

# Passenger Rail Feasibility Study: Oroville to Wenatchee corridor

Charu Nethra Sekar  
Arizona State University

## ABSTRACT

This study assesses the feasibility of introducing scheduled passenger rail service on the Cascade and Columbia River Railroad (CSCD) corridor between Oroville and Wenatchee, Washington. The corridor spans 217.9 km through north-central Washington State, a region with limited intercity transportation options and documented socioeconomic disadvantage. The analysis draws on original geospatial infrastructure assessment conducted using GeoPandas in Python, incorporating the FHWA National Bridge Inventory and FRA Crossing Inventory, alongside verified demographic data, scenario based ridership modeling, financial analysis and environmental and regulatory review. Comparable state supported rural corridors including the Amtrak Cascades, the Heartland Flyer and the Downeaster provide benchmarks for ridership projections and financial modeling. Capital investment and annual operating subsidy estimates are developed across conservative, base and optimistic scenarios and evaluated against available federal funding mechanisms, particularly the FRA CRISI program. The study concludes with a phased implementation roadmap and an overall feasibility determination.

## 1. INTRODUCTION

### 1.1 Purpose and scope

This feasibility study evaluates the technical, financial, environmental and socioeconomic viability of introducing scheduled passenger rail service on the Cascade and Columbia River Railroad (CSCD) corridor between Oroville and Wenatchee, Washington. The study was prepared to inform planning decisions and identify the conditions under which passenger service could be financially sustainable, equitably justified and implementable with available federal and state funding mechanisms.

### 1.2 The Corridor at a Glance

The CSCD corridor runs 217.9 km (approximately 131 miles) through north-central Washington, roughly parallel to U.S. Highway 97, connecting the Columbia River Basin at Wenatchee to the Okanogan River Valley and the Canadian border at Oroville. The line was constructed by Great Northern Railway in 1914 and has been in continuous operation since, passing through or near Wenatchee, Chelan, Pateros, Brewster, Okanogan, Omak, Tonasket and Oroville. The railroad is currently operated by a private short-line carrier headquartered in Omak, WA, and interchanges with BNSF at Olds Junction

north of Wenatchee. It carries approximately one freight round trip per day, handling timber products, limestone, pulpwood, grain and agricultural commodities.

The existence of active rail infrastructure along the full alignment is the corridor's most consequential planning asset. Unlike greenfield proposals, this corridor does not require new right-of-way acquisition or track construction from scratch. The question is whether existing infrastructure can be upgraded to passenger standards and whether an access arrangement with the operating carrier can be secured on financially sustainable terms.

### 1.3 The Problem This Study Addresses

North-central Washington is among the most transportation-disadvantaged regions in the Pacific Northwest. Okanogan County's poverty rate of 18.5% and median household income of \$60,293 (U.S. Census ACS 2023 [10]) reflect a population with severely limited transportation alternatives. The county's primary transit provider, Okanogan County Transportation and Nutrition (OCTN), offers only limited human-services transport including monthly long-distance medical trips from Brewster, Twisp, Tonasket, and Oroville to Omak, with no connection to Wenatchee on weekends. The AppleLine intercity bus provides weekday service between Okanogan and Omak to Wenatchee but does not reach northern communities. No passenger rail of any kind currently serves any point on the corridor.

Confluence Health in Wenatchee serves a 12,000-square-mile catchment area across Chelan, Douglas, Grant and Okanogan counties [19]. It is the primary regional facility for oncology, cardiac care, dialysis, surgery and trauma services. For Okanogan Valley residents without a personal vehicle, these services are effectively inaccessible. Rail service would provide a reliable, affordable and all-weather connection that no current mode provides.

U.S. Highway 97, the corridor's only north-south artery, is periodically closed by wildfire, rockfall and winter weather. The Carlton Complex wildfire of July 2014 burned over 250,000 acres in Okanogan County and destroyed approximately 300 homes [21], blocking highway access for multiple days. A rail corridor along a structurally distinct alignment provides a redundant transportation and emergency resupply route with different vulnerability characteristics.

## 1.4 Study Objectives

- Characterize the corridor's physical infrastructure through original geospatial analysis using GeoPandas and Python.
- Assess bridge and crossing conditions using the FHWA National Bridge Inventory and FRA Crossing Inventory.
- Evaluate demand through ridership scenario modeling benchmarked against comparable state-supported corridors.
- Estimate capital and operating costs and assess financial sustainability under public subsidy.
- Review environmental, regulatory and tribal consultation requirements.
- Evaluate federal and state funding mechanisms, particularly FRA CRISI grants.
- Recommend a phased implementation roadmap.

## 2. EXISTING TRANSPORTATION AND RAIL INFRASTRUCTURE

### 2.1 The Cascade and Columbia River Railroad

The CSCD is a Class III short-line railroad and the only existing rail connection between Wenatchee and Oroville. It is the foundational infrastructure asset for this study. The key attributes of the railroad are summarized below.

Attribute	details
Line length	131 miles (217.9 km per GIS analysis)
Built by / Year	Great Northern Railway, 1914
Previous owners	Burlington Northern, RailAmerica Corp
Current operator	Private short-line carrier; headquarters in Omak, WA
BNSF interchange	Olds Junction, north of Wenatchee
Current service	Approximately 1 freight round trip per day
Primary freight commodities	Timber products, limestone, pulpwood, grain, sand and gravel
Carloads	~5,200
Observed track speed	Approximately 30 to 35 mph; some 10 mph slow orders
FRA track class	Estimated Class 2 or 3

**TABLE 2.1:** CSCD RAILROAD ATTRIBUTES

The CSCD's continuous operation since 1914 confirms the viability of the physical alignment. Track speed observations are consistent with FRA Class 2 or 3 standards; FRA Class 3 (60 mph maximum for passenger equipment) is the minimum standard required for passenger operations. A formal track geometry assessment has not been conducted for this study and is identified as a Phase 0 priority in Section 13.

### 2.2 Highway 97: The Only Alternative

U.S. Highway 97 runs parallel to the CSCD along most of the corridor's length and is the sole north-south surface transportation artery for the region. The highway is two lanes undivided for most of its rural extent and is subject to seasonal closures from wildfire, rockfall and winter weather. During the Carlton Complex wildfire of 2014, highway access was blocked for several days across a substantial stretch of the corridor, isolating communities and cutting off supply routes. A rail corridor with a distinct physical alignment provides a

structurally separate emergency alternative that highway closures cannot affect.

## 2.3 Existing Transit Services

Intercity transit options within the corridor are as follows:

- AppleLine: Weekday bus service between Okanogan and Omak to Wenatchee. No weekend service and no northern reach beyond Okanogan.
- Okanogan County Transportation and Nutrition (OCTN): Human-services transit providing monthly long-distance medical trips from Brewster, Twisp, Tonasket and Oroville to Omak. Not a general-purpose intercity service.
- Link Transit: Serves the Wenatchee urban area. Has operated fare-free since 2021. Does not extend into Okanogan Valley.
- Amtrak Empire Builder: Stops at Wenatchee's Columbia Station at inconvenient overnight times. Serves no other point on the corridor.
- Air: Pangborn Memorial Airport (EAT) in East Wenatchee provides jet service to Seattle-Tacoma via Alaska Air. No air service exists at any point north of Wenatchee.

