to vehicular accidents and releases of hazardous



materials, the potential for toxic spills is also considered as a criterion. This evaluation is based on the *Emergency Response Assessment and Hazardous Materials Spill Control Memorandum* (HDR, 2003). The location of each alternative in relation to Tier I waters (the Kenai River, Russian River, Juneau Creek and Cooper Creek), Tier II waters (tributaries of the Kenai River), riparian areas, and wetlands is considered. The portion of each alternative with down gradient residences that potentially have wells is also considered. Evaluation of degree of impact is described as an estimation of high (67% - 100%), moderate (33% - 66%), and low (0 – 32%).

### 3.3 Social Environment Criteria

**Historical and Archaeological Properties:** These are structures or properties on or eligible for the National Register of Historic Places established under the National Historic Preservation Act (NHPA) of 1966. Historic properties are defined in the NHPA as prehistoric and historic sites, buildings, structures, districts, and objects included in or eligible for inclusion in the National Register of Historic Places, as well as artifacts, records, and remains related to such properties. Section 106 of the NHPA addresses the need for federally funded projects to assess impacts to historical properties. Certain historic properties are also protected under Section 4(f) of the Department of Transportation Act (1966), later re-codified as Title 49 of the U.S. Code. Impacts to historic properties are based on the potential effect of the alternative (determined by existing preliminary design information) on such resources identified during preliminary literature reviews and agency coordination and/or in the *Preliminary Identification of Section 4(f) Properties Technical Memorandum* (HDR 2002) prepared for the Sterling Highway project. Historic properties adjacent to or potentially directly affected by the alignment are identified and the number reported (see Appendix A).

**Recreational, Public Park, Wildlife and Waterfowl Refuge, or Historic Properties:** Recreational, public park, wildlife and waterfowl refuge, or historic properties are also protected under Section 4(f) of the Department of Transportation Act (1966). Section 303 of Title 49 is a “policy on lands, wildlife and waterfowl refuges, and historic sites.” It states that the FHWA may approve a transportation project that requires use of “publicly owned land of a public park, recreation area, or wildlife and waterfowl refuge..., or historic site” only under specific conditions. These conditions are:

- “(1) there is no prudent and feasible alternative to using that land; and
- (2) the program or project includes all possible planning to minimize harm to the park, recreation area, wildlife and waterfowl refuge, or historic site resulting from the use.”

Impacts (determined by existing preliminary design information) to publicly owned recreation areas, parks, wildlife refuges, and historic sites are assumed to occur where the alignment crosses the property. These areas are identified in the *Preliminary Identification of Section 4(f) Properties Technical Memorandum* (HDR 2002).

**Impacts to Land Use/Community Facilities:** The impacts of each alternative (determined by existing preliminary design information) on existing land use and community facilities are described as follows:

***Existing Development:*** This criterion identifies direct impacts to current land uses in and immediately adjacent to Cooper Landing (private residences, businesses, other property, mining claims, etc.) as a result of the location of the alignment of each alternative. The number of structures that may be relocated by construction of each alternative is also considered (see Appendix D).

***Community Facilities:*** This criterion identifies direct impacts to community facilities, including the school, post office, and community center.

**Local, Regional, Statewide, and Federal Plans:** This criterion discusses whether an alternative is addressed in local, regional, Statewide, or federal plans guiding future land use decisions and land manager policy within the project study area. Plans reviewed include the Kenai Area Plan, Kenai River Comprehensive Management Plan, Cooper Landing Land Use Plan, Chugach National Forest Plan, Kenai National Wildlife Refuge Plan, and Cook Inlet Region, Incorporated (CIRI) land selections. Discussion is based on feedback received during recent project scoping efforts.

The ***Kenai Area Plan*** (DNR, 2000) identifies several parcels in the project area that are of particular interest to the Cooper Landing community. The Kenai Peninsula Borough (KPB) made several selections, including Unit 395, near the proposed Juneau Creek alignment as it was proposed in the 1994 Draft EIS for the Sterling Highway MP 37-60 project, and Unit 394B, which is south of the highway and east of Gwin's (MP 52.4). As a result of developing the SDEIS, the KPB and the community of Cooper Landing have elected to leave the designated use of the land selections unchanged if the preferred alternative is north of the river. In the event a south-side alternative is advanced as preferred, the KPB, which selected Unit 394B as recreation land, would work with the Alaska Department of Natural Resources (DNR) regarding the possibility of changing the use designation of selected parcels (*Sterling Highway, MP 45-60: Secondary and Cumulative Impacts Study*, 1997).

The ***Kenai River Comprehensive Management Plan*** identifies objectives, goals, and recommendations for land use actions within the Kenai River Special Management Area (KRSMA) and adjacent lands. According to the plan, the purpose of the KRSMA is "to protect and perpetuate the fishery and wildlife resources and habitat in the unit and adjacent area, and to manage recreational uses of development activities in the unit and adjacent areas." For road construction projects, the plan recommends positioning alignments away from the Kenai River and minimizing impacts to riverine areas, wetlands and tributaries of the Kenai River. The plan also recommends minimizing the number of new crossings of the Kenai River and its tributaries. The length of each alternative within the KRSMA (and proposed additions to the KRSMA) and the consistency of the alternatives with the goals, objectives, and recommendations of the KRSMA are considered (see Appendix B).

The *Cooper Landing Land Use Plan* (KPB 1996) serves as a guideline to evaluate the best uses of borough-owned land in Cooper Landing. The plan identifies several community goals, including maintaining the scenic qualities, unique character, and pristine setting of Cooper Landing; encouraging a safe environment for children, pedestrians, and tourists; and maintaining and providing a community economic base. Among the proposed land uses identified in the plan are two subdivisions located north of the existing highway in the vicinity of Bean Creek Road (see Appendix B, Figure B-2). According to the KPB, design of the Grouse Ridge and Birch Ridge subdivisions and a senior center should be completed by the end of 2003. Road construction in the subdivisions is planned to start in 2004. The location of the each alternative in relation to these subdivisions is considered.

The *Chugach National Forest Plan* has designated land in the project area into several management prescriptions (see Appendix C). The land use prescriptions of Forest Service land impacted by the alignments are considered. The land prescriptions within the project area are listed below (in order of most protective categories to least protective categories): management goals of each prescription are also presented:

- Backcountry lands are managed to emphasize a variety of recreational opportunities for backcountry activities in natural appearing landscapes. Other agencies (non-Forest Service) can build roads, with conditions.
- Fish and Wildlife Conservations Areas are managed to emphasize the conservation of specific fish and wildlife habitats. Other agencies (non-Forest Service) can build roads, with conditions.
- Fish, Wildlife, and Recreation lands are managed to provide a variety of habitats for fish and wildlife species and year-round recreational opportunities in developed and dispersed settings. There are no conditions on roads built by other agencies.
- Recreational Rivers are managed to maintain, enhance, and protect the free-flowing character and outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values for the benefit and enjoyment of present and future generations. There are no conditions on roads built by others.
- Major Transportation/Utility Systems are managed for existing and future transportation systems/utility systems (defined as state and federal highways, etc.). This prescription was developed to specify management direction for existing and reasonably foreseeable future major transportation and utility routes. There are no conditions on roads built by others.

The CNF has identified two Inventoried Roadless Areas within the project area. Impacts to these areas are considered for each alignment. Although these areas are designated as roadless, the Forest Service allows road construction in these areas upon approval.

The *Kenai National Wildlife Refuge Plan* is currently being updated. According to the 1985 plan, the refuge land within the project area is designated as Wilderness or Intensive Management (see Appendix C):

- Wilderness lands are managed to preserve the pristine and unmodified character of these areas. Wilderness is the most protective management category and Congressional approval is required to construct roads in these areas.
- Intensive Management lands are areas of high public use where natural processes are modified and the influence of human activities is evident. Intensive Management is the least protective management category. Construction of roads is allowed in these lands.

**Economics:** The impacts to the local economy (determined by existing preliminary design information) both in Cooper Landing and on the Kenai Peninsula are evaluated based on the results from the origin and destination study to assess the percentage of vehicles passing through the community as opposed to those stopping for services (*Origin-Destination Survey, Sterling Highway Project MP 45-60, HDR 2001*). The information in the existing study will be updated for use in evaluating the alternatives brought forward to the SDEIS.

**Subsistence:** Impacts (determined by existing preliminary design information) are discussed in terms of whether an alternative would affect known areas currently used for subsistence, based on feedback received during recent project scoping efforts.

### **3.4 Transportation Criteria**

The impacts of each alternative (determined by existing preliminary design information) on transportation are summarized in terms of impacts to vehicular transportation. Note that the Purpose and Need Criterion (Section 3.1) details the transportation criteria relating to capacity and demand, highway characteristics, and system linkage. Additional measures are as follows:

**Vehicular Traffic Impacts During Construction and Operation:** This criterion describes impacts during construction to vehicle travel in the vicinity of the alternatives. Impacts to vehicular traffic are based on existing average daily traffic along the affected portion of the Sterling Highway.

