# I-15 INTERCHANGE SPRINGVILLE SPANISH FORK

## ENVIRONMENTAL ASSESSMENT

**Project Number: F-I15-6(239)-259**

**PIN: 15153**

**April 2021**

# APPENDIX

The environmental review, consultation, and other actions required by applicable federal environmental laws for this project are being or have been carried out by UDOT pursuant to 23 USC 327 and a Memorandum of Understanding dated January 17,2017, and executed by FHWA and UDOT.

# APPENDIX

Note: The project number changed from S-I15-6(239)259 to F-I-15-6(239)259 near the end of the study. The technical reports reference the old project number.

| DOCUMENT | PREPARER | CONTACT |
|---|---|---|
| Existing and No-Build (2050) Traffic Report | Avenue Consultants<br>Ivan Hooper | Ivan Hooper<br>Avenue Consultants<br>6605 S Redwood Rd, Suite 200<br>Taylorsville, UT 84123 |
| Build (2050) Traffic and Safety Memo | Avenue Consultants<br>Ivan Hooper | Ivan Hooper<br>Avenue Consultants<br>6605 S Redwood Rd, Suite 200<br>Taylorsville, UT 84123 |
| Phase 1 Design Summary Memo | Horrocks Engineers<br>Justin Beddoes | Justin Beddoes, P.E.<br>Horrocks Engineers<br>2162 W. Grove Parkway, Suite 400<br>Pleasant Grove, Utah 84602 |
| Construction Phasing Memo | Horrocks Engineers<br>Trevor Youd | Justin Beddoes, P.E.<br>Horrocks Engineers<br>2162 W. Grove Parkway, Suite 400<br>Pleasant Grove, Utah 84602 |
| Hazardous Materials Memo | Horrocks Engineers<br>Haylie Ferguson | Ryan Pitts<br>Horrocks Engineers<br>2162 W. Grove Parkway, Suite 400<br>Pleasant Grove, Utah 84602 |
| Air Quality Memorandum Conformity Determination | Mountainland Association of Governments | Mountainland Association of Governments<br>586 East 800 North<br>Orem, UT 84097-4146 |
| Air Quality Memo | Horrocks Engineers<br>Judy Imlay | Ryan Pitts<br>Horrocks Engineers<br>2162 W. Grove Parkway, Suite 400<br>Pleasant Grove, Utah 84602 |
| Project of Air Quality Concern Evaluation | Horrocks Engineers<br>Judy Imlay | Ryan Pitts<br>Horrocks Engineers<br>2162 W. Grove Parkway, Suite 400<br>Pleasant Grove, Utah 84602 |
| Air Quality Project Level Conformity Determination | Federal Highway Administration<br>Edward Woolford | Federal Highway Administration<br>Utah Division<br>2520 West 4700 South<br>Salt Lake City, UT 84129 |
| Noise Analysis | Horrocks Engineers<br>Haylie Ferguson | Ryan Pitts<br>Horrocks Engineers<br>2162 W. Grove Parkway, Suite 400<br>Pleasant Grove, Utah 84602 |

| DOCUMENT | PREPARER | CONTACT |
|---|---|---|
| Selective Reconnaissance Level Survey for Historic Architecture | Horrocks Engineers<br>Nancy Calkins | Ryan Pitts<br>Horrocks Engineers<br>2162 W. Grove Parkway, Suite 400<br>Pleasant Grove, Utah 84602 |
| Aquatic Resources Delineation Report | Horrocks Engineers<br>Nathan Clarke | Ryan Pitts<br>Horrocks Engineers<br>2162 W. Grove Parkway, Suite 400<br>Pleasant Grove, Utah 84602 |
| Threatened and Endangered Species Evaluation Memo | Horrocks Engineers<br>Haylie Ferguson | Ryan Pitts<br>Horrocks Engineers<br>2162 W. Grove Parkway, Suite 400<br>Pleasant Grove, Utah 84602 |
| Agency Workshop and Scoping Meeting Summary | Horrocks Engineers<br>Samantha Patterson | Ryan Pitts<br>Horrocks Engineers<br>2162 W. Grove Parkway, Suite 400<br>Pleasant Grove, Utah 84602 |
| Correspondence and Coordination | Horrocks Engineers<br>Samantha Patterson | Ryan Pitts<br>Horrocks Engineers<br>2162 W. Grove Parkway, Suite 400<br>Pleasant Grove, Utah 84602 |
| Public Hearing Summary | Horrocks Engineers<br>Molly Betebenner and Samantha Patterson | Ryan Pitts<br>Horrocks Engineers<br>2162 W. Grove Parkway, Suite 400<br>Pleasant Grove, Utah 84602 |

I-15 Interchange
ENVIRONMENTAL ASSESSMENT
Springville/Spanish Fork

# EXISTING AND NO-BUILD (2050) TRAFFIC REPORT

**Project No. F-I15-6(239)259**
**Pin: 15153**
**March 2021**

The environmental review, consultation, and other actions required by applicable federal environmental laws for this project are being or have been carried out by UDOT pursuant to 23 USC 327 and a Memorandum of Understanding dated January 17,2017, and executed by FHWA and UDOT.

# MEMORANDUM

**To:** UDOT Region Three & Environmental

**From:** Avenue Consultants

**Date:** March 30, 2021

**Subject:** I-15; Springville/Sp. Fork Interchange - Existing and 2050 No Build Traffic & Safety Analysis

The Utah Department of Transportation (UDOT) is performing an environmental study for a potential new interchange on I-15 at Springville 1600 South / Spanish Fork 2700 North, which is approximately milepost 258 and where there is an existing overpass. The environmental study is also considering potential widening of 1600 South / 2700 North from Spanish Fork Main Street to State Street (SR-51) to meet the increased demand associated with the interchange. The new interchange would provide access to and from south Springville, north Spanish Fork, and Mapleton. This memorandum summarizes the traffic evaluation for existing (2018) and future (2050) no build conditions within the study area. For this analysis, the study area consists of the 1600 South / 2700 North corridor and I-15 from north of the Springville 400 South interchange to south of the Spanish Fork Main Street interchange, as illustrated in **Figure 1**.

**Figure 1:** I-15 and Adjacent Intersections Study Area

## 1 ANALYSIS METHODOLOGY

The analysis described in this memorandum utilized project traffic data, Vissim traffic operations software and the Wasatch Front Regional Council (WFRC) / Mountainland Associated of Governments (MAG) travel demand model for year 2050 traffic forecasts. This section describes how each of these tools were implemented for this project.

## 1.1 Travel Demand Modeling

The WFRC/MAG travel demand model (TDM) was the primary tool used to predict future travel and traffic volumes within the study area. WFRC and MAG are the Metropolitan Planning Organizations (MPOs) for the Wasatch Front and are responsible for coordinating transportation planning in the region. MAG is responsible for Utah County and recently updated their Regional Transportation Plan (RTP), which is the plan for the development of the future transportation system. The 2019-2050 RTP (also known as TransPlan50) includes a list of projects that are planned to meet future transportation needs over a 30+ year horizon.

The travel demand 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). The travel model inputs are prepared for a base year, which in this case was 2015, and for a future year, which in this case was 2050. A base year of 2015 was used because both travel model socioeconomic inputs and published traffic volume data are available for that year. In travel modeling, the base year always lags the current year by a few years because of the need to have land use input and calibration data. In consultation with the region's cities, WFRC and MAG prepare future land use projections.

The draft TDM was used to estimate how many trips will be generated in the region, where those trips are going, the mode by which they will be made, and the transportation facilities used for the trip. To improve the model resolution, several TAZs were split in the study area and corresponding roads were added to more accurately reflect local travel patterns. A figure showing the TAZ splits can be found in Appendix A: Traffic Analysis Zones.

To validate the model for the study area, base year model volumes were compared to published traffic volumes. Free flow speeds on some roadways in the study area were adjusted to bring the model volumes closer to the observed volumes.

## 1.2 Traffic Operations Analysis

The Vissim software was selected for this study because it allows for the evaluation of freeways, closely spaced intersections, and the interaction between the two facilities. Vissim allows for driving behaviors to be modified, can collect travel time data for user-specified segments and can measure queue lengths at key intersections such as the 400 South interchange, which collectively are used to calibrate the model to observed conditions.

Existing traffic signal timing data were obtained from the UDOT Traffic Operations Center and used in modeling signalized intersections in Vissim. The intersections within the study area were modeled according to existing geometry and speeds. The study area was modeled as a network; however, the analysis was completed for each intersection independently. The intersections within the study area were modeled according to existing geometry and speeds.

### 1.2.1 Traffic Volumes / Data Collection

Turning movement counts were collected on Wednesday, September 12, 2018 for the AM (7:00-9:00) and PM (4:00-6:00) peak periods at the fifteen study intersections. Traffic data for I-15 was collected for these same periods just north the 400 South interchange as shown in **Figure 2.**

**Figure 2:** Intersection Turning Movement Count Locations, September 12, 2018

The collected turning movement traffic volumes were balanced throughout the study area so that the volume exiting one intersection was the same as the volume arriving at the next intersection to create existing AM and PM peak two-hour volumes. The AM and PM peak two-hour volumes were developed for year 2050 using principles described in the National Highway Cooperative Research Program (NCHRP) Report 255 document. The forecast peak period intersection volumes were developed from the existing peak period traffic volumes and data from the WFRC/MAG travel demand model. The travel model was run for the base year (2015) and for the future year (2050) and the difference between these models was used to estimate the traffic increase, which was applied to the existing traffic volumes. The future volumes were then balanced to ensure the correct number of inbound and outbound vehicles on each leg of the intersection. Included in Appendix B: Peak Hour Traffic Volumes are figures presenting the resulting Existing 2018 and 2050 No Build traffic volumes used in this analysis.

### 1.2.2 Measures of Effectiveness

The operational analysis is based upon Vissim output correlated to the *Highway Capacity Manual (HCM) 6th Edition* methodologies, which describes how transportation system performance can be measured and ranked by level of service (LOS). LOS is measured quantitatively and reported on a scale from A to F, with A representing the best performance and F the worst. Different types of transportation facilities use different criteria to determine LOS. Three different types of facilities were analyzed for this study using the following criteria:

- **Intersections** – LOS is based on average vehicle delay measured in seconds per vehicle. Delay and LOS are determined for each turning movement, approach, and the overall intersection. For signalized intersections, the overall intersection LOS is most commonly reported, while for unsignalized intersections, LOS is most commonly reported based for the approach with the highest delay. Another important measure of effectiveness is 95th percentile queue length for each turning movement and is the vehicle queue distance that will only be exceeded five percent of the time during the analysis period and helps identify issues such as queuing between intersections and queues that exceed their turning movement storage.

- **Arterial Streets** – LOS is based on average travel speeds and is determined for each segment and for the overall roadway corridor. LOS thresholds vary based on the speed limit of the study roadway.
- **Freeways** – LOS is based on average vehicle density per lane and is determined for each freeway segment. The density is calculated by dividing the hourly flow by the average speed of vehicles on the freeway segment divided by the number of lanes on that segment. There are three different types of freeway segments for which LOS is determined: basic (i.e., segments with no interchange interaction), merge/diverge, and weaving, each of which have slightly different density to LOS thresholds.

**Tables 1-3** provide details regarding LOS criteria thresholds for each of the roadway facility types: intersection, arterial, and freeway, respectively.

**Table 1.** Intersection Level of Service Criteria

| Level of Service | Traffic Conditions | Average Delay (seconds/vehicle) | |
|---|---|---|---|
| | | Unsignalized | Signalized |
| A | Free Flow Operations / Insignificant Delay | 0 ≤ 10 | 0 ≤ 10 |
| B | Smooth Operations / Short Delays | >10.0 and ≤ 15.0 | > 10 and ≤ 20 |
| C | Stable Operations / Acceptable Delays | >15.0 and ≤ 25.0 | > 20 and ≤ 35 |
| D | Approaching Unstable Operations / Tolerable Delays | >25.0 and ≤ 35.0 | > 35 and ≤ 55 |
| E | Unstable Operations / Significant Delays Begin | >35.0 and ≤ 50.0 | > 55 and ≤ 80 |
| F | Very Poor Operations / Excessive Delays Occur | > 50.0 | > 80 |

*Source:* Highway Capacity Manual 6th Edition, *Transportation Research Board National Research Council, Washington D.C*

**Table 2.** Arterial Level of Service Criteria

| LOS | Travel Speed Threshold by Base Free-Flow Speed (mph) | | | | | | |
|---|---|---|---|---|---|---|---|
| | 25 | 30 | 35 | 40 | 45 | 50 | 55 |
| A | > 20 | > 24 | > 28 | > 32 | > 36 | > 40 | > 44 |
| B | > 17 | > 20 | > 23 | > 27 | > 30 | > 34 | > 37 |
| C | > 13 | > 15 | > 18 | > 20 | > 23 | > 25 | > 28 |
| D | > 10 | > 12 | > 14 | > 16 | > 18 | > 20 | > 22 |
| E | > 8 | > 9 | > 11 | > 12 | > 14 | > 15 | > 17 |
| F | ≤ 8 | ≤ 9 | ≤ 11 | ≤ 12 | ≤ 14 | ≤ 15 | ≤ 17 |

*Source:* Highway Capacity Manual 6th Edition, *Transportation Research Board National Research Council, Washington D.C*

**Table 3.** Freeway Segment Level of Service Criteria

| Level of Service | Average Basic Freeway Density (passenger car/mile/lane) | Average Merge/Diverge Freeway Density (passenger car/mile/lane) | Average Weave Freeway Density (passenger car/mile/lane) |
|---|---|---|---|
| A | 0 ≤ 11.0 | 0 ≤ 10.0 | 0 ≤ 10.0 |
| B | > 11.0 and ≤ 18.0 | > 10.0 and ≤ 20.0 | > 10.0 and ≤ 20.0 |
| C | > 18.0 and ≤ 26.0 | > 20.0 and ≤ 28.0 | > 20.0 and ≤ 28.0 |
| D | > 26.0 and ≤ 35.0 | > 28.0 and ≤ 35.0 | > 28.0 and ≤ 35.0 |
| E | > 35.0 and ≤ 45.0 | > 35.0 | > 35.0 and ≤ 43.0 |
| F | > 45.0 | Demand exceeds capacity | > 43.0 |

*Source:* Highway Capacity Manual 6th Edition, *Transportation Research Board National Research Council, Washington D.C*

### 1.2.3 Model Calibration

Vissim model calibration focused on matching observed queues, travel times, and vehicle behavior to observed conditions. The objective of the model calibration was to obtain the best match possible between model results and the field data. The traffic model calibration focused on matching traffic volumes, observed queues, and vehicle behavior to existing travel patterns within the study area. During the Vissim calibration, model outputs were compared against field data to determine if the model output reflected observed traffic conditions and driving behaviors were adjusted as necessary to replicate existing travel times, delays, and queues.

It was determined through the calibration effort that the Vissim parameters for additive and multiplicative part of safety distance needed to be increased to replicate existing queues and travel times along 400 South. Look ahead distance, priority rules and conflict areas were also used to help mimic existing driver behavior between intersections and driveways to prevent unrealistic gridlocked conditions in the model.

## 1.3 Safety Analysis

Two types of safety analyses were performed for this study:

- **Analysis of Historic Crash Data** – Crash data was provided by UDOT through the crash query tool included as part of UDOT's online safety tools[1]. The query tool was used to filter crashes based on location within the study area and the year the crash occurred. Six years of crash data from 2014-2019 were filtered to include those crashes occurring on 1600 South, I-15, US-6, and Main Street (SR-51), and 400 South (SR-77) within the study area boundaries. Note that the 2019 data was not complete. The analysis was performed using ESRI GIS tools and Excel based spreadsheets to compile, aggregate and display the analysis results.
- **Analysis Based on Highway Safety Manual Method** – For the safety evaluation of future conditions, the methodology described in Chapter 18 of the *Highway Safety Manual* (HSM) was used to predict average crash rates. The HSM uses national safety data, traffic volumes, and roadway segment characteristics, including number of lanes, length, speed, curvature, and lane, shoulder, and median widths to predict average crash frequencies. Each change in any of these attributes creates a new analysis segment. There are two types of urban freeway segments: mainline and speed-change lanes. The mainline segments include general purpose lanes and auxiliary lanes longer than 0.3 miles in length. Speed-change lanes are auxiliary acceleration or deceleration lanes less than 0.3 miles long and are adjacent to mainline segments. High Occupancy Vehicle and toll lanes are excluded from the analysis. The methodology does not provide directional crash frequencies and does not account for congested conditions due to interchange queuing. The HSM analysis was performed for existing and future no build conditions.

# 2 EXISTING AND 2050 NO BUILD ANALYSIS RESULTS

The analysis results presented in this section include intersection delay, intersection LOS, 95$^{th}$ percentile queue lengths, freeway LOS and freeway speeds. For each Vissim analysis (e.g., Existing Conditions, 2050 No Build), the model was run enough times to produce statistically significant results (10 times with a GEH statistic of less than 5) and the results averaged.

[1] This data is protected under 23 USC 409 (Source: UDOT, January 1, 2010 through December 31, 2019).

## 2.1 Existing Conditions

The evaluation of key intersections, arterial roadway, and freeway operations within the study area are presented in the following sections.

### 2.1.1 Intersection and Interchange Performance

The estimated delay and LOS for all the study intersections, including the interchanges and adjacent arterial intersections are shown in **Table 4**, while **Figure 3** shows similar information. During the AM and PM peak hours, all the intersections are at LOS D or better; however, there are individual movements at LOS E and F.

**Table 4.** Existing Intersection Level of Service / Delay Results

| Location | 2018 AM Peak Hour | | 2018 PM Peak Hour | |
|---|---|---|---|---|
| | Worst Approach[2] | AM LOS / Delay[1] | Worst Approach[2] | PM LOS / Delay[1] |
| 400 South & I-15 Interchange | - | B / 15 | - | D / 48 |
| 400 South & 1750 West | - | B / 19 | - | C / 33 |
| 2700 North & Main Street | WB | A / 10 | WB | C / 21 |
| 2700 North & 200 East | SB | A / 6 | SB | A / 7 |
| 1600 South & 1950 West | SB | A / 7 | SB | A / 8 |
| 1600 South & 1750 West | SB | A / 7 | SB | B / 11 |
| 1600 South & Canyon Creek Parkway | SB | A / 6 | NB | A / 9 |
| 1600 South & 1200 West | SB | A / 5 | SB | A / 5 |
| 1600 South & 950 West | SB | A / 6 | SB | A / 8 |
| 1600 South & SR-51 | EB | A / 8 | EB | B / 15 |
| US-6 & I-15 Southbound Ramps | - | A / 7 | - | A / 9 |
| US-6 & 1000 North/Canyon Creek Parkway | - | B / 15 | - | C / 25 |
| Spanish Fork Main Street & I-15 Interchange | - | A / 9 | - | C / 31 |
| Spanish Fork Main Street & 1000 North | - | A / 7 | - | B / 18 |

1. Average delay reported in seconds/vehicle
2. Worst approach delay is reported for unsignalized intersections
NB = Northbound, SB = Southbound, EB = Eastbound, WB = Westbound

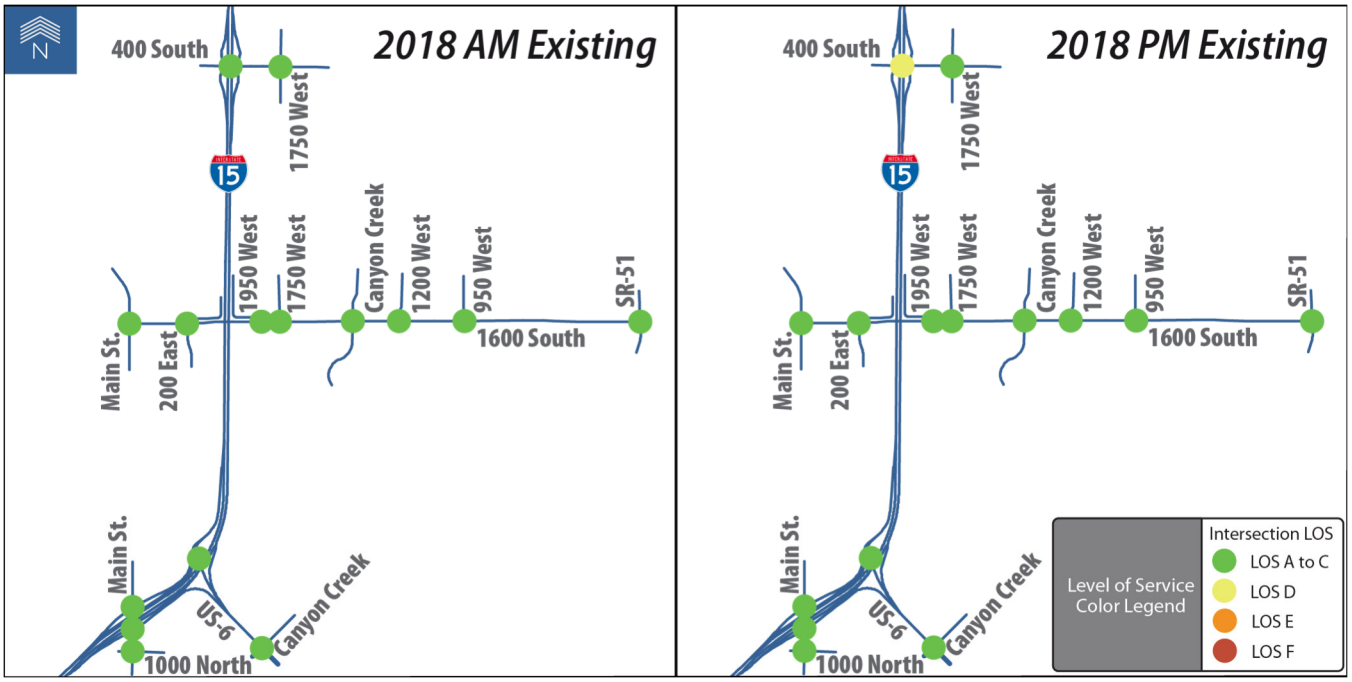



**Figure 3:** Existing AM and PM Peak Hour Intersection LOS

Interchange related movements of LOS E/F are summarized in **Table 5**. For the AM peak hour, there were no movements operating at LOS E or F. During the PM peak hour, there were four movements that operate at LOS E or F. These movements include the eastbound left at the Spanish Fork Main Street & I-15 interchange and the eastbound, westbound, and southbound lefts at the 400 South & I-15 interchange. Due to the relatively low volumes on 2700 North / 1600 South the intersections of that roadway are all at LOS C or better. The existing movement LOS for each intersection is summarized in Appendix C: Existing (2018) Intersection Movement Level of Service.

**Table 5.** Existing Interchange Movement Level of Service at LOS E/F

| Location | AM Peak Hour | | PM Peak Hour | |
|---|---|---|---|---|
| | Movement | LOS / Delay[1] | Movement | LOS / Delay[1] |
| 400 South & I-15 Interchange | n/a[2] | n/a[2] | Southbound Left | F / 85 |
| 400 South & I-15 Interchange | n/a[2] | n/a[2] | Eastbound Left | E / 62 |
| 400 South & I-15 Interchange | n/a[2] | n/a[2] | Westbound Left | E / 57 |
| Spanish Fork Main Street & I-15 Interchange | n/a[2] | n/a[2] | Eastbound Left | F / 101 |

1. Average delay reported in seconds/vehicle
2. No movements operate at LOS E/F during the AM peak hour

Estimated 95th percentile queue lengths are presented in **Table 6** for the interchange ramps and other key intersections with the potential for queuing. There is no substantial queuing in the AM peak period. During the PM peak period, there is moderate queuing of nearly 2,000 feet on the I-15 southbound off-ramp to 400 South, which occasionally backs onto mainline I-15. The southbound off-ramp at Spanish Fork Main Street also experiences queues of almost 1,000 feet. Additionally, the northbound queue at 400 South & 1750 West extends through the 500 South & 1750 West intersection.

**Table 6.** Existing 95th Percentile Queue Length Results

| Intersection | Approach | 2018 AM Existing (feet) | 2018 PM Existing (feet) |
|---|---|---|---|
| 400 South & I-15 Interchange | Northbound Off-Ramp | 75 | 75 |
| 400 South & I-15 Interchange | Southbound Off-Ramp | 225 | 2,450 |
| 400 South & I-15 Interchange | Westbound | 125 | 250 |
| 400 South & 1750 West | Eastbound | 225 | 800 |
| 400 South & 1750 West | Northbound | 225 | 325 |
| US-6 & I-15 Interchange | Southbound Off-Ramp | 100 | 325 |
| Spanish Fork Main Street & I-15 Interchange | Northbound Off-Ramp | 125 | 100 |
| Spanish Fork Main Street & I-15 Interchange | Southbound Off-Ramp | 150 | 1,100 |
| Spanish Fork Main Street & 1000 North | Westbound | 75 | 350 |

### 2.1.2 Arterial Performance

Arterial LOS was determined for the 1600 South / 2700 North corridor from Spanish Fork Main Street to SR-51 based on the existing 35 mph speed limit. **Table 7** shows the travel times and speeds for each of the segments on 1600 South / 2700 North under existing conditions.

**Table 7.** Existing Arterial Travel Times

| Travel Time Segment | | AM Peak Hour | | PM Peak Hour | |
|---|---|---|---|---|---|
| | | Travel Time (min.) | LOS / Speed (mph) | Travel Time (min.) | LOS / Speed (mph) |
| Eastbound | Main Street to 200 East | 0.5 | A / 32 | 0.5 | A / 33 |
| | 200 East to 1950 West | 0.6 | A / 35 | 0.6 | A / 34 |
| | 1950 West to 1750 West | 0.1 | A / 33 | 0.2 | A / 30 |
| | 1750 West to Wallace Lane | 0.6 | A / 34 | 0.6 | A / 33 |
| | Wallace Lane to 1200 West | 0.4 | A / 34 | 0.4 | A / 34 |
| | 1200 West to 950 West | 0.5 | A / 34 | 0.5 | A / 34 |
| | 950 West to State Street | 1.5 | A / 32 | 1.5 | A / 31 |
| | **Eastbound Total** | **4.2** | **A / 33** | **4.2** | **A / 33** |
| Westbound | State Street to 950 West | 1.4 | A / 34 | 1.3 | A / 35 |
| | 950 West to 1200 West | 0.5 | A / 33 | 0.5 | A / 33 |
| | 1200 West to Wallace Lane | 0.4 | A / 34 | 0.4 | A / 34 |
| | Wallace Lane to 1750 West | 0.6 | A / 33 | 0.6 | A / 33 |
| | 1750 West to 1950 West | 0.1 | A / 33 | 0.1 | A / 32 |
| | 1950 West to 200 East | 0.6 | A / 34 | 0.6 | A / 34 |
| | 200 East to Main Street | 0.6 | B / 26 | 0.7 | C / 21 |
| | **Westbound Total** | **4.3** | **A / 32** | **4.3** | **A / 32** |

All segments along the 1600 South / 2700 North corridor operate at acceptable LOS. The majority of segments operate at LOS A while the westbound segment from 200 East to Main Street operates at LOS C.

### 2.1.3 Freeway Performance

Freeway operations for existing conditions were evaluated using the Vissim traffic models and the results are summarized below in **Figure 4**. I-15 operates at LOS C or better with minimal to no delay on the freeway during both the AM and PM peak hour except for the 400 South southbound diverge during the PM peak hour, which operates at LOS D. As shown by the decrease in freeway performance, there is minor slowing at the southbound diverge to the 400 South off-ramp during the PM hour caused by vehicles slowing on the off-ramp from queuing from the ramp terminal. The off-ramps to 400 South are relatively short at approximately 1,200 feet, so queuing at the ramp terminal occasionally impacts freeway operations.

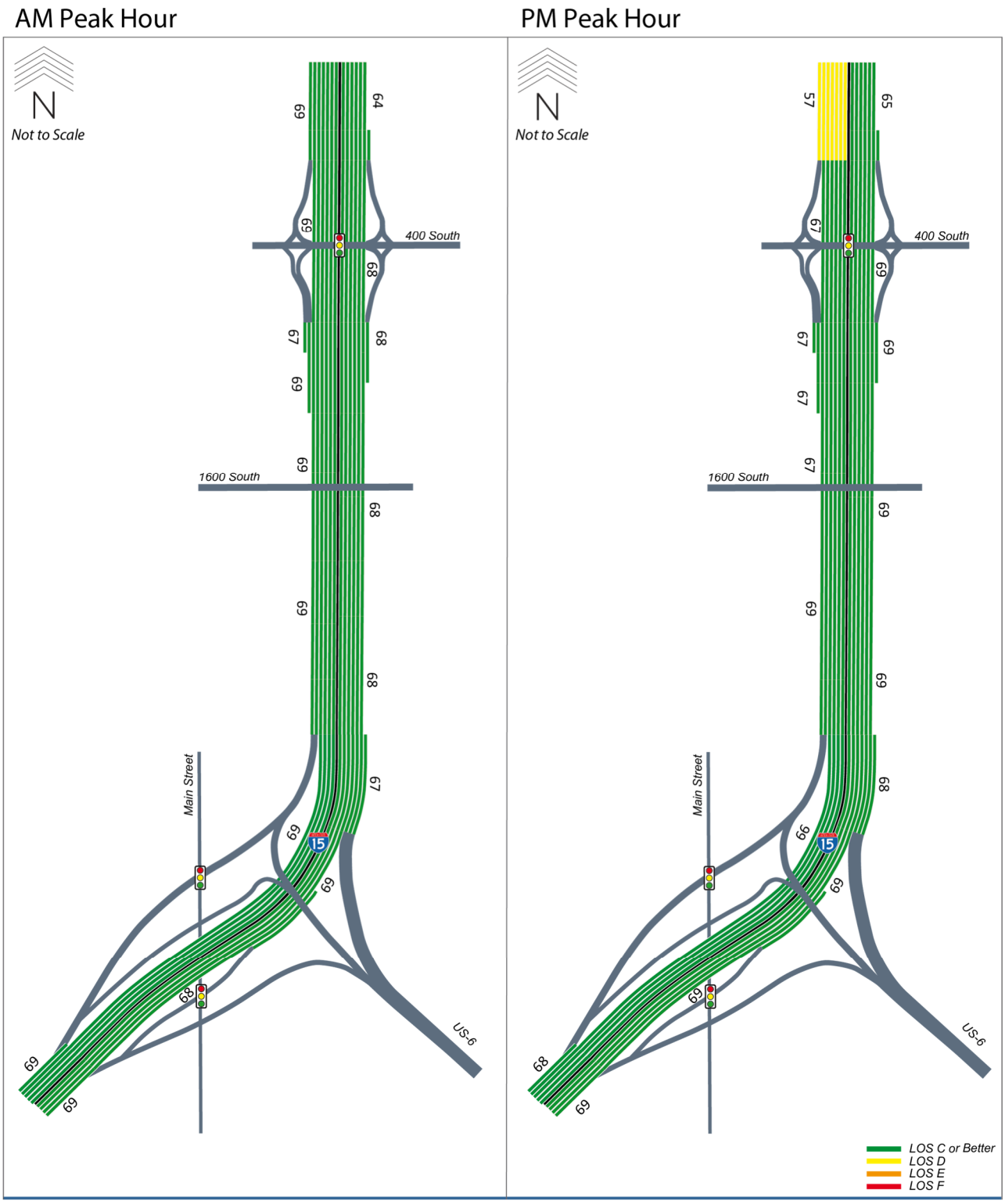



**Figure 4:** Existing Freeway Levels of Service and Speeds (mph)

## 2.2 2050 No Build Conditions

For the 2050 No Build analysis, the following changes and assumptions were made in both the TDM and Vissim models. As previously stated, the future 2050 volumes were forecast using the TDM. Version 8.3 of the travel demand model with a highway network from August 2019 was used for this study. The model reflected planned land use and transportation projects per the RTP. Planned transportation projects near the study area are shown in Appendix E: Planned Transportation Projects and include:

- I-15 widening with one additional general purpose lane in each direction *(RTP Project 62)*
- Converting US-6 to freeway with frontage road system from I-15 to Spanish Fork Center Street, including direct system-to-system ramps at I-15 *(RTP Project 92)*
- Widening Spanish Fork Main Street to five lanes from Spanish Fork to Provo *(RTP Project 84)*
- Constructing Springville 1200 West / Canyon Creek Parkway as a five-lane road to Provo *(RTP Project 55)*
- Extension of 1600 South from SR-51 to US-89 *(RTP Project 85)*
- I-15 Parallel Freeway Alternative *(RTP Project 62)*

The MAG 2019-2050 RTP (TransPlan50) does not recommend specific modifications to I-15, but rather lists several potential solutions, including (1) widening the freeway south of Orem, (2) building a frontage road system on each side of the freeway, (3) building a collector-distributor system on each side of the freeway, (4) adding divided express lanes down the middle of the freeway, or (5) constructing a new parallel facility, similar to Legacy Parkway in Davis County. For the purposes of this study, it was assumed that options 1 and 5 would be implemented. This assumption is consistent with the RTP travel modeling performed by the MPO.

It was also assumed that there would be relatively low cost, operational modifications to the I-15 / 400 South interchange to increase its capacity to allow it to better meet future traffic demands. These modifications, which are too minor to be included in the RTP, consist of widening the off-ramps to have triple southbound left turn lanes and dual northbound right turn lanes. It is anticipated that improvements to the 400 South & 1750 West intersection will also be required and may need to include an innovative intersection to meet anticipated traffic demands. For the no build analysis, it was assumed that 400 South would be widened to a seven-lane cross-section to about 1600 feet to the east of the 1750 West intersection. In addition, an eastbound right-turn pocket and southbound dual-right turn lanes were assumed. It was assumed that the westbound off-ramp at Spanish Fork Main Street would be widened to have triple left turn lanes.

### 2.2.1 Intersection and Interchange Performance

As presented in **Table 8**, the I-15 / 400 South interchange is anticipated to operate at LOS F in the 2050 PM peak hour even with the assumed interchange improvements as part of the 2050 No Build conditions. Intersection LOS for the AM and PM peak hours for the entire network is shown in **Figure 5**.

The analysis also assumed a preliminary concept for the frontage road system on US-6 based upon the MAG RTP. With the planned frontage roads, the intersection of US-6 and 1000 North/Canyon Creek Parkway is projected to operate at LOS D during both the AM and PM peak hours.

All other study intersections are projected to perform at LOS C or better under 2050 No Build conditions.

**Table 8.** 2050 No Build Intersection Delay and Level of Service Results

| Location | AM Peak Hour | | PM Peak Hour | |
|---|---|---|---|---|
| | Worst Approach[2] | LOS / Delay[1] | Worst Approach[2] | LOS / Delay[1] |
| 400 South & I-15 Interchange | - | C / 26 | - | F / 164 |
| 400 South & 1750 West | - | D / 46 | - | F / 135 |
| 2700 North & Spanish Fork Main Street | - | B / 11 | - | B / 15 |
| 2700 North & 200 East | NB | A / 8 | SB | B / 12 |
| 1600 South & 1950 West | SB | A / 7 | SB | B / 11 |
| 1600 South & 1750 West | SB | A / 3 | SB | A / 9 |
| 1600 South & Canyon Creek Parkway | NB | A / 7 | NB | C / 16 |
| 1600 South & 1200 West | - | B / 14 | - | C / 22 |
| 1600 South & 950 West | NB | A / 6 | SB | B / 12 |
| 1600 South & SR-51 | - | B / 19 | - | C / 25 |
| US-6 & I-15 Southbound Ramps | - | n/a [3] | - | n/a [3] |
| US-6 & 1000 North/Canyon Creek Pkwy | - | D / 39 | - | D / 44 |
| Spanish Fork Main St & I-15 Interchange | - | C / 23 | - | C / 26 |
| Spanish Fork Main Street & 1000 North | - | B / 15 | - | C / 26 |

1. Average delay reported in seconds/vehicle
2. Approach with the worst delay is reported for unsignalized intersections
3. Intersection replaced in freeway/frontage road concept with direct ramps

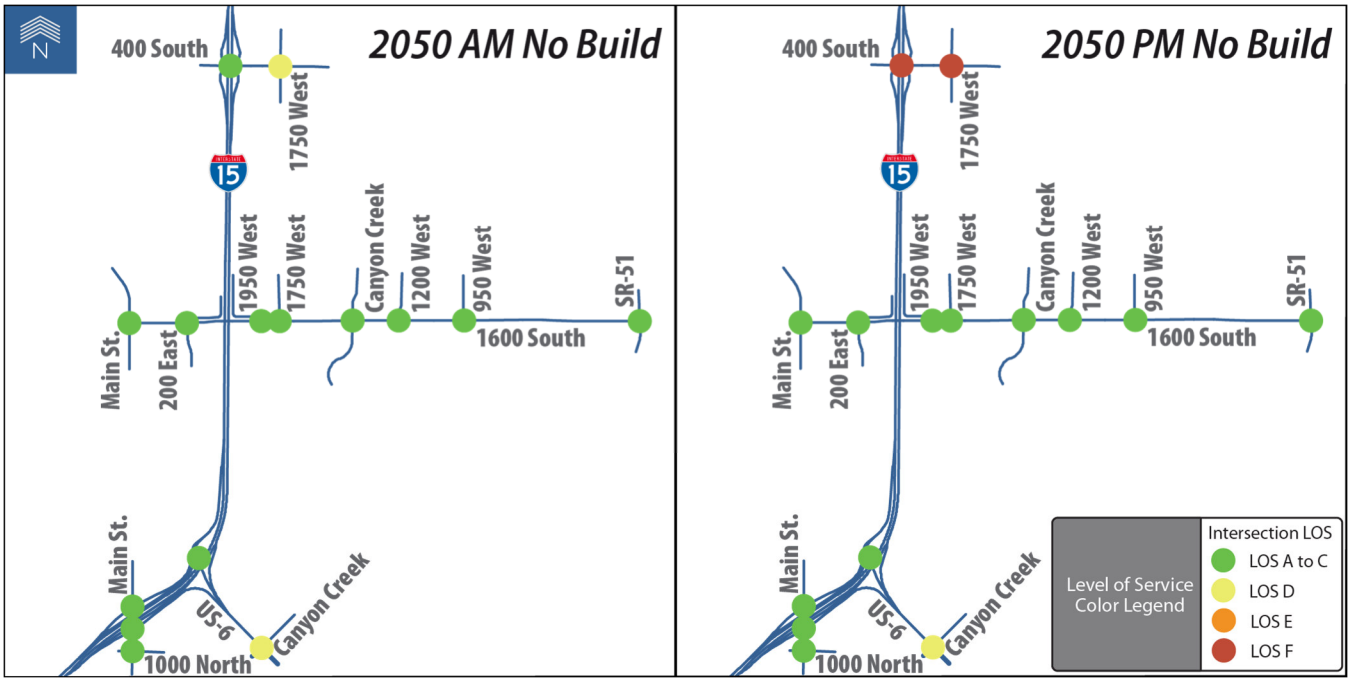



**Figure 5:** 2050 No Build AM and PM Peak Hour Intersection LOS Spanish Fork / Springville Network

Interchange related movements of LOS E/F are summarized in **Table 9**. For the AM peak hour, there are three movements expected to operate at LOS E or F. These movements include the eastbound and westbound

through lanes at the 400 South interchange and the westbound left at the Spanish Fork Main Street interchange. During the PM peak hour, there are nine movements projected to be LOS E or F. The majority of these movements occur at the 400 South interchange but also includes the eastbound left at the Spanish Fork Main Street interchange. Due to the relatively low volumes on 2700 North / 1600 South the intersections are all expected to operate at LOS C or better. The 2050 No Build movement LOS for each intersection is summarized in Appendix F: 2050 No Build Intersection Movement Level of Service.

**Table 9.** 2050 No Build Interchange Movement Level of Service at LOS E/F

| Location | AM Peak Hour | | PM Peak Hour | |
|---|---|---|---|---|
| | Movement | LOS / Delay[1] | Movement | LOS / Delay[1] |
| 400 South & I-15 Interchange | - | - | Northbound Right | E / 75 |
| 400 South & I-15 Interchange | - | - | Southbound Left | F / >120 |
| 400 South & I-15 Interchange | - | - | Southbound Right | F / >120 |
| 400 South & I-15 Interchange | - | - | Eastbound Left | F / >120 |
| 400 South & I-15 Interchange | Eastbound Thru | E / 69 | Eastbound Thru | F / >120 |
| 400 South & I-15 Interchange | - | - | Eastbound Right | F / >120 |
| 400 South & I-15 Interchange | - | - | Westbound Left | E / 75 |
| 400 South & I-15 Interchange | Westbound Thru | E / 74 | Westbound Thru | E / 56 |
| Spanish Fork Main Street & I-15 Interchange | Westbound Left | E / 56 | Eastbound Left | E / 57 |
| Spanish Fork Main Street & I-15 Interchange | - | - | Eastbound Thru | E / 60 |

1. Average delay reported in seconds/vehicle

The 95th percentile queue lengths presented in **Table 10** are of the approaches with the longest queue lengths from the 2050 No Build analysis. The largest difference between the Existing and 2050 No Build conditions occur at the 400 South Interchange. The westbound approach queue increased by 1,000 feet to 1,250 feet and the southbound off-ramp increased by 1,400 feet to feet for the PM peak period, ***which results in queues extending over 1,000 feet onto mainline I-15***. With increased traffic demand and queue lengths, traffic operations are expected to deteriorate within the study area.

**Table 10.** 2018 Existing and 2050 No Build Analysis 95th Percentile Queue Results

| Intersection | Approach | AM Peak Hour | | | PM Peak Hour | | |
|---|---|---|---|---|---|---|---|
| | | Existing (feet) | 2050 No Build (feet) | Change 2018-2050 (feet) | Existing (feet) | 2050 No Build (feet) | Change 2018-2050 (feet) |
| 400 South Interchange | NB Off-Ramp | 75 | 400 | 325 | 100 | 1,000 | 900 |
| 400 South Interchange | SB Off-Ramp | 225 | 275 | 50 | 1,725 | 3,125 | 1,400 |
| 400 South Interchange | Westbound | 150 | 350 | 200 | 250 | 1,250 | 1,000 |
| 400 South & 1750 West | Northbound | 225 | 950 | 725 | 325 | 2,475 | 2,150 |
| US-6 & I-15 Interchange | SB Off-Ramp | 100 | n/a[1] | n/a[1] | 300 | n/a[1] | n/a[1] |
| Spanish Fork Main St Interchange | NB Off-Ramp | 125 | 375 | 250 | 100 | 400 | 300 |
| Spanish Fork Main St Interchange | SB Off-Ramp | 150 | 225 | 75 | 950 | 475 | -475 |
| Spanish Fork Main St & 1000 N | Westbound | 75 | 150 | 75 | 350 | 425 | 75 |

1. Intersection replaced in freeway/frontage road concept

### 2.2.2 Arterial Performance

Arterial LOS was determined for the 1600 South/2700 North corridor from Spanish Fork Main Street to SR-51 based on the existing 35 mph speed limit for the 2050 No Build conditions. **Table 11** shows the AM and PM travel times and speeds for each of the segments for 2050 No Build Conditions.

**Table 11.** 2050 No Build Corridor Travel Times

| Travel Time Segment | | AM Peak Hour | | PM Peak Hour | |
|---|---|---|---|---|---|
| | | Travel Time (min.) | LOS / Speed (mph) | Travel Time (min.) | LOS / Speed (mph) |
| Eastbound | Main Street to 200 East | 0.5 | A / 32 | 0.5 | A / 32 |
| | 200 East to 1950 West | 0.6 | A / 34 | 0.6 | A / 34 |
| | 1950 West to 1750 West | 0.1 | A / 32 | 0.2 | A / 32 |
| | 1750 West to Wallace Lane | 0.6 | A / 34 | 0.6 | A / 33 |
| | Wallace Lane to 1200 West | 0.5 | B / 28 | 0.6 | C / 22 |
| | 1200 West to 950 West | 0.5 | A / 34 | 0.5 | A / 33 |
| | 950 West to SR-51 | 2.0 | B / 24 | 2.0 | C / 23 |
| | **Eastbound Total** | **4.8** | **A / 29** | **5.0** | **B / 28** |
| Westbound | SR-51 to 950 West | 1.5 | A / 33 | 1.5 | A / 33 |
| | 950 West to 1200 West | 0.6 | A / 29 | 0.7 | B / 26 |
| | 1200 West to Wallace Lane | 0.4 | A / 34 | 0.4 | A / 33 |
| | Wallace Lane to 1750 West | 0.6 | A / 33 | 0.6 | A / 33 |
| | 1750 West to 1950 West | 0.1 | A / 33 | 0.2 | A / 32 |
| | 1950 West to 200 East | 0.6 | A / 33 | 0.6 | A / 33 |
| | 200 East to Main Street | 0.8 | D / 18 | 0.9 | D / 17 |
| | **Westbound Total** | **4.6** | **A / 30** | **4.7** | **A / 29** |

All segments along the 1600 South / 2700 North corridor are anticipated to operate at an acceptable LOS under 2050 No Build conditions. The majority of the segments are estimated at LOS A; however, there is one segment at a LOS D, westbound from 200 East to Main Street.

### 2.2.3 Freeway Performance

**Figure 6** presents the 2050 No Build LOS and speeds for I-15. During the AM peak hour, one segment is at LOS D and all other segments are LOS C or better. The northbound segment with LOS D are the diverge to Spanish Fork Main Street / US-6. No segments are at LOS E/F. However, it should be noted that these results assume the planned widening with an additional general-purpose lane as discussed previously, along with the new parallel freeway west of I-15.

During the PM peak hour, the southbound diverge to 400 South is expected to be at LOS F due to queuing from the ramp terminal that would extend onto mainline I-15. All remaining segments are at LOS C or better.

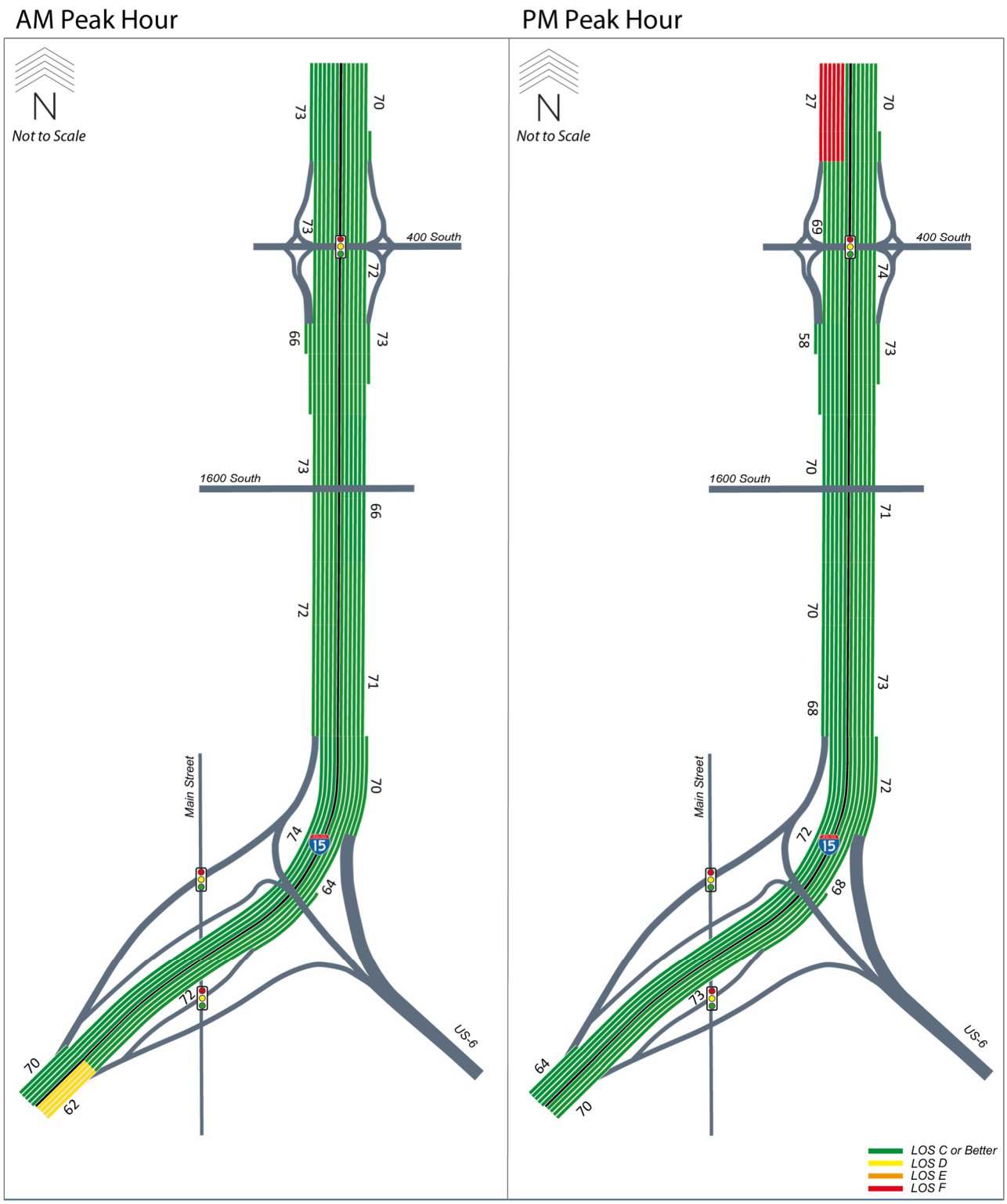



**Figure 6:** Future 2050 No Build Peak Hour Freeway Levels of Service and Speeds (mph)

## 3 SAFETY ANALYSIS

A safety analysis was performed for I-15 in the study area to understand existing crashes and safety concerns and to estimate the potential safety concerns in future no build conditions.

## 3.1 Existing Safety Conditions

### 3.1.1 Study Area Crash Statistics

The I-15 study area included the both the southbound and northbound directions. **Figure 7** on the following page shows the study area with mile point limits for each freeway segment that was analyzed. The limits of the analysis were from the north of the 400 South interchange to south of the Spanish Fork Main Street interchange (approximately four miles).

The evaluation of the crash and safety analysis for the existing conditions includes discussions on study area historical trends and results for the hot spot analysis along the study segments and intersections. A final discussion reviews specific crash types and attributes that can be mitigated by the proposed improvements.

A review of the data for the I-15 study area shows that there was a total of 607 crashes over the six-year period. **Table 12** shows the segments with the beginning and end point mile posts and the total crash count by direction for the six years analyzed. As the table shows, the I-15 southbound segment has the highest number of mainline crashes with 331 in the 4-mile segment, while the northbound segment has 276 crashes.

**Table 12.** I-15 Segments and Total Crash Count

| Route | Begin MP | End MP | Total Crashes (2014-2019) |
|---|---|---|---|
| I-15 Southbound (Mainline & Ramps) | 256.6 | 260.7 | 331 |
| I-15 Northbound (Mainline & Ramps) | 256.6 | 260.7 | 276 |

**Figure 8** shows the distributions of the crashes over time. The figure shows that the PM peak period (Chart a) sees the highest concentration of crashes, while the daily distribution (Chart b) shows higher concentration of crashes at the beginning of the week starting with Monday with a small peak on Friday. The monthly distribution (Chart c) generally shows a higher number of crashes between November and February. These distributions are for the study area; however, the individual directions have similar distributions. Also shown in the figure (Chart d) is that crashes increase through 2017 with a slight drop in 2018. Data from 2019 was not complete of validated at the time of analysis and should not be used for comparisons.

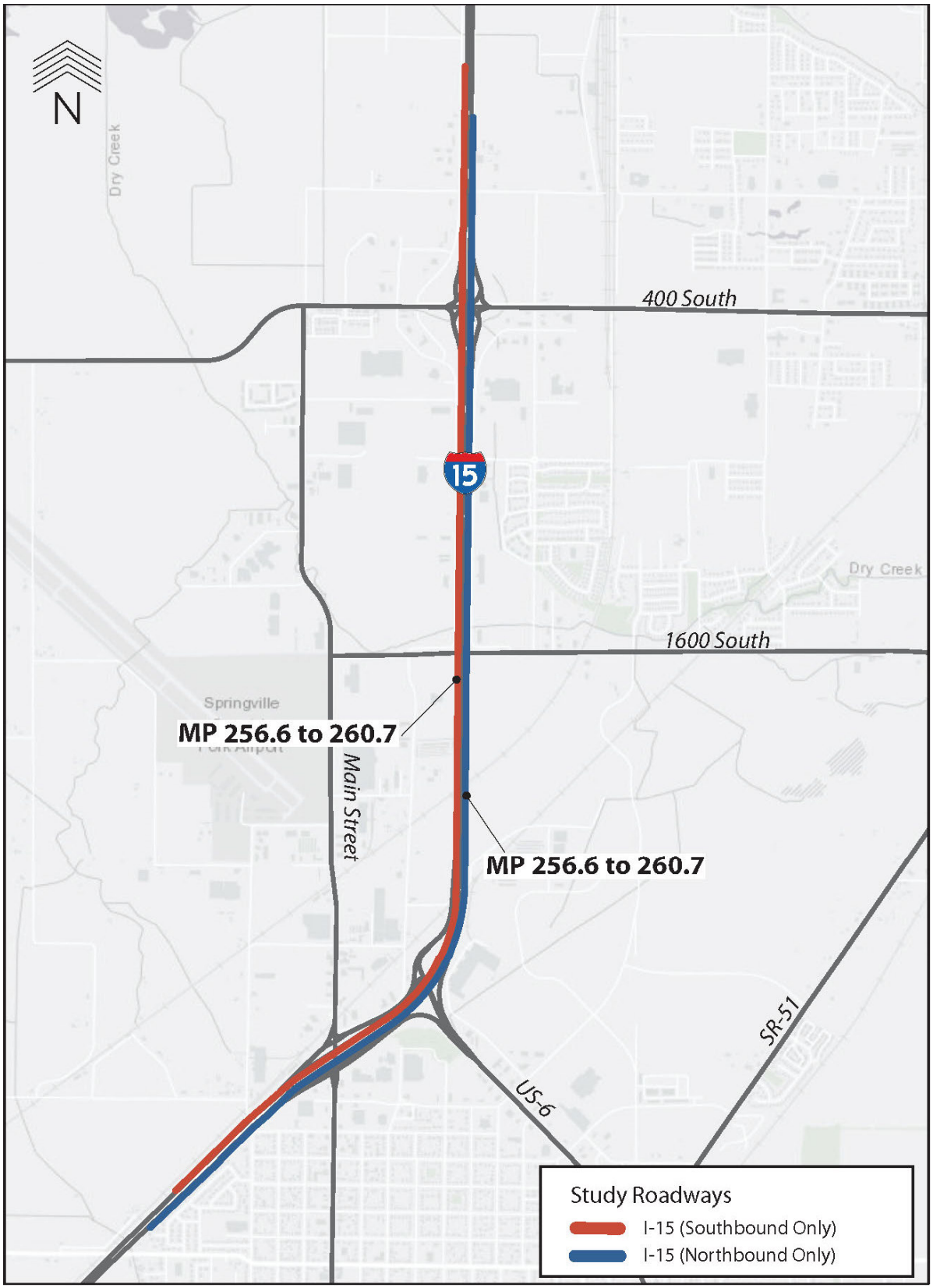



**Figure 7:** Study Area Segments with Mile Point Limits

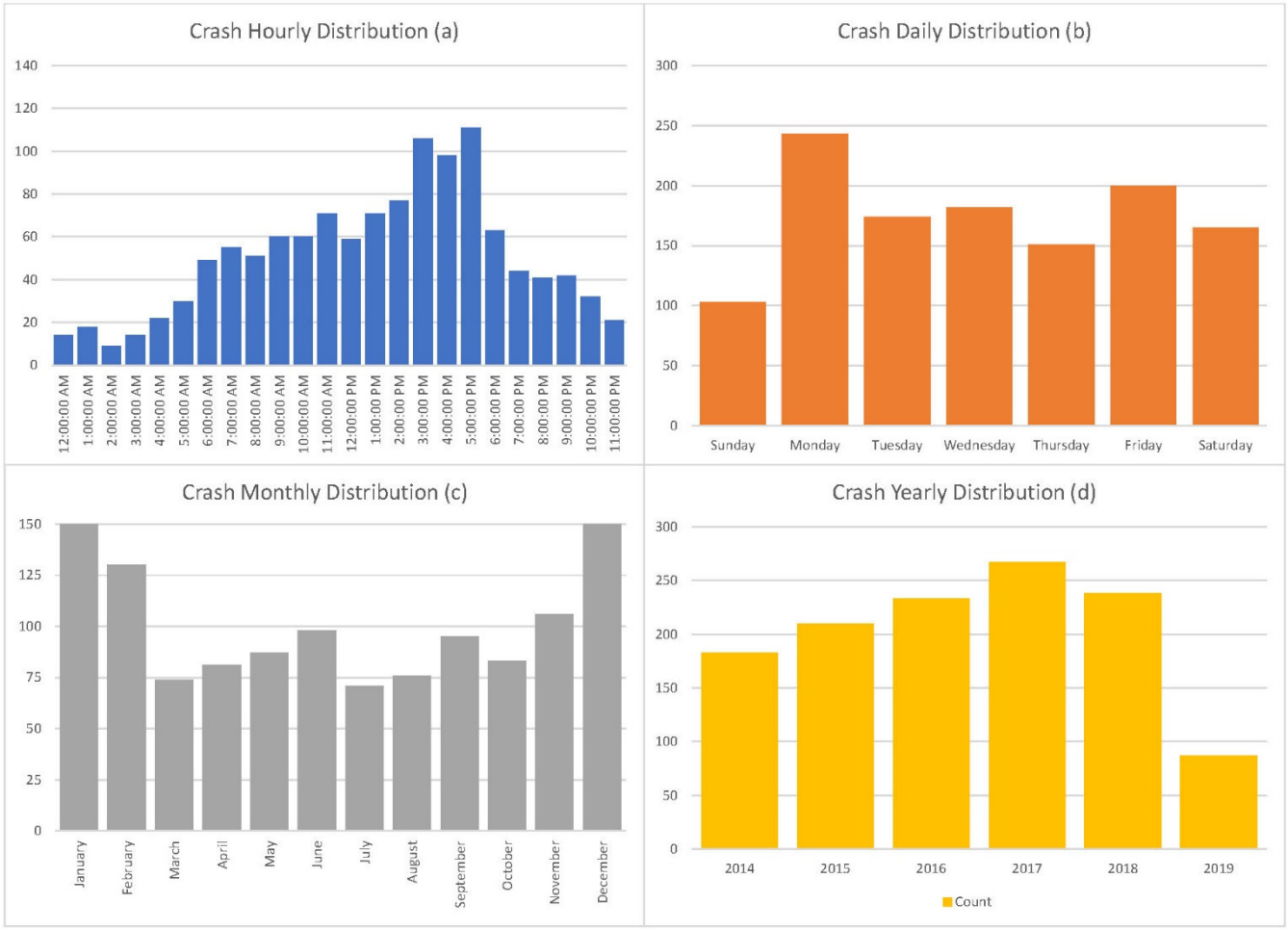



**Figure 8:** Crash Distributions (Charts a, b, c and d)

### 3.1.2 Area Hot Spot Crash Analysis

An analysis of the spatial distribution within the study area was completed to determine if there were "Hot Spots" within the study area that showed higher concentration of crashes. The analysis included two increasingly focused evaluations to pinpoint key crash locations. The hot spot analysis used all crashes and crash types within the I-15 study area with no exclusions. The first level of analysis was at the corridor level to identify if either travel direction had potential issues. The second level breaks down the roadway into smaller segments to identify potential areas along the roadway and the final is a look at intersections within the study area. These are comparative analyses identify spots that have the greatest potential within the study area. However, UDOT average crash rates (2009-2013) were used reference of distribution but not as an indicator of safety concern.

#### CORRIDOR LEVEL HOT SPOT ANALYSIS

A corridor level analysis was conducted to determine which of the travel directions might have higher crash rates. Only crashes along the corridors were included. The ramp or cross street crashes were excluded for this mainline analysis. The detailed crash analysis was completed for southbound and northbound I-15 mainline only (4 miles). **Table 13** shows the results of the corridor crash rate analysis. The table shows that the I-15 corridor exceeds the UDOT average crash rate with 1.35/1.13 crashes/million-vehicle miles. The table includes additional information for the corridor.

**Table 13.** Corridor Level Crash Rate Results

| Begin MP | End MP | Roadway | Total Crashes | Six-Year AADT | UDOT Average Crash Rate[1] | Crash Rate[1] | Exceeds UDOT Avg. Rate? |
|---|---|---|---|---|---|---|---|
| 256.6 | 260.7 | I-15 Mainline (SB) | 331 | 37,200 | 0.75 | 1.35 | Yes |
| 256.6 | 260.7 | I-15 Mainline (NB) | 276 | 37,200 | 0.75 | 1.13 | Yes |
| Note 1. Crash rate in crashes/million-vehicle miles | | | | | | | |

#### TENTH OF A MILE SEGMENT LEVEL HOT SPOT ANALYSIS

The overall segment crashes rates may not highlight portions of the roadway that might see issues linked to higher crashes. For a more detailed evaluation, the roadways were divided into 0.1-mile segments which were each analyzed. This evaluation was used to highlight potential sections of the larger roadway segments that may be a "hotspot" for crashes. **Figure 9** and **Tables 14** and **15** show the results of the segment crash rates for northbound and southbound I-15. In the figure, the orange, red, and black segments are locations where the average crash rate exceeds the UDOT average crash rate. The UDOT crash rate was selected as a reference for comparison. However, the UDOT average was not developed for use with extremely short segments, as such the comparison of spot crash rates and the UDOT average crashes rate should not be used as indicator of safety issues. The tables include detailed results including the AADT, total crashes, crash rates, and comparisons to UDOT average crash rates. They show that the highest rates are for the segments southbound near 1600 South and the merge area at Main Street northbound on-ramp.

**Table 14.** I-15 Northbound Crash Rate Results

| Begin MP | End MP | Intersection | Total Crashes | Six-Year AADT | UDOT Average Crash Rate[1] | Crash Rate[1] | Exceeds UDOT Avg. Rate? |
|---|---|---|---|---|---|---|---|
| 256.6 | 256.7 | | 1 | 22,753 | 0.75 | 0.2 | No |
| 256.7 | 256.8 | | 1 | 22,753 | 0.75 | 0.2 | No |
| 256.8 | 256.9 | | 1 | 22,753 | 0.75 | 0.2 | No |
| 256.9 | 257.0 | | 1 | 22,753 | 0.75 | 0.2 | No |
| 257.0 | 257.1 | | 3 | 22,753 | 0.75 | 0.6 | No |
| 257.1 | 257.2 | | 3 | 22,753 | 0.75 | 0.6 | No |
| 257.2 | 257.3 | | 6 | 26,191 | 0.75 | 1.1 | Yes |
| 257.3 | 257.4 | | 4 | 29,630 | 0.75 | 0.6 | No |
| 257.4 | 257.5 | Main Street | 5 | 29,630 | 0.75 | 0.8 | Yes |
| 257.5 | 257.6 | | 11 | 29,630 | 0.75 | 1.7 | Yes |
| 257.6 | 257.7 | | 19 | 32,285 | 0.75 | 2.7 | Yes |
| 257.7 | 257.8 | | 9 | 39,718 | 0.75 | 1.0 | Yes |
| 257.8 | 257.9 | US-6 | 9 | 39,718 | 0.75 | 1.0 | Yes |
| 257.9 | 258.0 | | 11 | 39,718 | 0.75 | 1.3 | Yes |
| 258.0 | 258.1 | | 13 | 39,718 | 0.75 | 1.5 | Yes |
| 258.1 | 258.2 | | 8 | 39,718 | 0.75 | 0.9 | Yes |
| 258.2 | 258.3 | | 10 | 39,718 | 0.75 | 1.2 | Yes |
| 258.3 | 258.4 | | 6 | 39,718 | 0.75 | 0.7 | No |
| 258.4 | 258.5 | | 6 | 39,718 | 0.75 | 0.7 | No |
| 258.5 | 258.6 | | 4 | 39,718 | 0.75 | 0.5 | No |
| 258.6 | 258.7 | | 8 | 39,718 | 0.75 | 0.9 | Yes |
| 258.7 | 258.8 | 1600 South | 5 | 39,718 | 0.75 | 0.6 | No |
| 258.8 | 258.9 | | 9 | 39,718 | 0.75 | 1.0 | Yes |
| 258.9 | 259.0 | | 11 | 39,718 | 0.75 | 1.3 | Yes |
| 259.0 | 259.1 | | 7 | 39,718 | 0.75 | 0.8 | Yes |
| 259.1 | 259.2 | | 4 | 39,718 | 0.75 | 0.5 | No |
| 259.2 | 259.3 | | 4 | 39,718 | 0.75 | 0.5 | No |
| 259.3 | 259.4 | | 3 | 39,718 | 0.75 | 0.3 | No |
| 259.4 | 259.5 | | 1 | 39,718 | 0.75 | 0.1 | No |
| 259.5 | 259.6 | | 4 | 39,718 | 0.75 | 0.5 | No |
| 259.6 | 259.7 | | 6 | 39,718 | 0.75 | 0.7 | No |
| 259.7 | 259.8 | | 10 | 39,718 | 0.75 | 1.2 | Yes |
| 259.8 | 259.9 | | 5 | 39,718 | 0.75 | 0.6 | No |
| 259.9 | 260.0 | | 11 | 44,503 | 0.75 | 1.1 | Yes |
| 260.0 | 260.1 | 400 South | 12 | 46,298 | 0.75 | 1.2 | Yes |
| 260.1 | 260.2 | | 6 | 46,298 | 0.75 | 0.6 | No |
| 260.2 | 260.3 | | 16 | 46,298 | 0.75 | 1.6 | Yes |
| 260.3 | 260.4 | | 7 | 46,298 | 0.75 | 0.7 | No |
| 260.4 | 260.5 | | 11 | 46,298 | 0.75 | 1.1 | Yes |
| 260.5 | 260.6 | | 2 | 46,298 | 0.75 | 0.2 | No |
| 260.6 | 260.7 | | 3 | 46,298 | 0.75 | 0.3 | No |

Note 1. Crash rate in crashes/million-vehicle miles

**Table 15:** I-15 Southbound Crash Rate Results

| Begin MP | End MP | Intersection | Total Crashes | Six-Year AADT | UDOT Average Crash Rate[1] | Crash Rate[1] | Exceeds UDOT Avg. Rate? |
|---|---|---|---|---|---|---|---|
| 256.6 | 256.7 | | 1 | 22,753 | 0.75 | 0.2 | No |
| 256.7 | 256.8 | | 4 | 22,753 | 0.75 | 0.8 | Yes |
| 256.8 | 256.9 | | 2 | 22,753 | 0.75 | 0.4 | No |
| 256.9 | 257.0 | | 4 | 22,753 | 0.75 | 0.8 | Yes |
| 257.0 | 257.1 | | 3 | 22,753 | 0.75 | 0.6 | No |
| 257.1 | 257.2 | | 2 | 22,753 | 0.75 | 0.4 | No |
| 257.2 | 257.3 | | 8 | 25,332 | 0.75 | 1.4 | Yes |
| 257.3 | 257.4 | | 4 | 29,630 | 0.75 | 0.6 | No |
| 257.4 | 257.5 | Main Street | 4 | 29,630 | 0.75 | 0.6 | No |
| 257.5 | 257.6 | | 6 | 29,630 | 0.75 | 0.9 | Yes |
| 257.6 | 257.7 | | 3 | 32,993 | 0.75 | 0.4 | No |
| 257.7 | 257.8 | | 7 | 39,718 | 0.75 | 0.8 | Yes |
| 257.8 | 257.9 | US-6 | 6 | 39,718 | 0.75 | 0.7 | No |
| 257.9 | 258.0 | | 5 | 39,718 | 0.75 | 0.6 | No |
| 258.0 | 258.1 | | 9 | 39,718 | 0.75 | 1.0 | Yes |
| 258.1 | 258.2 | | 14 | 39,718 | 0.75 | 1.6 | Yes |
| 258.2 | 258.3 | | 10 | 39,718 | 0.75 | 1.2 | Yes |
| 258.3 | 258.4 | | 12 | 39,718 | 0.75 | 1.4 | Yes |
| 258.4 | 258.5 | | 7 | 39,718 | 0.75 | 0.8 | Yes |
| 258.5 | 258.6 | | 3 | 39,718 | 0.75 | 0.3 | No |
| 258.6 | 258.7 | | 10 | 39,718 | 0.75 | 1.2 | Yes |
| 258.7 | 258.8 | 1600 South | 9 | 39,718 | 0.75 | 1.0 | Yes |
| 258.8 | 258.9 | | 11 | 39,718 | 0.75 | 1.3 | Yes |
| 258.9 | 259.0 | | 11 | 39,718 | 0.75 | 1.3 | Yes |
| 259.0 | 259.1 | | 20 | 39,718 | 0.75 | 2.3 | Yes |
| 259.1 | 259.2 | | 7 | 39,718 | 0.75 | 0.8 | Yes |
| 259.2 | 259.3 | | 4 | 39,718 | 0.75 | 0.5 | No |
| 259.3 | 259.4 | | 4 | 39,718 | 0.75 | 0.5 | No |
| 259.4 | 259.5 | | 5 | 39,718 | 0.75 | 0.6 | No |
| 259.5 | 259.6 | | 10 | 39,718 | 0.75 | 1.2 | Yes |
| 259.6 | 259.7 | | 11 | 39,718 | 0.75 | 1.3 | Yes |
| 259.7 | 259.8 | | 7 | 39,718 | 0.75 | 0.8 | Yes |
| 259.8 | 259.9 | | 10 | 39,718 | 0.75 | 1.2 | Yes |
| 259.9 | 260.0 | | 19 | 44,220 | 0.75 | 2.0 | Yes |
| 260.0 | 260.1 | 400 South | 17 | 46,298 | 0.75 | 1.7 | Yes |
| 260.1 | 260.2 | | 7 | 46,298 | 0.75 | 0.7 | No |
| 260.2 | 260.3 | | 9 | 46,298 | 0.75 | 0.9 | Yes |
| 260.3 | 260.4 | | 13 | 46,298 | 0.75 | 1.3 | Yes |
| 260.4 | 260.5 | | 10 | 46,298 | 0.75 | 1.0 | Yes |
| 260.5 | 260.6 | | 11 | 46,298 | 0.75 | 1.1 | Yes |
| 260.6 | 260.7 | | 12 | 46,298 | 0.75 | 1.2 | Yes |

Note 1. Crash rate in crashes/million-vehicle miles

**Figure 9:** Hot Spot Segment and Intersection Crash Rates

### 3.1.3 Crash Type and Attribute Analysis

The I-15 segment crash data was evaluated with a focus on three areas: (1) severity, (2) vulnerable users, (3) and manner of collision. The results of the evaluations are shown in the accompanying figures.

**Figure 10** shows the locations of the 26 severe crashes that occurred on I-15 in the study area. There were two fatal crashes in the past six years. A review of the police crash reports for the fatal and severe injury crashes showed no noticeable trends or issues that are related to this change request. The fatal crashes included single vehicle crashes into fixed objects. Almost half of severe injury crashes where single vehicle collisions with fixed objects.

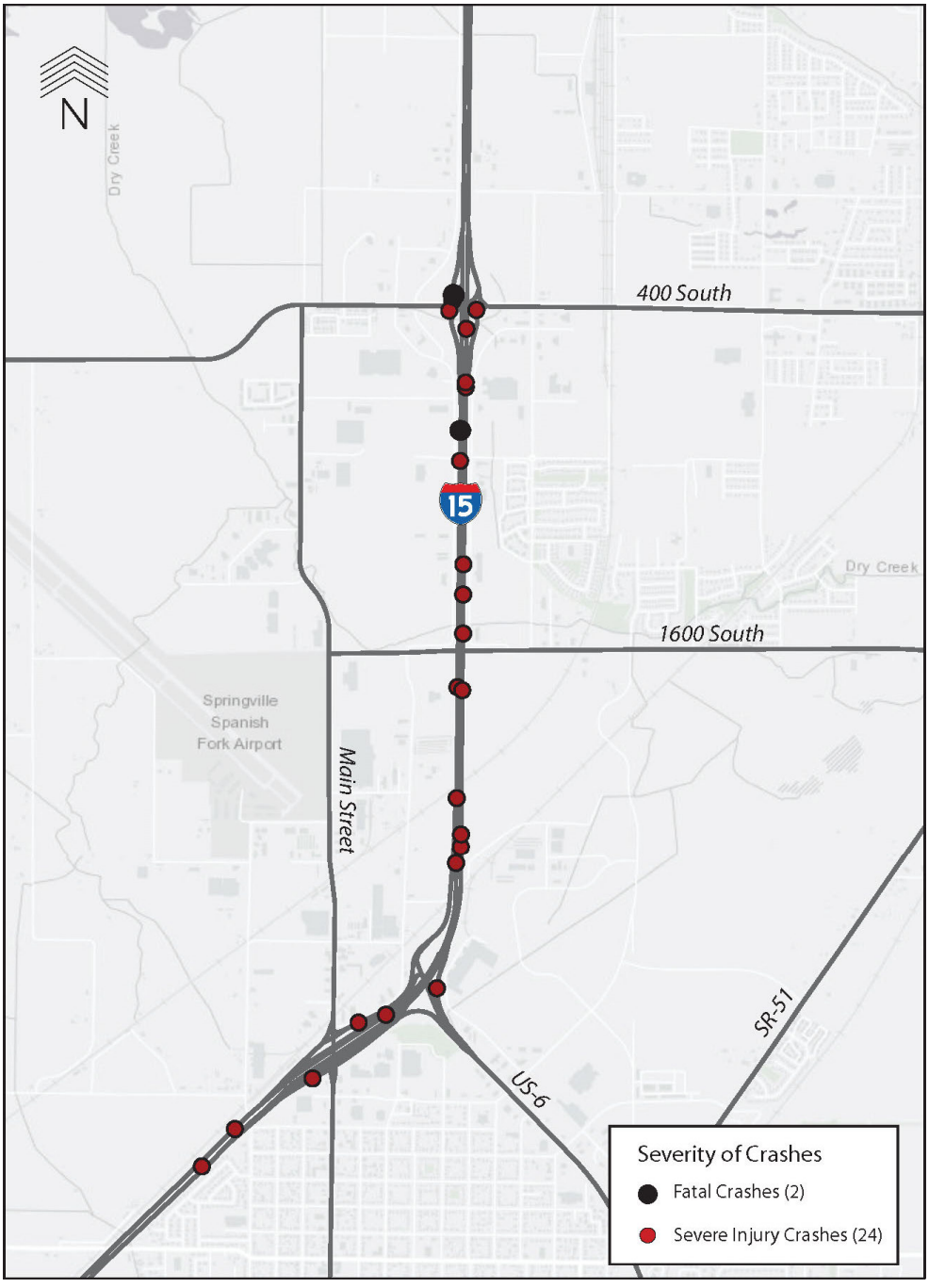



**Figure 10:** Severe Crashes Along I-15

**Figure 11** shows the location of the four crashes that involved pedestrians. It is important to review bike- and ped-involved crashes as they are more vulnerable users, and it is more likely that a crash with them will include injury. Although pedestrians and bicycles are not allowed on the I-15 roadway, there are times when people exit their vehicles at great risk. Evaluating if and where these types of crashes occur can help determine if there are any safety measures that can be implemented. A review of these crashes showed no mitigation measures.

**Figure 11:** Bicycle and Pedestrian Involved Crashes Along US-6

**Figure 12** shows the location of the total of 220 sideswipe and rear-end crashes along I-15. These manners of crashes constitute 36% of all crashes along I-15. These types of crashes are also noted (as derived from the *Highway Safety Manual* and CMF Clearing House) to potentially be mitigated by a reduction in congested traffic operations on a freeway particularly in weave areas. Of the total crashes, half (109 crashes) are rear end, with the greatest concentration located at or near the merge and diverge areas. As shown Figure 12, the rear end crashes on I-15 occur throughout the weave area between the interchanges at US-6 and 400 South. Also, there were 353 single vehicle crashes along the corridor with most striking the concrete barrier or other fixed objects.

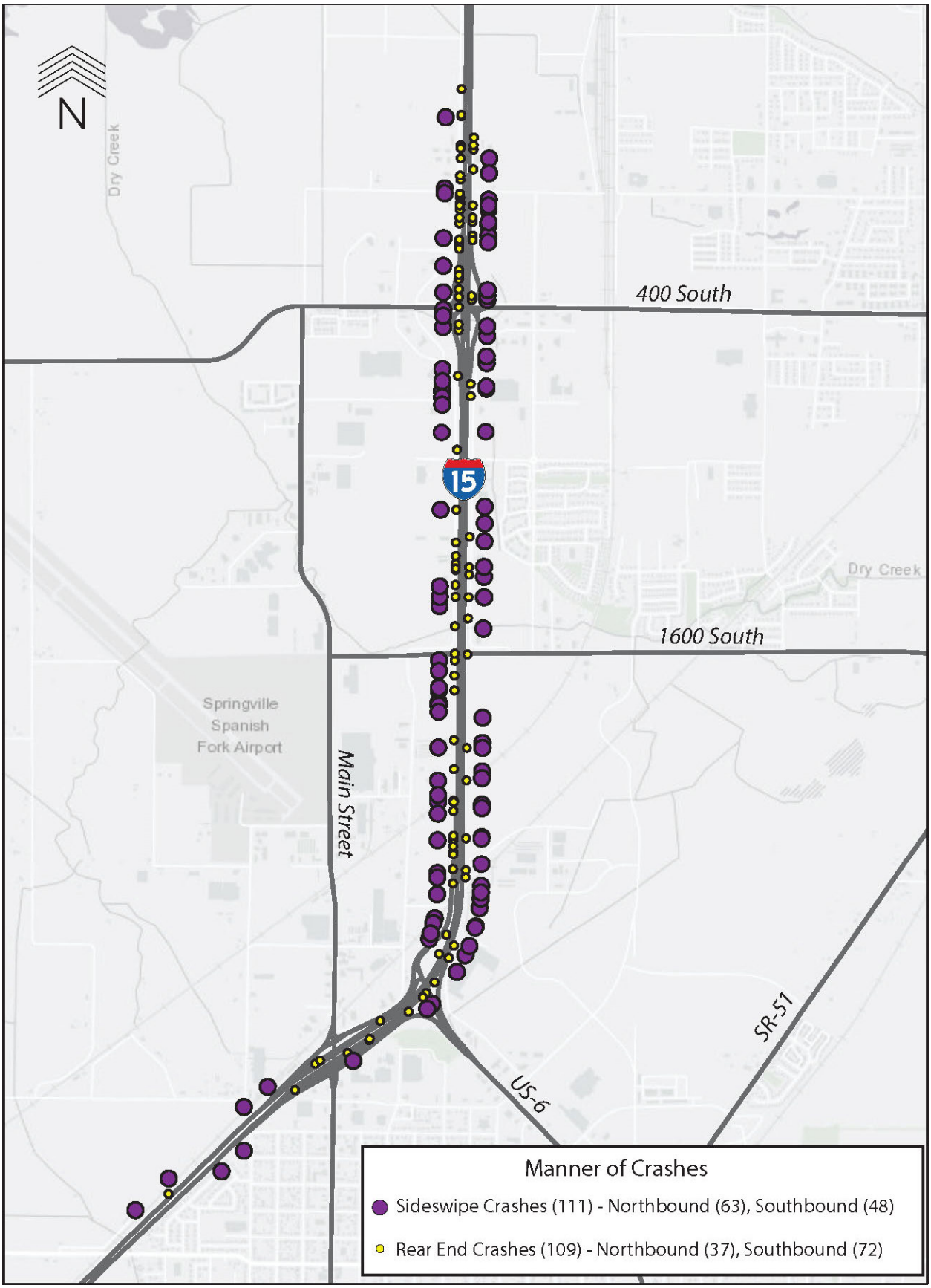



**Figure 12:** Rear End and Side-Swipe Crashes along I-15 (Crashes Offset for Clarity)

### 3.1.4 Existing Conditions HSM Analysis

The I-15 study area was divided into individual freeway segments for existing 2018 based on roadway characteristics. **Figure 13** shows the extents of the different segments along with the number of lanes and total predicted average crash frequencies. According to the analysis, with 2018 volumes, the predicted total crash frequency for I-15 is 63.6 crashes per year including all the mainline segments and speed-change lanes. For each segment, the number of total crashes can also be segregated into fatal and injury or property damage only (PDO) severities and multi-vehicle or single vehicle crash types. A detailed worksheet for the analysis and the segregated crash frequency outputs can be found in Appendix D: Safety Analysis Worksheets.

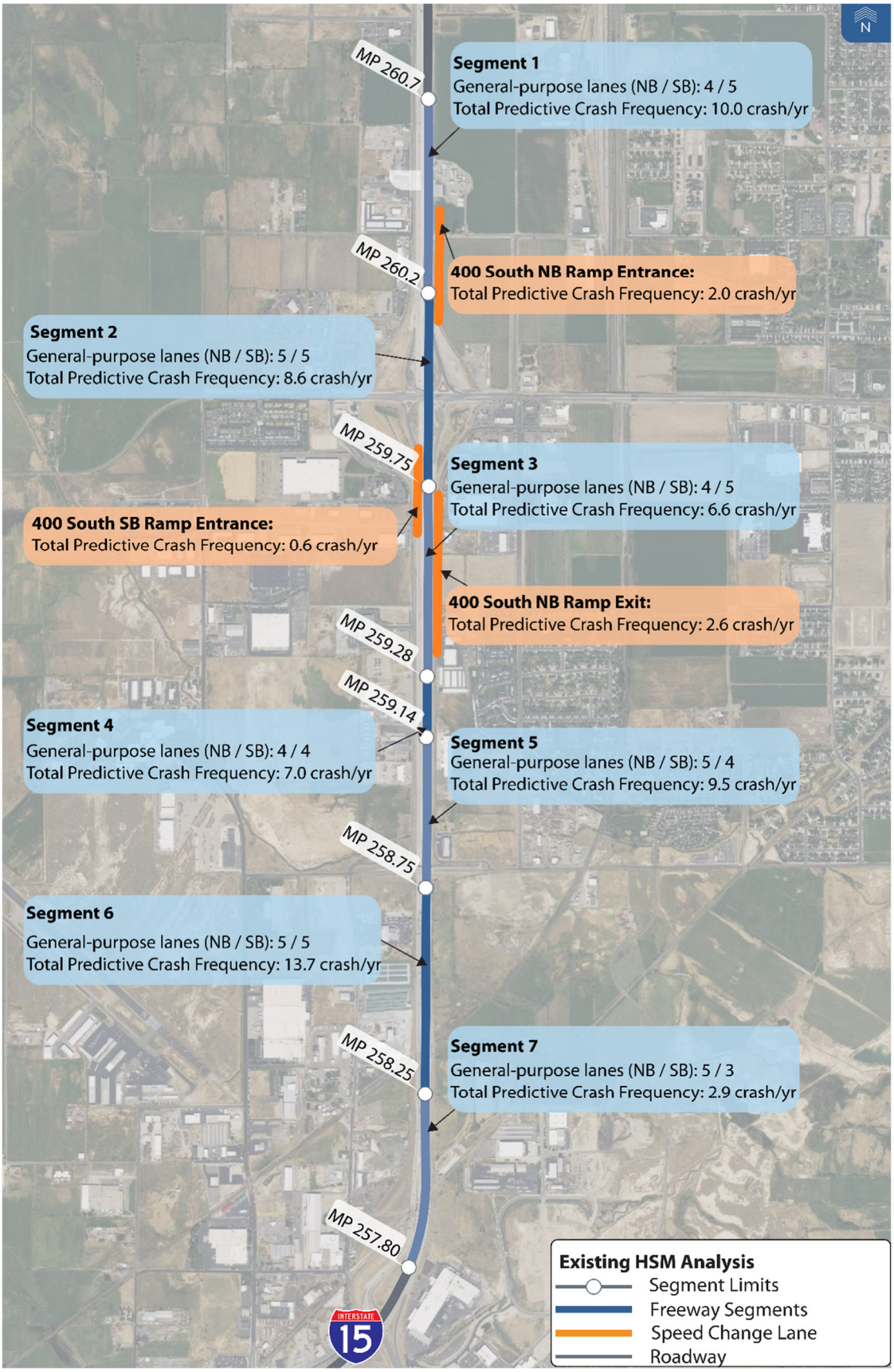



**Figure 13:** Existing Conditions HSM Crash Frequencies

## 3.2 2035 No Build Safety Conditions

**Figure 14** shows the extents of different segments along with their separating geometry property for 2035 No Build condition which indicates no change from existing condition. According to the analysis, with 2035 No Build volumes, the predicted total crash frequency for I-15 is 104.5 crashes per year including all the mainline segments and speed-change lanes. This represents nearly a 65% increase compared to the 2018 predictions, which is due to the expected increase in traffic volumes. For each segment, the number of total crashes can also be segregated into fatal and injury or property damage only (PDO) severities and multi-vehicle or single vehicle crash types. A detailed worksheet for the analysis and the segregated crash frequency outputs can be found in Appendix D: Safety Analysis Worksheets.

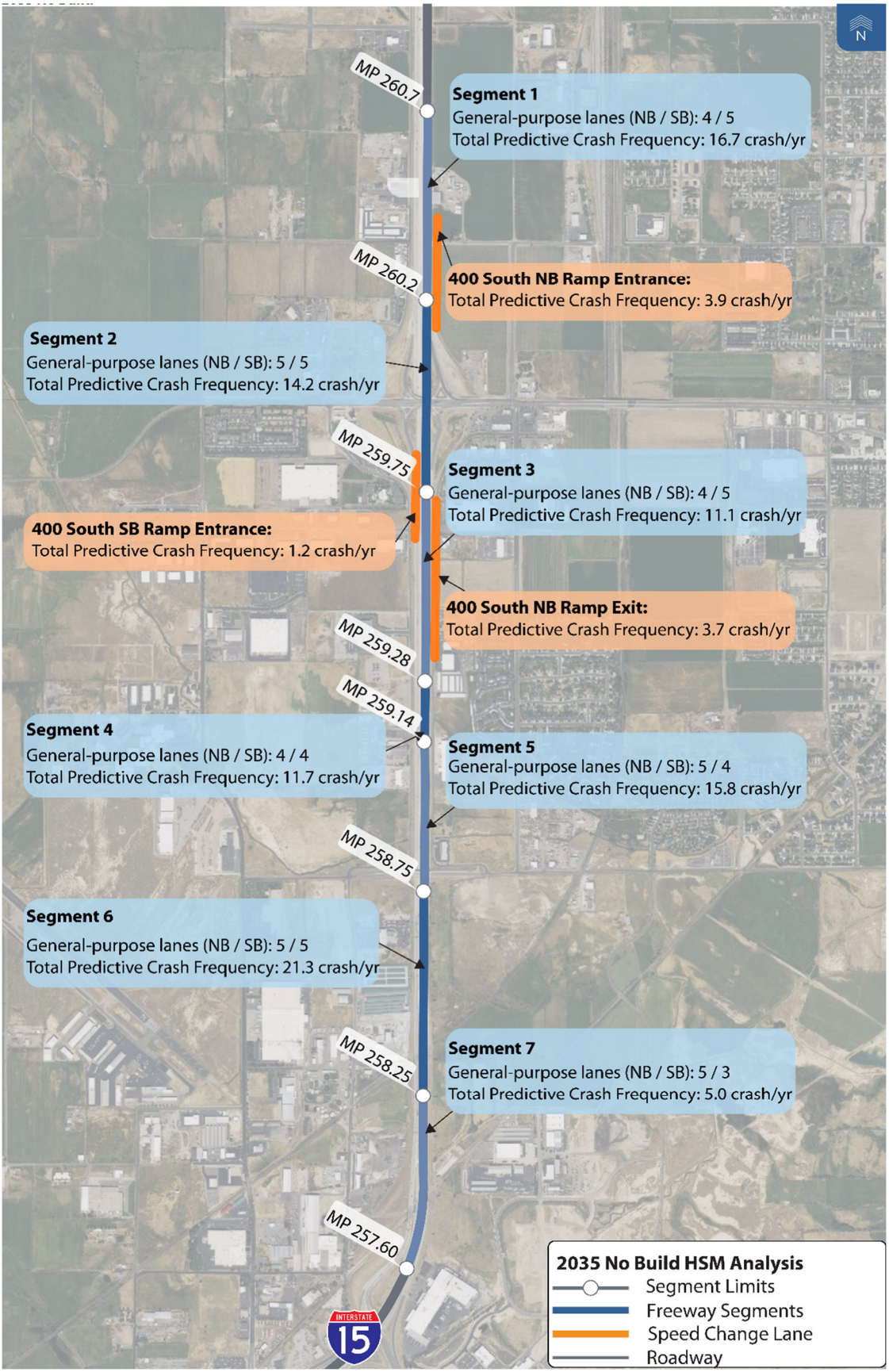



**Figure 14:** 2035 No Build Condition HSM Crash Frequencies

## 3.3 2050 No Build Condition HSM Analysis

Assumed changes in I-15 geometry for 2050 No Build conditions are discussed in Section 2.2. The only change that affects the safety analysis is the addition of one general purpose lane in both directions on mainline I-15. The extents of the different segments along with the number of lanes and predicted average crash frequencies are presented in **Figure 15**. According to the analysis, with the 2050 No Build volumes and I-15 configuration, the predicted total crash frequency is 94.6 crashes per year for all the mainline segments and speed-change lanes combined. This represents a decrease of nearly 10 percent compared to the 2035 No Build predictions, which is due to the additional general purpose lane that counteracts the increase in volumes. For each segment, the number of total crashes can also be segregated into fatal and injury or property damage only (PDO) severities and multi-vehicle or single vehicle crash types. A detailed worksheet for the analysis and the segregated crash frequency outputs is attached in Appendix D: Safety Analysis Worksheets.

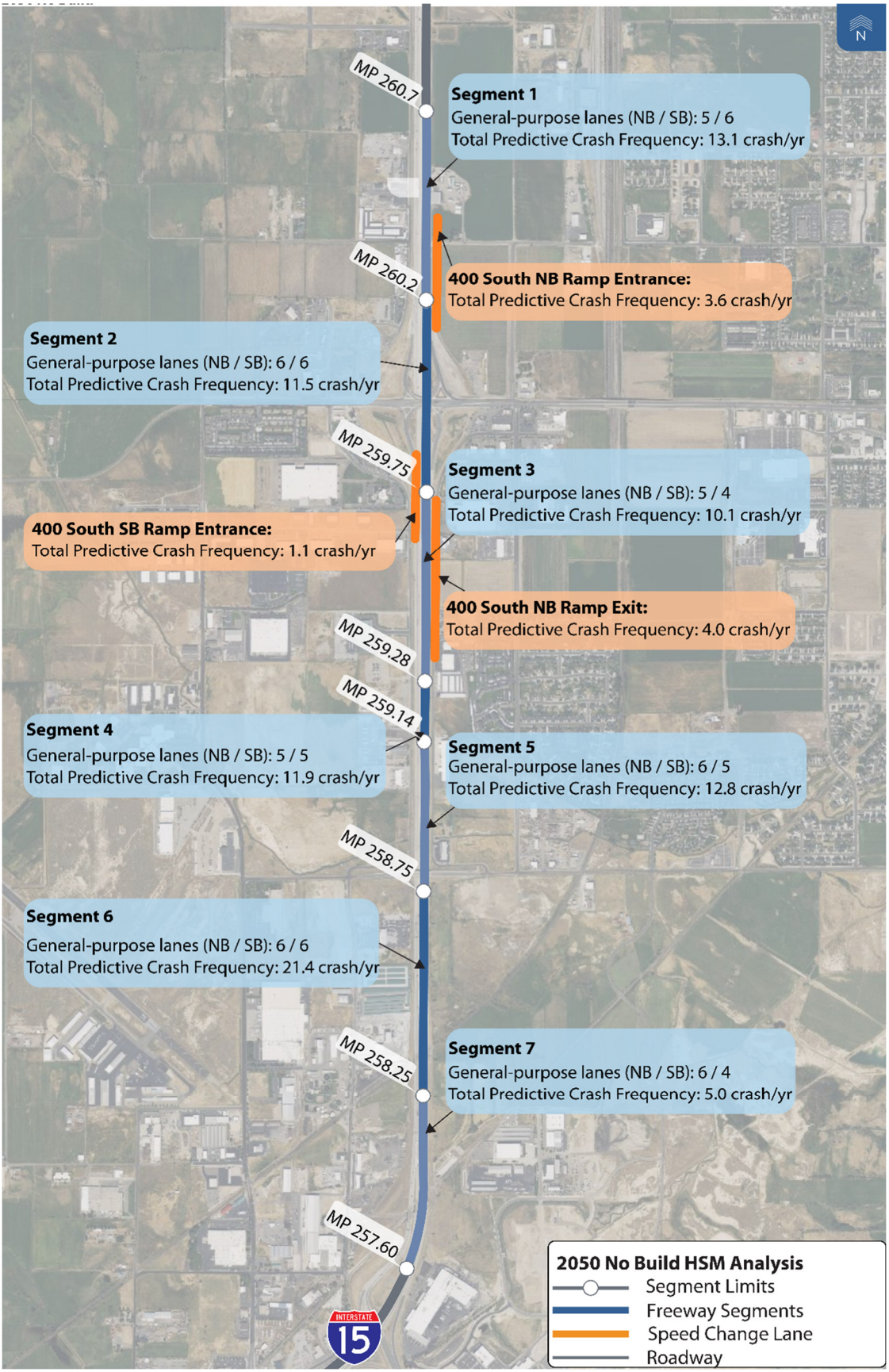



**Figure 15:** 2050 No Build Condition HSM Crash Frequencies

**Table 16** compares the total predicted crash frequencies for existing and no build conditions.

**Table 16:** Existing and No Build Predicted Crash Rates (Crashes/Year)

| Segment Type | 2018 Existing | 2035 No Build | 2050 No Build |
|---|---|---|---|
| **Freeway Mainline** | | | |
| Segment 1 | 10.0 | 16.7 | 13.1 |
| Segment 2 | 8.6 | 14.2 | 11.5 |
| Segment 3 | 6.6 | 11.1 | 10.1 |
| Segment 4 | 7.0 | 11.7 | 11.9 |
| Segment 5 | 9.5 | 15.8 | 12.8 |
| Segment 6 | 13.7 | 21.3 | 21.4 |
| Segment 7 | 2.9 | 5.0 | 5.0 |
| **Speed Change Lane** | | | |
| 400 South NB Ramp Entrance | 2.0 | 3.9 | 3.6 |
| 400 South SB Ramp Entrance | 0.6 | 1.2 | 1.1 |
| 400 South NB Ramp Exit | 2.6 | 3.7 | 4.0 |
| **Total** | **63.5** | **104.6** | **94.5** |

According to the HSM analysis, the average predicted crash frequencies increase between 2018 and 2035 No Build conditions since the geometric conditions would remain the same but the AADT would increase. However, between 2035 and 2050 no build conditions, average crash frequencies go down due to the additional general purpose lane in each direction on I-15.

# 4 1600 SOUTH PROJECT EXTENTS

Although the focus of this memorandum is existing and no build conditions, there was a question concerning logical project extents for the evaluation of the potential widening of 2700 North / 1600 South. To provide context for the traffic volumes that would use a potential interchange, the travel model was used to estimate the proportion of traffic on 1600 South that would utilize the interchange. **Table 17** summarizes daily model volumes for interchange traffic, total traffic, and the proportion of traffic that would use a new interchange.

**Table 17:** 2050 Build Conditions – 1600 South Interchange Traffic Volumes

| Location | Interchange Traffic | Total Traffic | % Interchange Related |
|---|---|---|---|
| Spanish Fork Main Street to 200 East | 9,200 | 15,700 | 59% |
| 200 East to I-15 | 11,900 | 19,000 | 63% |
| I-15 to 1750 West | 28,100 | 35,200 | 80% |
| 1750 W to Canyon Creek Pkwy | 19,800 | 26,600 | 74% |
| Canyon Creek Pkwy to 1200 W | 11,400 | 16,000 | 71% |
| 1200 W to 950 W | 10,000 | 17,200 | 58% |
| 950 West to SR-51 | 6,600 | 12,000 | 55% |
| SR-51 to US-89 | 4,300 | 10,100 | 43% |

It seems reasonable that logical extents of the corridor widening would include segments where at least half of the traffic would be using the interchange. On the west side of a proposed interchange, the proportion of traffic using the interchange ranges from 59% to 63% with the break point between the two being at 200 East. This would suggest that Main Street should be the project extents on the west.

