

GNB

GRAY NOTEBOOK



Washington State
Department of Transportation

Quarterly performance analysis of WSDOT's
multimodal systems and programs

Roger Millar, Secretary of Transportation, PE, FASCE, FAICP

Edition 84 ■ December 2021

CHIPPING AWAY

WSDOT MAINTENANCE GOES TOE-TO-TOE WITH
NATURE'S WORST TO KEEP HIGHWAYS FUNCTIONAL

Water landings

WSF aiming to improve
vessels and terminals
for the traveling public

Solid options

WSDOT working to keep
its pavement in a state of
good repair

Power rangers

WSDOT increasing zero
emission vehicle options
in Washington



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The Gray Notebook team

WSDOT's Gray Notebook is produced by the Performance Management and Strategic Management offices of the Transportation Safety & Systems Analysis Division: Hide Aso, Elena Brunstein, Hui Dong, Sreenath Gangula, Mani Goudarzi, Joe Irwin, Dustin Motte and Michele Villnave. TSSA is directed by John Milton.

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Note: ¹ Due to the pandemic's effects on statewide restrictions and travel, the GNB is using updated data that does not align with the quarter ending December 31, 2021. **On the cover:** Maintenance crews knock huge icicles off a sign on Snoqualmie Pass.

PERFORMANCE HIGHLIGHTS for the quarter ending December 31, 2021



45

of WSDOT-administered **freight rail projects** were underway as of December 31, 2021



of WSDOT pavement lane miles were in **fair** or **better condition** in 2020, a slight increase from 92.9% in 2019 (not including chip seal)

44

PERCENT

of **highway maintenance** condition targets were missed in 2021

23

PERCENT

of WSDOT's passenger vehicle fleet was **Electric Vehicles** in 2020

\$27

MILLION

leveraged by Washington state for **airport investments** in FY2022

\$21.3

MILLION

in economic benefit provided by WSDOT's **Incident Response** teams clearing 9,664 incidents during the quarter

39

PERCENT

increase in **zero emission vehicle** registrations from 2020 to 2021

84

COVID-19 EFFECTS ON STATE
TRANSPORTATION AND WSDOT

Washington travel trends down slightly

Statewide travel trended slightly down as cases of the Omicron variant of COVID-19 increased throughout Washington, slowing ongoing efforts at economic recovery.

As of January 31, 2022, highway travel was 8% below 2020 levels, showing a drop of two percentage points from being 6% below 2020 levels on

Most travel mode usage decreases statewide since November 2021

Percentages from select dates in 2020 as well as November 1, 2021 and January 31, 2022 compared to 2019 data; Safety fatality rate per 100 million vehicle miles traveled

Transportation mode	Lowest percentage (date) ¹ 2020	Monday, Nov. 1, 2021 ²	Monday, Jan. 31, 2022 ²
Highway travel	-63% (3/29)	-6%	-8%
Tolling	-80% (3/28)	-22%	-28%
WSF ridership	-87% (3/29)	-37%	-39%
Amtrak Cascades ridership	-98% (4/19)	-51%	-62%
Freight			
Snohomish	-78% ³ (4/12)	-19%	-14%
King	-88% (4/5) ³	-14%	-16%
Pierce	-89% ³ (4/5)	-7%	-1%
Thurston	-44% (4/12)	7%	3%
Lewis	-65% (4/4)	4%	2%
Clark	-71% ³ (4/4)	-6%	-9%
Benton	-57% (4/5)	-9%	-11%
Franklin	-62% (4/12)	-15%	-8%
Active Transportation			
Pedestrians	-58% (3/13)	-2%	79%
Bicyclists	-60% (3/14)	-21%	7%
Safety & Air travel	2020 lowest rate or percentage	Latest data for 2021 ⁴	
Highway crashes ⁵	0.7 ³ (March)	1.0 (Oct)	0.9 (Dec)
Aviation			
Domestic passengers	-93.1% (April)	-14.0% (Oct)	-10.2% (Nov)
International passengers	-97.8% (April)	-62.3% (Oct)	-51.1% (Nov)

Data source: WSDOT Transportation Safety & Systems Analysis.

Notes: Due to the pandemic's effects on statewide restrictions and travel, the GNB is using more recent data that does not align with the quarter ending December 2021. Some percentages have been updated since GNB 80. 1 Dates compared to corresponding pre-pandemic days in 2019. 2 January 31, 2022 compared to February 3, 2020. November 1, 2021 compared to November 4, 2019. 3 Some data has been updated from GNB 77 and as a result, corresponding dates may have also changed. 4 Most recent data available. 5 Fatality crash rate per 100 million vehicle miles traveled.

Notable results

- Highway travel decreased to 8% below its pre-pandemic levels as of January 31, 2022, a two percentage point drop from November 1, 2021
- Amtrak Cascades ridership was 62% below its pre-pandemic levels as of January 31, 2022, a decrease of 11 percentage points from November 1, 2021
- Active transportation use saw large increases from November 1, 2021 to January 31, 2022, with respective jumps of 81 percentage points for pedestrian travel (-2% to 79%) and 28 percentage points for bicyclists (-21% to 7%)

November 1, 2021. For this same time period, tolling was down six percentage points (from -22% to -28%) while Washington State Ferries ridership was down two percentage points, from -37 to -39% below its pre-pandemic norms.

Amtrak Cascades ridership, which had previously been experiencing modest increases, dropped 11 percentage points (from -51% to -62%) from November 1, 2021 to January 31, 2022.

Active transportation experienced large increases in use from November 1, 2021 to January 31, 2022, with respective hikes of 81 percentage points for pedestrian travel (-2% to 79%) and 28 percentage points for bicyclists (-21% to 7%) compared to their pre-pandemic norms.

Domestic and international air travel had mixed results compared to 2019 levels. November 2021 compared to October 2021 saw domestic air travel increasing 3.8 percentage points and international air travel increasing 11.2 percentage points. Domestic air travel was 10.2% lower in November 2021 than in November 2019, and international air travel was 51.1% lower for the same period.

WSDOT continues to put health and safety first

WSDOT has been working closely with the state Department of Health, the Governor's Office, Labor and Industries and the state Emergency Management Division since the COVID-19 pandemic started.

Employees whose positions allow for it—and who are able to telework—have been doing so since March 2020.

WSDOT has been following the Governor's Office direction since April 2020 and continuing a [safe restart to construction](#). This effort ensures WSDOT workers in offices and in the field, along with Washington State Ferries follow stringent safety guidelines, including temperature checks, handwashing, physical distancing and wearing of proper personal protective equipment, including masks.

In August 2021, following an upswing in COVID-19 related cases and revised mask recommendations for indoor venues, Gov. Jay Inslee mandated that all state employees be fully vaccinated by October 18, 2021 as a condition of employment. The majority of WSDOT complied with this mandate, but approximately 400 employees separated from state service as a result of it.

WSDOT's COVID-19 dashboard tracks state's multimodal changes

WSDOT tracks the [effects of COVID-19 on multimodal transportation system performance](#) through an interactive online dashboard. The dashboard is updated each weekday and shows changes to modes ranging from highway travel and Washington State Ferries to active transportation and aviation via interactive graphs, maps and tables.

WSDOT will follow guidance from the Governor's Office, which has declared an end to the indoor mask mandate effective March 12, 2022, and will continue to work to ensure safe conditions for its employees and the public as the state rolls back some of its preventative COVID-19 measures.

WSDOT's Strategic Plan has three goals: Inclusion, Practical Solutions and Workforce Development. This plan continues WSDOT's focus on how the agency makes investments and delivers projects with limited resources.

Under the strategic plan, WSDOT engages employees, communities and partners to collaboratively deliver its Inclusion goal. Practical Solutions allows WSDOT to leverage finite funding to get the most capacity and safety out of the entire multimodal transportation system. WSDOT's focus on Workforce Development ensures the agency attracts and retains a quality workforce to meet its legislative, regulatory, service and public expectations.

Inclusion: Diverse Business Spending

WSDOT strives to meet its Inclusion goal by creating an awareness of, and meeting state and federal diverse business targets. One way this is measured is through the rate of awards and commitments, as well as the utilization rate of [disadvantaged business enterprises](#).

In federal fiscal year 2021 (October 2020 to September 2021), 16.3% of WSDOT's awards and commitments were to DBEs. During the same period, the rate of DBE utilization on completed contracts was 11.8%. These missed the agency's target of 19%.

In FFY2017, WSDOT implemented a white-women owned business waiver; the agency no longer counts white-women owned businesses toward individual project goals. In FFY2021, white-women owned businesses made up 10.3 percentage points of the 19% overall goal. WSDOT was unable to meet the current overall DBE goal due to the waiver.

DBE goals are federally-mandated targets for transportation projects that use federal aid. These goals are important because they help to ensure a level playing field and foster equal opportunity for firms owned and operated by disadvantaged individuals.

WSDOT's strategic plan remains adaptable

WSDOT is making changes to its strategic plan to ensure the agency remains flexible in the face of change while continuing to deliver its mission of providing safe, reliable and cost-effective transportation options to improve communities and economic vitality for people and businesses.

The agency is expanding its Inclusion goal to cover Diversity, Equity and Inclusion. The Practical Solutions goal will become Resilience. These changes will help the agency remain efficient and effective.

WSDOT's Vision

Washington travelers have a safe, sustainable and integrated multimodal transportation system.

WSDOT's Mission

We provide safe, reliable and cost-effective transportation options to improve communities and economic vitality for people and businesses.

■ Inclusion Goal

Strengthen commitment to diversity and engagement in every aspect of our work.

■ Practical Solutions Goal

Prioritize innovative, timely and cost-effective decisions, with our stakeholders and partners.

■ Workforce Development Goal

Be an employer of choice by hiring, training and retaining skilled workers to meet Washington's transportation needs.

WSDOT's Values

- Safety
- Engagement
- Innovation
- Integrity
- Leadership
- Sustainability

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STATEWIDE TRANSPORTATION POLICY GOALS DASHBOARD

Statewide policy goal/ WSDOT performance measure	Previous period	Current period	Goal	Goal met	Five-year trend (unless noted)	Desired trend
Safety						
Rate of traffic fatalities per 100 million vehicle miles traveled statewide ¹ (Annual measure: calendar years 2019 & 2020)	0.86	1.04	<1.00			
Rate of recordable incidents for every 100 full-time WSDOT workers (Annual measure: calendar years 2019 & 2020)	4.7	4.4	<5.0			
Preservation						
Percentage of state highway pavement in fair or better condition by lane miles (Annual measure: calendar years 2019 & 2020)	92.9% ²	93.0% ²	≥ 90%			
Percentage of state bridges in fair or better condition by bridge deck area (Annual measure: fiscal years 2020 & 2021)	93.8%	93.2%	≥ 90%			
Mobility² (congestion relief)						
Highways: Vehicle Miles Traveled (VMT) on state highways (Annual measure: calendar years 2019 & 2020)	35.4 billion	30.0 billion	*	N/A		Not applicable
Highways: Average incident clearance times for all Incident Response program responses (Calendar quarterly measure: Q4 2020 & Q4 2021)	15.8 minutes	17.4 minutes	*	N/A		
Ferries: Percentage of trips departing on time ³ (Fiscal quarterly measure: Q2 FY2021 & Q2 FY2022)	88.2%	88.6%	≥ 95%			
Rail: Amtrak Cascades on-time performance ⁴ (Annual measure: calendar years 2019 & 2020) ⁵	58%	62%	≥ 88%			
Environment						
Number of WSDOT stormwater management facilities constructed (Annual measure: fiscal years 2020 & 2021)	106	72	*	N/A		Not applicable
Cumulative number of WSDOT fish passage improvement projects constructed (Annual measure: calendar years 2019 & 2020)	352	365	*	N/A		
Stewardship						
Cumulative number of Nickel and TPA projects completed⁵ and percentage on time⁶ (Biennial quarterly measure: Q1 2021-2023 & Q2 2021-2023, trendline for percentage on time)	383/ 86%	383/ 86%	≥ 90% on time		 (Five-quarter trend)	
Cumulative number of Nickel and TPA projects completed⁵ and percentage on budget⁶ (Biennial quarterly measure: Q1 2021-2023 & Q2 2021-2023, trendline for percentage on budget)	383/ 91%	383/ 91%	≥ 90% on budget		 (Five-quarter trend)	
Variance of total project costs ⁵ compared to budget expectations⁶ (Biennial quarterly measure: Q1 2021-2023 & Q2 2021-2023)	Under budget by 1.5%	Under budget by 1.5%	On or under budget		 (Five-quarter trend)	Not applicable

Data source: WSDOT Transportation Safety & Systems Analysis.

Notes: (*) = goal has not been set. Dash (—) = goal was not met in the reporting period. **1** The Statewide Transportation Policy Goal for this performance measure is different than the federal Transportation Performance Management goal for the same measure. The separate goals for reducing pedestrian/bicyclist fatalities to zero were not met (see [p. 7, GNB 79](#)) as the five-year rolling average trend line is moving upward even with some decline in 2019. **2** Excludes chip seal pavement. **3** Washington State Ferries' on-time departures include any trip recorded by automated tracking as leaving the terminal within 10 minutes of scheduled time. **4** Amtrak Cascades' on-time performance includes any trip arriving within 10 or 15 minutes, depending on the route, of scheduled arrival time. **5** Construction projects only. **6** Projects are on time if they are completed within the quarter planned in the last approved schedule, and on budget if costs are within 5% of the budget set in the last approved state transportation budget.

84 TRANSPORTATION PERFORMANCE MANAGEMENT

WSDOT reports its federally-mandated 2022 TPM highway safety baselines, targets

WSDOT reported its Transportation Performance Management (formerly MAP-21) highway safety baselines and targets for 2022 to the Federal Highway Administration on August 31, 2021.

FHWA previously determined WSDOT did not make significant progress toward achieving its 2020 targets for highway safety (also referred to as PM1). States that did not make significant progress on PM1 must develop a strategic Highway Safety Implementation Plan and obligate federal HSIP funds based on the previous year's allocations. WSDOT outlines how it will address these efforts in its 2021 HSIP.

Washington's Strategic Highway Safety Plan (Target Zero) aims to achieve the goal of zero fatalities and serious injuries by 2030, which differs from the federal TPM targets listed below.

WSDOT established its federally-required TPM baselines and targets for bridges and pavement (PM2), and highway system performance, freight, and Congestion Mitigation and Air Quality (PM3) on May 20, 2018. Like the PM1 targets, WSDOT is required to show significant progress toward meeting the PM2 and PM3 targets.

WSDOT and Metropolitan Planning Organizations collaborated to establish four-year targets for PM2 and PM3 and submitted them to FHWA on October 1, 2018. This began a four-year reporting cycle for PM2 and PM3 performance measures, which included WSDOT producing a Mid-Performance Period Progress Report (submitted October 1, 2020) as well as a Full-Performance Period Progress Report (due October 1, 2022).

TPM safety reporting on annual cycle

Targets for the highway safety rules (included in PM1) are on an annual reporting cycle, which differs from the two-year and four-year reporting cycles for PM2 and PM3. The safety targets established for 2021 represent the third annual reporting cycle since the initial reporting of TPM safety targets for 2018.

MAP-21 performance measures by program area		2015-2019 baseline	2021 target ¹	Penalty ²
Highway Safety (PM1)	23 CFR Part 490 ID No. 2125-AF49			
Number of traffic fatalities on all public roads ³		≤ 542.8	≤ 444.1	Yes
Rate of traffic fatalities per 100 million vehicle miles traveled (VMT) on all public roads ³		≤ 0.885	≤ 0.724	Yes
Number of serious traffic injuries on all public roads ³		≤ 2,208.6	≤ 1,807.0	Yes
Rate of serious traffic injuries per 100 million VMT on all public roads ³		≤ 3.599	≤ 2.944	Yes
Number of non-motorist traffic fatalities plus serious injuries		≤ 577.0	≤ 472.1	Yes
MAP-21 Special Rules (Safety)				
Rate of per capita traffic fatalities for drivers and pedestrians 65 or older		Show yearly progress		No
Rate of fatalities on high-risk rural roads ³		Show yearly progress		Yes
Highway-railway crossing fatalities ⁴		Show yearly progress		No

Data source: WSDOT Transportation Safety & Systems Analysis.

Notes: The PM1 targets for 2021 were submitted on August 31, 2020, using the five-year rolling average of 2015-2019 for current baseline data. ¹ The Strategic Highway Safety Plan for Washington (Target Zero) aims to achieve the goal of zero fatalities and serious injuries by 2030. ² Penalties will not be assessed if WSDOT shows significant progress on four of five PM1 targets. Significant progress is achieved if the five-year rolling average is less than or equal to the target or less than or equal to the baseline level. Yes/No does not mean a penalty has been assessed but rather whether a penalty is associated with the measure. ³ Performance metric includes all individuals (for example, pedestrians and bicyclists) who died or were seriously injured as a result of a crash with a motorist in Washington. ⁴ Includes bicyclists and pedestrians.

The 2020 mid-performance period progress report on PM2 and PM3 included updates on two-year condition/performance and investment strategy discussions as well as target adjustment discussions. WSDOT had the option to adjust four-year targets at that time but determined they did not need adjusting and should remain unchanged.

In 2022, FHWA will use the full-performance period progress report to determine whether WSDOT has made significant progress toward its PM2 and PM3 targets. Not showing significant progress toward targets requires an explanation to FHWA of what WSDOT will do to make progress in the future, and may also trigger a financial penalty if targets are not met (see table below). These penalties require redistributing

federal monies to help ensure significant progress toward specific targets in the future.

TPM folios helping stakeholders

WSDOT has developed [informational folios](#) to ensure the agency and its partners are aligned as TPM work progresses.

MAP-21 performance measures by program area		Current data/ 2-year actuals	2-year target ^{1,2}	4-year target ^{1,2}	Penalty ³
Pavement and Bridges (PM2) 23 CFR Part 490 ID No. 2125-AF53					
Pavement					
Percent of Interstate pavement on the NHS in good condition		39.8% ⁴	N/A	30%	No
Percent of Interstate pavement on the NHS in poor condition		1.7% ⁴	N/A	4% ⁵	Yes
Percent of non-Interstate pavement on the NHS in good condition		45.2% ⁴	45%	18%	No
Percent of non-Interstate pavement on the NHS in poor condition		17.4% ⁴	21%	5%	No
Bridges					
Percent of NHS bridges classified in good condition (weighted by deck area)		32.8%	30%	30%	No
Percent of NHS bridges classified in poor condition (weighted by deck area)		7.0%	10%	10% ⁵	Yes
Highway System Performance, Freight, and Congestion Mitigation & Air Quality (PM3) 23 CFR Part 490 ID No. 2125-AF54					
Highway System Performance (Congestion)					
Percent of person-miles traveled on the Interstate System that are reliable		77%	70%	68%	No
Percent of person-miles traveled on the Non-Interstate NHS System that are reliable		80.8%	N/A	61%	No
National Freight Movement Program					
Truck Travel Time Reliability (TTTR) Index		1.54	1.70	1.75	No
Congestion Mitigation & Air Quality Program					
Non-Single Occupancy Vehicle (SOV) travel in Seattle urbanized area (NHS)		33.1%	32.8%	33.2%	No
Peak hours of Excessive Delay per capita in Seattle urbanized area (NHS)		23.2	N/A	28	No
All Pollutants (kg/day) ²		1,222.870	366.285	658.300	No
Carbon Monoxide (CO) (kg/day) ²		714.710	309.000	309.060	No
Particulate Matter less than 10 microns (PM ₁₀) (kg/day) ²		274.640	0.305	224.000	No
Particulate Matter less than 2.5 microns (PM _{2.5}) (kg/day) ²		56.750	2.100	8.700	No
Nitrogen Oxides (NOX) (kg/day) ²		176.770	54.880	116.540	No

Data sources: WSDOT Pavement Office, WSDOT Bridge and Structures Office, WSDOT Transportation Safety & Systems Analysis, WSDOT Rail, Freight, and Ports Division, WSDOT Environmental Services Office.