**Freight Movement:** Each alternative is evaluated based on factors critical to the movement of freight on the Kenai Peninsula. Highway characteristics, travel speed, and the mix of freight vs. recreational/local traffic are assessed.

### **3.5 Cost**

The estimated costs for the total project and maintenance are considered for each alternative. This cost breakdown is defined as follows:

**Construction Costs:** The total estimated project costs are based on conceptual design quantities and materials unit costs in 2005 dollars, for comparison purposes. This includes administration, design, construction, structure cost, construction management, and contingencies for construction. In this analysis, a contingency of 25% is applied to all options.

**Annual Maintenance Costs:** These costs include current and estimated annual operating and maintenance costs expressed in 2005 dollars. Primary costs are for personnel and equipment to conduct normal maintenance on any of the alternatives.

**Life Cycle Costs:** These costs represent the total expected expenditures over the design life of the alternative: design, construction, operation and maintenance costs. They are expressed in 2005 dollars (see Appendix F).

### **3.6 Other factors**

Other factors affecting the reasonableness of project alternatives are discussed to the extent they have a bearing on the particular alternative.

**Engineering Feasibility:** Certain alternatives depend on the construction of structures that may pose a risk to the surrounding area should they fail. The extent to which an alternative involves challenging engineering measures is discussed.

## **4.0 Alternatives Analysis**

### **4.1 Introduction**

Each alternative will be evaluated for the design year 2025 according to the criteria outlined previously:

- Consistency with the purpose and need statement.
- Consideration of physical and social environment criteria.
- Consideration of transportation criteria.
- Consideration of cost criteria.
- Consideration of engineering feasibility.
- Consideration of criteria important to the community.

Criteria important to the community include minimizing impacts to water quality and fish habitat, minimizing impacts to the Kenai River, improving driver and pedestrian safety, efficient movement of traffic for through-traffic and within Cooper Landing, minimizing impacts to wildlife habitat, and maintaining the scenic quality of the corridor.

The alternatives summary table (Table 1) provides the framework for determining which of the alternatives are reasonable. The NEPA considers reasonable those alternatives that are practical or feasible from a technical and economic standpoint and using common sense.<sup>1</sup> The task of this document is to determine which alternatives, based on their feasibility and practicality, are reasonable for inclusion in the project NEPA document, a Supplemental Draft Environmental Impact Statement (SDEIS).

### **4.2 Analysis of Alternatives**

#### **4.2.1 *No Build Alternative***

The No Build Alternative would not meet the purpose and need of the project in the design year 2025 because capacity would not be improved. This Alternative has LOS E on all segments (Appendix E, Traffic Analysis Memorandum). Narrow lanes, lack of shoulders, and uneven grades contribute to poor operations. The Sportsman's Landing area (MP 54.5) is expected to operate poorly during peak periods because of the number of vehicles entering and exiting the roadway at this point. The LOS in the project area would continue to be unacceptable for the peak season for longer and longer daily periods. Consequently, the peak season – three months during summer – would become more unremitting. Highway characteristics also would not be improved to “rural principal arterial” standards as recommended. Given the lack of improvement in capacity and highway characteristics, this section of the Sterling Highway would continue to be an impediment to effective system linkage (traffic flow).

---

<sup>1</sup> Council on Environmental Quality: 40 Most Asked Questions Concerning CEQ's NEPA Regulations; 46 Fed. Reg. 18026, as amended, 51 Fed. Reg. 15168.

The physical environment would not sustain additional impacts, either adverse or beneficial, under the No Build Alternative. However, non-standard drainage and runoff management would continue to contribute potential adverse impacts to Kenai River water quality. There would be no improvement in the risk of hazardous material spills. There would be no additional impact to historical properties, recreational properties, or subsistence. However, impacts would be felt in the areas of land use and community facilities and economics. As congestion increases, movement of travelers and goods through the project area would slow. Increased congestion in Cooper Landing and at recreation access points may compel travelers to proceed through the project area and stop elsewhere.

There would be no traffic impacts due to construction. Without construction costs, cost impacts would also be negligible under this alternative. Annual maintenance costs are \$63,000. The life cycle cost (maintenance through the design year 2025) of the No Build Alternative is estimated at \$837,210. Based on public input received-to-date, the community of Cooper Landing and through travelers from other parts of the region say that the No Build Alternative does not improve the road to address their stated concerns of improved traffic flow, pedestrian safety, reducing traffic speed and fixing identified problem areas such as tight curves and intersections. Concerns about the efficient and safe movement of freight through Cooper Landing would not be addressed. Freight movements would be impacted over time by increasing congestion.

#### ***4.2.2 Kenai River Wall Alternative***

The Kenai River Wall Alternative (Figure 1) does not meet the project purpose and need with respect to capacity and demand in the design year 2025. Although the Kenai River Wall Alternative would operate well (LOS B) on each end of the project due to the inclusion of passing lanes, segments between MP 55.5-49 and MP 47.2-46 would operate at LOS D due primarily to high traffic volume (Appendix E, Traffic Analysis Memorandum). The segment between MP 49-47.2 would operate at LOS E because of steep grades, slow speeds, and high traffic volume. The Sportsman's Landing area (MP 54.5) would continue to operate poorly during peak periods because of the number of vehicles entering and exiting the roadway. The LOS would remain low (LOS E) for three- to five-hour periods per day during the peak season, with only marginal improvements in traffic flow due to added passing and left turn lanes. Highway characteristics, however, would be improved by reconstructing the highway to "rural principal arterial" standards, and system linkage would be enhanced and made consistent with other Sterling Highway improvements.

The physical environment would experience habitat impacts related to widening the roadway, building retaining walls, and reconstructing existing bridges on the Kenai River (Cooper Landing and Schooner Bend Bridges) and on Cooper Creek. Reaches of the Kenai River and Cooper Creek within the project area contain anadromous fish. Kenai River water quality and aquatic habitat would be put at risk due to potential wall failure.

Approximately 2.6 acres of wetlands and 185 acres of vegetated habitats would be directly impacted. Roadway widening and wall construction would displace wildlife in these habitats and increase the fragmentation of ranges and the interruption of migration corridors. Line-of-sight and visibility would be improved to reduce the occurrence of animal/vehicle collisions.

There could be a beneficial impact on the quality of storm water runoff due to construction of drainage features that meet current standards. The area available for construction of drainage and water treatment features may, however, be limited under this alternative due to the proximity of the Kenai River. The existing conditions do not meet current standards for drainage and storm water runoff management. However, wall construction could pose a threat to water quality in the Kenai River due to possible erosion of exposed soils and rock and a possible catastrophic event creating a potential wall failure. There would be the potential for water quality impacts from storm runoff during construction. Best management practices would be used to reduce the risk of adverse impacts to water quality.

According to the *Emergency Response Assessment and Hazardous Materials Spill Control Memorandum*, the Kenai River Wall Alternative has high exposure to Tier I waters (Kenai River, Russian River, Juneau Creek, and Cooper Creek). Over 70% of this alternative is located within 500 feet of Tier I waters. This alternative has low (1.5% and 1.3%) exposure to Tier II streams and wetlands, but has moderate (37.2%) exposure to down gradient residences (where well contamination could be possible in the event of a release of hazardous materials).

Aesthetics would be substantially impacted by the visibility of retaining walls, which would be up to 180 feet high, the height of an 18-story building (assuming 10 feet per story). The walls would be visible to recreationists on the Kenai River and Resurrection Trail and to travelers and residents. Noise reflected from the walls could be audible in areas currently valued for their natural setting such as the KRSMA, the Resurrection National Recreation Trail, and the community.

There are potential adverse impacts to the social environment under this alternative. In particular, an estimated 20 historic and archaeological properties including the Footprints and Beginnings Interpretive Sites, are potentially adversely affected. Recreational properties would also be impacted along the length of the project. A number of recreation areas (Cooper Landing Boat Launch, Cooper Creek Campground, KPB Recreation land, and the USFS Kenai River Recreation Area) are adjacent to the existing alignment and would be affected by any widening of the ROW and construction of retaining walls.

The Kenai River Wall Alternative would not interfere with the planned Grouse Ridge and Birch Ridge subdivisions (*Cooper Landing Land Use Plan*). Approximately 22.5 acres of the KRSMA or proposed additions to the KRSMA would be built on by the Kenai River Wall Alternative. The *Kenai River Comprehensive Management Plan* recommends that new public roads be located away from the Kenai River. Contrary to this



recommendation, the Kenai River Wall Alternative is located adjacent to the Kenai River. This alternative would not, however, require additional bridge crossings of the Kenai River or its tributaries. According to the KRSMA, development within the Kenai River watershed should avoid significant impacts to the resources of the river including its visual quality. As mentioned above, wall construction would substantially impact the aesthetics of the project area. The Kenai River Wall Alternative would impact approximately 4 miles of CNF land designated as Major Transportation/ Utility Systems and approximately 0.4 miles of Fish, Wildlife, and, Recreation land.

This alternative potentially impacts a total of 46 private properties. In addition, construction of this alternative may require the relocation of 7 homes or businesses. Changed or limited access to local businesses resulting from eliminating driveways or parking area access, coupled with increasing traffic, may sway travelers to pass through the community without stopping for services.

