

APPENDIX F: ROAD CROSSINGS HAZARD INDEX CALCULATIONS

Although not used as an input to the evaluation matrix presented in Chapter 5, calculations were performed to determine the composite grade crossing hazard index for each alternative. The index values obtained intended for comparison of the alternatives.

F.1 Assumptions for Calculations

The hazard index calculations were based on the following basic assumptions:

- Road ownership was determined by records from the Matanuska-Susitna Borough and a Federal Railroad Administration grade crossing inventory website (<http://safetydata.fra.dot.gov/OfficeofSafety/NewCrossing/Default.asp>).
- Annual Average Daily Traffic (AADT) was determined where possible from the ADOT&PF 2005 traffic map and the Matanuska-Susitna Borough 2006 traffic map.
- Where AADT was not available from agency traffic maps, TNH-Hanson, LLC estimated values, utilizing aerial photography to identify land usage and structures.
- Train traffic is initially estimated by ARRC to be 2 trains per day.
- The two trains per day shown for the crossings on the existing ARRC mainline are the increase in trains attributed to this project above those currently using those crossings.

F.2 Calculation Methodology

A hazard index for each crossing was calculated using the New Hampshire Method as adopted by ADOT&PF, as the product of the roadway Annual Average Daily Traffic, trains per day, and a crossing protection factor. The crossing protection factor is defined as 1.00 for crossbuck signage, 0.90 for crossbucks with stop signs, 0.20 for crossbucks with automatic flashers, and 0.11 for crossbucks with automatic flashers and gates. Crossings identified by ARRC that would be grade separated are assigned a crossing protection factor of zero, appropriately resulting in a zero hazard index for that crossing.

The calculations at each crossing are presented in Table F-1 on the following page. Although these calculations were not used in the matrix evaluation in Chapter 5, they provide additional data regarding the relative traffic impacts of the various alternatives. The index values provide a comparison of the probability for train-vehicle collisions. Higher index values point to a higher probability of collisions.

