# State Route 73
## Eagle Mountain to Saratoga Springs

## Draft State Environmental Study

Utah Department of Transportation

UDOT Keeping Utah Moving

UDOT Project No. S-0073(33)30, PIN 13608

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# Acronyms and Abbreviations

| | |
|---|---|
| APA | Agriculture Protection Area |
| APE | area of potential effects |
| BMP | best management practice |
| CFR | Code of Federal Regulations |
| dBA | A-weighted decibels |
| DERR | Utah Division of Environmental Response and Remediation |
| EPA | United States Environmental Protection Agency |
| ESA | Endangered Species Act |
| FEMA | Federal Emergency Management Agency |
| FHWA | Federal Highway Administration |
| GIS | geographic information systems |
| GPS | global positioning system |
| LOS | level of service |
| MAG | Mountainland Association of Governments |
| ML | monitoring location |
| mph | miles per hour |
| MS4 | municipal separate storm sewer system |
| NAC | noise-abatement criteria |
| NHPA | National Historic Preservation Act |
| NRHP | National Register of Historic Places |
| $PM_{10}$ | particulate matter 10 microns in diameter or less |
| RTP | Regional Transportation Plan |
| S.R. | state route |
| SES | State Environmental Study |
| SHPO | State Historic Preservation Officer |
| SITLA | School and Institutional Trust Lands Administration |
| TNM | Traffic Noise Model |
| U.S. | United States |
| UAC | Utah Administrative Code |
| UCA | Utah Code Annotated |
| UDOT | Utah Department of Transportation |
| USACE | United States Army Corps of Engineers |
| USC | United States Code |
| USDOT | United States Department of Transportation |
| USFWS | United States Fish and Wildlife Service |
| UST | underground storage tank |

# 1. INTRODUCTION

## 1.1. Study Area

The study area for the Utah State Route (S.R.) 73, Eagle Mountain to Saratoga Springs State Environmental Study (SES) is located in Cedar Valley west of Utah Lake in northwestern Utah County, Utah. S.R. 73 serves as the primary roadway arterial connecting Cedar Valley with the rest of the Wasatch Front. Cedar Valley includes the municipalities of Eagle Mountain, Cedar Fort, and Fairfield. Eagle Mountain is the largest city in terms of population and serves as a "bedroom community" for residents commuting to jobs in the Salt Lake and Utah Valleys. S.R. 73 is also an important roadway for Saratoga Springs, serving current and planned development west of the future Mountain View Corridor. Because of topographical constraints, roadway connectivity between Cedar Valley and Utah Valley is limited. Pony Express Parkway is the only other road that provides access to northern Cedar Valley.

As shown in Figure 1-1, S.R. 73 Study Area, in Chapter 8, Figures, the study area is bounded on the east by the future Mountain View Corridor (800 West/Foothill Boulevard in Saratoga Springs) and on the west by Eagle Mountain Boulevard.

## 1.2. Project Background

### 1.2.1. Mountainland Association of Governments' Regional Transportation Plan

The Mountainland Association of Governments (MAG) is the designated metropolitan planning organization that works in partnership with the Utah Department of Transportation (UDOT), the Utah Transit Authority, local governments, and other stakeholders to develop the regional transportation plan (RTP) for the communities in its jurisdiction (Utah, Summit, and Wasatch Counties).

The major transportation needs in the S.R. 73 study area are a result of rapidly growing population and existing and projected roadway congestion in northern Utah County. The transportation needs are documented in several regional and local plans, most notably in MAG's 2015–2040 RTP, which shows S.R. 73 being widened to six lanes in Phase 1 of the RTP (2015 to 2024, Project 12) and subsequently being developed into a freeway with a frontage road system in Phase 2 (2025 to 2034, Project 49) of the RTP (MAG 2015).

According to MAG, Utah County's population is expected to increase by nearly half a million people by 2030, resulting in nearly 100% growth and a population of over 1 million. In addition, employment in Utah County is projected to double (MAG 2015). The populations of Eagle Mountain and Saratoga Springs are expected to increase by almost 300% by 2040 (MAG 2012). With this projected increase in population and employment, the S.R. 73 through Eagle Mountain will not be able to serve the associated increase in travel demand.

### 1.2.2. S.R. 73 Corridor Planning Study

In February 2016, UDOT published the S.R. 73 Corridor Planning Study (UDOT 2016). The goal of the planning study was to identify a recommended concept to improve transportation on S.R. 73 from Eagle Mountain Boulevard to the future Mountain View Corridor (800 West/Foothill Boulevard in Saratoga Springs), in northwestern Utah County based on the needs identified in MAG's 2015–2040 RTP.

The 2016 S.R. 73 Corridor Planning Study considered four different improvement concepts and applied a screening process to evaluate the effectiveness of each. The four concepts were a reversible lane system, a system of widened and new arterials, a freeway, and a frontage road freeway system. Each concept was evaluated for projected congestion levels, right-of-way requirements, local access, and transit and trail compatibility. Based on this evaluation, UDOT identified the freeway with frontage roads system as the recommended concept and carried it forward for evaluation in this SES. The freeway with frontage roads system is referred to in this SES as the Proposed Project. Details regarding the Proposed Project are included in Section 2, Project Description.

## 1.3. Project Goals and Objectives

The primary purpose of the Proposed Project is to improve regional mobility by reducing roadway congestion on S.R. 73 between Cedar Valley and the surrounding communities. UDOT intends the Proposed Project to address the following three goals:

1. Improve regional mobility by reducing roadway congestion.
2. Improve travel mode choices by accommodating transit, bicycle, and pedestrian uses.
3. Support local needs and objectives identified in land use and transportation plans for transportation improvements.

### 1.3.1. Improve Regional Mobility by Reducing Roadway Congestion

A primary goal of the Proposed Project is to improve regional mobility by reducing traffic congestion on S.R. 73. The Cedar Valley population is expected to increase to about 130,000 residents by 2040 compared to about 28,000 residents in 2015 (see Appendix A, S.R. 73 Environmental Study Traffic Memo). With this amount of growth, S.R. 73 in its current configuration through the study area will be unable to serve the resulting heavy growth in traffic demand.

The project team evaluated traffic patterns in the Proposed Project study area to quantify the future need for transportation improvements. The team evaluated existing and future roads in the study area for current (2015) and future (2040) performance with and without improvements to S.R. 73. Details regarding this traffic analysis are provided in Appendix A.

The traffic analysis divided S.R. 73 into a western segment and an eastern segment. The western segment was divided into two stretches: Eagle Mountain Boulevard to Six-Mile Cutoff Road and Six-Mile Cutoff Road to Ranches Parkway. The eastern segment included Ranches Parkway to the future Mountain View Corridor/Foothill Boulevard. For the existing and no-build conditions, the project team analyzed S.R. 73 as a two-lane road with one travel lane per direction and turn lanes at cross streets only on the western section of the road between Eagle Mountain Boulevard and Cedar Pass Road. On the eastern section of the road between Cedar Pass Road and Pioneer Crossing, S.R. 73 was analyzed as a five-lane road with two lanes in each direction of travel and a center two-way, left-turn lane.

#### Existing Conditions

The existing conditions (2015) analysis shows that S.R. 73 is currently performing with minimal delay during both the AM and PM peak periods. Average daily traffic volumes range from 7,800 to 10,900 vehicles per day in the western segment to 24,000 vehicles per day in the eastern segment (Table 1-1).

### Table 1-1. Existing (2015) Average Daily Traffic and Congestion Levels

| Year | Measure | Segment of S.R. 73 | | |
|---|---|---|---|---|
| | | Western Segment | | Eastern Segment |
| | | Eagle Mountain Blvd. to Six-Mile Cutoff Rd. | Six-Mile Cutoff Rd. to Ranches Pkwy. | Ranches Pkwy. to Foothill Blvd. |
| 2015 | Average daily traffic | 7,800 | 10,900 | 24,000 |
| | Congestion level | Minimal delay | Minimal delay | Minimal delay |

### Future (2040) No-Build Conditions

The analysis of future (2040) no-build conditions shows how S.R. 73 is expected to operate in the future if no substantial changes are made. The no-build analysis (that is, an analysis of future conditions on S.R. 73 without the Proposed Project) provides a benchmark for measuring the benefits of potential improvement scenarios. The no-build analysis includes all of the projects in the MAG's 2015–2040 RTP (MAG 2015) except for improvements to S.R. 73.

According to the no-build analysis, both segments of S.R. 73 in the study area are expected to be heavily congested in 2040. Average daily traffic volumes are projected to range from 32,000 to 40,000 vehicles per day in the western segment to 59,000 vehicles per day in the eastern segment (Table 1-2).

### Table 1-2. Future (2040) No-Build Average Daily Traffic and Congestion Levels

| Year | Measure | S.R. 73 Segment | | |
|---|---|---|---|---|
| | | Western Segment | | Eastern Segment |
| | | Eagle Mountain Blvd. to Six-Mile Cutoff Rd. | Six-Mile Cutoff Rd. to Ranches Pkwy. | Ranches Pkwy. to Foothill Blvd. |
| 2040 | Average daily traffic | 32,000 | 40,000 | 59,000 |
| | Congestion level | Heavily congested | Heavily congested | Heavily Congested |

### Build Concepts

To assess future traffic demand for the build scenario, the project team analyzed travel demand for the four build concepts presented in the 2016 S.R. 73 Corridor Planning Study for the 2040 horizon year. The analysis showed that all concepts were expected to have congested roadway segments by 2040; however, the Proposed Project was the only concept with no *heavily* congested segments in 2040. In addition, the frontage road system with the Proposed Project would maintain access to public streets.

With the no-build scenario, S.R. 73 could accommodate 59,000 vehicles per day on the eastern section. In comparison, with the Proposed Project, S.R. 73 could accommodate about 60,000 additional vehicles, for a total of 120,000 vehicles per day. For specific design details, see Section 2.1, Roadway Components.

## 1.3.2. Accommodate Travel Mode Choices

Another goal of the Proposed Project is to accommodate travel mode choices. In addition to improving mobility and reducing congestion for vehicles, the Proposed Project would accommodate transit service and would improve the availability and quality of bicycle and pedestrian options for east-west travel between Cedar Valley and the surrounding communities.

There is currently no transit service in the study area. The nearest transit service includes bus service to Eagle Mountain via Pony Express Parkway. MAG’s 2015–2040 RTP includes plans for a future transit facility to Eagle Mountain, but the project is neither listed nor funded in the RTP (not listed in Phases 1, 2, or 3). To meet the need identified in the RTP for future transit to Eagle Mountain, the Proposed Project would be able to accommodate future transit options once they are identified by the Utah Transit Authority.

In addition, the existing S.R. 73 corridor lacks pedestrian and bicycle facilities. Currently, there are no continuous east-west pedestrian or bicycle facilities in the study area that connect Eagle Mountain to other parts of Utah County. MAG’s 2015–2040 RTP includes a Phase 1 plan for an asphalt trail along S.R. 73 (Project 103). Expanded trail facilities are also included in Eagle Mountain City’s master plans to provide regional connectivity. These trail facilities are needed to improve the availability of pedestrian and bicycle facilities as an alternative to travel by automobile.

### 1.3.3. Support Local Economic Needs and Growth Objectives

The Proposed Project would support local economic development and growth objectives as expressed through locally adopted land-use and transportation plans and policies, specifically those for Eagle Mountain and Saratoga Springs.

In terms of area, Eagle Mountain is the third-largest city in Utah. According to the City's General Plan, the City needs to ensure that growth and development occur in a way that is safe, is environmentally responsible, and continues to contribute to the quality of life of residents as a whole. In its adopted 2005 General Plan, the City stated that S.R. 73 (at the time, the only fully improved road to and from Eagle Mountain) was nearing its traffic capacity (Eagle Mountain City 2005).

Eagle Mountain City continues to encourage master planning of property. The City's most recent Future Land Use and Transportation Corridors Map (Eagle Mountain City 2011) identifies S.R. 73 as a highway with mixed-use commercial, mixed-use residential, and rural residential land uses bordering the S.R. 73 study area (see Figure 1-2, Eagle Mountain City's Future Land Use and Transportation Corridors Map, in Chapter 8, Figures). UDOT has worked closely with Eagle Mountain City to make the Proposed Project as consistent as possible with the City's ongoing land use and transportation plans and policies.

Similarly, the City of Saratoga Springs' 2017 Transportation Master Plan shows S.R. 73 as a future freeway and an important connection to the future Mountain View Corridor (City of Saratoga Springs 2017a). S.R. 73 will tie into the future Mountain View Corridor via a system-to-system interchange that allows free-flow connections between the two facilities. These facilities will connect at 800 West/Foothill Boulevard in Saratoga Springs.

The Proposed Project would provide transportation improvements that complement locally established land use and transportation plans and community objectives. The S.R. 73 design team worked closely with these communities to accommodate their land use and transportation plans and policies that show a need for improvements to S.R. 73.

# 2. PROJECT DESCRIPTION

The Proposed Project consists of improvements to S.R. 73 in Cedar Valley in the cities of Eagle Mountain and Saratoga Springs. Because of water and topographical features, east-west transportation connectivity between Cedar Valley and the rest of Utah County is limited. S.R. 73 serves as the primary arterial road connecting Cedar Valley to the rest of Utah County and the Wasatch Front. Pony Express Parkway is the only other northern access to Cedar Valley, and it currently operates as a minor arterial.

Within the study area, S.R. 73 is classified as a major arterial with varying lane configurations and overall roadway widths. Between Eagle Mountain Boulevard and Cedar Pass Road, S.R. 73 currently has two lanes with one travel lane per direction and turn lanes at cross streets. Between Cedar Pass Road and Pioneer Crossing (S.R. 145), S.R. 73 currently has five lanes with two lanes per direction and a center two-way, left-turn lane. The existing right-of-way for S.R. 73 is about 150 feet wide.

## 2.1. Roadway Components

The Proposed Project includes about 6 miles of S.R. 73 between Eagle Mountain Boulevard and the future Mountain View Corridor (800 West/Foothill Boulevard in Saratoga Springs) and would serve as a principal arterial to Salt Lake County and the rest of Utah County. The Proposed Project would convert S.R. 73 into a frontage road freeway system with grade-separated intersections. The freeway mainline for this concept would include two lanes per direction west of Ranches Parkway and three lanes per direction east of Ranches Parkway. From Eagle Mountain Boulevard to Six-Mile Cutoff Road, the improvements would consist only of widening S.R. 73 from two to four lanes. The frontage road freeway system would start at Six-Mile Cutoff Road. Additional auxiliary lanes are included where needed to facilitate weaving movements between slip ramps.

**What is a freeway mainline?**

A freeway mainline is a controlled-access road designed for high-speed, unhindered traffic flow, and ingress and egress are regulated.

Figure 2-1, Changes in Travel Lanes on S.R. 73 with the Proposed Project, in Chapter 8, Figures, shows the lane configurations along the alignment. UDOT would determine which components of the roadway are constructed depending on funding, safety, and the ability to provide a project with logical limits. For these reasons, the project might be built in phases.

One-way frontage roads would be constructed to the north and south of the freeway mainline lanes. Frontage roads would run the entire length of the freeway, with one lane per direction west of Ranches Parkway and two lanes per direction east of Ranches Parkway. The freeway mainline would be constructed as a grade-separated facility. The one-way frontage roads would operate as arterial streets that provide access to the local street network and connect the freeway to cross streets.

Access to the frontage road system would occur from public streets only (no access would be allowed from private driveways), with access limited to five connections per mile as stated in Utah Administrative Code, Rule R930-6. Frontage roads would also have curb and gutter with lighting at the intersections. Slip ramps would be constructed to provide access between the freeway mainline lanes and the frontage roads.

**What is a slip ramp?**

A slip ramp is a short section of road that allows vehicles to enter or exit a controlled-access freeway from lower-speed frontage roads that provide access to connecting arterials and collector roads. It allows speed changes between the freeway and arterials or collector roads.

Typical cross-sections are shown in Figure 2-2 through Figure 2-5 in Chapter 8, Figures. The roadway design is generally depressed (below the existing ground level). Elevated sections are used only to avoid certain utility corridors and existing washes. Figure 2-2, Typical Depressed Section West of Ranches Parkway, and Figure 2-3, Typical Elevated Section West of Ranches Parkway, show typical depressed and elevated sections west of Ranches Parkway, and Figure 2-4, Typical Depressed Section East of Ranches Parkway, and Figure 2-5, Typical Elevated Section East of Ranches Parkway, show typical depressed and elevated sections east of Ranches Parkway. Figure 2-6 provides a photo simulation of the Proposed Project looking west at Ranches Parkway. Appendix B, S.R. 73 Engineering Plan Sheets, provides preliminary engineering plan sheets. These typical sections, as well as the final elevation of the freeway (depressed versus elevated), could change during the final design of the Proposed Project.

## 2.2. Trail Components

The Proposed Project includes a 12-foot-wide, east-west trail along the north side of the northern frontage road. This trail supports MAG's 2015–2040 RTP and would accommodate bicycles and pedestrians in accordance with Eagle Mountain City's Master Plan. Additionally, the south side of the improved S.R. 73 would include a 6-foot-wide pedestrian sidewalk.

## 2.3. Transit Components

This SES does not evaluate operation of a transit system as part of the Proposed Project; however, MAG has identified future transit service to Eagle Mountain once it is warranted by demand (MAG 2015). The project team also coordinated with Eagle Mountain City and the City of Saratoga Springs to be sure that the Proposed Project is compatible with their future transit plans. As proposed, the Proposed Project is wide enough to accommodate a future transit system if growth, ridership, and demand warrant a dedicated transit facility.

# 3. ENVIRONMENTAL ANALYSIS

This chapter describes the existing environmental, community, and economic conditions in the project study area which serve as a baseline for evaluating the impacts of the Proposed Project. This chapter provides information about the following subjects:

- Land use
- Farmland
- Community
- Relocations and right-of-way
- Economics
- Pedestrian and bicyclist considerations
- Air quality
- Noise
- Water resources
- Biological resources
- Historic properties
- Hazardous material
- Construction impacts

For each resource analyzed, the impact analysis area, regulatory environment, current conditions, expected impacts, and required mitigation are described.

The expected impacts from the Proposed Project are based on existing conditions and not future no-build conditions. If the Proposed Project were not constructed, no other new project or projects would be identified in the RTP to replace the Proposed Project to improve regional mobility.

With the expected population growth rate, much of the open land (vacant land and agricultural land) that would have been affected by Proposed Project would be converted to other urban uses, particularly residential, by 2040. Thus, UDOT expects that the population growth and associated development would have a similar level of impacts as the Proposed Project to resources such as land use, farmland, biological resources, historic properties, paleontological resources, and wetlands. The main difference in impacts would be associated with traffic and noise.

With the Proposed Project, noise impacts would increase in some locations. However, without the Proposed Project, traffic conditions as described in Section 1.3.1, Improve Regional Mobility by Reducing Roadway Congestion, would continue, and there would be no travel-related benefits from the Proposed Project.

## 3.1. Land Use

Section 3.1 describes the existing land use patterns and current land use plans for each jurisdiction in the land use impact analysis area as well as applicable land use plans and policies. It also analyzes the expected impacts of the Proposed Project on land use patterns in this area.

**Land Use Impact Analysis Area.** The land use impact analysis area is about 1,690 acres and includes parts of Eagle Mountain, Saratoga Springs, and Utah County within a 1,100-foot buffer on either side of the centerline of S.R. 73 between the future Mountain View Corridor (800 West/Foothill Boulevard in

Saratoga Springs) on the east and Eagle Mountain Boulevard on the west. The majority of the land use impact analysis area is within the incorporated city limits of Eagle Mountain and Saratoga Springs.

### 3.1.1. Regulatory Environment and Compliance

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 community that each local government desires.

### 3.1.2. Methodology

The project team inventoried current land uses by reviewing aerial images that were taken on June 28, 2017, as well as images from Google Imagery (2017). Current land use categories were assigned to be consistent with those used in city zoning and general plans. A copy of the Utah County parcel dataset was used to calculate acreages.

Zoning data and general plans were collected in geographic information systems (GIS) format from MAG, Eagle Mountain City, and the City of Saratoga Springs in December 2017 and January 2018. These datasets were merged and categories generalized in order to calculate impacts. All calculations are based on spatial analysis using GIS software.

### 3.1.3. Current Conditions

This section describes the existing land use in the land use impact analysis area as well as the applicable local and regional land use plans and policies. Table 3-1 lists the current land use categories and associated acreage in the impact analysis area, and Figure 3-1, Current and Planned Land Use in the Land Use Impact Analysis Area, in Chapter 8, Figures, shows these current land use categories. Currently, the most prevalent land use along S.R. 73 is agriculture, followed by residential.

### Table 3-1. Current Land Use in the Land Use Impact Analysis Area

| Land Use Category | Acres within Impact Analysis Area | Percentage of Impact Analysis Area | Land Use Category Description |
|---|---|---|---|
| Planned Land Use | | | |
| Agriculture | 682.01 | 40.36% | Land that is vacant and shows evidence of grazing or plowing |
| Commercial/Office | 15.03 | 0.89% | Land that is used for commercial, retail, or office space |
| Education | 19.62 | 1.16% | Land that is used for schools |
| Open Space/ Recreation | 79.67 | 4.72% | Land that is set aside as open space in residential developments, has evidence of walking paths, or is set aside for a specific recreation activity such as golf courses or playgrounds |
| Public | 1.69 | 0.10% | Includes churches and city buildings |
| Residential | 461.85 | 27.33% | Predominantly single-family homes |
| Transportation | 281.48 | 16.66% | UDOT right-of-way, UDOT-owned property, and local and collector road network |
| Utility | 23.99 | 1.42% | Land owned and used by utility companies |
| Vacant | 124.28 | 7.36% | Vacant parcels in residential developments not set aside for open space, and land without an obvious use when aerial images were reviewed |
| Total | 1,689.62 | 100.00% | |

### 3.1.4. Planned Land Use

This section describes the planned land use in the land use impact analysis area. This information is based on the most current general plans and zoning data obtained from MAG, Eagle Mountain City, and the City of Saratoga Springs. In the impact analysis area, the most prevalent planned land use is residential, followed by commercial. The most prevalent zoning is also residential.

**What are planned land use and zoning?**

Planned land use (master plans) guides the physical development of a community but is not enforceable, whereas zoning is a legal framework that permits particular land uses on specific sites.

Although the current land use is mostly agricultural (40.36%) and residential (27.33%), zoning and future land use plans indicate that the impact analysis area will be mostly residential, commercial, and transportation-related. Table 3-2 lists the acreage for category of planned land use and zoning in the land use impact analysis area, and Figure 3-1, Current and Planned Land Use in the Land Use Impact Analysis Area, and Figure 3-2, Zoning in the Land Use Impact Analysis Area, in Chapter 8, Figures, show the planned land use and zoning, respectively.

Eagle Mountain City's Future Land Use and Transportation Corridors Map designates S.R. 73 as a highway connecting to the future location of the Mountain View Corridor (Eagle Mountain City 2011). The Saratoga Springs Transportation Master Plan designates S.R. 73 within the city limits as a six-lane freeway connecting to the future Mountain View Corridor (City of Saratoga Springs 2017a).

### Table 3-2. Planned Land Use and Zoning in the Land Use Impact Analysis Area

| Land Use Category | Acres within Impact Analysis Area | Percentage of Impact Analysis Area | Land Use Category Description |
|---|---|---|---|
| Planned Land Use | | | |
| Agriculture | 31.79 | 1.88% | Agricultural zones and large-lot residential agriculture |
| Business Park | 101.37 | 6.00% | Areas designated for future business parks |
| Commercial | 405.58 | 24.00% | Commercial zones and mixed-use development zones with a commercial focus |
| Industrial | 19.48 | 1.15% | Industrial zones, light manufacturing, and mining |
| Institutional | 0.41 | 0.02% | Institutional facilities |
| Mixed Use | 121.16 | 7.17% | Mixed-use development |
| Office | 126.00 | 7.46% | Office and office/warehouse space |
| Open Space | 16.02 | 0.95% | Developed and natural open-space areas |
| Public | 21.31 | 1.26% | Areas zoned as public-use facilities |
| Recreation | 26.28 | 1.56% | Areas designated for recreation, including golf courses |
| Residential | 758.21 | 44.87% | All other residential zones, including high- and low-density zoning; does not include large-lot residential agriculture |
| Unclassified | 62.00 | 3.67% | Acreage in the impact analysis area without land use information; some of these areas are road right-of-way |
| Total | 1,689.62 | 100.00% | |
| Zoning | | | |
| Agriculture | 104.10 | 6.16% | Agricultural zones and large-lot residential agriculture |
| Business Park | 31.32 | 1.85% | Business park |
| Commercial | 300.38 | 17.78% | Commercial zones and mixed-use development zones with a commercial focus |
| Industrial | 1.35 | 0.08% | Industrial zones, light manufacturing, and mining |
| Mixed Use | 5.81 | 0.34% | Mixed-use development |
| Open Space | 31.81 | 1.88% | Areas zoned for recreation and open space, including golf courses |
| Public | 10.39 | 0.61% | Areas zoned as public uses and facilities |
| Residential | 665.87 | 39.41% | All other residential zones, including high- and low-density zoning; does not include large-lot residential agriculture |
| Unclassified | 538.59 | 31.88% | Acreage in the impact analysis area without zoning information. Some of these areas are road right-of-way. A large portion of the Eagle Mountain zoning data was unclassified and is included in this area calculation. |
| Total | 1,689.62 | 100.00% | |

### 3.1.5. Expected Impacts

Table 3-3 lists the planned land use and zoning designations that would be converted to a transportation use (highway right-of-way) by the Proposed Project. The project's footprint totals 216.30 acres without counting existing pavement. The largest impact would occur in residential areas. Section 3.4, Relocations and Right-of-Way Acquisition, provides details about the specific properties that would be affected. The Proposed Project would be consistent with the Eagle Mountain and Saratoga Springs general land use and transportation plans, which show a freeway system connecting Eagle Mountain to the future Mountain View Corridor. In addition, frontage roads would improve access to adjacent residential, recreational, and public-use facilities.

**Table 3-3. Impacts from the Proposed Project to Planned Land Use and Zoning in the Land Use Impact Analysis Area**

| Land Use Category | Acres Converted to S.R. 73 Right-of-Way | Percentage of Project Right-of-Way | Land Use Category Description |
|---|---|---|---|
| Planned Land Use | | | |
| Agriculture | 0 | 0.00% | Agricultural zones and large-lot residential agriculture |
| Business Park | 26.79 | 12.39% | Areas designated for future business parks |
| Commercial | 46.89 | 21.68% | Commercial zones and mixed-use development zones with a commercial focus |
| Industrial | 0.78 | 0.36% | Industrial zones, light manufacturing, and mining and grazing |
| Institutional | 0 | 0.00% | Institutional facilities |
| Mixed Use | 20.71 | 9.57% | Mixed-use development |
| Office | 10.15 | 4.69% | Office and office/warehouse space |
| Open Space | 0 | 0.00% | Developed and natural open-space areas |
| Public | 2.29 | 1.06% | Areas zoned as public-use facilities |
| Recreation | 0.02 | 0.01% | Areas designated for recreation, including golf courses |
| Residential | 96.27 | 44.51% | All other residential zones, including high- and low-density zoning; does not include large-lot residential agriculture |
| Unclassified | 12.39 | 5.73% | Acreage in the impact analysis area without land use information; some of these areas are side street right-of-way |
| Total | 216.30 | 100.00% | |

(*continued on next page*)

**Table 3-3. Impacts from the Proposed Project to Planned Land Use and Zoning in the Land Use Impact Analysis Area**

| Land Use Category | Acres Converted to S.R. 73 Right-of-Way | Percentage of Project Right-of-Way | Land Use Category Description |
|---|---|---|---|
| Zoning | | | |
| Agriculture | 0.70 | 0.32% | Agricultural zones and large-lot residential agriculture |
| Business Park | 1.23 | 0.57% | Business park |
| Commercial | 52.91 | 24.46% | Commercial zones and mixed-use development zones with a commercial focus |
| Industrial | 0 | 0.00% | Industrial zones, light manufacturing, and mining and grazing |
| Mixed Use | 0 | 0.00% | Mixed-use development |
| Open Space | 7.44 | 3.44% | Areas zoned for recreation and open space, including golf courses |
| Public | 1.55 | 0.72% | Areas zoned as public uses and facilities |
| Residential | 80.78 | 37.35% | All other residential zones, including high- and low-density zoning; does not include large-lot residential agriculture |
| Unclassified | 71.69 | 33.14% | Acreage in the impact analysis area without zoning information. Some of these areas are side street right-of-way. A large portion of the Eagle Mountain zoning data was unclassified and is included in this area calculation. |
| Total | 216.30 | 100.00% | |

Roadway improvements can induce development in a study area because of the improved accessibility and mobility created by the project. Based on input from both MAG and Eagle Mountain City planners and on the project team's review of future growth projections, land use and zoning plans, and City-approved projects and awarded building permits, the project team expects that Cedar Valley, which includes Eagle Mountain and Saratoga Springs, will develop with residential and commercial developments with or without the Proposed Project.

Currently, much of the land adjacent to S.R. 73 between Saratoga Springs and Six-Mile Cutoff Road is already developed or in the process of being developed. Land within the Eagle Mountain city limits is planned and zoned to support future development with or without the Proposed Project. Overall, the Proposed Project would not change the residential and commercial trends or the future land uses planned by Eagle Mountain City to support the over 300% population growth expected by 2040.

Because future development is expected to occur with or without the Proposed Project, the project team does not anticipate that the Proposed Project would substantially change the type or rate of development and therefore would not substantially contribute to induced growth and the resulting indirect impacts.

### 3.1.6. Mitigation

No mitigation is required.

## 3.2. Farmland

Section 3.2 discusses general farmland trends and crops in the farmland impact analysis area.

**Farmland Impact Analysis Area.** The farmland impact analysis area is about 1,690 acres and includes portions of Saratoga Springs, Eagle Mountain, and Utah County within a 1,100-foot buffer on either side of the centerline of S.R. 73 between the future Mountain View Corridor (800 West/Foothill Boulevard in Saratoga Springs) on the east and Eagle Mountain Boulevard on the west. The majority of the farmland impact analysis area is within the incorporated city limits of Eagle Mountain and Saratoga Springs.

### 3.2.1. Regulatory Environment and Compliance

The Utah Agricultural and Industrial Protection Act (Utah Code Title 17, Chapter 41, Part 4) establishes the creation and protection of Agriculture Protection Areas (APAs). There are no APAs in the farmland impact analysis area; so they were not evaluated for this study (Utah County 2017a).

### 3.2.2. Methodology

Data were collected for APAs (Utah County 2017a), prime and unique farmland (NRCS 2016), and vegetation and crop cover (Utah Division of Water Resources 2016) in GIS format for the farmland impact analysis area. The characteristics of the impact analysis area were also visually surveyed in the field during the fall of 2017. All calculations are based on analyses using GIS software.

### 3.2.3. Current Conditions

Within the farmland impact analysis area, the majority of the land use is residential and nonirrigated dry land (an agricultural land use). Of the land used for crop production, three crop types predominate: alfalfa, dry grain/seeds, and grain. These crop types are planted on about 13% of the impact analysis area. Some dry land parcels show evidence of tillage and forage production, but no active grazing, irrigation, crop production, or livestock fences were observed within the impact analysis area.

Table 3-4 lists the acreages of crops and nonagricultural land in the impact analysis area. Existing pavement and right-of-way are included as nonagricultural land. Figure 3-3, Land Cover and Crop Types in the Farmland Impact Analysis Area, in Chapter 8, Figures, shows the crop types in the impact analysis area.

**Table 3-4. Crops and Nonagricultural Land in the Farmland Impact Analysis Area**

| Crop or Land Cover Type | Acres within Impact Analysis Area | Percentage of Impact Analysis Area |
|---|---|---|
| Agricultural uses | | |
| Alfalfa | 42.12 | 2.49% |
| Dry grain/seeds | 156.93 | 9.29% |
| Dry land | 554.39 | 32.81% |
| Grain | 17.26 | 1.02% |
| Nonagricultural uses | | |
| Other, nonagriculture | 918.91 | 54.39% |
| Total | 1,689.62 | 100.00% |

Source: Utah Division of Water Resources 2016

### 3.2.4. Expected Impacts

The Proposed Project would be constructed within the incorporated city limits of Eagle Mountain and Saratoga Springs, and the agricultural and undeveloped vacant land along S.R. 73 is committed to urban development in the Cities' respective zoning and general plans. There is less than 1 acre of agriculturally zoned land within the right-of-way for the Proposed Project. For more information about land use trends in the project area, see Section 3.1, Land Use.

Table 3-5 lists the acreages of crops and nonagricultural land within the right-of-way of the Proposed Project. The project's footprint totals 216.30 acres without counting existing pavement, and the project would convert all 216.30 acres listed in Table 3-5 to a transportation use (highway right-of-way). The greatest impacts would be to nonirrigated dry land and to other, nonagricultural uses.

The Proposed Project would acquire right-of-way from the edges of the adjacent agricultural parcels, so the project would not affect the continued viability of the large, contiguous agricultural parcels along S.R. 73.

**Table 3-5. Impacts to Crops and Nonagricultural Land within the Project Right-of-Way**

| Crop or Land Cover Type | Acres within Project Right-of-Way | Percentage of Project Right-of-Way |
|---|---|---|
| Agricultural uses | | |
| Alfalfa | 0.27 | 0.12% |
| Dry grain/seeds | 36.72 | 16.98% |
| Dry land | 65.90 | 30.47% |
| Grain | 0.00 | 0.00% |
| Nonagricultural uses | | |
| Other, nonagriculture | 94.73 | 43.80% |
| Total | 216.30 | 100.00% |

Source: Utah Division of Water Resources 2016
Values in this table do **not** include existing pavement or right-of-way.

### 3.2.5. Mitigation

No mitigation is required.

# 3.3. Community

Section 3.3 describes the social environment in the community impact analysis area and the impacts to the social environment from the Proposed Project. The community impact analysis focuses on the overall community setting, community cohesion and quality of life, community facilities and recreation resources, public health and safety, and public services and utilities.

**Community Impact Analysis Area.** The community impact analysis area totals 1,689.62 acres and includes parts of Eagle Mountain and Saratoga Springs within a 1,100-foot buffer on either side of the centerline of S.R. 73 between the future Mountain View Corridor (800 West/Foothill Boulevard in Saratoga Springs) to the east and Eagle Mountain Boulevard to the west.

## 3.3.1. Regulatory Environment and Compliance

Transportation projects frequently produce social and economic effects and can influence the character and nature of communities and its quality of life. The Federal Highway Administration's (FHWA) guidelines for evaluating community impacts consider several types of impacts, including impacts to community cohesion, the availability of public facilities and services, taxes and property values, and displacements of people, businesses, and farms. Among the community impacts analyzed in this SES, one type is subject to specific legal requirements and obligations: the acquisition of property by UDOT as necessary to improve S.R. 73. See Section 3.4, Relocations and Right-of-Way Acquisition, for more information about property acquisition.

In addition, the U.S. Department of Transportation (USDOT) issued the *United States Department of Transportation Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations* on March 11, 2010, to reflect USDOT's support for developing fully integrated active transportation networks. The policy states that "every transportation agency has the responsibility to improve conditions and opportunities for walking and bicycling and to integrate walking and bicycling into [its] transportation systems" (FHWA 2010).

## 3.3.2. Methodology

The project team obtained information about the existing community environment by reviewing zoning and general plans from Eagle Mountain City and the City of Saratoga Springs; reviewing aerial images obtained on June 28, 2017, as well as images from Google Imagery (2017); conducting field surveys; and reviewing city websites. Zoning data and general plans were collected from MAG, Eagle Mountain City, and the City of Saratoga Springs in December 2017 and January 2018. The project team also reviewed publicly available demographic and community information such as U.S. Census Bureau data and data from Eagle Mountain City and the City of Saratoga Springs, local chambers of commerce, and the State of Utah.

## 3.3.3. Current Conditions

The majority of the community impact analysis area comprises agricultural land uses (682.01 acres) followed by residential land uses and predominantly single-family homes (461.85 acres) (for more information, see Section 3.1, Land Use). Communities in the community impact analysis area include those in Eagle Mountain and Saratoga Springs. Of the two, Eagle Mountain has the largest population. Both cities have experienced unprecedented residential growth for the past few years, resulting in about 60,000 residents combined in the two cities (Neely 2017).

### Community Cohesion and Quality of Life

Community cohesion is the degree to which residents have a sense of belonging to their neighborhood or community, while quality of life can be characterized as a person's well-being and happiness. Quality of life considerations focus on those elements that the public generally associates with a high quality of life: education, safety, recreation opportunities, convenient shopping and services, access to transportation facilities, and a positive general living environment.

**Community Cohesion.** The majority of the community impact analysis area and existing residential development is located in Eagle Mountain. There are portions of six master-planned communities within the community impact analysis area (Eagle Mountain City, no date). Meadow Ranch, Valley View, and North Ranch are north of S.R. 73, while Sage Valley, Cedar Pass Ranch, and the Ranches are south of S.R. 73. These master-planned communities would likely be cohesive within themselves and are not divided by the current S.R. 72 highway.

**Quality of Life.** Eagle Mountain and Saratoga Springs serve primarily as "bedroom communities," with many of the residents commuting to employment centers in Utah and Salt Lake Counties. S.R. 73 operates as the primary arterial highway to the rest of Utah County and the Wasatch Front. Both cities have a high quality of life. For Saratoga Springs residents, this includes lakeshore living, a quiet and rural atmosphere, superb views, and an excellent central location midway between the Provo–Orem and Salt Lake City metropolitan areas (City of Saratoga Springs, no date).

Eagle Mountain residents enjoy quiet, safe neighborhoods with plenty of open space where families can play and spend time together. The city's master plan includes more than 30 miles of jogging, cycling, and horse trails that connect Eagle Mountain's residential developments (Utah Valley Economic Partnership, no date). According to comments from the public open house held September 7, 2017, many residents moved to the community impact analysis area for the rural atmosphere. However, many residents also said that transportation along S.R. 73 needs to be improved, which indicates that transportation might be one quality of life issue of concern to local residents.

### Community Facilities

Community facilities generally include (but are not limited to) schools, churches, libraries, community centers, senior centers, cemeteries, healthcare centers, and city facilities (such as city halls). Table 3-6 lists the community facilities in the community impact analysis area.

**Table 3-6. Community Facilities in the Community Impact Analysis Area**

| Facility Type | Name | Address | City |
|---|---|---|---|
| School | Rockwell Charter High School | 3435 E. Stonebridge Ln. | Eagle Mountain |
| School | Black Ridge Elementary School | 9358 Sunset Dr. | Eagle Mountain |
| Memorial site | Cory Wride Memorial | Between Six-Mile Cutoff Rd. and Eagle Mountain Blvd. | Eagle Mountain |

### Recreation Resources

Recreation resources include community parks, nature and wildlife preserves, county fair parks, golf courses, and trail systems. S.R. 73 currently lacks pedestrian and bicycle facilities, and there are no continuous east-west pedestrian or bicycle facilities in the community impact analysis area. Expanded trail facilities are included in the city master plans and are intended to improve the availability of pedestrian and bicycle facilities as an alternative to travel by automobile. Trail systems and specific considerations related to pedestrians and bicyclists (including trails) are discussed in Section 3.6, Pedestrian and Bicyclist Considerations. Table 3-7 lists the recreation facilities in the community impact analysis area.

**Table 3-7. Recreation Facilities in the Community Impact Analysis Area**

| Facility Type | Name | Address | City |
|---|---|---|---|
| Golf course | The Ranches | 4128 E. Clubhouse Ln. | Eagle Mountain |
| Park | Meadow Ranch Park | 9387 N. Sunset Dr. | Eagle Mountain |
| Park | Prairie View | 2412 E. Prairie View Dr. | Eagle Mountain |
| Park | North Ranch Park | 9242 N. Canyon Wash Dr. | Eagle Mountain |
| Park | Sage Valley Park | 1448 E. Smithfield Rd. | Eagle Mountain |

### Public Health and Safety

Fire and ambulance services for Eagle Mountain are provided by the Unified Fire Authority, while Saratoga Springs Fire and Rescue provides structural and wildland firefighting as well as an emergency medical technician–paramedic and emergency medical service ambulance service to Saratoga Springs. No public health or safety provider facilities (police departments, fire stations, or hospital services) were identified in the community impact analysis area.

### Public Services and Utilities

The project team contacted Eagle Mountain City, the City of Saratoga Springs, Utah County, and privately owned companies that own utility infrastructure along S.R. 73 between the future Mountain View Corridor (800 West/Foothill Boulevard in Saratoga Springs) and Eagle Mountain Boulevard. The following five utilities providers were identified as providing utility services in the community impact analysis area:

- **Eagle Mountain City:** water lines, sewer lines, septic systems, and stormwater facilities.
- **City of Saratoga Springs:** water lines.
- **Kern River Gas:** utility corridor crossing near the east end of the impact analysis area consisting of two natural gas pipelines.
- **Rocky Mountain Power:** utility corridor crossing near the east end of the impact analysis area consisting of two transmission lines (one 345-kilovolt line and one 138-kilovolt line) as well as distribution power lines.
- **Dominion Energy:** tap station that connects into Kern River Gas pipelines near the east end of the impact analysis area as well as several high-pressure gas lines that parallel S.R. 73.
- **Central Utah Water Conservatory District:** aqueduct near the crossing of Foothill Boulevard and Pioneer Crossing and future aqueduct corridor preservation planned to parallel S.R. 73.

Additional utilities could be identified during the final design phase of the Proposed Project and prior to construction.

### 3.3.4. Expected Impacts

#### Community Cohesion and Quality of Life

**Community Cohesion.** Because the six master-planned communities in the community impact analysis area are already divided by the existing S.R. 73 alignment (that is, three communities are north of S.R. 73 and three communities are south of S.R. 73), the Proposed Project would not further separate these communities. In addition, the Proposed Project would not divide any of the individual six master-planned communities. Individual neighborhood cohesion and cohesion within the broader local community would likely not be altered as a result of changes to S.R. 73. The Proposed Project would require the acquisition of 19 residences with additional changes in access, which could potentially change social integration and cohesion in those individual neighborhoods. For more information about right-of-way acquisitions, see Section 3.4, Relocations and Right-of-Way Acquisition. The improved frontage road system included with the Proposed Project could facilitate future social interactions for some residents on the north and south sides of S.R. 73 by easing travel across the highway and joining currently disconnected neighborhoods.

**Quality of Life.** The Proposed Project could contribute to a sense among residents that their rural lifestyle is being lost. Part of the appeal of Eagle Mountain and Saratoga Springs is the rural lifestyles, and, with a rural lifestyle, typically there are only a few ways into and out of a community. An improved S.R. 73 could make the look and feel of the community impact analysis area less rural. However, development is ongoing in this area and is likely affecting the lifestyle with or without the Proposed Project.

The populations of Eagle Mountain and Saratoga Springs are expected to increase almost 300% by 2040 (MAG 2012). With this projected increase in population, S.R. 73 through Eagle Mountain and Saratoga Springs would not be able to serve the associated increase in travel demand. Although many residents might have moved to the community impact analysis area for the rural lifestyle, the proximity of Eagle Mountain and Saratoga Springs to employers in Utah and Salt Lake Counties was undoubtedly a draw as well.

The Proposed Project would provide transportation improvements that complement locally established land use and transportation plans, specifically those for Eagle Mountain and Saratoga Springs, and would improve the commute for residents leaving these bedroom communities for points east and north for work. The Proposed Project would also provide continuous east-west pedestrian and bicycle facilities in the community impact analysis area (for more information about these facilities, see Section 3.6, Pedestrian and Bicyclist Considerations). Both improved transportation and the addition of pedestrian and bicycle facilities would increase the overall quality of life in the area.

#### Community Facilities

The Proposed Project would not affect any of the community facilities listed in Table 3-6, Community Facilities in the Community Impact Analysis Area, above. Although the boundaries for Blackridge Elementary School encompass property on both sides of S.R. 73, students who live south of S.R. 73 are bussed to the school by Alpine School District and do not walk across S.R. 73.

#### Recreation Resources

The Proposed Project would not affect any of the recreation facilities listed in Table 3-7, Recreation Facilities in the Community Impact Analysis Area, above.

### Public Health and Safety

The Proposed Project would not directly affect any public health and safety service providers. Although the project team did not contact emergency service providers in either city, traffic congestion could affect emergency response times along S.R. 73. The widened road and turning and passing lanes would better facilitate emergency response in the impact analysis area. The addition of through-traffic lanes and dedicated turn lanes would improve emergency service providers' access and response times. Increased shoulder widths could also accommodate emergency response vehicles. The wider highway would allow emergency services providers to better patrol and respond to incidents along S.R. 73.

### Public Services and Utilities

The Proposed Project could affect utilities along the proposed alignment. UDOT would determine the effects on these utilities and appropriate utility treatments by working with local jurisdictions during the final design phase of the Proposed Project. All utility relocations would be coordinated with the utility owner during the final design phase of the Proposed Project to ensure the safety and continuity of utility service during construction.

The Proposed Project would cross the Kern River Gas and Rocky Mountain Power utility corridor, and accommodations would be reflected in the final design. In general, the design would be at or near grade at this location to minimize impacts to the utility corridor and the associated costs to relocate the utilities. The Rocky Mountain Power distribution power lines on the east end of the community impact analysis area would need to be relocated.

The Proposed Project has been designed to avoid the Dominion Energy tap station. The project team is in the process of gathering information regarding the Dominion Energy high-pressure gas lines that parallel S.R. 73. It is likely that some gas lines would need to be relocated.

The project team has been coordinating with Eagle Mountain City regarding the Central Utah Water Conservatory District aqueduct planned to parallel S.R. 73. The project team has suggested that the aqueduct be installed on the north side of the alignment under the planned trail. This is an important issue for Eagle Mountain City since the aqueduct is needed to accommodate future growth. Additionally, the Proposed Project would affect multiple Eagle Mountain City water mains, septic systems, and stormwater facilities in Eagle Mountain. The project team will continue to work closely with Eagle Mountain City to relocate all necessary utilities.

Additional utilities could be identified during the final design phase, and any relocations would be coordinated prior to construction.

## 3.3.5. Mitigation

Planning and coordination with local utility providers during the final design and construction phases of the Proposed Project will minimize or eliminate utility conflicts and reduce disruptions in service. This planning and coordination includes submitting a set of plans for the Proposed Project to the utility providers for their use in preparing their utility relocation plans. This close coordination will enable UDOT to identify any potential conflicts early on and will provide time for UDOT to formulate strategies to overcome them. No additional mitigation is anticipated.

## 3.4. Relocations and Right-of-Way Acquisition

Section 3.4 describes the property in the right-of-way impact analysis area and the impacts to properties from the Proposed Project. The right-of-way impact analysis focuses on property impacts.

**Right-of-Way Impact Analysis Area.** The right-of-way impact analysis area includes portions of Saratoga Springs, Eagle Mountain, and Utah County bordering S.R. 73 between the future Mountain View Corridor (800 West/Foothill Boulevard in Saratoga Springs) on the east and Eagle Mountain Boulevard on the west. The footprint of the Proposed Project is 330.47 acres. The existing S.R. 73 right-of-way, including existing pavement, totals 107.25 acres. The Proposed Project would require about 223 additional acres (this includes areas with existing pavement).

### 3.4.1. Regulatory Environment and Compliance

The acquisition of property by UDOT as necessary to improve S.R. 73 is subject to specific legal requirements and obligations. When such acquisitions are necessary, UDOT's guidelines and policies are consistent with the federal Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (42 United States Code [USC] § 4601 and subsequent sections, amended 1989) and the State of Utah Relocation Program (part of the Utah Relocation Assistance Act, Utah Administrative Code, Section 57-12). These laws provide for 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 2013 *Relocation Assistance Brochure*. Relocation resources are available to all residents (including 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 2013 *Relocation Assistance Brochure* is available at www.udot.utah.gov/main/uconowner.gf?n=200602240821161.

### 3.4.2. Methodology

The project team identified property to be acquired based on the most recent Utah County records of property data as of April 10, 2018. The information identified property boundaries, size, ownership, and encumbrances such as easements and structures within the footprint of the Proposed Project. Property impacts are generally defined based on whether an existing structure is within the right-of-way of a proposed project or within a certain distance of the proposed right-of way.

In addition to these considerations, the project team also defined property impacts for the Proposed Project based on the intended function of the existing property. Close to half of the project study area in Eagle Mountain operates on a septic system and numerous residential properties are zoned for horses, both of which are factors that require a minimum lot size. If the Proposed Project would affect an existing property such that it would lose its intended function as a horse property or the septic system could no longer operate, then the property would be considered a relocation, even if the primary or secondary structures would not be affected. Property impacts are further defined as follows.

**Relocations.** A relocation occurs when an existing structure is within the right-of-way of the Proposed Project or a property is affected such that the remaining property no longer retains its original functionality. Example situations other than those mentioned in the paragraph above that result in a loss of functionality include loss of access to a public street, significant reduction in lot size, and impacts to existing structures. In these cases, the entire property would need to be acquired, and the residents or business would need to relocate.

**Potential Relocations.** A potential relocation is defined as a situation in which a property is directly affected by the Proposed Project, an existing structure (excluding porches and garages) is within 15 feet of the proposed right of-way, or the property could lose some of its original functionality, but it is not clear whether the entire parcel needs to be acquired. By the end of the right-of-way acquisition phase, UDOT would determine whether each potential relocation is a full acquisition (relocation) or a partial acquisition (see below). This determination will depend on an independent valuation of the property that will include any project-related damage to buildings and an assessment of potential loss of functionality.

**Partial Acquisitions.** A partial acquisition generally occurs when a property is located within the proposed right-of-way, but the right-of-way would be more than 15 feet from an existing structure or the remaining property is able to retain original functionality. For this type of impact, only a strip of land would need to be acquired. As with potential relocations, UDOT could refine partial acquisitions during the right-of-way acquisition phase.

### 3.4.3. Current Conditions

The majority of the right-of-way impact analysis area is used for agricultural (682.01 acres) and residential (461.85 acres) land uses (for more information, see Section 3.1, Land Use). Single-family housing, located in the Eagle Mountain master-planned communities, is the predominant type of residence.

### 3.4.4. Expected Impacts

The Proposed Project would require just over 223 acres of additional right-of-way, which would affect about 81 individual property parcels. The relocations, potential relocations, and partial acquisitions described in this section are based on preliminary engineering. Some of this additional right-of-way was already owned by or has recently been acquired by UDOT. Property impacts could change and would be determined during the final design phase of the Proposed Project and during the property-acquisition process.

**Relocations and Potential Relocations.** The Proposed Project would require 19 residential relocations and 2 potential residential relocations. Table 3-8 lists the addresses of the relocations and potential relocations on occupied residential lots. Also, 6 vacant/empty residential parcels, 2 vacant/empty commercial parcels, and 5 vacant/empty parcels owned by Eagle Mountain City would need to be fully acquired. Two vacant/empty commercial properties and 1 vacant/empty residential property are potential relocations.

**Partial Acquisitions.** In addition, there would be partial acquisitions on 44 parcels, 6 of which are vacant/empty commercial properties; 11 are vacant/empty parcels owned by local schools, utilities, homeowners' associations, and Eagle Mountain City; 12 are vacant/empty residential parcels, and 15 are occupied residential parcels. No school playgrounds or athletic fields would be affected. Partial acquisitions on occupied residential properties are listed in Table 3-8.

**Table 3-8. Residential Relocations, Potential Relocations, and Partial Acquisitions on Occupied Residential Lots**

| Impact Type | Address |
|---|---|
| Relocation | 1762 E DEERFIELD CIR, EAGLE MOUNTAIN, UT 84005 |
| Relocation | 1792 E DEERFIELD CIR, EAGLE MOUNTAIN, UT 84005 |
| Relocation | 1838 E DEERFIELD CIR, EAGLE MOUNTAIN, UT 84005 |
| Relocation | 1884 E DEERFIELD CIR, EAGLE MOUNTAIN, UT 84005 |
| Relocation | 1904 E DEERFIELD CIR, EAGLE MOUNTAIN, UT 84005 |
| Relocation | 2036 E SUNNYVALE CIR, EAGLE MOUNTAIN, UT |
| Relocation | 2046 E SUNNYVALE CIR, EAGLE MOUNTAIN, UT |
| Relocation | 2076 E SUNNYVALE DR, EAGLE MOUNTAIN, UT |
| Relocation | 2094 E SUNNYVALE DR, EAGLE MOUNTAIN, UT |
| Relocation | 2106 E SUNNYVALE DR, EAGLE MOUNTAIN, UT |
| Relocation | 2224 E BOBCAT WY, EAGLE MOUNTAIN, UT 84005 |
| Relocation | 2262 E BOBCAT WY, EAGLE MOUNTAIN, UT 84005 |
| Relocation | 2311 E BOBCAT WY, EAGLE MOUNTAIN, UT 84005 |
| Relocation | 2357 E BOBCAT WY, EAGLE MOUNTAIN, UT 84005 |
| Relocation | 2393 E BOBCAT WY, EAGLE MOUNTAIN, UT 84005 |
| Relocation | 2427 E BOBCAT WY, EAGLE MOUNTAIN, UT 84005 |
| Relocation | 9482 N BOBCAT WY, EAGLE MOUNTAIN, UT 84005 |
| Relocation | 2629 E RILEY DR, EAGLE MOUNTAIN, UT 84005 |
| Relocation | 9121 N CANYON WASH DR, EAGLE MOUNTAIN, UT 84005 |
| Potential relocation | 9155 N CEDAR PASS RD, EAGLE MOUNTAIN, UT 84005 |
| Potential relocation | 2585 E RILEY DR, EAGLE MOUNTAIN, UT 84005 |
| Partial acquisition | 2265 E BOBCAT WY, EAGLE MOUNTAIN, UT 84005 |
| Partial acquisition | 2519 E RILEY DR, EAGLE MOUNTAIN, UT 84005 |
| Partial acquisition | 2551 E RILEY DR, EAGLE MOUNTAIN, UT 84005 |
| Partial acquisition | 3178 E HARVEST LA, EAGLE MOUNTAIN, UT 84005 |
| Partial acquisition | 3330 E HARVEST LN, EAGLE MOUNTAIN, UT 84005 |
| Partial acquisition | 4478 E CORY B WRIDE MEMORIAL HWY, EAGLE MOUNTAIN, UT 84005 |
| Partial acquisition | 8938 N CANYON WASH DR, EAGLE MOUNTAIN, UT 84005 |
| Partial acquisition | 9033 N VALLEY DR, EAGLE MOUNTAIN, UT 84005 |
| Partial acquisition | 9038 N VALLEY DR, EAGLE MOUNTAIN, UT 84005 |
| Partial acquisition | 9250 N HAWK LA, EAGLE MOUNTAIN, UT |
| Partial acquisition | 9286 N 3277 EAST, EAGLE MOUNTAIN, UT 84005 |
| Partial acquisition | 9291 N 3277 EAST, EAGLE MOUNTAIN, UT 84005 |
| Partial acquisition | 9295 N 3377 EAST, EAGLE MOUNTAIN, UT 84005 |
| Partial acquisition | 9296 N 3377 EAST, EAGLE MOUNTAIN, UT 84005 |
| Partial acquisition | 976 W 1200 NORTH, SARATOGA SPRINGS, UT |

**Construction Easements.** Some properties outside the right-of-way might be affected by cuts or fills required during roadway construction. UDOT would acquire temporary construction easements for these properties. These properties might be affected but are not considered relocations or partial relocations because the property would not be permanently used. Construction easements are not included in the relocation impacts discussed in Section 3.4.4. UDOT would compensate the property owners for the temporary use of the property, and the restored property would be returned to the owner when the use of the property is no longer needed. These properties are not included in this analysis, nor are these properties discussed in this section.

### 3.4.5. Mitigation

Property acquisitions will be completed according to the provisions of the federal Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended, and the Utah Relocation Assistance Act, Utah Code, Section 57-12. 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.

## 3.5. Economics

Section 3.5 examines the economic characteristics in the S.R. 73 study area and evaluates how these characteristics would be affected by the Proposed Project. The economic analysis considers the economic conditions along S.R. 73 in Saratoga Springs, Eagle Mountain, and Utah County.

**Economic Impact Analysis Area.** The economic impact analysis area includes the parts of Saratoga Springs and Eagle Mountain in the S.R. 73 study area.

### 3.5.1. Regulatory Environment and Compliance

No federal, state, or local regulations require an economic impact analysis for the Proposed Project. However, because one of the project's goals and objectives is to support the local economic needs and growth objectives of Saratoga Springs and Eagle Mountain, the project team conducted an economic evaluation of the project.

### 3.5.2. Methodology

The project team evaluated changes in traffic circulation and access and direct right-of-way impacts from the Proposed Project to determine whether the project would have adverse and/or beneficial economic impacts to businesses, general commerce and employment, local government property and sales tax revenues, and property values. The economic impacts from constructing the Proposed Project were also evaluated.

### 3.5.3. Current Conditions

#### Regional Economic Conditions

**Employment Data and Unemployment Rate.** Nonfarm employment numbers in Utah County have increased from 171,380 in January 2010 to 251,629 in December 2017 (an increase of 47%). The unemployment rates in Utah County have paralleled the state unemployment rate during the last 10 years. The unemployment rates for both Utah County and for the state have been decreasing since 2010. The

December 2017 unemployment rate was 2.9% in Utah County, which was slightly lower than the 3.1% unemployment rate for the state overall (Utah Department of Workforce Services 2018).

Employment in the Provo–Orem metropolitan area, which includes Saratoga Springs and Eagle Mountain, is expected to increase by about 8,000 jobs (or 3.8%) annually between 2014 to 2024 (Utah Department of Workforce Services 2018).

**Employment Sectors.** The top five employment sectors in Utah County in 2017 were educational and health services; trade, transportation, and utilities; professional and business services; government (federal, state, and local); and construction (Utah Department of Workforce Services 2018).

**Major Employers.** The largest employers in Utah County are Brigham Young University, Alpine School District, Utah Valley University, Utah Valley Regional Medical Center, Vivint, Walmart, and the State of Utah (Utah Department of Workforce Services 2018).

**Tax Revenues.** The revenues for all local governments in Utah come from a combination of tax revenues, intergovernmental transfers, and fees. Collectively, property and sales tax revenues were 66% of Utah County's revenue in 2016, 37% of Saratoga Springs' revenue in 2017, and 18% of Eagle Mountain's revenue in 2017 (City of Saratoga Springs 2017b; Eagle Mountain City 2017; Utah County 2017b; Utah Office of the State Auditor 2018).

**Tax Rates.** In 2017, average property tax rates in Saratoga Springs and Eagle Mountain were between 1.0 and 1.1% (Utah State Tax Commission 2017). The 2018 sales tax rates in Eagle Mountain and Saratoga Springs is 6.75% (Utah State Tax Commission 2018).

**Property Values.** Property values in Utah County, Saratoga Springs, and Eagle Mountain increased between 2012 and 2017. The median home value in January 2018 was $313,000 in Saratoga Springs, $257,000 in Eagle Mountain, and $273,900 in Utah County (Zillow 2018a, 2018b, 2018c). As of January 2018, home values increased about 7.8% in Saratoga Springs, 10.5% in Eagle Mountain, and 8.6% in Utah County over the previous year (Zillow 2018a, 2018b, 2018c).

#### Local Economic Conditions

As the number of residents of Saratoga Springs and Eagle Mountain has increased, the number of businesses in these cities has also increased. Most of the current businesses are service-based businesses that cater to residents. Many residents of both cities commute to other cities in Utah County or Salt Lake County for work. Both Cities have economic development goals to try to increase employment opportunities in their respective city.

Currently, no businesses in Saratoga Springs are adjacent to S.R. 73 or have direct access to S.R. 73. In Eagle Mountain, Maverik, the Prairie Gate Business Park East, and Sunset Storage and RV are adjacent to S.R. 73, and the Staker Parsons access road has direct access to S.R. 73. The Prairie Gate Business Park East is located on East Campus Drive, which is accessed from Ranches Parkway and is parallel to S.R. 73 on the south side. The Prairie Business Park East includes three commercial office buildings, each with multiple businesses—such as chiropractors, orthodontists, dentists, and realtors—as tenants. Staker Parsons is a construction materials company that produces rock and concrete products.

### 3.5.4. Expected Impacts

**Business Impacts.** The Proposed Project would not require any business relocations. The project would modify three existing business accesses. Under the existing conditions, employees and customers of

Maverik, the Prairie Business Park East, Sunset Storage and RV, and Staker Parsons use signalized intersections on S.R. 73 to access the cross streets on which these businesses are located. Access with the Proposed Project would require employees and customers of these three businesses to exit from S.R. 73 onto the Proposed Project's frontage roads to access the cross streets on which these businesses are located. This modification in access would add less than 0.05 mile to the trip and would be a minor change compared to the existing conditions.

The project team does not expect this change in access to have any negative economic impacts to these businesses because the exits would be signed with the names of the cross streets and the increase in distance to the businesses by using the Proposed Project's frontage roads would be less than 0.05 mile compared to the existing conditions. Rather, these changes in access to the existing businesses are anticipated to be beneficial impacts because the Proposed Project would maintain existing accesses and would make access to and from S.R. 73 safer for customers and employees of these businesses.

The Proposed Project would also require minor partial acquisitions (acquisition of strips of property along the edges of parcels) from businesses as a result of the additional right-of-way required for this project. The partial acquisitions would not affect the viability of any businesses.

**General Impacts to Local Government Revenues.** UDOT has already purchased multiple parcels adjacent to S.R. 73 that would be used for the Proposed Project. Similarly, Eagle Mountain City owns additional parcels adjacent to S.R. 73 that would be used for the Proposed Project. Properties owned by UDOT, Eagle Mountain City, and some of the utility companies are exempt from local property taxes and are not part of the tax base of the communities in the economic impact analysis area. The Proposed Project would require that UDOT purchase private property for right-of-way. The State's removal of private properties from the tax base for use as a roadway facility would reduce local government revenues and prevent development on this land.

Over the long term, roadway improvements could facilitate higher use of the land (change from vacant or residential to commercial land uses near interchanges) from an increase in commercial development along S.R. 73. More commercial development could reduce travel by providing goods and services closer to residential areas in Eagle Mountain. The increased economic competitiveness and higher property values due to the roadway improvements would likely offset any local adverse tax loss from the acquisition of private land for the Proposed Project. The economic benefits of higher property values would similarly affect local government revenues in a positive way, most likely increasing them above the levels that would occur without the Proposed Project. Quantifying this net benefit of the improved transportation system is difficult because the benefits would occur incrementally over a long period and would be influenced by other economic factors. In addition, these benefits might not occur uniformly across communities.

**General Impacts to Property Values.** Impacts to regional property values are focused on the Proposed Project's operation, rather than construction, and would vary by the type of surrounding land use. Many studies have attempted to quantify the effect of transportation facilities on surrounding properties. Since property values in any area depend on many different variables (including location, adjacent land uses, community services, land-use controls, topography, drainage, natural amenities, regional growth or decline, interest rates, and local supply and demand), it is difficult to isolate and identify the effect of one transportation facility on property values. For these same reasons, it is also difficult to use study results from projects in different areas to compare to other projects. Generally, studies and any effects for one area are not directly comparable to other areas, given the differences in the real estate markets between areas.

This qualitative analysis on property values for the Proposed Project uses several commonly accepted generalizations when discussing property value impacts. These generalizations are either intuitive or are supported by previous studies, and in either case provide evidence for whether an impact would be beneficial or adverse. In some cases, these generalizations provide insights into the degree to which the property value might be changed. For the Proposed Project:

- Property values in the economic impact analysis area would likely increase, since there would be an improved transportation system and less delay on S.R. 73. The expected increase in population and improved infrastructure would likely be contributing factors to an increase in all property values in the economic impact analysis area. Overall, the project team expects the Proposed Project to result in a net increase in property values in the economic impact analysis area.
- Residential properties adjacent to the Proposed Project could have lower property values and could have a lower rate of appreciation than similar properties farther from the Proposed Project if all other variables were the same. These potential adverse effects could be caused by noise, visual impacts, and other effects attributable to the highway. For the Proposed Project, these potential adverse effects on residential properties would be more likely in areas where residential properties are located close to the Proposed Project.

### 3.5.5. Mitigation

Where property acquisition is necessary and state funds are used, UDOT compensates land owners under the provisions of the Utah Relocation Assistance Act (Utah Code Annotated [UCA] Section 57-12-1 and subsequent sections). For businesses that experience short-term access and visibility problems during construction, a traffic access management plan will be developed and implemented by the construction contractor that maintains the public's access to the business during normal business hours.

Mitigation is not offered to local governments that are adversely affected when land is removed from their tax base. Over the long term, increased property values as a result of improved regional transportation access are expected to generate enough revenue to offset the short-term impact of the Proposed Project on local government revenues.

## 3.6. Pedestrian and Bicyclist Considerations

Section 3.6 describes the current and proposed pedestrian and bicyclist facilities in the S.R. 73 study area and the expected impacts to these facilities from the Proposed Project. Some of these facilities are regional and span several municipalities and counties, while other facilities serve only one municipality.

### 3.6.1. Regulatory Environment and Compliance

When UDOT develops a project, it considers the economic, social, and environmental effects of the project, including disruption or destruction of human-made facilities and services. If a proposed project would sever an existing major route for non-motorized traffic, the project must provide a reasonable alternate route for the non-motorized traffic or show that a reasonable route exists.

### 3.6.2. Methodology

The project team identified existing and proposed bicyclist and pedestrian facilities using several sources including MAG's 2015–2040 RTP as well as Saratoga Springs, Eagle Mountain, and Utah County

General Plans, Recreation Plans, and Transportation Master Plans. The bicyclist and pedestrian sections of these plans give a comprehensive view of the regional pedestrian and bicyclist system for northwest Utah County. These plans have been compiled with input from the Cities and Counties and identify which pedestrian and bicyclist accommodations should be included in the regional system.

### 3.6.3. Current Conditions

The existing and proposed pedestrian and bicyclist facilities in the S.R. 73 study area are shown in Figure 3-4, Existing and Proposed Pedestrian and Bicyclist Facilities, in Chapter 8, Figures, and listed in Table 3-9. As shown in Figure 3-4, Eagle Mountain has multiple trails that parallel existing roads or go through its subdivisions. MAG's 2015–2040 RTP includes a proposed bicyclist/pedestrian project on S.R. 73 as part of the S.R. 73 highway project.

**Table 3-9. Existing and Proposed Pedestrian and Bicyclist Facilities in the S.R. 73 Study Area**

| Facility Name or Location | East or North Terminus | West or South Terminus | Label in Figure 3-4 |
|---|---|---|---|
| Existing Trails | | | |
| Pioneer Crossing Trail | Redwood Road | Foothill Boulevard | A |
| Ranches Parkway Trail | Hillside Drive | Pony Express Parkway | B |
| Harvest Lane Trail | Shiloh Way | Autumn Drive | C |
| Sunset Drive Loop | Sunset Drive | Mustang Way | D |
| Riley Drive Trail | S.R. 73 | Riley Circle | E |
| Mustang Way Trail | Autumn Lane | S.R. 73 | F |
| North Ranch Park Trail | Canyon Wash Drive | S.R. 73 | G |
| Smithfield Drive Trail | Gooseberry Drive | Wheatland Drive | H |
| Proposed Trails | | | |
| S.R. 73 Trail[a] | Foothill Boulevard | Eagle Mountain Boulevard | — |
| Welby Jacobs Canal Trail Extension | Harvest Hills subdivision | Pony Express Parkway Trail | I |
| Powerline Trail #1 | Harvest Hills Boulevard | Cedar Valley Regional Trail | J |
| Powerline Trail #2 | 2100 North | Southern Saratoga Springs city boundary | K |
| Harvest Hills Boulevard Trail Extension | Mountain View Corridor | S.R. 73 | L |
| Mountain View Corridor Trail | Salt Lake City | Saratoga Springs | M |

Sources: City of Saratoga Springs 2011, Map 3: Existing and Planned City Trails; MAG 2015, Active Transportation Map

[a] The Proposed Project trail and sidewalk is shown in yellow in Figure 3-4, Existing and Proposed Pedestrian and Bicyclist Facilities, in Chapter 8, Figures.

### 3.6.4. Expected Impacts

**New Pedestrian and Bicyclist Facilities.** The Proposed Project would have a beneficial impact to pedestrian and bicyclist facilities because it would construct a new 12-foot-wide pedestrian and bicyclist trail on the north side of S.R. 73 and a new 6-foot-wide sidewalk on the south side of S.R. 73 between the future Mountain View Corridor (800 West/Foothill Boulevard in Saratoga Springs) and Six-Mile Cutoff Road.

The Proposed Project would also have a beneficial impact to pedestrian and bicyclist facilities because it would construct new sidewalks on both sides of the following local roads that cross S.R. 73 at grade-separated crossings:

- Sage Hill Drive
- Mt. Airey Drive
- Ranches Parkway
- Sunset Drive
- Valley Drive/Mustang Way
- Canyon Wash Road
- Six-Mile Cutoff Road

**Existing Pedestrian and Bicyclist Facilities.** Table 3-10 summarizes the impacts to existing pedestrian and bicyclist facilities from the Proposed Project.

**Table 3-10. Existing Pedestrian and Bicyclist Facility Impacts from the Proposed Project**

| Facility Name or Location | Proposed Project Impacts |
|---|---|
| Harvest Lane Trail | No impacts. |
| Smithfield Drive Trail | No impacts. |
| Pioneer Crossing Trail | New connection to S.R. 73 Trail. |
| Ranches Parkway Trail on south side of S.R. 73 | New connection to S.R. 73 Trail. |
| Riley Drive Trail | New connection to S.R. 73 Trail. |
| Mustang Way Trail | New connection to S.R. 73 Trail. |
| Sunset Loop Trail | Replace the southern segment of the Sunset Loop Trail with the S.R. 73 Trail and provide new connections to the east and west sides of the Sunset Loop Trail. |
| North Ranch Park Trail | Replace the southern segment of the North Ranch Park Trail with the S.R. 73 Trail and provide a new connection to the North Ranch Park Trail. |

Overall, the Proposed Project would have a beneficial impact to existing pedestrian and bicyclist facilities by providing the new S.R. 73 Trail, sidewalk, and connections to existing trails.

**Proposed Pedestrian and Bicyclist Facilities.** The Proposed Project would cross the alignments proposed for the planned Welby Jacobs Canal Trail, Powerline Trail #1, and Powerline Trail #2. The planned Welby Jacobs Canal Trail would not be affected by the Proposed Project. The Proposed Project would not provide trail crossings for Powerline Trail #1 and Powerline Trail #2 because these trails currently do not exist. If these trails are constructed in the future, they can connect to the Proposed Project trails and sidewalks with a crossing of S.R. 73 provided at the nearest cross-street.

### 3.6.5. Mitigation

No mitigation is required.

## 3.7. Air Quality

Section 3.7 describes the existing air quality characteristics at both the regional and project levels. It also analyzes the expected impacts of the Proposed Project on air quality at the regional and local levels.

**Air Quality Impact Analysis Area.** The air quality impact analysis area at the regional level is Utah County. The air quality impact analysis area at the local level is focused on the south-side frontage road intersection at Ranches Parkway. This location was chosen because it is projected to have the heaviest traffic load in 2040, the design year for the Proposed Project.

### 3.7.1. Regulatory Environment and Compliance

**National Ambient Air Quality Standards.** The U.S. Environmental Protection Agency (EPA) has set National Ambient Air Quality Standards (NAAQS) for pollutants considered harmful to public health and the environment. These standards include both primary and secondary standards. Primary standards protect public health, while secondary standards 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. For the pollutants addressed in this section, the primary and secondary standards are the same. The current NAAQS are listed in Table 3-11. The pollutants in Table 3-11 are referred to as *criteria pollutants* because air quality standards (criteria) have been established for these pollutants.

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 non-attainment 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.

### Table 3-11. National and Utah Ambient Air Quality Standards (NAAQS)

| Pollutant | Primary/ Secondary | Averaging Time | Level | Form |
|---|---|---|---|---|
| Carbon monoxide (CO) | Primary | 8 hours | 9 ppm | Not to be exceeded more than once per year |
| | | 1 hour | 35 ppm | |
| Lead (Pb) | Primary and secondary | Rolling 3-month average | 0.15 μg/m$^3$ | Not to be exceeded |
| Nitrogen dioxide ($NO_2$) | Primary | 1 hour | 100 ppb | 98th percentile of 1-hour daily maximum concentrations, averaged over 3 years |
| | Primary and secondary | 1 year | 53 ppb | Annual mean |
| Ozone ($O_3$) | Primary and secondary | 8 hours | 0.070 ppm | Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years |
| Particulate matter ($PM_{2.5}$) | Primary | 1 year | 12.0 μg/m$^3$ | Annual mean, averaged over 3 years |
| | Secondary | 1 year | 15.0 μg/m$^3$ | Annual mean, averaged over 3 years |
| | Primary and secondary | 24 hours | 35 μg/m$^3$ | 98th percentile, averaged over 3 years |
| 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 |
| Sulfur dioxide ($SO_2$) | Primary | 1 hour | 75 ppb | 99th percentile of 1-hour daily maximum concentrations, averaged over 3 years |
| | Secondary | 3 hours | 0.5 ppm | Not to be exceeded more than once per year |

Source: EPA 2018a

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

**Transportation Conformity Requirements.** All state governments are required to develop a State Implementation Plan (SIP), which explains how the State will comply with the requirements of the federal Clean Air Act of 1990, as amended. Section 176(c) of the Clean Air Act, and its related amendments, require that transportation plans, programs, and projects that are developed, funded, or approved by FHWA and metropolitan planning organizations must demonstrate that such activities conform to the SIP. Transportation conformity requirements apply to any transportation-related criteria pollutants (for example, carbon monoxide [CO] or particulate matter) for which the project area has been designated a nonattainment or maintenance area.

According to Section 176(c) of the Clean Air Act, a transportation project is said to "conform" to the provisions and purposes of the SIP if the project, both alone and in combination with other planned projects, does 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.

The transportation conformity rule (40 CFR 93, Subpart A) establishes the criteria and procedures for determining whether projects conform to the SIP (EPA 2012). The Proposed Project is identified in MAG's 2015–2040 RTP, which shows S.R. 73 being widened to six lanes in Phase 1 of the RTP (2015 to 2024, Project 12) and subsequently being developed into a freeway with a frontage road system in Phase 2 of the RTP (2025 to 2034, Project 49) (MAG 2015). The RTP was developed to meet the requirements of the Clean Air Act and addresses the short- and long-term transportation needs of the region.

Transportation conformity at the project level requires hot-spot analyses if an area has been designated as a nonattainment or maintenance area for CO and/or PM and the project would be either federally funded or federally approved. The Proposed Project would not require federal funding or approval and is therefore not subject to transportation conformity requirements. The modeling criteria and methods referenced by the transportation conformity rules have been used in this case only as a guide in conducting this study.

A hot-spot analysis is defined in 40 CFR 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. PM hot-spot analyses are required for projects of local air quality concern.

The Proposed Project would be located in Utah County, Utah. Utah County does not meet the NAAQS for $PM_{10}$ (particulate matter 10 microns in diameter or smaller) or $PM_{2.5}$ (particulate matter 2.5 microns in diameter or smaller) (EPA 2018b; UDEQ 2018a, 2018b). Therefore, the project area is classified as a nonattainment for $PM_{10}$ and $PM_{2.5}$. The county is also a maintenance area (former nonattainment area within the last 20 years) for CO. However, because CO is no longer a significant concern for transportation projects due to improved vehicle emission controls, a quantitative analysis was not conducted for CO.

The Proposed Project is designed to serve mostly local traffic, would be used mainly by gasoline-fueled vehicles, and would not operate with a significant number of diesel vehicles. In addition, the daily volume of traffic for the air quality impact analysis area in 2040 is expected to be between 40,000 to 59,000 vehicles per day, and the assessed interchange is expected to operate at a level of service of LOS C (see Appendix A, S.R. 73 Environmental Study Traffic Memo), which is less than the volume of traffic (125,000 vehicles per day) that could warrant a hot-spot evaluation for $PM_{10}$ or $PM_{2.5}$.

Based on the evaluation criteria from EPA, the Proposed Project would not be considered a project of air quality concern for which hot-spot analysis would be required if the project were subject to transportation conformity [for more information, see 40 CFR 93.123(b), EPA 2015a, and EPA 2015b]. However, in an effort to address potential public concern regarding the expected air quality impacts of the Proposed Project, the project team conducted project-level analyses for $PM_{10}$ and $PM_{2.5}$ for disclosure purposes. This analysis focused on the local air quality impact analysis area at the south-side frontage road intersection at Ranches Parkway.

The project area meets all other air quality parameters including CO; therefore, no additional air quality analyses are required.

### 3.7.2. Methodology

The project team used EPA guidelines (EPA 2015a, 2015b), as well as materials used in EPA-sponsored training classes (for example, "Completing Quantitative PM Hot-spot Analyses: 3-Day Course"), to complete project-level analyses for 24-hour $PM_{10}$, 24-hour $PM_{2.5}$, and annual $PM_{2.5}$.

MOVES2014a was used to estimate on-road motor vehicle emission rates from vehicle exhaust, brake wear, and tire wear caused by the Proposed Project. These estimates were then used in CAL3QHCR, the air quality model, which estimates PM concentrations at specific points in the project area known as *receptors*. The PM concentrations generated from the air quality model were then added to background concentrations at the receptor locations. The resulting statistic is known as the *design value*. If the design value is less than or equal to the relevant PM NAAQS, then the project is considered to comply with standards. Where a project does not demonstrate modeled compliance with standards, it can still be still be approved if the project would improve air quality in comparison to the no-build case. However, in such a situation, a project sponsor may consider mitigation or control measures to further reduce emissions in the project area.

Specific details regarding the methodology and calculations can be found in Appendix C, S.R. 73 Air Quality Technical Report.

### 3.7.3. Current Conditions

The project team derived the background concentrations used in developing the design values for the 24-hour $PM_{10}$ standard, the 24-hour $PM_{2.5}$ standard, and the annual $PM_{2.5}$ standard from data reports from the Lindon, Utah, air quality monitor (EPA AIRS Code 490494001), which is the closest air quality monitor to the Proposed Project (EPA, no date). Data for which EPA has granted data exclusion under the Exceptional Events rule (see 40 CFR 50.14) were excluded.

The 24-hour $PM_{10}$ background concentration is based on identifying the appropriate 24-hour monitor value from the 3 most recent years of monitoring data, based on Exhibit 9-6 in EPA's transportation conformity guidance (EPA 2015a). The 24-hour $PM_{2.5}$ background concentration is based on the 3-year average of the 98th percentile of 24-hour recorded concentrations. The annual $PM_{2.5}$ background concentration is based on the 3-year average of the annual arithmetic mean $PM_{2.5}$ recorded at the monitoring station. Table 3-15 lists the background concentrations for each of these pollutants.

**Table 3-12. Background Concentrations Used in PM Hot-spot Analyses**

| Pollutant | Background Concentration (μg/m$^3$) |
|---|---|
| 24-hour $PM_{10}$ | 82[a] |
| 24-hour $PM_{2.5}$ | 27.5[b] |
| Annual $PM_{2.5}$ | 8.01[c] |

[a] Based on monitoring values for 2015–2017
[b] Based on 98th-percentile values for 2015–2017
[c] Based on annual averages for 2015–2017

### 3.7.4. Expected Impacts

Table 3-13 below shows the results of the project-level analyses for the 24-hour $PM_{10}$, 24-hour $PM_{2.5}$, and annual $PM_{2.5}$ standards. Design values were calculated by adding the modeled concentrations to the background concentrations presented in Table 3-12 above (for specific details regarding the methodology and calculations, refer to Appendix C, S.R. 73 Air Quality Technical Report).

For all pollutants, the design values for 2040 are less than the NAAQS. This demonstrates that the Proposed Project would not contribute to any new local violations, increase the frequency or severity of any existing violation, or delay timely attainment of the $PM_{10}$ or $PM_{2.5}$ NAAQS. Therefore, the Proposed Project is consistent with SIP control measures and would not cause an exceedance of the $PM_{10}$ or $PM_{2.5}$ NAAQS. In addition, the Proposed Project is identified in MAG's 2015–2040 RTP, so the project would meet regional air quality conformity requirements.

**Table 3-13. Design Values for the 24-hour $PM_{10}$, 24-hour $PM_{2.5}$, and Annual $PM_{2.5}$ Standards in 2040**

In μg/m$^3$

| Pollutant | Design Value | NAAQS |
|---|---|---|
| 24-hour $PM_{10}$ | 90[a] | 150 |
| 24-hour $PM_{2.5}$ | 28[b] | 35 |
| Annual $PM_{2.5}$ | 8.3[c] | 12 |

[a] 24-hour $PM_{10}$ design value is rounded to the nearest 10 μg/m$^3$.
[b] 24-hour $PM_{2.5}$ design value is rounded to the nearest 1 μg/m$^3$.
[c] Annual $PM_{2.5}$ design value is rounded to the nearest 0.1 μg/m$^3$.

### 3.7.5. Mitigation

No mitigation is required.

## 3.8. Noise

Section 3.7 discusses the current noise levels in the noise impact analysis area and the expected impacts to noise levels from the Proposed Project.

**Noise Impact Analysis Area.** The noise impact analysis area includes parts of Eagle Mountain and Saratoga Springs within a 500-foot buffer on either side of the centerline of S.R. 73 between the future Mountain View Corridor (800 West/Foothill Boulevard in Saratoga Springs) on the east and Eagle Mountain Boulevard on the west.

### 3.8.1. Regulatory Environment and Compliance

UDOT projects must conform to UDOT's Noise Abatement Policy (Policy 08A2-01) (UDOT 2017). This policy describes procedures for conducting traffic noise studies and determining potential impacts and provides criteria for determining if noise-abatement measures are feasible and reasonable. UDOT's Noise Abatement Policy is consistent with FHWA's regulations for highway traffic noise (23 CFR Part 772).

#### Noise Policy Applicability

The Proposed Project would alter the horizontal and/or vertical alignment of S.R. 73 and increase the number of through-traffic lanes on S.R. 73. Under UDOT Policy 08A2-01, this project is considered a Type I project requiring consideration of noise-abatement measures.

#### Noise-Abatement Criteria

Noise-abatement criteria (NAC) are used to define the noise levels that are considered an impact (in hourly A-weighted sound-level decibels) for each land use activity category. 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 NAC for specified land use categories or (2) the future worst-case noise level is greater than or equal to an increase of 10 A-weighted decibels (dBA) over the existing noise level. The UDOT NAC are summarized in Table 3-14. UDOT gives primary consideration to exterior areas that are frequently used by people.

**Table 3-14. UDOT's Noise-abatement Criteria**

| Activity Category | UDOT Criterion $L_{eq}(h)$ | Evaluation Location | Activity Description |
|---|---|---|---|
| A | 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 | 66 | Exterior | Residential. |
| C | 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 | 51 | Interior | Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios. |
| E | 71 | Exterior | Hotels, motels, offices, restaurants/bars, and other developed lands, properties or activities not included in Categories A–D or F. |
| F | —[a] | —[a] | 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 | —[a] | —[a] | Undeveloped lands that are not permitted. |

Source: UDOT 2017
$L_{eq}$ = equivalent noise level
[a] The F and G activity categories do not have specified noise-abatement criteria.

### 3.8.2. Methodology

Noise impact and abatement analyses are required for projects that would occur within land use activity categories A, B, C, D, and E (see Table 3-14) only when development exists or has been permitted (that is, a formal building permit has been issued before the final environmental decision document is approved). Activity Categories F and G include lands that are not sensitive to traffic noise.

There are no Activity Category A land uses in the noise impact analysis area. Activity Category B land uses include all residences. Activity Category C land uses in the noise impact analysis area include the Ranches Golf Club, Rockwell Charter High School, Sage Valley Park, and Black Ridge Elementary School. There are no Activity Category D land uses in the noise impact analysis area. Activity Category E land uses includes the noise sensitive businesses and offices in the noise impact analysis area. Activity Category F land uses include businesses that are not noise sensitive. UDOT's Noise Abatement Policy states that a noise impact analysis is not required for Activity Categories F and G.

### 3.8.3. Current Conditions

The primary source of existing noise in the project study area is automobile and truck traffic on S.R. 73. Current traffic noise levels in the noise impact analysis area were calculated with the Traffic Noise Model version 2.5 software (TNM) using existing conditions (that is, the existing travel lane configurations and the posted speed limit of 55 miles per hour [mph]). Existing noise levels were determined using the level of service (LOS) C traffic volumes based on roadway capacity. The noise model developed for the existing conditions scenario included 195 receptors throughout the project study area.

Existing noise levels in the project study area were measured by taking short-term (10-minute) sound-level measurements at seven locations along S.R. 73 with a Larson-Davis model 820 sound-level meter. Noise measurements were taken on September 28, 2017. Noise-measurement locations were selected to represent existing residential developments, recreation areas, or other areas where people could be exposed to traffic noise for extended periods. Noise-monitoring locations (ML) and the associated measured noise levels are listed in Table 3-15.

Measured noise levels in the S.R. 73 corridor ranged from 45 to 57 dBA depending on the proximity of the monitoring location to S.R. 73 or other noise sources such as local traffic on arterials. As a comparison, typical noise levels range from 35 to 50 dBA in rural and agricultural areas, 50 to 65 dBA in suburban to urban areas, and 65 to 75 dBA in downtown urban areas. None of the monitored noise levels exceeded the NAC for Category B (residential) or Category C (schools, parks, or playgrounds) land uses.

The TNM was validated at three noise-measurement locations that had clear line of sight to S.R. 73, allowing traffic counts and vehicle mix determinations to be made. When measured noise levels are within 3 dBA of modeled noise levels using the traffic volumes and speeds actually present when the noise measurements were taken, the TNM is considered valid. Validation measurements are shown in Table 3-15.

See Appendix D, S.R. 73 Noise Technical Report, for a figure of the noise measurement locations.

**Table 3-15. Measured and Modeled Noise Levels in the Noise Impact Analysis Area**

| Monitoring Location (ML)[a] | Address | Activity Category and Noise Level (dBA $L_{eq}$)[b] | Measured Noise Level (dBA) | Modeled Noise Level (dBA)[d] | Difference (dBA) |
|---|---|---|---|---|---|
| ML-1[c,d] | North side of S.R. 73 at Ranches Parkway/S.R. 73 intersection | B (66) | 56.6 | 59.4 | 2.8 |
| ML-2[c,d] | Undeveloped residential lot on East Harvest Lane adjacent to playground at Black Ridge Elementary School | B (66)<br>C (66) | 54.6 | 56.9 | 2.3 |
| ML-3 | South side of S.R. 73 east of South Sunset Drive (residential development under construction) | B (66) | 44.5 | NA | NA |
| ML-4[c] | North side of S.R. 73 on Bobcat Way east of Mustang Way | B (66) | 52.0 | NA | NA |
| ML-5[c,d] | Undeveloped parcel on south side of S.R. 73 east of Valley Drive (representative of residences on Riley Drive) | B (66) | 50.7 | 53.3 | 2.6 |
| ML-6[b] | South side of S.R. 73 on Cedar Fort Drive east of Canyon Wash Drive | B (66) | 44.8 | NA | NA |
| ML-7 | North side of S.R. 73, Ranch Park on Canyon Wash Road | C (66) | 47.8 | NA | NA |

ML = monitoring location; NA = not applicable

[a] Noise-monitoring locations are shown in Figure 1, Noise-monitoring Locations, in Appendix D, S.R. 73 Noise Technical Report.

[b] For descriptions of the activity categories, see Table 3-14, UDOT's Noise-abatement Criteria, above.

[c] Clear line of sight to S.R. 73. Used for traffic counts and vehicle mix determination.

[d] Monitoring locations ML-1, ML-2, and ML-5 were used for model validation because they had a clear line of sight to S.R. 73 and would be the sites most influenced by traffic noise from S.R. 73.

### 3.8.4. Expected Impacts

Traffic-related noise impacts with the Proposed Project were estimated with TNM 2.5 based on the proposed roadway design. The modeled roadway included the proposed improvements on S.R. 73 (including ramps and auxiliary lanes) and the addition of the eastbound and westbound frontage roads. Roadway sections were modeled in 200-foot increments to provide a high degree of accuracy in the model output. Traffic volumes used in the model were based on LOS C volumes with traffic on S.R. 73 operating at 70 mph and traffic on the frontage roads operating at 40 mph.

With the Proposed Project, the locations of the mainline S.R. 73 through-traffic lanes would be both north and south of its existing alignment. The noise model developed for the existing conditions and Proposed

Project included 195 receptors throughout the project study area. In those areas where the Proposed Project through-traffic lanes are moved farther from the receptors, noise levels at those locations would be lower. Conversely, in areas where the Proposed Project through-traffic lanes are moved closer to residences, noise levels at those locations would be higher. Overall, noise levels with the Proposed Project would range from 56 to 75 dBA compared to the existing conditions of 54 to 76 dBA.

With the Proposed Project, 73 of the 195 receptors would have traffic noise impacts; that is, they would approach, exceed, or substantially exceed (≥ 10 dBA increase over existing noise levels) the NAC as defined in Section 3.8.1, Regulatory Environment and Compliance. The locations of those receptors exceeding the NAC are shown in Appendix C, Build Scenario Noise Receptor Maps, of Appendix D, S.R. 73 Noise Technical Report, of this SES. Another 20 receptors would be relocated by UDOT as part of the Proposed Project's right-of-way requirements.

### 3.8.5. Mitigation

UDOT evaluated noise walls for 11 locations along S.R. 73 where noise impacts would occur with the Proposed Project. The two primary criteria to consider when evaluating noise-abatement measures are feasibility and reasonableness. Noise abatement will be provided by UDOT only if UDOT determines that noise-abatement measures are both feasible and reasonable.

- Feasibility refers to engineering considerations (whether the barrier can be constructed) and the effectiveness of the noise barrier (whether the barrier would reduce noise levels by at least 5 dBA at affected receptors).
- Reasonableness is associated mainly with the cost-effectiveness of a given barrier and the desire for a noise barrier from those residents who would benefit from it.

Noise barriers are most effective where they're continuous and block a large number of homes. If a noise barrier has openings to allow access to individual receptors, these gaps cause "noise leaks," which reduce the effectiveness of the barrier at receptors near the gap. Noise barriers for individual receptors don't meet the cost-effectiveness criterion of UDOT's Noise Abatement Policy.

Of the 11 locations analyzed where noise impacts would occur with the Proposed Project, most of the noise walls were found to be not feasible or reasonable because they either did not meet UDOT's noise-reduction criteria or were not cost-effective (see Appendix D, S.R. 73 Noise Technical Report). Only one noise wall, Noise Barrier A, was determined to be both feasible and reasonable.

#### *Noise Barrier A*

According to the criteria in UDOT's Noise Abatement Policy, one noise wall is recommended. Noise Barrier A would be south of S.R. 73 just west of Mt. Airey Drive and would be 1,040 feet long (see Appendix D, Build Scenario Noise Walls, of Appendix D, S.R. 73 Noise Technical Report, of this SES).

An 8-foot-high wall would reduce noise levels by 7 dBA for 63% of front-row receptors and would be cost-effective at $11,093 per benefited receptor. This wall is both reasonable and feasible.

# 3.9. Water Resources

Section 3.9 describes the water resources in the water resources impact analysis area and the expected impacts of the Proposed Project on these resources. Water resources include floodplains, streams, water rights points of diversion, and water quality. Wetlands and waters of the U.S. are addressed in Section 3.10, Biological Resources.

**Water Resources Impact Analysis Area.** The water resources impact analysis area is the area within a 500-foot buffer of the construction footprint for the Proposed Project.

## 3.9.1. Regulatory Environment and Compliance

This evaluation of water resources has been prepared in compliance with federal laws including Sections 401 and 404 of the Clean Water Act, which is administered by the U.S. Army Corps of Engineers (USACE), and the National Flood Insurance Act of 1968 (Public Law 90-448), which is administered by the Federal Emergency Management Agency (FEMA). In addition, UDOT must comply with State of Utah regulations for water wells (Utah Administrative Code [UAC] R655-4), stream alteration (UAC R655-13), and water quality (UAC R317), specifically UAC R317-8 pertaining to the Utah Pollutant Discharge Elimination System.

## 3.9.2. Methodology

### Floodplains

The project team identified the local communities and obtained the effective Flood Insurance Rate Maps for the project area from the FEMA Map Service Center (FEMA 2002).

### Perennial, Intermittent or Ephemeral Streams

Stream data were obtained from the Utah Automated Geographic Reference Center for all streams that cross the water resources impact analysis area (Utah AGRC 2017).

### Points of Diversion

Points-of-diversion data were obtained from the Utah Division of Water Rights as a GIS shapefile on March 13, 2018 (Utah Division of Water Rights 2018). The project team performed a qualitative assessment for each point of diversion in the water resources impact analysis area.

### Water Quality

Google Street View images were used to verify the existing geometry of S.R. 73 and the presence of existing roadway drainage facilities (Google Earth 2018).

### 3.9.3. Current Conditions

Section 3.9.3 discusses the current conditions for floodplains, streams, points of diversion for water rights, and water quality in the water resources impact analysis area.

#### Floodplains

The water resources impact analysis area does not have any FEMA-mapped floodplains. The nearest FEMA-mapped floodplain is east of the project area near the Jordan River.

#### Perennial, Intermittent or Ephemeral Streams

All streams and washes that cross the water resources impact analysis area are ephemeral; therefore, these streams are not impaired, and no annual or other flow data are available.

#### Points of Diversion

There are 37 spatially unique points of diversion in the water resources impact analysis area, but 13 of these unique points contain 33 water rights claims, for a total of 57 points of diversion. Five of these points of diversion have an approved application status, 10 have a perfected status, 1 has an unapproved status, and 41 have a terminated status.