Evaluation of the Kenai River Wall Alternative using the transportation criteria indicates that it fails to achieve the purpose and need of the project regarding capacity and demand, LOS C in design year 2025 (32% at LOS B, 54% at LOS D, and 14% at LOS E) (Appendix E). Through and local traffic would not be separated in the community of Cooper Landing. Traffic impacts would result from failure of the reconstructed highway to improve the LOS during the peak season. Although the addition of passing lanes would improve traffic flow and capacity in some segments, capacity will not be sufficiently increased overall.

Local access would be maintained to the extent practicable. Driveways may be moved or if access cannot be provided acquisition of property may be necessary. Without separation of through and local traffic, improvement in freight movement would be limited.

Vehicular traffic impacts during construction would include closing at least one lane of the highway and intermittent complete closures. Moderate to severe impacts could result from construction during the summer tourist season. There would likely be some seasonal constraints on the construction schedule to lessen impacts to fish and wildlife habitat.

Construction costs are estimated to be \$120 million. The annual wall maintenance costs are substantial, adding \$97,570 per year (approximately 10% of construction costs over 50-year design life). Overall annual maintenance costs are \$205,090. The life cycle cost of this alternative is estimated at \$104 million.

Under this alternative, three major walls approximately 130 feet to 180 feet high would be required, which would produce 1.5 million cubic yards of excess material. The excess material (approximately 150,000 end-dump truck loads) would require environmentally acceptable disposal, which is currently unavailable and infeasible in this area and unlikely to be developed. It would be necessary to develop a new disposal site in another

area, which would require hauling the material some distance. This would greatly increase both the environmental impacts and the cost of the project.

Wall construction raises serious engineering feasibility concerns (*Soil Nail Walls Assessment, Kenai River Alternative Memorandum, 2003*). Research conducted for the memorandum indicates that walls of this height and type have not been constructed previously in the U.S. There is also a geotechnical risk involved in constructing walls of this height because of the type of rock and soil present and the prevalence of earthquakes in the area. In addition, the complication of long-term maintenance to protect water quality in the Kenai River must be considered. The erosion of exposed glacial deposits and unstable rock in the area, together with the possibility of wall failure due to earthquakes, would be a hazard not only to the adjacent sections of the Kenai River but to downstream aquatic environments as well.

Upgrades to shoulder widths, horizontal and vertical road curvature, side slopes, recovery areas, and stopping distances would improve driver safety under this alternative. Shoulders would be provided for bicyclists and pedestrians. Because through and local traffic would continue to travel in Cooper Landing, bicycles and pedestrians would still face safety concerns stemming from large volumes of traffic (including trucks) moving through town.

Public and agency input received-to-date places “protection of the Kenai River” as the highest priority criteria. The potential for failure of the walls and the resulting impacts places the river at risk in the Kenai River Wall Alternative, which the public and agencies have clearly indicated is a concern. Public and agency input has included concerns about impacts to historical, cultural and recreational areas along the river, increased travel speed through the community, local access safety issues, and construction impacts during the peak tourist seasons. While this alternative is in conflict with the many concerns expressed by the public and agencies, there is interest in an alternative along the existing alignment because it is a built environment.

### **4.2.3 Kenai River Alternative**

The Kenai River Alternative (Figure 1) does not meet the project purpose and need with respect to capacity and demand in the design year 2025. Although the alternative would operate well (LOS B) on each end of the project, due to the inclusion of passing lanes, segments between MP 55.5-49 and MP 47.2-46 would operate at LOS D, primarily because of the traffic volume (Appendix E, Traffic Analysis Memorandum). The segment between MP 49-47.2 would operate at LOS E because of grades, slow speeds, and traffic volume. The Sportsman’s Landing area (MP 54.5) would continue to operate poorly during peak periods because of the number of vehicles entering and exiting the roadway. For three- to five-hour periods per day during the peak season, the LOS would remain low (LOS E). Adding passing and left turn lanes would improve traffic flow somewhat, but capacity would not increase. Highway characteristics, however, would be improved by reconstructing the highway to “rural principal arterial” standards and the

system linkage would be enhanced and made consistent with other Sterling Highway improvements.

The principal impacts to the physical environment would be the result of highway widening and new bridge construction. Four new bridges would be constructed over the Kenai River, one over Juneau Creek near its mouth, and the existing Schooner Bend and Cooper Landing Bridges would be replaced. These reaches of the Kenai River, Juneau Creek, and Cooper Creek contain anadromous fish. In addition, the aesthetic experience of river users would be affected by encountering more bridges.

Approximately 3.9 acres of wetlands and 180 acres of vegetated habitats would be directly affected by construction of this alternative. Roadway widening and bridge construction would displace wildlife in these habitats and increase the fragmentation of ranges and the interruption of migration corridors. Line-of-sight and visibility would be improved, however, to reduce the occurrence of animal/vehicle collisions.

There could be a beneficial impact on the quality of storm water runoff due to construction of drainage features that meet current standards. The area available for construction of drainage and water treatment features may, however, be limited under this alternative due to the proximity of the Kenai River. The existing conditions do not meet current standards for drainage and storm water runoff management. There would be the potential for adverse water quality impacts from storm runoff during construction. Best management practices would be used to reduce the risk of adverse impacts to water quality.

According to the *Emergency Response Assessment and Hazardous Materials Spill Control Memorandum* the Kenai River Alternative has a high exposure to Tier I waters (Kenai River, Russian River, Juneau Creek, and Cooper Creek). Over 72% of this alternative is located within 500 feet of Tier I waters. This alternative has low (2.9% and 2.0%) exposure to Tier II streams and wetlands, but has moderate (40%) exposure to down gradient residences (where well contamination could be possible in the event of a release of hazardous materials).

There are potential impacts to the social environment of the project area. In particular, an estimated 21 historical and archaeological properties, including the Footprints and Beginnings Interpretive Sites, would possibly be adversely affected. Recreational properties would also be impacted along the length of the project. A number of recreational areas (Cooper Landing Boat Launch, Cooper Creek Campground, KPB Recreation land, and the USFS Kenai River Recreation Area) are adjacent to the existing alignment and would be affected by any widening of the existing ROW and construction of new bridges.

The Kenai River Alternative would not interfere with the planned Grouse Ridge and Birch Ridge subdivisions (*Cooper Landing Land Use Plan*). Approximately 31.6 acres of the KRSMA or proposed additions to the KRSMA would be built on by the Kenai River Alternative. Contrary to recommendations of the KRSMA, this alternative is

located adjacent to the Kenai River and requires four new bridge crossings of the Kenai River and one new crossing of Juneau Creek. The Kenai River Alternative would impact approximately 3 miles of CNF land designated as Major Transportation/Utility Systems and approximately 1.3 miles Fish, Wildlife, and Recreation land.

This alternative potentially impacts 47 private properties, particularly from the Cooper Landing Bridge to the Cooper Creek Bridge. In addition, construction of this alternative may require the relocation of seven homes or businesses. Changed or limited access to local businesses resulting from eliminating driveways or parking area access, coupled with increasing traffic, may sway travelers to pass through the community without stopping for services.

Evaluation of the Kenai River Alternative using the transportation criteria indicates that it fails to achieve the purpose and need of the project regarding capacity and demand, in design year 2025 (Appendix E). Through and local traffic would not be separated in the community of Cooper Landing and traffic impacts would result from failure of the reconstructed highway to improve the LOS during the peak season: 32% at LOS B, 54% at LOS D, and 14% at LOS E (Appendix E). Although the addition of passing lanes would improve traffic flow and capacity in some segments, capacity will not be sufficiently increased overall.

Local access would be maintained to the extent practicable. Driveways may be moved or, if access cannot be provided, acquisition of property may be necessary. There would be no adverse effect on existing freight movement through the area, which may benefit from straightening some curves. However, without separation of through and local traffic, improvement in freight movement would be limited.

Vehicular traffic impacts during construction would include intermittently closing at least one lane of the highway. Moderate to severe impacts could result from construction during the summer tourist season. There would likely be some seasonal constraints on the construction schedule to lessen impacts to fish and wildlife habitat.

Construction costs for this alternative are estimated to be \$73 million with \$145,560 required for annual maintenance. The cost of bridges is estimated to be \$26 million and the life cycle cost of this alternative is estimated at \$67 million.

Engineering feasibility is not considered a critical factor because there are no unique structures or conditions under this alternative.

Upgrades to shoulder widths, horizontal and vertical road curvature, side slopes, recovery areas, and stopping distances would improve driver safety under this alternative. Shoulders would be provided for bicyclists and pedestrians. Because through and local traffic would continue to travel in Cooper Landing, bicycles and pedestrians would still face safety concerns stemming from large volumes of traffic (including trucks) moving through town.

The public and agency input received-to-date places “protection of the Kenai River” as the highest priority criteria. The public and agency input received-to-date has included concerns about visual impacts where the highway traverses the river, potential risks to the river by moving all peninsula traffic closer to and over the river, impacts to historical, cultural and recreational areas, increased travel speed through the community, local access safety issues, and construction impacts during the peak tourist seasons. There is no support in the community or from the broader public and agencies for moving the highway closer to the river.

