Appendix D

Grade-Crossing Safety and Delay Analysis

This appendix describes the calculations that OEA performed to estimate impacts on grade-crossing safety and delay from operation of the proposed rail line. The appendix also presents the detailed results of the analysis for each grade crossing. The results of the safety analysis are presented first, followed by the results of the delay analysis. OEA estimated grade-crossing safety and delay impacts for both the project study area and the downline study area. The primary factors influencing safety impacts are the volumes of rail and roadway traffic and grade-crossing characteristics, including road types (paved or unpaved) and safety protection (passive or active). The primary factors influencing delay impacts is the volume of rail and roadway traffic, train speed, and train length.

OEA analyzed grade-crossing safety and delay on at-grade crossings of public roads. Private road crossings were not considered in the analysis because they would not pose a safety or delay concern to the general public. Chapter 3, Section 3.1, *Vehicle Safety and Delay,* Figure 3.1-1, of the Draft Environmental Impact Statement (EIS) displays the locations of the new, public at-grade crossings in the project study area. Because grade-separated crossings do not pose a collision safety hazard or delay risk, they are not included in the analysis.

Grade-Crossing Safety

Calculation of Predicted Accident Frequency

OEA used the Federal Railroad Administration (FRA) accident prediction formula from the *Rail-Highway Crossing Resource Allocation Procedure User's Guide* (FRA 1987) to calculate predicted annual accident rates for new at-grade crossing proposed by the Coalition in the project study area and for existing downline at-grade crossings.

OEA compiled the characteristics of each at-grade crossing as input to the accident prediction formula. For the analysis of new at-grade crossings in the project study area, OEA used information provided by the Coalition regarding the type of safety protection at each grade crossing. The Coalition has stated that all unpaved public at-grade road crossings would have passive crossing devices (stop signs and crossbucks). All paved public roadway crossings, if not grade-separated, would be equipped with active warning devices such as bells, flashers, and/or gates. OEA used surface types (gravel, dirt, and paved) to distinguish between paved and unpaved roads. For downline at-grade crossings, OEA used the road and warning devise type reported in the FRA database (FRA 2020).

The data sources for other inputs to the accident prediction formula, including annual average daily traffic (AADT) and train characteristics, are described in Chapter 3, Section 3.1, *Vehicle Safety and Delay*, *Data Sources*.

The FRA's accident prediction formula follows:

a = K * EI *DT *MS *MT *HP *HL

Where:

K = the basic accident prediction constant

EI = the exposure index factor based on the -product of the number of roadway vehicles and trains per day

DT = the factor for the total number of through trains per day

MS = the factor for maximum timetable speed

MT = the factor for number of main tracks

HP = the factor for paved roadway

HL = the factor for number of roadway lanes

The exposure index factor (EI) is calculated using:

EI = ((c*t)+0.2/0.2)^0.37

Where:

c=number of vehicles (AADT)

t=number of trains per day

Predicted Accident Frequency for the Project Study Area

Tables D-1 through D-2 show the results of the grade-crossing safety analysis for each Action Alternative under the low and high rail traffic scenarios in the project study area[1]. For each crossing, the tables identify the type of protection (passive or active), road type (paved or unpaved), the number of roadway lanes and AADT, and details on train characteristics. The last two columns identify the predicted accident frequency and interval (number of years) between accidents, based on the FRA accident prediction formula.

[1] The Coalition estimates that rail traffic on the proposed rail line could range from as few as 3.68 trains per day, on average (the low rail traffic scenario), to as many as 10.52 trains per day, on average (the high rail traffic scenario), depending on future market conditions, including future demand for crude oil produced in the Basin.

Table D-1. Grade-Crossing Safety expressed as Estimated Accident Frequency, Low Rail Traffic Scenario (Year 2026)

Crossing	Type of Crossing	Type of Protection	Road Type	Number of Roadway Lanes	AADT	Train Speed (mph)	Train Length (feet)	Trains Per Day	Predicted Accident Frequency	Predicted Intervals between Accidents (years)
Indian Canyon Alternative										
Quarry Road	At-Grade	Passive	Unpaved	2	54	40	7,599	3.7	0.01014	98.6
FR 304	At-Grade	Passive	Unpaved	2	54	40	7,599	3.7	0.01014	98.6
FR 303	At-Grade	Passive	Unpaved	2	54	40	7,599	3.7	0.01014	98.6
FS Road	At-Grade	Passive	Unpaved	2	54	40	7,599	3.7	0.01014	98.6
FS 302	At-Grade	Passive	Unpaved	2	54	40	7,599	3.7	0.01014	98.6
Unnamed	At-Grade	Passive	Unpaved	2	54	40	7,599	3.7	0.01014	98.6
3540 W	At-Grade	Active	Paved	2	162	40	7,599	3.7	0.01230	81.3
Leland Bench Road	At-Grade	Passive	Unpaved	2	162	40	7,599	3.7	0.01523	65.7
Overall Predicted Accident Frequency and Interval									**0.01105**	**90.5**
Wells Draw Alternative										
Horner Knoll Road	At-Grade	Passive	Unpaved	2	162	40	7,599	3.7	0.01523	65.7
Quarry Road	At-Grade	Passive	Unpaved	2	54	40	7,599	3.7	0.01014	98.6
Unnamed	At-Grade	Passive	Unpaved	2	54	40	7,599	3.7	0.01014	98.6
Rye Patch Road	At-Grade	Passive	Unpaved	2	54	40	7,599	3.7	0.01014	98.6
Unnamed	At-Grade	Passive	Unpaved	2	54	40	7,599	3.7	0.01014	98.6
Unnamed	At-Grade	Passive	Unpaved	2	54	40	7,599	3.7	0.01014	98.6
Unnamed	At-Grade	Passive	Unpaved	2	54	40	7,599	3.7	0.01014	98.6
Pipeline Road	At-Grade	Passive	Unpaved	2	54	40	7,599	3.7	0.01014	98.6
Wells Draw Road (Nine Mile Canyon Road)	At-Grade	Active	Paved	2	1040	40	7,599	3.7	0.02123	47.1
Unnamed	At-Grade	Passive	Unpaved	2	54	40	7,599	3.7	0.01014	98.6
Unnamed	At-Grade	Passive	Unpaved	2	54	40	7,599	3.7	0.01014	98.6
Unnamed	At-Grade	Passive	Unpaved	2	54	40	7,599	3.7	0.01014	98.6
Horner Knoll Road	At-Grade	Passive	Unpaved	2	54	40	7,599	3.7	0.01014	98.6
Horner Knoll Road	At-Grade	Passive	Unpaved	2	54	40	7,599	3.7	0.01014	98.6
Horner Knoll Road	At-Grade	Passive	Unpaved	2	54	40	7,599	3.7	0.01014	98.6
Horner Knoll Road	At-Grade	Passive	Unpaved	2	54	40	7,599	3.7	0.01014	98.6

Crossing	Type of Crossing	Type of Protection	Road Type	Number of Roadway Lanes	AADT	Train Speed (mph)	Train Length (feet)	Trains Per Day	Predicted Accident Frequency	Predicted Intervals between Accidents (years)
Unnamed	At-Grade	Passive	Unpaved	2	54	40	7,599	3.7	0.01014	98.6
Unnamed	At-Grade	Passive	Unpaved	2	54	40	7,599	3.7	0.01014	98.6
Unnamed	At-Grade	Passive	Unpaved	2	54	40	7,599	3.7	0.01014	98.6
Pariette Road	At-Grade	Passive	Unpaved	2	162	40	7,599	3.7	0.01523	65.7
3000 West	At-Grade	Passive	Unpaved	2	162	40	7,599	3.7	0.01523	65.7
S 500 W	At-Grade	Active	Paved	2	162	40	7,599	3.7	0.01230	81.3
Wells Draw Road	At-Grade	Active	Paved	2	1040	40	7,599	3.7	0.02123	47.1
County Road 41	At-Grade	Passive	Unpaved	2	162	40	7,599	3.7	0.01523	65.7
Unnamed	At-Grade	Passive	Unpaved	2	54	40	7,599	3.7	0.01014	98.6
Unnamed	At-Grade	Passive	Unpaved	2	54	40	7,599	3.7	0.01014	98.6
Leland Bench Road	At-Grade	Passive	Unpaved	2	162	40	7,599	3.7	0.01523	65.7
Overall Predicted Accident Frequency and Interval									**0.01199**	**83.4**
Whitmore Park Alternative										
Quarry Road	At-Grade	Passive	Unpaved	2	54	40	7,599	3.7	0.01014	98.6
Unnamed	At-Grade	Passive	Unpaved	2	54	40	7,599	3.7	0.01014	98.6
Unnamed	At-Grade	Passive	Unpaved	2	54	40	7,599	3.7	0.01014	98.6
Whitmore Park Road	At-Grade	Passive	Unpaved	2	162	40	7,599	3.7	0.01523	65.7
Whitmore Park Road	At-Grade	Passive	Unpaved	2	162	40	7,599	3.7	0.01523	65.7
Minnie Maud Creek Road	At-Grade	Passive	Unpaved	2	54	40	7,599	3.7	0.01014	98.6
Minnie Maud Creek Road	At-Grade	Passive	Unpaved	2	54	40	7,599	3.7	0.01014	98.6
Minnie Maud Creek Road	At-Grade	Passive	Unpaved	2	54	40	7,599	3.7	0.01014	98.6
FR 304	At-Grade	Passive	Unpaved	2	54	40	7,599	3.7	0.01014	98.6
FR 303	At-Grade	Passive	Unpaved	2	54	40	7,599	3.7	0.01014	98.6
FS Road	At-Grade	Passive	Unpaved	2	54	40	7,599	3.7	0.01014	98.6
FS 302	At-Grade	Passive	Unpaved	2	54	40	7,599	3.7	0.01014	98.6
Unnamed	At-Grade	Passive	Unpaved	2	54	40	7,599	3.7	0.01014	98.6
Unnamed	At-Grade	Passive	Unpaved	2	54	40	7,599	3.7	0.01014	98.6
3540 W	At-Grade	Active	Paved	2	162	40	7,599	3.7	0.01230	81.3
Leland Bench Road	At-Grade	Passive	Unpaved	2	162	40	7,599	3.7	0.01523	65.7
Quarry Road	At-Grade	Passive	Unpaved	2	54	40	7,599	3.7	0.01014	98.6

Crossing	Type of Crossing	Type of Protection	Road Type	Number of Roadway Lanes	AADT	Train Speed (mph)	Train Length (feet)	Trains Per Day	Predicted Accident Frequency	Predicted Intervals between Accidents (years)
Overall Predicted Accident Frequency and Interval									**0.01117**	**89.5**

Notes:
AADT = annual average daily traffic; mph = miles per hour

Table D-2. Grade-Crossing Safety expressed as Estimated Accident Frequency, High Rail Traffic Scenario (Year 2026)

