11. TRANSPORTATION SAFETY AND DELAY

This chapter describes the analysis of potential transportation safety and delay impacts from the proposed Port MacKenzie Rail Extension. Section 11.1 describes the regulatory setting, Section 11.2 describes the analysis methodology, Section 11.3 describes the affected environment (existing conditions), Section 11.4 describes potential environmental consequences (impacts) under the proposed action and the No-Action Alternative, and Section 11.5 describes unavoidable environmental consequences of the proposed action to transportation safety and delay.

11.1 Regulatory Setting

Several agencies within the U.S. Department of Transportation (USDOT) – including the Federal Highway Administration (FHWA) and the Federal Railroad Administration (FRA) – have safety-related roles with respect to rail/roadway at-grade crossings. All traffic control devices installed at railroad facilities involving Federal aid projects must comply with FHWA's Manual on Uniform Traffic Control Devices (23 Code of Federal Regulations [C.F.R.] part 655, subpart F), and on certain projects where Federal-aid funds are used for the installation of warning devices, must include automatic gates and flashing light signals. The FRA has issued rules under its railroad safety authority that impose minimum maintenance, inspection, and testing standards for at-grade crossing warning devices (49 C.F.R. parts 234-36). Generally, however, states have jurisdiction over grade crossing safety issues, including the selection and placement of warning devices (Railroad-Highway Grade Crossing Handbook [FHWA, 2007]). Thus, the Surface Transportation Board's Office of Environmental Analysis (OEA) analyzed grade separation of rail/roadway crossings based on FHWA guidelines (FHWA, 2002), including the Alaska Traffic Manual, which provides guidelines for improvements in grade crossing warning devices (ADOT&PF, 2005). The guidelines include consideration of delay, roadway classification, average daily traffic, number of trains per day, and train speed at grade crossings.

Several Federal agencies have established requirements for hazardous materials transportation on rail lines, and for emergency planning and spill response for hazardous materials. These agencies include the USDOT, the U.S. Environmental Protection Agency (USEPA), and the Occupational Safety and Health Administration (OSHA). USDOT rules include requirements for shipping and packaging containers for hazardous materials, emergency response information, and training. The USDOT's FRA has authority to ensure the safe movement of rail traffic. Regulatory and enforcement powers of the FRA are found at 49 C.F.R. parts 200 through 240. The USDOT's Pipeline and Hazardous Materials Safety Administration has established design standards and requirements, found at 49 C.F.R. parts 171 and 179, for rail cars used to transport hazardous materials. USEPA rules address spill prevention and cleanup. Most USEPA rules address only fixed facilities, rather than transport activities. However, USEPA rules at 40 C.F.R. part 263, Standards Applicable to Transporters of Hazardous Waste, specify immediate response actions, discharge cleanup, and other requirements for transporters of hazardous waste. Finally, OSHA rules at 29 C.F.R. § 1910.120, Hazardous Waste Operations and Emergency Response, specify emergency response and clean-up operations for releases, or substantial threats of releases, of hazardous substances.

11.2 Analysis Methodology

Because the Alaska Railroad Corporation's (ARRC or the Applicant) stated purpose for the proposed action is to provide rail service between Port MacKenzie and Interior Alaska, OEA evaluated each alternative for the proposed action from Port MacKenzie to a common point on the existing ARRC main line. This common point is where the Willow Segment would connect to the existing ARRC main line. Therefore, some alternatives include the use of existing crossings along the main line between the point where the alternative would connect to the main line and the point where the Willow Segment would connect to the main line. The analysis assumes that about 11 trains per day currently operate along this segment on the main rail line.

OEA evaluated at-grade crossing safety at existing public grade crossings by estimating future accident frequency under the No-Action Alternative and the proposed action using the FRA Personal Computer Accident Prediction System (FRA, 2007). The analysis accounted for accident history and frequency of trains at grade crossings, volume of vehicle traffic, existing safety devices at grade crossings, and other factors to determine the potential impacts of an increase in rail traffic. The analysis also considered the existing rail traffic volumes included in FRA's Accident Prediction System, and the additional proposed rail traffic. Estimates of annual average daily traffic (AADT) for vehicles at each road crossing were calculated for 2012 and used in the analysis. Appendix L provides more information about the methods OEA used to analyze impacts at grade crossings.