No transit route connects any Okanogan Valley community to Wenatchee on weekends. The gap in weekend service is particularly significant for medical travel, which is not constrained to weekdays.

## 3. RELATED WORK

Rural passenger rail feasibility studies converge on three recurring analytical challenges: infrastructure condition, financial sustainability under public subsidy and transportation equity. This study draws on the following bodies of work.

Amtrak's Connects US plan [7] provides a national framework for intercity rail expansion, with emphasis on connecting underserved rural communities to regional economic centers. The plan's analytical methodology, covering origin-destination demand modeling, infrastructure overlay, and state-partnership financing, directly informs this study's structure. The Federal Railroad Administration's Corridor Identification and Development Program [8], established under the Infrastructure Investment and Jobs Act (IIJA, 2021), further defines the formal federal pathway for new corridor development through a three-part test of transportation need, infrastructure feasibility and financial viability.

Transportation equity research by Giuliano and Hanson [9] documents that rural households without vehicle access experience measurably worse health, employment and educational outcomes. The Transportation Research Board's TCRP Report 125 [11] reinforces that communities in persistent poverty are systematically underserved by benefit-cost-ratio-focused planning, and that equity-weighted

analysis is necessary. Both findings are applicable to Okanogan County's verified demographic profile [10].

For financial benchmarking, this study draws primarily on the WSDOT Amtrak Cascades Annual Performance Report (2023) [13] as the most directly comparable Washington State-supported corridor. The Heartland Flyer (Oklahoma City to Fort Worth, 206 miles) [14] and the Downeaster (Portland, ME to Brunswick, ME, 169 miles) [15] provide rural corridor analogues for ridership trajectory and subsidy modeling.

The geospatial methodology follows infrastructure assessment techniques described in the FHWA Bridge Inspector's Reference Manual [16] for BCI computation and the FRA Crossing Inventory methodology [17] for CRI derivation. The use of National Bridge Inventory data as a proxy for corridor infrastructure health follows Zhao et al. (2022) [18], who validate roadway bridge condition as an indicator of shared environmental stressors in multi-modal corridor assessments.

Studies of short-line railroad passenger accommodation are limited. Faber and O'Brien [12] identify several short-line properties where state DOT infrastructure investment has enabled passenger services under negotiated access arrangements, providing a relevant operational precedent for this corridor.

#### 4. STUDY CORRIDOR DESCRIPTION AND CHARACTERIZATION

This section defines the corridor's physical extent and quantifies its spatial characteristics through original geospatial analysis. It provides the spatially consistent framework for the infrastructure assessment in Section 5 and the environmental review in Section 11.

##### 4.1 Data and Methods

To characterize the study corridor, multiple open source spatial datasets were compiled and analyzed using the GeoPandas framework in Python within a Jupyter environment. All datasets were reprojected into a common coordinate system to enable distance based calculations and area measurements.

The following data sources were employed:

- Washington State Rail Lines Dataset [1]
- OpenStreetMap Roads Dataset [2]
- US Census TIGER/Line Places (2024) [3]
- US Geological Survey National Hydrography Dataset [4]

The CSCD alignment was extracted from the WSDOT dataset as the rail line connecting Wenatchee, Chelan, Omak, and Oroville. A 10 km buffer was generated around the alignment to define the study zone. All other datasets were spatially clipped to this buffer. Figure 4.1 shows the corridor in regional context against Washington State's complete rail network.

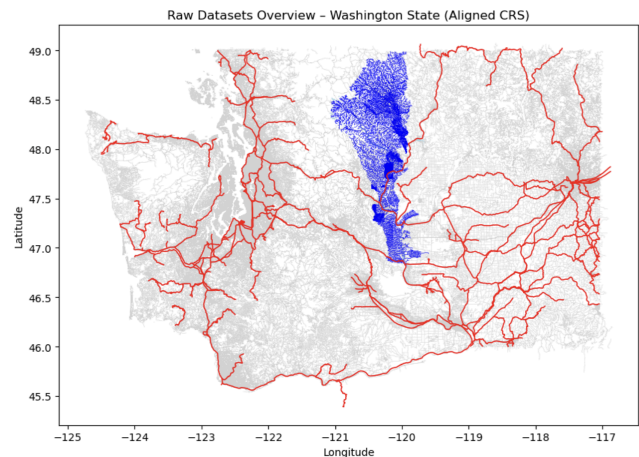


FIGURE 4.1: WASHINGTON STATE WITH RAIL NETWORK

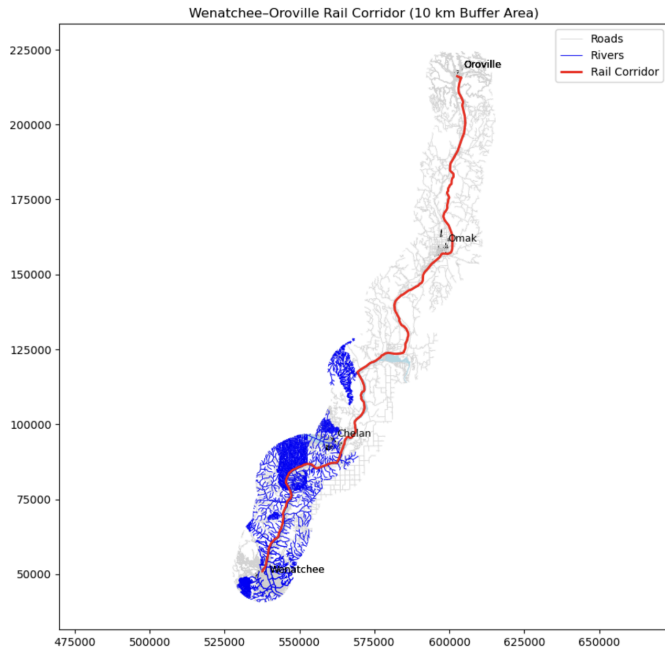
#### 4.2 Spatial and Descriptive Analysis

The filtered alignment measures approximately 217.9 km in total length. The 10 km buffer encompasses 5,751.8 km<sup>2</sup>, defining the immediate study zone. Within this buffer, spatial overlay of settlement boundaries identified four major urban centers: Wenatchee, Chelan, Omak and Oroville, which serve as the principal population and service nodes for the corridor. The alignment closely parallels U.S. Highway 97, providing strong intermodal connectivity between rail and road networks. Figure 4.2 shows the full corridor extent with its hydrographic and road context.

