Washington State Department of Transportation

AMTRAK CASCADES

PRELIMINARY SERVICE DEVELOPMENT PLAN

ALTERNATIVES DEVELOPMENT AND RECOMMENDATIONS REPORT

June 2024

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EXECUTIVE SUMMARY

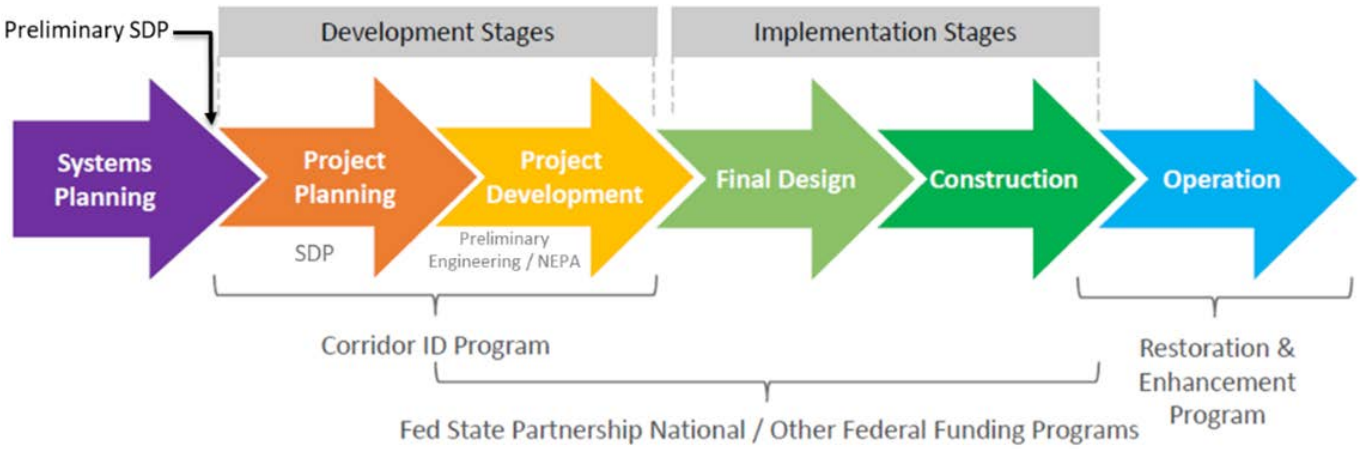
Why are we developing a Preliminary Service Development Plan?

Well-informed planning for the future of Amtrak Cascades is critical to ensuring that available resources are invested in the wisest ways possible. Much has changed on the Pacific Northwest Rail Corridor (PNWRC)[1] since the 2006 long-range plan was created. A refreshed plan that accounts for growth, operational, and social changes is needed to inform future improvements.

Amtrak Cascades is an intercity passenger rail service operating along a 461-mile corridor connecting 18 cities in the Pacific Northwest, including Vancouver (British Columbia), Seattle, Portland, and Eugene.

In 2022, Congress established the Federal Railroad Administration (FRA) Corridor Identification and Development (CID) Program. This new program is a national framework for passenger rail planning and development that will create a pipeline for preferential funding and delivery of intercity passenger rail projects (see below). A Service Development Plan (SDP) is a key requirement of the CID Program. In December 2023, the FRA selected the Amtrak Cascades corridor to be part of the CID Program. Completion of this Preliminary SDP, along with similar planning work in Oregon, gives Amtrak Cascades a head start to participate in this federal investment process.

FRA project life cycle stages and corresponding FRA funding programs



The Preliminary SDP is the first step in developing a comprehensive plan that will serve as a blueprint for improving the entire Amtrak Cascades corridor. WSDOT coordinated regularly with its Amtrak Cascades service partners in the development of this Preliminary SDP. These service partners include:

- FRA,
- BNSF Railway (BNSF)
- Sound Transit
- Canadian National Railway
- Amtrak
- Oregon Department of Transportation (ODOT)

[1] The Pacific Northwest Rail Corridor (PNWRC) is one of 11 federally designated high-speed rail corridors in the U.S. In this document, it is also referred to as the Amtrak Cascades corridor.

Following federal and state funding, including legislative direction[2], this initial phase allows WSDOT to identify future Amtrak Cascades service goals and initiate analysis of ridership data; different levels of train service; and potential infrastructure improvements to the railroad corridor. This preliminary plan serves as the foundation for future analysis and more robust planning under the CID Program. Creating this preliminary plan also allows service partners and interested parties to be involved from the onset. Host railroads require thorough analysis of the impacts new passenger service may have on their current and future operations, as well as any added costs. BNSF Railway, the primary host railroad for the Washington segment of Amtrak Cascades, has documented its needs in its BNSF Railway Passenger Principles found at the end of Appendix D.

What is in this Preliminary Service Development Plan?

The primary work products from the Preliminary SDP are: (1) Preliminary Purpose and Need statement; (2) preliminary alternatives.

The Preliminary Purpose and Need statement defines the goals for future service improvement and why it is needed. It is used to identify and guide the range of preliminary alternatives that will be evaluated; establish criteria to evaluate those alternatives; and ultimately help determine the preferred alternative for service improvement.

The preliminary alternatives (described in Chapter 3) were used to address post-pandemic travel trends; assess how different service characteristics could affect ridership; and gain an initial understanding of the additional infrastructure that may be needed to implement them. Some of the preliminary alternatives could be considered incremental improvements implemented in the process of attaining higher service levels. During upcoming activities related to a corridor-wide SDP, which will be developed under Step 2 of the CID Program (Step 2 SDP), the preliminary alternatives will be further analyzed, and more comprehensive examination of needs, costs, and resources will be evaluated. Also, the Step 2 SDP will integrate this work focused on the Washington segment of the corridor with planning work that has been completed by ODOT for the Oregon segment, creating an SDP for the full Amtrak Cascades corridor.

This Preliminary SDP also includes the results of a scenario analysis WSDOT performed to understand how potential future travel trends could affect Amtrak Cascades ridership for each of the preliminary alternatives.

How did we conduct outreach?

WSDOT conducted extensive outreach during development of the Preliminary Purpose and Need statement, receiving over 4,000 responses via webpage content, webinars, social media posts, and major employer interviews. Input was incorporated into the statement to strengthen the language and clarify the intent. It was also used to inform development of the preliminary alternatives. Similar feedback was received when the initial results were shared at public webinars in October 2023. The top priorities identified through public feedback are more frequent service, shorter travel times, reliable service, reduced greenhouse gas emissions, and better local connections at stations.

WSDOT published the draft of this document for a 30-day public review that ended on April 18, 2024. Nearly 800 comment submittals were received by WSDOT. These included comments from individuals, as well as a variety of public agencies and nongovernmental organizations. Public agencies included metropolitan planning organizations, state agencies, local jurisdictions, and transit agencies. The most common themes from feedback received during the public review are discussed in Chapter 2 of this document and in Appendix E.

[2] ESSB 5689, Section 223 (2)

What were our initial findings?

Five preliminary alternatives, described below, were identified for further analysis. They include a variety of potential service levels that vary depending on service frequency, operating speed, and station stopping patterns. With each preliminary alternative, trips were spread evenly throughout the day as much as feasible. The project team developed an initial list of infrastructure improvements that may be needed to allow for the various levels of ridership and service. These need to be further analyzed and discussions will be needed with host railroads and other service partners during development of the upcoming Step 2 SDP. Host railroads have not endorsed these improvements and no engineering analysis has been performed to design infrastructure improvements; therefore, no cost estimates are available, nor funding identified at this point in the planning process.

Summary of Preliminary Alternatives

	Preliminary Alternatives					
	Baseline	A	B	C	D	E
Seattle – Vancouver, BC daily roundtrips	**2**	**4**	**5**	**6**	**6**	**6**
Local trips	2	2	3	3	2	6
Express trips (13 minutes faster)	-	-	-	-	1	-
Seattle – Bellingham with bus to Vancouver	-	2	2	3	3	-
Seattle – Portland daily roundtrips	**6**	**8**	**10**	**13**	**13**	**16**
Local trips	6	7	10	13	9	16
Limited trips (14 minutes faster)	-	-	-	-	2	-
Express trips (20 minutes faster)	-	1	-	-	2	-
Maximum speed limit[3]	79 mph	79 mph	79 mph	90 mph	79 mph	90 mph
Estimated 2045 annual ridership (in millions)	1.3 M	2.1 M	2.4 M	2.9 M	2.5 M	3.2 M
Minimum number of infrastructure improvements	-	14	15	17	17	19

What did we learn?

Service Frequency: The ridership forecasts showed that increasing service also increased ridership, up to a point. Forecasted ridership between Seattle and Portland level off with service increases beyond 16 daily roundtrips[4], but a better understanding of the capital investments and operating expenses for the alternatives are needed. The upper limit of six roundtrips for the Seattle-Vancouver, BC service represents a three-fold increase from the current two roundtrips. As part of the Step 2 SDP, the optimal level of service to maximize potential ridership growth will be further explored in coordination with Canadian partners.

Speed Increases: Shorter travel times could increase ridership. Simply raising the maximum speed to 90 mph may be viable in some locations, but more analysis and host railroad discussions are needed to confirm if these increases are viable. An assessment of opportunities to increase speeds in locations with current speed restrictions through infrastructure investments will be considered in the upcoming Step 2 SDP work.

Stopping Patterns: Express/limited service showed a negative effect on ridership compared to all local service, but further analysis is needed to better understand revenue performance if higher fares are charged for faster trips.

[3] See "How did we develop timetables for the preliminary alternatives?" at the end of Chapter 3 for more information about how maximum speed limits were assigned to the preliminary alternatives.

[4] See the "Service option definition and screening" section of Chapter 3 for more information about the service frequency analysis.

Seattle-Bellingham Rail Service: More train trips to Vancouver, BC are not viable without support from Canadian partners. However, additional trains to Bellingham, with connecting buses across the border could capture most of the ridership between Seattle and Vancouver, BC and should be analyzed further if infrastructure improvements in Canada become a challenge.

Future Travel Trends: The scenario analysis showed that higher population and employment growth, and supportive rail and transit service improvements are major drivers for further boosting ridership. Less business travel and the continuation of the current teleworking trend could have a strong dampening effect on future ridership. In addition, technology trends such as vehicle automation have the potential to limit ridership growth. Strategies for enhancing the passenger experience should be considered as tools for maximizing ridership as the travel market evolves.

What are our next steps?

WSDOT was awarded a $500,000 grant from FRA in December 2023 for Step 1 of the Corridor ID Program. This will be used to scope a work plan for a full and comprehensive corridor-wide SDP in coordination with the Oregon Department of Transportation (ODOT) and FRA.
The comprehensive corridor-wide Step 2 SDP will further refine and evaluate the preliminary alternatives. It will be based on more extensive and detailed transportation planning analyses[5] that will include:

- Operations analysis
- Ridership and revenue forecasts
- Conceptual engineering
- Capital cost estimates
- Operating and maintenance cost estimates
- Labor and fleet planning
- Station area and access analysis

Additional work for the Step 2 SDP development also includes:

- Initial environmental planning
- Financial planning and benefits/cost analysis
- Corridor governance
- Phased implementation plan

This work will continue to be coordinated with other transportation planning efforts, including Cascadia High Speed Rail and the I-5 Master Plan.

Public engagement will continue throughout development of the Step 2 SDP, including communities, partners, and interested parties. Feedback already received for this Preliminary SDP will be incorporated into the Step 2 SDP work.

[5] For more information about the tasks that may be involved in preparation of a SDP, refer to the Service Development Plan Draft Statement of Work Framework on the FRA website.

1 | INTRODUCTION

What is Amtrak Cascades?

Amtrak Cascades is an intercity passenger rail service operating along a 461-mile corridor connecting 18 cities in the Pacific Northwest, including Vancouver (British Columbia), Seattle, Portland, and Eugene as shown in Exhibit 1. The service carried more than 800,000 annual passengers prior to the COVID-19 pandemic, and ridership and revenue performance in 2023 are nearing 2019 (pre-pandemic) levels. Trains operate on railroad tracks owned by BNSF, Sound Transit, Canadian National (CN Railway), and Union Pacific.[6]

Corridor segments	Daily round trips
Vancouver, BC – Seattle, WA	
Seattle, WA – Portland, OR	
Portland, OR– Eugene, OR	

Exhibit 1: Amtrak Cascades map

What are we doing?

This Preliminary Service Development Plan (Preliminary SDP) was prepared by the Washington State Department of Transportation (WSDOT), to study future potential alternatives for enhancing the Amtrak Cascades service. This plan, created with coordination and support[7] from the Federal Railroad Administration (FRA), focuses on the corridor between Portland, OR and Vancouver, BC, which is the Washington state segment of the Amtrak Cascades Corridor. This work complements similar planning work undertaken by the Oregon Department of Transportation (ODOT) for the Portland to Eugene portion of the Pacific Northwest Rail Corridor (PNWRC)[8]

The Preliminary SDP explores potential service alternatives (e.g. number of trips, stations served, travel times between stations) and identifies congested locations along the corridor that may need capital improvements before service can be enhanced. The goal is to provide information that informs decisions about what should be analyzed further as the planning process continues, considering travel trends, population growth, community needs, and other service development factors.

[6] Amtrak Cascades only uses Union Pacific tracks in the Oregon segment of the corridor, which was not part of this analysis for the Washington segment.

[7] The plan is funded by a $500,000 Consolidated Rail Infrastructure and Safety Improvements (CRISI) grant awarded to WSDOT by FRA in 2019 and $500,000 of state funds as match.

[8] Oregon Department of Transportation, Oregon Corridor Investment Plan.

Why are we doing this?

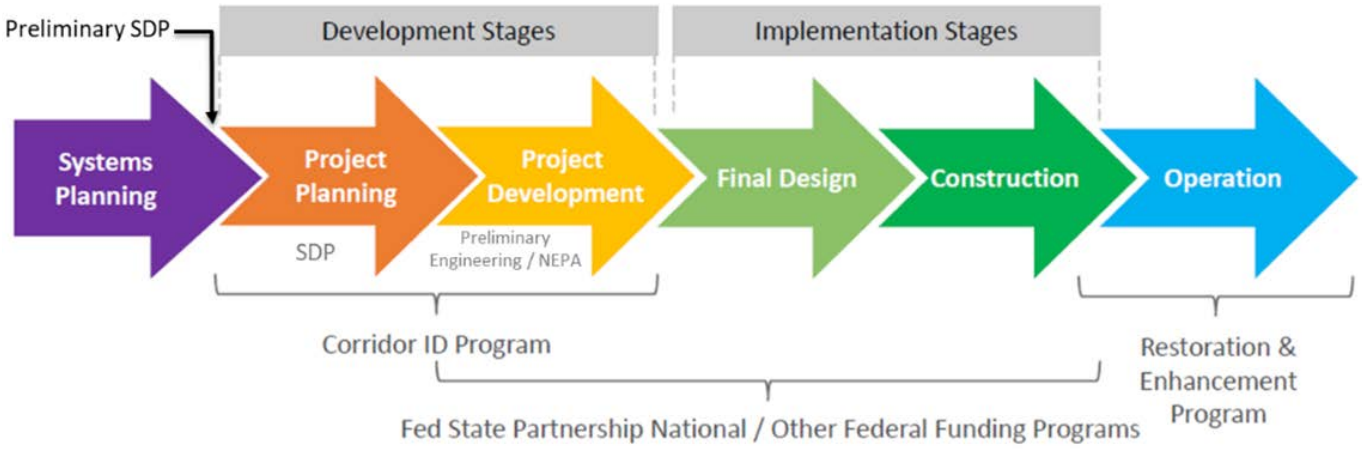
Well-informed planning for the future of Amtrak Cascades is critical to ensuring that available resources are invested in the wisest ways possible. Much has changed on the Amtrak Cascades corridor since the last long-range plan was created in 2006. A refreshed plan that accounts for current conditions is needed to guide future improvements. This Preliminary Service Development Plan is the first phase towards creating a blueprint for improving Amtrak Cascades service for the next two decades.

The 2006 Long-Range Plan for Amtrak Cascades set the stage for securing nearly $800 million in American Recovery and Reinvestment Act (ARRA) and High-Speed Intercity Passenger Rail (HSIPR) funds to create capacity for two additional Seattle to Portland round trips, reduce travel times, and improve on-time performance in the corridor. Building on this achievement, an updated plan based on current rail system conditions and updated federal requirements is needed to guide practical improvements that will meet the needs of the corridor over the next 20 years. In addition, many other factors contribute to the analysis, such as population growth, housing, employment, travel preferences, and environmental initiatives.

This analysis also aligns with FRA's new foundation for a long-term intercity passenger rail program, the Corridor Identification and Development (CID) Program. It was established by FRA in 2022 as part of the federal Infrastructure Investment and Jobs Act. CID is a national framework for passenger rail planning and development that will create a pipeline for funding and delivery of intercity passenger rail projects. Exhibit 2 illustrates how accepted corridors progress through the CID process.

This Preliminary SDP is part of Systems Planning and positions Amtrak Cascades to formally enter FRA's Development and Implementation Stages in the CID Program. This document is being done now to provide a thorough initial analysis of alternative concepts as the first step in developing a comprehensive SDP for the entire PNWRC in the Project Planning stage. The full corridor SDP will be Step 2 in the Corridor ID Program (Step 2 SDP).

Exhibit 2: FRA project life cycle stages and corresponding FRA funding programs



In addition to being a part of FRA's project development process, the Preliminary SDP is the first step in coordinating service improvements with the host railroads and other key partners. It is the beginning of a thorough analysis of the potential benefits and impacts of current and future passenger rail service may have on the needs of freight operations and passenger ridership, including added costs. BNSF Railway, the primary host railroad for the Washington segment of Amtrak Cascades, has documented its needs in its BNSF Railway Passenger Principles found at the end of Appendix D.

Preparing for future rail investment opportunities

During the development of this Preliminary SDP, WSDOT and ODOT submitted an application seeking entry into the FRA CID Program for the Amtrak Cascades corridor and were successfully accepted into the CID Program in December 2023. As part of the CID Program moving forward, a more comprehensive Service Development Plan must be developed that includes scoping, planning, and development for the entire PNWRC corridor. This corridor-wide plan then must be approved by FRA. Additional requirements, direction, and guidance from FRA are anticipated in the future as the CID Program grows and develops. In the meantime, work with FRA and our service partners continues as we undertake further analysis that is required for federal funding of future rail investments on the Amtrak Cascades corridor.

Planning and policy context

Statewide transportation policy

Service planning for Amtrak Cascades is guided by Washington's six statewide transportation policy goals defined by statute[9] and the Washington Transportation Plan.[10]

Washington's Statewide Transportation Policy Goals

Preservation: To maintain, preserve and extend the life and utility of prior investments in transportation systems and services.

Safety: To provide for and improve the safety and security of transportation customers and the transportation system.

Stewardship: To continuously improve the quality, effectiveness, resilience, and efficiency of the transportation system.

Mobility: To improve the predictable movement of goods and people throughout Washington, including congestion relief and improved freight mobility.

Economic Vitality: To promote and develop transportation systems that stimulate, support, and enhance the movement of people and goods to ensure a prosperous economy.

Environment: To enhance Washington's quality of life through transportation investments that promote energy conservation, enhance healthy communities and protect the environment.

State Rail Plan

Amtrak Cascades service planning is aligned with the 2019 State Rail Plan, including the rail system vision statement. Information from this Preliminary SDP and the subsequent Step 2 SDP will be integrated into future versions of the State Rail Plan to meet federal[11] and state[12] requirements.

Vision for Washington's Rail System

As an integral part of Washington's multimodal transportation network, the rail system provides for the safe, reliable and environmentally responsible movement of freight and passengers to ensure the state's economic vitality and quality of life.

[9] RCW 47.04.280

[10] https://wsdot.wa.gov/construction-planning/statewide-plans/washington-transportation-plan

[11] The federal requirements for a state rail plan are outlined in 49 USC 22705 and 49 CFR 266.15 which implement the Passenger Rail Investment and Improvement Act of 2008 and the FAST Act of 2015.

[12] The State Rail Plan meets several state requirements:

- State Rail Plan required in RCW 47.76.220
- Intercity Passenger Rail Plan required in RCW 47.06.090
- Rail Passenger Plan required in RCW 47.79.040

Other transportation planning

Planning for Amtrak Cascades will continue to be coordinated with other transportation planning efforts, including Cascadia High Speed Rail, the I-5 Master Plan, and commercial aviation capacity studies. Planning will also consider WSDOT's habitat connectivity plans where relevant.

What is in this Preliminary Service Development Plan?

The Preliminary Service Development Plan is the first step in developing a comprehensive plan for the entire Amtrak Cascades corridor. Given the available level of resources, this initial phase was limited to two main work products. It allowed WSDOT to develop the goals for future Amtrak Cascades service and to begin analysis of ridership data; different levels of train service; and potential infrastructure improvements to the railroad corridor.

This preliminary plan will serve as the foundation for further analysis and more robust planning activities as the final Service Development Plan is undertaken. Publishing this preliminary plan allows interested parties to be involved from the onset in the continued development of the final plan. Engaging communities, partners, and other interested parties in creating the program goals ensured WSDOT received valuable feedback on the issues of greatest importance in planning for the future of the service. Sharing the preliminary analysis of data and service configurations provided additional opportunities for input as the process continues.

The two primary work products included in this preliminary plan are: (1) Preliminary Purpose and Need statement and (2) preliminary alternatives. During the Step 2 SDP, the alternatives will be further analyzed, and a more comprehensive examination of needs, costs, impacts, and resources will be evaluated. More details on those activities can be found in the "Next Steps" section of this report.

Preliminary Purpose and Need

The Preliminary Purpose and Need statement defines the goals for future service improvement and why it is needed. It is used to identify and guide the range of alternatives that will be evaluated; establish criteria to evaluate those alternatives; and ultimately help determine the preferred option for service improvement. It is intended to transition into the Purpose and Need statement for subsequent environmental analysis under the National Environmental Policy Act, if the analysis requires one.

Preliminary alternatives

WSDOT developed preliminary alternatives to address post-pandemic travel trends; assess how different service characteristics could affect ridership; and gain an initial understanding of the additional infrastructure that may be needed to implement them. Some of the preliminary alternatives could be considered incremental improvements implemented in the process of attaining higher service levels.

To develop preliminary alternatives, the project team:

- Reviewed recent literature and data to understand post-pandemic travel trends
- Created a wide range of service options based on the Preliminary Purpose and Need, public feedback and travel market data
- Assessed initial service options using criteria, including ridership projections, to narrow them down to five preliminary alternatives
- Conducted capacity analysis of rail corridor capacity, identifying potential investments needed to support the service levels of preliminary alternatives
- Undertook a scenario analysis to gain insights into how future uncertainties may shift ridership projections

WSDOT will carry the preliminary alternatives forward into the Step 2 SDP analysis.

2 | PUBLIC INPUT

The public outreach process provided several opportunities for feedback and engagement from individuals and organizations throughout the corridor.

The public outreach activities sought to:

- Provide an opportunity for public participants to engage in the service planning process and give relevant input to the project
- Focus public input in a structured manner to allow decisions to be made based on public involvement
- Ensure elected officials, agencies, partners, and the public were informed about the project and its implications for their communities so that potential concerns could be addressed and resolved
- Receive feedback from people representing a wide range of perspectives in the corridor, including those not historically engaged in transportation planning activities

The project team engaged many audiences, including:

- Current and future riders of Amtrak Cascades
- WSDOT's Amtrak Cascades service partners (BNSF, Sound Transit, CN Railway, Amtrak, ODOT, FRA)
- Communities along the corridor, particularly those in underserved communities
- Elected officials
- Federal, state, regional, and local agencies
- Tribes
- Advocacy and special interest groups

Key public outreach activities are described below in Exhibit 3.

Exhibit 3: Key public outreach activities

Project activity	Outreach activities
Preliminary Purpose and Need statement	• Amtrak Cascades email distribution list notifications • Social media posts (translated into Chinese, Spanish, Vietnamese) • Text messages to limited-English speakers and low-income populations • Informational website, with project fact sheets into Spanish, Russian, Vietnamese, Korean, Chinese, Somali, and Arabic. • Webinars (local and regional agencies, passenger rail advocacy organizations, members of the public) • Online comment form (translated into Chinese, Spanish, and Vietnamese)
Preliminary alternatives	• Major employer interviews • Technical working group meetings with service partners • Amtrak Cascades email distribution list notifications • Website update • Webinars (local and regional agencies, passenger rail advocacy organizations, members of the public)
Final report	• Notifications through the Amtrak Cascades email distribution list • Website update

Some key themes WSDOT heard early in the outreach process are listed below in Exhibit 4 and Exhibit 5. These themes were considered by the project team while developing the alternatives. More information about public outreach can be found in Appendix B.

Exhibit 4: Key themes from Preliminary Purpose and Need outreach

More service	Increasing the number of trips would make Amtrak Cascades more convenient and encourage people to use it more.
Faster trips	Shorter travel times would eliminate one of the perceived advantages of driving and make taking the train a more attractive option.
Better reliability	Better on-time performance would encourage people to take the train more, especially for trips that require arrival by a specific time.
Improvements to first- and last-mile connections	Better connections to other transportation options at stations would make it easier for people to get to and from their destinations
Emission reductions	Service improvements could encourage people to take the train instead of using an option with higher greenhouse gas emissions, helping Washington meet emission reduction goals

Exhibit 5: Areas of potential improvement cited in major employer interviews

Efficiency and reliability	Travel times faster than driving, or if similar, with more convenience and opportunities for increased work productivity.
Round trips with fewer stops	Faster travel times using express or limited-stop trains.
Enhanced business class features	Amenities to increase work productivity during the journey, such as reliable broadband Wi-Fi (e.g., for video calls), comfortable seating, worktables, and specific cars designated for phone calls.
Improvements to first- and last-mile connections	Reliable, frequent transit connections at stations will help address the post-pandemic unreliability of rideshare services and a lack of secure long-term parking at stations.
Convenient and expedited border crossings	More efficient border crossing via Amtrak would increase the attractiveness of train travel given the long wait times for autos at the Canadian border.

Draft report feedback

Comment submittals

WSDOT published the draft of this document for a 30-day public review that ended on April 18, 2024. Nearly 800 comment submittals were received by WSDOT. These included comments from individuals, as well as a variety of public agencies and nongovernmental organizations. Public agencies included metropolitan planning organizations, state agencies, local jurisdictions, and transit agencies.

Common themes

The most common themes from feedback received during the public review are discussed below in Exhibit 6. A more detailed summary can be found in Appendix E.

Exhibit 6: Public review feedback

Topic	Feedback	Response
2006 Long-Range Plan	Refresh the 2006 plan and submit it as the SDP that FRA requires for the CID Program	WSDOT will develop an SDP that meets current FRA requirements and is based on current data and information.
Shorter travel times	WSDOT should keep the travel time goals in the 2006 Long-Range Plan	WSDOT will work with BNSF to assess the potential for higher maximum speeds within its right of way. WSDOT will also identify opportunities where infrastructure investments could allow increased speeds in locations with current speed restrictions as part of conceptual engineering during the Step 2 SDP work.
Express service	Do not continue studying service patterns that skip stations because of equity concerns.	WSDOT will undertake further analysis of service patterns that skip stations during development of the Step 2 SDP, to determine its implications from an equity perspective.
Reliability	Reliable service is key to improving Amtrak Cascades	The more detailed analysis to be performed during upcoming Step 2 SDP work will identify and include opportunities to improve reliability.
Infrastructure projects	The proposed infrastructure projects are not adequate to provide reliable, faster service	A more detailed analysis of infrastructure needs will be performed during development of the Step 2 SDP. Additional projects are likely to be identified in that analysis, including some needed to ensure more reliable service.

Exhibit 6: Public review feedback (continued)

Topic	Feedback	Response
Multimodal connectivity	Improve multimodal connections	WSDOT will identify improvements to multimodal connectivity at stations and opportunities to provide connecting service to locations outside the corridor as part of the Step 2 SDP work.
New stations	Add stations to the route	Consideration of new stations needs to follow the Station Stop Policy, independent of the SDP process.
Environmental Concerns	Address impacts related to: • Fish barriers • Habitat connectivity • Air quality • Water quality • Noise and vibration	WSDOT will identify potential impacts to environmental resources as part of the Step 2 SDP and other federal requirements such as the National Environmental Policy Act (NEPA) process.
Equity Concerns	Provide equitable access to passenger train service. Avoid increasing burdens on marginalized communities. Engage minority and low-income communities in meaningful ways.	WSDOT will continue to engage marginalized, minority and low-income communities as planning work continues.

3 | DEVELOPMENT OF PRELIMINARY ALTERNATIVES

Preliminary Purpose and Need statement

The Preliminary Purpose and Need statement served as the foundation for the Preliminary Service Development Plan and guided the identification and evaluation of service options. Input was sought from the public and stakeholders that was incorporated into this statement to strengthen the language and clarify the intent.

The purpose of the proposed Project is to enhance intercity passenger rail service for travelers along the existing route used for the Washington state segment of the PNWRC[13].

The Project would meet the following transportation needs:

- Meet growing intercity travel demand with more frequent, reliable and customer-focused service
- Strengthen multimodal connections to improve accessibility and provide better travel options
- Support greenhouse gas reduction goals
- Support the economic vitality of communities served by PNWRC passenger service
- Address transportation system equity issues along the corridor
- Ensure the rail corridor has the capacity to support needs of all passenger and freight rail service providers

Additionally, the project will:

- Avoid or minimize negative community and environmental impacts
- Be a cost-effective investment

More detailed information about the Preliminary Purpose and Need can be found in Appendix A.

Market data and information

In addition to the Preliminary Purpose and Need statement and public input, WSDOT used travel market data and information gathered during the preliminary alternatives development process to identify travel trends (Exhibit 7).

Exhibit 7: Summary table of travel trends and service planning implications

	Trends	Implications
Underlying Travel Market Shifts	• **Trip purpose** – Less business/commute travel, more discretionary travel. • **Trip distance** – Shorter- and mid-distance trips (50–250 miles) are increasing, while long-distance trips are not recovering.	• More travel in the off-peak and weekends, leading to a more balanced service plan (and potentially less congestion). • Service plans should accommodate intermediate markets with ideas like express and local stopping patterns, shorter run segments. • New connections for outlying cities to urban job centers, potential coordination with commuter rail.