**What is a point of diversion application status?**

The application status for a point of diversion is defined as follows:

- Approved – water right granted
- Perfected – fully developed water right
- Unapproved – water right not granted
- Terminated – water right lapsed, expired, or abandoned

#### Water Quality

S.R. 73 is a shouldered, two-lane highway with a normal crown. All storm drainage from the roadway is conveyed in ditches within the existing UDOT right-of-way and is regulated under UDOT's municipal separate storm sewer system (MS4) permit for water quality issued by the Utah Division of Water Quality.

### 3.9.4. Expected Impacts

Section 3.9.4 discusses the expected impacts of the Proposed Project to floodplains, streams, water rights points of diversion, and water quality based on the proposed design.

#### Floodplains

The water resources impact analysis area does not have any FEMA-mapped floodplains; therefore, the Proposed Project would not affect FEMA-mapped floodplains.

#### Perennial, Intermittent, or Ephemeral Streams

The Proposed Project would alter the existing ephemeral streams by adding a larger culvert to span the width of the Proposed Project right-of-way. Ephemeral streams identified as waters of the U.S. are discussed in Section 3.10, Biological Resources.

### Points of Diversion

Forty-one of the 57 points of diversion in the water resources impact analysis area have a terminated status; therefore, the Proposed Project would not affect the water rights associated with these points of diversion. Figure 3-5, Points of Diversion and Ephemeral Streams in the Water Resources Impact Analysis Area, in Chapter 8, Figures, shows the 16 remaining points of diversion in the impact analysis area. One of these 16 points of diversion is within the proposed right-of-way and is a non-production well owned by Kern River Gas Transmission Company.

### Water Quality

The project team does not anticipate that the Proposed Project would affect the water quality in the ephemeral streams and washes that cross the water resources impact analysis area, since there is only limited, periodic flow in these streams.

## 3.9.5. Mitigation

### Floodplains

No mitigation is required.

### Perennial, Intermittent or Ephemeral Streams

UDOT will obtain stream alteration permits for construction impacts from crossing ephemeral streams as required through the Stream Alteration Program administered by the Utah Division of Water Resources during the design phase of the Proposed Project. Additional mitigation for streams identified as waters of the U.S. will be determined during the Clean Water Act Section 404 permitting phase of the Proposed Project before construction.

### Points of Diversion

UDOT will work with Kern River Gas Transmission Company to identify an appropriate location to relocate its well. UDOT will also work directly with the owners and operators of any other points of diversion that are adjacent to the right-of-way and will strive to protect these facilities during construction and maintain the water supply to the affected water rights users. UDOT will properly abandon affected wells in accordance with UAC R655-4 administered by the Utah Division of Water Rights.

### Water Quality

Stormwater runoff from the roadway surface and embankments will be conveyed within the UDOT right-of-way in constructed ditches, culverts, and pipes that will discharge to proposed detention ponds. Stormwater runoff could contain common roadway contaminants including copper, lead, zinc, and salts. These facilities will be covered by UDOT's MS4 permit for water quality issued by the Utah Division of Water Rights. These facilities will be analyzed and designed in accordance with UDOT's Stormwater Quality Design Manual.

UDOT will create and follow a Stormwater Pollution Prevention Plan during all construction activities and will implement feasible permanent best management practices (BMPs) as a part of the Proposed Project's design.

# 3.10. Biological Resources

Section 3.10 describes the current conditions of and expected impacts to the biological resources in the biological resources impact analysis area. For this study, biological resources include federally threatened, endangered, or candidate species and avian and non-avian species of wildlife. Additionally, this section evaluates wetlands and other waters of the United States.

**Biological Resources Impact Analysis Area.** The biological resources impact analysis area is about 1,690 acres and includes parts of Eagle Mountain and Saratoga Springs within a 1,100-foot buffer on either side of the centerline of S.R. 73 between the future Mountain View Corridor (800 West/Foothill Boulevard in Saratoga Springs) on the east and Eagle Mountain Boulevard on the west.

## 3.10.1. Regulatory Environment and Compliance

### Federally Threatened, Endangered, or Candidate Species

The Endangered Species Act of 1973 (ESA) serves as the vehicle for protecting federally listed threatened, endangered, and candidate species and designated critical habitat for such species. The ESA is administered by the U.S. Fish and Wildlife Service (USFWS). Section 10 of the ESA is used by state and local governments, tribes, and private landowners to consult with USFWS on the development of private or public property that is inhabited by species listed under the ESA.

Section 7 of the ESA requires federal agencies to consult with USFWS before taking any action that could affect a federally listed threatened or endangered species or designated critical habitat for an endangered species. In addition, federal agencies must ensure that their actions are not likely to jeopardize the continued existence of any listed species or to destroy or adversely modify any designated critical habitat. Although this is a UDOT-led SES, Section 7 of the ESA would apply to any Clean Water Act Section 404 permit authorization.

### Wildlife

UDOT assessed the Proposed Project for impacts that that might affect species protected by the Migratory Bird Treaty Act of 1918, species protected by the Bald and Golden Eagle Protection Act of 1940, and species identified on the Utah Division of Wildlife Resources' Utah Sensitive Species List as established by UAC R657-48, *Wildlife Species of Concern and Habitat Designation Advisory Committee*.

### Waters of the United States

As described in 33 CFR § 328.4, the objective of the Clean Water Act is to maintain and restore the chemical, physical, and biological integrity of the waters of the United States. Any person, firm, or agency planning to alter or work in waters of the United States, including the discharge of dredged or fill material, must first obtain authorization from USACE under Clean Water Act Section 404 and, if applicable, Section 10 of the Rivers and Harbors Act of 1899 (33 USC § 403) for work within navigable waters of the United States.

Section 401 of the Clean Water Act requires state certification for any permit or license issued by a federal agency for an activity that could result in a discharge into waters of the United States. This requirement allows each State to have input into federally approved projects that could affect its waters (rivers, streams, lakes, and wetlands) and to ensure that the projects will comply with state water quality standards and any other water quality requirements of state law. Any Section 401 certification in Utah also ensures that a proposed project will not adversely affect impaired waters (waters that do not meet water quality standards) and that the project complies with applicable water quality improvement plans.

Section 73-3-29 of the Utah Code requires any person, governmental agency, or other organization wishing to alter the bed or banks of a natural stream to obtain written authorization from the State Engineer before beginning work. Natural streams are considered any natural waterway that receives enough water to develop an ecosystem that differs from the surrounding upland environment. Although it cannot be applied to permit wetland impacts, USACE Programmatic General Permit 10 allows an applicant to obtain both state approval and authorization under Clean Water Act Section 404 through a single application process.

### 3.10.2. Methodology

UDOT used several methods to collect data regarding the elements of the ecosystem that could be affected by the Proposed Project. These methods included conducting literature reviews, consulting with agency personnel, performing field surveys, and interpreting aerial photographs and maps. UDOT consulted the Environmental Conservation Online System (USFWS 2018), the Utah Conservation Data Center (Utah Division of Wildlife Resources 2017), and the Utah Wildlife Action Plan (Utah Wildlife Action Plan Joint Team 2015) for lists of federally threatened, endangered, or candidate species as well as state-listed sensitive species known to be present in Utah County, Utah. NatureServe (www.natureserve.org) was used to research habitat characteristics for each species identified. The Utah Conservation Data Center was consulted to determine whether there were existing records of occurrence for threatened, endangered, or sensitive species in the biological resources impact analysis area.

Additionally, UDOT sent letters to USFWS and the Utah Division of Wildlife Resources' Central Region. UDOT also submitted a letter to the Utah Resource Development Coordinating Committee's project management system for state agency review to request information from agencies regarding the resources under their jurisdiction in the impact analysis area. The letters requested that the agencies identify resources that could be affected by the Proposed Project, identify issues that should be analyzed in the SES, and determine whether project construction would require any permits or approvals from the agency. These letters are provided in Appendix E, S.R. 73 Correspondence for Biological Resources.

UDOT identified, mapped, and delineated wetlands and other waters in the impact analysis area using the *Corps of Engineers Wetlands Delineation Manual* (USACE 1987), the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0)* (USACE 2008), *A Field Guide for the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States: A Delineation Manual* (Lichvar and McColley 2008), and the *Updated Datasheet for the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States* (Curtis and Lichvar 2010). Constructed ditches in uplands are common in agricultural areas and are not considered jurisdictional, so these ditches were not mapped.

Fieldwork for the delineation of wetlands and other waters was conducted on September 7 and 19, 2017; October 18, 2017; December 4, 2017; and March 16, 2018. Aquatic resource boundaries in the impact analysis area were mapped through a combination of global positioning system (GPS)-based field mapping (using ArcGIS Collector software and an iPad) and desktop digitization referencing high-resolution aerial images obtained for the Proposed Project on June 28, 2017. To produce aquatic resources delineation maps for the impact analysis area, UDOT exported these data into GIS software (ArcMap 10.5). These data were also used to calculate the area, lengths, and widths of aquatic resources in the impact analysis area. Appendix F, S.R. 73 Aquatic Delineation Report, includes the full *Aquatic Resource Delineation Report* for the Proposed Project.

## 3.10.3. Current Conditions

### Federally Threatened, Endangered, or Candidate Species

Database research indicates that five federally listed species are known to be present in Utah County (Table 3-16). However, there is no suitable habitat for any of these five species in the biological resources impact analysis area.

### Wildlife and Plants

**Wildlife.** Twenty-five wildlife species that are included in the Utah Wildlife Action Plan are known to be present in Utah County (Table 3-16). Three of these species have potential habitat in the biological resources impact analysis area: burrowing owl (*Athene cunicularia*), ferruginous hawk (*Buteo regalis*), and little brown bat (*Myotis lucifugus*). Habitat for burrowing owls includes open grasslands as well as other open areas such as vacant lots near human habitation. They often nest in abandoned burrows dug by other animals. Ferruginous hawks prefer open grasslands and shrub-steppe communities and will sometimes nest and forage in cropland. They tend to avoid areas with intensive agriculture or high human disturbance. Little brown bats, which use a wide range of habitats, often use human-made structures for resting and maternity sites and hibernate over the winter in caves and tunnels.

Despite the presence of potential habitat for these three wildlife species, the existing habitat in the impact analysis area is marginal due to ongoing agricultural practices and encroaching residential development. The Utah Division of Wildlife Resources does not have records of occurrence for any threatened, endangered, or sensitive species within 0.5 mile of the impact analysis area. See Appendix E, S.R. 73 Correspondence for Biological Resources, for a letter from the Utah Division of Wildlife Resources noting this information.

The two main ungulate species with habitat in the impact analysis area are mule deer (*Odocoileus hemionus*) and pronghorn (*Antilocapra americana*). Mule deer are of particular concern in the impact analysis area. This section of S.R. 73 crosses crucial mule deer habitat and is a migration corridor between the Oquirrh and Lake Mountains. Agricultural fields on the southeastern side of S.R. 73 also retain resident populations of deer that do not migrate. Appendix G, U.S. Highway 73 Wildlife-Vehicle Collision Minimization Recommendations, provides a study conducted by the Utah Division of Wildlife Resources, *U.S. Highway 73 Wildlife-Vehicle Collision Minimization Recommendations*, regarding mule deer along S.R. 73. Wildlife-vehicle collisions are of particular concern to UDOT, the Utah Division of Wildlife Resources, and the general public, especially since rapid development can lead to sudden increases in wildlife-vehicle collisions because deer and pronghorn have not yet adapted to the loss of their historical winter range.

**Plants.** UDOT also obtained from the Utah Conservation Data Center a list of three sensitive plant species known to be present in Utah County (Table 3-16Table 1-1).

**Table 3-16. Federal and State-listed Species Known To Be Present in Utah County, Utah**

| Common Name | Scientific Name | Federally Listed in Environmental Conservation Online System | Listed in Utah Wildlife Action Plan | Potentially Suitable Habitat in Impact Analysis Area |
|---|---|---|---|---|
| Amphibians | | | | |
| Columbia spotted frog | *Rana luteiventris* | No | Yes | No |
| Northern leopard frog | *Rana pipiens* | No | Yes | No |
| Western toad | *Anaxyrus boreas* | No | Yes | No |
| Birds | | | | |
| American white pelican | *Pelecanus erythrorhynchos* | No | Yes | No |
| Bald eagle | *Haliaeetus leucocephalus* | No | Yes | No |
| Band-tailed pigeon | *Patagioenas fasciata* | No | Yes | No |
| Black swift | *Cypseloides niger* | No | Yes | No |
| Burrowing owl | *Athene cunicularia* | No | Yes | Possible |
| Caspian tern | *Sterna caspia* | No | Yes | No |
| Ferruginous hawk | *Buteo regalis* | No | Yes | Possible |
| Golden eagle | *Aquila chrysaetos* | No | Yes | No |
| Greater sage-grouse | *Centrocercus urophasianus* | No | Yes | No |
| Lewis's woodpecker | *Melanerpes lewis* | No | Yes | No |
| Peregrine falcon | *Falco peregrinus* | No | Yes | No |
| Snowy plover | *Charadrius nivosus* | No | Yes | No |
| Yellow-billed cuckoo | *Coccyzus americanus* | Yes – threatened | Yes | No |
| Fish | | | | |
| Bonneville cutthroat trout | *Oncorhynchus clarkii utah* | No | Yes | No |
| Colorado River cutthroat trout | *Oncorhynchus clarkii pleuriticus* | No | Yes | No |
| June sucker | *Chasmistes liorus* | Yes – endangered | Yes | No |
| Southern leatherside chub | *Lepidomeda aliciae* | No | Yes | No |
| Invertebrates | | | | |
| Eureka mountainsnail | *Oreohelix eurekensis* | No | Yes | No |
| Green River pebblesnail | *Fluminicola coloradoensis* | No | Yes | No |
| Southern Bonneville springsnail | *Pyrgulopsis transversa* | No | Yes | No |

(*continued on next page*)

**Table 3-16. Federal and State-listed Species Known To Be Present in Utah County, Utah**

| Common Name | Scientific Name | Federally Listed in Environmental Conservation Online System | Listed in Utah Wildlife Action Plan | Potentially Suitable Habitat in Impact Analysis Area |
|---|---|---|---|---|
| Mammals | | | | |
| American pika | *Ochotona princeps* | No | Yes | No |
| Little brown bat | *Myotis lucifugus* | No | Yes | Possible |
| Plants | | | | |
| Clay phacelia | *Phacelia argillacea* | Yes – endangered | Not applicable | No |
| Deseret milkvetch | *Astragalus desereticus* | Yes – threatened | Not applicable | No |
| Ute ladies'-tresses | *Spiranthes diluvialis* | Yes – threatened | Not applicable | No |

### Waters of the United States

Seven aquatic resource features were identified in the biological resources impact analysis area. These resources are two palustrine wetlands that total 0.53 acre, four ephemeral stream channels that total 15,686 linear feet (3.06 acres), and 3,687 linear feet (0.34 acre) of open-channel canal. The delineated wetlands were classified using the Cowardin Classification System (Cowardin and others 1979). Appendix F, S.R. 73 Aquatic Delineation Report, provides the full *Aquatic Resource Delineation Report*.

Table 3-17 lists the aquatic resources that could be subject to USACE's jurisdiction. The *Aquatic Resource Delineation Report* and jurisdictional determination in Appendix F, S.R. 73 Aquatic Delineation Report, have not been submitted to USACE for approval. This process would occur prior to construction as part of the Clean Water Act Section 404 permitting process. Therefore, the jurisdictional determinations in this SES are preliminary and might need additional investigation during USACE's review.

Figure 3-6, Aquatic Resource Locations in the Biological Resources Impact Analysis Area, in Chapter 8, Figures, shows the locations of the aquatic resources in the impact analysis area. Most of the aquatic resources that were delineated appear to be hydrologically linked to Utah Lake. The West Canyon Wash (EPH-1) and EPH-2 (an unnamed tributary to West Canyon Wash) drain into Tickville Gulch (EPH-3), which eventually connects to Utah Lake. It is unclear whether EPH-4 connects to Utah Lake. WET-3 is likely irrigation-induced and could dry up if irrigation were removed. WET-4 is a stormwater detention basin constructed in uplands.

### Table 3-17. Aquatic Resources Summary

| Aquatic Resource Feature | Aquatic Resource Type | Cowardin Classification[a] | Waters Type Code[b] | Size (acres) | Length (feet) |
|---|---|---|---|---|---|
| Wetlands | | | | | |
| WET-3 | Emergent wetland | PSS | RPWWD | 0.393 | — |
| WET-4 | Emergent wetland | PEM | NRPWW | 0.135 | — |
| Streams | | | | | |
| EPH-1 | Ephemeral steam (West Canyon Wash) | R6 | NRPW | 0.538 | 3,313 |
| EPH-2 | Ephemeral steam | R6 | NRPW | 0.135 | 2,527 |
| EPH-3 | Ephemeral steam (Tickville Gulch) | R6 | NRPW | 0.246 | 3,653 |
| EPH-4 | Ephemeral steam | R6 | NRPW | 2.142 | 6,193 |
| Canals | | | | | |
| Provo Reservoir Canal | Canal | R4SB | RPW | 0.335 | 3,687 |

[a] Codes from *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin and others 1979): PEM (palustrine emergent), PSS (palustrine scrub-shrub), R4SB (riverine intermittent streambed/canal), and R6 (riverine ephemeral streambed).

[b] USACE Sacramento District, Aquatic Resources Spreadsheet "Waters_Type" codes (USACE 2016): RPWWD (wetlands directly abutting relatively permanent waters [RPWs] that flow directly or indirectly into TNWs); NRPWW (wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs); RPW (relatively permanent waters that flow directly or indirectly into TNWs); and NRPW (non-RPWs that flow directly or indirectly into TNWs).

## 3.10.4. Expected Impacts

### Federally Threatened, Endangered, or Candidate Species

Since no federally threatened, endangered, or candidate species or habitat was identified in the biological resources impact analysis area, no impacts to threatened and endangered species would occur as a result of constructing the Proposed Project. Consultation with USFWS under Section 10 of the ESA is not required for this project.

### Wildlife

#### *Avian Species*

Most of the avian species in the biological resources impact analysis area are fairly common, widespread species that are well-adapted to human-influenced environments. These species would experience few impacts from the Proposed Project. Project impacts would include impacts to individual birds that nest or forage within the Proposed Project right-of-way. These individuals would be forced go elsewhere for their nesting or foraging needs, both during and after construction. Species that nest and forage outside the project right-of-way could be affected by various indirect factors such as habitat fragmentation; increased mortality from vehicle strikes; disturbance from light, sound, and movement; and interference of roadway sounds with mating and/or territorial calls.

Two avian species, the burrowing owl and ferruginous hawk, that are included in the Utah Wildlife Action Plan were identified as having potential habitat in the impact analysis area (see Table 3-16, Federal and State-listed Species Known To Be Present in Utah County, Utah, above). Both of these species use open grassland/shrub-steppe communities, and both are ranked as an S3 species in Utah, meaning that they are rare and vulnerable species. However, while the current land use in the impact analysis area is mostly agricultural (which includes the existing open grassland/shrub-steppe communities), future zoning and land use plans show this shifting to mainly residential, commercial, and transportation land uses (see Section 3.1, Land Use).

The Proposed Project's footprint totals 216.30 acres without counting the existing pavement. Within this area, only a small portion (0.32%) of land zoned as agricultural would be affected by the Proposed Project. Given that the impact to potential habitat is small and given that the Utah Division of Wildlife Resources does not have records of occurrence for any threatened, endangered, or sensitive species within ½ mile of the impact analysis area, the potential impacts to the burrowing owl and ferruginous hawk would be minor.

#### *Non-avian Species*

The main impacts of the Proposed Project to non-avian species would be the further fragmentation of habitat, the creation of a barrier to movement (daily and possibly migratory), additional mortality from roadway strikes, and overall disturbance from noise, light, and movement on the new road.

Mule deer crossing the Proposed Project alignment could pose a hazard to motorists. Because S.R. 73 would be wider than it is currently, wildlife that cross S.R. 73 would spend more time on the roadway. In addition, the posted speed limit on S.R. 73 would be increased, thereby posing a greater risk to deer as well as motorists.

One non-avian species, the little brown bat, which is included in the Utah Wildlife Action Plan was identified as having potential habitat in the impact analysis area (see Table 3-16, Federal and State-listed Species Known To Be Present in Utah County, Utah, above). Little brown bats use a wide range of habitats, including human-made structures, and the species is ranked as an S4 species in Utah, meaning it is uncommon but not rare. Given the wide range of potential habitats in the impact analysis area, the fact that the little brown bat is not rare, and the fact that the Utah Division of Wildlife Resources does not have records of occurrence for any threatened, endangered, or sensitive species with ½ mile of the impact analysis area, the potential impacts to the little brown bat would be minor.

### Waters of the United States

The Proposed Project would alter 2,835 linear feet (1.424 acres) of ephemeral streams and 573 linear feet (0.049 acre) of the Provo Reservoir Canal. Neither of the two palustrine wetlands would be affected. Table 3-18 lists the aquatic resources, their current size, and the amount of the expected impacts. Each of these resources crosses the current S.R. 73 alignment with a culvert. Impacts would occur through the addition of a larger culvert to span the width of the Proposed Project right-of-way. EPH-4 could experience additional impacts where a stormwater retention basin is planned on the southwest corner of S.R. 73 and Foothill Boulevard. Before construction begins, UDOT would coordinate with USACE regarding the jurisdictional status of the aquatic resources identified in Appendix F, S.R. 73 Aquatic Delineation Report.

**Table 3-18. Direct Impacts to Aquatic Resources in the Biological Resources Impact Analysis Area**

| Aquatic Resource Feature | Aquatic Resource Type | Current Size (acres) | Current Length (feet) | Impact Size (acres) | Impact Length (feet) |
|---|---|---|---|---|---|
| Wetlands | | | | | |
| WET-3 | Emergent wetland | 0.393 | — | 0 | — |
| WET-4 | Emergent wetland | 0.135 | — | 0 | — |
| Streams | | | | | |
| EPH-1 | Ephemeral steam (West Canyon Wash) | 0.538 | 3,313 | 0.032 | 250 |
| EPH-2 | Ephemeral steam | 0.135 | 2,527 | 0.018 | 470 |
| EPH-3 | Ephemeral steam (Tickville Gulch) | 0.246 | 3,653 | 0.032 | 670 |
| EPH-4 | Ephemeral steam | 2.142 | 6,193 | 1.424 | 2,835 |
| Canals | | | | | |
| Provo Reservoir Canal | Canal | 0.335 | 3,687 | 0.049 | 573 |
| Total for all aquatic resources | | 3.924 | 19,373 | 1.555 | 4,798 |

## 3.10.5. Mitigation

### Wildlife

In both an in-person meeting (HDR 2017) and a report, the Utah Division of Wildlife Resources recommended specific measures to mitigate mule deer–related wildlife-vehicle collisions (the report is provided in Appendix G, U.S. Highway 73 Wildlife-Vehicle Collision Minimization Recommendations). Based on these recommendations, a wildlife fencing strategy will be developed along the frontage road system with continued coordination efforts with the Division of Wildlife Resources and would be included with the final project design. A deer crossing will also be developed under S.R. 73 at Tickville Gulch. The deer crossing will consist of 10-foot-high by 12-foot-wide box culverts under the frontage roads and two 60-foot-long roadway bridges that will span the existing wash on both the eastbound and westbound mainlines for S.R. 73. Wildlife fencing will be installed such that it channels wildlife through the crossing. UDOT might also consider additional measures to reduce wildlife-vehicle collisions west of the biological resources impact analysis area, but these measures are outside the scope of this project.

To ensure that project activities do not result in a "take" of an active nest or migratory birds protected by the Migratory Bird Treaty Act, USFWS recommends that any ground-disturbing activities or vegetation treatments be performed before migratory birds begin nesting or after all young have fledged. In this regard, the ideal time to construct the Proposed Project is September through December (Great Salt Lake Audubon and others, no date).

If any activities must be scheduled during migratory bird nesting and breeding season (January through August), UDOT will take steps to prevent the birds from establishing nests in the potential impact area, and a site-specific survey will be conducted for nesting birds. If nesting birds are found during the survey, appropriate spatial buffers will be established around nests and vegetation treatments, or ground-disturbing activities within the buffer areas will be postponed until the birds have left the nest. A qualified biologist will confirm that all young have fledged. UDOT will use the *Utah Field Office Guidelines for Raptor Protection from Human and Land Use Disturbances* (USFWS 2002) as recommended by USFWS. Specific information is provided in Appendix E, S.R. 73 Correspondence for Biological Resources, USFWS Response Letter.

**What is a take of a migratory bird?**

The term *take* means to pursue, hunt, shoot, capture, collect, kill, or attempt to pursue, hunt, shoot, capture, collect, or kill a migratory bird or any part, nest, or egg of a migratory bird (16 USC § 715n).

### Wetlands

Mitigation for affected aquatic resources will be determined during the Clean Water Act Section 404 permitting phase of the Proposed Project before construction.

# 3.11. Historic Properties and Paleontological Resources

Section 3.11 describes the known historic properties and paleontological resources in the historic properties and paleontological resources impact analysis area and evaluates how these resources would be affected by the Proposed Project. The term *historic property* is defined in the National Historic Preservation Act (NHPA) as any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places (NRHP) (54 USC § 300308). This includes artifacts, records, and remains that are related to such a district, site, building, structure, or object. To be considered historic, resources generally must be at least 50 years old.

Paleontological resources, often referred to as fossils, are the remains, traces, or imprints of ancient organisms preserved in or on the earth's crust that provide information about the history of life on earth.

**Historic Properties and Paleontological Resources Impact Analysis Area.** The historic properties and paleontological resources impact analysis area is also known as the area of potential effects (APE). The APE is the geographic area within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties. For the Proposed Project, the APE is an irregular polygon encompassing all areas where UDOT anticipates acquiring right-of-way or easements and/or disturbing ground. The APE is described in greater detail in the technical reports for the historic property surveys (Certus Environmental Solutions 2017a, 2017b, 2018).

## 3.11.1. Regulatory Environment and Compliance

### Historic Properties

In compliance with UCA 9-8-404, each state agency must take into account the effects of an expenditure or undertaking on historic properties before funds are allocated for the undertaking's completion. According to the Programmatic Agreement between UDOT and the Utah State Historic Preservation Officer (SHPO), which was signed into effect March 19, 2008, UDOT will be in compliance with UCA 9-8-404 for state projects by following the Section 106 process for federal projects found in the First Amended Programmatic Agreement between FHWA and UDOT. Section 106 of the National Historic Preservation Act requires that historic properties be identified within a proposed project's APE and that the agency identify appropriate consulting parties and allow them an opportunity to comment on the undertaking. The agency must also make eligibility and effects findings in consultation with the SHPO.

**What is the National Register of Historic Places (NRHP)?**

The National Register of Historic Places, or NRHP, is the official federal list of districts, sites, buildings, structures, and objects that are significant in American history, architecture, archaeology, engineering, and culture.

Once the historic properties located within a project's APE are identified, the Section 106 process requires that the significance of the archaeological or architectural properties be evaluated for inclusion in the National Register of Historic Places (NRHP).

A resource may be considered eligible for inclusion in the NRHP if it:

A. Is associated with events that have made a significant contribution to the broad patterns of our history; or

B. Is associated with the lives of persons significant in our past; or

C. Embodies the distinctive characteristics of a type, period, or method of construction, or represents the work of a master, or possesses high artistic values, or represents a significant and distinguishable entity whose components may lack individual distinction; or

D. Has yielded, or may be likely to yield, information important in prehistory or history.

Historic properties considered potentially eligible under one of the above criteria are also to be evaluated for integrity of location, design, setting, materials, workmanship, feeling, and association. To be eligible for inclusion in the NRHP, a historic property must possess integrity of those elements directly related to the criterion or criteria under which it would be determined eligible.

The Section 106 process also requires that the agency determine effects findings in consultation with the SHPO. Possible effects are defined as follows (36 CFR Part 800):

- **No historic properties affected.** A **no historic properties affected** determination is made when it is determined that either there are no historic properties present or there are historic properties present but the undertaking would have no effect on them as defined in 36 CFR § 800.16(i).
- **No adverse effect.** A **no adverse effect** determination is made when the undertaking's effects do not meet the criteria described in the item below for an adverse effect, or the undertaking is modified or conditions are imposed, such as the subsequent review of plans for rehabilitation by the SHPO, to ensure consistency with the Secretary of the Interior's Standards for the Treatment of Historic Properties (36 CFR Part 68) and applicable guidelines, to avoid adverse effects.
- **Adverse effect.** An **adverse effect** determination is made when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the NRHP in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. Consideration is given to all qualifying characteristics of a historic property, including those that might have been identified after the original evaluation of the property's eligibility for inclusion in the NRHP. Adverse effects can include reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance, or be cumulative.

### Paleontological Resources

The State of Utah has enacted legislation (UCA-79-3-508) that requires state agencies to take into account the effect of the undertaking on a specimen that is included in or eligible for inclusion in the State Paleontological Register. As part of this state-level legislation, UDOT entered into a Memorandum of Understanding with the Utah Geological Survey for the purpose of consultation to identify known or potential paleontological localities of importance that could be affected by UDOT's projects and to consider measures to avoid or minimize those impacts.

### 3.11.2. Methodology

#### Historic Properties

The project team used literature reviews and field inspections to determine what historic properties were present in the APE. Field inspections were conducted in the summer of 2017 and spring of 2018 to identify historic properties that could be affected by the Proposed Project. The APE, literature review, and field inspection methods are described in greater detail in the technical reports for the historic property surveys (Certus Environmental Solutions 2017a, 2017b, 2018).

In accordance with UDOT guidelines, and to accommodate a time lag between the compilation of the survey data and any future construction associated with the undertaking, the project team used a cutoff age of 45 years old to designate historical properties. Given the timing of the survey reported in this SES, this meant that a resource had to be created during or before 1972 to be considered historical.

As part of the effort to identify historic properties in the APE, the Section 106 consultation process was carried out between UDOT and the Utah SHPO. Additionally, UDOT consulted with federally recognized Native American tribes. The following 10 Native American tribes with patrimonial claims over the general project area were contacted by UDOT on August 21, 2017; invited to be consulting parties to the S.R. 73; Eagle Mountain to Saratoga Springs SES Section 106 process; invited to provide comments on known or potential properties or issues of concern to the tribes; and offered a meeting with UDOT:

- Cedar Band of Paiute Indians
- Confederated Tribes of the Goshute Reservation
- Eastern Shoshone Tribe of the Wind River Reservation
- Northwestern Band of Shoshone Nation
- Paiute Indian Tribe of Utah
- Shivwits Band of Paiute Indians
- Shoshone-Bannock Tribes of the Fort Hall Reservation
- Skull Valley Band of Goshute Indians
- Southern Ute Indian Tribe
- Ute Indian Tribe of the Uintah & Ouray Reservation

None of the Native American tribes contacted by UDOT requested to be consulting parties, to meet with UDOT, or to provide input on the undertaking. For copies of the letters sent to these tribes, see Appendix H, S.R. 73 Correspondence for Historic Properties.

During the public scoping process for the Proposed Project, the public was asked to comment on any potential environmental impacts, including impacts to historic properties. No comments regarding historic properties were received. UDOT will provide information to the public regarding impacts to historic properties and will accept comments on the SES and the Section 106 process during the public comment period when the SES is released to the public.

Following the steps of the Section 106 process, UDOT submitted a letter and technical reports that identified historic properties, preliminary Determinations of Eligibility for the NRHP for each historic property, and their preliminary Findings of Effect for the historic properties in the APE. This letter was sent on April 17, 2018. The Utah SHPO concurred with the preliminary Determinations of Eligibility and Findings of Effect on May 10, 2018. See Appendix H, S.R. 73 Correspondence for Historic Properties, for the SHPO concurrence letter.

#### Paleontological Resources

In accordance with UDOT guidelines, the project team consulted with the Utah Geological Survey regarding the presence and/or absence of and potential for encountering fossil resources in the APE. This consultation was undertaken via a letter written to the Utah Geological Survey (Certus Environmental Solutions 2017b).

### 3.11.3. Current Conditions

#### Historic Properties

Land along S.R. 73 has long been used primarily for agricultural uses including crop growing and livestock pasturing. No buildings are known to have been present in the APE during the historic period, and no historic structures were identified during a survey of the APE (Certus Environmental Solutions 2017a).

An intensive-level pedestrian survey was conducted in the APE using 15-meter transects to identify archaeological resources. Archaeological resources include historic linear resource sites such as railroad alignments and canals, prehistoric sites, and historic artifact scatters. The survey identified six archaeological sites. Four of the sites were previously documented, and three were previously determined to be eligible for inclusion in the NRHP.

Two new sites were documented, both of which are small, historical artifact scatters. The two new sites were recommended as ineligible for inclusion in the NRHP (Certus Environmental Solutions 2017b). UDOT submitted a Determination of Eligibility to the Utah SHPO on April 17, 2018. The SHPO concurred with UDOT's determination on May 10, 2018, that three of six identified sites in the APE are NRHP-eligible. The sites and Determinations of Eligibility are listed in Table 3-19.

**Table 3-19. Archaeological Sites and Determinations of Eligibility Identified in the APE**

| Site | Name or Description | NRHP Eligibility | New or Previously Documented? |
|---|---|---|---|
| 42UT537 | Historical clay mine and railroad spur | Eligible | Previously documented |
| 42UT612 | Prehistoric lithic scatter | Ineligible | Previously documented |
| 42UT947 | Provo Reservoir Canal/Murdock Ditch | Eligible | Previously documented |
| 42UT948 | Salt Lake & Western Railroad | Eligible | Previously documented |
| 42UT1999 | Historic trash scatter | Ineligible | New |
| 42UT2000 | Historic trash scatter | Ineligible | New |

#### Paleontological Resources

The Utah Geological Survey stated that no paleontological localities are known to be present in the APE and that the potential for encountering such resources is low (Certus Environmental Solutions 2017b).

### 3.11.4. Expected Impacts

#### Historic Properties

Three possible findings can be made regarding the impacts a project might have on NRHP-eligible cultural resources under the Section 106 process: **no historic properties affected**, **adverse effect**, and **no adverse effect**. With regard to the Proposed Project, UDOT has made a finding of **no adverse effect** for two archaeological sites and a finding of **no historic properties affected** for all remaining archaeological sites. Therefore, the overall Finding of Effect for the proposed UDOT Project No. S-0073(33)30, S.R. 73; Eagle Mountain to Saratoga Springs, Utah County, Utah, is **no adverse effect**.

The Utah SHPO concurred with the recommended Determinations of Eligibility and Findings of Effect on May 10, 2018. See Appendix H, S.R. 73 Correspondence for Historic Properties, for the SHPO concurrence letter. Descriptions of effects on the individual eligible archaeological resources are summarized in Table 3-20 and described in more detail below.

- **Site 42UT537.** This site is a historical clay mine and its associated railroad spur that once connected to the Salt Lake & Western Railroad (site 42UT948). The railroad spur portion of the site comprises remnants of the historical berm and occasional tie plates or spikes; the tracks were removed long ago. The site is located north of the Proposed Project alignment, and the Proposed Project would not affect this site. Because of this, UDOT has made a finding of **no historic properties affected** for this site.
- **Site 42UT947.** The Provo Reservoir Canal/Murdock Ditch, located west of the Jordan River in Utah County, has also been referred to as the Welby Jacobs Canal. Through the APE, the canal is a combination of concrete-lined and unlined segments. It varies from 3 to 6 feet wide and from 2 to 4 feet deep. The canal as a whole has been previously determined eligible for inclusion in the NRHP. The Proposed Project would cross and pipe the canal for a total of 658 feet. The Proposed Project would affect a relatively small portion of the site and would not substantially affect or alter any contributing elements of the site or any of the character-defining features for which it was determined eligible for inclusion in the NRHP. Thus, UDOT has made a finding of **no adverse effect** for this site.
- **Site 42UT948.** This site is the remains of the Salt Lake & Western Railroad. The railroad berm is overgrown and discontinuous, with some segments having been destroyed by land development and other roadway construction. The segment of the site near the junction with S.R. 73 and 800 West has been bisected by the highway, and disturbances from highway construction have removed large sections of the railroad alignment in the APE. Consequently, the actual length of railroad berm that would be affected by the Proposed Project is about 626 linear feet. Northeast of the Proposed Project alignment, the railroad berm remains intact, and that segment is extensive, running for more than 1.3 miles. Numerous extant segments are southwest of the Proposed Project alignment, and, in Cedar Valley, the railroad berm maintains its integrity for several miles. The Proposed Project would affect a relatively small portion of the site and would not substantially affect or alter any contributing elements of the site or any of the character-defining features for which it was determined eligible for inclusion in the NRHP. Thus, UDOT has made a finding of **no adverse effect** for this site.

**Table 3-20. Determinations of Eligibility and Findings of Effect for Eligible Archaeological Resources in the APE**

| Site | Name or Description | NRHP Eligibility | Finding of Effect |
|---|---|---|---|
| 42UT537 | Historical clay mine and railroad spur | Eligible | No historic properties affected |
| 42UT947 | Provo Reservoir Canal/Murdock Ditch | Eligible | No adverse effect |
| 42UT948 | Salt Lake & Western Railroad | Eligible | No adverse effect |

#### Paleontological Resources

No impacts are expected.

### 3.11.5. Mitigation

#### Historic Properties

No mitigation is required.

#### Paleontological Resources

No mitigation is required.

## 3.12. Hazardous Material Sites

Section 3.12 lists sites near the S.R. 73 study area that could contain hazardous material. This section analyzes the effects of the Proposed Project on these sites. Section 3.12 also analyzes the health and safety effects on construction workers or people who live near any hazardous material sites affected by the Proposed Project.

**Hazardous Material Sites Impact Analysis Area.** The hazardous material sites impact analysis area includes parts of Eagle Mountain, Saratoga Springs, and Utah County within 1,000 feet of the centerline of S.R. 73 between the future Mountain View Corridor (800 West/Foothill Boulevard in Saratoga Springs) on the east and Eagle Mountain Boulevard on the west.

### 3.12.1. Regulatory Environment and Compliance

Hazardous material sites are regulated by the Resource Conservation and Recovery Act; by the Comprehensive Environmental Response, Compensation, and Liability Act; and by Utah Administrative Code Title 19 (*Environmental Quality Code*).

The following concerns are raised when a transportation project could affect sites that contain hazardous material:

- The spread of existing soil or groundwater contamination through road-construction activities
- The potential for increased construction costs
- The potential for construction delays
- The health and safety of construction workers and people who live near the hazardous waste site
- The short-term and long-term liability associated with acquiring environmentally distressed properties

This section provides a preliminary identification of known parcels that contain hazardous material. During the final design phase of the project and before any property is acquired, assessments would be conducted on sites of concern to determine the presence of contamination and establish the exact nature and limits of the chemical hazard. For more information, see Section 3.12.5, Mitigation.

### 3.12.2. Methodology

To determine the presence of hazardous material sites in the hazardous material sites impact analysis area, the project team reviewed the following private and public databases: the Utah Division of Environmental Response and Remediation's (DERR) Interactive Map, DERR's leaking underground storage tanks database, DERR's underground storage tanks (UST) database, the Utah Division of Solid and Hazardous Waste's active and closed landfills database, and the U.S. Environmental Protection Agency's (EPA) EnviroMapper database.

The project team used the DERR Interactive Map and the EPA EnviroMapper database to query databases that contain inventories of regulated facilities that produce or contain hazardous materials and sites with a history of spills or contamination.

### 3.12.3. Current Conditions

The hazardous material sites in the hazardous material sites impact analysis area are listed by facility type in Table 3-21 and shown in Figure 3-7, Hazardous Material Sites, in Chapter 8, Figures. Tier 2 sites are sites that either store or release toxic materials, which include materials such as fertilizers, cleaners, oil, and gasoline. The three Tier 2 sites listed in Table 3-21 do not have publicly available information regarding what types of chemicals or hazardous materials are stored or released at the sites. For this analysis, the project team assumes that any storage or release of toxic materials would occur at the business facilities located on these parcels and not on the surrounding vacant land.

**Table 3-21. Hazardous Material Sites in the Hazardous Material Sites Impact Analysis Area and Impacts from the Proposed Project**

| Facility Type | Description | Location | Impacts from the Proposed Project |
|---|---|---|---|
| Tier 2 | Staker Parson Companies<br>Tier 2 Facility 5283 | North side of S.R. 73 at Mt. Airey Drive, Eagle Mountain | About 0.25 acre of the southwest corner of the parcel would be acquired. This impact is not anticipated to affect the operation of the business facilities on the parcel. |
| Tier 2 | Questar Gas – Lakeside Tap<br>Tier 2 Facility 8209 | North side of S.R. 73 at 12236 West, Saratoga Springs | About 0.5 acre of the south side of the parcel would be acquired. This impact is not anticipated to affect the operation of the business facilities on the parcel. |
| Tier 2 | Verizon Wireless<br>Tier 2 Facility 7266 | South of S.R. 73 west of Six-Mile Cutoff Road, Eagle Mountain | This facility is within 1,000 feet of the Proposed Project. No impacts to the business facilities are anticipated from the Proposed Project. |
| Underground storage tanks | Maverik Gas Station #380<br>UST #100859 | 9217 N. Ranches Parkway, Eagle Mountain | This facility is within 1,000 feet of the Proposed Project. No impacts to the USTs are anticipated from the Proposed Project. |

Source: DERR 2017

### 3.12.4. Expected Impacts

Hazardous material–related sites and facilities were screened to identify those that have a higher probability of containing contaminated soil or groundwater and those that are located closer to the Proposed Project. The sites that meet both of these criteria have the potential to affect or be affected by the Proposed Project.

- **Sites of greatest concern** are sites with a high probability of contamination whose property boundaries are within the proposed right-of-way of the Proposed Project. The criterion for determining the sites of greatest concern involved analyzing each site's location relative to the Proposed Project.
- **Sites of secondary concern** are sites with a high to moderate probability of contamination that are outside but near (within 1,000 feet of) the right-of-way for the Proposed Project.

As shown above in Table 3-21, there are four sites within 1,000 feet of the Proposed Project: three Tier 2 sites and one operational UST.

Two of the Tier 2 sites (the Staker Parsons and Questar Gas sites) are considered sites of greatest concern because their parcels would be directly affected by the Proposed Project (some of the parcels would be acquired). However, the impacts from the Proposed Project would not affect the business facilities where the Tier 2 material storage or releases are assumed to be located. No impacts to the Tier 2 storage or releases are anticipated from the Proposed Project.

The Verizon Wireless Tier 2 facility and the Maverik UST would not be affected by the Proposed Project.

Overall, the project team does not expect any effects on hazardous material sites from the Proposed Project; therefore, there would be no health impacts to construction workers or the public from hazardous material sites.

### 3.12.5. Mitigation

UDOT will confirm the exact location of the Tier 2 storage or release facilities with the property owners during the right-of-way acquisition process to confirm that construction of the Proposed Project would not affect the Tier 2 storage or release facilities.

## 3.13. Construction Impacts and Mitigation

Constructing the Proposed Project would cause temporary construction-related impacts from ground disturbance and the operation of construction equipment. The nature and timing of these impacts would be related to the Proposed Project's construction methods. Most construction-related impacts to the public would be associated with travel delays on S.R. 73 itself.

### 3.13.1. Land Use

#### Impacts

No impacts are expected.

#### Mitigation

No mitigation is required.

### 3.13.2. Farmland

#### Impacts

No impacts are expected.

#### Mitigation

No mitigation is required.

### 3.13.3. Community

#### Impacts

**Utilities.** Although utility service would be maintained throughout most construction activities, utility service could be temporarily disrupted during construction. The affected utilities could include electric, natural gas, water, sewer, telephone, cable, and storm drainage.

**Traffic.** The primary construction impacts that would affect vehicle traffic during construction of the Proposed Project are the following:

- Traffic detours and some temporary road closures would change frequently throughout construction. Changes in roadway conditions could include rerouting of traffic onto other roads, temporary closure of lanes or sections, and temporary lane shifts. Detours and road closures would temporarily increase vehicle commute times, fuel use, and air pollutant emissions.
- Access to some residential, institutional, and commercial properties would be temporarily disrupted.

#### Mitigation

**Utilities.** The project specifications will require the contractor to coordinate with the utility providers affected by construction to complete utility agreements before construction, and the construction contractor would coordinate with all utility providers to minimize utility service interruptions.

Before beginning work, the contractor is required to contact Blue Stakes to identify the locations of all utilities. The contractor will be required to use care when excavating to avoid unplanned utility disruptions. If utilities are unintentionally disrupted, UDOT will work with the contractor and the utility companies to restore service as quickly as possible.

**Traffic.** A thorough public information program will be implemented to inform the public about construction impacts including identifying work hours and alternate routes. Construction signs will be used to notify drivers about work activities and changes in traffic patterns.

Impacts from lights used during nighttime construction will be reduced by aiming construction lights directly at the work area and/or shielding the lights. Utility agreements will be completed to coordinate utility relocations.

The contractor will be required to develop a *Maintenance-of-Traffic Plan* that defines measures to reduce construction impacts on traffic. A general requirement of this plan is that, to the extent reasonably practical, safe access to businesses and residences must be maintained and existing roads must be kept open to traffic unless alternate routes are provided.

### 3.13.4. Relocations and Right-of-Way Acquisition

#### Impacts

UDOT might need to obtain temporary easements for some properties in order to construct the Proposed Project. These properties are not included in the right-of-way analysis in this SES because the final locations of easements would be determined during the final design phase of the project. Easements would be required for properties that are outside the right-of-way but would be affected by the cuts or fills required during roadway construction, would require utilities to be relocated, or would need to have the properties' access modified to fit within the proposed design.

UDOT would use these properties and would provide compensation to the landowner for the use. For some construction and utility easements, the property would be fully returned to the owner when the use of the property is no longer required, typically when construction is complete or the utility is buried. These properties might be temporarily affected, but no long-term impacts are expected.

For some utilities such as water canals and power poles, permanent easements might be required. The locations of these easements would be determined during the final design phase of the project in coordination with the utility companies. For permanent easements, the appropriate environmental documentation would be prepared for any potential impacts.

Additionally, the contractor would establish staging areas for equipment during construction and would obtain fill material for improvements. Because a contractor has not yet been selected, the exact location of staging areas and sources of fill material is not known.

#### Mitigation

No mitigation is required.

### 3.13.5. Economics

#### Impacts

Construction activities could temporarily affect access to businesses in the area of construction. Although UDOT would maintain access to properties to the extent practicable, temporary detours would limit some access or change the route to some businesses. The resulting traffic congestion and motorists' perceptions of inaccessibility could discourage some customers from patronizing businesses in the area of construction.

#### Mitigation

Access to businesses will be maintained during the construction and post-construction phases of this project. For each phase of the project, UDOT will coordinate with property owners and businesses to evaluate ways to maintain access while still allowing efficient construction operations. This coordination could entail sharing a temporary access or identifying acceptable timeframes when access is not needed. Adequate signs will be placed in construction areas to direct drivers to businesses.

### 3.13.6. Pedestrians and Bicyclist Considerations

#### Impacts

No impacts are expected.

#### Mitigation

No mitigation is required.

## 3.13.7. Air Quality

### Impacts

Construction could take up to 2 years, depending on available funding. Air quality impacts during construction would be limited to short-term increases in fugitive dust, particulates, and local pollutant emissions from construction equipment in the area of construction. Because construction would be local and short-term, any impacts to individual air quality receptors would also be short-term. The most common air pollutant created by construction would be $PM_{10}$. Construction activity could also generate a temporary increase in emissions of mobile-source air toxics from construction-related emissions during the construction period.

To reduce construction-related air quality pollutants, an air quality approval order is required to build, own, or operate a facility that pollutes the air, including the Proposed Project. To obtain an air quality approval order, a notice of intent must be submitted to the Utah Division of Air Quality describing the construction activities and emissions that would be associated with operating construction equipment. The permit applicant must include provisions for controlling dust and emission sources, and the permit might require other construction approvals depending on the source and location of aggregate, asphalt, combustion, and/or fuel storage facilities. This permit would be obtained by the contractor before construction.

### Mitigation

The contractor will be required to follow the appropriate BMPs included in UDOT's plans and specifications for construction. This includes items such as fugitive-dust control and street sweeping.

## 3.13.8. Noise

### Impacts

The operation of machinery and other construction activities would increase noise levels. Construction would temporarily increase noise levels, but the impacts would be short-term. Construction equipment could generate noise levels near residences of 80 dBA to 90 dBA or similar to that of a heavy truck at 50 feet.

### Mitigation

To reduce temporary noise impacts associated with construction, the contractor will comply with all state and local regulations relating to construction noise. Land uses that are sensitive to traffic noise are also sensitive to construction noise. Methods of controlling construction noise include establishing the hours that construction equipment can be operated and permissible sound levels at those times. In view of this, UDOT has developed a specification that establishes construction noise control. This specification can be found in UDOT's *2017 Standard Specifications for Road and Bridge Construction*, Section 01355, *Environmental Protection*, Part 3.6, *Noise Control*. The contractor would be required to conform to this specification to reduce the impact of construction noise on the surrounding community.

### 3.13.9. Water Resources

#### Impacts

Excavation, grading, and other construction activities could increase sediment and pollution (oil, gasoline, and so on) levels in stormwater runoff, and this sediment could enter nearby waterways. The potential for sediment and pollution levels to increase would exist until the Proposed Project is completed and permanent soil-stabilization measures are installed.

#### Mitigation

Because more than 1 acre of ground would be disturbed, a Utah Pollutant Discharge Elimination System General Storm Water Discharge Permit and a *Stormwater Pollution Prevention Plan*, consistent with UDOT's *2017 Standard Specifications for Road and Bridge Construction*, Section 01355, *Environmental Protection*, Part 3.3, *Water Resource Permits*, are required. The plan will identify measures to reduce impacts to receiving waters from construction activities including site grading, materials handling and storage, fueling, and equipment maintenance.

### 3.13.10. Biological Resources

#### Impacts

**Wetlands and Wildlife.** During construction, some erosion might occur outside the specific roadway construction zone.

Construction activities could disrupt the feeding, nesting, and reproductive activities of wildlife in or near the right-of-way because of higher noise levels, construction equipment activity, and lights. These temporary construction activities are of particular concern during nesting periods for migratory birds near the right-of-way because the activities could disrupt nesting or cause birds to flee the nest.

**Invasive Species.** Construction operations would remove the existing hard surfaces and established vegetation, which would expose the underlying soils to the risk of being infiltrated by invasive weeds. Materials and equipment delivered to the job site could introduce invasive weeds into the area if seeds are present in imported soil or on equipment that is not properly cleaned.

#### Mitigation

**Wetlands and Wildlife.** BMPs such as silt fences and other erosion-control features would be used in areas adjacent to wetlands.

**Invasive Species.** To mitigate the possible introduction of invasive weeds due to construction activities, the invasive weed BMPs in UDOT's current Standard Specifications for Road and Bridge Construction will be implemented and monitored and included in the plans and specifications for the project.

## 3.13.11. Historic Properties and Paleontological Resources

### Impacts

During construction, additional archaeological, paleontological, or historical resources might be discovered other than those identified during the historic properties surveys.

### Mitigation

Ground-disturbing activities during construction could result in the discovery of previously unidentified subsurface cultural or paleontological resources. In the case of an inadvertent discovery during construction, activities in the area of discovery will be immediately stopped and the procedures in UDOT's *2017 Standard Specifications for Road and Bridge Construction*, Section 01355, *Environmental Protection*, Part 3.8, *Discovery of Historical, Archaeological, or Paleontological Objects, Features, Sites, or Human Remains* will be followed.

The construction contractor will notify UDOT of the nature and exact location of the finding and will not damage or remove the resource. Work in the area of the discovery would be delayed until UDOT evaluates the extent and cultural significance of the site in consultation with the Utah SHPO. The course of action and the construction delay would vary depending on the nature and location of the discovery. Construction would not resume until the contractor receives written authorization from UDOT to continue.

## 3.13.12. Hazardous Material Sites

### Impacts

As with any ground-disturbing activities, there is the potential to encounter previously unknown sites such as underground storage tanks, leaking underground storage tanks, and other hazardous materials sites. Exposure to these sites could pose a health risk. Because the general public would not be allowed onto construction sites, there would be no health risks to the public from ground contamination.

### Mitigation

If contamination is discovered during construction, mitigation measures will be coordinated according to UDOT Standard Specification 01355, *Environmental Compliance*, which directs the construction contractor to stop work and notify the engineer of the possible contamination. Any hazardous materials will be disposed of according to applicable state and federal guidelines.

If previously unidentified sites or contamination are encountered during construction, work will stop in the area of the contamination according to UDOT Standard Specification 01355, Part 3.1, *Hazardous Waste*, and the contractor will consult with UDOT and DERR to determine the appropriate remedial measures. Hazardous waste spills by the construction contractor will be handled according to UDOT Standard Specification 01355, Part 3.2, *Spill of Petroleum-Based Product or Used Oil*, and the requirements and regulations of the Utah Department of Environmental Quality and EPA.

# 4. PUBLIC AND AGENCY INVOLVEMENT

Public and agency involvement is important to the success of any project. The planning for the S.R. 73 SES involved extensive coordination and consultation with the affected community, agencies, and other stakeholders. The affected community includes not only the residents and businesses in the project study area but also land owners, individuals, groups, tribes, and others interested in the project study area.

The project team coordinated a series of public and agency involvement outreach activities to make sure that all affected stakeholders were notified of the Proposed Project and had a chance to voice their concerns and share their ideas. The public outreach activities for the S.R. 73 SES will culminate with a 30-day public comment period on this draft document including a public open house in the summer of 2018. A formal summary of all public involvement activities will be prepared and included as part of the final SES.

The project team will continue to work with the public to ensure that people who are interested in the project understand the next steps (design and construction) and how such steps might affect the community.

## 4.1. Local Governments and Agency Involvement

Throughout the environmental process, the project team coordinated with local governments and state and federal agencies that might have an interest in the Proposed Project.

### 4.1.1. Local Governments

The project team held regular one-on-one updated meetings with both Eagle Mountain City and the City of Saratoga Springs to discuss the SES process and involve them in the development of the Proposed Project. In addition, the project team held the following stakeholder coordination meetings:

- **August 30, 2017: Stakeholder Committee Meeting #1.** This meeting was held in the Eagle Mountain City council chambers. Those in attendance included UDOT representatives, Eagle Mountain City staff, City of Saratoga Springs staff, the Cedar Fort mayor, MAG representatives, School and Institutional Trust Lands Administration (SITLA) representatives, the Alpine School District Transportation Department routing supervisor, the Black Ridge Elementary School principal, the Rockwell Charter High School director, Camp Williams/Utah National Guard representatives, Farmland Reserve, Inc., representatives, and representatives from the project team. Meeting attendees discussed the purpose of the stakeholder committee, reviewed input received during the S.R. 73 Corridor Planning Study, reviewed the freeway with frontage roads concept recommended in the Planning Study, and discussed the SES process and timeline as well as public outreach communication methods.
- **August 30, 2017, and September 18, 2018: Land Use Workshops.** This meeting was held in the offices of WSP. Those in attendance included UDOT representatives, Eagle Mountain City staff, and representatives from MAG, Farmland Reserve, Inc., Avenue Consultants, SITLA, and the project team. The purpose of this meeting was to consult with landowners regarding proposed growth and land use assumptions in the project study area. The primary discussion concerned differences between a land use study commissioned by SITLA and Farmland Reserve, Inc., and the results presented in MAG's 2015–2040 RTP. The parties agreed to modify certain population and employment growth assumptions from what is in the current RTP based on input provided at

this meeting. MAG agreed to make those modifications to the RTP land use model and agreed that these changes would be reflected in the RTP either as part of the next amendment or as part of the next RTP (expected in June 2019).

- **February 27, 2018: Stakeholder Committee Meeting #2.** This meeting was held in the Eagle Mountain City council chambers. Those in attendance included UDOT representatives, Eagle Mountain City staff, City of Saratoga Springs staff, and representatives from MAG, SITLA, Farmland Reserve, Inc., and the project team. Stakeholders were provided summary of the public open house (for a summary of the public open house, refer to Section 4.2, Public Involvement) and reviewed the SES process and timeline as well as the draft alignment. They also discussed transit options, timing, and funding for the Proposed Project as well as how the Proposed Project would tie into the future Mountain View Corridor.

### 4.1.2. State and Federal Agencies

The project team sent letters to USFWS and the Utah Division of Wildlife Resources' Central Region. The project team also submitted a letter to the Utah Resource Development Coordinating Committee's project management system for state agency review to request information from agencies regarding the resources under their jurisdiction in the project study area. The letters requested that the agencies identify resources that could be affected by the Proposed Project, identify issues that should be analyzed in the SES, and determine whether project construction would require any permits or approvals from the agency. The project team received one response letter from USFWS that offered mitigation guidance in regard to migratory birds. These letters are provided in Appendix E, S.R. 73 Correspondence for Biological Resources.

The project team also met with the Utah Division of Wildlife Resources' Central Region to discuss mule deer concerns and mitigation recommendations in the project study area. This meeting was held on October 11, 2017, at the UDOT Central Complex.

### 4.1.3. UCA 9-8-404 Consultation

As part of the effort to identify historic properties in the APE and assess the effects on those properties, UCA 9-8-404 consultation activities were conducted among UDOT, the Utah SHPO (both the Preservation and Antiquities Departments), and federally recognized Native American tribes.

## 4.2. Public Involvement

In addition to agency coordination, public participation is important to developing sound recommendations that are supported by the community. UDOT's commitment at the beginning of this environmental review process was to proactively involve the public so decisions could be made that reflect the goals of those who live, work, and travel in the project study area. Throughout this process, UDOT has kept the public informed and has incorporated their feedback. A project website (https://www.udot.utah.gov/sr73), Facebook page (https://www.facebook.com/groups/300531263752763), telephone hotline, and project-specific emails were used to communicate project developments as well as answer questions from the public.

UDOT held a public open house on September 7, 2017, at Blackridge Elementary School. Invitations were sent to Eagle Mountain residents living along S.R. 73; residents of Ranches Parkway, Saratoga Springs, Cedar Fort, White Hills, and Fairfield; Eagle Mountain City and City of Saratoga Springs elected officials and staff; and other interested stakeholders. Invitations were sent through postcards and announced in the Eagle Mountain City newsletter, on Facebook, on Twitter, through email, and on public meeting calendars.

The public open house included a series of information stations for both the S.R. 73 SES and the Mountain View Corridor project. The purposes of the open house were to update the public about the status of the Proposed Project, to provide a description and schedule for the SES, and to serve as a scoping meeting for the SES process. About 167 stakeholders attended the public open house. Attendees were invited to submit comments at the open house or online. A majority of comments were focused on potential impacts to property, followed by noise and wildlife concerns as well as questions regarding the size and placement of the Proposed Project. A public meeting for the SES will be held during the summer of 2018.

# 5. PERMITS AND CLEARANCES

Table 5-1 lists the permits, reviews, clearances, and approvals that would likely be required to construct the Proposed Project.

The contractor would be responsible for obtaining all construction-related permits and other environmental clearances for activities occurring outside the right-of-way such as activities in construction staging areas, borrow areas, and batch plant sites.

### Table 5-1. Permits, Reviews, Clearances, and Approvals Likely To Be Required for the S.R. 73 Project

| Permit | Granting Agency(ies) | Applicant | Application Time | Granting Time | Applicable Portion of Project |
|---|---|---|---|---|---|
| Federal Permits, Reviews, and Approvals | | | | | |
| Individual permit under Section 404 of the Clean Water Act | USACE | UDOT | After the Final SES | Before construction | Portions of roadway in wetlands |
| Compliance with Section 106 of the National Historic Preservation Act | Utah SHPO and Advisory Council on Historic Preservation | UDOT | Concurrent with the SES | Final SES (the Section 106 process has been completed) | Considerations of impacts to historic properties; includes consultation between agencies and interested parties |
| State Permits, Reviews, and Clearances | | | | | |
| Water quality certification under Section 401 of the Clean Water Act | Utah Division of Water Quality | UDOT | Concurrent with Section 404 individual permit | Concurrent with Section 404 individual permit | Required if the Proposed Project could discharge fill into navigable waters |
| UPDES permit under Section 402 of the Clean Water Act | Utah Division of Water Quality | Contractor | Construction phase | Before construction | Stormwater quality during construction phase |
| Stream alteration permit | Utah Division of Water Rights | UDOT | Final design phase | Before construction | Required for new or modified stream crossings proposed as part of the Proposed Project |
| Air quality approval order | Utah Division of Air Quality | Contractor | Construction phase | Before construction | Air quality during construction phase (emissions from equipment) |
| Certificate of registration | Utah Division of Wildlife Resources | Contractor | Construction phase | Before construction | Impacts to raptor nests from construction |
| Local Permits and Clearances | | | | | |
| Floodplain development permit | Local jurisdictions | UDOT | Final design phase | Final design phase | Portions of roadway or structure in FEMA floodplain |
| Construction-related permits | Various agencies | Contractor | Contractor | Before construction | Impacts associated with off-site activities such as activities in construction staging areas, borrow areas, batch plant sites, and so on |

# 6. PRELIMINARY CONCLUSIONS

Based on the environmental analyses included in this SES, the project team anticipates a number of impacts from constructing and operating the Proposed Project. Table 6-1 summarizes the resource impacts of the Proposed Project. More information is provided in Chapter 3, Environmental Analysis.

### Table 6-1. Environmental Impacts of the Proposed Project

| Impact Category | Impact | Mitigation |
|---|---|---|
| Land Use | | |
| Land converted to transportation use | 216 acres | No mitigation required. |
| Farmland | | |
| Agricultural land converted to transportation use | 103 acres | No mitigation required. |
| Community | | |
| Impacts to community cohesion | None | No mitigation required. |
| Impacts to quality of life | An improved S.R. 73 could make the look and feel of the community impact analysis area less rural. However, the Proposed Project would provide transportation improvements that complement locally established land use and transportation plans, specifically those for Eagle Mountain and Saratoga Springs, and would improve the commute for residents leaving these “bedroom communities” for areas east and north for work. | No mitigation required. |
| Impacts to community facilities | None | No mitigation required. |
| Impacts to recreation facilities | None | No mitigation required. |
| Impacts to utilities | Yes | Coordinate with local utility providers to minimize or eliminate utility conflicts and reduce disruptions in service. |
| Relocations and Right-of-Way | | |
| Relocations | 19 relocations on occupied residential properties. | Comply with the Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended, and the Utah Relocation Assistance Act, Utah Code, Section 57-12. |
| Potential relocations | 2 potential relocations on occupied residential properties. | Same as for relocations above. |
| Partial acquisitions | 15 partial acquisitions on occupied residential properties. | Same as for relocations above. |

(*continued on next page*)

### Table 6-1. Environmental Impacts of the Proposed Project

| Impact Category | Impact | Mitigation |
|---|---|---|
| **Economics** | | |
| Economic impacts | The project would modify three existing business accesses and require minor partial acquisitions. | Comply with the Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended, and the Utah Relocation Assistance Act, Utah Code, Section 57-12. |
| **Pedestrian and Bicyclist Considerations** | | |
| Impacts to existing trails | Beneficial impact. The Proposed Project would provide continuous east-west pedestrian and bicycle facilities in the community impact analysis area. | No mitigation required. |
| Impacts to proposed trails | Beneficial impact. The Proposed Project would provide continuous east-west pedestrian and bicycle facilities in the community impact analysis area. | No mitigation required. |
| **Air Quality** | | |
| Air quality impacts | None | No mitigation required. |
| **Noise** | | |
| Noise impacts above criteria | 73 of the 195 model receptors would have traffic noise impacts. | A noise barrier south of S.R. 73 just west of Mt. Airey Drive would be considered. |
| **Water Resources** | | |
| Floodplains impacts | None | No mitigation required. |
| Stream impacts | None | No mitigation required. |
| Point-of-diversion impacts | 15 points of diversion could be impacted. | UDOT will avoid or relocate wells and properly abandon affected wells in accordance with UAC R655-4 administered by the Utah Division of Water Rights. |
| Water quality impacts | None | Comply with UDOT's MS4 Permit and Stormwater Pollution Prevention Plan. |
| **Biological Resources** | | |
| Impacts to threatened, endangered, or sensitive species | None | No mitigation required. |
| Impacts to waters of the U.S. | 1.56 acres | Comply with the Clean Water Act. |
| **Historic Properties and Paleontological Resources** | | |
| Adverse impacts to historic properties or paleontological resources | No adverse effects. | No mitigation required. |
| **Hazardous Materials** | | |
| Impacts to hazardous waste sites | None | UDOT will avoid hazardous waste sites during construction. |

# 7. REFERENCES

Certus Environmental Solutions, LLC

2017a A Selective Reconnaissance-Level Historic Structures Assessment for the S.R. 73; Eagle Mountain to Saratoga Springs Project, Utah County, Utah. November 20.

2017b An Archaeological Resource Assessment for the S.R. 73; Eagle Mountain to Saratoga Springs Project, Utah County, Utah. November 20.

2018 Addendum to: An Archaeological Resource Assessment for the S.R. 73; Eagle Mountain to Saratoga Springs Project, Utah County, Utah. March 9.

City of Saratoga Springs

No date Quality of Life. https://www.saratogaspringscity.com/537/Quality-Of-Life. Accessed April 29, 2018.

2011 Saratoga Springs Parks, Recreation, Trails, and Open Space Master Plan. November 15.

2017a Saratoga Springs Transportation Master Plan. https://www.saratogaspringscity.com/DocumentCenter/View/144.

2017b Comprehensive Annual Financial Report for City of Saratoga Springs: Fiscal Year Ended June 30, 2017.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe

1979 Classification of Wetlands and Deepwater Habitats of the United States. Office of Biological Services, U.S. Department of the Interior, FWS/OBS-79/31.

Curtis, K.E., and R.W. Lichvar

2010 Updated Datasheet for the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States. ERDC/CRREL TN-10-1. Hanover, New Hampshire: U.S. Army Engineer Research and Development Center, Cold Regions Research and Engineering Laboratory.

[DERR] Utah Division of Environmental Response and Remediation

2017 Utah Environmental Interactive Map. http://enviro.deq.utah.gov. Accessed March 20, 2018.

Eagle Mountain City

No date Master Development Plans and Agreements. http://eaglemountaincity.com/departments/planning/master-development-plans-agreements. Accessed April 29, 2018.

2005 Eagle Mountain City General Plan. http://eaglemountaincity.com/home/showdocument?id=1464.

2011 Eagle Mountain City Future Land Use and Transportation Corridors [General Plan Map 2]. http://eaglemountaincity.com/home/showdocument?id=1372.

2017 Comprehensive Annual Financial Report for Eagle Mountain City, UT: Fiscal Year Ended June 30, 2017.

[EPA] U.S. Environmental Protection Agency

No date Air Data: Air Quality Data Collected at Outdoor Monitors Across the U.S. https://www.epa.gov/outdoor-air-quality-data. Accessed May 29, 2018.

2012 Transportation Conformity Regulations as of April 2012. EPA-420-B-12-013. April. https://nepis.epa.gov/Exe/ZyPDF.cgi/P100E7CS.PDF?Dockey=P100E7CS.PDF. Accessed May 29, 2018.

2015a Transportation Conformity Guidance for Quantitative Hot-spot Analyses in $PM_{2.5}$ and $PM_{10}$ Nonattainment and Maintenance Areas. EPA-420-B-15-040. November.

2015b Transportation Conformity Guidance for Quantitative Hot-Spot Analyses in $PM_{2.5}$ and $PM_{10}$ Nonattainment and Maintenance Areas (Appendices). EPA-420-B-15-084. November.

2018a NAAQS Table. https://www.epa.gov/criteria-air-pollutants/naaqs-table. Accessed May 31, 2018.

2018b Utah Nonattainment/Maintenance Status for Each County by Year for All Criteria Pollutants. https://www3.epa.gov/airquality/greenbook/anayo_ut.html. Accessed May 29, 2018.

[FEMA] Federal Emergency Management Agency

2002 National Flood Insurance Program. Flood Insurance Rate Map Community-Panel Numbers 495517IND0 and 4955170115 B. Revised July 17, 2002.

[FHWA] Federal Highway Administration

2010 United States Department of Transportation Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations. https://www.fhwa.dot.gov/environment/bicycle_pedestrian/guidance/policy_accom.cfm.

2011 Highway Traffic Noise: Analysis and Abatement Guidance. FHWA-HEP-10-025. https://www.fhwa.dot.gov/environment/noise/regulations_and_guidance/analysis_and_abatement_guidance/revguidance.pdf. December.

Google Earth

2018 Accessed March 2018 (multiple dates).

Google Imagery

2017 Aerial images (flight date June 23, 2017) accessed online using the Utah Automatic Geographic Reference Center's Discover server. https://gis.utah.gov/discover. Accessed January 15, 2018.

Great Salt Lake Audubon, U.S. Fish and Wildlife Service, Utah Division of Wildlife Resources, and Tracy Aviary

No date Our Shared Responsibilities and the Migratory Bird Treaty Act. Available online at https://www.fws.gov/utahfieldoffice/Documents/MigBirds/MBTA_Brochure_440KB.pdf.

HDR, Inc.

2017 Minutes from a meeting with Matt Howard of the Utah Division of Wildlife Resources regarding mule deer along S.R. 73. October 11.

Lichvar, R.W., and S.M. McColley

2008 A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States: A Delineation Manual. ERDC/CRREL TR-08-12. Hanover, New Hampshire: U.S. Army Engineer Research and Development Center, Cold Regions Research and Engineering Laboratory.

[MAG] Mountainland Association of Governments

2012 Future Population Projections. Estimates based on 2010 U.S. Census data. https://www.mountainland.org/population-projections. Accessed March 16, 2018.

2015 TransPlan40 Regional Transportation Plan 2015–2040 for the Provo/Orem Metropolitan Area. http://mountainland.org/img/transportation/TransPlan40/TransPlan40.pdf.

Neely, Karissa

2017 Strain on Eagle Mountain's transportation infrastructure felt more painfully during winter months. https://www.heraldextra.com/news/local/north/eagle-mountain/strain-on-eagle-mountain-s-transportation-infrastructure-felt-more-painfully/article_e8aed0a6-8be9-53b4-a8ab-625fdb669f99.html. *Daily Herald* (Provo, Utah): February 4.

[NRCS] U.S. Department of Agriculture, Natural Resources Conservation Service

2016 Soil Survey Geographic Database. GIS data retrieved September, 22, 2017.

[UDEQ] Utah Department of Environmental Quality

2018a Area Designations: $PM_{10}$. https://deq.utah.gov/legacy/pollutants/p/particulate-matter/pm10/areas.htm. Accessed May 29, 2018.

2018b Area Designations: $PM_{2.5}$ State Implementation Plan Development. https://deq.utah.gov/legacy/pollutants/p/particulate-matter/pm25/areas.htm. Accessed May 29, 2018.

[UDOT] Utah Department of Transportation

2016 S.R. 73 Corridor Planning Study. https://www.udot.utah.gov/main/uconowner.gf?n=32695713753413451.

2017 Noise Abatement. Policy UDOT 08A2-01. https://www.udot.utah.gov/main/uconowner.gf?n=10496602977480171. Effective November 6, 1987; revised June 15, 2017.

[USACE] U.S. Army Corps of Engineers

1987 Corps of Engineers Wetlands Delineation Manual. Technical Report Y-87-1. Vicksburg, Mississippi: U.S. Army Engineer Waterways Experiment Station.

2008 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0), edited by J.S. Wakeley, R.W. Lichvar, and C.V. Noble. ERDC/EL TR-08-28. Vicksburg, Mississippi: U.S. Army Engineer Research and Development Center.

2016 Aquatic Resources Excel Spreadsheet, version dated January 11, 2018, prepared by the USACE Sacramento District. Available online at http://www.spk.usace.army.mil/Missions/Regulatory/Jurisdiction/Aquatic-Resources-Delineation. Accessed April 3, 2018.

[USFWS] U.S. Fish and Wildlife Service

2002 Utah Field Office Guidelines for Raptor Protection from Human and Land Use Disturbances. Prepared by Laura A. Romin and James A. Muck. Available online at https://www.fws.gov/utahfieldoffice/Documents/MigBirds/Raptor%20Guidelines%20(v%20March%2020,%202002).pdf.

2018 Listed Species Believed To or Known To Occur in Utah. Available online at https://ecos.fws.gov/ecp0/reports/species-listed-by-state-report?state=UT&status=listed. Accessed April 16, 2018.

[Utah AGRC] Utah Automated Geographic Reference Center

2017 Lakes, Rivers, Streams, and Springs. https://gis.utah.gov/data/water/lakes-rivers-dams. Accessed October 30, 2017.

Utah County

2017a Agriculture Protection Areas. GIS data received from Utah County on December 1, 2017.

2017b Utah County, Utah, Financial Statements: Year Ended December 31, 2016. June 26.

Utah Department of Workforce Services

2018 Employment Data. http://jobs.utah.gov/wi/data/employment. Accessed March 12, 2018.

Utah Division of Water Resources

2016 Water-Related Land Use GIS Data. https://gis.utah.gov/data/planning/water-related-land. Retrieved September 22, 2017.

Utah Division of Water Rights

2018 GIS Data and Related Tables. Water Rights Points of Diversion. https://www.waterrights.utah.gov/gisinfo/wrcover.asp. Accessed March 13, 2018.

Utah Division of Wildlife Resources

2017 Utah's State Listed Species by County. Available online at https://dwrcdc.nr.utah.gov/ucdc/ViewReports/sscounty.pdf. Updated November 1, 2017. Accessed April 16, 2018.

Utah Office of the State Auditor

2018 Local Government Reports. http://reporting.auditor.utah.gov. Accessed March 12, 2018.

Utah State Tax Commission

2017 Utah Property Tax Rates by Area. http://propertytax.utah.gov/rates/area-rates. Accessed March 20, 2018.

2018 Utah Sales and Use Tax Rates. http://tax.utah.gov/sales/rates. Accessed March 20, 2018.

Utah Valley Economic Partnership

No date Eagle Mountain. http://utahvalleyinformation.com/utahvalley/site-selector-toolbox/community-profiles/eagle-mountain. Accessed April 29, 2018.

Utah Wildlife Action Plan Joint Team

2015 Utah Wildlife Action Plan: A Plan for Managing Native Wildlife Species and Their Habitats to Help Prevent Listing under the Endangered Species Act. Publication number 15-14. Available online at https://wildlife.utah.gov/wap/Utah_WAP.pdf.

Zillow

2018a Eagle Mountain Home Prices & Values. http://www.zillow.com/eagle-mountain-ut/home-values. Accessed March 12, 2018.

2018b Saratoga Springs Home Prices & Values. http://www.zillow.com/saratoga-springs-ut/home-values. Accessed March 12, 2018.

2018c Utah County Home Prices & Values. http://www.zillow.com/utah-county-ut/home-values. Accessed March 12, 2018.

# 8. FIGURES

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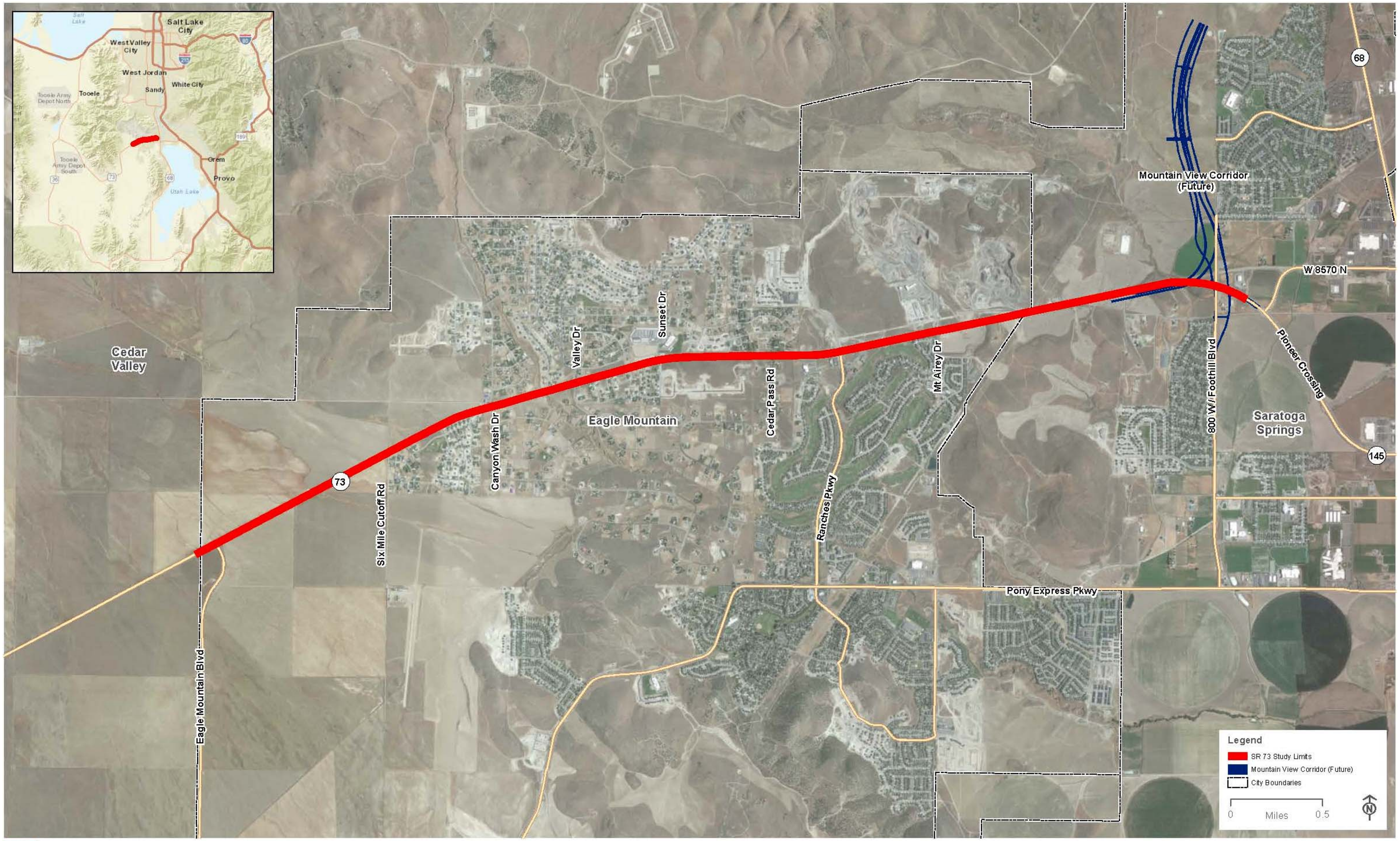
**Figure 1-1. S.R. 73 Study Area**




State Route 73
ENVIRONMENTAL STUDY
Eagle Mountain to Saratoga Springs

STUDY AREA

FIGURE 1 OF 1

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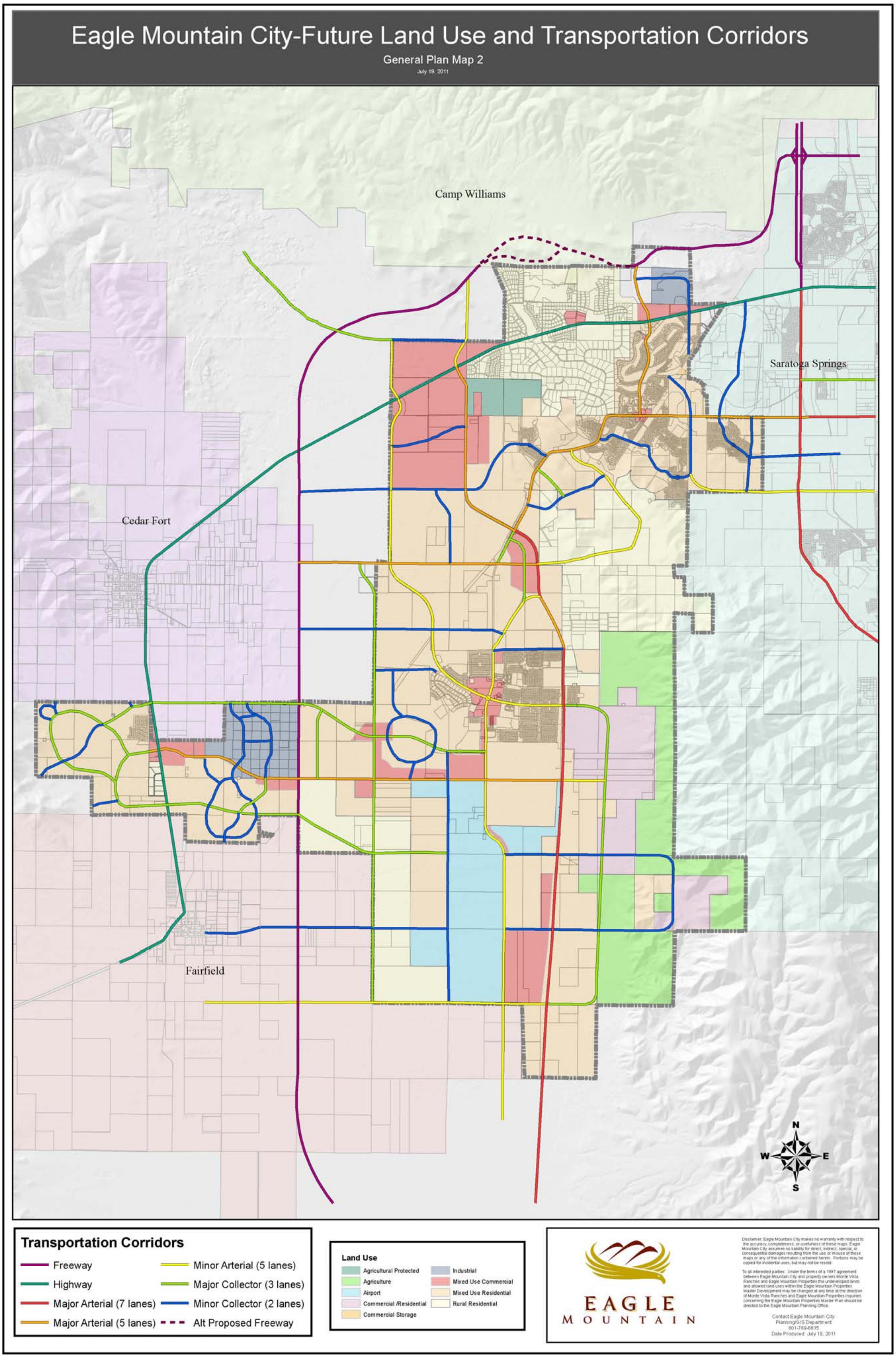
**Figure 1-2. Eagle Mountain City's Future Land Use and Transportation Corridors Map**




Source: Eagle Mountain City 2011

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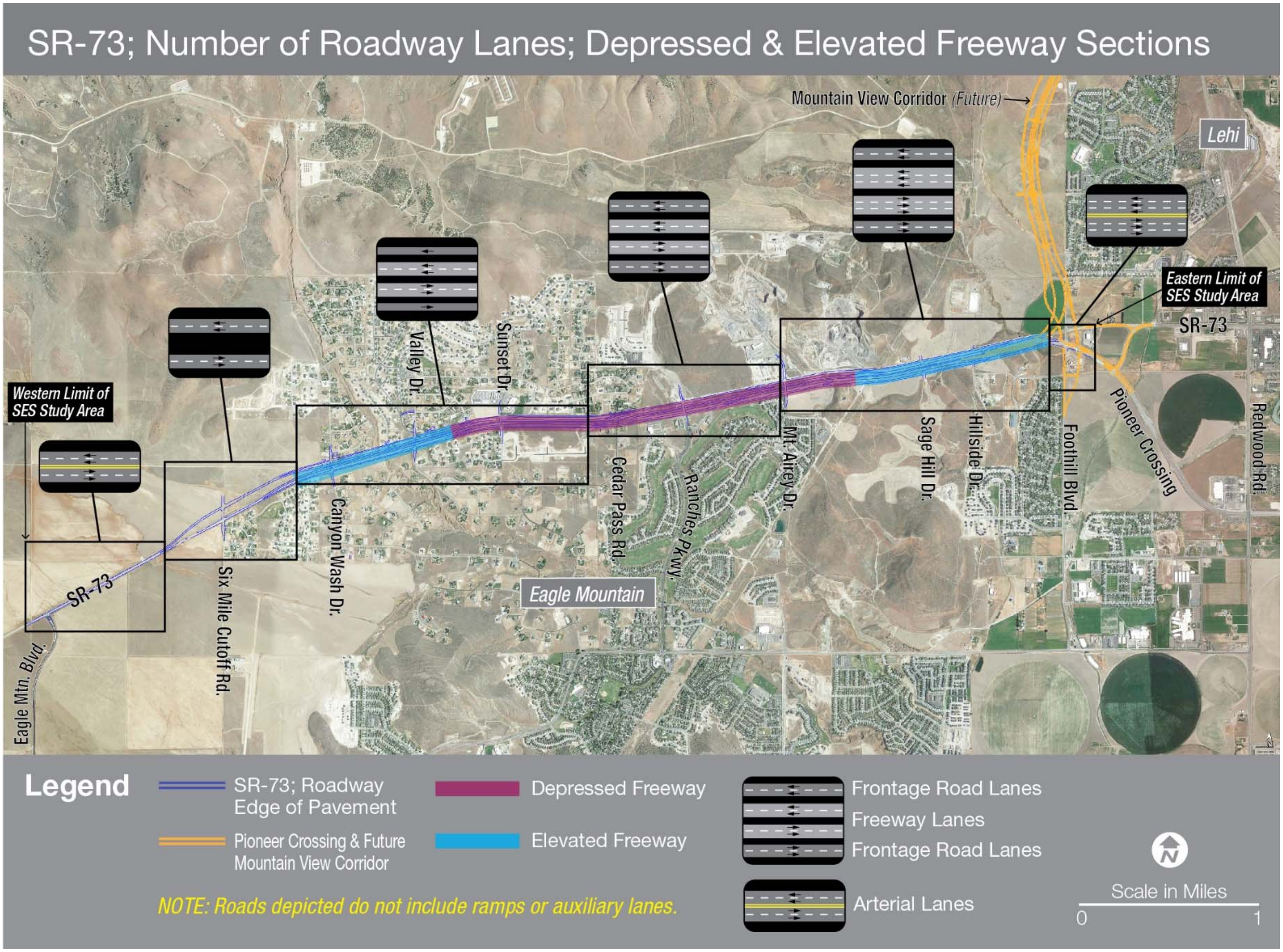
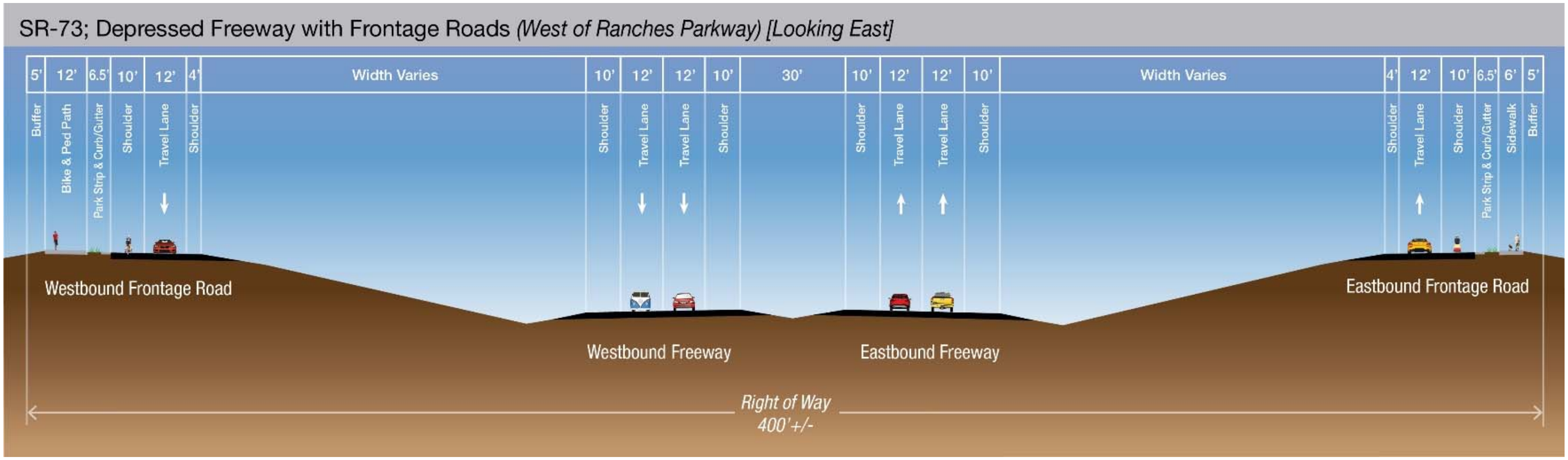
**Figure 2-1. Changes in Travel Lanes on S.R. 73 with the Proposed Project**



### Figure 2-2. Typical Depressed Section West of Ranches Parkway




### Figure 2-3. Typical Elevated Section West of Ranches Parkway

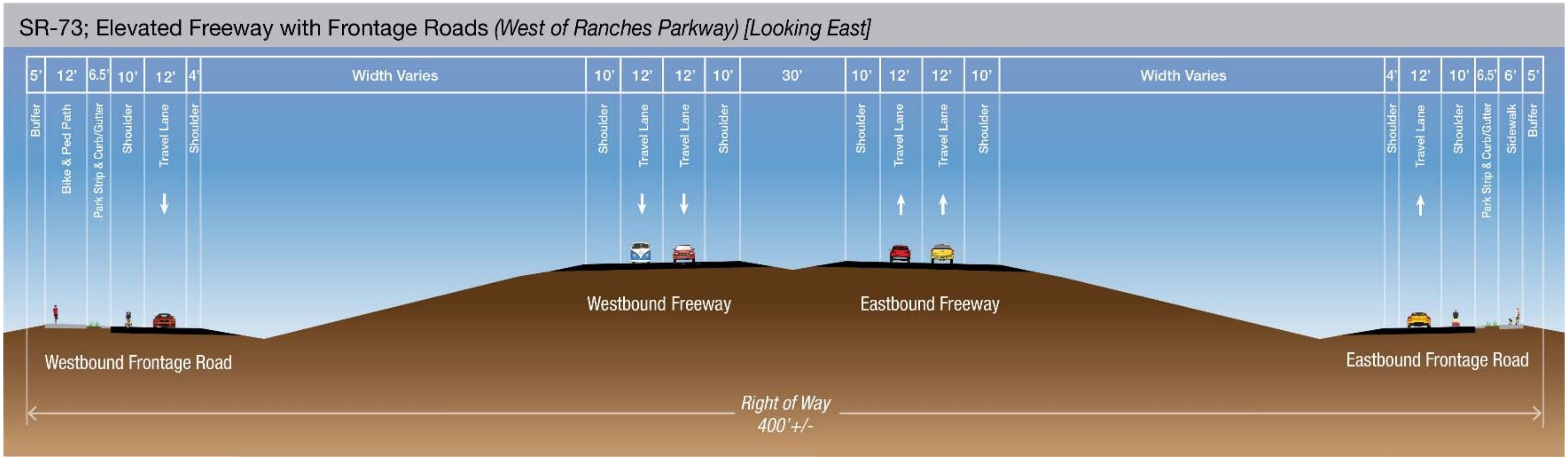


**Figure 2-4. Typical Depressed Section East of Ranches Parkway**

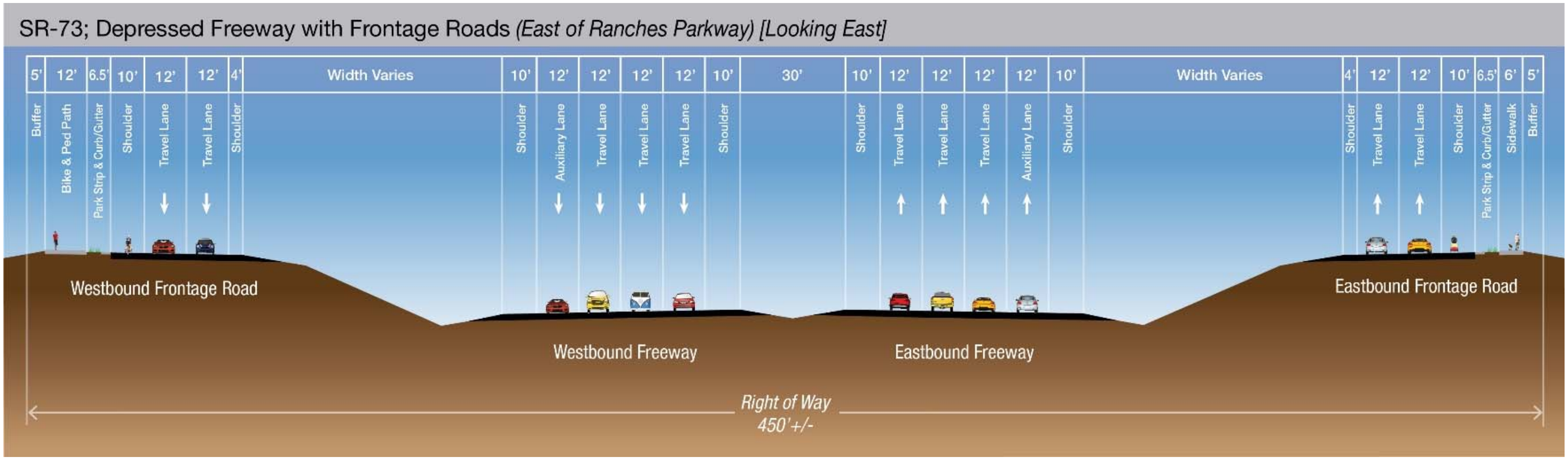



**Figure 2-5. Typical Elevated Section East of Ranches Parkway**

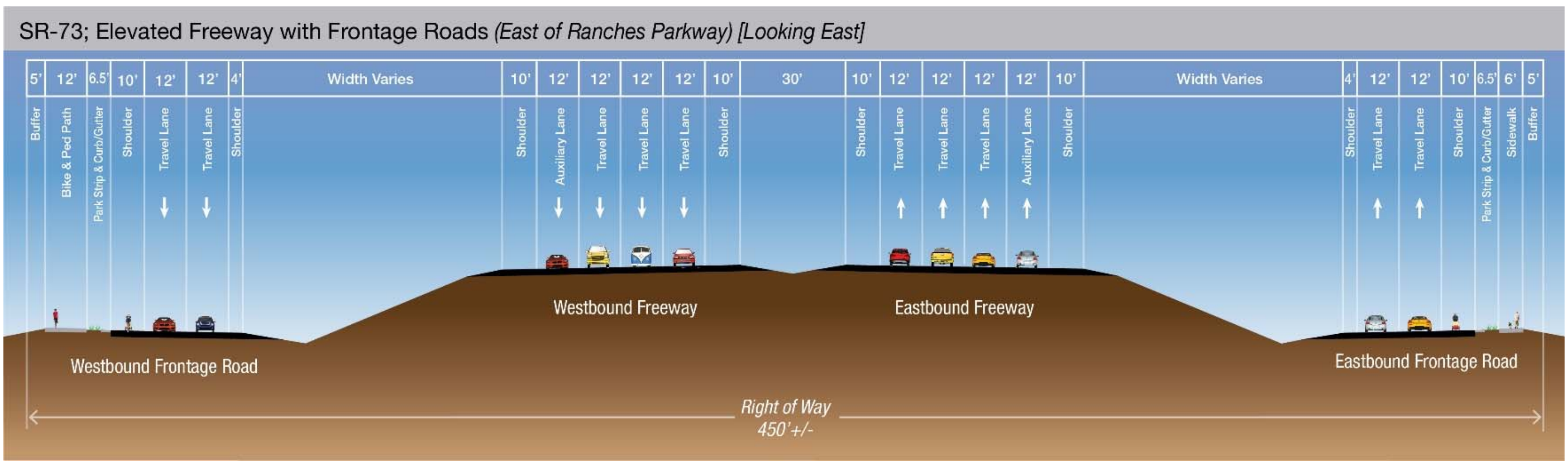


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**Figure 2-6. Photosimulation of Proposed Project Looking West at Ranches Parkway**