On the east side, the proportion of traffic using the interchange ranges from 43% to 80%. The interchange percentage drops below half at SR-51 with the segment from there to US-89 having only 43% interchange utilization. As such, it is recommended that the project extents go to SR-51 since over half of the traffic would be using the interchange. Likewise, the segment between SR-51 and US-89 with less than half the traffic using the interchange would appear to have independent utility from the interchange.

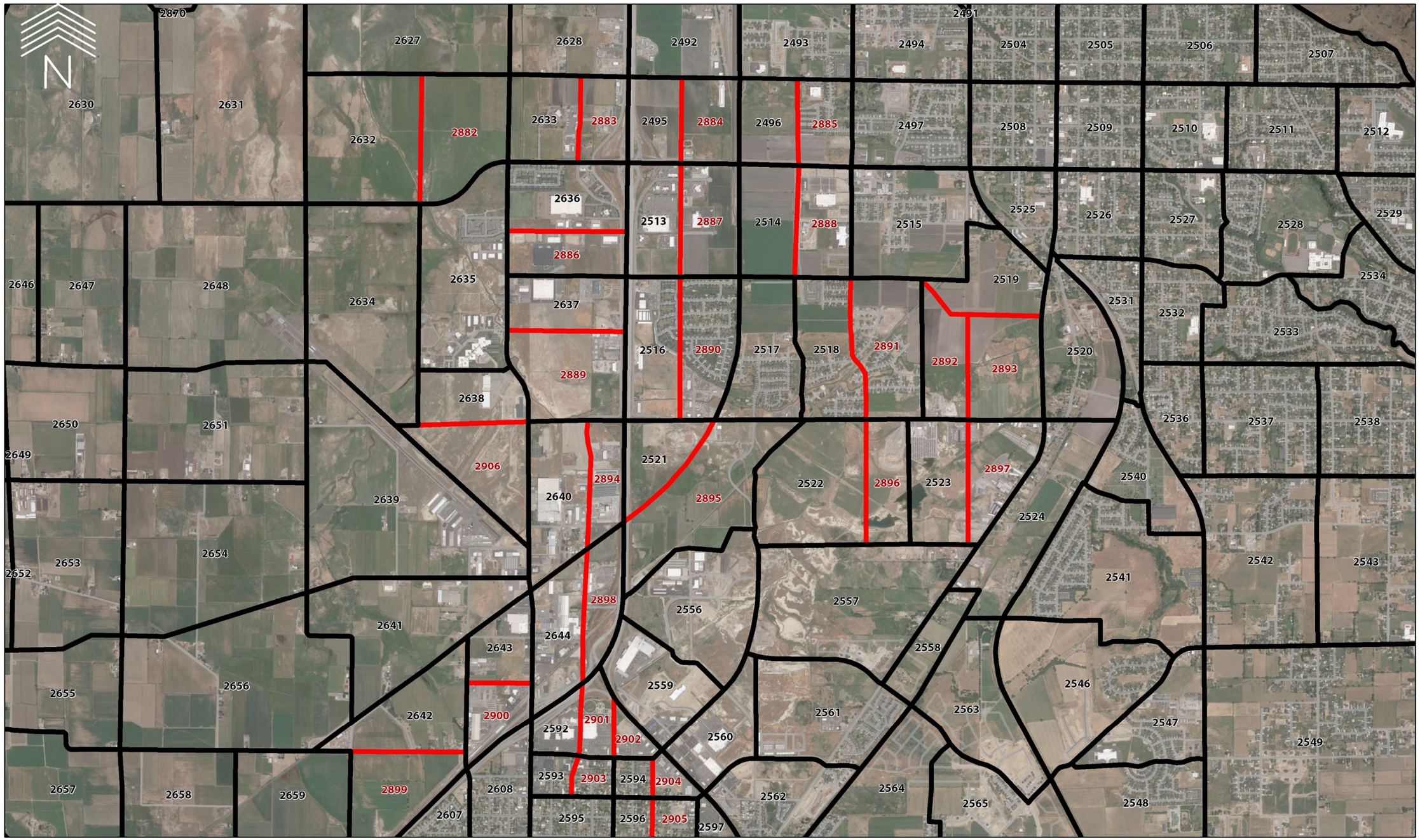
SR-51 (State Street) is a regionally significant roadway providing north/south connectivity between Spanish Fork and Springville where it connects to US-89 which traverses the entire state. There is one other regionally significant road on the corridor and that is Canyon Creek Parkway / 1200 West, which is planned to be a five-lane roadway from Spanish Fork to Provo. When the at-grade railroad crossing at the existing 1200 West intersection is removed, Canyon Creek Parkway will be realigned to 1200 West. At this future Canyon Creek Parkway / 1200 West intersection, the interchange utilization drops from 71% to 58%. Given that the drop from 71% to 58% is relatively minor and that SR-51 is a more regionally significant road than Canyon Creek Parkway / 1200 West, SR-51 is still the recommended project limit on the east side of I-15.

# 5 CONCLUSION

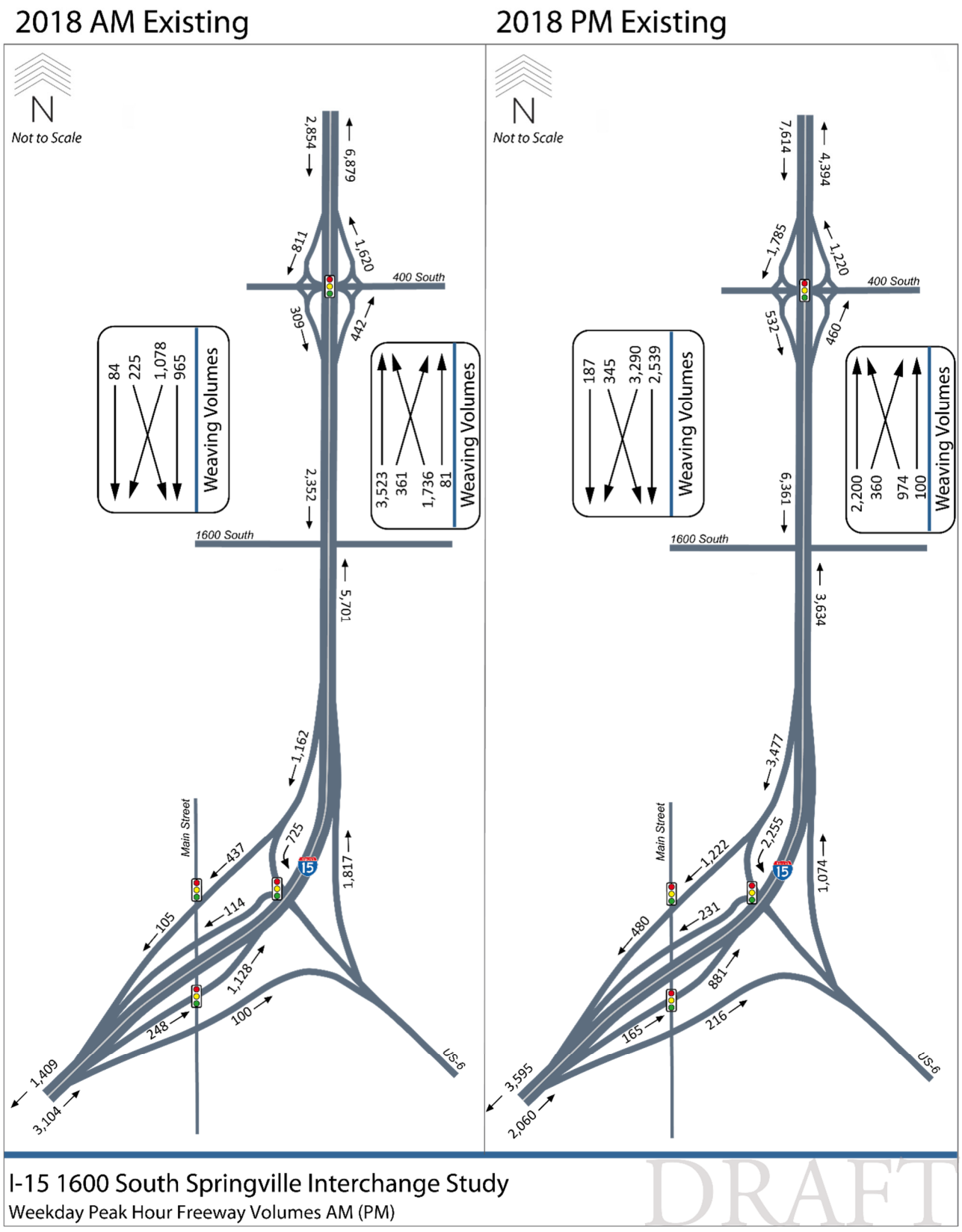
The analysis shows that there are existing movements at the I-15 and Springville 400 South interchange that operate at LOS E and F. These delays are anticipated to increase in the future even with additional lanes at the interchange and at 1750 West and planned improvements to US-6, such that five of the six non-right turn movements are expected to operate at LOS E or F under 2050 No Build conditions. These operational issues at the 400 South interchange will continue to impact freeway operations due to queue spill back to mainline I-15.

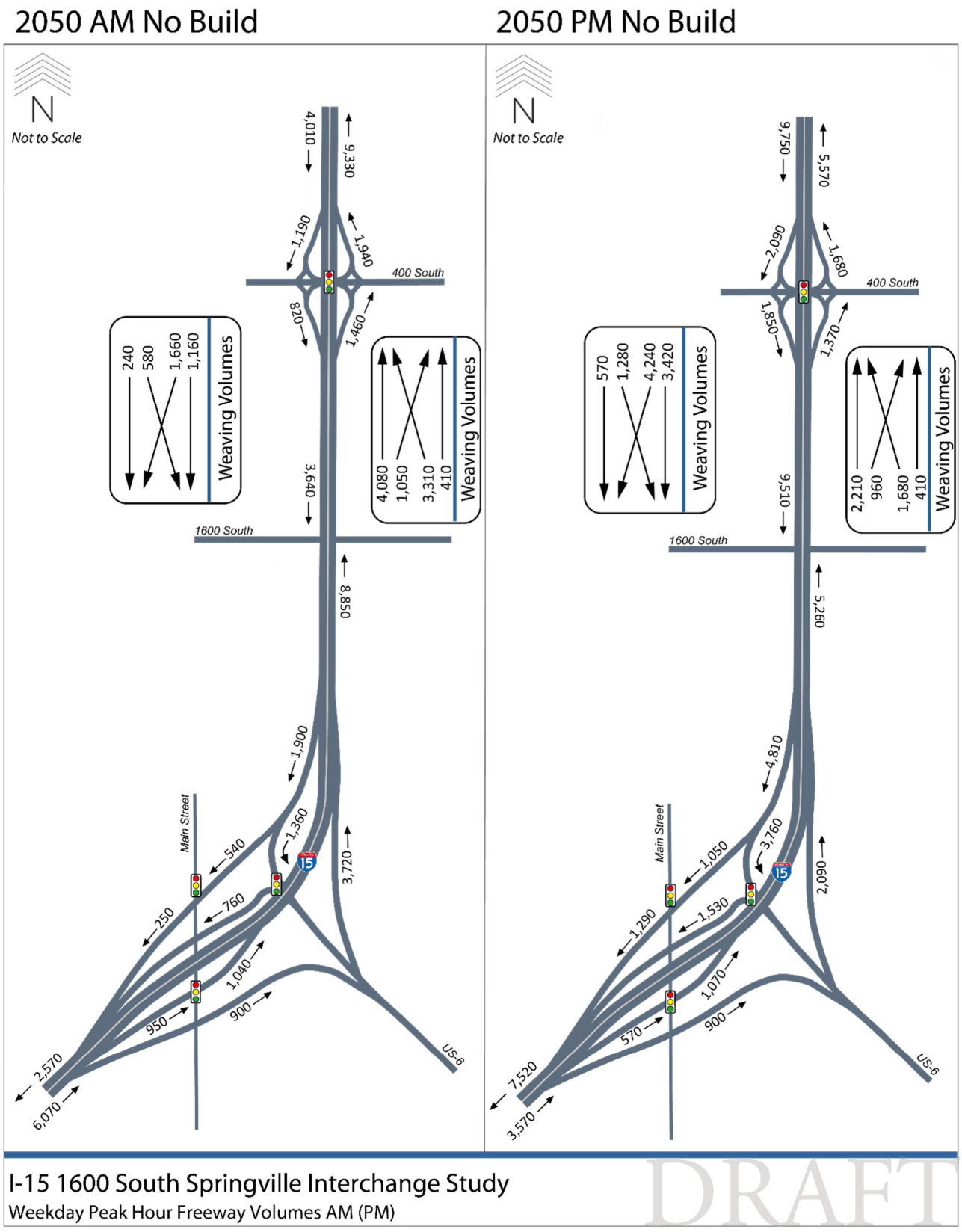
# APPENDIX A: TRAFFIC ANALYSIS ZONES

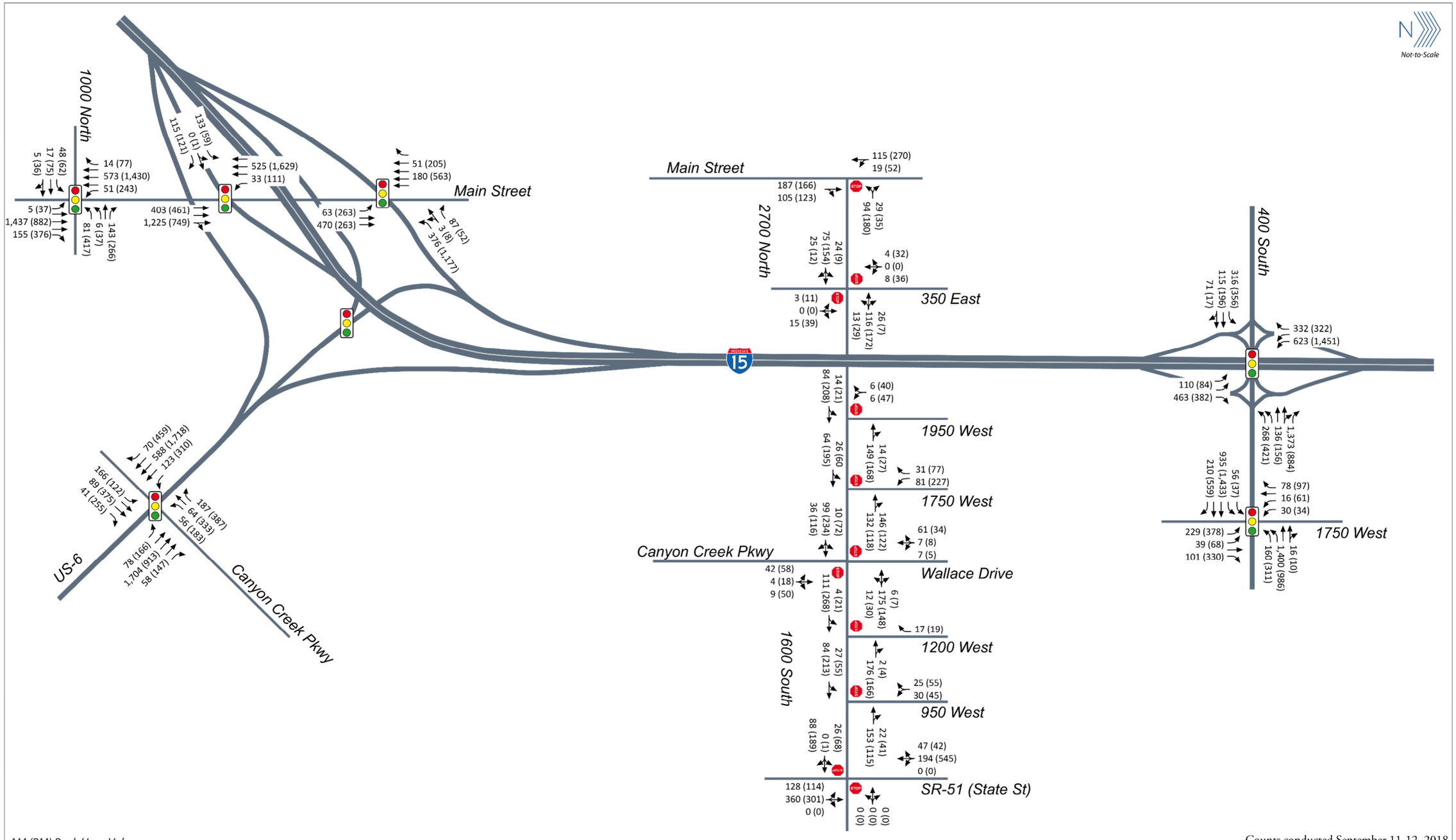
# TAZ Structure - I-15 Spanish Fork/Springville Interchange Environmental Study



# APPENDIX B: PEAK HOUR TRAFFIC VOLUMES


2018 AM Existing
2018 PM Existing
N
Not to Scale
N
Not to Scale
2,854
6,879
811
1,620
400 South
309
442
84
225
1,078
965
Weaving Volumes
3,523
361
1,736
81
Weaving Volumes
2,352
1600 South
5,701
1,162
Main Street
437
725
15
1,817
105
114
1,128
248
100
1,409
3,104
US-6
7,614
4,394
1,785
1,220
400 South
532
460
187
345
3,290
2,539
Weaving Volumes
2,200
360
974
100
Weaving Volumes
6,131
1600 South
3,634
3,477
Main Street
1,222
2,255
15
1,074
480
231
881
165
216
3,595
2,060
US-6
I-15 1600 South Springville Interchange Study
Weekday Peak Hour Freeway Volumes AM (PM)
DRAFT


2050 AM No Build
2050 PM No Build
N
Not to Scale
400 South
1600 South
Main Street
US-6
Weaving Volumes
240
580
1,660
1,160
4,080
1,050
3,310
410
570
1,280
4,240
3,420
2,210
960
1,680
410
4,010
9,330
1,190
1,940
820
1,460
3,640
8,850
1,900
1,360
3,720
540
760
250
1,040
950
900
2,570
6,070
9,750
5,570
2,090
1,680
1,850
1,370
9,510
5,260
4,810
3,760
1,050
1,530
1,290
1,070
570
900
2,090
7,520
3,570
I-15 1600 South Springville Interchange Study
Weekday Peak Hour Freeway Volumes AM (PM)
DRAFT



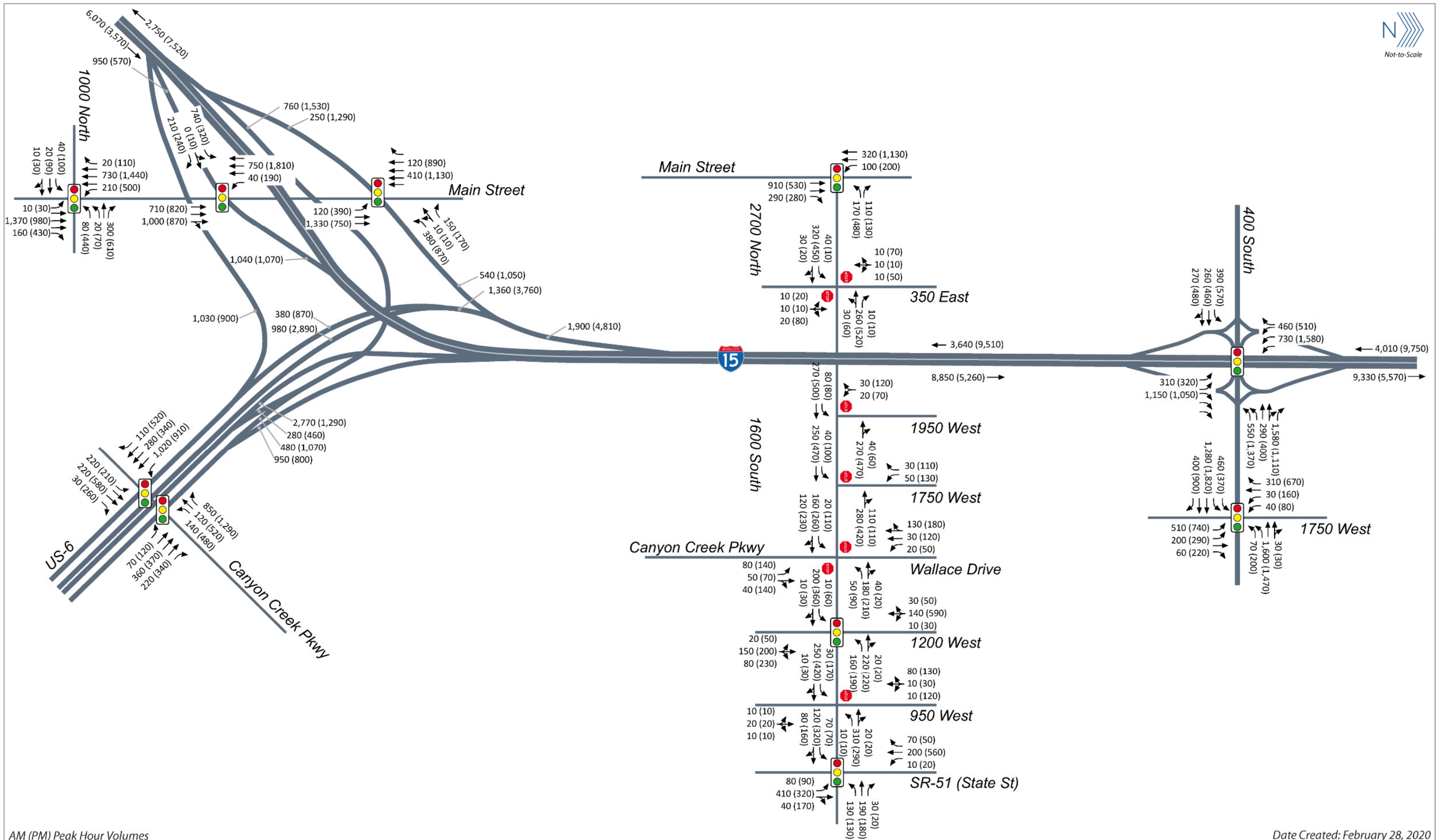

*AM (PM) Peak Hour Volumes*

Counts conducted September 11-12, 2018

## Existing Peak Hour Volumes

I-15 Spanish Fork/Springville Interchange Environmental Study

DRAFT




AM (PM) Peak Hour Volumes

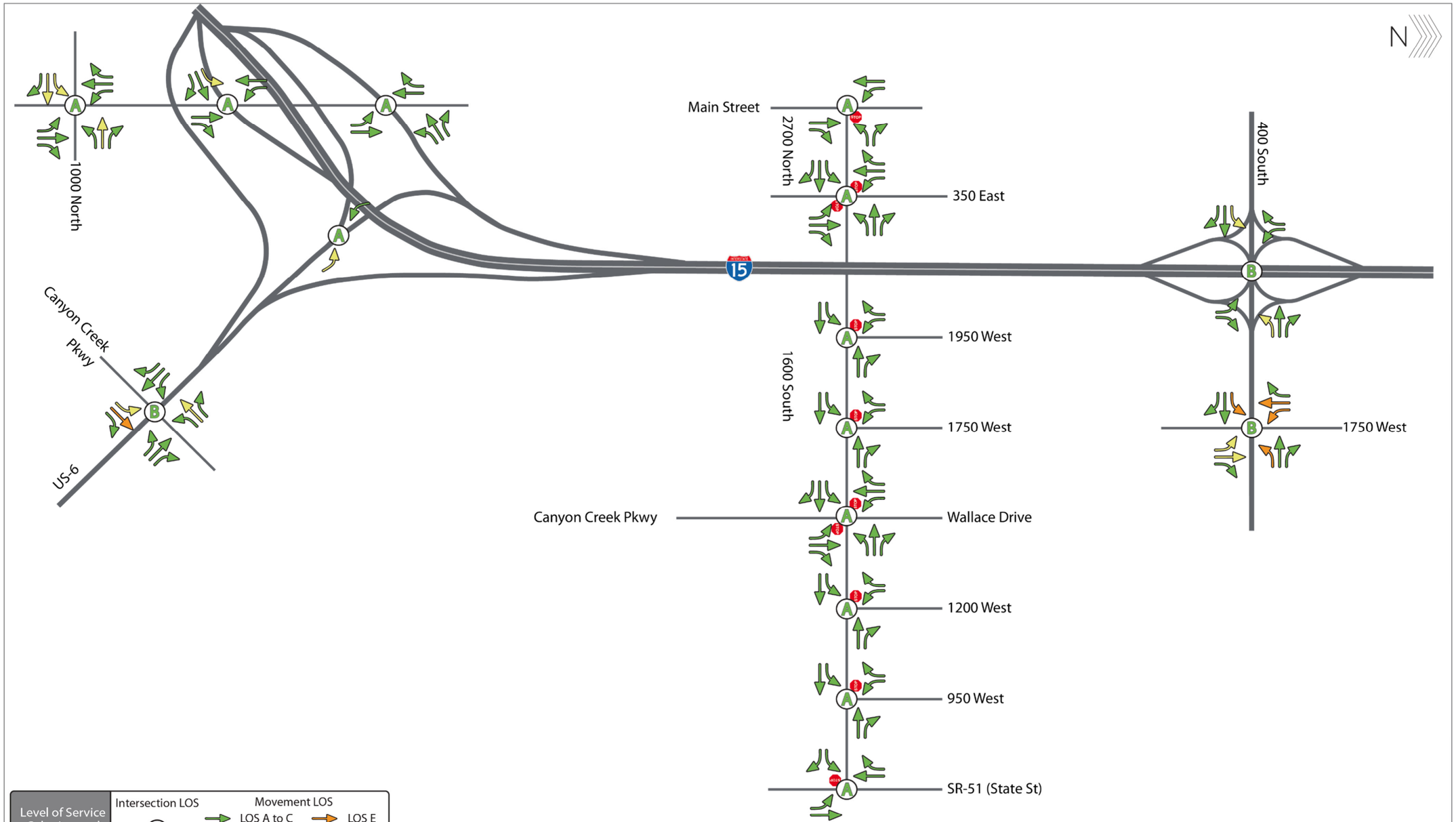
Date Created: February 28, 2020

## 2050 No Build Peak Hour Volumes

I-15 Spanish Fork/Springville Interchange Environmental Study

DRAFT

# APPENDIX C: EXISTING (2018) INTERSECTION MOVEMENT LEVEL OF SERVICE




Existing AM Level of Service

I-15 Spanish Fork/Springville Interchange Environmental Study

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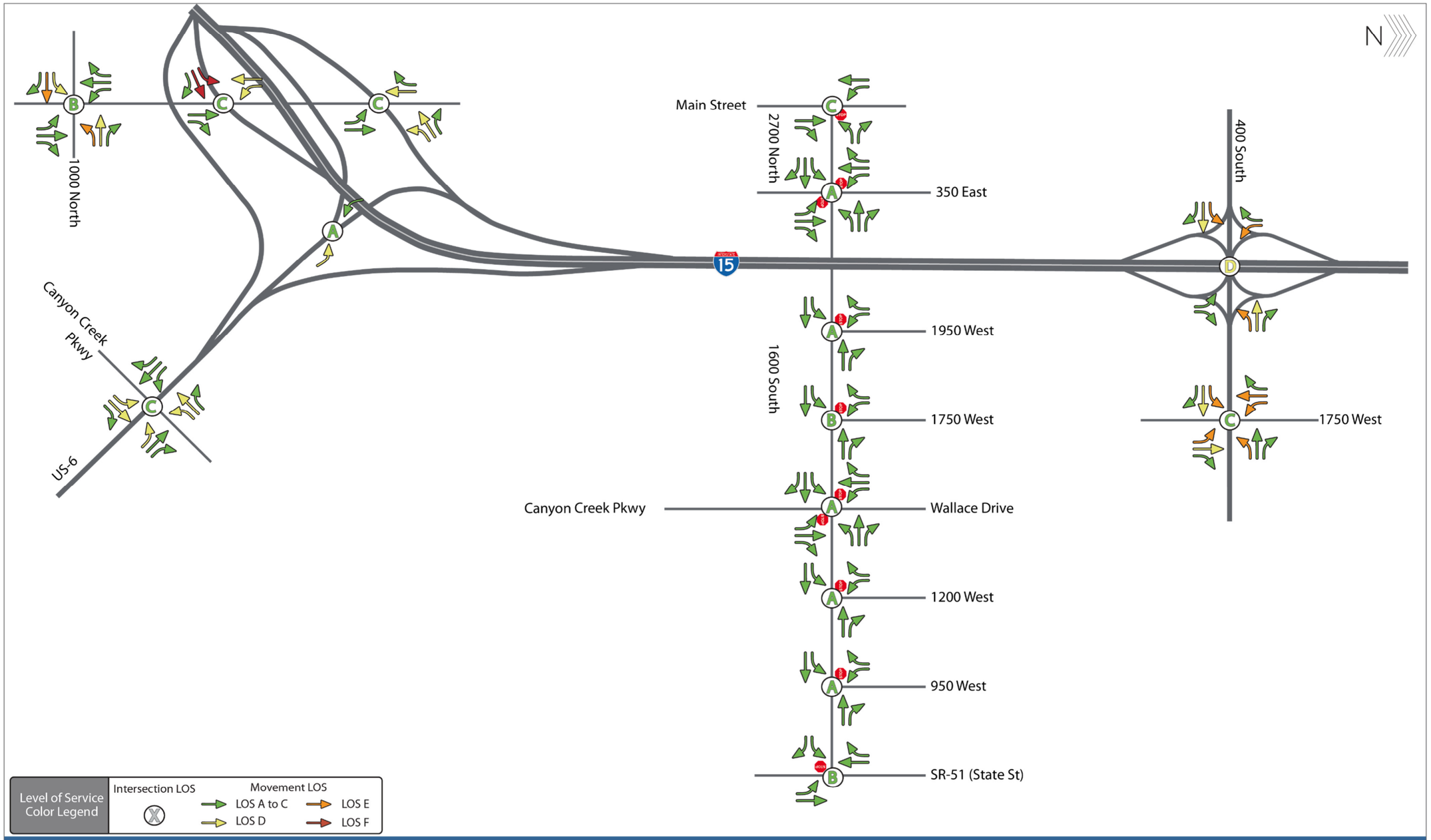


Existing PM Level of Service

I-15 Spanish Fork/Springville Interchange Environmental Study

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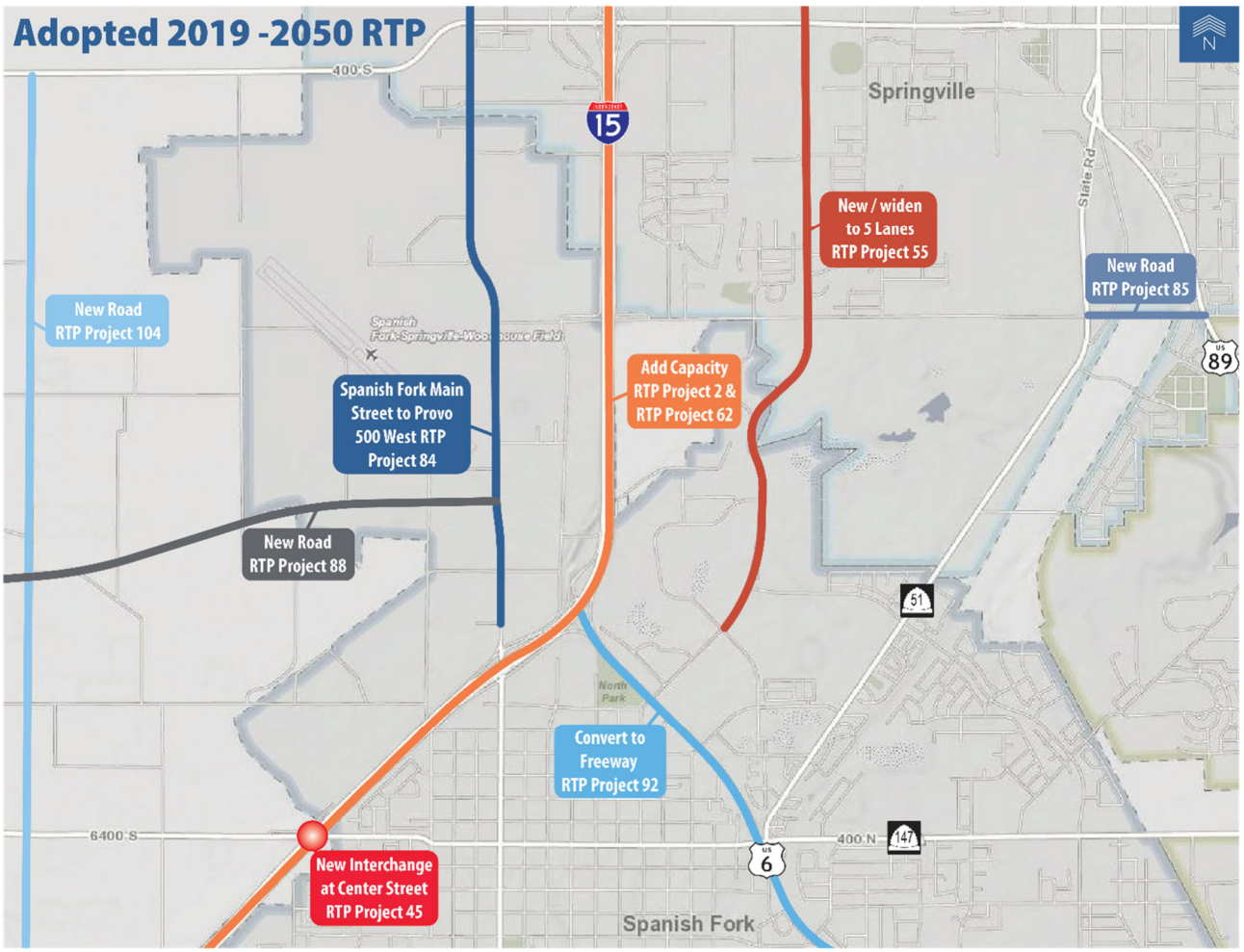
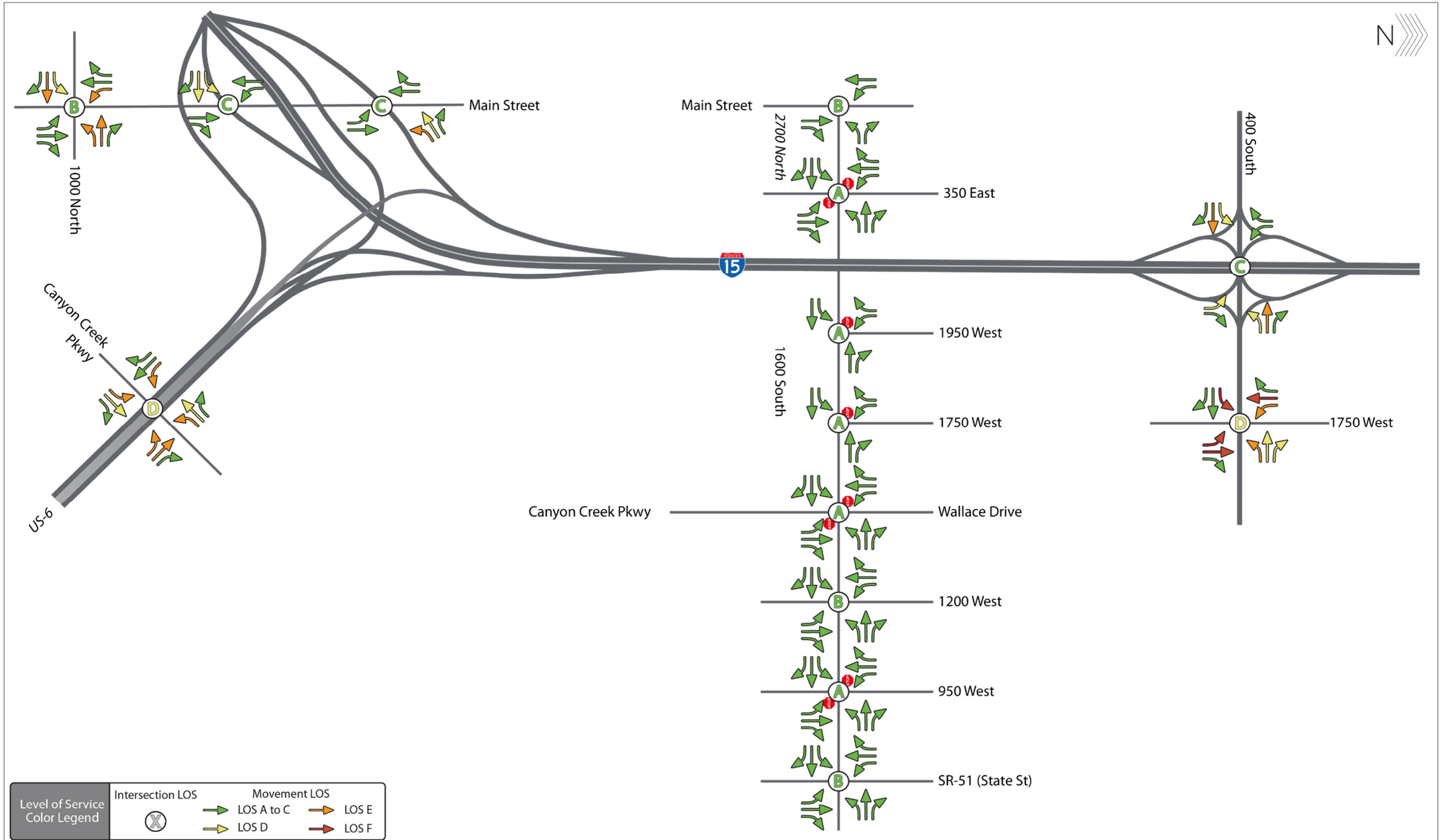
# APPENDIX D: SAFETY ANALYSIS WORKSHEETS

# APPENDIX E: PLANNED TRANSPORTATION PROJECTS


Adopted 2019 -2050 RTP
N
400 S
15
Springville
State Rd
New / widen to 5 Lanes RTP Project 55
New Road RTP Project 85
New Road RTP Project 104
Spanish Fork-Springville-Woodhouse Field
Add Capacity RTP Project 2 & RTP Project 62
Spanish Fork Main Street to Provo 500 West RTP Project 84
89
New Road RTP Project 88
51
North Park
Convert to Freeway RTP Project 92
6400 S
400 N
147
6
New Interchange at Center Street RTP Project 45
Spanish Fork

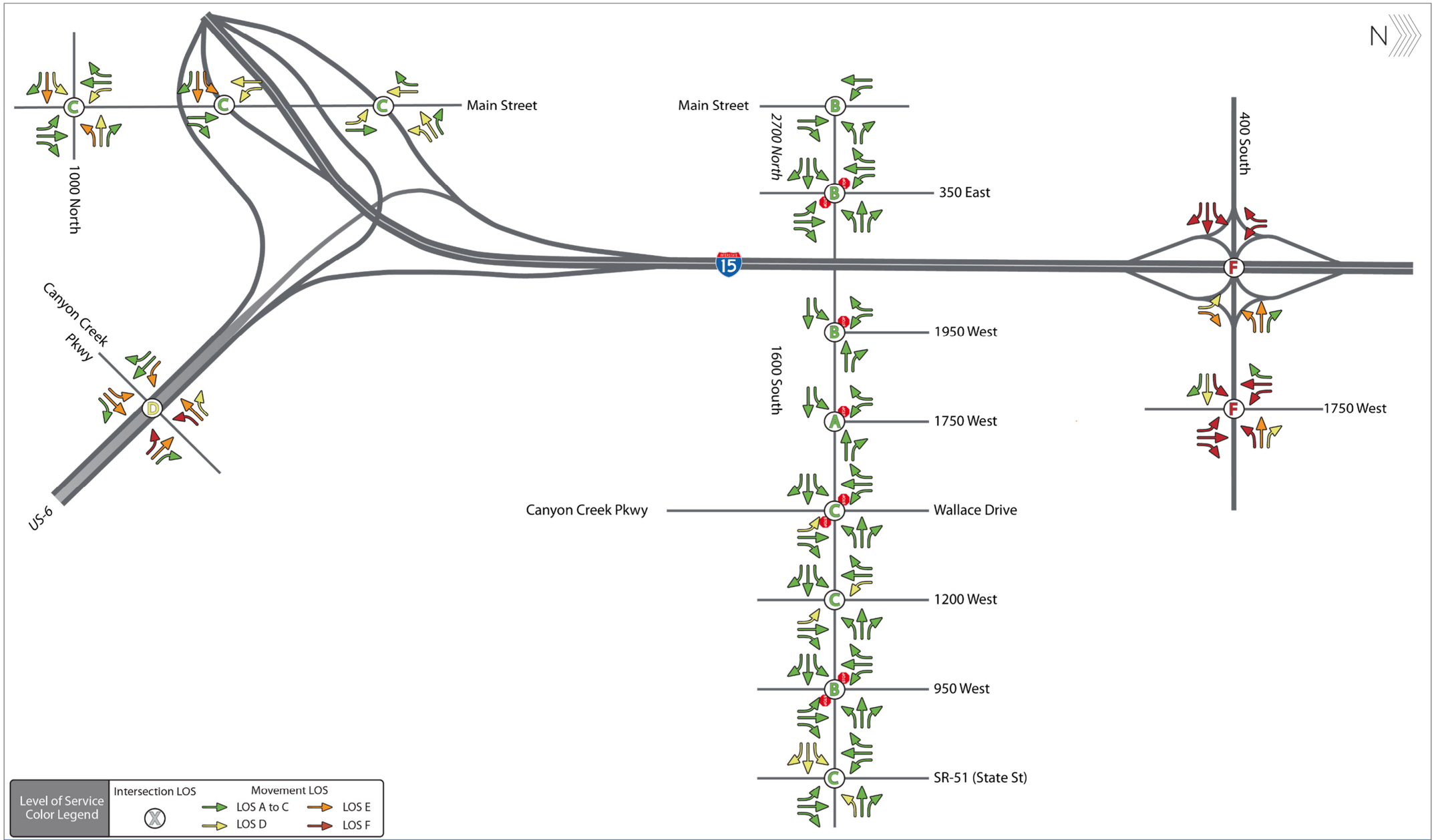
# APPENDIX F: 2050 NO BUILD INTERSECTION MOVEMENT LEVEL OF SERVICE




2050 AM No Build Level of Service

I-15 Spanish Fork/Springville Interchange Environmental Study

DRAFT




2050 PM No Build Level of Service

I-15 Spanish Fork/Springville Interchange Environmental Study

DRAFT

I-15 Interchange
ENVIRONMENTAL ASSESSMENT
Springville/Spanish Fork

# BUILD (2050) TRAFFIC AND SAFETY MEMO

**Project No. F-I15-6(239)259**
**Pin: 15153**
**March 2021**

The environmental review, consultation, and other actions required by applicable federal environmental laws for this project are being or have been carried out by UDOT pursuant to 23 USC 327 and a Memorandum of Understanding dated January 17,2017, and executed by FHWA and UDOT.

# MEMORANDUM

**To:** UDOT Region Three & Environmental

**From:** Avenue Consultants

**Date:** March 30, 2021

**Subject:** I-15; Springville/Spanish Fork Interchange – 2050 Build Traffic and Safety Analysis

The Utah Department of Transportation (UDOT) is performing an environmental study for a potential new interchange on I-15 at Springville 1600 South / Spanish Fork 2700 North, which is approximately milepost 258 where there is an existing overpass. The environmental study is also considering potential widening of 1600 South / 2700 North from Spanish Fork Main Street to State Street (SR-51) to meet the increased demand associated with the interchange. The new interchange would provide access to and from south Springville, north Spanish Fork, and Mapleton. This memorandum summarizes the traffic evaluation for the future 2050 Build conditions, and the interim 2035 Build conditions and is companion to the I-15; Springville/Spanish Fork Interchange - Existing and 2050 No Build Traffic Analysis memo dated May 7, 2020. For this analysis, the study area consists of the 1600 South / 2700 North corridor and I-15 from north of the Springville 400 South interchange to south of the Spanish Fork Main Street interchange, as illustrated in **Figure 1**.

**Figure 1.** I-15 and Adjacent Intersections Study Area

# 1 ANALYSIS METHODOLOGY

## 1.1 Traffic Operations Analysis Methodology

For traffic operations analysis, the Vissim software was selected because it allows for the evaluation of freeways, closely spaced intersections, and the interaction between the two facilities. Vissim allows for driving behaviors to be modified, can measure queue lengths at intersections, and can measure freeway performance which

collectively were used to calibrate the model to observed conditions. The study area was modeled as a network; however, the analysis was completed for each intersection independently.

The analysis consists of a future build year (2050) analysis, an interim year (2035) analysis and interchange sensitivity tests for the future build year. The following sub-sections discuss the measures of effectiveness used for the traffic operations analysis. The remaining document elaborates the results derived from the Vissim analysis and how the different alternatives are going to affect the study area traffic in future years.

### 1.1.1 Measures of Effectiveness

The operational analysis is based upon Vissim output correlated to the *Highway Capacity Manual (HCM) 6th Edition* methodologies, which describes how transportation system performance can be measured and ranked by level of service (LOS). LOS is measured quantitatively and reported on a scale from A to F, with A representing the best performance and F the worst. Different types of transportation facilities use different criteria to determine LOS. Three different types of facilities were analyzed for this study using the following criteria:

- **Intersections** – LOS is based on average vehicle delay measured in seconds per vehicle. Delay and LOS are determined for each individual turning movement, approach, and the overall intersection. For signalized intersections, the overall intersection LOS is most commonly reported, while for unsignalized intersections, LOS is most commonly reported based for the approach with the highest delay. Another important measure of effectiveness is 95th percentile queue length for each turning movement and is the vehicle queue distance that will only be exceeded five percent of the time during the analysis period and helps identify issues such as queuing between intersections and queues that exceed their turning movement storage.
- **Arterial Streets** – LOS is based on average travel speeds and is determined for each segment and for the overall roadway corridor. LOS thresholds vary based on the speed limit of the study roadway.
- **Freeways** – LOS is based on average vehicle density per lane and is determined for each freeway segment. The density is calculated by dividing the hourly flow by the average speed of vehicles on the freeway segment divided by the number of lanes on that segment. There are three different types of freeway segments for which LOS is determined: basic (i.e. segments with no interchange interaction), merge/diverge, and weaving, each of which have slightly different density to LOS thresholds.

**Tables 1-3** provide details regarding LOS criteria thresholds for each of the roadway facility types: intersection, arterial, and freeway, respectively.

**Table 1.** Intersection Level of Service Criteria

| Level of Service | Traffic Conditions | Average Delay (seconds/vehicle) | |
|---|---|---|---|
| | | Unsignalized | Signalized |
| A | Free Flow Operations / Insignificant Delay | 0 ≤ 10 | 0 ≤ 10 |
| B | Smooth Operations / Short Delays | >10.0 and ≤ 15.0 | > 10 and ≤ 20 |
| C | Stable Operations / Acceptable Delays | >15.0 and ≤ 25.0 | > 20 and ≤ 35 |
| D | Approaching Unstable Operations / Tolerable Delays | >25.0 and ≤ 35.0 | > 35 and ≤ 55 |
| E | Unstable Operations / Significant Delays Begin | >35.0 and ≤ 50.0 | > 55 and ≤ 80 |
| F | Very Poor Operations / Excessive Delays Occur | > 50.0 | > 80 |

*Source:* Highway Capacity Manual 6th Edition, *Transportation Research Board National Research Council, Washington D.C*

**Table 2.** Arterial Level of Service Criteria

| LOS | Travel Speed Threshold by Base Free-Flow Speed (mph) | | | | | | |
|---|---|---|---|---|---|---|---|
| | 25 | 30 | 35 | 40 | 45 | 50 | 55 |
| A | > 20 | > 24 | > 28 | > 32 | > 36 | > 40 | > 44 |
| B | > 17 | > 20 | > 23 | > 27 | > 30 | > 34 | > 37 |
| C | > 13 | > 15 | > 18 | > 20 | > 23 | > 25 | > 28 |
| D | > 10 | > 12 | > 14 | > 16 | > 18 | > 20 | > 22 |
| E | > 8 | > 9 | > 11 | > 12 | > 14 | > 15 | > 17 |
| F | ≤ 8 | ≤ 9 | ≤ 11 | ≤ 12 | ≤ 14 | ≤ 15 | ≤ 17 |

*Source:* Highway Capacity Manual 6th Edition, *Transportation Research Board National Research Council, Washington D.C*

**Table 3.** Freeway Segment Level of Service Criteria

| Level of Service | Average Basic Freeway Density (passenger car/mile/lane) | Average Merge/Diverge Freeway Density (passenger car/mile/lane) | Average Weave Freeway Density (passenger car/mile/lane) |
|---|---|---|---|
| A | 0 ≤ 11.0 | 0 ≤ 10.0 | 0 ≤ 10.0 |
| B | > 11.0 and ≤ 18.0 | > 10.0 and ≤ 20.0 | > 10.0 and ≤ 20.0 |
| C | > 18.0 and ≤ 26.0 | > 20.0 and ≤ 28.0 | > 20.0 and ≤ 28.0 |
| D | > 26.0 and ≤ 35.0 | > 28.0 and ≤ 35.0 | > 28.0 and ≤ 35.0 |
| E | > 35.0 and ≤ 45.0 | > 35.0 | > 35.0 and ≤ 43.0 |
| F | > 45.0 | Demand exceeds capacity | > 43.0 |

*Source:* Highway Capacity Manual 6th Edition, *Transportation Research Board National Research Council, Washington D.C*

### 1.1.2 Model Calibration

Vissim model calibration focused on matching observed queues, travel times, and vehicle behavior to observed conditions. The objective of the model calibration was to obtain the best match possible between model results and the field data. The traffic model calibration focused on matching traffic volumes, observed queues, and vehicle behavior to existing travel patterns within the study area. During the Vissim calibration, model outputs were compared against field data to determine if the model output reflected observed traffic conditions and driving behaviors were adjusted as necessary to replicate existing travel times, delays, and queues.

It was determined through the calibration effort that the Vissim parameters for additive and multiplicative part of safety distance needed to be increased to replicate existing queues and travel times along 400 South. Look ahead distance, priority rules and conflict areas were also used to help mimic existing driver behavior between intersections and driveways to prevent unrealistic gridlocked conditions in the model.

## 1.2 Safety Analysis Methodology

Two types of safety analyses were performed for this study:

- **Analysis of Historic Crash Data** – Crash data was provided by UDOT through the crash query tool included as part of UDOT's online safety tools[1]. The query tool was used to filter crashes based on location within the study area and the year the crash occurred. Six years of crash data from 2014-2019 were filtered to include those crashes occurring on 1600 South, I-15, US-6, and Main Street (SR-156), and

[1] This data is protected under 23 USC 409 (Source: UDOT, January 1, 2010 through December 31, 2019).

400 South (SR-77) within the study area boundaries. Note that the 2019 data was not complete and is being validated by UDOT. The analysis was performed using ESRI GIS tools and Excel based spreadsheets to compile, aggregate and display results of the analysis.

- **Analysis Based on Highway Safety Manual Method** – For the safety evaluation of future conditions, the methodology described in Chapter 18 of the *Highway Safety Manual* (HSM) was used to predict average crash rates. The HSM uses national safety data, traffic volumes, and roadway segment characteristics, including number of lanes, length, speed, curvature, and lane, shoulder, and median widths to predict average crash frequencies. Each change in any of these attributes creates a new analysis segment. There are two types of urban freeway segments: mainline and speed-change lanes. The mainline segments include general purpose lanes and auxiliary lanes longer than 0.3 miles in length. Speed-change lanes are auxiliary acceleration or deceleration lanes less than 0.3 miles long and are adjacent to mainline segments. High Occupancy Vehicle and toll lanes are excluded from the analysis. The methodology does not provide directional crash frequencies and does not account for congested conditions due to interchange queuing. HSM analyses were performed for existing conditions and the future build and no build alternatives.

# 2 2050 BUILD ALTERNATIVES ANALYSIS

For the purposes of the build alternatives analysis, proposed alternatives for the new interchange at 1600 South were developed using projected 2050 traffic volumes. The two interchange alternatives analyzed are a Diamond Interchange and a Single Point Urban Interchange (SPUI). Three build alternatives for widening 1600 South / 2700 North were analyzed, each with different widening limits. The following sections describe the alternatives in more detail.

## 2.1 Build Alternatives

### 2.1.1 Interchange Alternatives

Both interchange alternatives have the same cross-section on 1600 South tying into the interchange. The conceptual design of the Diamond Interchange alternative is illustrated in **Figure 2**.

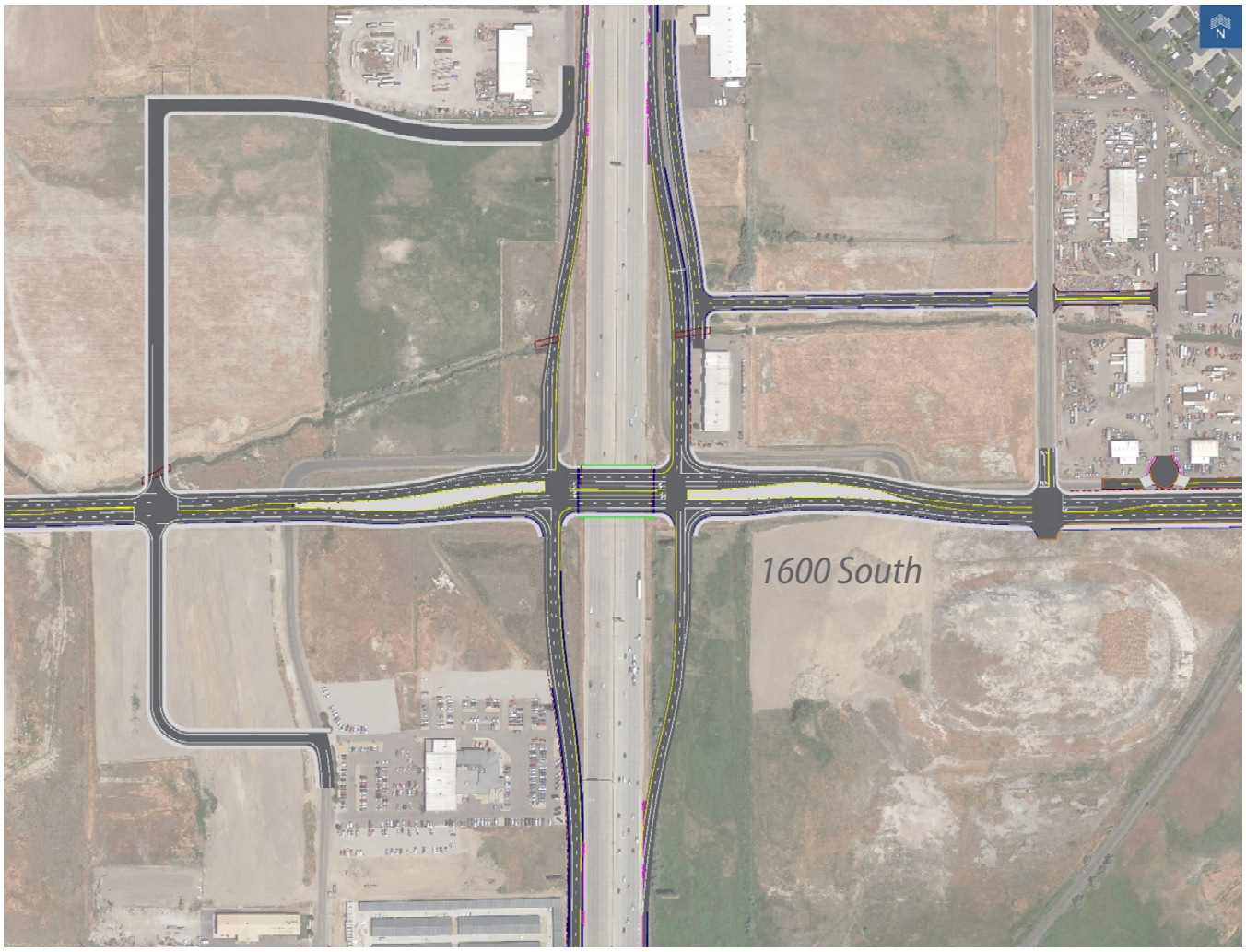



**Figure 2.** Diamond Interchange Alternative Concept Design

The SPUI alternative combines the interchange ramps into a single location on 1600 South. **Figure 3** shows the conceptual design of the SPUI alternative.

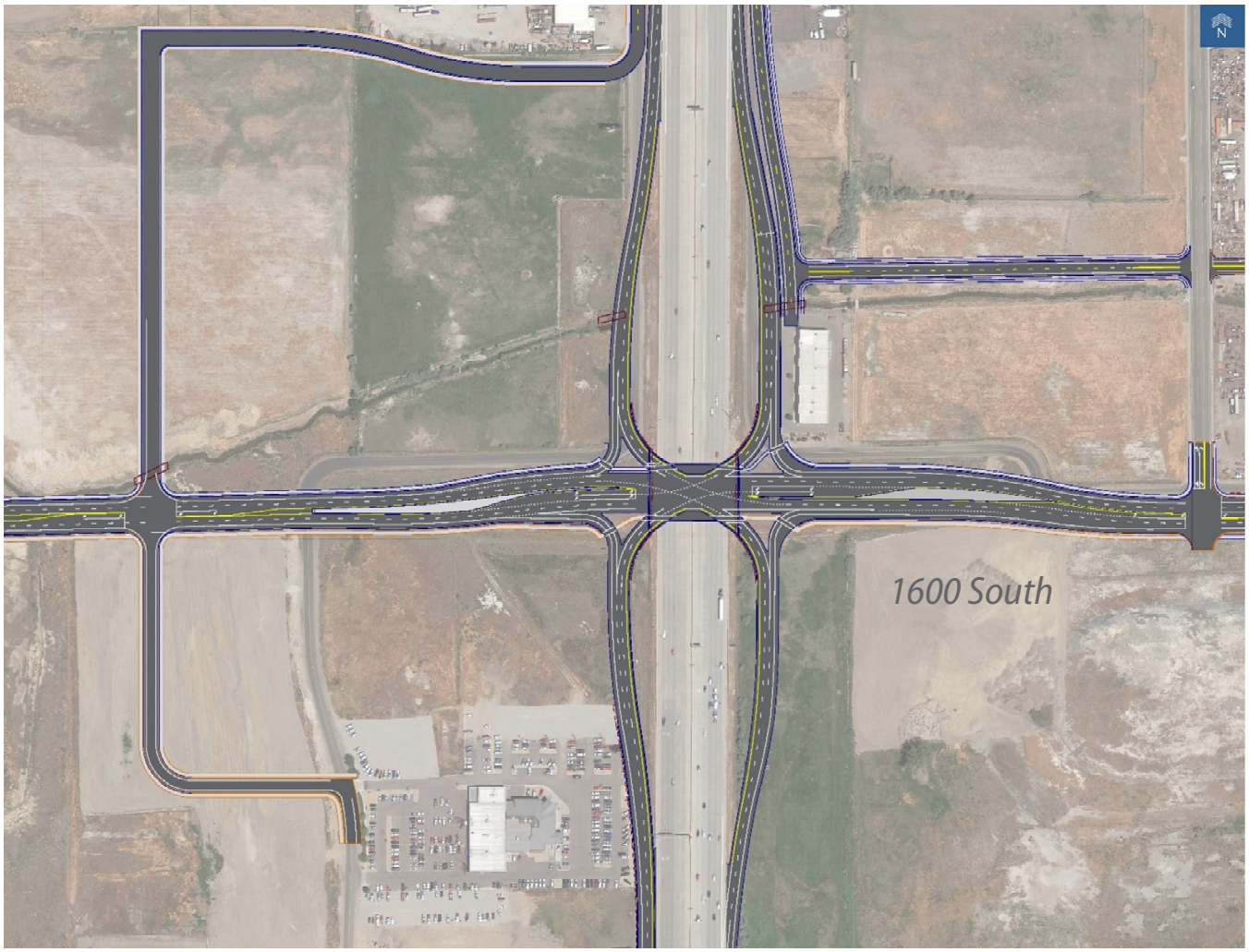



**Figure 3.** SPUI Alternative Concept Design

### 2.1.2 1600 South / 2700 North Alternatives

Three 1600 South / 2700 North corridor widening alternatives were analyzed in conjunction with an interchange build alternative to determine the limits for widening the 1600 South / 2700 North corridor. The alternatives analyzed were:

- Widening from 350 East to 1750 West
- Widening from Spanish Fork Main Street to 1200 West / Canyon Creek Parkway
- Widening from Spanish Fork Main Street to SR-51 (State Street)

Each alternative assumed the SPUI for the interchange alternative and that the widened portion of the corridor would have two travel lanes in each direction. A center two-way left-turn lane and improved shoulders with bicycle lanes were assumed for the entire corridor for all alternatives.

## 2.2 Interchange Alternative Analysis

The analysis results presented in this section include intersection delay, LOS, travel times, and 95th percentile queue lengths. For the 2050 Build analysis, the 2050 No Build analysis are used as a baseline against which to compare the build alternatives. The WFRC travel model was used to develop future study area traffic volumes for each build alternative. The peak hour volumes for each alternative are presented in figures located in Appendix A: Peak Hour Volumes. It was assumed that there would be relatively low cost, operational modifications to the I-15 & 400 South interchange and the 1750 West & 400 South intersection to increase their capacity to allow them to better meet future traffic demands. These modifications, which are too minor to be included in the RTP, consist of widening the off-ramps to have triple southbound left turn lanes and dual northbound right turn lanes. At the 1750 West intersection, it was assumed that 400 South would be widened to a three through lanes in each direction through the intersection and that there would be an eastbound right-turn pocket and southbound dual-right turn lanes.

### 2.2.1 Interchange Performance

The following sections present the evaluation of traffic operations and queue lengths for the study area with the proposed 1600 South & I-15 interchange alternatives. **Table 4** presents the level of service (LOS) and delay in seconds per vehicle for the AM and PM peak hours of the 2050 No Build and Build alternatives. Figures showing the intersection level of service by movement can be found in Appendix B: Level of Service Figures.

**Table 4.** 2050 No Build and Build Intersection Delay and Level of Service

| Location | 2050 AM Peak Hour | | | 2050 PM Peak Hour | | |
|---|---|---|---|---|---|---|
| | No Build[1] | Diamond[1] | SPUI[1] | No Build[1] | Diamond[1] | SPUI[1] |
| 400 South & I-15 Interchange | C / 26 | C /27 | C / 29 | F / 164 | D / 46 | D / 46 |
| 1600 South & I-15 Interchange | - | B / 11 | B / 18 | - | C / 20 | C / 22 |
| US-6 & 1000 North/Canyon Creek Pkwy | D / 39 | D / 39 | D / 39 | D / 44 | D / 39 | D / 39 |
| Spanish Fork Main Street & I-15 Interchange | C / 23 | C / 24 | C / 24 | C / 26 | C / 28 | C / 28 |
| Spanish Fork Main Street & 1000 North | B / 15 | B / 14 | B / 14 | C / 26 | C / 24 | C / 24 |

1. Average delay reported in seconds/vehicle

Comparing the delay per vehicle shows relatively little difference between alternatives. Both the Diamond and SPUI interchange alternatives operate well and the surrounding intersections also perform similarly.

The 95th percentile queue lengths presented in **Table 5** are of the I-15 ramp approaches with the longest queue lengths from the 2050 No Build analysis with the comparable 95th percentile queues of the proposed 2050 Diamond and SPUI alternatives. Both alternatives generally reduce the 95th percentile queues associated with the No Build. In particular, the queue for the southbound off-ramp at 400 South is expected to decrease by over 1,600 feet in the build alternatives. Comparing the 95th percentile queues shows relatively little difference between alternatives.

**Table 5.** 2050 No Build and Build Interchange 95th Percentile Queue Lengths

| Intersection | Approach | 2050 AM Peak Hour | | | 2050 PM Hour | | |
|---|---|---|---|---|---|---|---|
| | | No Build (feet) | Diamond (feet) | SPUI (feet) | No Build (feet) | Diamond (feet) | SPUI (feet) |
| 400 South & I-15 | NB Off-Ramp | 400 | 250 | 225 | 1,000 | 475 | 575 |
| 400 South & I-15 | SB Off-Ramp | 275 | 275 | 275 | 3,125 | 1,150 | 1,050 |
| 1600 South & I-15 | NB Off-Ramp | - | 150 | 125 | - | 275 | 100 |
| 1600 South & I-15 | SB Off-Ramp | - | 75 | 125 | - | 150 | 200 |
| Main Street & I-15 | NB Off-Ramp | 200 | 175 | 300 | 400 | 450 | 425 |
| Main Street & I-15 | SB Off-Ramp | 100 | 100 | 150 | 450 | 325 | 325 |

### 2.2.2 Freeway Performance

**Figure 4** presents the 2050 AM freeway LOS and speeds for the No Build, SPUI, and Diamond Interchange alternatives. During the AM peak hour, the No Build has one northbound segment at LOS D, and the Diamond Interchange and SPUI alternatives have a second segment at LOS D. The northbound segments with LOS D are the diverge to Spanish Fork Main Street / US-6 and the basic freeway segment where a general-purpose lane becomes an Express Lane. All other segments are LOS C or better with no segments at LOS E/F. However, it should be noted that these results assume the planned widening with an additional general-purpose lane as discussed previously, along with the new parallel freeway west of I-15.

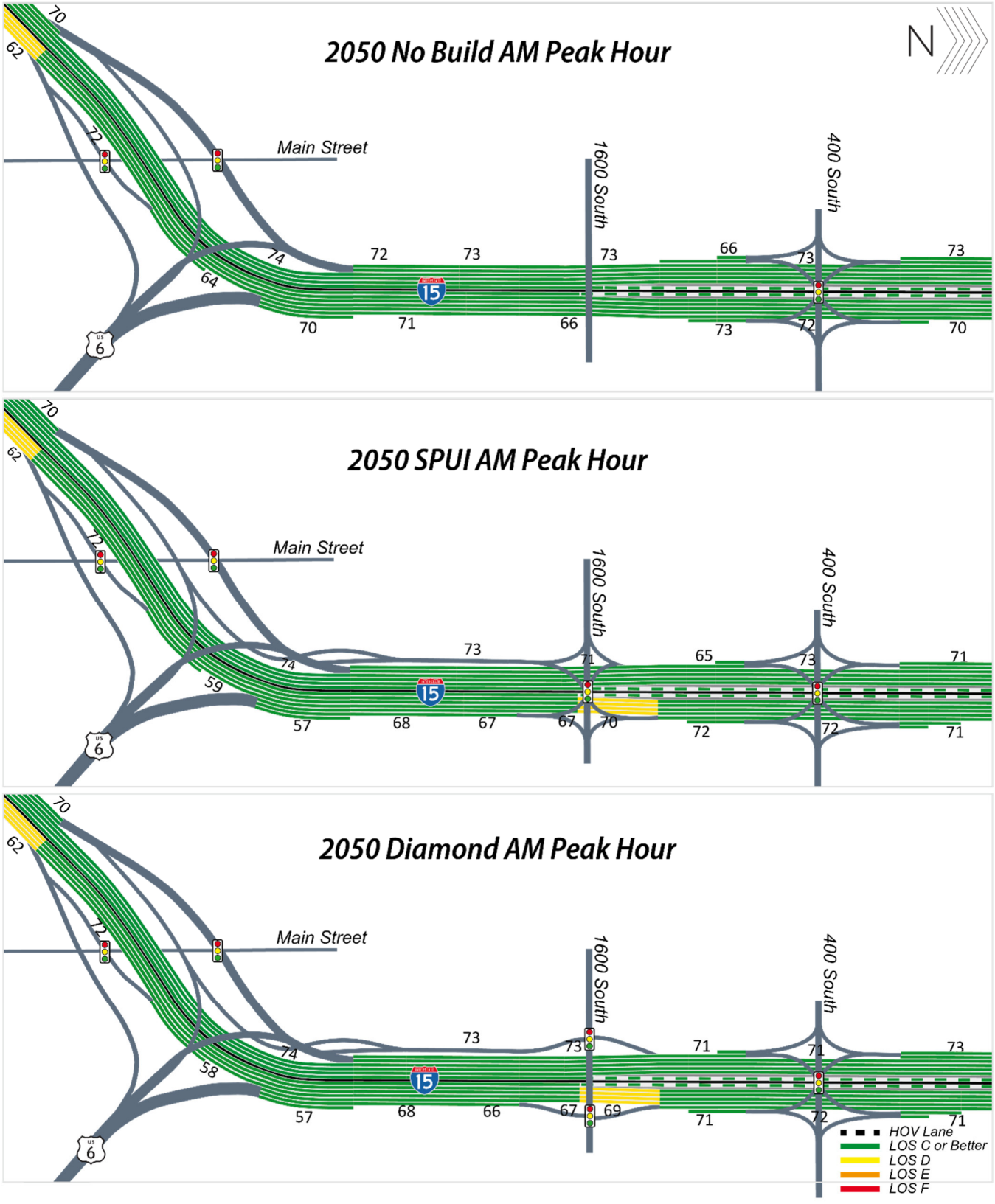



**Figure 4.** 2050 AM Freeway LOS & Speeds

**Figure 5** presents the 2050 PM freeway LOS and speeds for the No Build, SPUI, and Diamond Interchange alternatives.

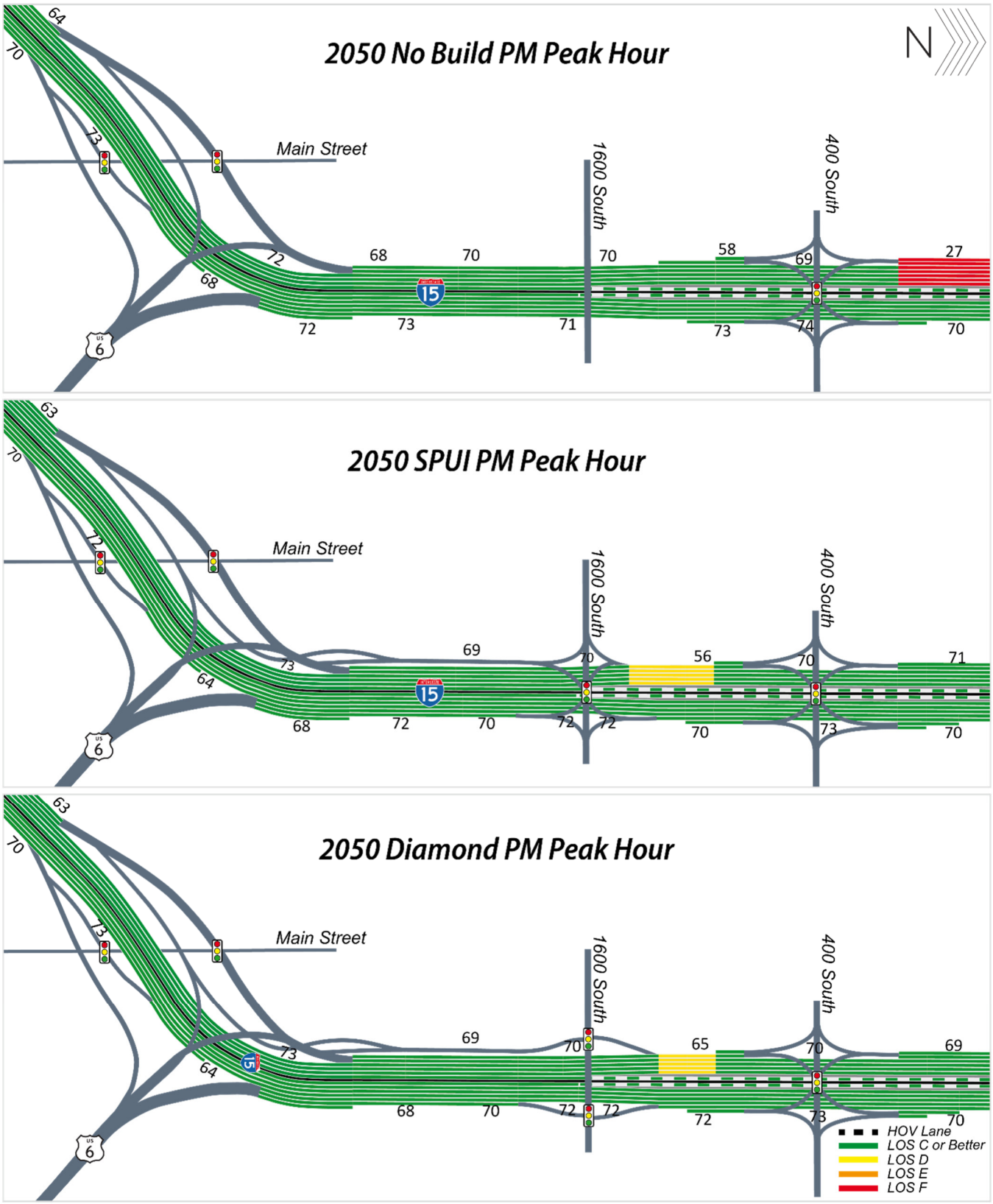



**Figure 5.** 2050 PM Freeway LOS & Speeds

During the PM peak hour, for the No Build conditions. the southbound diverge to 400 South is at LOS F due queuing at the ramp terminal that extends onto mainline I-15. The SPUI and Diamond alternatives improve this to a LOS C condition with an additional LOS C segment at the southbound diverge to 1600 South. All remaining segments are at LOS C or better.

## 2.3 1600 South / 2700 North Corridor

The following sections present the corridor evaluation of traffic operations for the three 1600 South / 2700 North corridor widening alternatives, each of which assumed a new I-15 interchange. Intersection and corridor results are presented in the following sections. As presented in the Existing and No Build Traffic Memo, the 1600 South / 2700 North corridor operates effectively under No Build conditions. However, adding an interchange essentially doubles 2050 corridor traffic volumes. The purpose of this analysis is to determine how much of the corridor should be widened to accommodate the anticipated 2050 demand. A sensitivity test using the MAG travel model showed that the corridor volumes with an interchange would be approximately the same regardless of the widening alternative, therefore the same build volumes were assumed for all three alternatives.

### 2.3.1 Intersection Performance

**Figures 6** and **7** on the following pages present the intersection performance for the three widening alternatives by individual movement and for the overall intersection at signalized intersections and for the approach with the highest delay for unsignalized intersections for the 2050 AM and PM peak hours, respectively. The intersection performance for each alternative is described below.

#### WIDENING FROM 350 EAST TO 1750 WEST

As shown in **Figure 7**, six of the eight corridor study intersections would operate at LOS E or F in the 2050 PM peak hour under this alternative. The most critical intersection is 1750 West where the volume projections are for nearly 1,200 westbound through vehicles. This is more than a single lane can handle, causing queues to back through adjacent intersections leading to catastrophic failure throughout the system. There are no intersections that operate at LOS E or F in the 2050 AM peak hour.

#### WIDENING FROM SPANISH FORK MAIN STREET TO 1200 WEST / CANYON CREEK PARKWAY

This alternative operates well with a single unsignalized intersection at LOS E in the 2050 PM peak hour. This is at 950 West where the southbound left and through turn movements are shown at LOS F with 55 seconds of delay per vehicle, which is just over the LOS F threshold of 50 seconds. There are no intersections that operate at LOS E or F in the 2050 AM peak hour.

#### WIDENING FROM SPANISH FORK MAIN STREET TO SR-51 (STATE STREET)

This full widening alternative does not have any intersections at LOS E or F in either the 2050 AM or PM peak hours.

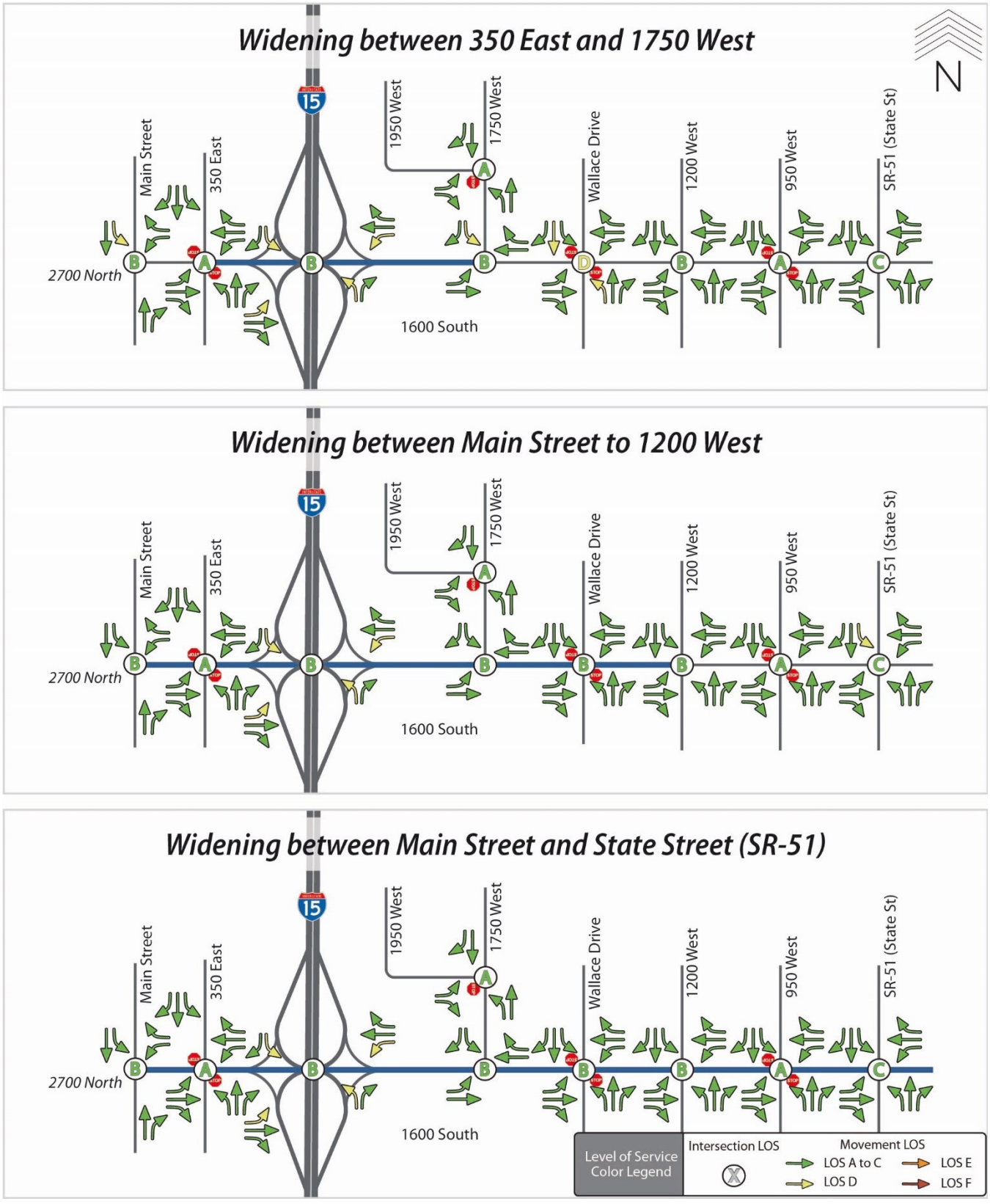



**Figure 6.** 1600 South / 2700 North 2050 AM Intersection LOS

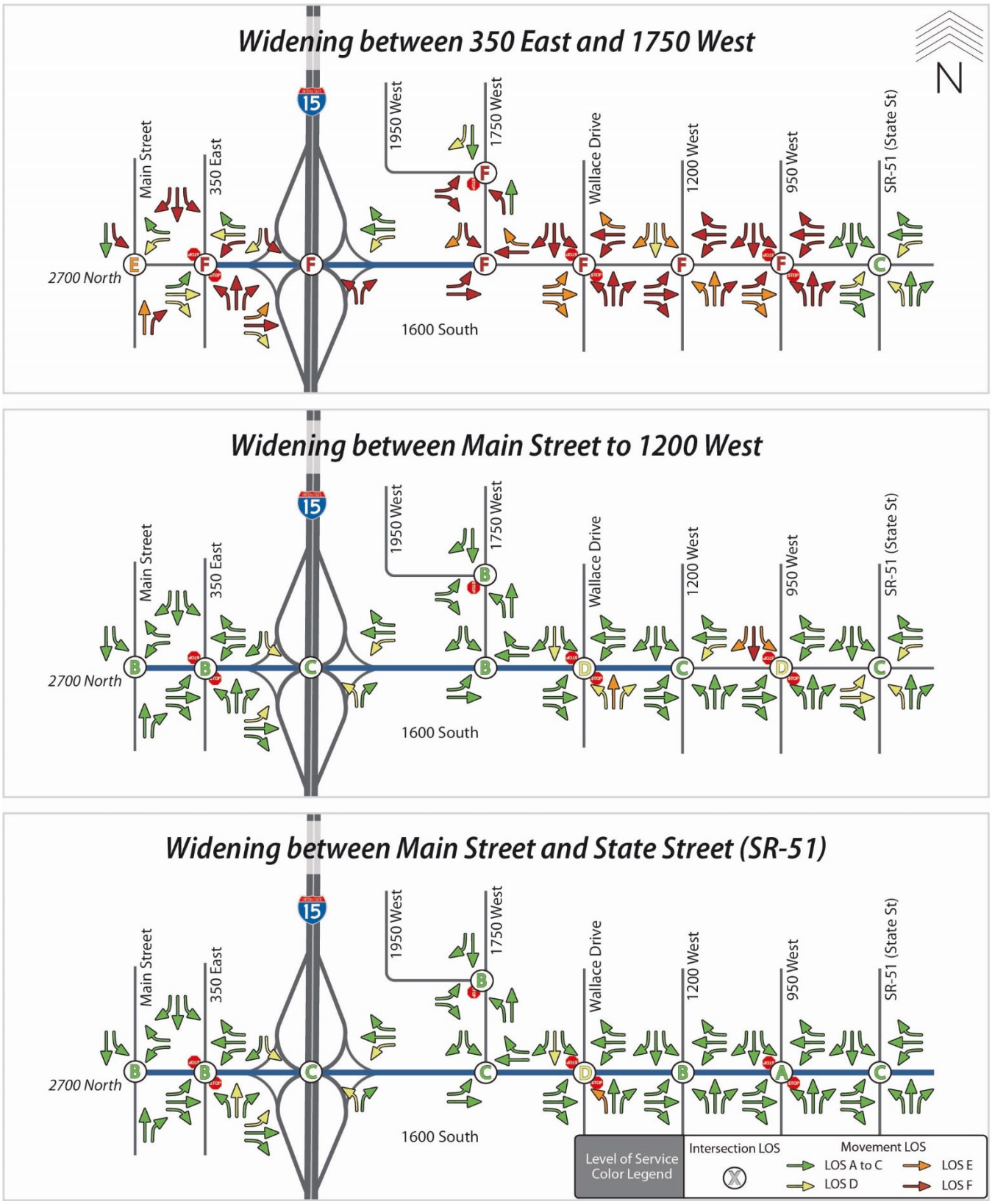



**Figure 7.** 1600 South / 2700 North 2050 PM Intersection LOS

### 2.3.2 Arterial Performance

**Table 6** shows the travel times for each of the widening alternatives for 1600 South / 2700 North.

**Table 6.** 2050 Segment Travel Times for Widening Alternatives

| Travel Time Segment | | 2050 AM Peak Hour | | | 2050 PM Peak Hour | | |
|---|---|---|---|---|---|---|---|
| | | 200 E. to 1750 W. (min.) | Main St. to 1200 W. (min.) | Main St. to State St. (min.) | 200 E. to 1750 W. (min.) | Main St. to 1200 W. (min.) | Main St. to State St. (min.) |
| Eastbound | Main Street to 350 East | 0.5 | 0.5 | 0.5 | 0.8 | 0.5 | 0.5 |
| | 350 East to I-15 Interchange | 0.6 | 0.5 | 0.5 | 2.3 | 0.7 | 0.7 |
| | I-15 Interchange to 1750 West | 0.5 | 0.4 | 0.4 | 2.3 | 0.5 | 0.5 |
| | 1750 W to Wallace Dr (1400 W) | 0.6 | 0.6 | 0.6 | 1.5 | 0.6 | 0.6 |
| | Wallace Dr (1400 W) to 1200 W | 0.5 | 0.5 | 0.5 | 1.6 | 0.7 | 0.6 |
| | 1200 West to 950 West | 0.5 | 0.5 | 0.5 | 1.3 | 0.6 | 0.5 |
| | 950 West to SR-51 (State Street) | 1.6 | 1.6 | 1.8 | 1.9 | 1.9 | 1.9 |
| | **Eastbound Total** | 4.8 | 4.7 | 4.8 | 11.6 | 5.5 | 5.2 |
| Westbound | SR-51 (State Street) to 950 West | 1.6 | 1.5 | 1.5 | 3.2 | 1.5 | 1.4 |
| | 950 West to 1200 West | 1.0 | 0.8 | 0.7 | 2.7 | 0.8 | 0.7 |
| | 1200 W to Wallace Dr (1200 W) | 0.6 | 0.4 | 0.4 | 1.3 | 0.4 | 0.4 |
| | Wallace Dr (1400 W) to 1750 W | 1.1 | 0.7 | 0.7 | 1.9 | 0.9 | 0.9 |
| | 1750 West to I-15 Interchange | 0.7 | 0.7 | 0.7 | 0.8 | 0.8 | 0.8 |
| | I-15 Interchange to 350 East | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 |
| | 350 East to Main Street | 0.8 | 0.8 | 0.7 | 0.9 | 0.9 | 0.9 |
| | **Westbound Total** | 6.1 | 5.1 | 4.9 | 11.2 | 5.5 | 5.3 |

For the widening between Main Street and 1200 West and between Main Street and State Street, the travel times are comparable for both the AM and PM peak hours. However, for the widening between 350 East and 1750 West, the travel time significantly increases during the PM peak hour. The associated LOS and speeds for the widening alternatives for 1600 South / 2700 North are shown in **Table 7**.

**Table 7.** 2050 Segment Arterial LOS and Speed for Widening Alternatives

| Travel Time Segment | | 2050 AM Peak Hour | | | 2050 PM Peak Hour | | |
|---|---|---|---|---|---|---|---|
| | | 200 E. to 1750 W. (mph) | Main St. to 1200 W. (mph) | Main St. to State St. (mph) | 200 E. to 1750 W. (mph) | Main St. to 1200 W. (mph) | Main St. to State St. (mph) |
| Eastbound | Main Street to 350 East | A / 32 | A / 33 | A / 33 | C / 21 | A / 32 | A / 32 |
| | 350 East to 1950 West | C / 21 | C / 21 | C / 21 | F / 5 | D / 17 | D / 17 |
| | 1950 West to 1750 West | A / 30 | A / 34 | A / 34 | F / 6 | A / 28 | A / 28 |
| | 1750 West to Wallace Lane | A / 32 | A / 34 | A / 34 | E / 13 | A / 32 | A / 32 |
| | Wallace Lane to 1200 West | B / 24 | B / 26 | B / 27 | F / 8 | C / 18 | C / 23 |
| | 1200 West to 950 West | A / 33 | A / 33 | A / 34 | D / 14 | A / 32 | A / 33 |
| | 950 West to State Street | A / 29 | A / 29 | B / 26 | B / 25 | B / 24 | B / 25 |
| | **Eastbound Total** | **A / 29** | **A / 30** | **A / 29** | **E / 12** | **B / 25** | **B / 26** |
| Westbound | State Street to 950 West | A / 29 | A / 32 | A / 33 | D / 15 | A / 32 | A / 33 |
| | 950 West to 1200 West | D / 18 | C / 23 | B / 26 | F / 6 | C / 21 | B / 24 |
| | 1200 West to Wallace Lane | C / 21 | A / 34 | A / 34 | F / 10 | A / 34 | A / 33 |
| | Wallace Lane to 1750 West | D / 18 | B / 27 | B / 27 | F / 10 | C / 23 | B / 23 |
| | 1750 West to 1950 West | C / 21 | C / 21 | C / 21 | D / 17 | D / 18 | D / 18 |
| | 1950 West to 350 East | A / 40 | A / 40 | A / 40 | A / 34 | A / 40 | A / 41 |
| | 350 East to Main Street | D / 18 | D / 18 | C / 21 | D / 17 | D / 17 | D / 17 |
| | **Westbound Total** | **C / 23** | **B / 27** | **A / 28** | **E / 12** | **B / 25** | **B / 26** |

For the widening alternatives between Main Street and 1200 West and between Main Street and State Street, the 1600 South / 2700 North corridor operates at acceptable LOS. For the widening between 350 East and 1750 West, there are three segments that operate at LOS F in both the eastbound and westbound directions during the peak hour.

# 3 INTERIM YEAR (2035) ANALYSIS

Due to funding constraints, the entire build alternative from the EA will not be built at once. Instead, the project will be built in two phases. An interim year analysis for phase 1 of the interchange was performed for 2035 for what might be an initial build condition that would add ramps to the existing 1600 South / 2700 North bridge over I-15 and widen the 1600 South / 2700 North corridor to a five-lane cross-section. The analysis was performed for 2035 Build and No Build conditions. Per the MAG RTP, it was assumed that the following projects near the study area would be constructed by 2035:

- Widening Spanish Fork Main Street to five lanes
- Constructing Springville 1200 West / Canyon Creek Parkway as a five-lane road

The same relatively low cost, operational modifications to the I-15 & 400 South interchange and the 1750 West & 400 South intersection assumed for the 2050 interchange analysis were also assumed for the 2035 analysis, namely widening the off-ramps to have triple southbound left turn lanes and dual northbound right turn lanes, three east-west through lanes at 1750 West along with an exclusive eastbound right-turn lane and southbound dual-right turn lanes.

For the build analysis, it was assumed that a diamond interchange would be added at 1600 South / 2700 North to provide full access to I-15. Because the existing bridge would be used, the diamond interchange would have single through and left-turn lanes instead of the dual left-turn lanes assumed for the 2050 analysis. **Figure 8** shows the diamond interchange concept design.

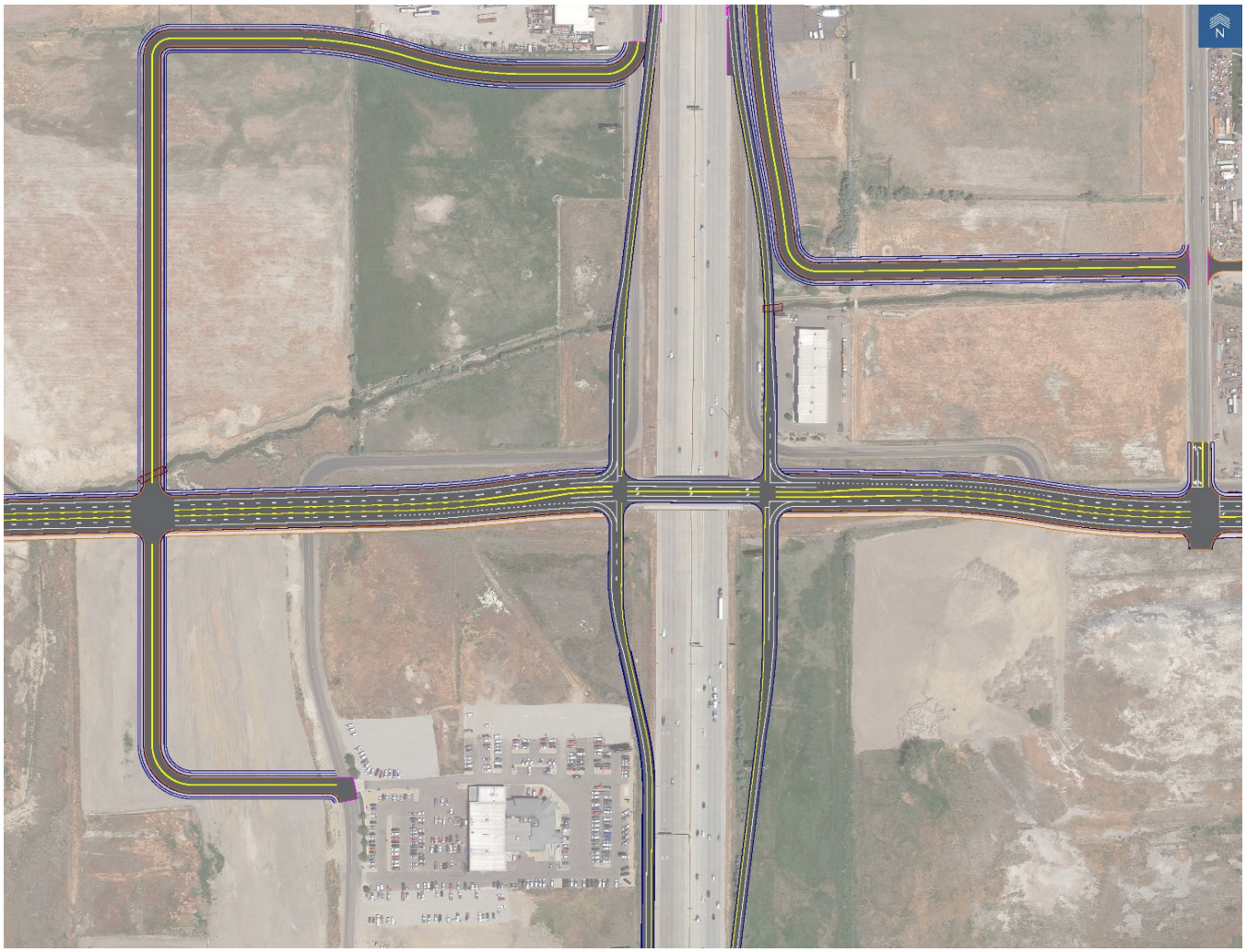


**Figure 8:** 1600 South I-15 Interchange Concept Design

One of the challenges associated with the interim condition is how the southbound on-ramp from the new 1600 South interchange should connect to I-15. Due to the close proximity of the US-6 / Spanish Fork Main Street off-ramp, the study team felt that a typical ramp onto I-15 would be problematic by introducing new multi-lane vehicle weaving movements that would have to be made in a short distance and that would lead to operational and safety issues. Therefore, for this analysis it was assumed that the southbound on-ramp would not merge with I-15 mainline immediately, but rather would run parallel to I-15 for approximately 4,000 feet and merge onto the US-6 / Spanish Fork Main Street off-ramp. The vehicles would then have the choice to exit to Spanish Fork Main Street, turn right at the traffic signal that controls the SB I-15 to US-6 and US-6 to SB I-15 movements to get onto to I-15 or continue straight through that same signal to get onto US-6. It was assumed that a new southbound right turn pocket would be built at the signalized intersection to facilitate the right turns and that there would not be any right turns allowed on a red light. The concept design for the southbound on-ramp is shown in **Figure 9**. The study team did not see the same issue in the northbound direction because there would

be much more distance between the US-6 on-ramp and the 1600 South off-ramp than in the southbound direction.

