Kootenai Metropolitan Planning Organization

Railroad Quiet Zones

An Information Guide

May 2019

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Background

Historically, trains have used their horns or whistles as a universal safety precaution when nearing grade crossings and in other circumstances. Railroad Quiet Zones, or whistle bans, existed in a number of places throughout the country for decades prior to current regulations. However, in the 1980s, the Federal Railroad Administration (FRA) studied Florida's whistle bans (allowed by state statute) and found a 195 percent increase[1] in the number of nighttime train-vehicle collisions at grade crossings.

In 1994, Congress enacted a law that required the FRA to regulate train horns at public crossings. The Train Horn Rule was finalized in 2006. These regulations, while setting standards for the use of train horns, also continued to provide communities with the option for relief from horns by detailing the process and criteria for creating Quiet Zones.[2]

What is the purpose of train horns?

The train horn is used specifically to warn travelers at public grade crossings that a train is approaching. The Train Horn Rule requires the horn to be sounded 15 to 20 seconds before entering the crossing. The pattern is two long, one short, two long and is repeated until the locomotive clears the crossing. Train whistles must be between 96 – 110 decibels.

What is a Quiet Zone?

A Quiet Zone (QZ) is a stretch of railroad that is a one-half mile in length or longer where trains do not sound their horns at crossings. In order to maintain safe crossings, additional safety treatments are installed.

Quiet Zones are defined and regulated by the FRA. The Train Horn Rule states that trains must use their whistles at crossings except when 1) a certified local QZ is created or 2) when wayside horns are used. This ruling preempts any local regulations, and both local agencies and railroads are required to adhere to the law. Within a Quiet Zone, trains are still allowed to use their horns in cases of emergency.

How are Quiet Zones established?

The process to establish a Quiet Zone can be a long and complex process. Local agencies and the railroads must follow all specifications outlined in the FRA regulations.

Quiet Zones are authorized and established by the local agency with jurisdiction of the roadway at the crossing. Without the horn, an adequate level of safety must be maintained. All crossings within the QZ must go through a full safety analysis by a diagnostic team made up of state and local agencies, railroad officials, and FRA managers. They must determine the Quiet Zone Risk Index (QZRI), or what the additional safety risk is without horns, and what safety measures, if needed, must be installed.

One of the following conditions must be met in order for a crossing to qualify for a QZ:

1. *The QZRI is less than or equal to the Nationwide Significant Risk Threshold (NSRT).* The NSRT is the annual average risk at all the Nation's public crossings equipped with gates and lights when train horns are sounded.

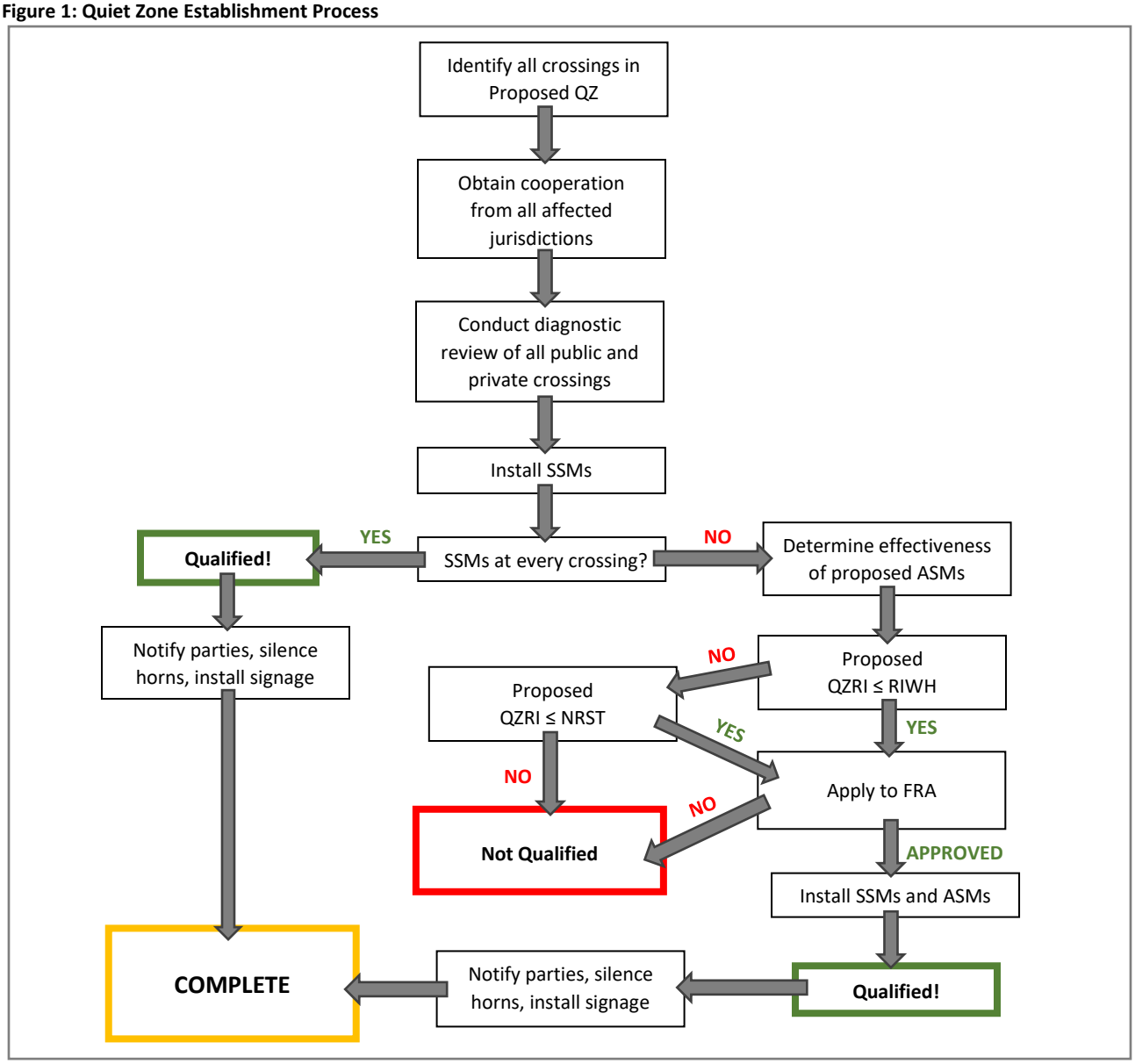
[1] Government Accountability Office, Railroad Safety: Quiet Zone Analyses and Inspections Could be Improved, 2017, p. 2

