US 2 CORRIDOR ASSET MANAGEMENT STUDY

BONNER COUNTY, IDAHO

MAY 2019

US 2 CORRIDOR ASSET MANAGEMENT STUDY

WASHINGTON TO SANDPOINT

BONNER COUNTY, IDAHO

PREPARED FOR:

IDAHO TRANSPORTATION DEPARTMENT

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PROJECT NO. 21337

FIGURES & TABLES

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PROJECT OVERVIEW

The US 2 Corridor Asset Management Study identifies cost-effective operational and safety improvements for the US 2 corridor between the Washington State line and Sandpoint, Idaho.

The improvements recommended in this study will be considered by the Idaho Transportation Department for incorporation into future capital and maintenance projects, or for implementation as stand-alone projects. The projects accomplish the following objectives:

- Accommodate future traffic demands on the US 2 corridor
- Increase transportation safety for all users
- Support economic development of communities along the US 2 corridor
- Support local and intrastate freight
- Improve conditions for people bicycling on US Bicycle Route 10, which includes the US 2 corridor
- Minimize potential impacts to the natural and built environment

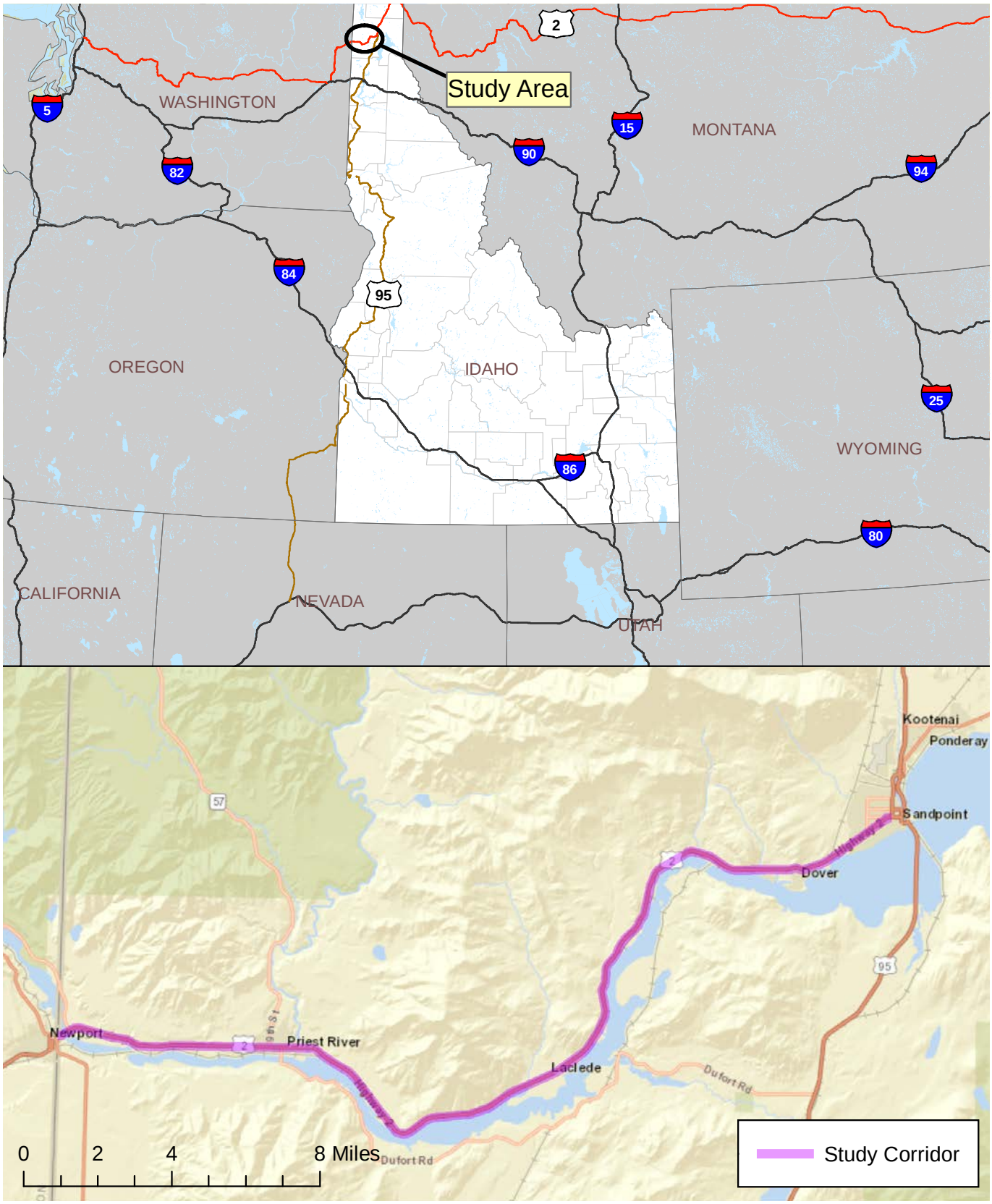
CORRIDOR BACKGROUND

US 2 is part of the original 1925 National Highway System and is the northernmost east-west route in the state of Idaho. Today, US 2 is the primary east-west transportation route north of I-90. From Sandpoint, US 2 remains a key route to travel east as far as the North Dakota / Minnesota border.

The portion of the corridor within the study area also serves as an alternate route to US 95 between the Canadian border and Spokane, and could see increased usage by traffic and freight with the completion of the North Spokane Corridor project by the Washington Department of Transportation (WSDOT). It is also a major access route for the Town of Oldtown, the City of Priest River, the City of Dover, and the City of Sandpoint. A map of the corridor study area is shown in **Figure 1.** The primary function of US 2 between Old Town and Sandpoint is to serve the cities and industry along the corridor. Additionally, the corridor provides access to recreational amenities, such as the Pend Oreille River, Albeni Falls Dam, Priest Lake, and a new marina at Dover Bay.

The American Association of State Highway and Transportation Officials (AASHTO) has designated US 2 as part of the US Bicycle Route System (USBRS). It is also a part of the International Selkirk Loop, which is designated as one of America's Byways by the US Secretary of Transportation.

FIGURE 1. STUDY AREA



PROJECT PROCESS

The process used for identifying the future improvements is illustrated in **Figure 2**. It began with evaluating existing roadway, traffic, and stakeholder concerns along the corridor. Future traffic volumes were then projected and analyzed to identify the need for operational and capacity improvements to address future growth. Potential mitigation options were then evaluated and projects recommended based on study objectives. A technical memorandum was created for each part of the project, and the key findings and recommendations are summarized in this document. The technical memorandums are included in a separate Technical Appendix.

FIGURE 2. PROJECT PROCESS

1 EXISTING CONDITIONS ANALYSIS

- Data Collection
- Roadway Characteristics Evaluation
- Crash Evaluation
- Traffic Operations Analysis
- Stakeholder Interviews

2 FUTURE CONDITIONS ANALYSIS

- Development of Future Traffic Volumes
- Year 2040 Traffic Operations Analysis
- Year 2040 Crash Evaluation
- Preliminary Evaluation of Improvement Strategies

3 MITIGATIONS EVALUATION

- Evaluation of Improvement Strategies
- Project Prioritization

4 RECOMMENDATIONS

- Recommended Project List

COMMUNITIES

The primary function of US 2 between Oldtown and Sandpoint is to serve the cities and industry along the corridor. This section provides descriptions of the various communities along the corridor.

OLDTOWN

Oldtown is a city on the Washington State line that spans both sides of the Pend Oreille River. It is bordered to the west by the City of Newport, WA. The city has experienced commercial development along US 2 and designates additional properties along US 2 for future commercial development in the next twenty years on the north side of the river that could significantly alter the character of the corridor. The total population of Oldtown is approximately 177 people based on US Census data (Reference 1).

Photo: SH 41 intersection in Oldtown

PRIEST RIVER

Priest River is the largest city between Oldtown and Sandpoint and sits at the confluence of the Priest River and Pend Oreille River. It has several commercial and public facilities, including a municipal airport, a high school, a lumber facility, and shopping centers. Within the city, US 2 intersects with SH 57, which provides access north to Priest Lake, and with Wisconsin Street, which provide access to the south of the Pend Oreille River. The city was recently awarded grant money for revitalization of the downtown, which includes improvements on Wisconsin Street. The total population of Priest River is 1,658 persons based on US Census data.

Photo: US 2 through Priest River Commercial Area

LACLEDE

Laclede is an unincorporated community approximately 15 miles east of the Washington State line and approximately 9 miles east of Priest River. It has several commercial and industrial facilities, including a lumber mill. Adjacent to the community is the Riley Creek Recreation Area, a regional tourist destination.

Photo: Logging Truck in Laclede

DOVER

Dover is located to the west of Sandpoint and is currently experiencing a high level of development. Based on a draft of the City of Dover Comprehensive Plan (Reference 2), the City expects approximately 400 to 450 homes to be built in the next decade. The population of Dover is approximately 692 based on US Census data and has been undergoing annual growth rates of over 4%. Growth in Dover is expected to continue on a rapid pace. The primary access to the City of Dover is from the intersection of Old US Highway 2 on US 2.

Photo: Multi-Family Development in Dover

SANDPOINT

Sandpoint is approximately 27 miles east of the Washington state line and where US 95 and US 2 intersect. Sandpoint is the county seat of, and the largest city in, Bonner County. US 2 serves as the primary east-west arterial through the City of Sandpoint and provides access to commercial uses. The city has numerous commercial, public, industrial, and recreational facilities. This includes an airport, government facilities, shopping centers, public schools, and marinas that provide access to Lake Pend Oreille. Sandpoint is connected to the north and south by US 95. The population of Sandpoint is approximately 7,918 based on US Census data.

Photo: Multi-Use Path in Sandpoint

STAKEHOLDER INPUT

Interviews of stakeholders along the corridor were conducted after completion of the existing conditions analysis. In-person or phone interviews were conducted with representatives from the following organizations:

- City of Sandpoint
- City of Priest River
- City of Dover
- City of Oldtown
- Bonner County
- City of Newport
- North Idaho Bikeways
- Albeni Falls Dam
- Pend Oreille School District
- Pend Oreille Valley Railroad
- Bonner County School District
- Peak Sand & Gravel
- Selkirk Fire
- Woods Crushing & Hauling
- Bonner County Sheriff

FEEDBACK

The primary themes that emerged from the stakeholder comments include:

SAFETY:

- High amount of animal-related crashes
- Lack of bike route accommodations on US 2 and Dufort Road
- Conflicts at angled intersections in Sandpoint
- Proximity of multi-use path to highway (east of Dover) and lack of barrier
- Poor sight distance at unsignalized access locations
- Commercial access on the super-elevated curve in Oldtown

OPERATIONS

- Need for passing lanes
- Need for dedicated turn lanes in Sandpoint
- US 2/SH 57 turn movements difficult for trucks

MAINTENANCE

- Rutting in some areas
- Continuation of the good winter maintenance

OTHER

- Future impacts of widening US 2 in Sandpoint beyond two lanes with turn lanes
- Expansion of the multi-use pathway system planned along the corridor
- Potential increase in trucks from the North Spokane Corridor (NSC) completion
- Potential increase in trucks from the proposed silica smelter in Newport
- Access for future commercial development in Oldtown
- Pedestrian access and crossing improvements
- Need for another bridge over the river
- Concerns over Albeni Falls Dam traffic congestion

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CORRIDOR CHARACTERISTICS

EXISTING ROADWAY CHARACTERISTICS

In general, much of the study section of US 2 between the Washington state line and Sandpoint has undergone improvements in the past 30 years. Existing roadway characteristics were inventoried in order to identify existing deficiencies and locations for potential improvements.

DATA AND ASSUMPTIONS

Information on the physical characteristics of the roadway was acquired from the Idaho Transportation Department (ITD) through the IPLAN portal, from as-built drawings, and from data collected in the field or on Google Earth.

Traffic information was obtained from a mixture of historical data from the ITD automatic traffic recorder on US 2, data from the IPLAN portal, and traffic counts conduct as part of this study. Daily traffic volumes on the corridor are influenced by recreational activities, with the highest average daily traffic (ADT) volumes occurring during the months of July and August. **Figure 3** shows the monthly ADT variation. The peak hours are generally highest on Fridays and Saturdays.

Weekday pm peak hour counts were collected on a Friday in August 2017 at the study intersections and daily counts were taken during the same day at a limited number of locations along US 2. The counts were used in the intersection traffic operations analysis and for use in estimating August Friday pm peak hour conditions for individual segments along the corridor. **Figure 4** shows the daily traffic volumes along the corridor provided by IPLAN and the daily traffic counts taken on August 25, 2017.

As shown in Figure 4, the highest traffic volumes on the corridor are in the urbanized sections in Sandpoint, Oldtown, and Priest River. The highest volume rural section is between Oldtown and Priest River. While all the segments experience peaking in the summer months, the peak is more extreme in the rural sections due the to the lower amount of daily traffic activity from the local communities as compared to the cities.

Heavy Vehicle Data

Based on the ATR vehicle length data, trucks and other vehicles over 23 feet, defined as heavy vehicles, represent approximately 9 percent of traffic east of Oldtown. From a historical perspective, the number of trucks has remained relatively consistent over the last 10 years, resulting in the truck percentages dropping slightly during this time period.

Heavy vehicles from the intersection traffic counts, defined as vehicles with three or more axles, were used to approximate the percentage of heavy vehicles, such as freight or RV's, for other sections within the corridor. The resulting heavy vehicle percentages vary between 7 percent and 13 percent. The percentages from key points on the study corridor are shown in **Figure 5**. As shown in Figure 5, the highest percentages of trucks were in Priest River, near SH 57 and in Sandpoint.

FIGURE 3. US 2 AVERAGE DAILY TRAFFIC VOLUMES BY MONTH (2016)

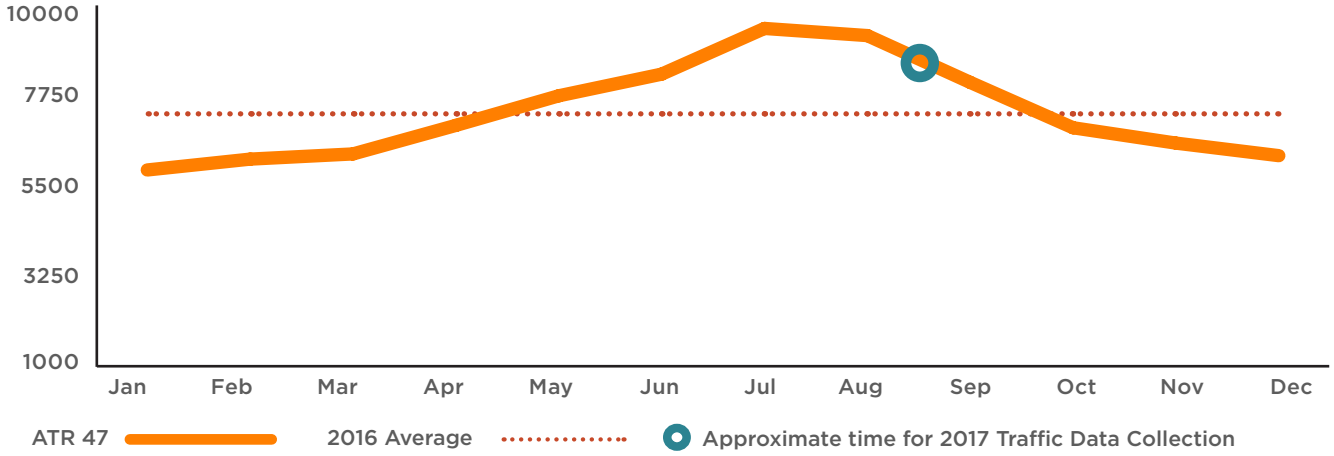


FIGURE 4. ANNUAL AVERAGE DAILY TRAFFIC VOLUMES AND AUGUST 25TH, 2017 TUBE COUNT VOLUMES

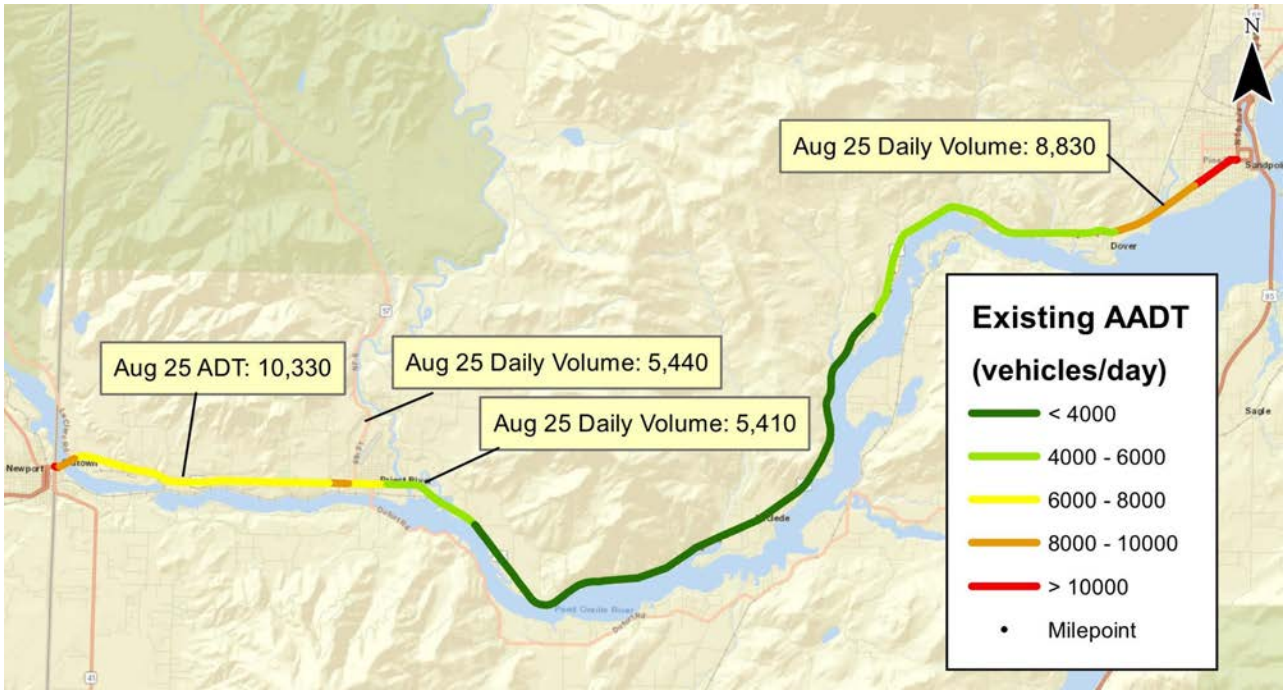
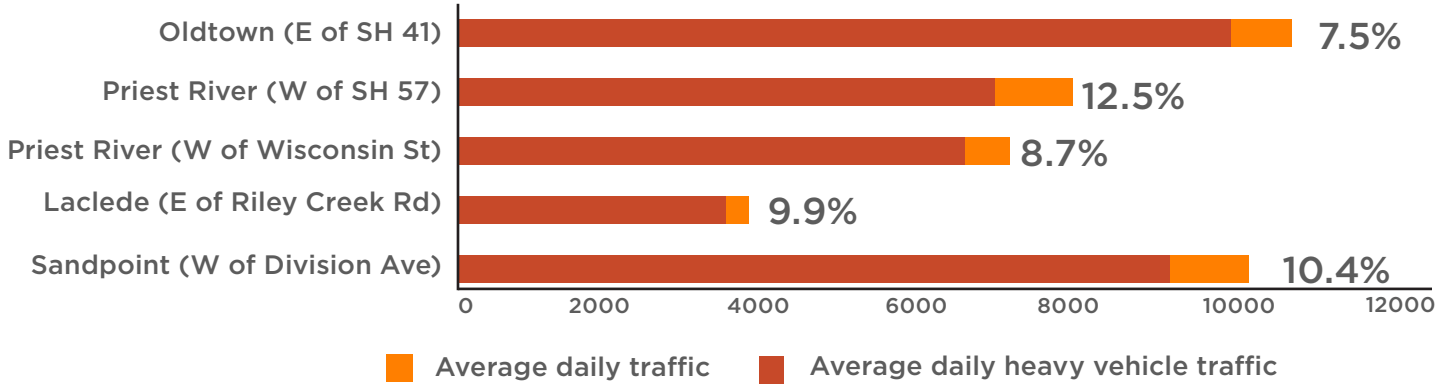


FIGURE 5. ESTIMATED HEAVY VEHICLE PERCENTAGES



ROADWAY CONDITIONS ASSESSMENT

An assessment of existing roadway conditions was conducted using GIS data obtained from ITD, observations from aerial imagery, and information gathered during site visits.

