Reconnaissance Study

Wasilla Alaska Railroad Relocation

Prepared for:
City of Wasilla
Wasilla, Alaska

January 24, 2002

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Public Comments – separate report dated January 28, 2002

Executive Summary

The purpose of this reconnaissance study is to answer five basic questions: 1) from an engineering standpoint, is it technically possible to relocate the Alaska Railroad away from the Wasilla downtown business corridor, 2) if it can be relocated, what possible alternative routes might it take, 3) how much would it cost, 4) how long would it take, and 5) what would the public's perception be. The reason for conducting the study is to improve safety and enhance the community's central business district. It is prudent and reasonable for the City to address the potential for loss of life and property in downtown Wasilla with respect to at-grade railroad crossings. This study includes five alternative routes (A through E), plus a "No Build" alternative. The following is a summary of our findings.

1. It is technically feasible to relocate the railroad to a new location outside its current corridor.

2. The most feasible routes will be located south, rather than north of the Parks Highway because of extensive development on the north side of the Parks Highway.

3. The total project cost of relocating the railroad outside the downtown corridor will range between $47 million and $62.5 million in 2002 dollars.

4. The construction costs range from $29.3 million to $37.9 million, and include $6.0 million to $10.0 million to construct two to four Grade Separated Crossings, and $3.1 million to $4.2 million to relocate fiber optic cables.

5. Because of the size of the project and the controversy associated with the right-of-way take, an Environmental Impact Statement (EIS) will likely be required.

6. The Alaska Railroad currently has a $2.5 million Federal Transit Authority (FTA) grant and $625,000 in railroad funds to perform the EIS; however, the railroad is recommending reprogramming the monies to other Wasilla projects because of the size and controversy of the project.

7. It will take approximately 7 to 10 years to complete this project, starting from the beginning of the EIS phase to the end of the construction phase.

8. The project will be controversial because of the right-of-way take and the impact to adjacent landowners.

9. We received approximately 200 public comments. Most people support the project, but do not want it in their backyard.

10. The right-of-way acquisition costs used in the estimate are approximately 10 times the amount needed to acquire a 200-foot right-of-way at 2000 Borough tax appraisal land evaluations.

11. The cost of restarting this project in future years will be much more expensive and difficult because of the rapid development of lands in the study area.

12. In 1999, the Alaska Department of Transportation and Public Facilities (DOT&PF) reported that 12,770 vehicles per day (average daily traffic) cross the tracks at Knik-Goose Bay (KGB) Road. Approximately 3,200 trains pass through Wasilla annually. The Matanuska-Susitna valley region is currently the fastest growing region in the state at 3.3%. With the valley's growth rate and current traffic congestion, safety concerns will only increase.

13. The new Palmer-Wasilla Highway Extension will mitigate traffic congestion on KGB Road for awhile, however the congestion at KGB will not go away.

14. An estimated 240 school busses cross eight (8) at-grade railroad crossings each school day. We recommend the School District consider adopting a policy of using the new Palmer-Wasilla Highway Extension to the greatest extent possible to avoid at-grade crossings.

15. The potential for catastrophic accidents at at-grade crossings would be eliminated if all at-grade crossings could be removed.

16. Moving the railroad and its at-grade crossings from the downtown corridor would free up 200 feet of the 300-foot total right-of-way and would allow significant improvements in safety, traffic flow, landscaping, and environmental protections.

The following table summarizes the key features of the five alternatives considered in this study:

SUMMARY OF PROJECT FEATURES

Alternative	At-Grade Crossings Eliminated	Project Length	Track Permanently Eliminated From System	Run-Time Reduction	Wetlands Impacted (acres)	Right-of-Way Required	Estimated Total Project Cost
No Build	0	0.00 mi.	0.00 mi.	0.0 min.	00.0	0 acres	0
A	7	6.04 mi.	0.00 mi.	2.7 min.	44.0	136 acres	$47,026,500
B	7	5.70 mi.	0.35 mi.	2.8 min.	62.7	138 acres	$56,913,000
C	7	5.65 mi.	0.39 mi.	3.8 min.	53.3	137 acres	$54,076,700
D	11	7.98 mi.	1.16 mi.	8.5 min.	13.1	193 acres	$54,930,500
E	11	7.71 mi.	1.42 mi.	8.9 min.	53.3	187 acres	$62,513,600

1.0 Introduction

1.01 Historical Background

The Alaska Central Railway, a private company, began the first railroad in Alaska in 1903. In 1908, the Alaska Central Railway went bankrupt after laying only about 50 miles of track north of Seward toward the coal fields of the Matanuska Valley. The federal government became involved in 1913 after an act of Congress designated a commission to study rail transportation in Alaska to serve harbors, navigable waters, coalfields, agricultural lands and national defense.

Construction began in 1915 and was completed eight years later for approximately $60 million as a "force-account" project by the U.S. government. On July 15, 1923, President Warren G. Harding, at what would be one of his last official acts, drove the golden spike at ceremonies in Nenana. Shortly thereafter, he became ill and died in San Francisco while still on his return home.

FIGURE 1 – DRIVING THE GOLDEN SPIKE AT NENANA
(Photo Courtesy ARRC)

In 1947, the federal government rehabilitated the railroad after it was worn out from heavy wartime use. The project removed dangerous curves, replaced wooden bridges with steel bridges, laid heavier 115-pound rail, and improved freight depots, wharves and shop facilities.[1] The railroad was operated by the U.S. Department of the Interior from 1923 to 1967. In 1967 the railroad was transferred to the newly formed Federal Railroad Administration under the U.S. Department of Transportation. In 1985 the federal government sold the railroad to the State of Alaska for $22.3 million. The State of Alaska established the Alaska Railroad Corporation (ARRC) to operate the rail system.

1.02 Introduction

On September 25, 2000, the Wasilla City Council passed Resolution Number 0044, authorizing the study of alternative transportation corridors for the purpose of rerouting ARRC's tracks around the community. The existing railroad is located alongside the Parks Highway through much of the central business district (CBD). If the railroad could be relocated out of the CBD, the right-of-way could be used for priority improvements in the downtown area. In addition, the City has serious safety concerns with respect to the at-grade crossings located in or near the City. The at-grade crossing at Knik-Goose Bay Road causes

traffic congestion each time the train passes through the community. Passenger trains pick up passengers at the Wasilla station causing stoppages on Knik-Goose Bay Road of approximately 5 minutes. Approximately 300 passenger trains and 2,900 freight trains passed through Wasilla in 1999.[8] The growth in tourism and the development of commuter rail service between Anchorage and the Valley will continue to increase the number and size of trains each year.

