Chapter 3
Transportation

3.1 Introduction

This chapter describes the impacts on transportation that would result from construction and operation of each of the build alternatives. The sections that follow describe the study area, the methods used to analyze the impacts, the affected environment, and the impacts of the build alternatives on each of the following transportation issues.

- Section 3.2, *Rail Operations and Rail Safety*
- Section 3.3, *Grade-Crossing Delay*
- Section 3.4, *Grade-Crossing Safety*
- Section 3.5, *Navigation*

The regulations and guidance related to transportation are summarized in Section 3.6, *Applicable Regulations*. Appendix D, *Grade-Crossing Safety and Delay Analysis*, provides further information on assessment methods, assumptions, and results. The contribution of the proposed rail line to cumulative impacts on transportation is discussed in Chapter 18, *Cumulative Impacts*.

3.2 Rail Operations and Rail Safety

This section describes the impacts on rail operations and rail safety that would result from construction and operation of each of the build alternatives. These impacts could include collisions, derailments, and obstructions on the track resulting in loss of cargo or even fatalities or injuries. The regulations and guidance related to rail operations and rail safety are summarized in Section 3.6, *Applicable Regulations*. The contribution of the proposed rail line to cumulative impacts on rail operations and rail safety is discussed in Chapter 18, *Cumulative Impacts*. The subsections that follow describe the rail operations and safety study area, the methods used to analyze the impacts, the affected environment, and the impacts of the build alternatives on rail operations and rail safety.

For context, in 2013 there were 1,800 train accidents of the types evaluated here across all railroads (Federal Railroad Administration 2013). In summary, if the Board decides to license construction and operation of the proposed rail line, OEA estimates that operation would result in 0.5 to 2.2 predicted train accidents (primarily collisions and derailments) per year, with the specific value depending on the length of the build alternative licensed and the level of coal production. The Decker Alternatives would have the lowest predicted number of accidents (0.5 per year for the low production scenario and 1.1 per year for the high production scenario), or roughly half the number of the other build alternatives. The predicted accidents for the other build alternatives are comparable (1.8 to 2.2 per year for the high production scenario).

The consequences of an accident could range from no loss of coal to spills from one or more rail cars, and could involve injuries or fatalities. Because the analysis considers both loaded outbound coal trains and empty returning trains, only half of the predicted accidents could spill coal (accident rates do not differentiate between empty and loaded trains). For those accidents involving loaded trains, most would involve derailments of a few cars.

Operation of the proposed rail line would result in an increase in accidents, which OEA concludes to be a minor adverse impact.

3.2.1 Study Area

OEA defined the study area for rail operations and rail safety as the rights-of-way for the build alternatives plus the existing Colstrip Subdivision, which connects the Colstrip Alternatives to the BNSF Railway Company (BNSF) main line.

3.2.2 Analysis Methods

OEA used existing rail accident data from the Federal Rail Administration (FRA) as the basis for the rail safety and accident analysis. *Accident rates* (accidents per train mile) do not change dramatically from one year to the next, but generally trend downward over time due to improved control systems, communications, and inspection practices. As a result, using current data for projections to 2037 is conservative. Typically, variations in year-to-year accident rates are smaller than variations in year-to-year traffic volumes on any specific route.

3.2.2.1 Accident Analysis Data Sources

OEA used several data sources to estimate impacts on rail safety, based on predicted accident frequency.

- Train characteristics, including length, provided by TRRC.
- Future train traffic (average trains per day) under three coal production scenarios as estimated by TRRC and OEA (Chapter 2, Section 2.3.3, *Rail Traffic*).
- Accident rates compiled by FRA along with analyses by Liu et al. (2011), and Anderson and Barkan (2004) giving derailment rates by track class and discussing the impacts of track class, train length, and signal systems.

3.2.2.2 Accident Analysis Methods

Accident Rates

OEA used both qualitative and quantitative methods to estimate accident rates. OEA estimated the number of accidents (primarily collisions and derailments) resulting from rail operation based on rates from FRA (2013). OEA analyzed the rates in combination with the specifics of the proposed rail line operation (e.g., number of trains, route length, track class) to estimate the number of accidents per year. The analysis compared predicted rates for all rail traffic with predicted rates for BNSF rail traffic (accidents per million train miles) (Table 3.2-1).

Table 3.2-1. Train Accident Rates

	Accident Rate per Million Train Miles	
Year	**All Railroads**	**BNSF**
2010	2.70	2.64
2011	2.82	2.72
2012	2.40	2.19
2013	2.39	2.01

Train accident rates are generally distinguished only by freight versus passenger service, not by specific cargoes. OEA evaluated both loaded and unloaded coal trains. Given that TRRC would operate *unit trains* that would travel from the mines to the end markets without being split up, trains would generally pass around or straight through yards. Thus, OEA focused the analysis on accidents on the alignments of the build alternatives, rather than in rail yards.

Accident rates have been shown to vary considerably by track class, with higher accident rates occurring on lower track classes that require lower train speeds.[1] Liu et al. (2011) derived derailment rates by track class, using the baseline rates provided by Anderson and Barkan (2004). The predicted number of accidents per year is calculated by multiplying segment length by the number of trains per year by the accident rate. They found that the derailment rates for Track Class 3 were twice the overall average and derailment rates for Track Class 2 were six times the overall average (accident rates increase with lower track classes due to lower track quality). Conversely, derailment rates for Track Class 5 were roughly a third of the overall average rates (accident rates decrease with higher track classes due to higher track quality and other factors). Anderson and Barkan (2004) found that the overall accident rate (collisions, derailments, and other types) on Track Class 3 was roughly twice the total rate for all track classes, and the overall rate on Track Classes 4 and higher was roughly half the total rate for all track classes.

OEA evaluated data on accident rates by track class to generate a base accident rate for each build alternative, assumed to be operating on a Track Class 3 (operating up to 40 miles per hour) based on information from TRRC. OEA used the 2013 BNSF rate of two accidents per million train miles (Table 3.2-1) as the basis for predicting accident rates. Using the multiplier of two for Track Class 3, as indicated by Anderson and Barkan (2004) and Liu et al. (2011), OEA predicted a rate of four accidents per million train miles for the build alternatives.

Accident Severity

OEA reviewed mainline accidents in Montana with and without injuries and fatalities as an indicator of accident severity, focusing on areas with similar topographical characteristics. Based on FRA data (2013), there were two fatalities in Montana in 2013—one was a trespasser struck by on-track equipment (not included in this analysis) and one was at a grade crossing (Section 3.4, *Grade-Crossing Safety*, addresses impacts at grade crossings). No derailments or collisions were reported to have fatalities. Of 28 accidents in 2013, 14 involved mainline track. Nine of these were derailments, and five were classified as "other" accidents. Six of the nine derailments on mainline track derailed from zero to four cars; the other three derailed from 10 to 24 cars.

[1] Train accidents are more likely to occur on lower track classes (which have lower allowable speeds) because lower track classes are not designed and maintained to the same standards as higher track classes.

3.2.3 Affected Environment

The existing environmental conditions related to rail operations and rail safety are described below.

Any build alternative would require the construction of new track and crossings, for which there is no historical data, except on the 29.7 miles of existing track on the Colstrip Subdivision. The estimated lengths of the build alternatives are provided in Table 3.2-2.

Table 3.2-2. Lengths of the Build Alternatives[a]

Build Alternative	Miles
Tongue River	83.7
Tongue River East	86.3
Colstrip[b]	72.0
Colstrip East[b]	75.1
Tongue River Road	83.7
Tongue River Road East	85.9
Moon Creek	82.1
Moon Creek East	84.7
Decker	51.1
Decker East	49.6

Notes:
[a] Total track length, including both Terminus 1 and Terminus 2
[b] Includes 29.7 miles of the Colstrip Subdivision

The Colstrip Alternatives would use existing track on the Colstrip Subdivision. In the last 10 years (2004 to 2013), FRA (2013) data show that one derailment occurred on the Colstrip Subdivision. In 2007, a broken rail resulted in three loaded coal cars derailing near the junction with the main line. No collisions were reported. Chapter 2, *Proposed Action and Alternatives,* describes the upgrades planned for the Colstrip Subdivision. These upgrades would support unit trains and bring the subdivision to Track Class 3 like the other build alternatives.

3.2.4 Environmental Consequences

Impacts on rail operations and rail safety could result from construction and operation of any build alternative. The impacts common to all build alternatives are presented first, followed by impacts specific to the build alternatives.

3.2.4.1 Impacts Common to All Build Alternatives

The impact on rail operations and rail safety common to all build alternatives is described below.

- **Yield a Small Number of Predicted Accidents**

  Any build alternative would yield a small number of predicted accidents per year. These accidents would not all be serious—some might involve standing derailments of a few cars, while others could involve more derailed cars. Half of all accidents would be expected to involve empty trains and would not include any spills of coal no matter how many cars were derailed. The variations among build alternatives are attributable to the relative length of each build alternative and the coal production scenario (number of trains per day).

3.2.4.2 Impacts by Build Alternative

The impacts on rail operations and rail safety that are specific to each build alternative are described below and are summarized in Table 3.2-3, which shows the predicted annual number of accidents by build alternative.

Table 3.2-3. Predicted Annual Train Accidents by Build Alternative

Build Alternative	Low Production Scenario[a] 7.4 Trains/Day		Medium Production Scenario[a] 11.9 Trains/Day		High Production Scenario[a] 18.6 Trains/Day		High Production Scenario[a] 26.7 Trains/Day	
	Length[b] (miles)	Accidents per Year	Length (miles)	Accidents per Year	Length (miles)	Accidents per Year	Length (miles)	Accidents per Year
Tongue River	75.7	0.8	77.7	1.3	77.7	2.1	--	--
Tongue River East	77.3	0.8	82.3	1.4	82.3	2.2	--	--
Colstrip[c]	64.0	0.7	66.0	1.1	66.0	1.8	--	--
Colstrip East[c]	66.1	0.7	71.1	1.2	71.1	1.9	--	--
Tongue River Road	75.7	0.8	77.7	1.3	77.7	2.1	--	--
Tongue River Road East	76.9	0.8	81.9	1.4	81.9	2.2	--	--
Moon Creek	74.1	0.8	76.1	1.3	76.1	2.1	--	--
Moon Creek East	75.7	0.8	80.7	1.4	80.7	2.2	--	--
Decker	51.1	0.6	37.1	0.6	--	--	27.4	1.1
Decker East	49.6	0.5	36.6	0.6	--	--	29.3	1.1

Notes:

[a] Production scenario depends on the mines that would be accessed by each build alternative as described in Appendix C, *Coal Production and Markets*. The dashes (--) indicate that these scenarios would not occur.