[2] Federal Railroad Administration, Guide to the Quiet Zone Establishment Process: An Information Guide, nd., p. 3

2. *The QZRI is less than or equal to the Risk Index With Horns (RIWH) with the additional safety measures*. The RIWH is the average risk for all public crossings in the proposed QZ with horns are sounded.
3. *Install Supplementary Safety Measures (SSMs) at every public highway-rail crossing.*[3]

Safety measures must be professionally engineered and use specific technologies, in order to be approved by the FRA. The safety improvements are installed by the railroad at 100% local agency expense. Figure 1 summarizes the establishment process.[4]

Figure 1: Quiet Zone Establishment Process



[3] FRA, Guide to the Quiet Zone Establishment Process, nd., p. 4

[4] Federal Railroad Administration, How to Create a Quiet Zone, 2012, p. 6

What Safety Measures are Allowed?

At a minimum, all crossings must have active warning devices, which include flashing lights, gates, constant warning time devices, and power out indicators.

The FRA details four specific SSMs approved for Quiet Zones:

1) Closing Street/Crossing – Permanent or Temporary or by grade separation
2) Four Quadrant Gates – Gates prohibiting traffic on all lanes, in both directions
3) Two Quadrant Gates with Medians/Channelization – Gates prohibiting traffic in each direction with a median at least 60 feet in length from gate to intersection
4) One-way Street with Gates

Additional information on safety measures is detailed below.[5]

Street Closure (Partial or Permanent)

Photo: Quiet Zone Technologies

Required

- ✓ Must completely block traffic on all lanes
- ✓ Must completely block pedestrian access

PROS	CONS
► No conflicts between vehicles and trains ► Low cost ► Partial closures can be implemented from 10 PM to 7 AM	► Limits access

COST Permanent: $70,000 - $160,000
Partial: $250,000+

Grade Separation

(included under 'Street Closure')

Photo: Kohli & Kaliher Associates

Required None Specified

PROS	CONS
► No interactions between vehicles and trains ► Guaranteed no horns	► Most expensive treatment

COST $5 million +

[5] 49 C.F.R. § 222 Subpart C, Appendix A (2019)

Four Quadrant Gates

Photo: Trains and Locomotives Wiki

Required

- ✓ Gates must span all travel lanes
- ✓ Must utilize constant warning devices
- ✓ Gate ends must be no farther than two feet apart when lowered, unless a median is present

PROS	CONS
► Eliminates the risk of drivers going around gates	► Expensive

COST $900,000+

Two Quadrant Gates with Medians or Channelization

Photo: Lacrosse Tribune (top); Federal Railroad Administration (bottom)

Required

- ✓ Median must extend 100 feet from gates or 60 feet intersection is within 100 feet
- ✓ Median must be non-traversable
- ✓ Must utilize constant warning devices
- ✓ Gap between gate ends and curb or channelization must be less than 1 foot

PROS	CONS
► Low cost ► Medians or channelization can be added to gated crossings	► May not be feasible at all locations ► Intersections within 60 feet of gates must be closed

COST Gates $700,000+
(includes median/channelization)
Median $95,000+

One-way Street with Gates

Photo: Quiet Zone Technologies

Required

- ✓ Gate arms must extend across the road within one foot of the pavement edge
- ✓ If only one gate, far edge must have non-traversable curb
- ✓ Must utilize constant warning devices

PROS	CONS
► Eliminates the risk of drivers going around gates	► Limits access ► May need more than one gate depending on road width

COST $250,000 - $550,000

Non-Motorized Crossing[6]

Used in conjunction with other SSMs

Photo: KTLA 5 News

Required

- ✓ Horns or bells must still be sounded if required by state law
- ✓ Pre-existing bells must remain in use
- ✓ Must be included in diagnostic review

- The FRA recommends including bells at non-motorized crossings
- Gates are not required for non-motorized crossings but may increase safety
- Treatments may differ depending on individual railroad requirements

COST $65,000 - $200,000

The FRA also allows for the use of Alternative Safety Measures (ASMs). These may include three-quadrant gates, shortened medians, or others. These treatments must be submitted to FRA for approval prior to implementation.