**Figure 3-1. Current and Planned Land Use in the Land Use Impact Analysis Area**

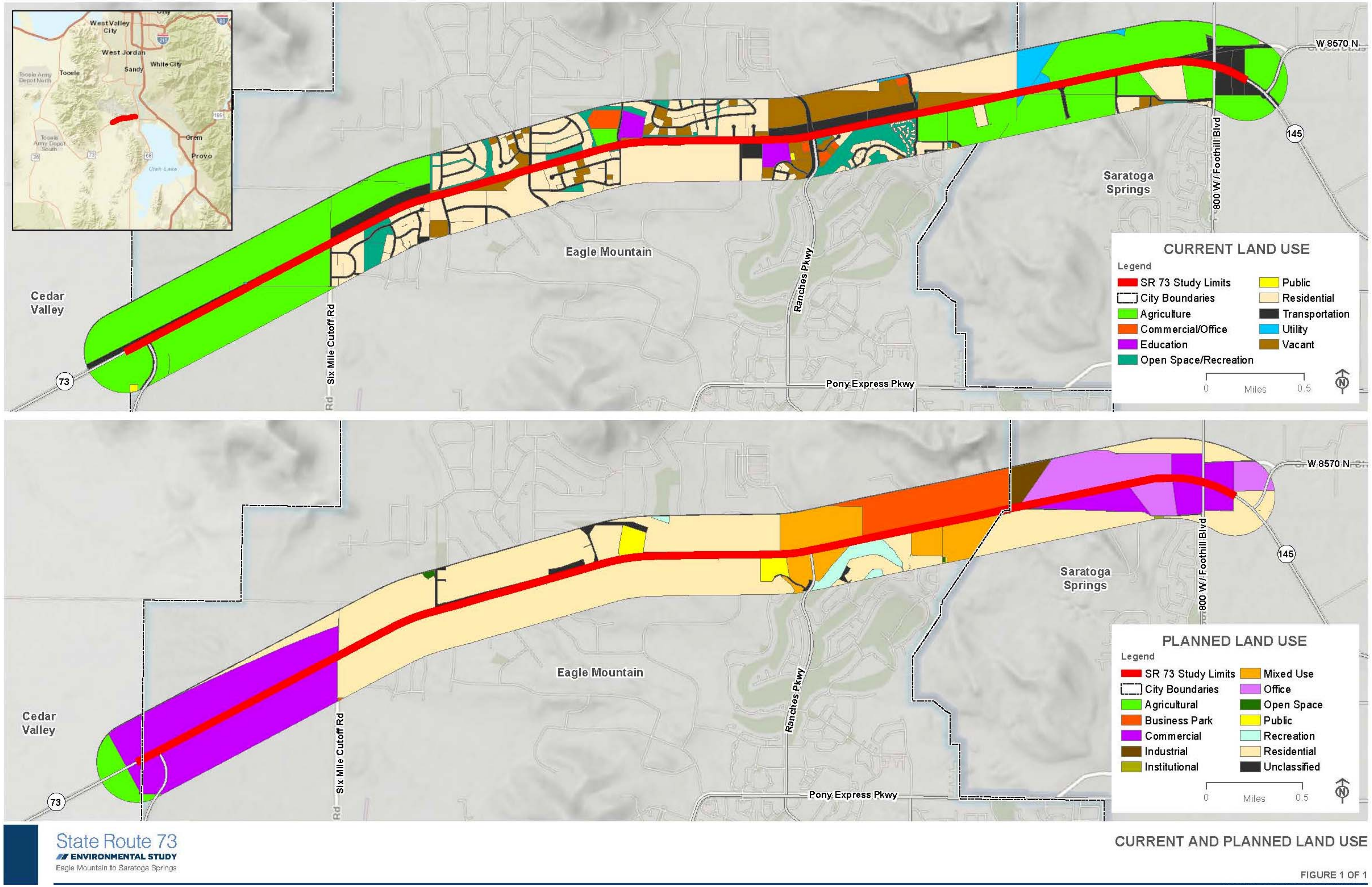


**Figure 3-2. Zoning in the Land Use Impact Analysis Area**

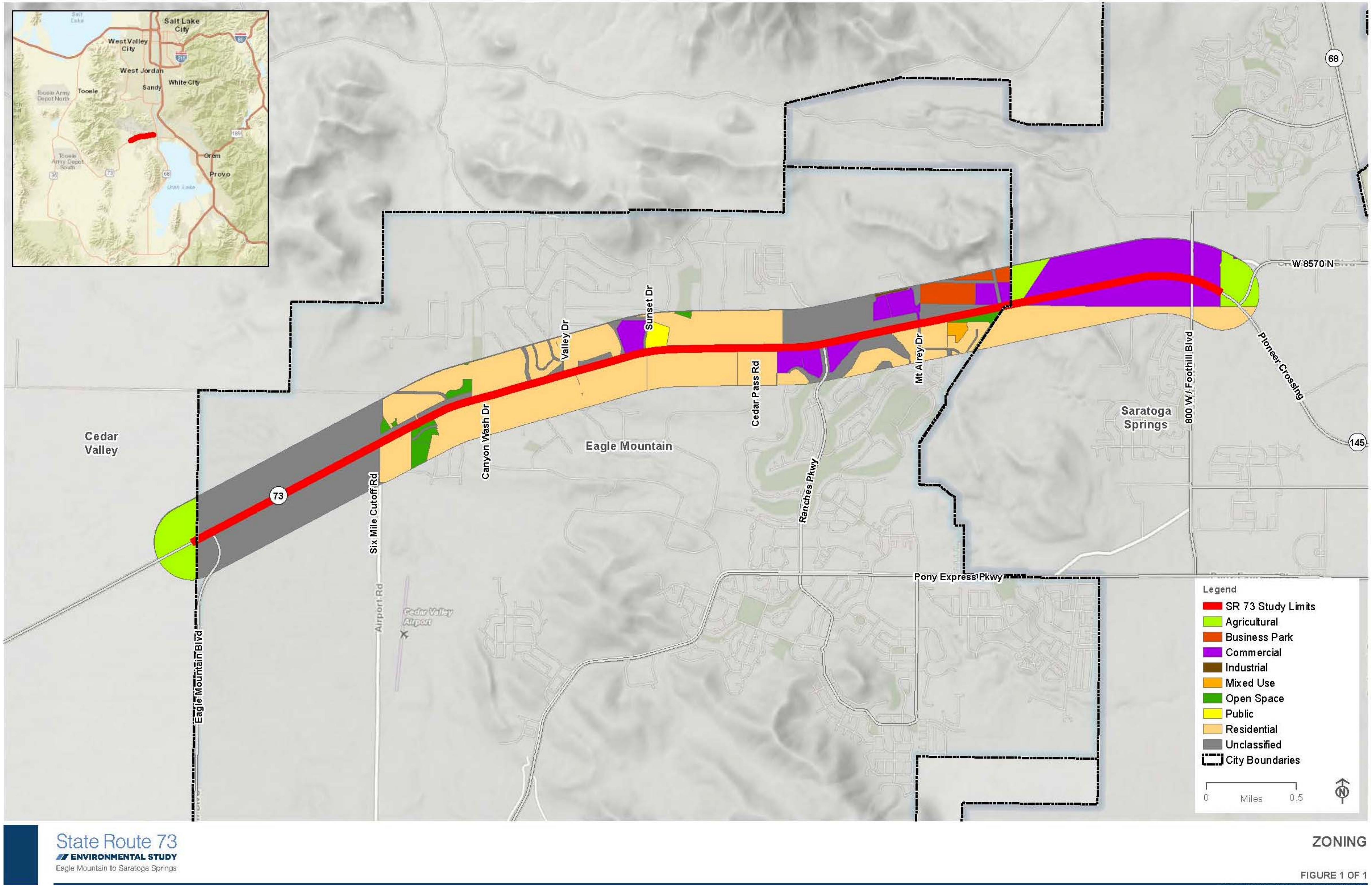


**Figure 3-3. Land Cover and Crop Types in the Farmland Impact Analysis Area**

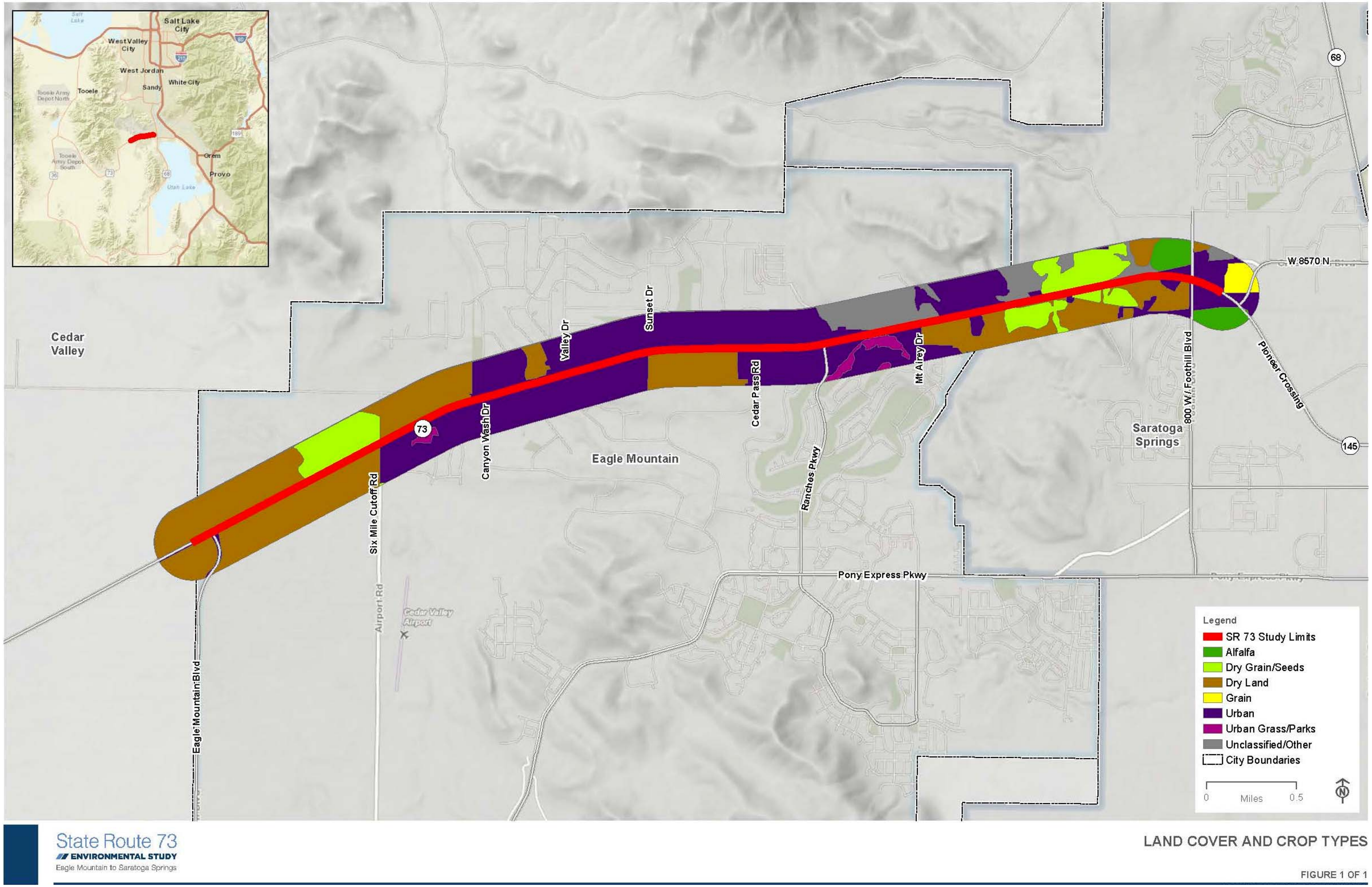
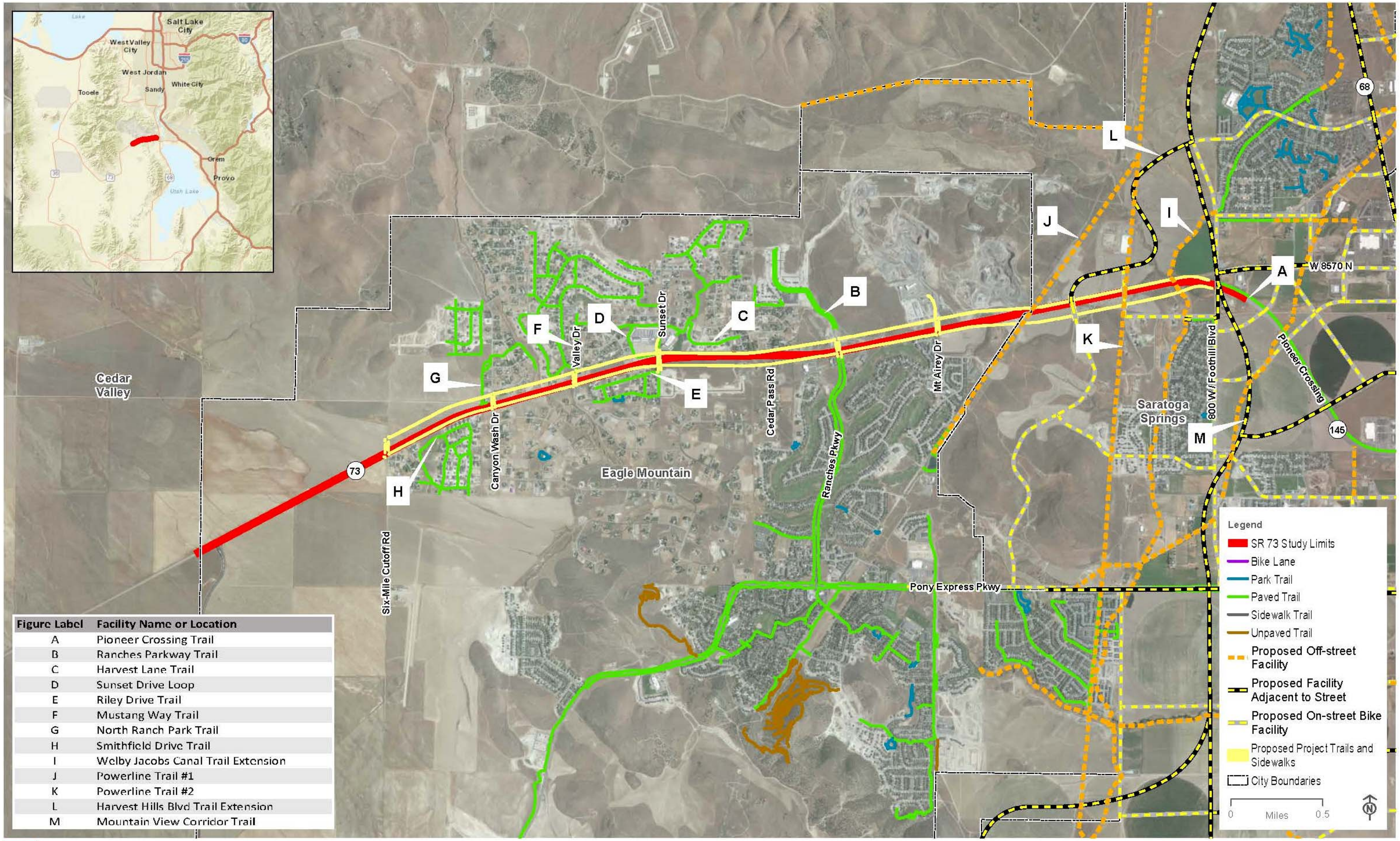


**Figure 3-4. Existing and Proposed Pedestrian and Bicyclist Facilities**



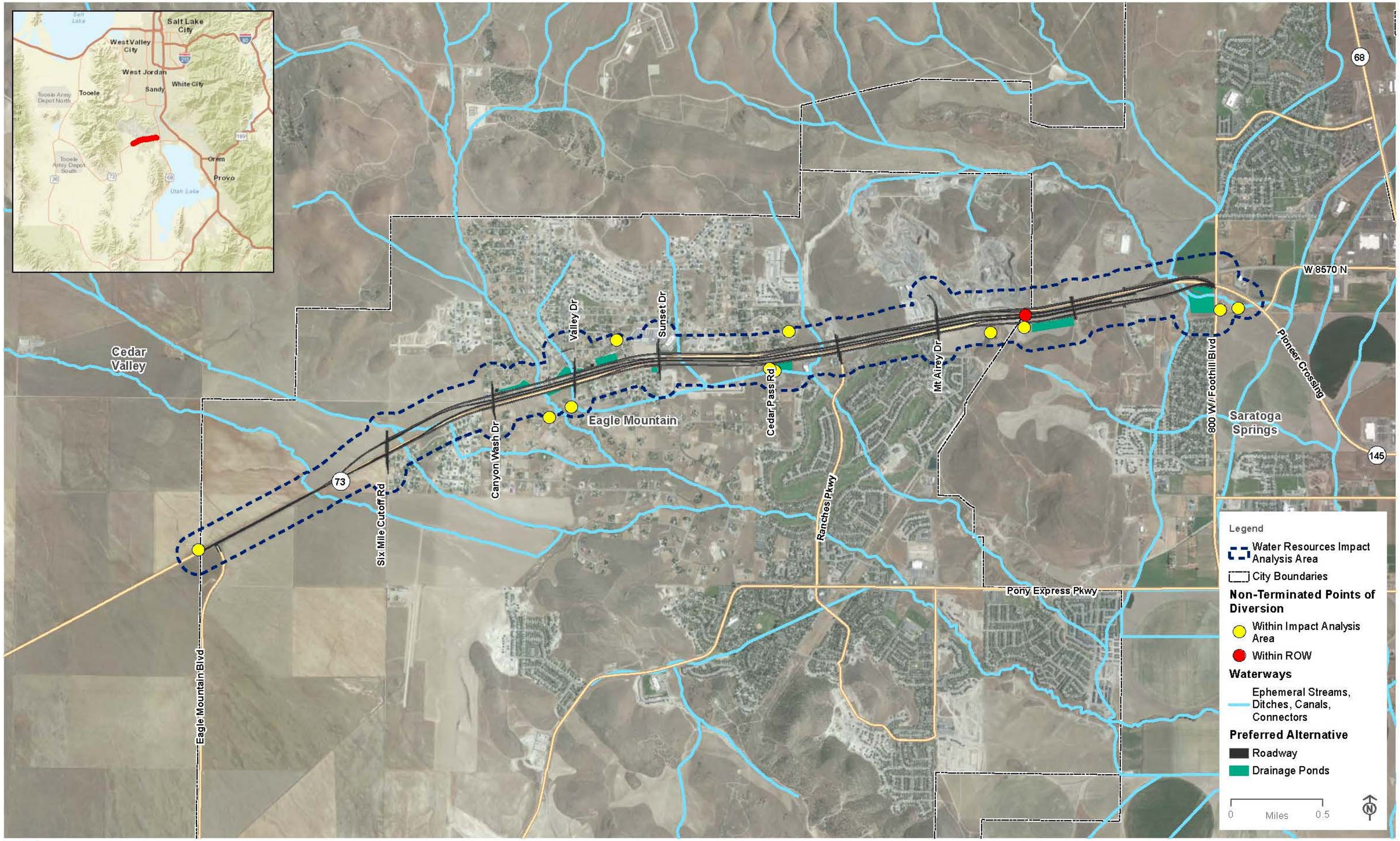

| Figure Label | Facility Name or Location |
|---|---|
| A | Pioneer Crossing Trail |
| B | Ranches Parkway Trail |
| C | Harvest Lane Trail |
| D | Sunset Drive Loop |
| E | Riley Drive Trail |
| F | Mustang Way Trail |
| G | North Ranch Park Trail |
| H | Smithfield Drive Trail |
| I | Welby Jacobs Canal Trail Extension |
| J | Powerline Trail #1 |
| K | Powerline Trail #2 |
| L | Harvest Hills Blvd Trail Extension |
| M | Mountain View Corridor Trail |

State Route 73
ENVIRONMENTAL STUDY
Eagle Mountain to Saratoga Springs

EXISTING AND PROPOSED BICYCLE AND PEDESTRIAN FACILITIES

FIGURE 1 OF 1

**Figure 3-5. Points of Diversion and Ephemeral Streams in the Water Resources Impact Analysis Area**




State Route 73
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Eagle Mountain to Saratoga Springs

POINTS OF DIVERSION AND EPHEMERAL STREAMS

FIGURE 1 OF 1

**Figure 3-6. Aquatic Resource Locations in the Biological Resources Impact Analysis Area**

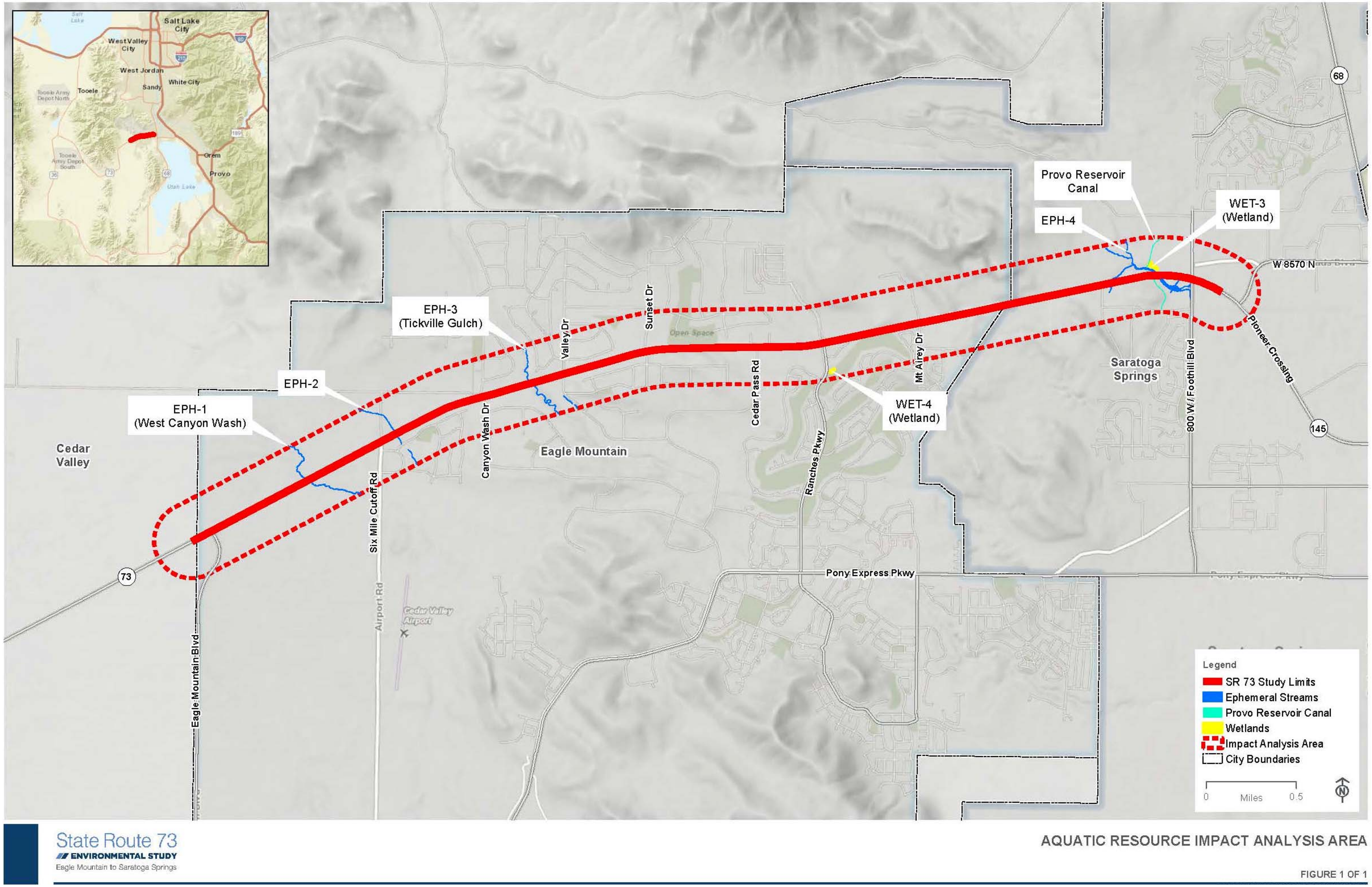
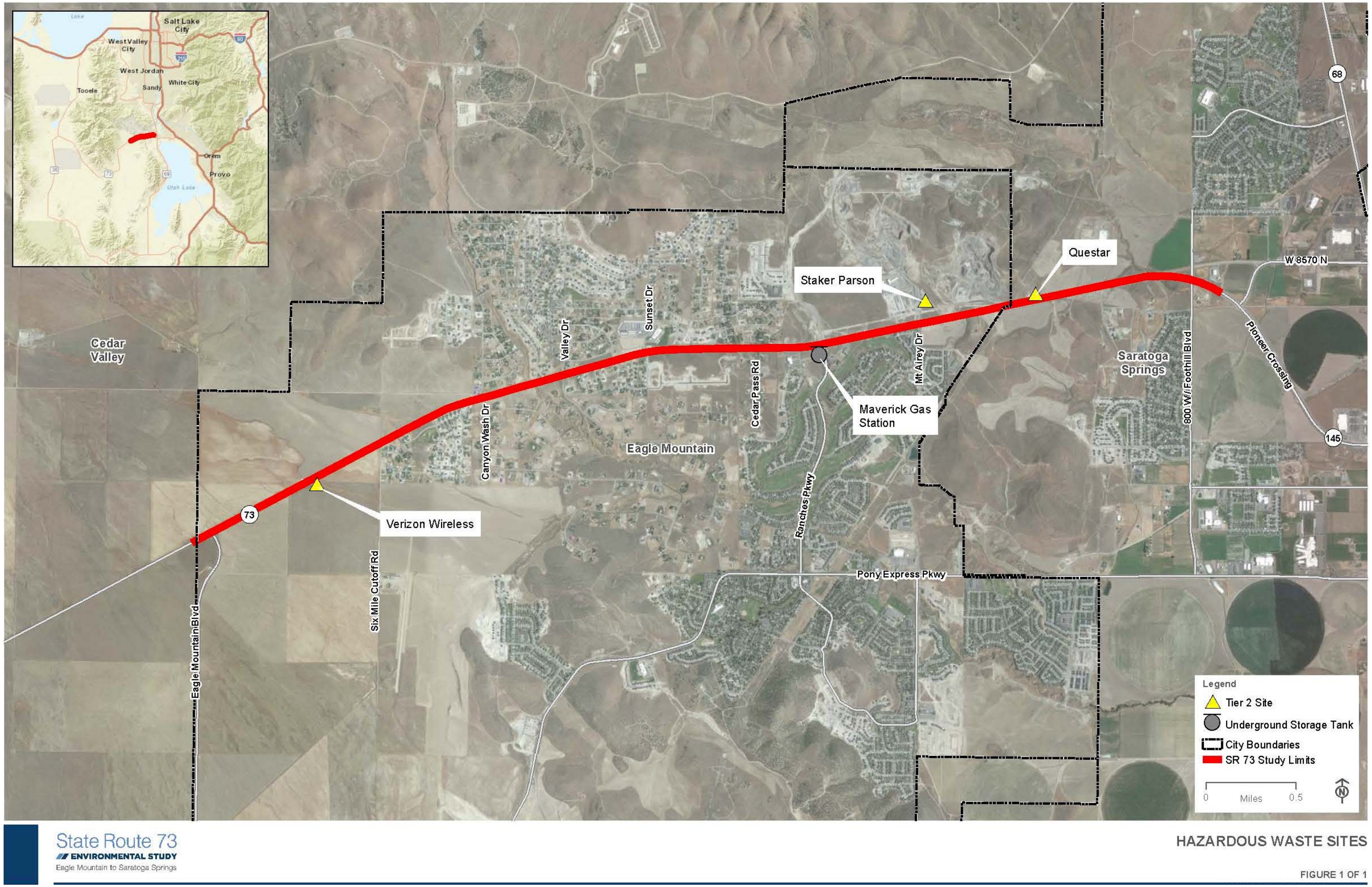


**Figure 3-7. Hazardous Material Sites**



# APPENDIX A

## S.R. 73 Environmental Study Traffic Memo

# MEMORANDUM

**To:** UDOT Region Three & UDOT Environmental

**From:** Avenue Consultants

**Date:** July 3, 2018

**Subject:** SR-73 State Environmental Study Traffic Memo

## 1 INTRODUCTION

Utah State Route 73 (SR-73) serves as the primary roadway arterial connecting the Cedar Valley (located in Utah County west of Utah Lake) with the rest of the Wasatch Front. Cedar Valley contains the municipalities of Eagle Mountain, Cedar Fort, and Fairfield. Eagle Mountain is by far the largest in population and primarily serves as a bedroom community with residents commuting to employment centers in the Salt Lake and Utah valleys. Due to topographical constraints, roadway connectivity between Cedar Valley and Utah Valley is limited. Pony Express Parkway is the only other roadway accessing northern Cedar Valley and is classified as a minor arterial.

The Cedar Valley population is expected to increase to approximately 130,000 residents by 2040 compared to the approximately 28,000 residents in 2015. With this amount of growth, SR-73 as it currently exists through Eagle Mountain will be unable to serve the resulting heavy growth in traffic demand. This report describes the traffic analysis portion of the SR-73 State Environmental Study, includes the analysis of various alternatives under future traffic conditions, and is an update to analyses previously performed for the SR-73 Corridor Study[1] that was a precursor to the environmental study.

## 2 ANALYSIS METHODOLOGY

The Mountainland Association of Governments (MAG) travel demand model (TDM) is the key tool used in analyzing SR-73. The TDM estimates future travel patterns and traffic volumes for the Wasatch Front area. The travel model predicts how many person trips will be generated in the region, where those trips will be going, the mode by which they will be made, and the transportation facilities that will be used to get there. It is jointly owned and maintained by the Wasatch Front Regional Council (WFRC) and MAG, which are the Metropolitan Planning Organizations for the Wasatch Front. MAG is responsible for Utah County and WFRC covers Weber, Davis, and Salt Lake Counties. Version 8.3 beta of the travel model was used for this study.

The travel model has two primary inputs: land use data and transportation system data. The land use data consists of residential and employment data for the entire region. This data is prepared in geographic blocks called Traffic Analysis Zones (TAZs). There are over 1,100 TAZs in Utah County and over 80 zones in the northern Eagle Mountain area. The transportation system data consists of roadway and transit networks. The travel model inputs are prepared for a base year and a horizon year, which in this case are 2015 and 2040, respectively. In consultation with the cities, MAG prepares future land use projections for each year. These projections are used by MAG to develop the Regional Transportation Plan (RTP), which is the plan for the development of the future transportation system and includes a list of projects that will be built by each of the future horizon years.

[1] SR-73 Corridor Planning Study Final Report, UDOT, February 2016.

To improve the model's accuracy in the study area modifications were made to the area's TAZs. As a high growth area, there are new roadways planned by Saratoga Springs and Eagle Mountain that don't match up well with the existing TAZ structure. TAZs were split along these new and planned roadways throughout northern Eagle Mountain and western Saratoga Springs to allow for better refinement of travel patterns. A total of seven TAZs were modified resulting in sixteen TAZs.

Land use data in the model consists primarily of household and employment total spread out among the region's various TAZs. The basis of land use projections for this study was taken from the WFRC/MAG Real Estate Market Model (REMM). The population and employment numbers from REMM were adjusted through consultation with Eagle Mountain City and MAG to obtain an appropriate data set for this study. More detail about this process can be found in the SR-73 State Environmental Study Land Use Memo, dated July 3, 2018

To better illustrate land use growth in the study area, TAZs for the Eagle Mountain area were aggregated into six districts, as shown in **Figure 1**, which illustrates projected population changes between 2015 and 2040. Population growth per district is represented by the intensity of the blue colors, i.e. a darker blue represents more population growth for that district. As to be expected due to topography, most of the population growth occurs south of SR-73 in districts 3 through 6.

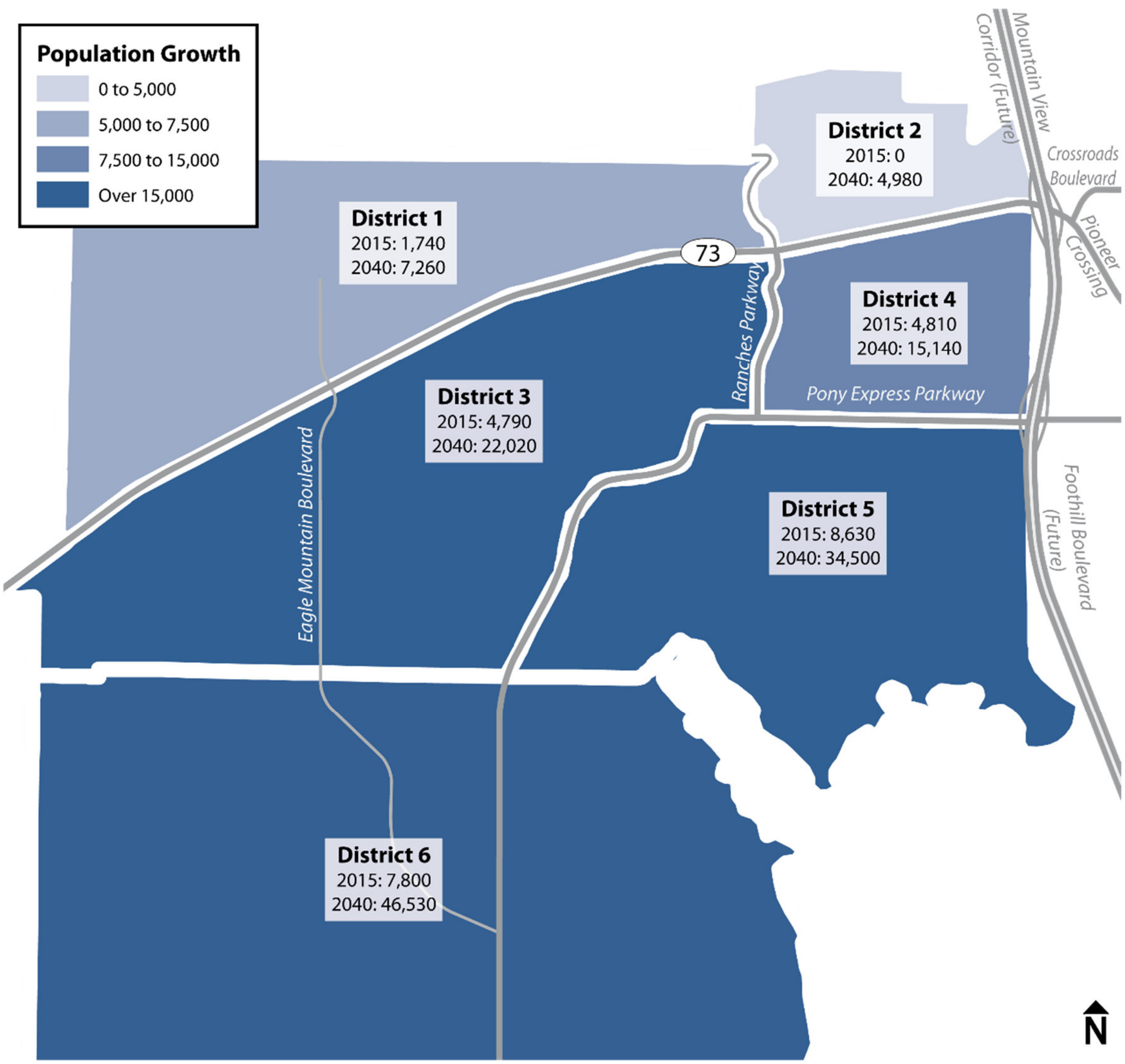



**Figure 1.** Population Growth by District

Estimated population and employment numbers for each district for 2015 and 2040 are shown in Table 1. The Eagle Mountain area population is expected to more than quadruple by 2040, increasing from about 28,000 in 2015 to 130,000 in 2040. Area employment is expected to increase from about 3,000 jobs in 2015 to approximately 23,000 jobs in 2040. Significant population and employment growth can be found in all districts.

**Table 1.** Population and Employment Growth by District

| District | Population | | | | Employment | | | |
|---|---|---|---|---|---|---|---|---|
| | 2015 | 2040 | Growth | % Growth | 2015 | 2040 | Growth | % Growth |
| 1 | 1,770 | 7,260 | 5,490 | 310% | 280 | 3,060 | 2,780 | 990% |
| 2 | 0 | 4,980 | 4,980 | n/a | 10 | 4,780 | 4,770 | >1,000% |
| 3 | 4,790 | 22,020 | 17,230 | 360% | 800 | 6,880 | 6,080 | 760% |
| 4 | 4,810 | 15,140 | 10,330 | 210% | 800 | 3,040 | 2,240 | 280% |
| 5 | 8,630 | 34,500 | 25,870 | 300% | 1,250 | 4,840 | 3,590 | 290% |
| 6 | 7,800 | 46,530 | 38,730 | 500% | 1,120 | 8,530 | 7,410 | 660% |
| **Total** | **27,800** | **130,430** | **102,630** | **370%** | **4,260** | **31,130** | **26,870** | **630%** |

## 3 MEASURES OF EFFECTIVENESS

The primary measure of effectiveness used for this study is the volume-to-capacity (v/c) ratio. To calculate v/c ratios both traffic volumes and roadway capacities are needed. The travel demand model estimates the demand volume for each link in the model network by travel direction for both the AM and PM peak periods, as well as off-peak periods. These volumes are then adjusted based on actual average daily volumes for roadways as reported by UDOT. This adjustment corrects discrepancies between actual and modeled volumes and are applied to all future year analyses. Traffic volumes, as Average Daily Traffic (ADT), are summarized on the segment level for the entire highway network.

By dividing the adjusted demand volume by the associated roadway capacity, the travel demand model outputs a v/c ratio for each modeled roadway link. The roadway capacity is based several factors, including number of lanes, facility type (e.g. arterial, expressway, freeway), and density of surrounding development.

The individual roadway links were aggregated to create three segments: Eagle Mountain Boulevard to Six Mile Cutoff Road, Six Mile Cutoff Road to Ranches Parkway, and Ranches Parkway to the Mountain View Corridor / Foothill Boulevard. For the purposes of this study, congestion levels as defined by volume-to-capacity ratios are shown in Table 2. When reporting v/c ratios in this study, the maximum v/c ratio between the AM and PM peak periods is used.

**Table 2.** Congestion Levels by Volume-to-Capacity Ratio

| Congestion Level | v/c Ratio Range |
|---|---|
| Minimal Delay | 0 to 0.7 |
| Approaching Congested | 0.7 to 0.9 |
| Congested | 0.9 to 1.0 |
| Heavily Congested | 1.0 and greater |

# 4 EXISTING AND FUTURE NO BUILD CONDITIONS

This section describes existing traffic operations along the SR-73 corridor and the anticipated future traffic operations if no changes are made to the road. For these conditions, SR-73 was analyzed as a five-lane corridor with two lanes per travel direction and center two-way-left-turn-lane on the eastern section of the roadway between Cedar Pass Road and Pioneer Crossing. On the western section of the roadway between Eagle Mountain Boulevard and Cedar Pass Road, SR-73 was analyzed as a two-lane corridor with one travel lane per direction and turn lanes at cross streets. Results of the analysis are reported in terms of v/c ratios and congestion levels for the roadway segments.

## 4.1 Existing Conditions

The existing conditions (2015) analysis shows that the corridor is currently performing with minimal delay (v/c ratio < 0.7) along the length of SR-73 during both the AM and PM peak periods. Table 3 lists the ADT, the highest v/c ratio (between AM and PM), and the associated congestion level for each of the three SR-73 segments. The segment between Ranches Parkway and Foothill Boulevard has the highest v/c ratio along SR-73 with a value of 0.65.

**Table 3.** Existing (2015) ADT Volumes and Congestion Levels

| Year | Measure | SR-73 Segment | | |
|---|---|---|---|---|
| | | Western Section | | Eastern Section |
| | | Eagle Mtn Blvd to Six Mile Cutoff Rd | Six Mile Cutoff Rd to Ranches Pkwy | Ranches Pkwy to Foothill Blvd |
| 2015 (Existing) | ADT | 7,800 | 10,900 | 24,000 |
| | Max V/C | 0.35 | 0.49 | 0.65 |
| | Congestion Level | Minimal Delay | Minimal Delay | Minimal Delay |

## 4.2 Future No Build Conditions

Future no build conditions show how the corridor is expected to operate in the future if no substantial changes are made to the current facility. The no build analysis provides a benchmark for measuring the benefit of potential improvement scenarios. Thus, baseline traffic operations for SR-73 can be established and all other improvement scenarios can be compared to this condition. The No Build Alternative includes all the projects in the MAG RTP except for SR-73. Most relevant to this study is the planned widening of Pony Express Parkway from two to four lanes and its eastward extension to the Vineyard Connector near I-15.

Table 4 summarizes the ADT and associated congestion levels by segment for future conditions. By 2040, all the SR-73 segments are expected to be heavily congested with volumes ranging from 32,000 vehicles per day on the west to 59,000 vehicles per day on the east. The attached figures show the estimated study area 2040 number of lanes, daily traffic volumes, and peak hour congestion levels for the No Build Alternative.

**Table 4.** Future (2040) No Build ADT Volumes and Congestion Levels

| Year | Measure | SR-73 Segment | | |
|---|---|---|---|---|
| | | Western Section | | Eastern Section |
| | | Eagle Mtn Blvd to Six Mile Cutoff Rd | Six Mile Cutoff Rd to Ranches Pkwy | Ranches Pkwy to Mountain View Corridor |
| 2040 (No Build) | ADT | 32,000 | 40,000 | 59,000 |
| | Max V/C | 1.39 | 1.79 | 1.49 |
| | Congestion Level | Heavily Congested | Heavily Congested | Heavily Congested |

# 5 BUILD ALTERNATIVES

Several build alternatives were considered for the SR-73 corridor to see how they would meet the anticipated 2040 travel demand. The four alternatives analyzed under 2040 conditions were: reversible lanes, widened and new arterials, a freeway without frontage roads, and a freeway with frontage roads. These alternatives were analyzed in the corridor study where the Freeway with Frontage Roads alternative was the recommended alternative. This new analysis was done to verify the results from the previous analysis using updated models, assumptions, and land use projections. Specific assumptions for each alternative are described in this section. All roadway configurations in the study area not specifically defined for a given alternative were analyzed per the number of lanes and functional class as found in the 2040 RTP. The attached figures show the assumed number of lanes, estimated 2040 daily traffic volumes and peak hour congestion levels for the study area for each alternative.

## 5.1 Reversible Lanes

The Reversible Lanes Alternative includes a seven-lane cross-section on SR-73 from Eagle Mountain Boulevard to the planned Mountain View Corridor / Foothill Boulevard with three travel lanes per direction in off-peak periods. During peak periods, one lane per direction is reversed to match the peak flow of traffic resulting in four lanes in the peak direction and two lanes in the off-peak direction. Therefore, during the AM period, there are four lanes for eastbound traffic and two lanes for westbound traffic and in the PM period four lanes in the westbound direction and two lanes in the eastbound direction.

## 5.2 Widened and New Arterials

The Widened and New Arterials Alternative includes widening SR-73 and Pony Express Parkway to six-lanes (three travel lanes per direction) from Eagle Mountain Boulevard to Mountain View Corridor / Foothill Boulevard, as well as new four-lane arterial (two travel lanes per direction) known as the Lake Mountain Highway. The new road would be north of SR-73 and run along the base of the mountains connecting on the east to the Mountain View Corridor and Harvest Hills Boulevard in Saratoga Springs and to Six Mile Cutoff Road on the west.

## 5.3 Freeway without Frontage Roads

The Freeway without Frontage Roads Alternative converts SR-73 to a freeway facility between Six Mile Cutoff Road on the west and the Mountain View Corridor / Foothill Boulevard on the east. This differs from what was assumed in the corridor study when the freeway was assumed to continue just west of Eagle Mountain Boulevard. The new assumption is that a future phase of the freeway would curve the alignment to the south between Eagle Mountain Boulevard and Six Mile Cutoff Road, which alignment is planned to be included in the 2019 RTP. For this reason, the freeway component of this alternative ends east of Six Mile Cutoff Road and a six-lane arterial between Eagle Mountain Boulevard and Six Mile Cutoff Road is assumed. The freeway section includes two lanes per travel direction west of Ranches Parkway and three lanes per direction east of Ranches Parkway. The eastern terminus of the freeway assumes system-to-system flyover ramps to/from the Mountain View Corridor and slip ramps to/from Pioneer Crossing. Three interchanges are located along SR-73:

- Valley Drive (half interchange with ramps to/from the east only)
- Ranches Parkway
- Mt Airey Road (half interchange with ramps to/from the east only)

All other cross streets along SR-73 are grade separated with no direct access to the SR-73 freeway, but instead must use the surrounding roadway network to reach one of the interchange locations.

## 5.4 Freeway with Frontage Roads

The Freeway with Frontage Roads Alternative converts SR-73 to a freeway facility between Six Mile Cutoff Road on the west and Mountain View Corridor on the east. This alternative assumes that one-way frontage roads run the entire length of the freeway with two lanes per direction east of Ranches Parkway and one lane per direction west of Ranches Parkway. As with the previous alternative, this alternative also assumes that a future extension of the freeway would curve to the south; therefore, this alternative also assumes a six-lane arterial between Eagle Mountain Boulevard and Six Mile Cutoff Road.

The freeway includes two lanes per direction west of Ranches Parkway and three lanes per direction east of Ranches Parkway. All cross streets along SR-73 are accessible from the frontage roads in that all the cross streets intersect the frontage roads at which point vehicles can travel along the frontage road until they reach one of the access locations. The eastern terminus of the freeway assumes system-to-system flyover ramps to/from the Mountain View Corridor and slip ramps to/from the frontage roads, which then become Pioneer Crossing. The analysis assumed the following locations for slip on- and off-ramps between the frontage roads and the freeway:

- Valley Drive (access to and from the east only)
- Ranches Parkway (full access)
- Mt Airey Road (access to and from the east only)

These assumptions were made for the purposes of this analysis. Ultimately, the geometric design and topographical constraints will determine ramp locations and levels of cross-street access (i.e. full access vs. right-in / right-out only).

# 6 ANALYSIS RESULTS

A travel demand analysis was performed for each of the four build alternatives for the 2040 horizon year. Segment level volumes and v/c ratios were extracted from the travel model and are shown in Table 5.

All alternatives are expected to have congested SR-73 segments in 2040. However, based on roadway v/c ratios and congestion levels, the best performing alternative is the Freeway with Frontage Roads, which is the only one with no heavily congested segments. The Reversible Lanes and Widened and New Arterials alternatives result in heavily congested levels for the segments between Six Mile Cutoff Road and Mountain View Corridor. The Freeway without Frontage Roads performs at heavily congested levels across the entire length of the corridor. The Freeway with Frontage Roads alternative is the only one that is not heavily congested between Six Mile Cutoff Road and Mountain View Corridor.

The Freeway with Frontage Roads alternative also moves a larger amount of traffic compared to the other alternatives. In the No Build Alternative only 59,000 vehicles per day are served on the eastern section. By building a freeway with frontage roads, approximately 60,000 additional vehicles can be served or more than double for a total of 120,000 vehicles per day on the eastern section. The Freeway without Frontage Roads alternative moves about 12% less at 106,000 vehicles per day on the eastern section.

In the Reversible Lanes and Widened and New Arterials alternatives, SR-73 handles 74,000 and 79,000 vehicles per day on the eastern section, respectively. Most of the excess demand is served by Pony Express Parkway with approximately 60,000 vehicles per day, which exceeds its capacity by 25% or more. The Lake Mountain Highway modeled for the Widened and New Arterials alternative does little to relieve traffic demand on SR-73 or Pony Express Parkway.

**Table 5.** 2040 ADT and Congestion for SR-73

| Alternative | Measure | SR-73 Segment | | |
|---|---|---|---|---|
| | | Western Section | | Eastern Section |
| | | Eagle Mtn Blvd to Six Mile Cutoff Rd | Six Mile Cutoff Rd to Ranches Pkwy | Ranches Pkwy to Mountain View Corridor |
| No Build | ADT | 32,000 | 40,000 | 59,000 |
| | Max V/C | 1.39 | 1.79 | 1.49 |
| | Congestion Level | Heavily Congested | Heavily Congested | Heavily Congested |
| Reversible Lanes | ADT | 42,000 | 60,000 | 74,000 |
| | Max V/C | 0.79 | 1.14 | 1.28 |
| | Congestion Level | Approaching Congested | Heavily Congested | Heavily Congested |
| Widened and New Arterials | ADT | 41,000 | 58,000 | 79,000 |
| | Max V/C | 0.92 | 1.05 | 1.19 |
| | Congestion Level | Congested | Heavily Congested | Heavily Congested |
| Freeway without Frontage Roads | ADT | 44,000 | 66,000 | 106,000 |
| | Max V/C | 1.00 | 1.11 | 1.01 |
| | Congestion Level | Heavily Congested | Heavily Congested | Heavily Congested |
| Freeway with Frontage Roads[1] | ADT | 47,000 | 80,000 | 120,000 |
| | Max V/C | 0.98 | 0.97 | 0.93 |
| | Congestion Level | Congested | Congested | Congested |

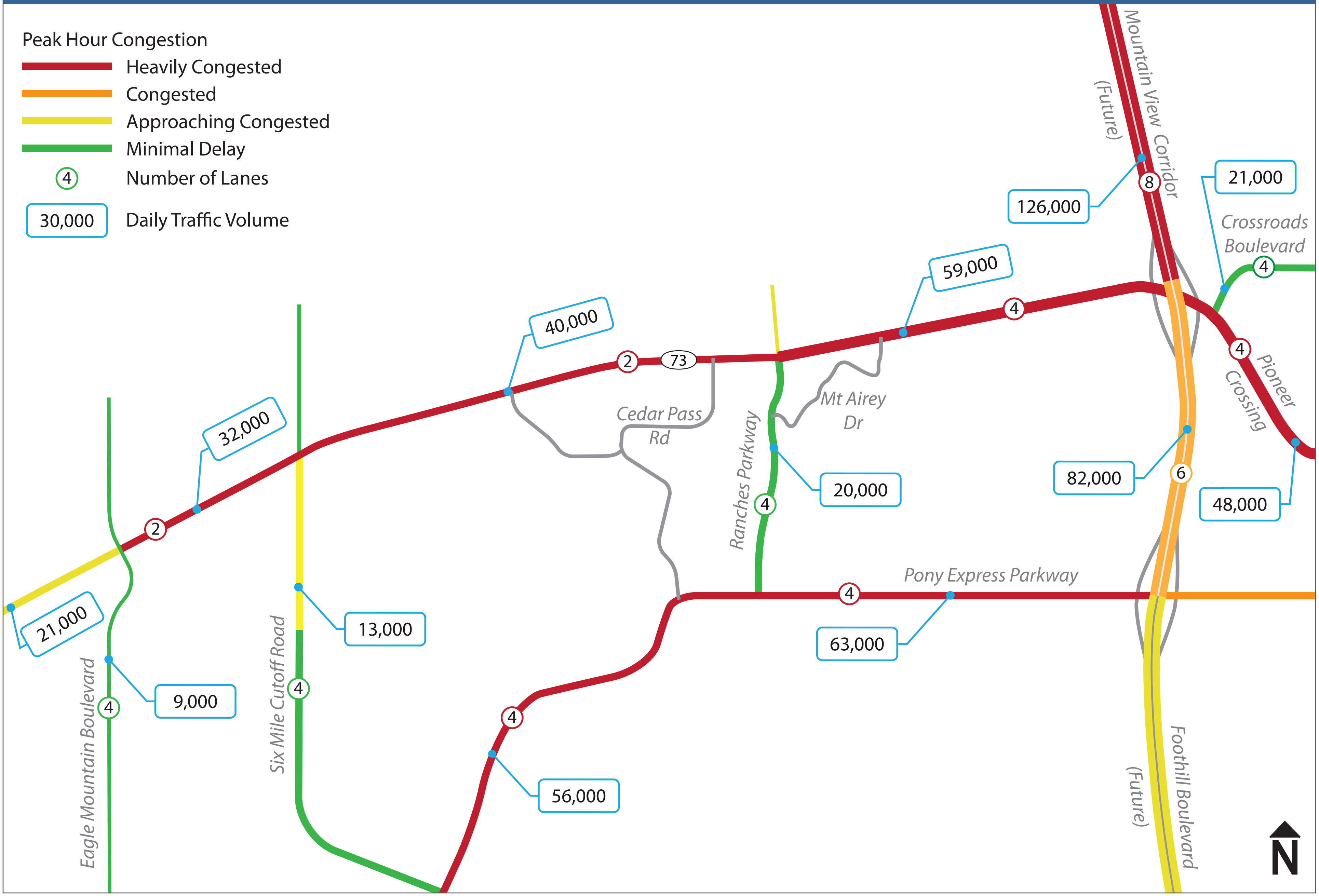
[1]*Volume is the total of both the freeway and the frontage roads, while v/c is for the freeway only*

# 7 CONCLUSION

Four build alternatives for SR-73 were analyzed under 2040 conditions: Reversible Lanes, Widened and New Arterials, Freeway without Frontage Roads, and Freeway with Frontage Roads. All alternatives have segments that are congested; however, the Freeway with Frontage Roads alternative is the only one that does not have any heavily congested segments. It is also the one that carries that most traffic with 120,000 vehicles per day on the eastern section compared to around 74,000 to 79,000 vehicles per day for the Reversible Lanes and Widened and New Arterials alternatives, respectively, and 106,000 for the Freeway without Frontage Roads alternative.

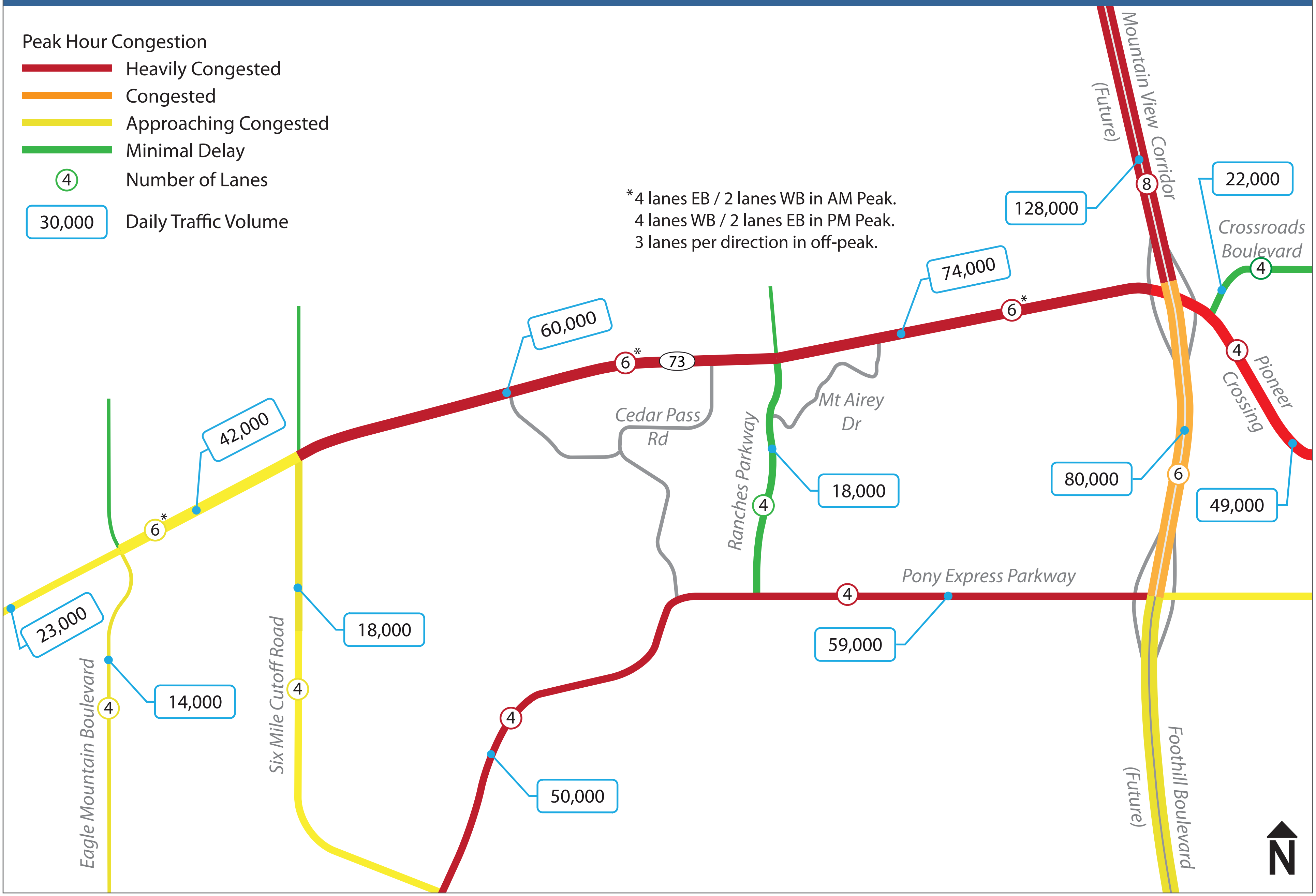
# No Build Alternative

2040 Average Daily Traffic Volumes and Congestion



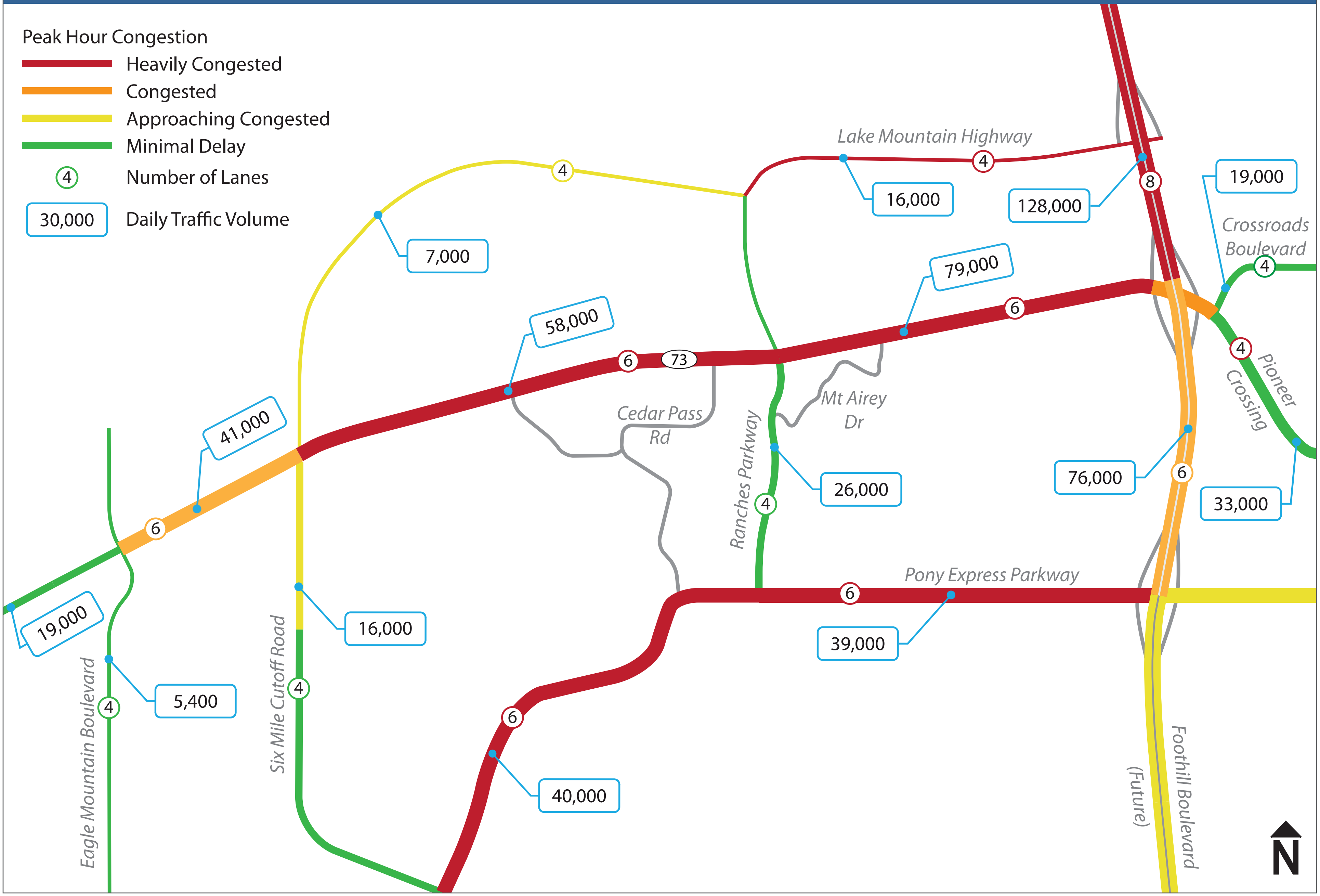
# Reversible Lanes Alternative

2040 Average Daily Traffic Volumes and Congestion



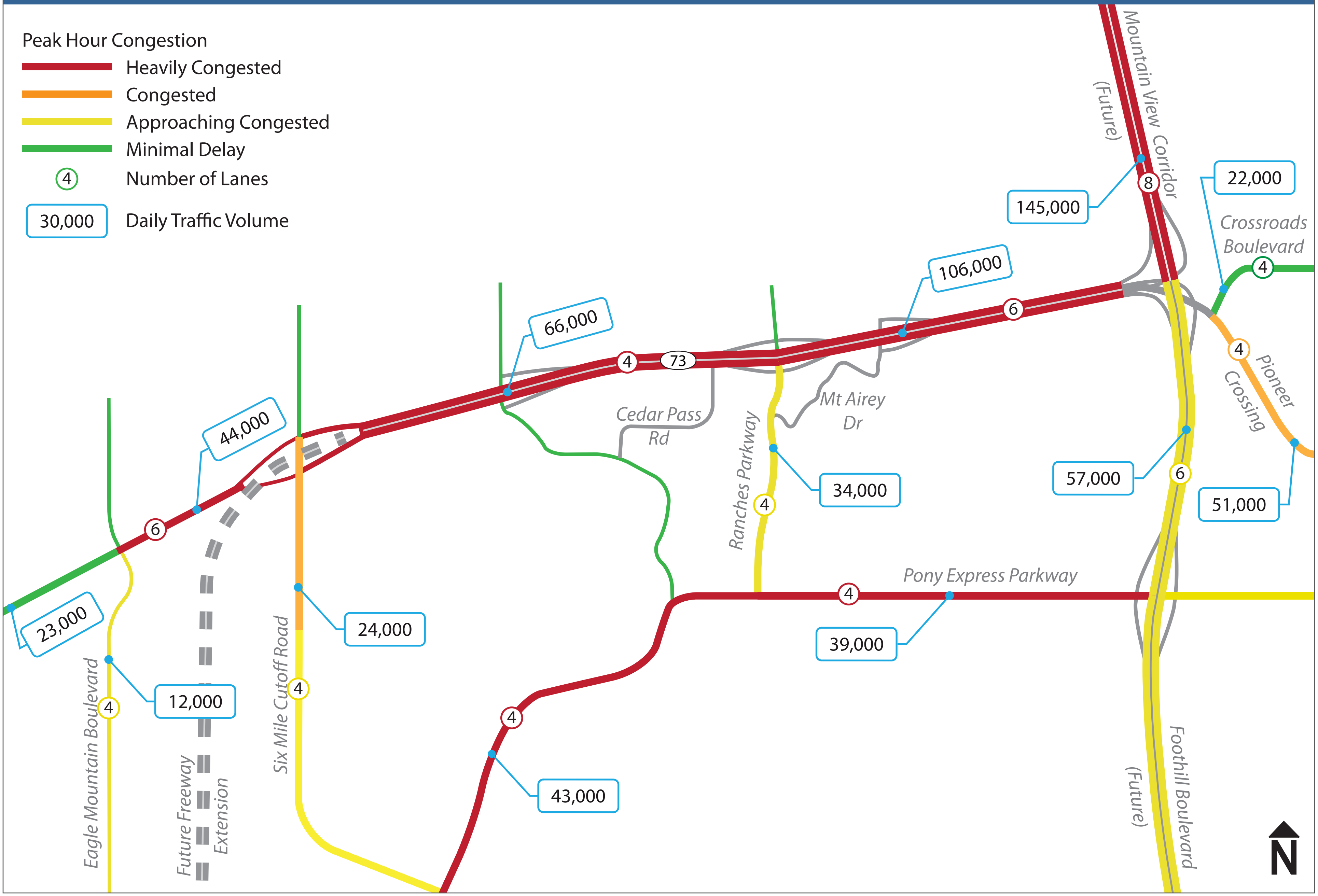
# Widened and New Arterials Alternative

2040 Average Daily Traffic Volumes and Congestion



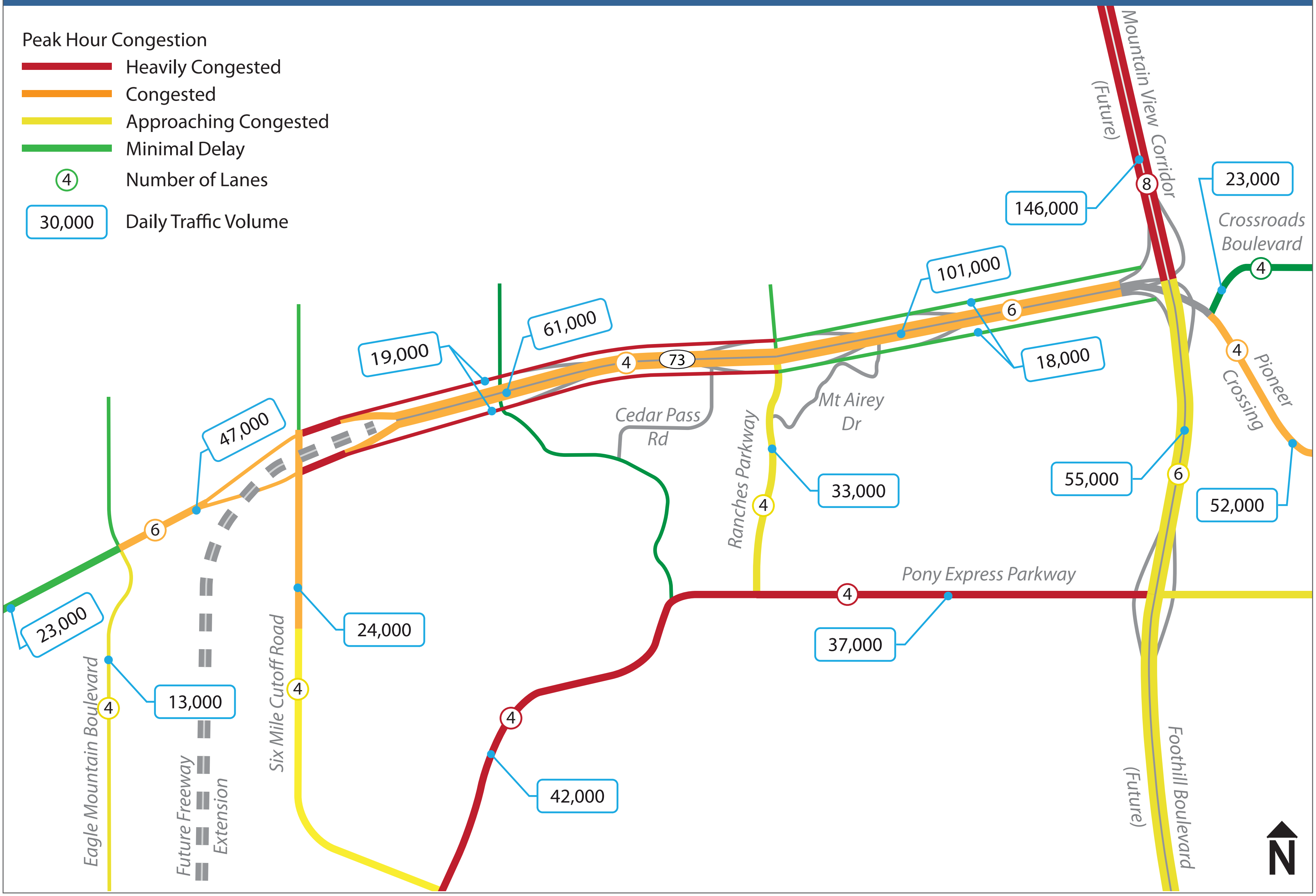
# Freeway without Frontage Roads Alternative

2040 Average Daily Traffic Volumes and Congestion



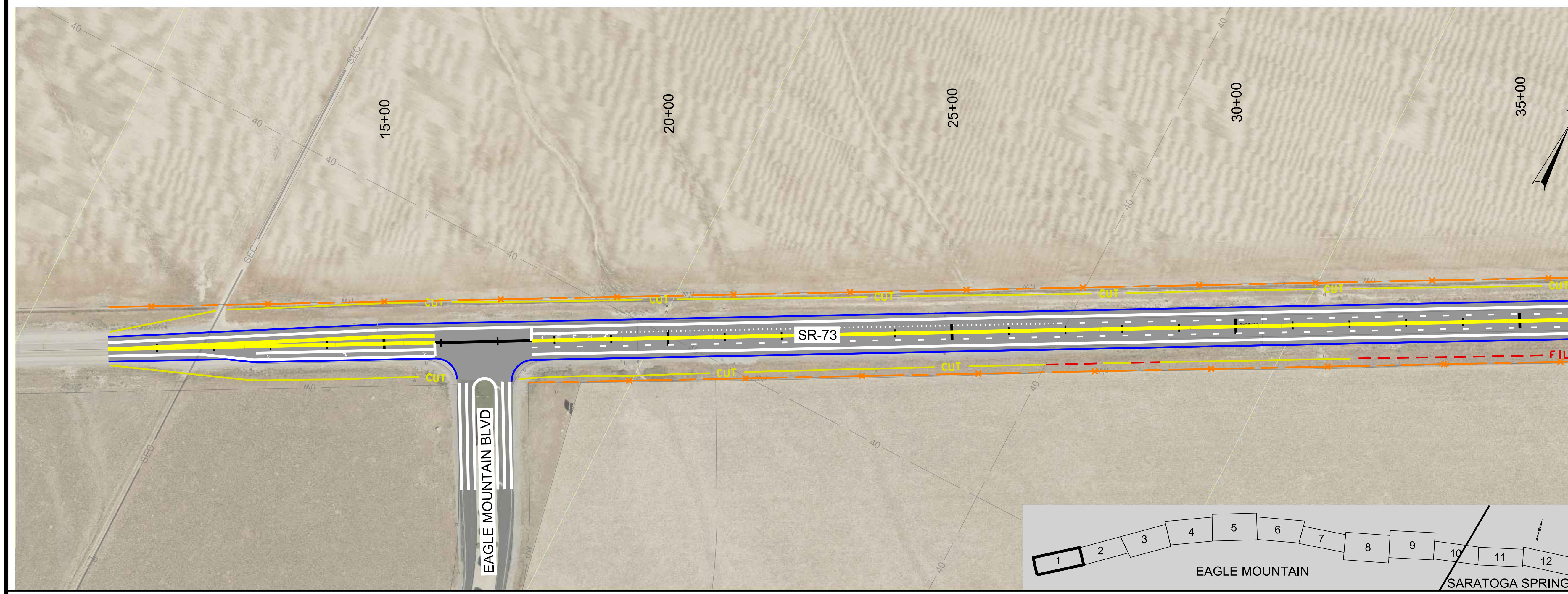
# Freeway with Frontage Roads Alternative

2040 Average Daily Traffic Volumes and Congestion



# APPENDIX B

## S.R. 73 Engineering Plan Sheets

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LEGEND:

- WETLAND
- UDOT-OWNED PROPERTY
- WILDLIFE FENCE
- RIGHT-OF -WAY FENCE
- POTENTIAL RETAINING WALL
- POTENTIAL NOISE WALL
- POTENTIAL RESIDENTIAL RELOCATION
- POTENTIAL DETENTION POND

State Route 73
ENVIRONMENTAL STUDY
Eagle Mountain to Saratoga Springs

PROJECT: SR-73; EAGLE MT. TO SARATOGA SPRINGS ENVIRONMENTAL

PROJECT NUMBER: S-0073(33)30

PIN: 13608

PLAN AND PROFILE

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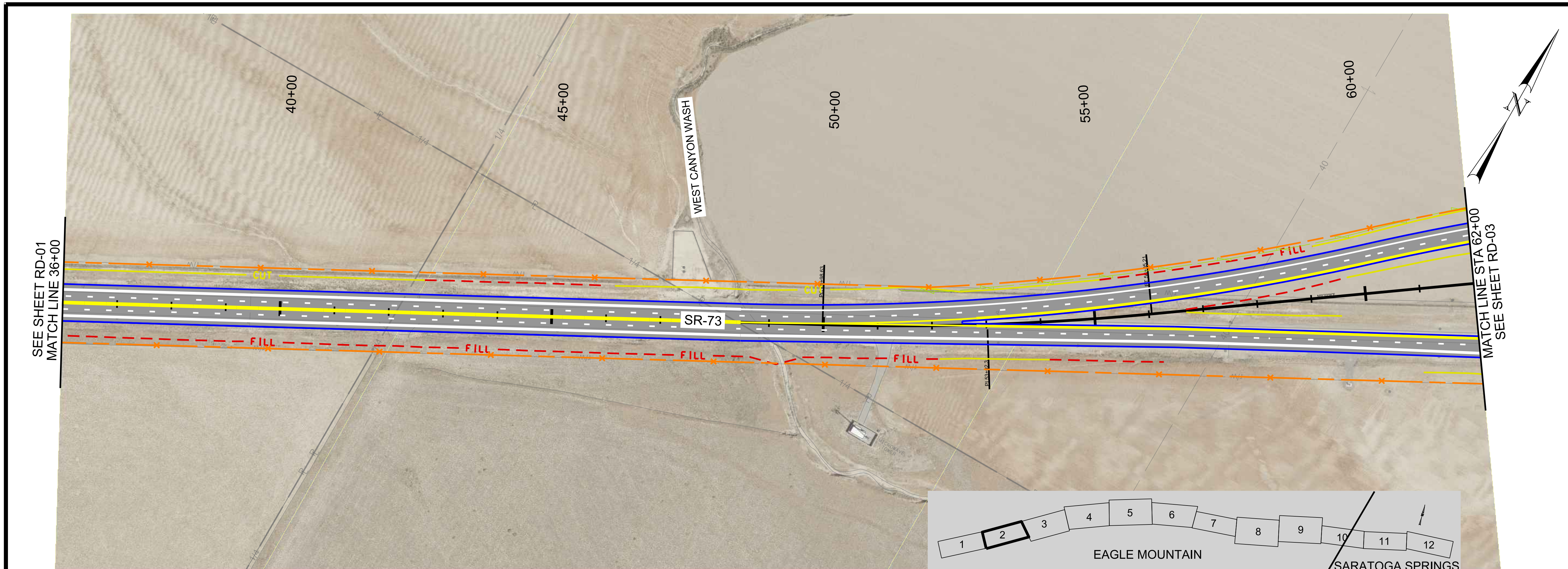


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- POTENTIAL NOISE WALL
- POTENTIAL RESIDENTIAL RELOCATION
- POTENTIAL DETENTION POND
- WETLAND
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State Route 73
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Eagle Mountain to Saratoga Springs

PROJECT: SR-73; EAGLE MT. TO SARATOGA SPRINGS ENVIRONMENTAL

PROJECT NUMBER: S-0073(33)30

PIN: 13608

PLAN AND PROFILE

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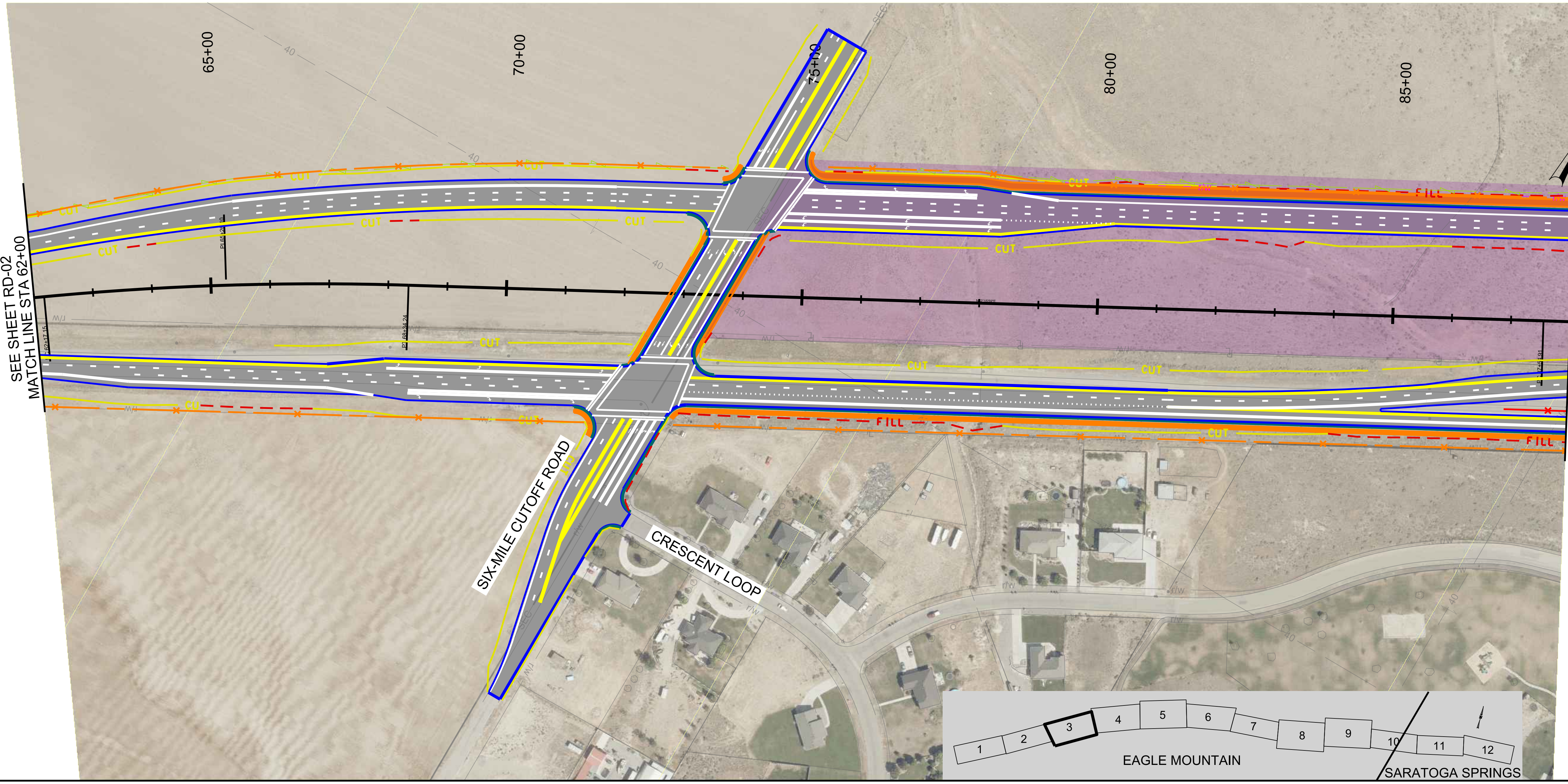


NO PROFILE THIS SHEET

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- WILDLIFE FENCE
- RIGHT-OF -WAY FENCE
- POTENTIAL RETAINING WALL
- POTENTIAL NOISE WALL
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- POTENTIAL DETENTION POND

State Route 73
ENVIRONMENTAL STUDY
Eagle Mountain to Saratoga Springs

| | |
|---|---|
| PROJECT | SR-73; EAGLE MT. TO SARATOGA SPRINGS ENVIRONMENTAL |
| PROJECT NUMBER | S-0073(33)30 |
| PIN | 13608 |
| | PLAN AND PROFILE |
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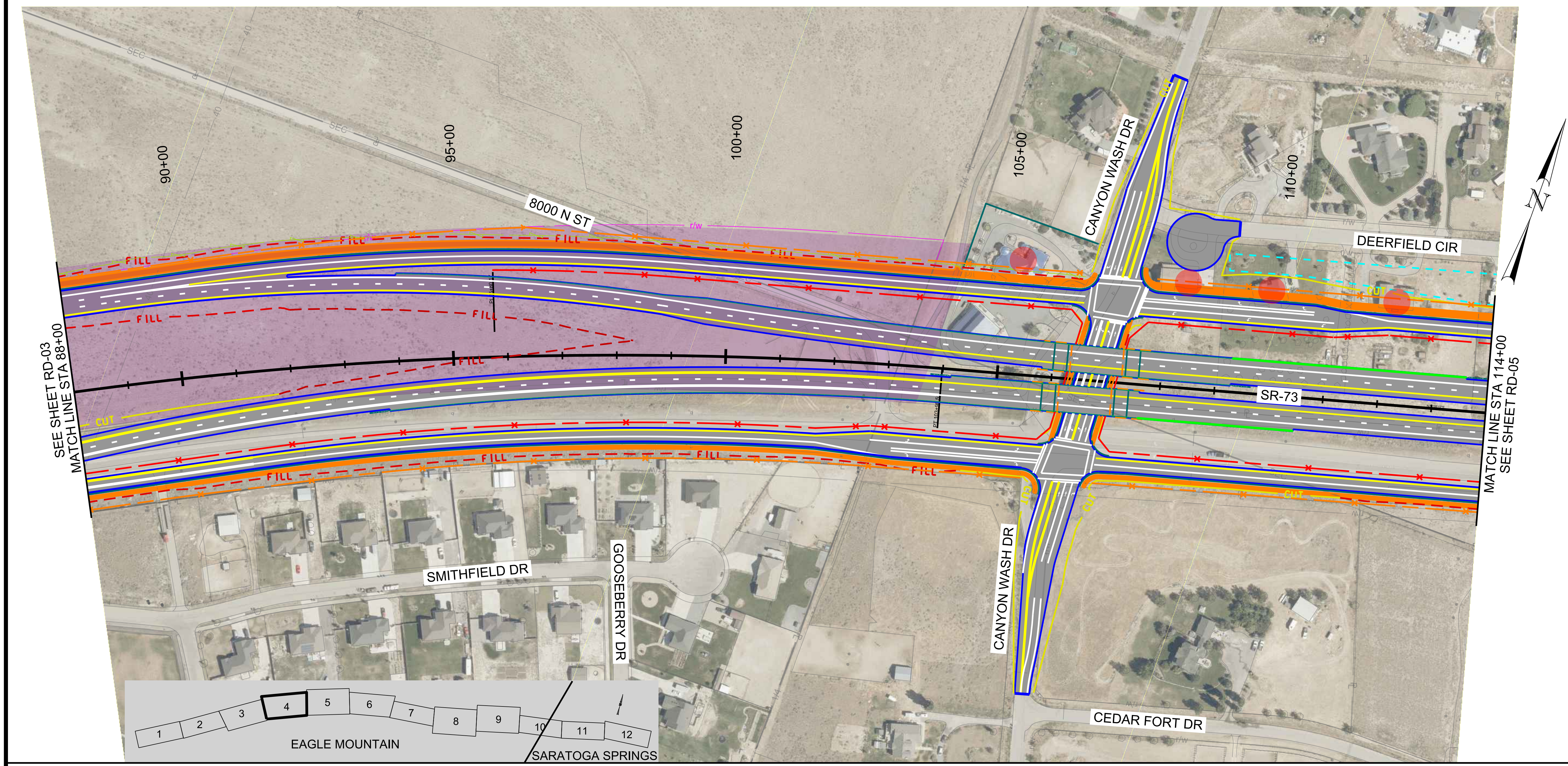


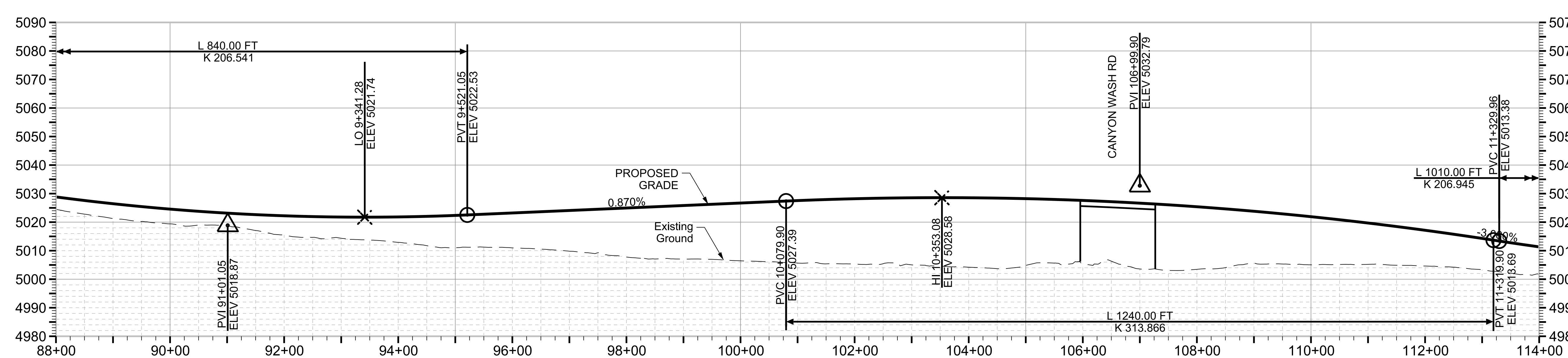


LEGEND:

- WETLAND
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State Route 73
ENVIRONMENTAL STUDY
Eagle Mountain to Saratoga Springs

PROJECT: SR-73; EAGLE MT. TO SARATOGA SPRINGS ENVIRONMENTAL

PIN: 13608

PROJECT NUMBER: S-0073(33)30

PLAN AND PROFILE

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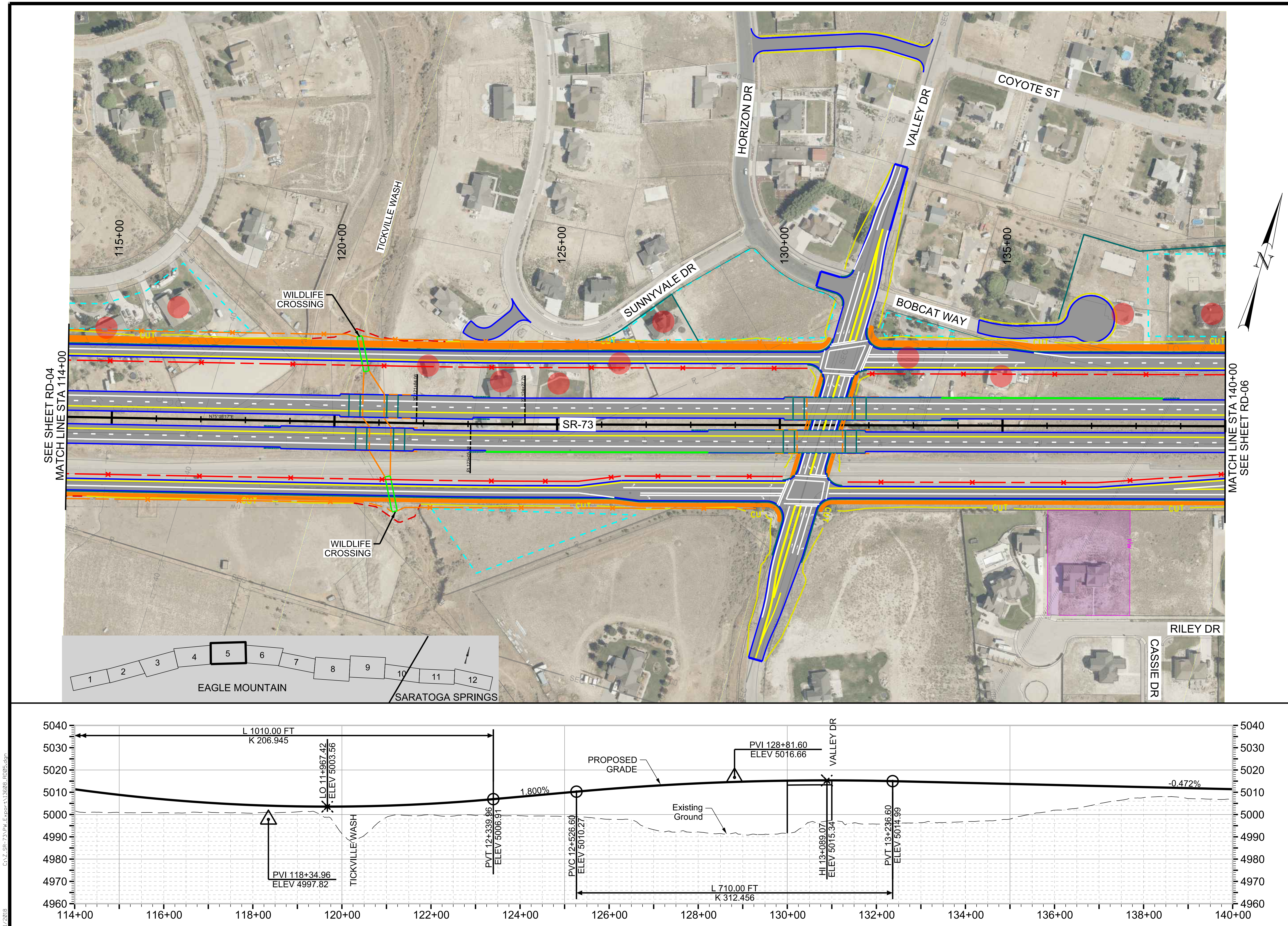


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State Route 73
ENVIRONMENTAL STUDY
Eagle Mountain to Saratoga Springs