Calculation of projected accident frequencies was limited to existing public grade crossings. Because new grade crossings that would result from the proposed rail line lack historical accident data, it was not possible to apply FRA's Accident Prediction System to calculate crossing-specific, projected accident frequencies for these crossings. To provide an approximate upper bound of predicted accident frequency for the new at-grade crossings that would be required for this project, OEA calculated predicted accident frequency for (1) the crossing with the highest AADT whose planned warning device is crossbucks and (2) the crossing with the highest AADT whose planned crossing would have gates. This was done by using similar existing crossings along the ARRC main line as proxies for accident history.

Finally, OEA calculated a hazard index for each crossing. The hazard index, which is the product of AADT, daily train traffic, and a crossing protection factor, provides a comparison among the alternatives of the relative likelihood of train-vehicle collisions at grade crossings.

At-grade crossings can be a source of delay for motorists because trains have priority of movement. OEA analyzed potential delay at grade crossings by calculating the estimated delay that road vehicles would experience at grade crossings as a result of rail traffic due to the proposed action. For each grade crossing analyzed, OEA calculated the time that each crossing would be blocked for each train crossing event and the average number of vehicles that would be delayed by each crossing event. OEA also calculated the average delay for all vehicles using each crossing in a 24-hour period and the total delay for all crossings associated with each alternative.

ARRC anticipates transporting primarily bulk materials on the proposed rail line and has not indicated any plans to carry hazardous materials. OEA considered the potential impacts of

occasional hazardous material shipments based on analysis previously conducted for rail transport of fuel and other hazardous materials in other cases.

Appendix L includes a list of data sources and a more detailed explanation of the methodology OEA used to estimate potential grade crossing safety and delay impacts of the proposed action.

11.3 Affected Environment

The proposed project could have a potential impact on the local transportation system, primarily at the rail-road at-grade crossings. New at-grade and grade-separated road crossings would be created, and there would be the potential for additional accidents involving trains and vehicles at new at-grade crossings. Vehicular traffic could also be delayed at new at-grade crossings as trains pass by.

The existing transportation system in the project area consists of a network of local roads with some arterial and collector roads, including Hollywood Road, Burma Road, and Ayrshire Avenue. Table 11-1 summarizes AADT for at-grade crossings analyzed as part of one or more of the alternatives. These AADT values are well below roadway capacities, so motorists currently experience minimal if any delay on these roads. Crossings that would be grade-separated are not included because vehicle traffic on these roads would not be affected by operation of the proposed rail line.

In the past 10 years, there have been 3 incidents involving at-grade crossings in the Matanuska-Susitna Borough (MSB), with a total of 2 injuries and no fatalities. None of these incidents occurred at the existing main line crossings included in Table 11-1. Besides the 3 incidents involving at-grade crossings in the MSB between 1999 and 2008, there was 1 fatal trespass-related accident in 2005 that was unrelated to a grade crossing (FRA, 2008). None of these incidents involved hazardous materials. Information related to all ARRC accidents and incidents during the most recent 10-year period, including accidents involving hazardous materials, is summarized in Appendix L. ARRC transports hazardous materials, primarily between Fairbanks and Anchorage, on the existing main line and is involved in emergency preparedness training with local communities, including how to respond in case of a train accident or a hazardous material incident (ARRC, 2006, 2007). The Alaska Department of Transportation & Public Facilities (ADOT&PF) does not have formal emergency management standards for rail line emergency management. If a rail line accident affected the road system, the ADOT&PF would initiate emergency response according to its 2006 Incident Field Operations Guide (ADOT&PF, 2008).

11.4 Environmental Consequences

11.4.1 Proposed Action

11.4.1.1 Grade Crossing Safety

Table 11-2 lists predicted accident frequency for the existing at-grade crossings along the ARRC main line between the point where the Big Lake Segment would connect to the main line and the point where the Willow Segment would connect to the main line. Depending on the alternative,