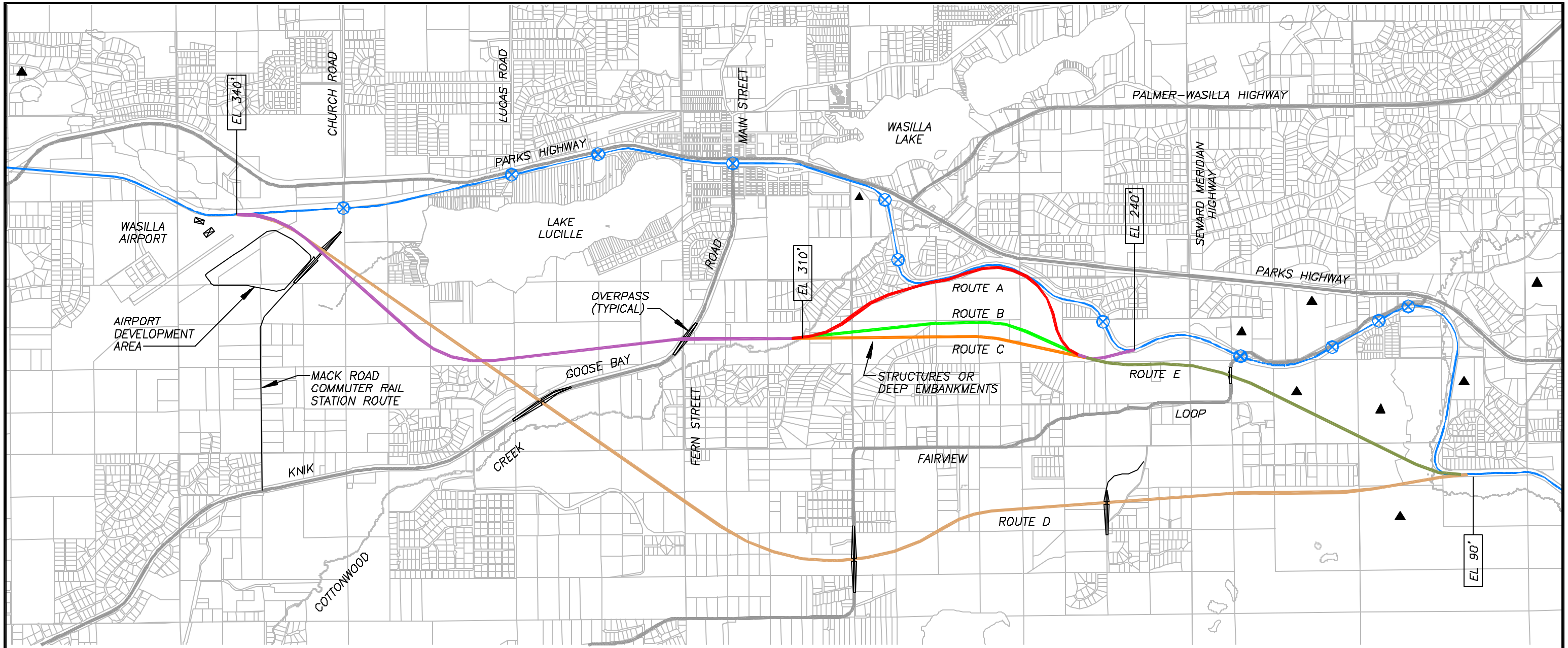
The result of the preliminary review of the City's idea to relocate the railroad was that, yes, in fact, there were five technically feasible alternative railroad routes that could serve the City's objectives of:

- Enhancing Traffic Safety and Traffic Flow
- Improving Quality of Life
- Enhancing the Environment and Protecting Area Water Bodies
- Promoting Economic Development
- Improving the Central Business District

The preliminary review indicated that eleven (11) at-grade railroad crossings between the Glenn Highway and the Wasilla Airport could be eliminated, and the 200–foot wide railroad corridor could be converted to other high-value uses such as traffic safety and capacity improvements, trails, stormwater controls, and landscaping.

	Location	**Controlled Crossing**	**Comment**
#1	Private Drive	No	Uncontrolled Driveway Crossing to Residence
#2	South Abbey Boulevard	Yes	Entrance to Grandview Terrace Subdivision
#3	Valley Block and Concrete	No	Uncontrolled Crossing to Concrete and Gravel Company
#4	Fairview Loop	Yes	Road curves prior to Crossing the Railroad.
#5	Jude Drive	Yes	Access Drive to Sewer Plant and East Jude Drive residences
#6	East Glennwood Avenue	Yes	Subdivision Entrance
#7	Kenai Supply and Wasilla Concrete Access	No	Uncontrolled Crossing to Business
#8	Knik-Goose Bay Road	Yes	Crosses Major Arterial
#9	Snider Subdivision	No	Access to North Side of Lucille Lake properties.
#10	Hallea Lane / Lucas Road	Yes	Access to Best Western Hotel and Lake Lucille properties
#11	Church Road	No	Future Access to Airport and Commuter Rail Station

TABLE 1 – RAILROAD CROSSINGS IN THE STUDY AREA



LEGEND

- RAILROAD ROUTE A, LENGTH = 5.97 MILES
- RAILROAD ROUTE B, LENGTH = 5.64 MILES
- RAILROAD ROUTE C, LENGTH = 5.60 MILES
- RAILROAD ROUTE D, LENGTH = 7.98 MILES
- RAILROAD ROUTE E, LENGTH = 7.71 MILES
- EXISTING RAILROAD, LENGTH = 6.01 MILES (ROUTES A,B,C) 9.17 MILES (ROUTES D,E)
- EL 240' EXISTING GRADE ELEVATION
- EXISTING RAILROAD CROSSING
- EXISTING GRAVEL SOURCE

DATA

PROPERTY LINES SHOWN ARE FROM MAPPING SUPPLIED BY THE MATANUSKA–SUSITNA BOROUGH
DATE OF MAPPING: 1999

FIGURE 2

N

0 3000
SCALE IN FEET

EXISTING AND ALTERNATE ROUTES
ALASKA RAILROAD RELOCATION
WASILLA ALASKA

FOUNDED 1917 CITY OF WASILLA ALASKA

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The City of Wasilla planning objective is to fundamentally change the character and environment of the Parks Highway corridor through the center of the community. The vision is to improve safety and capacity, while at the same time making the downtown area a more friendly and inviting place. Adding traffic channelization, landscaping, trails, waysides, and interpretive areas is necessary. Stormwater controls are to be included with planned improvements to protect water quality of important area streams and lakes. The relocation of the railroad is the first step in transforming the Parks Highway from multiple lanes of asphalt into a more interesting, environmentally friendly place.