PROJECT: SR-73; EAGLE MT. TO SARATOGA SPRINGS ENVIRONMENTAL

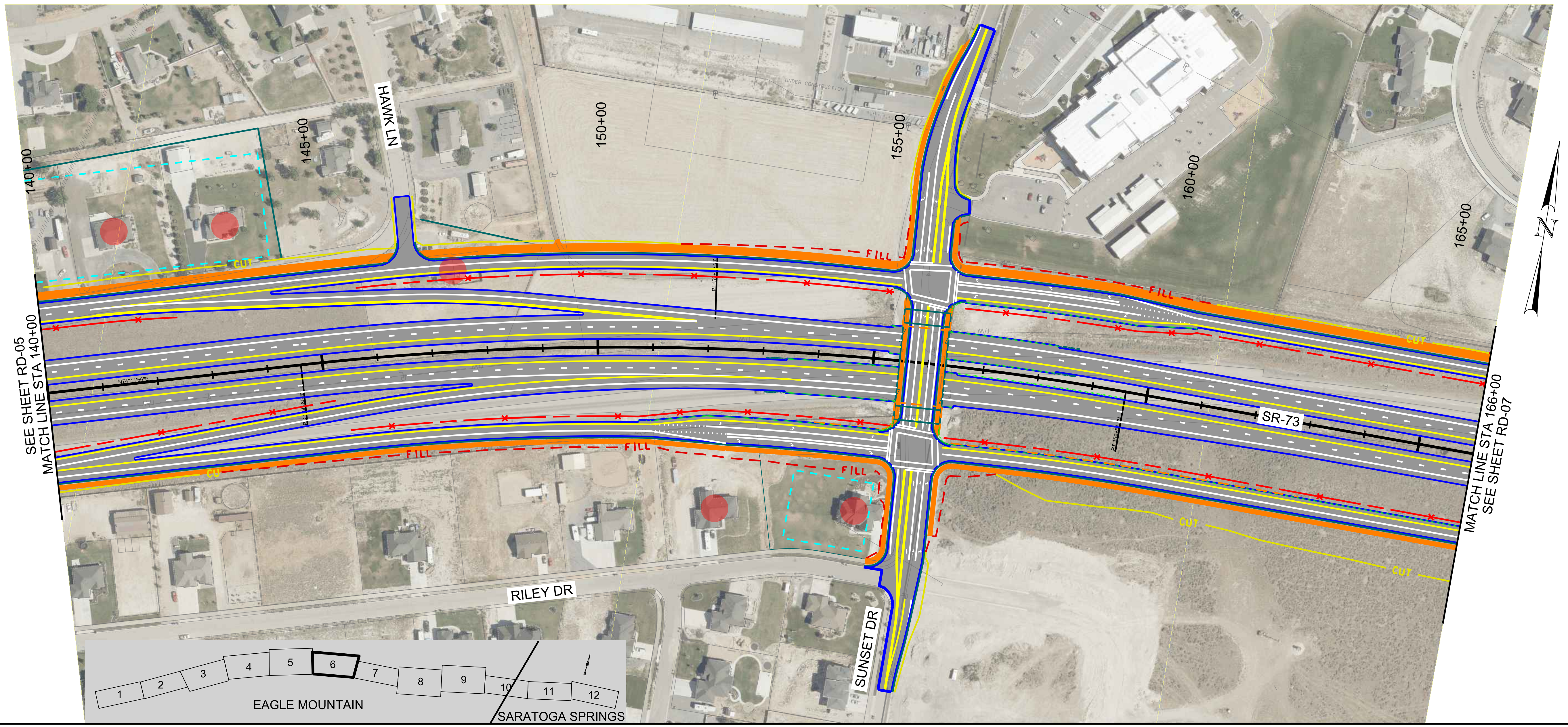
PIN: 13608

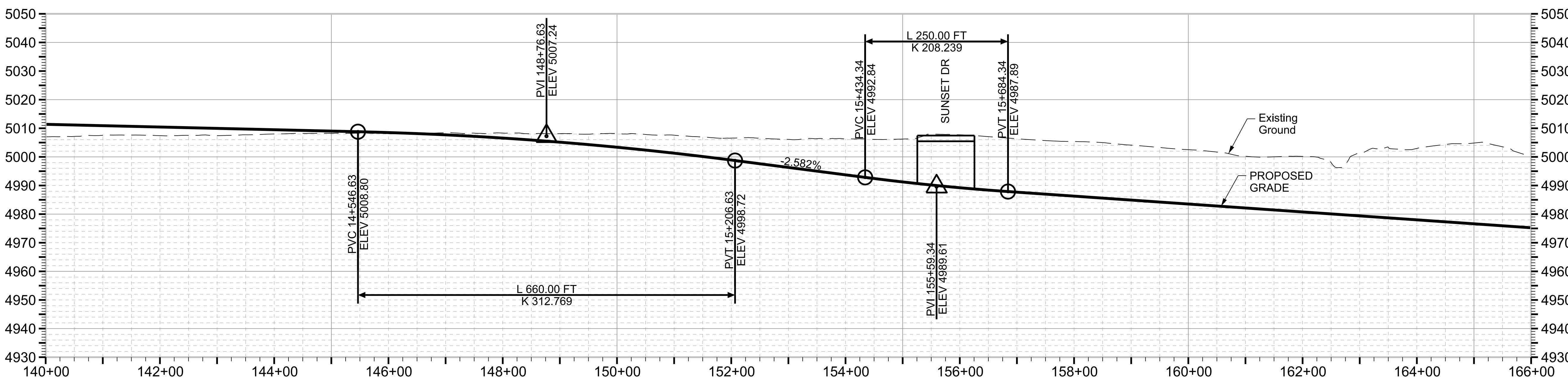
PROJECT NUMBER: S-0073(33)30

PLAN AND PROFILE

SHEET NO. RD-05

7/11/2018

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- POTENTIAL DETENTION POND

State Route 73

ENVIRONMENTAL STUDY

Eagle Mountain to Saratoga Springs

| | |
|---|---|
| PROJECT | SR-73; EAGLE MT. TO SARATOGA SPRINGS ENVIRONMENTAL |
| PIN | 13608 |
| PROJECT NUMBER | S-0073(33)30 |
| | PLAN AND PROFILE |
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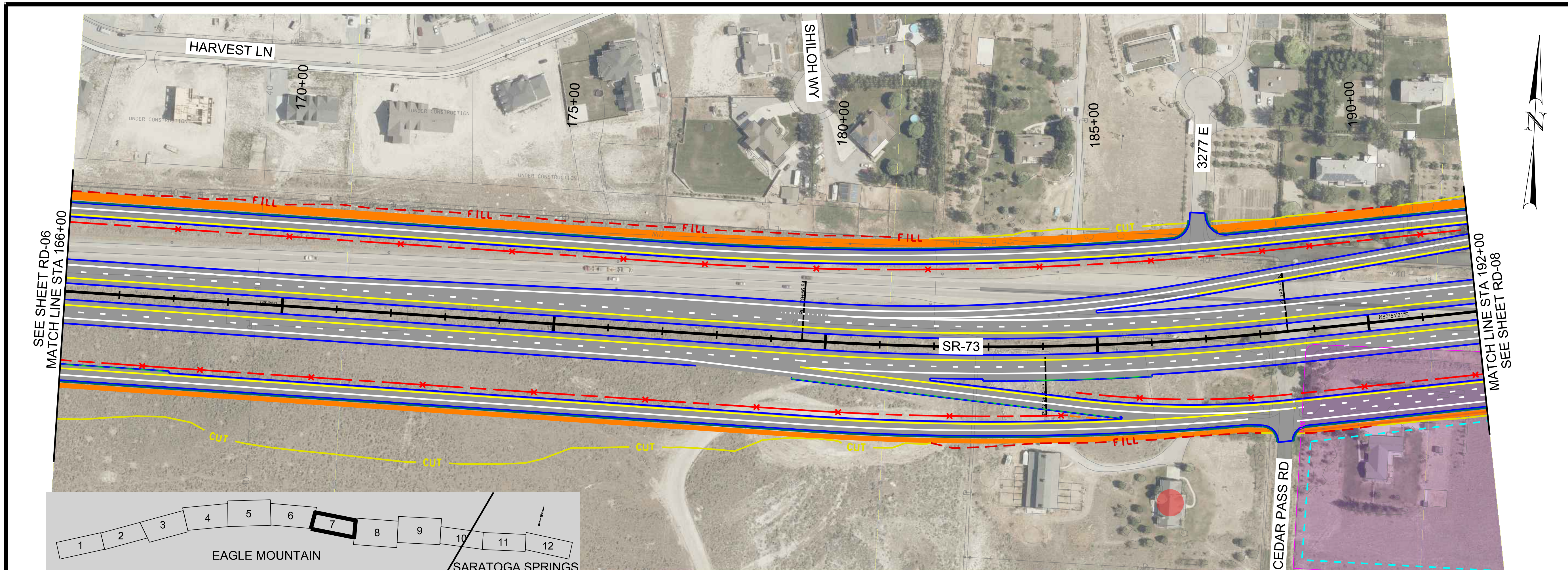


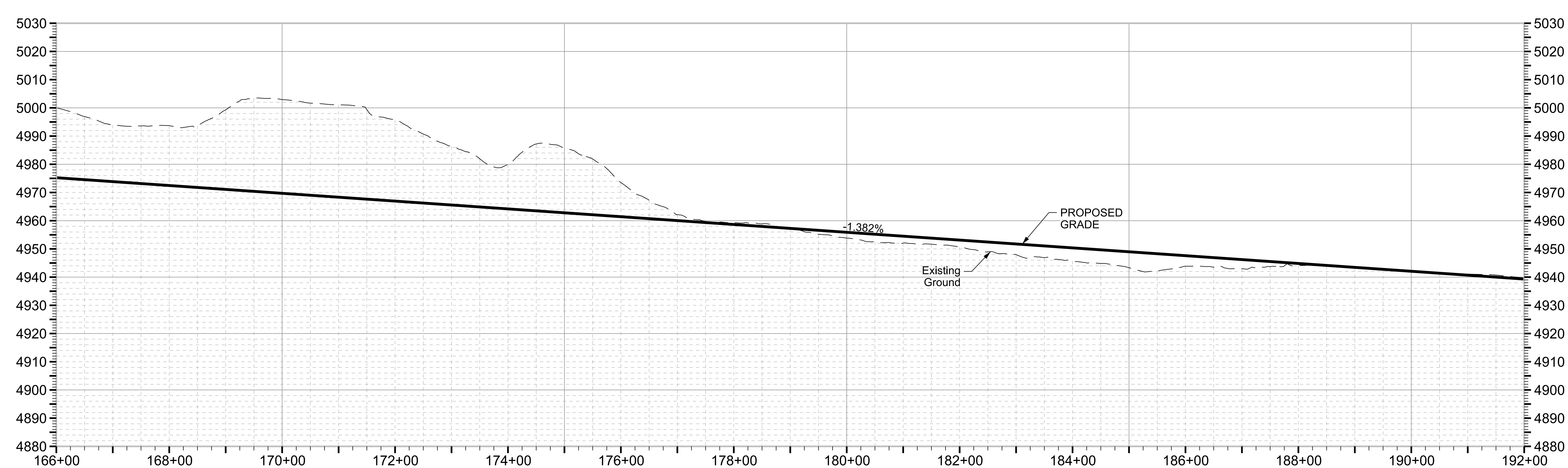


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- POTENTIAL RETAINING WALL
- POTENTIAL NOISE WALL
- POTENTIAL RESIDENTIAL RELOCATION
- POTENTIAL DETENTION POND
- WETLAND
- UDOT-OWNED PROPERTY
- WILDLIFE FENCE
- RIGHT-OF-WAY FENCE

State Route 73
ENVIRONMENTAL STUDY
Eagle Mountain to Saratoga Springs

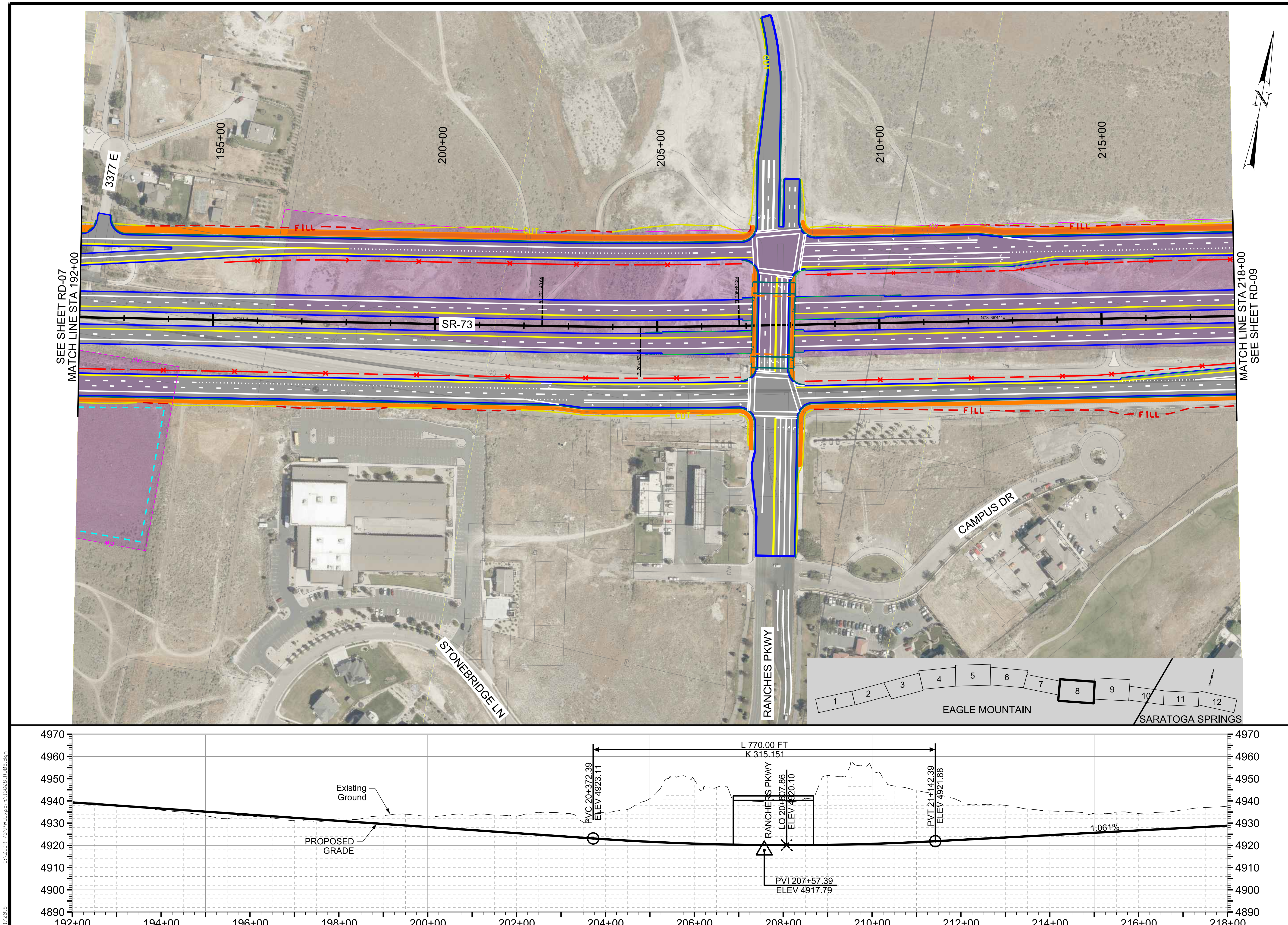
PROJECT: SR-73; EAGLE MT. TO SARATOGA SPRINGS ENVIRONMENTAL

PIN: 13608

PROJECT NUMBER: S-0073(33)30

PLAN AND PROFILE

SHEET NO. RD-07




LEGEND:

- WETLAND
- UDOT-OWNED PROPERTY
- WILDLIFE FENCE
- RIGHT-OF -WAY FENCE
- POTENTIAL RETAINING WALL
- POTENTIAL NOISE WALL
- POTENTIAL RESIDENTIAL RELOCATION
- POTENTIAL DETENTION POND

State Route 73
ENVIRONMENTAL STUDY
Eagle Mountain to Saratoga Springs

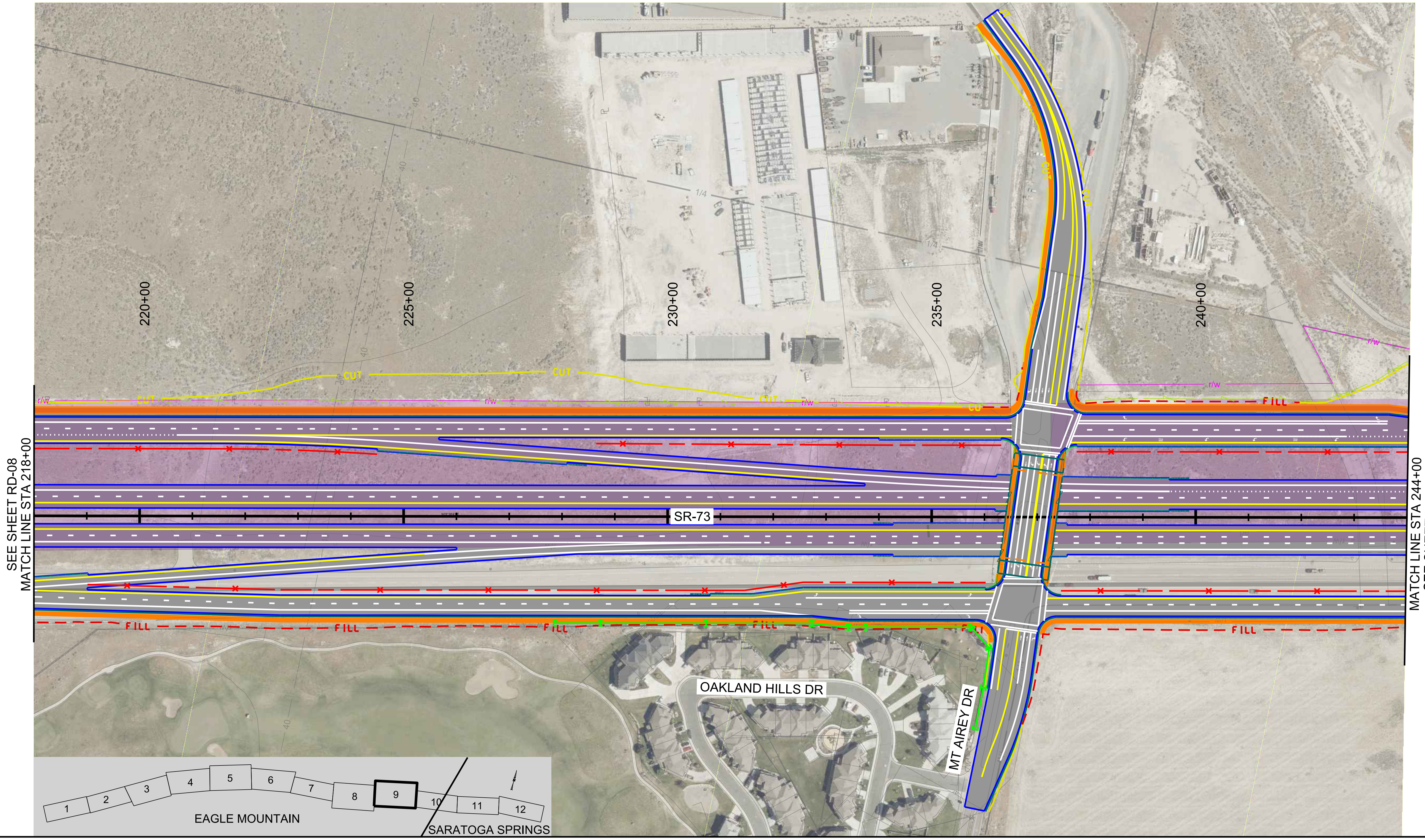
PROJECT: SR-73; EAGLE MT. TO SARATOGA SPRINGS ENVIRONMENTAL

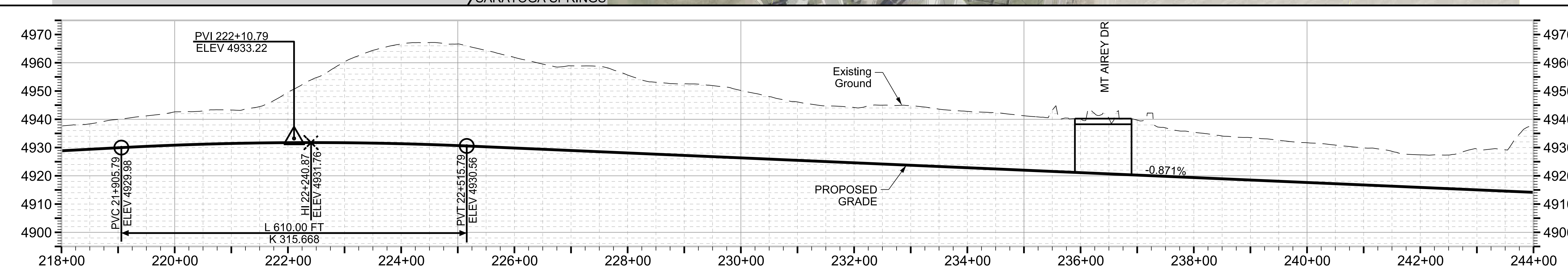
PIN: 13608

PROJECT NUMBER: S-0073(33)30

PLAN AND PROFILE

SHEET NO. RD-08




LEGEND:

- WETLAND
- UDOT-OWNED PROPERTY
- WILDLIFE FENCE
- RIGHT-OF -WAY FENCE
- POTENTIAL RETAINING WALL
- POTENTIAL NOISE WALL
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State Route 73
ENVIRONMENTAL STUDY
Eagle Mountain to Saratoga Springs

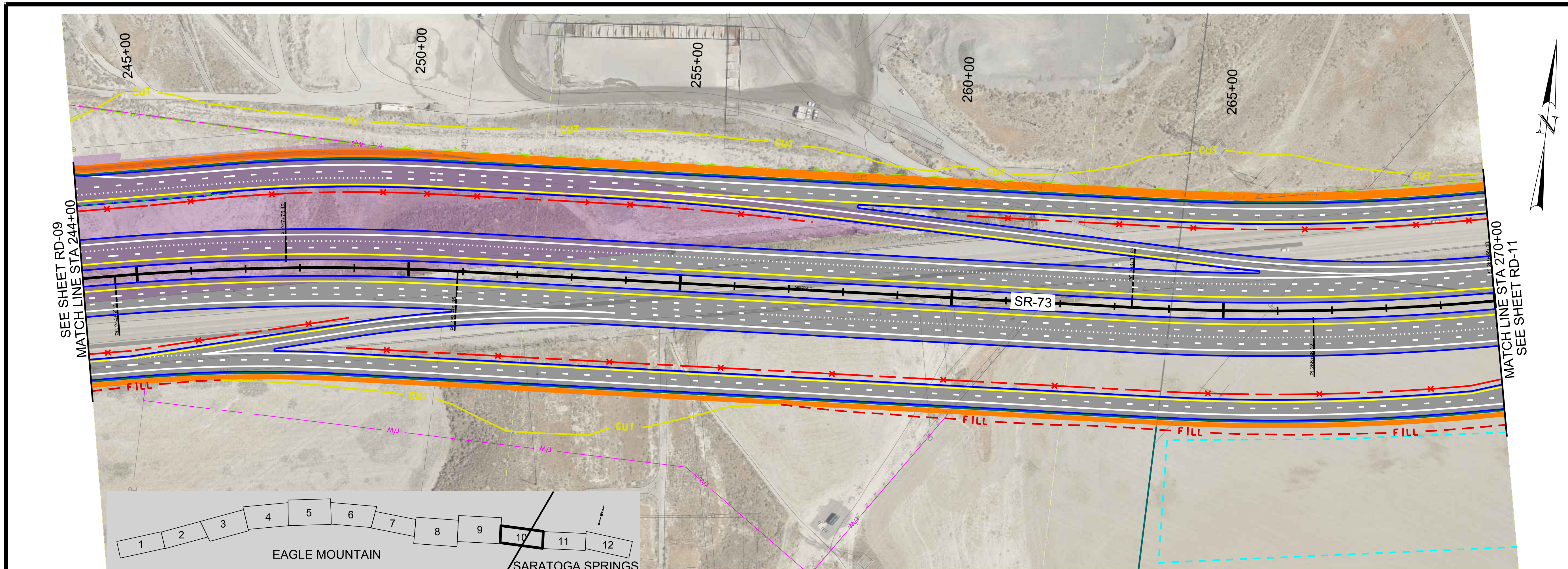
PROJECT: SR-73; EAGLE MT. TO SARATOGA SPRINGS ENVIRONMENTAL

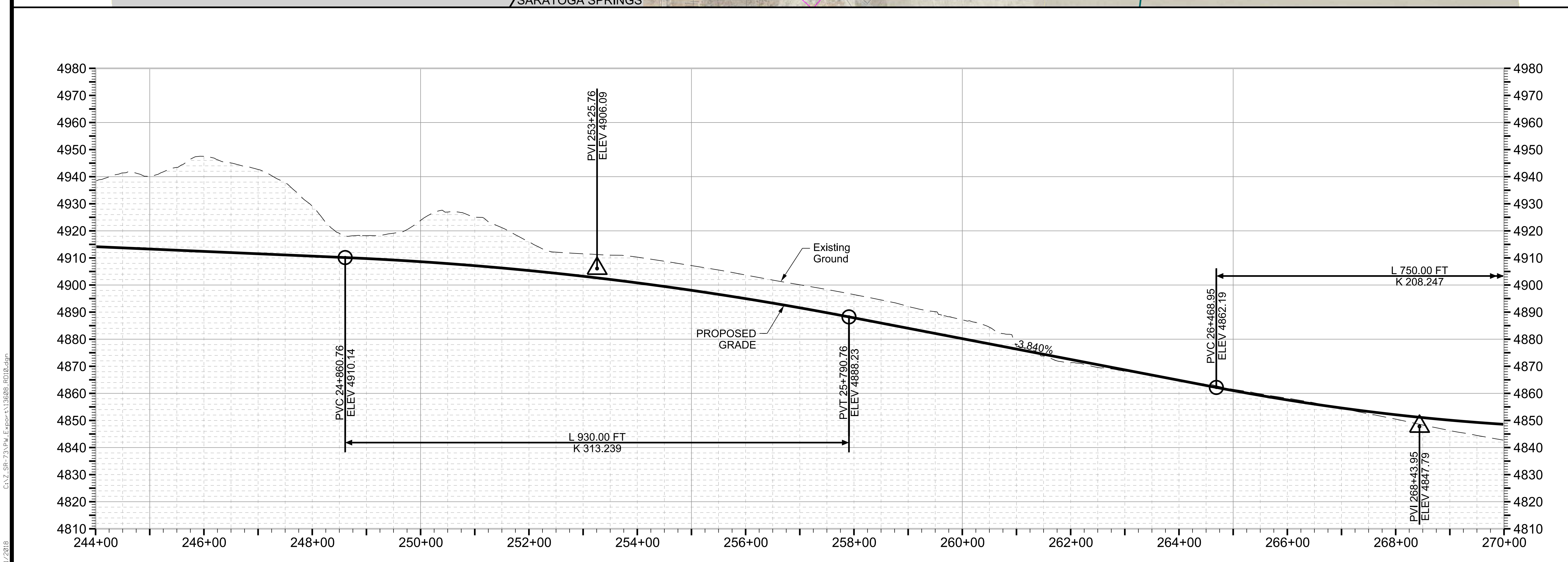
PIN: 13608

PROJECT NUMBER: S-0073(33)30

PLAN AND PROFILE

SHEET NO. RD-09




LEGEND:

- POTENTIAL RETAINING WALL
- POTENTIAL NOISE WALL
- POTENTIAL RESIDENTIAL RELOCATION
- POTENTIAL DETENTION POND
- WETLAND
- UDOT-OWNED PROPERTY
- WILDLIFE FENCE
- RIGHT-OF -WAY FENCE

State Route 73
**ENVIRONMENTAL STUDY**
Eagle Mountain to Saratoga Springs

PROJECT: SR-73; EAGLE MT. TO SARATOGA SPRINGS ENVIRONMENTAL

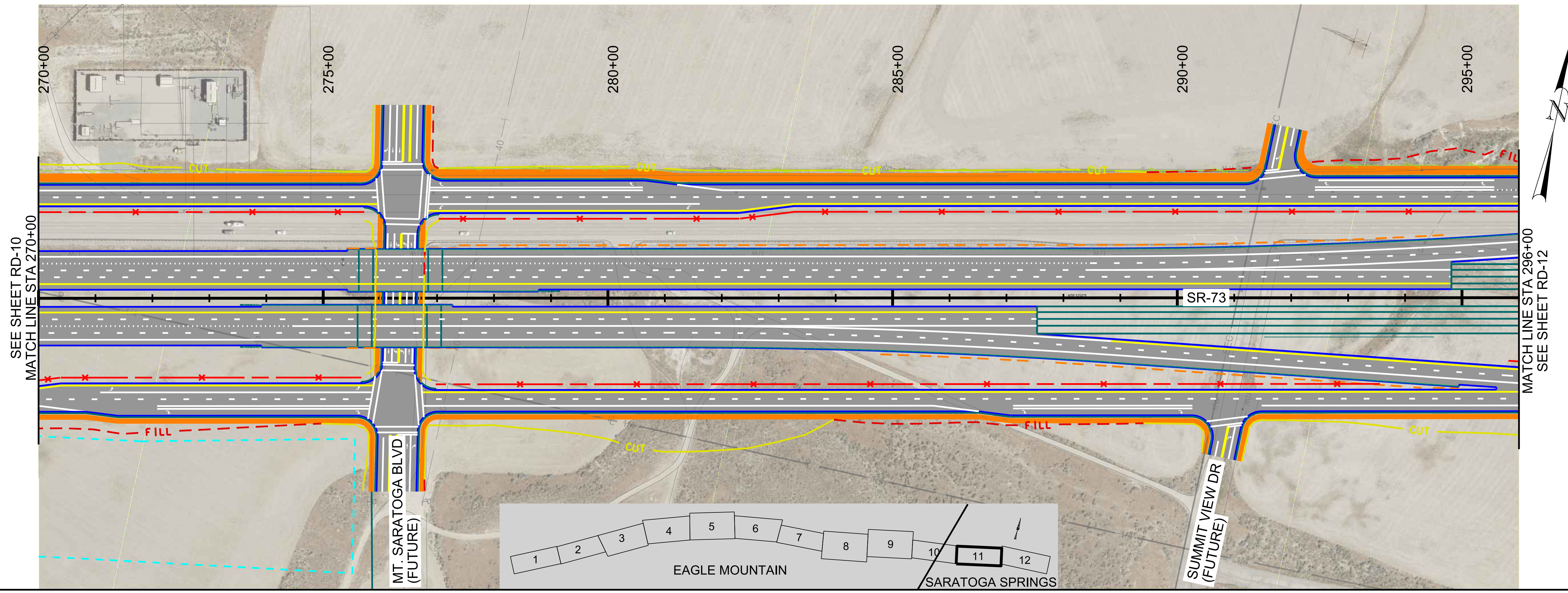
PIN: 13608

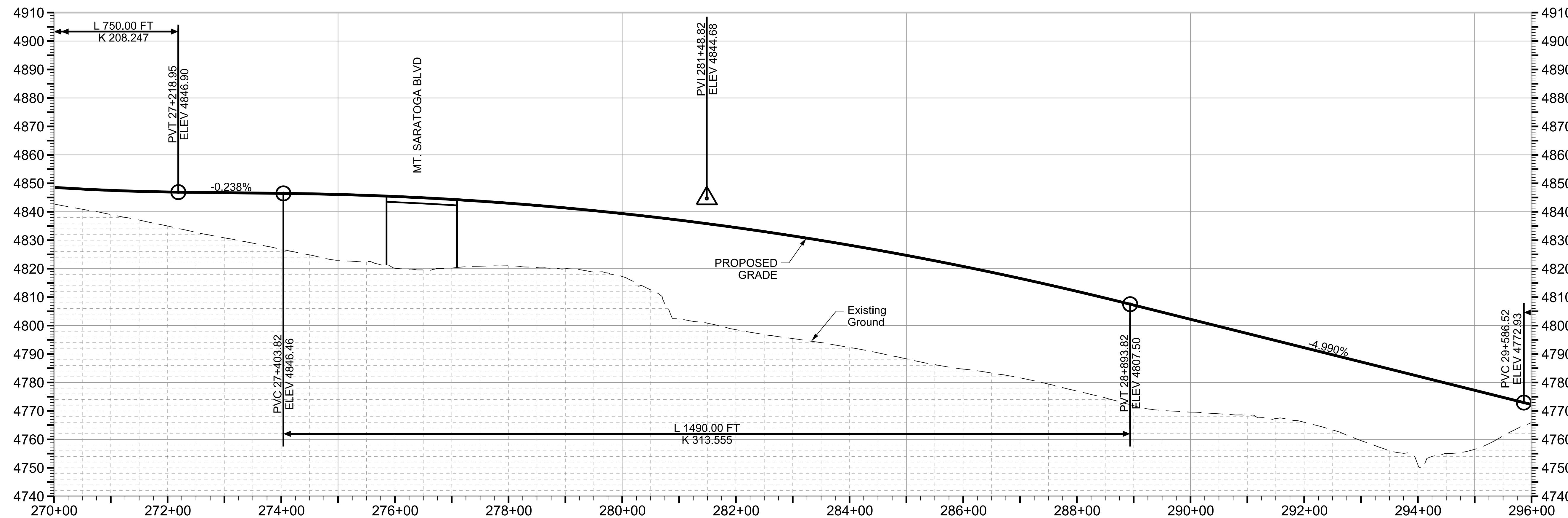
PROJECT NUMBER: S-0073(33)30

PLAN AND PROFILE

SHEET NO. RD-10

7/11/2018




LEGEND:

- POTENTIAL RETAINING WALL
- POTENTIAL NOISE WALL
- POTENTIAL RESIDENTIAL RELOCATION
- POTENTIAL DETENTION POND
- WETLAND
- UDOT-OWNED PROPERTY
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State Route 73
ENVIRONMENTAL STUDY
Eagle Mountain to Saratoga Springs

PROJECT: SR-73; EAGLE MT. TO SARATOGA SPRINGS ENVIRONMENTAL

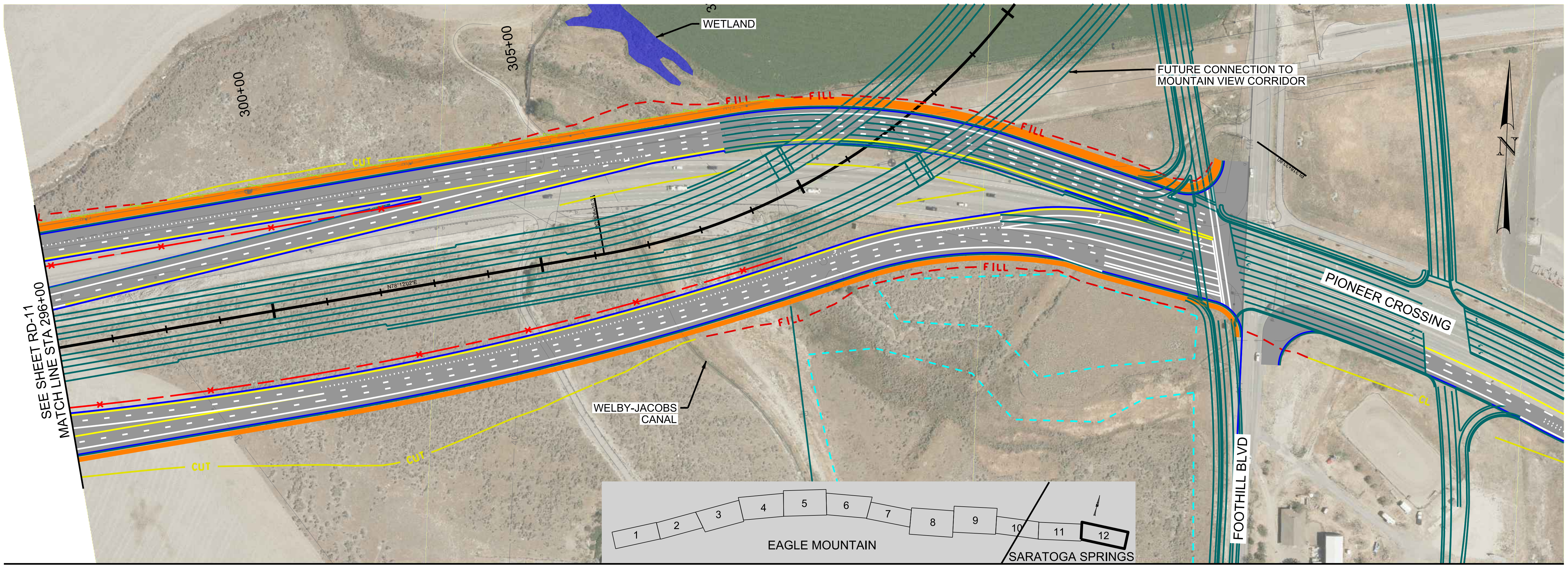
PROJECT NUMBER: S-0073(33)30

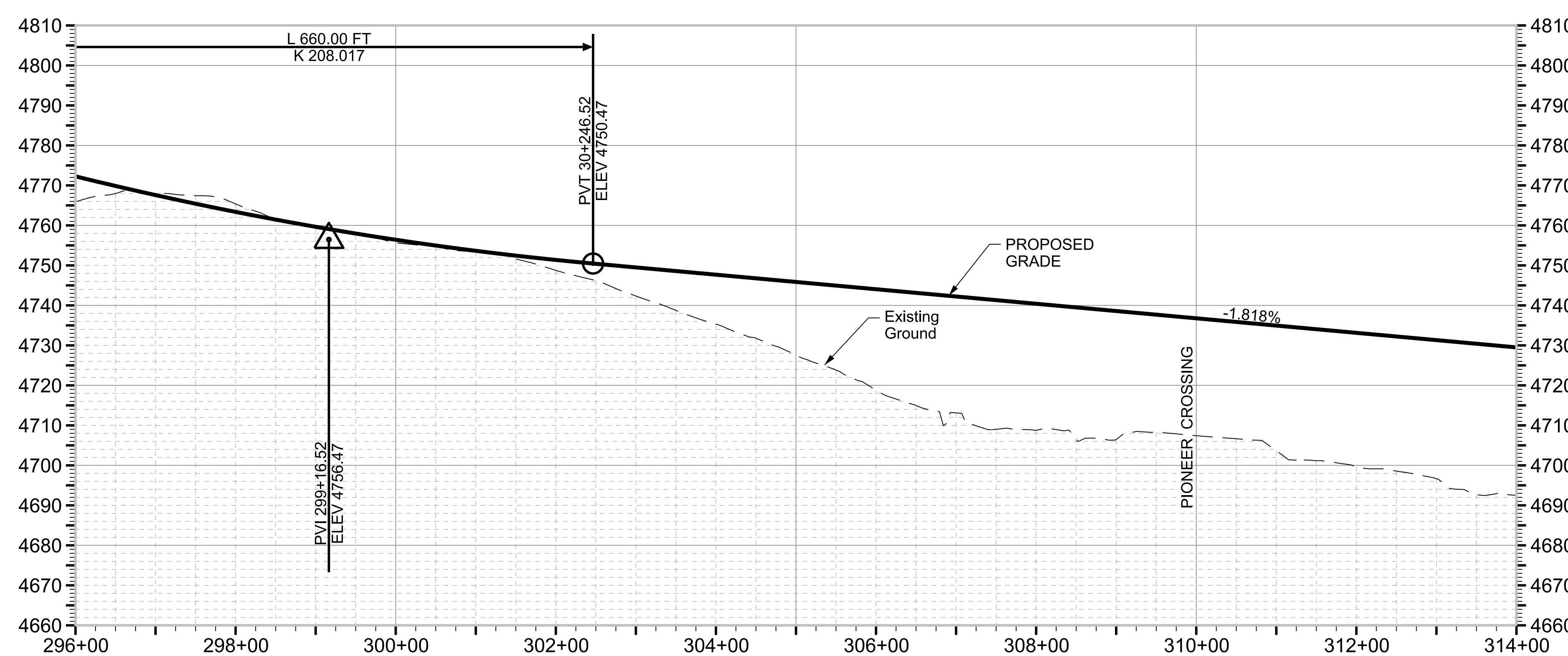
PIN: 13608

PLAN AND PROFILE

SHEET NO. RD-11

7/11/2018




LEGEND:

- WETLAND
- UDOT-OWNED PROPERTY
- WILDLIFE FENCE
- RIGHT-OF -WAY FENCE
- POTENTIAL RETAINING WALL
- POTENTIAL NOISE WALL
- POTENTIAL RESIDENTIAL RELOCATION
- POTENTIAL DETENTION POND

State Route 73
ENVIRONMENTAL STUDY
Eagle Mountain to Saratoga Springs

PROJECT: SR-73; EAGLE MT. TO SARATOGA SPRINGS ENVIRONMENTAL

PROJECT NUMBER: S-0073(33)30

PIN: 13608

PLAN AND PROFILE

SHEET NO. RD-12

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7/11/2018

# APPENDIX C

## S.R. 73 Air Quality Technical Report

State Route 73
ENVIRONMENTAL STUDY
Eagle Mountain to Saratoga Springs

# Draft S.R. 73 Air Quality Technical Report

**State Route 73, Eagle Mountain to Saratoga Springs State Environmental Study**

**June 29, 2018**

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# Contents



# Tables



# Appendixes

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# 1.0 Introduction

This technical report discusses the quantitative air quality analyses (also called “hot-spot” or project-level analyses) that were conducted in support of the State Route (S.R.) 73, Eagle Mountain to Saratoga Springs State Environmental Study (SES) for a proposed roadway project (Proposed Project) in Utah County, Utah.

This report describes the methodology, inputs, and results of analyses for $PM_{10}$ (particulate matter 10 microns in diameter or smaller) and $PM_{2.5}$ (particulate matter 2.5 microns in diameter or smaller). The air quality analysis described in this technical report is not required to meet regulatory requirements but was conducted to disclose the expected impacts of the Proposed Project to the public adjacent to S.R. 73.

# 2.0 Project Description

The Proposed Project consists of improvements to S.R. 73 in Cedar Valley in the cities of Eagle Mountain and Saratoga Springs. Because of water and topographical features, east-west transportation connectivity between Cedar Valley and the rest of Utah County is limited. S.R. 73 serves as the primary arterial road connecting Cedar Valley to the rest of Utah County and the Wasatch Front. Pony Express Parkway is the only other northern access to Cedar Valley, and it currently operates as a minor arterial.

The major transportation needs in the project study area are a result of rapidly growing population and existing and projected roadway congestion in northern Utah County. The transportation needs are documented in several regional and local plans, most notably in the Mountainland Association of Governments’ (MAG) 2015–2040 Regional Transportation Plan (RTP; MAG 2015).

**What is the project study area?**

The project study area is the S.R. 73 corridor bounded on the east by the future Mountain View Corridor (800 West/Foothill Boulevard in Saratoga Springs) and on the west by Eagle Mountain Boulevard.

The Proposed Project includes about 6 miles of S.R. 73 between Eagle Mountain Boulevard and the future Mountain View Corridor (800 West/Foothill Boulevard in Saratoga Springs) and would serve as a principal arterial to northern and eastern Utah County. The Proposed Project would convert S.R. 73 into a frontage road freeway system with grade-separated intersections. The freeway mainline for this concept would include two lanes per travel direction west of Ranches Parkway and three lanes per travel direction east of Ranches Parkway.

One-way frontage roads would be established on each side of the freeway mainline lanes. Frontage roads would run the entire length of the freeway, with one lane per direction west of Ranches Parkway and two lanes per direction east of Ranches Parkway. The freeway mainline would be constructed as a grade-separated facility. The one-way frontage roads would operate as arterial streets that provide access to the local street network and connect the freeway to cross streets at signalized intersections. Slip ramps would be constructed to provide access between the freeway mainline lanes and the frontage roads.

The detailed, project-level hot-spot analyses were focused on the south-side frontage road intersection at Ranches Parkway (air quality impact analysis area at the local level). This location was chosen because it is projected to have the heaviest traffic load in 2040, the design year for the Proposed Project.

**What is the air quality impact analysis area?**

The air quality impact analysis area at the regional level is Utah County. The air quality impact analysis area at the local level is focused on the south-side frontage road intersection at Ranches Parkway.

The project team used the MOVES2014a model to generate project-specific, speed-related vehicle emission rates, which were then used in the latest version of the CAL3QHCR air quality dispersion model (dated 13196 and described in Model Change Bulletin Number 8 dated July 15, 2013) along with other meteorological data and traffic parameters to predict pollutant concentrations at specific receptor locations in the air quality impact analysis area.

The CAL3QHCR model output was used to determine whether the vehicle emissions from the Proposed Project, when added to a background concentration, would cause the applicable National Ambient Air Quality Standards (NAAQS) for $PM_{10}$ or $PM_{2.5}$ to be exceeded at specific receptor locations in the air quality impact analysis area.

# 3.0 Regulatory Environment and Compliance

**National Ambient Air Quality Standards.** The U.S. Environmental Protection Agency (EPA) has set NAAQS for pollutants considered harmful to public health and the environment. These standards include both primary and secondary standards. Primary standards protect public health, while secondary standards 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. For the pollutants addressed in this report, the primary and secondary standards are the same. The current NAAQS are listed in Table 1. The pollutants in Table 1 are referred to as *criteria pollutants* because air quality standards (criteria) have been established for these pollutants.

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 non-attainment 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.

### Table 1. National and Utah Ambient Air Quality Standards (NAAQS)

| Pollutant | Primary/ Secondary | Averaging Time | Level | Form |
|---|---|---|---|---|
| Carbon monoxide (CO) | Primary | 8 hours | 9 ppm | Not to be exceeded more than once per year |
| | | 1 hour | 35 ppm | |
| Lead (Pb) | Primary and secondary | Rolling 3-month average | 0.15 μg/m$^3$ | Not to be exceeded |
| Nitrogen dioxide ($NO_2$) | Primary | 1 hour | 100 ppb | 98th percentile of 1-hour daily maximum concentrations, averaged over 3 years |
| | Primary and secondary | 1 year | 53 ppb | Annual mean |
| Ozone ($O_3$) | Primary and secondary | 8 hours | 0.070 ppm | Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years |
| Particulate matter ($PM_{2.5}$) | Primary | 1 year | 12.0 μg/m$^3$ | Annual mean, averaged over 3 years |
| | Secondary | 1 year | 15.0 μg/m$^3$ | Annual mean, averaged over 3 years |
| | Primary and secondary | 24 hours | 35 μg/m$^3$ | 98th percentile, averaged over 3 years |
| 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 |
| Sulfur dioxide ($SO_2$) | Primary | 1 hour | 75 ppb | 99th percentile of 1-hour daily maximum concentrations, averaged over 3 years |
| | Secondary | 3 hours | 0.5 ppm | Not to be exceeded more than once per year |

Source: EPA 2018a

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

**Transportation Conformity Requirements.** All state governments are required to develop a State Implementation Plan (SIP), which explains how the State will comply with the requirements of the federal Clean Air Act of 1990, as amended. Section 176(c) of the Clean Air Act, and its related amendments, require that transportation plans, programs, and projects that are developed, funded, or approved by the Federal Highway 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 example, carbon monoxide [CO] or PM) for which the project area has been designated a nonattainment or maintenance area.

According to Section 176(c) of the Clean Air Act, a transportation project is said to "conform" to the provisions and purposes of the SIP if the project, both alone and in combination with other planned projects, does 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.

While not applicable to this project, the transportation conformity rule (40 Code of Federal Regulations [CFR] 93, Subpart A) establishes the criteria and procedures for determining whether projects conform to the SIP (EPA 2012). The Proposed Project is identified in MAG's 2015–2040 RTP, which shows S.R. 73 being widened to six lanes in Phase 1 of the RTP (2015 to 2024, Project 12) and subsequently being developed into a freeway with a frontage road system in Phase 2 of the RTP (2025 to 2034, Project 49) (MAG 2015). The RTP was developed to meet the requirements of the Clean Air Act and addresses the short- and long-term transportation needs of the region.

Transportation conformity at the project level requires hot-spot analyses if an area has been designated as a nonattainment or maintenance area for CO and/or PM and the project would be either federally funded or federally approved. The Proposed Project would not require federal funding or approval and is therefore not subject to transportation conformity requirements. The modeling criteria and methods referenced by the transportation conformity rules have been used in this case only as a guide in conducting this study.

A hot-spot analysis is defined in 40 CFR 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. PM hot-spot analyses are required for projects of local air quality concern.

The Proposed Project would be located in Utah County, Utah. Utah County does not meet the NAAQS for $PM_{10}$ or $PM_{2.5}$ (EPA 2018b; UDEQ 2018a, 2018b). Therefore, the project area is classified as a nonattainment area for $PM_{10}$ and $PM_{2.5}$. The county is also a maintenance area (former nonattainment area within the last 20 years) for CO. However, because CO is no longer a significant concern for transportation projects due to improved vehicle emission controls, a quantitative analysis was not conducted for CO.

The Proposed Project is designed to serve mostly local traffic, would be used mainly by gasoline-fueled vehicles, and would not operate with a significant number of diesel vehicles.

In addition, the daily volume of traffic for the air quality impact analysis area in 2040 is expected to be between 40,000 to 59,000 vehicles per day, and the assessed interchange is expected to operate at a level of service of LOS C (see Appendix A of the S.R. 73 SES, S.R. 73 Environmental Study Traffic Memo), which is less than the volume of traffic (125,000 vehicles per day) that could warrant a hot-spot evaluation for $PM_{10}$ or $PM_{2.5}$.

Based on the evaluation criteria from EPA, the Proposed Project would not be considered a project of air quality concern for which hot-spot analysis would be required if the project were subject to transportation conformity [for more information, see 40 CFR 93.123(b), EPA 2015a, and EPA 2015b]. However, in an effort to address potential public concern regarding the expected air quality impacts of the Proposed Project, the project team conducted hot-spot analyses for $PM_{10}$ and $PM_{2.5}$ for disclosure purposes. This analysis focused on the local air quality impact analysis area at the south-side frontage road intersection at Ranches Parkway.

In general, a hot-spot analysis compares air quality concentrations with a proposed project (the build scenario) to the air quality concentrations without the project (the no-build scenario). The air quality concentrations are determined by calculating a "design value," a statistic that describes future air quality concentration in the project area that can be compared to a particular NAAQS. The EPA guidance *Transportation Conformity Guidance for Quantitative Hot-spot Analysis in $PM_{2.5}$ and $PM_{10}$ Nonattainment and Maintenance Areas* (EPA 2015a) suggests modeling the build scenario first. If the design values for the build scenario are less than or equal to the relevant NAAQS, the project is deemed to comply with standards, and no further modeling is needed.

PM hot-spot analyses must consider either the full timeframe of an area's transportation plan or, in an isolated rural nonattainment or maintenance area, the 20-year regional emissions analysis. These requirements are met if the analysis demonstrates that no new or worsened violations occur in the year(s) of highest expected emissions, which includes the project's emissions in addition to background concentrations. Analysis years must be within the timeframe of the transportation plan. For the Proposed Project, analyses were conducted for the year 2040.

Additionally, hot-spot analyses should include the entire project area [40 CFR 93.123(c)(2)]. However, for larger projects, it might be appropriate to focus the analysis on only the locations of highest air pollutant concentrations. If compliance with air quality standards is demonstrated at such locations, then it can be assumed that standards are met in the entire project area. The air quality impact analysis area was chosen because it is projected to have the heaviest traffic load in the project study area in 2040.

# 4.0 Methodology

Section 4.0 describes the methodology used to conduct the $PM_{10}$ and $PM_{2.5}$ hot-spot analyses. The project team used EPA guidelines (EPA 2015a, 2015b), as well as materials used in EPA-sponsored training classes (for example, "Completing Quantitative PM Hot-spot Analyses: 3-Day Course"), to complete hot-spot analyses for 24-hour $PM_{10}$, 24-hour $PM_{2.5}$, and annual $PM_{2.5}$.

MOVES2014a was used to estimate on-road motor vehicle emission rates from vehicle exhaust, brake wear, and tire wear caused by the Proposed Project. These estimates were then used in CAL3QHCR, the air quality model, which estimates PM concentrations at specific points in the project area known as *receptors*. The PM concentrations generated from the air quality model were then added to background concentrations at the receptor locations. The resulting statistic is known as the *design value*. If the design value is less than or equal to the relevant PM NAAQS, then the project is considered to comply with the standards. Where a project does not demonstrate modeled compliance with standards, it can still be approved if the project would improve air quality in comparison to the no-build case. However, in such a situation, a project sponsor may consider mitigation or control measures to further reduce emissions in the project area.

Before beginning the analyses, the project team defined project links. A link represents a section of road where a certain type of vehicle activity occurs. In the case of the Proposed Project, links represent road segments with similar traffic and activity conditions and characteristics (for example, decelerating vehicles approaching an intersection should be treated as one link). Links are characterized by facility type, length (miles), hourly traffic volume (units of vehicles per hour), average speed (miles per hour), and road grade (percent).

Hourly traffic volumes were determined from data provided by the project traffic consultant and the MAG's regional travel demand model. Link-specific traffic volumes were developed for four periods: the morning peak (6:00 AM – 9:00 AM), midday (9:00 AM – 4:00 PM), the evening peak (4:00 PM – 7:00 PM), and overnight (7:00 PM – 6:00 AM). Link speeds were assigned for accelerating and decelerating links, idle speeds at intersections, and cruise speeds on the S.R. 73 mainline (the travel lanes). Vehicle speeds were based on the project team's best professional judgment consistent with EPA guidance and the availability of detailed project-level design information describing vehicle activity. The project team identified 49 individual links in the air quality impact analysis area.

**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.

## 4.1 MOVES2014a

The project team used the MOVES2014a model as the mobile-source emission factor model for these analyses. MOVES2014a provides great flexibility to capture the influence of time of day, vehicle speeds, and seasonal weather effects on vehicle emission rates.

MOVES2014a requires project-specific data pertaining to links, local meteorology, fuel characteristics (fuel supply, fuel formulation, fuel usage, and alternative vehicle and fuel technology), vehicle age distribution, and the volume of traffic for each type of vehicle. Although default data are available, the hot-spot analyses must use the latest planning assumptions available when the analysis begins (40 CFR 93.110). In addition, the rule states that the assumptions used in hot-spot analyses must be consistent with the assumptions used in the regional emissions analysis for any inputs that are required for both analyses [40 CFR 93.123(c)(3)]. The project team contacted MAG to obtain meteorological information, vehicle age distribution, and the volume of traffic for each type of vehicle

(Hardy 2018a). EPA's hot-spot analysis guidance (EPA 2015a) recommends using the default values for fuel information.

**What is re-entrained road dust?**

Re-entrained road dust is small particles that are thrown from the street surface by contact with vehicle tires.

The project team used MOVES2014a to calculate hourly emission rates for $PM_{10}$ and $PM_{2.5}$ for each of 49 links during four meteorological seasons (winter [December through February], spring [March through May], summer [June through August], and fall [September through November]) and, within each season, for the four daily time periods (morning, midday, evening, and overnight). The project team analyzed 16 combinations of season and time of day for the 2040 analysis year when traffic volumes would be greatest and would generate the highest emissions. A MOVES2014a post-processing script was used to generate link-specific emission rates for $PM_{10}$ and $PM_{2.5}$. In addition, emissions of re-entrained road dust were added to the vehicle emissions rates to generate a total emission rate for $PM_{10}$. Values for re-entrained road dust were obtained from MAG (Hardy 2018b).

The emissions rates calculated from MOVES2014a were then used in CAL3QHCR, the air quality model, to estimate $PM_{10}$ and $PM_{2.5}$ concentrations.

## 4.2 CAL3QHCR

The CAL3QHCR model depends on appropriate input data. The required input data include the MOVES2014a-generated emissions rates for $PM_{10}$ and $PM_{2.5}$, link characteristics (length, width, and vehicle volume per hour), and a meteorological data set that is as representative as possible of the project area. The meteorological data set includes surface data from a site that measures the atmosphere near the ground and upper air data describing the vertical temperature profile of the atmosphere. Meteorological data are necessary for the dispersion model to calculate how pollutants will be dispersed in the lower atmosphere. PM hot-spot analyses can be based on either off-site or site-specific meteorological data. When using off-site data, 5 consecutive years of the most recent representative meteorological data should be used. The project team obtained a meteorological data set for 2012–2016 from the Salt Lake City International Airport for use in these analyses.

The CAL3QHCR model estimates future PM concentrations at specific, predefined locations in a study area or impact analysis area. These locations are referred to as *receptors*. The project team identified 63 receptors along the south side of the air quality impact analysis area. These receptors were spaced 25 meters (82 feet) apart along the edge of the traffic lane. For the Proposed Project, most personal exposure to vehicle emissions would be at locations closest to S.R. 73, so only one row of receptors was used.

The project team used CAL3QHCR to estimate concentrations for $PM_{10}$ and $PM_{2.5}$ for each year of meteorological data (2012–2016) and, within each year, for the four meteorological seasons (winter, spring, summer, and fall). The 20 combinations of year and season were analyzed for the 2040 analysis year.

## 4.3 Background Concentrations

The project team derived the background concentrations used in developing the design values for the 24-hour $PM_{10}$ standard, the 24-hour $PM_{2.5}$ standard, and the annual $PM_{2.5}$ standard from data reports from the Lindon, Utah, air quality monitor (EPA AIRS Code 490494001), which is the closest air quality monitor to the Proposed Project (EPA, no date). Data for which EPA has granted data exclusion under the Exceptional Events rule (see 40 CFR 50.14) were excluded.

The 24-hour $PM_{10}$ background concentration is based on identifying the appropriate 24-hour monitor value from the 3 most recent years of monitoring data, based on Exhibit 9-6 in EPA's transportation conformity guidance (EPA 2015a). The 24-hour $PM_{2.5}$ background concentration is based on the 3-year average of the 98th percentile of 24-hour recorded concentrations. The annual $PM_{2.5}$ background concentration is based on the 3-year average of the annual arithmetic mean $PM_{2.5}$ recorded at the monitoring station.

Table 2 lists the background concentrations for each of these pollutants. The project team did not identify any other nearby individual sources that could contribute to local background PM concentrations.

**Table 2. Background Concentrations Used in PM Hot-spot Analyses**

| Pollutant | Background Concentration (µg/m$^3$) |
|---|---|
| 24-hour $PM_{10}$ | 82[a] |
| 24-hour $PM_{2.5}$ | 27.5[b] |
| Annual $PM_{2.5}$ | 8.01[c] |

[a] Based on monitoring values for 2015–2017
[b] Based on 98th-percentile values for 2015–2017
[c] Based on annual averages for 2015–2017

## 4.4 Design Values

Design values are calculated by adding modeled receptor values to background monitor values. The resulting design value concentration is then compared to NAAQS standards.

**24-Hour $PM_{10}$ Design Values.** The 24-hour $PM_{10}$ design value is calculated by first identifying the sixth-highest 24-hour concentration in each of the 5 years of meteorological data. To estimate the sixth-highest concentration, for each receptor, the six highest 24-hour concentrations from each quarter and year of meteorological data are arrayed together and ranked. From all quarters and years of meteorological data, the sixth-highest concentration should be identified. This value is then added to the background monitor value and compared to NAAQS standards.

**24-Hour $PM_{2.5}$ Design Values.** The 24-hour $PM_{2.5}$ design value is calculated by first identifying the three highest 24-hour concentrations in each quarter and year of meteorological data. Within each year of meteorological data, the eighth-highest 24-hour concentration from the 12 values (the top three for each of four quarters) at each receptor should be identified. For each receptor, the eighth-highest concentration (98th percentile from 365 values) from each year of meteorological data should be averaged together. This value is then added to the background monitor value and compared to NAAQS standards.

**Annual $PM_{2.5}$ Design Values.** The annual $PM_{2.5}$ design value is calculated by averaging modeled concentration values for each receptor for each quarter and year of meteorological data. The receptor with the highest modeled average concentration for any year is identified, and this value is then added to the background monitor value and compared to NAAQS.

# 5.0 Results

## 5.1 24-hour $PM_{10}$

The 24-hour $PM_{10}$ design value was calculated by adding the modeled receptor value to the background monitor value (EPA 2015a). The resulting 24-hour $PM_{10}$ design value concentration was then rounded to the nearest 10 micrograms per cubic meter (μg/m$^3$) (EPA 2015b).

Table 3 shows the results of the analysis for the 24-hour $PM_{10}$ standard. The 24-hour $PM_{10}$ design value of 130 μg/m$^3$ is less than the 24-hour $PM_{10}$ NAAQS (150 μg/m$^3$). This demonstrates that the Proposed Project would not contribute to any new local violations, increase the frequency or severity of any existing violation, or delay timely attainment of the $PM_{10}$ NAAQS. Therefore, the Proposed Project is consistent with SIP control measures and would not cause an exceedance of the $PM_{10}$ NAAQS.

**Table 3. Design Values for the 24-hour $PM_{10}$ Standard in 2040**

In μg/m$^3$

| Pollutant | Modeled Value: 6th-highest $PM_{10}$ Concentration[a,b] | Background Concentration | Design Value[c] | 24-hour $PM_{10}$ NAAQS |
|---|---|---|---|---|
| 24-Hour $PM_{10}$ | 10.53 | 82 | 90 | 150 |

[a] Sixth-highest $PM_{10}$ concentration over 5 years of meteorological data.
[b] Design value computations are included with model files in Appendix A.
[c] 24-hour $PM_{10}$ design value is rounded to the nearest 10 μg/m$^3$.

## 5.2 24-hour $PM_{2.5}$

The 24-hour $PM_{2.5}$ design value was calculated by adding the modeled receptor value to the background monitor value (EPA 2015a). The resulting 24-hour $PM_{2.5}$ design value concentration was then rounded to the nearest 1 μg/m$^3$.

Table 4 shows the results of the analysis for the 24-hour $PM_{2.5}$ standard. The 24-hour $PM_{2.5}$ design value of 28 μg/m$^3$ is less than the 24-hour $PM_{2.5}$ NAAQS (35 μg/m$^3$). This demonstrates that the Proposed Project would not contribute to any new local violations, increase the frequency or severity of any existing violation, or delay timely attainment of the 24-hour $PM_{2.5}$ NAAQS. Therefore, the Proposed Project is consistent with SIP control measures and would not cause an exceedance of the $PM_{2.5}$ NAAQS.

### Table 4. Design Values for the 24-hour $PM_{2.5}$ Standard in 2040

In μg/m$^3$

| Pollutant | Modeled Value: 98th-percentile 24-hour Average $PM_{2.5}$ Concentration[a,b] | Background Concentration | Design Value[c] | 24-hour $PM_{2.5}$ NAAQS |
|---|---|---|---|---|
| 24-Hour $PM_{2.5}$ | 0.75 | 27.5 | 28 | 35 |

[a] Receptor with the highest modeled average 24-hour concentration over 5 years of meteorological data.
[b] Design value computations are included with model files in Appendix A, Model Input and Output Files.
[c] 24-hour PM2.5 design value is rounded to the nearest 1 μg/m$^3$.

## 5.3 Annual $PM_{2.5}$

The annual $PM_{2.5}$ design value was calculated by adding the modeled receptor value to the background monitor value (EPA 2015a). The resulting annual $PM_{2.5}$ design value concentration was then rounded to the nearest 0.1 μg/m$^3$.

Table 5 shows the results of the analysis for the annual $PM_{2.5}$ standard. The annual $PM_{2.5}$ design value of 8.3 μg/m$^3$ is less than the annual $PM_{2.5}$ NAAQS (12 μg/m$^3$). This demonstrates that the Proposed Project would not contribute to any new local violations, increase the frequency or severity of any existing violation, or delay timely attainment of the annual $PM_{2.5}$ NAAQS. Therefore, the Proposed Project is consistent with SIP control measures and would not cause an exceedance of the annual $PM_{2.5}$ NAAQS.

### Table 5. Design Values for the Annual $PM_{2.5}$ Standard in 2040

In μg/m$^3$

| Pollutant | Modeled Value: Highest Annual Average $PM_{2.5}$ Concentration[a,b] | Background Concentration | Design Value[c] | Annual $PM_{2.5}$ NAAQS |
|---|---|---|---|---|
| Annual $PM_{2.5}$ | 0.32 | 8.01 | 8.3 | 12 |

[a] Receptor with the highest modeled average annual concentration over 5 years of meteorological data.
[b] Design value computations are included with model files in Appendix A, Model Input and Output Files.
[c] Annual $PM_{2.5}$ design value is rounded to the nearest 0.1 μg/m$^3$.

# 6.0 References

[EPA] U.S. Environmental Protection Agency

No date Air Data: Air Quality Data Collected at Outdoor Monitors Across the U.S. https://www.epa.gov/outdoor-air-quality-data. Accessed May 29, 2018.

2012 Transportation Conformity Regulations as of April 2012. EPA-420-B-12-013. April. https://nepis.epa.gov/Exe/ZyPDF.cgi/P100E7CS.PDF?Dockey=P100E7CS.PDF. Accessed May 29, 2018.

2015a Transportation Conformity Guidance for Quantitative Hot-spot Analyses in $PM_{2.5}$ and $PM_{10}$ Nonattainment and Maintenance Areas. EPA-420-B-15-040. November.

2015b Transportation Conformity Guidance for Quantitative Hot-Spot Analyses in $PM_{2.5}$ and $PM_{10}$ Nonattainment and Maintenance Areas (Appendices). EPA-420-B-15-084. November.

2018a NAAQS Table. https://www.epa.gov/criteria-air-pollutants/naaqs-table. Accessed May 31, 2018.

2018b Utah Nonattainment/Maintenance Status for Each County by Year for All Criteria Pollutants. https://www3.epa.gov/airquality/greenbook/anayo_ut.html. Accessed May 29, 2018.

Hardy, Susan

2018a Email communication from Susan Hardy of MAG to Amy Croft of HDR regarding data sets for MOVES inputs. May 8.

2018b Email communication from Susan Hardy of MAG to Amy Croft of HDR regarding road dust emission rates. May 15.

[MAG] Mountainland Association of Governments

2015 TransPlan40 Regional Transportation Plan 2015–2040 for the Provo/Orem Metropolitan Area. http://mountainland.org/img/transportation/TransPlan40/TransPlan40.pdf.

[UDEQ] Utah Department of Environmental Quality

2018a Area Designations: $PM_{10}$. https://deq.utah.gov/legacy/pollutants/p/particulate-matter/pm10/areas.htm. Accessed May 29, 2018.

2018b Area Designations: $PM_{2.5}$ State Implementation Plan Development. https://deq.utah.gov/legacy/pollutants/p/particulate-matter/pm25/areas.htm. Accessed May 29, 2018.

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# Appendix A. Model Input and Output Files

(*MOVES2014a and CAL3QHCR files provided on separate disc upon request*)

# APPENDIX D

# S.R. 73 Noise Technical Report

State Route 73
ENVIRONMENTAL STUDY
Eagle Mountain to Saratoga Springs

# Draft S.R. 73 Noise Technical Report

**State Route 73, Eagle Mountain to Saratoga Springs State Environmental Study**

**July 2, 2018**

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# Contents



# Tables

## Figures



## Appendixes

# 1.0 Introduction

The Utah Department of Transportation (UDOT) is preparing a State Environmental Study (SES) to evaluate improvements on State Route 73 (S.R. 73) in Eagle Mountain, Utah (the Proposed Project). This report evaluates the traffic-generated noise impacts from the proposed improvements to S.R. 73 as described in Section 2, Project Description, of the SES.

The Proposed Project would alter the horizontal and/or vertical alignment of S.R. 73, as well increase the number of through-traffic lanes on S.R. 73 and is, therefore, a Type 1 Project requiring consideration of noise abatement measures.

Noise impacts were evaluated using noise models and methodologies approved by the Federal Highway Administration (FHWA) and UDOT (*Noise Abatement*, UDOT 08A2-01, revised June 15, 2017). Noise impacts were identified and evaluated at residential, commercial, and other locations (for example, schools and recreation sites) throughout the project study area using level of service (LOS) C traffic volumes to represent the worst-case noise conditions while traffic is operating at uncongested, free-flow speeds of 70 miles per hour (mph) on S.R. 73 and 40 mph on the frontage roads.

# 2.0 Project Description

The Proposed Project consists of improvements to S.R. 73 in Cedar Valley in the cities of Eagle Mountain and Saratoga Springs. Because of water and topographical features, east-west transportation connectivity between Cedar Valley and the rest of Utah County is limited. S.R. 73 serves as the primary arterial road connecting Cedar Valley to the rest of Utah County and the Wasatch Front. Pony Express Parkway is the only other northern access to Cedar Valley, and it currently operates as a minor arterial.

The Proposed Project includes about 6 miles of S.R. 73 between Eagle Mountain Boulevard and the future Mountain View Corridor (800 West/Foothill Boulevard in Saratoga Springs) and would serve as a principal arterial to northern and eastern Utah County. The Proposed Project would convert S.R. 73 into a frontage road freeway system. The freeway mainline for this concept would include three lanes per travel direction east of Ranches Parkway and two lanes per travel direction west of Ranches Parkway.

Frontage roads would be established on each side of the freeway mainline lanes. Frontage roads would run the entire length of the freeway, with two lanes per direction east of Ranches Parkway and one lane per direction west of Ranches Parkway. The freeway mainline would be constructed as a grade-separated facility. The one-way frontage roads would operate as arterial streets that provide access to the local street network and connect the freeway to cross streets at signalized intersections. Slip ramps would be constructed to provide access between the freeway mainline lanes and the frontage roads.

The Proposed Project includes a 12-foot-wide, east-west trail along the north side of the northern frontage road. Additionally, the south side of the improved S.R. 73 would include a 6-foot-wide pedestrian sidewalk.

# 3.0 Characteristics of Noise

Sound travels through the air as waves of minute air-pressure fluctuations caused by vibration. In general, sound waves travel away from the noise source as an expanding spherical surface. As a result, the energy contained in a sound wave is spread over an increasing area as it travels away from the source. This results in a decrease in loudness at greater distances from the noise source.

Sound-level meters measure the actual pressure fluctuations caused by sound waves and record separate measurements for different sound frequency ranges. The decibel (dB) scale used to describe sound is a logarithmic scale that accounts for the large range of sound-pressure levels in the environment. Most sounds consist of a broad range of sound frequencies. Several frequency-weighting schemes have been used to develop composite decibel scales that approximate the way the human ear responds to sound levels. The A-weighted decibel (dBA) scale most closely approximates the way the human ear hears sounds and is the most widely used scale in assessing traffic-related noise impacts. Typical A-weighted noise levels for various types of sound sources are summarized in Table 1.

Varying noise levels are often described in terms of the equivalent noise level ($L_{eq}$). Equivalent noise levels are used to develop single-value descriptions of average noise exposure over stated periods of time (for example, 1 hour) and are generally based on A-weighted sound-level measurements.

The logarithmic nature of decibel scales is such that individual decibel ratings for different noise sources cannot be added directly to give the noise level for the combined noise source. For example, two noise sources that produce equal decibel ratings at a given location will produce a combined noise level that is 3 dBA greater than either sound alone. When two noise sources differ by 10 dBA, the combined noise level will be 0.4 dBA greater than the louder source alone.

People generally perceive a 10-dBA increase in a noise source as a doubling of loudness. For example, a 70-dBA sound will be perceived by an average person as twice as loud as a 60-dBA sound. People generally cannot detect a 1- to 2-dBA increase in noise levels. Under ideal listening conditions, differences of 2 or 3 dBA can be detected by some people.

A 5-dBA change would probably be perceived by most people under normal listening conditions.

When distance is the only factor considered, sound levels from isolated point sources of noise typically decrease by about 6 dBA for every doubling of distance from the noise source. When the noise source is a continuous line (for example, vehicle traffic on a highway), noise levels decrease by about 3 dBA for every doubling of distance away from the source.

### Table 1. Weighted Noise Levels and Human Response

| Sound Source | dBA[a] | Response Descriptor |
|---|---|---|
| Carrier deck jet operation | 140 | Limit of amplified speech |
| | 130 | Painfully loud |
| Jet takeoff (200 feet)<br>Auto horn (3 feet) | 120 | Threshold of feeling and pain |
| Riveting machine<br>Jet takeoff (2,000 feet) | 110 | |
| Shout (0.5 foot)<br>New York subway station | 100 | Very annoying |
| Heavy truck (50 feet)<br>Pneumatic drill (50 feet) | 90 | Hearing damage (8-hour exposure) |
| Passenger train (100 feet)<br>Helicopter (in-flight, 500 feet)<br>Freight train (50 feet) | 80 | Annoying |
| Freeway traffic (50 feet) | 70 | Intrusive |
| Air conditioning unit (20 feet)<br>Light auto traffic (50 feet) | 60 | |
| Normal speech (15 feet) | 50 | Quiet |
| Living room, bedroom, library | 40 | |
| Soft whisper (15 feet) | 30 | Very quiet |
| Broadcasting studio | 20 | |
| | 10 | Just audible |
| | 0 | Threshold of hearing |

Source: CEQ 1970

[a] Typical A-weighted noise levels taken with a sound-level meter and expressed as decibels on the “A” scale. The “A” scale approximates the frequency response of the human ear.

Noise levels at different distances can also be affected by factors other than the distance from the noise source. Topographic features and structural barriers that absorb, reflect, or scatter sound waves can increase or decrease noise levels. Atmospheric conditions (wind speed and direction, humidity levels, and temperatures) can also affect the degree to which sound is attenuated over distance.

Reflections off topographical features or buildings can sometimes result in higher noise levels (lower sound-attenuation rates) than would normally be expected. Temperature inversions and wind conditions can also diffract and focus a sound wave to a location at considerable distance from the noise source. Focusing effects are usually noticeable only for very intense noise sources, such as blasting operations. As a result of these factors, the existing noise environment can be highly variable depending on the local conditions.

# 4.0 Regulatory Setting

The federal regulation that FHWA uses to assess noise impacts is 23 Code of Federal Regulations (CFR) 772, *Procedures for Abatement of Highway Traffic Noise and Construction Noise*. This regulation was most recently updated on July 13, 2010. Utah Administrative Code Rule 930-3 and UDOT's Noise Abatement Policy 08A2-01, revised June 15, 2017, establish UDOT's noise impact and abatement policies and procedures that are compliant with 23 CFR 772.

Noise-abatement criteria (NAC) are used to define the noise levels that are considered an impact (in hourly A-weighted sound-level decibels) for each land use activity category. 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 NAC for specified land use categories or (2) the future worst-case noise level is greater than or equal to an increase of 10 dBA over the existing noise level.

The UDOT NAC are summarized in Table 2. As defined by UDOT, a design-year noise level greater than or equal to the NAC is considered to exceed the NAC, and a 10-dBA increase over existing noise levels is considered to substantially exceed the NAC.

### Table 2. UDOT's Noise-abatement Criteria

| Activity Category | $L_{eq}$ Noise Levels (dBA) | Description of Activity Category |
|---|---|---|
| A | 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 | 66 (exterior) | Residential. |
| C | 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 | 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 | 71 (exterior) | Hotels, motels, offices, restaurants/bars, and other undeveloped 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. |

Source: UDOT 2017

# 5.0 Affected Environment

The noise study area (see Appendix A, Existing Noise Receptor Maps) includes parts of Eagle Mountain and Saratoga Springs within a 500-foot buffer on either side of the centerline of S.R. 73 between the future Mountain View Corridor (800 West/Foothill Boulevard in Saratoga Springs) on the east and Eagle Mountain Boulevard on the west.

The S.R. 73 corridor is a mix of undeveloped land, residential developments, recreational facilities (golf courses and parks), industrial facilities, and commercial properties (business parks). The predominant source of noise in the noise study area is automobile and truck traffic on the existing S.R. 73 alignment.

Existing noise levels in the project study area were determined by taking short-term (10-minute) sound-level measurements at seven locations along S.R. 73 with a Larson-Davis model 820 sound-level meter. Noise measurements were taken on September 28, 2017. Noise-measurement locations were selected to represent existing residential developments, recreation areas, or other areas where people could be exposed to traffic noise for extended periods. Noise-monitoring locations (ML) and the associated measured noise levels are listed in Table 3 and shown in Figure 1. Noise monitoring field data sheets are located in Appendix B, Field Data Sheets.

### Table 3. Measured Noise Levels in the Project Study Area

| Monitoring Location[a] | Address | Activity Category and Noise Level (dBA $L_{eq}$)[b] | Measured Noise Level (dBA $L_{eq}$, rounded) |
|---|---|---|---|
| ML-1[c,d] | North side of S.R. 73 at Ranches Parkway/S.R. 73 intersection | B (66) | 57 |
| ML-2[c,d] | Undeveloped residential lot on East Harvest Lane adjacent to playground at Black Ridge Elementary School | B (66)<br>C (66) | 55 |
| ML-3 | South side of S.R. 73 east of South Sunset Drive (residential development under construction) | B (66) | 45 |
| ML-4[c] | North side of S.R. 73 on Bobcat Way east of Mustang Way | B (66) | 52 |
| ML-5[c,d] | Undeveloped parcel on south side of S.R. 73 east of Valley Drive (representative of residences on Riley Drive) | B (66) | 51 |
| ML-6[b] | South side of S.R. 73 on Cedar Fort Drive east of Canyon Wash Drive | B (66) | 45 |
| ML-7 | North side of S.R. 73, Ranch Park on Canyon Wash Road | C (66) | 48 |

[a] Noise-monitoring locations are shown in Figure 1, Noise-monitoring Locations, below.
[b] For descriptions of the activity categories, see Table 2, UDOT’s Noise-abatement Criteria, above.
[c] Clear line-of-sight to S.R. 73. Used for traffic counts and vehicle mix determination.
[d] Monitoring location used for model validation.

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**Figure 1. Noise-monitoring Locations**


State Route 73
ENVIRONMENTAL STUDY
Eagle Mountain to Saratoga Springs

SR 73 ENVIRONMENTAL STUDY
NOISE MONITORING LOCATIONS

FIGURE 1 OF 1

PATH: O:\PROJECTS\UDOT\10067024_SR73\7.2_WORK_IN_PROGRESS\MAP_DOCS\DRAFT\MEMO_NOISEPOINTS.MXD - USER: SRIGARD - DATE: 10/3/2017

STATE ROUTE 73 ENVIRONMENTAL STUDY

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Measured noise levels were used to characterize the existing noise environment, and three monitoring locations close to S.R. 73 were used to validate the Traffic Noise Model (TNM). These three locations were chosen because they had a clear line of sight to S.R. 73 for counting and classifying traffic and because the main source of noise at these locations was S.R. 73. 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 purposes of model validation (Table 4). As shown in the table, the measured noise levels were within 3 dBA of the modeled noise levels, so the TNM is considered valid.

Traffic volumes were counted at those monitoring locations with a clear line of sight to S.R. 73 and 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 S.R. 73.

Monitored noise levels in the S.R. 73 corridor ranged from 45 to 57 dBA depending on the proximity of the monitoring location to S.R. 73 and other noise sources such as local traffic on arterials. As a comparison, typical noise levels range from 35 to 50 dBA in rural and agricultural areas, 50 to 65 dBA in suburban to urban areas, and 65 to 75 dBA in downtown urban areas. None of the monitored noise levels exceeded the NAC for Activity Category B (residential) or Activity Category C (schools, parks, or playgrounds) land uses.

**Table 4. Model Validation**

| Monitoring Location | Address | Measured Noise Level (dBA) | Modeled Noise Level (dBA) | Difference (dBA) |
|---|---|---|---|---|
| ML-1 | North side of S.R. 73 at Ranches Parkway/ S.R. 73 intersection | 56.6 | 59.4 | 2.8 |
| ML-2 | Undeveloped residential lot on East Harvest Lane adjacent to playground at Black Ridge Elementary School | 54.6 | 56.9 | 2.3 |
| ML-5 | Undeveloped parcel on south side of S.R. 73 east of Valley Drive (representative of residences on Riley Drive) | 50.7 | 53.3 | 2.6 |

## 5.1 Existing Noise Levels

The primary source of noise in the project study area is automobile and truck traffic on S.R. 73. Existing traffic noise levels for each receptor in the study area were calculated with the TNM version 2.5 software using existing conditions (that is, the existing travel lane configurations and the posted speed limit of 55 mph). Existing noise levels were determined using the LOS C traffic volumes based on roadway capacity.

The noise model developed for the existing conditions scenario included 195 receptors throughout the project study area.

Under existing conditions, 56 receptors exceeded the NAC representing 56 individual dwelling units. The locations of those receptors exceeding the NAC are shown in Appendix A, Existing Noise Receptor Maps.

# 6.0 Expected Impacts with the Proposed Project

Traffic-related noise impacts with the Proposed Project were estimated with TNM 2.5 based on the proposed roadway design as shown in Appendix C, Build Scenario Noise Receptor Maps. The modeled roadway included the proposed improvements on S.R. 73 (including ramps and auxiliary lanes) and the addition of the eastbound and westbound frontage roads. Roadway links were modeled in 200-foot increments to provide a high degree of accuracy in the model output. Traffic volumes used in the model were based on LOS C volumes as provided by the traffic consultant for S.R. 73 with traffic on S.R. 73 operating at 70 mph and traffic on the frontage roads operating at 40 mph.

With the Proposed Project, the locations of the mainline S.R. 73 through-traffic lanes would be both north and south of its existing alignment. The noise model developed for the existing conditions and Proposed Project included 195 receptors throughout the project study area. In those areas where the Proposed Project through-traffic lanes are moved farther from the receptors, noise levels at those locations would be lower. Conversely, in areas where the Proposed Project through-traffic lanes are moved closer to residences, noise levels at those locations would be higher. Overall, noise levels with the Proposed Project would range from 56 to 75 dBA compared to the existing conditions of 54 to 76 dBA.

With the Proposed Project, 73 of the 195 receptors would have traffic noise impacts; that is, they would approach, exceed, or substantially exceed (≥ 10-dBA increase over existing noise levels) the NAC as defined in Section 4.0, Regulatory Setting. The locations of those receptors exceeding the NAC are shown in Appendix C. Additionally, 20 receptors would be acquired as part of the Proposed Project's right-of-way requirements.

# 7.0 Summary

Table 5 summarizes the modeled existing and Proposed Project noise levels at the 195 receptors throughout the project study area. For receptor locations, refer to the maps in Appendix A, Existing Noise Receptor Maps, and Appendix C, Build Scenario Noise Receptor Maps.

### Table 5. Modeled Existing and Future Noise Levels in the Project Study Area

| Receptor | UDOT NAC $L_{eq}$(h) | Existing | | With Proposed Project | | |
|---|---|---|---|---|---|---|
| | | Existing Noise Levels (dBA) | Existing Impact? | Proposed Project Noise Levels (dBA) | ≥ 10 dBA Increase over Existing Noise Level? | ≥ UDOT NAC? |
| 1 | 66 | 73 | Yes | 67 | No | Yes |
| 2 | 66 | 74 | Yes | 68 | No | Yes |
| 3 | 66 | 75 | Yes | 69 | No | Yes |
| 4 | 66 | 74 | Yes | 68 | No | Yes |
| 5 | 66 | 76 | Yes | 70 | No | Yes |
| 6 | 66 | 76 | Yes | 70 | No | Yes |
| 7 | 66 | 76 | Yes | 70 | No | Yes |
| 8 | 66 | 76 | Yes | 70 | No | Yes |
| 9 | 66 | 76 | Yes | 70 | No | Yes |
| 10 | 66 | 76 | Yes | 70 | No | Yes |
| 11 | 66 | 76 | Yes | 70 | No | Yes |
| 12 | 66 | 76 | Yes | 70 | No | Yes |
| 13 | 66 | 76 | Yes | 71 | No | Yes |
| 14 | 66 | 76 | Yes | 70 | No | Yes |
| 15 | 66 | 75 | Yes | 70 | No | Yes |
| 16 | 66 | 74 | Yes | 69 | No | Yes |
| 17 | 66 | 68 | Yes | 63 | No | No |
| 18 | 66 | 67 | Yes | 62 | No | No |
| 19 | 66 | 66 | Yes | 62 | No | No |
| 20 | 66 | 66 | Yes | 61 | No | No |
| 21 | 66 | 67 | Yes | 60 | No | No |
| 22 | 66 | 66 | Yes | 60 | No | No |
| 23 | 66 | 65 | No | 59 | No | No |
| 24 | 66 | 65 | No | 59 | No | No |
| 25 | 66 | 67 | Yes | 61 | No | No |
| 26 | 66 | 67 | Yes | 61 | No | No |
| 27 | 66 | 66 | Yes | 60 | No | No |
| 28 | 66 | 65 | No | 59 | No | No |
| 29 | 66 | 66 | Yes | 60 | No | No |

## Table 5. Modeled Existing and Future Noise Levels in the Project Study Area

| Receptor | UDOT NAC $L_{eq}$(h) | Existing | | With Proposed Project | | |
|---|---|---|---|---|---|---|
| | | Existing Noise Levels (dBA) | Existing Impact? | Proposed Project Noise Levels (dBA) | ≥ 10 dBA Increase over Existing Noise Level? | ≥ UDOT NAC? |
| 30 | 66 | 66 | Yes | 61 | No | No |
| 31 | 66 | 66 | Yes | 61 | No | No |
| 32 | 66 | 66 | Yes | 61 | No | No |
| 33 | 66 | 65 | No | 60 | No | No |
| 34 | 66 | 64 | No | 59 | No | No |
| 35 | 66 | 63 | No | 59 | No | No |
| 36 | 66 | 63 | No | 58 | No | No |
| 37 | 66 | 64 | No | 59 | No | No |
| 38 | 66 | 63 | No | 59 | No | No |
| 39 | 66 | 63 | No | 58 | No | No |
| 40 | 66 | 63 | No | 58 | No | No |
| 41 | 66 | 62 | No | 58 | No | No |
| 42 | 66 | 62 | No | 58 | No | No |
| 43 | 66 | 63 | No | 59 | No | No |
| 44 | 66 | 63 | No | 59 | No | No |
| 45 | 66 | 62 | No | 57 | No | No |
| 46 | 66 | 62 | No | 57 | No | No |
| 47 | 66 | 62 | No | 57 | No | No |
| 48 | 66 | 62 | No | 58 | No | No |
| 49 | 66 | 62 | No | 58 | No | No |
| 50 | 66 | 62 | No | 58 | No | No |
| 51 | 66 | 62 | No | 57 | No | No |
| 52 | 66 | 62 | No | 57 | No | No |
| 53 | 66 | 62 | No | 57 | No | No |
| 54 | 66 | 61 | No | 58 | No | No |
| 55 | 66 | 67 | Yes | 60 | No | No |
| 56 | 66 | 71 | Yes | 64 | No | No |
| 57 | 66 | 62 | No | 57 | No | No |
| 58 | 66 | 62 | No | 57 | No | No |
| 59 | 66 | 62 | No | 57 | No | No |
| 60 | 66 | 62 | No | 57 | No | No |
| 61 | 66 | 62 | No | 57 | No | No |
| 62 | 66 | 62 | No | 57 | No | No |
| 63 | 66 | 62 | No | 57 | No | No |
| 64 | 71 | 65 | No | 58 | No | No |

## Table 5. Modeled Existing and Future Noise Levels in the Project Study Area

| Receptor | UDOT NAC $L_{eq}(h)$ | Existing | | With Proposed Project | | |
|---|---|---|---|---|---|---|
| | | Existing Noise Levels (dBA) | Existing Impact? | Proposed Project Noise Levels (dBA) | ≥ 10 dBA Increase over Existing Noise Level? | ≥ UDOT NAC? |
| 65 | 71 | 70 | No | 66 | No | No |
| 66 | 66 | 67 | Yes | 67 | No | Yes |
| 67 | 66 | 69 | Yes | NA[a] | NA[a] | NA[a] |
| 68 | 66 | 65 | No | NA[a] | NA[a] | NA[a] |
| 69 | 66 | 66 | Yes | NA[a] | NA[a] | NA[a] |
| 70 | 66 | 60 | No | 61 | No | No |
| 71 | 66 | 58 | No | 59 | No | No |
| 72 | 66 | 61 | No | 60 | No | No |
| 73 | 66 | 59 | No | 60 | No | No |
| 74 | 66 | 61 | No | 62 | No | No |
| 75 | 66 | 58 | No | 60 | No | No |
| 76 | 66 | 67 | Yes | 64 | No | No |
| 77 | 66 | 67 | Yes | 67 | No | Yes |
| 78 | 66 | 65 | No | 67 | No | Yes |
| 79 | 66 | 66 | Yes | 68 | No | Yes |
| 80 | 66 | 61 | No | 63 | No | No |
| 81 | 66 | 61 | No | 63 | No | No |
| 82 | 66 | 67 | Yes | 69 | No | Yes |
| 83 | 66 | 67 | Yes | 70 | No | Yes |
| 84 | 66 | 61 | No | 64 | No | No |
| 85 | 66 | 61 | No | 65 | No | No |
| 86 | 66 | 61 | No | 65 | No | No |
| 87 | 66 | 61 | No | 66 | No | Yes |
| 88 | 66 | 59 | No | 64 | No | No |
| 89 | 66 | 67 | Yes | 72 | No | Yes |
| 90 | 66 | 70 | Yes | 75 | No | Yes |
| 91 | 66 | 67 | Yes | 72 | No | Yes |
| 92 | 66 | 59 | No | 65 | No | No |
| 93 | 66 | 60 | No | 66 | No | Yes |
| 94 | 66 | 58 | No | 63 | No | No |
| 95 | 66 | 59 | No | 63 | No | No |
| 96 | 66 | 62 | No | 67 | No | Yes |
| 97 | 66 | 64 | No | 67 | No | Yes |
| 98 | 66 | 72 | Yes | 70 | No | Yes |
| 99 | 66 | 70 | Yes | 69 | No | Yes |

## Table 5. Modeled Existing and Future Noise Levels in the Project Study Area

| Receptor | UDOT NAC $L_{eq}$(h) | Existing | | With Proposed Project | | |
|---|---|---|---|---|---|---|
| | | Existing Noise Levels (dBA) | Existing Impact? | Proposed Project Noise Levels (dBA) | ≥ 10 dBA Increase over Existing Noise Level? | ≥ UDOT NAC? |
| 100 | 66 | 70 | Yes | 70 | No | Yes |
| 101 | 66 | 70 | Yes | 69 | No | Yes |
| 102 | 66 | 70 | Yes | 69 | No | Yes |
| 103 | 66 | 70 | Yes | 69 | No | Yes |
| 104 | 66 | 70 | Yes | 70 | No | Yes |
| 105 | 66 | 60 | No | 65 | No | No |
| 106 | 66 | 58 | No | 63 | No | No |
| 107 | 66 | 62 | No | 65 | No | No |
| 108 | 66 | 62 | No | 65 | No | No |
| 109 | 66 | 62 | No | 65 | No | No |
| 110 | 66 | 62 | No | 65 | No | No |
| 111 | 66 | 62 | No | 64 | No | No |
| 112 | 66 | 62 | No | 64 | No | No |
| 113 | 66 | 60 | No | 63 | No | No |
| 114 | 66 | 66 | Yes | 69 | No | Yes |
| 115 | 66 | 66 | Yes | 69 | No | Yes |
| 116 | 66 | 60 | No | 63 | No | No |
| 117 | 66 | 59 | No | 62 | No | No |
| 118 | 66 | 62 | No | 65 | No | No |
| 119 | 66 | 64 | No | 68 | No | Yes |
| 120 | 66 | 66 | Yes | 70 | No | Yes |
| 121 | 66 | 60 | No | 63 | No | No |
| 122 | 66 | 62 | No | 64 | No | No |
| 123 | 71 | 59 | No | 60 | No | No |
| 124 | 71 | 56 | No | 56 | No | No |
| 125 | 66 | 63 | No | 65 | No | No |
| 126 | 66 | 67 | Yes | 69 | No | Yes |
| 127 | 66 | 65 | No | 67 | No | Yes |
| 128 | 66 | 69 | Yes | 70 | No | Yes |
| 129 | 66 | 64 | No | 66 | No | Yes |
| 130 | 66 | 63 | No | 65 | No | No |
| 131 | 66 | 67 | Yes | 70 | No | Yes |
| 132 | 66 | 65 | No | 68 | No | Yes |
| 133 | 66 | 65 | No | 67 | No | Yes |
| 134 | 66 | 61 | No | 64 | No | No |

## Table 5. Modeled Existing and Future Noise Levels in the Project Study Area

| Receptor | UDOT NAC $L_{eq}(h)$ | Existing | | With Proposed Project | | |
|---|---|---|---|---|---|---|
| | | Existing Noise Levels (dBA) | Existing Impact? | Proposed Project Noise Levels (dBA) | ≥ 10 dBA Increase over Existing Noise Level? | ≥ UDOT NAC? |
| 135 | 66 | 62 | No | 65 | No | No |
| 136 | 66 | 62 | No | 64 | No | No |
| 137 | 66 | 63 | No | 65 | No | No |
| 138 | 66 | 65 | No | 66 | No | Yes |
| 139 | 66 | 64 | No | 66 | No | Yes |
| 140 | 66 | 65 | No | 66 | No | Yes |
| 141 | 66 | 64 | No | 66 | No | Yes |
| 142 | 66 | 59 | No | 61 | No | No |
| 143 | 66 | 60 | No | 62 | No | No |
| 144 | 66 | 59 | No | 62 | No | No |
| 145 | 66 | 59 | No | 61 | No | No |
| 146 | 66 | 60 | No | 62 | No | No |
| 147 | 66 | 60 | No | 61 | No | No |
| 148 | 66 | 58 | No | 61 | No | No |
| 149 | 66 | 57 | No | 59 | No | No |
| 150 | 66 | 65 | No | 69 | No | Yes |
| 151 | 66 | 64 | No | 70 | No | Yes |
| 152 | 66 | 58 | No | 60 | No | No |
| 153 | 71 | 57 | No | 60 | No | No |
| 154 | 66 | 58 | No | 67 | No | Yes |
| 155 | 66 | 59 | No | 68 | No | Yes |
| 156 | 66 | 61 | No | NA[a] | NA[a] | NA[a] |
| 157 | 66 | 61 | No | NA[a] | NA[a] | NA[a] |
| 158 | 66 | 62 | No | NA[a] | NA[a] | NA[a] |
| 159 | 66 | 62 | No | NA[a] | NA[a] | NA[a] |
| 160 | 66 | 65 | No | NA[a] | NA[a] | NA[a] |
| 161 | 66 | 64 | No | NA[a] | NA[a] | NA[a] |
| 162 | 66 | 56 | No | 63 | No | No |
| 163 | 66 | 55 | No | 63 | No | No |
| 164 | 66 | 56 | No | 65 | No | No |
| 165 | 66 | 57 | No | 66 | No | Yes |
| 166 | 66 | 56 | No | 65 | No | No |
| 167 | 66 | 61 | No | 71 | Yes | Yes |
| 168 | 66 | 59 | No | 70 | Yes | Yes |
| 169 | 66 | 55 | No | 64 | No | No |

## Table 5. Modeled Existing and Future Noise Levels in the Project Study Area

| Receptor | UDOT NAC $L_{eq}$(h) | Existing | | With Proposed Project | | |
|---|---|---|---|---|---|---|
| | | Existing Noise Levels (dBA) | Existing Impact? | Proposed Project Noise Levels (dBA) | ≥ 10 dBA Increase over Existing Noise Level? | ≥ UDOT NAC? |
| 170 | 66 | 58 | No | 69 | Yes | Yes |
| 171 | 66 | 56 | No | 66 | Yes | Yes |
| 172 | 66 | 62 | No | NA[a] | NA[a] | NA[a] |
| 173 | 66 | 65 | No | NA[a] | NA[a] | NA[a] |
| 174 | 66 | 65 | No | NA[a] | NA[a] | NA[a] |
| 175 | 66 | 67 | Yes | NA[a] | NA[a] | NA[a] |
| 176 | 66 | 65 | No | NA[a] | NA[a] | NA[a] |
| 177 | 66 | 59.0 | No | 70 | Yes | Yes |
| 178 | 66 | 60 | No | 72 | Yes | Yes |
| 179 | 66 | 59 | No | 71 | Yes | Yes |
| 180 | 66 | 60 | No | 72 | Yes | Yes |
| 181 | 66 | 56 | No | 66 | Yes | Yes |
| 182 | 66 | 56 | No | 67 | Yes | Yes |
| 183 | 66 | 54 | No | 64 | Yes | No |
| 184 | 66 | 54 | No | 64 | Yes | No |
| 185 | 66 | 57 | No | 67 | Yes | Yes |
| 186 | 66 | 61 | No | NA[a] | NA[a] | NA[a] |
| 187 | 66 | 63 | No | NA[a] | NA[a] | NA[a] |
| 188 | 66 | 62 | No | NA[a] | NA[a] | NA[a] |
| 189 | 66 | 63 | No | NA[a] | NA[a] | NA[a] |
| 190 | 66 | 62 | No | NA[a] | NA[a] | NA[a] |
| 191 | 66 | 56 | No | 67 | Yes | Yes |
| 192 | 66 | 56 | No | 68 | Yes | Yes |
| 193 | 66 | 56 | No | 68 | Yes | Yes |
| 194 | 66 | 55 | No | 66 | Yes | Yes |
| 195 | 66 | 62 | No | NA[a] | NA[a] | NA[a] |

[a] These receptors will be relocated as part of the Proposed Project.