#### ***4.2.4 Cooper Creek Alternative***

Although the Cooper Creek Alternative (Figure 1) would operate well (LOS B) on each end of the project due to the inclusion of passing lanes, it does not meet the project purpose and need regarding capacity and demand in the design year 2025. Segments between approximately MP 55.5-51 would operate at LOS D because of traffic volumes (Appendix E, Traffic Analysis Memorandum). The Sportsman’s Landing area (MP 54.5) would continue to be affected by conflicts between vehicles entering and exiting the roadway during peak periods. The segment between approximately MP 48-46 would operate at LOS D because of rolling terrain. In the new section, climbing lanes would add capacity (both up and downgrade) and the section would operate at LOS C. Operations would improve to LOS C through Cooper Landing after through-traffic is routed to the new section.

The realigned and reconstructed sections would be designed to “rural principal arterial” standards and system linkage would be enhanced and made consistent with other Sterling Highway improvements. The maximum grade on the realignment is 6%.

Constructing a new alignment around Cooper Landing and reconstruction of a portion of the Sterling Highway would potentially adversely impact the physical environment. Adverse impacts would occur as a result of constructing the new section in previously unaffected habitats and reconstructing the existing Cooper Landing and Schooner Bend Bridges. Reaches of the Kenai River and Cooper Creek within the project area contain EFH. However, the project would be beneficial to the Kenai River for the length of the new section, because a portion of the highway alignment and through-traffic would be relocated south and away from the floodplain. Moving the highway away from the river would reduce potential impacts due to runoff and the risk of hazardous materials spills. The existing portion through Cooper Landing would remain unimproved, but traffic volumes and associated potential impacts to the Kenai River would be less.

Approximately 4.6 acres of wetlands and 210 acres of vegetated habitat would be directly affected by construction. The new areas of habitat impact would contribute to wildlife displacement, habitat fragmentation, and migration route disruption. The Cooper Creek canyon is likely a migration corridor for wildlife between the Kenai River valley and the Cooper Lake area. This alternative would include measures to maximize visibility to help prevent animal/vehicle collisions, however, the new section of highway would increase the possibility of animal/vehicle collisions.

According to the *Emergency Response Assessment and Hazardous Materials Spill Control Memorandum*, the Cooper Creek Alternative has moderate exposure to Tier I waters (61%) (Kenai River, Russian River, Juneau Creek, and Cooper Creek) and down gradient residences (37%), where well contamination could be possible in the event of a release of hazardous materials. This alternative has low exposure to Tier II streams and wetlands (1.5% and 2.1%, respectively).

Aesthetically, this alternative potentially affects the view of residents on the north side of the valley and changes the character of the area near the new alignment. Those whose property is adjacent to the new alignment may experience increased noise.

Constructing a new section would increase the area of impervious surface and the volume of storm water runoff. The new section and upgraded sections of the Sterling Highway would have drainage and storm water management structures that meet current standards. This would be an improvement over the existing highway, which does not meet current standards. The storm water facilities along the existing section through Cooper Landing would not be upgraded.

Under the Cooper Creek Alternative, there is a preliminary total of 16 impacted historical properties, including archaeological properties, such as the Footprints and Beginnings Interpretive Sites. A number of recreational areas (Cooper Creek Campground, KPB Recreation land, the USFS Kenai River Recreation Area, and State Unit 394B) and two trails (Stetson Creek and Shakleford Creek Trails) are adjacent to the existing alignment and would be affected by constructing a new alignment, widening the existing ROW, and constructing bridges.

The Cooper Creek Alternative would not interfere with the planned Grouse Ridge and Birch Ridge subdivisions (*Cooper Landing Land Use Plan*). Approximately 25.3 acres of the KRSMA or proposed additions to the KRSMA would be built on by the Cooper Creek Alternative. In accordance with one recommendation of the KRSMA, a portion of the Cooper Creek Alternative is located away from the Kenai River. This alternative does, however, require one new bridge crossing of Cooper Creek. The Cooper Creek Alternative would impact approximately 3.5 miles of CNF land designated as Major Transportation/ Utility Systems and approximately 0.8 miles of Fish, Wildlife, and Recreation land. The location of the new community post office, near the Cooper Landing Bridge, may also be affected.

This alternative potentially impacts 39 private properties. In addition, construction of the Cooper Creek Alternative may require the relocation of six homes or businesses. Traffic that traditionally stops in Cooper Landing for services, approximately 7% of travelers, would be affected by rerouting through-traffic around the community. The necessity to exit the highway to access services could adversely affect community economics. Conversely, decreasing both traffic speed and congestion in Cooper Landing could increase its attractiveness as a destination for services.

Segments of the Cooper Creek Alternative, MP 55.5-51, near intersections to Sportsman's Landing (MP 54.5), Russian River Campground (MP 52.8), and MP 48-46, would experience LOS D. The resulting capacity (31% at LOS B, 22% at LOS C, 47% at LOS D) does not meet the project purpose and need (achieving LOS C); see Appendix E. Although capacity is not increased sufficiently to meet the project purpose and need, the transportation system would be beneficially impacted by separating through and local traffic in the Cooper Landing area. Traffic flow would improve in some segments of the new section and at either end of the reconstructed portion, in part due to the addition of passing lanes. Freight movement would be improved with the addition of left-turn lanes and hill-climbing lanes. The existing section of highway through Cooper Landing would be maintained for local access.

Analysis of the transportation criteria indicates that new alignment construction can occur without obstruction to present traffic. Delays required for reconstruction along the existing alignment would be limited to 11.2 miles.

Construction costs for the Cooper Creek Alternative are estimated at \$95 million. Annual maintenance costs are estimated at \$185,480. The life cycle cost of the Cooper Creek Alternative is estimated at \$85 million.

Engineering feasibility is not considered a critical factor because there are no unique structures under this alternative. There is, however, the potential for encountering unfavorable bedrock and soil conditions that could affect construction and maintenance of bridges over Cooper Creek (unstable materials near Cooper Creek Campground are currently causing erosion and sedimentation problems have increased due to rains and flooding in 2002). There is the risk of failures in the cuts and erosion of unstable materials into Cooper Creek, and thence into the Kenai River.

Driver safety would be improved under the Cooper Creek Alternative because the new section would be constructed to meet current standards for shoulder widths, horizontal and vertical curvature, side slopes, recovery areas, and stopping distances, and through-traffic would be removed from town. By removing traffic from Cooper Landing and directing pedestrians and bicyclists through town, pedestrian safety would be substantially improved.

Public and agency input received-to-date has included concerns about visual and direct private property impacts of a highway south of town. Although the Cooper Creek Alternative addresses some issues of moving through-traffic out of town, there are concerns about how this alternative rejoins the existing alignment and concerns with the impacts associated with improving sections of highway that remain close to the river. There is also concern from the community about potential economic impacts of moving through-traffic away from town. Broader public input has shown support for this alternative because of the increased ability to move through-traffic away from town. Agency input has shown some interest in this alternative because part of the new alignment is through a partially built environment, although there are outstanding concerns about the impacts to cultural and recreational resources and to the Kenai River

for those sections of improved highway along the river, as well as overall habitat concerns.

#### ***4.2.5 Russian River Alternative***

In the design year 2025, the Russian River Alternative (Figure 1) would operate well (LOS B) on each end of the project due to the inclusion of passing lanes (Appendix E, Traffic Analysis Memorandum). Between approximately MP 48-46, the alternative would operate at LOS D due to rolling terrain. Although the reduction of traffic volumes on the new section would generally improve operations in that area (LOS C), there are two segments (between MP 55.5 and the Russian River, and between Cooper Creek and approximately 2 miles east) that also would operate at LOS D because of rolling terrain. The climbing lanes in the new section would operate at LOS C both on the up and downgrade because of additional capacity. The Sportsman's Landing area (MP 54.5) would operate better because of the reduced volume of through-traffic. Lower traffic volume would produce fewer conflicts between vehicles entering and exiting the roadway during peak periods. The entire existing section through Cooper Landing would improve to LOS C after through-traffic is routed to the new alignment.

The new and reconstructed sections would be designed to "rural principal arterial" standards. Along the realigned portion, the maximum grade would be 6%. The added capacity and upgraded standards enhance the linkage with the rest of the highway system on the Kenai Peninsula. The existing highway would be maintained for local access.

New construction in this location, south of the Kenai River and crossing both Cooper Creek and the Russian River, would adversely impact the physical environment. Adverse impacts would occur as a result of constructing the new alignment in previously unaffected habitats and reconstructing the Cooper Landing Bridge and building new bridges on the Kenai River, Russian River, and Cooper Creek. The reaches of the Kenai River, Russian River, and Cooper Creek within the project area contain anadromous fish. However, a new alignment would benefit the Kenai River to the extent that it moves through-traffic south and away from the floodplain. Moving the highway away from the river would reduce potential impacts due to runoff and the risk of hazardous materials spills. Lowering traffic volumes on the existing section through Cooper Landing would lessen highway impacts to the Kenai River.