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Table F-1: Hazard Index

Segment	Milepost	Road Name	Owner	Type of Crossing	Type of Protection	AADT	Date of Traffic Count	Data Source	Trains per Day (ADTT)	Mac West, Conn 1, Willow		Mac West, Conn 1, Houston, Houston North		Mac West, Conn 1, Houston, Houston South		Mac West, Conn 2, Big Lake		Mac East, Conn 3, Willow		Mac East, Conn 3, Houston, Houston North		Mac East, Conn 3, Houston, Houston South		Mac East, Big Lake		
										Crossing Protection Factor (P)	DOT/PF Hazard Index	Crossing Protection Factor (P)	DOT/PF Hazard Index	Crossing Protection Factor (P)	DOT/PF Hazard Index	Crossing Protection Factor (P)	DOT/PF Hazard Index	Crossing Protection Factor (P)	DOT/PF Hazard Index	Crossing Protection Factor (P)	DOT/PF Hazard Index	Crossing Protection Factor (P)	DOT/PF Hazard Index	Crossing Protection Factor (P)	DOT/PF Hazard Index	
Mac West	MW 5.7	S. Guernsey Road	MSB	At-Grade	Crossbucks	<100	Estimated Traffic		2	1.00	200	1.00	200	1.00	200	1.00	200	NA	NA	NA	NA	NA	NA	NA	NA	
Mac East	ME 4.9	Baker Farm Road	Private	At-Grade	Crossbucks	<100	Estimated Traffic		2	NA	NA	NA	NA	NA	NA	NA	NA	1	200	1.00	200	1.00	200	1.00	200	
Mac East	ME 9.8	W. Holstein Avenue	MSB	At-Grade	Crossbucks	<100	Estimated Traffic		2	NA	NA	NA	NA	NA	NA	NA	NA	1	200	1.00	200	1.00	200	1.00	200	
Conn 1	C1- 2.4	Little Su River Road	MSB	At-Grade	Crossbucks	148	2005	MSB	2	1.00	296	1.00	296	1.00	296	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Conn 2	C2- 2.3	S. Guernsey Road	MSB	At-Grade	Crossbucks	<100	Estimated Traffic		2	NA	NA	NA	NA	NA	NA	1.00	200	NA	NA	NA	NA	NA	NA	NA	NA	
Conn 3	C3- 0.7	Ayrshire Avenue	MSB	At-Grade	Flashing Lights/Gates	555	2005	MSB	2	NA	NA	NA	NA	NA	NA	NA	NA	0.11	122	0.11	122	0.11	122	NA	NA	
Conn 3	C3- 1.0	W. Carpenter Lake Road	MSB	At-Grade	Crossbucks	56	2005	MSB	2	NA	NA	NA	NA	NA	NA	NA	NA	1	112	1.00	112	1.00	112	NA	NA	
Willow	W 19.8	W. Deshka Landing Road	MSB	At-Grade	Crossbucks	159	2005	MSB	2	1.00	318	NA	NA	NA	NA	NA	NA	1	318	NA	NA	NA	NA	NA	NA	
Willow	W 23.4	Willow Creek Parkway	MSB	At-Grade	Crossbucks	380	2005	ADOT	2	1.00	760	NA	NA	NA	NA	NA	NA	1	760	NA	NA	NA	NA	NA	NA	
Willow	W 25.9	Parks Highway	State of Alaska	Grade Separation	Hwy over RR	NA	NA	NA	NA	0.00	0	NA	NA	NA	NA	NA	NA	0	0	NA	NA	NA	NA	NA	NA	
Houston	H 3.3	W. Susitna Parkway	MSB	At-Grade	Crossbucks	352	2007	MSB	2	NA	NA	1.00	704	1.00	704	NA	NA	NA	NA	1.00	704	1.00	704	NA	NA	
Houston	H 4.0	W. Papoose Twins Road	MSB	At-Grade	Crossbucks	157	2005	MSB	2	NA	NA	1.00	314	1.00	314	NA	NA	NA	NA	1.00	314	1.00	314	NA	NA	
Houston South	HS 5.0	W. Millers Reach Road	City of Houston	At-Grade	Crossbucks	<150	Estimated Traffic		2	NA	NA	NA	NA	1.00	300	NA	NA	NA	NA	NA	NA	1.00	300	NA	NA	
Big Lake	B 0.8	S. Burma Road	MSB	At-Grade	Flashing Lights/Gates	611	2005	MSB	2	NA	NA	NA	NA	NA	NA	0.11	134	NA	NA	NA	NA	NA	NA	0.11	134	
Big Lake	B 3.2	Homestead Road	MSB	At-Grade	Crossbucks	<100	Estimated Traffic		2	NA	NA	NA	NA	NA	NA	1.00	200	NA	NA	NA	NA	NA	NA	1.00	200	
Big Lake	B 5.0	Homestead Road	MSB	At-Grade	Crossbucks	<100	Estimated Traffic		2	NA	NA	NA	NA	NA	NA	1.00	200	NA	NA	NA	NA	NA	NA	1.00	200	
Big Lake	B 11.1	S. Larrys Lane	MSB	At-Grade	Crossbucks	<100	Estimated Traffic		2	NA	NA	NA	NA	NA	NA	1.00	200	NA	NA	NA	NA	NA	NA	1.00	200	
Big Lake	B 14.0	W. Hollywood Road	State of Alaska	At-Grade	Flashing Lights/Gates	1426	2005	ADOT	2	NA	NA	NA	NA	NA	NA	0.11	314	NA	NA	NA	NA	NA	NA	0.11	314	
Big Lake	B 15.8	W. Big Lake Road	State of Alaska	Grade Separation	RR over Hwy	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.00	0	NA	NA	NA	NA	NA	NA	0.00	0	
Big Lake	B 16.4	W. Calonder Way	City of Houston	At-Grade	Crossbucks	<50	Estimated Traffic		2	NA	NA	NA	NA	NA	NA	1.00	100	NA	NA	NA	NA	NA	NA	1.00	100	
Big Lake	B 16.7	W. Larae Road	City of Houston	At-Grade	Crossbucks	<100	Estimated Traffic		2	NA	NA	NA	NA	NA	NA	1.00	200	NA	NA	NA	NA	NA	NA	1.00	200	
Big Lake	B 17.1	Parks Highway	State of Alaska	Grade Separation	Hwy over RR	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.00	0	NA	NA	NA	NA	NA	NA	0.00	0	
Existing ML	171.3	Cheri Lake Drive	City of Houston	At-Grade	Flashing Lights/Gates	<200	Estimated Traffic		2	NA	NA	NA	NA	NA	NA	0.11	44	NA	NA	NA	NA	NA	NA	0.11	44	
Existing ML	173.0	Parks Highway	State of Alaska	Grade Separation	RR over Hwy	NA	2006	ARRC	NA	NA	NA	NA	NA	NA	NA	0.00	0	NA	NA	NA	NA	NA	NA	0.00	0	
Existing ML	180.0	N. Lynx Lake Road	MSB	At-Grade	Crossbucks/Stop Signs	<100	Estimated Traffic		2	NA	NA	0.90	180	0.90	180	0.90	180	NA	NA	0.90	180	0.90	180	0.90	180	
Existing ML	180.8	W. Twitty Avenue / Nancy Lake Landing	MSB	At-Grade	Crossbucks/Stop Signs	<100	Estimated Traffic		2	NA	NA	0.90	180	0.90	180	0.90	180	NA	NA	0.90	180	0.90	180	0.90	180	
Existing ML	182.6	Parks Highway	State of Alaska	Grade Separation	RR over Hwy	NA	2006	ARRC	NA	NA	NA	0.00	0	0.00	0	0.00	0	NA	NA	0.00	0	0.00	0	0.00	0	
Existing ML	185.5	Willow Station Road	MSB	At-Grade	Flashing Lights/Gates	395	2005	ADOT	2	NA	NA	0.11	86.9	0.11	86.9	0.11	86.9	NA	NA	0.11	86.9	0.11	86.9	0.11	86.9	
Existing ML	186.9	Willow Fishhook Road	State of Alaska	At-Grade	Flashing Lights/Gates	710	2005	ADOT	2	NA	NA	0.11	156.2	0.11	156.2	0.11	156.2	NA	NA	0.11	156.2	0.11	156.2	0.11	156.2	
HAZARD INDEX:												1574		2117		2417		2395		1712		2255		2555		2395

Notes:

- Crossing data from FRA website -- <http://safetydata.fra.dot.gov/OfficeofSafety/NewCrossing/Default.asp>
- The State of Alaska and the MSB both own portions of Hollywood Road and Big Lake Road.
- The City of Houston and the MSB both own portions of Millers Reach Road
- Guernsey Road, Baker Farm Road, and Holsetin Avenue did not appear on MSB or ADOT traffic maps.
- Teeka Run Circle and Lynx Lake Road primitive/unimproved road. No traffic data is available.
- Millers Reach Road, Larrys Lane, Calonder Way, Larae Road, Cheri Lake Drive, and Twitty Ave/Nancy Lake Landing are minor roads. No traffic data is available.
- AADT numbers for Little Su River Road, Carpenter Lake Road, Deshka Landing Road, Papoose Twins Road, and Burma Road were estimated from closest available data points.