Hydrographic analysis using the USGS NHD dataset identified 187 river and stream crossings along the alignment. This frequency reflects the corridor's alignment through the Columbia and Okanogan River valleys and directly informs the bridge condition assessment in Section 5. Table 4.1 summarizes the principal spatial statistics.

Spatial Indicator	Value	Source
Corridor alignment length	217.9 km (135.4 miles)	WSDOT [1]; GeoPandas analysis
10 km corridor buffer area	5,751.8 km <sup>2</sup>	GeoPandas buffer analysis
Major urban centers in buffer	4: Wenatchee, Chelan, Omak, Oroville	Census TIGER/Line [3]
River and stream crossings	187	USGS NHD [4]
Total road network in buffer	38,617.5 km	OpenStreetMap [2]
Total river network in buffer	21,878.4 km	USGS NHD [4]
Lakes and waterbodies	335	USGS NHD [4]
Coordinate reference system	Washington North (EPSG: 32148)	GeoPandas reprojection

TABLE 4.1: CORRIDOR SPATIAL SUMMARY STATISTICS



**FIGURE 4.2: OROVILLE - WENATCHEE CORRIDOR**

### 4.3 Findings and Interpretation

The corridor is geographically continuous and follows a natural valley alignment along the Columbia and Okanogan rivers, with moderate grades favorable for rail operations compared to mountain crossings. The four urban centers identified provide a clear station node structure. The high frequency of water crossings (187) signals that bridge and culvert condition assessment is critical for understanding true infrastructure readiness and that Section 404 permitting for in-water construction will be a significant regulatory requirement.

## 5. EXISTING INFRASTRUCTURE ASSESSMENT

This section presents a geospatial inventory of existing transport infrastructure within the 10 km corridor buffer, using six spatial datasets. The bridge and crossing assessments provide the quantitative foundation for the capital cost estimates in Section 10.

### 5.1 Data Sources and Preprocessing

In addition to the four datasets used in Section 4, the infrastructure assessment incorporates:

- WSDOT / FHWA National Bridge Inventory [5]
- Federal Railroad Administration Crossing Inventory [6]

All datasets were clipped to the 10 km study buffer and processed in Python 3.11 / GeoPandas at EPSG: 32148.

The corridor contains 125 bridge structures and 111 highway-rail crossings within the study zone, at densities of 0.11 and 0.10 per km respectively. These moderate densities reflect a rural short-line corridor with manageable infrastructure complexity. The mean Bridge Condition Index (BCI) of 75.6 and mean Crossing Risk Index (CRI) of 12.96 establish the corridor's infrastructure health baseline, both discussed in detail in the following subsections.

## 5.2 Bridge Condition Assessment

### 5.2.1 Methodology

Bridge data were obtained from the FHWA NBI 2024 (WA24 ASCII dataset) [5]. Component condition ratings for deck, superstructure and substructure were extracted for each structure. After coordinate parsing and reprojection to EPSG: 32148, bridge features were spatially clipped to the 10 km buffer. The Bridge Condition Index (BCI) was computed as:

$$BCI = [(Deck + Superstructure + Substructure) / 27] \times 100$$

Structures were classified as Good (BCI of 80 or above), Fair (BCI between 60 and 80) or Poor (BCI below 60), consistent with FHWA standards [16].

### 5.2.2 Results

Of the 125 bridges and culverts within the buffer, 43 (34.4%) are in Good condition, 67 (53.6%) are Fair and 15 (12.0%) are Poor. The mean BCI is 75.6 (SD = 8.79), corresponding to a Fair overall classification.

Condition Class	BCI Range	Count	Share
Good	BCI 80 or above	43	34.40%
Fair	BCI 60 to 80	67	53.60%
Poor	BCI below 60	15	12.00%
Total		125	Mean BCI = 75.6, SD = 8.79

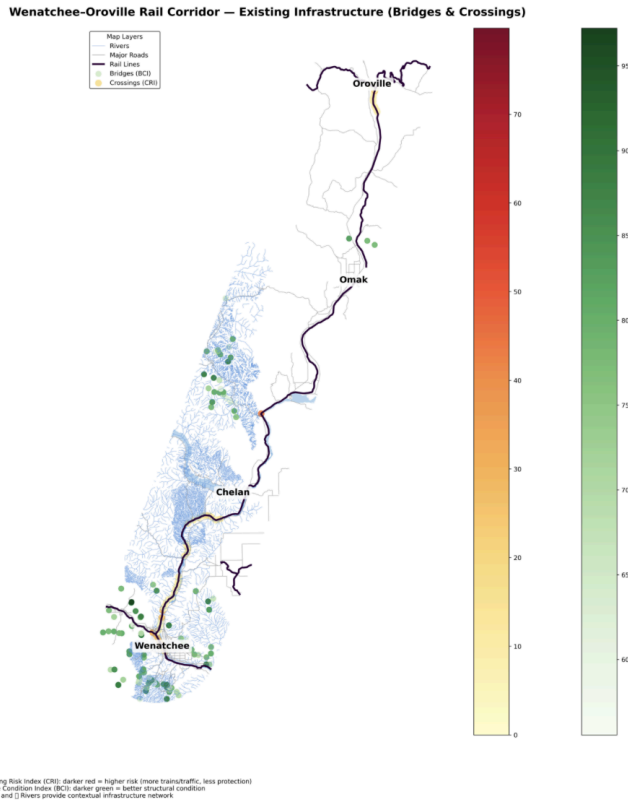
**TABLE 5.1: BRIDGE CONDITION DISTRIBUTION**

A strong negative correlation ( $r = 0.70$ ) between bridge age and BCI confirms that older structures are in substantially worse condition. Bridges built before 1970 average BCI approximately 66, compared to approximately 83 for newer structures, a 17-point difference reflecting age-related deterioration. Since portions of CSCD infrastructure date to the 1914 construction period, this relationship has direct implications for rehabilitation scope.

### 5.2.3 Spatial Distribution

Better-condition bridges cluster near Wenatchee and Chelan in the southern corridor, reflecting more recent investment and higher maintenance intensity. Lower-rated structures

concentrate between Pateros and Omak, coinciding with flood-prone valleys, multiple Okanogan River crossings, and older truss designs. The 15 Poor-condition structures are the priority rehabilitation candidates for any passenger rail upgrade program. Figure 5.1 illustrates the spatial distribution of bridge condition and crossing risk across the full corridor.



**FIGURE 5.1: EXISTING INFRASTRUCTURE INVENTORY OF THE WENATCHEE - OROVILLE CORRIDOR**

### 5.3 Crossing Risk Assessment

The FRA Form 71 Crossing Inventory [6] identifies 111 highway-rail crossings within the 10 km buffer, yielding a density of 0.10 crossings per km. The Crossing Risk Index (CRI) was computed using normalized values of Annual Average Daily Traffic (AADT), train frequency and train speed. Road traffic volume ( $r = 0.74$ ) and train frequency ( $r = 0.77$ ) are the primary drivers of elevated CRI, with train speed showing moderate influence ( $r = 0.53$ ). Table 5.2 presents the risk classification.