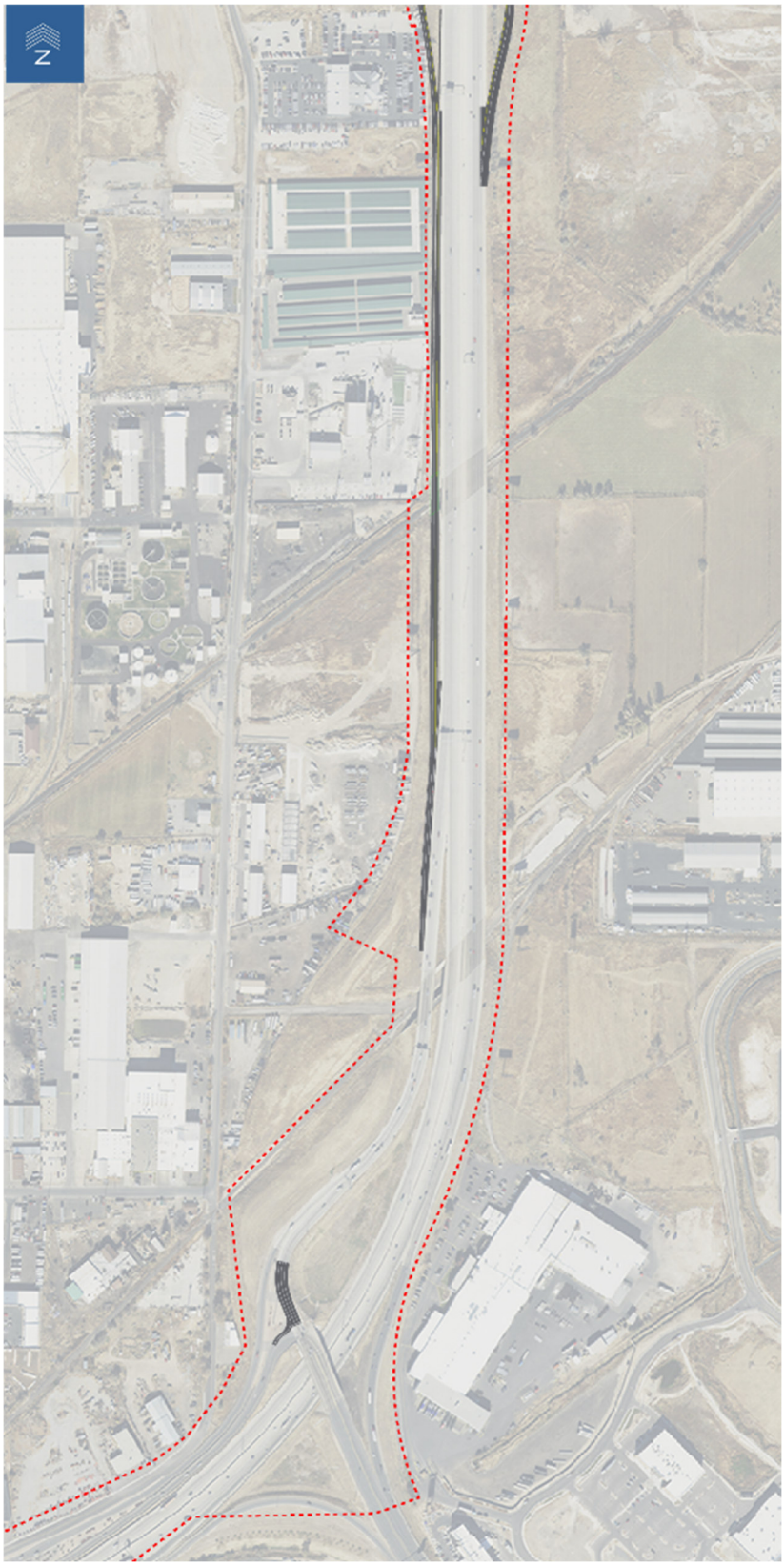



**Figure 9:** 1600 South Interchange Southbound On-ramp Concept Design

The analysis results presented in the following sub-sections include intersection delay, LOS, travel times, and 95th percentile queue lengths. For the 2035 Build analysis, the 2035 No Build analysis is used as the baseline for comparison. The WFRC travel model was used to develop future study area traffic volumes for the build alternative based on the assumed roadway network. The peak hour volumes for each alternative are presented in figures located in Appendix A: Peak Hour Volumes.

## 3.1 2035 Intersection and Interchange Performance

The following sections present the evaluation of traffic operations and queue lengths for the study area with the proposed interim 1600 South & I-15 interchange. **Table 8** presents the level of service (LOS) and delay in seconds per vehicle for the AM and PM peak hours of the 2035 No Build and Build scenario. Figures showing the intersection level of service by movement can be found in Appendix B: Level of Service Figures.

**Table 8.** 2035 No Build and Build Intersection Delay and Level of Service

| Location | 2035 AM Peak Hour | | 2035 PM Peak Hour | |
|---|---|---|---|---|
| | No Build[1] | Build[1] | No Build[1] | Build[1] |
| 400 South & I-15 Interchange | C / 23 | C / 22 | D / 40 | D / 31 |
| 400 South & 1750 West | C / 29 | C / 28 | D / 41 | D / 35 |
| 2700 North & Spanish Fork Main Street | A / 8 | A / 10 | B / 11 | B / 12 |
| 2700 North & 350 East[2] | A / 7 | A / 3 | A / 9 | A / 8 |
| 1600 S & I-15 Interchange | - | B / 16 | - | C / 30 |
| 1600 South & 1950 West[2] | A / 9 | A / 6 | B / 10 | A / 7 |
| 1600 South & 1750 West[2] | A / 7 | A / 6 | A / 9 | A / 10 |
| 1600 South & Wallace Drive[2] | B / 10 | A / 5 | C / 27 | A / 7 |
| 1600 South & 1200 West | B / 17 | B / 13 | B / 17 | B / 15 |
| 1600 South & 950 West[2] | A / 2 | A / 6 | A / 3 | A / 7 |
| 1600 South & SR-51 | B / 10 | A / 8 | C / 24 | B / 14 |
| US-6 & I-15 Southbound Ramps | B / 10 | A / 9 | B / 15 | C / 22 |
| US-6 & 1000 North/Canyon Creek Pkwy | D / 44 | D / 36 | E / 65 | E / 69 |
| Spanish Fork Main Street & I-15 Interchange | C / 29 | C / 24 | D / 40 | C / 35 |
| Spanish Fork Main Street & 1000 North | A / 10 | A / 9 | C / 23 | B / 20 |

1. Average delay reported in seconds/vehicle
2. Approach with the worst delay is reported for unsignalized intersections

Generally speaking, there is little difference between the no build and build analysis results. However, the new interchange would reduce the delay at the 400 South & I-15 interchange during the PM peak hour from 40 seconds per vehicle down to 31. The new diamond interchange at 1600 South & I-15 would operate at a LOS C during PM peak hour due to high volumes on the westbound left turn with just one turn lane.

The 95th percentile queue lengths presented in **Table 9** are of the I-15 ramp approaches with the longest queue lengths from the 2035 No Build analysis with the comparable 95th percentile queues of the Build analysis. For both AM and PM peak hours, the Build condition is expected to reduce 95th percentile queues compared to the No Build. However, the SB queue on the 400 South off-ramp is decreased significantly compared to the existing analysis due to the intersection improvements at the 400 South SPUI and 1750 West intersection.

**Table 9.** 2035 No Build and Build 95th Percentile Queue Lengths

| Approach | Intersection | 2035 AM | | 2035 PM | |
|---|---|---|---|---|---|
| | | No Build (feet) | Diamond (feet) | No Build (feet) | Diamond (feet) |
| NB Off-Ramp | 400 S & I-15 | 425 | 75 | 350 | 175 |
| SB Off-Ramp | 400 S & I-15 | 500 | 150 | 575 | 350 |
| NB Off-Ramp | 1600 S & I-15 | - | 100 | - | 125 |
| SB Off-Ramp | 1600 S & I-15 | - | 125 | - | 250 |
| NB Off-Ramp | Main St & I-15 | 300 | 225 | 175 | 75 |
| SB Off-Ramp | Main St & I-15 | 75 | 75 | 425 | 300 |

## 3.2 2035 Freeway Performance

**Figures 10** and **11** present the 2035 No Build and 2035 Build LOS and speeds. During the AM peak hour, one segment is at LOS D all other segments are LOS C or better. Nearly every segment operates at the same speed throughout the study area.

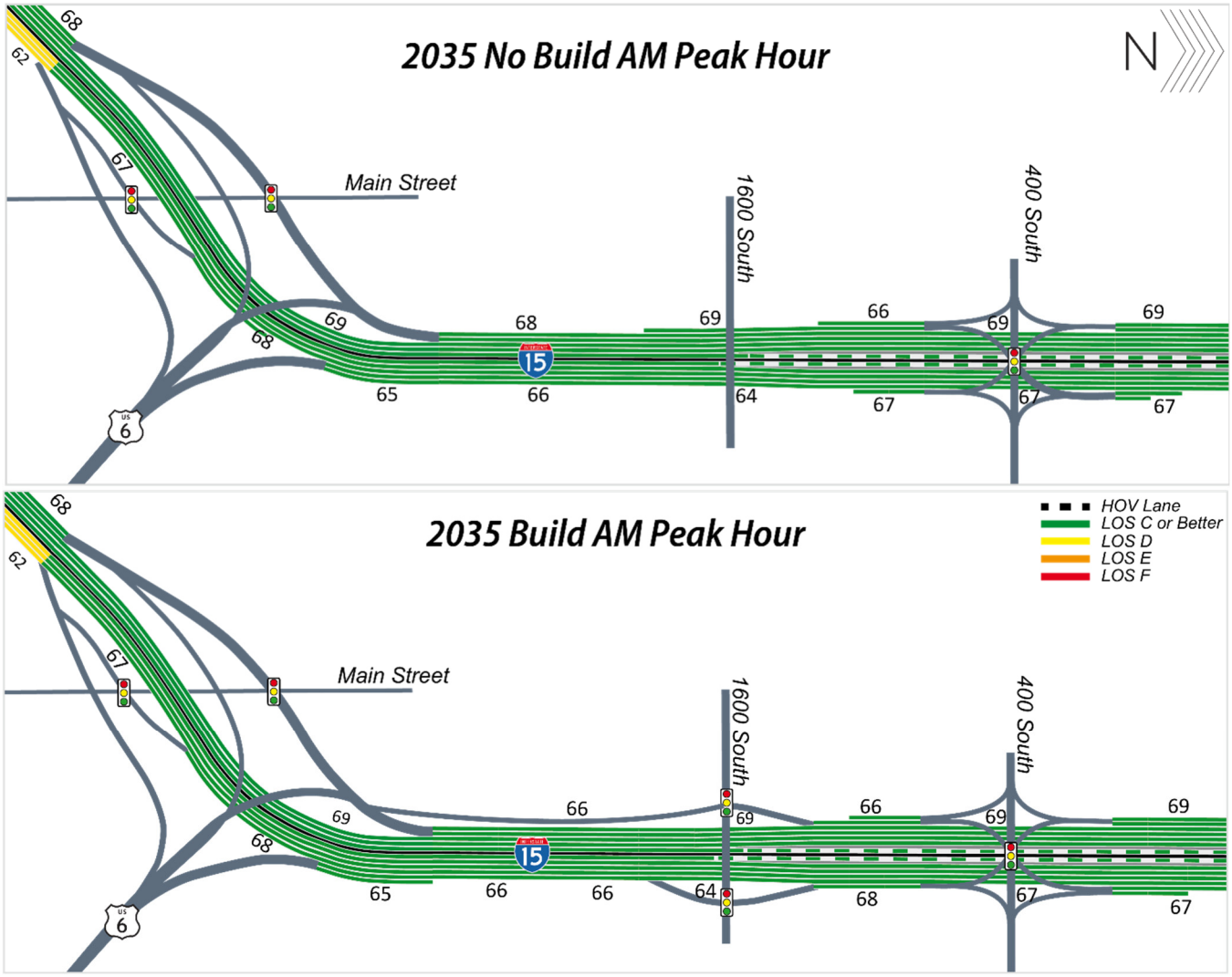



**Figure 10:** 2035 AM Freeway LOS and Speed (mph)

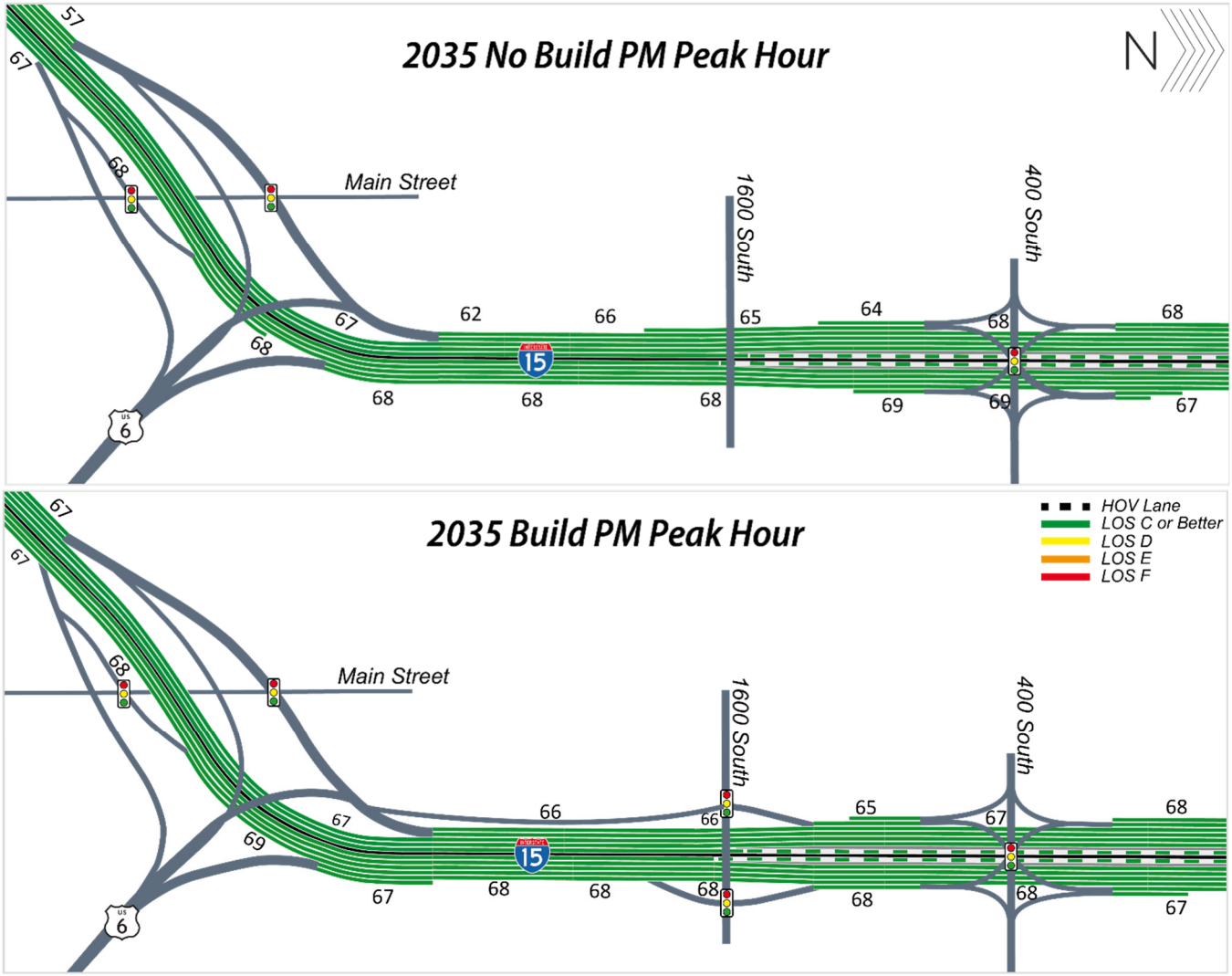



**Figure 11:** 2035 PM Freeway LOS and Speed (mph)

# 4 INTERCHANGE SENSITIVITY TESTS

Several sensitivity tests were performed for the 1600 South interchange to determine the importance of different geometric configurations and its resilience to future volume increases beyond those assumed for 2050 conditions.

## 4.1 Interchange Geometry Sensitivity

Several geometry sensitivity scenarios were analyzed for the 1600 South interchange for both the SPUI and Diamond alternatives. The geometric changes investigated included the number of left turn lanes and the traffic control for the right turn lanes (i.e. signalized or free). Each of the geometric options are compared to the base alternative presented in section 3. The lane configurations and intersection LOS for the 1600 South Interchange for each of the interchange geometry sensitivity test is shown in **Table 10**.

**Table 10.** 1600 South Interchange Geometry Sensitivity Test Results

| Scenario | Left Turns | | Right Turns | | Traffic Performance | |
|---|---|---|---|---|---|---|
| | NB/SB | EB/WB | NB/SB | EB/WB | AM | PM |
| SPUI Base | 2 | 2 | Free | Free | B / 19 | C / 22 |
| SPUI (Signalized Right Off-ramps) | 2 | 2 | Signalized | Free | B / 19 | C / 22 |
| SPUI (Single Lefts) | 1 | 1 | Free | Free | B / 19 | C / 23 |
| Diamond Base | 2 | 2 | Free | Free | B / 11 | C / 19 |
| Diamond (Single Lefts) | 1 | 1 | Signalized | Free | B / 17 | F / 90 |

The SPUI configuration operates at LOS B during the AM peak hour and LOS C during the PM peak hour in all three geometric configurations tested. The PM peak hour increases from 22 seconds of delay per vehicle to 23 seconds of delay per vehicle when single left turn lanes are used.

The diamond configuration operates at LOS B during the AM peak hour and LOS C during the PM peak hour in in the base configuration. When single lefts are used for the diamond interchange, the delay per vehicle increases from 11 seconds to 17 seconds during the AM peak hour. For the PM peak hour, the diamond is LOS F when single lefts are used.

## 4.2 Traffic Volume Sensitivity

Traffic volume sensitivity tests were analyzed to understand the traffic performance of the each of the SPUI and Diamond options. The volume sensitivity tests isolated the 1600 South interchange and increased the interchange volumes by 25, 50, and 75 percent for the PM peak hour. Each of the volume sensitivity tests used the SPUI and Diamond base options for the interchange geometry. The interchange LOS for the 1600 South interchange for each of the interchange volume sensitivity tests is shown in **Table 11**.

**Table 11.** 1600 South Interchange Volume Sensitivity LOS

| Scenario | Traffic Performance |
|---|---|
| | PM Peak Hour |
| SPUI Base | C / 22 |
| SPUI + 25% | C / 22 |
| SPUI + 50% | D / 38 |
| SPUI + 75% | E / 75 |
| Diamond Base | C / 19 |
| Diamond + 25% | C / 32 |
| Diamond + 50% | F / >100 |
| Diamond + 75% | F / >100 |

For the SPUI configuration, the interchange operates at acceptable LOS for volume increases of 25 and 50 percent, while serving 97 and 96 percent of volumes, respectively. For a volume increase of 75 percent, the SPUI operates at LOS E with 75 seconds of delay per vehicle, serving 70 percent of volumes indicating that the vehicle demand would exceed the capacity by approximately 30%.

The Diamond interchange operates at LOS C and served 97 percent of volumes for a volume increase of 25 percent. With a volume increase of 50 and 75 percent, the diamond interchange operates at LOS F with delay per vehicle of over 100 seconds, while serving 59 and 25 percent of volumes, respectively. The low percent served values indicate that the demand would exceed the capacity by about 40% for the 50 percent volume increase scenario and by about 75% for the 75 percent increase scenario.

# 5 I-15 HSM SAFETY ANALYSIS

A safety analysis was performed for I-15 in the study area to estimate the potential safety effects of a new I-15 interchange.

## 5.1 2035 Build Condition HSM Analysis

For 2035 interim build option, ramps are added to the existing 1600 South overpass to convert it to a diamond interchange. This change in geometry along with increased volume affects the segmentation and overall crash frequency calculation of the study area. **Figure 12** shows the extents of the different segments along with the number of lanes and total predicted crash frequencies. According to the analysis, with 2035 Build condition volume and I-15 configuration, the total predicted crash frequency for I-15 is 118.9 crashes per year for all the mainline segments and speed-change lanes combined. For each segment, the number of total crashes can also be segregated into fatal and injury or property damage only (PDO) severities and multi-vehicle or single vehicle crash types. A detailed worksheet for the analysis and the segregated crash frequency outputs can be found in Appendix D: Safety Analysis Worksheets.

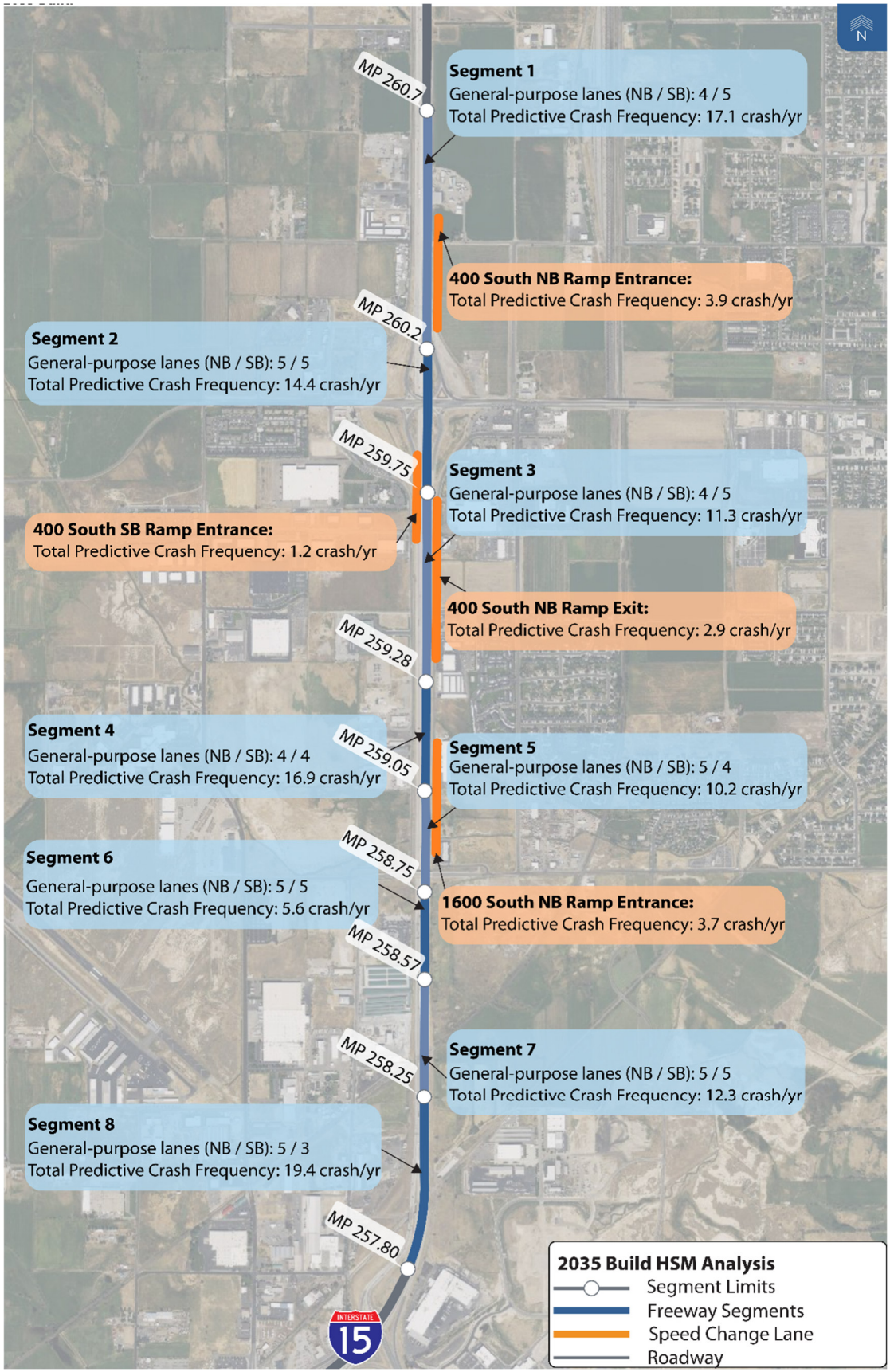



**Figure 12:** 2035 Build Conditions HSM Crash Frequencies

## 5.2 2050 Build Condition HSM Analysis

For 2050 Build condition safety analysis, the preferred build (SPUI concept) was analyzed. This scenario involves the changes associated with the 2050 No Build condition plus a single point urban interchange (SPUI) at I-15 and Springville 1600 South/Spanish Fork 2700 North. The extents of the different segments along with the number of lanes and total predicted average crash frequencies are presented in **Figure 13**. According to the analysis, with 2050 Build conditions volumes and I-15 configuration, the total predicted crash frequency for I-15 is 115.4 crashes per year for all the mainline segments and speed-change lanes combined. For each segment, the number of total crashes can be separated into fatal and injury or property damage only (PDO) severities and multi-vehicle or single vehicle crash types. A detailed worksheet for the analysis and the segregated crash frequency outputs is attached in Appendix D: Safety Analysis Worksheets.

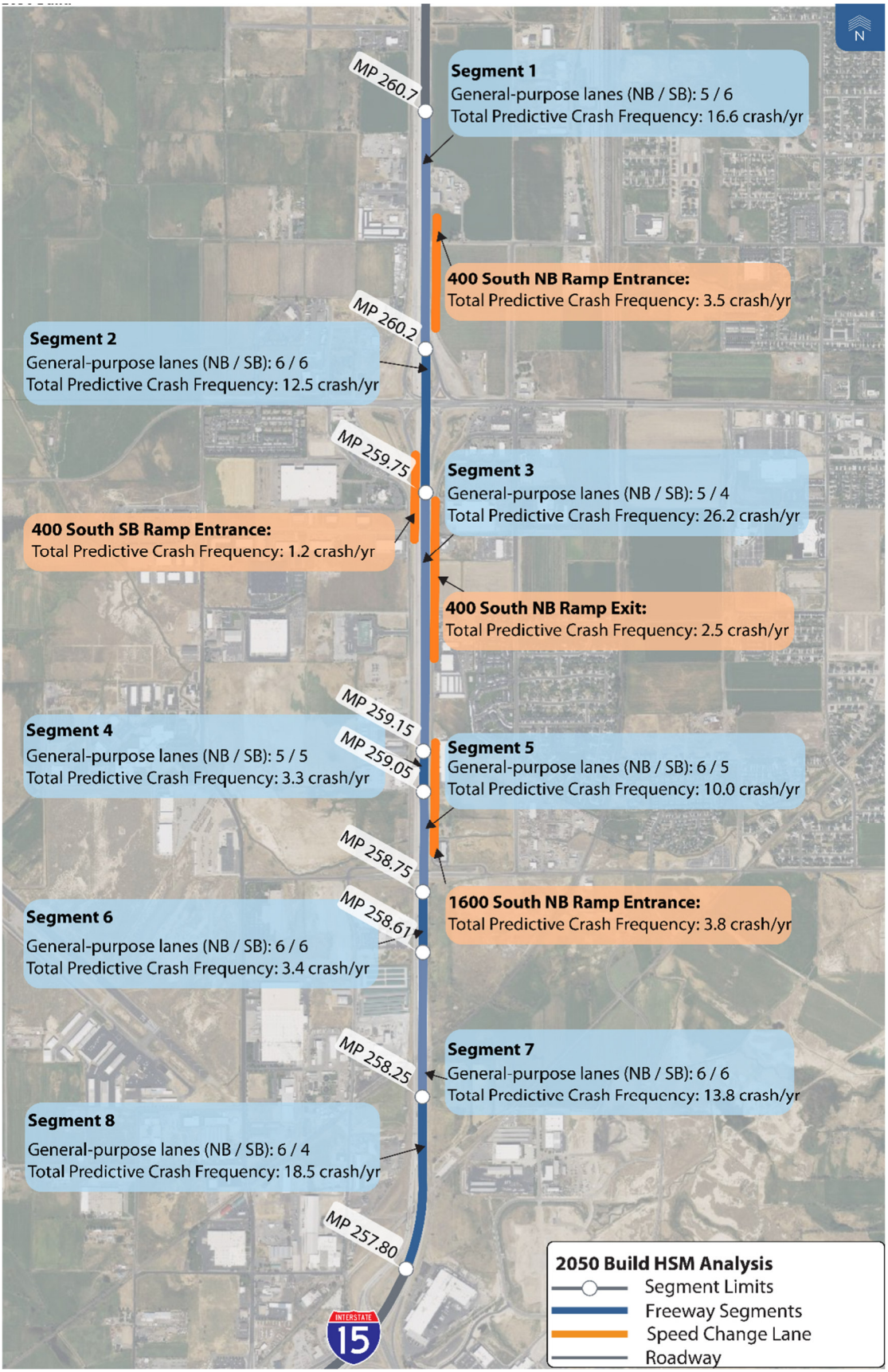



**Figure 13:** 2050 Build Conditions HSM Crash Frequencies

Table 18 shows the total predicted crash frequencies for all the comparable scenarios. Existing and No Build safety analysis is discussed in detail in "Existing and No Build Safety Memo". Results for mainline I-15 segments are combined as the segment start/end mile points may vary between different scenarios.

**Table 12:** Predicted Average HSM Crash Frequencies Comparison

| | 2018 Existing | 2035 No Build | 2035 Build | 2050 No Build | 2050 Build |
|---|---|---|---|---|---|
| Mainline I-15 | 58.3 | 95.8 | 107.2 | 85.8 | 104.3 |
| | | | | | |
| 400 South NB Ramp Entrance | 2.0 | 3.9 | 3.9 | 3.6 | 3.50 |
| 400 South SB Ramp Entrance | 0.6 | 1.2 | 1.2 | 1.1 | 1.2 |
| 1600 South NB Ramp Entrance | - | - | 2.9 | - | 2.5 |
| 400 South NB Ramp Exit | 2.6 | 3.7 | 3.7 | 4.0 | 3.8 |
| **Total** | **63.5** | **104.6** | **119.0** | **94.5** | **115.4** |

According to the HSM analysis, average predicted crash frequencies increase from the no build to the build scenarios. The interim year (2035) has the highest crash frequency with a 14% increase from the 2035 No Build condition. The predicted crash frequency in 2050 Build condition also shows an increase of 22% compared to the 2050 no build condition. The increase in safety concern in build conditions is due to the introduction of the interchange at 1600 South and hence, increased merge/weave and lane change maneuver along I-15. The 2050 Build option shows an improvement in safety compared to 2035 Build option although 2050 has a higher volume. This improvement is due to the additional general purpose lane on I-15 in both directions and the presence of auxiliary lanes between the 1600 South and 400 South interchanges.

The build condition would improve safety by eliminating queueing of vehicles from the 400 South interchange back onto mainline I-15; however, the HSM methodology is not able to quantify that benefit. The build condition would also eliminate the at-grade railroad crossing on 1600 South / 2700 North with an overpass, which would also improve safety.

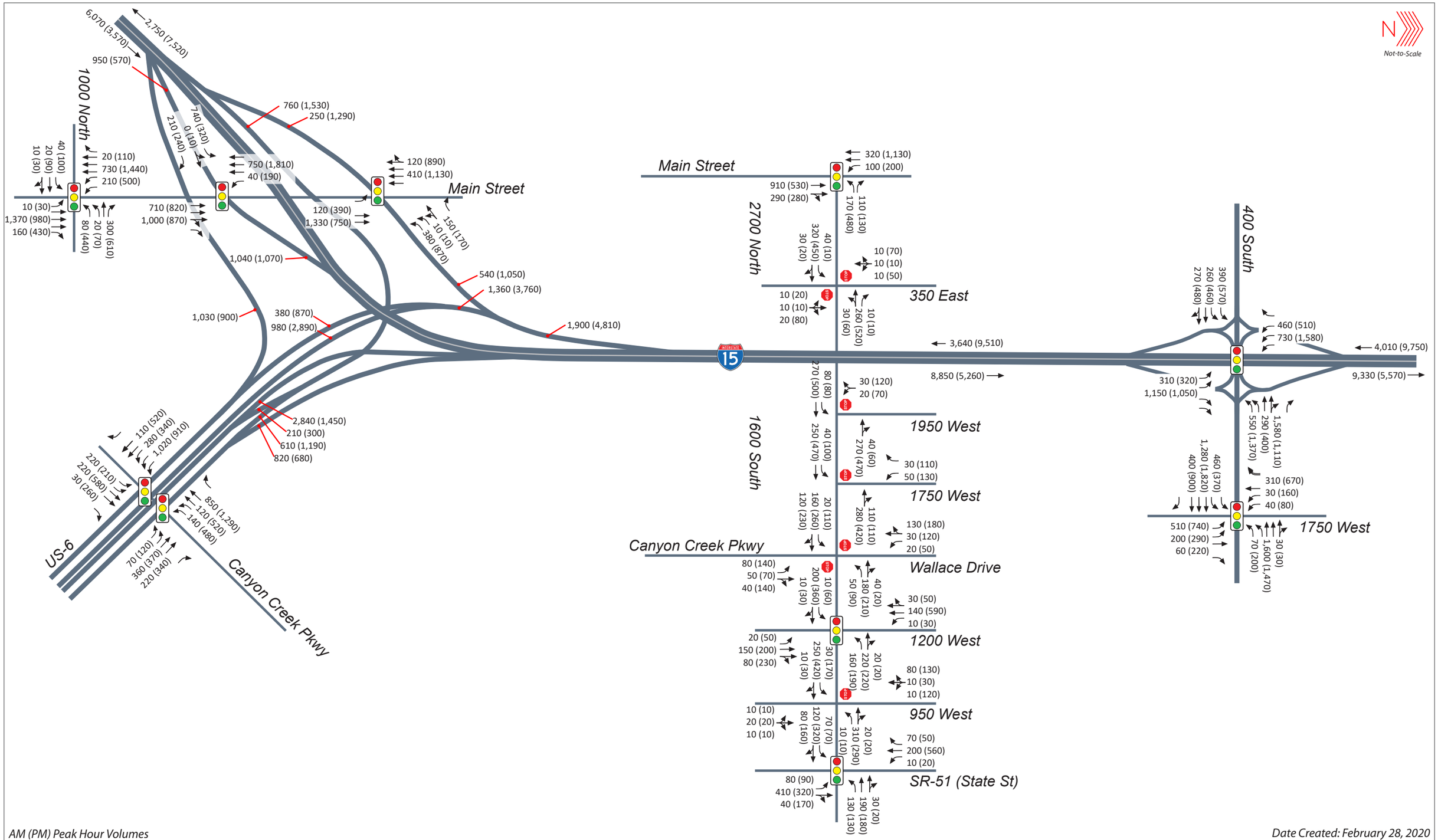
# 6 CONCLUSION

The traffic analysis for 2050 build conditions shows that the 1600 South interchange and widening from Main Street to SR-51 (State Street) will relieve most of the excessive delay from the 400 South interchange and bring it down to an acceptable LOS. This benefit is realized with either the SPUI or Diamond alternatives. Additionally, I-15 freeway LOS operates at acceptable LOS along the entire study corridor.

The geometry sensitivity analysis showed that the SPUI alternative provides substantially more capacity than the Diamond Interchange, which provides resiliency for traffic volumes that exceed those assumed for 2050 conditions. The volume sensitivity for the SPUI showed that the SPUI option would begin to fail with volume increase between 50 and 75 percent. The diamond option begins to fail with a volume increase between 25 and 50 percent.

The HSM analyses for future conditions showed an increase in predicted crash frequencies with the new interchange. However, the HSM methodology is unable to quantify the safety benefits associated with eliminating dangerous queuing from the 400 South interchange onto mainline I-15. Thus the safety analysis is somewhat inconclusive given that there are likely to be more crashes around the new interchange but fewer around the 400 South interchange.

# Appendix A – Peak Hour Volumes



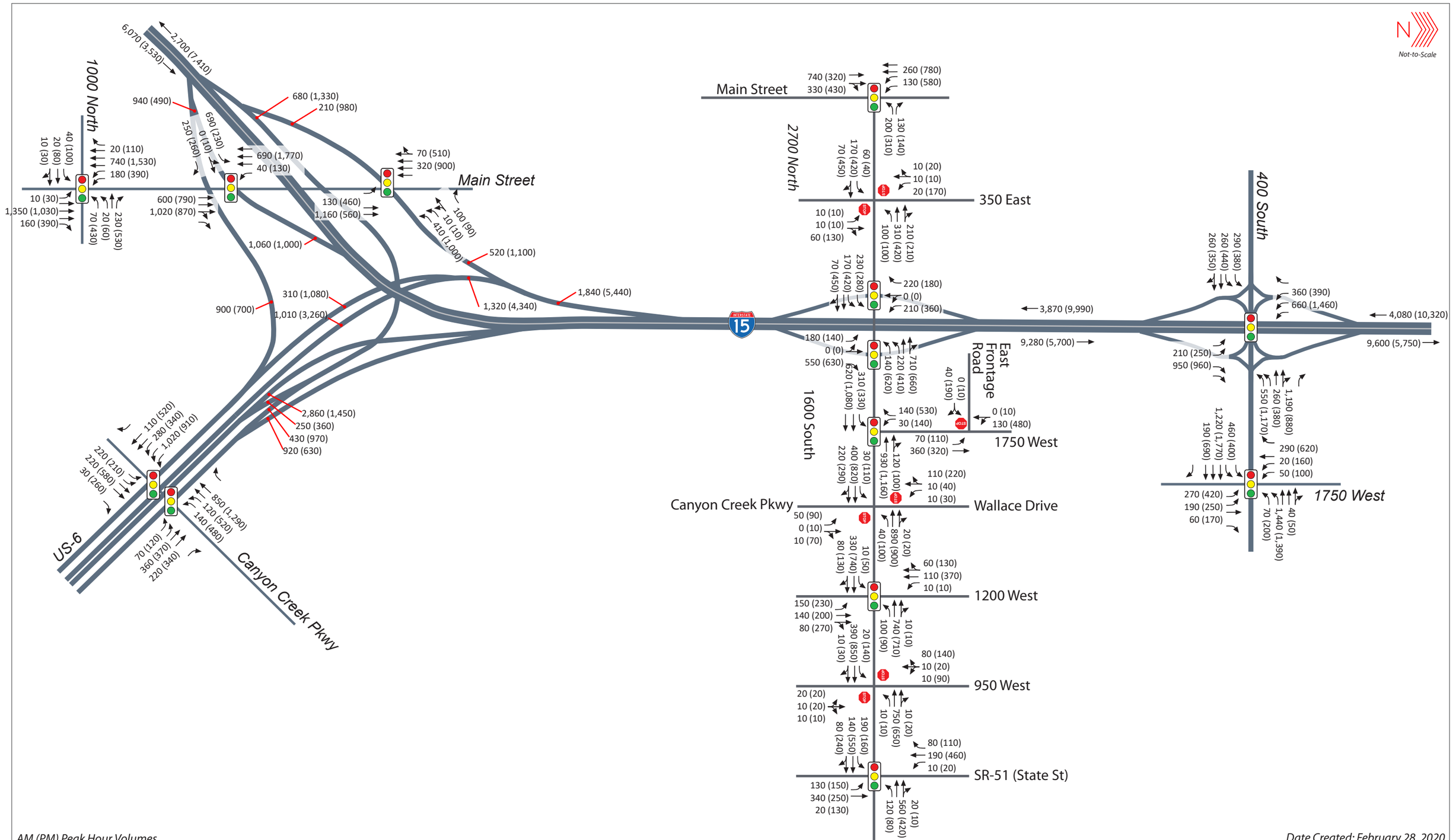

AM (PM) Peak Hour Volumes

Date Created: February 28, 2020

# 2050 No Build Peak Hour Volumes

I-15 Spanish Fork/Springville Interchange Environmental Study

DRAFT



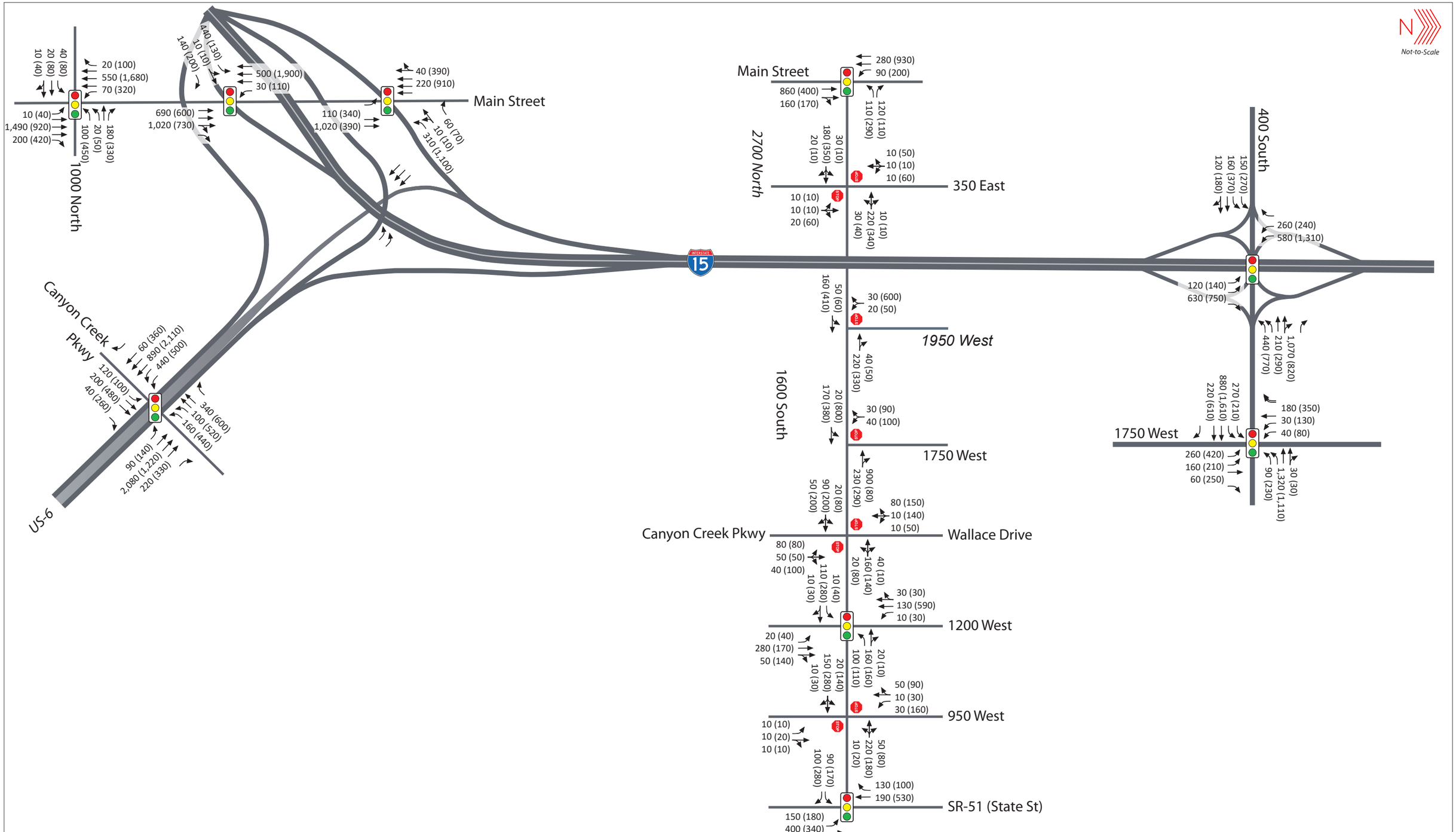

*AM (PM) Peak Hour Volumes*

*Date Created: February 28, 2020*

# 2050 Build Peak Hour Volumes

I-15 Spanish Fork/Springville Interchange Environmental Study

DRAFT

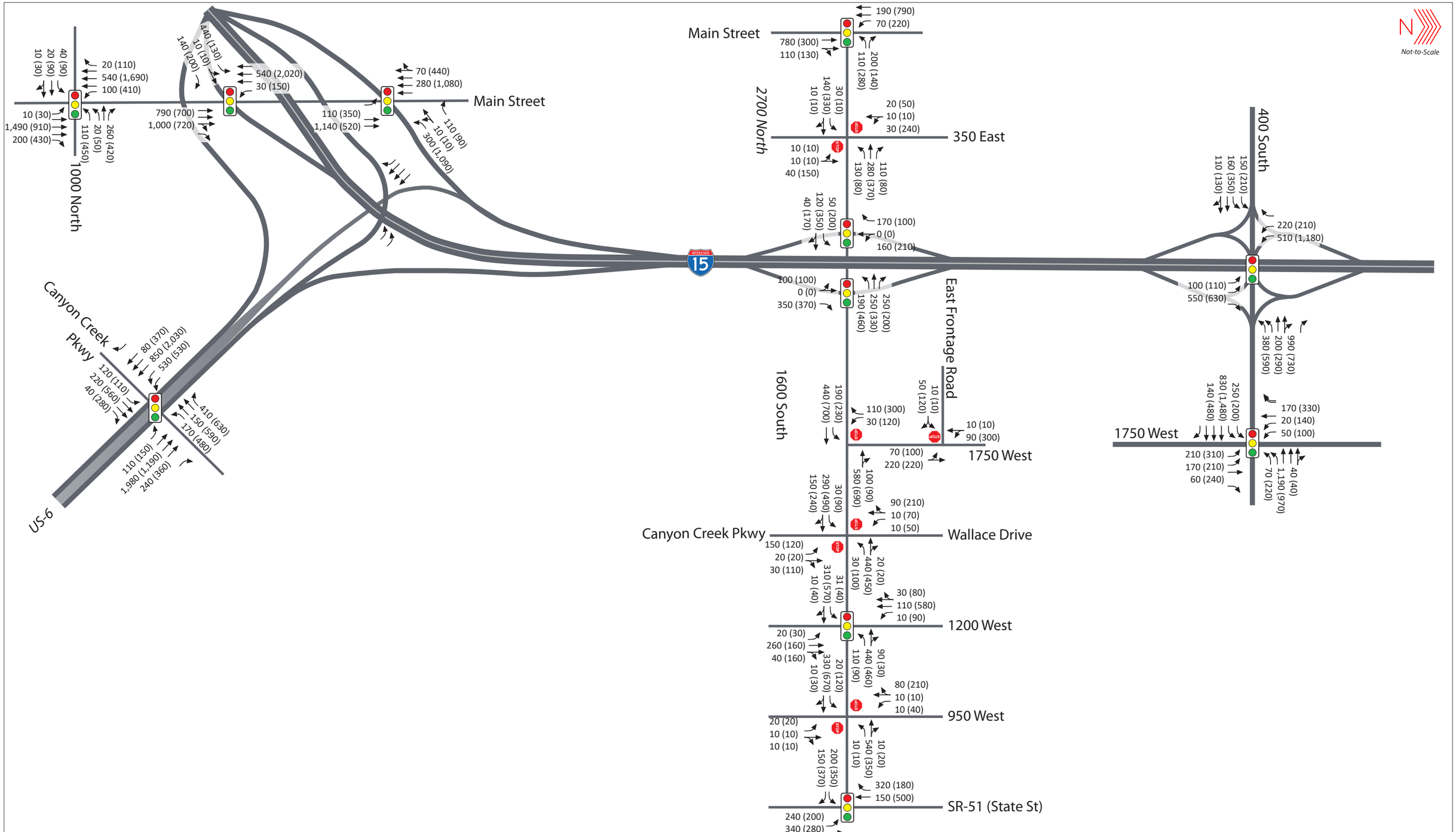



*AM (PM) Peak Hour Volumes*

## 2035 No Build Peak Hour Volumes

I-15 Spanish Fork/Springville Interchange Environmental Study

DRAFT




*AM (PM) Peak Hour Volumes*

## 2035 Build Peak Hour Volumes

I-15 Spanish Fork/Springville Interchange Environmental Study

DRAFT

# Appendix B – Level of Service Figures

N

Main Street

1000 North

Canyon Creek Pkwy

US-6

Main Street

2700 North

350 East

1600 South

1950 West

1750 West

Canyon Creek Pkwy

Wallace Drive

1200 West

950 West

SR-51 (State St)

400 South

1750 West

| Level of Service Color Legend | Intersection LOS | Movement LOS | |
|---|---|---|---|
| | X | LOS A to C | LOS E |
| | | LOS D | LOS F |

## 2050 AM No Build Level of Service

I-15 Spanish Fork/Springville Interchange Environmental Study

DRAFT

N

Main Street

1000 North

Main Street

2700 North

350 East

400 South

1600 South

1950 West

1750 West

1750 West

Canyon Creek Pkwy

Canyon Creek Pkwy

Wallace Drive

1200 West

950 West

SR-51 (State St)

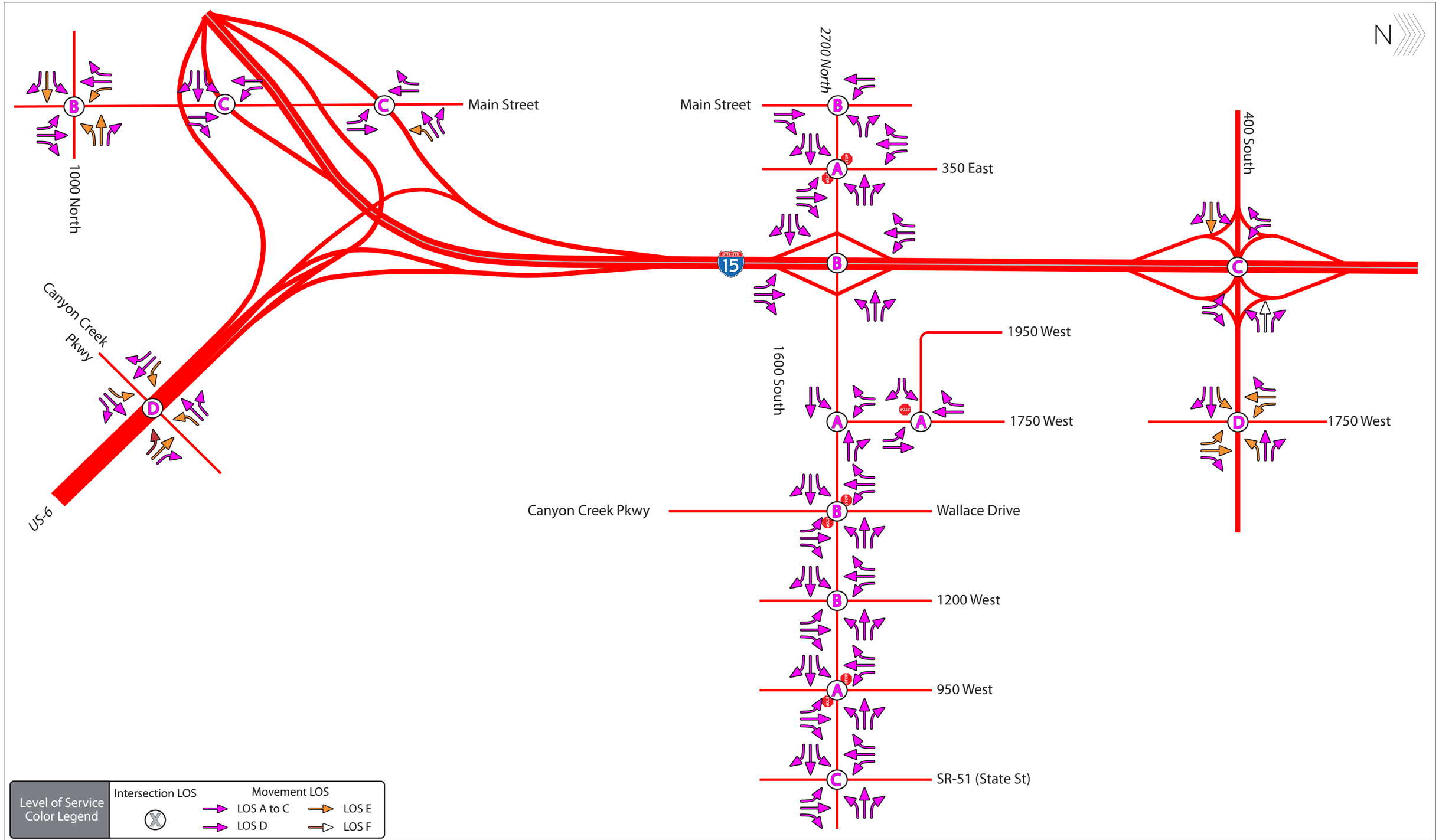
US-6

| Level of Service Color Legend | Intersection LOS | Movement LOS | |
|---|---|---|---|
| | | LOS A to C | LOS E |
| | | LOS D | LOS F |

# 2050 PM No Build Level of Service

I-15 Spanish Fork/Springville Interchange Environmental Study

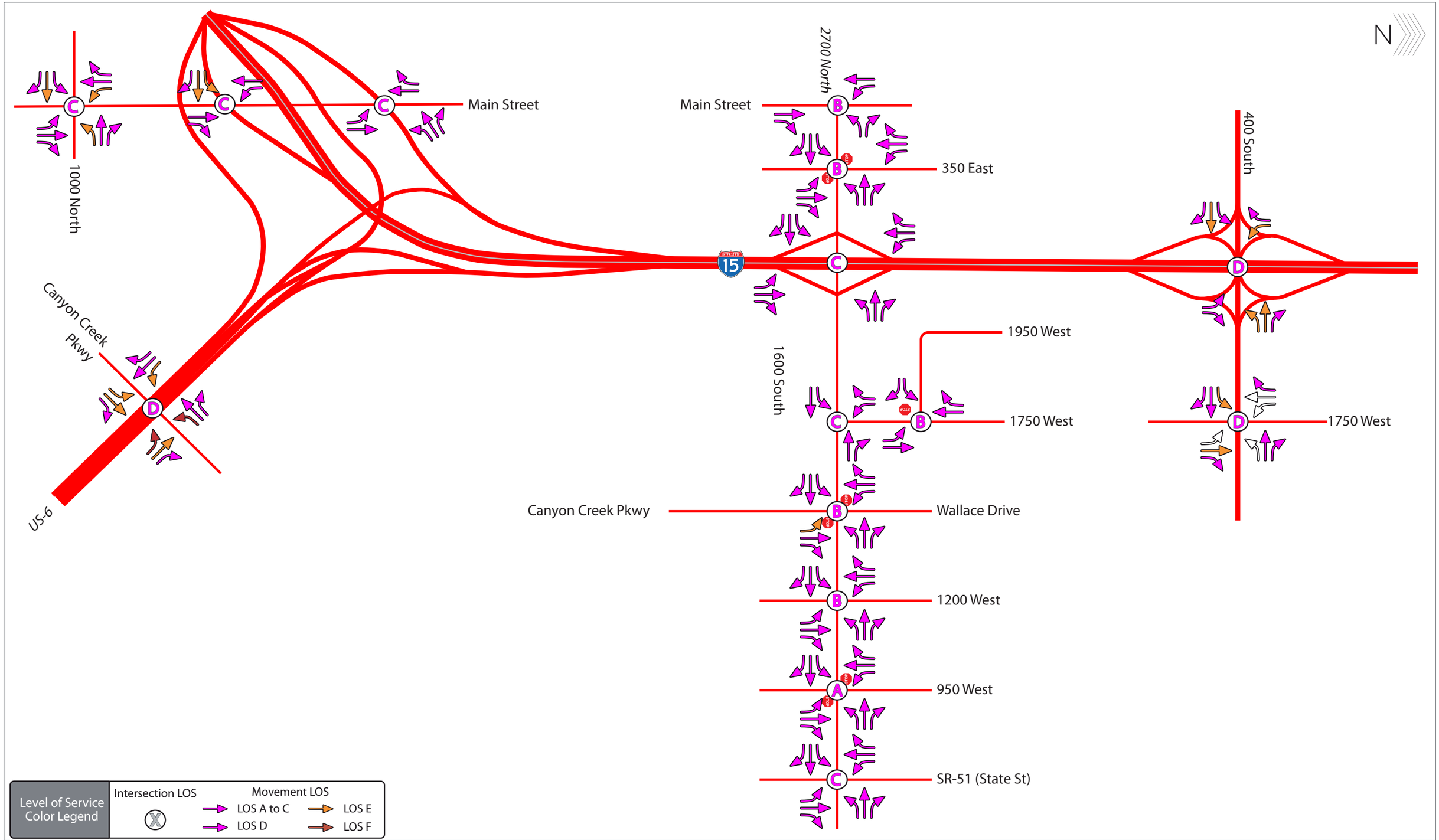
DRAFT




## 2050 Build Diamond AM Peak Hour Level of Service

I-15 Spanish Fork/Springville Interchange Environmental Study

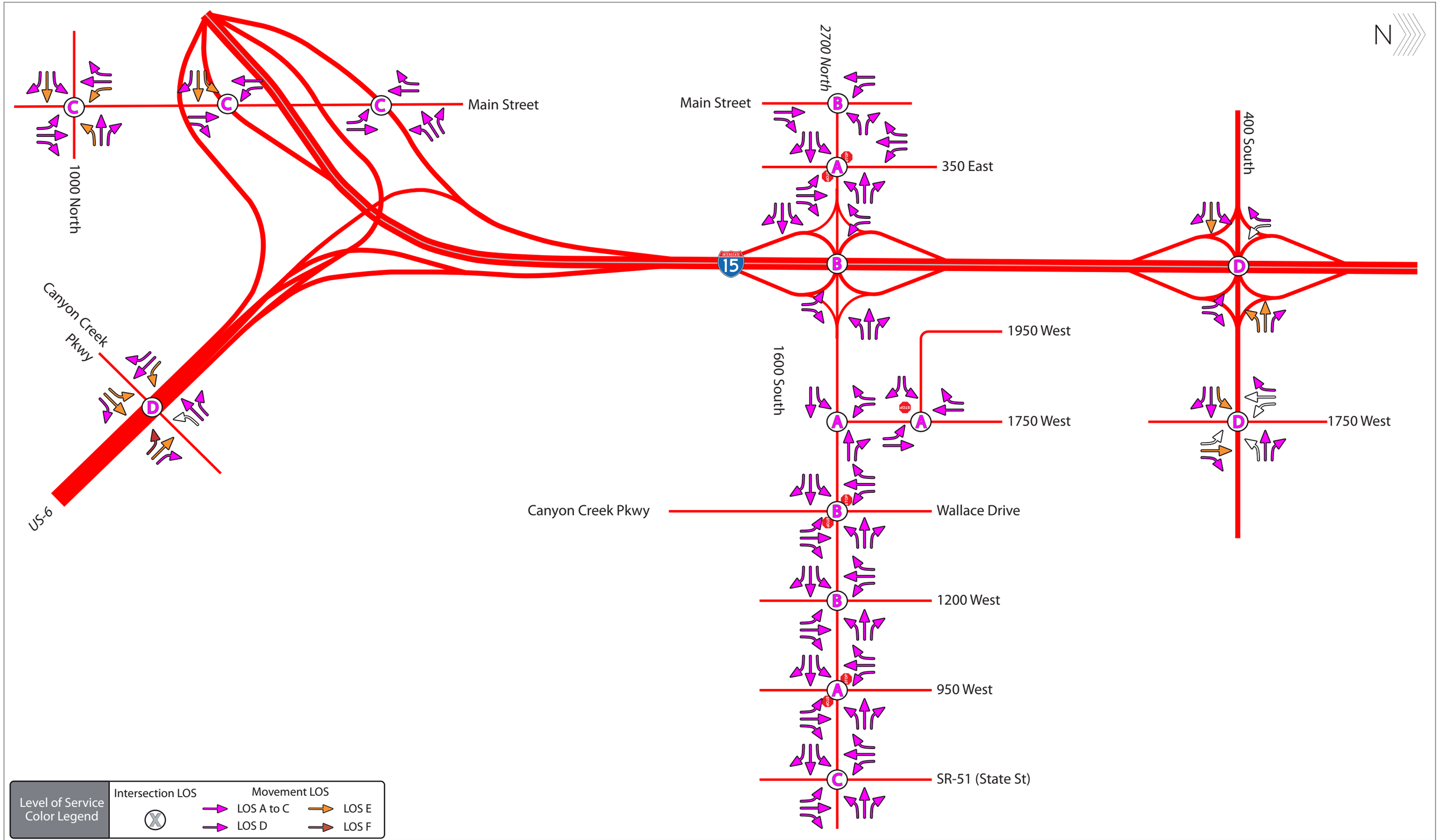
DRAFT




## 2050 Build Diamond PM Peak Hour Level of Service

I-15 Spanish Fork/Springville Interchange Environmental Study

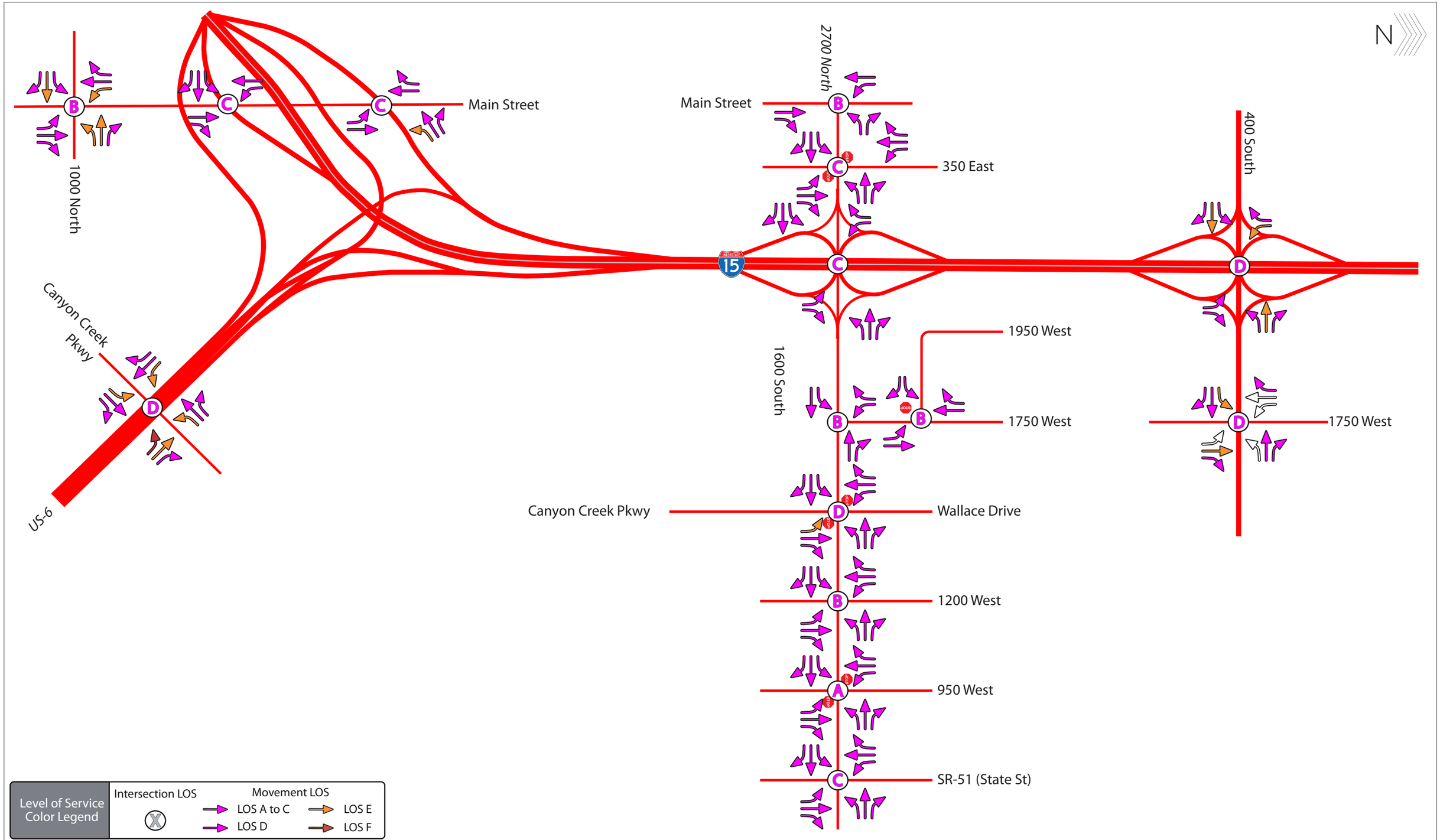
DRAFT




## 2050 Build SPUI AM Peak Hour Level of Service

I-15 Spanish Fork/Springville Interchange Environmental Study

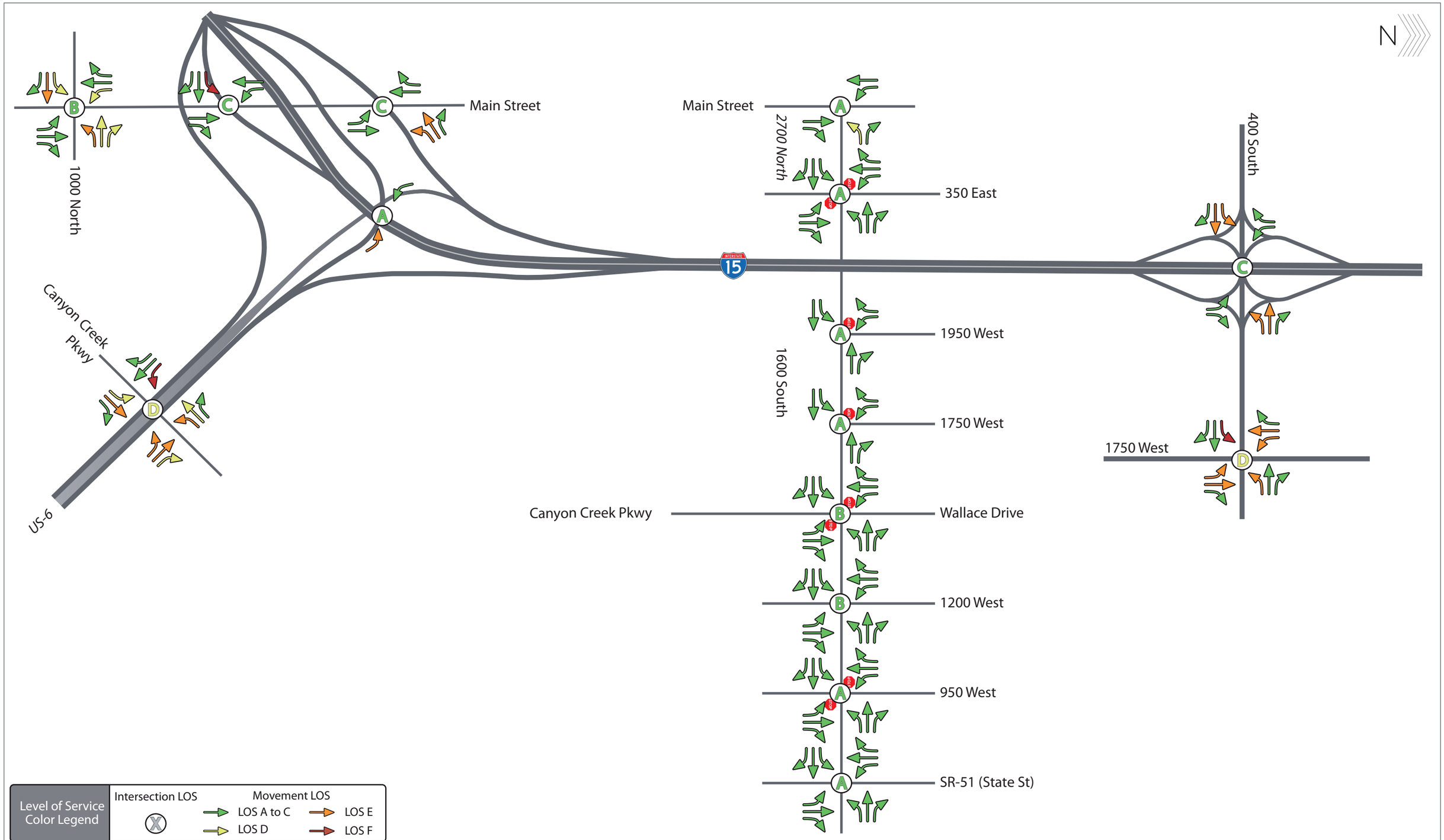
DRAFT




# 2050 Build SPUI PM Peak Hour Level of Service

I-15 Spanish Fork/Springville Interchange Environmental Study

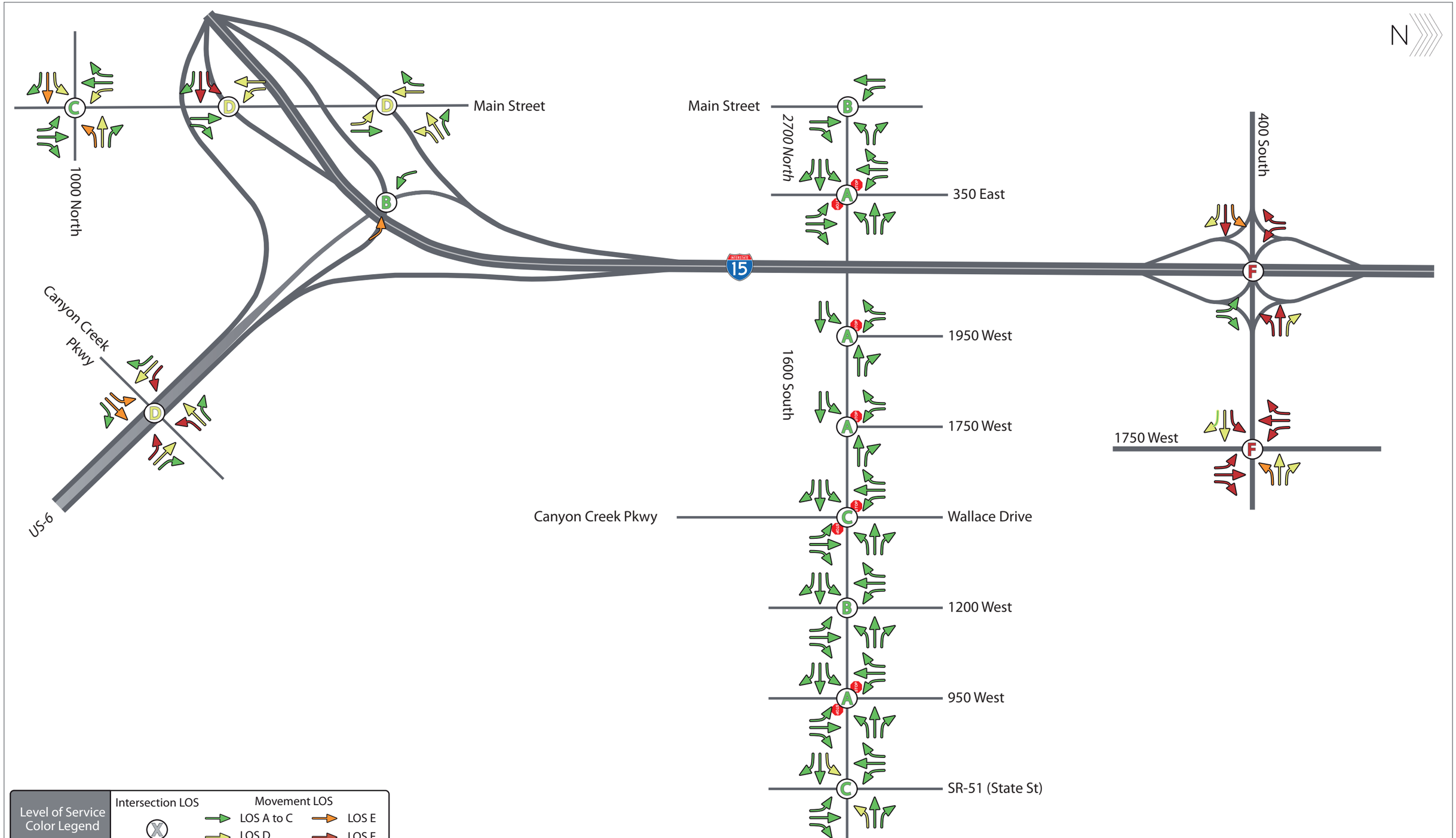
DRAFT




## 2035 AM No Build Level of Service

I-15 Spanish Fork/Springville Interchange Environmental Study

DRAFT




## 2035 PM No Build Level of Service

I-15 Spanish Fork/Springville Interchange Environmental Study

DRAFT

N

Main Street

1000 North

Main Street

2700 North

350 East

400 South

East Frontage Road

1600 South

1750 West

1750 West

Canyon Creek Pkwy

Wallace Drive

1200 West

950 West

SR-51 (State St)

US-6

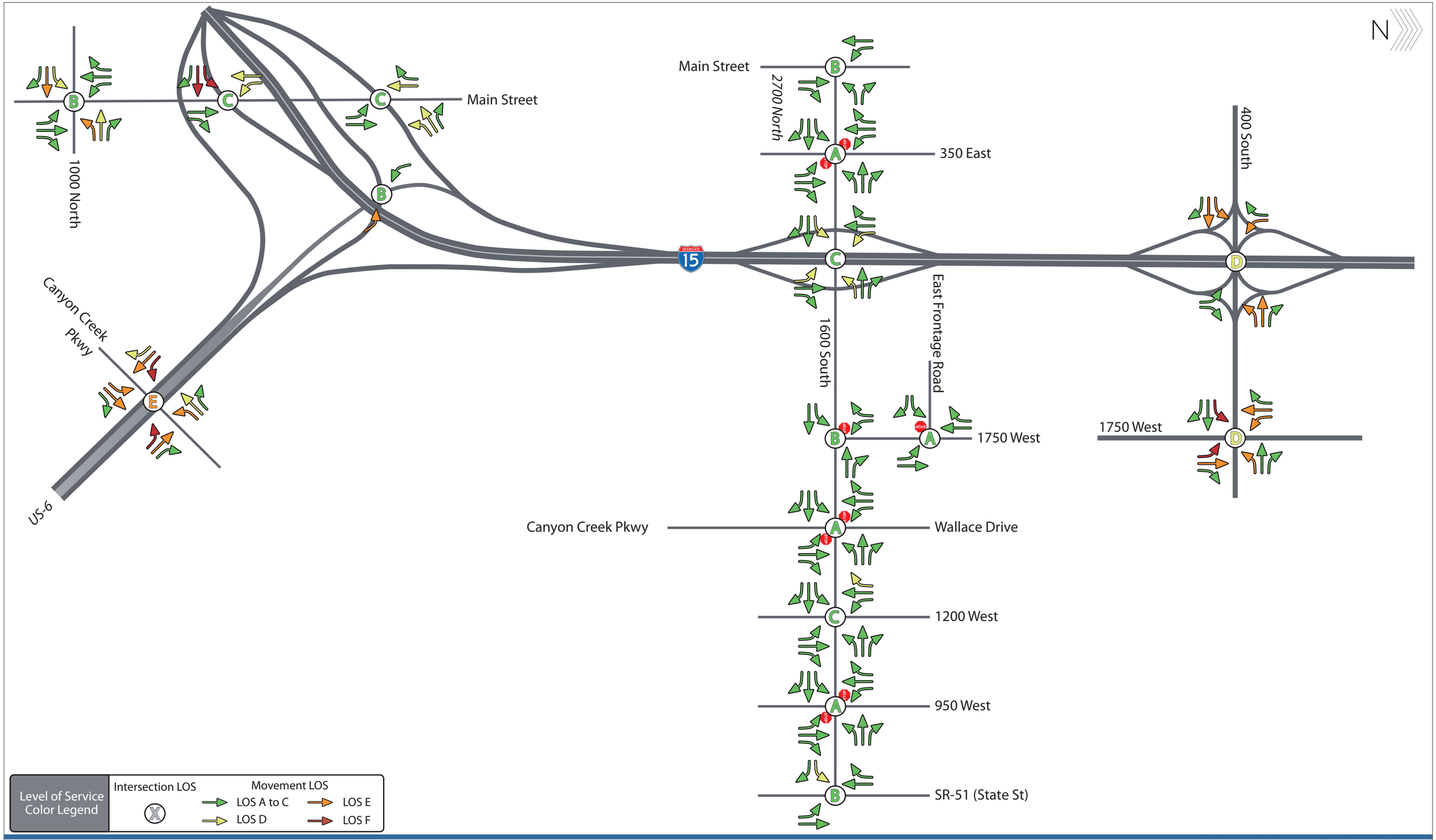
Canyon Creek Pkwy

| Level of Service Color Legend | Intersection LOS | Movement LOS | |
|---|---|---|---|
| | X | LOS A to C | LOS E |
| | | LOS D | LOS F |

## 2035 AM Build Level of Service

I-15 Spanish Fork/Springville Interchange Environmental Study

DRAFT




## 2035 PM Build Level of Service

I-15 Spanish Fork/Springville Interchange Environmental Study

DRAFT

# Appendix C – Vissim Model Results

# 2050 No Build AM - IACR Update Mar21

*I-15 Spanish Fork/Springville Interchange Study*

**Link Peak Results**

*Number of Runs: 10*

## I15 NB

V: Speed (mph), K: Density (vpmpl), and LOS

| ID | Location | Seg Type | Ln | Q: Hr Flow Rate / Lane Demand | Served | % Served | Length (ft) | Max 15-min. Interval V | K | LOS | Begin | Segment Peak Hour V | K | LOS | Begin | Peak Hour: 07:00 V | K | LOS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | ML - North of 400 S | B | 5.2 | 1,510 | 1,490 | 99% | 6,125 | 71 | 23.5 | C | 07:30 | 71 | 22.2 | C | 07:00 | 71 | 22.2 | C |
| 2 | ML - 400 S On Ramp | M | 6.7 | 1,180 | 1,160 | 99% | 1,525 | 69 | 16.0 | B | 07:30 | 70 | 14.9 | B | 07:00 | 70 | 14.9 | B |
| 3 | ML - 400 S | B | 6.0 | 1,150 | 1,150 | 100% | 2,450 | 72 | 18.1 | C | 07:30 | 72 | 17.1 | B | 07:00 | 72 | 17.1 | B |
| 4 | ML -400 S Off Ramp | D | 6.0 | 1,260 | 1,250 | 99% | 1,525 | 57 | 32.0 | D | 08:45 | 66 | 20.8 | C | 08:00 | 73 | 13.4 | B |
| 5 | ML - US6 to 400 S w HOV | B | 5.0 | 1,510 | 1,500 | 100% | 3,575 | 64 | 29.0 | D | 07:45 | 66 | 26.0 | C | 07:15 | 66 | 25.3 | C |
| 6 | ML - US6 to 400 S wo HOV | B | 6.0 | 1,420 | 1,420 | 100% | 3,050 | 71 | 22.6 | C | 07:30 | 71 | 20.9 | C | 07:00 | 71 | 20.9 | C |
| 7 | ML - US 6 On Ramp | M | 7.0 | 1,220 | 1,220 | 100% | 1,500 | 69 | 20.7 | C | 07:30 | 70 | 19.1 | B | 07:30 | 70 | 18.9 | B |
| 8 | ML - Main St. On Ramp | M | 4.6 | 1,090 | 1,090 | 100% | 1,325 | 62 | 20.9 | C | 07:30 | 63 | 18.9 | B | 07:30 | 64 | 18.7 | B |
| 9 | ML- Main St. | B | 4.0 | 990 | 990 | 100% | 4,075 | 71 | 15.9 | B | 07:30 | 72 | 14.5 | B | 07:00 | 72 | 14.5 | B |
| 10 | ML - Main St. Off Ramp | D | 4.0 | 1,400 | 1,400 | 100% | 1,500 | 53 | 38.5 | E | 07:30 | 62 | 31.2 | D | 07:00 | 62 | 31.2 | D |
| 11 | ML - South of Main St. | B | 4.0 | 1,400 | 1,400 | 100% | 6,075 | 69 | 24.5 | C | 07:30 | 70 | 21.7 | C | 07:00 | 70 | 21.7 | C |
| | **Urban Facility** | **U** | **5.1** | **1,370** | **1,370** | **100%** | **32,750** | **69** | **22.1** | C | **07:30** | **70** | **20.2** | C | **07:00** | **70** | **20.2** | C |

## I15 SB

V: Speed (mph), K: Density (vpmpl), and LOS

| ID | Location | Seg Type | Ln | Q: Hr Flow Rate / Lane Demand | Served | % Served | Length (ft) | Max 15-min. Interval V | K | LOS | Begin | Segment Peak Hour V | K | LOS | Begin | Peak Hour: 07:30 V | K | LOS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 12 | ML - North of 400 S | B | 5.0 | 800 | 800 | 100% | 5,350 | 73 | 11.8 | B | 07:30 | 73 | 11.1 | B | 08:00 | 73 | 11.0 | A |
| 13 | ML - 400 S Off Ramp | D | 6.0 | 670 | 660 | 100% | 1,500 | 68 | 14.0 | B | 08:45 | 71 | 10.7 | B | 08:00 | 73 | 9.0 | A |
| 14 | ML - 400 S | B | 5.0 | 550 | 550 | 100% | 2,500 | 73 | 8.3 | A | 07:30 | 73 | 7.7 | A | 07:00 | 73 | 7.6 | A |
| 15 | ML - 400 S On Ramp | M | 5.8 | 610 | 600 | 100% | 1,500 | 66 | 8.8 | A | 07:30 | 66 | 8.4 | A | 08:00 | 66 | 8.3 | A |
| 16 | ML - 400 S to US6/Main St. w HO | B | 5.0 | 710 | 700 | 100% | 2,425 | 73 | 10.5 | A | 07:30 | 73 | 9.8 | A | 07:00 | 73 | 9.8 | A |
| 17 | ML - 400 S to US6/Main St. wo H | B | 6.0 | 600 | 600 | 100% | 2,775 | 73 | 8.9 | A | 07:30 | 73 | 8.4 | A | 07:30 | 73 | 8.4 | A |
| 19 | ML -US6/Main St. Off Ramp | D | 6.0 | 600 | 600 | 100% | 1,500 | 72 | 11.4 | B | 07:30 | 72 | 10.8 | B | 07:30 | 72 | 10.8 | B |
| 20 | ML -Main St. | B | 4.0 | 430 | 420 | 99% | 6,250 | 74 | 6.1 | A | 08:45 | 74 | 5.9 | A | 08:00 | 74 | 5.7 | A |
| 21 | ML - US6/Main St. On Ramp | M | 5.3 | 510 | 510 | 99% | 1,500 | 70 | 9.1 | A | 07:30 | 70 | 8.6 | A | 07:00 | 70 | 8.5 | A |
| 22 | ML - South of Main St. | B | 4.0 | 680 | 670 | 99% | 8,450 | 74 | 9.6 | A | 07:30 | 74 | 9.2 | A | 07:00 | 74 | 9.2 | A |
| | **Urban Facility** | **U** | **4.8** | **650** | **640** | **99%** | **33,725** | **73** | **9.3** | A | **07:30** | **73** | **8.8** | A | **07:30** | **73** | **8.8** | A |

## I15_Exp. NB

V: Speed (mph), K: Density (vpmpl), and LOS

| ID | Location | Seg Type | Ln | Q: Hr Flow Rate / Lane Demand | Served | % Served | Length (ft) | Max 15-min. Interval V | K | LOS | Begin | Segment Peak Hour V | K | LOS | Begin | Peak Hour: 07:00 V | K | LOS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 23 | HOV -North of 400 S | B | 1.0 | 970 | 980 | 101% | 7,675 | 69 | 16.7 | B | 07:30 | 69 | 15.5 | B | 07:00 | 69 | 15.5 | B |
| 24 | HOV - South of 400 S | B | 1.0 | 970 | 980 | 101% | 5,100 | 70 | 16.5 | B | 07:30 | 70 | 15.1 | B | 07:00 | 70 | 15.1 | B |
| | **Urban Facility** | **U** | **1.0** | **970** | **980** | **101%** | **12,800** | **69** | **16.6** | B | **07:30** | **69** | **15.3** | B | **07:00** | **69** | **15.3** | B |

## I15_Exp. SB

V: Speed (mph), K: Density (vpmpl), and LOS

| ID | Location | Seg Type | Ln | Q: Hr Flow Rate / Lane Demand | Served | % Served | Length (ft) | Max 15-min. Interval V | K | LOS | Begin | Segment Peak Hour V | K | LOS | Begin | Peak Hour: 08:00 V | K | LOS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 25 | HOV - North of 400 S | B | 1.0 | 90 | 90 | 102% | 6,850 | 74 | 1.3 | A | 07:30 | 74 | 1.3 | A | 08:00 | 74 | 1.3 | A |
| 26 | HOV - South of 400 S | B | 1.0 | 90 | 90 | 102% | 3,925 | 73 | 1.3 | A | 07:30 | 74 | 1.3 | A | 07:30 | 74 | 1.2 | A |
| | **Urban Facility** | **U** | **1.0** | **90** | **90** | **102%** | **10,775** | **74** | **1.3** | A | **07:30** | **74** | **1.3** | A | **08:00** | **74** | **1.3** | A |

# II: 2050 AM No Build

*LOS Category: Signalized*

## 1: SR- 77 (400 South) SPUI

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| NBL | 310 | 304 | 98% | 50 | 200 | 35 | D |
| NBR | 1,150 | 1,150 | 100% | 100 | 400 | 22 | C |
| **NB** | **1,460** | **1,454** | **100%** | | | **24** | **C** |
| SBL | 730 | 722 | 99% | 75 | 275 | 33 | C |
| SBR | 460 | 465 | 101% | 0 | 150 | 7 | A |
| **SB** | **1,190** | **1,187** | **100%** | | | **23** | **C** |
| EBL | 390 | 386 | 99% | 75 | 250 | 48 | D |
| EBT | 260 | 259 | 100% | 75 | 200 | 69 | E |
| EBR | 270 | 268 | 99% | 0 | 0 | 1 | A |
| **EB** | **920** | **913** | **99%** | | | **40** | **D** |
| WBL | 550 | 558 | 101% | 75 | 350 | 42 | D |
| WBT | 290 | 291 | 100% | 75 | 250 | 74 | E |
| WBR | 1,580 | 1,550 | 98% | 0 | 0 | 6 | A |
| **WB** | **2,420** | **2,399** | **99%** | | | **22** | **C** |
| **Total** | **5,990** | **5,953** | **99%** | | | **26** | **C** |

*Node Letter: A VISSIM ID: 1*

*LOS Category: Signalized*

## 2: SR-77 (400 ) & 1750 West

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| NBL | 510 | 507 | 99% | 300 | 950 | 90 | F |
| NBT | 200 | 202 | 101% | 100 | 450 | 81 | F |
| NBR | 60 | 58 | 97% | 0 | 50 | 12 | B |
| **NB** | **770** | **767** | **100%** | | | **81** | **F** |
| SBL | 40 | 37 | 93% | 25 | 75 | 73 | E |
| SBT | 30 | 31 | 103% | 25 | 75 | 87 | F |
| SBR | 310 | 307 | 99% | 25 | 150 | 20 | C |
| **SB** | **380** | **375** | **99%** | | | **31** | **C** |
| EBL | 460 | 472 | 103% | 150 | 600 | 81 | F |
| EBT | 1,280 | 1,266 | 99% | 200 | 800 | 33 | C |
| EBR | 400 | 393 | 98% | 0 | 200 | 9 | A |
| **EB** | **2,140** | **2,131** | **100%** | | | **39** | **D** |
| WBL | 70 | 73 | 104% | 25 | 75 | 69 | E |
| WBT | 1,600 | 1,589 | 99% | 200 | 600 | 41 | D |
| WBR | 30 | 28 | 93% | 200 | 600 | 49 | D |
| **WB** | **1,700** | **1,690** | **99%** | | | **42** | **D** |
| **Total** | **4,990** | **4,963** | **99%** | | | **46** | **D** |

*Node Letter: B VISSIM ID: 2*

*LOS Category: Signalized*

## 3: Main Street & I-15 Ramps

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| NBL | 120 | 121 | 101% | 0 | 175 | 22 | C |
| NBT | 590 | 591 | 100% | 25 | 200 | 20 | B |
| NBR | 1,000 | 1,006 | 101% | 0 | 0 | 1 | A |
| **NB** | **1,710** | **1,718** | **100%** | | | **9** | **A** |
| SBL | 40 | 41 | 103% | 0 | 100 | 26 | C |
| SBT | 370 | 366 | 99% | 0 | 100 | 23 | C |
| SBR | 120 | 121 | 101% | 0 | 0 | 0 | A |
| **SB** | **530** | **528** | **100%** | | | **18** | **B** |
| EBL | 740 | 736 | 99% | 25 | 200 | 49 | D |
| EBR | 210 | 206 | 98% | 50 | 375 | 9 | A |
| **EB** | **950** | **942** | **99%** | | | **40** | **D** |
| WBL | 380 | 386 | 102% | 75 | 225 | 56 | E |
| WBT | 10 | 9 | 90% | 75 | 225 | 52 | D |
| WBR | 150 | 150 | 100% | 0 | 100 | 12 | B |
| **WB** | **540** | **545** | **101%** | | | **44** | **D** |
| **Total** | **3,730** | **3,733** | **100%** | | | **23** | **C** |

*Node Letter: K VISSIM ID: 11*

*LOS Category: Signalized*

## 4: Main Street & 1000 North

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| NBL | 10 | 10 | 100% | 0 | 25 | 7 | A |
| NBT | 1,370 | 1,372 | 100% | 50 | 300 | 12 | B |
| NBR | 160 | 157 | 98% | 0 | 75 | 4 | A |
| **NB** | **1,540** | **1,539** | **100%** | | | **11** | **B** |
| SBL | 210 | 204 | 97% | 50 | 175 | 66 | E |
| SBT | 730 | 729 | 100% | 0 | 75 | 3 | A |
| SBR | 20 | 20 | 100% | 0 | 25 | 1 | A |
| **SB** | **960** | **953** | **99%** | | | **16** | **B** |
| EBL | 40 | 39 | 98% | 0 | 75 | 53 | D |
| EBT | 20 | 18 | 90% | 0 | 50 | 67 | E |
| EBR | 10 | 10 | 100% | 25 | 100 | 6 | A |
| **EB** | **70** | **67** | **96%** | | | **50** | **D** |
| WBL | 80 | 83 | 104% | 50 | 125 | 63 | E |
| WBT | 20 | 17 | 85% | 0 | 50 | 58 | E |
| WBR | 300 | 297 | 99% | 25 | 150 | 10 | B |
| **WB** | **400** | **397** | **99%** | | | **23** | **C** |
| **Total** | **2,970** | **2,956** | **100%** | | | **15** | **B** |

*Node Letter: M VISSIM ID: 13*

# II: 2050 AM No Build

*LOS Category: Signalized*

## 5: US-6 & 1000 North

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| NBL | 220 | 221 | 100% | 50 | 175 | 80 | E |
| NBT | 220 | 216 | 98% | 50 | 150 | 51 | D |
| NBR | 30 | 30 | 100% | 0 | 50 | 5 | A |
| **NB** | **470** | **467** | **99%** | | | **62** | **E** |
| SBL | 140 | 137 | 98% | 25 | 100 | 68 | E |
| SBT | 120 | 124 | 103% | 25 | 75 | 44 | D |
| SBR | 850 | 847 | 100% | 0 | 0 | 3 | A |
| **SB** | **1,110** | **1,108** | **100%** | | | **16** | **B** |
| EBL | 1,020 | 1,010 | 99% | 125 | 400 | 59 | E |
| EBT | 240 | 272 | 113% | 25 | 150 | 24 | C |
| EBR | 110 | 113 | 103% | 0 | 0 | 8 | A |
| **EB** | **1,370** | **1,395** | **102%** | | | **48** | **D** |
| WBL | 70 | 75 | 107% | 25 | 75 | 79 | E |
| WBT | 360 | 345 | 96% | 75 | 250 | 64 | E |
| WBR | 220 | 229 | 104% | 25 | 100 | 9 | A |
| **WB** | **650** | **649** | **100%** | | | **46** | **D** |
| **Total** | **3,600** | **3,619** | **101%** | | | **39** | **D** |

*Node Letter: O VISSIM ID: 15*

*LOS Category: Signalized*

## 6: Main Street & 1600 South/2700 North

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| NBT | 910 | 912 | 100% | 25 | 250 | 8 | A |
| NBR | 290 | 287 | 99% | 25 | 275 | 7 | A |
| **NB** | **1,200** | **1,199** | **100%** | | | **8** | **A** |
| SBL | 100 | 100 | 100% | 0 | 100 | 24 | C |
| SBT | 320 | 318 | 99% | 0 | 75 | 4 | A |
| **SB** | **420** | **418** | **100%** | | | **9** | **A** |
| WBL | 170 | 170 | 100% | 25 | 150 | 29 | C |
| WBR | 110 | 109 | 99% | 50 | 175 | 20 | C |
| **WB** | **280** | **279** | **100%** | | | **26** | **C** |
| **Total** | **1,900** | **1,896** | **100%** | | | **11** | **B** |

*Node Letter: C VISSIM ID: 3*

*LOS Category: Unsignalized*

## 7: SB West Frontage Road & 1600 South/2700 Nort

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| SBL | 10 | 10 | 100% | 0 | 50 | 8 | A |
| SBT | 10 | 10 | 100% | 0 | 50 | 7 | A |
| SBR | 10 | 10 | 100% | 0 | 50 | 8 | A |
| **SB** | **30** | **30** | **100%** | | | **7** | **A** |
| **Total** | **30** | **30** | **100%** | | | **7** | **A** |

*Node Letter: D VISSIM ID: 4*

*LOS Category: Unsignalized*

## 8: NB West Frontage Road & 1600 South/2700 Nort

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| NBL | 10 | 10 | 100% | 0 | 50 | 8 | A |
| NBT | 10 | 10 | 100% | 0 | 50 | 8 | A |
| NBR | 20 | 18 | 90% | 0 | 50 | 8 | A |
| **NB** | **40** | **38** | **95%** | | | **8** | **A** |
| **Total** | **40** | **38** | **95%** | | | **8** | **A** |

*Node Letter: D VISSIM ID: 18*

*LOS Category: Unsignalized*

## 9: East Frontage Road & 1600 South/2700 North

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| SBL | 20 | 22 | 110% | 0 | 50 | 9 | A |
| SBR | 30 | 28 | 93% | 0 | 50 | 5 | A |
| **SB** | **50** | **50** | **100%** | | | **7** | **A** |
| **Total** | **50** | **50** | **100%** | | | **7** | **A** |

*Node Letter: E VISSIM ID: 5*

*LOS Category: Unsignalized*

## 10: 1750 West & 1600 South/2700 North

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| SBL | 50 | 49 | 98% | 0 | 25 | 4 | A |
| SBR | 30 | 31 | 103% | 0 | 25 | 3 | A |
| **SB** | **80** | **80** | **100%** | | | **3** | **A** |
| **Total** | **80** | **80** | **100%** | | | **3** | **A** |

*Node Letter: F VISSIM ID: 6*

*LOS Category: Unsignalized*

## 11: SB Canyon Creek & 1600 South/2700 North

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| SBL | 20 | 21 | 105% | 0 | 0 | 2 | A |
| SBT | 30 | 28 | 93% | 0 | 50 | 4 | A |
| SBR | 130 | 130 | 100% | 0 | 50 | 4 | A |
| **SB** | **180** | **179** | **99%** | | | **4** | **A** |
| **Total** | **180** | **179** | **99%** | | | **4** | **A** |

*Node Letter: G VISSIM ID: 7*

*LOS Category: Unsignalized*

## 12: NB Canyon Creek & 1600 South/2700 North

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| NBL | 80 | 77 | 96% | 0 | 50 | 10 | A |
| NBT | 50 | 53 | 106% | 0 | 50 | 4 | A |
| NBR | 40 | 39 | 98% | 0 | 50 | 4 | A |
| **NB** | **170** | **169** | **99%** | | | **7** | **A** |
| **Total** | **170** | **169** | **99%** | | | **7** | **A** |

*Node Letter: G VISSIM ID: 19*

# II: 2050 AM No Build

*LOS Category: Signalized*

## 13: 1200 West & 1600 South/2700 North

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| NBL | 20 | 18 | 90% | 0 | 50 | 32 | C |
| NBT | 150 | 152 | 101% | 25 | 100 | 31 | C |
| NBR | 80 | 82 | 103% | 25 | 125 | 15 | B |
| **NB** | **250** | **252** | **101%** | | | **26** | **C** |
| SBL | 10 | 10 | 100% | 0 | 50 | 33 | C |
| SBT | 140 | 141 | 101% | 25 | 75 | 29 | C |
| SBR | 30 | 30 | 100% | 25 | 100 | 14 | B |
| **SB** | **180** | **181** | **101%** | | | **27** | **C** |
| EBL | 10 | 10 | 100% | 0 | 25 | 6 | A |
| EBT | 200 | 196 | 98% | 0 | 100 | 6 | A |
| EBR | 10 | 10 | 100% | 0 | 125 | 4 | A |
| **EB** | **220** | **216** | **98%** | | | **5** | **A** |
| WBL | 160 | 155 | 97% | 0 | 75 | 7 | A |
| WBT | 220 | 218 | 99% | 0 | 100 | 6 | A |
| WBR | 20 | 17 | 85% | 0 | 125 | 6 | A |
| **WB** | **400** | **390** | **98%** | | | **6** | **A** |
| **Total** | **1,050** | **1,039** | **99%** | | | **14** | **B** |

