

FISCAL YEAR 2023 // BRIDGE INVESTMENT PROGRAM

I-80 VERDI BRIDGE REPLACEMENTS PROJECT

LARGE BRIDGE GRANT



NOVEMBER 27, 2023

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one

Basic Project Information

PROJECT DESCRIPTION

The I-80 Verdi Bridge Replacement Project is comprised of a series of eight candidate structures (four twin-bridges) across the Truckee River and Union Pacific Railroad (UPRR) Overland Route, just west of the Reno, Nevada area (I-773 E/W, G-772 E/W, G-765 E/W, and B-764 E/W).

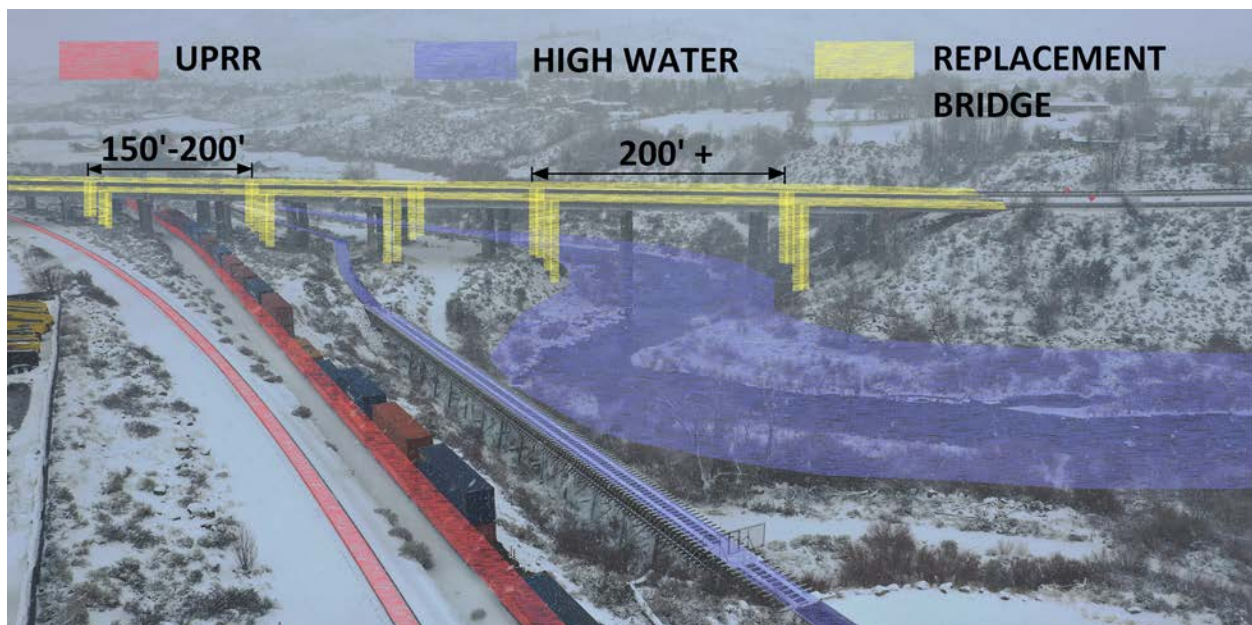
These bridges were built more than 60 years ago and do not meet today's design standards. In particular, shoulder and lane widths are too narrow. The two sets of bridges that cross the Truckee River are considered scour-critical, signifying that the foundations could become unstable due to excessive erosion of nearby soil. Additionally, as steel-girder bridges, the structures are experiencing fatigue via fractures and cracks. While the typical lifespan of a bridge may be 75 years, **these bridges were designed with a 50-year future, meaning they have exceeded their usable service life with deteriorated decks, fatigued girders, and scour critical substructures.**

Thus, the general scope of the project is to remove and replace each of the identified bridges on I-80 to bring their design up to current standards and prevent materials failure.

Regional Context

Interstate 80 (I-80) is the second-longest interstate highway in the United States (after I-90), and extends from San Francisco, California to Teaneck, New Jersey. It is an east-west transcontinental freeway traversing various terrain across 11 states. The facility spans nearly 3,000 miles in length, connecting a wide array of population and geographical diversity. I-80 also intersects with dozens of other interstate systems across the country, and also parallels the Union Pacific Railroad's (UPRR) Class 1 Overland Route.

This section of I-80 holds significant importance as a crucial freight facility, linking ports in Oakland and San Francisco to the rest of the United States. The Reno, NV area serves as a pivotal warehouse and distribution hub for freight, hosting the Tahoe Reno Industrial Center (TRIC), an expansive



107,000-acre industrial park. TRIC is the largest center of its kind in the United States and is the third largest globally. It is home to more than a hundred companies including Home Depot, Walmart, and Tesla. This area operates as a foreign trade zone, allowing goods from Oakland to be unpacked in Reno, enhancing its role in international trade.



In October 2023, President Biden designated the Reno area as a Regional Innovation and Technology Hub (Nevada Lithium Batteries and Other UV Material Loop Tech Hub). These areas will catalyze investment in technologies critical to economic growth, national security, and job creation, and will help communities across the country become centers of innovation critical to American competitiveness. I-80 is vital to the success of this Tech Hub for the transport of people and goods.

Challenges and Needed Improvements

Inherent to a large infrastructure element that lasts several decades, these bridges are challenged with past materials and construction methods.

The I-80 Verdi Bridge Replacements Project aims to address the following:

- **Steel girder superstructure fatigue -**
As fatigue was not adequately addressed in the 1960s design codes, severe fatigue cracks exist in the steel girders and bearings. This has damaged these structural elements and has dramatically reduced their capacity. Pre-cast concrete and/or material enhancements with less frequent maintenance needs will be explored as the bridge material preferences advance.

DANGEROUS CONDITIONS

The Verdi bridges carry I-80 from the gateway of the Sierras at the California/Nevada border over multiple river and canal crossings, canyon terrain, lifeline utilities, and multiple UPRR mainline tracks. The bridges have exceeded their usable service life, and could be susceptible to collapse from the design post-winter flood event. Such an event would impact both I-80 and the UPRR corridor, crippling east-west goods movement and recreational travel across the West.

- **Steel girder superstructure corrosion -**
Corrosion of the steel has led to section loss and insufficient load-bearing capacity, as indicated by load rating reports.
- **Insufficient concrete cover -** Reinforced concrete elements, such as the deck, piers, and abutments, have suffered from reinforcement corrosion and concrete spalling due to inadequate concrete cover.
- **Bridge foundations in Truckee River -** Identified as scour-critical, the foundations are vulnerable to scour and instability, posing a risk of bridge collapse.
- **Bridges on heavy traffic I-80 corridor -** Temporary lane closures for frequent, necessary inspection and maintenance results in significant traffic congestion. The design of the bridge roadway configuration will address and accommodate projected traffic increases, including wider shoulders to decrease the need for lane closures during traffic incidents and maintenance/inspections.