Risk Class	CRI Range	Count	Share
Low Risk	0 to 25	107	96.40%
Moderate Risk	25 to 50	3	2.70%
High Risk	50 to 100	1	0.90%
Total		111	Mean CRI = 12.96, SD = 12.31

**TABLE 5.2: CROSSING RISK INDEX DISTRIBUTION**

The predominantly low-risk profile (96.4% Low Risk) is favorable for passenger rail introduction. The four moderate and high-risk crossings are concentrated in the southern corridor near Wenatchee and Chelan, where road traffic volumes and freight frequency are highest. These locations require priority treatment under FRA passenger rail standard.

### 5.4 Integrated Infrastructure Assessment

The corridor presents a serviceable but aging infrastructure base. Most bridges are structurally sound at current freight loading levels, but the 12% Poor-condition rate in the Pateros to Omak flood zone represents a defined capital liability for passenger rail upgrade. Crossing risks are predominantly low, with a manageable number of priority locations requiring treatment. Taken together, the GIS-derived BCI and CRI data indicate that infrastructure readiness is achievable through targeted, phased investment rather than wholesale reconstruction.

### 5.5 Track Condition and Rolling Stock

A formal track geometry assessment of the CSCD has not been conducted for this study. Observed operating speeds of approximately 30 to 35 mph (field reports, with some 10 mph slow orders) suggest the track is consistent with FRA Class 2 or Class 3. FRA Class 3 (60 mph maximum for passenger equipment) is the minimum standard for passenger operations. Track rehabilitation costs from Class 2 to Class 3 are estimated at \$220,000 to \$400,000 per mile, based on FRA benchmark data. A licensed railroad engineer's assessment is required to confirm these estimates.

The recommended rolling stock is Diesel Multiple Unit (DMU) trainsets, specifically the Siemens Venture or Stadler FLIRT, both in service on state-supported U.S. corridors. DMUs eliminate a separate locomotive, reduce fuel consumption and offer appropriate acceleration for a multi-stop rural route. An initial fleet of 2 to 3 trainsets (once-daily service with a maintenance spare) implies a rolling stock cost of \$25 to \$42 million, consistent with recent state procurement pricing.

### 5.6 Proposed Station Locations

Six station communities along the CSCD alignment are proposed as initial stops. Population figures are from Census ACS 2023 [10]; daily boardings and facility costs are modeled estimates based on comparable small-city stations.

Station	Population	Est. Daily Boardings	Est. Facility Cost
Wenatchee	~35,500	180 to 250	\$5M to \$12M
Pateros	~597	20 to 35	\$300K to \$600K
Brewster	~2,200	30 to 55	\$600K to \$1.1M
Okanogan / Omak	~7,400	95 to 140	\$2.5M to \$4.5M
Tonasket	~1,080	35 to 55	\$600K to \$1.0M
Oroville	~1,686	65 to 95	\$1.5M to \$3.5M

**TABLE 5.3: PROPOSED STATION LOCATION.**  
Boardings and costs are estimates.

## 6. DEMOGRAPHIC AND SOCIOECONOMIC PROFILE

Okanogan County constitutes the primary service area for the northern two-thirds of the corridor and is among Washington State's most economically disadvantaged counties. All demographic figures are from the U.S. Census Bureau ACS 2023 [10].

### 6.1 Corridor Population

Table 6.1 presents verified population figures for the principal communities along the alignment. The combined two-county catchment (Okanogan and Chelan) totals approximately 122,329, with a practical rail catchment area within 10 km of proposed station locations estimated at 70,000 to 80,000 residents given the sparse rural distribution of both counties.

Community	County	Population (ACS 2023)	Role in Corridor
Wenatchee	Chelan	~35,500	Southern terminus; medical, commerce, and employment hub
East Wenatchee	Douglas	~14,000	Wenatchee metro area; Pangborn Memorial Airport (EAT)
Pateros	Okanogan	~597	Columbia and Methow River confluence
Brewster	Okanogan	~2,200	Agricultural center; orchard industry
Okanogan (city)	Okanogan	~2,500	County seat; courts and government services
Omak	Okanogan	~4,900	Largest Okanogan Valley city; CSCD headquarters
Tonasket	Okanogan	~1,080	North Okanogan Valley agricultural community
Oroville	Okanogan	~1,686	Northern terminus; 4 miles from the Canadian border
Okanogan County total	Okanogan	42,811	Primary service area county
Chelan County total	Chelan	79,518	Southern terminus county

**TABLE 6.1: CORRIDOR COMMUNITY POPULATION**

### 6.2 Socioeconomic Indicators

Table 6.2 compares key socioeconomic indicators between Okanogan County and Washington State. The 18.5% poverty rate and median household income at 63% of the state median define a population with limited transportation alternatives and disproportionate need for affordable intercity connectivity.

Indicator	Okanogan County	Washington State	Source
Median Household Income	\$60,293	\$94,952	Census ACS 2023 [10]
Per Capita Income	\$31,905	\$51,493	Census Reporter ACS 2023 [10]
Poverty Rate	18.50%	9.90%	Census Reporter ACS 2023 [10]
Median Age	43.4 years	38.2 years	Census ACS 2023 [10]
Workers Driving Alone	63.90%	~70%	ACS 2023 [10]
Mean Commute Time	19.2 min	27 min	ACS 2023 [10]
Agricultural Workers	3,981	N/A	ACS 2023 [10]
Residents below poverty line	~7,920	N/A	18.5% of 42,811

**TABLE 6.2: SOCIOECONOMIC COMPARISON**

Okanogan County qualifies as an Area of Persistent Poverty under USDOT criteria, conferring priority scoring in CRISI and RAISE federal grant competitions [8]. The transportation implications are direct: approximately 7,920 residents live below the poverty line, and Confluence Health in Wenatchee serves a 12,000-square-mile catchment [19] that includes the entire county. The combination of poverty, auto-dependence, and absence of weekend transit creates a measurable, Census-documented mobility gap that passenger rail can directly address.

## 7. TRAVEL DEMAND AND RIDERSHIP PROJECTIONS

### 7.1 Demand Context

No origin-destination travel survey exists for this corridor. Projections are modeled estimates benchmarked against three comparable state-supported rural corridors: the Heartland Flyer (Oklahoma City to Fort Worth, 206 miles, approximately 110,000 to 130,000 riders per year at maturity, ODOT Oklahoma [14]); the Downeaster (Portland, ME to Brunswick, ME, 169 miles, approximately 155,000 riders at Year 10, NNEPRA [15]); and rural segments of the Amtrak Cascades [13]. All projections carry a margin of plus or minus 40%. Conducting a primary origin-destination survey in Okanogan and Chelan Counties is the most critical near-term data needed for advancing this project.

