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3.8 Water Resources

This section describes the Truckee River and its tributaries, man-made irrigation/drainage canals, wetlands, and the Truckee River floodplain. It also describes the project’s potential long-term and construction impacts on these features and the measures that NDOT is considering to minimize impacts. Additional information about study area water resources can be found in the [Aquatic Resource Inventory \(Appendix D.8\)](#).



EXISTING CONDITIONS

Surface Water Resources

In summer 2017, NDOT surveyed wetlands, streams, and man-made drainage ditches in the study area using the latest U.S. Army Corps of Engineers (Corps) guidelines. Biologists identified several streams and man-made irrigation/drainage ditches (see Table 3.8 1 and Figure 3.8-1) and a 0.56-acre potential wetland within the study area.



Man-made ditch adjacent to I-580

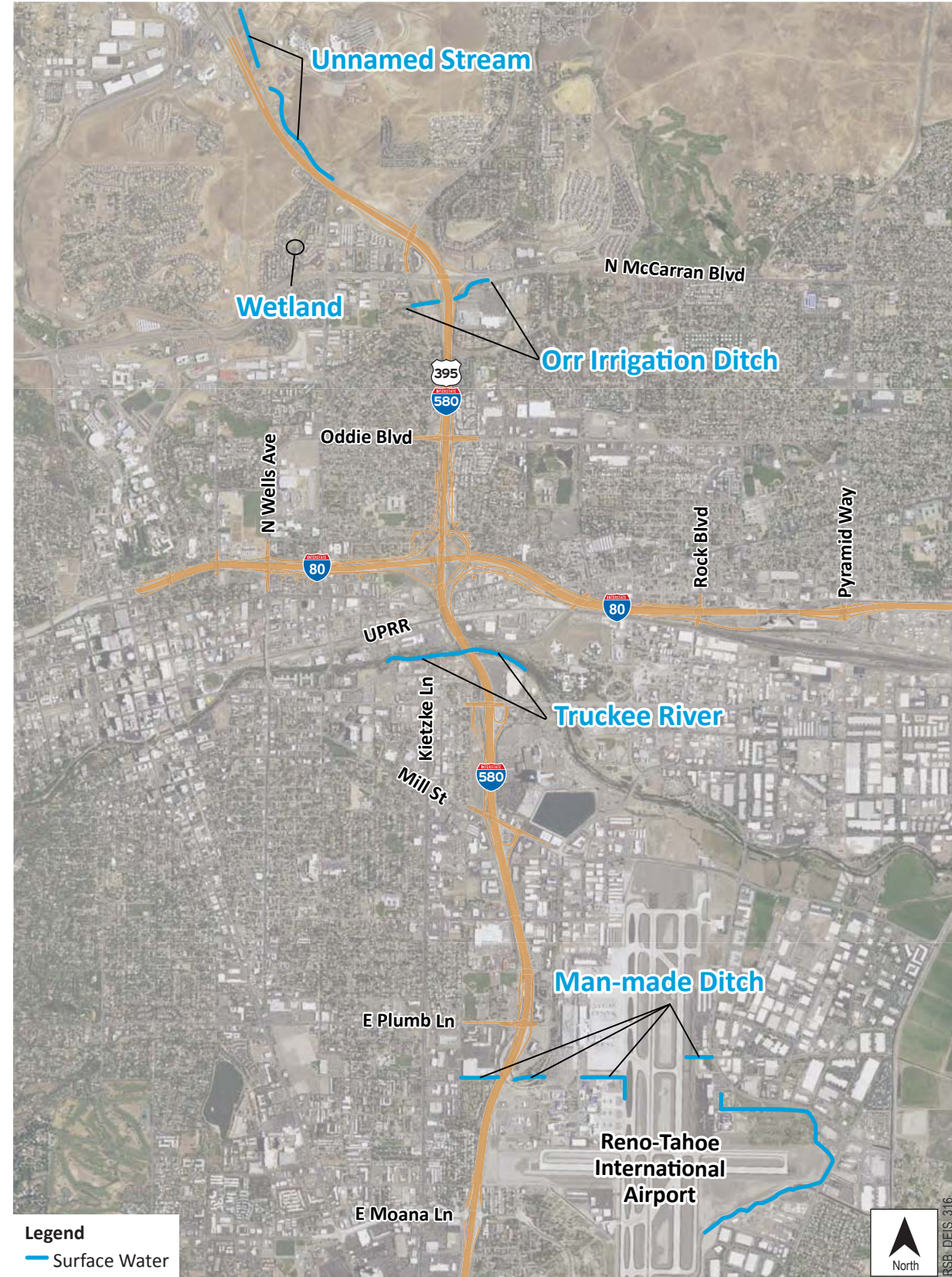
Table 3.8-1. Streams and Ditches in the Study Area

