

Seattle Department of Transportation

ROADWAY STRUCTURES

2024 Annual Summary



University and Ship Canal Bridges



Seattle
Department of
Transportation

ASSET CONDITION

Bridges

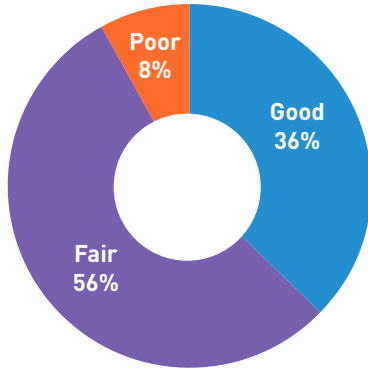
- **Bridge inspection frequency:** We ensure all bridges undergo inspections at least once every 24 months per Federal Highway Administration's (FHWA) requirements. Depending on the bridge's condition and type, we may increase inspection frequency or employ specialized inspection techniques. This includes assessments for nonredundant steel tension members, underwater inspections (every 60 months), or focused inspections for atypical or non-standard bridge components.
- **Rating bridge condition:** Bridge conditions are rated following the FHWA National Bridge Inspection Standards (NBIS). This system evaluates bridges based on their current state relative to their original condition, focusing on critical components such as the deck, superstructure, and substructure. In alignment with NBIS guidelines, SDOT assigns bridges a rating of good, fair, or poor, reflecting the condition of these essential elements, with the overall assessment based on the component with the lowest rating. This is not the only factor in developing asset preservation strategies.
- **Poor condition bridges:** A bridge rated in poor condition can still be deemed safe. Such ratings indicate the presence of structural or maintenance considerations. To continue meeting our top priority of safety, we can proactively undertake one of several steps: increasing the frequency of inspections, adjusting load capacity through restriping, posting weight limits, or executing temporary repairs as necessary to maintain public use.

SDOT assesses the condition of 39 pedestrian and 91 vehicular bridges.

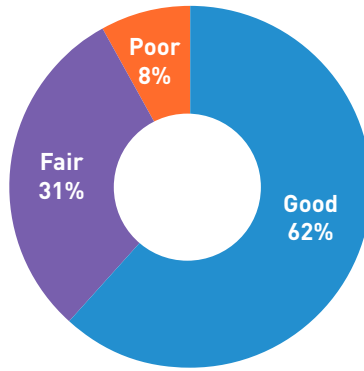


Fremont Bridge

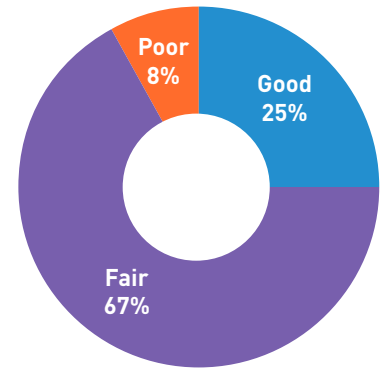
Overall Bridge Condition



Pedestrian Bridge Condition



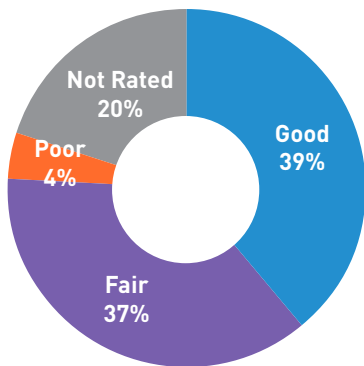
Vehicular Bridge Condition



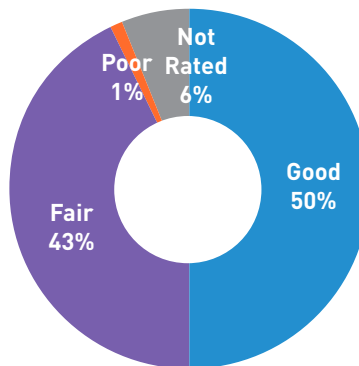
Main Component Condition



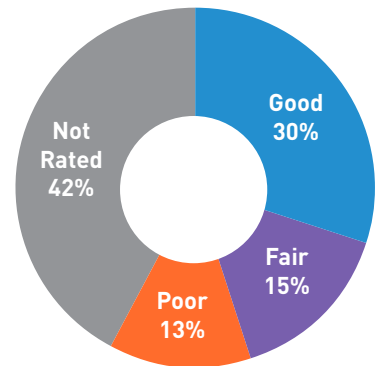
Retaining Wall Condition



Stairway Condition



Areaway Condition



STRUCTURAL OPERATIONS AND MAINTENANCE HIGHLIGHTS

Levy to Move Seattle Highlights

The Levy to

MOVE SEATTLE



Bridge Maintenance

Completed 394 bridge minor repairs, including:

- **Magnolia Bridge:** Repairs included patching concrete spalls, rebar treatment, grout pack filling, modifying expansion joints to address structural deficiencies, sidewalk and railing repairs, and truss bracing fixes.
- **Albro Place over Airport Way:** Work included epoxy injection and sealing, including air testing, port drilling, and sealing cracks, as well as spall repairs under both the North and South sidewalks by removing loose concrete, cleaning rebar, and applying grouts.
- **Royal Brougham/RR Bridge:** Working included removing sunken expansion joint compression seals over the walkway, cleaning diagonal cracks in the concrete box girder spans and sidewalk and injecting epoxy.
- **Ballard Bridge:** Structural repairs included injecting cracks with epoxy, concrete spall repairs, and replacing damaged railings. Mechanical work involved troubleshooting motor malfunctions, centerlock failures were resolved, and installing grease containment trays. Electrical repairs included fixing power outages, gate malfunctions, and traffic signal issues. Additional maintenance involved emergency plumbing repairs, bridge cleaning, and thermal expansion mitigation.
- **Fremont Bridge:** Structural repairs included fixing a cracked weld connection, replacing rusted anchor bolts, and addressing section loss due to corrosion. Mechanical repair work included addressing issues such as motor malfunctions, and gear box maintenance. Electrical work involved repairing sign and navigation lighting, addressing a power outage, and troubleshooting alarm and gate control issues.