### 7.2 Trip Purpose

Based on Okanogan County's land-use profile and comparable rural corridor surveys, the corridor's passenger demand is estimated to be driven primarily by healthcare access (approximately 28% of trips), reflecting Confluence Health's 12,000 square mile catchment; employment and commuting (approximately 20%); personal business including courts and government services (approximately 18%); education, primarily Wenatchee Valley College (approximately 12%); tourism and recreation including Lake Chelan and the Okanogan wine region (approximately 14%); and cross-border travel at the Oroville to Osoyoos border crossing (approximately 8%). All shares are modeled estimates.

### 7.3 Ridership Scenarios

Table 7.1 presents annual ridership projections across three scenarios. The base case Year 1 figure of 62,000 is benchmarked against the Downeaster's first year of approximately 92,000 riders (on a longer corridor with a higher-population catchment), scaled down by approximately 30% for the Okanogan Valley's smaller population base. The 20-year base case of 152,000 mirrors the Downeaster's Year 10 trajectory of approximately 155,000 [15].

Scenario	Year 1	Year 5	Year 10	Year 20
Conservative (1 daily trip, limited promotion)	42,000	65,000	82,000	95,000
Base Case (1 daily trip, active promotion)	62,000	98,000	130,000	152,000
Optimistic (2 daily trips by Year 5)	78,000	140,000	175,000	210,000

**TABLE 7.1: ANNUAL RIDERSHIP PROJECTION.**  
All values are modeled estimates from [14][15]

## 7.4 Sensitivity Analysis

Ridership is most sensitive to the following variables, based on comparable rural corridor demand literature:

- **Service frequency:** Twice-daily service increases ridership by approximately 30 to 40% relative to once-daily service. This is the single most impactful operational lever available after service launch.
- **Fare level:** A 10% fare increase is estimated to reduce ridership by 5 to 8%, consistent with price elasticity estimates for rural rail demand in the range of negative 0.5 to negative 0.8.
- **First and last-mile connectivity:** Improved connecting transit at station communities, particularly Omak, Okanogan, and Oroville, could increase ridership by an estimated 15 to 25% at maturity. This requires coordinated investment with OCTN and Link Transit.
- **Cross-border traffic:** The Oroville to Osoyoos border crossing introduces a cross-border travel component. Coordination with BC Transit for connecting service at Osoyoos could meaningfully increase northern-segment ridership, though the magnitude is not modeled here.
- **Wildfire and highway closures:** Recurring Highway 97 closures represent a demand-creating factor unique to this corridor. During closure events, rail would be the only practical surface connection, generating temporary ridership spikes with possible lasting mode-shift effects.

All sensitivity estimates are modeled from comparable corridor literature and carry inherent uncertainty. They are presented as directional indicators, not precise forecasts.

## 8. COMPARABLE CORRIDOR ANALYSIS

Three state-supported passenger rail corridors provide the primary benchmarks for this study's ridership projections and financial modeling. Each is selected for specific analytical relevance rather than overall comparability; no single corridor is a direct match for the Oroville to Wenatchee route.

### 8.1 Amtrak Cascades (Washington State)

The Amtrak Cascades (467 miles, Portland to Seattle to Vancouver BC) is Washington State's only active state-supported intercity passenger rail service and provides the

most directly applicable governance and financial model. Verified 2023 figures from WSDOT [13]:

- **Total ridership:** 746,000 passengers (a 75% increase over 2022); 2024 ridership reached approximately 985,000, a record
- **Operating cost:** \$55.2 million; ticket revenue: \$32.5 million; farebox recovery: 60%
- **Peak seat utilization:** 71.2% on the Tacoma to Olympia segment
- **State operating support (Washington portion):** approximately \$22.7 million in 2023

The Cascades' 60% farebox recovery reflects a mature corridor serving metropolitan areas of 750,000 (Seattle), 650,000 (Portland), and 2.4 million (Vancouver BC). This figure should not be used as a target for Oroville to Wenatchee. A realistic rural target of 20 to 40% farebox recovery is appropriate, consistent with rural Amtrak corridors nationally. The Cascades is relevant as a governance and grant precedent: WSDOT's experience administering state-supported rail under PRIIA Section 209 and its CRISI grant track record directly apply.

### 8.2 Heartland Flyer (Oklahoma City to Fort Worth)

The Heartland Flyer operates 206 miles between Oklahoma City, OK (population approximately 700,000) and Fort Worth, TX (Dallas-Fort Worth metro 7.5 million). It carries approximately 110,000 to 130,000 annual riders and is state-supported by ODOT Oklahoma [14]. As a length benchmark the Heartland Flyer is closely comparable to the Oroville to Wenatchee corridor. As a ridership benchmark it overstates likely demand due to the much larger endpoint populations. The conservative and base case Year 1 ridership figures in Section 7 are scaled down from Heartland Flyer levels to account for the Okanogan Valley's smaller catchment area.

### 8.3 Downeaster (Portland, ME to Brunswick, ME)

The Downeaster (169 miles, operated by NNEPRA in partnership with Amtrak) provides the closest demographic match to the Oroville to Wenatchee corridor. It serves a rural New England corridor with small station communities, agricultural and tourism demand, and seasonal weather challenges comparable to north-central Washington. Key performance data from NNEPRA [15]:

- **Year 1 ridership:** approximately 92,000 passengers (service launched 2001)
- **Year 10 ridership:** approximately 155,000 passengers
- **Annual state operating support (Maine and New Hampshire combined):** approximately \$8 million at maturity
- **Farebox recovery:** approximately 35 to 40% at maturity

The Downeaster's Year 1 to Year 10 ridership trajectory (92,000 to 155,000, approximately 68% growth) forms the primary

basis for the base case ridership scenario in Section 7, scaled downward by approximately 30% for the smaller Okanogan Valley catchment. Its \$8 million annual state support figure is the most directly comparable financial benchmark for the estimated \$6 to \$12 million subsidy range in this study.

## 9. SOCIOECONOMIC IMPACT ASSESSMENT

This section assesses the potential socioeconomic benefits of passenger rail service on the Oroville to Wenatchee corridor. Where specific impact figures are cited, they are modeled estimates. The underlying need they address is documented in verified demographic data from Section 6.

### 9.1 Transportation Equity

The equity case for this corridor is grounded in verified data rather than projections. Okanogan County's 18.5% poverty rate, \$60,293 median household income, and absence of weekend intercity transit collectively define a population with urgent unmet mobility needs. An estimated 4,000 to 6,000 households in the corridor area face transportation constraints from poverty or disability. Rail service at an accessible fare would directly reduce this constraint for medical travel, employment access and educational opportunity.

Okanogan County's Area of Persistent Poverty designation under USDOT criteria is relevant beyond symbolic equity framing. It confers priority scoring in federal competitive grant programs including CRISI and RAISE, directly strengthening a future grant application. Under the Infrastructure Investment and Jobs Act [8], equity outcomes are an explicit evaluation criterion for transportation investment, meaning a well-documented equity case translates into competitive advantage.