Description of Water Feature	Surface Water Acreage within Study Area
US 395 Unnamed Ephemeral Natural Watercourse ^a	1.16 acres
Orr Ditch	0.38 acre
Truckee River ^b	9.78 acres
I-580 Man-made Ditch	1.81 acres
Potential Palustrine Emergent Wetland ^c	0.56 acre

^a Ephemeral streams only exist for a short time after precipitation or snowmelt.
^b The Truckee River is a perennial stream. Perennial streams have a well-defined channel that contains water year-round during a year with normal rainfall.
^c Palustrine emergent wetlands include vegetated areas such as marshes, swamps, and bogs, as well as some small shallow ponds, where erect, rooted plants, including cat tails and other grasses, grow most of the year (Cowardin et al. 1979)

3.8 WATER RESOURCES

Figure 3.8-1. Water Resources in the Study Area



The Truckee River, natural drainages, man-made irrigation/drainage ditches, and wetlands are depicted.



The Truckee River is the largest river in the study area, is the only Lake Tahoe outlet, and empties into Pyramid Lake, about 60 miles east of Reno and Sparks. All urban streams in the study area and Truckee Meadows valley empty into the Truckee River (City of Reno 2018). The Truckee River is the primary drinking water source for the Truckee Meadows Water Authority, which serves more than 385,000 residents in the Reno and Sparks region. The Authority reports that 85 percent of the drinking water it supplies is surface water from the Truckee River. The Glendale Water Treatment Plant, which is about one-half mile downstream of the I-580 bridge over the Truckee River, treats raw river water for use as drinking water (NDOT Stormwater Division 2017).

Stormwater

Stormwater from the study area freeway system and local streets discharges to the Truckee River via NDOT's, Reno's, and Sparks' separate storm drains. A National Pollutant Discharge Elimination System (NPDES) permit authorizes NDOT to discharge stormwater to the Truckee River through its storm drains. There are two large NDOT stormwater discharge points into the Truckee River west of I-580 (Figure 3.8-2). Although rainwater or snowmelt draining off the freeway ("runoff") may pass over areas of soil, gravel, and vegetation before entering storm drains, those areas do not remove the dirt, grit, and pollutants like motor oil in the runoff before it enters the Truckee River or one of the local tributaries. As a result, it is likely that runoff from the freeway adversely affects water quality in the Truckee River and some of its tributaries.

Figure 3.8-2. I-580 Stormwater Discharge Points into the Truckee River



Three waterways cross under the freeways. Water runs off the freeways into storm drains and into these waterways. Currently this water is not treated.

Wetlands

The one potential wetland in the study area is palustrine emergent, which means that either groundwater or standing surface water provides habitat for rooted vegetation such as cattails. NDOT considers the wetland to be “jurisdictional,” which means it is subject to Clean Water Act regulations.

Truckee River Water Quality

The Clean Water Act envisions that all waters be able to provide for designated uses that include recreation and the protection and propagation of aquatic life. Additional designated uses described in the Act that can be adopted in standards by states and tribes include drinking water supply and fish consumption.

The U.S. Environmental Protection Agency maintains a list of impaired waters under Section 303(d) of the Clean Water Act. Impaired waters are those that do not meet state water quality standards or those that do not achieve designated uses. The Truckee River, between the east and west McCarran Boulevard bridges, is on Nevada’s current 303(d) list because water temperature in the river, which determines the body temperature of fish, regularly exceeds levels that are beneficial for native fish species and for the snails, worms, mollusks, and other species that provide food for fish.