Notes: Federal rule allows state and MPOs to adjust four-year targets during the mid-performance period progress report. **1** Two-year and four-year reports for PM2 and PM3 are due October 1, 2020, and October 1, 2022. **2** Base emissions are for the four-year period 2013-2016 as reported in the CMAQ Public Access System. **3** Yes/No does not mean a penalty has been assessed but rather whether a penalty is associated with the measure. **4** Current data refers to 2019. **5** The National Highway Performance Program (NHPP) targets require the percentage of Interstate pavement on the NHS in poor condition not exceed 5% and the percentage of NHS bridges classified in poor condition (weighted by deck area) not exceed 10%.

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PAVEMENT
ANNUAL REPORT

WSDOT pavement conditions improve slightly in 2020, preservation funding issues continue

The condition of WSDOT-managed pavement lane miles in fair or better condition improved slightly from 92.9% in 2019 (not including chip seal roadways) to 93.0% in 2020. Weighted by the amount of traffic carried, 93.5% of vehicle miles traveled (VMT) in 2020 were driven on pavement in fair or better condition, down 0.6 percentage points from 94.1% in 2019.

When VMT is considered in pavement condition measures, roadways with higher traffic volumes are given additional weight in calculations than less-traveled roads. As a result, the pavement condition is higher when measured via vehicle miles traveled; 93.5% for VMT compared to 93.0% for lane miles.

WSDOT ensures interstate pavement preservation takes priority over other roadways due to the Federal Highway Administration Transportation Performance Management requirements ([refer to GNB 80, p. 17](#)). The emphasis on these more-traveled strategic freight corridors (also known as T-1 and T-2 corridors, refer to box at right) is one reason the state did not experience a larger decrease in the percentage of VMT-weighted pavement in fair or better condition between 2019 and 2020.

During the last 15 years, WSDOT's approach to pavement preservation has focused on extending how long its pavement assets remain in fair or better condition. However, due to preservation continuing to be underfunded, this strategy is no longer sustainable. Preservation and maintenance of Washington's transportation system—including WSDOT-owned pavement—has been underfunded for decades. According to current backlogs, WSDOT would need approximately \$320 million annually for pavement maintenance and preservation needs; the agency receives less than half of those funds.

COVID-19 limits WSDOT pavement data collection

WSDOT usually collects pavement condition data for 100% of the state-owned route system. Due to COVID-19 restrictions, WSDOT could only obtain 2020 data for approximately 20% of the lane-miles. The agency's pavement data collection vehicle requires a driver and an operator to safely collect the data, but for a time WSDOT personnel were not allowed in the van within six feet of each other due to COVID-19 safety measures. Most of the data collection was for Washington's interstates—which accounts for approximately 40% of the annual vehicle-miles traveled. Chip seal projects were also not included in 2020 pavement data due to COVID-19 restrictions. In 2021, WSDOT was again able to collect the state's entire route system and will report on this in Gray Notebook 88.

Notable results

- *WSDOT pavement lane miles in fair or better condition increased slightly from 92.9% in 2019 to 93.0% in 2020, not including chip seal roadways*
- *COVID-19 restrictions limited WSDOT's data collection for pavement condition to 20%. In a typical year, the agency collects 100% of this data*
- *WSDOT is not preserving enough pavement to replenish what was used in 2020, repair needs continue to grow*

Strategic freight corridor classifications

WSDOT classifies highway segments, or corridors, by how much freight travels on them. T-1 freight corridors are the most heavily traveled and see over 10 million tons of truck freight per year. Corridors that see between four million and 10 million tons of truck freight annually are T-2 corridors and corridors that see between 300,000, and four million tons of truck freight annually are T-3 corridors. Both T-1 and T-2 corridors are considered strategic freight corridors under the definition established in [RCW 47.06A.020](#).

For additional information, refer to: <https://wsdot.wa.gov/freight/fgts>.

Percentage of WSDOT's pavement in very poor condition decreases between 2016 and 2020

Actual values for 2016 and 2020; Characteristics of pavement at each condition; Percentage of lane miles and vehicle miles traveled (VMT) by condition category

	WHAT DRIVERS SEE	WHAT IS HAPPENING	2016	2020	Trend ¹	Desired trend	
GOOD/VERY GOOD			By lane miles 73.8% By VMT ² 73.3%	 	73.5% 72.8%	↓ ↓	↑
		This pavement is in good condition with minimal deterioration Road users experience a smooth road with minimal cracks, ruts or potholes					
FAIR			By lane miles 18.4% By VMT ² 18.4%	 	19.5% 20.7%	↑ ↑	N/A ³
		It is most cost-effective to resurface or repair a road when it is in fair condition. The surface of pavement in fair condition shows wear, but the underlying structure is undamaged Preventive preservation (maintenance and rehabilitation) repairs at this stage can maximize the road's service life					
POOR			By lane miles 5.8% By VMT ² 6.6%	 	5.2% 5.1%	↓ ↓	↓
		Restoring a road in poor condition to good condition costs 1.5 to 2 times more than restoring a road in fair condition to good condition because of the damage to the pavement's underlying structure Roads in poor condition cause more wear on vehicles and higher fuel use					
VERY POOR			By lane miles 2.0% By VMT ² 1.7%	 	1.8% 1.4%	↓ ↓	↓
		Repairing pavement in poor condition costs 3 to 5 times as much as repairing pavement in fair condition, because deep pavement failure requires reconstruction Roads in very poor condition require reactive repairs to hold them together until reconstruction, which is not a good strategy for minimizing costs over the life of the pavement					

Data source: WSDOT Materials Lab, WSDOT Capital Program Development and Management.

Notes: Percentages were slightly affected in 2020 due to COVID-19 impacts on data collection. Percentages may not add to 100 due to rounding. WSDOT collects data on the condition of pavement annually using a van equipped with lasers, cameras and other equipment (refer to [GNB 68, p. 21](#)). Condition figures for 2019 include chip seal pavement, also known as Bituminous Surface Treatment. Chip seal pavement, was not evaluated from 2010 through 2016 due to budget restrictions. Chip seal data for 2017 and 2018 was collected, but has not yet been processed.

¹ Trends are based on observed condition trends between 2016 and 2020. Arrows indicate trends by lane mile. ² When pavement condition is weighted by VMT, roadways with more traffic are weighted more heavily than less traveled roads. Weighting pavement condition by VMT better accounts for the higher costs to maintain and preserve roads with more traffic. ³ N/A = Not Applicable. Because pavement in fair condition may have entered that category by either improving from poor condition or deteriorating from good condition, WSDOT does not have a desired trend for the percentage of pavement in fair condition.

Lowest cost pavement rehabilitation should occur at fair condition

WSDOT prefers to begin the rehabilitation process to protect the pavement structure and manage the pavement at the lowest life-cycle cost when pavement is in fair condition. The condition of WSDOT-managed roadways is evaluated annually using three indicators:

- Surface cracking (an indicator of structural deterioration);

- Rutting (which is monitored for safety and structural reasons); and
- Roughness (measured using the International Roughness Index, or IRI).

WSDOT uses these criteria to classify pavement conditions into five categories: very good, good, fair, poor and very poor (refer to chart on p. 10).

The good, fair, poor indicators are useful for short-term evaluations

of current conditions but do not provide information about past performance or forecasted future performance. Long-term performance indicators provide a more in-depth assessment of pavement infrastructure, as they account for the impact funding has on asset sustainability, pavement service life and preservation backlog (refer to chart below).

All long-term WSDOT pavement performance measures worsen from 2019 to 2020

2019 and 2020; Annual pavement performance measures

ANNUAL PAVEMENT PERFORMANCE MEASURES ^{1,2}			2019	2020	Agency Target	Target ³	Trend	Desired trend
Short term	Percent of pavement in fair or better condition		Without chip seal ⁴	With chip seal ⁴	Without chip seal ⁴			
	When pavement is in fair condition this is where typically WSDOT begins the rehabilitation process to protect the pavement structure and manage the pavement at the lowest life-cycle cost.	Lane Miles	92.9%	93.2%	93.0%	90.0%	✓	↑
		VMT ⁵	94.0%	94.1%	93.5%			↓
	Asset Sustainability Ratio⁶							
	Years of pavement service life added to the pavement network through rehabilitation in a given year divided by the service life consumed in that year.		1.01	0.84	0.90 to 1.10	—	↓	↑
	Remaining Service Life⁶							
	Average percentage of original total useful life remaining before rehabilitation or replacement is needed; average years remaining before rehabilitation or replacement is needed.		48.0%	47.1%	45% to 55%	✓	↓	↑
			(7.8 yrs)	(7.6 yrs)				
	Deferred Preservation Liability (backlog)							
	An estimate of the accumulated cost (in current dollars) to fund the backlog of past-due (deferred) pavement rehabilitation work.		\$352 million	\$478 million	\$0	—	↑	↓

Data source: WSDOT Pavement Office.

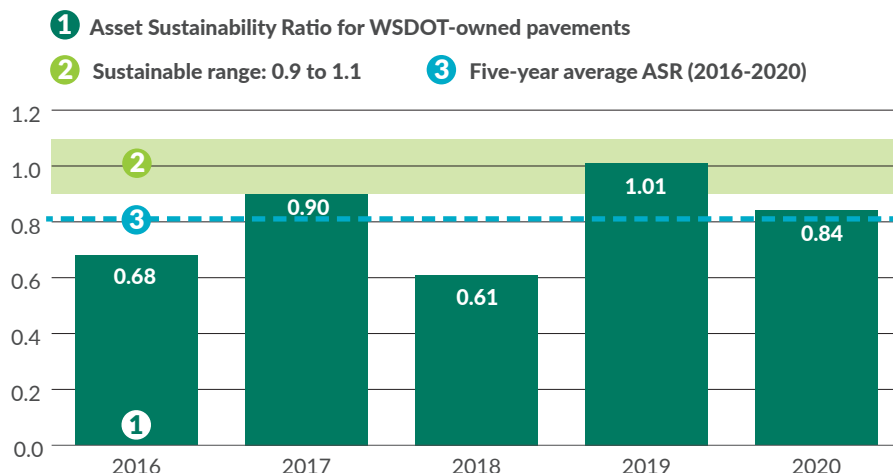
Notes: Fair or better percentages were slightly affected in 2020 by COVID-19 impacts on data collection. **1** Calculations for all measures, excluding percent of pavement in fair or better condition in 2018, include all pavement types (asphalt, chip seal and concrete). **2** See pp. 12-13 for additional discussion of long-term measures. **3** Check indicates target met, dash indicates target not met. **4** 2018 short-term condition information for chip seal pavement was not collected due to funding constraints; 2019 short-term condition information is shown both without chip seal (to allow comparisons with 2019) and with it. Due to COVID-19 restrictions, chip seal data was not collected in 2020. **5** VMT = vehicle miles traveled. **6** Measure is weighted by vehicle miles traveled to better capture the typical road user's experience.

Asset Sustainability Ratio shows insufficient funding

The Asset Sustainability Ratio is a measure that reflects the level of asset replenishment that is being invested into the pavement network. If the value is equal to or above 1.0, sufficient investments are being made to keep the pavement assets sustained and preserved into the future. A value less than 1.0 indicates insufficient funding for pavement asset sustainability.

Pavement Asset Sustainability Ratio drops below sustainable range in 2020

2016 through 2020



Data source: WSDOT Materials Lab.

Notes: The Asset Sustainability Ratio is calculated by dividing the years of pavement service life added to the network in a given year by the years of pavement service life consumed in that same year.

After improving in 2019, WSDOT's long-term pavement performance measures worsen in 2020

Asset Sustainability Ratio declines

In 2020, WSDOT was not preserving enough pavement to replenish what was used, and the backlog of pavement needing repair continued to grow. WSDOT pavement assets were below 1.0—lower than the sustainable range—for four of the past five years (refer to chart above).

In 2019, WSDOT had an Asset Sustainability Ratio of 1.01, an improvement of 65.6% over 2018. This was a combined number due to multiple, large, multi-year concrete pavement projects that became substantially complete in 2019 and temporarily raised the ASR. The 2020 ASR dropped 16.8% to 0.84, which means WSDOT continues to fall behind in replenishing the state's roadways.

The ASR is calculated by determining the years of pavement service life added to the network in a given year divided by the pavement service life consumed during the same year. For example, a network of 18,500 lane-miles will consume 18,500 lane-mile years of life by aging one year.

Remaining Service Life declines

The Remaining Service Life of state-owned pavement dropped 0.9 percentage points in 2020, with a value of 47.1%, compared to of 48.0% in 2019 (refer to chart at right).

RSL is a measure of average remaining pavement life summed for each section across the roadway network. It is calculated by first estimating the number of years remaining before the condition of a pavement section is expected to become unacceptable (poor or very poor) and then dividing by the pavement section's total expected lifetime. This number is then averaged over all of the pavement sections in the network to yield the statewide RSL. The target value is between 45% to 55% and should remain within this range into the future.

Preservation backlog increases

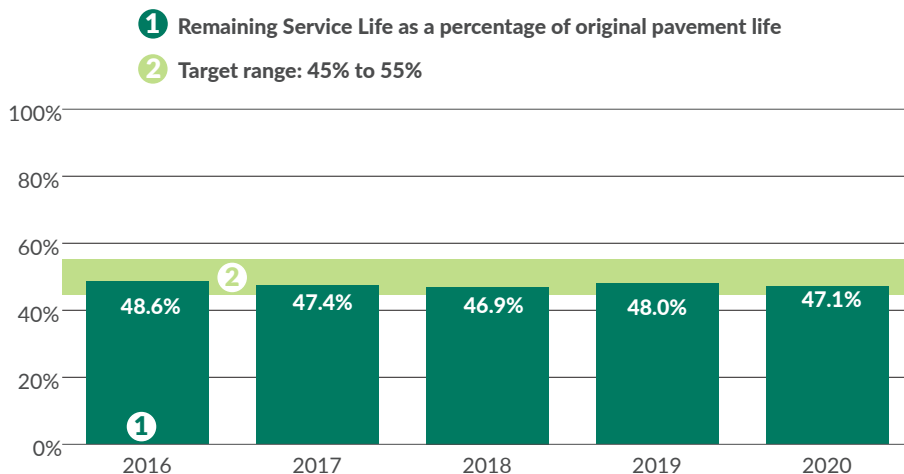
WSDOT's pavement Deferred Preservation Liability (also known as the pavement preservation backlog) increased 35.8% from \$352 million in 2019 to \$478 million in 2020 (refer to chart at right).

When funding is inadequate to maintain pavement in an acceptable condition, WSDOT uses Deferred Preservation Liability to indicate the investment that will eventually be needed to restore the pavement network to an adequate condition.

The DPL estimates the accumulated cost to fund the backlog of past-due (deferred) pavement rehabilitation work. The goal is to have a DPL of \$0.

WSDOT pavement Remaining Service Life stays in target range in 2020

2016 through 2020; Remaining Service Life shown as a percent of original pavement life

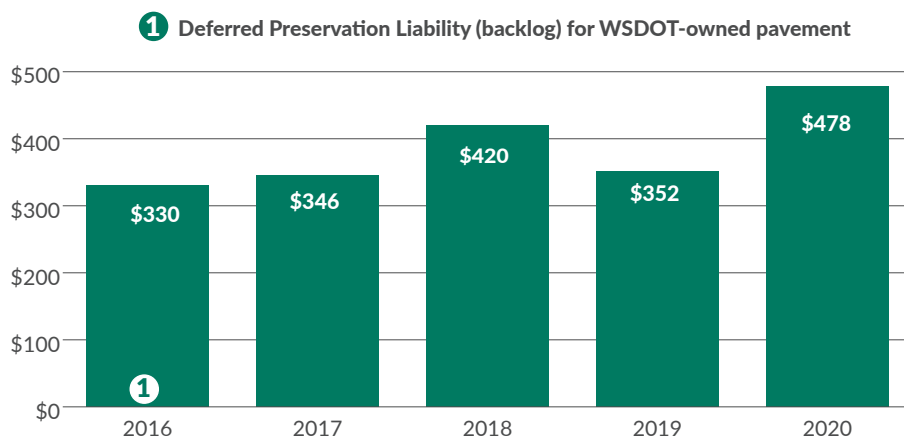


Data source: WSDOT Materials Lab.

Notes: For 2020, the Remaining Service Life of 47.1% is equivalent to an average of 7.6 years remaining before rehabilitation is needed.

WSDOT's pavement Deferred Preservation Liability increases 35.8% in 2020

2016 through 2020; Dollars in millions



Data source: WSDOT Materials Lab.

Notes: Deferred Preservation Liability is defined as the funding necessary to address past due pavement rehabilitation for all pavement types. WSDOT's goal is to have \$0 in Deferred Preservation Liability.

In 2020, WSDOT's DPL had increased approximately 45% from \$330 million in 2016. The DPL will

continue to increase until adequate preservation funding is allocated.

WSDOT increases asphalt density to extend pavement life, makes most of funding

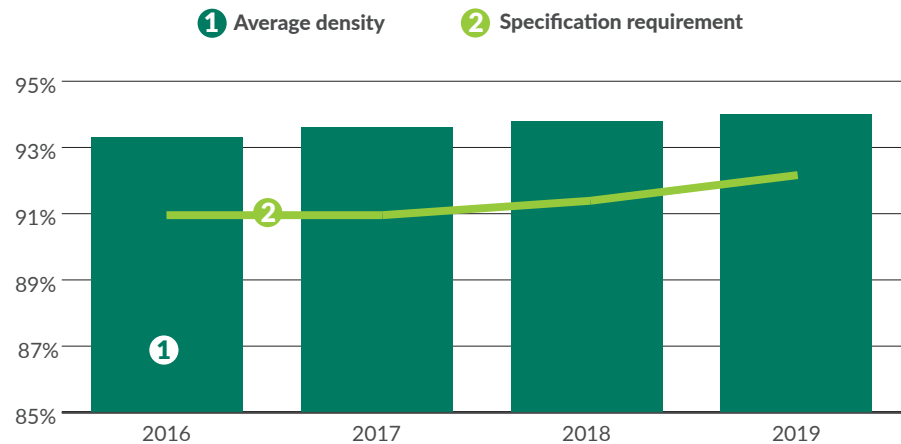
To make the most of available funding, WSDOT continues to find ways to increase the lifespan of pavement. In Washington, asphalt pavement lasts an average of 14 years before needing rehabilitation. If the average pavement life is extended by one year, the state can save \$1,200 per lane mile in rehabilitation costs.

WSDOT in collaboration with the Washington Asphalt Pavement Association developed new standards for asphalt density to increase the life of asphalt pavement.

WSDOT's specification requirement for pavement density has gradually increased from 91% in 2016 to 92% in 2019, average densities have remained above the target by steadily increasing from 93.3% in 2016 to 94.0% in 2019. This 0.7 percentage point increase in average density should provide an additional year of pavement life. A 1% increase

WSDOT pavement density improves since 2016

2016 through 2019; Percentage of acceptable density requirement increases



Data source: WSDOT Materials Lab.

Notes: Based on paving year with that year's minimum compaction specifications requirement. Specification requirement is the minimum density for pavement. Improved pavement density extends the life and is the best value for the state.

in density can increase asphalt pavement life by approximately 10%.

WSDOT implemented the last phase of the increased minimum density specification, and expects to see additional improvements in pavement density. Through this process, WSDOT plans to gain another year of pavement life for a total of two years.

WSDOT monitors pavement by using its standard practices of rating roughness, cracking, and rutting for all state-owned pavement. The agency uses this data to ensure pavement can be rehabilitated at the most cost-effective time—pending adequate funding—and will provide data to measure the effectiveness of the density changes.

WSDOT evaluates new ways to improve pavement measuring technology

WSDOT continues to evaluate new pavement technology that may result in a more cost-effective and non-destructive method to measure asphalt pavement density. The density of asphalt pavement is critical to pavement performance.

Currently, the density of the asphalt pavement on bridge decks is determined with a destructive test method called coring. Coring removes a 4-inch hole of asphalt material, which can destroy the protective membrane on bridges deck and leave a hole in the pavement that must be filled.