Lane Configuration and Speed Limit

Through most of the study area, US 2 is a two-lane highway with 12-foot lanes. Passing is prohibited in most sections with curves. The roadway cross-section varies in areas with higher traffic, with some locations having four lanes and/or a center turn lane. The corridor's lane configuration are shown in **Figure 6.**

Posted speeds are generally 55 mph west of Priest River and 60 mph east of Priest River, with lower speeds in the urban sections along the corridor in Old Town, Priest River, Laclede, Dover, and Sandpoint.

Shoulders, Rumble Strips, & Access

Shoulder width and type varies throughout the corridor. Many sections have inconsistent shoulder widths due to roadside topography and/or other constraints. Paved shoulders generally vary between 3 and 6 feet wide, and are typically less than 6 feet wide, which is the recommended width in the ITD Roadway Design Manual (Reference). **Figure 7** illustrates sections of US 2 which include portions on either side of the highway with shoulder widths below 6 feet. The shoulders in Priest River and Oldtown have curbs, while the shoulders in Sandpoint are mostly gravel.

A review of as-built drawings identified that much of the corridor was designed with shoulder widths equal to or greater than 6 feet, but the addition of center left-turn lanes and right-turn lanes have resulted in reducing shoulders in many locations, as shown in **Figure 8**. Additionally, some paved shoulders appear to have been reduced due to pavement deterioration, addition of guardrail and barriers, and maintenance activities which may not have overlaid to the edges of the shoulders.

FIGURE 6. EXISTING LANE CONFIGURATION

FIGURE 7. SEGMENTS WITH PAVED SHOULDERS BELOW 6 FT

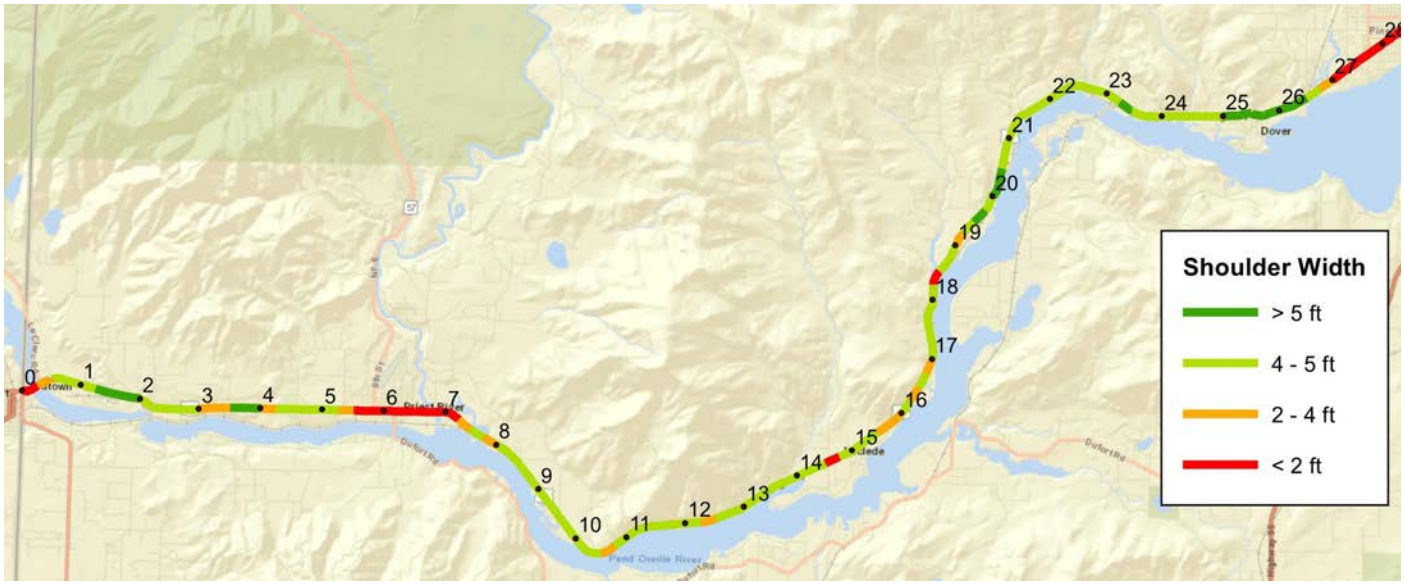
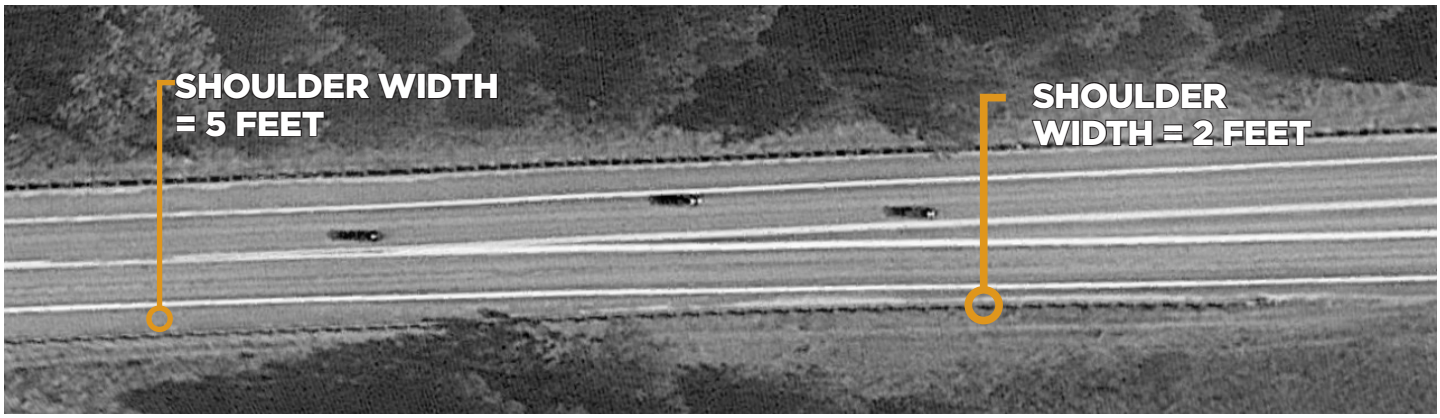


FIGURE 8. NARROW PAVED SHOULDER AT TURN LANE LOCATION



Existing Centerline Rumble Strips Between Dover and Laclede

Currently, centerline rumble strips are installed along many non-passing sections of the corridor west of milepost 18.4

Access density along the corridor varies greatly. In many rural and constrained sections, the density is generally low, but the access density increases in urban sections. **Figure 9** shows the access densities along the corridor.

The areas with the highest driveway densities include:

- Between Oldtown and Priest River (MP 2.0 to 4.0): In this section there are many individual low-volume driveways and roads that service single parcels.
- In Priest River: There are many commercial driveways and some residential driveways.
- In Sandpoint: There are many commercial driveways, mostly on the south side of US 2 to the east of Division Street.

High access density can increase crash frequency, reduce travel speeds, and add delay for through traffic on US 2, particularly where adequate turn lanes are not provided. Therefore, as properties redevelop, ITD and the local agencies should work with property owners to consolidate access points such that they serve multiple properties, with a focus on the areas listed above.

Roadway Curvature and Topography

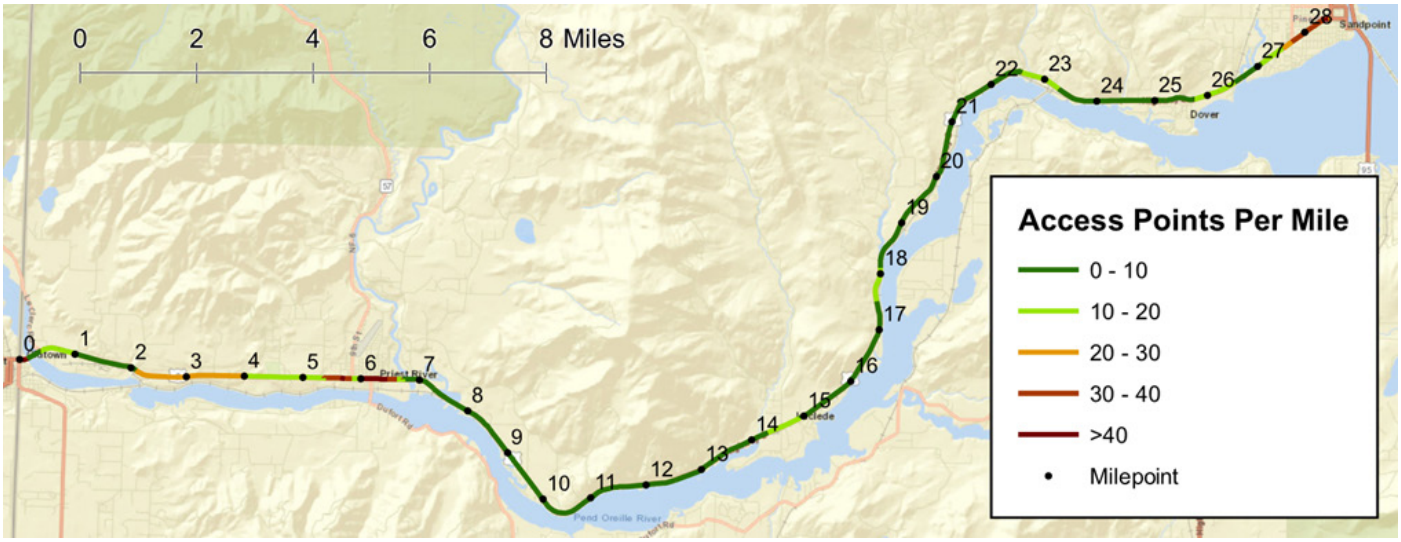
Topography plays a significant role in the route and design of the study section. The corridor follows the natural path of the Pend Oreille River and curves to avoid topographic barriers. Some of the key elements related to topography include:

- Super-elevation for the higher speed curve section through Oldtown, which has commercial driveways.
- Long sections of guardrail at several locations along the corridor, including long segments and along the outside edge of some curves between Priest River and Dover.
- Steep embankments and cliffs along the roadside in some areas.
- Grades between Laclede and Dover.

Based on a review of the curvature, some horizontal curves do not meet the minimum length requirements. These locations are primarily in the constrained sections between Priest River and Sandpoint. Additionally, the super-elevated curve section in Oldtown results in high grades and breakover angles for commercial driveways to the existing retail developments.

Much of the corridor is also located adjacent to steep topographical features like cliffs or hills. These areas are

FIGURE 9. ACCESS POINT DENSITY



ROADWAY CURVATURE AND TOPOGRAPHY EXAMPLES

Oldtown: Super-elevation

East of Laclede: Guardrail

East of Laclede: Grade

East of Priest River: Cliffs

East of Priest River: Concrete barrier

East of Laclede: Curve section

constrained for widening purposes and often have concrete barriers, cliffs, or steep drops. Falling rocks can also be an issue in these areas which often requires a barrier. Widening in these sections is costly and can be difficult due to environmental impacts.

EXISTING PAVEMENT CONDITIONS

Site visit observations revealed no significant pavement quality issues along the corridor although much of the corridor had been chip sealed recently. Discussion with maintenance staff indicated that recent overlays and chip seals have improved surface conditions, but there are locations with significant rutting that were difficult to grind off. There are also some locations that have geotechnical issues that result in lack of a stable roadway base. These sections may require reconstructing the roadway base to stabilize the roadway. These areas are near mileposts 3.3 and 14.4 where past work has included using sawdust fill to stabilize the roadway base.

BICYCLE AND PEDESTRIAN FACILITIES

US 2 serves many purposes for people walking and biking. US 2 serves as a primary commercial corridor in the cities and communities along the corridor. Schools are also located on or near US 2 in Priest River and Sandpoint.

Outside of the cities and towns, US 2 primarily serves rural residents and rural businesses, resulting in lower walking and biking activity. However, when people do walk or bike in these communities, they must often use US 2 because there are few parallel roadways in the rural areas.

US 2 is an important route for recreational bicycling. It is designated as a part of the US Bike Route System (USBRS) network developed by the American Association of State Highway and Transportation Officials (AASHTO). There are currently limited bicycle facilities along much of the corridor. People bicycling on the corridor must ride in the shoulder or in the roadway.

Pedestrian and bicycle facilities along the corridor are generally limited to short sections within the cities of Oldtown, Priest River, Dover, and Sandpoint. The most complete facilities are in Sandpoint where a multi-use path parallels US 2 on the north side of the highway.

A long-term plan for a multi-use pathway between Oldtown and Priest River was developed as part of the Bonner County Trails Plan (Reference 4). The multi-use pathway would generally be located on the north side of the Pend O'Reille River. It would connect pathways that have been implemented between Dover and Sandpoint and partially implemented in Dover, Priest River, and Oldtown. There is no designated timeframe for completion of the pathway.

Sidewalks have been installed in some of the urbanized portions of the corridor, mainly in Priest River and near intersections in Sandpoint. Many of the sidewalk sections are in relatively poor condition and cover relatively short sections. Snow is not consistently cleared from sidewalks along the highway and can limit access to them in winter months.

Person bicycling on shoulder of US 2

Multi-Use Path West of Sandpoint

Sidewalk in Priest River covered with snow

CRASH EVALUATION

Safety performance along US 2 was assessed by evaluating crash data and roadway and traffic characteristics. The crash evaluation used crash records obtained from the Idaho Transportation Department for the years of 2011 to 2015. Partial data from 2016 was also acquired to review potential crash changes in the areas following recent geometric changes. There was also 1 fatal crash that occurred in 2016.

Approximately 278 total crashes were reported from 2011 to 2015. The crashes are shown by type on **Figure 10**. Overall, the corridor experiences relatively low crash activity, with a crash rate of approximately 72.6 crashes per 100 million average vehicle miles traveled (AVMT). For comparison, this is below the 2015 average rate for rural roadways of 90.1 crashes per million AVMT (Reference 5). However, there were some crash trends that could be mitigated by safety-focused countermeasures.

Table 1 shows the number of crashes reported in each study year. The crash activity was relatively consistent each year and does not indicate a recent trend.

TABLE 1. YEARLY REPORTED CRASHES

Year	Number of Crashes
2011	67
2012	60
2013	47
2014	46
2015	58

CRASH TRENDS

The most common types of crashes include:

- **Animal Crashes:** Crashes involving wild animals make up the greatest proportion, approximately 28 percent, of all crashes and 38 percent of non-intersection crashes. This is much higher than the statewide average, where animal crashes comprised approximately 6 percent of all crashes in 2015 (Reference 5). It is also higher than the expected proportion of crashes estimated in the Highway Safety Manual (Reference 5) for rural two-lane roads, where animal crashes comprise 12 percent of all crashes.
- **Rear-End and Turning/Angle Crashes:** Rear-end and turning/angle related crashes each make up approximately 21 percent of crashes along US 2. Most occurred near intersection or driveways within the cities of Oldtown, Priest River, and Sandpoint. Many of these locations coincided with areas with high access density.
- **Fixed Object and Overturn Crashes:** Fixed object and overturn related crashes make up approximately 14 percent and 7 percent, respectively, of crashes along US 2. These crashes are dispersed along the corridor. The most common type of fixed object crash involved guardrail.

Figure 11 also illustrates the approximate locations for these common types of crashes.

Findings from reviewing other crash types include:

- **Sideswipe and Head-On Crashes:** Side swipe and head-on crashes make up approximately 4 percent and 2 percent of crashes along the US 2, respectively. These crashes can indicate an issue with vehicles crossing the centerline, but the percentages on US 2 are similar to what is expected for a two lane highway (Reference 4).
- **Intersection Crashes:** Some intersections experienced crash patterns indicative of underlying geometric-related issues. However, the intersection crash analysis indicates that all intersections have crash rates that are within the calculated expected range. The intersections identified that might benefit from safety-focused treatments include:
  - **4th Street/Wisconsin Street intersection:** A high percentage of crashes involving the northbound left-turn movement. This intersection is programed for improvement by the City and LHTAC.
  - **US 2/SH 57 intersection**: A high percentage of crashes involving a failure to yield.
  - **Superior Street/Florence Avenue intersection:** A mixture of angle and rear-end crashes.

Road surface conditions during the crashes were also reviewed. Approximately 34 percent of the crashes occurred during wet or snow conditions. While ITD does not publish data on the statewide averages regarding surface conditions, this percentage is not considered high based on evaluations of corridors with similar topography and weather conditions.