# 8.0 Noise Abatement

This section discusses UDOT's methodology for evaluating noise-abatement mitigation measures for the traffic noise impacts identified in Section 6.0, Expected Impacts with the Proposed Project.

For a sound wall to be effective, it must be high enough and long enough to block the view of the noise source (that is, traffic on the roadway) from the receptor's line of sight. FHWA's *Highway Traffic Noise: Analysis and Abatement Guidance* (FHWA 2011) states that a general rule of thumb is that the noise barrier should extend four times as far in each direction as the distance from the receptor to the barrier. For example, if the receptor is 50 feet from the proposed noise barrier, the barrier needs to extend at least 200 feet on either side of the receptor in order to shield the receptor from noise traveling past the ends of the barrier.

Noise walls for individual homes do not meet the cost-effectiveness criterion of UDOT's Noise Abatement Policy. Gaps in a noise wall cause "noise leaks," which reduce the effectiveness of the wall at homes near the gap. In addition, the effectiveness of noise walls decreases with increasing distance from the wall. For example, a residence that is 300 feet from a noise wall might experience noise levels that exceed the residential NAC. However, the noise wall might be ineffective in reducing noise levels by 7 dBA or more at that distance, and, therefore, a noise barrier might not be warranted according to UDOT's Noise Abatement Policy. The goal of noise abatement is to substantially reduce noise, which might or might not result in noise levels below the residential NAC.

The two primary criteria to consider when evaluating noise-abatement measures are feasibility and reasonableness. Noise abatement would be provided by UDOT only if UDOT determines that noise-abatement measures are *both* feasible and reasonable.

## 8.1 Feasibility and Reasonableness Factors

### 8.1.1 Feasibility Factors

The feasibility of noise-abatement measures deals primarily with construction and engineering considerations such as safety, location of cross streets, sight distance, and access to adjacent properties, among others. Under UDOT's Noise Abatement Policy, a noise barrier must be considered "acoustically feasible" (that is, the barrier must reduce noise by at least 5 dBA for at least 50% of front-row receptors).

If a noise-abatement measure is determined by UDOT to be acoustically feasible, then the abatement measure will be evaluated to determine whether its construction is reasonable. If a noise-abatement measure is determined by UDOT to be not feasible, it will not be considered any further.

### 8.1.2 Reasonableness Factors

Under UDOT's Noise Abatement Policy, reasonableness factors must be collectively achieved in order for a noise-abatement measure to be considered "reasonable." If any of the three reasonableness factors specified in the policy are not achieved, the noise-abatement measure will not be considered not reasonable and therefore will not be included in the project.

- **Noise-Abatement Design Goal.** Every reasonable effort should be made to achieve substantial reductions in noise. 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 receptors. No abatement measure will be considered reasonable if the noise-abatement design goal cannot be achieved.
- **Cost-Effectiveness.** The cost of a noise-abatement measure must be considered reasonable in order for it to be included in a project. Noise-abatement costs are determined by multiplying a fixed unit cost per square foot by the height and length of the barrier.

  For residential receptors, cost-effectiveness is based on the cost of the abatement measure (for example, a noise wall) divided by the number benefited receptors (the total number of dwelling units at which noise is reduced by a minimum of 5 dBA as a result of the abatement measure).

  Currently, the maximum cost used to determine the reasonableness of a noise-abatement measure is $30,000 per benefiting residence (Activity Category B) based on a unit cost of $20 per square foot of barrier, and $360 per lineal foot for Activity Categories A, C, D, or E.
- **Viewpoints of Property Owners and Residents.** If a noise-abatement measure is both feasible and reasonable, UDOT will also consider the viewpoints of property owners and residents to determine whether the noise-abatement measures are desired. Balloting will be conducted for those noise-abatement measures that both meet the noise-abatement design goal and are cost-effective consistent with the procedures described in UDOT's Noise Abatement Policy.

The noise walls considered for the Proposed Project are discussed below. UDOT evaluated noise walls for 11 locations along S.R. 73 where noise impacts would occur with the Proposed Project. Only one noise wall, Noise Barrier A, was found to be both reasonable and feasible.

### 8.1.3 Barrier Evaluations

#### Noise Barrier A

Noise Barrier A is located south of S.R. 73 just west of Mt. Airey Drive. This wall is about 1,040 feet long (see Appendix D, Build Scenario Noise Walls). As summarized in Table 6, walls ranging in height from 8 to 20 feet were evaluated. More specific calculation details are included in Appendix E, Noise Wall Analysis.

**Table 6. Noise Abatement Analysis for Noise Barrier A**

| | Feasibility | | Reasonableness | | | | | |
|---|---|---|---|---|---|---|---|---|
| Barrier Height | % Front-row with 5-dBA Reduction | Acoustically Feasible?[a] | % Front-row with 7-dBA Reduction | Noise Abatement Design Goal?[b] | Anticipated Cost | Allowable Cost | Cost-Effective?[c] | Is Barrier Feasible & Reasonable? |
| 20 | 100.0 | Yes | 94.0 | Yes | $416,000 | $600,000 | Yes | Yes |
| 19 | 100.0 | Yes | 94.0 | Yes | $395,200 | $600,000 | Yes | Yes |
| 18 | 100.0 | Yes | 88.0 | Yes | $374,400 | $600,000 | Yes | Yes |
| 17 | 100.0 | Yes | 88.0 | Yes | $353,600 | $600,000 | Yes | Yes |
| 16 | 100.0 | Yes | 88.0 | Yes | $332,800 | $600,000 | Yes | Yes |
| 15 | 100.0 | Yes | 88.0 | Yes | $312,000 | $600,000 | Yes | Yes |
| 14 | 94.0 | Yes | 88.0 | Yes | $291,200 | $540,000 | Yes | Yes |
| 13 | 94.0 | Yes | 81.0 | Yes | $270,400 | $480,000 | Yes | Yes |
| 12 | 94.0 | Yes | 81.0 | Yes | $249,600 | $450,000 | Yes | Yes |
| 11 | 94.0 | Yes | 81.0 | Yes | $228,800 | $450,000 | Yes | Yes |
| 10 | 94.0 | Yes | 81.0 | Yes | $208,000 | $450,000 | Yes | Yes |
| 9 | 94.0 | Yes | 75.0 | Yes | $187,200 | $450,000 | Yes | Yes |
| **8** | **94.0** | **Yes** | **63.0** | **Yes** | **$166,400** | **$450,000** | **Yes** | **Yes** |

[a] 5-dBA reduction for at least 50% of front-row receptors.
[b] 7-dBA reduction for at least 35% of front-row receptors.
[c] Anticipated cost is less than allowable cost.

Walls ranging in height from 8 to 20 feet are considered both feasible and reasonable for Noise Barrier A. An 8-foot-high wall for is recommended for balloting because it is the shortest wall height that is both feasible and reasonable.

## Noise Barrier B

Noise Barrier B was modeled south of S.R. 73, west of Ranches Parkway in an attempt to shield impacted receptor 66 (Rockwell Charter School). This wall is about 1,009 feet long (see Appendix D, Build Scenario Noise Walls). As summarized in Table 7, walls ranging in height from 8 to 20 feet were evaluated. More specific calculation details are included in Appendix E, Noise Wall Analysis.

### Table 7. Noise Abatement Analysis for Noise Barrier B

| | Feasibility | | Reasonable | | | | | |
|---|---|---|---|---|---|---|---|---|
| Barrier Height | % Front-row with 5-dBA Reduction | Acoustically Feasible?[a] | % Front-row with 7-dBA Reduction | Noise Abatement Design Goal?[b] | Anticipated Cost | Allowable Cost | Cost-Effective?[c] | Is Barrier Feasible & Reasonable? |
| 20 | 100.0 | Yes | 0.0 | No | NA | NA | NA | No |
| 19 | 100.0 | Yes | 0.0 | No | NA | NA | NA | No |
| 18 | 100.0 | Yes | 0.0 | No | NA | NA | NA | No |
| 17 | 100.0 | Yes | 0.0 | No | NA | NA | NA | No |
| 16 | 100.0 | Yes | 0.0 | No | NA | NA | NA | No |
| 15 | 0.0 | No | 0.0 | No | NA | NA | NA | No |
| 14 | 0.0 | No | 0.0 | No | NA | NA | NA | No |
| 13 | 0.0 | No | 0.0 | No | NA | NA | NA | No |
| 12 | 0.0 | No | 0.0 | No | NA | NA | NA | No |
| 11 | 0.0 | No | 0.0 | No | NA | NA | NA | No |
| 10 | 0.0 | No | 0.0 | No | NA | NA | NA | No |
| 9 | 0.0 | No | 0.0 | No | NA | NA | NA | No |
| 8 | 0.0 | No | 0.0 | No | NA | NA | NA | No |

[a] 5-dBA reduction for at least 50% of front-row receptors.
[b] 7-dBA reduction for at least 35% of front-row receptors.
[c] Anticipated cost is less than allowable cost.

None of the wall heights evaluated for Noise Barrier B were found to be both feasible and reasonable. Therefore, a wall at this location is not recommended for balloting.

## Noise Barrier C

Noise Barrier C was modeled south of S.R. 73 between Valley Drive and Sunset Drive. This wall is about 2,303 feet long (see Appendix D, Build Scenario Noise Walls). As summarized in Table 8, walls ranging in height from 14 to 20 feet were evaluated. More specific calculation details are included in Appendix E, Noise Wall Analysis.

### Table 8. Noise Abatement Analysis for Noise Barrier C

| | Feasibility | | Reasonableness | | | | | |
|---|---|---|---|---|---|---|---|---|
| Barrier Height | % Front-row with 5-dBA Reduction | Acoustically Feasible?[a] | % Front-row with 7-dBA Reduction | Noise Abatement Design Goal?[b] | Anticipated Cost | Allowable Cost | Cost-Effective?[c] | Is Barrier Feasible & Reasonable? |
| 20 | 100.0 | Yes | 78.0 | Yes | $921,200 | $330,000 | No | No |
| 19 | 100.0 | Yes | 67.0 | Yes | $875,140 | $270,000 | No | No |
| 18 | 100.0 | Yes | 67.0 | Yes | $829,080 | $270,000 | No | No |
| 17 | 100.0 | Yes | 56.0 | Yes | $783,020 | $270,000 | No | No |
| 16 | 89.0 | Yes | 44.0 | Yes | $736,960 | $240,000 | No | No |
| 15 | 67.0 | Yes | 33.0 | No | NA | NA | NA | No |
| 14 | 67.0 | Yes | 22.0 | No | NA | NA | NA | No |

[a] 5-dBA reduction for at least 50% of front-row receptors.
[b] 7-dBA reduction for at least 35% of front-row receptors.
[c] Anticipated cost is less than allowable cost.

None of the wall heights evaluated for Noise Barrier C were found to be both feasible and reasonable. Therefore, a wall at this location is not recommended for balloting.

## Noise Barrier D

Noise Barrier D was modeled south of S.R. 73, west of Valley Drive in an attempt to shield impacted receptor 93. This wall was 1,020 feet long (see Appendix D, Build Scenario Noise Walls). As summarized in Table 9, walls ranging in height from 8 to 20 feet were evaluated. More specific calculation details are included in Appendix E, Noise Wall Analysis.

### Table 9. Noise Abatement Analysis for Noise Barrier D

| | Feasibility | | Reasonableness | | | | | |
|---|---|---|---|---|---|---|---|---|
| Barrier Height | % Front-row with 5-dBA Reduction | Acoustically Feasible?[a] | % Front-row with 7-dBA Reduction | Noise Abatement Design Goal?[b] | Anticipated Cost | Allowable Cost | Cost-Effective?[c] | Is Barrier Feasible & Reasonable? |
| 20 | 0.0 | No | 0.0 | No | NA | NA | NA | No |
| 19 | 0.0 | No | 0.0 | No | NA | NA | NA | No |
| 18 | 0.0 | No | 0.0 | No | NA | NA | NA | No |
| 17 | 0.0 | No | 0.0 | No | NA | NA | NA | No |
| 16 | 0.0 | No | 0.0 | No | NA | NA | NA | No |
| 15 | 0.0 | No | 0.0 | No | NA | NA | NA | No |
| 14 | 0.0 | No | 0.0 | No | NA | NA | NA | No |
| 13 | 0.0 | No | 0.0 | No | NA | NA | NA | No |
| 12 | 0.0 | No | 0.0 | No | NA | NA | NA | No |
| 11 | 0.0 | No | 0.0 | No | NA | NA | NA | No |
| 10 | 0.0 | No | 0.0 | No | NA | NA | NA | No |
| 9 | 0.0 | No | 0.0 | No | NA | NA | NA | No |
| 8 | 0.0 | No | 0.0 | No | NA | NA | NA | No |

[a] 5-dBA reduction for at least 50% of front-row receptors.
[b] 7-dBA reduction for at least 35% of front-row receptors.
[c] Anticipated cost is less than allowable cost.

None of the wall heights evaluated for Noise Barrier D were found to be both feasible and reasonable. Therefore, a wall at this location is not recommended for balloting.

## Noise Barrier E

Noise Barrier E was modeled south of S.R. 73, east of Canyon Wash Drive in an attempt to shield impacted receptor 96. This wall was 720 feet long (see Appendix D, Build Scenario Noise Walls). As summarized in Table 10, walls ranging in height from 8 to 20 feet were evaluated. More specific calculation details are included in Appendix E, Noise Wall Analysis.

### Table 10. Noise Abatement Analysis for Noise Barrier E

| Barrier Height | Feasibility | | Reasonableness | | | | | Is Barrier Feasible & Reasonable? |
|---|---|---|---|---|---|---|---|---|
| | % Front-row with 5-dBA Reduction | Acoustically Feasible?[a] | % Front-row with 7-dBA Reduction | Noise Abatement Design Goal?[b] | Anticipated Cost | Allowable Cost | Cost-Effective?[c] | |
| 20 | 0.0 | No | 0.0 | No | NA | NA | NA | No |
| 19 | 0.0 | No | 0.0 | No | NA | NA | NA | No |
| 18 | 0.0 | No | 0.0 | No | NA | NA | NA | No |
| 17 | 0.0 | No | 0.0 | No | NA | NA | NA | No |
| 16 | 0.0 | No | 0.0 | No | NA | NA | NA | No |
| 15 | 0.0 | No | 0.0 | No | NA | NA | NA | No |
| 14 | 0.0 | No | 0.0 | No | NA | NA | NA | No |
| 13 | 0.0 | No | 0.0 | No | NA | NA | NA | No |
| 12 | 0.0 | No | 0.0 | No | NA | NA | NA | No |
| 11 | 0.0 | No | 0.0 | No | NA | NA | NA | No |
| 10 | 0.0 | No | 0.0 | No | NA | NA | NA | No |
| 9 | 0.0 | No | 0.0 | No | NA | NA | NA | No |
| 8 | 0.0 | No | 0.0 | No | NA | NA | NA | No |

[a] 5-dBA reduction for at least 50% of front-row receptors.
[b] 7-dBA reduction for at least 35% of front-row receptors.
[c] Anticipated cost is less than allowable cost.

None of the wall heights evaluated for Noise Barrier E were found to be both feasible and reasonable. Therefore, a wall at this location is not recommended for balloting.

## Noise Barrier F

Noise Barrier F was modeled south of S.R. 73 between Peppergrass Drive and Canyon Wash Drive. This wall is about 1,280 feet long (see Appendix D, Build Scenario Noise Walls). As summarized in Table 11, walls ranging in height from 14 to 20 feet were evaluated. More specific calculation details are included in Appendix E, Noise Wall Analysis.

### Table 11. Noise Abatement Analysis for Noise Barrier F

| | Feasibility | | Reasonableness | | | | | |
|---|---|---|---|---|---|---|---|---|
| Barrier Height | % Front-row with 5-dBA Reduction | Acoustically Feasible?[a] | % Front-row with 7-dBA Reduction | Noise Abatement Design Goal?[b] | Anticipated Cost | Allowable Cost | Cost-Effective?[c] | Is Barrier Feasible & Reasonable? |
| 20 | 88.0 | Yes | 88.0 | Yes | $512,000 | $210,000 | No | No |
| 19 | 88.0 | Yes | 88.0 | Yes | $486,400 | $210,000 | No | No |
| 18 | 88.0 | Yes | 88.0 | Yes | $460,800 | $210,000 | No | No |
| 17 | 88.0 | Yes | 88.0 | Yes | $435,200 | $210,000 | No | No |
| 16 | 88.0 | Yes | 75.0 | Yes | $409,600 | $210,000 | No | No |
| 15 | 88.0 | Yes | 38.0 | Yes | $384,000 | $210,000 | No | No |
| 14 | 88.0 | Yes | 13.0 | No | NA | NA | NA | No |

[a] 5-dBA reduction for at least 50% of front-row receptors.
[b] 7-dBA reduction for at least 35% of front-row receptors.
[c] Anticipated cost is less than allowable cost.

None of the wall heights evaluated for Noise Barrier F were found to be both feasible and reasonable. Therefore, a wall at this location is not recommended for balloting.

## Noise Barrier G

Noise Barrier G was modeled south of S.R. 73 between Six Mile Cutoff Road and Peppergrass Drive. This wall is about 1,100 feet long (see Appendix D, Build Scenario Noise Walls). As summarized in Table 12, walls ranging in height from 16 to 20 feet were evaluated. More specific calculation details are included in Appendix E, Noise Wall Analysis.

### Table 12. Noise Abatement Analysis for Noise Barrier G

| Barrier Height | Feasibility | | Reasonableness | | | | | Is Barrier Feasible & Reasonable? |
|---|---|---|---|---|---|---|---|---|
| | % Front-row with 5-dBA Reduction | Acoustically Feasible?[a] | % Front-row with 7-dBA Reduction | Noise Abatement Design Goal?[b] | Anticipated Cost | Allowable Cost | Cost-Effective?[c] | |
| 20 | 100.0 | Yes | 60.0 | Yes | $440,000 | $150,000 | No | No |
| 19 | 100.0 | Yes | 40.0 | Yes | $418,000 | $150,000 | No | No |
| 18 | 100.0 | Yes | 40.0 | Yes | $396,000 | $150,000 | No | No |
| 17 | 100.0 | Yes | 40.0 | Yes | $374,000 | $150,000 | No | No |
| 16 | 100.0 | Yes | 20.0 | No | NA | NA | NA | No |

[a] 5-dBA reduction for at least 50% of front-row receptors.
[b] 7-dBA reduction for at least 35% of front-row receptors.
[c] Anticipated cost is less than allowable cost.

None of the wall heights evaluated for Noise Barrier G were found to be both feasible and reasonable. Therefore, a wall at this location is not recommended for balloting.

## Noise Barrier H

Noise Barrier H was modeled north of S.R. 73 between Sunset Drive and Spring Run Drive. This wall is about 3,969 feet long (see Appendix D, Build Scenario Noise Walls). As summarized in Table 13, walls ranging in height from 16 to 20 feet were evaluated. More specific calculation details are included in Appendix E, Noise Wall Analysis.

### Table 13. Noise Abatement Analysis for Noise Barrier H

| | Feasibility | | Reasonableness | | | | | |
|---|---|---|---|---|---|---|---|---|
| Barrier Height | % Front-row with 5-dBA Reduction | Acoustically Feasible?[a] | % Front-row with 7-dBA Reduction | Noise Abatement Design Goal?[b] | Anticipated Cost | Allowable Cost | Cost-Effective?[c] | Is Barrier Feasible & Reasonable? |
| 20 | 88.0 | Yes | 41.0 | Yes | $1,587,600 | $510,000 | No | No |
| 19 | 88.0 | Yes | 35.0 | Yes | $1,508,220 | $510,000 | No | No |
| 18 | 88.0 | Yes | 35.0 | Yes | $1,428,840 | $480,000 | No | No |
| 17 | 82.0 | Yes | 35.0 | Yes | $1,349,460 | $420,000 | No | No |
| 16 | 76.0 | Yes | 24.0 | No | NA | NA | NA | No |

[a] 5-dBA reduction for at least 50% of front-row receptors.
[b] 7-dBA reduction for at least 35% of front-row receptors.
[c] Anticipated cost is less than allowable cost.

None of the wall heights evaluated for Noise Barrier H were found to be both feasible and reasonable. Therefore, a wall at this location is not recommended for balloting.

## Noise Barrier I

Noise Barrier I was modeled north of S.R. 73 between Mustang Way and Sunset Drive. This wall is about 2,105 feet long (see Appendix D, Build Scenario Noise Walls). As summarized in Table 14, walls ranging in height from 16 to 20 feet were evaluated. More specific calculation details are included in Appendix E, Noise Wall Analysis.

### Table 14. Noise Abatement Analysis for Noise Barrier I

| | Feasibility | | Reasonableness | | | | | |
|---|---|---|---|---|---|---|---|---|
| Barrier Height | % Front-row with 5-dBA Reduction | Acoustically Feasible?[a] | % Front-row with 7-dBA Reduction | Noise Abatement Design Goal?[b] | Anticipated Cost | Allowable Cost | Cost-Effective?[c] | Is Barrier Feasible & Reasonable? |
| 20 | 86.0 | Yes | 29.0 | No | NA | NA | NA | No |
| 18 | 71.0 | Yes | 29.0 | No | NA | NA | NA | No |
| 16 | 57.0 | Yes | 29.0 | No | NA | NA | NA | No |
| 14 | 29.0 | No | 0.0 | No | NA | NA | NA | No |

[a] 5-dBA reduction for at least 50% of front-row receptors.
[b] 7-dBA reduction for at least 35% of front-row receptors.
[c] Anticipated cost is less than allowable cost.

None of the wall heights evaluated for Noise Barrier I were found to be both feasible and reasonable. Therefore, a wall at this location is not recommended for balloting.

## Noise Barrier J

Noise Barrier J was modeled north of S.R. 73 between Canyon Wash Drive and Mustang Way. This wall is about 2,715 feet long (see Appendix D, Build Scenario Noise Walls). As summarized in Table 15, walls ranging in height from 15 to 20 feet were evaluated. More specific calculation details are included in Appendix E, Noise Wall Analysis.

### Table 15. Noise Abatement Analysis for Noise Barrier J

| | Feasibility | | Reasonableness | | | | | |
|---|---|---|---|---|---|---|---|---|
| Barrier Height | % Front-row with 5-dBA Reduction | Acoustically Feasible?[a] | % Front-row with 7-dBA Reduction | Noise Abatement Design Goal?[b] | Anticipated Cost | Allowable Cost | Cost-Effective?[c] | Is Barrier Feasible & Reasonable? |
| 20 | 100.0 | Yes | 88.0 | Yes | $1,086,000 | $270,000 | No | No |
| 19 | 100.0 | Yes | 75.0 | Yes | $1,031,700 | $270,000 | No | No |
| 18 | 100.0 | Yes | 63.0 | Yes | $977,400 | $270,000 | No | No |
| 17 | 88.0 | Yes | 63.0 | Yes | $923,100 | $240,000 | No | No |
| 16 | 75.0 | Yes | 63.0 | Yes | $868,800 | $180,000 | No | No |
| 15 | 75.0 | Yes | 25.0 | No | NA | NA | NA | No |

[a] 5-dBA reduction for at least 50% of front-row receptors.
[b] 7-dBA reduction for at least 35% of front-row receptors.
[c] Anticipated cost is less than allowable cost.

None of the wall heights evaluated for Noise Barrier J were found to be both feasible and reasonable. Therefore, a wall at this location is not recommended for balloting.

## Noise Barrier K

Noise Barrier K was modeled north of S.R. 73, west of Canyon Wash Drive in an attempt to shield impacted receptor 194. This wall was about 840 feet long (see Appendix D, Build Scenario Noise Walls). As summarized in Table 16, walls ranging in height from 8 to 20 feet were evaluated. More specific calculation details are included in Appendix E, Noise Wall Analysis.

### Table 16. Noise Abatement Analysis for Noise Barrier K

| Barrier Height | Feasibility | | Reasonableness | | | | | Is Barrier Feasible & Reasonable? |
|---|---|---|---|---|---|---|---|---|
| | % Front-row with 5-dBA Reduction | Acoustically Feasible?[a] | % Front-row with 7-dBA Reduction | Noise Abatement Design Goal?[b] | Anticipated Cost | Allowable Cost | Cost-Effective?[c] | |
| 20 | 0.0 | No | 0.0 | No | NA | NA | NA | No |
| 19 | 0.0 | No | 0.0 | No | NA | NA | NA | No |
| 18 | 0.0 | No | 0.0 | No | NA | NA | NA | No |
| 17 | 0.0 | No | 0.0 | No | NA | NA | NA | No |
| 16 | 0.0 | No | 0.0 | No | NA | NA | NA | No |
| 15 | 0.0 | No | 0.0 | No | NA | NA | NA | No |
| 14 | 0.0 | No | 0.0 | No | NA | NA | NA | No |
| 13 | 0.0 | No | 0.0 | No | NA | NA | NA | No |
| 12 | 0.0 | No | 0.0 | No | NA | NA | NA | No |
| 11 | 0.0 | No | 0.0 | No | NA | NA | NA | No |
| 10 | 0.0 | No | 0.0 | No | NA | NA | NA | No |
| 9 | 0.0 | No | 0.0 | No | NA | NA | NA | No |
| 8 | 0.0 | No | 0.0 | No | NA | NA | NA | No |

[a] 5-dBA reduction for at least 50% of front-row receptors.
[b] 7-dBA reduction for at least 35% of front-row receptors.
[c] Anticipated cost is less than allowable cost.

None of the wall heights evaluated for Noise Barrier K were found to be both feasible and reasonable. Therefore, a wall at this location is not recommended for balloting.

# 9.0 Construction Noise

## 9.1 Construction Noise Activities

Table 17 shows the noise levels produced by various types of construction equipment. Properly maintained equipment will produce noise levels near the middle of the indicated ranges. The types of construction equipment used for this project will typically generate noise levels of 80 dBA to 90 dBA at a distance of 50 feet while the equipment is operating (EPA 1971; Gharabegian and others 1985; Toth 1979).

Construction equipment operations can vary from intermittent to fairly continuous with multiple pieces of equipment operating concurrently. Assuming that a bulldozer (85 dBA), backhoe (90 dBA), grader (90 dBA), and front-end loader (82 dBA) are operating concurrently in the same area, peak construction-period noise would generally be about 94 dBA at 50 feet from the construction site. Table 17 summarizes noise levels expected near an active construction site with the above equipment operating.

### Table 17. Typical Noise Levels for Construction Equipment

| Type of Equipment | Noise Level (dBA) at 50 Feet |
|---|---|
| Bulldozer | 85 |
| Front loader | 72 – 84 |
| Jack hammer or rock drill | 81 – 98 |
| Crane with headache ball | 75 – 87 |
| Backhoe | 72 – 93 |
| Scraper and grader | 80 – 93 |
| Electrical generator | 71 – 82 |
| Concrete pump | 81 – 83 |
| Concrete vibrator | 76 |
| Concrete and dump trucks | 83 – 90 |
| Air compressor | 74 – 87 |
| Pile drivers (peaks) | 95 – 106 |
| Pneumatic tools | 81 – 98 |
| Roller (compactor) | 73 – 75 |
| Saws | 73 – 82 |

Source: EPA 1971

Locations within about 1,900 feet of a construction site will experience occasional episodes of noise levels greater than 60 dBA. Areas within about 750 feet of a construction site will experience episodes of noise levels greater than 70 dBA. Such episodes of high noise levels associated with the proposed construction would not be continuous throughout the day.

Most construction activities associated with the Proposed Project would occur during daylight hours, which would minimize the number of noise impacts. Noise impacts could occur when construction directly adjacent to residential, park, or recreational areas is necessary.

## 9.2 Construction Noise Mitigation

To reduce temporary noise impacts associated with construction, the contractor will comply with all state and local regulations relating to construction noise. Land uses that are sensitive to traffic noise are also sensitive to construction noise. Methods of controlling construction noise include establishing the hours that construction equipment can be operated and permissible sound levels at those times. In view of this, UDOT has developed a specification that establishes construction noise control. This specification can be found in UDOT's 2017 Standard Specifications for Road and Bridge Construction, Section 01355, Environmental Protection, Part 3.6, Noise Control. The contractor would be required to conform to this specification to reduce the impact of construction noise on the surrounding community.

# 10.0 Information for Local Officials

Activity Categories F and G include lands that are not sensitive to traffic noise. There are no impact criteria for these land use types, so noise abatement is not required. However, for Activity Category G, an estimate of the distance to the approach criteria must be provided to local governments. This will help local government officials promote compatibility between land development and the Proposed Project.

Table 18 lists the distances from the edge of the roadway pavement to the locations where the worst-hour $L_{eq}(h)$ levels of 66 dBA and 71 dBA would occur.

**Table 18. Contour Distance to Future Noise Levels**

| Roadway | Approximate Distance to 66-dBA Noise Level from Edge of S.R. 73 Pavement (feet) | Approximate Distance to 71-dBA Noise Level from Edge of S.R. 73 Pavement (feet) |
|---|---|---|
| S.R. 73 | 280 | 130 |

# 11.0 References

[CEQ] Council on Environmental Quality

1970 Environmental Quality: The First Annual Report of the Council on Environmental Quality. U.S. Government Printing Office, Washington, DC.

[EPA] U.S. Environmental Protection Agency

1971 Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances. NTID300.1. Prepared by Bolt, Beranek, & Newman, Boston, Mass. U.S. Government Printing Office, Washington, DC.

[FHWA] Federal Highway Administration

2011 Highway Traffic Noise: Analysis and Abatement Guidance. FHWA-HEP-10-025. https://www.fhwa.dot.gov/environment/noise/regulations_and_guidance/analysis_and_abatement_guidance/revguidance.pdf. December.

Gharabegian, A., K.M. Cosgrove, J.R. Pehrson, and T.D. Trinh

1985 Forest Fire Fighters' Noise Exposure. *Noise Control Engineering Journal* 25(3): 96–111.

Toth, W.J.

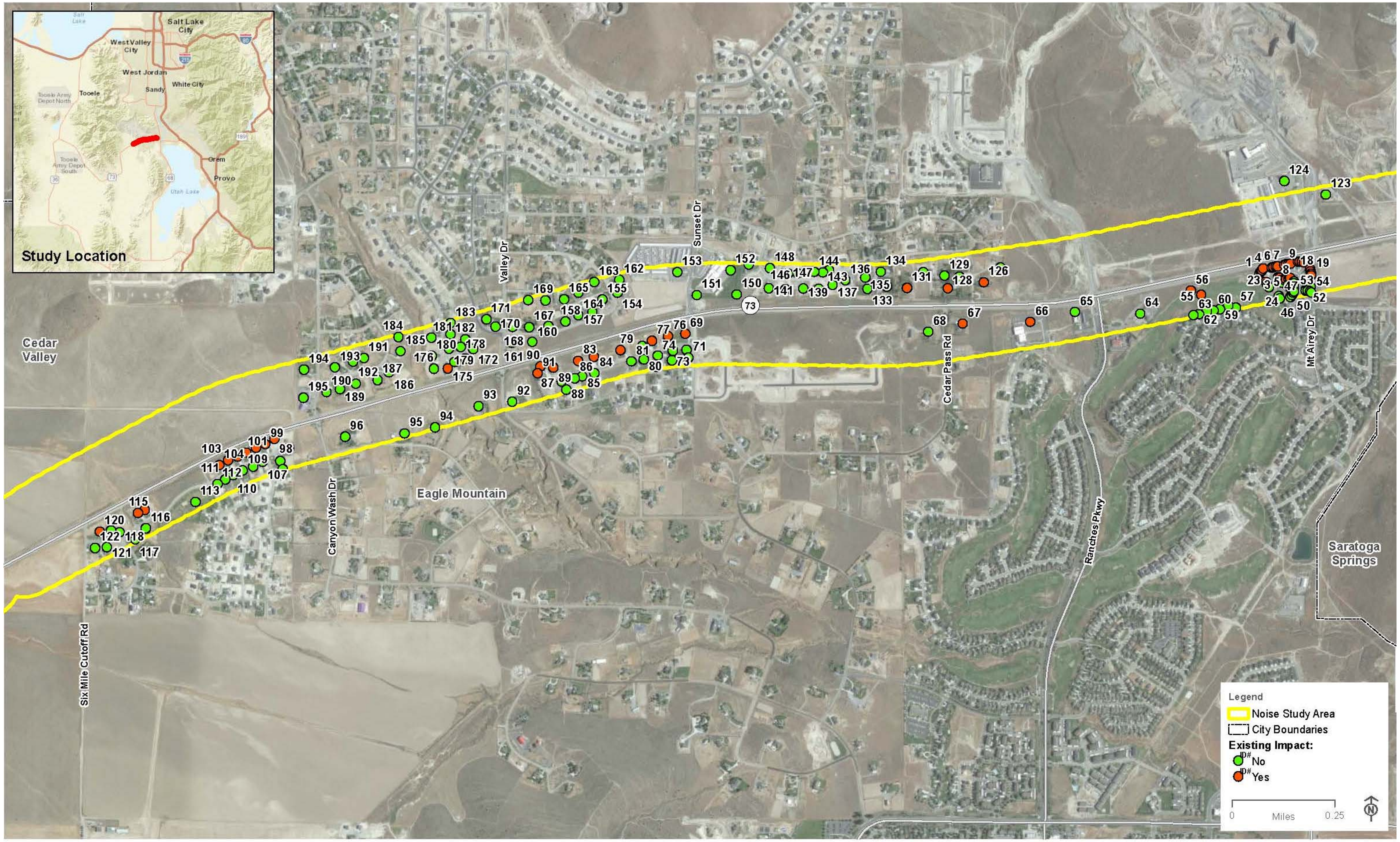
1979 Noise-Abatement Techniques for Construction Equipment. HS-803 293; DOT-TSC-NHTSA-79-45: PB-300 948. U.S. Department of Transportation, National Highway Traffic Safety Administration, Washington, DC.

[UDOT] Utah Department of Transportation

2017 Noise Abatement. UDOT 08A2-1. Effective November 6, 1987. Revised June 15, 2017. https://www.udot.utah.gov/main/uconowner.gf?n=10496602977480171.

# APPENDIX A

Existing Noise Receptor Maps

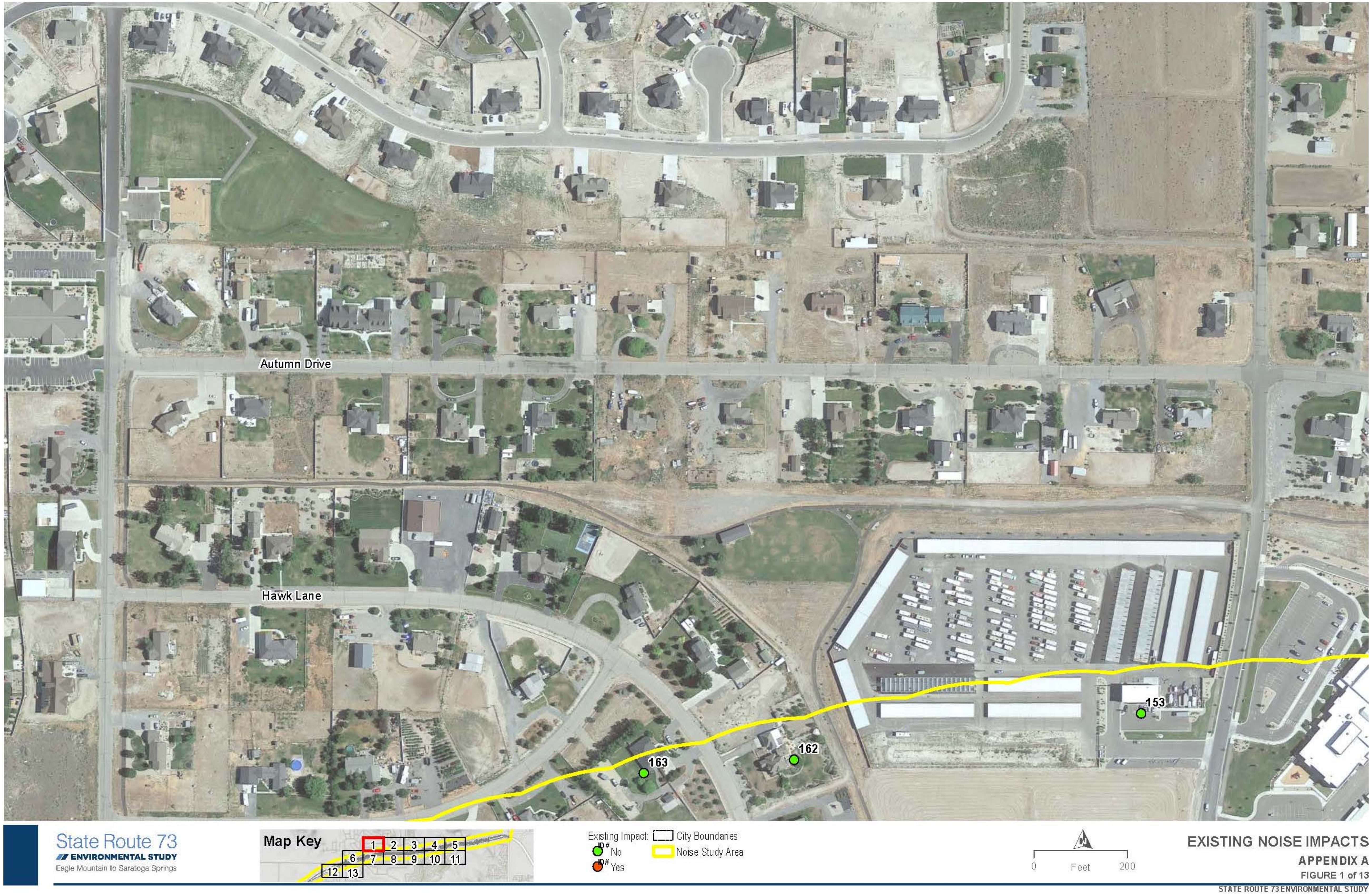



State Route 73
ENVIRONMENTAL STUDY
Eagle Mountain to Saratoga Springs

EXISTING NOISE IMPACTS OVERVIEW

FIGURE 1 OF 1

STATE ROUTE 73 ENVIRONMENTAL STUDY


Autumn Drive
Hawk Lane
153
162
163
State Route 73
ENVIRONMENTAL STUDY
Eagle Mountain to Saratoga Springs
Map Key
1 2 3 4 5
6 7 8 9 10 11
12 13
Existing Impact:
No
Yes
City Boundaries
Noise Study Area
0 Feet 200
EXISTING NOISE IMPACTS
APPENDIX A
FIGURE 1 of 13
STATE ROUTE 73 ENVIRONMENTAL STUDY

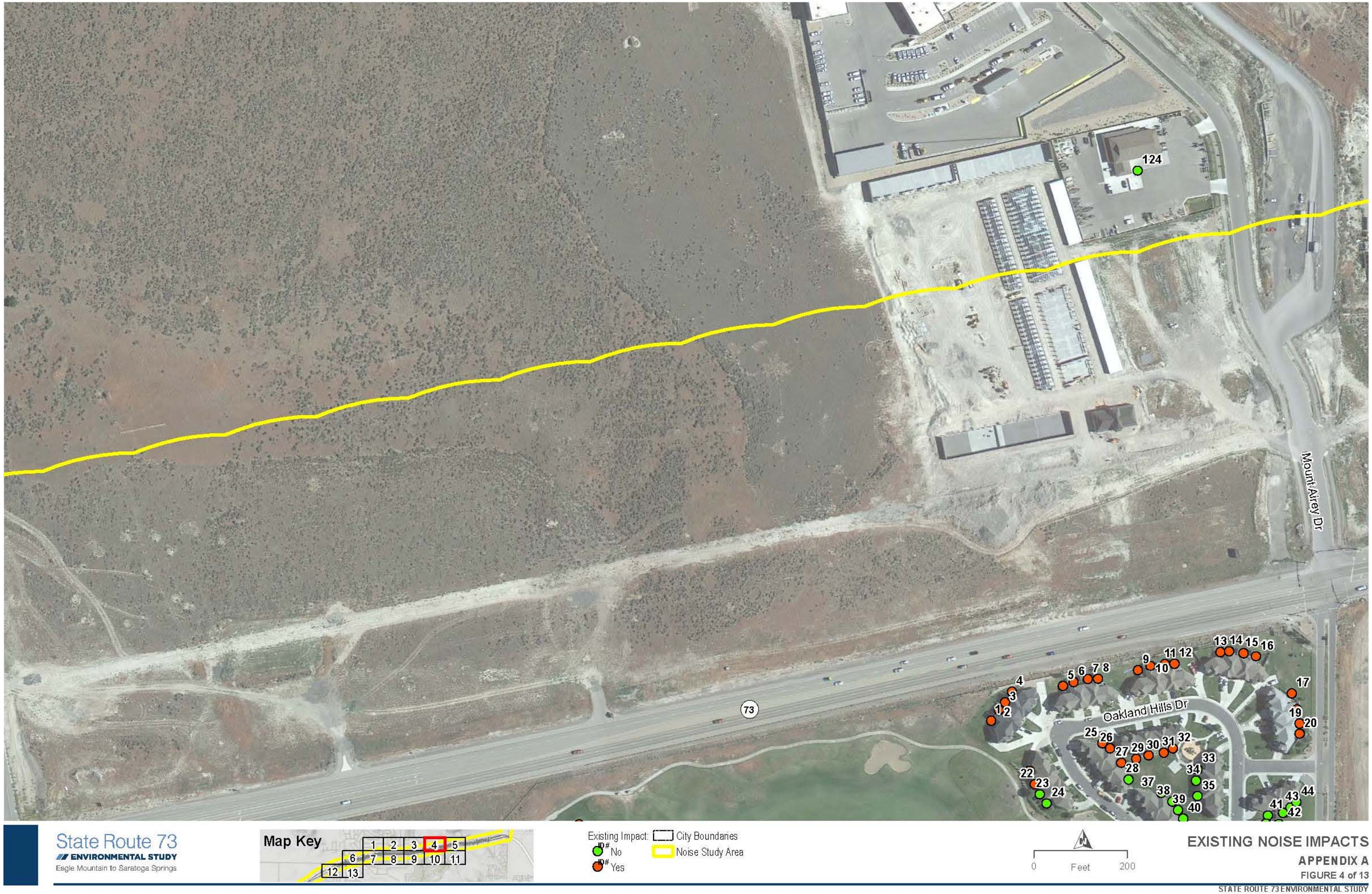

EXISTING NOISE IMPACTS

APPENDIX A

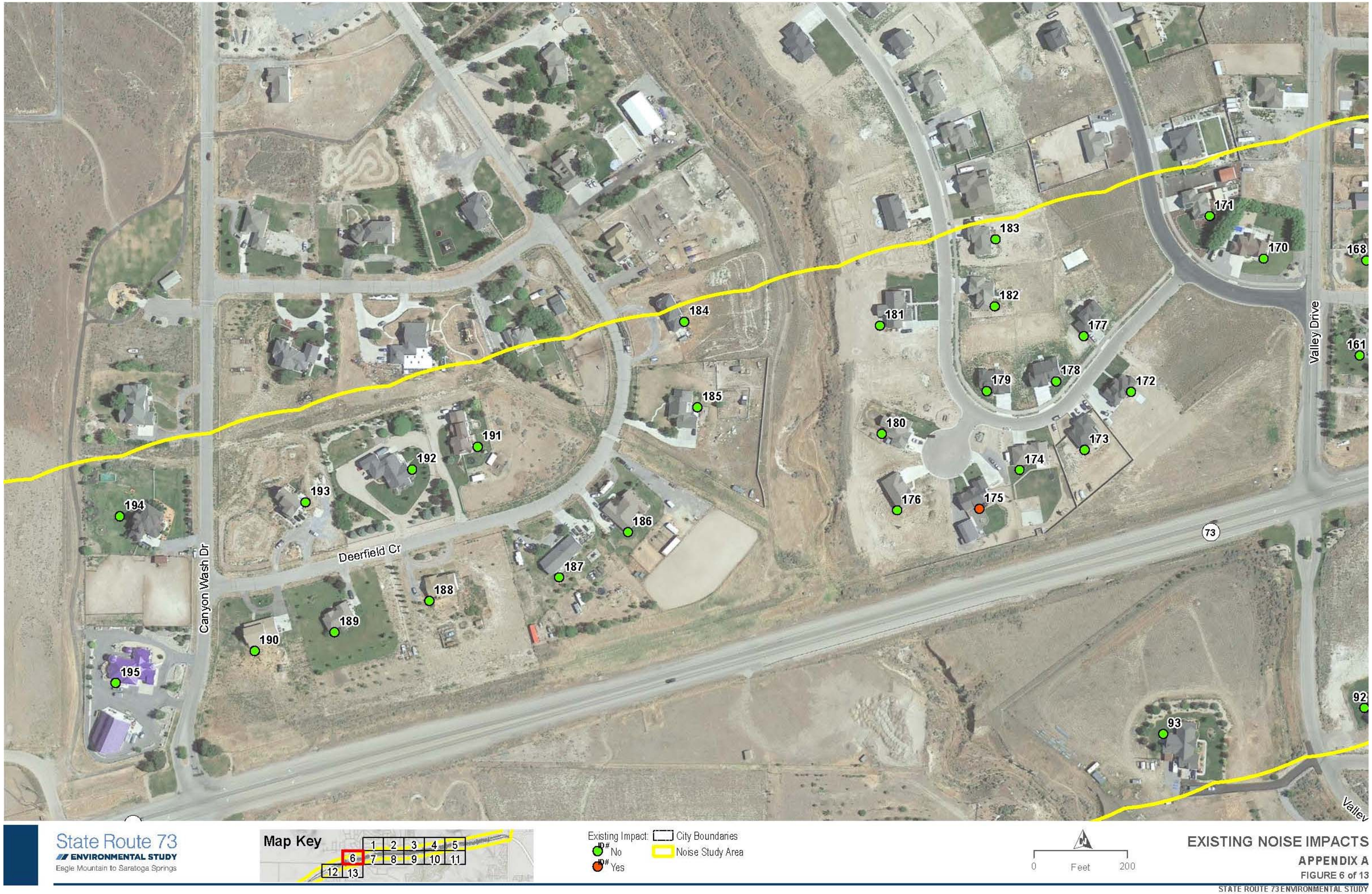
FIGURE 2 of 13

STATE ROUTE 73 ENVIRONMENTAL STUDY


East Ox Bridge
Harvest Lane
Spring Run Dr
125
126
127
128
129
130
131
State Route 73
ENVIRONMENTAL STUDY
Eagle Mountain to Saratoga Springs
Map Key
1
2
3
4
5
6
7
8
9
10
11
12
13
Existing Impact:
No
Yes
City Boundaries
Noise Study Area
0
Feet
200
EXISTING NOISE IMPACTS
APPENDIX A
FIGURE 3 of 13
STATE ROUTE 73 ENVIRONMENTAL STUDY


124
Mount Airey Dr
73
Oakland Hills Dr
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 19 20
22 23 24 25 26 27 28 29 30 31 32 33 34 35 37 38 39 40 41 42 43 44
State Route 73
ENVIRONMENTAL STUDY
Eagle Mountain to Saratoga Springs
Map Key
1 2 3 4 5
6 7 8 9 10 11
12 13
Existing Impact:
No
Yes
City Boundaries
Noise Study Area
0 Feet 200
EXISTING NOISE IMPACTS
APPENDIX A
FIGURE 4 of 13
STATE ROUTE 73 ENVIRONMENTAL STUDY


123
Mount Airey Dr
73
14 15 16
13
17
19
20
43 44
41
42
State Route 73
ENVIRONMENTAL STUDY
Eagle Mountain to Saratoga Springs
Map Key
1 2 3 4 5
6 7 8 9 10 11
12 13
Existing Impact:
No
Yes
City Boundaries
Noise Study Area
0 Feet 200
EXISTING NOISE IMPACTS
APPENDIX A
FIGURE 5 of 13
STATE ROUTE 73 ENVIRONMENTAL STUDY


171
183
170
168
182
184
181
177
161
179
178
172
185
180
173
191
174
192
175
176
193
194
186
187
188
189
190
195
92
93
Canyon Wash Dr
Deerfield Cr
Valley Drive
73
Valley
State Route 73
ENVIRONMENTAL STUDY
Eagle Mountain to Saratoga Springs
Map Key
1
2
3
4
5
6
7
8
9
10
11
12
13
Existing Impact:
No
Yes
City Boundaries
Noise Study Area
0
Feet
200
EXISTING NOISE IMPACTS
APPENDIX A
FIGURE 6 of 13
STATE ROUTE 73 ENVIRONMENTAL STUDY


State Route 73
ENVIRONMENTAL STUDY
Eagle Mountain to Saratoga Springs

Map Key

1 2 3 4 5
6 7 8 9 10 11
12 13

Existing Impact:
ID# No
ID# Yes

City Boundaries
Noise Study Area

0 Feet 200

EXISTING NOISE IMPACTS

APPENDIX A

FIGURE 7 of 13

STATE ROUTE 73 ENVIRONMENTAL STUDY


State Route 73
ENVIRONMENTAL STUDY
Eagle Mountain to Saratoga Springs


Existing Impact:
ID# No
ID# Yes
City Boundaries
Noise Study Area

0 Feet 200

EXISTING NOISE IMPACTS

APPENDIX A

FIGURE 8 of 13

STATE ROUTE 73 ENVIRONMENTAL STUDY


EXISTING NOISE IMPACTS

APPENDIX A

FIGURE 9 of 13

STATE ROUTE 73 ENVIRONMENTAL STUDY


State Route 73
ENVIRONMENTAL STUDY
Eagle Mountain to Saratoga Springs

Map Key
1 2 3 4 5
6 7 8 9 10 11
12 13

Existing Impact:
ID# No
ID# Yes

City Boundaries
Noise Study Area

0 Feet 200

EXISTING NOISE IMPACTS
APPENDIX A
FIGURE 10 of 13
STATE ROUTE 73 ENVIRONMENTAL STUDY


43
44
51
52
53
41
54
Cornwall Way
State Route 73
ENVIRONMENTAL STUDY
Eagle Mountain to Saratoga Springs
Map Key
1
2
3
4
5
6
7
8
9
10
11
12
13
Existing Impact:
No
Yes
City Boundaries
Noise Study Area
0
Feet
200
EXISTING NOISE IMPACTS
APPENDIX A
FIGURE 11 of 13
STATE ROUTE 73 ENVIRONMENTAL STUDY


73
73
Smithfield Drive
Cutoff Road
97
98
99
100
101
102
103
104
105
106
107
108
109
110
111
112
113
114
115
116
117
118
119
120
121
122
State Route 73
ENVIRONMENTAL STUDY
Eagle Mountain to Saratoga Springs
Map Key
1 2 3 4 5
6 7 8 9 10 11
12 13
Existing Impact:
No
Yes
City Boundaries
Noise Study Area
0 Feet 200
EXISTING NOISE IMPACTS
APPENDIX A
FIGURE 12 of 13
STATE ROUTE 73 ENVIRONMENTAL STUDY


EXISTING NOISE IMPACTS
APPENDIX A
FIGURE 13 of 13
STATE ROUTE 73 ENVIRONMENTAL STUDY

# APPENDIX B

## Field Data Sheets

## Ambient Noise Monitoring Data Sheet

**Date:** 9/28/17
**Time:** 10:10 AM
**Monitoring Period:**
**Location:** ML-1 (Ranches Parkway)

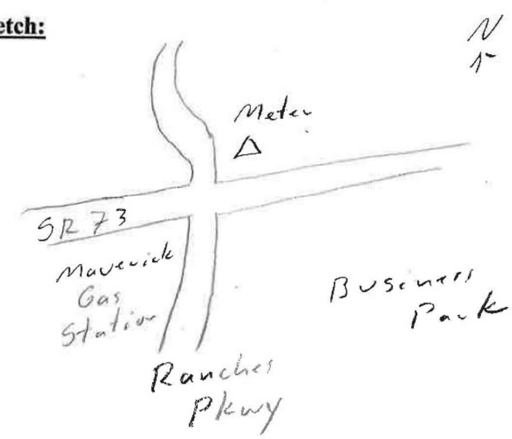
**Client:**
**Project No.:**
**Project Title:** SR-73

| Weather Description | Temp (°F) | Wind (mph) | RH (%) |
|---|---|---|---|
| Calm, high clouds | | | |

| Data and Results | | |
|---|---|---|
| Measurement # | | |
| Leq | 56.6 | |
| Lmin | 39.9 | |
| Lmax | 72.2 | |
| Start Time | | |
| Duration | | |
| File No. | | |

| TNM Vehicle Class Counts | | |
|---|---|---|
| | WB | EB |
| Cars | 43 | 33 |
| Medium Trucks | 1 | 0 |
| Heavy Trucks | 6 | 4 |
| Buses | | |
| Motorcycles | | |

**Monitoring Location Sketch:**




**Notes :**

## Ambient Noise Monitoring Data Sheet

**Date:** 9/28/17
**Time:** 10:50 AM
**Monitoring Period:**
**Location:** ML-2 (East Harvest Lane)

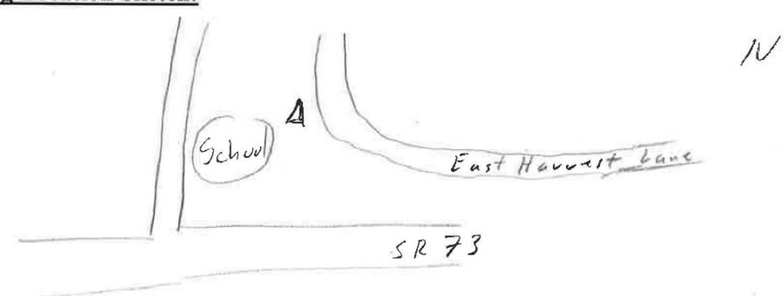
**Client:**
**Project No.:**
**Project Title:** SR-73

| Weather Description | Temp (°F) | Wind (mph) | RH (%) |
|---|---|---|---|
| Calm, Cloudy | | | |

| Data and Results | | |
|---|---|---|
| Measurement # | | |
| Leq | 54.4 | |
| Lmin | 44.3 | |
| Lmax | 63.3 | |
| Start Time | | |
| Duration | 10 min. | |
| File No. | | |

| TNM Vehicle Class Counts | | |
|---|---|---|
| | WB | EB |
| Cars | 45 | 40 |
| Medium Trucks | 5 | 3 |
| Heavy Trucks | 7 | 2 |
| Buses | | |
| Motorcycles | | |

**Monitoring Location Sketch:**




About 500' to ℄ of SR 73
Nail gun on nearby construction (to the east)
Recess at school (Black Ridge Elementary)

**Notes :**

## Ambient Noise Monitoring Data Sheet

**Date:** ~~9/17~~ 9/28/17
**Time:** 11:17 AM
**Monitoring Period:**
**Location:** ML-3 (So. side of SR 73 east of Sunset Dr.

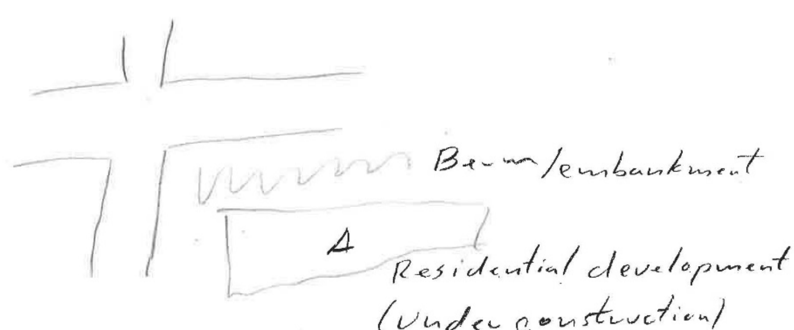
**Client:**
**Project No.:**
**Project Title:**

| Weather Description | Temp (°F) | Wind (mph) | RH (%) |
|---|---|---|---|
| | | | |

| Data and Results | | |
|---|---|---|
| Measurement # | | |
| Leq | 44.5 | |
| Lmin | 39.9 | |
| Lmax | 56.0 | |
| Start Time | | |
| Duration | | |
| File No. | | |

| TNM Vehicle Class Counts | | |
|---|---|---|
| | | |
| Cars | | |
| Medium Trucks | | |
| Heavy Trucks | | |
| Buses | | |
| Motorcycles | | |

**Monitoring Location Sketch:**




On top of embankment
Can't see SR-73 from this location

**Notes :** Excavator in background

## Ambient Noise Monitoring Data Sheet

**Date:** 9/28/17
**Time:** 11:37 AM
**Monitoring Period:**
**Location:** ML-4 (Bobcat Way, east of N 1400 (Valley Dr.)

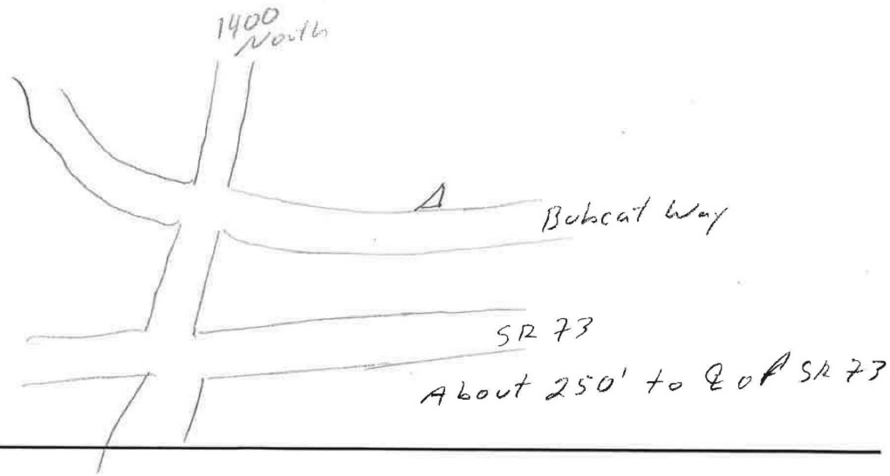
**Client:**
**Project No.:**
**Project Title:**

| Weather Description | Temp (°F) | Wind (mph) | RH (%) |
|---|---|---|---|
| | | | |

| Data and Results | | |
|---|---|---|
| Measurement # | | |
| Leq | 52.0 | |
| Lmin | 40.1 | |
| Lmax | 65.6 | |
| Start Time | | |
| Duration | | |
| File No. | | |

| TNM Vehicle Class Counts | | |
|---|---|---|
| | WB | EB |
| Cars | 29 | 48 |
| Medium Trucks | 3 | 3 |
| Heavy Trucks | 7 | 7 |
| Buses | | |
| Motorcycles | | |

**Monitoring Location Sketch:**




**Notes :**

## Ambient Noise Monitoring Data Sheet

**Date:** 9/28/17
**Time:** 12:05 PM
**Monitoring Period:**
**Location:** ML-5 (So. of SR 73, east of Valley Dr.

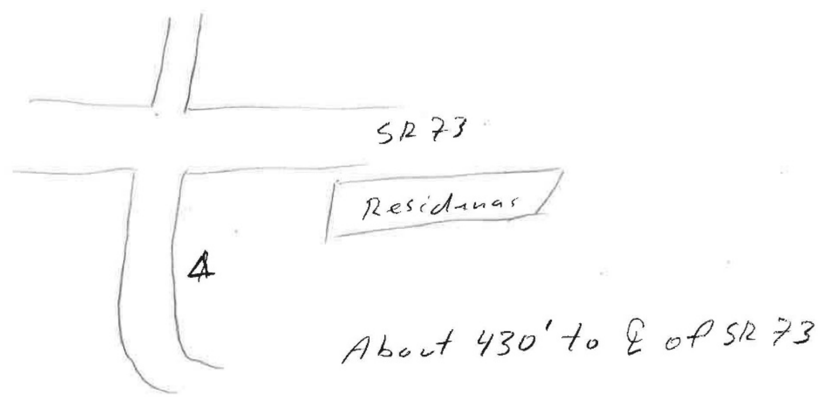
**Client:**
**Project No.:**
**Project Title:**

| Weather Description | Temp (°F) | Wind (mph) | RH (%) |
|---|---|---|---|
| | | | |

| Data and Results | | |
|---|---|---|
| Measurement # | | |
| Leq | 50.7 | |
| Lmin | 37.0 | |
| Lmax | 71.4 | |
| Start Time | | |
| Duration | | |
| File No. | | |

| TNM Vehicle Class Counts | | |
|---|---|---|
| | WB | EB |
| Cars | 18 | 35 |
| Medium Trucks | 5 | 24 |
| Heavy Trucks | 5 | 4 |
| Buses | | |
| Motorcycles | | |

**Monitoring Location Sketch:**




**Notes :**

## Ambient Noise Monitoring Data Sheet

**Date:** 9/28/17
**Time:** 12:42 PM
**Monitoring Period:**
**Location:** ML-6 (Cedar Fork Dr., east of Canyon Wash Dr.)

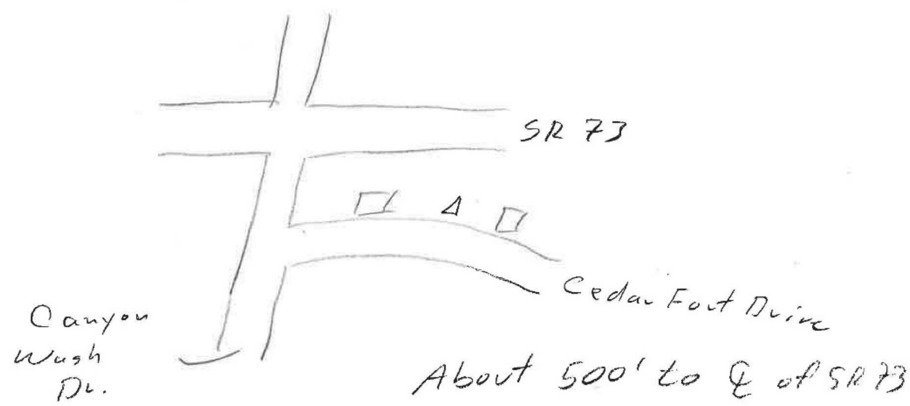
**Client:**
**Project No.:**
**Project Title:**

| Weather Description | Temp (°F) | Wind (mph) | RH (%) |
|---|---|---|---|
| | | | |

| Data and Results | | |
|---|---|---|
| Measurement # | | |
| Leq | 44.8 | |
| Lmin | 37.4 | |
| Lmax | 61.4 | |
| Start Time | | |
| Duration | | |
| File No. | | |

| TNM Vehicle Class Counts | | |
|---|---|---|
| | WB | EB |
| Cars | 35 | 32 |
| Medium Trucks | 3 | 2 |
| Heavy Trucks | 2 | 4 |
| Buses | | |
| Motorcycles | | |

**Monitoring Location Sketch:**




**Notes :**

## Ambient Noise Monitoring Data Sheet

**Date:** 9/28/17
**Time:** 12:25 PM
**Monitoring Period:**
**Location:** ML-7 (Ranch Park)

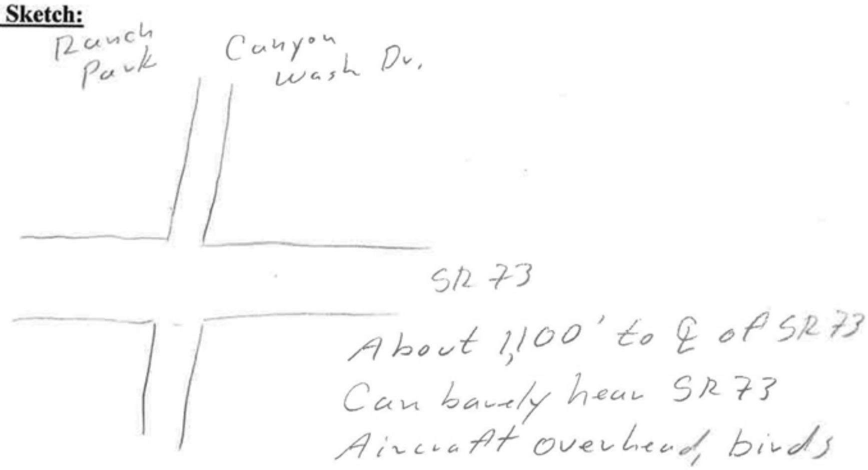
**Client:**
**Project No.:**
**Project Title:**

| Weather Description | Temp (°F) | Wind (mph) | RH (%) |
|---|---|---|---|
| | | | |

| Data and Results | | |
|---|---|---|
| Measurement # | | |
| Leq | 47.8 | |
| Lmin | 37.6 | |
| Lmax | 64.3 | |
| Start Time | | |
| Duration | | |
| File No. | | |

| TNM Vehicle Class Counts | | |
|---|---|---|
| | | |
| Cars | | |
| Medium Trucks | | |
| Heavy Trucks | | |
| Buses | | |
| Motorcycles | | |

**Monitoring Location Sketch:**




**Notes :**

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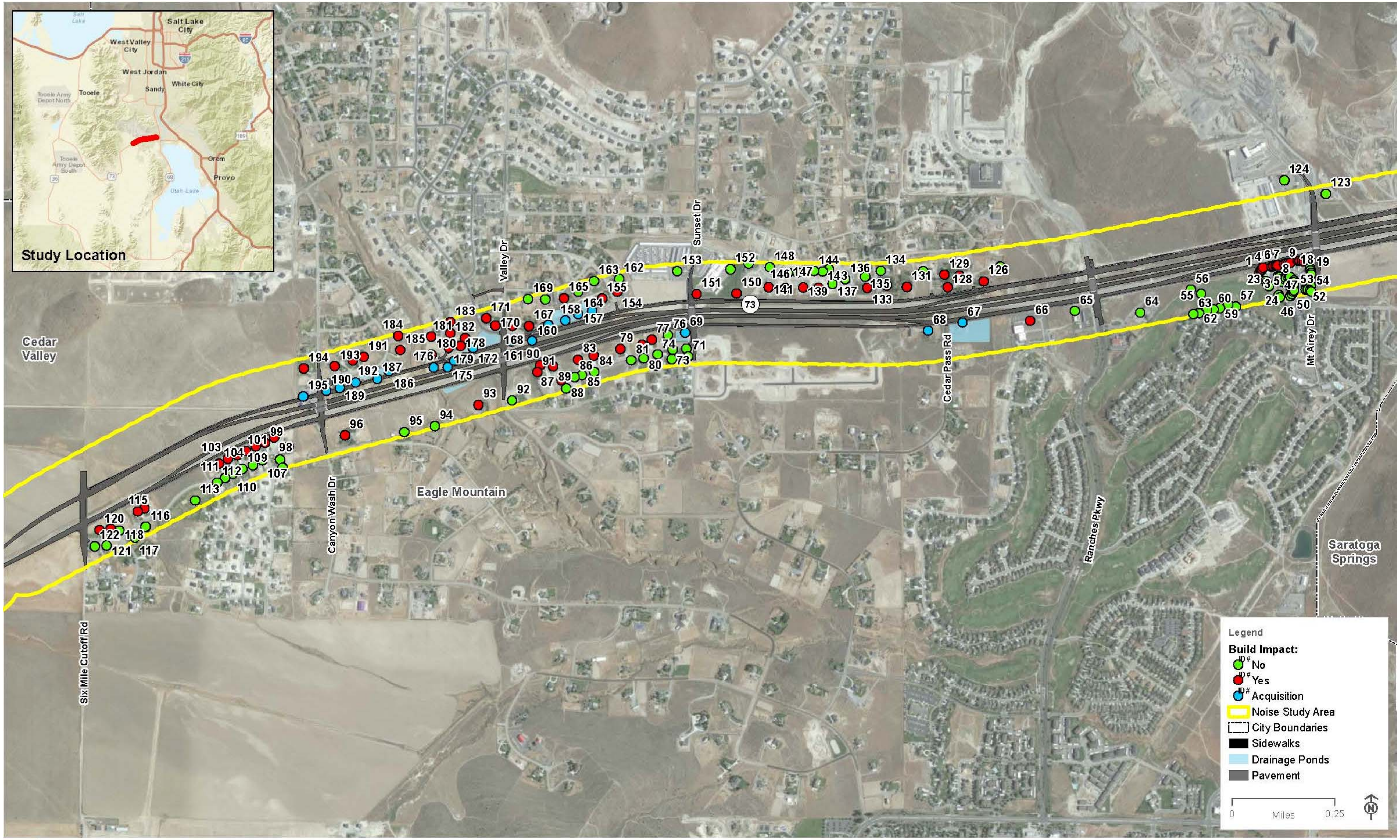
# APPENDIX C

Build Scenario Noise Receptor Maps

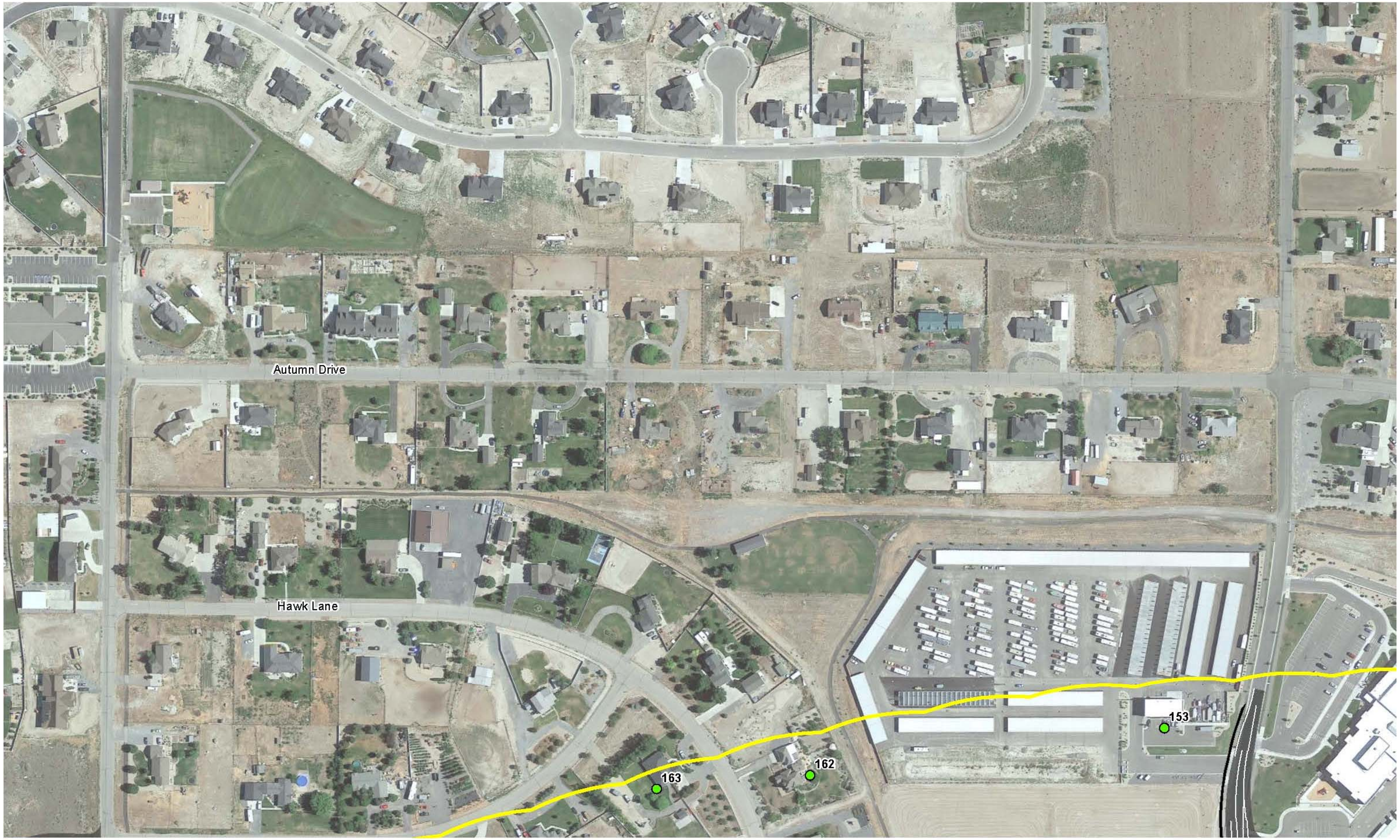



State Route 73
ENVIRONMENTAL STUDY
Eagle Mountain to Saratoga Springs

BUILD SCENARIO NOISE IMPACTS OVERVIEW

FIGURE 1 OF 1

STATE ROUTE 73 ENVIRONMENTAL STUDY





BUILD SCENARIO NOISE IMPACTS

APPENDIX B

FIGURE 1 of 13

STATE ROUTE 73 ENVIRONMENTAL STUDY


BUILD SCENARIO NOISE IMPACTS

APPENDIX B

FIGURE 2 of 13

STATE ROUTE 73 ENVIRONMENTAL STUDY


East Ox Bridge
Harvest Lane
Spring Run Dr
125
126
127
128
129
130
131
State Route 73
ENVIRONMENTAL STUDY
Eagle Mountain to Saratoga Springs
Map Key
1 2 3 4 5
6 7 8 9 10 11
12 13
Build Impact:
Yes
No
Acquisition
City Boundaries
Noise Study Area
Drainage Ponds
Pavement
0 Feet 200
BUILD SCENARIO NOISE IMPACTS
APPENDIX B
FIGURE 3 of 13
STATE ROUTE 73 ENVIRONMENTAL STUDY


BUILD SCENARIO NOISE IMPACTS
APPENDIX B
FIGURE 4 of 13
STATE ROUTE 73 ENVIRONMENTAL STUDY


BUILD SCENARIO NOISE IMPACTS

APPENDIX B

FIGURE 5 of 13

STATE ROUTE 73 ENVIRONMENTAL STUDY


Canyon Wash Dr
Deerfield Cr
Valley Drive
73
171
170
168
183
182
181
184
177
161
179
178
172
185
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173
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192
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193
176
175
194
186
187
188
189
190
195
92
93
State Route 73
ENVIRONMENTAL STUDY
Eagle Mountain to Saratoga Springs
Map Key
1 2 3 4 5
6 7 8 9 10 11
12 13
Build Impact:
Yes
No
Acquisition
City Boundaries
Noise Study Area
Drainage Ponds
Pavement
0 Feet 200
BUILD SCENARIO NOISE IMPACTS
APPENDIX B
FIGURE 6 of 13
STATE ROUTE 73 ENVIRONMENTAL STUDY


169
166
165
164
154
155
151
156
157
158
159
170
168
167
161
160
Valley Drive
73
76
69
77
Sunset Drive
78
79
72
70
74
80
71
81
73
82
83
Riley Drive
75
90
89
84
91
85
86
87
88
92
State Route 73
ENVIRONMENTAL STUDY
Eagle Mountain to Saratoga Springs
Map Key
1 2 3 4 5
6 7 8 9 10 11
12 13
Build Impact: Yes
No
Acquisition
City Boundaries
Noise Study Area
Drainage Ponds
Pavement
0 Feet 200
BUILD SCENARIO NOISE IMPACTS
APPENDIX B
FIGURE 7 of 13
STATE ROUTE 73 ENVIRONMENTAL STUDY


BUILD SCENARIO NOISE IMPACTS

APPENDIX B

FIGURE 8 of 13

STATE ROUTE 73 ENVIRONMENTAL STUDY


131
128
73
65
66
67
68
Cedar Pass Road
Ranches Parkway
State Route 73
ENVIRONMENTAL STUDY
Eagle Mountain to Saratoga Springs
Map Key
1 2 3 4 5
6 7 8 9 10 11
12 13
Build Impact:
Yes
No
Acquisition
City Boundaries
Noise Study Area
Drainage Ponds
Pavement
0 Feet 200
BUILD SCENARIO NOISE IMPACTS
APPENDIX B
FIGURE 9 of 13
STATE ROUTE 73 ENVIRONMENTAL STUDY


State Route 73
ENVIRONMENTAL STUDY
Eagle Mountain to Saratoga Springs

Map Key

1 2 3 4 5 6 7 8 9 10 11 12 13

Build Impact: Yes, No, Acquisition

City Boundaries

Noise Study Area

Drainage Ponds

Pavement

0 Feet 200

## BUILD SCENARIO NOISE IMPACTS

APPENDIX B

FIGURE 10 of 13

STATE ROUTE 73 ENVIRONMENTAL STUDY

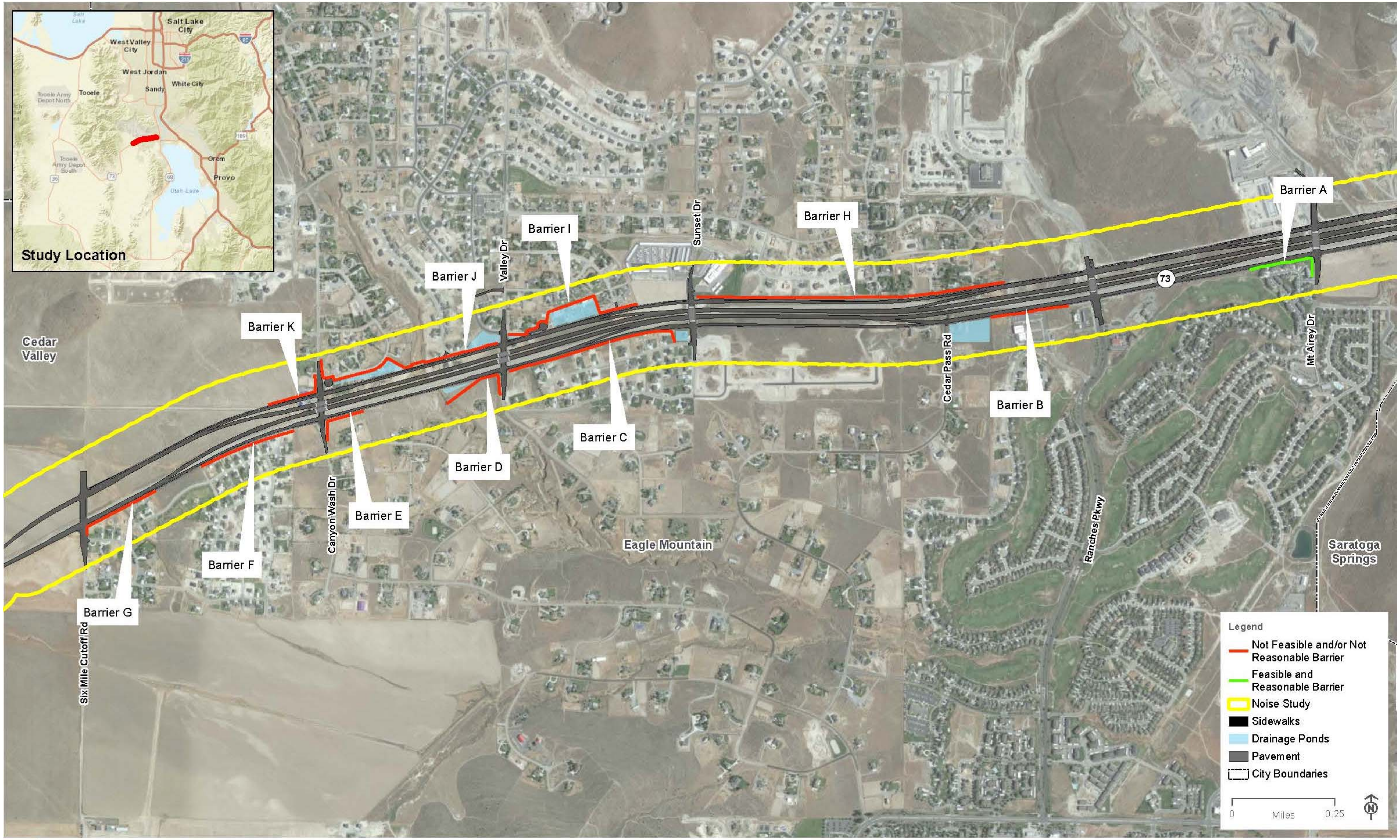

43
44
51
52
53
41
54
Cornwall Way
State Route 73
ENVIRONMENTAL STUDY
Eagle Mountain to Saratoga Springs
Map Key
1
2
3
4
5
6
7
8
9
10
11
12
13
Build Impact:
Yes
No
Acquisition
City Boundaries
Noise Study Area
Drainage Ponds
Pavement
0
Feet
200
BUILD SCENARIO NOISE IMPACTS
APPENDIX B
FIGURE 11 of 13
STATE ROUTE 73 ENVIRONMENTAL STUDY


73
98
99
100
97
101
102
103
107
105
104
108
106
109
110
111
112
73
113
114
115
Smithfield Drive
116
120
119
118
117
122
121
Road
State Route 73
ENVIRONMENTAL STUDY
Eagle Mountain to Saratoga Springs
Map Key
1 2 3 4 5
6 7 8 9 10 11
12 13
Build Impact: Yes
No
Acquisition
City Boundaries
Noise Study Area
Drainage Ponds
Pavement
0 Feet 200
BUILD SCENARIO NOISE IMPACTS
APPENDIX B
FIGURE 12 of 13
STATE ROUTE 73 ENVIRONMENTAL STUDY


73
Canyon Wash Dr
Cedar Fort Drive
94
95
96
97
State Route 73
ENVIRONMENTAL STUDY
Eagle Mountain to Saratoga Springs
Map Key
1 2 3 4 5
6 7 8 9 10 11
12 13
Build Impact:
Yes
No
Acquisition
City Boundaries
Noise Study Area
Drainage Ponds
Pavement
0 Feet 200
BUILD SCENARIO NOISE IMPACTS
APPENDIX B
FIGURE 13 of 13
STATE ROUTE 73 ENVIRONMENTAL STUDY