A non-destructive device—a rolling density meter—can measure the density of asphalt pavement using ground-penetrating radar technology. This method is faster than coring and does not destroy the pavement and membrane. WSDOT plans to perform research on bridge deck paving projects in 2022 to determine its usability for future work.

WSDOT wins three pavement awards

In fall 2021, WSDOT received three Perpetual Pavement Awards from the Asphalt Pavement Alliance for 2020, including awards for two new categories: Design and Conversion.

This was WSDOT's seventh Perpetual Pavement by Performance Award in the original category of Performance and was for a 6.9-mile section of State Route 395 in Franklin County. This award's qualifications are that the pavement must be at least 35 years old and have never suffered a structural failure. It must also demonstrate excellence in design, quality construction and high value to taxpayers.

The second award WSDOT won was for a 4.38-mile section of State Route 522 in Snohomish County and was under the new Perpetual by Design award criteria. This award recognizes newly designed and constructed asphalt roads built over new or reconditioned subgrade that also meet the criteria. Two new lanes were built for SR 522 in 2015 to accommodate the increasing traffic volumes, which qualified WSDOT as the first winner of this award.

The third award recognizes new asphalt roads constructed over an existing road. This award was for a 9.31-mile section of Interstate 5 in Skagit County and was under the new Perpetual by Conversion award criteria. This section of I-5 received a crack seal and overlay on the original concrete, and the CSOL converted the roadway into asphalt. WSDOT was the first—and only—winner of this award.

Contributors include Karen Carlie, Kyler Carlson, Rob Charbonneau, Jianhua Li, Tim Rydholm, Kim Schofield, Karen Strauss, Michele Villnave and Joe Irwin

Perpetual Pavement by Performance Awards

Over the past 20 years, the Asphalt Pavement Alliance has awarded WSDOT seven Perpetual Pavement by Performance awards. Illustrating that WSDOT has many miles of roadway that have been in place for over 35 years and are in excellent condition.

- 2020 - SR 395 Mesa to Connell, Franklin County
- 2019 - SR 12 Lewis County
- 2018 - SR 195 / SR 271 Junction, Whitman County
- 2017 - SR 16 Pierce & Kitsap counties
- 2016 - SR 512 / SR 161 Interchange, Pierce County
- 2008 - I-5 Snohomish County
- 2001 - I-90 Corridor, Kittitas & Grant counties

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Challenges continue for WSDOT Maintenance

WSDOT missed 44% (12 of 27) of its highway Maintenance Accountability Process funded Level of Service targets for 2021 an increase of 12 percentage points from 32% (eight of 25) missed in 2020.

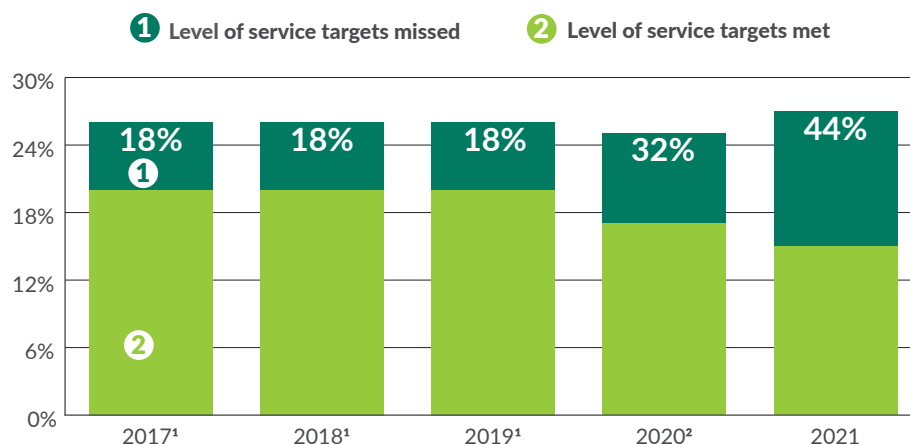
The percentage of Level of Service targets missed has steadily increased over the past five years (refer to chart below) as long-standing preservation funding challenges persist throughout the state. Maintenance efforts continue to suffer the effects of inadequate preservation funding. This work includes projects to resurface roadways, rehabilitate and paint bridges, and maintain highway infrastructure like guardrail, signal systems, signs, drainage systems, and roadside activities such as mowing and spraying.

There is an estimated average annual funding shortfall of \$475 million for highways while the state's average annual need for maintenance and preservation is approximately \$1.06 billion. As a result, road and bridge conditions continue to worsen and WSDOT must post signs warning travelers of rough roadways, reduced speed limits and weight restrictions.

Maintenance activities aim to ensure infrastructure remains in good working order, whereas preservation allows the system to perform at its lowest life-cycle cost. Maintenance activities are intended to maintain the condition of transportation system assets and restore assets to a functional state of operation in-between preservation projects that complete longer-term repair or restoration work.

WSDOT misses 44% of its Level of Service maintenance targets in 2021

Number of targets missed and met 2017-2021; percentage of targets missed



Data source: WSDOT Maintenance and Operations Office.

Notes: ¹ All facilities in the Urban Tunnel Systems Operations category were under construction during the reporting periods, so the category was not included target calculations.

² WSDOT was unable to complete condition assessments for Regulatory/Warning Sign Maintenance and Guide Sign Maintenance due to COVID-19 and carpooling restrictions.

Notable results

- WSDOT missed 44% (12 of 27) of its highway maintenance asset condition targets in 2021
- WSDOT added 6,824 assets and processed 182,109 maintenance records in 2021 using HATS (Highway Activities Tracking System)
- WSDOT's winter operations staff was down 19.5% from approximately 1,500 to roughly 1,200 during the 2020-2021 winter season

Level of Service scores

LOS is reported on a scale of "A" through "F." The general definition of each LOS is as follows:

- "A" - The assets are in excellent condition and all systems are operational.
- "B" - The assets are in good condition and all systems are operational.
- "C" - The assets are in fair condition and systems may occasionally be inoperable.
- "D" - The assets are in poor condition and system failures could occur.
- "F" - The assets are in poor and failing condition and system failures are likely.

How WSDOT measures its Level of Service targets

WSDOT measures the annual performance of 27 maintenance activities using two metrics:

■ **Asset condition Level of Service** is measured for each asset using data collected from site surveys or operational assessments that evaluate the asset's performance.

■ **Task completion** is an evaluation of planned maintenance tasks for specific activities compared to how many of those tasks were completed. [Task completion data can be viewed on this attachment.](#)

WSDOT scores its Level of Service using a letter grading scale, with A being the highest and F being the lowest (refer to box at right). Of the 27 maintenance activities measured in 2021, WSDOT missed LOS targets for the following 12 activities:

- Snow and Ice Control Operations
- Regulatory/Warning Sign Maintenance
- Pavement Striping Maintenance
- Culvert Maintenance
- Shoulder Maintenance
- Sweeping and Cleaning
- Slope Repair
- Pavement Marking Maintenance
- Guidepost Maintenance
- Noxious Weed Control
- Roadside Cleanup
- Guide Sign Maintenance

WSDOT misses 44% of highway maintenance asset condition targets

2020-2021; Funded Level of Service asset condition targets and scores achieved

Category	Funded level (LOS target)	2020 results	2021 results
Special Bridge and Ferry Operations	A	A	A
Snow and Ice Control Operations	A	A	B
Traffic Signal System Operations	C	B	B
Catch Basin and Inlet Maintenance	A	B	A
Urban Tunnel System Operations	B	B	B
Regulatory/Warning Sign Maintenance	C	N/A ¹	F
Barrier Maintenance	B	B	A
Pavement Striping Maintenance	B	F	C
Stormwater Facility Maintenance	A	B	A
Bridge Cleaning	B	F	A
Intelligent Transportation Systems	A	A	A
Culvert Maintenance	D	D	F
Shoulder Maintenance	C	C	D
Rest Area Operations	B	B	B
Ditch Maintenance	B	B	B
Raised/Recessed Pavement Marker Maintenance	C	C	C
Sweeping and Cleaning	A	B	C
Slope Repair	B	F	D
Pavement Marking Maintenance	D	D	F
Vegetation Obstruction Control	C	C	C
Guidepost Maintenance	D	D	F
Highway Lighting Systems	B	B	B
Noxious Weed Control	B	C	C
Roadside Cleanup	D	F	F
Guide Sign Maintenance	C	N/A ¹	F
Nuisance Vegetation Control	D	D	D
Landscape Maintenance	D	C	D
Percent of targets achieved or exceeded		68%	56%
Percent of targets missed		32%	44%

Data source: WSDOT Maintenance Office.

Notes: The 27 maintenance activities are listed in prioritized order. Highlighted boxes indicate the targets missed. Asset condition Level of Service is affected by maintenance activity, rehabilitation/reconstruction of highway infrastructure, third party damage, disaster events and new construction projects. LOS assessments occur throughout the reporting year, and scores are based on the asset condition at the time of assessment. ¹ WSDOT was unable to complete night reflectivity assessments for Regulatory/Warning Sign Maintenance and Guide Sign Maintenance due to COVID-19 and carpooling restrictions in 2020.

WSDOT faces ongoing struggle to meet maintenance staffing needs

WSDOT is working to rebound from a hiring freeze that accompanied Initiative 976 as well as continued retirements, recruitment/retention struggles and COVID-19 restrictions that furthered staffing shortages while increasing training time for new employees.

Pandemic-related revenue decreases that left WSDOT unable to hire in 2020 continued into July 2021. Recruitment efforts increased at that time but were affected by the mandatory vaccine requirement for state employees, which resulted in the loss of trained personnel both in Maintenance and the Transportation Equipment Fund (motor pool and mechanics).

WSDOT continues to recruit for vacancies created by various factors, including an aging workforce and several pandemic-related circumstances including: furloughs, hiring freezes, temporary instead of permanent hires, vaccine mandates, and increased competition for workers with diesel mechanic qualifications or commercial driver licenses (CDL).

The CDL issue, is partly due to a pandemic-related spike in the demand for CDL truck drivers, which affected all states in 2021.

As a result, WSDOT aligned workload expectations with available staffing levels. While it shifted resources wherever possible, it also could not push its crews beyond safe workloads.

Staffing levels affect WSDOT's statewide winter operations

With the pandemic affecting winter operations for the second year in a row, WSDOT's winter operations staff was down 19.5% from approximately 1,500 to roughly 1,200. Maintenance was already down 142 positions as of October 1, 2021. After the October 18, 2021 vaccination mandate, another 151 staff in those positions resigned or retired from the agency, leaving a total of 293 winter operations positions unfilled—more than four times what it was the year prior.

Responding to severe winter conditions

The 2020-2021 winter weather index indicated that this was the third highest snowfall in 20 years. While December, January and March were unseasonably mild, October and November were severe and February was record breaking. Snoqualmie, Stevens and White passes were all above their 10-year average snowfall.

WSDOT innovations help with winter operations

WSDOT—through a partnership with the Transportation Equipment Fund, Eastern Region Maintenance and Henke Manufacturing—was able to develop a plow that clears the traveled lanes and the shoulder on secondary highways with a single pass. The “breakaway” design for a 3-foot extension, which brings the total plow width to 15 feet, was constructed and piloted in WSDOT's Eastern Region during the 2020-2021 winter.



WSDOT's extended snowplow adds 3-feet of width to a standard plow and allows maintenance crews to clear snow from traveled lanes and shoulders on secondary highways with a single pass.

The extendable plow was used on a modified truck, but it can be installed on any truck and used as a standard plow if needed.

In the past, WSDOT Maintenance would install a second “wing plow” on the side of the vehicle to reach shoulders. Doing so added weight to one side of the vehicle and also required more controllers to operate the two, separate plows.

Designed with safety in mind, the new extendable plow is highly visible from inside the cab. With only one blade to monitor, it eliminates the problems associated with using two blades. The extended plows can easily be adjusted when the truck is approaching guardrail or bridges and minimize the time it takes to transition the trucks from season to season.

Tow plows tackle double duties

WSDOT's Eastern Region is home to the agency's three tow plows. These plows are designed to be towed and extended out at an angle behind a plow truck to clear a secondary lane at the same time. Tow plows, when angled, have a 14-foot clearing path.

These plows are also equipped with a granular spreader and liquid tanks to apply deicing materials. The combination of the tow plow with the materials application allows a single truck to perform the work of two trucks, clearing two lanes at once. Tow plows not only clear the roadway faster, but also reduce the cost of the operations.



Tow plows work together to keep roads in Eastern Region clear of snow and ice.

The three tow plows in Eastern Region have nicknames as part of a public engagement campaign. This light-hearted campaign has yielded serious results—including increased public engagement about WSDOT's plowing work and extending the reach of plow safety messaging to a broader audience.

The plows are named:

- Plowie McPlow Plow
- The Big Leplowski
- Sir Plows-a-Lot

Naming each tow plow has become a tradition of sorts, with the agency allowing the public to submit suggestions each time a new tow plow is added. Staff then narrow it down to a smaller list before putting the name up to a vote on social media.

HATS data collection increases 3% in 2021

WSDOT continues to develop and enhance HATS, a tool that documents work activities in the field with 1,200 iPads used by frontline maintenance staff each day. Since the launch of HATS in 2008, and a major update in 2015, the agency has developed a clearer understanding of the condition of assets in the field, along with maintenance tasks performed. The system helps WSDOT better manage the funding it receives each biennium. In 2021, a mobile cost estimating tool was deployed in HATS.

Maintenance technicians added 6,824 assets to the HATS inventory and completed 182,109 records of work activities in 2021. This averages to 499 HATS record entries per day, a 3% increase from 2020.

Maintenance responds to extreme events statewide

WSDOT's planned maintenance activities come to a halt when an emergency or disaster occurs because crews must first respond to potential hazards that threaten Washington's transportation infrastructure. These types of emergency responses divert maintenance crews from scheduled work as they must assist with road closures and traffic control and, in some cases, begin initial repairs. These unfunded emergencies exacerbate the maintenance backlog because they take personnel away from planned activities.

The summer of 2021 marked a historic heat wave that affected the state's infrastructure and roads, causing pavement damage across the state. During the late-June and early-July heat wave, regions across the state experienced multiple days at well above 100 degrees Fahrenheit which resulted in buckling and peeling pavement. WSDOT crews responded to 26 extreme heat-related issues across the state.

Landslides, washouts, and cleanup due to heavy rains and previous fire damage also affected Washington's roadways in 2021, including long-term closures in some locations. In total, WSDOT crews responded to 41 landslides.

Contributors include Bruce Castillo, Barbara LaBoe, Kelly Shields, Jim Weston, Daryl Blumberg, Joe Irwin, Dustin Motte and Michele Villnave



Extreme heat during the 2021 summer resulted in pavement buckling on SR 544 in Whatcom County.

US 101 south of Forks landslide due to November storm

A large landslide closed US 101 at milepost 185 near Forks after a storm on November 15, 2021. The slide affected approximately 50 feet of roadway while three smaller embankment failures filled a ditch with debris and trees, clogging a nearby culvert and causing water to spill onto the roadway. Maintenance crews were able to clear downed trees, debris and water, and install a jersey barrier in the center of the roadway to reopen access to Forks. Crews restored one-way, alternating travel near Kallman Road on Wednesday, November 17 after two days of work. An emergency contract is being prepared for a long-term fix of the site. Smaller slides on SR 113 and SR 110 were cleared in the days that followed.



This landslide closed US 101 at milepost 185 near Forks in mid-November.

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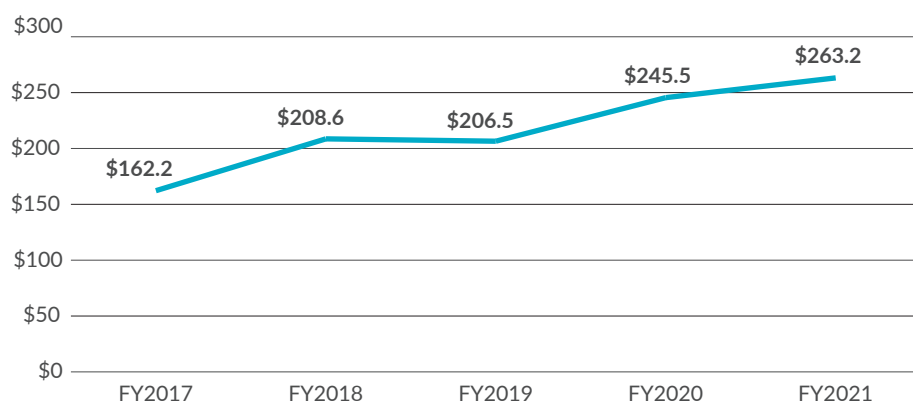
Washington State Ferries vessel preservation backlog increases by \$17.7 million in fiscal year 2021

The Washington State Ferries vessel preservation backlog was \$263.2 million in fiscal year 2021, up \$17.7 million (7%) from \$245.5 million in FY2020. WSF has allotted \$91.9 million to vessel preservation for the 2021-2023 biennium—funding sources are approximately 63% federal and 37% state.

This investment level meets approximately 35% of the \$263.2 million preservation backlog identified in the vessels Life-Cycle Cost Model for FY2021. Over the past five years, the vessel preservation backlog has increased 62.3 % from \$162.2 million in FY2017.

WSF vessel preservation backlog increases 62.3% in five-year trend

Fiscal years 2017 through 2021; Dollars in millions



Data source: Washington State Ferries.

Note: Values have been rounded.

Fifty-seven percent of WSF's fleet in State of Good Repair; annual preservation gap projected to continue increasing

As of June 2021, 12 of 21 vessels (57%) met the agency preservation targets for State of Good Repair, missing the agency goal of 90%. The State of Good Repair preservation target for each vessel is defined as having fewer than 20% of life-cycle cost items that are overdue for investment (replacement or rehabilitation). The remaining nine vessels in the fleet had between 20% and 25% of systems overdue (refer to table on p. 22).

Vessels asset management plan highlights preservation

WSF's investment strategy for the next six years seeks to maintain as many vessels as possible in a State of Good Repair with available funding. Preservation will be prioritized over improvement, and funding will be directed as required to keep all 21 vessels within regulatory compliance.

Any remaining preservation funding will then be directed toward vessels at the mid-point of their service lives. This includes the Issaquah, Jumbo, and Jumbo Mark II classes. No discretionary funding is directed toward newer Olympic and Kwa-di Tabil classes, so the preservation backlog will

Notable results

- The WSF vessel preservation backlog increased by \$17.7 million between FY2020 and FY2021
- WSF determined that nine of 21 vessels did not meet the target for State of Good Repair in FY2021
- WSF had 93.7% of terminal assets in a State of Good Repair in FY2021

likely increase for these vessels. Discretionary funding will not be directed at WSF's oldest vessels, which include the Evergreen State class M/V *Tillikum* and Super class vessels M/V *Kaleetan* and M/V *Yakima*. As a result, any unforeseen deficiencies on these vessels could require removal from service pending reallocation of agency funding (refer to table on p. 23).

WSF plans major preservation projects in the 2021-2023 biennium

Following its investment strategy in an effort to maintain regulatory compliance, WSF has the following major preservation projects (defined as those costing over \$5 million) planned for the 2021-2023 biennium:

■ **Jumbo Mark II Propulsion Controls Replacement (\$17.9 million):** The propulsion controls and monitoring systems on these vessels have reached the end of their service lives and cannot be supported. WSF completed the upgrade design in the 2019-2021 biennium, and materials were procured. Work on the M/V *Wenatchee* and M/V *Tacoma* is scheduled to occur in the 2021-2023 biennium.

■ **M/V Walla Walla Drydock & Preservation (\$10.4 million):** This Jumbo class vessel will receive routine drydock inspections, extensive underwater body repairs and painting, selected bilge and topside painting, vehicle deck repairs, fire screen door replacement, and propulsion control system updates.

