

Summary

Introduction

Interstate 90 (I-90) is a critical transportation link within Washington State, connecting Puget Sound’s large population and business centers with the farmlands, diverse industries, and extensive recreational areas of Eastern Washington. The uninterrupted movement of people, freight, and goods over Snoqualmie Pass is essential to the quality of life and economic vitality of Washington State.

The I-90 Snoqualmie Pass East Project (I-90 project) is located on the east side of Snoqualmie Pass between the community of Hyak, at milepost (MP) 55.1, and the community of Easton, at MP 70.3 (Exhibit S-1). This 15-mile stretch of I-90 is in Kittitas County, Washington, and passes through the Okanogan-Wenatchee National Forest.

Exhibit S-1
I-90 Project Area



What is the status of the I-90 project?

Washington State Department of Transportation (WSDOT) published a Final Environmental Impact Statement (EIS) for the I-90 project in July 2008 (WSDOT 2008a). The Preferred Alternative was to widen the existing highway from four lanes to six in the same approximate alignment. In October 2008, the Federal Highway Administration (FHWA) signed the Record of Decision (ROD), which identified the Preferred Alternative from the 2008 Final EIS as the Selected Alternative for construction. WSDOT secured funding for the initial five miles of construction (Phase 1) and awarded the first of three Phase 1 construction contracts to begin work in 2009. Construction has continued into 2012.

In fall 2011, WSDOT awarded the third Phase 1 construction contract, which included highway improvements from MP 57.3 to MP 60.2, demolition of the snowshed along Keechelus Lake (Existing Snowshed), and construction of a new, expanded snowshed (Selected Snowshed). The contractor subsequently proposed a design modification to construct eastbound and westbound avalanche bridges (Proposed Bridges) instead of the Selected Snowshed. The contractor proposed this design modification through the Cost Reduction Incentive Proposal process. This process encourages contractors to be innovative in planning and performing work. WSDOT evaluated the proposal and granted concept approval of the Proposed Bridges because they introduce several benefits to the I-90 project, including the following:

- Reduction of long-term operations and maintenance costs by eliminating the Selected Snowshed and many of its electrical, mechanical, and fire suppression systems;
- Implementation of industry-standard engineering design and construction methods for bridge structures that avoid uncertainties associated with a more complicated, unique snowshed structure;
- Transfer of risk associated with structural design from the state to the contractor; and
- Improvement in traffic movement during construction by increasing the distance between construction activities and the traveling public.

The **Selected Alternative** in the 2008 ROD is Keechelus Lake Alignment Alternative 4, which includes construction of three lanes in each direction around Slide Curve and demolition and replacement of the Existing Snowshed with a new, expanded snowshed that would cover all eastbound and westbound lanes in an avalanche hazard area.

Cost Reduction Incentive Proposals are intended to promote innovative ideas involving improved work methods, new products, and improved equipment. Once the Cost Reduction Incentive Proposal is approved, WSDOT and the contractor split the construction cost savings.

After preliminary evaluation and refinement of the contractor’s proposal, FHWA and WSDOT decided to consider this proposed change in the I-90 project scope by preparing this Avalanche Structures Draft Supplemental EIS (Supplemental EIS).

What is a Supplemental EIS and why is it necessary?

According to the regulations implementing the National Environmental Policy Act (NEPA) for Federal-aid projects, and similar requirements in the State Environmental Policy Act (SEPA), an agency must prepare a Supplemental EIS when:

- “Changes to the [Selected Alternative] would result in significant environmental impacts that were not evaluated in the EIS; or
- New information or circumstances relevant to environmental concerns and bearings on the [Selected Alternative] or its impacts would result in significant environmental impacts not evaluated in the EIS” [Title 23 Code of Federal Regulations (CFR), Section 771.130(a)].

