Chapter 3: Affected Environment, Environmental Consequences, and Mitigation Measures

This chapter describes the existing social, economic, and environmental conditions in the Interstate 15 (I-15): Farmington to Salt Lake City Project study area, which serve as a baseline for evaluating the impacts of the Action Alternative. This chapter also addresses the expected beneficial and adverse social, economic, and environmental impacts of the Action Alternative. If no mitigation measures are listed for a resource in this chapter, then none are proposed. Potential indirect and cumulative effects are described in Section 3.18, *Indirect and Cumulative Effects*.

The I-15: Farmington to Salt Lake City Project includes two project alternatives:

- No-action Alternative
- Action Alternative

Resource-specific Evaluation Areas. For each resource discussed in this chapter, a resource-specific evaluation area has been defined that establishes the geographic area of impacts for that resource. The introduction to each resource section defines the specific evaluation area for that resource.

Resources Not Analyzed in Detail in This EIS. Farmland, wild and scenic rivers, and paleontological resources are not analyzed in detail in this Environmental Impact Statement (EIS).

- The Utah Department of Transportation's (UDOT) review of land use data and aerial photographs showed that the I-15: Farmington to Salt Lake City Project study area has no farmland. The study area is in an urban environment and is already developed, is used for parks and recreation, or is within municipal boundaries, which qualifies the land as being committed to urban development.
- There are no wild and scenic rivers in the study area.
- No paleontological resources are known to be present in the project study area. According to the Utah Geological Survey, the potential for encountering fossil resources is low due to the nature of the geology in the area (UGS 2022).

3.1 Land Use

3.1.1 Introduction

Section 3.1 describes existing land uses and adopted general plans and zoning ordinances for communities in the land use evaluation area as well as the expected impacts to land use from the project alternatives.

Land Use Evaluation Area. The land use evaluation area is the area within 1,000 feet on each side of the Action Alternative approximate right-of-way. This area was selected because traffic patterns and access from the Action Alternative could affect influence land use patterns in this area. Land use is influenced by many variables, including access to regional transportation. There are no formal guidelines for buffer distances to use for land use evaluations. A distance of 1,000 feet was used for the land use evaluation area because I-15 already exists, and the land uses around I-15 are already developed and are part of a large urban area with a mature transportation network. Any effects on land use beyond 1,000 feet from the right-of-way would be unlikely or very limited. The land use and planning in the evaluation area are regulated by seven cities: Farmington City, Centerville City, West Bountiful City, Bountiful City, Woods Cross City, City of North Salt Lake, and Salt Lake City (Figure 3.1-1).

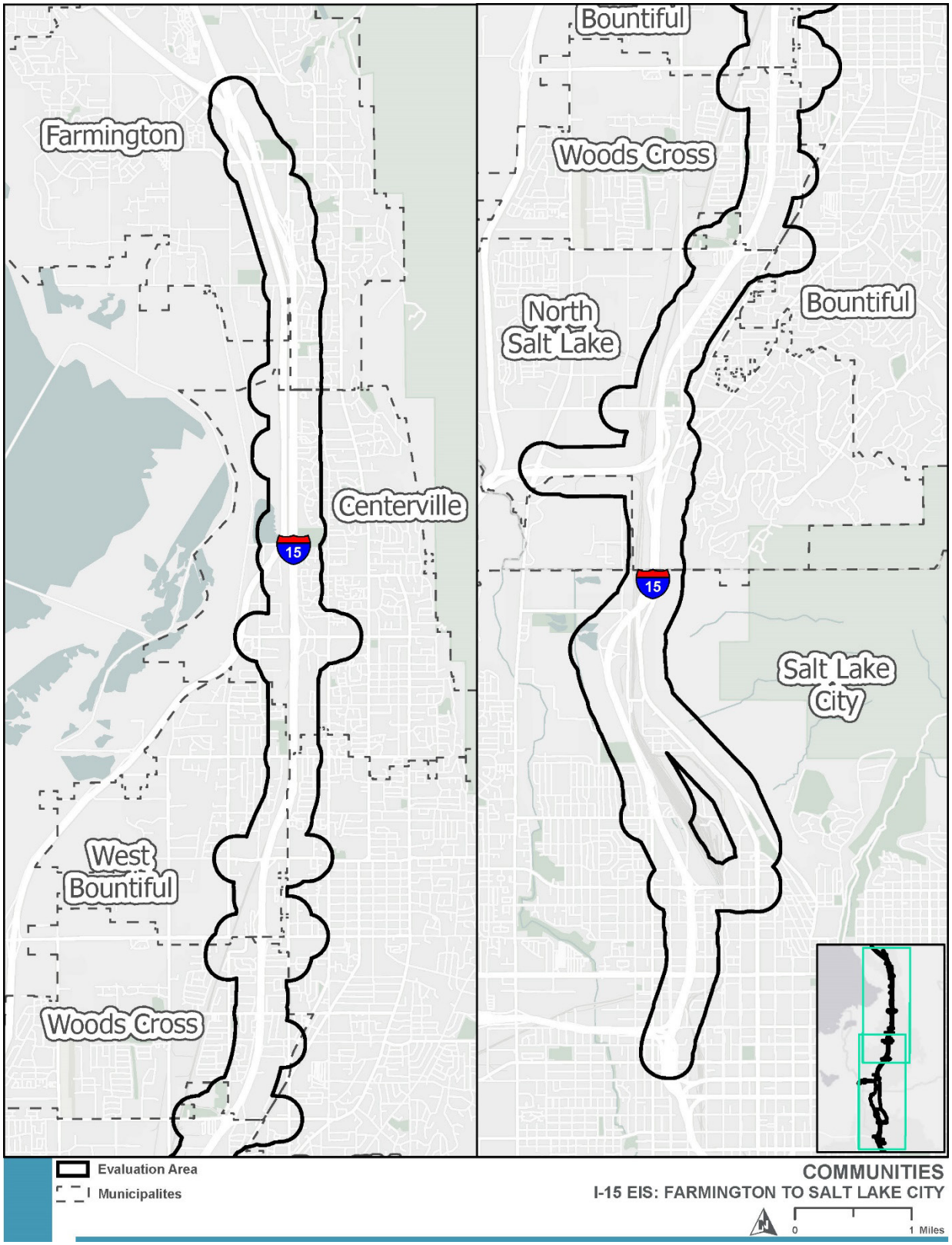
3.1.2 Regulatory Setting

The Federal Highway Administration's (FHWA) Technical Advisory T 6640.8A, *Guidance for Preparing and Processing Environmental and Section 4(f) Documents*, states that environmental documents for National Environmental Policy Act (NEPA) projects should identify and review development trends, area growth, and land use plans and policies in the area that will be affected by the proposed project (FHWA 1987). The land use discussion should assess the consistency of alternatives with the area's plans and any secondary impacts associated with substantial, foreseeable, induced development for each alternative.

The Utah legislature has delegated responsibility for land use planning and regulation to the state's Counties and Cities. These local governments develop general or comprehensive plans for land development within their jurisdictional boundaries. These plans provide the parameters for future land use as well as infrastructure needs. The public has the opportunity to participate in the land-planning process by reviewing and commenting on draft land use and zoning plans before they are approved by local officials.

All plans discussed in Section 3.1 have been developed in accordance with this general approach and, therefore, represent the type of land use and built environment that each community desires.

Figure 3.1-1. Cities and Counties in the Land Use Evaluation Area



3.1.3 Affected Environment

This section describes the existing land use in each jurisdiction in the land use evaluation area as well as the applicable local and regional land use plans and policies. The land use patterns described below are the product of interdependent decisions by numerous parties including local elected officials, local planning staff, developers, citizens, regional planning authorities, and many other public and private entities.

3.1.3.1 Current Land Use

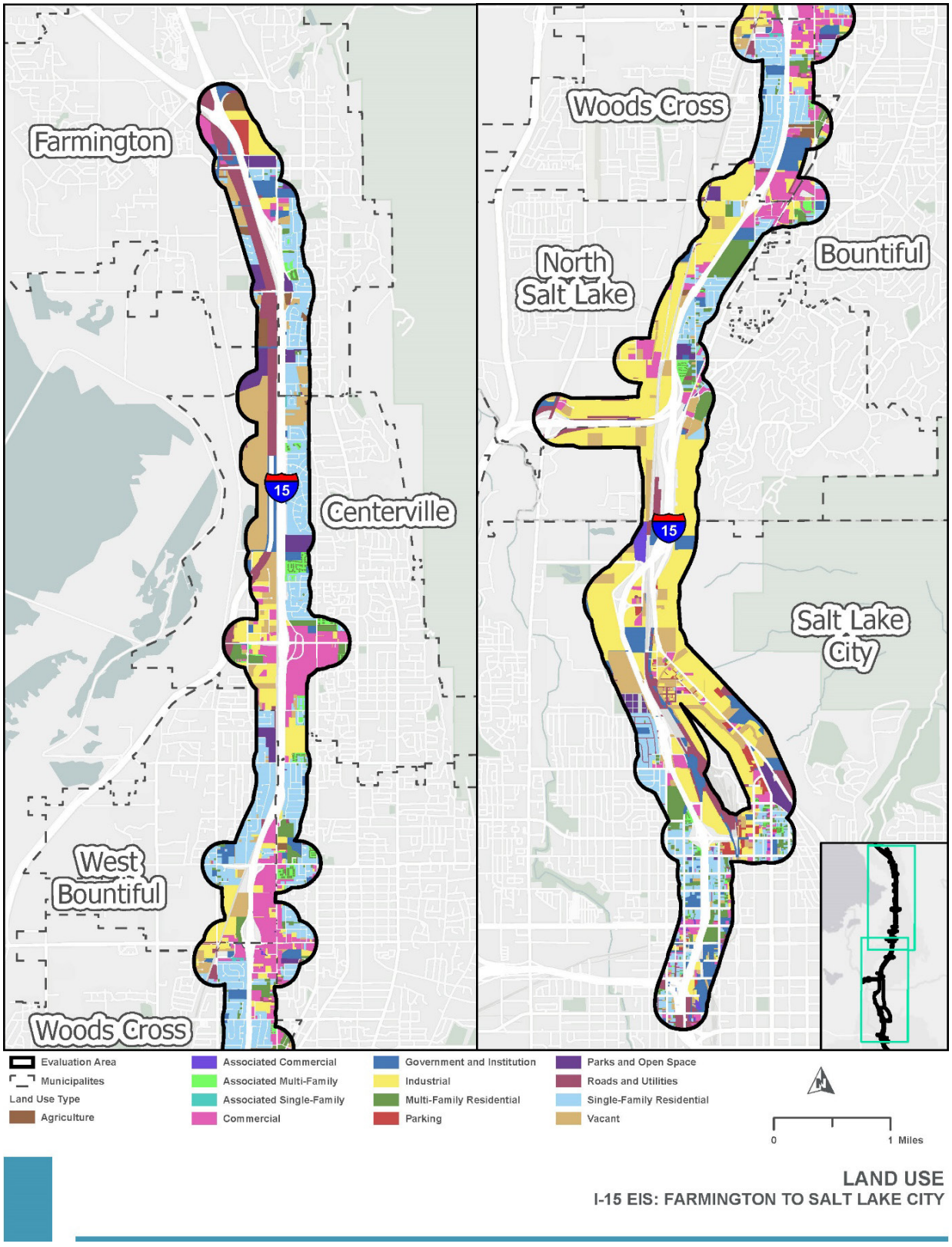
UDOT inventoried the current land uses in the land use evaluation area by using the Wasatch Front Regional Council's (WFRC) 2018 land use data layer. The WFRC data layer was edited to remove areas in the existing road corridors and update land use categories for areas that had been recently developed based on a review of more recent aerial images. The land use categories are grouped by general type of land use. For example, the residential land use type includes all densities of housing, and the commercial land use type includes both retail and office space. See Table 3.1-1 and Figure 3.1-2.

Table 3.1-1. Current Land Use in the Land Use Evaluation Area

Land Use Type	Acreage in Evaluation Area	Percent in Evaluation Area	Description
Parks and Open Space	174	4	Several parks and developed recreation areas are located in the evaluation area.
Residential	1,317	27	Residential is a third of the land use in the evaluation area. Residential areas consist primarily of single-family dwelling units. Some higher-density, multifamily units are located near the commercial centers.
Commercial	613	13	The evaluation area encompasses four commercial areas. These areas are discussed in more detail in Section 3.5, *Economic Conditions*.
Industrial	1,311	27	There is a large industrial corridor along both sides of I-15 in the evaluation area throughout Salt Lake City and North Salt Lake. Other industrial areas in the evaluation area are present at the intersection of I-15 and 500 South (Woods Cross) and I-15 and Parrish Lane.
Agriculture	58	1	There is little agricultural land use in the evaluation area. It is mostly present is small quantities throughout the evaluation area.
Government and Institution	409	8	Educational facilities intersected by the evaluation area include a number of schools, police departments, places of worship, and libraries (see Section 3.2, *Social Environment*).
Roads and Utilities	361	7	This land use consists of the local collector and arterial roads as well as areas owned, administered, and/or used by the various utility companies that have property and facilities in the evaluation area.
Parking	48	1	This land use consists of areas used for parking.
Vacant	555	11	There is relatively little vacant land in the evaluation area. The largest quantity of vacant land is present in Farmington and Centerville west of I-15 and Legacy Parkway.
Total	4,846	100	

Source: Calculated from geographic information systems (GIS)-based inventory

Figure 3.1-2. Current Land Uses in the Land Use Evaluation Area



3.1.3.2 Planning and Zoning

The land use evaluation area intersects the incorporated cities of Farmington, Centerville, West Bountiful, Bountiful, Woods Cross, North Salt Lake, and Salt Lake City. UDOT reviewed current general plans and zoning for these areas.

3.1.3.2.1 Planning

This section reviews the land use chapters from the general plans and neighborhood master plans from Farmington, Centerville, West Bountiful, Bountiful, Woods Cross, North Salt Lake, and Salt Lake City. General plans typically include guidelines for regulating growth and future development. They are developed with public input and adopted by each area's respective planning commission. Figure 3.1-2 above shows the cities in the land use evaluation area.

Farmington General Plan

The *Farmington General Plan* (Farmington City 2016) identifies I-15 as a major arterial that runs north-south throughout the city. The plan states that circulation in the city is limited by the location of I-15 and U.S. Highway 89 (U.S. 89). Glovers Lane, State Street, and Shepard Lane provide the only east-west connections, and the plan states a preference for more east-west collector streets over I-15, Legacy Parkway, and U.S. 89. The importance of these connections will increase with population growth and the need to provide efficient emergency services to more people. The I-15 land use evaluation area extends from the southernmost extent of I-15 to approximately where U.S. 89 and I-15 split. Existing residential land is present on the east side of I-15 to about 200 West, clustered around State Street and intermixed along the west side of Legacy Parkway. Other land uses are present predominantly in the northern part of the land use evaluation area and consist of commercial, industrial, governmental/institutional, and agricultural land use.

Centerville City General Plan

The *Centerville City General Plan* (Centerville City, no date) provides a collection of policies and guidance for the city as a whole as well as planning initiatives for subparts within the city. I-15 runs south to north through the entirety of the city and is within the land use evaluation area (Figure 3.1-2 above). Current land use east of I-15 is primary residential with some commercial land use on Parrish Lane. The *Centerville City General Plan* states that residents of this community value and wish to retain the suburban, low-density residential land use.

The residential land use on the east side of I-15 is largely broken up only by the Central Business District, which extends from about Pages Lane to Parrish Lane along Main Street. Existing and future land use reflect mostly commercial uses in the Central Business District. The *South Main Street Corridor Plan*, Part 12-480-7 of the general plan, states that the City's goal is to provide a distinctive entryway into Centerville from the I-15 interchange that guides travelers toward Main Street.

The plan states that Centerville is limited in its east-west dimension by the Great Salt Lake on the west and the Wasatch Mountains on the east. Therefore, it is the stated intention of Centerville City to concentrate on the development of major east-west streets to allow traffic to move quickly from the city proper to one of the major north-south routes. The major streets proposed are Pages Lane, Porter Lane, Parrish Lane (400 North), Chase Lane (1000 North), Jennings Lane (1700–1800 North), 2025 North, and Lund Lane. The City also

wishes to improve pedestrian and biking access to current and future trails west of I-15 to residents living both west and east of I-15, including a trailhead to the Legacy Parkway Trail on 1275 North.

West Centerville Neighborhood Plan

Although the majority of Centerville is developed, the West Centerville Neighborhood, located entirely west of I-15, has current land uses comprising industrial, commercial, residential, open space and vacant land. The *West Centerville Neighborhood Plan* (Centerville City 2009) examines land use surrounding Legacy Parkway, which parallels the west side of I-15 throughout Centerville.

Current land use shows predominantly commercial and industrial uses in south Centerville between Legacy Parkway and I-15. Moving north, the current land use west of Legacy Parkway and I-15 is vacant land. The plan's future land use states that this area will be the Shoreline Commerce Park District and the Shoreline Commerce Park/Mixed Node.

The *West Centerville Neighborhood Plan* specifies that the land west of I-15 is suited best for well-planned highway commercial, office, business and research parks, light manufacturing, and permanent open space and that commercial uses should be developed as an extension of the Parrish Lane Corridor. The plan includes objectives that support the enhancement of I-15 and Legacy Parkway. The goal is to ensure construction and reconstruction of these roads, particularly with interchange areas such that they can provide needed capacity to serve the city.

The plan also includes Centerville City's desire to connect the east side of the city to the Legacy Parkway trail system. The plan mentions connecting to Glovers Lane and Parrish Lane through an enhanced trail system.

West Bountiful City General Plan 2019–2039

I-15 is one of two major north-south transportation corridors in West Bountiful. It runs through the southeast part of the city and continues northward just outside the eastern city limit. The southeast corner and eastern edge of West Bountiful is within the land use evaluation area (Figure 3.1-2, *Current Land Uses in the Land Use Evaluation Area*, above). The *West Bountiful City General Plan 2019–2039* (West Bountiful City 2019) describes the city as a low-density residential area that prides itself on its agricultural past and present rural atmosphere. Current land use patterns indicate commercial and industrial use in the southeast corner of the land use evaluation area, while the remaining land use evaluation area is primarily residential. The commercial district along the southeast corner around I-15 allows it to buffer the residential areas from I-15. The *West Bountiful Land Use Plan* states that the City intends to carry forward these same attributes into the future. Generally, the land use plan maintains the same land use patterns already present in the city. The *West Bountiful City General Plan* acknowledges the likelihood of I-15 reconstruction in the area.

Bountiful City General Plan

I-15 runs along the northwest limits of Bountiful, and the western limits of the city are within the land use evaluation area. Land use in this area is primarily residential with commercial corridors around 500 South and 2600 South. The City is currently working on a 2023 update to its general plan.

The *2009 Bountiful City General Plan – Downtown Master Plan* (Bountiful City 2009a) describes goals and objectives to revitalize the city's historic downtown.

Woods Cross City General Plan Update 2019

Wood Cross is immediately north of North Salt Lake and immediately south of West Bountiful (Figure 3.1-2, *Current Land Uses in the Land Use Evaluation Area*, above). I-15 runs north-south along the city's eastern edge. The east side of the city is within the land use evaluation area. The *Woods Cross City General Plan Update 2019* (Woods Cross City 2019) documents existing conditions and analyzes important community issues and ideas. Current land use in the land use evaluation area shows that industrial and commercial uses are present at the southern and northern limits of the city, with some commercial and industrial use around 1500 South. Residential land use in the land use evaluation area is located primarily on the west side of I-15. The east side has more of a mixed land use with an emphasis on commercial activity. Two schools, Woods Cross Elementary School and Woods Cross High School, are adjacent to the I-15 corridor.

Quality of life is mentioned in the plan, with Woods Cross residents considering easy access to I-15 and the Salt Lake area as one amenity that increases their quality of life. The plan also mentions the impact of traffic issues on I-15 on local streets—that when I-15 is congested, the local network becomes congested.

Future land use in the land use evaluation area will be consistent with current land use patterns, with the exception of plans to revitalize the 500 West Commercial District North End, a shared commercial corridor with Bountiful.

North Salt Lake General Plan 2013

North Salt Lake is adjacent to and directly north of Salt Lake City. I-15 runs north-south through the middle of the city. Interstate 215 (I-215) merges with I-15 within the city, and the land use evaluation area comprises areas along both roads. The predominant land use along I-215 and the west side of I-15 in the land use evaluation area is industrial. Along the east side of I-15, land use is industrial in the southern part of the city and then largely residential. A commercial corridor surrounds the intersection of Main Street and 1100 North/2600 South in the northeast corner of the city where the city limits of North Salt Lake, Woods Cross, and Bountiful meet.

According to the *North Salt Lake General Plan* (City of North Salt Lake 2013), much of the city in the land use evaluation area has been developed. Current land use is largely consistent with future land use with the exception of one major area where an anticipated and desired change is planned over the next decade: the Town Center, oriented generally between I-15 and Orchard Drive around the Center Street neighborhoods on the east side of I-15. The Orchard District is intended to become the town center complete with improved commercial areas, mixed-use buildings, and residential areas. The City desires a way to connect communities on both sides of I-15 as well as beautified gateways from I-15 to destination areas such as the Town Center.

Plan Salt Lake

Adopted in 2015, *Plan Salt Lake* (Salt Lake City 2015) is the unified vision for Salt Lake City and its neighborhoods for the next 25 years. The purposes of *Plan Salt Lake* are to:

- Establish and articulate a citywide vision for Salt Lake City;
- Identify the commonly held values of the community;
- Establish a framework for future community master plans and element plans (also known as thematic plans) to carry out the City's 2040 Vision; and
- Set targets and identify metrics to help measure success over time.

Thirteen guiding principles (see the box at right) were established in *Plan Salt Lake* to serve as a framework for developing neighborhood and community plans. *Plan Salt Lake* includes metrics for each principle and baseline numbers to help measure the City's progress toward its vision for the city in 2040.

What are the guiding principles in *Plan Salt Lake*?

The guiding principles in *Plan Salt Lake* are:

- Neighborhoods
- Growth
- Housing
- Transportation and Mobility
- Air Quality
- Natural Environment
- Parks and Recreation
- Beautiful City
- Preservation
- Arts and Culture
- Equity
- Economy
- Government

The communities listed below are in the land use evaluation area and have individual master plans that were developed under the guiding principles.

Capitol Hill Community Master Plan

The Capitol Hill community of Salt Lake City is generally bounded by the Central Business District on the south, I-15 on the west, the north city limits on the north, and City Creek Canyon of the east. The *Capitol Hill Community Master Plan* (Salt Lake City 2001b) states that the Capitol Hill community has the greatest land use diversity of all communities in Salt Lake City and is home to two regional activity centers: the state capitol and the headquarters for the Church of Jesus Christ of Latter-day Saints. The southern end of the I-15 corridor is within the land use evaluation area (see Figure 3.1-2, *Current Land Uses in the Land Use Evaluation Area*, above).

Existing residential and recreational uses (Children's Museum) are shown on the plan's future land use map as unchanged from their current use. In the future land use plan, the Capitol Hill Business Park is shown as a redevelopment area. Current land use designates this area as industrial. In general, land use in this community has remained relatively unchanged over the last 30 years.

Northwest Community Master Plan Update

The Northwest community of Salt Lake City is immediately west of the Capitol Hill community in northwest Salt Lake City (Figure 3.1-2, *Current Land Uses in the Land Use Evaluation Area*, above). The I-15 corridor is the east boundary of the Northwest community, and the area to the west of I-15 is in the land use evaluation area. The *Northwest Community Master Plan Update* (Salt Lake City 1992) is the planning document for the Northwest community.

The current land use in this community within the land use evaluation area is industrial. The future land use plan states that this area is planned to be a mix of industrial, recreational, open space, and limited residential; however, a detailed plan has not been created.

West Salt Lake Community Master Plan

The West Salt Lake community is directly north of the Northwest community and I-15 on the east. The area west of I-15 is in the land use evaluation area. Land use in the corridor is primarily residential. The *West Salt Lake Community Master Plan* (Salt Lake City 1995) describes the residential part of the community as consisting of dense single-family housing. Future land use in the land use evaluation area reflects the current land use.

Gateway Specific Master Plan

The Gateway District is about 650 acres and is bounded by I-15 on the west and 300 West on the east. The *Gateway Specific Master Plan* (Salt Lake City 1998) describes this area is the gateway to downtown Salt Lake City and the Wasatch Front. Once a very diverse neighborhood, the area became increasingly industrial after over time, reducing the community connectedness in the area. The construction of I-15 created small pockets of land within the area that were difficult to develop. Current land use in the land use evaluation area is largely industrial and government and institutional. Future land use is intended to be mixed-use office, residential, and commercial areas oriented toward mass transit.

Rose Park Small Area Plan

Rose Park is defined as west of I-15, north of 600 North, and east of Redwood Road. The neighborhood's boundaries extend north to the city limits. The area west of I-15 is in the land use evaluation area. The *Rose Park Small Area Plan* (Salt Lake City 2001c) describes small commercial nodes in the Rose Park neighborhood that historically acted as community gathering areas but have since become less used since residents are able to easily travel to nearby larger commercial areas. The future land use for this area includes revitalizing these commercial nodes into a gathering point for residents. The majority of the commercial land use in the neighborhood is along I-15.

Beck Street Reclamation Framework and Foothill Area Plan

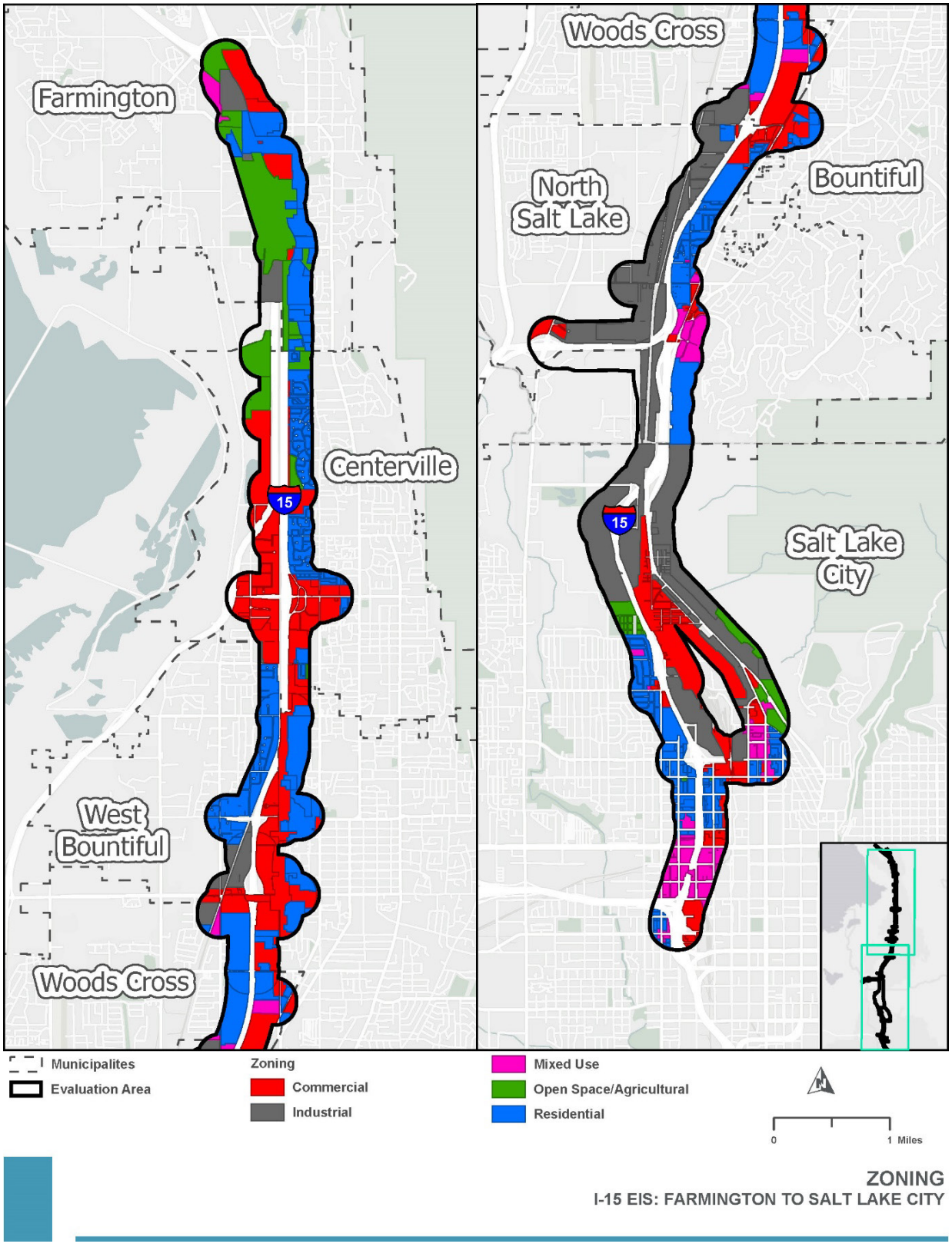
The *Beck Street Reclamation Framework and Foothill Area Plan* study area is situated on the northern edge of Salt Lake City and the southernmost portion of North Salt Lake along Beck Street along the east side of I-15 (Dames & Moore 1999). Currently, the area supports industrial and extractive land uses. Mining and excavation work might continue for several decades. Estimates from the current operators are that the Lakeview Rock quarry in North Salt Lake might be ended in the 2030s or 2040s depending on demand. Current assumptions from Staker Parsons about its current quarry in Salt Lake City are to continue mining and operations at least through 2050, if not longer. Once excavation has ceased and mitigation has been implemented, future land use designations indicate that open space and residential uses would be the primary land use types in the northern part, while open space and business parks would be the primary land use in the southern part.

3.1.3.2.2 Zoning

Zoning designations are used by municipalities to understand land use and implement land use goals determined in the planning documents discussed in Section 3.1.3.2.1, *Planning*. UDOT reviewed zoning ordinances from each jurisdiction with land in the land use evaluation area. Figure 3.1-3 shows the zoning designations for the municipalities with land in the land use evaluation area. The predominant zoning is residential, followed by commercial and industrial. The zoning designations are generally consistent with the planned future land uses for the cities in the land use evaluation area.

The zoning land use data used the current zoning data from Farmington City, Centerville City, Bountiful City, West Bountiful City, Woods Cross City, the City of North Salt Lake, and Salt Lake City. The zoning categories are grouped by general type of land use. For example, the residential land use type includes all densities of housing, and the commercial land use type includes both retail and office space. Some of the cities' zoning data are contiguous for all land within the city boundaries, meaning that the roadway areas are included in the data set. Additionally, some of the cities' zoning identifies roadway areas as commercial, residential, or industrial zoning, so some of these data are counting roadway areas as some other form of land use.

Figure 3.1-3. Zoning in the Land Use Evaluation Area



3.1.4 Environmental Consequences and Mitigation Measures

This section analyzes the expected effects on land use and conflicts with local and regional land use plans from the project alternatives. The Action Alternative options were evaluated equally in this section. To reduce repetitive discussions, if impacts from one option would be the same as impacts from a previously discussed option, the text is not repeated but instead references the previous analysis.

This section focuses on the direct impacts to land use and land use plans from the project alternatives. For a detailed discussion of indirect effects on land use and growth as a result of the project alternatives, see Section 3.18, *Indirect and Cumulative Effects*.

3.1.4.1 Methodology

To assess the expected impacts to land use from the Action Alternative, UDOT reviewed the improvements included with the Action Alternative to determine whether the Action Alternative would be consistent with the planned land use and zoning for the cities in the land use evaluation area.

3.1.4.2 No-action Alternative

With the No-action Alternative, I-15 between Farmington and Salt Lake City would not be reconstructed, so no changes to current land uses or zoning would occur as a result of the project. However, the No-action Alternative would not be consistent with WFRC's 2019–2050 *Wasatch Front Regional Transportation Plan* (RTP; WFRC 2019a), which identifies improvements to I-15 in this segment. And, the community connections proposed as part of the Action Alternative would not be made, thereby ultimately impacting community cohesion and land use.

3.1.4.3 Action Alternative

3.1.4.3.1 Land Converted to Transportation Use

The Action Alternative would convert certain existing land uses to transportation use through the purchase of property adjacent to the Action Alternative. For more details about impacts to specific parcels and properties and mitigation for these impacts, see Section 3.3, *Right-of-way and Relocations*.

Because I-15 is an existing freeway, and the land uses around I-15 are already developed and are part of a large urban area with a mature transportation network, UDOT does not expect the Action Alternative to cause any changes to local zoning or land uses in the areas adjacent to the Action Alternative that are not purchased for roadway use. See Section 3.18, *Indirect and Cumulative Effects*, for more information about potential indirect impacts to land use from the Action Alternative.

Any remaining land purchased by UDOT that is not used for transportation use would be surplused (sold to the highest bidders at auction) and subject to the city zoning rules before it is redeveloped.

3.1.4.3.2 Consistency with Planned Land Use and Zoning

The Action Alternative would be consistent with the planned land uses and zoning for all the cities in the land use evaluation area. All of the city general plans and zoning assume the continued use of I-15 in its existing location. Around the Action Alternative interchange locations, all of the cities have existing and planned land

uses that are consistent and compatible with the interchange improvements proposed by the Action Alternative.

The Action Alternative includes one new interchange location at I-215/U.S. 89 in North Salt Lake. This new interchange would provide better access to North Salt Lake and reduce out-of-direction travel to 2600 South. However, it would not provide new access to any areas that do not currently have access to the regional transportation network.

The Action Alternative would also be consistent with WFRC's 2019–2050 *Wasatch Front Regional Transportation Plan* (WFRC 2019a), which identifies improvements to I-15 between Farmington and Salt Lake City.

3.1.4.4 Mitigation Measures

Because the Action Alternative would have no impacts to land use or zoning, no mitigation is proposed.

3.2 Social Environment

3.2.1 Introduction

Section 3.2 describes the social characteristics in the social environmental evaluation area and the impacts to the social environment from the Action Alternative in terms of community cohesion, quality of life, recreation resources, community facilities, public safety and security, and utilities.

FHWA's guidelines for "social impacts" also include the impacts to travel patterns and accessibility for all users (roadway users, transit users, pedestrians, and bicyclists), highway and traffic safety, and social groups (such as environmental justice communities or other social groups that could be harmed by the project) (FHWA 1987). Information about impacts to travel patterns, accessibility for all users, and highway and traffic safety is provided in Section 3.6, *Transportation and Mobility*. Information about environmental justice communities and other social groups is provided in Section 3.4, *Environmental Justice Populations*. Sometimes noise impacts or visual impacts are included as "social impacts." Impacts to these resources are described in more detail in Section 3.9, *Noise*, and Section 3.15, *Visual Resources*.

Social Environment Evaluation Area. The general social environment evaluation area includes parts of Farmington, Centerville, West Bountiful, Bountiful, Woods Cross, North Salt Lake, and Salt Lake City, since these are the communities that immediately surround the footprint for the Action Alternative.

3.2.2 Regulatory Setting

FHWA's guidelines for preparing environmental documents for evaluating community impacts consider several types of impacts, including impacts to community cohesion; changes in travel patterns and accessibility; impacts to school districts, recreation areas, houses of worship, and businesses; effects on public facilities and services; benefits or harm to different social groups; and displacements of people, businesses, and farms (FHWA 1987).

3.2.3 Affected Environment

Community cohesion, quality of life, recreation resources, community facilities, and public safety and security are important factors in determining how residents develop a sense of belonging to their neighborhoods. UDOT obtained information about the existing social environment by reviewing aerial images; reviewing general plans and other publications from Farmington City, Centerville City, West Bountiful City, Bountiful City, Woods Cross City, the City of North Salt Lake, and Salt Lake City; communicating with local officials; attending public meetings; and conducting field surveys.

3.2.3.1 Community Cohesion

Community cohesion is the degree to which residents have a sense of belonging to their neighborhood or community, including commitment to the community or a strong attachment to neighbors, institutions, or particular groups. Community cohesion can also be described as the patterns of social networking within a community (NCHRP 2001). Community cohesion is subjective and cannot be solidly defined, though specific indicators include interaction among neighbors, use of community facilities and services, community leadership, participation in local organizations, desire to stay in the community and length of residency, satisfaction with the community, and the presence of families in communities (FDOT 2003).

The social environment evaluation area includes 11 planning communities and neighborhoods: Farmington, Centerville, West Centerville, Bountiful, West Bountiful, Woods Cross, North Salt Lake, and the Salt Lake City communities of Northwest, Capitol Hill, Rose Park, and Beck Street. The majority of the evaluation area is fully developed. Residential land use is characterized by urban and suburban single-family homes. The planning communities and neighborhoods have all published a general plan or neighborhood plan, which describe community boundaries, discuss history, and provide long-range guidance and goals for future development and community life (see Section 3.1, *Land Use*). The planning communities have long and rich histories, and many have experienced significant change over time. All of the planning communities expressed a desire to enhance commerce, in part, to create attractive opportunities for people to shop and gather.

Commercial land uses in the evaluation area, include four larger commercial centers which consist of office complexes, “big-box” stores, small retail shops, restaurants, and providers of professional and hospitality services. Some higher-density, multifamily units are located near these commercial centers, and the commercial centers are within walking distance or a short drive of many of the neighborhoods in the planning communities.

Other land uses in the evaluation area include industrial (such as gravel quarries, oil refineries, and warehouses) and municipal (schools and parks).

3.2.3.2 Quality of Life

Quality of life encompasses the general sense of well-being and satisfaction experienced by individuals or communities. Although the factors that contribute to quality of life can be somewhat subjective and vary from person to person, quality of life considerations often include safety, general living environment, accessibility to work, public services and shopping, affordable housing, and cultural and recreation activities.

The area needs and project purposes were defined using UDOT’s Quality of Life Framework’s outcome areas of good health, connected communities, strong economy, and better mobility. Quality of life informed the project purpose statement “to improve safety, replace aging infrastructure, provide better mobility for all

travel modes, strengthen the state and local economy, and better connect communities along I-15 from Farmington to Salt Lake City." For more information, see Chapter 1, *Purpose and Need.*

Information regarding quality of life considerations for the planning communities in the social environment evaluation area is provided in Section 3.2.3.3, *Recreation Resources*; Section 3.2.3.4, *Community Facilities*; Section 3, *Public Safety and Security*; and Section 3.2.3.6, *Utilities*. Other factors, such as air quality, noise, and changes in the surrounding viewshed could also contribute to a person's quality of life. For more information about air quality and noise impacts, see Section 3.8, *Air Quality*; Section 3.9, *Noise*; and Section 3.15, *Visual Resources*.

3.2.3.3 Recreation Resources

Recreation resources are scattered throughout the social environment evaluation area. As shown in Table 3.2-1 and Figure 3.2-1, numerous parks and recreation areas are entirely or partially located within the evaluation area. There are no golf courses or trailheads in the evaluation area.

Information regarding trails and pedestrian and bicyclist facilities is included in Section 3.6, *Transportation and Mobility*.

There are 19 parks or recreation resources in the social environment evaluation area. All parks and recreation resources in the evaluation area are listed in Table 3.2-1 and shown in Figure 3.2-1.

Table 3.2-1. Recreation Resources in the Social Environment Evaluation Area

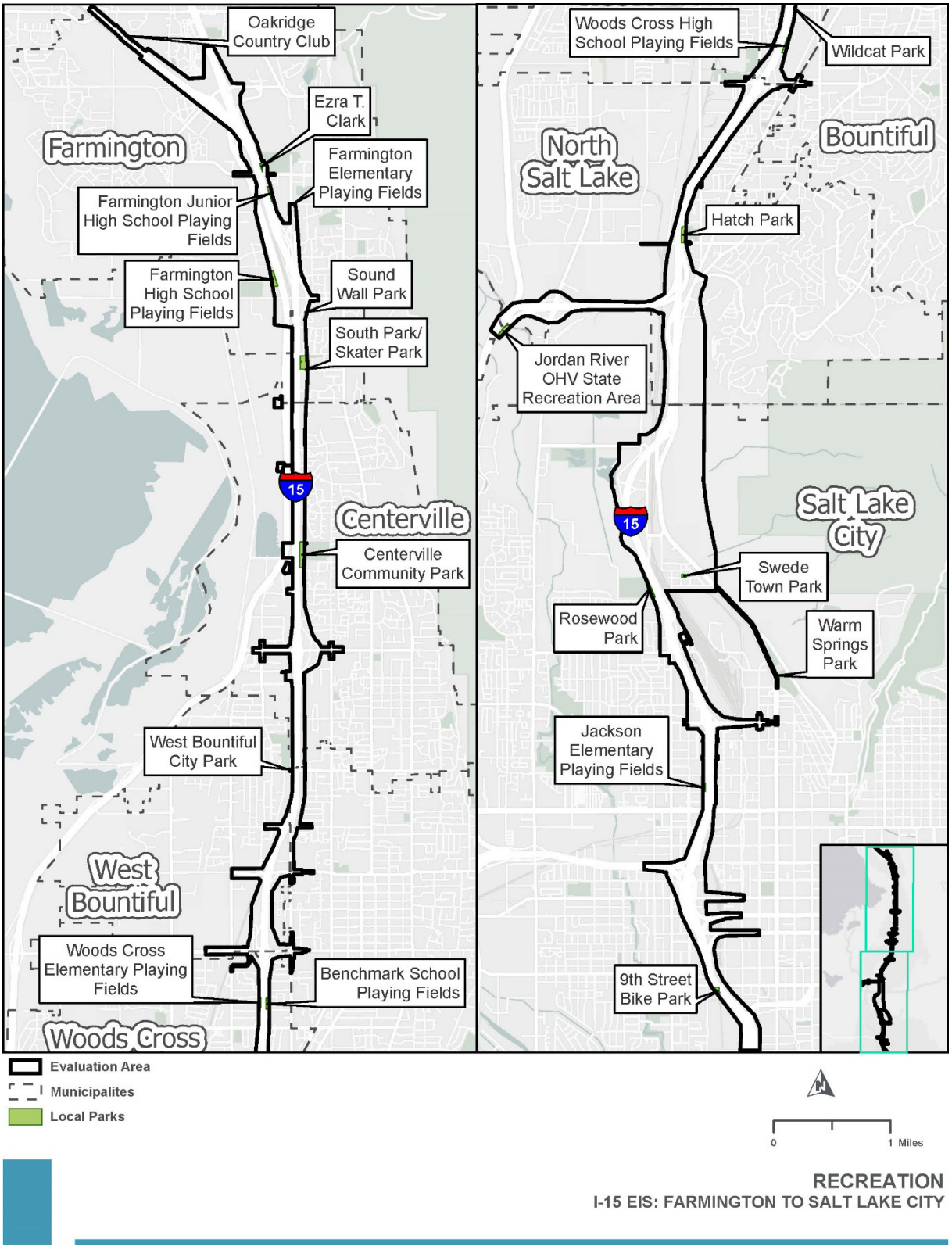
Recreation Resource	Description	Address
Parks		
Ezra T. Clark Park	2-acre park east of I-15 north of State Street. Amenities include a pavilion and access to Farmington Creek Trail.	400 W. State Street, Farmington
Farmington Junior High School playing fields	8.25-acre sports fields on the east side of I-15 on the west side of Farmington Junior High School. Amenities include grass playing fields.	150 South 200 West, Farmington
Farmington High School playing fields	15.4-acre sports fields on the west side of Legacy Parkway north of Glovers Lane and on the east side of Farmington High School. Amenities include baseball field, softball field, football field, tennis courts, grass playing fields, and parking lots.	548 W. Glovers Lane, Farmington
Sound Wall Park	0.3-acre neighborhood park at about 100 West 1050 South. Amenities include grass playing fields and Davis Creek Trail.	1050 S. I-15 Frontage Road, Farmington
South Park	6.6-acre park east of I-15 north of 1470 South. Amenities include basketball courts, volleyball court, playground, softball field, skate park, pavilion, and parking.	1384 S. Frontage Road, Farmington
Centerville Community Park	30-acre park east of I-15 at about 1200 N. Frontage Road in Centerville. Amenities include 6 multisport fields, drinking fountains, 1 mile jogging path, playground, sand volleyball court, pavilions, bathrooms, and parking.	1350 North 400 West, Centerville

(*Continued on next page*)

Table 3.2-1. Recreation Resources in the Social Environment Evaluation Area

Recreation Resource	Description	Address
West Bountiful City Park	14.5-acre park west of I-15 at about 1600 North in West Bountiful. Amenities include Softball fields, soccer fields, sand volleyball courts, tennis court, pavilions, bathrooms, parking, and playground.	550 West 1600 North, West Bountiful
Wildcat Park	0.9-acre park with two playgrounds, benches, and a pavilion.	1950 Wildcat Way, Woods Cross
Benchmark Behavioral Health playing field	1.2-acre sports fields associated with Benchmark Behavioral Health.	592 West 1350 South, Woods Cross
Woods Cross Elementary School playing fields and walking path	4.2-acre sports fields on the west side of I-15 at about 1300 South in Woods Cross and on the east side of Woods Cross Elementary School. Amenities include grass playing fields and walking path.	745 West 1100 South, Woods Cross
Woods Cross High School playing fields	16.3-acre sports fields on the east side of I-15 at about 2200 South in Woods Cross and on the south side of Woods Cross High School. Amenities include baseball field, softball field, football field, tennis courts, grass playing fields, and parking lots.	600 West 2200 South, Woods Cross
Hatch Park	12.3-acre park on the east side of I-15 and the north side of Center Street in North Salt Lake. Amenities include Softball fields, tennis courts, basketball court, soccer fields, sand volleyball court, walking path, playground, parking, bathrooms, and pavilions	50 W. Center Street, North Salt Lake
Swede Town Park	0.6-acre park at 840 West 1500 North. Amenities include playground, sandbox, basketball court, and grass playing fields.	840 West 1500 North, Salt Lake City
Rosewood Park	29-acre park on the west side of I-15 and east of 1200 West around 1400 North. Amenities include a skate park, tennis courts, walking path, softball fields, playground, basketball court, grass playing fields, restrooms, and parking.	1400 North 1200 West, Salt Lake City
Warm Spring Park	13.5-acre park east of U.S. 89 in Salt Lake City. Amenities include a playground, restrooms, multi-use fields, tennis courts, drinking fountains, picnic tables, and parking.	840 N. Beck Street, Salt Lake City
North Gateway Park	6-acre park east of U.S. 89 in Salt Lake City. Amenities include restrooms, walking path, drinking fountains, and parking.	840 N. Beck Street, Salt Lake City
Jordan River OHV State Recreation Area	133.7-acre recreation area for off-highway vehicles (OHV). Includes trails, jumps, and training areas. Amenities include trails, jumps, training areas, restrooms, picnic tables, pavilions, and fee station/main office.	2800 N. Rose Park Lane, Salt Lake City
Jackson Elementary School playing fields	2.5-acre sports fields on the west side of I-15 at about 200 North in Salt Lake City and on the southeast side of Jackson Elementary School. Amenities include grass playing fields.	750 West 200 North, Salt lake City
9-Line Bike Park	0.5-acre parcel on the south side of 900 South under I-15. Amenities include bike jumps, pump track, and walking path.	700 West 900 South, Salt Lake City

Figure 3.2-1. Recreation Resources in the Social Environment Evaluation Area



RECREATION
I-15 EIS: FARMINGTON TO SALT LAKE CITY

3.2.3.4 Community Facilities

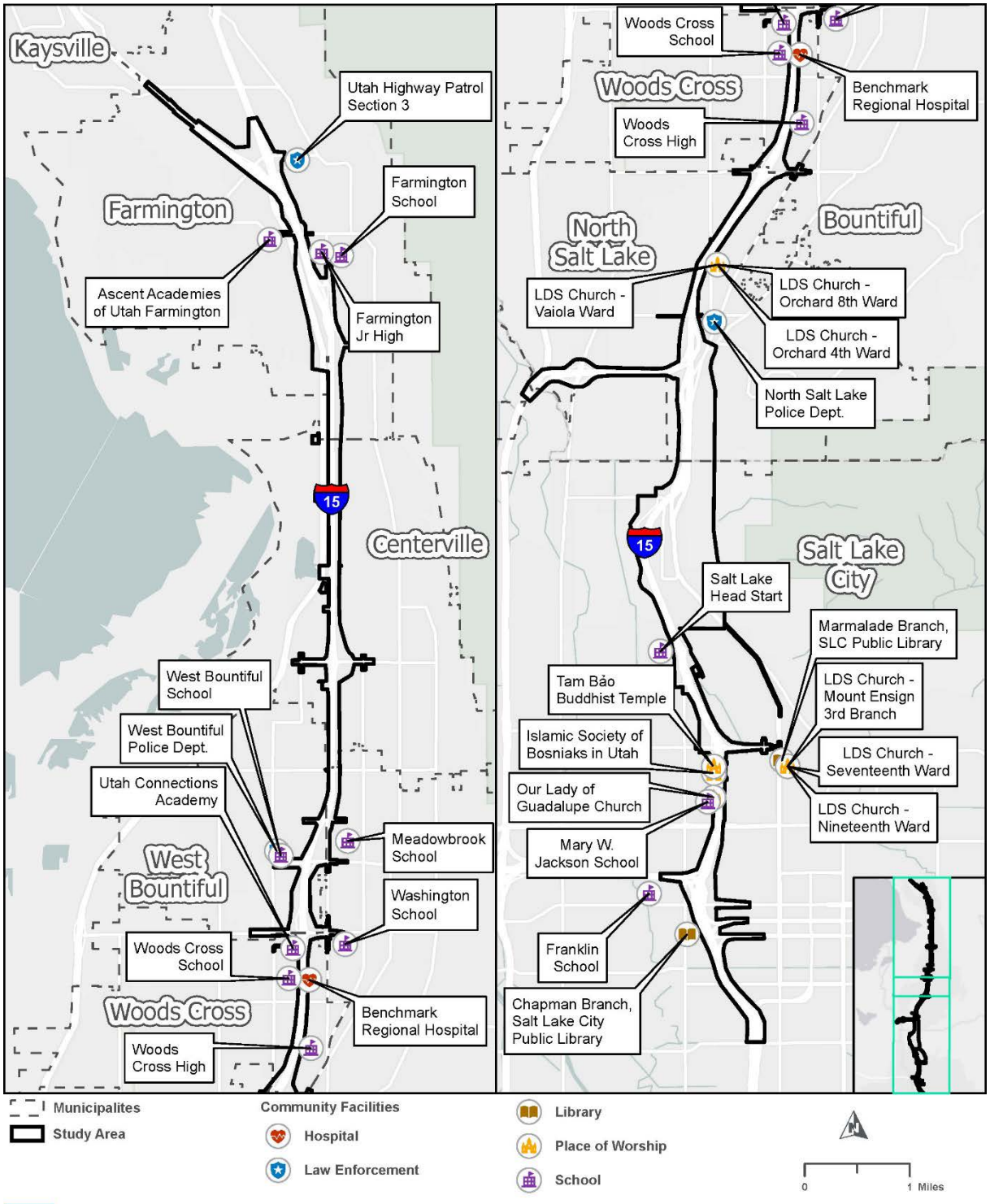
Community facilities provide opportunities for the public to interact; help to define a city, community, or neighborhood; and contribute to community cohesion and quality of life. Community facilities generally include (but are not limited to) schools, houses of worship, law-enforcement facilities, fire stations, libraries, and government offices. These facilities provide opportunities for residents to gather and interact as well as provide a basis for community education, networking, and communication.

There are 26 community facilities in the social environment evaluation area: 12 schools, 9 places of worship, 3 emergency service providers, and 2 libraries. All community facilities in the evaluation area are listed in Table 3.2-2 and shown in Figure 3.2-2.

Table 3.2-2. Community Facilities in the Social Environment Evaluation Area

Name	Address
Schools	
Ascent Academies of Utah, Farmington	22 South 650 West, Farmington
Farmington Junior High School	150 South 200 West, Farmington
Farmington School	50 West 200 South, Farmington
West Bountiful School	750 West 400 North, West Bountiful
Meadowbrook School	700 North 325 West, Bountiful
Washington School	340 West 650 South, Bountiful
Utah Connections Academy	687 West 700 South, Woods Cross
Woods Cross High	600 West 2200 South, Woods Cross
Woods Cross School	745 West 1100 South, Woods Cross
Mary W. Jackson School	750 West 200 North, Salt Lake City
Salt Lake Head Start	1240 American Beauty Drive, Salt Lake City
Franklin School	1115 West 300 South, Salt Lake City
Places of Worship	
Our Lady of Guadalupe Church	715 West 300 North, Salt Lake City
Islamic Society of Bosniaks in Utah	425 North 700 West, Salt Lake City
Tam Bảo Buddhist Temple	459 North 700 West, Salt Lake City
The Church of Jesus Christ of Latter-day Saints – Mount Ensign 3rd (Spanish) Branch	225 West 500 North, Salt Lake City
The Church of Jesus Christ of Latter-day Saints – Nineteenth Ward	225 West 500 North, Salt Lake City
The Church of Jesus Christ of Latter-day Saints – Orchard 4th Ward	55 East 350 North, Salt Lake City
The Church of Jesus Christ of Latter-day Saints – Orchard 8th Ward	55 East 350 North, Salt Lake City
The Church of Jesus Christ of Latter-day Saints – Seventeenth Ward	225 West 500 North, Salt Lake City
The Church of Jesus Christ of Latter-day Saints – Vaiola (Samoan) Ward	55 East 350 North, Salt Lake City
Emergency Services	
Utah Highway Patrol, Section 3, Farmington Office	631 Lagoon Drive, Farmington
West Bountiful Police Department	550 North 800 West, West Bountiful
North Salt Lake Police Department	17 S. Main Street, North Salt Lake
Libraries	
Salt Lake City Public Library, Marmalade Branch	280 West 500 North, Salt Lake City
Salt Lake City Public Library, Chapman Branch	577 South 900 West, Salt Lake City

Figure 3.2-2. Community Facilities in the Social Environment Evaluation Area



3.2.3.5 Public Safety and Security

Public safety in the social environment evaluation area is provided by community police departments, fire stations, emergency response units, and hospitals. Public safety plays an important role in fostering community cohesion and social interaction by ensuring the safety and security of the community. In addition, an effective public safety presence, safe streets, and safe homes contribute to residents' quality of life.

As shown in Figure 3.2-2 above, two police stations in the evaluation area serve the local communities. There are no fire stations in the evaluation area. Salt Lake City provides its own police, fire, and emergency medical and ambulance services in the Salt Lake City neighborhoods in the evaluation area. Farmington, Centerville, Bountiful, West Bountiful, Woods Cross, and North Salt Lake each have their own municipal police department.

3.2.3.6 Utilities

UDOT contacted local municipalities and public and private utility providers that operate utility infrastructure in and adjacent to the project study area. Table 3.2-3 lists the utilities in or adjacent to I-15 between U.S. 89 in Farmington and 400 South in Salt Lake City.

Table 3.2-3. Utilities in or adjacent to the Project Study Area

Utility Provider			
AT&T	Comcast	North Salt Lake City	UNEV Pipeline
Beehive Broadband	Deuel Creek Irrigation	Phillips 66 Pipeline	Unknown Utility Owner
Bountiful City Fiber Optic	Dominion Energy	Pioneer Pipeline	U.S. Bureau of Reclamation
Bountiful City Power	Davis County	Rocky Mountain Power	UTOPIA
Bountiful City Water	First Digital	South Davis Sewer District	Unknown Utility Owner
Bountiful Irrigation District	Farmington City	South Davis Water District	West Bountiful City
Benchland Water District	Google Fiber	Salt Lake City Public Utilities	MCI Verizon
Centerville City	Holly Energy	Syringa Networks	Weber Basin Water Conservancy District
Central Davis Sewer District	Kern River Gas	Sprint T-Mobile	Woods Cross City
Chevron Pipeline Company	Linde Gas	UDOT Region One	Zayo
CenturyLink Lumen	Marathon Petroleum	UDOT Region Two	

3.2.4 Environmental Consequences and Mitigation Measures

This section discusses the direct effects of the Action Alternative on the social environment in the social environment evaluation area.

3.2.4.1 Methodology

To assess the expected impacts to the social environment from the Action Alternative, UDOT used geographic information systems (GIS) software to identify recreation resources and community facilities that would be affected.

3.2.4.2 No-action Alternative

With the No-action Alternative, the improvements associated with the I-15: Farmington to Salt Lake City Project would not be implemented. Therefore, there would be no change to neighborhood and community cohesion, recreation resources, community facilities, or public safety as a result of the project. The increased congestion on I-15 and the lack of safety improvements could reduce the quality of life for residents who use I-15 and the I-15 interchanges in the social environment evaluation area. In addition, the increased congestion could increase response times for emergency service providers that travel on I-15 or on the I-15 interchanges. Local economies would not benefit from the roadway improvements, and communities would not benefit from the community-focused aspects of this project related to improved community connections, improved bicyclist and pedestrian connections, and reduced speeds for traffic coming into residential areas. Therefore, the No-action Alternative would not meet the quality of life project purposes of improving safety, providing better mobility for all travel modes, and better connecting communities.

3.2.4.3 Action Alternative

This section describes the impacts of the Action Alternative on the social environment evaluation area.

With all segment options of the Action Alternative, the alternative could change noise levels and the visual elements within each segment option. These resources are described in more detail in see Section 3.9, *Noise*, and Section 3.15, *Visual Resources*.

3.2.4.3.1 Community Cohesion and Quality of Life

The improvements associated with all segment options of the Action Alternative would be similar and would benefit community cohesion and quality of life by reducing congestion, improving safety on I-15 and the I-15 interchanges, providing for better mobility for all travel modes, and better connecting communities. The proposed improvements would be consistent with the current community setting since most impacts would occur within or immediately adjacent to the existing freeway right-of-way. The surrounding communities and neighborhoods would have improved access to commercial areas, and increased access between the east and west side of I-15, which would benefit community cohesion and quality of life.

The bicyclist and pedestrian improvements listed in Table 3.6-15, *Action Alternative Pedestrian and Bicyclist Improvements by Location*, in Section 3.6.4.3, *Action Alternative*, would meaningfully improve safety and the user experience for pedestrians and bicyclists at all of the existing interchanges in the social environment evaluation area (200 West in Farmington; Parrish Lane in Centerville; 400 North in Bountiful and West

Bountiful; 500 South in Bountiful, West Bountiful, and Woods Cross; 1100 North/2600 South in North Salt Lake and Woods Cross; 1000 North in Salt Lake City; and 600 North in Salt Lake City). All of these interchanges would include wider, safer facilities that are intended specifically for pedestrians and bicyclists. Additional roadway design features, such as signal-controlled turn movements at the interchange terminals and perpendicular intersection designs, would also improve the safety and user experience for pedestrians and bicyclists crossing I-15 at an interchange.

Additionally, the Action Alternative improvements to the 2100 North interchange in Salt Lake City would improve community cohesion and quality of life in Salt Lake City by taking some truck traffic off 600 North and reducing the overall traffic volumes on 600 North. UDOT has received comments from Salt Lake City and residents east of I-15 that truck traffic on 600 North and 300 West has adversely impacted the quality of life of residents near 600 North through noise, road debris, and congestion.

The addition of the new interchange at I-215/U.S. 89 in North Salt Lake with the Action Alternative would improve community cohesion and quality of life by reducing out-of-direction travel for roadway users in North Salt Lake and Bountiful who are going west on I-215 and would also reduce traffic and congestion on 2600 South and at the I-15/2600 South interchange.

In addition to the improvements at the I-15 interchanges, the Action Alternative would also provide:

- A new 3.8-mile shared-use path (SUP) connection between Eagle Ridge Drive in North Salt Lake and Wall Street/200 West in Salt Lake City
- Three new grade-separated SUP crossings of I-15 (Centerville Community Park SUP, Centerville 200 North SUP, and North Salt Lake 2600 South SUP)
- One new crossing of I-15 as part of the new road crossings under I-15 at 800 West in Woods Cross
- Improvements to the existing pedestrian and bicyclist facilities crossing I-15 at three locations (State Street in Farmington, Glovers Lane in Farmington, and Center Street in North Salt Lake)
- New, longer bridges at four locations (1600 North/Pages Lane in West Bountiful and Centerville, 1500 South in Woods Cross, Main Street in North Salt Lake, and 300 North in Salt Lake City)

These new SUPs and crossing improvements would increase connectivity, community cohesion, and quality of life and enhance pedestrian and bicyclist experiences.

3.2.4.3.2 Recreation Resources

North Segment Impacts

The Action Alternative would impact parks in the north segment. Table 3.2-4 lists the impacts to these resources.

Table 3.2-4. Recreation Resource Impacts in the North Segment

Community Resource	Acres of Impacts	
	Farmington 400 West Option	Farmington State Street Option
Centerville Community Park	1.26 [a]	1.26 [a]
Ezra T. Clark	0.45 [b]	0.47 [b]
South Park	0.40	0.40
Benchmark Behavioral Health playing field	0.96	0.96
Woods Cross High School playing fields	0.32	0.32
Total	3.39	3.41

[a] 1.26 acres includes 0.92 acre of permanent impact and 0.34 acre of temporary impact for constructing a new pedestrian bridge.