[b] Lengths include either Terminus 1 or 2, not both, and vary by scenario depending on which coal source(s) would be accessed

[c] Includes the Colstrip Subdivision

Tongue River Alternatives

Tongue River Alternative

Operation of the Tongue River Alternative would result in a predicted number of train accidents ranging from 0.8 per year in the low production scenario to 2.1 per year in the high production scenario.

Tongue River East Alternative

Operation of the Tongue River East Alternative would result in a predicted number of accidents ranging from 0.8 per year for the low production scenario to 2.2 per year in the high production scenario.

Colstrip Alternatives

Colstrip Alternative

Operation of the Colstrip Alternative would result in a predicted number of accidents ranging from 0.7 per year in the low production scenario to 1.8 per year in the high production scenario. Operation of this build alternative would also result in a predicted increase of 0.2 accident per year for the existing traffic on the Colstrip Subdivision.

Colstrip East Alternative

Operation of the Colstrip East Alternative would result in a predicted number of accidents ranging from 0.7 per year in the low production scenario to 1.9 per year in the high production scenario. Operation of this build alternative would also result in a predicted increase of 0.2 accident per year for the existing traffic on the Colstrip Subdivision.

Tongue River Road Alternatives

Tongue River Road Alternative

Operation of the Tongue River Road Alternative would result in a predicted number of accidents ranging from 0.8 per year in the low production scenario to 2.1 per year in the high production scenario.

Tongue River Road East Alternative

Operation of the Tongue River Road East Alternative would result in a predicted number of accidents ranging from 0.8 per year in the low production scenario to 2.2 per year in the high production scenario.

Moon Creek Alternatives

Moon Creek Alternative

Operation of the Moon Creek Alternative would result in a predicted number of accidents ranging from 0.8 per year in the low production scenario to 2.1 per year in the high production scenario.

Moon Creek East Alternative

Operation of the Moon Creek East Alternative would result in a predicted number of accidents ranging from 0.8 per year in the low production scenario to 2.2 per year in the high production scenario.

Decker Alternatives

Decker Alternative

Operation of the Decker Alternative would result in a predicted number of accidents ranging from 0.6 per year in the low production scenario to 1.1 per year in the high production scenario.

Decker East Alternative

Operation of the Decker East Alternative would result in a predicted number of accidents ranging from 0.5 per year in the low production scenario to 1.1 per year in the high production scenario.

3.2.4.3 No-Action Alternative

Under the No-Action Alternative, TRRC would not construct and operate the proposed Tongue River Railroad, and there would be no impacts on rail operations and rail safety from construction or operation of the proposed rail line.

3.2.4.4 Mitigation and Unavoidable Environmental Consequences

OEA is not recommending that the Board impose any rail safety mitigation measures because the analysis assumes compliance with FRA regulations. However, operation of the proposed rail line could result in unavoidable rail operations and rail safety impacts, including collisions and derailment. OEA concludes that these adverse impacts would be minor.

3.3 Grade-Crossing Delay

This section describes the impacts on grade-crossing delay that would result from construction and operation of each of the build alternatives. *Grade-crossing delay*[1] refers to vehicle delay at a road/railroad crossing. The regulations and guidance related to grade-crossing delay are summarized in Section 3.6, *Applicable Regulations*. The subsections that follow describe the methods used to analyze the impacts, the affected environment, and the impacts of the build alternatives on grade-crossing delay. Appendix D, *Grade-Crossing Safety and Delay Analysis*, presents assessment methods, delay calculations, and detailed results. The contribution of the proposed rail line to cumulative impacts on grade-crossing delay is discussed in Chapter 18, *Cumulative Impacts*.

In summary, construction and operation of any build alternative would have a very small impact on grade-crossing delay, and none of the build alternatives would reduce the *level of service* (LOS; a qualitative measure of traffic flow) designation at any *at-grade crossing* (an intersection where two modes of transportation cross at the same elevation level).[2] The Colstrip Alternatives would have the most new and existing at-grade crossings (nine and eight, respectively); the Decker Alternatives, Tongue River East Alternative, and Moon Creek East Alternative would have the fewest (three each). For all coal production scenarios,[3] the Colstrip Alternatives would have the largest average increase in total delay over 24 hours (between 16.15 and 17.92 minutes averaged across all at-grade crossings under the high production scenario). The Tongue River Alternatives and Moon Creek Alternatives would have the lowest average increase in total delay over 24 hours (between 3.45 and 3.78 minutes averaged across all at-grade crossings under the high production scenario). Construction and operation of the proposed rail line would result in impacts on traffic and emergency vehicles. OEA concludes that these impacts would be negligible.

3.3.1 Study Area

OEA defined the study area for grade-crossing delay as encompassing roads in Custer, Rosebud, Big Horn, and Powder River Counties with existing at-grade crossings or new at-grade crossings for the proposed rail line. The new at-grade crossings include all crossings that would be installed for any build alternative, as shown in Figure 3.3-1. The existing

[1] Terms italicized at first use are defined in Chapter 25, *Glossary*.

[2] An at-grade crossing refers to an intersection where two modes of transportation cross at the same elevation level. In this analysis, both the train and the vehicular traffic would be crossing at the same level, so one mode of traffic (vehicular) would be impeded by the other (train). All grade crossings described in this analysis refer to at-grade crossings unless otherwise specified.

[3] The coal production scenarios (low, medium, high) reflect different levels of rail traffic depending on which build alternative is licensed, which mines are induced or developed, and the production capacities of those mines (Chapter 2, Section 2.3.3, *Rail Traffic*).

crossings are only located on the Colstrip Subdivision[4] and would be affected only by the Colstrip Alternatives, as shown in Figure 3.3-2. This analysis focuses on at-grade crossings in the study area. *Grade-separated crossings* (intersections at which traffic crosses at different elevations) are not analyzed because vehicle traffic on these roads would not be affected by operation of the proposed rail line. For example, all locations where a build alternative would intersect with Interstate 94 (I-94) and Highway 212 would be grade-separated crossings, and are not considered further in this analysis.

[4] The Colstrip Subdivision is a segment of existing BNSF track located between the junction with the BNSF main line in Nichols, Montana, and the City of Colstrip, Montana, which would connect to the Colstrip Alternatives (Figure 3.3-2).