■ **Winter weather and traffic** - Temperature fluctuations contribute to additional stress and cracking in the structures, including the deck. Because of the heavy chain and snow tire traffic experienced over the Sierra Nevada mountain range, the deck deteriorates more quickly than on other corridors and requires a higher degree of maintenance costs. Further, as a safety

measure, de-icing salts are used on the bridge decks during cold and icy weather to prevent traffic incidents. High chloride levels from de-icing salts contributes to further road deterioration at a faster rate than other bridges that do not experience high volumes of traffic in winter weather conditions.

INFRASTRUCTURE ISSUES



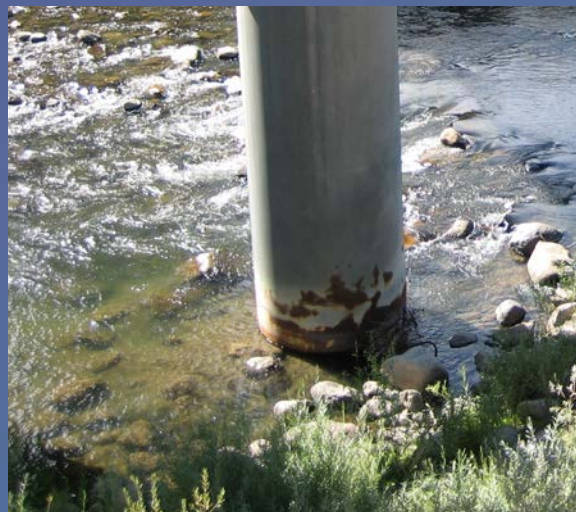
Example of steel girder corrosion along bridge.



Example of concrete spalling.



Example of concrete spalling.



Example of scour-critical pilings.



HISTORY

I-80 spans northern Nevada for 410 miles of the 3,000 miles that it traverses the United States. It is one of two interstate highways in Nevada and is continuously preserved and improved to maintain this critically important corridor on the Primary Highway Freight System. NDOT has completed a series of long-range planning studies for I-80 that establishes the vision of corridor operations and outlines future improvement needs based on expected travel patterns, with deep consideration of nationally transported freight originating from the Ports of Oakland and San Francisco. The initial plan was developed in [2009](#), with an update in [2014](#), and a third update currently underway. Several recommended improvements from these plans have been and continue to be implemented on an annual basis, with \$1.7 billion worth of improvements on I-80 currently in NDOT's [10-Year Transportation Plan](#).

In 2022, NDOT completed a *Bridge Replacement Scoping Report* that documents needs, concerns, and costs to replace or rehabilitate 27 bridges across the NDOT system. These eight Verdi bridges are included in this document and due to

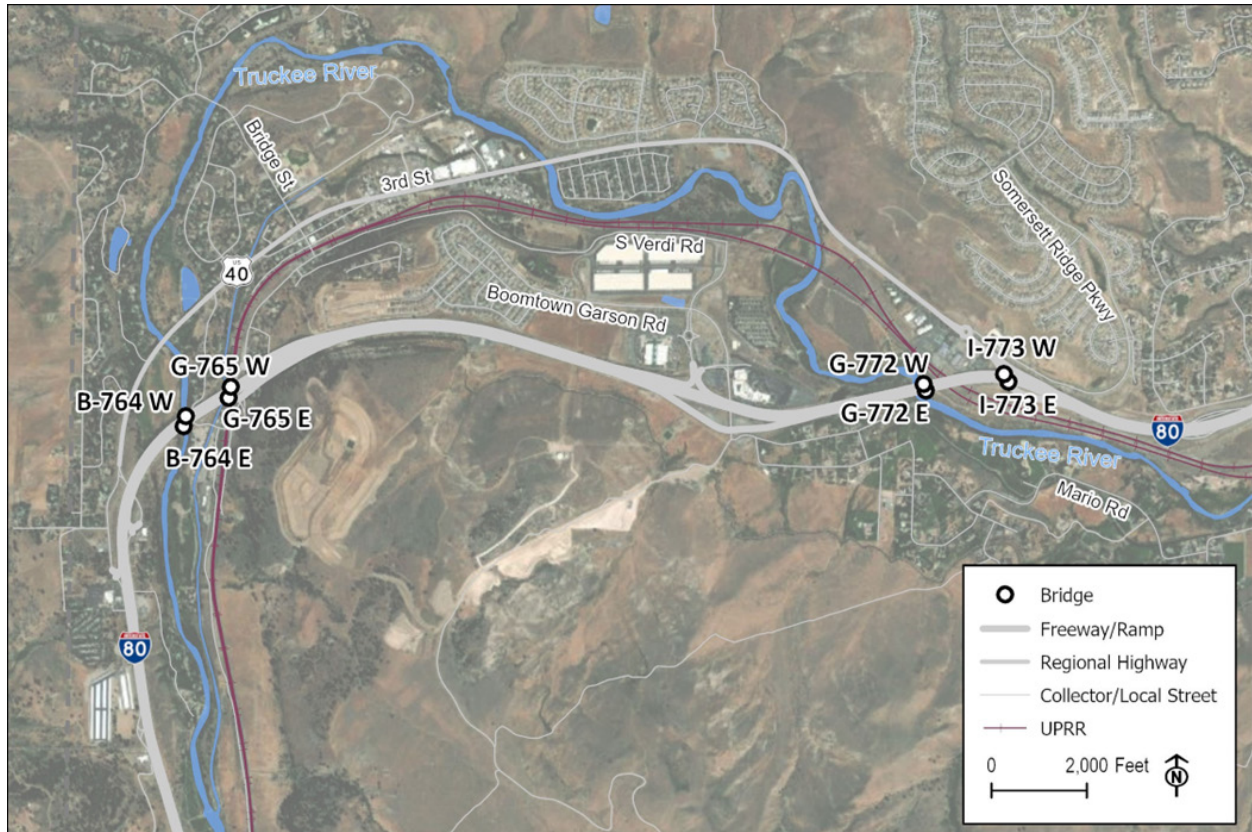
the findings, have quickly advanced into preliminary engineering and pre-NEPA (effort currently underway, estimated at \$10 million).

Project Location

The Verdi bridges (eight bridges, constructed as four twin-bridge structures) are located along I-80 within a 3-mile radius just west of Reno, Nevada in Washoe County, as shown in **Exhibit 1**. The Verdi bridges are positioned near the California/Nevada border on the westernmost side of the county, crossing the Truckee River. The river crosses I-80 twice in this area, with two sets of bridges spanning across, and with piers within, the Truckee River. Similarly, two sets of bridges cross over the UPRR line, which also crosses under I-80 two times in this vicinity, along with a series of local access roads.

This area is within the **Reno, NV—CA Urbanized Area** (Census Tract 23.02 Washoe County, Nevada (32031002302)). It is not within an Area of Persistent Poverty but is partially designated as a Historically Disadvantaged Community. A geospatial file illustrating the location of these bridges is appended to this grant application.

Exhibit 1: Project Location Map



As discussed in the introduction, I-80 not only serves as a vital artery for trucking but also integrates rail services from UPRR, a major class 1 railroad facility. The Verdi bridges play a critical role in sustaining the local, regional, and national economies, and they will continue to enable economic growth in the future.