[b] 0.41 acre of the 0.45 acre would be temporarily impacted from the realignment of the Farmington Creek Trail in Ezra T. Clark Park. Only about 0.04 acre of Ezra T. Clark owned by Farmington would be permanently impacted by the roadway improvements. The impacted acreage shown includes only the acreage of the park owned by Farmington City. There would be additional impacts to Ezra T. Clark Park on the parcels of the park that are located on property owned by UDOT.

The impacts to parks in the north segment would be similar for both the Farmington 400 West Option and the Farmington State Street Option. The only differences are the impacts to Ezra T. Clark Park. The Farmington 400 West Option would permanently impact 0.04 acre of Ezra T. Clark Park while avoiding impacts to the parking lot, pavilion, and historic monument at the park. The Farmington 400 West Option would have temporarily impacted 0.41 acre of Ezra T. Clark Park due to the realignment of the Farmington Creek Trail. The Farmington State Street Option would permanently impact 0.47 acre of Ezra T. Clark Park, which is all of the park owned by Farmington City. A new roadway would be placed in the areas where the parking lot, pavilion, and historic monument are currently located at the park.

What is Section 4(f)?

Section 4(f) of the Department of Transportation Act and FHWA's implementing regulations require a review of significant publicly owned parks, recreation areas, and wildlife and waterfowl refuges and to significant publicly or privately owned historic properties. For more information, see Chapter 4, *Section 4(f) Analysis*.

South Segment Impacts

There would be impact to parks and recreational resources in the south segment as a result of the project. The impacts to parks in the south segment would be the same for both the Salt Lake City 1000 North – Northern Option and the Salt Lake City 1000 North – Southern Option. Both options would impact 0.21 acre of Hatch Park. The 0.21-acre impact to Hatch Park would be temporary construction impacts on the south edge of the park to construct a new sidewalk and bike lane on City-owned park property. Additionally, the existing noise wall might be replaced, and another noise wall might be added on the west edge of the park. There would be no permanent conversion of right-of-way.

3.2.4.3.3 Community Facilities

There would be no impacts to community facilities from the Action Alternative.

3.2.4.3.4 Public Safety and Security

With the Action Alternative, all impacts to public safety and security would be the same for all segment options. The Action Alternative would reduce congestion and improve safety in the social environment evaluation area, which would benefit emergency services including fire protection, ambulance services, and law enforcement.

3.2.4.3.5 Utilities

With the Action Alternative, all impacts to utilities would be temporary and would occur during construction. The construction contractor would contact local businesses and residences if any loss of service is required during construction. Effects on these utilities would be determined by UDOT by working with local jurisdictions and utility providers during the final design of the selected alternative. Impacts to these utilities can often be avoided during final design. UDOT would continue to communicate with local jurisdictions and utility providers throughout the development of the selected alternative to minimize service disruptions.

Based on data provided by the U.S. Bureau of Reclamation and the Weber Basin Water Conservancy District, the Action Alternative would cross some U.S. Bureau of Reclamation facilities or easements. The data used for this analysis are preliminary and identify only the general locations of Reclamation easements or facilities. The data have some discrepancies regarding the locations of the facilities and easements and whether some facilities or easements are still active or whether they have been vacated. The actual locations would be verified based on surveys during the final design of the Action Alternative (if it is implemented).

UDOT would also conduct additional review of right-of-way documents with the Bureau of Reclamation and the Weber Basin Water Conservancy District to determine whether the facilities or easements are still active. The Bureau of Reclamation facilities or easements that would be crossed by the Action Alternative could require either relocation or protection-in-place mitigation measures for utility impacts.

Table 3.2-5 summarizes the potential impacts and potential mitigation measures for the Reclamation facilities or easements. Based on the final locations of the facilities or easements, UDOT would work with Reclamation and the Weber Basin Water Conservancy District to identify whether protection-in-place or relocation mitigation measures are needed for any utility impacts.

Table 3.2-5. Action Alternative Potential Impacts to Bureau of Reclamation Facilities or Easements

Bureau of Reclamation Facility or Easement	Approximate Location	Impact	Anticipated Mitigation Measures
West Farmington Laterals and Pipeline	West side of railroad tracks from U.S. 89 ramps to ~525 South, Farmington, west side of I-15	Crossing at State Street	Protect in place or relocate depending on final design
Easement	West side of 200 West, Farmington, east side of I-15	Encroachment	Protect in place or relocate depending on final design
Easement	Glovers Lane, Farmington, west side of I-15	Encroachment	Protect in place or relocate depending on final design
Davis Aqueduct Overflow Easement and Pipeline	1350 South Farmington, crosses from east to west side of I-15	Encroachment	Protect in place or relocate depending on final design
Easement	2150 North Farmington, east of I-15	Encroachment	Protect in place or relocate depending on final design
Pages Lane Easement	Pages Lane, west side of the railroads	Potential encroachment	Protect in place or relocate depending on final design
Woods Cross Laterals Easements and Pipeline	West side of railroad tracks from ~1200 North Centerville to 1500 South Woods Cross	Encroachment	Relocation between ~250 North and ~250 South in Bountiful Potential relocation or protect in place between 700 South and 1350 South in Woods Cross Protect in place at crossings of Parrish Lane, Centerville 200 North SUP, Pages Lane, Bountiful 400 North, Woods Cross 500 South, Woods Cross 1500 South, and several drainage pipes
Easement	West side of 800 West from 650 South to 1500 South, Woods Cross	Crossing of SUP on 700 South	Protect in place
Easement South Davis Laterals	~2275 South Woods Cross, west of I-15	Potential encroachment on easement	Protect in place or relocate depending on final design
Easement	800 West Woods Cross, west of I-15	Potential encroachment on easement near Motel 6	Protect in place or relocate depending on final design

Source: GIS data provided by U.S. Bureau of Reclamation and Weber Basin Water Conservancy District, January 2024

3.2.4.3.6 Summary of Action Alternative Impacts

Table 3.2-6 summarizes the impacts from the Action Alternative broken down by each segment and option. The Action Alternative would not affect community facilities. There is about 0.02 acre of difference between the minimum and maximum acres of impacts to parks.

Table 3.2-6. Summary of Impacts to the Social Environment from the Action Alternative

Segment	Option	Impacts	
		Parks (acres)	Community Facilities (number)
North	Farmington 400 West Option	3.39	0
	Farmington State Street Option	3.41	0
South	Salt Lake City 1000 North – Northern Option	0.21	0
	Salt Lake City 1000 North – Southern Option	0.21	0
	Minimum impacts (sum of lowest impacts for each segment)	3.60	0
	Maximum impacts (sum of highest impacts for each segment)	3.62	0
	Range of impacts	3.60 to 3.62	0

3.2.4.4 Mitigation Measures

As discussed above, the social impacts are generally beneficial or would be temporary during construction. No mitigation is necessary because there would be no disproportionate impact to any particular social group. More information is provided below about UDOT's best practices for project development.

3.2.4.4.1 Community Cohesion

The Action Alternative would benefit the communities and neighborhoods in the social environment evaluation area. No mitigation is proposed.

3.2.4.4.2 Quality of Life

The Action Alternative would benefit the communities and neighborhoods in the social environment evaluation area. No mitigation is proposed.

3.2.4.4.3 Recreation Resources

Mitigation for impacts to recreation resources typically includes replacing or relocating impacted amenities (for example, trails, pavilions, or playgrounds) or providing other items that can enhance the recreation use of the recreation resource. During the final design of the selected segment options of the Action Alternative, UDOT would work with the local municipalities with jurisdiction over the public parks and recreation areas to evaluate opportunities to further mitigate impacts. For all temporary construction impacts, the disturbed land would be restored and revegetated.

3.2.4.4.4 Community Facilities

There would be no impacts to community facilities from the Action Alternative. No mitigation is proposed.

3.2.4.4.5 Public Safety and Security

The Action Alternative would benefit public safety providers by improving the operations on I-15 and the I-15 interchanges in the social environment evaluation area. No mitigation is proposed.

3.2.4.4.6 Utilities

All impact to utilities would be temporary. The UDOT document *Accommodation of Utilities and the Control and Protection of State Highway Rights-of-Way* (Utah Administrative Code Rule R930-6) would be followed. The construction contractor would contact local businesses and residences if any loss of utility service is required during construction. UDOT would work with the utility companies during final design or the design-build process if utilities need to be relocated.

UDOT would also identify and obtain all appropriate permits from state and local government agencies, as necessary, related to relocating and modifying utilities. UDOT would comply with all permit conditions.

Based on the final location of the facilities or easements, UDOT will work with Reclamation and the Weber Basin Water Conservancy District to identify whether protection-in-place or relocation mitigation measures are needed for any facility or easement impacted by the Action Alternative. Any protection-in-place or relocation mitigation measures would be completed before construction of the Action Alternative's roadway improvements.

3.3 Right-of-way and Relocations

3.3.1 Introduction

Section 3.3 discusses the potential displacements, relocations, and right-of-way acquisitions associated with the project alternatives.

Right-of-way and Relocations Evaluation Area. The right-of-way and relocations evaluation area is residential and commercial buildings within the geographical area required for the Action Alternative. Appendix 3B, *Property Impact Figures*, includes figures showing all parcel impacts.

3.3.2 Regulatory Setting

The acquisition of property for the selected alternative would be subject to the federal Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended (42 United States Code [USC] Section 4601 and subsequent sections); Title VI of the Civil Rights Act of 1964, as amended; and the State of Utah Relocation Program (under the Utah Relocation Assistance Act, Utah Code Title 57, Chapter 12). These laws provide for the uniform and equitable treatment of all persons displaced from their homes, businesses, and farms, without discrimination on any basis.

The guidelines used by UDOT for carrying out the provisions of these acts are contained in its 2023 *Relocation Assistance Brochure*. Relocation resources are available to all residents (including qualified

renters) and businesses whose properties need to be acquired, and the process for acquiring replacement housing and other sites must be fair and open. The 2023 *Relocation Assistance Brochure* can be viewed on UDOT's website (UDOT 2023a).

3.3.3 Affected Environment

The right-of-way and relocations evaluation area consists mostly of commercial, residential, and industrial land uses. For more information, see Section 3.1, *Land Use*.

3.3.4 Environmental Consequences and Mitigation Measures

3.3.4.1 Methodology

The property impacts described below are based on preliminary engineering for the Action Alternative. The actual property impacts could change and would be determined during the final design phase of the project and during the property-acquisition process. Property impacts are defined as follows:

- **Relocation.** A relocation is when an existing building is within the proposed right-of-way and the current residents or business would need to be relocated to a new property. A relocation includes the full acquisition of the parcel and relocation of the residents or business. In the situation where the property owner is not the resident or business owner, the property owner would receive fair compensation for the land and structure impacts, and the residents or business owners would receive relocation benefits.
- **Potential Relocation.** For this analysis, a potential relocation is assumed when any of the following three situations would occur. UDOT would make a final determination about the property impact for each of these three situations during the right-of-way acquisition phase of the project, which would occur shortly before construction.
    - **Encroachment** – an existing building is outside of but within 15 feet of the proposed right-of-way. This type of impact is referred to as a *potential relocation* because it is not clear whether the structure would be impacted or whether the entire property would be acquired.
    - **Impacts to continued usage of the property** – if the Action Alternative would impact portions of the property (for example, drive-thru lanes, circulation patterns, or parking lots for businesses) that could make the property difficult to maintain its current uses. If the property could not continue to be used with its current uses with mitigation with the Action Alternative, UDOT would need to acquire the property and relocate the occupants.
    - **Adverse construction impacts** – if impacts during construction would occur close enough to a residential or commercial property that the property might not be habitable or usable during construction. These circumstances could include the operation of construction equipment in back yards or the extended closure of property accesses. In these circumstances, the Action Alternative would not have a permanent physical impact to the property, but UDOT might end up relocating the occupants of the property to avoid their having adverse impacts during construction.

- **Full Acquisition.** A full acquisition is when UDOT would need to purchase an entire parcel to construct an alternative. This category is used for properties without buildings, and it is used for the circumstance when the remaining land outside the proposed right-of-way is unusable for its intended purpose because it is too small or because access is cut off.
- **Partial Acquisition.** A partial acquisition is when UDOT would need to purchase only a portion of a parcel, and the property owner would retain ownership outside the proposed right-of-way. For this analysis, a partial acquisition is assumed when an existing building is at least 15 feet from the proposed right-of-way. For properties without buildings, a partial acquisition is assumed when the remaining land would be large enough to function for its intended purpose and would still have access. A partial acquisition includes situations in which the impacts from the Action Alternative would not impact the primary structures on the parcel (for example, a house or main business buildings) and there would be enough remaining acreage to maintain continued use of the property. The final determination of the impacted acreage UDOT would need to acquire would be made during the final design phase of the project.
- **Temporary Construction Easement (TCE).** A TCE would allow UDOT to temporarily use property during construction. Land ownership would not change. Examples of work done under a TCE could include replacing noise walls on the edge of the property or reconstructing driveway access or sidewalks on the edge of the property.
- **Perpetual Easement.** A perpetual easement would allow UDOT to have ongoing access to a property for maintenance activities during and after construction. Land ownership would not change. Examples of work done with a perpetual easement could include the maintenance of noise walls, retaining walls, drainage system, bridges, and/or utilities on the edge of the property.

For this analysis, the numbers of relocations, potential relocations, full acquisitions, and partial acquisitions were calculated using the Salt Lake County and Davis County parcel data as of September 2021 and the anticipated right-of-way footprint for the Action Alternative. There are known issues with the Salt Lake County and Davis County parcel data in some areas. Some of the data issues include gaps or overlaps between parcels, parcel boundaries extending into UDOT's right-of-way, and parcel boundaries set back from UDOT's right-of-way leaving no record of ownership for land adjacent to existing roads. UDOT did not attempt to fix the parcel data for this impact analysis; impacts are likely to change when property boundaries are surveyed during the final design and right-of-way phases of the project.

3.3.4.2 No-action Alternative

The No-action Alternative would not require any displacements, relocations, or right-of-way acquisitions.

3.3.4.3 Action Alternative

For this analysis, the numbers of relocations, potential relocations, and partial acquisitions were calculated using Salt Lake County's and Davis County's parcel data as of September 2021 and the anticipated right-of-way footprint for the Action Alternative. For all relocations listed below, UDOT would acquire the entire property, and the residents or businesses would need to relocate. However, during the final design process, UDOT will look at measures that could avoid needing to acquire these properties.

This section also includes a summary of potential impacts due to changes in access in each segment.

3.3.4.3.1 North Segment Impacts

Table 3.3-1, *Summary of Right-of-way Impacts from the Action Alternative*, below shows right-of-way impacts with the Farmington 400 West Option and the Farmington State Street Option for the north segment. The majority of the property impacts would be partial acquisitions that would not affect the activities that occur on each affected parcel. The number of relocations and potential relocations for both options in the north segment would be the same.

3.3.4.3.2 South Segment Impacts

Table 3.3-1 shows right-of-way impacts with the Salt Lake City 1000 North – Northern Option and the Salt Lake City 1000 North – Southern Option for the south segment. For both options, the majority of the property impacts would be partial acquisitions or temporary construction easements that would not affect the activities that occur on each affected parcel.

The Salt Lake City 1000 North – Northern Option would have 1 more commercial acquisition and business relocation (the Salt City Inn at 1026 North 900 West) compared to the Salt Lake City 1000 North – Southern Option.

Table 3.3-1. Summary of Right-of-way Impacts from the Action Alternative

Impact Type	North Segment		South Segment		Summary
	Farmington 400 West Option	Farmington State Street Option	Salt Lake City 1000 North – Northern Option	Salt Lake City 1000 North – Southern Option	
Relocation [a]	15 / 8.07	15 / 8.07	3 / 2.84	2 / 2.34	17 to 18 / 10.41 to 10.91
Potential relocation [a]	14 / 0.96	14 / 0.96	16 / 2.7	16 / 2.7	30 / 3.66
Full acquisition [a]	4 / 2.11	5 / 2.59	8 / 2.98	7 / 2.31	11 to 13 / 4.42 to 5.57
Partial acquisition [a]	221 / 64.67	220 / 64.3	45 / 35.66	45 / 37.34	265 to 266 / 99.96 to 102.01
TCE	98	98	53	55	151 to 153
Perpetual easement	9	9	5	5	14

Sources: Salt Lake County and Davis County parcel GIS data, September 2021
[a] Number of parcels / acres of impact

Table 3.3-1 above lists the impacts to parcels from the Action Alternative.

Appendix 3A, *Property Impact Tables*, includes tables showing all parcel impacts including address, type of impact, and impact amount as well as these TCEs, and Appendix 3B, *Property Impact Figures*, includes figures showing all parcel impacts.

3.3.4.3.3 Potential Impacts due to Changes in Access with the Action Alternative

There is potential for changes in access to affect properties with the Action Alternative. Table 3.3-2 describes the notable access changes with the Action Alternative.

For roads not included in Table 3.3-2, the Action Alternative would maintain a similar level of access as existing conditions.

Table 3.3-2. Access Changes with the Action Alternative

Location	Description of Change in Access
State Street Farmington (with State Street Option)	The Farmington State Street Option would have a new, signalized four-way intersection with Frontage Road/Lagoon Drive and State Street. This option would improve access to State Street from Frontage Road/Lagoon Drive but would require travelers on Frontage Road/Lagoon Drive to go through the new signalized intersection.
200 West Farmington	The Action Alternative would improve access at 200 West in Farmington by providing a signalized intersection at 200 West and the Frontage Road which would allow southbound traffic on Frontage Road to go north on 200 West or continue south on Frontage Road. These movements are not accommodated with the existing conditions. The Action Alternative would maintain the free traffic movement from northbound I-15 to northbound Frontage Road.
800 West Centerville	The Action Alternative would improve access for northbound I-15 traffic accessing 800 West north of Parrish Lane by providing a dedicated underpass to 800 West from the northbound off-ramp, thereby removing the need for drivers to go east on Parrish Lane first and then turn left at the 800 West traffic signal.
500 South Bountiful	A raised median would be added to 500 South between I-15 and 500 West. All business access on 500 South in this segment would be right-in and right-out only. Travelers who currently make left turns onto or off of 500 South would be required to make U-turns on 500 South and/or use alternate accesses to or from 500 West with the Action Alternative.
2600 South interchange (North Salt Lake/Woods Cross)	At the 2600 South interchange, a new road connection would be made on the north end between Wildcat Way and 800 West through a new underpass of I-15. Businesses on 800 West (Lorena's Restaurant, Hampton Inn, and Motel 6) would continue to have access on 800 West, but customers traveling to or from I-15 would have additional distance with the Action Alternative's new 800 West design compared to existing conditions. A segment of existing 800 West might be closed or converted to a private driveway between 1100 North and the new 800 West underpass. Business access for Thomas Petroleum on 800 West would be moved to a new cul-de-sac off of 1100 North/2600 South. The 400 East and 2600 South intersection would be closed, and 400 East terminated in a cul-de-sac south of 2600 South. Businesses on 400 East (Best Western Plus and Jerry Seiner Buick GMC of North Salt Lake) would continue to have access to 400 East, but customers traveling to or from I-15 would be required to use 500 East and would have additional distance with the Action Alterative compared to existing conditions. With the Action Alternative, customers would travel south on 500 East and west on 1000 North to access 400 East.
Center Street southbound off-ramp (North Salt Lake)	The southbound off-ramp of I-15 at Center Street would be removed. Access to Center Street from I-15 would require travel through the I-15 2600 South interchange to the north, the new I-15/I-215 interchange to the south, or the I-215/Redwood Road interchange to the west.
I-215 interchange (North Salt Lake)	Access would be increased at the I-215/I-15 interchange to accommodate all directions of travel between I-215 and I-15, and a new access would be added to I-215 and I-15 to and from U.S. 89/Beck Street.

(*Continued on next page*)

Table 3.3-2. Access Changes with the Action Alternative

Location	Description of Change in Access
2100 North interchange (Salt Lake City)	Access would be increased between 2100 North, I-15, and Beck Street/U.S. 89. A new diamond interchange at 2100 North would replace the partial-access interchange to allow vehicles to access every direction of I-15 from 2100 North. A new overpass of the Union Pacific and FrontRunner railroad tracks would allow traffic on Beck Street/U.S. 89 to connect to the new interchange at 2100 North and vice versa. This change in access would allow truck traffic to bypass the 600 North interchange and the 300 West Marmalade neighborhood of Salt Lake City when accessing or departing the industrial areas surrounding 2100 North.
Warm Springs Road north of 1100 North (Salt Lake City)	The businesses located on Warm Springs Road north of 1100 North would have changes to their access to get on or off northbound I-15 at the 2100 North interchange. To access northbound I-15 at the from Warm Springs Road north of 1000 North, travelers would need to either (1) go under I-15 near 2300 North and travel to the new 2100 North interchange on the west side or (2) use the existing 1800 North railroad crossing to get over to U.S. 89 to get on I-15 at either the new 2100 North interchange or the new I-215 interchange. This is similar to what they have to do to get on or off southbound with the existing design.
Warm Springs Road south of 1100 North (Salt Lake City)	Reconfigured access to northbound and southbound I-15 would be provided around 1100 North with the Salt Lake City 1000 North – Southern Option. With the Salt Lake City 1000 North – Northern Option, new northbound off-ramp and on-ramp access would be provided near 800 North. Both of these options would improve access to businesses on Warm Springs Road because there would be new access from northbound I-15 that does not currently exist.
900 West and 1000 North (Salt Lake City)	900 West and 1000 North would be reconfigured to support a new collector-distributor (CD) interchange between 1000 North and 600 North. The current access between 900 West and Warm Springs Road would be relocated to the south, closer to 1100 North. 1000 North would be reconfigured to provide direct access to Warm Springs Road and all directions of I-15 via a new CD interchange paired with 600 North. At 1000 North, drivers would be able to access northbound I-15 and Warm Springs Road, and those exiting southbound I-15 would be able to access 1000 North directly. Drivers accessing southbound I-15 or 600 North from 1000 North would travel along the CD system, no longer using 900 West for access.
600 North (Salt Lake City)	600 North would be reconfigured as a CD interchange paired with 1000 North. Southbound I-15 traffic traveling to 600 North would be required to exit I-15 near the current exit for 900 West and travel through the CD system to 600 North, stopping at one traffic signal at 1000 North. Access to southbound I-15 from 600 North would be the same as existing conditions. Access to northbound I-15 from 600 North would require drivers to travel north to 1000 North via the CD system before accessing the northbound I-15 on-ramp. Accessing northbound I-15 from 600 North requires travel through two additional traffic signals compared to existing conditions. Business access from the westbound one-way frontage road on the north side of 600 North between 500 West and 400 West would be removed with the Action Alternative because 600 North would have a wider footprint that would encroach on the one-way frontage road. UDOT anticipates that access to the commercial building at 615 North 400 West and Industrial Heat Treat at 430 West 600 North can be moved to 400 West. UDOT anticipates that access to Mixtec North America at 454 West 600 North and Land Cruiser Heritage Museum at 476 West 600 North can be moved to 500 West. UDOT will work with these businesses to try to find acceptable alternate methods of access from 400 West or 500 West.

3.3.4.4 Mitigation Measures

No mitigation is proposed beyond the requirements of federal and state relocation assistance acts.

During the final design process, UDOT will look at measures that could avoid needing to acquire properties. Where necessary, UDOT would acquire all property according to the federal Uniform Relocation Assistance and Real Property Acquisitions Policy Act of 1970 (as amended July 2008) and the Utah Relocation

Assistance Act. These regulations require fair compensation for property owners and qualified renters to offset or eliminate any financial hardship that private individuals or entities could experience as a result of acquiring property for public purposes. No individual or family would be required to relocate until adequate, decent, safe, and sanitary housing is available.

Relocation resources will be available to all residents and businesses that are relocated, and the process for acquiring replacement housing and other sites will be fair and open.

3.4 Environmental Justice Populations

3.4.1 Introduction

Section 3.4 describes the impacts of the project alternatives on low-income populations, minority populations, and other populations identified as environmental justice (EJ) communities in accordance with federal regulations and guidance. UDOT follows three fundamental EJ principles identified by FHWA:

- Avoid, minimize, or mitigate disproportionate adverse human health and environmental effects, including social and economic effects, on minority populations and low-income populations.
- Ensure the full and fair participation by all potentially affected communities in the transportation decision-making process.
- Prevent the denial of, reduction in, or significant delay in the receipt of benefits by minority and low-income populations.

Section 3.4 includes a review of the regulatory context and methodology, identification of EJ populations, an overview of the public outreach efforts and activities conducted to engage these communities in the project planning process, an assessment of project impacts and burdens on EJ populations, and the preliminary results of UDOT's EJ analysis.

What does environmental justice seek to do?

Environmental justice seeks to:

- Identify and address disproportionate adverse effects of an agency's programs, policies, and activities on minority and low-income populations to achieve an equitable distribution of benefits and burdens
- Include the full and fair participation by all potentially affected communities in the decision-making process

Environmental Justice Evaluation Area. The environmental justice evaluation area (EJ evaluation area) considers all communities within 0.5 mile of the Action Alternative's limits of construction to include both direct construction and operational impacts as well as potential indirect impacts. Therefore, all U.S. Census Bureau census tract block groups that are totally or partially within the 0.5-mile buffer are included in the evaluation area. These block groups are located in Davis and Salt Lake Counties. UDOT's analysis included an expanded area in these counties surrounding the block groups to capture local users of I-15 and to help UDOT determine whether each block group has a percentage of minority populations (referred to in Section 3.4 as, broadly, people of color) or low-income households that is meaningfully greater than a comparative community.

Consideration of Cumulative Effects on Environmental Justice Populations. Section 3.18, *Indirect and Cumulative Effects*, includes an indirect and cumulative effects (ICE) analysis for the I-15 project. The ICE analysis considers the effects of the Action Alternative in the context of general population, employment, and development trends in the cities in the ICE analysis area. It also considers the effects of other previous,

ongoing, and anticipated future actions to determine whether the overall effect of the combined actions would be substantial. The ICE analysis is focused on the potential indirect and cumulative effects to specific resources (for example, social and community impacts, air quality, greenhouse gases, noise, floodplains, and others). The potential for cumulative effects specific to EJ populations is addressed in Section 3.4 as part of Section 3.4.5, *Affected Environment: Identification of Historic and Ongoing Issues for EJ Communities*, and Section 3.4.6, *Environmental Consequences and Mitigation Measures*. Certain resources evaluated in the ICE analysis are also issues of concern for EJ populations. Therefore, some of this discussion is replicated here to address potential effects on EJ populations.

3.4.2 Regulatory Setting

The principles of environmental justice have their origins in the Civil Rights Act of 1964 and have evolved through presidential Executive Orders and other federal policies, as summarized below.

3.4.2.1 Civil Rights Act of 1964

Title VI of the Civil Rights Act prohibits discrimination on the basis of race, color, national origin, age, sex, or disability in programs receiving federal funding. Federal agencies are required to ensure that no person is excluded from participation in, denied the benefits of, or subjected to discrimination under any program or activity receiving federal financial assistance.

3.4.2.2 Executive Order 12898

Executive Order (EO) 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-income Populations*, issued February 11, 1994, directs federal agencies to take the appropriate and necessary steps to identify and address disproportionately high and adverse effects of federal projects on the health or environment of minority and low-income populations to the greatest extent practicable and permitted by law. EO 12898 seeks the "fair treatment and meaningful involvement of all people regardless of race, color, sex, national origin, or income with respect to the development, implementation and enforcement of environmental laws, regulations, and policies."

FHWA implemented the U.S. Department of Transportation's (USDOT) Order 6640.23A on June 14, 2012, to establish policies and procedures for complying with EO 12898, which aims to address environmental justice in minority and low-income populations.

UDOT also considered the Council on Environmental Quality's (CEQ) guidance document *Environmental Justice: Guidance Under the National Environmental Policy Act* (CEQ 1997a), which was issued to help agencies consistently and effectively meet the goals of EO 12898. The CEQ guidance states that "agencies should recognize the interrelated cultural, social, occupational, historical, or economic factors that may amplify the natural and physical environmental effects of the proposed agency action. These factors should include the physical sensitivity of the community or population to particular impacts; the effect of any disruptions on the community structure associated with the proposed action; and the nature and degree of the impact on the physical and social structure of the community."

3.4.2.3 Executive Order 13985

EO 13985, *Advancing Racial Equity and Support for Underserved Communities Through the Federal Government*, issued January 20, 2021, aimed to address systemic racism and advance equity in the United States by directing federal agencies to review their policies and practices for potential disparities affecting underserved communities, engage with these communities to understand their needs, enhance data collection and analysis to measure equity, foster diversity and inclusion in the federal workforce, and establish an interagency working group for equitable data coordination, all with the overarching goal of advancing racial equity and support for marginalized groups across the nation.

3.4.2.4 Executive Order 14008

Established as a requirement of Section 223 of EO 14008, the Justice40 Initiative is a federal government effort to deliver at least 40% of the overall benefits from certain federal investments to disadvantaged communities that are marginalized, underserved, and overburdened by pollution. The Justice40 Initiative's investment areas, including clean energy, energy efficiency, and clean transit, are especially relevant in the context of transportation, where Justice40 provides an opportunity to address current gaps in transportation infrastructure and access and public services. USDOT grants, programs, policies, and initiatives work toward the goal that at least 40% of the benefits of projects flow to disadvantaged communities that have been overburdened by legacy pollution and environmental hazards and are ultimately intended to address underinvestment in disadvantaged communities and advance environmental justice.

3.4.2.5 Executive Order 14091

EO 14091, *Further Advancing Racial Equity and Support for Underserved Communities Through the Federal Government,* issued February 22, 2023, directs federal agencies to undertake additional efforts to advance equity initiatives. Specifically, the order requires agencies to:

- Identify and address specific barriers to equity that underserved communities face.
- Develop and implement equity plans that outline how they will achieve racial equity in their programs and operations.
- Collect and analyze data on the impact of their programs and policies on underserved communities.
- Report to the President on their progress in advancing racial equity.

The EO also establishes a new Interagency Equity Council to coordinate federal efforts to advance racial equity. The council will be chaired by the White House Domestic Policy Council and will include representatives from all federal agencies. The EO provides federal agencies with clear guidance on how to identify and address the specific barriers that underserved communities face. It also requires agencies to collect and analyze data on the impact of their programs and policies on underserved communities.

3.4.2.6 Executive Order 14096

EO 14096, *Revitalizing Our Nation's Commitment to Environmental Justice for All*, issued April 21, 2023, defines environmental justice as "[t]he just treatment and meaningful involvement of all people, regardless of income, race, color, national origin, Tribal affiliation, or disability, in agency decision-making and other federal activities, that affect human health and the environment so that people:

- Are fully protected from disproportionate and adverse human health and environmental effects (including risks) and hazards, including those related to climate change, the cumulative impacts of environmental and other burdens, and the legacy of racism or other structure or systemic barriers; and
- Have equitable access to a healthy, sustainable, and resilient environment in which to live, play, work, learn, grow, worship, and engage in cultural and subsistence practices."

The EO directs federal agencies, as appropriate and consistent with applicable law, to identify, analyze, and address disproportionate and adverse human health and environmental effects (including risks) and hazards of federal activities, including those related to climate change and the cumulative impacts of environmental and other burdens on communities with EJ concerns. The EO also emphasizes the importance of engaging and collaborating with underserved communities to address adverse conditions and ensure that they do not face any additional disproportionate burdens or underinvestment.

3.4.2.7 Department of Transportation Order 5610.2c

Issued on May 16, 2021, USDOT Order 5610.2c updates EJ procedures for USDOT in response to the *Memorandum of Understanding on Environmental Justice* signed by heads of federal agencies on August 4, 2011; USDOT's revised Environmental Justice Strategy, updated on November 15, 2016; and EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-income Populations*, issued February 11, 1994. Order 5610.2c promotes the principles of environmental justice through incorporating those principles in all USDOT programs, policies, and activities and throughout all planning and decision-making processes in the development of programs, policies, and activities under NEPA, Title VI of the Civil Rights Act of 1964 (Title VI), and other statutes, regulations, and guidance that address or affect infrastructure planning and decision-making.

The Order states that USDOT shall avoid imposing adverse effects on minority and low-income communities through overly burdensome requirements that hinder projects and deprive communities of economic opportunity. It also affirms the importance of providing meaningful opportunities for public engagement of minority populations and low-income populations, as well as providing public access to information concerning the human health or environmental impacts of programs, policies, and activities, including information that will address the concerns of minority and low-income populations regarding the health and environmental impacts of the proposed action.

3.4.2.8 U.S. Department of Transportation Equity Action Plan

The USDOT Equity Action Plan is a roadmap for the Department to advance equity in the transportation system. The plan was released in January 2022 and outlines four focus areas:

- **Wealth Creation:** USDOT will work to increase access to transportation and transportation-related opportunities for underserved communities, with a focus on increasing homeownership, business ownership, and access to capital.
- **Power of Community:** USDOT will support community-led transportation planning and decision-making, and will work to increase the participation of underserved communities in transportation planning and decision-making processes.

- **Interventions:** USDOT will take proactive steps to address transportation-related disparities, such as developing a national transportation cost burden measure and increasing funding for transportation safety programs in underserved communities.
- **Expanding Access:** USDOT will expand access to transportation for all Americans, regardless of their income, race, ethnicity, or zip code. This includes expanding access to public transportation, improving pedestrian and bicycle infrastructure, and making it easier for people to get around without a car.

3.4.3 Outreach, Coordination, and Public Engagement

Consistent with EO 13985 and EO 14096, throughout the EIS process, UDOT has been engaging with EJ populations to understand their needs, address the needs through the alternatives development process, and collaborating with underserved communities to better understand and address their adverse conditions and ensure that they do not face additional disproportionate burdens or underinvestment due to the project.

Purpose and Need Development. During the development of the purpose and need for the project, UDOT conducted Smart Growth Workshops and other targeted coordination that was aimed at identifying the transportation needs in the communities for all users (roadway, transit, pedestrians, and bicyclists). UDOT also obtained and reviewed various data sources focused on nonmotorized transportation (such as Streetlight data) to help identify transportation needs related to transit riders, pedestrians, and bicyclists. UDOT reviewed these data sources with the demographic data related to EJ populations to try to identify specific transportation needs in areas with EJ populations that could be improved as part of the I-15 project.

The importance of and focus on transportation needs for all users was intended to help identify transportation and mobility needs for people who do not own a vehicle and have a higher reliance on transit, walking, or bicycling for transportation and access to jobs. A specific focus of this effort was the areas where demographic data show a lot of overlap among these groups and minorities (people of color), low-income populations, and/or persons with disabilities. UDOT included the broad transportation needs in the purpose and need for the project and considers the incorporation of transportation benefits to all users a key benefit to EJ populations in the EJ evaluation area.

The results of this effort were incorporated into the purpose and need for the I-15 project. See the *Mobility Memorandum for the I-15 Environmental Impact Statement from Farmington to Salt Lake City* (Horrocks 2022b) on the project website for more information and details about this effort.

Alternatives Development Process. Based on the input received during scoping and the purpose and need phases of the project, UDOT considered and placed emphasis on incorporating the data related to needs in the areas with EJ populations as part of the alternatives development process. This emphasis on providing safe, convenient facilities for all users was carried into the alternatives development process. The interchange designs that propose slower vehicle speeds and more comfortable, convenient pedestrian and bicyclist facilities were a direct result of the engagement with EJ populations, and these designs focus on trying to improve the diverse transportation needs in areas with EJ populations.

Draft EIS Process. Based on the input received during the alternatives development process, UDOT has directly considered community feedback through the design of the Action Alternative and the options presented in the Draft EIS. These refinements included removing the 400 North and 500 North underpasses in Salt Lake City (which have generated lots of conflicting opinions and preferences), designing the Action

Alternative to minimize impacts to adjacent properties, improving and refining pedestrian and bicyclist facilities, and making design refinements on local streets such as greater separation of bike lanes from vehicle traffic on 600 North in Salt Lake City. These considerations were a direct result of UDOT's engagement with EJ populations.

Outreach and Coordination. Throughout the EIS process, UDOT has engaged with a number of city councils, advisory boards, planning commissions, homeowners' associations, and other entities to gain insight into the concerns of the communities and to better understand where additional disadvantaged communities might be located to inform the EJ analysis. As part of these activities, UDOT developed an Equity Working Group through which UDOT sought equitable engagement with groups and individuals with affordable-housing interests and in areas of the project study area that historically might have been underserved due to language or other outreach barriers. Later, the Equity Working Group combined with three Local Area Working Groups to develop and engage with community members to capture the diverse viewpoints along I-15 and for the members to share study information with their communities and neighbors. The Local Area Working Groups included representatives across chambers of commerce, school districts, social service organizations, youth organizations, business owners, developers, and residents, among others. Chapter 6, *Coordination*, provides more information about these engagement activities.

3.4.4 Affected Environment: EJ Populations

This section provides the methodology and analysis approach used to identify the locations of EJ communities in the EJ evaluation area as well as the key environmental issues relevant to those EJ populations. For this analysis, EJ communities are defined as those census block groups with percentages of people of color and/or low-income households that exceed the county percentage. In addition, consistent with EO 14096, this analysis also considers persons with a disability. Additional information is included in Section 3.4.5, *Affected Environment: Identification of Historic and Ongoing Issues for EJ Communities*, on the communities in the EJ evaluation area who might have experienced historical environmental disparities such as diminished air quality (the prevalence of air toxics, particulate matter [$PM_{2.5}$], or ozone) and/or the presence of, or proximity to, hazardous materials from past industrial developments, effluent or wastewater discharges, and other distressed environmental conditions.

3.4.4.1 Methodology

UDOT collected data from the U.S. Census Bureau's American Community Survey (2017–2021 5-year estimates) for each of the socioeconomic characteristics below:

- EJ populations:
  - Minority populations / people of color
  - Low-income households
- Additional characteristics based on EO 14096:
  - Households with 1 or more persons with a disability

Across each socioeconomic characteristic listed above, UDOT collected data for each block group and compared the data to the county in which the block group lies. A block group is considered an EJ community if it has either a percentage of people of color or a percentage of low-income households that exceed the county percentage, which is used as a benchmark community of comparison. In addition, UDOT calculated one standard deviation (SD)[1] from the county percentage (county mean) as a benchmark to identify those block groups with much higher percentages of people of color and/or low-income households, which indicates a potential for a more disadvantaged community.

UDOT then collected and analyzed percentages of households with one or more persons with a disability using the same methodology to capture additional populations in the EJ evaluation area that would be considered potentially disadvantaged. Depending on the individuals, persons with a disability might have mobility limitations that affect how they move within their communities and access jobs and essential services. Sections 3.4.4.2 through 3.4.4.5 discuss the socioeconomic characteristics of the EJ evaluation area. Appendix 3C, *Environmental Justice Data Tables*, includes tabular data.

What is the difference between an EJ population and an EJ community?

In Section 3.4, the term *EJ communities* is generally used when referring to locations with higher percentages of EJ populations.

The term *EJ populations* is generally used when referring to the people in the communities.

However, in Section 3.4, the terms *EJ populations*, *areas with EJ populations*, and *EJ communities* are used interchangeably.

Although this analysis uses higher percentages of minority populations, low-income populations, and persons with disabilities to identify EJ populations, this data does not assume that all people in these categories are disadvantaged. To the extent that these socioeconomic categories have a higher percentage of people that are disadvantaged compared to the general population, they are used as proxies to identify areas where there is a higher potential for disadvantaged people that could have one or more of these socioeconomic characteristics.

In addition, comments and input received during the EIS process and public data from the Climate and Economic Justice Screening Tool (Justice40) and the U.S. Environmental Protection Agency's (EPA) Environmental Justice Screen Tool (EJScreen) were also reviewed for the project area to identify areas with historical environmental disparities (see Section 3.4.5, *Affected Environment: Identification of Historic and Ongoing Issues for EJ Communities*). The socioeconomic data for the Climate and Economic Justice Screening Tool and the EPA Environmental Justice Screen Tool were consistent with the information that was collected from the U.S. Census Bureau.

[1] Based on an assumed normally distributed set of data, in which one standard deviation from the mean represents approximately 68% of all data points on either side of the mean (34% on each side). Therefore, for this analysis, one standard deviation as a benchmark means that 50% plus 34% of the data points fall below the benchmark, and 16% of the data points fall above the benchmark. Percentages that are among the top 16% would be among the highest and considered to have the highest potential to be disadvantaged as EJ communities.

3.4.4.2 Minority Populations/People of Color

3.4.4.2.1 North Segment

The north segment is located completely in Davis County, which is the benchmark community of comparison. People of color make up 17.5% of the population of Davis County. In the north segment, 14 out of 40 block groups have percentages of people of color greater than Davis County, as shown in Figure 3.4-1. Three of the block groups have percentages that exceed 1 SD from the county percentage, which is 29.5%, indicating areas with relatively high numbers of people of color that might be more disadvantaged than other communities. These communities with high percentages of people of color are located on both sides of I-15 in Bountiful, West Bountiful, and Woods Cross.

3.4.4.2.2 South Segment

The south segment is located primarily in Salt Lake County, but a small part is located in Davis County; therefore, both counties are used as benchmark communities of comparison. As stated above, people of color make up 17.5% of the population of Davis County. In Salt Lake County, people of color make up 30.2% of the population. In the Davis County part of the south segment, three of the five block groups have percentages of people of color greater than Davis County, as shown in Figure 3.4-2. Among these, one block group, located in North Salt Lake, has a percentage of people of color that exceeds 1 SD from the county percentage (29.5%), indicating an area with a relatively high number of people of color that might be more disadvantaged than other communities.

In the Salt Lake County part of the south segment, 19 of the 25 block groups have percentages of people of color greater than Salt Lake County, as shown in Figure 3.4-2. Among these, 10 block groups have percentages that exceed 1 SD from the county percentage (29.5%), indicating areas with relatively high numbers of people of color that might be more disadvantaged than other communities. As Figure 3.4-2 illustrates, the communities with high percentages of people of color in the Salt Lake County part of the south segment are located predominantly on the west side of I-15 in Salt Lake City.

Figure 3.4-1. People of Color in the North Segment

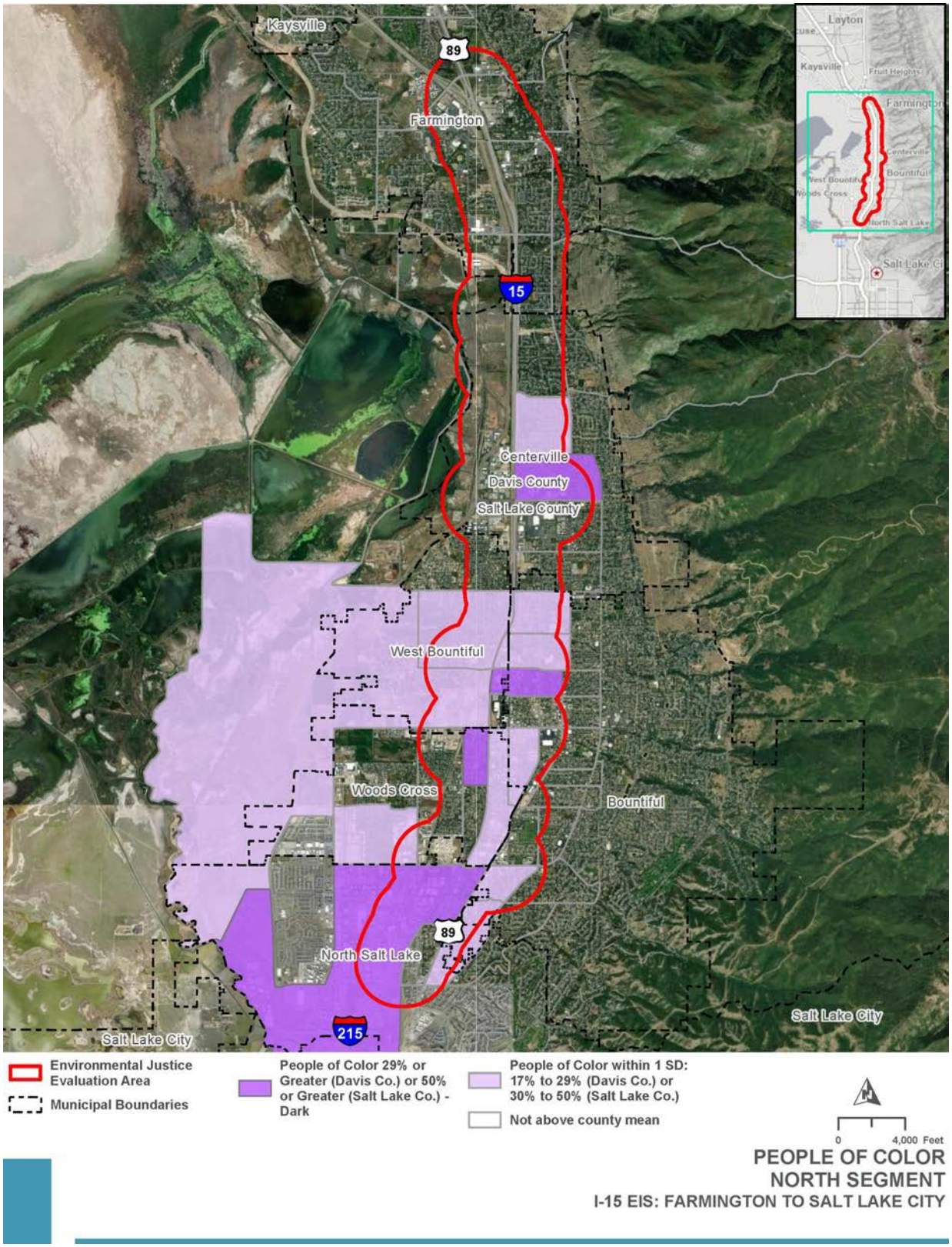
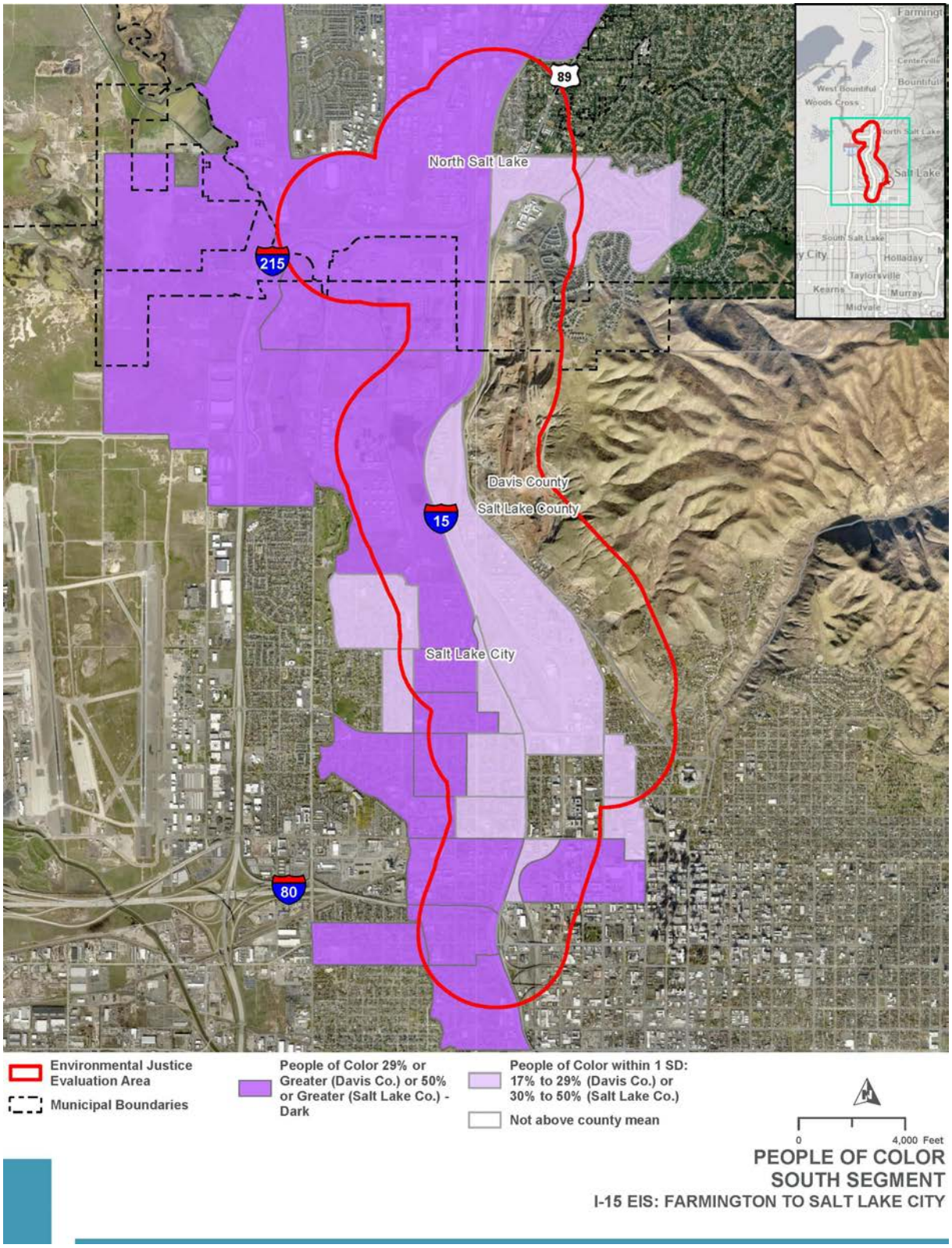


Figure 3.4-2. People of Color in the South Segment



3.4.4.3 Low-income Households

3.4.4.3.1 North Segment

In Davis County, the benchmark community of comparison for the north segment, 5.5% of the households are considered low-income. In the north segment, 17 out of 40 block groups have percentages of low-income households greater than Davis County, as shown in Figure 3.4-3. Five of the block groups have percentages that exceed 1 SD from the county percentage, which is 13.3%. These communities with high percentages of low-income households are located on both sides of I-15 in West Bountiful, Woods Cross, and Bountiful.

3.4.4.3.2 South Segment

The south segment is located primarily in Salt Lake County, but a small part is located in Davis County; therefore, both counties are used as benchmark communities of comparison. In the Davis County part of the south segment, three out of five block groups have percentages of low-income households greater than Davis County (5.5%), as shown in Figure 3.4-4. None of these five block groups have percentages that exceed 1 SD from the Davis County percentage (13.3%).

In the Salt Lake County part of the south segment, 21 out of 25 block groups have percentages of low-income households greater than Salt Lake County, which is 8.3%, as shown in Figure 3.4-4. Among these, 13 block groups have percentages that exceed 1 SD from the Salt Lake County percentage, which is 18.4%. These communities with high percentages of low-income households are located in Salt Lake City on both sides of I-15.

Figure 3.4-3. Low-income Households in the North Segment

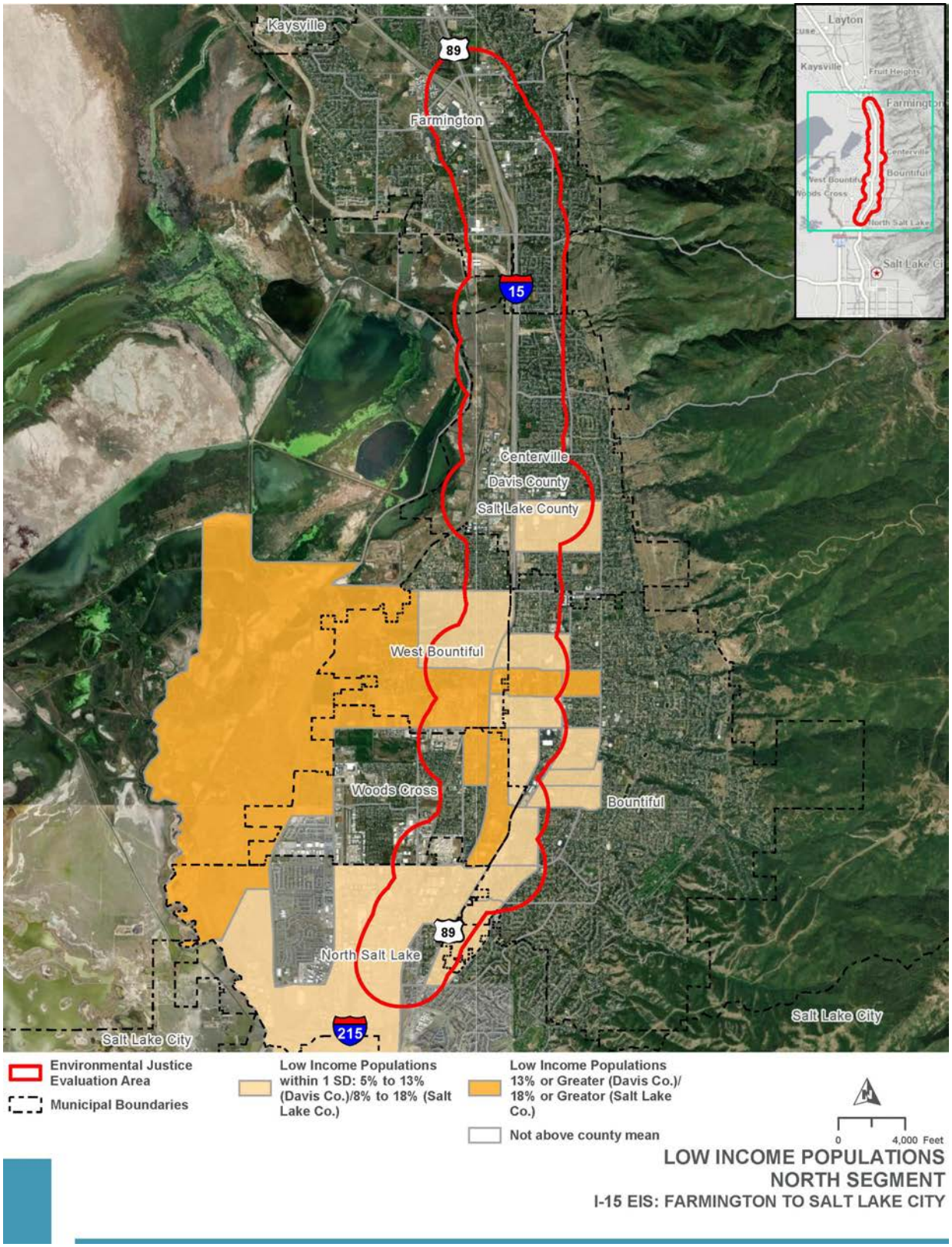
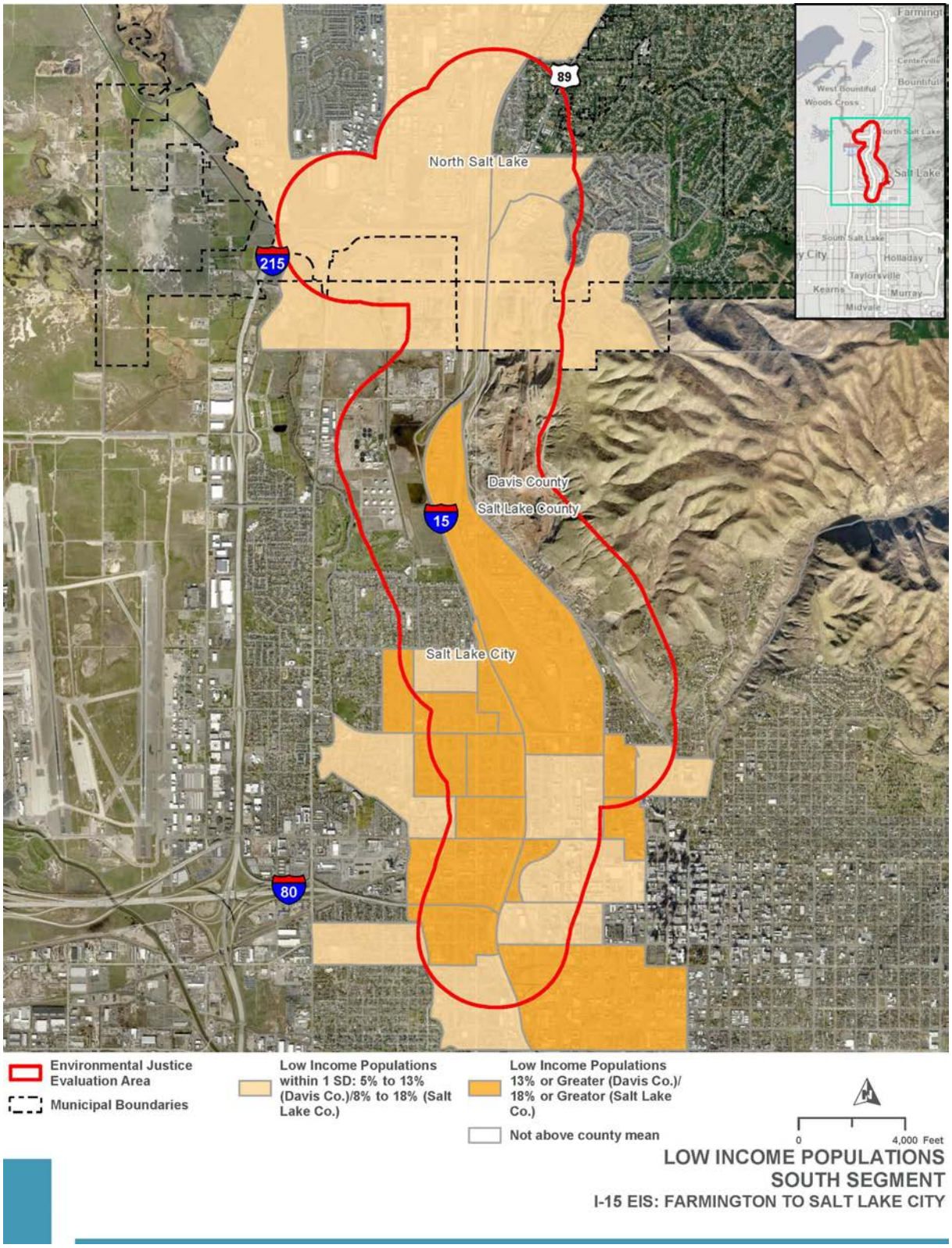


Figure 3.4-4. Low-income Households in the South Segment



3.4.4.4 Households with One or More Persons with a Disability

3.4.4.4.1 North Segment

In the north segment, 17 out of 40 block groups have percentages of households with one or more persons with a disability greater than Davis County (22.3%), as shown in Figure 3.4-5. Four of these block groups in the north segment have a percentage that exceeds 1 SD from the county percentage (32.3%). These communities with high percentages of households with one or more persons with a disability are located on both sides of I-15 in Bountiful and Woods Cross.

3.4.4.4.2 South Segment

In the Davis County part of the south segment, one out of five block groups have percentages of households with one or more persons with a disability greater than Davis County (22.3%), as shown in Figure 3.4-6. None of these block groups has a percentage that exceeds 1 SD from the county percentage (32.3%).

In the Salt Lake County part of the south segment, 13 out of 25 block groups have percentages of households with one or more persons with a disability greater than Salt Lake County (21.6%), as shown in Figure 3.4-6. Among these, 4 block groups have percentages that exceed 1 SD from the county percentage (32.6%). These communities with high percentages of households with one or more persons with a disability are located predominantly west of I-15 in Salt Lake City.