Crossing	Type of Crossing	Type of Protection	Road Type	Number of Roadway Lanes	AADT	Train Speed (mph)	Train Length (feet)	Trains per Day	Predicted Accident Frequency	Predicted Intervals between Accidents (years)
Indian Canyon Alternative										
Quarry Road	At-Grade	Passive	Unpaved	2	54	40	7,403	10.5	0.01775	56.3
FR 304	At-Grade	Passive	Unpaved	2	54	40	7,403	10.5	0.01775	56.3
FR 303	At-Grade	Passive	Unpaved	2	54	40	7,403	10.5	0.01775	56.3
FS Road	At-Grade	Passive	Unpaved	2	54	40	7,403	10.5	0.01775	56.3
FS 302	At-Grade	Passive	Unpaved	2	54	40	7,403	10.5	0.01775	56.3
Unnamed	At-Grade	Passive	Unpaved	2	54	40	7,403	10.5	0.01775	56.3
3540 W	At-Grade	Active	Paved	2	162	40	7,403	10.5	0.01989	50.3
Leland Bench Road	At-Grade	Passive	Unpaved	2	162	40	7,403	10.5	0.02666	37.5
Overall Predicted Accident Frequency and Interval									**0.01914**	**52.3**
Wells Draw Alternative										
Horner Knoll Road	At-Grade	Passive	Unpaved	2	162	40	7,403	10.5	0.02666	37.5
Quarry Road	At-Grade	Passive	Unpaved	2	54	40	7,403	10.5	0.01775	56.3
Unnamed	At-Grade	Passive	Unpaved	2	54	40	7,403	10.5	0.01775	56.3
Rye Patch Road	At-Grade	Passive	Unpaved	2	54	40	7,403	10.5	0.01775	56.3
Unnamed	At-Grade	Passive	Unpaved	2	54	40	7,403	10.5	0.01775	56.3
Unnamed	At-Grade	Passive	Unpaved	2	54	40	7,403	10.5	0.01775	56.3
Unnamed	At-Grade	Passive	Unpaved	2	54	40	7,403	10.5	0.01775	56.3
Pipeline Road	At-Grade	Passive	Unpaved	2	54	40	7,403	10.5	0.01775	56.3

Crossing	Type of Crossing	Type of Protection	Road Type	Number of Roadway Lanes	AADT	Train Speed (mph)	Train Length (feet)	Trains per Day	Predicted Accident Frequency	Predicted Intervals between Accidents (years)
Wells Draw Road (Nine Mile Canyon Road)	At-Grade	Active	Paved	2	1040	40	7,403	10.5	0.03435	29.1
Unnamed	At-Grade	Passive	Unpaved	2	54	40	7,403	10.5	0.01775	56.3
Unnamed	At-Grade	Passive	Unpaved	2	54	40	7,403	10.5	0.01775	56.3
Unnamed	At-Grade	Passive	Unpaved	2	54	40	7,403	10.5	0.01775	56.3
Horner Knoll Road	At-Grade	Passive	Unpaved	2	54	40	7,403	10.5	0.01775	56.3
Horner Knoll Road	At-Grade	Passive	Unpaved	2	54	40	7,403	10.5	0.01775	56.3
Horner Knoll Road	At-Grade	Passive	Unpaved	2	54	40	7,403	10.5	0.01775	56.3
Horner Knoll Road	At-Grade	Passive	Unpaved	2	54	40	7,403	10.5	0.01775	56.3
Unnamed	At-Grade	Passive	Unpaved	2	54	40	7,403	10.5	0.01775	56.3
Unnamed	At-Grade	Passive	Unpaved	2	54	40	7,403	10.5	0.01775	56.3
Unnamed	At-Grade	Passive	Unpaved	2	54	40	7,403	10.5	0.01775	56.3
Pariette Road	At-Grade	Passive	Unpaved	2	162	40	7,403	10.5	0.02666	37.5
3000 West	At-Grade	Passive	Unpaved	2	162	40	7,403	10.5	0.02666	37.5
S 500 W	At-Grade	Active	Paved	2	162	40	7,403	10.5	0.01989	50.3
Wells Draw Road	At-Grade	Active	Paved	2	1040	40	7,403	10.5	0.03435	29.1
County Road 41	At-Grade	Passive	Unpaved	2	162	40	7,403	10.5	0.02666	37.5
Unnamed	At-Grade	Passive	Unpaved	2	54	40	7,403	10.5	0.01775	56.3
Unnamed	At-Grade	Passive	Unpaved	2	54	40	7,403	10.5	0.01775	56.3
Leland Bench Road	At-Grade	Passive	Unpaved	2	162	40	7,403	10.5	0.02666	37.5
Overall Predicted Accident Frequency and Interval									**0.02071**	**48.3**
Whitmore Park Alternative										
Quarry Road	At-Grade	Passive	Unpaved	2	54	40	7,403	10.5	0.01775	56.3
Unnamed	At-Grade	Passive	Unpaved	2	54	40	7,403	10.5	0.01775	56.3
Unnamed	At-Grade	Passive	Unpaved	2	54	40	7,403	10.5	0.01775	56.3
Whitmore Park Road	At-Grade	Passive	Unpaved	2	162	40	7,403	10.5	0.02666	37.5
Whitmore Park Road	At-Grade	Passive	Unpaved	2	162	40	7,403	10.5	0.02666	37.5
Minnie Maud Creek Road	At-Grade	Passive	Unpaved	2	54	40	7,403	10.5	0.01775	56.3
Minnie Maud Creek Road	At-Grade	Passive	Unpaved	2	54	40	7,403	10.5	0.01775	56.3
Minnie Maud Creek Road	At-Grade	Passive	Unpaved	2	54	40	7,403	10.5	0.01775	56.3

Crossing	Type of Crossing	Type of Protection	Road Type	Number of Roadway Lanes	AADT	Train Speed (mph)	Train Length (feet)	Trains per Day	Predicted Accident Frequency	Predicted Intervals between Accidents (years)
FR 304	At-Grade	Passive	Unpaved	2	54	40	7,403	10.5	0.01775	56.3
FR 303	At-Grade	Passive	Unpaved	2	54	40	7,403	10.5	0.01775	56.3
FS Road	At-Grade	Passive	Unpaved	2	54	40	7,403	10.5	0.01775	56.3
FS 302	At-Grade	Passive	Unpaved	2	54	40	7,403	10.5	0.01775	56.3
Unnamed	At-Grade	Passive	Unpaved	2	54	40	7,403	10.5	0.01775	56.3
Unnamed	At-Grade	Passive	Unpaved	2	54	40	7,403	10.5	0.01775	56.3
3540 W	At-Grade	Active	Paved	2	162	40	7,403	10.5	0.01989	50.3
Leland Bench Road	At-Grade	Passive	Unpaved	2	162	40	7,403	10.5	0.02666	37.5
Quarry Road	At-Grade	Passive	Unpaved	2	54	40	7,403	10.5	0.01775	56.3
Overall Predicted Accident Frequency and Interval									**0.01945**	**51.4**

Notes:
AADT = annual average daily traffic; mph = miles per hour

Predicted Accident Frequency for Downline Rail Segments

Table D-3 through Table D-7 show the results of the grade-crossing safety analysis for each of the five downline segments under the low and high rail traffic scenarios and under baseline conditions without the proposed rail line (No Action Alternative). The anticipated traffic on the downline segments would be the same for all Action Alternatives. For each crossing, the tables identify the FRA crossing ID, Street name, AADT, the number of trains per day, and the predicted interval (years) between accidents.

Table D-3. Grade-Crossing Safety, Kyune to Denver Downline Segment (Year 2026)

			Baseline (No Action Alternative)		Low Rail Traffic Scenario		High Rail Traffic Scenario	
FRA Crossing ID	Street	AADT	Trains per Day	Intervals Between Accidents (years)	Trains per Day	Predicted Intervals Between Accidents (years)	Trains per Day	Predicted Intervals between Accidents (years)
253281K	Lowell Blvd	8,236	143	4.0	146.3	3.9	152.5	3.9
253282S	Tennyson Street	5,311	143	4.5	146.3	4.5	152.5	4.4
253284F	North Lamar Street	8,103	11	13.4	14.3	11.8	20.5	10.0
253285M	Pierce Street	3,609	11	19.8	14.3	17.5	20.5	14.8
253287B	Olde Wadsworth Blvd	9,669	11	14.8	14.3	13.1	20.5	11.0
253288H	Carr Street	10,142	11	14.6	14.3	12.9	20.5	10.9
253290J	West 66th Avenue	2,678	11	21.6	14.3	19.1	20.5	16.1
253291R	Kipling Street	6,409	11	16.7	14.3	14.8	20.5	12.5
253293E	72nd Avenue	20,730	11	11.8	14.3	10.5	20.5	8.8
253294L	Simms Street	18,391	11	12.2	14.3	10.8	20.5	9.1
253295T	80th Avenue	7,662	11	15.8	14.3	14.0	20.5	11.8
253298N	Blue Mountain Drive	105	11	55.9	14.3	49.5	20.5	41.8
253301U	Gross Dam Road	429	11	22.5	14.3	19.6	20.5	16.3
253302B	Coal Creek Road	3,362	11	20.2	14.3	17.8	20.5	15.1
253303H	Beaver Creek Road	515	11	23.9	14.3	20.7	20.5	17.0
253309Y	CR 6	165	11	36.4	14.3	31.6	20.5	25.9
253311A	CR 6	150	11	42.3	14.3	36.7	20.5	30.1
253316J	Vasquez Road	166	11	48.9	14.3	43.3	20.5	36.6
253318X	Eisenhower Drive	841	11	30.3	14.3	26.8	20.5	22.7
253320Y	CR 5	294	11	41.3	14.3	36.5	20.5	30.9
253324B	Zero Street	103	11	56.2	14.3	49.8	20.5	42.0
253325H	Wasatch Road	41	11	73.6	14.3	65.1	20.5	55.0
253328D	Spring Road	21	11	40.0	14.3	34.7	20.5	28.5
253329K	CR 20	21	11	51.9	14.3	54.1	20.5	44.4
253340K	CR 20	21	11	51.5	14.3	53.7	20.5	44.1
253341S	CR 139	62	11	20.6	14.3	21.4	20.5	17.6