Approximately 8.8 acres of wetlands and 245 acres of vegetated habitat would be directly affected. The new areas of impact would contribute to wildlife displacement, habitat fragmentation, and migration route disruption. The Cooper Creek canyon is likely a migration corridor for wildlife between the Kenai River valley and the Cooper Lake area. Wildlife use, including the Kenai Peninsula brown bear, is documented along the Russian River, an important salmon spawning stream and another migration corridor. This alternative would include measures to maximize visibility to help prevent animal/vehicle collisions. However, the new section of highway would increase the possibility of such collisions.



According to the *Emergency Response Assessment and Hazardous Materials Spill Control Memorandum*, the Russian River Alternative has moderate exposure to Tier I waters (Kenai River, Russian River, Juneau Creek, and Cooper Creek). Approximately 40% of this alternative is located within 500 feet of Tier I waters. This alternative has moderate (48.7%) exposure to down gradient residences (where well contamination could be possible in the event of a release of hazardous materials), but low (0.4% and 3.6%) exposure to Tier II waters and wetlands.

Aesthetically, this alternative potentially affects the view of residents on the north side of the valley and changes the character of the area near the new section. The aesthetic impacts of a highway across 2 miles of KNWR in the area of the Russian River and Russian River Campground would adversely affect the experience of those who come to enjoy the world-class salmon fishery. Those in Cooper Landing whose residential property is adjacent to the new section also may experience increased noise.

Constructing a new section would increase the area of impervious surface and the volume of storm water runoff. The new section and upgraded sections of the Sterling Highway would have drainage and storm water management structures that meet current standards. This would be an improvement over the existing highway, which does not meet current storm water standards. The storm water facilities along the existing section through Cooper Landing would not be upgraded.

Under the Russian River Alternative, the adverse impacts to historical properties is potentially extensive. Only a limited survey has been completed in the area of the Russian River Alternative, but the density of archaeological sites in adjacent areas indicates that there is likely a wealth of archaeological material in the path of the new section. A number of recreational areas (KPB Recreation land, State Unit 394B, the USFS Lower Russian Lake Recreation Area, Cooper Creek Campground, and Russian River Campground) and a number of trails (Russian Lake Trail, Russian River Angler Trail, and Shakleford Creek Trail) in the KNWR and the CNF would be impacted by this alternative.

This alignment would require a 2,000-foot bridge crossing of the Russian River, which is a world-class fishing destination. The river typically receives an annual angler effort in excess of 450,000 hours, with annual harvests ranging from 50,000 fish to as many as 190,000 fish. The Russian River is Alaska's second most popular sport fishing location for sockeye salmon (the Kenai River mainstem is the most popular). This river is also one of Alaska's most popular trophy rainbow trout recreational fishing locations. The majority of the fishing in this area is conducted on the south bank of the Kenai River at its confluence with the Russian River. The Russian River Alternative would be located approximately 1,300 feet south of the most heavily fished area. The alignment would pass within 400 feet of the Russian River Campground, which receives approximately 50,000 visitors per year. The Russian River Alternative would cross the Russian River angler trail and the Russian Lakes trail. These trails are heavily used and provide access to the Russian Lakes, the Russian River falls, and several Forest Service cabins.

The Russian River Alternative would not interfere with the planned Grouse Ridge and Birch Ridge subdivisions (*Cooper Landing Land Use Plan*). Approximately 16.9 acres of the KRSMA or proposed additions to the KRSMA would be built on by the Russian River Alternative. In accordance with one recommendation of the KRSMA, the majority of the Russian River Alternative is located away from the Kenai River. This alternative does, however, require new bridge crossings of the Kenai and Russian Rivers and Cooper Creek. The Russian River Alternative would impact approximately 3 miles of CNF land designated as Fish, Wildlife, and Recreation, approximately 0.3 miles of Recreational River land, and approximately 0.1 miles Major Transportation/ Utility Systems land. Additionally, this alternative would pass through approximately 1 mile of an “Inventoried Roadless Area”. The Russian River Alternative would cross approximately 2 miles of undisturbed KNWR land designated as Intensive Management.

This alternative potentially impacts 39 private properties. In addition, construction of the Russian River Alternative may require the relocation of six homes or businesses. Traffic that traditionally stops in Cooper Landing for services, approximately 7% of travelers, would be affected by rerouting through-traffic around the community. The necessity to exit the highway to access services could potentially adversely affect community economics. Conversely, decreasing both traffic speed and congestion in Cooper Landing could increase its attractiveness as a destination for tourist services.

The purpose and need for the project, with respect to capacity and demand (achieving LOS C), is not met under the Russian River Alternative: 31% at LOS B, 28% at LOS C, and 41% at LOS D (Appendix E). Although the transportation system would be beneficially impacted by separating through and local traffic in the area of Cooper Landing, there would be segments (41%) of the project (MP 55.5–Russian River, Cooper Creek–MP 49, and MP 48-46) that would operate at LOS D. Freight movement, however, would be improved simply with the addition passing lanes and hill climbing lanes. The existing section of highway through Cooper Landing would be maintained for local access.

Analysis of the transportation criteria indicates that new alignment construction can occur without obstruction to present traffic. Delays required for reconstruction along the existing alignment would be limited to 6.1 miles.

Construction costs for the Russian River Alternative are estimated at \$124 million with annual maintenance costs of \$234,000. The life cycle cost of this alternative is estimated to be \$109 million.

Engineering feasibility is not considered a critical factor because there are no unique structures under this alternative. There is, however, the potential for encountering unfavorable bedrock and soil conditions that could affect construction and maintenance of bridges over Cooper Creek and the Russian River (unstable materials near Cooper Creek Campground are currently causing erosion and sedimentation problems). There is the risk of failures in the cuts and erosion of unstable materials into Cooper Creek, the Russian River, and thence into the Kenai River.

Driver safety would be improved under the Russian River Alternative because the new section would be constructed to meet current standards for shoulder widths, horizontal and vertical curvature, side slopes, recovery areas, and stopping distances and through-traffic would be removed from town. By removing traffic from Cooper Landing and directing pedestrians and bicyclists through town, pedestrian safety would be substantially improved.

There is very little support from public and agency input received-to-date to pursue the Russian River Alternative. Impacts to the Russian River recreational areas seem to be unacceptable in the public's opinion, and few gave this alternative further consideration. The impacts that most concerned the public and agencies included impacts to wildlife, cultural and recreational areas, and potential economic impacts from moving through-traffic away from town.

#### ***4.2.6 "G" South and "G" North Alternatives***

In the design year 2025, the "G" Alternatives (Figure 1) operate well (LOS B) on each end of the project due to the inclusion of passing lanes. The reduction of traffic volumes on the new section would generally improve operations in that area (LOS C), although the segment from approximately MP 46 to approximately 3 miles west would operate at LOS D because of rolling terrain (Appendix E, Traffic Analysis Memorandum). The climbing lanes of the new section would operate at LOS C on both up and downgrades because of additional capacity. Segments between approximately MP 55.5-51.5 would operate at LOS D, primarily because of the traffic volume.

Under both "G" Alternatives, the Russian River Campground (MP 52.8) access and Sportsman's Landing area (MP 54.5) would continue to operate poorly during peak periods because of the number of vehicles entering and exiting the roadway. Although the addition of left turn lanes could partially improve traffic flow, there would still be three- to five-hour periods of LOS E per day at these locations during the peak season. The existing section through Cooper Landing would operate at LOS C after through-traffic is routed to the new alignment.

The realigned and reconstructed sections would be designed to "rural principal arterial" standards. System linkage would be enhanced and made consistent with other Sterling Highway improvements. The maximum grade on the realignment is 6%.

Construction of these alternatives has the potential to adversely impact the physical environment. Adverse impacts would occur as a result of constructing the new section in previously unaffected habitats, constructing new bridges on the Kenai River, Juneau Creek, and Bean Creek, and reconstructing the existing Schooner Bend Bridge. Reaches of the Kenai River, Bean Creek, and Juneau Creek within the project area contain anadromous fish. However, building a new alignment would provide some benefit to the Kenai River because it would move through-traffic north and away from the river. Moving the highway away from the river would reduce potential impacts due to runoff

and the risk of hazardous materials spills. Although the existing portion through Cooper Landing would remain unimproved, traffic volumes would be less and would thus have less potential environmental threat from sources such as storm water runoff and accidental spills.

The “G” South Alternative and “G” North Alternative would affect approximately 16.0 and 22.9 acres of wetlands, respectively. The “G” South Alternative and “G” North Alternative would affect approximately 225 and 235 acres of vegetated habitats, respectively. The new areas of habitat impact would contribute to wildlife displacement, habitat fragmentation, and migration route disruption. The Juneau Creek drainage is a migration corridor for wildlife, including the Kenai Peninsula brown bear, between the Kenai River valley and Resurrection Pass and adjoining mountains. Design improvements would increase visibility to decrease the incidence of animal/vehicle collisions. The new section of highway would, however, increase the possibility of such collisions.