Figure 3.4-5. Households with One or More Persons with a Disability in the North Segment

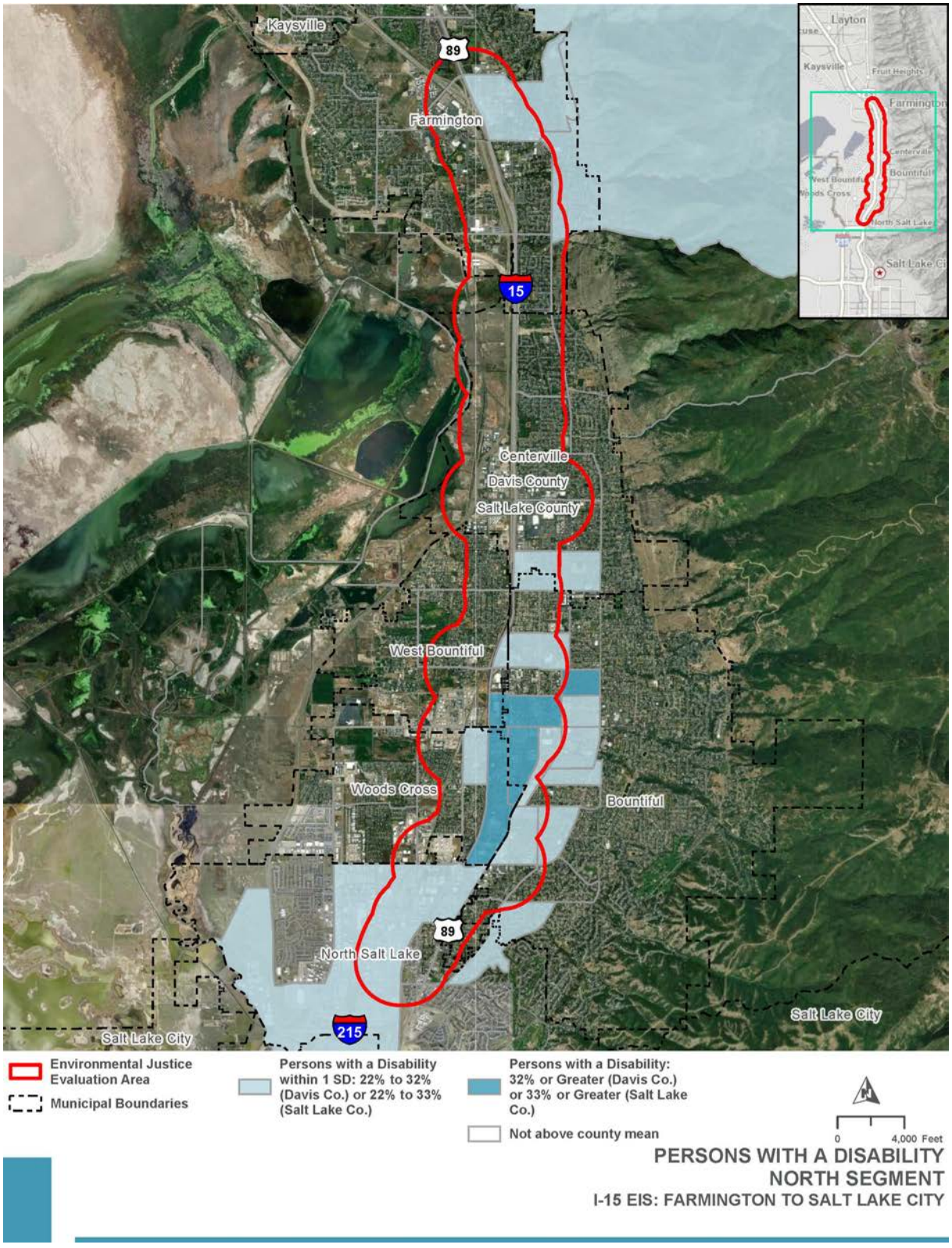
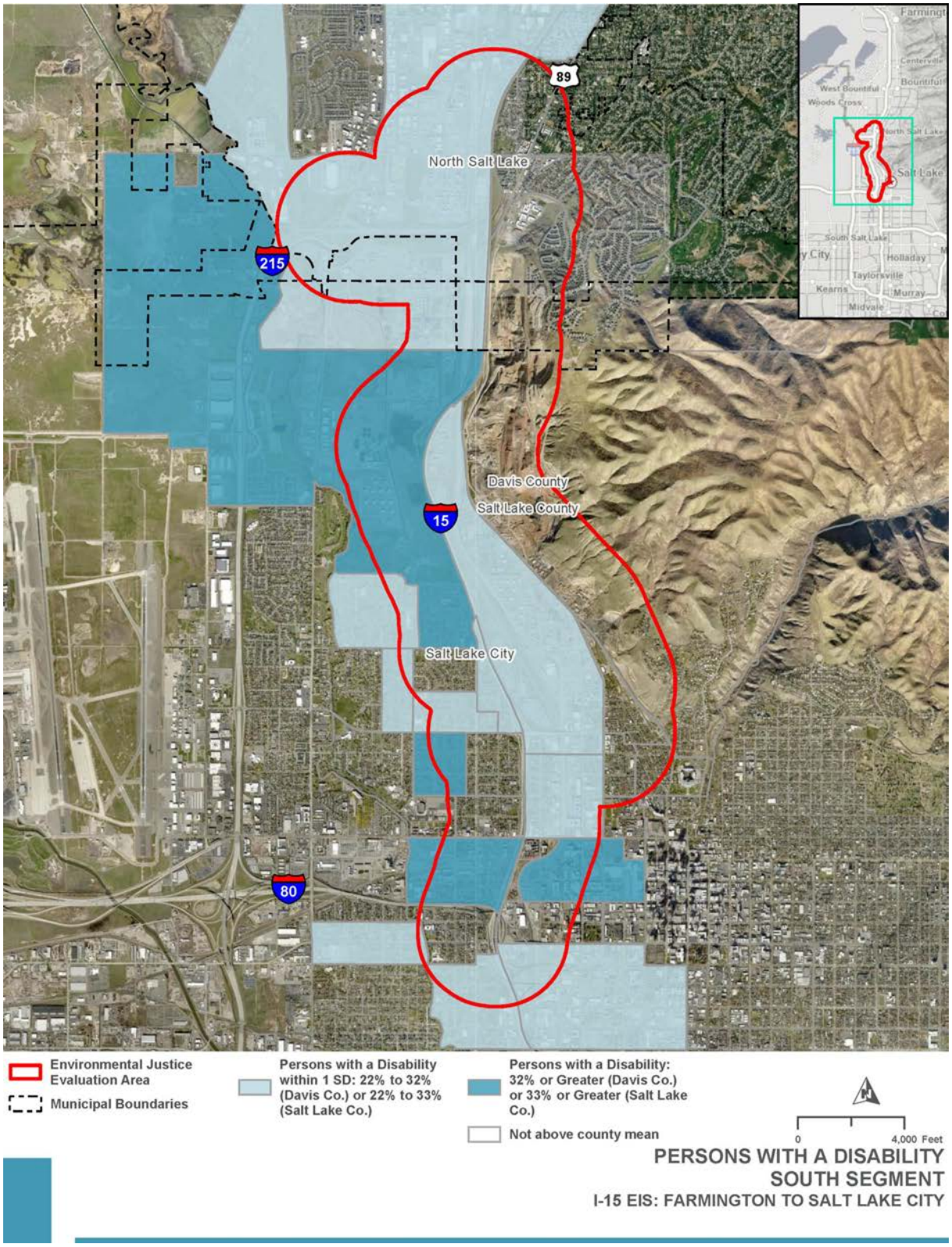


Figure 3.4-6. Households with One or More Persons with a Disability in the South Segment



3.4.4.5 Environmental Justice and Additional Potentially Burdened Communities

According to EO 12898 and subsequent USDOT guidance, EJ populations include minority (people of color) and/or low-income populations. Additional potentially burdened communities and persons with disabilities were also identified consistent with EO 14096. Figure 3.4-7 and Figure 3.4-8 show the EJ populations in the EJ evaluation area, by segment, illustrating the areas that are identified as EJ populations according to the original definition (lighter shading) and those that have an additional burden of households with one or more persons with a disability.

As the figures illustrate, in the north segment, the EJ populations are located toward the southern part of the segment, east of I-15 in Centerville and on both sides of I-15 in West Bountiful, Bountiful, and North Salt Lake (Figure 3.4-7). In the south segment, the entirety of the block groups west of I-15 and most block groups east of I-15 in Salt Lake City are considered EJ populations.

Figure 3.4-7. EJ Populations in the North Segment

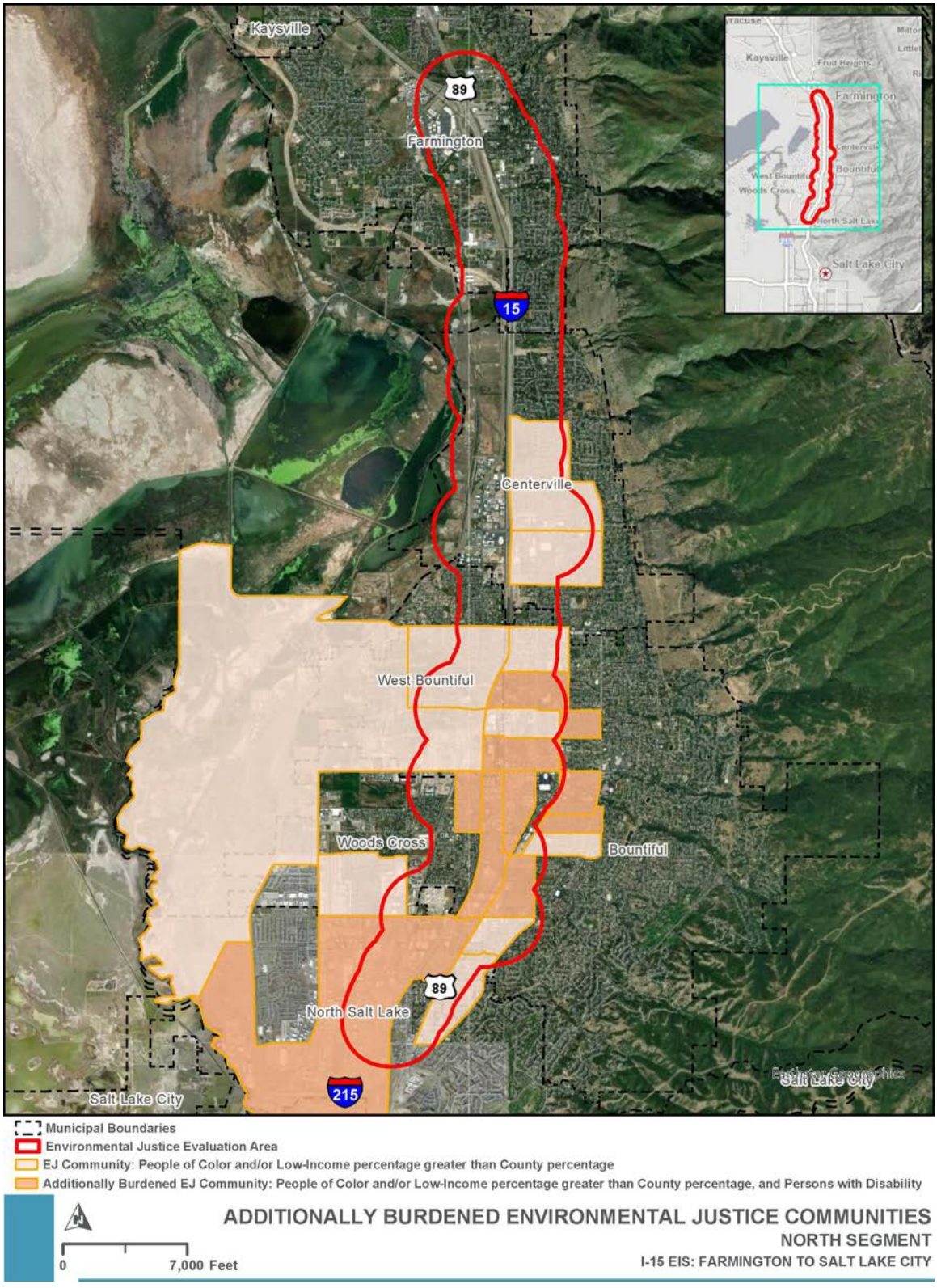
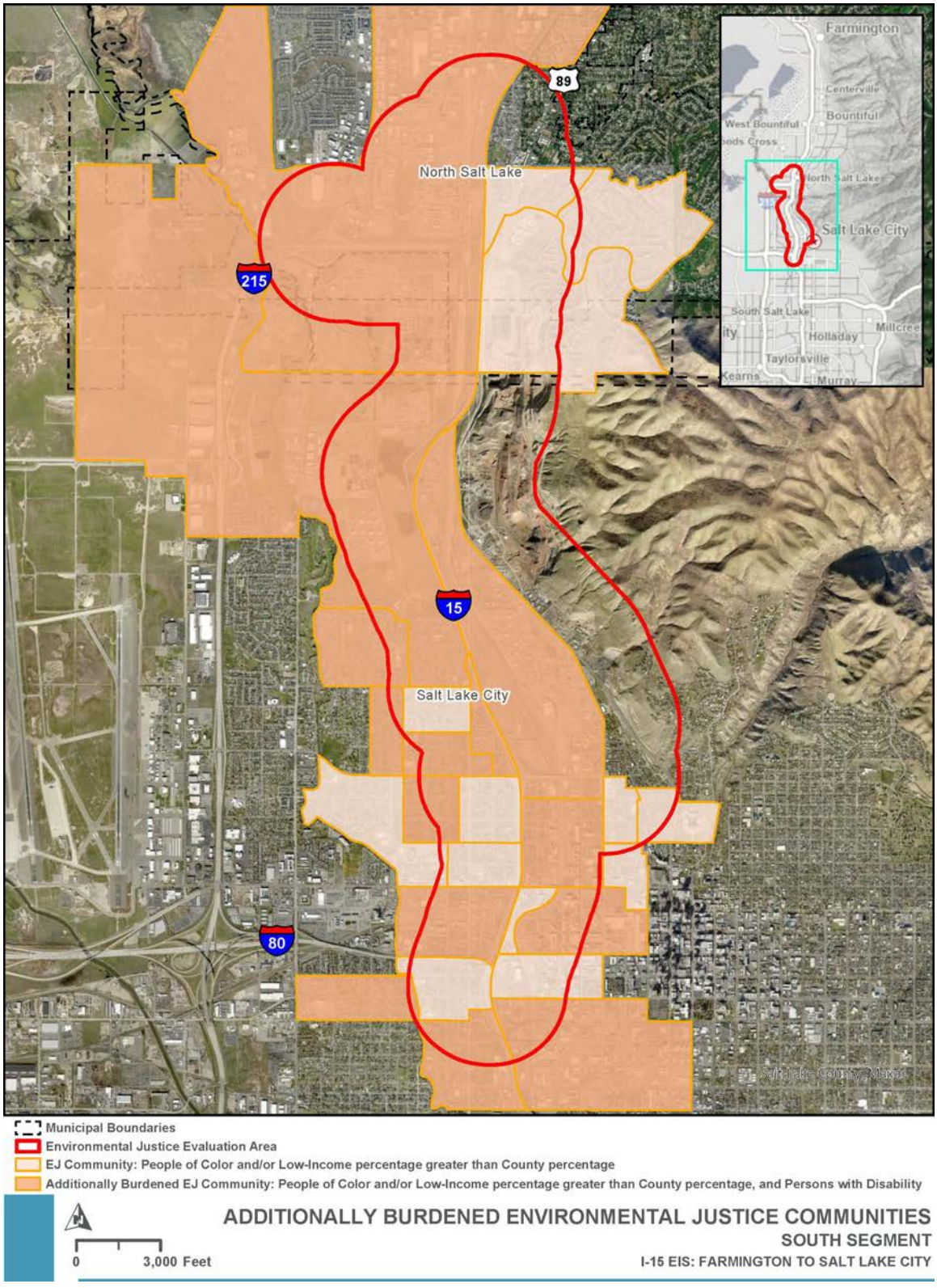


Figure 3.4-8. EJ Populations in the South Segment



3.4.5 Affected Environment: Identification of Historic and Ongoing Issues for EJ Communities

UDOT confirmed EJ populations through census data and by evaluating the historic issues these communities have faced. To help identify specific issues of concern facing EJ populations in the EJ evaluation area, UDOT reviewed background information about historic issues, considered comments received during the EIS scoping and alternatives development processes, and reviewed the EPA Climate and Environmental Justice Screening Tool (Justice40) and the EJScreen Tool.

3.4.5.1 Background and Issues Identified during the EIS Process

During the development of the I-15: Farmington to Salt Lake City EIS, many stakeholders and community groups have made UDOT aware of the past impacts on the west side communities of Salt Lake City (Rose Park, Fairpark, and Poplar Grove in particular) from redlining, past transportation infrastructure (railroads, roads, and the Salt Lake City International Airport), and industrial developments. UDOT is also aware of concerns from Salt Lake City and local groups about potential impacts from the Utah Inland Port and associated development west of the Salt Lake City International Airport.

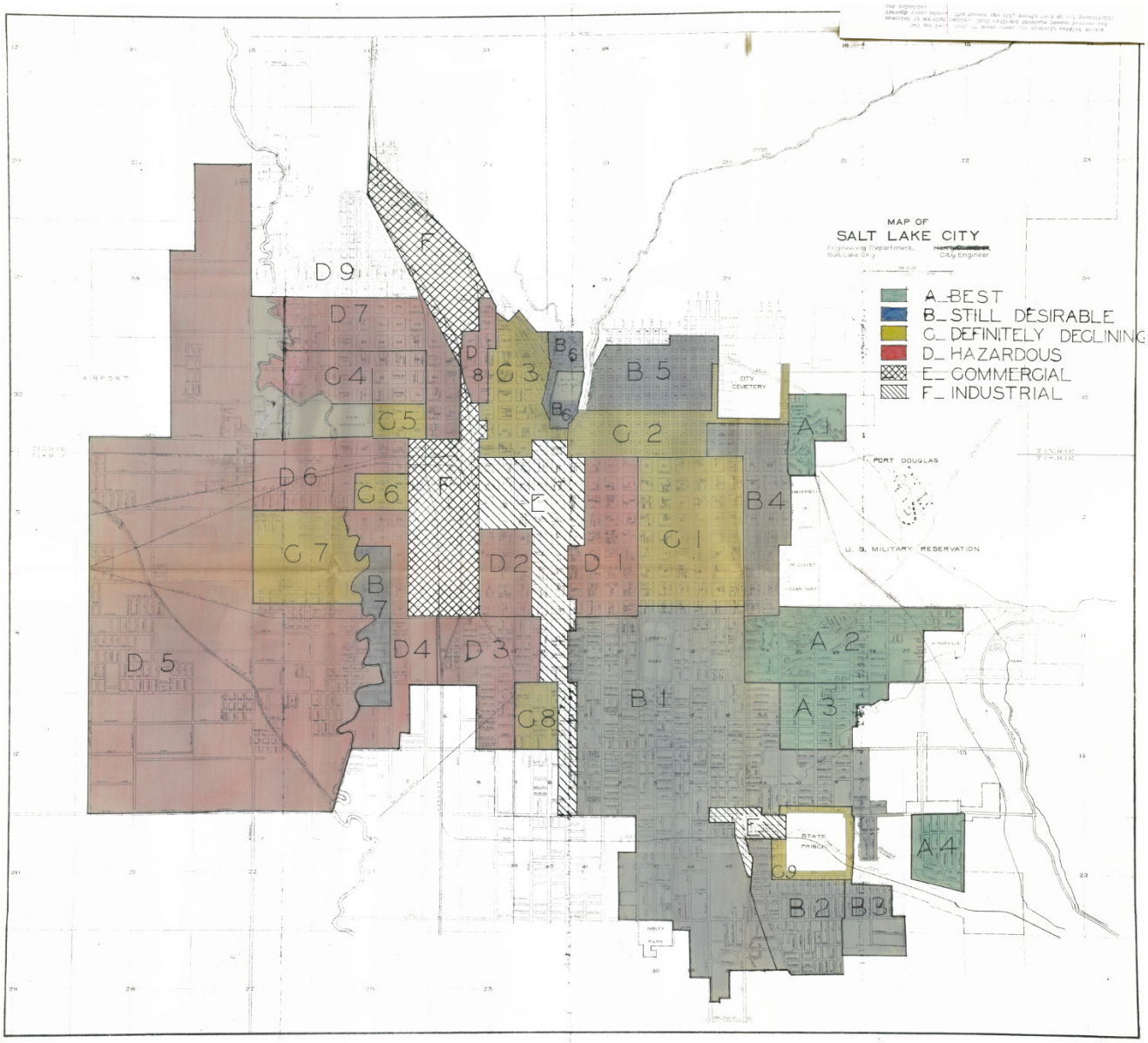
As a January 2023 letter to UDOT from the mayor and others at Salt Lake City stated, Salt Lake City is one of the few cities in Utah where a redlining map was created (in 1939) to predict “safe” or “risky” home mortgage lending conditions, based in part on the racial composition of an area (Figure 3.4-9; Salt Lake City 2023a). The letter states that “most neighborhoods west of the Salt Lake City freight rail tracks were designated as ‘hazardous’ for lending, and most of those neighborhoods are west of I-15 today.” Redlining has historically made wealth creation through home ownership more difficult for communities of color.

The January 2023 letter from Salt Lake City to UDOT also noted the physical barriers, such as I-15 (which was constructed in the 1950s and 1960s) and the railroad tracks (which were constructed in the 1860s) located two blocks east of I-15, that have “perpetuated racial segregation and disparate economic, educational, and health outcomes for the city’s west-side communities” (Salt Lake City 2023a). A Westside Coalition was developed in 2018 to address many of the issues shared by the west-side communities, including ongoing environmental concerns with clean air and clean water, affordable housing, unhoused populations, transportation and accessibility, and future west-side development. These issues, which perpetuate environmental and social burdens, confirm the presence of EJ populations west of I-15, as illustrated in Figure 3.4-9.

The areas of concern to these communities include air quality (including how air quality could affect health and the economy), physical barriers or separation caused by the railroads and I-15, noise, and potential for relocations or displacements of residents, businesses, or community facilities from the proposed I-15 improvements. Commenters have noted that the west-side communities of Salt Lake City have historically had disparate economic, educational, and health outcomes and are concerned about the potential for the I-15 improvements to exacerbate these concerns.

Concerns about impacts to the west-side neighborhoods of Salt Lake City have been long-standing and are a result of many contributing factors.

Figure 3.4-9. Historic Redlining Map of Salt Lake City



Many of the existing issues and the contributions of transportation infrastructure and land uses preceded the original construction of I-15 in the 1960s. Examples include historical placement of transportation infrastructure and other industrial facilities that placed barriers and emission sources within and near these communities before the original construction of I-15. The meteorological and topographical makeup of the region also affects air quality. For example, the transcontinental railroad was constructed in the 1860s north of the project study area, and many subsequent north-south railroad lines from Salt Lake City to the transcontinental railroad have created the main railroad corridor that exists in the narrow corridor between the Wasatch Mountains and the Great Salt Lake. Since the initial railroad lines were constructed in the late 1800s, many additional railroad lines have been added in this railroad corridor, most recently the Utah Transit Authority's (UTA) FrontRunner in 2008. Many of the industrial land uses and facilities in western and

northern Salt Lake City, which were established prior to the construction of I-15, were developed around these rail lines.

As one example, the Salt Lake City refinery (currently the Marathon Oil Refinery) was opened in 1908. The Salt Lake City International Airport was constructed the 1930s. The historic Salt Lake City redlining mapping was most recently documented in 1939. Additionally, prior to the construction of I-15 in the 1960s, there was also U.S. Highway 91 that was located on a similar alignment to the current U.S. Highway 89/Beck Street alignment (about 4 blocks east from the current I-15 alignment in most areas of northern Salt Lake City). Local zoning and the types of industries allowed in various zones were then established around these early developments. Concerns about air quality (in the late 1800s) resulted in many industrial land uses being located in the northern and western areas of the city to keep these land uses farther away from the downtown areas and residential east of the railroads.

Similarly, air quality issues and concerns are multivariate and have been an ongoing issue in Salt Lake City since Mormon pioneers settled in Utah in 1847 (Mitchell and Zajchowski 2022; University of Utah, J. Willard Marriott Library, no date). In addition to the multivariate sources of emissions (industry, transportation, and residential and commercial emissions from heating and appliances), the Wasatch Front also has valleys that trap air during winter inversions. In the late 1800s and early 1900s, most winter heat was produced by burning wood or charcoal, which produce high rates of particulate matter, carbon monoxide, and other air quality pollutants. Salt Lake City passed its first air quality ordinance in 1893 and has made ongoing efforts, along with the State of Utah, to continue to look at ways to improve air quality, especially during winter inversions.

From a historical perspective, the current air quality in Utah is much improved from historical levels, even with a much higher population, and continues to get better due to stricter air quality standards, better industrial and vehicle emission technologies, cleaner-burning fuels, and energy-efficiency measures. Consistent with this recent trend, transportation-related air quality pollutants are projected to continue to decrease in the future due to even-better emissions technologies and fuel efficiency (WFRC 2019b).

Although the regional air quality in the project study area is improving, many commenters stated, and the EPA EJScreen Tool (see Section 3.4.5.3, *EPA EJScreen Tool*) found, that air quality in many EJ communities in the project study area is often worse than air quality in non-EJ communities. Monitoring data from the Utah Division of Air Quality confirm that monitored levels of some pollutants are higher at the Rose Park monitoring station (in west Salt Lake City) compared to the Hawthorne (in east Salt Lake City) and Bountiful monitoring stations (see Table 3.8-3, *Air Quality Monitoring Data from the Bountiful #2, Rose Park, Hawthorne, and Utah Technical Center Monitoring Stations in* Davis and Salt Lake Counties, in Section 3.8, *Air Quality*). The reasons for this disparity in air quality between the monitoring stations is not known, and EPA and Salt Lake City are currently studying this issue. EPA anticipates that a report documenting the results of its literature review, data review, and recommendations for areas of further research will be available in the fall of 2023. UDOT has been coordinating with EPA and its contractors as part of the EPA study and will review the EPA report when it is available.

UDOT received comments stating issues of concern for EJ populations that included air quality (including how air quality could affect health and the economy), physical barriers or separation caused by the railroads and I-15, noise, and potential for relocations or displacements of residents, businesses, or community facilities from the I-15 improvements. Many of these comments also noted that the west-side communities of Salt Lake City have historically had disparate economic, educational, and health outcomes, and the commenters were concerned about the potential for the I-15 improvements to exacerbate these concerns.

Although decision-making relevant to the proposed Action Alternative cannot remedy many of these past transportation and industrial decisions, UDOT will continue to collaborate with the community through this NEPA process. For more information, see Section 3.4.6.4, *Mitigation Measures*.

3.4.5.2 Climate and Environmental Justice Screening Tool

Disadvantaged communities were identified in the EJ evaluation area using the Climate and Environmental Justice Screening Tool (CEJST). The tool was developed to help federal agencies and project sponsors identify disadvantaged communities to fulfill the promise of the Justice40 Initiative so that federal investments reach communities that need them most. Communities are considered disadvantaged if they are in census tracts that meet the thresholds for at least one of the tool's categories of burden (climate change, clean energy and energy efficiency, health, affordable housing, legacy pollution, clean and affordable transportation, water and wastewater, and barriers to workforce development), or if they are on land within the boundaries of federally recognized tribes.

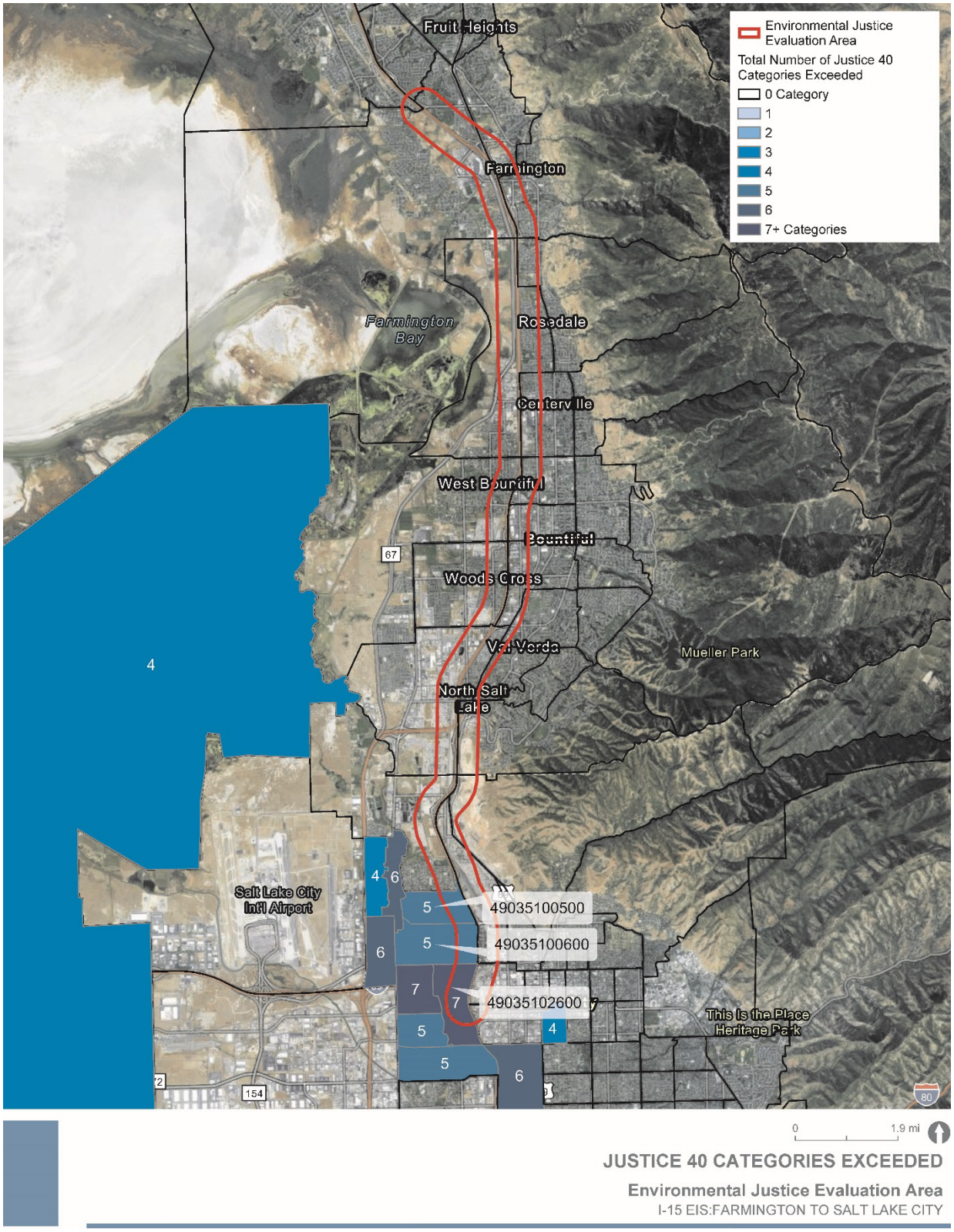
Three census tracts along I-15 have been identified as disadvantaged in this tool due to meeting multiple burden thresholds as well as the associated socioeconomic criteria (see Table 3.4-1 and Figure 3.4-10). These tracts are located in the south segment on the western side of I-15 in Salt Lake City. Given their proximity, the indicators exceeding Justice40 thresholds are nearly identical among these adjacent tracts. This area faces several existing environmental disparities including heightened projected flood risk, asthma prevalence, a history of underinvestment in housing, close proximity to Superfund sites, or wastewater discharge.

Table 3.4-1. Justice40 Categories of Disadvantaged Census Tracts in the EJ Evaluation Area

Justice40 Category	Census Tract 49035100500 (5 categories exceeded)	Census Tract 49035100600 (5 categories exceeded)	Census Tract 49035102600 (7 categories exceeded)
Climate Change	Projected flood risk (94th percentile)	Projected flood risk (94th percentile)	Expected population loss rate (99th percentile)
Energy	NA	NA	NA
Health	Asthma (93rd percentile)	Asthma (93rd percentile)	Asthma (93rd percentile) Low life expectancy (96th percentile)
Housing	Historic underinvestment – census tracts with historically high barriers to accessing home loans	NA	Historic underinvestment – census tracts with historically high barriers to accessing home loans
Legacy Pollution	Proximity to Superfund sites (98th percentile)	Proximity to Superfund sites (98th percentile)	Proximity to Superfund Sites (99th percentile)
Transportation	NA	NA	Traffic proximity and volume (98th percentile)
Water and Wastewater	Wastewater discharge (95th percentile)	Wastewater discharge (95th percentile)	Wastewater discharge (95th percentile)
Workforce Development	NA	Poverty (91st percentile)	Unemployment (92nd percentile) High school education only (28th percentile)

Data accessed from CJEST on August 16, 2023 (https://screeningtool.geoplatform.gov/en/#3/33.47/-97.5)

Figure 3.4-10. Justice40 Disadvantaged Communities and Number of Categories Exceeded



3.4.5.3 EPA EJScreen Tool

The EPA EJScreen tool is a mapping and screening tool that helps identify communities that might be disproportionately exposed to environmental hazards. The tool evaluates environmental and demographic data to create EJ indices that represent a potential for disparate existing impacts.

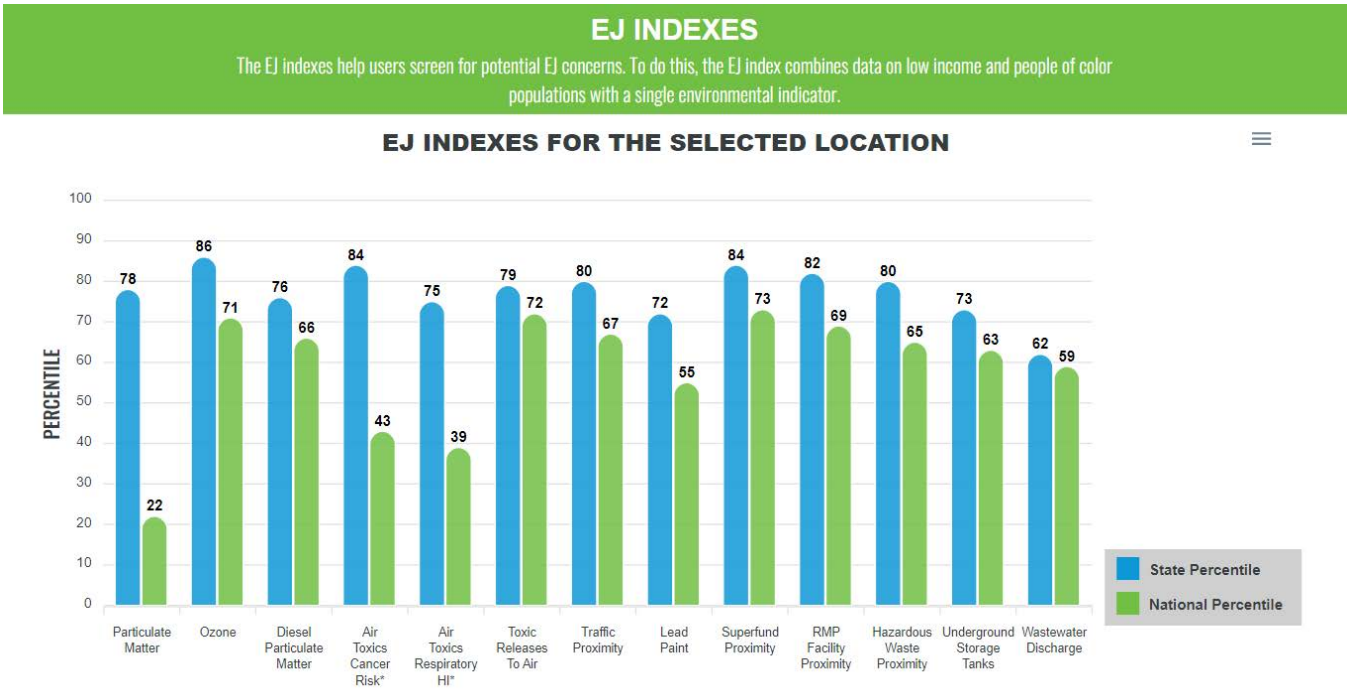
The EJ indices are a measure of the potential for environmental injustice in a community. They are calculated by combining a single environmental indicator, such as proximity to a hazardous waste site, with the demographic index of an EJ population, which then becomes a measure of the population's vulnerability to environmental hazards. The demographic index is calculated by averaging the percentage of people in a community who are low-income and people of color in the state. A high EJ index score indicates that a community might be disproportionately exposed to environmental hazards. An index is presented as a percentile, which compares residents in the community to state and national populations. The reported percentile represents what percentage of the state and U.S. population has an equal or lower value, meaning less potential for exposure, risk, or proximity to certain facilities. EPA has found that the tool is helpful to establish a suggested starting point for the purpose of identifying geographic areas that might warrant further consideration, analysis, and public and agency outreach.

The EJScreen Tool generates EJ indices for 13 environmental indicators:

- Particulate matter 2.5
- Ozone
- Diesel particulate matter
- Air toxics cancer risk
- Air toxics respiratory hazard index
- Toxics releases to air
- Traffic proximity
- Lead paint
- Superfund proximity
- Risk Management Plan (RMP) facility proximity
- Hazardous waste proximity
- Underground storage tanks and leaking underground storage tanks
- Wastewater discharge

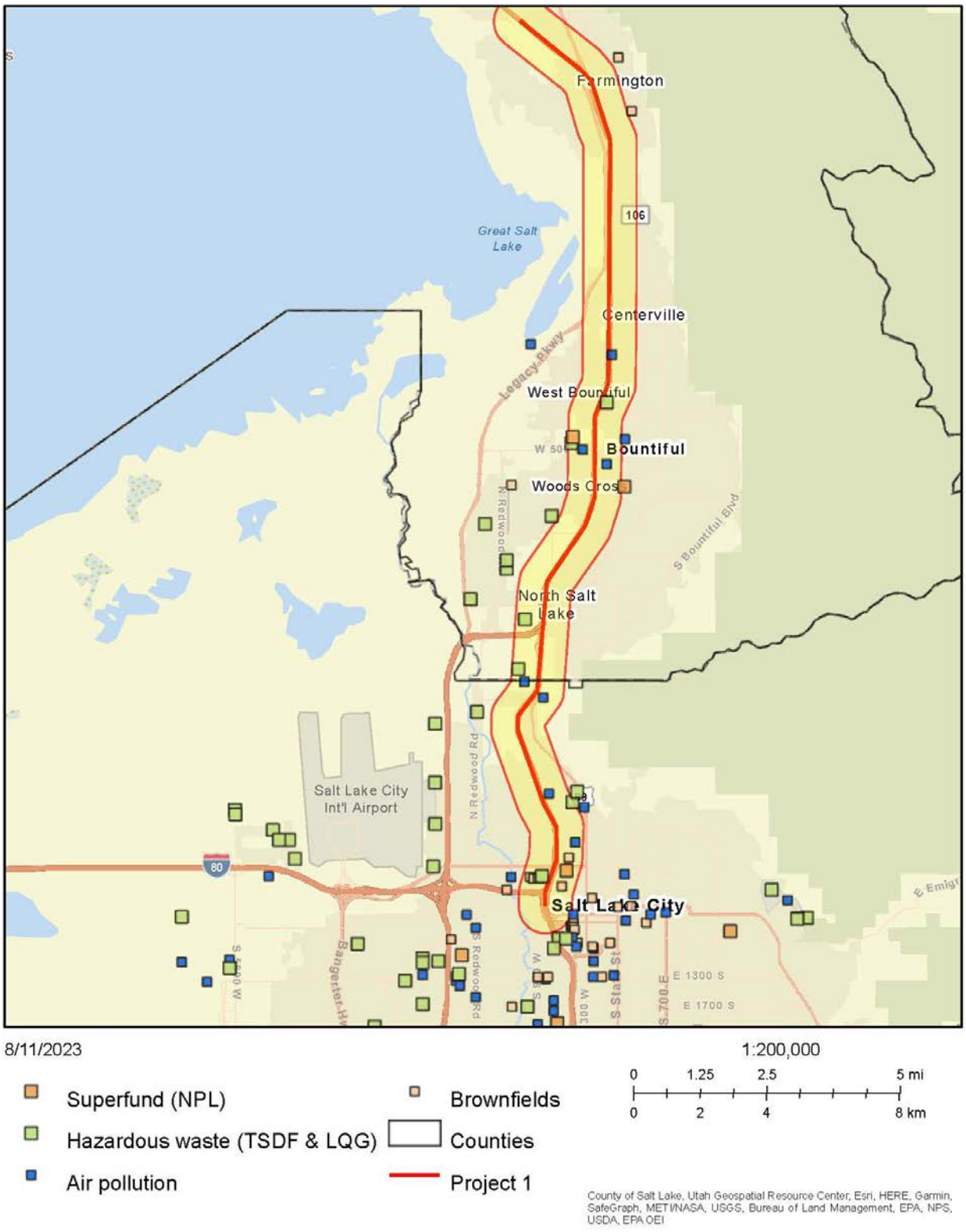
The EJScreen Tool found the EJ indices for the selected location to have a greater existing burden when it comes to particulate matter (78th percentile), ozone level (86th percentile), diesel particulate matter (76th percentile), air toxics cancer risk (84th percentile), toxic releases to air (79th percentile), traffic proximity (80th percentile), Superfund proximity (84th percentile), RMP facility proximity (82th percentile), and hazardous waste proximity (80th percentile) (Figure 3.4-11). These percentiles are the results for these indicators compared to the state population.

Figure 3.4-11. EJ Indexes for the EJ Evaluation Area from the EPA EJScreen Tool



The area report generated by the tool also provided documentation on location-specific sites in the EJ evaluation area. The report showed that these EPA sites are located both within and outside EJ communities, as shown previously in Figure 3.4-7, *EJ Populations in the North Segment*. For example, there are pockets of potentially hazardous waste sites in EJ communities in Bountiful and non-EJ communities in North Salt Lake. However, hazardous waste sites are disproportionately concentrated in the south segment and in the EJ communities of that segment (Figure 3.4-12).

Figure 3.4-12. Locations of EJ Regulated Sites in the EJ Evaluation Area from the EPA EJScreen Tool



3.4.5.4 Summary of EJ Issues of Concern

Based on review of the CEJST and EPA EJScreen Tool and input provided by comments during the I-15 EIS process, UDOT identified the following topics as the topics of concern for EJ populations relevant for consideration with the I-15 project. These issues are discussed in more detail in Section 3.4.6.3, *Action Alternative*.

- Community connectivity, transportation, and accessibility
- Air quality
- Property impacts to residents and businesses in areas with EJ populations
- Noise

Non-transportation-related EJ Issues. Other identified issues, such as proximity to hazardous materials (including Superfund sites, RMP sites, and underground storage tanks), wastewater discharges, flood risk, lead paint, and educational concerns would not be affected positively or negatively by the I-15 project, are outside of UDOT's area of jurisdiction, and are not discussed further in this analysis. Although the Action Alternative would have potential impacts to sites with hazardous materials (see Section 3.14, *Hazardous Materials and Hazardous Waste Sites*), it would not add any new hazardous material sites or increase exposure to hazardous materials to any areas with EJ populations. Similarly, the Action Alternative would have stormwater discharges, which would be treated and have similar effects on the existing stormwater discharges from I-15 (see Section 3.11, *Water Quality and Water Resources*). There would not be any new wastewater discharges or increased exposure to wastewater discharges with the I-15 project. As described in Section 3.13, *Floodplains*, the Action Alternative would not increase risk of upstream flooding or otherwise change the flood risk to any areas, including areas with EJ populations. Issues related to lead paint and workforce development are not related to transportation and would not be affected by the I-15 project.

3.4.6 Environmental Consequences and Mitigation Measures

This section discusses the direct impacts of the project alternatives on the EJ populations in the EJ evaluation area.

3.4.6.1 Methodology

To determine the potential for the Action Alternative to result in disproportionate adverse human health or environmental effects on EJ populations, UDOT reviewed the expected project impacts discussed in the resource sections and assessed the likelihood of any of these impacts to affect minority populations and/or low-income populations. The EJ justice impact analysis considers the USDOT Order 5610.2c definition of adverse effects, which are:

> … the totality of significant individual or cumulative human health or environmental effects, including interrelated social and economic effects, which may include, but are not limited to: bodily impairment, infirmity, illness or death; air, noise, and water pollution and soil contamination; destruction or disruption of man-made or natural resources; destruction or diminution of aesthetic values; destruction or disruption of community cohesion or a community's economic vitality; destruction or disruption of the availability of public and private facilities.

According to USDOT Order 5610.2c, a disproportionate adverse effect is one that:

1. is predominately borne by a minority population and/or a low-income population; or
2. will be suffered by the minority population and/or low-income population and is appreciably more severe or greater in magnitude than the adverse effect that will be suffered by the nonminority population and/or non-low-income population.

Moreover, this review includes an assessment of the effects of the Action Alternative on the identified communities with EJ concerns compared to the effects on the reference community as a whole (that is, the counties in which the Action Alternative would be located).

UDOT reviewed the temporary construction and permanent operational effects of the Action Alternative and identified the magnitude of the effects, whether effects are adverse or beneficial, the duration of effects (temporary or permanent), and the geographic location of the effects on the identified minority and low-income populations in the EJ evaluation area. Where the Action Alternative would have no adverse effects on populations in general, no further analysis was conducted.

In addition to reviewing operational and construction-phase adverse effects, UDOT considered the benefits of the Action Alternative. Of note are any benefits to the communities that have experienced a legacy of impacts on environmental injustice populations and for which the I-15 project might improve the quality of life for these populations.

This approach is consistent with EO 12898, which states that a comparison group should be identified in the "affected environment" for the project. The comparison communities used in the I-15 study area provide an appropriate basis by which to conduct the disproportionate and adverse effects analysis.

3.4.6.2 No-action Alternative

With the No-action Alternative, the improvements associated with the I-15: Farmington to Salt Lake City Project would not be implemented. There would be no project-related construction activities on I-15, and all nearby roads in the project area would continue to operate as they currently do. With the No-action Alternative, there would be no benefit to communities and residents' and workers' quality of life from the roadway and pedestrian and bicyclist facility improvements. Moreover, the increased congestion on I-15 and the lack of safety improvements could reduce the quality of life for all users of I-15 and the I-15 interchanges, including the EJ communities who use I-15, the I-15 interchanges, and cross-streets. Although there would be no short-term construction impacts to the minority and low-income populations in the EJ evaluation area, there would also be no benefits to these communities. The project purposes to improve safety, replace aging infrastructure, provide better mobility for all travel modes, strengthen the state and local economy, and better connect communities along I-15 from Farmington to Salt Lake City would not be met.

3.4.6.3 Action Alternative

This section provides a summary of the Action Alternative's expected impacts on historical issues of community connectivity, air quality, right-of-way impacts, and noise, and an evaluation of any disproportionate adverse effects on EJ populations from the Action Alternative. This section also summarizes the potential for cumulative effects for these resources in EJ communities.

3.4.6.3.1 Action Alternative Impacts Related to Community Connectivity, Transportation, and Accessibility for EJ Populations

As previously discussed, the community separation issues began with the construction of the railroads in the 1860s and are longstanding and multivariate. Items that have and continue to contribute to the separation between the east- and west-side neighborhoods in Davis County and Salt Lake City include the railroads, I-15, and industrial land uses (such as oil refineries) in some locations.

In order to improve connectivity to and from I-15, UDOT is proposing to maintain all existing crossings of I-15 and improve the safety for all users (roadway, transit, pedestrians, and bicyclists, some of which might be from disadvantaged EJ populations) on I-15, the I-15 interchanges and the I-15 cross streets by making geometric improvements and congestion relief elements. UDOT will improve connectivity to both sides of I-15 by adding new pedestrian and bicyclist crossings of I-15.

The Action Alternative includes new or improved pedestrian and bicyclist facilities at each interchange in the transportation and mobility evaluation area. The improvements (listed in Table 3.6-15, *Action Alternative Pedestrian and Bicyclist Improvements by Location*, in Section 3.6, *Transportation and Mobility*) would meaningfully improve safety and the user experience for pedestrians and bicyclists at all of the existing interchanges in the transportation and mobility evaluation area (200 West in Farmington; Parrish Lane in Centerville; 400 North in Bountiful, and West Bountiful; 500 South in Bountiful, West Bountiful, and Woods Cross; 1100 North/2600 South in North Salt Lake and Woods Cross; 1000 North in Salt Lake City; and 600 North in Salt Lake City). All of these interchanges would include wider, safer facilities that are intended specifically for pedestrians and bicyclist needs. Additional roadway design features, such as signal-controlled turn movements at the interchange terminals and perpendicular intersection designs, would also improve the safety and user experience for pedestrians and bicyclists crossing I-15 at an interchange.

In addition to the improvements at the I-15 interchanges, the Action Alternative would also provide:

- A new 3.8-mile SUP connection between Eagle Ridge Drive in North Salt Lake and Wall Street/ 200 West in Salt Lake City
- Three new grade-separated SUP crossings of I-15 (Centerville Community Park SUP, Centerville 200 North SUP, and North Salt Lake 2600 South SUP).
- One new crossing of I-15 as part of the new road crossings under I-15 at 800 West in Woods Cross
- Improvements to the existing pedestrian and bicyclist facilities crossing I-15 at three locations (State Street in Farmington, Glovers Lane in Farmington, and Center Street in North Salt Lake)
- New, longer bridges at four locations (1600 North/Pages Lane in West Bountiful and Centerville, 1500 South in Woods Cross, Main Street in North Salt Lake, and 300 North in Salt Lake City) that will allow improved pedestrian and bicycle facilities on the local streets
- One new SUP connection to the FrontRunner Woods Cross Station.

In Salt Lake City, the Action Alternative would also provide a benefit to the west-side EJ populations in the Rose Park and Fairpark communities by providing a new collector-distributor design between 600 North and 1000 North. This interchange design would benefit these neighborhoods by allowing full access to and from I-15 at 1000 North, which would reduce traffic on 600 North and other local roads (such as 900 West and 1000 West) for traffic going to or from 600 North.

In Salt Lake City, the Action Alternative would also provide a new, full-access interchange at 2100 North that would have a grade-separated railroad crossing to U.S. 89. This new interchange and grade-separated railroad crossing would be a benefit to the Salt Lake City neighborhoods east of I-15 by reducing overall traffic and industrial truck traffic on both 600 North and U.S. 89/Beck Street.

The Action Alternative would also provide a benefit to EJ populations from the improvements to I-15 and the broader regional transportation network. The predominant transportation mode used in the EIS study area, Salt Lake County, and Davis County is personal vehicles, which are used for about 90% of all transportation trips (WFRC 2019). Similarly, most commuting and other trips undertaken by minority populations and workers below the poverty level also use personal vehicles. The Action Alternative would provide economic benefits in the form or reduced fuel costs, reduced automobile operating costs, reductions in congestion, and improvements to travel times that would be most experienced by service and labor workers. These workers could include low-income and minority populations that live in or adjacent to the EJ evaluation area and use I-15 for commuting or other trips.

Overall, the Action Alternative would be a net benefit to community connectivity and would reduce barriers. The Action Alternative would maintain all existing crossings of I-15 would and be a beneficial improvement to all users. This net benefit would also be considered beneficial from the perspective of cumulative effects on EJ populations since it would help to reduce historic issues in EJ populations related to community connectivity. The beneficial effects of the Action Alternative on community connectivity, transportation, and accessibility for EJ communities would be greater than those on the two counties as whole, since the majority of the proposed improvements are located in neighborhoods considered communities with EJ concerns in Centerville, Bountiful, West Bountiful, Woods Cross, North Salt Lake, and Salt Lake City.

3.4.6.3.2 Action Alternative Impacts Related to Air Quality Issues for EJ Populations

Air quality issues and concerns are multivariate and have been an ongoing issue in Salt Lake City since Mormon pioneers settled in Utah in 1847 (Mitchell and Zajchowski 2022; University of Utah, J. Willard Marriott Library, no date). In addition to the multiple sources of emissions (industry, transportation, and residential and commercial emissions from heating and appliances), the Wasatch Front also has valleys that trap air during winter inversions. In the late 1800s and early 1900s most winter heat was provided by burning wood or charcoal, which produces high rates of particulate matter emissions, carbon monoxide, and other air quality pollutants. Salt Lake City passed its first air quality ordinance in 1893 and has made ongoing efforts, along with the State of Utah, to continue to look at ways to improve air quality, especially during winter inversions.

As summarized in the Utah Division of Air Quality's *2022 Annual Report* (UDAQ 2022), air quality along the Wasatch Front during the winter shows a clear trend of continued improvement over the past two decades, even with the large population and economic growth in the region during this period. The Division also notes that summertime ozone is now the primary air quality concern along the Wasatch Front.

From a historical perspective, the current air quality in Utah is much improved from historical levels, even with a much higher population, and continues to get better due to stricter air quality standards, better industrial and vehicle emission technologies, cleaner-burning fuels, and energy-efficiency measures. Consistent with this recent trend, transportation-related air quality pollutants are projected to continue to decrease in the future due to even-better emissions technologies and fuel efficiency standards (WFRC 2019b).

Air quality in a given area depends on several factors such as the area itself (size, nature of existing development, and topography), the prevailing weather patterns (meteorology and climate), and the pollutants released into the air. All state governments are required to develop a state implementation plan (SIP) for each pollutant for which an area is in nonattainment or maintenance status. The SIP explains how the State will comply with the requirements of the Clean Air Act. The 2019–2050 conforming RTP and transportation improvement program (TIP) include the I-15 project (widening I-15 from five lanes to six lanes in each direction) from Farmington to the Salt Lake County border (2019–2050 RTP project: R-D-45) and other transportation projects.

Regional air quality modeling conducted by WFRC for the 2050 transportation conformity determination (WFRC 2019b) used existing ambient air quality conditions which capture to current air quality conditions in the entire WFRC coverage area (Salt Lake, Davis, Tooele, Weber, and Morgan Counties). The modeling demonstrated that all regionally significant transportation projects, including the I-15 project, would be in compliance with the National Ambient Air Quality Standards (NAAQS).

As described in Section 3.8, *Air Quality*, the Action Alternative would help reduce regional traffic congestion, which would reduce idling emissions. UDOT modeling shows annual on-road emissions of criteria pollutants (with the exception of particulate matter [PM_{10}]) and mobile-source air toxics (MSAT) emissions for the Action Alternative will decrease compared to existing conditions. The expected decrease in emissions is projected to occur even with expected increases in vehicle-miles traveled (VMT) in the project study area due to improved fuel and emissions standards in the future. PM_{10} emissions are expected to increase because of increased road dust emissions, which are projected to increase proportionately with VMT. However, Utah is in a maintenance area for PM_{10} and this minor increase in PM_{10} emissions related to road dust emissions is not anticipated to cause any issues related to the region continuing to meet the NAAQS for PM_{10}. Additionally, the hot-spot analysis conducted for the I-15 project demonstrated that the Action Alternative would not contribute to any new local violations, increase the frequency or severity of any existing violation, or delay timely attainment of the $PM_{2.5}$ or PM_{10} NAAQS. Therefore, the I-15 project meets the conformity rule's hot-spot requirements and would not cause an exceedance of the $PM_{2.5}$ or PM_{10} NAAQS.

UDOT expects that, during construction, air quality would be degraded in the short term from the release of diesel exhaust particulate matter and other emissions from equipment and on-road vehicles powered by gasoline and diesel engines and fugitive dust generated from ground disturbances. Construction activities in the area could temporarily increase traffic congestion and slow the speed of traffic, resulting in a temporary increase in on-road emissions. These emissions would be limited to the immediate area affected by construction-related traffic. There would also be short-term increases in fugitive dust, particulates, and local air pollutant emissions from construction equipment.

Since there would be no temporary or permanent adverse air quality impacts, the Action Alternative would not result in disproportionate adverse air quality effects on EJ populations and would not contribute to additional degradation of air quality in the project study area, including any areas with EJ populations.

As summarized in Section 3.18, *Indirect and Cumulative Effects*, any future air quality sources in the EJ evaluation area would need to apply to the Utah Division of Air Quality for an approval order, which would address compliance with the SIP. Therefore, the I-15 project would not have adverse impacts to air quality and would not contribute to cumulative effects when combined with other reasonably foreseeable projects or

future land use changes. Overall, the forecasted trend of improving air quality should benefit both EJ populations and non-EJ populations.

3.4.6.3.3 Action Alternative Impacts Related to Right-of-Way Impacts in Areas with EJ Populations

Constructing the Action Alternative options would require property acquisitions, which could affect the adjacent EJ populations. UDOT is dedicated to working closely with property owners and officials to minimize any potential negative effects. Each option within the Action Alternative segments would involve full acquisitions and relocations of commercial or residential properties. Although some of the commercial properties and/or businesses might be minority-owned, employ minority or low-income individuals, or serve minority and low-income customers, they are not unique and can be relocated to comparable locations. These impacts would be dispersed throughout the project area and would avoid disproportionate effects on EJ populations. An overview of acquisitions and relocations is provided in Table 3.3-2, *Access Changes with the Action Alternative*, in Section 3.3, *Right-of-way and Relocations*.

The Action Alternative would also result in partial acquisition of residential, commercial, utility, and municipal properties, many of which are located in EJ communities. During the final design process for the Action Alternative, UDOT would explore measures to minimize the need for property acquisition. Properties required for the project would be acquired at fair market values, and relocation assistance would be provided in accordance with federal requirements.

Specific to the Salt Lake City area, there are 2 or 3 commercial relocations and 1 potential commercial relocation. In Salt Lake City, no residential properties are currently anticipated to need to be demolished and considered as relocations from the project. Fourteen residential properties, located on the east side of I-15 between 400 North and 300 North, are identified as potential relocations. These 14 properties are considered potential relocations because they are located close to the existing I-15 retaining wall and potentially could experience adverse construction impacts (due to road closures or construction equipment operating in back yards). All but one of these 14 properties was constructed on surplus property after the last I-15 project in the late 1990s or early 2000s, and none are considered historic properties. UDOT will work with the property owners and renters, if applicable, of these properties through the right-of-way process to minimize impacts during construction and provide fair compensation and/or relocation assistance, if needed, in accordance with federal requirements.

With the Action Alternative, the number of residential and commercial relocations (likely and potential) in communities with EJ concerns, compared to those in the counties as a whole, is about half of all relocations across the EJ evaluation area and the two counties (the reference community). Comparatively, communities of EJ concern are located in more than 70% of the EJ evaluation area; that is, 48 census block groups out of the total of 68 in the EJ evaluation area are considered EJ communities, as shown in Figure 3.4-7 through Figure 3.4-10 above. These communities are located primarily in the north and south segments and adjacent to I-15 where UDOT anticipates construction activity with the Action Alternative.

Because the proportion of anticipated relocations the Action Alternative in EJ communities is lower than the proportion of EJ communities across the EJ evaluation area, and because federal laws require fair compensation for any impacted property owners or renters, no disproportionate adverse effects on EJ populations are anticipated from right-of-way acquisitions and relocations.

3.4.6.3.4 Action Alternative Impacts Related to Noise Impacts in Areas with EJ Populations

The main determinant of noise levels is proximity to the noise source. Therefore, noise impacts from the I-15 project would be similar throughout the noise evaluation area and would be experienced similarly in both EJ and non-EJ areas.

According to Section 3.9, *Noise*, the construction activities for all options would take place in specific locations for short periods as the work progresses. Although some of these improvement areas are located within or close to EJ populations, the majority of typical construction activities fall within the 75-to-85 dBA range at 50 feet. The noise impacts would be temporary and would be experienced in both EJ and non-EJ areas.

To minimize the temporary noise impacts associated with construction, the contractor would comply with all state and local regulations relating to construction noise. This includes adhering to UDOT's 2022 Standard Specification 00555 for nighttime construction work and UDOT's 2017 Special Provision Section 00555M, *Prosecution and Progress*, to reduce the impacts of construction noise on the surrounding community.

Based on the noise analysis in the EIS (see Section 3.9), UDOT determined that the expected noise impacts of the Action Alternative would reasonably predict the cumulative effects analysis for noise, and there would likely not be any significant cumulative noise impacts from other foreseeable future actions. With the proposed mitigation measures, no cumulative effects on EJ populations from noise are anticipated.

3.4.6.3.5 Evaluation of Potential Disproportionate Adverse Effects from the Action Alternative to EJ Populations

As summarized in Section 3.4.4.5, *Environmental Justice and Additional Potentially Burdened Communities*, using various data sources, EJ populations are present in almost all areas of the project study area.

As summarized in Appendix 2A, *Alternatives Development and Screening Report*, the Action Alternative was advanced through the alternatives screening process because it was the concept that met the purpose of and need for the project and would have the fewest impacts to all resources, including areas with EJ populations. Other I-15 mainline options evaluated during the screening process would have wider widths and more impacts to all resources, including areas with EJ populations. When refining the design of the Action Alternative, UDOT also went to substantial effort to avoid and minimize impacts to areas with EJ populations. The best example of this consideration in the design process is in the Salt Lake City segment between 600 North and about 1400 North where the wider I-15 and collector-distributor ramps proposed with the Action Alternative were shifted to the east to avoid impacts to residential areas and Rosewood Park that are located in areas with EJ communities on the west side of I-15.

Because I-15 is an existing facility and the Action Alternative proposes making the same roadway, pedestrian, and bicyclist improvements to the existing I-15 corridor, the benefits and impacts from the Action Alternative would be similar and proportionate for all populations throughout the corridor. The Action Alternative's width and impacts would be similar and proportionate throughout the project study area because the Action Alternative is proposing the same 5 general-purpose (GP) lanes, 1 high-occupancy/toll (HOT) lane, and auxiliary lanes cross section consistently through the project study area. Therefore, the Action Alternative's benefits (roadway, pedestrian, and bicyclist facility improvements), impacted resources (for example, right-of-way, noise, air quality, public parks, etc.), magnitude or severity of impacts, and

proposed mitigation for impacts (for example, noise barriers, right-of-way compensation, etc.) would be the same for all segments regardless of whether there are EJ populations or non-EJ populations.