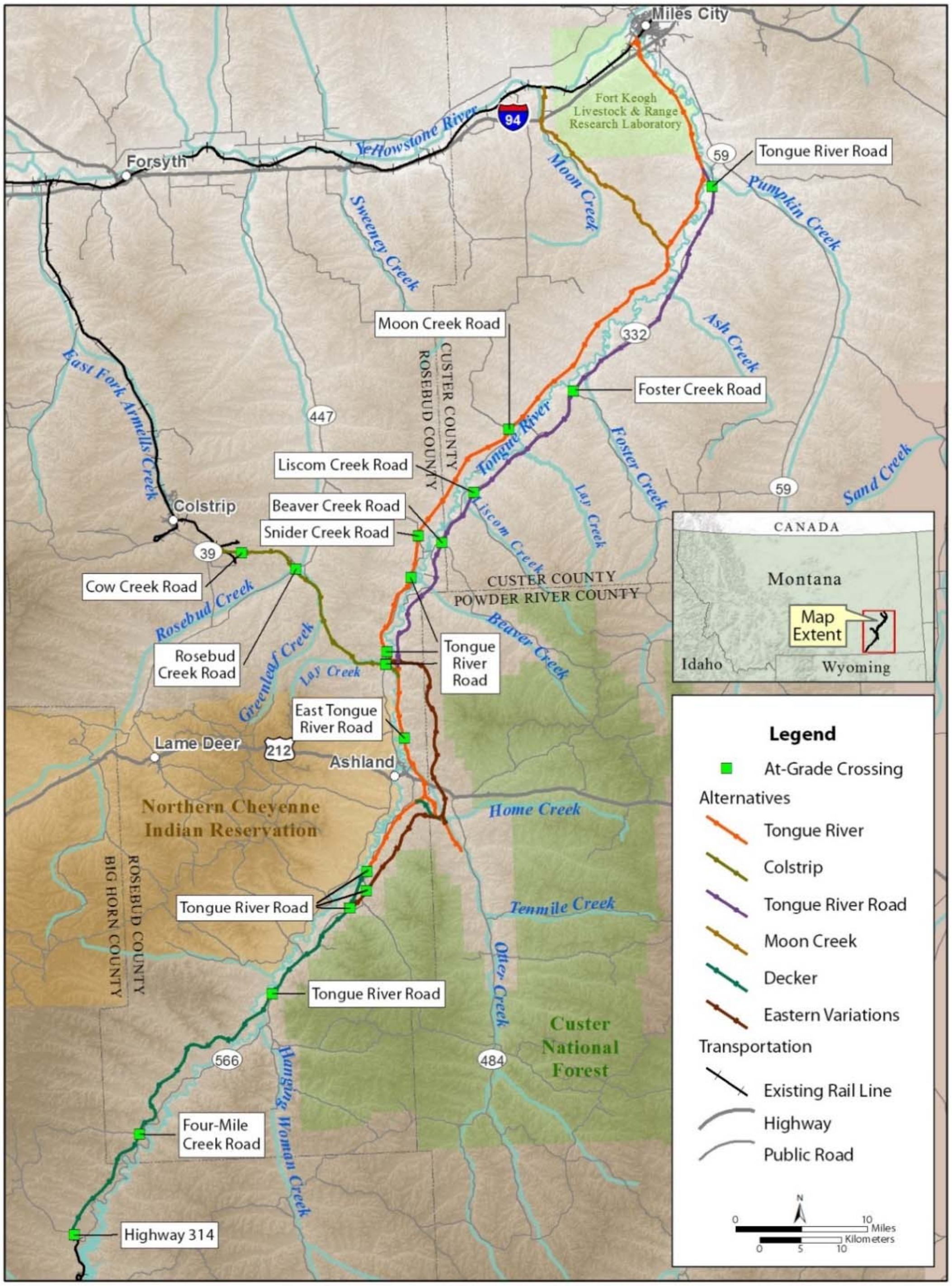

Figure 3.3-1. New Grade Crossings

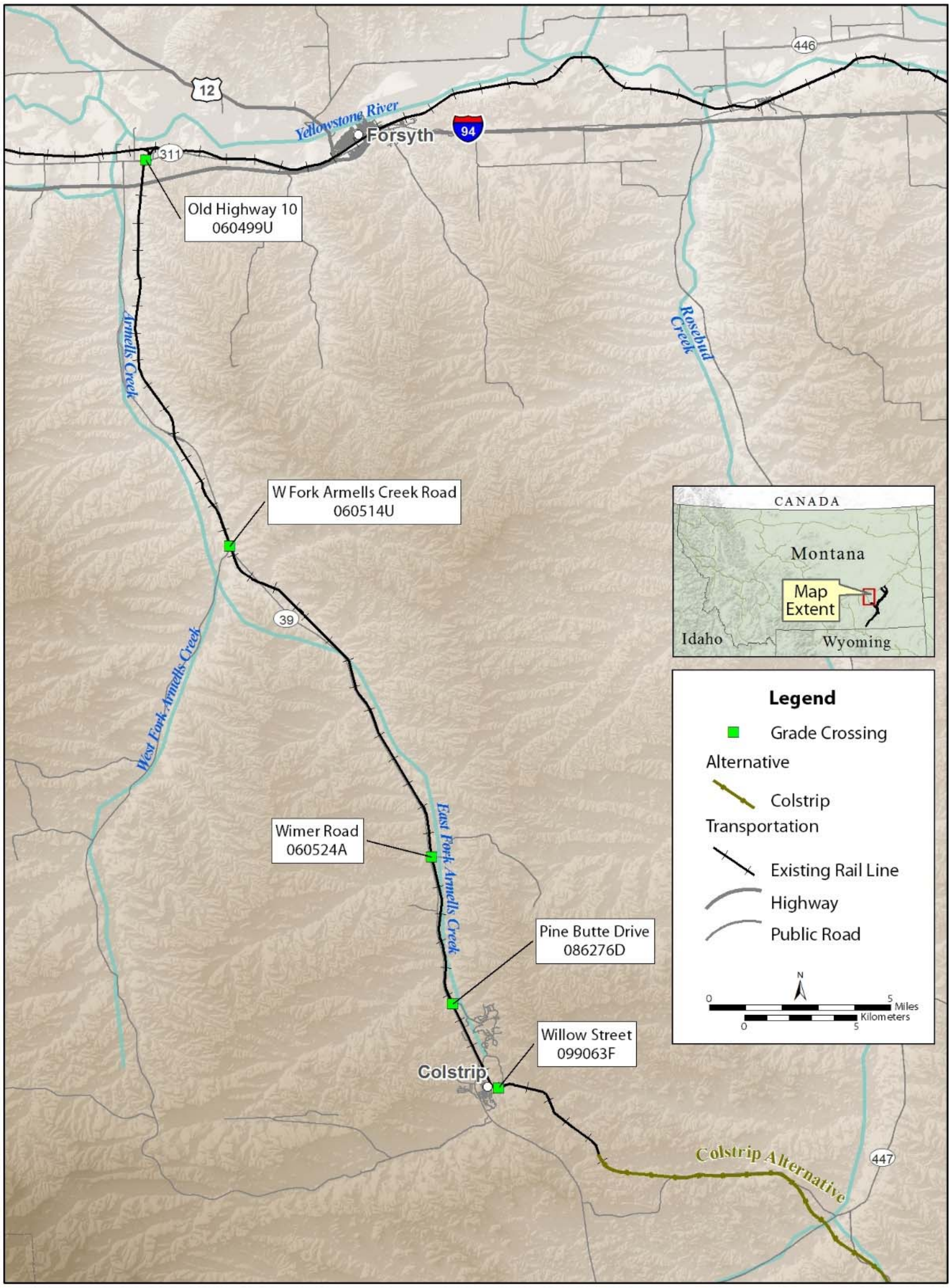

Figure 3.3-2. Existing Grade Crossings Along the Colstrip Subdivision

3.3.2 Analysis Methods

OEA used the following data and methods to evaluate the impacts of the build alternatives on grade-crossing delay.

3.3.2.1 Delay Analysis Data Sources

OEA used several data sources to characterize grade-crossing delay conditions.

- *Annual average daily traffic* (AADT) from the Montana Department of Transportation (MDT) (2014) traffic maps and reports and the Federal Railroad Administration database (2013).
- Forecasted future increases in vehicle traffic from the U.S. Energy Information Administration (2014) and the MDT traffic data (2014).
- Existing train traffic (average number of trains per day) and operating speed on the Colstrip Subdivision (Federal Railroad Administration 2013).
- Future train traffic (average number of trains per day) as estimated by TRRC and OEA (Chapter 2, Section 2.3.3, *Rail Traffic*).
- Train characteristics, including length and speed, provided by TRRC.

3.3.2.2 Delay Analysis Methods

For each at-grade crossing analyzed, OEA estimated the average delay per vehicle in a 24-hour period based on the estimated time each train would block the crossing, the average number of trains per day, and grade-crossing characteristics (e.g., AADT, number of roadway lanes). The resulting estimate of delay per train is 2.5 minutes (assuming an average train length of 6,925 feet for proposed action trains). OEA multiplied this value by the maximum estimated AADT values (for 2037, the last year of the analysis period for this EIS) to obtain a conservative estimate of average vehicle delay per crossing (values and calculations are described in Appendix D, *Grade-Crossing Safety and Delay Analysis*). OEA was then able to determine the LOS at each at-grade crossing. 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 3.3-1).

Table 3.3-1. Level of Service Designations

Level of Service	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

3.3.3 Affected Environment

The existing environmental conditions related to grade-crossing delay in the study area are described below.

3.3.3.1 Current Level of Service

The transportation system in the study area consists of a network of local roads with some *collector roads.* A collector road connects local roads with *arterial roads*. Arterial roads provide the highest LOS at the greatest speed for the longest distance. No arterial roads would be crossed at grade by any build alternative (Federal Highway Administration 2012). The local and collector roads that would be crossed by any build alternative are shown in Table 3.3-2 along with their estimated vehicle traffic volumes in 2037. Traffic on these roads is currently well below roadway capacities, and the roads operate at LOS A. Grade-separated crossings (I-94 and Highway 212) are not included for further analysis because the roadway and train traffic would be separated by either a bridge or a tunnel.

Table 3.3-2. Local and Collector Roads with Existing or New At-Grade Crossings

Road	Estimated AADT in 2037 (vehicles/day)
Cow Creek Road	80
Rosebud Creek Road	80
Tongue River Road	60–330
East Tongue River Road	50
Moon Creek Road	110
Snider Creek Road	60
Liscom Creek Road	60
Beaver Creek Road	60
Foster Creek Road	130
Highway 314	630
Four-Mile Creek Road	20
W. Fork Armells Creek (FRA ID: 060514U)	44
Old Highway 10 (FRA ID: 060499U)	1,200
Wimer Road (FRA ID: 060524A)	30
Pine Butte Drive (FRA ID: 086276D)	1,100
Willow Street (FRA ID: 099063F)	1,100

Notes:
AADT = annual average daily traffic; FRA = Federal Railroad Administration

3.3.3.2 Emergency Services

Emergency services (medical, ambulance, and fire services) are limited in the study area because of its rural character (Figure 3.3-3).

Medical Services and Emergency Medical Response

Medical facilities in the study area are located in Colstrip at the Colstrip Medical Center, in Forsyth at the Rosebud Health Care Center, in Lame Deer at the Bureau of Indian Affairs Clinic, in Miles City at the Holy Rosary Healthcare Center, and in Sheridan, Wyoming, at the South Sheridan Medical Center (Colstrip Medical Center 2013; Indian Health Service 2013; Holy Rosary Healthcare 2014). The Rosebud Health Care Center and South Sheridan Medical Center offer urgent care services (Rosebud Health Care Center 2013; South Sheridan Medical Center 2007). In the Ashland-Birney area, only basic medical services are available. Advanced medical care services are available in Billings, Montana, which can be accessed by road or helicopter transport. Ambulance service for the Decker area is provided by Big Horn County Ambulance in Hardin, Montana (Big Horn County 2009a, 2009b). Ambulance services for the area surrounding Miles City and Ashland are provided by the Miles City Fire and Rescue Department and the Bureau of Indian Affairs Clinic in Lame Deer (Miles City Fire Rescue 2013; City of Sheridan 2014).

Fire Protection

Fire protection facilities in the study area are located in Colstrip, Forsyth, Ashland, Decker, Miles City, and Sheridan (City of Forsyth 2009). Colstrip and the St. Labre Fire Department in Ashland are volunteer fire departments (Colstrip Volunteer Fire Department 2014). The Colstrip Volunteer Fire Department responds to between 30 and 40 calls a year; approximately 20 percent of the responses require emergency equipment to cross the Colstrip Subdivision at either Willow Street or Montana 39 (Reid pers. comm.).

The Miles City Fire and Rescue Department has 14 full-time employees and 20 part-time employees. In 2013, the Miles City Fire and Rescue Department responded to 1,402 calls for service, including medical emergencies, structural fires, and motor vehicle accidents. Miles City Fire and Rescue Department has four fire engines, four ambulances, and other specialty emergency vehicles (Miles City Fire Rescue 2013). The Sheridan Fire and Rescue Department has three fire engines and two ambulances as well as several other specialty emergency vehicles. The Sheridan Fire Rescue Department responded to 714 calls in 2013 (City of Sheridan 2013).