WSF vessel preservation backlog increases in FY2021

Fiscal years 2020 and FY2021; Age in 2020; Percent of systems past due for investment in FY2021; Dollars in millions

Vessel classes and vessels	Age	Systems past due in FY2021 ¹	Preservation backlog FY2020	Preservation backlog FY2021	Change in backlog
Jumbo Mark II Class (202-vehicle)					
M/V <i>Tacoma</i>	24	12%	\$17.0	\$16.6	-\$0.4
M/V <i>Wenatchee</i>	23	21% ²	\$36.0	\$32.2	-\$3.8
M/V <i>Puyallup</i>	23	20% ²	\$28.0	\$28.4	\$0.4
Jumbo Class (188-vehicle)					
M/V <i>Spokane</i>	48	17%	\$11.7	\$12.4	\$0.7
M/V <i>Walla Walla</i>	44	20% ²	\$14.8	\$16.6	\$1.8
Super Class (144-vehicle)					
M/V <i>Kaleetan</i>	54	12%	\$1.6	\$2.0	\$0.4
M/V <i>Yakima</i>	54	11%	\$14.0	\$13.0	-\$1.0
Olympic Class (144-vehicle)					
M/V <i>Tokitae</i>	7	0%	\$0	\$0	\$0
M/V <i>Samish</i>	6	0%	\$0	\$0	\$0
M/V <i>Chimacum</i>	4	0%	\$0	\$0	\$0
M/V <i>Suquamish</i>	3	0%	\$0	\$0	\$0
Issaquah Class (124-vehicle)					
M/V <i>Issaquah</i>	42	24% ²	\$17.0	\$19.4	\$2.4
M/V <i>Kitsap</i>	41	20% ²	\$10.0	\$14.4	\$4.4
M/V <i>Kittitas</i>	41	20% ²	\$16.0	\$17.3	\$1.3
M/V <i>Cathlamet</i>	40	25% ²	\$15.0	\$17.4	\$5.0
M/V <i>Chelan</i>	40	19%	\$14.5	\$20.2	\$5.7
M/V <i>Sealth</i> ³	39	25% ²	\$14.8	\$18.4	\$3.6
Evergreen State Class (87-vehicle)					
M/V <i>Tillikum</i>	62	22% ²	\$20.0	\$20.8	\$0.8
Kwa-di Tabil Class (64-vehicle)					
M/V <i>Chetzemoka</i>	11	5%	\$6.0	\$5.4	-\$0.6
M/V <i>Salish</i>	10	3%	\$5.8	\$5.3	-\$0.5
M/V <i>Kennewick</i>	9	1%	\$3.3	\$3.4	\$0.1
Fleet-wide	Avg. 30	Avg. 13%	Total \$245.5	Total \$263.2	Net Change \$17.7

Data source: Washington State Ferries.

Notes: Numbers may not add perfectly due to rounding. ¹ Vessel condition is reported as a percent of systems included in WSF's vessel Life-Cycle Cost Model past due for investment. A vessel is considered in a state of good repair if fewer than 20% of LCCM systems are past due. ² Bold text indicates that these vessels are not in a State of Good repair. ³ The M/V *Sealth* is a 90-vehicle vessel in the Issaquah Class.

■ **M/V Chelan Preservation (\$6.3 million):** WSF's only remaining vessel certified for international service will receive an underwater body inspection, vehicle deck steel repairs, deck covering renewal, fire main and sewage piping repairs, overhaul of the No. 1 propulsion reduction gear and electrical switchboard renewal.

■ **M/V Kittitas Drydock and Preservation (\$6.3 million):** This Issaquah class vessel will receive routine dry-docking and inspections, hull and stern tube repairs, wet space deck covering renewal, bilge preservation, vehicle deck steel replacement, fire main and sewage piping renewal, propeller hub replacement and rudder system overhaul.

WSF faces challenges as it looks to address preservation issues

While WSF will be making some progress on much-needed preservation projects, the following challenges remain:

Reliance on federal funds: The over-reliance on federal funding for the vessel preservation program is increasingly problematic. Restrictions on international purchases and competitive procurement requires specialized attention and contracting approaches to ensure compliance.

Shipyard capacity: The number of qualified shipyards continues to decline, which impacts the cost of shipyard services while reducing the opportunities for preservation projects. Puglia Shipyard in Bellingham and Foss Shipyard in Seattle recently went out of business. Meanwhile, Everett Ship

WSF vessel investment strategy aims for State of Good Repair

2021-2023 biennium; Dollars in millions

Vessel classes	Number of vessels	Percent of vessels in SOGR	Planned investment for 2021-2023 biennium	Total percent of spending
Evergreen State	1	0%	0	0%
Super	2	100%	\$2.3	3%
Jumbo	2	50%	\$14.8	16%
Issaquah	6	17%	\$36.0	39%
Jumbo MKII	3	33%	\$20.0	22%
Kwa-di Tabil	3	100%	\$9.1	10%
Olympic	4	100%	\$6.2	7%
System-wide	N/A	N/A	\$3.5	4%

Data source: Washington State Ferries.

Repair was established and has taken on several WSF preservation contracts. The Dakota Creek Industries shipyard received state approval for its apprenticeship program, making that Anacortes-based business eligible for WSF preservation contracts.

Vessel availability: WSF does not have a sufficient number of spare vessels to cover service while meeting preservation requirements. The situation worsened in the 2019-2021 biennium when the M/V *Elwha*—one of two vessels capable of international service—was permanently removed from service due to a lack of funding needed to replace heavily corroded steel on the vehicle deck.

WSF vessel improvements include hybrid-electric conversions

The most significant improvement planned in the 2021-2023 biennium is the hybrid-electric conversion of the Jumbo Mark II class vessels.

In conjunction with planned propulsion control system

replacement preservation project, the M/V *Wenatchee* will undergo an extensive conversion to hybrid-electric propulsion. Funded primarily through a \$35 million grant from Washington State Department of Ecology (Washington's allocation of federal Volkswagen settlement mitigation trust funds), this project will establish WSF as a leader in sustainable marine transportation. The project replaces two of the four diesel generators with two lithium-ion energy storage banks. Design work was completed and materials procured during the 2019-2021 biennium and construction is scheduled for April-September 2023.

The M/V *Wenatchee* will initially operate in hybrid-electric mode with approximately a 25% reduction in fuel consumption. Once terminal electrification is complete, the vessel will operate in full battery mode, with a fuel consumption savings of approximately 95%. WSF will continue to seek funding for sister vessels: the M/V *Tacoma* and M/V *Puyallup*. Once all three vessels are converted, this program will

save nearly five million gallons of fuel each year, with corresponding reductions in CO₂, NO_x and particulates. The preliminary life-cycle cost analysis projects a net savings of \$60 million over the remaining 40-year service life of these vessels.

New hybrid-electric propulsion vessels currently in the works

The legislature authorized the extension of the Olympic class new construction program, including an update of the design to include hybrid-electric propulsion, and construction of up to five additional vessels.

The first vessel and long lead time materials for the second vessel received \$187 million from the 2019-2021 and 2021-2023 biennia budgets. The first two vessels will be assigned to the Clinton/Mukilteo and Seattle/Bremerton routes.

The functional design update is nearly completed and under US Coast Guard design review. The propulsion system includes lithium-ion energy storage, a direct current grid power distribution system, and four permanent magnet motors.

WSF is negotiating final terms and conditions with a design-build contractor and construction could begin as soon as February 2023 with delivery in mid-2025.

Once all five vessels are delivered, WSF projects a savings of 300 million gallons of diesel fuel over 60 years, and \$55 million in life-cycle cost savings.

WSF replaces Maintenance Management System

The legislature provided \$3.7 million to fund a new Maintenance Management System to replace the existing system. The new system will support critical asset management functions for both vessels and terminals, including procurement, inventory management, maintenance planning, execution and history. It will also have Life-Cycle Cost Model functionality to project preservation needs.

WSF conducted a needs analysis in the 2019-2021 biennium and moved forward to procure and implement an Enterprise Asset Management System. The project officially kicked off in early October 2021, although there was significant preparation in the months prior. WSF is using a top rated, highly effective cloud-based software called Enterprise Asset Management by Hexagon to manage the agency's assets and equipment. Hexagon completed the foundational training of the project team in November. This and other targeted workshops have provided the vendor input on the system's configuration to support improved workflow processes. WSF is currently gathering information from end-users to determine the best system configurations.

M/V Wenatchee gets emergency repairs

During sea trials on April 22, 2021, the M/V *Wenatchee* experienced a catastrophic main diesel engine failure and a subsequent machinery space fire.

The No. 2 and No. 3 main diesel engines had been overhauled by a commercial contractor in February 2021 and, after an extended maintenance period, sea trials were scheduled to run in the engines and test all other affected equipment. During these trials, the crankcase on the No. 3 main diesel engine exploded. The damage resulted in a fire in the No. 2 engine room. Engine crew immediately isolated the engine room and the fire extinguished itself as oxygen and fuel diminished.

A third-party forensic analysis determined a single, inadequately torqued bolt on a connecting rod assembly was the root cause of the failure which resulted in extensive equipment damage.

WSF planned and coordinated the nine-month repair effort. Approximately \$3.6 million in repairs occurred at the WSF Eagle Harbor Maintenance Facility and the M/V *Wenatchee* returned to service on January 26, 2022.

Washington State Ferries keeps 93.7% of terminal assets in a State of Good Repair in fiscal year 2021

As of July 2021, 93.7% of WSDOT's 794 terminal assets were in a State of Good Repair. This includes 94 new assets under the Information Technology Systems category. WSF did not report on these systems in previous Gray Notebooks because the evaluation of their life-cycle and replacement costs was still in progress.

A total of 56.3% of passenger-only ferry facilities by replacement cost were not in a State of Good Repair as of July 2021—the largest percentage of any asset category. The increase from 36% in July 2020 was due to a re-assessment of replacement costs of these assets and not because of physical deterioration of the assets. Of the 94 newly added Information Technology Systems, roughly 29% by replacement cost were not in a State of Good Repair. In their current state, the terminals at Fauntleroy, Anacortes, Orcas Island, and Tahlequah have the greatest value of assets not in a State of Good Repair. In response, WSF has planned preservation projects at all four terminals for the next 10 years to improve the SOGR.

The project at Fauntleroy terminal will address the deteriorating timber trestle constructed in the 1950s, sea-level rise, operational inefficiencies, and the seismic condition of the structure. The project is in the early stages of the environmental process. Community, technical, and executive advisory groups have each met at least once and provided input on this project.

Projects at the Anacortes terminal include replacing the aging terminal building, the tollbooths, and the timber trestles. At the Orcas Island and

Tahlequah terminals, the projects include preserving the trestles in addition to rehabilitation of some of the vehicle movable bridge systems. Other major terminal projects WSF has programmed within the 10-year time frame include:

- A preservation project in Kingston to address seismic deficiencies of the trestle and vehicle movable bridge.
- A preservation project in Bremerton to replace aging vehicle movable bridge systems.
- A preservation project in Southworth to replace the timber trestle and terminal building and improve operational efficiency.
- A project at the Bainbridge Island terminal to replace an overhead loading walkway is scheduled for construction this year. The existing wooden-supported walkway will be replaced with a modern walkway designed to better withstand earthquakes.

WSF identifies state of good repair values for terminal assets

Facility or system type	Number of systems	In SOGR	Not in SOGR	Not rated
Buildings ¹	120	98.6%	1.4%	0.0%
Landing aids ²	174	99.0%	1.0%	0.0%
Overhead loading systems ³	55	86.7%	13.3%	0.0%
Passenger-only ferry facilities ^{3,4}	9	43.7%	56.3%	0.0%
Pavement	79	88.7%	11.3%	0.0%
Trestles and bulkheads	62	95.0%	5.0%	0.0%
Vehicle movable bridge systems ³	201	91.0%	9.0%	0.0%
Information Technology Systems	94	71.4%	28.6%	0.0%
Total/weighted average FY2021	794	93.7%	6.3%	0.0%

Data source: Washington State Ferries.

Notes: Percentages are weighted by replacement cost. Percentages may not add to 100 due to rounding. In previous Gray Notebooks, WSF reported on condition of terminal assets only. WSF now reports on state of good repair. **1** Buildings include terminal buildings, agent buildings, storage buildings, maintenance buildings, and toll booths. **2** Landing aids ensure the ferry vessels are aligned correctly at the terminals, and include wingwalls and dolphins. **3** Systems include foundation supports, movable bridge span, electrical parts, and mechanical parts. **4** Passenger-only ferry systems are located at the Eagle Harbor maintenance facility and are only used for maintenance functions. **5** Information Technology Systems include camera systems, access control systems, phones, electronic fare systems, visual paging, network, and cables/conduits.

WSF terminals defines State of Good Repair

State of Good Repair is based on the risks of operational failure and economic consequences of these failures. Under risk-based life cycle cost analysis, a system with risk cost less than the annualized cost of installing and operating a new system is in a SOGR; a system with risk cost greater than the annualized cost of installing and operating a new system is not in a SOGR.

- A project at Colman Dock in Seattle to replace aging and seismically-vulnerable assets is under construction and scheduled for completion in 2023.

WSF develops terminal preservation backlog projections

If 100% of preservation funds are programmed, WSF predicts that 6.8% (by replacement cost) of the agency's terminal systems will not be in a SOGR by the end of FY2023 (refer to chart at right). At this funding level, the rate of terminal assets not in SOGR is expected to be 1% by the end of FY2031.

If preservation funding levels are reduced by 50%, the percentage of terminal assets not in a SOGR is predicted to increase to 15.9% by the end of FY2031. With no funding, the percentage of terminal assets not in a SOGR almost doubles and is predicted to increase to 30.9%.

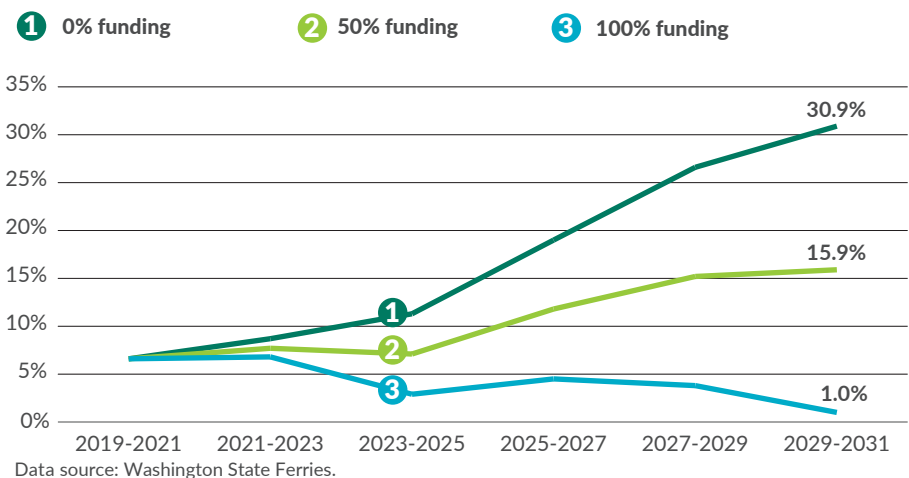
If WSF's terminals funding is reduced, there will likely be a reduction in service reliability and an increase in maintenance costs. WSF is currently working to illustrate the impacts of funding shortfalls and the strategic approaches it plans to take to provide a safe and reliable transportation system.

WSF updates existing risks and challenges for terminals

WSF will be reevaluating risks and reexamining the risk response plan in the coming year. Identified below are some high level risks of concern:

Projected preservation backlog for terminal assets dependent upon funding

2019-2021 biennium through 2029-2031 biennium; Projected percent of assets not in a state of good repair based on possible funding scenarios



- Loss of workforce capacity and skill levels has been rated very high in previous WSF risk evaluations. Due to COVID-19 this risk is now realized. WSF is enacting mitigation strategies such as nationwide recruitment, workforce development, flexible schedules, and training.
- The seismic risk to WSF terminal systems is high. WSF continues to identify critical routes for seismic resiliency, and includes seismic risk while prioritizing capital projects. WSF's 10-year budget includes several preservation projects that upgrade terminal structures to the latest seismic code.
- WSF is studying of the effects of sea-level rise at the terminals. The study will be completed in the 2021-2023 biennium. Once the study is processed, sea-level rise may be included in the risk response plan.

WSF terminals continue to face challenges due to COVID-19

WSF terminals continue experiencing challenges during the COVID-19 pandemic, including:

- WSF terminal project construction costs have increased significantly. The cost of all goods has increased due to lack of construction material availability. These cost increases without an increase in funding will result in less preservation projects moving into the construction phase.
- COVID-19 has impacted work force capacity. The vaccine mandate resulted in a small number of resignations, but they have impacted the staff's ability to respond to problems quickly in some departments at WSF.
- Delays in design delivery and construction, and change orders associated with mandatory state requirements.

Contributors include John Bernhard, Jeri Bernstein, Srikanth Sree Ramoju, Donna Thomas, Matt Von Ruden, Joe Irwin and Dustin Motte

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Influx of federal funds facilitates increases state funding to non-NPIAS airports

An influx of federal funding from the Coronavirus Aid, Relief, and Economic Security Act, Coronavirus Response and Relief Supplemental Appropriation Act, and American Rescue Plan Act combined to provide \$591.8 million to [National Plan of Integrated Airport Systems](#) airports in 2020 and 2021 (refer to table below right). The financial support was provided as economic relief to airports affected by the COVID-19 pandemic and fully funded the federal share of Federal Aviation Administration Airport Improvement Program grants, which did not require WSDOT to contribute its local match (typically half of the 10%) to FAA grants.

WSDOT uses \$100,000 to leverage \$27 million in federal and local funds for airport aid, maximizes return on investment of aviation funding

WSDOT's airport aid grant awarded a total of \$930,360 to nine airports for pavement maintenance, safety, and sustainability projects during fiscal year 2022 (July 2021 through June 2022). Approximately 80% (\$748,950) of these funds will support airports that are not eligible for federal funds—facilities not included in the NPIAS. The airport aid grant program targets 55% of grant awards to the smaller non-NPIAS airports and NPIAS airports with fewer than 20 based aircraft.

WSDOT maximized the return on investment of the grant cycle by using the remaining 20% (\$100,000) to leverage \$27 million in federal and local funds for use on NPIAS airports. The majority of these funds will be used for airport pavement projects.

Majority of airport investment funding slated for pavement projects

Funding by source for fiscal year 2022

Project type	Local	State	Federal	Total
Pavement	\$2,143,600	\$878,900	\$24,923,500	\$27,946,000
Safety	\$5,000	\$50,000	\$0	\$55,000
Planning and environmental	\$1,500	\$1,500	\$0	\$3,000
Total	\$2,150,100	\$930,400	\$24,923,500	\$28,004,000

Data Source: WSDOT Aviation Division.

Note: Numbers have been rounded.

Community Aviation Revitalization Board loan program awards more than \$7 million to 15 projects

In May 2021, the Washington State Legislature voted to make the Community Aviation Revitalization Board loan program permanent and provided \$5 million in state funding to be awarded during the 2021-2023 biennium. The revolving loan program provides low-interest loans to airports for revenue-producing

Notable results

- Federal relief provided \$591.8 million for use at NPIAS airports
- Washington state leveraged \$100,000 to secure \$27 million in funding for airport investments in FY2022
- Community Aviation Revitalization Board loan program awarded \$4.7 million for 11 projects at 10 airports in 2019-2021 biennium

Federal aid provides \$591.8 million to NPIAS airports in Washington

2020 through 2021; Federal aid received by funding source; Dollars in millions

Source	Amount
Coronavirus Aid, Relief, and Economic Security Act	\$310.4
Coronavirus Response and Relief Supplemental Appropriation Act	\$64.3
American Rescue Plan Act	\$217.2
Total	\$591.8

Data source: WSDOT Aviation.

Notes: Due to rounding, amounts above do not add to total. NPIAS airports have 20 or more based aircraft.

projects to help them become more self-sustainable and less reliant on state and federal funding.

To date, the loan program has received 31 applications totaling over \$17 million. The eight-person board has awarded loans for 15 projects totaling \$7,070,000 (refer to table below).