- **Spokane Swing Bridge:** Rehabilitation work included the removal, refurbishment, and reinstallation of two of four slewing cylinders. We installed a new fiber optic connection under the Duwamish River, integrating into the updated control system to enhance operational troubleshooting. Additionally, HMIs (Human-Machine Interfaces) were added to improve bridge monitoring and control. Crews also responded to a vehicle collision with the gate arm barricade, fabricating and installing a replacement.
- **University Bridge:** Structural repairs included injecting cracks with epoxy, railing reattachment, and concrete delamination repairs to ensure structural integrity. Additional work involved addressing waterline repairs, roadway and navigation lighting fixes, traffic gate malfunctions, and installing grease containment measures. We also resolved mechanical issues, such as motor malfunctions.

Stairway Rehabilitation

Rehabilitated six stairways to meet current standards:

- Bonair Dr SW between Alki Ave and Halleck Ave
- Portage Bay Pl between E Allison St and E Martin St
- S Norman St between Lake Washington Blvd S and 33rd Ave S
- 50th Ave SW between SW Admiral Way and SW Grayson St
- SW Hudson St between 40th Ave SW and 41st Ave SW
- W Bertona St between 15th Ave W and Alleyway



Jose Rizal Bridge

BRIDGE INSPECTIONS

Completed 100% of NBIS bridges

Routine: 31
Fracture Critical: 8
Special: 4
Safety/Other: 57
Underwater: 1
Condition: 40
Short Span: 12

COMPLETED WORK ORDERS

Bridges: 607
Stairways: 56
Retaining Walls: 19
Areaways: 5

BRIDGE OPENINGS

Variance from 2023 identified at right

Ballard: 2,826	↓ 382
Fremont: 4,135	↓ 367
University: 2,340	↓ 312
Spokane: 1,543	↓ 84
South Park: 540	↑ 43

EMERGENCY RESPONSE

Crashes: 0
Operational: 55
Other Maintenance: 13

OTHER ASSET INSPECTIONS

Stairway: 171
Retaining Walls: 92
Areaways: 50

PLAN REVIEW AND SERVICE REQUESTS

Plan Review: 192
Service Requests: 113

Looking ahead to 2025

Thanks to the Seattle Transportation Levy, we will invest in keeping bridges and structures in reliable working condition and preparing for future bridge projects. This includes implementing preventative maintenance for the City's 134 bridges, making optimum preservation-focused treatment schedules for deck and joint replacement, bridge cleaning and painting, and spot repairs.

GLOSSARY

Bridge Inspection Types:

Routine: Regularly scheduled inspections consisting of documenting observations, measurements, or both, used to determine the physical and functional condition of the bridge at a point in time.

Nonredundant Steel Tension Member (NSTM) (previously Fracture Critical): Inspection to assess the structural condition of each NSTM member, whose failure could result in the partial or total collapse of the bridge.

Private/Other: Inspection of privately-owned structures that spans across the public right-of-way.

Condition: Inspection to assess the condition of pedestrian structures or other bridge structures that may not meet National Bridge Inspection Standards guidelines for a “routine” inspection.

Short Span: Inspection used for vehicular bridges that are 20 feet or less.

Special: Inspection to assess the condition of special features on a bridge, such as the electrical and mechanical elements of a moveable bridge.

Underwater: In-water inspections to examine the underwater elements of the bridge to determine their structural condition and adequacy.

Variance: Change, either up or down, from the prior year.



Cowen Park Bridge

Bridge Load Rating

Determines a bridge's capacity to carry specific types of vehicle loads. This information is used to manage and enforce vehicle loads on bridges. This is important for safety and preservation.

Activities include:

- Analyze the vehicle load capacity of bridges
- Field verification tests
- Post or restrict the weight and or type of vehicle for bridges or structures with reduced load ratings.

Component level assessment

Detailed assessment of the condition state of the individual bridge components, which includes and is not limited to the deck, the substructure, and the superstructure.

Other Inspections

Inspections to assess the condition of other roadway structures that are not identified as a bridge, such as areaways, retaining walls, and stairways.

Superstructure

Typically refers to the bridge elements above the bearings and piers. Key components include:

Deck

This is the surface that people drive, ride, or walk on.

Girders: These horizontal structures provide support to the deck, spanning the length of the bridge.

Trusses: An assembly of members such as beams, connected by nodes that creates a rigid structure that supports the deck; a structural system used particularly on long bridges.

Bearings: The interface between the superstructure and substructure; bearings support the superstructure's weight and allows defined movement of the bridge.

Parapets

Railing or barrier that is located along the outside edge of a bridge.

Expansion Joints

These elements provide continuity between the bridge and the roadway and allows the bridge to expand and contract due to variations in temperature

Substructure

Typically refers to all the other elements of the bridge that supports the superstructure. Key elements include:

Column: Vertical component that supports the superstructure

Bent or Pier: Commonly used to refer to a column or a line of columns situated perpendicular to the path of travel

Foundation: Element that is located below ground and supports the bent or pier

Abutment: Refers to a bent or pier, denotes the support elements that support the beginning and the end of the bridge

Roadway Structures Mission

Make the most of Seattle's transportation investment, preserve infrastructure, manage capital improvements and maintain and operate bridges, retaining walls, stairways and areaways to provide a safe and reliable transportation system.