The Nevada Division of Environmental Protection’s 2016 *Water Quality Trend Analysis* indicates that pollutant concentrations in the Truckee River at McCarran Boulevard (about 1 mile south of the I-80/McCarran Boulevard interchange) are increasing for sulfate (sulfur-containing mineral salts), total dissolved solids (minerals, salts, and metals), and cloudiness (turbidity) in water caused by particles such as total dissolved solids. The Clean Water Act requires that the chemical, physical, and biological integrity of the nation’s waters be maintained and restored. Dams, diversions, urban development, and channel modification have all adversely affected the Truckee River since the settlement of the Reno area.

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Truckee River Floodplain

The Truckee River, which is the largest river in the study area, is the only Lake Tahoe outlet, and it empties into Pyramid Lake, about 60 miles east of Reno and Sparks. All urban streams in the study area and Truckee Meadows empty into the Truckee River.

Floodplains are natural extensions of waterways that provide important natural and beneficial values such as open space, wetlands, and wildlife habitat/movement corridors. Floodplains also attenuate flood and stormwater by decreasing water velocities and providing temporary flood water storage, which filters sediments and provides erosion control. The extent to which a floodplain provides these functions varies with vegetative cover, stream hydrology, and distance from the stream.

The Truckee River is a regulatory floodway, which is defined as a channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that a 100-year flood can be carried without substantial increases in flood heights. This floodway extends below the existing I-580 bridges over the Truckee River (Figure 3.8-3). During floods, the Truckee River floodway, shown on the figure, can pass as much as 14,000 cubic feet of water per second.¹

A levee on the south side of the river protects the Walmart Supercenter and other properties from being inundated by the 100-year flood. The Reno-Sparks Indian Colony worked with the Washoe County Flood Control Project, the Washoe County Public Works Department, the Nevada Departments of State Lands, the Corps, and Walmart to construct this quarter-mile-long levee (Figure 3.8-3).

The Truckee River Flood Management Authority, through its ongoing flood control project, is constructing levees, floodwalls, and floodplain terraces along the Truckee River in the study area. The project also includes recreational features such as fishing access locations, picnic areas, and trails (Corps 2013).

Figure 3.8-3. Truckee River Floodway (Existing Condition)



The floodway extends below the existing I-580 bridges over the Truckee River.

¹ Cubic feet per second is used to describe the rate of a stream or river flow. One cubic foot per second is equal to about 7.5 gallons of water flowing each second.



WATER RESOURCES IMPACTS

Potential impacts to water resources in the study area may occur because NDOT is proposing to widen the freeways, relocate freeway-to-freeway ramps and freeway on- or off-ramps, and modify streets in some locations (Table 3.8-2). This project would not construct new roads on a new alignment. The freeway widening, new ramp locations, and street modifications associated with Alternatives 1, 2, and 3 would result in new strips of land required for freeway use. NDOT designed Alternatives 1, 2, and 3 to avoid or minimize impacts to the adjacent environment, to the extent practicable. As a result, the alternatives NDOT analyzed minimize impacts while addressing the purpose and need of the project.

Alternative 1, with about 1,000 square feet of bridge piers in the floodway, would have more I-580 bridges over the Truckee River than Alternatives 2 and 3, which would each have only about 100 square feet. The existing bridge has 1,091 square feet of piers in the floodway, all of which would be removed with Alternatives 1, 2, and 3.