1.03 Scope

This document is a preliminary study of five alternative alignments of the Alaska Railroad between railroad milepost (MP) 153 and MP 163 in the vicinity of Wasilla, Alaska. The scope does not include making a recommendation for a preferred alternative. The forthcoming environmental process per the National Environmental Policy Act (NEPA) needs to evaluate the alternatives in an unbiased way. The document discusses significant engineering issues such as alignment, grade, run times, length, soil conditions, drainage, availability of gravel, right-of-way, erosion control, maintenance, snow and icing problems, utilities, potential development areas within the community, wetlands, and cultural and historical resources. This study also provides preliminary opinion of probable cost for programming and a realistic schedule that can be anticipated for this project. This study will help the ARRC secure funding for the project's construction. The next step, once funding is identified, is to initiate the environmental process in accordance with NEPA standards.

1.04 Purpose

The purpose of this study is to develop alternatives and estimate costs for relocating the Alaska Railroad around the City of Wasilla. The project's objective is to improve safety, improve railroad run times to facilitate better commuter passenger service, improve area water quality protections, and make the railroad and highway consistent with City of Wasilla's planning objectives for the downtown area.

1.05 Public Need

The public need associated with the railroad relocation project is to improve traffic safety, improve traffic capacity, enhance environmental protections, and provide for pedestrian access and safety.

Safety and capacity can be improved by eliminating the eleven (11) at-grade crossings between MP 153 and MP 163. Traffic at railroad crossings is increasing. Knik-Goose Bay (KGB) Road and the Parks Highway have recently experienced substantial increases in traffic volumes. From 1997 to 1999 Average

Daily Traffic (ADT) on Knik-Goose Bay Road increased from 11,300 vehicles per day to 12,770 vehicles per day[2]. This is an increase of 6.3 percent per year. The forecasted population growth in the Wasilla area is an annual rate of 3 percent.[3] Using three percent growth, the community will see 23,000 vehicles per day crossing the tracks at KGB Road in the year 2020 and using a 6.3 percent growth rate 43,300 vehicles will cross the tracks each day. These growing traffic volumes at the Knik-Goose Bay Road crossing will lead to worsening traffic stoppages and congestion in the CBD.

FIGURE 3 – CONGESTED TRAFFIC AT KNIK-GOOSE BAY ROAD CROSSING

Safety will be improved by eliminating school busses from crossing controlled and uncontrolled railroad crossings. The Matanuska-Susitna Borough School District estimates that 240 school busses cross tracks each school day to access the south side of the community (60 buses, four times each day).

Safety will be improved by reducing response times for emergency vehicles. Travel from the north side of the community to the south side of the tracks during a train passage can be improved by up to 13 minutes, 5 to 10 minutes for the stoppage and 3 minutes estimated clearing time. The south side of the community is isolated from emergency vehicle access during a train passage.

Environmental protections are also needed to reduce the potential for hazardous material releases into local streams and lakes. The City Public Works and Planning Departments are taking a lead role in implementing stormwater discharge controls to protect Wasilla's sensitive high-value waters, which include Wasilla Lake, Lake Lucille, and Cottonwood Creek. Lake Lucille has been on the Alaska Department of Environmental Protection's (ADEC) Section 303(d) impaired water body list since 1994[4]. In 1998, the ADEC ranked Wasilla's stormwater needs Number 1 in the state. The City currently has $2.0 million in state, federal, and local funding for a stormwater control project that includes a collection and treatment system. The system will process downtown area stormwater prior to reaching Wasilla Lake, Lake Lucille, and Cottonwood Creek. The City's planning staff also monitors new projects through their permitting process to minimize impacts to the area's surface waters.

Relocation of the railroad out of the Parks Highway corridor addresses two important environmental needs. Removing the at-grade crossings completely eliminates the potential for collision-related derailments and associated hazardous material releases into area surface and ground water. Approximately 200 feet of the approximate 300-foot wide transportation corridor through downtown Wasilla is dedicated to railroad. See FIGURE 4. The 200 feet of railroad right-of-way is badly needed for future stormwater controls associated with Parks Highway improvements in the downtown area. The additional 200 feet of corridor is also needed for traffic safety, capacity, and environmental improvements including:

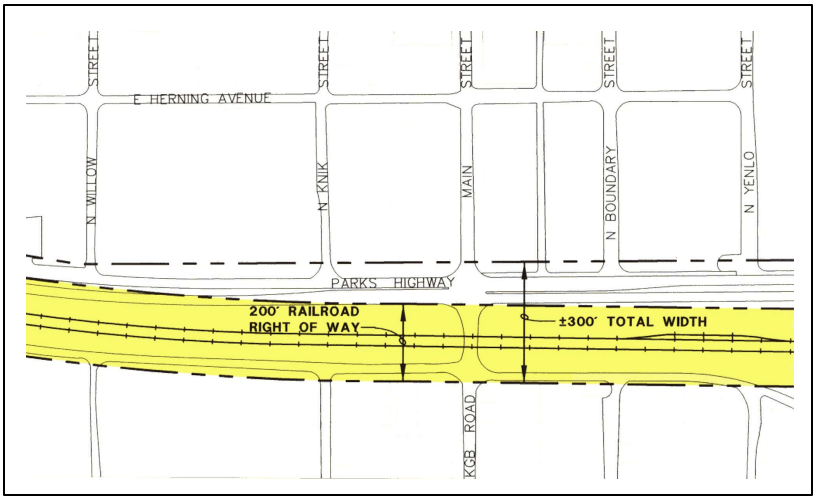

FIGURE 4 – TYPICAL RIGHT OF WAY, DOWNTOWN WASILLA

- synchronized signals
- traffic channelization
- acceleration / deceleration lanes
- stormwater controls
- landscaping
- new trails, waysides, and interpretive sites.

FIGURE 5 – EXCERPT FROM PARKS HIGHWAY LANDSCAPING PLAN
(Prepared by Bert Lent, Group III Design)

The City of Wasilla recently completed and adopted a concept plan for improvements to their central business district.[5] See Figure 5.

Pedestrian Access and Safety be enhanced by relocation of the railroad. Currently, the downtown area is quite pedestrian unfriendly. The Parks Highway and railroad pose a difficult and unsafe barrier for pedestrian and bicycle traffic between the north and south sides of the community. Pedestrians wishing to cross the railroad tracks may only legally cross at Glennwood Avenue, which is quite inconvenient, or at the heavily traveled Knik-Goose Bay Road, which has no sidewalks or pathways. This is a dangerous situation. Pedestrians crossing at other locations may be subject to trespass by the ARRC. Currently seniors have no safe means of walking to and from the Seniors Center to the shopping areas. Relocating the railroad will provide the badly needed space for pathways, trails, and highway underpasses to allow the free flow of pedestrians and bicycles across and along the Parks Highway.