[6] 49 C.F.R. § 222.27 (2019)

What are Wayside Horns?

Wayside horns are sound devices that are installed at a crossing and replace the train's horn. These devices are triggered by the approach of the train and sound their horns directly down the roadway at the crossing. The footprint of the noise produced by wayside horns is significantly less than that of the train's horn, as can be seen in Figure 2, resulting in less noise impact to surrounding land uses. Wayside horns can be used as an alternative to a Quiet Zone or as an added safety measure within a QZ. Wayside horns must be used in conjunction with existing gated crossings. The cost of these systems may start around $30,000 but may cost over $100,000 if the crossing needs to be updated with gates.[7]

Figure 2: Wayside Horn Contour Comparison

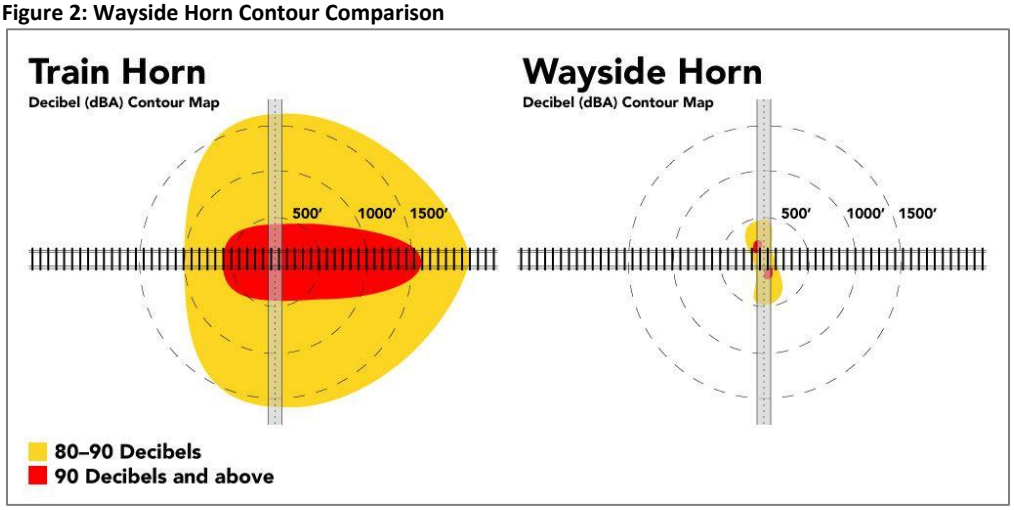


Image from City of Merriam, Kansas

What does it cost to establish a Quiet Zone?

The cost of establishing a QZ can vary greatly depending on the safety improvements and the number of crossings within the QZ. Estimated costs can range from $30,000 to over $1 million.[8] There are also ongoing costs associated with QZs. Annual maintenance of QZ crossings can be between $5,000 to $10,000 for each crossing.[9]

Are there benefits to Quiet Zones?

The Government Accountability Office (GAO) reports that some cities cite benefits such as increased economic development and quality of life for residents in areas where Quiet Zones exist. Although some may think that, with additional improvements at crossings, they may be safer, there is no data that can conclusively state that Quiet Zones provide additional safety benefits.

What about disadvantages?

While agencies may not be opposed to the benefits Quiet Zones generate, cost is, ultimately, the largest drawback for jurisdictions. Not only can it be very expensive to establish a QZ, but there are on-going annual maintenance costs, as well.

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[7] City of Spokane Valley, Railroad Quiet Zones Report, 2011, p. 3

[8] Federal Railroad Administration, How to Create a Quiet Zone, 2012, p. 6. Costs are likely higher than 2012 estimates.

[9] Union Pacific Railroad, Federal Railroad Administration's Train Horn & Quiet Zone Rule, n.d., web. Costs are likely higher than those estimated.

How do Railroads feel about Quiet Zones?

"Union Pacific believes quiet zones compromise the safety of railroad employees, customers, and the general public. While the railroad does not endorse quiet zones, it does comply with the provisions outlined in the federal law…. Establishing quiet zones not only creates a public safety risk but also is a potential cost burden to taxpayers. Public authorities are responsible for the cost of preliminary engineering, construction, maintenance and replacement of active warning devices or their components, including wayside horn systems installed at crossing to meet quiet zone standards."[10]

"BNSF encourages public authorities to make the safety of the traveling public and BNSF employees their priority…BNSF strongly recommends safety measures at all at-grade crossings within the limits of the Quiet Zone corridor. BNSF reserves the right to object to any Quiet Zone which does not have safety measures at every Public Crossing. "[11]

How are Quiet Zones Funded?