FIGURE 10. US 2 CORRIDOR CRASHES BY TYPE

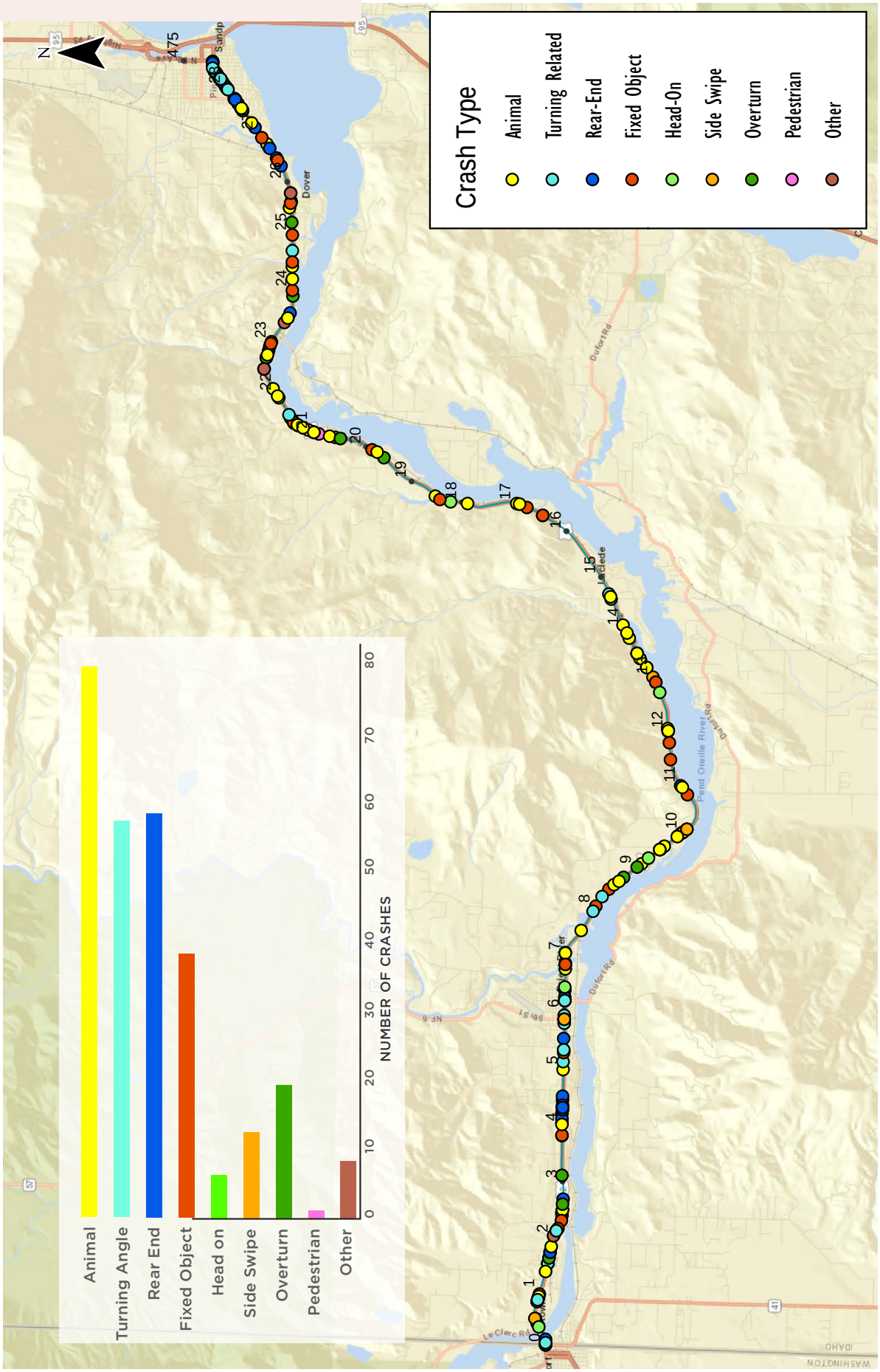
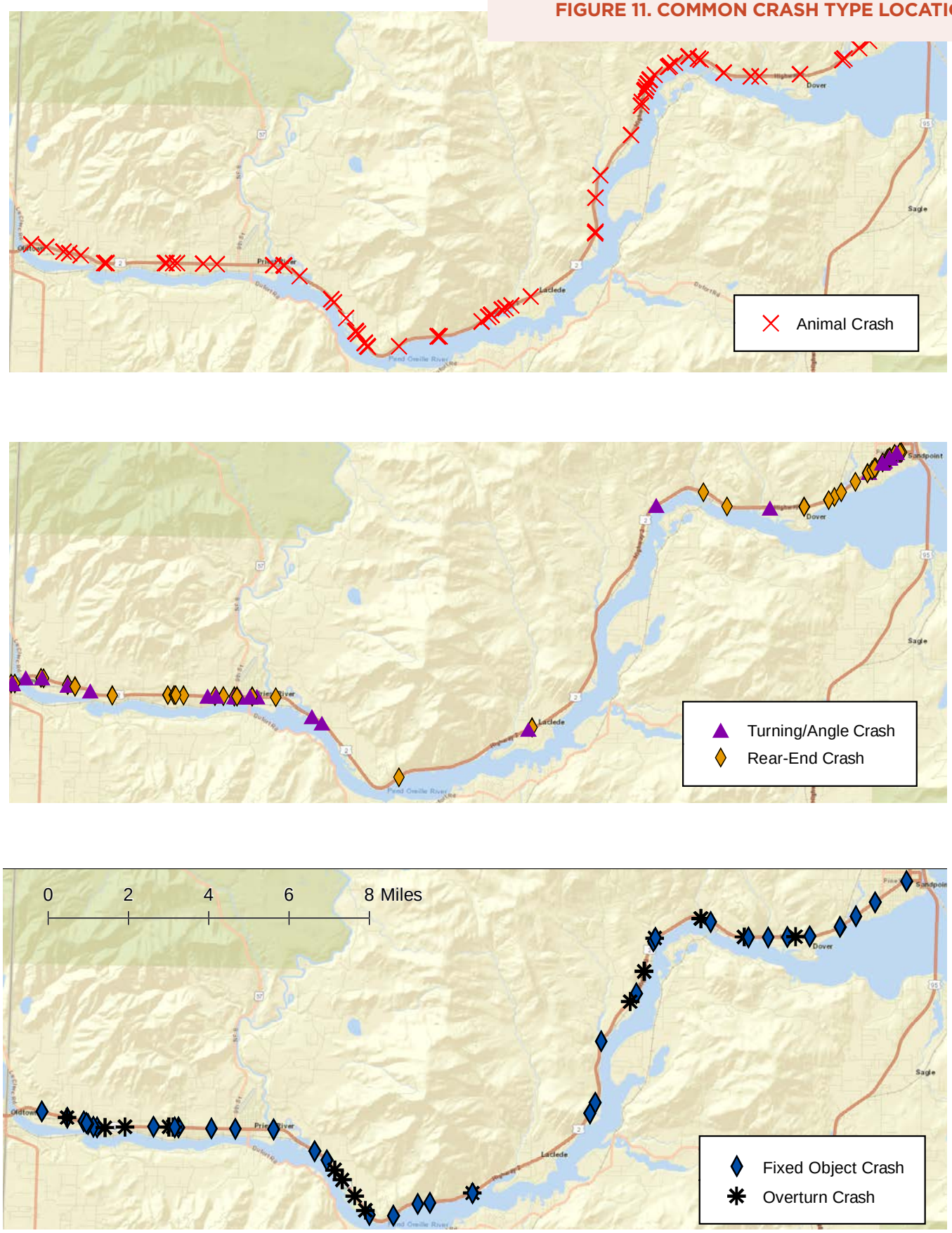


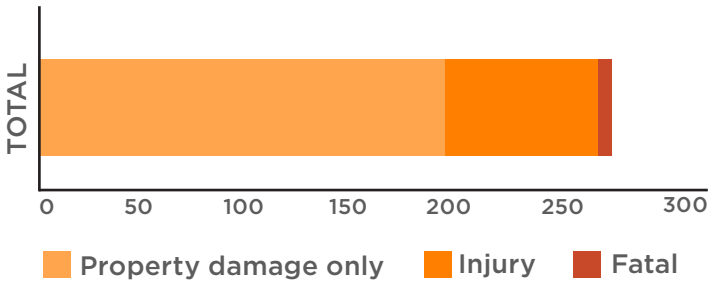
FIGURE 11. COMMON CRASH TYPE LOCATIONS



CRASH SEVERITY

Figure 12 shows the severity of crashes reported as property damage only (PDO), injury, and fatal crashes. Fatal and injury crashes account for 2.5 percent and 26 percent of the total crashes, respectively. The 2015 statewide average for fatalities and injury crashes are approximately 1.1 percent and 38 percent for US and state highways, respectively. Therefore, the proportion of fatalities is higher than the statewide average. This could be due to low numbers, unique characteristics of the US 2 crashes because of higher speeds, or the impacts of the terrain and other conditions.

FIGURE 12. CRASHES BY SEVERITY (2011 - 2015)



TRAFFIC OPERATIONS EVALUATION

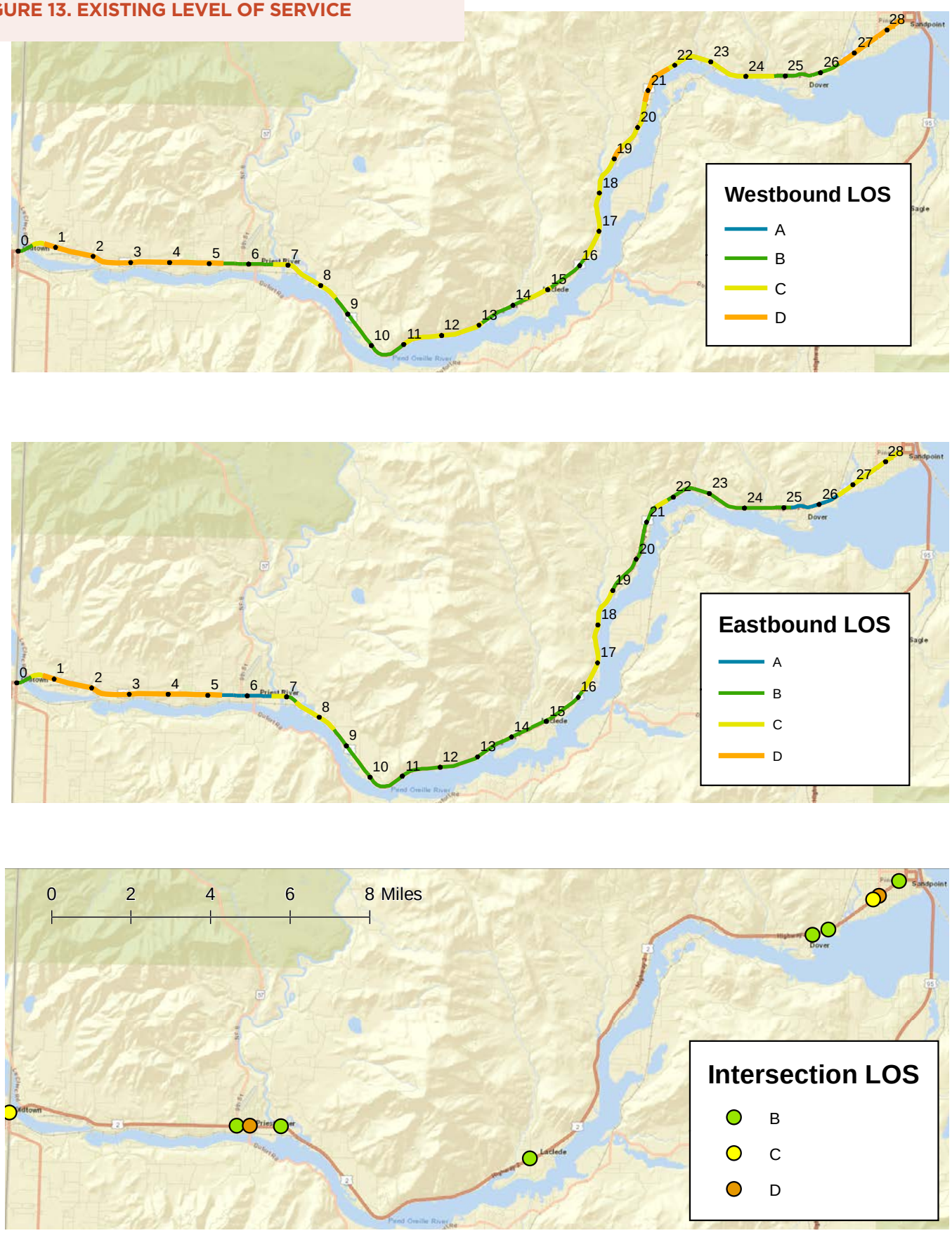
The traffic operations evaluation identifies locations where current traffic levels warrant consideration for improvements to accommodate traffic demand on highway segments and at study intersections. **Figure 13** shows the level of service results for the segments and study intersections under existing traffic conditions during the study peak hour. The key findings from the existing conditions operations analysis are as follows:

- All highway segments and study intersections operate at or better than the minimum LOS D threshold that was used for this study
- The majority of US 2 operates at LOS C or better with the exception of the area in Sandpoint and between Oldtown and Priest River, which operate at LOS D
- All of the study intersections operate at LOS C or better, with the exception of the northbound movement onto US 2 from Wisconsin Street and the US 2 and Division Avenue intersection, which operate at LOS D

Therefore, there are no immediate needs for additional travel lanes or major intersection improvements along the US 2 corridor to accommodate existing demand.

Intersection at US 2 and Division Avenue

FIGURE 13. EXISTING LEVEL OF SERVICE



CORRIDOR NEEDS ASSESSMENT

FUTURE CONDITIONS EVALUATION

The future conditions evaluation identifies if additional operational improvements are expected to be needed within the 20-year planning horizon.

FUTURE TRAFFIC PROJECTIONS

Future year 2040 traffic forecasts were developed in order to evaluate the need for additional capacity or other operational improvements along the corridor over the next 20 years. The future 2040 traffic projections were developed based on an evaluation of the following information:

- Historical traffic growth
- ITD statewide travel demand model projections
- Review of the potential impacts of completion of the North Spokane Corridor (NSC) on travel patterns
- Discussions with Washington State Department of Transportation modeling staff
- Freight projections from the Inland Pacific Hub Transportation Study
- Interviews with stakeholders regarding expected development

Based on this evaluation, traffic along the US 2 corridor between Old Town and Sandpoint is projected to increase by approximately 32 percent by 2040. **Figure 14** illustrates the projected growth in ADT volumes as compared with the historical growth from ATR 47, located between Oldtown and Priest River.

Figure 15 shows the estimated 2040 average annual daily traffic volumes (AADT) along the corridor and the estimated Friday August daily traffic volumes.

FIGURE 14. HISTORICAL ADT AND PROJECTED GROWTH BY 2040 AT ATR 47

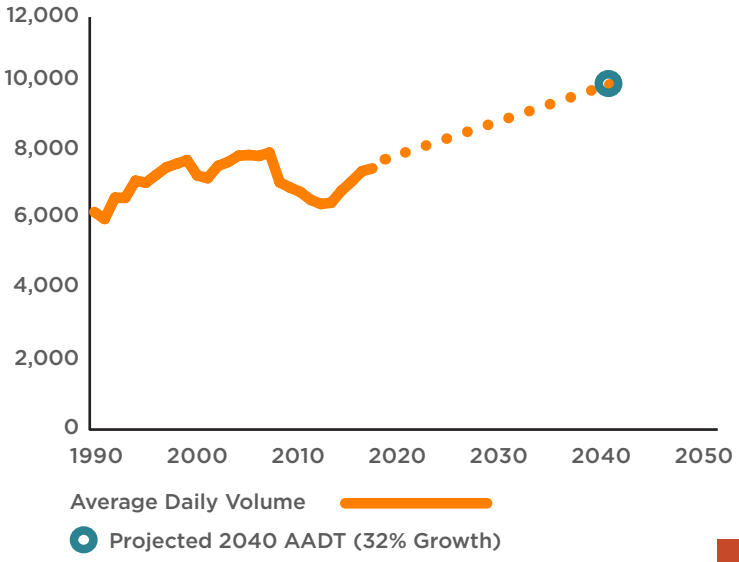
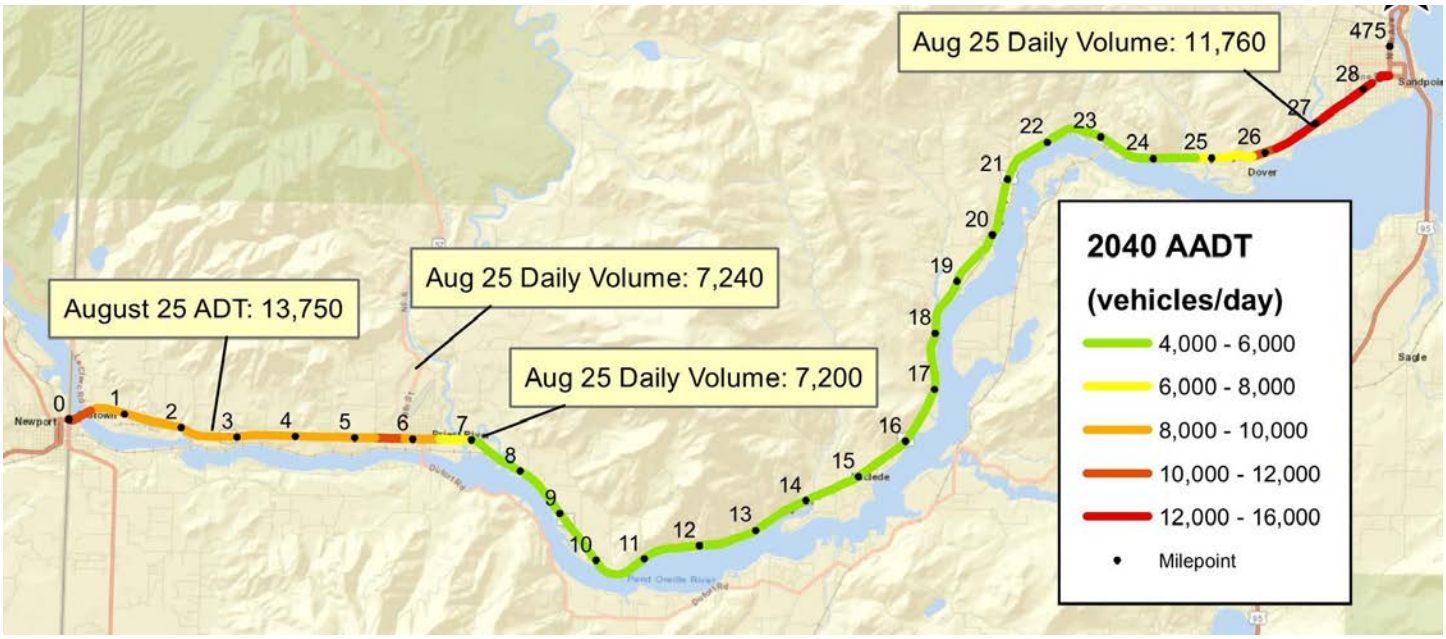


FIGURE 15. 2040 PROJECTED AVERAGE DAILY TRAFFIC VOLUMES AND ESTIMATED 2040 FRIDAY AUGUST DAILY VOLUMES



Heavy Vehicle Considerations

The projected growth in trucks and freight was also estimated for the US 2 corridor. Based on historical traffic data, truck volumes along the corridor have remained relatively constant, with the percentage of trucks decreasing as the non-truck traffic has increased over the years. The Inland Pacific HUB study (Reference 7) projected a one percent per year increase in freight on US 2, which equates to approximately 20 to 25 percent growth in traffic. That study does not specifically consider the potential impact of the North Spokane Corridor or the potential for the silica smelter proposed in Newport.