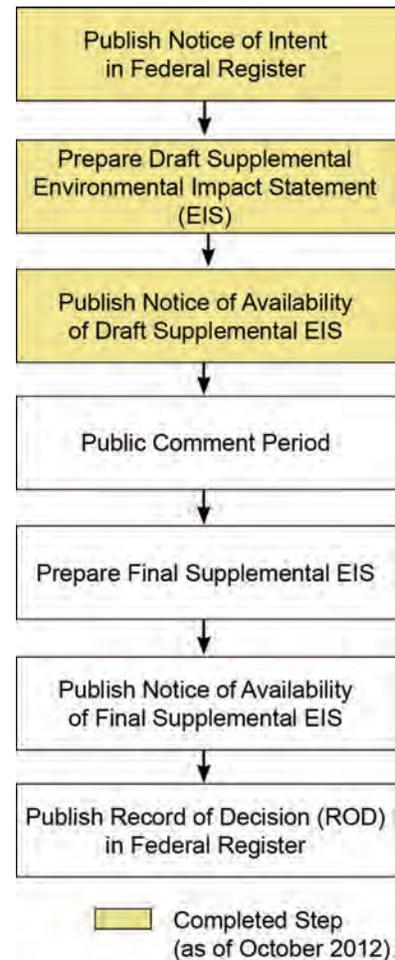
FHWA and WSDOT reevaluated the NEPA analysis conducted for the I-90 project’s 2005 Draft EIS and 2008 Final EIS. Uncertainty regarding the design and potential impacts of the Proposed Bridges led to the determination that a limited-scope Supplemental EIS was appropriate. As of the publication of this Draft Supplemental EIS, most of the uncertainty has been resolved.

This Supplemental EIS is being developed using the same process as a typical EIS, except that public scoping is not required [Title 23 CFR, Section 771.130(d)]. Exhibit S-2 shows the steps in the Supplemental EIS process, with completed steps shown in yellow.

What options are evaluated in this Supplemental EIS?

The scope of this Supplemental EIS is limited to analyzing the potential impacts of constructing, operating, and maintaining the Proposed Bridges and comparing them to the potential impacts of the Selected Snowshed as described in the 2008 Final EIS and ROD. Activities evaluated in this Supplemental EIS are all located on I-90 between MP 57.9 and MP 58.4.

*Exhibit S-2
Supplemental EIS Process*



Selected Snowshed

The Selected Snowshed option would include demolition of the 500-foot-long Existing Snowshed at MP 58.1 and replacement with a new 1,100-foot-long concrete structure. The Selected Snowshed would be constructed along the shoreline of Keechelus Lake, in the same general location as the Existing Snowshed. This option would reduce risks associated with avalanches, rock fall, and landslides in this location by covering the highway with a protective structure. The Selected Snowshed would require ongoing maintenance of the electrical, lighting, ventilation, and fire and life-safety systems associated with the structure and clearing of snow and debris from the top of the structure and the adjacent snow containment trench on an as-needed basis.



The Selected Snowshed would cover all lanes of traffic and protect the traveling public from the avalanche paths shown in blue (lake elevation at 2,490 feet above mean sea level in this design visualization).

Proposed Bridges

The Proposed Bridges option would replace the Existing Snowshed with eastbound and westbound avalanche bridges. The 1,200-foot-long bridges would be constructed along the shoreline of Keechelus Lake, in the same general location as the Existing Snowshed. This option would reduce risks associated with avalanches, rock fall, and landslides in this location by removing and stabilizing loose materials located upslope from the highway and by physically separating the highway from the hillside.



The Proposed Bridges would carry traffic over the avalanche paths shown in blue (lake elevation at 2,490 feet above mean sea level in this design visualization).

The Proposed Bridges are designed high enough to allow typical avalanches, rock, and debris to pass under the highway without impacting traffic. Although the bridge piers are designed to withstand potential impact forces from avalanches, the potential for the piers to be directly impacted by avalanches is reduced by locating the piers on raised benches between avalanche paths and building up fill material around the piers to form a series of chutes that would assist in directing sliding snow, rock, and debris between the piers and toward the lake. Ongoing maintenance of the Proposed Bridges would involve annual inspections, plowing and de-icing of the highway, and clearing of snow and debris from the avalanche chutes and adjacent snow containment trench on an as-needed basis.

Do both options meet the I-90 project purpose and need?

The purpose and need for a project drives the process of alternative identification, analysis, and selection. The purpose of the I-90 project

is to meet projected traffic demands, improve public safety, and meet the identified project needs for a 15-mile stretch of I-90 between the communities of Hyak and Easton, in Kittitas County, Washington. Both the Proposed Bridges and Selected Snowshed support the I-90 project purpose and meet the identified project needs, as described below.

Avalanches

I-90 is frequently closed due to avalanches and associated control work. These closures strand motorists and freight on Snoqualmie Pass, resulting in substantial safety hazards to the traveling public, travel delays, and impacts to the state's economy. The traveling public and movement of goods remain at risk as long as the avalanche problem is not resolved. The risk will increase with growth in traffic volumes.