*Node Letter: H VISSIM ID: 8*

*LOS Category: Unsignalized*

## 14: SB 950 West & 1600 South/2700 North

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| SBL | 10 | 10 | 100% | 0 | 25 | 6 | A |
| SBT | 10 | 9 | 90% | 0 | 25 | 6 | A |
| SBR | 80 | 79 | 99% | 0 | 25 | 2 | A |
| **SB** | **100** | **98** | **98%** | | | **2** | **A** |
| **Total** | **100** | **98** | **98%** | | | **2** | **A** |

*Node Letter: I VISSIM ID: 9*

*LOS Category: Unsignalized*

## 15: NB 950 West & 1600 South/2700 North

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| NBL | 10 | 9 | 90% | 0 | 50 | 6 | A |
| NBT | 20 | 18 | 90% | 0 | 50 | 5 | A |
| NBR | 10 | 11 | 110% | 0 | 50 | 6 | A |
| **NB** | **40** | **38** | **95%** | | | **6** | **A** |
| **Total** | **40** | **38** | **95%** | | | **6** | **A** |

*Node Letter: I VISSIM ID: 20*

*LOS Category: Signalized*

## 16: SR-51 & 1600 South/2700 North

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| NBL | 80 | 80 | 100% | 0 | 75 | 12 | B |
| NBT | 410 | 409 | 100% | 25 | 225 | 11 | B |
| NBR | 40 | 39 | 98% | 25 | 250 | 8 | A |
| **NB** | **530** | **528** | **100%** | | | **11** | **B** |
| SBL | 10 | 9 | 90% | 0 | 25 | 15 | B |
| SBT | 200 | 203 | 102% | 0 | 100 | 10 | A |
| SBR | 70 | 66 | 94% | 0 | 0 | 1 | A |
| **SB** | **280** | **278** | **99%** | | | **8** | **A** |
| EBL | 70 | 68 | 97% | 25 | 125 | 35 | C |
| EBT | 120 | 117 | 98% | 50 | 200 | 34 | C |
| EBR | 80 | 81 | 101% | 50 | 200 | 34 | C |
| **EB** | **270** | **266** | **99%** | | | **34** | **C** |
| WBL | 130 | 131 | 101% | 25 | 125 | 32 | C |
| WBT | 190 | 186 | 98% | 25 | 200 | 30 | C |
| WBR | 30 | 31 | 103% | 50 | 200 | 6 | A |
| **WB** | **350** | **348** | **99%** | | | **28** | **C** |
| **Total** | **1,430** | **1,420** | **99%** | | | **19** | **B** |

*Node Letter: J VISSIM ID: 10*

# 2050 No Build PM - IACR Update Mar21

*I-15 Spanish Fork/Springville Interchange Study*

**Link Peak Results**

*Number of Runs: 10*

## I15 NB

V: Speed (mph), K: Density (vpmpl), and LOS

| ID | Location | Seg Type | Ln | Q: Hr Flow Rate / Lane Demand | Served | % Served | Length (ft) | Max 15-min. Interval V | K | LOS | Begin | Segment Peak Hour V | K | LOS | Begin | Peak Hour: 16:15 V | K | LOS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | ML - North of 400 S | B | 5.2 | 980 | 940 | 96% | 6,125 | 73 | 13.4 | B | 16:15 | 73 | 13.2 | B | 16:15 | 73 | 13.2 | B |
| 2 | ML - 400 S On Ramp | M | 6.7 | 770 | 730 | 96% | 1,525 | 70 | 9.5 | A | 16:15 | 70 | 9.2 | A | 16:00 | 70 | 9.2 | A |
| 3 | ML - 400 S | B | 6.0 | 640 | 640 | 100% | 2,450 | 73 | 9.1 | A | 17:00 | 74 | 8.8 | A | 16:15 | 74 | 8.8 | A |
| 4 | ML -400 S Off Ramp | D | 6.0 | 800 | 800 | 100% | 1,525 | 73 | 10.0 | A | 17:00 | 73 | 9.7 | A | 16:15 | 73 | 9.7 | A |
| 5 | ML - US6 to 400 S w HOV | B | 5.0 | 960 | 960 | 100% | 3,575 | 71 | 14.4 | B | 17:00 | 71 | 13.8 | B | 16:15 | 71 | 13.8 | B |
| 6 | ML - US6 to 400 S wo HOV | B | 6.0 | 870 | 870 | 100% | 3,050 | 73 | 12.7 | B | 17:00 | 73 | 12.2 | B | 16:15 | 73 | 12.2 | B |
| 7 | ML - US 6 On Ramp | M | 7.0 | 750 | 750 | 100% | 1,500 | 72 | 13.3 | B | 17:00 | 72 | 12.8 | B | 16:15 | 72 | 12.8 | B |
| 8 | ML - Main St. On Ramp | M | 4.6 | 700 | 680 | 98% | 1,325 | 67 | 13.6 | B | 17:00 | 67 | 12.9 | B | 17:00 | 68 | 12.6 | B |
| 9 | ML- Main St. | B | 4.0 | 540 | 530 | 98% | 4,075 | 73 | 7.7 | A | 16:15 | 73 | 7.5 | A | 16:15 | 73 | 7.5 | A |
| 10 | ML - Main St. Off Ramp | D | 4.0 | 880 | 880 | 100% | 1,500 | 70 | 20.1 | C | 17:00 | 70 | 19.5 | B | 17:00 | 70 | 18.9 | B |
| 11 | ML - South of Main St. | B | 4.0 | 880 | 880 | 100% | 6,075 | 72 | 12.9 | B | 17:00 | 72 | 12.4 | B | 17:00 | 72 | 12.2 | B |
| | **Urban Facility** | **U** | **5.1** | **860** | **840** | **99%** | **32,750** | **72** | **12.2** | **B** | **17:00** | **72** | **11.8** | **B** | **16:15** | **72** | **11.8** | **B** |

## I15 SB

V: Speed (mph), K: Density (vpmpl), and LOS

| ID | Location | Seg Type | Ln | Q: Hr Flow Rate / Lane Demand | Served | % Served | Length (ft) | Max 15-min. Interval V | K | LOS | Begin | Segment Peak Hour V | K | LOS | Begin | Peak Hour: 17:00 V | K | LOS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 12 | ML - North of 400 S | B | 5.0 | 1,630 | 1,620 | 99% | 5,350 | 58 | 36.3 | E | 17:45 | 66 | 28.7 | D | 17:00 | 66 | 28.7 | D |
| 13 | ML - 400 S Off Ramp | D | 6.0 | 1,360 | 1,340 | 99% | 1,500 | 7 | ##### | F | 17:45 | 27 | 88.8 | F | 17:00 | 27 | 88.8 | F |
| 14 | ML - 400 S | B | 5.0 | 1,440 | 1,430 | 99% | 2,500 | 68 | 22.2 | C | 17:45 | 69 | 21.9 | C | 17:00 | 69 | 21.9 | C |
| 15 | ML - 400 S On Ramp | M | 5.8 | 1,370 | 1,330 | 97% | 1,500 | 57 | 20.0 | B | 17:00 | 58 | 19.0 | B | 17:00 | 58 | 19.0 | B |
| 16 | ML - 400 S to US6/Main St. w HO | B | 5.0 | 1,600 | 1,550 | 97% | 2,425 | 70 | 23.8 | C | 17:00 | 70 | 23.0 | C | 17:00 | 70 | 23.0 | C |
| 17 | ML - 400 S to US6/Main St. wo H | B | 6.0 | 1,500 | 1,460 | 97% | 2,775 | 70 | 22.1 | C | 17:00 | 70 | 21.6 | C | 17:00 | 70 | 21.6 | C |
| 19 | ML -US6/Main St. Off Ramp | D | 6.0 | 1,500 | 1,460 | 97% | 1,500 | 66 | 26.9 | C | 17:15 | 68 | 25.8 | C | 17:00 | 68 | 25.8 | C |
| 20 | ML -Main St. | B | 4.0 | 1,140 | 1,120 | 98% | 6,250 | 72 | 16.0 | B | 17:00 | 72 | 15.6 | B | 16:15 | 72 | 15.6 | B |
| 21 | ML - US6/Main St. On Ramp | M | 5.3 | 1,380 | 1,340 | 97% | 1,500 | 63 | 23.4 | C | 17:00 | 64 | 22.6 | C | 17:00 | 64 | 22.6 | C |
| 22 | ML - South of Main St. | B | 4.0 | 1,810 | 1,760 | 97% | 8,450 | 71 | 26.2 | D | 17:00 | 71 | 25.5 | C | 17:00 | 71 | 25.5 | C |
| | **Urban Facility** | **U** | **4.8** | **1,550** | **1,510** | **98%** | **33,725** | **64** | **30.5** | **D** | **17:45** | **66** | **26.7** | **D** | **17:00** | **66** | **26.7** | **D** |

## I15_Exp. NB

V: Speed (mph), K: Density (vpmpl), and LOS

| ID | Location | Seg Type | Ln | Q: Hr Flow Rate / Lane Demand | Served | % Served | Length (ft) | Max 15-min. Interval V | K | LOS | Begin | Segment Peak Hour V | K | LOS | Begin | Peak Hour: 16:15 V | K | LOS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 23 | HOV -North of 400 S | B | 1.0 | 420 | 420 | 100% | 7,675 | 70 | 6.5 | A | 16:30 | 71 | 6.1 | A | 16:15 | 71 | 6.1 | A |
| 24 | HOV - South of 400 S | B | 1.0 | 420 | 420 | 100% | 5,100 | 72 | 6.3 | A | 16:30 | 72 | 6.0 | A | 16:15 | 72 | 6.0 | A |
| | **Urban Facility** | **U** | **1.0** | **420** | **420** | **100%** | **12,800** | **71** | **6.4** | **A** | **16:30** | **71** | **6.1** | **A** | **16:15** | **71** | **6.1** | **A** |

## I15_Exp. SB

V: Speed (mph), K: Density (vpmpl), and LOS

| ID | Location | Seg Type | Ln | Q: Hr Flow Rate / Lane Demand | Served | % Served | Length (ft) | Max 15-min. Interval V | K | LOS | Begin | Segment Peak Hour V | K | LOS | Begin | Peak Hour: 17:00 V | K | LOS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 25 | HOV - North of 400 S | B | 1.0 | 1,000 | 1,010 | 101% | 6,850 | 70 | 15.8 | B | 17:00 | 70 | 15.4 | B | 17:00 | 70 | 15.4 | B |
| 26 | HOV - South of 400 S | B | 1.0 | 1,000 | 1,000 | 101% | 3,925 | 69 | 15.8 | B | 17:30 | 69 | 15.6 | B | 17:00 | 69 | 15.6 | B |
| | **Urban Facility** | **U** | **1.0** | **1,000** | **1,000** | **101%** | **10,775** | **69** | **15.7** | **B** | **17:00** | **69** | **15.5** | **B** | **17:00** | **69** | **15.5** | **B** |

# II: 2050 PM No Build

*LOS Category: Signalized*

## 1: SR- 77 (400 South) SPUI

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| NBL | 320 | 296 | 93% | 50 | 225 | 49 | D |
| NBR | 1,050 | 1,094 | 104% | 350 | 1,000 | 75 | E |
| **NB** | **1,370** | **1,390** | **101%** | | | **70** | **E** |
| SBL | 1,580 | 1,414 | 89% | 1,600 | 3,125 | 213 | F |
| SBR | 510 | 450 | 88% | 0 | 225 | 131 | F |
| **SB** | **2,090** | **1,864** | 89% | | | **193** | **F** |
| EBL | 570 | 297 | 52% | 525 | 2,175 | 492 | F |
| EBT | 460 | 220 | 48% | 2,325 | 3,100 | 1040 | F |
| EBR | 480 | 223 | 46% | 0 | 0 | 676 | F |
| **EB** | **1,510** | **740** | 49% | | | **710** | **F** |
| WBL | 1,370 | 1,294 | 94% | 500 | 1,250 | 75 | E |
| WBT | 400 | 378 | 95% | 75 | 275 | 56 | E |
| WBR | 1,110 | 1,064 | 96% | 0 | 0 | 3 | A |
| **WB** | **2,880** | **2,736** | **95%** | | | **45** | D |
| **Total** | **7,850** | **6,730** | 86% | | | **164** | **F** |

*Node Letter: A VISSIM ID: 1*

*LOS Category: Signalized*

## 2: SR-77 (400 ) & 1750 West

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| NBL | 740 | 533 | 72% | 2,350 | 2,450 | 514 | F |
| NBT | 290 | 217 | 75% | 2,350 | 2,450 | 491 | F |
| NBR | 220 | 156 | 71% | 2,375 | 2,475 | 439 | F |
| **NB** | **1,250** | **906** | 72% | | | **496** | **F** |
| SBL | 80 | 77 | 96% | 25 | 100 | 99 | F |
| SBT | 160 | 150 | 94% | 375 | 1,375 | 217 | F |
| SBR | 670 | 657 | 98% | 300 | 1,200 | 70 | E |
| **SB** | **910** | **884** | **97%** | | | **98** | **F** |
| EBL | 370 | 324 | 88% | 100 | 400 | 100 | F |
| EBT | 1,820 | 1,618 | 89% | 625 | 1,175 | 54 | D |
| EBR | 900 | 778 | 86% | 550 | 1,375 | 30 | C |
| **EB** | **3,090** | **2,720** | 88% | | | **53** | D |
| WBL | 200 | 185 | 93% | 375 | 1,200 | 349 | F |
| WBT | 1,470 | 1,454 | 99% | 575 | 1,350 | 62 | E |
| WBR | 30 | 30 | 100% | 575 | 1,375 | 41 | D |
| **WB** | **1,700** | **1,669** | **98%** | | | **94** | **F** |
| **Total** | **6,950** | **6,179** | 89% | | | **135** | **F** |

*Node Letter: B VISSIM ID: 2*

*LOS Category: Signalized*

## 3: Main Street & I-15 Ramps

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| NBL | 390 | 399 | 102% | 100 | 375 | 44 | D |
| NBT | 430 | 435 | 101% | 50 | 400 | 20 | B |
| NBR | 870 | 856 | 98% | 0 | 0 | 1 | A |
| **NB** | **1,690** | **1,690** | **100%** | | | **16** | **B** |
| SBL | 190 | 182 | 96% | 100 | 450 | 38 | D |
| SBT | 940 | 926 | 99% | 100 | 450 | 36 | D |
| SBR | 890 | 873 | 98% | 0 | 0 | 4 | A |
| **SB** | **2,020** | **1,981** | **98%** | | | **22** | **C** |
| EBL | 320 | 328 | 103% | 50 | 400 | 57 | E |
| EBT | 10 | 11 | 110% | 75 | 225 | 60 | E |
| EBR | 240 | 235 | 98% | 25 | 175 | 8 | A |
| **EB** | **570** | **574** | **101%** | | | **37** | D |
| WBL | 870 | 831 | 96% | 150 | 475 | 54 | D |
| WBT | 10 | 8 | 80% | 150 | 475 | 40 | D |
| WBR | 170 | 172 | 101% | 0 | 100 | 9 | A |
| **WB** | **1,050** | **1,011** | **96%** | | | **47** | D |
| **Total** | **5,330** | **5,256** | **99%** | | | **26** | **C** |

*Node Letter: K VISSIM ID: 11*

*LOS Category: Signalized*

## 4: Main Street & 1000 North

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| NBL | 30 | 30 | 100% | 0 | 25 | 28 | C |
| NBT | 980 | 966 | 99% | 75 | 350 | 30 | C |
| NBR | 430 | 421 | 98% | 25 | 250 | 15 | B |
| **NB** | **1,440** | **1,417** | **98%** | | | **25** | **C** |
| SBL | 500 | 484 | 97% | 75 | 325 | 52 | D |
| SBT | 1,440 | 1,406 | 98% | 25 | 350 | 8 | A |
| SBR | 110 | 110 | 100% | 0 | 50 | 3 | A |
| **SB** | **2,050** | **2,000** | **98%** | | | **18** | **B** |
| EBL | 100 | 106 | 106% | 25 | 125 | 42 | D |
| EBT | 90 | 83 | 92% | 25 | 75 | 60 | E |
| EBR | 30 | 29 | 97% | 50 | 125 | 11 | B |
| **EB** | **220** | **218** | **99%** | | | **45** | D |
| WBL | 440 | 445 | 101% | 125 | 425 | 58 | E |
| WBT | 70 | 70 | 100% | 25 | 225 | 48 | D |
| WBR | 610 | 599 | 98% | 75 | 425 | 18 | B |
| **WB** | **1,120** | **1,114** | **99%** | | | **36** | D |
| **Total** | **4,830** | **4,749** | **98%** | | | **26** | **C** |

*Node Letter: M VISSIM ID: 13*

# II: 2050 PM No Build

*LOS Category: Signalized*

## 5: US-6 & 1000 North

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| NBL | 210 | 205 | 98% | 50 | 150 | 74 | E |
| NBT | 580 | 560 | 97% | 125 | 450 | 61 | E |
| NBR | 260 | 263 | 101% | 25 | 125 | 14 | B |
| **NB** | **1,050** | **1,028** | **98%** | | | **52** | D |
| SBL | 480 | 463 | 96% | 125 | 650 | 111 | F |
| SBT | 520 | 518 | 100% | 125 | 550 | 60 | E |
| SBR | 1,290 | 1,289 | 100% | 0 | 0 | 10 | A |
| **SB** | **2,290** | **2,270** | **99%** | | | **42** | D |
| EBL | 910 | 908 | 100% | 100 | 325 | 55 | E |
| EBT | 340 | 338 | 99% | 25 | 150 | 24 | C |
| EBR | 520 | 496 | 95% | 25 | 250 | 17 | B |
| **EB** | **1,770** | **1,742** | **98%** | | | **38** | D |
| WBL | 120 | 129 | 108% | 25 | 100 | 82 | F |
| WBT | 370 | 360 | 97% | 75 | 275 | 65 | E |
| WBR | 340 | 343 | 101% | 50 | 250 | 20 | B |
| **WB** | **830** | **832** | **100%** | | | **49** | D |
| **Total** | **5,940** | **5,872** | **99%** | | | **44** | D |

*Node Letter: O VISSIM ID: 15*

*LOS Category: Signalized*

## 6: Main Street & 1600 South/2700 North

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| NBT | 530 | 536 | 101% | 25 | 225 | 12 | B |
| NBR | 280 | 272 | 97% | 50 | 250 | 10 | B |
| **NB** | **810** | **808** | **100%** | | | **12** | **B** |
| SBL | 200 | 197 | 99% | 25 | 175 | 24 | C |
| SBT | 1,130 | 1,124 | 99% | 25 | 275 | 10 | B |
| **SB** | **1,330** | **1,321** | **99%** | | | **12** | **B** |
| WBL | 480 | 469 | 98% | 50 | 225 | 26 | C |
| WBR | 130 | 130 | 100% | 75 | 225 | 24 | C |
| **WB** | **610** | **599** | **98%** | | | **26** | **C** |
| **Total** | **2,750** | **2,728** | **99%** | | | **15** | **B** |

*Node Letter: C VISSIM ID: 3*

*LOS Category: Unsignalized*

## 7: SB West Frontage Road & 1600 South/2700 Nort

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| SBL | 50 | 48 | 96% | 0 | 75 | 13 | B |
| SBT | 10 | 10 | 100% | 0 | 75 | 12 | B |
| SBR | 70 | 72 | 103% | 0 | 75 | 12 | B |
| **SB** | **130** | **130** | **100%** | | | **12** | **B** |
| **Total** | **130** | **130** | **100%** | | | **12** | **B** |

*Node Letter: D VISSIM ID: 4*

*LOS Category: Unsignalized*

## 8: NB West Frontage Road & 1600 South/2700 Nort

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| NBL | 20 | 20 | 100% | 0 | 75 | 10 | A |
| NBT | 10 | 13 | **130%** | 0 | 75 | 9 | A |
| NBR | 80 | 77 | 96% | 0 | 75 | 9 | A |
| **NB** | **110** | **110** | **100%** | | | **9** | **A** |
| **Total** | **110** | **110** | **100%** | | | **9** | **A** |

*Node Letter: D VISSIM ID: 18*

*LOS Category: Unsignalized*

## 9: East Frontage Road & 1600 South/2700 North

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| SBL | 70 | 69 | 99% | 0 | 100 | 13 | B |
| SBR | 120 | 118 | 98% | 0 | 100 | 10 | B |
| **SB** | **190** | **187** | **98%** | | | **11** | **B** |
| **Total** | **190** | **187** | **98%** | | | **11** | **B** |

*Node Letter: E VISSIM ID: 5*

*LOS Category: Unsignalized*

## 10: 1750 West & 1600 South/2700 North

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| SBL | 130 | 132 | 102% | 0 | 75 | 12 | B |
| SBR | 110 | 107 | 97% | 0 | 75 | 5 | A |
| **SB** | **240** | **239** | **100%** | | | **9** | **A** |
| **Total** | **240** | **239** | **100%** | | | **9** | **A** |

*Node Letter: F VISSIM ID: 6*

*LOS Category: Unsignalized*

## 11: SB Canyon Creek & 1600 South/2700 North

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| SBL | 50 | 52 | 104% | 0 | 25 | 6 | A |
| SBT | 120 | 114 | 95% | 25 | 175 | 16 | C |
| SBR | 180 | 180 | 100% | 25 | 175 | 15 | C |
| **SB** | **350** | **346** | **99%** | | | **14** | **B** |
| **Total** | **350** | **346** | **99%** | | | **14** | **B** |

*Node Letter: G VISSIM ID: 7*

*LOS Category: Unsignalized*

## 12: NB Canyon Creek & 1600 South/2700 North

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| NBL | 140 | 140 | 100% | 25 | 100 | 26 | D |
| NBT | 70 | 64 | 91% | 0 | 100 | 8 | A |
| NBR | 140 | 140 | 100% | 0 | 100 | 8 | A |
| **NB** | **350** | **344** | **98%** | | | **16** | **C** |
| **Total** | **350** | **344** | **98%** | | | **16** | **C** |

*Node Letter: G VISSIM ID: 19*

# II: 2050 PM No Build

*LOS Category: Signalized*

## 13: 1200 West & 1600 South/2700 North

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| NBL | 50 | 52 | 104% | 25 | 100 | 43 | D |
| NBT | 200 | 200 | 100% | 25 | 200 | 23 | C |
| NBR | 230 | 226 | 98% | 50 | 225 | 16 | B |
| **NB** | **480** | **478** | **100%** | | | **22** | **C** |
| SBL | 30 | 26 | 87% | 0 | 75 | 37 | D |
| SBT | 590 | 576 | 98% | 100 | 325 | 35 | C |
| SBR | 50 | 60 | **120%** | 100 | 350 | 30 | C |
| **SB** | **670** | **662** | **99%** | | | **34** | **C** |
| EBL | 60 | 59 | 98% | 0 | 75 | 13 | B |
| EBT | 360 | 348 | 97% | 25 | 200 | 13 | B |
| EBR | 30 | 32 | 107% | 25 | 225 | 12 | B |
| **EB** | **450** | **439** | **98%** | | | **13** | **B** |
| WBL | 190 | 189 | 99% | 25 | 125 | 14 | B |
| WBT | 220 | 213 | 97% | 0 | 125 | 10 | A |
| WBR | 20 | 18 | 90% | 25 | 150 | 9 | A |
| **WB** | **430** | **420** | **98%** | | | **12** | **B** |
| **Total** | **2,030** | **1,999** | **98%** | | | **22** | **C** |

*Node Letter: H VISSIM ID: 8*

*LOS Category: Signalized*

## 16: SR-51 & 1600 South/2700 North

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| NBL | 90 | 80 | 89% | 25 | 125 | 32 | C |
| NBT | 320 | 326 | 102% | 50 | 325 | 19 | B |
| NBR | 170 | 167 | 98% | 50 | 325 | 13 | B |
| **NB** | **580** | **573** | **99%** | | | **19** | **B** |
| SBL | 20 | 22 | 110% | 0 | 25 | 27 | C |
| SBT | 560 | 559 | 100% | 75 | 375 | 20 | B |
| SBR | 50 | 48 | 96% | 0 | 0 | 6 | A |
| **SB** | **630** | **629** | **100%** | | | **19** | **B** |
| EBL | 70 | 73 | 104% | 25 | 125 | 36 | D |
| EBT | 320 | 313 | 98% | 125 | 550 | 39 | D |
| EBR | 160 | 152 | 95% | 125 | 575 | 37 | D |
| **EB** | **550** | **538** | **98%** | | | **38** | **D** |
| WBL | 130 | 131 | 101% | 25 | 125 | 38 | D |
| WBT | 180 | 178 | 99% | 25 | 150 | 20 | C |
| WBR | 20 | 21 | 105% | 25 | 150 | 5 | A |
| **WB** | **330** | **330** | **100%** | | | **26** | **C** |
| **Total** | **2,090** | **2,070** | **99%** | | | **25** | **C** |

*Node Letter: J VISSIM ID: 10*

*LOS Category: Unsignalized*

## 14: SB 950 West & 1600 South/2700 North

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| SBL | 120 | 120 | 100% | 25 | 175 | 15 | B |
| SBT | 30 | 30 | 100% | 25 | 175 | 13 | B |
| SBR | 130 | 128 | 98% | 25 | 175 | 10 | B |
| **SB** | **280** | **278** | **99%** | | | **12** | **B** |
| **Total** | **280** | **278** | **99%** | | | **12** | **B** |

*Node Letter: I VISSIM ID: 9*

*LOS Category: Unsignalized*

## 15: NB 950 West & 1600 South/2700 North

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| NBL | 10 | 10 | 100% | 0 | 50 | 7 | A |
| NBT | 20 | 18 | 90% | 0 | 50 | 6 | A |
| NBR | 10 | 9 | 90% | 0 | 50 | 6 | A |
| **NB** | **40** | **37** | **93%** | | | **7** | **A** |
| **Total** | **40** | **37** | **93%** | | | **7** | **A** |

*Node Letter: I VISSIM ID: 20*

# VISSIM Travel Time Comparison

*Springville / Spanish Fork EA*

## 2050 No Build AM

| 1600 South / 2700 North EB | Dist (mi) | Base FFS (mph) | # Veh | Travel Time (sec) | Travel Speed (mph) | LOS |
|---|---|---|---|---|---|---|
| Main Street to 200 East | 0.3 | 35 | 625 | 29 | 32 | A |
| 200 East to 1950 West | 0.3 | 35 | 583 | 36 | 34 | A |
| 1950 West to 1750 Wes | 0.1 | 35 | 506 | 8 | 32 | A |
| 1750 West to Wallace L | 0.3 | 35 | 275 | 36 | 34 | A |
| Wallace Lan to 1200 W | 0.2 | 35 | 315 | 27 | 28 | B |
| 1200 West to 950 West | 0.3 | 35 | 406 | 31 | 34 | A |
| 950 West to State Stree | 0.8 | 35 | 200 | 118 | 24 | B |
| Total | 2.3 | 35 | -- | 286 | 29 | A |

| 1600 South / 2700 North WB | Dist (mi) | Base FFS (mph) | # Veh | Travel Time (sec) | Travel Speed (mph) | LOS |
|---|---|---|---|---|---|---|
| State Street to 950 Wes | 0.8 | 35 | 633 | 87 | 33 | A |
| 950 West to 1200 West | 0.3 | 35 | 432 | 36 | 29 | A |
| 1200 West to Wallace L | 0.2 | 35 | 390 | 23 | 34 | A |
| Wallace Lane to 1750 | 0.3 | 35 | 573 | 36 | 33 | A |
| 1750 West to 1950 Wes | 0.1 | 35 | 589 | 8 | 33 | A |
| 1950 West to 200 East | 0.3 | 35 | 570 | 37 | 33 | A |
| 200 East to Main Street | 0.2 | 35 | 618 | 50 | 18 | D |
| Total | 2.3 | 35 | -- | 278 | 30 | A |

## 2050 No Build PM

| 1600 South / 2700 North EB | Dist (mi) | Base FFS (mph) | # Veh | Travel Time (sec) | Travel Speed (mph) | LOS |
|---|---|---|---|---|---|---|
| Main Street to 200 East | 0.3 | 35 | 825 | 29 | 32 | A |
| 200 East to 1950 West | 0.3 | 35 | 934 | 37 | 34 | A |
| 1950 West to 1750 Wes | 0.1 | 35 | 851 | 9 | 32 | A |
| 1750 West to Wallace L | 0.3 | 35 | 472 | 37 | 33 | A |
| Wallace Lan to 1200 W | 0.2 | 35 | 631 | 34 | 22 | C |
| 1200 West to 950 West | 0.3 | 35 | 790 | 32 | 33 | A |
| 950 West to State Stree | 0.8 | 35 | 577 | 122 | 23 | C |
| Total | 2.3 | 35 | -- | 299 | 28 | B |

| 1600 South / 2700 North WB | Dist (mi) | Base FFS (mph) | # Veh | Travel Time (sec) | Travel Speed (mph) | LOS |
|---|---|---|---|---|---|---|
| State Street to 950 Wes | 0.8 | 35 | 556 | 87 | 33 | A |
| 950 West to 1200 West | 0.3 | 35 | 414 | 40 | 26 | B |
| 1200 West to Wallace L | 0.2 | 35 | 404 | 23 | 33 | A |
| Wallace Lane to 1750 | 0.3 | 35 | 801 | 37 | 33 | A |
| 1750 West to 1950 Wes | 0.1 | 35 | 887 | 9 | 32 | A |
| 1950 West to 200 East | 0.3 | 35 | 934 | 37 | 33 | A |
| 200 East to Main Street | 0.2 | 35 | 1088 | 52 | 17 | D |
| Total | 2.3 | 35 | -- | 284 | 29 | A |

# 2050 Build Diamond AM - IACR Update Mar21

*I-15 Spanish Fork/Springville Interchange Study*

**Link Peak Results**

*Number of Runs: 10*

## I15 NB

V: Speed (mph), K: Density (vpmpl), and LOS

| ID | Location | Seg Type | Ln | Q: Hr Flow Rate / Lane Demand | Served | % Served | Length (ft) | Max 15-min. Interval V | K | LOS | Begin | Segment Peak Hour V | K | LOS | Begin | Peak Hour: 07:00 V | K | LOS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | ML - North of 400 S | B | 5.2 | 1,530 | 1,530 | 100% | 6,125 | 71 | 23.7 | C | 07:30 | 71 | 22.6 | C | 07:00 | 71 | 22.6 | C |
| 2 | ML- 400 S On Ramp | M | 6.7 | 1,200 | 1,190 | 100% | 1,525 | 70 | 13.0 | B | 07:30 | 71 | 12.1 | B | 07:00 | 71 | 12.1 | B |
| 3 | ML - 400 S | B | 6.0 | 1,280 | 1,270 | 100% | 2,450 | 72 | 19.8 | C | 07:30 | 72 | 18.8 | C | 07:00 | 72 | 18.8 | C |
| 4 | ML - 400 S Off Ramp | D | 6.0 | 1,330 | 1,330 | 100% | 1,525 | 72 | 15.2 | B | 07:30 | 73 | 14.6 | B | 07:30 | 73 | 14.4 | B |
| 5 | ML - 1600 S to 400 S | B | 5.0 | 1,600 | 1,580 | 99% | 375 | 71 | 24.2 | C | 07:30 | 71 | 23.0 | C | 07:00 | 71 | 23.0 | C |
| 6 | ML - 1600 S On Ramp | M | 5.0 | 1,600 | 1,590 | 99% | 1,500 | 71 | 23.2 | C | 07:30 | 71 | 22.1 | C | 07:15 | 71 | 22.0 | C |
| 7 | ML - 1600 S with HOV Lane | B | 4.0 | 1,740 | 1,740 | 100% | 1,700 | 69 | 28.1 | D | 07:30 | 69 | 26.3 | D | 07:00 | 69 | 26.3 | D |
| 8 | ML - 1600 S without HOV Lane | B | 5.0 | 1,580 | 1,580 | 100% | 875 | 65 | 27.6 | D | 07:30 | 67 | 25.2 | C | 07:00 | 67 | 25.2 | C |
| 9 | ML - 1600 S Off Ramp | D | 6.0 | 1,450 | 1,450 | 100% | 1,500 | 63 | 23.5 | C | 07:30 | 65 | 21.8 | C | 07:30 | 66 | 21.2 | C |
| 10 | ML - US 6 to 1600 S | B | 6.0 | 1,450 | 1,440 | 100% | 675 | 65 | 24.9 | C | 07:30 | 68 | 22.3 | C | 07:00 | 68 | 22.3 | C |
| 11 | ML - US 6 On Ramp | M | 7.0 | 1,240 | 1,240 | 100% | 1,500 | 51 | 21.6 | C | 07:30 | 57 | 18.1 | B | 07:00 | 57 | 18.1 | B |
| 12 | ML - Main St. On Ramp | M | 4.6 | 1,120 | 1,120 | 101% | 1,325 | 53 | 32.5 | D | 07:30 | 57 | 25.8 | C | 07:30 | 58 | 25.2 | C |
| 13 | ML - Main St. | B | 4.0 | 1,010 | 1,020 | 101% | 4,075 | 71 | 16.5 | B | 07:30 | 72 | 15.1 | B | 07:00 | 72 | 15.1 | B |
| 14 | ML - Main St. Off Ramp | D | 4.0 | 1,400 | 1,400 | 100% | 1,500 | 57 | 38.3 | E | 07:30 | 62 | 32.2 | D | 07:00 | 62 | 32.2 | D |
| 15 | ML - South of Main St. | B | 4.0 | 1,400 | 1,410 | 100% | 6,075 | 69 | 24.3 | C | 07:30 | 70 | 21.6 | C | 07:00 | 70 | 21.6 | C |
| | **Urban Facility** | **U** | **5.0** | **1,420** | **1,420** | **100%** | **32,750** | **67** | **22.6** | C | **07:30** | **69** | **20.5** | C | **07:00** | **69** | **20.5** | C |

## I15 SB

V: Speed (mph), K: Density (vpmpl), and LOS

| ID | Location | Seg Type | Ln | Q: Hr Flow Rate / Lane Demand | Served | % Served | Length (ft) | Max 15-min. Interval V | K | LOS | Begin | Segment Peak Hour V | K | LOS | Begin | Peak Hour: 08:00 V | K | LOS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 16 | ML - North of 400 S | B | 5.0 | 810 | 810 | 100% | 5,350 | 73 | 12.0 | B | 07:30 | 73 | 11.3 | B | 08:00 | 73 | 11.3 | B |
| 17 | ML - 400 S Off Ramp | D | 6.0 | 680 | 670 | 100% | 1,500 | 73 | 8.8 | A | 08:45 | 73 | 8.2 | A | 08:00 | 73 | 8.2 | A |
| 18 | ML - 400 S | B | 5.0 | 610 | 600 | 100% | 2,500 | 73 | 9.0 | A | 07:30 | 73 | 8.4 | A | 07:00 | 73 | 8.2 | A |
| 19 | ML - 400 S On Ramp | M | 5.8 | 650 | 650 | 100% | 1,500 | 65 | 10.7 | B | 07:30 | 65 | 10.4 | B | 08:00 | 65 | 10.4 | B |
| 20 | ML - 400 S to 1600 S | B | 5.0 | 760 | 760 | 100% | 275 | 70 | 11.6 | B | 07:30 | 71 | 10.9 | A | 07:30 | 71 | 10.7 | A |
| 21 | ML - 1600 S Off Ramp | D | 5.0 | 760 | 760 | 100% | 1,500 | 71 | 14.6 | B | 08:45 | 71 | 14.2 | B | 08:00 | 71 | 14.2 | B |
| 22 | ML - 1600 S | B | 6.0 | 570 | 570 | 100% | 3,300 | 73 | 8.4 | A | 07:30 | 73 | 7.9 | A | 07:00 | 73 | 7.7 | A |
| 23 | ML - US 6/Main St. Off Ramp | D | 6.0 | 570 | 570 | 100% | 1,500 | 73 | 10.4 | B | 07:30 | 73 | 9.8 | A | 07:00 | 73 | 9.5 | A |
| 24 | ML - US 6 to Main St. | B | 4.0 | 420 | 400 | 96% | 6,250 | 74 | 5.8 | A | 08:45 | 74 | 5.6 | A | 08:00 | 74 | 5.6 | A |
| 25 | ML - Main St. On-ramp | M | 5.3 | 510 | 500 | 99% | 1,500 | 70 | 8.7 | A | 07:30 | 70 | 8.5 | A | 07:00 | 70 | 8.1 | A |
| 26 | ML - South of Main St. | B | 4.0 | 670 | 660 | 99% | 2,375 | 73 | 9.4 | A | 07:30 | 73 | 9.1 | A | 07:00 | 73 | 9.0 | A |
| | **Urban Facility** | **U** | **5.0** | **640** | **640** | **99%** | **27,550** | **72** | **9.3** | A | **07:30** | **72** | **8.9** | A | **08:00** | **72** | **8.9** | A |

## I15_Exp. NB

V: Speed (mph), K: Density (vpmpl), and LOS

| ID | Location | Seg Type | Ln | Q: Hr Flow Rate / Lane Demand | Served | % Served | Length (ft) | Max 15-min. Interval V | K | LOS | Begin | Segment Peak Hour V | K | LOS | Begin | Peak Hour: 07:00 V | K | LOS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 27 | HOV -North of 400 S | B | 1.0 | 1,080 | 1,070 | 99% | 7,675 | 69 | 17.8 | B | 07:30 | 69 | 16.7 | B | 07:00 | 69 | 16.7 | B |
| 28 | HOV -1600 S to 400 S | B | 1.0 | 950 | 940 | 99% | 5,100 | 70 | 15.6 | B | 07:30 | 70 | 14.5 | B | 07:00 | 70 | 14.5 | B |
| | **Urban Facility** | **U** | **1.0** | **1,030** | **1,020** | **99%** | **12,800** | **69** | **16.9** | B | **07:30** | **69** | **15.8** | B | **07:00** | **69** | **15.8** | B |

## I15_Exp. SB

V: Speed (mph), K: Density (vpmpl), and LOS

| ID | Location | Seg Type | Ln | Q: Hr Flow Rate / Lane Demand | Served | % Served | Length (ft) | Max 15-min. Interval V | K | LOS | Begin | Segment Peak Hour V | K | LOS | Begin | Peak Hour: 07:15 V | K | LOS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 29 | HOV - North of 400 S | B | 1.0 | 100 | 90 | 100% | 6,850 | 74 | 1.4 | A | 08:15 | 74 | 1.3 | A | 07:15 | 74 | 1.3 | A |
| 30 | HOV - 400 S to 1600 S | B | 1.0 | 80 | 80 | 101% | 3,400 | 73 | 1.2 | A | 07:30 | 74 | 1.1 | A | 07:00 | 74 | 1.1 | A |
| | **Urban Facility** | **U** | **1.0** | **90** | **90** | **100%** | **10,250** | **74** | **1.3** | A | **08:45** | **74** | **1.2** | A | **07:15** | **74** | **1.2** | A |

# II: 2050 AM Build - Diamond

*LOS Category: Signalized*

## 1: SR- 77 (400 South) SPUI

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| NBL | 210 | 208 | 99% | 25 | 150 | 31 | C |
| NBR | 950 | 944 | 99% | 50 | 250 | 12 | B |
| **NB** | **1,160** | **1,152** | **99%** | | | **16** | **B** |
| SBL | 660 | 652 | 99% | 50 | 275 | 28 | C |
| SBR | 360 | 368 | 102% | 0 | 75 | 5 | A |
| **SB** | **1,020** | **1,020** | **100%** | | | **19** | **B** |
| EBL | 290 | 290 | 100% | 50 | 200 | 50 | D |
| EBT | 260 | 262 | 101% | 75 | 200 | 68 | E |
| EBR | 260 | 258 | 99% | 0 | 0 | 1 | A |
| **EB** | **810** | **810** | **100%** | | | **40** | **D** |
| WBL | 550 | 564 | 103% | 100 | 375 | 46 | D |
| WBT | 260 | 257 | 99% | 75 | 275 | 85 | F |
| WBR | 1,190 | 1,170 | 98% | 0 | 0 | 15 | B |
| **WB** | **2,000** | **1,991** | **100%** | | | **33** | **C** |
| **Total** | **4,990** | **4,973** | **100%** | | | **27** | **C** |

*Node Letter: A VISSIM ID: 1*

*LOS Category: Signalized*

## 2: SR-77 (400 ) & 1750 West

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| NBL | 270 | 273 | 101% | 75 | 250 | 61 | E |
| NBT | 190 | 183 | 96% | 75 | 300 | 66 | E |
| NBR | 60 | 60 | 100% | 0 | 25 | 5 | A |
| **NB** | **520** | **516** | **99%** | | | **57** | **E** |
| SBL | 50 | 46 | 92% | 25 | 75 | 72 | E |
| SBT | 20 | 21 | 105% | 0 | 50 | 77 | E |
| SBR | 290 | 289 | 100% | 25 | 150 | 17 | B |
| **SB** | **360** | **356** | **99%** | | | **28** | **C** |
| EBL | 460 | 462 | 100% | 125 | 525 | 76 | E |
| EBT | 1,220 | 1,209 | 99% | 100 | 550 | 24 | C |
| EBR | 190 | 189 | 99% | 0 | 75 | 6 | A |
| **EB** | **1,870** | **1,860** | **99%** | | | **35** | **D** |
| WBL | 60 | 59 | 98% | 25 | 75 | 71 | E |
| WBT | 1,440 | 1,436 | 100% | 125 | 475 | 30 | C |
| WBR | 40 | 40 | 100% | 125 | 475 | 34 | C |
| **WB** | **1,540** | **1,535** | **100%** | | | **32** | **C** |
| **Total** | **4,290** | **4,267** | **99%** | | | **36** | **D** |

*Node Letter: B VISSIM ID: 2*

*LOS Category: Signalized*

## 3: Main Street & I-15 Ramps

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| NBL | 130 | 131 | 101% | 0 | 150 | 20 | C |
| NBT | 470 | 476 | 101% | 25 | 175 | 19 | B |
| NBR | 1,020 | 1,022 | 100% | 0 | 0 | 1 | A |
| **NB** | **1,620** | **1,629** | **101%** | | | **8** | **A** |
| SBL | 40 | 40 | 100% | 0 | 100 | 26 | C |
| SBT | 280 | 276 | 99% | 0 | 100 | 23 | C |
| SBR | 70 | 72 | 103% | 0 | 0 | 0 | A |
| **SB** | **390** | **388** | **99%** | | | **19** | **B** |
| EBL | 690 | 693 | 100% | 25 | 175 | 52 | D |
| EBR | 250 | 249 | 100% | 50 | 350 | 9 | A |
| **EB** | **940** | **942** | **100%** | | | **40** | **D** |
| WBL | 410 | 423 | 103% | 75 | 250 | 56 | E |
| WBT | 10 | 10 | 100% | 75 | 250 | 51 | D |
| WBR | 100 | 102 | 102% | 0 | 75 | 8 | A |
| **WB** | **520** | **535** | **103%** | | | **47** | **D** |
| **Total** | **3,470** | **3,494** | **101%** | | | **24** | **C** |

*Node Letter: K VISSIM ID: 11*

*LOS Category: Signalized*

## 4: Main Street & 1000 North

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| NBL | 10 | 10 | 100% | 0 | 0 | 8 | A |
| NBT | 1,350 | 1,350 | 100% | 25 | 275 | 11 | B |
| NBR | 160 | 157 | 98% | 0 | 50 | 4 | A |
| **NB** | **1,520** | **1,517** | **100%** | | | **10** | **B** |
| SBL | 180 | 176 | 98% | 50 | 150 | 62 | E |
| SBT | 740 | 743 | 100% | 0 | 75 | 3 | A |
| SBR | 20 | 22 | 110% | 0 | 25 | 2 | A |
| **SB** | **940** | **941** | **100%** | | | **14** | **B** |
| EBL | 40 | 39 | 98% | 0 | 75 | 52 | D |
| EBT | 20 | 18 | 90% | 0 | 50 | 66 | E |
| EBR | 10 | 10 | 100% | 25 | 100 | 5 | A |
| **EB** | **70** | **67** | **96%** | | | **49** | **D** |
| WBL | 70 | 69 | 99% | 50 | 125 | 63 | E |
| WBT | 20 | 20 | 100% | 0 | 50 | 56 | E |
| WBR | 230 | 230 | 100% | 25 | 100 | 8 | A |
| **WB** | **320** | **319** | **100%** | | | **23** | **C** |
| **Total** | **2,850** | **2,844** | **100%** | | | **14** | **B** |

*Node Letter: M VISSIM ID: 13*

# II: 2050 AM Build - Diamond

*LOS Category: Signalized*

## 5: US-6 & 1000 North

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Delay / LOS Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| NBL | 220 | 223 | 101% | 50 | 150 | 69 | E |
| NBT | 230 | 231 | 100% | 50 | 150 | 50 | D |
| NBR | 40 | 41 | 103% | 0 | 50 | 4 | A |
| **NB** | **490** | **495** | **101%** | | | **55** | **D** |
| SBL | 140 | 140 | 100% | 25 | 100 | 69 | E |
| SBT | 90 | 95 | 106% | 25 | 75 | 45 | D |
| SBR | 700 | 698 | 100% | 0 | 0 | 2 | A |
| **SB** | **930** | **933** | **100%** | | | **17** | **B** |
| EBL | 880 | 870 | 99% | 125 | 375 | 56 | E |
| EBT | 230 | 228 | 99% | 25 | 150 | 23 | C |
| EBR | 90 | 91 | 101% | 0 | 0 | 5 | A |
| **EB** | **1,200** | **1,189** | **99%** | | | **46** | **D** |
| WBL | 70 | 73 | 104% | 25 | 75 | 85 | F |
| WBT | 430 | 408 | 95% | 100 | 300 | 65 | E |
| WBR | 230 | 242 | 105% | 25 | 125 | 9 | A |
| **WB** | **730** | **723** | **99%** | | | **48** | **D** |
| **Total** | **3,350** | **3,340** | **100%** | | | **39** | **D** |

*Node Letter: O VISSIM ID: 15*

*LOS Category: Signalized*

## 6: 1600 South Interchange

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Delay / LOS Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| NBL | 180 | 179 | 99% | 25 | 75 | 26 | C |
| NBR | 550 | 542 | 99% | 0 | 150 | 5 | A |
| **NB** | **730** | **721** | **99%** | | | **11** | **B** |
| SBL | 210 | 204 | 97% | 25 | 75 | 24 | C |
| SBR | 220 | 220 | 100% | 0 | 75 | 3 | A |
| **SB** | **430** | **424** | **99%** | | | **13** | **B** |
| EBL | 230 | 228 | 99% | 25 | 125 | 23 | C |
| EBT | 170 | 165 | 97% | 0 | 50 | 14 | B |
| EBR | 70 | 73 | 104% | 0 | 0 | 1 | A |
| **EB** | **470** | **466** | **99%** | | | **16** | **B** |
| WBL | 140 | 146 | 104% | 0 | 100 | 25 | C |
| WBT | 220 | 223 | 101% | 0 | 100 | 17 | B |
| WBR | 710 | 698 | 98% | 0 | 25 | 2 | A |
| **WB** | **1,070** | **1,067** | **100%** | | | **9** | **A** |
| **Total** | **2,700** | **2,678** | **99%** | | | **11** | **B** |

*Node Letter: P VISSIM ID: 21*

*LOS Category: Signalized*

## 7: Main Street & 1600 South/2700 North

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Delay / LOS Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| NBT | 740 | 741 | 100% | 50 | 275 | 13 | B |
| NBR | 330 | 328 | 99% | 50 | 300 | 12 | B |
| **NB** | **1,070** | **1,069** | **100%** | | | **13** | **B** |
| SBL | 130 | 132 | 102% | 25 | 100 | 33 | C |
| SBT | 260 | 257 | 99% | 0 | 75 | 5 | A |
| **SB** | **390** | **389** | **100%** | | | **14** | **B** |
| WBL | 200 | 201 | 101% | 25 | 150 | 30 | C |
| WBR | 130 | 131 | 101% | 50 | 175 | 17 | B |
| **WB** | **330** | **332** | **101%** | | | **25** | **C** |
| **Total** | **1,790** | **1,790** | **100%** | | | **15** | **B** |

*Node Letter: C VISSIM ID: 3*

*LOS Category: Unsignalized*

## 8: SB West Frontage Road & 1600 South/2700 Nort

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Delay / LOS Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| SBL | 20 | 18 | 90% | 0 | 25 | 7 | A |
| SBT | 10 | 8 | 80% | 0 | 25 | 11 | B |
| SBR | 10 | 11 | 110% | 0 | 0 | 2 | A |
| **SB** | **40** | **37** | **93%** | | | **7** | **A** |
| **Total** | **40** | **37** | **93%** | | | **7** | **A** |

*Node Letter: D VISSIM ID: 4*

*LOS Category: Unsignalized*

## 9: NB West Frontage Road & 1600 South/2700 Nort

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Delay / LOS Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| NBL | 10 | 9 | 90% | 0 | 0 | 3 | A |
| NBT | 10 | 12 | **120%** | 0 | 25 | 14 | B |
| NBR | 60 | 58 | 97% | 0 | 25 | 1 | A |
| **NB** | **80** | **79** | **99%** | | | **3** | **A** |
| **Total** | **80** | **79** | **99%** | | | **3** | **A** |

*Node Letter: D VISSIM ID: 18*

*LOS Category: Unsignalized*

## 10: East Frontage Road & 1600 South/2700 North

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Delay / LOS Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| EBR | 40 | 38 | 95% | 0 | 75 | 8 | A |
| **EB** | **40** | **38** | **95%** | | | **8** | **A** |
| **Total** | **40** | **38** | **95%** | | | **8** | **A** |

*Node Letter: E VISSIM ID: 5*

# II: 2050 AM Build - Diamond

*LOS Category: Signalized*

## 11: 1750 West & 1600 South/2700 North

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| SBL | 30 | 27 | 90% | 0 | 75 | 35 | C |
| SBR | 140 | 141 | 101% | 25 | 100 | 10 | B |
| **SB** | **170** | **168** | **99%** | | | **14** | **B** |
| EBL | 310 | 306 | 99% | 0 | 125 | 14 | B |
| EBT | 620 | 605 | 98% | 0 | 75 | 2 | A |
| **EB** | **930** | **911** | **98%** | | | **6** | **A** |
| WBT | 930 | 925 | 99% | 25 | 225 | 9 | A |
| WBR | 120 | 117 | 98% | 25 | 225 | 10 | B |
| **WB** | **1,050** | **1,042** | **99%** | | | **9** | **A** |
| **Total** | **2,150** | **2,121** | **99%** | | | **8** | **A** |

*Node Letter: F VISSIM ID: 6*

*LOS Category: Unsignalized*

## 12: SB Canyon Creek & 1600 South/2700 North

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| SBL | 10 | 9 | 90% | 0 | 25 | 6 | A |
| SBT | 10 | 10 | 100% | 0 | 50 | 11 | B |
| SBR | 110 | 110 | 100% | 0 | 75 | 8 | A |
| **SB** | **130** | **129** | **99%** | | | **8** | **A** |
| **Total** | **130** | **129** | **99%** | | | **8** | **A** |

*Node Letter: G VISSIM ID: 7*

*LOS Category: Unsignalized*

## 13: NB Canyon Creek & 1600 South/2700 North

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| NBL | 50 | 50 | 100% | 0 | 50 | 11 | B |
| NBR | 10 | 8 | 80% | 0 | 25 | 5 | A |
| **NB** | **60** | **58** | **97%** | | | **10** | **B** |
| **Total** | **60** | **58** | **97%** | | | **10** | **B** |

*Node Letter: G VISSIM ID: 19*

*LOS Category: Signalized*

## 14: 1200 West & 1600 South/2700 North

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| NBL | 150 | 156 | 104% | 25 | 150 | 29 | C |
| NBT | 140 | 138 | 99% | 25 | 100 | 25 | C |
| NBR | 80 | 81 | 101% | 25 | 100 | 12 | B |
| **NB** | **370** | **375** | **101%** | | | **24** | **C** |
| SBL | 10 | 10 | 100% | 0 | 50 | 31 | C |
| SBT | 110 | 108 | 98% | 25 | 100 | 30 | C |
| SBR | 60 | 63 | 105% | 25 | 100 | 15 | B |
| **SB** | **180** | **181** | **101%** | | | **25** | **C** |
| EBL | 10 | 10 | 100% | 0 | 0 | 11 | B |
| EBT | 330 | 316 | 96% | 0 | 100 | 6 | A |
| EBR | 80 | 80 | 100% | 0 | 125 | 5 | A |
| **EB** | **420** | **406** | **97%** | | | **6** | **A** |
| WBL | 100 | 106 | 106% | 0 | 100 | 10 | B |
| WBT | 740 | 722 | 98% | 25 | 200 | 9 | A |
| WBR | 10 | 11 | 110% | 25 | 225 | 8 | A |
| **WB** | **850** | **839** | **99%** | | | **9** | **A** |
| **Total** | **1,820** | **1,801** | **99%** | | | **13** | **B** |

*Node Letter: H VISSIM ID: 8*

*LOS Category: Unsignalized*

## 15: SB 950 West & 1600 South/2700 North

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| SBL | 10 | 8 | 80% | 0 | 50 | 5 | A |
| SBT | 10 | 10 | 100% | 0 | 50 | 5 | A |
| SBR | 80 | 80 | 100% | 0 | 25 | 3 | A |
| **SB** | **100** | **98** | **98%** | | | **3** | **A** |
| **Total** | **100** | **98** | **98%** | | | **3** | **A** |

*Node Letter: I VISSIM ID: 9*

*LOS Category: Unsignalized*

## 16: NB 950 West & 1600 South/2700 North

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| NBL | 20 | 20 | 100% | 0 | 50 | 6 | A |
| NBT | 10 | 8 | 80% | 0 | 50 | 6 | A |
| NBR | 10 | 10 | 100% | 0 | 25 | 1 | A |
| **NB** | **40** | **38** | **95%** | | | **4** | **A** |
| **Total** | **40** | **38** | **95%** | | | **4** | **A** |

*Node Letter: I VISSIM ID: 20*

# II: 2050 AM Build - Diamond

*LOS Category: Signalized*

| 17: SR-51 & 1600 South/2700 North | | | | | | Delay / LOS | |
|---|---|---|---|---|---|---|---|
| | | Volume | | Queue (ft) Avg / 95th | | Analysis Period | |
| Mvmt | Demand | Served | % Served | 1800-5400 | | 1800-5400 | |
| NBL | 130 | 131 | 101% | 25 | 125 | 17 | B |
| NBT | 340 | 338 | 99% | 25 | 225 | 15 | B |
| NBR | 20 | 20 | 100% | 25 | 250 | 10 | A |
| **NB** | **490** | **489** | **100%** | | | **15** | **B** |
| SBL | 10 | 10 | 100% | 0 | 25 | 20 | B |
| SBT | 190 | 188 | 99% | 0 | 125 | 15 | B |
| SBR | 80 | 78 | 98% | 0 | 25 | 2 | A |
| **SB** | **280** | **276** | **99%** | | | **11** | **B** |
| EBL | 190 | 174 | 92% | 50 | 175 | 32 | C |
| EBT | 140 | 142 | 101% | 25 | 100 | 23 | C |
| EBR | 80 | 75 | 94% | 25 | 125 | 9 | A |
| **EB** | **410** | **391** | **95%** | | | **24** | **C** |
| WBL | 120 | 121 | 101% | 25 | 150 | 27 | C |
| WBT | 560 | 554 | 99% | 75 | 275 | 29 | C |
| WBR | 20 | 19 | 95% | 75 | 275 | 25 | C |
| **WB** | **700** | **694** | **99%** | | | **29** | **C** |
| **Total** | **1,880** | **1,850** | **98%** | | | **22** | **C** |

*Node Letter: J VISSIM ID: 10*

# 2050 Build Diamond PM

*I-15 Spanish Fork/Springville Interchange Study*

**Link Peak Results**

*Number of Runs: 10*

## I15 NB

V: Speed (mph), K: Density (vpmpl), and LOS

| ID | Location | Seg Type | Ln | Q: Hr Flow Rate / Lane Demand | Served | % Served | Length (ft) | Max 15-min. Interval V | K | LOS | Begin | Segment Peak Hour V | K | LOS | Begin | Peak Hour: 16:15 V | K | LOS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | ML - North of 400 S | B | 5.2 | 1,000 | 1,000 | 99% | 6,125 | 73 | 13.9 | B | 17:00 | 73 | 13.8 | B | 16:15 | 73 | 13.8 | B |
| 2 | ML- 400 S On Ramp | M | 6.7 | 780 | 780 | 99% | 1,525 | 70 | 8.4 | A | 16:45 | 70 | 8.3 | A | 16:15 | 70 | 8.3 | A |
| 3 | ML - 400 S | B | 6.0 | 740 | 740 | 100% | 2,450 | 73 | 10.3 | A | 17:00 | 73 | 10.2 | A | 16:15 | 73 | 10.2 | A |
| 4 | ML - 400 S Off Ramp | D | 6.0 | 880 | 880 | 100% | 1,525 | 73 | 11.1 | B | 17:00 | 73 | 10.8 | B | 16:15 | 73 | 10.8 | B |
| 5 | ML - 1600 S to 400 S | B | 5.0 | 1,060 | 1,050 | 99% | 375 | 72 | 15.0 | B | 17:00 | 72 | 14.7 | B | 16:15 | 72 | 14.7 | B |
| 6 | ML - 1600 S On Ramp | M | 5.0 | 1,060 | 1,050 | 99% | 1,500 | 71 | 16.3 | B | 17:00 | 71 | 15.9 | B | 16:15 | 71 | 15.9 | B |
| 7 | ML - 1600 S with HOV Lane | B | 4.0 | 1,080 | 1,080 | 100% | 1,700 | 72 | 15.4 | B | 16:15 | 72 | 15.2 | B | 16:15 | 72 | 15.2 | B |
| 8 | ML - 1600 S without HOV Lane | B | 5.0 | 940 | 940 | 100% | 875 | 72 | 13.6 | B | 17:00 | 72 | 13.3 | B | 16:15 | 72 | 13.3 | B |
| 9 | ML - 1600 S Off Ramp | D | 6.0 | 900 | 910 | 100% | 1,500 | 70 | 17.4 | B | 17:00 | 70 | 16.8 | B | 16:15 | 70 | 16.8 | B |
| 10 | ML - US 6 to 1600 S | B | 6.0 | 900 | 910 | 100% | 675 | 72 | 13.1 | B | 16:15 | 72 | 12.8 | B | 16:15 | 72 | 12.8 | B |
| 11 | ML - US 6 On Ramp | M | 7.0 | 780 | 780 | 100% | 1,500 | 68 | 12.2 | B | 17:00 | 68 | 11.8 | B | 16:15 | 68 | 11.8 | B |
| 12 | ML - Main St. On Ramp | M | 4.6 | 720 | 720 | 100% | 1,325 | 63 | 15.8 | B | 17:00 | 64 | 14.8 | B | 16:15 | 64 | 14.8 | B |
| 13 | ML - Main St. | B | 4.0 | 590 | 590 | 100% | 4,075 | 72 | 8.9 | A | 16:15 | 73 | 8.5 | A | 16:00 | 73 | 8.5 | A |
| 14 | ML - Main St. Off Ramp | D | 4.0 | 890 | 890 | 100% | 1,500 | 69 | 20.6 | C | 17:00 | 70 | 19.7 | B | 17:00 | 70 | 19.6 | B |
| 15 | ML - South of Main St. | B | 4.0 | 890 | 890 | 100% | 6,075 | 73 | 12.9 | B | 16:15 | 73 | 12.5 | B | 16:15 | 73 | 12.5 | B |
| | **Urban Facility** | **U** | **5.0** | **900** | **900** | **100%** | **32,750** | **71** | **12.9** | B | **17:00** | **72** | **12.6** | B | **16:15** | **72** | **12.6** | B |

## I15 SB

V: Speed (mph), K: Density (vpmpl), and LOS

| ID | Location | Seg Type | Ln | Q: Hr Flow Rate / Lane Demand | Served | % Served | Length (ft) | Max 15-min. Interval V | K | LOS | Begin | Segment Peak Hour V | K | LOS | Begin | Peak Hour: 17:00 V | K | LOS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 16 | ML - North of 400 S | B | 5.0 | 1,690 | 1,680 | 100% | 5,350 | 70 | 26.3 | D | 17:00 | 71 | 25.5 | C | 17:00 | 71 | 25.5 | C |
| 17 | ML - 400 S Off Ramp | D | 6.0 | 1,400 | 1,400 | 100% | 1,500 | 66 | 16.8 | B | 17:45 | 69 | 14.3 | B | 17:00 | 69 | 14.3 | B |
| 18 | ML - 400 S | B | 5.0 | 1,590 | 1,590 | 100% | 2,500 | 70 | 24.7 | C | 17:00 | 70 | 24.2 | C | 17:00 | 70 | 24.2 | C |
| 19 | ML - 400 S On Ramp | M | 5.8 | 1,420 | 1,420 | 100% | 1,500 | 55 | 23.3 | C | 17:15 | 57 | 22.3 | C | 17:00 | 57 | 22.3 | C |
| 20 | ML - 400 S to 1600 S | B | 5.0 | 1,650 | 1,650 | 100% | 275 | 63 | 27.9 | D | 17:15 | 65 | 27.2 | D | 17:00 | 65 | 27.2 | D |
| 21 | ML - 1600 S Off Ramp | D | 5.0 | 1,650 | 1,650 | 100% | 1,500 | 65 | 29.6 | D | 17:15 | 66 | 28.8 | D | 17:00 | 66 | 28.8 | D |
| 22 | ML - 1600 S | B | 6.0 | 1,490 | 1,490 | 100% | 3,300 | 70 | 22.7 | C | 17:15 | 70 | 22.4 | C | 17:00 | 70 | 22.4 | C |
| 23 | ML - US 6/Main St. Off Ramp | D | 6.0 | 1,490 | 1,490 | 100% | 1,500 | 69 | 27.1 | C | 17:15 | 69 | 26.5 | C | 17:00 | 69 | 26.5 | C |
| 24 | ML - US 6 to Main St. | B | 4.0 | 1,120 | 1,120 | 100% | 6,250 | 72 | 15.9 | B | 17:15 | 73 | 15.7 | B | 16:45 | 73 | 15.7 | B |
| 25 | ML - Main St. On-ramp | M | 5.3 | 1,360 | 1,350 | 99% | 1,500 | 62 | 22.9 | C | 17:00 | 63 | 22.1 | C | 17:00 | 63 | 22.1 | C |
| 26 | ML - South of Main St. | B | 4.0 | 1,790 | 1,780 | 99% | 2,375 | 70 | 26.4 | D | 17:00 | 70 | 26.1 | D | 17:00 | 70 | 26.1 | D |
| | **Urban Facility** | **U** | **5.0** | **1,530** | **1,520** | **100%** | **27,550** | **69** | **22.6** | C | **17:00** | **69** | **22.3** | C | **17:00** | **69** | **22.3** | C |

## I15_Exp. NB

V: Speed (mph), K: Density (vpmpl), and LOS

| ID | Location | Seg Type | Ln | Q: Hr Flow Rate / Lane Demand | Served | % Served | Length (ft) | Max 15-min. Interval V | K | LOS | Begin | Segment Peak Hour V | K | LOS | Begin | Peak Hour: 16:15 V | K | LOS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 27 | HOV -North of 400 S | B | 1.0 | 490 | 500 | 102% | 7,675 | 71 | 7.5 | A | 16:30 | 71 | 7.1 | A | 16:15 | 71 | 7.1 | A |
| 28 | HOV -1600 S to 400 S | B | 1.0 | 390 | 390 | 100% | 5,100 | 73 | 5.6 | A | 16:15 | 73 | 5.5 | A | 16:15 | 73 | 5.5 | A |
| | **Urban Facility** | **U** | **1.0** | **450** | **460** | **101%** | **12,800** | **72** | **6.7** | A | **16:30** | **72** | **6.5** | A | **16:15** | **72** | **6.5** | A |

## I15_Exp. SB

V: Speed (mph), K: Density (vpmpl), and LOS

| ID | Location | Seg Type | Ln | Q: Hr Flow Rate / Lane Demand | Served | % Served | Length (ft) | Max 15-min. Interval V | K | LOS | Begin | Segment Peak Hour V | K | LOS | Begin | Peak Hour: 17:00 V | K | LOS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 29 | HOV - North of 400 S | B | 1.0 | 1,240 | 1,240 | 100% | 6,850 | 69 | 19.6 | C | 17:00 | 69 | 19.1 | C | 17:00 | 69 | 19.1 | C |
| 30 | HOV - 400 S to 1600 S | B | 1.0 | 1,160 | 1,160 | 100% | 3,400 | 68 | 18.2 | C | 17:15 | 68 | 18.0 | B | 17:00 | 68 | 18.0 | B |
| | **Urban Facility** | **U** | **1.0** | **1,220** | **1,220** | **100%** | **10,250** | **69** | **19.1** | C | **17:00** | **69** | **18.7** | C | **17:00** | **69** | **18.7** | C |

# II: 2050 PM Build - Diamond

*LOS Category: Signalized*

## 1: SR- 77 (400 South) SPUI

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| NBL | 250 | 234 | 94% | 50 | 200 | 41 | D |
| NBR | 960 | 968 | 101% | 125 | 475 | 30 | C |
| **NB** | **1,210** | **1,202** | **99%** | | | **32** | **C** |
| SBL | 1,460 | 1,420 | 97% | 325 | 1,150 | 69 | E |
| SBR | 390 | 374 | 96% | 0 | 100 | 16 | B |
| **SB** | **1,850** | **1,794** | **97%** | | | **58** | **E** |
| EBL | 380 | 376 | 99% | 50 | 225 | 42 | D |
| EBT | 440 | 451 | 103% | 100 | 300 | 65 | E |
| EBR | 350 | 342 | 98% | 0 | 0 | 2 | A |
| **EB** | **1,170** | **1,169** | **100%** | | | **39** | **D** |
| WBL | 1,170 | 1,176 | 101% | 375 | 975 | 74 | E |
| WBT | 380 | 373 | 98% | 75 | 325 | 62 | E |
| WBR | 880 | 876 | 100% | 0 | 0 | 5 | A |
| **WB** | **2,430** | **2,425** | **100%** | | | **47** | **D** |
| **Total** | **6,660** | **6,590** | **99%** | | | **46** | **D** |

*Node Letter: A VISSIM ID: 1*

*LOS Category: Signalized*

## 2: SR-77 (400 ) & 1750 West

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| NBL | 420 | 419 | 100% | 225 | 750 | 124 | F |
| NBT | 250 | 249 | 100% | 125 | 500 | 76 | E |
| NBR | 170 | 169 | 99% | 0 | 100 | 8 | A |
| **NB** | **840** | **837** | **100%** | | | **86** | **F** |
| SBL | 100 | 97 | 97% | 50 | 125 | 96 | F |
| SBT | 160 | 154 | 96% | 150 | 600 | 136 | F |
| SBR | 620 | 615 | 99% | 50 | 250 | 21 | C |
| **SB** | **880** | **866** | **98%** | | | **50** | **D** |
| EBL | 400 | 397 | 99% | 125 | 525 | 75 | E |
| EBT | 1,770 | 1,756 | 99% | 325 | 1,000 | 33 | C |
| EBR | 690 | 669 | 97% | 200 | 925 | 19 | B |
| **EB** | **2,860** | **2,822** | **99%** | | | **36** | **D** |
| WBL | 200 | 204 | 102% | 75 | 250 | 132 | F |
| WBT | 1,390 | 1,390 | 100% | 200 | 775 | 34 | C |
| WBR | 50 | 45 | 90% | 200 | 775 | 29 | C |
| **WB** | **1,640** | **1,639** | **100%** | | | **46** | **D** |
| **Total** | **6,220** | **6,164** | **99%** | | | **47** | **D** |

*Node Letter: B VISSIM ID: 2*

*LOS Category: Signalized*

## 3: Main Street & I-15 Ramps

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| NBL | 460 | 472 | 103% | 125 | 425 | 47 | D |
| NBT | 330 | 339 | 103% | 75 | 450 | 21 | C |
| NBR | 870 | 852 | 98% | 0 | 0 | 1 | A |
| **NB** | **1,660** | **1,663** | **100%** | | | **18** | **B** |
| SBL | 130 | 125 | 96% | 75 | 325 | 38 | D |
| SBT | 770 | 767 | 100% | 75 | 325 | 34 | C |
| SBR | 510 | 497 | 97% | 0 | 0 | 2 | A |
| **SB** | **1,410** | **1,389** | **99%** | | | **23** | **C** |
| EBL | 230 | 227 | 99% | 75 | 450 | 57 | E |
| EBT | 10 | 10 | 100% | 50 | 175 | 59 | E |
| EBR | 260 | 266 | 102% | 25 | 125 | 10 | A |
| **EB** | **500** | **503** | **101%** | | | **32** | **C** |
| WBL | 1,000 | 997 | 100% | 175 | 550 | 53 | D |
| WBT | 10 | 10 | 100% | 175 | 550 | 37 | D |
| WBR | 90 | 85 | 94% | 0 | 50 | 8 | A |
| **WB** | **1,100** | **1,092** | **99%** | | | **50** | **D** |
| **Total** | **4,670** | **4,647** | **100%** | | | **28** | **C** |

*Node Letter: K VISSIM ID: 11*

*LOS Category: Signalized*

## 4: Main Street & 1000 North

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| NBL | 30 | 30 | 100% | 0 | 25 | 30 | C |
| NBT | 1,030 | 1,010 | 98% | 75 | 350 | 26 | C |
| NBR | 390 | 386 | 99% | 25 | 200 | 11 | B |
| **NB** | **1,450** | **1,426** | **98%** | | | **22** | **C** |
| SBL | 390 | 383 | 98% | 75 | 225 | 57 | E |
| SBT | 1,530 | 1,525 | 100% | 50 | 400 | 9 | A |
| SBR | 110 | 120 | 109% | 0 | 75 | 3 | A |
| **SB** | **2,030** | **2,028** | **100%** | | | **18** | **B** |
| EBL | 100 | 105 | 105% | 25 | 125 | 44 | D |
| EBT | 80 | 74 | 93% | 25 | 75 | 58 | E |
| EBR | 30 | 29 | 97% | 50 | 125 | 12 | B |
| **EB** | **210** | **208** | **99%** | | | **44** | **D** |
| WBL | 430 | 436 | 101% | 125 | 350 | 58 | E |
| WBT | 60 | 61 | 102% | 25 | 125 | 45 | D |
| WBR | 530 | 521 | 98% | 50 | 325 | 15 | B |
| **WB** | **1,020** | **1,018** | **100%** | | | **35** | **D** |
| **Total** | **4,710** | **4,680** | **99%** | | | **24** | **C** |

*Node Letter: M VISSIM ID: 13*

# II: 2050 PM Build - Diamond

*LOS Category: Signalized*

## 5: US-6 & 1000 North

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Delay / LOS Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| NBL | 180 | 176 | 98% | 25 | 125 | 66 | E |
| NBT | 500 | 483 | 97% | 100 | 325 | 58 | E |
| NBR | 240 | 242 | 101% | 25 | 100 | 10 | B |
| **NB** | **920** | **901** | **98%** | | | **47** | D |
| SBL | 450 | 433 | 96% | 75 | 300 | 86 | F |
| SBT | 450 | 449 | 100% | 75 | 275 | 54 | D |
| SBR | 1,130 | 1,130 | 100% | 0 | 0 | 5 | A |
| **SB** | **2,030** | **2,012** | **99%** | | | **34** | C |
| EBL | 930 | 944 | 102% | 100 | 325 | 56 | E |
| EBT | 340 | 337 | 99% | 25 | 150 | 23 | C |
| EBR | 510 | 497 | 97% | 25 | 250 | 16 | B |
| **EB** | **1,780** | **1,778** | **100%** | | | **39** | D |
| WBL | 110 | 109 | 99% | 25 | 100 | 84 | F |
| WBT | 290 | 284 | 98% | 75 | 225 | 62 | E |
| WBR | 340 | 348 | 102% | 50 | 225 | 18 | B |
| **WB** | **740** | **741** | **100%** | | | **45** | D |
| **Total** | **5,470** | **5,432** | **99%** | | | **39** | D |

*Node Letter: O VISSIM ID: 15*

*LOS Category: Signalized*

## 6: 1600 South Interchange

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Delay / LOS Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| NBL | 140 | 136 | 97% | 25 | 75 | 38 | D |
| NBR | 630 | 632 | 100% | 25 | 275 | 8 | A |
| **NB** | **770** | **768** | **100%** | | | **14** | B |
| SBL | 360 | 356 | 99% | 25 | 150 | 39 | D |
| SBR | 180 | 175 | 97% | 0 | 25 | 3 | A |
| **SB** | **540** | **531** | **98%** | | | **27** | C |
| EBL | 380 | 373 | 98% | 50 | 250 | 47 | D |
| EBT | 420 | 422 | 100% | 25 | 225 | 28 | C |
| EBR | 450 | 432 | 96% | 0 | 0 | 2 | A |
| **EB** | **1,250** | **1,227** | **98%** | | | **25** | C |
| WBL | 620 | 611 | 99% | 75 | 425 | 34 | C |
| WBT | 410 | 401 | 98% | 25 | 200 | 19 | B |
| WBR | 660 | 652 | 99% | 0 | 0 | 3 | A |
| **WB** | **1,690** | **1,664** | **98%** | | | **18** | B |
| **Total** | **4,250** | **4,190** | **99%** | | | **20** | C |

*Node Letter: P VISSIM ID: 21*

*LOS Category: Signalized*

## 7: Main Street & 1600 South/2700 North

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Delay / LOS Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| NBT | 320 | 320 | 100% | 50 | 250 | 19 | B |
| NBR | 430 | 427 | 99% | 50 | 275 | 13 | B |
| **NB** | **750** | **747** | **100%** | | | **16** | B |
| SBL | 580 | 564 | 97% | 50 | 250 | 33 | C |
| SBT | 780 | 786 | 101% | 25 | 150 | 7 | A |
| **SB** | **1,360** | **1,350** | **99%** | | | **18** | B |
| WBL | 310 | 293 | 95% | 50 | 175 | 27 | C |
| WBR | 140 | 146 | 104% | 50 | 200 | 19 | B |
| **WB** | **450** | **439** | **98%** | | | **24** | C |
| **Total** | **2,560** | **2,536** | **99%** | | | **18** | B |

*Node Letter: C VISSIM ID: 3*

*LOS Category: Unsignalized*

## 8: SB West Frontage Road & 1600 South/2700 Nort

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Delay / LOS Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| SBL | 170 | 168 | 99% | 25 | 150 | 21 | C |
| SBT | 10 | 9 | 90% | 0 | 25 | 15 | C |
| SBR | 20 | 20 | 100% | 0 | 0 | 2 | A |
| **SB** | **200** | **197** | **99%** | | | **19** | C |
| **Total** | **200** | **197** | **99%** | | | **19** | C |

*Node Letter: D VISSIM ID: 4*

*LOS Category: Unsignalized*

## 9: NB West Frontage Road & 1600 South/2700 Nort

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Delay / LOS Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| NBL | 10 | 9 | 90% | 0 | 0 | 4 | A |
| NBT | 10 | 12 | **120%** | 0 | 50 | 23 | C |
| NBR | 130 | 129 | 99% | 0 | 50 | 2 | A |
| **NB** | **150** | **150** | **100%** | | | **4** | A |
| **Total** | **150** | **150** | **100%** | | | **4** | A |

*Node Letter: D VISSIM ID: 18*

*LOS Category: Unsignalized*

## 10: East Frontage Road & 1600 South/2700 North

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Delay / LOS Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| EBL | 10 | 11 | 110% | 25 | 100 | 13 | B |
| EBR | 190 | 187 | 98% | 25 | 100 | 13 | B |
| **EB** | **200** | **198** | **99%** | | | **13** | B |
| **Total** | **200** | **198** | **99%** | | | **13** | B |

*Node Letter: E VISSIM ID: 5*

# II: 2050 PM Build - Diamond

*LOS Category: Signalized*

## 11: 1750 West & 1600 South/2700 North

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| SBL | 140 | 138 | 99% | 175 | 575 | 35 | C |
| SBR | 530 | 522 | 98% | 200 | 600 | 46 | D |
| **SB** | **670** | **660** | **99%** | | | **43** | **D** |
| EBL | 330 | 340 | 103% | 50 | 250 | 31 | C |
| EBT | 1,080 | 1,071 | 99% | 25 | 200 | 7 | A |
| **EB** | **1,410** | **1,411** | **100%** | | | **13** | **B** |
| WBT | 1,160 | 1,149 | 99% | 125 | 450 | 25 | C |
| WBR | 100 | 94 | 94% | 125 | 450 | 25 | C |
| **WB** | **1,260** | **1,243** | **99%** | | | **25** | **C** |
| **Total** | **3,340** | **3,314** | **99%** | | | **24** | **C** |

*Node Letter: F VISSIM ID: 6*

*LOS Category: Unsignalized*

## 12: SB Canyon Creek & 1600 South/2700 North

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| SBL | 30 | 28 | 93% | 0 | 25 | 10 | B |
| SBT | 40 | 38 | 95% | 25 | 125 | 28 | D |
| SBR | 220 | 220 | 100% | 25 | 125 | 14 | B |
| **SB** | **290** | **286** | **99%** | | | **15** | **C** |
| **Total** | **290** | **286** | **99%** | | | **15** | **C** |

*Node Letter: G VISSIM ID: 7*

*LOS Category: Unsignalized*

## 13: NB Canyon Creek & 1600 South/2700 North

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| NBL | 90 | 89 | 99% | 25 | 100 | 41 | E |
| NBT | 10 | 10 | 100% | 0 | 50 | 16 | C |
| NBR | 70 | 66 | 94% | 0 | 50 | 7 | A |
| **NB** | **170** | **165** | **97%** | | | **26** | **D** |
| **Total** | **170** | **165** | **97%** | | | **26** | **D** |

*Node Letter: G VISSIM ID: 19*

*LOS Category: Signalized*

## 14: 1200 West & 1600 South/2700 North

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| NBL | 230 | 230 | 100% | 50 | 275 | 33 | C |
| NBT | 200 | 202 | 101% | 50 | 250 | 20 | B |
| NBR | 270 | 264 | 98% | 50 | 250 | 14 | B |
| **NB** | **700** | **696** | **99%** | | | **22** | **C** |
| SBL | 10 | 8 | 80% | 0 | 25 | 32 | C |
| SBT | 370 | 369 | 100% | 75 | 250 | 32 | C |
| SBR | 130 | 126 | 97% | 75 | 250 | 27 | C |
| **SB** | **510** | **503** | **99%** | | | **31** | **C** |
| EBL | 50 | 46 | 92% | 0 | 25 | 15 | B |
| EBT | 740 | 737 | 100% | 25 | 200 | 11 | B |
| EBR | 130 | 128 | 98% | 25 | 225 | 9 | A |
| **EB** | **920** | **911** | **99%** | | | **11** | **B** |
| WBL | 90 | 90 | 100% | 0 | 100 | 23 | C |
| WBT | 710 | 702 | 99% | 25 | 200 | 13 | B |
| WBR | 10 | 8 | 80% | 25 | 200 | 10 | B |
| **WB** | **810** | **800** | **99%** | | | **14** | **B** |
| **Total** | **2,940** | **2,910** | **99%** | | | **18** | **B** |

*Node Letter: H VISSIM ID: 8*

*LOS Category: Unsignalized*

## 15: SB 950 West & 1600 South/2700 North

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| SBL | 90 | 91 | 101% | 25 | 150 | 13 | B |
| SBT | 20 | 20 | 100% | 25 | 150 | 13 | B |
| SBR | 140 | 136 | 97% | 0 | 150 | 7 | A |
| **SB** | **250** | **247** | **99%** | | | **9** | **A** |
| **Total** | **250** | **247** | **99%** | | | **9** | **A** |

*Node Letter: I VISSIM ID: 9*

*LOS Category: Unsignalized*

## 16: NB 950 West & 1600 South/2700 North

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| NBL | 20 | 20 | 100% | 0 | 50 | 7 | A |
| NBT | 20 | 18 | 90% | 0 | 50 | 7 | A |
| NBR | 10 | 11 | 110% | 0 | 25 | 3 | A |
| **NB** | **50** | **49** | **98%** | | | **6** | **A** |
| **Total** | **50** | **49** | **98%** | | | **6** | **A** |

*Node Letter: I VISSIM ID: 20*

# II: 2050 PM Build - Diamond

*LOS Category: Signalized*

| 17: SR-51 & 1600 South/2700 North | | | | | | Delay / LOS | |
|---|---|---|---|---|---|---|---|
| | | Volume | | Queue (ft) Avg / 95th | | Analysis Period | |
| Mvmt | Demand | Served | % Served | 5400-9000 | | 5400-9000 | |
| NBL | 150 | 143 | 95% | 25 | 175 | 30 | C |
| NBT | 250 | 256 | 102% | 25 | 225 | 17 | B |
| NBR | 130 | 127 | 98% | 25 | 250 | 11 | B |
| **NB** | **530** | **526** | **99%** | | | **19** | **B** |
| SBL | 20 | 19 | 95% | 0 | 25 | 23 | C |
| SBT | 460 | 461 | 100% | 50 | 300 | 20 | B |
| SBR | 110 | 108 | 98% | 0 | 25 | 4 | A |
| **SB** | **590** | **588** | **100%** | | | **17** | **B** |
| EBL | 160 | 166 | 104% | 25 | 225 | 30 | C |
| EBT | 550 | 538 | 98% | 75 | 325 | 27 | C |
| EBR | 240 | 236 | 98% | 75 | 350 | 22 | C |
| **EB** | **950** | **940** | **99%** | | | **26** | **C** |
| WBL | 80 | 78 | 98% | 25 | 75 | 36 | D |
| WBT | 420 | 418 | 100% | 25 | 175 | 24 | C |
| WBR | 10 | 9 | 90% | 50 | 175 | 22 | C |
| **WB** | **510** | **505** | **99%** | | | **26** | **C** |
| **Total** | **2,580** | **2,559** | **99%** | | | **23** | **C** |

*Node Letter: J VISSIM ID: 10*

# 2050 Build Diamond AM - IACR Update Mar21

*I-15 Spanish Fork/Springville Interchange Study*

**Link Peak Results**

*Number of Runs: 10*

## I15 NB

V: Speed (mph), K: Density (vpmpl), and LOS

| ID | Location | Seg Type | Ln | Q: Hr Flow Rate / Lane Demand | Served | % Served | Length (ft) | Max 15-min. Interval V | K | LOS | Begin | Segment Peak Hour V | K | LOS | Begin | Peak Hour: 07:00 V | K | LOS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | ML - North of 400 S | B | 5.2 | 1,530 | 1,530 | 100% | 6,125 | 71 | 23.7 | C | 07:30 | 71 | 22.6 | C | 07:00 | 71 | 22.6 | C |
| 2 | ML- 400 S On Ramp | M | 6.7 | 1,200 | 1,190 | 100% | 1,525 | 70 | 13.0 | B | 07:30 | 71 | 12.1 | B | 07:00 | 71 | 12.1 | B |
| 3 | ML - 400 S | B | 6.0 | 1,280 | 1,270 | 100% | 2,450 | 72 | 19.8 | C | 07:30 | 72 | 18.8 | C | 07:00 | 72 | 18.8 | C |
| 4 | ML - 400 S Off Ramp | D | 6.0 | 1,330 | 1,330 | 100% | 1,525 | 72 | 15.2 | B | 07:30 | 73 | 14.6 | B | 07:30 | 73 | 14.4 | B |
| 5 | ML - 1600 S to 400 S | B | 5.0 | 1,600 | 1,580 | 99% | 375 | 71 | 24.2 | C | 07:30 | 71 | 23.0 | C | 07:00 | 71 | 23.0 | C |
| 6 | ML - 1600 S On Ramp | M | 5.0 | 1,600 | 1,590 | 99% | 1,500 | 71 | 23.2 | C | 07:30 | 71 | 22.1 | C | 07:15 | 71 | 22.0 | C |
| 7 | ML - 1600 S with HOV Lane | B | 4.0 | 1,740 | 1,740 | 100% | 1,700 | 69 | 28.1 | D | 07:30 | 69 | 26.3 | D | 07:00 | 69 | 26.3 | D |
| 8 | ML - 1600 S without HOV Lane | B | 5.0 | 1,580 | 1,580 | 100% | 875 | 65 | 27.6 | D | 07:30 | 67 | 25.2 | C | 07:00 | 67 | 25.2 | C |
| 9 | ML - 1600 S Off Ramp | D | 6.0 | 1,450 | 1,450 | 100% | 1,500 | 63 | 23.5 | C | 07:30 | 65 | 21.8 | C | 07:30 | 66 | 21.2 | C |
| 10 | ML - US 6 to 1600 S | B | 6.0 | 1,450 | 1,440 | 100% | 675 | 65 | 24.9 | C | 07:30 | 68 | 22.3 | C | 07:00 | 68 | 22.3 | C |
| 11 | ML - US 6 On Ramp | M | 7.0 | 1,240 | 1,240 | 100% | 1,500 | 51 | 21.6 | C | 07:30 | 57 | 18.1 | B | 07:00 | 57 | 18.1 | B |
| 12 | ML - Main St. On Ramp | M | 4.6 | 1,120 | 1,120 | 101% | 1,325 | 53 | 32.5 | D | 07:30 | 57 | 25.8 | C | 07:30 | 58 | 25.2 | C |
| 13 | ML - Main St. | B | 4.0 | 1,010 | 1,020 | 101% | 4,075 | 71 | 16.5 | B | 07:30 | 72 | 15.1 | B | 07:00 | 72 | 15.1 | B |
| 14 | ML - Main St. Off Ramp | D | 4.0 | 1,400 | 1,400 | 100% | 1,500 | 57 | 38.3 | E | 07:30 | 62 | 32.2 | D | 07:00 | 62 | 32.2 | D |
| 15 | ML - South of Main St. | B | 4.0 | 1,400 | 1,410 | 100% | 6,075 | 69 | 24.3 | C | 07:30 | 70 | 21.6 | C | 07:00 | 70 | 21.6 | C |
| | **Urban Facility** | **U** | **5.0** | **1,420** | **1,420** | **100%** | **32,750** | **67** | **22.6** | C | **07:30** | **69** | **20.5** | C | **07:00** | **69** | **20.5** | C |

## I15 SB

V: Speed (mph), K: Density (vpmpl), and LOS

| ID | Location | Seg Type | Ln | Q: Hr Flow Rate / Lane Demand | Served | % Served | Length (ft) | Max 15-min. Interval V | K | LOS | Begin | Segment Peak Hour V | K | LOS | Begin | Peak Hour: 08:00 V | K | LOS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 16 | ML - North of 400 S | B | 5.0 | 810 | 810 | 100% | 5,350 | 73 | 12.0 | B | 07:30 | 73 | 11.3 | B | 08:00 | 73 | 11.3 | B |
| 17 | ML - 400 S Off Ramp | D | 6.0 | 680 | 670 | 100% | 1,500 | 73 | 8.8 | A | 08:45 | 73 | 8.2 | A | 08:00 | 73 | 8.2 | A |
| 18 | ML - 400 S | B | 5.0 | 610 | 600 | 100% | 2,500 | 73 | 9.0 | A | 07:30 | 73 | 8.4 | A | 07:00 | 73 | 8.2 | A |
| 19 | ML - 400 S On Ramp | M | 5.8 | 650 | 650 | 100% | 1,500 | 65 | 10.7 | B | 07:30 | 65 | 10.4 | B | 08:00 | 65 | 10.4 | B |
| 20 | ML - 400 S to 1600 S | B | 5.0 | 760 | 760 | 100% | 275 | 70 | 11.6 | B | 07:30 | 71 | 10.9 | A | 07:30 | 71 | 10.7 | A |
| 21 | ML - 1600 S Off Ramp | D | 5.0 | 760 | 760 | 100% | 1,500 | 71 | 14.6 | B | 08:45 | 71 | 14.2 | B | 08:00 | 71 | 14.2 | B |
| 22 | ML - 1600 S | B | 6.0 | 570 | 570 | 100% | 3,300 | 73 | 8.4 | A | 07:30 | 73 | 7.9 | A | 07:00 | 73 | 7.7 | A |
| 23 | ML - US 6/Main St. Off Ramp | D | 6.0 | 570 | 570 | 100% | 1,500 | 73 | 10.4 | B | 07:30 | 73 | 9.8 | A | 07:00 | 73 | 9.5 | A |
| 24 | ML - US 6 to Main St. | B | 4.0 | 420 | 400 | 96% | 6,250 | 74 | 5.8 | A | 08:45 | 74 | 5.6 | A | 08:00 | 74 | 5.6 | A |
| 25 | ML - Main St. On-ramp | M | 5.3 | 510 | 500 | 99% | 1,500 | 70 | 8.7 | A | 07:30 | 70 | 8.5 | A | 07:00 | 70 | 8.1 | A |
| 26 | ML - South of Main St. | B | 4.0 | 670 | 660 | 99% | 2,375 | 73 | 9.4 | A | 07:30 | 73 | 9.1 | A | 07:00 | 73 | 9.0 | A |
| | **Urban Facility** | **U** | **5.0** | **640** | **640** | **99%** | **27,550** | **72** | **9.3** | A | **07:30** | **72** | **8.9** | A | **08:00** | **72** | **8.9** | A |

## I15_Exp. NB

V: Speed (mph), K: Density (vpmpl), and LOS

| ID | Location | Seg Type | Ln | Q: Hr Flow Rate / Lane Demand | Served | % Served | Length (ft) | Max 15-min. Interval V | K | LOS | Begin | Segment Peak Hour V | K | LOS | Begin | Peak Hour: 07:00 V | K | LOS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 27 | HOV -North of 400 S | B | 1.0 | 1,080 | 1,070 | 99% | 7,675 | 69 | 17.8 | B | 07:30 | 69 | 16.7 | B | 07:00 | 69 | 16.7 | B |
| 28 | HOV -1600 S to 400 S | B | 1.0 | 950 | 940 | 99% | 5,100 | 70 | 15.6 | B | 07:30 | 70 | 14.5 | B | 07:00 | 70 | 14.5 | B |
| | **Urban Facility** | **U** | **1.0** | **1,030** | **1,020** | **99%** | **12,800** | **69** | **16.9** | B | **07:30** | **69** | **15.8** | B | **07:00** | **69** | **15.8** | B |

## I15_Exp. SB

V: Speed (mph), K: Density (vpmpl), and LOS

| ID | Location | Seg Type | Ln | Q: Hr Flow Rate / Lane Demand | Served | % Served | Length (ft) | Max 15-min. Interval V | K | LOS | Begin | Segment Peak Hour V | K | LOS | Begin | Peak Hour: 07:15 V | K | LOS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 29 | HOV - North of 400 S | B | 1.0 | 100 | 90 | 100% | 6,850 | 74 | 1.4 | A | 08:15 | 74 | 1.3 | A | 07:15 | 74 | 1.3 | A |
| 30 | HOV - 400 S to 1600 S | B | 1.0 | 80 | 80 | 101% | 3,400 | 73 | 1.2 | A | 07:30 | 74 | 1.1 | A | 07:00 | 74 | 1.1 | A |
| | **Urban Facility** | **U** | **1.0** | **90** | **90** | **100%** | **10,250** | **74** | **1.3** | A | **08:45** | **74** | **1.2** | A | **07:15** | **74** | **1.2** | A |

# II: 2050 AM Build - Diamond

*LOS Category: Signalized*

## 1: SR- 77 (400 South) SPUI

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| NBL | 210 | 208 | 99% | 25 | 150 | 31 | C |
| NBR | 950 | 944 | 99% | 50 | 250 | 12 | B |
| **NB** | **1,160** | **1,152** | **99%** | | | **16** | **B** |
| SBL | 660 | 652 | 99% | 50 | 275 | 28 | C |
| SBR | 360 | 368 | 102% | 0 | 75 | 5 | A |
| **SB** | **1,020** | **1,020** | **100%** | | | **19** | **B** |
| EBL | 290 | 290 | 100% | 50 | 200 | 50 | D |
| EBT | 260 | 262 | 101% | 75 | 200 | 68 | E |
| EBR | 260 | 258 | 99% | 0 | 0 | 1 | A |
| **EB** | **810** | **810** | **100%** | | | **40** | **D** |
| WBL | 550 | 564 | 103% | 100 | 375 | 46 | D |
| WBT | 260 | 257 | 99% | 75 | 275 | 85 | F |
| WBR | 1,190 | 1,170 | 98% | 0 | 0 | 15 | B |
| **WB** | **2,000** | **1,991** | **100%** | | | **33** | **C** |
| **Total** | **4,990** | **4,973** | **100%** | | | **27** | **C** |

*Node Letter: A VISSIM ID: 1*

*LOS Category: Signalized*

## 2: SR-77 (400 ) & 1750 West

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| NBL | 270 | 273 | 101% | 75 | 250 | 61 | E |
| NBT | 190 | 183 | 96% | 75 | 300 | 66 | E |
| NBR | 60 | 60 | 100% | 0 | 25 | 5 | A |
| **NB** | **520** | **516** | **99%** | | | **57** | **E** |
| SBL | 50 | 46 | 92% | 25 | 75 | 72 | E |
| SBT | 20 | 21 | 105% | 0 | 50 | 77 | E |
| SBR | 290 | 289 | 100% | 25 | 150 | 17 | B |
| **SB** | **360** | **356** | **99%** | | | **28** | **C** |
| EBL | 460 | 462 | 100% | 125 | 525 | 76 | E |
| EBT | 1,220 | 1,209 | 99% | 100 | 550 | 24 | C |
| EBR | 190 | 189 | 99% | 0 | 75 | 6 | A |
| **EB** | **1,870** | **1,860** | **99%** | | | **35** | **D** |
| WBL | 60 | 59 | 98% | 25 | 75 | 71 | E |
| WBT | 1,440 | 1,436 | 100% | 125 | 475 | 30 | C |
| WBR | 40 | 40 | 100% | 125 | 475 | 34 | C |
| **WB** | **1,540** | **1,535** | **100%** | | | **32** | **C** |
| **Total** | **4,290** | **4,267** | **99%** | | | **36** | **D** |

*Node Letter: B VISSIM ID: 2*

*LOS Category: Signalized*

## 3: Main Street & I-15 Ramps

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| NBL | 130 | 131 | 101% | 0 | 150 | 20 | C |
| NBT | 470 | 476 | 101% | 25 | 175 | 19 | B |
| NBR | 1,020 | 1,022 | 100% | 0 | 0 | 1 | A |
| **NB** | **1,620** | **1,629** | **101%** | | | **8** | **A** |
| SBL | 40 | 40 | 100% | 0 | 100 | 26 | C |
| SBT | 280 | 276 | 99% | 0 | 100 | 23 | C |
| SBR | 70 | 72 | 103% | 0 | 0 | 0 | A |
| **SB** | **390** | **388** | **99%** | | | **19** | **B** |
| EBL | 690 | 693 | 100% | 25 | 175 | 52 | D |
| EBR | 250 | 249 | 100% | 50 | 350 | 9 | A |
| **EB** | **940** | **942** | **100%** | | | **40** | **D** |
| WBL | 410 | 423 | 103% | 75 | 250 | 56 | E |
| WBT | 10 | 10 | 100% | 75 | 250 | 51 | D |
| WBR | 100 | 102 | 102% | 0 | 75 | 8 | A |
| **WB** | **520** | **535** | **103%** | | | **47** | **D** |
| **Total** | **3,470** | **3,494** | **101%** | | | **24** | **C** |

*Node Letter: K VISSIM ID: 11*

*LOS Category: Signalized*

## 4: Main Street & 1000 North

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| NBL | 10 | 10 | 100% | 0 | 0 | 8 | A |
| NBT | 1,350 | 1,350 | 100% | 25 | 275 | 11 | B |
| NBR | 160 | 157 | 98% | 0 | 50 | 4 | A |
| **NB** | **1,520** | **1,517** | **100%** | | | **10** | **B** |
| SBL | 180 | 176 | 98% | 50 | 150 | 62 | E |
| SBT | 740 | 743 | 100% | 0 | 75 | 3 | A |
| SBR | 20 | 22 | 110% | 0 | 25 | 2 | A |
| **SB** | **940** | **941** | **100%** | | | **14** | **B** |
| EBL | 40 | 39 | 98% | 0 | 75 | 52 | D |
| EBT | 20 | 18 | 90% | 0 | 50 | 66 | E |
| EBR | 10 | 10 | 100% | 25 | 100 | 5 | A |
| **EB** | **70** | **67** | **96%** | | | **49** | **D** |
| WBL | 70 | 69 | 99% | 50 | 125 | 63 | E |
| WBT | 20 | 20 | 100% | 0 | 50 | 56 | E |
| WBR | 230 | 230 | 100% | 25 | 100 | 8 | A |
| **WB** | **320** | **319** | **100%** | | | **23** | **C** |
| **Total** | **2,850** | **2,844** | **100%** | | | **14** | **B** |