### 9.2 Economic Development

Direct economic benefits include construction-phase employment and permanent operations employment. Based on FRA standard labor multipliers applied to the estimated capital cost range, construction employment is estimated at 500 to 1,000 job years over the project build-out. Permanent operations would support approximately 35 to 60 direct jobs in train operations, station staffing and maintenance. These are modeled estimates; actual figures depend on contract structure and local hiring provisions.

Agricultural sector connectivity is a secondary benefit. Okanogan County's 3,981 agricultural workers [10] and its orchard and crop industries rely on regional labor mobility. Rail access to Wenatchee improves workforce connectivity between residential communities in the Okanogan Valley and employment centers in Chelan County. Tourism is a further upside: the Lake Chelan recreation area, the North Cascades, and the growing Okanogan wine region represent demand

segments that could generate off-peak ridership and support local hospitality businesses.

## 9.3 Climate Resilience

Passenger rail generates substantially lower greenhouse gas emissions per passenger-mile than single-occupancy vehicle travel. Washington State's electricity grid, approximately 70 to 75% hydropower-sourced, is among the cleanest in the nation, meaning that any future electrification of corridor services would further reduce per-passenger emissions. More immediately relevant in this corridor is physical resilience: the Carlton Complex wildfire of 2014 demonstrated that Highway 97 is a single-point-of-failure for regional surface transportation. A rail corridor with a distinct physical alignment provides a structurally independent transportation and emergency resupply route. This resilience benefit is not captured in standard benefit-cost analysis but is directly relevant to Okanogan County emergency planners and state emergency management.

## 10. FINANCIAL ANALYSIS

### 10.1 Benchmark: Amtrak Cascades 2023

The Amtrak Cascades (467 miles, Portland to Seattle to Vancouver BC) provides the most relevant verified benchmark for a Washington State-supported service. Key 2023 figures from WSDOT [13]: 746,000 passengers (a 75% increase over 2022), \$55.2 million operating cost, \$32.5 million ticket revenue, 60% farebox recovery, and 71.2% peak seat utilization. In 2024, ridership reached approximately 985,000 (a record). State operating support was approximately \$22.7 million (the gap between operating cost and ticket revenue). The Oroville to Wenatchee corridor serves a far smaller population base, so a realistic target farebox recovery is 20 to 40%, consistent with rural Amtrak corridors nationally rather than the Cascades' dense urban alignment.

### 10.2 Capital Costs

Capital costs are modeled from FRA Class II and III infrastructure benchmarks and the WSDOT CRISI award of \$72.8 million for the Palouse River and Coulee City Railroad Phase II (2023) [20], a comparable rural short-line upgrade in Washington State. The bridge condition findings from Section 5 (12% Poor-condition structures concentrated in Pateros to Omak, with pre-1970 bridges averaging BCI approximately 66) directly inform the bridge rehabilitation estimate. All values are modeled estimates pending an engineering study.

Capital Cost Category	Low Estimate	High Estimate
Track access and rights arrangement	\$0 to \$50M+	Depends on access terms
Track upgrade to FRA Class 3 or 4 passenger standard	\$25M	\$75M
Bridge rehabilitation and replacement	\$15M	\$70M
Grade crossing upgrades (111 crossings, Section 5.1)	\$11M	\$22M
Signaling and CTC upgrades	\$8M	\$22M
Station construction (6 locations)	\$11M	\$23M
Rolling stock (2 to 3 DMU trainsets)	\$25M	\$42M
Engineering and program management (15%)	\$14M	\$42M
Contingency (25%)	\$14M	\$64M
TOTAL	\$123M	\$410M

**TABLE 10.1: CAPITAL COST ESTIMATES.**

All values are estimates. Source: FRA, WSDOT CRISI precedent [20].

The wide range reflects the track access scenario. An operating agreement with the CSCD operator could confine total capital to approximately \$120 to \$180 million, while an outright line acquisition could approach \$350 to \$410 million. Resolving the access structure through early engagement with the operator is the single most impactful step toward narrowing this range.

### 10.3 Annual Operating Costs

Operating costs are benchmarked against state-supported rural Amtrak corridors. The Heartland Flyer, operating 206 miles with two trains per day, runs at approximately \$10 to \$13 million annually [14]. The Oroville to Wenatchee service, initially operating fewer trains on a shorter corridor, is estimated at \$8.0 to \$16.0 million annually, depending on service frequency and infrastructure maintenance terms. The cost breakdown is as follows: train operations (crews, fuel, supplies) at \$3.0 to \$5.2 million; track and infrastructure maintenance at \$2.0 to \$5.0 million; rolling stock maintenance at \$1.0 to \$2.0 million; station operations at \$0.7 to \$1.5 million; administration, insurance and overhead at \$1.0 to \$1.8 million; and marketing at \$0.3 to \$0.5 million. These are modeled estimates.

### 10.4 Revenue and Subsidy

Based on base case ridership and an average fare of \$24 to \$30 per one-way trip (benchmarked against Cascades fares, adjusted for rural purchasing power), annual farebox revenue at maturity is estimated at \$3.5 to \$5.5 million. This implies a farebox recovery rate of 25 to 40% and an annual state operating subsidy of \$6 to \$12 million. For comparison, WSDOT's 2023 Cascades operating support was \$22.7 million for a 467-mile corridor serving three metropolitan areas. The Downeaster, a closer rural analogue, receives approximately \$8 million in annual state support at maturity [15]. The Oroville to Wenatchee subsidy estimate is broadly consistent with these benchmarks at a smaller corridor scale.

## 11. ENVIRONMENTAL AND REGULATORY ASSESSMENT

### 11.1 Environmental Setting

The corridor traverses three distinct environmental zones: the Columbia River canyon between Pateros and Wenatchee, the Okanogan River Valley riparian system between Omak and Oroville, and portions of the Okanogan-Wenatchee National Forest. The 187 water crossings identified in Section 4 concentrate in these zones and trigger Section 404 permitting requirements for any in-water construction, along with Section 401 Water Quality Certification from Washington Department of Ecology.

The Carlton Complex wildfire of July 2014 burned over 250,000 acres in Okanogan County and destroyed approximately 300 homes [21], underscoring the corridor's recurring wildfire exposure. Rail infrastructure in fire-prone terrain requires vegetation management, fire-resistant bridge and station construction material and operational protocols for service suspension during extreme fire conditions. A secondary benefit of rail in this context is that it provides a structurally independent evacuation and resupply route when Highway 97 is closed by fire, as occurred during the Carlton Complex.

### 11.2 NEPA and Environmental Review

Any FRA-funded project requires National Environmental Policy Act (NEPA) compliance. Given the project's scale and sensitive resources including riparian corridors, tribal lands and potentially affected species habitat, a Tier 1 Programmatic Environmental Impact Statement (EIS) covering the full corridor, followed by Tier 2 project-level reviews for specific construction segments, is the expected regulatory pathway. Realistic project timelines should budget 3 to 4 years for Tier 1 EIS completion. Washington State Environmental Policy Act (SEPA) review runs concurrently.