			Baseline (No Action Alternative)		Low Rail Traffic Scenario		High Rail Traffic Scenario	
FRA Crossing ID	**Street**	**AADT**	**Trains per Day**	**Intervals Between Accidents (years)**	**Trains per Day**	**Predicted Intervals Between Accidents (years)**	**Trains per Day**	**Predicted Intervals between Accidents (years)**
253344M	CR 39	84	11	30.9	14.3	32.1	20.5	26.4
253353L	CR 11	105	11	46.4	14.3	40.3	20.5	33.1
253355A	Sheephorn Road	105	11	40.1	14.3	35.0	20.5	29.0
253358V	CR 301	210	11	30.2	14.3	26.3	20.5	21.8
253559L	South Canyon Road	127	11	37.1	14.3	32.4	20.5	26.8
253563B	Kamm Avenue	127	11	28.6	14.3	9.8	20.5	24.5
253564H	Rippy Road	127	11	37.1	14.3	32.4	20.5	26.8
253565P	CR 262	127	11	37.1	14.3	32.4	20.5	26.8
253566W	16th Street	127	11	37.1	14.3	32.4	20.5	26.8
253579X	Public Road	2	11	171.3	14.3	151.6	20.5	128.2
253591E	CR 300	127	11	52.9	14.3	46.8	20.5	39.5
253594A	CR 435	127	11	40.1	14.3	34.8	20.5	28.6
253597V	CR 9	525	11	34.8	14.3	30.8	20.5	26.0
253600B	CR 7	127	11	52.9	14.3	46.8	20.5	39.5
253601H	Bower Avenue	127	11	52.9	14.3	46.8	20.5	39.5
253602P	Main Street	2,090	11	23.2	14.3	20.5	20.5	17.3
253603W	Kluge Avenue	1,409	11	26.1	14.3	23.0	20.5	19.5
253604D	Elberta Road	3,266	11	20.3	14.3	18.0	20.5	15.2
253605K	CR 37 1	127	11	52.9	14.3	46.8	20.5	39.5
253606S	G Road	1,084	11	28.1	14.3	24.9	20.5	21.0
253607Y	CR 36	127	11	52.9	14.3	46.8	20.5	39.5
253610G	CR 35	127	11	52.9	14.3	46.8	20.5	39.5
253613C	CR 34	127	11	52.9	14.3	46.8	20.5	39.5
253766F	County Road 3375	127	11	52.9	14.3	46.8	20.5	39.5
253769B	CR 33	7,797	11	15.7	14.3	13.9	20.5	11.8
253770V	CR 32 1/2	127	11	52.9	14.3	46.8	20.5	39.5
253772J	CR 315	5,356	11	17.6	14.3	15.6	20.5	13.1
253776L	9th Street	10,829	11	12.4	14.3	11.0	20.5	9.3

			Baseline (No Action Alternative)		Low Rail Traffic Scenario		High Rail Traffic Scenario	
FRA Crossing ID	**Street**	**AADT**	**Trains per Day**	**Intervals Between Accidents (years)**	**Trains per Day**	**Predicted Intervals Between Accidents (years)**	**Trains per Day**	**Predicted Intervals between Accidents (years)**
253778A	South 7th Street	10,829	11	14.3	14.3	12.7	20.5	10.7
253787Y	CR G	127	8	61.3	11.3	52.2	17.5	42.6
253790G	CR 20	129	8	61.0	11.3	51.9	17.5	42.3
253791N	Mesa Avenue	127	8	43.8	11.3	36.6	17.5	29.1
253793C	17 Road/Greenway Drive	2	8	198.5	11.3	169.2	17.5	138.0
253795R	County Road 16	127	8	61.3	11.3	52.2	17.5	42.6
253796X	CR 15 1/2	127	8	34.0	11.3	3.9	17.5	26.7
253797E	CR 15	127	8	61.3	11.3	52.2	17.5	42.6
253799T	CR 13 1/2	127	8	61.3	11.3	52.2	17.5	42.6
253800K	SH 139	2,818	8	24.6	11.3	21.0	17.5	17.1
253801S	CR 12	127	8	61.3	11.3	52.2	17.5	42.6
253803F	SH 6	833	8	35.3	11.3	30.0	17.5	24.5
254214U	Kings Crossing Rd	1,538	11	25.4	14.3	22.5	20.5	19.0
255116G	Bear Canyon Rd	8,386	8	6.5	11.3	5.4	17.5	4.3
255118V	SR-191	10,799	8	14.3	11.3	12.1	17.5	9.9
255119C	150 West/D Street	2,298	12	8.9	15.3	7.9	21.5	6.6
255124Y	1500 West Street	2,298	8	26.2	11.3	22.3	17.5	18.2
255127U	760 North	7,582	8	18.4	11.3	15.7	17.5	12.8
255131J	100 West	3,791	8	22.6	11.3	19.2	17.5	15.7
255132R	Carbon Avenue	3,791	8	22.6	11.3	19.2	17.5	15.7
255133X	100 East	3,791	8	22.6	11.3	19.2	17.5	15.7
255134E	400 East	3,791	8	22.6	11.3	19.2	17.5	15.7
255137A	800 East	3,791	8	5.3	11.3	5.3	17.5	4.2
255141P	2000 East	3,791	8	9.7	11.3	9.6	17.5	7.6
255144K	400 West	3,791	8	10.9	11.3	9.1	17.5	7.2
255145S	100 East	3,791	8	10.9	11.3	9.1	17.5	7.2
255149U	South Farnham Rd	1,838	8	12.6	11.3	12.6	17.5	9.9

			Baseline (No Action Alternative)		Low Rail Traffic Scenario		High Rail Traffic Scenario	
FRA Crossing ID	Street	AADT	Trains per Day	Intervals Between Accidents (years)	Trains per Day	Predicted Intervals Between Accidents (years)	Trains per Day	Predicted Intervals between Accidents (years)
255150N	Mounds Road	1,838	8	12.6	11.3	12.6	17.5	9.9
255165D	SR-128	719	8	21.5	11.3	18.0	17.5	14.3
255168Y	Sego Canyon Road	457	8	25.9	11.3	21.6	17.5	17.2
255169F	Lumber Road	131	8	3.4	11.3	33.5	17.5	26.4
255171G	Brender Road	163	8	56.9	11.3	48.5	17.5	39.5
255176R	BLM 170	229	8	15.1	11.3	15.0	17.5	11.8
255336C	BLM 225	163	8	32.2	11.3	32.1	17.5	25.3
255341Y	Airport Road	1,838	8	7.0	11.3	6.9	17.5	5.5
255342F	800 East	1,838	8	14.6	11.3	12.2	17.5	9.7
920426K	County Road	1,838	8	18.4	11.3	15.3	17.5	12.0

Table D-4. Grade-Crossing Safety, Denver East/North Downline Segment (Year 2026)

			No Action		Low Rail Traffic Scenario		High Rail Traffic Scenario	
FRA Crossing ID	Street	AADT	Trains per Day	Intervals Between Accidents (years)	Trains per Day	Predicted Intervals Between Accidents (years)	Trains per Day	Predicted Intervals Between Accidents (years)
253266H	Broadway Street	23,431	25	7.8	27.9	7.4	33.4	6.8
253269D	Washington Street	38,816	25	5.0	27.9	4.8	33.4	4.4

Table D-5. Grade-Crossing Safety, Denver Southbound Downline Segment (Year 2026)

			No Action		Low Rail Traffic Scenario		High Rail Traffic Scenario	
FRA Crossing ID	Street	AADT	Trains per Day	Intervals Between Accidents (years)	Trains per Day	Predicted Intervals Between Accidents (years)	Trains per Day	Predicted Intervals Between Accidents (years)
245260W	Walnut WO 4th	2,574	14	16.8	14.4	16.5	15.1	16.2
245255A	Colfax EO Umatil	1,188	38	13.2	38.4	13.1	39.1	13.0
245254T	13th WO Shoshone	8,578	38	7.4	38.4	7.3	39.1	7.3
245394V	Kalamath Avenue	11,421	38	5.9	38.4	5.8	39.1	5.8
245393N	Bayaud Street	2,426	38	10.7	38.4	10.6	39.1	10.5
245392G	Santa Fe Avenue	26,762	38	4.6	38.4	4.5	39.1	4.5
253054E	West Louviers Ave	237	20	33.3	20.4	33.0	21.1	32.5
253057A	Airport Road	2,366	20	16.9	20.4	16.8	21.1	16.5
253058G	Clay Street	71	20	20.5	20.4	20.3	21.1	20.0
253059N	Manhart Street	9,222	20	11.3	20.4	11.2	21.1	11.1
003600M	Private	23	20	28.8	20.4	28.5	21.1	27.9
003598N	Territorial Road	21	20	54.6	20.4	54.0	21.1	53.0
003596A	Lowell Place	23	20	28.8	20.4	28.5	21.1	27.9
003593E	Tomah Road	21	20	68.3	20.4	67.6	21.1	66.6
003589P	Perry Park Avenue	618	20	25.1	20.4	24.9	21.1	24.5
003586U	CO Road 74	41	20	42.3	20.4	41.8	21.1	41.0

Table D-6. Grade-Crossing Safety, Denver Eastbound Downline Segment (Year 2026)

			No Action		Low Rail Traffic Scenario		High Rail Traffic Scenario	
FRA Crossing ID	Street	AADT	Trains per Day	Intervals Between Accidents (years)	Trains per Day	Predicted Intervals Between Accidents (years)	Trains per Day	Predicted Intervals Between Accidents (years)
804422R	York Street	6,650	10	14.8	10.4	14.6	11.1	14.1
804622A	York Street	7,973	3	28.4	3.4	26.9	4.1	24.7
804623G	Josephine Street	8,453	3	28.0	3.4	26.4	4.1	24.3
804625V	Clayton Street	1,706	149	6.2	149.4	6.2	150.1	6.2
804626C	Steele Street	11,187	149	3.6	149.4	3.6	150.1	3.6
804628R	Dahlia Street	6,238	149	3.7	149.4	3.7	150.1	3.7
804631Y	Holly Street	7,367	149	3.5	149.4	3.5	150.1	3.5
804633M	Monaco Street	7,397	149	2.6	149.4	2.6	150.1	2.6
804635B	Quebec Street SBFR	45,032	149	1.8	149.4	1.8	150.1	1.8
804636H	Quebec Street NBFR	45,032	149	2.1	149.4	2.1	150.1	2.1
804638W	Ulster Street	2,468	149	4.8	149.4	4.8	150.1	4.8
804606R	Havana Street	18,458	149	1.7	149.4	1.7	150.1	1.7
906047B	Sable Blvd	7,373	149	3.5	149.4	3.5	150.1	3.5
805500Y	Chambers Road	31,440	149	1.3	149.4	1.3	150.1	1.3
805501F	Airport Blvd	39,352	3	10.1	3.4	9.5	4.1	8.7
805502M	Tower Road	29,739	3	12.6	3.4	11.9	4.1	10.9
805504B	Picadilly Road	4,076	3	34.7	3.4	32.7	4.1	30.1
805507W	Powhaton Road	370	3	70.2	3.4	66.3	4.1	60.9
805509K	CR 223	704	3	58.1	3.4	54.9	4.1	50.4
805510E	Denver Street	107	3	101.0	3.4	95.5	4.1	87.7
805511L	Imboden Road	2,084	3	42.2	3.4	39.9	4.1	36.6
805514G	CR 28	1,813	3	44.0	3.4	41.6	4.1	38.2
805515N	CR 29	107	3	79.8	3.4	74.7	4.1	67.7
805516V	Harback Road	64	4	103.1	4.4	98.7	5.1	92.2
805517C	Palmer Avenue	4,710	3	38.6	3.4	36.5	4.1	33.5