Based on a review of information from WSDOT for the North Spokane Corridor and current travel time estimates for routes from Sandpoint to Spokane, the US 95 connection to Spokane is still expected to remain the fastest route, but the travel time difference will be significantly reduced. Therefore, it is anticipated that trucking companies that currently send trucks down US 95 to I-90 to Spokane or other destinations along I-90 may send more trucks down US 2 depending on the specific time of day or roadway conditions. It was estimated that this shift could increase truck traffic on US 2 by 10 to 20 percent.

While the proposed smelter is only in the planning and environmental study stages, build-out of the smelter could have a small impact on the truck activity on the corridor depending on the ability to utilize the railroad.

Based on these considerations, the truck volumes on US 2 were also estimated to increase by approximately 32 percent by 2040. This growth is estimated to result in approximately 235 additional trucks and other vehicles over 23 feet per day on the US 2 corridor between Oldtown and Priest River.

Utility Truck East of Laclede

FUTURE TRAFFIC OPERATIONS EVALUATION

Figure 16 shows the level of service results for the corridor by segment during the study peak hour. Many segments that currently operate at LOS C are projected to operate at LOS D during this same study period in the year 2040, with one section dropping to LOS E. Based on this 2040 operations analysis, the following can be concluded:

» None of the study segments are projected to warrant widening of US 2 to add additional continuous through travel lanes by 2040.

» The corridor in Sandpoint will be close to capacity and may require widening beyond the year 2040 to accommodate future growth at current levels of service. The signalized intersections are the key limitation for capacity in on US 2 in Sandpoint.

» Approximately 35 to 40 percent of the rural two-lane portions of the corridor in the westbound direction during the study peak hour are projected to operate at LOS D and could benefit from adding passing lanes.

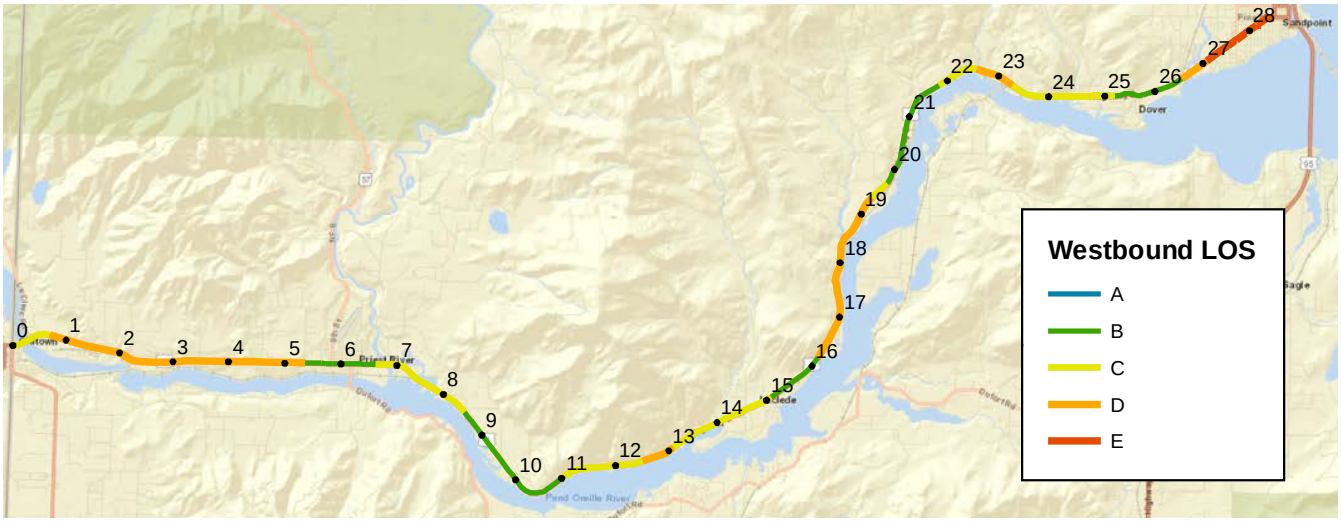
» The following study intersections would be the highest priorities for operational improvements:

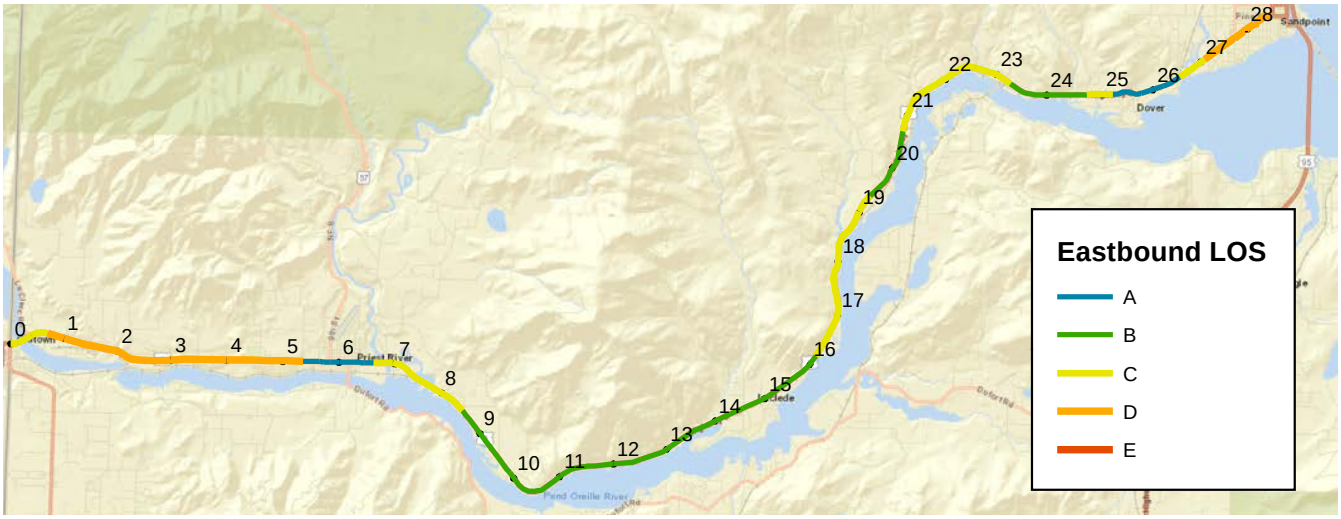
- **US 2/Wisconsin Street:** Potential need for signalization around year 2040 depending on the future traffic growth in downtown Priest River. The City has recently received funding from LHTAC to begin design of improvements to the intersection to address the intersection alignment and other safety elements.
- **US 2/Division Street:** Modifying the signal phasing and timing for peak time periods to provide more time to the through movements on US 2.
- **US 2/Ontario Street:** Reconfiguration or circulation changes to restrict unsignalized minor street left-turns may be required to meet future traffic demand beyond 2040 or if significant development occurs along Ontario Street.

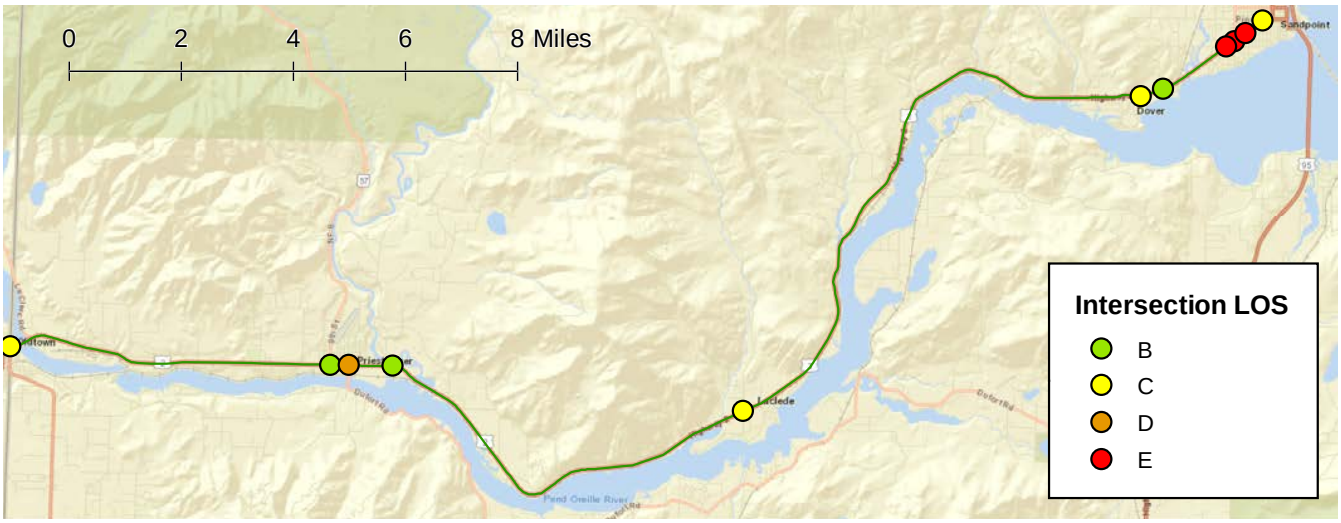
Based on the 2040 traffic operations evaluation, US 2 is projected to continue to operate acceptably at LOS D or better, with the exception of some intersections in Sandpoint. While the rural sections of US are still projected to operate acceptably, the benefit of adding passing lanes will be increased as traffic volumes grow, average travel speeds decrease, and the percent time in which vehicles follow other vehicles increases.

Signalized Intersection in Sandpoint

FIGURE 16. YEAR 2040 PROJECTED LEVEL OF SERVICE







RECOMMENDED CORRIDOR IMPROVEMENTS

Corridor improvement strategies and projects were identified to mitigate deficiencies identified in the existing conditions and future conditions analyses. Generally, the improvements can be categorized as operations-focused or safety-focused.

OPERATIONS FOCUSED IMPROVEMENTS

This section identifies strategies for improving the level of service along the corridor. The operational improvements focused on the sections of US 2 with the following characteristics:

- LOS D or worse operations, which indicate the potential need for capacity improvements within the 2040 planning horizon or somewhat after 2040.
- Locations where passing lanes could improve both vehicles and truck operations, such as on uphill grades.
- Sections with high driveway densities where safety and operations could be improved with the addition of turn lanes.

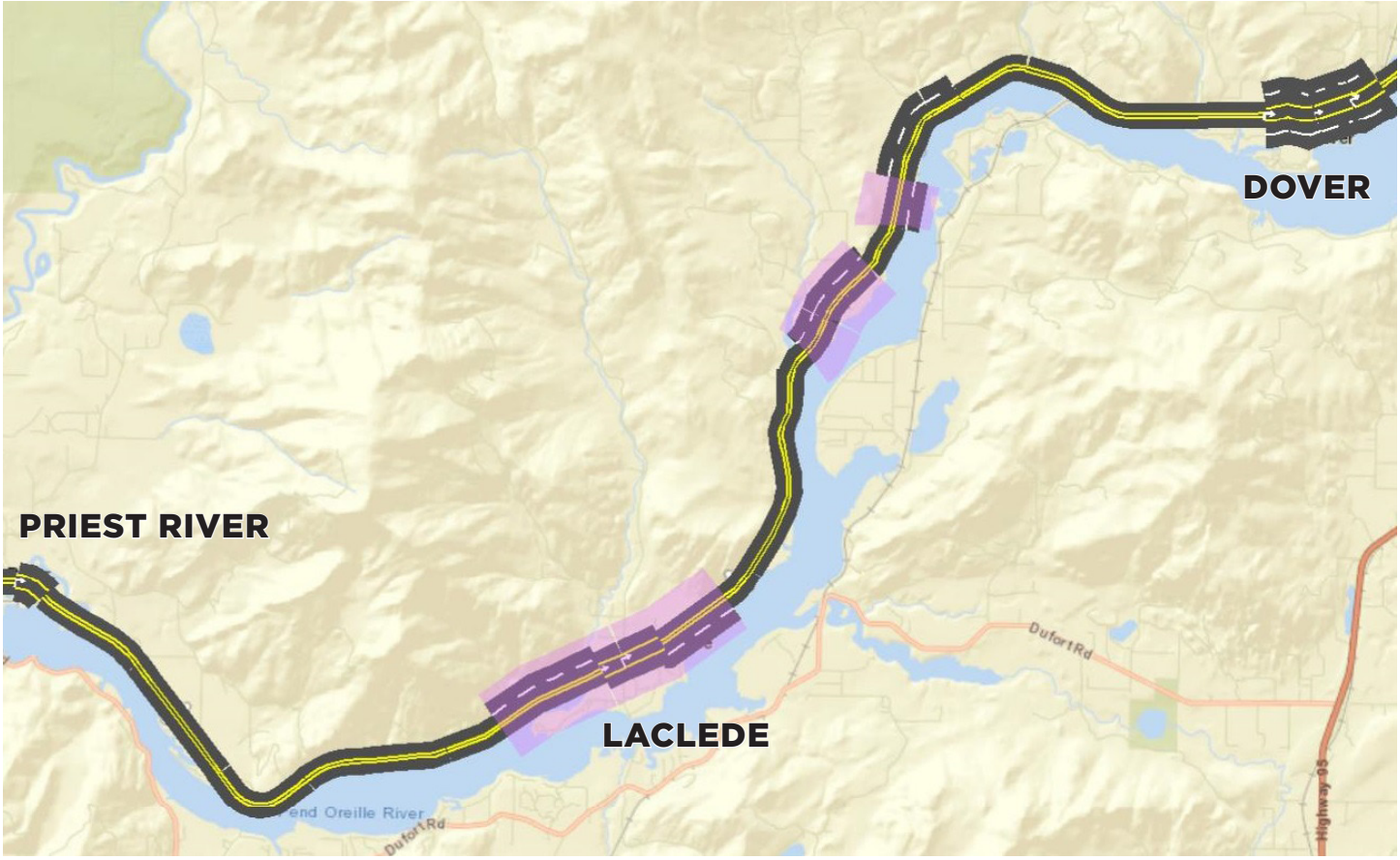
Each of the strategies was evaluated to determine its applicability to the varying sections of the corridor.

Passing Lanes

Passing lanes can provide a significant benefit for corridor traffic operations. The primary operational benefits of passing lanes are increased average speeds and a reduction in the percent time following in the direction of the passing lane. Recommended locations for passing lanes were identified based on the LOS analysis, review of the geometry and grade of the road, and evaluation of feasibility to widen the roadway. Between Priest River and Dover, a total of four additional passing lanes are proposed, two in each direction. The recommended locations for passing lanes are shown in **Figure 17**.

If passing lanes are implemented in the recommended locations, they are expected to increase average travel speeds in the range of 2 to 4 miles per hour (mph) and reduce percent time following by approximately 20 percent in the areas that are installed. Passing lanes can also reduce crashes by approximately 25% (Reference 6).

FIGURE 17. POTENTIAL PASSING LANE LOCATIONS (PRIEST RIVER TO DOVER)



2 + 1 Configuration

This treatment describes the implementation of passing lanes in alternating directions along a two-lane highway with the inclusion of center turn lanes where passing lanes are not provided. It can be a cost-effective means to improve traffic operations and reduce crashes without incurring the expense of widening to a four-lane or five-lane highway. This pattern of alternating passing lanes is often referred to as a "2 + 1" configuration. **Figure 18** shows the recommended locations for the implementation of a "2+1" configuration.

The segment between Oldtown and Priest River is the highest volume rural section on the corridor. While this segment does not warrant widening to four lanes, most of it is projected to operate at LOS D for the year 2040 projected traffic conditions. This segment also has numerous access points to driveways and local streets. Between Oldtown and Priest River, a total of four passing lanes and two center turn lanes are proposed in an alternating "2 + 1" configuration. If more development takes place on the east side of Oldtown, the center turn lanes may need to be extended to access commercial development and significant development could necessitate extension of the four lanes to the east in the very long term.

SAFETY FOCUSED IMPROVEMENTS

This section identifies strategies for reducing crashes along the corridor and enhancing bicycle and pedestrian safety and accessibility. Each of the strategies was evaluated to determine the applicability of that strategy to the varying sections of the corridor.

Shoulder Widening Locations

Increased shoulder widths can reduce crashes, improve operations, and provide an area for people to bike. Shoulder widths vary along the corridor but most segments have locations that are below the ITD standard of 6 feet wide along much of the study corridor.

The safety evaluation determined that widening shoulders along the rural sections of the corridor will reduce overall crashes on sections with shoulders that are less than 6 feet by between 7 percent and 30 percent, depending on the characteristics of the section. **Figure 19** shows priority locations for shoulder widening along the corridor based on current deficiencies in shoulder widths, locations of "bottlenecks" for bicyclists, and widening potential. Many locations identified in Figure 18 do not require widening along the entire segment, but only in certain points where the shoulder narrows to below 6 feet, often due to pavement degradation, barrier/guardrail placement or the implementation of turn lanes.

Access Management and Enhancement

Access management strategies can include driveway consolidation, installing turn lanes, and using medians to restrict certain traffic movements. Installing a raised median on two-lane urban roadways is estimated to reduce injury crashes by 39 percent (Reference 4) and the installation of a two-way left-turn lane is estimated to reduce crashes by 29 percent (Reference 8). Medians are especially effective in reducing rear-end and angle crashes and center turn lanes are effective at reducing rear-end crashes at driveways and unsignalized intersections.