*Node Letter: M VISSIM ID: 13*

# II: 2050 AM Build - Diamond

*LOS Category: Signalized*

## 5: US-6 & 1000 North

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Delay / LOS Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| NBL | 220 | 223 | 101% | 50 | 150 | 69 | E |
| NBT | 230 | 231 | 100% | 50 | 150 | 50 | D |
| NBR | 40 | 41 | 103% | 0 | 50 | 4 | A |
| **NB** | **490** | **495** | **101%** | | | **55** | **D** |
| SBL | 140 | 140 | 100% | 25 | 100 | 69 | E |
| SBT | 90 | 95 | 106% | 25 | 75 | 45 | D |
| SBR | 700 | 698 | 100% | 0 | 0 | 2 | A |
| **SB** | **930** | **933** | **100%** | | | **17** | **B** |
| EBL | 880 | 870 | 99% | 125 | 375 | 56 | E |
| EBT | 230 | 228 | 99% | 25 | 150 | 23 | C |
| EBR | 90 | 91 | 101% | 0 | 0 | 5 | A |
| **EB** | **1,200** | **1,189** | **99%** | | | **46** | **D** |
| WBL | 70 | 73 | 104% | 25 | 75 | 85 | F |
| WBT | 430 | 408 | 95% | 100 | 300 | 65 | E |
| WBR | 230 | 242 | 105% | 25 | 125 | 9 | A |
| **WB** | **730** | **723** | **99%** | | | **48** | **D** |
| **Total** | **3,350** | **3,340** | **100%** | | | **39** | **D** |

*Node Letter: O VISSIM ID: 15*

*LOS Category: Signalized*

## 6: 1600 South Interchange

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Delay / LOS Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| NBL | 180 | 179 | 99% | 25 | 75 | 26 | C |
| NBR | 550 | 542 | 99% | 0 | 150 | 5 | A |
| **NB** | **730** | **721** | **99%** | | | **11** | **B** |
| SBL | 210 | 204 | 97% | 25 | 75 | 24 | C |
| SBR | 220 | 220 | 100% | 0 | 75 | 3 | A |
| **SB** | **430** | **424** | **99%** | | | **13** | **B** |
| EBL | 230 | 228 | 99% | 25 | 125 | 23 | C |
| EBT | 170 | 165 | 97% | 0 | 50 | 14 | B |
| EBR | 70 | 73 | 104% | 0 | 0 | 1 | A |
| **EB** | **470** | **466** | **99%** | | | **16** | **B** |
| WBL | 140 | 146 | 104% | 0 | 100 | 25 | C |
| WBT | 220 | 223 | 101% | 0 | 100 | 17 | B |
| WBR | 710 | 698 | 98% | 0 | 25 | 2 | A |
| **WB** | **1,070** | **1,067** | **100%** | | | **9** | **A** |
| **Total** | **2,700** | **2,678** | **99%** | | | **11** | **B** |

*Node Letter: P VISSIM ID: 21*

*LOS Category: Signalized*

## 7: Main Street & 1600 South/2700 North

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Delay / LOS Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| NBT | 740 | 741 | 100% | 50 | 275 | 13 | B |
| NBR | 330 | 328 | 99% | 50 | 300 | 12 | B |
| **NB** | **1,070** | **1,069** | **100%** | | | **13** | **B** |
| SBL | 130 | 132 | 102% | 25 | 100 | 33 | C |
| SBT | 260 | 257 | 99% | 0 | 75 | 5 | A |
| **SB** | **390** | **389** | **100%** | | | **14** | **B** |
| WBL | 200 | 201 | 101% | 25 | 150 | 30 | C |
| WBR | 130 | 131 | 101% | 50 | 175 | 17 | B |
| **WB** | **330** | **332** | **101%** | | | **25** | **C** |
| **Total** | **1,790** | **1,790** | **100%** | | | **15** | **B** |

*Node Letter: C VISSIM ID: 3*

*LOS Category: Unsignalized*

## 8: SB West Frontage Road & 1600 South/2700 Nort

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Delay / LOS Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| SBL | 20 | 18 | 90% | 0 | 25 | 7 | A |
| SBT | 10 | 8 | 80% | 0 | 25 | 11 | B |
| SBR | 10 | 11 | 110% | 0 | 0 | 2 | A |
| **SB** | **40** | **37** | **93%** | | | **7** | **A** |
| **Total** | **40** | **37** | **93%** | | | **7** | **A** |

*Node Letter: D VISSIM ID: 4*

*LOS Category: Unsignalized*

## 9: NB West Frontage Road & 1600 South/2700 Nort

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Delay / LOS Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| NBL | 10 | 9 | 90% | 0 | 0 | 3 | A |
| NBT | 10 | 12 | **120%** | 0 | 25 | 14 | B |
| NBR | 60 | 58 | 97% | 0 | 25 | 1 | A |
| **NB** | **80** | **79** | **99%** | | | **3** | **A** |
| **Total** | **80** | **79** | **99%** | | | **3** | **A** |

*Node Letter: D VISSIM ID: 18*

*LOS Category: Unsignalized*

## 10: East Frontage Road & 1600 South/2700 North

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Delay / LOS Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| EBR | 40 | 38 | 95% | 0 | 75 | 8 | A |
| **EB** | **40** | **38** | **95%** | | | **8** | **A** |
| **Total** | **40** | **38** | **95%** | | | **8** | **A** |

*Node Letter: E VISSIM ID: 5*

# II: 2050 AM Build - Diamond

*LOS Category: Signalized*

## 11: 1750 West & 1600 South/2700 North

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| SBL | 30 | 27 | 90% | 0 | 75 | 35 | C |
| SBR | 140 | 141 | 101% | 25 | 100 | 10 | B |
| **SB** | **170** | **168** | **99%** | | | **14** | **B** |
| EBL | 310 | 306 | 99% | 0 | 125 | 14 | B |
| EBT | 620 | 605 | 98% | 0 | 75 | 2 | A |
| **EB** | **930** | **911** | **98%** | | | **6** | **A** |
| WBT | 930 | 925 | 99% | 25 | 225 | 9 | A |
| WBR | 120 | 117 | 98% | 25 | 225 | 10 | B |
| **WB** | **1,050** | **1,042** | **99%** | | | **9** | **A** |
| **Total** | **2,150** | **2,121** | **99%** | | | **8** | **A** |

*Node Letter: F VISSIM ID: 6*

*LOS Category: Unsignalized*

## 12: SB Canyon Creek & 1600 South/2700 North

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| SBL | 10 | 9 | 90% | 0 | 25 | 6 | A |
| SBT | 10 | 10 | 100% | 0 | 50 | 11 | B |
| SBR | 110 | 110 | 100% | 0 | 75 | 8 | A |
| **SB** | **130** | **129** | **99%** | | | **8** | **A** |
| **Total** | **130** | **129** | **99%** | | | **8** | **A** |

*Node Letter: G VISSIM ID: 7*

*LOS Category: Unsignalized*

## 13: NB Canyon Creek & 1600 South/2700 North

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| NBL | 50 | 50 | 100% | 0 | 50 | 11 | B |
| NBR | 10 | 8 | 80% | 0 | 25 | 5 | A |
| **NB** | **60** | **58** | **97%** | | | **10** | **B** |
| **Total** | **60** | **58** | **97%** | | | **10** | **B** |

*Node Letter: G VISSIM ID: 19*

*LOS Category: Signalized*

## 14: 1200 West & 1600 South/2700 North

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| NBL | 150 | 156 | 104% | 25 | 150 | 29 | C |
| NBT | 140 | 138 | 99% | 25 | 100 | 25 | C |
| NBR | 80 | 81 | 101% | 25 | 100 | 12 | B |
| **NB** | **370** | **375** | **101%** | | | **24** | **C** |
| SBL | 10 | 10 | 100% | 0 | 50 | 31 | C |
| SBT | 110 | 108 | 98% | 25 | 100 | 30 | C |
| SBR | 60 | 63 | 105% | 25 | 100 | 15 | B |
| **SB** | **180** | **181** | **101%** | | | **25** | **C** |
| EBL | 10 | 10 | 100% | 0 | 0 | 11 | B |
| EBT | 330 | 316 | 96% | 0 | 100 | 6 | A |
| EBR | 80 | 80 | 100% | 0 | 125 | 5 | A |
| **EB** | **420** | **406** | **97%** | | | **6** | **A** |
| WBL | 100 | 106 | 106% | 0 | 100 | 10 | B |
| WBT | 740 | 722 | 98% | 25 | 200 | 9 | A |
| WBR | 10 | 11 | 110% | 25 | 225 | 8 | A |
| **WB** | **850** | **839** | **99%** | | | **9** | **A** |
| **Total** | **1,820** | **1,801** | **99%** | | | **13** | **B** |

*Node Letter: H VISSIM ID: 8*

*LOS Category: Unsignalized*

## 15: SB 950 West & 1600 South/2700 North

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| SBL | 10 | 8 | 80% | 0 | 50 | 5 | A |
| SBT | 10 | 10 | 100% | 0 | 50 | 5 | A |
| SBR | 80 | 80 | 100% | 0 | 25 | 3 | A |
| **SB** | **100** | **98** | **98%** | | | **3** | **A** |
| **Total** | **100** | **98** | **98%** | | | **3** | **A** |

*Node Letter: I VISSIM ID: 9*

*LOS Category: Unsignalized*

## 16: NB 950 West & 1600 South/2700 North

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| NBL | 20 | 20 | 100% | 0 | 50 | 6 | A |
| NBT | 10 | 8 | 80% | 0 | 50 | 6 | A |
| NBR | 10 | 10 | 100% | 0 | 25 | 1 | A |
| **NB** | **40** | **38** | **95%** | | | **4** | **A** |
| **Total** | **40** | **38** | **95%** | | | **4** | **A** |

*Node Letter: I VISSIM ID: 20*

# II: 2050 AM Build - Diamond

*LOS Category: Signalized*

| 17: SR-51 & 1600 South/2700 North | | | | | | Delay / LOS | |
|---|---|---|---|---|---|---|---|
| | | Volume | | Queue (ft) Avg / 95th | | Analysis Period | |
| Mvmt | Demand | Served | % Served | 1800-5400 | | 1800-5400 | |
| NBL | 130 | 131 | 101% | 25 | 125 | 17 | B |
| NBT | 340 | 338 | 99% | 25 | 225 | 15 | B |
| NBR | 20 | 20 | 100% | 25 | 250 | 10 | A |
| **NB** | **490** | **489** | **100%** | | | **15** | **B** |
| SBL | 10 | 10 | 100% | 0 | 25 | 20 | B |
| SBT | 190 | 188 | 99% | 0 | 125 | 15 | B |
| SBR | 80 | 78 | 98% | 0 | 25 | 2 | A |
| **SB** | **280** | **276** | **99%** | | | **11** | **B** |
| EBL | 190 | 174 | 92% | 50 | 175 | 32 | C |
| EBT | 140 | 142 | 101% | 25 | 100 | 23 | C |
| EBR | 80 | 75 | 94% | 25 | 125 | 9 | A |
| **EB** | **410** | **391** | **95%** | | | **24** | **C** |
| WBL | 120 | 121 | 101% | 25 | 150 | 27 | C |
| WBT | 560 | 554 | 99% | 75 | 275 | 29 | C |
| WBR | 20 | 19 | 95% | 75 | 275 | 25 | C |
| **WB** | **700** | **694** | **99%** | | | **29** | **C** |
| **Total** | **1,880** | **1,850** | **98%** | | | **22** | **C** |

*Node Letter: J VISSIM ID: 10*

# 2050 Build SPUI PM

*I-15 Spanish Fork/Springville Interchange Study*

**Link Peak Results**

*Number of Runs: 10*

## I15 NB

V: Speed (mph), K: Density (vpmpl), and LOS

| ID | Location | Seg Type | Ln | Q: Hr Flow Rate / Lane Demand | Served | % Served | Length (ft) | Max 15-min. Interval V | K | LOS | Begin | Segment Peak Hour V | K | LOS | Begin | Peak Hour: 16:15 V | K | LOS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | ML - North of 400 S | B | 5.2 | 1,000 | 1,000 | 99% | 6,125 | 73 | 13.9 | B | 17:00 | 73 | 13.8 | B | 16:15 | 73 | 13.8 | B |
| 2 | ML- 400 S On Ramp | M | 6.7 | 780 | 780 | 99% | 1,525 | 70 | 8.4 | A | 16:30 | 70 | 8.3 | A | 16:15 | 70 | 8.3 | A |
| 3 | ML - 400 S | B | 6.0 | 740 | 740 | 100% | 2,450 | 73 | 10.3 | A | 17:00 | 73 | 10.2 | A | 16:15 | 73 | 10.2 | A |
| 4 | ML - 400 S Off Ramp | D | 6.0 | 880 | 880 | 100% | 1,525 | 72 | 11.1 | B | 17:00 | 72 | 10.9 | B | 16:30 | 73 | 10.8 | B |
| 5 | ML - 1600 S to 400 S | B | 5.0 | 1,060 | 1,050 | 99% | 375 | 72 | 15.1 | B | 17:00 | 72 | 14.7 | B | 16:15 | 72 | 14.7 | B |
| 6 | ML - 1600 S On Ramp | M | 5.0 | 1,060 | 1,050 | 99% | 1,500 | 70 | 16.6 | B | 17:00 | 70 | 16.0 | B | 17:00 | 70 | 15.9 | B |
| 7 | ML - 1600 S with HOV Lane | B | 4.0 | 1,080 | 1,080 | 100% | 1,700 | 72 | 15.4 | B | 16:15 | 72 | 15.2 | B | 16:15 | 72 | 15.2 | B |
| 8 | ML - 1600 S without HOV Lane | B | 5.0 | 940 | 940 | 100% | 875 | 72 | 13.5 | B | 16:15 | 72 | 13.3 | B | 16:15 | 72 | 13.3 | B |
| 9 | ML - 1600 S Off Ramp | D | 6.0 | 900 | 910 | 100% | 1,500 | 70 | 17.4 | B | 17:00 | 70 | 16.9 | B | 16:15 | 70 | 16.9 | B |
| 10 | ML - US 6 to 1600 S | B | 6.0 | 900 | 910 | 100% | 675 | 72 | 13.1 | B | 16:15 | 72 | 12.8 | B | 16:15 | 72 | 12.8 | B |
| 11 | ML - US 6 On Ramp | M | 7.0 | 780 | 780 | 100% | 1,500 | 68 | 12.2 | B | 17:00 | 69 | 11.7 | B | 16:15 | 68 | 11.7 | B |
| 12 | ML - Main St. On Ramp | M | 4.6 | 720 | 720 | 100% | 1,325 | 64 | 15.6 | B | 16:15 | 64 | 14.9 | B | 16:15 | 64 | 14.9 | B |
| 13 | ML - Main St. | B | 4.0 | 590 | 590 | 100% | 4,075 | 72 | 8.9 | A | 16:15 | 73 | 8.5 | A | 16:00 | 72 | 8.5 | A |
| 14 | ML - Main St. Off Ramp | D | 4.0 | 890 | 890 | 100% | 1,500 | 69 | 20.6 | C | 17:00 | 70 | 19.7 | B | 17:00 | 70 | 19.6 | B |
| 15 | ML - South of Main St. | B | 4.0 | 890 | 890 | 100% | 6,075 | 73 | 12.9 | B | 16:15 | 73 | 12.5 | B | 16:15 | 73 | 12.5 | B |
| | **Urban Facility** | **U** | **5.0** | **900** | **900** | **100%** | **32,750** | **71** | **12.9** | B | **17:00** | **72** | **12.7** | B | **16:15** | **72** | **12.7** | B |

## I15 SB

V: Speed (mph), K: Density (vpmpl), and LOS

| ID | Location | Seg Type | Ln | Q: Hr Flow Rate / Lane Demand | Served | % Served | Length (ft) | Max 15-min. Interval V | K | LOS | Begin | Segment Peak Hour V | K | LOS | Begin | Peak Hour: 17:00 V | K | LOS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 16 | ML - North of 400 S | B | 5.0 | 1,690 | 1,680 | 100% | 5,350 | 70 | 26.3 | D | 17:00 | 71 | 25.5 | C | 17:00 | 71 | 25.5 | C |
| 17 | ML - 400 S Off Ramp | D | 6.0 | 1,400 | 1,400 | 100% | 1,500 | 69 | 14.5 | B | 17:45 | 71 | 13.3 | B | 17:00 | 71 | 13.3 | B |
| 18 | ML - 400 S | B | 5.0 | 1,590 | 1,590 | 100% | 2,500 | 70 | 24.7 | C | 17:00 | 70 | 24.1 | C | 17:00 | 70 | 24.1 | C |
| 19 | ML - 400 S On Ramp | M | 5.8 | 1,420 | 1,420 | 100% | 1,500 | 55 | 23.8 | C | 17:15 | 56 | 22.7 | C | 17:00 | 56 | 22.7 | C |
| 20 | ML - 400 S to 1600 S | B | 5.0 | 1,650 | 1,650 | 100% | 275 | 64 | 27.8 | D | 17:15 | 65 | 27.3 | D | 17:00 | 65 | 27.3 | D |
| 21 | ML - 1600 S Off Ramp | D | 5.0 | 1,650 | 1,650 | 100% | 1,500 | 65 | 29.5 | D | 17:00 | 66 | 28.7 | D | 17:00 | 66 | 28.7 | D |
| 22 | ML - 1600 S | B | 6.0 | 1,490 | 1,490 | 100% | 3,300 | 70 | 22.6 | C | 17:00 | 70 | 22.3 | C | 17:00 | 70 | 22.3 | C |
| 23 | ML - US 6/Main St. Off Ramp | D | 6.0 | 1,490 | 1,490 | 100% | 1,500 | 69 | 26.8 | C | 17:15 | 69 | 26.3 | C | 17:00 | 69 | 26.3 | C |
| 24 | ML - US 6 to Main St. | B | 4.0 | 1,120 | 1,120 | 100% | 6,250 | 73 | 15.9 | B | 17:15 | 73 | 15.7 | B | 17:00 | 73 | 15.7 | B |
| 25 | ML - Main St. On-ramp | M | 5.3 | 1,360 | 1,350 | 99% | 1,500 | 63 | 22.5 | C | 17:00 | 63 | 22.2 | C | 17:00 | 63 | 22.2 | C |
| 26 | ML - South of Main St. | B | 4.0 | 1,790 | 1,780 | 99% | 2,375 | 70 | 26.5 | D | 17:00 | 70 | 26.1 | D | 17:00 | 70 | 26.1 | D |
| | **Urban Facility** | **U** | **5.0** | **1,530** | **1,520** | **100%** | **27,550** | **69** | **22.6** | C | **17:00** | **69** | **22.2** | C | **17:00** | **69** | **22.2** | C |

## I15_Exp. NB

V: Speed (mph), K: Density (vpmpl), and LOS

| ID | Location | Seg Type | Ln | Q: Hr Flow Rate / Lane Demand | Served | % Served | Length (ft) | Max 15-min. Interval V | K | LOS | Begin | Segment Peak Hour V | K | LOS | Begin | Peak Hour: 16:15 V | K | LOS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 27 | HOV -North of 400 S | B | 1.0 | 490 | 500 | 102% | 7,675 | 71 | 7.5 | A | 16:30 | 71 | 7.1 | A | 16:15 | 71 | 7.1 | A |
| 28 | HOV -1600 S to 400 S | B | 1.0 | 390 | 390 | 100% | 5,100 | 59 | 7.1 | A | 16:15 | 59 | 6.9 | A | 16:15 | 59 | 6.9 | A |
| | **Urban Facility** | **U** | **1.0** | **450** | **460** | **101%** | **12,800** | **66** | **7.3** | A | **16:30** | **66** | **7.0** | A | **16:15** | **66** | **7.0** | A |

## I15_Exp. SB

V: Speed (mph), K: Density (vpmpl), and LOS

| ID | Location | Seg Type | Ln | Q: Hr Flow Rate / Lane Demand | Served | % Served | Length (ft) | Max 15-min. Interval V | K | LOS | Begin | Segment Peak Hour V | K | LOS | Begin | Peak Hour: 17:00 V | K | LOS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 29 | HOV - North of 400 S | B | 1.0 | 1,240 | 1,240 | 100% | 6,850 | 69 | 19.6 | C | 17:00 | 69 | 19.1 | C | 17:00 | 69 | 19.1 | C |
| 30 | HOV - 400 S to 1600 S | B | 1.0 | 1,160 | 1,160 | 100% | 3,400 | 68 | 18.1 | C | 17:15 | 68 | 18.0 | B | 17:00 | 68 | 18.0 | B |
| | **Urban Facility** | **U** | **1.0** | **1,220** | **1,220** | **100%** | **10,250** | **69** | **19.1** | C | **17:00** | **69** | **18.7** | C | **17:00** | **69** | **18.7** | C |

# II: 2050 PM Build - SPUI

*LOS Category: Signalized*

## 1: SR- 77 (400 South) SPUI

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| NBL | 250 | 234 | 94% | 50 | 200 | 43 | D |
| NBR | 960 | 967 | 101% | 125 | 575 | 33 | C |
| **NB** | **1,210** | **1,201** | **99%** | | | **35** | **D** |
| SBL | 1,460 | 1,426 | 98% | 300 | 1,050 | 68 | E |
| SBR | 390 | 375 | 96% | 0 | 100 | 13 | B |
| **SB** | **1,850** | **1,801** | **97%** | | | **57** | **E** |
| EBL | 380 | 376 | 99% | 50 | 225 | 42 | D |
| EBT | 440 | 451 | 103% | 100 | 300 | 66 | E |
| EBR | 350 | 342 | 98% | 0 | 0 | 2 | A |
| **EB** | **1,170** | **1,169** | **100%** | | | **39** | **D** |
| WBL | 1,170 | 1,174 | 100% | 375 | 1,025 | 75 | E |
| WBT | 380 | 373 | 98% | 75 | 325 | 62 | E |
| WBR | 880 | 876 | 100% | 0 | 0 | 5 | A |
| **WB** | **2,430** | **2,423** | **100%** | | | **48** | **D** |
| **Total** | **6,660** | **6,594** | **99%** | | | **46** | **D** |

*Node Letter: A VISSIM ID: 1*

*LOS Category: Signalized*

## 2: SR-77 (400 ) & 1750 West

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| NBL | 420 | 419 | 100% | 200 | 675 | 118 | F |
| NBT | 250 | 249 | 100% | 125 | 475 | 75 | E |
| NBR | 170 | 169 | 99% | 0 | 150 | 8 | A |
| **NB** | **840** | **837** | **100%** | | | **83** | **F** |
| SBL | 100 | 97 | 97% | 50 | 125 | 96 | F |
| SBT | 160 | 154 | 96% | 150 | 600 | 136 | F |
| SBR | 620 | 616 | 99% | 50 | 250 | 21 | C |
| **SB** | **880** | **867** | **99%** | | | **50** | **D** |
| EBL | 400 | 397 | 99% | 125 | 525 | 77 | E |
| EBT | 1,770 | 1,758 | 99% | 375 | 1,100 | 35 | D |
| EBR | 690 | 669 | 97% | 275 | 1,125 | 23 | C |
| **EB** | **2,860** | **2,824** | **99%** | | | **38** | **D** |
| WBL | 200 | 203 | 102% | 75 | 250 | 135 | F |
| WBT | 1,390 | 1,390 | 100% | 225 | 800 | 34 | C |
| WBR | 50 | 45 | 90% | 225 | 800 | 29 | C |
| **WB** | **1,640** | **1,638** | **100%** | | | **47** | **D** |
| **Total** | **6,220** | **6,166** | **99%** | | | **48** | **D** |

*Node Letter: B VISSIM ID: 2*

*LOS Category: Signalized*

## 3: Main Street & I-15 Ramps

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| NBL | 460 | 470 | 102% | 100 | 400 | 45 | D |
| NBT | 330 | 338 | 102% | 75 | 425 | 21 | C |
| NBR | 870 | 852 | 98% | 0 | 0 | 1 | A |
| **NB** | **1,660** | **1,660** | **100%** | | | **17** | **B** |
| SBL | 130 | 125 | 96% | 75 | 325 | 38 | D |
| SBT | 770 | 767 | 100% | 75 | 325 | 34 | C |
| SBR | 510 | 497 | 97% | 0 | 0 | 2 | A |
| **SB** | **1,410** | **1,389** | **99%** | | | **23** | **C** |
| EBL | 230 | 227 | 99% | 75 | 425 | 56 | E |
| EBT | 10 | 10 | 100% | 50 | 175 | 59 | E |
| EBR | 260 | 266 | 102% | 25 | 125 | 10 | A |
| **EB** | **500** | **503** | **101%** | | | **32** | **C** |
| WBL | 1,000 | 996 | 100% | 175 | 575 | 53 | D |
| WBT | 10 | 10 | 100% | 175 | 575 | 40 | D |
| WBR | 90 | 85 | 94% | 0 | 50 | 7 | A |
| **WB** | **1,100** | **1,091** | **99%** | | | **50** | **D** |
| **Total** | **4,670** | **4,643** | **99%** | | | **28** | **C** |

*Node Letter: K VISSIM ID: 11*

*LOS Category: Signalized*

## 4: Main Street & 1000 North

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| NBL | 30 | 30 | 100% | 0 | 25 | 31 | C |
| NBT | 1,030 | 1,010 | 98% | 75 | 350 | 26 | C |
| NBR | 390 | 386 | 99% | 25 | 200 | 11 | B |
| **NB** | **1,450** | **1,426** | **98%** | | | **22** | **C** |
| SBL | 390 | 382 | 98% | 75 | 250 | 57 | E |
| SBT | 1,530 | 1,524 | 100% | 50 | 425 | 9 | A |
| SBR | 110 | 120 | 109% | 0 | 75 | 3 | A |
| **SB** | **2,030** | **2,026** | **100%** | | | **18** | **B** |
| EBL | 100 | 105 | 105% | 25 | 125 | 44 | D |
| EBT | 80 | 74 | 93% | 25 | 75 | 58 | E |
| EBR | 30 | 29 | 97% | 50 | 125 | 12 | B |
| **EB** | **210** | **208** | **99%** | | | **44** | **D** |
| WBL | 430 | 436 | 101% | 125 | 350 | 58 | E |
| WBT | 60 | 61 | 102% | 25 | 150 | 45 | D |
| WBR | 530 | 521 | 98% | 50 | 325 | 15 | B |
| **WB** | **1,020** | **1,018** | **100%** | | | **35** | **D** |
| **Total** | **4,710** | **4,678** | **99%** | | | **24** | **C** |

*Node Letter: M VISSIM ID: 13*

# II: 2050 PM Build - SPUI

*LOS Category: Signalized*

## 5: US-6 & 1000 North

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Delay / LOS Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| NBL | 180 | 176 | 98% | 25 | 125 | 66 | E |
| NBT | 500 | 483 | 97% | 100 | 325 | 58 | E |
| NBR | 240 | 242 | 101% | 25 | 100 | 10 | B |
| **NB** | **920** | **901** | **98%** | | | **47** | D |
| SBL | 450 | 435 | 97% | 75 | 300 | 88 | F |
| SBT | 450 | 449 | 100% | 75 | 275 | 54 | D |
| SBR | 1,130 | 1,130 | 100% | 0 | 0 | 5 | A |
| **SB** | **2,030** | **2,014** | **99%** | | | **34** | C |
| EBL | 930 | 944 | 102% | 100 | 325 | 56 | E |
| EBT | 340 | 337 | 99% | 25 | 150 | 24 | C |
| EBR | 510 | 498 | 98% | 25 | 250 | 15 | B |
| **EB** | **1,780** | **1,779** | **100%** | | | **39** | D |
| WBL | 110 | 109 | 99% | 25 | 100 | 84 | F |
| WBT | 290 | 284 | 98% | 75 | 225 | 62 | E |
| WBR | 340 | 348 | 102% | 50 | 225 | 18 | B |
| **WB** | **740** | **741** | **100%** | | | **45** | D |
| **Total** | **5,470** | **5,435** | **99%** | | | **39** | D |

*Node Letter: O VISSIM ID: 15*

*LOS Category: Signalized*

## 6: 1600 South Interchange

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Delay / LOS Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| NBL | 140 | 135 | 96% | 25 | 100 | 49 | D |
| NBR | 630 | 631 | 100% | 0 | 0 | 5 | A |
| **NB** | **770** | **766** | **99%** | | | **13** | B |
| SBL | 360 | 356 | 99% | 50 | 200 | 51 | D |
| SBR | 180 | 175 | 97% | 0 | 0 | 6 | A |
| **SB** | **540** | **531** | **98%** | | | **36** | D |
| EBL | 380 | 374 | 98% | 50 | 200 | 43 | D |
| EBT | 420 | 421 | 100% | 25 | 150 | 20 | B |
| EBR | 450 | 432 | 96% | 0 | 0 | 2 | A |
| **EB** | **1,250** | **1,227** | **98%** | | | **21** | C |
| WBL | 620 | 616 | 99% | 100 | 325 | 47 | D |
| WBT | 410 | 402 | 98% | 25 | 150 | 19 | B |
| WBR | 660 | 654 | 99% | 0 | 25 | 2 | A |
| **WB** | **1,690** | **1,672** | **99%** | | | **23** | C |
| **Total** | **4,250** | **4,196** | **99%** | | | **22** | C |

*Node Letter: P VISSIM ID: 21*

*LOS Category: Signalized*

## 7: Main Street & 1600 South/2700 North

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Delay / LOS Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| NBT | 320 | 320 | 100% | 50 | 250 | 19 | B |
| NBR | 430 | 427 | 99% | 50 | 275 | 13 | B |
| **NB** | **750** | **747** | **100%** | | | **15** | B |
| SBL | 580 | 565 | 97% | 75 | 250 | 34 | C |
| SBT | 780 | 786 | 101% | 25 | 150 | 7 | A |
| **SB** | **1,360** | **1,351** | **99%** | | | **19** | B |
| WBL | 310 | 294 | 95% | 50 | 200 | 31 | C |
| WBR | 140 | 146 | 104% | 50 | 225 | 21 | C |
| **WB** | **450** | **440** | **98%** | | | **27** | C |
| **Total** | **2,560** | **2,538** | **99%** | | | **19** | B |

*Node Letter: C VISSIM ID: 3*

*LOS Category: Unsignalized*

## 8: SB West Frontage Road & 1600 South/2700 Nort

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Delay / LOS Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| SBL | 170 | 168 | 99% | 25 | 150 | 22 | C |
| SBT | 10 | 9 | 90% | 0 | 50 | 15 | C |
| SBR | 20 | 20 | 100% | 0 | 50 | 8 | A |
| **SB** | **200** | **197** | **99%** | | | **20** | C |
| **Total** | **200** | **197** | **99%** | | | **20** | C |

*Node Letter: D VISSIM ID: 4*

*LOS Category: Unsignalized*

## 9: NB West Frontage Road & 1600 South/2700 Nort

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Delay / LOS Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| NBL | 10 | 9 | 90% | 0 | 0 | 4 | A |
| NBT | 10 | 12 | **120%** | 0 | 50 | 20 | C |
| NBR | 130 | 129 | 99% | 0 | 50 | 2 | A |
| **NB** | **150** | **150** | **100%** | | | **4** | A |
| **Total** | **150** | **150** | **100%** | | | **4** | A |

*Node Letter: D VISSIM ID: 18*

*LOS Category: Unsignalized*

## 10: East Frontage Road & 1750 West

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Delay / LOS Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| EBL | 10 | 11 | 110% | 0 | 100 | 11 | B |
| EBR | 190 | 187 | 98% | 0 | 100 | 10 | B |
| **EB** | **200** | **198** | **99%** | | | **10** | B |
| **Total** | **200** | **198** | **99%** | | | **10** | B |

*Node Letter: E VISSIM ID: 5*

# II: 2050 PM Build - SPUI

*LOS Category: Signalized*

## 11: 1750 West & 1600 South/2700 North

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| SBL | 140 | 138 | 99% | 50 | 275 | 31 | C |
| SBR | 530 | 524 | 99% | 75 | 300 | 20 | B |
| **SB** | **670** | **662** | **99%** | | | **22** | **C** |
| EBL | 330 | 339 | 103% | 50 | 225 | 28 | C |
| EBT | 1,080 | 1,068 | 99% | 25 | 275 | 7 | A |
| **EB** | **1,410** | **1,407** | **100%** | | | **12** | **B** |
| WBT | 1,160 | 1,150 | 99% | 75 | 375 | 19 | B |
| WBR | 100 | 94 | 94% | 75 | 375 | 19 | B |
| **WB** | **1,260** | **1,244** | **99%** | | | **19** | **B** |
| **Total** | **3,340** | **3,313** | **99%** | | | **17** | **B** |

*Node Letter: F VISSIM ID: 6*

*LOS Category: Unsignalized*

## 12: SB Canyon Creek & 1600 South/2700 North

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| SBL | 30 | 28 | 93% | 0 | 50 | 11 | B |
| SBT | 40 | 38 | 95% | 25 | 150 | 30 | D |
| SBR | 220 | 220 | 100% | 25 | 150 | 15 | B |
| **SB** | **290** | **286** | **99%** | | | **17** | **C** |
| **Total** | **290** | **286** | **99%** | | | **17** | **C** |

*Node Letter: G VISSIM ID: 7*

*LOS Category: Unsignalized*

## 13: NB Canyon Creek & 1600 South/2700 North

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| NBL | 90 | 88 | 98% | 25 | 125 | 47 | E |
| NBT | 10 | 10 | 100% | 0 | 50 | 16 | C |
| NBR | 70 | 66 | 94% | 0 | 50 | 7 | A |
| **NB** | **170** | **164** | **96%** | | | **29** | **D** |
| **Total** | **170** | **164** | **96%** | | | **29** | **D** |

*Node Letter: G VISSIM ID: 19*

*LOS Category: Signalized*

## 14: 1200 West & 1600 South/2700 North

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| NBL | 230 | 230 | 100% | 50 | 275 | 33 | C |
| NBT | 200 | 202 | 101% | 50 | 250 | 19 | B |
| NBR | 270 | 264 | 98% | 50 | 250 | 14 | B |
| **NB** | **700** | **696** | **99%** | | | **22** | **C** |
| SBL | 10 | 8 | 80% | 0 | 25 | 32 | C |
| SBT | 370 | 369 | 100% | 75 | 225 | 32 | C |
| SBR | 130 | 126 | 97% | 75 | 250 | 26 | C |
| **SB** | **510** | **503** | **99%** | | | **30** | **C** |
| EBL | 50 | 46 | 92% | 0 | 25 | 17 | B |
| EBT | 740 | 735 | 99% | 25 | 225 | 12 | B |
| EBR | 130 | 128 | 98% | 50 | 250 | 10 | B |
| **EB** | **920** | **909** | **99%** | | | **12** | **B** |
| WBL | 90 | 90 | 100% | 25 | 100 | 23 | C |
| WBT | 710 | 702 | 99% | 25 | 200 | 13 | B |
| WBR | 10 | 8 | 80% | 25 | 200 | 11 | B |
| **WB** | **810** | **800** | **99%** | | | **14** | **B** |
| **Total** | **2,940** | **2,908** | **99%** | | | **18** | **B** |

*Node Letter: H VISSIM ID: 8*

*LOS Category: Unsignalized*

## 15: SB 950 West & 1600 South/2700 North

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| SBL | 90 | 91 | 101% | 25 | 125 | 12 | B |
| SBT | 20 | 20 | 100% | 25 | 125 | 12 | B |
| SBR | 140 | 137 | 98% | 0 | 150 | 7 | A |
| **SB** | **250** | **248** | **99%** | | | **9** | **A** |
| **Total** | **250** | **248** | **99%** | | | **9** | **A** |

*Node Letter: I VISSIM ID: 9*

*LOS Category: Unsignalized*

## 16: NB 950 West & 1600 South/2700 North

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| NBL | 20 | 20 | 100% | 0 | 50 | 7 | A |
| NBT | 20 | 18 | 90% | 0 | 50 | 7 | A |
| NBR | 10 | 11 | 110% | 0 | 25 | 2 | A |
| **NB** | **50** | **49** | **98%** | | | **6** | **A** |
| **Total** | **50** | **49** | **98%** | | | **6** | **A** |

*Node Letter: I VISSIM ID: 20*

# II: 2050 PM Build - SPUI

*LOS Category: Signalized*

| 17: SR-51 & 1600 South/2700 North | | | | | | Delay / LOS | |
|---|---|---|---|---|---|---|---|
| | | Volume | | Queue (ft) Avg / 95th | | Analysis Period | |
| Mvmt | Demand | Served | % Served | 5400-9000 | | 5400-9000 | |
| NBL | 150 | 143 | 95% | 25 | 175 | 30 | C |
| NBT | 250 | 256 | 102% | 25 | 225 | 16 | B |
| NBR | 130 | 127 | 98% | 25 | 250 | 11 | B |
| **NB** | **530** | **526** | **99%** | | | **19** | **B** |
| SBL | 20 | 19 | 95% | 0 | 25 | 21 | C |
| SBT | 460 | 461 | 100% | 50 | 325 | 20 | B |
| SBR | 110 | 108 | 98% | 0 | 25 | 4 | A |
| **SB** | **590** | **588** | **100%** | | | **17** | **B** |
| EBL | 160 | 166 | 104% | 50 | 250 | 31 | C |
| EBT | 550 | 536 | 97% | 75 | 325 | 27 | C |
| EBR | 240 | 236 | 98% | 75 | 350 | 22 | C |
| **EB** | **950** | **938** | **99%** | | | **27** | **C** |
| WBL | 80 | 79 | 99% | 25 | 100 | 35 | D |
| WBT | 420 | 418 | 100% | 25 | 150 | 24 | C |
| WBR | 10 | 9 | 90% | 50 | 175 | 22 | C |
| **WB** | **510** | **506** | **99%** | | | **26** | **C** |
| **Total** | **2,580** | **2,558** | **99%** | | | **23** | **C** |

*Node Letter: J VISSIM ID: 10*

# VISSIM Travel Time Comparison

*Springville / Spanish Fork EA*

## 2050 Build Full Widening AM

| 1600 South / 2700 North EB | Dist (mi) | Base FFS (mph) | # Veh | Travel Time (sec) | Travel Speed (mph) | LOS |
|---|---|---|---|---|---|---|
| Main Street to 200 East | 0.3 | 35 | 806 | 19 | 50 | A |
| 200 East to I-15 | 0.2 | 35 | 300 | 41 | 16 | D |
| I-15 to 1750 West | 0.2 | 35 | 501 | 24 | 34 | A |
| 1750 West to Wallace L | 0.3 | 35 | 720 | 36 | 34 | A |
| Wallace Lan to 1200 W | 0.2 | 35 | 571 | 28 | 27 | B |
| 1200 West to 950 West | 0.3 | 35 | 683 | 31 | 34 | A |
| 950 West to State Stree | 0.8 | 35 | 264 | 107 | 26 | B |
| Total | 2.3 | 35 | -- | 286 | 29 | A |

| 1600 South / 2700 North WB | Dist (mi) | Base FFS (mph) | # Veh | Travel Time (sec) | Travel Speed (mph) | LOS |
|---|---|---|---|---|---|---|
| State Street to 950 Wes | 0.8 | 35 | 1647 | 87 | 33 | A |
| 950 West to 1200 West | 0.3 | 35 | 1624 | 40 | 26 | B |
| 1200 West to Wallace L | 0.2 | 35 | 1929 | 22 | 34 | A |
| Wallace Lane to 1750 | 0.3 | 35 | 1988 | 44 | 27 | B |
| 1750 West to I-15 | 0.2 | 35 | 478 | 40 | 21 | C |
| I-15 to 200 East | 0.2 | 35 | 404 | 26 | 26 | B |
| 200 East to Main Street | 0.2 | 35 | 642 | 32 | 27 | B |
| Total | 2.3 | 35 | -- | 292 | 28 | A |

## 2050 Build Full Widening PM

| 1600 South / 2700 North EB | Dist (mi) | Base FFS (mph) | # Veh | Travel Time (sec) | Travel Speed (mph) | LOS |
|---|---|---|---|---|---|---|
| Main Street to 200 East | 0.3 | 35 | 1846 | 19 | 50 | A |
| 200 East to I-15 | 0.2 | 35 | 825 | 50 | 13 | E |
| I-15 to 1750 West | 0.2 | 35 | 1108 | 29 | 28 | A |
| 1750 West to Wallace L | 0.3 | 35 | 1550 | 38 | 32 | A |
| Wallace Lan to 1200 W | 0.2 | 35 | 1359 | 33 | 23 | B |
| 1200 West to 950 West | 0.3 | 35 | 1630 | 32 | 33 | A |
| 950 West to State Stree | 0.8 | 35 | 1034 | 112 | 25 | B |
| Total | 2.3 | 35 | -- | 311 | 26 | B |

| 1600 South / 2700 North WB | Dist (mi) | Base FFS (mph) | # Veh | Travel Time (sec) | Travel Speed (mph) | LOS |
|---|---|---|---|---|---|---|
| State Street to 950 Wes | 0.8 | 35 | 1259 | 86 | 33 | A |
| 950 West to 1200 West | 0.3 | 35 | 1350 | 43 | 24 | B |
| 1200 West to Wallace L | 0.2 | 35 | 1813 | 23 | 34 | A |
| Wallace Lane to 1750 | 0.3 | 35 | 2197 | 52 | 23 | C |
| 1750 West to I-15 | 0.2 | 35 | 731 | 46 | 18 | C |
| I-15 to 200 East | 0.2 | 35 | 595 | 28 | 24 | B |
| 200 East to Main Street | 0.2 | 35 | 830 | 41 | 21 | C |
| Total | 2.3 | 35 | -- | 319 | 26 | B |

# II: 2050 AM Build SPUI - Frontage Widening

*LOS Category: Signalized*

## 1: SR- 77 (400 South) SPUI

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| NBL | 210 | 209 | 100% | 25 | 150 | 31 | C |
| NBR | 950 | 946 | 100% | 50 | 250 | 12 | B |
| **NB** | **1,160** | **1,155** | **100%** | | | **15** | **B** |
| SBL | 660 | 652 | 99% | 50 | 250 | 28 | C |
| SBR | 360 | 370 | 103% | 0 | 75 | 4 | A |
| **SB** | **1,020** | **1,022** | **100%** | | | **19** | **B** |
| EBL | 290 | 289 | 100% | 50 | 200 | 50 | D |
| EBT | 260 | 262 | 101% | 50 | 175 | 68 | E |
| EBR | 260 | 258 | 99% | 0 | 0 | 1 | A |
| **EB** | **810** | **809** | **100%** | | | **40** | **D** |
| WBL | 550 | 566 | 103% | 100 | 350 | 53 | D |
| WBT | 260 | 259 | 100% | 150 | 725 | 74 | E |
| WBR | 1,190 | 1,175 | 99% | 25 | 475 | 10 | A |
| **WB** | **2,000** | **2,000** | **100%** | | | **30** | **C** |
| **Total** | **4,990** | **4,986** | **100%** | | | **26** | **C** |

*Node Letter: A VISSIM ID: 1*

*LOS Category: Signalized*

## 3: Main Street & I-15 Ramps

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| NBL | 130 | 131 | 101% | 0 | 150 | 20 | C |
| NBT | 470 | 476 | 101% | 25 | 175 | 18 | B |
| NBR | 1,020 | 1,022 | 100% | 0 | 0 | 1 | A |
| **NB** | **1,620** | **1,629** | **101%** | | | **8** | **A** |
| SBL | 40 | 40 | 100% | 0 | 100 | 26 | C |
| SBT | 280 | 276 | 99% | 0 | 100 | 23 | C |
| SBR | 70 | 72 | 103% | 0 | 0 | 0 | A |
| **SB** | **390** | **388** | **99%** | | | **19** | **B** |
| EBL | 690 | 693 | 100% | 25 | 175 | 52 | D |
| EBR | 250 | 249 | 100% | 50 | 350 | 9 | A |
| **EB** | **940** | **942** | **100%** | | | **40** | **D** |
| WBL | 410 | 423 | 103% | 75 | 250 | 57 | E |
| WBT | 10 | 10 | 100% | 75 | 250 | 45 | D |
| WBR | 100 | 102 | 102% | 0 | 75 | 9 | A |
| **WB** | **520** | **535** | **103%** | | | **47** | **D** |
| **Total** | **3,470** | **3,494** | **101%** | | | **24** | **C** |

*Node Letter: K VISSIM ID: 11*

*LOS Category: Signalized*

## 4: Main Street & 1000 North

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| NBL | 10 | 10 | 100% | 0 | 0 | 8 | A |
| NBT | 1,350 | 1,350 | 100% | 25 | 275 | 11 | B |
| NBR | 160 | 157 | 98% | 0 | 50 | 4 | A |
| **NB** | **1,520** | **1,517** | **100%** | | | **10** | **B** |
| SBL | 180 | 176 | 98% | 50 | 150 | 63 | E |
| SBT | 740 | 743 | 100% | 0 | 75 | 3 | A |
| SBR | 20 | 21 | 105% | 0 | 25 | 2 | A |
| **SB** | **940** | **940** | **100%** | | | **14** | **B** |
| EBL | 40 | 39 | 98% | 0 | 75 | 52 | D |
| EBT | 20 | 18 | 90% | 0 | 50 | 66 | E |
| EBR | 10 | 10 | 100% | 25 | 100 | 6 | A |
| **EB** | **70** | **67** | **96%** | | | **49** | **D** |
| WBL | 70 | 69 | 99% | 50 | 125 | 63 | E |
| WBT | 20 | 20 | 100% | 0 | 50 | 56 | E |
| WBR | 230 | 230 | 100% | 0 | 100 | 8 | A |
| **WB** | **320** | **319** | **100%** | | | **23** | **C** |
| **Total** | **2,850** | **2,843** | **100%** | | | **14** | **B** |

*Node Letter: M VISSIM ID: 13*

*LOS Category: Signalized*

## 5: US-6 & 1000 North

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| NBL | 220 | 223 | 101% | 50 | 150 | 69 | E |
| NBT | 230 | 231 | 100% | 50 | 150 | 50 | D |
| NBR | 40 | 41 | 103% | 0 | 50 | 4 | A |
| **NB** | **490** | **495** | **101%** | | | **55** | **D** |
| SBL | 140 | 140 | 100% | 25 | 100 | 69 | E |
| SBT | 90 | 95 | 106% | 25 | 75 | 45 | D |
| SBR | 700 | 698 | 100% | 0 | 0 | 2 | A |
| **SB** | **930** | **933** | **100%** | | | **17** | **B** |
| EBL | 880 | 869 | 99% | 125 | 375 | 56 | E |
| EBT | 230 | 228 | 99% | 25 | 150 | 23 | C |
| EBR | 90 | 91 | 101% | 0 | 0 | 5 | A |
| **EB** | **1,200** | **1,188** | **99%** | | | **46** | **D** |
| WBL | 70 | 73 | 104% | 25 | 75 | 85 | F |
| WBT | 430 | 408 | 95% | 100 | 300 | 65 | E |
| WBR | 230 | 242 | 105% | 25 | 100 | 9 | A |
| **WB** | **730** | **723** | **99%** | | | **48** | **D** |
| **Total** | **3,350** | **3,339** | **100%** | | | **40** | **D** |

*Node Letter: O VISSIM ID: 15*

# II: 2050 AM Build SPUI - Frontage Widening

*LOS Category: Signalized*

## 6: 1600 South Interchange

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| NBL | 180 | 179 | 99% | 25 | 125 | 53 | D |
| NBR | 550 | 542 | 99% | 0 | 0 | 7 | A |
| **NB** | **730** | **721** | **99%** | | | **18** | **B** |
| SBL | 210 | 204 | 97% | 50 | 125 | 53 | D |
| SBR | 220 | 220 | 100% | 0 | 0 | 5 | A |
| **SB** | **430** | **424** | **99%** | | | **28** | **C** |
| EBL | 230 | 228 | 99% | 50 | 175 | 52 | D |
| EBT | 170 | 165 | 97% | 0 | 75 | 10 | A |
| EBR | 70 | 74 | 106% | 0 | 0 | 1 | A |
| **EB** | **470** | **467** | **99%** | | | **29** | **C** |
| WBL | 140 | 145 | 104% | 25 | 125 | 50 | D |
| WBT | 220 | 222 | 101% | 0 | 100 | 11 | B |
| WBR | 710 | 697 | 98% | 0 | 0 | 2 | A |
| **WB** | **1,070** | **1,064** | **99%** | | | **10** | **B** |
| **Total** | **2,700** | **2,676** | **99%** | | | **18** | **B** |

*Node Letter: P VISSIM ID: 21*

*LOS Category: Signalized*

## 7: Main Street & 1600 South/2700 North

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| NBT | 740 | 740 | 100% | 25 | 275 | 11 | B |
| NBR | 330 | 328 | 99% | 25 | 275 | 10 | A |
| **NB** | **1,070** | **1,068** | **100%** | | | **10** | **B** |
| SBL | 130 | 133 | 102% | 50 | 175 | 51 | D |
| SBT | 260 | 257 | 99% | 0 | 50 | 3 | A |
| **SB** | **390** | **390** | **100%** | | | **20** | **B** |
| WBL | 200 | 202 | 101% | 25 | 150 | 34 | C |
| WBR | 130 | 131 | 101% | 50 | 175 | 16 | B |
| **WB** | **330** | **333** | **101%** | | | **27** | **C** |
| **Total** | **1,790** | **1,791** | **100%** | | | **15** | **B** |

*Node Letter: C VISSIM ID: 3*

*LOS Category: Unsignalized*

## 8: SB West Frontage Road & 1600 South/2700 Nort

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| SBL | 20 | 18 | 90% | 0 | 0 | 2 | A |
| SBT | 10 | 8 | 80% | 0 | 25 | 7 | A |
| SBR | 10 | 11 | 110% | 0 | 0 | 1 | A |
| **SB** | **40** | **37** | **93%** | | | **3** | **A** |
| EBL | 60 | 64 | 107% | 0 | 75 | 3 | A |
| **EB** | **60** | **64** | **107%** | | | **3** | **A** |
| WBR | 210 | 208 | 99% | 0 | 75 | 1 | A |
| **WB** | **210** | **208** | **99%** | | | **1** | **A** |
| **Total** | **310** | **309** | **100%** | | | **2** | **A** |

*Node Letter: D VISSIM ID: 4*

*LOS Category: Unsignalized*

## 9: NB West Frontage Road & 1600 South/2700 Nort

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| NBL | 10 | 9 | 90% | 0 | 0 | 4 | A |
| NBT | 10 | 11 | 110% | 0 | 25 | 10 | A |
| NBR | 60 | 58 | 97% | 0 | 0 | 1 | A |
| **NB** | **80** | **78** | **98%** | | | **2** | **A** |
| EBR | 10 | 8 | 80% | 0 | 0 | 3 | A |
| **EB** | **10** | **8** | **80%** | | | **3** | **A** |
| WBL | 100 | 101 | 101% | 0 | 100 | 2 | A |
| **WB** | **100** | **101** | **101%** | | | **2** | **A** |
| **Total** | **190** | **187** | **98%** | | | **2** | **A** |

*Node Letter: D VISSIM ID: 18*

*LOS Category: Unsignalized*

## 10: East Frontage Road & 1750 West

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| NBL | 70 | 71 | 101% | 0 | 50 | 1 | A |
| **NB** | **70** | **71** | **101%** | | | **1** | **A** |
| EBR | 40 | 38 | 95% | 0 | 75 | 8 | A |
| **EB** | **40** | **38** | **95%** | | | **8** | **A** |
| **Total** | **110** | **109** | **99%** | | | **4** | **A** |

*Node Letter: E VISSIM ID: 5*

*LOS Category: Signalized*

## 11: 1750 West & 1600 South/2700 North

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| SBL | 30 | 27 | 90% | 0 | 50 | 39 | D |
| SBR | 140 | 141 | 101% | 0 | 100 | 5 | A |
| **SB** | **170** | **168** | **99%** | | | **11** | **B** |
| EBL | 310 | 308 | 99% | 50 | 250 | 26 | C |
| EBT | 620 | 605 | 98% | 50 | 250 | 2 | A |
| **EB** | **930** | **913** | **98%** | | | **10** | **B** |
| WBT | 930 | 924 | 99% | 125 | 875 | 15 | B |
| WBR | 120 | 117 | 98% | 0 | 0 | 8 | A |
| **WB** | **1,050** | **1,041** | **99%** | | | **14** | **B** |
| **Total** | **2,150** | **2,122** | **99%** | | | **12** | **B** |

*Node Letter: F VISSIM ID: 6*

# II: 2050 AM Build SPUI - Frontage Widening

*LOS Category: Unsignalized*

## 12: SB Canyon Creek & 1600 South/2700 North

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| SBL | 10 | 9 | 90% | 0 | 25 | 7 | A |
| SBT | 10 | 10 | 100% | 0 | 50 | 27 | D |
| SBR | 110 | 110 | 100% | 0 | 50 | 6 | A |
| **SB** | **130** | **129** | **99%** | | | **8** | **A** |
| EBL | 30 | 29 | 97% | 0 | 100 | 9 | A |
| **EB** | **30** | **29** | **97%** | | | **9** | **A** |
| WBR | 20 | 20 | 100% | 25 | 300 | 5 | A |
| **WB** | **20** | **20** | **100%** | | | **5** | **A** |
| **Total** | **180** | **178** | **99%** | | | **8** | **A** |

*Node Letter: G VISSIM ID: 7*

*LOS Category: Unsignalized*

## 13: NB Canyon Creek & 1600 South/2700 North

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| NBL | 50 | 50 | 100% | 0 | 50 | 29 | D |
| NBR | 10 | 8 | 80% | 0 | 25 | 5 | A |
| **NB** | **60** | **58** | **97%** | | | **25** | **D** |
| EBR | 220 | 213 | 97% | 0 | 25 | 3 | A |
| **EB** | **220** | **213** | **97%** | | | **3** | **A** |
| WBL | 40 | 41 | 103% | 0 | 75 | 7 | A |
| **WB** | **40** | **41** | **103%** | | | **7** | **A** |
| **Total** | **320** | **312** | **98%** | | | **7** | **A** |

*Node Letter: G VISSIM ID: 19*

*LOS Category: Signalized*

## 14: 1200 West & 1600 South/2700 North

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| NBL | 150 | 156 | 104% | 25 | 150 | 32 | C |
| NBT | 140 | 137 | 98% | 25 | 100 | 27 | C |
| NBR | 80 | 81 | 101% | 25 | 125 | 14 | B |
| **NB** | **370** | **374** | **101%** | | | **26** | **C** |
| SBL | 10 | 10 | 100% | 0 | 50 | 35 | C |
| SBT | 110 | 108 | 98% | 25 | 100 | 34 | C |
| SBR | 60 | 62 | 103% | 25 | 125 | 18 | B |
| **SB** | **180** | **180** | **100%** | | | **28** | **C** |
| EBL | 10 | 10 | 100% | 0 | 25 | 20 | B |
| EBT | 330 | 316 | 96% | 25 | 175 | 9 | A |
| EBR | 80 | 80 | 100% | 0 | 50 | 3 | A |
| **EB** | **420** | **406** | **97%** | | | **8** | **A** |
| WBL | 100 | 106 | 106% | 0 | 100 | 15 | B |
| WBT | 740 | 723 | 98% | 75 | 500 | 15 | B |
| WBR | 10 | 11 | 110% | 0 | 25 | 8 | A |
| **WB** | **850** | **840** | **99%** | | | **15** | **B** |
| **Total** | **1,820** | **1,800** | **99%** | | | **17** | **B** |

*Node Letter: H VISSIM ID: 8*

*LOS Category: Unsignalized*

## 15: SB 950 West & 1600 South/2700 North

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| SBL | 10 | 8 | 80% | 0 | 50 | 6 | A |
| SBT | 10 | 10 | 100% | 0 | 50 | 6 | A |
| SBR | 80 | 80 | 100% | 0 | 25 | 2 | A |
| **SB** | **100** | **98** | **98%** | | | **3** | **A** |
| EBL | 20 | 22 | 110% | 0 | 75 | 5 | A |
| **EB** | **20** | **22** | **110%** | | | **5** | **A** |
| WBR | 10 | 10 | 100% | 0 | 0 | 4 | A |
| **WB** | **10** | **10** | **100%** | | | **4** | **A** |
| **Total** | **130** | **130** | **100%** | | | **3** | **A** |

*Node Letter: I VISSIM ID: 9*

*LOS Category: Unsignalized*

## 16: NB 950 West & 1600 South/2700 North

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| NBL | 20 | 20 | 100% | 0 | 50 | 7 | A |
| NBT | 10 | 8 | 80% | 0 | 50 | 6 | A |
| NBR | 10 | 10 | 100% | 0 | 25 | 1 | A |
| **NB** | **40** | **38** | **95%** | | | **5** | **A** |
| EBR | 10 | 11 | 110% | 0 | 0 | 1 | A |
| **EB** | **10** | **11** | **110%** | | | **1** | **A** |
| WBL | 10 | 12 | 120% | 0 | 25 | 4 | A |
| **WB** | **10** | **12** | **120%** | | | **4** | **A** |
| **Total** | **60** | **61** | **102%** | | | **4** | **A** |

*Node Letter: I VISSIM ID: 20*

# II: 2050 AM Build SPUI - Frontage Widening

*LOS Category: Signalized*

| 17: SR-51 & 1600 South/2700 North | | | | | | Delay / LOS | |
|---|---|---|---|---|---|---|---|
| | | Volume | | Queue (ft) Avg / 95th | | Analysis Period | |
| Mvmt | Demand | Served | % Served | 1800-5400 | | 1800-5400 | |
| NBL | 130 | 131 | 101% | 25 | 125 | 28 | C |
| NBT | 340 | 339 | 100% | 50 | 275 | 27 | C |
| NBR | 20 | 20 | 100% | 75 | 300 | 18 | B |
| **NB** | **490** | **490** | **100%** | | | **27** | **C** |
| SBL | 10 | 10 | 100% | 0 | 25 | 33 | C |
| SBT | 190 | 188 | 99% | 25 | 150 | 27 | C |
| SBR | 80 | 79 | 99% | 0 | 25 | 2 | A |
| **SB** | **280** | **277** | **99%** | | | **20** | **B** |
| EBL | 190 | 175 | 92% | 25 | 150 | 23 | C |
| EBT | 140 | 142 | 101% | 0 | 75 | 12 | B |
| EBR | 80 | 75 | 94% | 0 | 50 | 6 | A |
| **EB** | **410** | **392** | **96%** | | | **16** | **B** |
| WBL | 120 | 121 | 101% | 0 | 100 | 18 | B |
| WBT | 560 | 554 | 99% | 100 | 575 | 20 | B |
| WBR | 20 | 19 | 95% | 0 | 25 | 11 | B |
| **WB** | **700** | **694** | **99%** | | | **19** | **B** |
| **Total** | **1,880** | **1,853** | **99%** | | | **21** | **C** |

*Node Letter: J VISSIM ID: 10*

# II: 2050 PM Build SPUI - Main to 1200 West Widening

*LOS Category: Signalized*

## 1: SR- 77 (400 South) SPUI

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| NBL | 250 | 234 | 94% | 50 | 200 | 43 | D |
| NBR | 960 | 971 | 101% | 75 | 375 | 23 | C |
| **NB** | **1,210** | **1,205** | **100%** | | | **27** | **C** |
| SBL | 1,460 | 1,426 | 98% | 225 | 700 | 58 | E |
| SBR | 390 | 376 | 96% | 0 | 100 | 12 | B |
| **SB** | **1,850** | **1,802** | **97%** | | | **48** | **D** |
| EBL | 380 | 376 | 99% | 50 | 225 | 41 | D |
| EBT | 440 | 451 | 103% | 100 | 300 | 71 | E |
| EBR | 350 | 342 | 98% | 0 | 0 | 2 | A |
| **EB** | **1,170** | **1,169** | **100%** | | | **41** | **D** |
| WBL | 1,170 | 1,185 | 101% | 250 | 775 | 54 | D |
| WBT | 380 | 373 | 98% | 150 | 650 | 68 | E |
| WBR | 880 | 878 | 100% | 0 | 100 | 7 | A |
| **WB** | **2,430** | **2,436** | **100%** | | | **39** | **D** |
| **Total** | **6,660** | **6,612** | **99%** | | | **40** | **D** |

*Node Letter: A VISSIM ID: 1*

*LOS Category: Signalized*

## 3: Main Street & I-15 Ramps

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| NBL | 460 | 470 | 102% | 125 | 425 | 48 | D |
| NBT | 330 | 339 | 103% | 75 | 450 | 21 | C |
| NBR | 870 | 852 | 98% | 0 | 0 | 1 | A |
| **NB** | **1,660** | **1,661** | **100%** | | | **18** | **B** |
| SBL | 130 | 125 | 96% | 75 | 325 | 38 | D |
| SBT | 770 | 770 | 100% | 75 | 325 | 34 | C |
| SBR | 510 | 498 | 98% | 0 | 0 | 2 | A |
| **SB** | **1,410** | **1,393** | **99%** | | | **23** | **C** |
| EBL | 230 | 227 | 99% | 75 | 450 | 57 | E |
| EBT | 10 | 10 | 100% | 50 | 175 | 59 | E |
| EBR | 260 | 266 | 102% | 25 | 125 | 9 | A |
| **EB** | **500** | **503** | **101%** | | | **32** | **C** |
| WBL | 1,000 | 994 | 99% | 175 | 525 | 53 | D |
| WBT | 10 | 10 | 100% | 175 | 525 | 39 | D |
| WBR | 90 | 85 | 94% | 0 | 75 | 8 | A |
| **WB** | **1,100** | **1,089** | **99%** | | | **49** | **D** |
| **Total** | **4,670** | **4,646** | **99%** | | | **28** | **C** |

*Node Letter: K VISSIM ID: 11*

*LOS Category: Signalized*

## 4: Main Street & 1000 North

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| NBL | 30 | 30 | 100% | 0 | 25 | 30 | C |
| NBT | 1,030 | 1,010 | 98% | 75 | 350 | 27 | C |
| NBR | 390 | 386 | 99% | 25 | 200 | 12 | B |
| **NB** | **1,450** | **1,426** | **98%** | | | **23** | **C** |
| SBL | 390 | 384 | 98% | 75 | 250 | 57 | E |
| SBT | 1,530 | 1,523 | 100% | 50 | 425 | 9 | A |
| SBR | 110 | 121 | 110% | 0 | 75 | 3 | A |
| **SB** | **2,030** | **2,028** | **100%** | | | **18** | **B** |
| EBL | 100 | 105 | 105% | 25 | 125 | 44 | D |
| EBT | 80 | 74 | 93% | 25 | 75 | 58 | E |
| EBR | 30 | 29 | 97% | 50 | 125 | 12 | B |
| **EB** | **210** | **208** | **99%** | | | **44** | **D** |
| WBL | 430 | 436 | 101% | 125 | 350 | 58 | E |
| WBT | 60 | 60 | 100% | 25 | 125 | 45 | D |
| WBR | 530 | 521 | 98% | 50 | 325 | 15 | B |
| **WB** | **1,020** | **1,017** | **100%** | | | **35** | **D** |
| **Total** | **4,710** | **4,679** | **99%** | | | **24** | **C** |

*Node Letter: M VISSIM ID: 13*

*LOS Category: Signalized*

## 5: US-6 & 1000 North

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| NBL | 180 | 176 | 98% | 25 | 125 | 66 | E |
| NBT | 500 | 483 | 97% | 100 | 325 | 58 | E |
| NBR | 240 | 242 | 101% | 25 | 100 | 10 | B |
| **NB** | **920** | **901** | **98%** | | | **47** | **D** |
| SBL | 450 | 435 | 97% | 75 | 300 | 87 | F |
| SBT | 450 | 449 | 100% | 75 | 275 | 54 | D |
| SBR | 1,130 | 1,130 | 100% | 0 | 0 | 5 | A |
| **SB** | **2,030** | **2,014** | **99%** | | | **34** | **C** |
| EBL | 930 | 944 | 102% | 100 | 325 | 56 | E |
| EBT | 340 | 338 | 99% | 25 | 150 | 23 | C |
| EBR | 510 | 498 | 98% | 25 | 250 | 16 | B |
| **EB** | **1,780** | **1,780** | **100%** | | | **39** | **D** |
| WBL | 110 | 109 | 99% | 25 | 100 | 84 | F |
| WBT | 290 | 284 | 98% | 75 | 225 | 62 | E |
| WBR | 340 | 348 | 102% | 50 | 225 | 19 | B |
| **WB** | **740** | **741** | **100%** | | | **45** | **D** |
| **Total** | **5,470** | **5,436** | **99%** | | | **39** | **D** |

*Node Letter: O VISSIM ID: 15*

# II: 2050 PM Build SPUI - Main to 1200 West Widening

*LOS Category: Signalized*

## 6: 1600 South Interchange

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Delay / LOS Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| NBL | 140 | 135 | 96% | 25 | 100 | 49 | D |
| NBR | 630 | 630 | 100% | 0 | 0 | 5 | A |
| **NB** | **770** | **765** | **99%** | | | **13** | **B** |
| SBL | 360 | 356 | 99% | 50 | 200 | 52 | D |
| SBR | 180 | 175 | 97% | 0 | 0 | 5 | A |
| **SB** | **540** | **531** | **98%** | | | **37** | **D** |
| EBL | 380 | 375 | 99% | 50 | 200 | 41 | D |
| EBT | 420 | 422 | 100% | 25 | 150 | 20 | C |
| EBR | 450 | 433 | 96% | 0 | 0 | 2 | A |
| **EB** | **1,250** | **1,230** | **98%** | | | **20** | **B** |
| WBL | 620 | 613 | 99% | 100 | 325 | 47 | D |
| WBT | 410 | 402 | 98% | 25 | 150 | 19 | B |
| WBR | 660 | 653 | 99% | 0 | 0 | 2 | A |
| **WB** | **1,690** | **1,668** | **99%** | | | **23** | **C** |
| **Total** | **4,250** | **4,194** | **99%** | | | **22** | **C** |

*Node Letter: P VISSIM ID: 21*

*LOS Category: Signalized*

## 7: Main Street & 1600 South/2700 North

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Delay / LOS Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| NBT | 320 | 320 | 100% | 50 | 250 | 19 | B |
| NBR | 430 | 427 | 99% | 50 | 275 | 13 | B |
| **NB** | **750** | **747** | **100%** | | | **16** | **B** |
| SBL | 580 | 562 | 97% | 75 | 225 | 34 | C |
| SBT | 780 | 785 | 101% | 25 | 150 | 7 | A |
| **SB** | **1,360** | **1,347** | **99%** | | | **19** | **B** |
| WBL | 310 | 292 | 94% | 50 | 200 | 31 | C |
| WBR | 140 | 145 | 104% | 50 | 225 | 21 | C |
| **WB** | **450** | **437** | **97%** | | | **28** | **C** |
| **Total** | **2,560** | **2,531** | **99%** | | | **19** | **B** |

*Node Letter: C VISSIM ID: 3*

*LOS Category: Unsignalized*

## 8: SB West Frontage Road & 1600 South/2700 Nort

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Delay / LOS Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| SBL | 170 | 168 | 99% | 25 | 125 | 14 | B |
| SBT | 10 | 9 | 90% | 0 | 25 | 7 | A |
| SBR | 20 | 20 | 100% | 0 | 0 | 1 | A |
| **SB** | **200** | **197** | **99%** | | | **12** | **B** |
| EBL | 40 | 41 | 103% | 0 | 75 | 5 | A |
| **EB** | **40** | **41** | **103%** | | | **5** | **A** |
| WBR | 210 | 199 | 95% | 0 | 75 | 1 | A |
| **WB** | **210** | **199** | **95%** | | | **1** | **A** |
| **Total** | **450** | **437** | **97%** | | | **7** | **A** |

*Node Letter: D VISSIM ID: 4*

*LOS Category: Unsignalized*

## 9: NB West Frontage Road & 1600 South/2700 Nort

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Delay / LOS Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| NBL | 10 | 9 | 90% | 0 | 0 | 6 | A |
| NBT | 10 | 12 | **120%** | 0 | 50 | 22 | C |
| NBR | 130 | 129 | 99% | 0 | 50 | 2 | A |
| **NB** | **150** | **150** | **100%** | | | **4** | **A** |
| EBR | 20 | 20 | 100% | 0 | 25 | 3 | A |
| **EB** | **20** | **20** | **100%** | | | **3** | **A** |
| WBL | 100 | 102 | 102% | 0 | 125 | 6 | A |
| **WB** | **100** | **102** | **102%** | | | **6** | **A** |
| **Total** | **270** | **272** | **101%** | | | **5** | **A** |

*Node Letter: D VISSIM ID: 18*

*LOS Category: Unsignalized*

## 10: East Frontage Road & 1750 West

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Delay / LOS Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| NBL | 110 | 115 | 105% | 0 | 125 | 3 | A |
| **NB** | **110** | **115** | **105%** | | | **3** | **A** |
| SBR | 10 | 11 | 110% | 0 | 0 | 1 | A |
| **SB** | **10** | **11** | **110%** | | | **1** | **A** |
| EBL | 10 | 11 | 110% | 0 | 100 | 11 | B |
| EBR | 190 | 187 | 98% | 0 | 100 | 10 | B |
| **EB** | **200** | **198** | **99%** | | | **10** | **B** |
| **Total** | **320** | **324** | **101%** | | | **7** | **A** |

*Node Letter: E VISSIM ID: 5*

*LOS Category: Signalized*

## 11: 1750 West & 1600 South/2700 North

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Delay / LOS Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| SBL | 140 | 138 | 99% | 50 | 275 | 31 | C |
| SBR | 530 | 525 | 99% | 75 | 325 | 19 | B |
| **SB** | **670** | **663** | **99%** | | | **22** | **C** |
| EBL | 330 | 339 | 103% | 50 | 225 | 28 | C |
| EBT | 1,080 | 1,070 | 99% | 25 | 250 | 7 | A |
| **EB** | **1,410** | **1,409** | **100%** | | | **12** | **B** |
| WBT | 1,160 | 1,149 | 99% | 75 | 350 | 19 | B |
| WBR | 100 | 94 | 94% | 75 | 350 | 20 | C |
| **WB** | **1,260** | **1,243** | **99%** | | | **19** | **B** |
| **Total** | **3,340** | **3,315** | **99%** | | | **17** | **B** |

*Node Letter: F VISSIM ID: 6*

# II: 2050 PM Build SPUI - Main to 1200 West Widening

*LOS Category: Unsignalized*

## 12: SB Canyon Creek & 1600 South/2700 North

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| SBL | 30 | 28 | 93% | 0 | 50 | 12 | B |
| SBT | 40 | 38 | 95% | 25 | 150 | 35 | D |
| SBR | 220 | 220 | 100% | 25 | 150 | 14 | B |
| **SB** | **290** | **286** | **99%** | | | **17** | **C** |
| EBL | 110 | 104 | 95% | 0 | 125 | 7 | A |
| **EB** | **110** | **104** | **95%** | | | **7** | **A** |
| WBR | 20 | 20 | 100% | 0 | 0 | 1 | A |
| **WB** | **20** | **20** | **100%** | | | **1** | **A** |
| **Total** | **420** | **410** | **98%** | | | **13** | **B** |

*Node Letter: G VISSIM ID: 7*

*LOS Category: Unsignalized*

## 13: NB Canyon Creek & 1600 South/2700 North

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| NBL | 90 | 88 | 98% | 50 | 150 | 75 | F |
| NBT | 10 | 10 | 100% | 0 | 50 | 20 | C |
| NBR | 70 | 66 | 94% | 0 | 50 | 6 | A |
| **NB** | **170** | **164** | **96%** | | | **44** | **E** |
| EBR | 290 | 286 | 99% | 0 | 200 | 4 | A |
| **EB** | **290** | **286** | **99%** | | | **4** | **A** |
| WBL | 100 | 101 | 101% | 25 | 150 | 13 | B |
| **WB** | **100** | **101** | **101%** | | | **13** | **B** |
| **Total** | **560** | **551** | **98%** | | | **18** | **C** |

*Node Letter: G VISSIM ID: 19*

*LOS Category: Signalized*

## 14: 1200 West & 1600 South/2700 North

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| NBL | 230 | 229 | 100% | 50 | 250 | 34 | C |
| NBT | 200 | 202 | 101% | 25 | 225 | 19 | B |
| NBR | 270 | 265 | 98% | 50 | 250 | 18 | B |
| **NB** | **700** | **696** | **99%** | | | **24** | **C** |
| SBL | 10 | 8 | 80% | 0 | 25 | 32 | C |
| SBT | 370 | 369 | 100% | 75 | 250 | 32 | C |
| SBR | 130 | 126 | 97% | 75 | 250 | 25 | C |
| **SB** | **510** | **503** | **99%** | | | **30** | **C** |
| EBL | 50 | 46 | 92% | 0 | 50 | 32 | C |
| EBT | 740 | 734 | 99% | 125 | 650 | 24 | C |
| EBR | 130 | 128 | 98% | 150 | 650 | 9 | A |
| **EB** | **920** | **908** | **99%** | | | **22** | **C** |
| WBL | 90 | 89 | 99% | 25 | 100 | 36 | D |
| WBT | 710 | 700 | 99% | 100 | 525 | 21 | C |
| WBR | 10 | 8 | 80% | 0 | 25 | 9 | A |
| **WB** | **810** | **797** | **98%** | | | **22** | **C** |
| **Total** | **2,940** | **2,904** | **99%** | | | **24** | **C** |

*Node Letter: H VISSIM ID: 8*

*LOS Category: Unsignalized*

## 15: SB 950 West & 1600 South/2700 North

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| SBL | 90 | 89 | 99% | 100 | 375 | 52 | F |
| SBT | 20 | 20 | 100% | 100 | 375 | 53 | F |
| SBR | 140 | 135 | 96% | 75 | 375 | 43 | E |
| **SB** | **250** | **244** | **98%** | | | **47** | **E** |
| EBL | 140 | 140 | 100% | 0 | 125 | 6 | A |
| **EB** | **140** | **140** | **100%** | | | **6** | **A** |
| WBR | 20 | 19 | 95% | 0 | 0 | 4 | A |
| **WB** | **20** | **19** | **95%** | | | **4** | **A** |
| **Total** | **410** | **403** | **98%** | | | **31** | **D** |

*Node Letter: I VISSIM ID: 9*

# II: 2050 PM Build SPUI - Main to 1200 West Widening

*LOS Category: Unsignalized*

| 16: NB 950 West & 1600 South/2700 North | | | | | | Delay / LOS | |
|---|---|---|---|---|---|---|---|
| | | Volume | | Queue (ft) Avg / 95th | | Analysis Period | |
| Mvmt | Demand | Served | % Served | 5400-9000 | | 5400-9000 | |
| NBL | 20 | 20 | 100% | 0 | 50 | 9 | A |
| NBT | 20 | 18 | 90% | 0 | 50 | 10 | B |
| NBR | 10 | 11 | 110% | 0 | 25 | 2 | A |
| **NB** | **50** | **49** | **98%** | | | **8** | **A** |
| EBR | 30 | 27 | 90% | 0 | 25 | 2 | A |
| **EB** | **30** | **27** | **90%** | | | **2** | **A** |
| WBL | 10 | 9 | 90% | 0 | 50 | 10 | A |
| **WB** | **10** | **9** | **90%** | | | **10** | **B** |
| **Total** | **90** | **85** | **94%** | | | **6** | **A** |

*Node Letter: I VISSIM ID: 20*

*LOS Category: Signalized*

| 17: SR-51 & 1600 South/2700 North | | | | | | Delay / LOS | |
|---|---|---|---|---|---|---|---|
| | | Volume | | Queue (ft) Avg / 95th | | Analysis Period | |
| Mvmt | Demand | Served | % Served | 5400-9000 | | 5400-9000 | |
| NBL | 150 | 142 | 95% | 25 | 150 | 39 | D |
| NBT | 250 | 256 | 102% | 50 | 250 | 23 | C |
| NBR | 130 | 128 | 98% | 50 | 300 | 16 | B |
| **NB** | **530** | **526** | **99%** | | | **26** | **C** |
| SBL | 20 | 19 | 95% | 0 | 25 | 34 | C |
| SBT | 460 | 462 | 100% | 75 | 425 | 31 | C |
| SBR | 110 | 108 | 98% | 0 | 25 | 7 | A |
| **SB** | **590** | **589** | **100%** | | | **26** | **C** |
| EBL | 160 | 165 | 103% | 75 | 700 | 41 | D |
| EBT | 550 | 533 | 97% | 225 | 1,300 | 36 | D |
| EBR | 240 | 235 | 98% | 25 | 450 | 26 | C |
| **EB** | **950** | **933** | **98%** | | | **35** | **C** |
| WBL | 80 | 78 | 98% | 25 | 100 | 53 | D |
| WBT | 420 | 414 | 99% | 75 | 350 | 25 | C |
| WBR | 10 | 9 | 90% | 0 | 25 | 6 | A |
| **WB** | **510** | **501** | **98%** | | | **29** | **C** |
| **Total** | **2,580** | **2,549** | **99%** | | | **30** | **C** |

*Node Letter: J VISSIM ID: 10*

# II: 2050 AM Build SPUI - Main to 1200 West Widening

*LOS Category: Signalized*

## 1: SR- 77 (400 South) SPUI

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| NBL | 210 | 209 | 100% | 25 | 150 | 31 | C |
| NBR | 950 | 946 | 100% | 25 | 225 | 11 | B |
| **NB** | **1,160** | **1,155** | **100%** | | | **15** | **B** |
| SBL | 660 | 652 | 99% | 50 | 250 | 28 | C |
| SBR | 360 | 370 | 103% | 0 | 75 | 4 | A |
| **SB** | **1,020** | **1,022** | **100%** | | | **19** | **B** |
| EBL | 290 | 290 | 100% | 50 | 200 | 50 | D |
| EBT | 260 | 262 | 101% | 50 | 175 | 68 | E |
| EBR | 260 | 258 | 99% | 0 | 0 | 1 | A |
| **EB** | **810** | **810** | **100%** | | | **40** | **D** |
| WBL | 550 | 567 | 103% | 100 | 350 | 51 | D |
| WBT | 260 | 259 | 100% | 125 | 600 | 70 | E |
| WBR | 1,190 | 1,176 | 99% | 25 | 425 | 8 | A |
| **WB** | **2,000** | **2,002** | **100%** | | | **28** | **C** |
| **Total** | **4,990** | **4,989** | **100%** | | | **25** | **C** |

*Node Letter: A VISSIM ID: 1*

*LOS Category: Signalized*

## 3: Main Street & I-15 Ramps

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| NBL | 130 | 130 | 100% | 0 | 125 | 20 | C |
| NBT | 470 | 474 | 101% | 25 | 175 | 18 | B |
| NBR | 1,020 | 1,022 | 100% | 0 | 0 | 1 | A |
| **NB** | **1,620** | **1,626** | **100%** | | | **8** | **A** |
| SBL | 40 | 40 | 100% | 0 | 100 | 27 | C |
| SBT | 280 | 276 | 99% | 0 | 100 | 22 | C |
| SBR | 70 | 72 | 103% | 0 | 0 | 0 | A |
| **SB** | **390** | **388** | **99%** | | | **19** | **B** |
| EBL | 690 | 693 | 100% | 25 | 175 | 52 | D |
| EBR | 250 | 249 | 100% | 50 | 350 | 9 | A |
| **EB** | **940** | **942** | **100%** | | | **40** | **D** |
| WBL | 410 | 423 | 103% | 75 | 250 | 56 | E |
| WBT | 10 | 10 | 100% | 75 | 250 | 48 | D |
| WBR | 100 | 102 | 102% | 0 | 75 | 9 | A |
| **WB** | **520** | **535** | **103%** | | | **47** | **D** |
| **Total** | **3,470** | **3,491** | **101%** | | | **24** | **C** |

*Node Letter: K VISSIM ID: 11*

*LOS Category: Signalized*

## 4: Main Street & 1000 North

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| NBL | 10 | 10 | 100% | 0 | 0 | 8 | A |
| NBT | 1,350 | 1,350 | 100% | 25 | 275 | 11 | B |
| NBR | 160 | 157 | 98% | 0 | 50 | 4 | A |
| **NB** | **1,520** | **1,517** | **100%** | | | **10** | **B** |
| SBL | 180 | 176 | 98% | 50 | 150 | 62 | E |
| SBT | 740 | 744 | 101% | 0 | 75 | 3 | A |
| SBR | 20 | 21 | 105% | 0 | 25 | 2 | A |
| **SB** | **940** | **941** | **100%** | | | **14** | **B** |
| EBL | 40 | 39 | 98% | 0 | 75 | 52 | D |
| EBT | 20 | 18 | 90% | 0 | 50 | 66 | E |
| EBR | 10 | 10 | 100% | 25 | 100 | 5 | A |
| **EB** | **70** | **67** | **96%** | | | **49** | **D** |
| WBL | 70 | 69 | 99% | 50 | 125 | 63 | E |
| WBT | 20 | 20 | 100% | 0 | 50 | 56 | E |
| WBR | 230 | 230 | 100% | 0 | 100 | 8 | A |
| **WB** | **320** | **319** | **100%** | | | **23** | **C** |
| **Total** | **2,850** | **2,844** | **100%** | | | **14** | **B** |

*Node Letter: M VISSIM ID: 13*

*LOS Category: Signalized*

## 5: US-6 & 1000 North

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| NBL | 220 | 223 | 101% | 50 | 150 | 69 | E |
| NBT | 230 | 231 | 100% | 50 | 150 | 50 | D |
| NBR | 40 | 41 | 103% | 0 | 50 | 4 | A |
| **NB** | **490** | **495** | **101%** | | | **55** | **D** |
| SBL | 140 | 140 | 100% | 25 | 100 | 69 | E |
| SBT | 90 | 95 | 106% | 25 | 75 | 45 | D |
| SBR | 700 | 698 | 100% | 0 | 0 | 2 | A |
| **SB** | **930** | **933** | **100%** | | | **17** | **B** |
| EBL | 880 | 869 | 99% | 125 | 375 | 56 | E |
| EBT | 230 | 228 | 99% | 25 | 150 | 24 | C |
| EBR | 90 | 91 | 101% | 0 | 0 | 5 | A |
| **EB** | **1,200** | **1,188** | **99%** | | | **46** | **D** |
| WBL | 70 | 73 | 104% | 25 | 75 | 85 | F |
| WBT | 430 | 408 | 95% | 100 | 300 | 65 | E |
| WBR | 230 | 242 | 105% | 25 | 125 | 9 | A |
| **WB** | **730** | **723** | **99%** | | | **48** | **D** |
| **Total** | **3,350** | **3,339** | **100%** | | | **40** | **D** |

*Node Letter: O VISSIM ID: 15*

# II: 2050 AM Build SPUI - Main to 1200 West Widening

*LOS Category: Signalized*

## 6: 1600 South Interchange

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| NBL | 180 | 179 | 99% | 25 | 125 | 53 | D |
| NBR | 550 | 542 | 99% | 0 | 0 | 7 | A |
| **NB** | **730** | **721** | **99%** | | | **18** | **B** |
| SBL | 210 | 203 | 97% | 50 | 125 | 52 | D |
| SBR | 220 | 220 | 100% | 0 | 0 | 5 | A |
| **SB** | **430** | **423** | **98%** | | | **28** | **C** |
| EBL | 230 | 228 | 99% | 50 | 175 | 52 | D |
| EBT | 170 | 165 | 97% | 0 | 50 | 9 | A |
| EBR | 70 | 73 | 104% | 0 | 0 | 1 | A |
| **EB** | **470** | **466** | **99%** | | | **29** | **C** |
| WBL | 140 | 146 | 104% | 25 | 125 | 51 | D |
| WBT | 220 | 222 | 101% | 0 | 100 | 11 | B |
| WBR | 710 | 697 | 98% | 0 | 0 | 2 | A |
| **WB** | **1,070** | **1,065** | **100%** | | | **11** | **B** |
| **Total** | **2,700** | **2,675** | **99%** | | | **18** | **B** |

*Node Letter: P VISSIM ID: 21*

*LOS Category: Signalized*

## 7: Main Street & 1600 South/2700 North

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| NBT | 740 | 740 | 100% | 50 | 275 | 12 | B |
| NBR | 330 | 328 | 99% | 50 | 300 | 11 | B |
| **NB** | **1,070** | **1,068** | **100%** | | | **12** | **B** |
| SBL | 130 | 132 | 102% | 25 | 100 | 33 | C |
| SBT | 260 | 257 | 99% | 0 | 50 | 5 | A |
| **SB** | **390** | **389** | **100%** | | | **15** | **B** |
| WBL | 200 | 202 | 101% | 25 | 175 | 32 | C |
| WBR | 130 | 130 | 100% | 50 | 175 | 19 | B |
| **WB** | **330** | **332** | **101%** | | | **26** | **C** |
| **Total** | **1,790** | **1,789** | **100%** | | | **15** | **B** |

*Node Letter: C VISSIM ID: 3*

*LOS Category: Unsignalized*

## 8: SB West Frontage Road & 1600 South/2700 Nort

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| SBL | 20 | 18 | 90% | 0 | 0 | 2 | A |
| SBT | 10 | 8 | 80% | 0 | 25 | 7 | A |
| SBR | 10 | 11 | 110% | 0 | 0 | 0 | A |
| **SB** | **40** | **37** | **93%** | | | **3** | **A** |
| EBL | 60 | 63 | 105% | 0 | 100 | 4 | A |
| **EB** | **60** | **63** | **105%** | | | **4** | **A** |
| WBR | 210 | 208 | 99% | 0 | 75 | 1 | A |
| **WB** | **210** | **208** | **99%** | | | **1** | **A** |
| **Total** | **310** | **308** | **99%** | | | **2** | **A** |

*Node Letter: D VISSIM ID: 4*

*LOS Category: Unsignalized*

## 9: NB West Frontage Road & 1600 South/2700 Nort

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| NBL | 10 | 9 | 90% | 0 | 0 | 3 | A |
| NBT | 10 | 11 | 110% | 0 | 25 | 15 | B |
| NBR | 60 | 58 | 97% | 0 | 25 | 1 | A |
| **NB** | **80** | **78** | **98%** | | | **3** | **A** |
| EBR | 10 | 9 | 90% | 0 | 0 | 2 | A |
| **EB** | **10** | **9** | **90%** | | | **2** | **A** |
| WBL | 100 | 101 | 101% | 0 | 100 | 2 | A |
| **WB** | **100** | **101** | **101%** | | | **2** | **A** |
| **Total** | **190** | **188** | **99%** | | | **2** | **A** |

*Node Letter: D VISSIM ID: 18*

*LOS Category: Unsignalized*

## 10: East Frontage Road & 1750 West

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| NBL | 70 | 71 | 101% | 0 | 50 | 1 | A |
| **NB** | **70** | **71** | **101%** | | | **1** | **A** |
| EBR | 40 | 38 | 95% | 0 | 75 | 8 | A |
| **EB** | **40** | **38** | **95%** | | | **8** | **A** |
| **Total** | **110** | **109** | **99%** | | | **3** | **A** |

*Node Letter: E VISSIM ID: 5*

*LOS Category: Signalized*

## 11: 1750 West & 1600 South/2700 North

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| SBL | 30 | 27 | 90% | 0 | 75 | 34 | C |
| SBR | 140 | 141 | 101% | 0 | 100 | 9 | A |
| **SB** | **170** | **168** | **99%** | | | **13** | **B** |
| EBL | 310 | 308 | 99% | 25 | 150 | 14 | B |
| EBT | 620 | 604 | 97% | 0 | 75 | 1 | A |
| **EB** | **930** | **912** | **98%** | | | **6** | **A** |
| WBT | 930 | 923 | 99% | 25 | 225 | 7 | A |
| WBR | 120 | 118 | 98% | 25 | 225 | 8 | A |
| **WB** | **1,050** | **1,041** | **99%** | | | **7** | **A** |
| **Total** | **2,150** | **2,121** | **99%** | | | **7** | **A** |

*Node Letter: F VISSIM ID: 6*

# II: 2050 AM Build SPUI - Main to 1200 West Widening

*LOS Category: Unsignalized*

## 12: SB Canyon Creek & 1600 South/2700 North

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| SBL | 10 | 9 | 90% | 0 | 25 | 6 | A |
| SBT | 10 | 10 | 100% | 0 | 50 | 11 | B |
| SBR | 110 | 110 | 100% | 0 | 75 | 7 | A |
| **SB** | **130** | **129** | **99%** | | | **8** | **A** |
| EBL | 30 | 29 | 97% | 0 | 75 | 4 | A |
| **EB** | **30** | **29** | **97%** | | | **4** | **A** |
| WBR | 20 | 20 | 100% | 0 | 0 | 1 | A |
| **WB** | **20** | **20** | **100%** | | | **1** | **A** |
| **Total** | **180** | **178** | **99%** | | | **6** | **A** |

*Node Letter: G VISSIM ID: 7*

*LOS Category: Unsignalized*

## 13: NB Canyon Creek & 1600 South/2700 North

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| NBL | 50 | 50 | 100% | 0 | 50 | 14 | B |
| NBR | 10 | 8 | 80% | 0 | 25 | 5 | A |
| **NB** | **60** | **58** | **97%** | | | **13** | **B** |
| EBR | 220 | 212 | 96% | 0 | 50 | 2 | A |
| **EB** | **220** | **212** | **96%** | | | **2** | **A** |
| WBL | 40 | 41 | 103% | 0 | 75 | 5 | A |
| **WB** | **40** | **41** | **103%** | | | **5** | **A** |
| **Total** | **320** | **311** | **97%** | | | **4** | **A** |

*Node Letter: G VISSIM ID: 19*

*LOS Category: Signalized*

## 14: 1200 West & 1600 South/2700 North

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| NBL | 150 | 153 | 102% | 25 | 150 | 29 | C |
| NBT | 140 | 136 | 97% | 25 | 100 | 25 | C |
| NBR | 80 | 81 | 101% | 25 | 125 | 13 | B |
| **NB** | **370** | **370** | **100%** | | | **24** | **C** |
| SBL | 10 | 10 | 100% | 0 | 50 | 30 | C |
| SBT | 110 | 107 | 97% | 25 | 75 | 29 | C |
| SBR | 60 | 63 | 105% | 25 | 125 | 13 | B |
| **SB** | **180** | **180** | **100%** | | | **24** | **C** |
| EBL | 10 | 10 | 100% | 0 | 0 | 15 | B |
| EBT | 330 | 316 | 96% | 0 | 125 | 7 | A |
| EBR | 80 | 80 | 100% | 25 | 150 | 4 | A |
| **EB** | **420** | **406** | **97%** | | | **6** | **A** |
| WBL | 100 | 107 | 107% | 0 | 100 | 14 | B |
| WBT | 740 | 725 | 98% | 50 | 500 | 13 | B |
| WBR | 10 | 11 | 110% | 0 | 25 | 7 | A |
| **WB** | **850** | **843** | **99%** | | | **13** | **B** |
| **Total** | **1,820** | **1,799** | **99%** | | | **15** | **B** |

*Node Letter: H VISSIM ID: 8*

*LOS Category: Unsignalized*

## 15: SB 950 West & 1600 South/2700 North

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| SBL | 10 | 8 | 80% | 0 | 50 | 6 | A |
| SBT | 10 | 10 | 100% | 0 | 50 | 6 | A |
| SBR | 80 | 80 | 100% | 0 | 25 | 2 | A |
| **SB** | **100** | **98** | **98%** | | | **3** | **A** |
| EBL | 20 | 22 | 110% | 0 | 75 | 5 | A |
| **EB** | **20** | **22** | **110%** | | | **5** | **A** |
| WBR | 10 | 10 | 100% | 0 | 0 | 4 | A |
| **WB** | **10** | **10** | **100%** | | | **4** | **A** |
| **Total** | **130** | **130** | **100%** | | | **3** | **A** |

*Node Letter: I VISSIM ID: 9*

*LOS Category: Unsignalized*

## 16: NB 950 West & 1600 South/2700 North

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| NBL | 20 | 20 | 100% | 0 | 50 | 6 | A |
| NBT | 10 | 8 | 80% | 0 | 50 | 6 | A |
| NBR | 10 | 10 | 100% | 0 | 25 | 1 | A |
| **NB** | **40** | **38** | **95%** | | | **5** | **A** |
| EBR | 10 | 11 | 110% | 0 | 0 | 1 | A |
| **EB** | **10** | **11** | **110%** | | | **1** | **A** |
| WBL | 10 | 12 | **120%** | 0 | 25 | 5 | A |
| **WB** | **10** | **12** | **120%** | | | **5** | **A** |
| **Total** | **60** | **61** | **102%** | | | **4** | **A** |

*Node Letter: I VISSIM ID: 20*

# II: 2050 AM Build SPUI - Main to 1200 West Widening

*LOS Category: Signalized*

| 17: SR-51 & 1600 South/2700 North | | | | | | Delay / LOS | |
|---|---|---|---|---|---|---|---|
| | | Volume | | Queue (ft) Avg / 95th | | Analysis Period | |
| Mvmt | Demand | Served | % Served | 1800-5400 | | 1800-5400 | |
| NBL | 130 | 131 | 101% | 25 | 150 | 33 | C |
| NBT | 340 | 341 | 100% | 50 | 300 | 31 | C |
| NBR | 20 | 20 | 100% | 75 | 325 | 21 | C |
| **NB** | **490** | **492** | **100%** | | | **31** | **C** |
| SBL | 10 | 10 | 100% | 0 | 25 | 34 | C |
| SBT | 190 | 190 | 100% | 25 | 175 | 32 | C |
| SBR | 80 | 79 | 99% | 0 | 25 | 2 | A |
| **SB** | **280** | **279** | **100%** | | | **24** | **C** |
| EBL | 190 | 172 | 91% | 25 | 150 | 23 | C |
| EBT | 140 | 140 | 100% | 0 | 75 | 12 | B |
| EBR | 80 | 75 | 94% | 0 | 50 | 6 | A |
| **EB** | **410** | **387** | **94%** | | | **16** | **B** |
| WBL | 120 | 120 | 100% | 0 | 150 | 17 | B |
| WBT | 560 | 552 | 99% | 75 | 550 | 19 | B |
| WBR | 20 | 19 | 95% | 0 | 25 | 9 | A |
| **WB** | **700** | **691** | **99%** | | | **18** | **B** |
| **Total** | **1,880** | **1,849** | **98%** | | | **22** | **C** |

*Node Letter: J VISSIM ID: 10*

# VISSIM Travel Time Comparison

*Springville / Spanish Fork EA*

## 2050 Build 200 E to 1750 W. Widening AM

| 1600 South / 2700 North EB | Dist (mi) | Base FFS (mph) | # Veh | Travel Time (sec) | Travel Speed (mph) | LOS |
|---|---|---|---|---|---|---|
| Main Street to 200 East | 0.3 | 35 | 805 | 29 | 32 | A |
| 200 East to I-15 | 0.2 | 35 | 343 | 33 | 21 | C |
| I-15 to 1750 West | 0.2 | 35 | 501 | 27 | 30 | A |
| 1750 West to Wallace L | 0.3 | 35 | 719 | 38 | 32 | A |
| Wallace Lan to 1200 W | 0.2 | 35 | 571 | 31 | 24 | B |
| 1200 West to 950 West | 0.3 | 35 | 681 | 32 | 33 | A |
| 950 West to State Stree | 0.8 | 35 | 264 | 97 | 29 | A |
| Total | 2.3 | 35 | -- | 287 | 29 | A |

| 1600 South / 2700 North WB | Dist (mi) | Base FFS (mph) | # Veh | Travel Time (sec) | Travel Speed (mph) | LOS |
|---|---|---|---|---|---|---|
| State Street to 950 Wes | 0.8 | 35 | 1619 | 98 | 29 | A |
| 950 West to 1200 West | 0.3 | 35 | 1573 | 58 | 18 | D |
| 1200 West to Wallace L | 0.2 | 35 | 1874 | 36 | 21 | C |
| Wallace Lane to 1750 | 0.3 | 35 | 1906 | 67 | 18 | D |
| 1750 West to I-15 | 0.2 | 35 | 461 | 39 | 21 | C |
| I-15 to 200 East | 0.2 | 35 | 398 | 17 | 40 | A |
| 200 East to Main Street | 0.2 | 35 | 633 | 50 | 18 | D |
| Total | 2.3 | 35 | -- | 364 | 23 | C |