[13] The Pacific Northwest Rail Corridor (PNWRC) is one of 11 federally designated high-speed rail corridors in the U.S. The 462-mile (742-kilometer) PNWRC serves the most densely populated areas of the Cascadia megaregion, linking Vancouver, BC to Seattle, Portland, and Eugene. In this document, it is also referred to as the Amtrak Cascades corridor.

Exhibit 7: Summary table of travel trends and service planning implications (continued)

	Trends	Implications
Changing Demand	• Urban auto trips have been slower to return, and suburban and rural auto trips have grown faster • Amtrak Cascades ridership has steadily increased since 2020 as service has been incrementally restored. • Future travel demand will continue to increase, driven by strong population and employment growth.	• Maintain competitive travel times with auto. • Ridership is likely to continue to increase with service restoration and planned increases.

Travel market shift in the region

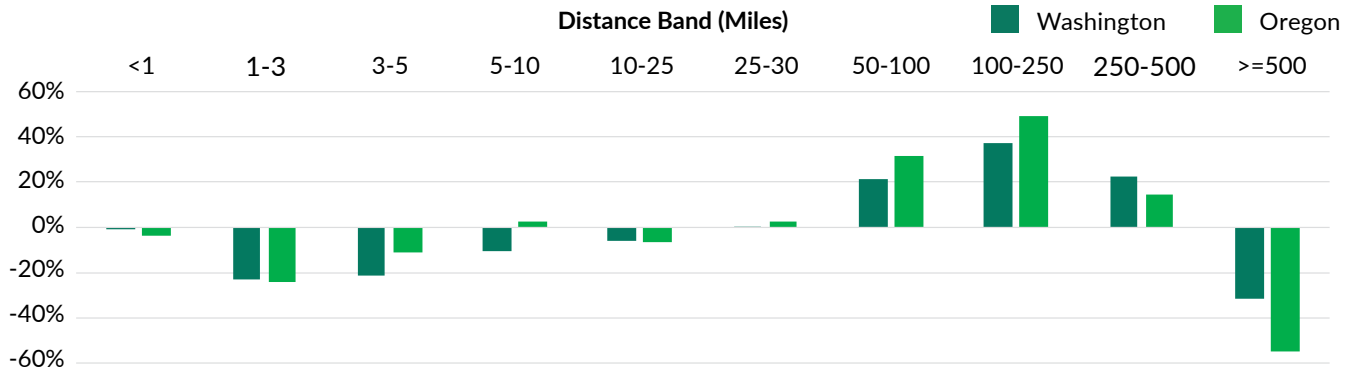
Trip purpose

Mid and long-distance trips (longer than 64 miles) in the PNWRC region[14] are shifting from work related activities toward discretionary travels from 2019 (pre-pandemic) to 2022. The share of work-related travel dropped from 24% to 20%, while the combined share for 'eat and shop' and 'recreation' categories increased from 61% to 72%. The pandemic's impacts on business travel in the region is consistent with national trends. Morning Consult's 2022 survey of thousands of U.S. adults[15] found that "the share of U.S. adults who say they travel for business is now 18% lower" than in typical pre-pandemic years, with "high-frequency business travelers [showing] the biggest decline".[16] While business travel continues to be down relative to pre-pandemic levels, intercity passenger rail service can better capture discretionary travel by accommodating discretionary trips during off-peak periods and weekends.

Trip distance

Trips of distances between 50 and 250 miles[17] increased 20% to 50% between 2019 and 2022 in Washington and Oregon (Exhibit 8). This trip-distance market is ideal for rail travel and indicates potential for a higher modal split toward rail. Conversely, for longer-distance journeys exceeding 500 miles, both Washington and Oregon experienced pronounced declines of more than 30%, indicating that long-distance travel had yet to rebound in the early post-pandemic period.

Exhibit 8: Change in percentage of trips by distance from 2019 to 2022



[14] Source: Replica data for 2019 and 2022. Replica is an enterprise data platform and a data source relating to travel factors and patterns: https://replicahq.com/

[15] "Report: Business, but Not As Usual." Morning Consult. February 2023

[16] "Business Travel Will Never Bounce Back To Pre-Pandemic Levels, Studies Say." Forbes. April 2023.

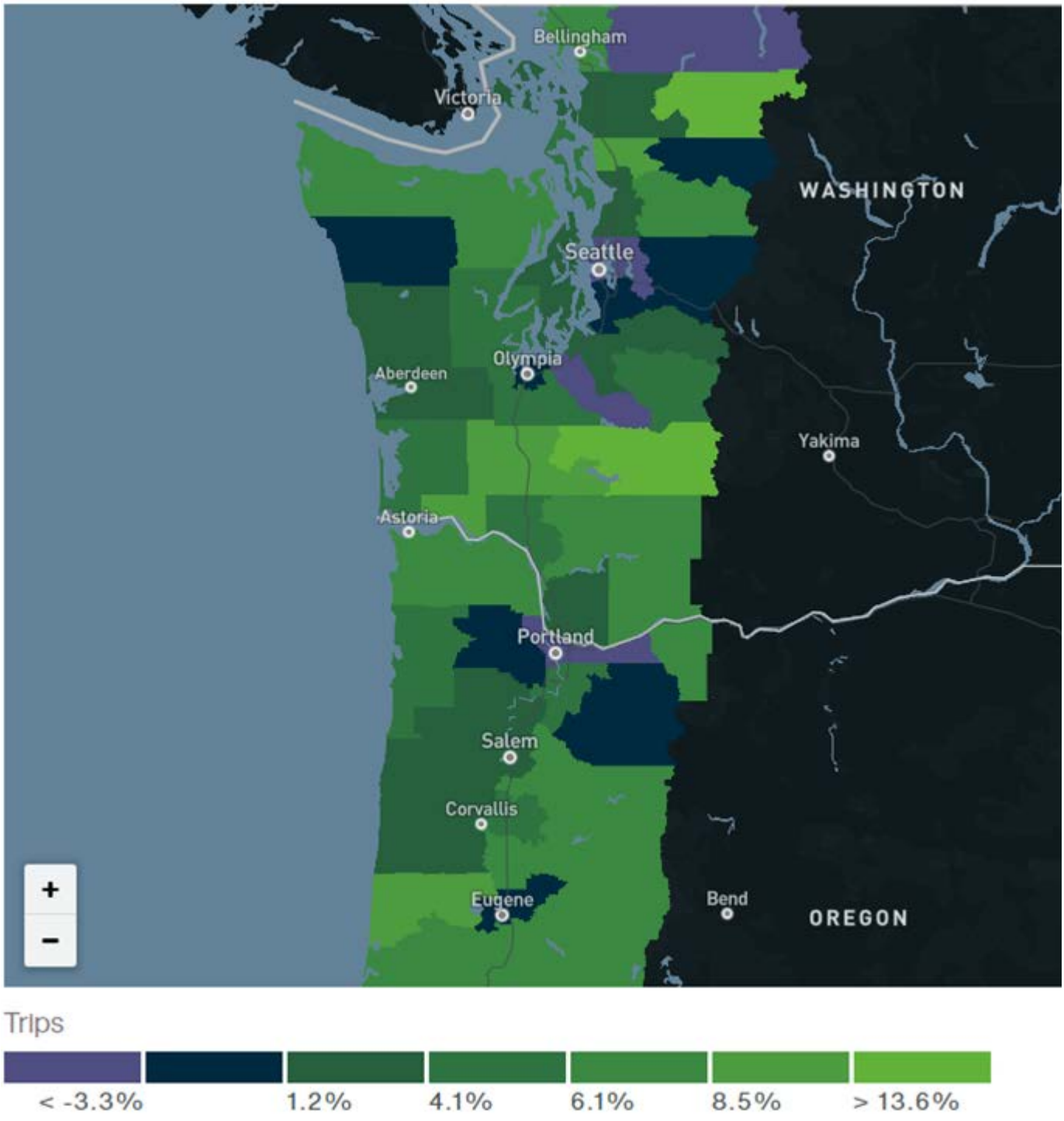
[17] U.S. Department of Transportation, Transportation Statistics Annual Report 2022. Trips encompass various transportation modes such as driving, rail, transit, and air: https://data.bts.gov/Research-and-Statistics/Trips-by-Distance/w96p-f2qv/data

Changing demand

Shift in automobile trips

Trip-making patterns within the PNWRC shifted because of COVID-19, with urban automobile trips slow to return to pre-pandemic levels. As shown in Exhibit 9, compared to 2019 levels, daily automobile trips in 2022 were 5% lower in Seattle and 4% lower in Portland. In contrast, there has been an overall increase in suburban and rural automobile trips, especially in the area between Seattle and Portland. This includes Lewis County (15% increase) and Cowlitz County (11% increase).

Exhibit 9: Change in total automobile trips along the PNWRC (July 2019 and July 2022)

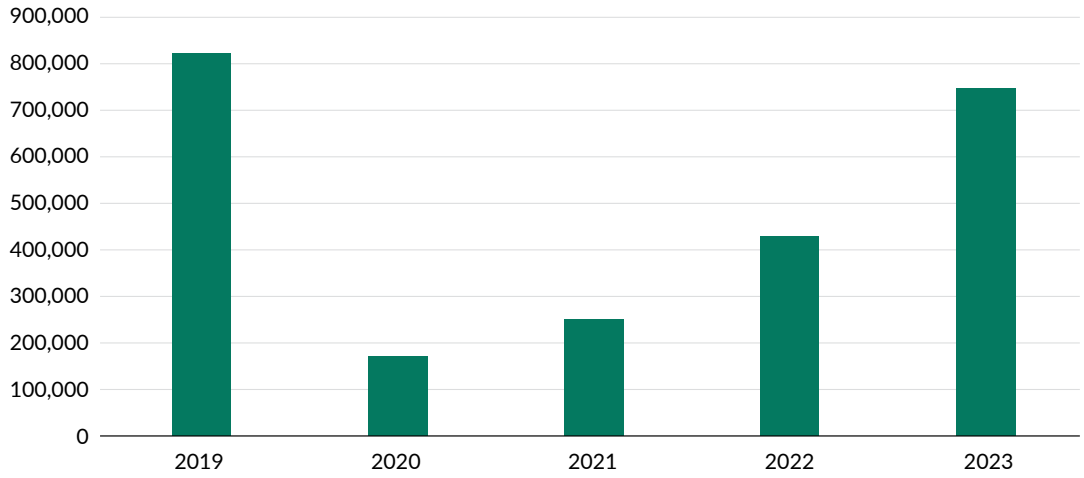


Source: Replica trends data https://replicahq.com/

Robust recovery for Amtrak Cascades ridership

The recent ridership trend indicates a robust recovery for Amtrak Cascades travel since COVID-19 (Exhibit 10). In 2020, Amtrak Cascades ridership plummeted to just 21% of the 2019 level, primarily due to significant service reductions and travel restrictions. It has rebounded steadily since then. In 2022, ridership increased nearly 70% compared to 2021. With service fully restored to pre-pandemic levels in March 2023, ridership continued the strong upward trend and increased by 74% compared to 2022.

Exhibit 10: Amtrak Cascades annual ridership from 2019 to 2023

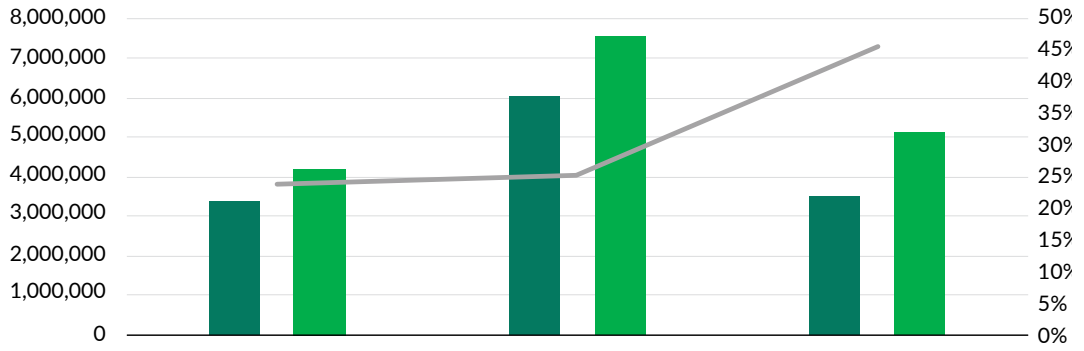


* Note: Service between Seattle and Vancouver, BC was restarted in September 2022 with one daily roundtrip, and full service of two daily roundtrips was restored in March 2023.

Population and employment trends

Between 2020 and 2045, population in counties along the PNWRC is forecast to grow between 24% to 46%, and employment is forecasted to grow by 18% to 35%, which will drive the regional travel demand for all modes, including Amtrak Cascades (Exhibit 11).

Exhibit 11: Population growth in the PNWRC corridor[18]



	Oregon	Washington	British Columbia
2020	3,377,625	6,036,519	3,501,631
2045	4,183,179	7,569,479	5,098,192
Growth	24%	25%	46%

[18] Sources: Washington-Office of Financial Management; Oregon-Bureau of Economic Analysis (for the current year), Portland State University (for 2045 / other counties along the rail corridor in Oregon not including Portland MSA), The Metro Council (for 2045 / Portland MSA only); British Columbia-Statistics Canada (current year), BCStats (for 2045)

Service option definition and screening

WSDOT defined initial service options based on key service characteristics and selected a subset to carry forward as preliminary alternatives for further analysis. This section documents the three service characteristics and their values that were used to define initial service options, and the service option screening process and criteria.

Service options for Amtrak Cascades refer to potential configurations of future service, defined by key characteristics including service frequency, operating speed, and station stopping patterns. The preliminary alternatives represent a short list of refined service options and the corresponding infrastructure improvements that are advanced to the Step 2 SDP work.

What key service characteristics define the initial service options?

The key service characteristics used to define the 13 initial service options included service frequency, stopping patterns, and the potential for speed increases (Exhibit 12). These three characteristics and their values are summarized in the table below and then discussed in detail. The process leading to 13 initial service options is also described at the end of this section.

The detailed list of 13 initial service options is documented in Appendix C.

Exhibit 12: Key service characteristics and values for service option definition

Service frequency *Increased frequency beyond 2023 levels*	• Frequency from 2006 Long-Range Plan (13 daily round trips between Seattle and Portland) • Lower service frequency options (minimum of 8 daily round trips for Seattle-Portland, 3 for Seattle-Vancouver BC) • Higher service frequency options (up to 16 daily round trips for Seattle-Portland, 6 for Seattle-Vancouver BC)
Stopping patterns *Skipping intermediate stops for shorter trip times or introducing integrated bus/rail service*	• Local (stop at all stations) • Express (non-stop) • Limited (stops in Seattle, Tacoma, Vancouver, WA and Portland) • Partial rail service for new Seattle-Vancouver, BC trips (rail for Seattle–Bellingham, bus for Bellingham–Vancouver)
Speed increases *Faster operating speeds to reduce travel times*	• Increasing maximum speed from 79 mph to 90 mph in straight sections • Adjusting speed limits in specific locations on the corridor where it is feasible or where improvements will allow for faster speeds

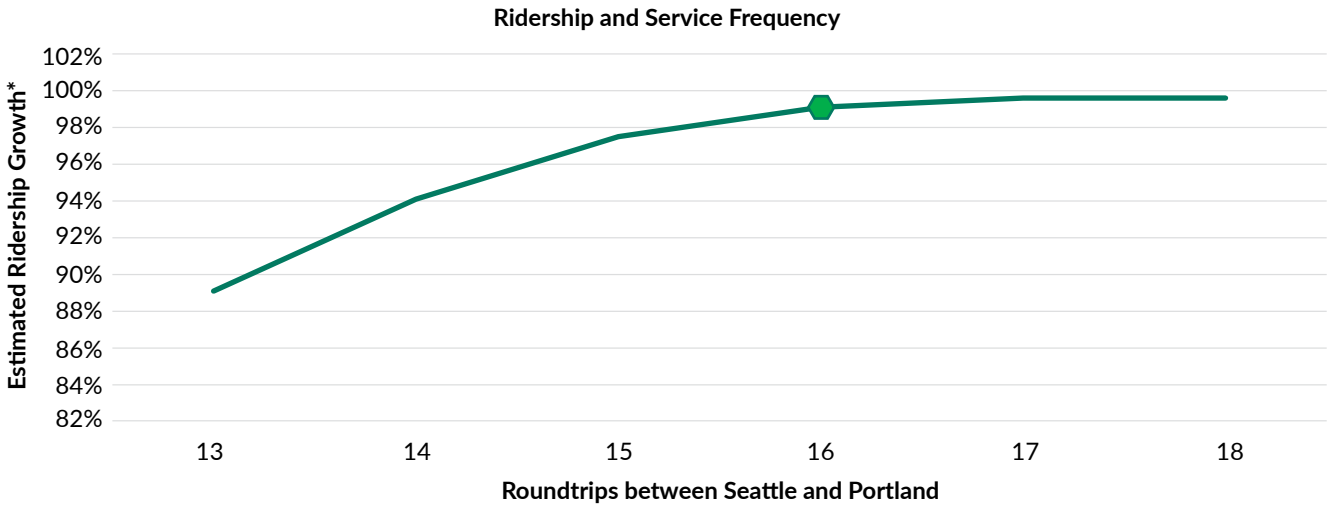
Service frequency

Higher service levels were the priority for future service improvements most often mentioned during Preliminary Purpose and Need outreach, with 35% of nearly 3,000 respondents requesting additional daily trips. To determine a basis for service frequency, the following was considered:

- WSDOT's 2006 Long-Range Plan, which identified 13 daily round trips between Seattle and Portland
- All service options include six future round trips between Portland and Eugene, consistent with ODOT's Oregon Passenger Rail Tier 1 Draft and Environmental Impact Statement (2020) and the Oregon Passenger Rail Service Development Plan (2021)

- Most importantly, the upper limit of 16 roundtrips for Seattle-Portland service was determined based on an early ridership sensitivity analysis using a simplified version of the ridership forecast model. As shown in Exhibit 13, potential ridership growth for the PNWRC begins leveling off at approximately 16 daily round trips between Seattle and Portland
- The upper limit of six roundtrips for the Seattle-Vancouver, BC service represents a three-fold increase from the current two roundtrips. As part of the Step 2 SDP, the optimal level of service to maximize potential ridership growth can be further explored in coordination with Canadian partners.

Exhibit 13: Ridership as a function of service frequency



* Ridership growth based on six rail roundtrips for the northern corridor segment.

Source: AECOM

Speed increases

Shorter travel times was another high priority identified during public outreach. The existing maximum speed limit allowed on the corridor is 79 mph. Operating Amtrak Cascades trains at higher speeds will require negotiations with the host railroads. BNSF has indicated a maximum speed limit of 90 mph may be feasible but very challenging to implement.

As part of this Preliminary SDP, the project team made an initial assessment of locations where there may be opportunities to reduce travel times through higher speeds. A higher maximum speed limit was only considered for sections where the speed limit can be raised using higher maintenance standards. Increasing speeds in locations with current speed restrictions through infrastructure investments will be considered as part of conceptual engineering during the Step 2 SDP work.

Further analysis and discussions with host railroads will be required during the upcoming Step 2 SDP to better understand the feasibility, benefits, and impacts of increasing speeds on the corridor.

Stopping patterns

Currently, all trains stop at every station. To provide shorter travel times or introduce additional service more quickly, the following alternate stopping patterns were considered:

- Express or limited-stop services to provide shorter travel times between the busiest stations.
    - Express services with no intermediate stops between Seattle and Portland, OR, as well as between Seattle and Vancouver, BC. The three stations in those cities are the busiest in the corridor, serving 68% of all rider boardings along the PNWRC.

- Limited-stop service between Seattle and Portland OR with intermediate stops at the Tacoma and Vancouver, WA stations. Tacoma and Vancouver WA were the next two busiest stations for Amtrak Cascades service in 2019. In addition, Portland – Tacoma, and Seattle – Vancouver, WA were the third and fourth most popular station pairs by number of trips in 2019.

- Additional rail service between Seattle and Bellingham, with connecting bus service between Bellingham and Vancouver, BC was also considered as an option when looking at reduced infrastructure investments in Canada. This allows service increases within Washington until additional service and investments can be implemented in Canada.

Initial service option definition

WSDOT developed four groups of service options based on the level of service frequency: low, medium, high, and highest as shown in Exhibit 14. Except for the highest service option group, each group identifies four service options, combining different station stopping patterns and service frequency. Low, medium, and high service option groups consider various stopping patterns such as express/limited service, all local service, and connecting bus service between Bellingham and Vancouver BC.

Exhibit 14: Initial service option groups

Service option group	Low	Medium	High	Highest
Number of service options	4	4	4	1
Service frequency – Portland to Seattle	8 roundtrips	10 roundtrips	13 roundtrips	16 roundtrips
Service frequency – Seattle to Vancouver BC	3 and 4 roundtrips	5 and 6 roundtrips	6 roundtrips	6 roundtrips
Service frequency – Eugene to Portland	6 roundtrips			

The highest service option group includes a single option with the highest number of roundtrips and maximum number of station stops. This option is based on the result of the initial ridership sensitivity analysis that generates the highest ridership.

Adding up the four service options groups results in an initial list of 13 service options. This initial list assumes 79 mph as the maximum speed to estimate trip runtime for service option screening process. A higher maximum speed limit of 90 mph is examined later as part of the timetable development to refine the remaining service options.

Screening and evaluation of service options

The service option screening analysis assessed 13 service options representing different combinations of service characteristics. The following process was employed for the service option screening:

- Develop five evaluation criteria based on the Preliminary Purpose and Need: high-level ridership growth[19], feasibility, multimodal connectivity, equity, and travel time improvements
- Evaluate and score each service option using these five criteria
- Choose at least one highest scoring option from each service level group to advance as preliminary alternatives

[19] These initial ridership estimates did not use the full ridership model for the service options. Given there were 13 initial service options to consider, the approach was to conduct what is referred to as "ridership sensitivity testing", which provides initial estimates based on a simple approach. In lieu of fully developed timetables, runtimes used for the ridership sensitivity testing were determined using train performance characteristics based on data about the rail line geometry and how that affects train operating speeds, the performance characteristics of assumed trainset types (the Airo trainsets currently being manufactured for Amtrak Cascades was assumed), and the current freight train operating speeds. These initial ridership estimates were one of several factors considered in the screening the long list of possible service options.

WSDOT consulted with Amtrak Cascades service partners (FRA, BNSF, Sound Transit, Canadian National, Amtrak, and ODOT) regularly throughout the service option screening process.

This process resulted in identifying the five highest scoring service options, including 1 from the low service level group, 1 from the medium group, 2 from high group, and 1 from highest service level group. Those five were advanced for further detailed operational, infrastructure, and ridership analysis. The evaluation criteria and methods for ranking the service options are shown in Exhibit 15. The results are documented in Appendix C.

Exhibit 15: Evaluation criteria descriptions

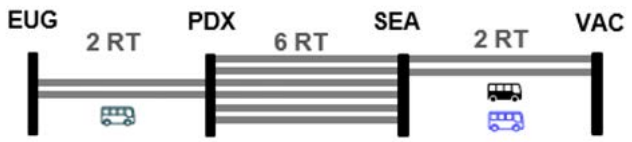
Criteria	Description
 **Ridership**	Projected high-level ridership increases over the existing service
 **Feasibility**	Existing corridor constraints and magnitude of service improvements that affect feasibility
 **Equity**	Service options stopping at all existing stations provide more equitable access to Amtrak Cascades service
 **Multimodal Connectivity**	Service options with higher frequency create more opportunities to use complementary transportation systems
 **Travel Time Improvement**	Service options with express and/or limited-stop service patterns provide travel time improvements compared to local service

What are the preliminary alternatives?

The 13 initial service options were pared down, with five service options and their associated infrastructure improvements selected for further analysis as preliminary alternatives that are described in detail below in Exhibit 16 and Exhibit 17. All alternatives are preliminary concepts subject to further analysis and refinement. All alternatives include six daily round trips between Eugene and Portland, as identified in ODOT's Service Development Plan.

Exhibit 16: Existing service diagram

Existing service



Legend

Local Roundtrip Train (serves all stops)

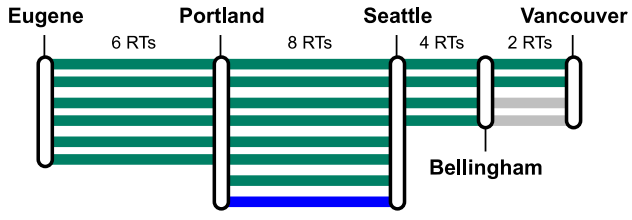
Thruway Bus (Cantrail)
Seattle – Vancouver • 4 Roundtrips
Runtime – 3 hours 30 mins

Thruway Bus (Cascades)
Seattle – Bellingham • 2 Roundtrips
Runtime – 2 hours 40 mins

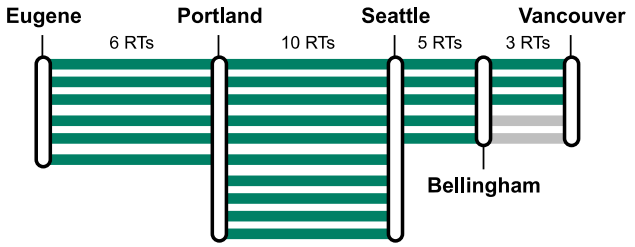
Thruway Bus (Cascades POINT)
Portland – Eugene • 5 Roundtrips
Runtime – 3 hours

Exhibit 17: Preliminary alternative service diagrams

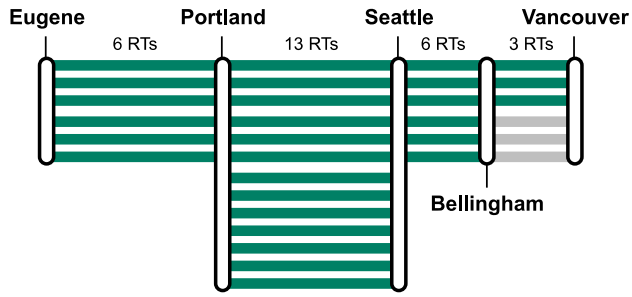
Preliminary Alternative A



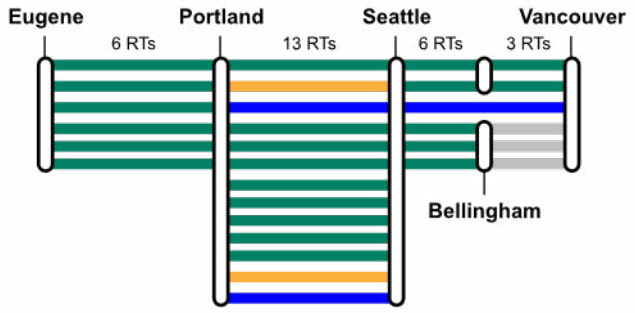
Preliminary Alternative B



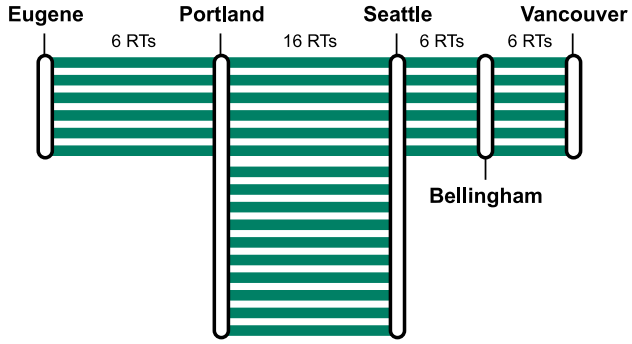
Preliminary Alternative C



Preliminary Alternative D



Preliminary Alternative E



Legend

Local Service (stops at all stations)

Limited Stop Service (stops in Tacoma and Vancouver, WA)

Express Service (nonstop)

Thruway Bus Service (bus connection for Bellingham – Vancouver BC)

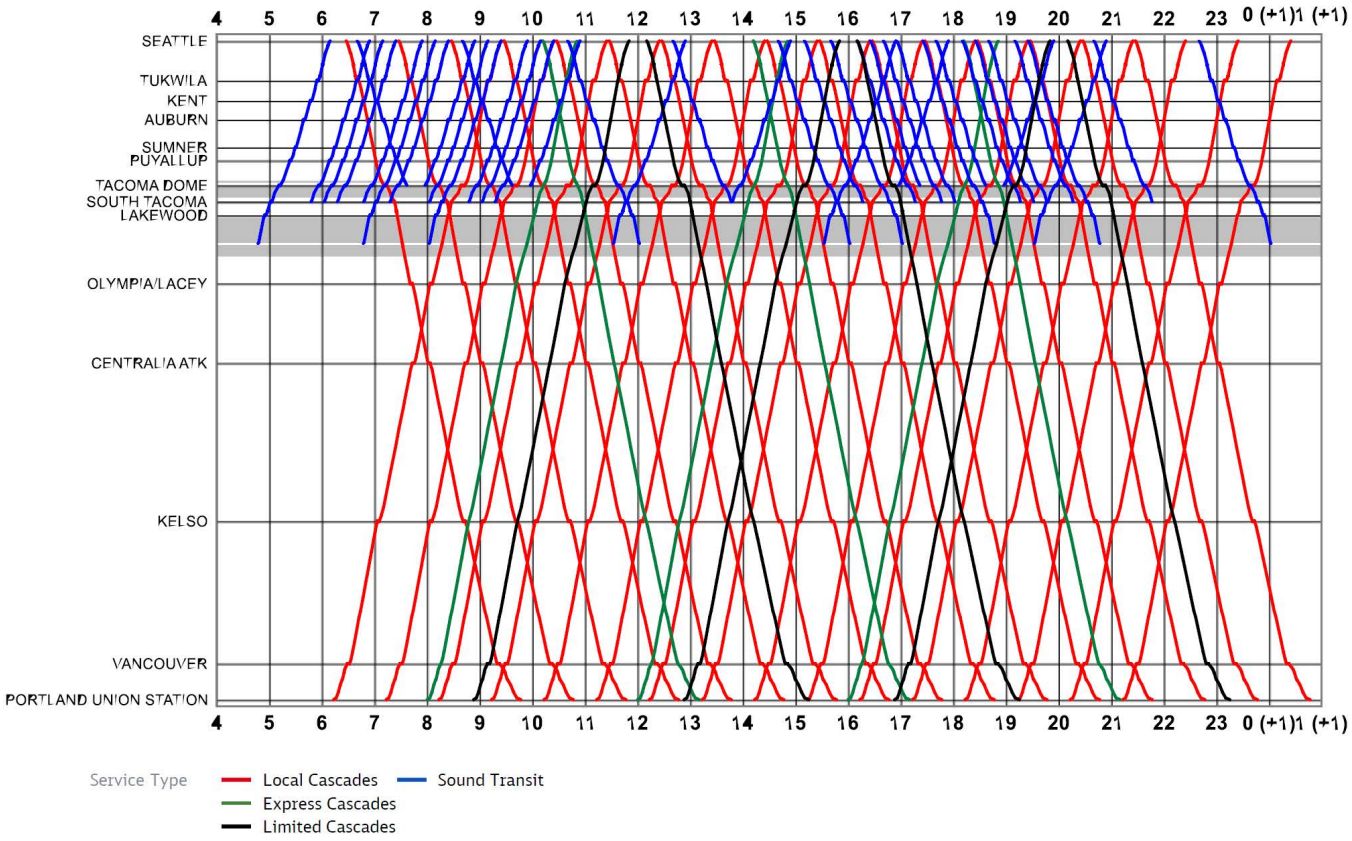
RT = Round Trip

How did we develop timetables for the preliminary alternatives?