According to the *Emergency Response Assessment and Hazardous Materials Spill Control Memorandum*, the “G” Alternatives have moderate exposure to Tier I waters (Kenai River, Russian River, Juneau Creek, and Cooper Creek). Approximately 47% of these alternatives are located within 500 feet of Tier I waters. These alternatives have moderate (40.6%) exposure to down gradient residences (where well contamination could be possible in the event of a release of hazardous materials) and low (9.2%-10.7% and 9.3%-6.8%) exposure to Tier II waters and wetlands.

Aesthetically, these alternatives potentially affect the view of residents on the south side of the valley and change the character of the area near the new alignment. Those whose property is adjacent to the new section (especially near Bean Creek) may experience increased noise.

Constructing a new section would increase the area of impervious surface and the volume of storm water runoff. The new and upgraded sections of the Sterling Highway would have drainage and storm water management structures that meet current storm water standards. This would be an improvement over the existing highway, which does not meet current standards. The storm water facilities along the existing section through Cooper Landing would not be upgraded.

There is a preliminary total of 17 potentially impacted historical properties including the Footprints and Beginnings Interpretive Sites, under both “G” Alternatives. A number of recreation areas (KPB Recreation land, State Unit 394B, and the USFS Kenai River Recreation Area) and two trails (Bean Creek Trail, and Art Anderson Gulch Trail) are adjacent to the existing alignment and would be affected by constructing a new alignment, widening the existing ROW, and constructing bridges.

Although the footprint of the “G” North Alternative would be located near the northern boundaries of the planned Grouse Ridge and Birch Ridge subdivisions, it is likely this alternative would not limit the residential development of these areas. The “G” South

Alternative is, however, located within the planned Grouse Ridge Subdivision (Figure B-2). It is likely that construction of this alternative would reduce planned residential development of this area.

The “G” North Alternative would build on 35.5 acres of the KRSMA or proposed additions to the KRSMA. The “G” South Alternative would build on 36.5 acres of the KRSMA or proposed additions to the KRSMA. In accordance with recommendations of the KRSMA, a portion of the “G” Alternatives is located away from the Kenai River. These alternatives do, however, require new crossings of the Kenai River and Juneau and Bean Creeks. These alternatives would impact approximately 2.8 miles of CNF land designated as Major Transportation/ Utility Systems and approximately 1.6 miles of Fish, Wildlife, and Recreation land. The “G” North Alternative would impact an additional mile of Fish and Wildlife Conservation land. The “G” South Alternative would impact approximately 1 mile of an Inventoried Roadless Area whereas the “G” North Alternative would impact approximately 2 miles of this Inventoried Roadless Area. Notable impacts would occur to the Bean Creek Trail at the intersection above the existing trailhead. The construction of these alternatives would not affect state land selections.

The “G” South and the “G” North Alternatives potentially impact four private properties. No homes or businesses would be relocated under the “G” Alternatives. Traffic that traditionally stops in Cooper Landing for services, approximately 7% of travelers, would be affected by rerouting through-traffic around the community. The necessity to exit the highway to access services could adversely affect community economics. Conversely, decreased traffic speed and congestion in Cooper Landing could increase its attractiveness as a destination for services.

As analyzed using the transportation criteria, the “G” Alternatives do not achieve the project purpose and need regarding capacity: “G” South Alternative - 31% at LOS B, 13% at LOS C, 56% at LOS D; and “G” North Alternative - 31% at LOS B, 8% at LOS C, 61% at LOS D (Appendix E). Segments of the alternatives, MP 55.5 to approximately MP 51, at intersections to the Sportsman’s Landing (MP 54.5) and Russian River Campground (MP 52.8), and Bean Creek area (MP 46), would experience LOS D. The goal for the project is LOS C in design year 2025.

The transportation system would be beneficially affected by separating through and local traffic in the Cooper Landing area. Traffic flow would improve in some segments of the new section and at either end of the reconstructed portions. Freight movement would be improved with the addition of left turn lanes and hill climbing lanes. The existing section of highway through Cooper Landing would be maintained for local access.

Analysis of the transportation criteria indicates that new alignment construction can occur without obstruction to present traffic. Delays required for reconstruction along the existing alignment would be limited to 8.4 miles for the both “G” Alternatives.

Construction costs for the “G” Alternatives are estimated at \$104 million. The annual maintenance costs for each alternative are estimated at \$200,080. The life cycle cost of the “G” South Alternative and the “G” North Alternative is estimated to be \$92 million.

Engineering feasibility is not considered a critical factor because there are no unique structures or conditions under this alternative. There is, however, the potential for encountering unstable rock and soils in the areas of bridge construction.

Driver safety would be improved under the “G” Alternatives because the new section would be constructed to meet current standards for shoulder widths, horizontal and vertical curvature, side slopes, recovery areas, and stopping distances and through-traffic would be removed from town. By removing traffic from Cooper Landing and directing pedestrians and bicyclists through town, pedestrian safety would be substantially improved.

Public and agency input received-to-date has included concerns about visual impacts, impacts to the Kenai River with additional bridge crossings, and impacts to wildlife habitat. The “G” Alternatives address some concerns of moving through-traffic out of town, however there are concerns about how these alternatives rejoin the existing alignment and the ability to make improvements along the sections that continue close to the river without adversely affecting water quality and habitat. There is also concern from the community about the potential economic impacts of moving through-traffic away from town. The “G” Alternatives do resolve the local access and safety issues raised by the community in that through-traffic does not cross the Cooper Landing Bridge, thus avoiding mixing through and local traffic. Broader public input has shown some support for this alternative because of the increased ability to move through-traffic away from town. Agency input has shown some interest in these alternatives because part of the new alignment is through a partially built environment. There are outstanding concerns about the impacts to cultural and recreational resources, to the Kenai River for those sections of improved highway along the river, ; and to brown bear habitat. The “G” Alternatives came from agency and public input as a way to avoid the Resurrection Pass Trail and minimize recreation area and secondary and cumulative impacts.

#### ***4.2.7 Juneau Creek “F” Wilderness and Forest Alternatives***

The Juneau Creek “F” Wilderness and Forest Alternatives (Figure 1) would operate well (LOS B in the design year, 2025) on each end of the project due to the inclusion of passing lanes (Appendix E, Traffic Analysis Memorandum). The reduction of traffic volumes on the new sections would generally improve operations in those areas to LOS C. The “F” Wilderness Alternative can operate at LOS C or better for its entire length. However, under the “F” Forest Alternative, there are segments that would operate at LOS D: from approximately MP 46 to 2.25 miles east and from MP 56 to approximately 1 mile west of MP 55. These segments have rolling terrain, which would result in the low LOS. The segment just west of Juneau Creek under both alternatives would operate well (LOS C) because the terrain does not have steep grades. Climbing lanes would operate at LOS C on both the up and downgrades because of additional capacity. The Sportsman’s

Landing area (MP 54.5) would operate better under the “F” Wilderness Alternative because the new section would reduce the volume of through-traffic and reduce the conflicts between vehicles entering and exiting the roadway during peak periods. Under the “F” Forest Alternative, the conditions at Sportsman’s Landing would not be improved. Under both alternatives, the existing section through Cooper Landing would operate at LOS C after through-traffic is routed to the new alignment.

These alternatives would be designed to “rural principal arterial” standards, enhancing system linkage and making the project consistent with other Sterling Highway improvements. The maximum grade on the new section of the Wilderness Alternative is approximately 5%. A maximum grade of 7% was incorporated into the “F” Forest Alternative due to topographic constraints and avoidance of Wilderness-designated lands. A grade of 7% does not meet current design standards.

Constructing a new alignment would potentially adversely impact the physical environment. Adverse impacts would occur as a result of constructing the new alignment in previously unaffected habitats, including a new bridge over Juneau Creek. The Juneau Creek “F” Forest and Wilderness Alternatives would directly affect approximately 32.7 and 32.2 acres of wetlands, and 265 and 270 acres of vegetated habitats, respectively. The new areas of impact would contribute to wildlife displacement, habitat fragmentation, and migration route disruption. The Juneau Creek drainage is a migration corridor for wildlife, including the Kenai Peninsula brown bear, between the Kenai River valley and Resurrection Pass and adjoining mountains. However, a new alignment would be beneficial to the Kenai River because it moves through-traffic north and away from the river. Moving the highway away from the river would reduce potential impacts due to runoff and the risk of hazardous materials spills. The existing portion through Cooper Landing would remain unimproved, but traffic volumes would be less (and therefore pose less potential environmental threat). Design improvements would increase visibility to decrease the incidence of animal/vehicle collisions. The new section of highway would, however, increase the possibility of such collisions.

According to the *Emergency Response Assessment and Hazardous Materials Spill Control Memorandum*, the Juneau Creek “F” Alternatives have low exposure to Tier I waters (Kenai River, Russian River, Juneau Creek, and Cooper Creek), Tier II waters, and wetlands. Approximately 28% of these alternatives are located within 500 feet of Tier I waters, 25% within 500 feet of Tier II waters, and 12% within 500 feet of wetlands. These alternatives have moderate (36%) exposure to down gradient residences (where well contamination could be possible in the event of a release of hazardous materials).