Table 3.8-2. Water Resources Impacts

	No Build Alternative	Alternative 1	Alternative 2 (Preferred Alternative)	Alternative 3
Surface Water Impacts	<ul style="list-style-type: none"> Avoids impacts to the natural streams and man-made drainages associated with Alternatives 1, 2, and 3. <ul style="list-style-type: none"> Leaves the I-580 bridge pier in the Truckee River. Continues to discharge untreated highway runoff directly to the Truckee River and the drainages that empty into the river. As freeway traffic volumes increase over time, the trend of increasing concentrations of sulfate and total dissolved solids in the study area (see Truckee River Water Quality section above) would likely continue. The increase in pollution in the Truckee River and decrease in water clarity could contribute to an increase in the river temperature, which would have adverse effects on most fish species, including the federally protected Lahontan cutthroat trout and cui-ui, as well as the species that the fish feed on. 	<ul style="list-style-type: none"> Impacts 0.43 acre of streams and ditches: <ul style="list-style-type: none"> 0.19 acre of natural ephemeral watercourse south of Parr Blvd and east of US 395 0.24 acre of Orr Ditch south of N McCarran Blvd (requires a 12-foot-wide concrete channel to return flows to the existing earthen drainage channel) Because Alternative 1 would have the largest paved area, it would have the greatest potential impact on water quality. 	<ul style="list-style-type: none"> Impacts 0.22 acre of streams and ditches: <ul style="list-style-type: none"> 0.19 acre of natural ephemeral watercourse south of Parr Blvd and east of US 395 0.03 acre of Orr Ditch south of N McCarran Blvd 	<ul style="list-style-type: none"> Impacts 0.29 acre of streams and ditches: <ul style="list-style-type: none"> 0.19 acre of natural ephemeral watercourse south of Parr Blvd and east of US 395 0.03 acre of Orr Ditch south of N McCarran Blvd 0.07 acre of irrigation ditch south of Plumb Lane (the embankment for the northbound airport connector ramp would fill in the existing drainage ditch and require a 12-foot by 4-foot box culvert under the proposed embankment)
	<ul style="list-style-type: none"> All three alternatives would remove the existing I-580 bridge pier and construct a bridge that would span the river without piers. This would cause impacts during construction, mostly related to turbidity. No fill would be placed in the river with these alternatives. No wetlands would be impacted by Alternative 1, 2, or 3. All three alternatives would require relocating the southernmost 300 feet of the drainage ditch south of Parr Blvd and east of US 395 beyond the proposed expansion of the roadway embankment. NDOT would also reconstruct the headwall for the 36-inch culvert at the south end of the drainage ditch that carries flows west under US 395. All three alternatives would fill the existing earthen channel of the Orr Ditch, requiring the 12-foot by 7-foot box culvert to be extended and the culvert headwall to be reconstructed. The larger areas of pavement associated with Alternatives 1, 2, and 3 would cause water quality impacts to the Truckee River and other streams and ditches. The project’s potential impacts to water quality from freeway runoff would be more of an issue for larger receiving waters like the Truckee River and Orr Ditch that flow year-round and receive more freeway runoff than for ephemeral streams that are dry most of the time. 			

Alternatives 1, 2, and 3 would extend the existing culverts that carry water from man-made ditches and natural streams under the widened freeway, which would impact surface water.

Table 3.8-2. Water Resources Impacts (continued)

	No Build Alternative	Alternative 1	Alternative 2 (Preferred Alternative)	Alternative 3
Permanent Floodplain Impacts	No impact	<p>Executive Order 11988, Floodplain Management, and FHWA’s implementing regulations in 23 CFR 650 Subpart A, Location and Hydraulic Design of Encroachments on Floodplains, direct federal agencies to reduce the risk of flood loss; minimize the impacts of floods on human safety, health, and welfare; and restore and preserve the natural and beneficial values served by floodplains.</p> <p>With Alternatives 1, 2, and 3, the I-580 bridges would span the Truckee River, with the bridge piers constructed on the banks of the river. There would be a small improvement (decrease) in the water surface elevation below the I-580 bridge because Alternatives 1, 2, and 3 would remove the I-580 bridge pier from the river. The I-580 bridge pier is located near the deepest and fastest stretches of the Truckee River. The bridge pier obstructs the free flow of the river, causing water to “pile up” to the right and left of the pier until it passes the obstruction. Alternatives 1, 2, and 3 would have no adverse impacts on the regulatory floodway during a 100-year flood (Appendix D.9, Drainage Design Report). Although the project would span the regulatory floodway limits and remove the existing I-580 bridge pier in the Truckee River, NDOT would have to obtain a Section 408 permit from the Corps because the project passes over the Corps’ flood works project.</p> <p>The existing bridge has 1,091 square feet of piers in the floodway, all of which would be removed with Alternatives 1, 2, and 3. NDOT is not planning to permanently place any fill in the floodway or do any work in the floodway other than tree clearing and grading associated with constructing the proposed I-580 bridge abutments and piers.</p>		
		<ul style="list-style-type: none"> • Has more bridges over the Truckee River than Alternatives 2 and 3 to accommodate the expanded I-580 and the ramps that connect I-580 to I-80 in the Spaghetti Bowl (Figure 3.8-4). • Would have about 1,000 square feet of bridge piers in the floodway, which is about 100 square feet less than the existing bridge. 	<ul style="list-style-type: none"> • Alternatives 2 and 3 would have about 100 square feet of bridge piers in the floodway, which is about 1,000 square feet less than the existing bridge has. 	