WSDOT further defined each preliminary alternative by creating timetables, which identify train arrival and departure times and the runtime between stations. The timetables for the preliminary alternatives serve as key input data for predicting Amtrak Cascades ridership and assessing crew and equipment needs at a high-level, which are described in Chapter 4. Performance characteristics of the new Siemens Airo train sets expected to be operating in the PNWRC in 2026 were used to calculate runtimes between stations. The timetables are conceptual, not an Amtrak Cascades service operations plan for implementation. They have not been approved by the host railroads. Further detailed analysis and discussions with service partners will be needed to develop an operations plan before any additional service can be implemented.

The timetables were developed by applying a slot catalog concept, which is a structured set of time slots allocated for the operation of trains on a rail corridor. Each slot represents a designated period during which a train is scheduled to travel. The slot catalog accounts for operational and infrastructure constraints along the corridor. It is designed to prevent conflicts between Amtrak Cascades, Sounder commuter trains, and long-distance passenger trains. An example of a slot catalog concept is shown in Exhibit 18.

Exhibit 18: Example of slot catalog concept South of Seattle[20]



Due to the variable nature of freight operations, the slot catalog does not include specific schedules for freight trains to avoid conflicts. Freight trains are accounted for in the infrastructure analysis, described in Chapter 4, which addresses the capacity needed for all types of passenger trains and freight traffic to move through the corridor.

[20] X axis represents the time of day, and the Y axis represents the Amtrak Cascades and Sounder stations.

The following principles guided the slot catalog and timetable creation:

- Use clockface departures (i.e., departures that are at the same time within each hour throughout the day, such as 10:15 a.m., 11:15 a.m., 12:15 p.m., etc.) from the Seattle, Portland and Vancouver, BC stations
- Provide continuous all-day service between early morning and late evening and spreading trips throughout the day
- Maximize the opportunity for trains to operate through Seattle and Portland, maintaining the convenience of traveling on a single train rather than transferring at these stations.
- Maintain current layover times in Seattle (30 minutes) and Portland (15 minutes)
- Schedule the morning express and limited train departures close to 8 a.m., and the afternoon express and limited train departures at or after the evening rush hour to better serve daytrip travelers

Two slot catalogs were created through this process: 1) a baseline slot catalog with a 79-mph maximum speed limit, reflecting existing track alignment, speed restrictions and operating rules as in 2022; 2) an upgraded slot catalog with a 90-mph maximum speed limit, assuming track class 5 upgrades to certain sections. Compared to baseline slot catalog, the upgraded slot catalog could theoretically achieve runtime savings of about 13 minutes through the entire corridor between Portland and Vancouver, BC (7 minutes south of Seattle, and 6 minutes north of Seattle). Detailed engineering analysis and further discussion with the host railroads will be required during the Step 2 SDP work to evaluate the feasibility and impact of increasing maximum speed limit on those sections.

WSDOT chose to apply the baseline slot catalog of 79-mph to Preliminary Alternatives A and B, and upgraded slot catalog of 90-mph in some locations to Preliminary Alternatives C and E. The rationale was that the advantage of shorter travel times would benefit more train trips and more riders for alternatives with higher service frequency.

Preliminary Alterative D was the exception to this because it provides shorter travel times by using limited-stop and express service for some trips. The Baseline slot catalog was used for this preliminary alternative to provide a clear contrast to the approach of using higher maximum speed limits to provide shorter travel times.

Run times for each preliminary alternative can be found at the end of Chapter 4, in the summary of the preliminary alternative analysis.

Preliminary Alternative	Selected Slot Catalog
A	Baseline – 79 mph
B	Baseline – 79 mph
C	Upgraded – 90 mph
D	Baseline – 79 mph
E	Upgraded – 90 mph

4 | ANALYSIS OF PRELIMINARY ALTERNATIVES

This chapter provides the Cascades ridership projections and infrastructure improvement needs identified for the five preliminary alternatives. A summary of these alternatives, along with key analysis results, is included at the end of the chapter.

Ridership analysis

Ridership forecasting approach

WSDOT developed Amtrak Cascades ridership forecasts using AECOM's National Intercity Model. The model incorporates all major travel modes for passenger trips, including auto, air, bus, and rail, and uses a two-stage process for ridership forecasting:

- First it forecasts the growth in the total number of person trips
- Next it predicts the share of total person travel by mode and produces a ridership forecast for Amtrak Cascades

The model used 2019 as the baseline year for data input and 2045 as the forecast year. WSDOT chose 2019 as the baseline year because it was the last year when a full-service level operated. Amtrak Cascades service was significantly reduced during 2020 in response to the pandemic, with full restoration of service not occurring until 2023. WSDOT also used travel market scenario analysis to assess potential long-term impacts on ridership projection resulting from COVID and other external factors (see chapter 5). The geographic area for ridership modeling covers the counties along the PNWRC, stretching from south of Eugene, OR to north of Vancouver, BC, to capture total ridership for entire route.

Key data inputs collected for ridership modeling include existing and future population, employment and income data, service characteristics (travel time, cost, and frequency), and trip tables for all modes, including auto, air, bus, and rail. Replica and StreetLight data was used to create the base auto trip table, and Amtrak rail ridership data was used to create rail trip table for the model. The ridership forecasting does not factor in the zero-fare policy for riders 18 and under and any induced demand associated with this new policy.

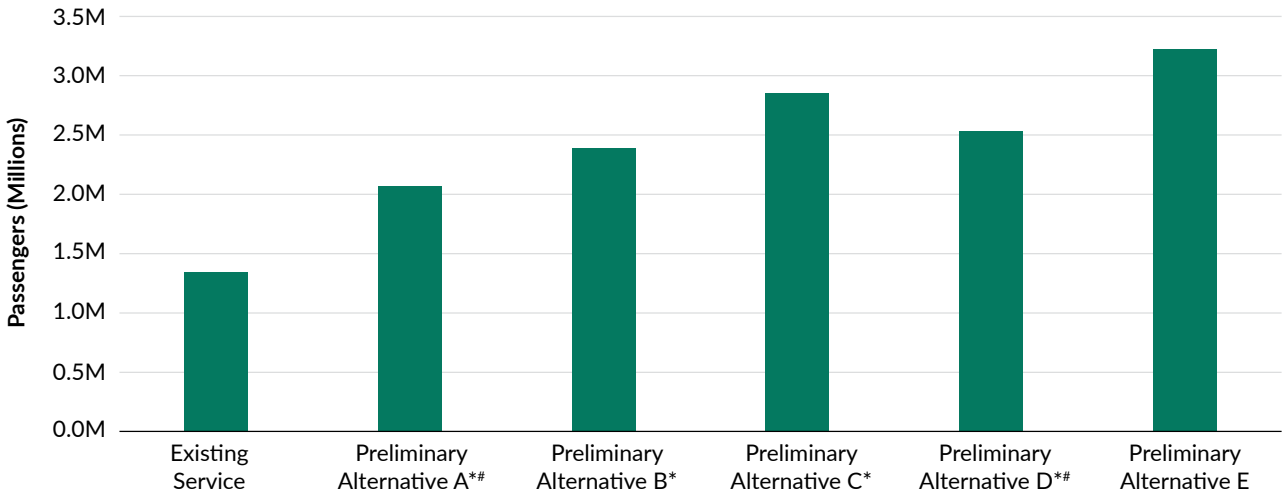
More information about ridership forecasting can be found in Appendix C.

Ridership forecasting results

The existing service is forecasted to serve approximately 1.3 million riders in 2045. The five preliminary alternatives are projected to increase the total ridership by 54% to 140% compared to the existing service (Exhibits 19 and 20):

- Preliminary Alternative E, which has the highest service frequency and faster travel time, is forecasted to serve approximately 3.2 million passengers in 2045, 140% higher than the existing service.
- Preliminary Alternative C is projected to achieve 12% higher ridership than Preliminary Alternative D, despite having an equal number of daily Cascades trains. This suggests that skipping intermediate stations (Preliminary Alternative D) has a negative effect on total ridership.
- Portland-Seattle segment is expected to have the highest number of trips among all segments, constituting about 61 to 64% of all trips across five alternatives.
- About 9-13% of projected trips will traverse more than one segment.

Exhibit 19: Forecasted annual corridor-wide ridership in 2045 by preliminary alternative



Note: * includes some connecting bus trips between Bellingham and Vancouver BC
includes some limited/express trips

Exhibit 20: Forecasted annual ridership in 2045 by segment and preliminary alternative

Segment	Existing Service	Preliminary Alternative A	Preliminary Alternative B	Preliminary Alternative C	Preliminary Alternative D	Preliminary Alternative E
Vancouver–Seattle	374,300	686,500	845,200	1,076,700	907,800	1,295,900
Seattle–Portland	935,500	1,267,900	1,483,400	1,821,600	1,578,800	1,994,000
Portland–Eugene	151,800	360,700	353,700	354,300	350,300	355,800
Total corridor-wide trips	**1,342,700**	**2,072,300**	**2,391,200**	**2,853,900**	**2,535,200**	**3,221,400**
Ratio of total trips in segments to total corridor-wide trips	109%	112%	112%	114%	112%	113%
Percent growth over existing service	—	**54%**	**78%**	**113%**	**89%**	**140%**

What did we learn from the ridership analysis?

In addition to providing forecasts for the preliminary alternatives, the ridership analysis provided insight into the effect of different service characteristics.

Service frequency

The ridership forecasts showed that increasing service also increased ridership, up to a point. Forecasted ridership between Seattle and Portland level off with service increases beyond 16 daily roundtrips. Further analysis during the Step 2 SDP work will provide a better understanding of the costs involved with increasing service levels.

> Forecasted ridership between Seattle and Portland level off with service increases beyond 16 daily roundtrips.

Speed increases

Providing faster trips by increasing the maximum speed limit from 79 mph to 90 mph in selected locations had a positive effect on ridership. The ridership results from Preliminary Alternative C variations showed that a 13-minute (3%) runtime reduction in travel time resulted in a 6% to 7% increase in corridor wide ridership. The travel time savings identified from increasing the maximum speed limit is a best-case outcome. WSDOT will have more discussions with the host railroads (BNSF and Sound Transit) and perform more detailed analysis to better understand the opportunities for higher maximum speeds.

> A 13-minute runtime saving from higher maximum speed limit, results in 6% to 7% increase in total ridership.

Speeding up slower parts of the corridor instead of increasing the maximum speed could attain similar travel time reduction results. That could avoid the long-term increase in operating expenses needed for additional track maintenance that is required when operating at higher maximum speeds. This will require conceptual engineering analysis to identify and define those opportunities and will be studied during the Step 2 SDP work.

> Speeding up slow sections could attain similar travel time reductions and have lower operating expenses.

Stopping patterns

Express or limited-stop services

The ridership analysis showed that eliminating some or all intermediate stops to reduce travel times did not improve ridership as much as increasing the maximum speed limit.

> Increasing the maximum speed limit improves ridership more than eliminating intermediate stops, but would be more expensive to operate.

Preliminary Alternative C (all local service) and Preliminary Alternative D (some express and limited-stop trains) each provided the same level of service frequency but have different stopping patterns and maximum speed limits. Preliminary Alternative D is projected to result in 11% lower ridership than Preliminary Alternative C. A variation of Preliminary Alternative D, changing maximum speed limit assumption from 79 to 90 mph, still results in 5% lower ridership than Preliminary Alternative C.

While it may be possible to optimize the schedules of the express and limited trips to improve ridership, this is unlikely to produce equivalent or better ridership than Preliminary Alternative C. However, a service option with limited and/or express service would be more cost effective than increasing maximum speed limit for faster service. Charging higher fares for express service may also yield better revenue performance. Preliminary Alternative D allows for further analysis of these factors in the Step 2 SDP work.

Limited and/or express service may yield better revenue performance if higher fares were charged.

Seattle-Bellingham service

Ridership sensitivity results indicated a slightly lower ridership growth potential north of Seattle for options with Seattle-Bellingham trips compared to those with Seattle-Vancouver, BC trips during development of the service options.

Ridership in the Seattle-Vancouver segment was 13% higher for all rail service.

Preliminary Alternative C has three Seattle-Vancouver, BC rail trips and three Seattle-Bellingham rail trips that have connecting bus service to Vancouver, BC.

In the sensitivity analysis, a service option with identical service frequency but all rail service between Seattle and Vancouver, BC instead of rail-bus trips was projected to have 13% higher ridership than Preliminary Alternative C, and 4% higher corridor-wide ridership. This analysis suggests that providing Seattle-Bellingham rail service should be studied further in the Step 2 SDP work if providing additional rail service to Vancouver, BC is not viable in the near term.

Full corridor ridership was only 4% higher with Seattle-Bellingham rail service instead of Seattle-Vancouver rail service.

Capacity analysis

A capacity study was performed to analyze the operational capacity of the corridor and identify infrastructure improvements necessary to support the service levels of the preliminary alternatives. The capacity study considered both the proposed Amtrak Cascades service and the needs of host railroads and other service providers through 2045. The goal of the capacity study was to identify the least amount of new infrastructure needed to effectively address capacity issues in the future. New infrastructure to ensure reliable operations or reduce travel times will be considered in the CID Program SDP work.

During this study, WSDOT coordinated with its Amtrak Cascades service partners regularly, including conducting technical working group meetings every other week to present results and receive feedback. These meetings were attended by representatives of:

- BNSF Railway
- Canadian National Railway
- Sound Transit
- Amtrak
- Oregon Department of Transportation
- Federal Railroad Administration

The infrastructure improvements identified in this capacity study are a preliminary assessment of what may be needed for each preliminary alternative. Further analysis, as well as discussions with host railroads and other interested parties, will be required to determine the improvements necessary for service to be

increased. While the results of this capacity analysis represent the collaborative efforts of the service partners, it does not indicate endorsement of the capacity study findings by the host railroads.

Canadian National Railway participated in the Preliminary SDP process but elected not to provide the detailed data needed for the capacity study at this time. Infrastructure needs in Canada between the Fraser River bridge and Pacific Central Station in Vancouver will need to be addressed in the CID Program SDP work. Because of this, the list of infrastructure needs north of Seattle is considered incomplete.

No engineering design work has been performed to develop cost estimates for the needed infrastructure at this stage of the process. That work will be undertaken in the Step 2 SDP work.

How did we identify preliminary capacity improvements needed to support the potential service options?

WSDOT worked with its service partners to examine current and future capacity on the route, identify areas expected to be over-capacity, and develop preliminary infrastructure needs to support each of the identified service options. This approach was consistent with BNSF's Railway Passenger Principles[21], which require that studies of new passenger service account for not only current freight traffic levels, but also projected freight traffic growth. BNSF requires that passenger rail operations not degrade BNSF's freight service, negatively affect BNSF's freight customers or BNSF's ability to provide them with service.

The capacity analysis was based on 2019 data documenting train movements and extrapolated out to 2045. On BNSF's recommendation, the study assumed all freight traffic would grow 2% annually. On Sound Transit's recommendation, the study assumed that Sounder service would include 21 roundtrips south of Seattle (four of the 21 would go to DuPont) and 4 roundtrips north of Seattle in 2045. Amtrak long-distance trains in the corridor were kept at the existing service level, with one daily roundtrip for both the Empire Builder and the Coast Starlight. Additional long-distance service being considered in FRA's Amtrak Daily Long-Distance Service Study was not included in the analysis and may require additional capacity improvements.

Capacity measurement

WSDOT measured capacity in units derived from the performance characteristics of a standard train applied to the characteristics of the route. The standard train is based on the average characteristics of trains in the 95th percentile of length (and associated performance) in 2019. This conservative assumption about train length and performance was developed in cooperation with BNSF to ensure that capacity on the corridor was not overstated.

In addition to using this unit of capacity to measure consumption by train operations, it was also used to allocate capacity for the following activities:

- Maintenance of way (track maintenance)
- Mainline staging
- Yard and facility entry/exit[22]
- Variability[23]

General assumptions about these activities were made for the capacity analysis. More detailed assessment of corridor capacity, including dynamic simulation, may be required during the Step 2 SDP work.

[21] BNSF's Railway Passenger Principles can be found in Appendix D.

[22] While the impact of trains entering/exiting yards is considered in the study, operations within yard limits are not.

[23] Variability accounts for factors such as temporary track speed restrictions, track work windows, terminal congestion issues, other line congestion issues, delays holding off from grade crossings, or drawbridges opening for water traffic.

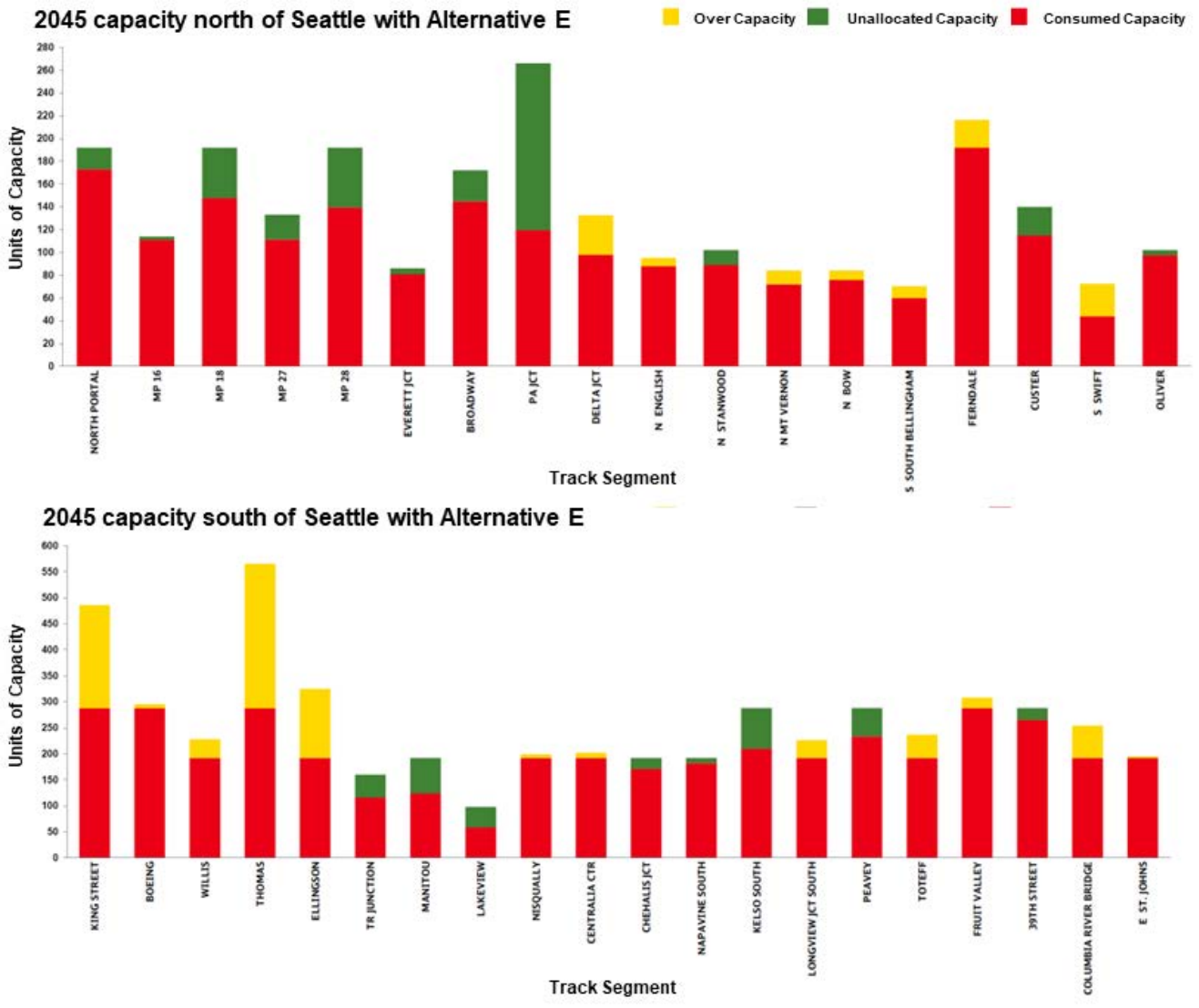
In general, capacity is most constrained at yards, customer facilities and junctions. These are all locations where trains enter or exit a main track.

More information about the capacity analysis is available in Appendix D.

Capacity improvements

The infrastructure improvements necessary for each preliminary alternative were identified by applying the future traffic volumes anticipated for Amtrak, Sound Transit, and BNSF in 2045 to determine locations where the anticipated traffic would exceed capacity. An example of this analysis is shown graphically in Exhibit 21 with the units of capacity shown by track segment. This capacity chart is based on Preliminary Alternative E, which has the highest increase in Amtrak Cascades service. Exhibit 21 shows anticipated 2045 traffic in comparison to existing capacity by each individual track segment between Vancouver, BC and Portland, OR. The yellow bar indicates that the anticipated rail traffic in 2045 exceeds current capacity, and the green bar indicates there is enough capacity to accommodate 2045 traffic. Exhibit 21 illustrates the locations of rail segments that have capacity constraints and need improvements to support future traffic volume. Additional locations that need more capacity may be identified during future analysis.

Exhibit 21: Example rail capacity chart showing where improvements may be needed



X axis should be read from left to right – i.e., the North Portal bar captures capacity for track segment between North Portal and MP 16. While the results of this capacity analysis represent the collaborative efforts of the service partners, it does not indicate the endorsement of the capacity analysis findings by the host railroads.

The infrastructure improvements were designed to support the estimated future traffic volumes with the minimal amount of new construction. The amount of infrastructure improvements needed increases with the addition of more Amtrak Cascades trains. It is possible to undertake infrastructure improvements incrementally over time, allowing for the attainment of increased service levels such as those identified in Alternatives A and B, then moving forward with additional improvements for higher service levels in the future.

An overview of the infrastructure needs identified for each preliminary alternative is shown in Exhibit 22 provided below.

Exhibit 22: List of preliminary capacity improvements*

	Improvement type	Location	Host Railroad	Preliminary Alternatives				
				A	B	C	D	E
North of Seattle**	Controlled siding (0.5 miles)	White Rock, BC	BNSF	✓	✓	✓	✓	✓
	Extend double track (2.3 miles)	Custer	BNSF	✓	✓	✓	✓	✓
	Extend double track (2.2 miles)	Ferndale	BNSF		✓	✓	✓	✓
	Extend siding (2 miles)	South Bellingham	BNSF	✓	✓	✓	✓	✓
	Expand yard facilities	Everett (Delta Yard)	BNSF	✓	✓	✓	✓	✓
South of Seattle	Controlled siding (3.3 miles)	Seattle (Georgetown/Boeing Field)	BNSF	✓	✓	✓	✓	✓
	Controlled siding (2.9 miles)	Seattle (Boeing Field/Renton)	BNSF					✓
	Extend triple track (2.8 miles)	Kent–Auburn	BNSF	✓	✓	✓	✓	✓
	Expand yard facilities	Auburn Yard	BNSF	✓	✓	✓	✓	✓
	Extend triple track (8.5 miles)	Sumner–Tacoma	BNSF	✓	✓	✓	✓	✓
	Controlled siding (2.2 miles)	Tacoma	ST	✓	✓	✓	✓	✓
	Controlled siding (0.2 miles)	DuPont	ST	✓	✓	✓	✓	✓
	Controlled siding (2.9 miles)	Chehalis	BNSF			✓	✓	✓
	Extend triple track (3.1 miles)	Longview	BNSF	✓	✓	✓	✓	✓
	Extend triple track (2 miles)	Vancouver, WA (Vancouver Yard)	BNSF			✓	✓	✓
	Expand yard facilities	Vancouver Yard	BNSF			✓	✓	✓
	Reconfigure junction	Portland, OR (North Portland Junction)	BNSF	✓	✓	✓	✓	✓
	Extend triple track (1.9 miles)	Portland, OR (Willbridge Yard)	BNSF					✓

* This listing of infrastructure improvements does not constitute funding availability or endorsement of the improvements by the host railroads
**Does not include any necessary improvements in Canada between the Fraser River Bridge and Pacific Central Station in Vancouver, BC

No engineering analysis has been performed to design these improvements; therefore, no cost estimates are available. These infrastructure improvements are an initial assessment of what may be needed to provide capacity to operate the level of service proposed for each preliminary alternative. Additional detailed analysis and discussions with host railroads and other service partners will be required about infrastructure and operational impacts to existing capacity and velocity for current and future growth of freight and passenger traffic on the PNWRC. Additional capacity improvement projects, as well as projects to ensure reliable service or reduce travel time, may be identified as part of this future work. The listing of infrastructure improvements in this Preliminary SDP does not constitute funding availability or endorsement of the improvements by the host railroads.

Equipment needs

WSDOT made a preliminary estimate of the minimum additional train sets and train crews necessary to operate the service proposed in each preliminary alternative. The analysis uses the performance characteristics of the new Siemens Airo train sets expected to be operating in the PNWRC in 2026. The ability to acquire more trainsets for the service is dependent on the manufacturer's schedule, with several years lead time needed before funding, manufacturing and delivery is possible.

The train set estimates were based on the number of scheduled trips each set could make, including at least 20 minutes at terminals to prepare a train set for the next trip. These estimates do not include train sets used as spares to replace sets that are out of service or additional time for maintenance needs. The minimum additional train sets needed for each preliminary alternative is shown in Exhibit 23.

Preliminary Alternative D requires more additional train sets than either Preliminary Alternative C (which has the same number of trips) or Preliminary Alternative E (which has more trips). This is due to inefficiencies in the use of the train sets for multiple daily trips when they are used for express and limited-stop trips.

Exhibit 23: Minimum additional train sets required (not including spares)

Preliminary Alternative	Minimum additional train sets
A	6
B	6
C	9
D	11
E	9

Summary of the preliminary alternatives analysis

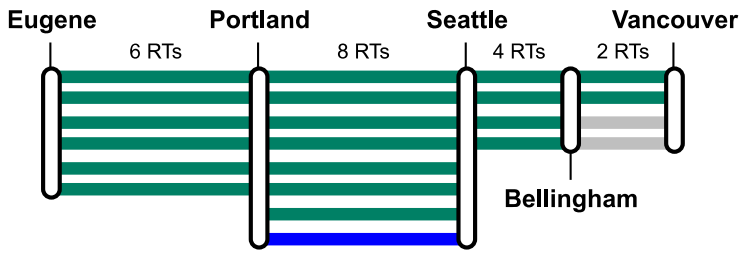
The characteristics of each preliminary alternative are listed below, with a summary of the analysis results for each.

Preliminary Alternative A

Conceptual schedule and service levels

	Travel Time	Roundtrips
Vancouver – Seattle		**4**
Local	3h 46m	2
Express	—	—
Local + Thruway bus	4h 07m	2
Portland – Seattle		**8**
Local	3h 11m	7
Limited	—	—
Express	2h 51m	1

Trips are generally on a clockface schedule and evenly spread throughout the day as much as feasible.



Highlights

- Projected preliminary ridership 54% over the existing service
- Highest speeds of 79 mph
- Minimum of 6 more train sets needed
- Travel time reduction via service patterns (express service)
- Potential building block service option

Conceptual list of capacity improvements

- White Rock, BC siding
- South Bellingham siding extension
- Custer double track extension
- Delta Yard (Everett) expansion
- Georgetown/Boeing Field siding
- Kent–Auburn triple track
- Auburn Yard expansion
- Sumner-Tacoma triple track
- Tacoma siding
- DuPont siding
- Longview Junction-Peavey triple track
- North Portland Junction reconfiguration

The travel times listed above are not the anticipated schedule times and only should be used for comparing the alternatives. Schedules will need to be negotiated with Amtrak and the host railroads prior to adding new service.

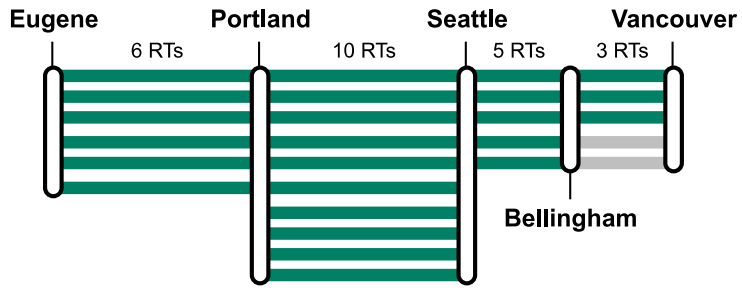
The conceptual list of capacity improvements is preliminary, subject to further analysis and discussion with host railroads.

Preliminary Alternative B

Conceptual schedule and service levels

	Travel Time	Roundtrips
Vancouver – Seattle		**5**
Local	3h 46m	3
Express	—	—
Local + Thruway bus	4h 07m	2
Portland – Seattle		**10**
Local	3h 11m	10
Limited	—	—
Express	—	—

Trips are generally on a clockface schedule and evenly spread throughout the day as much as feasible.



Highlights

- Projected preliminary ridership 78% over the existing service
- Highest speeds of 79 mph
- Minimum of 6 more train sets needed
- Potential building block service option

Conceptual list of capacity improvements

- White Rock, BC siding
- Custer double track extension
- Ferndale double track extension
- South Bellingham siding extension
- Delta Yard (Everett) expansion
- Georgetown/Boeing Field siding
- Kent–Auburn triple track
- Auburn Yard expansion
- Sumner-Tacoma triple track
- Tacoma siding
- DuPont siding
- Longview Junction-Peavey triple track
- North Portland Junction reconfiguration

The travel times listed above are not the anticipated schedule times and only should be used for comparing the alternatives. Schedules will need to be negotiated with Amtrak and the host railroads prior to adding new service.