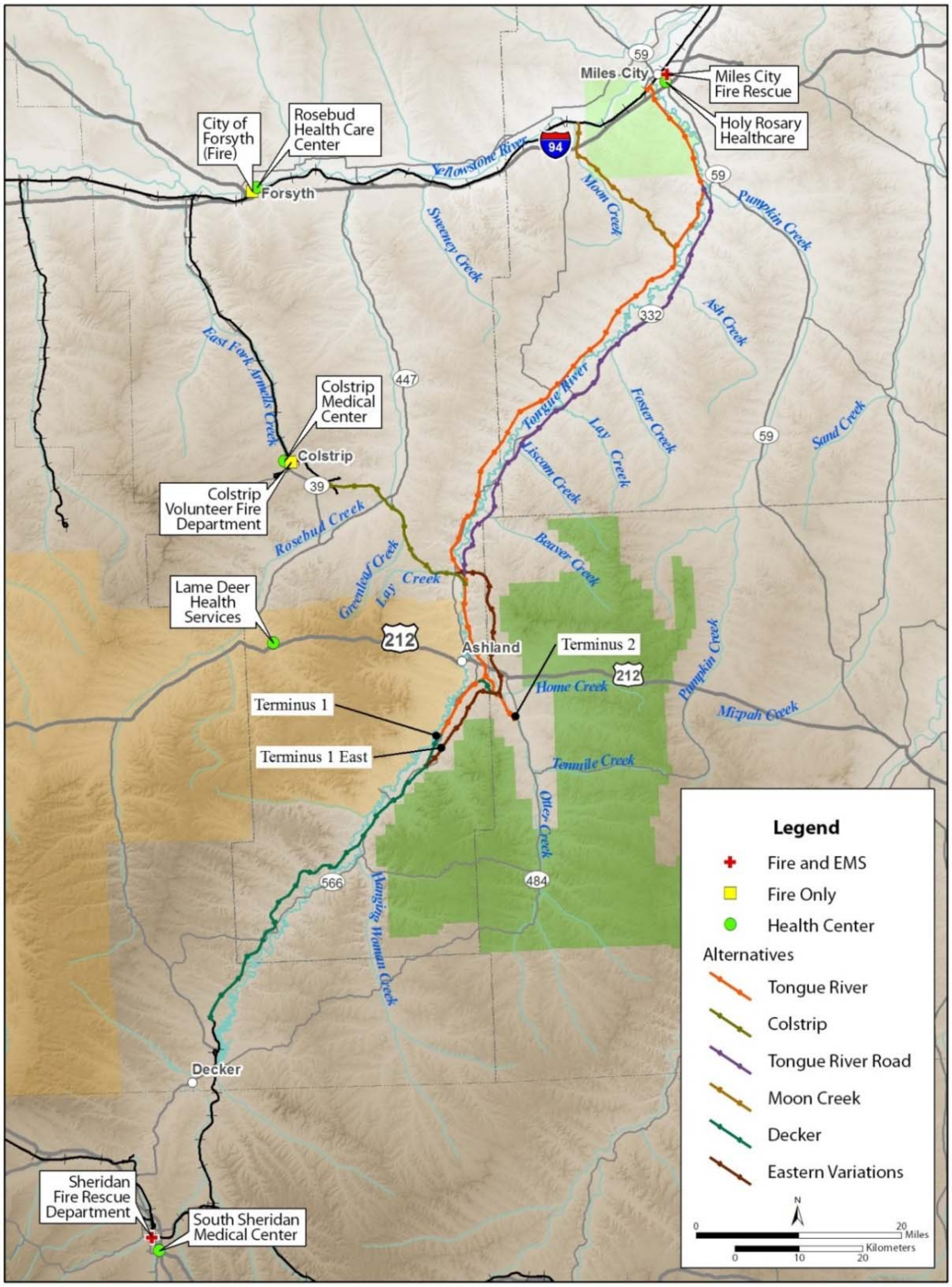

Figure 3-3.3. Emergency Services

3.3.4 Environmental Consequences

Grade-crossing delay would result from construction and operation of any build alternative. The increased and new delay impacts common to all build alternatives are presented first, followed by impacts specific to the build alternatives.

3.3.4.1 Impacts Common to All Build Alternatives

The impacts on grade-crossing delay that are common to all build alternatives are described as follows.

Construction

The following construction impacts on grade=crossing delay are common to all build alternatives.

- **Cause Temporary Traffic Delays during Construction**

  Motorists could experience temporary delays at new at-grade crossings during construction of the proposed rail line. As the railroad is being constructed it would be used to move construction materials to areas of rail not yet constructed. OEA anticipates that rail traffic during construction would be lower than during operation because rail traffic would involve only shipments of construction materials. OEA anticipates that additional train traffic associated with construction would not exceed one train per day for the longest build alternative, and would be even lower for the other build alternatives. OEA expects that TRRC would coordinate this limited, additional construction-related rail traffic with existing rail traffic along the Colstrip Subdivision.

  The increased workforce required for construction could also increase grade-crossing delays as the number of vehicles traveling on roads that would be crossed by the rail line would increase. The maximum number of workers during construction would be about 175 employees. The employees would likely take varying routes to the construction site, have fluctuating shift schedules, and be posted at various locations along the track, causing minimal increases in overall AADT on area roads.

- **Cause Temporary Delays to Emergency Services during Construction**

  Emergency service vehicles would be subject to the same grade-crossing delays described for all traffic. Emergency vehicle use of these roads is infrequent and train crossings would be infrequent. Therefore, emergency vehicles would rarely be delayed for very long during construction because train traffic would only consist of existing train traffic along the Colstrip Subdivision and the supply trains, which would be temporary and would not run the full length of the alternatives.

Operation

The following rail operation impacts are common to all build alternatives. The severity of the impact would vary depending on the volume of train traffic.

- **Cause Permanent Traffic Delays during Operation**

  Motorists, including emergency vehicle operators, would experience delays at new and existing at-grade crossings during operation of the proposed rail line. OEA estimated that the increase in the average delay could be as much as 1.02 seconds per vehicle for the low coal production scenario, 1.65 seconds per vehicle for the medium coal production scenario, and 2.57 seconds per vehicle for the high coal production scenario (Table 3.3-4). Even with such delays, the LOS designation for all new and existing grade crossings along any build alternative would remain at LOS A, an acceptable level of service with free-flowing traffic.

  Emergency vehicles would also experience grade-crossing delays. The longest average delays near the Colstrip Volunteer Fire Department would be 2.55 seconds per vehicle at Willow Street for the high coal production scenario in year 2037 and 2.54 seconds per vehicle at Old Highway 10 (MT-39) for the high coal production scenario in year 2037. (See Table D-15 in Appendix D, *Grade-Crossing Safety and Delay Analysis*, for calculations.) The closest crossing to the Miles City Fire and Rescue Department, the Holy Rosary Healthcare Facility, the City of Forsyth Fire Department, and the Rosebud Health Care Center is a grade-separated crossing for I-94. As previously noted, the road and railroad would not intersect, and no delays would occur. No build alternative would be constructed within 10 miles of the Lame Deer Health Services, the Sheridan Fire Rescue Department, and the South Sheridan Medical Center.

3.3.4.2 Impacts by Build Alternative

The impacts on grade-crossing delay that are specific to each build alternative are summarized in the following tables.

- Table 3.3-3 shows the new and existing at-grade crossings by build alternative.
- Table 3.3-4 shows the estimated average delay by build alternative under the low, medium, and high coal production scenarios.

Table 3.3-3. New and Existing At-Grade Crossings by Build Alternative

Road	Estimated AADT in 2037 (vehicles/day)	Tongue River	Tongue River East	Colstrip[a]	Colstrip East[a]	Tongue River Road	Tongue River Road East	Moon Creek	Moon Creek East	Decker	Decker East
Cow Creek Road	80			X	X						
Rosebud Creek Road	80			X	X						
Tongue River Road[b]	60–330	X	X	X	X	X	X	X	X	X	X
East Tongue River Road	50	X		X		X		X			
Moon Creek Road	110	X	X					X	X		
Snider Creek Road	60	X	X					X	X		
Liscom Creek Road	60					X	X				
Beaver Creek Road	60					X	X				
Foster Creek Road	130					X	X				
Highway 314	630									X	X
Four-Mile Creek Road	20									X	X
W Fork Armells Creek (FRA ID: 060514U)	44			X	X						
Old Highway 10 (FRA ID: 060499U)	1,200			X	X						
Wimer Road (FRA ID: 060524A)	30			X	X						
Pine Butte Dr (FRA ID: 086276D)	1,100			X	X						
Willow St (FRA ID: 099063F)	1,100			X	X						
Total At-Grade Crossings by Build Alternative		4	3	9	8	5	4	4	3	3	3

Notes:
[a] Colstrip Alternatives include existing rail crossings along the Colstrip Subdivision
[b] The locations of Tongue River Road crossings vary by build alternative (Figure 3.3-1)
AADT= annual average daily traffic; FRA = Federal Railroad Administration

Table 3.3-4. Estimated Average Increase in Grade-Crossing Delay by Build Alternative (Low, Medium, High Production Scenarios)

	Low Production			Medium Production			High Production		
Build Alternative	**Estimated Number of Vehicles Delayed per Day[a]**	**Average Delay per Vehicle (seconds/ vehicle)[b]**	**Total Delay in a 24-hour period (minutes)[c]**	**Estimated Number of Vehicles Delayed per Day**	**Average Delay per Vehicle (seconds/ vehicle)**	**Total Delay in a 24-hour period (minutes)**	**Estimated Number of Vehicles Delayed per Day**	**Average Delay per Vehicle (seconds/ vehicle)**	**Total Delay in a 24-hour period (minutes)**
Tongue River	1	0.94	1.37	2	1.51	2.21	3	2.37	3.45
Tongue River East	1	0.94	1.50	2	1.51	2.42	3	2.37	3.78
Colstrip[d]	5	1.01	6.60	9	1.63	10.62	13	2.55	16.15
Colstrip East[d]	6	1.02	7.30	10	1.65	11.75	15	2.57	17.92
Tongue River Road	2	0.94	2.28	3	1.52	3.67	5	2.37	5.74
Tongue River Road East	2	0.94	2.61	3	1.52	4.20	5	2.37	6.56
Moon Creek	1	0.94	1.37	2	1.51	2.21	3	2.37	3.45
Moon Creek East	1	0.94	1.50	2	1.51	2.42	3	2.37	3.78
Decker	4	0.95	5.49	7	1.52	8.32	16	3.42	19.80
Decker East	4	0.95	4.46	5	1.52	6.76	13	3.42	16.08

Notes:
[a] An average across all at-grade crossings for each build alternative
[b] Delay per stopped vehicle times number of vehicles delayed per day divided by the annual average daily traffic
[c] Delay per stopped vehicle times number of vehicles delayed at all crossings
[d] The Colstrip Alternatives include estimated increase in delay at existing crossings along the Colstrip Subdivision

3.3.4.3 No-Action Alternative

Under the No-Action Alternative, TRRC would not construct and operate the proposed Tongue River Railroad, and there would be no new grade-crossing delay or increase in grade-crossing delay from construction or operation of the proposed rail line.