Relocating the railroad will serve the public need by providing space for future improvements to Parks Highway traffic safety, traffic capacity, environmental protections, and pedestrian access and safety.

1.06 Governing Regulations.

The ARRC operates under the regulatory authority of the United State's Department of Transportation, Federal Railroad Administration, Code of Federal Regulations, Title 49-Transportation, Subtitle B--Other Regulations Relating To Transportation, Chapter II - Federal Railroad Administration (FRA), Department of Transportation.

Environmental work for railroad projects will follow FRA policies and procedures as approved by the President's Council on Environmental Quality.

1.07 Engineering Standards.

The engineering standards for design, construction and maintenance of railways in the United States have been developed over the past 60 years by the American Railway Engineering and Maintenance-of-Way Association (AREMA). AREMA publishes the "Manual for Railway Engineering" which is the authoritative source for current railway engineering practice. The ARRC recognizes the AREMA Manual for Railway Engineering as their standard[6]. The ARRC has also prepared and adopted Standard Drawings that provide engineering guidance for typical design elements for their particular system.

1.08 Geometrics.

Geometrics govern railway design. Sharp curves cause (1) reduced speeds, (2) increased wear on tracks, (3) increased train resistance, and (4) higher track maintenance costs. The ARRC desires a maximum curvature of 2 degrees (a 2,865-foot radius) to allow for future higher-speed passenger trains. A two-degree curve provides for design speed of 70 miles per hour.[7]

Curves. Railroad track consists of a series of straight sections of track called "tangents" connected by circular, compound, reverse or spiral horizontal curves. Circular and spiral curves are the most commonly used curves in railroad design. Spiral curves are preferred because they allow the gradual elevation of the outer rail into the superelevation section of the curve. Spiral curves provide a smoother ride and reduced wear on the rails. Reverse curves are usually avoided in railway design because they cause undue track wear and are difficult to transition superelevations effectively.

Superelevation**,** or banking of the track at curves, is necessary to counteract centrifugal forces. Normally the outside rail is elevated and the inside rail follows profile grade. Tracks are superelevated for a specific speed. Properly designed superelevation prevents excessive track wear. The required superelevations for various curves and speeds are set forth in the ARRC's standard drawings[8]. The maximum allowable superelevation permitted by the ARRC is 5 inches.

Grades. Vertical grades also affect design. Vertical grades are the vertical rise in feet per 100 feet of horizontal track expressed as a percent. Grades govern the tonnage that a single engine can handle. Compensated grades are grades at curves that must be reduced to take into consideration the additional frictional resistance from centrifugal forces. Ruling grade is the maximum grade permitted by a particular railroad given the type and size of trains and engines utilized. A ruling grade of 1% maximum[4], or 52.8 feet in vertical rise per each mile of track has been established by the ARRC.

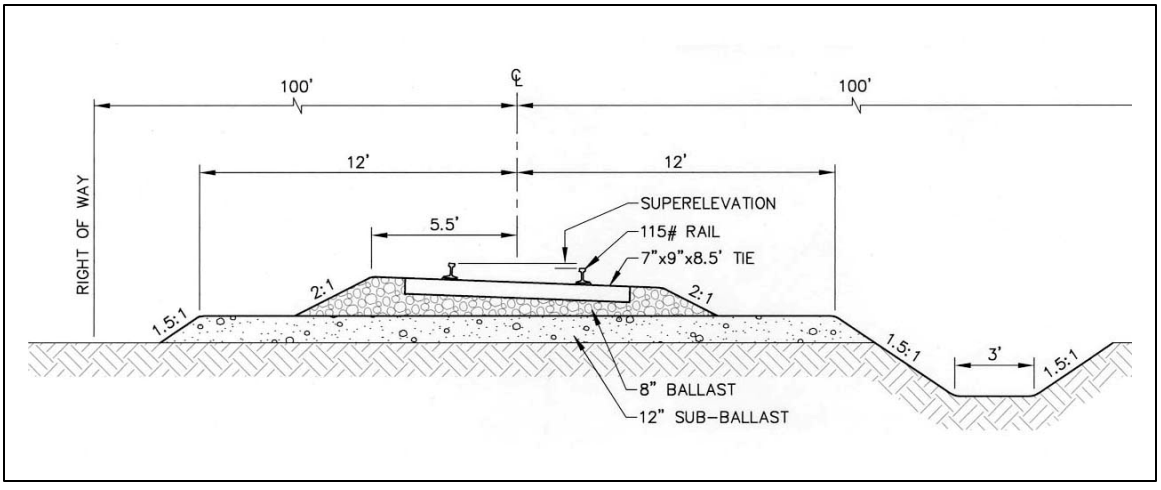

FIGURE 6 – RAILROAD CROSS-SECTION

2.0 Existing Railroad Route MP 153.72 and MP 162.85

2.01 General Condition of Existing Track

The existing railroad between Milepost (MP) 153.72 and MP 162.85 was constructed circa 1920 and was reconstructed in 1947 with heavier 115-pound rail. Since 1985, the rails in the six curves have been replaced. Major tie renewals (25% replacement) occurred in 1989 and 1999.

Track is maintained to FRA standards that are set forth in 49 CFR 213, Track Safety Standards. Tracks are visually inspected and a written report prepared twice a week by ARRC personnel. Twice annually, the track receives a 100% electronic inspection to measure actual track deflection under load versus the allowable FRA standard. Annually, the track receives a 100% ultrasonic inspection to reveal internal flaws and cracks in the steel rails. ARRC personnel perform special patrols after earthquakes, floods and extreme weather.

2.02 Alignment and Grade

The existing railroad meanders, following rising terrain as it climbs from the lowlands on the Palmer Hay Flats up to the uplands at Wasilla. *See* Figure 2. At the Glenn Highway crossing, the railroad elevation is at about 30 feet mean sea level (MSL). At MP 153, the railroad is at an elevation of about 90 feet and it rises at varying grades not exceeding 0.98% to an elevation of 310 feet as it breaks out on top, near Glennwood Avenue. From Glennwood Avenue to the Wasilla Airport (MP 163) the profile is nearly flat.