FIGURE 18. POTENTIAL 2 + 1 CONFIGURATION (OLDTOWN-PRIEST RIVER)

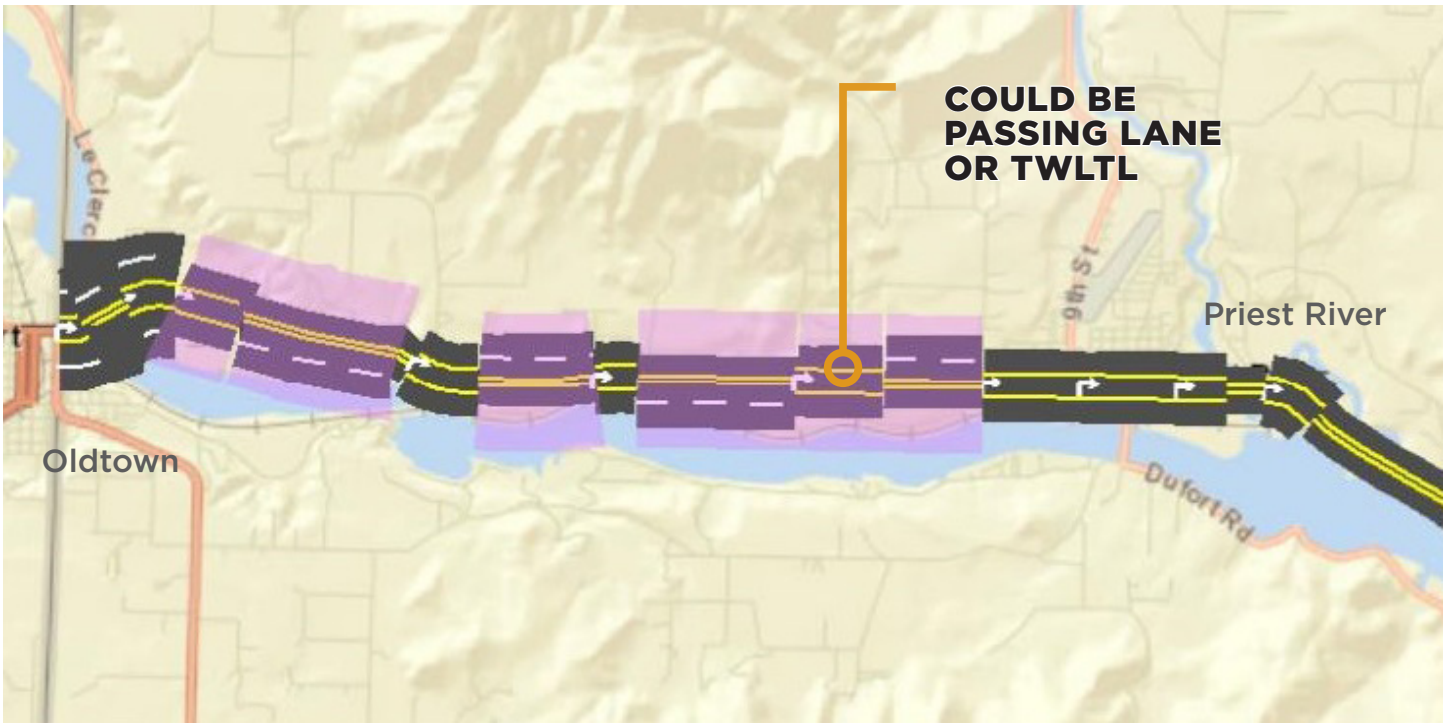
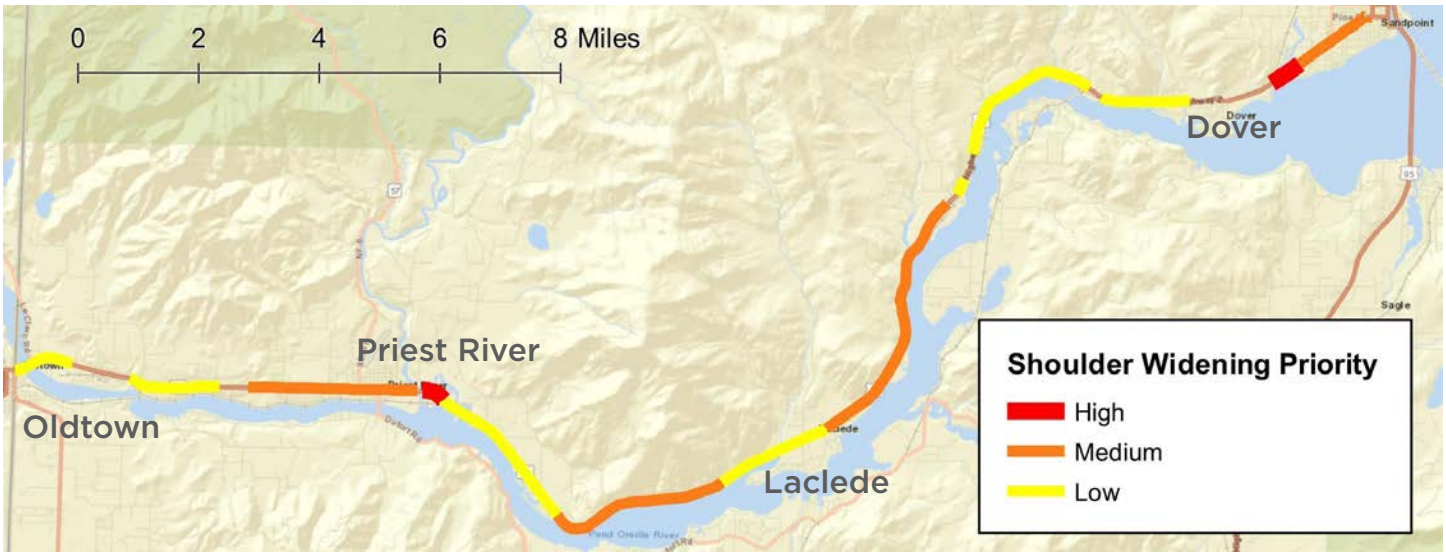
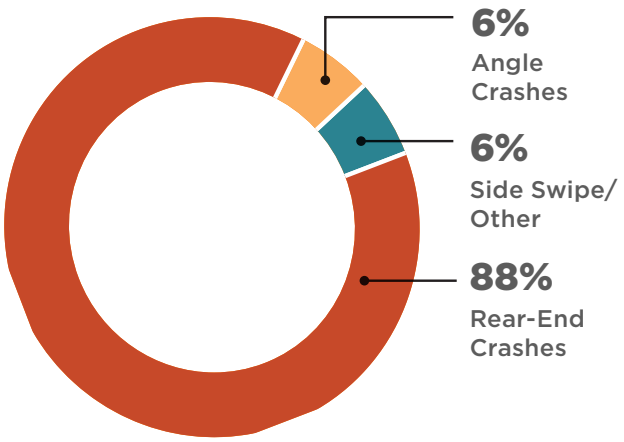


FIGURE 19. SHOULDER WIDENING PRIORITY LOCATIONS



A typical 3-4-foot shoulder

FIGURE 20. DISTRIBUTION OF SEGMENT CRASHES ON US 2 IN SANDPOINT (MP 27.5-28.5)



US 2 in Sandpoint has a high access density and limited turn lanes. It also has a higher proportion of rear-end crashes, as shown in **Figure 20,** that would benefit from access management techniques. Given the high percent of rear-end crashes, a center left-turn turn lane was determined to be an effective way to reduce crashes, although installation of a median would reduce even more crashes and provide additional benefits at some of the skewed and five-legged intersections. The Quad Cities, Idaho Highway 2/200 Corridor study (Reference 8) proposed installing a center median with turn lanes at key intersections in Sandpoint.

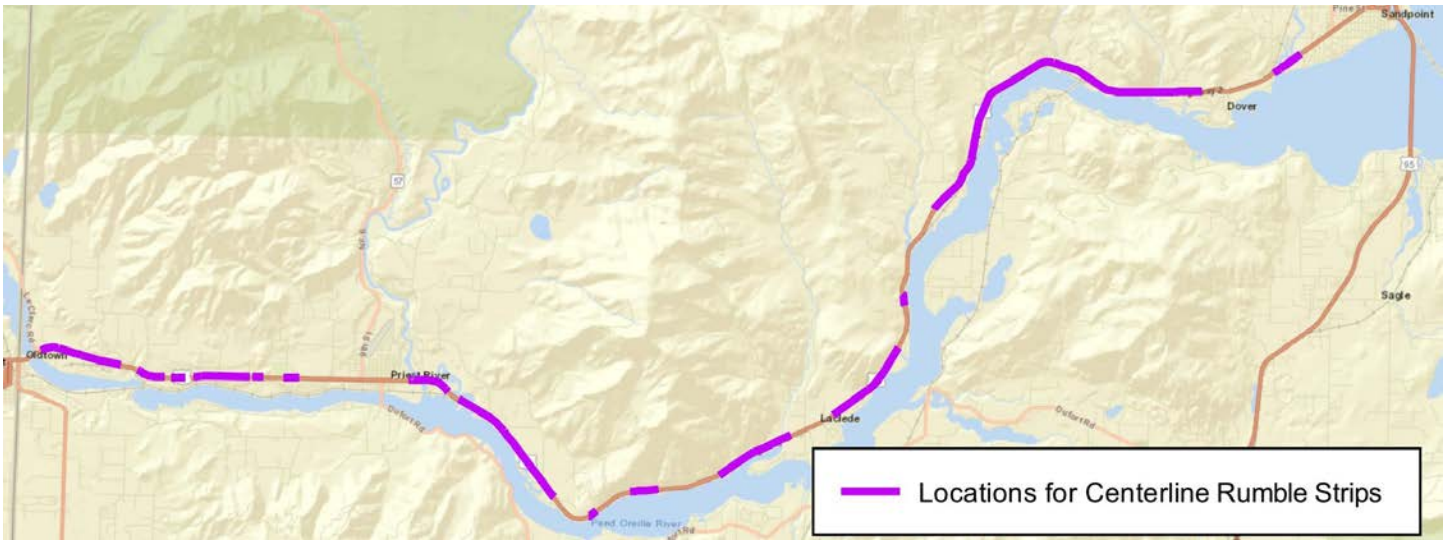
Shoulder and Centerline Rumble Strips

Rumble strips are one of FHWA's *Proven Safety Countermeasures*. Rumble strips can be effective in reducing severe roadway crashes resulting from a vehicle departing from their travel lane.

Centerline rumble strips are a cost-effective improvement that have yet to be implemented on most of the corridor. It is recommended that they be implemented along the extents of the corridor, excluding the urban areas. Recommended locations for centerline rumble strips are shown in **Figure 21**. Further study will be needed to determine exact placement in areas with some residential development due to potential noise.

Shoulder rumble strips are also a relatively low-cost treatment for improving safety but can have a negative impact on bicycles if the paved shoulders are not at least 6 feet. Given the existing lack of shoulder width in locations throughout the corridor and its bicycle route designation, shoulder rumble strips should be considered when shoulders are widened to 6-feet or greater.

FIGURE 21. RECOMMENDED LOCATIONS FOR CENTERLINE RUMBLE STRIPS



Enhancing Clear Zones

Removing trees and other fixed objects from the roadside can provide additional clear zones for vehicles that leave the roadway. This treatment can reduce fixed object crashes.

Fixed-object type crashes with roadside hazards were found to be the most harmful event in approximately 14 percent of all crashes on the corridor and are generally scattered among many locations and involve a wide range of objects. Guardrail was the most common fixed object (32 percent of fixed object crashes), with ditches/embankments and trees being the next highest object types. Trees were also observed growing in the ditch slope areas and were identified in some crashes. While a detailed evaluation of sight distance, obstructions, and roadside hazards was not done along the corridor, field observations identified that there are locations along US 2 where removal of vegetation and minor changes to embankments could be beneficial.

Animal Crash Reduction Strategies

Animal crash reduction strategies are improvements aimed to reduce animal and vehicle conflicts. This is primarily done by providing a route for animals that does not cross the highway at-grade, increasing driver awareness of animals through signing and warning systems, improving potential sight lines to see animals along the roadside, or keeping animals off roadways. Additional treatments, such as roadway lighting, nighttime speed reductions, and temporary driver information displays, are also used in some cases to provide additional warning and reaction time for vehicle drivers.

Based on a review of the crash data, animal crossing activity appears to occur throughout the year, with the highest number of crashes being in the winter months. The monthly crashes involving wild animals are shown in **Figure 22**. This indicates that an effective treatment will need to be active year-round.

Example Trees Near Roadway Edge

Example of Guardrail Segment on US 2.

FIGURE 22. PROPORTION OF ANIMAL CRASHES BY MONTH

Average Daily Volume

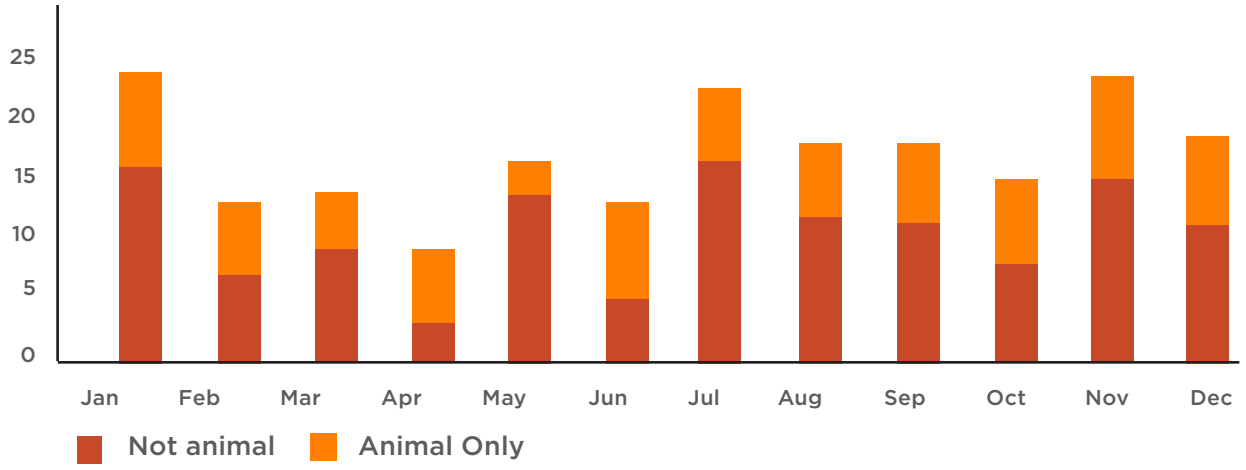


FIGURE 23. ANIMAL CRASHES BY TIME OF DAY

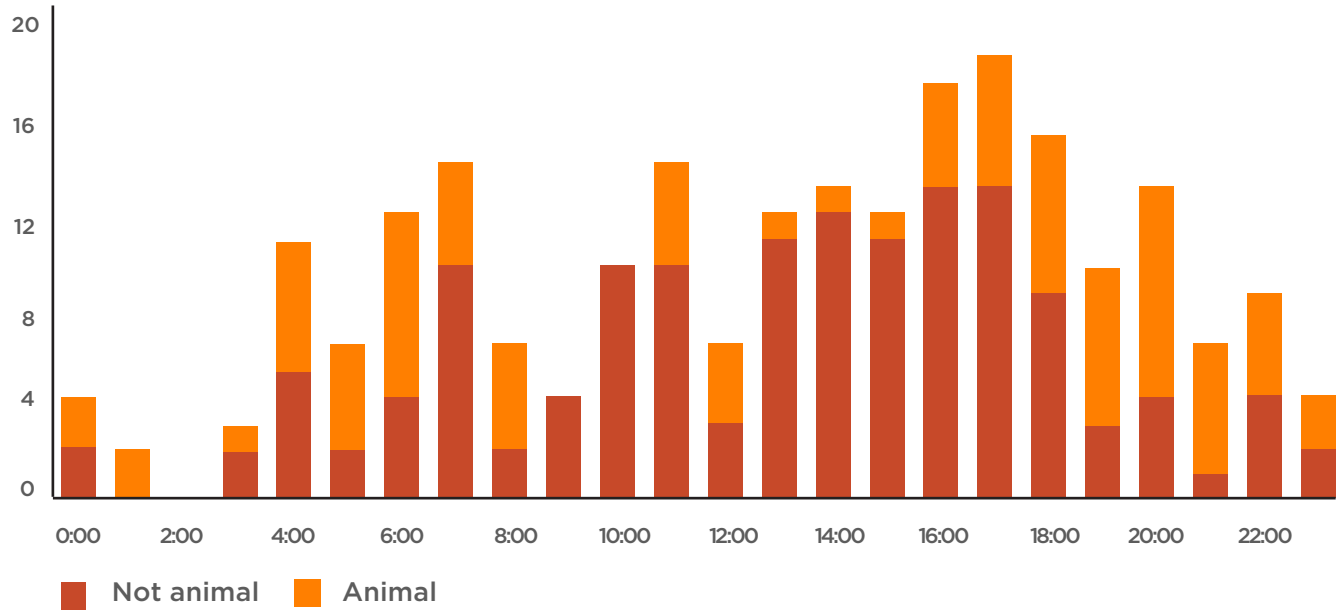


Figure 23 shows the time of day which animal crashes occurred. The animal crashes were the largest proportion of crashes during the following periods:

- 4:00 am to 7:00 am
- 6:00 pm to 10:00 pm

This indicates that mitigations aimed to decrease animal crashes during low-light conditions may be especially effective.

A review of the density of the crashes indicated that the animal crossings are concentrated in certain locations, but those locations are spread across the corridor and therefore will require mitigation options unique to the many crossing locations. The Idaho Fish and Game maintains GIS mapping for the key wildlife linkages, which provides explanation of the concentration of wild animal crashes in certain area. **Figure 24** shows the linkage areas along US 2 that Idaho Fish and Game data has identified.

Reducing crashes that involve wild animals can be difficult, especially when crossing locations are spread along a corridor. Additionally, this corridor has characteristics that impact mitigation options in many places, such as topographic constraints, roadside development with driveways, railroad tracks to the south of the highway, and heavy brush and wooded areas adjacent to some sections.