Table 11-1
Potential New and Existing At-Grade Crossing Locations

Rail Line Segment	Road Name	Estimated AADT in 2012 (vehicles/day)
Mac West	S. Guernsey Road	102
Mac East Variant	W. Holstein Avenue	102
Mac East Variant	Reddane Avenue	102
Connector 1	Little Su River Road/ Little Susitna Public Use Facility Access Road	154
Connector 2	S. Guernsey Road	102
Connector 3 and Variant	Ayrshire Avenue	579
Connector 3	W. Carpenter Lake Road	58
Connector 3 Variant	Farmers Road	102
Willow	W. Deshka Landing Road	166
Willow	Willow Creek Parkway	396
Houston	W. Susitna Parkway	363
Houston	W. Papoose Twins Road	164
Houston South	W. Millers Reach Road	154
Big Lake	S. Burma Road	637
Big Lake	Homestead Road	102
Big Lake	Homestead Road	102
Big Lake	S. Larrys Lane	102
Big Lake	W. Calonder Way	51
Big Lake	W. La Rae Road	102
Existing main line	Cheri Lake Drive	205
Existing main line	N. Lynx Lake Road	102
Existing main line	W. Twitty Avenue/Nancy Lake Landing	102
Existing main line	Willow Station Road	412
Existing main line	Willow Fishhook Road	740

Table 11-2
Predicted Accident Frequency

	Predicted Accidents per Year		Years between Accidents	
Road [a]	Existing Rail Traffic	With Additional Port MacKenzie Rail Traffic [b]	Existing Rail Traffic	With Additional Port MacKenzie Rail Traffic [b]
N. Lynx Lake Road	0.015093	0.016025	66	62
W. Twitty Avenue/Nancy Lake Landing	0.015093	0.016025	66	62
Willow Station Road	0.015937	0.016800	62	59
Willow Fishhook Road	0.018508	0.019486	54	51

[a] Cheri Lake Drive is excluded from this table because the Applicant proposes to relocate this crossing for alternatives involving the Big Lake Segment, which would make it a new, rather than an existing, crossing and it would not be crossed by rail traffic associated with the other alternatives.

[b] Potential increases in rail traffic at existing at-grade crossings from the proposed rail line would vary by alternative. The number of affected crossings would range from 0 for any alternative that includes the Willow Segment to 4 for any alternative that includes the Big Lake, Houston North, or Houston South segments.

rail traffic between Port MacKenzie and Interior Alaska would move through as many as 4 existing at-grade rail/roadway crossings listed (see Table 11-2). At the crossing with the highest predicted accident frequency for existing conditions, Willow Fishhook Road, the predicted accident frequency would increase from 0.018508 to 0.019486, reducing the predicted interval between individual accidents from 54 to 51 years.

Because predicted accident frequency at at-grade crossings is calculated using historical accident data, crossing-specific predicted accident frequencies could not be calculated for new at-grade crossings associated with the alternatives. ARRC has proposed to equip proposed at-grade crossings with roads having AADT of more than 500 vehicles per day with active warning devices such as flashing lights and gates, while those with AADT of less than 500 vehicles per day would be marked with passive warning devices such as crossbucks and stop signs. To provide an approximate upper bound of predicted accident frequency for the new at-grade crossings, OEA estimated predicted accident frequency for the crossings with the highest AADT in each of these categories by using similar existing crossings in the study area as proxies. South Burma Road, at the potential Big Lake Segment, has a projected AADT of about 640 vehicles per day, and it would be equipped with flashing signs and gates. The predicted accident frequency for this combination of conditions would be 0.00763 accident per year, which is the equivalent of 1 accident every 131 years. Willow Creek Parkway, at the potential Willow Segment, would have an AADT of about 400 vehicles per day and would be equipped with crossbuck signs. The predicted accident frequency for this combination of conditions would be 0.008742 accident per year, or 1 accident every 114 years.

The hazard index provides another mechanism for comparing the likelihood of collisions between trains and vehicles at grade crossings. OEA calculated a hazard index for each crossing to provide a comparison among the alternatives with respect to grade crossing safety. Table 11-3 summarizes the number of crossings (at-grade and grade-separated) and the total hazard index (sum of hazard indexes for each crossing) for each alternative. The last column indicates the ratio between total hazard index for each alternative and the lowest hazard index calculated for any of the alternatives. Appendix L provides detailed inputs and the calculated hazard index for each crossing.