3.3.4.4 Mitigation and Unavoidable Impacts

To avoid or minimize environmental impacts on grade-crossing delay from the proposed rail line, OEA is recommending that the Board impose two mitigation measures, including one measure volunteered by TRRC (Chapter 19, Section 19.2.1.2, *Grade-Crossing Delay*). These measures would require TRRC to consult with the Montana Department of Transportation to determine the final design of grade crossings and to notify users of road closures during construction.

Even with implementation of OEA's recommended mitigation measure and TRRC's voluntary measure, construction and operation of the proposed rail line would cause unavoidable impacts on grade-crossing delay. These impacts would include temporary traffic and emergency service delays during construction and traffic and emergency service delays during operation. OEA concludes that these impacts would be negligible.

3.4 Grade-Crossing Safety

This section describes the impacts on grade-crossing safety that would result from construction and operation of each of the build alternatives. The regulations and guidance related to grade-crossing safety are summarized in Section 3.6, *Applicable Regulations*. The subsections that follow describe the study area, methods used to analyze the impacts, the affected environment, and the impacts of the build alternatives on grade-crossing safety. Appendix D, *Grade-Crossing Safety and Delay Analysis*, provides further description of assessment methods, an explanation of delay calculations, and detailed results. The contribution of the proposed rail line to cumulative impacts on grade-crossing safety is discussed in Chapter 18, *Cumulative Impacts*.

In summary, construction and operation of any build alternative would have a small impact on grade-crossing safety except at the at-grade crossing of Highway 314 (Decker Alternatives). Safety would vary depending on rail and roadway traffic and grade-crossing characteristics, including the type of safety protection provided. For new crossings, the Decker Alternative would have the greatest predicted safety impact on a single new crossing and crossings overall with an average of one predicted grade-crossing accident per crossing every 26 years in the high production scenario,[1] primarily because either of these build alternatives would cross Highway 314. The Tongue River Alternatives would have the least safety impact on a single new crossing and crossings overall with an average of one predicted accident per crossing every 94 years in the low production scenario. The Colstrip Alternatives are the only build alternatives that would affect existing crossings in the study area. The Decker Alternative would have the greatest predicted safety impacts for all crossings combined, and the Colstrip Alternatives would have the smallest predicted safety impacts for all crossings combined.

Construction and operation of any build alternative except the Decker Alternatives would cause an increase in grade-crossing accidents. OEA concludes that these adverse impacts would be minor. The Decker Alternatives would cause a greater increase in grade-crossing safety impacts because of the greater traffic on Highway 314. OEA concludes that these adverse impacts would be moderate.

[1] The coal production scenarios (low, medium, high) reflect different levels of rail traffic depending on which build alternative is licensed, which mines are induced or developed, and the production capacities of those mines (Chapter 2, Section 2.3.3, *Rail Traffic*).

3.4.1 Study Area

OEA defied the study area for grade-crossing safety as encompassing roads in Custer, Rosebud, Big Horn, and Powder River Counties with existing *at-grade crossings*.[2,3] or new at-grade crossings for the proposed rail line. The new at-grade crossings include all crossings that would be installed for any build alternative (Figure 3.3-1). The existing crossings are only located on the Colstrip Subdivision[4] and would be affected only by the Colstrip Alternatives (Figure 3.3-2). This analysis focuses on at-grade crossings in the study area. *Grade-separated crossings* (intersections at which traffic crosses at different elevations) are not analyzed because vehicle traffic on these roads would not be affected by operation of the proposed rail line. For example, all locations where a build alternative would intersect with Interstate 94 and Highway 212 would be grade-separated crossings, and are not considered further in this analysis.

3.4.2 Analysis Methods

OEA used the following data and methods to evaluate the impacts of the build alternatives on grade-crossing safety.

3.4.2.1 Safety Analysis Data Sources

OEA used several data sources to characterize grade-crossing safety.

- *Annual average daily traffic* (AADT) from the Montana Department of Transportation (MDT) (2014) and the Federal Railroad Administration database (2013).
- Forecasted future increases in vehicle traffic from U.S. Energy Information Administration (2014) and MDT traffic data.
- Existing train traffic (average number of trains per day), operating speed, and grade-crossing characteristics, including accident history, on the Colstrip Subdivision (Federal Railroad Administration 2013).
- Future train traffic (average number of trains day) as estimated by TRRC and OEA (Chapter 2, Section 2.3.3, *Rail Traffic*).
- Train characteristics, including length and speed, provided by TRRC.

[2] An at-grade crossing refers to an intersection where two modes of transportation cross at the same elevation level. In this analysis, both the train and the vehicular traffic would be crossing at the same level, so one mode of traffic (vehicular) would be impeded by the other (train). All grade crossings described in this analysis refer to at-grade crossings unless otherwise specified.

[3] Terms italicized at first use are defined in Chapter 25, *Glossary*.

[4] The Colstrip Subdivision is a segment of existing BNSF Railway Company (BNSF) track located between the junction with the BNSF main line in Nichols, Montana, and the City of Colstrip, Montana, which would connect to the proposed Colstrip Alternatives (Figure 3.3-2).

3.4.2.2 Safety Analysis Methods

For each at-grade crossing analyzed, OEA estimated future accident frequency and the corresponding predicted interval between accidents using the general accident prediction formula (Federal Railroad Administration 1987). Appendix D, *Grade-Crossing Safety and Delay Analysis*, provides more information about the analysis methods.

Existing At-Grade Crossings

For existing public at-grade crossings on the Colstrip Subdivision, OEA used the Federal Railroad Administration (FRA) GradeDec.Net Model to analyze highway-rail grade crossings (Federal Railroad Administration 2014a). This model accounts for accident history and frequency of trains at existing at-grade crossings, volume of vehicle traffic, existing safety devices at the at-grade crossings, and other factors to determine the potential impacts of an increase in rail traffic. The model also considers the existing rail traffic volumes provided by FRA's grade-crossing database (2014b) and the additional proposed rail traffic. Estimates of AADT for vehicles at each road crossing were calculated for 2012, 2018, 2023, 2030, and 2037. These analysis years are consistent with those analyzed in Appendix C, *Coal Production and Market*s, and represent the 20-year analysis period of this EIS.

New At-Grade Crossings

Because new at-grade crossings lack historical accident data, it was not possible to apply FRA's GradeDec.Net Model to calculate crossing-specific, projected accident frequencies for these crossings. For new at-grade crossings, OEA used an accident prediction formula based on FRA's *Rail-Highway Crossing Resource Allocation Procedure User's Guide* (Federal Railroad Administration 1987). OEA conservatively assumed that these crossings would have a passive form of protection. Passive forms of protection include crossbucks, pavement markings, and stop signs. Federal law requires that, at a minimum, each state provide signs at all crossings. The railroad crossbuck sign and other supplemental signs attached to the crossbuck mast are usually installed and maintained by the railroad company contracted to oversee operation of the proposed rail line, which in this case would be BNSF Railway Company (BNSF). The agency responsible for maintaining the roadway is normally responsible for maintaining advance warning signs and pavement markings (Federal Highway Administration 2007). OEA's assumption that passive protection would be provided at the at-grade crossings yielded a higher predicted accident frequency than would result from use of active safety protection measures such as gates and flashing lights.

3.4.3 Affected Environment

The transportation system in the study area consists of a network of local roads with some *collector roads*. AADT for the new and existing (Colstrip Subdivision) at-grade crossings is summarized in Section 3.3, *Grade-Crossing Delay*, Table 3.3-2. The results of the GradeDec.Net Model for accident intervals at existing at-grade crossings are summarized in

Table 3.4-1. Under current conditions with vehicle traffic volumes estimated for 2037, the existing crossings along the Colstrip Subdivision have a predicted interval between accidents ranging from 110 to 402 years.

Table 3.4-1. Predicted Accident Frequency and Intervals at Existing At-Grade Crossings on the Colstrip Subdivision

FRA Crossing ID	Road	AADT (Year 2037)	Predicted Accident Frequency (per year)	Predicted Intervals Between Accidents (years)
060514U	W Fork Armells Creek Road	44	0.00396	252
060499U	Old Highway 10	1,200	0.00678	147
060524A	Wimar Road	30	0.00249	402
086276D	Pine Butte Drive	1,100	0.00842	119
099063F	Willow Street	1,100	0.00909	110
Average Predicted Accident Frequency and Interval			0.00615	163

Notes:
FRA = Federal Railroad Administration; AADT = annual average daily traffic

3.4.4 Environmental Consequences

Impacts on grade-crossing safety could result from construction and operation of the build alternatives. The impacts common to all build alternatives are presented first, followed by impacts specific to the build alternatives.