Common treatments for reducing crashes with wild animals were reviewed with respect to their feasibility and potential effectiveness at the key crash locations. The most common treatments to reduce animal related crashes are shown in **Table 2.**

FIGURE 24. FISH AND GAME WILDLIFE LINKAGES

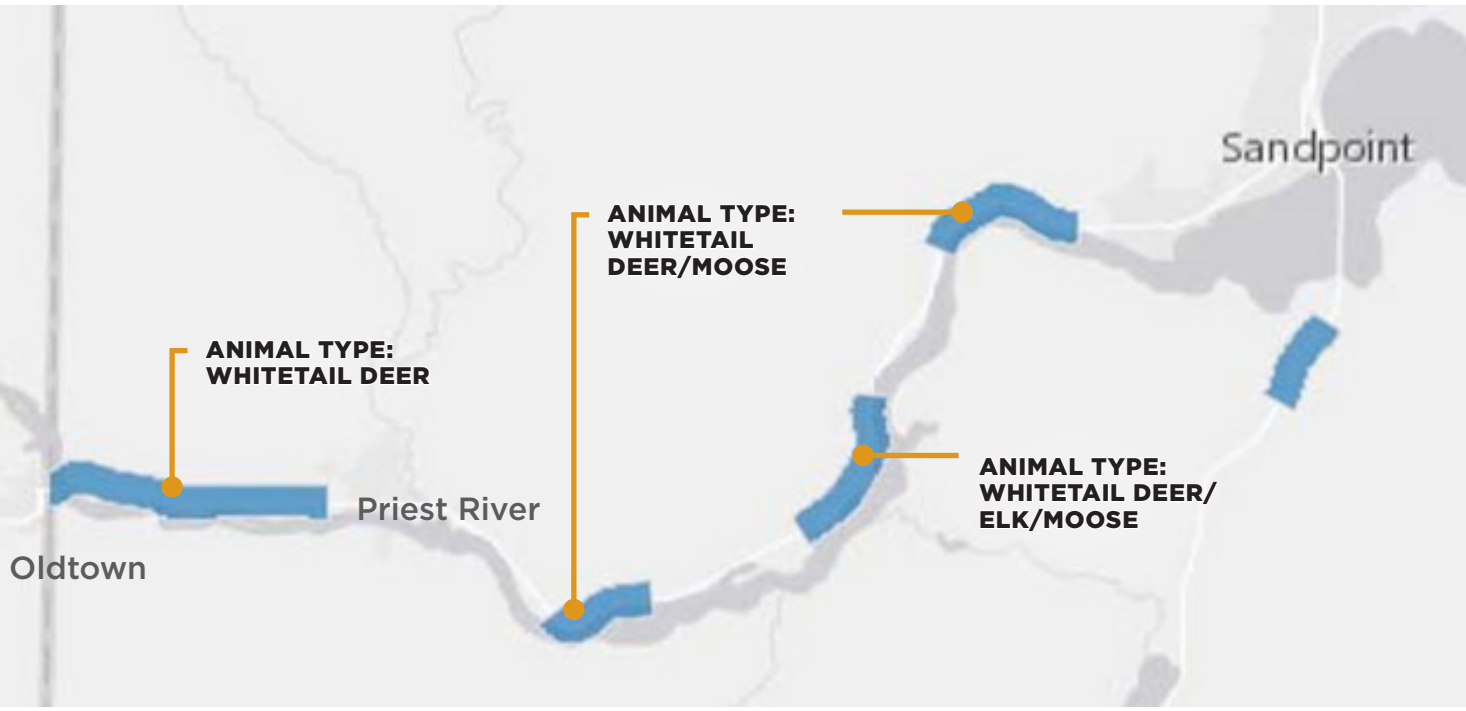


TABLE 2. ANIMAL CRASH MITIGATION TREATMENTS

Treatment	Description	Benefits	Limitations	Picture
Clear Zones	Trimming vegetation and removing other objects from the roadside area to provide better sight lines for drivers to see animals. **Est. Cost: $850 per mile per year**	Can improve the ability of drivers to identify a wild animal that may be attempting to cross the highway. Also reduces fixed object related crashes.	Limited effectiveness. Does not prevent animals from entering roadway or warn drivers.	
Speed Reductions	The reduction of roadway speeds in areas with high animal activity. Can be used just during night time or during high migration seasons. **Est. Cost: Cost associated with enforcement and additional signing**	Crash severity and frequency is generally reduced due to speed reductions. This is especially true in low-light conditions.	Limited data on effectiveness and depends on driver reducing speeds and enforcement.	 *Source: Google Maps*
Static Signage	Signage that warns of high animal crash activity. Signs should be specific identifying type of animal and where animal activity is high. **Est. Cost: $100-$700 (depending on location) per sign (two signs)**	Low-cost improvement which increases driver awareness and may reduce travel speeds resulting in reductions in crashes and severities.	Not shown to have long-term effectiveness in reducing crashes with wildlife.	 *Source: MUTCD*

Treatment	Description	Benefits	Limitations	Picture
Activated Warning Signage/ System	Radar activated warning signs that alert drivers when animals come within the radar's vicinity. **Est. Cost: $120,000 per mile (cost will be higher in areas with curves or slopes)**	Studies show up to an 82 percent reduction in crashes.	Inconsistent results, technology problems, and can be expensive to implement and maintain.	 *Source: Google Maps*
Fencing	Fencing can be used to restrict animals from crossing or direct them to cross at specific locations. Should include "escape ramps" to let animals leave roadways. **Est. Cost: $13 per foot**	Most effective treatment when combined with grade-separated crossings.	Not feasible in many areas due to private property and public street access. Fencing must be designed based on the animal characteristics. Environmental factors can limit the ability to implement safely.	 *Source: Google Maps*
Grade Separated Crossing: Undercrossing	Culvert or tunnel underneath roadway that can be utilized by animals for crossings. Minimize length (less than 120 feet - this is the most important factor in predicting their use), maximize width, and maximize height. **Est. Cost: $2,650 per foot length**	Very effective when combined with fencing for animals, such as deer, that will utilize spaces under bridges and through large culverts.	Can be expensive Requires fencing along the highway to channelize the wild animals to crossing locations. May not be feasible due to topographic, right-of-way, environmental, or drainage requirements	 *Source: Utah Department of Transportation*
Grade Separated Crossing: Overcrossing	Bridge or overpass structure that allow animals to cross roadway. **Est. Cost: $1.6 – 2.6 million**	Most effective mitigation. Eliminates animal/vehicle conflicts. More likely to be utilized by Elk or other large mammals than undercrossing.	Expensive to construct Requires fencing along the highway to channelize the wild animals to crossing locations. May not be feasible due to topographic, right of way, environmental, or drainage requirements	 *Source: Google Maps*

Note: All costs obtained from the Federal Highway Administration's Wildlife-Vehicle Reduction Study (Reference 10) and increased by a factor of 1.07 based on the FHWA construction price index between 2008 and 2018.

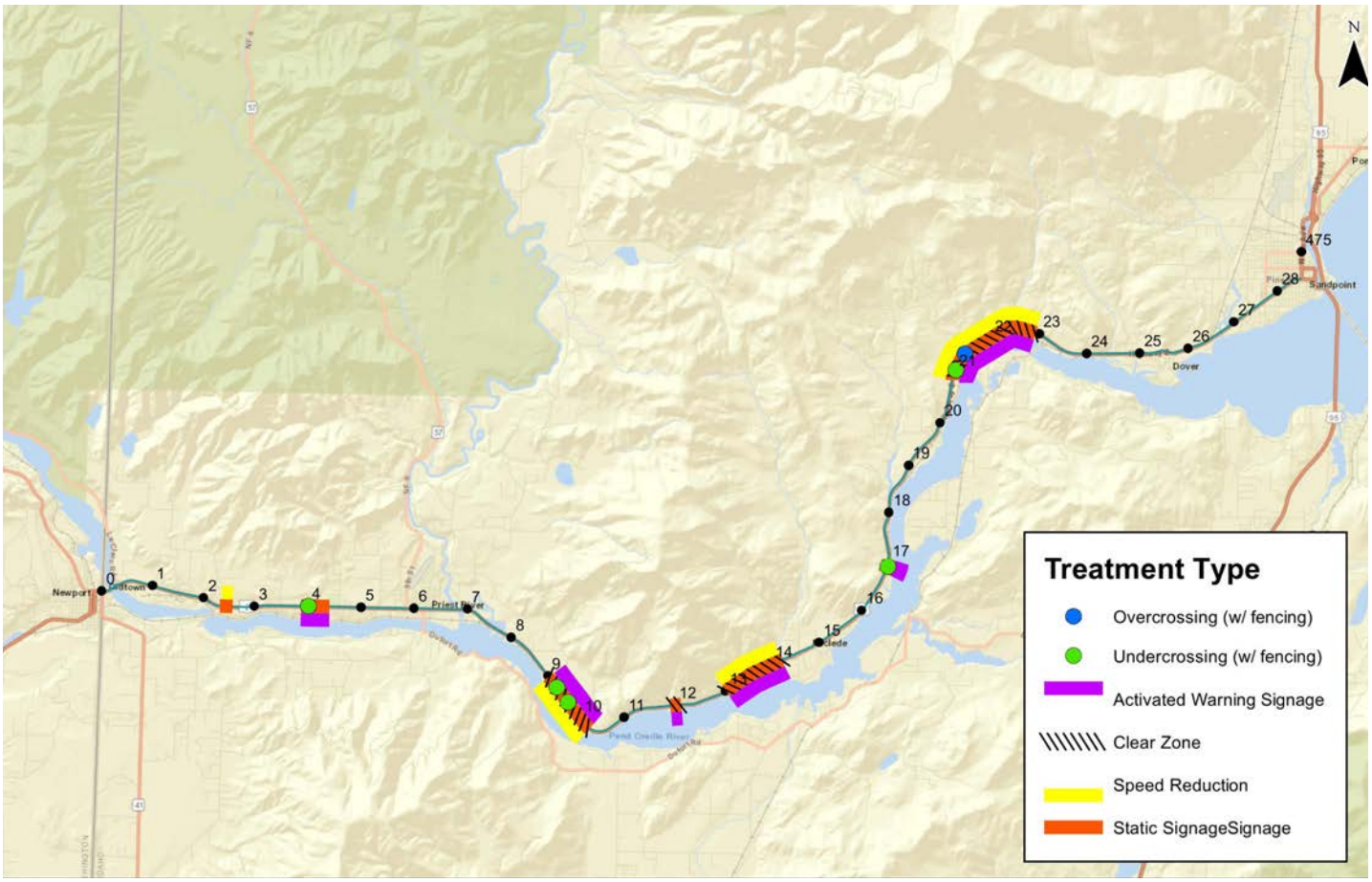
Each of the wild animal crash reduction treatments shown in Table 1 were evaluated with respect to their feasibility at the key locations with concentrations of wild animal crashes. The results are shown in **Figure 25.**

A couple locations may have an existing culvert that could be modified or an undercrossing could be installed. But even at those locations, fencing may not be feasible or effective due to access and public road intersections.

Most locations could benefit from signage and activated warning systems, but care would need to be taken with respect to the locations of the signage and warning systems and what impact driveways or other accesses to the highway might have on the ability to accurately detect wild animals versus vehicles.

Further study is required to confirm the locations, identify the most appropriate treatment, work with local agencies and property owners on right-of-way and access issues, and determine the correct placement and design of the animal crash mitigations treatments.

FIGURE 25. POTENTIAL ANIMAL CRASH MITIGATION LOCATIONS



EXPECTED BENEFITS OF CORRIDOR IMPROVEMENTS

In order to assess the potential benefit of the recommended improvement strategies, the safety and operational benefits were evaluated for the improvement strategies where benefits could be quantified. These improvement strategies are as follows:

- Passing lanes
- Two-way-left-turn lanes
- Shoulder widening
- Centerline rumble strips

Following is a summary of the expected safety and operational benefits from the recommended projects.

ESTIMATED SAFETY BENEFITS

Figure 26 provides a summary of the expected change in crashes with the proposed segment safety treatments including the lane improvements shown in Figures 17 and 18, the shoulder improvements identified in Figure 19, and installation of centerline rumble strips in the rural two-lane highway sections.

As shown in **Figure 26**, wider shoulders and centerline rumble strips are expected to have the greatest individual impacts on reducing total crashes. The addition of lane improvements, including passing lanes, 2+1 and center turn lanes, has less of an impact on reducing crashes because of limited extent that they can be implemented on the corridor. The Combined Improvements bar on the graph includes the benefits from all three treatments.

Figure 27 shows the estimated combined expected reduction in crashes for individual sections along the corridor.

FIGURE 26. EXPECTED CRASH FREQUENCY ON US 2 WITH PROPOSED TREATMENTS

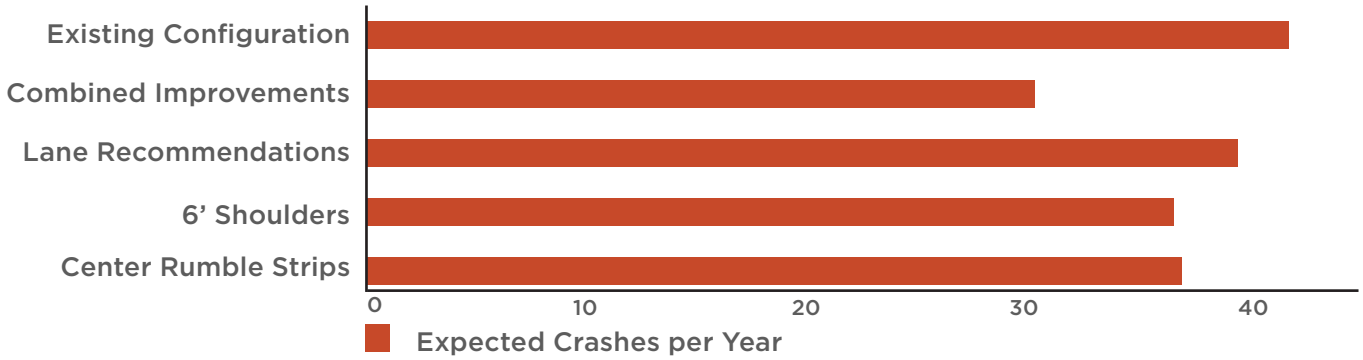
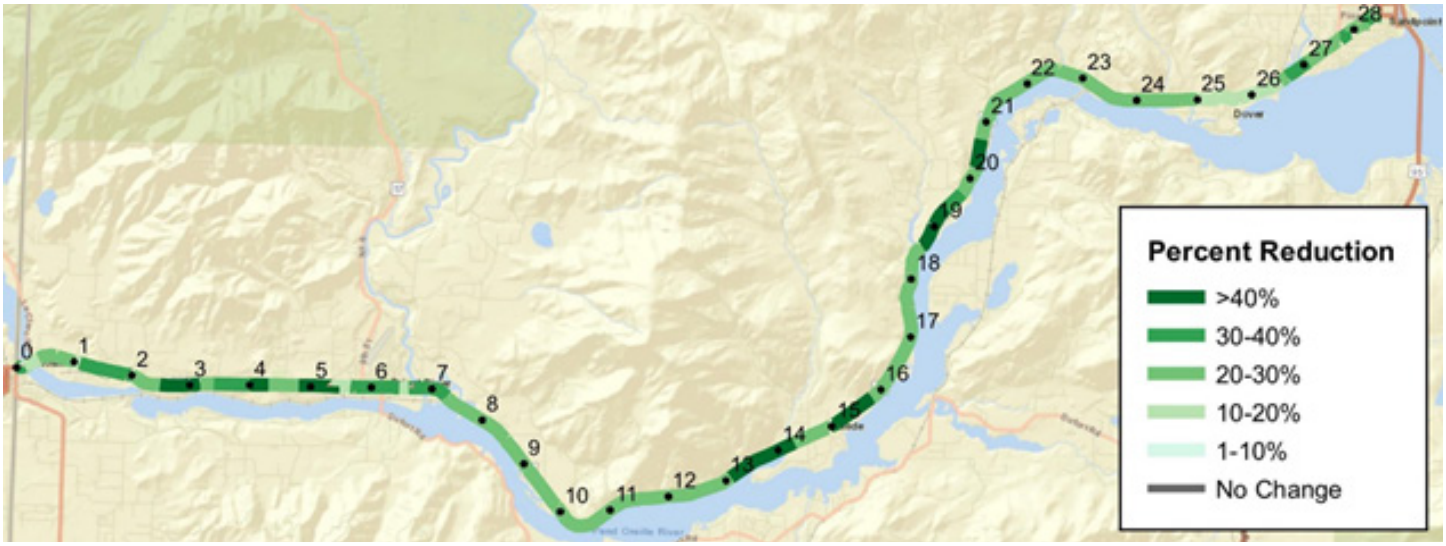


FIGURE 27. PERCENT REDUCTION OF EXPECTED CRASHES WITH MITIGATIONS



Operational Benefits of Segment Capacity and Safety Improvements

Figure 28 shows a summary of the overall operational performance for the rural sections of the corridor with the recommended improvements. As shown in Figure 28, the installation of the 2+1 configuration between Oldtown and Priest River and the passing lanes east of Priest River improves the level of service from LOS D to LOS C in most of the section between Oldtown and Priest River and the section between MP 16 and MP 19.

Potential Annual Near-Term Benefit of Treatments

Table 3 shows the expected annual reduction in crashes and vehicle delay, and the associated economic benefit from the implementation of the recommended lane configurations, widened shoulders, and rumble strips.