The differences among the Action Alternative options would be minor and would not have any notable differences in benefits or impacts to areas with EJ populations. No option would be better or have more adverse impacts to areas with EJ populations.

All impacts from the Action Alternative would be strictly a result of the geographic proximity of resources to the existing I-15 roadway. Most impacts from the Action Alternative would be minor and/or could be mitigated. In the context of the broader community, the conditions with the Action Alternative after construction would be similar to the existing conditions given that I-15 already exists.

In locations where the Action Alternative would have impacts to areas with EJ populations, these areas would also receive the benefits of the Action Alternative. In locations where there are impacts to areas with EJ populations, it would not be possible to avoid impacts to areas with EJ populations because the areas with EJ populations are located on both sides of the existing I-15. In other words, there are not situations or locations in the project study area where there would be options to shift the alignment to avoid impacts to EJ populations by impacting non-EJ populations.

As a hypothetical example, it would not be possible to avoid impacts from the Action Alternative to areas with EJ populations in the south segment by proposing more impacts in areas without EJ populations in the north segment. Although this hypothetical example would avoid impacts to the south segment, it would also not meet the purpose of and need for the project, and a wider roadway in the north segment would not provide the benefits of the Action Alternative to the south segment. A reduced number of lanes in the south segment would create a bottleneck with no transportation benefits and more congestion for the EJ populations in this area.

Therefore, there are not any impacts from the Action Alternative, or options in various segments, that are being predominantly borne by EJ populations, or adverse impacts that would be suffered by the EJ populations appreciably more severe or greater in magnitude than the adverse effect that would be suffered by the non-EJ populations. With consideration of avoidance, minimization, and mitigation measures, as well as offsetting benefits, the identified impacts would not have disproportionate adverse effects on minority, low-income, and additionally burdened communities as defined in Section 3.4.

3.4.6.3.6 Summary of Action Alternative Impacts

As discussed in this analysis, the Action Alternative would not result in disproportionate adverse effects on EJ populations or contribute to substantial cumulative effects from the Action Alternative on EJ populations. With consideration of avoidance, minimization, and mitigation measures, as well as offsetting benefits, the identified impacts would not have disproportionate adverse effects on minority, low-income and additionally burdened communities as defined in Section 3.4.4, *Affected Environment: EJ Populations*. The Action Alternative's benefits and impacts to the EJ issues of concern (community cohesion, transportation, and accessibility; air quality; right-of-way; and noise) would be similar throughout the EJ evaluation area, and

any adverse impacts would be proportionate to all of the areas, regardless of whether there are EJ populations in the area or not.

3.4.6.4 Mitigation Measures

Although decision-making relevant to the proposed Action Alternative cannot remedy many of these past transportation and industrial decisions, UDOT intends to continue to work collaboratively with the community to address past impacts to the extent that they are related to I-15 and can be addressed with the current I-15 project. By actively involving the community in the process and considering their feedback, UDOT is committed to working with the community to identify and incorporate those ideas into the project that will have lasting benefits for all members of the community.

3.5 Economic Conditions

3.5.1 Introduction

Section 3.5 describes the economic characteristics in the economic conditions evaluation area and evaluates how those characteristics would be affected by the project alternatives. The economic analysis considers the economic conditions in the areas surrounding the Action Alternative.

Economic Conditions Evaluation Area. The economic conditions evaluation area is located in Davis and Salt Lake Counties. It measures about 18 miles north-south and extends from the U.S. 89/Legacy Parkway/ Park Lane interchange (I-15 milepost 325) in Farmington to the Interstate 80 (I-80) West/400 South interchange (I-15 milepost 308) in Salt Lake City. The economic conditions evaluation area includes the businesses within 0.5 mile of the project footprint. The distance of 0.5 mile was chosen for the economic conditions evaluation area because businesses in this area would be most likely affected by property impacts or indirectly affected by changes in vehicle access and by traffic congestion on I-15 and the interchange cross streets. The economic conditions for Salt Lake City and major cities in Davis County located along the I-15 project are also provided as context for regional economic activity.

3.5.2 Regulatory Setting

Currently, no regulations specify how to evaluate economic impacts in an EIS. FHWA's Technical Advisory T 6640.8A, *Guidance for Preparing and Processing Environmental and Section 4(f) Documents* (FHWA 1987), recommends that the economic analysis, if applicable, should discuss the following impacts:

- The economic impacts on the regional and/or local economy such as development, taxes and public expenditures, employment opportunities, accessibility, and retail sales;
- Impacts on the economic vitality of existing highway-related businesses (for example, gas stations and motels) and the overall local economy; and
- Impacts of the project alternatives on established business districts, and any opportunities to minimize or reduce such impacts by the public and/or private sectors.

3.5.3 Affected Environment

This section describes the regional and local economic conditions in the economic conditions evaluation area.

3.5.3.1 Regional Economic Conditions

This section describes the regional economic conditions related to I-15 as an employment link, a freight link, and city economics in the economic conditions evaluation area.

Employment Link

I-15 is the primary transportation corridor connecting the cities of Farmington, Centerville, West Bountiful, Bountiful, Woods Cross, North Salt Lake, and Salt Lake City. The I-15 project serves as a regional transportation artery, providing these population centers access to major economic employers and centers in the region. The I-15 project provides residents of Davis County access to 2 of Utah's top 10 employers: the University of Utah and Intermountain Health Care (Utah Department of Workforce Services 2021). The primary destinations for commuters travelling south from Davis County on I-15 include areas in downtown Salt Lake City, primarily the LDS Church Office Building, the University of Utah, and Research Park (Fehr & Peers 2022).

The Strong Economy outcome area of UDOT's Quality of Life Framework recognizes the vital role of transportation in business and commerce. I-15 provides Davis County and Salt Lake County access to jobs, education, services, and many other essential needs and supports economic development to improve quality of life (UDOT 2020a).

Freight Link

I-15 is a national freight corridor, and all segments of I-15 located in Davis and Salt Lake Counties carry some of the highest volumes and percentages of freight trips in Utah. In Utah, trucks carry the highest percentage of freight trips by both value and weight when compared to air, water, and rail freight. UDOT anticipates that the amount of freight moved by trucks will increase 73% by value and 37% by weight by 2045 compared to 2015 (UDOT 2017a).

I-15 is a National Highway Freight Network route that provides direct connections to West Coast ports. The 2017 *Utah Freight Plan* (UDOT 2017a) emphasizes the importance of I-15 to national and regional freight trips; summarizes the "Interstate 15 Mobility Alliance" and joint planning among California, Nevada, Arizona, and Utah; and summarizes the development of the *I-15 Corridor System Master Plan Update 2017* (CH2M 2017).

Salt Lake City is a major freight hub due to the presence of Salt Lake City International Airport and major rail lines into and out of the region, I-80, and I-15. As a result, manufacturing and distribution companies have established their western distribution centers in the Salt Lake City–to–Ogden portion of I-15. Additionally, many large trucking firms are either headquartered in this area or maintain large truck terminals here (UDOT 2017a).

The 2017 *Utah Freight Plan* emphasizes the importance of I-15 to national and regional freight trips and lists the I-15 project as a Phase 1 freight project (to be constructed between 2017 and 2024; UDOT 2017a). In 2019, UDOT estimated that truck traffic on I-15 from Park Lane to the I-80 interchange was between 4% and 6% of the total traffic in this segment (UDOT and FHWA 2019).

City Economics

The economic conditions evaluation area includes the cities of Farmington, Centerville, West Bountiful, Bountiful, Woods Cross, and North Salt Lake in Davis County and Salt Lake City in Salt Lake County.

The cities in Davis County have a combined total employment of 61,025 and a combined total population of 124,851. For the majority of cities in this portion of the evaluation area, the major employment sectors are health care/social assistance, educational services, and retail trade. However, in both West Bountiful and North Salt Lake, manufacturing is the largest employment sector. While these cities do offer employment opportunities, the predominant land use on both the east and west sides of I-15 consists of single-family homes and other lower-density housing. The average commute times in these cities range from 20.5 minutes in Woods Cross to 24.9 minutes in West Bountiful. Traffic data patterns show that residents in these cities travel south to Salt Lake County and north to northern Davis County (Layton and Hill Air Force Base) or Weber County for work.

Salt Lake City is Utah's main economic center; in 2023, the total employment in the city was 114,921 and the total population was 199,153 (U.S. Census Bureau 2021). In 2022, the unemployment rate for the city was 2.1%, which was below the national average of 3.9% (U.S. Bureau of Labor Statistics 2023). The largest employment sectors are educational services (14.3%); healthcare and social assistance (12.9%); professional, scientific, and technical services (10.5%); and retail trade (10.5%). Of the cities included in the economic conditions evaluation area, Salt Lake City had the shortest commute time (19.4 minutes), which might suggest that many of the city's residents work in Salt Lake City (ESRI 2022; U.S. Bureau of Labor Statistics 2020; U.S. Census Bureau 2021).

3.5.3.2 Local Economic Conditions

To determine the current economic conditions in the economic conditions evaluation area (defined in Section 3.5.1, *Introduction*, as the businesses within 0.5 mile of the project footprint), UDOT discussed pending and future developments with local economic development officials, reviewed general plans and zoning documents, and conducted a field review of the businesses in the evaluation area. The evaluation area has a variety of businesses that support both local and regional customers. As shown in Figure 3.5-1 and Figure 3.5-2, businesses are generally clustered along major streets transecting and adjacent to I-15, including the I-15/U.S. 89 Interchange in Farmington, Parrish Lane in Centerville, 400 North and 500 South in Bountiful, 1100 North/2600 South and along U.S. 89 in North Salt Lake/Woods Cross, and North Temple in Salt Lake City.

Figure 3.5-1. Commercial Developments in the Economic Conditions Evaluation Area – North Segment

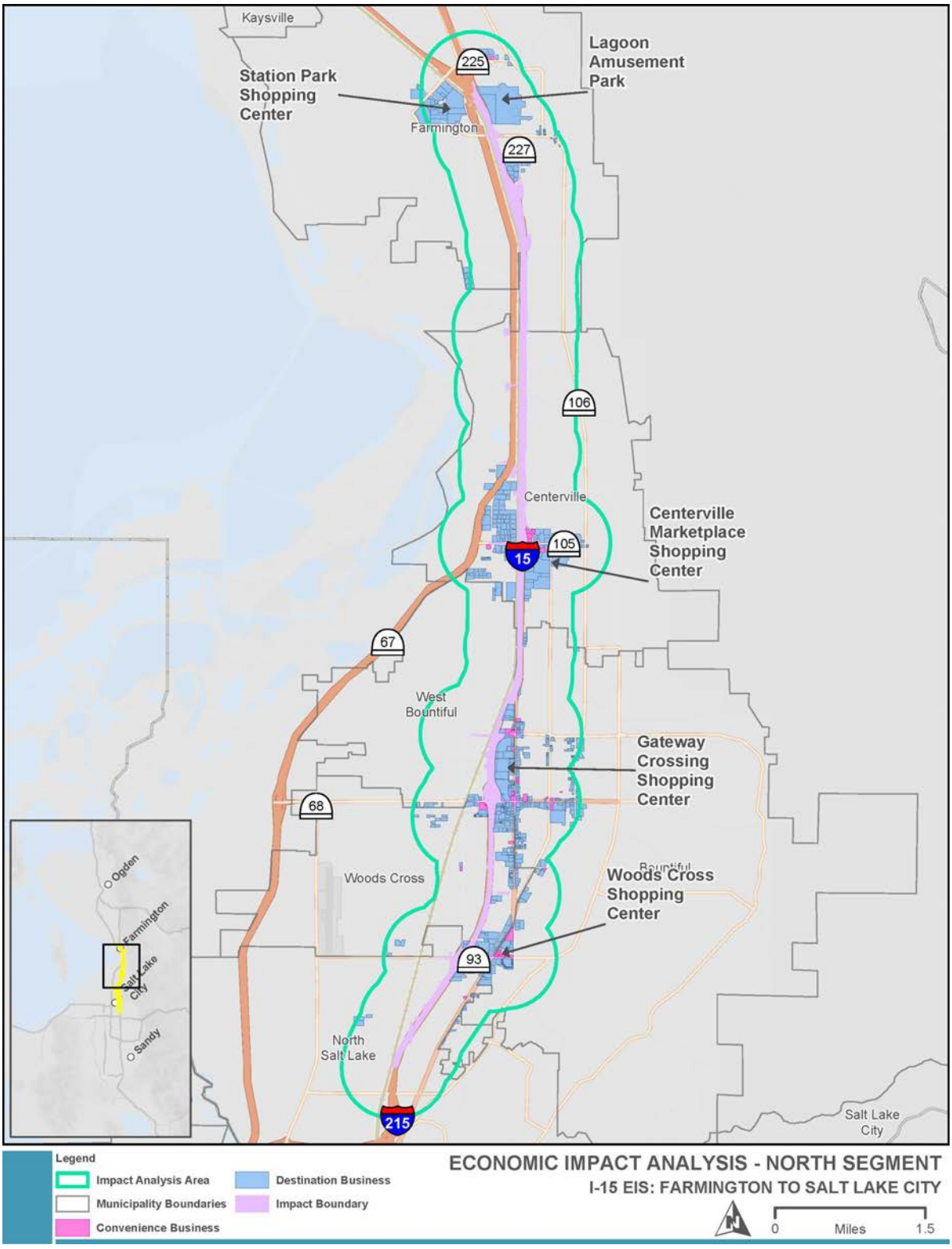
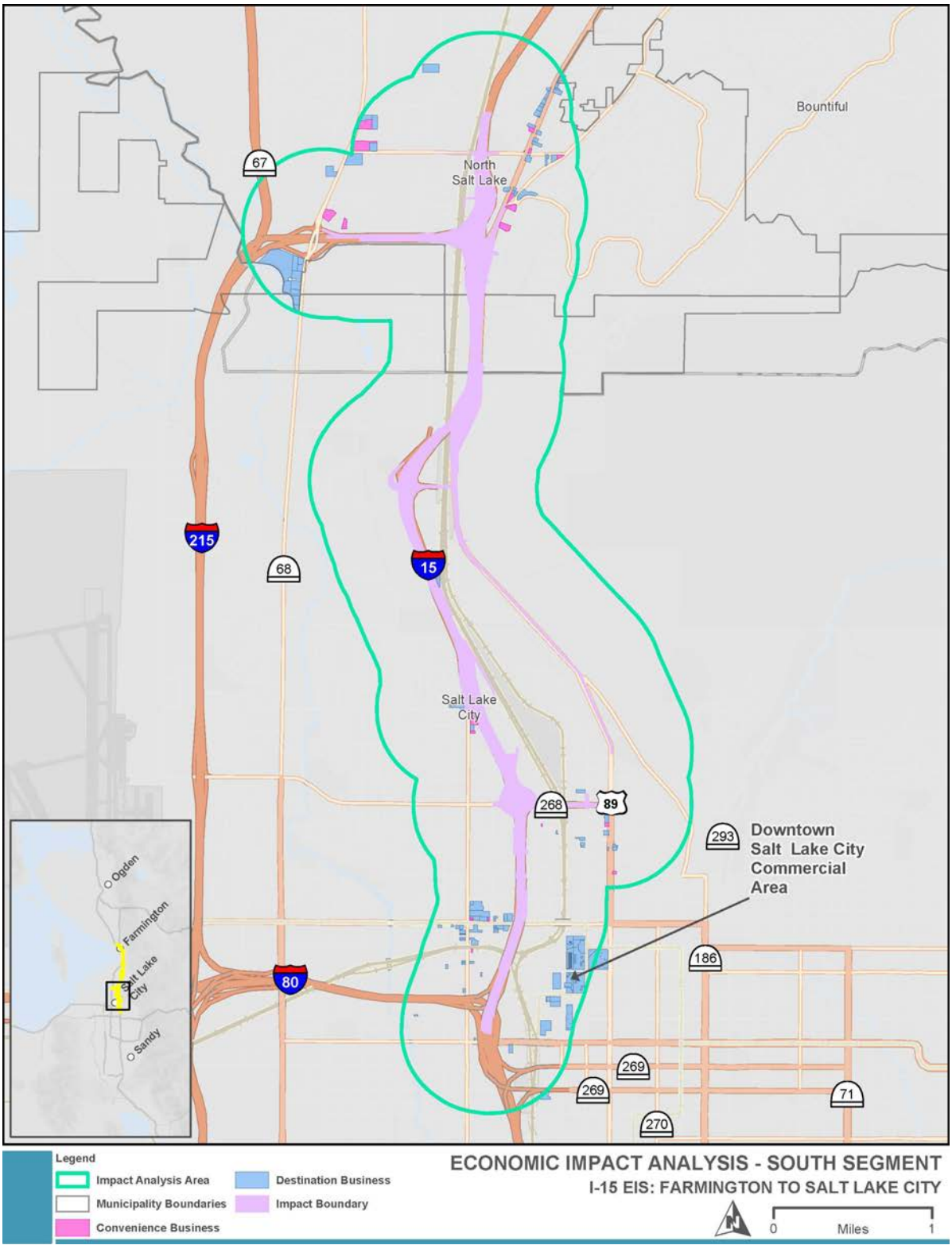


Figure 3.5-2. Commercial Developments in the Economic Conditions Evaluation Area – South Segment



The two main types of private businesses in the economic conditions evaluation area are destination businesses and convenience businesses. This EIS makes this distinction because customers use these types of businesses differently and because most available studies regarding the economic effects of changes in access distinguish between these business types. For purposes of this analysis, industrial businesses were not considered because they would not consistently attract a significant number of daily customers.

- **Destination businesses.** These include businesses that customers plan to visit in advance of their trip. Examples include trucking companies, vehicle repair shops, specialty stores, doctors' or dentists' offices (and most offices), major retailers, insurance agencies, and sit-down restaurants.
- **Convenience businesses.** These include businesses that customers visit more on impulse or when passing by. Examples include convenience stores, gas stations, and fast-food restaurants. Convenience businesses are also referred to as "drive-by" businesses.

The primary destination businesses for traffic travelling on I-15 to Davis County from outside the evaluation area include Lagoon Amusement Park at 375 N. Lagoon Drive and the Station Park Shopping Center and mixed-use development on 140 N. Union Avenue in Farmington. Other major destination businesses in Davis County include shopping centers adjacent to I-15 such as the Centerville Marketplace Shopping Center on 400 West and Parrish Lane in Centerville; the Gateway Crossing Shopping Center on 500 West and 500 South in Bountiful; and the Woods Cross Shopping Center on 618 West 2600 South in Woods Cross. The business destinations for traffic traveling south on I-15 to Salt Lake City include primarily businesses located downtown, such as the City Creek Shopping Center, Temple Square, and the University of Utah located east of downtown.

In both Davis and Salt Lake Counties, convenience businesses are located along major roads directly adjacent to the I-15 interchanges in Farmington, Centerville, Bountiful, Woods Cross, and Salt Lake City.

3.5.3.3 Government Revenues and Tax Services

This section describes the government revenues and tax rates for cities and counties in the economic conditions evaluation area.

3.5.3.3.1 Government Revenues

Revenues for all local governments in Utah are a combination of tax revenues, intergovernmental transfers, and fees. Table 3.5-1 shows the total dollar amounts of property and sales taxes, and the percentage of total government revenue this represents for each city and county included in the economic conditions evaluation area.

Table 3.5-1. Tax Revenues for Cities and Counties in the Economic Conditions Evaluation Area

Jurisdiction (Year)	Tax Revenue and Percent of Total Revenue	
	Property Tax	Sales Tax
Davis County (fiscal year 2021)	$64.9 million, 28%	$31.9 million, 14%
Farmington (fiscal year 2022)	$4.6 million, 12%	$8.2 million, 21%
Centerville (fiscal year 2022)	$2.1 million, 15%	$6.2 million, 44%
West Bountiful (fiscal year 2022)	$1.7 million, 29%	$3 million, 51%
Bountiful (fiscal year 2022)	$4.1 million, 6%	$11.5 million, 16%
Woods Cross (fiscal year 2021)	$2.1 million, 29%	$3.9 million, 54%
North Salt Lake (fiscal year 2022)	$3.1 million, 20%	$6.3 million, 41%
Salt Lake County (fiscal year 2021)	$332.4 million, 25%	$169.3 million, 13%
Salt Lake City (fiscal year 2022)	$136.6 million, 27%	$175.1 million, 35%

Sources: Bountiful City Finance Department 2022; Centerville City Corporation 2022; City of North Salt Lake Finance Department 2022; Davis County Clerk and Auditor's Office 2021; Farmington City Corporation 2022; Keddington & Christensen, LLC 2021; Office of the Utah State Auditor 2022a, 2022b; West Bountiful City 2022

3.5.3.3.2 Tax Rates

Table 3.5-2 shows the property and sales tax rates for each city and county in the economic conditions evaluation area. In 2023, combined[2] sales tax rates were 7.25% for Farmington, Centerville, West Bountiful, Bountiful, Woods Cross, and North Salt Lake; and 7.75% for Salt Lake City. Davis and Salt Lake Counties had sales tax rates of 7.15% and 7.25%, respectively (Utah State Tax Commission 2022, 2023).

The average property tax rate in Davis County was 0.12% in 2022, with property tax for cities ranging from 0.09% in North Salt Lake and Bountiful to 0.13% in Centerville. Salt Lake County had an average property tax rate of 0.13% in 2023, with the average for Salt Lake City being 0.15% (Utah State Tax Commission 2022).

[2] Combined sales tax rate, which can include state, county, city, and district tax rates. For 2023, the Utah state sales tax rate was 4.85%.

Table 3.5-2. Tax Rates in the Economic Conditions Evaluation Area

Jurisdiction	2022 Property Tax Rate[a]	2023 Sales Tax Rate[b]
Davis County	0.12%	7.15%
Farmington	0.12%	7.25%
Centerville	0.13%	7.25%
West Bountiful	0.12%	7.25%
Bountiful	0.09%	7.25%
Woods Cross	0.12%	7.25%
North Salt Lake	0.09%	7.25%
Salt Lake County	0.13%	7.25%
Salt Lake City	0.15%	7.75%

Source: Utah State Tax Commission 2022

[a] Average percent of property's assessed market value.

[b] Combined sales tax rate, which could include state, county, city, and district tax rates. For 2023, the Utah state sales tax rate is 4.85%.

3.5.4 Environmental Consequences and Mitigation Measures

This section discusses the direct impacts and indirect effects of the project alternatives on the economic conditions in the economic conditions evaluation area.

3.5.4.1 Methodology

The evaluation was based on data and information presented in Section 3.5.3, *Affected Environment*. Site visits to the project area, desktop evaluation of the county assessor parcel data, review of aerial photography, and analysis of GIS data were also conducted.

3.5.4.2 No-action Alternative

With the No-action Alternative, the I-15 project would not be implemented, and impacts to traffic congestion and safety conflicts in the project area of I-15 would increase. The No-action Alternative would not require relocating any existing businesses. As a result, there would be no loss to the property tax base and revenues.

Worsening congestion and safety concerns would make it increasingly difficult to access businesses in the regional study area. Travel demand modeling projects that the heavy congestion would occur on I-15 in the northbound and southbound directions during both the morning and evening peak periods. Travel times in 2050 are expected to increase between 30% and 432% during the morning peak period for I-15 southbound travel, resulting in failing operations on I-15 for morning commuters. Travel times in 2050 are projected to increase between 129% and 407% during the evening peak period for I-15 northbound travel.

The congestion that would occur with the No-action Alternative would most likely affect convenience businesses, which customers visit more on impulse or when passing by. During the peak travel periods of the morning and evening commutes, some travelers might avoid convenience businesses in the economic

conditions evaluation area and take other routes with less congestion. Because of the difficulty of entering or exiting a business, this congestion could result in fewer people visiting businesses. As a result, the No-action Alternative could reduce business revenue, sales tax, or employment levels at some convenience businesses in the evaluation area.

The predicted congestion levels with the No-action Alternative could delay local, regional, and national truck travel through this important freight link during the morning and evening commutes. Freight traffic would avoid these congested times or would incur additional travel-related costs such as fuel and longer travel times, which would increase hourly cost.

Davis and Salt Lake Counties are both projected to have large increases in population, employment, and households by 2050. These projected increases are included in WFRC's 2019–2050 RTP and are expected to result in continued increased travel demand on I-15 and its interchanges. Regional economic growth in Davis and Salt Lake Counties would continue, and the rate and patterns of growth would not substantially change with the implementation of the No-action Alternative. However, local economic impacts such as reduction in trips to businesses adjacent to I-15 could result from increased congestion.

3.5.4.3 Action Alternative

3.5.4.3.1 Regional Economic Impacts

As described in Section 3.5.3.1, *Regional Economic Conditions*, I-15 serves as the primary transportation artery connecting population centers in Davis and Salt Lake Counties to major employers in the region. With all options for the Action Alternative, the less-congested conditions on I-15 and through the interchanges would result in shorter travel times when compared to the No-action Alternative. Shorter travel times and easier commutes could result in higher employee retention for businesses and make the area more attractive for new employees due to the easier commute.

Local, regional, and nationwide freight traffic would also benefit from the reduction in travel time with all options during the morning and evening commutes. The reduction in travel time during peak travel periods would provide freight businesses more flexibility with regard to scheduling deliveries and would decrease freight traffic travel times during these periods. These shorter travel times could also translate into reduced fuel and labor costs, making businesses more competitive with companies outside this area.

Overall, the improved mobility resulting from all options would benefit the regional economy.

3.5.4.3.2 Local Economic Impacts

Effects of Construction

With the Action Alternative, construction activities could result in congestion and an increase in travel delays. Due to reduced accessibility, commercial businesses adjacent to construction activities could experience temporary adverse economic impacts.

Several studies conducted in Texas show that the actual impacts experienced by businesses can vary based on the nature of the businesses. Some generalities can be drawn from these studies, including that convenience businesses such as fast-food restaurants and gas stations might experience slightly reduced revenues and that sales rebounded after the construction project was completed. Additionally, the studies

found that opinions of the economic impacts were more pessimistic than the actual, measured impacts (Buffington and Wildenthal 1997a, 1997b).

A follow-up study on the business types that the previous studies had considered the most vulnerable destination businesses (retail other, retail food, retail auto, and services) was conducted by the Center for Transportation Research at the University of Texas at Austin. Similarly, this study found that construction did not substantially affect these types of businesses in the construction area (Buffington and Wildenthal 1998).

Another study conducted by Wisconsin Department of Transportation (1989) found that detours caused by construction led to a decline in total sales ranging from 2% to 17%. The level of impact once again depended on the type of business.

With the Action Alternative, impacts from construction would be experienced primarily by convenience businesses directly accessed from I-15 (such gas stations and fast-food restaurants). Customers might avoid these businesses because the area would be congested and not easily accessible, which might result in a temporary loss in sales. The severity of the impact would depend on the length of construction.

In contrast, a customer who wants to go to a specific business (a destination business such as Station Park State Street) in a construction area would be less likely to avoid the area and select another business because of temporary construction-related congestion. Patrons of these destination businesses would be more likely to travel during off-peak periods to avoid construction delays, and any impacts would be temporary and moderate depending on the length of construction.

Because the construction of the Action Alternative could take several years, construction impacts from poor access or longer travel times would have the greatest effects on convenience businesses and fewer effects on destination businesses.

Effects of Operation

With the Action Alternative, travel times and average speeds would improve compared to the No-action Alternative. Both convenience and destination businesses that use I-15 for access would have an increase in business as a result of the reduction in roadway congestion, which could result in slightly more tax revenue for cities. Overall, the Action Alternative would likely provide economic benefits to businesses as a result of reduced congestion.

3.5.4.3.3 Business Impacts

Table 3.5-3 shows the direct impacts to businesses for each option of the two segments of the Action Alternative. Direct impacts to businesses occur when an existing structure is within the right-of-way of a proposed alternative. UDOT would acquire the entire property, and the business would need to relocate. Direct impacts also include potential relocations, where an existing structure for a business is within 15 feet of the proposed right-of-way or where there could be impacts that would affect the continued use of the property (such as impacts to drive-throughs or parking capacity) and the property might need to be relocated. UDOT would make a final determination about the property during the right-of-way acquisition phase of the project, which would occur shortly before construction.

In addition to properties that would need to be relocated or potentially relocated as described below, UDOT would acquire minor strips of property from businesses. The acquisition of minor strips of property would not affect the viability of any of these businesses and therefore would not reduce local government property tax or sales tax revenue.

Table 3.5-3. Direct Impacts to Businesses from Relocation or Potential Relocation

Business Name	Business Address	Impact Type	Option	
North Segment			Farmington 400 West	Farmington State Street
Taco Bell	311 N. Frontage Road, Centerville	Potential relocation	X	X
Holiday Inn	999 North 500 West, Bountiful	Relocation	X	X
Unsigned business	573 West 550 North, West Bountiful	Relocation	X	X
Sunmart	391 North 500 West, Bountiful	Relocation	X	X
Shell Station	405 North 500 West, Bountiful	Potential relocation	X	X
Shell Station	560 West 500 South, Bountiful	Relocation	X	X
FedEx building (5 businesses in building)	521 West 500 South, Bountiful	Relocation	X	X
MiaBel building (5 businesses in building)	535 West 500 South, Bountiful	Relocation	X	X
KFC	495 South 500 West, Bountiful	Relocation	X	X
TitleMax	426 West 500 South, Bountiful	Relocation	X	X
K-9 Cuts (dog groomer)	1484 South 600 West, Woods Cross	Potential relocation	X	X
Entellus	1470 South 600 West, Woods Cross	Potential relocation	X	X
2 businesses in building	1414 South 600 West, Bountiful	Potential relocation	X	X
Affordable Tax and Accounting	1398 South 600 West, Bountiful	Potential relocation	X	X
IHOP	2487 South 800 West, North Salt Lake	Relocation	X	X
U.S. Bank	1090 North 500 East, North Salt Lake	Potential relocation	X	X
South Segment			Salt Lake City 1000 North – Northern	Salt Lake City 1000 North – Southern
Storage City	211 W. Center Street, North Salt Lake	Potential relocation	X	X
Salt City Inn	1026 North 900 West, Salt Lake City	Relocation	X	—
Lifetime Store	745 N. Warm Springs Road, Salt Lake City	Relocation	X	X
Industrial Heat Treat	430 West 600 North, Salt Lake City	Potential relocation	X	X
Western Telcom	775 N. Warm Springs Road, Salt Lake City	Relocation	X	X

Note: X = direct impact to businesses from relocation or potential relocation; — = no direct impact to business from relocation or potential relocation.

North Segment

The impacts on businesses in the north segment would be the same for both the Farmington 400 West Option and the Farmington State Street Option. Both options would require relocating 9 commercial buildings (with 17 businesses) and potentially relocating 7 commercial buildings (with 8 businesses). The commercial building relocations include two businesses on 500 West in West Bountiful, 1 business on 400 North in West Bountiful, 5 commercial buildings (with 13 businesses) on 500 South, and 1 business on 800 West in Woods Cross. The potential relocations the Taco Bell located at 311 N. Frontage Road in Centerville, a gas station on 400 North in Bountiful, 4 buildings (with 5 businesses) located east of I-15 on 600 West and north of 1500 South, and the U.S. Bank building on 2600 South. See Table 3.5-3 above for the full list.

Potential Impacts due to Changes in Access. Some effects due to changes in access are anticipated with the Action Alternative in the north segment. The Action Alternative would provide similar access as existing conditions for Glovers Lane, Frontage Road, Parrish Lane, Pages Lane, 500 West, and 400 North. The Action Alternative would improve access at 200 West in Farmington by providing a signalized intersection at 200 West and the Frontage Road, which would allow southbound traffic on the Frontage Road to go north on 200 West or continue south on the Frontage Road. These movements are not accommodated with the existing conditions. The Action Alternative would maintain the free movement from northbound I-15 to the northbound Frontage Road. The Action Alternative would also improve access for northbound I-15 traffic accessing 800 West north of Parrish Lane by providing a dedicated underpass to 800 West from the northbound off-ramp, thereby removing the need to go east on Parrish Lane first and then turn left at the 800 West traffic signal.

The Farmington State Street Option would have a new, signalized four-way intersection with the Frontage Road/Lagoon Drive and State Street. This option would improve access to State Street from the Frontage Road/Lagoon Drive but would require travelers on the Frontage Road/Lagoon Drive to go through the new signalized intersection.

There is potential for changes in access to affect properties that access 500 South between I-15 and 500 West with the Action Alternative in the north segment. The Action Alternative would include a raised median on 500 South between I-15 and 500 West. All business accesses on the north and south sides of 500 South in this segment would be right-in and right-out only. Travelers who currently make left turns onto or off of 500 South would be required to make U-turns on 500 South and/or use alternate accesses to or from 500 West with the Action Alternative.

There could be changes in access to businesses at 2600 South/800 West in North Salt Lake and Woods Cross. Table 3.3-2, *Access Changes with the Action Alternative*, in Section 3.3, *Right-of-way and Relocations*, describes these potential changes in access in more detail.

South Segment

Salt Lake City 1000 North – Northern Option Impacts. The Salt Lake City 1000 North – Northern Option would require relocating 3 businesses and potentially relocating 2 businesses. The Salt Lake City 1000 North – Northern Option would have 1 more relocation (the Salt City Inn at 1026 North 900 West) compared to the Salt Lake City 1000 North – Southern Option.

Salt Lake City 1000 North – Southern Option Impacts. The Salt Lake City 1000 North – Southern Option would result in slightly less direct impacts to businesses compared to the Salt Lake City 1000 North – Northern Option because it would not require relocating the Salt City Inn at 1026 North 900 West. This option would require relocating 2 businesses and potentially relocating 2 businesses.

Potential Impacts due to Changes in Access. There could be changes in access to businesses at Center Street in North Salt Lake, I-215, 2100 North in Salt Lake City, Warm Springs Road in Salt Lake City, 900 West/1000 North in Salt Lake City, and 600 North in Salt Lake City. Table 3.3-2, *Access Changes with the Action Alternative*, in Section 3.3, *Right-of-way and Relocations*, describes these potential changes in access in more detail. UDOT does not anticipate that any of these access changes would result in the relocation or potential relocation of any businesses in the south segment.

3.5.4.3.4 Government Revenues and Tax Rates

Local government revenues overall would not be substantially affected by any of the Action Alternative options. UDOT anticipates that the potential loss of business would be a small portion of the total tax revenue for the Cities and would therefore not substantially reduce the Cities' revenue. Although less congestion during the morning and evening commutes could make the area more accessible to business patrons, the increase in revenues would be small compared to the total government revenues in the cities in the economic conditions evaluation area.

Overall, local government revenues would continue to increase at a pace about equal to the community's population and job growth. Property tax revenues and sales tax revenues would continue to be important sources of funds for the communities, and other forms of revenue generation would likely be developed.

3.5.4.3.5 Summary of Action Alternative Impacts

Table 3.5-4 shows a summary of impacts to economic resources from the Action Alternative.

Table 3.5-4. Summary of Impacts to Economic Conditions by Segment and Option

Segment	Option	Impacts to Businesses	
		Relocations	Potential Relocations
North	Farmington 400 West Option	17	8
	Farmington State Street Option	17	8
South	Salt Lake City 1000 North – Northern Option	3	2
	Salt Lake City 1000 North – Southern Option	2	2

(*Continued on next page*)

Table 3.5-4. Summary of Impacts to Economic Conditions by Segment and Option

Segment	Option	Impacts to Businesses	
		Relocations	Potential Relocations
	Minimum impacts (sum of lowest impacts for each segment)	19	10
	Maximum impacts (sum of highest impacts for each segment)	20	10
	Range of impacts	19 to 20	10

3.5.4.4 Mitigation Measures

UDOT proposes to implement mitigation to include the following.

3.5.4.4.1 Construction

To mitigate short-term access and visibility impacts to businesses during construction, a traffic access management plan would be developed and implemented by the construction contractor that maintains public access to impacted businesses during normal business hours. Following completion of the construction phase, UDOT would install appropriate roadway directional signs consistent with UDOT policy.

3.5.4.4.2 Operation

When acquisition of a right-of-way is necessary, it is done in compliance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended. This mitigation measure is discussed in more detail in Section 3.3, *Right-of-way and Relocations*. Compliance with the Act ensures that all persons regardless of race, color, religion, sex, national origin, disability, or age will be fairly and equitably treated.

Mitigation is not provided to local governments that are adversely affected when land is removed from their tax base. Over the long term, property values are expected to increase as a result of improved regional transportation access to businesses. The revenues generated from this would offset any short-term impacts from the I-15 project on local government revenues.

3.6 Transportation and Mobility

3.6.1 Introduction

Section 3.6 discusses the existing travel patterns on and adjacent to I-15 and considers the expected effects of the Action Alternative on these travel patterns. Section 3.6 also describes the existing and planned pedestrian and bicyclist facilities in the transportation and mobility evaluation area and the effects of the project alternatives on pedestrian and bicyclist facilities and movement in the evaluation area. The purpose of the I-15: Farmington to Salt Lake City Project is to provide better mobility for all travel modes and better connect communities along I-15 from Farmington to Salt Lake City. Improving pedestrian and bicyclist connectivity is a project purpose.

Transportation and Mobility Evaluation Area. The transportation and mobility evaluation area includes the roads that connect to or are adjacent to I-15 and could be beneficially or adversely affected by the Action Alternative. The transportation and mobility evaluation area also includes the existing and planned pedestrian and bicyclist facilities that cross over, cross under, or run parallel I-15 from Farmington to Salt Lake City.

3.6.2 Regulatory Setting

Technical Advisory T 6640.8A, *Guidance for Preparing and Processing Environmental and Section 4(f) Documents*, from FHWA (1987) recommends an analysis of travel patterns and accessibility in an EIS.

In addition, when UDOT develops a project, it considers the social and environmental effects of the project, including disruption or destruction of human-made facilities and services. Under 23 USC Section 109(m), if a proposed project would sever an existing major route for nonmotorized traffic, the project must provide a reasonable alternate route for the nonmotorized traffic, or UDOT must show that a reasonable route exists. In addition, UDOT encourages bicycle use on and connecting with its facilities that are suitable for bicycle use. Bicycle facilities or improvements for bicycle transportation are included in UDOT's project development and highway programming processes.

For a detailed discussion of trails that are regulated under Section 4(f) of the Department of Transportation Act of 1966, see Chapter 4, *Section 4(f) Analysis*. For information about other recreation resources, see Section 3.2, *Social Environment*.

3.6.3 Affected Environment

This section describes the existing transportation facilities in the transportation and mobility evaluation area.

3.6.3.1 Roadway System

I-15, the primary north-south interstate highway in Utah, links a large volume of trips going to or from all destinations along the Wasatch Front and within Davis and Salt Lake Counties. I-15 also provides regional connections to Las Vegas, southern California, eastern Idaho, and Montana. I-15 is a critical freight route and supports numerous transit routes. The length of I-15 in the transportation and mobility evaluation area is 16 miles and includes 14 interchanges and several cross streets without connections to I-15. Table 2.4-1, *Action Alternative Interchanges and Crossings*, in Chapter 2, *Alternatives*, lists the interchanges and cross streets.

The need for the project and background on the importance of I-15 are listed in Section 1.2, *Background of the I-15 Project,* and Section 1.3, *Need for the Project*, in Chapter 1, *Purpose and Need*. Mobility and traffic operations on I-15 are in decline and are projected to fail by 2050 without action. For more information, see Section 3.6.4.2, *No-action Alternative*.

3.6.3.2 Existing Pedestrian and Bicyclist Facilities

In Utah, bicycles are considered vehicles and are allowed on roads and road shoulders except where prohibited by state or local ordinances, such as I-15 along the urban Wasatch Front. Bicyclists are prohibited for the entire length of I-15 in the transportation and mobility evaluation area. Existing pedestrian and

bicyclist facilities on cross streets of I-15 are shown in Table 1A-1 and shown in Figure 1A-1 of Appendix 1A, *Purpose and Need Chapter Supplemental Information*. The appendix includes only dedicated facilities on or parallel to roads, but not every location in the evaluation area where pedestrians and bicyclists are legally allowed to travel.

In addition to the facilities listed in Appendix 1A, UDOT analyzed the nonmotorized demand and operations in the evaluation area. UDOT reviewed the location, distance, origin, and destinations of nonmotorized trips as well as demographics of the locations of origins and destinations. A brief summary of this analysis is included in Table 3.6-1. For more information about this analysis and the outreach UDOT conducted, see the *Mobility Memorandum for the I-15 Environmental Impact Statement from Farmington to Salt Lake City* (Horrocks 2022b).

3.6.3.3 Future Pedestrian and Bicyclist Facilities

Several proposed pedestrian and bicyclist facility projects are in adopted city and county plans that would improve active transportation connectivity across the transportation and mobility evaluation area. These proposed improvements have been compiled into the adopted WFRC RTP. Maps and descriptions of these improvements can be referenced through WFRC's website at https://wfrc.org/vision-plans. The evaluation area crosses 28 proposed pedestrian and bicyclist projects listed in WFRC's 2019–2050 RTP.

Table 3.6-1. Summary of Existing Conditions from the Non-Motorized Demand and Operations Analysis

Cross Street	Level of Traffic Stress[a]	Speed Limit (miles per hour)	Top Crossings Used for Pedestrian Trips	Top Crossings Used for Bicycle Trips	Crossings with Safety Concerns
North Segment (Farmington, Centerville, West Bountiful, Bountiful, Woods Cross, and North Salt Lake)					
State Street	4	35	Yes	Yes	—
Glovers Lane	3	35	—	—	—
Parrish Lane	4	35	Yes	Yes	Yes
Pages Lane	1	25	—	—	—
400 North	4	35	—	—	Yes
500 South	3	35	Yes	Yes	Yes
1500 South	1	25	Yes	Yes	—
2600 South	3	35–40	Yes	Yes	—
Main Street	4	25	—	—	—
South Segment (North Salt Lake, Woods Cross, and Salt Lake City)					
Center Street	3	25	—	—	Yes
Beck Street	4	50	—	—	—
900 West	NA	40	—	—	—
600 North	4	35	Yes	Yes	Yes
300 North	2	30	Yes	Yes	—
North Temple	3	30	—	—	—

Source: Horrocks 2022b

[a] Level of traffic stress is defined as: 1 – comfortable for nearly all riders, 2 – comfortable for most adults, 3 – comfortable for confident bicyclists, and 4 – comfortable for only the most confident bicyclists.

3.6.4 Environmental Consequences and Mitigation Measures

This section analyzes how the No-action and Action Alternatives would affect the travel patterns on freeways and arterials (included in WFRC's travel demand model) in the transportation and mobility evaluation area (the effects would be experienced by both motorists and transit users). This section also analyzes the benefits and impacts to pedestrian and bicyclist facilities with the No-action and Action Alternatives.

This section does not specifically address construction-related transportation impacts (see Section 3.17, *Construction Impacts*). However, during construction, there would be increased congestion on roads and on pedestrian and bicyclist facilities depending on the timing and methods of construction. The delays associated with construction would be temporary, and alternate routes to minimize effects on motorists, pedestrians, and bicyclists would be identified with signs.

3.6.4.1 Methodology

To evaluate the No-action and Action Alternatives, UDOT used the following traffic analysis software packages and travel demand model to generate data about delay, congestion, travel time, and vehicle queuing on the road network in the transportation and mobility evaluation area for the future (2050) no-action and action conditions. These models and tools follow the standard of practice set forth by FHWA to analyze traffic. For a detailed methodology, see *IACR Methods and Assumptions Memorandum I-15 EIS; Farmington to Salt Lake City* (Horrocks 2023a).

What is a travel demand model?

A travel demand model is a computer model that predicts the number of transportation trips (travel demand) in an area at a given time. This prediction is based on the expected population, employment, household, and land use conditions in the area. The travel demand model used for the I-15: Farmington to Salt Lake City Project is jointly maintained by WFRC and MAG.

Synchro/SimTraffic (Trafficware/Cubic). Synchro/SimTraffic software, version 11, was used to organize and balance the peak-period traffic counts in the transportation and mobility evaluation area. The software was also used to optimize signal timing for future-year scenarios.

VISSIM (PTV). VISSIM is a microscopic simulation software program used to perform a detailed traffic operations analysis for this study. UDOT used VISSIM version 2021, with service pack 13, for operational analysis. The software has the ability to model complicated intersection geometries and operations in addition to freeway operations. VISSIM was used in this EIS analysis to determine delay, vehicle density, speed, percent of traffic demand served, number of lane changes, vehicle queue lengths, congestion, travel time, and VMT.

Cube (Bentley). Cube software was used to forecast future traffic based on projections of land use, socioeconomic patterns, and transportation system characteristics. Cube software runs the travel demand model described below and is used to calculate daily and peak-period volumes and future demand.

Regional Travel Demand Model. WFRC and the Mountainland Association of Governments (MAG) jointly maintain a regional travel demand forecasting model (the model) for the five-county metropolitan region that includes Box Elder, Weber, Davis, Salt Lake, and Utah Counties. The regional model predicts future travel demand based on projections of land use, socioeconomic patterns, and transportation system characteristics. The model is based on the Cube software (currently using version 6.5.0). The EIS analysis used version 8.3.2 of the regional model (made available on February 4, 2022), which was the most recent official release of the model at the start of the analysis. For more information about the regional travel demand model calibration for the analysis, see the *Mobility Memorandum for the I-15 Environmental Impact Statement from Farmington to Salt Lake City* (Horrocks 2022b).

Using the software and travel demand model described above, UDOT analyzed the 2050 No-action and Action Alternative traffic operations for the following traffic metrics:

Delay and Congestion. Delay and congestion on I-15 adds time to regional and local trips on I-15 and local side streets near interchanges. Average vehicle delay was calculated using VISSIM for the I-15 mainline, interchanges, and arterials. UDOT analyzed network delay in the transportation and mobility evaluation area using the travel demand model. Congestion is represented by a three-tier system ranging from minimal congestion for excellent conditions (free-flowing traffic and little delay) to heavy congestion for failure conditions (extremely congested, stop-and-go traffic and excessive delay). Moderate congestion is intermediate traffic conditions between minimal and heavy congestion.

Vehicle Queuing. The vehicle queue length is the length of a line of vehicles backed up waiting to get through an intersection, similar to those intersections at the ends of off-ramps of I-15. Vehicle queues at intersections form as the result of heavy traffic volumes and can affect traffic operations and safety because vehicles back up onto the I-15 mainline from interchange ramps. Vehicle queue lengths were computed for the I-15 off-ramps using VISSIM.

Travel Time. Vehicle travel times were measured throughout the VISSIM network and collected for each of the arterial corridors for existing (2019) and 2050 conditions. These measures were calculated for the morning and evening peak periods.

Impacts to Pedestrian and Bicyclist Facilities. To assess the expected impacts to pedestrian and bicyclist facilities from the Action Alternative, UDOT used data in GIS format to identify the pedestrian and bicyclist facilities intersected or affected by the Action Alternative's improvements. The GIS data include city, county, and WFRC data for existing and planned pedestrian and bicyclist facilities. Aerial images were also reviewed to confirm existing pedestrian and bicyclist facilities.

What are peak periods?

The peak periods for the I-15 project represent the 4-hour periods during the morning and evening during which travel demand is highest. The morning peak period occurred between 6 AM and 10 AM, and the evening peak period occurred between 3 PM and 7 PM. The I-15 peak periods were determined by reviewing traffic data from 2019 and 2021. For information regarding why 2019 data are used for this EIS, see Section 1.3.4.1.2, *Impact of COVID-19 on Traffic Data*, in Chapter 1, *Purpose and Need*.

3.6.4.2 No-action Alternative

With the No-action Alternative, the changes associated with the I-15: Farmington to Salt Lake City Project would not be made. I-15 lane geometry would remain in its existing configuration. Future traffic operations would reach failing conditions for all metrics analyzed under no-action conditions. In addition, the operational and safety deficiencies and aging infrastructure described in Chapter 1, *Purpose and Need*, would not be corrected. The traffic measures for the No-action Alternative are included in the tables below for comparison with the Action Alternative.

3.6.4.2.1 Delay and Congestion

Delay and congestion on I-15 add time to regional and local trips on I-15 and local side streets near interchanges. UDOT analyzed network delay in the needs assessment study area (defined in Section 1.1.3, *Description of the Needs Assessment Study Area and Logical Termini*), in Chapter 1, *Purpose and Need*. The I-15 EIS *Existing and No-action Traffic Operations Analysis Technical Memorandum* (Horrocks 2022a) shows that daily hours of network delay during both the morning and evening peak periods is projected to increase more than 1,300% under the no-action conditions in 2050 compared to 2019 (Table 3.6-2).

Table 3.6-2. Existing (2019) and 2050 No-action Network Daily Delay

AM			PM		
2019 Delay (hours)	2050 Delay (hours)	Percent Increase	2019 Delay (hours)	2050 Delay (hours)	Percent Increase
2,409	36,782	1,427%	2,910	42,500	1,360%

Source: Horrocks 2022a

3.6.4.2.2 Travel Times

UDOT modeled the existing (2019) and 2050 no-action conditions for peak morning and evening travel times on I-15. Travel times in 2050 are expected to increase between 30% and 432% during the morning peak period for I-15 southbound travel, resulting in failing operations on I-15 for morning commuters. Travel times in 2050 are projected to increase between 129% and 407% during the evening peak period for I-15 northbound travel (Table 3.6-3).

Table 3.6-3. Comparison of I-15 Mainline Travel Time between Farmington and Salt Lake City (2019 and 2050)

Times during the AM and PM Peak Periods	Existing (2019) Travel Time (minutes)	2050 No-action Travel Time (minutes)	Percent Change
Southbound			
6:00 AM	15.9	20.6	30%
7:00 AM	19.2	41.6	117%
8:00 AM	19.1	69.1	262%
9:00 AM	16.7	88.9	432%
Northbound			
3:00 PM	16.5	37.8	129%
4:00 PM	20.6	64.5	213%
5:00 PM	23.6	78.1	231%
6:00 PM	16.6	84.2	407%

Source: Horrocks 2022a

3.6.4.2.3 Vehicle Queuing and Deceleration Lengths

Vehicle queue length and deceleration length are interrelated and affect traffic operations and safety. Deceleration length is the length needed for vehicles exiting a road to safely decelerate or stop before an intersection at the end of an off-ramp. During periods of traffic congestion, if a vehicle queue length exceeds the ramp length, there is not enough room (or length) for vehicles to safely decelerate when exiting an interstate or other high-speed road.

Several locations in the transportation and mobility evaluation area have worsening operational issues for the I-15 mainline for vehicle queue lengths and ramp deceleration lengths. These issues include locations where traffic volumes exceed capacity of the interchange and traffic can back onto the I-15 mainline, which is a safety concern because of the high travel speeds on the I-15 mainline. See the *Mobility Memorandum for the I-15 Environmental Impact Statement from Farmington to Salt Lake City* (Horrocks 2022b) for more information regarding existing vehicle queue characteristics.

What is the 95th-percentile vehicle queue length?

The vehicle queue length is the length of a line of vehicles backed up waiting to get through an intersection, like those found at the end of off-ramps for I-15. The 95th-percentile vehicle queue length is the vehicle queue length in feet that should not be exceeded in 95% of the operational periods based on predicted traffic volumes. In 5% of the operational periods, the vehicle queues will extend longer than this distance.

In 2050, under the no-action conditions, the 95th-percentile vehicle queue lengths are expected to extend back into the I-15 mainline at the 600 North, 2600 South, 500 South, 400 North, and Parrish Lane interchanges and the Center Street southbound off-ramp during peak travel periods (see Horrocks 2022a and Appendix 3D, *Alternatives Operations Analysis Memo*, of this EIS). See Table 3.6-14, *Vehicle Queuing and Deceleration Lengths for the Action Alternative*, on page 3-97.

3.6.4.2.4 Impacts to Pedestrian and Bicyclist Facilities

The No-action Alternative would not meet the purpose of the project because it would not provide better mobility for all travel modes and better connect communities along I-15 from Farmington to Salt Lake City. With the No-action Alternative, mainline I-15 and its interchanges would be maintained in the current configurations, and UDOT would conduct only necessary maintenance. The pedestrian and bicyclist improvements described in Section 3.6.4.3.6, *Impacts to Pedestrian and Bicyclist Facilities*, would not be made, and the benefits of these improvements would not be available to the pedestrians and bicyclists in the transportation and mobility evaluation area.

Existing Facilities

The existing pedestrian and bicyclist facilities in the transportation and mobility evaluation area would continue to operate similarly to the existing conditions. These existing conditions include narrow and disconnected pedestrian and bicyclist facilities that would not be improved through the elements of the Action Alternative that are listed in Table 3.6-15, *Action Alternative Pedestrian and Bicyclist Improvements by Location*, on page 3-100.

Future Facilities

The future facilities identified in WFRC's 2019–2050 RTP would be completed when funding becomes available.

3.6.4.3 Action Alternative

With the Action Alternative, an additional travel lane would be added in each direction of I-15 between Farmington and Salt Lake City, and numerous improvements would be made at each interchange and at most cross streets. A full description of the Action Alternative by location is provided in Section 2.4.2, *Action Alternative*, in Chapter 2, *Alternatives*. The Action Alternative is projected to improve delay, congestion, travel times, and traffic operation characteristics such as vehicle queuing in all locations of the transportation and mobility evaluation area.

3.6.4.3.1 Delay and Congestion

The Action Alternative would reduce delay and congestion during the morning and evening peak periods compared to the No-action Alternative. Based on results from the travel demand model, daily network delay on roads in the vicinity of the Action Alternative and including the Action Alternative (I-15, I-215, U.S. 89, Legacy Parkway, and connecting arterial roads) would be greatly reduced compared to the 2050 no-action conditions. With the Action Alternative, daily network-wide delay, as reported in the travel demand model, would be reduced from 95,000 hours to 50,000 hours, a 47% reduction in delay (Horrocks 2022a).

At the local level, the main arterials and interchanges reconstructed as part of the Action Alternative would also experience a reduction in delay and congestion. These measures are summarized below by segment.

North Segment Impacts

The north segment options, the Farmington 400 West Option and the Farmington State Street Option, were analyzed for delay and congestion in five portions. Table 3.6-4 includes the delay for the northern half of the north segment from State Street to 200 West in Farmington. Both the Farmington 400 West Option and the Farmington State Street Option would operate similarly, improving the poor, congested conditions observed during the evening peak period at Frontage Road at 200 West and at Glovers Lane.

Table 3.6-4. North Segment Options Delay and Congestion for State Street to 200 West[a]

Intersection	No-action (2050)				Farmington 400 West Option[b]				Farmington State Street Option[b]			
	AM Delay (sec)	AM Cgstn	PM Delay (sec)	PM Cgstn	AM Delay (sec)	AM Cgstn	PM Delay (sec)	PM Cgstn	AM Delay (sec)	AM Cgstn	PM Delay (sec)	PM Cgstn
Frontage Rd at 200 W	10.7	Min	120.7	Hvy	5.8	Min	5.8	Min	5.4	Min	6.0	Min
W Glovers Ln at Farmington High School	9.9	Min	8.9	Min	9.5	Min	9.0	Min	10.0	Min	9.3	Min
W Glovers Ln at Frontage Rd	11.1	Min	37.1	Mod	10.3	Min	18.2	Min	10.5	Min	18.7	Min
W Glovers Ln at 650 W	27.5	Min	29.5	Min	18.4	Min	23.0	Min	19.2	Min	23.0	Min
400 W at W State	—	—	—	—	5.4	Min	8.5	Min	13.7	Min	18.0	Min
400 W & Lagoon Dr	—	—	—	—	5.5	Min	9.9	Min	—	—	—	—

Source: Appendix 3D, *Alternatives Operations Analysis Memo*

[a] Delay is measured as per vehicle in seconds. The color coding shows results by measure: green is minimal congestion (Min), yellow is moderate congestion (Mod), and red is heavy congestion (Hvy).

[b] These options include State Street and 200 West. Parrish Lane is reviewed separately in Table 3.6-5 below.

Table 3.6-5 shows the delay for the Parrish Lane interchange in Centerville. The Action Alternative is the same at Parrish Lane for both the Farmington 400 West Option and the Farmington State Street Option. The Action Alternative would substantially reduce delay and congestion on Parrish Lane compared to the No-action Alternative during both the morning and evening peak periods.

Table 3.6-5. North Segment Options Delay and Congestion for the Parrish Lane Interchange[a]

Intersection	No-action (2050)[a]				Parrish Lane[b]			
	AM Delay (sec)	AM Cgstn	PM Delay (sec)	PM Cgstn	AM Delay (sec)	AM Cgstn	PM Delay (sec)	PM Cgstn
Bypass at 800 W	—	—	—	—	5.1	Min	12.7	Min
Marketplace Dr at 700 W	—	—	—	—	0.0	Min	0.0	Min
Parrish Ln at S.R. 67 SB ramps	23.4	Min	15.9	Min	16.5	Min	14.5	Min
Parrish Ln at S.R. 67 NB ramps	225.8	Hvy	21.5	Mod[c]	24.3	Min	15.5	Min
Parrish Ln at (NB) 700 W	67.1	Hvy	272.1	Hvy	18.5	Min	16.9	Min
Parrish Ln at I-15 SB ramps	76.3	Hvy	165.0	Hvy	28.6	Min	30.6	Min
Parrish Ln at I-15 NB ramps	12.0	Min	59.1	Hvy	28.6	Min	30.6	Min
Parrish Ln at Marketplace Dr	15.1	Min	52.0	Mod	16.4	Min	27.4	Min
Parrish Ln at 400 W	14.4	Min	50.4	Mod	18.6	Min	29.8	Min
Parrish Ln at 1250 W	24.7	Min	42.0	Mod	24.6	Min	39.7	Mod

Source: Appendix 3D, *Alternatives Operations Analysis Memo*

[a] Delay is measured as per vehicle in seconds. The color coding shows results by measure: green is minimal congestion (Min), yellow is moderate congestion (Mod), and red is heavy congestion (Hvy).

[b] Parrish Lane is the same for both north segment options. Both options for State Street to 200 West are reviewed separately in Table 3.6-4 above.

[c] This unsignalized intersection has different thresholds for congestion. In this case, moderate congestion is acceptable.

Table 3.6-6 shows the delay for 400 North interchange in Bountiful. The Action Alternative is the same at 400 North for both the Farmington 400 West Option and the Farmington State Street Option. The delay and congestion for the Action Alternative at 400 North is comparable to that with the No-action Alternative during the morning peak period; however, during the evening peak period, the Action Alternative would be a beneficial improvement over the No-action Alternative at 400 North.

Table 3.6-6. North Segment Options Delay and Congestion for the 400 North Interchange[a]

Intersection	No-action (2050)[a]				Bountiful 400 North			
	AM Delay (sec)	AM Cgstn	PM Delay (sec)	PM Cgstn	AM Delay (sec)	AM Cgstn	PM Delay (sec)	PM Cgstn
400 N at 800 W	9.5	Min	20.2	Min	12.0	Min	15.1	Min
400 N at 660 W Access	7.6	Min	7.8	Min	7.8	Min	8.0	Min
400 N at 660 W	0.0	Min	6.0	Min	6.2	Min	6.2	Min
400 N at I-15 ramp	12.3	Min	89.7	Hvy	14.0	Min	20.5	Min
400 N at U.S. 89	82.4	Hvy	223.2	Hvy	34.1	Min	41.1	Mod

Source: Appendix 3D, *Alternatives Operations Analysis Memo*

[a] Delay is measured as per vehicle in seconds. The color coding shows results by measure: green is minimal congestion (Min), yellow is moderate congestion (Mod), and red is heavy congestion (Hvy).

Table 3.6-7 shows the delay for 500 South interchange in Bountiful. The Action Alternative is the same at 500 South for both the Farmington 400 West Option and the Farmington State Street Option. The delay and congestion for the Action Alternative at 500 South would be an improvement compared to the No-action Alternative during the morning peak period and would be greatly improved compared to the No-action Alternative during the evening peak period. (In Table 3.6-7, a DDI is a diverging diamond interchange.)

Table 3.6-7. North Segment Options Delay and Congestion for the 500 South Interchange[a]

Intersection	No-action (2050)[a]				Bountiful 500 South			
	AM Delay (sec)	AM Cgstn	PM Delay (sec)	PM Cgstn	AM Delay (sec)	AM Cgstn	PM Delay (sec)	PM Cgstn
500 S at 800 W	7.4	Min	219.4	Hvy	7.9	Min	7.9	Min
500 S at 700 W	11.2	Min	466.1	Hvy	9.7	Min	14.4	Min
U.S. 89 at 1000 N	53.0	Mod	103.1	Hvy	10.4	Min	14.6	Min
500 S at I-15 DDI	24.9	Min	95.7	Hvy	36.8	Mod	36.6	Mod
500 S at U.S. 89	28.9	Min	176.8	Hvy	36.4	Mod	54.6	Mod

Source: Appendix 3D, *Alternatives Operations Analysis Memo*

[a] Delay is measured as per vehicle in seconds. The color coding shows results by measure: green is minimal congestion (Min), yellow is moderate congestion (Mod), and red is heavy congestion (Hvy).