Between MP 153.72 and MP 162.85 there is 9.13 miles of existing track. Within this section there are 14 horizontal curves that vary in radius from 465 feet to 3,997 feet. Maximum design speed for each curve is listed in Table 2. The tightest curve for each track section governs the speed limits set by the ARRC. In the case of the existing alignment, 25 mph is the speed limit between MP 153.72 and MP 159.60.

The recommended sharpest curve for high-speed commuter passenger service is 2 degrees maximum. The existing route does not meet the criteria for commuter passenger service.

	Curve Number	Degree of Curvature	Radius of Curvature (feet)	Maximum Speed (mph)
1	* 154	12° 20'	465	25
2	154A	1° 26'	3,997	70
3	155	4° 32'	1,264	45
4	156	2° 31'	2,277	60
5	156A	2° 53'	1,987	60
6	157	10° 2'	571	25
7	157A	10° 5'	568	25
8	157B	9° 47'	586	25
9	158	3° 34'	1,606	50
10	158A	3° 41'	1,556	50
11	158B	9° 59'	574	25
12	159	6° 4'	944	40
13	159A	5° 50'	982	40
14	160A	3° 59'	1,438	50

* Blue denotes 25 mph curves

TABLE 2 – EXISTING CURVES IN STUDY AREA

3.0 Alternative Railroad Routes

3.01 Design Criteria

We used the following design criteria for layout of the new alternative alignments.

- 2 degrees of curvature, maximum
- 70 mph design speed (for future passenger commuter rail operations)
- 1% maximum grade, including adjustments for compensated curves
- Avoidance of developed lands
- Avoidance of Environmentally Sensitive areas

3.02 Discussion of Alternative Routes

Alternative Route A was selected to eliminate four 25 mph curves – 157, 157A. 157B, and 158B located near Jude Drive and Glennwood Avenue. Alternative A contours around the gully located west of the sewer plant at an approximate 1% grade until it daylights out on top of the gully at Glennwood Avenue. From there the route turns west, crosses Cottonwood Creek, Knik-Goose Bay Road, passes north of the City's baseball fields and then turns northwest to the Wasilla airport where it ties into existing track. This route is not the least-cost alternative event though it is nearly the shortest route at 5.97 miles and it does not require crossing the gully. This route significantly impacts the Richmond Hills Subdivision. ***Alternative A eliminates 7 at-grade crossings.***

Alternative Route B is a variation of Alternative A, except that it crosses the gully rather than skirting around it. Alternative B converges back onto the common alignment with Alternative A, B and C between Cottonwood Creek and the airport. This route was a natural variation of Alternative A. It was selected because it avoids the direct impact of the Richmond Hills Subdivision and it is shorter than Alternative A. Alternative B is, however, more complicated and more expensive than Alternative A, because it requires a 3,600-foot long structure or deep embankment to

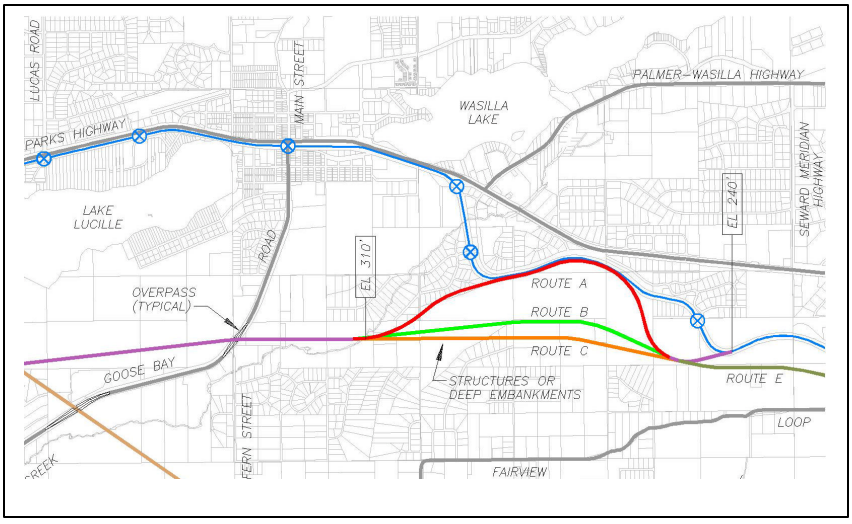

FIGURE 7 – ALTERNATE ROUTES A, B, C, AND E

cross the 120-foot deep gully. Alternative B has a slight dogleg to avoid property on the south bluff. Alternative B visually impacts the view of bluff lots in Richmond Hills. ***Alternative B eliminates 8 at-grade crossings.***

Alternative Route C is the same as Alternative B, except the dogleg near Valley View Estates is removed and a more direct route across the gully is taken. Alternative C requires a 3,000-foot long gully crossing which is some 600 feet shorter than Alternative B. This reduces the amount of bridge or embankment for the gully crossing, but Alternative C also has a more direct impact to the properties on the south bluff including a few developed lots in Valley View Estates Addition Number Two. ***Alternative C eliminates 8 at-grade crossings.***

Alternative Route D is the southern route. We analyzed the route because it eliminates 11 crossings, three more than the other alternatives, and it eliminates the last of the four sharpest curves in the area, Curve 154. Curve 154 is a sharp 25 mph curve that restricts train speed in this area.