Lead Applicant

NDOT is the lead applicant for the I-80 Verdi Bridge Replacements Project. NDOT has substantial experience in planning, designing, and maintaining bridges across the state. NDOT owns and maintains 1,240 bridges across the State of Nevada as part of our bridge program. Responsibilities for the development and operation of this program lie with the Structures section of our Engineering Division. NDOT monitors the health of its structures through a bridge

NECESSARY MEASURES

Because of the deteriorated condition of the proposed bridge replacement structures, all candidate bridges are inspected annually.

inspection program conducted on a bi-annual basis for each structure.

NDOT has extensive experience with receipt and expenditure of federal-aid highway programs. We are the lead recipient of a variety of federal funding, including formula and discretionary funds. The agency is highly experienced in collaborating with federal agencies from regulatory, compliance, and stakeholder perspectives.

Within the agency, NDOT has a formal Grants Department. This department prepares

discretionary grant applications, coordinates with local agencies seeking federal support, and assists other divisions with federal reporting requirements upon receipt of funding (e.g., quarterly SF-425). We also communicate frequently with the FHWA-Nevada division on state and local project priorities.



Currently, NDOT is facilitating and/or supporting four FY 2022 and 2023 awarded grant projects

under RAISE and MPDG/INFRA, with several other project selections pending. NDOT was also the recipient of prior Competitive Highway Bridge Program funding.

Other Public and Private Parties

There are no other public or private parties involved in the delivery of this project, however several agencies will be involved in consultations during the design and environmental approval process, including obtaining an agreement from UPRR on approval of the bridge design and maintenance of train traffic during construction. No entities will receive a direct or predictable financial benefit if the project is awarded.

Additional Eligibility Requirements

Maintenance Commitment

NDOT will oversee the maintenance and/or preservation of each bridge as part of the agency's bridge program. Routine maintenance activities will be conducted by NDOT District 2, the district where the bridges are located. Additionally, these structures will be included in NDOT's regular bi-annual bridge inspection cycle, which assigns a bridge rating, monitored over time. Documentation of bridge conditions are included in NDOT's [State Highway Preservation Report](#).

Issues identified during inspections that exceed routine maintenance requirements will either be integrated into the District's maintenance program or prioritized and added to the Department's preservation program, referred to as 3R (Resurfacing, Restoration, and Rehabilitation), funded through the Statewide Transportation Improvement Program (STIP). These issues will be addressed within regularly scheduled projects or in projects specifically tailored to tackle the preservation needs. The 3R cycle occurs approximately every 7 to 10 years, and bridges generally operate on a 75-year replacement cycle.



Drones assist in bridge inspections.

It is estimated that the cost to maintain each bridge will be \$339,200 over the life of the project, totaling \$2.7 million for the entire eight bridge project bundle. The funding sources are included in NDOT's preservation program, which is funded by the Federal Highway Trust Fund.

Bike and Pedestrian Accommodation

There are no accommodations for bicyclists and pedestrians on the bridge structures, as this is not a safe or allowable use on the interstate highway system (no connectivity is allowed at either end). However, accommodation will be made during design for these bridges to cross the Tahoe-Pyramid Trail, a 114-mile hiking and biking trail along the Truckee River.

Asset Management Plan

These bridges are owned and operated by NDOT. The project is consistent with [NDOT's BIL-Compliant Transportation Asset Management Plan \(TAMP\)](#), updated in May 2022. NDOT is divided into six Maintenance Sub Districts and this bridge project will fall under District 2- Reno/Carson City Sub District. NDOT's maintenance work preserves roadway facilities in a safe and usable condition through routine maintenance, capital improvement, and emergency activities. NDOT's TAMP serves as an important communication and accountability tool that will guide transportation asset investments. The TAMP summarizes the quantities and condition of certain assets (pavement, bridge, and ITS assets) and the agency's plans for managing these assets for the next 10 years.



TWO

National Bridge Inventory Data

Exhibit 2 provides the National Bridge Inventory data for the bundled eight structures. Twin-bridges are presented in the same column, as the data is shared for both the eastbound and westbound directions unless otherwise noted in the table (eastbound data / westbound data).

Exhibit 2: National Bridge Inventory Data

No	Item	I-773 E/W	G-765 E/W	G-772 E/W	B-764 E/W
Identification					
1	State Code & Name	32 - NV	32 - NV	32 - NV	32 - NV
8	Structure Number	I 773 E/W	G 765 E/W	G 772 E/W	B 764 E/W
5A	Record Type	1	1	1	1
3	County Code	031	031	031	031
6A	Feature Intersected	SR425 THIRD ST	SPRR AND POWER CANAL	TRUCKEE RIVER & SPRR	TRUCKEE RIVER
7	Facility Carried	I 80E/I 80W	I 80	I 80	I 80
16	Latitude	39304298/ 39304377	39304087/ 39304187	39304143/ 39304211	39303687/ 39303771
17	Longitude	119565439/ 119565491	119593468/ 119593458	119571189/ 119571308	119594259/ 119594275
98A	Border Bridge	0	0	0	0
99	Border Bridge Structure Number	N/A	N/A	N/A	N/A
Classification					
20	Toll	3	3	3	3
21	Maintenance Responsibility	01	01	01	01
22	Owner	01	01	01	01
26	Functional Classification	01	01	01	01
104	Highway System of Inventory	1	1	1	1
110	Designated National Network	1	1	1	1

No	Item	I-773 E/W	G-765 E/W	G-772 E/W	B-764 E/W
112	NBIS Bridge Length	Y	Y	Y	Y
Age and Service					
27	Year Built	1964	1962	1964	1962
106	Year Reconstructed	0	0	0	0
42A	Type of Service	1	1	1	1
28A	Lanes on the Structure	2	2	2	2
29	Average Daily Traffic	18,750	16,500	18,750	16,500
109	Average Daily Truck Traffic	18	16	17	16
19	Bypass, Detour Length	1	5	11	3
Structure Type and Material					
43A	Structure Type, Main	3	3	4	3
Condition					
58	Deck Condition	7	6	6	7
59	Superstructure Condition	6	5	6	6
60	Substructure Condition	5	5	6	6
61	Channel and Channel Protection	N	8	6	7
62	Culverts	N	N	N	N
Geometric Data					
49	Structure Length	49.1/47.9	144.2/129.8	326.1/326.1	137.8/137.8
50A	Curb of Sidewalk Widths, Left curb or sidewalk width	0	0	0	0
50B	Curb of Sidewalk Widths, Right curb or sidewalk width	0	0	0	0
51	Bridge Roadway Width, curb-to-curb	11.6	11.6	11.6	11.6
52	Deck Width, out-to-out	13.1	13.1	13.1	13.1
32	Approach Roadway Width	11.6	11.6	11.6	11.6