			No Action		Low Rail Traffic Scenario		High Rail Traffic Scenario	
FRA Crossing ID	**Street**	**AADT**	**Trains per Day**	**Intervals Between Accidents (years)**	**Trains per Day**	**Predicted Intervals Between Accidents (years)**	**Trains per Day**	**Predicted Intervals Between Accidents (years)**
805518J	Adams Street	4,710	3	33.2	3.4	31.4	4.1	28.8
805523F	Monroe Street	1,294	3	28.0	3.4	26.2	4.1	23.8
805527H	CR 173	1,387	3	27.2	3.4	25.5	4.1	23.2
813918X	Main Street	1,387	3	35.8	3.4	33.8	4.1	31.1
805531X	CR 185	1,387	3	17.0	3.4	16.0	4.1	14.4
805532E	Peoria Road	214	3	34.0	3.4	31.8	4.1	28.8
805535A	West Street	107	3	77.7	3.4	72.9	4.1	66.2
805538V	Burton Street	171	3	64.1	3.4	60.1	4.1	54.6

Table D-7. Grade-Crossing Safety, Denver Northbound Downline Segment (Year 2026)

			No Action		Low Rail Traffic Scenario		High Rail Traffic Scenario	
FRA Crossing ID	Street	AADT	Trains per Day	Intervals Between Accidents (years)	Trains per Day	Predicted Intervals Between Accidents (years)	Trains per Day	Predicted Intervals Between Accidents (years)
804600A	E 64 Avenue	5,135	10	18.6	12.5	16.8	17.3	14.4
804598B	East 69th Avenue	2,870	10	22.1	12.5	19.9	17.3	17.1
804597U	East 72nd Avenue	18,527	10	8.3	12.5	7.5	17.3	6.5
804596M	East 76th Avenue	5,201	10	18.5	12.5	16.7	17.3	14.4
804595F	East 80th Avenue	7,575	10	16.6	12.5	15.0	17.3	12.9
804594Y	East 88th Avenue	22,668	10	12.0	12.5	10.8	17.3	9.3
804592K	East 96th Avenue	13,182	10	14.1	12.5	12.7	17.3	10.9
804433D	East 104th Avenue/CO 44	20,575	10	9.3	12.5	8.4	17.3	7.2
804434K	East 112th Street	8,502	10	16.0	12.5	14.5	17.3	12.4
804435S	East 120th Avenue	1,883	10	25.0	12.5	22.5	17.3	19.4
804457S	124th Avenue	5,385	10	18.4	12.5	16.5	17.3	14.2
804468E	East 136th Avenue	556	10	35.8	12.5	32.3	17.3	27.7
804476W	East 144th Avenue	1,114	10	29.2	12.5	26.3	17.3	22.6
804487J	Bromley Lane	22,623	10	9.1	12.5	8.2	17.3	7.0
804486C	Jessup Street	3,677	10	20.5	12.5	18.5	17.3	15.9
804485V	Egbert Street	5,989	10	17.8	12.5	16.0	17.3	13.8
804484N	Bush Street	7,502	10	16.7	12.5	15.0	17.3	12.9
804482A	Bridge Street	30,063	10	8.3	12.5	7.5	17.3	6.5
804477D	Longspeak Street	9,141	10	15.7	12.5	14.2	17.3	12.2
804479S	168th Avenue	10,776	10	15.0	12.5	13.5	17.3	11.6
804480L	CR 2.5	321	10	15.3	12.5	13.5	17.3	11.3
804481T	CR 4	321	10	42.1	12.5	37.9	17.3	32.6
804475P	CR 6	107	10	58.1	12.5	52.4	17.3	45.0
804472U	CR 8	206	10	16.7	12.5	14.8	17.3	12.4

			No Action		Low Rail Traffic Scenario		High Rail Traffic Scenario	
FRA Crossing ID	**Street**	**AADT**	**Trains per Day**	**Intervals Between Accidents (years)**	**Trains per Day**	**Predicted Intervals Between Accidents (years)**	**Trains per Day**	**Predicted Intervals Between Accidents (years)**
804488R	CR 10	107	10	21.2	12.5	18.8	17.3	15.8
804461G	CR 12	86	10	23.0	12.5	20.4	17.3	17.1
804463V	1st St/Hwy 52	7,412	10	16.7	12.5	15.1	17.3	12.9
804464C	4th Street	990	10	30.2	12.5	27.2	17.3	23.4
804465J	9th Street	5,069	10	18.7	12.5	16.8	17.3	14.5
804374D	14th Street	119	10	56.4	12.5	50.8	17.3	43.6
804375K	CR 16	103	10	58.8	12.5	53.0	17.3	45.5
804377Y	CR 18	107	10	21.2	12.5	18.8	17.3	15.8
804378F	CR 18 1/2	43	10	54.0	12.5	47.9	17.3	40.1
804379M	County Road 20	43	10	54.0	12.5	47.9	17.3	40.1
804329J	CR 22	129	10	55.1	12.5	49.6	17.3	42.6
804331K	CR 23	2	10	163.2	12.5	144.7	17.3	121.4
804334F	CR 26	41	10	30.2	12.5	26.8	17.3	22.4
804336U	CR 28	41	10	54.8	12.5	48.6	17.3	40.7
804338H	County Road 30	21	10	39.0	12.5	34.6	17.3	29.0
804341R	Grand Avenue	634	10	34.5	12.5	31.0	17.3	26.7
804342X	County Road 34	43	10	54.0	12.5	47.9	17.3	40.1
804343E	CR 36	43	10	29.8	12.5	26.4	17.3	22.1
804347G	CR 38	21	10	70.9	12.5	62.8	17.3	52.6
804346A	CR 29	82	10	23.4	12.5	20.7	17.3	17.4
804345T	CR 40	124	10	55.7	12.5	50.2	17.3	43.1
804348N	CR 42	206	10	47.9	12.5	43.2	17.3	37.1
804351W	CR 33	206	10	16.7	12.5	14.8	17.3	12.4
804352D	CR 44	721	10	33.2	12.5	29.9	17.3	25.7
804354S	CR 46	21	10	39.0	12.5	34.6	17.3	29.0
804355Y	CR 48	103	10	21.5	12.5	19.1	17.3	16.0

			No Action		Low Rail Traffic Scenario		High Rail Traffic Scenario	
FRA Crossing ID	**Street**	**AADT**	**Trains per Day**	**Intervals Between Accidents (years)**	**Trains per Day**	**Predicted Intervals Between Accidents (years)**	**Trains per Day**	**Predicted Intervals Between Accidents (years)**
804356F	1st Avenue	8,446	10	16.1	12.5	14.5	17.3	12.4
804357M	Walnut Street	618	10	20.4	12.5	18.1	17.3	15.3
804358U	CR 52	144	10	34.5	12.5	30.6	17.3	25.6
804359B	42nd Street	206	14	41.0	16.5	38.0	21.3	33.7
804361C	39th Street	990	14	14.1	16.5	12.9	21.3	11.3
804362J	37th Street	7,210	14	14.4	16.5	13.3	21.3	11.8
804363R	31st Street	2,472	14	14.9	16.5	13.8	21.3	12.2
816131K	22nd Street	9,014	14	10.2	16.5	9.4	21.3	8.3
804365E	18th Street	4,703	14	16.3	16.5	15.1	21.3	13.4
804366L	16th Street	7,708	14	10.6	16.5	9.8	21.3	8.7
804367T	13th Street	8,230	14	10.4	16.5	9.7	21.3	8.6
804370B	10th Street	129	14	47.0	16.5	43.5	21.3	38.6
804372P	8th Street	129	14	35.4	16.5	32.8	21.3	29.1
804373W	6th Street	5,562	14	6.9	16.5	6.4	21.3	5.6
804851U	5th Street	11,627	14	8.1	16.5	7.5	21.3	6.7
804845R	CR 64	3,976	14	14.7	16.5	13.7	21.3	12.1
804846X	CR 66	1,715	14	22.0	16.5	20.3	21.3	18.1
804847E	Main Street	1,982	14	21.1	16.5	19.5	21.3	17.3
804848L	CR 70	321	14	21.4	16.5	19.5	21.3	17.0
804854P	Collins Avenue	9,002	14	13.5	16.5	12.5	21.3	11.1
804853H	2nd Street	803	14	27.5	16.5	25.4	21.3	22.6
804855W	5th Street	107	14	17.7	16.5	16.2	21.3	14.1
804856D	County Road 76	206	14	41.0	16.5	38.0	21.3	33.7
804857K	CR 37	412	14	33.4	16.5	31.0	21.3	27.5
804859Y	CR 78	107	14	32.1	16.5	29.3	21.3	25.5
804860T	CR 80	103	14	50.3	16.5	46.5	21.3	41.3

			No Action		Low Rail Traffic Scenario		High Rail Traffic Scenario	
FRA Crossing ID	**Street**	**AADT**	**Trains per Day**	**Intervals Between Accidents (years)**	**Trains per Day**	**Predicted Intervals Between Accidents (years)**	**Trains per Day**	**Predicted Intervals Between Accidents (years)**
804861A	1st Street	4,396	14	16.7	16.5	15.4	21.3	13.7
804876P	3rd Street	206	14	41.0	16.5	38.0	21.3	33.7
804877W	Railroad Avenue	64	14	38.8	16.5	35.5	21.3	30.9
804878D	CR 84	129	12	18.0	14.5	16.2	19.3	13.9
804881L	CR 86	107	14	17.7	16.5	16.2	21.3	14.1
804868X	CR 88	214	14	13.7	16.5	12.5	21.3	10.9
804875H	Main Avenue	206	14	41.0	16.5	38.0	21.3	33.7
804874B	CR 90	1,500	14	11.9	16.5	10.9	21.3	9.5
804873U	CR 92	64	14	38.8	16.5	35.5	21.3	30.9
804872M	CR 94	43	14	45.0	16.5	41.2	21.3	35.8
804870Y	CR 98	64	14	38.8	16.5	35.5	21.3	30.9
804869E	4th Street	124	14	33.1	16.5	30.4	21.3	26.6
804867R	CR 100	107	14	32.1	16.5	29.3	21.3	25.5

Grade-Crossing Delay

Calculation of Grade-Crossing Delay

OEA used the following calculations to estimate traffic delay for public, at-grade crossings for the project study area and for the downline rail segments. The traffic delay at a crossing includes the time for the train to pass, and the time for any warning device to engage and disengage. For simplification purposes, it is assumed that both rail and road traffic would be uniform throughout the day. The data sources for the calculation inputs, including AADT and train characteristics, are described in Draft EIS Chapter 3, Section 3.1, *Vehicle Safety and Delay*, *Data Sources*.