# APPENDIX D

Build Scenario Noise Walls




State Route 73
ENVIRONMENTAL STUDY
Eagle Mountain to Saratoga Springs

BUILD SCENARIO NOISE WALL REVIEW

FIGURE 1 OF 1

STATE ROUTE 73 ENVIRONMENTAL STUDY

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# APPENDIX E

## Noise Wall Analysis

**Noise Barrier A**

**Wall Length:** 1040 ft

**Wall Cost per sq ft:** $20

**Cost of items critical to safety:**

**# of First Row Receivers:** 16

| Name | # of DU | Relocation | 1st Row | # of 1st Row | Baseline Noise Level | 8-ft Noise Level | 8-ft Noise Reduction | Design Goal | Benefited | 1st Row Design Goal | 1st Row 5 dBA Reduction | 9-ft Noise Level | 9-ft Noise Reduction | Design Goal | Benefited | 1st Row Design Goal | 1st Row 5 dBA Reduction | 10-ft Noise Level | 10-ft Noise Reduction | Design Goal | Benefited | 1st Row Design Goal | 1st Row 5 dBA Reduction | 11-ft Noise Level | 11-ft Noise Reduction | Design Goal | Benefited | 1st Row Design Goal | 1st Row 5 dBA Reduction |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | | Yes | 1 | 66.7 | 62.9 | 3.8 | No | No | No | No | 62.6 | 4.1 | No | No | No | No | 62.3 | 4.4 | No | No | No | No | 62.1 | 4.6 | No | No | No | No |
| 2 | 1 | | Yes | 1 | 67.5 | 62.5 | 5.0 | No | Yes | No | Yes | 62.1 | 5.4 | No | Yes | No | Yes | 61.9 | 5.6 | No | Yes | No | Yes | 61.8 | 5.7 | No | Yes | No | Yes |
| 3 | 1 | | Yes | 1 | 68.5 | 62.6 | 5.9 | No | Yes | No | Yes | 62.2 | 6.3 | No | Yes | No | Yes | 62.1 | 6.4 | No | Yes | No | Yes | 61.9 | 6.6 | No | Yes | No | Yes |
| 4 | 1 | | Yes | 1 | 67.5 | 60.8 | 6.7 | No | Yes | No | Yes | 60.4 | 7.1 | Yes | Yes | Yes | Yes | 60.2 | 7.3 | Yes | Yes | Yes | Yes | 59.8 | 7.7 | Yes | Yes | Yes | Yes |
| 5 | 1 | | Yes | 1 | 70.1 | 61.9 | 8.2 | Yes | Yes | Yes | Yes | 61.5 | 8.6 | Yes | Yes | Yes | Yes | 61.3 | 8.8 | Yes | Yes | Yes | Yes | 61 | 9.1 | Yes | Yes | Yes | Yes |
| 6 | 1 | | Yes | 1 | 70.3 | 61.8 | 8.5 | Yes | Yes | Yes | Yes | 61.4 | 8.9 | Yes | Yes | Yes | Yes | 61.0 | 9.3 | Yes | Yes | Yes | Yes | 60.9 | 9.4 | Yes | Yes | Yes | Yes |
| 7 | 1 | | Yes | 1 | 70.3 | 61.8 | 8.5 | Yes | Yes | Yes | Yes | 61.4 | 8.9 | Yes | Yes | Yes | Yes | 61.0 | 9.3 | Yes | Yes | Yes | Yes | 60.8 | 9.5 | Yes | Yes | Yes | Yes |
| 8 | 1 | | Yes | 1 | 70.0 | 61.9 | 8.1 | Yes | Yes | Yes | Yes | 61.4 | 8.6 | Yes | Yes | Yes | Yes | 61.1 | 8.9 | Yes | Yes | Yes | Yes | 60.8 | 9.2 | Yes | Yes | Yes | Yes |
| 9 | 1 | | Yes | 1 | 69.9 | 61.8 | 8.1 | Yes | Yes | Yes | Yes | 61.3 | 8.6 | Yes | Yes | Yes | Yes | 60.9 | 9.0 | Yes | Yes | Yes | Yes | 60.7 | 9.2 | Yes | Yes | Yes | Yes |
| 10 | 1 | | Yes | 1 | 69.6 | 61.3 | 8.3 | Yes | Yes | Yes | Yes | 60.8 | 8.8 | Yes | Yes | Yes | Yes | 60.3 | 9.3 | Yes | Yes | Yes | Yes | 59.9 | 9.7 | Yes | Yes | Yes | Yes |
| 11 | 1 | | Yes | 1 | 69.6 | 61.6 | 8.0 | Yes | Yes | Yes | Yes | 60.9 | 8.7 | Yes | Yes | Yes | Yes | 60.5 | 9.1 | Yes | Yes | Yes | Yes | 60 | 9.6 | Yes | Yes | Yes | Yes |
| 12 | 1 | | Yes | 1 | 69.6 | 61.8 | 7.8 | Yes | Yes | Yes | Yes | 61.2 | 8.4 | Yes | Yes | Yes | Yes | 60.7 | 8.9 | Yes | Yes | Yes | Yes | 60.3 | 9.3 | Yes | Yes | Yes | Yes |
| 13 | 1 | | Yes | 1 | 70.5 | 61.5 | 9.0 | Yes | Yes | Yes | Yes | 60.7 | 9.8 | Yes | Yes | Yes | Yes | 60.2 | 10.3 | Yes | Yes | Yes | Yes | 59.6 | 10.9 | Yes | Yes | Yes | Yes |
| 14 | 1 | | Yes | 1 | 70.4 | 62.3 | 8.1 | Yes | Yes | Yes | Yes | 61.3 | 9.1 | Yes | Yes | Yes | Yes | 60.5 | 9.9 | Yes | Yes | Yes | Yes | 60.1 | 10.3 | Yes | Yes | Yes | Yes |
| 15 | 1 | | Yes | 1 | 69.9 | 63.5 | 6.4 | No | Yes | No | Yes | 62.5 | 7.4 | Yes | Yes | Yes | Yes | 61.9 | 8.0 | Yes | Yes | Yes | Yes | 61.4 | 8.5 | Yes | Yes | Yes | Yes |
| 16 | 1 | | Yes | 1 | 68.9 | 62.9 | 6.0 | No | Yes | No | Yes | 62.1 | 6.8 | No | Yes | No | Yes | 61.5 | 7.4 | Yes | Yes | Yes | Yes | 61.1 | 7.8 | Yes | Yes | Yes | Yes |
| 17 | 1 | | | 0 | 63.2 | 59.9 | 3.3 | No | No | No | No | 59.5 | 3.7 | No | No | No | No | 59.2 | 4.0 | No | No | No | No | 58.8 | 4.4 | No | No | No | No |
| 18 | 1 | | | 0 | 62.5 | 59.4 | 3.1 | No | No | No | No | 59 | 3.5 | No | No | No | No | 58.6 | 3.9 | No | No | No | No | 58.2 | 4.3 | No | No | No | No |
| 19 | 1 | | | 0 | 61.9 | 59.2 | 2.7 | No | No | No | No | 58.6 | 3.3 | No | No | No | No | 58.1 | 3.8 | No | No | No | No | 57.7 | 4.2 | No | No | No | No |
| 20 | 1 | | | 0 | 61.5 | 59.5 | 2.0 | No | No | No | No | 58.6 | 2.9 | No | No | No | No | 58.0 | 3.5 | No | No | No | No | 57.6 | 3.9 | No | No | No | No |
| 21 | 1 | | | 0 | 59.9 | 59.0 | 0.9 | No | No | No | No | 59 | 0.9 | No | No | No | No | 58.9 | 1.0 | No | No | No | No | 58.7 | 1.2 | No | No | No | No |
| 22 | 1 | | | 0 | 59.3 | 58.4 | 0.9 | No | No | No | No | 58.4 | 0.9 | No | No | No | No | 58.4 | 0.9 | No | No | No | No | 58.2 | 1.1 | No | No | No | No |
| 23 | 1 | | | 0 | 59.0 | 58.1 | 0.9 | No | No | No | No | 58.1 | 0.9 | No | No | No | No | 58.1 | 0.9 | No | No | No | No | 57.9 | 1.1 | No | No | No | No |
| 24 | 1 | | | 0 | 58.8 | 57.9 | 0.9 | No | No | No | No | 57.9 | 0.9 | No | No | No | No | 57.9 | 0.9 | No | No | No | No | 57.8 | 1.0 | No | No | No | No |
| 25 | 1 | | | 0 | 61.1 | 59.5 | 1.6 | No | No | No | No | 59.4 | 1.7 | No | No | No | No | 59.3 | 1.8 | No | No | No | No | 59 | 2.1 | No | No | No | No |
| 26 | 1 | | | 0 | 60.6 | 59.1 | 1.5 | No | No | No | No | 59 | 1.6 | No | No | No | No | 59.0 | 1.6 | No | No | No | No | 58.7 | 1.9 | No | No | No | No |
| 27 | 1 | | | 0 | 60.2 | 58.6 | 1.6 | No | No | No | No | 58.6 | 1.6 | No | No | No | No | 58.6 | 1.6 | No | No | No | No | 58.4 | 1.8 | No | No | No | No |
| 28 | 1 | | | 0 | 59.6 | 58.0 | 1.6 | No | No | No | No | 58 | 1.6 | No | No | No | No | 58.0 | 1.6 | No | No | No | No | 57.9 | 1.7 | No | No | No | No |
| 29 | 1 | | | 0 | 60.2 | 58.8 | 1.4 | No | No | No | No | 58.7 | 1.5 | No | No | No | No | 58.7 | 1.5 | No | No | No | No | 58.6 | 1.6 | No | No | No | No |
| 30 | 1 | | | 0 | 60.6 | 59.0 | 1.6 | No | No | No | No | 58.9 | 1.7 | No | No | No | No | 58.9 | 1.7 | No | No | No | No | 58.8 | 1.8 | No | No | No | No |
| 31 | 1 | | | 0 | 60.5 | 58.8 | 1.7 | No | No | No | No | 58.8 | 1.7 | No | No | No | No | 58.8 | 1.7 | No | No | No | No | 58.6 | 1.9 | No | No | No | No |
| 32 | 1 | | | 0 | 60.6 | 58.9 | 1.7 | No | No | No | No | 58.8 | 1.8 | No | No | No | No | 58.8 | 1.8 | No | No | No | No | 58.6 | 2.0 | No | No | No | No |
| 33 | 1 | | | 0 | 59.5 | 58.0 | 1.5 | No | No | No | No | 58 | 1.5 | No | No | No | No | 57.9 | 1.6 | No | No | No | No | 57.9 | 1.6 | No | No | No | No |
| 34 | 1 | | | 0 | 59.0 | 57.7 | 1.3 | No | No | No | No | 57.6 | 1.4 | No | No | No | No | 57.6 | 1.4 | No | No | No | No | 57.6 | 1.4 | No | No | No | No |
| 35 | 1 | | | 0 | 58.6 | 57.4 | 1.2 | No | No | No | No | 57.3 | 1.3 | No | No | No | No | 57.3 | 1.3 | No | No | No | No | 57.3 | 1.3 | No | No | No | No |
| 36 | 1 | | | 0 | 58.2 | 57.1 | 1.1 | No | No | No | No | 57.1 | 1.1 | No | No | No | No | 57.1 | 1.1 | No | No | No | No | 57.1 | 1.1 | No | No | No | No |
| 37 | 1 | | | 0 | 58.8 | 57.6 | 1.2 | No | No | No | No | 57.6 | 1.2 | No | No | No | No | 57.6 | 1.2 | No | No | No | No | 57.6 | 1.2 | No | No | No | No |
| 38 | 1 | | | 0 | 58.6 | 57.5 | 1.1 | No | No | No | No | 57.4 | 1.2 | No | No | No | No | 57.4 | 1.2 | No | No | No | No | 57.4 | 1.2 | No | No | No | No |
| 39 | 1 | | | 0 | 58.5 | 57.3 | 1.2 | No | No | No | No | 57.3 | 1.2 | No | No | No | No | 57.3 | 1.2 | No | No | No | No | 57.3 | 1.2 | No | No | No | No |
| 40 | 1 | | | 0 | 58.1 | 57.0 | 1.1 | No | No | No | No | 57 | 1.1 | No | No | No | No | 57.0 | 1.1 | No | No | No | No | 57 | 1.1 | No | No | No | No |
| 41 | 1 | | | 0 | 58.0 | 57.5 | 0.5 | No | No | No | No | 57.4 | 0.6 | No | No | No | No | 57.4 | 0.6 | No | No | No | No | 57.4 | 0.6 | No | No | No | No |
| 42 | 1 | | | 0 | 58.5 | 58.0 | 0.5 | No | No | No | No | 58 | 0.5 | No | No | No | No | 57.9 | 0.6 | No | No | No | No | 57.9 | 0.6 | No | No | No | No |
| 43 | 1 | | | 0 | 59.2 | 58.6 | 0.6 | No | No | No | No | 58.5 | 0.7 | No | No | No | No | 58.5 | 0.7 | No | No | No | No | 58.4 | 0.8 | No | No | No | No |
| 44 | 1 | | | 0 | 58.7 | 58.2 | 0.5 | No | No | No | No | 58.2 | 0.5 | No | No | No | No | 58.2 | 0.5 | No | No | No | No | 58.2 | 0.5 | No | No | No | No |
| 45 | 1 | | | 0 | 57.5 | 56.7 | 0.8 | No | No | No | No | 56.7 | 0.8 | No | No | No | No | 56.7 | 0.8 | No | No | No | No | 56.7 | 0.8 | No | No | No | No |
| 46 | 1 | | | 0 | 57.3 | 56.5 | 0.8 | No | No | No | No | 56.4 | 0.9 | No | No | No | No | 56.4 | 0.9 | No | No | No | No | 56.4 | 0.9 | No | No | No | No |
| 47 | 1 | | | 0 | 57.6 | 56.6 | 1.0 | No | No | No | No | 56.5 | 1.1 | No | No | No | No | 56.5 | 1.1 | No | No | No | No | 56.5 | 1.1 | No | No | No | No |
| 48 | 1 | | | 0 | 57.8 | 56.7 | 1.1 | No | No | No | No | 56.7 | 1.1 | No | No | No | No | 56.7 | 1.1 | No | No | No | No | 56.7 | 1.1 | No | No | No | No |
| 49 | 1 | | | 0 | 57.8 | 56.8 | 1.0 | No | No | No | No | 56.8 | 1.0 | No | No | No | No | 56.8 | 1.0 | No | No | No | No | 56.8 | 1.0 | No | No | No | No |
| 50 | 1 | | | 0 | 57.7 | 56.8 | 0.9 | No | No | No | No | 56.8 | 0.9 | No | No | No | No | 56.8 | 0.9 | No | No | No | No | 56.8 | 0.9 | No | No | No | No |
| 51 | 1 | | | 0 | 56.9 | 56.5 | 0.4 | No | No | No | No | 56.5 | 0.4 | No | No | No | No | 56.5 | 0.4 | No | No | No | No | 56.5 | 0.4 | No | No | No | No |
| 52 | 1 | | | 0 | 56.9 | 56.6 | 0.3 | No | No | No | No | 56.6 | 0.3 | No | No | No | No | 56.6 | 0.3 | No | No | No | No | 56.6 | 0.3 | No | No | No | No |
| 53 | 1 | | | 0 | 56.8 | 56.5 | 0.3 | No | No | No | No | 56.5 | 0.3 | No | No | No | No | 56.5 | 0.3 | No | No | No | No | 56.5 | 0.3 | No | No | No | No |
| 54 | 1 | | | 0 | 57.9 | 57.5 | 0.4 | No | No | No | No | 57.5 | 0.4 | No | No | No | No | 57.5 | 0.4 | No | No | No | No | 57.5 | 0.4 | No | No | No | No |

| | | | | |
|---|---|---|---|---|
| **Feasibility Factors:** | | | | |
| **# of First-Row 5 dBA Reduction:** | 15 | 15 | 15 | 15 |
| **% of First-Row 5 dBA Reduction:** | 94% | 94% | 94% | 94% |
| **Acoustic Feasibility (5 dBA reduction for 50% of front-row):** | Yes | Yes | Yes | Yes |
| **Reasonableness Factors:** | | | | |
| **# of First-Row Design Goal:** | 10 | 12 | 13 | 13 |
| **% of First-Row Design Goal:** | 63% | 75% | 81% | 81% |
| **Noise Abatement Design Goal (7 dBA reduction for 35% of front-row):** | Yes | Yes | Yes | Yes |
| **# of Benefited:** | 15 | 15 | 15 | 15 |
| **Cost of Noise Wall (Length x Height x $20/sq ft):** | $166,400 | $187,200 | $208,000 | $228,800 |
| **Cost of any other items critical to safety:** | 0 | 0 | 0 | 0 |
| **Anticipated Cost of Noise Abatement:** | $166,400 | $187,200 | $208,000 | $228,800 |
| **Allowable Cost ($30,000 per benefited receptor):** | $450,000 | $450,000 | $450,000 | $450,000 |
| **Cost Effective (Anticipated Cost < Allowable Cost):** | Yes | Yes | Yes | Yes |
| **Feasible and Reasonable:** | Yes | Yes | Yes | Yes |

| Name | 12-ft Noise Level | 12-ft Noise Reduction | Design Goal | Benefited | 1st Row Design Goal | 1st Row 5 dBA Reduction | 13-ft Noise Level | 13-ft Noise Reduction | Design Goal | Benefited | 1st Row Design Goal | 1st Row 5 dBA Reduction | 14-ft Noise Level | 14-ft Noise Reduction | Design Goal | Benefited | 1st Row Design Goal | 1st Row 5 dBA Reduction | 15-ft Noise Level | 15-ft Noise Reduction | Design Goal | Benefited | 1st Row Design Goal | 1st Row 5 dBA Reduction | 16-ft Noise Level | 16-ft Noise Reduction | Design Goal | Benefited | 1st Row Design Goal | 1st Row 5 dBA Reduction |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 62.0 | 4.7 | No | No | No | No | 62.0 | 4.7 | No | No | No | No | 61.8 | 4.9 | No | No | No | No | 61.6 | 5.1 | No | Yes | No | Yes | 61.4 | 5.3 | No | Yes | No | Yes |
| 2 | 61.7 | 5.8 | No | Yes | No | Yes | 61.6 | 5.9 | No | Yes | No | Yes | 61.3 | 6.2 | No | Yes | No | Yes | 61.1 | 6.4 | No | Yes | No | Yes | 60.9 | 6.6 | No | Yes | No | Yes |
| 3 | 61.7 | 6.8 | No | Yes | No | Yes | 61.6 | 6.9 | No | Yes | No | Yes | 61.3 | 7.2 | Yes | Yes | Yes | Yes | 61 | 7.5 | Yes | Yes | Yes | Yes | 60.8 | 7.7 | Yes | Yes | Yes | Yes |
| 4 | 59.4 | 8.1 | Yes | Yes | Yes | Yes | 59.1 | 8.4 | Yes | Yes | Yes | Yes | 58.9 | 8.6 | Yes | Yes | Yes | Yes | 58.7 | 8.8 | Yes | Yes | Yes | Yes | 58.2 | 9.3 | Yes | Yes | Yes | Yes |
| 5 | 60.8 | 9.3 | Yes | Yes | Yes | Yes | 60.6 | 9.5 | Yes | Yes | Yes | Yes | 60.2 | 9.9 | Yes | Yes | Yes | Yes | 59.7 | 10.4 | Yes | Yes | Yes | Yes | 59.3 | 10.8 | Yes | Yes | Yes | Yes |
| 6 | 60.6 | 9.7 | Yes | Yes | Yes | Yes | 60.2 | 10.1 | Yes | Yes | Yes | Yes | 59.8 | 10.5 | Yes | Yes | Yes | Yes | 59.5 | 10.8 | Yes | Yes | Yes | Yes | 59.2 | 11.1 | Yes | Yes | Yes | Yes |
| 7 | 60.6 | 9.7 | Yes | Yes | Yes | Yes | 60.2 | 10.1 | Yes | Yes | Yes | Yes | 59.8 | 10.5 | Yes | Yes | Yes | Yes | 59.5 | 10.8 | Yes | Yes | Yes | Yes | 59.2 | 11.1 | Yes | Yes | Yes | Yes |
| 8 | 60.8 | 9.2 | Yes | Yes | Yes | Yes | 60.5 | 9.5 | Yes | Yes | Yes | Yes | 60.0 | 10.0 | Yes | Yes | Yes | Yes | 59.6 | 10.4 | Yes | Yes | Yes | Yes | 59.2 | 10.8 | Yes | Yes | Yes | Yes |
| 9 | 60.6 | 9.3 | Yes | Yes | Yes | Yes | 60.2 | 9.7 | Yes | Yes | Yes | Yes | 59.7 | 10.2 | Yes | Yes | Yes | Yes | 59.4 | 10.5 | Yes | Yes | Yes | Yes | 59.2 | 10.7 | Yes | Yes | Yes | Yes |
| 10 | 59.7 | 9.9 | Yes | Yes | Yes | Yes | 59.6 | 10.0 | Yes | Yes | Yes | Yes | 59.1 | 10.5 | Yes | Yes | Yes | Yes | 58.6 | 11.0 | Yes | Yes | Yes | Yes | 58.2 | 11.4 | Yes | Yes | Yes | Yes |
| 11 | 59.5 | 10.1 | Yes | Yes | Yes | Yes | 59.1 | 10.5 | Yes | Yes | Yes | Yes | 59.2 | 10.4 | Yes | Yes | Yes | Yes | 58.9 | 10.7 | Yes | Yes | Yes | Yes | 58.7 | 10.9 | Yes | Yes | Yes | Yes |
| 12 | 59.8 | 9.8 | Yes | Yes | Yes | Yes | 59.3 | 10.3 | Yes | Yes | Yes | Yes | 59.2 | 10.4 | Yes | Yes | Yes | Yes | 59.1 | 10.5 | Yes | Yes | Yes | Yes | 58.9 | 10.7 | Yes | Yes | Yes | Yes |
| 13 | 59.2 | 11.3 | Yes | Yes | Yes | Yes | 58.9 | 11.6 | Yes | Yes | Yes | Yes | 58.5 | 12.0 | Yes | Yes | Yes | Yes | 58.1 | 12.4 | Yes | Yes | Yes | Yes | 57.8 | 12.7 | Yes | Yes | Yes | Yes |
| 14 | 59.8 | 10.6 | Yes | Yes | Yes | Yes | 59.6 | 10.8 | Yes | Yes | Yes | Yes | 59.1 | 11.3 | Yes | Yes | Yes | Yes | 58.7 | 11.7 | Yes | Yes | Yes | Yes | 58.2 | 12.2 | Yes | Yes | Yes | Yes |
| 15 | 60.9 | 9.0 | Yes | Yes | Yes | Yes | 60.8 | 9.1 | Yes | Yes | Yes | Yes | 60.6 | 9.3 | Yes | Yes | Yes | Yes | 60.2 | 9.7 | Yes | Yes | Yes | Yes | 59.6 | 10.3 | Yes | Yes | Yes | Yes |
| 16 | 60.7 | 8.2 | Yes | Yes | Yes | Yes | 60.7 | 8.2 | Yes | Yes | Yes | Yes | 60.5 | 8.4 | Yes | Yes | Yes | Yes | 60.2 | 8.7 | Yes | Yes | Yes | Yes | 59.9 | 9.0 | Yes | Yes | Yes | Yes |
| 17 | 58.5 | 4.7 | No | No | No | No | 58.3 | 4.9 | No | No | No | No | 58.1 | 5.1 | No | Yes | No | No | 57.9 | 5.3 | No | Yes | No | No | 57.7 | 5.5 | No | Yes | No | No |
| 18 | 57.8 | 4.7 | No | No | No | No | 57.5 | 5.0 | No | Yes | No | No | 57.3 | 5.2 | No | Yes | No | No | 57.1 | 5.4 | No | Yes | No | No | 56.9 | 5.6 | No | Yes | No | No |
| 19 | 57.3 | 4.6 | No | No | No | No | 57 | 4.9 | No | No | No | No | 56.8 | 5.1 | No | Yes | No | No | 56.6 | 5.3 | No | Yes | No | No | 56.3 | 5.6 | No | Yes | No | No |
| 20 | 57.2 | 4.3 | No | No | No | No | 56.9 | 4.6 | No | No | No | No | 56.7 | 4.8 | No | No | No | No | 56.4 | 5.1 | No | Yes | No | No | 56.2 | 5.3 | No | Yes | No | No |
| 21 | 58.6 | 1.3 | No | No | No | No | 58.5 | 1.4 | No | No | No | No | 58.4 | 1.5 | No | No | No | No | 58.3 | 1.6 | No | No | No | No | 58.2 | 1.7 | No | No | No | No |
| 22 | 58.2 | 1.1 | No | No | No | No | 58.1 | 1.2 | No | No | No | No | 58.0 | 1.3 | No | No | No | No | 57.9 | 1.4 | No | No | No | No | 57.7 | 1.6 | No | No | No | No |
| 23 | 57.9 | 1.1 | No | No | No | No | 57.8 | 1.2 | No | No | No | No | 57.7 | 1.3 | No | No | No | No | 57.6 | 1.4 | No | No | No | No | 57.5 | 1.5 | No | No | No | No |
| 24 | 57.7 | 1.1 | No | No | No | No | 57.6 | 1.2 | No | No | No | No | 57.5 | 1.3 | No | No | No | No | 57.4 | 1.4 | No | No | No | No | 57.3 | 1.5 | No | No | No | No |
| 25 | 58.9 | 2.2 | No | No | No | No | 58.8 | 2.3 | No | No | No | No | 58.7 | 2.4 | No | No | No | No | 58.6 | 2.5 | No | No | No | No | 58.4 | 2.7 | No | No | No | No |
| 26 | 58.6 | 2.0 | No | No | No | No | 58.5 | 2.1 | No | No | No | No | 58.4 | 2.2 | No | No | No | No | 58.2 | 2.4 | No | No | No | No | 58.1 | 2.5 | No | No | No | No |
| 27 | 58.3 | 1.9 | No | No | No | No | 58.2 | 2.0 | No | No | No | No | 58.1 | 2.1 | No | No | No | No | 57.9 | 2.3 | No | No | No | No | 57.8 | 2.4 | No | No | No | No |
| 28 | 57.7 | 1.9 | No | No | No | No | 57.6 | 2.0 | No | No | No | No | 57.6 | 2.0 | No | No | No | No | 57.4 | 2.2 | No | No | No | No | 57.3 | 2.3 | No | No | No | No |
| 29 | 58.4 | 1.8 | No | No | No | No | 58.3 | 1.9 | No | No | No | No | 58.2 | 2.0 | No | No | No | No | 58 | 2.2 | No | No | No | No | 57.9 | 2.3 | No | No | No | No |
| 30 | 58.6 | 2.0 | No | No | No | No | 58.5 | 2.1 | No | No | No | No | 58.4 | 2.2 | No | No | No | No | 58.2 | 2.4 | No | No | No | No | 58.1 | 2.5 | No | No | No | No |
| 31 | 58.4 | 2.1 | No | No | No | No | 58.3 | 2.2 | No | No | No | No | 58.2 | 2.3 | No | No | No | No | 58.1 | 2.4 | No | No | No | No | 57.9 | 2.6 | No | No | No | No |
| 32 | 58.4 | 2.2 | No | No | No | No | 58.3 | 2.3 | No | No | No | No | 58.2 | 2.4 | No | No | No | No | 58.1 | 2.5 | No | No | No | No | 57.9 | 2.7 | No | No | No | No |
| 33 | 57.7 | 1.8 | No | No | No | No | 57.5 | 2.0 | No | No | No | No | 57.4 | 2.1 | No | No | No | No | 57.3 | 2.2 | No | No | No | No | 57.2 | 2.3 | No | No | No | No |
| 34 | 57.3 | 1.7 | No | No | No | No | 57.3 | 1.7 | No | No | No | No | 57.2 | 1.8 | No | No | No | No | 57.1 | 1.9 | No | No | No | No | 57.0 | 2.0 | No | No | No | No |
| 35 | 57.1 | 1.5 | No | No | No | No | 57 | 1.6 | No | No | No | No | 57.0 | 1.6 | No | No | No | No | 56.9 | 1.7 | No | No | No | No | 56.8 | 1.8 | No | No | No | No |
| 36 | 56.9 | 1.3 | No | No | No | No | 56.8 | 1.4 | No | No | No | No | 56.8 | 1.4 | No | No | No | No | 56.7 | 1.5 | No | No | No | No | 56.6 | 1.6 | No | No | No | No |
| 37 | 57.4 | 1.4 | No | No | No | No | 57.3 | 1.5 | No | No | No | No | 57.2 | 1.6 | No | No | No | No | 57.1 | 1.7 | No | No | No | No | 57.0 | 1.8 | No | No | No | No |
| 38 | 57.3 | 1.3 | No | No | No | No | 57.2 | 1.4 | No | No | No | No | 57.1 | 1.5 | No | No | No | No | 57 | 1.6 | No | No | No | No | 56.9 | 1.7 | No | No | No | No |
| 39 | 57.1 | 1.4 | No | No | No | No | 57 | 1.5 | No | No | No | No | 57.0 | 1.5 | No | No | No | No | 56.9 | 1.6 | No | No | No | No | 56.8 | 1.7 | No | No | No | No |
| 40 | 56.8 | 1.3 | No | No | No | No | 56.8 | 1.3 | No | No | No | No | 56.7 | 1.4 | No | No | No | No | 56.6 | 1.5 | No | No | No | No | 56.5 | 1.6 | No | No | No | No |
| 41 | 57.3 | 0.7 | No | No | No | No | 57.3 | 0.7 | No | No | No | No | 57.2 | 0.8 | No | No | No | No | 57.2 | 0.8 | No | No | No | No | 57.1 | 0.9 | No | No | No | No |
| 42 | 57.8 | 0.7 | No | No | No | No | 57.8 | 0.7 | No | No | No | No | 57.7 | 0.8 | No | No | No | No | 57.7 | 0.8 | No | No | No | No | 57.7 | 0.8 | No | No | No | No |
| 43 | 58.4 | 0.8 | No | No | No | No | 58.3 | 0.9 | No | No | No | No | 58.2 | 1.0 | No | No | No | No | 58.2 | 1.0 | No | No | No | No | 58.1 | 1.1 | No | No | No | No |
| 44 | 58.1 | 0.6 | No | No | No | No | 58.1 | 0.6 | No | No | No | No | 58.1 | 0.6 | No | No | No | No | 58 | 0.7 | No | No | No | No | 58.0 | 0.7 | No | No | No | No |
| 45 | 56.6 | 0.9 | No | No | No | No | 56.5 | 1.0 | No | No | No | No | 56.5 | 1.0 | No | No | No | No | 56.4 | 1.1 | No | No | No | No | 56.3 | 1.2 | No | No | No | No |
| 46 | 56.4 | 0.9 | No | No | No | No | 56.3 | 1.0 | No | No | No | No | 56.2 | 1.1 | No | No | No | No | 56.2 | 1.1 | No | No | No | No | 56.1 | 1.2 | No | No | No | No |
| 47 | 56.5 | 1.1 | No | No | No | No | 56.4 | 1.2 | No | No | No | No | 56.3 | 1.3 | No | No | No | No | 56.3 | 1.3 | No | No | No | No | 56.2 | 1.4 | No | No | No | No |
| 48 | 56.6 | 1.2 | No | No | No | No | 56.5 | 1.3 | No | No | No | No | 56.5 | 1.3 | No | No | No | No | 56.4 | 1.4 | No | No | No | No | 56.3 | 1.5 | No | No | No | No |
| 49 | 56.7 | 1.1 | No | No | No | No | 56.6 | 1.2 | No | No | No | No | 56.5 | 1.3 | No | No | No | No | 56.5 | 1.3 | No | No | No | No | 56.4 | 1.4 | No | No | No | No |
| 50 | 56.7 | 1.0 | No | No | No | No | 56.6 | 1.1 | No | No | No | No | 56.5 | 1.2 | No | No | No | No | 56.5 | 1.2 | No | No | No | No | 56.4 | 1.3 | No | No | No | No |
| 51 | 56.4 | 0.5 | No | No | No | No | 56.4 | 0.5 | No | No | No | No | 56.4 | 0.5 | No | No | No | No | 56.4 | 0.5 | No | No | No | No | 56.3 | 0.6 | No | No | No | No |
| 52 | 56.5 | 0.4 | No | No | No | No | 56.4 | 0.5 | No | No | No | No | 56.4 | 0.5 | No | No | No | No | 56.4 | 0.5 | No | No | No | No | 56.4 | 0.5 | No | No | No | No |
| 53 | 56.4 | 0.4 | No | No | No | No | 56.4 | 0.4 | No | No | No | No | 56.4 | 0.4 | No | No | No | No | 56.4 | 0.4 | No | No | No | No | 56.3 | 0.5 | No | No | No | No |
| 54 | 57.5 | 0.4 | No | No | No | No | 57.4 | 0.5 | No | No | No | No | 57.4 | 0.5 | No | No | No | No | 57.4 | 0.5 | No | No | No | No | 57.3 | 0.6 | No | No | No | No |

| | | | | |
|---|---|---|---|---|
| 15 | 15 | 15 | 16 | 16 |
| 94% | 94% | 94% | 100% | 100% |
| Yes | Yes | Yes | Yes | Yes |
| 13 | 13 | 14 | 14 | 14 |
| 81% | 81% | 88% | 88% | 88% |
| Yes | Yes | Yes | Yes | Yes |
| 15 | 16 | 18 | 20 | 20 |
| $249,600 | $270,400 | $291,200 | $312,000 | $332,800 |
| 0 | 0 | 0 | 0 | 0 |
| $249,600 | $270,400 | $291,200 | $312,000 | $332,800 |
| $450,000 | $480,000 | $540,000 | $600,000 | $600,000 |
| Yes | Yes | Yes | Yes | Yes |
| Yes | Yes | Yes | Yes | Yes |

| Name | 17-ft Noise Level | 17-ft Noise Reduction | Design Goal | Benefited | 1st Row Design Goal | 1st Row 5 dBA Reduction | 18-ft Noise Level | 18-ft Noise Reduction | Design Goal | Benefited | 1st Row Design Goal | 1st Row 5 dBA Reduction |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 61.3 | 5.4 | No | Yes | No | Yes | 61.1 | 5.6 | No | Yes | No | Yes |
| 2 | 60.7 | 6.8 | No | Yes | No | Yes | 60.6 | 6.9 | No | Yes | No | Yes |
| 3 | 60.6 | 7.9 | Yes | Yes | Yes | Yes | 60.4 | 8.1 | Yes | Yes | Yes | Yes |
| 4 | 57.7 | 9.8 | Yes | Yes | Yes | Yes | 57.3 | 10.2 | Yes | Yes | Yes | Yes |
| 5 | 59.1 | 11.0 | Yes | Yes | Yes | Yes | 58.9 | 11.2 | Yes | Yes | Yes | Yes |
| 6 | 58.8 | 11.5 | Yes | Yes | Yes | Yes | 58.3 | 12.0 | Yes | Yes | Yes | Yes |
| 7 | 58.8 | 11.5 | Yes | Yes | Yes | Yes | 58.3 | 12.0 | Yes | Yes | Yes | Yes |
| 8 | 59 | 11.0 | Yes | Yes | Yes | Yes | 58.7 | 11.3 | Yes | Yes | Yes | Yes |
| 9 | 58.8 | 11.1 | Yes | Yes | Yes | Yes | 58.3 | 11.6 | Yes | Yes | Yes | Yes |
| 10 | 57.9 | 11.7 | Yes | Yes | Yes | Yes | 57.7 | 11.9 | Yes | Yes | Yes | Yes |
| 11 | 58.3 | 11.3 | Yes | Yes | Yes | Yes | 57.8 | 11.8 | Yes | Yes | Yes | Yes |
| 12 | 58.6 | 11.0 | Yes | Yes | Yes | Yes | 58.1 | 11.5 | Yes | Yes | Yes | Yes |
| 13 | 57.5 | 13.0 | Yes | Yes | Yes | Yes | 57.2 | 13.3 | Yes | Yes | Yes | Yes |
| 14 | 57.8 | 12.6 | Yes | Yes | Yes | Yes | 57.5 | 12.9 | Yes | Yes | Yes | Yes |
| 15 | 59.1 | 10.8 | Yes | Yes | Yes | Yes | 58.7 | 11.2 | Yes | Yes | Yes | Yes |
| 16 | 59.5 | 9.4 | Yes | Yes | Yes | Yes | 59.1 | 9.8 | Yes | Yes | Yes | Yes |
| 17 | 57.5 | 5.7 | No | Yes | No | No | 57.2 | 6.0 | No | Yes | No | No |
| 18 | 56.6 | 5.9 | No | Yes | No | No | 56.4 | 6.1 | No | Yes | No | No |
| 19 | 56.1 | 5.8 | No | Yes | No | No | 55.9 | 6.0 | No | Yes | No | No |
| 20 | 55.9 | 5.6 | No | Yes | No | No | 55.7 | 5.8 | No | Yes | No | No |
| 21 | 58 | 1.9 | No | No | No | No | 57.9 | 2.0 | No | No | No | No |
| 22 | 57.6 | 1.7 | No | No | No | No | 57.5 | 1.8 | No | No | No | No |
| 23 | 57.4 | 1.6 | No | No | No | No | 57.3 | 1.7 | No | No | No | No |
| 24 | 57.2 | 1.6 | No | No | No | No | 57.1 | 1.7 | No | No | No | No |
| 25 | 58.2 | 2.9 | No | No | No | No | 58.1 | 3.0 | No | No | No | No |
| 26 | 57.9 | 2.7 | No | No | No | No | 57.8 | 2.8 | No | No | No | No |
| 27 | 57.6 | 2.6 | No | No | No | No | 57.5 | 2.7 | No | No | No | No |
| 28 | 57.2 | 2.4 | No | No | No | No | 57.0 | 2.6 | No | No | No | No |
| 29 | 57.7 | 2.5 | No | No | No | No | 57.6 | 2.6 | No | No | No | No |
| 30 | 57.9 | 2.7 | No | No | No | No | 57.8 | 2.8 | No | No | No | No |
| 31 | 57.8 | 2.7 | No | No | No | No | 57.6 | 2.9 | No | No | No | No |
| 32 | 57.8 | 2.8 | No | No | No | No | 57.6 | 3.0 | No | No | No | No |
| 33 | 57 | 2.5 | No | No | No | No | 56.9 | 2.6 | No | No | No | No |
| 34 | 56.8 | 2.2 | No | No | No | No | 56.7 | 2.3 | No | No | No | No |
| 35 | 56.7 | 1.9 | No | No | No | No | 56.6 | 2.0 | No | No | No | No |
| 36 | 56.5 | 1.7 | No | No | No | No | 56.4 | 1.8 | No | No | No | No |
| 37 | 56.9 | 1.9 | No | No | No | No | 56.8 | 2.0 | No | No | No | No |
| 38 | 56.8 | 1.8 | No | No | No | No | 56.7 | 1.9 | No | No | No | No |
| 39 | 56.7 | 1.8 | No | No | No | No | 56.6 | 1.9 | No | No | No | No |
| 40 | 56.4 | 1.7 | No | No | No | No | 56.4 | 1.7 | No | No | No | No |
| 41 | 57.1 | 0.9 | No | No | No | No | 57.0 | 1.0 | No | No | No | No |
| 42 | 57.6 | 0.9 | No | No | No | No | 57.6 | 0.9 | No | No | No | No |
| 43 | 58.1 | 1.1 | No | No | No | No | 58.1 | 1.1 | No | No | No | No |
| 44 | 57.9 | 0.8 | No | No | No | No | 57.9 | 0.8 | No | No | No | No |
| 45 | 56.3 | 1.2 | No | No | No | No | 56.2 | 1.3 | No | No | No | No |
| 46 | 56.1 | 1.2 | No | No | No | No | 56.0 | 1.3 | No | No | No | No |
| 47 | 56.1 | 1.5 | No | No | No | No | 56.1 | 1.5 | No | No | No | No |
| 48 | 56.3 | 1.5 | No | No | No | No | 56.2 | 1.6 | No | No | No | No |
| 49 | 56.3 | 1.5 | No | No | No | No | 56.3 | 1.5 | No | No | No | No |
| 50 | 56.3 | 1.4 | No | No | No | No | 56.3 | 1.4 | No | No | No | No |
| 51 | 56.3 | 0.6 | No | No | No | No | 56.2 | 0.7 | No | No | No | No |
| 52 | 56.3 | 0.6 | No | No | No | No | 56.3 | 0.6 | No | No | No | No |
| 53 | 56.3 | 0.5 | No | No | No | No | 56.3 | 0.5 | No | No | No | No |
| 54 | 57.3 | 0.6 | No | No | No | No | 57.3 | 0.6 | No | No | No | No |

| Name | 19-ft Noise Level | 19-ft Noise Reduction | Design Goal | Benefited | 1st Row Design Goal | 1st Row 5 dBA Reduction | 20-ft Noise Level | 20-ft Noise Reduction | Design Goal | Benefited | 1st Row Design Goal | 1st Row 5 dBA Reduction |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 61.0 | 5.7 | No | Yes | No | Yes | 60.9 | 5.8 | No | Yes | No | Yes |
| 2 | 60.4 | 7.1 | Yes | Yes | Yes | Yes | 60.3 | 7.2 | Yes | Yes | Yes | Yes |
| 3 | 60.2 | 8.3 | Yes | Yes | Yes | Yes | 60.0 | 8.5 | Yes | Yes | Yes | Yes |
| 4 | 57 | 10.5 | Yes | Yes | Yes | Yes | 56.7 | 10.8 | Yes | Yes | Yes | Yes |
| 5 | 58.6 | 11.5 | Yes | Yes | Yes | Yes | 58.2 | 11.9 | Yes | Yes | Yes | Yes |
| 6 | 57.9 | 12.4 | Yes | Yes | Yes | Yes | 57.6 | 12.7 | Yes | Yes | Yes | Yes |
| 7 | 57.9 | 12.4 | Yes | Yes | Yes | Yes | 57.6 | 12.7 | Yes | Yes | Yes | Yes |
| 8 | 58.3 | 11.7 | Yes | Yes | Yes | Yes | 57.9 | 12.1 | Yes | Yes | Yes | Yes |
| 9 | 57.9 | 12.0 | Yes | Yes | Yes | Yes | 57.5 | 12.4 | Yes | Yes | Yes | Yes |
| 10 | 57.5 | 12.1 | Yes | Yes | Yes | Yes | 57.3 | 12.3 | Yes | Yes | Yes | Yes |
| 11 | 57.4 | 12.2 | Yes | Yes | Yes | Yes | 57.0 | 12.6 | Yes | Yes | Yes | Yes |
| 12 | 57.7 | 11.9 | Yes | Yes | Yes | Yes | 57.3 | 12.3 | Yes | Yes | Yes | Yes |
| 13 | 56.9 | 13.6 | Yes | Yes | Yes | Yes | 56.6 | 13.9 | Yes | Yes | Yes | Yes |
| 14 | 57.2 | 13.2 | Yes | Yes | Yes | Yes | 57.0 | 13.4 | Yes | Yes | Yes | Yes |
| 15 | 58.4 | 11.5 | Yes | Yes | Yes | Yes | 58.1 | 11.8 | Yes | Yes | Yes | Yes |
| 16 | 58.7 | 10.2 | Yes | Yes | Yes | Yes | 58.4 | 10.5 | Yes | Yes | Yes | Yes |
| 17 | 57 | 6.2 | No | Yes | No | No | 56.8 | 6.4 | No | Yes | No | No |
| 18 | 56.2 | 6.3 | No | Yes | No | No | 56.0 | 6.5 | No | Yes | No | No |
| 19 | 55.7 | 6.2 | No | Yes | No | No | 55.5 | 6.4 | No | Yes | No | No |
| 20 | 55.6 | 5.9 | No | Yes | No | No | 55.4 | 6.1 | No | Yes | No | No |
| 21 | 57.8 | 2.1 | No | No | No | No | 57.7 | 2.2 | No | No | No | No |
| 22 | 57.4 | 1.9 | No | No | No | No | 57.3 | 2.0 | No | No | No | No |
| 23 | 57.2 | 1.8 | No | No | No | No | 57.1 | 1.9 | No | No | No | No |
| 24 | 57 | 1.8 | No | No | No | No | 56.9 | 1.9 | No | No | No | No |
| 25 | 57.9 | 3.2 | No | No | No | No | 57.8 | 3.3 | No | No | No | No |
| 26 | 57.6 | 3.0 | No | No | No | No | 57.5 | 3.1 | No | No | No | No |
| 27 | 57.4 | 2.8 | No | No | No | No | 57.3 | 2.9 | No | No | No | No |
| 28 | 56.9 | 2.7 | No | No | No | No | 56.8 | 2.8 | No | No | No | No |
| 29 | 57.5 | 2.7 | No | No | No | No | 57.3 | 2.9 | No | No | No | No |
| 30 | 57.6 | 3.0 | No | No | No | No | 57.5 | 3.1 | No | No | No | No |
| 31 | 57.5 | 3.0 | No | No | No | No | 57.4 | 3.1 | No | No | No | No |
| 32 | 57.5 | 3.1 | No | No | No | No | 57.4 | 3.2 | No | No | No | No |
| 33 | 56.8 | 2.7 | No | No | No | No | 56.6 | 2.9 | No | No | No | No |
| 34 | 56.6 | 2.4 | No | No | No | No | 56.5 | 2.5 | No | No | No | No |
| 35 | 56.5 | 2.1 | No | No | No | No | 56.4 | 2.2 | No | No | No | No |
| 36 | 56.3 | 1.9 | No | No | No | No | 56.2 | 2.0 | No | No | No | No |
| 37 | 56.7 | 2.1 | No | No | No | No | 56.6 | 2.2 | No | No | No | No |
| 38 | 56.6 | 2.0 | No | No | No | No | 56.5 | 2.1 | No | No | No | No |
| 39 | 56.5 | 2.0 | No | No | No | No | 56.4 | 2.1 | No | No | No | No |
| 40 | 56.3 | 1.8 | No | No | No | No | 56.2 | 1.9 | No | No | No | No |
| 41 | 57 | 1.0 | No | No | No | No | 56.9 | 1.1 | No | No | No | No |
| 42 | 57.5 | 1.0 | No | No | No | No | 57.5 | 1.0 | No | No | No | No |
| 43 | 58 | 1.2 | No | No | No | No | 58.0 | 1.2 | No | No | No | No |
| 44 | 57.9 | 0.8 | No | No | No | No | 57.8 | 0.9 | No | No | No | No |
| 45 | 56.1 | 1.4 | No | No | No | No | 56.1 | 1.4 | No | No | No | No |
| 46 | 56 | 1.3 | No | No | No | No | 55.9 | 1.4 | No | No | No | No |
| 47 | 56 | 1.6 | No | No | No | No | 56.0 | 1.6 | No | No | No | No |
| 48 | 56.1 | 1.7 | No | No | No | No | 56.1 | 1.7 | No | No | No | No |
| 49 | 56.2 | 1.6 | No | No | No | No | 56.1 | 1.7 | No | No | No | No |
| 50 | 56.2 | 1.5 | No | No | No | No | 56.1 | 1.6 | No | No | No | No |
| 51 | 56.2 | 0.7 | No | No | No | No | 56.1 | 0.8 | No | No | No | No |
| 52 | 56.3 | 0.6 | No | No | No | No | 56.2 | 0.7 | No | No | No | No |
| 53 | 56.2 | 0.6 | No | No | No | No | 56.2 | 0.6 | No | No | No | No |
| 54 | 57.2 | 0.7 | No | No | No | No | 57.2 | 0.7 | No | No | No | No |

| | | | |
|---|---|---|---|
| 16 | 16 | 16 | 16 |
| 100% | 100% | 100% | 100% |
| Yes | Yes | Yes | Yes |
| 14 | 14 | 15 | 15 |
| 88% | 88% | 94% | 94% |
| Yes | Yes | Yes | Yes |
| 20 | 20 | 20 | 20 |
| $353,600 | $374,400 | $395,200 | $416,000 |
| 0 | 0 | 0 | 0 |
| $353,600 | $374,400 | $395,200 | $416,000 |
| $600,000 | $600,000 | $600,000 | $600,000 |
| Yes | Yes | Yes | Yes |
| Yes | Yes | Yes | Yes |

## Noise Barrier B

**Wall Length:** 1009 ft
**Wall Cost per sq ft:** $20
**Cost of items critical to safety:**
**# of First Row Receivers:** 1

| Name | # of DU | Relocation | 1st Row | # of 1st Row | Baseline Noise Level | 15-ft Noise Level | 15-ft Noise Reduction | Design Goal | Benefited | 1st Row Design Goal | 1st Row 5 dBA Reduction | 16-ft Noise Level | 16-ft Noise Reduction | Design Goal | Benefited | 1st Row Design Goal | 1st Row 5 dBA Reduction |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 66 | 1 | | Yes | 1 | 67.0 | 62.1 | 4.9 | No | No | No | No | 61.7 | 5.3 | No | Yes | No | Yes |

| | 15-ft | 16-ft |
|---|---|---|
| **Feasibility Factors:** | | |
| **# of First-Row 5 dBA Reduction:** | 0 | 1 |
| **% of First-Row 5 dBA Reduction:** | 0% | 100% |
| **Acoustic Feasibility (5 dBA reduction for 50% of front-row):** | No | Yes |
| **Reasonableness Factors:** | | |
| **# of First-Row Design Goal:** | NA | 0 |
| **% of First-Row Design Goal:** | NA | 0% |
| **Noise Abatement Design Goal (7 dBA reduction for 35% of front-row):** | NA | No |
| **# of Benefited:** | NA | NA |
| **Cost of Noise Wall (Length x Height x $20/sq ft):** | NA | NA |
| **Cost of any other items critical to safety:** | NA | NA |
| **Anticipated Cost of Noise Abatement:** | NA | NA |
| **Allowable Cost ($30,000 per benefited receptor):** | NA | NA |
| **Cost Effective (Anticipated Cost < Allowable Cost):** | NA | NA |
| **Feasible and Reasonable:** | No | No |

| Name | 17-ft Noise Level | 17-ft Noise Reduction | Design Goal | Benefited | 1st Row Design Goal | 1st Row 5 dBA Reduction | 18-ft Noise Level | 18-ft Noise Reduction | Design Goal | Benefited | 1st Row Design Goal | 1st Row 5 dBA Reduction | 19-ft Noise Level | 19-ft Noise Reduction | Design Goal | Benefited | 1st Row Design Goal | 1st Row 5 dBA Reduction |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 66 | 61.3 | 5.7 | No | Yes | No | Yes | 60.8 | 6.2 | No | Yes | No | Yes | 60.5 | 6.5 | No | Yes | No | Yes |
| | | | 1 | | | | | | 1 | | | | | | 1 | | | |
| | | | 100% | | | | | | 100% | | | | | | 100% | | | |
| | | | Yes | | | | | | Yes | | | | | | Yes | | | |
| | | | 0 | | | | | | 0 | | | | | | 0 | | | |
| | | | 0% | | | | | | 0% | | | | | | 0% | | | |
| | | | No | | | | | | No | | | | | | No | | | |
| | | | NA | | | | | | NA | | | | | | NA | | | |
| | | | NA | | | | | | NA | | | | | | NA | | | |
| | | | NA | | | | | | NA | | | | | | NA | | | |
| | | | NA | | | | | | NA | | | | | | NA | | | |
| | | | NA | | | | | | NA | | | | | | NA | | | |
| | | | NA | | | | | | NA | | | | | | NA | | | |
| | | | No | | | | | | No | | | | | | No | | | |

| Name | 20-ft Noise Level | 20-ft Noise Reduction | Design Goal | Benefited | 1st Row Design Goal | 1st Row 5 dBA Reduction |
|---|---|---|---|---|---|---|
| 66 | 60.1 | 6.9 | No | Yes | No | Yes |

1

100%

Yes

0

0%

No

NA

NA

NA

NA

NA

NA

No

**Noise Barrier C**

| | |
|---|---|
| **Wall Length:** | 2303 ft |
| **Wall Cost per sq ft:** | $20 |
| **Cost of items critical to safety:** | |
| **# of First Row Receivers:** | 9 |

| Name | # of DU | Relocation | 1st Row | # of 1st Row | Baseline Noise Level | 14-ft Noise Level | 14-ft Noise Reduction | Design Goal | Benefited | 1st Row Design Goal | 1st Row 5 dBA Reduction | 15-ft Noise Level | 15-ft Noise Reduction | Design Goal | Benefited | 1st Row Design Goal | 1st Row 5 dBA Reduction |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 72 | 1 | | | 0 | 61.9 | 58.4 | 3.5 | No | No | No | No | 58.3 | 3.6 | No | No | No | No |
| 73 | 1 | | | 0 | 60.8 | 58.0 | 2.8 | No | No | No | No | 57.9 | 2.9 | No | No | No | No |
| 74 | 1 | | | 0 | 62.3 | 60.0 | 2.3 | No | No | No | No | 59.6 | 2.7 | No | No | No | No |
| 75 | 1 | | | 0 | 60.1 | 58.4 | 1.7 | No | No | No | No | 58.2 | 1.9 | No | No | No | No |
| 76 | 1 | | Yes | 1 | 64.9 | 60.2 | 4.7 | No | No | No | No | 60 | 4.9 | No | No | No | No |
| 77 | 1 | | Yes | 1 | 68.4 | 62.7 | 5.7 | No | Yes | No | Yes | 62.2 | 6.2 | No | Yes | No | Yes |
| 78 | 1 | | Yes | 1 | 67.0 | 62.6 | 4.4 | No | No | No | No | 62.1 | 4.9 | No | No | No | No |
| 79 | 1 | | Yes | 1 | 68.1 | 62.7 | 5.4 | No | Yes | No | Yes | 62.2 | 5.9 | No | Yes | No | Yes |
| 80 | 1 | | | 0 | 62.8 | 60.3 | 2.5 | No | No | No | No | 59.9 | 2.9 | No | No | No | No |
| 81 | 1 | | | 0 | 63.3 | 60.2 | 3.1 | No | No | No | No | 59.8 | 3.5 | No | No | No | No |
| 82 | 1 | | Yes | 1 | 69.3 | 63.1 | 6.2 | No | Yes | No | Yes | 62.6 | 6.7 | No | Yes | No | Yes |
| 83 | 1 | | Yes | 1 | 70.1 | 63.1 | 7.0 | No | Yes | No | Yes | 62.6 | 7.5 | Yes | Yes | Yes | Yes |
| 84 | 1 | | | 0 | 64.1 | 60.9 | 3.2 | No | No | No | No | 60.5 | 3.6 | No | No | No | No |
| 85 | 1 | | | 0 | 64.9 | 61.9 | 3.0 | No | No | No | No | 61.5 | 3.4 | No | No | No | No |
| 86 | 1 | | | 0 | 65.0 | 62.0 | 3.0 | No | No | No | No | 61.7 | 3.3 | No | No | No | No |
| 87 | 1 | | | 0 | 65.8 | 63.4 | 2.4 | No | No | No | No | 63.1 | 2.7 | No | No | No | No |
| 88 | 1 | | | 0 | 63.9 | 62.4 | 1.5 | No | No | No | No | 62.1 | 1.8 | No | No | No | No |
| 89 | 1 | | Yes | 1 | 71.5 | 64.8 | 6.7 | No | Yes | No | Yes | 64.2 | 7.3 | Yes | Yes | Yes | Yes |
| 90 | 1 | | Yes | 1 | 74.6 | 66.7 | 7.9 | Yes | Yes | Yes | Yes | 66 | 8.6 | Yes | Yes | Yes | Yes |
| 91 | 1 | | Yes | 1 | 72.0 | 68.6 | 3.4 | No | No | No | No | 68.2 | 3.8 | No | No | No | No |

| | 14-ft | 15-ft |
|---|---|---|
| **Feasibility Factors:** | | |
| **# of First-Row 5 dBA Reduction:** | 6 | 6 |
| **% of First-Row 5 dBA Reduction:** | 67% | 67% |
| **Acoustic Feasibility (5 dBA reduction for 50% of front-row):** | Yes | Yes |
| **Reasonableness Factors:** | | |
| **# of First-Row Design Goal:** | 2 | 3 |
| **% of First-Row Design Goal:** | 22% | 33% |
| **Noise Abatement Design Goal (7 dBA reduction for 35% of front-row):** | No | No |
| **# of Benefited:** | NA | NA |
| **Cost of Noise Wall (Length x Height x $20/sq ft):** | NA | NA |
| **Cost of any other items critical to safety:** | NA | NA |
| **Anticipated Cost of Noise Abatement:** | NA | NA |
| **Allowable Cost ($30,000 per benefited receptor):** | NA | NA |
| **Cost Effective (Anticipated Cost < Allowable Cost):** | NA | NA |
| **Feasible and Reasonable:** | No | No |

| Name | 16-ft Noise Level | 16-ft Noise Reduction | Design Goal | Benefited | 1st Row Design Goal | 1st Row 5 dBA Reduction | 17-ft Noise Level | 17-ft Noise Reduction | Design Goal | Benefited | 1st Row Design Goal | 1st Row 5 dBA Reduction | 18-ft Noise Level | 18-ft Noise Reduction | Design Goal | Benefited | 1st Row Design Goal | 1st Row 5 dBA Reduction |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 72 | 58.1 | 3.8 | No | No | No | No | 57.9 | 4.0 | No | No | No | No | 57.7 | 4.2 | No | No | No | No |
| 73 | 57.8 | 3.0 | No | No | No | No | 57.6 | 3.2 | No | No | No | No | 57.5 | 3.3 | No | No | No | No |
| 74 | 59.3 | 3.0 | No | No | No | No | 59.1 | 3.2 | No | No | No | No | 58.8 | 3.5 | No | No | No | No |
| 75 | 58.0 | 2.1 | No | No | No | No | 57.7 | 2.4 | No | No | No | No | 57.5 | 2.6 | No | No | No | No |
| 76 | 59.8 | 5.1 | No | Yes | No | Yes | 59.5 | 5.4 | No | Yes | No | Yes | 59.2 | 5.7 | No | Yes | No | Yes |
| 77 | 61.7 | 6.7 | No | Yes | No | Yes | 61.3 | 7.1 | Yes | Yes | Yes | Yes | 60.9 | 7.5 | Yes | Yes | Yes | Yes |
| 78 | 61.6 | 5.4 | No | Yes | No | Yes | 61.2 | 5.8 | No | Yes | No | Yes | 60.8 | 6.2 | No | Yes | No | Yes |
| 79 | 61.8 | 6.3 | No | Yes | No | Yes | 61.4 | 6.7 | No | Yes | No | Yes | 61.0 | 7.1 | Yes | Yes | Yes | Yes |
| 80 | 59.6 | 3.2 | No | No | No | No | 59.3 | 3.5 | No | No | No | No | 59.0 | 3.8 | No | No | No | No |
| 81 | 59.5 | 3.8 | No | No | No | No | 59.2 | 4.1 | No | No | No | No | 58.9 | 4.4 | No | No | No | No |
| 82 | 62.1 | 7.2 | Yes | Yes | Yes | Yes | 61.7 | 7.6 | Yes | Yes | Yes | Yes | 61.2 | 8.1 | Yes | Yes | Yes | Yes |
| 83 | 62.1 | 8.0 | Yes | Yes | Yes | Yes | 61.7 | 8.4 | Yes | Yes | Yes | Yes | 61.3 | 8.8 | Yes | Yes | Yes | Yes |
| 84 | 60.2 | 3.9 | No | No | No | No | 59.9 | 4.2 | No | No | No | No | 59.6 | 4.5 | No | No | No | No |
| 85 | 61.2 | 3.7 | No | No | No | No | 60.9 | 4.0 | No | No | No | No | 60.6 | 4.3 | No | No | No | No |
| 86 | 61.4 | 3.6 | No | No | No | No | 61.1 | 3.9 | No | No | No | No | 60.8 | 4.2 | No | No | No | No |
| 87 | 62.8 | 3.0 | No | No | No | No | 62.5 | 3.3 | No | No | No | No | 62.2 | 3.6 | No | No | No | No |
| 88 | 61.9 | 2.0 | No | No | No | No | 61.7 | 2.2 | No | No | No | No | 61.4 | 2.5 | No | No | No | No |
| 89 | 63.8 | 7.7 | Yes | Yes | Yes | Yes | 63.3 | 8.2 | Yes | Yes | Yes | Yes | 62.7 | 8.8 | Yes | Yes | Yes | Yes |
| 90 | 65.3 | 9.3 | Yes | Yes | Yes | Yes | 64.6 | 10.0 | Yes | Yes | Yes | Yes | 63.7 | 10.9 | Yes | Yes | Yes | Yes |
| 91 | 67.7 | 4.3 | No | No | No | No | 67 | 5.0 | No | Yes | No | Yes | 66.2 | 5.8 | No | Yes | No | Yes |

| | | |
|---|---|---|
| 8 | 9 | 9 |
| 89% | 100% | 100% |
| Yes | Yes | Yes |
| 4 | 5 | 6 |
| 44% | 56% | 67% |
| Yes | Yes | Yes |
| 8 | 9 | 9 |
| $736,960 | $783,020 | $829,080 |
| 0 | 0 | 0 |
| $736,960 | $783,020 | $829,080 |
| $240,000 | $270,000 | $270,000 |
| No | No | No |
| No | No | No |

| Name | 19-ft Noise Level | 19-ft Noise Reduction | Design Goal | Benefited | 1st Row Design Goal | 1st Row 5 dBA Reduction | 20-ft Noise Level | 20-ft Noise Reduction | Design Goal | Benefited | 1st Row Design Goal | 1st Row 5 dBA Reduction |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 72 | 57.6 | 4.3 | No | No | No | No | 57.4 | 4.5 | No | No | No | No |
| 73 | 57.4 | 3.4 | No | No | No | No | 57.3 | 3.5 | No | No | No | No |
| 74 | 58.6 | 3.7 | No | No | No | No | 58.3 | 4.0 | No | No | No | No |
| 75 | 57.3 | 2.8 | No | No | No | No | 57.1 | 3.0 | No | No | No | No |
| 76 | 59 | 5.9 | No | Yes | No | Yes | 58.7 | 6.2 | No | Yes | No | Yes |
| 77 | 60.5 | 7.9 | Yes | Yes | Yes | Yes | 60.2 | 8.2 | Yes | Yes | Yes | Yes |
| 78 | 60.4 | 6.6 | No | Yes | No | Yes | 60.1 | 6.9 | No | Yes | No | Yes |
| 79 | 60.6 | 7.5 | Yes | Yes | Yes | Yes | 60.2 | 7.9 | Yes | Yes | Yes | Yes |
| 80 | 58.7 | 4.1 | No | No | No | No | 58.5 | 4.3 | No | No | No | No |
| 81 | 58.7 | 4.6 | No | No | No | No | 58.4 | 4.9 | No | No | No | No |
| 82 | 60.9 | 8.4 | Yes | Yes | Yes | Yes | 60.5 | 8.8 | Yes | Yes | Yes | Yes |
| 83 | 61 | 9.1 | Yes | Yes | Yes | Yes | 60.6 | 9.5 | Yes | Yes | Yes | Yes |
| 84 | 59.3 | 4.8 | No | No | No | No | 59.0 | 5.1 | No | Yes | No | No |
| 85 | 60.2 | 4.7 | No | No | No | No | 59.9 | 5.0 | No | Yes | No | No |
| 86 | 60.4 | 4.6 | No | No | No | No | 60.2 | 4.8 | No | No | No | No |
| 87 | 61.8 | 4.0 | No | No | No | No | 61.4 | 4.4 | No | No | No | No |
| 88 | 61.2 | 2.7 | No | No | No | No | 61.0 | 2.9 | No | No | No | No |
| 89 | 62.2 | 9.3 | Yes | Yes | Yes | Yes | 61.9 | 9.6 | Yes | Yes | Yes | Yes |
| 90 | 62.8 | 11.8 | Yes | Yes | Yes | Yes | 62.1 | 12.5 | Yes | Yes | Yes | Yes |
| 91 | 65.3 | 6.7 | No | Yes | No | Yes | 64.8 | 7.2 | Yes | Yes | Yes | Yes |

| | |
|---|---|
| 9 | 9 |
| 100% | 100% |
| Yes | Yes |
| 6 | 7 |
| 67% | 78% |
| Yes | Yes |
| 9 | 11 |
| $875,140 | $921,200 |
| 0 | 0 |
| $875,140 | $921,200 |
| $270,000 | $330,000 |
| No | No |
| No | No |

**Noise Barrier D**

**Wall Length:** 1002 ft

**Wall Cost per sq ft:** $20

**Cost of items critical to safety:**

**# of First Row Receivers:** 1

| Name | # of DU | Relocation | 1st Row | # of 1st Row | Baseline Noise Level | 20-ft Noise Level | 20-ft Noise Reduction | Design Goal | Benefited | 1st Row Design Goal | 1st Row 5 dBA Reduction |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 93 | 1 | | Yes | 1 | 66.0 | 62.1 | 3.9 | No | No | No | No |

| | |
|---|---|
| **Feasibility Factors:** | |
| **# of First-Row 5 dBA Reduction:** | 0 |
| **% of First-Row 5 dBA Reduction:** | 0% |
| **Acoustic Feasibility (5 dBA reduction for 50% of front-row):** | No |
| **Reasonableness Factors:** | |
| **# of First-Row Design Goal:** | NA |
| **% of First-Row Design Goal:** | NA |
| **Noise Abatement Design Goal (7 dBA reduction for 35% of front-row):** | NA |
| **# of Benefited:** | NA |
| **Cost of Noise Wall (Length x Height x $20/sq ft):** | NA |
| **Cost of any other items critical to safety:** | NA |
| **Anticipated Cost of Noise Abatement:** | NA |
| **Allowable Cost ($30,000 per benefited receptor):** | NA |
| **Cost Effective (Anticipated Cost < Allowable Cost):** | NA |
| **Feasible and Reasonable:** | No |

## Noise Barrier E

**Wall Length:** 720 ft

**Wall Cost per sq ft:** $20

**Cost of items critical to safety:**

**# of First Row Receivers:** 1

| Name | # of DU | Relocation | 1st Row | # of 1st Row | Baseline Noise Level | 20-ft Noise Level | 20-ft Noise Reduction | Design Goal | Benefited | 1st Row Design Goal | 1st Row 5 dBA Reduction |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 96 | 1 | | Yes | 1 | 66.7 | 64.0 | 2.7 | No | No | No | No |

| | |
|---|---|
| **Feasibility Factors:** | |
| **# of First-Row 5 dBA Reduction:** | 0 |
| **% of First-Row 5 dBA Reduction:** | 0% |
| **Acoustic Feasibility (5 dBA reduction for 50% of front-row):** | No |
| **Reasonableness Factors:** | |
| **# of First-Row Design Goal:** | NA |
| **% of First-Row Design Goal:** | NA |
| **Noise Abatement Design Goal (7 dBA reduction for 35% of front-row):** | NA |
| **# of Benefited:** | NA |
| **Cost of Noise Wall (Length x Height x $20/sq ft):** | NA |
| **Cost of any other items critical to safety:** | NA |
| **Anticipated Cost of Noise Abatement:** | NA |
| **Allowable Cost ($30,000 per benefited receptor):** | NA |
| **Cost Effective (Anticipated Cost < Allowable Cost):** | NA |
| **Feasible and Reasonable:** | No |

# APPENDIX E

# S.R. 73 Correspondence for Biological Resources

August 23, 2017

Larry Crist
Utah Ecological Services Field Office, USFWS
2369 West Orton Circle, Suite 50
West Valley City, UT 84119

**Subject: State Route 73 State Environmental Study Request for Agency Input – UDOT Project S-0073(33)30**

Dear Mr. Crist:

The Utah Department of Transportation (UDOT) is preparing a State Environmental Study (SES) for the improvement of State Route 73 (S.R. 73) in Cedar Valley, Utah, located northwest of Utah Lake in northwestern Utah County, Utah (see the enclosed map). In preparing the SES, UDOT will evaluate the environmental, social, and economic impacts of the proposed S.R. 73 improvements.

Most of the proposed project is in Cedar Valley, which is home to the municipalities of Eagle Mountain, Cedar Fort, and Fairfield. S.R. 73 is the primary arterial highway connecting Cedar Valley to the rest of Utah County and the Wasatch Front. S.R. 73 is currently a two-lane arterial from Eagle Mountain Boulevard to just west of Ranches Parkway and expands to a five-lane arterial to the east as the arterial crosses Ranches Parkway.

Recent and planned growth in Cedar Valley is greatly affecting traffic in and around the project study area. The project is included in the 2015 Mountainland Association of Governments Regional Transportation Plan. As proposed in the plan, the project would entail converting S.R. 73 to a freeway between about Eagle Mountain Boulevard on the west and the Mountain View Corridor (Saratoga Springs 800 West) on the east.

The purpose of this letter is to request information from your agency regarding the resources under your jurisdiction in the study area that could be affected by the project, identify the issues that should be analyzed in the SES, and determine whether project construction would require any permits or approvals from your agency. UDOT will use information from your agency, other agencies, and the public to develop project alternatives in the study area shown on the enclosed map.

We request written comments no later than September 29, 2017. Please mail your comments to:

Amy Croft
HDR, Inc.
2825 East Cottonwood Parkway, Suite 200
Salt Lake City, UT 84121-7077

Comments can also be emailed to amy.croft@hdrinc.com. Please include the project name (**UDOT Project S-0073(33)30)** in the subject line of either written or email correspondence.

If you would like to meet in person to discuss the project, please contact me to set up a date and time for a meeting. You may also attend the public open house for S.R. 73 on September 7, 2017, from 5:30 to 7:30 p.m. at Black Ridge Elementary School at 9358 N. Sunset Drive, Eagle Mountain, Utah.

Please contact me at (801) 227-8034 with any questions about the project.

Sincerely,

Matt Parker

Matt Parker
UDOT Project Manager

Enclosure: Study area map

cc: Elisa Albury, UDOT
Amy Croft, HDR
Laura Romin, USFWS


State Route 73
ENVIRONMENTAL STUDY
Eagle Mountain to Saratoga Springs

# SR 73 ENVIRONMENTAL STUDY AREA EXTENT

## N 16800 W TO PIONEER CROSSING

FIGURE 1 OF 1

August 23, 2017

Matt Howard
Utah Department of Wildlife Resources – Central Region
1115 N Main St
Springville, UT 84663

**Subject: State Route 73 State Environmental Study Request for Agency Input – UDOT Project S-0073(33)30**

Dear Mr. Howard:

The Utah Department of Transportation (UDOT) is preparing a State Environmental Study (SES) for the improvement of State Route 73 (S.R. 73) in Cedar Valley, Utah, located northwest of Utah Lake in northwestern Utah County, Utah (see the enclosed map). In preparing the SES, UDOT will evaluate the environmental, social, and economic impacts of the proposed S.R. 73 improvements.

Most of the proposed project is in Cedar Valley, which is home to the municipalities of Eagle Mountain, Cedar Fort, and Fairfield. S.R. 73 is the primary arterial highway connecting Cedar Valley to the rest of Utah County and the Wasatch Front. S.R. 73 is currently a two-lane arterial from Eagle Mountain Boulevard to just west of Ranches Parkway and expands to a five-lane arterial to the east as the arterial crosses Ranches Parkway.

Recent and planned growth in Cedar Valley is greatly affecting traffic in and around the project study area. The project is included in the 2015 Mountainland Association of Governments Regional Transportation Plan. As proposed in the plan, the project would entail converting S.R. 73 to a freeway between about Eagle Mountain Boulevard on the west and the Mountain View Corridor (Saratoga Springs 800 West) on the east.

The purpose of this letter is to request information from your agency regarding the resources under your jurisdiction in the study area that could be affected by the project, identify the issues that should be analyzed in the SES, and determine whether project construction would require any permits or approvals from your agency. UDOT will use information from your agency, other agencies, and the public to develop project alternatives in the study area shown on the enclosed map.

We request written comments no later than September 29, 2017. Please mail your comments to:

Amy Croft
HDR, Inc.
2825 East Cottonwood Parkway, Suite 200
Salt Lake City, UT 84121-7077

Comments can also be emailed to amy.croft@hdrinc.com. Please include the project name (**UDOT Project S-0073(33)30)** in the subject line of either written or email correspondence.

If you would like to meet in person to discuss the project, please contact me to set up a date and time for a meeting. You may also attend the public open house for S.R. 73 on September 7, 2017, from 5:30 to 7:30 p.m. at Black Ridge Elementary School at 9358 N. Sunset Drive, Eagle Mountain, Utah.

Please contact me at (801) 227-8034 with any questions about the project.

Sincerely,

Matt Parker

Matt Parker
UDOT Project Manager

Enclosure: Study area map

cc: Elisa Albury, UDOT
Amy Croft, HDR


State Route 73
ENVIRONMENTAL STUDY
Eagle Mountain to Saratoga Springs

# SR 73 ENVIRONMENTAL STUDY AREA EXTENT

## N 16800 W TO PIONEER CROSSING

FIGURE 1 OF 1

September 9, 2017

Sindy Smith
Governor's Office of Planning and Budget Resource Development Coordinating Committee
P.O. Box 141107
Salt Lake City, UT 84114-1107

**Subject: State Route 73 State Environmental Study Request for Agency Input – UDOT Project S-0073(33)30**

Dear Ms. Smith:

The Utah Department of Transportation (UDOT) is preparing a State Environmental Study (SES) for the improvement of State Route 73 (S.R. 73) in Cedar Valley, Utah, located northwest of Utah Lake in northwestern Utah County, Utah (see the enclosed map). In preparing the SES, UDOT will evaluate the environmental, social, and economic impacts of the proposed S.R. 73 improvements.

Most of the proposed project is in Cedar Valley, which is home to the municipalities of Eagle Mountain, Cedar Fort, and Fairfield. S.R. 73 is the primary arterial highway connecting Cedar Valley to the rest of Utah County and the Wasatch Front. S.R. 73 is currently a two-lane arterial from Eagle Mountain Boulevard to just west of Ranches Parkway and expands to a five-lane arterial to the east as the arterial crosses Ranches Parkway.

Recent and planned growth in Cedar Valley is greatly affecting traffic in and around the project study area. The project is included in the 2015 Mountainland Association of Governments Regional Transportation Plan. As proposed in the plan, the project would entail converting S.R. 73 to a freeway between about Eagle Mountain Boulevard on the west and the Mountain View Corridor (Saratoga Springs 800 West) on the east.

The purpose of this letter is to request information from your agency regarding the resources under your jurisdiction in the study area that could be affected by the project, identify the issues that should be analyzed in the SES, and determine whether project construction would require any permits or approvals from your agency. UDOT will use information from your agency, other agencies, and the public to develop project alternatives in the study area shown on the enclosed map.

We request written comments no later than September 29, 2017. Please mail your comments to:

Amy Croft
HDR, Inc.
2825 East Cottonwood Parkway, Suite 200
Salt Lake City, UT 84121-7077

Comments can also be emailed to amy.croft@hdrinc.com. Please include the project name (**UDOT Project S-0073(33)30)** in the subject line of either written or email correspondence.

If you would like to meet in person to discuss the project, please contact me to set up a date and time for a meeting. Please contact me at (801) 227-8034 with any questions about the project.

Sincerely,

Matt Parker
UDOT Project Manager

Enclosure: Study area map

cc: Elisa Albury, UDOT
Amy Croft, HDR


State Route 73
ENVIRONMENTAL STUDY
Eagle Mountain to Saratoga Springs

# SR 73 ENVIRONMENTAL STUDY AREA EXTENT

## N 16800 W TO PIONEER CROSSING

FIGURE 1 OF 1

PATH: O:\PROJECTS\UDOT\10067024_SR73\7.2_WORK_IN_PROGRESS\MAP_DOCS\DRAFT\MEMO_STUDYEXTENTS.MXD - USER: SRIGARD - DATE: 8/9/2017

# United States Department of the Interior

## FISH AND WILDLIFE SERVICE

Utah Field Office
2369 West Orton Circle, Suite 50
West Valley City, Utah 84119

IN REPLY REFER TO
FWS/R6
ES/UT
06E23000-2017-
CPA-0037

SEP 2 8 2017

Ms. Amy Croft
HDR, Inc.
2825 East Cottonwood Parkway, Suite 200
Salt Lake City, UT 84121-7077

RE: State Route 73 State Environmental Study – UDOT Project S-0073(33)30

Dear Ms. Croft:

We received notification that the Utah Department of Transportation (UDOT) is preparing a State Environmental Study (SES) for the improvement of State Route 73 (S.R. 73) in Cedar Valley, Utah. The UDOT proposes to convert S.R. 73 from a two-lane arterial to a freeway between Eagle Mountain Boulevard and the Mountain View Corridor. We provide the following comments regarding resources under our jurisdiction.

*Migratory Birds*

To ensure project activities do not result in the "take" of an active nest or migratory birds protected under the Migratory Bird Treaty Act, we recommend:

a. Any ground-disturbing activities or vegetation treatments will be performed before migratory birds begin nesting or after all young have fledged to avoid take.
b. If activities must be scheduled to start during the migratory bird breeding season, take appropriate steps to prevent migratory birds from establishing nests in the potential impact area. These steps could include covering equipment and structures and use of various excluders (e.g., noise). Birds can be hazed to prevent them from nesting until egg(s) are present in the nest. Do not haze or exclude access for eagles and threatened or endangered species.
c. If activities must be scheduled during the migratory bird breeding season, a site-specific survey for nesting birds will be performed starting no more than 7 to 10 days prior to ground-disturbing activities or vegetation treatments. Birds with eggs or young cannot be hazed, and nests with eggs or young cannot be moved until young are no longer dependent on the nest. Confirmation that all young have fledged should be made by a qualified biologist.

d. If nesting birds are found during the survey, appropriate spatial buffers will be established around nests. Vegetation treatments or ground-disturbing activities within the buffer areas will be postponed until the birds have left the nest. Confirmation that all young have fledged should be made by a qualified biologist.

We recommend the use of the *Utah Field Office Guidelines for Raptor Protection from Human and Land Use Disturbances* (Romin and Muck 2002) to provide consistent application of raptor protection measures and provide full compliance with environmental laws regarding raptor protection. Raptor surveys and conservation measures are provided in the Guidelines to ensure that proposed projects will avoid adverse impacts to raptors. Locations of existing raptor nests should be identified prior to the initiation of project activities. Appropriate spatial buffer zones of inactivity should be established during crucial breeding and nesting periods relative to raptor nest sites or territories. Arrival at nesting sites can occur as early as December for certain raptor species. Nesting and fledging can continue through August.

We appreciate the opportunity to provide comments. If you require further assistance or have questions about our comments, please contact Amy Defreese, Supervisory Fish and Wildlife Biologist, at (801) 975-3330 x 128, or email amy_defreese@fws.gov.

Sincerely,

Paul D. Abate

for Larry Crist
Utah Field Supervisor

cc: Matt Parker, Utah Department of Transportation (email); Jason Gipson, Army Corps of Engineers (email); Matt Howard, Utah Division of Wildlife (email)

GARY R. HERBERT
*Governor*

SPENCER J. COX
*Lieutenant Governor*

# State of Utah

**DEPARTMENT OF NATURAL RESOURCES**

MICHAEL R. STYLER
*Executive Director*

**Division of Wildlife Resources**

MICHAL D. FOWLKS
*Division Director*

April 25, 2018

Amy Croft
HDR
2825 East Cottonwood Parkway, Suite 200
Salt Lake City, UT 84121

Subject: Species of Concern Near the UDOT SR 73 Road Improvement Project

Dear Amy Croft:

I am writing in response to your email dated April 24, 2018 regarding information on species of special concern proximal to the proposed UDOT SR 73 Road Improvement Project located in Sections 15-18 of Township 5 South, Range 1 West, and Sections 13 and 22-24 of Township 5 South, Range 2 West, SLB&M in Saratoga Springs and Eagle Mountain, Utah.

The Utah Division of Wildlife Resources (UDWR) does not have records of occurrence for any threatened, endangered, or sensitive species within a ½-mile radius project area noted above. However, within a two-mile radius there are historical records of occurrence for kit fox and greater sage-grouse. All of the aforementioned species are included on the *Utah Sensitive Species List*.

The information provided in this letter is based on data existing in the Utah Division of Wildlife Resources' central database at the time of the request. It should not be regarded as a final statement on the occurrence of any species on or near the designated site, nor should it be considered a substitute for on-the-ground biological surveys. Moreover, because the Utah Division of Wildlife Resources' central database is continually updated, and because data requests are evaluated for the specific type of proposed action, any given response is only appropriate for its respective request.

In addition to the information you requested, other significant wildlife values might also be present on the designated site. Please contact UDWR's habitat manager for the central region, Mark Farmer, at (801) 491-5653 if you have any questions.

Please contact our office at (801) 538-4759 if you require further assistance.

Sincerely,

Sarah Lindsey

Sarah Lindsey
Information Manager
Utah Natural Heritage Program

cc: Mark Farmer

# APPENDIX F

## S.R. 73 Aquatic Delineation Report

State Route 73
ENVIRONMENTAL STUDY
Eagle Mountain to Saratoga Springs

# Draft Aquatic Resource Delineation Report

**State Route 73, Eagle Mountain to Saratoga Springs Environmental Study**

**April 25, 2018**

# Executive Summary

On behalf of the Utah Department of Transportation (UDOT), HDR, Inc. (HDR), has prepared this aquatic resource delineation report in support of the proposed roadway improvements to State Route (S.R.) 73 in Utah County, Utah. HDR conducted fieldwork for the delineation in 2017 and 2018.

The delineation was conducted in accordance with the *Corps of Engineers Wetlands Delineation Manual* (USACE 1987), the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0)* (USACE 2008), *A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States: A Delineation Manual* (Lichvar and McColley 2008), *Updated Datasheet for the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States* (Curtis and Lichvar 2010), and U.S. Army Corps of Engineers regulatory guidance letters and joint agency regulations, policies, references, and guidance.

The entire delineation survey area is about 1,689 acres and contains a total of 3.92 acres of aquatic resources. These resources consist of two palustrine wetlands that total 0.53 acre, 15,686 linear feet (3.06 acres) of ephemeral stream channels, and 3,687 linear feet (0.34 acre) of open-channel canal.

# Contents

## Tables



## Appendixes

# Acronyms and Abbreviations

| | |
|---|---|
| CFR | Code of Federal Regulations |
| CWA | Clean Water Act |
| EPA | U.S. Environmental Protection Agency |
| FAC | facultative (plants that occur in wetlands and non-wetlands) |
| FACU | facultative upland (plants that usually occur in non-wetlands but can occur in wetlands) |
| FACW | facultative wetland (plants that usually occur in wetlands but can occur in non-wetlands) |
| GIS | geographic information systems |
| HDR | HDR, Inc. |
| NA | not applicable |
| NL | not listed (plants that are not listed in the National Wetlands Plant List and therefore are assumed to be upland) |
| NWI | National Wetlands Inventory |
| NWPL | National Wetlands Plant List |
| OBL | obligate wetland (plants that almost always occur in wetlands) |
| OHWM | ordinary high water mark |
| PEM | palustrine emergent |
| PSS | palustrine scrub-shrub |
| RPW | relatively permanent water |
| S.R. | State Route |
| TNW | traditional navigable water |
| UDOT | Utah Department of Transportation |
| UPL | upland (plants that almost never occur in wetlands) |
| USACE | U.S. Army Corps of Engineers |
| USDA NRCS | U.S. Department of Agriculture, Natural Resource Conservation Service |
| USFWS | U.S. Fish and Wildlife Service |
| WOUS | waters of the United States |

# 1.0 Introduction

On behalf of the Utah Department of Transportation (UDOT), HDR, Inc. (HDR), has prepared this aquatic resource delineation report in support of the Utah State Route (S.R.) 73, Eagle Mountain to Saratoga Springs State Environmental Study for a proposed roadway project (Proposed Project) in Utah County, Utah.

The purpose of this report is to identify and describe aquatic resources within the delineation survey area for the Proposed Project (survey area; see Appendix A, Project Location Index Map). The results of the delineation are summarized in Table 4, Aquatic Resources Summary, on page 17. If UDOT requests an approved jurisdictional determination, the jurisdictional status of the delineated aquatic resources would be determined by the U.S. Army Corps of Engineers (USACE) after it reviews this delineation report.

## 1.1 Aquatic Resource Delineation Survey Area

The survey area is located in Cedar Valley, west of Utah Lake in northwestern Utah County, Utah. It covers about 1,689 acres and includes parts of Eagle Mountain and Saratoga Springs within a 1,100-foot buffer on either side of the centerline of S.R. 73 between the future Mountain View Corridor (800 West/Foothill Boulevard in Saratoga Springs) on the east and Eagle Mountain Boulevard on the west.

The survey area can be accessed from Interstate 15 from exits in Lehi and American Fork and then by driving along state and local roads to access various parts of the survey area. As defined by the Public Land Survey System, the survey area is located in Township 5 South, Range 2 West, Sections 13, 23, and 24, and Township 5 South, Range 1 West, Sections 15, 16, 17, and 18. These sections are shown on the U.S. Geological Survey 7.5-minute Series Quadrangle Topographic maps for Cedar Fort, Jordan Narrows, Saratoga Springs, and Tickville Spring (Utah). Elevations in the survey area range from 4,683 to 5,050 feet above mean sea level.

## 1.2 Contact Information

### 1.2.1 Project Applicant and Owner

The applicant and owner for this project are the same entity:

Utah Department of Transportation, Region Three
658 North 1500 West
Orem, Utah  84057

Attention: Matt Parker, Project Manager
(801) 227-8034
mattparker@utah.gov

### 1.2.2 Land Ownership

Land in the survey area includes private and public land. Contact information and written permission to access private land can be provided on request as appropriate.

### 1.2.3 Contact Information for the Delineation Consultant

HDR, Inc.
2825 E. Cottonwood Parkway, Suite 200
Salt Lake City, Utah 84121

Field Biologists:

Amy Croft
(801) 743-7832
amy.croft@hdrinc.com

Michael Perkins
(801) 743-7864
michael.perkins@hdrinc.com

# 2.0 Regulatory Framework

As described in Part 328 of Title 33 in the Code of Federal Regulations (CFR), the objective of the Clean Water Act (CWA) is to maintain and restore the chemical, physical, and biological integrity of the waters of the United States (33 CFR Part 328, Section 328.4). Any person, firm, or agency planning to alter or work in waters of the United States (WOUS), including the discharge of dredged or fill material, must first obtain authorization from USACE under CWA Section 404 and, if applicable, Section 10 of the Rivers and Harbors Act of 1899 (Title 33 United States Code 403) for work within navigable WOUS.

The Proposed Project would not require a Section 10 permit because it does not entail work within navigable waters. To comply with Section 404 of the CWA, UDOT anticipates that the Proposed Project would likely be constructed under a USACE Nationwide Permit 14. Permits, licenses, variances, or similar authorization might also be required by other federal, state, and local statutes.

Section 2.0 discusses the regulatory framework that might apply to areas within the survey area that are potentially subject to federal jurisdiction.

## 2.1 Section 404 of the Clean Water Act

*Waters of the United States* is the encompassing term for areas that qualify for federal regulation under Section 404 of the CWA. Section 404 of the CWA gives the U.S. Environmental Protection Agency (EPA) and USACE regulatory and permitting authority regarding discharge of dredged or fill material into “navigable waters of the United States.” Section 502(7) of the CWA defines *navigable waters* as “waters of the United States, including territorial seas.”

The regulation at 33 CFR Part 328 defines the term *waters of the United States* as it applies to the jurisdictional limits of the authority of USACE under the CWA. A summary of this definition of WOUS in 33 CFR Part 328, Section 328.3, includes (1) waters used for commerce and subject to tides; (2) interstate waters and wetlands; (3) “other waters” such as intrastate lakes, rivers, streams, and wetlands; (4) impoundments of waters; (5) tributaries of waters; (6) territorial seas; and (7) wetlands adjacent to waters. Therefore, for purpose of determining USACE jurisdiction under the CWA, *navigable waters* as defined in the CWA are the same as WOUS defined in 33 CFR Part 328, Section 328.3. WOUS include non-isolated "wetlands" and "other WOUS."

The term *other WOUS* refers to unvegetated waterways and other water bodies with a defined bed and bank, water bodies such as drainages, creeks, rivers, and lakes. This definition approximately translates to the bank-to-bank portion of water bodies, up to the ordinary high water mark (OHWM). Other WOUS typically lack hydrophytic vegetation and might also lack hydric soils. Jurisdiction in non-tidal areas extends to the OHWM, which is defined as:

> … that line on the shore established by the fluctuations of water and indicated by physical characteristics such as clear, natural line impresses on the bank, shelving, changes in the characteristics of the soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas. [33 CFR Section 328.3(e);
> 51 Federal Register 41250, November 13, 1986, as amended at 58 Federal Register 45036, August 25, 1993]

Wetlands are defined as:

> … areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.
> [33 CFR Section 328.3(b), 40 CFR Section 230.3(t)]

The guidelines for implementing Section 404 of the CWA are referred to as the Section 404 (b)(1) Guidelines. They were developed by EPA in conjunction with USACE (40 CFR Part 230). The Guidelines allow the discharge of dredged or fill material into the aquatic system only if there is no practicable alternative that would have less adverse impacts.

On June 29, 2015, EPA and USACE jointly published the *Clean Water Rule: Definition of "Waters of the United States"* (Clean Water Rule), which became effective August 28, 2015 (40 CFR Section 230.3). However, a nationwide stay was issued by the U.S. Court of Appeals for the Sixth Circuit on October 9, 2015, which blocked the implementation of the Clean Water Rule.

To provide time for EPA and USACE to reconsider the definition of WOUS, the agencies published an applicability date amendment to the Clean Water Rule in February 2018 that states it will not be applicable until February 6, 2020. In the meantime, USACE is not implementing the Clean Water Rule but is instead using the 1986 regulations and applicable guidance in making jurisdictional determinations or taking other actions based on the definition of WOUS.

### 2.1.1 Significant Nexus of Tributaries

On December 2, 2008, USACE and EPA issued joint guidance implementing the June 19, 2006, U.S. Supreme Court opinions resulting from the *Rapanos v. United States* and *Carabell v. United States* (*Rapanos*) cases. This guidance states that the agencies will assert jurisdiction over (1) traditional navigable waters (TNW), (2) wetlands adjacent to TNW, (3) non-navigable tributaries of TNW that are relatively permanent where the tributaries typically flow year around or have continuous flow at least seasonally (for example, typically 3 months), and (4) wetlands that abut such tributaries. A "significant nexus" determination will be made for non-navigable tributaries that are not relatively permanent and their adjacent wetlands. Such features that are determined to have a "significant nexus" to a TNW will also be subject to CWA jurisdiction.

A significant nexus requires that there be "more than an insubstantial or speculative effect on the chemical, physical, and/or biological integrity of a TNW." This guidance also states the following features will generally not be subject to CWA jurisdiction: swales or erosional features (for example, gullies or small washes characterized by low volume and infrequent or short-duration flow) and ditches (including roadside ditches) excavated wholly in and draining only uplands and that do not carry a relatively permanent flow of water.

### 2.1.2 Isolated Areas Excluded from Section 404 Jurisdiction

Some wetlands and waters might also be considered outside USACE jurisdiction as a result of the Supreme Court's decision in *Solid Waste Agency of Northern Cook County (SWANCC) v. United States Army Corps of Engineers* (531 U.S. 159 [2001]). Isolated wetlands and waters are those areas that do not have a surface or groundwater connection to, and are not adjacent to, a navigable "water of the United States" and do not otherwise exhibit an interstate commerce connection.

## 2.2 Section 401 of the Clean Water Act

Section 401 of the CWA requires state certification for any permit or license issued by a federal agency for an activity that could discharge fill into WOUS. This requirement allows each state to have input into federally approved projects that could affect its waters (rivers, streams, lakes, and wetlands) and to ensure that the projects will comply with state water quality standards and any other water quality requirements of state law. Any Section 401 certification in Utah also ensures that the project will not adversely affect impaired waters (waters that do not meet state water quality standards) and that the project complies with applicable water quality improvement plans.

## 2.3 Utah Stream Alteration Program

Section 73-3-29 of the Utah Code requires any person, governmental agency, or other organization wishing to alter the bed or banks of a natural stream to obtain written authorization from the State Engineer before beginning work. Natural streams are considered any natural waterway that receives enough water to develop an ecosystem that differs from the surrounding upland environment. Although it cannot be applied to permit wetland impacts, USACE Programmatic General Permit 10 allows an applicant to obtain both state approval and authorization under Section 404 of the CWA through a single application process.

# 3.0 Delineation Methodology

## 3.1 Preliminary Data Gathering

Before conducting delineation fieldwork, HDR reviewed information from several sources, including the following:

- Aerial images of the Proposed Project area
- Topography and surface water maps from the U.S. Geological Survey 7.5-minute Series Quadrangle Topographic maps for Cedar Fort, Jordan Narrows, Saratoga Springs, and Tickville Spring (Utah)
- National Hydric Soils List for Utah (USDA NRCS 2018a)
- U.S. Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI) maps in geographic information systems (GIS) format
- U.S. Department of Agriculture, Natural Resources Conservation Service's (USDA NRCS) Web Soil Survey (USDA NRCS 2018b)
- USACE delineation manuals and delineation reference guides (described in Section 3.3, Delineation Procedures)

## 3.2 Delineation Survey Area Boundaries

All areas within the approximately 1,689-acre survey area were included in the delineation.

## 3.3 Delineation Procedures

HDR conducted fieldwork for the delineation on September 7 and 19, 2017; October 18, 2017; December 4, 2017; and March 16, 2018.

The delineation was conducted in accordance with the *Corps of Engineers Wetlands Delineation Manual* (USACE 1987), the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0)* (*Arid West Regional Supplement*; USACE 2008), *A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States: A Delineation Manual* (Lichvar and McColley 2008), *Updated Datasheet for the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States* (Curtis and Lichvar 2010), and USACE regulatory guidance letters and joint (USACE and EPA) regulations, policies, references, and guidance.

HDR evaluated regional delineation supplements for their application to the survey area. The regional supplements state that selecting a regional supplement for a particular site should be based on landscape and site conditions. The *Arid West Regional Supplement* (USACE 2008) was selected because the natural landscapes in the survey area and surrounding areas are not forested but are generally dominated by shrubland communities with big sagebrush (*Artemisia tridentata*) and rubber rabbitbrush (*Ericameria nauseosa*).

HDR assessed the entire survey area to determine the presence or absence of aquatic features. The routine method was applied by selecting data collection point locations in the field. These sampling points were placed at locations where landform, vegetative, or hydrologic characteristics indicated the potential for wetlands. A minimum of one set of paired data points (one within a wetland and one just outside wetland boundaries) was established to help delineate each wetland or wetland complex. Additional data points were located as needed to help determine wetland boundaries.

HDR recorded detailed information about vegetation, soils, and hydrologic characteristics for each data point and used this information to determine whether an area qualifies as a wetland and to help identify the wetland boundaries. HDR completed USACE datasheets prescribed for delineating intermittent and ephemeral streams in the Arid West for applicable features in the survey area. All datasheets are included as Appendix B, Delineation Datasheets. Photographs of aquatic resources in the survey area and sample locations are included as Appendix C On-site Representative Photographs.

Based on information gathered from sample points and observable changes in elevation and plant communities, HDR mapped aquatic resource boundaries in the survey area through a combination of global positioning system (GPS)-based field mapping (using ArcGIS Collector and an iPad) and desktop digitization referencing high-resolution aerial images that were taken for the Proposed Project on June 28, 2017. HDR reviewed existing GIS data for other aquatic resources at numerous locations in the field, mapped the lateral extents (to the OHWM) of large sections of these features in the field, and measured representative OHWM transects in the field. To produce aquatic resources delineation maps for the survey area, data were exported into GIS software (ArcMap 10.5). Appendix D, Aquatic Resource Delineation Map Series, provides the aquatic resources delineation maps. These data were also used to calculate the area, lengths, and widths of aquatic features in the survey area.

### 3.3.1 Wetlands

A determination of the occurrence of wetlands is based on the presence or absence of hydrophytic (wetland) vegetation, hydric (wetland) soils, and wetland hydrology. The presence of all three of the criteria is necessary for an area to be designated as a jurisdictional wetland unless problematic conditions or significant disturbance is identified and evaluated in accordance with delineation procedures. Wetland boundaries are considered to be a line across which the vegetation, soils, and hydrologic characteristics begin or cease to meet wetland criteria.

#### Vegetation

Hydrophytic vegetation includes plants that are adapted to grow in water, or in a substrate that is at least periodically deficient in oxygen as a result of excessive water contact. Hydrophytic vegetation indicators include a prevalence of hydrophytic vegetation (that is, a majority of dominant plant species that are facultative or obligate wetland plants as listed in the National Wetland Plant List [NWPL; Lichvar et al. 2016]) and morphological or physiological adaptations to saturated soil conditions. Table 1 lists the most recent NWPL indicator statuses assigned to plant species for the purpose of delineating wetlands (Lichvar et al. 2012). A list of observed plant species, including their indicator status, is provided in Appendix G, List of Plant Species Observed.

**Table 1. Wetland Indicator Status System**

| Indicator Status | Indicator Symbol | Definition |
|---|---|---|
| Obligate wetland | OBL | Plants that almost always occur in wetlands. |
| Facultative wetland | FACW | Plants that usually occur in wetlands but could occur in non-wetlands. |
| Facultative | FAC | Plants that occur in wetlands and non-wetlands. |
| Facultative upland | FACU | Plants that usually occur in non-wetlands but could occur in wetlands. |
| Upland plants | UPL | Plants that almost never occur in wetlands. |
| Not listed | NL | Plants that are not listed on the NWPL and therefore are assumed to be upland. |

HDR documented vegetation within a sample plot surrounding each sampling point location. Each polygon area was visually inspected, and plant species were identified. Vegetation was considered hydrophytic when over 50% of the dominant species had an indicator status of facultative (FAC), facultative wetland (FACW), or obligate (OBL) or when the prevalence index was less than 3.0 in cases where the dominance was less than or equal to 50%. To identify the appropriate indicator status of each plant species recorded, HDR referenced the version of the Arid West Regional Wetland Plant List (a subset of the NWPL) that was available for delineation fieldwork and analysis (Lichvar et al. 2016).

## Soils

Hydric soils are soils that are saturated, flooded, or ponded for long enough during the growing season to develop anaerobic conditions in the upper part of the soil profile. Anaerobic conditions favor the growth and regeneration of hydrophytic vegetation. Hydric soil indicators can include organic soils (histosols), mineral soils saturated and rich in organics (histic epipedons), sulfidic odor, low dissolved oxygen concentration (aquic moisture regime) and reducing conditions, gleyed and/or low chroma soils, soils listed on national, state, or local hydric soils lists, and iron and manganese concentrations close to the soil surface. HDR used a standard Munsell soil color chart to determine the soil matrix and mottle colors (Munsell Color 2009). In accordance with USACE methodology, soil profiles were investigated at sampling points in the survey area and were examined for indicators of hydric conditions.

## Hydrology

The term *wetland hydrology* encompasses all hydrologic characteristics of areas that are periodically inundated or have soils saturated to the surface at some time during the growing season. Areas with evident characteristics of wetland hydrology are those where the presence of water has an overriding influence on the characteristics of vegetation and soils due to anaerobic and reducing conditions, respectively. Wetland hydrology indicators include obvious characteristics such as surface water, soil saturation, and water table depth. Other indicators include soil cracking, a salt crust, drainage patterns, water-stained leaves, and the presence of oxidized rhizospheres. HDR evaluated hydrology at each sampling point in the survey area.

### 3.3.2 Other Aquatic Resources

This delineation also evaluated the presence of aquatic resources other than wetlands potentially subject to USACE's jurisdiction. In non-tidal areas, USACE maintains jurisdiction over areas below the OHWM in water features such as navigable streams, rivers, and lakes; interstate waters; and tributaries to navigable waters.

HDR delineated non-wetland aquatic features based on the presence of a bed and bank and an OHWM (Lichvar and McColley 2008; USACE 2005). Potentially jurisdictional non-wetland features were delineated along the OHWM. If a feature did not exhibit a bed and bank and an OHWM, and did not show distinct vegetation changes, it was not further evaluated as a potential aquatic resource or considered to be a potentially jurisdictional water.

#### Perennial Streams

Perennial water features are those that usually flow all year during typical years, or with lower to no flows during short periods during drier years. Perennial streams are supported primarily by groundwater where precipitation runoff can only supplement stream flow.

#### Intermittent Streams

Intermittent stream features are channels that flow most of or during parts of the year when groundwater is in sufficient supply to allow surface water flows. During dry, lower-groundwater periods, these channels are likely not to be flowing or might even have dry channels. Rainfall can also supplement stream flow but is not the primary water source.

#### Ephemeral Streams

Ephemeral features are supported solely by rainfall events, and are always above the water table. These features are likely to flow only during and shortly after precipitation events or periods of rainfall. Ephemeral channels can be distinguished from swales and erosion features by receiving flows sufficiently often (typically at least every year or so) to maintain a clear and definable OHWM.

### 3.3.3 Observations Pertaining to Jurisdictional Status of Delineated Aquatic Resources

USACE considers an area to be a wetland if it is characterized by the three parameters of hydrophytic vegetation, hydric soils, and wetland hydrology. Other aquatic resources are identified based on evidence of an OHWM. However, as described in Section 2.1, Section 404 of the Clean Water Act, for these resources to be subject to regulation under the CWA, they also must meet jurisdictional criteria.

Under current guidance, USACE asserts jurisdiction over wetlands that are adjacent to a TNW, relatively permanent non-navigable tributaries of TNW, and wetlands that directly abut relatively permanent non-navigable tributaries of TNW (USACE 2008). A fact-specific analysis is used to determine whether wetlands that are adjacent to but not abutting non-navigable tributaries have a significant nexus with a TNW (USACE 2008). Wetlands adjacent to non-navigable tributaries that lack a significant nexus and any wetlands determined to be isolated would not be subject to CWA jurisdiction if they do not have an identifiable connection to interstate or foreign commerce and they do not include interstate waters.

# 4.0 Environmental Setting

The survey area is located in urban, agricultural, and open-space areas in the Cedar Valley, Utah County, Utah. The survey area is north of the Lake Mountains and northwest of Utah Lake. The survey area is part of the Basin and Range physiographic region—specifically, the Great Basin subregion—and was historically covered by sagebrush basins and slopes. Topography in the area is relatively flat, with several ephemeral wash channels draining to the southeast toward Utah Lake. The survey area is located in the Utah Lake watershed, hydrologic unit code 16020201 (EPA 2018).

## 4.1 National Wetlands Inventory Wetland Mapping

NWI maps provide data on wetlands and deepwater habitats such as lakes and streams, categorized by the Classification of Wetlands and Deepwater Habitats of the United States (Cowardin Classification System; Cowardin et al. 1979). NWI data are primarily based on the interpretation of high-altitude images and do not represent regulatory boundaries.

Appendix E, National Wetlands Inventory Map Series, provides a map series that displays NWI data across the survey area. These maps do not identify any wetlands but identify one class of aquatic habitats (riverine) in the survey area.

## 4.2 Existing Field Conditions

The delineation field reconnaissance was conducted September 7 and 19, 2017; October 18, 2017; December 4, 2017; and March 16, 2018.

Weather data for the survey area was obtained from historic records collected in Saratoga Springs, Utah (U.S. Climate Data 2018). During the field surveys, temperatures ranged from 38 to 91 degrees Fahrenheit, with no measurable precipitation and mostly sunny skies to cloudy skies. The average annual precipitation in the survey area is 13.47 inches, and average annual snowfall is 30 inches.

### 4.2.1 General Hydrology

Wetlands and other aquatic features in the survey area are hydrologically connected with the Utah Lake watershed. Utah Lake is one of the largest natural freshwater lakes in the western United States and is used by residents of the Salt Lake Valley as a water source. The primary inflows come from the Provo, Spanish Fork, and American Fork Rivers, and the Jordan River drains the lake to the north. The survey area is generally dry, with several ephemeral washes that drain southeast toward Utah Lake. The Provo Reservoir Canal passes through the survey area.

### 4.2.2 General Soil Conditions

The survey area has a variety of soil types, none of which are listed as hydric in the *Soil Survey of Utah* (USDA NRCS 2018a). Table 2 lists the 21 soil types that were identified in the survey area. Soil map unit boundaries for the survey area are provided in Appendix F, USDA NRCS Soil Map Series (USDA NRCS 2018b).