No	Item	I-773 E/W	G-765 E/W	G-772 E/W	B-764 E/W
47	Inventory Route, Total Horizontal Clearance	11.6	11.6	11.6	11.6
53	Minimum Vertical Clearance over Bridge Roadway	99.99/99.99	99.99/99.99	99.99/99.99	8.99/7.99
54A	Minimum Vertical Underclearance, Reference Feature	H	R	R	N
54B	Minimum Vertical Underclearance	4.66	7.25	7.01	0
55A	Minimum Lateral Underclearance on Right, Reference Feature	H	R	R	N
55B	Minimum Lateral Underclearance on Right	2.1	3.1	3	0
56	Minimum Lateral Underclearance on Left	2.1	0	0	0
Navigation Data					
111	Pier or Abutment Protection	0	0	0	0
39	Navigation Vertical Clearance	0	0	0	0
40	Navigation Horizontal Clearance	0	0	0	0
Load Rating and Posting					
70	Bridge Posting	5	5	5	5
41	Structure Open, Posted, or Closed to Traffic	A	A	A	A
Appraisal					
113	Scour Critical Bridges	N	8	3	3
Inspections					
90	Inspection Date	422	622	622	622

three

Project Budget – Grant Funds, Sources, and Uses of All Project Funding

PROJECT BUDGET

NDOT is requesting a Large Bridge Investment Program Grant in the amount of **\$136.3 million**, which represents 50% of the estimated total project construction cost of \$272.6 million. This project includes the replacement of four twin-bridge sets which will be **delivered as a single project bundle**. For discussion and estimating purposes, bridge costs are presented in two groups: the two bridges on the west side of Verdi and the two bridges on the east side of Verdi. Both sets have two separate structures to cross the UPRR corridor, Truckee River, and local roadways, as previously illustrated in Exhibit 1.

Planning and scoping are complete, with preliminary engineering (15% design) and

pre-NEPA activities to be complete by April 2024 (prior to grant award). 30% design and NEPA is anticipated to be complete by July 2026, with final design to follow. In total, these pre-construction costs incurred will total approximately \$20 million and are expected to be fully complete by December 2026.

Exhibit 3 presents the costs for the proposed bridge project, including previously incurred costs. Costs are presented by bridge grouping and a total for the entire proposed bundled project. The budget presented includes a 30% contingency cost element, totaling \$46 million, as well as escalation costs to accommodate the increase/inflation in services and materials expected in the future.



Exhibit 3: Project Budget Detail

Description	B-764 & G-765	G-722 & I-773	Total Bridge Bundle
Roadway Excavation	\$85,995	\$85,995	\$171,990
Bridge Removal	\$600,000	\$500,000	\$1,100,000
Temporary Roadway	\$2,392,610	\$2,637,360	\$5,029,970
Temporary Roadway Embankment	\$1,218,056	\$1,342,628	\$2,560,684
Temporary Bridge	\$5,073,900	\$0	\$5,073,900
Proposed Roadway	\$573,300	\$5,733,300	\$6,306,600
Proposed Bridge	\$45,663,750	\$61,639,200	\$107,302,950
<i>Subtotal</i>	<i>\$55,607,611</i>	<i>\$71,938,483</i>	<i>\$127,546,094</i>
Landscaping & Aesthetics	\$1,668,228	\$2,158,154	\$3,826,383
Surveying	\$556,076	\$719,385	\$1,275,461
Clearing & Grubbing	\$1,112,152	\$1,438,770	\$2,550,922
Signing & Striping	\$1,112,152	\$1,438,770	\$2,550,922
Drainage/Stormwater/Permanent Erosion Control	\$1,390,190	\$1,798,462	\$3,188,652
River Diversion	\$278,038	\$359,692	\$637,730
Traffic Control	\$1,112,152	\$1,438,770	\$2,550,922
<i>Construction Subtotal</i>	<i>\$62,836,600</i>	<i>\$81,290,486</i>	<i>\$144,127,086</i>
Mobilization	\$4,398,562	\$5,690,334	\$10,088,896
Contingency (30%)	\$20,170,549	\$26,094,246	\$46,264,795
<i>Construction + Mobilization + Contingency Subtotal</i>	<i>\$87,405,711</i>	<i>\$113,075,066</i>	<i>\$200,480,777</i>
Escalation (3% per year, 7 years)	\$18,355,199	\$23,745,764	\$42,100,963
Construction Engineering & Inspection	\$13,110,857	\$16,961,260	\$30,072,117
<i>Total Construction Costs</i>	<i>\$118,871,767</i>	<i>\$153,782,089</i>	<i>\$272,653,857</i>
Total Grant Request (50% match)			\$136,326,928
Preliminary Engineering	\$4,370,286	\$5,653,753	\$10,024,039
Final Engineering	\$4,370,286	\$5,653,753	\$10,024,039
<i>Previously Incurred Costs</i>	<i>\$8,740,571</i>	<i>\$11,307,507</i>	<i>\$20,048,078</i>
Total Project Cost	\$127,612,338	\$165,089,596	\$292,701,934

Notes: Estimates are based on 2021 unit prices. Escalation assumes construction in 2028 & 2029.

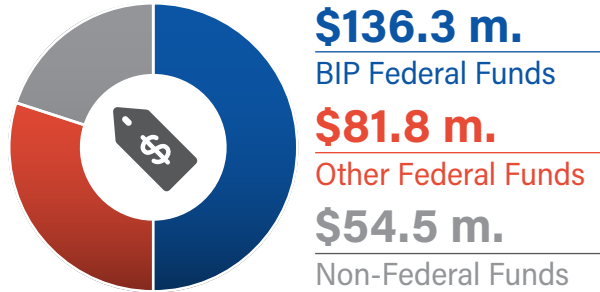
Funding Sources

As the Large Bridge Grant program requires a local match of 50% of total project dollars, NDOT will bring \$136.3 million to the project. NDOT has secured 30% of the project cost from its share of bridge formula program funding, bringing the total Federal share to 80%. \$54.5 million, or 20% of the project cost, is comprised of non-Federal funding, from NDOT's State Highway Fund.

Financial Completeness

The non-Federal funding match will come from NDOT's State Highway Fund. This Fund is a healthy and stable funding source. State Highway Funds are populated from proceeds from licensing, registration, and other charges related to motor vehicle operations,

Exhibit 4: Funding Sources



in addition to fuel taxes. Any cost overruns on this project can be taken from this fund. The State Highway Fund is also the primary source for maintenance activities, with \$250 million budgeted every year for this purpose across the state highway system.



four

Merit Criteria

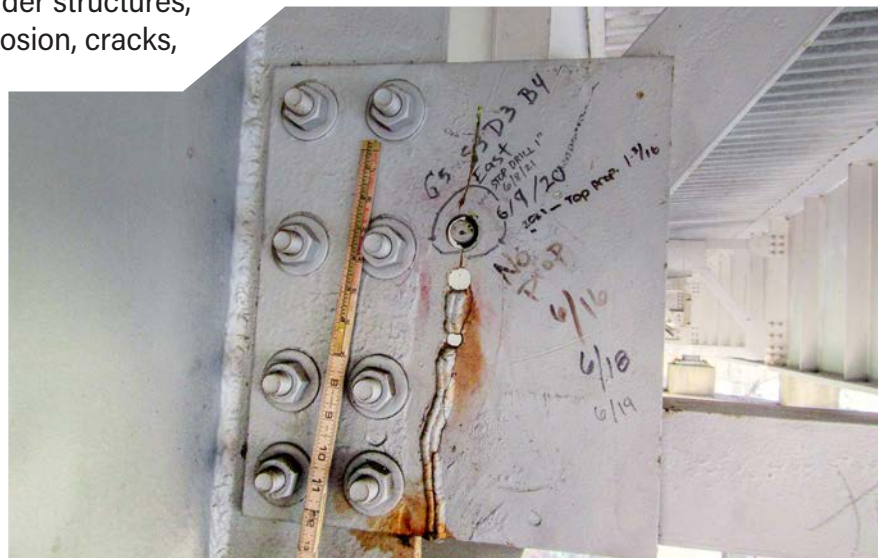
CRITERION #1: STATE OF GOOD REPAIR

Despite the condition categorization of these bridges not being poor, the Verdi bridges have significant maintenance and inspection demands (decks, erosion/embankments, fatigue cracking and corrosion of primary elements, etc.) and are fundamentally not acceptable to resist design flood events. These bridges have exceeded their useful life, with minimal resiliency to extreme flooding events.