The first step includes the calculation of gate-down time per train event (T).

$$T = T_W + \frac{L}{V}$$

Where:

T_W = Gate warning time

L = Average train length

V = Average train speed

The number of stopped vehicles delayed per day (N_V) can be calculated as follows:

$$N_V = \frac{T}{24} * N * ADT$$

Where:

N = Number of trains per day

AADT = Average daily traffic

24 = Hours per day

The average delay per vehicle in a 24-hour period (D_V) is:

$$D_V = \frac{N_V}{AADT} * \frac{T * \frac{R_D}{R_D - R_A}}{2}$$

Where:

R_D = Departure rate (vehicles/lane/hour)[2]

[2] The vehicle departure rate depends on a wide range of factors such as the presence or absence of signals, number and type of lanes, lane width, grade, sight distances, type and peak of vehicle traffic, and curve radius. Data on these factors are not readily available for the grade crossings included in this analysis and, thus, calculation of crossing-specific departure rates is not feasible. Based on the *Highway Capacity Manual* (Transportation Research Board 2010), departure rates (in vehicles/lane-hour) are the following: highways (1,800), arterials (1,400), collectors (900), and local Roads (700).

R_A = Arrival rate, average daily traffic converted to vehicles/lane-hour

2 = Denominator to reflect that vehicles do not experience the entire time the train is blocking the grade crossing. They are assumed to arrive on average at the midpoint of the train crossing period.

Total vehicle delay (D) is the product of average delay per vehicle (DV) and the average daily traffic (ADT).

$$D = D_V * ADT$$

For each at-grade crossing analyzed, OEA estimated the time that each passing train would block a particular crossing and estimated the average delay per vehicle at that crossing in a 24-hour period. OEA used the average delay per vehicle at signalized intersections to determine the level of service (LOS) and to provide a conservative estimate of potential delay impacts. LOS designations provide a qualitative measure of traffic flow. While a designation of A indicates free-flowing traffic, a designation of F indicates that traffic is constantly slowed at that location (Table D-8). OEA also estimated the average traffic delays for all vehicles over a 24-hour period and used the average delay per vehicle to determine LOS for each grade crossing.

Table D-8. Level of Service Designations

Level of Service (LOS)	Average Delay for All Vehicles (seconds/vehicle)
A	<=10
B	>10 and <=20
C	>20 and <=35
D	>35 and <=55
E	>55 and <=80
F	>80

Source: Transportation Research Board 2010

Estimated Grade Crossing Delay for the Project Study Area

Tables D-9 through D-10 show the results of the grade-crossing delay analysis for each Action Alternative under the low and high rail traffic scenarios in the project study area. For each crossing, the tables identify the milepost, AADT, and the results of the delay calculations.

Table D-9. Grade-Crossing Delay, Low Rail Traffic Scenario (Year 2026)

			Delay Calculations				
Grade Crossing	**Milepost**	**AADT**	**Delay per Stopped Vehicle (min/veh)**	**Number of Vehicles Delayed per Day (veh/day)**	**Average Delay per Vehicle in a 24-Hour Period (sec/veh)**	**Level of service**	**Total Delay in a 24-Hour Period (min)**
Indian Canyon Alternative							
Quarry Road	07.01	54	3.13	0.87	3	A	2.71
FR 304	21.60	54	3.13	0.87	3	A	2.71
FR 303	23.70	54	3.13	0.87	3	A	2.71
FS Road	25.53	54	3.13	0.87	3	A	2.71
FS 302	26.74	54	3.13	0.87	3	A	2.71
Unnamed	38.38	54	3.13	0.87	3	A	2.71
3540 W	68.53	162	3.14	2.60	3	A	8.16
Leland Bench Road	79.25	162	3.14	2.60	3	A	8.16
Wells Draw Alternative							
Horner Knoll Road	00.36	162	3.14	2.60	3	A	8.16
Quarry Road	07.01	54	3.13	0.87	3	A	2.71
Unnamed	42.87	54	3.13	0.87	3	A	2.71
Rye Patch Road	47.76	54	3.13	0.87	3	A	2.71
Unnamed	48.48	54	3.13	0.87	3	A	2.71
Unnamed	48.74	54	3.13	0.87	3	A	2.71
Unnamed	48.88	54	3.13	0.87	3	A	2.71
Pipeline Road	56.97	54	3.13	0.87	3	A	2.71
Wells Draw Road (9 Mile Canyon Road)	58.44	1040	3.21	16.62	3	A	53.28
Unnamed	58.62	54	3.13	0.87	3	A	2.71
Unnamed	59.77	54	3.13	0.87	3	A	2.71
Unnamed	68.76	54	3.13	0.87	3	A	2.71

			Delay Calculations				
Grade Crossing	**Milepost**	**AADT**	**Delay per Stopped Vehicle (min/veh)**	**Number of Vehicles Delayed per Day (veh/day)**	**Average Delay per Vehicle in a 24-Hour Period (sec/veh)**	**Level of service**	**Total Delay in a 24-Hour Period (min)**
Horner Knoll Road	70.45	54	3.13	0.87	3	A	2.71
Horner Knoll Road	72.01	54	3.13	0.87	3	A	2.71
Horner Knoll Road	72.62	54	3.13	0.87	3	A	2.71
Horner Knoll Road	73.20	54	3.13	0.87	3	A	2.71
Unnamed	74.12	54	3.13	0.87	3	A	2.71
Unnamed	74.97	54	3.13	0.87	3	A	2.71
Unnamed	76.21	54	3.13	0.87	3	A	2.71
Pariette Road	80.35	162	3.14	2.60	3	A	8.16
3000 West	81.15	162	3.14	2.60	3	A	8.16
S 500 W	83.63	162	3.14	2.60	3	A	8.16
Wells Draw Road	83.90	1040	3.21	16.62	3	A	53.28
County Road 41	85.72	162	3.14	2.60	3	A	8.16
Unnamed	89.1	54	3.13	0.87	3	A	2.71
Unnamed	90.98	54	3.13	0.87	3	A	2.71
Leland Bench Road	95.09	162	3.14	2.60	3	A	8.16
Whitmore Park Alternative							
Quarry Road	10.85	54	3.13	0.87	3	A	2.71
Unnamed	12.80	54	3.13	0.87	3	A	2.71
Unnamed	13.20	54	3.13	0.87	3	A	2.71
Whitmore Park Road	14.35	162	3.14	2.60	3	A	8.16
Whitmore Park Road	16.10	162	3.14	2.60	3	A	8.16
Minnie Maud Creek Road	17.20	54	3.13	0.87	3	A	2.71
Minnie Maud Creek Road	17.35	54	3.13	0.87	3	A	2.71
Minnie Maud Creek Road	17.41	54	3.13	0.87	3	A	2.71
FR 304	26.90	54	3.13	0.87	3	A	2.71

			Delay Calculations				
Grade Crossing	**Milepost**	**AADT**	**Delay per Stopped Vehicle (min/veh)**	**Number of Vehicles Delayed per Day (veh/day)**	**Average Delay per Vehicle in a 24-Hour Period (sec/veh)**	**Level of service**	**Total Delay in a 24-Hour Period (min)**
FR 303	29.09	54	3.13	0.87	3	A	2.71
FS Road	30.92	54	3.13	0.87	3	A	2.71
FS 302	32.17	54	3.13	0.87	3	A	2.71
Unnamed	43.80	54	3.13	0.87	3	A	2.71
Unnamed	56.70	54	3.13	0.87	3	A	2.71
3540 W	75.30	162	3.14	2.60	3	A	8.16
Leland Bench Road	86.04	162	3.14	2.60	3	A	8.16
Quarry Road	9.80	54	3.13	0.87	3	A	2.71

Table D-10. Grade-Crossing Delay, High Rail Traffic Scenario (Year 2026)

			Delay Calculations				
Grade Crossing	**Milepost**	**AADT**	**Delay per Stopped Vehicle (min/veh)**	**Number of Vehicles Delayed per Day (veh/day)**	**Average Delay per Vehicle in a 24-Hour Period (sec/veh)**	**Level of Service**	**Total Delay in a 24-Hour Period (min)**
Indian Canyon Alternative							
Quarry Road	07.01	54	3.06	2.4	8	A	7.39
FR 304	21.60	54	3.06	2.4	8	A	7.39
FR 303	23.70	54	3.06	2.4	8	A	7.39
FS Road	25.53	54	3.06	2.4	8	A	7.39
FS 302	26.74	54	3.06	2.4	8	A	7.39
Unnamed	38.38	54	3.06	2.4	8	A	7.39
3540 W	68.53	162	3.07	7.2	8	A	22.22
Leland Bench Road	79.25	162	3.07	7.2	8	A	22.22
Wells Draw Alternative							
Horner Knoll Road	00.36	162	3.07	7.2	8	A	22.22
Quarry Road	07.01	54	3.06	2.4	8	A	7.39
Unnamed	42.87	54	3.06	2.4	8	A	7.39
Rye Patch Road	47.76	54	3.06	2.4	8	A	7.39
Unnamed	48.48	54	3.06	2.4	8	A	7.39
Unnamed	48.74	54	3.06	2.4	8	A	7.39
Unnamed	48.88	54	3.06	2.4	8	A	7.39
Pipeline Road	56.97	54	3.06	2.4	8	A	7.39
Wells Draw Road (9 Mile Canyon Road)	58.44	1040	3.13	46.4	8	A	145.17
Unnamed	58.62	54	3.06	2.4	8	A	7.39
Unnamed	59.77	54	3.06	2.4	8	A	7.39
Unnamed	68.76	54	3.06	2.4	8	A	7.39
Horner Knoll Road	70.45	54	3.06	2.4	8	A	7.39