What is a Section 408 Permit?

Section 14 of the River and Harbors Appropriation Act of 1899 (33 United States Code 408) provides that “the Secretary of the Army may, on recommendation of the Chief of Engineers, grant permission for the alteration of a public work so long as that alteration is not injurious to the public interest and will not impair the usefulness of the work.”

For more information see <http://www.spl.usace.army.mil/Missions/Section-408-Permits/>

3.8 WATER RESOURCES



Table 3.8-2. Water Resources Impacts (continued)

	No Build Alternative	Alternative 1	Alternative 2 (Preferred Alternative)	Alternative 3
Construction	No impact	<ul style="list-style-type: none"> • During construction of any alternative, NDOT would place temporary embankment material on the Truckee River banks outside the ordinary high-water mark, but within the floodway to create work platforms. Temporary embankment slopes would be armored with riprap and/or gabion baskets to prevent erosion in the event of high flows during construction. • Temporary work platforms on the north bank of the Truckee River would provide access for equipment and materials to construct center-pier foundations, columns, and cap and to erect the bridge superstructure. Temporary work platforms on the south bank of the Truckee would provide access for equipment and materials to construct bridge abutments. • There may be temporary impacts on the quality of water entering ditches, streams, and the Truckee River during construction from runoff containing soils disturbed by excavation and grading and inadvertent discharges of gasoline and other fluids used by construction equipment. • Removing the I-580 bridge pier in the Truckee River during Phase 4 of the project would ultimately benefit the river and the species that live in the river. However, removing the pier would pose a challenge because it is in the middle of the river. NDOT is considering several options for bringing construction equipment out to the bridge pier to remove it. NDOT could temporarily divert Truckee River flows from about half of the river channel (north or south), creating a dry work zone within the river channel around the existing pier. The estimated limits of the river diversion would begin 150 feet upstream and end 300 feet downstream from the existing in-stream pier. Then a geotextile fabric would be placed on the river bed, and gravel or boulders placed on the fabric to support construction equipment. After construction is complete, the gravel and geotextile fabric would be removed from the river. • As part of the Section 408 permitting process, NDOT’s contractor would develop a Truckee River diversion plan and dewatering plan and submit it to the U.S. Fish and Wildlife Service, the U.S. Army Corps of Engineers, and NDOT Environmental Services Division for review and approval at least 30 days before construction. • The greatest potential for sediment release would be when the contractor installs and later removes the river diversion barrier. However, any releases associated with the installation and removal of the water diversion are expected to be small. During Phase 1 of construction, part of the I-580 pier top may be removed. This work would be done from above and no in-water work would be needed. During bridge removal, some debris may fall into the river. 		



I-580 bridge over the Truckee River, and the bridge pier supporting it.



Man-made ditch east of I-580.

MEASURES TO MINIMIZE AND MITIGATE ADVERSE WATER RESOURCES IMPACTS

From early in the alternatives development phase, NDOT has refined the design of Alternatives 1, 2, and 3 to avoid or minimize adverse effects on water resources, while also meeting the project’s purpose and need.

Because the streams and irrigation ditches that would be affected by Alternatives 1, 2, and 3 already flow under the freeway, it is not possible to avoid water resource impacts completely. In the final design phase, NDOT will continue

to investigate measures to minimize impacts to natural streams and man-made ditches by employing the principles and standards from NDOT’s water quality manuals, the *Planning and Design Guide* (NDOT 2017a) and the *Construction Site Best Management Practices Manual* (NDOT 2017b). Construction in or near waterways will be performed in accordance with NDOT’s Structures Manual (NDOT 2008) and the U.S. Fish and Wildlife Service’s Biological Opinion (included in [Appendix D.10](#)).