Quiet Zones must be paid for by the local agency establishing the Zone. There are currently no funding mechanisms specifically targeted to assist in the establishment of QZs. There are some grants that can be used to fund SSM improvements at crossings to improve safety but not specifically for QZ improvements, as these improvements are not a safety, but a livability issue. Table 1 lists a few funding options that may be used to supplement the total cost for QZ establishment.

Table 1: Potential Funding Mechanisms

Mechanism	Description
Local Improvement District (LID)	Local taxing district that is formed to provide funding for capital improvement projects within a geographic area. Improvements are paid for by the benefiting property owners.
Safety Funds	Railroad safety funds may be used at crossings that have a history of fatal or injury accidents. This funding source may be appropriate to upgrade qualifying grade crossings with initial safety improvements, such as adding gates and/or lights.
TIFIA (Transportation Infrastructure Finance and Innovation Act)	This program provides credit assistance for significant national or regional projects. This funding source may be appropriate for large-scale projects, such as grade separations along the BNSF corridor.
FRA Grants	Variety of grants available through the FRA. Funding may be available to upgrade crossings.

[10] UPRR, Federal Railroad Administration's Train Horn & Quiet Zone Rule, n.d., web.

[11] BNSF Railway, Public Projects Manual, 2018, p. 47-49

I already pay taxes. Shouldn't those funds go towards the creation of a Quiet Zone?

The funding that agencies receive from taxes are often already obligated with agency budgets, as these are guaranteed funds that agencies use for day-to-day operations and maintenance. Large projects are often funded by other means, such as grants. Local transportation dollars are used to mitigate capacity and safety issues within the local roadway. Mitigating train horn noise falls outside of this scope.

Priority Quiet Zones in Kootenai County

Proposed Quiet Zones

KCATT's subcommittee on Railroad Quiet Zones identified a section of the Union Pacific Railroad main line from McGuire Road to Idaho Road as a priority location for the establishment of a Quiet Zone.

The subcommittee considered several factors when looking at priority areas:

- Density of residential development (exhibits current or future suburban development patterns)
- Impact of horns on commercial and residential activity
- Number of crossings included within the Zone
- Condition of crossing infrastructure
- Planned projects for proposed crossings
- Available funding for construction and annual maintenance

Figure 3: Proposed Quiet Zone - McGuire Road to Idaho Road

However, the cost to establish a Quiet Zone from McGuire Road to Idaho Road is still significant. Table 2 details the estimated costs for proposed improvements. Total costs include estimates for project construction, based on current conditions and infrastructure at those crossing locations, as well as an additional 35% for engineering, 20% for inter-agency coordination, and 25% for contingency.

Table 2: Estimated Costs for McGuire-to-Idaho Quiet Zone

Crossing	Treatment	Estimated Cost
McGuire Road	**Median/Channelization**	**$391,000**
	Constant Warning Detection[12]	$128,000
	+Second Track	$64,000
	Median	$20,000
	Signs	$5,000
	Engineering/Coordination/Contingency	$174,000
Poleline Ave.	**Grade Separation**	**$7,000,000**
Chase Road	**Median/Channelization**	**$275,000**
	Constant Warning Detection	$128,000
	Median	$20,000
	Signs	$5,000
	Engineering/Coordination/Contingency	$122,000
Grange Ave.	**Median/Channelization**	**$95,000**
	Median	$20,000
	Signs	$5,000
	Engineering/Coordination/Contingency	$70,000
Spokane St.	**Median/Channelization**	**$138,000**
	Median	$20,000
	Pedestrian Gates	$32,000
	Signs	$8,000
	Engineering/Coordination/Contingency	$78,000
Prairie Ave.	**Median/Channelization**	**$138,000**
	Median	$20,000
	Pedestrian Gates	$32,000
	Signs	$8,000
	Engineering/Coordination/Contingency	$78,000
Idaho Road	**Two-Quadrant Gates with Median**	**$751,000**
	Constant Warning Detection	$128,000
	Signals	$96,000
	Gates	$32,000
	Signal Control Cabinet	$48,000
	Concrete Planking	$54,000
	New Track/Track Bed	$34,000
	Median	$20,000
	Signs	$5,000
	Engineering/Coordination/Contingency	$334,000
	TOTAL	**$8,788,000**
	Annual Maintenance	**$70,000**

Note: All costs are estimates. Costs may vary by crossing location. Construction cost information is based off of 2018 Idaho Transportation Department estimates for railroad work and average unit prices.

[12] Constant Warning Detection is "a motion sensing system with the capability of measuring train speed and providing a relatively uniform warning time to public traffic at highway-rail intersections." *Operation Life Saver,* https://oli.org/education-resources/glossary . Constant Warning Detection systems are a requirement at crossings within Quiet Zones.

A more economical alternative for implementing the Quiet Zone would be to complete the project in stages starting with Chase Road to Idaho Road and completing McGuire Road to Chase Road later. This would allow for the city of Post Falls to acquire funding for the grade separation at Poleline Ave. Furthermore, constructing a gated crossing at Poleline Ave. (i.e. $750,000) as an alternative or for the interim would also be a cost-effective solution.