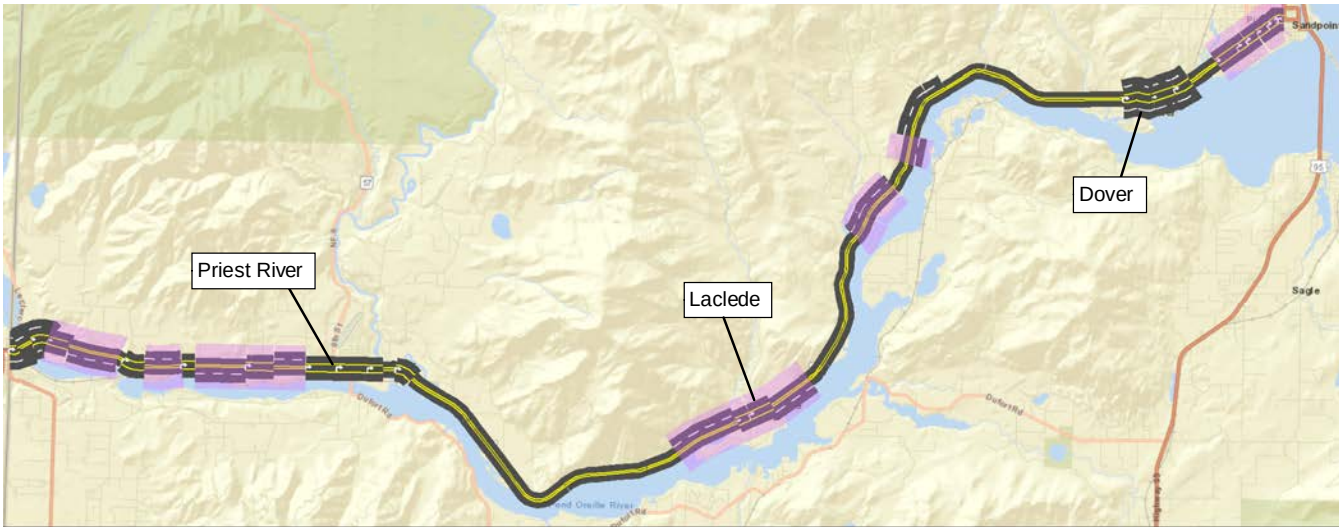
TABLE 3. ECONOMIC BENEFIT OF LANE AND SHOULDER IMPROVEMENTS

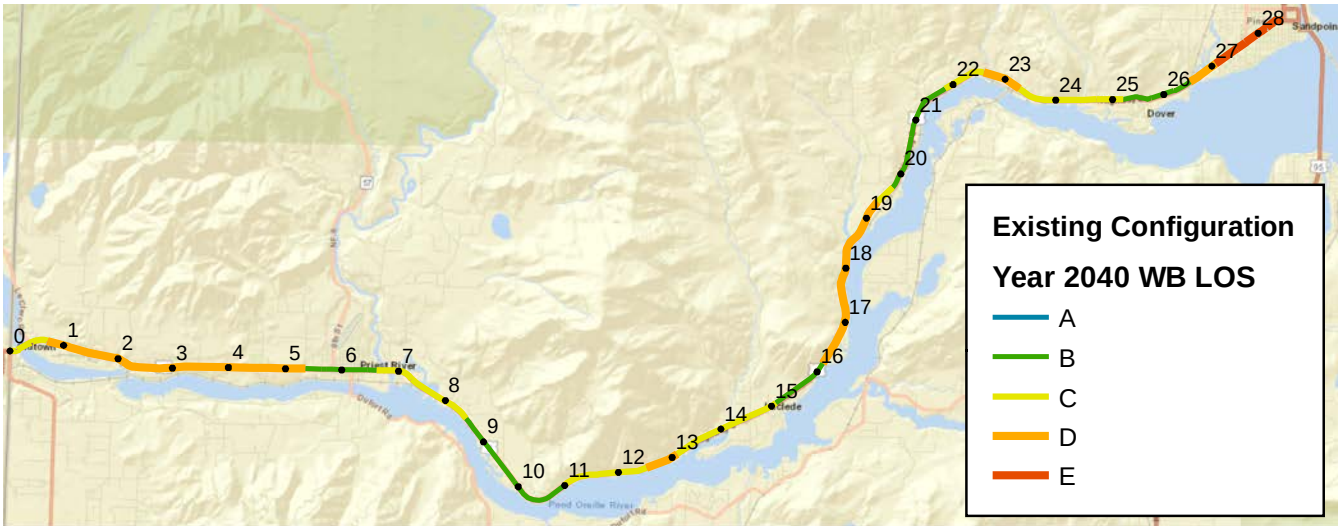
Severity	Estimated Average Annual Crash Reduction (Year 2018 Crashes)	Annual Crash Reduction Benefit (2018 Dollars)1	Annual Estimated Delay Reduction (2018 Hours)	Estimated Annual Operational Benefit (2018 Dollars)
Shoulder Widening	4.82	$465,947	20,685	$164,922
Lane Improvements	2.34	$158,339	52,690	$421,523
Centerline Rumble Strips	4.82	$466,675	NA	NA
Combined Benefit[2]	11.43	$1,105,569	73,306	$586,445

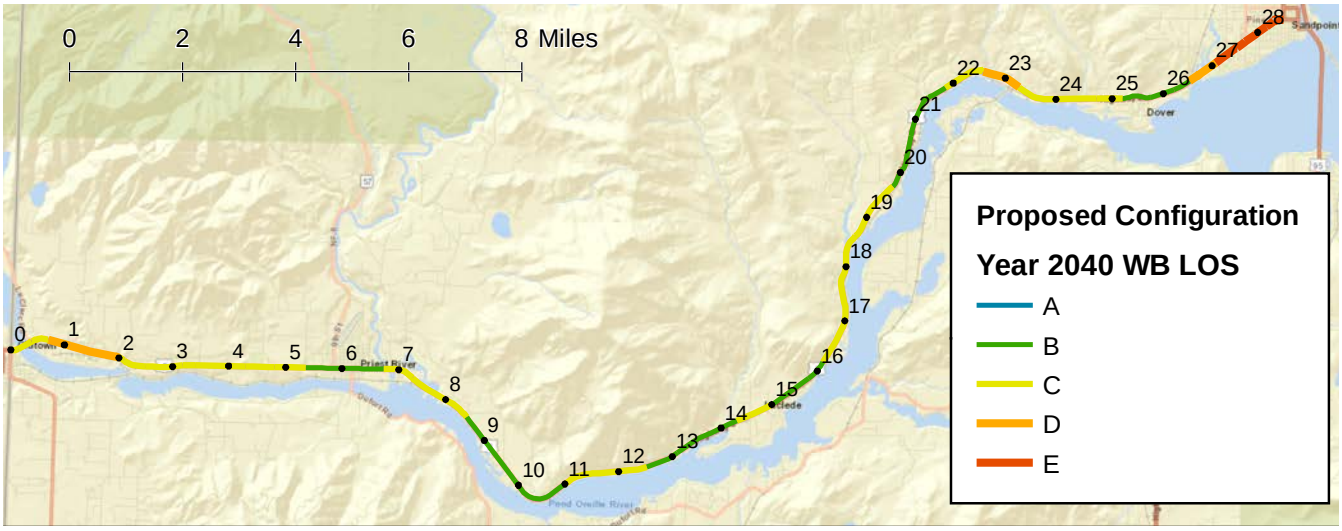
[1]. Based on Idaho crash costs from Idaho Traffic Crashes 2016 Table 4 (Reference 11). Weighted average was used for fatal and injury crashes

[2]. The combined benefit is not the same as the addition of the individual elements since there is some overlapping benefit between the different treatments.

FIGURE 28. YEAR 2040 OPERATIONS COMPARISON







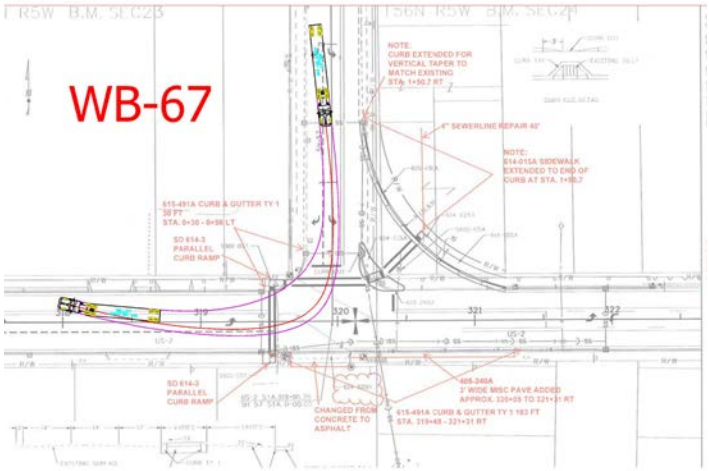
PROPOSED INTERSECTION IMPROVEMENTS

In addition to the improvement strategies evaluated in the previous section, the traffic operations and safety analyses identified other potential improvements at intersections that are proposed for further study. The following study intersections should be prioritized for improvements:

US 2 / SH 57

At the US 2/SH 57 intersection, stakeholder interviews identified the need to improve the northwest corner radius to accommodate trucks without them having to utilize both southbound lanes, which can cause conflicts during the summer peak season when traffic volumes increase. Field observations and a turning simulation analysis at the intersection for an interstate semi-type truck (WB-67) confirmed that a large truck turning from southbound to westbound must utilize both southbound lanes and use a portion of the eastbound left-turn lane. A picture of the turning simulation overlaid on the design plans for the recent westbound to northbound channelized right-turn lane is shown in **Figure 29**. Widening of the northwest quadrant of this intersection is recommended to accommodate truck movements.

FIGURE 29. US2/SH 57 WB-67 TURNING PATHS



US 2 / Wisconsin Street

Wisconsin Street provides access to downtown Priest River and the bridge across the Pend Oreille River to Dufort Road. This intersection is projected to operate at LOS D and is projected to meet traffic signal warrants in 2040. Additionally, the crash analysis revealed that approximately 80 percent of the crashes reported at the intersection were northbound left-turning movements and many were identified as not obeying the stop sign. While the severity of the crashes was low with all crashes being categorized as property damage only, this pattern indicates potential for improvement.

The field review identified that the grade of the northbound approach, vertical curvature of the roadway, and vegetation and utility poles along US 2 impact the comfort of drivers making northbound left-turning movements. These factors could be contributing to some vehicles slowly moving into the intersection instead of stopping on the approach.

Figure 30 shows what elements should be improved as part of a future project, including flattening the northbound approach, improving sight distance for northbound left-turning vehicles, and signalizing the intersection once warrants are met.

It is our understanding that the City recently received funding from LHTAC to begin design of improvements to the intersection. **Figure 31** shows a concept submitted by the City of Priest River to LHTAC that should address the issues identified in this study.

FIGURE 30. WISCONSIN/4TH ST INTERSECTION IMPROVEMENTS

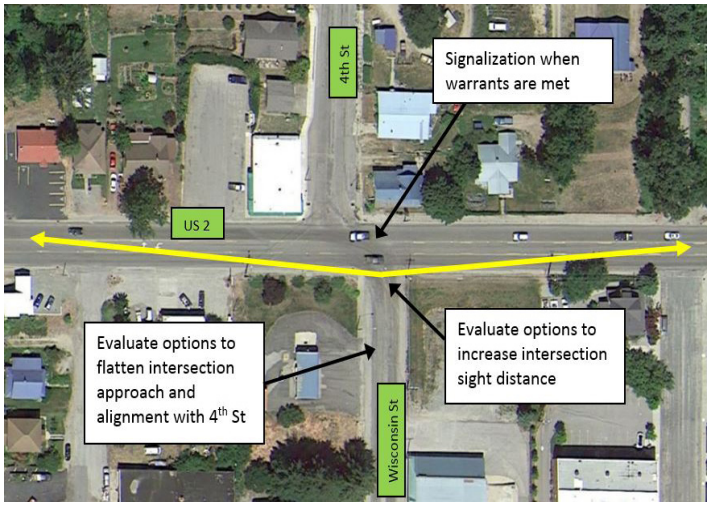
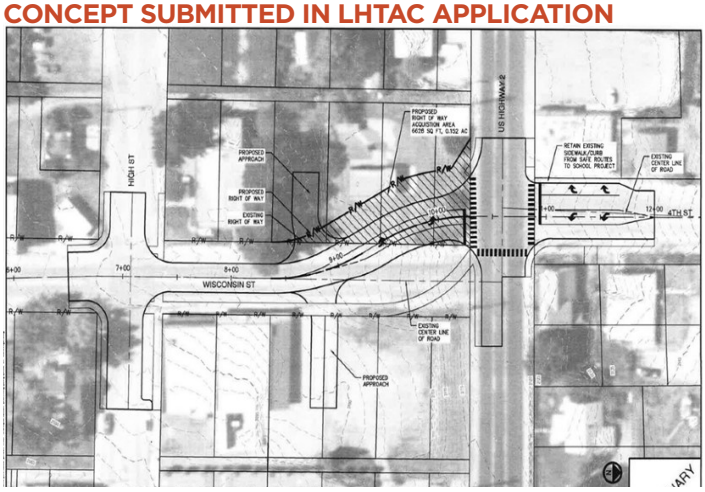


FIGURE 31. US 2/WISCONSIN STREET IMPROVEMENT CONCEPT SUBMITTED IN LHTAC APPLICATION



US 2/Ontario Street

The US 2/Ontario Street intersection is projected to operate at LOS E in 2040 and meet warrants for a traffic signal. The proximity to the signal to Division Avenue makes signalization of the intersection undesirable.

Reconfiguration or circulation changes are projected to be needed to meet future traffic demand. **Figure 32** shows an option presented in the Highway 2/200 Corridor Study (Reference 8). The Split intersection option identified in Figure 32 splits the intersection into two intersections and utilizes medians for access restriction and as turn lanes. This option will reduce conflicts for the minor street left-turning movements but does not eliminate the movements and may not improve the intersection operation to the extent needed.

An alternative, shown in **Figure 33**, uses the existing streets for circulation to re-reroute the left-turning movements. This option should provide for the intersection to operate acceptably unsignalized for the long-term, but results in out-of-direction travel for the left-turning movements.

FIGURE 32. HIGHWAY 2/200 CORRIDOR STUDY SPLIT INTERSECTION OPTION (REFERENCE 10)

FIGURE 33. US 2/ONTARIO STREET ALTERNATIVE INTERSECTION OPTIONS

US 2/Division Avenue

The US 2/Division Avenue intersection is projected to operate at LOS E in 2040.

While the intersection is projected to have sufficient capacity in 2040, the existing signal timing and phasing limits the ability to increase the green time for traffic on US 2. There is also a school nearby that causes sudden increases in pedestrian crossings at the intersection and impacts the signal operation during certain hours of the day. **Figure 34** shows a picture of the intersection and the need to ensure pedestrian are accommodated.

Modifying the signal timing by increasing the cycle length and phase split times for the US 2 through movements results in acceptable operations through 2040.

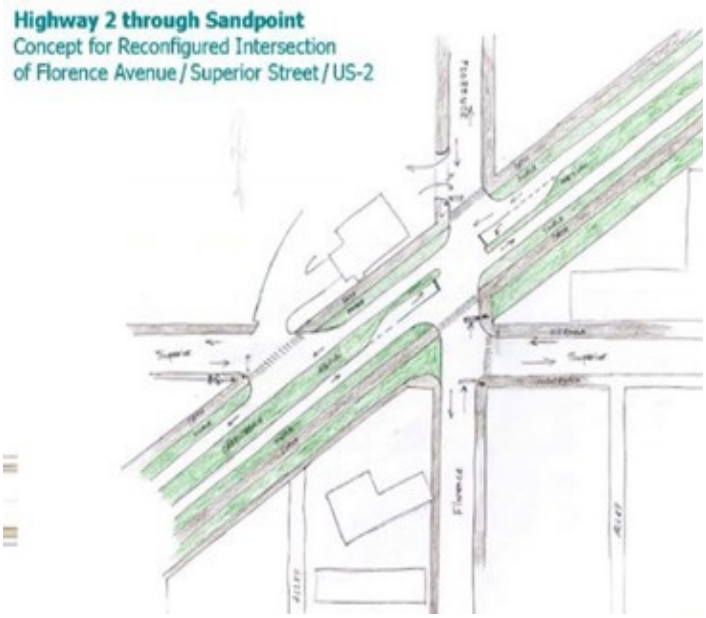
FIGURE 34. PEDESTRIAN INTERSECTION CROSSING

US 2/Superior Street/Florence Avenue

This intersection has the highest number of crashes of the intersections reviewed on the corridor and is ranked at 419 on the ITD High Accident List list with a frequency rank of 321 and a severity rank of 674.

Due to the complexity of this intersection, a separate intersection study will be necessary to determine the appropriate configuration. Additionally, because the intersection is approximately 800 feet from the Boyer Avenue signal, signal spacing will not meet ITD criteria. To improve this intersection, the approach legs should be reconfigured to form a more typical four-leg intersection and the skew minimized to the extent possible. **Figure 35** illustrates a concept from the US 2/200 Corridor Study (Reference 8) which addresses the size and of the intersection and number of approaches. Evaluation of additional design concepts, similar to the one shown in Figure 35, and options to reduce the skew is recommended.

FIGURE 35. CONCEPT FROM US 2/200 CORRIDOR STUDY (SOURCE: REFERENCE 10)



PAVEMENT IMPROVEMENTS & GEOMETRIC IMPROVEMENTS

Pavement Improvement

Based on discussions with ITD staff, pavement maintenance is a high priority along US 2 and many sections were improved in 2017. In the future, pavement conditions will continue to deteriorate and then be improved as part of maintenance on the corridor. In addition to poor pavement conditions that will be addressed through maintenance projects, there are also some locations that have geotechnical conditions that result in lack of a stable roadway base or other issues. These sections may require reconstructing the roadway base to stabilize the roadway. These areas include:

- Soft areas near MP 3.3 and MP 14.4 where past work has included using sawdust fill to stabilize the roadway base.
- Some areas of rutting where recent grinding and overlays have not fully removed the ruts.

Horizontal Curve Lengths

There are many horizontal curve locations that do meet ITD's minimum length criteria. The locations are illustrated in **Figure 36**. Short horizontal curves are sometimes necessary due to constraints but can result in appearing like a "kink" in the roadway.

A review of the crash data did not identify unique crash patterns at these locations, so mitigation measures were not evaluated. Therefore, these locations should be reviewed to ensure adequate signing is in place. Additionally, the locations should be evaluated at the time other widening or roadway reconstruction projects to determine if the short curve lengths can be improved as part of other projects.

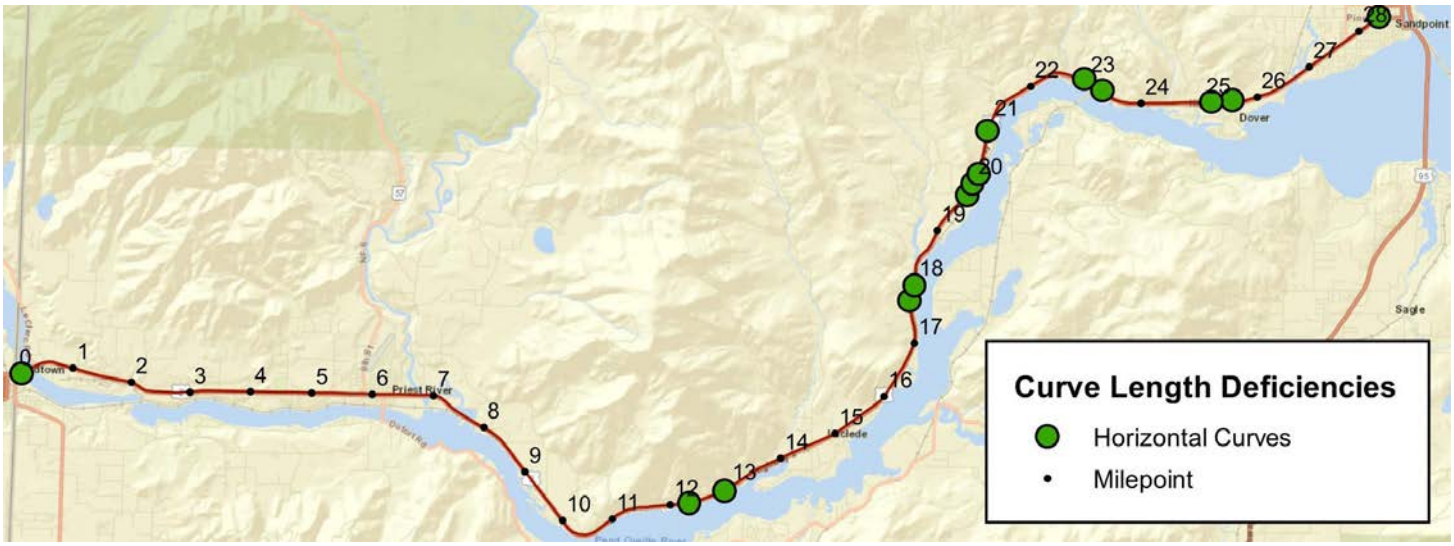
Other Geometric Improvements

Stakeholder interviews identified that the super-elevation on the horizontal curve east of the bridge at Oldtown (MP 0.5) causes difficulties for traffic using driveways along the curve.