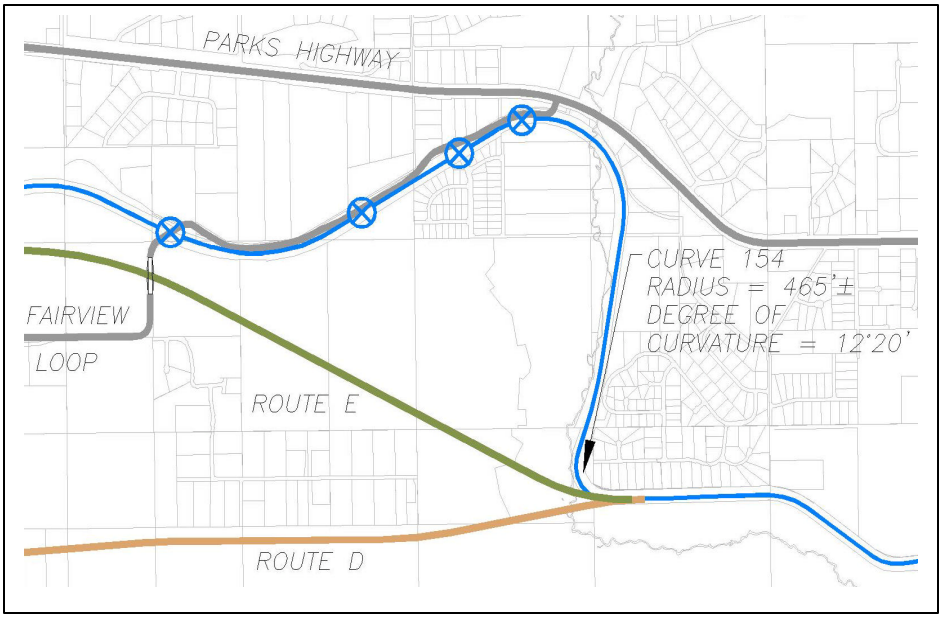

FIGURE 8 – CURVE 154

Alternative D starts at MP 153.72 at an elevation of about 90 feet and climbs at a 0.59% grade, generally following the land's contours and progresses through undeveloped lands, for the most part. Near Curve 154, it doglegs slightly south to miss the Fairview East Subdivision and passes through open meadow land. Alternative D then continues west until it reaches the Red Birch Subdivision area where it doglegs further south to avoid both Arkose Estates and Sunrise Acres Subdivisions. It crosses Fairview Loop at a right angle, passes through a recently developed subdivision and then turns northwest toward Knik-Goose Bay Road. Alternative D crosses Knik-Goose Bay Road between the Iditarod Headquarters and the Smith Baseball Fields, then continues northwest. The route avoids developed portions of the Tallerico Subdivision and a wetland pond as it makes it's way northwest to the Wasilla Airport. Alternative D is governed by the natural lay of the land as it must generally follow the natural contours as it climbs from an elevation of 90 feet at the beginning to an elevation of 340 feet at the existing tie-in at MP 162.85 near the airport.

Alternative Route E begins at MP 153.7 where it travels northwest to Route C and follows the general path of Route C. Alternative E eliminates 11 at grade crossings while also eliminating the four sharpest curves. Alternative E impacts the same lands as Alternative C plus 8 additional lots. Two of these additional lots are developed with the other 6 undeveloped, however, four of the undeveloped lots are in the planning stages of a proposed subdivision (Ranch Subdivision).

3.03 Grade

Northbound ruling grade was assumed to be a 1% (rise divided by run) maximum slope, which is set by ARRC engineers.[6] Table 3 is a summary of steepest grades we encountered when laying out profiles. Grades are compensated for the effects of curves. Detailed profile grades are shown on the drawings in Appendix E at the end of this report. Except for the deep embankments on Alternatives B and C (See Figure 2), we were able to achieve reasonable profiles with reasonable cuts and fills using 1% compensated grade or less.

Alternative Routes	Maximum Grade (%)	Compensating Curve Radius (feet)	Maximum Compensated Grade (%)
Existing Route	0.99	465	1.48
Alternative A	0.94	3,000	1.00
Alternative B	0.94	3,000	1.00
Alternative C	1.00	N/A	1.00
Alternative D	0.94	3,000	1.00
Alternative E	1.04	3,000	1.10

TABLE 3 - MAXIMUM GRADES BY ROUTE

3.04 Length

Each alternative replaces different lengths of track, which impacts the initial construction cost and also operational and maintenance costs. Alternative A requires the least amount of new roadbed at 5.62 miles (0.42 miles of roadbed will be reused). Alternative C calls for 5.65 miles of new roadbed and track. Alternative D is the longest project, which requires 7.98

Alternative Routes	New Track Constructed (miles)	Track Permanently Eliminated from the System (miles)
Alternative A	6.04	None
Alternative B	5.70	0.35
Alternative C	5.65	0.39
Alternative D	7.98	1.16
Alternative E	7.71	1.42

TABLE 4 – TRACK LENGTHS

miles of new track. Alternative A does not remove any overall track length from the system. Alternative E permanently removes the most track from the system, 1.42 miles.

3.05 Run Times

Railroad run times are governed by federal regulation, track geometrics (curves and grades) for the different passenger and freight train configurations. The FRA regulates maximum operating speeds of 49 miles per hour (mph) for freight trains, and 59 mph for passenger trains. Higher speeds are allowed for passenger trains on track systems with automatic block signals. The ARRC does not have automatic block signals.

We assumed for preliminary run time calculations that trains on the existing route would achieve the speed limits in the ARRC track chart (Appendix A) which are 25 mph from MP 153.72 to MP 159.60 and 49 mph from MP 159.60 to MP 162.85. This applies to both passenger and freight trains. We also assumed that the average train would be able to accelerate from 25 mph to 49 mph in approximately 0.5 miles. We also assumed that in all alternatives that the 25 mph speed limit would prevail until MP 156.72. The results indicate that Alternative A, B, and C shave 3 to 4 minutes off run time when compared to the existing route. Alternative D cuts 9 to 10 minutes off existing run times. Table 5 shows the results.

Alternative Routes	Distance (miles)	Run Time (minutes) No Stop *	Run Time (minutes) Stop**	Run Time Net Savings (minutes)	Comment
Existing Route	9.13	18.3	19.8	0.0	Train speed = 25 mph / 49 mph
Alternative A	9.02	15.6	17.1	2.7	Train speed = 25 mph / 49 mph
Alternative B	8.73	14.5	16.0	2.8	Train speed = 25 mph / 49 mph
Alternative C	8.69	14.5	16.0	3.8	Train speed = 25 mph / 49 mph
Alternative D	7.98	9.8	11.3	8.5	Train speed = 49 mph
	7.98	8.2	9.7	10.1	Train speed = 59 mph
Alternative E	7.71	9.4	10.9	8.9	Train speed = 49 mph
		7.8	9.3	10.5	Train speed = 59 mph

* assumes no stop at the airport
** assumes a stop at the airport's future commuter rail station

TABLE 5 – PRELIMINARY RUN TIMES
See Appendix B

3.06 Soil Conditions

Soils in the area are a complex of flood plains and stream terraces. Flood plain features include point bars, cutoff meanders and back swamps. Short steep escarpments are found between floodplains and different stream terraces. Soil parent material on floodplains and stream terraces include stratified sandy and silty alluvium of varying thickness over gravelly and sandy alluvium. Glaciation is found above floodplains and stream terraces at elevations between 150 and 500 feet. Glacial land forms include nearly level and undulating outwash and till plains and steep hills. Soil parent material includes loose sandy and gravelly glacial outwash, friable to firm loamy and gravelly glacial drift, and firm gravelly glacial till. Most uplands in the area are covered with a layer of silty airborne or eolian deposits. Eolian deposits in loess derived from blowing winds over barren floodplains of the Matanuska and Knik Rivers. In the Matanuska Valley, the surface mantle consists primarily of loess[9].