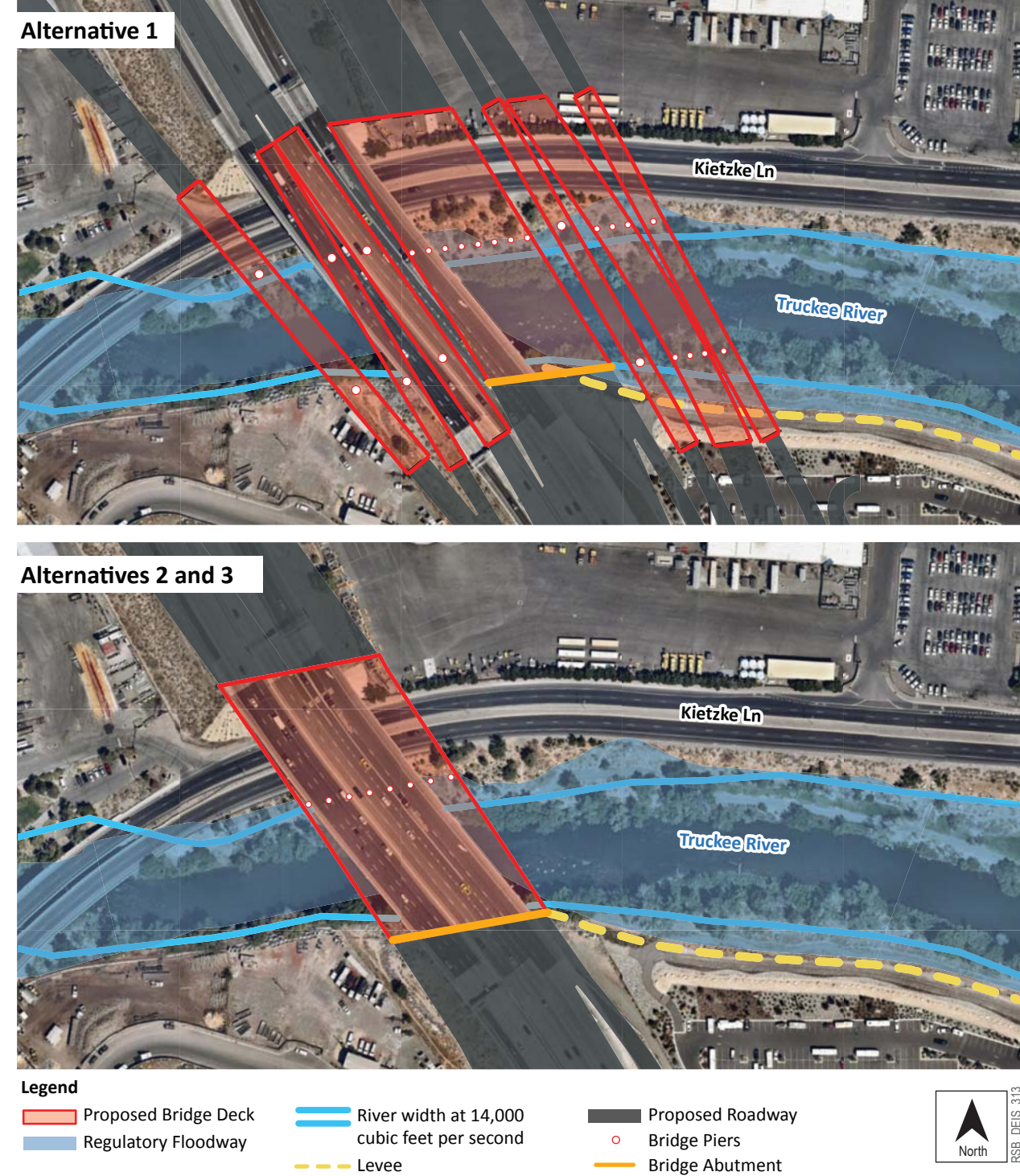
Because the streams and irrigation ditches that would be affected by Alternatives 1, 2, and 3 already flow under the freeway, it is not possible to avoid all water resource impacts.