Both options are designed to provide a similar level of protection from avalanches, improving public safety and reducing avalanche-related road closures. The Selected Snowshed would reduce closures by covering all six lanes of traffic to allow avalanches to pass over the top of the structure without impacting traffic. The Proposed Bridges would reduce closures by elevating and separating the highway from the hillside, allowing avalanches to pass under the highway without impacting traffic. Each structure is designed to withstand impact by avalanches. Reduced visibility for drivers during powder avalanches is addressed by the enclosed nature of the Selected Snowshed and the height of the Proposed Bridges.

Slope Instability

I-90 has several unstable slopes, which results in rock and debris falling onto the roadway, causing damage to property and loss of life. These slopes will continue to pose a threat to property and safety if they are not stabilized or if the highway is not realigned to avoid areas of slope instability.

The Selected Snowshed and Proposed Bridges would both address safety risks from falling rock and greatly reduce the number of road closures because of rock fall. Both options would include removal of overburden and excavation of the adjacent hillside to remove loose rock and boulders. The two options would also use similar techniques to stabilize the new rock face on the adjacent hillside and further minimize the potential for rock fall, including the use of rock



Avalanches in the I-90 project area regularly close I-90.



Unstable slopes in the I-90 project area lead to rock fall.

anchors (dowels and bolts), wire mesh, or cable net slope drapery. Both structures are designed to protect the traveling public from falling rock, but differ in their approach. The enclosed Selected Snowshed structure would support the hillside and cover traffic lanes to protect drivers from falling rocks. The Proposed Bridges would elevate and separate the highway from the hillside, allowing debris to pass under the highway without impacting traffic. The placement of the bridge piers on raised benches and the creation of avalanche chutes help protect the structure by directing falling rock and debris between the piers.

Structural Deficiencies

The pavement on I-90 is beyond its design life and the roadway is rapidly deteriorating. If it is not repaired or replaced, continued deterioration of the roadway will result in unsafe driving conditions, increased vehicle damage, travel delay, and eventual failure of the roadway.

The Selected Snowshed and Proposed Bridges would both remove and replace the deteriorated highway surface from MP 57.9 to MP 58.4.

Traffic Volumes

Traffic volumes on I-90 are increasing at an estimated rate of 2.1 percent per year and are expected to increase at a similar rate well into the future. Traffic volumes already exceed the highway's design capacity during peak travel periods. The worsening traffic situation may lead to higher numbers of accidents, adverse economic impacts, and increased travel times.

Both the Selected Snowshed and Proposed Bridges would meet capacity needs for projected traffic volumes by accommodating three lanes of traffic in each direction from MP 57.9 to MP 58.4.

Ecological Connectivity

Federal land management plans have documented that I-90 forms a barrier to fish and wildlife movement, and have identified the need to increase ecological connectivity across the highway. Improving ecological connectivity will advance federal land management goals by reducing fish and wildlife population isolation. It also will reduce the risks to wildlife and the public from collisions between vehicles and wildlife.



Cracked and deteriorated pavement on I-90.



Recreational vehicles and freight traveling on I-90 during a holiday weekend.

The need for improving ecological connectivity would not be affected by the Selected Snowshed or Proposed Bridges. All of the proposed wildlife crossings, intended to reconnect habitats and reduce collisions between vehicles and wildlife, are located outside this segment of the highway (MP 57.9 to MP 58.4), as are all of the habitat linkage areas identified in the 2008 Final EIS.

How would the Proposed Bridges affect I-90 project cost?

Design, environmental analysis, and construction of the Proposed Bridges are anticipated to cost essentially the same as construction of the Selected Snowshed. The annual cost to operate and maintain the Proposed Bridges is estimated at \$100,000. The annual operations and maintenance cost for the Selected Snowshed is over \$750,000. The potential cost savings over the 75-year design life of the structures (approximately \$48 million) is one of the primary reasons FHWA and WSDOT are considering the Proposed Bridges.

How do the effects of the Proposed Bridges compare to the Selected Snowshed?

The 2008 Final EIS concluded that the beneficial effects of the I-90 project with the Selected Snowshed would be much more extensive than the adverse impacts. The beneficial effects of the I-90 project (see Exhibit ES-9 of the 2008 Final EIS) are generally upheld by the Proposed Bridges, including the reduction of avalanche and rock fall hazards, implementation of the Cascadian Architectural design theme, reduction in traffic delays, and improvement in water quality. Relative to the Selected Snowshed, the Proposed Bridges also offer additional benefits to the I-90 project, including:

- less fill material placed in Keechelus Lake,
- a slight increase in the storage capacity of Keechelus Lake, and
- creation of new aquatic habitat underneath the bridge structures (Exhibit S-3).