A review of the crash data did not identify a high number of crashes or unique crash pattern that may indicate a safety issue, but the locations of the commercial driveway accesses on the curve with the super-elevated section could result in future safety issues as traffic volumes increase on the highway and additional commercial development occurs. Future location of commercial driveway access on the curve should be avoided. Additionally, if the highway is ever reconstructed, reducing the super-elevation should be examined.

View From Driveway onto Curve at MP 0.5

FIGURE 36. LOCATIONS WITH HORIZONTAL CURVE LENGTHS THAT DO NOT MEET ITD POLICY



IMPROVEMENTS BEYOND 2040

The 2040 traffic evaluation found that the section of US 2 through Sandpoint is projected to reach the LOS D threshold and the east-west through movements on US 2 are projected to operate at 70 to 80 percent of their capacity during the summer weekday (Friday) peak hour. This indicates that widening of US 2 to five lanes will be needed beyond 2040 for the sections in Sandpoint to maintain current levels of service. The timing for the widening will depend on the rate of traffic growth but is projected to be needed approximately 10 to 15 years beyond the 2040 planning horizon, in approximately 2050. While 2050 is over 30 years in the future, widening of US 2 through Sandpoint will require significant planning, investment, and evaluation of alternatives. Additionally,the US 2/Michigan Street/ Olive Avenue intersection will likely need channelization improvements due to the six-leg configuration, skew of US 2, and increases in traffic over the long-term. Therefore, development of a long-term vision and plan that will accommodate future traffic demands and freight accessibility through Sandpoint is recommended.

SUMMARY OF RECOMMENDED PROJECTS

RECOMMENDED PROJECTS, PRIORITIZATION & PHASING

Based on each of the improvement strategies and recommendations, specific projects were identified and prioritized. A total of approximately 38 projects are identified with this plan and a brief summary of the phasing is presented in this section. The projects were then ranked to identify priority and evaluated with respect to a potential timeframe.

The prioritization process utilized six criteria. The six criteria are:

- Timeframe
- Operations Benefit
- Safety Benefit
- Bicycle/Pedestrian Benefit
- Freight Benefit
- Construction Cost & Impact

Priority levels were assigned based on the final rankings. Timeframes (near-term, medium-term, and long-term) were determined based on a combination of the priority ranking and when an improvement may need needed. The evaluation results are shown in **Tables 4, 5 and 6**.

Based on the priority levels, timeframe in which the improvement may be needed each project was assigned into one of three timeframe: near-term, medium-term, and long-term.

Figure 37 shows the potential projects on a map of the corridor. The projects identified in the plan are categorized by the following lettering scheme:

P – Passing Lanes and Turn Lanes

S – Shoulder Widening

I – Intersection

A – Additional improvements

Tables 4, 5, and 6 summarize the near-term, medium-term, and long-term projects, respectively, for this plan. To support the implementation strategy, a project prospectus sheet has been developed for each of the projects containing key information for reach project. The project prospectus sheets are included in Appendix A.

Figure 37 illustrates the approximate project locations.

NEAR-TERM IMPROVEMENTS (0 TO 10 YEARS)

The near-term phasing represents an approximate timeline of the next ten years for planning, design, and construction of the identified improvements. Table 4 shows the recommended near-term projects.

TABLE 4. NEAR-TERM PROJECT RECOMMENDATIONS

Project #	Project Name	Project Description	Priority	Estimated Cost
A1	Animal Crash Reduction Strategies Focus areas include: MP 2.5; 4.0-4.5; 9.5-10; 12; 13.2 – 13.5; 16.95-17.0: 3; 20.9-21.3On	Further study of applicable treatments is necessary. Install signage active detection systems in key locations, or underpasses/fencing where possible.	**High**	**Further Study Needed**
S3	Shoulder Widening-MP 4.0-5.35	Widen paved shoulders to 6 ft focused on two short sections with 3 ft shoulders that exist at turn lane locations. This could be done along with passing lanes P2 and P3.	**High**	**$826,000**
S5	Shoulder Widening-MP 6.90-7.25	Widen/add paved shoulders from 1-3 ft to 6 ft and to connect to sidewalk across bridge	**High**	**$469,000**
S12	Shoulder Widening - MP 16.25-19.50	Widen shoulders from 3-6 ft with a short section with 1-foot shoulders to 6 ft in this overall section to remove inconsistencies in shoulder widths.	**High**	**$3,130,400**
A2	Centerline Rumble Strips	Add centerline rumble strips to all rural two-lane sections of the highway.	**Moderate**	**$95,980**
I1	US 2/SH57	Widen northwest quadrant of intersection and modify signal to accommodate southbound WB-67 trucks.	**Moderate**	**$119,400**
I2	US 2/Wisconsin Street	Improve grade at intersection, alignment across intersection and install signal if warranted. This project has a funding from LHTAC.	**Moderate**	**$1,117,000**
I4	US 2/Division Avenue Signal Phasing Timing Modifications	Modify the signal timing and phasing to better allocate peak hour green time to US 2.	**Moderate**	**$10,000**

MEDIUM-TERM IMPROVEMENTS (10 TO 20 YEARS)

The medium-term phasing represents an approximate timeline of 10 to 20 years for planning, design, and construction of the identified improvements. Table 5 shows the recommended medium-term projects.

TABLE 5. MEDIUM-TERM PROJECT RECOMMENDATIONS (10-20 YEARS)

Project #	Project Name	Project Description	Priority	Estimated Cost
P1	2+1 Eastbound Passing Lane (Approx. MP 1.10-2.00)	Add an eastbound passing lane as part of a 2+1 configuration between Oldtown and Priest River to add capacity and improve operations and safety. Should be located to the east of any potential development in Oldtown.	**Moderate**	**$1,922,300**
P2	2+1 Westbound Passing Lane (Approx. MP 2.50-3.17)	Add a westbound passing lane as part of a 2+1 configuration between Oldtown and Priest River to add capacity and improve operations and safety.	**Moderate**	**$943,000**
P3	2+1 Eastbound Passing Lane (Approx. MP 3.40-4.30)	Add an eastbound passing lane as part of a 2+1 configuration between Oldtown and Priest River to add capacity and improve operations and safety	**Moderate**	**$1,302,100**
P4	2+1 Westbound Passing Lane (Approx. MP 4.80-5.35)	Add a westbound passing lane as part of a 2+1 configuration between Oldtown and Priest River to add capacity and improve operations and safety.	**Moderate**	**$772,400**
P5	Westbound Passing Lane (Approx. MP 13.10-14.30)	Add a westbound passing lane configuration west of Laclede to add capacity and improve operations and safety.	**Low**	**$1,590,100**
P6	Eastbound Passing Lane (Approx. MP 15.00-15.80)	Add an eastbound passing lane configuration east of Laclede to add capacity and improve operations and safety.	**Low**	**$1,013,000**
P7	Westbound Passing Lane (Approx. MP 18.60-19.71)	Add a westbound passing lane between Laclede and Dover to improve operations and safety.	**Low**	**$1,600,300**
P8	Eastbound Passing Lane (Approx. MP 20.20-20.70)	Add a westbound passing lane between Laclede and Dover to improve operations and safety.	**Low**	**$877,800**
T1	Extend center left-turn lane (MP 0.70-1.10)	Extend the existing center left-turn lane as part of a 2+1 configuration between Oldtown and Priest River to serve an adjacent section of highway with a high number of driveways. Should be extended as far as necessary to the east to capture any potential development in Oldtown.	**Low**	**$618,400**

Project #	Project Name	Project Description	Priority	Estimated Cost
T2	Add center left-turn lane (MP 4.30-4.80)	Extend the existing center left-turn lane as part of a 2+1 configuration between Oldtown and Priest River to serve an adjacent section of highway with a high number of driveways and local streets.	Low	$1,728,000
T3	Extend center left-turn lane (MP 14.30-15.0)	Extend the existing center left-turn lane to serve driveways and local streets in Laclede.	Low	$867,720
T4	Add center left-turn lane or median with turn pockets in Sandpoint (MP 27.08-5th Ave)	Add center left-turn lane or median with turn pockets to facilitate access to businesses at key public street intersections and provide a pedestrian median refuge.	Low	$1,793,400
S1	Shoulder Widening MP 0.00-1.00	Add shoulder/bike lanes on the curbed section west of the bridge and narrow sections of shoulders on east side of the bridge to a minimum of 6 feet. The bridge is not proposed to be widened	Low	$645,400
S2	Shoulder Widening MP 2.00-3.5	Widen shoulders in narrow areas and where turn lanes have been added	Low	$837,200
S4	Shoulder Widening MP 5.35-6.80	This project would add 6 foot-shoulders/bicycle lanes through the City of Priest River.	Moderate	$3,571,400
S10	Shoulder Widening - MP 13.0-15.0	Widen shoulders from 4-5 ft and a short section in Laclede with 1 ft shoulders to 6 ft in this overall section.	Low	$3,158,000
S11	Shoulder Widening - MP 15.00-16.25	Widen shoulders from 3-6 ft sections to 6 ft in this overall section to remove inconsistencies in shoulder widths and shoulder surfaces.	Moderate	$966,000
S16	Shoulder Widening - MP 26.5-28.35	Widen shoulders from 1-2 ft sections to 6 ft to serve as shoulders and bicycle lanes.	Moderate	$2,646,000
I6	US 2/Superior Street/Florence Street Median and Channelization Improvements	Reconfigure intersection approaches to minimize intersection skew and add median to restrict access to local streets	Moderate	$1,740,000

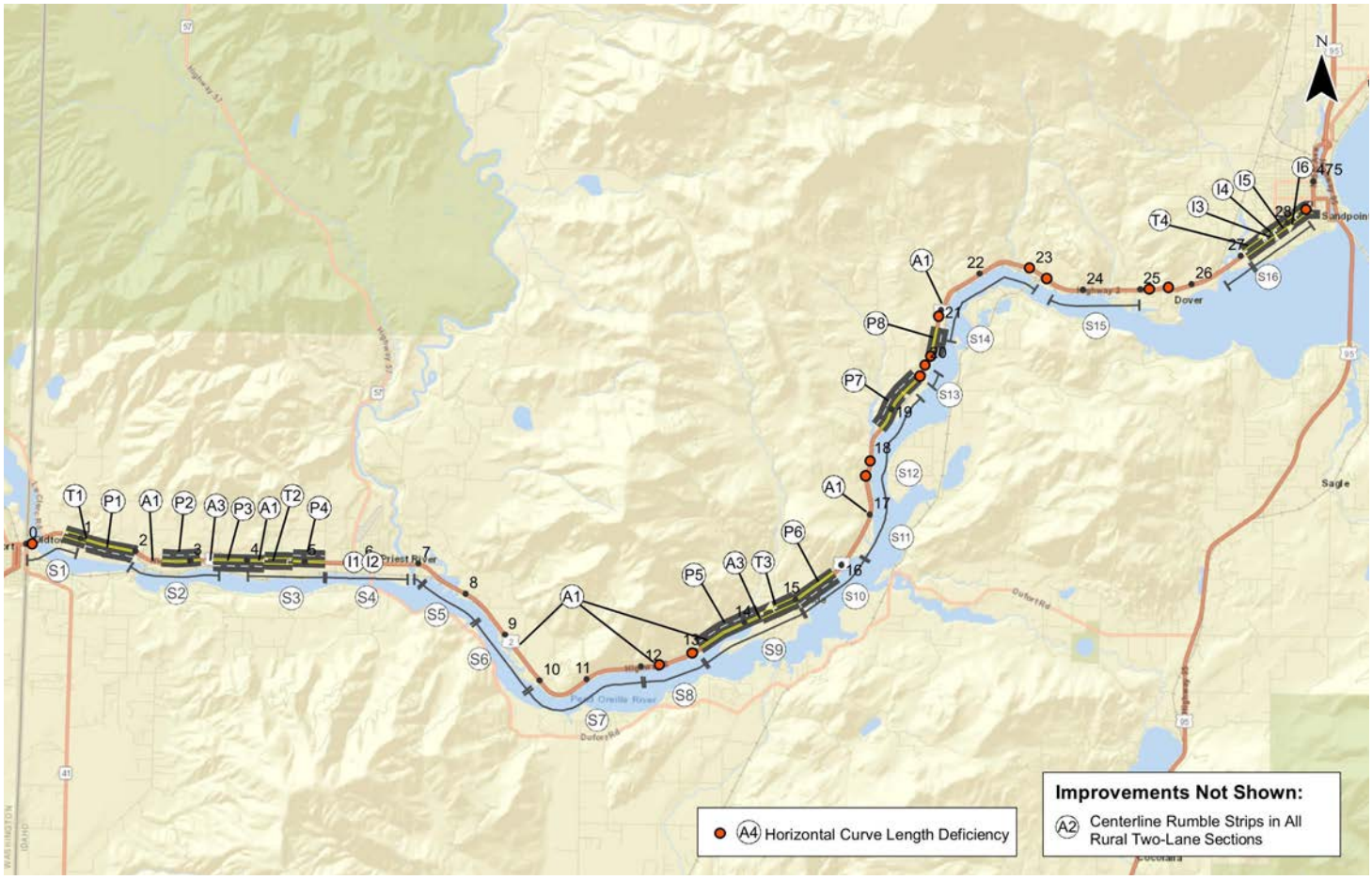
LONG-TERM IMPROVEMENTS (20+ YEARS)

The long-term projects represent projects that are not likely needed until approximately 20 years, or more, in the future. Table 6 shows the recommended long-term projects.

TABLE 6. LONG-TERM PROJECT RECOMMENDATIONS (20+ YEARS)

Project #	Project Name	Project Description	Priority	Estimated Cost
S6	Shoulder Widening - MP 7.25-8.50	Widen shoulders from 3-5 ft sections to 6 ft in this overall section to remove inconsistencies in shoulder widths and shoulder surfaces.	Moderate	$1,513,400
S7	Shoulder Widening - MP 8.50-10.00	Widen shoulders from 4-6 ft sections to 6 ft in this overall section to remove inconsistencies in shoulder widths and shoulder surfaces.	Low	$1,080,800
S8	Shoulder Widening - MP 10.00-12.00	Widen shoulders from 3-6 ft sections to 6 ft in this overall section to remove inconsistencies in shoulder widths and shoulder surfaces.	Moderate	$1,941,800
S9	Shoulder Widening - MP 12.00-13.0	Widen shoulders from 3-5 ft in sections to 6 ft in this overall section to remove inconsistencies in shoulder widths and shoulder surfaces.	Moderate	$964,600
S13	Shoulder widening - MP 19.75-20.00	Widen shoulders from approximately 5 ft to 6 ft in this overall section to remove inconsistencies in shoulder widths and shoulder surfaces.	Low	$201,600
S14	Shoulder Widening - MP 20.5-23.25	Widen shoulders from 4-5 ft sections to 6 ft in this overall section to remove inconsistencies in shoulder widths and shoulder surfaces.	Low	$1,856,400
S15	Shoulder Widening - MP 23.5-25.0	Widen shoulders from 4-6 ft sections to 6 ft in this overall section to remove inconsistencies in shoulder widths and shoulder surfaces.	Low	$746,200
A4	Lengthen Horizontal Curves	Modify horizontal curves have lengths that don't meet current ITD policy during other improvement projects. MP 0.10,. 12.32, 12,93, 17.70, 17.97, 19.76, 19.97, 20.16, 20.90, 22.96, 23.31, 25.17, 25.56, 28.40 (urban).	Low	Incorporate into Other Projects
I3	US 2/Ontario Street Left-turn Circulation Modifications	Local circulation improvements and channelization to accommodate minor street left-turns and to restrict them at intersections.	Low	$1,980,000
I5	US 2/Michigan Street Median and Channelization Improvements	Plan for long-term channelization improvements to reduce vehicle path overlaps and conflicts, potentially reduce the skew in intersection approaches and possibly include circulation improvements to reduce number of intersection legs.	Low	$1,320,000
C1	Widen US 2 to 5 lanes in Sandpoint	Plan for long-term widening of US 2 to 5 Lanes from Rocky Point Road (MP 26.5) to 5th Avenue in Sandpoint. This is expected to be required beyond 2040.	Low	Unknown (Further Study Required)

FIGURE 37. APPROXIMATE PROJECT LOCATIONS



RECOMMENDATIONS SUMMARY

Based on this analysis, the study section of US 2 will function acceptably as a two-lane highway through the 2040 planning horizon. But there are improvement needs that have been identified as part of the existing conditions and future conditions analysis. The projects recommended in this study will improve operations to accommodate the projected traffic demand through the 2040 horizon year for most sections of the corridor and improve safety. Additionally, these projects should serve as a foundation for developing future projects for inclusion in the state ITIP.

REFERENCES

REFERENCES

1. US Census Bureau. *American Community Survey Five Year Estimates.* 2017.
2. City of Dover. C*omprehensive Plan - Draft.* 2017.
3. Idaho Department of Transportation. *Roadway Design Manual*. 2013.
4. Bonner County. *Trails Plan*. 2016.
5. Idaho Department of Transportation. *Idaho Traffic Crashes*. 2015.
6. American Association of State Highway and Transportation Officials. *Highway Safety Manual*. 2010.
7. Inland Pacific Hub Advisory Board. I*nland Pacific Hub Transportation Study – Technical Memorandum 1*. 2017.
8. New Mobility West. *Quad Cities, Idaho – Highway 2/200 Corridor*. 2016.
9. Federal Highway Administration. *Safety Evaluation of Installing Center Two-Way Left-Turn Lanes on Two-Lane Roads.* 2008.
10. Federal Highway Administration. *Wildlife Vehicle Reduction Study*. 2008.
11. Idaho Department of Transportation. *Idaho Traffic Crashes*. 2016.
12. American Association of State Highway and Transportation Officials. P*olicy on Geometric Design of Highways and Streets.* 2011
13. Transportation Research Board. *Highway Capacity Manual*. 2016.

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