Aesthetically, these alternatives potentially affect the view of residents on the south side of the valley and change the character of the area near the new section. Maintaining the backcountry character and beauty surrounding the Resurrection Pass Trail, which passes under these alignments is of particular concern to trail users.

Constructing a new section would increase the area of impervious surface and the volume of storm water runoff. The new section and upgraded sections of the Sterling Highway

would have drainage and storm water management structures that meet current standards. This would be an improvement over the existing highway, which does not meet current storm water standards. The storm water facilities along the existing section through Cooper Landing would not be upgraded.

There is a preliminary total of six impacted historical or archaeological properties under the “F” Forest Alternative. The “F” Wilderness Alternative would impact seven historical or archaeological properties. A number of recreational trails (Bean Creek Trail, Resurrection Pass Trail, Juneau Bench Trails, and Art Anderson Gulch Trail) would be adversely affected by constructing the new sections, widening of the existing ROW, and constructing bridges. The “F” Wilderness Alternative would cross approximately 0.75 miles of undisturbed KNWR land designated as Wilderness. The “F” Forest Alternative would affect Sportsman’s Landing and would cross at least 0.3 miles of KNWR land designated as Intensive Management. Recent engineering studies indicate it is likely that the Forest Alternative would impact additional areas of the KNWR (discussed below). Impacts from both alternatives would occur to the Resurrection Pass National Recreation Trail and the Bean Creek Trail, which would be crossed by bridges that would be visible and possibly audible from the trails.

Although the Juneau Creek “F” Alternatives would be located near the northern boundaries of the planned Grouse Ridge and Birch Ridge subdivisions, it is likely that these alternatives would not limit the residential development of these areas. The Juneau Creek “F” Alternatives would build on 15.2 acres of the KRSMA or proposed additions to the KRSMA. In accordance with one recommendation of the KRSMA, the majority of the Juneau Creek “F” Alternatives are located away from the Kenai River. These alternatives do, however, require a new crossing of Juneau Creek. These alternatives would impact approximately 2.1 miles of CNF land designated as Fish and Wildlife Conservation, 1.5 miles of Fish, Wildlife, and Recreation land, and 0.2 miles of Backcountry land. In addition, the Juneau Creek “F” Forest and Wilderness Alternatives would impact 3 and 4 miles of an Inventoried Roadless Areas, respectively.

The Juneau Creek “F” Forest and Wilderness Alternatives potentially impact four private properties. No homes or businesses would be relocated under these alternatives. Traffic that traditionally stops in Cooper Landing for services, approximately 7% of travelers, would be affected by rerouting through-traffic around the community. The necessity to exit the highway to access services could adversely affect community economics. Conversely, decreased traffic speed and congestion in Cooper Landing could increase its attractiveness as a destination for services.

The Juneau Creek “F” Wilderness Alternative achieves the project purpose and need for capacity by achieving LOS C or better for its entire length (32% at LOS B, 68% at LOS C) (Appendix E). The “F” Forest Alternative would experience LOS D for 2 miles east of MP 55.5, the intersection to the Sportsman’s Landing (MP 54.5), and for 2.3 miles west of MP 46 (31% at LOS B, 40% at LOS C, 29% at LOS D). Therefore, capacity is increased to the extent necessary to meet the project purpose and need only under the Wilderness Alternative.



The transportation system would be beneficially affected by separating through and local traffic in the Cooper Landing area. Traffic flow would improve in the area of the new and reconstructed portion of the “F” Wilderness Alternative and to a lesser degree along the “F” Forest Alternative. Freight movement would be improved with the addition of left turn lanes and hill climbing lanes. The existing section of highway through Cooper Landing would be maintained for local access.

The “F” Forest Alternative was developed after the 1994 DEIS to avoid impacts to “Wilderness-designated lands in the KNWR. Since 1994, rural principal arterial standards have changed. Recent analysis of the “F” Forest Alternative indicates that current standards cannot be met under this alternative due to topographic and ROW constraints associated with avoiding Wilderness-designated lands and the Kenai River. In addition, traffic management where this alternative returns to the existing highway at the intersection to Sportsman’s Landing (MP 54.5) would require the use of a structure, such as an underpass, to maintain the flow of traffic. The Kenai River, Wilderness-designated lands, Sportsman’s Landing, and topography would limit the location of a structure in this area. While construction is possible under these limitations, the associated impacts of a structure to the Kenai River, the KNWR, recreational activities, and the visual quality of the area would be substantial. These impacts would negate the reason this alternative was developed, which was to avoid impacts to Wilderness in the KNWR.

Analysis of the transportation criteria indicates that new alignment construction can occur without obstruction to present traffic. Delays required for reconstruction along the existing alignment would be limited to 3.7 miles of the “F” Wilderness Alternative and 4.6 miles of the “F” Forest Alternative.

Construction costs for Juneau Creek “F” Forest and Wilderness Alternatives are estimated at \$74 million with annual maintenance costs of \$154,040. The life cycle costs of these alternatives are estimated to be \$70 million.

Driver safety would be improved under the Juneau Creek “F” Alternatives because the new section would be constructed to meet current standards for shoulder widths, horizontal and vertical curvature, side slopes, recovery areas, and stopping distances, and through-traffic would be removed from town. By removing traffic from Cooper Landing and directing pedestrians and bicyclists through town, pedestrian safety would be substantially improved.

Public and agency input received-to-date regarding the Juneau Creek “F” Alternatives has included concerns about disturbing a relatively undisturbed area, wildlife impacts, visual impacts, potential impacts to the Resurrection Pass Trail, and potential secondary and cumulative impacts associated with borough land selections. In addition, there are concerns about how the “F” Forest Alternative rejoins the existing alignment at Sportsman’s Landing (MP 54.5) and the potentially unsafe conditions that could result during the seasonal peak time. There also is concern from the community about the

potential economic impacts of moving through-traffic away from town. The Juneau Creek “F” Alternatives do resolve local access and safety issues raised by the community because through-traffic does not cross the Cooper Landing Bridge, thereby avoiding mixing through and local traffic. Broader public input has shown some support for this alternative because of the increased ability to move through-traffic away from town. Agency input has highlighted habitat concerns (particularly brown bear), impacts to the Resurrection Pass Trail, and impacts of a new transportation system being built through the area. The Juneau Creek “F” Alternatives came from agency and public input as an alternative to the Juneau Creek Alternatives to move the road away from the falls and lessen recreation area impacts.

#### ***4.2.8 Juneau Creek Wilderness and Forest Alternatives***

The Juneau Creek Wilderness and Forest Alternatives (Figure 1) operate well (LOS B in the design year 2025) on each end of the project due to the inclusion of passing lanes (Appendix E, Traffic Analysis Memorandum). The reduction of traffic volumes in the new section generally would improve operations in that area to LOS C. However, there are segments under both alternatives that would operate at LOS D: from approximately MP 46 to 2.25 miles east and from approximately 0.5 mile east of Juneau Creek to 1.5 miles west of Juneau Creek (both Forest and Wilderness Alternatives); and from MP 56 to approximately 1 mile west of MP 55 (Forest Alternative only). These segments have rolling terrain that would result in the low LOS. The segment of the Wilderness Alternative between approximately MP 55.5 and 2 miles east would operate well (LOS C) because the terrain does not have steep grades. The climbing lanes operate at LOS C on both the up and down grade sections because of additional capacity. Under the Wilderness Alternative, the Sportsman’s Landing area (MP 54.5) would operate better because the new alignment would reduce the volume of through-traffic and reduce the conflicts between vehicles entering and exiting the roadway during peak periods. Under the Forest Alternative, the conditions at Sportsman’s Landing would not be improved. Routing through-traffic to the new section under either the Wilderness or Forest Alternative would improve operations through Cooper Landing to LOS C.

These alternatives would be designed to “rural principal arterial” standards, enhancing system linkage and making the project consistent with other Sterling Highway improvements. The maximum grade on the new section of the Wilderness Alternative is approximately 5%. A maximum grade of 7% was incorporated into the Forest Alternative due to topographic constraints and avoidance of Wilderness-designated lands. A grade of 7% does not meet current design standards.

The Juneau Creek Alternatives would be beneficial to the Kenai River because they move through-traffic north and away from the river. Moving the highway away from the river would reduce potential impacts due to runoff and the risk of hazardous materials spills. The existing portion through Cooper Landing would remain unimproved, but traffic volumes would be less (and therefore pose less potential environmental threat). No new bridges on the Kenai River or bridge reconstruction are planned for this alternative. In

addition, the bridge that would be constructed over Juneau Creek would be small and located at a non-anadromous portion of the creek.

Adverse impacts would occur as a result of constructing the new alignment in previously undeveloped habitats. The Juneau Creek Forest and Wilderness Alternatives would affect approximately 36.9 and 36.5 acres of wetlands, respectively. Both alternatives would affect approximately 280 acres of vegetated habitats. The new areas of impact would contribute to wildlife displacement, habitat fragmentation, and migration route disruption. The Juneau Creek drainage is a migration corridor for wildlife, including the Kenai Peninsula brown bear, between the Kenai River valley and Resurrection Pass and adjoining mountains. Design improvements would increase visibility to decrease the incidence of animal/vehicle collisions. The new section of highway would, however, increase the possibility of such collisions.