There is potential to expand this Quiet Zone over time, as well. The Subcommittee proposed expanding the Quiet Zone (once established) to include the sections from Stateline to McGuire Road and Idaho Road to Meyer Road as improvements are made to adjacent crossings. Once completed, the Quiet Zone would extend a total of nine miles and include 15 crossings.

Other potential Quiet Zones may be considered if the conditions for establishment are consistent with KMPO's Railroad Quiet Zone Policy.

Existing Quiet Zones

There is one existing Quiet Zone in Kootenai County which encompasses the BNSF crossing at Mill Street in downtown Rathdrum. The train horns were silenced in March 2011 after almost a decade of going through the establishment process. The Mill Street crossing required improvements to deter drivers from circumventing the crossing gates. The city of Rathdrum installed a median barrier and closed access to an alley southeast of the crossing. The cost to the city was $30,000-$40,000 at the time.

Although this Quiet Zone has already been established for a number of years, KMPO considers it a priority to maintain the Mill Street crossing as a Quiet Zone. This location exhibits all of the characteristics that the KCATT subcommittee considers when looking at regional QZ locations. The Mill Street Quiet Zone continues to bolster quality of life and economic development in the city's downtown district.

Quiet Zones vs. Grade Separations

The public has suggested several locations for the implementation of Quiet Zones throughout Kootenai County – many along the BNSF corridor. However, what many people may not be aware of is that all grade crossings along the BNSF rail line are slated to be replaced with grade separations in the future, as determined by the Bridging the Valley Project conducted by KMPO and Spokane Regional Transportation Council (SRTC) in 2005.

Cost is a limiting factor for both types of projects, but funds would be best used for constructing the planned grade separations. Grade separations guarantee that the train horn will be silenced, as well as eliminating car and train conflicts. With the implementation of grade separations, safety is significantly improved, and agencies do not need to be concerned about crossings remaining below a certain safety threshold.

Additional Resources:

- The Train Horn Rule and Quiet Zones Resource Page
  https://www.fra.dot.gov/Page/P0889

- Guide to the Quiet Zone Establishment Process
  https://www.fra.dot.gov/eLib/Details/L04781

- Government Accountability Office Railroad Safety Memo
  https://www.gao.gov/products/GAO-18-97

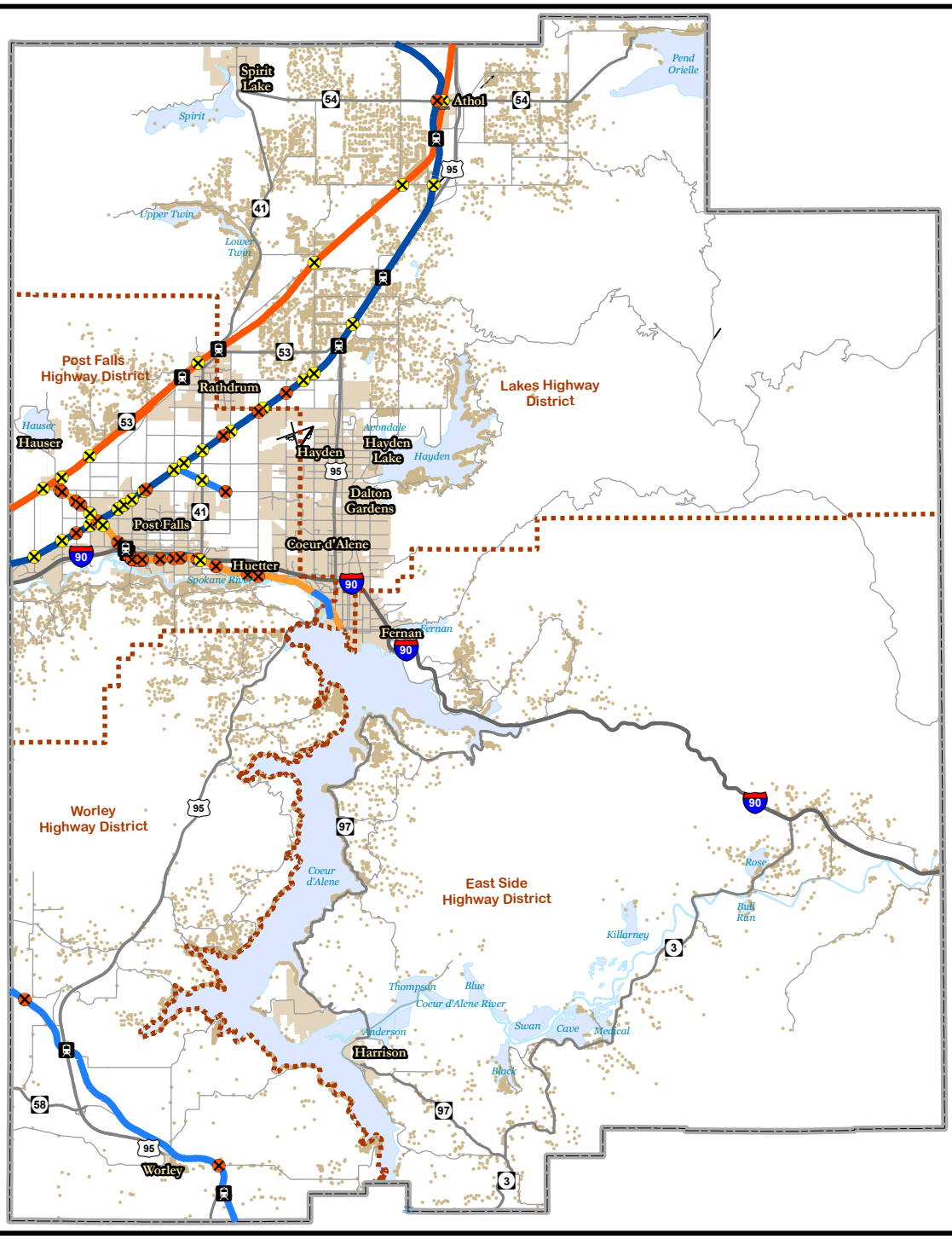
- The Train Horn Final Rule
  https://www.ecfr.gov/cgi-bin/text-idx?tpl=/ecfrbrowse/Title49/49cfr222_main_02.tpl