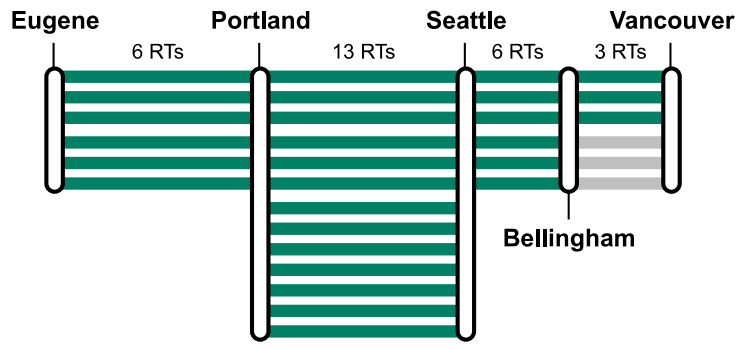
The conceptual list of capacity improvements is preliminary, subject to further analysis and discussion with host railroads.

Preliminary Alternative C

Conceptual schedule and service levels

	Travel Time	Roundtrips
Vancouver – Seattle		**6**
Local	3h 39m	3
Express	—	—
Local + Thruway bus	4h 00m	3
Portland – Seattle		**13**
Local	3h 05m	13
Limited	—	—
Express	—	—

Trips are generally on a clockface schedule and evenly spread throughout the day as much as feasible.



Highlights

- Projected preliminary ridership 112% over the existing service
- Highest speeds of 90 mph
- Minimum of 9 more train sets needed
- Second highest ridership performance
- Travel time reduction via track improvements

Conceptual list of capacity improvements

- White Rock, BC siding
- Custer double track extension
- Ferndale double track extension
- South Bellingham siding extension
- Delta Yard (Everett) expansion
- Georgetown/Boeing Field siding
- Kent–Auburn triple track
- Auburn Yard expansion
- Sumner-Tacoma triple track
- Tacoma siding
- DuPont siding
- Centralia-Chehalis siding
- Longview Junction-Peavey triple track
- Fruit Valley-Vancouver Yard triple track
- Vancouver Yard expansion
- North Portland Junction reconfiguration

The travel times listed above are not the anticipated schedule times and only should be used for comparing the alternatives. Schedules will need to be negotiated with Amtrak and the host railroads prior to adding new service.

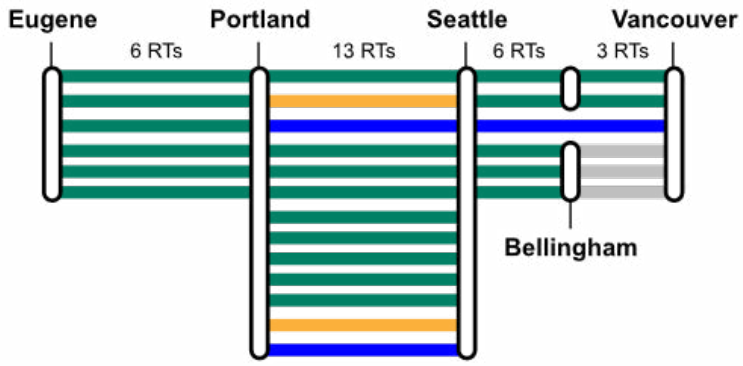
The conceptual list of capacity improvements is preliminary, subject to further analysis and discussion with host railroads.

Preliminary Alternative D

Conceptual schedule and service levels

	Travel Time	Roundtrips
Vancouver – Seattle		**6**
Local	3h 46m	2
Express	3h 33m	1
Local + Thruway bus	4h 07m	3
Portland – Seattle		**13**
Local	3h 11m	9
Limited	2h 57m	2
Express	2h 51m	2

Trips are generally on a clockface schedule and evenly spread throughout the day as much as feasible.



Highlights

- Projected preliminary ridership 89% over the existing service
- Highest speeds of 79 mph
- Minimum of 11 more train sets needed
- Travel time reduction via service patterns (express and limited stop service)
- Express and limited trains serve major markets in both directions
- Potential for phased travel time reductions

Conceptual list of capacity improvements

- White Rock, BC siding
- Custer double track extension
- Ferndale double track extension
- South Bellingham siding extension
- Delta Yard (Everett) expansion
- Georgetown/Boeing Field siding
- Kent–Auburn triple track
- Auburn Yard expansion
- Sumner-Tacoma triple track
- Tacoma siding
- DuPont siding
- Centralia-Chehalis siding
- Longview Junction-Peavey triple track
- Fruit Valley-Vancouver Yard triple track
- Vancouver Yard expansion
- North Portland Junction reconfiguration

The travel times listed above are not the anticipated schedule times and only should be used for comparing the alternatives. Schedules will need to be negotiated with Amtrak and the host railroads prior to adding new service.

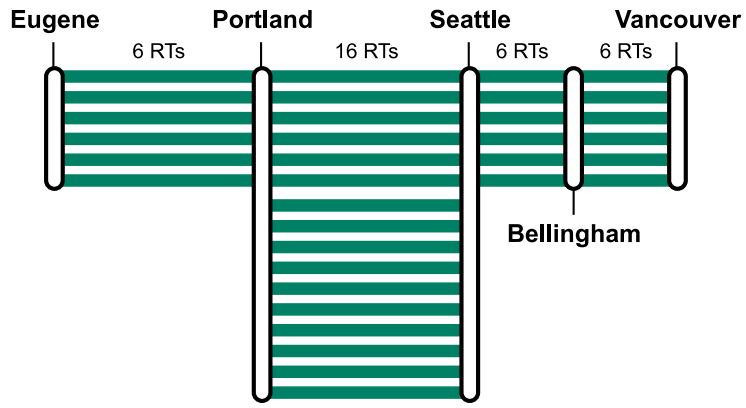
The conceptual list of capacity improvements is preliminary, subject to further analysis and discussion with host railroads.

Preliminary Alternative E

Conceptual schedule and service levels

	Travel Time	Roundtrips
Vancouver – Seattle		**6**
Local	3h 39m	6
Express	—	—
Local + Thruway bus	—	—
Portland – Seattle		**16**
Local	3h 05m	16
Limited	—	—
Express	—	—

Trips are generally on a clockface schedule and evenly spread throughout the day as much as feasible.



Highlights

- Projected preliminary ridership 140% over the existing service
- Highest speeds of 90 mph
- Minimum of 9 more train sets needed
- Highest overall ridership growth

Conceptual list of capacity improvements

- White Rock, BC siding
- Custer double track extension
- Ferndale double track extension
- South Bellingham siding extension
- Delta Yard (Everett) expansion
- Georgetown/Boeing Field siding
- Boeing Field-Renton siding
- Kent–Auburn triple track
- Auburn Yard expansion
- Sumner-Tacoma triple track
- Tacoma siding
- DuPont siding
- Centralia-Chehalis siding
- Longview Junction-Peavey triple track
- Fruit Valley-Vancouver Yard triple track
- Vancouver Yard expansion
- North Portland Junction reconfiguration
- Willbridge Yard (Portland) triple track

The travel times listed above are not the anticipated schedule times and only should be used for comparing the alternatives. Schedules will need to be negotiated with Amtrak and the host railroads prior to adding new service.

The conceptual list of capacity improvements is preliminary, subject to further analysis and discussion with host railroads.

5 | TRAVEL MARKET SCENARIO ANALYSIS

The purpose of the scenario analysis is to gain a deeper understanding of how uncertainties in the future landscape of the travel market, transportation policies, and investments might impact the ridership projections and other performance measures for Amtrak Cascades service across the five preliminary alternatives. The results of the scenario analysis were not employed to refine or alter the preliminary alternatives.

Future travel market scenarios

WSDOT identified four major factors to define future travel market scenarios (Exhibit 24). The factors address external trends such as post-pandemic travel behavior and varying demographic growth, supporting service enhancements to Amtrak Cascades, and policy initiatives that could influence mode choice.

Exhibit 24: Factors considered in scenario definition

External trends	Supporting service enhancements	Policy initiatives	Future investment
• Population and employment growth • Post-pandemic travel behavior change (work and recreational) • Emerging technologies (electric vehicles, automated vehicles) • Land use changes	• Additional transit service • Station accessibility • Improved amenities • Border crossing time reduction • Transit/rail fare integration • Reliability improvement	• Vehicle miles traveled (VMT) pricing • Parking restrictions • Ridesharing service promotion • Reduced fare programs	• Current air travel forecasts

Based on those major factors, WSDOT established six travel market scenarios (Exhibit 25), including two bookends to represent extremes, and four additional scenarios to evaluate how those scenarios may enhance or dampen future Amtrak Cascades ridership.

Exhibit 25: Future travel market scenarios

Scenario group	Scenario description
Two plausible scenarios as bookends to represent extremes	**Scenario 1:** Higher demographic growth and improved rail and transit services **Scenario 2:** Lower demographic growth and improved highway travel conditions
Four additional scenarios addressing the following major factors	**Scenario 3:** Urban growth shifts to suburban and rural areas and telework trend continues **Scenario 4:** Potential improvements to enhance rail service (station accessibility, reliability, amenities) **Scenario 5:** Possible improvements to enhance transit service **Scenario 6:** Air travel increases as forecasted in the corridor

Future travel market scenarios analysis results

WSDOT applied Mobilitics[24] scenario planning tool in combination with the intercity passenger rail ridership model to evaluate the possible impacts of each scenario on Amtrak Cascades ridership and other measures across the five preliminary service alternatives.

All the preliminary alternatives show growth in 2045 for each scenario, as shown in Exhibit 26. However, the extent of growth varies across the scenarios. The scenario analysis results show that future uncertainties could result in a range of a 39% decrease to a 43% increase compared to the 2045 Amtrak Cascades ridership forecast presented in Exhibit 19, depending upon specific scenarios. The scenario analysis also shows that higher population and employment growth, supportive rail service enhancements, and transit service improvements are major drivers for further boosting ridership, while less business travel and the continuation of the current teleworking trend could have a strong dampening effect on future ridership. In addition, technology trends such as vehicle automation have the potential to limit ridership growth.

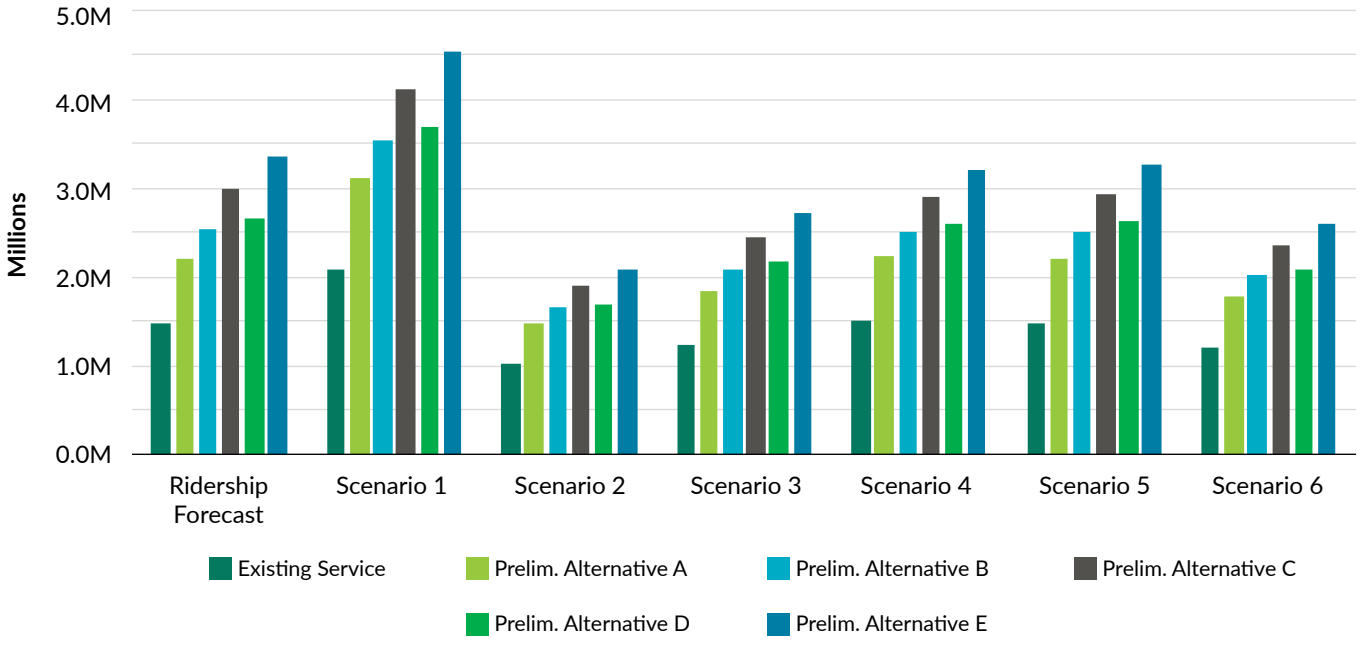
Travel trends with a positive effect on ridership:

- higher population and employment growth
- supportive rail service enhancements
- transit improvements

Travel trends with a negative effect on ridership:

- less business travel
- higher teleworking rates
- vehicle automation

Exhibit 26: 2045 ridership estimates for future travel market scenarios by preliminary alternative



[24] Mobilitics is AECOM's scenario-planning tool designed to help clients understand long-range transportation and land use planning scenarios.

The results below describe the ridership sensitivity to underlying demographic and population growth, travel behaviors, policy incentive and other factors by individual scenario. Ridership sensitivity reflects the percentage difference in 2045 ridership estimates between a specific scenario and the ridership forecast in Exhibit 19 for corresponding alternatives.

Ridership uncertainty

Scenario 1

This scenario represents an optimistic bookend for developments that could boost Amtrak Cascades ridership and is the only scenario yielding a significantly higher ridership estimate (36% to 43% higher than ridership forecast in Exhibit 19):

- Assumptions for higher population and employment growth (17% higher) and a 30% increase in transit service frequency and coverage are the main drivers for high ridership in this scenario
- Higher parking costs in the central business districts of major cities and implementing a per-mile charge based on the number of miles driven[25] have relatively small impacts on boosting Cascades ridership
- Telework has negative impact on ridership and restrains ridership from reaching even higher levels

Scenario 2

This scenario represents the pessimistic bookend and yields the lowest estimated ridership (33% - 39% less than the ridership forecast in Exhibit 19). Main drivers contributing to lower ridership include:

- Slower population and employment growth (13% less)
- Continuation of current teleworking patterns and less business travel
- Improvements in highway capacity and vehicle automation

Scenario 3

This scenario assumes that 25% of urban growth will be shifted to more suburban and rural areas, and yields an estimated ridership 17%-20% less than the ridership forecast in Exhibit 19:

- Estimated ridership falls between that for the ridership forecast (Exhibit 19) and Scenario 2, highlighting how important urban areas are for Amtrak Cascades.
- Reductions in business travel and a continuation of current teleworking patterns also dampen ridership.

Scenario 4

This scenario includes many assumptions that are supportive of rail service, yet estimated Amtrak Cascades ridership is still slightly less than ridership in the ridership forecast in Exhibit 19 (1% higher to 5% lower). This is due to positive impact on ridership resulting from improvements in rail-related attributes (amenities, reliability, costs) is offset by the negative impacts of reductions in business travel and a continuation of current teleworking trends.

Scenario 5

Estimated Amtrak Cascades ridership for this scenario is similar to the ridership forecast in Exhibit 19 across the preliminary alternatives (0% to 3% lower than the ridership forecast in Exhibit 19). This is due to positive impacts on ridership from increased parking restrictions, expanded transit service, and improved rail station accessibility are offset by the negative impacts of reductions in business travel and a continuation of current teleworking trends.

Scenario 6

Estimated ridership in Scenario 6 falls between ridership in the ridership forecast in Exhibit 19 and in the pessimistic Scenario 2 (19%-23% lower than the ridership forecast in Exhibit 19). This is driven by continuation of telework patterns, and increased air service diverting some rail trips.

[25] The per-mile charge was assumed to be a 5% increase in vehicle operating costs based on the 2023 federal IRS mileage rate of 65.5 cents/mile.

Implications on other performance measures

The scenario analysis also evaluated performance measures such as mode shares, vehicle miles traveled (VMT), greenhouse gas (GHG) emissions in the future years, as compared to the results for the preliminary alternatives in the ridership forecast (Exhibit 19).

Mode Shares

As service for each preliminary alternative increases, the number of people choosing to travel by train increases and shifts travel from bus and air to rail. More people tend to shift to train travel in Scenarios 1, 4, and 5 because these scenarios have assumptions about conditions and policies (e.g., increased likelihood to select rail, expanded transit service coverage and increase frequencies, improved rail station accessibility) that are more favorable to rail compared to assumptions in other scenarios. The increase in air service in Scenario 6 reduces the rail and bus passenger numbers between major markets.

Vehicle Miles Traveled (VMT)

Scenario 1 is the only scenario in which the number of miles traveled in vehicles is expected to increase over the VMT projection for the preliminary alternatives in the ridership forecast (Exhibit 19), because of higher population growth. Scenarios 4 and 5 are expected to have the best chance of lowering VMT of all scenarios provided that certain conditions are met. There is relatively little difference in the total number of miles driven within the study area under each of the preliminary alternatives since there are substantially more people driving vehicles than riding the trains.

Greenhouse Gas Emissions

Greenhouse gas (GHG) emissions are expected to be much lower under all scenarios as compared to the emissions for the preliminary alternatives in the ridership forecast (Exhibit 19). As more people travel by train rather than in vehicles, GHG emissions decrease. However, most of the GHG emissions decrease is a result of new electric vehicle sale policies for Washington state.

6 | FUTURE WORK AND NEXT STEPS

Future work

Preliminary alternatives

WSDOT is planning to carry forward the preliminary alternatives developed and analyzed in this Preliminary SDP into the full corridor-wide Step 2 SDP, following guidance provided by FRA. Further refinement and screening of alternatives will occur during that process. The completion of the full SDP will advance Amtrak Cascades in the pipeline for further federal infrastructure funding from the Federal Railroad Administration.

Service characteristics

Service frequency

The preliminary analysis shows that up to 16 daily roundtrips between Seattle and Portland are viable based on forecasted travel demand. Additional detailed analysis and discussions with host railroads and other service partners are needed to better understand what capital investments and ongoing operating expenses will be required to support reliable operation of the different service levels.

Speed increases

The forecasted ridership increased when the maximum speed limit raised to 90 mph on some segments of the corridor. The travel time savings identified from increasing the maximum speed limit is a best-case outcome. WSDOT needs further discussions with the host railroads (BNSF and Sound Transit) and to perform more detailed analysis to understand the feasibility of higher maximum speeds, including potential costs, benefits and impacts. Other options for reducing travel times, such as increasing speeds in lower speed sections of the corridor, need to be explored as part of the conceptual engineering analysis planned in the Step 2 SDP work. Several different strategies for reducing the travel time of trains can be a part of an alternative.

Stopping patterns

Express or limited-stop service

Skipping intermediate stations to reduce travel time has a negative impact on total ridership. While ridership may be lower, it could result in better revenue performance if higher fares were changed for the service. This will be addressed in the revenue analysis performed for the Step 2 SDP.

Seattle-Bellingham rail service

Initial results suggest that adding train service between Seattle and Bellingham captures most of the ridership possible between Seattle and Vancouver, BC. This service pattern warrants continued analysis, possibly as a phased implementation approach.

Future travel market scenarios

The scenario analysis shows that higher population and employment growth, and supportive rail and transit service improvements, are major drivers for further boosting ridership. Future planning should place a high priority on improving rail service amenities and the experience of passengers getting to and from Amtrak Cascades stations.

Less business travel and the continuation of the current teleworking trend could have a strong dampening effect on future ridership. In addition, technology trends such as vehicle automation have the potential to limit ridership growth. WSDOT could try mitigating the negative effect of teleworking by implementing service amenities that make Amtrak Cascades a desirable travel choice for remote workers who make infrequent trips to the office. Examples include high-speed internet access and quiet spaces on the trains that would enable people to be productive while traveling.

Connectivity

Analysis of the connectivity between Amtrak Cascades and other modes of transportation will be done in the Step 2 SDP analysis. This work will be performed consistent with the legislative direction given to WSDOT to continue coordinating all different types of transportation modes, with the goal of maximizing system performance in the most cost-effective manner. WSDOT has received specific direction from the Legislature[26] that this coordination must include but is not limited to:

- The Interstate 5 highway corridor
- Existing rail infrastructure
- A future high-speed rail alignment
- Commercial aviation capacity

Next steps

Corridor Identification and Development (CID) Program

In December 2023, both Amtrak Cascades and Cascadia High-Speed Rail were accepted into FRA's newly established CID Program. The CID Program includes three steps in sequence that Amtrak Cascades corridor must complete before moving into design and construction of infrastructure improvements:

- **Step 1** – develop scope, schedule and budget for the corridor SDP
- **Step 2** – develop the SDP
- **Step 3** – complete preliminary engineering and NEPA (National Environmental Policy Act) environmental review for capital projects

Project advancement is contingent on FRA approvals, as well as funding availability for Steps 2 and 3.

The next task for Amtrak Cascades is to implement CID Step 1 and Step 2 activities for a corridor-wide SDP between Vancouver, British Columbia and Eugene, Oregon in partnership with Oregon DOT and in close coordination with Cascadia High-Speed Rail Program. Upon FRA's approval, Step 1 will be completed as quickly as possible so the planning activities can advance to Step 2 of the CID Program.

FRA provides funding through the CID program to support the work needed to complete the program – 100% ($500,000) for Step 1, 90% for Step 2, and 80% for Step 3. The states of Washington and Oregon must provide the remaining funds to proceed through each of the steps in the CID program.

Service Development Plan preparation

Step 2 of the CID program will develop an SDP to include further refinement, analysis, and screening of alternatives to determine the alternative that will move forward to implementation as funding becomes available.[27] Some of the work will involve additional iterations of the technical analysis started with this Preliminary SDP.

[26] Engrossed Substitute House Bill (ESHB) 1125 Sec. 219 (10)

[27] For more information about the tasks that may be involved in preparation of a SDP, refer to the Service Development Plan Draft Statement of Work Framework on the FRA website.

Alternative analysis will expand upon the analysis performed under Preliminary SDP to further refine and evaluate service options and investment packages. This analysis will be based on more extensive and detailed transportation planning analyses that will include:

- Operations analysis
- Ridership and revenue forecasts
- Conceptual engineering
- Capital cost estimates
- Operating and maintenance cost estimates
- Labor and fleet planning
- Station area and access analysis

Additional work for the Step 2 SDP development also includes:

- Initial environmental planning
- Financial planning and benefits/cost analysis
- Corridor governance
- Phased implementation plan

Public engagement will continue throughout development of the Step 2 SDP, including communities, partners, and other interested parties. Feedback on this Preliminary SDP will be incorporated into the Step 2 SDP work.

APPENDIX A
PRELIMINARY PURPOSE AND NEED STATEMENT

Background

The Pacific Northwest Rail Corridor (PNWRC) is one of 11 federally designated high-speed rail corridors in the United States. The 461-mile (742-kilometer) PNWRC runs primarily parallel to Interstate 5 (I-5) and serves the most densely populated areas of the Cascadia megaregion, linking Seattle, Washington to Vancouver, British Columbia (BC), Portland and Eugene, Oregon. The PNWRC is a critical north-south transportation corridor for local, regional, statewide, and international passenger and freight rail operations in the Pacific Northwest.

The Washington State Legislature authorized an intercity rail passenger program in 1993 and directed the Washington State Department of Transportation (WSDOT) to provide a safe, efficient, environmentally responsible alternative to increasing highway capacity.[1] The Amtrak Cascades program was developed by WSDOT in response to this directive. It is intended to complement the other parts of the transportation system, help accommodate future intercity travel demand, ensure economic vitality, reduce emissions contributing to climate change, and protect the quality of life in the state.

The states of Washington and Oregon provide financial support to Amtrak in the operation of the Amtrak Cascades passenger rail service serving 18 cities along the corridor. As of December 2023, the Cascades passenger rail service includes the level of service made possible by federal investments under the American Recovery and Reinvestment Act, with six daily round trips between Seattle and Portland; two daily round trips between Seattle and Vancouver, BC; and two daily round trips between Portland and Eugene.

WSDOT, in conjunction with the Federal Railroad Administration (FRA), is preparing its Preliminary Service Development Plan (SDP) to study possible alternatives for enhancing the Amtrak Cascades service between Portland and Vancouver, BC, over the next 20 years (referred to as the Washington state segment). This Preliminary SDP is intended to identify the future development of intercity passenger rail service along the Washington state segment of PNWRC through improvements to rail safety, daily frequencies, travel times between stations, passenger amenities, trip reliability, and on-time performance (this future development is defined as the "Project"). The Preliminary SDP complements similar planning work being undertaken by the Oregon Department of Transportation for the Portland to Eugene portion of the PNWRC.[2]

Exhibit 1 shows the study area for the Preliminary SDP for the Washington state segment of the PWNRC from Vancouver, BC, to Portland, as well as the entire 461-mile PNWRC extending down to Eugene, OR.

Exhibit 1: Study Area Map

This Preliminary Purpose and Need Statement will be used to guide alternatives development, analysis, and the identification of refined service options during planning. It will be subject to agency and public review and comment in any subsequent National Environmental Policy Act (NEPA) process.

[1] RCW 47.79.010 Legislative declaration
[2] Oregon Department of Transportation, Oregon Corridor Investment Plan

Preliminary Purpose

The purpose of the proposed Project is to enhance intercity passenger rail service for travelers along the existing route used for the Washington state segment of the PNWRC. The Project would:

- Meet growing intercity travel demand with more frequent, reliable and customer-focused service
- Strengthen multimodal connections to improve accessibility and provide better travel options
- Support greenhouse gas reduction goals
- Support the economic vitality of communities served by PNWRC passenger service
- Address transportation system equity issues along the corridor
- Ensure the rail corridor has the capacity to support needs of all passenger and freight rail service providers

Additionally, the project will:

- Avoid or minimize negative community and environmental impacts
- Be a cost-effective investment

Preliminary Need

In the years since WSDOT's intercity passenger rail program started in 1993, the need for intercity passenger rail service in the Pacific Northwest has continued to grow as rail travel has become a more desirable and convenient mode of transportation compared to air and highway travel.

Amtrak Cascades service improvements are needed to address the growing travel demand and congestion in the corridor, as well as improve the connectivity of the transportation system. Effective and efficient transportation options like Amtrak Cascades are crucial to ensure the economy of the state of Washington and the Pacific Northwest region continues to thrive. These improvements will support WSDOT in achieving its vision of a safe, sustainable, and integrated multimodal transportation system.

Growing travel demand in the corridor

Travel demand continues to increase due to the rapid growth in regional commerce and population in the corridor. Highway traffic congestion on I-5, which primarily parallels the entire PNWRC, is no longer restricted to peak times around major cities. Recent forecasts suggest that the commercial airports in the Puget Sound region, even with planned expansions, will not be able to accommodate the demand for air travel by 2050. As the population is increasing, it is also changing. Demographic trends may increase the demand for intercity passenger rail. Amtrak Cascades provides a safe and more efficient travel option to meet the growing travel demand in the corridor.

Population and employment growth

Population and employment growth are key factors affecting demand for passenger rail service. The populations of cities along the PNWRC have been growing and this growth is expected to continue in the future. Exhibit 2 shows the populations of the three major metropolitan areas in the corridor and forecasted populations in 2040. Collectively, the three areas have added 1.3 million people in the past decade and are forecast to add another two million people over the next two decades. Exhibit 2 also shows how employment is increasing in these metropolitan areas. The capacity of the transportation system, including Amtrak Cascades, needs to grow to meet the demands of a larger population and work force.

Exhibit 2: Population and employment data and forecasts for major PNWRC metropolitan areas

Population (million)	2010	2020	2040 forecast
Metropolitan area			
Vancouver, BC[3,4]	2.4	2.8	3.6
Seattle, WA[5]	3.7	4.3	5.4
Portland, OR[6,7]	2.2	2.5	3.0
Total	**8.3**	**9.6**	**11.6**

Employment (million)	2010	2020	2040 forecast
Metropolitan area			
Vancouver, BC[8,9]	1.2	1.4	1.8
Seattle, WA[10]	1.9	2.4	3.0
Portland, OR[11,12,13]	0.8	1.0	1.2
Total	**3.9**	**4.6**	**6.0**

Demographic changes

In addition to population growth, demographic changes in the population of Washington are increasing the proportion of people likely to ride Amtrak Cascades.

Amtrak Cascades is popular with people over 65 years old. Nearly 25% of riders indicated they were over 65 in an on-board survey performed in 2018. As ridership recovers after the pandemic the percentage is similar, with 27% of Amtrak Cascades riders responding to customer surveys in 2022[14] in this age group. The number of people over 65 is increasing quickly nationwide, corresponding with a similar increase in births after World War II (the Baby Boomer generation). In Washington, this age group represented 17% of the state's total population. This percentage is forecast to increase to 23% by 2050, with most of the growth occurring by 2030.[15] As the population ages, more people are likely to experience limitations to their mobility, which may create a greater demand for transportation options like passenger rail.

[3] BC Stats, Population Estimates & Projections for British Columbia, accessed July 7, 2022
[4] BC Stats, Population Estimates & Projections for British Columbia, accessed July 7, 2022
[5] Puget Sound Regional Council, PSRC Data Portal LUV-it County Summaries 2023, accessed July 19, 2023
[6] Metro, Population Forecast to 2060, April 2016
[7] Portland State University Population Research Center, 2020 Census Metropolitan Statistical Area Profiles
[8] Metro Vancouver, Metro 2040 – Shaping Our Future: Baseline Annual Report 2011-2013, 2013
[9] Metro Vancouver, Metro 2050, 2021
[10] Puget Sound Regional Council, PSRC Data Portal LUV-it County Summaries 2023, accessed July 19, 2023
[11] Metro, Employment forecasts for 2035 by city and county, February 2013
[12] Metro, Portland-area 2045 population and housing forecasts by city and county, February 2021
[13] Metro, Portland-area 2040 population and housing forecasts by city and county, July 2016
[14] Federal Fiscal Year 2022
[15] Office of Financial Management, Forecast of the State Population December 2021 Forecast, December 2021

In 2015, millennials surpassed baby boomers as the nation's largest living generation. This segment of the population includes people born in the 1980s through the late 1990s and composed 24% of Washington's population in 2020.[16] Millennials are an important part of the travel market. They travel more frequently and spend more money on travel than any other age group.[17] Almost 90% of millennials live in metropolitan areas.[18] Passenger rail can be an attractive option for this age group, supporting car-free travel between urban centers. Customer surveys from 2022[19] indicate that approximately 30% of Amtrak Cascades passengers have been millennials.