This project will contribute to a state of good repair by replacing two (2) scour-critical bridges (B-764 and G-772). Replacing these bridges now ensures that they can withstand future extreme weather events, including flooding and other natural disasters. This resiliency is particularly important in the face of climate change and the associated changes in weather patterns.

Replacing this series of bridges will also reduce future maintenance costs for the department, particularly in the case of the two (2) scour-critical bridges spanning the Truckee River, and the overall fatigue and corrosion experienced by all eight bridges due to the outdated steel girder structures, which are experiencing corrosion, cracks, and fracturing. The Department has employed stop-drilling measures multiple times to arrest fatigue cracks in the aging girders. This has achieved limited success as cracks have propagated beyond previous stop-drilling operations. The

Example of fatigue cracking on bridge structure.



Department's experience with fatigue has shown that superstructure condition ratings decline more rapidly after the onset of extensive fatigue cracking.

Continuing to rehabilitate bridges as they move past their useful life can be a time-intensive and costly endeavor. Scour-critical bridges require more frequent inspections, flood monitoring, and the development of a schedule of countermeasures (e.g., placement of riprap) to help protect them from scour and stream stability problems. The new bridges will have a predicted standard lifespan of 75 years (or more), with regular maintenance.

NDOT typically assumes maintenance costs of \$1.00 per square foot of deck area per year. However, recent and historical maintenance costs for bridges G-772 and 773, in particular, have well exceeded this estimate, at approximately \$10.00 and \$39.00 per square foot of deck area per year, respectively.

These bridges experience greater wear and tear due to winter weather in this part of the state, including truck chains, snow tires, de-icing salts, and plowing, as well as very high heavy truck volumes originating from the deepwater seaports in California. These factors lead to more

rapid deterioration of the roadway through this portion of I-80.

NDOT currently owns eight (8) structurally deficient bridges, all of which are in the planning, design, or construction stages of remediation. Thus, the Department has been able to take a proactive approach to improving the health of our bridge inventory. We are also actively helping other bridge owners replace their off-system structurally deficient bridges, allowing us to focus our financial resources on the pressing needs of the Verdi bridges.

**CRITERION #2:
SAFETY AND MOBILITY**

The proposed design for the bridge replacement projects being applied for as part of this grant application includes two, 12-foot travel lanes in each direction, with an outside shoulder width of 12 feet and an inside shoulder width of 16 feet. The wide inside shoulder - an upgrade from substandard existing 4-foot shoulders - will preserve the possibility of adding an additional travel lane in the future. The outside shoulder, an upgrade from substandard existing 8-foot shoulders, will improve safety via improved crash response. Shoulder upgrades may result in overall crash reductions or secondary crash reductions attributed to improved emergency response and clearing times. These improvements may also increase travel time reliability following incidents.

Recent structural inspections of the bridges have caused significant travel delays and traffic build-up across the state line. These disruptions to the flow of traffic reduce speeds through the mountainous area along the Nevada-California border, creating a dangerous condition for both travelers and maintenance personnel. The widening of both



Existing piers located within 100-year floodplain.

shoulders will allow for the specialized bridge inspection trucks to access both sides of the bridges. This is necessary, as the bridge superelevations often prevent the trucks from accessing the lower edge of the structure as it puts the vehicles at risk of tipping.

Current design plans also call for upgraded roadside guardrail/barrier rail, which will further improve safety.

The proposed bridge replacement projects will also alleviate the safety concern of two (2) scour-critical bridges (B-764 and G-772) over the Truckee River. The foundations of these scour-critical bridges are gradually eroding with the potential to become unstable, making them particularly vulnerable to the effects of flooding and extreme weather events. Thus, these bridge replacements will protect the traveling public, including freight and general passenger traffic, from future risks should the bridges continue to deteriorate. The bridge replacement project will remove a known safety issue while also protecting motorized travelers and the surrounding community from potential harm.

CRITERION #3: ECONOMIC COMPETITIVENESS AND OPPORTUNITY

I-80 is primarily an east-west corridor, spanning the 2,901 miles between San Francisco, CA and Teaneck, New Jersey. As the second-longest interstate in the United States, I-80 connects a number of major cities, including Oakland and Sacramento, CA; Reno, NV; Salt Lake City, UT; Cheyenne, WY; Omaha, NE; Des Moines, IA; and Toledo, OH. The facility also passes with 10 miles of Chicago, IL; Cleveland, OH; and New York City, NY.

As a transcontinental interstate, I-80 serves as an important connector of some of the nation's largest ports, including the Port of Oakland and the Port of New York and New Jersey – the largest US East Coast container port.

As one of the country's few transcontinental freeways, this facility is especially significant for freight movement. Some sections of the interstate see incredibly high percentages of truck traffic (upwards of 45%), especially during summer and fall harvest seasons in the Western United States. A relatively large number of refrigerated trucks use I-80, in part due to the C.R. England headquarters located along I-80 in Salt Lake City. Reliability is particularly important for these trucks, as their deliveries are typically time sensitive. Many of these trucks transport high value fruit and vegetable crops from California to other markets across the United States.

Thus, I-80 is often the preferred route for transcontinental freight shipping due to the desire of many trucking companies to avoid the steep grades and the potential for treacherous winter conditions along I-70 west of Denver. In addition to agriculture, I-80 is also an important route for the manufacturing and trade sectors.

The I-80 Verdi Bridges provide a critical link in this transcontinental interstate. Detours in this area are potentially costly due to time lost and can be logistically challenging due to the mountainous terrain in the surrounding region.

CRITERION #4: CLIMATE CHANGE, SUSTAINABILITY, RESILIENCY, AND THE ENVIRONMENT

The bridges spanning the Truckee River, specifically B-764 and G-772, have been classified as scour-critical in NDOT's most recent inspection, indicating the potential for instability due to excessive erosion of the nearby soil. This erosion risk poses a potential threat of abrupt bridge failure, which could result in a complete disruption of the I-80 corridor. To mitigate this risk, the new bridge foundations will be strategically placed to avoid flood-prone areas.

This region falls within a 100-year floodplain, and flooding events can be highly unpredictable. With ongoing climate change, the frequency and unpredictability of extreme weather events are increasing. It is imperative to replace these bridges before such events occur. Their replacement is crucial to ensuring the smooth operation of the I-80 freight corridor. Bridge failure would necessitate detours, increasing vehicle miles traveled and emissions.