- Spokane Valley, WA Quiet Zone Report
  http://www.spokanevalley.org/filestorage/6836/6896/6914/Railroad_Quiet_Zones_110111.pdf

- Union Pacific Railroad Quiet Zone Information
  https://www.up.com/real_estate/roadxing/industry/horn_quiet/index.htm

- BNSF Project Manual
  http://www.bnsf.com/in-the-community/pdf/public-projects-manual-mtm.pdf

KOOTENAI COUNTY RAILROAD CROSSINGS



CURRENT RAILROAD CROSSINGS
Kootenai County

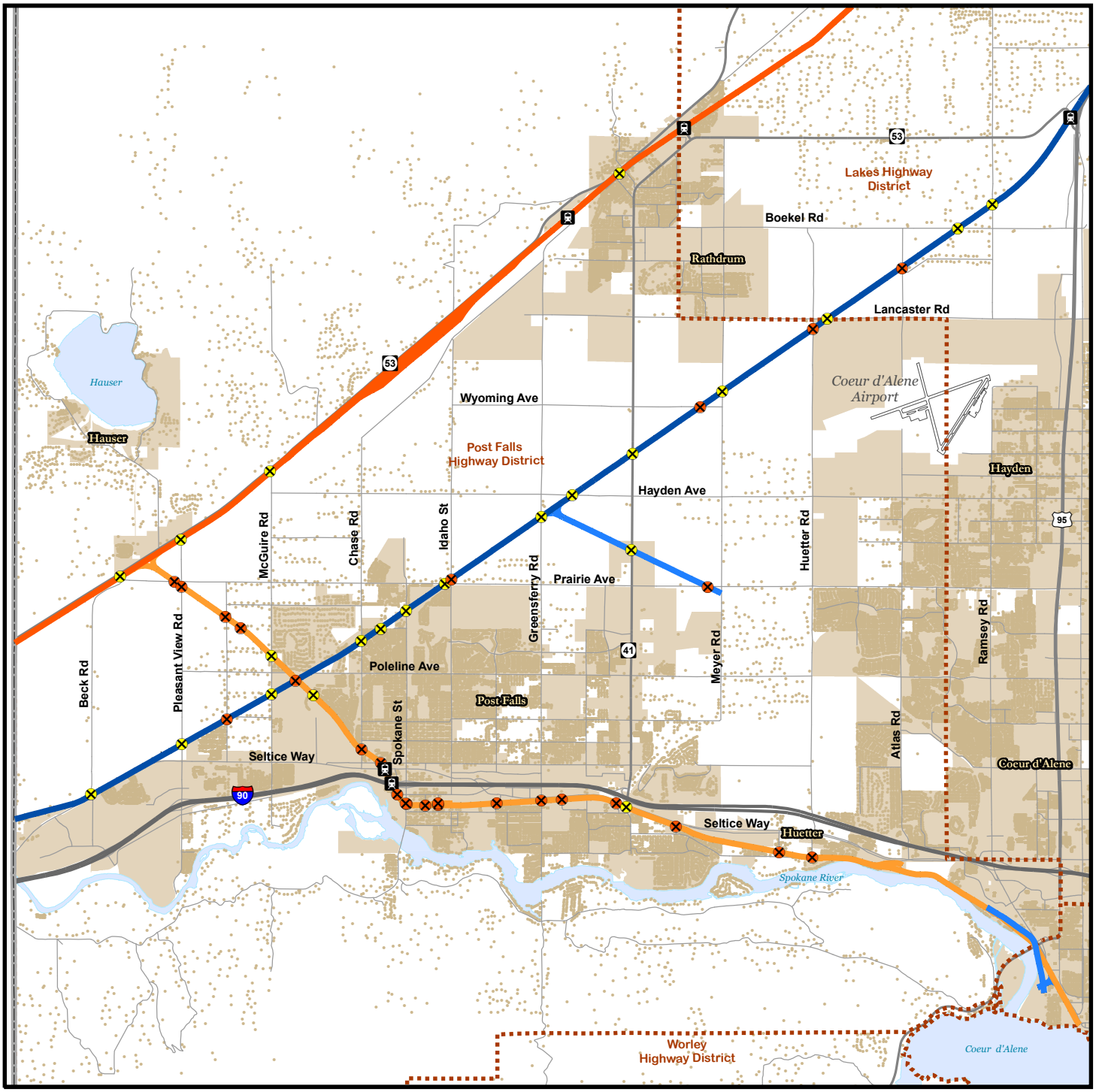
Railroad Crossings
- At-Grade
- At-Grade - Gated
- Grade Seperation
- Closed/Removed