These changing demographic trends contribute to an increasing demand for non-automobile intercity travel and could result in an increased demand for passenger rail services like Amtrak Cascades.

Increasing corridor congestion

I-5 runs primarily parallel to the PNWRC and is frequently congested, particularly around major Washington cities like Seattle, Tacoma, Everett and Vancouver. As seen in Exhibit 3, the central part of the corridor between Olympia and Everett is heavily used and travelers on I-5 are regularly delayed by congestion. Congestion on the corridor is not limited to weekday commute periods. Some parts of I-5 see recurring congestion on the weekends as well, because of high traffic volumes. Construction and special events, such as sporting events and concerts, also frequently cause localized congestion. In some cases, construction on specific sections of I-5 can last multiple years. For instance, the projects in the Revive I-5 Program will result in recurring construction delays into the 2030s. A Federal Highway Administration analysis of traffic impacts on highways from special events calculated that travelers in Portland experienced 750,000 to 1.5 million hours of cumulative travel delay annually due to special events, with the average traveler experiencing 38 hours of delay per year.[20] In addition, traffic incidents anywhere in the corridor can cause long delays for travelers.

Increasing population and employment growth have led to increased congestion on I-5. Expanding I-5 to eliminate congestion is not a viable option in the multiple metropolitan regions served by the PNWRC. A preliminary estimate of the cost to address congestion by adding lanes to I-5 in the central Puget Sound area between Olympia and Everett suggests that it would cost around $100 billion (in 2017 dollars) just to construct the new lanes.[21] That cost does not account for increased demand, expanding connecting roads, or mitigation for the negative effects of building the new lanes.[22] Amtrak Cascades service provides intercity travelers in the corridor an alternative to congested conditions on I-5.

Exhibit 3 Annual person miles traveled and hours of vehicle delay on I-5 in 2019

Location	Annual person miles traveled (2019)	Annual hours of vehicle delay (2019)
Federal Way-Seattle-Everett[23]	2.7 billion	4.6 million
Olympia-Tacoma-Federal Way[24]	1.6 billion	2.4 million

[16] Office of Financial Management, Population by age and sex, November 2021

[17] Berkshire Hathaway Travel Protection, Research: millennials spend more and travel more than any other age group, September 18, 2019

[18] Pew Research Center, How Millennials today compare with their grandparents 50 years ago, March 16, 2018

[19] Federal Fiscal Year 2022

[20] Federal Highway Administration, Planned Special Events – Economic Role and Congestion Effects, August 2008

[21] WSDOT, 2022 State of Transportation presentation, House Transportation Committee, January 10, 2022

[22] WSDOT, Developing a resilient transportation system for a rapidly changing world, January 10, 2022

[23] WSDOT, Central Puget Sound Interstate 5 Corridor – Dashboard, accessed July 7, 2022

[24] WSDOT, Multimodal Mobility Dashboard - South Puget Sound Region, accessed July 7, 2022

Barriers to transportation system connectivity

Rail passenger trips start and end somewhere other than the train station. Riding a passenger train is typically just one part of a journey, with passengers using another mode of travel to reach and leave the train station. Seamless connections with other modes are important to integrate passenger rail into the statewide transportation system to make it an even more viable, convenient option for travelers.

The transportation system in the PNWRC is complex, with many entities involved. Amtrak Cascades shares the tracks with multiple freight railroads and with commuter rail service in the central Puget Sound region. The rail stations in the corridor have different owners, mostly local government entities such as cities, transit agencies, and port districts. The stations are each served by different combinations of other transportation services, including local transit agencies, intercity bus services, and private shared transportation services. Serving both sides of the border with Canada brings additional complexity. The complexity of the system can be a burden, and sometimes a barrier, to travelers using it. Creating seamless connections in the transportation system will require continued cooperation between these entities to minimize the effect of its complexity on travelers.

Rail station connectivity

Connectivity refers to the collective influence of land use, transportation system infrastructure, and the availability of transportation services on the options for passengers to access or leave the rail stations. A multimodal connectivity analysis of Amtrak Cascades stations was performed for the 2019 Washington State Rail Plan that evaluated the quality of existing station access. The goal of the analysis was to identify opportunities for increasing station accessibility to the stations without the need to increase the parking supply. The types of gaps identified included incomplete pedestrian and bicycle networks around stations, lack of availability of travel options, and land use not conducive to supporting ridership. Connections at stations need to be safer and easier to use to maximize their benefits. Improving multimodal connectivity at stations would increase the viability and convenience of intercity passenger rail for travelers.[25]

Passenger experience

Another aspect of connectivity is the ease of passengers moving between transportation services. Moving between services can be challenging for passengers and the experience could be improved. Factors affecting this include wayfinding, access to real-time information, schedule coordination, as well as the experience of planning and paying for travel on multiple services. For example, Mobility-as-a-Service (MaaS) enables travelers to plan, book, pay for and use multiple types of transportation services through a website or an application on a mobile device. It is becoming indispensable for many people as a convenience that makes travel easier.

As technology evolves to become further integrated into our connected lives and transportation options proliferate, improving the passenger experience by making it easier to move between Amtrak Cascades and other modes of transportation would make intercity rail a more desirable travel choice and attract more riders.[26]

[25] Multimodal connectivity at stations will be addressed in more detail as planning work continues after the Preliminary Service Development Plan is completed.

[26] Passenger experience enhancements will be addressed in more detail as planning work continues after the Preliminary Service Development Plan is completed.

Reduced greenhouse gas emissions

Washington state law requires that greenhouse gas emissions in the state be reduced to 27 million metric tons annually by 2040.[27] Transportation is the largest contributor to greenhouse gas emissions in Washington, accounting for 39% of emissions statewide in 2019. Transportation emissions in 2019 were 40.3 million metric tons (MMT) of carbon dioxide equivalent, an increase of 4.48 MMT compared to 2018.[28]

Intercity passenger rail can help reduce greenhouse gas emissions by supporting increased land use density in communities that concentrates activities close together and encouraging greater use of other energy efficient modes (bicycle, bus, other rail systems, etc.) This can provide benefits even as the electrification of passenger vehicles increases, by reducing the demand for electricity and the need for related infrastructure investments.

Economic vitality of station communities

Economic vitality is one of Washington's transportation system policy goals.[29]

Passenger rail improvements enhance economic vitality by supporting tourism and business travel in communities. As Washington's fourth-largest industry, tourism is a key sector of the state's economy.[30] Passenger rail stations can be an important community gateway for visitors. Passenger rail brings paying customers who help increase local economic activity.

Improved passenger rail service can also encourage and enhance development around stations, which often serve as a transportation hub for an area. With frequent, reliable service and connections to major destinations — including job centers, educational institutions, hospitals, and tourist attractions — rail stations can strengthen existing development as well as support new planned development. Passenger rail service can support local transit-oriented development, economic development, and affordable housing goals, and close coordination with local jurisdictions can maximize the potential benefits.

Transportation system equity

Initiatives at the federal (Justice 40[31]) and state (HEAL Act[32]) levels have placed an increased focus on equity in transportation planning. Passenger rail service can play an important role in an equitable transportation system by actively engaging members of disadvantaged communities throughout the planning process. Historically, some transportation planning decisions have negatively affected low-income and minority communities, resulting in issues such as pollutant emission disparities and limited access to transportation systems. By contributing to emission reductions, passenger rail can help address disproportionate effects the transportation system has on disadvantaged populations. Passenger rail can also improve accessibility for underserved populations to make it easier to reach services and opportunities. Ensuring these benefits are realized will require incorporating equity as a priority throughout planning and development of Amtrak Cascades improvements.

[27] RCW 70A.45.020 Greenhouse gas emissions reductions—Reporting requirements

[28] Washington State Department of Ecology, Washington's greenhouse gas inventory

[29] RCW 47.04.280 Transportation system policy goals

[30] Washington State Department of Commerce, Washington's key sectors – tourism, accessed July 6, 2022

[31] US Department of Transportation, Justice40 Initiative

[32] Washington State Department of Ecology, Healthy Environment for All (HEAL) Act

Future rail corridor capacity and reliability

With increases in Amtrak Cascades service, it is critical to ensure that rail corridor capacity is maintained so people and goods can be efficiently moved within the PNWRC.

The PNWRC accommodates multiple uses. Nearly all the PNWRC in Washington is privately owned by BNSF Railway and it is an important part of its freight hauling network. The corridor is especially important for Washington's coastal ports that rely heavily on freight shipments to and from inland locations. The Northwest Seaport Alliance is the seventh largest container port in the United States, handling nearly 3.4 million TEUs in 2022.[33] Also, Washington ports moved more than 20% of the nation's agricultural exports in 2022.[34] The Pacific Northwest is the second largest grain exporting region in the United States.[35] Much of this freight volume is handled by rail to or from the ports. Ensuring that freight movement stays fluid as passenger service is added or changed is critical for Washington's economy. The PNWRC is also used by other passenger rail services. Sound Transit uses the corridor for routes from Seattle to Everett and Lakewood, while Amtrak operates long distance trains on the corridor. These services also need to ensure reliably for their passengers.

Rail corridor capacity is one component of ensuring Amtrak Cascades provides reliable service, along with careful train traffic dispatching to coordinate train movements. In 2017, WSDOT, Amtrak, and BNSF entered into a legally binding Service Outcome Agreement (SOA) when WSDOT invested nearly $800 million in American Recovery and Reinvestment Act (ARRA) and High-Speed Intercity Passenger Rail (HSIPR) funds to improve the corridor. The agreement requires an on-time performance of 88% and sets a ceiling for BNSF-responsible delay minutes on specific segments of the rail line. WSDOT, BNSF, and Amtrak have been working together to improve on-time performance and achieving the 88% target on a consistent basis and will continue to do so. While adding rail corridor capacity can be an important part of ensuring the efficient movement of people and goods, careful and constant stewardship by the service partners (WSDOT, Amtrak, BNSF, and Sound Transit in the Washington segment of the PNWRC) will be needed to ensure rail corridor capacity is utilized effectively and passenger rail service is recognized as a reliable method of travel.

[33] Marine Insight, Top 10 Largest And Busiest Container Ports In The United States, May 24, 2023

[34] US Department of Agriculture, Agricultural Marketing Service, U.S. Agricultural Port Profiles

[35] U.S. Grains Council, U.S. Grains Council Grains Importer Manual, Chapter 5, May 2022

APPENDIX B
PRELIMINARY PURPOSE AND NEED ENGAGEMENT SUMMARY

Overview

The Washington State Department of Transportation (WSDOT) is developing a preliminary Service Development Plan (SDP) for Amtrak Cascades in the segment of the Pacific Northwest Rail Corridor (PNWRC)[1] between Vancouver, British Columbia and Portland, Oregon. This work will be used to guide improvements to the PNWRC with a focus on increasing intercity passenger rail service to accommodate growing travel demand in the corridor through the next 20 years. Strategies to reduce travel times, improve safety, enhance passenger amenities, and achieve greater schedule reliability of Amtrak Cascades will be considered.

The SDP is critical to the Federal Railroad Administration (FRA) project development process. It is an iterative process that includes service planning, preliminary engineering, environmental analysis, and alternatives analysis. Each iteration provides more specific information as the project moves toward the implementation phase of final design and construction. The SDP process starts early in project development, with the intent of completing basic project development work prior to starting project-level analysis that meets National Environmental Policy Act (NEPA) requirements. The goal of this early work is to identify and resolve issues prior to starting NEPA. The SDP will later be updated with information generated during NEPA analysis, and then refined further as service planning and preliminary engineering continue after the NEPA decision.

To guide the SDP work, WSDOT prepared a Preliminary Purpose and Need statement that describes why service improvements are being considered and the issues they are intended to address. The Preliminary Purpose and Need statement is the primary focus of public engagement during this phase of the planning effort.

WSDOT gathered input on the Preliminary Purpose and Need during a 45-day comment period from January 10 to February 24, 2023.

A map of Amtrak Cascades route and station areas.

[1] On October 20, 1992, FRA designated this passenger rail corridor as one of five original corridors called for in the Intermodal Surface Transportation Efficiency Act of 1991. The FRA classifies the PNWRC as a Regional Express Corridor, providing service between mid-sized and large cities at 90-125 mph.

Targeted audiences

To ensure that future investments benefit the most people, WSDOT sought public input on the draft Preliminary Purpose and Need Statement from a wide range of perspectives in the corridor.

- Government agencies
- Municipal planning organizations (MPOs) and regional transportation planning organizations (RTPOs)
- Local jurisdictions
- Transit agencies
- Regulatory agencies
- Other government entities
- Native American tribes
- Non-governmental organizations
    - Rail/transportation organizations
    - Equity and environmental justice organizations
    - Economic development organizations
- Individuals
    - WSDOT public email list subscribers and social media followers
    - Non-English speakers, including, but not limited to the following languages:
        - Spanish
        - Vietnamese
        - Chinese
    - Low-income (annual household income below $50,000)

Engagement methods

An important part of understanding what travelers need from Amtrak Cascades is knowing what factors drive their decisions about whether to take the train for their trip. The recent pandemic prompted wide-ranging changes to travel behavior, but not all these changes are expected to persist in the long-term. Achieving insight into the current decision-making considerations people apply to their travel choices was a key goal of the engagement process for the Preliminary Purpose and Need.

WSDOT approached this process with the goal of getting feedback that represents a broad range of perspectives from as many people as possible, particularly from groups of people who are typically under-represented in public outreach responses.

The engagement tools and methods used by the project team are described below.

Website and comment form

The project website provided information about the Preliminary SDP and linked to a comment form. The primary information was posted on the website in English, Arabic, Chinese, Korean, Somali, Spanish, Russian and Vietnamese.

The digital comment form asked respondents for input on the evolution of their travel habits through the pandemic, their experience with Amtrak Cascades and what would persuade them to take the train more frequently, and their priorities for the Preliminary Purpose and Need. The comment form was available in English, Chinese, Spanish and Vietnamese, which are the leading languages spoken by those in the Washington state Amtrak Cascades service corridor.

Notifications

Emails with background information and announcement of the public comment period were distributed in January 2023 to:

- Municipal planning organizations (MPOs) and regional transportation planning organizations (RTPOs), local jurisdictions, and transit agencies
- Regulatory agencies
- Other government entities
- Non-governmental organizations (rail/ transportation, equity and environmental justice, economic development organizations, etc.)
- 21,411 subscribers to WSDOT public email lists on topics related to Amtrak Cascades
- 150 non-English language media outlets in western Washington

Social media announcements were posted on WSDOT and Amtrak Cascades Facebook, Twitter and TikTok accounts. Social media posts were also used to remind followers to submit input via the comment form before the close of the comment period.

A letter and email were sent to all Washington and Oregon tribes along the corridor requesting feedback.

Amplification strategies

The following amplification strategies were performed virtually in accordance with COVID restrictions.

A text message campaign targeted in-language and low-income populations. The project team sent English, Chinese, Spanish, and Vietnamese texts to share the corresponding comment form link with 10,000 mobile phone contacts throughout the comment period. Click rates on the comment form link were generally higher than the industry average for ads in Chinese, Spanish, and Vietnamese. The contact breakdown included:

- 1,000 Chinese-speakers (3.6% click rate)
- 1,200 Vietnamese-speakers (3.7% click rate)
- 2,000 Spanish-speakers (1.8% click rate)
- 5,800 English-speaking individuals with annual income below $50,000 (2.3% click rate)

A video tailored to elicit comment form responses was promoted via a social mirroring digital outreach campaign that included a customized video to reach adults 18 and older within 10 miles of Amtrak Cascades stations. People are more likely to click on a video than on a display ad so the project team created a video as a specific digital carrot to carry the message. Viewers were asked to provide input, with the potential to win two tickets on Amtrak Cascades and concert tickets to Ed Sheeran following completion of the comment form. The video was digitally mirrored through Facebook, Twitter, and TikTok posts, which resulted in more than one million impressions and generated nearly 4,000 clicks on the comment form link during the campaign. The click-through rate for this campaign (0.52%) was almost eight times the national average. The goal of the video was to:

- Invite the public to fill out the comment form
- Introduce the opportunity to win prize incentives
- Explain that WSDOT is hosting this comment period to ensure Amtrak Cascades funding benefits the most people

Facebook posts were translated into Chinese, Spanish, and Vietnamese and publications and organizations that serve these in-language populations were tagged to further target limited-English-speaking audiences—resulting in more than 2,000 views and almost 200 clicks.

Webinars were held for three key audiences during the comment period:

- Technical audiences, including MPOs and RTPOs, state and local government representatives, local transit agencies, regulatory agencies, and other government entities (hosted on January 26 from 2 – 3:30 PM) – 41 participants.
- Rail-advocacy organizations (hosted on February 1 from 1 – 2 PM) – 26 participants.
- Public audiences, including non-governmental organizations and station area community members (hosted on February 7 from 5:30 – 6:30 PM) – 70 participants.

Earned media coverage from The Urbanist, Local Today News, and social media shares from the Washington Democrats Environment and Climate Caucus and the Burlington Chamber of Commerce.

What we heard

Summary

The primary feedback WSDOT received is that people see the need for more passenger train service. The current schedule sometimes makes it inconvenient to use Amtrak Cascades and more frequent service would encourage people to use the service. People also want the trains to operate reliably. Travel time is also important to people. Another commonly mentioned need was for better connections to and from stations. Many people feel they need a car at their destination. Better local travel options could make the train a more viable alternative to driving.

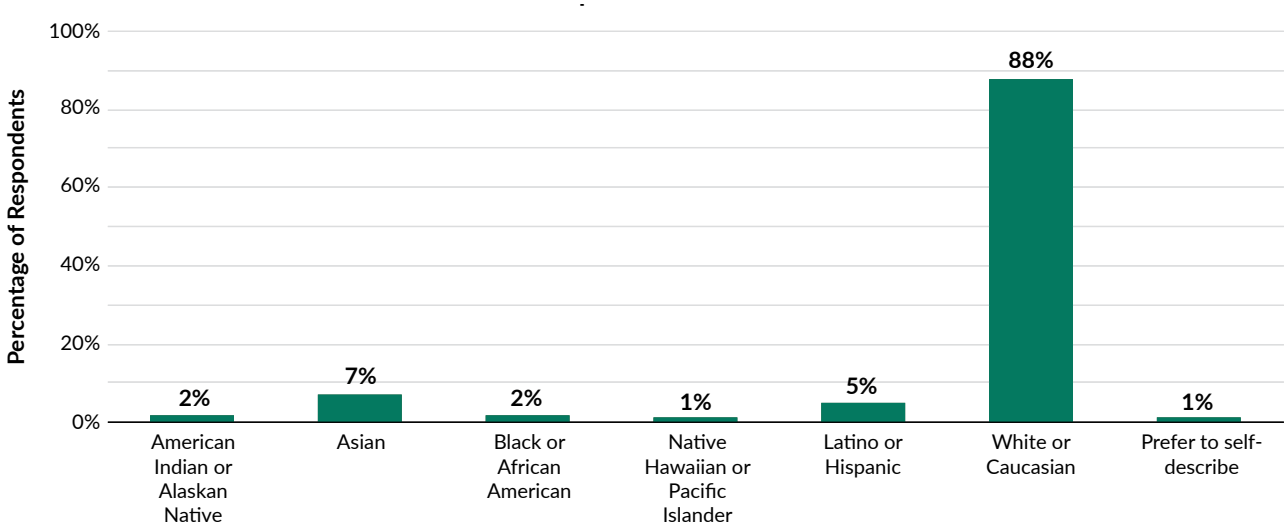
Comment form feedback

Throughout the comment period, the project team collected a total of 4,717 comment forms. Some totals may not sum to 4,717 as some people did not respond to every question in the comment form. Insights below also include comments received by email and letter.

Demographics of participants

The 14-question comment form included four optional questions at the end that invited participants to share some demographic details to give the project team insight into who the amplification strategy reached. Approximately 4,000 of the total number of comment form respondents chose to answer the demographic questions, providing important and statistically significant regressions on the core ten questions on the comment form. An overview of how respondents identified can be found below.

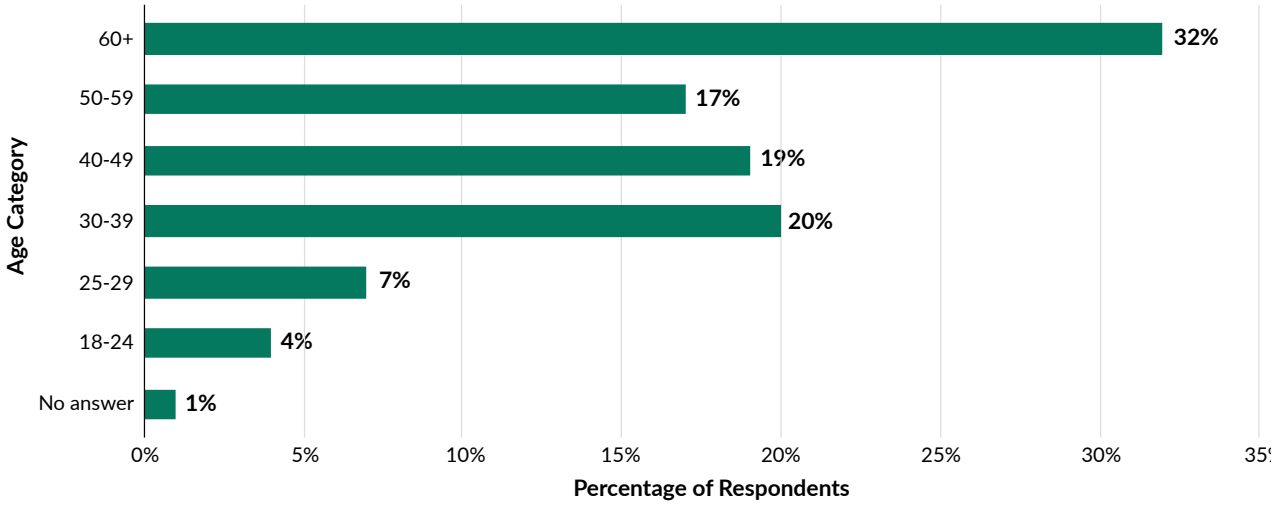
Figure 1: How Respondents Identified



Most commenters identified as White or Caucasian (88%), with 7% identifying as Asian, 5% as Latino or Hispanic, 2% as American Indian or Alaskan Native, and 2% as Black (Figure 1). A small number of people (60) preferred to self-describe, 61 people refused to answer this question, and 331 people skipped it. The above totals do not sum to 100% because respondents could select more than one option if they identified as multi-racial. There were no significant differences in answers from respondents based solely on racial identity.

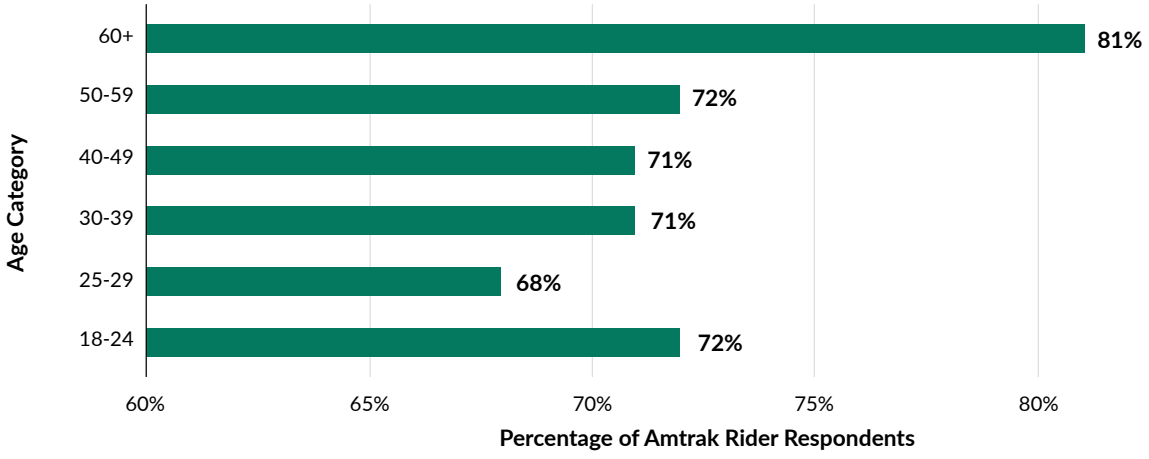
Most participants chose to complete the comment form in English, but in-language responses included eighteen in Spanish, six in Vietnamese, and one in Chinese.

Figure 2: Respondent Age



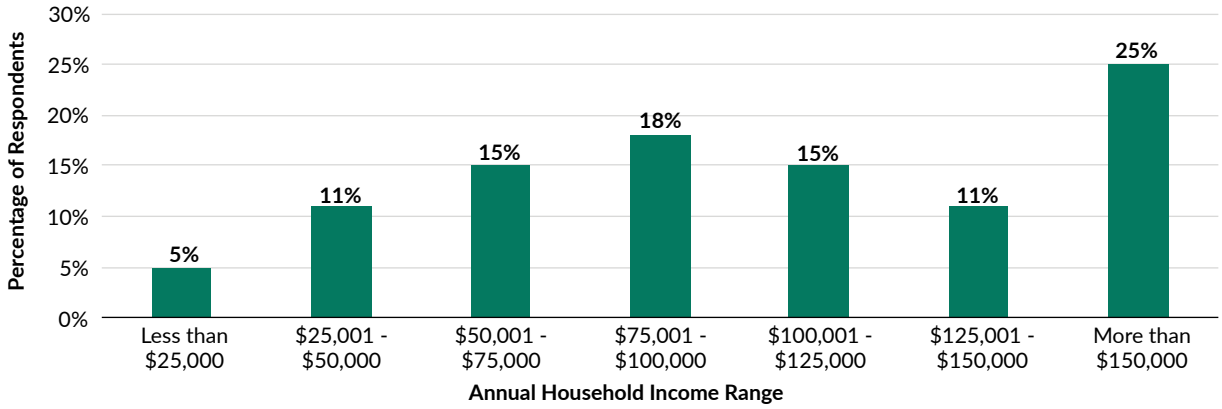
Most respondents (32%) were aged 60 or older (Figure 2). This age demographic represents a significant portion of current Amtrak Cascades ridership. WSDOT understands that younger demographics are less likely to own cars and could be a large portion of future ridership. 7% of respondents were aged 25-29 and 4% were between 18 and 24 years old.

Figure 3: Percentage of Amtrak Cascades Riders by Age



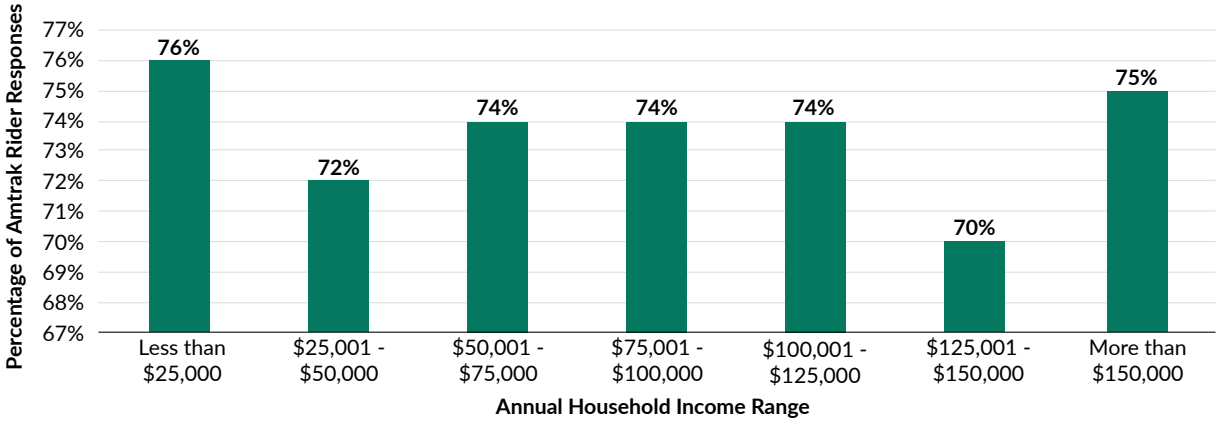
Of those who shared their demographic details, 74% reported that they had ridden an Amtrak Cascades train at least once. The largest rider age demographic is people 60 or older with 81% of people in that age bracket reporting riding the train before (Figure 3). Respondents aged 25-29 had the lowest percentage (68%) of people reporting they had ridden Amtrak Cascades before, while the other age demographics had a similar percentage of Amtrak Cascades riders.

Figure 4: Respondent Annual Income



Many participants were higher income earners with a quarter (25%) of people reporting annual household incomes higher than $150,000 (Figure 4). A combined 16% of respondents (661 people) reported earning less than $50,000 per year

Figure 5: Percentage of Amtrak Cascades Riders by Income



There is not a clear trend of Amtrak Cascades ridership based on respondent income (*Figure* 5). Individuals with annual household incomes between $25,001 and $50,000 and between $125,001 and $150,000 had lower numbers of respondents who had ridden an Amtrak Cascades train before (72% and 70%, respectively). People in other income brackets reported riding Amtrak Cascades before with similar frequency.