Table 3.6-8 shows the delay and congestion for the northern extent of the south segment options at the 2600 South interchange in Woods Cross. The Action Alternative is the same at 2600 South for both the Farmington 400 West Option and the Farmington State Street Option The delay and congestion for the Action Alternative in the south segment is comparable with the No-action Alternative during the morning peak period; however, during the evening peak period, the Action Alternative would be greatly improved compared to the No-action Alternative at 2600 South. With the Action Alternative, the 2600 South and U.S. 89 intersection would experience less delay compared to the No-action Alternative, but UDOT expects it to experience congested conditions during the morning and afternoon peak travel times as a result of heavy traffic on all four approaches coupled with a single northbound left-turn lane serving a heavy traffic movement.

Table 3.6-8. North Segment Options Delay and Congestion for 2600 South Interchange[a]

Intersection	No-action (2050)[a]				2600 South[b]			
	AM Delay (sec)	AM Cgstn	PM Delay (sec)	PM Cgstn	AM Delay (sec)	AM Cgstn	PM Delay (sec)	PM Cgstn
2600 S at 1100 W	16.4	Min	82.9	Hvy	14.3	Min	14.4	Min
2600 S at Overland Rd	9.1	Min	11.7	Min	9.5	Min	9.8	Min
2600 S at Wildcat Way	23.3	Min	64.3	Hvy	22.1	Min	33.9	Min
2600 S at U.S. 89	100.1	Hvy	140.0	Hvy	60.5	Hvy	75.6	Hvy
2600 S at 800 W	18.5	Min	26.9	Min	27.9	Min	28.9	Min
2600 S at I-15 NB Ramps	21.9	Min	125.2	Hvy	27.9	Min	28.9	Min
Wildcat Way/625 W & 800 W/2500 S	—	—	—	—	7.2	Min	11.1	Min

Source: Appendix 3D, *Alternatives Operations Analysis Memo*

[a] Delay is measured as per vehicle in seconds. The color coding shows results by measure: green is minimal congestion (Min), yellow is moderate congestion (Mod), and red is heavy congestion (Hvy).

[b] 2600 South is the same for both south segment options.

South Segment Impacts

The south segment options, Salt Lake City 1000 North – Northern Option and Salt Lake City 1000 North – Southern Option, were analyzed for delay and congestion in three portions. Table 3.6-9 shows the delay and congestion for the I-215 interchange area in North Salt Lake. The delay and congestion for the Action Alternative in the south segment is comparable with the No-action Alternative at the I-215 interchange.

Table 3.6-9. South Segment Options Delay and Congestion for I-215 Interchange[a]

Intersection	No-action (2050)[a]				I-215[b]			
	AM Delay (sec)	AM Cgstn	PM Delay (sec)	PM Cgstn	AM Delay (sec)	AM Cgstn	PM Delay (sec)	PM Cgstn
Center St at Main St	20.2	Min	23.7	Min	23.6	Min	21.7	Min
U.S. 89 at Main St	8.7	Min	11.2	Min	9.4	Min	9.4	Min
U.S. 89 at Eagle Gate Dr	8.9	Min	10.9	Min	10.4	Min	13.3	Min
U.S. 89 at Eagle Ridge Dr	26.7	Min	16.5	Min	16.2	Min	16.8	Min
U.S. 89 at Center St	18.9	Min	22.0	Min	19.0	Min	17.6	Min
U.S. 89 at I-215	—	—	—	—	17.4	Min	22.1	Min
I-15 at I-215	—	—	—	—	17.3	Min	25.9	Min

Source: Appendix 3D, *Alternatives Operations Analysis Memo*

[a] Delay is measured as per vehicle in seconds. The color coding shows results by measure: green is minimal congestion (Min), yellow is moderate congestion (Mod), and red is heavy congestion (Hvy).

[b] I-215 is the same for both south segment options.

Table 3.6-10 shows the delay and congestion for the southern extent of the south segment from 2100 North to 600 North in Salt Lake City. Although some intersections would operate better with the Northern Option, the 600 North interchange would operate better with the Southern Option. The ramps at this location could affect I-15 mainline operations if vehicle queuing is too heavy and vehicles are backing onto I-15; therefore, UDOT prefers the Southern Option. The new interchanges at 1000 North and 2100 North in Salt Lake City would operate well with both options.

Table 3.6-10. South Segment Options Delay and Congestion for 2100 North to 600 North[a]

Intersection	No-action (2050)[a]				Salt Lake City 1000 North – Northern Option[b]				Salt Lake City 1000 North – Southern Option[b]			
	AM Delay (sec)	AM Cgstn	PM Delay (sec)	PM Cgstn	AM Delay (sec)	AM Cgstn	PM Delay (sec)	PM Cgstn	AM Delay (sec)	AM Cgstn	PM Delay (sec)	PM Cgstn
600 N at 8th W	10.1	Min	6.4	Min	12.5	Min	9.8	Min	10.9	Min	8.8	Min
600 N at 900 W	15.6	Min	24.0	Min	20.0	Min	24.9	Min	19.0	Min	31.2	Min
600 N at 300 W	111.3	Hvy	100.2	Hvy	37.8	Mod	51.9	Mod	39.3	Mod	57.4	Hvy
600 N at 400 W	108.1	Hvy	44.0	Mod	25.2	Min	60.7	Hvy	24.2	Min	53.5	Mod
Beck St at N Chicago St	15.0	Min	13.1	Min	22.0	Min	25.2	Min	22.5	Min	27.6	Min
600 N at I-15	46.9	Mod	41.6	Mod	60.0	Hvy	48.5	Mod	46.8	Mod	49.0	Mod
900 W at 1000 N	22.6	Min	99.5	Hvy	10.3	Min	14.7	Min	14.3	Min	20.8	Min
1000 N at I-15	—	—	—	—	20.2	Min	25.9	Mod	17.3	Min	36.0	Mod
2100 N at Beck St	—	—	—	—	15.9	Min	15.7	Min	15.8	Min	15.7	Min
2100 N at I-15	—	—	—	—	36.7	Mod	33.8	Min	33.3	Min	27.4	Min

Source: Appendix 3D, *Alternatives Operations Analysis Memo*

[a] Delay is measured as per vehicle in seconds. The color coding shows results by measure: green is minimal congestion (Min), yellow is moderate congestion (Mod), and red is heavy congestion (Hvy).

[b] These options include 2100 North, 1000 North, and 600 North.

3.6.4.3.2 Travel Time

The Action Alternative would lower travel times compared to the No-action Alternative; however, the Action Alternative would still have some congestion and would not result in free-flow traffic at all locations and at all times of day.

Travel times were measured on I-15 for 2050 No-action Alternative and design 2050 Action Alternative conditions during morning and evening peak travel times. The results of the morning travel time comparison for I-15 southbound is shown in Table 3.6-11.

Table 3.6-11. I-15 Southbound Mainline Travel Time Comparison

I-15 Southbound Period	2050 No-action Travel Time (minutes)	2050 Action Travel Time (minutes)	Percent Change
6:00 AM	20.6	16.6	–19%
7:00 AM	41.6	18.5	–55%
8:00 AM	69.1	20.8	–70%
9:00 AM	88.9	16.9	–81%

Source: Appendix 3D, *Alternatives Operations Analysis Memo*

As shown above in Table 3.6-11, travel times on I-15 are expected to decrease by more than half during most of the 4-hour morning commute period with the Action Alternative. The results of the evening travel time comparison for I-15 northbound are shown in Table 3.6-12.

Table 3.6-12. I-15 Northbound Mainline Travel Time Comparison

I-15 Southbound Period	2050 No-action Travel Time (minutes)	2050 Action Travel Time (minutes)	Percent Change
3:00 PM	37.8	18.2	–52%
4:00 PM	64.5	27.4	–57%
5:00 PM	78.1	41.8	–46%
6:00 PM	84.2	40.5	–52%

Source: Appendix 3D, *Alternatives Operations Analysis Memo*

As shown above in Table 3.6-12, travel times on I-15 are expected to decrease by more than half during most of the 4-hour evening commute period with the Action Alternative.

The main arterials and interchanges that would be reconstructed as part of the Action Alternative would also experience an improvement (decrease) in travel times compared to the No-action Alternative. These measures are summarized by arterial in Table 3.6-13. Both the Salt Lake City 1000 North – Northern Option and the Salt Lake City 1000 North – Southern Option would increase travel times on 600 North due to increased capacity at the 300 West and 600 North intersection, which would result in more westbound traffic on 600 North.

Table 3.6-13. Travel Times for the Action Alternative

Street	Direction	No-action (2050)[a] Travel Time (minutes)		Action Alternative Travel Time (minutes)		Percent Change	
		AM	PM	AM	PM	AM	PM
Parrish Lane – Eastbound travel measured from S.R. 67 to 400 West, westbound travel from Main Street to S.R. 67 on-ramp							
Parrish Lane	Eastbound	9.1	9.9	2.8	3.3	–69%	–67%
	Westbound	4.0	11.1	3.5	4.5	–12%	–60%
400 North – Eastbound travel measured from 900 West to U.S. 89, westbound from 200 West to 800 West							
400 North	Eastbound	2.4	3.6	2.3	2.9	–2%	–19%
	Westbound	3.0	9.3	2.4	2.5	–20%	–73%
500 South – Eastbound travel measured from 1100 West to U.S. 89, westbound from 200 West to 800 West							
500 South	Eastbound	3.0	3.7	2.6	3.0	–13%	–17%
	Westbound	6.8	6.6	2.7	3.2	–60%	–51%
2600 South – Eastbound travel measured from 1250 West to U.S. 89, westbound from 500 West to 1100 West							
2600 South	Eastbound	4.5	7.4	3.3	4.2	–26%	–43%
	Westbound	5.0	9.7	4.5	5.3	–9%	–45%
600 North – Eastbound travel measured from 1300 West to 300 West, westbound from Wall Avenue to 1000 West							
600 North[b]	Eastbound	9.0	6.2	5.7	5.8	–36%	–8%
	Westbound	4.7	4.4	5.1	5.8	+7%	+32%
600 North[c]	Eastbound	9.0	6.2	5.3	5.9	–41%	–5%
	Westbound	4.7	4.4	5.2	6.8	+10%	+57%

Source: Appendix 3D, *Alternatives Operations Analysis Memo*

[a] Travel time is measured as average per vehicle in minutes.

[b] This is the travel time for the Salt Lake City 1000 North – Northern Option at 600 North.

[c] This is the travel time for the Salt Lake City 1000 North – Southern Option at 600 North.

3.6.4.3.3 Vehicle Queuing and Deceleration Lengths

When vehicle queue lengths exceed ramp deceleration lengths due to traffic congestion, traffic operations and safety issues arise because vehicles stop on the mainline of I-15. The Action Alternative would improve vehicle queuing and deceleration lengths for all off-ramps compared to the No-action Alternative. The No-action Alternative vehicle queue lengths are described in the *Mobility Memorandum* (Horrocks 2022b). Table 3.6-14 shows the vehicle queue lengths and deceleration lengths at I-15 off-ramps at arterials in the transportation and mobility evaluation area. Acceptable vehicle queue lengths and deceleration lengths on off-ramps increase safety for travelers and improve the traffic operations of the I-15 mainline.

For example, at Parrish Lane with the No-action Alternative, the 95th-percentile vehicle queue length during the afternoon peak period would be 3,883 feet, which is much longer than the existing 1,218-foot ramp length available for vehicles. This vehicle queue length would cause traffic to back onto mainline I-15. By comparison, at Parrish Lane with the Action Alternative, the 95th-percentile vehicle queue length during the afternoon peak period would be 583 feet, which is much shorter than the proposed 1,370-foot ramp length. With the Action Alternative, no vehicles would back onto mainline I-15 in the 95th-percentile conditions.

Table 3.6-14. Vehicle Queuing and Deceleration Lengths for the Action Alternative

Location	I-15 Off-ramp	Option[a]	Vehicle Queue Length (ft)			Ramp Length (ft)	Deceleration Length (ft)[b]
			AM	PM	95%		
200 West	Northbound	Farmington 400 West Option	165	175	175	1,500	1,325
	Northbound	Farmington State Street Option	131	180	180	1,500	1,320
Parrish Lane	Northbound	No-action Alternative	196	3,883	3,883	1,218	–2,665
		NA	246	583	583	1,370	787
	Southbound	No-action Alternative	3,438	3,436	3,438	1,076	–2,362
		NA	294	312	312	1,520	1,208
400 North	Northbound	No-action Alternative	113	2,449	2,449	1,121	–1,328
		NA	152	258	258	920	662
500 South	Northbound	No-action Alternative	211	3,985	3,985	1,124	–2,861
		NA	181	350	350	1,290	940
	Southbound	No-action Alternative	352	3,523	3,523	1,463	–2,060
		NA	511	614	614	1,440	826
2600 South	Northbound	No-action Alternative	228	4,051	4,051	1,147	–2,904
		NA	331	681	681	1,200	519
	Southbound	NA	273	391	391	1,400	1,009
Center Street	Southbound	No-action Alternative	3,133	239	3,133	1,328	–1,805
I-215	Northbound	NA	283	619	619	2,580	1,961
	Southbound	NA	121	103	121	1,270	1,149
Warm Springs	Northbound	No-action Alternative	452	195	452	1,365	913

(*Continued on next page*)

Table 3.6-14. Vehicle Queuing and Deceleration Lengths for the Action Alternative

Location	I-15 Off-ramp	Option[a]	Vehicle Queue Length (ft)			Ramp Length (ft)	Deceleration Length (ft)[b]
			AM	PM	95%		
2100 North	Northbound	Salt Lake City 1000 North – Northern Option	166	201	201	1,760	1,559
		Salt Lake City 1000 North – Southern Option	173	198	198	1,760	1,562
	Southbound	Salt Lake City 1000 North – Northern Option	389	249	389	1,440	1,051
		Salt Lake City 1000 North – Southern Option	400	239	400	1,440	1,040
1000 North	Northbound	Salt Lake City 1000 North – Northern Option	422	347	422	3,170	2,748
		Salt Lake City 1000 North – Southern Option	209	930	930	2,850	1,920
	Southbound	Salt Lake City 1000 North – Northern Option	363	302	363	1,340	977
		Salt Lake City 1000 North – Southern Option	259	367	367	2,050	1,683
600 North	Northbound	No-action Alternative	3,575	552	3,575	2,395	–1,180
		Salt Lake City 1000 North – Northern Option	322	457	457	1,200	743
		Salt Lake City 1000 North – Southern Option	264	358	358	1,640	1,282
	Southbound	No-action Alternative	361	298	361	1,352	991

Source: Appendix 3D, *Alternatives Operations Analysis Memo*

[a] NA (not applicable) indicates that the measures apply to all options of the Action Alternative at this location.

[b] If deceleration length is greater than 430 feet or more for 50-miles-per-hour travel, the cell is shaded green, indicating that adequate deceleration length is available. Distances of at least 430 feet are needed to provide adequate stopping distance for vehicles traveling at 50 miles per hour.

3.6.4.3.4 Access Impacts

The Action Alternative would introduce some change in network connectivity. These access impacts are described in Table 3.3-2, *Access Changes with the Action Alternative*, in Section 3.3.4.3.3, *Potential Impacts due to Changes in Access with the Action Alternative*. For descriptions of pedestrian and bicyclist access and connectivity, see Section 3.6.4.3.6, *Impacts to Pedestrian and Bicyclist Facilities*.

3.6.4.3.5 Transit Travel Impacts

The Action Alternative would not impact existing or planned transit projects or access to transit. The Action Alternative would provide room to construct and operate the FrontRunner Double Track project. The Action Alternative would provide better multimodal connections to the Woods Cross FrontRunner Station and would improve access east-west across I-15 for pedestrians and bicyclists accessing other bus and FrontRunner stations. The Action Alternative would benefit bus routes using I-15, the interchanges, and cross streets through improved traffic operations (reduced delay, faster travel times, reduced congestion, and improved vehicle queuing) as described above.

3.6.4.3.6 Impacts to Pedestrian and Bicyclist Facilities

The Action Alternative includes new or improved pedestrian and bicyclist facilities at each interchange in the transportation and mobility evaluation area. Several of these improvements are not included in WFRC's 2019–2050 RTP and would therefore not be constructed without the Action Alternative unless they were added to a future, adopted active transportation plan and constructed as part of a future project.

When developing these proposed facilities, UDOT assessed nonmotorized demand and operations in the evaluation area. UDOT reviewed the location, distance, origin, and destinations of nonmotorized trips as well as demographics of the locations of origins and destinations. For more information about this analysis and the outreach UDOT conducted, see the *Mobility Memorandum for the I-15 Environmental Impact Statement from Farmington to Salt Lake City* (Horrocks 2022b). This analysis informed the Action Alternative pedestrian and bicyclist improvements listed in Table 3.6-15 and shown in Figure 3.6-1.

What is a shared-use path?

Shared-use paths (SUPs) are an improved facility with exclusive right-of-way for bicycles and pedestrians and have minimal intersections with motor vehicles.

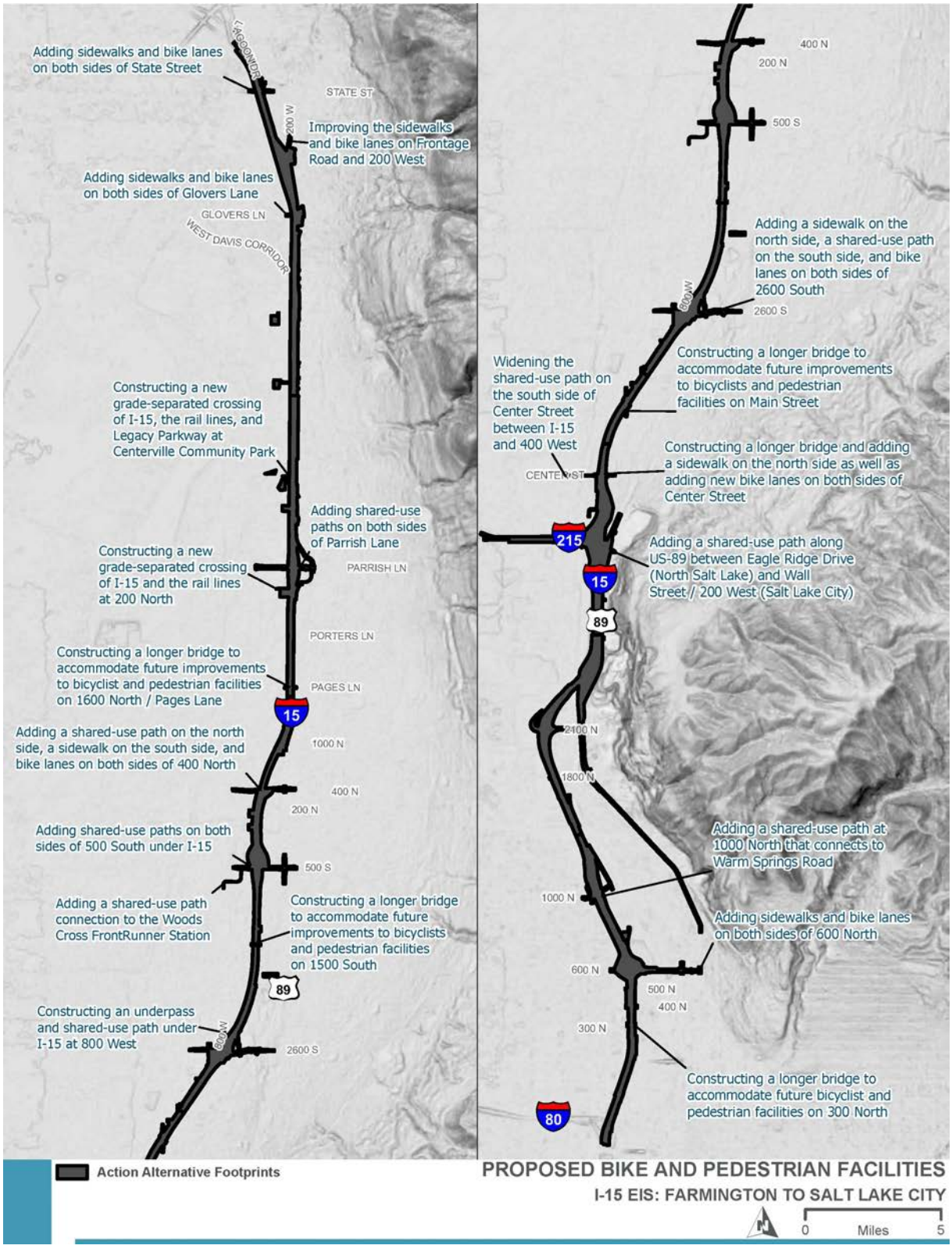
The improvements listed in Table 3.6-15 would meaningfully improve safety and the user experience for pedestrians and bicyclists at all of the existing interchanges in the transportation and mobility evaluation area (200 West in Farmington; Parrish Lane in Centerville; 400 North in Bountiful, and West Bountiful; 500 South in Bountiful, West Bountiful, and Woods Cross; 1100 North/2600 South in North Salt Lake and Woods Cross; 1000 North in Salt Lake City; and 600 North in Salt Lake City). All of these interchanges would include wider, safer facilities that are intended specifically for pedestrians and bicyclists. Additional roadway design features, such as signal-controlled turn movements at the interchange terminals and perpendicular intersection designs, would also improve the safety and user experience for pedestrians and bicyclists crossing I-15 at an interchange.

Table 3.6-15. Action Alternative Pedestrian and Bicyclist Improvements by Location

Geographic Area	Action Alternative Bicyclist and Pedestrian Crossing Features
North Segment (Farmington, Centerville, West Bountiful, Bountiful, and Woods Cross)	• State Street/Clark Lane: State Street/Clark Lane bridge over I-15 and the Union Pacific and FrontRunner railroad tracks would be widened to include buffered bike lanes and sidewalks on both sides that match the facilities going over Legacy Parkway. • 200 West Interchange: No free right-hand turns for vehicles and better sight lines, thereby enhancing safety for bicyclists and pedestrians at the 200 West interchange. • Glovers Lane: Glovers Lane bridge over I-15 and the Union Pacific and FrontRunner railroad tracks would be widened to include a 10-foot-wide sidewalk on the north side, a 6-foot-wide sidewalk on the south side, and bike lanes on both sides to match the facilities going over Legacy Parkway. • Centerville Park: New grade-separated 12-foot-wide SUP crossing at Centerville Park over I-15/Union Pacific and FrontRunner railroad tracks/Legacy Parkway. • Parrish Lane: 12-foot-wide SUP on north side of Parrish Lane across I-15. East of I-15, the SUP would narrow to a 5- to 6-foot-wide sidewalk with a park strip. 12-foot-wide SUP on the south side of Parrish Lane extending to across I-15 to Marketplace Drive. Paved shoulders on Parrish Lane to accommodate future bike lanes. • 200 North: Grade-separated 12-foot-wide SUP crossing of I-15 and the Union Pacific and FrontRunner railroad tracks. • 1600 North/Pages Lane: Lengthen bridge over 1600 North/Pages Lane to accommodate future bicyclist and pedestrian improvements. • 500 South and 400 North interchanges: No free right-hand turns for vehicles and better sight lines, thereby enhancing safety for bicyclists and pedestrians at the 500 South and 400 North interchanges. • 400 North: 12-foot-wide SUP on the north side, 6-foot-wide sidewalk on the south side, and buffered or barrier-separated bike lanes on both sides of 400 North from 750 West to 500 West. • 500 South: 12-foot-wide SUP on both sides of 500 South under I-15. East of I-15 to 500 West, 12-foot-wide SUP on the south side of 500 South and 5-foot-wide sidewalk on the north side of 500 South. New SUP connection from 500 South to the FrontRunner Woods Cross Station west of I-15. • 1500 South: Lengthen bridge over 1500 South to accommodate future bicyclist and pedestrian improvements. • 800 West: At 800 West, new underpass of I-15 with new 12-foot-wide SUP. 12-foot-wide SUP connection between 800 West and 2600 South on west side of I-15. • 2600 South: Buffered or barrier-separated bike lanes on both sides of 2600 South. 8-foot-wide sidewalk on north side of 2600 South. 12-foot-wide grade-separated SUP on south side of 2600 South. • Main Street: Lengthen bridge over Main Street to accommodate future bicyclist and pedestrian improvements.
South Segment (North Salt Lake, Woods Cross, and Salt Lake City)	• Center Street: Lengthened the bridge over Center Street to accommodate buffered or barrier-separated bike lanes on both sides of Center Street and a 5-foot-wide sidewalk on the north side of Center Street under I-15. 12-foot-wide SUP on the south side of Center Street between I-15 and 400 West. • U.S. 89: New 12-foot-wide SUP on the east side of U.S. 89 between Eagle Ridge Drive in North Salt Lake and Wall Street/200 West in Salt Lake City. • 1000 North: 12-foot-wide SUP on 1000 North that crosses under I-15 and connects to Warm Springs Road east of I-15. • 600 North Interchange: No free right-hand turns and better sight lines for vehicles, thereby enhancing safety for bicyclists and pedestrians at 600 North interchange. • 600 North: Buffered or barrier-separated bike lanes and 8-foot-wide sidewalks on both sides of 600 North. • 300 North: Lengthened bridge over 300 North to accommodate future bicyclist and pedestrian improvements.

Definitions: SUP = shared-use path

Figure 3.6-1. Action Alternative Proposed Pedestrian and Bicyclist Facilities Improvements



In addition to the improvements at the I-15 interchanges, the Action Alternative would also provide:

- A new 3.8-mile SUP connection between Eagle Ridge Drive in North Salt Lake and Wall Street/ 200 West in Salt Lake City
- Three new grade-separated SUP crossings of I-15 (Centerville Community Park SUP, Centerville 200 North SUP, and North Salt Lake 2600 South SUP)
- One new crossing of I-15 as part of the new road crossings under I-15 at 800 West in Woods Cross
- Improvements to the existing pedestrian and bicyclist facilities crossing I-15 at three locations (State Street in Farmington, Glovers Lane in Farmington, and Center Street in North Salt Lake)
- New, longer bridges at four locations (1600 North/Pages Lane in West Bountiful and Centerville, 1500 South in Woods Cross, Main Street in North Salt Lake, and 300 North in Salt Lake City) that will allow improved pedestrian and bicycle facilities on the local streets

Existing Facilities

UDOT anticipates that the impacts to pedestrian and bicyclist facilities, including trails, from the Action Alternative would be new crossings of existing trails or the realignment and/or reconnection of existing trails. The impacts to the pedestrian and bicyclist facilities would be limited to potential temporary closures and/or detours during construction. None of the pedestrian and bicyclist facilities would be permanently removed or disconnected.

The Action Alternative would require relocating the following existing pedestrian and bicyclist facilities (Table 3.6-16). The Action Alternative would replace each affected facility with a similar facility near its current location as described in the table.

Table 3.6-16. Impacts from Action Alternative to Existing On-street Pedestrian and Bicyclist Facilities

Route or Trail	Description of Impact	Proposed Mitigation
North Segment (Farmington and Centerville)		
Farmington Creek Trail	North Lagoon Drive would be realigned to the east to accommodate the I-15 mainline. This realignment would temporarily close a segment of Farmington Creek Trail in Ezra T. Clark Park.	The trail will be realigned within the park and maintain the same width and characteristics. The Farmington 400 West Option will include a new box culvert under 400 West that would be sized to include both the Farmington Creek Trail and Farmington Creek. The 400 West Option will also include a new trail connection for the Farmington Creek Trail in Ezra T. Clark Park to connect to the existing Farmington Creek Trail.
State Street	State Street would be widened to add a turn lane onto 400 West. The existing sidewalks and bike lanes would be temporarily closed.	The sidewalks and bike lanes would be replaced and upgraded to match the sidewalks and bike lanes on the State Street bridge that goes over Legacy Parkway.
200 West and Frontage Road	200 West would be realigned to the west where it meets the off-ramp for I-15 and Lagoon Drive. The sidewalks and bike lanes would be temporarily closed.	The sidewalk network would be extended and improved on the west side of 200 West where it currently does not exist. The bike lanes and sidewalk on the east side of 200 West would be replaced in kind. The sidewalks and SUP by the Frontage Road would be replaced in kind and connected to the new 200 West sidewalks.
Glovers Lane	The bike lanes and sidewalks on Glovers Lane and the pedestrian and bicyclist overpass on the north side of Glovers Lane would be temporarily closed during construction.	The sidewalks and bike lanes would be upgraded to match the sidewalks and bike lanes on the Glovers Lane bridge that goes over Legacy Parkway.
South Frontage Road and 800 West	South Frontage Road/800 West would be realigned to the east to accommodate the I-15 mainline. This realignment would temporarily close the bike lanes and the sidewalk on the east side of the road.	The sidewalks and bike lanes would be replaced in kind.
Parrish Lane	Along Parrish Lane is a multi-use pathway on the north side of the street. This multi-use pathway would be temporarily closed during construction.	This pathway would be rebuilt and improved. Additionally, new pedestrian and bicyclist facilities would be constructed on the south side of Parrish Lane.
Market Place Drive	Market Place Drive would have minor realignment to add or improve turn lanes. These improvements would relocate the existing sidewalks.	The sidewalks would be replaced in kind.
400 North	The 400 North barrier-separated sidewalk on the north side of the street would be temporarily closed during construction.	The shoulders would be replaced with buffered or barrier-separated bike lanes on both sides of 400 North, a 12-foot-wide SUP on the north side of 400 North, and a 6-foot-wide sidewalk on the south side of 400 North.
500 South	The bike lanes and sidewalks that traverse the diverging diamond interchange would be temporarily closed during construction.	The bike lanes and SUPs would be part of the new design for both sides of 500 South through the new diamond interchange configuration.

(*Continued on next page*)

Table 3.6-16. Impacts from Action Alternative to Existing On-street Pedestrian and Bicyclist Facilities

Route or Trail	Description of Impact	Proposed Mitigation
2600 South/ 1100 North	The bike lanes and sidewalks that traverse the existing interchange would be temporarily closed during construction.	The bike lanes would be realigned to the north and south of the street of the new single-point urban interchange. A separate multi-use path would be constructed to the south side of 2600 South, and a new pathway would be constructed on the north side in a new alignment under I-15 connecting 800 West and Wildcat Way.
800 West	The sidewalk on the east side of 800 West would be temporarily closed during construction.	A SUP would be constructed on the west and south sides of 800 West.
South Segment (North Salt Lake, Woods Cross, and Salt Lake City)		
Center Street	The sidewalks and bike lanes along Center Street would be temporarily closed during construction while a new overpass for I-15 is installed. There are gaps in the sidewalk network on the west side of I-15.	Bike lanes would be constructed along both sides of Center Street, thereby providing a complete network. The Action Alternative would provide a 5-foot-wide sidewalk on the north side of Center Street under I-15 and widen and improve the SUP on the south side of Center Street between I-15 and 400 West.
U.S. 89/Beck Street	The bike lane on the east side of Beck Street would be temporarily closed construction.	The bike lane would be replaced with an SUP on the east side of U.S. 89. The new SUP would be extended to connect Eagle Ridge Drive in North Salt Lake to Wall Avenue/200 West in Salt Lake City.
900 West	900 West would be realigned as part of the new interchange at 1000 North. The bike lanes and sidewalks would be temporarily closed during construction.	The sidewalks and bike lanes would be replaced in kind.
1000 North	1000 North would be realigned near 900 West as part of the new interchange at 1000 North. The bike lanes and sidewalks would be temporarily closed during construction.	The sidewalks and bike lanes would be replaced in kind. A new SUP that connects 1000 North to Warm Springs Road and goes under I-15 would also be provided with the Action Alternative.
600 North	The bike lanes and sidewalk on the south side of the street that traverse the single-point urban interchange would be temporarily closed during construction.	The bike lanes and sidewalks would be realigned to the north and south of the street of the new diamond interchange configuration. Buffered or barrier-protected bike lanes and new sidewalks would be constructed with the Action Alternative.

Definitions: SUP = shared-use path

The Action Alternative would cross but not have any direct impact to the following existing pedestrian and bicyclist facilities. These facilities would be accommodated or connected to the improvements to the pedestrian and bicyclist facilities proposed with the Action Alternative:

- 1600 North/Pages Lane in West Bountiful and Centerville
- 1500 South in Woods Cross
- Main Street in North Salt Lake
- 300 North in Salt Lake City
- North Temple in Salt Lake City
- South Temple/Folsom Trail in Salt Lake City
- 200 South in Salt Lake City

Future Facilities

The Action Alternative would support the proposed pedestrian and bicyclist facilities in WFRC's 2019–2050 RTP through the construction of features listed in Table 3.6-15, *Action Alternative Pedestrian and Bicyclist Improvements by Location*, above and through the construction of wider bridges at Center Street and Main Street in North Salt Lake, 1600 North/Pages Lane in West Bountiful and Centerville, and 1500 South in Woods Cross. Additional proposed projects in the RTP are subject to available funding and coordination with local jurisdictions.

3.6.4.3.7 Summary of Action Alternative Impacts

The Action Alternative would improve traffic operations in the transportation and mobility evaluation area compared to the No-action Alternative by reducing delay, reducing congestion, reducing travel times, enhancing safety, and increasing access.

The Action Alternative would meaningfully improve safety and the user experience for pedestrians and bicyclists at all of the existing interchanges in the evaluation area. The Action Alternative would also provide a new 3.8-mile SUP between North Salt Lake and Salt Lake City, three new grade-separated SUP crossings of I-15 (Centerville Community Park SUP, Centerville 200 North SUP, and North Salt Lake 2600 South SUP), one new crossing for pedestrians and bicyclists under I-15 at 800 West in Woods Cross, improvements to existing pedestrian and bicyclist facilities crossing I-15 in three locations (State Street in Farmington, Glovers Lane in Farmington, and Center Street in North Salt Lake), and new, longer bridges in four locations (1600 North/Pages Lane in West Bountiful and Centerville, 1500 South in Woods Cross, Main Street in North Salt Lake, and 300 North in Salt Lake City).

3.6.4.4 Mitigation Measures

The Action Alternative would be an improvement over the no-action conditions. No mitigation for impacts to the roadway network is proposed.

Each existing pedestrian and bicyclist facility that would be closed and removed during construction would be replaced with a similar or improved facility near its current location. Project construction for pedestrian and bicyclist facilities would be phased to minimize disruptions to the public to the extent feasible. UDOT would also coordinate with the Counties and Cities during the final design of the Action Alternative to mitigate disruptions to pedestrian and bicyclist facility users. Potential mitigation for disruption would include

providing signed on-road detours where feasible, closing facilities during low-use seasons (winter), and providing information to the public about closures.

3.7 Joint Development

3.7.1 Introduction

Joint development refers to opportunities to develop other public works projects jointly with the I-15 project. Section 3.7 discusses proposed road, rail, park, and pedestrian and bicyclist facilities that might be developed jointly with the I-15 project.

Joint Development Evaluation Area. The joint development evaluation area is the same as the needs assessment study area described in Section 1.1.3, *Description of the Needs Assessment Study Area and Logical Termini*, in Chapter 1, *Purpose and Need*.

3.7.2 Regulatory Setting

Under FHWA guidelines [Technical Advisory T 6640.8A, *Guidance for Preparing and Processing Environmental and Section 4(f) Documents*], an agency developing a project that uses federal money should identify and discuss those joint development measures that will preserve or enhance an affected community's social, economic, environmental, and visual values. As required by that guideline, Section 3.7 discusses facilities that might be developed jointly with the I-15 project.

3.7.3 Affected Environment

The joint development evaluation area has many road, rail, park, pedestrian, and bicyclist facilities that cross over, cross under, or are located near I-15. Representatives with Davis County, Salt Lake County, Farmington City, Centerville City, West Bountiful City, Bountiful City, Woods Cross City, the City of North Salt Lake, and Salt Lake City have asked to work with UDOT to develop improvements to enhance road, park, and pedestrian and bicyclist facility connections at I-15 interchange areas or at separate crossings of I-15.

3.7.4 Environmental Consequences and Mitigation Measures

3.7.4.1 No-action Alternative

With the No-action Alternative, the changes associated with the I-15 project would not be made, including the pedestrian and bicyclist improvements described in more detail in Section 3.6, *Transportation and Mobility*. If the I-15 project is not implemented, it would be more difficult for affected Cities and Counties to improve road, park, and pedestrian and bicyclist facilities across I-15.

3.7.4.2 Action Alternative

The Action Alternative would require reconstructing portions of the existing roads and pedestrian and bicyclist facilities that cross I-15. However, with the Action Alternative, UDOT would work with the Cities and Counties in the joint development evaluation area during the final design process for the Action Alternative

to determine whether additional roadway elements or pedestrian and bicyclist facilities could be constructed while the Action Alternative is under construction.

The Action Alternative would impact the park strips between the Frontage Road and the parking lot and would relocate the Central Davis Sewer District pump station close to the skate park of South Park in Farmington. Farmington City is planning to upgrade South Park around the same time as the Action Alternative might be constructed.

The Action Alternative would have temporary construction impacts due to sidewalk and bike lane improvements on the south side of Hatch Park in North Salt Lake. During the final design of the Action Alternative, UDOT would coordinate with these Cities regarding impacts or connections to any existing or planned park facilities and would determine feasible options to redesign planned park facilities if necessary.

In addition, three existing at-grade railroad crossings are being considered for grade separation by Woods Cross at 500 South or North Salt Lake at 1100 North and Center Street. The Action Alternative would not require reconstructing the crossings, and the Action Alternative is compatible with the planned rail crossing upgrades. UDOT will coordinate with the Cities and railroads to determine whether these railroad grade-separation projects are candidates for joint development with the I-15 project.

During the final design process for the Action Alternative, UDOT would work with the applicable Counties and/or Cities to determine the scope and design for the additional road, rail, park, and pedestrian and bicyclist facilities beyond those replaced or constructed as part of the Action Alternative. The cost of constructing additional facilities beyond those replaced or constructed as part of the Action Alternative improvements and long-term maintenance of the additional facilities would be the responsibility of the applicable Counties or Cities. By considering these improvements during the final design process for the Action Alternative, the final designers or design-builder could look at opportunities to limit construction impacts and closures, save costs, and provide cohesive road and pedestrian and bicyclist facilities across I-15.

Table 3.7-1 lists the planned projects that could have a similar construction timeline and could be considered for potential joint development with the I-15 project. This list of projects is based on WFRC's 2019–2050 RTP and discussions with the Counties and Cities. Other planned projects listed in the 2019–2050 RTP could also be considered joint development opportunities if the timing of these projects were to coincide with that of the I-15 project (see Table 1A-3, *Planned Transportation Improvements in the 2019–2050 RTP in the Needs Assessment Study Area*, in Appendix 1A, *Purpose and Need Chapter Supplemental Information*).

Table 3.7-1. Potential Joint Development Projects

Project Name	Municipality	Location/Limits	Description
Farmington South Park Updates	Farmington	1384 S. Frontage Road, Farmington	Farmington City has mentioned that planned upgrades and reconstruction of South Park might occur at around the same time as the Action Alternative would be constructed. UDOT would coordinate any park impacts and mitigation for impacts to South Park with Farmington City to be compatible with the City's planned South Park upgrades.
500 South Railroad Crossing	Woods Cross	800 West 500 South, Woods Cross	This project is a grade-separated railroad crossing west of the Action Alternative improvements on 500 South in Woods Cross. The Action Alternative is forward-compatible with this future grade-separated railroad crossing project.
2600 South/ 1100 North Railroad Crossing	North Salt Lake	1050 West 1100 North, North Salt Lake	This project is a grade-separated railroad crossing west of the Action Alternative improvements on 2600 South/1100 North in North Salt Lake. The Action Alternative is forward-compatible with this future grade-separated railroad crossing project.
Center Street Railroad Crossing	North Salt Lake	300 W. Center Street, North Salt Lake	This project is a grade-separated railroad crossing west of the Action Alternative improvements on Center Street in North Salt Lake. The Action Alternative is forward-compatible with this future grade-separated railroad crossing project.
Hatch Park Expansion and Upgrades	North Salt Lake	50 W. Center Street, North Salt Lake	The City of North Salt Lake is purchasing land and beginning work on expansions and upgrades to Hatch Park. The City of North Salt Lake has provided UDOT with a copy of the plan for Hatch Park. UDOT will coordinate the Action Alternative improvements to the Center Street roadway, sidewalks, bike lanes, and SUP with the City of North Salt Lake to be compatible with the City's planned Hatch Park improvements.
600 North/700 North Protected Bike Lane Project	Salt Lake City	600 North from 800 West to 2200 West, Salt Lake City	Salt Lake City is currently studying this segment of 600 North to add new protected bike lanes, safer pedestrian facilities, and other operational improvements. UDOT is coordinating with Salt Lake City on this project so that the Action Alternative improvements to the 600 North roadway, SUPs, and bike lanes are compatible with Salt Lake City's planned improvements to 600 North.

Sources: City of North Salt Lake 2022; WFRC 2019a

3.7.4.3 Mitigation Measures

No mitigation measures for joint development impacts are proposed because no adverse impacts are expected. UDOT will continue to work with the Counties and Cities to make the Action Alternative compatible with the planned projects listed above in Table 3.7-1, *Potential Joint Development Projects*.

3.8 Air Quality

3.8.1 Introduction

Section 3.8 describes the existing air quality conditions in the applicable evaluation area and potential effects of the project alternatives on air quality. Air quality in a given area depends on several factors such as the area itself (size and topography), the prevailing weather patterns (meteorology and climate), and the pollutants released into the air. Air quality is described in terms of the concentrations of various pollutants in a given area of atmosphere (for example, parts per million or micrograms per cubic meter).

Air Quality Evaluation Area. The air quality evaluation area is broader than the needs assessment area and includes the regionally significant roads in the RTP that are in the geographic area of the I-15 project. The evaluation area includes all freeways, arterials, and collectors between roughly Shepard Lane in Farmington and roughly 1300 South in Salt Lake City (including I-15, Legacy Parkway, I-215, and U.S. 89 in addition to the smaller arterial and collector roads in this area). The evaluation area includes these other regionally significant roads because the traffic volumes and associated emissions or other air quality effects could be beneficially or adversely affected by the Action Alternative.

3.8.2 Regulatory Setting

3.8.2.1 National Ambient Air Quality Standards

EPA, under the authority of the Clean Air Act (42 USC Section 7401 and subsequent sections), established National Ambient Air Quality Standards (NAAQS) for ubiquitous pollutants considered harmful to public health and the environment (40 Code of Federal Regulations [CFR] Part 50). These standards are broken down into primary standards, which protect public health, and secondary standards, which protect public welfare (such as protecting property and vegetation from the effects of air pollution). These standards have been adopted by the Utah Division of Air Quality as the official ambient air quality standards for Utah.

EPA has set NAAQS for six principal pollutants known as *criteria pollutants*. The current NAAQS are listed in Table 3.8-1. According to EPA, transportation sources currently contribute to four of the six criteria pollutants: carbon monoxide (CO), particulate matter (PM_{10} and $PM_{2.5}$), ozone (O_3), and nitrogen dioxide (NO_2).

If an area meets the NAAQS for a given air pollutant, the area is called an *attainment area* for that pollutant (because the NAAQS have been attained). If an area does not meet the NAAQS for a given air pollutant, the area is called a *nonattainment area*. A *maintenance area* is an area previously designated as a nonattainment area that has been redesignated as an attainment area and is required by Section 175A of the Clean Air Act, as amended, to have a maintenance plan for the 20 years following its redesignation to attainment or maintenance status.

The air quality evaluation area is located in Davis and Salt Lake Counties. Davis and Salt Lake Counties are attainment areas for CO, NO_2, and lead (Pb), and Davis County is an attainment area for PM_{10} and sulfur dioxide (SO_2). Salt Lake County is a nonattainment area for $PM_{2.5}$, O_3, and secondary SO_2 and a maintenance area for PM_{10}, having transitioned from a nonattainment area effective March 27, 2020. Davis County is a nonattainment area for $PM_{2.5}$ and O_3. Table 3.8-1 above shows the attainment status for Davis and Salt Lake Counties for each criteria pollutant.

SO_2 and Pb are not considered transportation-related criteria pollutants and are not discussed further.

Table 3.8-1. National and Utah Ambient Air Quality Standards for Criteria Pollutants and Attainment Status for Salt Lake and Davis Counties

Pollutant	Primary/ Secondary	Averaging Time	Level	Form	Attainment Status for Salt Lake and Davis Counties
Carbon monoxide (CO)	Primary	8 hours	9 ppm	Not to be exceeded more than once per year	Salt Lake and Davis Counties are attainment areas
		1 hour	35 ppm	Not to be exceeded more than once per year	
Ozone (O_3)	Primary and secondary	8 hours	0.070 ppm	Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years	Salt Lake and Davis Counties are moderate nonattainment areas[a]
Particulate matter ($PM_{2.5}$)	Primary	1 year	12.0 µg/m^3 [b]	Annual mean, averaged over 3 years	Salt Lake and Davis Counties are attainment areas
	Secondary	1 year	15.0 µg/m^3	Annual mean, averaged over 3 years	Salt Lake and Davis Counties are attainment areas
	Primary and secondary	24 hours	35 µg/m^3	98th percentile, averaged over 3 years	Salt Lake and Davis Counties are serious nonattainment areas[c]
Particulate matter (PM_{10})	Primary and secondary	24 hours	150 µg/m^3	Not to be exceeded more than once per year on average over 3 years	Salt Lake County is a maintenance area and Davis County is an attainment area
Nitrogen dioxide (NO_2)	Primary	1 hour	100 ppb	98th percentile of 1-hour daily maximum concentrations, averaged over 3 years	Salt Lake and Davis Counties are attainment areas
	Primary and secondary	1 year	53 ppb	Annual mean	Salt Lake and Davis Counties are attainment areas
Sulfur dioxide (SO_2)	Primary	1 hour	75 ppb	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years	Salt Lake and Davis Counties are attainment areas
	Secondary	3 hours	0.5 ppm	Not to be exceeded more than once per year	Salt Lake County is a nonattainment area and Davis County is an attainment area
Lead (Pb)	Primary and secondary	Rolling 3-month average	0.15 µg/m^3	Not to be exceeded	Salt Lake and Davis Counties are attainment areas

Sources: 49 CFR Part 50 (NAAQS) and EPA 2022 (attainment status)

Definitions: µg/m^3 = micrograms per cubic meter; ppm = parts per million; ppb = parts per billion; $PM_{2.5}$ = particulate matter 2.5 microns in diameter or less; PM_{10} = particulate matter 10 microns in diameter or less

[a] A "moderate" nonattainment area is one where the O_3 level has a value of 0.081 ppm up to but not including 0.093 ppm.

[b] EPA proposed revising the annual $PM_{2.5}$ NAAQS from 12 µg/m^3 to 9 µg/m^3 on February 7, 2024. However, the air quality analysis supporting the NEPA review for the I-15 project was initiated prior to this proposed revision. Moreover, that regulatory action is currently being challenged in court. Therefore, UDOT continues to base this air quality analyses on the 12 µg/m^3 standard in place when the study was initiated.

[c] A "serious" nonattainment area is one that failed to meet the 2006 24-hour $PM_{2.5}$ NAAQS within a timeframe required by EPA.

3.8.2.2 Transportation Conformity Requirements

Transportation conformity is a process required by Clean Air Act Section 176(c), which establishes the framework for improving air quality to protect public health and the environment. All state governments are required to develop a state implementation plan (SIP) for each pollutant for which an area is in nonattainment or maintenance status. The SIP explains how the State will comply with the requirements of the Clean Air Act.

Section 176(c) of the Clean Air Act, and its related amendments, require that transportation plans, programs, and projects developed, funded, or approved by FHWA and/or the Federal Transit Administration and metropolitan planning organizations must demonstrate that such activities conform to the SIP. Transportation conformity requirements apply to any transportation-related criteria pollutants for which the project area is designated a nonattainment or maintenance area.

Unless the project is exempt from conformity requirements, federal agencies are required to make a conformity determination before adopting, accepting, approving, or funding an activity or project located in a nonattainment or maintenance area. A conformity determination is a finding that the activity or project conforms to the SIP's purpose of "eliminating or reducing the severity and number of violations" of the NAAQS and "achieving expeditious attainment of the NAAQS" [42 USC Section 7506(c)] and that the project or activity will not:

- Cause or contribute to new air quality violations of the NAAQS,
- Worsen existing violations of the NAAQS, or
- Delay timely attainment of the NAAQS or required interim milestones.

What is a hot-spot analysis?

A hot-spot analysis is an estimation of likely future local pollutant concentrations and a comparison of those concentrations to the relevant NAAQS.

To demonstrate project-level conformity, a project must come from a conforming RTP and TIP[3]. The project design concept and scope must not have changed significantly from those in the RTP and TIP and the analysis must have used the latest planning assumptions and latest estimates of emissions. Additional analysis might be necessary in CO, PM_{10}, and $PM_{2.5}$ nonattainment or maintenance areas to determine whether a project would have local air quality impacts. This analysis is referred to as a "hot-spot" analysis. A hot-spot analysis is defined in 40 CFR Section 93.101 as an estimation of likely future local pollutant concentrations and a comparison of those concentrations to the relevant NAAQS. A hot-spot analysis assesses air quality impacts on a smaller scale than an entire nonattainment or maintenance area.

A PM hot-spot analysis is required only for specific types of projects, which are listed in the transportation conformity regulations at 40 CFR Section 93.123(b)(1). EPA uses the term *project of air quality concern* (POAQC) to refer to any of the project types for which a PM hot-spot analysis is required.

Because the improvements associated with the I-15 project would be in a CO attainment area, a CO hot-spot analysis is not required.

[3] A conforming RTP or TIP is one that has been analyzed for emissions of controlled air pollutants and found to be within emission limits established in the State Implementation Plan (SIP) or within guidelines established by the EPA until such time that a SIP is approved.

3.8.2.2.1 Transportation Conformity Compliance

WFRC, the metropolitan planning organization for the project region, develops the Wasatch Front RTP. The I-15 project used WFRC's 2019–2050 RTP (WFRC 2019a), which was the current RTP at the time the EIS was initiated. The 2019–2050 RTP was adopted in 2019 and had a total of four amendments in 2020 and 2021. The amended 2019–2050 RTP includes two projects that identify improvements to I-15 in Davis and Salt Lake Counties:

- I-15 widening (from five lanes to six lanes in each direction) from Farmington to Salt Lake County line (2019 RTP project: R-D-53)
- I-15 widening (from four and five lanes to six lanes in each direction) in Davis County to 600 North (2019 RTP project: R-S-137)

According to Air Quality Memorandum 40 (WFRC 2021), which was prepared for an amendment to the RTP in 2021, the RTP is consistent with and conforms to the SIP or the EPA interim conformity guidelines.

Under federal law, WFRC must update its RTP every 4 years. WFRC's 2023–2050 RTP (WFRC 2023a) was adopted in May 2023, which was 4 months before the release of the I-15: Farmington to Salt Lake City Draft EIS in September 2023. Assumptions regarding the I-15 project presented in the 2023–2050 RTP are consistent with those presented in the 2019–2050 RTP. According to Air Quality Memorandum 41 (WFRC 2023b), the RTP is consistent with and conforms to the SIP or the EPA interim conformity guidelines. Accordingly, regional transportation conformity is demonstrated with respect to this project.

EPA approved the maintenance plan for the Salt Lake County 8-hour O_3 standard on September 26, 2013 (78 Federal Register 59242). Project-level conformity for O_3 is met by demonstrating that the area has a conforming RTP and transportation improvement program (TIP), and that the project is consistent with the description provided in the RTP.

EPA approved the maintenance plan for the Salt Lake County SIP for PM_{10} on July 8, 1994 (59 Federal Register 35036). Davis and Salt Lake Counties do not yet have an approved SIP. Until the SIP for $PM_{2.5}$ is approved, interim emissions tests are required for RTP conformity determinations.

The I-15 EIS is also listed in the 2023–2028 TIP (WFRC 2022).

3.8.2.2.2 Exempt Projects

EPA regulations set forth certain projects that are exempt from transportation conformity requirements. See 40 CFR Sections 93.126 and 93.128. Projects consistent with 40 CFR Section 93.126 or 40 CFR Section 93.128 are exempt from transportation conformity requirements. Exempt projects include safety projects such as railroad crossings, guard rails, and bridge reconstruction (with no additional travel lanes); mass transit projects such as rehabilitation of transit vehicles; air quality projects such as pedestrian and bicycle facilities; and other projects such as noise attenuation. The I-15 project does not qualify for any of these exemptions.

3.8.2.2.3 Projects of Air Quality Concern

Because the project would be located in a $PM_{2.5}$ nonattainment and PM_{10} maintenance area, it is subject to procedures to determine whether it should be classified as a POAQC such that quantitative hot-spot analysis is warranted [see 40 CFR Section 93.123(b)(1)]. Projects that require quantitative hot-spot analyses for $PM_{2.5}$ and PM_{10} include:

i. New highway projects that have a significant number of diesel vehicles, and expanded highway projects that have a significant increase in the number of diesel vehicles

ii. Projects affecting intersections that are at a level of service (LOS) of LOS D, E, or F with a significant number of diesel vehicles, or those that will change to LOS D, E, or F because of increased traffic volumes from a significant number of diesel vehicles related to the project

iii. New bus and rail terminals and transfer points that have a significant number of diesel vehicles congregating at a single location

iv. Expanded bus and rail terminals and transfer points that significantly increase the number of diesel vehicles congregating at a single location

v. Projects in or affecting locations, areas, or categories of sites that are identified in the PM_{10} or $PM_{2.5}$ applicable implementation plan or implementation plan submission, as appropriate, as sites of violation or possible violation

EPA's *Transportation Conformity Guidance for Quantitative Hot-spot Analyses in $PM_{2.5}$ and PM_{10} Nonattainment and Maintenance Areas* (EPA 2021) provides guidance for reviewing transportation projects in the context of CFR Title 40 and clarification regarding the criteria for determining whether a project is a project of air quality concern. Appendix B of EPA's hot-spot guidance provides the following examples of projects of local air quality concern that would be covered by 40 CFR Section 93.123(b)(1)(i) and (ii):

- A project on a new highway or expressway that serves a significant volume of diesel vehicle traffic, such as facilities with greater than 125,000 annual average daily traffic (AADT), and 8% or more of such AADT is diesel truck traffic (or the equivalent of 10,000 diesel new AADT)
- New exit ramps and other highway facility improvements to connect a highway or expressway to a major freight, bus, or intermodal terminal
- Expansion of an existing highway or other facility that affects a congested intersection (operated at LOS D, E, or F) that has a significant increase in the number of diesel trucks
- Similar highway projects that involve a significant increase in the number of diesel transit buses and/or diesel trucks

EPA's hot-spot guidance also provides the following examples of projects that are *not* projects of local air quality concern under 40 CFR Section 93.123(b)(1)(i) and (ii):

- Any new or expanded highway project that services primarily gasoline vehicle traffic (that is, does not involve a significant number or increase in the number of diesel vehicles), including such projects involving congested intersections operating at LOS D, E, or F.
- An intersection channelization project or interchange-configuration project that involves either turn lanes or slots, or lanes or movements that are physically separated. These kinds of projects improve

freeway operations by smoothing traffic flow and vehicle speeds by improving weave and merge operations, which would not be expected to create or worsen PM NAAQS violations.

- Intersection channelization projects, traffic circles or roundabouts, intersection signalization projects at individual intersections, and interchange-reconfiguration projects that are designed to improve traffic flow and vehicle speeds, and do not involve any increases in idling. Thus, they would be expected to have a neutral or positive influence on PM emissions.

Project of Air Quality Concern Determination. When the Draft EIS was published, UDOT's opinion was that the I-15 project would not be considered a POAQC according to the regulations at 40 CFR Section 93.123(b)(1). UDOT's evaluation and rationale is discussed in detail in Appendix 3E, *Project of Air Quality Concern Evaluation*.

EPA provided a comment on the Draft EIS stating that EPA did not agree with UDOT's POAQC determination. EPA's Draft EIS comment also stated that EPA had concluded that the project should be considered a POAQC and that the Final EIS should include a particulate matter hot-spot analysis to satisfy transportation conformity requirements. In subsequent Interagency Coordination Team (ICT) meetings the ICT determined that the project was a POAQC, and UDOT conducted hot-spot analyses for PM2.5 and PM10 for this project following the transportation conformity procedures. See Section 3.8.4.1.2, *Hot-spot Analysis*, for more details on the methodology used for the hot-spot analysis. The hot-spot analyses methodology and assumptions are described in Appendix 3N, *Air Quality Technical Report: Hot-spot Analysis*.

3.8.2.3 Hazardous Air Pollutants

The Clean Air Act Amendments of 1990 listed 188 hazardous air pollutants (also referred to as air toxics or HAPs) that are known to cause or are suspected of causing cancer or other serious health effects or adverse environmental effects. Most air toxics originate from human-made sources including road mobile sources, nonroad mobile sources (such as locomotives, construction equipment, and airplanes), and stationary sources (such as factories or refineries). Section 112 of the Clean Air Act Amendments of 1990 requires EPA to establish emission standards that require the maximum degree of reduction in emissions of hazardous air pollutants. Unlike the criteria pollutants, HAPs do not have NAAQS, making evaluation of their impacts more subjective.

In 2001, EPA issued its first Mobile-source Air Toxics Rule, which identified 21 mobile-source air toxic compounds (MSATs) as being HAPs that required regulation. EPA issued a second MSAT Rule in 2007 that generally supported the findings in the first rule and specified several emissions standards that must be implemented.

Using the 2011 National Air Toxics Assessment, EPA further identified nine MSATs that are among the national and regional-scale cancer risk drivers or contributors and noncancer hazard contributors. These are the MSATs that should be evaluated during NEPA analysis. FHWA's *Updated Interim Guidance on Mobile-source Air Toxic Analysis in NEPA Documents* (FHWA 2023a) specifies how MSATs should be considered in NEPA documents. FHWA developed a tiered approach for analyzing MSATs in NEPA documents, depending on the following specific project circumstances:

- **Tier 1:** No analysis for projects with no potential for meaningful MSAT effects;
- **Tier 2:** Qualitative analysis for projects with low potential MSAT effects; or

- **Tier 3:** Quantitative analysis to differentiate alternatives for projects with higher potential MSAT effects.

Tier 3 projects that require quantitative analysis include (1) projects that create or significantly alter a major intermodal freight facility that has the potential to concentrate high levels of diesel particulate matter in a single location, involving a significant number of diesel vehicles for new projects or expansion projects accommodating a significant increase in the number of diesel vehicles; or (2) projects that create new capacity or add significant capacity to urban highways such as interstates, urban arterials, or urban collector-distributor routes with traffic volumes where the AADT is projected to be in the range of 140,000 to 150,000 or greater by the design year; and also proposed to be located in proximity to populated areas. The I-15 project is considered a Tier 3 project because it would add capacity to an interstate where the AADT is projected to be in the range of 140,000 to 150,000 or greater by the design year. Table 3.8-2 shows the AADT on segments of I-15 in 2019 and the design year, 2050, all of which are over 150,000 in 2050.

Table 3.8-2. Estimated AADT on Segments of I-15 in the Air Quality Evaluation Area in 2019 and 2050

From	To	AADT		
		2019[a]	2050 No-action Alternative	2050 Action Alternative[b]
Park Lane	Shepard Lane	145,000	175,000	179,000
200 West	U.S. 89	141,000	156,000	170,000
Parrish Lane	200 West	155,000	201,000	221,000
500 West	Parrish Lane	160,000	207,000	228,000
500 South	400 North	157,000	197,000	221,000
2600 South	500 South	159,000	197,000	224,000
Center Street	2600 South	166,000	208,000	236,000
U.S. 89/Beck Street	I-215	129,000	172,000	208,000
1100 West/Warm Springs Road	U.S. 89/Beck Street	135,000	176,000	225,000
1000 North	1100 West/Warm Springs Road	139,000	180,000	232,000
600 North	1000 North	135,000	175,000	226,000
I-80	600 North	153,000	204,000	240,000
400 South	I-80	139,000	185,000	211,000

[a] Source: 2019 AADT taken from UDOT automated PeMes traffic counters in 2019
[b] Source: 2050 AADT from WFRC regional travel demand model, version 8.3.2

The following MSATs should be considered in a NEPA analysis. Note that polycyclic organic matter (POM) is broadly defined in the Clean Air Act as organic substances that have at least two benzene rings and a boiling point of at least 100 degrees Celsius. Thus, POM includes naphthalene, which is also listed for regulation by itself as an MSAT.