Innovative methods will be employed, especially over the Truckee River, to prevent the entry of silt or debris into the river, maintaining its cleanliness during the replacement process. Best Management Practices will be implemented, including silt fencing and turbidity curtains around the work area on slopes and in the river. The replacement of these bridges will guarantee that the piers are no longer located within the floodplain, enhancing the overall safety and resilience of the transportation infrastructure.

CRITERION #5: EQUITY AND QUALITY OF LIFE

I-80 serves as a vital freight corridor for transporting both people and goods across the country, while also acting as a crucial link to the Reno-Sparks metropolitan area. Many individuals in Western Nevada rely on I-80 to access employment opportunities and essential goods and services. As noted previously, the Tahoe-Reno Industrial Center is one of many major employment hubs along I-80 in this metropolitan area, employing more than 25,000 people today, with extensive growth planned in the high-tech sector. This area is also home to more than a hundred companies and their warehouse logistics centers and fulfillment centers.

I-80 also provides a key connection to California. The potential failure of these bridges would not only disrupt the regional freight economy but also profoundly impact the lives of individuals in this area.

In the preliminary engineering phase, virtual public engagement efforts are planned for Q3 of 2024. This approach ensures equitable access for a wide audience at various times.

Additionally, materials have been translated into Spanish, facilitating broader community participation and understanding.

CRITERION #6: INNOVATION

The project will deploy innovative designs and construction techniques to facilitate the rapid and safe reconstruction of these bridges. Bridge material designs will be explored that target a service life beyond the standard AASHTO 75 years, including but not limited to the potential use of pre-cast concrete instead of steel girders, girders that do not require a 15-year paint cycle, or joint detailing to alleviate repetitive maintenance.

Throughout the construction phase, the implementation of maintenance of traffic methods will ensure the continuous flow of two-way traffic, preventing disruptions of freight and passenger vehicle traffic. Accelerated superstructure construction methods will also be explored to minimize impacts to the traveling public. This approach is crucial for a vital freight corridor connecting Oakland and San Francisco to the Eastern United States. Therefore, this project aims to achieve accelerated bridge



Tahoe-Reno Industrial Center, located along I-80. Tahoe-Reno Industrial Center, located along I-80. Photo by [Ken Lund](#)

construction, significantly reducing detours and alleviating major construction-related traffic concerns in the area.

Furthermore, the project will utilize Best Management Practices to remove existing piers, employing measures like silt fences and turbidity curtains around the work area on slopes and within the river. These measures

are designed to prevent silt and debris from entering the river, safeguarding the environment during the replacement process. This proactive approach not only protects the bridges but also fortifies the surrounding environment against potential impacts of future extreme weather events.

Benefit-Cost Analysis

BCA RESULTS

The Benefit-Cost Analysis (BCA) for the I-80 Verdi Bridge Replacement Project was developed using the Bridge Investment Program [Benefit-Cost Analysis Tool](#) and the information and recommended methodologies from the latest version of the Benefit-Cost Analysis Guidance for Discretionary Grant Programs released in January 2023. The analysis base year is 2021 and all monetized values are converted to 2021 Dollar amounts. All assumptions, input values, and methodologies are documented in detail in the BCA Technical Memorandum and Excel Workbook, appended to the Project Narrative on grants.gov.

The BCA showcases a projected Net Present Value (NPV) of \$648 million for the overall project. The Benefit Cost Ratio (BCR) for the entire project is computed at **4.5**, indicating that the anticipated benefits to the region exceed the investment by more than fourfold. The BCA also reveals positive NPVs for each individual bridge replacement, indicating the cost-effectiveness of all project components.

Exhibit 5: BCA Results

Project Component	Total Discounted Benefits	Total Discounted Costs	Benefit Cost Ratio (BCR)	Net Present Value (NPV)
B-764E	\$77,612,608	\$20,207,952	3.84	\$57,404,656
B-764W	\$77,612,608	\$20,207,952	3.84	\$57,404,656
G-765E	\$77,594,480	\$20,207,952	3.84	\$57,386,528
G-765W	\$77,594,480	\$20,207,952	3.84	\$57,386,528
G-772E	\$155,379,787	\$26,141,670	5.94	\$129,238,117
G-772W	\$155,379,787	\$26,141,670	5.94	\$129,238,117
I-773E	\$106,107,290	\$26,141,670	4.06	\$79,965,620
I-773W	\$106,107,290	\$26,141,670	4.06	\$79,965,620
Entire Project	\$833,388,330	\$185,398,488	4.5	\$647,989,842

six

Project Readiness and Environmental Risk

TECHNICAL FEASIBILITY AND TECHNICAL COMPETENCY

Technical Capacity

NDOT is the lead applicant for the I-80 Verdi Bridge Replacements Project and has substantial experience with the planning, design, and construction of bridge structures, overseeing over 2,000 bridges statewide. As discussed in the Lead Applicant section, we as an agency facilitate a variety of formula and discretionary funds each year. The department is highly experienced in collaborating with federal agencies from regulatory, compliance, and stakeholder perspectives. Coordination with several federal agencies is already underway with the permitting process for these bridge structures.

More broadly, NDOT complies with various civil rights laws and regulations, including Title VI of the Civil Rights Act of 1964 and accompanying DOT regulations, ADA, and Section 504 of the Rehabilitation Act. Our Civil Rights Division recently updated our [Title VI Implementation Plan](#).

Technical Feasibility

The primary intent of this project is to replace four twin-bridge structures. These bridges were constructed in 1962, just seven years after the Federal Aid Highway Act was signed in 1956, initiating development of the Interstate Highway System. Design standards have changed significantly in the past 60 years to improve safety, and many elements of the candidate bridges are deficient by today's standards.

Design and Costs. Preliminary engineering is currently underway, with 30% plans expected to be complete by July 2026. The current basis of design and related cost estimates are from the Bridge Replacement Scoping Report completed by NDOT in April 2022, which documents the needs, concerns, and costs to replace or rehabilitate 27 bridges across the NDOT system. Costs are derived from preliminary planning work paired with unit costs from recent bridge improvements. The Scoping Report summarizes a comprehensive technical assessment of each of the bridges, including evaluation of maintenance, structural, roadway, safety, traffic, environmental, utility, right-of-way, hydraulics, construction, and staging considerations.