## 2050 Build 200 E to 1750 W. Widening PM

| 1600 South / 2700 North EB | Dist (mi) | Base FFS (mph) | # Veh | Travel Time (sec) | Travel Speed (mph) | LOS |
|---|---|---|---|---|---|---|
| Main Street to 200 East | 0.3 | 35 | 1778 | 45 | 21 | C |
| 200 East to I-15 | 0.2 | 35 | 763 | 136 | 5 | F |
| I-15 to 1750 West | 0.2 | 35 | 1004 | 140 | 6 | F |
| 1750 West to Wallace L | 0.3 | 35 | 1288 | 92 | 13 | E |
| Wallace Lan to 1200 W | 0.2 | 35 | 1086 | 98 | 8 | F |
| 1200 West to 950 West | 0.3 | 35 | 1384 | 75 | 14 | D |
| 950 West to State Stree | 0.8 | 35 | 864 | 112 | 25 | B |
| Total | 2.3 | 35 | -- | 698 | 12 | E |

| 1600 South / 2700 North WB | Dist (mi) | Base FFS (mph) | # Veh | Travel Time (sec) | Travel Speed (mph) | LOS |
|---|---|---|---|---|---|---|
| State Street to 950 Wes | 0.8 | 35 | 1255 | 192 | 15 | D |
| 950 West to 1200 West | 0.3 | 35 | 1258 | 164 | 6 | F |
| 1200 West to Wallace L | 0.2 | 35 | 1726 | 77 | 10 | F |
| Wallace Lane to 1750 | 0.3 | 35 | 1894 | 114 | 10 | F |
| 1750 West to I-15 | 0.2 | 35 | 650 | 50 | 17 | D |
| I-15 to 200 East | 0.2 | 35 | 522 | 20 | 34 | A |
| 200 East to Main Street | 0.2 | 35 | 751 | 53 | 17 | D |
| Total | 2.3 | 35 | -- | 671 | 12 | E |

# VISSIM Travel Time Comparison

*Springville / Spanish Fork EA*

## 2050 Build Main to 1200 W. Widening AM

| 1600 South / 2700 North EB | Dist (mi) | Base FFS (mph) | # Veh | Travel Time (sec) | Travel Speed (mph) | LOS |
|---|---|---|---|---|---|---|
| Main Street to 200 East | 0.3 | 35 | 805 | 29 | 33 | A |
| 200 East to I-15 | 0.2 | 35 | 343 | 32 | 21 | C |
| I-15 to 1750 West | 0.2 | 35 | 501 | 24 | 34 | A |
| 1750 West to Wallace L | 0.3 | 35 | 720 | 36 | 34 | A |
| Wallace Lan to 1200 W | 0.2 | 35 | 572 | 29 | 26 | B |
| 1200 West to 950 West | 0.3 | 35 | 681 | 32 | 33 | A |
| 950 West to State Stree | 0.8 | 35 | 263 | 98 | 29 | A |
| Total | 2.3 | 35 | -- | 279 | 30 | A |

| 1600 South / 2700 North WB | Dist (mi) | Base FFS (mph) | # Veh | Travel Time (sec) | Travel Speed (mph) | LOS |
|---|---|---|---|---|---|---|
| State Street to 950 Wes | 0.8 | 35 | 1640 | 90 | 32 | A |
| 950 West to 1200 West | 0.3 | 35 | 1619 | 46 | 23 | C |
| 1200 West to Wallace L | 0.2 | 35 | 1924 | 22 | 34 | A |
| Wallace Lane to 1750 | 0.3 | 35 | 1984 | 44 | 27 | B |
| 1750 West to I-15 | 0.2 | 35 | 476 | 40 | 21 | C |
| I-15 to 200 East | 0.2 | 35 | 403 | 17 | 40 | A |
| 200 East to Main Street | 0.2 | 35 | 639 | 49 | 18 | D |
| Total | 2.3 | 35 | -- | 308 | 27 | B |

## 2050 Build Main to 1200 W. Widening PM

| 1600 South / 2700 North EB | Dist (mi) | Base FFS (mph) | # Veh | Travel Time (sec) | Travel Speed (mph) | LOS |
|---|---|---|---|---|---|---|
| Main Street to 200 East | 0.3 | 35 | 1849 | 30 | 32 | A |
| 200 East to I-15 | 0.2 | 35 | 825 | 40 | 17 | D |
| I-15 to 1750 West | 0.2 | 35 | 1108 | 29 | 28 | A |
| 1750 West to Wallace L | 0.3 | 35 | 1550 | 38 | 32 | A |
| Wallace Lan to 1200 W | 0.2 | 35 | 1362 | 41 | 18 | C |
| 1200 West to 950 West | 0.3 | 35 | 1625 | 33 | 32 | A |
| 950 West to State Stree | 0.8 | 35 | 1028 | 116 | 24 | B |
| Total | 2.3 | 35 | -- | 327 | 25 | B |

| 1600 South / 2700 North WB | Dist (mi) | Base FFS (mph) | # Veh | Travel Time (sec) | Travel Speed (mph) | LOS |
|---|---|---|---|---|---|---|
| State Street to 950 Wes | 0.8 | 35 | 1257 | 89 | 32 | A |
| 950 West to 1200 West | 0.3 | 35 | 1352 | 49 | 21 | C |
| 1200 West to Wallace L | 0.2 | 35 | 1811 | 22 | 34 | A |
| Wallace Lane to 1750 | 0.3 | 35 | 2197 | 52 | 23 | C |
| 1750 West to I-15 | 0.2 | 35 | 730 | 46 | 18 | D |
| I-15 to 200 East | 0.2 | 35 | 595 | 17 | 40 | A |
| 200 East to Main Street | 0.2 | 35 | 829 | 52 | 17 | D |
| Total | 2.3 | 35 | -- | 327 | 25 | B |

# 2035 Build AM - IACR Update Mar21

*I-15 Spanish Fork/Springville Interchange Study*

**Link Peak Results**

*Number of Runs: 10*

## I15 NB

V: Speed (mph), K: Density (vpmpl), and LOS

| ID | Location | Seg Type | Ln | Q: Hr Flow Rate / Lane Demand | Served | % Served | Length (ft) | Max 15-min. Interval V | K | LOS | Begin | Segment Peak Hour V | K | LOS | Begin | Peak Hour: 07:00 V | K | LOS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | ML - North of 400 South | B | 4.2 | 1,610 | 1,600 | 99% | 6,150 | 66 | 26.9 | D | 07:30 | 67 | 25.5 | C | 07:00 | 67 | 25.5 | C |
| 2 | ML - 400 S On Ramp | M | 5.7 | 1,200 | 1,190 | 99% | 1,525 | 66 | 14.5 | B | 07:30 | 67 | 13.6 | B | 07:00 | 67 | 13.6 | B |
| 3 | ML - 400 S | B | 5.0 | 1,340 | 1,330 | 100% | 2,475 | 67 | 22.5 | C | 07:30 | 67 | 21.1 | C | 07:00 | 67 | 21.1 | C |
| 4 | ML - 400 S Off Ramp | D | 5.0 | 1,300 | 1,290 | 99% | 1,500 | 67 | 15.8 | B | 07:30 | 67 | 14.6 | B | 07:15 | 67 | 14.5 | B |
| 5 | ML - 1600 S to 400 S | B | 5.0 | 1,300 | 1,280 | 98% | 350 | 67 | 21.1 | C | 07:30 | 68 | 19.6 | C | 07:00 | 68 | 19.6 | C |
| 6 | ML - 1600 S On Ramp | M | 5.0 | 1,300 | 1,290 | 100% | 1,500 | 67 | 18.8 | B | 07:30 | 68 | 17.4 | B | 07:00 | 68 | 17.4 | B |
| 7 | ML - 1600 S | B | 4.4 | 1,630 | 1,500 | 92% | 2,550 | 63 | 26.5 | D | 07:30 | 64 | 24.4 | C | 07:00 | 64 | 24.4 | C |
| 8 | ML - 1600 S Off Ramp | D | 5.0 | 1,520 | 1,520 | 100% | 1,500 | 64 | 27.8 | C | 07:30 | 66 | 25.0 | C | 07:00 | 66 | 25.0 | C |
| 9 | ML - US 6 to 1600 S | B | 5.0 | 1,520 | 1,520 | 100% | 875 | 66 | 26.0 | C | 07:30 | 66 | 23.9 | C | 07:00 | 66 | 23.9 | C |
| 10 | ML - US 6 On Ramp | M | 5.8 | 1,310 | 1,310 | 100% | 1,500 | 64 | 20.3 | C | 07:30 | 65 | 18.5 | B | 07:00 | 65 | 18.5 | B |
| 11 | ML - Main St. On Ramp | M | 4.0 | 1,340 | 1,310 | 98% | 1,325 | 68 | 21.4 | C | 07:30 | 68 | 19.7 | B | 07:00 | 68 | 19.7 | B |
| 12 | ML - Main St. | B | 3.0 | 1,450 | 1,430 | 98% | 4,200 | 66 | 24.4 | C | 07:30 | 67 | 22.2 | C | 07:00 | 67 | 22.2 | C |
| 13 | ML - Main St. Off Ramp | D | 3.0 | 1,720 | 1,720 | 100% | 1,500 | 58 | 36.3 | E | 07:30 | 62 | 31.0 | D | 07:00 | 62 | 31.0 | D |
| 14 | ML - South of Main St. | B | 3.0 | 1,720 | 1,720 | 100% | 5,975 | 66 | 30.1 | D | 07:30 | 67 | 27.1 | D | 07:00 | 67 | 27.1 | D |
| | **Urban Facility** | **U** | **4.1** | **1,540** | **1,520** | **99%** | **32,900** | **66** | **24.4** | C | **07:30** | **66** | **22.5** | C | **07:00** | **66** | **22.5** | C |

## I15 SB

V: Speed (mph), K: Density (vpmpl), and LOS

| ID | Location | Seg Type | Ln | Q: Hr Flow Rate / Lane Demand | Served | % Served | Length (ft) | Max 15-min. Interval V | K | LOS | Begin | Segment Peak Hour V | K | LOS | Begin | Peak Hour: 08:00 V | K | LOS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 15 | ML - North of 400 South | B | 5.0 | 750 | 750 | 100% | 5,325 | 69 | 11.7 | B | 07:30 | 69 | 11.1 | B | 08:00 | 69 | 11.1 | B |
| 16 | ML - 400 S Off Ramp | D | 6.0 | 630 | 630 | 100% | 1,500 | 69 | 6.6 | A | 08:45 | 69 | 6.2 | A | 08:00 | 69 | 6.2 | A |
| 17 | ML - 400 S | B | 5.0 | 620 | 620 | 100% | 2,525 | 69 | 9.7 | A | 07:30 | 69 | 9.0 | A | 07:15 | 69 | 8.9 | A |
| 18 | ML - 400 S On Ramp | M | 5.6 | 630 | 630 | 100% | 1,500 | 66 | 9.5 | A | 07:30 | 66 | 9.1 | A | 07:30 | 66 | 9.1 | A |
| 19 | ML - 400 S to 1600 S | B | 5.0 | 700 | 700 | 100% | 675 | 69 | 10.9 | A | 07:30 | 69 | 10.4 | A | 07:30 | 69 | 10.3 | A |
| 20 | ML - 1600 S Off Ramp | D | 4.3 | 820 | 820 | 100% | 1,500 | 67 | 12.5 | B | 07:30 | 67 | 12.0 | B | 07:30 | 68 | 11.9 | B |
| 21 | ML - 1600 S Off Ramp to US 6 | B | 5.0 | 660 | 650 | 100% | 2,975 | 69 | 10.2 | A | 07:30 | 69 | 9.6 | A | 07:15 | 69 | 9.6 | A |
| 22 | ML - US 6 Off Ramp | D | 5.0 | 660 | 650 | 99% | 1,500 | 68 | 9.8 | A | 07:30 | 69 | 9.4 | A | 07:15 | 69 | 9.4 | A |
| 23 | ML - US 6 to Main St. | B | 3.0 | 650 | 660 | 102% | 6,275 | 69 | 10.0 | A | 07:30 | 69 | 9.6 | A | 07:30 | 69 | 9.6 | A |
| 24 | ML - Main St. On Ramp | M | 4.5 | 550 | 550 | 100% | 1,500 | 68 | 8.8 | A | 08:45 | 68 | 8.5 | A | 07:30 | 68 | 8.5 | A |
| 25 | ML - South of Main St. | B | 3.0 | 820 | 820 | 100% | 5,575 | 69 | 12.5 | B | 08:45 | 69 | 12.0 | B | 07:30 | 69 | 12.0 | B |
| | **Urban Facility** | **U** | **4.2** | **730** | **730** | **100%** | **30,825** | **69** | **10.4** | A | **07:30** | **69** | **9.9** | A | **08:00** | **69** | **9.9** | A |

## I15_Exp. NB

V: Speed (mph), K: Density (vpmpl), and LOS

| ID | Location | Seg Type | Ln | Q: Hr Flow Rate / Lane Demand | Served | % Served | Length (ft) | Max 15-min. Interval V | K | LOS | Begin | Segment Peak Hour V | K | LOS | Begin | Peak Hour: 07:00 V | K | LOS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 26 | HOV -North of 400 S | B | 1.0 | 1,000 | 1,000 | 101% | 2,900 | 66 | 17.8 | B | 07:30 | 66 | 16.2 | B | 07:00 | 66 | 16.2 | B |
| 27 | HOV -1600 S to 400 S | B | 1.0 | 950 | 960 | 101% | 4,975 | 67 | 16.7 | B | 07:30 | 67 | 15.3 | B | 07:00 | 67 | 15.3 | B |
| | **Urban Facility** | **U** | **1.0** | **970** | **970** | **101%** | **7,875** | **66** | **17.1** | B | **07:30** | **67** | **15.6** | B | **07:00** | **67** | **15.6** | B |

## I15_Exp. SB

V: Speed (mph), K: Density (vpmpl), and LOS

| ID | Location | Seg Type | Ln | Q: Hr Flow Rate / Lane Demand | Served | % Served | Length (ft) | Max 15-min. Interval V | K | LOS | Begin | Segment Peak Hour V | K | LOS | Begin | Peak Hour: 07:00 V | K | LOS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 28 | HOV - North of 400 S | B | 1.0 | 130 | 130 | 99% | 6,825 | 69 | 2.1 | A | 07:30 | 69 | 1.9 | A | 07:00 | 69 | 1.9 | A |
| 29 | HOV - 400 S to 1600 S | B | 1.0 | 100 | 100 | 97% | 875 | 69 | 1.6 | A | 07:30 | 69 | 1.5 | A | 07:00 | 69 | 1.5 | A |
| | **Urban Facility** | **U** | **1.0** | **130** | **130** | **99%** | **7,725** | **69** | **2.0** | A | **07:30** | **69** | **1.9** | A | **07:00** | **69** | **1.9** | A |

# II: 2035 AM No Build

*LOS Category: Signalized*

## 1: SR-77 (400 South) SPUI

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| NBL | 120 | 118 | 98% | 0 | 75 | 17 | B |
| NBR | 630 | 620 | 98% | 25 | 425 | 6 | A |
| **NB** | **750** | **738** | **98%** | | | **8** | **A** |
| SBL | 580 | 572 | 99% | 75 | 500 | 18 | B |
| SBR | 260 | 272 | 105% | 0 | 0 | 4 | A |
| **SB** | **840** | **844** | **100%** | | | **14** | **B** |
| EBL | 150 | 149 | 99% | 25 | 125 | 61 | E |
| EBT | 160 | 157 | 98% | 50 | 125 | 66 | E |
| EBR | 120 | 118 | 98% | 0 | 0 | 2 | A |
| **EB** | **430** | **424** | **99%** | | | **47** | **D** |
| WBL | 450 | 462 | 103% | 100 | 350 | 64 | E |
| WBT | 210 | 210 | 100% | 75 | 275 | 68 | E |
| WBR | 1,100 | 1,092 | 99% | 0 | 0 | 4 | A |
| **WB** | **1,760** | **1,764** | **100%** | | | **27** | **C** |
| **Total** | **3,780** | **3,770** | **100%** | | | **23** | **C** |

*Node Letter: A VISSIM ID: 1*

*LOS Category: Signalized*

## 2: SR-77 (400 South) & 1750 West

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| NBL | 260 | 267 | 103% | 100 | 275 | 72 | E |
| NBT | 160 | 153 | 96% | 50 | 250 | 64 | E |
| NBR | 60 | 60 | 100% | 0 | 50 | 5 | A |
| **NB** | **480** | **480** | **100%** | | | **61** | **E** |
| SBL | 40 | 39 | 98% | 25 | 75 | 71 | E |
| SBT | 30 | 30 | 100% | 25 | 75 | 75 | E |
| SBR | 180 | 180 | 100% | 0 | 100 | 11 | B |
| **SB** | **250** | **249** | **100%** | | | **28** | **C** |
| EBL | 270 | 262 | 97% | 125 | 450 | 94 | F |
| EBT | 880 | 869 | 99% | 25 | 175 | 13 | B |
| EBR | 220 | 219 | 100% | 50 | 375 | 6 | A |
| **EB** | **1,370** | **1,350** | **99%** | | | **27** | **C** |
| WBL | 90 | 89 | 99% | 25 | 75 | 71 | E |
| WBT | 1,320 | 1,314 | 100% | 50 | 275 | 16 | B |
| WBR | 30 | 31 | 103% | 50 | 300 | 16 | B |
| **WB** | **1,440** | **1,434** | **100%** | | | **20** | **B** |
| **Total** | **3,540** | **3,513** | **99%** | | | **29** | **C** |

*Node Letter: B VISSIM ID: 2*

*LOS Category: Signalized*

## 4: Main Street & I-15 Ramps

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| NBL | 110 | 113 | 103% | 25 | 300 | 14 | B |
| NBT | 680 | 682 | 100% | 25 | 300 | 23 | C |
| NBR | 1,000 | 1,006 | 101% | 0 | 0 | 3 | A |
| **NB** | **1,790** | **1,801** | **101%** | | | **11** | **B** |
| SBL | 30 | 30 | 100% | 0 | 75 | 28 | C |
| SBT | 250 | 249 | 100% | 0 | 75 | 10 | A |
| SBR | 70 | 73 | 104% | 0 | 0 | 0 | A |
| **SB** | **350** | **352** | **101%** | | | **9** | **A** |
| EBL | 460 | 471 | 102% | 175 | 425 | 101 | F |
| EBR | 130 | 131 | 101% | 100 | 400 | 13 | B |
| **EB** | **590** | **602** | **102%** | | | **81** | **F** |
| WBL | 300 | 302 | 101% | 75 | 200 | 56 | E |
| WBT | 10 | 10 | 100% | 75 | 200 | 53 | D |
| WBR | 110 | 116 | 105% | 0 | 100 | 15 | B |
| **WB** | **420** | **428** | **102%** | | | **45** | **D** |
| **Total** | **3,150** | **3,183** | **101%** | | | **29** | **C** |

*Node Letter: K VISSIM ID: 11*

*LOS Category: Signalized*

## 5: Main Street & 1000 North

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| NBL | 10 | 10 | 100% | 0 | 0 | 9 | A |
| NBT | 1,490 | 1,490 | 100% | 25 | 175 | 6 | A |
| NBR | 200 | 197 | 99% | 0 | 0 | 4 | A |
| **NB** | **1,700** | **1,697** | **100%** | | | **6** | **A** |
| SBL | 100 | 99 | 99% | 0 | 75 | 24 | C |
| SBT | 560 | 569 | 102% | 0 | 75 | 2 | A |
| SBR | 20 | 18 | 90% | 0 | 25 | 3 | A |
| **SB** | **680** | **686** | **101%** | | | **6** | **A** |
| EBL | 40 | 39 | 98% | 0 | 75 | 53 | D |
| EBT | 20 | 18 | 90% | 0 | 50 | 66 | E |
| EBR | 10 | 11 | 110% | 0 | 50 | 5 | A |
| **EB** | **70** | **68** | **97%** | | | **48** | **D** |
| WBL | 110 | 111 | 101% | 25 | 100 | 61 | E |
| WBT | 20 | 19 | 95% | 0 | 50 | 51 | D |
| WBR | 260 | 255 | 98% | 25 | 125 | 11 | B |
| **WB** | **390** | **385** | **99%** | | | **27** | **C** |
| **Total** | **2,840** | **2,836** | **100%** | | | **10** | **A** |

*Node Letter: M VISSIM ID: 13*

# II: 2035 AM No Build

*LOS Category: Signalized*

## 6: US-6 Interchange

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| NBR | 480 | 471 | 98% | 0 | 0 | 4 | A |
| **NB** | **480** | **471** | **98%** | | | **4** | **A** |
| SBL | 1,070 | 1,060 | 99% | 0 | 175 | 6 | A |
| **SB** | **1,070** | **1,060** | **99%** | | | **6** | **A** |
| WBL | 220 | 212 | 96% | 50 | 175 | 80 | E |
| WBR | 2,290 | 2,268 | 99% | 0 | 0 | 7 | A |
| **WB** | **2,510** | **2,480** | **99%** | | | **14** | **B** |
| **Total** | **4,060** | **4,011** | **99%** | | | **10** | **B** |

*Node Letter: N VISSIM ID: 14*

*LOS Category: Signalized*

## 7: US-6 & 1000 North

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| NBL | 120 | 120 | 100% | 50 | 175 | 45 | D |
| NBT | 220 | 210 | 95% | 50 | 150 | 59 | E |
| NBR | 40 | 42 | 105% | 0 | 75 | 6 | A |
| **NB** | **380** | **372** | **98%** | | | **49** | **D** |
| SBL | 170 | 172 | 101% | 50 | 150 | 58 | E |
| SBT | 150 | 147 | 98% | 25 | 100 | 48 | D |
| SBR | 410 | 411 | 100% | 0 | 0 | 2 | A |
| **SB** | **730** | **730** | **100%** | | | **25** | **C** |
| EBL | 560 | 562 | 100% | 175 | 550 | 87 | F |
| EBT | 900 | 878 | 98% | 25 | 175 | 13 | B |
| EBR | 90 | 90 | 100% | 0 | 50 | 4 | A |
| **EB** | **1,550** | **1,530** | **99%** | | | **40** | **D** |
| WBL | 110 | 110 | 100% | 25 | 125 | 52 | D |
| WBT | 1,980 | 1,929 | 97% | 325 | 1,150 | 55 | E |
| WBR | 240 | 237 | 99% | 0 | 100 | 34 | C |
| **WB** | **2,330** | **2,276** | **98%** | | | **53** | **D** |
| **Total** | **4,990** | **4,908** | **98%** | | | **44** | **D** |

*Node Letter: O VISSIM ID: 15*

*LOS Category: Signalized*

## 8: Main Street & 1600 South/2700 North

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| NBT | 860 | 851 | 99% | 0 | 150 | 4 | A |
| NBR | 160 | 165 | 103% | 0 | 150 | 4 | A |
| **NB** | **1,020** | **1,016** | **100%** | | | **4** | **A** |
| SBL | 90 | 89 | 99% | 0 | 100 | 12 | B |
| SBT | 280 | 281 | 100% | 0 | 50 | 3 | A |
| **SB** | **370** | **370** | **100%** | | | **5** | **A** |
| WBL | 110 | 110 | 100% | 25 | 150 | 53 | D |
| WBR | 120 | 120 | 100% | 25 | 150 | 6 | A |
| **WB** | **230** | **230** | **100%** | | | **28** | **C** |
| **Total** | **1,620** | **1,616** | **100%** | | | **8** | **A** |

*Node Letter: C VISSIM ID: 3*

*LOS Category: Unsignalized*

## 9: SB West Frontage Road & 1600 South/2700 Nort

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| SBL | 10 | 10 | 100% | 0 | 50 | 7 | A |
| SBT | 10 | 10 | 100% | 0 | 50 | 7 | A |
| SBR | 10 | 10 | 100% | 0 | 50 | 6 | A |
| **SB** | **30** | **30** | **100%** | | | **6** | **A** |
| **Total** | **30** | **30** | **100%** | | | **6** | **A** |

*Node Letter: D VISSIM ID: 4*

*LOS Category: Unsignalized*

## 10: NB West Frontage Road & 1600 South/2700 Nor

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| NBL | 10 | 10 | 100% | 0 | 50 | 8 | A |
| NBT | 10 | 10 | 100% | 0 | 50 | 7 | A |
| NBR | 20 | 18 | 90% | 0 | 75 | 6 | A |
| **NB** | **40** | **38** | **95%** | | | **7** | **A** |
| **Total** | **40** | **38** | **95%** | | | **7** | **A** |

*Node Letter: D VISSIM ID: 19*

*LOS Category: Unsignalized*

## 11: East Frontage Road & 1750 West

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| SBL | 20 | 22 | 110% | 0 | 75 | 11 | B |
| SBR | 30 | 28 | 93% | 0 | 75 | 7 | A |
| **SB** | **50** | **50** | **100%** | | | **9** | **A** |
| **Total** | **50** | **50** | **100%** | | | **9** | **A** |

*Node Letter: E VISSIM ID: 5*

# II: 2035 AM No Build

*LOS Category: Unsignalized*

## 12: 1750 West & 1600 South/2700 North

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| SBL | 40 | 39 | 98% | 0 | 50 | 7 | A |
| SBR | 30 | 31 | 103% | 0 | 50 | 7 | A |
| **SB** | **70** | **70** | **100%** | | | **7** | **A** |
| **Total** | **70** | **70** | **100%** | | | **7** | **A** |

*Node Letter: F VISSIM ID: 6*

*LOS Category: Unsignalized*

## 13: SB Canyon Creek Pkwy & 1600 South/2700 Nort

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| SBL | 10 | 9 | 90% | 0 | 50 | 6 | A |
| SBT | 10 | 10 | 100% | 0 | 50 | 6 | A |
| SBR | 80 | 80 | 100% | 0 | 50 | 6 | A |
| **SB** | **100** | **99** | **99%** | | | **6** | **A** |
| **Total** | **100** | **99** | **99%** | | | **6** | **A** |

*Node Letter: G VISSIM ID: 7*

*LOS Category: Signalized*

## 14: NB Canyon Creek Pkwy & 1600 South/2700 Nort

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| NBL | 80 | 77 | 96% | 0 | 75 | 11 | B |
| NBT | 50 | 52 | 104% | 0 | 75 | 10 | A |
| NBR | 40 | 39 | 98% | 0 | 75 | 9 | A |
| **NB** | **170** | **168** | **99%** | | | **10** | **B** |
| **Total** | **170** | **168** | **99%** | | | **10** | **B** |

*Node Letter: G VISSIM ID: 18*

*LOS Category: Signalized*

## 15: 1200 West & 1600 South/2700 North

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| NBL | 20 | 19 | 95% | 0 | 25 | 26 | C |
| NBT | 280 | 283 | 101% | 25 | 150 | 29 | C |
| NBR | 50 | 48 | 96% | 50 | 175 | 19 | B |
| **NB** | **350** | **350** | **100%** | | | **28** | **C** |
| SBL | 10 | 11 | 110% | 0 | 25 | 23 | C |
| SBT | 130 | 130 | 100% | 25 | 75 | 27 | C |
| SBR | 30 | 29 | 97% | 25 | 100 | 16 | B |
| **SB** | **170** | **170** | **100%** | | | **25** | **C** |
| EBL | 10 | 10 | 100% | 0 | 25 | 5 | A |
| EBT | 150 | 148 | 99% | 0 | 75 | 5 | A |
| EBR | 10 | 10 | 100% | 0 | 75 | 2 | A |
| **EB** | **170** | **168** | **99%** | | | **5** | **A** |
| WBL | 100 | 96 | 96% | 0 | 50 | 6 | A |
| WBT | 170 | 170 | 100% | 0 | 75 | 6 | A |
| WBR | 20 | 20 | 100% | 0 | 100 | 4 | A |
| **WB** | **290** | **286** | **99%** | | | **6** | **A** |
| **Total** | **980** | **974** | **99%** | | | **17** | **B** |

*Node Letter: H VISSIM ID: 8*

*LOS Category: Unsignalized*

## 16: SB 950 West & 1600 South/2700 North

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| SBL | 30 | 29 | 97% | 0 | 25 | 2 | A |
| SBT | 10 | 9 | 90% | 0 | 25 | 5 | A |
| SBR | 50 | 50 | 100% | 0 | 0 | 1 | A |
| **SB** | **90** | **88** | **98%** | | | **2** | **A** |
| **Total** | **90** | **88** | **98%** | | | **2** | **A** |

*Node Letter: I VISSIM ID: 9*

*LOS Category: Unsignalized*

## 17: NB 950 West & 1600 South/2700 North

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| NBL | 10 | 9 | 90% | 0 | 0 | 1 | A |
| NBT | 10 | 10 | 100% | 0 | 0 | 1 | A |
| NBR | 10 | 10 | 100% | 0 | 0 | 1 | A |
| **NB** | **30** | **29** | **97%** | | | **1** | **A** |
| **Total** | **30** | **29** | **97%** | | | **1** | **A** |

*Node Letter: I VISSIM ID: 21*

# II: 2035 AM No Build

*LOS Category: Signalized*

| 18: SR-51 (State Street) & 1600 South/2700 North | | | | | | Delay / LOS | |
|---|---|---|---|---|---|---|---|
| | | Volume | | Queue (ft) Avg / 95th | | Analysis Period | |
| Mvmt | Demand | Served | % Served | 1800-5400 | | 1800-5400 | |
| NBL | 160 | 158 | 99% | 0 | 125 | 11 | B |
| NBT | 400 | 398 | 100% | 0 | 125 | 9 | A |
| **NB** | **560** | **556** | **99%** | | | **9** | **A** |
| SBT | 190 | 194 | 102% | 0 | 75 | 9 | A |
| SBR | 130 | 125 | 96% | 0 | 25 | 2 | A |
| **SB** | **320** | **319** | **100%** | | | **6** | **A** |
| EBL | 100 | 99 | 99% | 25 | 100 | 28 | C |
| EBR | 110 | 107 | 97% | 0 | 75 | 9 | A |
| **EB** | **210** | **206** | **98%** | | | **18** | **B** |
| **Total** | **1,090** | **1,081** | **99%** | | | **10** | **B** |

*Node Letter: J VISSIM ID: 10*

# 2035 No Build PM - IACR Update Mar21

*I-15 Spanish Fork/Springville Interchange Study*

**Link Peak Results**

*Number of Runs: 10*

## I15 NB

V: Speed (mph), K: Density (vpmpl), and LOS

| ID | Location | Seg Type | Ln | Q: Hr Flow Rate / Lane Demand | Served | % Served | Length (ft) | Max 15-min. Interval V | K | LOS | Begin | Segment Peak Hour V | K | LOS | Begin | Peak Hour: 16:15 V | K | LOS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | ML - South of Main St. | B | 3.0 | 1,240 | 1,240 | 100% | 5,975 | 68 | 19.1 | C | 16:15 | 68 | 18.5 | C | 16:15 | 68 | 18.5 | C |
| 2 | ML - South of Main St. | D | 3.0 | 1,240 | 1,240 | 100% | 1,500 | 66 | 20.9 | C | 16:15 | 67 | 20.2 | C | 16:15 | 67 | 20.2 | C |
| 3 | ML - Main St. | B | 3.0 | 1,000 | 990 | 99% | 4,200 | 68 | 15.2 | B | 16:15 | 68 | 14.8 | B | 16:15 | 68 | 14.8 | B |
| 4 | ML - Main St. to US 6 | M | 3.6 | 1,060 | 1,050 | 98% | 1,325 | 68 | 16.2 | B | 17:00 | 68 | 15.6 | B | 16:15 | 68 | 15.6 | B |
| 5 | ML - US 6 to 400 S before HOV | M | 5.0 | 1,060 | 1,050 | 100% | 1,500 | 68 | 11.5 | B | 17:00 | 68 | 11.2 | B | 16:15 | 68 | 11.2 | B |
| 6 | ML - US 6 to 400 S before HOV | B | 5.0 | 1,060 | 1,050 | 100% | 3,300 | 68 | 16.0 | B | 17:00 | 68 | 15.7 | B | 16:15 | 68 | 15.7 | B |
| 7 | ML - US 6 to 400 S | B | 4.0 | 1,170 | 1,160 | 100% | 3,475 | 68 | 17.7 | B | 17:00 | 68 | 17.2 | B | 16:15 | 68 | 17.2 | B |
| 8 | ML - US 6 to 400 S | D | 5.0 | 940 | 930 | 100% | 1,500 | 69 | 12.3 | B | 17:00 | 68 | 11.9 | B | 16:15 | 69 | 11.9 | B |
| 9 | ML - 400 S | B | 5.0 | 880 | 870 | 99% | 2,475 | 69 | 13.1 | B | 17:00 | 69 | 12.8 | B | 16:15 | 69 | 12.8 | B |
| 10 | ML- North of 400 S | M | 5.7 | 860 | 850 | 99% | 1,525 | 67 | 9.5 | A | 17:00 | 67 | 9.3 | A | 16:15 | 67 | 9.3 | A |
| | **Urban Facility** | **U** | **4.0** | **1,100** | **1,090** | **100%** | **26,750** | **68** | **15.4** | **B** | **17:00** | **68** | **15.0** | **B** | **16:15** | **68** | **15.0** | **B** |

## I15 SB

V: Speed (mph), K: Density (vpmpl), and LOS

| ID | Location | Seg Type | Ln | Q: Hr Flow Rate / Lane Demand | Served | % Served | Length (ft) | Max 15-min. Interval V | K | LOS | Begin | Segment Peak Hour V | K | LOS | Begin | Peak Hour: 17:00 V | K | LOS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 11 | ML - North of 400 S | D | 6.0 | 1,200 | 1,190 | 100% | 1,500 | 66 | 13.1 | B | 17:00 | 68 | 12.4 | B | 17:00 | 68 | 12.4 | B |
| 12 | ML - 400 S | B | 5.0 | 1,360 | 1,330 | 98% | 2,525 | 67 | 21.4 | C | 17:00 | 68 | 21.0 | C | 17:00 | 68 | 21.0 | C |
| 13 | ML - 400 S to US 6 | M | 5.6 | 1,200 | 1,170 | 98% | 1,500 | 63 | 16.3 | B | 17:15 | 64 | 15.9 | B | 17:00 | 64 | 15.9 | B |
| 14 | ML - 400 S to US 6 | B | 4.5 | 1,490 | 1,460 | 98% | 2,400 | 65 | 24.2 | C | 17:00 | 65 | 23.7 | C | 17:00 | 65 | 23.7 | C |
| 15 | ML - 400 S to US 6 after HOV | B | 5.0 | 1,550 | 1,520 | 98% | 2,750 | 66 | 24.8 | C | 17:15 | 66 | 24.3 | C | 17:00 | 66 | 24.3 | C |
| 16 | ML - 400 S to US 6 after HOV | D | 5.0 | 1,550 | 1,520 | 98% | 1,500 | 61 | 23.7 | C | 17:15 | 62 | 22.6 | C | 17:00 | 62 | 22.6 | C |
| 17 | ML - US 6 to Main St. | B | 3.0 | 1,450 | 1,440 | 99% | 6,275 | 67 | 22.9 | C | 17:15 | 67 | 22.3 | C | 17:00 | 67 | 22.3 | C |
| 18 | ML - South of Main St. | M | 3.9 | 1,420 | 1,390 | 98% | 1,500 | 55 | 23.7 | C | 17:15 | 57 | 22.2 | C | 17:00 | 57 | 22.2 | C |
| 19 | ML - South of Main St. | B | 3.0 | 1,840 | 1,810 | 98% | 5,400 | 67 | 29.1 | D | 17:15 | 67 | 28.1 | D | 17:00 | 67 | 28.1 | D |
| | **Urban Facility** | **U** | **4.1** | **1,550** | **1,520** | **98%** | **25,325** | **65** | **22.7** | **C** | **17:15** | **66** | **22.1** | **C** | **17:00** | **66** | **22.1** | **C** |

## I15_Exp. NB

V: Speed (mph), K: Density (vpmpl), and LOS

| ID | Location | Seg Type | Ln | Q: Hr Flow Rate / Lane Demand | Served | % Served | Length (ft) | Max 15-min. Interval V | K | LOS | Begin | Segment Peak Hour V | K | LOS | Begin | Peak Hour: 16:15 V | K | LOS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 20 | HOV - South of 400 S | B | 1.0 | 600 | 600 | 100% | 4,975 | 68 | 9.3 | A | 16:30 | 68 | 9.0 | A | 16:00 | 68 | 9.0 | A |
| 21 | HOV -North of 400 S | B | 1.0 | 600 | 600 | 100% | 2,900 | 67 | 9.6 | A | 16:30 | 67 | 9.2 | A | 16:15 | 67 | 9.2 | A |
| | **Urban Facility** | **U** | **1.0** | **600** | **600** | **100%** | **7,875** | **68** | **9.4** | **A** | **16:30** | **68** | **9.1** | **A** | **16:15** | **68** | **9.1** | **A** |

## I15_Exp. SB

V: Speed (mph), K: Density (vpmpl), and LOS

| ID | Location | Seg Type | Ln | Q: Hr Flow Rate / Lane Demand | Served | % Served | Length (ft) | Max 15-min. Interval V | K | LOS | Begin | Segment Peak Hour V | K | LOS | Begin | Peak Hour: 17:00 V | K | LOS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 22 | HOV - North of 400 S | B | 1.0 | 1,060 | 1,060 | 100% | 6,825 | 66 | 17.4 | B | 17:00 | 66 | 16.9 | B | 17:00 | 66 | 16.9 | B |
| 23 | HOV - South of 400 S | B | 1.0 | 1,060 | 1,050 | 99% | 875 | 66 | 17.1 | B | 17:15 | 66 | 17.0 | B | 17:00 | 66 | 17.0 | B |
| | **Urban Facility** | **U** | **1.0** | **1,060** | **1,060** | **100%** | **7,725** | **66** | **17.4** | **B** | **17:00** | **66** | **16.9** | **B** | **17:00** | **66** | **16.9** | **B** |

# II: 2035 PM No Build

*LOS Category: Signalized*

## 1: SR-77 (400 South) SPUI

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| NBL | 140 | 128 | 91% | 25 | 100 | 25 | C |
| NBR | 750 | 763 | 102% | 75 | 350 | 26 | C |
| **NB** | **890** | **891** | **100%** | | | **26** | **C** |
| SBL | 1,310 | 1,411 | 108% | 125 | 575 | 40 | D |
| SBR | 240 | 250 | 104% | 0 | 0 | 7 | A |
| **SB** | **1,550** | **1,661** | **107%** | | | **35** | **D** |
| EBL | 270 | 264 | 98% | 50 | 175 | 56 | E |
| EBT | 370 | 363 | 98% | 125 | 300 | 96 | F |
| EBR | 180 | 178 | 99% | 0 | 0 | 4 | A |
| **EB** | **820** | **805** | **98%** | | | **63** | **E** |
| WBL | 770 | 779 | 101% | 200 | 725 | 67 | E |
| WBT | 290 | 287 | 99% | 100 | 325 | 72 | E |
| WBR | 820 | 810 | 99% | 0 | 0 | 7 | A |
| **WB** | **1,880** | **1,876** | **100%** | | | **42** | **D** |
| **Total** | **5,140** | **5,233** | **102%** | | | **40** | **D** |

*Node Letter: A VISSIM ID: 1*

*LOS Category: Signalized*

## 2: SR-77 (400 South) & 1750 West

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| NBL | 420 | 414 | 99% | 125 | 350 | 83 | F |
| NBT | 210 | 212 | 101% | 75 | 275 | 61 | E |
| NBR | 250 | 250 | 100% | 0 | 75 | 6 | A |
| **NB** | **880** | **876** | **100%** | | | **56** | **E** |
| SBL | 80 | 81 | 101% | 25 | 100 | 71 | E |
| SBT | 130 | 126 | 97% | 50 | 225 | 76 | E |
| SBR | 350 | 347 | 99% | 25 | 100 | 11 | B |
| **SB** | **560** | **554** | **99%** | | | **34** | **C** |
| EBL | 210 | 214 | 102% | 75 | 250 | 93 | F |
| EBT | 1,610 | 1,683 | 105% | 225 | 875 | 38 | D |
| EBR | 610 | 621 | 102% | 50 | 450 | 26 | C |
| **EB** | **2,430** | **2,518** | **104%** | | | **40** | **D** |
| WBL | 230 | 224 | 97% | 50 | 175 | 70 | E |
| WBT | 1,110 | 1,109 | 100% | 50 | 250 | 20 | C |
| WBR | 30 | 27 | 90% | 50 | 275 | 14 | B |
| **WB** | **1,370** | **1,360** | **99%** | | | **28** | **C** |
| **Total** | **5,240** | **5,308** | **101%** | | | **39** | **D** |

*Node Letter: B VISSIM ID: 2*

*LOS Category: Signalized*

## 4: Main Street & I-15 Ramps

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| NBL | 350 | 365 | 104% | 25 | 175 | 45 | D |
| NBT | 350 | 358 | 102% | 25 | 175 | 32 | C |
| NBR | 720 | 706 | 98% | 0 | 0 | 2 | A |
| **NB** | **1,420** | **1,429** | **101%** | | | **21** | **C** |
| SBL | 150 | 142 | 95% | 125 | 425 | 65 | E |
| SBT | 930 | 927 | 100% | 125 | 425 | 62 | E |
| SBR | 440 | 433 | 98% | 50 | 350 | 6 | A |
| **SB** | **1,520** | **1,502** | **99%** | | | **46** | **D** |
| EBL | 170 | 183 | 108% | 75 | 225 | 96 | F |
| EBR | 190 | 191 | 101% | 25 | 175 | 15 | B |
| **EB** | **360** | **374** | **104%** | | | **55** | **D** |
| WBL | 1,090 | 1,040 | 95% | 175 | 725 | 53 | D |
| WBT | 10 | 10 | 100% | 175 | 725 | 58 | E |
| WBR | 90 | 83 | 92% | 0 | 125 | 20 | C |
| **WB** | **1,190** | **1,133** | **95%** | | | **51** | **D** |
| **Total** | **4,490** | **4,438** | **99%** | | | **40** | **D** |

*Node Letter: K VISSIM ID: 11*

*LOS Category: Signalized*

## 5: Main Street & 1000 North

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| NBL | 30 | 29 | 97% | 0 | 25 | 38 | D |
| NBT | 910 | 901 | 99% | 50 | 250 | 23 | C |
| NBR | 430 | 420 | 98% | 0 | 100 | 9 | A |
| **NB** | **1,370** | **1,350** | **99%** | | | **19** | **B** |
| SBL | 410 | 395 | 96% | 75 | 400 | 40 | D |
| SBT | 1,690 | 1,642 | 97% | 50 | 400 | 11 | B |
| SBR | 110 | 111 | 101% | 0 | 50 | 12 | B |
| **SB** | **2,210** | **2,148** | **97%** | | | **17** | **B** |
| EBL | 90 | 95 | 106% | 25 | 125 | 41 | D |
| EBT | 90 | 83 | 92% | 25 | 75 | 58 | E |
| EBR | 30 | 29 | 97% | 25 | 75 | 15 | B |
| **EB** | **210** | **207** | **99%** | | | **44** | **D** |
| WBL | 450 | 456 | 101% | 100 | 300 | 58 | E |
| WBT | 50 | 48 | 96% | 0 | 75 | 45 | D |
| WBR | 420 | 419 | 100% | 50 | 250 | 17 | B |
| **WB** | **920** | **923** | **100%** | | | **38** | **D** |
| **Total** | **4,710** | **4,628** | **98%** | | | **23** | **C** |

*Node Letter: M VISSIM ID: 13*

# II: 2035 PM No Build

*LOS Category: Signalized*

## 6: US-6 Interchange

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| NBR | 440 | 421 | 96% | 50 | 375 | 16 | B |
| **NB** | **440** | **421** | **96%** | | | **16** | **B** |
| SBL | 2,490 | 2,399 | 96% | 50 | 450 | 14 | B |
| **SB** | **2,490** | **2,399** | **96%** | | | **14** | **B** |
| WBL | 420 | 383 | 91% | 75 | 275 | 66 | E |
| WBR | 1,510 | 1,494 | 99% | 0 | 0 | 5 | A |
| **WB** | **1,930** | **1,877** | **97%** | | | **17** | **B** |
| **Total** | **4,860** | **4,697** | **97%** | | | **15** | **B** |

*Node Letter: N VISSIM ID: 14*

*LOS Category: Signalized*

## 7: US-6 & 1000 North

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| NBL | 110 | 108 | 98% | 50 | 300 | 60 | E |
| NBT | 560 | 541 | 97% | 150 | 500 | 68 | E |
| NBR | 280 | 285 | 102% | 75 | 400 | 38 | D |
| **NB** | **950** | **934** | **98%** | | | **58** | **E** |
| SBL | 480 | 458 | 95% | 250 | 875 | 86 | F |
| SBT | 590 | 568 | 96% | 125 | 700 | 52 | D |
| SBR | 630 | 602 | 96% | 0 | 0 | 14 | B |
| **SB** | **1,700** | **1,628** | **96%** | | | **48** | **D** |
| EBL | 530 | 504 | 95% | 475 | 1,550 | 163 | F |
| EBT | 2,030 | 1,943 | 96% | 425 | 1,525 | 68 | E |
| EBR | 370 | 349 | 94% | 25 | 200 | 37 | D |
| **EB** | **2,930** | **2,796** | **95%** | | | **81** | **F** |
| WBL | 150 | 142 | 95% | 250 | 750 | 217 | F |
| WBT | 1,190 | 1,174 | 99% | 225 | 725 | 52 | D |
| WBR | 360 | 363 | 101% | 25 | 250 | 24 | C |
| **WB** | **1,700** | **1,679** | **99%** | | | **60** | **E** |
| **Total** | **7,280** | **7,037** | **97%** | | | **65** | **E** |

*Node Letter: O VISSIM ID: 15*

*LOS Category: Signalized*

## 8: Main Street & 1600 South/2700 North

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| NBT | 400 | 398 | 100% | 0 | 125 | 8 | A |
| NBR | 170 | 171 | 101% | 0 | 125 | 5 | A |
| **NB** | **570** | **569** | **100%** | | | **7** | **A** |
| SBL | 200 | 206 | 103% | 25 | 125 | 13 | B |
| SBT | 930 | 917 | 99% | 25 | 150 | 8 | A |
| **SB** | **1,130** | **1,123** | **99%** | | | **9** | **A** |
| WBL | 290 | 290 | 100% | 50 | 200 | 26 | C |
| WBR | 110 | 111 | 101% | 50 | 200 | 6 | A |
| **WB** | **400** | **401** | **100%** | | | **20** | **C** |
| **Total** | **2,100** | **2,093** | **100%** | | | **11** | **B** |

*Node Letter: C VISSIM ID: 3*

*LOS Category: Unsignalized*

## 9: SB West Frontage Road & 1600 South/2700 Nort

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| SBL | 60 | 57 | 95% | 0 | 75 | 10 | A |
| SBT | 10 | 10 | 100% | 0 | 75 | 9 | A |
| SBR | 50 | 51 | 102% | 0 | 75 | 8 | A |
| **SB** | **120** | **118** | **98%** | | | **9** | **A** |
| **Total** | **120** | **118** | **98%** | | | **9** | **A** |

*Node Letter: D VISSIM ID: 4*

*LOS Category: Unsignalized*

## 10: NB West Frontage Road & 1600 South/2700 Nor

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| NBL | 10 | 8 | 80% | 0 | 50 | 10 | B |
| NBT | 10 | 12 | **120%** | 0 | 50 | 7 | A |
| NBR | 60 | 58 | 97% | 0 | 50 | 7 | A |
| **NB** | **80** | **78** | **98%** | | | **7** | **A** |
| **Total** | **80** | **78** | **98%** | | | **7** | **A** |

*Node Letter: D VISSIM ID: 19*

*LOS Category: Unsignalized*

## 11: East Frontage Road & 1750 West

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| SBL | 50 | 49 | 98% | 0 | 75 | 13 | B |
| SBR | 60 | 59 | 98% | 0 | 75 | 8 | A |
| **SB** | **110** | **108** | **98%** | | | **10** | **B** |
| **Total** | **110** | **108** | **98%** | | | **10** | **B** |

*Node Letter: E VISSIM ID: 5*

# II: 2035 PM No Build

*LOS Category: Unsignalized*

## 12: 1750 West & 1600 South/2700 North

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| SBL | 100 | 98 | 98% | 0 | 50 | 11 | B |
| SBR | 90 | 90 | 100% | 0 | 50 | 8 | A |
| **SB** | **190** | **188** | **99%** | | | **9** | **A** |
| **Total** | **190** | **188** | **99%** | | | **9** | **A** |

*Node Letter: F VISSIM ID: 6*

*LOS Category: Unsignalized*

## 13: SB Canyon Creek Pkwy & 1600 South/2700 Nort

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| SBL | 50 | 52 | 104% | 25 | 150 | 15 | B |
| SBT | 140 | 134 | 96% | 25 | 150 | 15 | B |
| SBR | 150 | 148 | 99% | 25 | 150 | 14 | B |
| **SB** | **340** | **334** | **98%** | | | **14** | **B** |
| **Total** | **340** | **334** | **98%** | | | **14** | **B** |

*Node Letter: G VISSIM ID: 7*

*LOS Category: Signalized*

## 14: NB Canyon Creek Pkwy & 1600 South/2700 Nort

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| NBL | 80 | 78 | 98% | 25 | 200 | 32 | C |
| NBT | 50 | 51 | 102% | 25 | 200 | 25 | C |
| NBR | 100 | 97 | 97% | 25 | 200 | 24 | C |
| **NB** | **230** | **226** | **98%** | | | **27** | **C** |
| **Total** | **230** | **226** | **98%** | | | **27** | **C** |

*Node Letter: G VISSIM ID: 18*

*LOS Category: Signalized*

## 15: 1200 West & 1600 South/2700 North

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| NBL | 40 | 41 | 103% | 0 | 50 | 18 | B |
| NBT | 170 | 168 | 99% | 25 | 100 | 20 | B |
| NBR | 140 | 140 | 100% | 25 | 150 | 9 | A |
| **NB** | **350** | **349** | **100%** | | | **15** | **B** |
| SBL | 30 | 28 | 93% | 0 | 25 | 22 | C |
| SBT | 590 | 576 | 98% | 50 | 250 | 25 | C |
| SBR | 30 | 40 | **133%** | 75 | 275 | 27 | C |
| **SB** | **650** | **644** | **99%** | | | **25** | **C** |
| EBL | 40 | 42 | 105% | 0 | 100 | 10 | B |
| EBT | 280 | 278 | 99% | 25 | 150 | 11 | B |
| EBR | 30 | 24 | 80% | 25 | 175 | 6 | A |
| **EB** | **350** | **344** | **98%** | | | **10** | **B** |
| WBL | 110 | 105 | 95% | 0 | 50 | 8 | A |
| WBT | 160 | 155 | 97% | 0 | 75 | 8 | A |
| WBR | 10 | 9 | 90% | 0 | 100 | 5 | A |
| **WB** | **280** | **269** | **96%** | | | **8** | **A** |
| **Total** | **1,630** | **1,606** | **99%** | | | **17** | **B** |

*Node Letter: H VISSIM ID: 8*

*LOS Category: Unsignalized*

## 16: SB 950 West & 1600 South/2700 North

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| SBL | 160 | 158 | 99% | 0 | 50 | 4 | A |
| SBT | 30 | 30 | 100% | 0 | 50 | 6 | A |
| SBR | 90 | 90 | 100% | 0 | 25 | 1 | A |
| **SB** | **280** | **278** | **99%** | | | **3** | **A** |
| **Total** | **280** | **278** | **99%** | | | **3** | **A** |

*Node Letter: I VISSIM ID: 9*

*LOS Category: Unsignalized*

## 17: NB 950 West & 1600 South/2700 North

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| NBL | 10 | 9 | 90% | 0 | 0 | 4 | A |
| NBT | 20 | 18 | 90% | 0 | 0 | 1 | A |
| NBR | 10 | 10 | 100% | 0 | 0 | 2 | A |
| **NB** | **40** | **37** | **93%** | | | **2** | **A** |
| **Total** | **40** | **37** | **93%** | | | **2** | **A** |

*Node Letter: I VISSIM ID: 21*

# II: 2035 PM No Build

*LOS Category: Signalized*

| 18: SR-51 (State Street) & 1600 South/2700 North | | | | | | Delay / LOS | |
|---|---|---|---|---|---|---|---|
| | | Volume | | Queue (ft) Avg / 95th | | Analysis Period | |
| Mvmt | Demand | Served | % Served | 5400-9000 | | 5400-9000 | |
| NBL | 180 | 174 | 97% | 75 | 400 | 52 | D |
| NBT | 340 | 344 | 101% | 25 | 250 | 17 | B |
| **NB** | **520** | **518** | **100%** | | | **29** | **C** |
| SBT | 530 | 527 | 99% | 50 | 350 | 24 | C |
| SBR | 100 | 101 | 101% | 0 | 50 | 9 | A |
| **SB** | **630** | **628** | **100%** | | | **21** | **C** |
| EBL | 170 | 160 | 94% | 25 | 175 | 42 | D |
| EBR | 280 | 273 | 98% | 0 | 100 | 14 | B |
| **EB** | **450** | **433** | **96%** | | | **24** | **C** |
| **Total** | **1,600** | **1,579** | **99%** | | | **24** | **C** |

*Node Letter: J VISSIM ID: 10*

# 2035 Build AM - IACR Update Mar21

*I-15 Spanish Fork/Springville Interchange Study*

**Link Peak Results**

*Number of Runs: 10*

## I15 NB

V: Speed (mph), K: Density (vpmpl), and LOS

| ID | Location | Seg Type | Ln | Q: Hr Flow Rate / Lane Demand | Served | % Served | Length (ft) | Max 15-min. Interval V | K | LOS | Begin | Segment Peak Hour V | K | LOS | Begin | Peak Hour: 07:00 V | K | LOS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | ML - North of 400 South | B | 4.2 | 1,610 | 1,600 | 99% | 6,150 | 66 | 26.9 | D | 07:30 | 67 | 25.5 | C | 07:00 | 67 | 25.5 | C |
| 2 | ML - 400 S On Ramp | M | 5.7 | 1,200 | 1,190 | 99% | 1,525 | 66 | 14.5 | B | 07:30 | 67 | 13.6 | B | 07:00 | 67 | 13.6 | B |
| 3 | ML - 400 S | B | 5.0 | 1,340 | 1,330 | 100% | 2,475 | 67 | 22.5 | C | 07:30 | 67 | 21.1 | C | 07:00 | 67 | 21.1 | C |
| 4 | ML - 400 S Off Ramp | D | 5.0 | 1,300 | 1,290 | 99% | 1,500 | 67 | 15.8 | B | 07:30 | 67 | 14.6 | B | 07:15 | 67 | 14.5 | B |
| 5 | ML - 1600 S to 400 S | B | 5.0 | 1,300 | 1,280 | 98% | 350 | 67 | 21.1 | C | 07:30 | 68 | 19.6 | C | 07:00 | 68 | 19.6 | C |
| 6 | ML - 1600 S On Ramp | M | 5.0 | 1,300 | 1,290 | 100% | 1,500 | 67 | 18.8 | B | 07:30 | 68 | 17.4 | B | 07:00 | 68 | 17.4 | B |
| 7 | ML - 1600 S | B | 4.4 | 1,630 | 1,500 | 92% | 2,550 | 63 | 26.5 | D | 07:30 | 64 | 24.4 | C | 07:00 | 64 | 24.4 | C |
| 8 | ML - 1600 S Off Ramp | D | 5.0 | 1,520 | 1,520 | 100% | 1,500 | 64 | 27.8 | C | 07:30 | 66 | 25.0 | C | 07:00 | 66 | 25.0 | C |
| 9 | ML - US 6 to 1600 S | B | 5.0 | 1,520 | 1,520 | 100% | 875 | 66 | 26.0 | C | 07:30 | 66 | 23.9 | C | 07:00 | 66 | 23.9 | C |
| 10 | ML - US 6 On Ramp | M | 5.8 | 1,310 | 1,310 | 100% | 1,500 | 64 | 20.3 | C | 07:30 | 65 | 18.5 | B | 07:00 | 65 | 18.5 | B |
| 11 | ML - Main St. On Ramp | M | 4.0 | 1,340 | 1,310 | 98% | 1,325 | 68 | 21.4 | C | 07:30 | 68 | 19.7 | B | 07:00 | 68 | 19.7 | B |
| 12 | ML - Main St. | B | 3.0 | 1,450 | 1,430 | 98% | 4,200 | 66 | 24.4 | C | 07:30 | 67 | 22.2 | C | 07:00 | 67 | 22.2 | C |
| 13 | ML - Main St. Off Ramp | D | 3.0 | 1,720 | 1,720 | 100% | 1,500 | 58 | 36.3 | E | 07:30 | 62 | 31.0 | D | 07:00 | 62 | 31.0 | D |
| 14 | ML - South of Main St. | B | 3.0 | 1,720 | 1,720 | 100% | 5,975 | 66 | 30.1 | D | 07:30 | 67 | 27.1 | D | 07:00 | 67 | 27.1 | D |
| | **Urban Facility** | **U** | **4.1** | **1,540** | **1,520** | **99%** | **32,900** | **66** | **24.4** | C | **07:30** | **66** | **22.5** | C | **07:00** | **66** | **22.5** | C |

## I15 SB

V: Speed (mph), K: Density (vpmpl), and LOS

| ID | Location | Seg Type | Ln | Q: Hr Flow Rate / Lane Demand | Served | % Served | Length (ft) | Max 15-min. Interval V | K | LOS | Begin | Segment Peak Hour V | K | LOS | Begin | Peak Hour: 08:00 V | K | LOS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 15 | ML - North of 400 South | B | 5.0 | 750 | 750 | 100% | 5,325 | 69 | 11.7 | B | 07:30 | 69 | 11.1 | B | 08:00 | 69 | 11.1 | B |
| 16 | ML - 400 S Off Ramp | D | 6.0 | 630 | 630 | 100% | 1,500 | 69 | 6.6 | A | 08:45 | 69 | 6.2 | A | 08:00 | 69 | 6.2 | A |
| 17 | ML - 400 S | B | 5.0 | 620 | 620 | 100% | 2,525 | 69 | 9.7 | A | 07:30 | 69 | 9.0 | A | 07:15 | 69 | 8.9 | A |
| 18 | ML - 400 S On Ramp | M | 5.6 | 630 | 630 | 100% | 1,500 | 66 | 9.5 | A | 07:30 | 66 | 9.1 | A | 07:30 | 66 | 9.1 | A |
| 19 | ML - 400 S to 1600 S | B | 5.0 | 700 | 700 | 100% | 675 | 69 | 10.9 | A | 07:30 | 69 | 10.4 | A | 07:30 | 69 | 10.3 | A |
| 20 | ML - 1600 S Off Ramp | D | 4.3 | 820 | 820 | 100% | 1,500 | 67 | 12.5 | B | 07:30 | 67 | 12.0 | B | 07:30 | 68 | 11.9 | B |
| 21 | ML - 1600 S Off Ramp to US 6 | B | 5.0 | 660 | 650 | 100% | 2,975 | 69 | 10.2 | A | 07:30 | 69 | 9.6 | A | 07:15 | 69 | 9.6 | A |
| 22 | ML - US 6 Off Ramp | D | 5.0 | 660 | 650 | 99% | 1,500 | 68 | 9.8 | A | 07:30 | 69 | 9.4 | A | 07:15 | 69 | 9.4 | A |
| 23 | ML - US 6 to Main St. | B | 3.0 | 650 | 660 | 102% | 6,275 | 69 | 10.0 | A | 07:30 | 69 | 9.6 | A | 07:30 | 69 | 9.6 | A |
| 24 | ML - Main St. On Ramp | M | 4.5 | 550 | 550 | 100% | 1,500 | 68 | 8.8 | A | 08:45 | 68 | 8.5 | A | 07:30 | 68 | 8.5 | A |
| 25 | ML - South of Main St. | B | 3.0 | 820 | 820 | 100% | 5,575 | 69 | 12.5 | B | 08:45 | 69 | 12.0 | B | 07:30 | 69 | 12.0 | B |
| | **Urban Facility** | **U** | **4.2** | **730** | **730** | **100%** | **30,825** | **69** | **10.4** | A | **07:30** | **69** | **9.9** | A | **08:00** | **69** | **9.9** | A |

## I15_Exp. NB

V: Speed (mph), K: Density (vpmpl), and LOS

| ID | Location | Seg Type | Ln | Q: Hr Flow Rate / Lane Demand | Served | % Served | Length (ft) | Max 15-min. Interval V | K | LOS | Begin | Segment Peak Hour V | K | LOS | Begin | Peak Hour: 07:00 V | K | LOS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 26 | HOV -North of 400 S | B | 1.0 | 1,000 | 1,000 | 101% | 2,900 | 66 | 17.8 | B | 07:30 | 66 | 16.2 | B | 07:00 | 66 | 16.2 | B |
| 27 | HOV -1600 S to 400 S | B | 1.0 | 950 | 960 | 101% | 4,975 | 67 | 16.7 | B | 07:30 | 67 | 15.3 | B | 07:00 | 67 | 15.3 | B |
| | **Urban Facility** | **U** | **1.0** | **970** | **970** | **101%** | **7,875** | **66** | **17.1** | B | **07:30** | **67** | **15.6** | B | **07:00** | **67** | **15.6** | B |

## I15_Exp. SB

V: Speed (mph), K: Density (vpmpl), and LOS

| ID | Location | Seg Type | Ln | Q: Hr Flow Rate / Lane Demand | Served | % Served | Length (ft) | Max 15-min. Interval V | K | LOS | Begin | Segment Peak Hour V | K | LOS | Begin | Peak Hour: 07:00 V | K | LOS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 28 | HOV - North of 400 S | B | 1.0 | 130 | 130 | 99% | 6,825 | 69 | 2.1 | A | 07:30 | 69 | 1.9 | A | 07:00 | 69 | 1.9 | A |
| 29 | HOV - 400 S to 1600 S | B | 1.0 | 100 | 100 | 97% | 875 | 69 | 1.6 | A | 07:30 | 69 | 1.5 | A | 07:00 | 69 | 1.5 | A |
| | **Urban Facility** | **U** | **1.0** | **130** | **130** | **99%** | **7,725** | **69** | **2.0** | A | **07:30** | **69** | **1.9** | A | **07:00** | **69** | **1.9** | A |

# II: 2035 AM Build

*LOS Category: Signalized*

## 1: SR-77 (400 South) SPUI

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| NBL | 100 | 98 | 98% | 0 | 50 | 17 | B |
| NBR | 550 | 544 | 99% | 0 | 75 | 5 | A |
| **NB** | **650** | **642** | **99%** | | | **7** | **A** |
| SBL | 510 | 504 | 99% | 25 | 150 | 16 | B |
| SBR | 220 | 228 | 104% | 0 | 0 | 2 | A |
| **SB** | **730** | **732** | **100%** | | | **12** | **B** |
| EBL | 150 | 150 | 100% | 50 | 125 | 65 | E |
| EBT | 160 | 158 | 99% | 25 | 125 | 66 | E |
| EBR | 110 | 109 | 99% | 0 | 0 | 2 | A |
| **EB** | **420** | **417** | **99%** | | | **49** | **D** |
| WBL | 380 | 393 | 103% | 100 | 275 | 63 | E |
| WBT | 200 | 197 | 99% | 75 | 250 | 66 | E |
| WBR | 990 | 984 | 99% | 0 | 0 | 4 | A |
| **WB** | **1,570** | **1,574** | **100%** | | | **26** | **C** |
| **Total** | **3,370** | **3,365** | **100%** | | | **22** | **C** |

*Node Letter: A VISSIM ID: 1*

*LOS Category: Signalized*

## 2: SR-77 (400 South) & 1750 West

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| NBL | 210 | 213 | 101% | 50 | 200 | 63 | E |
| NBT | 170 | 165 | 97% | 75 | 275 | 72 | E |
| NBR | 60 | 62 | 103% | 0 | 50 | 5 | A |
| **NB** | **440** | **440** | **100%** | | | **58** | **E** |
| SBL | 50 | 47 | 94% | 25 | 75 | 75 | E |
| SBT | 20 | 19 | 95% | 0 | 75 | 70 | E |
| SBR | 170 | 170 | 100% | 0 | 100 | 11 | B |
| **SB** | **240** | **236** | **98%** | | | **29** | **C** |
| EBL | 250 | 243 | 97% | 75 | 225 | 88 | F |
| EBT | 830 | 823 | 99% | 25 | 125 | 10 | B |
| EBR | 140 | 139 | 99% | 0 | 50 | 6 | A |
| **EB** | **1,220** | **1,205** | **99%** | | | **26** | **C** |
| WBL | 70 | 68 | 97% | 25 | 75 | 74 | E |
| WBT | 1,190 | 1,188 | 100% | 50 | 300 | 16 | B |
| WBR | 40 | 40 | 100% | 50 | 325 | 19 | B |
| **WB** | **1,300** | **1,296** | **100%** | | | **19** | **B** |
| **Total** | **3,200** | **3,177** | **99%** | | | **28** | **C** |

*Node Letter: B VISSIM ID: 2*

*LOS Category: Signalized*

## 3: I-15 & 1600 South TDI

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| NBL | 100 | 101 | 101% | 0 | 100 | 35 | D |
| NBR | 350 | 345 | 99% | 0 | 0 | 5 | A |
| **NB** | **450** | **446** | **99%** | | | **12** | **B** |
| SBL | 160 | 158 | 99% | 25 | 125 | 37 | D |
| SBR | 170 | 175 | 103% | 0 | 0 | 2 | A |
| **SB** | **330** | **333** | **101%** | | | **19** | **B** |
| EBL | 50 | 49 | 98% | 0 | 75 | 40 | D |
| EBT | 120 | 118 | 98% | 25 | 100 | 26 | C |
| EBR | 40 | 42 | 105% | 0 | 0 | 1 | A |
| **EB** | **210** | **209** | **100%** | | | **24** | **C** |
| WBL | 190 | 191 | 101% | 25 | 125 | 26 | C |
| WBT | 250 | 253 | 101% | 25 | 150 | 17 | B |
| WBR | 250 | 239 | 96% | 0 | 25 | 2 | A |
| **WB** | **690** | **683** | **99%** | | | **14** | **B** |
| **Total** | **1,680** | **1,671** | **99%** | | | **16** | **B** |

*Node Letter: P VISSIM ID: 22*

*LOS Category: Signalized*

## 4: Main Street & I-15 Ramps

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| NBL | 110 | 112 | 102% | 25 | 225 | 14 | B |
| NBT | 580 | 581 | 100% | 25 | 225 | 21 | C |
| NBR | 1,020 | 1,026 | 101% | 0 | 0 | 2 | A |
| **NB** | **1,710** | **1,719** | **101%** | | | **9** | **A** |
| SBL | 30 | 30 | 100% | 0 | 75 | 23 | C |
| SBT | 190 | 188 | 99% | 0 | 75 | 10 | B |
| SBR | 40 | 41 | 103% | 0 | 0 | 0 | A |
| **SB** | **260** | **259** | **100%** | | | **10** | **B** |
| EBL | 440 | 445 | 101% | 125 | 325 | 74 | E |
| EBR | 140 | 140 | 100% | 50 | 300 | 11 | B |
| **EB** | **580** | **585** | **101%** | | | **59** | **E** |
| WBL | 310 | 304 | 98% | 75 | 200 | 58 | E |
| WBT | 10 | 10 | 100% | 75 | 200 | 55 | D |
| WBR | 60 | 65 | 108% | 0 | 50 | 11 | B |
| **WB** | **380** | **379** | **100%** | | | **50** | **D** |
| **Total** | **2,930** | **2,942** | **100%** | | | **24** | **C** |

*Node Letter: K VISSIM ID: 11*

# II: 2035 AM Build

*LOS Category: Signalized*

## 5: Main Street & 1000 North

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Delay / LOS Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| NBL | 10 | 10 | 100% | 0 | 0 | 7 | A |
| NBT | 1,490 | 1,491 | 100% | 25 | 150 | 5 | A |
| NBR | 200 | 197 | 99% | 0 | 0 | 3 | A |
| **NB** | **1,700** | **1,698** | **100%** | | | **5** | **A** |
| SBL | 70 | 68 | 97% | 0 | 50 | 21 | C |
| SBT | 550 | 547 | 99% | 0 | 75 | 2 | A |
| SBR | 20 | 20 | 100% | 0 | 0 | 2 | A |
| **SB** | **640** | **635** | **99%** | | | **4** | **A** |
| EBL | 40 | 39 | 98% | 0 | 75 | 53 | D |
| EBT | 20 | 18 | 90% | 0 | 50 | 66 | E |
| EBR | 10 | 11 | 110% | 0 | 50 | 5 | A |
| **EB** | **70** | **68** | **97%** | | | **49** | **D** |
| WBL | 100 | 99 | 99% | 25 | 75 | 63 | E |
| WBT | 20 | 23 | **115%** | 0 | 50 | 52 | D |
| WBR | 180 | 176 | 98% | 0 | 100 | 8 | A |
| **WB** | **300** | **298** | **99%** | | | **30** | **C** |
| **Total** | **2,710** | **2,699** | **100%** | | | **9** | **A** |

*Node Letter: M VISSIM ID: 13*

*LOS Category: Signalized*

## 6: US-6 Interchange

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Delay / LOS Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| NBR | 400 | 399 | 100% | 0 | 0 | 3 | A |
| **NB** | **400** | **399** | **100%** | | | **3** | **A** |
| SBL | 1,040 | 994 | 96% | 0 | 175 | 5 | A |
| SBR | 160 | 160 | 100% | | | 7 | A |
| **SB** | **1,200** | **1,154** | **96%** | | | **5** | **A** |
| WBL | 160 | 154 | 96% | 50 | 125 | 79 | E |
| WBR | 2,330 | 2,380 | 102% | 0 | 0 | 7 | A |
| **WB** | **2,490** | **2,534** | **102%** | | | **12** | **B** |
| **Total** | **4,090** | **4,087** | **100%** | | | **9** | **A** |

*Node Letter: N VISSIM ID: 14*

*LOS Category: Signalized*

## 7: US-6 & 1000 North

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Delay / LOS Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| NBL | 120 | 119 | 99% | 75 | 225 | 78 | E |
| NBT | 200 | 192 | 96% | 50 | 175 | 62 | E |
| NBR | 40 | 44 | 110% | 0 | 75 | 6 | A |
| **NB** | **360** | **355** | **99%** | | | **60** | **E** |
| SBL | 160 | 160 | 100% | 75 | 250 | 63 | E |
| SBT | 100 | 98 | 98% | 25 | 75 | 52 | D |
| SBR | 340 | 344 | 101% | 0 | 0 | 2 | A |
| **SB** | **600** | **602** | **100%** | | | **26** | **C** |
| EBL | 440 | 452 | 103% | 150 | 425 | 94 | F |
| EBT | 890 | 878 | 99% | 25 | 150 | 11 | B |
| EBR | 60 | 62 | 103% | 0 | 50 | 3 | A |
| **EB** | **1,390** | **1,392** | **100%** | | | **37** | **D** |
| WBL | 90 | 86 | 96% | 0 | 100 | 33 | C |
| WBT | 2,080 | 2,060 | 99% | 200 | 825 | 36 | D |
| WBR | 220 | 221 | 100% | 0 | 75 | 18 | B |
| **WB** | **2,390** | **2,367** | **99%** | | | **34** | **C** |
| **Total** | **4,740** | **4,716** | **99%** | | | **36** | **D** |

*Node Letter: O VISSIM ID: 15*

*LOS Category: Signalized*

## 8: Main Street & 1600 South/2700 North

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Delay / LOS Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| NBT | 780 | 772 | 99% | 25 | 175 | 6 | A |
| NBR | 110 | 115 | 105% | 25 | 175 | 7 | A |
| **NB** | **890** | **887** | **100%** | | | **6** | **A** |
| SBL | 70 | 69 | 99% | 0 | 75 | 8 | A |
| SBT | 190 | 190 | 100% | 0 | 50 | 4 | A |
| **SB** | **260** | **259** | **100%** | | | **5** | **A** |
| WBL | 110 | 111 | 101% | 50 | 175 | 51 | D |
| WBR | 200 | 202 | 101% | 50 | 200 | 11 | B |
| **WB** | **310** | **313** | **101%** | | | **25** | **C** |
| **Total** | **1,460** | **1,459** | **100%** | | | **10** | **A** |

*Node Letter: C VISSIM ID: 3*

*LOS Category: Unsignalized*

## 9: SB West Frontage Road & 1600 South/2700 Nort

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Delay / LOS Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| SBL | 30 | 28 | 93% | 0 | 25 | 2 | A |
| SBT | 10 | 10 | 100% | 0 | 0 | 1 | A |
| SBR | 20 | 20 | 100% | 0 | 0 | 3 | A |
| **SB** | **60** | **58** | **97%** | | | **2** | **A** |
| **Total** | **60** | **58** | **97%** | | | **2** | **A** |

*Node Letter: D VISSIM ID: 4*

# II: 2035 AM Build

*LOS Category: Unsignalized*

## 10: NB West Frontage Road & 1600 South/2700 Nor

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| NBL | 10 | 9 | 90% | 0 | 25 | 2 | A |
| NBT | 10 | 11 | 110% | 0 | 25 | 1 | A |
| NBR | 40 | 38 | 95% | 0 | 25 | 3 | A |
| **NB** | **60** | **58** | **97%** | | | **2** | **A** |
| **Total** | **60** | **58** | **97%** | | | **2** | **A** |

*Node Letter: D VISSIM ID: 19*

*LOS Category: Unsignalized*

## 11: East Frontage Road & 1750 West

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| EBL | 10 | 9 | 90% | 0 | 25 | 2 | A |
| EBR | 50 | 49 | 98% | 0 | 50 | 6 | A |
| **EB** | **60** | **58** | **97%** | | | **6** | **A** |
| **Total** | **60** | **58** | **97%** | | | **6** | **A** |

*Node Letter: E VISSIM ID: 5*

*LOS Category: Unsignalized*

## 12: 1750 West & 1600 South/2700 North

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| SBL | 30 | 29 | 97% | 0 | 50 | 5 | A |
| SBR | 110 | 109 | 99% | 0 | 75 | 6 | A |
| **SB** | **140** | **138** | **99%** | | | **6** | **A** |
| **Total** | **140** | **138** | **99%** | | | **6** | **A** |

*Node Letter: F VISSIM ID: 6*

*LOS Category: Unsignalized*

## 13: SB Canyon Creek Pkwy & 1600 South/2700 Nort

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| SBL | 10 | 10 | 100% | 0 | 0 | 1 | A |
| SBT | 10 | 10 | 100% | 0 | 25 | 1 | A |
| SBR | 90 | 89 | 99% | 0 | 50 | 6 | A |
| **SB** | **110** | **109** | **99%** | | | **5** | **A** |
| **Total** | **110** | **109** | **99%** | | | **5** | **A** |

*Node Letter: G VISSIM ID: 7*

*LOS Category: Signalized*

## 14: NB Canyon Creek Pkwy & 1600 South/2700 Nort

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| NBL | 150 | 148 | 99% | 0 | 0 | 1 | A |
| NBT | 20 | 20 | 100% | 0 | 0 | 1 | A |
| NBR | 30 | 30 | 100% | 0 | 0 | 3 | A |
| **NB** | **200** | **198** | **99%** | | | **1** | **A** |
| **Total** | **200** | **198** | **99%** | | | **1** | **A** |

*Node Letter: G VISSIM ID: 18*

*LOS Category: Signalized*

## 15: 1200 West & 1600 South/2700 North

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| NBL | 20 | 19 | 95% | 0 | 25 | 33 | C |
| NBT | 260 | 263 | 101% | 25 | 150 | 30 | C |
| NBR | 40 | 38 | 95% | 25 | 150 | 30 | C |
| **NB** | **320** | **320** | **100%** | | | **30** | **C** |
| SBL | 10 | 10 | 100% | 0 | 25 | 33 | C |
| SBT | 110 | 111 | 101% | 25 | 100 | 28 | C |
| SBR | 30 | 30 | 100% | 25 | 125 | 17 | B |
| **SB** | **150** | **151** | **101%** | | | **26** | **C** |
| EBL | 10 | 10 | 100% | 0 | 0 | 6 | A |
| EBT | 310 | 304 | 98% | 0 | 75 | 5 | A |
| EBR | 10 | 11 | 110% | 0 | 100 | 2 | A |
| **EB** | **330** | **325** | **98%** | | | **5** | **A** |
| WBL | 110 | 110 | 100% | 0 | 50 | 7 | A |
| WBT | 440 | 441 | 100% | 0 | 75 | 5 | A |
| WBR | 90 | 95 | 106% | 0 | 100 | 3 | A |
| **WB** | **640** | **646** | **101%** | | | **5** | **A** |
| **Total** | **1,440** | **1,442** | **100%** | | | **13** | **B** |

*Node Letter: H VISSIM ID: 8*

*LOS Category: Unsignalized*

## 16: SB 950 West & 1600 South/2700 North

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| SBL | 10 | 12 | **120%** | 0 | 0 | 1 | A |
| SBT | 10 | 2 | 20% | 0 | 75 | 9 | A |
| SBR | 80 | 85 | 106% | 0 | 75 | 6 | A |
| **SB** | **100** | **99** | **99%** | | | **5** | **A** |
| **Total** | **100** | **99** | **99%** | | | **5** | **A** |

*Node Letter: I VISSIM ID: 9*

*LOS Category: Unsignalized*

## 17: NB 950 West & 1600 South/2700 North

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 1800-5400 | | Analysis Period 1800-5400 | |
|---|---|---|---|---|---|---|---|
| NBL | 20 | 18 | 90% | 0 | 50 | 7 | A |
| NBT | 10 | 8 | 80% | 0 | 25 | 7 | A |
| NBR | 10 | 11 | 110% | 0 | 25 | 3 | A |
| **NB** | **40** | **37** | **93%** | | | **6** | **A** |
| **Total** | **40** | **37** | **93%** | | | **6** | **A** |

*Node Letter: I VISSIM ID: 21*

# II: 2035 AM Build

*LOS Category: Signalized*

| 18: SR-51 (State Street) & 1600 South/2700 North | | | | | | Delay / LOS | |
|---|---|---|---|---|---|---|---|
| | | Volume | | Queue (ft) Avg / 95th | | Analysis Period | |
| Mvmt | Demand | Served | % Served | 1800-5400 | | 1800-5400 | |
| NBL | 240 | 238 | 99% | 0 | 125 | 9 | A |
| NBT | 340 | 339 | 100% | 0 | 100 | 8 | A |
| **NB** | **580** | **577** | **99%** | | | **8** | **A** |
| SBT | 150 | 144 | 96% | 0 | 50 | 7 | A |
| SBR | 320 | 322 | 101% | 0 | 0 | 2 | A |
| **SB** | **470** | **466** | **99%** | | | **4** | **A** |
| EBL | 210 | 199 | 95% | 25 | 150 | 21 | C |
| EBR | 140 | 148 | 106% | 0 | 50 | 6 | A |
| **EB** | **350** | **347** | **99%** | | | **15** | **B** |
| **Total** | **1,400** | **1,390** | **99%** | | | **8** | **A** |

*Node Letter: J VISSIM ID: 10*

# 2035 Build PM - IACR Update Mar21

*I-15 Spanish Fork/Springville Interchange Study*

**Link Peak Results**

*Number of Runs: 10*

## I15 NB

V: Speed (mph), K: Density (vpmpl), and LOS

| ID | Location | Seg Type | Ln | Q: Hr Flow Rate / Lane Demand | Served | % Served | Length (ft) | Max 15-min. Interval V | K | LOS | Begin | Segment Peak Hour V | K | LOS | Begin | Peak Hour: 16:15 V | K | LOS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | ML - North of 400 South | B | 4.2 | 1,160 | 1,160 | 99% | 6,150 | 68 | 17.5 | B | 17:00 | 68 | 17.2 | B | 16:15 | 68 | 17.2 | B |
| 2 | ML - 400 S On Ramp | M | 5.7 | 870 | 860 | 99% | 1,525 | 67 | 9.8 | A | 17:00 | 67 | 9.5 | A | 16:15 | 67 | 9.5 | A |
| 3 | ML - 400 S | B | 5.0 | 920 | 910 | 99% | 2,475 | 68 | 13.9 | B | 17:00 | 68 | 13.5 | B | 16:15 | 68 | 13.5 | B |
| 4 | ML - 400 S Off Ramp | D | 5.0 | 950 | 950 | 100% | 1,500 | 68 | 12.3 | B | 17:00 | 68 | 11.7 | B | 16:15 | 68 | 11.7 | B |
| 5 | ML - 1600 S to 400 S | B | 5.0 | 950 | 940 | 99% | 350 | 68 | 14.4 | B | 17:00 | 68 | 13.9 | B | 16:15 | 68 | 13.9 | B |
| 6 | ML - 1600 S On Ramp | M | 5.0 | 950 | 950 | 100% | 1,500 | 68 | 13.5 | B | 17:00 | 68 | 13.0 | B | 16:15 | 68 | 13.0 | B |
| 7 | ML - 1600 S | B | 4.4 | 1,140 | 1,060 | 93% | 2,550 | 68 | 16.0 | B | 16:15 | 68 | 15.8 | B | 16:15 | 68 | 15.8 | B |
| 8 | ML - 1600 S Off Ramp | D | 5.0 | 1,080 | 1,080 | 100% | 1,500 | 67 | 18.4 | B | 17:00 | 68 | 17.8 | B | 16:15 | 68 | 17.8 | B |
| 9 | ML - US 6 to 1600 S | B | 5.0 | 1,080 | 1,080 | 100% | 875 | 68 | 16.6 | B | 17:00 | 68 | 16.2 | B | 16:15 | 68 | 16.2 | B |
| 10 | ML - US 6 On Ramp | M | 5.8 | 940 | 930 | 100% | 1,500 | 67 | 13.2 | B | 17:00 | 67 | 12.7 | B | 16:15 | 67 | 12.7 | B |
| 11 | ML - Main St. On Ramp | M | 4.0 | 970 | 950 | 98% | 1,325 | 68 | 14.4 | B | 17:00 | 69 | 14.0 | B | 16:15 | 69 | 14.0 | B |
| 12 | ML - Main St. | B | 3.0 | 1,040 | 1,020 | 99% | 4,200 | 68 | 15.8 | B | 16:15 | 68 | 15.4 | B | 16:15 | 68 | 15.4 | B |
| 13 | ML - Main St. Off Ramp | D | 3.0 | 1,250 | 1,250 | 100% | 1,500 | 67 | 20.6 | C | 16:15 | 67 | 20.1 | C | 16:15 | 67 | 20.1 | C |
| 14 | ML - South of Main St. | B | 3.0 | 1,250 | 1,250 | 100% | 5,975 | 68 | 19.3 | C | 16:15 | 68 | 18.7 | C | 16:15 | 68 | 18.7 | C |
| | **Urban Facility** | **U** | **4.1** | **1,100** | **1,090** | **99%** | **32,900** | **68** | **15.7** | **B** | **17:00** | **68** | **15.4** | **B** | **16:15** | **68** | **15.4** | **B** |

## I15 SB

V: Speed (mph), K: Density (vpmpl), and LOS

| ID | Location | Seg Type | Ln | Q: Hr Flow Rate / Lane Demand | Served | % Served | Length (ft) | Max 15-min. Interval V | K | LOS | Begin | Segment Peak Hour V | K | LOS | Begin | Peak Hour: 17:00 V | K | LOS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 15 | ML - North of 400 South | B | 5.0 | 1,440 | 1,430 | 100% | 5,325 | 68 | 23.3 | C | 17:00 | 68 | 22.5 | C | 17:00 | 68 | 22.5 | C |
| 16 | ML - 400 S Off Ramp | D | 6.0 | 1,200 | 1,190 | 100% | 1,500 | 68 | 11.6 | B | 17:00 | 68 | 11.2 | B | 17:00 | 68 | 11.2 | B |
| 17 | ML - 400 S | B | 5.0 | 1,400 | 1,360 | 98% | 2,525 | 67 | 22.0 | C | 17:00 | 67 | 21.5 | C | 17:00 | 67 | 21.5 | C |
| 18 | ML - 400 S On Ramp | M | 5.6 | 1,190 | 1,160 | 98% | 1,500 | 65 | 16.2 | B | 17:00 | 65 | 15.8 | B | 17:00 | 65 | 15.8 | B |
| 19 | ML - 400 S to 1600 S | B | 5.0 | 1,330 | 1,300 | 98% | 675 | 67 | 20.8 | C | 17:00 | 67 | 20.5 | C | 17:00 | 67 | 20.5 | C |
| 20 | ML - 1600 S Off Ramp | D | 4.3 | 1,540 | 1,510 | 98% | 1,500 | 63 | 22.4 | C | 17:00 | 63 | 21.9 | C | 17:00 | 63 | 21.9 | C |
| 21 | ML - 1600 S | B | 5.0 | 1,480 | 1,450 | 98% | 2,475 | 66 | 23.5 | C | 17:15 | 66 | 23.1 | C | 17:00 | 66 | 23.1 | C |
| 22 | ML - 1600 S On Ramp to US 6 Of | W | 5.0 | 1,600 | 1,450 | 91% | 2,000 | 64 | 24.3 | C | 17:15 | 64 | 23.9 | C | 17:00 | 64 | 23.9 | C |
| 23 | ML - US 6 to Main St. | B | 3.0 | 1,500 | 1,380 | 92% | 6,275 | 67 | 21.7 | C | 17:15 | 67 | 21.3 | C | 17:00 | 67 | 21.3 | C |
| 24 | ML - Main St. On Ramp | M | 4.5 | 1,240 | 1,220 | 98% | 1,500 | 67 | 18.4 | B | 17:00 | 67 | 18.2 | B | 17:00 | 67 | 18.2 | B |
| 25 | ML - South of Main St. | B | 3.0 | 1,850 | 1,820 | 98% | 5,575 | 66 | 29.1 | D | 17:15 | 66 | 28.6 | D | 17:00 | 66 | 28.6 | D |
| | **Urban Facility** | **U** | **4.2** | **1,530** | **1,490** | **97%** | **30,850** | **67** | **22.0** | **C** | **17:00** | **67** | **21.7** | **C** | **17:00** | **67** | **21.7** | **C** |

## I15_Exp. NB

V: Speed (mph), K: Density (vpmpl), and LOS

| ID | Location | Seg Type | Ln | Q: Hr Flow Rate / Lane Demand | Served | % Served | Length (ft) | Max 15-min. Interval V | K | LOS | Begin | Segment Peak Hour V | K | LOS | Begin | Peak Hour: 16:15 V | K | LOS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 26 | HOV -North of 400 S | B | 1.0 | 610 | 610 | 100% | 2,900 | 68 | 9.4 | A | 16:30 | 68 | 9.2 | A | 16:15 | 68 | 9.2 | A |
| 27 | HOV -1600 S to 400 S | B | 1.0 | 560 | 570 | 100% | 4,975 | 68 | 8.8 | A | 16:30 | 68 | 8.5 | A | 16:15 | 68 | 8.5 | A |
| | **Urban Facility** | **U** | **1.0** | **580** | **580** | **100%** | **7,875** | **68** | **9.0** | **A** | **16:30** | **68** | **8.8** | **A** | **16:15** | **68** | **8.8** | **A** |

## I15_Exp. SB

V: Speed (mph), K: Density (vpmpl), and LOS

| ID | Location | Seg Type | Ln | Q: Hr Flow Rate / Lane Demand | Served | % Served | Length (ft) | Max 15-min. Interval V | K | LOS | Begin | Segment Peak Hour V | K | LOS | Begin | Peak Hour: 17:00 V | K | LOS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 28 | HOV - North of 400 S | B | 1.0 | 1,090 | 1,090 | 100% | 6,825 | 66 | 17.8 | B | 17:00 | 66 | 17.4 | B | 17:00 | 66 | 17.4 | B |
| 29 | HOV - 400 S to 1600 S | B | 1.0 | 1,040 | 1,040 | 99% | 875 | 66 | 17.0 | B | 17:30 | 66 | 16.7 | B | 17:00 | 66 | 16.7 | B |
| | **Urban Facility** | **U** | **1.0** | **1,080** | **1,080** | **100%** | **7,725** | **66** | **17.7** | **B** | **17:00** | **66** | **17.3** | **B** | **17:00** | **66** | **17.3** | **B** |

# II: 2035 PM Build

*LOS Category: Signalized*

## 1: SR-77 (400 South) SPUI

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| NBL | 110 | 115 | 105% | 0 | 100 | 22 | C |
| NBR | 630 | 631 | 100% | 25 | 175 | 12 | B |
| **NB** | **740** | **746** | **101%** | | | **14** | **B** |
| SBL | 1,180 | 1,289 | 109% | 75 | 350 | 27 | C |
| SBR | 210 | 222 | 106% | 0 | 0 | 5 | A |
| **SB** | **1,390** | **1,511** | **109%** | | | **24** | **C** |
| EBL | 210 | 212 | 101% | 50 | 150 | 59 | E |
| EBT | 350 | 334 | 95% | 75 | 225 | 74 | E |
| EBR | 130 | 134 | 103% | 0 | 0 | 3 | A |
| **EB** | **690** | **680** | **99%** | | | **55** | **E** |
| WBL | 590 | 606 | 103% | 125 | 400 | 59 | E |
| WBT | 290 | 292 | 101% | 75 | 300 | 62 | E |
| WBR | 730 | 725 | 99% | 0 | 0 | 2 | A |
| **WB** | **1,610** | **1,623** | **101%** | | | **34** | **C** |
| **Total** | **4,430** | **4,560** | **103%** | | | **31** | **C** |

*Node Letter: A VISSIM ID: 1*

*LOS Category: Signalized*

## 2: SR-77 (400 South) & 1750 West

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| NBL | 310 | 312 | 101% | 100 | 225 | 74 | E |
| NBT | 210 | 209 | 100% | 75 | 300 | 64 | E |
| NBR | 240 | 239 | 100% | 0 | 50 | 5 | A |
| **NB** | **760** | **760** | **100%** | | | **49** | **D** |
| SBL | 100 | 99 | 99% | 25 | 100 | 73 | E |
| SBT | 140 | 134 | 96% | 75 | 325 | 83 | F |
| SBR | 330 | 332 | 101% | 50 | 250 | 23 | C |
| **SB** | **570** | **565** | **99%** | | | **46** | **D** |
| EBL | 200 | 212 | 106% | 75 | 200 | 84 | F |
| EBT | 1,480 | 1,539 | 104% | 125 | 575 | 27 | C |
| EBR | 480 | 493 | 103% | 25 | 275 | 19 | B |
| **EB** | **2,160** | **2,244** | **104%** | | | **31** | **C** |
| WBL | 220 | 218 | 99% | 50 | 150 | 70 | E |
| WBT | 970 | 973 | 100% | 50 | 275 | 19 | B |
| WBR | 40 | 33 | 83% | 50 | 300 | 8 | A |
| **WB** | **1,230** | **1,224** | **100%** | | | **28** | **C** |
| **Total** | **4,720** | **4,793** | **102%** | | | **35** | **C** |

*Node Letter: B VISSIM ID: 2*

*LOS Category: Signalized*

## 3: I-15 & 1600 South TDI

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| NBL | 100 | 100 | 100% | 25 | 125 | 45 | D |
| NBR | 370 | 372 | 101% | 0 | 25 | 4 | A |
| **NB** | **470** | **472** | **100%** | | | **12** | **B** |
| SBL | 210 | 198 | 94% | 75 | 250 | 66 | E |
| SBR | 100 | 102 | 102% | 0 | 0 | 3 | A |
| **SB** | **310** | **300** | **97%** | | | **45** | **D** |
| EBL | 200 | 206 | 103% | 50 | 275 | 81 | F |
| EBT | 350 | 353 | 101% | 75 | 375 | 35 | C |
| EBR | 170 | 163 | 96% | 0 | 0 | 3 | A |
| **EB** | **720** | **722** | **100%** | | | **41** | **D** |
| WBL | 460 | 458 | 100% | 75 | 375 | 43 | D |
| WBT | 330 | 331 | 100% | 25 | 175 | 14 | B |
| WBR | 200 | 205 | 103% | 0 | 75 | 2 | A |
| **WB** | **990** | **994** | **100%** | | | **25** | **C** |
| **Total** | **2,490** | **2,488** | **100%** | | | **30** | **C** |

*Node Letter: P VISSIM ID: 22*

*LOS Category: Signalized*

## 4: Main Street & I-15 Ramps

Delay / LOS

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| NBL | 340 | 348 | 102% | 0 | 75 | 35 | C |
| NBT | 260 | 272 | 105% | 0 | 75 | 27 | C |
| NBR | 730 | 714 | 98% | 0 | 0 | 1 | A |
| **NB** | **1,330** | **1,334** | **100%** | | | **15** | **B** |
| SBL | 110 | 104 | 95% | 75 | 300 | 45 | D |
| SBT | 800 | 809 | 101% | 75 | 300 | 47 | D |
| SBR | 390 | 383 | 98% | 25 | 200 | 2 | A |
| **SB** | **1,300** | **1,296** | **100%** | | | **34** | **C** |
| EBL | 130 | 135 | 104% | 50 | 175 | 95 | F |
| EBT | 0 | 1 | | 50 | 175 | 67 | E |
| EBR | 200 | 202 | 101% | 25 | 125 | 11 | B |
| **EB** | **330** | **338** | **102%** | | | **45** | **D** |
| WBL | 1,100 | 1,040 | 95% | 175 | 750 | 58 | E |
| WBT | 10 | 10 | 100% | 175 | 750 | 54 | D |
| WBR | 70 | 63 | 90% | 0 | 125 | 26 | C |
| **WB** | **1,180** | **1,113** | **94%** | | | **56** | **E** |
| **Total** | **4,140** | **4,081** | **99%** | | | **35** | **C** |

*Node Letter: K VISSIM ID: 11*

# II: 2035 PM Build

*LOS Category: Signalized*

## 5: Main Street & 1000 North

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Delay / LOS Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| NBL | 40 | 40 | 100% | 0 | 25 | 34 | C |
| NBT | 920 | 904 | 98% | 25 | 200 | 17 | B |
| NBR | 420 | 414 | 99% | 0 | 75 | 8 | A |
| **NB** | **1,380** | **1,358** | **98%** | | | **15** | **B** |
| SBL | 320 | 308 | 96% | 25 | 225 | 28 | C |
| SBT | 1,680 | 1,642 | 98% | 50 | 375 | 10 | A |
| SBR | 100 | 99 | 99% | 0 | 50 | 8 | A |
| **SB** | **2,100** | **2,049** | **98%** | | | **13** | **B** |
| EBL | 80 | 86 | 108% | 25 | 125 | 43 | D |
| EBT | 80 | 74 | 93% | 25 | 75 | 62 | E |
| EBR | 40 | 39 | 98% | 25 | 75 | 12 | B |
| **EB** | **200** | **199** | **100%** | | | **44** | **D** |
| WBL | 450 | 454 | 101% | 75 | 275 | 57 | E |
| WBT | 50 | 50 | 100% | 0 | 75 | 42 | D |
| WBR | 330 | 331 | 100% | 25 | 150 | 12 | B |
| **WB** | **830** | **835** | **101%** | | | **38** | **D** |
| **Total** | **4,510** | **4,441** | **98%** | | | **20** | **B** |

*Node Letter: M VISSIM ID: 13*

*LOS Category: Signalized*

## 6: US-6 Interchange

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Delay / LOS Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| NBR | 360 | 355 | 99% | 100 | 525 | 40 | D |
| **NB** | **360** | **355** | **99%** | | | **40** | **D** |
| SBL | 2,610 | 2,464 | 94% | 225 | 1,475 | 26 | C |
| SBR | 340 | 337 | 99% | 0 | 100 | 27 | C |
| **SB** | **2,950** | **2,801** | **95%** | | | **26** | **C** |
| WBL | 360 | 314 | 87% | 50 | 225 | 52 | D |
| WBR | 1,560 | 1,573 | 101% | 0 | 25 | 5 | A |
| **WB** | **1,920** | **1,887** | **98%** | | | **13** | **B** |
| **Total** | **5,230** | **5,043** | **96%** | | | **22** | **C** |