3.4.4.1 Impacts Common to All Build Alternatives

Construction

The following construction impact is common to all build alternatives.

- **Cause Temporary Increase in Predicted Grade-Crossing Accidents**

  Motorists could experience increased accidents at the at-grade crossings during construction of the proposed rail line. As the railroad is being constructed, it would be used to move construction materials to areas of rail not yet constructed. OEA anticipates that rail traffic during construction would be lower than during operation; traffic would not exceed one train per day for the longest build alternative and would be even lower for the other build alternatives. For context, the predicted interval between accidents at grade crossings on the existing Colstrip Subdivision, where existing rail traffic is three trains per day, ranges from 110 years to 402 years. OEA anticipates that the predicted interval between accidents during construction with trains moving construction materials would be similar.

Operation

The following rail operation impact is common to all build alternatives.

- **Cause Increase in Predicted Grade-Crossing Accidents**

  Motorists would experience an increased chance of accidents at the new and existing at-grade crossings. The magnitude of the increase would be determined by the volume of train traffic, which would vary by coal production scenario.

3.4.4.2 Impacts by Build Alternative

Safety impacts by build alternative would vary by coal production scenario. For all proposed new at-grade crossings with passive protection impacts would range as follows.

- One predicted accident per crossing every 23 to 147 years for the low production scenario.
- One predicted accident per crossing every 17 to 111 years for the medium production scenario.
- One predicted accident per crossing every 11 to 80 years for the high production scenario.

Highway 314 would have the highest predicted accident frequencies (and smallest predicted accident intervals) of all new at-grade crossings for any build alternative because it has the highest AADT value at 788 vehicles per year. Although additional crossing protection is not planned for Highway 314, if crossing protection were improved to gates and flashing lights instead of passive protection, the predicted accident frequency would change as follows.

- Decrease to 0.01950 accident per year with a predicted accident interval of 51 years for the low coal production scenario.
- Decrease to 0.02243 accident per year with a predicted accident interval of 45 years for the medium coal production scenario.
- Decrease to 0.02844 accident per year with a predicted accident interval of 35 years for the high coal production scenario.

The impacts on grade-crossing safety that are specific to each build alternative are summarized in the following tables.

- Table 3.4-2 shows predicted accident frequency at new at-grade crossings and the corresponding intervals between accidents for the build alternatives under the low, medium, and high coal production scenarios.
- Tables 3.4-3 shows predicted accident frequency at existing at-grade crossings (Colstrip Subdivision) and the corresponding intervals between accidents for the Colstrip Alternatives under the low, medium, and high coal production scenarios.

Table 3.4-2. Predicted Accident Frequency and Intervals between Predicted Accidents for New At-Grade Crossings by Build Alternative (Low, Medium, and High Production Scenarios)

	Low Production Scenario		Medium Production Scenario		High Production Scenario	
At-Grade Crossing by Build Alternatives	**Predicted Accident Frequency (per year)**	**Predicted Intervals Between Accidents (years)**	**Predicted Accident Frequency (per year)**	**Predicted Intervals Between Accidents (years)**	**Predicted Accident Frequency (per year)**	**Predicted Intervals Between Accidents (years)**
Tongue River Alternative						
Moon Creek Road	0.01272	79	0.01733	58	0.02044	49
Snider Creek Road	0.01017	98	0.01385	72	0.01634	61
Tongue River Road	0.01017	98	0.01385	72	0.01634	61
East Tongue River Road	0.00951	105	0.01295	77	0.01527	65
Average Predicted Accident Frequency and Interval	0.01064	94	0.01450	69	0.01710	58
Tongue River East Alternative						
Moon Creek Road	0.01272	79	0.01733	58	0.02044	49
Snider Creek Road	0.01017	98	0.01385	72	0.01634	61
Tongue River Road	0.01017	98	0.01385	72	0.01634	61
Average Predicted Accident Frequency and Interval	0.01102	91	0.01501	67	0.01771	56
Colstrip Alternative						
Cow Creek Rd	0.01131	88	0.01541	65	0.01817	55
Rosebud Creek Road	0.01131	88	0.01541	65	0.01817	55
Tongue River Road	0.01557	64	0.02121	47	0.02502	40
East Tongue River Road	0.00951	105	0.01295	77	0.01527	65
Average Predicted Accident Frequency and Interval	0.01192	84	0.01624	62	0.01916	52
Colstrip East Alternative						
Cow Creek Road	0.01131	88	0.01541	65	0.01817	55
Rosebud Creek Road	0.01131	88	0.01541	65	0.01817	55
Tongue River Road	0.01557	64	0.02121	47	0.02502	40
Average Predicted Accident Frequency and Interval	0.01273	79	0.01734	58	0.02046	49
Tongue River Road Alternative						

At-Grade Crossing by Build Alternatives	Low Production Scenario		Medium Production Scenario		High Production Scenario	
	Predicted Accident Frequency (per year)	Predicted Intervals Between Accidents (years)	Predicted Accident Frequency (per year)	Predicted Intervals Between Accidents (years)	Predicted Accident Frequency (per year)	Predicted Intervals Between Accidents (years)
Tongue River Road	0.01797	56	0.02448	41	0.02888	35
Liscom Creek Road	0.01017	98	0.01385	72	0.01634	61
Beaver Creek Road	0.01017	98	0.01385	72	0.01634	61
East Tongue River Road	0.00951	105	0.01295	77	0.01527	65
Foster Creek Road	0.01353	74	0.01843	54	0.02175	46
Average Predicted Accident Frequency and Interval	0.01227	82	0.01671	60	0.01972	51
Tongue River Road East Alternative						
Tongue River Road	0.01797	56	0.02448	41	0.02888	35
Liscom Creek Road	0.01017	98	0.01385	72	0.01634	61
Beaver Creek Road	0.01017	98	0.01385	72	0.01634	61
Foster Creek Road	0.01353	74	0.01843	54	0.02175	46
Average Predicted Accident Frequency and Interval	0.01296	77	0.01766	57	0.02083	48
Moon Creek Alternative						
Moon Creek Road	0.01272	79	0.01733	58	0.02044	49
Snider Creek Road	0.01017	98	0.01385	72	0.01634	61
Tongue River Road	0.01017	98	0.01385	72	0.01634	61
East Tongue River Road	0.01729	58	0.02354	42	0.02777	36
Average Predicted Accident Frequency and Interval	0.01259	79	0.01714	58	0.02022	49
Moon Creek East Alternative						
Moon Creek Road	0.01272	79	0.01733	58	0.02044	49
Snider Creek Road	0.01017	98	0.01385	72	0.01634	61
Tongue River Road	0.01017	98	0.01385	72	0.01634	61
Average Predicted Accident Frequency and Interval	0.01102	91	0.01501	67	0.01771	56
Decker Alternative						
Highway 314	0.04411	23	0.05882	17	0.08891	11
Four-Mile Creek Road	0.00678	147	0.00904	111	0.01244	80

At-Grade Crossing by Build Alternatives	Low Production Scenario		Medium Production Scenario		High Production Scenario	
	Predicted Accident Frequency (per year)	**Predicted Intervals Between Accidents (years)**	**Predicted Accident Frequency (per year)**	**Predicted Intervals Between Accidents (years)**	**Predicted Accident Frequency (per year)**	**Predicted Intervals Between Accidents (years)**
Tongue River Road	0.01910	52	0.02547	39	0.03508	29
Tongue River Road	0.01910	52	0.02547	39	0.03508	29
Tongue River Road	0.01076	93	0.01435	70	0.01977	51
Average Predicted Accident Frequency and Interval	0.01997	50	0.02663	38	0.03826	26
Decker East Alternative						
Highway 314	0.04411	23	0.05882	17	0.08891	11
Four-Mile Creek Road	0.00678	147	0.00904	111	0.01244	80
Tongue River Road	0.01910	52	0.02547	39	0.03508	29
Tongue River Road	0.01076	93	0.01435	70	0.01977	51
Tongue River Road	0.01076	93	0.01435	70	0.01977	51
Average Predicted Accident Frequency and Interval	0.01830	55	0.02441	41	0.03520	28

Table 3.4-3. Predicted Accident Frequency and Intervals Between Accidents for Existing At-Grade Crossings[a] (Low, Medium, and High Production Scenarios)

		Low Production Scenario		Medium Production Scenario		High Production Scenario	
FRA Crossing ID	Road	Predicted Accident Frequency (per year)	Predicted Intervals Between Accidents (years)	Predicted Accident Frequency (per year)	Predicted Intervals Between Accidents (years)	Predicted Accident Frequency (per year)	Predicted Intervals Between Accidents (years)
060514U	W Fork Armells Creek Road	0.007499	133	0.008992	111	0.011534	87
060499U	Old Highway 10	0.010609	94	0.012004	83	0.014186	70
060524A	Wimar Road	0.004759	210	0.005736	174	0.007421	135
086276D	Pine Butte Drive	0.014137	71	0.016340	61	0.019883	50
099063F	Willow Street	0.014954	67	0.017576	57	0.021400	47
Average Accident Frequency and Interval		0.010392	96	0.012130	82	0.014885	67

Notes:
[a] Existing at-grade crossings are only present in the Colstrip Subdivision and would only be affected by the Colstrip Alternatives
FRA = Federal Railroad Administration

3.4.4.3 No-Action Alternative

Under the No-Action Alternative, TRRC would not construct and operate the proposed Tongue River Railroad, and there would be no impacts on grade-crossing safety from construction or operation of the proposed rail line.

3.4.4.4 Mitigation and Unavoidable Environmental Consequences

To avoid or minimize environmental impacts on grade-crossing safety from the proposed rail line, OEA is recommending that the Board impose nine mitigation measures (Chapter 19, Section 19.2.1.2, *Grade-Crossing Safety*), including five measures volunteered by TRRC. These measures would require TRRC to obtain permits as required for all activities, signage and safety phone numbers at each public grade crossing, make operation Lifesaver educational activities available, consult with the Montana Department of Transportation and other transportation agencies on grade-crossing design, confine project-related highway traffic to established roads, comply with speed limits and applicable laws, install appropriate signage, require BNSF or other operators to comply with federal safety requirements, and develop an internal emergency response plan.