Table 3.8-3. Mitigation Measures for Water Resources Impacts

	Mitigation All Alternatives
Water Quality	<p>Current NDOT standards only require treatment of road runoff that is caused by the addition of paved and disturbed areas. To mitigate the project’s potential longer-term water quality impacts, NDOT will design water quality detention basins to treat stormwater runoff from all of the project’s paved areas, as well as unpaved and disturbed areas within the construction footprint (Figure 3.8-5).</p> <p>The water quality detention basins will be designed to store runoff from a 2-year storm for a minimum of 24 hours so that solid pollutants can settle out of the stormwater before entering the storm drains and eventually the Truckee River. Special storm drain inlets will be used to control the time stormwater is detained, while allowing the basins to fully drain over a 24-hour period.</p> <p>The potential water quality improvements associated with the proposed stormwater detention basins will have indirect benefits for wildlife living in and along the Truckee River, as well as for recreational users.</p> <p>Construction. NDOT’s contractor will follow NDOT’s <i>Construction Site Best Management Practices Manual</i> (NDOT 2017b) to keep exposed soil from eroding offsite, thereby reducing the potential for discharge of sediment and other pollutants into ditches, streams, and the Truckee River. Typical best management practices include landscaping, mulch, and rock slope protection at storm drain outlets. In areas where construction will occur near water, temporary check dams, sediment traps, silt fences, dikes, or ditches may be used to trap sediment and prevent it from moving into the Truckee River.</p> <p>NDOT’s construction contractor must file a Notice of Intent with the Nevada Division of Environmental Protection’s Bureau of Water Pollution Control to comply with the General Permit for Stormwater Discharges Associated with Construction Activity. The contractor will develop a stormwater pollution prevention plan before construction to identify potential stormwater pollution sources and appropriate best management practices to prevent or reduce, to the maximum extent possible, pollutant discharges associated with construction. The stormwater pollution prevention plan will meet the requirements for NDOT, Nevada Division of Environmental Protection, and U.S. Army Corps of Engineers Clean Water Act permitting. Permits from the Division of Environmental Protection’s Bureau of Water Pollution Control may also be needed if construction results in discharge to surface water or groundwater.</p> <p>NDOT will direct its contractor to construct and maintain barriers to isolate and confine in-water work areas to prevent sediment, petroleum products, chemicals, and other liquids and solids from entering streams or ditches during construction.</p> <p>Bridge removal will minimize debris falling into the Truckee River. Any bridge debris that falls into the river will be removed by NDOT’s contractor, if possible, and disposed of according to state law.</p> <p>To minimize the potential for contaminant releases into the Truckee River during construction, all equipment will be fueled and maintained at a designated fueling location that is at least 100 feet away from the river.</p> <p>After constructing the I-580 bridges over the Truckee River, NDOT will remove the work platform armor and embankment materials, and the river banks will be regraded and revegetated to pre-project conditions. NDOT will also restore the multi-use paths on the north and south sides of the river.</p>
Required Permits	<p>Before the project can be constructed, NDOT must receive a Section 404 permit from the Corps to place fill in “waters of the U.S.,” which is the term for surface water the Corps has jurisdiction over. During a September 2017 meeting, the Corps told the project team that no Section 404 permit would be needed for the new I-580 bridges crossing the Truckee River. Extending the culverts carrying other waterways under the freeway would require a Corps permit, likely a Nationwide Permit 14. NDOT must also receive a Section 408 permit because the project affects a Corps-constructed flood work project (the Truckee River is considered a Corps of Engineers flood work). There are also dams upstream and downstream of the study area. To obtain a Section 408 permit, NDOT must demonstrate to the Corps that the project would not impair the usefulness of any Corps flood-protection project.</p>