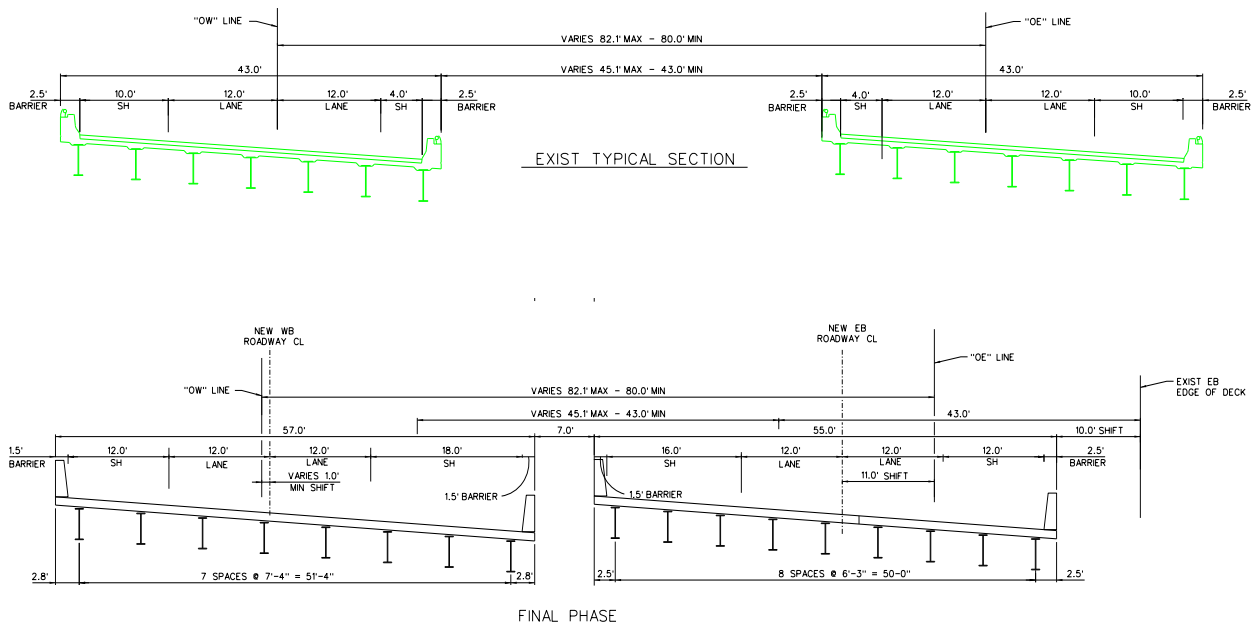
Right-of-Way. This project has no new right-of-way needs; all improvements will be completed within the existing NDOT right-of-way.

Statement of Work. In addition to replacing the four twin-bridge structures, NDOT will bring I-80 to today's interstate design standards as it crosses the Verdi area. This includes maintaining the current number of lanes (two lanes each direction) but widening the inside shoulder to accommodate one additional lane per direction in the future, as traffic warrants. Today's outside shoulders are substandard, at barely eight feet wide. These will be widened to 12 feet to safely accommodate vehicles that may need to pull out of traffic. An upgraded roadside guardrail/barrier will also be constructed.

Additionally, according to the most recent inspection reports prepared by NDOT, the bridges spanning the Truckee River, specifically B-764 and G-772, have been classified as **Scour Critical**. This designation signifies that the foundations could potentially become unstable due to excessive erosion of the nearby soil. **This erosion risk poses a potential threat of abrupt bridge failure, which could result in a complete disruption of the I-80 corridor.** To address this issue, the new bridge foundations will be strategically situated to avoid areas prone to flooding. Overall design and construction activities will be adjusted to avoid placing piers within the nearby 100-year flood plain.

Exhibit 6 illustrates the existing typical section of the twin bridge structures, as well as the proposed bridge structure layout.

Exhibit 6: Typical Sections



Project Schedule

Exhibit 7 presents the schedule to fully complete the I-80 Verdi Bridge Replacements Project. Items in gray are underway and/or will be completed prior to the execution of this grant request, allowing construction-related activities to advance quickly. Exhibit 7 presents the schedule to fully complete the I-80 Verdi Bridge Replacements Project. Items in gray are underway and/or will be completed prior to the execution of this grant request, allowing construction-related activities to advance quickly.

Exhibit 7: Schedule

Task Name	2023		2024				2025				2026				2027				2028				2029				
	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	
Preliminary Engineering	Gray	Gray																									
Intermediate Design/NEPA			Gray	Gray	Gray	Gray	Gray	Gray	Gray	Gray																	
Final Design										Gray	Gray																
Advertise/Award for Construction															Blue												
Construction																Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue
Closeout																										Blue	Blue



Required Approvals

Environmental Permits and Reviews

NDOT and FHWA have made an early determination to complete a Categorical Exclusion under NEPA. NEPA scoping and preliminary environmental technical reviews have not yet commenced for this project, however preliminary environmental technical reviews and the initiation of the permitting process will be occurring during preliminary engineering, allowing NDOT to identify any major environmental concerns pre-NEPA.



NDOT and FHWA have a “Programmatic Agreement for Processing Categorical Exclusions” that allows for expedited administration of Categorical Exclusions by NDOT, decreasing the review time required for NEPA approval.

I-80 crosses the Truckee River twice in the span of the I-80 Verdi Bridge Replacement Project. Therefore, the US Army Corps of Engineers will be a Cooperating Agency under NEPA and will require Section 401 and 404 permitting. To date, no significant environmental issues or mitigations are expected, however the presence of the Lahontan Cutthroat Trout will require biological reviews and coordination with the Nevada Department of Wildlife.

State and Local Approvals

No additional state or local approvals are required for this project. Public outreach and engagement have been occurring in this area over the course of several recent projects, including the [I-80 Corridor Systems Management Plan](#), [One Nevada Long Range Transportation Plan](#), and [Verdi Area Multimodal Transportation Study](#). Strong support exists through the state DOTs, economic development partnerships, and trucking industry, as vocalized as part of the I-80 Corridor Coalition, a five-state partnership of public and private stakeholder organizations.

Federal Transportation Requirements Affecting State and Local Planning

The [Statewide Transportation Improvement Program](#) (STIP) is a four-year fiscally constrained plan that NDOT updates annually, with amendments allowable throughout the year. The current STIP includes projects for [FY 2023-2026](#). Because the requested grant funding is for construction services beginning mid-2027 and ending mid-2029, this project is beyond the current STIP window of funding years. If awarded this grant, this project will be incorporated in the next STIP update to account for 2027 funding. See appended “financial letter of commitment” from NDOT Leadership.

Project Risks and Mitigation Strategies

Project Risk	Mitigation Strategy
UPRR Coordination	Coordination is underway with UPRR to establish review and approval schedules through the design and engineering of the bridge replacement project. While construction is not anticipated to impact train traffic, two of the four bridges cross over UPRR’s Class 1 Overland Route.

Project Risk	Mitigation Strategy
NEPA/ Permitting	NDOT is skilled at efficiently completing NEPA analyses and documentation, and with our Programmatic Agreement in place with FHWA-Nevada to process Categorical Exclusions, lengthy back and forth reviews are minimized. However, coordinating and obtaining permits from external agencies can always potentially extend schedules. For this project, the primary permitting agency is the US Army Corps of Engineers.