Forty percent of the projects (six out of 15) have been completed, and three have started making loan repayments. Another round of funding is planned for spring 2022.



This new above-ground fueling facility at the Chehalis-Centralia Municipal Airport was partially funded by a \$750,000 Community Aviation Revitalization Board loan.

CARB loan program awards more than \$7 million to 15 projects statewide since inception in 2019

Project location	Project description	Amount awarded
Port of Port Angeles, William R. Fairchild Airport	Utility and hangar development	\$750,000
City of Chehalis, Chehalis-Centralia Municipal Airport	Above ground fueling facility	\$750,000
City of Othello, Othello Municipal Airport	10-unit hangar facility	\$450,000
Sequim Valley Airport, Inc., Sequim Valley Airport	Underground storage tank removal	\$15,000
Port of Bremerton, Bremerton National Airport	Multi-purpose facility	\$750,000
Sequim Valley Airport, Inc., Sequim Valley Airport	Access road, fueling area repaving	\$70,000
Pierce County, Thun Field	Hangar doors replacement	\$750,000
City of Chewelah, Chewelah Municipal Airport	Aviation fuel tank facility	\$425,000
City of Kelso, Southwest Washington Regional Airport	Fuel farm improvements	\$500,000
City of Moses Lake, Moses Lake Municipal Airport	New fuel system	\$175,000
Kittitas County, Bowers Field	Hangar utility extension	\$105,000
City of Deer Park, Deer Park Municipal Airport	Sewer main installation	\$730,000
Port of Benton, Richland Airport	Hangar acquisition	\$750,000
City of Auburn, Auburn Municipal Airport	Hangar rehabilitation	\$750,000
Kittitas County, Bowers Field	Hangar taxilane	\$100,000
Total		\$7,070,000

Source: WSDOT Aviation Division.

WSDOT and Commerce collaborate to address aviation fuel shortages

As a result of the COVID-19 pandemic, the demand for aviation fuel fell to all-time lows. In 2021, the sudden increase in commercial air travel and the busy wildfire season caused an unprecedented aviation fuel supply shortages across the western states.

The increased fuel demand and supply chain challenges required the State Department of Commerce's Emergency Support Function 12 (ESF12) response team to be activated. The ESF12—part of Washington State's emergency incident management system—consolidated fuel shortage response efforts in collaboration with Washington Military Department, WSDOT, U.S. Forest Service, State Department of Natural Resources and other federal, state, and local stakeholders.

WSDOT Aviation and the State Emergency Operations Center played a critical role by implementing the "ReadyOp" communication tool, which allowed wildfire fighting helibase managers and participating airports around the state to quickly communicate critical fuel shortage and delivery information to the ESF12, ensuring the team could direct fuel shipments to areas of highest need.

WSDOT continues to identify strategies to build resiliency and preparedness across the state's airport system.

WSDOT airports provide critical staging areas for wildland fire management

In 2021, WSDOT-managed airports once again served as critical staging areas for statewide wildland fire management efforts.

In particular, the Methow Valley State Airport supported emergency helicopter staging efforts for the Cedar Creek, Cub Creek 2, Delancy, and Muckamuck Wildland fires and provided access for emergency response teams from across the nation.

The Methow Valley State Airport remained open to the public during the busy fire season. Temporary flight restrictions over the fires and close coordination between fire response crews and WSDOT Aviation kept the airport and airspace operations safe. Thick, hazardous smoke in the morning limited flight operations mostly to afternoon missions.

Methow Valley State Airport is home to a U.S. Department of Agriculture Forest Service Smokejumper Base, which plays a critical role in fast-strike firefighting response efforts. The Tieton State Airport—located at Rim Rock Lake near Naches—also played a vital role for wildland firefighting staging efforts and was closed to the public for over a month to allow response teams to battle the fast-spreading Schneider Springs Fire. Easton, Lake Wenatchee, Skykomish, and Stehekin airports also supported staging access for wildland fire management.



A Department of Natural Resources helicopter and crew at the Bandera State Airport conduct quick turnaround refueling operations during a wildland fire near McClellan Butte. The Bandera State Airport provided a vital staging area allowing crews to refuel faster and deliver water more frequently.

WSDOT aims to keep pace with emerging aeronautics technology

Advanced Air Mobility (AAM), which includes safe, automated air transportation systems for passengers and cargo, and alternate propulsion technology (such as electric aircraft) have the potential to change how Washingtonians and the world travels. Following the release of the [Washington Electric Aircraft Feasibility Study](#) in 2020, WSDOT started pursuing recommendations from the study to implement this emerging technology into planning processes.

The demand for air passenger service and air cargo in Washington is projected to increase dramatically over the next 20 years. This is expected to result in higher greenhouse gas emissions and additional noise from traditional propulsion. WSDOT—through outreach conducted on behalf of the Commercial Aviation Coordinating Commission—determined the public wants more access to air travel, but would like it done in a sustainable and environmentally resilient manner.

WSDOT also defined strategies that keep pace with industry and regulators to set the conditions for Advanced Air Mobility aircraft as they become commercially viable. State and local stakeholders will need to work together to identify near-term applications for this emerging technology as well as other forms of propulsion using sustainable fuel. Creating multimodal connections with airports, vertiports (a type of airport for vehicles that land and take off vertically), and existing ground transportation modes will be paramount in the full-scale adoption of AAM. With this in mind, WSDOT is allocating 10% of the Airport Improvement Grant Program funds for AAM and sustainable aviation initiatives.

Electric Aircraft Feasibility study leads to increased partnership

The Washington State Electric Aviation Feasibility Study in 2020 identified six airports as candidates for the potential early adoption of electric aviation. Since the release of the study, 11 more airports expressed interest in pursuing planning and infrastructure projects in alignment with AAM initiatives.

As a result, WSDOT has expanded the beta test program to be more inclusive. The 17 Washington Sustainable Aviation Partner Airports will help champion AAM in Washington state.

WSDOT establishes state coordinator position

WSDOT established the position of Unpiloted Aircraft System State Coordinator as directed by the state legislature in 2021.

The Unpiloted Aircraft System (UAS) coordinator position is focused on collaborating with stakeholders working with drones, coordinating with state and federal agencies on policies and rules, and assisting in the advancement of drone technology across the state in partnership with the Department of Commerce. The position also monitors the growth of UAS technology that will help shape the regulatory and operations framework of autonomous and sustainable airborne platforms in the state.

WSDOT to implement new drone registration program

In order to keep pace with emerging UAS technology, WSDOT is developing a drone registration program, which is scheduled to be implemented in April 2022. The program will mirror the aircraft registration process currently in place (refer to box at right), but will be tailored for drones used for commercial purposes.

Commercial Aviation Coordinating Commission considers expanding airport capacity

Over the course of 2021, the Commercial Aviation Coordinating Commission (CACC)—charged with making recommendations to increase aviation to accommodate air passenger service, air cargo operations and general aviation—made significant progress towards meeting its requirements. The CACC collaborated with several stakeholders to help establish its guiding principles of public benefit, economic feasibility, environmental responsibility, and social equity.

Feedback indicated that 44% of those surveyed favored adding aviation capacity and acknowledged that doing so would require funding and potentially create environmental impacts; 36% supported increased aviation capacity only if environmental impacts were mitigated, and 19% supported continued operating with the current airport facilities. The CACC identified the following airports as having potential capacity to expand:

- Paine Field has potential for additional commercial passenger service and air cargo capacity;
- Bremerton National Airport has potential for air cargo capacity and general aviation capacity; and
- Arlington Municipal Airport, Sanderson Field, South Lewis County Airport, and Tacoma Narrows Airport all have potential for additional general aviation capacity.

The [Washington Aviation System Plan](#) update is running concurrent to the CACC's work and will provide new airport location options for consideration in 2022. The CACC's final recommendations are currently due in February 2023.

Contributors include Dave Chenaar, Christina Crea, Eddy Hensley, Rob Hodgman, Eric Johnson, John MacArthur, Tracy Paul, Max Platts, Paul Wolf, Joe Irwin and Dustin Motte

WSDOT meets aircraft registration annual goal

WSDOT registered 7,032 aircraft and provided 2,899 exemptions to qualifying aircraft during the 2021 aircraft registration and renewal cycle. WSDOT has met its annual goal of registering at least 95% of all aircraft in the state for 16 years in a row.

WSDOT launched a new aircraft registration system in September 2019, replacing an outdated system introduced in 2002. The new system is more secure and offers users multiple online services in lieu of an in-person office visit. For more information, visit: <http://bit.ly/aircraftregistration>.

Number of aircraft registered by type during 2021 registration period

Aircraft type	Quantity
Single Engine	5,018
Home built	1,161
Piston, multi-engine, small	227
Helicopter	206
Turbojet, multi-engine	175
Sail/Glider	116
Turboprop, multi-engine	55
Lighter than air	33
Piston, multi-engine, large	20
Aircraft 8,001-9,000 lbs.	13
Aircraft 4,001-6,000 lbs.	6
Aircraft under 4,001 lbs.	2
Total	7,032

Data source: WSDOT Aviation Division.

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INCIDENT RESPONSE
QUARTERLY UPDATE

WSDOT Incident Response teams help improve driver safety at 9,664 incidents

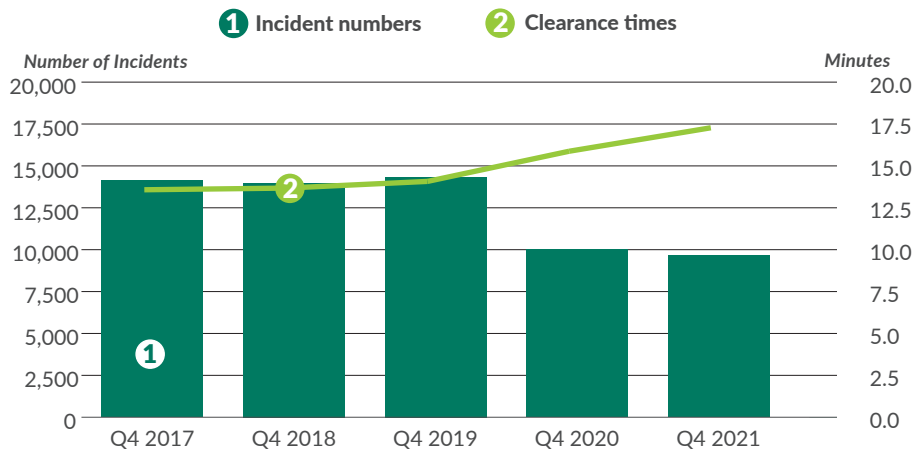
WSDOT's Incident Response teams assisted at 9,664 incidents during the fourth quarter (October through December) of 2021. On average, IR teams responded to an incident scene every 13 minutes and 43 seconds during the quarter. Statewide travel continued to decrease in response to COVID-19 and as a result, there were 336 (3.4%) fewer incidents during the fourth quarter of 2021 compared to the same quarter in 2020 (10,000).

On average, IR teams cleared each of the 9,664 incidents in 17 minutes and 24 seconds. This is one minute and 36 seconds (10.1%) slower than the average incident clearance time for the same quarter in 2020.

Of the 9,664 total incidents, 6,603 (68.3%) lasted less than 15 minutes, 2,837 (29.4%) lasted 15-90 minutes and 224 (2.3%) incidents lasted more than 90 minutes (refer to chart at right). During the fourth quarter of 2021, there was a 29.5% increase in incidents lasting more than 90 minutes compared to the same quarter in 2020, while there were 2.3% more incidents lasting 15-90 minutes and 6.4% fewer incidents lasting less than 15 minutes.

Average clearance times increase 27% over the past five years

Fourth quarters; 2017 through 2021; Number of incident responses; Clearance times in minutes



Data source: Washington Incident Tracking System.

Notes: The data above only accounts for incidents to which an IR unit responded. IR data reported for the current quarter (Q4 2021) is considered preliminary. In the previous quarter (Q3 2021), WSDOT responded to 11,906 incidents, clearing them in an average of 16.0 minutes. These numbers have been confirmed and are now finalized.

WSDOT teams respond to 224 over-90-minute incidents

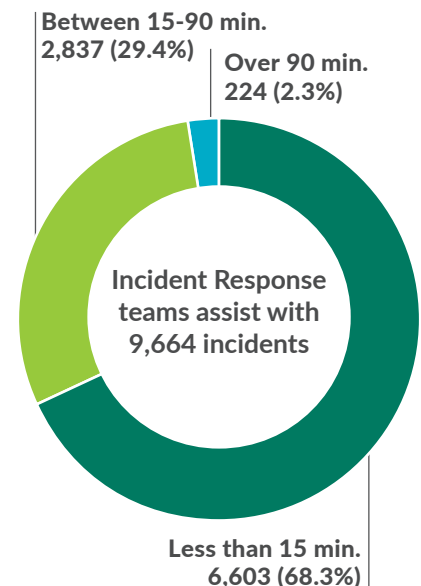
IR teams provided assistance at the scene of 224 incidents that lasted more than 90 minutes during the fourth quarter of 2021. This was 51 more incidents—a 29.5% increase—than in the same quarter in 2020. While these over-90-minute incidents accounted for 2.3% of all incidents, they resulted

Notable results

- WSDOT responded to 9,664 incidents during the fourth quarter of 2021, 336 (3.4%) fewer than during the same quarter in 2020
- WSDOT cleared incident scenes in an average of 17 minutes and 24 seconds during the fourth quarter of 2021, one minute and 36 seconds (10.1%) slower than the same quarter in 2020
- In the fourth quarter of 2021, IR teams provided an estimated \$21.3 million in economic benefit by reducing the effects of incidents on drivers
- For every dollar spent on the program during the quarter, the IR teams provided \$14.21 in economic benefit.

WSDOT clears majority of traffic incidents in 15 minutes or less

Fourth quarter 2021; Times to clear incidents; Number and percentage of incidents



Data source: Washington Incident Tracking System.

in 25.5% of all incident-related delay costs (refer to chart on next page).

Eight of the 224 over-90-minute incidents took six hours or more to clear (referred to as extraordinary incidents). This was two fewer extraordinary incidents than the same quarter in 2020. The eight incidents took an average of eight hours and 57 minutes to clear, accounting for 2.9% of all incident-induced delay costs for the quarter.

The average incident clearance time for all over-90-minute incidents was two hours and 48 minutes. This was about eight minutes and 16 seconds (4.7%) faster than the same quarter in 2020. Excluding the eight extraordinary incidents, WSDOT's average clearance time for over-90-minute incidents was two hours and 51 minutes.

WSDOT focuses on safety when clearing incidents, working to reduce incident-induced delay as

well as the potential for secondary incidents. Secondary incidents occur in the congestion resulting from a prior incident and may be caused by distracted driving, unexpected slowdowns or debris in the roadway.

Incident Response provides economic benefit to travelers

The Incident Response teams help alert drivers to incidents and clear roadways to reduce the likelihood of new incidents. WSDOT's assistance at incident scenes provided an estimated \$21.3 million in economic benefit during the fourth quarter of 2021 by reducing the impacts of incidents on drivers. This benefit is provided in two ways:

- WSDOT reduces the time and fuel motorists waste in incident-induced traffic delay by clearing incidents quickly. About \$12.2 million of IR's economic benefit for the quarter resulted from reduced traffic delay.

- WSDOT helps prevent secondary incidents by proactively managing traffic at incident scenes. About \$9.1 million of IR's economic benefit for the quarter resulted from preventing an estimated 1,830 secondary incidents and resulting delay. This figure is based on Federal Highway Administration data that indicates 20% of all incidents are secondary incidents.

Based on WSDOT's budget for IR, every dollar spent on the program during the quarter, the IR teams provided \$14.21 in economic benefit.

WSDOT's Incident Response teams provide an estimated \$21.3 million in economic benefit

Fourth quarter 2021; Incidents by duration in minutes; Time in minutes; Costs and benefits in millions of dollars

Incident duration	Number of incidents ¹	Percent blocking ²	Average incident clearance time ³ (all incidents)	Cost of incident-induced delay	Economic benefits from IR program ⁴
Less than 15 min.	6,603	20.4%	5.1	\$8.7	\$4.0
Between 15 and 90 min.	2,837	59.2%	33.1	\$27.6	\$12.0
Over 90 min.	224	84.8%	168.7	\$12.4	\$5.2
Total	9,664	30.5%	17.4	\$48.8	\$21.3
Percent change from the fourth quarter of 2020	↓3.2%	↑3.0%	↑10.1%	↑9.7%	↑8.7%

Data source: Washington Incident Tracking System.

Notes: Some numbers do not add up to 100% due to rounding.

¹ Teams were unable to locate 516 of the 9,664 incidents. Because an IR team attempted to respond, these incidents are included in the total incident count. Other performance measures do not include the incidents that, IR teams were unable to locate.

² An incident is considered blocking when it shuts down one or more lanes of travel.

³ Incident clearance time is the time between an IR team's first awareness of an incident and when the last responder has left the scene.

⁴ Estimated economic benefits include benefits from delay reduction and prevented secondary incidents. See [WSDOT's Handbook for Corridor Capacity Evaluation, 2nd edition, pp. 45-47](#) for WSDOT's methods to calculate IR benefits.

Incident numbers do not always directly influence the costs associated with incident induced delay

The 9,664 incidents during the quarter had a total incident-induced delay cost of \$48.8 million. The majority of these incidents were less than 15 minutes. The cost of these 6,603 incidents, which comprised 68.3% of all incidents, was \$8.7 million (17.9% of the total cost). There were 2,837 incidents lasting 15-90 minutes, which accounted for 29.4% of all incidents, and cost \$27.6 million (56.6% of the total cost). Incidents lasting more than 90 minutes made up 2.3% (224) of all incidents during the quarter, but accounted for \$12.4 million (25.5% of the total cost).

Performance data reported in this article is from WSDOT's Washington Incident Tracking System, which tracks incidents to which a WSDOT IR team responded.

For more information on how WSDOT calculates these figures and all IR performance metrics, see [WSDOT's Handbook for Corridor Capacity Evaluation, 2nd edition, pp. 45-47](#).

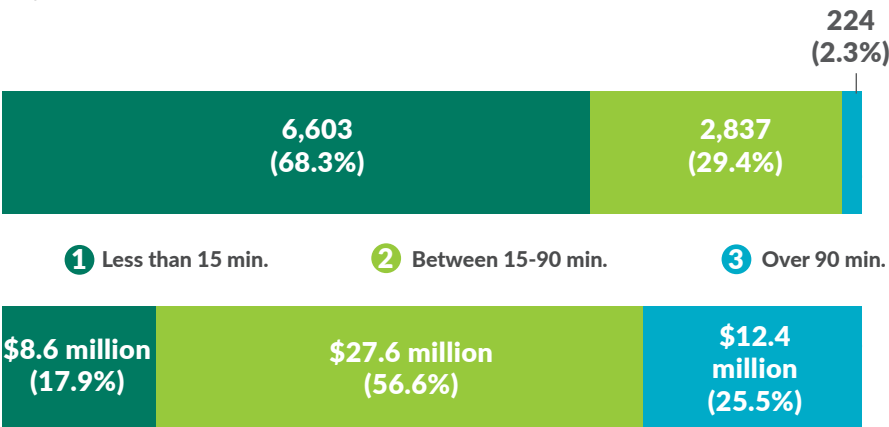
Contributors include Vince Fairhurst, Tony Leingang, Takahide Aso, Michele Villnave

Customer feedback:

- "Dennis rescued me on the freeway with a flat tire. I was on my way to an appointment and because of him I was only 5 minutes late!"
- "Craig was professional and very pleasant. He waited to be certain that a taxi arrived before he left and he had great music playing, too."
- "The service was amazing. Troy appeared like an angel when I was stuck on the side of the road and he immediately asked if I needed assistance."

Cost of incident-induced delay not proportional to response numbers

Fourth quarter 2021; Number and percentage of incidents; Cost of incident induced delay; Time to clear incidents



Data source: Washington Incident Tracking System.