### 11.3 Tribal Consultation

The Confederated Tribes of the Colville Reservation holds territory adjacent to the CSCD corridor. Section 106 consultation under the National Historic Preservation Act is legally mandated for any federally funded project in this area. Government-to-government consultation must be initiated before formal NEPA filing, not after. Early engagement is both a legal requirement and a practical necessity for project credibility and community acceptance.

## 11.4 Key Regulatory Requirements

The following agencies have regulatory jurisdiction over aspects of this project:

- Federal Railroad Administration (FRA): track safety standards and CRISI grant compliance
- Surface Transportation Board (STB): may have jurisdiction over passenger trackage rights on privately operated short-line freight railroads
- U.S. Army Corps of Engineers: Section 404 permits for water crossings (187 identified in the GIS analysis)
- Washington Department of Ecology: Section 401 Water Quality Certification and SEPA review
- Washington Utilities and Transportation Commission (WUTC): intrastate passenger service authorization
- Confederated Tribes of the Colville Reservation: Section 106 National Historic Preservation Act consultation
- U.S. Forest Service: coordination for segments adjacent to Okanogan-Wenatchee National Forest

## 12. FUNDING AND FINANCIAL STRATEGY

### 12.1 FRA CRISI Program

The Consolidated Rail Infrastructure and Safety Improvements (CRISI) program is the primary federal funding vehicle for this project. The FY2023 to 2024 Notice of Funding Opportunity (Federal Register, March 29, 2024) [22] made \$2,478,391,050 available, with a legally mandated rural set-aside of at least \$657 million (25%) and an 80% federal cost share requiring 20% non-federal match. Eligible uses include track, bridges, crossings, signaling, stations and rolling stock, covering all capital categories in Table 10.1. WSDOT received \$72.8 million in 2023 and \$37.7 million in 2024 in CRISI awards for the Palouse River and Coulee City Railroad [20], a directly comparable rural short-line rehabilitation in Washington State, demonstrating both program applicability and state competitive capability.

Additional applicable programs include the FRA Federal-State Partnership for intercity passenger rail capital (80% federal share); USDOT RAISE grants for stations and multimodal connections with rural priority scoring; and the FRA Restoration and Enhancement program, which provides up to three years of operating assistance for newly launched corridors. This last program is particularly valuable for bridging the farebox-to-cost gap during the early years of service before ridership matures and state appropriations fully cover the operating deficit. On the state side, WSDOT's Rail Division administers Washington's intercity rail program and has authority to enter operating assistance agreements. The Legislature's Multimodal Transportation Account and the Connecting Washington capital program are established vehicles for this type of investment.

## 12.2 Track Access Considerations

Because the CSCD is operated by a private short-line carrier, any passenger service requires a negotiated access arrangement. Three structures are possible: an operating or access agreement where the state pays a per-train-mile fee and a maintenance contribution while the carrier retains ownership; a cost-shared infrastructure upgrade where the state funds the passenger-standard improvements and receives a long-term access guarantee; or an outright acquisition of the line by a public authority. The operating agreement is the most capital-efficient starting point and is consistent with how other state-supported services have been launched on privately owned short-line infrastructure.

## 13. IMPLEMENTATION ROADMAP

### 13.1 Phased Plan

The roadmap is structured around three phases reflecting regulatory timelines, procurement lead times and the access negotiation dependency. Timelines are based on comparable state rail project development histories.

#### Phase 0: Pre-Feasibility (Months 1 to 18)

- Initiate informal outreach with the CSCD operator to gauge openness to passenger access and explore possible access structures.
- Commission a railroad engineering study covering track geometry, bridge load ratings and signaling inventory.
- Conduct an origin-destination household travel survey in Okanogan and Chelan Counties to replace modeled ridership estimates with primary data for grant applications.
- Initiate government-to-government consultation with the Confederated Tribes of the Colville Reservation, legally required prior to NEPA initiation.
- Engage WSDOT Rail Division on state partnership interest and a joint CRISI pre-development grant application.
- Conduct NEPA scoping to determine required environmental review tier and timeline.

#### Phase 1: Engineering and Southern Segment (Years 2 to 6)

- Commission a formal Engineering Feasibility Study for CSCD upgrade to passenger standards.
- Initiate Tier 1 Programmatic EIS with a 3 to 4 year timeline.
- Negotiate a formal track access agreement with the CSCD operator.
- Apply for CRISI Phase 1 capital for the southern segment (Pateros to Wenatchee, approximately 55 miles).
- Procure 2 DMU trainsets, allowing 3 to 4 years for manufacturing and delivery.

- Launch once-daily round trip service on the Pateros to Wenatchee segment; secure FRA Restoration and Enhancement operating support for Years 1 to 3.

### Phase 2: Full Corridor (Years 6 to 12)

- Apply for CRISI Phase 2 capital for the northern segment (Oroville to Pateros) based on Phase 1 ridership performance.
- Complete bridge and track upgrades in the Pateros to Omak segment, prioritizing the 15 Poor-condition structures identified in Section 5.
- Construct the full station program including Omak, Okanogan, Tonasket, and Oroville.
- Extend to full Oroville to Wenatchee service and implement twice-daily frequency if base case ridership is achieved.

### 13.2 Key Risks

The following risks carry the highest consequence for project viability:

- **Track access negotiation:** If the CSCD operator is unwilling to accommodate passenger services, the project cannot proceed without pursuing line acquisition, which would substantially increase capital requirements. This risk should be assessed through informal engagement before significant further planning investment is made.
- **Bridge condition:** The NBI-based bridge analysis provides a statistical proxy using roadway structures. Actual CSCD railway bridge conditions are not publicly documented. The Pateros to Omak segment carries the most risk given the concentration of older structures in flood-prone terrain.
- **Ridership shortfall:** All projections are modeled estimates with a plus or minus 40% uncertainty band. A primary origin-destination survey is required before any ridership figures are used in formal grant applications.
- **NEPA and tribal consultation timeline:** A Tier 1 Programmatic EIS on a corridor of this complexity and sensitivity should be planned for 3 to 4 years. Initiating tribal consultation in Phase 0 is both legally required and timeline-critical.
- **State subsidy appropriation:** Operating support requires sustained legislative commitment. The FRA Restoration and Enhancement program provides a 3-year federal bridge, reducing early-year budget exposure.

## 14. CONCLUSION

The Oroville to Wenatchee corridor presents a legitimate, data-grounded case for passenger rail feasibility assessment. The most consequential finding of this study is that active rail infrastructure already exists along the full 217.9 km alignment, operated as a freight railroad since 1914. The geospatial analysis confirms that this infrastructure, while aging, is structurally serviceable: 125 bridge structures within the study

buffer average a Fair Bridge Condition Index of 75.6, with targeted rehabilitation needs concentrated in the Pateros to Omak mid-corridor zone. The 111 highway-rail crossings are predominantly low-risk at 96.4% Low Risk by CRI, with only four locations requiring priority treatment. This is not a corridor requiring reconstruction; it is one requiring focused, phased upgrade investment.