A shown in Table 11-3, the alternative with the highest hazard index – Mac East Variant-Connector 3 Variant-Houston-Houston South – has an index approximately twice that of the alternative with the lowest index (Mac East-Connector 3-Willow). Although the 3 alternatives that include the Big Lake Segment would have as many or more at-grade crossings than the Mac East Variant-Connector 3 Variant-Houston-Houston South alternative, their hazard index is lower because their associated crossings have relatively lower AADT or additional crossing protection or both.

Rail line construction would occur mostly in relatively remote and rural areas. During rail line construction, new access roads to construction staging areas, if needed, would originate from nearby intersections with existing public roads. Equipment and materials needed for construction of the proposed rail line would be transported by rail and road, with the relative use of rail and road depending on the construction schedule and the approach selected by the

Table 11-3
Hazard Index Summary

Alternative	Number of Crossings		Total Hazard Index	Ratio
	At Grade	Grade Separated		
Mac East-Conn 3-Willow	4	3	1,368	1.00
Mac West-Conn 1-Willow	4	1	1,638	1.20
Mac East Variant-Conn 3 Variant-Willow	6	2	1,866	1.36
Mac East-Conn 3-Houston-Houston North[a]	8	3	1,919	1.40
Mac West-Conn 1-Houston-Houston North[a]	8	1	2,189	1.60
Mac East Variant-Conn 3 Variant-Houston-Houston North[a]	10	2	2,417	1.77
Mac East-Conn 3-Houston-Houston South[a]	9	3	2,226	1.63
Mac West-Conn 1-Houston-Houston South[a]	9	1	2,496	1.82
Mac East Variant-Conn 3 Variant-Houston-Houston South[a]	11	2	2,724	1.99
Mac East-Big Lake[a]	11	7	1,729	1.26
Mac West-Conn 2-Big Lake[a]	13	5	2,139	1.56
Mac East Variant-Conn 2a-Big Lake[a]	13	6	2,139	1.56

[a] Includes part of the existing ARRC main line.

construction contractor. OEA anticipates that the increased rail traffic during the construction period would be less than during operation (that is, less than 2 trains per day), and potential impacts on safety also would be less.

11.4.1.2 Grade Crossing Delay

Vehicle delay at grade crossings varies depending on rail and roadway traffic volumes, the number of roadway lanes, train length, and train speed. Table 11-4 summarizes estimated grade crossing delay from proposed rail line operation. All of the alternatives studied in detail would have a very small impact on road delay at grade crossings, with a maximum increase of about 7 minutes of delay per day (total for all vehicles collectively) for any of the alternatives.

At the existing crossing with the highest total daily delay, Willow Fishhook Road, the number of vehicles delayed would increase from 11 to 13 delayed vehicles per day. This represents an increase from 0.5 to 0.7 percent of all vehicles traveling through that particular crossing. At the new crossing with the highest total daily delay, South Burma Road at the Big Lake Segment, an average of 1.4 vehicles per day would experience an average delay of less than 1 minute and an average total aggregate delay of 1.2 minutes as a result of the proposed action. Because approximately 640 vehicles would pass through that crossing each day, an estimated 0.3 percent of vehicles per day would experience delay due to the proposed action. Because estimated delays at all other new at-grade crossings on any of the proposed rail segments would be less, OEA anticipates that the effect of the proposed action on grade crossing delay would be minimal. Trail users could also experience delays as a result of proposed rail line operation under any of the alternatives where trail users would need to take an alternative route as a result of the closure of a trail. However, where the rail line would cross officially recognized trails, ARRC proposed

Table 11-4
Grade Crossing Delay

Alternative	Number of Vehicles Delayed per Day (vehicles per day)		Average Delay per Stopped Vehicle (minutes per vehicle)		Total Delay in a 24-hour Period for all Vehicles Collectively (minutes)	
	No Action[a]	Proposed Action	No Action[a]	Proposed Action	No Action[a]	Proposed Action
Mac East-Conn 3-Willow	-	3	-	<1	-	2
Mac West-Conn 1-Willow	-	2	-	<1	-	2
Mac East Variant-Conn 3 Variant-Willow	-	3	-	<1	-	3
Mac East-Conn 3-Houston-Houston North	20	26	1	1	20	25
Mac West-Conn 1-Houston-Houston North	20	25	1	1	20	25
Mac East Variant-Conn 3 Variant-Houston- Houston North	20	27	1	1	20	26
Mac East-Conn 3-Houston-Houston South	20	27	1	1	20	26
Mac West-Conn 1-Houston-Houston South	20	26	1	1	20	25
Mac East Variant-Conn 3 Variant-Houston-Houston South	20	27	1	1	20	26
Mac East-Big Lake	23	30	1	1	22	29
Mac West-Conn 2-Big Lake	23	30	1	1	22	29
Mac East Variant-Conn 2a-Big Lake	23	30	1	1	22	29