Incident Response helps reduce congestion

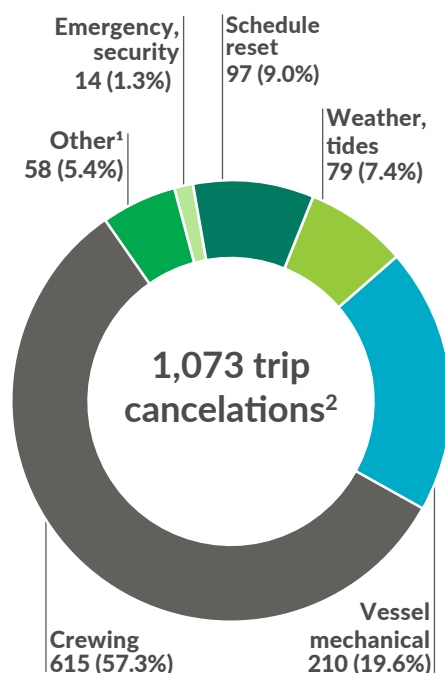
The mission of WSDOT's Incident Response program is to clear traffic incidents safely and quickly, minimizing congestion and the risk of secondary incidents. The statewide program has a biennial budget of \$12 million, about 59 full-time equivalent positions and 69 dedicated vehicles. Teams are on-call 24/7 and actively patrol approximately 1,300 centerline miles (3,400 lane miles) of highway on major corridors around the state during peak traffic hours. This covers approximately 18% of all state-owned centerline miles statewide.

Notable results

- *WSF completed 29,261 (96.6%) of its 30,277 regularly scheduled trips in the second quarter of fiscal year 2022*
- *WSF ridership was approximately 3.62 million in the second quarter of fiscal year 2022, 11.3% more than the corresponding quarter in FY2021*

Crewing issues cause most cancellations for the quarter

Second quarter FY2022



Data source: Washington State Ferries.

Notes: Fiscal years run from July 1 through June 30. As a result, October through December 2021 represents the second quarter of FY2022.

¹ The category for "Other" includes events like disabled vehicles, environmental reasons and non-vessel related incidents that can impact operations.

² WSF replaced 57 of the 1,073 canceled trips for a total of 1,016 net missed trips.

WSF service reliability declines to 96.6%

Washington State Ferries reviews service levels based on four criteria (pillars)—ridership demand, crew availability, vessel availability and financial resources—in an ongoing effort to provide the best level of service within these parameters.

Primarily due to crew availability issues, WSF began an alternate service schedule in October 2021. Eleven vessels operated on this schedule each day: one on each route except the Fauntleroy/Vashon/Southworth route (two vessels), and three vessels on the San Juan Domestic route until November 19 when a fourth vessel was added. Trips were added back on the Seattle/Bainbridge, Edmonds/Kingston and Mukilteo/Clinton routes on a daily basis as staffing levels permitted.

There were 30,277 regularly scheduled ferry trips during the second quarter of FY2022 (October through December 2021) compared to 36,690 in the same quarter in FY2021. WSF completed 96.6% (29,261) of these trips compared to 98.9% (36,288) in the previous year. Quarterly performance missed the annual service reliability performance goal of 99% (refer to table on p. 36). There were 1,073 trip cancellations system-wide and WSF replaced 57 of them for a total of 1,016 net missed trips.

The majority of cancellations (615) were related to crewing. COVID-19 exposures had a two-fold effect on crew: 1) crew members who test positive for COVID-19 must quarantine; 2) crew members who worked with that individual (identified through contact tracing) must also quarantine. In October, service on the Point Defiance/Tahlequah route was suspended for three days due to crewing, and Vashon Island travelers had to use the Fauntleroy/Vashon/Southworth route to travel to and from the island.

WSF trip reliability decreases during the pandemic

Second quarters; Fiscal years 2018 through 2022; Percent of scheduled ferry trips completed



Data source: Washington State Ferries.

Notes: Fiscal year = July 1 through June 30. As a result, October through December 2021 represents the second quarter of FY2022. ¹ During Q2 FY2021, WSF operated on a modified winter schedule.

The category with the second highest number of missed trips (210) was vessel breakdowns. Unplanned maintenance in October accounted for 105 cancellations for the M/V *Tillikum*, which also had an electrical problem in December that caused 76 additional missed trips. The M/V *Chetzemoka* experienced 19 cancellations in October due to a failed service generator. The remaining vessel related cancellations (10) covered a variety of brief service interruptions on various routes.

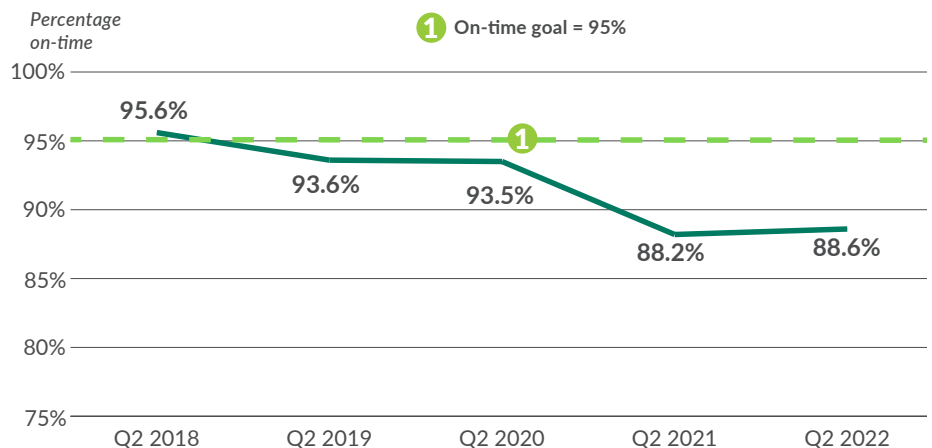
There were 97 cancellations for schedule resets; these occurred when vessels became so late that canceling the trip was required to get the vessel sailings back on schedule. When the main bridge hoist motor at the Tahlequah terminal froze in December due to the extremely cold temperatures, 19 trips were canceled.

WSF canceled 40 trips due to rough seas and high winds that included gale warnings, and canceled 39 trips due to tides. There were also 14 missed trips due to medical

emergencies. The remaining cancellations were due to various reasons with no one event causing more than six missed trips.

On-time performance improves, remains below target

Second quarters; Fiscal years 2018 through 2022; Percentage of ferry trips reported as on-time¹



Data source: Washington State Ferries.

Notes: Fiscal year = July 1 through June 30. As a result, October through December 2021 represents the second quarter of FY2022. ¹ A trip is considered delayed when a vessel leaves the terminal more than 10 minutes after the scheduled departure time.

WSF on-time performance up slightly, reliability down in the second quarter of fiscal year 2022

Second quarters (October through December) FY2021 and FY2022; Annual on-time goal = 95%; Annual service reliability goal = 99%

Route	On-time performance (second quarter)				Trip reliability (second quarter)			
	FY2021	FY2022	Status	Trend	FY2021	FY2022	Status	Trend
San Juan Domestic	53.6%	71.3%	17.7%	↑	99.1%	92.7%	-6.4%	↓
Anacortes/Friday Harbor/Sidney, B.C. ¹	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Edmonds/Kingston	98.4%	96.3%	-2.1%	↓	98.5%	99.0%	0.5%	↑
Fauntleroy/Vashon /Southworth	90.8%	88.2%	-2.6%	↓	99.8%	98.9%	-0.9%	↓
Port Townsend/Coupeville	96.3%	98.1%	1.8%	↑	94.5%	94.7%	0.2%	↑
Mukilteo/Clinton	96.2%	95.0%	-1.2%	↓	99.1%	98.6%	-0.5%	↓
Point Defiance/Tahlequah	98.8%	97.6%	-1.2%	↓	99.8%	94.2%	-5.6%	↓
Seattle/Bainbridge Island	95.9%	86.6%	-9.3%	↓	99.7%	98.2%	-1.5%	↓
Seattle/Bremerton	97.7%	89.1%	-8.6%	↓	96.3%	98.5%	2.2%	↑
Total system	88.2%	88.6%	0.4%	↑	98.9%	96.6%	-2.3%	↓

Data source: Washington State Ferries.

Notes: FY = fiscal year (July 1 through June 30). As a result, October through December 2021 represents the second quarter of FY2022. A trip is considered delayed when a vessel leaves the terminal more than 10 minutes after the scheduled departure time. WSF reports on nine routes. Anacortes/Friday Harbor service is combined with San Juan Interisland service as San Juan Domestic for on-time performance and service reliability. Due to unique fare collection methods in the San Juan Islands, and similar origin and destination legs on both routes, some statistics can not be separated between these two routes. Numbers shown in the table have been rounded to the tenth. ¹ The International route was closed during the quarter due to COVID-19.

On-time performance up slightly, misses goal

On-time performance increased to 88.6% in the second quarter of FY2022 compared to 88.2% for the same quarter in FY2021. The quarterly rate was below WSF's annual on-time performance goal of 95%.

On average in the second quarter of FY2022, 39 out of 339 (11.4%) daily trips did not leave the terminal within 10 minutes of the scheduled departure time, decreasing from an average of 45 out of 382 trips (11.8%) for the same quarter in FY2021.

On-time performance increased on two routes compared to the second quarter of FY2021. The San Juan domestic route had the largest increase (17.7%) compared to the same quarter last year. Some sailings experienced high vehicle ridership with the alternate service schedule. More volume on ferries resulted in longer loading and unloading times, which negatively affected on-time performance.

Construction continued on the terminal at Colman Dock in Seattle, and both routes that use the terminal (Seattle/Bainbridge and Seattle/Bremerton) had decreased on-time performance compared to the same quarter in FY2021 as a result.

Ridership increases in the second quarter of FY2022

Washington State Ferries' ridership was approximately 3.62 million during the second quarter of FY2022. This was 369,144 (11.3%) more than the same quarter in FY2021, but still 751,085 (17.2%) below projections.

The Seattle/Bremerton route had the most significant increase in ridership, carrying 42.6% more (856,077) passengers compared to the same quarter in FY2021 (600,419).

The San Juan domestic route experienced the largest decrease in ridership, carrying 3.6% (328,486) fewer people as compared to the second quarter of FY2021 (340,797).

Farebox revenue up in second quarter of FY2022

WSF farebox revenue was \$33.3 million for the second quarter of FY2022—about \$2 million (6.3%) more than the same quarter in FY2021 (\$31.3 million). Fare collection was about \$6.5 million (16.3%) below projections for the quarter mainly due to fewer sailings.

Passenger and employee injury rates increase

The rate of passenger injuries per million riders was 1.66 in the second quarter of FY2022, up 8% from 1.54 in the same quarter of FY2021. Passenger injuries are defined by the National Transit Database as any injury that results in transport to a medical facility. The passenger injury rate during the quarter (1.66) was above the WSF goal of 1.0 injury or fewer per million riders.

The rate of employee injuries reportable to the Occupational

Safety and Health Administration in the second quarter of FY2022 was 11.5 per 10,000 revenue service hours, a slight increase from 11.4 per 10,000 revenue service hours in the same quarter in FY2021. The employee injury rate was above WSF annual goal of fewer than 7.6 employee injuries per 10,000 revenue service hours.

Of the 29 employee injuries reportable to the Occupational Health and Safety Administration during the second quarter of FY2022, the most frequently reported was pain and soreness (10) and hearing loss (10).

Rate of passenger feedback increases

There were 742 complaints during the second quarter of FY2022, compared to 277 complaints in the same quarter last year. Expressed as a ratio related to ridership, there were 20.47 complaints per million riders in FY2022, up from 8.51 in FY2021. The most common complaint was related to the schedule with 8.5 per million riders (276) followed by employee behavior at 4.8 per million riders (157). Compliments in FY2022 were 0.7 per million riders (25) as compared to 0.4 (12) in the second quarter of FY2021.

Contributors include Matt Hanbey, Donna Thomas, Joe Irwin and Dustin Motte

Customer compliments WSF for service and communications

"WSF team, you are doing a fantastic job with service and communications. Specifically, the Twitter data is extremely useful. You are making lemonade out of lemons and still providing safe, clean, reliable transportation. Don't let the negative comments bring you down - they have no idea what it takes to run a specialized, maritime, and government operation which is regulated. THANK YOU. Keep your heads up!"

84 ZERO EMISSION VEHICLES ANNUAL REPORT

Washington sees approximately 39% increase in electric vehicle registrations from 2020

Washington state is second in the nation in terms of zero emission electric vehicle (ZEVs) market share, with more than 28 ZEVs per 1,000 registered vehicles. Washington state had 87,685 ZEV registrations as of December 31, 2021. This is roughly a 39% increase in ZEV registrations from 63,259 in 2020 and a 192% increase from 30,025 in 2017.

The total ZEV count in Washington for 2021 included 64,647 battery electric vehicles (BEVs) and 23,038 plug-in hybrid electric vehicles (PHEVs). Washington has maintained a ratio of approximately two BEVs for every PHEV since 2015 (see table below). For a county by county perspective, refer to map on p. 39.

Zero emission electric vehicle registrations surge upward in Washington

2017 through 2021; Number of zero emission electric vehicle registrations by vehicle type; Includes battery electric vehicles and plug-in hybrid electric vehicles

Vehicle type	2017	2018	2019	2020	2021
BEV	20,010	27,853	36,129	45,292	64,647
PHEV	10,015	15,025	17,178	17,967	23,038
ZEV totals	30,025	42,878	53,307	63,259	87,685

Data source: Washington State Department of Licensing.

Notes: BEV = Battery electric vehicles. PHEV = Plug-in hybrid electric vehicles. ZEV = Zero Emission Electric vehicles.

To help ensure these vehicles have ready access to power when needed, Washington has worked with its ZEV partners to increase the number of ZEV charging stations and ports. As of 2021, the state has:

- 1,605 Level 2 electric vehicle supply equipment units with 3,404 ports (Level 2 Charging: 208-Volt to 240-Volt). Depending on the vehicle, this will take around eight hours to completely charge.
- 217 Direct Current fast chargers with 726 ports (Fast Charging: 400-Volt to 900-Volt). Fast chargers allow most vehicles to recharge in minutes as opposed to hours.

In the past five years, the total number of charging ports (both Level 2 and DC fast chargers) has increased 131% from 1,790 to 4,130.

Because not all electric vehicles use the same type of fast charger to plug in and recharge, WSDOT works with partners to ensure a variety is offered. Increased ZEV adoption is expected to help the state progress toward its goals of reducing greenhouse gases, protecting public health and the environment, and promoting economic growth.

Notable results

- Zero emission electric vehicle registrations in Washington increased 192% between 2017 and 2021
- Public charging ports for ZEVs in Washington state increased 131% between 2017 and 2021
- Twenty-three percent of WSDOT's passenger vehicle fleet is electric.

Zero emission vehicles

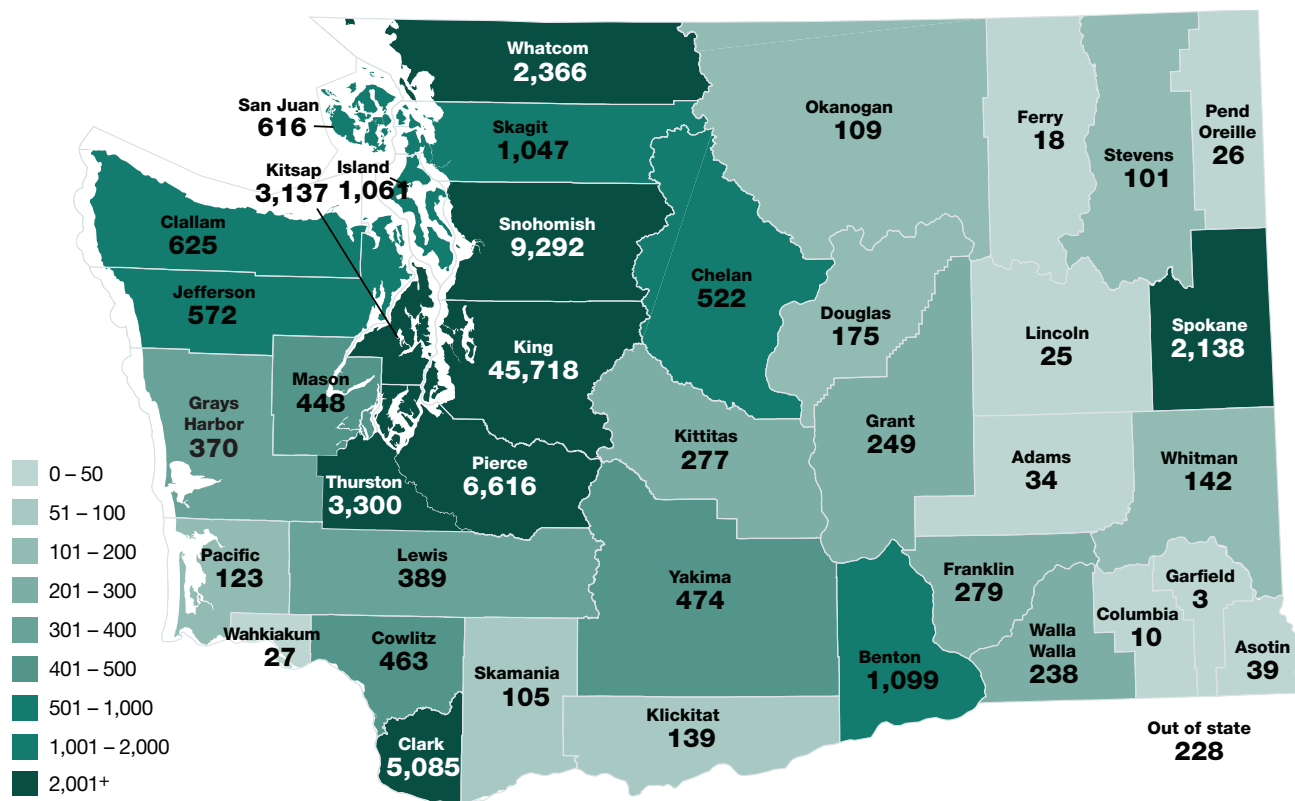
Zero emission vehicles do not emit exhaust gas or other pollutants from the onboard source of power. Electric vehicles include both battery electric vehicles, plug-in hybrid electric vehicles and hydrogen fuel cell vehicles.

- **Battery electric vehicles (BEVs)** are fully electric vehicles that have a battery as their sole energy source.
- **Plug-in hybrid electric vehicles (PHEVs)** have both a battery and an internal combustion engine. PHEVs run off the battery but can switch to the conventional engine to extend the range.
- **Hydrogen fuel cell electric vehicles (FCEVs)** run on electricity produced from a fuel cell using hydrogen gas

Hybrid vehicles have both a battery and an internal combustion engine that work in synergy. They do not plug into an external power source to recharge the battery and are not considered ZEVs.

Washington's total registered zero emission electric vehicles reach 87,685

Number of electric vehicle registrations by county; As of December 31, 2021



Data source: Washington State Department of Licensing.

Notes: Map includes all plug-in electric vehicles produced by major auto makers since 2011. It does not include cars converted to ZEVs by their owners, neighborhood ZEVs or motorcycles. "Out of state" vehicles are registered in the state of Washington, but the registered owner's address is out of state.

WSDOT expands its EV infrastructure

WSDOT expanded its electric vehicle charging infrastructure by 56% in 2021. This equates to a total of 84 charging stations of which 47 of these stations were part of the Volkswagen grant agreements with the Washington State Department of Ecology, Department of Enterprise Services and Volkswagen.

In 2021, as part of these grant agreements, WSDOT installed 43 Level 2 charging stations with the capacity to charge 86 vehicles and four DC fast charging stations throughout the state.

WSDOT installed Level 2 charging stations on Bainbridge Island, in Shoreline, Spokane and Union Gap, and at two locations in Seattle. WSDOT's DC fast charger network has expanded to include Shoreline, South Seattle, Spokane and Union Gap.

Since 2016, Volkswagen grant agreements have provided 58 Level 2 EV chargers and five DC fast chargers to WSDOT's electric vehicle infrastructure.