*Node Letter: N VISSIM ID: 14*

*LOS Category: Signalized*

## 7: US-6 & 1000 North

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Delay / LOS Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| NBL | 100 | 98 | 98% | 25 | 175 | 52 | D |
| NBT | 480 | 470 | 98% | 100 | 350 | 59 | E |
| NBR | 260 | 258 | 99% | 25 | 225 | 25 | C |
| **NB** | **840** | **826** | **98%** | | | **48** | **D** |
| SBL | 440 | 423 | 96% | 275 | 925 | 70 | E |
| SBT | 520 | 502 | 97% | 75 | 525 | 46 | D |
| SBR | 600 | 572 | 95% | 0 | 0 | 17 | B |
| **SB** | **1,560** | **1,497** | **96%** | | | **42** | **D** |
| EBL | 500 | 448 | 90% | 800 | 2,425 | 209 | F |
| EBT | 2,110 | 1,945 | 92% | 925 | 2,475 | 96 | F |
| EBR | 360 | 331 | 92% | 25 | 175 | 55 | D |
| **EB** | **2,970** | **2,724** | **92%** | | | **110** | **F** |
| WBL | 140 | 142 | 101% | 50 | 200 | 65 | E |
| WBT | 1,220 | 1,228 | 101% | 125 | 425 | 44 | D |
| WBR | 330 | 335 | 102% | 25 | 150 | 16 | B |
| **WB** | **1,690** | **1,705** | **101%** | | | **40** | **D** |
| **Total** | **7,060** | **6,752** | **96%** | | | **69** | **E** |

*Node Letter: O VISSIM ID: 15*

*LOS Category: Signalized*

## 8: Main Street & 1600 South/2700 North

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Delay / LOS Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| NBT | 300 | 299 | 100% | 25 | 125 | 10 | A |
| NBR | 130 | 128 | 98% | 25 | 125 | 10 | B |
| **NB** | **430** | **427** | **99%** | | | **10** | **A** |
| SBL | 220 | 221 | 100% | 25 | 150 | 12 | B |
| SBT | 790 | 781 | 99% | 25 | 150 | 9 | A |
| **SB** | **1,010** | **1,002** | **99%** | | | **9** | **A** |
| WBL | 290 | 279 | 96% | 50 | 225 | 24 | C |
| WBR | 140 | 144 | 103% | 50 | 225 | 8 | A |
| **WB** | **430** | **423** | **98%** | | | **18** | **B** |
| **Total** | **1,870** | **1,852** | **99%** | | | **12** | **B** |

*Node Letter: C VISSIM ID: 3*

*LOS Category: Unsignalized*

## 9: SB West Frontage Road & 1600 South/2700 Nort

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Delay / LOS Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| SBL | 240 | 238 | 99% | 0 | 125 | 8 | A |
| SBT | 10 | 10 | 100% | 0 | 100 | 4 | A |
| SBR | 50 | 46 | 92% | 0 | 100 | 8 | A |
| **SB** | **300** | **294** | **98%** | | | **7** | **A** |
| **Total** | **300** | **294** | **98%** | | | **7** | **A** |

*Node Letter: D VISSIM ID: 4*

# II: 2035 PM Build

*LOS Category: Unsignalized*

## 10: NB West Frontage Road & 1600 South/2700 Nor

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Delay / LOS Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| NBL | 10 | 1 | 10% | 0 | 50 | 1 | A |
| NBT | 10 | 11 | 110% | 0 | 50 | 3 | A |
| NBR | 150 | 155 | 103% | 0 | 50 | 4 | A |
| **NB** | **170** | **167** | **98%** | | | **4** | **A** |
| **Total** | **170** | **167** | **98%** | | | **4** | **A** |

*Node Letter: D VISSIM ID: 19*

*LOS Category: Unsignalized*

## 11: East Frontage Road & 1750 West

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Delay / LOS Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| EBL | 10 | 10 | 100% | 0 | 50 | 3 | A |
| EBR | 120 | 119 | 99% | 0 | 50 | 7 | A |
| **EB** | **130** | **129** | **99%** | | | **7** | **A** |
| **Total** | **130** | **129** | **99%** | | | **7** | **A** |

*Node Letter: E VISSIM ID: 5*

*LOS Category: Unsignalized*

## 12: 1750 West & 1600 South/2700 North

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Delay / LOS Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| SBL | 120 | 118 | 98% | 0 | 100 | 15 | C |
| SBR | 300 | 301 | 100% | 0 | 100 | 10 | A |
| **SB** | **420** | **419** | **100%** | | | **11** | **B** |
| **Total** | **420** | **419** | **100%** | | | **11** | **B** |

*Node Letter: F VISSIM ID: 6*

*LOS Category: Unsignalized*

## 13: SB Canyon Creek Pkwy & 1600 South/2700 Nort

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Delay / LOS Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| SBL | 50 | 50 | 100% | 0 | 0 | 2 | A |
| SBT | 70 | 68 | 97% | 0 | 75 | 4 | A |
| SBR | 210 | 209 | 100% | 0 | 75 | 8 | A |
| **SB** | **330** | **327** | **99%** | | | **6** | **A** |
| **Total** | **330** | **327** | **99%** | | | **6** | **A** |

*Node Letter: G VISSIM ID: 7*

*LOS Category: Signalized*

## 14: NB Canyon Creek Pkwy & 1600 South/2700 Nort

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Delay / LOS Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| NBL | 120 | 119 | 99% | 0 | 25 | 2 | A |
| NBT | 20 | 19 | 95% | 0 | 50 | 2 | A |
| NBR | 110 | 108 | 98% | 0 | 50 | 4 | A |
| **NB** | **250** | **246** | **98%** | | | **3** | **A** |
| **Total** | **250** | **246** | **98%** | | | **3** | **A** |

*Node Letter: G VISSIM ID: 18*

*LOS Category: Signalized*

## 15: 1200 West & 1600 South/2700 North

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Delay / LOS Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| NBL | 30 | 32 | 107% | 0 | 50 | 30 | C |
| NBT | 160 | 163 | 102% | 25 | 125 | 17 | B |
| NBR | 160 | 154 | 96% | 25 | 125 | 19 | B |
| **NB** | **350** | **349** | **100%** | | | **19** | **B** |
| SBL | 90 | 88 | 98% | 0 | 100 | 20 | C |
| SBT | 580 | 572 | 99% | 50 | 225 | 23 | C |
| SBR | 80 | 85 | 106% | 75 | 250 | 31 | C |
| **SB** | **750** | **745** | **99%** | | | **24** | **C** |
| EBL | 40 | 42 | 105% | 0 | 25 | 12 | B |
| EBT | 570 | 559 | 98% | 25 | 125 | 12 | B |
| EBR | 40 | 38 | 95% | 25 | 150 | 6 | A |
| **EB** | **650** | **639** | **98%** | | | **11** | **B** |
| WBL | 90 | 88 | 98% | 0 | 75 | 15 | B |
| WBT | 460 | 462 | 100% | 0 | 50 | 4 | A |
| WBR | 30 | 30 | 100% | 0 | 75 | 2 | A |
| **WB** | **580** | **580** | **100%** | | | **5** | **A** |
| **Total** | **2,330** | **2,313** | **99%** | | | **15** | **B** |

*Node Letter: H VISSIM ID: 8*

*LOS Category: Unsignalized*

## 16: SB 950 West & 1600 South/2700 North

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Delay / LOS Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| SBL | 40 | 38 | 95% | 0 | 25 | 2 | A |
| SBT | 10 | 10 | 100% | 0 | 75 | 9 | A |
| SBR | 210 | 212 | 101% | 0 | 75 | 8 | A |
| **SB** | **260** | **260** | **100%** | | | **7** | **A** |
| **Total** | **260** | **260** | **100%** | | | **7** | **A** |

*Node Letter: I VISSIM ID: 9*

*LOS Category: Unsignalized*

## 17: NB 950 West & 1600 South/2700 North

| Mvmt | Demand | Volume Served | % Served | Queue (ft) Avg / 95th 5400-9000 | | Delay / LOS Analysis Period 5400-9000 | |
|---|---|---|---|---|---|---|---|
| NBL | 20 | 19 | 95% | 0 | 25 | 6 | A |
| NBT | 10 | 9 | 90% | 0 | 25 | 6 | A |
| NBR | 10 | 9 | 90% | 0 | 25 | 3 | A |
| **NB** | **40** | **37** | **93%** | | | **5** | **A** |
| **Total** | **40** | **37** | **93%** | | | **5** | **A** |

*Node Letter: I VISSIM ID: 21*

# II: 2035 PM Build

*LOS Category: Signalized*

| 18: SR-51 (State Street) & 1600 South/2700 North | | | | | | Delay / LOS | |
|---|---|---|---|---|---|---|---|
| | | Volume | | Queue (ft) Avg / 95th | | Analysis Period | |
| Mvmt | Demand | Served | % Served | 5400-9000 | | 5400-9000 | |
| NBL | 200 | 199 | 100% | 25 | 150 | 17 | B |
| NBT | 280 | 278 | 99% | 0 | 125 | 9 | A |
| **NB** | **480** | **477** | **99%** | | | **12** | **B** |
| SBT | 500 | 496 | 99% | 25 | 200 | 10 | A |
| SBR | 180 | 181 | 101% | 0 | 0 | 2 | A |
| **SB** | **680** | **677** | **100%** | | | **8** | **A** |
| EBL | 350 | 341 | 97% | 75 | 300 | 31 | C |
| EBR | 370 | 355 | 96% | 25 | 150 | 14 | B |
| **EB** | **720** | **696** | **97%** | | | **22** | **C** |
| **Total** | **1,880** | **1,850** | **98%** | | | **14** | **B** |

*Node Letter: J VISSIM ID: 10*

# Appendix D – Safety Analysis Worksheets

Appendix- 2035 Build Condition Worksheet

Table: Project Level Predictive Crash Frequency Worksheet for Segment 1 (MP 259.75 – MP 260.20)

| Input | Segment 1 |
|---|---|
| Number of Lanes (in both direction) | 10 |
| Station | 259.75-260.20 |
| Length of Freeway Segment (mi), Lfs | 0.45 |
| Length of Ramp entrance I adjacent to subject freeway segment (mi), Len-inc | 0 |
| Length of Ramp entrance i adjacent to subject freeway segment in opposing direction (mi), Len-dec | 0 |
| Length of Ramp exit i adjacent to subject freeway segment (mi), Lex-inc | 0 |
| Length of Ramp exit i adjacent to subject freeway segment (mi), Lex-dec | 0 |
| AADT volume of Freeway segment (veh/day) | 158,000 |
| Curve >1000 ft? (0= No, 1= Yes), | **0** |
| number of horizontal curves in the segment, m | 0 |
| Curve length (mile) | 0 |
| equivalent radius of curve, Ri* | - |
| radius of curve i in one roadbed, Ra,i | 0 |
| radius of curve i in second roadbed, Rb,i | 0.000 |
| proportion of effective segment length with curve, Pc,i | 0.000 |
| Lane Width (ft), | 12 |
| Inside shoulder width (ft), | 10 |
| Median width, measured from near edges of traveled way in both directions (ft), Wm | 30 |
| Distance from edge of the inside shoulder to barrier face (ft), Wicb | 10 |
| Proportion of effective segment length with a barrier present in the median (inside), Pib | 1 |
| hours when volume exceeds 1000 veh/hr/ln, | 0 |
| Proportion of AADT during hours where volume exceeds 1000 veh/hr/ln, Pib | 0 |
| weaving section adjustment factor for travel in increasing milepost direction, fwev, inc | 1 |
| weaving section adjustment factor for travel in decreasing milepost direction, fwev, dec | 1 |
| proportion of segment length within a Type B weaving section for travel in increasing milepost direction, Pwev, inc | 0 |
| proportion of segment length within a Type B weaving section for travel in increasing milepost direction, Pwev, dec | 0 |
| weaving section length for travel in increasing milepost direction (may extend beyond segment boundaries) (mil), Lwev, inc | 0 |

Table: Project Level Predictive Crash Frequency Worksheet for Segment 1 (MP 259.75 – MP 260.20) (…cont)

| Input | Segment 1 |
|---|---|
| weaving section length for travel in decreasing milepost direction (may extend beyond segment boundaries) (mil), Lwev, dec | 0 |
| distance from segment begin milepost to nearest upstream entrance ramp gore point, for travel in increasing milepost direction (mile), Xb, ent | 0 |
| distance from segment begin milepost to nearest downstream exit ramp gore point, for travel in decreasing milepost direction (mile), Xb, ext | 0 |
| distance from segment end milepost to nearest upstream entrance ramp gore point, for travel in decreasing milepost direction (mile), Xe, ent | 0 |
| distance from segment begin milepost to nearest downstream exit ramp gore point, for travel in increasing milepost direction (mile), Xe, ext | 0 |
| AADT volume of entrance ramp located at distance Xb, ent, AADT b,ent | - |
| AADT volume of entrance ramp located at distance Xb, ext, AADT b,ext | - |
| AADT volume of entrance ramp located at distance Xe, ent, AADT e,ent | - |
| AADT volume of entrance ramp located at distance Xe, ext, AADT e,ext | - |
| Outside shoulder width (ft), Ws | 10 |
| length of rumble strips present on the inside shoulders (mile) | 0 |
| length of rumble strips present on the outside shoulders (mile) | 0 |
| proportion of effective segment length with rumble strips present on the inside shoulders | 0 |
| proportion of effective segment length with rumble strips present on the outside shoulders | 0 |
| Proportion of effective segment length with a barrier present on the roadside (i.e, outside), Pob | 1 |
| clear zone width (ft), Whc | 30 |
| Distance from edge of the inside shoulder to barrier face (ft), Wicb | 10 |
| Effective Length of Freeway, L* | 0.45 |

Table: Project Level Predictive Crash Frequency Worksheet for Segment 1 (MP 259.75 – MP 260.20) (…cont)

| **Crash Output** | | | | |
|---|---|---|---|---|
| | **MV** | | **SV** | |
| | **Fatal and Injury** | **PDO** | **Fatal and Injury** | **PDO** |
| **Base Average Crash Frequency, $N_{spf,fs,n,yz}$ (Table 18-3 of HSM)** | 3.06 | 5.71 | 1.75 | 3.62 |
| | | | | |
| **Crash Modification Factors (CMF):** | | | | |
| CMF for Horizontal Curve, $CMF_1$ (Eq 18-24, Eq 18-40) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for Lane Width, $CMF_2$ (Eq 18-25, Eq 18-41) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for Inside Shoulder Width, $CMF_3$ (Eq 18-26, Eq 18-42) | 0.93 | 0.94 | 0.93 | 0.94 |
| CMF for Median Width, $CMF_4$ ((Eq 18-27, Eq 18-43) | 1.09 | 1.08 | 0.97 | 1.08 |
| CMF for Median barrier, $CMF_5$ (Eq 18-28, Eq 18-44) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for High Volume, $CMF_6$ (Eq 18-29, Eq 18-45) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for Lane Change, $CMF_7$ (Eq 18-30) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for Outside Shoulder Width, $CMF_8$ (Eq 18-35) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for Shoulder Rumble Strip, $CMF_9$ (Eq 18-36) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for Outside Clearance, $CMF_{10}$ (Eq 18-38) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for Outside barrier, $CMF_{11}$ (Eq 18-39) | 1.01 | 1.02 | 1.01 | 1.02 |
| | | | | |
| **Predicted Average Crash Frequency, $N_{p,fs,n,yz}$ ( Eq 18-1)** | 3.15 | 5.93 | 1.60 | 3.75 |

Table: Project Level Predictive Crash Frequency Worksheet for Segment 2 (MP 259.28 – MP 259.75)

| Input | Segment 2 |
|---|---|
| Number of Lanes (in both direction) | **9** |
| Station | 259.28-259.75 |
| Length of Freeway Segment (mi), Lfs | 0.47 |
| Length of Ramp entrance I adjacent to subject freeway segment (mi), Len-inc | 0 |
| Length of Ramp entrance i adjacent to subject freeway segment in opposing direction (mi), Len-dec | 0 |
| Length of Ramp exit i adjacent to subject freeway segment (mi), Lex-inc | 0.28 |
| Length of Ramp exit i adjacent to subject freeway segment (mi), Lex-dec | 0 |
| AADT volume of Freeway segment (veh/day) | 158000 |
| Curve >1000 ft? (0= No, 1= Yes), | 0 |
| number of horizontal curves in the segment, m | 0 |
| Curve length (mile) | 0 |
| equivalent radius of curve, Ri* | 0 |
| radius of curve i in one roadbed, Ra,i | 0 |
| radius of curve i in second roadbed, Rb,i | 0 |
| proportion of effective segment length with curve, Pc,i | 0 |
| Lane Width (ft), | 12 |
| Inside shoulder width (ft), | 10 |
| Median width, measured from near edges of traveled way in both directions (ft), Wm | 50 |
| Distance from edge of the inside shoulder to barrier face (ft), Wicb | 10 |
| Proportion of effective segment length with a barrier present in the median (inside), Pib | 1 |
| hours when volume exceeds 1000 veh/hr/ln, | 50 |
| Proportion of AADT during hours where volume exceeds 1000 veh/hr/ln, Pib | 10 |
| weaving section adjustment factor for travel in increasing milepost direction, fwev, inc | 1 |
| weaving section adjustment factor for travel in decreasing milepost direction, fwev, dec | 1 |
| proportion of segment length within a Type B weaving section for travel in increasing milepost direction, Pwev, inc | 0 |
| proportion of segment length within a Type B weaving section for travel in increasing milepost direction, Pwev, dec | 0 |
| weaving section length for travel in increasing milepost direction (may extend beyond segment boundaries) (mil), Lwev, inc | 0 |

Table: Project Level Predictive Crash Frequency Worksheet for Segment 2 (MP 259.28 – MP 259.75) (..cont)

| Input | Segment 2 |
|---|---|
| weaving section length for travel in decreasing milepost direction (may extend beyond segment boundaries) (mil), Lwev, dec | 0 |
| distance from segment begin milepost to nearest upstream entrance ramp gore point, for travel in increasing milepost direction (mile), Xb, ent | 0 |
| distance from segment begin milepost to nearest downstream exit ramp gore point, for travel in decreasing milepost direction (mile), Xb, ext | 0 |
| distance from segment end milepost to nearest upstream entrance ramp gore point, for travel in decreasing milepost direction (mile), Xe, ent | 0 |
| distance from segment begin milepost to nearest downstream exit ramp gore point, for travel in increasing milepost direction (mile), Xe, ext | 0 |
| AADT volume of entrance ramp located at distance Xb, ent, AADT b,ent | 0 |
| AADT volume of entrance ramp located at distance Xb, ext, AADT b,ext | 26000 |
| AADT volume of entrance ramp located at distance Xe, ent, AADT e,ent | 0 |
| AADT volume of entrance ramp located at distance Xe, ext, AADT e,ext | 0 |
| Outside shoulder width (ft), Ws | 10 |
| length of rumble strips present on the inside shoulders (mile) | 0 |
| length of rumble strips present on the outside shoulders (mile) | 0 |
| proportion of effective segment length with rumble strips present on the inside shoulders | 0 |
| proportion of effective segment length with rumble strips present on the outside shoulders | 0 |
| Proportion of effective segment length with a barrier present on the roadside (i.e, outside), Pob | 1 |
| clear zone width (ft), Whc | 30 |
| Distance from edge of the inside shoulder to barrier face (ft), Wicb | 10 |
| Effective Length of Freeway, L* | 0.33 |

Table: Project Level Predictive Crash Frequency Worksheet for Segment 2 (MP 259.28 – MP 259.75) (..cont)

| **Crash Output** | | | | |
|---|---|---|---|---|
| | **MV** | | **SV** | |
| | **Fatal and Injury** | **PDO** | **Fatal and Injury** | **PDO** |
| **Base Average Crash Frequency, $N_{spf,fs,n,yz}$ (Table 18-3 of HSM)** | 2.25 | 4.82 | 1.24 | 2.70 |
| | | | | |
| **Crash Modification Factors (CMF):** | | | | |
| CMF for Horizontal Curve, $CMF_1$ (Eq 18-24, Eq 18-40) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for Lane Width, $CMF_2$ (Eq 18-25, Eq 18-41) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for Inside Shoulder Width, $CMF_3$ (Eq 18-26, Eq 18-42) | 0.93 | 0.94 | 0.93 | 0.94 |
| CMF for Median Width, $CMF_4$ ((Eq 18-27, Eq 18-43) | 1.09 | 1.08 | 0.97 | 1.08 |
| CMF for Median barrier, $CMF_5$ (Eq 18-28, Eq 18-44) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for High Volume, $CMF_6$ (Eq 18-29, Eq 18-45) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for Lane Change, $CMF_7$ (Eq 18-30) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for Outside Shoulder Width, $CMF_8$ (Eq 18-35) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for Shoulder Rumble Strip, $CMF_9$ (Eq 18-36) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for Outside Clearance, $CMF_{10}$ (Eq 18-38) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for Outside barrier, $CMF_{11}$ (Eq 18-39) | 1.01 | 1.02 | 1.01 | 1.02 |
| | | | | |
| **Predicted Average Crash Frequency, $N_{p,fs,n,yz}$ ( Eq 18-1)** | 2.31 | 5.00 | 1.14 | 2.81 |

Table: Project Level Predictive Crash Frequency Worksheet for Segment 3 (MP 259.05– MP 259.28)

| Input | Segment 3 |
|---|---|
| Number of Lanes (in both direction) | 8 |
| Station | 259.05-259.28 |
| Length of Freeway Segment (mi), Lfs | 0.23 |
| Length of Ramp entrance I adjacent to subject freeway segment (mi), Len-inc | 0 |
| Length of Ramp entrance i adjacent to subject freeway segment in opposing direction (mi), Len-dec | 0 |
| Length of Ramp exit i adjacent to subject freeway segment (mi), Lex-inc | 0 |
| Length of Ramp exit i adjacent to subject freeway segment (mi), Lex-dec | 0 |
| AADT volume of Freeway segment (veh/day) | 158000 |
| Curve >1000 ft? (0= No, 1= Yes), | 0 |
| number of horizontal curves in the segment, m | 0 |
| Curve length (mile) | 0 |
| equivalent radius of curve, Ri* | 0 |
| radius of curve i in one roadbed, Ra,i | 0 |
| radius of curve i in second roadbed, Rb,i | 0 |
| proportion of effective segment length with curve, Pc,i | 0 |
| Lane Width (ft), | 12 |
| Inside shoulder width (ft), | 10 |
| Median width, measured from near edges of traveled way in both directions (ft), Wm | 30 |
| Distance from edge of the inside shoulder to barrier face (ft), Wicb | 10 |
| Proportion of effective segment length with a barrier present in the median (inside), Pib | 1 |
| hours when volume exceeds 1000 veh/hr/ln, | 30 |
| Proportion of AADT during hours where volume exceeds 1000 veh/hr/ln, Pib | 10 |
| weaving section adjustment factor for travel in increasing milepost direction, fwev, inc | 1 |
| weaving section adjustment factor for travel in decreasing milepost direction, fwev, dec | 0 |
| proportion of segment length within a Type B weaving section for travel in increasing milepost direction, Pwev, inc | 1 |
| proportion of segment length within a Type B weaving section for travel in increasing milepost direction, Pwev, dec | 0 |
| weaving section length for travel in increasing milepost direction (may extend beyond segment boundaries) (mil), Lwev, inc | 0.23 |

Table: Project Level Predictive Crash Frequency Worksheet for Segment 3 (MP 259.05– MP 259.28) (..cont)

| Input | Segment 3 |
|---|---|
| weaving section length for travel in decreasing milepost direction (may extend beyond segment boundaries) (mil), Lwev, dec | 0 |
| distance from segment begin milepost to nearest upstream entrance ramp gore point, for travel in increasing milepost direction (mile), Xb, ent | 0 |
| distance from segment begin milepost to nearest downstream exit ramp gore point, for travel in decreasing milepost direction (mile), Xb, ext | 0.03 |
| distance from segment end milepost to nearest upstream entrance ramp gore point, for travel in decreasing milepost direction (mile), Xe, ent | 0 |
| distance from segment begin milepost to nearest downstream exit ramp gore point, for travel in increasing milepost direction (mile), Xe, ext | 0.68 |
| AADT volume of entrance ramp located at distance Xb, ent, AADT b,ent | 4000 |
| AADT volume of entrance ramp located at distance Xb, ext, AADT b,ext | 4000 |
| AADT volume of entrance ramp located at distance Xe, ent, AADT e,ent | 0 |
| AADT volume of entrance ramp located at distance Xe, ext, AADT e,ext | 9000 |
| Outside shoulder width (ft), Ws | 10 |
| length of rumble strips present on the inside shoulders (mile) | 0 |
| length of rumble strips present on the outside shoulders (mile) | 0 |
| proportion of effective segment length with rumble strips present on the inside shoulders | 0 |
| proportion of effective segment length with rumble strips present on the outside shoulders | 0 |
| Proportion of effective segment length with a barrier present on the roadside (i.e, outside), Pob | 1 |
| clear zone width (ft), Whc | 30 |
| Distance from edge of the inside shoulder to barrier face (ft), Wicb | 10 |
| Effective Length of Freeway, L* | 0.23 |

Table: Project Level Predictive Crash Frequency Worksheet for Segment 3 (MP 259.05– MP 259.28) (..cont)

| **Crash Output** | | | | |
|---|---|---|---|---|
| | **MV** | | **SV** | |
| | **Fatal and Injury** | **PDO** | **Fatal and Injury** | **PDO** |
| **Base Average Crash Frequency, $N_{spf,fs,n,yz}$ (Table 18-3 of HSM)** | 1.57 | 3.80 | 0.83 | 1.92 |
| | | | | |
| **Crash Modification Factors (CMF):** | | | | |
| CMF for Horizontal Curve, $CMF_1$ (Eq 18-24, Eq 18-40) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for Lane Width, $CMF_2$ (Eq 18-25, Eq 18-41) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for Inside Shoulder Width, $CMF_3$ (Eq 18-26, Eq 18-42) | 0.93 | 0.94 | 0.93 | 0.94 |
| CMF for Median Width, $CMF_4$ ((Eq 18-27, Eq 18-43) | 1.09 | 1.08 | 0.97 | 1.08 |
| CMF for Median barrier, $CMF_5$ (Eq 18-28, Eq 18-44) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for High Volume, $CMF_6$ (Eq 18-29, Eq 18-45) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for Lane Change, $CMF_7$ (Eq 18-30) | 2.38 | 2.36 | 1.00 | 1.00 |
| CMF for Outside Shoulder Width, $CMF_8$ (Eq 18-35) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for Shoulder Rumble Strip, $CMF_9$ (Eq 18-36) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for Outside Clearance, $CMF_{10}$ (Eq 18-38) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for Outside barrier, $CMF_{11}$ (Eq 18-39) | 1.01 | 1.02 | 1.01 | 1.02 |
| | | | | |
| **Predicted Average Crash Frequency, $N_{p,fs,n,yz}$ ( Eq 18-1)** | **3.84** | **9.32** | **0.76** | **1.99** |

Table: Project Level Predictive Crash Frequency Worksheet for Segment 4 (MP 258.75 – MP 259.05)

| Input | Segment 4 |
|---|---|
| Number of Lanes (in both direction) | **9** |
| Station | 258.75-259.05 |
| Length of Freeway Segment (mi), Lfs | 0.3 |
| Length of Ramp entrance I adjacent to subject freeway segment (mi), Len-inc | 0 |
| Length of Ramp entrance i adjacent to subject freeway segment in opposing direction (mi), Len-dec | 0 |
| Length of Ramp exit i adjacent to subject freeway segment (mi), Lex-inc | 0 |
| Length of Ramp exit i adjacent to subject freeway segment (mi), Lex-dec | 0 |
| AADT volume of Freeway segment (veh/day) | 158000 |
| Curve >1000 ft? (0= No, 1= Yes), | 0 |
| number of horizontal curves in the segment, m | 0 |
| Curve length (mile) | 0 |
| equivalent radius of curve, Ri* | 0 |
| radius of curve i in one roadbed, Ra,i | 0 |
| radius of curve i in second roadbed, Rb,i | 0 |
| proportion of effective segment length with curve, Pc,i | 0 |
| Lane Width (ft), | 12 |
| Inside shoulder width (ft), | 10 |
| Median width, measured from near edges of traveled way in both directions (ft), Wm | 30 |
| Distance from edge of the inside shoulder to barrier face (ft), Wicb | 10 |
| Proportion of effective segment length with a barrier present in the median (inside), Pib | 1 |
| hours when volume exceeds 1000 veh/hr/ln, | 30 |
| Proportion of AADT during hours where volume exceeds 1000 veh/hr/ln, Pib | 10 |
| weaving section adjustment factor for travel in increasing milepost direction, fwev, inc | 1 |
| weaving section adjustment factor for travel in decreasing milepost direction, fwev, dec | 1 |
| proportion of segment length within a Type B weaving section for travel in increasing milepost direction, Pwev, inc | 0 |
| proportion of segment length within a Type B weaving section for travel in increasing milepost direction, Pwev, dec | 0 |
| weaving section length for travel in increasing milepost direction (may extend beyond segment boundaries) (mil), Lwev, inc | 0 |

Table: Project Level Predictive Crash Frequency Worksheet for Segment 4 (MP 258.75 – MP 259.05) (..cont)

| Input | Segment 4 |
|---|---|
| weaving section length for travel in decreasing milepost direction (may extend beyond segment boundaries) (mil), Lwev, dec | 0 |
| distance from segment begin milepost to nearest upstream entrance ramp gore point, for travel in increasing milepost direction (mile), Xb, ent | 0 |
| distance from segment begin milepost to nearest downstream exit ramp gore point, for travel in decreasing milepost direction (mile), Xb, ext | 0 |
| distance from segment end milepost to nearest upstream entrance ramp gore point, for travel in decreasing milepost direction (mile), Xe, ent | 0 |
| distance from segment begin milepost to nearest downstream exit ramp gore point, for travel in increasing milepost direction (mile), Xe, ext | 0 |
| AADT volume of entrance ramp located at distance Xb, ent, AADT b,ent | 0 |
| AADT volume of entrance ramp located at distance Xb, ext, AADT b,ext | 0 |
| AADT volume of entrance ramp located at distance Xe, ent, AADT e,ent | 0 |
| AADT volume of entrance ramp located at distance Xe, ext, AADT e,ext | 0 |
| Outside shoulder width (ft), Ws | 10 |
| length of rumble strips present on the inside shoulders (mile) | 0 |
| length of rumble strips present on the outside shoulders (mile) | 0 |
| proportion of effective segment length with rumble strips present on the inside shoulders | 0 |
| proportion of effective segment length with rumble strips present on the outside shoulders | 0 |
| Proportion of effective segment length with a barrier present on the roadside (i.e, outside), Pob | 1 |
| clear zone width (ft), Whc | 30 |
| Distance from edge of the inside shoulder to barrier face (ft), Wicb | 10 |
| Effective Length of Freeway, L* | 0.3 |

Table: Project Level Predictive Crash Frequency Worksheet for Segment 4 (MP 258.75 – MP 259.05) (..cont)

| **Crash Output** | | | | |
|---|---|---|---|---|
| | **MV** | | **SV** | |
| | **Fatal and Injury** | **PDO** | **Fatal and Injury** | **PDO** |
| **Base Average Crash Frequency, $N_{spf,fs,n,yz}$ (Table 18-3 of HSM)** | 1.57 | 3.80 | 0.83 | 1.92 |
| | | | | |
| **Crash Modification Factors (CMF):** | | | | |
| CMF for Horizontal Curve, $CMF_1$ (Eq 18-24, Eq 18-40) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for Lane Width, $CMF_2$ (Eq 18-25, Eq 18-41) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for Inside Shoulder Width, $CMF_3$ (Eq 18-26, Eq 18-42) | 0.93 | 0.94 | 0.93 | 0.94 |
| CMF for Median Width, $CMF_4$ ((Eq 18-27, Eq 18-43) | 1.09 | 1.08 | 0.97 | 1.08 |
| CMF for Median barrier, $CMF_5$ (Eq 18-28, Eq 18-44) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for High Volume, $CMF_6$ (Eq 18-29, Eq 18-45) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for Lane Change, $CMF_7$ (Eq 18-30) | 2.38 | 2.36 | 1.00 | 1.00 |
| CMF for Outside Shoulder Width, $CMF_8$ (Eq 18-35) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for Shoulder Rumble Strip, $CMF_9$ (Eq 18-36) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for Outside Clearance, $CMF_{10}$ (Eq 18-38) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for Outside barrier, $CMF_{11}$ (Eq 18-39) | 1.01 | 1.02 | 1.01 | 1.02 |
| | | | | |
| **Predicted Average Crash Frequency, $N_{p,fs,n,yz}$ ( Eq 18-1)** | **3.84** | **9.32** | **0.76** | **1.99** |

Table: Project Level Predictive Crash Frequency Worksheet for Segment 5 (MP 258.57 – MP 258.75)

| Input | Segment 5 |
|---|---|
| Number of Lanes (in both direction) | 10 |
| Station | 258.57-258.75 |
| Length of Freeway Segment (mi), Lfs | 0.18 |
| Length of Ramp entrance I adjacent to subject freeway segment (mi), Len-inc | 0 |
| Length of Ramp entrance i adjacent to subject freeway segment in opposing direction (mi), Len-dec | 0 |
| Length of Ramp exit i adjacent to subject freeway segment (mi), Lex-inc | 0 |
| Length of Ramp exit i adjacent to subject freeway segment (mi), Lex-dec | 0 |
| AADT volume of Freeway segment (veh/day) | 155,000 |
| Curve >1000 ft? (0= No, 1= Yes), | **0** |
| number of horizontal curves in the segment, m | 0 |
| Curve length (mile) | 0 |
| equivalent radius of curve, Ri* | - |
| radius of curve i in one roadbed, Ra,i | 0 |
| radius of curve i in second roadbed, Rb,i | 0.000 |
| proportion of effective segment length with curve, Pc,i | 0.000 |
| Lane Width (ft), | 12 |
| Inside shoulder width (ft), | 10 |
| Median width, measured from near edges of traveled way in both directions (ft), Wm | 50 |
| Distance from edge of the inside shoulder to barrier face (ft), Wicb | 10 |
| Proportion of effective segment length with a barrier present in the median (inside), Pib | 1 |
| hours when volume exceeds 1000 veh/hr/ln, | 0 |
| Proportion of AADT during hours where volume exceeds 1000 veh/hr/ln, Pib | 0 |
| weaving section adjustment factor for travel in increasing milepost direction, fwev, inc | 1 |
| weaving section adjustment factor for travel in decreasing milepost direction, fwev, dec | 1 |
| proportion of segment length within a Type B weaving section for travel in increasing milepost direction, Pwev, inc | 0 |
| proportion of segment length within a Type B weaving section for travel in increasing milepost direction, Pwev, dec | 0 |
| weaving section length for travel in increasing milepost direction (may extend beyond segment boundaries) (mil), Lwev, inc | 0 |

Table: Project Level Predictive Crash Frequency Worksheet for Segment 5 (MP 258.57 – MP 258.75) (…cont)

| Input | Segment 5 |
|---|---|
| weaving section length for travel in decreasing milepost direction (may extend beyond segment boundaries) (mil), Lwev, dec | 0 |
| distance from segment begin milepost to nearest upstream entrance ramp gore point, for travel in increasing milepost direction (mile), Xb, ent | 0 |
| distance from segment begin milepost to nearest downstream exit ramp gore point, for travel in decreasing milepost direction (mile), Xb, ext | 0 |
| distance from segment end milepost to nearest upstream entrance ramp gore point, for travel in decreasing milepost direction (mile), Xe, ent | 0 |
| distance from segment begin milepost to nearest downstream exit ramp gore point, for travel in increasing milepost direction (mile), Xe, ext | 0 |
| AADT volume of entrance ramp located at distance Xb, ent, AADT b,ent | - |
| AADT volume of entrance ramp located at distance Xb, ext, AADT b,ext | - |
| AADT volume of entrance ramp located at distance Xe, ent, AADT e,ent | - |
| AADT volume of entrance ramp located at distance Xe, ext, AADT e,ext | - |
| Outside shoulder width (ft), Ws | 10 |
| length of rumble strips present on the inside shoulders (mile) | 0 |
| length of rumble strips present on the outside shoulders (mile) | 0 |
| proportion of effective segment length with rumble strips present on the inside shoulders | 0 |
| proportion of effective segment length with rumble strips present on the outside shoulders | 0 |
| Proportion of effective segment length with a barrier present on the roadside (i.e, outside), Pob | 1 |
| clear zone width (ft), Whc | 30 |
| Distance from edge of the inside shoulder to barrier face (ft), Wicb | 10 |
| Effective Length of Freeway, L* | 0.18 |

Table: Project Level Predictive Crash Frequency Worksheet for Segment 5 (MP 257.57 – MP 258.25) (…cont)

| **Crash Output** | | | | |
|---|---|---|---|---|
| | **MV** | | **SV** | |
| | **Fatal and Injury** | **PDO** | **Fatal and Injury** | **PDO** |
| **Base Average Crash Frequency, $N_{spf,fs,n,yz}$ (Table 18-3 of HSM)** | 1.19 | 2.20 | 0.69 | 1.42 |
| | | | | |
| **Crash Modification Factors (CMF):** | | | | |
| CMF for Horizontal Curve, $CMF_1$ (Eq 18-24, Eq 18-40) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for Lane Width, $CMF_2$ (Eq 18-25, Eq 18-41) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for Inside Shoulder Width, $CMF_3$ (Eq 18-26, Eq 18-42) | 0.93 | 0.94 | 0.93 | 0.94 |
| CMF for Median Width, $CMF_4$ ((Eq 18-27, Eq 18-43) | 1.09 | 1.08 | 0.97 | 1.08 |
| CMF for Median barrier, $CMF_5$ (Eq 18-28, Eq 18-44) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for High Volume, $CMF_6$ (Eq 18-29, Eq 18-45) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for Lane Change, $CMF_7$ (Eq 18-30) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for Outside Shoulder Width, $CMF_8$ (Eq 18-35) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for Shoulder Rumble Strip, $CMF_9$ (Eq 18-36) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for Outside Clearance, $CMF_{10}$ (Eq 18-38) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for Outside barrier, $CMF_{11}$ (Eq 18-39) | 1.01 | 1.02 | 1.01 | 1.02 |
| | | | | |
| **Predicted Average Crash Frequency, $N_{p,fs,n,yz}$ ( Eq 18-1)** | 1.23 | 2.29 | 0.63 | 1.48 |

Table: Project Level Predictive Crash Frequency Worksheet for Segment 6 (MP 258.25– MP 258.57)

| Input | Segment 6 |
|---|---|
| Number of Lanes (in both direction) | 10 |
| Station | 258.25-258.57 |
| Length of Freeway Segment (mi), Lfs | 0.32 |
| Length of Ramp entrance I adjacent to subject freeway segment (mi), Len-inc | 0 |
| Length of Ramp entrance i adjacent to subject freeway segment in opposing direction (mi), Len-dec | 0 |
| Length of Ramp exit i adjacent to subject freeway segment (mi), Lex-inc | 0 |
| Length of Ramp exit i adjacent to subject freeway segment (mi), Lex-dec | 0 |
| AADT volume of Freeway segment (veh/day) | 155,000 |
| Curve >1000 ft? (0= No, 1= Yes), | **0** |
| number of horizontal curves in the segment, m | 0 |
| Curve length (mile) | 0 |
| equivalent radius of curve, Ri* | - |
| radius of curve i in one roadbed, Ra,i | 0 |
| radius of curve i in second roadbed, Rb,i | 0.000 |
| proportion of effective segment length with curve, Pc,i | 0.000 |
| Lane Width (ft), | 12 |
| Inside shoulder width (ft), | 10 |
| Median width, measured from near edges of traveled way in both directions (ft), Wm | 30 |
| Distance from edge of the inside shoulder to barrier face (ft), Wicb | 10 |
| Proportion of effective segment length with a barrier present in the median (inside), Pib | 1 |
| hours when volume exceeds 1000 veh/hr/ln, | 0 |
| Proportion of AADT during hours where volume exceeds 1000 veh/hr/ln, Pib | 0 |
| weaving section adjustment factor for travel in increasing milepost direction, fwev, inc | 0 |
| weaving section adjustment factor for travel in decreasing milepost direction, fwev, dec | 0 |
| proportion of segment length within a Type B weaving section for travel in increasing milepost direction, Pwev, inc | 1 |
| proportion of segment length within a Type B weaving section for travel in increasing milepost direction, Pwev, dec | 1 |
| weaving section length for travel in increasing milepost direction (may extend beyond segment boundaries) (mil), Lwev, inc | 0.71 |

Table: Project Level Predictive Crash Frequency Worksheet for Segment 6 (MP 258.25– MP 258.57) (..cont)

| Input | Segment 6 |
|---|---|
| weaving section length for travel in decreasing milepost direction (may extend beyond segment boundaries) (mil), Lwev, dec | 0 |
| distance from segment begin milepost to nearest upstream entrance ramp gore point, for travel in increasing milepost direction (mile), Xb, ent | 0.37 |
| distance from segment begin milepost to nearest downstream exit ramp gore point, for travel in decreasing milepost direction (mile), Xb, ext | 0 |
| distance from segment end milepost to nearest upstream entrance ramp gore point, for travel in decreasing milepost direction (mile), Xe, ent | 0 |
| distance from segment begin milepost to nearest downstream exit ramp gore point, for travel in increasing milepost direction (mile), Xe, ext | 0 |
| AADT volume of entrance ramp located at distance Xb, ent, AADT b,ent | 20,000 |
| AADT volume of entrance ramp located at distance Xb, ext, AADT b,ext | - |
| AADT volume of entrance ramp located at distance Xe, ent, AADT e,ent | - |
| AADT volume of entrance ramp located at distance Xe, ext, AADT e,ext | 6,000 |
| Outside shoulder width (ft), Ws | 10 |
| length of rumble strips present on the inside shoulders (mile) | 0 |
| length of rumble strips present on the outside shoulders (mile) | 0 |
| proportion of effective segment length with rumble strips present on the inside shoulders | 0 |
| proportion of effective segment length with rumble strips present on the outside shoulders | 0 |
| Proportion of effective segment length with a barrier present on the roadside (i.e, outside), Pob | 1 |
| clear zone width (ft), Whc | 30 |
| Distance from edge of the inside shoulder to barrier face (ft), Wicb | 10 |
| Effective Length of Freeway, L* | 0.6 |

Table: Project Level Predictive Crash Frequency Worksheet for Segment 6 (MP 258.25– MP 258.57) (..cont)

| **Crash Output** | | | | |
|---|---|---|---|---|
| | **MV** | | **SV** | |
| | **Fatal and Injury** | **PDO** | **Fatal and Injury** | **PDO** |
| **Base Average Crash Frequency, $N_{spf,fs,n,yz}$ (Table 18-3 of HSM)** | 2.12 | 3.91 | 1.23 | 2.53 |
| | | | | |
| **Crash Modification Factors (CMF):** | | | | |
| CMF for Horizontal Curve, $CMF_1$ (Eq 18-24, Eq 18-40) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for Lane Width, $CMF_2$ (Eq 18-25, Eq 18-41) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for Inside Shoulder Width, $CMF_3$ (Eq 18-26, Eq 18-42) | 0.93 | 0.94 | 0.93 | 0.94 |
| CMF for Median Width, $CMF_4$ ((Eq 18-27, Eq 18-43) | 1.09 | 1.08 | 0.97 | 1.08 |
| CMF for Median barrier, $CMF_5$ (Eq 18-28, Eq 18-44) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for High Volume, $CMF_6$ (Eq 18-29, Eq 18-45) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for Lane Change, $CMF_7$ (Eq 18-30) | 1.38 | 1.37 | 1.00 | 1.00 |
| CMF for Outside Shoulder Width, $CMF_8$ (Eq 18-35) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for Shoulder Rumble Strip, $CMF_9$ (Eq 18-36) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for Outside Clearance, $CMF_{10}$ (Eq 18-38) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for Outside barrier, $CMF_{11}$ (Eq 18-39) | 1.01 | 1.02 | 1.01 | 1.02 |
| | | | | |
| **Predicted Average Crash Frequency, $N_{p,fs,n,yz}$ ( Eq 18-1)** | **3.00** | **5.56** | **1.13** | **2.62** |

Table: Project Level Predictive Crash Frequency Worksheet for Segment 7 (MP 257.60– MP 258.25)

| Input | Segment 7 |
|---|---|
| Number of Lanes (in both direction) | 8 |
| Station | 257.80-258.25 |
| Length of Freeway Segment (mi), Lfs | 0.45 |
| Length of Ramp entrance I adjacent to subject freeway segment (mi), Len-inc | 0 |
| Length of Ramp entrance i adjacent to subject freeway segment in opposing direction (mi), Len-dec | 0 |
| Length of Ramp exit i adjacent to subject freeway segment (mi), Lex-inc | 0 |
| Length of Ramp exit i adjacent to subject freeway segment (mi), Lex-dec | 0 |
| AADT volume of Freeway segment (veh/day) | 155,000 |
| Curve >1000 ft? (0= No, 1= Yes), | **1** |
| number of horizontal curves in the segment, m | 1 |
| Curve length (mile) | 0.15 |
| equivalent radius of curve, Ri* | 1,968 |
| radius of curve i in one roadbed, Ra,i | 0 |
| radius of curve i in second roadbed, Rb,i | 0.000 |
| proportion of effective segment length with curve, Pc,i | 0.273 |
| Lane Width (ft), | 12 |
| Inside shoulder width (ft), | 15 |
| Median width, measured from near edges of traveled way in both directions (ft), Wm | 30 |
| Distance from edge of the inside shoulder to barrier face (ft), Wicb | 10 |
| Proportion of effective segment length with a barrier present in the median (inside), Pib | 1 |
| hours when volume exceeds 1000 veh/hr/ln, | 0 |
| Proportion of AADT during hours where volume exceeds 1000 veh/hr/ln, Pib | 0 |
| weaving section adjustment factor for travel in increasing milepost direction, fwev, inc | 0 |
| weaving section adjustment factor for travel in decreasing milepost direction, fwev, dec | 0 |
| proportion of segment length within a Type B weaving section for travel in increasing milepost direction, Pwev, inc | 1 |
| proportion of segment length within a Type B weaving section for travel in increasing milepost direction, Pwev, dec | 1 |
| weaving section length for travel in increasing milepost direction (may extend beyond segment boundaries) (mil), Lwev, inc | 0.71 |

Table: Project Level Predictive Crash Frequency Worksheet for Segment 6 (MP 257.60– MP 258.25) (..cont)

| Input | Segment 6 |
|---|---|
| weaving section length for travel in decreasing milepost direction (may extend beyond segment boundaries) (mil), Lwev, dec | 0 |
| distance from segment begin milepost to nearest upstream entrance ramp gore point, for travel in increasing milepost direction (mile), Xb, ent | 0 |
| distance from segment begin milepost to nearest downstream exit ramp gore point, for travel in decreasing milepost direction (mile), Xb, ext | 0 |
| distance from segment end milepost to nearest upstream entrance ramp gore point, for travel in decreasing milepost direction (mile), Xe, ent | 0 |
| distance from segment begin milepost to nearest downstream exit ramp gore point, for travel in increasing milepost direction (mile), Xe, ext | 0.36 |
| AADT volume of entrance ramp located at distance Xb, ent, AADT b,ent | 20,000 |
| AADT volume of entrance ramp located at distance Xb, ext, AADT b,ext | - |
| AADT volume of entrance ramp located at distance Xe, ent, AADT e,ent | - |
| AADT volume of entrance ramp located at distance Xe, ext, AADT e,ext | 6,000 |
| Outside shoulder width (ft), Ws | 10 |
| length of rumble strips present on the inside shoulders (mile) | 0 |
| length of rumble strips present on the outside shoulders (mile) | 0 |
| proportion of effective segment length with rumble strips present on the inside shoulders | 0 |
| proportion of effective segment length with rumble strips present on the outside shoulders | 0 |
| Proportion of effective segment length with a barrier present on the roadside (i.e, outside), Pob | 1 |
| clear zone width (ft), Whc | 30 |
| Distance from edge of the inside shoulder to barrier face (ft), Wicb | 10 |
| Effective Length of Freeway, L* | 0.55 |

Table: Project Level Predictive Crash Frequency Worksheet for Segment 6 (MP 257.60– MP 258.25) (..cont)

| **Crash Output** | | | | |
|---|---|---|---|---|
| | **MV** | | **SV** | |
| | **Fatal and Injury** | **PDO** | **Fatal and Injury** | **PDO** |
| **Base Average Crash Frequency, $N_{spf,fs,n,yz}$ (Table 18-3 of HSM)** | 2.978 | 7.160 | 1.607 | 3.697 |
| | | | | |
| **Crash Modification Factors (CMF):** | | | | |
| CMF for Horizontal Curve, $CMF_1$ (Eq 18-24, Eq 18-40) | 1.04 | 1.08 | 1.17 | 1.14 |
| CMF for Lane Width, $CMF_2$ (Eq 18-25, Eq 18-41) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for Inside Shoulder Width, $CMF_3$ (Eq 18-26, Eq 18-42) | 0.86 | 0.87 | 0.86 | 0.87 |
| CMF for Median Width, $CMF_4$ ((Eq 18-27, Eq 18-43) | 1.09 | 1.08 | 0.97 | 1.08 |
| CMF for Median barrier, $CMF_5$ (Eq 18-28, Eq 18-44) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for High Volume, $CMF_6$ (Eq 18-29, Eq 18-45) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for Lane Change, $CMF_7$ (Eq 18-30) | 1.33 | 1.33 | 1.00 | 1.00 |
| CMF for Outside Shoulder Width, $CMF_8$ (Eq 18-35) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for Shoulder Rumble Strip, $CMF_9$ (Eq 18-36) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for Outside Clearance, $CMF_{10}$ (Eq 18-38) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for Outside barrier, $CMF_{11}$ (Eq 18-39) | 1.01 | 1.02 | 1.01 | 1.02 |
| | | | | |
| **Predicted Average Crash Frequency, $N_{p,fs,n,yz}$ ( Eq 18-1)** | 3.89 | 9.84 | 1.58 | 4.07 |

Appendix- 2050 Build Condition Worksheet

Table: Project Level Predictive Crash Frequency Worksheet for Segment 1 (MP 259.75 – MP 260.20)

| Input | Segment 1 |
|---|---|
| Number of Lanes (in both direction) | 12 |
| Station | 259.75-260.20 |
| Length of Freeway Segment (mi), Lfs | 0.45 |
| Length of Ramp entrance I adjacent to subject freeway segment (mi), Len-inc | 0 |
| Length of Ramp entrance i adjacent to subject freeway segment in opposing direction (mi), Len-dec | 0 |
| Length of Ramp exit i adjacent to subject freeway segment (mi), Lex-inc | 0 |
| Length of Ramp exit i adjacent to subject freeway segment (mi), Lex-dec | 0 |
| AADT volume of Freeway segment (veh/day) | 180,000 |
| Curve >1000 ft? (0= No, 1= Yes), | **0** |
| number of horizontal curves in the segment, m | 0 |
| Curve length (mile) | 0 |
| equivalent radius of curve, Ri* | - |
| radius of curve i in one roadbed, Ra,i | 0 |
| radius of curve i in second roadbed, Rb,i | 0.000 |
| proportion of effective segment length with curve, Pc,i | 0.000 |
| Lane Width (ft), | 12 |
| Inside shoulder width (ft), | 10 |
| Median width, measured from near edges of traveled way in both directions (ft), Wm | 30 |
| Distance from edge of the inside shoulder to barrier face (ft), Wicb | 10 |
| Proportion of effective segment length with a barrier present in the median (inside), Pib | 1 |
| hours when volume exceeds 1000 veh/hr/ln, | 0 |
| Proportion of AADT during hours where volume exceeds 1000 veh/hr/ln, Pib | 0 |
| weaving section adjustment factor for travel in increasing milepost direction, fwev, inc | 0 |
| weaving section adjustment factor for travel in decreasing milepost direction, fwev, dec | 0 |
| proportion of segment length within a Type B weaving section for travel in increasing milepost direction, Pwev, inc | 0 |
| proportion of segment length within a Type B weaving section for travel in increasing milepost direction, Pwev, dec | 0 |
| weaving section length for travel in increasing milepost direction (may extend beyond segment boundaries) (mil), Lwev, inc | 0 |

Table: Project Level Predictive Crash Frequency Worksheet for Segment 1 (MP 259.75 – MP 260.20) (…cont)

| Input | Segment 1 |
|---|---|
| weaving section length for travel in decreasing milepost direction (may extend beyond segment boundaries) (mil), Lwev, dec | 0 |
| distance from segment begin milepost to nearest upstream entrance ramp gore point, for travel in increasing milepost direction (mile), Xb, ent | 0 |
| distance from segment begin milepost to nearest downstream exit ramp gore point, for travel in decreasing milepost direction (mile), Xb, ext | 0 |
| distance from segment end milepost to nearest upstream entrance ramp gore point, for travel in decreasing milepost direction (mile), Xe, ent | 0 |
| distance from segment begin milepost to nearest downstream exit ramp gore point, for travel in increasing milepost direction (mile), Xe, ext | 0 |
| AADT volume of entrance ramp located at distance Xb, ent, AADT b,ent | - |
| AADT volume of entrance ramp located at distance Xb, ext, AADT b,ext | - |
| AADT volume of entrance ramp located at distance Xe, ent, AADT e,ent | - |
| AADT volume of entrance ramp located at distance Xe, ext, AADT e,ext | - |
| Outside shoulder width (ft), Ws | 10 |
| length of rumble strips present on the inside shoulders (mile) | 0 |
| length of rumble strips present on the outside shoulders (mile) | 0 |
| proportion of effective segment length with rumble strips present on the inside shoulders | 0 |
| proportion of effective segment length with rumble strips present on the outside shoulders | 0 |
| Proportion of effective segment length with a barrier present on the roadside (i.e, outside), Pob | 1 |
| clear zone width (ft), Whc | 30 |
| Distance from edge of the inside shoulder to barrier face (ft), Wicb | 10 |
| Effective Length of Freeway, L* | 0.45 |

Table: Project Level Predictive Crash Frequency Worksheet for Segment 1 (MP 259.75 – MP 260.20) (…cont)

| Crash Output | | | | |
|---|---|---|---|---|
| | MV | | SV | |
| | Fatal and Injury | PDO | Fatal and Injury | PDO |
| **Base Average Crash Frequency, $N_{spf,fs,n,yz}$ (Table 18-3 of HSM)** | **3.72** | **7.35** | **1.90** | **4.05** |
| | | | | |
| **Crash Modification Factors (CMF):** | | | | |
| CMF for Horizontal Curve, $CMF_1$ (Eq 18-24, Eq 18-40) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for Lane Width, $CMF_2$ (Eq 18-25, Eq 18-41) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for Inside Shoulder Width, $CMF_3$ (Eq 18-26, Eq 18-42) | 0.93 | 0.94 | 0.93 | 0.94 |
| CMF for Median Width, $CMF_4$ ((Eq 18-27, Eq 18-43) | 1.09 | 1.08 | 0.97 | 1.08 |
| CMF for Median barrier, $CMF_5$ (Eq 18-28, Eq 18-44) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for High Volume, $CMF_6$ (Eq 18-29, Eq 18-45) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for Lane Change, $CMF_7$ (Eq 18-30) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for Outside Shoulder Width, $CMF_8$ (Eq 18-35) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for Shoulder Rumble Strip, $CMF_9$ (Eq 18-36) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for Outside Clearance, $CMF_{10}$ (Eq 18-38) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for Outside barrier, $CMF_{11}$ (Eq 18-39) | 1.01 | 1.02 | 1.01 | 1.02 |
| CMF for one additional lane on both direction, CMF** | 0.72 | 0.72 | 0.72 | 0.72 |
| | | | | |
| **Predicted Average Crash Frequency, $N_{p,fs,n,yz}$ ( Eq 18-1)** | **2.76** | **5.49** | **1.26** | **3.03** |

** As predictive method does not have provision for 12 lane freeway, this value is applied to consider that scenario. Source: Traffic Operation Division Texas Department of Transportation (Developing Methodology for Identifying, Evaluating, and Prioritizing Systemic Improvements, Pg 92)

Table: Project Level Predictive Crash Frequency Worksheet for Segment 2 (MP 258.75 – MP 259.05)

| Input | Segment 2 |
|---|---|
| Number of Lanes (in both direction) | 11 |
| Station | 258.75-259.05 |
| Length of Freeway Segment (mi), Lfs | 0.3 |
| Length of Ramp entrance I adjacent to subject freeway segment (mi), Len-inc | 0 |
| Length of Ramp entrance i adjacent to subject freeway segment in opposing direction (mi), Len-dec | 0 |
| Length of Ramp exit i adjacent to subject freeway segment (mi), Lex-inc | 0 |
| Length of Ramp exit i adjacent to subject freeway segment (mi), Lex-dec | 0 |
| AADT volume of Freeway segment (veh/day) | 180,000 |
| Curve >1000 ft? (0= No, 1= Yes), | **0** |
| number of horizontal curves in the segment, m | 0 |
| Curve length (mile) | 0 |
| equivalent radius of curve, Ri* | - |
| radius of curve i in one roadbed, Ra,i | 0 |
| radius of curve i in second roadbed, Rb,i | 0.000 |
| proportion of effective segment length with curve, Pc,i | 0.000 |
| Lane Width (ft), | 12 |
| Inside shoulder width (ft), | 10 |
| Median width, measured from near edges of traveled way in both directions (ft), Wm | 30 |
| Distance from edge of the inside shoulder to barrier face (ft), Wicb | 10 |
| Proportion of effective segment length with a barrier present in the median (inside), Pib | 1 |
| hours when volume exceeds 1000 veh/hr/ln, | 0 |
| Proportion of AADT during hours where volume exceeds 1000 veh/hr/ln, Pib | 0 |
| weaving section adjustment factor for travel in increasing milepost direction, fwev, inc | 0 |
| weaving section adjustment factor for travel in decreasing milepost direction, fwev, dec | 0 |
| proportion of segment length within a Type B weaving section for travel in increasing milepost direction, Pwev, inc | 0 |
| proportion of segment length within a Type B weaving section for travel in increasing milepost direction, Pwev, dec | 0 |
| weaving section length for travel in increasing milepost direction (may extend beyond segment boundaries) (mil), Lwev, inc | 0 |

Table: Project Level Predictive Crash Frequency Worksheet for Segment 2 (MP 258.75 – MP 259.05)) (..cont)

| Input | Segment 2 |
|---|---|
| weaving section length for travel in decreasing milepost direction (may extend beyond segment boundaries) (mil), Lwev, dec | 0 |
| distance from segment begin milepost to nearest upstream entrance ramp gore point, for travel in increasing milepost direction (mile), Xb, ent | 0 |
| distance from segment begin milepost to nearest downstream exit ramp gore point, for travel in decreasing milepost direction (mile), Xb, ext | 0 |
| distance from segment end milepost to nearest upstream entrance ramp gore point, for travel in decreasing milepost direction (mile), Xe, ent | 0 |
| distance from segment begin milepost to nearest downstream exit ramp gore point, for travel in increasing milepost direction (mile), Xe, ext | 0 |
| AADT volume of entrance ramp located at distance Xb, ent, AADT b,ent | 0 |
| AADT volume of entrance ramp located at distance Xb, ext, AADT b,ext | 26000 |
| AADT volume of entrance ramp located at distance Xe, ent, AADT e,ent | 0 |
| AADT volume of entrance ramp located at distance Xe, ext, AADT e,ext | 0 |
| Outside shoulder width (ft), Ws | 10 |
| length of rumble strips present on the inside shoulders (mile) | 0 |
| length of rumble strips present on the outside shoulders (mile) | 0 |
| proportion of effective segment length with rumble strips present on the inside shoulders | 0 |
| proportion of effective segment length with rumble strips present on the outside shoulders | 0 |
| Proportion of effective segment length with a barrier present on the roadside (i.e, outside), Pob | 1 |
| clear zone width (ft), Whc | 30 |
| Distance from edge of the inside shoulder to barrier face (ft), Wicb | 10 |
| Effective Length of Freeway, L* | 0.3 |

Table: Project Level Predictive Crash Frequency Worksheet for Segment 2 (MP 258.75 – MP 259.05)) (..cont)

| **Crash Output** | | | | |
|---|---|---|---|---|
| | **MV** | | **SV** | |
| | **Fatal and Injury** | **PDO** | **Fatal and Injury** | **PDO** |
| **Base Average Crash Frequency, $N_{spf,fs,n,yz}$ (Table 18-3 of HSM)** | **4.96** | **9.80** | **2.53** | **5.40** |
| | | | | |
| **Crash Modification Factors (CMF):** | | | | |
| CMF for Horizontal Curve, $CMF_1$ (Eq 18-24, Eq 18-40) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for Lane Width, $CMF_2$ (Eq 18-25, Eq 18-41) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for Inside Shoulder Width, $CMF_3$ (Eq 18-26, Eq 18-42) | 0.93 | 0.94 | 0.93 | 0.94 |
| CMF for Median Width, $CMF_4$ ((Eq 18-27, Eq 18-43) | 1.09 | 1.08 | 0.97 | 1.08 |
| CMF for Median barrier, $CMF_5$ (Eq 18-28, Eq 18-44) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for High Volume, $CMF_6$ (Eq 18-29, Eq 18-45) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for Lane Change, $CMF_7$ (Eq 18-30) | 1.22 | 1.22 | 1.00 | 1.00 |
| CMF for Outside Shoulder Width, $CMF_8$ (Eq 18-35) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for Shoulder Rumble Strip, $CMF_9$ (Eq 18-36) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for Outside Clearance, $CMF_{10}$ (Eq 18-38) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for Outside barrier, $CMF_{11}$ (Eq 18-39) | 1.01 | 1.02 | 1.01 | 1.02 |
| | | | | |
| **Predicted Average Crash Frequency, $N_{p,fs,n,yz}$ ( Eq 18-1)** | **6.25** | **12.42** | **2.33** | **5.61** |

Table: Project Level Predictive Crash Frequency Worksheet for Segment 3 (MP 259.05– MP 259.15)

| Input | Segment 3 |
|---|---|
| Number of Lanes (in both direction) | 11 |
| Station | 259.05-259.15 |
| Length of Freeway Segment (mi), Lfs | 0.1 |
| Length of Ramp entrance I adjacent to subject freeway segment (mi), Len-inc | 0 |
| Length of Ramp entrance i adjacent to subject freeway segment in opposing direction (mi), Len-dec | 0 |
| Length of Ramp exit i adjacent to subject freeway segment (mi), Lex-inc | 0 |
| Length of Ramp exit i adjacent to subject freeway segment (mi), Lex-dec | 0 |
| AADT volume of Freeway segment (veh/day) | 180000 |
| Curve >1000 ft? (0= No, 1= Yes), | 0 |
| number of horizontal curves in the segment, m | 0 |
| Curve length (mile) | 0 |
| equivalent radius of curve, Ri* | 0 |
| radius of curve i in one roadbed, Ra,i | 0 |
| radius of curve i in second roadbed, Rb,i | 0 |
| proportion of effective segment length with curve, Pc,i | 0 |
| Lane Width (ft), | 12 |
| Inside shoulder width (ft), | 10 |
| Median width, measured from near edges of traveled way in both directions (ft), Wm | 30 |
| Distance from edge of the inside shoulder to barrier face (ft), Wicb | 10 |
| Proportion of effective segment length with a barrier present in the median (inside), Pib | 1 |
| hours when volume exceeds 1000 veh/hr/ln, | 30 |
| Proportion of AADT during hours where volume exceeds 1000 veh/hr/ln, Pib | 10 |
| weaving section adjustment factor for travel in increasing milepost direction, fwev, inc | 1 |
| weaving section adjustment factor for travel in decreasing milepost direction, fwev, dec | 0 |
| proportion of segment length within a Type B weaving section for travel in increasing milepost direction, Pwev, inc | 0 |
| proportion of segment length within a Type B weaving section for travel in increasing milepost direction, Pwev, dec | 0 |
| weaving section length for travel in increasing milepost direction (may extend beyond segment boundaries) (mil), Lwev, inc | 0 |

Table: Project Level Predictive Crash Frequency Worksheet for Segment 3 (MP 259.05– MP 259.15) (…cont)

| Input | Segment 3 |
|---|---|
| weaving section length for travel in decreasing milepost direction (may extend beyond segment boundaries) (mil), Lwev, dec | 0 |
| distance from segment begin milepost to nearest upstream entrance ramp gore point, for travel in increasing milepost direction (mile), Xb, ent | 0 |
| distance from segment begin milepost to nearest downstream exit ramp gore point, for travel in decreasing milepost direction (mile), Xb, ext | 0 |
| distance from segment end milepost to nearest upstream entrance ramp gore point, for travel in decreasing milepost direction (mile), Xe, ent | 0 |
| distance from segment begin milepost to nearest downstream exit ramp gore point, for travel in increasing milepost direction (mile), Xe, ext | 0 |
| AADT volume of entrance ramp located at distance Xb, ent, AADT b,ent | 0 |
| AADT volume of entrance ramp located at distance Xb, ext, AADT b,ext | 0 |
| AADT volume of entrance ramp located at distance Xe, ent, AADT e,ent | 0 |
| AADT volume of entrance ramp located at distance Xe, ext, AADT e,ext | 9000 |
| Outside shoulder width (ft), Ws | 10 |
| length of rumble strips present on the inside shoulders (mile) | 0 |
| length of rumble strips present on the outside shoulders (mile) | 0 |
| proportion of effective segment length with rumble strips present on the inside shoulders | 0 |
| proportion of effective segment length with rumble strips present on the outside shoulders | 0 |
| Proportion of effective segment length with a barrier present on the roadside (i.e, outside), Pob | 1 |
| clear zone width (ft), Whc | 30 |
| Distance from edge of the inside shoulder to barrier face (ft), Wicb | 10 |
| Effective Length of Freeway, L* | 0.1 |

Table: Project Level Predictive Crash Frequency Worksheet for Segment 3 (MP 259.05– MP 259.15) (…cont)

| **Crash Output** | | | | |
|---|---|---|---|---|
| | **MV** | | **SV** | |
| | **Fatal and Injury** | **PDO** | **Fatal and Injury** | **PDO** |
| **Base Average Crash Frequency, $N_{spf,fs,n,yz}$ (Table 18-3 of HSM)** | **0.827** | **1.634** | **0.422** | **0.901** |
| | | | | |
| **Crash Modification Factors (CMF):** | | | | |
| CMF for Horizontal Curve, $CMF_1$ (Eq 18-24, Eq 18-40) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for Lane Width, $CMF_2$ (Eq 18-25, Eq 18-41) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for Inside Shoulder Width, $CMF_3$ (Eq 18-26, Eq 18-42) | 0.93 | 0.94 | 0.93 | 0.94 |
| CMF for Median Width, $CMF_4$ ((Eq 18-27, Eq 18-43) | 1.09 | 1.08 | 0.97 | 1.08 |
| CMF for Median barrier, $CMF_5$ (Eq 18-28, Eq 18-44) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for High Volume, $CMF_6$ (Eq 18-29, Eq 18-45) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for Lane Change, $CMF_7$ (Eq 18-30) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for Outside Shoulder Width, $CMF_8$ (Eq 18-35) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for Shoulder Rumble Strip, $CMF_9$ (Eq 18-36) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for Outside Clearance, $CMF_{10}$ (Eq 18-38) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for Outside barrier, $CMF_{11}$ (Eq 18-39) | 1.01 | 1.02 | 1.01 | 1.02 |
| | | | | |
| | | | | |
| **Predicted Average Crash Frequency, $N_{p,fs,n,yz}$ ( Eq 18-1)** | 0.73 | 1.46 | 0.33 | 0.80 |

Table: Project Level Predictive Crash Frequency Worksheet for Segment 4 (MP 258.75 – MP 259.05)

| Input | Segment 4 |
|---|---|
| Number of Lanes (in both direction) | 11 |
| Station | 258.75-259.05 |
| Length of Freeway Segment (mi), Lfs | 0.3 |
| Length of Ramp entrance I adjacent to subject freeway segment (mi), Len-inc | 0 |
| Length of Ramp entrance i adjacent to subject freeway segment in opposing direction (mi), Len-dec | 0 |
| Length of Ramp exit i adjacent to subject freeway segment (mi), Lex-inc | 0 |
| Length of Ramp exit i adjacent to subject freeway segment (mi), Lex-dec | 0 |
| AADT volume of Freeway segment (veh/day) | 180000 |
| Curve >1000 ft? (0= No, 1= Yes), | 0 |
| number of horizontal curves in the segment, m | 0 |
| Curve length (mile) | 0 |
| equivalent radius of curve, Ri* | 0 |
| radius of curve i in one roadbed, Ra,i | 0 |
| radius of curve i in second roadbed, Rb,i | 0 |
| proportion of effective segment length with curve, Pc,i | 0 |
| Lane Width (ft), | 12 |
| Inside shoulder width (ft), | 10 |
| Median width, measured from near edges of traveled way in both directions (ft), Wm | 30 |
| Distance from edge of the inside shoulder to barrier face (ft), Wicb | 10 |
| Proportion of effective segment length with a barrier present in the median (inside), Pib | 1 |
| hours when volume exceeds 1000 veh/hr/ln, | 30 |
| Proportion of AADT during hours where volume exceeds 1000 veh/hr/ln, Pib | 10 |
| weaving section adjustment factor for travel in increasing milepost direction, fwev, inc | 1 |
| weaving section adjustment factor for travel in decreasing milepost direction, fwev, dec | 0 |
| proportion of segment length within a Type B weaving section for travel in increasing milepost direction, Pwev, inc | 0 |
| proportion of segment length within a Type B weaving section for travel in increasing milepost direction, Pwev, dec | 0 |
| weaving section length for travel in increasing milepost direction (may extend beyond segment boundaries) (mil), Lwev, inc | 0 |

Table: Project Level Predictive Crash Frequency Worksheet for Segment 4 (MP 258.75 – MP 259.05) (..cont)

| Input | Segment 4 |
|---|---|
| weaving section length for travel in decreasing milepost direction (may extend beyond segment boundaries) (mil), Lwev, dec | 0 |
| distance from segment begin milepost to nearest upstream entrance ramp gore point, for travel in increasing milepost direction (mile), Xb, ent | 0 |
| distance from segment begin milepost to nearest downstream exit ramp gore point, for travel in decreasing milepost direction (mile), Xb, ext | 0 |
| distance from segment end milepost to nearest upstream entrance ramp gore point, for travel in decreasing milepost direction (mile), Xe, ent | 0 |
| distance from segment begin milepost to nearest downstream exit ramp gore point, for travel in increasing milepost direction (mile), Xe, ext | 0 |
| AADT volume of entrance ramp located at distance Xb, ent, AADT b,ent | 0 |
| AADT volume of entrance ramp located at distance Xb, ext, AADT b,ext | 26000 |
| AADT volume of entrance ramp located at distance Xe, ent, AADT e,ent | 0 |
| AADT volume of entrance ramp located at distance Xe, ext, AADT e,ext | 0 |
| Outside shoulder width (ft), Ws | 10 |
| length of rumble strips present on the inside shoulders (mile) | 0 |
| length of rumble strips present on the outside shoulders (mile) | 0 |
| proportion of effective segment length with rumble strips present on the inside shoulders | 0 |
| proportion of effective segment length with rumble strips present on the outside shoulders | 0 |
| Proportion of effective segment length with a barrier present on the roadside (i.e, outside), Pob | 1 |
| clear zone width (ft), Whc | 30 |
| Distance from edge of the inside shoulder to barrier face (ft), Wicb | 10 |
| Effective Length of Freeway, L* | 0.3 |

Table: Project Level Predictive Crash Frequency Worksheet for Segment 4 (MP 258.75 – MP 259.05) (…cont)

| **Crash Output** | | | | |
|---|---|---|---|---|
| | **MV** | | **SV** | |
| | **Fatal and Injury** | **PDO** | **Fatal and Injury** | **PDO** |
| **Base Average Crash Frequency, $N_{spf,fs,n,yz}$ (Table 18-3 of HSM)** | **2.48** | **4.90** | **1.27** | **2.70** |
| | | | | |
| **Crash Modification Factors (CMF):** | | | | |
| CMF for Horizontal Curve, $CMF_1$ (Eq 18-24, Eq 18-40) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for Lane Width, $CMF_2$ (Eq 18-25, Eq 18-41) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for Inside Shoulder Width, $CMF_3$ (Eq 18-26, Eq 18-42) | 0.93 | 0.94 | 0.93 | 0.94 |
| CMF for Median Width, $CMF_4$ ((Eq 18-27, Eq 18-43) | 1.09 | 1.08 | 0.97 | 1.08 |
| CMF for Median barrier, $CMF_5$ (Eq 18-28, Eq 18-44) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for High Volume, $CMF_6$ (Eq 18-29, Eq 18-45) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for Lane Change, $CMF_7$ (Eq 18-30) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for Outside Shoulder Width, $CMF_8$ (Eq 18-35) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for Shoulder Rumble Strip, $CMF_9$ (Eq 18-36) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for Outside Clearance, $CMF_{10}$ (Eq 18-38) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for Outside barrier, $CMF_{11}$ (Eq 18-39) | 1.01 | 1.02 | 1.01 | 1.02 |
| | | | | |
| | | | | |
| **Predicted Average Crash Frequency, $N_{p,fs,n,yz}$ ( Eq 18-1)** | **2.20** | **4.38** | **1.00** | **2.41** |

Table: Project Level Predictive Crash Frequency Worksheet for Segment 5 (MP 258.61 – MP 258.75)

| Input | Segment 5 |
|---|---|
| Number of Lanes (in both direction) | 12 |
| Station | 258.61-258.75 |
| Length of Freeway Segment (mi), Lfs | 0.14 |
| Length of Ramp entrance I adjacent to subject freeway segment (mi), Len-inc | 0 |
| Length of Ramp entrance i adjacent to subject freeway segment in opposing direction (mi), Len-dec | 0 |
| Length of Ramp exit i adjacent to subject freeway segment (mi), Lex-inc | 0 |
| Length of Ramp exit i adjacent to subject freeway segment (mi), Lex-dec | 0 |
| AADT volume of Freeway segment (veh/day) | 164,000 |
| Curve >1000 ft? (0= No, 1= Yes), | **0** |
| number of horizontal curves in the segment, m | 0 |
| Curve length (mile) | 0 |
| equivalent radius of curve, Ri* | - |
| radius of curve i in one roadbed, Ra,i | 0 |
| radius of curve i in second roadbed, Rb,i | 0.000 |
| proportion of effective segment length with curve, Pc,i | 0.000 |
| Lane Width (ft), | 12 |
| Inside shoulder width (ft), | 10 |
| Median width, measured from near edges of traveled way in both directions (ft), Wm | 30 |
| Distance from edge of the inside shoulder to barrier face (ft), Wicb | 10 |
| Proportion of effective segment length with a barrier present in the median (inside), Pib | 1 |
| hours when volume exceeds 1000 veh/hr/ln, | 0 |
| Proportion of AADT during hours where volume exceeds 1000 veh/hr/ln, Pib | 0 |
| weaving section adjustment factor for travel in increasing milepost direction, fwev, inc | 0 |
| weaving section adjustment factor for travel in decreasing milepost direction, fwev, dec | 0 |
| proportion of segment length within a Type B weaving section for travel in increasing milepost direction, Pwev, inc | 0 |
| proportion of segment length within a Type B weaving section for travel in increasing milepost direction, Pwev, dec | 0 |
| weaving section length for travel in increasing milepost direction (may extend beyond segment boundaries) (mil), Lwev, inc | 0 |

Table: Project Level Predictive Crash Frequency Worksheet for Segment 5 (MP 258.61 – MP 258.75) (…cont)

| Input | Segment 5 |
|---|---|
| weaving section length for travel in decreasing milepost direction (may extend beyond segment boundaries) (mil), Lwev, dec | 0 |
| distance from segment begin milepost to nearest upstream entrance ramp gore point, for travel in increasing milepost direction (mile), Xb, ent | 0 |
| distance from segment begin milepost to nearest downstream exit ramp gore point, for travel in decreasing milepost direction (mile), Xb, ext | 0 |
| distance from segment end milepost to nearest upstream entrance ramp gore point, for travel in decreasing milepost direction (mile), Xe, ent | 0 |
| distance from segment begin milepost to nearest downstream exit ramp gore point, for travel in increasing milepost direction (mile), Xe, ext | 0 |
| AADT volume of entrance ramp located at distance Xb, ent, AADT b,ent | - |
| AADT volume of entrance ramp located at distance Xb, ext, AADT b,ext | - |
| AADT volume of entrance ramp located at distance Xe, ent, AADT e,ent | - |
| AADT volume of entrance ramp located at distance Xe, ext, AADT e,ext | - |
| Outside shoulder width (ft), Ws | 10 |
| length of rumble strips present on the inside shoulders (mile) | 0 |
| length of rumble strips present on the outside shoulders (mile) | 0 |
| proportion of effective segment length with rumble strips present on the inside shoulders | 0 |
| proportion of effective segment length with rumble strips present on the outside shoulders | 0 |
| Proportion of effective segment length with a barrier present on the roadside (i.e, outside), Pob | 1 |
| clear zone width (ft), Whc | 30 |
| Distance from edge of the inside shoulder to barrier face (ft), Wicb | 10 |
| Effective Length of Freeway, L* | 0.14 |

Table: Project Level Predictive Crash Frequency Worksheet for Segment 5 (MP 258.61 – MP 258.75) (…cont)

| Crash Output | | | | |
|---|---|---|---|---|
| | MV | | SV | |
| | Fatal and Injury | PDO | Fatal and Injury | PDO |
| **Base Average Crash Frequency, $N_{spf,fs,n,yz}$ (Table 18-3 of HSM)** | **1.01** | **1.91** | **0.56** | **1.16** |
| | | | | |
| **Crash Modification Factors (CMF):** | | | | |
| CMF for Horizontal Curve, $CMF_1$ (Eq 18-24, Eq 18-40) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for Lane Width, $CMF_2$ (Eq 18-25, Eq 18-41) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for Inside Shoulder Width, $CMF_3$ (Eq 18-26, Eq 18-42) | 0.93 | 0.94 | 0.93 | 0.94 |
| CMF for Median Width, $CMF_4$ ((Eq 18-27, Eq 18-43) | 1.09 | 1.08 | 0.97 | 1.08 |
| CMF for Median barrier, $CMF_5$ (Eq 18-28, Eq 18-44) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for High Volume, $CMF_6$ (Eq 18-29, Eq 18-45) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for Lane Change, $CMF_7$ (Eq 18-30) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for Outside Shoulder Width, $CMF_8$ (Eq 18-35) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for Shoulder Rumble Strip, $CMF_9$ (Eq 18-36) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for Outside Clearance, $CMF_{10}$ (Eq 18-38) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for Outside barrier, $CMF_{11}$ (Eq 18-39) | 1.01 | 1.02 | 1.01 | 1.02 |
| CMF for one additional lane on both direction, CMF** | 0.72 | 0.72 | 0.72 | 0.72 |
| | | | | |
| **Predicted Average Crash Frequency, $N_{p,fs,n,yz}$ ( Eq 18-1)** | **0.75** | **1.43** | **0.37** | **0.87** |

** As predictive method does not have provision for 12 lane freeway, this value is applied to consider that scenario. Source: Traffic Operation Division Texas Department of Transportation (Developing Methodology for Identifying, Evaluating, and Prioritizing Systemic Improvements, Pg 92)

Table: Project Level Predictive Crash Frequency Worksheet for Segment 6 (MP 258.25 – MP 258.61)

| Input | Segment 6 |
|---|---|
| Number of Lanes (in both direction) | 10 |
| Station | 258.25-258.61 |
| Length of Freeway Segment (mi), Lfs | 0.36 |
| Length of Ramp entrance I adjacent to subject freeway segment (mi), Len-inc | 0 |
| Length of Ramp entrance i adjacent to subject freeway segment in opposing direction (mi), Len-dec | 0 |
| Length of Ramp exit i adjacent to subject freeway segment (mi), Lex-inc | 0 |
| Length of Ramp exit i adjacent to subject freeway segment (mi), Lex-dec | 0 |
| AADT volume of Freeway segment (veh/day) | 164000 |
| Curve >1000 ft? (0= No, 1= Yes), | 0 |
| number of horizontal curves in the segment, m | 0 |
| Curve length (mile) | 0 |
| equivalent radius of curve, Ri* | 0 |
| radius of curve i in one roadbed, Ra,i | 0 |
| radius of curve i in second roadbed, Rb,i | 0 |
| proportion of effective segment length with curve, Pc,i | 0 |
| Lane Width (ft), | 12 |
| Inside shoulder width (ft), | 15 |
| Median width, measured from near edges of traveled way in both directions (ft), Wm | 30 |
| Distance from edge of the inside shoulder to barrier face (ft), Wicb | 10 |
| Proportion of effective segment length with a barrier present in the median (inside), Pib | 1 |
| hours when volume exceeds 1000 veh/hr/ln, | 30 |
| Proportion of AADT during hours where volume exceeds 1000 veh/hr/ln, Pib | 10 |
| weaving section adjustment factor for travel in increasing milepost direction, fwev, inc | 1 |
| weaving section adjustment factor for travel in decreasing milepost direction, fwev, dec | 0 |
| proportion of segment length within a Type B weaving section for travel in increasing milepost direction, Pwev, inc | 0 |
| proportion of segment length within a Type B weaving section for travel in increasing milepost direction, Pwev, dec | 0 |
| weaving section length for travel in increasing milepost direction (may extend beyond segment boundaries) (mil), Lwev, inc | 0 |

Table: Project Level Predictive Crash Frequency Worksheet for Segment 6 (MP 258.25 – MP 258.61) (..cont)

| Input | Segment 6 |
|---|---|
| weaving section length for travel in decreasing milepost direction (may extend beyond segment boundaries) (mil), Lwev, dec | 0 |
| distance from segment begin milepost to nearest upstream entrance ramp gore point, for travel in increasing milepost direction (mile), Xb, ent | 0.37 |
| distance from segment begin milepost to nearest downstream exit ramp gore point, for travel in decreasing milepost direction (mile), Xb, ext | 0 |
| distance from segment end milepost to nearest upstream entrance ramp gore point, for travel in decreasing milepost direction (mile), Xe, ent | 0 |
| distance from segment begin milepost to nearest downstream exit ramp gore point, for travel in increasing milepost direction (mile), Xe, ext | 0 |
| AADT volume of entrance ramp located at distance Xb, ent, AADT b,ent | 29000 |
| AADT volume of entrance ramp located at distance Xb, ext, AADT b,ext | 0 |
| AADT volume of entrance ramp located at distance Xe, ent, AADT e,ent | 0 |
| AADT volume of entrance ramp located at distance Xe, ext, AADT e,ext | 10000 |
| Outside shoulder width (ft), Ws | 10 |
| length of rumble strips present on the inside shoulders (mile) | 0 |
| length of rumble strips present on the outside shoulders (mile) | 0 |
| proportion of effective segment length with rumble strips present on the inside shoulders | 0 |
| proportion of effective segment length with rumble strips present on the outside shoulders | 0 |
| Proportion of effective segment length with a barrier present on the roadside (i.e, outside), Pob | 1 |
| clear zone width (ft), Whc | 30 |
| Distance from edge of the inside shoulder to barrier face (ft), Wicb | 10 |
| Effective Length of Freeway, L* | 0.36 |

Table: Project Level Predictive Crash Frequency Worksheet for Segment 6 (MP 258.25 – MP 258.61) (..cont)

| Crash Output | | | | |
|---|---|---|---|---|
| | MV | | SV | |
| | Fatal and Injury | PDO | Fatal and Injury | PDO |
| **Base Average Crash Frequency, $N_{spf,fs,n,yz}$ (Table 18-3 of HSM)** | **2.59** | **4.91** | **1.43** | **2.99** |
| | | | | |
| **Crash Modification Factors (CMF):** | | | | |
| CMF for Horizontal Curve, $CMF_1$ (Eq 18-24, Eq 18-40) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for Lane Width, $CMF_2$ (Eq 18-25, Eq 18-41) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for Inside Shoulder Width, $CMF_3$ (Eq 18-26, Eq 18-42) | 0.86 | 0.87 | 0.86 | 0.87 |
| CMF for Median Width, $CMF_4$ ((Eq 18-27, Eq 18-43) | 1.09 | 1.08 | 0.97 | 1.08 |
| CMF for Median barrier, $CMF_5$ (Eq 18-28, Eq 18-44) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for High Volume, $CMF_6$ (Eq 18-29, Eq 18-45) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for Lane Change, $CMF_7$ (Eq 18-30) | 1.35 | 1.35 | 1.00 | 1.00 |
| CMF for Outside Shoulder Width, $CMF_8$ (Eq 18-35) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for Shoulder Rumble Strip, $CMF_9$ (Eq 18-36) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for Outside Clearance, $CMF_{10}$ (Eq 18-38) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for Outside barrier, $CMF_{11}$ (Eq 18-39) | 1.01 | 1.02 | 1.01 | 1.02 |
| | | | | |
| | | | | |
| **Predicted Average Crash Frequency, $N_{p,fs,n,yz}$ ( Eq 18-1)** | **3.32** | **6.37** | **1.21** | **2.87** |

Table: Project Level Predictive Crash Frequency Worksheet for Segment 7 (MP 257.80 – MP 258.25)

| Input | Segment 7 |
|---|---|
| Number of Lanes (in both direction) | 10 |
| Station | 257.80-258.25 |
| Length of Freeway Segment (mi), Lfs | 0.45 |
| Length of Ramp entrance I adjacent to subject freeway segment (mi), Len-inc | 0 |
| Length of Ramp entrance i adjacent to subject freeway segment in opposing direction (mi), Len-dec | 0 |
| Length of Ramp exit i adjacent to subject freeway segment (mi), Lex-inc | 0 |
| Length of Ramp exit i adjacent to subject freeway segment (mi), Lex-dec | 0 |
| AADT volume of Freeway segment (veh/day) | 164000 |
| Curve >1000 ft? (0= No, 1= Yes), | 1 |
| number of horizontal curves in the segment, m | 1 |
| Curve length (mile) | 0.15 |
| equivalent radius of curve, Ri* | 1968 |
| radius of curve i in one roadbed, Ra,i | 0 |
| radius of curve i in second roadbed, Rb,i | 0 |
| proportion of effective segment length with curve, Pc,i | 0.333 |
| Lane Width (ft), | 12 |
| Inside shoulder width (ft), | 15 |
| Median width, measured from near edges of traveled way in both directions (ft), Wm | 30 |
| Distance from edge of the inside shoulder to barrier face (ft), Wicb | 10 |
| Proportion of effective segment length with a barrier present in the median (inside), Pib | 1 |
| hours when volume exceeds 1000 veh/hr/ln, | 30 |
| Proportion of AADT during hours where volume exceeds 1000 veh/hr/ln, Pib | 10 |
| weaving section adjustment factor for travel in increasing milepost direction, fwev, inc | 1 |
| weaving section adjustment factor for travel in decreasing milepost direction, fwev, dec | 0 |
| proportion of segment length within a Type B weaving section for travel in increasing milepost direction, Pwev, inc | 0 |
| proportion of segment length within a Type B weaving section for travel in increasing milepost direction, Pwev, dec | 0 |
| weaving section length for travel in increasing milepost direction (may extend beyond segment boundaries) (mil), Lwev, inc | 0 |

Table: Project Level Predictive Crash Frequency Worksheet for Segment 7 (MP 257.80 – MP 258.25) (..cont)

| Input | Segment 7 |
|---|---|
| weaving section length for travel in decreasing milepost direction (may extend beyond segment boundaries) (mil), Lwev, dec | 0 |
| distance from segment begin milepost to nearest upstream entrance ramp gore point, for travel in increasing milepost direction (mile), Xb, ent | 0 |
| distance from segment begin milepost to nearest downstream exit ramp gore point, for travel in decreasing milepost direction (mile), Xb, ext | 0 |
| distance from segment end milepost to nearest upstream entrance ramp gore point, for travel in decreasing milepost direction (mile), Xe, ent | 0 |
| distance from segment begin milepost to nearest downstream exit ramp gore point, for travel in increasing milepost direction (mile), Xe, ext | 0.36 |
| AADT volume of entrance ramp located at distance Xb, ent, AADT b,ent | 29000 |
| AADT volume of entrance ramp located at distance Xb, ext, AADT b,ext | 0 |
| AADT volume of entrance ramp located at distance Xe, ent, AADT e,ent | 0 |
| AADT volume of entrance ramp located at distance Xe, ext, AADT e,ext | 10000 |
| Outside shoulder width (ft), Ws | 10 |
| length of rumble strips present on the inside shoulders (mile) | 0 |
| length of rumble strips present on the outside shoulders (mile) | 0 |
| proportion of effective segment length with rumble strips present on the inside shoulders | 0 |
| proportion of effective segment length with rumble strips present on the outside shoulders | 0 |
| Proportion of effective segment length with a barrier present on the roadside (i.e, outside), Pob | 1 |
| clear zone width (ft), Whc | 30 |
| Distance from edge of the inside shoulder to barrier face (ft), Wicb | 10 |
| Effective Length of Freeway, L* | 0.55 |

Table: Project Level Predictive Crash Frequency Worksheet for Segment 7 (MP 257.80 – MP 258.25) (..cont)

| **Crash Output** | | | | |
|---|---|---|---|---|
| | **MV** | | **SV** | |
| | **Fatal and Injury** | **PDO** | **Fatal and Injury** | **PDO** |
| **Base Average Crash Frequency, $N_{spf,fs,n,yz}$ (Table 18-3 of HSM)** | **3.240** | **6.140** | **1.788** | **3.736** |
| | | | | |
| **Crash Modification Factors (CMF):** | | | | |
| CMF for Horizontal Curve, $CMF_1$ (Eq 18-24, Eq 18-40) | 1.04 | 1.08 | 1.17 | 1.14 |
| CMF for Lane Width, $CMF_2$ (Eq 18-25, Eq 18-41) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for Inside Shoulder Width, $CMF_3$ (Eq 18-26, Eq 18-42) | 0.86 | 0.87 | 0.86 | 0.87 |
| CMF for Median Width, $CMF_4$ ((Eq 18-27, Eq 18-43) | 1.09 | 1.08 | 0.97 | 1.08 |
| CMF for Median barrier, $CMF_5$ (Eq 18-28, Eq 18-44) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for High Volume, $CMF_6$ (Eq 18-29, Eq 18-45) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for Lane Change, $CMF_7$ (Eq 18-30) | 1.33 | 1.32 | 1.00 | 1.00 |
| CMF for Outside Shoulder Width, $CMF_8$ (Eq 18-35) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for Shoulder Rumble Strip, $CMF_9$ (Eq 18-36) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for Outside Clearance, $CMF_{10}$ (Eq 18-38) | 1.00 | 1.00 | 1.00 | 1.00 |
| CMF for Outside barrier, $CMF_{11}$ (Eq 18-39) | 1.01 | 1.02 | 1.01 | 1.02 |
| | | | | |
| | | | | |
| **Predicted Average Crash Frequency, $N_{p,fs,n,yz}$ ( Eq 18-1)** | **4.22** | **8.41** | **1.76** | **4.11** |

I-15 Interchange
ENVIRONMENTAL ASSESSMENT
Springville/Spanish Fork

# Phase 1 Design Summary Memo

**Project No. F-I15-6(239)259**
**Pin: 15153**
**April 2019**

The environmental review, consultation, and other actions required by applicable federal environmental laws for this project are being or have been carried out by UDOT pursuant to 23 USC 327 and a Memorandum of Understanding dated January 17,2017, and executed by FHWA and UDOT.

**I-15; Springville/Spanish Fork Interchange Study**
**Phase 1 Design Summary Memo**
Project Number: S-I15-6(239)259
PIN: 15153

The purpose of this memo is to summarize design work performed during Phase 1 of the I-15 Springville/Spanish Fork Interchange Study.

## Study Area

The study area is located on I-15 from the Main Street Interchange in Spanish Fork to the 400 South Interchange in Springville and along 2700 North Spanish Fork/1600 South Springville (1600 South) from Main Street to State Route 51 (SR-51) in Utah County, Utah.

## Existing and No-Build Operations

A traffic study was conducted considering existing year (2019) and design year (2050) volumes. The existing volumes were based on traffic counts and the projected design year volumes were based on the latest Mountainland Association of Governments (MAG) Travel Demand Model (TDM), which incorporates the draft Regional Transportation Plan (RTP).

The primary roadways of the Spanish Fork/Springville street network within the study area are: east/west - US-6, Spanish Fork 2700 N/Springville 1600 S (1600 S), and 400 S; north/south - Spanish Fork Main Street, I-15, Canyon Creek Parkway/Wallace Drive, and SR-51.

The roadways were first analyzed to determine existing and anticipated future operational issues under a "No-Build" scenario, to inform the proposed project improvements.

### *Street Network*

Within the study area, 1600 S and SR-51 have an acceptable existing level-of-service (LOS) and are expected to remain at an acceptable level in the design year.

The remaining corridors within the study area have an acceptable existing LOS but are expected to degrade to LOS D or worse in the design year (US-6 & 1000 North/Canyon Creek Parkway and 400 S, & 1750 West).

### *I-15 Corridor*

The existing corridor operates at an acceptable LOS, except in the proximity of the southbound off-ramp to 400 S where the SPUI intersection channelization and timing are creating long queues that impact mainline operations (LOS D) during the PM peak.

For the design year, the operations at the 400 S southbound off-ramp are expected to further degrade resulting in overall operations at the 400 S interchange to be LOS F (PM). In addition, slowdowns (LOS D and F) on the mainline are anticipated between the US-6/Spanish Fork Main Street and 400 S interchanges.

## Build Alternatives Considered

The goal of this study is to improve mobility within Spanish Fork and Springville by increasing network connectivity and reducing overall delay along 400 S, while limiting impacts to freeway operations. The primary 2050 build alternative considered consists of constructing a new interchange on I-15 at 1600 S and widening the cross street from Main Street (Spanish Fork) to SR-51, in order to convey the increased traffic volume. These improvements are expected to substantially relieve 400 S, though some enhancements may be necessary along 400 S (at the I-15 interchange and at 1750 W) to meet LOS D or better.

### Spanish Fork 2700 N/Springville 1600 S Corridor

Based on the traffic analysis, 1600 S would be widened to five lanes from Spanish Fork Main Street (west of I-15) to SR-51 (east of I-15). Numerous interchange layouts at I-15 are compatible with the cross street and can be sized to provide adequate capacity. It is understood that the two existing railroad routes creating at-grade crossings would be combined into a single grade separation (cross street over) at the western crossing location (just east of S 1750 W). The reconstructed cross street is envisioned to be offset south of the existing roadway, as Dry Creek (east of I-15) and an existing overhead transmission line (west of I-15) are along the north side of the ROW.

### I-15 Corridor

The primary build alternatives considered for Phase 1 of the study were simple “traditional” service interchange forms (diamond and loop) with full and direct access to 1600 S, constructed proximate to 1600 S to limit reconstruction at I-15 and adjacent interchanges.

The traffic analysis showed that the resultant spacing from adjacent interchanges is too short to accommodate these “traditional” forms. Notably, southbound it would require three lane changes within ½ mile for entering traffic from 1600 S to navigate across the SF Main St/US-6 exit-only lanes. Therefore, a broader footprint is required to incorporate I-15 access to/from 1600 S.

One full and direct access concept considered was a “centerchange,” consisting of a single intersection at the I-15 centerline and interior ramps. Preliminary traffic analysis indicates that freeway operations are not degraded as much as the other alternatives since the volume of 2700 N/1600 S traffic utilizing the adjacent interchanges is relatively small. However, left-hand ramps will require elimination of the HOV lane and would likely impact freeway operations for a much greater distance from the interchange than the other alternatives. This concept would dramatically increase the amount of reconstruction, as I-15 would need to be realigned.