**Table 2. Soil Types Identified in the Delineation Survey Area**

| Soil Name | Map Unit Symbol | Acreage |
|---|---|---|
| Birdow loam | Bf | 105.1 |
| Donnardo stony loam, 2 to 8 percent slopes | DdC | 156.7 |
| Donnardo stony loam, 8 to 25 percent slopes | DdE | 94.9 |
| Doyce loam, 2 to 4 percent slopes | DfB | 70.0 |
| Hillfield silt loam, 2 to 5 percent slopes | HeC | 60.8 |
| Hupp gravelly loam, 4 to 8 percent slopes | HfC | 27.9 |
| Hupp gravelly loam, 8 to 15 percent slopes | HfD | 26.1 |
| Juab loam, 2 to 4 percent slopes | JbB | 48.0 |
| Juab loam, 4 to 8 percent slopes | JbC | 25.5 |
| Lodar-Rock outcrop complex, 3 to 30 percent slopes | LdE | 1.2 |
| Lodar-Rock outcrop complex, 30 to 70 percent slopes | LdF | 129.3 |
| Musinia silty clay loam, moist, 2 to 5 percent slopes | MvC | 0.0 |
| Pits-Dumps complex | PK | 8.0 |
| Pleasant Vale loam, 0 to 2 percent slopes | PnA | 39.7 |
| Redola gravelly loam, 3 to 6 percent slopes | ReC | 63.3 |
| Rock land | RW | 28.8 |
| Sterling gravelly fine sandy loam, 6 to 10 percent slopes | SgD | 0.3 |
| Taylorsville silt loam, 0 to 2 percent slopes | TaA | 272.3 |
| Taylorsville silt loam, 2 to 4 percent slopes | TaB | 446.4 |
| Taylorsville silty clay loam, extended season, 1 to 3 percent slopes | TcB | 54.9 |
| Taylorsville silty clay loam, extended season, 3 to 6 percent slopes, eroded | TcC2 | 30.0 |
| **Total** | | **1,689.6** |

### 4.2.3 General Plant Community Types

The survey area consists primarily of upland shrublands, farmland, and residential areas. The vegetation characteristics of the delineated wetlands are described in Section 5.0, Results.

Upland shrubland communities in the survey area consist primarily of big sagebrush (*Artemisia tridentata*), rubber rabbitbrush (*Ericameria nauseosa*), broom snakeweed (*Gutierrezia sarothrae*), crested wheatgrass (*Agropyron cristatum*), and cheatgrass (*Bromus tectorum*). Dry grain, seeds, and alfalfa are grown in farmland areas.

With the exception of farm crops, Appendix G, List of Plant Species Observed, lists the plant species that were observed in the survey area including the scientific name, common name, family name, and wetland plant indicator status according to the Arid West Regional Plant List (Lichvar et al. 2016).

# 5.0 Results

The subsections that follow describe the results of the aquatic resource delineation. The maps in Appendix D, Aquatic Resource Delineation Map Series, depict the extent of aquatic resource areas in the survey area and the locations of wetland and stream delineation sampling points. To help delineate potential wetlands in the survey area, HDR completed six wetland determination forms. To help delineate stream segments in the survey area, HDR completed four delineation datasheets for ephemeral and intermittent streams. All delineation data forms are provided in Appendix B, Delineation Datasheets. On-site photographs are provided in Appendix C, On-site Representative Photographs. A list of observed plant species is provided in Appendix G, List of Plant Species Observed. Table 3 summarizes the wetland delineation sampling points ordered by their locations on the map sheets in Appendix B.

**Table 3. Wetland Determination Data Forms Summary**

| Sampling Point | Hydrophytic Vegetation? | Hydric Soils? | Wetland Hydrology? | Sampled Area within a Wetland? | Map Sheet Number[a] |
|---|---|---|---|---|---|
| UP-1 | Yes | No | No | No | 4 |
| WET-4 | Yes | NA | Yes | Yes | 6 |
| UP-4 | No | NA | No | No | 6 |
| UP-2 | Yes | No | No | No | 7 |
| WET-3 | Yes | Yes | No | Yes | 7 |
| UP-3 | No | NA | No | No | 7 |

[a] See Appendix D, Aquatic Resource Delineation Map Series. This summary lists the first map sheet on which a point appears. Corresponding wetland determination forms are provided in Appendix B, Delineation Datasheets.

A total of 3.92 acres of aquatic resources were delineated in the survey area. These resources include two palustrine wetlands that total 0.53 acre, 15,686 linear feet (3.06 acres) of ephemeral stream channels, and 3,687 linear feet (0.34 acre) of open-channel canal. Table 4, Aquatic Resources Summary, on page 17 summarizes all of the aquatic resource features that were delineated. The following subsections describe the delineated features by each aquatic resource type.

## 5.1 Wetlands

Two wetland features totaling 0.53 acre were delineated in the survey area. Based on observed wetland characteristics and on the Cowardin Classification System (Cowardin et al. 1979), one of these wetlands (WET-4) is PEM (palustrine emergent) temporarily to seasonally flooded. The other wetland (WET-3) is classified as PSS (palustrine scrub-shrub) temporarily to seasonally flooded.

## 5.2 Other (Non-wetland) Aquatic Resources

As described in Section 3.3, Delineation Procedures, other (non-wetland) aquatic resources were delineated based on the presence of a bed and bank and an OHWM (Curtis and Lichvar 2010; Lichvar and McColley 2008; USACE 2005). A total of 15,686 linear feet (3.06 acres) of ephemeral stream channels and 3,687 linear feet (0.34 acre) of open-channel canal were delineated. All of these features are depicted on delineation maps in Appendix D, Aquatic Resource Delineation Map Series.

### 5.2.1 Streams

Streams delineated in the survey area included two unnamed ephemeral drainages (EPH-2 and EPH-4) as well as the West Canyon Wash (EPH-1) and Tickville Gulch (EPH-3). There were no perennial or intermittent streams in the survey area. To help delineate stream segments in the survey area, HDR completed four delineation datasheets for ephemeral and intermittent streams at representative locations (see Appendix B, Delineation Datasheets). These datasheets include cross-section diagrams at these locations, and Appendix C, On-site Representative Photographs, includes photographs of representative cross-sections. The delineation maps in Appendix D, Aquatic Resource Delineation Map Series, include the locations of the representative cross-sections.

All of the ephemeral streams consisted of a single channel ranging from about 3 to 30 feet wide, and all were dry during the field surveys. The vegetation characteristics transitioned from upland shrublands across the low terraces and side slopes to little or no vegetation in the active floodplain (with the exception of EPH-4, which had thick patches of Scotch cottonthistle [*Onopordum acanthium*] and rough cocklebur [*Xanthium strumarium*]). In addition to vegetation changes, changes in sediment texture and small breaks in bank slopes were used to identify the lateral extent of the OHWM of each ephemeral feature. In the survey area, the lengths of these ephemeral features range from 2,500 to 6,200 linear feet. All of these features are culverted under S.R. 73 and drain southeast toward Utah Lake.

### 5.2.2 Canals, Ponds, and Ditches

One named canal, the Provo Reservoir Canal, was delineated in the survey area. Vegetation along the canal generally consists of agricultural land, non-wetland species, and a patch of narrowleaf willow (*Salix exigua*) near WET-3. Like the ephemeral features, the canal is culverted under S.R. 73. No ponds or ditches were mapped in the survey area.

# 6.0 Delineation Summary and Jurisdictional Evaluation

All areas in the delineation survey area were assessed to determine the presence or absence of aquatic resources including wetlands and other waters in accordance with the procedures and guidelines established by USACE. In the survey area are a total of 3.92 acres of aquatic resources. These resources consist of two palustrine wetlands that total 0.528 acre, 15,686 linear feet (3.06 acres) of ephemeral stream channels, and 3,687 linear feet (0.34 acre) of open-channel canal. All features recorded and mapped are included in Appendix D, Aquatic Resource Delineation Map Series.

Table 4 summarizes all aquatic resource delineated features in the delineation survey area. Features are ordered by resource type and then by their locations on the map sheets in Appendix D.

### Table 4. Aquatic Resources Summary

| Aquatic Resource Feature Name | Aquatic Resource Type | Cowardin Classification[a] | Waters Type Code[b] | Size (acres) | Length (feet) | Latitude[c] | Longitude[c] | Map Sheet Number(s)[d] |
|---|---|---|---|---|---|---|---|---|
| ***Wetlands*** | | | | | | | | |
| WET-3 | Emergent wetland | PSS | RPWWD | 0.393 | — | 40.387164 | –111.939737 | 7 |
| WET-4 | Emergent wetland | PEM | NRPWW | 0.135 | — | 40.378483 | –111.973181 | 6 |
| ***Streams*** | | | | | | | | |
| EPH-1 | Ephemeral steam | R6 | NRPW | 0.538 | 3,313 | 40.372124 | –112.030209 | 1 |
| | | | | | | 40.368352 | –112.022847 | |
| EPH-2 | Ephemeral steam | R6 | NRPW | 0.135 | 2,527 | 40.375076 | –112.022986 | 2, 3 |
| | | | | | | 40.370743 | –112.016931 | |
| EPH-3 | Ephemeral steam | R6 | NRPW | 0.246 | 3,653 | 40.380319 | –112.005936 | 4, 5 |
| | | | | | | 40.374913 | –112.002057 | |
| EPH-4 | Ephemeral steam | R6 | NRPW | 2.142 | 6,193 | 40.389044 | –111.942503 | 7, 8 |
| | | | | | | 40.383839 | –111.935500 | |
| ***Canals*** | | | | | | | | |
| Provo Reservoir Canal | Canal | R4SB | RPW | 0.335 | 3,687 | 40.389386 | –111.938637 | 7, 8 |
| | | | | | | 40.383337 | –111.938593 | |

[a] Codes from *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et al. 1979): PEM (palustrine emergent), PSS (palustrine scrub-shrub), R4SB (riverine intermittent streambed/canal), and R6 (riverine ephemeral streambed).

[b] USACE Sacramento District, Aquatic Resources Spreadsheet "Waters_Type" codes (USACE 2016): RPWWD (wetlands directly abutting relatively permanent waters [RPWs] that flow directly or indirectly into TNWs), NRPWW (wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs), and NRPW (non-RPWs that flow directly or indirectly into TNWs).

[c] Two sets of coordinates are included for long, linear features. The top row provides the uppermost (upstream) location of the feature in the survey area, and the bottom row provides the lowest downstream location of the feature in the survey area.

[d] See Appendix D, Aquatic Resource Delineation Map Series.

## 6.1 Jurisdictional Status of Delineated Aquatic Resources

Aquatic resources in the survey area do not have an identifiable connection to interstate or foreign commerce and do not include any interstate waters or a TNW. Most of the aquatic resources delineated appear to be hydrologically linked to Utah Lake. The West Canyon Wash (EPH-1) and EPH-2 (an unnamed tributary to West Canyon Wash) drain into Tickville Gulch (EPH-3), which eventually connects to Utah Lake. It is unclear whether EPH-4 connects to Utah Lake and should be evaluated further. The Provo Reservoir Canal is a relatively permanent water (that is, it typically flows year-round or has continuous flow at least seasonally). WET-3 abuts the Provo Reservoir Canal and has been classified as a RPWWD; however, this wetland appears to be irrigation-induced and would dry up if irrigation were removed. Irrigation-induced wetlands are not considered jurisdictional. WET-4 is a stormwater detention basin constructed in uplands. Stormwater facilities constructed in uplands are generally considered exempt from jurisdiction.

If a preliminary jurisdictional determination is requested to help expedite permitting, all delineated aquatic resources would be assumed jurisdictional. However, if an approved jurisdictional determination is requested, USACE would evaluate the jurisdictional status of each aquatic resource. Under current regulations and guidance, USACE asserts jurisdiction over relatively permanent waters (Provo Reservoir Canal). USACE would decide jurisdiction over the ephemeral streams based on a fact-specific analysis to determine whether they have a “significant nexus” with a TNW. If USACE agrees that WET-3 is irrigation-induced and WET-4 is a stormwater basin constructed in uplands, USACE would determine that both of these wetlands are not jurisdictional.

Although the jurisdictional status of aquatic resources is determined by USACE, based on the results of this delineation and consideration of the Proposed Project action, the Proposed Project would include work in WOUS. As a delineation, this document does not provide information regarding potential project impacts. UDOT would coordinate with USACE before constructing the Proposed Project to determine permitting requirements under Section 404 of the CWA for construction.

## 6.2 Additional Information

The attached appendices include supporting information for this delineation:

- Appendix A. Project Location Index Map
- Appendix B. Delineation Datasheets
- Appendix C. On-site Representative Photographs
- Appendix D. Aquatic Resource Delineation Map Series
- Appendix E. National Wetlands Inventory Map Series
- Appendix F. USDA NRCS Soil Map Series
- Appendix G. List of Plant Species Observed

# 7.0 References

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe

1979 Classification of Wetlands and Deepwater Habitats of the United States. Office of Biological Services, U.S. Department of the Interior, FWS/OBS-79/31.

Curtis, K.E., and R.W. Lichvar

2010 Updated Datasheet for the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States. ERDC/CRREL TN-10-1. Hanover, New Hampshire: U.S. Army Engineer Research and Development Center, Cold Regions Research and Engineering Laboratory.

[EPA] Environmental Protection Agency

2018 Surf Your Watershed webpage. Available at http://cfpub.epa.gov/surf/huc.cfm?huc_code=14040103. Accessed April 3, 2018.

Lichvar, R.W., D.L. Banks, W.N. Kirchner, and N.C. Melvin

2016 The National Wetland Plant List: 2016 Wetland Ratings. *Phytoneuron* 2016-30: 1–17. ISSN 2153 733X. Published April 28, 2016.

Lichvar, R.W., and S.M. McColley

2008 A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States: A Delineation Manual. ERDC/CRREL TR-08-12. Hanover, New Hampshire: U.S. Army Engineer Research and Development Center, Cold Regions Research and Engineering Laboratory.

Lichvar, R.W., N.C. Melvin, M. Butterwick, and W.N. Kirchner

2012 National Wetland Plant List Indicator Rating Definitions. ERDC/CRREL TR-12-1. Hanover, New Hampshire: U.S. Army Corps of Engineers, Engineer Research and Development Center, Cold Regions Research and Engineering Laboratory.

Munsell Color

2009 Munsell Soil-Color Charts. Grand Rapids, Michigan.

[USDA NRCS] U.S. Department of Agriculture, Natural Resources Conservation Service

2018a National Hydric Soils List for Utah. Available online at https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcseprd1316619.html. Accessed April 3, 2018.

2018b Web Soil Survey. Soil Survey Staff, USDA NRCS. Available online at http://websoilsurvey.nrcs.usda.gov/. Accessed April 3, 2018.

U.S. Climate Data

2018 Climate Data for Saratoga Springs, Utah. Available online at https://www.usclimatedata.com/climate/saratoga-springs/utah/united-states/usut0357/2017/1. Accessed March 30, 2018.

[USACE] U.S. Army Corps of Engineers

1987 Corps of Engineers Wetlands Delineation Manual. Technical Report Y-87-1. U.S. Army Engineer Waterways Experiment Station, Vicksburg, Mississippi.

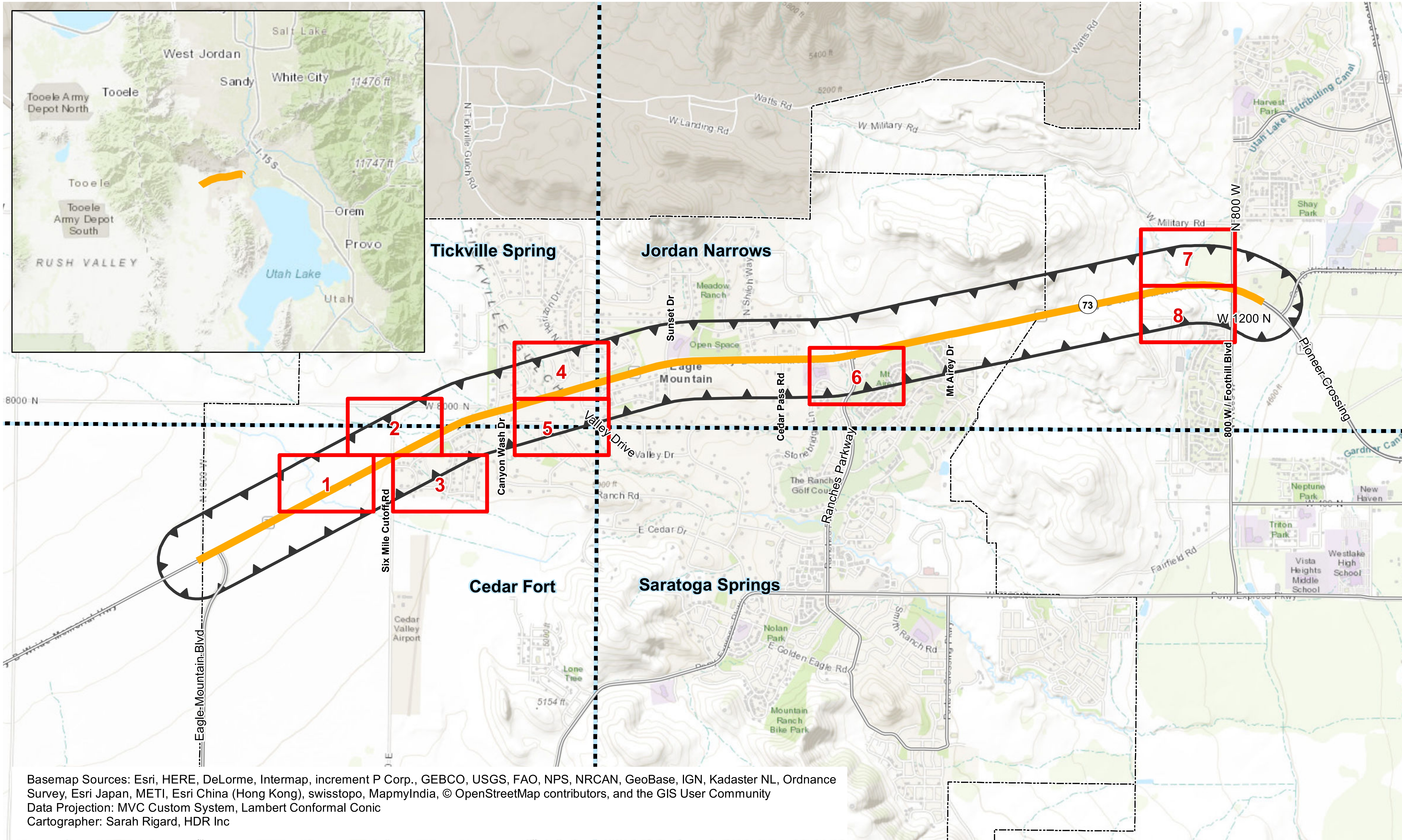
2005 Regulatory Guidance Letter No. 05-05. Available online at http://www.usace.army.mil/Missions/CivilWorks/RegulatoryProgramandPermits/GuidanceLetters.aspx. December 7, 2005.

2008 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0), ed. J.S. Wakeley, R.W. Lichvar, and C.V. Noble. ERDC/EL TR-08-28. Vicksburg, Mississippi: U.S. Army Engineer Research and Development Center.

2016 Aquatic Resources Excel Spreadsheet, version dated January 11, 2018, prepared by the USACE Sacramento District. Available online at http://www.spk.usace.army.mil/Missions/Regulatory/Jurisdiction/Aquatic-Resources-Delineation/. Accessed April 3, 2018.

# APPENDIX A

Project Location Index Map




Basemap Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community
Data Projection: MVC Custom System, Lambert Conformal Conic
Cartographer: Sarah Rigard, HDR Inc

State Route 73
ENVIRONMENTAL STUDY
Eagle Mountain to Saratoga Springs

**Legend**
- SR 73 Study Limits
- Delineation Survey Area
- City Boundaries
- USGS Quads

0 Feet 3,000

N

## AQUATIC RESOURCE DELINEATION OVERVIEW MAP

FIGURE 1 OF 1

# APPENDIX B

## Delineation Datasheets

# WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: S.R. 73 City/County: Eagle Mountain, Utah County Sampling Date: 9/19/2017

Applicant/Owner: UDOT State: Utah Sampling Point: UP-1

Investigator(s): MP/AC Section, Township, Range: ____

Landform (hillslope, terrace, etc.): depression Local relief (concave, convex, none): concave Slope (%): 0

Subregion (LRR): D Lat: 40.37852124890 Long: -112.00182340000 Datum: D North

Soil Map Unit Name: Donnardo stony loam, 2 to 8 percent slopes NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

| | | | |
|---|---|---|---|
| Hydrophytic Vegetation Present? | Yes ✓ | No ____ | **Is the Sampled Area within a Wetland?** Yes ____ No ✓ |
| Hydric Soil Present? | Yes ____ | No ✓ | |
| Wetland Hydrology Present? | Yes ____ | No ✓ | |

Remarks:

Possible storm water basin

## VEGETATION – Use scientific names of plants.

| Tree Stratum (Plot size: ____) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| | ____ = Total Cover | | |
| **Sapling/Shrub Stratum** (Plot size: 15 ft radius) | | | |
| 1. Apocynum cannabinum | 20% | Y | FAC |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | 20% = Total Cover | | |
| **Herb Stratum** (Plot size: 5 ft radius) | | | |
| 1. Poa palustrus | 150% | Y | FAC |
| 2. Taraxacum officinale | 2% | N | FACU |
| 3. Agrostis exarata | 1% | N | FACW |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| | 153% = Total Cover | | |
| **Woody Vine Stratum** (Plot size: ____) | | | |
| 1. | | | |
| 2. | | | |
| | ____ = Total Cover | | |

% Bare Ground in Herb Stratum ____ % Cover of Biotic Crust ____

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: |
|---|---|---|
| OBL species | ____ | x 1 = ____ |
| FACW species | ____ | x 2 = ____ |
| FAC species | ____ | x 3 = ____ |
| FACU species | ____ | x 4 = ____ |
| UPL species | ____ | x 5 = ____ |
| Column Totals: | ____ (A) | ____ (B) |

Prevalence Index = B/A = ____

**Hydrophytic Vegetation Indicators:**

✓ Dominance Test is >50%

__ Prevalence Index is ≤3.0[1]

__ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

__ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Hydrophytic Vegetation Present?** Yes ✓ No ____

Remarks:

## SOIL

Sampling Point: UP-1

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth (inches) | Matrix Color (moist) | Matrix % | Redox Features Color (moist) | Redox % | Type[1] | Loc[2] | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-9 | 10YR 3/2 | 95% | | | | | CL | |
| | 10YR 5/3 | 5% | | | | | | |
| 9-13 | 10YR 5/3 | 90% | | | | | SiL | dark pore linings |
| | 10YR 3/2 | 10% | | | | | | |
| 13-20 | 10YR 5/3 | 100% | | | | | SiL | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

**Indicators for Problematic Hydric Soils[3]:**

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if present):**

Type: ______

Depth (inches): ______

**Hydric Soil Present?** Yes ______ No ✓

Remarks:

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

**Field Observations:**

Surface Water Present? Yes ______ No ______ Depth (inches): ______

Water Table Present? Yes ______ No ______ Depth (inches): ______

Saturation Present? (includes capillary fringe) Yes ______ No ______ Depth (inches): ______

**Wetland Hydrology Present?** Yes ______ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

## WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: S.R. 73 City/County: Saratoga Springs, Utah Count Sampling Date: 9/19/2017

Applicant/Owner: UDOT State: Utah Sampling Point: UP-2

Investigator(s): MP/AC Section, Township, Range: ____

Landform (hillslope, terrace, etc.): depression Local relief (concave, convex, none): concave Slope (%): 0

Subregion (LRR): D Lat: 40.38683442300 Long: -111.94011168900 Datum: D North

Soil Map Unit Name: Taylorsville silty clay loam, 3 to 6 percent slopes, eroded NWI classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

### SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

| | | | |
|---|---|---|---|
| Hydrophytic Vegetation Present? | Yes ✓ | No ____ | Is the Sampled Area within a Wetland? Yes ____ No ✓ |
| Hydric Soil Present? | Yes ____ | No ✓ | |
| Wetland Hydrology Present? | Yes ____ | No ✓ | |

Remarks:

Not a wetland. Included in dry wash mapping.

### VEGETATION – Use scientific names of plants.

| Tree Stratum (Plot size: ____) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| = Total Cover | | | |
| **Sapling/Shrub Stratum** (Plot size: 15 ft radius) | | | |
| 1. Salix exigua | 30% | Y | FACW |
| 2. Ulmus pumila | 5% | N | UPL |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| = Total Cover | 35% | | |
| **Herb Stratum** (Plot size: 5 ft radius) | | | |
| 1. Dipsacus fullonum | 15% | Y | FAC |
| 2. Rumex crispus | 5% | Y | FAC |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| = Total Cover | 20% | | |
| **Woody Vine Stratum** (Plot size: ____) | | | |
| 1. | | | |
| 2. | | | |
| = Total Cover | | | |

% Bare Ground in Herb Stratum ____ % Cover of Biotic Crust ____

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: |
|---|---|---|
| OBL species | | x 1 = |
| FACW species | | x 2 = |
| FAC species | | x 3 = |
| FACU species | | x 4 = |
| UPL species | | x 5 = |
| Column Totals: | (A) | (B) |

Prevalence Index = B/A = ____

**Hydrophytic Vegetation Indicators:**

✓ Dominance Test is >50%

__ Prevalence Index is ≤3.0[1]

__ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

__ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Hydrophytic Vegetation Present?** Yes ✓ No ____

Remarks:

## SOIL

Sampling Point: UP-2

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth (inches) | Matrix Color (moist) | Matrix % | Redox Features Color (moist) | Redox Features % | Type[1] | Loc[2] | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-11 | 10YR 5/2 | 80% | | | | | | |
| | 7.5YR 4/3 | 20% | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

**Indicators for Problematic Hydric Soils[3]:**

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if present):**

Type: ______

Depth (inches): ______

**Hydric Soil Present?** Yes ______ No ✓

Remarks:

Cemented soil. Dug to 11" and stopped.

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

**Field Observations:**

Surface Water Present? Yes ______ No ______ Depth (inches): ______

Water Table Present? Yes ______ No ______ Depth (inches): ______

Saturation Present? (includes capillary fringe) Yes ______ No ______ Depth (inches): ______

**Wetland Hydrology Present?** Yes ______ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

# WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: S.R. 73 City/County: Saratoga Springs, Utah County Sampling Date: 9/19/2017

Applicant/Owner: UDOT State: Utah Sampling Point: WET-3

Investigator(s): MP/AC Section, Township, Range: ______

Landform (hillslope, terrace, etc.): top of slope Local relief (concave, convex, none): ______ Slope (%): 0

Subregion (LRR): D Lat: 40.38702154890 Long: -111.93958782500 Datum: D North

Soil Map Unit Name: Taylorsville silty clay loam, extended season, 1 to 3 percent slopes NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ✓ naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

| | | | |
|---|---|---|---|
| Hydrophytic Vegetation Present? | Yes ✓ | No ___ | Is the Sampled Area within a Wetland? Yes ✓ No ___ |
| Hydric Soil Present? | Yes ✓ | No ___ | |
| Wetland Hydrology Present? | Yes ___ | No ✓ | |

Remarks:

Problematic hydrology. Dry time of year. This wetland is most likely irrigation induced and would dry up if irrigation were removed.

## VEGETATION – Use scientific names of plants.

| | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| Tree Stratum (Plot size: ______) | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| = Total Cover | | | |
| Sapling/Shrub Stratum (Plot size: 15 ft radius) | | | |
| 1. Salix exigua | 100% | Y | FACW |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| = Total Cover | 100% | | |
| Herb Stratum (Plot size: 5 ft radius) | | | |
| 1. Phalaris arundinacea | 5% | N | FACW |
| 2. Ambrosia artemisiifolia | 2% | N | FACU |
| 3. Mentha arvensis | 2% | N | FACW |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| = Total Cover | 109% | | |
| Woody Vine Stratum (Plot size: ______) | | | |
| 1. | | | |
| 2. | | | |
| = Total Cover | | | |

% Bare Ground in Herb Stratum ______ % Cover of Biotic Crust ______

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: |
|---|---|---|
| OBL species | | x 1 = |
| FACW species | | x 2 = |
| FAC species | | x 3 = |
| FACU species | | x 4 = |
| UPL species | | x 5 = |
| Column Totals: | (A) | (B) |

Prevalence Index = B/A = ______

**Hydrophytic Vegetation Indicators:**

✓ Dominance Test is >50%
___ Prevalence Index is ≤3.0[1]
___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Hydrophytic Vegetation Present?** Yes ✓ No ___

Remarks:

## SOIL

Sampling Point: WET-3

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth (inches) | Matrix Color (moist) | Matrix % | Redox Features Color (moist) | Redox % | Type[1] | Loc[2] | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-3 | 10YR 4/2 | 100% | | | | | SiCl | |
| 3-10 | 10YR 4/2 | 97% | 10YR 5/8 | 3% | C | M | SiCl | redox in matrix |
| 10-20 | 10YR 4/3 | 100% | | | | | SiCl | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
✓ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

**Indicators for Problematic Hydric Soils[3]:**

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if present):**

Type: ______

Depth (inches): ______

**Hydric Soil Present?** Yes ✓ No ___

Remarks:

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

**Field Observations:**

Surface Water Present? Yes ___ No ___ Depth (inches): ___
Water Table Present? Yes ___ No ___ Depth (inches): ___
Saturation Present? (includes capillary fringe) Yes ___ No ___ Depth (inches): ___

**Wetland Hydrology Present?** Yes ___ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No hydrology indicators apparent. Dry time of year. Willows next to ditches and canals.

# WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: S.R. 73 City/County: Saratoga Springs, Utah Count Sampling Date: 9/19/2017

Applicant/Owner: UDOT State: Utah Sampling Point: UP-3

Investigator(s): MP/AC Section, Township, Range: ______

Landform (hillslope, terrace, etc.): slope Local relief (concave, convex, none): ______ Slope (%): 3%

Subregion (LRR): D Lat: 40.38698417580 Long: -111.93965925000 Datum: D North

Soil Map Unit Name: Taylorsville silty clay loam, extended season, 1 to 3 percent slopes NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

| | | | |
|---|---|---|---|
| Hydrophytic Vegetation Present? | Yes ___ No ✓ | Is the Sampled Area within a Wetland? | Yes ___ No ✓ |
| Hydric Soil Present? | Yes ___ No ___ | | |
| Wetland Hydrology Present? | Yes ___ No ✓ | | |

Remarks:

Upland vegetation. No soil pit.

## VEGETATION – Use scientific names of plants.

| Tree Stratum (Plot size: ______) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| = Total Cover | | | |
| **Sapling/Shrub Stratum** (Plot size: ______) | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| = Total Cover | | | |
| **Herb Stratum** (Plot size: 5 ft radius) | | | |
| 1. Ambrosia artemisiifolia | 15% | N | FACU |
| 2. Gutierrezia sarothrae | 15% | N | NL |
| 3. Bromus tectorum | 20% | N | NL |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| = Total Cover | 50% | | |
| **Woody Vine Stratum** (Plot size: ______) | | | |
| 1. | | | |
| 2. | | | |
| = Total Cover | | | |

% Bare Ground in Herb Stratum ______ % Cover of Biotic Crust ______

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: | |
|---|---|---|---|
| OBL species | | x 1 = | |
| FACW species | | x 2 = | |
| FAC species | | x 3 = | |
| FACU species | 15 | x 4 = | 60 |
| UPL species | 35 | x 5 = | 175 |
| Column Totals: | 50 (A) | | 235 (B) |

Prevalence Index = B/A = 4.7

**Hydrophytic Vegetation Indicators:**

- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Hydrophytic Vegetation Present?** Yes ___ No ✓

Remarks:

## SOIL

Sampling Point: UP-3

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth (inches) | Matrix Color (moist) | Matrix % | Redox Features Color (moist) | Redox Features % | Type[1] | Loc[2] | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

**Indicators for Problematic Hydric Soils[3]:**

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if present):**

Type: ______________

Depth (inches): ______________

**Hydric Soil Present? Yes ______ No ______**

Remarks:

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

**Field Observations:**

Surface Water Present? Yes ______ No ______ Depth (inches): ______________

Water Table Present? Yes ______ No ______ Depth (inches): ______________

Saturation Present? (includes capillary fringe) Yes ______ No ______ Depth (inches): ______________

**Wetland Hydrology Present? Yes ______ No ✓**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

# WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: S.R. 73 City/County: Saratoga Springs, Utah Count Sampling Date: 3/16/2018

Applicant/Owner: UDOT State: Utah Sampling Point: WET-4

Investigator(s): AC Section, Township, Range: ______

Landform (hillslope, terrace, etc.): depression Local relief (concave, convex, none): concave Slope (%): 0

Subregion (LRR): D Lat: 40.37832092820 Long: -111.97344643400 Datum: D North

Soil Map Unit Name: Donnardo stony loam, 2 to 8 percent slopes NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

| | Yes | No |
|---|---|---|
| Hydrophytic Vegetation Present? | ✓ | |
| Hydric Soil Present? | | |
| Wetland Hydrology Present? | ✓ | |

**Is the Sampled Area within a Wetland?** Yes ✓ No ___

Remarks:

Standing water present. No soil pit. This wetland is a stormwater detention basin.

## VEGETATION – Use scientific names of plants.

| Tree Stratum (Plot size: ______) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| = Total Cover | | | |
| **Sapling/Shrub Stratum** (Plot size: ______) | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| = Total Cover | | | |
| **Herb Stratum** (Plot size: 5 ft radius) | | | |
| 1. Phragmites australis | 75% | Y | FACW |
| 2. Rumex crispus | 2% | N | FAC |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| = Total Cover | 77% | | |
| **Woody Vine Stratum** (Plot size: ______) | | | |
| 1. | | | |
| 2. | | | |
| = Total Cover | | | |

% Bare Ground in Herb Stratum 23% % Cover of Biotic Crust ______

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: |
|---|---|---|
| OBL species | | x 1 = |
| FACW species | | x 2 = |
| FAC species | | x 3 = |
| FACU species | | x 4 = |
| UPL species | | x 5 = |
| Column Totals: | (A) | (B) |

Prevalence Index = B/A = ______

**Hydrophytic Vegetation Indicators:**

✓ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Hydrophytic Vegetation Present?** Yes ✓ No ___

Remarks:

The "bare ground" is not likely bare but is covered with water this time of year. Grasses underneath standing water.

## SOIL

Sampling Point: WET-4

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth (inches) | Matrix Color (moist) | Matrix % | Redox Features Color (moist) | Redox % | Type[1] | Loc[2] | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

**Indicators for Problematic Hydric Soils[3]:**

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if present):**

Type: ______________

Depth (inches): ______________

**Hydric Soil Present? Yes ______ No ______**

Remarks:

No soil pit due to standing water.

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one required; check all that apply)

✓ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

**Field Observations:**

Surface Water Present? Yes ✓ No ______ Depth (inches): ______________

Water Table Present? Yes ______ No ______ Depth (inches): ______________

Saturation Present? (includes capillary fringe) Yes ______ No ______ Depth (inches): ______________

**Wetland Hydrology Present? Yes ✓ No ______**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

# WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: S.R. 73 City/County: Saratoga Springs, Utah Count Sampling Date: 3/16/2018

Applicant/Owner: UDOT State: Utah Sampling Point: UP-4

Investigator(s): AC Section, Township, Range: ______

Landform (hillslope, terrace, etc.): slope Local relief (concave, convex, none): ______ Slope (%): 5%

Subregion (LRR): D Lat: 40.37830277790 Long: -111.97345752300 Datum: D North

Soil Map Unit Name: Donnardo stony loam, 2 to 8 percent slopes NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

| | Yes | No |
|---|---|---|
| Hydrophytic Vegetation Present? | | ✓ |
| Hydric Soil Present? | | |
| Wetland Hydrology Present? | | |

Is the Sampled Area within a Wetland? Yes ___ No ✓

Remarks:

Upland vegetation. No soil pit.

## VEGETATION – Use scientific names of plants.

| Tree Stratum (Plot size: ___) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| = Total Cover | | | |
| **Sapling/Shrub Stratum** (Plot size: 15 ft radius) | | | |
| 1. Ericameria nauseosa | 25% | Y | NL |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| = Total Cover | 25% | | |
| **Herb Stratum** (Plot size: 5 ft radius) | | | |
| 1. Agropyron cristatum | 75% | Y | NL |
| 2. Poa pratensis | 3% | N | FAC |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| = Total Cover | 77% | | |
| **Woody Vine Stratum** (Plot size: ___) | | | |
| 1. | | | |
| 2. | | | |
| = Total Cover | | | |

% Bare Ground in Herb Stratum 5% % Cover of Biotic Crust ______

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: ______ (A)

Total Number of Dominant Species Across All Strata: ______ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ______ (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: |
|---|---|---|
| OBL species | | x 1 = |
| FACW species | | x 2 = |
| FAC species | 3 | x 3 = 9 |
| FACU species | | x 4 = |
| UPL species | 100 | x 5 = 500 |
| Column Totals: | 103 (A) | 509 (B) |

Prevalence Index = B/A = 4.9

**Hydrophytic Vegetation Indicators:**

- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Hydrophytic Vegetation Present?** Yes ___ No ✓

Remarks:

## SOIL

Sampling Point: UP-4

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth (inches) | Matrix Color (moist) | Matrix % | Redox Features Color (moist) | Redox Features % | Type[1] | Loc[2] | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

**Indicators for Problematic Hydric Soils[3]:**

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if present):**

Type: ______________________

Depth (inches): ______________________

**Hydric Soil Present? Yes ______ No ______**

Remarks:

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

**Field Observations:**

Surface Water Present? Yes ______ No ______ Depth (inches): ____________

Water Table Present? Yes ______ No ______ Depth (inches): ____________

Saturation Present? (includes capillary fringe) Yes ______ No ______ Depth (inches): ____________

**Wetland Hydrology Present? Yes ______ No ✓**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

# Arid West Ephemeral and Intermittent Streams OHWM Datasheet

**Project:** S.R. 73
**Project Number:**
**Stream:** EPH-1
**Investigator(s):** MP/AC

**Date:** 9/19/2017
**Town:** Eagle Mountain
**Photo begin file#:**

**Time:**
**State:** Utah
**Photo end file#:**

Y ■ / N ☐ Do normal circumstances exist on the site?

Y ☐ / N ■ Is the site significantly disturbed?

**Location Details:**
Between Six Mile Cuttoff Rd and Eagle Mtn. Blvd.

**Projection:** Lambert_Conformal_Conic **Datum:** D_North_American_1983
**Coordinates:** -112.02780674100 40.36907298520

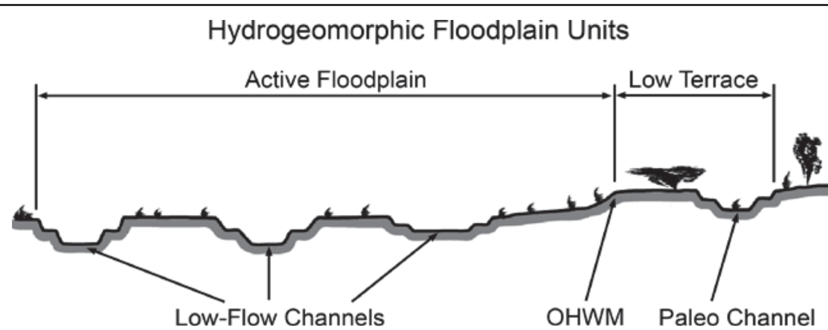
**Potential anthropogenic influences on the channel system:**
Crossing S.R. 73 and construction activity.

**Brief site description:**
Agricultural fields; mixed grassland/shrubland; toe of foothills.

**Checklist of resources (if available):**

- ■ Aerial photography
  Dates:
- ☐ Topographic maps
- ☐ Geologic maps
- ☐ Vegetation maps
- ☐ Soils maps
- ☐ Rainfall/precipitation maps
- ☐ Existing delineation(s) for site
- ■ Global positioning system (GPS)
- ☐ Other studies

- ☐ Stream gage data
  Gage number:
  Period of record:
  - ☐ History of recent effective discharges
  - ☐ Results of flood frequency analysis
  - ☐ Most recent shift-adjusted rating
  - ☐ Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event



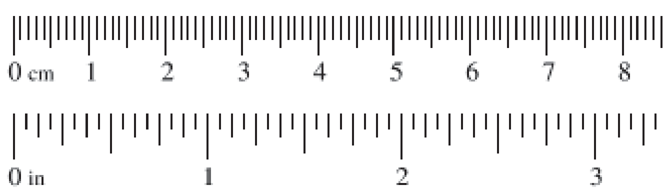

**Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:**

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:

   ■ Mapping on aerial photograph ■ GPS
   ■ Digitized on computer ☐ Other:

## Wentworth Size Classes

| Millimeters (mm) | | Inches (in) | Wentworth size class | |
|---|---|---|---|---|
| | | | Boulder | Gravel |
| | 10.08 | 256 | | |
| | | | Cobble | |
| | 2.56 | 64 | | |
| | | | Pebble | |
| | 0.157 | 4 | | |
| | | | Granule | |
| | 0.079 | 2.00 | | |
| | | | Very coarse sand | Sand |
| | 0.039 | 1.00 | | |
| | | | Coarse sand | |
| | 0.020 | 0.50 | | |
| | | | Medium sand | |
| 1/2 | 0.0098 | 0.25 | | |
| | | | Fine sand | |
| 1/4 | 0.005 | 0.125 | | |
| | | | Very fine sand | |
| 1/8 | 0.0025 | 0.0625 | | |
| | | | Coarse silt | Silt |
| 1/16 | 0.0012 | 0.031 | | |
| | | | Medium silt | |
| 1/32 | 0.00061 | 0.0156 | | |
| | | | Fine silt | |
| 1/64 | 0.00031 | 0.0078 | | |
| | | | Very fine silt | |
| 1/128 | 0.00015 | 0.0039 | | |
| | | | Clay | Mud |



**Project ID:** **Cross section ID:** **Date:** **Time:**

## Cross section drawing:

See attached photo.

## OHWM

**GPS point:** ____________________

**Indicators:**

- [x] Change in average sediment texture
- [ ] Change in vegetation species
- [x] Change in vegetation cover
- [x] Break in bank slope
- [ ] Other: ____________________
- [ ] Other: ____________________

**Comments:**

OHWM identified at break (main stream channel) with mostly unvegetated, gravelly channel bed below.

## Floodplain unit:

- [x] Low-Flow Channel
- [ ] Active Floodplain
- [ ] Low Terrace

**GPS point:** -112.02780674100 40.36907298520

**Characteristics of the floodplain unit:**

Average sediment texture: gravel; cobble

Total veg cover: 5 % Tree: ____% Shrub: 2 % Herb: 3 %

Community successional stage:

- [ ] NA
- [x] Early (herbaceous & seedlings)
- [x] Mid (herbaceous, shrubs, saplings)
- [ ] Late (herbaceous, shrubs, mature trees)

**Indicators:**

- [x] Mudcracks
- [ ] Ripples
- [x] Drift and/or debris
- [x] Presence of bed and bank
- [x] Benches
- [ ] Soil development
- [ ] Surface relief
- [ ] Other: ____________________
- [ ] Other: ____________________
- [ ] Other: ____________________

**Comments:**

Active flood plain covers the width of a mostly unvegetated stream channel and corresponds with OHWM identified. Plant species include Grindelia squarrosa, Ericameria nauseosa, and Salsola tragus.

**Project ID:** **Cross section ID:** **Date:** **Time:**

**Floodplain unit:** ☐ Low-Flow Channel ☐ Active Floodplain ☒ Low Terrace

**GPS point:** -112.02780674100 40.36907298520

**Characteristics of the floodplain unit:**

Average sediment texture: ____________

Total veg cover: 70 % Tree: ____% Shrub: 10 % Herb: 60 %

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☒ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

**Indicators:**

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☒ Benches
- ☐ Soil development
- ☐ Surface relief
- ☐ Other: ____________
- ☐ Other: ____________
- ☐ Other: ____________

**Comments:**

Variable and not distinct. Plant species include Bromus tectorum, Agropyron cristatum, Grindelia squarrosa, Lepidium perfoliatum, Bassia scoparia, and Helianthus annuus.

**Floodplain unit:** ☐ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

**GPS point:** ____________

**Characteristics of the floodplain unit:**

Average sediment texture: ____________

Total veg cover: ____ % Tree: ____% Shrub: ____% Herb: ____%

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

**Indicators:**

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☐ Other: ____________
- ☐ Other: ____________
- ☐ Other: ____________

**Comments:**


EPH-1 Upstream View

# Arid West Ephemeral and Intermittent Streams OHWM Datasheet

| | | |
|---|---|---|
| **Project:** S.R. 73 | **Date:** 9/19/2017 | **Time:** |
| **Project Number:** | **Town:** Eagle Mountain | **State:** Utah |
| **Stream:** EPH-2 | **Photo begin file#:** | **Photo end file#:** |
| **Investigator(s):** MP/AC | | |

| | |
|---|---|
| Y ■ / N ☐ Do normal circumstances exist on the site? | **Location Details:** Just east of Six Mile Cuttoff Rd |
| Y ☐ / N ■ Is the site significantly disturbed? | **Projection:** Lambert_Conformal_Conic **Datum:** D_North_American_1983<br>**Coordinates:** -112.02267740100 40.37505198160 |

**Potential anthropogenic influences on the channel system:**

Crossing S.R. 73 and construction activity.

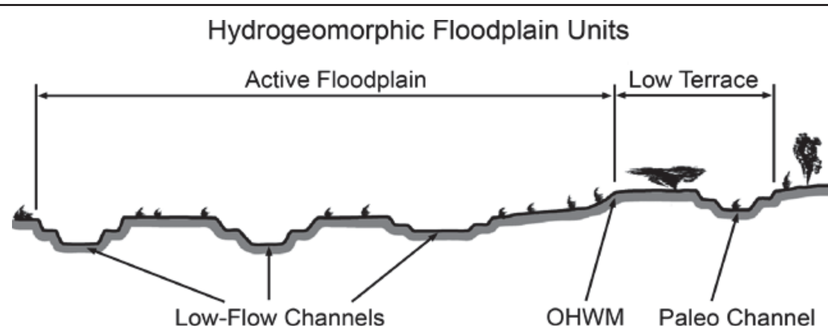
**Brief site description:**

Mixed grassland/shrubland; toe of foothills.

**Checklist of resources (if available):**

- ■ Aerial photography
  Dates:
- ☐ Topographic maps
- ☐ Geologic maps
- ☐ Vegetation maps
- ☐ Soils maps
- ☐ Rainfall/precipitation maps
- ☐ Existing delineation(s) for site
- ■ Global positioning system (GPS)
- ☐ Other studies

- ☐ Stream gage data
  Gage number:
  Period of record:
  - ☐ History of recent effective discharges
  - ☐ Results of flood frequency analysis
  - ☐ Most recent shift-adjusted rating
  - ☐ Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event




**Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:**

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
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   a) Record the floodplain unit and GPS position.
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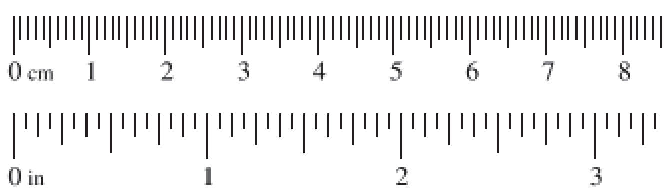
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:
   - ■ Mapping on aerial photograph
   - ■ Digitized on computer
   - ■ GPS
   - ☐ Other:

## Wentworth Size Classes

| Millimeters (mm) | | Inches (in) | Wentworth size class | |
|---|---|---|---|---|
| | | | Boulder | Gravel |
| | 10.08 | 256 | | |
| | | | Cobble | |
| | 2.56 | 64 | | |
| | | | Pebble | |
| | 0.157 | 4 | | |
| | | | Granule | |
| | 0.079 | 2.00 | | |
| | | | Very coarse sand | Sand |
| | 0.039 | 1.00 | | |
| | | | Coarse sand | |
| | 0.020 | 0.50 | | |
| | | | Medium sand | |
| 1/2 | 0.0098 | 0.25 | | |
| | | | Fine sand | |
| 1/4 | 0.005 | 0.125 | | |
| | | | Very fine sand | |
| 1/8 | 0.0025 | 0.0625 | | |
| | | | Coarse silt | Silt |
| 1/16 | 0.0012 | 0.031 | | |
| | | | Medium silt | |
| 1/32 | 0.00061 | 0.0156 | | |
| | | | Fine silt | |
| 1/64 | 0.00031 | 0.0078 | | |
| | | | Very fine silt | |
| 1/128 | 0.00015 | 0.0039 | | |
| | | | Clay | Mud |



**Project ID:** **Cross section ID:** **Date:** **Time:**

## Cross section drawing:

See attached photo.

## OHWM

**GPS point:** -112.02267740100 40.37505198160

**Indicators:**

- [x] Change in average sediment texture
- [ ] Change in vegetation species
- [x] Change in vegetation cover
- [x] Break in bank slope
- [ ] Other: ____________________
- [ ] Other: ____________________

**Comments:**

OHWM identified at break (main stream channel) with mostly unvegetated, gravelly-sandy channel bed below.

## Floodplain unit:

- [x] Low-Flow Channel
- [ ] Active Floodplain
- [ ] Low Terrace

**GPS point:** -112.02267740100 40.37505198160

**Characteristics of the floodplain unit:**

Average sediment texture: gravel; sand

Total veg cover: 2 % Tree: ____% Shrub: 1 % Herb: 1 %

Community successional stage:

- [ ] NA
- [x] Early (herbaceous & seedlings)
- [x] Mid (herbaceous, shrubs, saplings)
- [ ] Late (herbaceous, shrubs, mature trees)

**Indicators:**

- [ ] Mudcracks
- [ ] Ripples
- [ ] Drift and/or debris
- [x] Presence of bed and bank
- [ ] Benches
- [ ] Soil development
- [ ] Surface relief
- [ ] Other: ____________________
- [ ] Other: ____________________
- [ ] Other: ____________________

**Comments:**

Active flood plain covers the width of a mostly unvegetated stream channel and corresponds with OHWM identified. Plant species include Agropyron cristatum and Ericameria nauseosa.

**Project ID:** **Cross section ID:** **Date:** **Time:**

**Floodplain unit:** ☐ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

**GPS point:** ______________________________

**Characteristics of the floodplain unit:**

Average sediment texture: ____________________

Total veg cover: _____ % Tree: _____% Shrub: _____% Herb: _____%

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

**Indicators:**

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☐ Other: ______________________
- ☐ Other: ______________________
- ☐ Other: ______________________

**Comments:**

**Floodplain unit:** ☐ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

**GPS point:** ______________________________

**Characteristics of the floodplain unit:**

Average sediment texture: ____________________

Total veg cover: _____ % Tree: _____% Shrub: _____% Herb: _____%

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

**Indicators:**

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☐ Other: ______________________
- ☐ Other: ______________________
- ☐ Other: ______________________

**Comments:**


EPH-2 Upstream View

# Arid West Ephemeral and Intermittent Streams OHWM Datasheet

| | | |
|---|---|---|
| **Project:** S.R. 73 | **Date:** 9/19/2017 | **Time:** |
| **Project Number:** | **Town:** Eagle Mountain | **State:** Utah |
| **Stream:** EPH-3 | **Photo begin file#:** | **Photo end file#:** |
| **Investigator(s):** MP/AC | | |

| | |
|---|---|
| Y ■ / N ☐ Do normal circumstances exist on the site? | **Location Details:** Tickville Gulch |
| Y ☐ / N ■ Is the site significantly disturbed? | **Projection:** Lambert_Conformal_Conic **Datum:** D_North_American_1983<br>**Coordinates:** -112.00584437600 40.38014875880 |

**Potential anthropogenic influences on the channel system:**

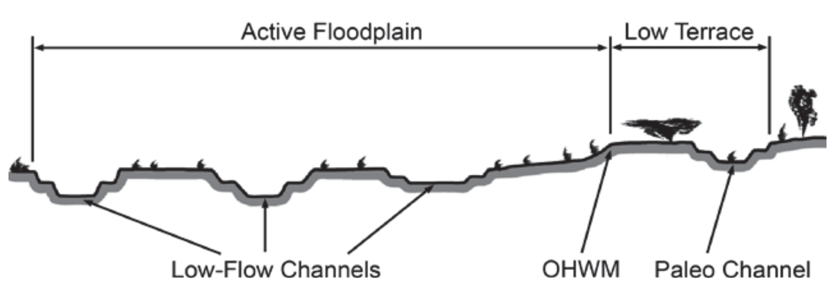
Crossing S.R. 73 and construction activity.

**Brief site description:**

Mixed grassland/shrubland; agricultural; largely residential in the study area.

**Checklist of resources (if available):**

- ■ Aerial photography
  Dates:
- ☐ Topographic maps
- ☐ Geologic maps
- ☐ Vegetation maps
- ☐ Soils maps
- ☐ Rainfall/precipitation maps
- ☐ Existing delineation(s) for site
- ■ Global positioning system (GPS)
- ☐ Other studies
- ☐ Stream gage data
  Gage number:
  Period of record:
  - ☐ History of recent effective discharges
  - ☐ Results of flood frequency analysis
  - ☐ Most recent shift-adjusted rating
  - ☐ Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event




**Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:**

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
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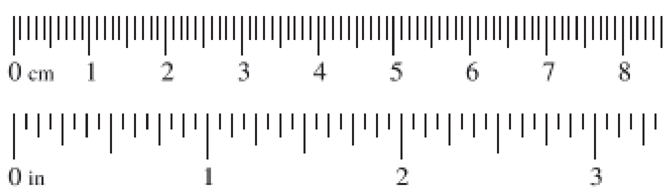
5. Identify the OHWM and record the indicators. Record the OHWM position via:
   - ■ Mapping on aerial photograph
   - ■ GPS
   - ■ Digitized on computer
   - ☐ Other:

## Wentworth Size Classes

| Millimeters (mm) | Inches (in) | Wentworth size class | |
|---|---|---|---|
| | | Boulder | Gravel |
| 10.08 | 256 | | |
| | | Cobble | |
| 2.56 | 64 | | |
| | | Pebble | |
| 0.157 | 4 | | |
| | | Granule | |
| 0.079 | 2.00 | | |
| | | Very coarse sand | Sand |
| 0.039 | 1.00 | | |
| | | Coarse sand | |
| 0.020 | 0.50 | | |
| | | Medium sand | |
| 1/2 0.0098 | 0.25 | | |
| | | Fine sand | |
| 1/4 0.005 | 0.125 | | |
| | | Very fine sand | |
| 1/8 0.0025 | 0.0625 | | |
| | | Coarse silt | Silt |
| 1/16 0.0012 | 0.031 | | |
| | | Medium silt | |
| 1/32 0.00061 | 0.0156 | | |
| | | Fine silt | |
| 1/64 0.00031 | 0.0078 | | |
| | | Very fine silt | |
| 1/128 0.00015 | 0.0039 | | |
| | | Clay | Mud |



**Project ID:** **Cross section ID:** **Date:** **Time:**

## Cross section drawing:

See attached photo.

## OHWM

**GPS point:** -112.00584437600 40.38014875880

**Indicators:**

- [x] Change in average sediment texture
- [ ] Change in vegetation species
- [x] Change in vegetation cover
- [x] Break in bank slope
- [ ] Other: ____________________
- [ ] Other: ____________________

**Comments:**

OHWM identified at break (main stream channel) with mostly unvegetated, cobble/gravel channel bed below.

## Floodplain unit:

- [x] Low-Flow Channel
- [ ] Active Floodplain
- [ ] Low Terrace

**GPS point:** -112.00584437600 40.38014875880

**Characteristics of the floodplain unit:**

Average sediment texture: gravel; sand

Total veg cover: 2 % Tree: ____% Shrub: 1 % Herb: 1 %

Community successional stage:

- [ ] NA
- [x] Early (herbaceous & seedlings)
- [x] Mid (herbaceous, shrubs, saplings)
- [ ] Late (herbaceous, shrubs, mature trees)

**Indicators:**

- [ ] Mudcracks
- [ ] Ripples
- [ ] Drift and/or debris
- [x] Presence of bed and bank
- [ ] Benches
- [ ] Soil development
- [ ] Surface relief
- [ ] Other: ____________________
- [ ] Other: ____________________
- [ ] Other: ____________________

**Comments:**

Active flood plain covers the width of a mostly unvegetated stream channel and corresponds with OHWM identified. Plant species include Agropyron cristatum and Artemisia tridentata.

**Project ID:** **Cross section ID:** **Date:** **Time:**

**Floodplain unit:** ☐ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

**GPS point:** ______________________________

**Characteristics of the floodplain unit:**

Average sediment texture: ____________________

Total veg cover: _____ % Tree: _____% Shrub: _____% Herb: _____%

Community successional stage:

☐ NA ☐ Mid (herbaceous, shrubs, saplings)

☐ Early (herbaceous & seedlings) ☐ Late (herbaceous, shrubs, mature trees)

**Indicators:**

☐ Mudcracks ☐ Soil development

☐ Ripples ☐ Surface relief

☐ Drift and/or debris ☐ Other: ______________________

☐ Presence of bed and bank ☐ Other: ______________________

☐ Benches ☐ Other: ______________________

**Comments:**

**Floodplain unit:** ☐ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

**GPS point:** ______________________________

**Characteristics of the floodplain unit:**

Average sediment texture: ____________________

Total veg cover: _____ % Tree: _____% Shrub: _____% Herb: _____%

Community successional stage:

☐ NA ☐ Mid (herbaceous, shrubs, saplings)

☐ Early (herbaceous & seedlings) ☐ Late (herbaceous, shrubs, mature trees)

**Indicators:**

☐ Mudcracks ☐ Soil development

☐ Ripples ☐ Surface relief

☐ Drift and/or debris ☐ Other: ______________________

☐ Presence of bed and bank ☐ Other: ______________________

☐ Benches ☐ Other: ______________________

**Comments:**


EPH-3 Upstream View

# Arid West Ephemeral and Intermittent Streams OHWM Datasheet

**Project:** S.R. 73
**Project Number:**
**Stream:** EPH-4
**Investigator(s):** MP/AC

**Date:** 9/19/2017
**Town:** Saratoga Springs
**Photo begin file#:**

**Time:**
**State:** Utah
**Photo end file#:**

Y ☒ / N ☐ Do normal circumstances exist on the site?

Y ☐ / N ☒ Is the site significantly disturbed?

**Location Details:**
Just west of 800 W in Saratoga Springs

**Projection:** Lambert_Conformal_Conic **Datum:** D_North_American_1983
**Coordinates:** -111.94082317700 40.38679589070

**Potential anthropogenic influences on the channel system:**
Crossing S.R. 73 and construction activity.

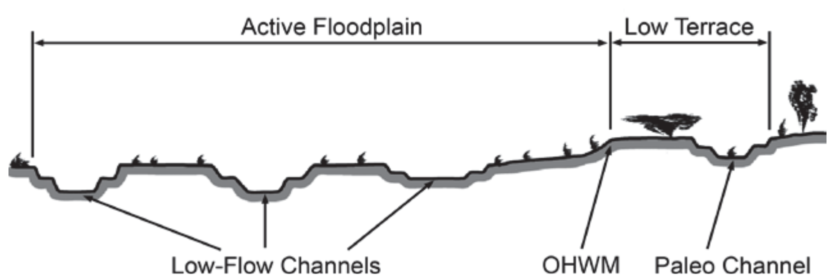
**Brief site description:**
Mixed grassland/shrubland; agricultural.

**Checklist of resources (if available):**

- ☒ Aerial photography
  Dates:
- ☐ Topographic maps
- ☐ Geologic maps
- ☐ Vegetation maps
- ☐ Soils maps
- ☐ Rainfall/precipitation maps
- ☐ Existing delineation(s) for site
- ☒ Global positioning system (GPS)
- ☐ Other studies

- ☐ Stream gage data
  Gage number:
  Period of record:
  - ☐ History of recent effective discharges
  - ☐ Results of flood frequency analysis
  - ☐ Most recent shift-adjusted rating
  - ☐ Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units



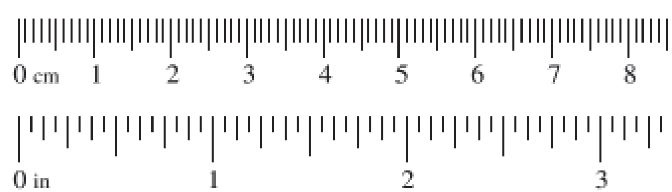

**Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:**

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:

   ☒ Mapping on aerial photograph ☒ GPS
   ☒ Digitized on computer ☐ Other:

## Wentworth Size Classes

| Millimeters (mm) | | Inches (in) | Wentworth size class | |
|---|---|---|---|---|
| | | | Boulder | Gravel |
| | 10.08 | 256 | | |
| | | | Cobble | |
| | 2.56 | 64 | | |
| | | | Pebble | |
| | 0.157 | 4 | | |
| | | | Granule | |
| | 0.079 | 2.00 | | |
| | | | Very coarse sand | Sand |
| | 0.039 | 1.00 | | |
| | | | Coarse sand | |
| | 0.020 | 0.50 | | |
| | | | Medium sand | |
| 1/2 | 0.0098 | 0.25 | | |
| | | | Fine sand | |
| 1/4 | 0.005 | 0.125 | | |
| | | | Very fine sand | |
| 1/8 | 0.0025 | 0.0625 | | |
| | | | Coarse silt | Silt |
| 1/16 | 0.0012 | 0.031 | | |
| | | | Medium silt | |
| 1/32 | 0.00061 | 0.0156 | | |
| | | | Fine silt | |
| 1/64 | 0.00031 | 0.0078 | | |
| | | | Very fine silt | |
| 1/128 | 0.00015 | 0.0039 | | |
| | | | Clay | Mud |



**Project ID:** **Cross section ID:** **Date:** **Time:**

## Cross section drawing:

See attached photo.

## OHWM

**GPS point:** -111.94082317700 40.38679589070

**Indicators:**

- [ ] Change in average sediment texture
- [ ] Change in vegetation species
- [x] Change in vegetation cover
- [x] Break in bank slope
- [ ] Other: ____________________
- [ ] Other: ____________________

**Comments:**

OHWM identified at break in vegetation cover and slope.

## Floodplain unit:

- [x] Low-Flow Channel
- [ ] Active Floodplain
- [ ] Low Terrace

**GPS point:** -111.94082317700 40.38679589070

**Characteristics of the floodplain unit:**

Average sediment texture: coarse silt

Total veg cover: 115 % Tree: _____% Shrub: 1 % Herb: 114 %

Community successional stage:

- [ ] NA
- [x] Early (herbaceous & seedlings)
- [x] Mid (herbaceous, shrubs, saplings)
- [ ] Late (herbaceous, shrubs, mature trees)

**Indicators:**

- [x] Mudcracks
- [ ] Ripples
- [ ] Drift and/or debris
- [x] Presence of bed and bank
- [ ] Benches
- [ ] Soil development
- [ ] Surface relief
- [x] Other: change in vegetation
- [ ] Other: ____________________
- [ ] Other: ____________________

**Comments:**

Active flood plain covers the width of heavily vegetated stream channel and corresponds with OHWM identified. Plant species include Dipsacus fullonum, Xanthium strumarium, Rumex crispus, Onopordum acanthium, Artemisia tridentata.

**Project ID:** **Cross section ID:** **Date:** **Time:**

**Floodplain unit:** ☐ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

**GPS point:** ____________________________

**Characteristics of the floodplain unit:**

Average sediment texture: ___________________

Total veg cover: _____ % Tree: _____% Shrub: _____% Herb: _____%

Community successional stage:

☐ NA ☐ Mid (herbaceous, shrubs, saplings)
☐ Early (herbaceous & seedlings) ☐ Late (herbaceous, shrubs, mature trees)

**Indicators:**

☐ Mudcracks ☐ Soil development
☐ Ripples ☐ Surface relief
☐ Drift and/or debris ☐ Other: _____________________
☐ Presence of bed and bank ☐ Other: _____________________
☐ Benches ☐ Other: _____________________

**Comments:**

**Floodplain unit:** ☐ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

**GPS point:** ____________________________

**Characteristics of the floodplain unit:**

Average sediment texture: ___________________

Total veg cover: _____ % Tree: _____% Shrub: _____% Herb: _____%

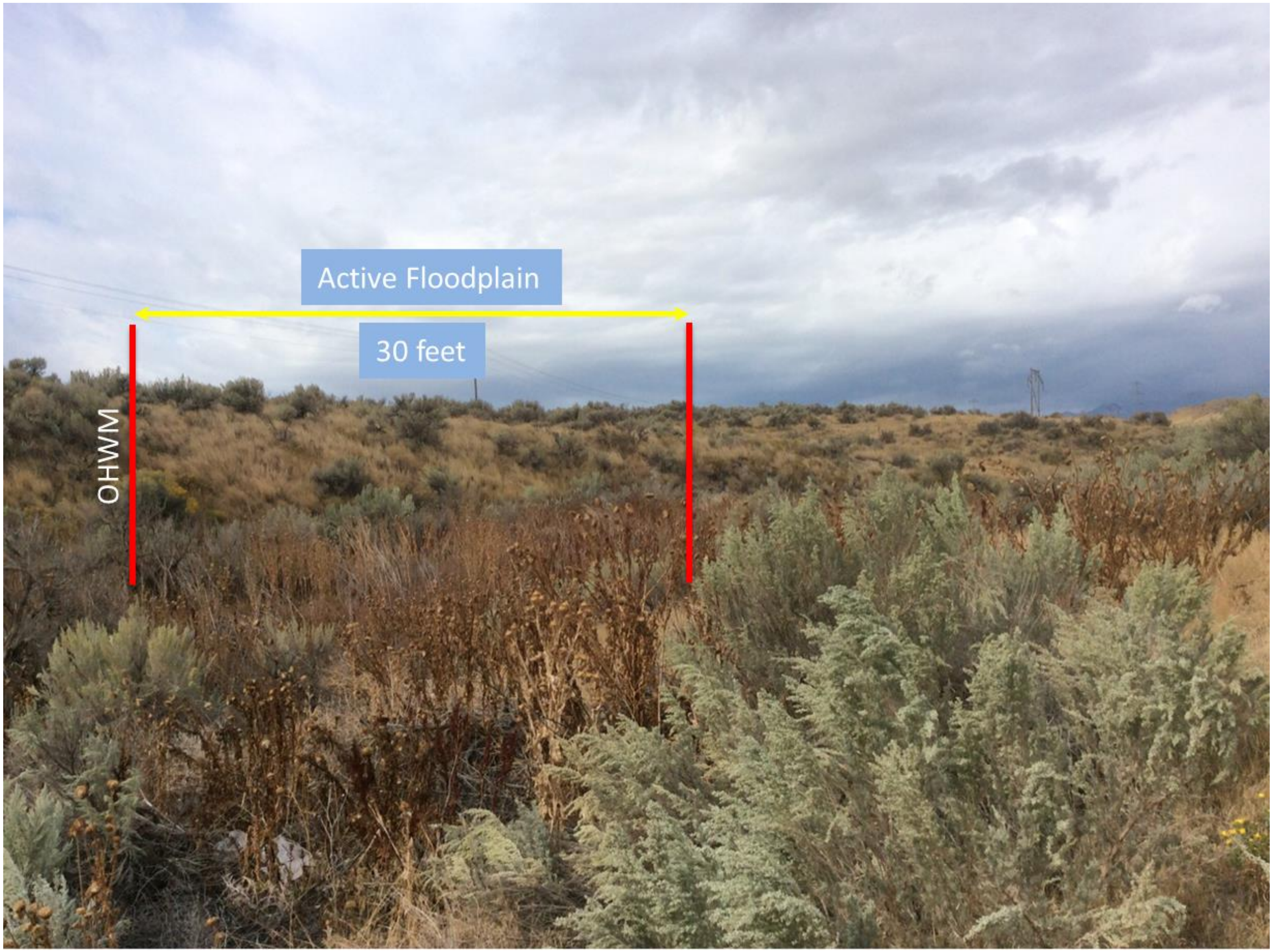
Community successional stage:

☐ NA ☐ Mid (herbaceous, shrubs, saplings)
☐ Early (herbaceous & seedlings) ☐ Late (herbaceous, shrubs, mature trees)

**Indicators:**

☐ Mudcracks ☐ Soil development
☐ Ripples ☐ Surface relief
☐ Drift and/or debris ☐ Other: _____________________
☐ Presence of bed and bank ☐ Other: _____________________
☐ Benches ☐ Other: _____________________

**Comments:**




EPH-4 Upstream View

# APPENDIX C

On-site Representative Photographs

## Upland Sampling Point UP-1


## Upland Sampling Point UP-2


## Wetland Sampling Point WET-3


## Upland Sampling Point UP-3

## Wetland Sampling Point WET-4

## Upland Sampling Point UP-4

*No photo of UP-4 available.*

## Ephemeral Stream Sampling Point EPH-1

*Upstream View*

*Downstream View*

## Ephemeral Stream Sampling Point EPH-2

## Ephemeral Stream Sampling Point EPH-3

*Upstream View*

*Downstream View*

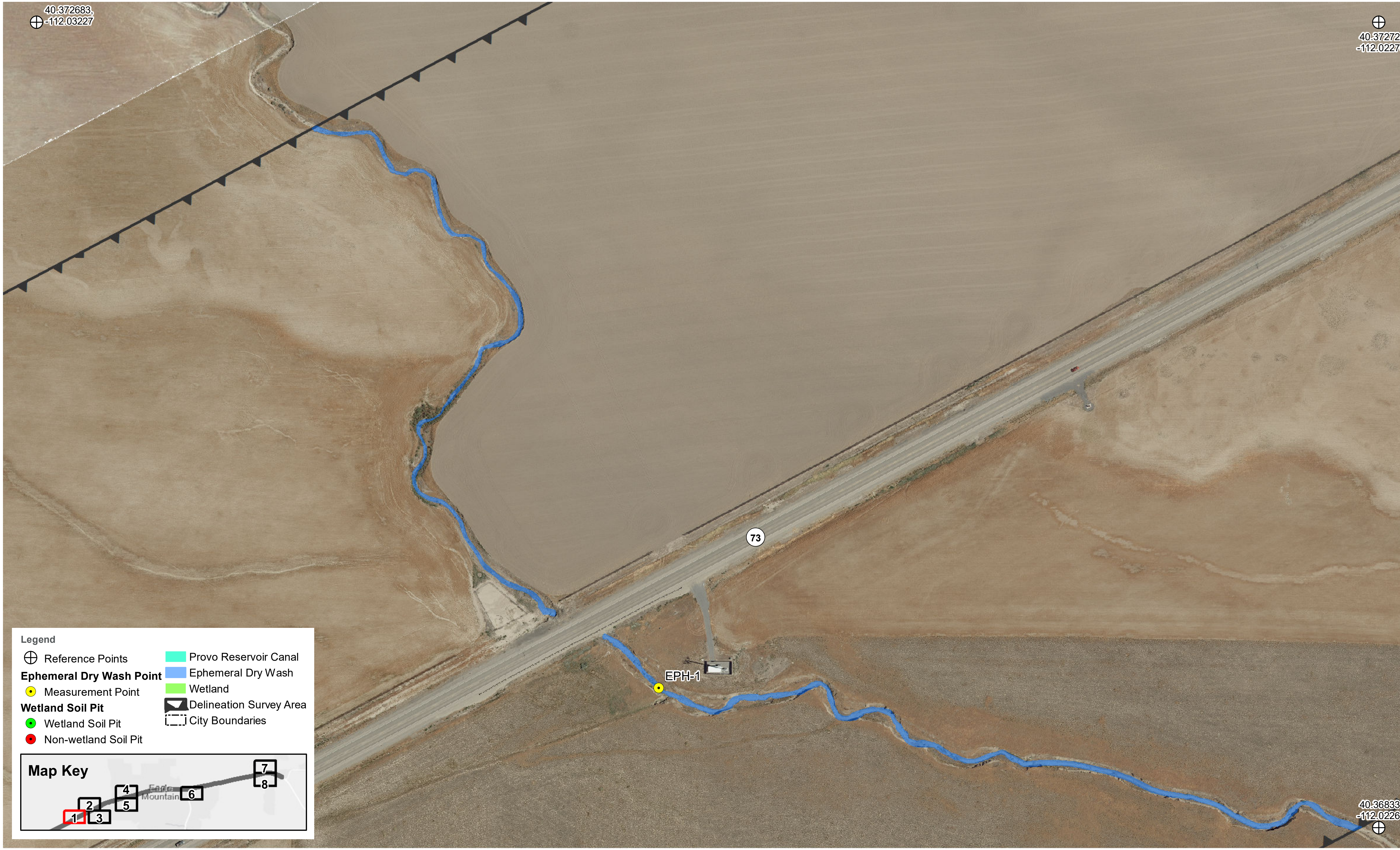
## Ephemeral Stream Sampling Point EPH-4

*Upstream View*

*No downstream photo available.*

# APPENDIX D

## Aquatic Resource Delineation Map Series




State Route 73
ENVIRONMENTAL STUDY
Eagle Mountain to Saratoga Springs

Imagery: Imagery flown 6/28/2017
Projection: MVC Custom System, Lambert Conformal Conic
Cartographer: Sarah Rigard, HDR Inc

AQUATIC RESOURCE DELINEATION MAP SERIES

FIGURE 1 OF 8


State Route 73
ENVIRONMENTAL STUDY
Eagle Mountain to Saratoga Springs

Imagery: Imagery flown 6/28/2017
Projection: MVC Custom System, Lambert Conformal Conic
Cartographer: Sarah Rigard, HDR Inc

1 inch = 175 feet

0 Feet 200

N

**AQUATIC RESOURCE DELINEATION MAP SERIES**

FIGURE 2 OF 8


State Route 73
ENVIRONMENTAL STUDY
Eagle Mountain to Saratoga Springs

Imagery: Imagery flown 6/28/2017
Projection: MVC Custom System, Lambert Conformal Conic
Cartographer: Sarah Rigard, HDR Inc

1 inch = 175 feet
0 Feet 200

N

AQUATIC RESOURCE DELINEATION MAP SERIES

FIGURE 3 OF 8


State Route 73
ENVIRONMENTAL STUDY
Eagle Mountain to Saratoga Springs

Imagery: Imagery flown 6/28/2017
Projection: MVC Custom System, Lambert Conformal Conic
Cartographer: Sarah Rigard, HDR Inc

1 inch = 175 feet
0 Feet 200

N

AQUATIC RESOURCE DELINEATION MAP SERIES

FIGURE 4 OF 8


State Route 73
ENVIRONMENTAL STUDY
Eagle Mountain to Saratoga Springs

Imagery: Imagery flown 6/28/2017
Projection: MVC Custom System, Lambert Conformal Conic
Cartographer: Sarah Rigard, HDR Inc

1 inch = 175 feet
0 Feet 200

N

AQUATIC RESOURCE DELINEATION MAP SERIES

FIGURE 5 OF 8


**State Route 73**
**ENVIRONMENTAL STUDY**
Eagle Mountain to Saratoga Springs

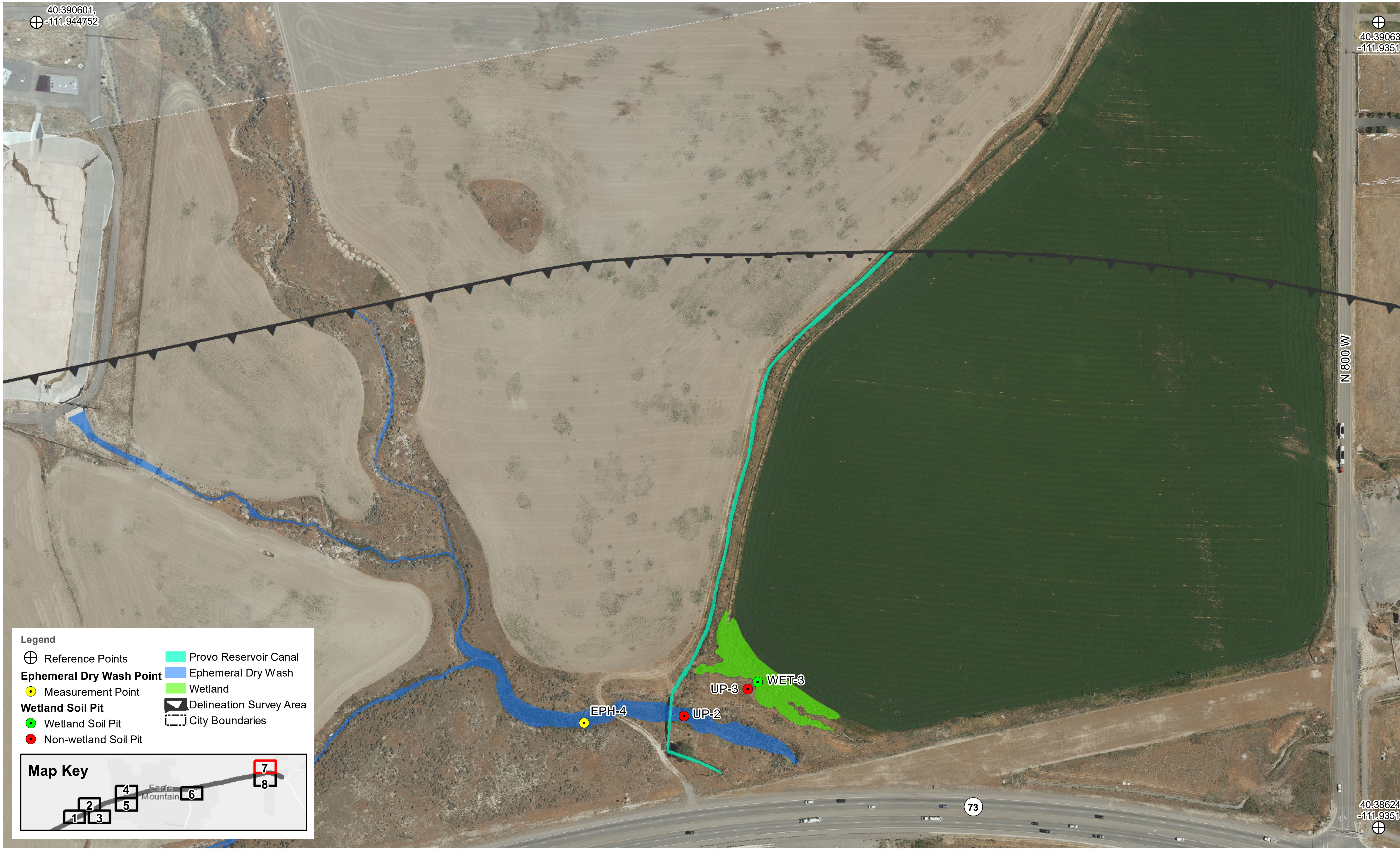
Imagery: Imagery flown 6/28/2017
Projection: MVC Custom System, Lambert Conformal Conic
Cartographer: Sarah Rigard, HDR Inc

1 inch = 175 feet
0 Feet 200

N

**AQUATIC RESOURCE DELINEATION MAP SERIES**

FIGURE 6 OF 8




State Route 73
ENVIRONMENTAL STUDY
Eagle Mountain to Saratoga Springs

Imagery: Imagery flown 6/28/2017
Projection: MVC Custom System, Lambert Conformal Conic
Cartographer: Sarah Rigard, HDR Inc

1 inch = 175 feet
0 Feet 200

N

**AQUATIC RESOURCE DELINEATION MAP SERIES**

FIGURE 7 OF 8


State Route 73
ENVIRONMENTAL STUDY
Eagle Mountain to Saratoga Springs

Imagery: Imagery flown 6/28/2017
Projection: MVC Custom System, Lambert Conformal Conic
Cartographer: Sarah Rigard, HDR Inc

1 inch = 175 feet
0 Feet 200

N

AQUATIC RESOURCE DELINEATION MAP SERIES

FIGURE 8 OF 8

# APPENDIX E

## National Wetlands Inventory Map Series

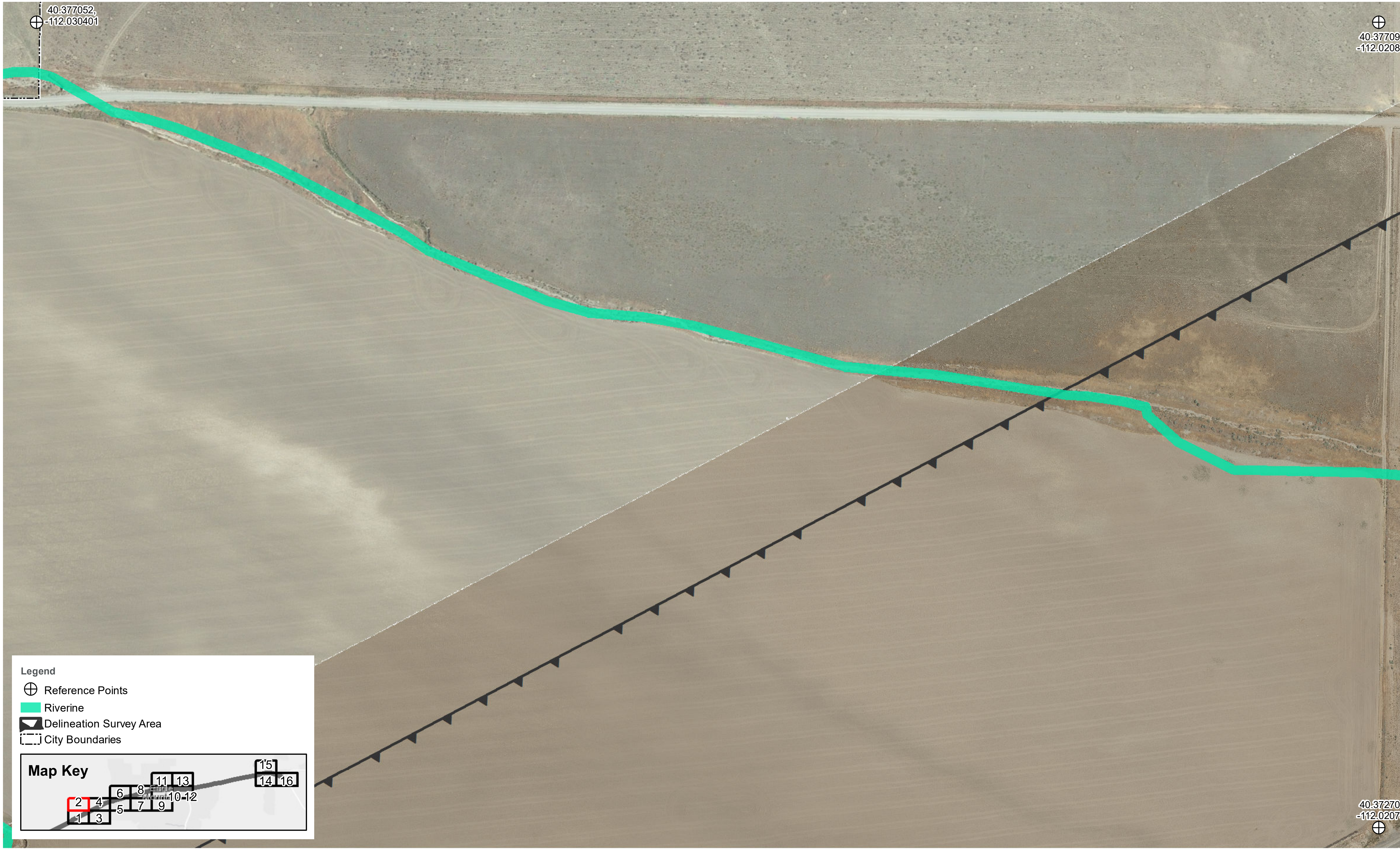

State Route 73
ENVIRONMENTAL STUDY
Eagle Mountain to Saratoga Springs

Imagery: Imagery flown 6/28/2017
Projection: MVC Custom System, Lambert Conformal Conic
Cartographer: Sarah Rigard, HDR Inc

1 inch = 175 feet
0 Feet 200

NATIONAL WETLAND INVENTORY MAP SERIES

FIGURE 1 OF 16




State Route 73
ENVIRONMENTAL STUDY
Eagle Mountain to Saratoga Springs

Imagery: Imagery flown 6/28/2017
Projection: MVC Custom System, Lambert Conformal Conic
Cartographer: Sarah Rigard, HDR Inc

1 inch = 175 feet
0 Feet 200

N

NATIONAL WETLAND INVENTORY MAP SERIES

FIGURE 2 OF 16

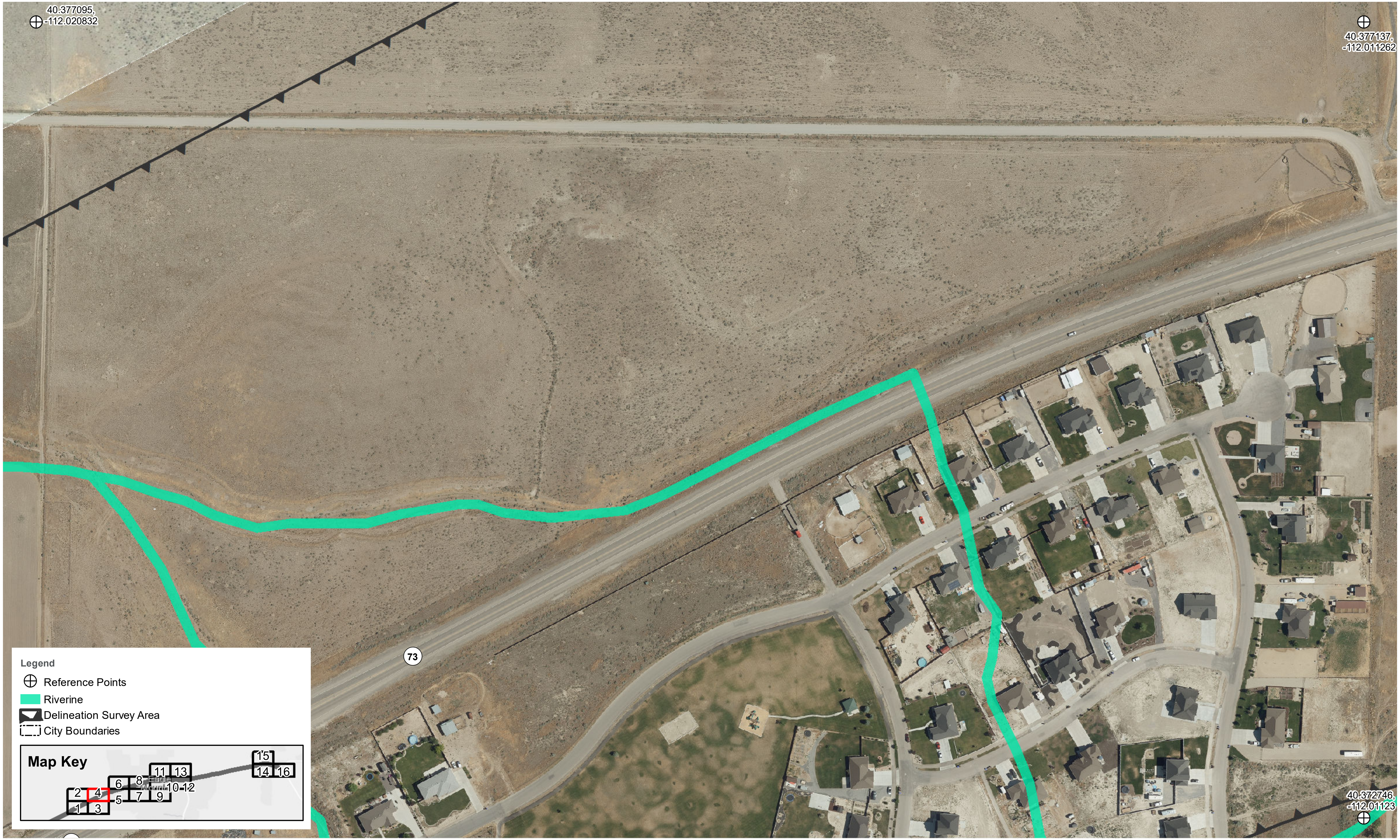

State Route 73
ENVIRONMENTAL STUDY
Eagle Mountain to Saratoga Springs

Imagery: Imagery flown 6/28/2017
Projection: MVC Custom System, Lambert Conformal Conic
Cartographer: Sarah Rigard, HDR Inc

1 inch = 175 feet
0 Feet 200

NATIONAL WETLAND INVENTORY MAP SERIES

FIGURE 3 OF 16




State Route 73
ENVIRONMENTAL STUDY
Eagle Mountain to Saratoga Springs

Imagery: Imagery flown 6/28/2017
Projection: MVC Custom System, Lambert Conformal Conic
Cartographer: Sarah Rigard, HDR Inc

1 inch = 175 feet
0 Feet 200

N

NATIONAL WETLAND INVENTORY MAP SERIES

FIGURE 4 OF 16


State Route 73
ENVIRONMENTAL STUDY
Eagle Mountain to Saratoga Springs

Imagery: Imagery flown 6/28/2017
Projection: MVC Custom System, Lambert Conformal Conic
Cartographer: Sarah Rigard, HDR Inc

1 inch = 175 feet
0 Feet 200

N

NATIONAL WETLAND INVENTORY MAP SERIES

FIGURE 5 OF 16


State Route 73
ENVIRONMENTAL STUDY
Eagle Mountain to Saratoga Springs

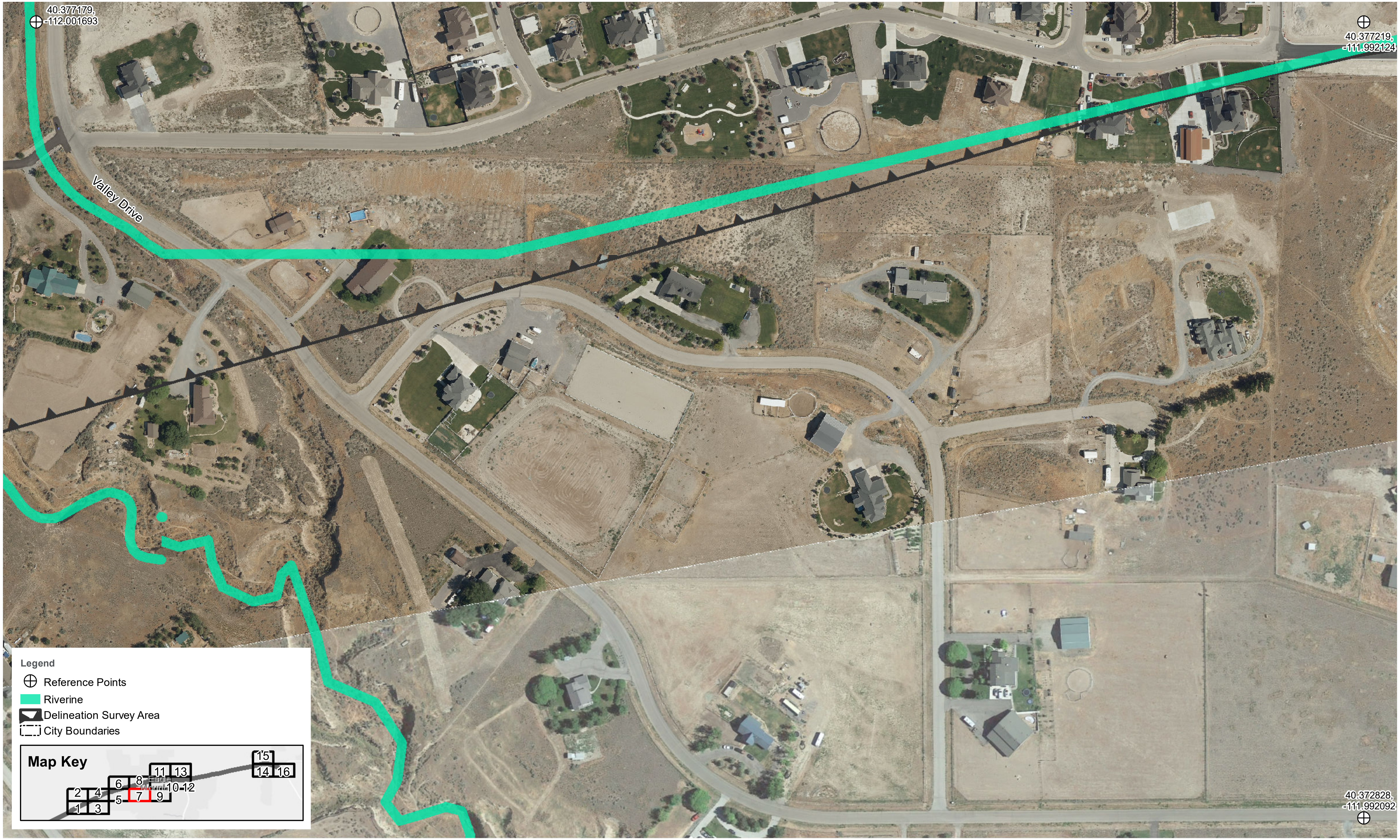
Imagery: Imagery flown 6/28/2017
Projection: MVC Custom System, Lambert Conformal Conic
Cartographer: Sarah Rigard, HDR Inc

1 inch = 175 feet
0 Feet 200

N

NATIONAL WETLAND INVENTORY MAP SERIES

FIGURE 6 OF 16




State Route 73
ENVIRONMENTAL STUDY
Eagle Mountain to Saratoga Springs

Imagery: Imagery flown 6/28/2017
Projection: MVC Custom System, Lambert Conformal Conic
Cartographer: Sarah Rigard, HDR Inc

1 inch = 175 feet
0 Feet 200

N

NATIONAL WETLAND INVENTORY MAP SERIES

FIGURE 7 OF 16


State Route 73
ENVIRONMENTAL STUDY
Eagle Mountain to Saratoga Springs

Imagery: Imagery flown 6/28/2017
Projection: MVC Custom System, Lambert Conformal Conic
Cartographer: Sarah Rigard, HDR Inc