[a] Depending on the alternative, up to 4 existing crossings on ARRC's main line within the project area would carry Port MacKenzie-related rail traffic. The values in the no-action column represent delays from existing ARRC main line rail traffic.

to provide grade separations or relocations where practicable and there would be no delays. Section 13.1 addresses potential impacts to trail users.

Motorists could also experience delay at new grade crossings during construction of the proposed rail line. Delays during construction of grade crossings would be temporary. OEA anticipates that the increased rail traffic during the construction period, when construction materials would be transported, would be less than during rail line operation. The potential delay impacts also would be less.

11.4.1.3 Rail Safety

Overall, compared to other rail lines, ARRC has a low accident rate. In the past 10 years, ARRC's train accident rate has been approximately 2 train accidents per million train miles. This overall rate is lower than the largest 5 freight rail lines (by revenue) in the United States, as well as the average of all United States rail lines (see Appendix L).

In the past 20 years (1990 to 2009), ARRC has experienced 6 incidents (derailments) which resulted in the release of hazardous materials (FRA, 2010b; see Appendix L). The smallest release during this time period occurred in 1994 when approximately 1 gallon of petroleum was

spilled. The largest release during this time period occurred in 1990 when approximately 170,000 gallons of diesel and jet fuel were spilled near Dunbar, Alaska. Within 3 weeks, the ARRC had the majority of the spill remediated (Alaska Railroad and Combs, 2010). No fires or injuries resulted from any of the 6 incidents during this time period.

ARRC anticipates transporting primarily bulk materials and does not intend to transport hazardous materials. As a result, the likelihood of a hazardous materials release due to an accident on the proposed rail line would be low. OEA previously analyzed rail transport of hazardous materials in situations involving transportation of flammable and/or toxic materials in areas with relatively high population densities and overall train traffic, and also found the likelihood of a release to be low (OEA, 2002). As mentioned above, ARRC has a low accident rate, and few accidents have resulted in the release of hazardous materials when they are being transported.

If a release of hazardous material were to occur, ARRC would implement emergency response and clean-up operations as required by Occupational Safety and Health Administration (OSHA) rules in 29 C.F.R. § 1910.120, Hazardous Waste Operations and Emergency Response. The potential environmental impacts of a release would depend on the accident location, the amount released, the material released, and the weather conditions at the time of the release. Chapters 4 and 5 discuss the potential impacts of a release of hazardous materials on water and biological resources, respectively.

11.4.2 No-Action Alternative

Under the No-Action Alternative, ARRC would not construct and operate the proposed Port MacKenzie Rail Extension. Therefore, there would be no new grade crossings, no increase in rail traffic as a result of the project, and, therefore no changes to rail safety and delay. Truck-to-rail diversion of freight and any associated reduction in truck traffic would not occur.

11.5 Unavoidable Environmental Consequences of the Proposed Action

To avoid or minimize the potential impacts to transportation safety and delay from the proposed rail line as described above in Section 11.4.1, OEA is recommending 7 mitigation measures volunteered by the Applicant (see Section 19.7 and 19.9). These measures include requiring: development of a team to address rail/roadway crossing safety; incorporation of the proposed project into the Applicant's existing emergency response process and the contact of appropriate emergency response organizations; permanent signs displaying a toll-free telephone number at grade crossings to address public inquiries; notification of road users of temporary road closings and construction-related activities; to the extent practicable, confinement of all construction traffic within the ROW or to public roads; removal and restoration of any temporary access outside the ROW; and consultation with appropriate agencies on final design of crossings and warning devices.

Notwithstanding the recommended mitigation measures, there still would be potential unavoidable impacts to transportation safety and delay from the proposed rail line. Potential impacts would include: vehicle delays during construction at new at-grade crossings and

increased predicted accident frequency and delay as a result of at-grade crossings. OEA concluded that such mitigated impacts from operation of the proposed rail line would be minimal given the circumstances presented here.