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), and Section 11.4 describes potential environmental consequences (impacts) under the proposed action and the No-Action Alternative.

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 highway-rail 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 [CFR] 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 grade crossing warning devices (49 CFR 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 Section of Environmental Analysis (SEA) analyzed grade separation of highway/rail crossings based on FHWA guidelines, including the Alaska Traffic Manual, which provides guidelines for improvements in grade crossing warning devices (ADOT&PF, 2005). The guidelines include consideration of delay, highway 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 FRA are found at 49 CFR Parts 200 through 240. USDOT's Pipeline and Hazardous Materials Safety Administration has established design standards and requirements, found at 49 CFR Parts 171 and 179, for railcars 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 CFR 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 CFR 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, SEA evaluated each alternative for the proposed action from Port MacKenzie to a common point on the existing ARRC main line where the Willow Segment would connect. Therefore, some alternatives include the use of existing crossings along the mainline between the point where the alternative would connect to the mainline and the point where the Willow Segment would connect to the mainline. The analysis assumes that about 11 trains per day currently operate along this segment on the main rail line.

SEA evaluated grade crossing safety at existing 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 quantitative analysis of accident frequencies at existing public grade crossings considered the existing rail traffic volumes included in Accident Prediction System, and the additional proposed rail traffic. Estimates of annual average daily traffic for each road crossing were calculated for 2012 and used in the analysis. Appendix L provides more information about the methods SEA 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 the Personal Computer 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, SEA calculated predicted accident frequency for (1) the crossing with the highest annual average daily traffic (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, SEA 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. SEA 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, SEA 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. SEA 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 bulk materials and containers on the proposed rail line and has not indicated any plans to carry hazardous materials. SEA considered the potential impacts of

occasional 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 SEA 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 road-rail 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 proposed rail line operations.

Table 11-1
At-Grade Crossings

Rail Line Segment	Road Name	Estimated AADT in 2012 (vehicles/day)
Mac West	S. Guernsey Road	102
Connector 1	Little Su River Road	154
Connector 2	S. Guernsey Road	102
Connector 3	Ayrshire Avenue	579
Connector 3	W. Carpenter Lake Road	58
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. Larae Road	102
Existing mainline	Cheri Lake Drive	205
Existing mainline	N. Lynx Lake Road	102
Existing mainline	W. Twitty Avenue/Nancy Lake Landing	102
Existing mainline	Willow Station Road	412
Existing mainline	Willow Fishhook Road	740

In the past 10 years, there have been three incidents involving at-grade crossings in Matanuska-Susitna Borough (MSB), with a total of two injuries and no fatalities. None of these incidents occurred at the existing crossings included in Table 11-1. Besides the three incidents involving

at-grade crossings in MSB between 1999 and 2008, there was one fatal trespass-related accident in 2005 that was unrelated to a grade crossing (FRA, 2008). None of these incidents involved hazardous materials. ARRC transports hazardous materials on the existing mainline 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, 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 mainline 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. 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.

Table 11-2
Predicted Accident Frequency

	Predicted Accidents per Year		Years between Accidents	
Road [a]	**No Action**	**Alternatives (except those using the Willow Segment)**	**No Action**	**Alternatives (except those using the Willow Segment)**
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.

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 with active warning devices such as flashing lights and gates, while those with AADT of less than 500 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, SEA estimated predicted accident frequency for the crossings with the highest AADT in each of these two categories by using similar existing crossings in the study area as proxies. South Burma Road, on the 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 one accident every 131 years. Willow Creek Parkway, on the 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 one accident every 114 years.

The hazard index provides another mechanism for comparing the likelihood of collisions between trains and vehicles at grade crossings. SEA 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 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.

Table 11-3
Hazard Index Summary

Alternative	Number of Crossings At Grade	Number of Crossings Separated	Total Hazard Index	Ratio
Mac East-Connector 3-Willow	4	3	1368	1.00
Mac West-Connector 1-Willow	4	1	1638	1.20
Mac East-Connector 3-Houston-Houston North[a]	8	3	1919	1.40
Mac West-Connector 1-Houston-Houston North[a]	8	1	2189	1.60
Mac East-Connector 3-Houston-Houston South[a]	9	3	2226	1.63
Mac West-Connector 1-Houston-Houston South[a]	9	1	2496	1.82
Mac East-Big Lake[a]	11	7	1729	1.26
Mac West-Connector 2-Big Lake[a]	13	5	2139	1.56

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

A shown in Table 11-3, the alternative with the highest hazard index – Mac West-Connector 1-Houston-Houston South – has an index about 80 percent higher than the alternative with the lowest index (Mac East-Connector 3-Willow). Although the two alternatives that include the Big Lake Segment would have the most at-grade crossings, their hazard index is lower than those that include the Houston South Segment because their associated crossings have relatively lower AADT or additional crossing protection or both. Therefore, even with fewer crossings, Mac West-Connector 1-Houston-Houston South has the greatest likelihood of train-vehicle collisions based on the hazard index.

Rail line construction would occur mostly in relatively remote and rural areas. During rail line construction, new access roads, if needed, to construction staging areas 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 road and rail depending on the construction schedule and the approach selected by the construction contractor. SEA anticipates that the increased rail traffic during the construction period would be less than during operations (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 roadway and rail traffic volumes, the number of roadway lanes, train length, and train speed. Table 11-4 summarizes estimated grade crossing delay from proposed rail line operations. All alternatives 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.

Table 11-4
Grade Crossing Delay

	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)	
Alternative	**No Action**	**Proposed Action**	**No Action**	**Proposed Action**	**No Action**	**Proposed Action**
Mac East-Connector 3-Willow	-	2	-	1	-	2
Mac West-Connector 1-Willow	-	3	-	1	-	3
Mac East-Connector 3-Houston-Houston North	20	26	1	1	20	25
Mac West-Connector 1-Houston-Houston North	20	27	1	1	20	26
Mac East-Connector 3-Houston-Houston South	20	26	1	1	20	26
Mac West-Connector 1-Houston-Houston South	20	27	1	1	20	27
Mac East-Big Lake	23	31	1	1	22	30
Mac West-Connector 2-Big Lake	23	30	1	1	22	29

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 on the Big Lake Segment, about two vehicles per day would experience an average delay of 1 minute 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 all other rail segments included in the proposed action would have shorter delays, SEA 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 operations under any of the alternatives where trail users would need to take an alternative route as a result of the closure of an unofficial trail. However, where the rail line would cross officially recognized trails, ARRC proposed 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. SEA anticipates that the increased rail traffic during the construction period, due to transport of construction material, would be less than during operations, and potential delay impacts would also be less.

11.4.1.3 Rail Safety

ARRC anticipates transporting bulk materials and containers on the proposed rail line and has not indicated any plans to carry hazardous materials. SEA previously has 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 found the potential impacts to be low (SEA, 2002). Thus, SEA concludes that potential impacts of hazardous materials transport, were it to occur, would be minimal.

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.