1 inch = 175 feet

0 Feet 200

N

NATIONAL WETLAND INVENTORY MAP SERIES


State Route 73
ENVIRONMENTAL STUDY
Eagle Mountain to Saratoga Springs

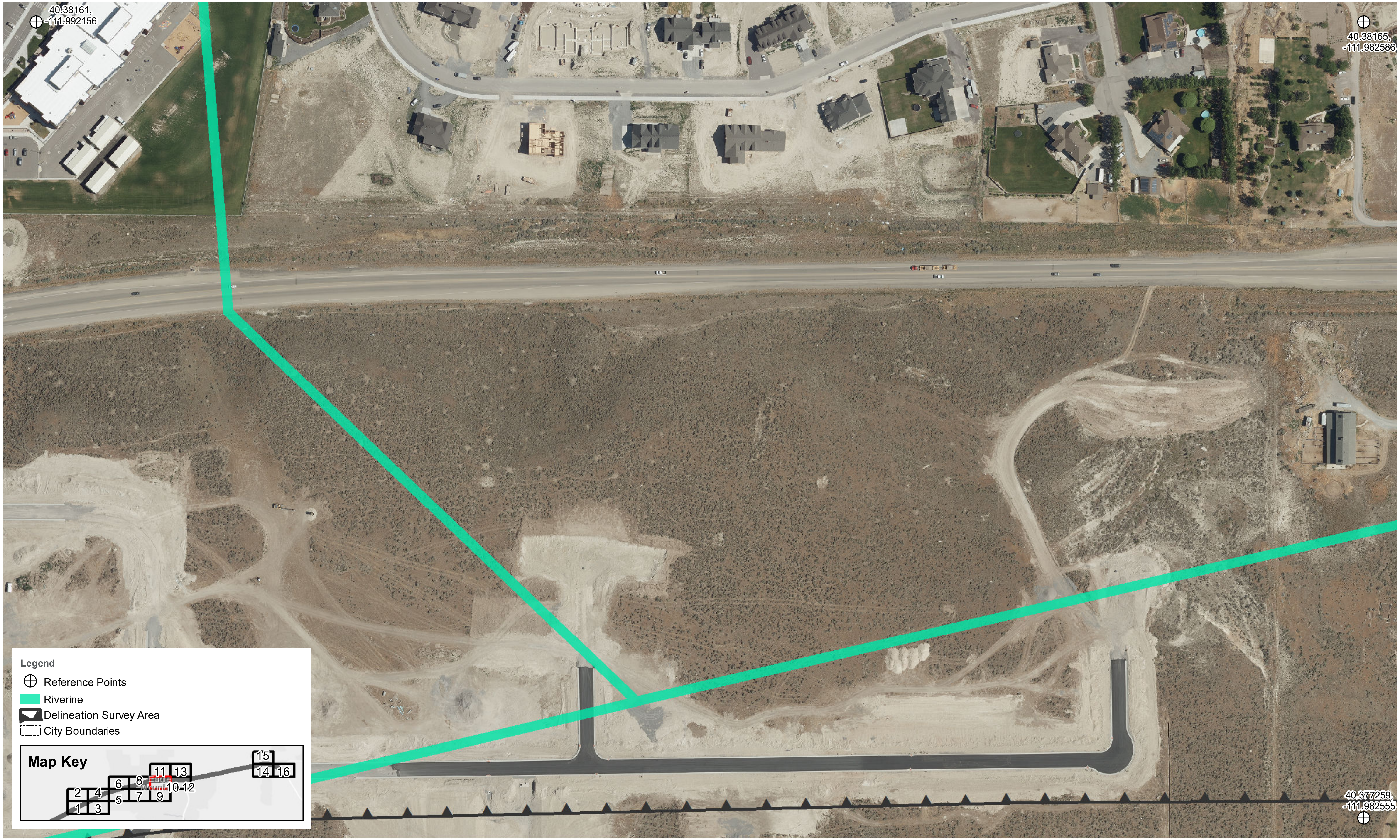
Imagery: Imagery flown 6/28/2017
Projection: MVC Custom System, Lambert Conformal Conic
Cartographer: Sarah Rigard, HDR Inc

1 inch = 175 feet
0 Feet 200

N

NATIONAL WETLAND INVENTORY MAP SERIES

FIGURE 9 OF 16




State Route 73
ENVIRONMENTAL STUDY
Eagle Mountain to Saratoga Springs

Imagery: Imagery flown 6/28/2017
Projection: MVC Custom System, Lambert Conformal Conic
Cartographer: Sarah Rigard, HDR Inc

1 inch = 175 feet
0 Feet 200

N

NATIONAL WETLAND INVENTORY MAP SERIES

FIGURE 10 OF 16


State Route 73
ENVIRONMENTAL STUDY
Eagle Mountain to Saratoga Springs

Imagery: Imagery flown 6/28/2017
Projection: MVC Custom System, Lambert Conformal Conic
Cartographer: Sarah Rigard, HDR Inc

1 inch = 175 feet
0 Feet 200

N

NATIONAL WETLAND INVENTORY MAP SERIES

FIGURE 11 OF 16


State Route 73
ENVIRONMENTAL STUDY
Eagle Mountain to Saratoga Springs

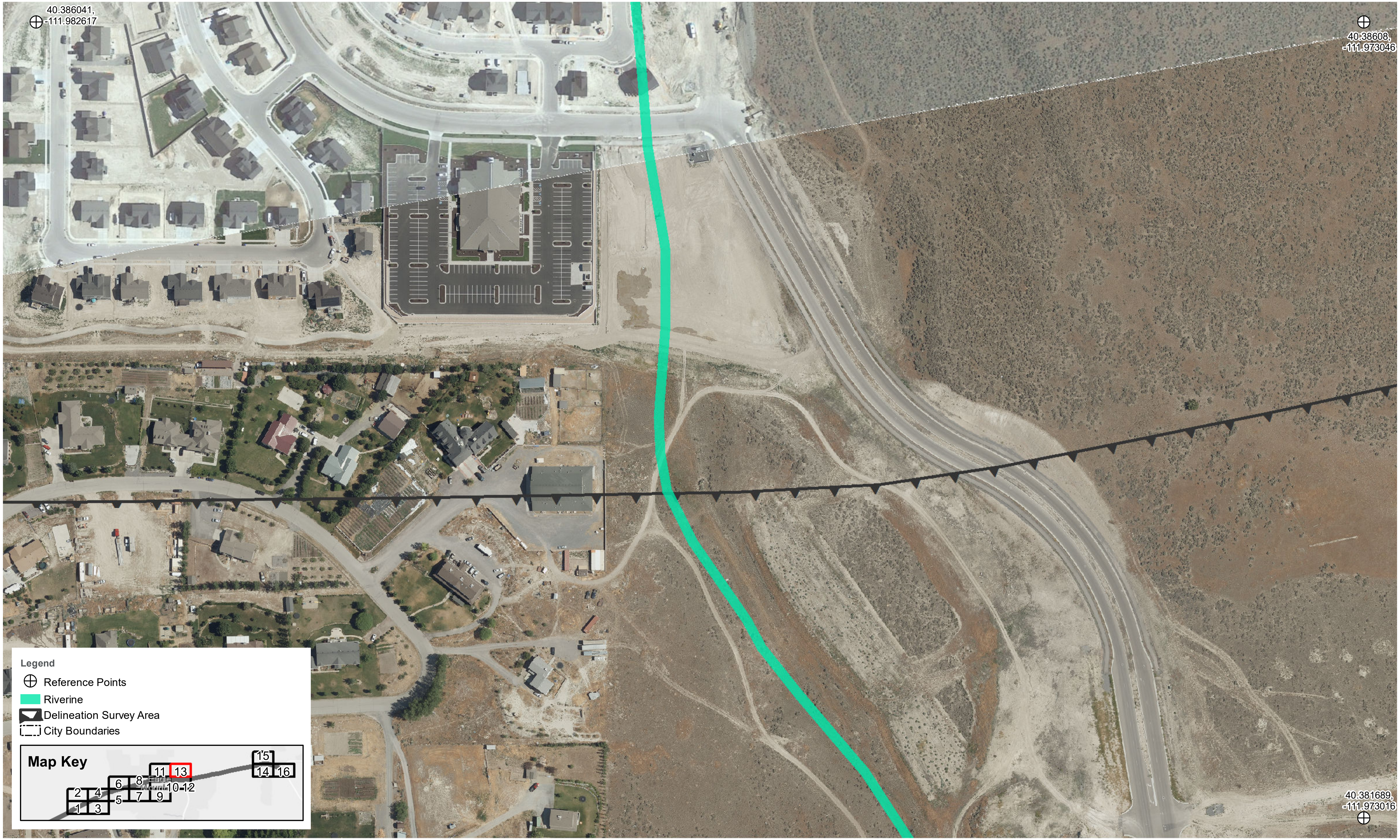
Imagery: Imagery flown 6/28/2017
Projection: MVC Custom System, Lambert Conformal Conic
Cartographer: Sarah Rigard, HDR Inc

1 inch = 175 feet
0 Feet 200

N

NATIONAL WETLAND INVENTORY MAP SERIES

FIGURE 12 OF 16



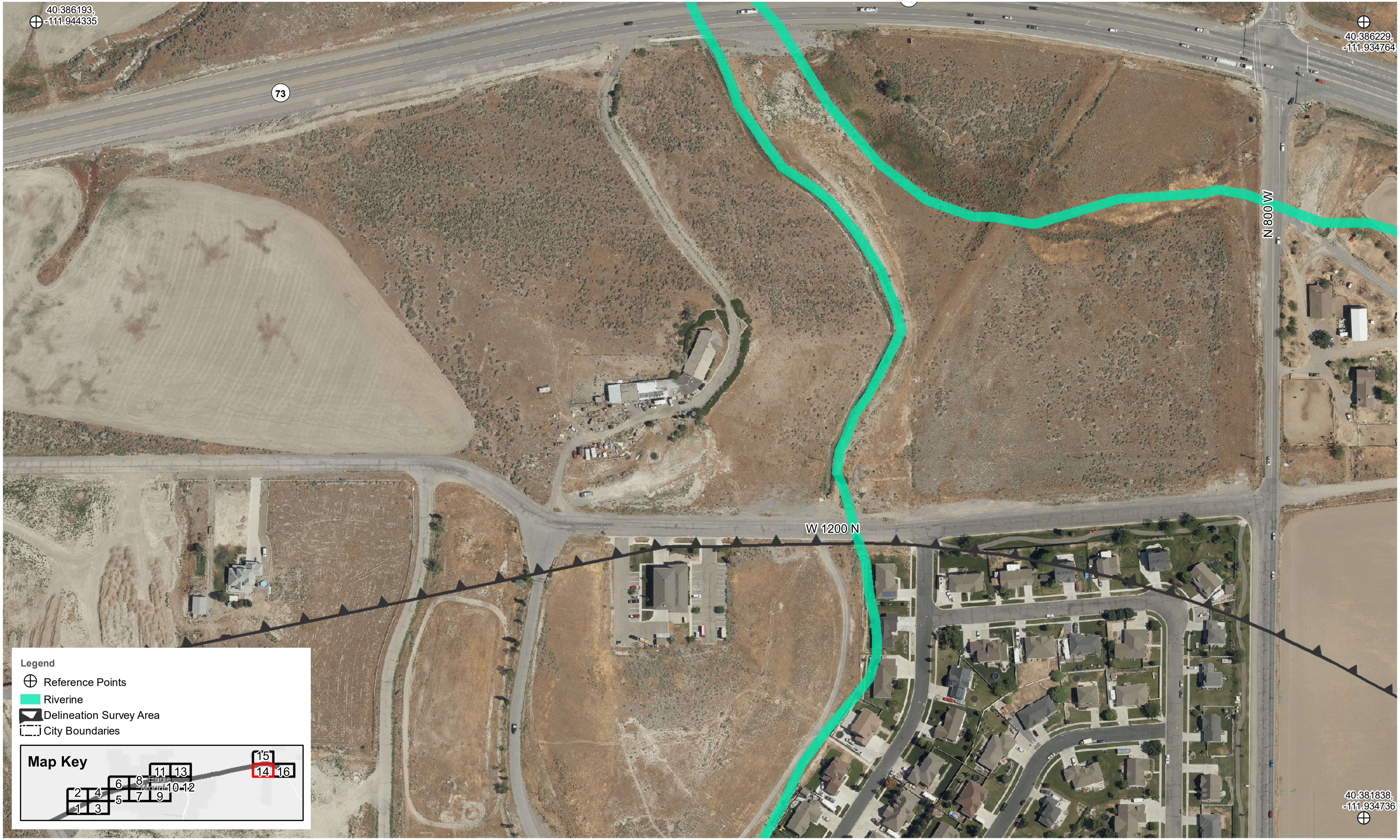

State Route 73
ENVIRONMENTAL STUDY
Eagle Mountain to Saratoga Springs

Imagery: Imagery flown 6/28/2017
Projection: MVC Custom System, Lambert Conformal Conic
Cartographer: Sarah Rigard, HDR Inc

1 inch = 175 feet
0 Feet 200

NATIONAL WETLAND INVENTORY MAP SERIES

FIGURE 13 OF 16



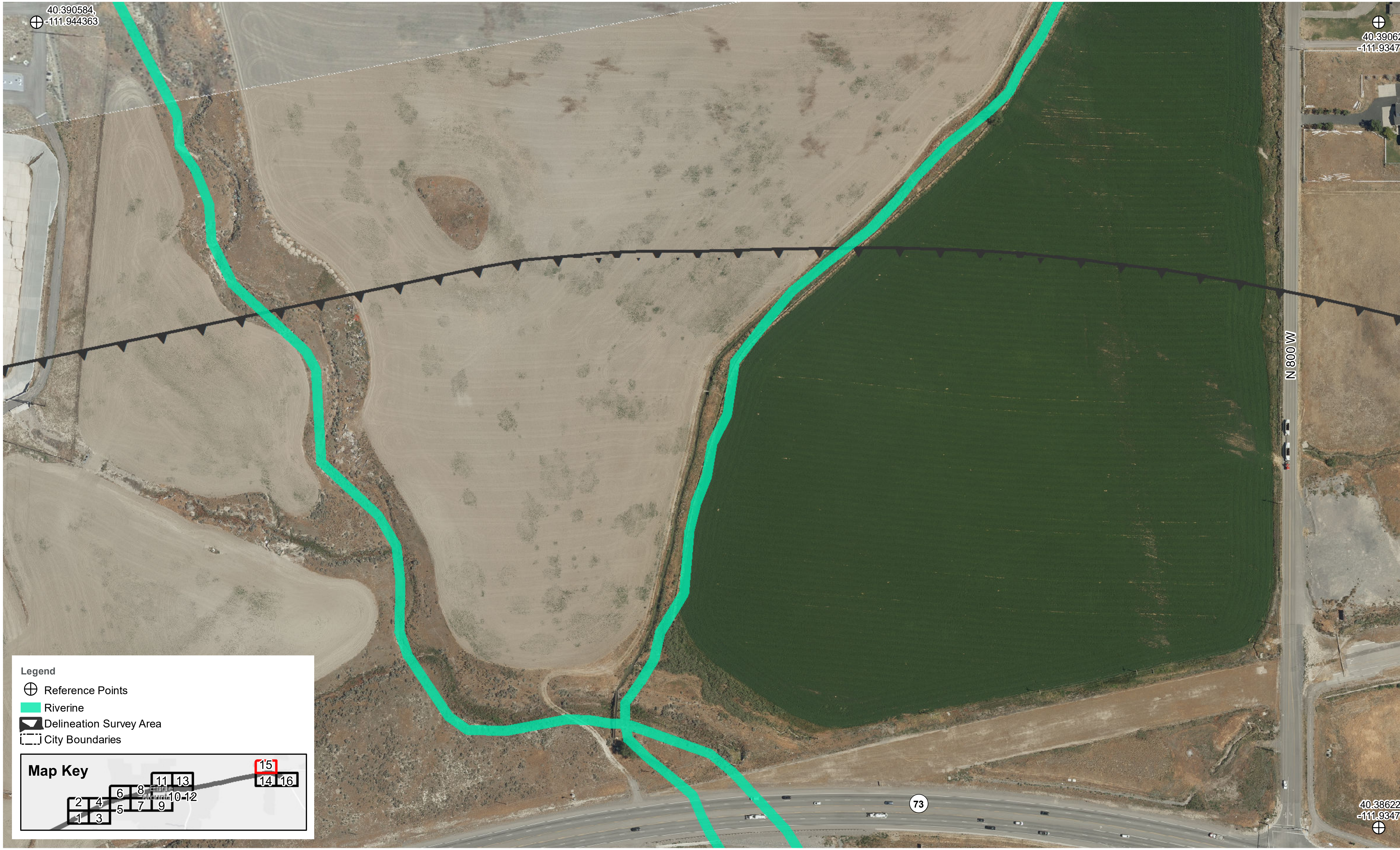

State Route 73
ENVIRONMENTAL STUDY
Eagle Mountain to Saratoga Springs

Imagery: Imagery flown 6/28/2017
Projection: MVC Custom System, Lambert Conformal Conic
Cartographer: Sarah Rigard, HDR Inc

1 inch = 175 feet
0 Feet 200

NATIONAL WETLAND INVENTORY MAP SERIES

FIGURE 14 OF 16



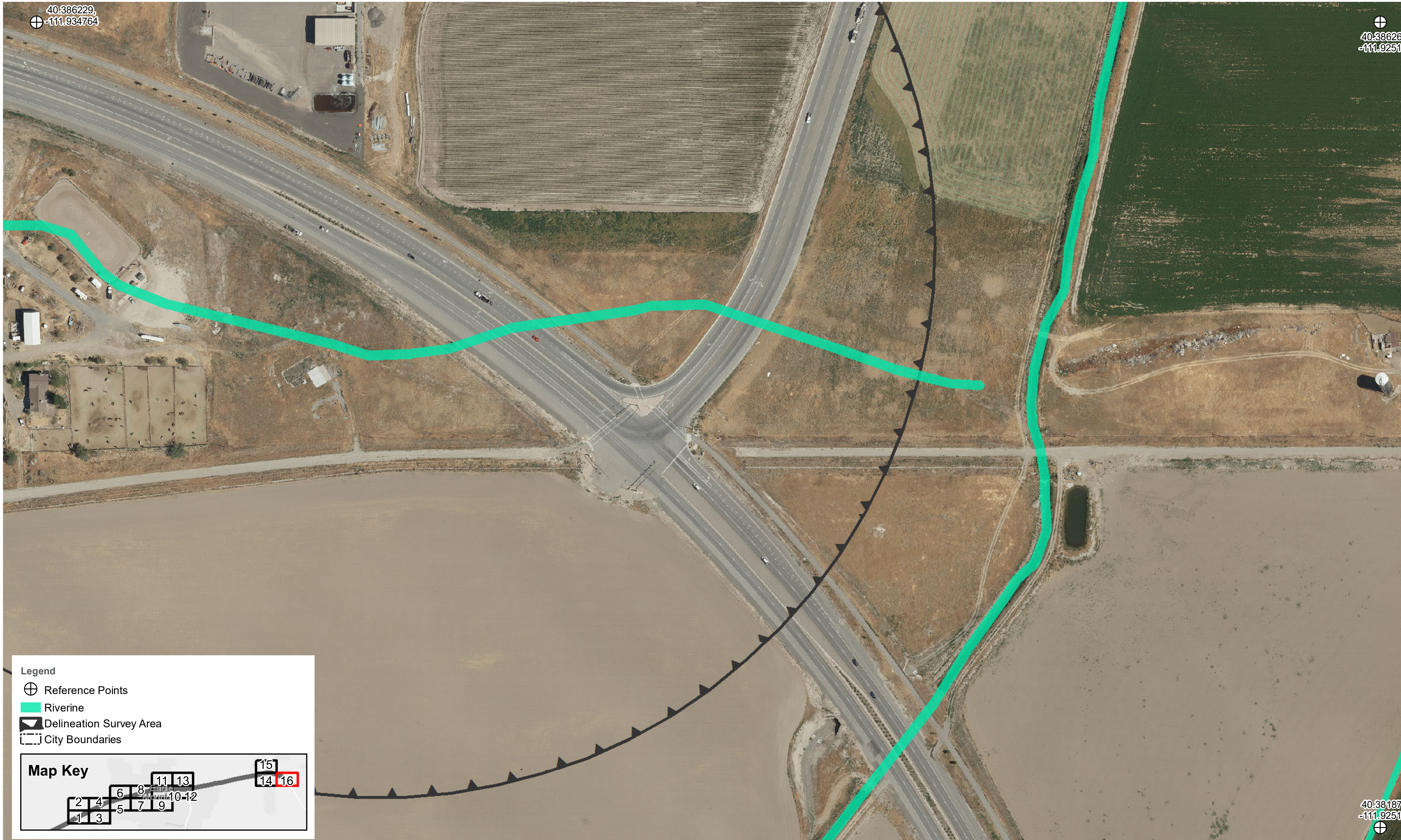

State Route 73
ENVIRONMENTAL STUDY
Eagle Mountain to Saratoga Springs

Imagery: Imagery flown 6/28/2017
Projection: MVC Custom System, Lambert Conformal Conic
Cartographer: Sarah Rigard, HDR Inc

1 inch = 175 feet
0 Feet 200

NATIONAL WETLAND INVENTORY MAP SERIES

FIGURE 15 OF 16




State Route 73
ENVIRONMENTAL STUDY
Eagle Mountain to Saratoga Springs

Imagery: Imagery flown 6/28/2017
Projection: MVC Custom System, Lambert Conformal Conic
Cartographer: Sarah Rigard, HDR Inc

1 inch = 175 feet
0 Feet 200

N

NATIONAL WETLAND INVENTORY MAP SERIES

FIGURE 16 OF 16

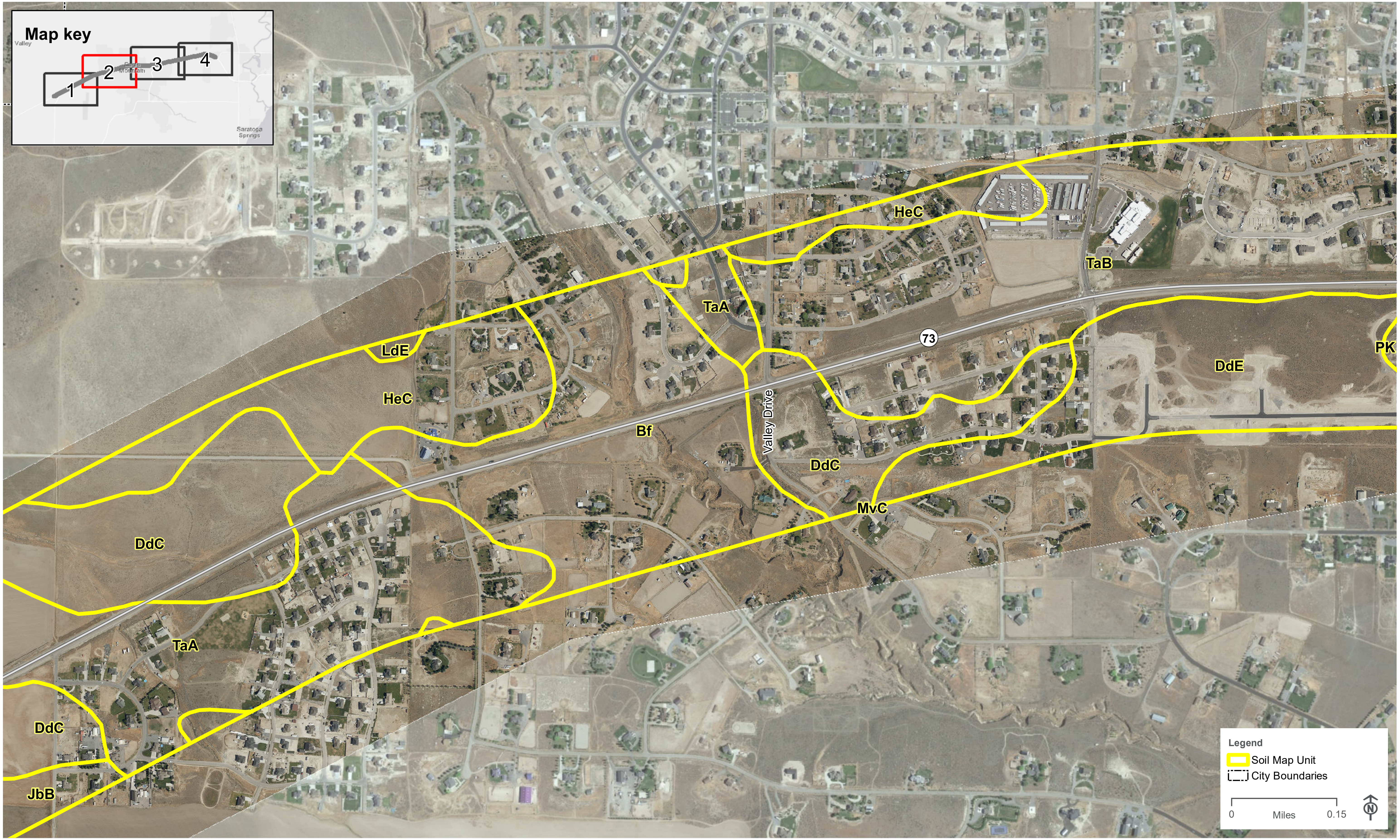
# APPENDIX F

USDA NRCS Soil Map Series




NRCS SOIL MAPS

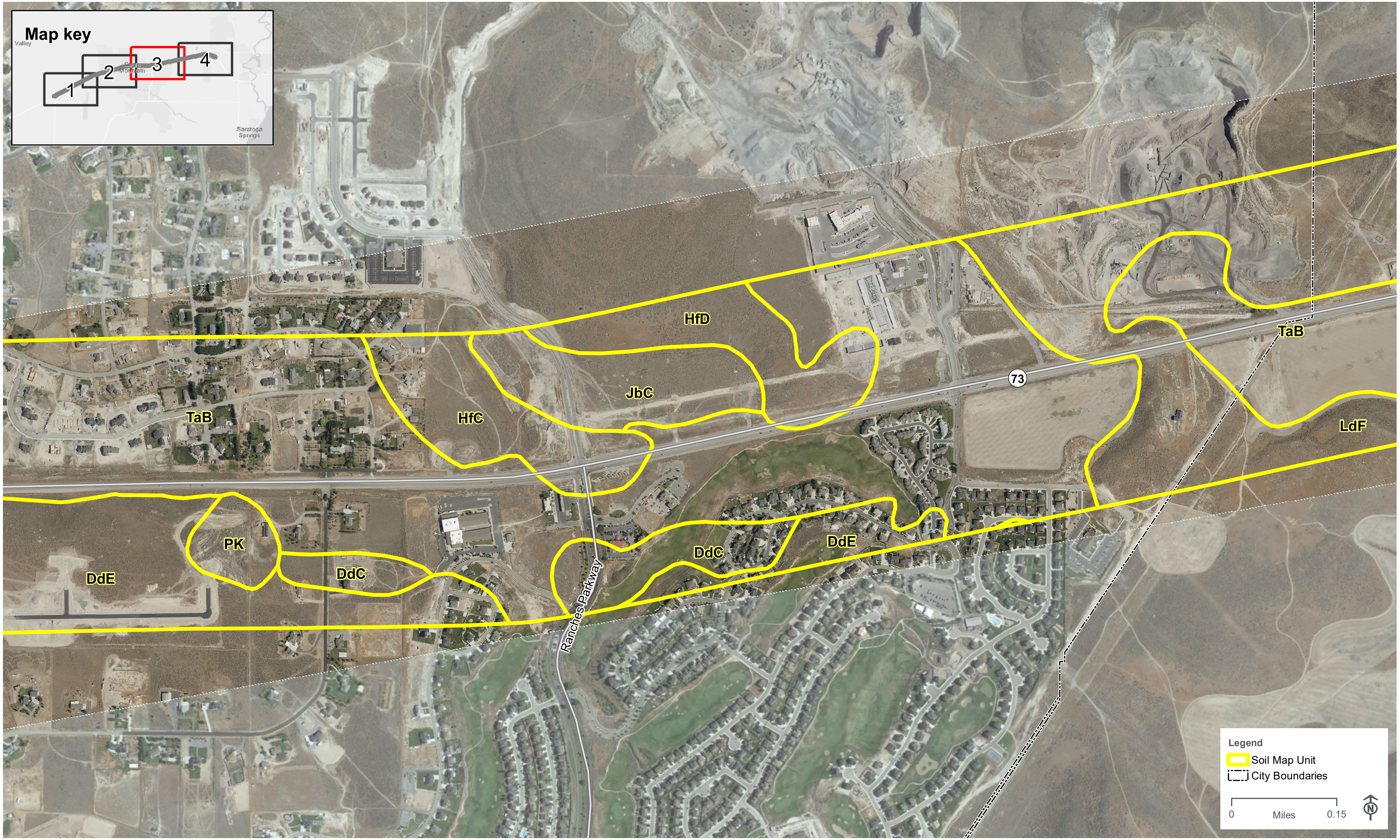
FIGURE 1 OF 4




State Route 73
ENVIRONMENTAL STUDY
Eagle Mountain to Saratoga Springs

## NRCS SOIL MAPS

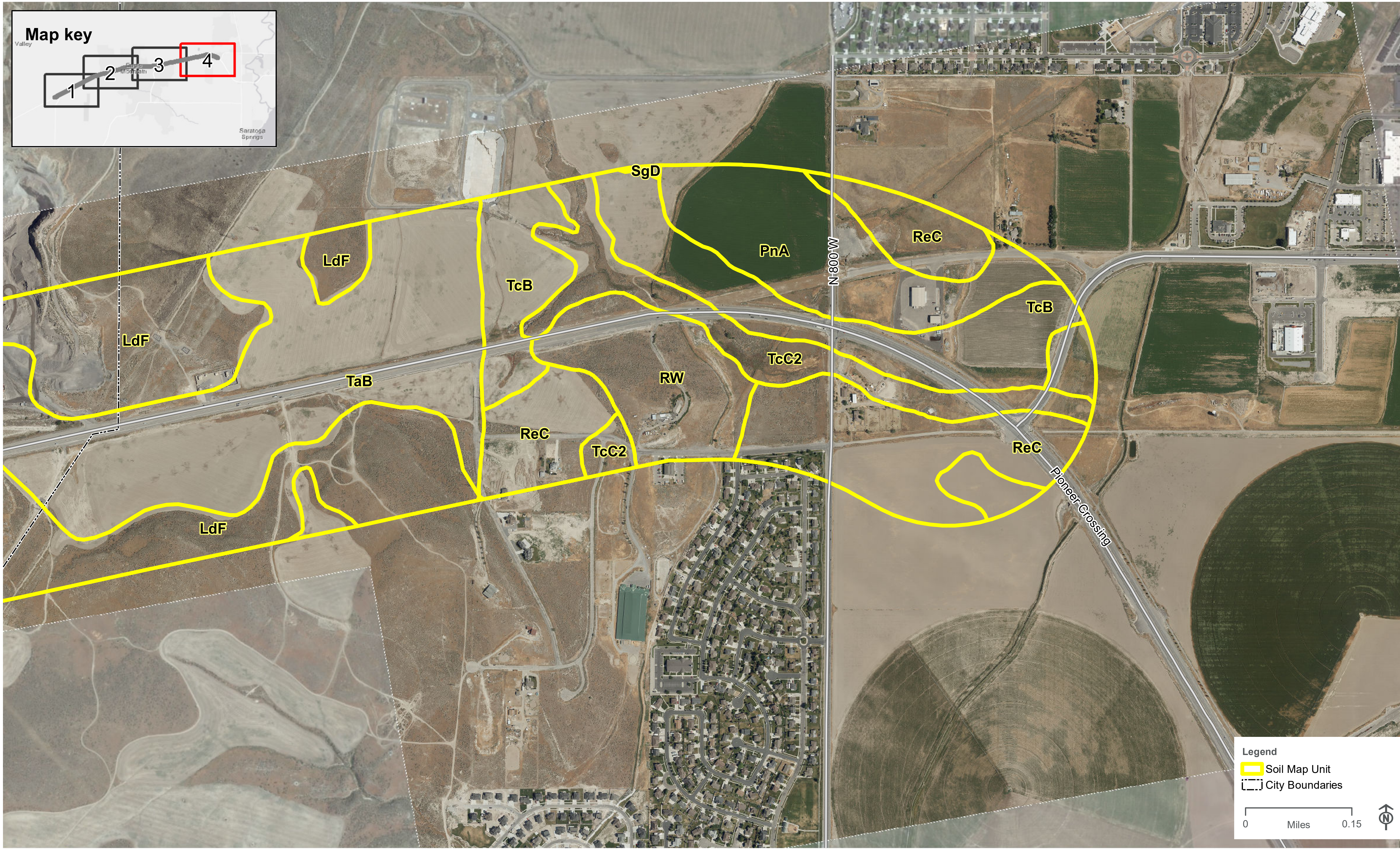
FIGURE 2 OF 4




State Route 73
ENVIRONMENTAL STUDY
Eagle Mountain to Saratoga Springs

NRCS SOIL MAPS

FIGURE 3 OF 4




State Route 73
ENVIRONMENTAL STUDY
Eagle Mountain to Saratoga Springs

## NRCS SOIL MAPS

FIGURE 4 OF 4

# APPENDIX G

List of Plant Species Observed

### Table G-1. List of Plant Species Observed

| Scientific Name[a] | Common Name[a] | Indicator Status[b] |
|---|---|---|
| *Agropyron cristatum* | Crested wheatgrass | NL |
| *Agrostis exarata* | Spike bentgrass | FACW |
| *Ambrosia artemisiifolia* | Annual ragweed | FACU |
| *Apocynum cannabinum* | Indianhemp | FAC |
| *Artemisia tridentata* | Big sagebrush | NL |
| *Atriplex micrantha* | Twoscale saltbush | NL |
| *Bassia scoparia* | Burning bush | FAC |
| *Bromus tectorum* | Cheatgrass | NL |
| *Dipsacus fullonum* | Fuller's teasel | FAC |
| *Ericameria nauseosa* | Rubber rabbitbrush | NL |
| *Grindelia squarrosa* | Curlycup gumweed | FACU |
| *Gutierrezia sarothrae* | Broom snakeweed | NL |
| *Helianthus annuus* | Common sunflower | FACU |
| *Lactuca serriola* | Prickly lettuce | FACU |
| *Lepidium perfoliatum* | Clasping pepperweed | FACU |
| *Mentha arvensis* | Wild mint | FACW |
| *Onopordum acanthium* | Scotch cottonthistle | NL |
| *Phalaris arundinacea* | Reed canarygrass | FACW |
| *Phragmites australis* | Common reed | FACW |
| *Poa palustris* | Fowl bluegrass | FAC |
| *Poa pratensis* | Kentucky bluegrass | FAC |
| *Rumex crispus* | Curly dock | FAC |
| *Salix exigua* | Narrowleaf willow | FACW |
| *Salsola tragus* | Prickly Russian thistle | FACU |
| *Taraxacum officinale* | Common dandelion | FACU |
| *Thinopyrum intermedium* | Intermediate wheatgrass | NL |
| *Ulmus pumila* | Siberian elm | UPL |
| *Xanthium strumarium* | Rough cocklebur | FAC |

[a] Naming conventions according to USDA NRCS Plants Database (https://plants.usda.gov/).
[b] Indicator status as assigned for the Arid West Region in the National Wetland Plant List (Lichvar et al. 2016). FAC = facultative; FACU = facultative upland; FACW = facultative wetland; UPL = upland plants; OBL = obligate wetland.

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# APPENDIX G

## U.S. Highway 73 Wildlife-Vehicle Collision Minimization Recommendations

# U.S. Highway 73, Highway Stretch (MP 26-35) Wildlife-Vehicle Collision Minimization Recommendations

Utah Division of Wildlife Resources

Prepared By:

Central Region Habitat Personnel

Utah Division of Wildlife Resources

Springville, UT

The Utah Division of Wildlife Resources (UDWR), Utah Department of Transportation (UDOT), and the public are concerned with vehicle-related wildlife mortality collisions across the state. One reach of particular concern is Highway 73 from Redwood Road (East of Milepost 35) to Cedar Fort's city limits (Milepost 26). This stretch is currently a two-lane rural-to-suburban highway that has an annual average daily traffic (AADT) level between 2,000 at the southeastern side and 20,000 from where development is focused and heading East (udot.utah.gov). For several years, numerous wildlife-vehicle collisions (WVCs) have been documented on this stretch of highway. Such collisions negatively affect the public in many ways, including vehicle damage/injury and death. Collisions also have deleterious effects on wildlife populations.

It is UDWR's understanding that the corridor is proposed to be a combination freeway/frontage road system in the near future, and the surrounding area is experiencing massive growth. This document has been compiled in part using carcass collection pick-up data by UDOT contractors, and provides recommendations to minimize WVCs in the future.

**Study Area:**

The section of Highway 73 analyzed for this report begins in the city of Saratoga Springs, at the intersection of Highway 73 and Redwood Road (near Milepost 36.5) and continues southwest through Eagle Mountain to approximately Milepost 26, just outside the city limits of the town of Cedar Fort. This section of highway crosses crucial habitat for numerous wildlife species, including pronghorn and mule deer. Highway 73 poses a high risk for WVCs for several reasons:

it is a potential migration corridor between two mountain ranges; the Oquirrh Mountains and Lake Mountains. The communities of Eagle Mountain and Saratoga Springs are among the fastest growing municipalities in the State of Utah and rapid growth leads to spikes in wildlife collisions as wildlife have not yet adapted to habitat conversion of historical winter range. Agricultural fields on the southeastern side of the highway corridor also retain resident populations of deer that do not migrate.

This report will focus on recommendations to reduce collisions with mule deer due to the high instances of WVC's with this species. Finally, UDOT's proposal to increase the size of the highway to a freeway corridor with frontage roads will dramatically increase the width of the road corridor, increasing the amount of time wildlife will be located within the corridor, as well as the speed of traveling motorists. Additionally, mitigation measures proposed for this species will likely result in fewer collisions with other wildlife species.

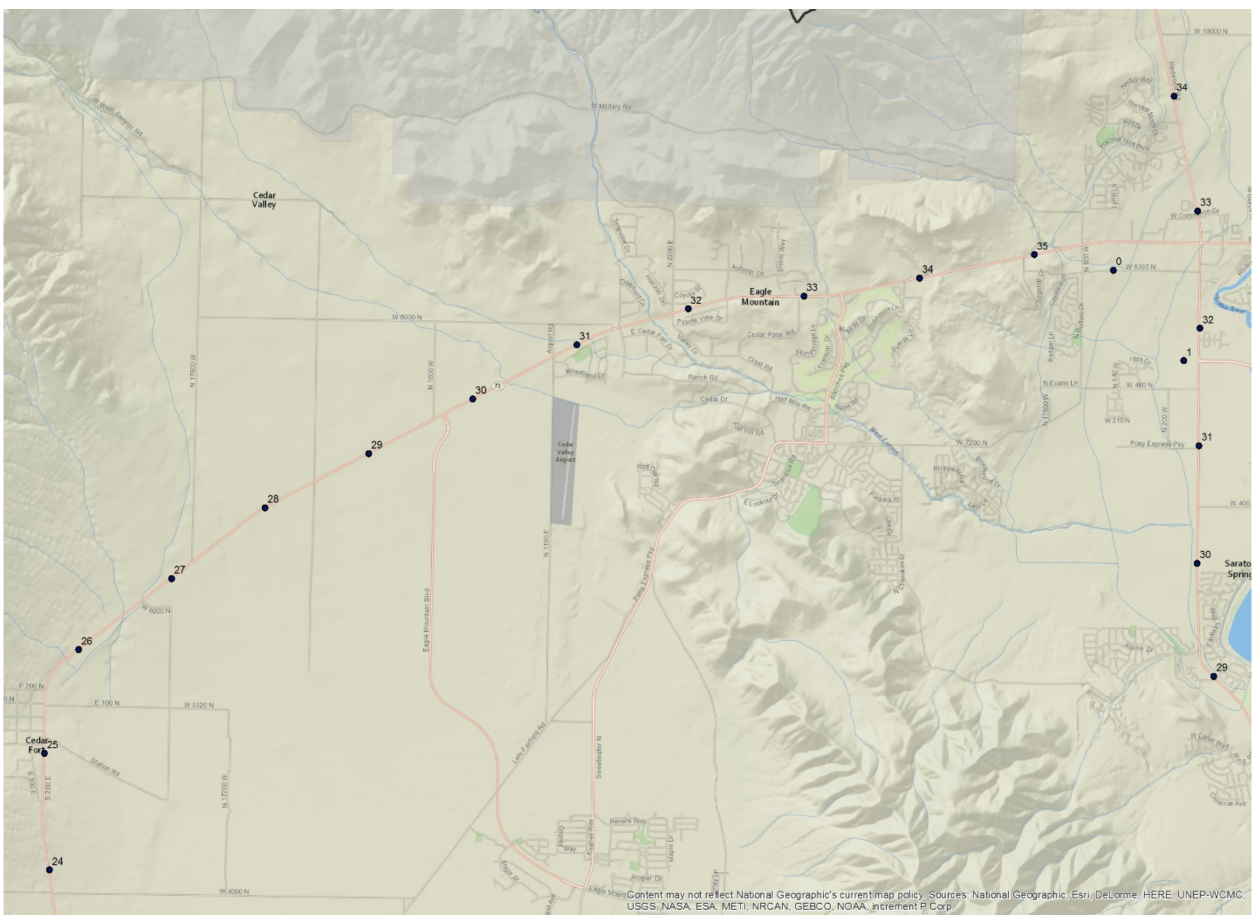


**Figure 1.** Map of Study Area

**Carcass Pick-up Data:**

Carcass data collected by UDOT contractors from January 2012-October 2017 was analyzed (see Figure 2). Data include: date of collection, species, gender, age, amount of xyphoid fat, collar/tag number if present, nearest milepost or latitude and longitude, as well as any additional noteworthy comments. Recording the carcass pickup locations allows for identification of areas with high numbers of WVCs that occur because some animals leave the roadway before dying, or are carried away by predators and are never found. All carcasses are removed from the highway following data collection.

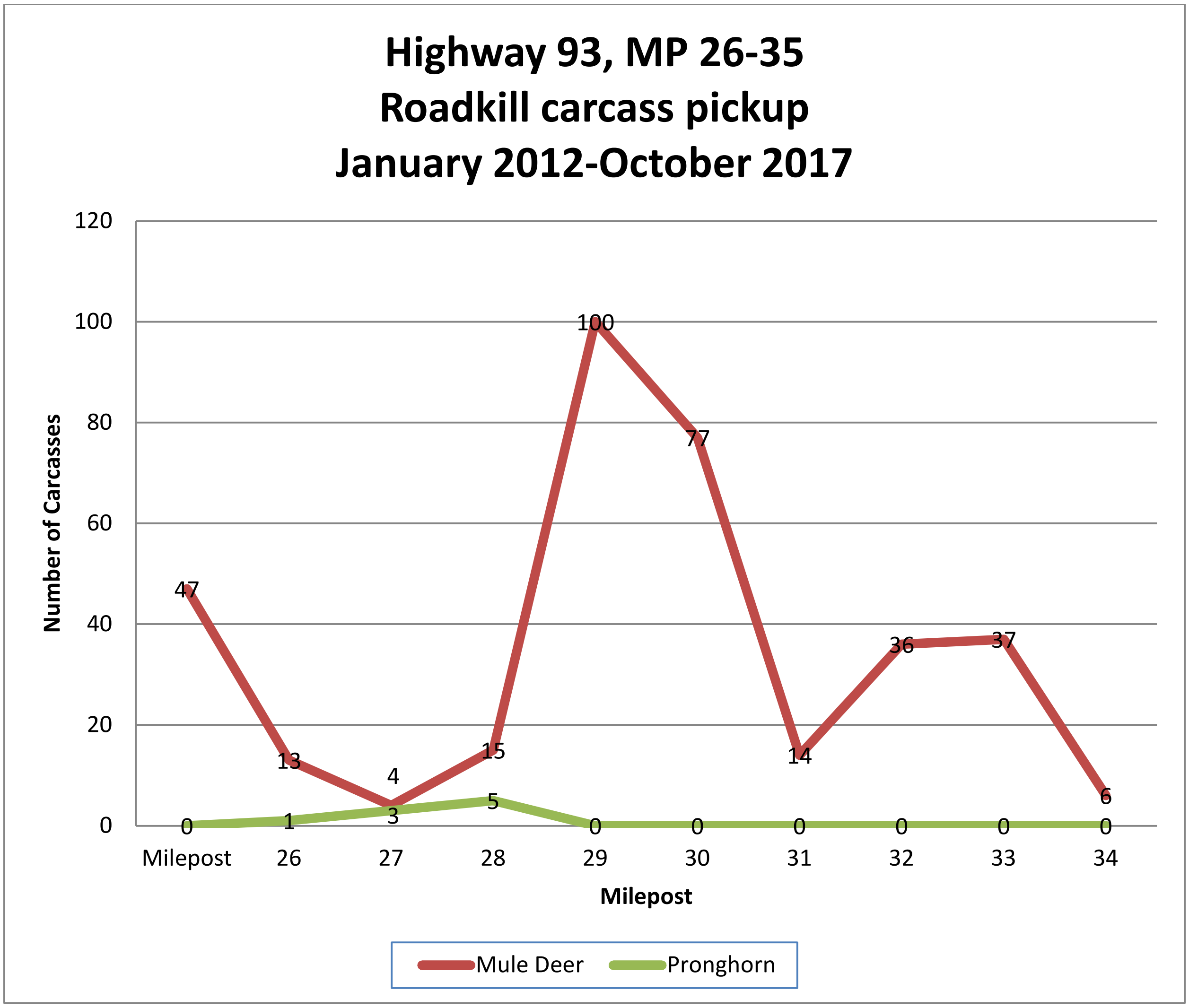


**Figure 2**. Summary of carcass pickup data from 2012-2017

**Issues**:

There are several issues to consider when planning wildlife crossings along this section of the highway.

1) There are several existing and planned residential, business, and farming access points along this stretch of highway that could create gaps in any potential wildlife fencing to be installed. Gates can be a low-cost solution in areas where traffic is low, but are only effective when kept closed. Double cattle guards would be a solution in some of the lower traffic ingresses and egresses, but some roads entering and exiting the main corridor have too much traffic for cattle guards.
2) Land ownership issues impair UDOT's ability to install a consistent fencing system from one end of the corridor to the other.
3) Future development and highway expansion make the current scenario unfit for analyzing mitigation structures; all structures need to anticipate the full development of the corridor.
4) Proposed freeway corridor will extend to an estimated 450 feet, which is much too long for an effective underpass. Proposed freeway would have a large bridge at the possible crossings, which may make underpasses possible, but more information is needed.
5) Build-out will be so extensive in the next several decades that it's difficult to recommend expensive wildlife structures that will only deposit animals from one suburban/urban area to another.

**Current WVC deterrent systems:**

This area has little to no structures currently in place to reduce wildlife impacts. There is extensive snow fencing on the northern side of the highway in the agricultural stretches of the corridor. These snow fences are permeable, but may have some impact on impeding animal entrance from the north to a certain extent. However, these fences may prevent wildlife from traveling quickly across the corridor if they are approaching from the south, keeping them within the corridor longer and increasing risk of collision.

Per conversation with UDOT staff, the culvert just east of milepost 35 is approximately 80 inches in diameter, which could potentially be a wildlife crossing if appropriate fencing is included.

**Recommendations:**

Due to population and infrastructure growth in the area, there is no apparent one-size-fits-all approach to this highway stretch. Land ownership issues combined with the multiple exits and entrances to the highway (both existing and anticipated), make a traditional plan of fencing and underpasses unlikely within extensive development. While some access roads can be fitted with double cattle guards or gates, others experience too much traffic to make them an appropriate solution. Tickville Wash, a deep gully between MP 31 and MP 32, is deep enough to make an underpass a feasible structure, but should be analyzed further given the width of the corridor. Generally a corridor of 450’, as proposed, would be far too long for a crossing structure to function. However, preliminary plans indicate that the proposed freeway would include a bridge spanning the gulch, resulting in a possible crossing that would include short culverts under each frontage road and a large open space between them that could be fenced in. Tickville Wash has some potential to remain a wildlife corridor even when the surrounding area is filled in with suburban infrastructure, as it is a wide vegetated gully.

The majority of WVCs are spread out between MP 29 and MP 31, which is undeveloped land to the west of the built infrastructure. It is possible that this area has become a thoroughfare for wildlife skirting the existing suburban build-out for both migrating and resident wildlife. In spite of the elevated number of wildlife collisions, this section of road gets a significantly smaller amount of traffic (approx. 2,000 AADT). It would be a good candidate for an at-grade crossing. Potential solutions could include a detection system for wildlife in the roadway combined with a method of signaling to motorists only when wildlife is actually in the roadway. This could be supplemented by a fenced opening including electrified concrete to prevent movement up and down the roadway.  It is recommended that this area be fenced as soon as possible, with an at-grade crossing included, before further development makes such structures impossible in the future.

As is common in new communities, it is anticipated that the communities of Eagle Mountain and Saratoga Springs will be home to a large population of migrating and resident mule deer and pronghorn accustomed to wintering in habitat recently displaced by housing developments. UDWR recommends that these communities develop an urban deer mitigation program to reduce the amount of wildlife living and moving throughout the communities, including attempting to cross the highway corridor and surrounding road system.


**Figure 3**. Suggested at-grade crossing area between MP 29 and MP 31 – dots represent WVCs from 2012-2017


**Figure 4**. Potential underpass locations

# APPENDIX H

# S.R. 73 Correspondence for Historic Properties

August 21, 2017

Mr. Virgil W. Johnson
Confederated Tribes of the Goshute Reservation
P.O. BOX 6104/195 Tribal Center Rd.
Ibapah, UT 84034

**Subject: State Route 73 State Environmental Study Request for Information and Request to be a Consulting Party – UDOT Project S-0073(33)30**

Dear Mr. Johnson,

The Utah Department of Transportation (UDOT) is preparing a State Environmental Study (SES) for the improvement of State Route 73 (S.R. 73) in Cedar Valley, Utah, located west of Utah Lake in northwestern Utah County, Utah (see the enclosed map). In preparing the SES, UDOT will evaluate the environmental, social, and economic impacts of the proposed S.R. 73 improvements.

Most of the proposed project is in Cedar Valley, which is home to the municipalities of Eagle Mountain, Cedar Fort, and Fairfield. S.R. 73 is the primary arterial highway connecting Cedar Valley to the rest of Utah County and the Wasatch Front. S.R. 73 is currently a two-lane arterial from Eagle Mountain Boulevard to just west of Ranches Parkway and expands to a five-lane arterial to the east as the arterial crosses Ranches Parkway.

Recent and planned growth in Cedar Valley is greatly affecting traffic in and around the project study area. The project is included in the 2015 Mountainland Association of Governments Regional Transportation Plan. As proposed in the plan, the project would entail converting S.R. 73 to a freeway between about Eagle Mountain Boulevard on the west and the Mountain View Corridor (Saratoga Springs 800 West) on the east.

In accordance with the *Programmatic Agreement between the UDOT and the Utah State Historic Preservation Officer Regarding Implementation of U.C.A. 9-8-404 for State Funded Transportation Projects in Utah* (executed March 19, 2008), the UDOT has taken into account the effects of this undertaking on historic properties and is affording the Native American Tribes an opportunity to comment on the undertaking.

In compliance with the PA, we request that you review the information in this letter and enclosed project information to determine if there are any historic properties of traditional religious and/or cultural importance that may be affected by the proposed undertaking. If you feel that there are any historic properties that may be impacted, we request your notification as such and your participation as a consulting party during the development of the environmental document.

At your request, we will meet with you to discuss any concerns you might have. Please be assured that we will maintain strict confidentiality about certain types of information regarding traditional religious and/or cultural historic properties that might be affected by this proposed undertaking. We would also appreciate any suggestions you might have about any other groups or individuals whom we should contact regarding this project.

If you have concerns about this project and/or wish to be a consulting party, a response within 30 days would be appreciated. If you have any questions, need additional information, or have comments please contact Liz Robinson, UDOT Cultural Resources Program Manager, at (801) 910-2035 or lizrobinson@utah.gov.

You can mail your comments to:

Liz Robinson
Cultural Resources Program Manager
Utah Department of Transportation
4501 South 2700 West, Box 148450
Salt Lake City, Utah 84114

Please include the project name (**UDOT Project S-0073(33)30)** in the subject line of either written or email correspondence. You may also attend the public open house for S.R. 73 on September 7, 2017, from 5:30 to 7:30 p.m. at Black Ridge Elementary School at 9358 N. Sunset Drive, Eagle Mountain, Utah.

Sincerely,

Elizabeth Rin

Liz Robinson

Enclosure: Study area map

cc: Matt Parker, UDOT
Elisa Albury, UDOT
Amy Croft, HDR
Sherri Ellis, Certus Environmental Solutions
Ms. Mary Pete-Freeman, Tribal Transportation Planner

August 21, 2017

Ms. Mary Pete-Freeman
Confederated Tribes of the Goshute Reservation
P.O. BOX 6104/195 Tribal Center Rd.
Ibapah, UT 84034

**Subject: State Route 73 State Environmental Study Request for Information and Request to be a Consulting Party – UDOT Project S-0073(33)30**

Dear Ms. Pete-Freeman,

The Utah Department of Transportation (UDOT) is preparing a State Environmental Study (SES) for the improvement of State Route 73 (S.R. 73) in Cedar Valley, Utah, located west of Utah Lake in northwestern Utah County, Utah (see the enclosed map). In preparing the SES, UDOT will evaluate the environmental, social, and economic impacts of the proposed S.R. 73 improvements.

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If you have concerns about this project and/or wish to be a consulting party, a response within 30 days would be appreciated. If you have any questions, need additional information, or have comments please contact Liz Robinson, UDOT Cultural Resources Program Manager, at (801) 910-2035 or lizrobinson@utah.gov.

You can mail your comments to:

Liz Robinson
Cultural Resources Program Manager
Utah Department of Transportation
4501 South 2700 West, Box 148450
Salt Lake City, Utah 84114

Please include the project name (**UDOT Project S-0073(33)30)** in the subject line of either written or email correspondence. You may also attend the public open house for S.R. 73 on September 7, 2017, from 5:30 to 7:30 p.m. at Black Ridge Elementary School at 9358 N. Sunset Drive, Eagle Mountain, Utah.

Sincerely,

Liz Robinson

Enclosure: Study area map

cc: Matt Parker, UDOT
Elisa Albury, UDOT
Amy Croft, HDR
Sherri Ellis, Certus Environmental Solutions
Mr. Virgil Johnson, Chairman

August 21, 2017

Ms. Candace Bear
Skull Valley Band of Goshute Indians
407 Skull Valley Rd.
Skull Valley, UT 84029

**Subject:** **State Route 73 State Environmental Study Request for Information and Request to be a Consulting Party – UDOT Project S-0073(33)30**

Dear Ms. Bear,

The Utah Department of Transportation (UDOT) is preparing a State Environmental Study (SES) for the improvement of State Route 73 (S.R. 73) in Cedar Valley, Utah, located west of Utah Lake in northwestern Utah County, Utah (see the enclosed map). In preparing the SES, UDOT will evaluate the environmental, social, and economic impacts of the proposed S.R. 73 improvements.

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In accordance with the *Programmatic Agreement between the UDOT and the Utah State Historic Preservation Officer Regarding Implementation of U.C.A. 9-8-404 for State Funded Transportation Projects in Utah* (executed March 19, 2008), the UDOT has taken into account the effects of this undertaking on historic properties and is affording the Native American Tribes an opportunity to comment on the undertaking.

In compliance with the PA, we request that you review the information in this letter and enclosed project information to determine if there are any historic properties of traditional religious and/or cultural importance that may be affected by the proposed undertaking. If you feel that there are any historic properties that may be impacted, we request your notification as such and your participation as a consulting party during the development of the environmental document.

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Cultural Resources Program Manager
Utah Department of Transportation
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Salt Lake City, Utah 84114

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Sincerely,

Elizabeth Robinson

Liz Robinson

Enclosure: Study area map

cc: Matt Parker, UDOT
Elisa Albury, UDOT
Amy Croft, HDR
Sherri Ellis, Certus Environmental Solutions

State of Utah

GARY R. HERBERT
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SPENCER J. COX
*Lieutenant Governor*

DEPARTMENT OF TRANSPORTATION

CARLOS M. BRACERAS, P.E.
*Executive Director*

SHANE M. MARSHALL, P.E.
*Deputy Director*

State Route 73
ENVIRONMENTAL STUDY
Eagle Mountain to Saratoga Springs

August 21, 2017

Mr. Shane Werner
Northwestern Band of Shoshone Nation
505 Pershing Ave. #200
Pocatello, ID 83201

**Subject: State Route 73 State Environmental Study Request for Information and Request to be a Consulting Party – UDOT Project S-0073(33)30**

Dear Mr. Werner,

The Utah Department of Transportation (UDOT) is preparing a State Environmental Study (SES) for the improvement of State Route 73 (S.R. 73) in Cedar Valley, Utah, located west of Utah Lake in northwestern Utah County, Utah (see the enclosed map). In preparing the SES, UDOT will evaluate the environmental, social, and economic impacts of the proposed S.R. 73 improvements.

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**WEBSITE** udot.utah.gov/sr73 **PHONE** 801-707-3662 **EMAIL** sr73@utah.gov

At your request, we will meet with you to discuss any concerns you might have. Please be assured that we will maintain strict confidentiality about certain types of information regarding traditional religious and/or cultural historic properties that might be affected by this proposed undertaking. We would also appreciate any suggestions you might have about any other groups or individuals whom we should contact regarding this project.

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Cultural Resources Program Manager
Utah Department of Transportation
4501 South 2700 West, Box 148450
Salt Lake City, Utah 84114

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Sincerely,

Liz Robinson

Enclosure: Study area map

cc: Matt Parker, UDOT
Elisa Albury, UDOT
Amy Croft, HDR
Sherri Ellis, Certus Environmental Solutions
Ms. Patty Timbimboo-Madsen, Cultural and Natural Resource Manager

August 21, 2017

Ms. Patty Timbimboo-Madsen
Northwestern Band of Shoshone Nation
707 North Main Street
Brigham City, UT 84302

**Subject: State Route 73 State Environmental Study Request for Information and Request to be a Consulting Party – UDOT Project S-0073(33)30**

Dear Ms. Timbimboo-Madsen,

The Utah Department of Transportation (UDOT) is preparing a State Environmental Study (SES) for the improvement of State Route 73 (S.R. 73) in Cedar Valley, Utah, located west of Utah Lake in northwestern Utah County, Utah (see the enclosed map). In preparing the SES, UDOT will evaluate the environmental, social, and economic impacts of the proposed S.R. 73 improvements.

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Elizabeth Ro

Liz Robinson

Enclosure: Study area map

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Elisa Albury, UDOT
Amy Croft, HDR
Sherri Ellis, Certus Environmental Solutions
Mr. Shane Werner, Chairman

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*Deputy Director*

State Route 73
ENVIRONMENTAL STUDY
Eagle Mountain to Saratoga Springs

August 21, 2017

Mr. Blaine Edmo
Shoshone-Bannock Tribes of the Fort Hall Reservation
P.O. Box 306 Pima Drive
Fort Hall, ID 83203

**Subject: State Route 73 State Environmental Study Request for Information and Request to be a Consulting Party – UDOT Project S-0073(33)30**

Dear Mr. Edmo,

The Utah Department of Transportation (UDOT) is preparing a State Environmental Study (SES) for the improvement of State Route 73 (S.R. 73) in Cedar Valley, Utah, located west of Utah Lake in northwestern Utah County, Utah (see the enclosed map). In preparing the SES, UDOT will evaluate the environmental, social, and economic impacts of the proposed S.R. 73 improvements.

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Utah Department of Transportation
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Sincerely,

Elizabeth Robinson

Liz Robinson

Enclosure: Study area map

cc: Matt Parker, UDOT
Elisa Albury, UDOT
Amy Croft, HDR
Sherri Ellis, Certus Environmental Solutions
Ms. Carolyn Smith, Cultural Resources/Heritage Tribal Office (HeTO)

August 21, 2017

Ms. Carolyn Smith
Shoshone-Bannock Tribes of the Fort Hall Reservation
P.O. Box 306 Pima Drive
Fort Hall, ID 83203

**Subject: State Route 73 State Environmental Study Request for Information and Request to be a Consulting Party – UDOT Project S-0073(33)30**

Dear Ms. Smith,

The Utah Department of Transportation (UDOT) is preparing a State Environmental Study (SES) for the improvement of State Route 73 (S.R. 73) in Cedar Valley, Utah, located west of Utah Lake in northwestern Utah County, Utah (see the enclosed map). In preparing the SES, UDOT will evaluate the environmental, social, and economic impacts of the proposed S.R. 73 improvements.

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You can mail your comments to:

Liz Robinson
Cultural Resources Program Manager
Utah Department of Transportation
4501 South 2700 West, Box 148450
Salt Lake City, Utah 84114

Please include the project name (**UDOT Project S-0073(33)30)** in the subject line of either written or email correspondence. You may also attend the public open house for S.R. 73 on September 7, 2017, from 5:30 to 7:30 p.m. at Black Ridge Elementary School at 9358 N. Sunset Drive, Eagle Mountain, Utah.

Sincerely,

Elizabeth Robinson

Liz Robinson

Enclosure: Study area map

cc: Matt Parker, UDOT
Elisa Albury, UDOT
Amy Croft, HDR
Sherri Ellis, Certus Environmental Solutions
Mr. Blaine Edmo, Chairman

August 21, 2017

Mr. Darwin St. Clair, Jr.
Eastern Shoshone Tribe of the Wind River Reservation
P.O. Box 538/15 North Fork Rd
Fort Washakie, WY 82514

**Subject: State Route 73 State Environmental Study Request for Information and Request to be a Consulting Party – UDOT Project S-0073(33)30**

Dear Mr. St. Clair, Jr. ,

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Elizabeth Rin

Liz Robinson

Enclosure: Study area map

cc: Matt Parker, UDOT
Elisa Albury, UDOT
Amy Croft, HDR
Sherri Ellis, Certus Environmental Solutions
Ms. Glenda Trosper, Director, Cultural Center
Mr. Joshua Mann, Tribal Historic Presevation Officer

DEPARTMENT OF TRANSPORTATION
CARLOS M. BRACERAS, P.E.
*Executive Director*
SHANE M. MARSHALL, P.E.
*Deputy Director*

State of Utah

GARY R. HERBERT
*Governor*

SPENCER J. COX
*Lieutenant Governor*

State Route 73
ENVIRONMENTAL STUDY
Eagle Mountain to Saratoga Springs

August 21, 2017

Ms. Glenda Trosper
Eastern Shoshone Tribe of the Wind River Reservation
P.O. Box 538/15 North Fork Rd
Fort Washakie, WY 82514

**Subject: State Route 73 State Environmental Study Request for Information and Request to be a Consulting Party – UDOT Project S-0073(33)30**

Dear Ms. Trosper,

The Utah Department of Transportation (UDOT) is preparing a State Environmental Study (SES) for the improvement of State Route 73 (S.R. 73) in Cedar Valley, Utah, located west of Utah Lake in northwestern Utah County, Utah (see the enclosed map). In preparing the SES, UDOT will evaluate the environmental, social, and economic impacts of the proposed S.R. 73 improvements.

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**WEBSITE** udot.utah.gov/sr73 **PHONE** 801-707-3662 **EMAIL** sr73@utah.gov

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Salt Lake City, Utah 84114

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Sincerely,

Elizabeth Rob

Liz Robinson

Enclosure: Study area map

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Elisa Albury, UDOT
Amy Croft, HDR
Sherri Ellis, Certus Environmental Solutions
Mr. Darwin St. Clair, Jr., Chairman
Mr. Joshua Mann, Tribal Historic Presevation Officer

August 21, 2017

Mr. Joshua Mann
Eastern Shoshone Tribe of the Wind River Reservation
P.O. Box 538/15 North Fork Rd
Fort Washakie, WY 82514

**Subject: State Route 73 State Environmental Study Request for Information and Request to be a Consulting Party – UDOT Project S-0073(33)30**

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Liz Robinson

Enclosure: Study area map

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Elisa Albury, UDOT
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Mr. Darwin St. Clair, Jr., Chairman
Ms. Glenda Trosper, Director, Cultural Center

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State Route 73
**ENVIRONMENTAL STUDY**
Eagle Mountain to Saratoga Springs

August 21, 2017

Mr. Luke Dunkin
Ute Indian Tribe of the Uintah & Ouray Reservation
P.O. Box 190
Fort Duchesne, UT 84026

**Subject: State Route 73 State Environmental Study Request for Information and Request to be a Consulting Party – UDOT Project S-0073(33)30**

Dear Mr. Dunkin,

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Sincerely,

Elizabeth Robinson

Liz Robinson

Enclosure: Study area map

cc: Matt Parker, UDOT
Elisa Albury, UDOT
Amy Croft, HDR
Sherri Ellis, Certus Environmental Solutions
Ms. Betsy Chapoose, Director, Cultural Rights & Protection

State of Utah

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DEPARTMENT OF TRANSPORTATION

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*Executive Director*

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State Route 73
**ENVIRONMENTAL STUDY**
Eagle Mountain to Saratoga Springs

August 21, 2017

Ms. Betsy Chapoose
Ute Indian Tribe of the Uintah & Ouray Reservation
P.O. Box 190
Fort Duchesne, UT 84026

**Subject: State Route 73 State Environmental Study Request for Information and Request to be a Consulting Party – UDOT Project S-0073(33)30**

Dear Ms. Chapoose,

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Elizabeth Rin

Liz Robinson

Enclosure: Study area map

cc: Matt Parker, UDOT
Elisa Albury, UDOT
Amy Croft, HDR
Sherri Ellis, Certus Environmental Solutions
Mr. Luke Dunkin, Chairperson

August 21, 2017

Mr. Clement Frost
Southern Ute Indian Tribe
P.O. Box 737
Ignacio, CO 81137

**Subject: State Route 73 State Environmental Study Request for Information and Request to be a Consulting Party – UDOT Project S-0073(33)30**

Dear Mr. Frost,

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Sincerely,

Liz Robinson

Enclosure: Study area map

cc: Matt Parker, UDOT<br>
Elisa Albury, UDOT<br>
Amy Croft, HDR<br>
Sherri Ellis, Certus Environmental Solutions<br>
Ms. Elise Redd

August 21, 2017

Ms. Tami Slayton
Paiute Indian Tribe of Utah
440 North Paiute Drive
Cedar City, UT 84721

**Subject: State Route 73 State Environmental Study Request for Information and Request to be a Consulting Party – UDOT Project S-0073(33)30**

Dear Ms. Slayton,

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Liz Robinson

Enclosure: Study area map

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Amy Croft, HDR
Sherri Ellis, Certus Environmental Solutions
Ms. Dorena Martineau, Cultural Resources Manager

August 21, 2017

Ms. Dorena Martineau
Paiute Indian Tribe of Utah
440 North Paiute Drive
Cedar City, UT 84721

**Subject: State Route 73 State Environmental Study Request for Information and Request to be a Consulting Party – UDOT Project S-0073(33)30**

Dear Ms. Martineau,

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Liz Robinson

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Ms. Tami Slayton, Chairwoman

State of Utah

GARY R. HERBERT
*Governor*

SPENCER J. COX
*Lieutenant Governor*

DEPARTMENT OF TRANSPORTATION

CARLOS M. BRACERAS, P.E.
*Executive Director*

SHANE M. MARSHALL, P.E.
*Deputy Director*

State Route 73
ENVIRONMENTAL STUDY
Eagle Mountain to Saratoga Springs

August 21, 2017

Ms. Lora Tom
Cedar Band of Paiute Indians
4655 North Utah Trail
Enoch, UT 84720

**Subject: State Route 73 State Environmental Study Request for Information and Request to be a Consulting Party – UDOT Project S-0073(33)30**

Dear Ms. Tom,

The Utah Department of Transportation (UDOT) is preparing a State Environmental Study (SES) for the improvement of State Route 73 (S.R. 73) in Cedar Valley, Utah, located west of Utah Lake in northwestern Utah County, Utah (see the enclosed map). In preparing the SES, UDOT will evaluate the environmental, social, and economic impacts of the proposed S.R. 73 improvements.

Most of the proposed project is in Cedar Valley, which is home to the municipalities of Eagle Mountain, Cedar Fort, and Fairfield. S.R. 73 is the primary arterial highway connecting Cedar Valley to the rest of Utah County and the Wasatch Front. S.R. 73 is currently a two-lane arterial from Eagle Mountain Boulevard to just west of Ranches Parkway and expands to a five-lane arterial to the east as the arterial crosses Ranches Parkway.

Recent and planned growth in Cedar Valley is greatly affecting traffic in and around the project study area. The project is included in the 2015 Mountainland Association of Governments Regional Transportation Plan. As proposed in the plan, the project would entail converting S.R. 73 to a freeway between about Eagle Mountain Boulevard on the west and the Mountain View Corridor (Saratoga Springs 800 West) on the east.

In accordance with the *Programmatic Agreement between the UDOT and the Utah State Historic Preservation Officer Regarding Implementation of U.C.A. 9-8-404 for State Funded Transportation Projects in Utah* (executed March 19, 2008), the UDOT has taken into account the effects of this undertaking on historic properties and is affording the Native American Tribes an opportunity to comment on the undertaking.

In compliance with the PA, we request that you review the information in this letter and enclosed project information to determine if there are any historic properties of traditional religious and/or cultural importance that may be affected by the proposed undertaking. If you feel that there are any historic properties that may be impacted, we request your notification as such and your participation as a consulting party during the development of the environmental document.

At your request, we will meet with you to discuss any concerns you might have. Please be assured that we will maintain strict confidentiality about certain types of information regarding traditional religious and/or cultural historic properties that might be affected by this proposed undertaking. We would also appreciate any suggestions you might have about any other groups or individuals whom we should contact regarding this project.

If you have concerns about this project and/or wish to be a consulting party, a response within 30 days would be appreciated. If you have any questions, need additional information, or have comments please contact Liz Robinson, UDOT Cultural Resources Program Manager, at (801) 910-2035 or lizrobinson@utah.gov.

You can mail your comments to:

Liz Robinson
Cultural Resources Program Manager
Utah Department of Transportation
4501 South 2700 West, Box 148450
Salt Lake City, Utah 84114

Please include the project name (**UDOT Project S-0073(33)30)** in the subject line of either written or email correspondence. You may also attend the public open house for S.R. 73 on September 7, 2017, from 5:30 to 7:30 p.m. at Black Ridge Elementary School at 9358 N. Sunset Drive, Eagle Mountain, Utah.

Sincerely,

Elizabeth Rin

Liz Robinson

Enclosure: Study area map

cc: Matt Parker, UDOT
Elisa Albury, UDOT
Amy Croft, HDR
Sherri Ellis, Certus Environmental Solutions
Ms. Vala Parashonts, Cultural Resources Representative

August 21, 2017

Ms. Vala Parashonts
Cedar Band of Paiute Indians
533 South 640 West
Cedar City, UT 84721

**Subject:** **State Route 73 State Environmental Study Request for Information and Request to be a Consulting Party – UDOT Project S-0073(33)30**

Dear Ms. Parashonts,

The Utah Department of Transportation (UDOT) is preparing a State Environmental Study (SES) for the improvement of State Route 73 (S.R. 73) in Cedar Valley, Utah, located west of Utah Lake in northwestern Utah County, Utah (see the enclosed map). In preparing the SES, UDOT will evaluate the environmental, social, and economic impacts of the proposed S.R. 73 improvements.

Most of the proposed project is in Cedar Valley, which is home to the municipalities of Eagle Mountain, Cedar Fort, and Fairfield. S.R. 73 is the primary arterial highway connecting Cedar Valley to the rest of Utah County and the Wasatch Front. S.R. 73 is currently a two-lane arterial from Eagle Mountain Boulevard to just west of Ranches Parkway and expands to a five-lane arterial to the east as the arterial crosses Ranches Parkway.

Recent and planned growth in Cedar Valley is greatly affecting traffic in and around the project study area. The project is included in the 2015 Mountainland Association of Governments Regional Transportation Plan. As proposed in the plan, the project would entail converting S.R. 73 to a freeway between about Eagle Mountain Boulevard on the west and the Mountain View Corridor (Saratoga Springs 800 West) on the east.

In accordance with the *Programmatic Agreement between the UDOT and the Utah State Historic Preservation Officer Regarding Implementation of U.C.A. 9-8-404 for State Funded Transportation Projects in Utah* (executed March 19, 2008), the UDOT has taken into account the effects of this undertaking on historic properties and is affording the Native American Tribes an opportunity to comment on the undertaking.

In compliance with the PA, we request that you review the information in this letter and enclosed project information to determine if there are any historic properties of traditional religious and/or cultural importance that may be affected by the proposed undertaking. If you feel that there are any historic properties that may be impacted, we request your notification as such and your participation as a consulting party during the development of the environmental document.

At your request, we will meet with you to discuss any concerns you might have. Please be assured that we will maintain strict confidentiality about certain types of information regarding traditional religious and/or cultural historic properties that might be affected by this proposed undertaking. We would also appreciate any suggestions you might have about any other groups or individuals whom we should contact regarding this project.

If you have concerns about this project and/or wish to be a consulting party, a response within 30 days would be appreciated. If you have any questions, need additional information, or have comments please contact Liz Robinson, UDOT Cultural Resources Program Manager, at (801) 910-2035 or lizrobinson@utah.gov.

You can mail your comments to:

Liz Robinson
Cultural Resources Program Manager
Utah Department of Transportation
4501 South 2700 West, Box 148450
Salt Lake City, Utah 84114

Please include the project name (**UDOT Project S-0073(33)30)** in the subject line of either written or email correspondence. You may also attend the public open house for S.R. 73 on September 7, 2017, from 5:30 to 7:30 p.m. at Black Ridge Elementary School at 9358 N. Sunset Drive, Eagle Mountain, Utah.

Sincerely,

Elizabeth Rin

Liz Robinson

Enclosure: Study area map

cc: Matt Parker, UDOT
Elisa Albury, UDOT
Amy Croft, HDR
Sherri Ellis, Certus Environmental Solutions
Ms. Lora Tom, Chairwoman

August 21, 2017

Ms. Patrick Charles
Shivwits Band of Paiute Indians
6060 West 3650 North
Ivins, UT 84738

**Subject: State Route 73 State Environmental Study Request for Information and Request to be a Consulting Party – UDOT Project S-0073(33)30**

Dear Ms. Charles,

The Utah Department of Transportation (UDOT) is preparing a State Environmental Study (SES) for the improvement of State Route 73 (S.R. 73) in Cedar Valley, Utah, located west of Utah Lake in northwestern Utah County, Utah (see the enclosed map). In preparing the SES, UDOT will evaluate the environmental, social, and economic impacts of the proposed S.R. 73 improvements.

Most of the proposed project is in Cedar Valley, which is home to the municipalities of Eagle Mountain, Cedar Fort, and Fairfield. S.R. 73 is the primary arterial highway connecting Cedar Valley to the rest of Utah County and the Wasatch Front. S.R. 73 is currently a two-lane arterial from Eagle Mountain Boulevard to just west of Ranches Parkway and expands to a five-lane arterial to the east as the arterial crosses Ranches Parkway.

Recent and planned growth in Cedar Valley is greatly affecting traffic in and around the project study area. The project is included in the 2015 Mountainland Association of Governments Regional Transportation Plan. As proposed in the plan, the project would entail converting S.R. 73 to a freeway between about Eagle Mountain Boulevard on the west and the Mountain View Corridor (Saratoga Springs 800 West) on the east.

In accordance with the *Programmatic Agreement between the UDOT and the Utah State Historic Preservation Officer Regarding Implementation of U.C.A. 9-8-404 for State Funded Transportation Projects in Utah* (executed March 19, 2008), the UDOT has taken into account the effects of this undertaking on historic properties and is affording the Native American Tribes an opportunity to comment on the undertaking.

In compliance with the PA, we request that you review the information in this letter and enclosed project information to determine if there are any historic properties of traditional religious and/or cultural importance that may be affected by the proposed undertaking. If you feel that there are any historic properties that may be impacted, we request your notification as such and your participation as a consulting party during the development of the environmental document.

At your request, we will meet with you to discuss any concerns you might have. Please be assured that we will maintain strict confidentiality about certain types of information regarding traditional religious and/or cultural historic properties that might be affected by this proposed undertaking. We would also appreciate any suggestions you might have about any other groups or individuals whom we should contact regarding this project.

If you have concerns about this project and/or wish to be a consulting party, a response within 30 days would be appreciated. If you have any questions, need additional information, or have comments please contact Liz Robinson, UDOT Cultural Resources Program Manager, at (801) 910-2035 or lizrobinson@utah.gov.

You can mail your comments to:

Liz Robinson
Cultural Resources Program Manager
Utah Department of Transportation
4501 South 2700 West, Box 148450
Salt Lake City, Utah 84114

Please include the project name (**UDOT Project S-0073(33)30)** in the subject line of either written or email correspondence. You may also attend the public open house for S.R. 73 on September 7, 2017, from 5:30 to 7:30 p.m. at Black Ridge Elementary School at 9358 N. Sunset Drive, Eagle Mountain, Utah.

Sincerely,

Elizabeth Rin

Liz Robinson

Enclosure: Study area map

cc: Matt Parker, UDOT
Elisa Albury, UDOT
Amy Croft, HDR
Sherri Ellis, Certus Environmental Solutions
Ms. Shanan Anderson, Cultural Resource Director

DEPARTMENT OF TRANSPORTATION

CARLOS M. BRACERAS, P.E.
*Executive Director*

SHANE M. MARSHALL, P.E.
*Deputy Director*

State of Utah

GARY R. HERBERT
*Governor*

SPENCER J. COX
*Lieutenant Governor*

State Route 73
**ENVIRONMENTAL STUDY**
Eagle Mountain to Saratoga Springs

August 21, 2017

Ms. Sabrina Redfoot
Shivwits Band of Paiute Indians
6060 West 3650 North
Ivins, UT 84738

**Subject: State Route 73 State Environmental Study Request for Information and Request to be a Consulting Party – UDOT Project S-0073(33)30**

Dear Ms. Redfoot,

The Utah Department of Transportation (UDOT) is preparing a State Environmental Study (SES) for the improvement of State Route 73 (S.R. 73) in Cedar Valley, Utah, located west of Utah Lake in northwestern Utah County, Utah (see the enclosed map). In preparing the SES, UDOT will evaluate the environmental, social, and economic impacts of the proposed S.R. 73 improvements.

Most of the proposed project is in Cedar Valley, which is home to the municipalities of Eagle Mountain, Cedar Fort, and Fairfield. S.R. 73 is the primary arterial highway connecting Cedar Valley to the rest of Utah County and the Wasatch Front. S.R. 73 is currently a two-lane arterial from Eagle Mountain Boulevard to just west of Ranches Parkway and expands to a five-lane arterial to the east as the arterial crosses Ranches Parkway.

Recent and planned growth in Cedar Valley is greatly affecting traffic in and around the project study area. The project is included in the 2015 Mountainland Association of Governments Regional Transportation Plan. As proposed in the plan, the project would entail converting S.R. 73 to a freeway between about Eagle Mountain Boulevard on the west and the Mountain View Corridor (Saratoga Springs 800 West) on the east.

In accordance with the *Programmatic Agreement between the UDOT and the Utah State Historic Preservation Officer Regarding Implementation of U.C.A. 9-8-404 for State Funded Transportation Projects in Utah* (executed March 19, 2008), the UDOT has taken into account the effects of this undertaking on historic properties and is affording the Native American Tribes an opportunity to comment on the undertaking.

In compliance with the PA, we request that you review the information in this letter and enclosed project information to determine if there are any historic properties of traditional religious and/or cultural importance that may be affected by the proposed undertaking. If you feel that there are any historic properties that may be impacted, we request your notification as such and your participation as a consulting party during the development of the environmental document.



**WEBSITE** udot.utah.gov/sr73 **PHONE** 801-707-3662 **EMAIL** sr73@utah.gov

At your request, we will meet with you to discuss any concerns you might have. Please be assured that we will maintain strict confidentiality about certain types of information regarding traditional religious and/or cultural historic properties that might be affected by this proposed undertaking. We would also appreciate any suggestions you might have about any other groups or individuals whom we should contact regarding this project.

If you have concerns about this project and/or wish to be a consulting party, a response within 30 days would be appreciated. If you have any questions, need additional information, or have comments please contact Liz Robinson, UDOT Cultural Resources Program Manager, at (801) 910-2035 or lizrobinson@utah.gov.

You can mail your comments to:

Liz Robinson
Cultural Resources Program Manager
Utah Department of Transportation
4501 South 2700 West, Box 148450
Salt Lake City, Utah 84114

Please include the project name (**UDOT Project S-0073(33)30)** in the subject line of either written or email correspondence. You may also attend the public open house for S.R. 73 on September 7, 2017, from 5:30 to 7:30 p.m. at Black Ridge Elementary School at 9358 N. Sunset Drive, Eagle Mountain, Utah.

Sincerely,

Liz Robinson

Enclosure: Study area map

cc: Matt Parker, UDOT
Elisa Albury, UDOT
Amy Croft, HDR
Sherri Ellis, Certus Environmental Solutions
Ms. Jetta Wood, Chairwoman

State of Utah

GARY R. HERBERT
*Governor*

SPENCER J. COX
*Lieutenant Governor*

DEPARTMENT OF TRANSPORTATION

CARLOS M. BRACERAS, P.E.
*Executive Director*

SHANE M. MARSHALL, P.E.
*Deputy Director*

April 17, 2018

Mr. Chris Merritt
Deputy State Historic Preservation Officer
Utah Division of State History
300 Rio Grande
Salt Lake City, UT 84101-1182

RE: UDOT Project No. S-0073(33)30, SR-73 Eagle Mountain to Saratoga Springs, Utah County, Utah
**Determination of Eligibility and Finding of No Adverse Effect.**

Dear Mr. Merritt:

The Utah Department of Transportation (UDOT) is preparing to undertake the subject state-aid project. In accordance with the Programmatic Agreement between the UDOT and the Utah State Historic Preservation Officer Regarding Implementation of U.C.A. 9-8-404 for State Funded Transportation Projects in Utah (executed January 22, 2018), the UDOT has taken into account the effects of this undertaking on historic properties and is affording the Utah State Historic Preservation Officer (SHPO) an opportunity to comment on the undertaking.

**PROJECT DESCRIPTION**

UDOT proposes improvements to SR-73 in Utah County. The improvements include the widening and upgrading of the existing road section, from milepost 29.70 to milepost 35.42, to include a freeway and frontage road system. Construction activities which will occur to widen the current two lane highway into a freeway and frontage road system will include site preparation (clearing and grubbing), application of roadway fill and base materials, excavation of material for cut slopes, construction of fill slopes, storm drainage, and paving. The freeway/frontage road system will include on and off ramps connecting the freeway lanes to the frontage roads and cross streets at intervals.

The project area is in north-central Utah County, northwest of Utah Lake, in the communities of Eagle Mountain and Saratoga Springs. The corridor extends into the Cedar Valley northwest of Lake Mountains and south and east of the Oquirrh Mountains. The limits of the project Area of Potential Effect (APE) are from milepost 29.70 to milepost 35.42. The APE for the project corridor is irregular, accounting for tie-ins with cross streets and connections to other highways at the east end. The width of the APE that was surveyed ranges from approximately 850 feet to just over 2000 feet. Land along the corridor has long been used primarily for agricultural uses, including crop growing and livestock pasturing. In more recent years, the area has been developed for residential uses, including large subdivisions of single-family homes. Most of this development has occurred in the eastern half of the survey area. The APE of the project is approximately 830 acres.

The APE has been surveyed by Certus Environmental Solutions, LLC, under State Antiquities Project Number U17HY0405ps, and the complete results are reported in *An Archaeological Resources Assessment for the SR-73;*

*Eagle mountain to Saratoga Springs Project, Utah County, Utah, 2017,* and *Addendum to: An Archaeological Resources Assessment for the SR-73; Eagle mountain to Saratoga Springs Project, Utah County, Utah, 2018* (see enclosed reports). An intensive level pedestrian survey was conducted using 15 meter transects to identify archaeological resources. An architectural survey was also conducted by Certus Environmental Solutions, LLC, and the results are reported in *A Selective Reconnaissance-Level Historic Structures Assessment for the SR-73; Eagle Mountain to Saratoga Springs Project, Utah County, Utah*, 2017.

The survey has resulted in the identification of six archaeological sites. Four of the sites were previously documented and, of the four, three of the sites were previously determined to be eligible for the NRHP. Two new sites were documented, both of which being small, historical artifact scatters. The two new sites are recommended as ineligible for the NRHP. No known traditional cultural properties or paleontological resources are located in the APE. No historic architectural features were located during the survey. The Determinations of Eligibility and Findings of Effects are provided in Table 1.

**ARCHAEOLOGICAL RESOURCES**

Table 1. Determinations of Eligibility and Findings of Effect for Archaeological Resources

| Site | Name or Description | NRHP Eligibility | Finding of Effect |
|---|---|---|---|
| 42UT537 | Historical Clay Mine Railroad Spur | Eligible | No Historic Properties Affected |
| 42UT612 | Prehistoric Lithic Scatter | Ineligible | No Historic Properties Affected |
| 42UT947 | Provo Reservoir Canal/Murdock Ditch | Eligible | No Adverse Effect |
| 42UT948 | Salt Lake & Western Railroad | Eligible | No Adverse Effect |
| 42UT1999 | Historic Trash Scatter | Ineligible | No Historic Properties Affected |
| 42UT2000 | Historic Trash Scatter | Ineligible | No Historic Properties Affected |

***Description of Effect to Site 42UT537****:* This site is a historical clay mine and its associated railroad spur that once connected to the Salt Lake & Western Railroad (site 42UT948). The rail spur portion of the site comprises remnants of the historical berm and occasional tie plates or spikes; the tracks were removed long ago. The site is located north of the proposed project area and the proposed project will not impact this site. Because of this, the project will result in a finding of No Historic Properties Affected for this site.

***Description of Effect to Site 42UT947****:* The Provo Reservoir Canal/Murdock Ditch located west of the Jordan River in Utah County has also been referred to as the Welby-Jacobs Canal. Through the current survey area, the canal is a combination of concrete-lined and unlined segments. It varies in width from 3 to 6 feet and from 2 to 4 feet in depth. The canal as a whole has been previously determined eligible for the NRHP. The project will cross and pipe the canal in for a total of 658 feet. The project will affect a relatively small portion of the site and will not substantially impact or alter any contributing elements of the site or any of the character-defining features for which it was determined eligible for the NRHP. Thus, the proposed project will result in a finding of No Adverse Effect.

***Description of Effect to Site 42UT948****:* This is the remains of the Salt Lake & Western Railroad. The railroad berm is overgrown and discontinuous, with some segments having been destroyed by land development and other roadway construction. The segment of the site near the junction with SR-73 and 800 West has been bisected by the highway and disturbances from highway construction have removed large sections of the railroad alignment in the APE. Consequently, the actual length of railroad berm that will be impacted by this project is approximately 626 linear feet. Northeast of the project area the railroad berm remains intact and that segment is extensive, running for more than 1.3 miles. Numerous extant segments occur southwest of the project area and in the Cedar Valley the railroad berm maintains its integrity for several miles. The project will affect a relatively small portion of the site and will not substantially impact or alter any contributing elements of the site or any of the character-defining features for which it was determined eligible for the NRHP. Thus, the proposed project will result in a finding of No Adverse Effect.

**CONSULTATION EFFORTS**

Native American consultation was initiated through letters sent to the Confederated Tribes of the Goshute Reservation, the Skull Valley Band of Goshute Indians, the Northwestern Band of Shoshone Nation, the Shoshone-Bannock Tribes of the Fort Hall Reservation, the Eastern Shoshone Tribe of the Wind River Reservation, the Ute Indian Tribe of the Uintah & Ouray Reservation, the Southern Ute Indian Tribe, the Paiute Indian Tribe of Utah, the Cedar Band of Paiute Indians, and the Shivwits Band of Paiute Indians (*sent August 21, 2017*). No responses or comments have currently been received from the tribes mentioned.

**SUMMARY**
To summarize, the project as a whole will result in a finding of **No Adverse Effect** for two archaeological sites, and a finding of No Historic Properties Affected for all remaining archaeological sites. Therefore, the Finding of Effect for the proposed UDOT Project No. S-0073(33)30, SR-73 Eagle Mountain to Saratoga Springs, Utah County, Utah, is **No Adverse Effect**.

Sincerely,

Liz Robinson

Liz Robinson
UDOT Cultural Resources Manager
UDOT Central Environmental

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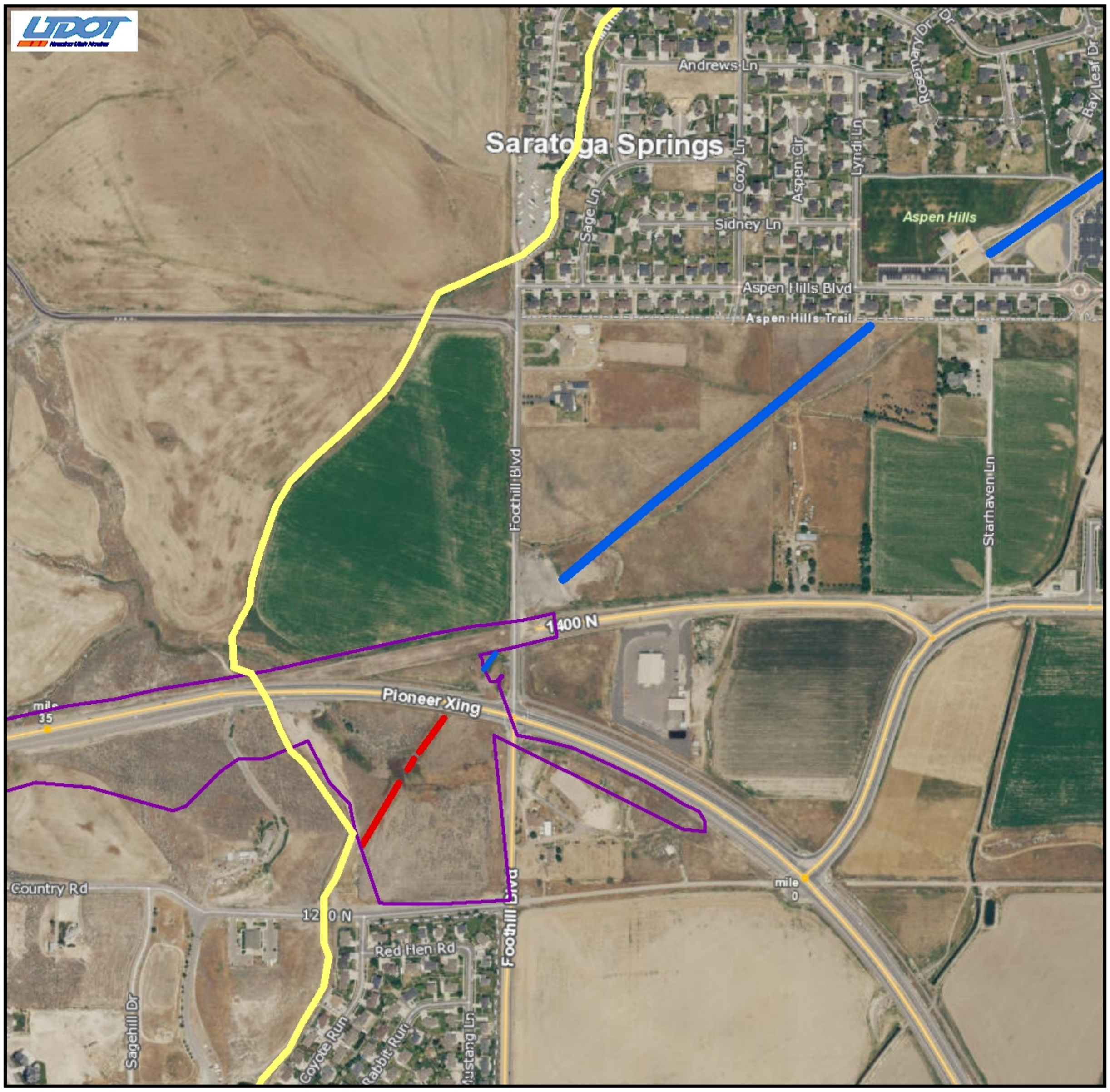
Regarding UDOT Project No. S-0073(33)30, SR-73 Eagle Mountain to Saratoga Springs, Utah County, Utah, I concur with the Determination of Eligibility and Finding of Effect, submitted to the Utah State Historic Preservation Office in accordance with the *Second Amended Programmatic Agreement,* Section 106 of the NHPA, and U.C.A. 9-8-404, which states that the UDOT has determined that the finding is **No Adverse Effect.**

| | |
|---|---|
| Chris Merritt<br>Deputy State Historic Preservation Officer | Date |




**UDOT Project S-0073(33)30**
**SR-73 Eagle Mountain to Saratoga Springs, Utah County**
**PIN 13608**

**42UT948 (Impacted areas)**
**42UT948 (Areas outside the APE)**
**42UT947**
Project Limits

0 0.075 0.15 0.3 Miles

Keeping Utah Moving

N

Date: 4/18/2018

GARY R. HERBERT
*Governor*

SPENCER J. COX
*Lieutenant Governor*

Jill Remington Love
*Executive Director*
*Department of Heritage & Arts*

Utah Division of
State History

Brad Westwood
*Director*

May 10, 2018

Liz Robinson
Cultural Resources Program Manager
Utah Dept of Transportation (UDOT)
4501 Constitution Blvd
Salt Lake City, UT 84119

RE: PIN 13608_SR-73 Eagle Mountain to Saratoga Springs_S-0073(33)30

For future correspondence, please reference Case No. 18-0852

Dear Ms Robinson,

The Utah State Historic Preservation Office received your request for our comment on the above-referenced undertaking on April 18, 2018.

We concur with your determinations of eligibility and effect for this undertaking. Thank you for the updated information about the potential project impacts.

This letter serves as our comment on the determinations you have made within the consultation process specified in §36CFR800.4. If you have questions, please contact me at (801)245-7241 or by email at ehora@utah.gov.

Sincerely,

Elizabeth Hora
Cultural Compliance Reviewer