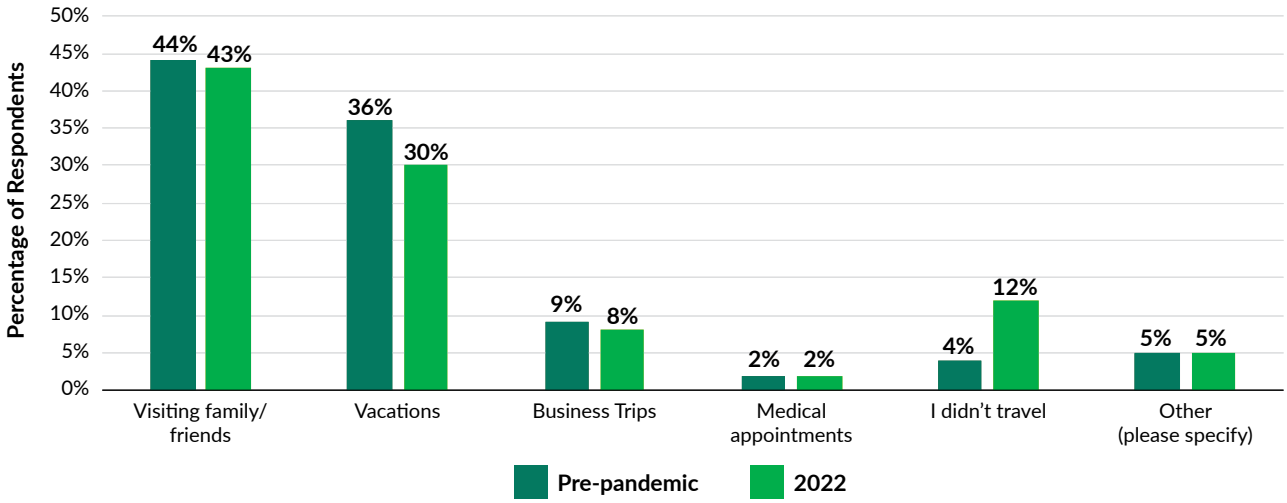
Respondents were also asked to share their zip codes (*Figure 6*). Most participants (64%) live in a zip code more than 5 miles away from existing stations. 14% of respondents live close to Seattle's King Street Station, while nearly equal percentages of respondents live close to a station North of Seattle and South of Seattle (8% and 7%, respectively).

Figure 6: Percentage of respondents within 5-miles of station

Existing Amtrak Cascades station	Percentage of respondents within 5-miles of station
Vancouver, British Columbia	5%
Washington stations North of Seattle: (*Bellingham, Mt. Vernon, Stanwood, Everett, and Edmonds*)	8%
Seattle (King Street Station)	14%
Washington stations South of Seattle: (*Tukwila, Tacoma, Olympia/ Lacey, Centralia, Kelso/Longview, and Vancouver, WA*)	7%
Portland, Oregon	3%
More than 5 miles away from existing stations	64%

Evolution of travel pre-pandemic vs. the past year

Figure 7: Predominant Reason for Travel Pre-Pandemic vs. 2022



The primary reasons identified by respondents for traveling 75 miles or longer in the I-5 corridor in Washington were visiting family/ friends and vacations for both pre-pandemic travel and travel in the last year (*Figure 7*). The percentage of respondents who reported visiting family/ friends was almost the same pre-pandemic as it was in 2022— 44% and 43%, respectively. The percentage of participants who selected traveling for vacations declined by 6% from pre-pandemic levels. Similarly, the percentage of respondents who communicated they did not travel increased by 8% from pre-pandemic travel patterns to the past year, likely due to travel frequency slowly rebounding as people feel safer.

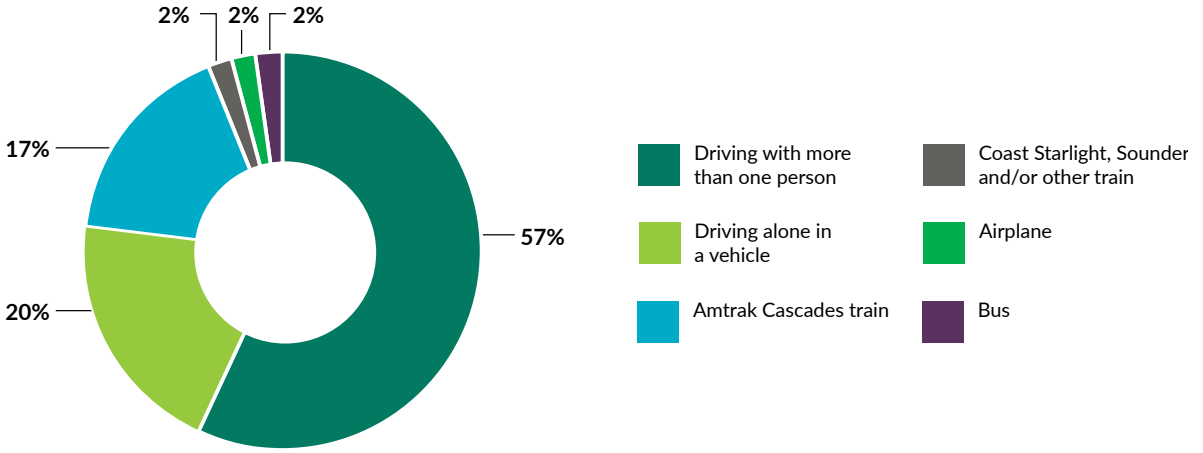
The percentage of business travelers in the I-5 corridor between Vancouver, B.C., and Portland, OR remained almost unchanged from reported pre-pandemic to 2022 levels – 9% before COVID compared to 8% in the last year. This suggests business has returned to pre-pandemic levels.

Commenters who reported another reason for travel beyond the pre-populated options in the comment form cited traveling for special events (e.g., concerts and sporting events), cultural resources (like museums), recreation, shopping (particularly cross-border shopping trips), and simple enjoyment of train travel.

Travel reasons and trends for respondents who had ridden Amtrak Cascades before were consistent with the overall trends represented in the above figure.

Most frequent mode of travel in the I-5 corridor

Figure 8: Mode of Travel between Vancouver, B.C. and Portland, OR

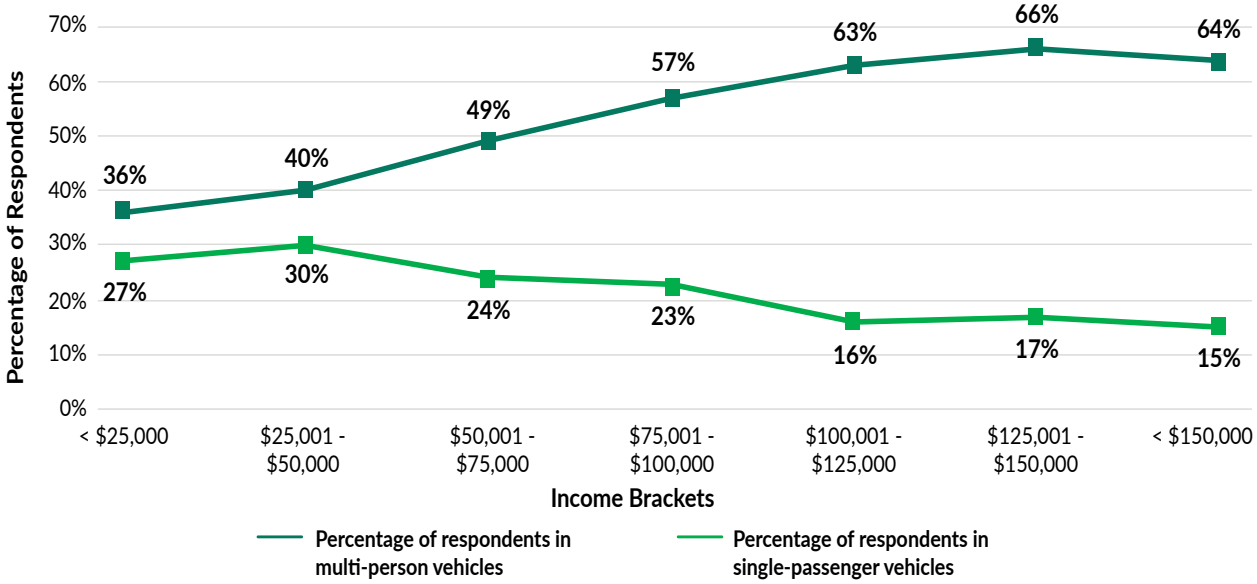


Commenters were most often regular travelers along the Interstate-5 corridor in Washington. Almost a third (31%) used this corridor at least monthly. Another 43% of respondents reported traveling at least once every couple of months. 74% of respondents had also ridden an Amtrak Cascades train before.

The comment form prompted respondents to share which mode of travel they take most frequently when traveling more than 75 miles along the I-5 corridor between Vancouver, B.C., and Portland, OR (Figure 8). More than half of respondents (57%) reported that driving with more than one person was their most used travel option. Of those 57% of respondents, 73% of them (898 people) had reportedly never ridden an Amtrak Cascades train before.

Further, more than 80% of commenters who live within five miles of Washington stations both north and south of King Street Station—Edmonds to Bellingham in the north and Tukwila to Vancouver, WA in the south—reported driving (either with another person or by themselves) compared to 64% of respondents who live within five miles of the King Street Station in Seattle.

Figure 9: Respondent Income and Car Travel Habits



The percentage of people who reported driving with more than one person increased as household income increased (Figure 9). Conversely, respondents with lower reported annual incomes were more likely to drive alone than those with higher annual incomes. There is not a clear reason for this trend, but one explanation could be that several commenters shared Amtrak Cascades was a cost-effective option if they were traveling alone, but when traveling with two or more people in a vehicle the cost was cheaper than multiple Amtrak Cascades tickets.

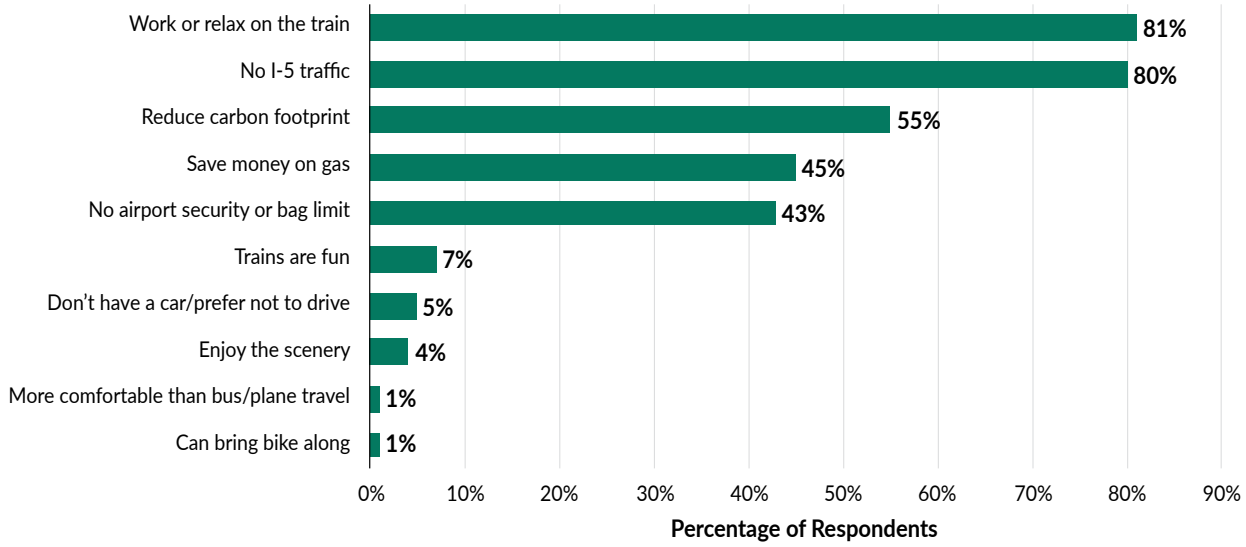
When prompted to share what would help them take Amtrak Cascades more often, 13% of participants (377 people) mentioned affordability as a barrier and expressed a desire for cheaper ticket options. More than a third of these respondents (138 people) earned less than $75,000 per year.

Respondents reported taking an Amtrak Cascades train and driving alone in a vehicle with similar frequency (17% and 20%, respectively). Of those 17% who reported taking Amtrak Cascades trains, 64% were people who also recorded that they take Amtrak Cascades trains monthly or more, indicating that regular riders already see the value of Amtrak Cascades service.

People reported taking an airplane, bus, or other heavy rail train with similar frequency – 2% of respondents selected these three options, respectively.

Reported benefits of traveling on Amtrak Cascades

Figure 10: Reported Benefits of Amtrak Cascades Travel



Comment form respondents were asked to select all pre-populated benefits they experience by riding Amtrak Cascades or add others that better illustrated their experience (Figure 10). The top two perceived benefits by a significant margin were tradeoffs specific to taking the train versus driving: the ability to work or relax on the train (81% of commenters) and not being delayed in heavy I-5 traffic (80% of respondents).

> *"We recently downsized to a single vehicle. Visiting family by myself by car would prevent my spouse from having mobility while at home. Amtrak Cascades + Sounder means about 30 min in the car from SW Portland suburbs to NW Seattle suburbs."*

Respondents also saw value in the ability to reduce their carbon footprint with 55% of commenters selecting this option. Younger respondents were more likely to select this option than older commenters—an average of 68% of respondents aged 18-29 chose this option compared to an average of only 50% of people aged 50 and older.

> *"I'm blind and driving isn't an option for me. Mass transit is my lifeline."*

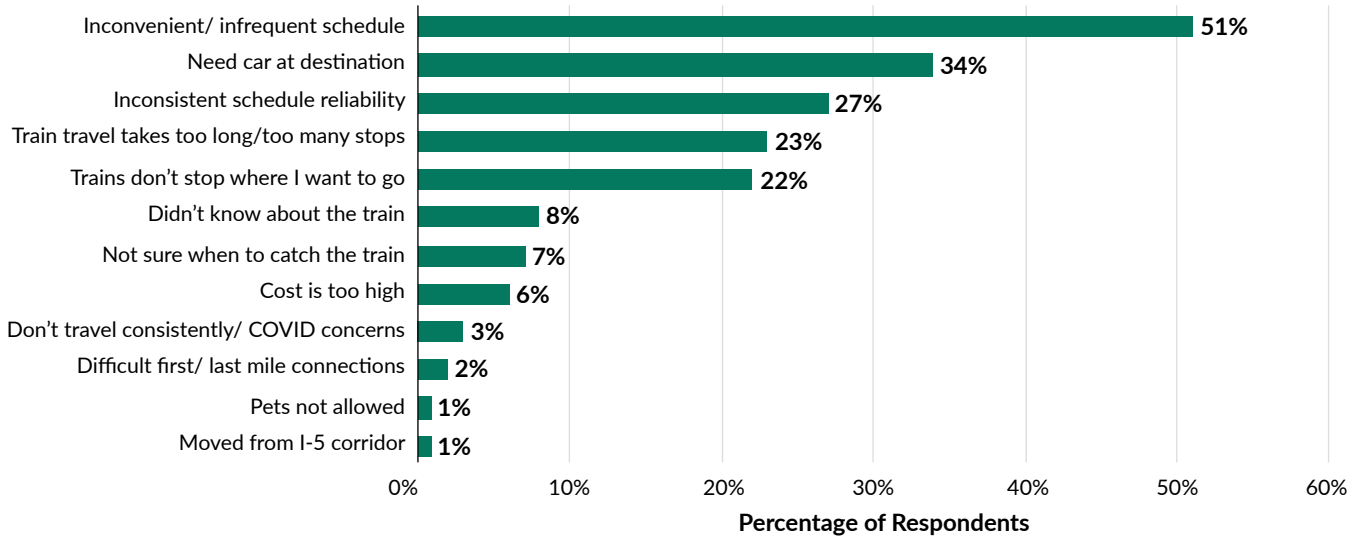
Saving money on gas and not experiencing air travel restrictions were selected with similar frequency, 45% and 43%, respectively. The importance of saving gas money decreased as participant age increased. Younger demographics (age brackets 18-24 and 25-29) were more likely to emphasize saving money on gas (69% and 61%) compared to an average of 43% of commenters in older age categories. Further, 10% of respondents aged 18-24 reported not having a car or preferring not to drive, which is 3-6% higher than other, older age groups.

Participants who wrote in other observed benefits included the fact that trains are fun (7%), not needing access to a car (5%), enjoyment of the scenery (4%), more comfort than a bus or plane (1%), and the ability to bring a bike along (1%).

> *The views!!! The unique experience of traveling on a train is unparalleled and having the opportunity to share it with my family is a fantastic memory-making experience.*

Reported difficulties with Amtrak Cascades train travel

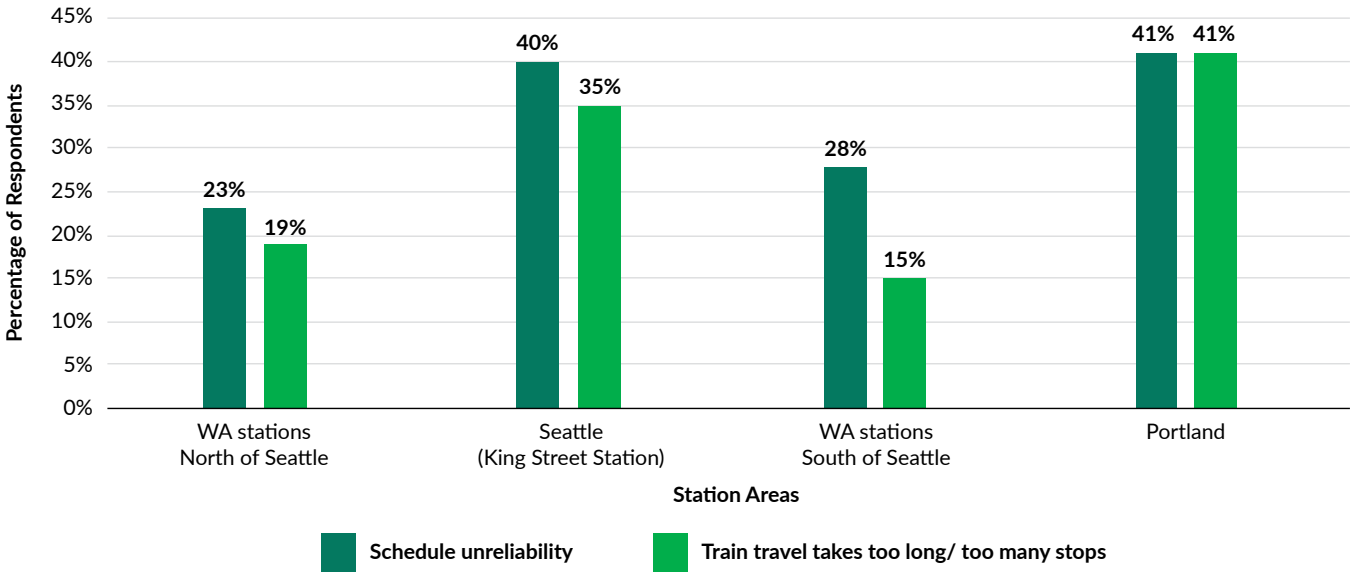
Figure 11: Reported difficulties with Amtrak Cascades travel



Participants were asked to select all pre-populated difficulties they perceived about traveling on Amtrak Cascades or add others that resonated with them (Figure 11). The most-selected reason respondents reported (51%) was that Amtrak Cascades trains do not run when they need to travel and that the schedule is inconvenient, or train arrival is too infrequent for them. More commenters (69%) who lived within five miles of Washington stations north of Seattle (Edmonds, Everett, Stanwood, Mt. Vernon, and Bellingham) reported difficulty with the infrequent and/or inconsistent Amtrak Cascades schedules, compared to 53% of respondents who lived within five miles of Washington stations south of Seattle and 60% of participants who live within five miles of King Street Station. Additionally, higher income earners (those who earn $100,000 or more per year) were more likely to cite inconvenient or infrequent schedule as the reason they don't take Amtrak Cascades more frequently (an average of 56% of higher-income earners vs. an average of 44% of those who earn less than $100,000 per year). Respondents who live in station areas north of Seattle were also more likely to select inconvenient and infrequent schedules as the reason they don't take Amtrak Cascades trains more often—69% compared to 60% for Seattle, 53% for south of Seattle, 44% for Portland, and 44% for Vancouver, B.C. respondents.

One-third of commenters also indicated that needing their car at their destination was a barrier that prevented them from riding Amtrak Cascades. More respondents (38%) who lived within five miles of Washington stations south of Seattle (Tukwila, Tacoma, Olympia/ Lacey, Centralia, Kelso/ Longview, and Vancouver, WA) selected this reason than people who lived within five miles or Washington stations north of Seattle (25%) and those who live within five miles of King Street Station (27%). Respondents suggested that increased non-car options for first- and last-mile connections in more rural station area communities might decrease this barrier for travelers.

Figure 12: Urban vs. Rural Station Area Community Experience



Reported difficulties with unreliable train schedules, length of travel time and number of stops, and lack of stops at desired destinations were all selected with similar frequency—27%, 23% and 22% of participants, respectively (Figure 11). Reliability concerns were most frequently selected by people who live within five miles of major station area cities—40% of Seattle and 41% of Portland respondents indicated this issue compared with 23% and 28% of people who live within five miles of Washington stations north and south of Seattle, correspondingly (Figure 12). This trend was also consistent with respondents who cited length of time/ number of stops as a difficulty with Amtrak Cascades—both Seattle and Portland station area participants were more likely (an average response rate of 38%) than those in more rural Washington station areas (an average response rate of 17%) to select this option.

A total of 310 respondents (8%) indicated that they did not know about Amtrak Cascades service (Figure 11). Respondents who reported earning less than $50,000 per year were more likely than individuals in other income brackets to report they didn't know about the train (an average of 11.5% vs. an average of 7.8% for higher income earners). Additionally, participants who identified as Latino/Hispanic were more likely than other people to cite not knowing about Amtrak Cascades as a reason for not taking the train. Respondents who live in station areas north of Seattle were also more likely to report not knowing about the train.

Another 6% of participants reported that Amtrak Cascades tickets are too expensive (Figure 11). Those with household annual incomes below $50,000 were almost twice as likely to identify cost as a barrier than higher income earners.

The most frequently cited other difficulties participants entered were related to their pets being above the weight limit (1%), moving outside of Amtrak Cascades' service corridor (1%), the condition/ comfort of trains and station facilities (<1%), and experienced confusion with the Amtrak Cascades website (<1%).

Future improvements that could increase ridership

Almost 3,000 respondents provided detailed comments about other travel needs and priorities that should be included in the analysis of future improvements and would cause them to take Amtrak Cascades more often. Five primary categories emerged from these comments:

- Scheduling/reliability
- Speed of train travel
- Convenience
- Accommodations
- Other improvements

Additional details about input for each of these categories can be found below. Please note that the following charts may not sum to 100% because comments could include feedback in multiple categories.

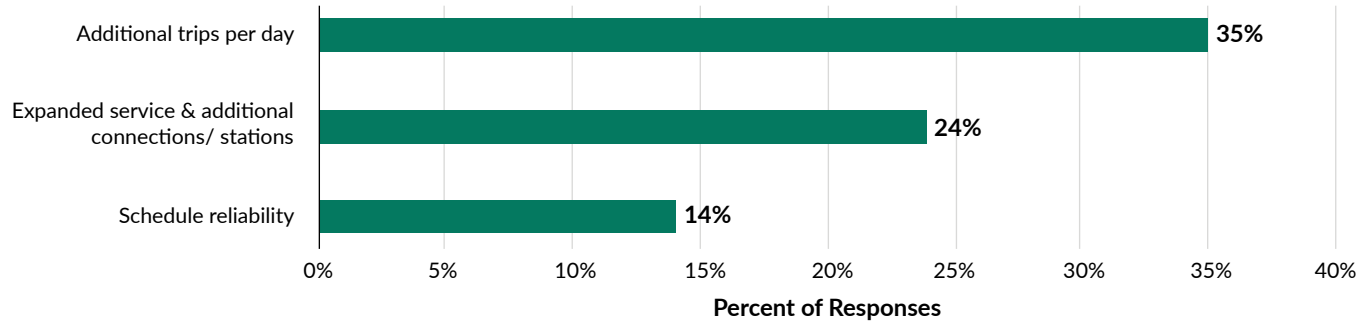
Scheduling/reliability

Approximately 1,700 responses mentioned scheduling and reliability improvements (Figure 13). 35% of responses expressed interest in making Amtrak Cascades viable for commuters, adding more trains for increased frequency and more daily trips. Respondents shared that current train schedules do not have enough options to allow commuters to make it to their destination and back home in the same day, which causes them to choose driving or short plane travel instead.

> *"Is there any way to simplify and streamline the service such that we run more trains continuously throughout the corridor end-to-end? I'd take it so much more if I knew there was more frequent and continuous service rather than stopping in the middle of my trip and waiting for a connecting train/bus."*

Another 24% of responses included requests for expanded service and additional stations. The most frequent request was to extend Amtrak Cascades' western Washington service area to eastern and central Washington cities. Many respondents acknowledged that it may not be possible to do this by rail and were open to connections from other transit modes to Yakima Valley, Tri-Cities, Spokane, and Pullman.

Figure 13: Scheduling and Reliability Priorities

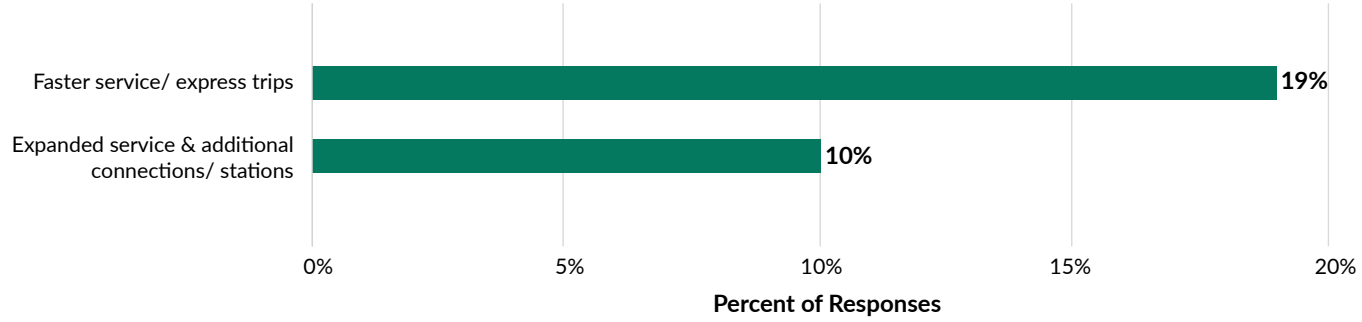


Some 14% of comments reiterated a need for improved on-time arrivals and departures. Negative experiences with delays dissuade repeat ridership from those who have ridden Amtrak Cascades before. Similarly, reports of schedule uncertainty deter new riders from trying the service.

> *"The one time I took Amtrak from Portland to Seattle it was hours late. While waiting for the train in Portland I asked about the delay and was told it is always late."*

Speed of train travel

Figure 14: Speed Priorities



Close to 770 comments included priorities related to speed of Amtrak Cascades train travel (Figure 14). 19% of responses were interested in express trip options, the most requested routes were connections to and from major cities—Vancouver, B.C., Seattle, and Portland, Oregon.

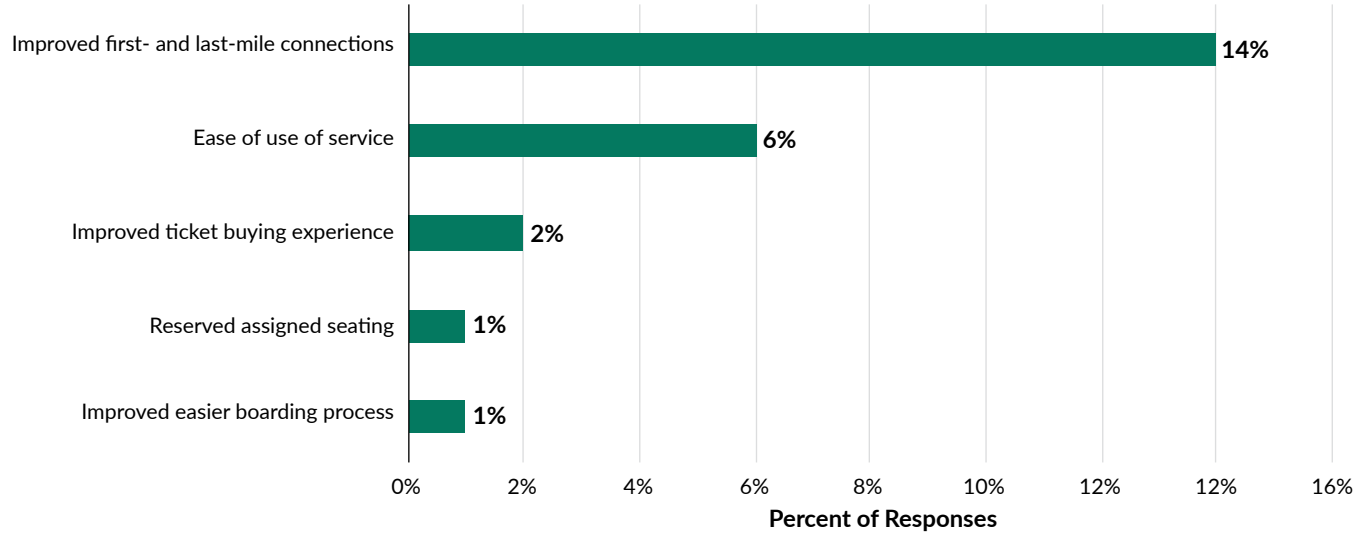
> *"Speed and frequency are the most important, which includes reliability. I live in Seattle, my family lives in Portland and my wife and I like to eat and ski and visit Vancouver. For fun visit weekend trips, we'd prefer to just train down and relax (and take our dog who is 50lbs) and enjoy the downtown area. As is, the trains are OK on travel time but often delayed making them worse on average. If we can get them to a 2.5-hour trip I'd never drive without reason (like camping or driving to a remote destination) to Portland again."*

Another 10% of responses included requests to prioritize development of dedicated passenger-only, high-speed rail. These respondents expressed experiences with delays due to freight train operations with whom Amtrak Cascades shares tracks and believed a dedicated passenger rail line could increase scheduling capacity and reduce delays.

> *"…having to share track with freight rail where it can be delayed significantly makes taking a trip by train much less appealing since you don't know for sure when you're going to arrive compared to other forms of travel. It's also generally slower than just driving, even in ideal conditions, which also makes it much less appealing."*

Convenience

Figure 15: Convenience Priorities



More than 600 responses detailed requests for increased convenience on Amtrak Cascades (Figure 15). The most frequently mentioned topic in this category (14% of responses) was a desire for better options for traveling to and from stations. Suggestions included better integration with local transit systems, more long-term parking options, and partnering with rental car agencies at stations.