These fast-charging stations now provide access for WSDOT cross-state EV travel between Spokane, Cle Elum, Union Gap, Seattle and Olympia.

WSDOT installs EV chargers on leased property

WSDOT collaborated with the Department of Corrections and Edna L. Goodrich (ELG) building landlord, Wright Runstad & Company, to install a bank of 10 Level 2 dual-head chargers and a DC fast charger in Tumwater at the ELG building in 2020. WSDOT and the Department of Corrections lease this building. WSDOT funded this project with monies from the 2016 Volkswagen settlement that stemmed from the car company violating the United States' Clean Air Act.

WSDOT reduces passenger vehicle fleet in 2021

WSDOT reduced the number of vehicles overall in its statewide passenger vehicle fleet by 5%, from 409 in 2016 to 389 in 2021.

Due to COVID-19 restrictions and an equipment purchasing freeze, WSDOT did not purchase new passenger vehicles in 2021. The ZEV passenger vehicle numbers increased from 66 in 2018 to 89 in 2020 and the percentage of electric vehicles in its passenger vehicle fleet increased from 6% to 23% between 2016 and 2020.

WSDOT plans to purchase more ZEVs for its passenger vehicle fleet and continue to reduce its environmental footprint.

WSDOT replaces internal combustion passenger vehicles

WSDOT prioritizes purchasing electric vehicles to replace internal combustion engine passenger vehicles to meet the Washington State Legislature's goal to reduce GHG emissions by 2030.

Since early 2018, WSDOT has replaced 32 internal combustion engine vehicles with Battery Electric Vehicles at its facilities in Spokane, Olympia area, Vancouver, Seattle area, Chehalis, Union Gap, Aberdeen, Port Angeles and Everett.

Contributors include Tonia Buell, Georgina Willner, Joe Irwin and Michele Villnave

WSDOT's electrification plan moves forward

WSDOT is actively working to reduce agency greenhouse gas emissions by electrifying its energy use and improving its energy efficiency. [WSDOT's plan to reduce GHGs \(PDF, 197 kb\)](#) has the agency on target to meet the Washington State Legislature's goal to reduce GHG emissions by 2030, but it is largely unfunded.



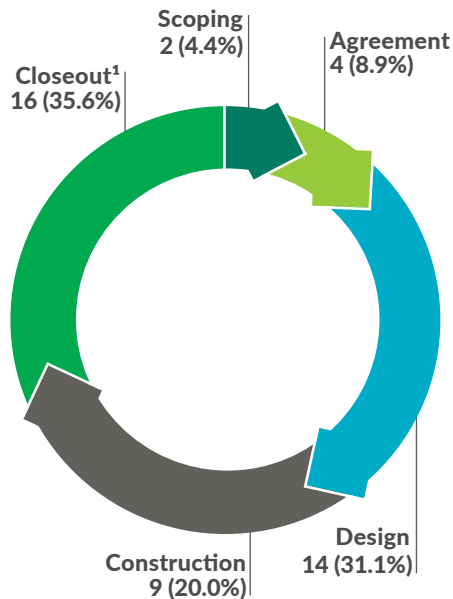
WSDOT's Northwest Region Corson Avenue building level 2 chargers are in operation. WSDOT installed six level 2 chargers and two DC fast chargers at this site.

Notable results

- As of December 31, 2021, 45 WSDOT-administered projects to improve freight rail structures and freight movement were underway
- WSDOT's Washington Rural Rail Rehabilitation project was completed in 2021

Sixteen of 45 freight rail projects reach final closeout stage in 2021

As of December 31, 2021



Data: WSDOT Rail, Freight, and Ports Division.

Notes: Percentages may not add to 100 percent due to rounding. Projects include those funded through the Freight Rail Assistance Program and the Freight Rail Investment Bank, as well as any freight rail projects funded federally or through Connecting Washington. ¹ Closeout includes capturing final records and closing the corresponding work orders.

WSDOT administers grants and loans funding 45 freight rail projects underway in 2021

A total of 45 WSDOT-administered projects to improve freight rail infrastructure and freight mobility were underway as of December 31, 2021. The work will continue in upcoming years and includes projects funded by the Connecting Washington transportation package, state and federal freight rail grants, and a state freight rail loan program.

Of these 45 freight rail projects, two (4.4%) were in the scoping phase, four (8.9%) were in the agreement stage, 14 (31.1%) were being designed, nine (20%) were under construction, and 16 (35.6%) were in the final closeout phase (refer to chart at left).

The legislature approved 13 of these projects as part of the 2021-2023 biennial transportation budget, the remaining 32 projects were approved in previous biennia (refer to chart below).

Thirteen of 45 rail projects approved in 2021-2023 biennium are underway

Projects underway as of December 31, 2021

Biennium originally approved	Projects
2015-2017	1
2017-2019	11
2019-2021	20
2021-2023	13
Total	45

Data source: WSDOT Rail, Freight, and Ports Division.

Notes: Projects include those funded through the Freight Rail Assistance Program and the Freight Rail Investment Bank, as well as any rail projects funded federally or through the Connecting Washington funding package.

Connecting Washington funds 10 freight rail projects underway in 2021

As of December 31, 2021, 10 freight rail improvement projects funded through the Connecting Washington transportation package were underway. These CW projects were approved by the legislature as part of the 2017-2019 or 2019-2021 transportation budgets. They include rail interchange improvements, rail infrastructure work at several ports, landslide mitigation along railroad tracks and rehabilitation of existing rail lines.

Three of the 2017-2019 biennium CW projects were in closeout phase, one was in design. The remaining six projects were funded in the 2019-2021 biennium, with two in design, three in construction, and one in closeout as of December 31, 2021.

Six Federal Rail Assistance Program projects and one Freight Rail Investment Bank loan program project in closeout phase

As of December 31, 2021

Project Status	FRAP projects	FRIB projects
Scope	1	
Agreement	3	3
Design	4	
Construction		
Operationally complete ¹	3	
Closeout	6	1
Total	17	4

Data source: WSDOT Rail, Freight, and Ports Division.

Freight Rail Assistance Program funds 17 projects underway in 2021

A total of 17 projects funded through the Freight Rail Assistance Program were underway as of December 31, 2021. Eight of these were new projects awarded for the 2021-2023 biennium for a total of \$6.6 million. This made up approximately 64% of the projects' total budgets of \$11.7 million.

These projects include rail and tie replacements, rail safety improvements, bridge replacements, new sidings (short segments of track that allow a train to pull off the main line so another train can pass), crossing improvements, tunnel repairs, noise abatement and preservation. Of these 17 FRAP projects, six were in closeout as of December 31, 2021 (refer to table above).

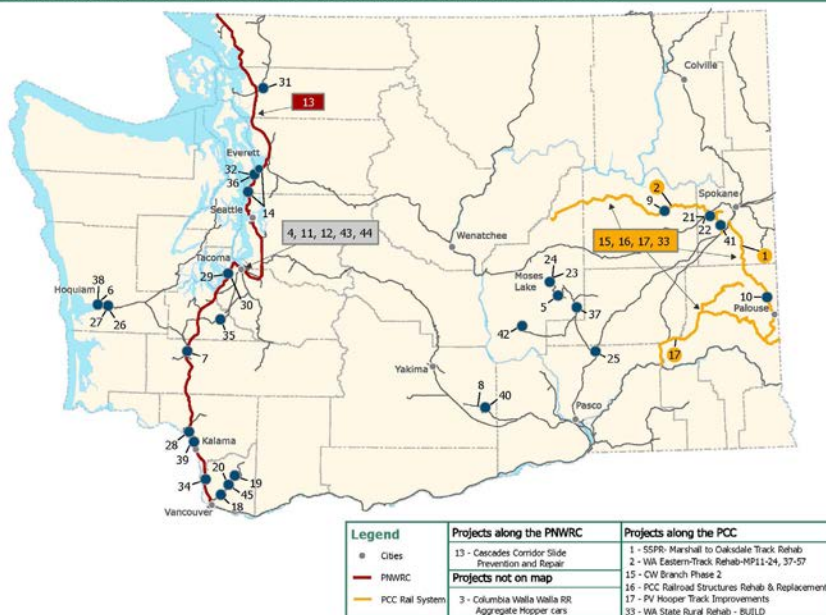
Freight Rail Investment Bank loan program assists four projects in 2021

Four projects financed using state Freight Rail Investment Bank loans were underway in 2021. All four of the loans active in 2021 were for Tacoma Rail projects. WSDOT awarded one of these loans during the 2019-2021 biennium and the project is currently in closeout. The other three loans, totaling \$1.6 million, were awarded for the 2021-2023 biennium. This made up approximately 34% of the projects' total budgets of \$4.8 million.

The Legislature funds the FRIB loan program to help deliver projects that improve the state's long-term economic vitality by improving freight movement. Past loan repayments have all been made on time, with 40 loans currently being repaid under 10-year or 15-year terms.

The map (below left) shows the locations of all the rail projects for the current 2021-2023 biennium as well as the past several biennia.

Rail, Freight, Ports Division Freight Rail Program: 2015-2023



Click anywhere on the image to view a larger version of this map.

State funds 10 additional freight rail projects underway in 2021

Ten freight rail capital projects received state funding through specifically designated line items in the Transportation Budget in 2021. These are administered by WSDOT and include work on the Chelatchie Prairie Railroad, Spokane Airport Transload Facility, as well as bridge replacements, grade separations, and track improvements across the state.

Palouse River and Coulee City Rail System

The PCC is the largest short line freight rail system in Washington, serving five eastern Washington counties: Grant, Lincoln, Spokane, Adams, and Whitman. The WSDOT-owned system allows farmers and growers to ship their agricultural products via rail from their more remote locations, thus connecting them with larger railroads, barges and container ships for distribution throughout the world.

WSDOT completes rural rail rehabilitation project, starts to make slope repairs at seven landslide-prone sights

After beginning construction in 2020, WSDOT's Washington State Rural Rail Rehabilitation project—funded by a \$5.6 million Better Utilizing Investments to Leverage Development grant from the U.S. Department of Transportation—was completed in 2021.

This \$5.6 million WSDOT project was awarded the grant in 2018 and improves strategically significant sections of the 298-mile state-owned Palouse River and Coulee City short line rail system in eastern Washington (refer to box at left). State and local funds were used to match the federal grant monies, providing a total of \$11.2 million for capital improvements.

WSDOT and BNSF use federal grants for landslide mitigation projects

WSDOT and BNSF Railway were awarded both a 2018 and a 2020 federal Consolidated Rail Infrastructure and Safety Improvements grant to reduce the risk of landslides at seven landslide-prone sites along railroad tracks between Seattle and Everett.

Two projects were funded with the 2018 grant and they are currently under design with construction scheduled in 2022. The 2020 grant will address landslide hazards at five additional locations. Work includes constructing walls to stop debris from reaching tracks, enhancing slope stabilization and making drainage improvements, and adding slide warning fences.

Contributors include Cameron Harper, Janet Matkin, Cara Motte, Mark Nickerson, Carolyn Simmonds and Joe Irwin

84 CAPITAL PROJECT DELIVERY PROGRAMS QUARTERLY UPDATES

Four Connecting Washington contracts complete during the second quarter

Four Connecting Washington contracts were operationally complete by WSDOT during the second quarter of the 2021-2023 biennium (October through December 2021). Operationally complete contracts and projects are functionally finished (for example, an overpass that has opened but still has some outstanding work items like landscaping. etc.).

Contracts that were operationally complete during the quarter include:

- I-90/Cabin Creek Interchange Eastbound - Replace Concrete Panels (Kittitas County)
- US 395/North Spokane Corridor BNSF - 2nd Railroad Realignment (Spokane County)
- I-5/Northbound On-Ramp at Bakerview - Improvements (Whatcom County)
- SR 125/Plaza Way - Intersection Improvements (Walla Walla County)

Nickel and Transportation Partnership Account funding continues to be lower than original projections

Fuel tax collections show 2003 and 2005 revenue forecasts, which were used to determine project lists, did not anticipate the economic recession in projecting future growth in fuel tax revenues. The 2003 Nickel and 2005 TPA gas taxes that fund projects are based on a fixed tax rate per gallon and do not change with the price of fuel. As such, reduced gasoline and diesel consumption and sales lead to reduced tax revenue.

Fuel tax funding from the 2005 TPA package has been lower than the original March 2005 projection. The original projection for the TPA account was \$4.9 billion over a 16-year period from 2005 through 2021. Current TPA projections through 2021 are estimated to be \$4.0 billion, approximately 20% lower than the original 2005 projection.

The 2003 Nickel transportation package was originally a 10-year plan, with revenues forecasted to total \$1.9 billion from 2003 through 2013. Fuel tax revenues collected during this period were 10.2% lower than the original March 2003 projection.

Nickel and TPA gas tax revenues are used to pay the debt on the bonds sold to finance planned projects. Once all the bonds are sold, revenues collected will be used to pay the debt.

Contributors include Nguyen Dang, Skye Fitzpatrick, Penny Haeger, Linda Kneeland, Thanh Nguyen, Aaron Ward, Dan Wilder, WSDOT regional project experts, and Joe Irwin

Notable results

- *Four Connecting Washington contracts were operationally complete during the second quarter of the 2021-2023 biennium*
- *WSDOT advertised 51 of 97 Pre-existing Funds projects during the second quarter of the 2021-2023 biennium*

GNB no longer tracking Current LEAP data

As progress on the vast majority of Nickel/Transportation Partnership Account projects winds down, the Gray Notebook will no longer be tracking their Current Legislative Evaluation and Accountability Program details. The GNB will also be phasing out reporting on these fuel taxes (which conclude at the end of 2021). The few, remaining Nickel/TPA projects will continue to be tracked in the Completed Projects and Contracts (pp. 45-46) and Ad Record (pp. 47-48) sections.

84

COMPLETED PROJECTS
& CONTRACTS

Notable results

- *Four Connecting Washington contracts were operationally complete during the second quarter of the 2021-2023 biennium*

GNB reporting on
projects and contracts

The Gray Notebook differentiates completed projects from completed contracts. Larger projects frequently include smaller contracts (e.g. pavement replacement on a section of I-5 that is part of a larger concrete rehabilitation project). Completing contracts does not mean that these larger projects are finished. For example, a project can involve three contracts total and have two contracts finished. The project would be complete when the third and final contract is done.

WSDOT's Watch List
projects available online:

To streamline work and ensure accuracy and consistency, the Watch List is no longer featured in the Gray Notebook. This change helps the GNB better align with [WSDOT's Capital Program Development and Management Office and its monthly online Watch List of projects](#) that have or may have significant changes in scope, schedule or budget.

Four Connecting Washington contracts
operationally complete

Four Connecting Washington contracts were operationally complete by WSDOT during the second quarter of the 2021-2023 biennium (October through December 2021). Operationally complete contracts and projects are functionally finished (for example, a pedestrian/bicyclist overpass that has opened but still has some outstanding work items like minor striping or landscaping).

I-90/Cabin Creek Interchange Eastbound -
Replace Concrete Panels

(Kittitas County)

Operationally complete:
October 14, 2021

The concrete panels on eastbound I-90 at the Cabin Creek interchange east of Snoqualmie Pass were deteriorating due to severe cracking and excessive wear. This Connecting Washington contract removed and replaced the damaged panels, restoring the structural integrity of this section of I-90 and providing a smoother driving surface.

Budget: This Connecting Washington contract was completed for approximately \$536,000, which was about \$110,000 higher than the last approved budget of \$426,100.

This budget increase was due to higher costs for preparation and mobilization to replace concrete panels as well as planning and work associated with bituminous pavement and hot mix asphalt.

Schedule: This contract's advertisement date was delayed by two months February to April 2021 and its operationally complete date has been delayed by three months from June to October 2021, primarily due to WSDOT bundling contract work to achieve construction efficiencies.

US 395/North Spokane Corridor BNSF -
2nd Railroad Realignment

(Spokane County)

Operationally complete:
October 27, 2021

This Connecting Washington contract—part of the larger North Spokane Corridor mega project—realigned and relocated BNSF railroad track west of the previously used track from Rowan Street to Cleveland Street. The contract included two new railroad structures over Wellesley Avenue and spur a line to the tank farm (an area housing oil or gas storage tanks) east of the North Spokane Corridor alignment. Other work included grading,

realigning city streets, utility relocations, and adding retaining walls, drainage, minor paving and sidewalks.

Budget: This Connecting Washington contract was completed for approximately \$79.5 million, which was on target with the last approved budget.

This contract's total cost increased by approximately \$17.5 million from \$62.2 million when work associated with acquiring additional right of way, and completing more utility relocation and site preparation work—was transferred to it from other North Spokane Corridor contracts. The work there benefited several additional NSC contracts.

Prior to this, costs increased by \$9.5 million from \$52.7 million due to a realized risk for WSDOT's participation in the Black Tank cleanup site (contaminated ground where acetylene gas was once produced). This work was transferred from the risk reserve on US 395/NSC Columbia to Freya contract and therefore did not affect the overall cost of the North Spokane Corridor project.

Schedule: This contract was completed in October 2021, which was on time with the last approved schedule.

Nationwide impacts from the COVID-19 pandemic and response resulted in delays for procuring steel girders needed for the contract delaying completion 12 months.

I-5/Northbound On-Ramp at Bakerview - Improvements

(Whatcom County)
Operationally complete:
November 4, 2021

This Connecting Washington contract constructed a second northbound on-ramp on the east side of I-5 to reduce congestion at the overcrossing at I-5 and the Bakerview Road interchange, enhance regional multimodal transportation and support economic development in northwestern Bellingham.

Budget: The contract was completed for approximately \$10.9 million, which was on target with the last approved legislative budget.

Schedule: The contract's advertisement was delayed a total of 13 months from October 2019 to November 2020. This was due to a three-month right of way acquisition delay, a four-month permit delay and a further six-month delay when Initiative 976 passed, which resulted in the governor directing WSDOT to postpone projects and contracts that were not underway.

SR 125/Plaza Way - Intersection Improvements

(Walla Walla County)
Operationally complete:
November 30, 2021

This Connecting Washington contract constructed a roundabout to improve traffic flow and reduce the potential for crashes at the intersection of SR 125 and Plaza Way.

Budget: This Connecting Washington contract was completed for approximately \$5.0 million, which was approximately \$162,000 less than the last approved budget.

The total original cost increased by \$1.8 million to reflect the City of Walla Walla's contribution to the project and to deliver project elements—including multimodal improvements—identified during community engagement and preliminary design. Costs later decreased by \$284,000 due to a reduced construction costs for clearing, surveying work, and less right of way needs.

Schedule: This contract's operationally complete date was delayed by a year in response to a City of Walla Walla request to allow other planned construction work on SR 125 to finish and reduce impacts to traffic.