- 1,3-butadiene
- Acetaldehyde
- Acrolein
- Benzene
- Diesel particulate matter
- Ethyl benzene
- Formaldehyde
- Naphthalene
- POM

3.8.2.4 Greenhouse Gases

Gases that trap heat in the atmosphere are called *greenhouse gases* (GHG). The primary greenhouse gases are carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). Concentrations of the key GHGs have all increased since the Industrial Revolution. CO_2 is the primary GHG emitted through human activities. In 2020, CO_2 accounted for about 79% of all U.S. GHG emissions from human activities (EPA 2022). The combustion of fossil fuels (coal, natural gas, and oil) for energy and transportation is the main source of these emissions.

CO_2, CH_4, and N_2O concentrations are now more abundant in the earth's atmosphere than during any time in the last 800,000 years (National Academy of Sciences 2020). The average temperature of the Earth's surface between 2011 and 2020 was 2 degrees Fahrenheit warmer than the average temperature during the late 19th century and warmer than at any time during the last 100,000 years (IPCC 2021). Rising GHG levels are causing corresponding increases in average global temperatures and in the frequency and severity of natural disasters including storms, flooding, and wildfires.

The effects of climate change observed to date and projected to occur in the future include more frequent and intense heat waves, longer fire seasons and more severe wildfires, degraded air quality, increased drought, greater sea-level rise, an increase in the intensity and frequency of extreme weather events, harm to water resources, harm to agriculture, ocean acidification, and harm to wildlife and ecosystems. Weather and climate extremes are also causing economic and societal impacts across national boundaries through supply chains, markets, and natural resource flows. Climate change is a particularly complex challenge given its global nature and the inherent interrelationships among its sources and effects. In addition, the effects of climate change are likely to fall disproportionately on vulnerable communities, including communities of color, low-income communities, and tribal nations and indigenous communities with EJ concerns (CEQ 2023; U.S. Global Change Research Center 2018).

From a quantitative perspective, GHG emissions can contribute to global climate change through the cumulative result of numerous and varied emissions sources (in terms of both absolute numbers and types), each of which makes a relatively small addition to global atmospheric GHG concentrations.

In contrast to broad-scale actions such as those involving an entire industry sector or very large geographic areas, it is difficult to isolate and understand the impacts of GHG emissions for a particular transportation project. Furthermore, there is currently no scientific methodology for attributing specific climatological changes to a particular transportation project's emissions.

On January 9, 2023, the Council on Environmental Quality issued interim guidance to assist agencies in analyzing GHGs and climate change effects of their proposed actions under NEPA (88 Federal Register 1196; CEQ 2023). In addition to quantifying GHG emissions, this guidance directs agencies to calculate the social cost of greenhouse gas emissions (SC-GHG) for each project alternative. SC-GHG is a monetary estimate of the net harm to society associated with adding a small amount of GHG to the atmosphere in a given year. This estimate allows agencies to understand the social benefits of reducing emissions of each GHG or the social costs of increasing such emissions. SC-GHG values are calculated using models that translate changes in emissions into economic impacts through a multistep process and include the value of all climate change impacts, including changes in net agricultural productivity, human health effects, property damage from increased natural disasters, disruption of energy systems, risk of conflict, environmental migration, and the value of ecosystem services.

State and Local Government Greenhouse Gas Reduction Goals

The State of Utah does not have a formal climate change policy or GHG emission-reduction goals. The University of Utah's Kem C. Gardner Policy Institute and associated Technical Advisor Committee prepared a Utah Roadmap that recommended Utah reduce CO_2 emissions statewide 25% below 2005 levels by 2025, 50% below 2005 levels by 2030, and 80% below 2005 levels by 2050 (Kem C. Gardner Policy Institute 2020a). To date, these recommendations have not been formally adopted by the State of Utah. The Utah Roadmap does not make any specific recommendations or GHG-reduction goals related to the transportation sector or specific projects.

One of the seven cities in the project study area, Salt Lake City, has a climate change plan and has passed a Mayor–Council Joint Resolution identifying that Salt Lake City would like to have 100% renewable energy for community electricity supply by 2030 and an 80% reduction in community GHG emissions by 2040 compared to a 2009 baseline (Salt Lake City, no date). The Salt Lake City climate change plan and joint resolution do not apply to state facilities such as I-15 and other state roads.

3.8.3 Affected Environment

3.8.3.1 Attainment Status

Davis and Salt Lake Counties are attainment areas for CO and NO_2 and Davis County is an attainment area for PM_{10}. Salt Lake County is a nonattainment area for $PM_{2.5}$, O_3, and a maintenance area for PM_{10}, having transitioned from a nonattainment area effective March 27, 2020. Davis County is a nonattainment area for $PM_{2.5}$ and O_3.

3.8.3.2 Existing Air Quality Data

The Utah Division of Air Quality maintains a network of air quality monitoring stations throughout the state. In general, these monitoring stations are located where there are known air quality problems, so they are usually in or near urban areas or close to specific emission sources. Other stations are located in suburban locations or remote areas to provide an indication of regional air pollution levels.

The Bountiful #2 Monitoring Station (#490110004) located at 171 West 1370 North in Bountiful, the Rose Park Monitoring Station (#490353010) located at 1400 W. Goodwin Avenue in Salt Lake City, the Hawthorne Monitoring Station (#490353006) located at 1675 South 600 East in Salt Lake City, and the Utah Technical Center (UTC) (#490353015) located at 240 North 1950 West in Salt Lake City are the closest air quality monitors to the air quality evaluation area that provide data for all transportation-related criteria pollutants (PM_{10}, $PM_{2.5}$, O_3, CO, and NO_2). Figure 3.8-1 provides a map showing the locations of these monitoring stations. Air quality data for transportation-related criteria pollutants from these monitoring stations are compiled in Table 3.8-3.

Davis and Salt Lake Counties are attainment areas for CO and NO_2 and Davis County is an attainment area for PM_{10} and sulfur dioxide (SO_2). Salt Lake County is a nonattainment area for $PM_{2.5}$ and O_3 and a maintenance area for PM_{10}. Davis County is a nonattainment area for $PM_{2.5}$ and O_3.

Figure 3.8-1. Air Quality Monitoring Stations

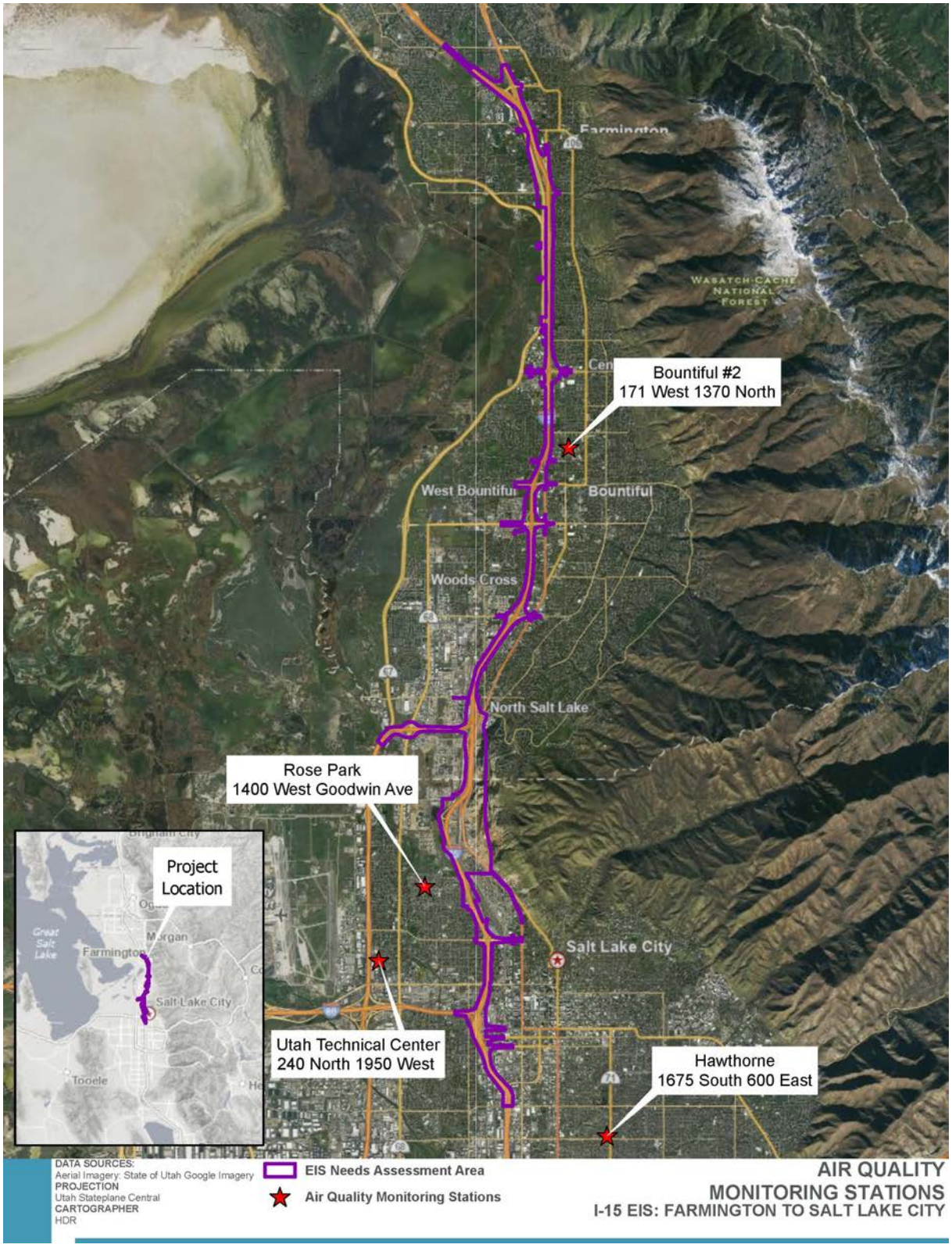


Table 3.8-3. Air Quality Monitoring Data from the Bountiful #2, Rose Park, Hawthorne, and Utah Technical Center Monitoring Stations in Davis and Salt Lake Counties

Pollutant	Standard[a]	Value	Monitoring Station	Monitoring Year and Data					
				2019	2020	2021	2022	2019–2021 Average	2020–2022 Average
Particulate Matter (PM_{10})	24-hour standard	150 µg/m³	Bountiful	30	52	79	57	NA	NA
			Rose Park	No data	No data	No data	No data	NA	NA
			Hawthorne	69	114	94	113	NA	NA
			UTC	106	162	116	148	NA	NA
Particulate matter ($PM_{2.5}$)	24-hour standard	35 µg/m³	Bountiful	22.5	25.6	33.5	27.4	27.2	28.8
			Rose Park	21.7	32.0	39.5	31.4	31.1	34.3
			Hawthorne	28.6	26.4	36.5	26.5	30.5	29.8
			UTC	18.8	30.0	41.0	34.4	29.9	35.1
	Annual standard	12 µg/m³	Bountiful	5.68	7.09	7.63	6.95	6.80	7.22
			Rose Park	6.66	8.05	8.99	8.35	7.90	8.46
			Hawthorne	6.22	7.60	8.17	7.36	7.33	7.71
			UTC	7.44	8.21	8.92	8.51	8.19	8.55
Ozone (O_3)	8-hour standard	0.070 ppm	Bountiful	0.073	0.080	0.082	0.075	0.078	0.079
			Rose Park	0.071	0.080	0.079	0.075	0.077	0.078
			Hawthorne	0.073	0.075	0.081	0.072	0.076	0.076
			UTC	0.037	0.070	0.082	0.076	0.063	0.076
Carbon monoxide (CO)	8-hour standard	9 ppm	Bountiful	No data	No data	No data	No data	NA	NA
			Rose Park	1.3	1.4	1.3	1.1	NA	NA
			Hawthorne	1.2	1.2	1.1	1.1	NA	NA
			UTC	1.3	1.3	1.5	1.3	NA	NA
	1-hour standard	35 ppm	Bountiful	No data	No data	No data	No data	NA	NA
			Rose Park	1.6	2.0	2.0	1.5	NA	NA
			Hawthorne	1.9	1.5	1.6	2.0	NA	NA
			UTC	2.1	1.6	1.9	2.2	NA	NA
Nitrogen dioxide (NO_2)	Annual standard	53 ppb	Bountiful	24.40	23.56	24.05	25.55	NA	NA
			Rose Park	27.73	28.97	27.33	28.82	NA	NA
			Hawthorne	28.08	29.24	25.01	27.00	NA	NA
			UTC	39.11	30.24	30.69	32.53	NA	NA
	1-hour standard	100 ppb	Bountiful	46.0	44.1	46.7	49.7	45.6	46.8
			Rose Park	46.8	50.4	48.6	49.8	48.6	49.6
			Hawthorne	55.4	52.6	46.6	51.0	51.5	50.1
			UTC	53.7	48.3	51.4	53.4	51.1	51.0

Source: UDEQ 2023

Definitions: µg/m³ = micrograms per cubic meter, ppb = parts per billion, ppm = parts per million, NA = not applicable, UTC = Utah Technical Center

[a] The full national and Utah standards are shown in Table 3.8-1, *National and Utah Ambient Air Quality Standards for Criteria Pollutants and Attainment Status for Salt Lake and Davis Counties*, above.

3.8.4 Environmental Consequences and Mitigation Measures

This section describes the effects of the project alternatives on air quality. The impacts of construction activities would be temporary and are discussed in Section 3.17.2.2.6, *Air Quality Impacts from Construction*. The operational impacts of the Action Alternative would be long-term and would be largely attributed to highway traffic and vehicle speeds on the highway.

3.8.4.1 Methodology

3.8.4.1.1 Emissions Inventory for Criteria Pollutants, MSATs, and GHGs

UDOT used EPA and FHWA guidelines (EPA 2016, 2020; FHWA 2023a, 2023b), as well as materials used in FHWA-sponsored training classes (for example, "Workshop on NEPA Air Quality Analysis for Highway Projects"), to complete emissions inventories for criteria pollutants, MSATs, and GHGs in the air quality evaluation area. Note that O_3, one of the criteria pollutants, is formed by photochemical reactions between the precursor pollutants, oxides of nitrogen (NO_x) and volatile organic compounds (VOCs). Therefore, emissions inventories were prepared for these two precursor pollutants. The emissions inventories were conducted for the years 2019 (existing conditions), 2035, and 2050. The year 2035 was modeled since this is likely the opening year for the complete project, and the year 2050 was modeled because traffic and demand for transit are not projected to reach their peak until 2050.

EPA's MOVES4 model was used to calculate daily on-road emissions. MOVES4 data inputs were provided by WFRC or were developed from traffic data provided by the traffic consultant using WFRC's travel demand model. MOVES defaults were used for fuel and meteorology inputs.

3.8.4.1.2 Hot-spot Analysis

UDOT conducted a quantitative hot-spot analysis for the following two locations in the air quality evaluation area:

1. **600 South to 600 North Evaluation Area.** The 600 South to 600 North evaluation area includes the section of I-15 between 600 South and just north of 600 North in Salt Lake City (between mileposts 307.8 and 309.9) as well as the section of I-80 between I-80 milepost 119.0 and the I-15 interchange.
2. **I-215 North Salt Lake Interchange Evaluation Area.** The I-215 North Salt Lake interchange evaluation area includes the section of I-15 near the I-215 North Salt Lake interchange, roughly between mileposts 314.2 and 312.8, including all associated ramps, and the section of U.S. 89 between these mileposts. This evaluation area also includes the section of I-215 between I-215 milepost 27.9 and I-15.

600 South to 600 North Evaluation Area. This section of I-15 was selected for a hot-spot analysis for the following reasons:

1. This section of I-15 is projected to have the highest average daily traffic (AADT) with about 8% diesel buses and trucks with the Action Alternative in 2050. For more information, see Table 2, *Estimated AADT and Percentage of Diesel Buses and Trucks on Segments of I-15 in the Project Study Area in 2019 and 2050*, in Appendix 3E, *Project of Air Quality Concern Evaluation*.
2. This section of I-15 is closer to the Rose Park and Hawthorne air quality monitoring stations, which record higher PM_{10} and $PM_{2.5}$ concentrations near the air quality evaluation area than does the Bountiful #2 monitoring station.
3. This section of I-15 is located in Salt Lake County, which is a nonattainment area for $PM_{2.5}$ and a maintenance area for PM_{10}, so the hot-spot analysis was conducted for both PM_{10} and $PM_{2.5}$.
4. This section of I-15 has residential areas on both the east and west sides. Most other sections of I-15 in the air quality evaluation area have industrial areas on at least one side of I-15.

For all of the reasons listed above, UDOT expected that this section of I-15 would have the highest future air pollutant emissions from I-15. This section has the highest projected AADT with the Action Alternative in 2050, and it is near the air quality monitoring stations along the project extent that record the highest PM_{10} and $PM_{2.5}$ concentrations.

I-215 North Salt Lake Interchange Evaluation Area. This section of I-15 was selected for a hot-spot analysis because the Chevron and Big West oil refineries are located on the west side of I-15 at this location and a residential area is located to the northeast. Section 8.2 of EPA's *Transportation Conformity Guidance for Quantitative Hot-spot Analyses in $PM_{2.5}$ and PM_{10} Nonattainment and Maintenance Areas* (EPA 2021) states that nearby emissions sources (such as the Chevron and Big West oil refineries) are individual sources that contribute PM concentrations to a project area.

In the case of the I-215 North Salt Lake interchange evaluation area, the refineries would be considered "nearby" sources. Given that there are residential receptors near this location, a hot-spot analysis was conducted for the I-215 North Salt Lake interchange evaluation area.

This section of I-15 is located in Davis County, which is a nonattainment area for $PM_{2.5}$ and an attainment area for PM_{10}, so the hot-spot analysis for this evaluation area was conducted for $PM_{2.5}$ only. Although the Bountiful #2 monitoring station is the closest monitoring station to the I-215 North Salt Lake interchange evaluation area in terms of distance, the Rose Park monitoring station regularly reports higher values of $PM_{2.5}$ because of its proximity to the airport and nearby highways and refineries. In terms of background data, the Rose Park monitoring station would represent a worst-case scenario for this evaluation area and would better represent background concentrations from nearby emission sources (such as the Chevron and Big West oil refineries). Therefore, background data from the Rose Park monitoring station was used for the hot-spot analysis for the I-215 North Salt Lake interchange evaluation area.

Hot-spot Models and Years of Analysis. UDOT used the MOVES4 emissions model to estimate on-road motor vehicle emission rates from vehicle exhaust, brake wear, and tire wear caused by the Action Alternative. These estimates were then used in AERMOD, an air quality dispersion model, which estimates PM concentrations. UDOT followed EPA guidelines (EPA 2021) to conduct the hot-spot analyses. Appendix 3N, *Air Quality Technical Report: Hot-spot Analysis*, provides more information about the data and

methodology used for the analyses. The hot-spot analyses were conducted for the Action Alternative in the years 2035 and 2050. The year 2035 was modeled since this is likely the opening year for the complete project, and the year 2050 was modeled because traffic and demand for transit are not projected to reach their peak until 2050.

3.8.4.2 Emissions Inventory for Criteria Pollutants

3.8.4.2.1 No-action Alternative

With the No-action Alternative, the improvements associated with the I-15 project would not be made. However, the air quality analysis presumed that other regionally significant transportation projects identified in WFRC's 2023–2050 RTP would still be built and would contribute to local air quality impacts throughout the air quality evaluation area.

As shown in Table 3.8-4, the amount of annual VMT in the evaluation area between 2019 and 2050 is expected to increase due to population and development growth. This growth is expected to occur with or without the I-15 project. However, over the same period, annual on-road emissions of criteria pollutants are expected to decrease, with the exception of PM_{10}, as shown in the table. These emissions reductions are projected to occur even with the expected increase in VMT during the same period. The expected decrease in emissions is due to improved fuel and emissions standards in the future resulting in lower emissions. PM_{10} emissions are expected to increase as a result of increased road dust emissions (road dust emissions increase with increasing VMT).

Table 3.8-4. Annual VMT and On-road Criteria Pollutant Emissions with Each Project Alternative

VMT (vehicle-miles traveled)	2019	2035		2050	
	Existing Conditions	No-action Alternative	Action Alternative	No-action Alternative	Action Alternative
VMT	1,389,642,965	1,728,073,885	1,810,062,375	1,784,512,740	1,994,497,240
Criteria Pollutant (tons/year)	**2019**	**2035**		**2050**	
	Existing Conditions	No-action Alternative	Action Alternative	No-action Alternative	Action Alternative
CO	4,983.70	2,684.80	3,020.40	2,196.87	2,469.04
VOCs	118.15	73.63	77.33	70.60	76.25
NO_x	561.39	138.22	153.39	113.69	127.14
PM_{10}[a]	350.57	387.49	399.75	404.38	444.84
$PM_{2.5}$[b]	14.89	9.15	9.06	9.13	9.32

[a] PM_{10} emissions include vehicle exhaust emissions, tire wear, brake wear, and road dust. Road dust values for 2019 were obtained from WFRC's Air Quality Memorandum Report No. 39, Table 11b (WFRC 2019b), and road dust values for 2050 were obtained from WFRC's Air Quality Memorandum Report No. 41, Table 10b (WFRC 2023b). This report did not include road dust values for the year 2035 (WFRC modeled the year 2032 for conformity analysis), so the 2032 road dust values were used for the year 2035 in this analysis since this was the closest relevant year.

[b] $PM_{2.5}$ emissions include vehicle exhaust emissions, tire wear, and brake wear.

3.8.4.2.2 Action Alternative

Similar to the No-action Alternative, annual on-road emissions of criteria pollutants for the Action Alternative are expected to decrease, with the exception of PM_{10}, compared to existing conditions. As shown above in Table 3.8-4, annual VMT with the Action Alternative is projected increase over the annual VMT with the No-action Alternative in 2035 and 2050. Annual on-road emissions of criteria pollutants with the Action Alternative are expected to increase compared to the No-action Alternative due to increased VMT.

3.8.4.3 Emissions Inventory for MSATs

3.8.4.3.1 No-action Alternative

With the No-action Alternative, the improvements associated with the I-15 project would not be made. However, the air quality analysis presumed that other regionally significant transportation projects identified in WFRC's 2023–2050 RTP would still be built and would contribute to local air quality impacts throughout the air quality evaluation area.

As shown in Table 3.8-5, annual on-road MSAT emissions in the air quality evaluation area are expected to decline from 2019 to 2050, regardless of whether the I-15 project is implemented. These emissions reductions are projected to occur even with an expected increase in VMT during the same period. The expected decrease in emissions is due to improved fuel and emissions standards in the future.

Table 3.8-5. Annual VMT and On-road MSAT Emissions with Each Project Alternative

VMT (vehicle-miles traveled)	2019	2035		2050	
	Existing Conditions	No-action Alternative	Action Alternative	No-action Alternative	Action Alternative
VMT	1,389,642,965	1,728,073,885	1,810,062,375	1,784,512,740	1,994,497,240
	2019	2035		2050	
MSAT (tons/year)	Existing Conditions	No-action Alternative	Action Alternative	No-action Alternative	Action Alternative
1,3-butadiene	0.206	0.001	0.001	0.000	0.000
Acetaldehyde	1.340	0.552	0.586	0.528	0.571
Acrolein	0.147	0.051	0.055	0.048	0.052
Benzene	4.259	3.009	3.191	2.976	3.237
Diesel particulate matter	6.716	0.447	0.503	0.183	0.203
Ethyl benzene	1.892	1.212	1.272	1.167	1.261
Formaldehyde	2.549	1.164	1.236	1.119	1.215
Naphthalene	0.294	0.127	0.135	0.123	0.134
Polycyclic organic matter	0.121	0.053	0.057	0.050	0.055

3.8.4.3.2 Action Alternative

Similar to the No-action Alternative, annual on-road MSAT emissions for the Action Alternative are expected to decrease compared to existing conditions. As shown above in Table 3.8-5, annual on-road MSAT emissions are expected to increase compared to those with the No-action Alternative due to increased VMT.

3.8.4.3.3 Incomplete or Unavailable Information for Analyzing Project-specific MSAT Health Impacts

FHWA has issued standard language that addresses incomplete or unavailable information related to MSATs (FHWA 2023a). That language is repeated here for reference.

> In FHWA's view, information is incomplete or unavailable to credibly predict the project-specific health impacts due to changes in mobile source air toxic (MSAT) emissions associated with a proposed set of highway alternatives. The outcome of such an assessment, adverse or not, would be influenced more by the uncertainty introduced into the process through assumption and speculation rather than any genuine insight into the actual health impacts directly attributable to MSAT exposure associated with a proposed action.
>
> The Environmental Protection Agency (EPA) is responsible for protecting the public health and welfare from any known or anticipated effect of an air pollutant. They are the lead authority for administering the Clean Air Act and its amendments and have specific statutory obligations with respect to hazardous air pollutants and MSAT. The EPA is in the continual process of assessing human health effects, exposures, and risks posed by air pollutants. They maintain the Integrated Risk Information System (IRIS), which is "a compilation of electronic reports on specific substances found in the environment and their potential to cause human health effects" (EPA, https://www.epa.gov/iris/). Each report contains assessments of non-cancerous and cancerous effects for individual compounds and quantitative estimates of risk levels from lifetime oral and inhalation exposures with uncertainty spanning perhaps an order of magnitude.
>
> Other organizations are also active in the research and analyses of the human health effects of MSAT, including the Health Effects Institute (HEI). A number of HEI studies are summarized in Appendix D of FHWA's Updated Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents. Among the adverse health effects linked to MSAT compounds at high exposures are: cancer in humans in occupational settings; cancer in animals; and irritation to the respiratory tract, including the exacerbation of asthma. Less obvious is the adverse human health effects of MSAT compounds at current environmental concentrations (HEI Special Report 16, https://www.healtheffects.org/publication/mobile-source-air-toxics-critical-review-literature-exposure-and-health-effects) or in the future as vehicle emissions substantially decrease.
>
> The methodologies for forecasting health impacts include emissions modeling; dispersion modeling; exposure modeling; and then final determination of health impacts—each step in the process building on the model predictions obtained in the previous step. All are encumbered by technical shortcomings or uncertain science that prevents a more complete differentiation of the MSAT health impacts among a set of project alternatives. These difficulties are magnified for lifetime (i.e., 70-year) assessments, particularly because unsupportable assumptions would have to be made regarding changes in travel patterns and vehicle technology (which affects emissions rates) over that time frame, since such information is unavailable.
>
> It is particularly difficult to reliably forecast 70-year lifetime MSAT concentrations and exposure near roadways; to determine the portion of time that people are actually exposed at a specific location; and

to establish the extent attributable to a proposed action, especially given that some of the information needed is unavailable.

There are considerable uncertainties associated with the existing estimates of toxicity of the various MSAT, because of factors such as low-dose extrapolation and translation of occupational exposure data to the general population, a concern expressed by HEI (Special Report 16, https://www.healtheffects.org/publication/mobile-source-air-toxics-critical-review-literature-exposure-and-health-effects). As a result, there is no national consensus on air dose-response values assumed to protect the public health and welfare for MSAT compounds, and in particular for diesel PM. The EPA states that with respect to diesel engine exhaust, "[t]he absence of adequate data to develop a sufficiently confident dose response relationship from the epidemiologic studies has prevented the estimation of inhalation carcinogenic risk." (EPA IRIS database, Diesel Engine Exhaust, Section II.C, https://iris.epa.gov/static/pdfs/0642_summary.pdf).

There is also the lack of a national consensus on an acceptable level of risk. The current context is the process used by the EPA as provided by the Clean Air Act to determine whether more stringent controls are required in order to provide an ample margin of safety to protect public health or to prevent an adverse environmental effect for industrial sources subject to the maximum achievable control technology standards, such as benzene emissions from refineries. The decision framework is a two-step process. The first step requires EPA to determine an "acceptable" level of risk due to emissions from a source, which is generally no greater than approximately 100 in a million. Additional factors are considered in the second step, the goal of which is to maximize the number of people with risks less than 1 in a million due to emissions from a source. The results of this statutory two-step process do not guarantee that cancer risks from exposure to air toxics are less than 1 in a million; in some cases, the residual risk determination could result in maximum individual cancer risks that are as high as approximately 100 in a million. In a June 2008 decision, the U.S. Court of Appeals for the District of Columbia Circuit upheld EPA's approach to addressing risk in its two-step decision framework. Information is incomplete or unavailable to establish that even the largest of highway projects would result in levels of risk greater than deemed acceptable (https://www.cadc.uscourts.gov/internet/opinions.nsf/284E23FFE079CD59852578000050C9DA/$file/07-1053-1120274.pdf).

Because of the limitations in the methodologies for forecasting health impacts described, any predicted difference in health impacts between alternatives is likely to be much smaller than the uncertainties associated with predicting the impacts. Consequently, the results of such assessments would not be useful to decision makers, who would need to weigh this information against project benefits, such as reducing traffic congestion, accident rates, and fatalities plus improved access for emergency response, that are better suited for quantitative analysis.

3.8.4.4 Emissions Inventory for Greenhouse Gases

3.8.4.4.1 No-action Alternative

With the No-action Alternative, the improvements associated with the I-15 project would not be made. However, the air quality analysis presumed that other regionally significant transportation projects identified in WFRC's 2023–2050 RTP would still be built and would contribute to local air quality impacts throughout the air quality evaluation area.

As shown in Table 3.8-6, between 2019 and 2050, annual on-road CH_4 emissions are expected to decrease, N_2O emissions are expected to increase, and CO_2 emissions are expected to decrease, regardless of whether the I-15 project is implemented. The overall projected decreases in GHG emissions are due to improved fuel and emissions standards in the future.

Table 3.8-6. Annual VMT and On-road GHG Emissions with Each Project Alternative

VMT (vehicle-miles traveled)	2019	2035		2050	
	Existing Conditions	No-action Alternative	Action Alternative	No-action Alternative	Action Alternative
VMT	1,389,642,965	1,728,073,885	1,810,062,375	1,784,512,740	1,994,497,240
GHG (tons/year)	2019	2035		2050	
	Existing Conditions	No-action Alternative	Action Alternative	No-action Alternative	Action Alternative
Methane (CH_4)	27.11	21.36	22.70	21.25	22.71
Nitrous oxide (N_2O)	9.14	10.14	11.64	9.54	10.59
Atmospheric carbon dioxide (CO_2)	598,237	474,516	525,312	435,457	484,005

3.8.4.4.2 Action Alternative

As shown above in Table 3.8-6, annual on-road CH_4 emissions for the Action Alternative are expected to decrease, N_2O emissions are expected to increase, and CO_2 emissions are expected to increase compared to existing conditions. Annual on-road GHG emissions are expected to increase compared to those with the No-action Alternative due to increased VMT. Although fuel economy and engine technology are improving, they are not improving enough to offset the increase in VMT.

3.8.4.4.3 Comparison of the Social Costs of Greenhouse Gases by Alternative

What is a discount rate?

As used in Section 3.8, a discount rate is the rate of return used to discount future cash flows back to their present value.

One of the most important factors influencing SC-GHG estimates is the discount rate. A large portion of climate change damages are expected to occur many decades into the future, and the present value of those damages (the value at present of damages that occur in the future) is highly dependent on the discount rate. Given the long time horizon over which the damages are expected to occur and uncertainty about how rates could change over time, the Interagency Working Group on the Social Cost of Greenhouse Gases (IWG) recommends that agencies use three discount rates to evaluate SC-GHG that span a plausible range of certainty-equivalent constant consumption discount rates: 2.5%, 3%, and 5% per year plus a fourth value, selected as the 95th-percentile of estimates based on a 3% discount rate (IWG 2021).

Table 3.8-7, Table 3.8-8, and Table 3.8-9 provide the discount rates for CH_4, N_2O, and CO_2, respectively, for 2020, 2035, and 2050 as well as the calculated social costs of each GHG for existing conditions, the 2035 and 2050 No-action Alternative, and the 2035 and 2050 Action Alternative. Due to the projected increase in VMT in the air quality evaluation area, which in turn would increase GHG emissions, SC-GHG is higher for the No-action Alternative compared to existing conditions, and the SC-GHG is higher for the Action Alternative compared to the No-action Alternative. Table 3.8-10 summarizes the combined social cost of CH_4, N_2O, and CO_2 for each project alternative.

Table 3.8-7. Social Cost of Methane (CH_4) for the Project Alternatives

Emissions Year[a]	Discount Rate for Social Cost of CH_4 (2020 dollars per metric ton of CH_4)			
	5% Average	3% Average	2.5% Average	3% 95th Percentile
2020	$670	$1,500	$2,000	$3,900
2035	$1,100	$2,200	$2,800	$6,000
2050	$1,700	$3,100	$3,800	$8,200

Conditions or Alternative	CH_4 (tons/year)	Social Cost of CH_4 (dollars per metric ton of CH_4)			
		5% Average	3% Average	2.5% Average	3% 95th Percentile
Existing conditions (2019)[a]	27.11	$18,164	$40,665	$54,220	$105,729
2035 No-action Alternative	21.36	$23,496	$46,992	$59,808	$128,160
2035 Action Alternative	22.70	$24,970	$49,940	$63,560	$136,200
2050 No-action Alternative	21.25	$36,125	$65,875	$80,750	$174,250
2050 Action Alternative	22.71	$38,607	$70,401	$86,298	$186,222

[a] Emissions years are those provided in *Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide Interim Estimates under Executive Order 13990* (IWG 2021). Emissions year 2020 was used to calculate the SC-GHG estimate for the 2019 existing conditions because 2019 was not provided as an option in IWG (2021), and 2035 and 2050 were used to calculate the SC-GHG estimates for the No-action and Action Alternative.

Table 3.8-8. Social Cost of Nitrous Oxide (N_2O) for the Project Alternatives

Emissions Year[a]	Discount Rate for Social Cost of N_2O (2020 dollars per metric ton of N_2O)			
	5% Average	3% Average	2.5% Average	3% 95th Percentile
2020	$5,800	$18,000	$27,000	$48,000
2035	$9,000	$25,000	$36,000	$67,000
2050	$13,000	$33,000	$45,000	$88,000

Conditions or Alternative	N_2O (tons/year)	Social Cost of N_2O (dollars per metric ton of N_2O)			
		5% Average	3% Average	2.5% Average	3% 95th Percentile
Existing conditions (2019)[a]	9.14	$53,012	$164,520	$246,780	$438,720
2035 No-action Alternative	10.14	$91,260	$253,500	$365,040	$679,380
2035 Action Alternative	11.64	$104,760	$291,000	$419,040	$779,880
2050 No-action Alternative	9.54	$124,020	$314,820	$429,300	$839,520
2050 Action Alternative	10.59	$137,670	$349,470	$476,550	$931,920

[a] Emissions years are those provided in *Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide Interim Estimates under Executive Order 13990* (IWG 2021). Emissions year 2020 was used to calculate the SC-GHG estimate for the 2019 existing conditions because 2019 was not provided as an option in IWG (2021), and 2035 and 2050 were used to calculate the SC-GHG estimates for the No-action and Action Alternative.

Table 3.8-9. Social Cost of Atmospheric Carbon Dioxide (CO_2) for the Project Alternatives

Emissions Year[a]	Discount Rate for Social Cost of CO_2 (2020 dollars per metric ton of CO_2)			
	5% Average	3% Average	2.5% Average	3% 95th Percentile
2020	$14	$51	$76	$152
2035	$22	$67	$96	$206
2050	$32	$85	$116	$260

Conditions or Alternative	Atmospheric CO_2 (tons/year)	Social Cost of CO_2 (dollars per metric ton of CO_2)			
		5% Average	3% Average	2.5% Average	3% 95th Percentile
Existing conditions (2019)[a]	598,237	$8,375,318	$30,510,087	$45,466,012	$90,932,024
2035 No-action Alternative	474,516	$10,439,352	$31,792,572	$45,553,536	$97,750,296
2035 Action Alternative	525,312	$11,556,864	$35,195,904	$50,429,952	$108,214,272
2050 No-action Alternative	435,457	$13,934,624	$37,013,845	$50,513,012	$113,218,820
2050 Action Alternative	484,005	$15,488,160	$41,140,425	$56,144,580	$125,841,300

[a] Emissions years are those provided in *Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide Interim Estimates under Executive Order 13990* (IWG 2021). Emissions year 2020 was used to calculate the SC-GHG estimate for the 2019 existing conditions because 2019 was not provided as an option in IWG (2021), and 2035 and 2050 were used to calculate the SC-GHG estimates for the No-action and Action Alternative.

Table 3.8-10. Combined Social Cost of CH_4, N_2O, and CO_2 for the Project Alternatives

Conditions or Alternative	Combined Social Cost of CH_4, N_2O, and CO_2 (2020 dollars per metric ton)			
	5% Average	3% Average	2.5% Average	3% 95th Percentile
Existing conditions (2019)[a]	$8,446,494	$30,715,272	$45,767,012	$91,476,473
2035 No-action Alternative	$10,554,108	$32,093,064	$45,978,384	$98,557,836
2035 Action Alternative	$11,686,594	$35,536,844	$50,912,552	$109,130,352
2050 No-action Alternative	$14,094,769	$37,394,540	$51,023,062	$114,232,590
2050 Action Alternative	$15,664,437	$41,560,296	$56,707,428	$126,959,442

Definitions: CH_4 = methane; CO_2 = carbon dioxide; N_2O = nitrous oxide

[a] Emissions years are those provided in *Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide Interim Estimates under Executive Order 13990* (IWG 2021). Emissions year 2020 was used to calculate the SC-GHG estimate for the 2019 existing conditions because 2019 was not provided as an option in IWG (2021), and 2035 and 2050 were used to calculate the SC-GHG estimates for the No-action and Action Alternative.

As shown above in Table 3.8-10, the combined SC-GHG is about 11% higher for the Action Alternative compared to the No-action Alternative using any of the discount rates.

3.8.4.5 Hot-spot Analyses600 South to 600 North Evaluation Area

Table 3.8-11 shows the results of the project-level hot-spot analyses for 24-hour PM_{10}, 24-hour $PM_{2.5}$, and annual $PM_{2.5}$ for the 600 South to 600 North evaluation area for the years 2035 and 2050 (for specific details

regarding the methodology and calculations, refer to Appendix 3N, *Air Quality Technical Report: Hot-spot Analysis*). The modeling showed that predicted pollutant concentrations (design concentrations in Table 3.8-11) at all receptors in the evaluation area do not exceed the 24-hour PM_{10}, 24-hour $PM_{2.5}$, or annual $PM_{2.5}$ NAAQS for the Action Alternative. Because design concentrations are equal to or less than the NAAQS, the I-15 project meets all conformity requirements.

Table 3.8-11. Modeled Design Values for PM_{10} and $PM_{2.5}$ for the 600 South to 600 North Evaluation Area in 2035 and 2050

In $\mu g/m^3$

Pollutant	Modeled Value[a]	Background Concentration[b]	Design Concentration[c]	NAAQS
2035				
24-hour PM_{10}	48.8	104.0	150[d]	150
24-hour $PM_{2.5}$	1.5	27.9	29[e]	35
Annual $PM_{2.5}$	0.8	8.1	8.9[f]	12.0
2050				
24-hour PM_{10}	49.4	104.0	150[d]	150
24-hour $PM_{2.5}$	1.0	27.9	29[e]	35
Annual $PM_{2.5}$	0.6	8.1	8.7[f]	12.0

Definitions: $\mu g/m^3$ = micrograms per cubic meter; $PM_{2.5}$ = particulate matter 2.5 microns in diameter or less; PM_{10} = particulate matter 10 microns in diameter or less

[a] Modeled values were derived from AERMOD, an air quality dispersion model. Modeled values are reported to one decimal place beyond the NAAQS value.

[b] Background concentrations were derived using the methodology described in Appendix 3N, *Air Quality Technical Report: Hot-spot Analysis*. Background concentrations are reported to one decimal place beyond the NAAQS value.

[c] Design values were calculated by adding modeled receptor values to background monitor values. The resulting design value concentration was then compared to the NAAQS.

[d] 24-hour PM_{10} design value is rounded to the nearest 10 $\mu g/m^3$ (EPA 2021). The modeled value plus the background concentration would sum to 152.8 for 2035 and 153.4 for 2050, both of which would round to 150 (the nearest 10 $\mu g/m^3$).

[e] 24-hour $PM_{2.5}$ design value is rounded to the nearest 1 $\mu g/m^3$ (EPA 2021).

[f] Annual $PM_{2.5}$ design value is rounded to the nearest 0.1 $\mu g/m^3$ (EPA 2021).

3.8.4.5.1 I-215 North Salt Lake Interchange Evaluation Area

Table 3.8-12 shows the results of the project-level hot-spot analyses for 24-hour $PM_{2.5}$ and annual $PM_{2.5}$ for the I-215 North Salt Lake interchange evaluation area for the years 2035 and 2050 (for specific details regarding the methodology and calculations, refer to Appendix 3N, *Air Quality Technical Report: Hot-spot Analysis*). The modeling showed that predicted pollutant concentrations (design concentrations in Table 3.8-12) at all receptors in the evaluation area do not exceed the 24-hour $PM_{2.5}$ or annual $PM_{2.5}$ NAAQS for the Action Alternative. Because design concentrations are equal to or less than the NAAQS, the I-15 project meets all conformity requirements.

Table 3.8-12. Modeled Design Values for PM_{10} and $PM_{2.5}$ for the I-215 North Salt Lake Interchange Evaluation Area in 2035 and 2050

In $\mu g/m^3$

Pollutant	Modeled Value[a]	Background Concentration[b]	Design Concentration[c]	NAAQS
2035				
24-hour $PM_{2.5}$	1.6	27.9	30[d]	35
Annual $PM_{2.5}$	0.6	8.1	8.7[e]	12.0
2050				
24-hour $PM_{2.5}$	1.0	27.9	29[d]	35
Annual $PM_{2.5}$	0.4	8.1	8.5[e]	12.0

Definitions: $\mu g/m^3$ = micrograms per cubic meter; $PM_{2.5}$ = particulate matter 2.5 microns in diameter or less

[a] Modeled values were derived from AERMOD, an air quality dispersion model. Modeled values are reported to one decimal place beyond the NAAQS value.

[b] Background concentrations were derived using the methodology described in Appendix 3N, *Air Quality Technical Report: Hot-spot Analysis*. Background concentrations are reported to one decimal place beyond the NAAQS value.

[c] Design values were calculated by adding modeled receptor values to background monitor values. The resulting design value concentration was then compared to the NAAQS.

[d] 24-hour $PM_{2.5}$ design value is rounded to the nearest 1 $\mu g/m^3$ (EPA 2021).

[e] Annual $PM_{2.5}$ design value is rounded to the nearest 0.1 $\mu g/m^3$ (EPA 2021).

3.8.4.6 FHWA Project-level Conformity Determination

As described in Section 3.8.2.2, *Transportation Conformity Requirements*, federal agencies are required to make a conformity determination before adopting, accepting, approving, or funding an activity or project located in a nonattainment or maintenance area. A conformity determination is a finding that the activity or project conforms to the SIP's purpose of "eliminating or reducing the severity and number of violations" of the NAAQS and "achieving expeditious attainment of the NAAQS" [42 USC Section 7506(c)] and that the project or activity will not:

- Cause or contribute to new air quality violations of the NAAQS
- Worsen existing violations of the NAAQS
- Delay timely attainment of the NAAQS or required interim milestones

To demonstrate project-level conformity, a project must come from a conforming RTP and TIP. Section 3.8.2.2.1, *Transportation Conformity Compliance*, describes that the I-15 project is included in WFRC's 2023–2050 RTP (WFRC 2023a) and 2023–2028 TIP (WFRC 2022). In addition, the hot-spot analyses showed that predicted pollutant concentrations at all receptors in the hot-spot evaluation areas do not exceed the 24-hour PM_{10}, 24-hour $PM_{2.5}$, or annual $PM_{2.5}$ NAAQS for the Action Alternative. Therefore, the I-15 project meets all conformity requirements.

FHWA approved the final project-level conformity determination on October 2, 2024. A copy of the project-level air quality conformity determination is included in Attachment I, *FHWA Project-level Conformity Determination*, of Appendix 3N, *Air Quality Technical Report: Hot-spot Analysis*.

3.8.4.7 Mitigation Measures

Regional modeling conducted by WFRC for the 2050 transportation conformity analyses demonstrated that all regionally significant transportation projects (including the I-15 project) would not adversely affect local compliance with the NAAQS. Atmospheric CO_2 and PM_{10} emissions are projected to increase in 2050 with the Action Alternative due to the projected increase in VMT in the air quality evaluation area. The amounts of all other pollutants are projected to decrease in future years due to improved fuel and emissions standards. Therefore, no mitigation is proposed related to the project operations. See Section 3.17.3.6, *Mitigation Measures for Air Quality Impacts from Construction*, for the proposed air quality mitigation related to construction.

3.9 Noise

3.9.1 Introduction

Section 3.9 describes the existing noise conditions in the noise evaluation area and the expected noise impacts of the project alternatives. Traffic noise impacts are evaluated using the noise model and methodologies approved by FHWA and UDOT (FHWA 2011; UDOT 2020b).

Where appropriate, noise barriers or other abatement measures are evaluated to mitigate noise impacts, and recommendations are made for noise-abatement measures consistent with UDOT Policy 08A2-01, *Noise Abatement*, revised May 28, 2020. For detailed information about the UDOT noise analysis described in Section 3.9, see Appendix 3F, *Noise Technical Report*.

Noise Evaluation Area. The noise evaluation area is the land adjacent to the Action Alternative that could be affected by an increase in noise levels to a distance of about 500 feet.

Noise Policy Applicability. Under UDOT's noise-abatement policy, the I-15 EIS is classified as a Type I project since the project's Action Alternative is proposing changes to the horizontal and vertical alignments of existing roads.

3.9.2 Regulatory Setting

The federal regulation that FHWA uses to assess noise impacts is 23 CFR Part 772, *Procedures for Abatement of Highway Traffic Noise and Construction Noise*. This regulation was updated on July 13, 2010. The highway traffic noise prediction requirements, noise analysis, and noise-abatement criteria described in Section 3.9 are consistent with 23 CFR Part 772 and with Utah Administrative Code Rule R930-3, *Highway Noise Abatement*.

Utah Administrative Code Rule R930-3 and UDOT's noise-abatement policy establish UDOT's noise impact and abatement policies and procedures. Since UDOT's noise-abatement policy is consistent with 23 CFR Part 772 and has been approved by FHWA, it was used by UDOT for the noise impact analysis in this EIS.

Noise-abatement Criteria. FHWA has established noise-abatement criteria (NAC) for several categories of land use activities (Table 3.9-1). FHWA's NAC are based on sound levels that are considered to be an impact to nearby noise-sensitive areas, also known as receivers. According to FHWA guidance, UDOT must give primary consideration for noise abatement to exterior areas that are frequently used by people.

UDOT has developed a noise-abatement policy for transportation projects, which conforms to FHWA's noise abatement requirements in 23 CFR Part 772.

For each land use category, UDOT's noise-abatement criterion is the A-weighted noise decibel (dBA) value reflecting the approach criterion of 1 dBA below the noise-abatement criterion value listed in 23 CFR Part 772 for that land use category (Table 3.9-1).

UDOT's noise-abatement policy states that a traffic noise impact occurs when either (1) the future worst-case noise level is equal to or greater than the UDOT noise-abatement criterion for a specified land-use category or (2) the future worst-case noise level is greater than or equal to an increase of 10 dBA over the existing noise level.

Noise impact and abatement analyses are required within land use activity categories A, B, C, D, and E (Table 3.9-1) only when development exists or has been permitted (formal building permit issued prior to the date when the final environmental decision document is approved). Activity categories F and G include lands that are not sensitive to traffic noise. There are no impact criteria for these land use types, and an analysis of noise impacts is not required.

For this noise analysis, aerial photographs and on-site visits were used to identify existing land uses and structure locations. UDOT also requested information from the Cities and Counties to identify planned and approved developments in the noise evaluation area.

Section 3.9.4.1, *Methodology*, describes how impacts are assessed for noise.

Table 3.9-1. UDOT's Noise-abatement Criteria

Activity Category	FHWA Criterion L_{eq} (dBA)	L_{eq} Noise Level (dBA)	Evaluation Location	Description of Activity Category
A	57	56	Exterior	Lands on which serenity and quiet are of extraordinary significance and serve an important public need, and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	67	66	Exterior	Residential.
C	67	66	Exterior	Active sports areas, amphitheaters, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails and trail crossings.
D	52	51	Interior	Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting room, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios.
E	72	71	Exterior	Hotels, motels, offices, restaurants/bars, and other developed lands, properties, or activities not included in categories A–D or F.
F	—	—	—	Agriculture, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical), and warehousing.
G	—	—	—	Undeveloped lands that are not permitted for other types of development.

Source: UDOT 2020b

Definitions: dBA = A-weighted decibels; L_{eq} = equivalent sound level

3.9.3 Affected Environment

The noise evaluation area contains a mix of residential developments, parks, recreation areas, schools, churches, commercial properties, industrial areas, and undeveloped land. The properties in the evaluation area fall within activity categories B, C, D, E, F, and G under UDOT's NAC. The predominant source of noise in the evaluation area is automobile, bus, and truck traffic on I-15, I-215, U.S. 89, the interchange cross-streets, and other roads in the area.

3.9.3.1 Noise Monitoring

Existing noise levels in the noise evaluation area for existing conditions were determined by taking short-term (20-minute) sound-level measurements at 40 locations throughout the evaluation area with an Extech Instruments 407780A Type II integrating sound-level meter. On-site measurements were taken between November 12 and November 19, 2021.

Noise-measurement locations were selected to represent existing residential developments or other areas of frequent human outdoor use where people could be exposed to traffic noise for extended periods. Traffic was counted during the short-term monitoring events so that vehicle counts and vehicle classifications could be determined. Weather conditions and other parameters that could affect measured noise levels were noted. Noise measurements were conducted under the following conditions:

- Wind speeds less than 12 miles per hour
- Dry weather conditions
- Dry road conditions

The 40 noise-monitoring locations (ML) are shown in Figure 3.9-1 and listed in Table 3.9-2. The noise descriptor used in the noise monitoring is the hourly equivalent sound level (L_{eq}).

The measured noise levels and traffic information collected in the field were used to validate FHWA's Traffic Noise Model (TNM) version 2.5. These measured noise levels were also used to establish baseline conditions. The traffic volumes were also counted at each of the monitoring locations shown above in Table 3.9-2 and were used to determine vehicle mix (that is, the percentage of cars, medium trucks, and heavy trucks) during each measurement period as well as the directional flow of traffic on the roads.

By following this process of measuring noise and counting traffic volumes and vehicle mixes at each monitoring location, UDOT does not need to monitor noise at every receiver and can develop a noise model that can predict the noise levels at all receivers in the evaluation area for existing and future conditions. This process of validating the noise model ensures that the measured noise levels recorded in the field agree with the traffic volumes recorded during the measurement period.

Measured noise levels that are within 3 dBA of the modeled noise are considered accurate for the purpose of validating the noise model. As shown in Table 3.9-2, the modeled noise levels were within 3 dBA of the measured noise levels, so the TNM is considered valid for use on this project.

Figure 3.9-1. Noise-monitoring Locations

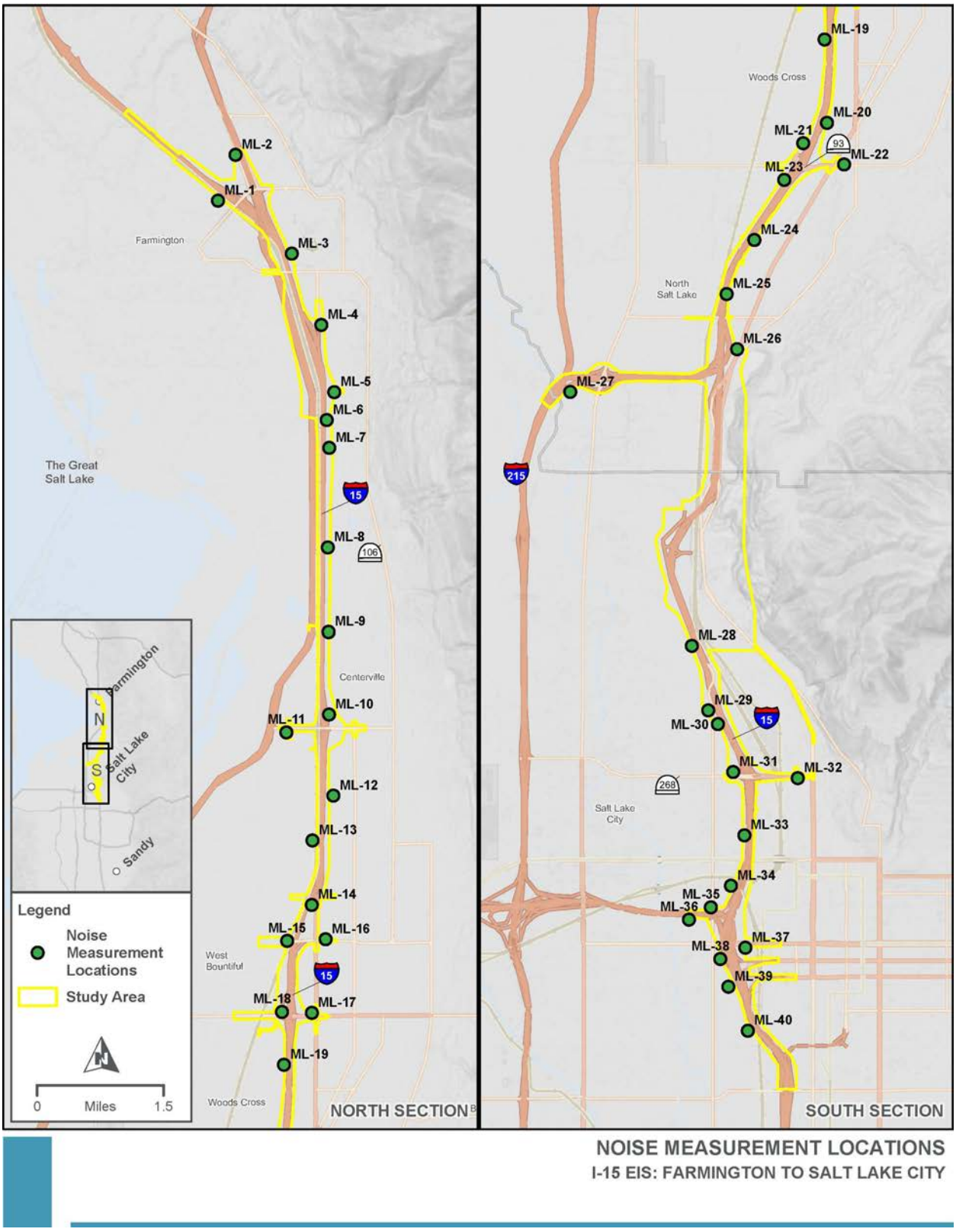


Table 3.9-2. Measured Short-term Noise Levels in the Noise Evaluation Area

Monitoring Location	Address	Activity Category and Noise Level (dBA L_{eq})	Measured Noise Level (dBA L_{eq} rounded)	Modeled Noise Level (dBA)	Difference (dBA)
ML-1[a]	Park Lane Village; 500 Broadway, Farmington	B (66)	—	—	—
ML-2[a]	Residence; 932 Spring Pond Drive, Farmington	B (66)	—	—	—
ML-3	Lagoon RV Park and Campground; 375 Lagoon Drive, Farmington	C (66)	66	63	–3
ML-4	Covington Senior Living; 430 South Brookside Drive, Farmington	B (66)	60	60	0
ML-5	Residence; 53 West Glovers Lane, Farmington	B (66)	67	64	–3
ML-6	Residence; 1138 South 110 West, Farmington	B (66)	67	67	0
ML-7	South Park; 1384 South Farmington Road, Farmington	C (66)	63	68	5[b]
ML-8	Residence; 773 West 1875 North, Centerville	B (66)	70	69	–1
ML-9	Community Park; 1350 North 400 West, Centerville	C (66)	73	71	–2
ML-10	McDonald's; 529 North 700 West, Centerville	E (71)	66	69	3
ML-11	Maverick; 1265 West Parrish Lane, Centerville	E (71)	61	59	–2
ML-12	Residence; 402 South 675 West, Centerville	B (66)	62	65	3
ML-13	West Bountiful City Park; 550 West 1600 North, West Bountiful	C (66)	—	—	—
ML-14	Country Inn and Suites; 999 North 500 West, Bountiful	E (71)	71	72	1
ML-15	Residence; 417 North 660 West, West Bountiful	B (66)	62	65	3
ML-16	Residence; 444 West, 400 North, Bountiful	B (66)	—	—	—
ML-17	McDonald's; 500 South, West Bountiful	E (71)	—	—	—
ML-18	Residence; 680 West 500 South, West Bountiful	B (66)	67	70	3
ML-19	Woods Cross Elementary School; 745 West 1100 South, Woods Cross	C (66)	68	69	1
ML-20	Woods Cross High School; 600 West 2200 South, Woods Cross	C (66)	71	74	3
ML-21	Motel 6; 2433 South 800 West, Woods Cross	E (71)	—	—	—
ML-22	Nielsen's Frozen Custard; 570 West 2600 South, Bountiful	E (71)	—	—	—
ML-23	Residence; 240 East 1100 North, North Salt Lake	B (66)	—	—	—
ML-24	Residence; 106 Wilson Drive, North Salt Lake	B (66)	70	69	–1

(*Continued on next page*)

Table 3.9-2. Measured Short-term Noise Levels in the Noise Evaluation Area

Monitoring Location	Address	Activity Category and Noise Level (dBA L_{eq})	Measured Noise Level (dBA L_{eq} rounded)	Modeled Noise Level (dBA)	Difference (dBA)
ML-25	Residence; 158 North 125 West, North Salt Lake	B (66)	73	71	2
ML-26	Chile Amor; 220 U.S. 89, North Salt Lake	E (71)	—	—	—
ML-27	Pony Express RV Resort; 1012 Recreation Way, North Salt Lake	C (66)	—	—	—
ML-28	Rosewood Park; 1400 North 1200 West, Salt Lake City	C (66)	69	70	1
ML-29	Residence; 948 Poinsettia Drive, Salt Lake City	B (66)	68	70	2
ML-30	Santo Taco; 910 North 900 West, Salt Lake City	E (71)	63	66	3
ML-31	Residence; 608 North 800 West, Salt Lake City	B (66)	—	—	—
ML-32	Residence; 578 North 400 West, Salt Lake City	B (66)	71	72	1
ML-33	Mary W. Jackson Elementary School; 750 West 200 North, Salt Lake City	C (66)	67	66	1
ML-34	Residence; 49 South 800 West, Salt Lake City	B (66)	—	—	—
ML-35	Chunga's; 180 South 900 West, Salt Lake City	E (71)	—	—	—
ML-36	Residence; 1033 Pierpont Avenue, Salt Lake City	B (66)	—	—	—
ML-37[a]	King's Peak Coffee Roasters; 412 South 700 West Suite 140, Salt Lake City	E (71)	59	62	3
ML-38[a]	Residence; 844 West 500 South, Salt Lake City	B (66)	—	—	—
ML-39[a]	Residence; 650 South 800 West, Salt Lake City	B (66)	—	—	—
ML-40[a]	9-Line Community Garden Playground; 725 West 900 South, Salt Lake City	C (66)	—	—	—

[a] These monitoring locations are outside the limits of improvements for the Action Alternative and were not used to validate the noise model.

[b] A 17-foot-tall noise wall is currently under construction in this area as part of the West Davis Corridor project, which is not included in the validation model.

3.9.3.2 Existing Noise Levels in the Noise Evaluation Area

The predominant source of noise in the evaluation area is automobile, bus, and truck traffic on I-15, I-215, U.S. 89, the interchange cross streets, and other roads in the area.

3.9.3.2.1 Methodology for Existing Traffic Model

UDOT evaluated existing noise levels using noise models and methodologies approved by FHWA and UDOT (UDOT Policy 08A2-01, *Noise Abatement*, revised May 28, 2020). Areas within 500 feet from the edge of the proposed right-of-way of the Action Alternative were reviewed to identify UDOT land use activity categories (primarily residential, schools, and recreation sites) and to select representative receivers for the existing conditions and proposed project noise analyses. The 500-foot buffer is a large enough area to encompass all locations potentially affected by the Action Alternative. More details about the methodology and data used for the noise model for the existing conditions analysis are provided in Appendix 3F, *Noise Technical Report*.

3.9.3.2.2 Summary of Existing Noise Model Results

The noise model developed for the existing conditions scenario included 5,219 receivers, including 5,000 residential receivers (land use activity category B), 152 receivers in land use activity category C, 21 receivers in land use activity category D, and 46 receivers in land use activity category E. Under the existing conditions, 1,789 receivers experience a noise level above the NAC threshold. The noise levels for the existing conditions and locations of the receivers are shown in Appendix 3F, *Noise Technical Report*.