			Delay Calculations				
Grade Crossing	**Milepost**	**AADT**	**Delay per Stopped Vehicle (min/veh)**	**Number of Vehicles Delayed per Day (veh/day)**	**Average Delay per Vehicle in a 24-Hour Period (sec/veh)**	**Level of Service**	**Total Delay in a 24-Hour Period (min)**
Horner Knoll Road	72.01	54	3.06	2.4	8	A	7.39
Horner Knoll Road	72.62	54	3.06	2.4	8	A	7.39
Horner Knoll Road	73.20	54	3.06	2.4	8	A	7.39
Unnamed	74.12	54	3.06	2.4	8	A	7.39
Unnamed	74.97	54	3.06	2.4	8	A	7.39
Unnamed	76.21	54	3.06	2.4	8	A	7.39
Pariette Road	80.35	162	3.07	7.2	8	A	22.22
3000 West	81.15	162	3.07	7.2	8	A	22.22
S 500 W	83.63	162	3.07	7.2	8	A	22.22
Wells Draw Road	83.90	1040	3.13	46.4	8	A	145.17
County Road 41	85.72	162	3.07	7.2	8	A	22.22
Unnamed	89.1	54	3.06	2.4	8	A	7.39
Unnamed	90.98	54	3.06	2.4	8	A	7.39
Leland Bench Road	95.09	162	3.07	7.2	8	A	22.22
Whitmore Park Alternative							
Quarry Road	10.85	54	3.06	2.4	8	A	7.39
Unnamed	12.80	54	3.06	2.4	8	A	7.39
Unnamed	13.20	54	3.06	2.4	8	A	7.39
Whitmore Park Road	14.35	162	3.07	7.2	8	A	22.22
Whitmore Park Road	16.10	162	3.07	7.2	8	A	22.22
Minnie Maud Creek Road	17.20	54	3.06	2.4	8	A	7.39
Minnie Maud Creek Road	17.35	54	3.06	2.4	8	A	7.39
Minnie Maud Creek Road	17.41	54	3.06	2.4	8	A	7.39
FR 304	26.90	54	3.06	2.4	8	A	7.39
FR 303	29.09	54	3.06	2.4	8	A	7.39

			Delay Calculations				
Grade Crossing	**Milepost**	**AADT**	**Delay per Stopped Vehicle (min/veh)**	**Number of Vehicles Delayed per Day (veh/day)**	**Average Delay per Vehicle in a 24-Hour Period (sec/veh)**	**Level of Service**	**Total Delay in a 24-Hour Period (min)**
FS Road	30.92	54	3.06	2.4	8	A	7.39
FS 302	32.17	54	3.06	2.4	8	A	7.39
Unnamed	43.80	54	3.06	2.4	8	A	7.39
Unnamed	56.70	54	3.06	2.4	8	A	7.39
3540 W	75.30	162	3.07	7.2	8	A	22.22
Leland Bench Road	86.04	162	3.07	7.2	8	A	22.22
Quarry Road	9.80	54	3.06	2.4	8	A	7.39

Estimated Grade Crossing Delay for Downline Rail Segments

Table D-11 through Table D-15 show the results of the grade-crossing delay analysis for each of the five downline segments under the low and high rail traffic scenarios and under baseline conditions without the proposed rail line (the No-Action Alternative). The anticipated traffic on the downline segments would be the same for all Action Alternatives. For each crossing, the tables identify FRA crossing ID, street name, AADT, the number of trains per day, the average delay for all vehicles over a 24-hour period, and the LOS.

Table D-11. Grade-Crossing Delay, Kyune to Denver Downline Segment (Year 2026)

			No Action Alternative			Low Rail Traffic Scenario			High Rail Traffic Scenario		
FRA Crossing ID	Street	AADT	Trains per Day	Average Delay for All Vehicles over 24-hour Period (sec/veh)	Level of Service	Trains per Day	Average Delay for All Vehicles over 24-hour Period (sec/veh)	Level of Service	Trains per Day	Average Delay for All Vehicles over 24-hour Period (sec/veh)	Level of Service
253281K	Lowell Blvd	8,236	143	2.41	A	146.3	2.98	A	152.5	4.43	A
253282S	Tennyson Street	5,311	143	2.29	A	146.3	2.84	A	152.5	4.22	A
253284F	North Lamar Street	8,103	11	1.46	A	14.3	2.16	A	20.5	3.48	A
253285M	Pierce Street	3,609	11	1.40	A	14.3	2.07	A	20.5	3.34	A
253287B	Olde Wadsworth Boulevard	9,669	11	1.65	A	14.3	2.45	A	20.5	3.94	A
253288H	Carr Street	10,142	11	1.68	A	14.3	2.48	A	20.5	4.00	A
253290J	West 66th Avenue	2,678	11	1.34	A	14.3	1.98	A	20.5	3.19	A
253291R	Kipling Street	6,409	11	1.42	A	14.3	2.10	A	20.5	3.38	A
253293E	72nd Avenue	20,730	11	1.86	A	14.3	2.75	A	20.5	4.43	A
253294L	Simms Street	18,391	11	1.77	A	14.3	2.61	A	20.5	4.21	A
253295T	80th Avenue	7,662	11	1.45	A	14.3	2.14	A	20.5	3.46	A
253298N	Blue Mountain Drive	105	11	3.49	A	14.3	5.24	A	20.5	8.49	A
253301U	Gross Damn Road	429	11	2.10	A	14.3	3.13	A	20.5	5.06	A
253302B	Coal Creek Road	3,362	11	0.72	A	14.3	1.05	A	20.5	1.69	A
253303H	Beaver Creek Road	515	11	1.56	A	14.3	2.31	A	20.5	3.73	A
253309Y	CR 6	165	11	1.20	A	14.3	1.78	A	20.5	2.86	A

			No Action Alternative			Low Rail Traffic Scenario			High Rail Traffic Scenario		
FRA Crossing ID	Street	AADT	Trains per Day	Average Delay for All Vehicles over 24-hour Period (sec/veh)	Level of Service	Trains per Day	Average Delay for All Vehicles over 24-hour Period (sec/veh)	Level of Service	Trains per Day	Average Delay for All Vehicles over 24-hour Period (sec/veh)	Level of Service
253311A	CR 6	150	11	2.08	A	14.3	3.11	A	20.5	5.02	A
253316J	Vasquez Road	166	11	0.94	A	14.3	1.38	A	20.5	2.23	A
253318X	Eisenhower Drive	841	11	0.91	A	14.3	1.34	A	20.5	2.15	A
253320Y	CR 5	294	11	0.90	A	14.3	1.31	A	20.5	2.11	A
253324B	Zero Street	103	11	0.82	A	14.3	1.20	A	20.5	1.92	A
253325H	Wasatch Road	41	11	1.95	A	14.3	2.90	A	20.5	4.68	A
253328D	Spring Road	21	11	0.97	A	14.3	1.43	A	20.5	2.30	A
253329K	CR 20	21	11	0.65	A	14.3	0.95	A	20.5	1.52	A
253340K	CR 20	21	11	0.65	A	14.3	0.95	A	20.5	1.52	A
253341S	CR 139	62	11	0.82	A	14.3	1.20	A	20.5	1.92	A
253344M	CR 39	84	11	0.65	A	14.3	0.95	A	20.5	1.52	A
253353L	CR 11	105	11	1.54	A	14.3	2.28	A	20.5	3.68	A
253355A	Sheephorn Road	105	11	2.49	A	14.3	3.72	A	20.5	6.02	A
253358V	CR 301	210	11	2.50	A	14.3	3.73	A	20.5	6.04	A
253559L	South Canyon Road	127	11	1.54	A	14.3	2.28	A	20.5	3.69	A
253563B	Kamm Avenue	127	11	0.82	A	14.3	1.20	A	20.5	1.92	A
253564H	Rippy Road	127	11	0.82	A	14.3	1.20	A	20.5	1.92	A
253565P	CR 262	127	11	0.82	A	14.3	1.20	A	20.5	1.92	A
253566W	16th Street	127	11	0.82	A	14.3	1.20	A	20.5	1.92	A
253579X	Public Road	2	11	0.82	A	14.3	1.19	A	20.5	1.92	A
253591E	CR 300	127	11	0.82	A	14.3	1.20	A	20.5	1.92	A
253594A	CR 435	127	11	1.54	A	14.3	2.28	A	20.5	3.69	A
253597V	CR 9	525	11	1.97	A	14.3	2.94	A	20.5	4.75	A

			No Action Alternative			Low Rail Traffic Scenario			High Rail Traffic Scenario		
FRA Crossing ID	Street	AADT	Trains per Day	Average Delay for All Vehicles over 24-hour Period (sec/veh)	Level of Service	Trains per Day	Average Delay for All Vehicles over 24-hour Period (sec/veh)	Level of Service	Trains per Day	Average Delay for All Vehicles over 24-hour Period (sec/veh)	Level of Service
253600B	CR 7	127	11	0.82	A	14.3	1.20	A	20.5	1.92	A
253601H	Bower Avenue	127	11	0.82	A	14.3	1.20	A	20.5	1.92	A
253602P	Main Street	2,090	11	0.87	A	14.3	1.27	A	20.5	2.04	A
253603W	Kluge Avenue	1,409	11	0.85	A	14.3	1.25	A	20.5	2.00	A
253604D	Elberta Road	3,266	11	0.90	A	14.3	1.32	A	20.5	2.12	A
253605K	CR 37 1	127	11	0.82	A	14.3	1.20	A	20.5	1.92	A
253606S	G Road	1,084	11	0.84	A	14.3	1.23	A	20.5	1.98	A
253607Y	CR 36	127	11	0.82	A	14.3	1.20	A	20.5	1.92	A
253610G	CR 35	127	11	0.82	A	14.3	1.20	A	20.5	1.92	A
253613C	CR 34	127	11	0.82	A	14.3	1.20	A	20.5	1.92	A
253766F	County Road 3375	127	11	0.82	A	14.3	1.20	A	20.5	1.92	A
253769B	CR 33	7,797	11	0.99	A	14.3	1.46	A	20.5	2.34	A
253770V	CR 32 1/2	127	11	0.82	A	14.3	1.20	A	20.5	1.92	A
253772J	CR 315	5,356	11	0.97	A	14.3	1.42	A	20.5	2.28	A
253776L	9th Street	10,829	11	1.98	A	14.3	2.95	A	20.5	4.76	A
253778A	South 7th Street	10,829	11	2.11	A	14.3	3.14	A	20.5	5.07	A
253787Y	CR G	127	8	0.55	A	11.3	0.94	A	17.5	1.66	A
253790G	CR 20	129	8	0.55	A	11.3	0.94	A	17.5	1.66	A
253791N	Mesa Avenue	127	8	0.55	A	11.3	0.94	A	17.5	1.66	A
253793C	17 Road/ Greenway Drive	2	8	0.55	A	11.3	0.93	A	17.5	1.66	A
253795R	County Road 16	127	8	0.55	A	11.3	0.94	A	17.5	1.66	A
253796X	CR 15 1/2	127	8	0.55	A	11.3	0.94	A	17.5	1.66	A
253797E	CR 15	127	8	0.55	A	11.3	0.94	A	17.5	1.66	A
253799T	CR 13 1/2	127	8	0.55	A	11.3	0.94	A	17.5	1.66	A