Railroad
- BNSF Mainline
- BNSF Spur
- UP Mainline
- UP Spur

Physical Characteristics
- Cities
- Rural Dwelling Units
- Highway Districts
- Interstate
- US/State Highways
- Local Roads
- County Boundary

*Data based on best available information. *Data for illustrative purposes only.

KOOTENAI COUNTY RAILROAD CROSSINGS



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Kootenai MPO

CURRENT RAILROAD CROSSINGS
Urban Area

Railroad Crossings
- At-Grade
- At-Grade - Gated
- Grade Seperation
- Closed/Removed

Railroad
- BNSF Mainline
- BNSF Spur
- UP Mainline
- UP Spur

Physical Characteristics
- Dwelling Units
- Cities
- Highway Districts
- Interstate
- US/State Highways
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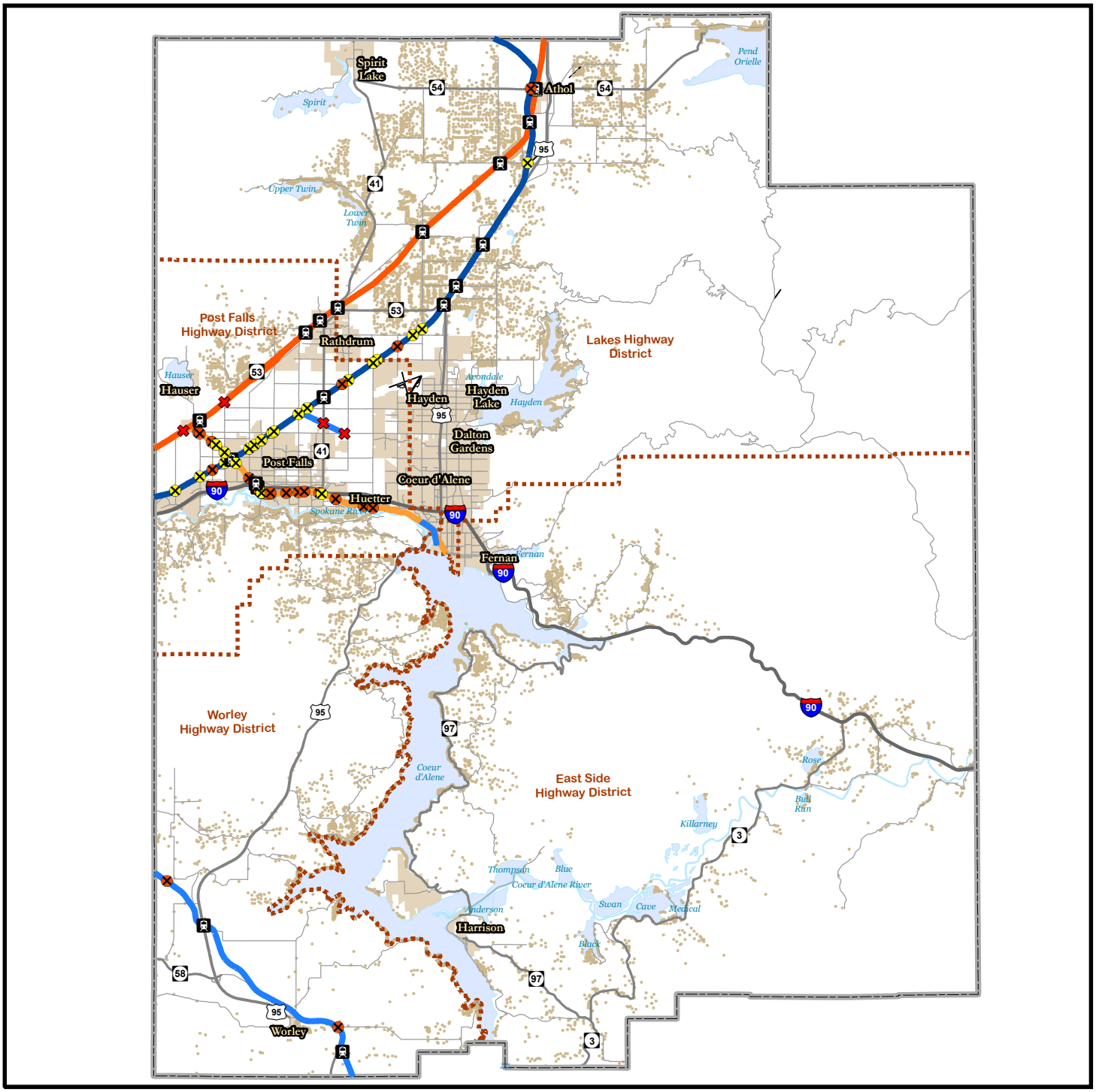
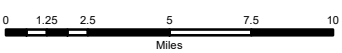
KOOTENAI COUNTY RAILROAD CROSSINGS