Soil conditions along each route varies greatly in short distances. In laying out the alternative alignments, we avoided wetlands, ponds, and bogs to the greatest extent possible; however, in a few locations wet/soft soils can be anticipated. The first location is in the bottom of the gully that Routes B, C, and E cross. Special attention should be paid to this area. Either a deep embankment or a bridge will require careful investigation of soil conditions. The other area of special attention is at the west end of the project area near the airport. Projects on Church Road and the 1982 Highway Bypass Study revealed saturated fine-grained soils with peat to depths of up to 9 feet in some areas.

There is some existing soils information along the alignment for Alternative D. In 1982, the Alaska Department of Transportation and Public Facilities (DOT&PF) commissioned a study of a Parks Highway bypass around Wasilla[10]. Soil borings were taken along the proposed Parks Highway bypass routes, and in some cases they match our railroad alternative routes. The boring logs show widely varying conditions of randomly stratified layers of peat, silts and gravels. As this project advances to the environmental and location engineering phases, supplemental borings should be gathered and analyzed to fill in the gaps in existing information.

3.07 Drainage

Drainage conditions along the alternative routes vary with the location. Adequate drainage should be provided in the final design to minimize future maintenance for railroad personnel. In cuts longitudinal grades should be provided to carry water to where cuts daylight. Longitudinal grades should be greater than 0.3 percent. In areas of fill rail, grade should be held 3 to 4 feet above terrain where surface water is anticipated. Culverts should be installed so as to not impede natural drainage patterns.

3.08 Availability of Construction Materials

Seven known gravel sources are known to exist in the project area. Gravel source locations are identified on Figure 2. Seven are located near the east end of the project area in the vicinity of Valley Block and Wasilla Concrete's pit on Fairview Loop. The Wasilla Concrete pit is located near the midpoint of the project at Crusey Street and Parks Highway. On the west end of the project area, a pit is located 1 mile north of the airport on the north side of the Parks Highway. In the vicinity of Knik-Goose Bay Road, the State DOT/PF has a gravel source. In addition to the known sources, other sources should be explored along each route to find sources closer to the project area. The cost of gravel is proportional to the haul distance, so proximity to the site greatly affects project costs. Sufficient gravel is available in the project area to build any of the alternatives.

3.09 New Right of Way Acquisition

New right-of-way acquisition and its socioeconomic impact to property owners will be a key issue in the environmental process. Right-of-way acquisition will occur after the Federal Transit Authority (FTA) grants location and design approval. Location approval consists of the FTA accepting the location engineering and the environmental documentation. Design approval occurs when the FTA reviews and approves the project design. After design approval, the FTA grants permission to appraise and acquire right-of-way.

Public parks, recreation areas, or wildlife refuges are “Protected Properties" under section 4(f) of the DOT Act (49 U.S.C. 303(c)). The Smith Baseball Fields fall under this designation and a determination report must be filed and approved by the Secretary of the US Department of Transportation before this property can be used. The current design for Alternative D avoids this property.

The key point for *Alternative A* is that it requires acquisition of a significant portion of the Richmond Hills Subdivision and other lands along the route.

Alternative B and Alternative C avoid the right-of-way acqusition in Richmond Hills Subdivision, but will require the acquisition of approximately 140 acres of property worth about $ 5.1 million.

Alternative D will require the purchase of significant portions of a new subdivision in the vicinity of Bluff Vista Circle off Edland Road. Alternative D will require the acquisition of approximately 200 acres of property worth about $ 7.7 million.

Alternative E will require acquisition of the properties in Alternative C along with the acquisition of eight additional properties for a total of about 187 acres at a cost of $ 6.15 million. Within these additional properties is the proposed Ranch Subdivisions development.

Right-of-way acquisition costs were estimated by taking all parcels directly impacted by the new route using year 2000 appraised valuation as determined by the Matanuska-Susitna Borough Assessor. Right-of-way figures included herein are approximtely 10 times the year 2000 appraisal cost to acquire a 200 foot wide corridor. See Table 6 and Appendix C.

Alternative Routes	Properties Requiring Partial or Full Acquisition					
	Gross Acres	No of Parcels	Developed Parcels	Un - Developed Parcels	**Right-of-Way Required using 200-foot Corridor**	**Estimated Right-of-Way Cost (Year 2000 $s)**
Alternative A	1455	50	20	30	136 acres	5,742,000
Alternative B	1671	54	22	32	138 acres	5,077,000
Alternative C	1548	52	22	30	137 acres	5,014,000
Alternative D	2542	81	35	46	193 acres	7,692,000
Alternative E	1920	60	24	36	187 acres	6,146,000

TABLE 6 – RIGHT-OF-WAY REQUIREMENTS
See Appendix C

3.10 Existing Right of Way

Once the new railroad section is constructed, the existing railroad right-of-way can be used for other high-value transportation and recreational purposes. The procecures for handling right-of-way is governed by the Alaska Railroad Transfer Act of 1982[11]. Additionally, the Transportation Enhancement (TE) program under the Intermodal Surface Transportation and Efficiency Act of 1991 (ISTEA) encourages the preservation of natural and cultural resources. Eligible activities include "railway corridors, including conversions and use for pedestrian and bicycle trails."[12] The right-of-way should be maintained as an ongoing transportation and recreational corridor as discussed in this study.

3.11 Public Involvement

Public involvement will be a key element during project planning and design. During the environmental process the Sponsor will follow regulatory requirements set forth in NEPA. The public involvement will include a series of public meetings and workshops, and will involve at a minimum:

- The ARRC (All Divisions)
- State of Alaska Department of Transportation and Public Facilites (All Divisions)

- Matanuska-Susitna Borough Planning Commission
- City of Wasilla, Public Works and Planning Departments
- City of Wasilla, Mayor's Office
- City of Wasilla, Planning Commission
- User Groups
- Local Chamber of Commerce
- Adjacent Property Owners
- General Public

3.12 Regulatory Permits and Agency Coordination

The environmental process will not only identify the regulatory permits needed for the project, but will also include applying for permits or approvals from the following agencies:

Regulatory Permits

- Federal Transit Authority Finding of No Significant Impact (FONSI), or approval of a Record of Decision (ROD)
- US Environmental Protection Agency NPDES Discharge Permit
- US Army Corps of Engineers 404 Wetlands Permit
- State DGC Coastal Zone Consistency Determination
- State Department of Fish and Game, Title 16 Habitat Modification Permit
- State DEC 401 Water Quality Certification
- State DNR Water Use Permits
- State DOT&PF Permits for work within state rights-of-way
- Matanuska-Susitna Borough Coastal Management Plan Consistency
- Matanuska-Susitna Borough Road Crossing Permits
- Matanuska-Susitna Borough Platting Approvals
- City of Wasilla Development Permits