			No Action Alternative			Low Rail Traffic Scenario			High Rail Traffic Scenario		
FRA Crossing ID	Street	AADT	Trains per Day	Average Delay for All Vehicles over 24-hour Period (sec/veh)	Level of Service	Trains per Day	Average Delay for All Vehicles over 24-hour Period (sec/veh)	Level of Service	Trains per Day	Average Delay for All Vehicles over 24-hour Period (sec/veh)	Level of Service
253800K	SH 139	2,818	8	0.60	A	11.3	1.02	A	17.5	1.81	A
253801S	CR 12	127	8	0.55	A	11.3	0.94	A	17.5	1.66	A
253803F	SH 6	833	8	0.57	A	11.3	0.96	A	17.5	1.70	A
254214U	Kings Crossing Road	1,538	11	3.65	A	14.3	5.47	A	20.5	8.87	A
255116G	Bear Canyon Road	8,386	8	1.91	A	11.3	3.31	A	17.5	5.94	A
255118V	SR 191	10,799	8	2.23	A	11.3	3.87	A	17.5	6.93	A
255119C	150 West/D Street	2,298	12	2.91	A	15.3	4.20	A	21.5	6.62	A
255124Y	1500 West Street	2,298	8	0.70	A	11.3	1.18	A	17.5	2.10	A
255127U	760 North	7,582	8	0.82	A	11.3	1.40	A	17.5	2.49	A
255131J	100 West	3,791	8	1.00	A	11.3	1.71	A	17.5	3.05	A
255132R	Carbon Avenue	3,791	8	1.00	A	11.3	1.71	A	17.5	3.05	A
255133X	100 East	3,791	8	1.00	A	11.3	1.71	A	17.5	3.05	A
255134E	400 East	3,791	8	0.61	A	11.3	1.02	A	17.5	1.82	A
255137A	800 East	3,791	8	0.61	A	11.3	1.02	A	17.5	1.82	A
255141P	2000 East	3,791	8	0.61	A	11.3	1.02	A	17.5	1.82	A
255144K	400 West	3,791	8	0.70	A	11.3	1.18	A	17.5	2.10	A
255145S	100 East	3,791	8	0.66	A	11.3	1.12	A	17.5	1.98	A
255149U	South Farnham Road	1,838	8	0.58	A	11.3	0.99	A	17.5	1.75	A
255150N	Mounds Road	1,838	8	0.58	A	11.3	0.99	A	17.5	1.75	A
255165D	SR-128	719	8	0.56	A	11.3	0.95	A	17.5	1.69	A
255168Y	Sego Canyon Road	457	8	0.56	A	11.3	0.94	A	17.5	1.68	A

			No Action Alternative			Low Rail Traffic Scenario			High Rail Traffic Scenario		
FRA Crossing ID	Street	AADT	Trains per Day	Average Delay for All Vehicles over 24-hour Period (sec/veh)	Level of Service	Trains per Day	Average Delay for All Vehicles over 24-hour Period (sec/veh)	Level of Service	Trains per Day	Average Delay for All Vehicles over 24-hour Period (sec/veh)	Level of Service
255169F	Lumber Road	131	8	0.55	A	11.3	0.94	A	17.5	1.66	A
255171G	Brender Road	163	8	0.56	A	11.3	0.94	A	17.5	1.66	A
255176R	BLM 170	229	8	0.56	A	11.3	0.94	A	17.5	1.67	A
255336C	BLM 225	163	8	0.64	A	11.3	1.08	A	17.5	1.92	A
255341Y	Airport Road	1,838	8	0.58	A	11.3	0.99	A	17.5	1.75	A
255342F	800 East	1,838	8	0.58	A	11.3	0.99	A	17.5	1.75	A
920426K	County Road	1,838	8	1.39	A	11.3	2.39	A	17.5	4.28	A

Table D-12. Grade-Crossing Delay, Denver East/North Downline Segment (Year 2026)

			No Action			Low Rail Traffic Scenario			High Rail Traffic Scenario		
FRA Crossing ID	Street	AADT	Trains per Day	Average Delay for All Vehicles over 24-hour Period (sec/veh)	Level of Service	Trains per Day	Average Delay for All Vehicles over 24-hour Period (sec/veh)	Level of Service	Trains per Day	Average Delay for All Vehicles over 24-hour Period (sec/veh)	Level of Service
253266H	Broadway Street	23,431	25	21.19	C	27.9	24.72	C	33.4	31.03	C
253269D	Washington Street	38,816	25	19.41	B	27.9	22.64	C	33.4	28.42	C

Table D-13. Grade-Crossing Delay, Denver Southbound Downline Segment (Year 2026)

			No Action Alternative			Low Rail Traffic Scenario			High Rail Traffic Scenario		
FRA Crossing ID	Street	AADT	Trains per Day	Average Delay for All Vehicles over 24-hour Period (sec/veh)	Level of Service	Trains per Day	Average Delay for All Vehicles over 24-hour Period (sec/veh)	Level of Service	Trains per Day	Average Delay for All Vehicles over 24-hour Period (sec/veh)	Level of Service
245260W	Walnut wo 4th	2,574	14	15.81	B	14.4	16.46	B	15.1	17.53	B
245255A	Colfax EO Umatil	1,188	38	20.50	C	38.4	20.81	C	39.1	21.31	C
245254T	13th WO Shoshone	8,578	38	22.67	C	38.4	23.01	C	39.1	23.57	C
245394V	Kalamath Ave	11,421	38	22.30	C	38.4	22.64	C	39.1	23.19	C
245393N	Bayaud Street	2,426	38	20.51	C	38.4	20.82	C	39.1	21.33	C
245392G	Santa Fe Ave	26,762	38	24.92	C	38.4	25.30	C	39.1	25.91	C
253054E	West Louviers Avenue	237	20	2.80	A	20.4	2.87	A	21.1	3.00	A
253057A	Airport Road	2,366	20	2.99	A	20.4	3.07	A	21.1	3.21	A
253058G	Clay Street	71	20	4.23	A	20.4	4.34	A	21.1	4.54	A
253059N	Manhart Street	9,222	20	5.81	A	20.4	5.98	A	21.1	6.24	A
003600M	Private	23	20	2.78	A	20.4	2.85	A	21.1	2.98	A
003598N	Territorial Rd	21	20	2.78	A	20.4	2.85	A	21.1	2.98	A
003596A	Lowell Pl	23	20	2.78	A	20.4	2.85	A	21.1	2.98	A
003593E	Tomah Road	21	20	2.78	A	20.4	2.85	A	21.1	2.98	A
003589P	Perry Park Ave	618	20	2.83	A	20.4	2.91	A	21.1	3.04	A
003586U	CO Rd 74	41	20	2.78	A	20.4	2.86	A	21.1	2.98	A

Table D-14. Grade-Crossing Delay, Denver Eastbound Downline Segment (Year 2026)

			No Action Alternative			Low Rail Traffic Scenario			High Rail Traffic Scenario		
FRA Crossing ID	Street	AADT	Trains per Day	Average Delay for All Vehicles over 24-hour Period (sec/veh)	Level of Service	Trains per Day	Average Delay for All Vehicles over 24-hour Period (sec/veh)	Level of Service	Trains per Day	Average Delay for All Vehicles over 24-hour Period (sec/veh)	Level of Service
804422R	York Street	6,650	10	6.13	A	10.4	6.48	A	11.1	7.05	A
804622A	York Street	7,973	3	3.32	A	3.4	3.96	A	4.1	5.01	A
804623G	Josephine Street	8,453	3	2.06	A	3.4	2.45	A	4.1	3.10	A
804625V	Clayton Street	1,706	149	1.71	A	149.4	1.82	A	150.1	2.01	A
804626C	Steele Street	11,187	149	2.43	A	149.4	2.59	A	150.1	2.86	A
804628R	Dahlia Street	6,238	149	1.79	A	149.4	1.91	A	150.1	2.11	A
804631Y	Holly Street	7,367	149	1.83	A	149.4	1.95	A	150.1	2.15	A
804633M	Monaco Street	7,397	149	1.69	A	149.4	1.81	A	150.1	1.99	A
804635B	Quebec Street SBFR	45,032	149	2.44	A	149.4	2.60	A	150.1	2.87	A
804636H	Quebec Street NBFR	45,032	149	2.93	A	149.4	3.12	A	150.1	3.44	A
804638W	Ulster Street	2,468	149	1.70	A	149.4	1.82	A	150.1	2.00	A
804606R	Havana Street	18,458	149	1.78	A	149.4	1.90	A	150.1	2.10	A
906047B	Sable Blvd	7,373	149	1.75	A	149.4	1.86	A	150.1	2.06	A
805500Y	Chambers Road	31,440	149	1.87	A	149.4	1.99	A	150.1	2.20	A
805501F	Airport Blvd	39,352	3	0.45	A	3.4	0.53	A	4.1	0.67	A
805502M	Tower Road	29,739	3	0.44	A	3.4	0.52	A	4.1	0.66	A
805504B	Picadilly Road	4,076	3	0.39	A	3.4	0.46	A	4.1	0.58	A
805507W	Powhaton Road	370	3	0.37	A	3.4	0.43	A	4.1	0.54	A
805509K	CR 223	704	3	0.37	A	3.4	0.43	A	4.1	0.55	A
805510E	Denver Street	107	3	0.36	A	3.4	0.43	A	4.1	0.54	A

			No Action Alternative			Low Rail Traffic Scenario			High Rail Traffic Scenario		
FRA Crossing ID	**Street**	**AADT**	**Trains per Day**	**Average Delay for All Vehicles over 24-hour Period (sec/veh)**	**Level of Service**	**Trains per Day**	**Average Delay for All Vehicles over 24-hour Period (sec/veh)**	**Level of Service**	**Trains per Day**	**Average Delay for All Vehicles over 24-hour Period (sec/veh)**	**Level of Service**
805511L	Imboden Road	2,084	3	0.38	A	3.4	0.45	A	4.1	0.57	A
805514G	CR 28	1,813	3	0.38	A	3.4	0.45	A	4.1	0.56	A
805515N	CR 29	107	3	0.36	A	3.4	0.43	A	4.1	0.54	A
805516V	Harback Road	64	4	0.48	A	4.4	0.55	A	5.1	0.66	A
805517C	Palmer Avenue	4,710	3	0.39	A	3.4	0.46	A	4.1	0.58	A
805518J	Adams Street	4,710	3	0.39	A	3.4	0.46	A	4.1	0.58	A
805523F	Monroe Street	1,294	3	0.37	A	3.4	0.44	A	4.1	0.55	A
805527H	CR 173	1,387	3	0.37	A	3.4	0.44	A	4.1	0.55	A
813918X	Main Street	1,387	3	0.37	A	3.4	0.43	A	4.1	0.55	A
805531X	CR 185	1,387	3	0.37	A	3.4	0.44	A	4.1	0.55	A
805532E	Peoria Road	214	3	0.36	A	3.4	0.43	A	4.1	0.54	A
805535A	West Street	107	3	0.36	A	3.4	0.43	A	4.1	0.54	A
805538V	Burton Street	171	3	0.36	A	3.4	0.43	A	4.1	0.54	A