Overall, noise levels with the existing conditions range from 45 to 81 dBA.

3.9.4 Environmental Consequences and Mitigation Measures

3.9.4.1 Methodology

According to UDOT's noise-abatement policy, a traffic noise impact occurs when either of the following conditions occurs at a sensitive land use (that is, at land uses defined in activity categories A, B, C, D, or E):

- The future-year worst-case noise level is equal to or greater than the UDOT NAC listed above in Table 3.9-1, *UDOT's Noise-abatement Criteria*, for each corresponding land-use category, or
- The future-year worst-case noise level is equal to or greater than an increase of 10 dBA over the existing noise level (a substantial increase). This second impact criterion applies regardless of existing noise levels.

Traffic-related noise impacts with the Action Alternative were estimated with TNM version 2.5 based on the roadway design for the Action Alternative.

The TNM estimates acoustic intensity at receiver locations based on the level of sound energy generated from a series of straight-line road segments. Where appropriate, the effects of local shielding from existing structures (for example, existing barriers and rows of homes), terrain, and other adjustment factors were included in the model to provide higher levels of detail and accuracy. The noise impact analysis for the Action Alternative used the same receivers that were used for the existing conditions analysis; these receivers are located within 500 feet from the edge of the proposed right-of-way of the Action Alternative.

What is level of service?

Level of service (LOS) is a measure of the operating conditions on a road or at an intersection. Level of service is represented by a letter "grade" ranging from A (free-flowing traffic and little delay) to F (extremely congested traffic and excessive delay).

The noise models for the Action Alternative used traffic volumes at a level of service of LOS C to represent the worst-case noise conditions while traffic is operating at uncongested, free-flow speeds for the proposed project noise analyses. The TNM inputs also include traffic volume and speed for the following vehicle classifications: automobiles, medium trucks, heavy trucks, and buses. More details are provided in Appendix 3F, *Noise Technical Report*.

3.9.4.2 No-action Alternative

Noise levels with the No-action Alternative would be the same as those modeled for the existing conditions.

The noise model developed for the existing conditions scenario included 5,219 receivers, including 5,000 residential receivers (land use activity category B), 152 receivers in land use activity category C, 21 receivers in land use activity category D, and 46 receivers in land use activity category E. Under the existing conditions, 1,789 receivers experience a noise level above the NAC threshold. The noise levels for the existing conditions and locations of the receivers are shown in Appendix 3F, *Noise Technical Report*.

Overall, noise levels with the existing conditions range from 45 to 81 dBA.

3.9.4.3 Action Alternative

Overall, noise levels with the Action Alternative would range from 47 to 86 dBA compared to the existing conditions of 45 to 81 dBA.

With the Action Alternative, 3,272 to 3,288 of the 5,219 receivers would have traffic noise impacts; that is, they would exceed the NAC as defined in Section 3.9.2, *Regulatory Setting*. A total of 545 to 549 of the impacted receivers would have future worst-case noise levels greater than or equal to an increase of 10 dBA over the existing noise level. The locations of those receivers exceeding the NAC are shown in Appendix 3F, *Noise Technical Report*.

Noise during construction is discussed in Section 3.17.2.2.7, *Noise Impacts from Construction*.

3.9.4.3.1 Summary of Action Alternative Impacts

Table 3.9-3 summarizes the Action Alternative noise impacts for each segment and option.

Table 3.9-3. Summary of Noise Impacts from the Action Alternative

Segment	Option(s)	Impacts
North	Farmington State Street Option	1,299
	Farmington 400 West Option	1,294
South	Salt Lake City 1000 North – Northern Option	1,989
	Salt Lake City 1000 North – Southern Option	1.981
	Minimum impacts (sum of lowest impacts for each segment)	3,275
	Maximum impacts (sum of highest impacts for each segment)	3,288
	Range of impacts	3,275 to 3,288

As listed in Table 3.9-3 above, the Action Alternative would cause noise impacts to 3,275 to 3,288 total receivers, depending on the option selected for each segment. The noise impacts among the Action Alternative options would not be substantially different. The Farmington 400 West Option would have 2 more noise impacts than the Farmington State Street Option. The Salt Lake City 1000 North – Northern Option would have 8 more noise impacts than the Salt Lake City 1000 North – Southern Option. The Action Alternative would cause a net increase of 1,483 to 1,499 noise impacts compared to the existing conditions and the No-action Alternative, and 1,789 receivers would exceed UDOT's NAC levels.

For each Action Alternative option, detailed summary tables with the existing and build noise levels and maps showing the receiver locations are included in Attachment B, *Summary of Existing and Action Alternative Noise Levels*, of Appendix 3F, *Noise Technical Report*.

3.9.4.4 Mitigation Measures

According to UDOT's noise-abatement policy, specific conditions must be met before traffic noise abatement is implemented. Noise abatement must be considered both feasible and reasonable.

The factors considered when determining whether abatement is feasible are:

- **Engineering Considerations.** Engineering considerations such as safety, presence of cross streets, sight distance, access to adjacent properties, wall height, topography, drainage, utilities, maintenance access, and maintenance of the abatement measure must be taken into account as part of establishing feasibility. Noise-abatement measures are not intended to serve as privacy fences or safety barriers. Abatement measures installed on structures would not exceed 10 feet in height measured from the top of deck or roadway to the top of the noise wall. Noise walls would not be installed on structures that require retrofitting to accommodate the noise-abatement measure. Noise-abatement measures would be considered if the project meets the criteria established in this policy if structure replacement is included as part of the project. Abatement measures shall be consistent with general American Association of State Highway and Transportation Officials (AASHTO) design principles.
- **Safety on Urban Non-access-controlled Roads.** To avoid a damaged barrier from becoming a safety hazard, in the event of a failure, barrier height must be no greater than the distance from the back-of-curb to the face of the proposed barrier. Because the distance from the back-of-curb to the face of a proposed barrier varies, barrier heights that meet this safety requirement might also vary.
- **Acoustic Feasibility.** Noise abatement must be considered "acoustically feasible." This is defined as achieving at least a 5-dBA highway traffic noise reduction for at least 50% of front-row receivers.

The following factors are considered when determining whether abatement is reasonable:

- **Noise-abatement Design Goal.** Every reasonable effort should be made to obtain substantial noise reductions. UDOT defines the minimum noise reduction (design goal) from proposed abatement measures to be 7 dBA or greater for at least 35% of front-row receivers.
- **Cost-effectiveness.** The cost of a noise-abatement measure must be deemed reasonable in order for it to be included in a project. Noise-abatement costs are based on a fixed unit cost of $20 per square foot, multiplied by the height and length of the wall, in addition to the cost of any other item associated with the abatement measure that is critical to safety. The fixed unit cost is based on the historical average cost of noise walls installed on UDOT projects and is reviewed at regular intervals, not to exceed 5 years. The cost-effectiveness of abatement is determined by analyzing the cost of a wall that would provide a noise reduction of 5 dBA or more for a benefited receiver. A reasonable cost is considered to be a maximum of $30,000 per benefited receiver for activity category B and $360 per linear foot for activity categories A, C, D, or E. If the anticipated cost of the noise-abatement measure is less than the allowable cost, then the abatement is deemed reasonable.

  The cost-effectiveness calculation also takes into account the cost of any items associated with the abatement measure that is critical to safety, such as snow storage and safety barriers where applicable.
- **Viewpoints of Property Owners and Residents.** As part of the final design phase for the Action Alternative, balloting would take place if noise-abatement measures meet the feasible criteria and reasonable noise-abatement design goal and cost-effectiveness criteria (listed above) in UDOT's noise-abatement policy.

  Section C.2I of UDOT's noise-abatement policy requires balloting for all benefited receivers (property owners or tenants that would receive a 5-dBA or greater reduction in noise from the noise-abatement measure) or receivers whose property would abut the proposed noise-abatement measures. Balloting approval is contingent on at least 75% of the total ballots being returned and 75% of the returned ballots being in favor of the proposed noise-abatement measure.

The Final EIS noise analysis includes the preliminary results based on an evaluation of all three feasibility factors and the reasonable noise-abatement design goal and cost-effectiveness factors. The evaluation of the reasonableness factor for the "viewpoints of property owners and residents" would take place as part of the final design phase for the Action Alternative.

3.9.4.4.1 Noise Barriers

For a noise barrier to be effective, it must be high enough and long enough to block the view of the noise source from the receiver's perspective. FHWA's *Highway Traffic Noise: Analysis and Abatement Guidance* states that a good "rule of thumb" is that the noise barrier should extend 4 times as far in each direction as the distance from the receiver to the barrier. For instance, if the receiver is 50 feet from the proposed noise barrier, the barrier needs to extend at least 200 feet on either side of the receiver in order to shield the receiver from noise traveling past the ends of the barrier.

Openings in noise barriers for driveway and cross street access greatly reduce the effectiveness of noise barriers. Therefore, impacted receivers with direct access onto local streets do not qualify for noise barriers.

The anticipated cost of each wall was calculated by multiplying the wall area and the wall cost per square foot ($20). The allowable cost was calculated using two variables: (1) activity category B allowable cost and (2) activity category C allowable cost. The category B allowable cost was calculated by multiplying the allowable cost per benefited receiver ($30,000) by the number of receivers benefited by the wall. The category C allowable cost was calculated by multiplying the length of the wall associated with category C land use by the allowable cost for category C land ($360 per linear foot). These two variables, activity category B allowable cost and activity category C allowable cost, were combined to produce the allowable cost for each wall (for detailed wall analyses, see Appendix 3F, *Noise Technical Report*).

For areas with noise impacts that do not have an existing noise wall, in an effort to provide an objective analysis of traffic noise reduction at impacted receivers, a variety of noise wall heights were considered. If multiple wall heights would meet noise-abatement requirements, the shortest wall height found to be both feasible and reasonable would be recommended for balloting.

UDOT's noise-abatement policy requires the replacement "in kind" of any existing noise wall. For areas with noise impacts that have an existing noise wall, UDOT evaluated only noise wall heights as tall as or taller than the existing noise wall height. For some replacement walls, UDOT also evaluated extensions to the replacement walls if the Action Alternative would have noise impacts to receivers beyond the ends of the existing walls. More details are included in Appendix 3F, *Noise Technical Report*.

A total of 26 noise barriers were considered for the Action Alternative. See Attachment D, *Noise Wall Maps,* in Appendix 3F, *Noise Technical Report*.

3.9.4.4.2 Noise-abatement Evaluation for the Action Alternative

UDOT evaluated 21 noise barriers at locations where noise impacts would occur with the Action Alternative. Eight of the 21 noise barriers were new noise barriers, and 13 of the 21 noise barriers were replacement noise barriers consistent with UDOT's noise-abatement policy. Three of the 8 new noise barriers met UDOT's feasibility and reasonableness acoustic and cost criteria with the Action Alternative. Maps showing the locations of the noise walls evaluated for the Action Alternative and more detailed information is available for each barrier in Appendix 3F, *Noise Technical Report*.

Table 3.9-4 summarizes the analyzed noise barriers and the results of the noise barrier analysis for the Action Alternative. The locations of the noise barriers are shown in Figure 3.9-2 through Figure 3.9-4 and in Attachment D, *Noise Wall Maps*, of Appendix 3F, *Noise Technical report*.

The 3 new noise barriers and 13 replacement noise barriers recommended in this analysis would provide a benefit (at least a 5-dBA reduction) to 1,568 to 1,647 receivers.

Noise-abatement Consideration during Final Design. Recommended noise walls in the noise evaluation area that met the requirements of UDOT's noise-abatement policy are summarized in Table 3.9-4. A barrier identified as recommended for balloting is a barrier that has been shown to meet the feasible criteria and reasonable design goal and cost-effectiveness criteria as defined in UDOT's noise-abatement policy. However, that finding is not a commitment to build a barrier.

Noise barriers shown in this analysis include replacement noise barriers for areas with existing noise walls and new or extended noise walls for locations modeled to have noise impacts from the Action Alternative. The final height for replacement noise barriers would be at least equal to the existing height. The new noise barriers are preliminary and must meet the feasibility and reasonableness requirements of the UDOT noise-abatement policy.

The final lengths and heights for any of the noise barriers identified in the environmental study phase are still subject to final design and the feasibility and reasonable criteria as defined in the UDOT noise-abatement policy (and summarized in Section 3.9.4.4, *Mitigation Measures*). UDOT would not make a decision whether to construct the proposed noise barrier until the project design is completed and refined utility relocation and right-of-way costs are available. Reasonableness would be evaluated using refined costs based on the final design.

UDOT will conduct balloting for the proposed noise-abatement measures with the final design engineering considerations and costs that meet the feasibility criteria and reasonable design goal and cost-effectiveness criteria as defined in UDOT's noise-abatement policy. As described above, Section I(c) of UDOT's noise-abatement policy requires balloting for all benefited receivers (property owners or tenants that would receive a 5-dBA or greater reduction in noise from the noise-abatement measure) or receivers whose property would abut the proposed noise-abatement measures. Balloting approval is contingent on at least 75% of the total ballots being returned and 75% of the returned ballots being in favor of the proposed noise-abatement measure.

Table 3.9-4. Barrier Analysis Summary

Proposed Barrier	Segment/Options	New Barrier or Replacement of Existing Barrier?	Is Barrier Feasible, Reasonable, and Recommended for Balloting? (applicable to new walls only)	Recommended Barrier Height, Length
1	North – Farmington State Street Option	New	No	NA
1	North – Farmington 400 West Option	New	No	NA
2	North – Farmington State Street Option	New	Yes	16 feet, 1,651 feet
2	North – Farmington 400 West Option	New	Yes	10 feet, 1,704 feet
3	North/both options	New	No	NA
4	North/both options	Replacement	NA	16 feet, 4,199 feet
5	North/both options	Replacement	NA	17 feet, 12,345 feet
6	North/both options	Replacement	NA	16 feet, 4,481 feet
7	North/both options	Replacement	NA	13 feet, 986 feet
8	North/both options	New	No	NA
9	North/both options	New	No	NA
10	North/both options	Replacement	NA	13 feet, 3,381 feet
11	North/both options	Replacement	NA	14 feet, 1,880 feet
12	North/both options	Replacement	NA	12 feet, 4,343 feet
13	North/both options	Replacement	NA	14 feet, 1,370 feet
14	North/both options	New	Yes	15 feet, 1,557 feet
15	North/both options	New	No	NA
16	North/both options	New	Yes	11 feet, 650 feet
17	North and South/both options	Replacement	NA	16 feet, 9,243 feet
18	South/1000 North Northern Option	Replacement	NA	12 feet, 1,726 feet
18	South/1000 North Southern Option	Replacement	NA	12 feet, 1,372 feet
19	South/1000 North Northern Option	Replacement	NA	16 feet, 3,282 feet
19	South/1000 North Southern Option	Replacement	NA	16 feet, 4,442 feet
20	South/both options	Replacement	NA	14 feet, 4,250 feet
21	South/both options	Replacement	NA	14 feet, 4,524 feet

Figure 3.9-2. Noise Wall Evaluation (1 of 3)

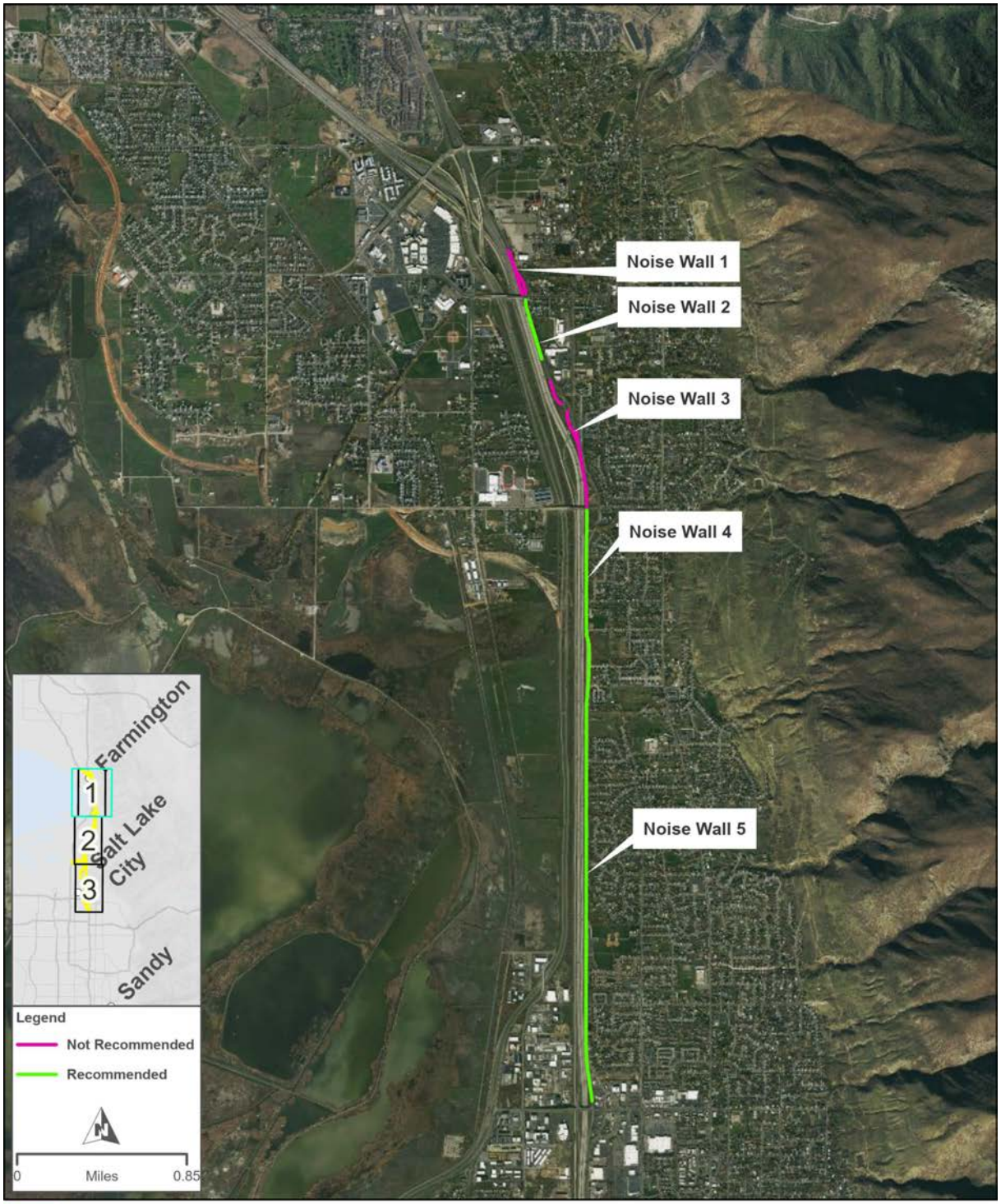


Figure 3.9-3. Noise Wall Evaluation (2 of 3)

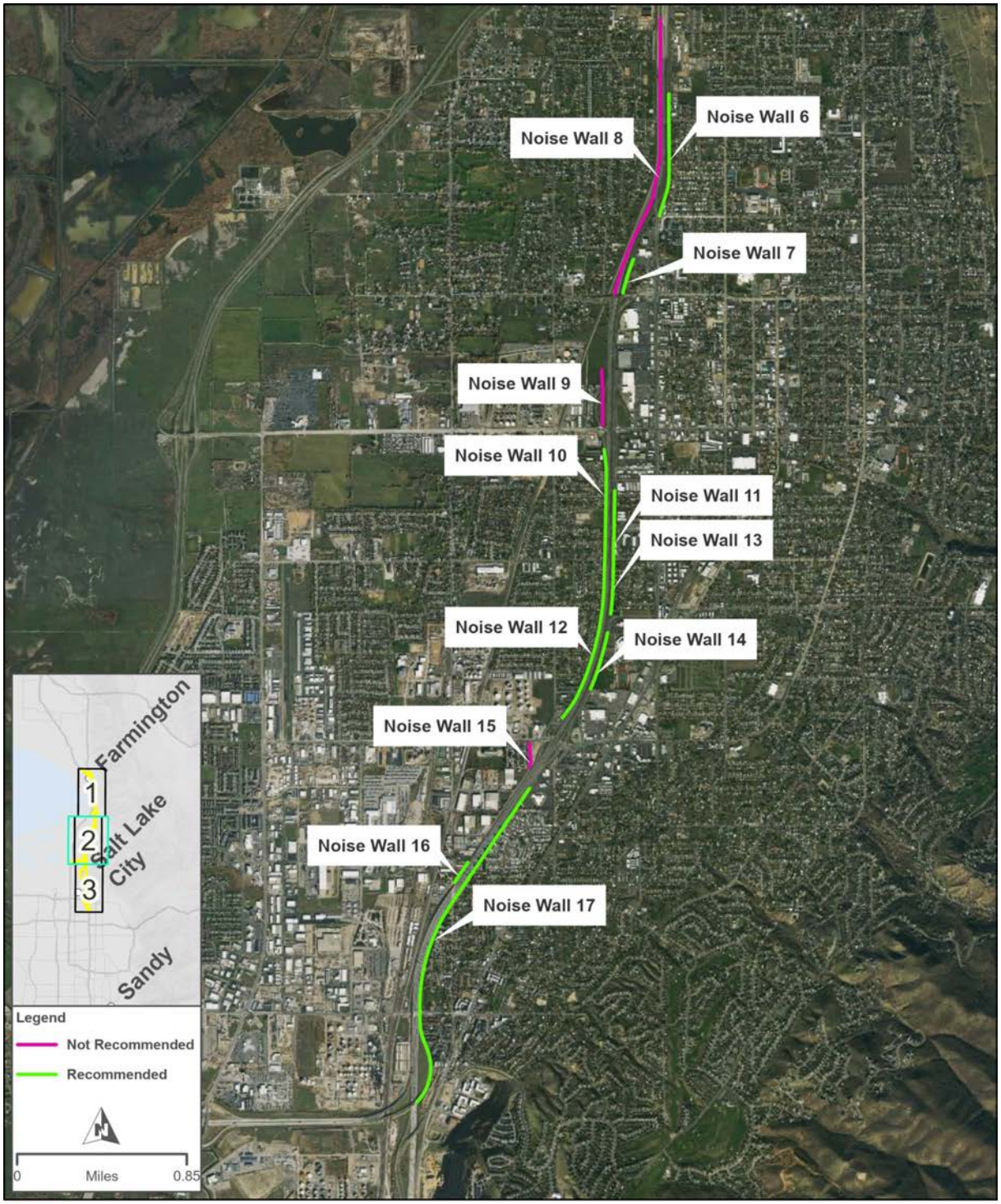
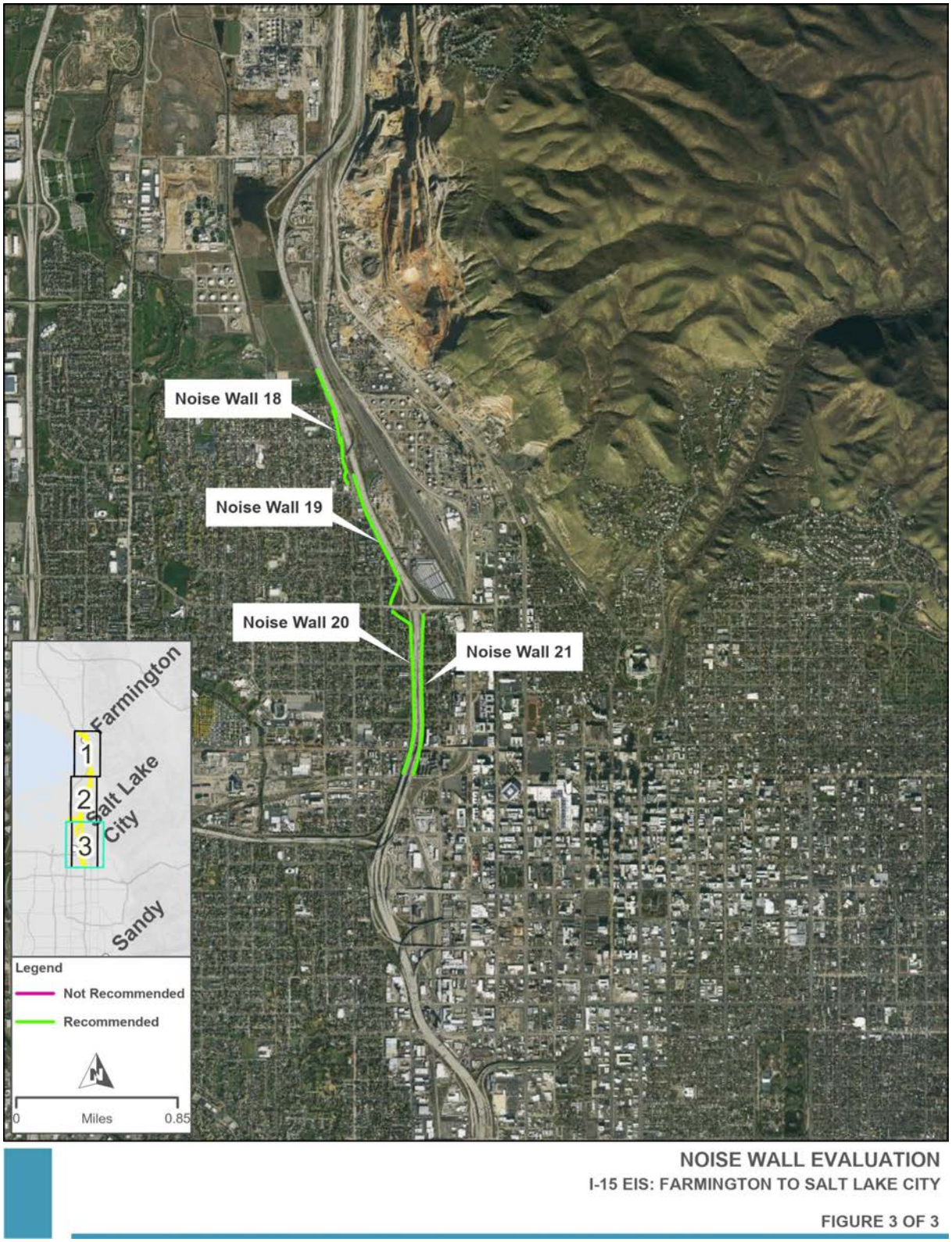


Figure 3.9-4. Noise Wall Evaluation (3 of 3)



3.10 Historic and Archaeological Resources

3.10.1 Introduction

Section 3.10 describes the cultural resources in the area of potential effects and the effects of the project alternatives on these resources.

The National Historic Preservation Act (NHPA) regulations establish the criteria for eligibility as a historic property. To be considered "historic," a resource must be deemed significant according to the National Register of Historic Places (NRHP) criteria (Table 3.10-1), possess integrity, and generally be at least 50 years old. To account for the amount of time that could elapse between identifying resources and implementing any project decision, UDOT identified and evaluated cultural resources that were at least 41 years old at the time of the 2021 field surveys (that is, constructed in or before 1980).

For this analysis, *cultural resources* include historic architectural and archaeological resources. *Architectural resources* can include structures, objects, historic buildings, or districts composed of these resources. In Section 3.10, they are also referred to as simply *architectural resources* or *historic buildings*. *Archaeological resources* are sites, features, structures, or districts that are composed primarily of nonarchitectural elements.

Area of Potential Effects. The area of potential effects (APE), or the survey area for cultural resources, is the corridor around I-15 and its cross streets. The APE was defined to encompass the combined areas of anticipated physical disturbance, right-of-way acquisition, and easements for the Action Alternative and the segment options being evaluated in this EIS. The approximate acreage of the APE is 4,848 acres. The Utah State Historic Preservation Office (SHPO) concurred with this APE in a letter dated September 24, 2021. The letter from the Utah SHPO is provided in Appendix 3I, *Cultural Resources Correspondence*.

What are the responsibilities of the Utah SHPO?

The Utah SHPO is responsible for carrying out the responsibilities of the National Historic Preservation Act of 1966 in Utah. These responsibilities include surveying, evaluating, and nominating significant historic buildings, sites, structures, districts, and objects to the National Register of Historic Places.

3.10.2 Regulatory Setting

Section 106 of the NHPA (16 USC Section 470), as amended, requires that federally funded projects, projects requiring a federal license or approval, or projects subject to state or local regulation administered pursuant to a delegation or approval by a federal agency be evaluated for their effects on historic properties listed in, or eligible for listing in, the NRHP. Also, the Utah Historic Preservation Act (Utah Code Annotated Section 9-8-401 and subsequent sections) was passed to provide protection of "all antiquities, historic and prehistoric ruins, and historic sites, buildings, and objects which, when neglected, desecrated, destroyed, or diminished in aesthetic value, result in an irreplaceable loss to the people of this state."

UDOT has assumed FHWA's responsibilities for complying with the NHPA for certain federal-aid highway projects under a May 26, 2022, Memorandum of Understanding pursuant to 23 USC Section 327, which applies to the I-15 project. UDOT's Section 106 responsibilities are further defined in the *Third Amended Programmatic Agreement among the Federal Highway Administration, the Utah State Historic Preservation Officer, the Advisory Council on Historic Preservation, the United States Army Corps of Engineers,*

Sacramento District, and the Utah Department of Transportation Regarding Section 106 Implementation for Federal-Aid Transportation Projects in the State of Utah (UDOT 2017b).

The term *eligible for listing in the NRHP* includes properties that meet the NRHP criteria as determined by the lead agency, with concurrence from the SHPO. The NRHP criteria (36 CFR Part 63) are listed in Table 3.10-1.

Table 3.10-1. Criteria for Evaluating Eligibility for the NRHP

NRHP Criterion	Characteristic
A	Associated with events that have made a significant contribution to the broad patterns of our history.
B	Associated with the lives of persons significant in our past.
C	Embody distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic value, or that represent a significant and distinguishable entity whose components may lack individual distinction.
D	Yielded, or may likely to yield, information important in prehistory or history.

Sources: NPS 1997; 36 CFR Part 63

The Utah SHPO has developed a rating system (Table 3.10-2) to qualify buildings in a reconnaissance-level survey to be used in conjunction with the NRHP criteria for evaluation.

Table 3.10-2. Utah SHPO Rating Definitions for Historic Structures

SHPO Rating	Characteristic
Eligible/Significant (ES)	Built within the historic period and retains integrity; excellent example of a style or type; unaltered or only minor alterations or additions; individually eligible for the NRHP under criterion “C”; also buildings of known historical significance.
Eligible/Contributing (EC)	Built within the historic period and retains integrity; good example of a style or type, but not as well-preserved or well-executed as “ES” buildings; more substantial alterations or additions than “ES” buildings, though overall integrity is retained; eligible for the NRHP as part of a potential historic district or primarily for historical, rather than architectural, reasons.
Ineligible/Non-contributing (NC)	Built during the historic period but has had major alterations or additions; no longer retains integrity.
Ineligible/Out-of-period (OP)	Constructed outside the historic period.

3.10.3 Affected Environment

3.10.3.1 Consultation

Section 106 of the NHPA requires the lead federal agency to consult with the state historic preservation officer, tribal historic preservation officer, and other consulting parties (such as certified local governments and members of the general public with an interest in the project), as applicable. The Section 106 consultation process is intended to provide interested consulting parties with an opportunity to review determinations or eligibility, findings of effect, and avoidance, minimization, or mitigation options to resolve adverse effects.

UDOT consulted with the Utah SHPO, Native American tribes, and other potential consulting party entities as part of the effort to define the APE, identify historic architectural and archaeological properties, and determine the expected effects of the Action Alternative.

The SHPO concurred with eligibility determinations for historic architectural and archaeological properties in a letter dated March 22, 2023, which is included in Appendix 3I, *Cultural Resources Correspondence*.

UDOT sent letters to the following Native American tribes, and other entities with preservation interests, inviting them to become consulting parties under Section 106 of the NHPA:

- Cedar Band of Paiutes
- Confederated Tribes of Goshute Reservation
- Eastern Shoshone Tribe of the Wind River Reservation
- Northwestern Band of Shoshone Nation
- Shivwits Band of Paiute Indian Tribe of Utah
- Shoshone-Bannock Tribes of the Fort Hall Reservation
- Skull Valley Band of Goshute Indians
- Ute Indian Tribe of the Uintah and Ouray Reservation
- Salt Lake County certified local government (CLG)
- Bountiful CLG
- Centerville CLG
- Farmington CLG
- Salt Lake City
- Clark Lane Historical Preservation Association
- Utah Professional Archaeological Council
- Preservation Utah

To date, no responses have been received from the tribes. Responses accepting the invitations to become consulting parties have been received from the Salt Lake County CLG, the Centerville CLG, and the Clark Lane Historical Preservation Association. See Chapter 6, *Coordination*, for additional details regarding agency consultation.

UDOT has received comments from the Clark Lane Historical Preservation Association as part of the alternatives development process public comment period that ended in January 2023 and as part of the Draft EIS comment period that ended in November 2023.

UDOT submitted its Determinations of Eligibility (DOE) report for historic architectural and archaeological properties to the Utah SHPO on March 17, 2023. The Utah SHPO concurred with all determinations in a letter dated March 23, 2023. UDOT submitted its Findings of Effect (FOE) report for historic architectural and archaeological properties to the Utah SHPO on July 25, 2023. The Utah SHPO concurred with all findings in a letter dated July 31, 2023. UDOT submitted an amended FOE report for historic architectural and archaeological properties for the Final EIS to the Utah SHPO on March 21, 2024. The Utah SHPO concurred with all findings in a letter dated March 22, 2024. UDOT also developed a Memorandum of Agreement (MOA) with the Utah SHPO to mitigate for adverse effects to historic properties. The MOA was signed on April 18, 2024. Copies of the correspondence between UDOT and the Utah SHPO are provided in Appendix 3I, *Cultural Resources Correspondence*.

3.10.3.2 Historic Architectural Resources

A historic structures survey conducted for the I-15 project identified previously documented buildings and structures as well as other buildings and structures that could be eligible for listing in the NRHP using the Utah SHPO ratings criteria (see Table 3.10-2, *Utah SHPO Rating Definitions for Historic Structures*, above). Fifty-six of the 328 previously documented buildings and structures had been demolished. Ultimately, 429 structures in the APE were determined to be eligible for listing in the NRHP. Of these, 377 structures are recommended as eligible/contributing (EC) and 52 structures are recommended as eligible/significant (ES) under the Utah Division of State History's rating system. The report *Selective Reconnaissance-level Survey for the I-15: Salt Lake City 600 North to Farmington EIS, Salt Lake and Davis Counties, Utah* (Horrocks 2023c) contains additional details including descriptions, locations, and pictures of the properties. Descriptions and photos of the potentially affected properties are included in Appendix 3I, *Cultural Resources Correspondence,* and the locations are shown in Appendix 3H, *Cultural Resources Maps*.

3.10.3.3 Archaeological Sites

An archaeological inventory conducted for the I-15 project identified 11 NRHP-eligible archaeological sites in the APE (Table 3.10-3). The reports *A Cultural Resource Inventory for the I-15: 600 North to Farmington Environmental Impact Study* (Horrocks 2022c), *A Cultural Inventory of Additional Areas for the I-15: 600 North to Farmington Environmental Impact Study* (Horrocks 2023b), and *Supplementary Areas for the I-15; 600 North to Farmington Environmental Impact Study* (Horrocks 2023d) contain additional details. Locations are shown in Appendix 3H, *Cultural Resources Maps*.

Table 3.10-3. NHRP-eligible Archaeological Sites in the APE

Site Number(s)	Site Name	NRHP Evaluation
42DV2	Prehistoric Artifact Scatter	Eligible (Criterion D)
42DV86/42SL293	Denver & Rio Grande Western Railroad	Eligible (Criterion A)
42DV89	Historic Earthen Berms/Lake Shore Resort	Eligible (Criterion A)
42DV87/42SL300	Union Pacific Railroad	Eligible (Criteria A, B, and C)
42DV93	Historic Trash Deposit	Eligible (Criterion D)
42DV126/42SL489	Historic Oil Drain	Eligible but not contributing (Criterion A)
42DV187	Historic Oakridge Golf Course	Eligible (Criterion A)
42DV197/42SL513	Historic Sewage Canal	Eligible but not contributing (Criterion A)
42SL718	Denver & Rio Grande Western Historic Railroad Repair Yard	Eligible but not contributing (Criteria A, C, and D)
42SL729	Historic Trolley Line	Eligible but not contributing (Criterion A)

Sources: Horrocks 2022c, 2023b

3.10.4 Environmental Consequences and Mitigation Measures

3.10.4.1 Methodology

The cultural resources identified in the APE and that are eligible for listing in the NRHP were then evaluated to determine whether the Action Alternative would impact those resources. Impacts (also called effects) could be direct or indirect.

- A **direct impact** is a physical alteration of any portion of the primary historic building, contributing historic outbuilding(s), or historically associated land as a result of one or more of the segment options. Includes activities that would diminish those qualities of the site that contribute to its historic significance.
- An **indirect impact** is an effect that is removed in space or time, such as a visual, audible, or atmospheric impact.

Once UDOT determined that an eligible historic property would be impacted, the next step was to assess whether there could be an “adverse effect” on those resources pursuant to Section 106 regulations. UDOT assessed the nature and extent of those effects on the characteristics of the resource that make it eligible for listing in the NRHP under a particular criterion. If an option would alter the important characteristics such that some portion of the resource’s eligibility would be affected, an adverse effect was considered likely. If the option would not significantly alter those important characteristics, the option was considered to have no adverse effect on the resource.

UDOT’s amended FOE, which was submitted to the Utah SHPO on March 21, 2024, provides greater detail regarding the effects findings. The Utah SHPO concurred with all findings in a letter dated March 22, 2024, which is provided in Appendix 3I, *Cultural Resources Correspondence*.

3.10.4.2 No-action Alternative

With the No-action Alternative, the I-15 project would not be implemented. The No-action Alternative would have no effect on archaeological sites or eligible historic architectural resources and would result in a finding of **no historic properties affected**.

3.10.4.3 Action Alternative

The Action Alternative would affect both historic architectural resources and archaeological sites. The summary of these effects is provided in the following sections. The Action Alternative would result in an overall finding of **adverse effect**. This effect would apply for any combination of options. The following subsections describe the effects on historic architectural resources and archaeological sites for each option for each of the four segments.

3.10.4.3.1 Historic Architectural Resources

The sections below summarize the impacts to architectural resources for each of the two segments of the Action Alternative. The address for the architectural resources with adverse effects is included in the summary sections below. The list of the architectural resources with no adverse effect is included in Appendix 3G, *Architectural Impacts*. “No adverse effects on architectural resources” include situations in which UDOT would need to acquire a small piece of property from a parcel that contains an eligible historic building, but the acquisition of this small piece of property would not have any direct effects on the eligible historic building. The “no adverse effects” also include situations in which the UDOT would obtain temporary construction easements on parcels that contain eligible historic buildings. The temporary construction easements include work associated with replacing or reconstructing noise walls, sidewalks, or driveway accesses on the edge of a parcel, but they would not have any direct effects on the eligible historic buildings.

North Segment Impacts

The impacts to architectural resources in the north segment would be the same for both the Farmington 400 West Option and the Farmington State Street Option. Both of these options would have an **adverse effect** on four architectural resources (399 W. State Street in Farmington, the Clark Lane Historic District in Farmington, 409 South 500 West in Bountiful, and U.S. Bank at 1090 North 500 East in North Salt Lake) and would have **no adverse effect** on 77 architectural resources (see Appendix 3G, *Cultural Resource Impact Tables*).

- The impact to 399 W. State Street would be considered an **adverse effect** because the Action Alternative would require the acquisition and demolition of the eligible historic building.
- The adverse effect on 399 W. State Street in Farmington and the potential loss of trees on State Street east of 400 West would also be considered an **adverse effect** on the Clark Lane Historical District.
- The impact to 409 South 500 West would be considered an **adverse effect** because the Action Alternative would remove the historic sign and encroach on the parking area on the west side main entrance to the property.

- The U.S. Bank building at 1090 North 500 East in North Salt Lake would not be demolished with the Action Alternative. However, the Action Alternative would require UDOT to acquire and remove parking stalls and part of the drive-through lane for the bank, which is considered a potential business relocation. If UDOT purchases and resells the historic structure, the impact would be considered an **adverse effect** because the new owner might remove or modify the eligible historic building.

South Segment Impacts

The impacts to architectural resources in the south segment would be the same for both the Salt Lake City 1000 North – Northern Option and the Salt Lake City 1000 North – Southern Option. Both of these options would have an **adverse effect** on one architectural resource (a Quonset hut at 825 N. Warm Springs Road in Salt Lake City) and would have **no adverse effect** on 26 architectural resources (see Appendix 3G, *Cultural Resource Impact Tables*). The impact to the Quonset hut at 825 N. Warm Springs Road would be considered an **adverse effect** because the Action Alternative would require acquiring and demolishing the eligible historic building.

3.10.4.3.2 Archaeological Sites

The sections below summarize the impacts to archaeological sites for each of the four segments of the Action Alternative.

North Segment Impacts

The impacts to archaeological sites in the north segment would be the same for both the Farmington 400 West Option and the Farmington State Street Option. Both of these options would require the following 11 crossings of the Union Pacific Railroad tracks and would have **no adverse effect** on site 42DV87/42SL300, Union Pacific Railroad:

- Reconstruction of four existing grade-separated road crossings (road over the railroad tracks at State Street in Farmington, Glovers Lane in Farmington, Parrish Lane in Centerville, and 400 North in Bountiful and West Bountiful). The existing bridges at these crossings are not historic.
- Reconstruction of one existing at-grade road and sidewalk crossing at Pages Lane in Centerville and West Bountiful.
- Construction of two new grade-separated SUP crossings (SUP over the railroad tracks), at the Centerville Community Park pedestrian bridge crossing and at 200 North in Centerville.
- Construction of four underground drainage crossings (drainage pipes would cross under the railroad tracks) near Lund Lane, 1825 North, 1175 North, and Chase Lane in Centerville.

All 10 of these crossings would be considered **no adverse effect** because the railroad alignment and the historic integrity of the railroad tracks would not be changed as a result of the road or drainage crossings.

South Segment Impacts

The impacts to archaeological sites in the south segment would be the same for both the Salt Lake City 1000 North – Northern Option and the Salt Lake City 1000 North – Southern Option. Both of these options would have **no adverse effect** on the following three archaeological sites:

- **Site 42DV86/42SL293 (Denver & Rio Grande Western Railroad)** at I-215 would have four grade-separated crossings (road over the railroad tracks). These four grade-separated crossings include reconstruction of two existing crossings (southbound to eastbound ramp and westbound to northbound ramp) and construction of two new crossings (a new westbound connection to I-215 from U.S. 89 and a new eastbound connection from I-215 to U.S. 89). The existing bridges at these crossings are not historic.
- **Site 42SL729 (Historic Trolley Line)** at 200 South in Salt Lake City would have a road over the historic trolley line. This would be a reconstruction of the existing I-15 crossing over the historic trolley line.
- **Site 42DV87/42SL300 (Union Pacific Railroad)** would have eight crossings of the railroad tracks:
  - Reconstruction of five existing grade-separated road crossings (road over the railroad tracks) at I-215 (southbound-to-westbound ramp and eastbound-to-northbound ramp), at I-15 near 2300 North in Salt Lake City, at 600 North in Salt Lake City, and at South Temple in Salt Lake City. The existing bridges at these crossings are not historic.
  - Reconstruction of one existing at-grade road and SUP crossing at Center Street in North Salt Lake.
  - Construction of three new grade-separated road crossings (road over the railroad tracks) at I-215 (a new westbound connection to I-215 from U.S. 89 and a new eastbound connection from I-215 to U.S. 89) and at 2100 North in Salt Lake City.

The crossings of the two railroads and the historic trolley line would be considered **no adverse effect** because the railroad and historic trolley line alignments and the historic integrity of the railroad tracks and historic trolley line would not be changed as a result of the road crossings.

3.10.4.3.3 Summary of Action Alternative Impacts

Table 3.10-4 shows the impacts associated with each segment and option of the Action Alternative. As shown in Table 3.10-4, the Action Alternative would have an **adverse effect** on 5 architectural resources, **no adverse effect** on 103 architectural resources, and **no adverse effect** on 3 archaeological resources regardless of which options are selected.

Table 3.10-4. Summary of Impacts to Cultural Resources from the Action Alternative

Segment	Option	Architecture Impacts	Archaeological Site Impacts
North	Farmington 400 West Option or Farmington State Street Option	4 adverse effects 77 no adverse effects	1 – no adverse effect on 42DV87/42SL300 (Union Pacific Railroad)
South	Salt Lake City 1000 North – Northern Option or Salt Lake City 1000 North – Southern Option	1 adverse effect 26 no adverse effects	3 – No adverse effect on 42DV87/42SL300 (Union Pacific Railroad), 42DV86/42SL293 (Denver & Rio Grande Western Railroad), and 42SL729 (Historic Trolley Line)
	Total impacts for Action Alternative	5 adverse effects 103 no adverse effects	3 no adverse effects

3.10.4.4 Mitigation Measures

3.10.4.4.1 Mitigation Measures for Impacts to Eligible Historic Architecture Resources

The Action Alternative would have an **adverse effect** on architectural resources. UDOT coordinated with the Utah SHPO, the Farmington Historic Commission, the Clark Lane Historical Preservation Association, the Salt Lake County CLG, tribes, and other consulting parties, as appropriate, to develop specific mitigation measures for the architectural resources that would have adverse effects from the project. These mitigation measures are documented in the MOA, which is included in Appendix 3I, *Cultural Resources Correspondence*, of this EIS.

The following mitigation measures for adversely affected historic buildings will be implemented:

- UDOT will be responsible for documenting the following buildings: 399 W. State Street in Farmington, 409 South 500 West in Bountiful, 1090 North 500 East in North Salt Lake, and 825 N. Warm Springs Road in Salt Lake City. The buildings will be documented according to the Utah State Intensive-level Survey Standards (ILS) as required by the Utah SHPO. Documentation will include completed historic site forms, which will be based partly on title searches and obituary research, photographs of the exterior of the buildings, a sketch map of the property layout, aerial photograph maps indicating the location of the buildings, and a U.S. Geological Survey map (scale: 1:24,000) showing the location of the buildings. The detailed documentation will also include the history of its occupants and uses since it was constructed.
- UDOT will develop an addendum to the Farmington Main Street Historic District nomination to include properties located between the Main Street and Clark Lane Historic Districts along State Street from Main Street to 200 West in Farmington. The addendum will include a reconnaissance-level survey of the properties to be added to the district, research to determine significance, and completion of the National Register of Historic Places nomination form.
- UDOT will contribute $8,000 to the Farmington Historic Museum to support digitization, archival, and exhibit efforts. Digitization may include scanning documentation of historic properties in the historic districts, family histories, or photographs and the archival digital storage of these documents.
- UDOT will replant all trees along State Street in Farmington and in the Clark Lane National Register District that are removed as part of the Action Alternative.

3.10.4.4.2 Mitigation Measures for Impacts to Archaeological Sites

The Union Pacific Railroad tracks, the Denver & Rio Grande Western Railroad tracks, and a historic trolley line are the eligible archaeological sites that would be impacted by the project. The project proposes to bridge most of the railroad crossings and the historic trolley crossing. The project's two at-grade railroad crossings already exist. Because the Action Alternative has been designed to have **no adverse effect** on archaeological sites, no specific mitigation measures are necessary.

3.11 Water Quality and Water Resources

3.11.1 Introduction

Section 3.11 describes the existing conditions of surface water and groundwater in the water quality and water resources evaluation area. This section also discusses the expected effects of the project alternatives on surface water and groundwater.

The focus of this section is on the expected impacts to water quality and water resources after the proposed improvements and project elements associated with the Action Alternative have been constructed. Water quality impacts during construction are addressed in Section 3.17, *Construction Impacts*. The existing conditions of riparian areas and wetlands, and the expected impacts to these areas from the project alternatives, are discussed in Section 3.12, *Ecosystem Resources*. Impacts to regulatory floodplains from the project alternatives are discussed in Section 3.13, *Floodplains*.

The main recurring impact to water quality is from highway stormwater runoff that flows off impervious areas of the highway surface during a precipitation event. This runoff could pick up pollutants and, in the absence of retention facilities, carry them to receiving water bodies.

Water Quality and Water Resources Evaluation Area. The water quality and water resources evaluation area is the combined project right-of-way or footprint for all options that are part of the Action Alternative. The evaluation area also includes the upstream watersheds of Farmington Creek, Ricks Creek, and Mill Creek, as well as downstream watershed areas for Ricks Creek and Mill Creek, which are outside the project right-of-way or footprint. These areas are included in the water quality modeling to establish a baseline water quality and to help assess the expected impacts of the project alternatives to surface water quality.

3.11.2 Regulatory Setting

The Utah Divisions of Water Quality (UDWQ) and Drinking Water (UDDW) within the Utah Department of Environmental Quality (UDEQ) regulate the quality of Utah's water bodies. These agencies act pursuant to delegated authority to enforce the federal Clean Water Act and the federal Safe Drinking Water Act and pursuant to Utah's water quality laws and regulations. The water quality laws and regulations that apply to the I-15: Farmington to Salt Lake City Project are summarized in Table 3.11-1 and discussed in the following sections.

Table 3.11-1. Laws and Regulations Related to Water Quality

Regulation	Regulating Agency and Requirement	Applicability
Clean Water Act Section 401 Utah Water Quality Certification (Utah Administrative Code [UAC] Rule [R] 317-15)	If a Clean Water Act Section 404 permit is needed for the I-15: Farmington to Salt Lake City Project, the Section 404 permit would require UDEQ to certify that the project would not cause Utah water quality standards (numeric and narrative) to be exceeded. This certification is a Section 401 Water Quality Certification.	Water Quality Certification UDEQ provides this certification to the U.S. Army Corps of Engineers if a Section 404 permit is required.
Clean Water Act Section 402 (UAC R317-8) NPDES Permit (UPDES in Utah, regulates discharges)	EPA has delegated authority for the National Pollutant Discharge Elimination System (NPDES) program in Utah to UDEQ. Construction projects that discharge stormwater to surface water and construction projects that disturb 1 or more acres of land must obtain a Utah Pollutant Discharge Elimination System (UPDES) permit to minimize impacts to water quality associated with construction activities. Operators of municipal separate storm sewer systems (MS4), such as UDOT, must comply with their UPDES permit to minimize water quality impacts associated with discharges from the project site. If dewatering activities discharge project water to surface waters during construction, a UPDES Construction Dewatering or Hydrostatic Testing General Permit must be obtained.	UPDES Permits Required for roadway construction stormwater discharges to surface water such as dewatering activities that discharge project water to surface waters. Compliance with UDOT's MS4 UPDES permit for ongoing operations is also required for all facilities.
UAC R317-2-7-2, *Narrative Water Quality Standards* (limits discharges)	This regulation states that it is unlawful to discharge into surface waters substances that could cause undesirable effects on human health or aquatic life.	Narrative Standards Surface water discharges must comply with narrative standards.
UAC R317-2-14 *Numeric Criteria (in-stream standards)*	Numeric standards for water quality are based on the water's designated beneficial uses, such as providing drinking water, supporting game fish, or supporting swimming. For surface waters exceeding water quality standards for pollutants identified on the state 303(d) list (of impaired waters), this regulation requires UDEQ to develop a total maximum daily load (TMDL) study to restore water quality standards and beneficial uses.	Numeric Standards Surface water discharges are permitted as long as beneficial uses are protected. Discharges to water with approved TMDL studies need to comply with pollutant load allocations defined in the TMDL studies.
UAC R317-2-3, *Antidegradation Policy*	UDEQ assigns protection categories to manage the allowable level of degradation of water bodies in the state. Antidegradation procedures are applied to each protection category on a parameter-by-parameter basis. Antidegradation reviews are required for any action that requires a Section 401 Water Quality Certification or UPDES permit or has the potential to significantly degrade water quality.	Antidegradation Review Might be required to support the Section 401 Water Quality Certification required by the U.S. Army Corps of Engineers Section 404 permit.
UAC R309-605, *Drinking Water Source Protection for Surface Waters* (regulates activities near drinking water sources)	Owners of public water systems are responsible for protecting sources of drinking water and for submitting a drinking water source protection plan to the Utah Division of Drinking Water. Such plans must identify drinking water source protection zones around each drinking water source (such as a lake or river), existing sources of contamination, and the types of new construction projects that are restricted within each zone.	Source Protection Land uses and potential sources of contamination should be managed in compliance with the drinking water source protection plans.

(Continued on next page)

Table 3.11-1. Laws and Regulations Related to Water Quality

Regulation	Regulating Agency and Requirement	Applicability
Clean Water Act Section 404 UAC R655-13, *Stream Alteration*	Any changes to a natural streambed and stream banks require a Clean Water Act Section 404 permit for stream alteration. This permit, which has been jointly authorized by the U.S. Army Corps of Engineers and the State of Utah, can be obtained from the Utah Division of Water Rights pursuant to certain rules.	Stream Alteration Permit Any project that proposes to alter a natural stream must receive a state stream alteration permit for those activities.
UAC R317-6, *Groundwater Quality Protection*	UDEQ classifies aquifers and permits discharges to groundwater to protect and maintain groundwater quality. Permits are required for discharges to groundwater.	Groundwater Discharge Permits Stormwater management facilities are "permitted by rule" by the Utah Division of Water Quality.

Definitions: EPA = U.S. Environmental Protection Agency; MS4 = municipal separate storm sewer system; NPDES = National Pollutant Discharge Elimination System; R = rule; TMDL = total maximum daily load; UAC = Utah Administrative Code; UDEQ = Utah Department of Environmental Quality; UPDES = Utah Pollutant Discharge Elimination System

3.11.2.1 Surface Waters and Beneficial-use Classifications

Under the Clean Water Act, every state must establish and maintain water quality standards designed to protect, restore, and preserve the quality of the waters of the state. UDEQ oversees these water quality standards in Utah. Utah's water quality regulations broadly consist of three types of standards: an antidegradation policy, beneficial-use designations and their associated numeric water quality criteria, and narrative standards that apply to all waters within the state boundaries.

What are beneficial uses?

Lakes, rivers, and other water bodies have uses to people and other forms of life called *beneficial uses*. Beneficial-use designations that apply to the water bodies in the water quality and water resources evaluation area are shown in Table 3.11-2 below.

3.11.2.1.1 Antidegradation Policy and Reviews

Utah's antidegradation policy states that waters whose existing quality is better than the established standards for their designated beneficial uses should be maintained at high quality (Utah Administrative Code [UAC] Rule [R] 317-2-3.1). Discharges that could lower or degrade water quality are allowable if UDEQ determines that these discharges are necessary for important economic or social development. However, discharges must not impair the existing in-stream beneficial uses of these high-quality waters.

Highway stormwater runoff is generally considered a nonpoint source discharge whether it flows overland and is discharged directly to an adjacent water body or whether it is collected in a storm drain system that then discharges to a water body at one or more points.

An antidegradation review determines whether a proposed activity complies with the applicable antidegradation requirements for receiving waters that may be affected. To facilitate the policy, all waters in the state of Utah are designated as Category 1, 2, or 3 waters.

- For **Category 1 waters**, new point discharges are not allowed; however, new discharges from nonpoint sources are allowed, provided that best management practices are used to the extent feasible to address the effects of pollution. Point source discharges might be allowed in these waters if the discharges are determined to be temporary and limited or limited to sediment.
- **Category 2 waters** have the same requirements as Category 1 waters, except that point source discharges may be allowed provided that the discharge does not degrade existing water quality.
- For **Category 3 waters**, point source discharges are allowed and degradation of water quality may occur as long as an antidegradation review is completed and approved to ensure that existing beneficial uses will be maintained and protected.

What is a best management practice (BMP)?

A BMP is a stormwater facility that is designed to manage runoff through conveying runoff to receiving waters by passing the runoff through features that remove pollutants from the water or by reducing the volume of potentially polluted runoff that reaches the water body.

Antidegradation reviews are also required for any activity that requires a federal permit and/or water quality certification or projects which, as determined by the Director of the Utah Division of Water Quality, could have a major impact.

Section 3.11.3.1, *Surface Waters and Beneficial-use Classifications*, discusses the designated beneficial uses and antidegradation categories of these waters.

3.11.2.1.2 Beneficial-use Designations, Numeric Standards, and Narrative Standards

UDEQ designates all surface water bodies in the state according to how the water is used, and each use designation has associated standards. Table 3.11-2 lists the applicable beneficial uses of the surface waters in the water quality and water resources evaluation area.

Table 3.11-2. Designated Beneficial Uses for Surface Waters in the Water Quality and Water Resources Evaluation Area

Class	Description
1C	Protected for domestic purposes with prior treatment by treatment processes as required by the Utah Division of Drinking Water.
2B	Protected for infrequent primary-contact recreation. Also protected for secondary-contact recreation where there is a low likelihood of ingestion of water or a low degree of bodily contact with the water. Examples include, but are not limited to, wading, hunting, and fishing.
3A	Protected for cold-water species of game fish and other cold-water aquatic life, including the necessary aquatic organisms in their food chain.
3B	Protected for warm-water species of game fish and other warm-water aquatic life, including the necessary aquatic organisms in their food chain.
4	Protected for agricultural uses including irrigation of crops and stock watering.

Source: UAC R317-2-6, *Use Designations*, updated January 25, 2023

Numeric standards for water quality are intended to protect the designated beneficial uses of the water, such as providing drinking water, supporting game fish and other wildlife, or protecting waders or swimmers (UAC R317-2-14). Numeric standards refer to pollutant concentration limits that are applied to each class of water to protect its beneficial uses.

Narrative standards, which are general policy statements that prohibit the discharge of waste or other substances that result in unacceptable water quality conditions, such as visible pollution, or that are harmful to healthy aquatic life, also apply to waters in the evaluation area.

When a lake, river, or stream fails to meet the water quality standards for its beneficial uses, the State places the water body on a list of "impaired" waters—also known as a 303(d) list, from Section 303(d) of the Clean Water Act—and prepares a study called a total maximum daily load (TMDL). The objective of a TMDL study is to determine the allowable load of a given pollutant for that water body and to allocate that load among different pollutant sources so that the appropriate actions can be taken, and controls implemented, to maintain water quality standards. The TMDL process is important for improving water quality because it serves as a link in the chain between water quality standards and implementing control actions designed to attain those standards.

What is a 303(d) list?

When a lake, river, or stream fails to meet the water quality standards for its designated beneficial use, the State places the water body on a list of "impaired" waters—also known as a 303(d) list, from Section 303(d) of the Clean Water Act—and prepares a study called a TMDL.

3.11.2.1.3 Stormwater Discharges

The State of Utah administers the Utah Pollutant Discharge Elimination System (UPDES) rules (UAC R317-8) under delegated authority from EPA under the Clean Water Act and the Utah Water Quality Act. Under this program, industries and municipalities that could discharge wastewater, stormwater, or other pollutants into water bodies must obtain a UPDES permit to minimize impacts to water quality.

UDOT has been issued a statewide municipal separate storm sewer system (MS4) permit (UTS000003) that allows the discharge of stormwater from transportation facilities to waters of the state. In addition to managing stormwater runoff during construction through the implementation of a stormwater pollution prevention plan (SWPPP), UDOT must address postconstruction stormwater runoff from new and redeveloped roads in accordance with its permit requirements. With regard to the I-15: Farmington to Salt Lake City Project, UDOT must, to the extent practical, evaluate permanent stormwater management BMPs (such as detention basins, vegetated swales, or infiltration trenches) that minimize impacts to surface water quality from the discharge of additional stormwater runoff associated with the proposed improvements and project elements. BMPs are designed to remove pollutants from the runoff and/or reduce the total volume of stormwater runoff that is discharged.

3.11.2.1.4 Groundwater Discharges

The Utah Water Quality Board classifies aquifers according to their quality and use (such as pristine, ecologically important, sole source, irreplaceable, drinking water quality, limited use, and saline). The Utah Division of Water Quality publishes numeric standards for each class of aquifer (UAC R317-6-3). Any person can petition the Board to classify an aquifer. Aquifers in Utah are classified as follows:

- **Class IA – Pristine** is a source of groundwater that has a concentration of total dissolved solids (TDS) less than 500 milligrams per liter (mg/L) and no contaminant concentrations that exceed the groundwater quality standards listed in UAC R317-6-2. Class IA groundwater is protected to the maximum extent feasible from degradation from facilities that discharge or would probably discharge pollutants to groundwater (UAC R317-6-4).
- **Class IB – Irreplaceable Groundwater** is a source of groundwater for a community public drinking water system for which no reliable supply of comparable quality and quantity is available because of economic or institutional constraints.
- **Class IC – Ecologically Important Groundwater** is a source of groundwater discharge important to the continued existence of wildlife habitat.
- **Class II – Drinking Water Quality** is a source of groundwater that has a concentration of TDS between 500 mg/L and 3,000 mg/L and no contaminant concentrations that exceed the groundwater quality standards listed in UAC R317-6-2. Class II groundwater is protected for use as drinking water or other similar beneficial use with conventional treatment prior to use (UAC R317-6-4).
- **Class III – Limited Use** is a source of groundwater that has a concentration of TDS between 3,000 mg/L and 10,000 mg/L or that has one or more contaminants that exceed the groundwater quality standards listed in UAC R317-6-2. Class III groundwater is protected as a potential source of drinking water after substantial treatment or as a source for industry and agriculture.
- **Class IV – Saline Groundwater** is a source of groundwater that has a concentration of TDS greater than 10,000 mg/L.