According to the *Emergency Response Assessment and Hazardous Materials Spill Control Memorandum*, the Juneau Creek Alternatives have low exposure to Tier I waters (Kenai River, Russian River, Juneau Creek, and Cooper Creek). Approximately 26% of these alternatives are located within 500 feet of Tier I waters. These alternatives have moderate (35%) exposure to down gradient residences (where well contamination could be possible in the event of a release of hazardous materials) and low (21% and 12.9%) exposure to Tier II waters and wetlands.

Aesthetically, these alternatives potentially affect the view of residents on the south side of the valley and change the character of the area near the new alignment. The backcountry character and scenic beauty surrounding the Resurrection Pass Trail is of particular concern to trail users to whom the new section would be visible and audible.

Constructing a new section would increase the area of impervious surface and the volume of storm water runoff. The new section and upgraded sections of the Sterling Highway would have drainage and storm water management structures that meet current storm water standards. This would be an improvement over the existing highway, which does not meet current standards. The storm water facilities along the existing section through Cooper Landing would not be upgraded.

Potential adverse impacts to historical properties include a preliminary total of five archaeological properties under the Forest Alternative and six archaeological properties under the Wilderness Alternative. A number of recreational trails (Resurrection Pass Trail, Juneau Bench Trails, and Art Anderson Gulch Trail) and the USFS Juneau Falls Recreation Area would be affected by constructing the new sections, widening the existing ROW, and constructing a bridge on Juneau Creek. The Wilderness Alternative would cross approximately 0.75 miles of undisturbed KNWR land designated as Wilderness. The Forest Alternative would affect Sportsman's Landing and at least 0.3 miles of KNWR lands designated as Intensive Management. Recent engineering studies indicate it is likely that the Forest Alternative would impact additional areas of the KNWR (discussed below). Impacts from both alternatives would occur to the Resurrection Pass National Recreation Trail, at the intersection above existing trailheads.

Although the Juneau Creek Alternatives would be located near the northern boundaries of the planned Grouse Ridge and Birch Ridge subdivisions, it is likely that these alternatives would not limit the residential development of these areas. The Juneau Creek Alternatives would build on 15.2 acres of the KRSMA or proposed additions to the KRSMA. In accordance with one recommendation of the KRSMA, the majority of the Juneau Creek Alternatives are located away from the Kenai River. These alternatives do, however, require new bridge crossings of Juneau and Bean Creeks. These alternatives would impact approximately 2.7 miles of CNF land designated as Fish and Wildlife Conservation, approximately 1.5 miles of Fish, Wildlife, and Recreation land, and approximately 1 mile of Backcountry land. The Wilderness Alternative would impact approximately 5 miles of an Inventoried Roadless Area and the Forest Alternative would impact approximately 4 miles of this Inventoried Roadless Area.

The Juneau Creek Forest and Wilderness Alternatives potentially impact four private properties. No homes or businesses would be relocated under these alternatives. Traffic that traditionally stops in Cooper Landing for services, approximately 7% of travelers, would be affected by rerouting through-traffic around the community. The necessity to exit the highway to access services could adversely affect community economics. Conversely, decreased traffic speed and congestion in Cooper Landing could increase its attractiveness as a destination for services.

The Juneau Creek Alternatives were analyzed using the transportation criteria. They partially meet the project purpose and need regarding capacity (Wilderness Alternative - 30% at LOS B, 42% at LOS C, 28% at LOS D and Forest Alternative - 30% at LOS B, 30% at LOS C, 40% at LOS D) (Appendix E). The Forest Alternative would experience LOS D for 2 miles east of MP 55.5, near the intersection to the Sportsman's Landing (MP 54.5), the segment looping north above Juneau Creek Falls, and for 2.3 miles west of MP 46. Under the Wilderness alternative, both the segment looping north above Juneau Creek and the segment west of MP 46 would experience LOS D.

The transportation system would be beneficially affected by separating through and local traffic in the Cooper Landing area. Traffic flow would improve along the entire length of the Wilderness Alternative and in the new section and to a lesser degree along the reconstructed portion of the Forest Alternative. Freight movement would be improved with the addition of left turn lanes and hill climbing lanes. The existing section of highway through Cooper Landing would be maintained for local access.

The Forest Alternative was developed after the 1994 DEIS to avoid impacts to Wilderness-designated lands in the KNWR. Since 1994, rural principal arterial standards have changed. Recent analysis of the Forest Alternative indicates that current standards cannot be met under this alternative due to topographic and ROW constraints associated with avoiding Wilderness-designated lands and the Kenai River. In addition, traffic management where this alternative returns to the existing highway at the intersection to Sportsman's Landing (MP 54.5) would require the use of a structure, such as an underpass, to maintain the flow of traffic. The Kenai River, Wilderness-designated lands,

Sportsman's Landing, and topography would limit the location of a structure in this area. While construction is possible under these limitations, the associated impacts of a structure to the Kenai River, the KNWR, recreational activities, and the visual quality of the area would be substantial. These impacts would negate the reason this alternative was developed, which was to avoid impacts to Wilderness in the KNWR.

Analysis of the transportation criteria indicates that new construction can occur without obstruction to present traffic. Delays required for reconstruction along the existing alignment would be limited to affects along 3.7 miles of the Wilderness Alternative and 4.6 miles of the Forest Alternative.

Construction costs for Juneau Creek Forest and Wilderness Alternatives are estimated at \$51 million. The maintenance costs are estimated at \$120,500 annually. The life cycle costs of these alternatives are estimated to be \$52 million.

Driver safety would be improved under the Juneau Creek Alternatives because the alternatives would be constructed to meet current standards for shoulder widths, horizontal and vertical curvature, side slopes, recovery areas, and stopping distances and through-traffic would be removed from town. By removing traffic from Cooper Landing and directing pedestrians and bicyclists through town, pedestrian safety would be substantially improved.

Public and agency input received-to-date regarding the Juneau Creek Alternatives has included concerns about disturbing a relatively undisturbed area, wildlife impacts, visual impacts, potential weather related issues due to elevation, potential impact to the Resurrection Pass Trail, and the potential for secondary and cumulative impacts from both the borough land selections and the potential ease of access to the falls. There are concerns from the public and agencies about how the Forest Alternative rejoins the existing alignment at Sportsman's Landing (MP 54.5) and the potential unsafe conditions that could result during the seasonal peak time. There is also concern from the community about the potential economic impacts of moving through-traffic away from town. The Juneau Creek Alternatives do resolve the local access and safety issues raised by the community because the through-traffic does not cross the Kenai Lake Bridge, mixing through-traffic with local traffic. Broader public input has shown some support for this alternative because of the increased ability to move through-traffic away from town. Agency input has highlighted the habitat concerns, particularly Kenai Peninsula brown bear, the impact to the Resurrection Pass Trail, and the impacts of a new transportation system being created through the area.

## 6.0 References

- Alaska Department of Fish and Game. 2002. Anadromous Waters Catalogue.
- Alaska Department of Natural Resources, 1997. Kenai River Comprehensive Management Plan.
- Alaska Department of Natural Resources, 2000. Kenai Area Plan.
- Alaska Department of Transportation and Public Facilities. 1997. Sterling Highway, MP 45-60 Secondary and Cumulative Impacts Study.
- Alaska Department of Transportation and Public Facilities. 1994. Sterling Highway MP 37-60 Draft Environmental Impact Statement and Section 4(f) Evaluation.
- Alaska Department of Transportation and Public Facilities. 1982. Sterling Highway MP 37-60 Draft Environmental Impact/Section 4(f) Statement.
- Alaska Department of Transportation and Public Facilities. 2001. Origin-Destination Survey, Sterling Highway Project MP 45-60.
- HDR Alaska, Inc. 2002. Draft Affected Environment, Sterling Highway SEDIS, MP 45-60.
- HDR Alaska, Inc. 2003. Soil Nail Walls Assessment, Kenai River Wall Alternative, Sterling Highway SDEIS, MP 45 - 60.
- HDR Alaska, Inc. 2002. Preliminary Identification of Section 4(f) Properties, Sterling Highway Project, MP 45 - 60.
- HDR Alaska, Inc. 2002. Wetlands Evaluation, Draft Technical Memorandum, Sterling Highway, MP 45 - 60.
- HDR Alaska, Inc. 2003. Traffic Analysis, Draft, Sterling Highway MP 45 - 60.
- HDR Alaska, Inc. 2003. Emergency Response Assessment and Hazardous Materials Spill Control for Sterling Highway MP 45 - 60.
- Kenai Peninsula Borough. 1996. Cooper Landing Land Use Plan.
- United States Department of Agriculture, Forest Service. 2002. Revised Land and Resource Management Plan, R10-MB-480c

United States Department of the Interior, Fish and Wildlife Service. 1985. Kenai National Wildlife Refuge Final Comprehensive Plan, Environmental Impact Statement, and Wilderness Review.