The transportation equity case is unambiguous and Census-verified. Okanogan County's poverty rate of 18.5%, median household income 63% below the state median, and absence of weekend intercity transit collectively define a population with urgent, unmet mobility needs. Confluence Health's 12,000 square mile catchment area, which includes the entire county, cannot be reached by public transit for most residents. This is not a speculative equity argument; it is documented in public records.

The financial picture is realistic rather than optimistic. Capital investment is estimated at \$120 to \$350 million with annual operating subsidy of \$6 to \$12 million, figures comparable to other state-supported rural rail programs. Federal funding through the CRISI program, with its 80% federal share and 25% rural set-aside, provides a credible capital financing pathway. WSDOT's demonstrated success accessing CRISI funds for comparable Washington State rail projects strengthens the case for a joint state application.

The study's primary limitation is the absence of primary data on two critical unknowns: the actual condition of the CSCD's own bridge and track assets, which the NBI analysis approximates but cannot replace and the operator's willingness to accommodate passenger services under a financially sustainable access arrangement. No further planning investment beyond Phase 0 pre-feasibility work is warranted until these two questions are directly addressed. If both yield positive signals, the corridor has the infrastructure base, equity justification and federal funding environment to advance to formal engineering and environmental review.

### 14.1 Feasibility Assessment

This corridor is assessed as conditionally feasible. The conditions are: a workable track access agreement with the CSCD operator and an engineering survey confirming that infrastructure upgrade costs fall within the modeled range. If these conditions are met, the corridor meets the FRA's three-part test of transportation needs, infrastructure feasibility and financial viability under public subsidy.

## DATA SOURCES AND REFERENCES

- [1] Washington State Department of Transportation (WSDOT). (2024). Rail Lines of Washington State Dataset. Olympia, WA. [https://gisdata-wsdot.opendata.arcgis.com/datasets/d306b6aa65eb4a7fb6cc8334b4c8aafd\\_0/explore?location=47.150755%2C-120.683750%2C7.57](https://gisdata-wsdot.opendata.arcgis.com/datasets/d306b6aa65eb4a7fb6cc8334b4c8aafd_0/explore?location=47.150755%2C-120.683750%2C7.57)
- [2] OpenStreetMap. (2025). Geofabrik Extract: Washington State Roads. Retrieved from Geofabrik Open Data Portal. <https://download.geofabrik.de/north-america/us/washington.html>
- [3] U.S. Census Bureau. (2024). TIGER/Line Shapefiles for Washington State: Places. Washington, D.C. <https://www.census.gov/cgi-bin/geo/shapefiles/index.php?year=2024&layergroup=Places>
- [4] U.S. Geological Survey (USGS) National Hydrography Dataset (NHD). U.S. Department of the Interior.(2023) <https://apps.nationalmap.gov/downloader/>
- [5] WSDOT / FHWA National Bridge Inventory <https://www.fhwa.dot.gov/bridge/nbi/ascii2024.cfm>
- [6] Federal Railroad Administration Crossing Inventory [https://data.transportation.gov/Railroads/Crossing-Inventory-D ata-Form-71-Current/m2f8-22s6/data\\_preview](https://data.transportation.gov/Railroads/Crossing-Inventory-D ata-Form-71-Current/m2f8-22s6/data_preview)
- [7] Amtrak. (2021). Amtrak Connects US: A Vision for Intercity Passenger Rail. National Railroad Passenger Corporation, Washington D.C. <https://www.amtrak.com/content/dam/projects/dotcom/english/public/documents/corporate/businessplanning/Amtrak-Connects-U s-Plan-042021.pdf>
- [8] Federal Railroad Administration (FRA). (2024). FY2023 to FY2024 CRISI Program Notice of Funding Opportunity. 89 Federal Register 22200. <https://www.federalregister.gov/d/2024-06569>
- [9] Giuliano, G., and Hanson, S. (Eds.). (2017). The Geography of Urban Transportation (4th ed.). Guilford Press.
- [10] U.S. Census Bureau. (2023). American Community Survey 5-Year Estimates (2019 to 2023): Okanogan County, WA; Chelan County, WA; City of Wenatchee, WA. <https://censusreporter.org> and <https://datausa.io>
- [11] Transportation Research Board, National Academies. (2020). TCRP Report 125: Transportation Options for Older Adults and People with Disabilities in Rural Areas. National Academies Press.
- [12] Faber, B., and O'Brien, T. (2019). Short-Line Railroad Operations and State Partnership Models in the United States. Transportation Research Record, 2673(4), 112 to 122. <https://doi.org/10.1177/0361198119840167>
- [13] Washington State Department of Transportation (WSDOT). (2023). Amtrak Cascades Annual Performance Data Report 2023. WSDOT Rail, Freight and Ports Division. <https://wsdot.wa.gov/business-wsdot/rail>
- [14] Oklahoma Department of Transportation (ODOT). (2023). Heartland Flyer Annual Report FY2023. ODOT Rail Division. <https://www.odot.org/rail>
- [15] Northern New England Passenger Rail Authority (NNEPRA). (2023). Amtrak Downeaster Annual Report 2023. <https://www.amtrakdowneaster.com/about-downeaster/nnepra/annual-reports>
- [16] Federal Highway Administration (FHWA). (2012). Bridge Inspector's Reference Manual (BIRM). Publication No. FHWA NHI 12-049. <https://www.fhwa.dot.gov/bridge/inspection/manual/>
- [17] Federal Railroad Administration (FRA). (2023). Crossing Inventory Data, Reporting Requirements and Methodology. <https://railroads.dot.gov/railroad-safety/highway-rail-grade-crossings/crossing-inventory>
- [18] Zhao, L., Chen, C., and Wang, J. (2022). Roadway Bridge Condition as a Proxy Indicator for Corridor Infrastructure Health in Multi-Modal Planning Contexts. Transportation Research Part D, 103, 103164. <https://doi.org/10.1016/j.trd.2021.103164>
- [19] Confluence Health. (2023). About Confluence Health. <https://www.confluencehealth.org>
- [20] FreightWaves / AASHTO Journal. (2023, 2024). FRA CRISI Awards: Palouse River and Coulee City Railroad Phase II (\$72.8M, 2023) and Phase III (\$37.7M, 2024).
- [21] Wikipedia. (2025). Carlton Complex. [https://en.wikipedia.org/wiki/Carlton\\_Complex](https://en.wikipedia.org/wiki/Carlton_Complex)
- [22] Federal Register. (2024, March 29). CRISI Program NOFO. 89 FR 22200. <https://www.federalregister.gov/documents/2024/03/29/2024-06569>
- [23] Genesee and Wyoming Inc. (2024). Cascade and Columbia River Railroad (CSCD). <https://www.gwrr.com/cscd>