Lead Agency

- Federal Transit Authority

Agency Coordination List

- US Environmental Protection Agency

- US Army Corps of Engineers, Regulatory Branch
- US Fish and Wildlife Service
- National Marine Fisheries Service
- State Division of Governmental Coordination, Coastal Zone Management Program
- State DNR / Historic Preservation Office
- State Department of Fish and Game
- State Department of Environmental Conservation
- State Department of Transportation and Public Facilites
- Matanuska-Susitna Borough Planning Department
- City of Wasilla Department of Planning
- City of Wasilla Department of Public Works

3.13 Wetlands

During the identification of alternative routes, wetlands were avoided to the greatest extent possible. The U.S. Army Corps of Engineerings Wetlands Mapping was also researched. There are at least two areas that are clearly classified as wetlands and will be impacted. The first location is the gully bottom traversed in Alternatives B, C, and E. This wetland area consists of about 40 acres and can be avoided by selecting Alternative D. The second wetland area is located east of the airport. We estimate approximately 11 acres of wetland will be directly impacted by Alternatives A, B, C, D, and E. The second wetland area must be crossed in order to merge back onto the existing railroad alignment. Table 7 provides the estimated area of wetlands impacted for each alternative.

Alternative	Impacted Wetlands
A	44.0 acres
B	62.7 acres
C	53.3 acres
D	13.1 acres
E	53.3 acres

TABLE 7 – IMPACTED WETLANDS

3.14 Noise

Noise impacts shall be evaluated during the environmental process. Special consideration should be given to the noise levels produced by ARRC's new, larger, more powerful diesel engines and the new engine whistles. Also, consideration shall be given to the noise impact of eliminating train whistles

blowing at the 11 at-grade crossings each time a train passes. Alternatives A, B, C, D, and E would eliminate the train whistles.

3.15 Cultural and Historic Sites

The State Historic Preservation Officer (SHPO) shall be contacted during the environmental process to determine if there are any known Cultural or Historic Sites in the vicinity of the study area.

3.16 Utilities

Utilities in and crossing the railroad right-of-way area are controlled by the various utility companies involved. Fiberstar has a fiber optic cable in the existing railroad right-of-way that will need to be relocated to the new alignment. The railroad has no communications cabling along the existing route. During the design process, consideration of future utilities should be addressed to avoid future borings and excavations near the railroad. Sleeves should be added at road and utility crossings to minimize future work in the right-of-way. The following utility companies should be included in any future design coordination.

- Communications — Alaska Fiber Star
- Power — Matanuska Electric Association
- Telephone — Matanuska Telephone Association and GCI Communications
- Cable TV — Rogers Cable and GCI Communications
- Water — City of Wasilla, Public Works Department
- Sewer — City of Wasilla, Public Works Department
- Storm water — City of Wasilla, Mantanuska-Susitna Borough, State DOT&PF

4.0 Engineer's Opinion of Probable Cost

The cost estimate is developed based on the project as it is currently perceived based on concept level plans dated January 2001. Computer generated quantities were prepared based on the standard ARRC railroad cross-section and 1.5:1 slopes on deep fills. This estimate contains the the following general assumptions:

- ✓ 0% inflation between now and the time of construction.
- ✓ No relocation of the Alaska Fiberstar cable to the new alignment.
- ✓ A 24-month construction period.
- ✓ Competitive bid construction.
- ✓ Right-of-way includes every whole parcel that touches the proposed right-of-way. Right-of-way included herein is approximtely 10 times the actual area needed for the 200 foot wide corridor.

Details of construction quantities and costs are included in Appendix D.

ROUTE A	**$52,667,000**
Environmental Engineering and Permitting	1,500,000
Right-of-Way	5,742,000
Administration @ 3%	879,000
Design @ 15%	4,396,000
Construction Management @ 12%	3,517,000
Construction	29,306,000
Construction Contingency @ 25%	7,327,000
	$52,667,000

ROUTE B	**$65,372,000**
Environmental Engineering and Permitting	1,500,000
Right-of-Way	5,077,000
Administration @ 3%	1,138,000
Design @ 15%	5,690,000
Construction Management @ 12%	4,552,000
Construction	37,932,000
Construction Contingency @ 25%	9,483,000
	$65,372,000

ROUTE C	$64,605,000
Environmental Engineering and Permitting	1,500,000
Right-of-Way	5,014,000
Administration @ 3%	1,124,000
Design @ 15%	5,622,000
Construction Management @ 12%	4,497,000
Construction	37,478,000
Construction Contingency @ 25%	9,370,000
	$64,605,000

ROUTE D	$54,930,500
Environmental Engineering and Permitting	1,500,000
Right-of-Way	7,692,000
Administration @ 3%	885,000
Design @ 15%	4,426,000
Construction Management @ 12%	3,541,000
Construction	29,509,500
Construction Contingency @ 25%	7,377,000
	$54,930,500

ROUTE E	$62,513,600
Environmental Engineering and Permitting	1,500,000
Right-of-Way	6,145,000
Administration @ 3%	1,062,000
Design @ 15%	5,310,000
Construction Management @ 12%	4,248,000
Construction	35,398,600
Construction Contingency @ 25%	8,850,000
	$62,513,600

[1] The Alaska Railroad, Praeger, 1967.

[2] Mat-Su Valley Traffic Map, Alaska DOT&PF Central Region Highway Data Section, 1997 and 1999.

[3] Using the Base Case Population Forecast from the April1996 Wasilla Comprehensive Plan prepared by Cannelos Group/Community Planning/LCMF.

[4] The ADEC has a federally-approved list of polluted waterbodies, often referred to as the Section 303(d) list.

[5] Wasilla Parks Highway Landscape Concept Plan, Bert Lent, Group III Design, 2000.

[6] Per discussions with Tom Brooks, P.E., Chief Railroad Engineer, Alaska Railroad Corporation.

[7] Using 5 inch superelevation, a 2 inch underbalance for passenger trains, and $E = 0.0007\ V^2\ D$ from AREMA, where E is superelevation, V is velocity, and D is the degree of curve.

[8] Alaska Railroad Standard Drawing Number 2.62, November 1984.

[9] Soil Survey of the Matanuska-Susitna Valley Area, Alaska, USDA, August 1998.

[10] Location Study, New Parks Highway, State Department of Transportation and Public Facilities, 1982.

[11] 45 USC Chapter 21 - Alaska Railroad Transfer.

[12] Alaska DOT&PF Highway Preconstruction Manual, Chapter 4, Project Development, 1999.