Elk killed in collision with vehicle near a proposed wildlife overcrossing structure.

Exhibit S-3

Selected Snowshed and Proposed Bridges at Keechelus Lake High-Pool Elevation (Design Visualizations)



The Selected Snowshed and Proposed Bridges provide a similar level of protection from avalanches and falling rock and debris, occupy roughly the same footprint, and result in similar impacts to natural resources. However, in some cases the Proposed Bridges would result in additional adverse impacts relative to the Selected Snowshed, including:

- more impacts to terrestrial habitat,
- acquisition of additional highway easement area, and
- a slight reduction in visual quality.

The permanent beneficial effects and adverse impacts of the entire 15-mile I-90 project are summarized in Exhibit S-4 along with the effects and impacts of the Selected Snowshed and Proposed Bridges.

Exhibit S-4**Permanent Beneficial Effects and Adverse Impacts of the I-90 Project, Selected Snowshed, and Proposed Bridges**

Element of the Environment	Entire I-90 Project ¹	Selected Snowshed	Proposed Bridges	Difference (Identifies which option is more favorable)
Geology, Soils, Avalanche, and Rock Fall				
Avalanche Hazard	Decrease	Decrease	Decrease	None ²
Unstable Slope Hazard (rock fall)	Decrease	Decrease	Decrease	None ²
Water Resources				
Treated Impervious Area (acres)	192.70	5.11	8.18	None ³
New Keechelus Lake Storage Capacity (acre feet)	0	0	28	28 acre-feet more storage with Proposed Bridges
Wetlands and Other Jurisdictional Waters				
Wetlands (acres)	16.20	0.06	0.06	None
Wetland (Lakeshore) Buffers (acres)	21.09	1.25	1.19	0.06 acre less impact with Proposed Bridges
Jurisdictional Ditches (linear feet)	3,810	200	200	None
Keechelus Lake (acres)	3.80	0.40	0.05	0.35 acre less impact with Proposed Bridges
Fish, Aquatic Species, and Habitats				
New Aquatic Habitat at High-Pool Elevation (acres)	0	0	2.22	2.22 acres more new habitat with Proposed Bridges
Terrestrial Species				
Total Terrestrial Habitat (acres)	248.7	4.45	7.71	3.26 acres less impact with Selected Snowshed
Transportation				
Road Closures	Decrease	Decrease	Decrease	None ²
Land Use				
Public Land (acres)	127.2	0 ³	1.07 ⁴	1.07 acres less impact with Selected Snowshed
Visual Quality				
Average Rating at Key Views (scale of 1 to 7, with 7 being most desirable)	5.0 (High)	5.4 (High)	5.0 (High)	0.4 point higher rating with Selected Snowshed ⁵

Exhibit S-4

Permanent Beneficial Effects and Adverse Impacts of the I-90 Project, Selected Snowshed, and Proposed Bridges

Element of the Environment	Entire I-90 Project ¹	Selected Snowshed	Proposed Bridges	Difference (Identifies which option is more favorable)
Social and Economic Resources				
Opportunity Cost of Avalanche-Related Road Closure	Decrease	Decrease	Decrease	None ²

¹ Values represent the effects of the Preferred Alternative from the 2008 Final EIS.

² Based upon applicable standards/criteria set for the project.

³ Treated impervious area for the Proposed Bridges is higher because the Selected Snowshed is considered a non-pollution-generating impervious surface. The Proposed Bridges would treat this area. Therefore, the differences negate each other (see Section 3.3).

⁴ Permanent impacts represent impacts to land outside of current right-of-way easements.

⁵ Differences of less than 1.0 in visual quality ratings are not considered a substantial visual impact.

Are the Proposed Bridges as safe as the Selected Snowshed?

The safety of the traveling public has been closely analyzed and will be seriously considered by FHWA and WSDOT in their decision on which option to construct. The Proposed Bridges have been evaluated for over a year to eliminate and reduce potential safety concerns. As a result, FHWA and WSDOT consider the Proposed Bridges as safe as the Selected Snowshed because they both meet:

- avalanche design criteria (powder and dense flow),
- national safety design standards (road geometrics and fire-life safety), and
- WSDOT factors of safety (rock fall and slope stability).