> *"I'd like to see more focus on intermodal connections, including both transit and car share/rental — need options to get around once arriving at the station, particularly outside the big cities."*

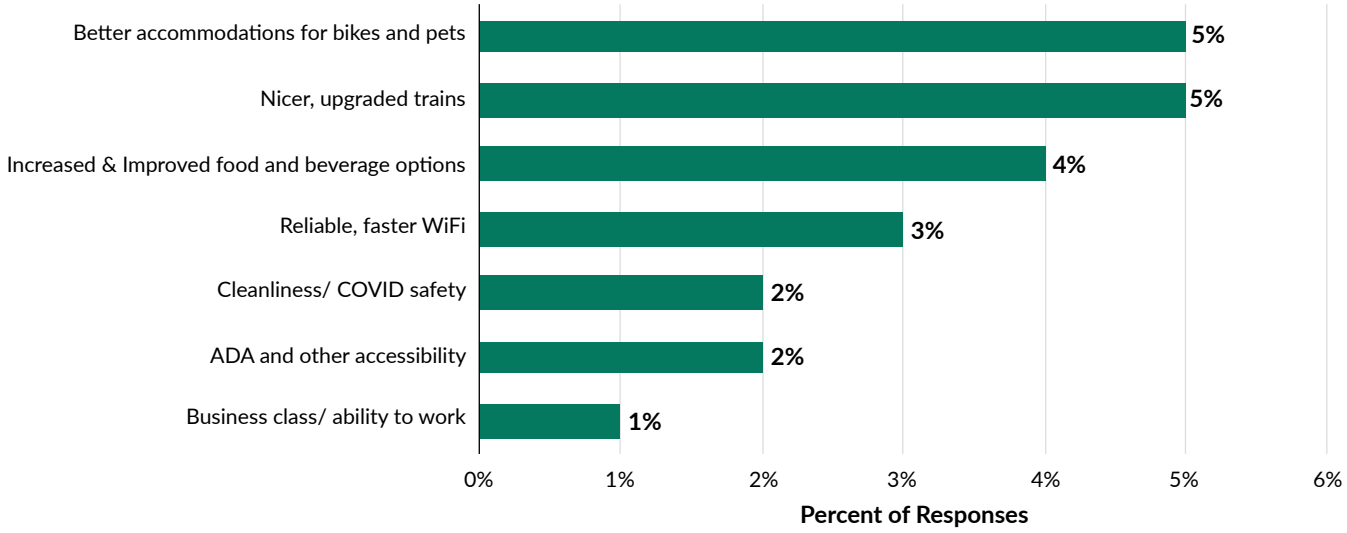
Another 6% of comments were related to ease of navigating the Amtrak Cascades system. Some people raised confusion with navigating some Amtrak Cascades stations, connecting between Amtrak Cascades and local transit systems, and frustration with the boarding process.

> *"The current boarding system at King Street and Portland Union Station (lining up and rushing to get seats onboard), is stressful, airport-esque, confusing, and overall unpleasant. I feel required to arrive at the station 1+ hour before departure to secure a spot in the front of the line to ensure seats together and/or a window seat, which eliminates some of the appeal of rail travel over flying."*

A smaller portion of comments were interested in an improved ticket purchasing experience (2%), both in the app and online, reserved and assigned seating (1%), and an easier boarding process (1%).

Accommodations

Figure 16: Accomodations Priorities



A smaller portion of comments (19% overall) were related to improvements to accommodations on Amtrak Cascades trains (Figure 16). Commenters were interested in more space and improved boarding experience for bikes as well as more flexibility to bring larger pets onboard (5%). Some were interested in nicer, upgraded trains (5%) and better on-board food and beverage options (4%), while others highlighted train cleanliness (2%) and ADA accessibility and accessibility overall (2%). Commenters with physical mobility challenges cited difficulties in navigating stations and trains with walkers and wheelchairs. Responses also included details about overall accessibility to and from the Amtrak Cascades system from their local transit networks.

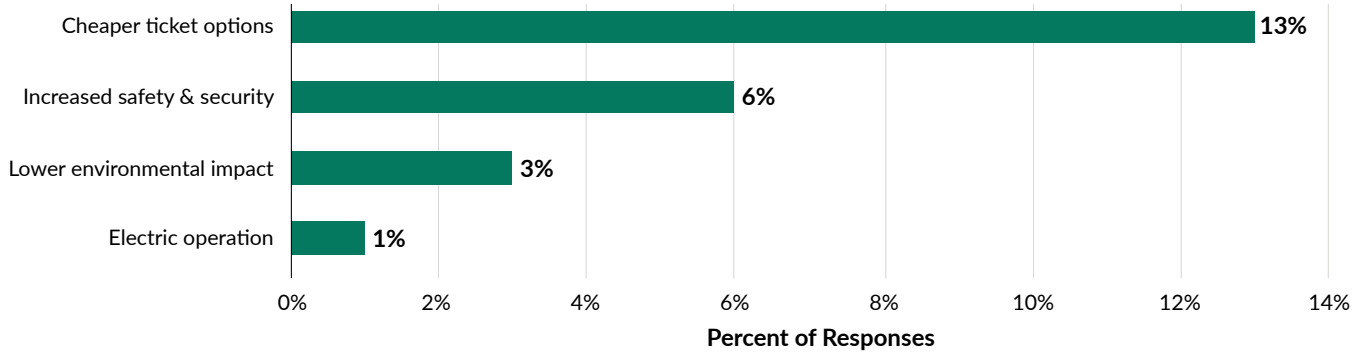
> *"Wheelchair accessible luxury options. I travel with my sister and wheelchair accessibility in the train is very, very limited. She cannot get to the dining car and the wheelchair accessible seating cars are uncomfortable."*

About 30 total comments mentioned a desire for a business class option and features that would make it easier for them to work onboard, such as cars dedicated to video/phone calls and more table space to spread out. Commenters emphasized a need for better Wi-Fi connectivity (3%).

> *"…it would be nice if the train had more than 6 bike hooks available so that cyclists would not have to box up their bikes to take them on a train."*

Other improvements

Figure 17: Other Priorities



The remaining priorities did not fit into the other above categories (Figure 17). Of these, 377 responses detailed a desire for less expensive ticket options. This was correlated with income level—of those who answered this question and completed the demographic questionnaire, most respondents made less than $70,000 per year.

> *"I would take Amtrak Cascades more if it was competitive with car pricing. When going by myself the train is more affordable and a better experience, however, if I'm traveling with my partner and my child it becomes more expensive than driving."*

Some 6% of comments also included a desire for increased safety and security both on trains and at stations. Several commenters suggested having a larger security guard presence on trains and at stations.

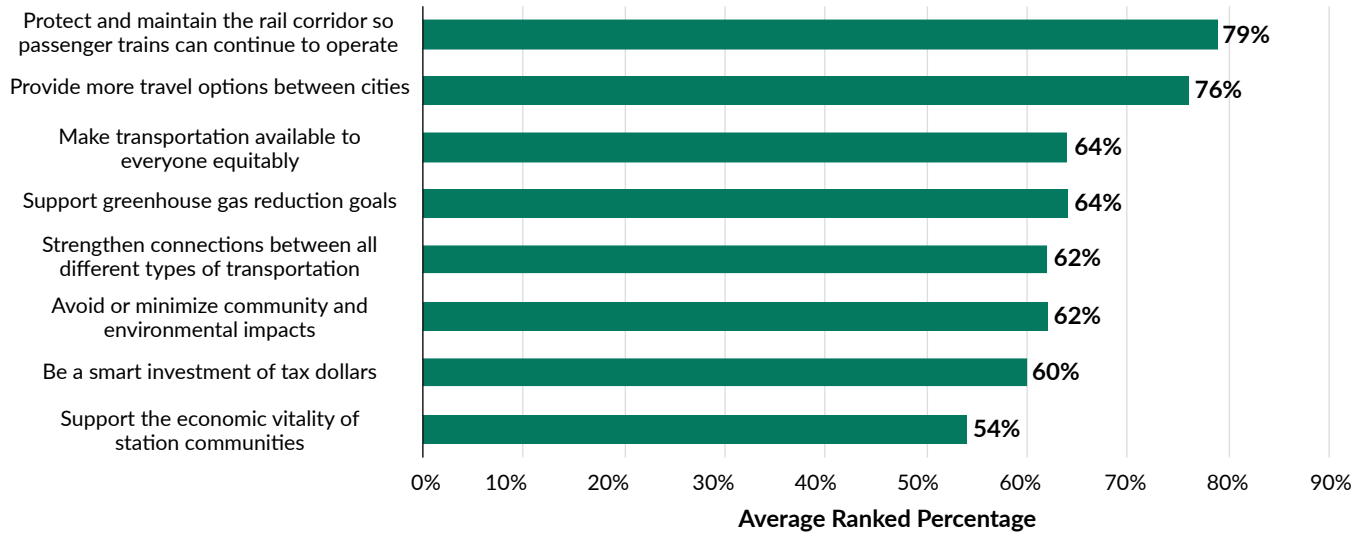
Finally, about 130 comments prioritized decreasing Amtrak Cascades' impact on the natural environment. Of these comments related to the natural environment, a desire for all-electric train operation was the most frequently mentioned priority (1%). The Tulalip Tribe submitted a letter emphasizing the importance of protecting waterways, including stream crossings, wetlands, shorelines, and other critical areas to ensure health of salmon and shellfish. The Environmental Protection Agency also noted a priority to ensure Amtrak Cascades service is resilient to climate change, especially sea level rise.

> *"As we're facing a climate crisis it's critically important that upgrades to the train system are prioritized and happen as soon as possible so that intercity train travel can become a realistic everyday option for me and other residents of Washington state."*

Preliminary Purpose and Need Statement priorities

Finally, respondents were asked to indicate the level of importance of eight priority roles for the next 20 years of Amtrak Cascades service. Participants rated the following themes on a Likert scale of one to five, with one being not at all important and five indicating high importance.

Figure 18: Preliminary Purpose and Need Statement Priorities



For ease in reporting, results for these categories have been ranked by weighted average (Figure 18). The Amtrak Cascades roles that resonated most for respondents is protecting and maintaining the rail corridor to ensure passenger trains can operate (79%) and providing more travel options between cities (76%).

The next five priorities scored within four percentage points and had virtually equal importance to commenters:

- Make transportation available to everyone equitably.
- Support greenhouse gas reduction goals.
- Strengthen connections between different types of transportation.
- Avoid or minimize community and environmental impacts.
- Be a smart investment of tax dollars.

The priority with the least reported importance was supporting the economic vitality of station communities.

Webinar feedback

Key takeaways from the technical webinar

The technical webinar audience included 41 participants from municipal planning organizations and regional transportation planning organizations, state and local government representatives, local transit agencies, regulatory agencies, and other government entities. Important themes from this discussion include:

- Suggestions to include reliability, safety, and customer service as needs in the Service Development Plan.
- A desire for WSDOT to not let freight displace passenger travel in balancing growing travel demand with increased rail usage for freight.

- A focus on station area communities, recognizing that train service can enhance affordable housing and economic development with transit-oriented development and better multimodal connectivity with non-motorized forms of transit.
- A suggestion to evaluate service needs based on trips made by different types of travelers, such as commuters vs. vacation travelers vs. senior riders.

Key takeaways from the rail advocacy groups briefing

This briefing was attended by 26 members of several rail and other advocacy groups: All Aboard Washington, Solutionary Rail and Climate Rail, Transport Action Canada, and Washington Physicians for Social Responsibility. Key themes from this conversation are highlighted below.

- An urgency around climate change and need to act now to achieve emission reduction goals and greenhouse gas pollution.
- A desire to link freight and passenger rail improvements to the Service Development Plan.
- Encouragement to explore other route options beyond the current Amtrak Cascades corridor.
- Suggestions for improved convenience and connectivity by adding a shuttle bus between the Tukwila station and SeaTac Airport and adding customs stop and station in Blaine, Washington.

Key takeaways from the public webinar

The public webinar was open to all community members and non-governmental organizations. Key elements of the discussion with 70 participants are emphasized below.

- Feedback to focus on connectivity and access for more rural stations that do not have adequate transit options. Priorities for this group included working with local transit providers and promoting bikes, scooters, and e-bikes on trains.
- Agreement that Amtrak Cascades has a role in addressing the climate crisis. Several suggestions included marketing the environmental benefits of trains and promoting increased train ridership.
- An emphasis on addressing unreliability and poor on-time performance because these things dissuade potential riders from using Amtrak Cascades more often.
- A desire for faster and more frequent service.
- Feedback about Vancouver, B.C. service and how to better connect with local transit and better serve the large area.

How feedback is being incorporated into the project

Nearly all the feedback WSDOT received was consistent with the needs identified in the draft Preliminary Purpose and Need statement. The comments about more frequent service, better schedule reliability, and shorter travel times illustrate changes to Amtrak Cascades that could address the need for improving the ability of the service to address growing travel demand and congestion in the corridor. Adjustments were made to the content of the document to incorporate recommendations from community engagement activities.

In addition to using the feedback to revise the Preliminary Purpose and Need, WSDOT also used it to inform development of Initial Service Options. Specifically, public feedback about frequency and travel times was considered.

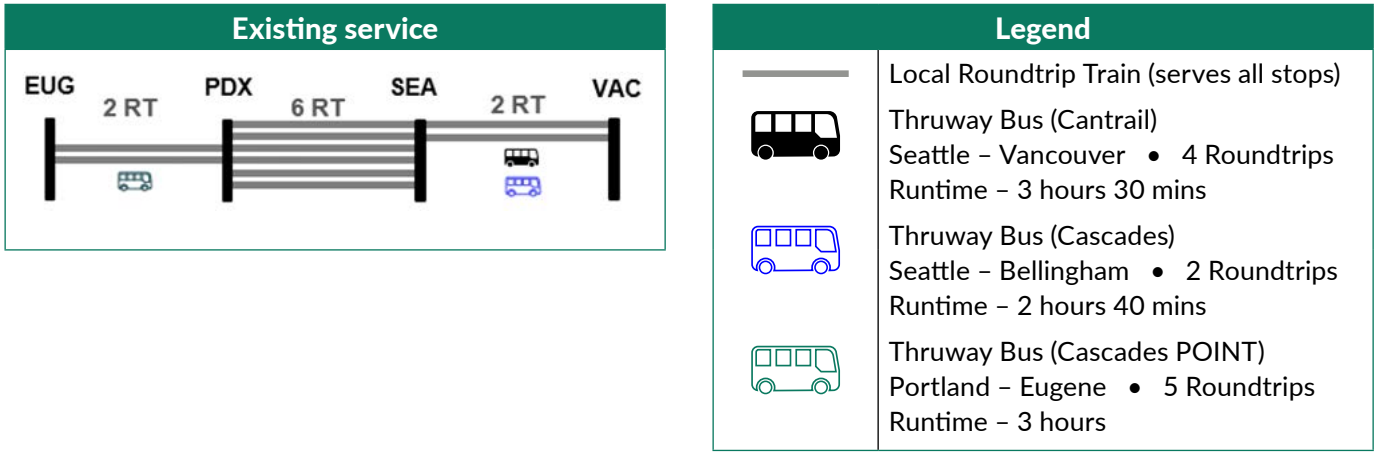
APPENDIX C

INITIAL SERVICE OPTIONS AND RIDERSHIP FORECASTING METHODOLOGY

Initial Service Options

WSDOT first established the baseline Service to use it as a benchmark to compare the future ridership growth of different service options. The Baseline Service, as depicted in Exhibit 1, represents the fully restored Amtrak Cascades service operating as of December 2023. It includes six roundtrips between Seattle and Portland, two roundtrips between Vancouver, BC, and Seattle, and two roundtrips between Portland and Eugene in Oregon.

Exhibit 1: Baseline Service Diagram (Operating by the end of 2023)



WSDOT developed a total of 13 initial service options based on key service characteristics including service frequency and stopping patterns. The service options were organized into four groups based on the level of service frequency: low, medium, high, and highest service level. Except for the highest service option group, each group identifies four service options, combining different station stopping patterns and service frequency. Low, medium, and high service option groups consider various stopping patterns such as express/limited service, all local service, and connecting bus service between Bellingham and Vancouver BC.

The highest service group only considers one option, defined as providing the highest number of roundtrips, stopping at all stations with full rail service to Vancouver BC.

The highest service option group includes a single option with the highest number of roundtrips and maximum number of station stops. This option was added based on the results of the initial ridership sensitivity analysis, which determined that ridership peaks at 16 round trips for Seattle-Portland.

Below are the groupings of service options. Exhibit 2, Exhibit 3, Exhibit 4, and Exhibit 5 show the groupings of service options and provide a diagram for each service option.

Exhibit 2: Low Service Option Group

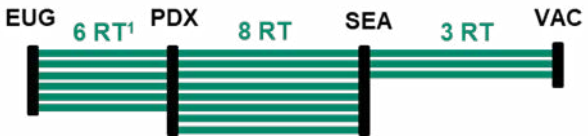
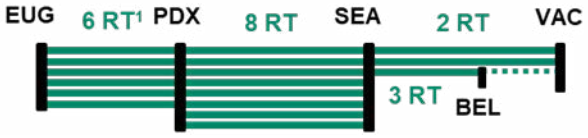
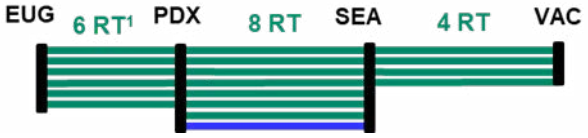
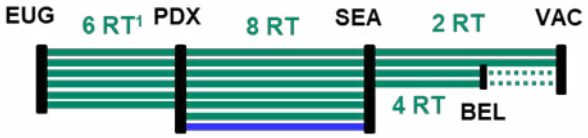
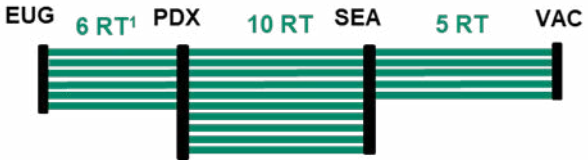
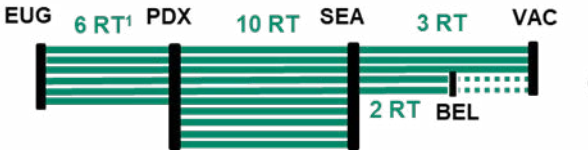
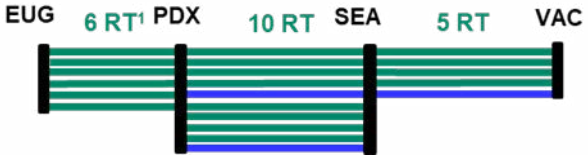
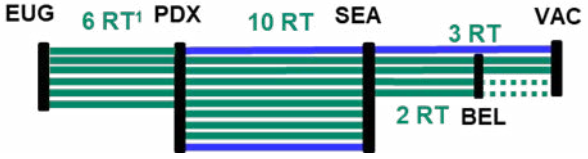
Service Option 1	
Service Option 2	
Service Option 3	
Service Option 4	

Exhibit 3: Low Service Option Group

Service Option 5	
Service Option 6	
Service Option 7	
Service Option 8	

Legend

- Local (All-Stops) Service
- Limited Stop Service
- Express Service
- Thruway Bus Service

RT = Round Trip
EUG = Eugene
PDX = Portland

SEA = Seattle
BEL = Bellingham
VAC = Vancouver, BC

Exhibit 4: High Service Option Group

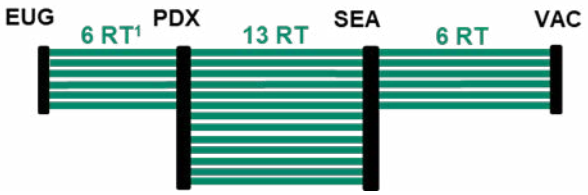
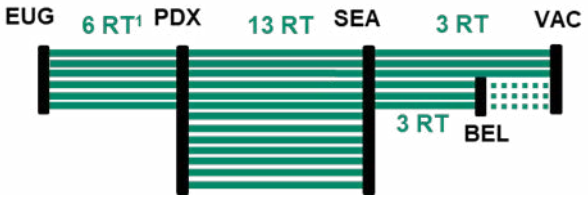
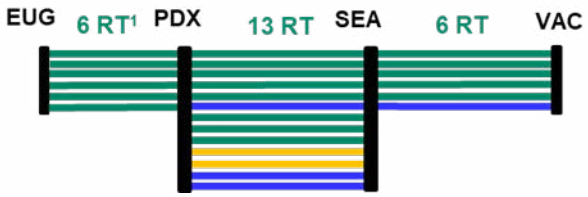
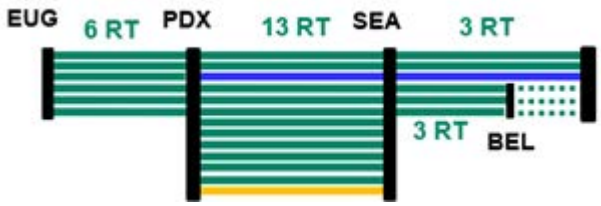
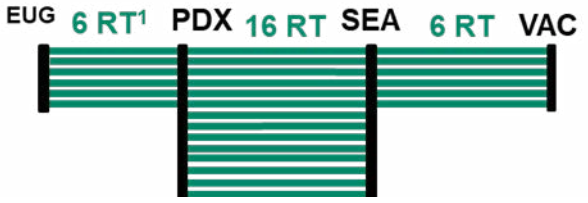
Service Option 9	
Service Option 10	
Service Option 11	
Service Option 12	

Exhibit 5: Highest Service Level Group

Service Option 13	

Legend

- Local (All-Stops) Service
- Limited Stop Service
- Express Service
- Thruway Bus Service

RT = Round Trip
EUG = Eugene
PDX = Portland

SEA = Seattle
BEL = Bellingham
VAC = Vancouver, BC

Screening and evaluation results of service options

The service option screening analysis assessed 13 service options representing different combinations of service characteristics. The following process was employed for the service option screening:

- Develop five evaluation criteria based on the Preliminary Purpose and Need: high-level ridership growth[1], feasibility, multimodal connectivity, equity, and travel time improvements
- Evaluate and score each service option using these five criteria
- Choose at least one highest-scoring option from each service option group to advance as preliminary alternatives

The analysis looked at 13 service options representing different combinations of service characteristics, including covering a range of low, medium, and high service frequency increases. Each service option was evaluated and scored using initial, high-level ridership estimates, feasibility, travel time improvements, multimodal connectivity, and equity. The evaluation criteria and methods for scoring the service options are shown in Exhibit 6.

Exhibit 6: Evaluation criteria descriptions and measurement methods

Criteria	Description	Measurement method
 **Ridership**	Projected high-level ridership increases over the existing service	Quantitative measure based on % of ridership growth over baseline service. The total range of growth (%) for all service options was split evenly into five categories: Low, Low/Medium, Medium, Medium/ High, and High. Each service option was assigned a category from its growth percentage result.
 **Feasibility**	Existing corridor constraints and magnitude of service improvements that affect feasibility	Qualitative measure considering corridor constraints and magnitude of service improvements. Service options with higher frequencies are assumed to require more service improvements and therefore assigned lower feasibility rankings.
 **Equity**	Service options stopping at all existing stations provide more equitable access to Amtrak Cascades service	Qualitative measure based on the proportion of total daily skipped stations compared to local service. The total range of the proportion is split into five categories: Low, Low/Medium, Medium, Medium/ High, and High. Service options with all local services were assigned a High ranking.
 **Multimodal Connectivity**	Service options with higher frequency create more opportunities to use complementary transportation systems	Qualitative measure based on frequency of service. Multimodal connectivity is correlated to the frequency of service, with higher frequencies supporting increased multimodal use.
 **Travel Time Improvement**	Service options with express and/or limited-stop service patterns provide travel time improvements compared to local service	Quantitative measure based on the proportion of Travel Time Savings through skipping station stops. The total range of the travel time improvement proportion for all service options was split evenly into five categories: Low, Low/Medium, Medium, Medium/High, and High. Service options with all local services were assigned a Low ranking.

[1] These initial ridership estimates did not use the full ridership model for the service options. Given there were 13 initial service options to considered, the approach was to conduct what is referred to as "ridership sensitivity testing", which provides initial estimates based on a simple approach. In lieu of fully developed timetables, runtimes used for the ridership sensitivity testing were determined through the utilization of train performance standards discussed in the "Evaluation of high-level operational considerations" section above. The purpose of this approach was to be one factor considered in the screening the long list of possible service options.

WSDOT advanced at least one of the initial service options from each service option group. The one with the highest raw score was selected from each group, except the high group. The high group had three options with the same high score. From this group, two options were chosen to compare the effectiveness of limited and express trips with all-local service. Options 10 and 12 are the same except for this one difference.

The evaluation process resulted in identifying five service options, including one from the low service level group, one from the medium, two from the high, and one from the highest service level group. Those five are advanced for further operational, infrastructure and detailed ridership analysis. The screening results are documented in Exhibit 7, Exhibit 8, and Exhibit 9.

Exhibit 7: Scoring of low service increase options

Initial Service Option / Potential Evaluation Criteria	Service Option 1	Service Option 2	Service Option 3	Service Option 4
Ridership Growth	L (35%)	L (35%)	L (35%)	L (35%)
Implementation Feasibility	H	H	M	H
Multimodal Connectivity	L	L	L/M	L/M
Equity	M	M	L/M	L/M
Travel Time Improvement	L	L	L/M	L/M
Raw Score	**9**	**9**	**9**	**9.5**
Recommendation	Eliminate	Eliminate	Eliminate	Advance
Explanation				Highest scoring option from 'Low' service option group

Exhibit 8: Scoring of medium service increase options

Initial Service Option / Potential Evaluation Criteria	Service Option 5	Service Option 6	Service Option 7	Service Option 8
Ridership Growth	M (64%)	L (59%)	L (60%)	L (56%)
Implementation Feasibility	L/M	M/H	L/M	M/H
Multimodal Connectivity	M/H	M/H	M/H	M/H
Equity	H	H	L/M	L/M
Travel Time Improvement	L	L	M/H	M/H
Raw Score	**10**	**11**	**10**	**10.5**
Recommendation	Eliminate	Advance	Eliminate	Eliminate
Explanation		Highest scoring option from 'Medium' service option group		

Exhibit 9: Scoring of high and highest service option groups

Initial Service Option / Potential Evaluation Criteria	High				Highest
	Service Option 9	Service Option 10	Service Option 11	Service Option 12	Service Option 12
Ridership Growth	M/H (89%)	M/H (82%)	M/H (83%)	M/H (82%)	H (99%)
Implementation Feasibility	L	L/M	L	L/M	L
Multimodal Connectivity	H	H	H	H	H
Equity	H	H	L	M	H
Travel Time Improvement	L	L	H	M	L
Raw Score	**11**	**11**	**10.5**	**11**	**11**
Recommendation	Eliminate	Advance	Eliminate	Advance	Advance
Explanation	Lower feasibility than Service Option 10 Six rail roundtrips for the northern segment is advanced by Service Option 13	Higher feasibility than Service Option 9 Provides a benchmark for further express & and limited-stop service pattern analysis in Service Option 12	The lowest scoring option from "High" service option group	Higher feasibility than Service Options 9 and 11 Provides travel time improvement over Service Options 9 and 10	Only option under the highest group

Ridership forecasting methodology

Ridership performance was based on the development of Amtrak Cascades ridership forecasts for Baseline Service and the five preliminary alternatives in 2045. The difference in ridership between the preliminary alternatives and Baseline Service indicated the ridership performance for each.

Model approach

WSDOT developed Amtrak Cascades ridership forecasts using AECOM's National Intercity Model. The model incorporates all major travel modes for passenger trips, including auto, air, bus, and rail. The ridership forecasting approach used a two-stage model system:

- The first stage forecasts the growth in the total number of person trips in each market
- The second stage (mode choice module) predicts the share of total person travel by each mode and produces a ridership forecast for Amtrak Cascades

The key markets are defined by geographical location (i.e., origin-destination zone pair). Both stages are dependent on the service characteristics of each mode and the socio-economic characteristics of the corridor.

The mode choice module uses the following key variables for auto, air, rail, and intercity bus modes to predict mode share:

- Travel time (minutes)
- Travel cost (dollars)
- Frequency (departures per day)

The mode choice model was calibrated to match the existing corridor by running the time, cost, and frequency characteristics of the existing Amtrak service, with current population, employment, and income data. The model parameters were then adjusted until the forecasted output corresponds with the actual ridership data.

Study area geography

The geographic area for ridership forecasting includes the entirety of the PNWRC between Eugene, OR and Vancouver, BC, to capture the overall market flows of riders using the Amtrak Cascades service throughout the PNWRC. This enables the project to capture the total ridership estimates for the entire route, including those traveling to/from Eugene, OR onto the Washington Segment.

A zonal system with 73 zones was developed for the study area and defined the geographic level of detail at which the intercity travel demand forecasting process was applied. The study area is shown in Exhibit 10, including the zone system, Amtrak rail stations, and airports. The model relies on the zone system to incorporate demographic data, represent travel demand between zones, and forecast trips between zones by mode.

The zone system was based on the county-level divisions for the consistency of the demographic data, with a few county-subdivision-level splits in more urban areas to ensure consistency in access/egress times, even demographic coverage, and small enough zones to avoid multiple rail stations in a single zone. The zone system covers all rail stations and airports and their service areas, which have a minimum 25-mile buffer around the corridor. In addition, the study area extends further around the terminal rail stations since they often attract more passengers than intermediate stations.

Exhibit 10: Cascades Study Area (with zone system)

Key data input and assumptions

The baseline year was assumed to be 2019, and the model was calibrated to match 2019 Amtrak Cascades rail ridership corridor wide and at a station level, with a target of being within 5% of actual 2019 boardings at Portland Union Station, Seattle King Street Station, and Vancouver, BC Pacific Central Station. 2045 was selected as the forecast year.

Key data that were collected during model development include the following:

- Existing and future population, employment, and income data for counties in Oregon and Washington and for the metro area of Vancouver, BC. Population data for Washington state is from the state's Office of Financial Management. Employment and income data are from TranSight and were provided by WSDOT.
- 2019 service plans for Amtrak's Cascades, Coast Starlight, and Empire Builder services
- 2019 trip tables for auto, air, bus, and rail modes
    - Auto trips were compiled from Replica and StreetLight trip data.
    - Air trips were compiled from the Bureau of Transportation Statistics (BTS) DB1B Market database.
    - Bus trips were estimated using an FHWA study with estimates for intercity bus trips between major markets. Where service existed but no FHWA estimate was available, intercity bus trips were estimated by assuming the number of bus trips equal to a fraction of auto trips.
    - Rail trips were compiled from Amtrak rail ridership data for Cascades, Coast Starlight, and Empire Builder services.
- Fare data
    - Rail fares are based on Cascades ridership data provided by WSDOT. Air fares are based on BTS air trip data. Bus fares were pulled from bus operators' websites and used in a linear regression equation to estimate intercity bus fares.