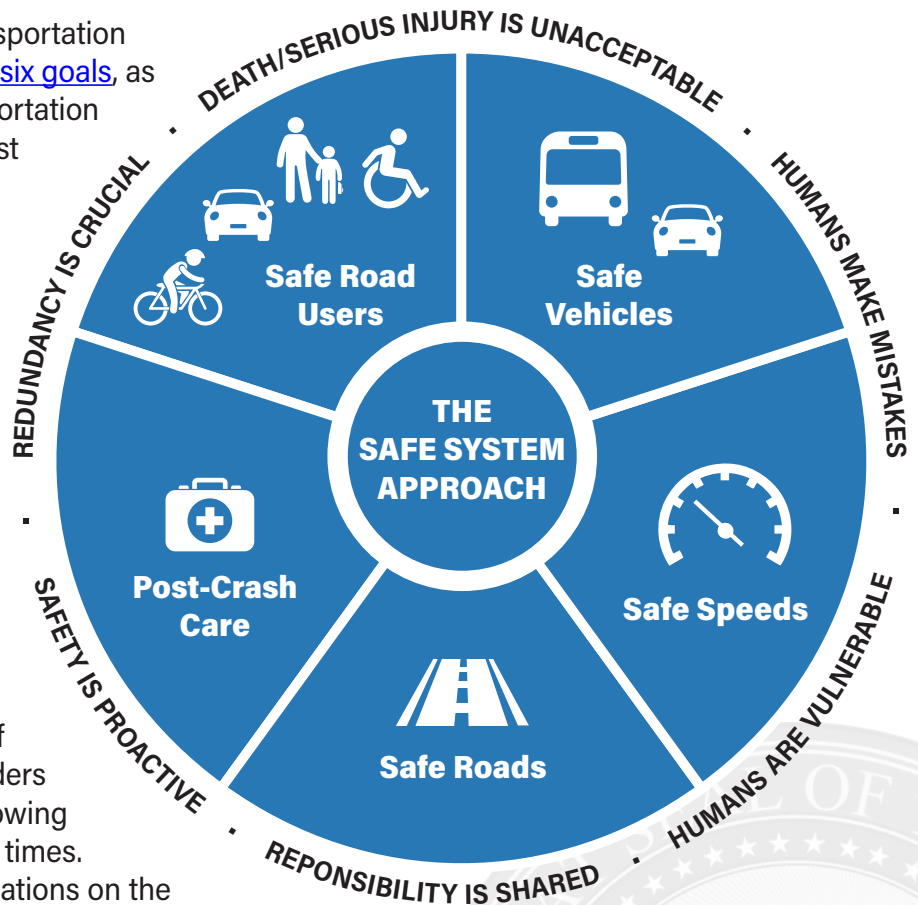
Administration Priorities and Department Strategic Plan Goals

SAFETY

While the Department makes transportation investment decisions surrounding [six goals](#), as defined in the One Nevada Transportation Plan, safety is the primary and most important goal. NDOT, as well as Nevada’s Office of Traffic Safety, have a goal of zero fatalities. The [Nevada Strategic Highway Safety Plan](#) identifies key areas of traffic safety investments and outlines methods for implementing a Safe Systems Approach.

In regards this project, the bridges along I-80 have deficient lane and shoulder widths by today’s design standards. The bridges do not allow adequate space to pull over onto the side of the road in case of emergency, and the narrow shoulders decrease travel time reliability following emergency response and clearing times. Improvements to the lane configurations on the bridges will both foster **safer roads** and **post-crash care**.

Additionally, current design plans also call for upgraded roadside guardrail/barrier rail, which will further improve safety through a design improvement to mitigate human mistakes and account for injury tolerances.



CLIMATE CHANGE AND SUSTAINABILITY

The foundation of the two (2) bridges over the Truckee River (B-764 and G-772) are considered scour-critical, meaning their foundations are gradually eroding with the potential to become unstable. Climate change may alter the flow of the river, including increased or more turbulent flow during extreme weather events, increasing this bridge's vulnerability to further erosion. This erosion risk poses a potential threat of **abrupt bridge failure**, which could result in a complete disruption of the I-80 corridor. To address this issue, the new bridge foundations will be strategically situated to avoid areas prone to flooding.

Preserving the functionality of this series of bridges along I-80, which in turn **preserves the continuity of a critical transcontinental travel route**, ensures the availability of the most direct and efficient route for both freight and passenger travel. Potential detours caused by failure of these bridges would result in substantial out-of-direction travel, increasing vehicle miles traveled by both passenger vehicles and large truck traffic, along with associated emissions.

EQUITY

The replacement of this series of bridges will maintain the integrity of one of our nation's most critical travel routes. In addition to the important role I-80 plays in the transcontinental movement of people and goods, this facility also provides an important connection to the Reno-Sparks metropolitan area for areas to the west. Residents of the towns west of Reno (including those in western Nevada and eastern California) rely on I-80 to access jobs, goods, and services. Likewise, I-80 provides an important connection for western Nevada residents into California.

The proposed bridge improvement projects are located just outside of Verdi, Nevada, a town of just under 2,000 residents as of 2023. The area's median age is 60.9, which is well over the average age in the state of Nevada of 38.2. In particular, the area immediately adjacent to I-80 to the south and east of Verdi is in the 90th to 95th percentile for over age 64 Population (as compared to national percentiles)¹.

Seniors may experience greater transportation challenges, as compared to the general population, due to either an inability or a preference not to drive a personal vehicle. I-80 is an important travel route for this population to access nearby goods and services, including medical care. Closures or detours could be especially problematic for seniors whose transportation options are limited or already somewhat marginal.

WORKFORCE DEVELOPMENT, JOB QUALITY, AND WEALTH CREATION

Typically, several years of planning, design, environmental clearance work, and engineering must occur before bridge construction can begin. These first several tasks support high-wage jobs across multiple sectors. In addition to competitive salaries, these types of jobs typically offer benefits like health insurance and retirement packages that support the creation of wealth in individuals and families over time.

The construction of a bridge structure also supports local businesses and jobs, often over the span of multiple years. Although construction jobs tend to bring lower wages than professional services such as engineering, they are still important, reliable jobs that feed into the regional and state economies. Further, these types of large

¹ <https://ejscreen.epa.gov/mapper/>

infrastructure construction projects have been shown to have a **powerful multiplier effect**, producing broad economic benefits across multiple sectors.



Recent research² by the Council of Economic Advisers (CEA) within the Executive Office of the President has estimated that every **\$1 billion in Federal highway and transit investment would support 13,000 jobs for one year.**

This figure includes direct, indirect, and induced jobs. Using this ratio as a rough estimate, an investment of \$300 million (total project cost) in the proposed bridge replacement projects could produce up to

² <https://www.fhwa.dot.gov/policy/otps/pubs/impacts/>

3,900 jobs per year, or **23,400 jobs over the life of the project** (assuming a total project schedule spanning approximately six years).

NDOT has also developed and abides by a [Disadvantaged Business Enterprise \(DBE\) program](#), as described in their 2023 [DBE Program Plan](#). The DBE program was established and is maintained in accordance with federal requirements, including 49 CFR Part 26. The provisions of the program apply to contractors, consultants, professional service agreements, and architectural/engineering contracts. Thus, the majority of the work involved in planning, designing, and constructing a bridge is likely covered – meaning there is the potential for some of this important work to go to DBEs.

DOT Priority Selection Considerations

The proposed projects do not meet the criteria required to receive priority consideration. The projects are not currently in poor condition and are not at risk of falling into poor condition within the next three years. However, it is important to note the significance of this series of bridges on the I-80 network, particularly as it relates to the transcontinental movement of freight and general passenger traffic. We feel that a proactive approach to preserving this

critical link in the interstate system is both prudent and warranted, as highlighted in the Economic Competitiveness and Opportunity section of this grant narrative. If not awarded, NDOT will choose to prioritize current bridge formula funding to complete this project. However, that funding will be deviated from other equally important projects, some of which do have a bridge classification of poor condition.