84 ADVERTISEMENT RECORD QUARTERLY UPDATE

Connecting Washington Account projects in construction ¹ Through December 31, 2021; (County); Dollars in millions	Schedule status	Completion date	Total project cost
SR 167/SR 509 Puget Sound Gateway (multiple counties)			
SR 509/SeaTac Stage 1 Elements (WSDOT Contribution)	Advanced	Nov-2022	\$49.2
SR 509/King County Trail (WSDOT Contribution)	Delayed	Mar-2023	\$12.0
SR 509/I-5 & SR 516 I/C ² to 28th/24th Ave. South - SR 509 Completion Stage 1	Delayed	Jun-2025	\$470.0
SR 167/I-5 to SR 509 - Stage 1B	Delayed	Jan-2026	\$617.8
I-405/Renton to Bellevue - Corridor Widening (King)			
I-405/Renton to Bellevue - Corridor Widening & ETL ³ (Stage 2)	Delayed	Dec-2024	\$788.6
I-405/Toll Vendor for Renton to Bellevue - Toll System	On schedule	Sep-2024	\$42.5
Land Mobile Radio Upgrade (multiple counties)			
Wireless Communication	Delayed	Sep-2022	\$37.0
SR 520 Seattle Corridor Improvements - West End (King)			
SR 520/Montlake to Lake Washington - I/C and Bridge Replacement	Delayed	Jun-2023	\$628.1
SR 520/I-5 to Lake Washington - Bridge Replacement - Mitigation	On schedule	Jun-2024	\$24.2
SR 520/I-5 Interchange - Improvement	Delayed	Aug-2023	\$ 114.1
US 395 North Spokane Corridor (Spokane)			
US 395/NSC Wellesley Ave. Improvements	On schedule	Oct-2022	\$35.8
US 395/NSC Spokane River to Columbia	On schedule	Oct-2022	\$49.2
US 395/NSC Spokane River to Columbia - Shared Use Path	On schedule	Jun-2022	\$13.3
US 395/NSC Sprague Ave. to Spokane River	Delayed	Dec-2022	\$112.5
I-90/Eastgate to SR 900 - Corridor Improvements (King)			
I-90/Eastgate to SR 900 - Corridor Improvements	Delayed	Oct-2021	\$73.0
US 12/Walla Walla Corridor Improvements (Walla Walla)			
US 12/Nine Mile Hill to Frenchtown Vicinity - Build New Highway	Delayed	Jul-2023	\$161.3
I-90 Snoqualmie Pass - Widen to Easton (Kittitas)			
I-90/Easton Hill to W. Easton I/C Westbound - Replace Bridge/Build Detour	Delayed	Jun-2022	\$14.6
I-90/Barker to Harvard - Improve Interchanges & Local Roads (Spokane)			
I-90/Barker to Harvard Phase 2 - Improve Interchanges and Local Roads	On schedule	Jul-2022	\$12.6
SR 305 Construction - Safety Mobility Improvements (Kitsap)			
SR 305/Johnson Rd. - Roundabout	Delayed	Aug-2022	\$5.9
I-405/NE 132nd Interchange - Totem Lake (King)			
I-405/NE 132nd Street Interchange Improvements	On schedule	Dec-2023	\$83.4

Data source: WSDOT Capital Program Development and Management.

Note: 1 Connecting Washington advertisements show projects currently in construction, and do not represent a comprehensive list of completed Connecting Washington projects. 2 I/C = Interchange 3 ETL = Electronic Toll Lanes. 4 Amount as listed, not in millions.

Connecting Washington Account projects in construction Through December 31, 2021; (County); Dollars in millions (continued)	Schedule status	Completion date	Total project cost		
SR 501/I-5 to Port of Vancouver (Clark)					
SR 501/I-5 to Port of Vancouver - Intersection and Profile Improvements	Delayed	Jun-2022	\$6.4		
SR 520/148th Ave NE Interchange - Overlake Access Ramp (King)					
SR 520/148th Ave NE Interchange - Overlake Access Ramp	Delayed	Oct-2022	\$68.3		
US 395/Ridgeline Intersection (Benton)					
US 395/Ridgeline Drive - Construct Interchange	Delayed	Oct-2022	\$17.6		
I-90/SR 18 Interchange Improvements (Kittitas)					
I-90/SR 18 Interchange to Deep Creek - Interchange Improvements & Widening	Delayed	Oct-2024	\$188.5		
I-5/Northbound Marine View Dr. to SR 529 - Corridor & Interchange Improvements (Snohomish)					
I-5/NB Marine View Dr. to SR 529 - Corridor & Interchange Improvements	Delayed	Sep-2024	\$122.8		
SR 14/I-205 to SE 164th Ave. - Auxiliary Lanes (Lewis)					
SR 14/I-205 to SE 164th Avenue-Auxiliary Lanes	Delayed	Oct-2024	\$28.4		
I-90/Medical Lake & Geiger Interchanges (Spokane)					
I-90/Medical Lake I/C to Geiger Field I/C - Reconstruction - Phase 2	Delayed	Sep-2022	\$6.4		
Nickel & TPA projects in construction Through December 31, 2021; (County); Dollars in millions	Fund type	Advertised on time	Ad date	Operationally complete date	Award amount
SR 99 Alaskan Way Viaduct Replacement (King)					
SR 99/South King Street Vicinity to Roy Street – Viaduct Replacement	Nickel/ TPA	✓	May-2010	Oct-2022	\$1,089.7
The SR 99 Tunnel opened to traffic in February 2019. The award amount is for the SR 99 Tunnel contract. The Viaduct Demolition, Battery Street Tunnel Decommissioning and Surface Street Improvements are in process.					
SR 99/Alaskan Way and Elliot Ave Surface Street Restoration	Nickel/ TPA	✓	Nov-2018	Jan-2023	\$153.0
The City of Seattle is the lead on this project.					
I-5/Tacoma HOV Improvements (Pierce)					
I-5/Portland Ave to Port of Tacoma Rd. - Northbound/Southbound HOV	Nickel/ TPA	Late	Jan-2018	Oct-2023	\$152.6
SR 290/Spokane River E. Trent Bridge - Replace Bridge (Spokane)					
SR 290/Spokane River E Trent Bridge - Replace Bridge	TPA	Late	Dec-2019	Oct-2022	\$20.1

Data source: WSDOT Capital Program Development and Management.

WSDOT has no change orders of \$500,000 or more during the quarter

WSDOT did not have any change orders of \$500,000 or more during the quarter ending December 31, 2021. After extensive reviews—which can involve subject matter experts, contract specialists and other outside stakeholders—WSDOT sometimes changes its engineers' original plans and specifications in order to complete projects. When this occurs, WSDOT issues a formal modification (or change order) to the contract containing a description of the change and details about how or if the contractor may be compensated for it. Each month, WSDOT posts all change orders estimated to cost \$500,000 or more online at [Change orders over \\$500,000 | WSDOT \(wa.gov\)](https://www.wa.gov/change-orders-over-500000).

84 PRE-EXISTING FUNDS QUARTERLY UPDATE

WSDOT advertises 51 Pre-existing Funds projects in the second quarter of the biennium

WSDOT advertised 51 of 97 Pre-existing Funds projects in the second quarter of the 2021-2023 biennium (October through December 2021). Of the 51 total projects advertised, five were advanced, 24 were on time, four were emergent, nine were emergency projects and nine were late. Of the remaining 46 projects originally scheduled to be advertised during the quarter, WSDOT completed two in an earlier biennium and delayed 44 within the 2021-2023 biennium.

As of December 31, 2021, WSDOT's current cost to complete the 79 PEF projects advertised through the second quarter of the 2021-2023 biennium was about \$420.2 million, approximately \$114.6 million (37.5%) more than the original value of \$305.6 million (refer to chart at right).

Cash flows currently lower than original projections

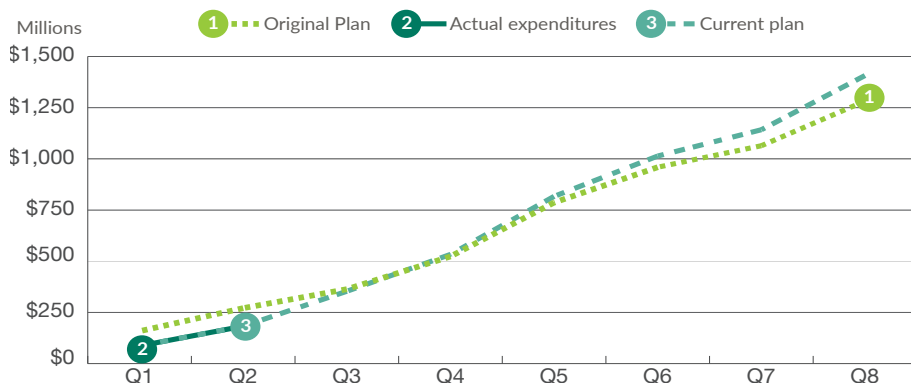
WSDOT originally planned to have approximated \$270.1 million in cumulative combined PEF improvement and preservation cash flows at the end of the second quarter of the 2021-2023 biennium, but had \$182.6 million, approximately \$87.5 million (32.4%) less in actual expenditures due to adjustments in the delivery plan.

Current cash flows can vary from originally planned cash flows for a number of reasons. For example, emergent projects may add cash flow to the current reporting quarter, whereas project deletions can remove cash flow.

As the biennium continues, the agency uses the original plan as a goal to achieve while working to meet projections set forth in the current plan. The current plan is more fluid and reflects quarterly changes due to projects being emergent, emergency, delayed, deferred, advanced or deleted.

Cumulative Pre-existing Funds improvement and preservation combined cash flows during the 2021-2023 biennium lower than planned

2021-2023 biennium; Quarter ending December 31, 2021; Planned vs. actual expenditures and current plan; Dollars in millions



Data source: WSDOT Capital Program Development and Management.

Note: Q2 refers to the second quarter (October through December 2021) of the 2021-2023 biennium, which runs from July 2021 through June 2023.

Current cost to complete PEF advertisements \$400,000 more than original value

2021-2023 biennium (July 2021 through June 2023); Second quarter (ending December 31, 2021); Dollars in millions

	Number of projects	Original value	Current cost to complete
Planned PEF advertisements for the 2021-2023 biennium	426	\$2,896.2	\$3,200.8
Actual PEF advertisements through the second quarter	79	\$305.6	\$420.2

Data source: WSDOT Capital Program Development and Management.

WSDOT advertises 79 PEF projects during the 2021-2023 biennium

Advertisement status	Quarter ¹	Cumulative ²
Advanced ³	5	9
On time	24	41
Emergent ⁴	4	7
Emergency	9	13
Late	9	9
Total projects advertised	51	79
Early ⁵	2	3
Delayed within the biennium	44	60
Deferred out of the biennium	0	0
Deleted	0	0

Data source: WSDOT Capital Program Development and Management.

Notes: **1** Quarter refers to October through December 2021. **2** Cumulative refers to July 2021 through June 2023. **3** Advanced projects were moved up from future quarters. **4** Emergent projects include unanticipated projects. **5** Early projects are planned for the quarter but advertised in a previous quarter.

WSDOT advertises 51 Pre-existing Funds projects during the second quarter of the 2021-2023 biennium

October through December 2021

Advanced (5)	
I-90/Lewis & Sunset Creeks - Fish Passage	SR 161/Unnamed Tributaries to Hylebos Creek - Fish Passage
SR 92/Lake Drive to 147th Ave. NE Vic. - Paving with Exceptions	I-405/SR 522 to SR 527 - Early Utility & Mitigation
SR 92/Lake Drive - ADA Compliance	
On time (24)	
I-5/Northbound Lowell Rd. to Snohomish River - Concrete Pavement Rehabilitation	US 97/Roadside Barrier Preservation
I-5/NB 41st St. Vic. to SR 529 Vic. - Expansion Joint Rehabilitation	NCR Bridge Patching 21-23
I-5/SB Samish River - Bridge Deck Overlay	SR 17/SR 260 to Adams County Line - Paving
SR 9/Bickford Ave - Intersection Improvements	I-90/Moses Lake to Adams County Line - Paving
SR 9/South Lake Stevens Road - Intersection Improvements	I-90/Moses Lake West Westbound Lanes - Paving
I-90/Westbound E Sunset Way to Coal Mine Wall - PCCP Replacement	US 97A/4 Miles South of Entiat - Rock Slope Scaling
I-90/Westbound E Fork Issaquah Creek Bridges - Deck Overlay	SR 971/Navarre Coulee Site 7 - Rock Slope Scaling
SR 202/Skunk Creek & Unnamed Tributary to Skunk Creek - Fish Passage	SR 971/Navarre Coulee Site 8 - Rock Slope Scaling
SR 203/Unnamed Tributaries to Snoqualmie River - Fish Passage	SR 971/Navarre Coulee Site 9 - Rock Slope Scaling
SR 525/Clinton Ferry Terminal Vic. - Pedestrian Connectivity	SR 971/Navarre Coulee Site 10 - Rock Slope Scaling
SR 544/Unnamed Tributary to Fourmile Creek - Fish Passage	SR 971/Navarre Coulee Site 11 - Rock Slope Scaling
SR 546/Pepin Creek and Duffner Ditch - Fish Passage	US 2/Davenport to Reardan - Paving
Emergent (4)	
Statewide 310W High Pressure Sodium Luminaire Fixture Removal/Replacement	I-5/Ship Canal Bridge - Fence Installation
NWR Fish Passage Adaptive Management - State Forces	I-405/Springbrook Creek Mitigation Bank - Long Term Management
Emergency (9)	
I-5/Tukwila to Lynnwood - PCCP Thermal Failures	SR 542/Chain Up Creek to East of Half Bridge - Unstable Slope
SR 9/E Hoff Road Vicinity - Eroded Roadway Reconstruction	SR 544/Nooksack River Overflow Culvert - Eroded Roadway & Damaged Culvert
SR 20/MP 101 to 116 Flood Repair - Emergency Contract	SR 8/Westbound Wildcat Creek Emergency Repair
I-90/PCCP Thermal Failures	SR 401/0.9 Miles North of Megler Rest Area - Emergency Slope Stabilization
SR 542/Boulder Creek - Streambed and Shoulder Repairs	

Data source: WSDOT Capital Program Development and Management.

Notes: SRA = Safety Rest Area. Vic. = Vicinity. WSDOT Regions: ER = Eastern Region, NCR = North Central Region, NWR = Northwest Region, OR = Olympic Region, SCR = South Central Region and SWR = Southwest Region. PCCP = Portland Cement Concrete Pavement

WSDOT advertises 51 Pre-existing Funds projects during the second quarter of the 2021-2023 biennium

October through December 2021

Late (9)	
I-405/SR 527 to I-5 Express Toll Lanes - Paving	SR 14/0.7 Miles West of Chamberlain Lake Rest Area- Slope Stabilization
I-405/SR 520 Ramps and SR 527 to I-5 - Paving	SR 14/0.6 Miles West of Chamberlain Lake Rest Area-Slope Stabilization
SR 16/Purdy Creek - Remove Fish Barrier	SR 14/0.2 Miles West of Chamberlain Lake Rest Area-Slope Stabilization
SR 302 (Spur)/SR 302 to N of 154th St. NW - Paving	SCR 2021-2023 Region Wide - Replace Signal Controllers
SR 302 (Spur)/Purdy Creek - Remove Fish Barrier	
Early (2)	
US 101/Hoodspoint Vicinity Slide - Debris Fence Emergency Repair	SR 108/US 101/Mason and Thurston Co Fish Barriers - Remove Fish Barriers
Delayed (44)	
US 2/Nason Creek SRA - Replace Sewer Panel - NCR	I-5/US 101 Interchange - Install Concrete Barrier
I-5/Smokey Point NB/SB Safety Rest Area - RV Sewage System Rehab	I-5/McAllister Creek Bridges - Repair Bridge Piles
SR 18/Eastbound Jenkins Creek to SE 231st St. Vic. - Paving	I-5/S 56th St. Interchange - ADA Compliance
SR 20/Deception and Canoe Pass Bridges - Soil Abatement	SR 19/Swansonville Creek - Remove Fish Barrier
SR 20/Rocky Creek to Granite Creek - BST	US 101/Ennis Creek - Remove Fish Barrier
SR 99/Tukwila International Blvd. to S Cloverdale St. - Bridge Deck Rehabilitation	US 101/Lees Creek - Remove Fish Barrier
SR 99/Tukwila International Blvd. to S Cloverdale St. - Paving	US 101/Hoquiam River-Riverside Ave Bridge - Machine Rooms Rehab
SR 104/Lyon Creek - Fish Passage	US 101/Mud Bay Bridges - Repair Bridge Piles
SR 202/Sammamish Creek - Fish Passage	US 101/Tumwater Creek in Vicinity of Nicholas Rd. - Remove Fish Barrier
SR 516/Barnes Creek - Fish Passage	SR 104/Paradise Bay-Shine Rd. - Intersection Safety Improvement
SR 516/Military Rd. Vic. to SR 181 - Paving	SR 104/SR 19 Intersection - Safety Improvements
SR 516/Reith Rd. - ADA Compliance	SR 104/Shine Creek - Remove Fish Barrier
SR 527/Penny Creek - Fish Passage	SR 109/West of Hoquiam - Stabilize Slope
SR 534/Unnamed Tributary to Carpenter Creek - Fish Passage	SR 116/Chimacum Creek - Remove Fish Barrier
US 2/Cashmere East - Paving	SR 166/Bethel/Bay/Maple Intersection - Roundabout
SR 17/ Lind Coulee Bridge to Vic. I-90 - Seal	SR 305/Murden Creek - Remove Fish Barrier
SR 17/Leahy West - Seal	SR 105/Washaway Beach Vicinity - Slope Protection
SR 17/Grape Dr. - Intersection Safety Improvement	SR 411/Cowlitz River Bridge - Replace Bridge Deck
SR 28/Quincy East - Seal and Pave	21-23 SCR Region Wide Safety Features - Signing
SR 170/West of Warden - Seal	I-90/S Cle Elum Rd. Bridges - Deck Rehabilitation
SR 207/Nason Creek - Chronic Environmental Deficiency	SR 125/Plaza Way - Railroad Crossing Improvements
2021 OR Region Wide Safety Features - Signing	Eastern Region - TMC Equipment Replacement

Notes: SRA = Safety Rest Area. Vic. = Vicinity. WSDOT Regions: ER = Eastern Region, NCR = North Central Region, NWR = Northwest Region, OR = Olympic Region, SCR = South Central Region and SWR = Southwest Region. ADA = Americans with Disabilities Act. PCCP = Portland Cement Concrete Pavement. BST = Chip seal. TMC = Traffic Management Center.

84

STATEWIDE TRANSPORTATION POLICY GOALS
& GRAY NOTEBOOK INFORMATION GUIDE

Statewide transportation policy goals

Laws enacted in 2007 established policy goals for transportation agencies in Washington (RCW 47.04.280). Throughout its editions, WSDOT's Gray Notebook reports on progress toward the six statewide transportation policy goals that include:

- **Safety:** To provide for and improve the safety and security of transportation customers and the transportation system;
- **Preservation:** To maintain, preserve, and extend the life and utility of prior investments in transportation systems and services;
- **Mobility:** To improve the predictable movement of goods and people throughout Washington, including congestion relief and improved freight mobility;
- **Environment:** To enhance Washington's quality of life through transportation investments that promote energy conservation, enhance healthy communities, and protect the environment;
- **Economic Vitality:** To promote and develop transportation systems that stimulate, support, and enhance the movement of people and goods to ensure a prosperous economy; and
- **Stewardship:** To continuously improve the quality, effectiveness, and efficiency of the transportation system.

Past Gray Notebook
editions are available

Readers can use the GNB archives to access the last five years of editions. Earlier editions are available by contacting the WSDOT Performance Management Office.

GNB reporting periods

WSDOT programs report their performance data during different periods to best fit the work they do. For example, a program that receives substantial federal funds may report performance based on the federal fiscal year (see charts below).

GNB credits

The GNB is developed and produced by members of the WSDOT Transportation Safety & Systems Analysis Division's Performance Management and Strategic Management offices, and articles feature bylines indicating key contributors from dozens of WSDOT programs. This edition of the GNB was completed entirely by staff members who were teleworking to help reduce the spread of COVID-19 in Washington. WSDOT's Headquarters Graphics Division (Marci Mill, Erica Mulherin and Steve Riddle) provides creative assistance, and WSDOT program staff and communicators take the photographs in each edition.

Calendar, state fiscal and federal fiscal quarters

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	GNB 81			GNB 82			GNB 83			GNB 84		
Calendar	Q1 2021			Q2 2021			Q3 2021			Q4 2021		
State Fiscal	Q3 FY2021			Q4 FY2021			Q1 FY2022			Q2 FY2022		
Fed. Fiscal	Q2 FFY2021			Q3 FFY2021			Q4 FFY2021			Q1 FFY2022		

2021-2023 biennial quarters (used by Legislature)

Period	Quarter	Period	Quarter
Jul – Sep 2021	Q1	Jul – Sep 2022	Q5
Oct – Dec 2021	Q2	Oct – Dec 2022	Q6
Jan – Mar 2022	Q3	Jan – Mar 2023	Q7
Apr – Jun 2022	Q4	Apr – Jun 2023	Q8

The Gray Notebook is prepared by:
Transportation Safety
& Systems Analysis Division
Washington State Department of
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