Even with the implementation of OEA's recommended mitigation measures and TRRC's voluntary measures, construction and operation of the proposed rail line would cause unavoidable impacts on grade-crossing safety. These impacts could include a temporary increase in grade-crossing accidents during construction and a permanent increase in grade-crossing accidents during operation. Construction and operation of any build alternative would have a minor adverse impact on grade-crossing safety except at the crossing of Highway 314 by either of the Decker Alternatives due to the high traffic levels on Highway 314. OEA concludes that the adverse impact at this location would be moderate.

3.5 Navigation

This section describes the impacts on navigation that would result from construction and operation of each of the build alternatives. Under the Administrative Rules of Montana (ARM) 36.25.1101, segments of the Tongue River are defined as a “navigable river” and are therefore subject to state regulatory requirements concerning use of the river for navigation by vessels and for other commercial and recreational purposes. The Tongue River is not classified as a navigable waterway by federal agencies.

The subsections that follow describe the navigation study area, the methods used to analyze the impacts, the affected environment, and the impacts of the build alternatives on navigation. The regulations and guidance related to navigation are summarized in Section 3.6, *Applicable Regulations*. The contribution of the proposed rail line to cumulative impacts on navigation is discussed in Chapter 18, *Cumulative Impacts*.

In summary, any build alternative, except the Decker Alternatives, would require construction of one bridge crossing over a segment of the Tongue River that is classified by the State of Montana as navigable. The Decker Alternatives would cross the Tongue River at a point where the river is not classified as navigable and therefore neither build alternative would affect navigation. The Tongue River Road Alternatives would have the northernmost crossing (10 miles south of Miles City) and bridge construction and maintenance activities for these build alternatives would be more likely to affect watercraft traveling the northernmost segments of the Tongue River. These build alternatives would also affect navigation on the longest stretch of the Tongue River, and could have greater impacts on navigation than the other build alternatives. No other water bodies crossed by any build alternative are classified by federal or state regulations as navigable waterways.

Operation of the proposed rail line on a bridge over the Tongue River would not result in permanent impacts on navigation. The Tongue River bridges for any of the Tongue River Alternatives, Tongue River Road Alternatives, Moon Creek Alternatives, or Colstrip Alternatives would be free-span bridges and would not require instream support structures. Recreational floaters and paddlers use the Tongue River from its confluence with the Yellowstone River to the Tongue River Dam, including navigable and nonnavigable segments of the river. Recreation impacts are discussed in Chapter 12, Section 12.3, *Recreation*. OEA concludes that the adverse construction impacts would be minor; the operation impacts would be negligible.

3.5.1 Study Area

OEA defined the study area for navigation as the Tongue River between the southernmost point of navigability (0.25 mile north of Ashland) and its confluence with the Yellowstone River. The study area includes the locations of proposed Tongue River bridge crossings in these navigable segments of the Tongue River. The segments of the Tongue River that are classified by the State of Montana as navigable are shown in Figure 3.5-1.

3.5.2 Analysis Methods

OEA used the following methods to evaluate the impacts of the build alternatives on navigation. OEA reviewed documents, maps, and data from the U.S. Coast Guard, U.S. Army Corps of Engineers, Bureau of Land Management, Montana Department of State Lands, and Montana Department of Natural Resources and Conservation (DNRC) to identify navigable waterways in the study area. OEA then assessed the impacts of the bridge crossings based on anticipated bridge design and construction and maintenance methods.

3.5.3 Affected Environment

Numerous waterways are near or crossed by the build alternatives, including the Tongue River and Ash, Beaver, Foster, Moon, Otter, and Rosebud Creeks. None of these waterways is listed as navigable by the U.S. Coast Guard or the U.S. Army Corps of Engineers, the federal agencies responsible for determining navigability for the purposes of federal regulation (Section 3.6, *Applicable Regulations*). Montana regulations define "navigable river" using different criteria than federal agencies. Of all these waterways near or crossed by the build alternatives, only the Tongue River is classified as state-navigable (Montana Department of State Lands 1997; U.S. Coast Guard 2013). DNRC has determined that the Tongue River is commercially navigable from the southern line of Township 2 South, Range 44 East north to its confluence with the Yellowstone River. The navigable segments of the Tongue River are shown in Figure 3.5-1. The southernmost point at which the Tongue River is classified as navigable is approximately 0.25 mile north of Ashland. The state claims ownership of the Tongue River between these two points, and state authorization is required for projects that would affect land below the low water mark of the navigable river segments.

At the request of an applicant, DNRC may also issue an easement, lease, or license for the use of a riverbed that is not yet adjudicated as navigable. This provision is potentially applicable to construction of fixed structures within riverbeds that are not classified by the State Board of Land Commission as navigable. OEA does not anticipate that DNRC would issue any easements, leases, or licenses related to any future adjudication for bridge crossings of waterways other than the navigable segments of the Tongue River.

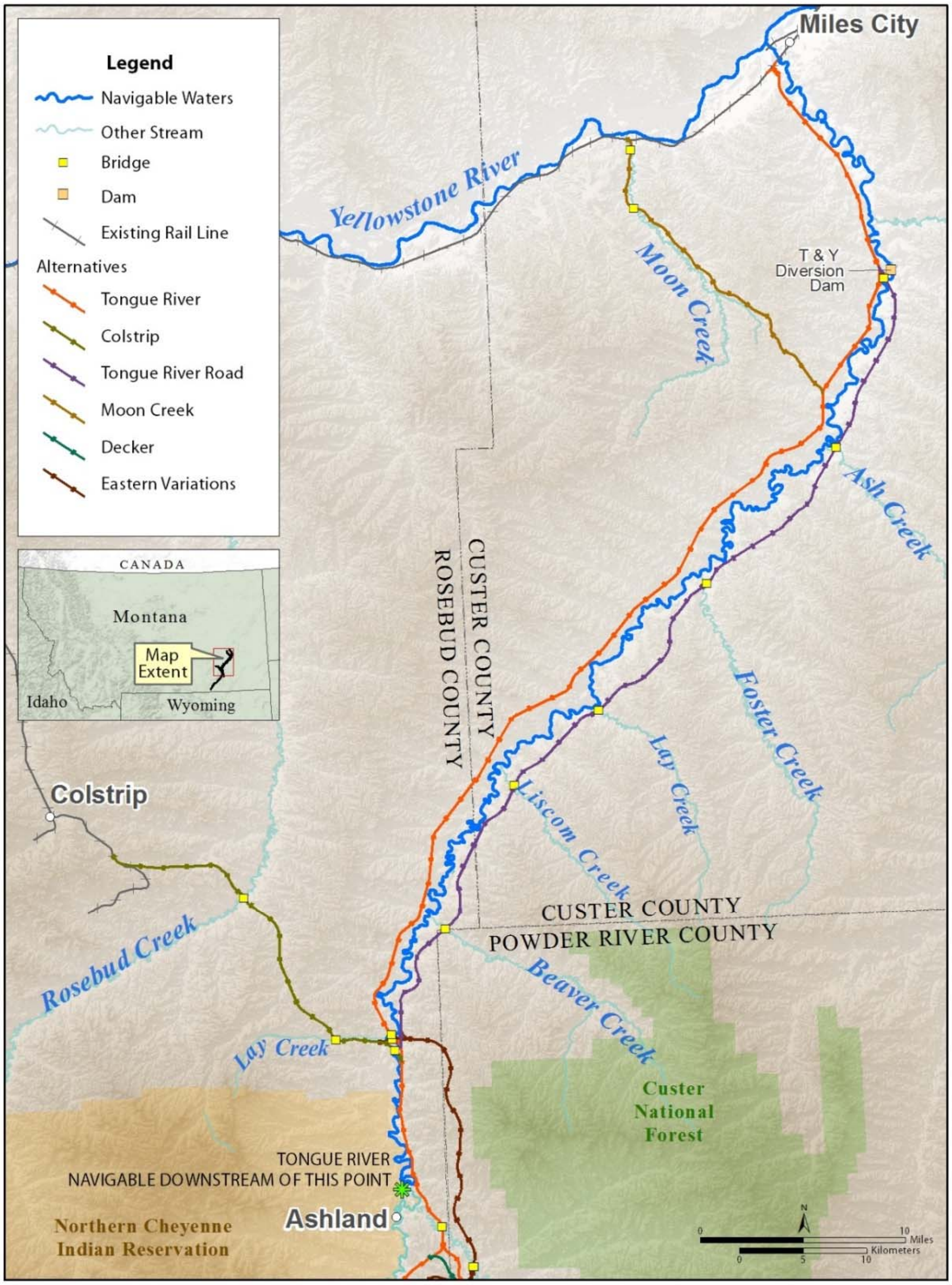

Figure 3.5-1. Navigable Waters in the Study Area

3.5.4 Environmental Consequences

Impacts on navigation could result from construction and operation of any build alternative except the Decker Alternatives, which would cross the Tongue River at a point where the river is not considered navigable. The impacts common to all build alternatives are presented first, followed by impacts specific to the build alternatives.

3.5.4.1 Impacts Common to All Build Alternatives

Construction

The following construction impact on navigation is common to all build alternatives except the Decker Alternatives.

- **Temporarily Impede Navigation on the Tongue River**

  Construction of bridges over the navigable portions of the Tongue River could temporarily impede navigation in the Tongue River. While bridge crossings would not require permanent support structures in the river channel, a *cofferdam*[1] may be necessary to isolate a dry, instream work area during bridge construction. Cofferdams are not expected to be used across the full width of the channel and the extent to which such temporary structures would affect navigation would depend on the bridge design and construction schedule. The exact locations would be determined during the final design and permitting process.