How would FHWA and WSDOT mitigate for the adverse impacts of the Proposed Bridges?

FHWA and WSDOT committed to a comprehensive list of best management practices (BMPs) and compensatory mitigation measures in the 2008 Final EIS to mitigate for any substantial adverse environmental impacts of the I-90 project. Impacts related to the Proposed Bridges were identified during the NEPA process and the design has been adjusted to decrease these impacts where

practicable. This “mitigation-by-design” process will continue through the Final Supplemental EIS, design, permitting, and construction. As discussed in Chapter 3, the Proposed Bridges would not result in any new substantial adverse impacts. Therefore, no additional BMPs or compensatory mitigation measures are anticipated for the Proposed Bridges.

What issues remain?

The following issues were identified during development of this Draft Supplemental EIS:

- Acquisition of an additional right-of-way easement from the US Forest Service for the Proposed Bridges, to be finalized upon completion of construction.
- Re-initiation of Endangered Species Act consultation with resource agencies, including potential effects of blasting on bull trout and other lake fish during construction.

FHWA and WSDOT will address these issues through ongoing communication and consultation with agencies. New and updated information will be included in the Final Supplemental EIS.

What are the next steps?

WSDOT is hosting public hearings in Bellevue, Hyak, and Ellensburg during the public comment period to solicit feedback on this Draft Supplemental EIS. FHWA and WSDOT will carefully consider comments made on this Draft Supplemental EIS and address them in a Final Supplemental EIS expected to be published in early 2013. Following this, FHWA and WSDOT will make an informed decision based on a critical examination and comparison of benefits and impacts. Since both structures would occupy roughly the same footprint and result in similar impacts to natural resources, the decision rests on the cost of long-term maintenance and operation. The decision will be published in a ROD issued by FHWA, expected in spring 2013. WSDOT can then complete SEPA requirements by adopting the FHWA-issued ROD.

If FHWA and WSDOT select the Proposed Bridges, the approvals and permits listed in Exhibit S-5 would require modification or amendment. WSDOT would then complete the final approval process with the contractor and issue a Notice to Proceed. Otherwise, WSDOT intends to proceed with construction of the Selected

FHWA and WSDOT are the joint **lead agencies** responsible for preparation of this Supplemental EIS. The USFS and USBR are **cooperating agencies** in preparation of this Supplemental EIS because they have jurisdiction by law over land needed for the I-90 project.

Snowshed as described in the 2008 Final EIS and ROD. Construction of either option is expected to begin in spring 2013, after the ROD is issued.

Exhibit S-5
Permits and Approvals for the Proposed Bridges

Agency	Statute	Permit/Approval
Federal		
US Fish and Wildlife Service/ National Oceanic and Atmospheric Administration Fisheries	Endangered Species Act Section 7 consultation and concurrence (impact to listed species) Migratory Bird Treaty Act	Consultation and Biological Opinion (<i>re- initiation of consultation based on new design information</i>)
US Army Corps of Engineers	Clean Water Act	Section 404 Individual Permit (<i>regulatory update and/or reissuance</i>)
US Forest Service	Acquisition of Rights-of-Way – Interstate System [Title 23 US Code 107(d)]	Consistency determination with the US Forest Service Forest Plan(s) (<i>review and update</i>)
US Forest Service	Organic Act of 1897, National Forest Management Act of 1976	Access Permit(s) and Special Use Permit(s) (<i>review and update</i>)
US Bureau of Reclamation	Use of Bureau of Reclamation Land, Facilities, and Waterbodies (Title 43 CFR Part 429) Reclamation Act of 1902 (Public Law 57-161) Reclamation Reform Act of 1982 (Title II of Public Law 97-293)	Use Authorization (<i>review and update</i>) US Forest Service Permit(s) (<i>review and concur</i>)
State		
Washington State Department of Ecology	Clean Water Act Section 401	Water Quality Certification (<i>modification</i>)
Washington State Department of Ecology	Shoreline Management Act (RCW 90.58)	Consider administrative appeals
Washington Department of Fish and Wildlife	Construction Projects in State Waters (RCW 77.55)	Hydraulic Project Approval (<i>modification</i>)
Local		
Kittitas County	County Code (Title 17 and 18) and Shoreline Management Act (RCW 90.58)	Substantial Development Permit(s) and/or exemption, Critical Areas Ordinance review, and limited zoning review (<i>review and update</i>)

CFR – Code of Federal Regulations

RCW – Revised Code of Washington