3.8 WATER RESOURCES

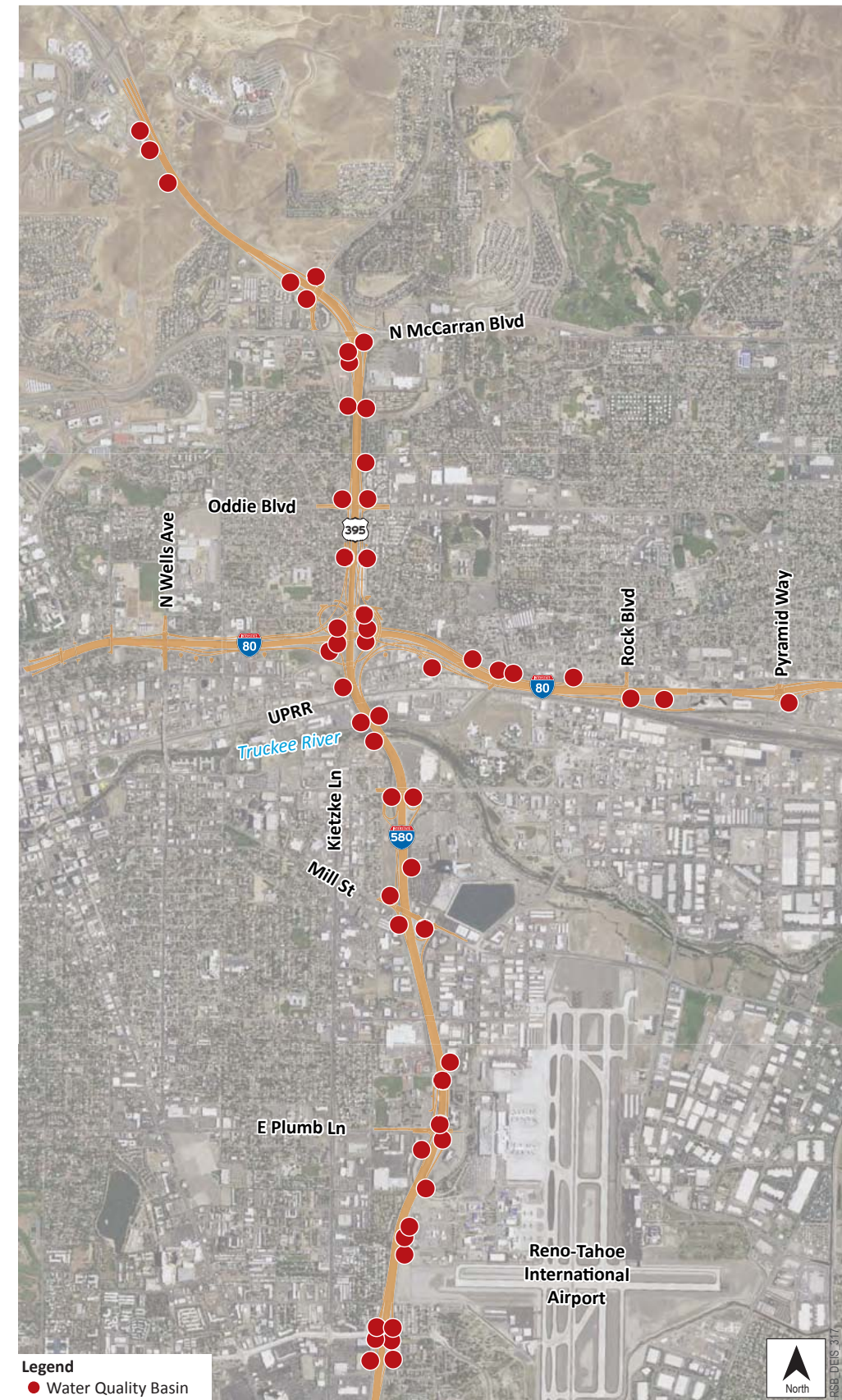
Figure 3.8-4. I-580 Bridges Associated with Alternatives 1, 2, and 3



Alternative 1 would have more bridges over the Truckee River than Alternative 2 and 3 to accommodate the expanded I-580 bridge and the ramps that connect I-580 to I-80.



Figure 3.8-5. Planned Water Quality Detention Basins



Water quality detention basins will treat stormwater runoff from paved surfaces and from the construction footprint during construction. There are no water quality basins on the west leg of the project because the entirety of I-80 west of the Spaghetti Bowl drains east via a storm drain trunk line back to the interchange.

WATER RESOURCES REFERENCES

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