Kootenai MPO

FUTURE RAILROAD CROSSINGS
Kootenai County

Railroad Crossings

- At-Grade
- At-Grade - Gated
- Grade Seperation
- Closed/Removed

Railroad

- BNSF Mainline
- BNSF Spur
- UP Mainline
- UP Spur

Physical Characteristics

- Cities
- Rural Dwelling Units
- Highway Districts
- Interstate
- US/State Highways
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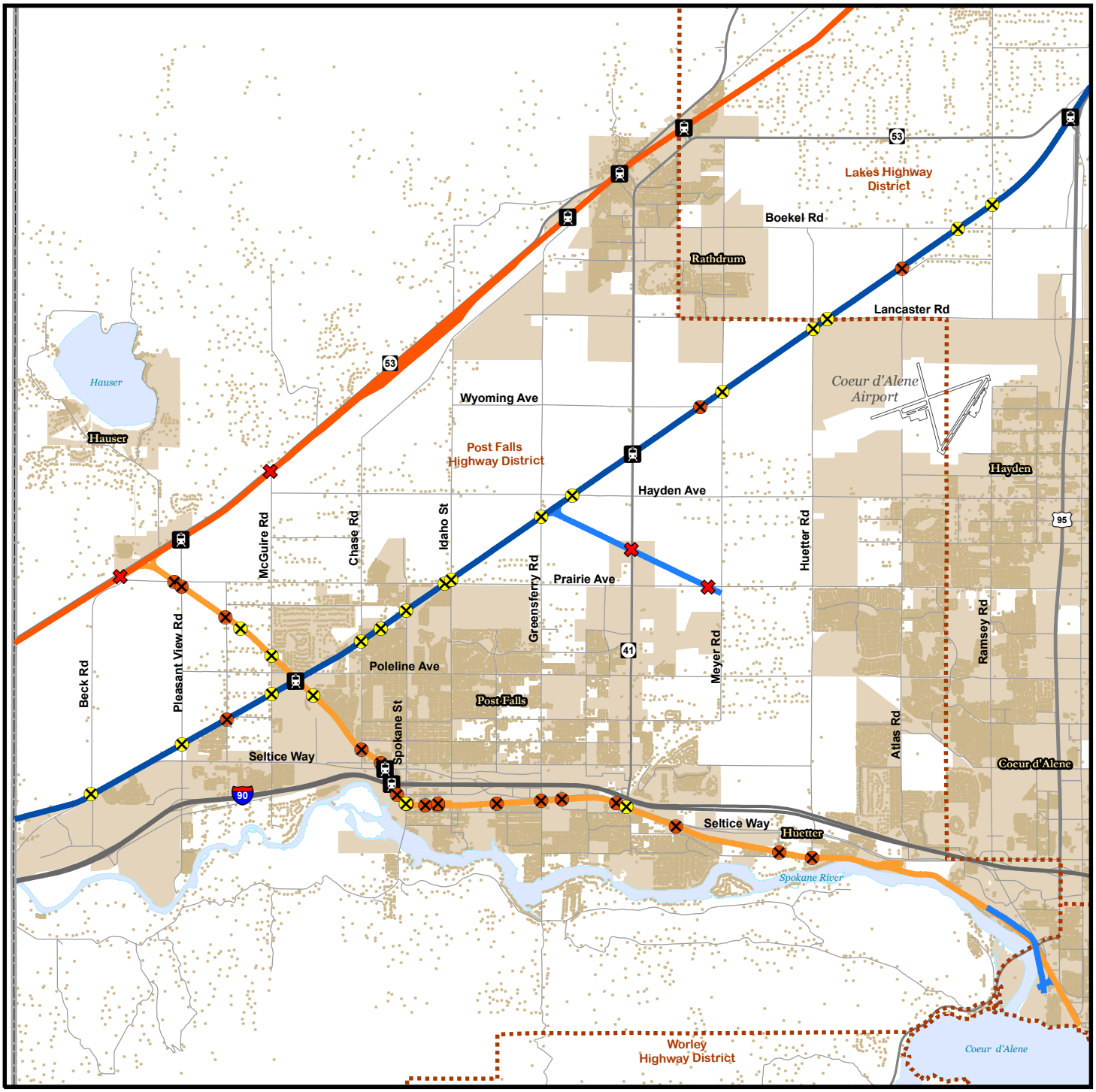
KOOTENAI COUNTY RAILROAD CROSSINGS



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Miles

Kootenai MPO

FUTURE RAILROAD CROSSINGS
Urban Area

Railroad Crossings

- At-Grade
- At-Grade - Gated
- Grade Seperation
- Closed/Removed

Railroad

- BNSF Mainline
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