Key model assumptions include the following:

- Air, bus, and long-distance rail (Coast Starlight and Empire Builder) service frequencies were assumed to remain constant over time.
- Future service assumption for Sounder commuter rail is consistent with 2020 Sounder South Strategic Development and Implementation Plan.
- Rail and bus terminal times were assumed to be 20 minutes. Air terminal times were assumed to be 120 minutes.
- The ridership modeling does not include Cascadia Hight Speed Rail because the alignment, station locations, and future service characteristics have not been determined.

APPENDIX D

CAPACITY ANALYSIS METHODOLOGY AND INITIAL INVESTMENTS LIST

Overview

WSDOT worked with its service partners to examine current and future capacity on the Washington segment of the Pacific Northwest Rail Corridor (PNWRC); identify areas expected to be over-capacity; and develop preliminary infrastructure needs to support each of the preliminary alternatives.

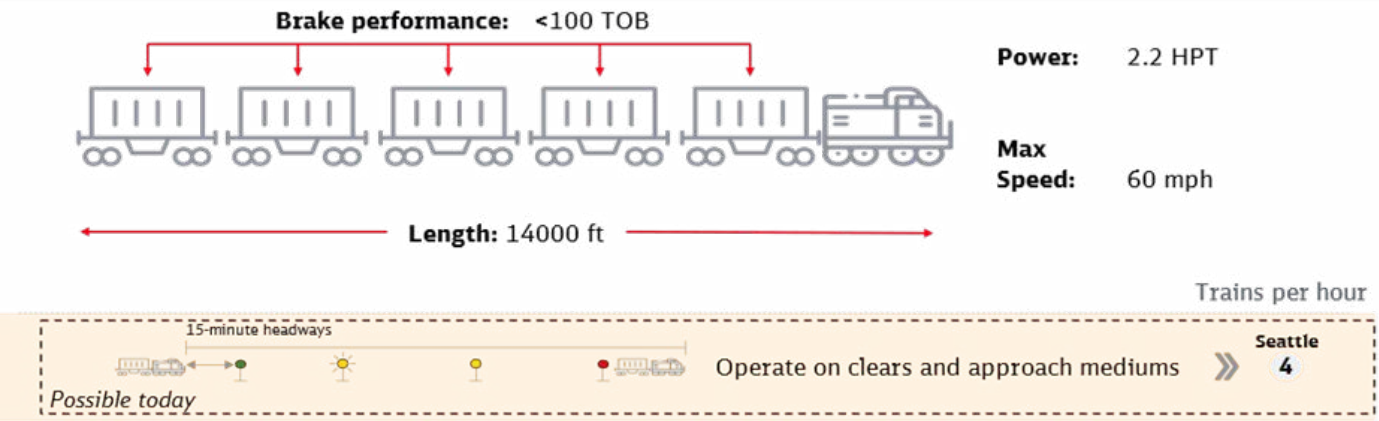
These infrastructure needs are a preliminary assessment of what will be needed for each preliminary alternative. This assessment is subject to further analysis, as well as discussions with host railroads and other stakeholders. While the results of this capacity analysis represent the collaborative efforts of the service partners, it does not indicate the host railroad's endorsement of the capacity study findings. The principles applied by BNSF Railway when considering new or additional passenger rail service on its routes are listed in Attachment A.

The capacity analysis was based on 2019 data documenting train movements and extrapolated out to 2045. On BNSF's recommendation, the study assumed all freight traffic would grow 2% annually. On Sound Transit's recommendation, the study assumed that Sounder service would include 42 one-way trains south of Seattle and eight one-way trains north of Seattle in 2045. Amtrak long distance trains in the corridor were kept at the current service level, with one daily roundtrip for both the Empire Builder and the Coast Starlight.

Capacity measurement

Capacity on a corridor is a function of the track and signaling (traffic control) infrastructure, the physical profile/limitations of the corridor, and the characteristics of the train operating over the corridor. While track infrastructure and the corridor profile are easily defined, train characteristics can vary significantly. To address this variable, the analysis used the concept of a 'standard train' to allow for a uniform measurement of how different trains consume corridor capacity. The standard train (shown in Exhibit 1) is based on the average characteristics of trains in the 95th percentile of length (and associated performance) in 2019. This conservative assumption about train length and performance was developed in cooperation with BNSF to ensure that capacity on the corridor was not overstated.

Exhibit 1: Standard train characteristics



By understanding the performance characteristics of the standard train on the corridor, the methodology created a defined unit of capacity to analyze the capacity consumption implications of operational and infrastructure decisions. This unit of capacity is based on the amount of time it takes the standard train to traverse a given segment of track. The number of times the standard train could traverse the segment of track (the throughput) in a 24-hour period is the amount of capacity on the given track segment. While the optimal use of a main track in any segment is trains traversing the line at track speed, there

are other activities which occur on the main tracks which consume capacity. Since units of capacity are expressions of time, the methodology quantitatively captures the capacity impact of these other activities by identifying the amount of time taken and simply converting it in the appropriate units of capacity. Capacity consumption was calculated for the following activities:

- Maintenance of way (track maintenance)
- Mainline staging
- Yard and facility entry/exit
- Variability

Using the standard train characteristics and performance, the maximum throughput of multiple track segments was determined to be four trains per hour or 96 trains per day with 15-minute headways. Thus, segments of multiple main tracks have 96 units of capacity per main track, with each unit of capacity representing 15 minutes. The various ways in which capacity is consumed on the corridor are defined in terms of time and converted into units of capacity (i.e., if a staging event on the mainline occurs for 30 minutes, it would consume two units of capacity).

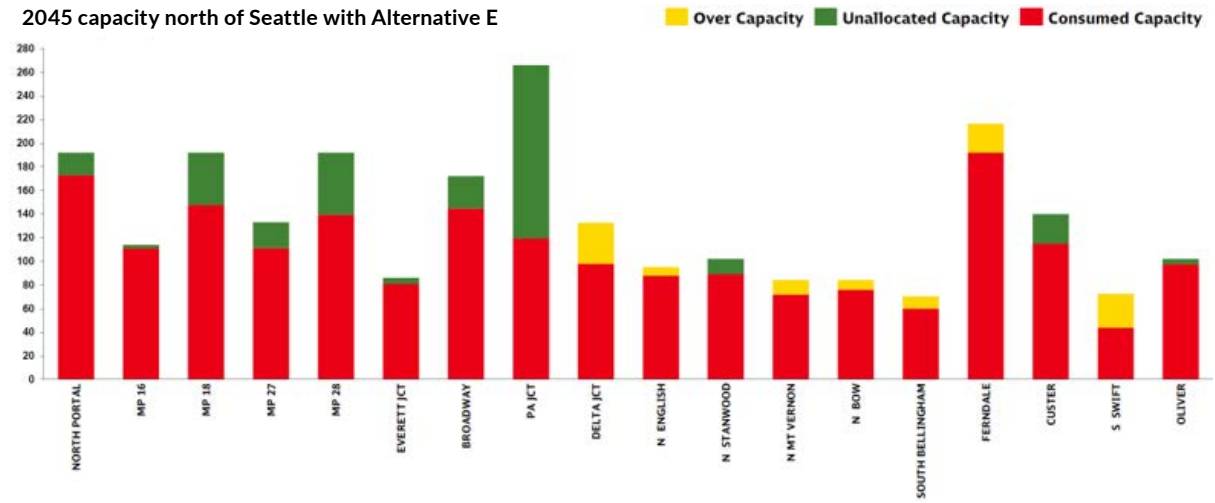
Capacity on segments of the corridor with a single main track function differently because trains operating in different directions cannot operate independently of each other as they theoretically can on a multiple track segment. To account for this, the capacity supply in single track segments was calculated by using the standard train characteristics and performance to determine the maximum throughput of trains on single track segments between passing sidings. Because the route distance and characteristics between passing sidings is not uniform, the amount of time it takes a train to travel that distance using the standard train characteristics varies between single track segments. Units of capacity supply vary from single track segment to single track segment, but the way in which capacity-consuming activities are calculated remains the same.

In general, capacity is most constrained at yards, customer facilities and junctions. These are all locations where trains enter or exit the main track.

Capacity improvements

The infrastructure improvements necessary for each preliminary alternative were identified by applying the future traffic volumes anticipated for Amtrak, Sound Transit, and BNSF in 2045 to determine locations where the anticipated traffic would exceed capacity. An example of this analysis is shown graphically in Exhibit 2. This capacity chart is based on Preliminary Alternative E, which has the highest increase in Amtrak Cascades service. It shows the locations between Seattle and Portland where there will not be enough capacity (labeled “over capacity”) for the anticipated traffic in 2045.

Exhibit 2: Example rail capacity chart showing where capacity improvements may be needed



The infrastructure improvements were designed to support the estimated future traffic volumes with reasonable adjustments to operating patterns using the minimal amount of new construction. The amount of infrastructure improvements increases with the greater levels of service in each preliminary alternative. Additionally, preliminary alternatives with higher levels of service incorporate the infrastructure of previous the lower service preliminary alternative.

An overview of the infrastructure needs initially identified for each preliminary alternative are shown in Exhibits 3 and 5 provided below. The locations of these preliminary capacity improvements are shown schematically in Exhibits 4 and 6, along with the segments identified as suitable for a 90-mph maximum speed limit.

These infrastructure improvements are an initial assessment of what may be needed for each preliminary alternative. The listing of infrastructure improvements in this Preliminary SDP does not constitute endorsement of the improvements by the host railroads. Further development and analysis will be conducted during the CID SDP process including conducting engineering analysis and cost estimates. In addition, extensive coordination with host railroads and other service partners regarding funding availability, infrastructure and operational impacts to existing capacity and velocity for current and future growth of freight and passenger traffic on the PNWRC will be conducted.

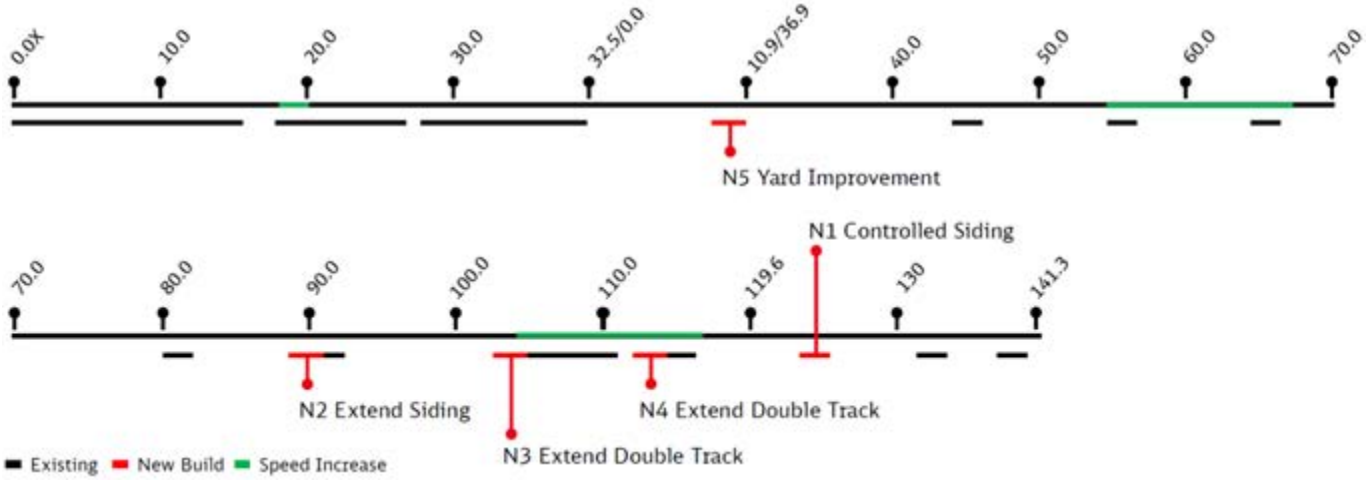
Exhibit 3: Preliminary list of capacity improvements (north of Seattle) *

				Preliminary Alternative				
No.	**Improvement**	**Details**	**Location**	**A**	**B**	**C**	**D**	**E**
N1	Controlled Siding	Allows passenger traffic to pass on New Westminster Subdivision	WHITE ROCK (0.5 Miles)	✓	✓	✓	✓	✓
N2	Extend siding	Allows for additional freight traffic to hold off main	MP 89.9 to S SOUTH BELLINGHAM MP 91.9 (2 Miles)	✓	✓	✓	✓	✓
N3	Extend double track	Increases operational flexibility by extending existing double track	RABANCO MP 104.2 to FERNDALE MP 106.4 (2.2 Miles)		✓	✓	✓	✓
N4	Extend double track	Increases operational flexibility by extending existing double track	CUSTER MP 111.2 to MP 113.5 (2.3 Miles)	✓	✓	✓	✓	✓
N5	Expand Yard Facilities	Allows freight traffic staging for various Bellingham Subdivision customers to hold off main, allows freight traffic to pass	DELTA YARD MP 8.9	✓	✓	✓	✓	✓

* This listing of infrastructure improvements does not constitute endorsement of the improvements by the host railroads

** Does not include any necessary improvements in Canada between the Fraser River Bridge and Pacific Central Station in Vancouver, BC

Exhibit 4: Preliminary locations of capacity improvements (north of Seattle)



Source: DB E.C.O. North America, Inc.

*Exhibit 5: Preliminary list of capacity improvements (south of Seattle)**

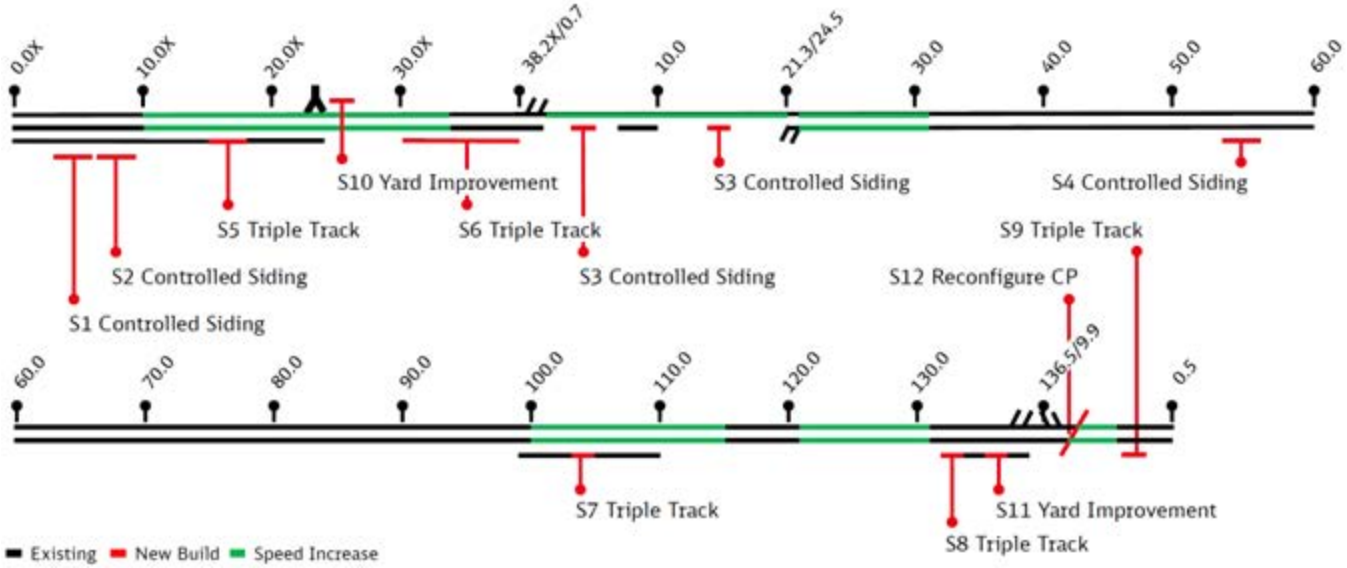
				Preliminary Alternative				
No.	**Improvement**	**Details**	**Location**	**A**	**B**	**C**	**D**	**E**
S1	Controlled Siding	Allows freight traffic staging, enter/exit from adjacent facilities to do so off main tracks	ARGO MP 3.3X – BOEING MP 6.6X (3.3 Miles)	✓	✓	✓	✓	✓
S2	Controlled Siding	Allows freight traffic staging, enter/exit from adjacent facilities to do so off main tracks	BOEING MP 6.6X to RENTON MP 9.5X (2.9 Miles)					✓
S3	Controlled Siding	Allows passenger traffic to pass on Lakewood Subdivision	CP 40 (2.2 Miles)	✓	✓	✓	✓	✓
	Controlled Siding	Allows passenger traffic to pass on Lakewood Subdivision	DUPONT (0.2 Miles)	✓	✓	✓	✓	✓
S4	Controlled Siding	Minimizes impact to mainline operations in Chehalis area	CENTRALIA SOUTH MP 55.8 to CHEHALIS JCT MP 58.7 (2.9 Miles)			✓	✓	✓
S5	Extend Triple Track	Creates continuous triple track	JAMES ST MP 15.7X –THOMAS MP 18.5X (2.8 Miles)	✓	✓	✓	✓	✓
S6	Extend Triple Track	Creates triple track approach to/from Tacoma terminal area	CP SUMNER MP 29.7X – TR JCT 38.2X (8.5 Miles)	✓	✓	✓	✓	✓

Exhibit 5: Preliminary list of capacity improvements (south of Seattle) (continued)*

				Preliminary Alternative				
No.	**Improvement**	**Details**	**Location**	**A**	**B**	**C**	**D**	**E**
S7	Extend Triple Track	Creates continuous triple track	LONGVIEW JCT SOUTH MP 102.6 to PEAVEY MP 105.7 (3.1 Miles)	✓	✓	✓	✓	✓
S8	Extend Triple Track	Allows freight traffic staging,	MP 131.5 to FRUIT VALLEY MP 133.5 (2 Miles)	✓	✓	✓	✓	✓
S9	Extend Triple Track	Allows freight traffic staging, enter/exit from Willbridge Yard to do so off main tracks	WILLBRIDGE MP 4.1 – CP 22 MP 2.2 (1.9 Miles)					✓
S10	Expand Yard Facilities	Allows freight traffic staging, enter/exit from Auburn Yard and Stampede Subdivision to do so off main tracks	AUBURN YARD MP 21.8X	✓	✓	✓	✓	✓
S11	Expand Yard Facilities	Allows freight traffic staging,	VANCOUVER YARD MP 135			✓	✓	✓
S12	Reconfigure Control Point	Creates at-grade diamond crossing with higher track speed to minimize impact of crossing traffic	N PORTLAND JCT MP 8.1	✓	✓	✓	✓	✓

* This listing of infrastructure improvements does not constitute funding availability or endorsement of the improvements by the host railroads

Exhibit 6: Preliminary locations of capacity improvements (south of Seattle)



Source: DB E.C.O. North America, Inc.

Attachment A

BNSF Railway Passenger Principles

BNSF is willing to cooperate on passenger rail studies and provide federal, state, and local officials with information. Where passenger rail service is proposed on a minimally used line that BNSF is willing to sell, BNSF shall be paid fair market value for the property. Where passenger rail service is proposed on a line BNSF intends to continue owning and to be jointly used for passenger and freight use, the following principles apply:

- Any passenger rail operation cannot degrade BNSF's freight service, negatively affect BNSF's freight customers or BNSF's ability to provide them with service.
- BNSF must be compensated for any and all costs incurred in providing passenger rail service and make a reasonable return for providing the service.
- Capital investments necessary for passenger rail service are the responsibility of the public, including investments for future capacity which is potentially more expensive, especially in urbanized areas.
- BNSF will not incur any liability for passenger rail operations that it would not have but for those operations. These operations are provided by BNSF primarily as a public service; the relatively modest compensation BNSF receives does not begin to justify assuming the significant liability associated with passenger service.
- Studies of how passenger rail service might be provided must take into account not only the current freight traffic levels, but projected freight traffic growth.
- Investments made for passenger rail projects must not result in BNSF incurring a higher tax burden. Property improvements should not become part of our tax base; materials used should be exempt from all sales and use taxes, etc. or BNSF must be made whole for any increased tax burden.
- BNSF must retain operating control of rail facilities used for passenger rail service. All dispatching, maintenance and construction must be done under the control of BNSF. Passenger stations, parking lots and other non-rail facilities may be publicly owned and operated.
- Studies must reflect BNSF's actual operating conditions and cost structures. For example, construction work estimates must reflect our labor contract costs, schedules cannot assume that we will not operate any freight trains during peak commuter periods, etc.
- BNSF will limit passenger rail operations to the passenger schedules initially agreed upon and for which the capital improvement plan has been designed. Future expansions will have to undergo the same analysis and provide any required capital improvements before schedules can be altered, service added, or stations added.
- Improvements must include grade crossing protection and intertrack fencing as required to minimize the risk of accidents, due to liability and service interruption concerns.

BNSF's relationship with Amtrak intercity passenger service is governed by Federal regulation supplemented by an operating contract between BNSF and Amtrak. Please direct questions about passenger rail service on BNSF Railway to www.bnsf.com/about-bnsf/contact-us/ or the passenger rail sponsoring agency.

Includes revisions from August 2007 and February 2023

APPENDIX E

DRAFT REPORT PUBLIC FEEDBACK

Comments received

WSDOT published the draft of this document for a 30-day public review that ended on April 18, 2024. Nearly 800 comment submittals were received by WSDOT. These included comments from individuals, as well as the following public agencies and nongovernmental organizations.

Metropolitan Planning Organizations

- Puget Sound Regional Council
- Oregon Metro (Portland)

State Agencies

- Oregon DOT
- Puget Sound Partnership
- WDFW Habitat Programs (Region 4, 5, & 6)

Local Jurisdictions

- Pierce County Council
- City of Mukilteo
- City of Seattle
- City of Tacoma

Transit Agencies

- Sound Transit
- TransLink

Nongovernmental Organizations

- Brotherhood of Locomotive Engineers and Trainmen, Division 60
- Pacific Northwest Economic Region, Regional Infrastructure Accelerator Program
- Puget Soundkeeper
- Front and Centered
- Sierra Club – Washington Chapter
- Washington Physicians for Social Responsibility
- All Aboard WA
- Transport Action Canada
- Solutionary Rail
- Climate Rail Alliance

Common themes

The most common themes from these comments are discussed below.

2006 Long-Range Plan

Some comments suggested that WSDOT simply refresh the 2006 Long-Range Plan and submit it as the SDP required for FRA's Corridor Identification and Development (CID) Program. The 2006 plan does not include all the elements for a Service Development Plan that are now required by the Federal Railroad Administration, Therefore, a simple refresh is not feasible. Current federal requirements that are not found in the 2006 Long Ranger Plan include the following:

- Specifics on federal funding application plans, including the capital projects for which federal funding will be sought, who will apply for the federal funding, the timeline for such requests, and what amounts will be requested
- Public engagement activities to provide an opportunity for consultation with stakeholders
- A description of compliance with Federal rail safety and security laws, orders, and regulations
- Current forecasts for ridership, revenue, project costs, and operating budgets
- A description of how the corridor would contribute to the development of a multi-State regional network of intercity passenger rail
- A description of how the improved corridor facilitates travel connections
- The anticipated environmental benefits of the corridor
- The corridor's impacts on highway and aviation congestion, energy consumption, land use, and economic development
- A planning horizon time period that is closely correlated to the anticipated useful life of the capital investments
- Social equity consideration during alternative development and selection

The work done for the 2006 Long-Range Plan identified projects using forecasts of the rail capacity, travel patterns, and ridership demands that are more than 20 years old. That information is now outdated and no longer reflects current conditions and WSDOT cannot assume that the infrastructure projects identified more than 20 years ago are the same as what will be needed over the next two decades.

Next steps

WSDOT will develop an SDP that meets current FRA requirements and is based on current data and information.

Shorter travel times

Many comments identified shorter travel times as an important outcome, often referencing the travel time goals in the 2006 Long-Range Plan.

Over the last three decades, WSDOT has developed Amtrak Cascades through incremental improvements of existing rail system infrastructure consistent with the intent of the high-speed ground transportation program established by the Washington State Legislature in 1993 (RCW 47.79). When the Legislature established the program, it set a goal of providing service with top speeds over 150 mph between Portland, OR and Vancouver, BC by 2030. It also set interim goals of 2-hour, 30-minute travel time between Seattle and Portland by 2000 and a further reduction to 2 hours by 2010. These goals in the RCW are targets, not requirements.

The 2006 Long-Range Plan identified improvements needed to meet the goal of a 2-hour, 30-minute travel time between Seattle and Portland and attain a 2-hour, 37-minute travel time between Seattle and Vancouver, BC. That analysis was based on a set of assumptions, including the ability of passenger trains to operate at speeds up to 110 mph within the BNSF right of way. More recently, BNSF has indicated that it will only allow passenger trains to attain a maximum speed of 90 mph in its right of way.

While reducing travel time is an important part of long-term plans for Amtrak Cascades service improvements, WSDOT also is focusing on funding infrastructure projects that will allow for an increase in the number of trains and a decrease in delays. This is the quickest and most cost-effective way to generate a societal modal shift away from driving and flying, thus supporting the attainment of carbon reduction goals. There will likely be travel time reductions related to some of these capacity and reliability improvements.

WSDOT received comments that the Preliminary Purpose and Need should be revised to explicitly identify faster travel times as a need. The current objective to "meet growing intercity travel demand with more frequent, reliable and customer-focused service" reflects the need for improvements in the service.

Next steps

As part of conceptual engineering during the CID Program Step 2 SDP work, WSDOT will identify locations where the maximum speed can be increased using current infrastructure and locations with speed restrictions where infrastructure investments could allow increased speeds.

Faster travel times will not be added as a separate need of the project, but instead will be addressed as service frequency and reliability goals are met. This is one of the ways for Amtrak Cascades to meet the needs that have been identified in the corridor as part of the Preliminary Purpose and Need, not an end by itself.

Express service

Most commentors who wrote about express service were against it, citing equity as the reason for new trains to stop at each Amtrak Cascades station. WSDOT identified equity as a negative aspect of express and limited service during the screening process.

Next steps

WSDOT will undertake further analysis during the CID Program Step 2 SDP planning process, to determine the implications of express service from an equity perspective. Some commentors were supportive of service that skips some stations.

Reliability

Providing reliable service is key to increasing Amtrak Cascades ridership and WSDOT has been working continuously to improve on-time performance of the trains. However, the conceptual analysis of rail operations performed for this preliminary planning study did not include a comprehensive analysis of reliability.

Next steps

WSDOT will perform more detailed analysis during upcoming CID Program Step 2 SDP work to identify and include opportunities to improve reliability.

Infrastructure projects

Some commentors questioned whether the infrastructure projects identified in the Preliminary SDP would be adequate to reliably implement the proposed service changes.

One specific project mentioned by multiple commentors was the realignment of the curve between DuPont and Nisqually on Sound Transit's Lakewood Subdivision, identifying it as high priority for addressing congestion in the corridor and a way to reduce travel time in the corridor. By itself, this project is not projected to provide any significant travel time savings and will require high costs to build. The curve at that location is only one of more than 20 places along the corridor where trains must slow down to 30 mph. A speed increase on one curve will not make a significant difference in the travel times. The Preliminary SDP identifies other capacity-constrained sections of the route that will provide more reliability through the reduction of schedule conflicts with existing and future rail traffic levels; improve on-time performance; and increase service levels with more frequent train service and schedule options for passengers.

Next steps

As noted in the document, the projects are a preliminary list. A more detailed analysis of infrastructure needs will be performed as the SDP work continues in Step 2 of the CID Program. Additional projects are likely to be identified in that analysis, including some needed to ensure more reliable service.

Future work on I-5 may require replacement of the bridges that carry the rail line over the highway near DuPont. Replacement of these bridges in a way that supports higher train speeds might be pursued as part of the work on I-5 or separately as an Amtrak Cascades service improvement if included in the future SDP work.

Multimodal connectivity

Multiple commentors discussed the importance of improving multimodal connections for Amtrak Cascades and asked that this be considered as planning for service improvements continues. Some highlighted specific opportunities, such as a shuttle between the Tukwila station and Seattle-Tacoma International Airport and ferry service between the Bellingham station and Victoria, BC.

In addition, WSDOT has received direction from the Legislature[1] that this coordination must also include:

- The Interstate 5 highway corridor
- Existing rail infrastructure
- A future high-speed rail alignment
- Commercial aviation capacity

Next steps

Analysis of multimodal connectivity opportunities at stations is part of the upcoming CID Program Step 2 SDP work. This will include coordination with local connections (such as transit, bicycle, and walking) as well as service connecting Amtrak Cascades to locations outside the corridor.

[1] Engrossed Substitute House Bill (ESHB) 1125 Sec. 219 (10)

New stations

WSDOT received several comments suggesting new station locations. Specifically, new stations were requested at the US-Canada border and at Mukilteo. Suggestions were also provided for changing the location of the station serving Vancouver, BC.

Next steps

Adding or relocating stations is outside the scope of this current study. WSDOT and ODOT have a Station Stop Policy in place for considering proposed station stop changes. A proposal to add a station would need to follow that policy, independent of the SDP process.

Environmental concerns

WSDOT received comments highlighting important environmental issues to consider as planning work continues. These included:

- Fish barriers
- Habitat connectivity
- Air quality
- Water quality
- Noise and vibration

Next steps

WSDOT will identify potential impacts to environmental resources as part of the SDP and other federal requirements such as the National Environmental Policy Act (NEPA) process.

Equity concerns

The need for equitable access to passenger train service was cited by commentors, as noted above in the discussion of express service. Commentors also noted the need to avoid increasing the burdens on marginalized communities and for meaningful engagement of minority and low-income populations.

Next steps

During the planning process, WSDOT undertook several community engagement activities to include marginalized, minority and low-income communities. These types of community engagement opportunities will continue to be a key element as planning work continues.

Washington State Department of Transportation

AMTRAK CASCADES

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