In addition, the Division of Water Quality requires groundwater permits for activities that discharge pollutants into groundwater. However, some flood-control facilities do not require a groundwater discharge permit and are instead considered “permitted by rule” [UAC R317-6-6.2(A)(5) and R317-6-6.2(A)(7)]. Under this generalized permit by rule, UDOT is not required to obtain a groundwater discharge permit provided that the groundwater discharge does not cause groundwater to exceed groundwater quality standards or the TDS limits for the applicable class of aquifer. Flood-control systems that are considered “permitted by rule” include detention basins, catch basins, and wetland treatment facilities used for collecting or conveying stormwater runoff, such as BMPs that infiltrate stormwater.

3.11.2.1.5 Drinking Water Source Protection Plans and Protection Zones

Owners of public water systems are responsible for protecting sources of drinking water and for submitting a drinking water source protection plan to the Utah Division of Drinking Water. Such plans must identify drinking water source protection zones around each drinking water source (such as a lake, river, spring, or groundwater well), identify existing and potential sources of contamination, and propose methods to control sources of pollution within each zone.

For groundwater sources, the Utah Division of Drinking Water requires the drinking water source protection plan to identify four distinct drinking water source protection zones for each well.

- **Zone 1** is the area within a 100-foot radius of the wellhead.
- **Zone 2** is the area within a 250-day groundwater time of travel to the wellhead.
- **Zone 3** is the area within a 3-year groundwater time of travel to the wellhead.
- **Zone 4** is the area within a 15-year groundwater time of travel to the wellhead.

For surface water sources, the Utah Division of Drinking Water requires the drinking water source protection plan to identify distinct drinking water source protection zones for each surface water source. The zone descriptions for streams and rivers are generally as follows:

- **Zone 1** is the area from 100 feet downstream of the system intake to 15 miles above the intake and a half-mile on each side of the drainage.
- **Zone 2** is the area between 15 and 65 miles upstream from the intake and 1,000 feet on each side of the drainage.
- **Zone 3** is the area between 65 miles upstream from the intake and the edge of the watershed and 500 feet on each side of the drainage.
- **Zone 4** is the rest of the contributing watershed area outside Zones 1 through 3.

In addition to the surface water source protection zones, watershed management plans, antidegradation reviews, and standards for surface water, beneficial-use designations provide many drinking water source protection mechanisms. Land managers are responsible for protecting drinking water sources from contamination in coordination with the public water system owners. Cities, through zoning and land use, control which forms of development are allowable within each of the various drinking water source protection zones. In general, if transportation development within source protection Zone 1 is determined by the owner to harm the function of a well or surface water intake, methods to reduce and/or eliminate the harm may be proposed. See Section 3.11.2.1.6 below for a description of surface water and groundwater right points of diversion in the water quality and water resources evaluation area.

3.11.2.1.6 Water Right Points of Diversion

All waters in Utah are public property. The Utah Division of Water Rights (UDWRi) regulates the appropriation and distribution of water in Utah. A water right is a right to divert (remove from its natural source) and beneficially use water (UDWRi 2011). The defining elements of a typical water right include:

- A defined nature and extent of beneficial use
- A priority date
- A defined quantity of water allowed for diversion by flow rate (cubic feet per second) and/or volume (acre-feet)
- A specified point of diversion and source of water
- A specified place of beneficial use

Water right points of diversion are overseen by UDWRi and are locations from which a water right owner can legally divert water from a source and beneficially use it. Knowing the location of and protecting existing points of diversion is important from the perspective of ensuring that a project does not affect the physical point of diversion, the water quality, or the beneficial use of the existing points of diversion. For administrative purposes, water rights are classified into the following four categories based on their status (UDWRi 2023a):

- **Approved** water rights have been granted through an application to the State Engineer and belong to specific places of use.
- **Perfected** water rights are fully developed and have been certificated by the State Engineer, decreed by a court of law, or certificated legislatively. These rights are considered real property.
- **Terminated** water rights have been ended by a court order.
- **Unapproved** water rights have been applied for but have not been granted by the State Engineer.

3.11.3 Affected Environment

There are several surface water bodies (streams) in the water quality and water resources evaluation area. These streams are conveyed both in open-water streams and in stream structures, such as constructed channels, culverts, and underground pipe systems. These waters have assigned beneficial uses and antidegradation categories.

The groundwater resources in the evaluation area are protected to supply agricultural, industrial, and drinking water. For drinking water, these groundwater resources have designated groundwater source protection zones. There are also multiple water right points of diversion in the evaluation area.

Figure 3.11-1 through Figure 3.11-11 show the footprints for the Action Alternative by segment as well as the surface water bodies and the water right points of diversion by current status in the water quality and water resources evaluation area.

Figure 3.11-1. Water Resources in the North Segment (1 of 7)

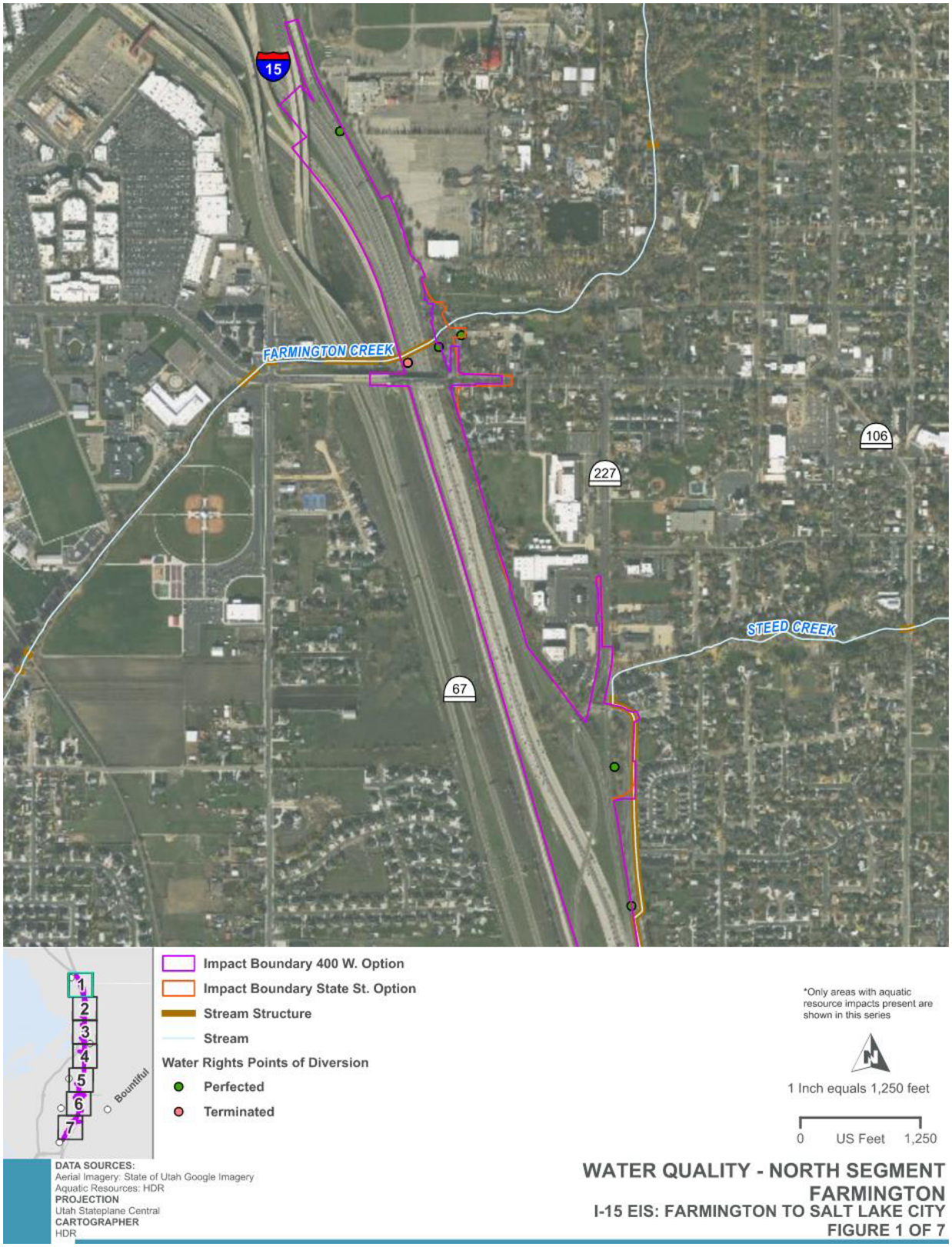


Figure 3.11-2. Water Resources in the North Segment (2 of 7)

Figure 3.11-3. Water Resources in the North Segment (3 of 7)

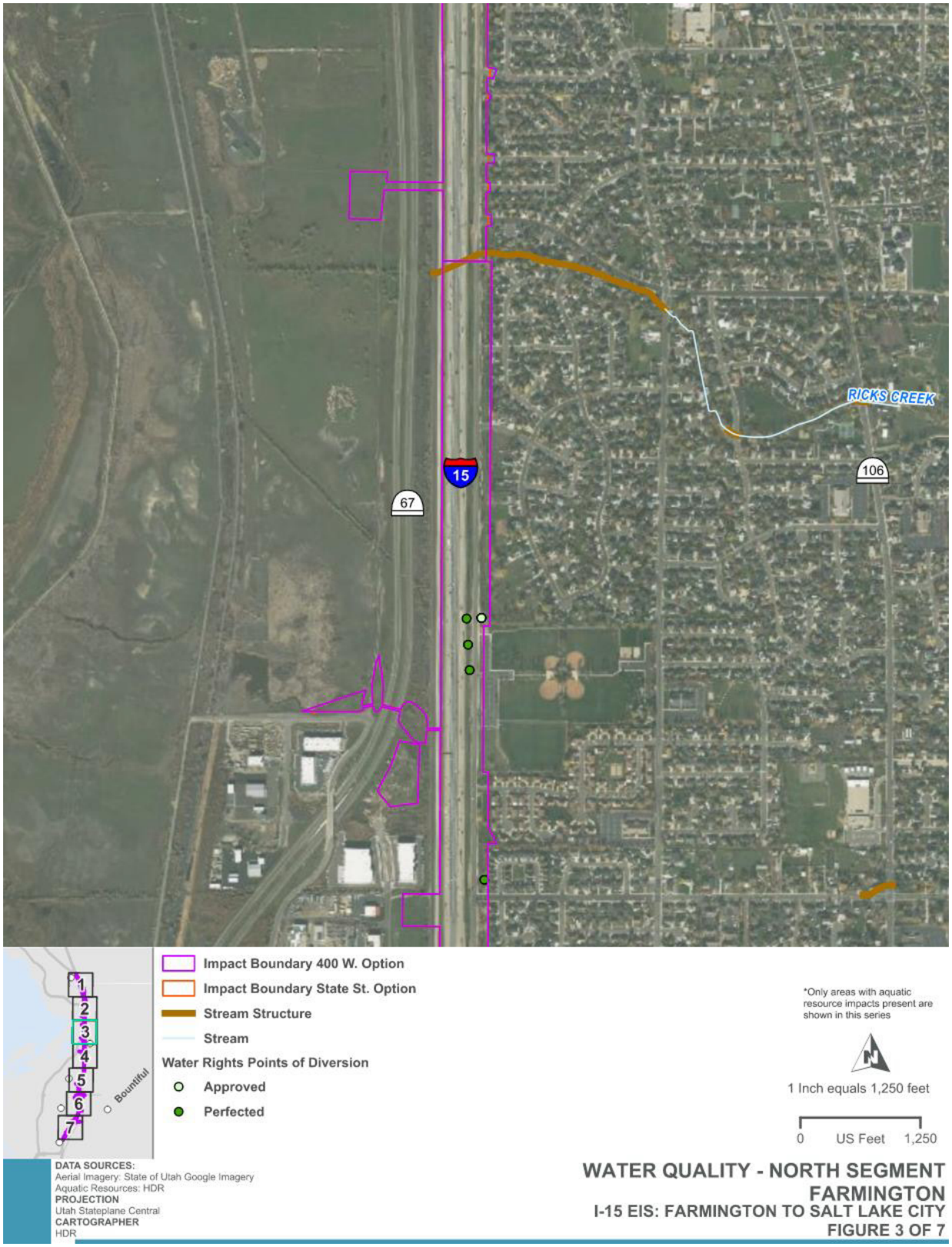


Figure 3.11-4. Water Resources in the North Segment (4 of 7)

Figure 3.11-5. Water Resources in the North Segment (5 of 7)

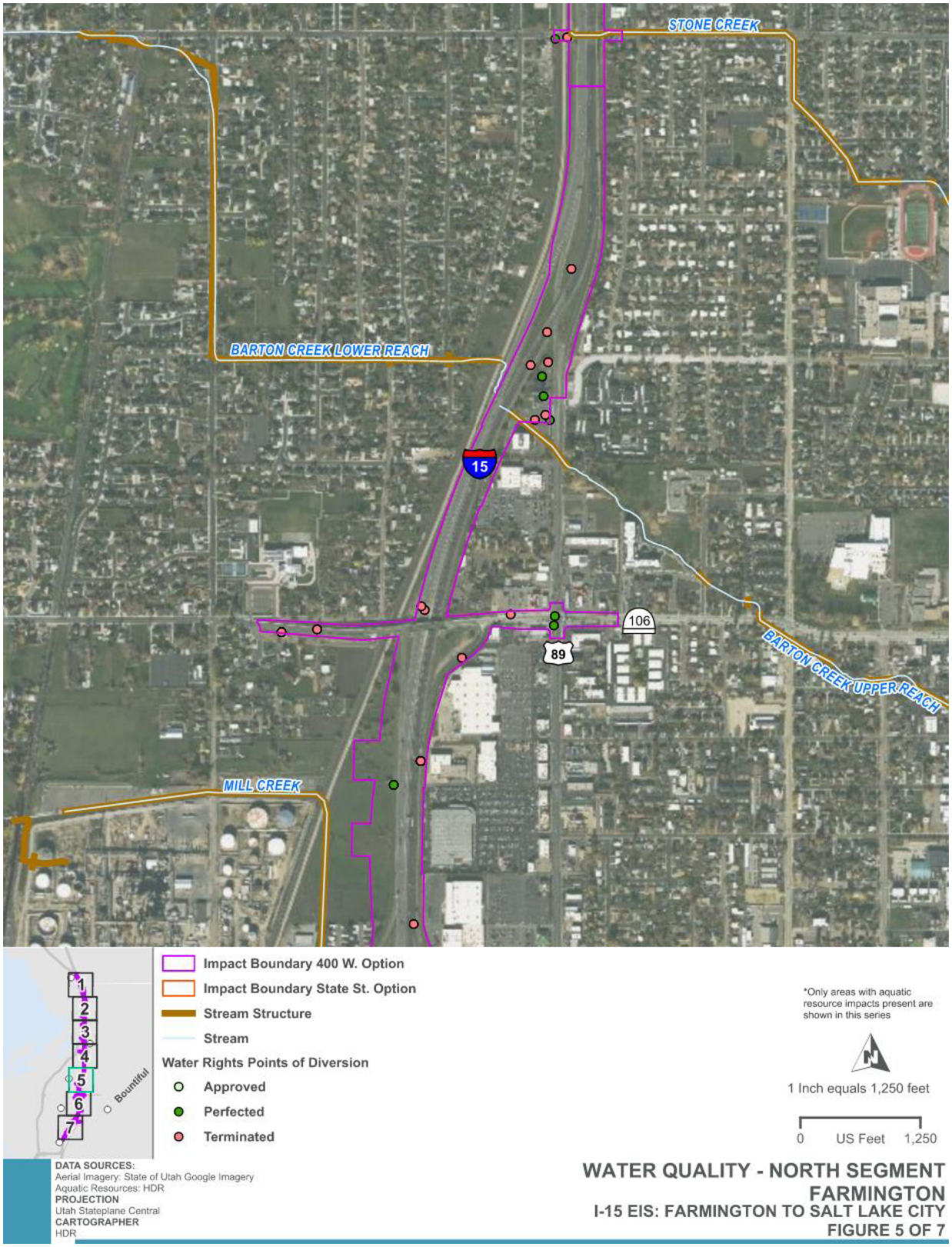


Figure 3.11-6. Water Resources in the North Segment (6 of 7)

Figure 3.11-7. Water Resources in the North Segment (7 of 7)

Figure 3.11-8. Water Resources in the South Segment (1 of 4)

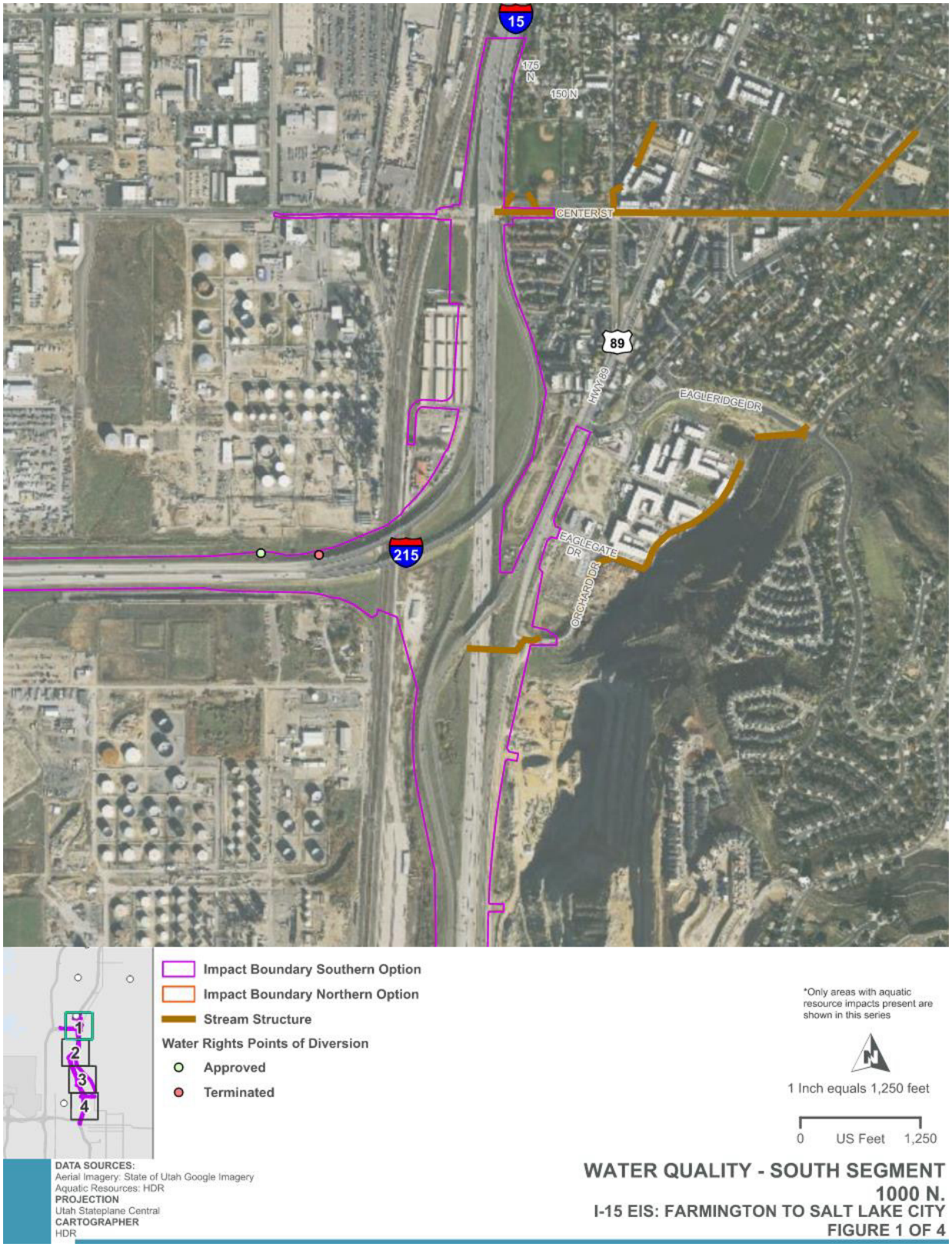


Figure 3.11-9. Water Resources in the South Segment (2 of 4)

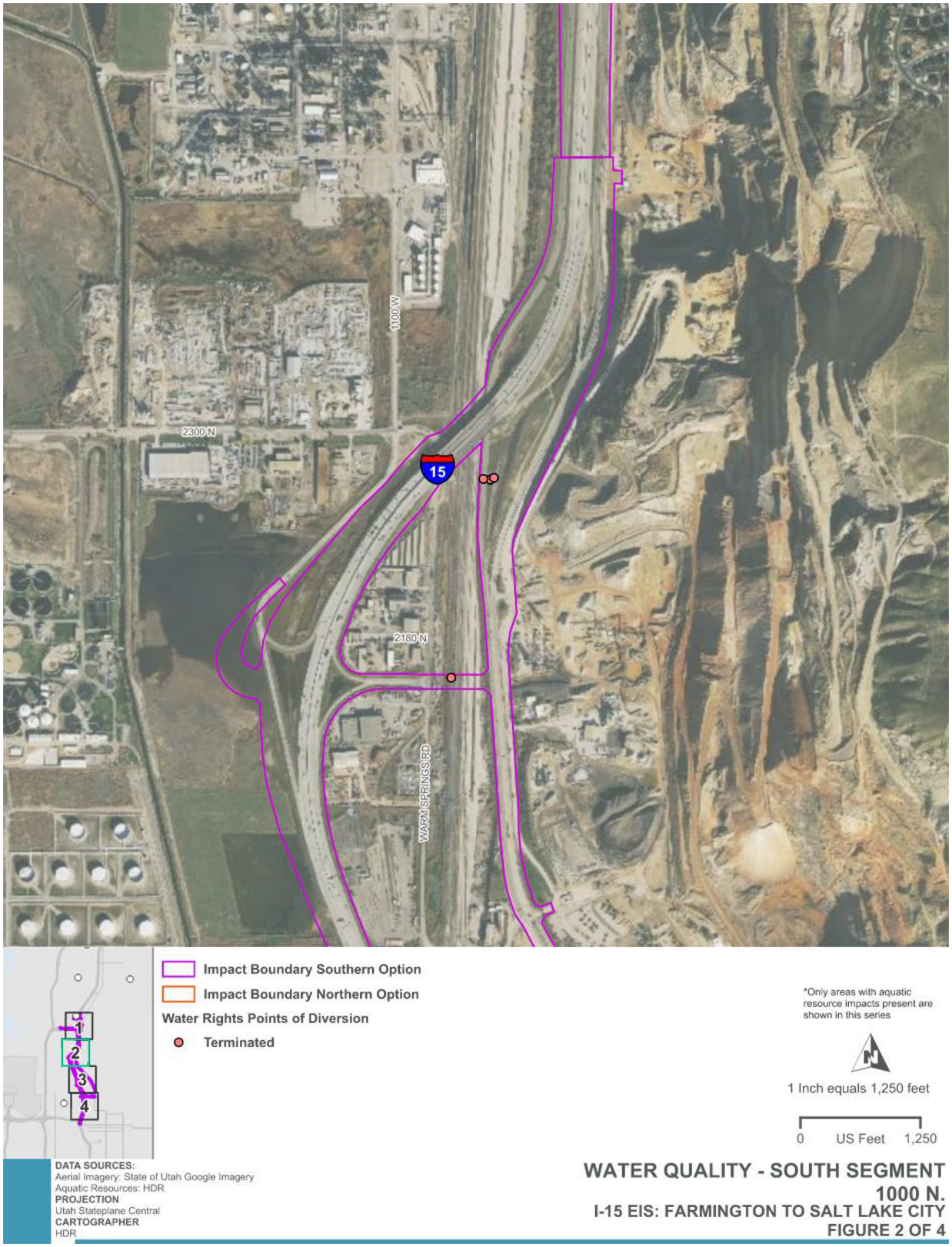


Figure 3.11-10. Water Resources in the South Segment (3 of 4)

Figure 3.11-11. Water Resources in the South Segment (4 of 4)

3.11.3.1 Surface Waters and Beneficial-use Classifications

All surface water bodies in the water quality and water resources evaluation area originate in the Wasatch Mountains to the east of the evaluation area, flow generally from east to west through the evaluation area, and have similar beneficial uses and antidegradation requirements. Three of these surface water bodies (Farmington Creek, Ricks Creek, and Mill Creek) have assigned assessment units (AUs) that overlap with the evaluation area. An AU is an area that the state has defined to determine whether the beneficial uses of the surface waters are supported. Enough historical water quality data is available near the evaluation area footprint for Farmington Creek, Ricks Creek, and Mill Creek.

Several other waters cross the evaluation area (Steed Creek, Davis Creek, Lone Pine Creek, Barnard Creek, Parrish Creek, Deuel Creek, Stone Creek, Barton Creek, and City Creek). These streams have AUs that terminate upstream of the evaluation area. These streams have similar beneficial uses as Farmington Creek, Ricks Creek, and Mill Creek; however, in most cases, these streams enter a culvert or underground pipe system upstream of I-15, and flows are conveyed west past the evaluation area. Historical water quality data are not available near the project footprint, so the existing water quality for these streams is undefined.

Due to the presence of an established AU and the availability of information regarding water quality data and beneficial-use impairments, only Farmington Creek, Ricks Creek, and Mill Creek are evaluated further in Section 3.11. UDOT anticipates that the expected impacts to these surface water bodies are representative of the potential impacts to all of the surface water bodies because of their similar headwater conditions, flow patterns, upstream basin land uses (forested and then urban), and watershed size.

Table 3.11-3 summarizes the beneficial-use classifications of Farmington Creek, Ricks Creek, and Mill Creek.

Table 3.11-3. Beneficial Uses and Antidegradation Categories of Representative Surface Waters in the Water Quality and Water Resources Evaluation Area

Water Body	Assessment Unit / Reach	Reach Description	Beneficial Uses	Antidegradation Category
Farmington Creek	Farmington Creek-1	Farmington Creek from Farmington Bay Waterfowl Management Area to U.S. Forest Service boundary	2B – Infrequent primary-contact recreation 3B – Warm-water fishery/aquatic life 4 – Agricultural uses including irrigation of crops and stock watering	Category 3
Ricks Creek	Ricks Creek	Entire reach (Ricks Creek from I-15 to headwaters)	1C – Domestic/drinking water with prior treatment 2B – Infrequent primary-contact recreation 3A – Cold-water fishery/aquatic life 4 – Agricultural uses including irrigation of crops and stock watering	Category 3
Mill Creek	Mill Creek1-Davis	Mill Creek from State Canal to U.S. Forest Service boundary	2B – Infrequent primary-contact recreation 3B – Warm-water fishery/aquatic life 4 – Agricultural uses including irrigation of crops and stock watering	Category 3

Sources: UAC R317-2-12, *Category 1 and Category 2 Waters*, and UAC R317-2-13, *Classification of Waters of the State*, as in effect January 25, 2023

3.11.3.2 Impaired Surface Waters

If the water quality of a surface water or segment does not meet the quality standards for its beneficial uses, the water or segment is listed in the State of Utah's *2022 Integrated Report* [commonly referred to as the 303(d) list] as impaired, and the Utah Division of Water Quality must develop a TMDL study to address pollutant sources and take measures to restore its beneficial uses.

Table 3.11-4 lists the impairments of Farmington Creek, Ricks Creek, and Mill Creek in the water quality and water resources evaluation area and the TMDL development status for each of these surface waters.

Table 3.11-4. Impaired Surface Waters in the Water Quality and Water Resources Evaluation Area

Impaired Water Body	Assessment Unit / Reach	Constituents or Measurements	Description of Impairment	TMDL Development Status
Farmington Creek	Farmington Creek-1	Dissolved oxygen Aluminum pH Copper *Escherichia coli* (*E. coli*)	Does not meet water quality standards for beneficial use 2B (infrequent primary-contact recreation) because of high levels of *E. coli* and beneficial use 3B (warm-water fishery and aquatic life) because of elevated concentrations of copper and aluminum and low levels of dissolved oxygen. pH measurements have also been recorded outside the allowable range for beneficial uses 2B (infrequent primary-contact recreation), 3B (warm-water fishery and aquatic life), and 4 (agricultural uses).	Not developed; low priority
Ricks Creek	Ricks Creek	Copper	Does not meet water quality standards for beneficial use 3A (cold-water fishery and aquatic life) because of elevated concentrations of copper.	Not developed; low priority
Mill Creek	Mill Creek1-Davis	Copper *E. coli* TDS	Does not meet water quality standards for beneficial use 2B (infrequent primary-contact recreation) because of high levels of *E. coli*, and beneficial uses 3A (cold-water fishery and aquatic life) and 4 because of elevated concentrations of copper and TDS, respectively.	Not developed; low priority

Source: UDWQ 2022

3.11.3.3 Groundwater Resources and Quality

The water quality and water resources evaluation area overlays protected groundwater basins or aquifers that are classified as Class IA – Pristine, Class II – Drinking Water Quality, and Class III – Limited Use. These aquifers are not classified as sole-source aquifers (aquifers that are the only source of drinking water for a community) (EPA 2023b).

The areas of Class IA – Pristine classification are mainly in the northern part of the evaluation area and generally include areas of Farmington, Centerville, Bountiful, and West Bountiful. Areas of Class II – Drinking Water Quality classification are mainly in the southern part of the evaluation area and generally include areas of Woods Cross, North Salt Lake, and Salt Lake City. Just south of the boundary between Davis County and Salt Lake County is an area that has groundwater classified as Class III – Limited Use.

According to the U.S. Geological Survey (USGS), the existing groundwater gradient in the evaluation area is generally from east to west, meaning that groundwater flows from the mountain bedrock and foothills through the evaluation area and toward the Great Salt Lake and the Jordan River (USGS 2008, 2011). Government facilities such as salt storage facilities and transportation and equipment storage facilities that could contribute chlorine, metals, salt, solvents, and petroleum are listed as potential contaminant sources if the materials are not appropriately managed. These facilities are not located in the project footprint area; however, UDOT owns and operates these facilities in other locations.

3.11.3.4 Drinking Water Source Protection Zones

This section discusses the drinking water source protection zones in the water quality and water resources evaluation area that could be impacted by the Action Alternative and those that are located within the project right-of-way. These areas have protection plans in place which include allowable activities, types of development, and measures to protect water quality from potential pollution sources in different zones.

In the evaluation area, six public water systems draw water from groundwater sources and have drinking water source protection plans in place. These systems are Bountiful City Water System, Lagoon Investment Company, North Salt Lake City Water System, Weber Basin Water Conservancy District – South, West Bountiful City Water System, and Woods Cross City Water System. Two of these systems have Zone 1 designations in the evaluation area – North Salt Lake City Water System has two and West Bountiful City Water System has four. Three systems within the project boundaries have Zone 2 designations – North Salt Lake City Water System has six, Weber Basin Water Conservancy District – South has two, and West Bountiful City Water System has four. With the exception of Lagoon Investment Company, each system has one or more Zone 3 source protection zones. All six systems have at least two Zone 4 source protection zones.

In the evaluation area, there are no public water systems that draw water from surface water sources and have drinking water source protection plans in place.

3.11.3.5 Water Rights

This section identifies water right points of diversion in the water quality and water resources evaluation area that would be impacted as a part of the Action Alternative and those that are located within the project right-of-way. For groundwater points (underground or abandoned wells), the point of diversion is typically the area around the wellhead. For surface waters (surface, drain, or point-to-point sources), the point of diversion could be a diversion structure in a stream or a collection system around a spring.

The Utah Division of Water Rights tracks water rights according to an inventoried water right number. Each water right number can represent one or more actual groundwater wells, springs, or surface water sources or a combination of these sources. Table 3.11-5 below summarizes the number of water rights by type in the project right-of-way. The approximate locations of points of diversion or clusters of water rights (shown as one point in the figures) are shown above in Figure 3.11-1 through Figure 3.11-11.

Table 3.11-5. Water Right Points of Diversion by Type and Status in the Project Right-of-way

Type of Diversion	Number of Water Rights	Status	Owners
Surface	11	P – Perfected (3), T – Terminated (8)	Clark Water Company (T, P), Bountiful Water Sub-Conservancy District (T), Beck Hot Spring Company (T), Dal-Tec Incorporated (T), Salt Lake Union Stock Yards (T), private owners (T, P)
Drain	1	P – Perfected (1)	Centerville City (P)
Underground	106	A – Approved (36), P – Perfected (23), T – Terminated (46), U – Unapproved (1)	Centerville City (A), West Bountiful City (A, P, T), City of North Salt Lake (A, P, T), Conoco Phillips (A), Monroc, Inc. (A), Underwood Environmental Consulting (A), U.S. Environmental Protection Agency (A), Utah Division of Environmental Response and Remediation (A), Clark Water Company (P, T), Corporation of the Presiding Bishop of the Church of Jesus Christ of Latter-day Saints (P), Professional United Builders Supply, Inc. (P), Phillips/Tosco C/O ATC Associates, Inc. (T), U.S. Bureau of Reclamation (T), UDOT (T), Utah State Road Commission (T), American Oil Company (P, T), California Oil Company (T), South Davis County Water Improvement District (T), Wasatch Potato Flake Manufacturing Company (T), Zions Security Corporation (T), HollyFrontier Woods Cross Refining, LLC (T), private owners (A, P, T, U)
Point to point	2	P – Perfected (2)	Private owner (P)
Abandoned well	30	A – Approved (30)	Ecova Corporation (A), Underground Environmental Consulting (A), Underwood Environmental Consulting (A)

Note that a single point of diversion in Figure 3.11-1 through Figure 3.11-11 above can represent more than one water right.

3.11.4 Environmental Consequences and Mitigation Measures

This section discusses the expected water quality impacts to surface water quality, groundwater quality, and water rights from the project alternatives.

3.11.4.1 Methodology

UDOT used the Stochastic Empirical Loading and Dilution Model (SELDM), which was developed by FHWA and USGS, to estimate the effects of the I-15 project on water quality. UDOT assessed the impacts of solids, nutrients, and metals, which are common pollutants in highway stormwater runoff, and other pollutants of concern if a particular water body is listed as impaired for that pollutant (such as pH and aluminum for Farmington Creek). UDOT has prepared a supplemental technical report (see UDOT 2023b and Appendix 3J, *Water Quality Technical Report*) to accompany this EIS to document in greater detail the methodology that was used to determine the environmental consequences of the Action Alternative, specifically water quality modeling to determine the expected impacts to surface water resources.

These environmental consequences were determined by comparing the results of the modeling for the Action Alternative to the results of the No-action Alternative (which represents the existing conditions) to understand the changes that could occur as a result of implementing the Action Alternative. If the I-15: Farmington to Salt Lake City Project is implemented, UDOT intends to continue to use any existing water quality control facilities or BMPs and to design and construct any new facilities that are needed to address the additional impervious areas added with the Action Alternative.

In addition to the surface water modeling that is described in the supplemental technical report, UDOT assessed impacts to points of diversion using GIS files of water rights points of diversion (UDWRi 2023b) and drinking water source protection zones (UDDW 2023). These shapefiles were overlaid on the preliminary design for the Action Alternative to determine the expected impacts of the Action Alternative to drinking water source protection zones and water right points of diversion.

There are many existing I-15 stream crossings in the water quality and water resources evaluation area. The physical condition of these crossings would be evaluated during the final design phase of the project, and the appropriate action for each location would be taken. These actions might include replacing, lining, extending, or repairing conveyance structures, as well as a number of other methods or techniques that might be pursued to limit the impacts of the work. Mitigation measures for these actions are discussed in Section 3.11.4.4, *Mitigation Measures*.

3.11.4.2 No-action Alternative

This section describes the impacts to water quality and water resources from stormwater runoff from the No-action Alternative. With this alternative, I-15 and its on- and off-ramps would remain mostly the same as they are now, so there would be no additional impervious areas added and no change to the current effects of highway stormwater runoff on water quality and water resources. Stormwater would be treated as it is currently, since vehicles would continue to use the existing roads in the water quality and water resources evaluation area. Other projects might be completed without the I-15: Farmington to Salt Lake City Project; however, the impacts to water quality and water resources from these projects would be addressed through individual UPDES permits (construction and/or community MS4 permits) and other regulatory processes that are in place to protect water quality.

3.11.4.2.1 Surface Waters and Beneficial-use Classifications

With the No-action Alternative, there would be no change to the impacts from existing highway stormwater runoff to surface waters or existing beneficial-use classifications since the I-15: Farmington to Salt Lake City Project would not be implemented. UDOT prepared a version of the water quality model for the No-action Alternative to establish a baseline to compare the modeled water quality of the Action Alternative to the baseline (existing conditions); see Sections 2.3.1, 2.3.2, and 2.3.3 in the supplemental water quality technical report (UDOT 2023b and Appendix 3J, *Water Quality Technical Report*) for a description of the baseline model and results for Farmington Creek, Ricks Creek, and Mill Creek, respectively. A summary of these results for both the No-action Alternative and the Action Alternative is provided in Table 3.11-6 below.

3.11.4.2.2 Groundwater Quality and Resources

The No-action Alternative would not additionally affect any groundwater resources or quality.

3.11.4.2.3 Drinking Water Source Protection Plans and Protection Zones

The No-action Alternative would not additionally affect drinking water source protection plans or protection zones.

3.11.4.2.4 Water Right Points of Diversion

The No-action Alternative would not additionally affect any water right points of diversion.

3.11.4.2.5 Stream Crossings

The No-action Alternative would not include actions that would additionally impact any existing stream crossings of I-15.

3.11.4.3 Action Alternative

This section describes the impacts to water quality and water resources from the Action Alternative. With this alternative, UDOT would construct an additional travel lane in each direction from Farmington to Salt Lake City. UDOT would also reconstruct several interchanges, which would result in a net increase of impervious area that contributes runoff. Any precipitation that would fall on the additional impervious area would be treated through the use of detention basins and other potential BMPs in accordance with UDOT's *Stormwater Quality Design Manual* (UDOT 2021).

For this EIS, the Action Alternative was divided into a north segment and a south segment. Section 3.11.4.3.1 through Section 3.11.4.3.5 discuss the water quality and water resources impacts for each segment by type of impact. Section 3.11.4.3.6 summarizes the water quality and water resources impacts for both segments as well as the range of possible impacts for the Action Alternative.

3.11.4.3.1 Surface Waters and Beneficial-use Classifications

Highway stormwater runoff and its impacts to surface waters have been analyzed in a supplemental technical report accompanying this EIS (UDOT 2023b). This report presents the results of a modeling analysis for Farmington Creek, Ricks Creek, and Mill Creek (all of which are located in the north segment), including comparisons between existing conditions that represent the No-action Alternative and proposed conditions that represent the Action Alternative. Refer to Sections 2.3.1, 2.3.2, and 2.3.3 of the supplemental water quality technical report for model results for Farmington Creek, Ricks Creek, and Mill Creek, respectively (UDOT 2023b and Appendix 3J, *Water Quality Technical Report*). A summary of these results for both the No-action Alternative and the Action Alternative for the main contaminants of concern, which are those with existing impairments, is shown in Table 3.11-6. The technical report can also be consulted for additional information regarding the model setup, assumptions, and results for all contaminants of concern. The paragraphs following the table provide a written summary of the model results.

Table 3.11-6. No-action Alternative and Action Alternative Impacts to Impaired Waters and Numeric Water Quality Exceedances

Pollutant	Units	Most Stringent Surface Water Quality Standard (Beneficial Use)	% of Simulated Storms Equaling or Exceeding the Most Stringent Water Quality Standard Downstream of I-15		"Central Concentration Range" – Downstream Concentration Equaled or Exceeded during _____ of Simulated Storms			
			No-action Alternative	Action Alternative	No-action Alternative		Action Alternative	
					80%	20%	80%	20%
Farmington Creek								
Dissolved aluminum	µg/L	750 µg/L (3B[a])	0.64	0.48	4.83	36.2	4.97	39.7
Dissolved copper	µg/L	65 µg/L (3B[a])	8.27	9.36	4.95	37.4	4.56	38.1
pH	—	6.5-9.0 (2B, 3B[a], 4)	5.53[c]	7.18[c]	7.03	7.96	7.00	7.94
Total phosphorus	mg/L	0.05 mg/L (3B[a,b])	50.9	48.5	0.0235	0.122	0.0238	0.130
Ricks Creek								
Dissolved copper	µg/L	65 µg/L (3A[a])	14.6	15.0	20.4	56.1	20.4	53.2
Total phosphorus	mg/L	0.05 mg/L (1C, 3A[a,b])	33.3	32.3	0.0240	0.0711	0.0235	0.0687
Mill Creek								
Dissolved copper	µg/L	65 µg/L (3B[a])	7.07	7.49	4.16	31.5	4.34	33.6
Total phosphorus	mg/L	0.05 mg/L (3B[a,b])	31.0	31.0	0.0169	0.0649	0.0175	0.0681
Total dissolved solids (TDS)	mg/L	1,200 mg/L (4)	14.1	14.3	184	857	183	921

Definitions: µg/L = micrograms per liter; mg/L = milligrams per liter

Note: This table only includes the constituents for which a stream is impaired and/or where the modeled central range of expected concentrations (between 20% and 80% of storms) exceeds the water quality standard. For full model results, see Sections 2.3.1 through 2.3.3 of the supplemental water quality technical report (UDOT 2023b).

[a] One-hour criterion – chosen since impacts from stormwater runoff typically move downstream and dissipate quickly.

[b] Pollution indicator.

[c] Percent of pH values outside (more acidic or more basic than) the standard range of pH values.

North Segment Impacts

The impacts to surface waters and beneficial-use classifications in the north segment would be the same for both the Farmington 400 West Option and the Farmington State Street Option. These options would both include similar quantities of highway and roadway pavement in the same general areas that are associated with the I-15 mainline and the interchanges in Farmington, Centerville, Bountiful, Woods Cross, and North Salt Lake. Since the quantity of highway and roadway pavement is a main factor that can cause impacts to surface water quality, UDOT anticipates that any impacts to surface waters would be the same for both options.

The Farmington Creek, Ricks Creek, and Mill Creek crossings of I-15 are also located in the north segment. The modeling shows that the expected surface water concentration ranges for most of the pollutants analyzed in Farmington Creek, Ricks Creek, and Mill Creek downstream of the project area would not materially change. Furthermore, the concentrations would not exceed the surface water quality standards associated with beneficial uses of Farmington Creek (2B, 3B, and 4) and Ricks Creek (1C, 2B, 3A, and 4). The concentrations would also not exceed the surface water quality standards associated with the beneficial uses of Mill Creek (2B, 3B, and 4), except for total phosphorus. Both the No-action Alternative and the Action Alternative were modeled to have the same effects on Mill Creek, where the total phosphorus concentrations exceed the 0.05-mg/L concentration standard (pollution indicator level) for 31% of storms.

Farmington Creek is currently impaired for aluminum, copper, pH, dissolved oxygen, and *E. coli*. The analysis shows that additional pollutant loads would not contribute to the impairments for aluminum, copper, or pH. The modeled expected concentration ranges (observed between 80% and 20% of storms or the "central range") for these pollutants show minor changes (less than 10%) between the No-action and Action Alternatives. Modeled expected central ranges are also below the standards for the creek's beneficial uses. Dissolved oxygen and *E. coli* were not modeled directly since these characteristics are not typically contaminants of concern for highway projects (NCHRP 2019). Nutrients (phosphorus) can contribute to low dissolved oxygen levels; therefore, an analysis of phosphorus was conducted, and modeling showed that 50.9% of storms would exceed the pollution indicator level for the No-action Alternative and 48.5% for the Action Alternative, representing a decrease from existing conditions.

Ricks Creek is impaired for copper, and the analysis shows a *de minimis* (less than 1%) decrease to the modeled central range of downstream copper concentrations between the No-action Alternative (20.4 to 56.1 micrograms per liter [µg/L]) and the Action Alternative (20.4 to 53.2 µg/L). With the Action Alternative, the modeled concentration of total phosphorus would exceed the 0.05-µg/L concentration standard (pollution indicator level) for about 32% of storm events compared to the No-action Alternative, for which the model results show that concentrations of total phosphorus would exceed this pollution indicator for about 33% of simulated storm events. The Action Alternative represents a slight decrease from the No-action Alternative with respect to the percent of storm events that could exceed this pollution indicator for total phosphorus.

Mill Creek is impaired for copper, TDS, and *E. coli*. The analysis shows that additional pollutant loads with the Action Alternative would not contribute to the impairments. The modeled central concentration ranges for copper show minor increases (less than 10%) with the Action Alternative. For TDS, modeling shows a minor decrease for more frequent storms (80% of storms) and a minor increase for less frequent storms (20% of storms) between the No-action and Action Alternatives. Modeled central ranges are also below the standards for the creek's beneficial uses. *E. coli* was not modeled or analyzed since it is not typically a contaminant of concern for highway projects (NCHRP 2019).

South Segment Impacts

The impacts to surface waters and beneficial-use classifications in the south segment would be the same for both the Salt Lake City 1000 North – Northern Option and the Salt Lake City 1000 North – Southern Option. These options would both include similar quantities of increased highway and roadway pavement associated with the I-15 mainline and the proposed interchange improvements in North Salt Lake and Salt Lake City that are part of this segment. Since the quantity of highway and roadway pavement is a main factor that causes impacts to surface water quality, UDOT anticipates that any impacts to surface waters would be the same for both options. The highway stormwater runoff concentration would be the same in this segment for both the No-action and Action Alternatives. Although the quantity of highway stormwater runoff would be greater with the Action Alternative, this runoff would be treated by BMPs (such as detention basins) to reduce pollutant concentrations before being discharged into a surface water body, and some of the runoff volume would be reduced per UDOT's stormwater manual. Therefore, in-stream pollutant concentrations would be similar to the No-action Alternative.

There are no surface water bodies in the south segment that were modeled as a part of the water quality model; however, since all of the surface water bodies that cross the evaluation area have similar headwaters and settings, UDOT anticipates that the water quality impacts to surface waters in this segment would be similar to the impacts to those creeks that were modeled.

3.11.4.3.2 Groundwater Quality and Resources

This section discusses the impacts to groundwater quality and resources for each segment of the Action Alternative. The groundwater of the principal aquifer underlying the water quality and water resources evaluation area is generally of high quality and is protected for drinking water and other uses of high-quality water.

North Segment Impacts

The impacts to groundwater quality and resources in the north segment would be the same for both the Farmington 400 West Option and the Farmington State Street Option. These options would both provide widening of I-15 along the existing corridor and interchange improvements in areas that are already used as a transportation land use. Transportation corridors are not specifically mentioned as potential pollution sources for these groundwater resources (USGS 2008, 2011); however, government facilities that provide salt storage and storage for transportation equipment (maintenance sheds) are listed as potential sources of groundwater pollution if materials are not properly managed. The north segment does not include building new roads to a level that would require additional maintenance sheds; therefore, UDOT does not anticipate that the north segment options would cause any additional impacts to groundwater quality and resources beyond the impacts that would be caused by the No-action Alternative.

Any infiltration that might occur from highway stormwater runoff BMPs to achieve the volume reduction goal in UDOT's *Stormwater Quality Design Manual* is "permitted by rule" because these facilities are not typically a major source of groundwater pollution. Therefore, UDOT did not conduct impact analysis of the No-action or Action Alternatives with regard to impacts to groundwater quality. UDOT anticipates that these facilities would not cause any additional impacts to groundwater quality beyond the impacts that would be caused by the No-action Alternative.

South Segment Impacts

The impacts to groundwater quality and resources in the south segment would be the same as those in the north segment.

3.11.4.3.3 Drinking Water Source Protection Plans and Protection Zones

The Action Alternative would impact groundwater drinking water source protection zones ranging in classification from Zone 1 to Zone 4. No drinking water source protection zones associated with surface water sources would be impacted by the Action Alternative. If the Action Alternative is selected, UDOT will collaborate with the public water system owners who have drinking water source protection zones in place (Bountiful City Water System, Lagoon Investment Company, North Salt Lake City Water System, Weber Basin Water Conservancy District – South, West Bountiful City Water System, and Woods Cross City Water System) to mitigate any impacts to water distribution infrastructure caused by the Action Alternative. These drinking water source protection zones currently have existing transportation infrastructure located inside their boundaries; therefore, UDOT anticipates that no additional mitigation measures would be necessary. A possible exception is in the event of encroachments into drinking water source protection Zone 1 (100-foot radius from the wellhead), since Zone 1 generally does not include transportation infrastructure, and construction in Zone 1 would require additional investigation and the design of specific mitigation measures (additional stormwater BMPs, routing stormwater out of the zone, or relocating the well) during the final design phase of the project.

North Segment Impacts

The impacts to groundwater drinking water source protection zones in the north segment would be the same for both the Farmington 400 West Option and the Farmington State Street Option. All six public water systems listed above draw water from groundwater sources and have drinking water source protection zones in place that could be impacted by these options. The West Bountiful City Water System has two Zone 1 designations in the evaluation area which are associated with the Stone Creek Well and the West 400 North Well. All six public water systems have the following Zone 2 through Zone 4 groundwater source protection zones in place.

The Bountiful City Water System has the following designations in place:

- One Zone 3 designation
- One Zone 4 designation

The Lagoon Investment Company has the following designations in place:

- One Zone 4 designation

The North Salt Lake City Water System has the following designations in place:

- Two Zone 2 designations
- Three Zone 3 designations
- Three Zone 4 designations

The Weber Basin Water Conservancy District – South has the following designations in place:

- One Zone 2 designation
- Two Zone 3 designations
- Three Zone 4 designations

In addition to the Zone 1 designations, the West Bountiful City Water System has the following designations in place:

- Two Zone 2 designations
- Two Zone 3 designations
- Two Zone 4 designations

The Woods Cross City Water System has the following designations in place:

- One Zone 3 designations
- Three Zone 4 designations

The effects of the Action Alternative on the four Zone 1 protection zones, as well as the need for any special mitigation measures, would be investigated during the final design phase of the project. The additional impervious area would not materially change the character of the existing transportation land uses in the other zones.

South Segment Impacts

The impacts to groundwater drinking water source protection zones in the south segment would be the same for both the Salt Lake City 1000 North – Northern Option and the Salt Lake City 1000 North – Southern Option. These options would both impact eight groundwater source protection zones associated with the North Salt Lake City Water System (two Zone 1, two Zone 2, two Zone 3, and two Zone 4 groundwater source protection zones). The effects of the Action Alternative on the two Zone 1 protection zones, as well as the need for any special mitigation measures, would be investigated during the final design phase of the project. The additional impervious area would not materially change the character of the existing transportation land uses in the other zones.

3.11.4.3.4 Water Right Points of Diversion

This section discusses the water right points of diversion that would be impacted by the Action Alternative in both of the project segments. If the Action Alternative is selected, UDOT will coordinate with the owners of these points of diversion during final design and construction to protect or replace the impacted points of diversion as necessary. The impacted points of diversion mentioned below could include points that are already impacted by the existing I-15 infrastructure.

North Segment Impacts

Farmington 400 West Option Impacts. This option would impact 90 underground water right points of diversion, 34 of which are approved, 22 of which are perfected, 33 of which are terminated, and 1 of which is unapproved. Additional impacts include 29 abandoned wells with approved status; 2 point-to-point, 2 surface, and 1 drain water right points of diversion that have perfected status; and 1 more surface water right point of diversion that has a terminated status.

Farmington State Street Option Impacts. This option would impact 91 underground water right points of diversion, 34 of which are approved, 23 of which are perfected, 33 of which are terminated, and 1 of which is unapproved. Additional impacts include 29 abandoned wells with approved status; 2 point-to-point, 3 surface, and 1 drain water right points of diversion that have perfected status; and 5 more surface water right points of diversion that have terminated status.

For both options, the water right owners that would be impacted are American Oil Company, Centerville City, City of North Salt Lake, Clark Water Company, Conoco Phillips, HollyFrontier Woods Cross Refining, LLC, Phillips/Tosco C/O ATC Associates, Inc., Professional United Builders Supply, Inc., Salt Lake Union Stock Yards, South Davis County Water Improvement District, UDOT, Utah State Road Commission, Underground Environmental Consulting, Underwood Environmental Consulting, U.S. Bureau of Reclamation, U.S. Environmental Protection Agency, Utah Division of Emergency Response, West Bountiful City, Zions Security Corporation, and private owners.

In addition, the Farmington State Street Option would also impact water right owners Bountiful Water Sub-Conservancy District and the Corporation of the Presiding Bishop of the Church of Jesus Christ of Latter-day Saints.

South Segment Impacts

The impacts to water right points of diversion in the south segment would be the same for both the Salt Lake City 1000 North – Northern Option and the Salt Lake City 1000 North – Southern Option. These options would impact 15 underground water rights, of which 13 are terminated and 2 are approved, as well as 3 terminated surface water right points of diversion. There is also 1 abandoned well with approved status.

Water right owners that would be impacted in the south segment are Ecova Corporation, Beck Hot Spring Company, Dal-Tec Incorporated, Monroc, Inc., American Oil Company, California Oil Company, Wasatch Potato Flake Manufacturing Company, and private owners.

3.11.4.3.5 Stream Crossings

This section describes the stream crossings that would be impacted by the Action Alternative for both of the project segments. If the Action Alternative is selected, UDOT will inspect the existing condition of all stream crossings and decide the proper course of action (replace, extend, or maintain the crossing) during the final design phase of the project. If UDOT determines that an action needs to be taken for a stream crossing, UDOT will follow the procedures and requirements in UDOT's *Drainage Design Manual of Instruction* (UDOT 2022a). For more information, see Section 3.12, *Ecosystem Resources*, and Section 3.13, *Floodplains*.

North Segment Impacts

The impacts to stream crossings in the north segment would be the same for both the Farmington 400 West Option and the Farmington State Street Option. These options would include modified or improved stream crossings in the same general areas as the existing stream crossings, and UDOT anticipates that the selected option would not impact the stream crossing design approach if one option is selected over the other.

South Segment Impacts

The impacts to stream crossings in the south segment would be the same for both the Salt Lake City 1000 North – Northern Option and the Salt Lake City 1000 North – Southern Option. These options would include modified or improved stream crossings that would occur in the same general areas as the existing stream crossings, and UDOT anticipates that the selected option would not impact the stream crossing design approach if one option is selected over the other.

3.11.4.3.6 Summary of Action Alternative Impacts

Table 3.11-7 summarizes the expected impacts to water quality and water resources from the Action Alternative. The table provides quantitative summaries of the number of groundwater drinking water source protection zones and the number of water right points of diversion that would be impacted by each option of the Action Alternative. No summary is given for impacts to surface waters and their beneficial uses (no substantial changes to water quality was modeled), groundwater quality (no impacts expected), or stream crossings since these impacts would be similar for all of the Action Alternative options.

As shown in Table 3.11-7, the same number of each groundwater source protection zone type would be impacted with any combination of Action Alternative options. Either of the south segment options would result in the same number of impacts to water right points of diversion; however, in the north segment, the Farmington State Street Option would impact two additional water right points of diversion with a perfected status and four additional water right points of diversion with terminated status compared to the Farmington 400 West Option.

Table 3.11-7. Summary of Impacts to Water Quality and Water Resources from the Action Alternative

Segment	Option	Impacts	
		Groundwater Drinking Water Source Protection Zones	Water Right Points of Diversion
North	Farmington 400 West Option	Number of Impacts by Zone Zone 1: 2; Zone 2: 5; Zone 3: 9; Zone 4: 13	Number of Impacts by Status Approved: 63; Perfected: 27; Terminated: 34; Unapproved: 1
	Farmington State Street Option	Number of Impacts by Zone Zone 1: 2; Zone 2: 5; Zone 3: 9; Zone 4: 13	Number of Impacts by Status Approved: 63; Perfected: 29; Terminated: 38; Unapproved: 1
South	Salt Lake City 1000 North – Northern Option	Number of Impacts by Zone Zone 1: 1; Zone 2: 1; Zone 3: 1; Zone 4: 1	Number of Impacts by Status Approved: 3; Perfected: 0; Terminated: 16; Unapproved: 0
	Salt Lake City 1000 North – Southern Option	Number of Impacts by Zone Zone 1: 1; Zone 2: 1; Zone 3: 1; Zone 4: 1	Number of Impacts by Status Approved: 3; Perfected: 0; Terminated: 16; Unapproved: 0
	Minimum impacts (sum of lowest impacts for each segment)	Number of Impacts by Zone Zone 1: 3; Zone 2: 6; Zone 3: 10; Zone 4: 14	Number of Impacts by Status Approved: 66; Perfected: 27; Terminated: 50; Unapproved: 1
	Maximum impacts (sum of highest impacts for each segment)	Number of Impacts by Zone Zone 1: 3; Zone 2: 6; Zone 3: 10; Zone 4: 14	Number of Impacts by Status Approved: 66; Perfected: 29; Terminated: 54; Unapproved: 1
	Range of impacts	Number of Impacts by Zone Zone 1: 3; Zone 2: 6; Zone 3: 10; Zone 4: 14	Number of Impacts by Status Approved: 66; Perfected: 27–29; Terminated: 50–54; Unapproved: 1

3.11.4.4 Mitigation Measures

UDOT proposes the following mitigation measures to help ensure that surface water and groundwater quality is maintained.

- UDOT or its design consultants would follow all applicable requirements of UDOT's *Stormwater Quality Design Manual* (UDOT 2021) for the design of BMPs to meet MS4 permit and groundwater permit-by-rule requirements.
- UDOT or its design consultants would follow UDOT's *Drainage Manual of Instruction* for the design of stream crossings and culverts.
- UDOT or its construction contractors would prepare SWPPPs and obtain a UPDES permit for stormwater discharges associated with construction activities. Restoration efforts would also be monitored to ensure successful revegetation as typically required by an SWPPP.
- If construction activities require dewatering that would discharge project water to surface waters, UDOT or its construction contractors would obtain a UPDES Construction Dewatering or Hydrostatic Testing General Permit.

- UDOT would visually inspect and maintain stormwater quality BMPs so that they are functioning properly. These BMPs would likely include detention basins; however, other BMPs from UDOT's *Stormwater Quality Design Manual* might be chosen during the final design phase of the project.
    - During construction, inspectors for the project would certify that the BMPs were installed according to contract documents and UDOT standards.
    - After construction, UDOT would document and maintain records of inspections, any deficiencies identified during inspections, and the repairs performed on the BMPs.
- UDOT would comply with the Clean Water Act Section 404 permit, including any required Section 401 Water Quality Certifications and applicable Stream Alteration Permits for activities placing fill into waters of the United States and altering natural stream bed and banks.
- UDOT would maintain wetland hydrology and existing surface water conveyance patterns through the installation of culverts or other engineering alternatives through the roadway embankment.
- UDOT would collaborate with the public water system owners that have drinking water source protection zones in place that might be impacted by the Project during final design and construction to mitigate any impacts to water distribution infrastructure.
- UDOT would coordinate with the owners of any impacted water right points of diversion during final design and construction to protect or replace the impacted points of diversion as necessary.
- UDOT would design and implement countermeasures to mitigate potential impacts to a stream's natural flow pattern, velocity, profile, channel stability, aquatic habitats, streambank vegetation, and riparian habitats that could result from replacing, lining, extending, or repairing conveyance structures for the project.

3.12 Ecosystem Resources

3.12.1 Introduction

Section 3.12 describes the ecosystem resources, including the plant species, wildlife species, habitat types, and aquatic resources, in the ecosystem resources evaluation area and how these resources would be directly and indirectly affected by the project alternatives.

Ecosystem Resources Evaluation Area. The ecosystem resources evaluation area is located in Davis and Salt Lake Counties. It measures about 18 miles north-south and extends from the U.S. 89/Legacy Parkway/ Park Lane interchange (I-15 milepost 325) in Farmington to the I-80 West/400 South interchange (I-15 milepost 308) in Salt Lake City (Figure 3.12-1). The width of the evaluation area varies. The boundaries for the evaluation area extend beyond the north and south termini of the project to include ramps that begin or end at these interchanges. In addition, the evaluation area includes each of the I-15 interchanges between the northern and southern termini and extends to the east and west to include the next major intersection. The evaluation area covers about 2,866 acres and ranges in elevation from about 4,210 to 4,710 feet.