  TRRC could construct clear-span bridges with no instream structures because bridge spans greater than 100 feet can be achieved with a *deck-plate girder* up to 200 feet. For a deck-plate girder bridge, the bridge deck—or railroad track—would be supported by girders or beams spanning the river. The girders would be supported by structures built on both sides of the river above the high water mark. No support structures would be constructed in the riverbed. Riprap and bank armoring, in which materials such as rocks and rubble provide stabilization for the stream bank, would be placed above the ordinary high water mark of the Tongue River.

  Bridges would be sized in accordance with BNSF Railway Company (BNSF) hydraulic design criteria, which require that each bridge be designed based on site-specific, 50-year and 100-year flood events. The lowest structural element of any bridge would be above the water surface elevation associated with 50-year flood events, and water elevation associated with 100-year flood events would not rise above the rail track subgrade at its lowest point on either side of the bridge.

  In addition to impacts from the bridges itself, flow bypasses could alter local flow and hydraulic conditions sufficiently to temporarily affect navigation during construction. Bridge construction would require temporarily removing water from work areas,

[1] Terms italicized at first use are defined in Chapter 25, *Glossary*.

constructing bridge abutments, and conducting other activities associated with stream crossings.

Operation

The following rail operation impact is common to all build alternatives except for the Decker Alternatives.

- **Temporarily Impede Navigation on the Tongue River**

  Bridge maintenance activities may periodically result in impacts similar to those associated with bridge construction, including dewatering, which could result in temporary restrictions to navigation. OEA does not anticipate that operation of the Tongue River bridge crossings would affect navigation other than during maintenance activities.

3.5.4.2 Impacts by Build Alternative

All impacts on navigation are common to all build alternatives except the Decker Alternatives, as described above. However, the locations of bridge crossings are specific to each build alternative (Figure 3.5-1). Bridge crossings are noted because Montana regulations allow, but do not require, applicants to obtain permits for crossing nonnavigable waters.

Tongue River Alternatives

Tongue River Alternative

The Tongue River Alternative would require two bridge crossing over two waterways: the Tongue River and Otter Creek (Figure 3.5-1). The Tongue River crossing would be approximately 8 miles north of Ashland at a point where the Tongue River is classified by the State of Montana as navigable.

Tongue River East Alternative

The Tongue River East Alternative would require the same bridge crossings as the Tongue River Alternative.

Colstrip Alternatives

Colstrip Alternative

The Colstrip Alternative would require three bridge crossings over three waterways: the Tongue River, Rosebud Creek, and Otter Creek (Figure 3.5-1). The Tongue River crossing would be approximately 7 miles north of Ashland at a point where the Tongue River is classified by the State of Montana as navigable.

Colstrip East Alternative

The Colstrip East Alternative would require the same bridge crossings as the Colstrip Alternative.

Tongue River Road Alternatives

Tongue River Road Alternative

The Tongue River Road Alternative would require five bridge crossings over five waterways: the Tongue River, Otter Creek, Beaver Creek, Foster Creek, and Ash Creek (Figure 3.5-1). The Tongue River crossing would be approximately 10 miles south of Miles City at a point where the Tongue River is classified by the State of Montana as navigable.

Tongue River Road East Alternative

The Tongue River Road East Alternative would require the same bridge crossings as the Tongue River Road Alternative.

Moon Creek Alternatives

Moon Creek Alternative

The Moon Creek Alternative would require four bridge crossings over three waterways: the Tongue River, Otter Creek, and Moon Creek (Figure 3.5-1). The location of the Tongue River crossing for the Moon Creek Alternative would be the same as for the Tongue River Alternative.

Moon Creek East Alternative

The Moon Creek East Alternative would require the same bridge crossings as the Moon Creek Alternative.

Decker Alternatives

Decker Alternative

The Decker Alternative would require one bridge crossing over the Tongue River (Figure 3.5-1). The Tongue River is not classified as navigable at this crossing point.

Decker East Alternative

The Decker East Alternative would require the same bridge crossing as the Decker Alternative.

3.5.4.3 No-Action Alternative

Under the No-Action Alternative, TRRC would not construct and operate the proposed Tongue River Railroad, and there would be no impacts on navigation from construction or operation of the proposed rail line.

3.5.4.4 Mitigation and Unavoidable Impacts

To avoid or minimize environmental impacts on navigation from the proposed rail line, OEA is recommending that the Board impose one mitigation measure (Chapter 19, Section 19.2.1.2, *Navigation*). This measure would require TRRC to consult with the Montana Department of Natural Resources Conservation to ensure compliance with permit conditions governing construction in navigable waterways (any build alternative except the Decker Alternatives).

Even with the implementation of OEA's recommended mitigation measures, construction and operation of the proposed rail line would cause would cause unavoidable impacts on navigation. These impacts could include temporary restrictions to navigation in the Tongue River during construction and maintenance of the Tongue River bridge crossings for the Tongue River Alternatives, Colstrip Alternatives, Tongue River Road Alternatives, or Moon Creek Alternatives. OEA concludes that the adverse construction impacts would be minor, and operation impacts would be negligible.

3.6 Applicable Regulations

Different federal, state, and local jurisdictions are responsible for the regulation of transportation. These entities and the regulations and guidance related to transportation are described in Table 3.6-1.

Table 3.6-1. Regulations and Guidance Related to Transportation

Regulation	Explanation
Federal	
National Environmental Policy Act (42 U.S.C. § 4321 *et seq*.)	Requires the consideration of potential environmental effects, NEPA implementation procedures are set forth in the President's Council on Environmental Quality's Regulations for Implementing NEPA (49 C.F.R. Part 1105).
Federal Railroad Safety Act of 1970	Gives FRA rulemaking authority over all areas of rail line safety. FRA has designated that state and local law enforcement agencies have jurisdiction over most aspects highway/rail grade crossings, including warning devices and traffic law enforcement.
Highway Safety Act and the Federal Railroad Safety Act	Gives FHWA and FRA regulatory jurisdiction over safety at federal highway/rail grade crossings. USDOT has promulgated rules addressing grade-crossing safety and provides funding for installation and improvement of warning devices. All traffic control devices installed at railroad facilities involving federal aid projects must comply with 23 C.F.R. Part 655F. On certain projects where federal funds are used for the installation of warning devices, those devices must include automatic gates and flashing light signals. FRA has issued rules that impose minimum maintenance, inspection, and testing standards for at-grade crossing warning devices for highway/rail grade crossings on federal highways and state and local roads (49 C.F.R. Parts 234–236).
Federal Railroad Administration general regulations (49 C.F.R. Parts 200–209)	Regulates safety, including operations, engineers, and crew (e.g., control of alcohol and drug use), track, signaling, and rolling stock (e.g., locomotives and passenger and freight cars) for common carrier rail lines that are part of the general rail line system of transportation.
Federal Railroad Administration safety regulations (49 C.F.R. Parts 171–180)	Regulates hazardous materials shipment by rail with standards for packaging, training, emergency response, and tank cars.
Railroad-Highway Grade Crossing Handbook (Federal Highway Administration 2007); *Manual on Uniform traffic Control Devices* (23 U.S.C. § 109(d))	Allows states jurisdiction over grade-crossing safety issues, including the selection and placement of warning devices and enforcement of traffic laws. Provides guidelines for traffic control devices that consider delay, roadway classification, average daily traffic, number of trains per day, and train speed at grade crossings.
General Bridge Act of 1946 (33 U.S.C. § 525 *et seq*.)	Authorizes the U.S. Coast Guard to issue permits for the construction of bridges and causeways across navigable waters. The U.S. Coast Guard has determined the Tongue River to be not navigable (Non-Nav CG) and not subject to U.S. Coast Guard jurisdiction (U.S. Coast Guard 2013)
U.S. Army Corps of Engineers	Regulations define navigable waterways for the purpose of regulating discharges of dredge or fill materials into these waters. No water in the study area is classified as navigable by USACE.

Regulation	Explanation
State	
Montana Department of Transportation Rules 18.6.301, 302, 304, 313	Provides guidance for railroad crossing signalization, including diagnostic reviews, maintenance, and safety regulations.
Regulation of Safety on Railroads (MCA 69-14-562)	Enforces most aspects of the safety of railroads and grade crossings, including warning devices and traffic law enforcement, and imposes penalties where violations occur.
Prohibition on Extended Obstruction of Highway Crossings (MCA 69-14-626)	Governs highway crossing violations such as blocking public highway crossings causing significant delay in rail traffic, running rail traffic over unsafe bridges, failing to have a functioning horn and failing to sound the horn at public highway/railroad crossings not in a designated Quiet Zone, and lacking proper signage at crossings
Role of Public Service Commission with Respect to Crossings (MCA 69-14-606)	Authorizes the Public Service Commission to enforce an order by any Board of County Commissioners for the construction of a new railroad crossing and decides the reasonableness of the order and may modify, change, or annul that order. The Public Service Commission presents the railroad company with 30 days to appeal to the commissioners' decision and request a hearing.
Montana Department of Natural Resources and Conservation designation of navigable streams (ARM 36.25.1101)	Defines a navigable waterway as segment of a river that has been adjudicated as navigable for land title purposes by a court of competent jurisdiction. DNRC has designated segments of the Tongue River as navigable. Land below the low water mark of navigable rivers is owned by the State of Montana. Montana DNRC authorizes permits for the construction, placement, maintenance, or modification of a fixed structure or improvements in, over, below, or above a navigable river. The authorization must be in the form of a lease, license, or easement. DNRC may also issue lease, license, or easement for use of a riverbed that is not yet adjudicated as navigable.
Local	
Rosebud, Big Horn, Powder River, and Custer Counties do not have specific county or city ordinances pertaining to the regulation of public, at-grade crossings.	

Notes:
U.S.C. = United States Code; NEPA = National Environmental Policy Act; C.F.R. = Code of Federal Regulations; FRA = Federal Railroad Administration, FHWA = Federal Highway Administration; USDOT = U.S. Department of Transportation; MCA = Montana Code Annotated; USACE = U.S. Army Corps of Engineers; ARM = Administrative Rules of Montana; DNRC = Department of Natural Resources and Conservation