Table D-15. Grade-Crossing Delay, Denver Northbound Downline Segment (Year 2026)

			No Action Alternative			Low Rail Traffic Scenario			High Rail Traffic Scenario		
FRA Crossing ID	Street	AADT	Trains per Day	Average Delay for All Vehicles over 24-hour Period (sec/veh)	Level of Service	Trains per Day	Average Delay for All Vehicles over 24-hour Period (sec/veh)	Level of Service	Trains per Day	Average Delay for All Vehicles over 24-hour Period (sec/veh)	Level of Service
804600A	E 64 Avenue	5,135	10	2.39	A	12.5	3.24	A	17.3	4.77	A
804598B	East 69th Avenue	2,870	10	2.26	A	12.5	3.05	A	17.3	4.50	A
804597U	East 72nd Avenue	18,527	10	2.71	A	12.5	3.66	A	17.3	5.39	A
804596M	East 76th Avenue	5,201	10	0.99	A	12.5	1.33	A	17.3	1.96	A
804595F	East 80th Avenue	7,575	10	1.13	A	12.5	1.52	A	17.3	2.22	A
804594Y	East 88th Avenue	22,668	10	1.84	A	12.5	2.47	A	17.3	3.62	A
804592K	East 96th Avenue	13,182	10	1.26	A	12.5	1.69	A	17.3	2.47	A
804433D	East 104th Avenue/ CO 44	20,575	10	1.15	A	12.5	1.54	A	17.3	2.26	A
804434K	East 112th Street	8,502	10	1.09	A	12.5	1.46	A	17.3	2.14	A
804435S	East 120th Avenue	1,883	10	0.91	A	12.5	1.23	A	17.3	1.80	A
804457S	124th Avenue	5,385	10	1.00	A	12.5	1.34	A	17.3	1.96	A
804468E	East 136th Avenue	556	10	0.89	A	12.5	1.19	A	17.3	1.74	A
804476W	East 144th Avenue	1,114	10	0.90	A	12.5	1.21	A	17.3	1.77	A
804487J	Bromley Lane	22,623	10	1.57	A	12.5	2.11	A	17.3	3.10	A
804486C	Jessup Street	3,677	10	1.27	A	12.5	1.71	A	17.3	2.50	A
804485V	Egbert Street	5,989	10	1.35	A	12.5	1.81	A	17.3	2.66	A
804484N	Bush Street	7,502	10	1.40	A	12.5	1.89	A	17.3	2.77	A
804482A	Bridge Street	30,063	10	1.78	A	12.5	2.39	A	17.3	3.51	A
804477D	Longspeak Street	9,141	10	1.33	A	12.5	1.79	A	17.3	2.62	A
804479S	168TH Avenue	10,776	10	1.40	A	12.5	1.88	A	17.3	2.75	A

			No Action Alternative			Low Rail Traffic Scenario			High Rail Traffic Scenario		
FRA Crossing ID	Street	AADT	Trains per Day	Average Delay for All Vehicles over 24-hour Period (sec/veh)	Level of Service	Trains per Day	Average Delay for All Vehicles over 24-hour Period (sec/veh)	Level of Service	Trains per Day	Average Delay for All Vehicles over 24-hour Period (sec/veh)	Level of Service
804480L	CR 2.5	321	10	1.06	A	12.5	1.42	A	17.3	2.09	A
804481T	CR 4	321	10	0.88	A	12.5	1.19	A	17.3	1.74	A
804475P	CR 6	107	10	0.88	A	12.5	1.18	A	17.3	1.73	A
804472U	CR 8	206	10	0.88	A	12.5	1.18	A	17.3	1.73	A
804488R	CR 10	107	10	0.88	A	12.5	1.18	A	17.3	1.73	A
804461G	CR 12	86	10	0.88	A	12.5	1.18	A	17.3	1.72	A
804463V	1ST St/Hwy 52	7,412	10	1.49	A	12.5	2.00	A	17.3	2.94	A
804464C	4TH Street	990	10	1.18	A	12.5	1.58	A	17.3	2.33	A
804465J	9TH Street	5,069	10	1.25	A	12.5	1.69	A	17.3	2.48	A
804374D	14TH Street	119	10	0.88	A	12.5	1.18	A	17.3	1.73	A
804375K	CR 16	103	10	0.88	A	12.5	1.18	A	17.3	1.72	A
804377Y	CR 18	107	10	0.88	A	12.5	1.18	A	17.3	1.73	A
804378F	CR 18 1/2	43	10	0.88	A	12.5	1.18	A	17.3	1.72	A
804379M	County Road 20	43	10	0.88	A	12.5	1.18	A	17.3	1.72	A
804329J	CR 22	129	10	0.88	A	12.5	1.18	A	17.3	1.73	A
804331K	CR 23	2	10	0.87	A	12.5	1.17	A	17.3	1.72	A
804334F	CR 26	41	10	0.88	A	12.5	1.18	A	17.3	1.72	A
804336U	CR 28	41	10	0.88	A	12.5	1.18	A	17.3	1.72	A
804338H	County Road 30	21	10	0.88	A	12.5	1.17	A	17.3	1.72	A
804341R	Grand Avenue	634	10	0.89	A	12.5	1.19	A	17.3	1.75	A
804342X	County Road 34	43	10	0.88	A	12.5	1.18	A	17.3	1.72	A
804343E	CR 36	43	10	0.88	A	12.5	1.18	A	17.3	1.72	A

			No Action Alternative			Low Rail Traffic Scenario			High Rail Traffic Scenario		
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804347G	CR 38	21	10	0.88	A	12.5	1.17	A	17.3	1.72	A
804346A	CR 29	82	10	0.88	A	12.5	1.18	A	17.3	1.72	A
804345T	CR 40	124	10	0.88	A	12.5	1.18	A	17.3	1.73	A
804348N	CR 42	206	10	0.88	A	12.5	1.18	A	17.3	1.73	A
804351W	CR 33	206	10	0.88	A	12.5	1.18	A	17.3	1.73	A
804352D	CR 44	721	10	0.89	A	12.5	1.19	A	17.3	1.75	A
804354S	CR 46	21	10	0.88	A	12.5	1.17	A	17.3	1.72	A
804355Y	CR 48	103	10	0.88	A	12.5	1.18	A	17.3	1.72	A
804356F	1st Avenue	8,446	10	1.00	A	12.5	1.34	A	17.3	1.97	A
804357M	Walnut Street	618	10	0.89	A	12.5	1.20	A	17.3	1.75	A
804358U	CR 52	144	10	0.88	A	12.5	1.18	A	17.3	1.73	A
804359B	42ND Street	206	14	1.63	A	16.5	2.04	A	21.3	2.77	A
804361C	39th Street	990	14	1.67	A	16.5	2.09	A	21.3	2.84	A
804362J	37th Street	7,210	14	1.82	A	16.5	2.27	A	21.3	3.08	A
804363R	31ST Street	2,472	14	1.67	A	16.5	2.08	A	21.3	2.83	A
816131K	22ND Street	9,014	14	1.74	A	16.5	2.17	A	21.3	2.95	A
804365E	18TH Street	4,703	14	1.82	A	16.5	2.27	A	21.3	3.09	A
804366L	16TH Street	7,708	14	1.72	A	16.5	2.15	A	21.3	2.92	A
804367T	13TH Street	8,230	14	1.73	A	16.5	2.16	A	21.3	2.93	A
804370B	10TH Street	129	14	1.63	A	16.5	2.03	A	21.3	2.76	A
804372P	8TH Street	129	14	1.63	A	16.5	2.03	A	21.3	2.76	A
804373W	6TH Street	5,562	14	1.86	A	16.5	2.32	A	21.3	3.16	A

			No Action Alternative			Low Rail Traffic Scenario			High Rail Traffic Scenario		
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804851U	5TH Street	11,627	14	1.78	A	16.5	2.22	A	21.3	3.01	A
804845R	CR 64	3,976	14	1.79	A	16.5	2.23	A	21.3	3.03	A
804846X	CR 66	1,715	14	1.29	A	16.5	1.61	A	21.3	2.18	A
804847E	Main Street	1,982	14	1.28	A	16.5	1.60	A	21.3	2.17	A
804848L	CR 70	321	14	1.24	A	16.5	1.54	A	21.3	2.09	A
804854P	Collins Avenue	9,002	14	1.41	A	16.5	1.76	A	21.3	2.39	A
804853H	2ND Street	803	14	1.25	A	16.5	1.56	A	21.3	2.12	A
804855W	5th Street	107	14	1.23	A	16.5	1.53	A	21.3	2.08	A
804856D	County Road 76	206	14	1.23	A	16.5	1.53	A	21.3	2.08	A
804857K	CR 37	412	14	1.24	A	16.5	1.54	A	21.3	2.09	A
804859Y	CR 78	107	14	1.23	A	16.5	1.53	A	21.3	2.08	A
804860T	CR 80	103	14	1.23	A	16.5	1.53	A	21.3	2.07	A
804861A	1ST Street	4,396	14	1.36	A	16.5	1.70	A	21.3	2.30	A
804876P	3RD Street	206	14	1.23	A	16.5	1.53	A	21.3	2.08	A
804877W	Railroad Avenue	64	14	1.23	A	16.5	1.53	A	21.3	2.07	A
804878D	CR 84	129	12	1.05	A	14.5	1.35	A	19.3	1.90	A
804881L	CR 86	107	14	1.23	A	16.5	1.53	A	21.3	2.08	A
804868X	CR 88	214	14	1.23	A	16.5	1.53	A	21.3	2.08	A
804875H	Main Avenue	206	14	1.23	A	16.5	1.53	A	21.3	2.08	A
804874B	CR 90	1,500	14	1.28	A	16.5	1.59	A	21.3	2.17	A
804873U	CR 92	64	14	1.23	A	16.5	1.53	A	21.3	2.07	A
804872M	CR 94	43	14	1.23	A	16.5	1.53	A	21.3	2.07	A

			No Action Alternative			Low Rail Traffic Scenario			High Rail Traffic Scenario		
FRA Crossing ID	**Street**	**AADT**	**Trains per Day**	**Average Delay for All Vehicles over 24-hour Period (sec/veh)**	**Level of Service**	**Trains per Day**	**Average Delay for All Vehicles over 24-hour Period (sec/veh)**	**Level of Service**	**Trains per Day**	**Average Delay for All Vehicles over 24-hour Period (sec/veh)**	**Level of Service**
804870Y	CR 98	64	14	1.23	A	16.5	1.53	A	21.3	2.07	A
804869E	4th Street	124	14	1.23	A	16.5	1.53	A	21.3	2.08	A
804867R	CR 100	107	14	1.23	A	16.5	1.53	A	21.3	2.08	A

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