The Phase 1 interchange alternatives consist of cross street intersection(s) construction, bridge widening or replacement, ramp construction, and auxiliary lane construction between adjacent interchanges. The addition of the auxiliary lanes along I-15 would require widening the existing railroad overcrossing structure about ½ mile south of 1600 S. The structural review demonstrated that widening is feasible, though a closer look will be required as the existing minimum vertical clearance is right at the UDOT minimum (23’-10”). If proposed alternatives impact the structures for the I-15 railroad overcrossing just north of US-6, a structural review will need to be conducted.

Some reconstruction of the local street network may be required with the new interchange and railroad grade separation.

Based on a structural review the 1600 S bridge, constructed in 2012 with the I-15 CORE project, can be widened to accommodate some interchange layouts. However, without design exceptions the 1600 S and 400 S bridges would need to be replaced under the ultimate I-15 lane configuration due to limited clear span.

Additionally, the traffic analysis indicates that poor freeway operations on the south end of the study area would be improved by converting the Main Street (Spanish Fork) northbound on ramp from a merge condition to an add-lane.

The following table and figures present the interchange forms considered as a part of Phase 1.

**Table 1: Phase 1 2700 N/1600 S Interchange Build Alternatives**

| Interchange Type | | Brief Description | Performance Metric | | | Remarks |
|---|---|---|---|---|---|---|
| | | | Interchange relieves 400 S | I-15 operations LOS D or better | 400 S SPUI Operations LOS D or better | |
| Loop Forms | ParClo A | Loop entrance ramps and diagonal exit ramps, with two signalized intersections at ramp termini. | Yes | No<br>Weave along SB I-15 from 400 S to US-6 causes slowdown | No<br>400 S Interchange improvements needed | Proximity of new ramps to existing results in poor I-15 performance. The high traffic volumes and successive multi-lane ramps further worsen operations. More complex/shared freeway access will be needed to mitigate degradation of mainline operations. |
| Diamond Forms | Tight Diamond | Diagonal ramps in all four quadrants, with two signalized intersections at ramp termini. | Yes | No<br>Weave along SB I-15 from 400 S to US-6 causes slowdown | No<br>400 S Interchange improvements needed | |
| | Single Point Diamond | Diagonal ramps in all four quadrants, with a single signalized intersection at ramp termini. | Yes | No<br>Weave along SB I-15 from 400 S to US-6 causes slowdown | No<br>400 S Interchange improvements needed | |
| | "Centerchange" | Inside (left-hand) ramps serving all movements, with a single signalized intersection at ramp termini. | Yes | Yes | No<br>400 S Interchange improvements needed | Impact of left-hand ramps and elimination of HOV lane to be examined in more detail with future efforts. |

I-15; SPRINGVILLE/ SPANISH FORK INTERCHANGE STUDY
UDOT REGION 3, UTAH COUNTY
PROJECT # S-I15-6(239)259 / PIN # 15153
APRIL 20, 2019

FIGURE: PARTIAL CLOVER INTERCHANGE

I-15; SPRINGVILLE/ SPANISH FORK INTERCHANGE STUDY
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APRIL 20, 2019

FIGURE: TIGHT DIAMOND INTERCHANGE

I-15; SPRINGVILLE/ SPANISH FORK INTERCHANGE STUDY
UDOT REGION 3, UTAH COUNTY
PROJECT # S-I15-6(239)259 / PIN # 15153
APRIL 20, 2019

FIGURE: SINGLE POINT INTERCHANGE

I-15; SPRINGVILLE/ SPANISH FORK INTERCHANGE STUDY
UDOT REGION 3, UTAH COUNTY
PROJECT # S-I15-6(239)259 / PIN # 15153
APRIL 20, 2019

FIGURE: CENTER - CHANGE INTERCHANGE

I-15 Interchange
ENVIRONMENTAL ASSESSMENT
Springville/Spanish Fork

# Construction Phasing Memo

**Project No. F-I15-6(239)259**
**Pin: 15153**
**March 2021**

The environmental review, consultation, and other actions required by applicable federal environmental laws for this project are being or have been carried out by UDOT pursuant to 23 USC 327 and a Memorandum of Understanding dated January 17,2017, and executed by FHWA and UDOT.

# *MEMORANDUM*

**TO:** **Darren Bunker, Project Manager – UDOT Region 3**

**FROM:** **Trevor Youd, Transportation Engineer – Horrocks Engineers**

**RE:** I-15; Springville/Spanish Fork Interchange: F-I15-6(239)259/PIN 15153; Construction Phasing

This potential phasing approach for the construction of the I-15; 1600 South/2700 North Interchange and the improvements to the 1600 South/2700 North corridor is meant to outline when infrastructure elements are needed and what are the anticipated costs. The criteria used for developing each phase includes accommodating the traffic demand, maintaining economic growth, and providing safe travel ways for motorists, pedestrians, and bicyclists.

Traffic analysis was performed and modeled using Vissim traffic operations software and the Wasatch Front Regional Council (WFRC)/Mountainland Association of Governments (MAG) travel demand model for the year 2050. For a detailed explanation of the analysis, see the Build (2050) Traffic and Safety Memo in Appendix A.

**Phase 1 (estimated construction start year 2022):** The traffic analysis concluded that with expected traffic increases on I-15, the interchange at 400 South in Springville will have severe operational issues. Traffic will queue on the northbound exit ramp and overflow onto mainline I-15. To alleviate queuing at 400 South, an interchange will need to be constructed at 1600 South/2700 North in Springville/Spanish Fork.

UDOT has allocated $80 Million for Phase 1 of this project. Key improvements and anticipated costs are listed below. (The cost estimate includes roadway items, utilities, right-of-way, construction, and price inflation. Inflation is based on a 2023 build year.)

**Table 1: Phase 1 Summary**

| Interchange | Frontage Roads | 1600 South/2700 North |
|---|---|---|
| • A diamond interchange with four single-lane ramps leading on and off I-15 mainline will be constructed.<br>• The SB entrance ramp will run parallel to I-15 and tie into US-6. The intersection with US-6 will be improved to accommodate right turns and allow motorists to continue SB on I-15.<br>•The existing 1600 South/2700 North structure going over I-15 will be maintained. | •The existing frontage roads will be relocated.<br>• 350 East and 200 East will be shifted west to accommodate future development on the west side of I-15; both roads will tie directly into 1600 South/2700 North.<br>• 1950 West will no longer tie into 1600 South/2700 North but will tie instead into 1750 West, which will maintain its connection to 1600 South/2700 North. | • 1600 South/2700 North will be reconstructed to accommodate five lanes.<br>•A meandering alignment will be used to minimize impacts to adjacent properties.<br>• A grade separation over the existing UPRR and planned UTA rail lines will be constructed.<br>•A trail and sidewalk will be built between Main St and SR-51 for pedestrians and bicyclists.<br>•Impacted utilities will be relocated. |
| **Phase 1 Estimated Total Cost: $80,000,000** | | |

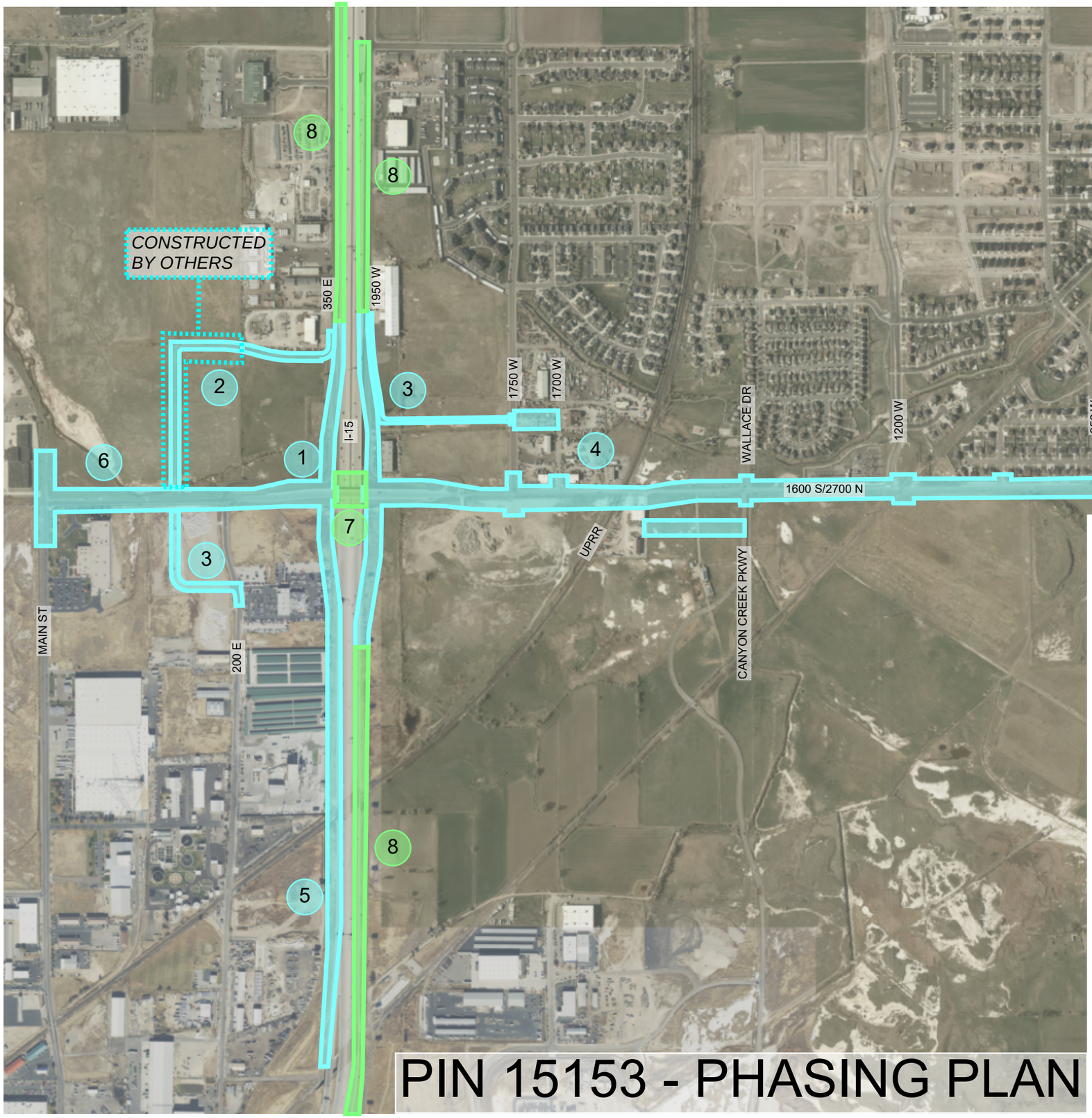
**Phase 2 (estimated construction start year 2035-2040):** Traffic will continue to grow, and the I-15 interchange and 1600 South/2700 North will need greater capacity. Two options were evaluated to increase the capacity of the interchange that is planned for construction in Phase 1: Making a bigger diamond interchange, or converting the diamond interchange into a SPUI.

Both options will require a new structure to meet requirements for clearance height and sight distance. Converting the interchange into a SPUI will cost $2-4 Million more than making a bigger diamond, but the SPUI provides a higher level of service than the diamond does. Through the evaluation of alternatives, the SPUI is the preferred alternative. Auxiliary lanes will be constructed on I-15 connecting the interchanges to the north and south.

Funds have not been allocated for Phase 2. Key improvements and anticipated costs are listed in Table 2 below. (The estimate includes roadway items, utilities, right-of-way, construction, and price inflation. Inflation is based on a 2035 build year.)

**Table 2: Phase 2 Summary**

| Interchange | Frontage Roads | 1600 South/2700 North |
|---|---|---|
| • The diamond interchange will be converted to a SPUI interchange.<br>• A new structure over I-15 will be required.<br>• Addition of a SB and NB I-15 auxiliary lane between the 400 South and 1600 South/2700 North ramps will be constructed.<br>• Addition of a NB I-15 auxiliary lane between US-6 and 1600 South/2700 North ramps will be constructed.<br>• Impacted structures along I-15 will be widened. | • No changes to the frontage roads will be needed. | • No changes to 1600 South/2700 North will be needed. |
| **Phase 2 Estimated Total Cost: $55,000,000** | | |




# PIN 15153 - PHASING PLAN

## PHASE I (2022)

1. Constructing a new diamond interchange on I-15 at 1600 South/2700 North to utilize the existing structure over I-15.
2. Realigning the northwest frontage road to the west to accommodate the new interchange and planned local development.
3. Realigning the southwest and northeast frontage roads to accommodate the new interchange.
4. Grade-separating 1600 South/2700 North over the planned combined Sharp/Tintic Railroad tracks and modifying existing access to adjacent properties.
5. Constructing a southbound auxiliary lane between US-6 and the new interchange, with barrier separation routing traffic entering southbound I-15 from the new interchange through the I-15/US-6 interchange.
6. Widening 1600 South/2700 North to five lanes with 10-foot shoulders to accommodate bicyclists between Spanish Fork Main Street and SR-51.

   Constructing a sidewalk on the north side and a 10-foot, multi-use trail along the south side of 1600 South/2700 North between Spanish Fork Main Street and SR-51.

## PHASE II (2035 - 2040)

7. Constructing a new single-point urban interchange (SPUI) on I-15 at 1600 South/2700 North (replacing the existing structure over I-15).
8. Constructing auxiliary lanes between adjacent interchanges on I-15.

I-15 Interchange
ENVIRONMENTAL ASSESSMENT
Springville/Spanish Fork

# Hazardous Materials Memo

**Project No. F-I15-6(239)259**
**Pin: 15153**
**August 2020**

The environmental review, consultation, and other actions required by applicable federal environmental laws for this project are being or have been carried out by UDOT pursuant to 23 USC 327 and a Memorandum of Understanding dated January 17,2017, and executed by FHWA and UDOT.

HORROCKS ENGINEERS

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**To:** Project File

**From:** Haylie Ferguson, Environmental Specialist

**Date:** August 14, 2020 **Memorandum**

**Subject:** An Evaluation of Hazardous Sites for the I-15 Interchange; Springville/Spanish Fork Environmental Study

## Introduction

Horrocks Engineers has prepared this evaluation in support of the Utah Department of Transportation's (UDOT) proposal to make improvements to Interstate 15 (I-15) at milepost 258 in Utah County.

## Hazardous Materials

Hazardous materials include any solid, liquid, or gaseous materials that, if improperly managed or disposed of, may pose substantial hazards to human health and the environment. A material is considered hazardous if it exhibits one or more of the following characteristics: ignitability, corrosivity, reactivity, and toxicity.

The Resource Conservation and Recovery Act (RCRA) was enacted in 1976 to regulate the management of solid waste (i.e. garbage), hazardous waste, and underground storage tanks (USTs) that hold petroleum products or certain chemicals, including leaking underground storage tanks (LUSTs). Under RCRA, hazardous wastes are tracked from the time they are generated until the time they are ultimately disposed of or recycled.

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) was enacted in 1980. CERCLA provides for the cleanup and remediation of closed and abandoned hazardous waste sites where hazardous waste has been abandoned, accidentally spilled, or illegally dumped and also created a "Superfund" to help pay for cleanup costs.

## Affected Environment

Hazardous materials and waste sites were evaluated by reviewing records from the Utah Department of Environmental Quality (UDEQ) and the EPA. These sites included National Priorities List (NPL) sites; Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) sites; Toxic Release Inventory (TRI); Used Oil Facilities; Enforceable Written Assurances (EWAs), Brownfields, USTs and LUSTs, and Environmental Incidents. Sites were reviewed for the potential to be affected by the Preferred Alternative based on standard radius distances as shown in Table 1.

*Table 1: Description of Hazardous Materials Sites and Search Radius*

| Site Type | Search Radius Beyond Study Area | Description |
|---|---|---|
| NPL | 1 mile | NPL sites are those containing listed chemicals under CERCLA and have been identified as priorities for cleanup. |
| CERCLIS | 0.5 miles | CERCLIS sites contain listed chemicals under CERCLA but have not been categorized as NPL sites. |
| TRI | 0.5 miles | TRI are sites such as manufacturing or mining facilities that manufacture or process listed chemicals. |
| Used Oil Facility | Study Area or Adjacent Property | Used oil facilities are sites that store, transport, or recycle used oil. |

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| | | |
|---|---|---|
| EWA | 0.5 miles | EWA sites are properties where the owner has come to an agreement with the UDEQ on obligations associated with hazardous materials or waste on the site. |
| Brownfield | 0.5 miles | Brownfields are former industrial areas. |
| UST | Study Area or Adjacent Property | USTs are sites where underground storage tanks are currently being used or have been used to store petroleum products such as gasoline or diesel fuel. |
| LUST | 0.5 miles* | LUSTs are UST sites where a leak has been detected. |
| Environmental Incident | Study Area or Adjacent Property | Environmental incidents are locations where a spill or other incident regarding hazardous materials has been reported. |

* Properties outside the study area that have been closed by the UDEQ with no evidence of contamination extending beyond the property boundary were not included.

*National Priorities List (NPL)*
No NPL sites are located within 1 mile of the study area.

*CERCLIS Sites*
No CERCLIS sites are located within 0.5 miles of the study area.

*Toxic Release Inventory (TRI)*
One TRI site is located within 0.5 miles of the study area. The site, Alcoa Extrusions at 1550 North Kirby Lane in Spanish Fork, is 0.1 miles from the study area. See Table 2 for a listing of Used Oil Facilities and the attached figure for the location.

*Used Oil Facilities*
Four used oil facilities are located within or adjacent to the study area. See Table 2 for a listing of Used Oil Facilities and the attached figure for locations.

*Enforceable Written Assurances (EWA)*
One EWA property is located within 0.5 miles of the study area. The site, the proposed America First Credit Union on the southwest corner of Marketplace Drive and Canyon Creek Parkway in Spanish Fork, is 0.5 miles from the study area. See the attached figure for the location.

*Brownfield*
No Brownfields are located within 0.5 miles of the study area.

*Underground Storage Tanks (USTs) and Leaking Underground Storage Tanks (LUSTs)*
Five underground storage tank sites are located within the study area or on an adjacent property (see Table 2). There are no sites within 0.5 miles of the study area where leaks have been detected from USTs. Properties outside the study area that have been closed by the UDEQ with no evidence of contamination extending beyond the property boundary were not included because they have no potential to affect the Preferred Alternative.

*Environmental Incidents*
Thirteen Environmental Incidents have occurred within or adjacent to the study area. See Table 2 for a listing of Environmental Incidents and the attached figure for locations.

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*Table 2: Hazardous Materials Sites in the Study Area*

| Name | Address | Type |
|---|---|---|
| Alumax | 1550 North Kirby Lane<br>Spanish Fork, UT | Environmental Incident |
| Alcoa Extrusions | 1550 North Kirby Lane<br>Spanish Fork, UT | Environmental Incident |
| Alcoa Engineer Products | 1550 North Kirby Lane<br>Spanish Fork, UT | Environmental Incident |
| Alcoa Engineered Products | 1550 North Kirby Lane<br>Spanish Fork, UT | Environmental Incident |
| Jones Motor Company | I-15 Northbound<br>Spanish Fork, UT | Environmental Incident |
| Alcoa Extrusions | 1550 North Kirby Lane<br>Spanish Fork, UT | Environmental Incident |
| Alcoa Engineered Products | 1550 North Kirby Lane<br>Spanish Fork, UT | Environmental Incident |
| Alcoa Extrusions | 1550 North Kirby Lane<br>Spanish Fork, UT | Environmental Incident |
| Alcoa | 1550 North Kirby Lane<br>Spanish Fork, UT | Environmental Incident |
| Sapa Products | 1550 North Kirby Lane<br>Spanish Fork, UT | Environmental Incident |
| Improper disposal at Salvage Yard | 615 West 1660 South<br>Springville, UT | Environmental Incident |
| Utah Co. Gasoline Tanker Rollover Fire | Southbound I-15<br>Spanish Fork, UT | Environmental Incident |
| Illegal dumping into storm drain | 740 South 1750 West<br>Spanish Fork, UT | Environmental Incident |
| Hydro Extrusion USA | 1550 North Kirby Lane<br>Spanish Fork, UT | Used Oil Facility |
| Walmart Supercenter | 660 South 1750 West<br>Springville, UT | Used Oil Facility |
| General Atomics Aeronautical Systems | 301 West 3000 North<br>Spanish Fork, UT | Used Oil Facility |

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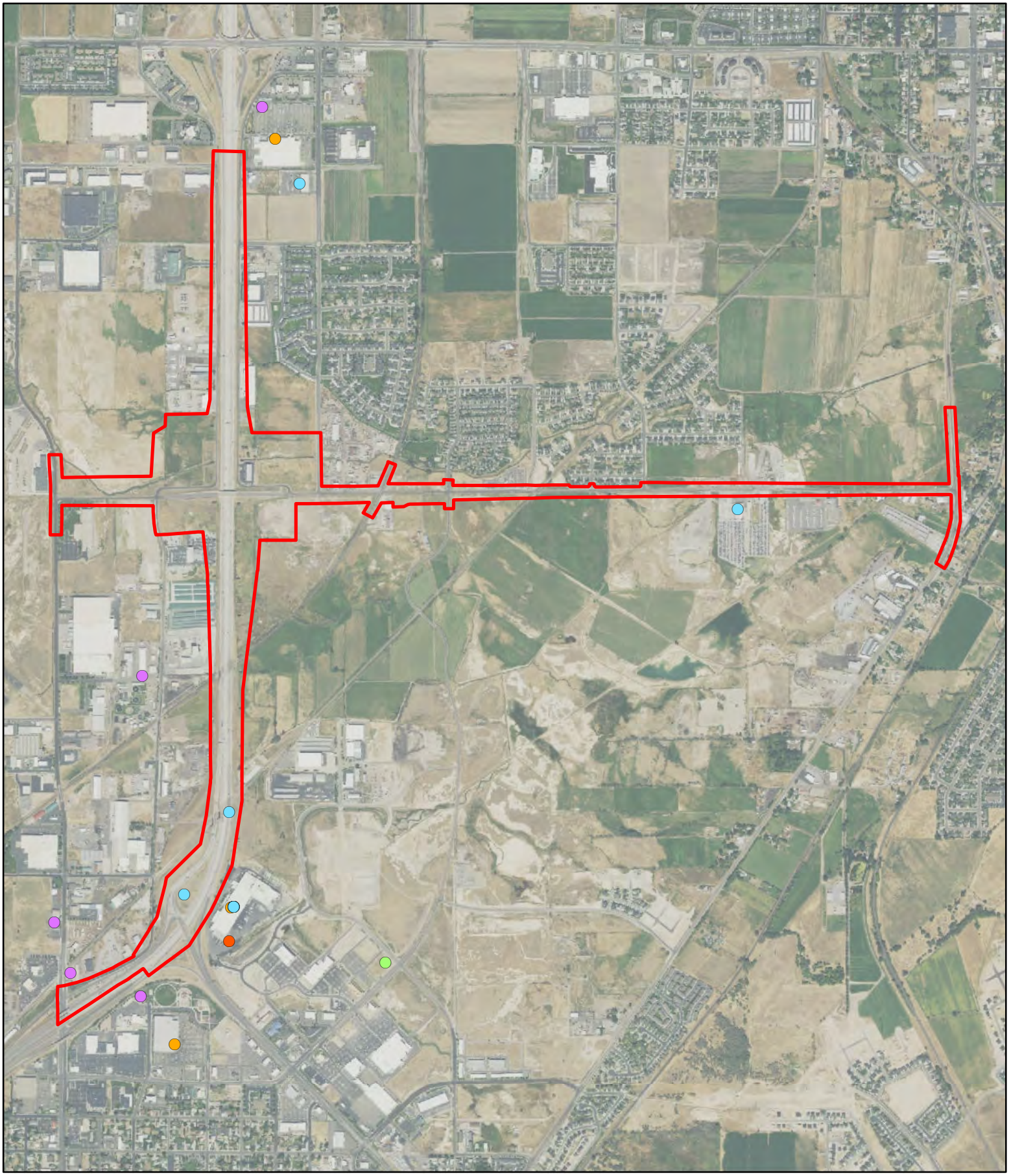
| | | |
|---|---|---|
| Costco Wholesale | 273 East 1000 North<br>Spanish Fork, UT | Used Oil Facility |
| Spanish Fork Packing (L.D.S) | 1090 North 200 East<br>Spanish Fork, UT | UST |
| Central Distributing Co., Inc. | 1445 North Main<br>Spanish Fork, UT | UST |
| Pit Stop | 1300 North Main<br>Spanish Fork, UT | UST |
| Spanish Fork City Shops | 2165 North 175 East<br>Spanish Fork, UT | UST |
| Mirastar | 680 S. 1950 W.<br>Springville, UT | UST |
| Alcoa Extrusions | 1550 North Kirby Lane<br>Spanish Fork, UT | TRI |
| Proposed America First Credit Union | Southwest Corner of Marketplace Drive and Canyon Creek Parkway | EWA |

**Environmental Consequences**

Two Environmental Incidents occurred directly within the study area and both involved oil or gasoline spills that occurred directly on pavement in the I-15 corridor. Both incidents have been closed. The preferred Alternative would have no direct or indirect impacts to hazardous materials sites identified in this evaluation.



# I-15 Interchange; Springville/Spanish Fork

## Hazardous Materials

Map 1 of 1

0 0.25 0.5 Miles

N

- Environmental Incident
- EWA
- TRI
- Used Oil Facility
- UST
- Study Area

# CONFORMITY DETERMINATION REPORT

## MOUNTAINLAND MPO

# TransPlan50

## 2050 Regional TRANSPORTATION PLAN AMENDMENT

MAG

Expert Resources. Enriching Lives.

**Final Document July 2020**

**Mountainland Association of Governments**

**586 East 800 North**
**Orem, Utah 84097-4146**

## TERMS AND ABBREVIATIONS

| | |
|---|---|
| CAA | Clean Air Act |
| CFR | Code of Federal Regulations |
| CMAQ | Congestion Mitigation and Air Quality |
| CO | Carbon Monoxide |
| FAST Act | Fixing America's Surface Transportation Act |
| GPI | Kem C. Gardner Policy Institute |
| HDDV | Heavy Duty Diesel Vehicle (8501 lbs. and heavier gross vehicle weight) |
| HOV | High Occupancy Vehicle |
| HPMS | Highway Performance Monitoring System |
| I/M | Inspection and Maintenance |
| LDGV | Light Duty Gas Vehicle (0-6000 lbs. gross vehicle weight) |
| LDGT1 | Light Duty Gas Truck 1 (0-6,000 lbs. Gross vehicle weight) |
| LDGT2 | Light Duty Gas Truck 2 (6,001-8,500 lbs. Gross vehicle weight) |
| LEV | Low Emission Vehicle |
| MOVES | Motor Vehicle Emission Simulator |
| MPO | Metropolitan Planning Organization |
| RTP | Regional Transportation Plan |
| NAAQS | National Ambient Air Quality Standards |
| NEPA | National Environmental Policy Act |
| NOx | Oxides of Nitrogen |
| OBD | On Board Diagnostics |
| $O_3$ | OZONE |
| PM10 | Particulate matter smaller than or equal to 10 microns |
| PM2.5 | Particulate matter smaller than or equal to 2.5 microns |
| REMM | Real Estate Market Model |
| RFG | Reformulated Gasoline |
| RVP | Reid Vapor Pressure |
| SIP | State Implementation Plan |
| STIP | State Transportation Improvement Program |
| TCM | Transportation Control Measures |
| TDM | Transportation Demand Management |
| TIP | Transportation Improvement Program |
| VMT | Vehicle Miles Traveled |

**Agencies:**

| | |
|---|---|
| MAG | Mountainland Association of Governments |
| DAQ | Division of Air Quality |
| EPA | Environmental Protection Agency |
| FHWA | Federal Highway Administration |
| FTA | Federal Transit Administration |

| | |
|---|---|
| UDOT | Utah Department of Transportation |
| UTA | Utah Transit Authority |
| WFRC | Wasatch Front Regional Council |
| CMPO | Cache MPO |

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**MAG Regional Planning Committee resolution adopting MAG TransPlan 50 and the Conformity Determination Report**

**WHEREAS**, MAG is the designated Metropolitan Planning Organization (MPO) for transportation planning in the Urbanized Area of Utah County; and

**WHEREAS**, the FAST Act – Fixing America's Surface Transportation Act and the Clean Air Act Amendments (CAA) require the MPO to develop Regional transportation plans (RTP) and short-range Transportation Improvement Programs (TIP) that conform with the applicable State Implementation Plan (SIP) for air quality; and

**WHEREAS**, MAG TransPlan 50 was developed to meet the requirements of the CAA and the FAST Act, and to address the short and long term transportation needs of the Region, and

**WHEREAS**, MAG TransPlan 50 has been developed in compliance with 23 CFR 450.322, Metropolitan Transportation Planning Process through appropriate technical and review processes, and

**WHEREAS**, the Conformity Determination Report covering TransPlan 50 has been developed to meet the requirements of 40 CFR 93 and the emission limits set for State Implementation Plans (SIP) for the State of Utah, and

**WHEREAS**, MAG TransPlan 50in its entirety was developed in cooperation with the MPO's planning partners and reflects local commitment for project implementation.

**NOW, THEREFORE, BE IT RESOLVED** that MAG Regional Planning Committee adopts the MAG TransPlan 50 and the Conformity Determination Report in its entirety.

**BE IT FURTHER RESOLVED** that MAG Regional Planning Committee authorizes staff, with approval of the Chairman of the Committee, to make non-substantive technical corrections to the final document as necessary.

**Resolution to be adopted by MAG Regional Planning Committee Board following 30-day public comment.**

# CONFORMITY DETERMINATION REPORT

## MAG TransPlan 50

**SUMMARY**

This report is the new Conformity Determination for MAG TransPlan50

As the Metropolitan Planning Organization (MPO), MAG) is responsible to develop, produce and adopt the Metropolitan Transportation Plan (MTP), Transportation Improvement Plan (TIP), and the Unified Planning Work Program (UPWP). MAG has the responsibility to ensure that the MAG TransPlan50 for the Utah Valley urbanized area **conform** to the air quality requirements of the State Implementation Plan (SIP) and the Environmental Protection Agency interim emissions tests for all pollutants in non-attainment or maintenance areas (40 CFR 93.119). This responsibility is fulfilled when MAG Regional Planning Committee approves the Conformity Determination Report. FHWA and FTA review this document, in consultation with the EPA, to ensure that all relevant planning regulations have been adequately addressed.

"Under 23 CFR Part 450 and the FAST Act, federally funded projects cannot be approved, funded, advanced through the planning process, or implemented unless those projects are in a Fiscally Constrained and Conforming Transportation Plan and Transportation Improvement Program."

**TRANSPORTATION CONFORMITY:**
A Basic Guide for State and
Local Officials US-DOT

This report updates the conformity analysis and describes the changes made to the travel model transportation networks.

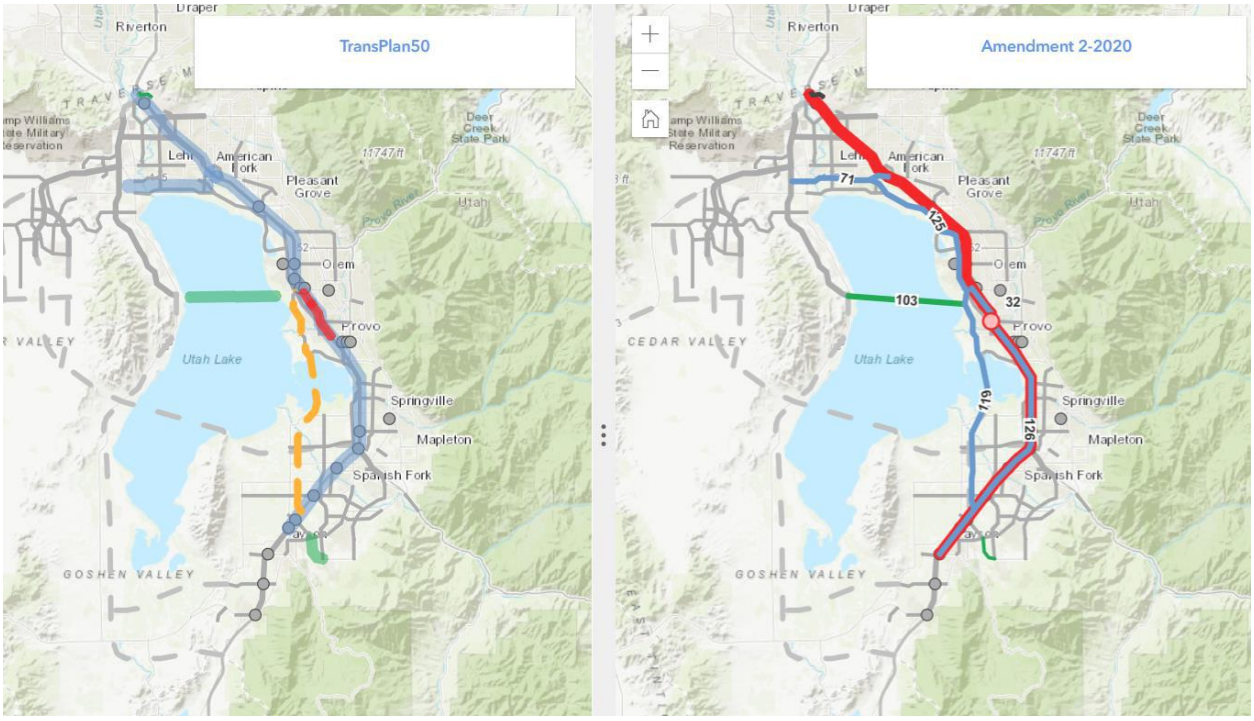
Approval of these documents by FHWA and FTA allow the policies, programs and projects to be implemented using Federal Funding.

All assumptions used in this determination report were found consistent with the federal regulations at various stages of the development of MAG TransPlan50

**Based on an analysis consistent with these rules, a positive determination can be made for all the transportation projects included in MAG TransPlan50 in the Provo City Carbon Monoxide maintenance area, in the Utah County 2006 $PM_{2.5}$ non-attainment area, in the Utah County $PM_{10}$ maintenance area and the 2015 OZONE non-attainment area.**

## RTP AMENDMENT

Additional capacity is needed to address congestion along the I-15 corridor. Three types of project scenarios were proposed in the plan along the corridor: an I-15 collector-distributor, a new parallel facility, a freeway within a freeway. These projects were identified as one larger transparent line labeled "location to be determined." For official air quality determination, an I-15 collector-distributor was modeled for the plan from Spanish Fork to Lehi combined with adding a lane in each direction on I-15 from Orem to Payson. UDOT has requested that the transportation modeling show that a parallel facility is modeled and shown in TransPlan50. However, as before, this project will still be identified as needing future study to determine the location.




***Highway changes***

**#32:** I-15 Improvements: Changes “Location to be Determined” status to an interchange at I-15/Provo 820 N for environmental purposes. Originally modeled in TransPlan50 at this location. Future study will determine the location.

**#62:** I-15 Alternatives Study: The I-15 corridor needs improvements before 2040. The study will identify the future needs of the corridor. This was originally listed in the plan as I-

15/Alternatives and modeled as adding a collector/distributor project to I-15. This is now just a study moved to phase one.

**#71:** North Lakeshore FWY: Changes "Location to be Determined" status to Pioneer Crossing for environmental purposes. Originally modeled in TransPlan50 at this location. Future study will determine the location.

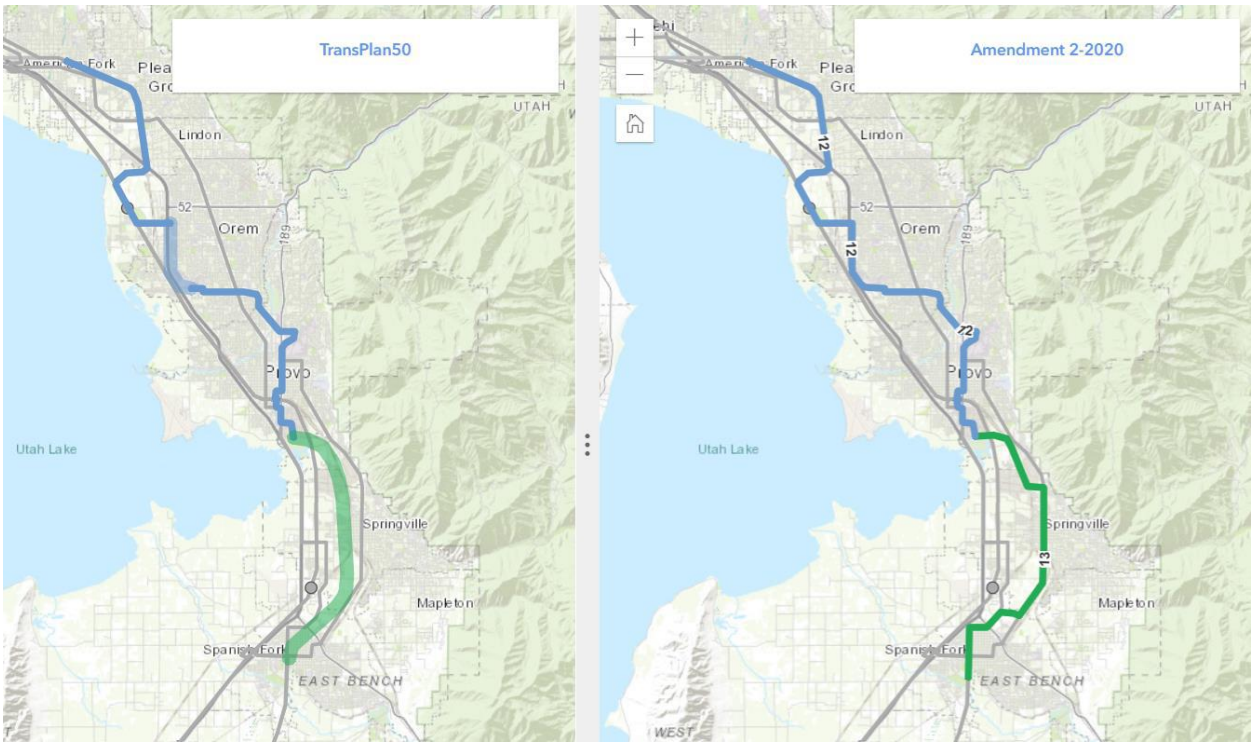
**#96:** Draper Gravel Pit RD: Remove from the plan, Draper is not planning for the corridor.

**#103:** Utah Lake Crossing: Changes "Location to be Determined" status for the Utah Lake Bridge Crossing. Originally modeled in TransPlan50 at this location. Future study will determine the location.

**#107:** Nebo Belt RD: Changes "Location to be Determined" status to an identifiable line for environmental work purposes. Originally modeled in TransPlan50 at this location. Future study will determine the location.

**#119/125:** I-15 Parallel Corridor: The South Wasatch Corridor is renamed I-15 Parallel Corridor and is extended to Lehi as a parallel highway to I-15. It is proposed as a solution to space out traffic between the two corridors. The southern section (south of University PKWY) is moved to phase 2 of the plan, the northern section is needed in phase 2, funded in phase 3. In the original RTP, this was the I-15/Alternatives project and was modeled on I-15 as a collector/distributer project. Future study will determine the location.

**#126 (new project):** I-15 Widening: This project continues the 12-lane configuration currently at Orem Center ST from University PKWY to US-6, Spanish Fork, and widens the freeway to 8 lanes between US-6 and Payson 800 South. Originally modeled in TransPlan50 at this location but included in project #62 I-15/Alternatives and shown as the "Location to be Determined" line.




***Transit changes***

**#12:** Central Light Rail Line: Changes "Location to be Determined" status to an identifiable line for environmental work purposes. Future study will determine the location.

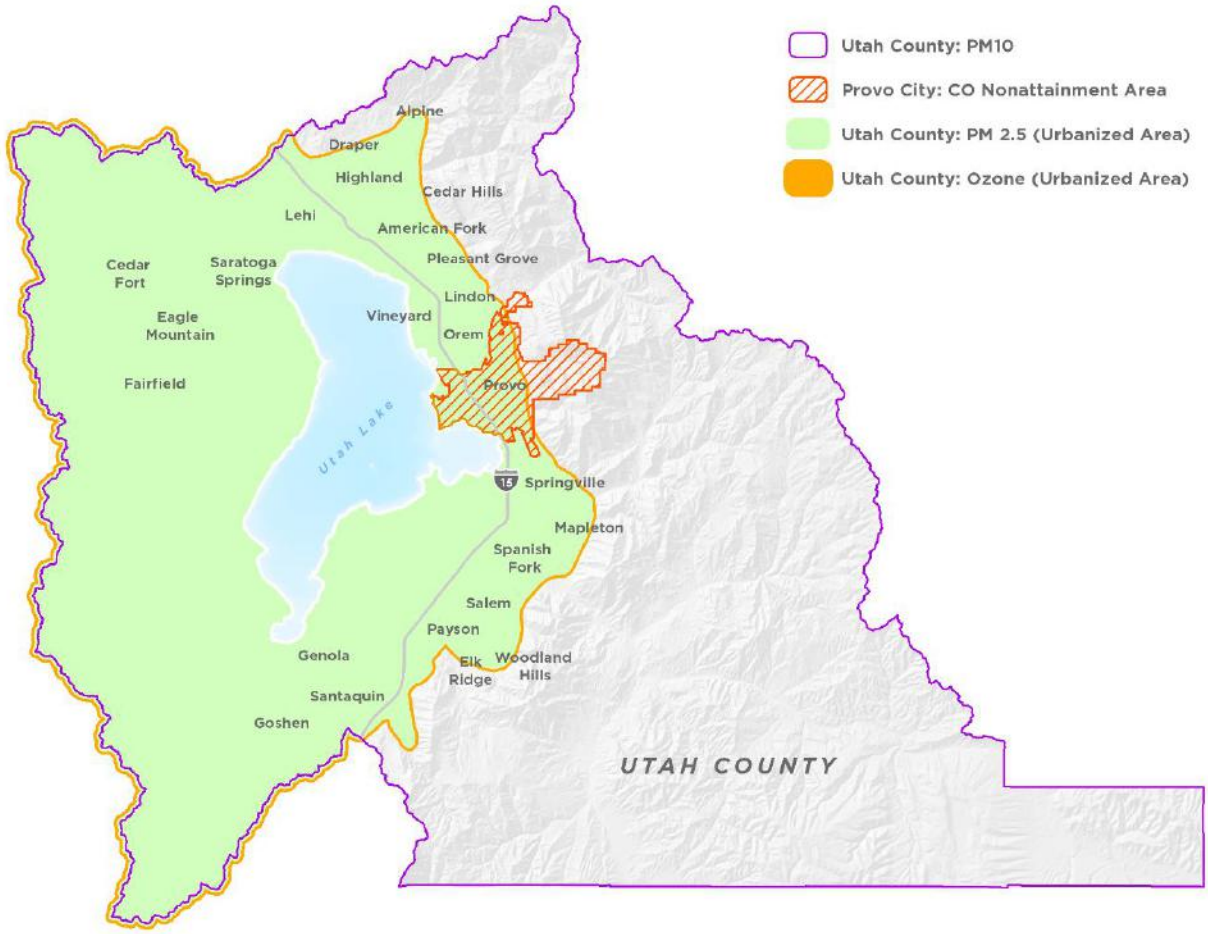
**#13:** South Light Rail Line: Changes "Location to be Determined" status to an identifiable line for environmental work purposes. Future study will determine the location.

## APPLICABLE CLEAN AIR ACT REQUIREMENTS AND CONFORMITY RULES

The FAST Act and the relevant elements of the CAA Subsections 176(c) (1) (2) and (3), requires the MPO to develop RTPs that conforms with the applicable State Implementation Plan (SIP) for air quality.

The EPA Transportation Conformity Rules (40 CFR Part 93) and FHWA/FTA Metropolitan Planning Regulation (23 CFR Part 450) were employed in the preparation of this conformity Determination.

## UTAH COUNTY Non-Attainment and Maintenance Areas MAP




Provo City is designated as a Maintenance Area for Carbon Monoxide. Utah County is designated as maintenance area for PM10, serious non-attainment for 2006 PM2.5 and marginal non-attainment for 2015 Ozone**.**

## CONFORMITY TESTS

Conformity Analysis Tests Table summarizes the specific quantitative conformity tests required by the conformity rules based on the State Implementation Plans for each non-attainment area or maintenance area pollutant in the MAG area.

Effective March 27, 2020, Utah County was redesignated to attainment for PM10 with the associated Maintenance Plan and 2030 NOx and PM10 Motor Vehicle Emissions Budgets.

Effective July 13, 2020, Provo City entered its 2nd 10-year Carbon Monoxide maintenance plan. This plan follows the provisions/requirements of the CO Limited Maintenance Plan (LMP) Policy. The CO LMP does not require a regional emissions test for a conformity determination. Other transportation conformity aspects, such as consultation, fiscal constraint, and hot spot analysis, still apply. According to the EPA, "… it is unreasonable to expect that an LMP area will experience so much growth in that period that a violation of the CO NAAQS would result. Therefore, for the Provo CO maintenance area, all actions that require conformity determinations for CO under our conformity rule provisions are considered to have already satisfied the regional emissions analysis and "budget test" requirements in 40 CFR 93.118."

Effective April 10, 2019, Utah County was declared a Clean Data $PM_{2.5}$ non- attainment area. The State, in collaboration with stakeholders, is required to prepare a $PM_{2.5}$ Maintenance Plan. Until the plan is approved by the EPA, the MPO is required to perform interim conformity tests for the 2006 $PM_{2.5}$ non-attainment area.

Effective June 4, 2018, Utah County was declared a Marginal OZONE non-attainment area. A marginal designation does not require preparation of a SIP, however the MPO is required to perform an interim conformity test for the 2015 Ozone non-attainment area.

**Conformity Analysis Tests**

| Area | Non-attainment and SIP Status | Pollutants | Test Period | Quantitative Tests |
|---|---|---|---|---|
| Provo | Approved Maintenance SIP | CO | Limited Maintenance | None |
| Utah County | Approved Maintenance SIP | NOX precursor Direct $PM_{10}$ | Maintenance Plan | Emissions Budget |
| Utah County | Marginal 2015 Ozone non-attainment. | NOX precursor VOC precursor | Interim Test | Build $\leq$ 2017 |
| Utah County | 2006 $PM_{2.5}$ Non-Attainment | NOX precursor VOC precursor Direct $PM_{2.5}$ | Interim Test | Build < No Build Or Build $\leq$ 2008 |

The conformity rules outline specific analysis requirements that non-attainment areas must follow depending on the severity of the non-attainment problem and the time frame established by the Clean Air Act to maintain National Ambient Air Quality Standards.

The following list describes the appropriate subsections of 40 CFR Part 93 the plan must

meet:

- 93.110 – Latest Planning Assumptions
- 93.111 – Latest Emission Model
- 93.112 – Consultation

Transportation Plan (RTP) and TIP:

- 93.113(b) – Transportation Control Measures (RTP)
- 93.113(c) – Transportation Control Measures (TIP)
- 93.118 or 93.119 – Emission Budget(s) or Emission Reduction

## 93.110 - LATEST PLANNING ASSUMPTIONS

Section 93.110 of the transportation conformity rule defines the requirements for the most recent planning assumptions that must be in place at the time of the conformity determination process. The planning assumptions relate to the socio-economic forecasts, transit operating policies, transit capital program policies, transit fare policies that impact the travel demand modeling. All planning assumptions have been reviewed and agreed to through the interagency consultation process at various stages of the TransPlan50 development

### HORIZON YEARS

Conformity must be determined for the Regional Transportation Plan that includes the Transportation Improvement Program (TIP) in the non-attainment and/or maintenance areas. While other requirements of the Metropolitan Transportation Planning Process dictate the financial feasibility and related programming and planning procedures, conformity is based largely on analyzing specific horizon years chosen according to the criteria found in under Section 93.118. The following rules have been followed to define the horizon years in the MAG study area:

- Any year for which the implementation plan establishes Motor Vehicle Emission Budget – for $PM_{10}$ the 2020 is a budget year, as is 2030 under the new maintenance plan. For CO maintenance plan 2015 is a budget year.
- The first horizon year must be no more than 10 years from the first year of the plan (2019)
- If the attainment year (2003 for $PM_{10}$, 2014 for CO) is in the time span of the transportation plan – it must be a horizon year.
- For $PM_{2.5}$ until a SIP budget is established – the baseline year is 2008
- For $PM_{2.5}$ until a SIP budget is established - The first horizon year must be no more than 5 years from the year of analysis.
- For Ozone – the baseline year is 2017
- For Ozone – The first horizon year must be no more than 5 years from the year of analysis.
- Horizon years may be no more than 10 years apart.

- For $PM_{10}$ -Years 2020, 2030, 2040 and 2050 meet this requirement.
- For $PM_{2.5}$ –Years 2024, 2034, 2044 and 2050 meet this requirement.
- For Ozone - Years 2024, 2034, 2044 and 2050 meet this requirement.
- The final horizon year must be the last year of the transportation plan and 2050 applies to all analyses.

Conformity Horizon Years Table summarizes the proposed horizon years for the three non-attainment areas in the MAG modeling area.

**CONFORMITY HORIZON YEARS**

| Area | Non-attainment Pollutant | Horizon Year(s) |
|---|---|---|
| Utah County | $PM_{10}$ | 2020<br>2030<br>2040<br>2050 |
| Utah County | $PM_{2.5}$ | 2024<br>2034<br>2044<br>2050 |
| Utah County | Ozone | 2024<br>2034<br>2044<br>2050 |

## SOCIO-ECONOMIC FORECASTS

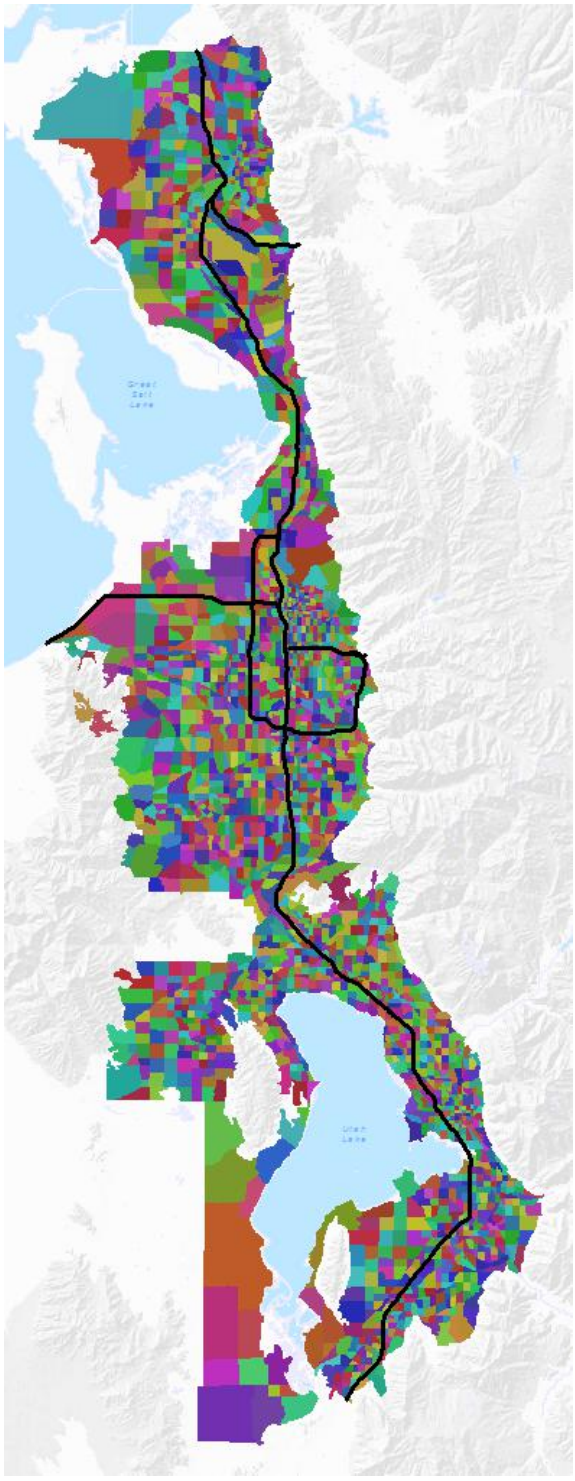
Perhaps the single greatest influence on the magnitude of pollutant emissions resulting from the transportation system is the rate of growth of persons, jobs, households, and related socio-economic measures. The conformity rules require that the socio-economic inputs used in the analysis represent the latest available estimates. Regional and county control totals of population, households and employment using a combination of cohort survival and economic base model (called the UPED model) are submitted by the University of Utah's GPI that is responsible for developing and producing population estimates and projections, neighborhood indicators and demographic analyses focusing on Utah. In addition, the Demography team is responsible for the Utah State Data Center, a program affiliated with the U.S. Census Bureau that is responsible for the dissemination and interpretation of demographic and socioeconomic data, including recently released and historical. These projections are updated approximately every two years. The Mountainland Association of Governments generally works with the Center to

disaggregate the regional and county socio-economic forecasts down to the individual traffic analysis zones, which comprise the region. Added socio-economic variables for dwelling units, automobile ownership, and stratified household size are also forecast by MAG down to the individual traffic zone level. The data employed in this plan was developed by MAG in 2019 and has not changed significantly for the 2020 amendment.

**THE INTEGRATED REGIONAL TRAVEL MODEL - TAZ MAP**

## LAND USE ALLOCATIONS

In addition to review by local municipalities, land use allocations feeding into the model were reviewed by a group of stakeholders, including developers, environmentalists, and other concerned and interested citizens.



## ZONAL DATA

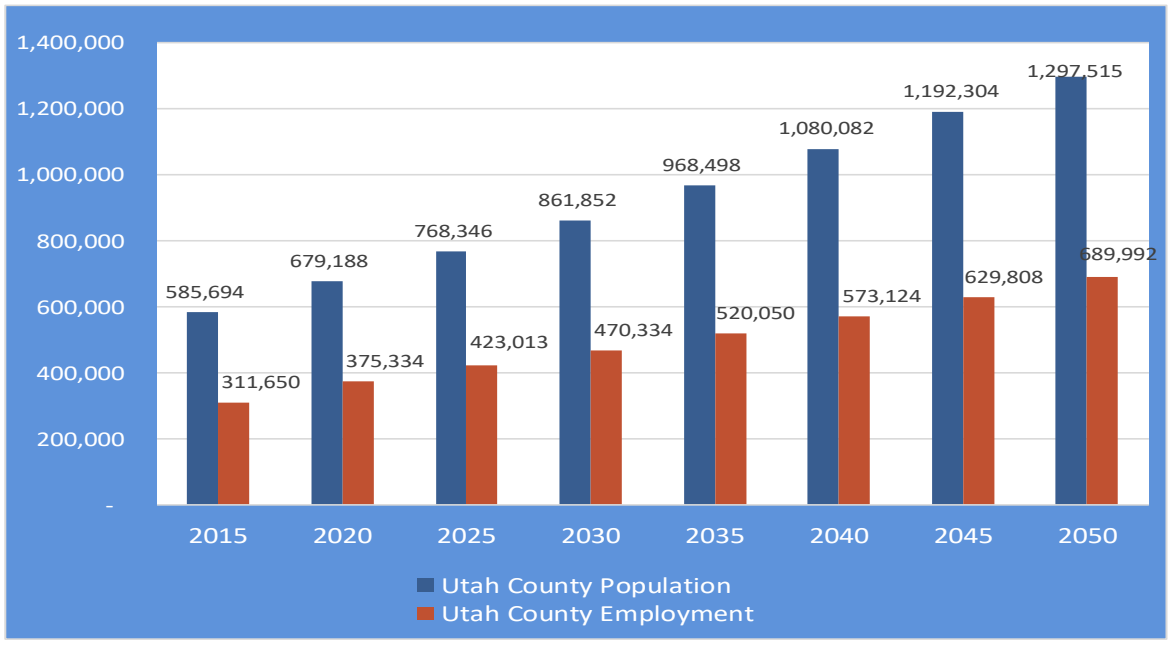
Travel models create a unique spatial framework for describing travel demand. The study area is subdivided into small geographic units called Traffic Analysis Zones (TAZ). The zonal systems to be used for this effort is a 1127-zone system for the Salt Lake Area, a 514-zone system for the Ogden Area, and a 1085-zone system for the Utah County Area. Zones are not bisected by census tract boundaries, thus each of the area's census tracts contains one or more TAZ.

## POPULATION & EMPLOYMENT

Economic and demographic data by TAZ are estimated by WFRC and MAG using information provided by the GPI as well as employment data provided by the Department of Workforce services. Future year projections of socio-economic data begin with control totals provided by the Center. They are the State's official demographic estimates and forecasts and are published for each county in the State.
Each MPO allocates the population, households, and employment to the TAZ. The allocation to zones is done on the basis of local master plans and in conjunction with local planners. Detailed projections are made for 2020, 2030, 2040, and 2050 and beginning in 2015. Estimates for intermediate years are not post-processed but do exist as raw land use model output. Household data has been stratified by (1) the number of persons per household and (2) by the number of vehicles used by the household. The model applies a set of equations to this data to calculate the expected number of person-trips for each household based on *household size/number of vehicles* combination totals for each TAZ.

Population and Employment Forecasts Table summarizes the population and employment forecasts used in this conformity analysis. These forecasts are the most current data and are consistent with those developed by the GPI published in June 2017 as the State of Utah, Economic and Demographic Projections and disaggregated by the MPO.
Employment data does not include agriculture, construction, or mining jobs.
Population data does not include group quarters population (institutionalized persons, student housing etc.)

### POPULATION AND EMPLOYMENT Chart



## PROJECTS IN THE TIP AND PLAN

All the projects identified in the 2050 Plan are included in the regional emissions analysis. The plan is fiscally constrained – containing only projects that are with an identified funding source. Estimated funding levels are based on current funding levels and reasonable assumptions that these funds will be continued in the future.

> ***Regionally Significant Projects:*** (40 CFR 93.101): means a transportation project (other than an exempt project) that is on a facility which serves regional transportation needs. This includes : access to and from the area outside of the region, major activity centers in the region, major planned developments such as new retail malls, sport complexes, etc., or transportation terminals) and would normally be included in the modeling of a metropolitan area's transportation network, including at a minimum all principal arterial highways and all fixed guide way transit facilities that offer an alternative to regional highway travel."

MAG's definition applied in the highway networks meets the EPA definition. All principal arterial projects and passenger rail projects are included in the regional travel model. Also, projects on minor arterial, collector and local transit service are included – therefore included in the emission analysis, even though they do not serve regional transportation needs as defined by EPA.

For a complete list of the projects included in this conformity analysis, see www.mountainland.org/transplan50.

Regionally significant projects may not proceed under a conformity lapse. This conformity analysis finds that the transportation plan conforms.

## UTAH COUNTY - Regionally Significant Corridors Map

## MOUNTAINLAND BASELINE /PLANNED REGIONALLY SIGNIFICANT FACILITIES

***Existing / Planned Facilities***

**I-15 Freeway --** Juab County Line to Salt Lake County Line
**SR-92 / Timpanogos Highway--** I-15 to mouth of American Fork Canyon
**SR-68** – Utah/Salt Lake County Line to Grandview Blvd, Saratoga Springs
**SR-73** – Redwood Road to Cedar Fort
**SR-85 / 2100 North --** I-15 / Lehi 2100 North Interchange to Redwood Road
**SR-145 / US-89 / American Fork Main Street/Pioneer Crossing--** American Fork State Street to Saratoga Springs Redwood Road
**SR-129** / North County Blvd – I-15 Pleasant Grove Interchange to SR-92
**SR-114 / Geneva Road / Provo Center Street –** US-89 to Provo Center Street to US-89 Provo State Street
**SR-52 / Orem 800 North --** I-15 / Orem 800 North Interchange to University Ave Provo
**Orem Center Street –** Orem SR-114 Geneva Road to Orem US-89 State Street
**Bulldog Blvd –** Provo US-89 State Street to Provo US-189 University Ave
**US-189 / University Ave Provo --** Orem 800 North to I-15 / University Ave Interchange Provo
**US-89 / State Street American Fork to Provo --** American Fork 200 East to Provo Bulldog Blvd
**US-89 / State Street Lehi / American Fork --** Lehi Main Street to American Fork Main Street
**US-89 / Main Street Springville --** Springville 1400 North to SR-51
**US-89 / Provo 300 South--** Provo 500 West to South State Street Provo
**US-89 / Provo 500 West--** Bulldog Blvd to Provo 300 South
**US-89 / South State Street Provo**, Provo 300 South to Springville 1400 North
**US-89 / Springville to Spanish Fork --** SR-51 Springville to US-6 Spanish Fork
**SR-75** - I-15 / Springville 1400 North to US-89 Springville State Street
**SR-77** - I-15 / Springville 400 South to US-89 Springville State Street
**US-6 Spanish Fork --** I-15 / US-6 Interchange Spanish Fork to MPO boundary (mouth of Spanish Fork Canyon)
**SR-156 / Spanish Fork Main Street --** I-15 / Spanish Fork Main Street Interchange to Arrowhead Trail Spanish Fork
**SR-265 / University Parkway --** I-15 / University Parkway Interchange Orem to University Ave Provo
**Intermodal Centers –** American Fork, Orem, Provo, Spanish Fork, and Vineyard Commuter Rail Station
**Commuter Rail** -- Provo to Salt Lake County Line and Provo to Payson
**TRAX Light Rail** – Draper to Lehi Line
**Bus Rapid Transit** – Provo to American Fork

### FUTURE YEARS TRAVEL DEMAND MODEL NETWORK

All projects included in the 2050 regional transportation plan were modeled to determine their impacts on air quality including baseline projects. This approach models conformity for the entire plan, but in the case of failure to demonstrate conformity, only exempt projects may proceed.

In order to remain consistent with past modeling practices, MAG included the analysis of all planned transportation capacity increase projects on facilities functionally classified as Collector, Minor Arterial, and Principal Arterial streets.

The highway projects list from the 2050 Regional Transportation Plan is included in the appendix. Maps of the transportation networks used for the emissions analysis are provided in the Appendix. The following "Build" model runs reflect the Plan.

| | | |
|---|---|---|
| *Baseline* | = | Includes existing network as of 2015 |
| *2024* | = | Includes project on current TIP and existing |
| *2030* | = | Includes projects up to and including year |
| *2040* | = | Includes projects up to and including year |
| *2050* | = | Includes projects up to and including year |

In addition to the Transportation Plan networks mentioned above, additional years were interpolated –2020, 2034, and 2044 to provide for transportation data needed to assess the air quality impacts on the $PM_{10}$ Ozone and $PM_{2.5}$ analysis years.

***Concept and Scope:*** the design concept and scope of all regionally significant capacity increasing projects in the TIP has not changed significantly from the design and scope identified in the plan.

## THE REGIONAL TRAVEL DEMAND MODEL

### MODEL OVERVIEW

The Regional model is an integrated land-use, transportation, and air quality model designed to perform a wide range of analyses. The model includes several advanced features that place it on the cutting edge of improved modeling methods required to meet the FAST Act and the Clean Air Act. In addition, several features recommended by the Travel Model Improvement Program of the US Department of Transportation, the Federal Highway Administration (FHWA), the Federal Transit Administration (FTA) and the Environmental Protection Agency (EPA) are incorporated into the model.

Some of the most useful model outputs include:

- Origin-Destination flows,
- Directional link vehicle volumes,
- Vehicular travel times and speeds, and
- Transit ridership numbers.
- The model produces forecasts for four times of day:
- AM Peak: 6-8:59 AM
- Midday: 9 AM – 2:59 PM
- PM Peak: 3-5:59 PM
- Evening/Off-peak: 6 PM – 5:59 AM

**MODEL COVERAGE**

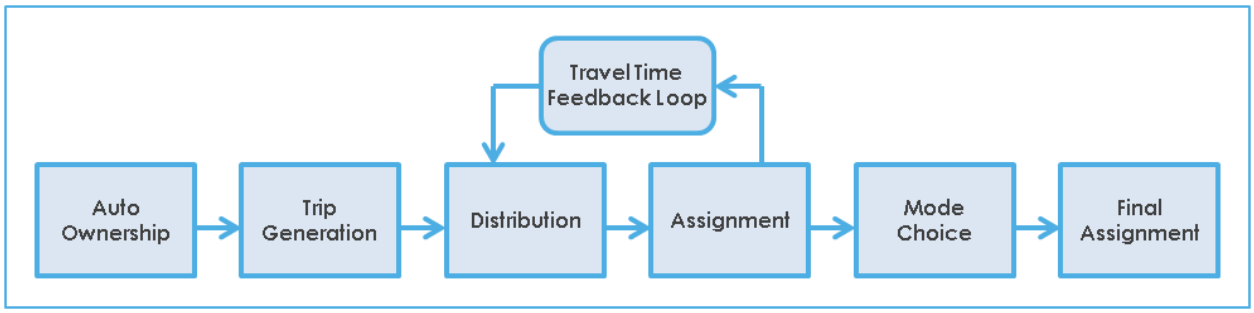
The model covers the developable area of Utah, Salt Lake, Davis, Weber, and a portion of Box Elder counties except for the canyons and the mountains to the east of the urbanized areas**.** In these cases, the population in the areas that are outside of the travel model coverage is relatively small and is separated from the urban area by some distance.

There is significant commuting from both Summit County (Park City) and Tooele County from In both cases the population centers are separated by distances of more than 15 miles from the urban portions of Salt Lake County. The issue of how to treat these growing travel flows may need to be dealt with in the future. At this time the commuting levels are not of a magnitude that treating the flows as an external-internal flow compromises the urban models to a significant degree.

**MODEL STRUCTURE**

System-wide transportation planning models are typically based on a four-step modeling process: trip generation, trip distribution, mode split, and trip assignment. The regional model incorporates these steps and adds an auto ownership model that is sensitive to urban design variables.

The model has a feedback loop between trip distribution and traffic assignment, which is a process that ensures consistency between travel congestion and times that *influence* trip distribution patterns and are also an *outcome* of trip assignment. Travel time, or more generally speaking *accessibility*, is calculated based on outputs from the assignment model, but also is an important determinant of trip distribution and mode split. Therefore, it is customary to iterate these three models in order to reach a convergent solution.




## CONCEPTUAL OVERVIEW OF THE WFRC/MAG MODEL

At the start of a full model run, the auto ownership model estimates household auto ownership levels and then the trip generation model uses land use data and auto ownership to calculate trip ends at the transportation analysis zone (TAZ) level. These trip ends are then paired into origins and destinations in the distribution model. In the mode split model, a mode of travel is selected for each trip. Vehicle trips are assigned to the highway network in the assignment model. The travel time feedback loop in the model is accomplished prior to mode choice by converting person trips to vehicle trips based on observed data.

## MODEL COMPONENTS

Although considered a five-step process as stated above, the model is actually comprised of several steps and each step is programmed or scripted separately. These steps include, but are not limited to:

- *Land use allocation model (REMM)* allocates future land use (i.e. housing and jobs) based on accessibility, availability of land (through physical constraints and zoning), and location of existing land uses.
- *Auto ownership model* estimates the likelihood of each household in the region owning 0, 1, 2, 3+ cars. Auto ownership is a function of characteristics of the household and where the household lives. Auto ownership and availability is a strong predictor of trip making and mode choice behavior.
- *Trip generation model* calculates the number of person trips generated within each TAZ. The trip generation model parameters are developed from the WFRC/MAG 2012 Household Travel Survey. The number of trips to and from a place is a function of the amount and types of land-use activity within the zone.
- *Trip distribution model* pairs the origins and destinations for each zone for each of the trip purposes. Trip generation estimates the number of trips to or from each TAZ, and trip distribution completes the trip by describing which trip origins are linked with which trip destinations. The result of this is a person trip matrix for each trip type. Trip distribution links trip-ends of the same type based primarily on the spatial separation of different land-uses and observed

sensitivities to trip length. One output of trip distribution is the person trip table for home to work that can be compared to the "Journey- to-Work" data provided by the Bureau of the Census.

- *Highway/transit skim builder* finds the best available travel path via each of the travel modes explicitly modeled. Several modes are explicitly modeled, including auto, transit modes (local bus, bus rapid transit, light rail, commuter rail) and non-motorized modes. Skims are reasonable approximations of the travel time and cost between all pairs of TAZs, and skims are described for each travel mode. The path-finding algorithms are calibrated based on observed travel paths and observed relationships between volumes and congested speeds.

- *Mode split model* calculates which mode the person trips are likely to take based on availability and mode-specific parameters (e.g. time, cost, transit frequency). Mode split provides a breakdown of person trips by mode both for captive riders (people without automobiles) and for the total population. The mode split model is developed based on observed data on mode preferences and what those preferences imply about sensitivities to mode attributes.

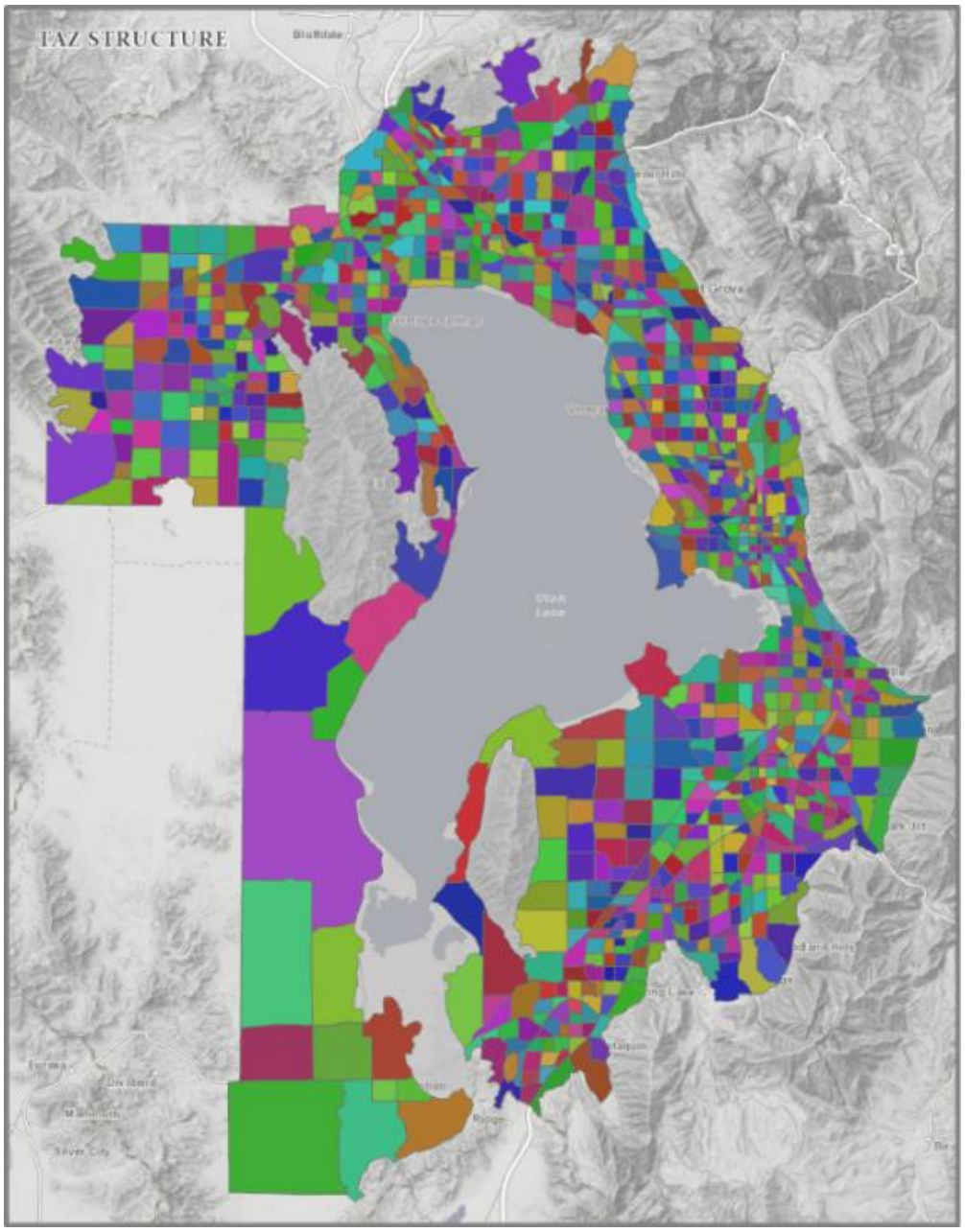
- *Vehicle assignment model* locates the "best" routes between each origin/destination pair and assigns the vehicle trips to the highway network. Important outputs of this module include number of vehicles on each roadway segment by time period and turning movements at intersections. Several other pieces of data can be extracted, including operating speeds, travel times, VMT, VHT, and V/C on links and at intersections. In addition, one can configure the vehicle assignment to save all the vehicle trips that use a single link in either direction (select link analysis) or all the vehicle trips that originate or are destined for a zone (select zone analysis).

- *Transit assignment* uses the transit trip table output from mode split and assigns person trips using transit to the appropriate transit route. This provides a means of viewing transit ridership graphically and understanding the relative effectiveness of different segments of the transit network.

- *Model output* is summarized automatically by the model, including regional statistics (e.g. VMT, VHT, transit shares and trip lengths), corridor and segment performance statistics (e.g. delay, volume, and ridership), district and county-level trip flows, MOVE emissions model inputs, and calibration statistics.

## MODEL GEOGRAPHY & UTAH COUNTY TAZ STRUCTURE MAP

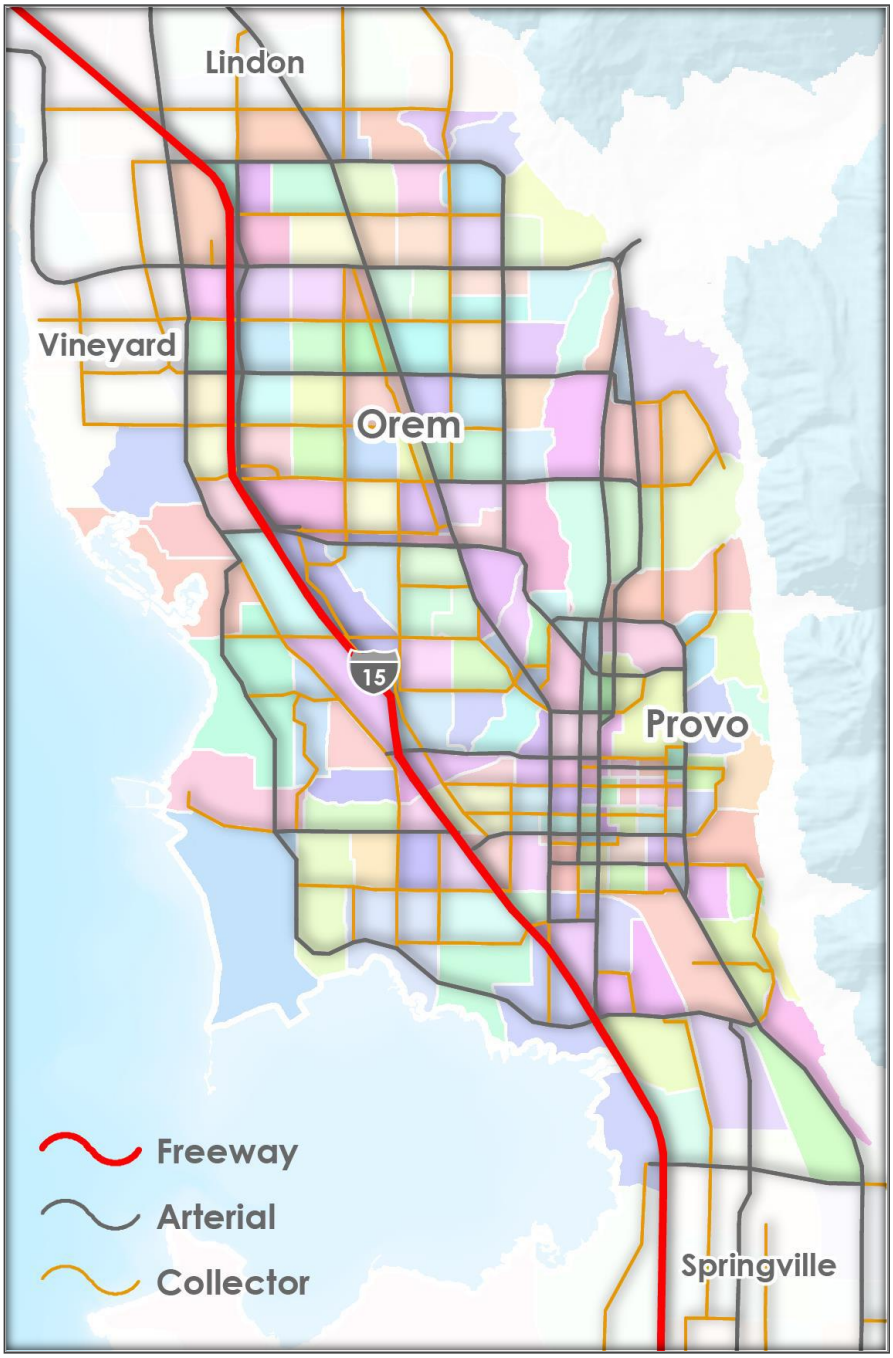
- **TAZ STRUCTURE**
- Utah County traffic model consists of 1,127 internal TAZs and 8 external TAZs. Land-use and socioeconomic data are summarized within this spatial framework and travel is estimated between the TAZs.



**NETWORK STRUCTURE**

For modeling purposes, the road network includes all facilities functionally designated as collector or above. There are approximately 50,000 road links in the network. The Street Network in Model (Provo and Orem) Map shows a portion of the Voyager network covering Provo and Orem.

**NETWORK IN MODEL (PROVO AND OREM) MAP**



## MODEL CALIBRATION

The model is calibrated to reasonably represent 2015 “base year” travel conditions and patterns, a process in which model output is checked or "validated" against real-world data. Trip rates, transit ridership and highway volumes are examples of type of model outputs that are validated. When the model results do not match the base- year values within an acceptable tolerance, parameters are adjusted until the model is acceptable. For future forecast years, the model output is reviewed for "reasonableness" to validate model results and model sensitivities can be assessed.

## QUALITY CONTROL AND MONITORING

Due to the vast amount of data required as input to the modeling process, numerous quality control tools have been developed to help ensure the integrity of that data, which in turn enhances the reliability of the model. These automated features include the following:

- Summaries of key demographic data – these are used to compare magnitudes and trends and to check for accuracy.
- Summaries of county-to-county flow magnitudes and trends- these help in checking for accuracy and reasonableness.
- Cross checks to detect conflicting network data.
- Visual inspection of differences between the highway networks.
- Screen line summaries to compare general traffic volumes.
- Check links for correct county and city tag.
- Check that link speeds and volumes are within reasonable ranges.
- Numerous other network detail checks.

# TRANSPORTATION MODELING

## UTAH COUNTY REGIONAL TRAVEL Characteristics

The Travel Characteristics table provides a summary of AAWDT VMT estimates resulting from the transportation system in the various horizon years. Base Year 2015 VMTs are actual UDOT counts.

| UDOT AADT | | Networks AAWDT | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Base Year** | **2015** | 2017 | 2020 | 2024 | 2030 | 2034 | 2040 | 2044 | 2050 |
| Arterial | 5,337,542 | 5,705,769 | 6,597,320 | 7,240,212 | 7,929,818 | 8,599,301 | 9,689,162 | 10,368,012 | 11,477,828 |
| Freeway | 4,621,863 | 5,324,030 | 6,034,676 | 5,791,432 | 7,547,265 | 8,404,192 | 9,874,602 | 11,065,892 | 13,127,639 |
| Local | 2,097,865 | 2,211,883 | 2,617,985 | 2,854,613 | 3,103,579 | 3,006,736 | 2,867,108 | 3,099,115 | 3,482,798 |
| Total | 12,057,270 | 13,241,682 | 15,249,981 | 15,886,257 | 18,580,662 | 20,010,229 | 22,430,872 | 24,533,019 | 28,088,265 |

### UTAH COUNTY 2015 AADT ADJUSTMENT FACTORS

| FACILITY TYPE | MODEL AWKDT VMT | HPMS AADT VMT | MODEL TO AADT |
|---|---|---|---|
| Freeways | 4,727,905 | 4,621,863 | 0.978 |
| Arterials | 5053,170 | 5,337,542 | 1.056 |
| Local Roads | 903,619 | 2,097,865 | 2.322 |

### PROVO CITY 2015 AADT ADJUSTMENT FACTORS

| FACILITY TYPE | MODEL AWKDT VMT | HPMS AADT VMT | MODEL TO AADT |
|---|---|---|---|
| Freeways | 621,093 | 602,460 | 0.97 |
| Arterials | 838,343 | 880,260 | 1.05 |
| Local Roads | 211,775 | 491,319 | 2.32 |

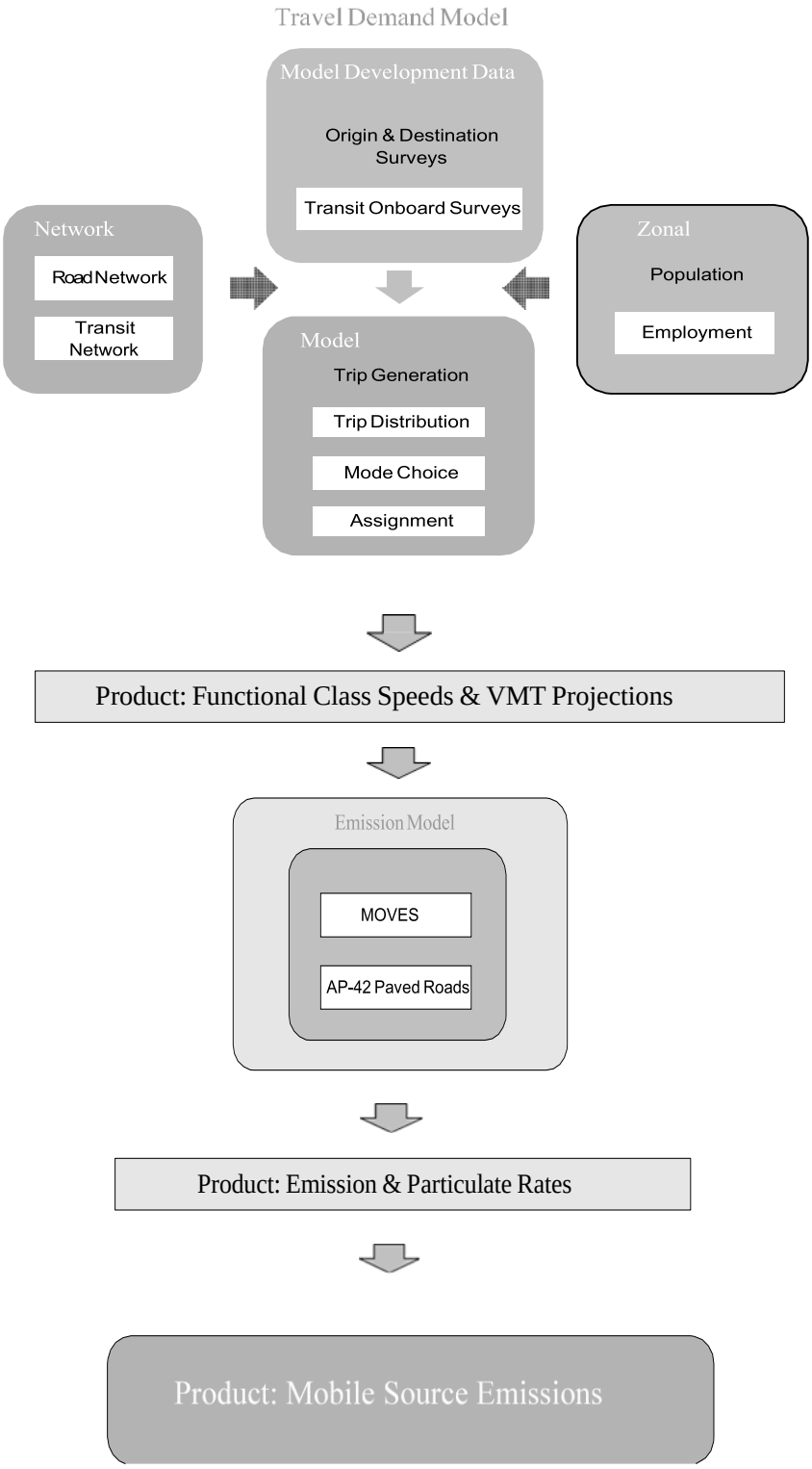
Since PM and CO emission analysis for Utah County and Provo City is related to winter episodes, the VMT data is adjusted to the winter season. The winter factor applied to the adjusted model VMT is 0.974 for both Utah County VMT and Provo City VMT as per seasonal traffic engineering area counts. Ozone emissions analysis is related to summer episodes, the VMY data is adjusted to the summer season. The summer factor applied to the adjusted model VMT is 1.07

## UTAH COUNTY - TRAVEL CHARACTERISTICS

| | Activity by Time of Day | | | | |
|---|---|---|---|---|---|
| | Base Year | | | | |
| Facility Type | 2015 | 2024 | 2030 | 2040 | 2050 |
| **Arterials** | | | | | |
| AM | 17.5% | 17.6% | 17.42% | 17.25% | 17.20% |
| Mid | 31.9% | 31.8% | 32.05% | 32.02% | 32.06% |
| PM | 26.1% | 26.3% | 26.14% | 26.39% | 26.42% |
| Eve | 24.6% | 24.4% | 24.39% | 24.35% | 24.32% |
| **Freeways** | | | | | |
| AM | 19.6% | 19.6% | 19.7% | 19.61% | 19.55% |
| Mid | 31.8% | 32.1% | 32.1% | 32.07% | 32.12% |
| PM | 25.5% | 25.1% | 25.3% | 25.18% | 25.06% |
| Eve | 23.2% | 23.2% | 22.9% | 23.14% | 23.26% |
| **Local roads** | | | | | |
| AM | 15.7% | 15.7% | 15.63% | 15.60% | 15.49% |
| Mid | 33.3% | 33.4% | 33.41% | 33.48% | 33.61% |
| PM | 25.6% | 25.5% | 25.56% | 25.51% | 25.46% |
| Eve | 25.4% | 25.4% | 25.41% | 25.41% | 25.43% |
| Total Network | | | | | |
| AM | 18.3% | 18.3% | 18.34% | 18.38% | 18.33% |
| Mid | 31.9% | 32.0% | 32.15% | 32.14% | 32.20% |
| PM | 25.8% | 25.7% | 25.71% | 25.68% | 25.62% |
| Eve | 24.0% | 24.0% | 23.80% | 23.80% | 23.86% |

| | Speeds by Time of Day | | | | |
|---|---|---|---|---|---|
| | Base Year | | | | |
| Facility Type | 2015 | 2024 | 2030 | 2040 | 2050 |
| **Arterials** | | | | | |
| AM | 33.1 | 31.1 | 33.4 | 32.0 | 31.7 |
| Mid | 34.6 | 33.8 | 34.3 | 33.0 | 32.7 |
| PM | 31.2 | 28.4 | 31.0 | 29.4 | 28.2 |
| Eve | 35.7 | 35.5 | 35.4 | 34.2 | 34.1 |
| **Freeways** | | | | | |
| AM | 68.2 | 64.6 | 67.8 | 64.1 | 59.6 |
| Mid | 73.0 | 73.4 | 73.5 | 72.3 | 71.9 |
| PM | 58.3 | 55.1 | 60.4 | 56.6 | 53.3 |
| Eve | 74.8 | 74.9 | 74.4 | 73.4 | 73.2 |
| **Local roads** | | | | | |
| AM | 19.4 | 19.3 | 19.1 | 18.9 | 18.8 |
| Mid | 19.4 | 19.3 | 19.1 | 18.9 | 18.8 |
| PM | 19.4 | 19.3 | 19.1 | 18.9 | 18.8 |
| Eve | 19.5 | 19.4 | 19.2 | 19.0 | 18.9 |
| Total Network | | | | | |
| AM | 40.6 | 38.1 | 41.4 | 41.4 | 40.3 |
| Mid | 41.2 | 40.2 | 41.7 | 42.3 | 42.2 |
| PM | 36.5 | 33.5 | 37.2 | 36.6 | 35.2 |
| Eve | 41.9 | 41.3 | 42.3 | 43.1 | 43.2 |

## TRAVEL MODEL AND MOBILE EMISSION MODEL INTERACTION DIAGRAM



### MODELING DOMAIN FOR $PM_{10}$ AND CO MAINTENANCE AREAS, AS WELL AS $PM_{2.5}$ AND OZONE NON-ATTAINMENT AREAS

The modeling area included in the MAG models covers the entire county. $PM_{10}$ ,$PM_{2.5}$ and ozone conformity must be found for the entire designated non-attainment areas. CO conformity must be found for the Provo City boundary, though modeling is not required for the Limited Maintenance Plan.

## 93.111- LATEST VEHICLE EMISSION MODEL

The Mobile Source emissions factor data is derived from employing two EPA models. For Oxides of Nitrogen emission factors and Particulates MAG employed the approved MOVES model and for determining Road Dust emission rates the AP-42 equation was used as summarized below:

**Secondary $PM_{10}$ Pollutants**
MOVES - NOx

**$PM_{10}$ Pollutants - Direct**
MOVES – Exhaust, Tire & Brake wear
AP-42– Chapter 13 - Road dust

**2006 $PM_{2.5}$ Precursor**
MOVES – Nox, VOC

**2006 $PM_{2.5}$ Pollutants - Direct**
MOVES Total $PM_{2.5}$, Break and Tireware

**2015 Ozone Precursor**
MOVES – Nox, VOC

Once the emission rates have been determined for each facility type the corresponding rates (in grams/mile) are multiplied by the seasonal daily VMT for that facility for that calendar year. As per following formula:

***Emission Rate (gram/mile) x Vehicle Miles Traveled (miles/day) = Emissions (gram/day)***

The total emissions for the County are determined by adding the rates of all 3 facility types (Freeways, Arterials, and Local roads)

**MOVES**
EPA approved air quality model MOVES 2014 was used in preparation of the plan conformity.

**I/M PROGRAMS**
Up to 1996 Utah County's I/M program was a basic two-speed idle, classified as a Test & Repair program. 1996 and later-The Utah County's I/M program was approved by EPA for credit as a centralized test only program with Technician Training credits.

Effective February 29, 2000, the Utah County I/M Program consists of a two-speed idle test on all gasoline vehicles of model years 1968 through 1995. OBD testing is performed on all gasoline vehicles of model years 1996 or newer. A vehicle that passes the OBD test will be given a certificate of compliance for registration purposes. If a vehicle fails the OBD test then it must pass the two-speed idle test in order to receive a certificate of compliance.

For modeling purposes – Model years 1996 and above are tested under the OBD procedure. H.B.172 went into effect January 2003 requiring biennial emission testing to the newest 6 years car models

**MOVES INPUT FILES**

The MOVES model is a very data intensive computer program based on the MYSQL database software. Input files utilized in the conformity analysis follow the agreed upon procedures and data that were established through consultation with the DAQ and EPA in the preparation of the SIPs and Maintenance Plans. For the projection inventories the input files were adapted to reflect changes in the local I/M programs, vehicle standards, and other parameters as they evolve over time – in accordance with the Interagency Consultation process that reflect the local conditions established. Vehicle activity input files are generated by the WFRC/MAG Regional Travel Demand Model.

Detailed discussion on MOVES procedures and proper use and an explanation of all command lines and external files used in the modeling is detailed in the EPA User's Guide to MOVES - October 2014.

**PRIMARY PARTICULATE EMISSIONS – MOVES, AND AP-42 Chapter 13- PAVED ROADS**

The conformity analysis for Particulate Matter10 ($PM_{10}$) was estimated by utilizing the MOVES model for Exhaust, Tire, and Brake Wear. Road Dust was estimated utilizing AP-42. A detailed discussion of the methodology appears in the guidance documentation of the MOVES and Chapter 13 of the AP-42 fifth edition. More information can be found at https://www.epa.gov/air-emissions-factors-and-quantification/ap-42-compilation-air-emissions-factors .

## 93.112 - CONSULTATION

***WFRC / MAG Regional Transportation Model*:** MAG in collaboration with WFRC employ a state of the practice travel demand model using the traditional four step travel demand process. The model is run using the TP+ program developed by the Urban Analysis Group. In the past, three similar but distinct travel models were used for the Ogden, Salt Lake, and Provo/Orem areas. These models have now been consolidated into one regional model. This improves the ability of the model to account for the effects of each area on

the others since interregional trips are no longer considered "external" to any of the regions.

***DAQ / MAG Emission Input Parameters:*** MAG in collaboration with the DAQ has developed, through consultation, the environmental conditions (such as ambient temperature profile, altitude and humidity) used in the MOVES model. These parameters were employed in the preparation of the $PM_{10}$ Maintenance Plan and the CO Maintenance Plan modeling. A detailed discussion of the environmental conditions and parameters is included in the $PM_{10}$ Maintenance Plan and the CO Maintenance Plan TSD respectively.

***Clean Air Agencies Consultation:*** As stated in the transportation bill, "In metropolitan areas which are non- attainment for ozone or carbon monoxide under the Clean Air Act, the metropolitan planning organization shall coordinate the development of a long range plan with the process for development of the transportation control measures of the State Implementation plans required by the Clean Air Act." A New Consultation Procedures SIP was adopted by the State AQ Board and Approved by EPA in September 2009.

The presence of the DAQ on our Mountainland MPO Planning Committee and on the Technical Advisory Committee, contributes to improved communications between Air Quality and Transportation Planning activities. In conjunction with the conformity determination we have established an Interagency Coordination Committee that includes representatives of FHWA, UDOT, DAQ, UTA, EPA, Mountainland, and the WFRC. These meetings have greatly improved the consultation process resulting in a successful plan consistent with the federal planning regulations and the SIP.

Employing the Interagency Consultation process articulated in 40 CFR 93.105, MAG has worked closely with the appropriate agencies to develop a process that established a set

of transportation, land use and air quality planning assumptions that were used in this conformity determination. The participants included staff representing the following agencies:

| | |
|---|---|
| UDOT | UTA |
| FHWA/FTA | Utah County Government |
| DAQ | Utah County Cities |
| EPA/Region 8 | WFRC |
| CMPO | |

## 93.113 - TRANSPORTATION CONTROL MEASURES

There are no mandatory Transportation Control Measures (TCM) identified in the $PM_{10}$ SIP for Utah County nor in the Provo CO Maintenance Plan.

***Transit Improvements*:** The Transportation Plan identifies strategic options for the role of public transit in Utah County. This plan identifies mass transit needs as well as intercity travel between Utah County and the Salt Lake Valley with a thirty- year horizon.

UTA is funded through portions of the sales tax used for both operation and capital expenses. Additional revenue is received through fares paid and federal grants received annually for capital expenses. While there have been some short- term fluctuations in transit patronage in response to fare increases, the implementation of commuter rail service and other transit improvements have increased transit patronage within the levels anticipated by the Plan.

Plans for expanding and increasing bus service, extending Bus Rapid Transit to American Fork, and the addition of commuter rail in South Utah County are moving forward. These transit goals are featured in the Plan, and the steps necessary to achieve them are moving forward, including a proposal of voter approval of additional revenue for transit funding. Detailed discussion on Public Transit is included in the TransPlan50 document.

# 93.118 - EMISSION BUDGETS

## UTAH COUNTY $PM_{10}$ CONFORMITY DETERMINATION

The Utah County PM10 Maintenance Plan requires conformity determinations for both NOx and Primary PM (a combination of Direct PM10.and Dust). Construction related $PM_{10}$ (§93.122(d) is not necessary because the PM10 SIP does not identify construction related dust as a contributor to the $PM_{10}$ non-attainment.

In 2005, the State introduced a Trading Rule for Salt Lake County (R307 – 110) that allows the WFRC MPO to apply potential surplus in its budget for Primary $PM_{10}$, to a potential short fall in its budget for NOX at a ratio of one-to-one.

Mountainland AOG requested the State to expand this existing rule to Utah County as well. The new Rule addressing specifically Utah County - R307 – 111 was incorporated into the state code and became effective March 5, 2015. The final Trading Rule for Utah County was published in the Federal Register on July 17, 2015.

### UTAH COUNTY PM10 EMISSION MODELING RESULTS

The following tables summarize the emission applied in the form MOVES and AP-42 -Paved Roads respectively.

| Utah County - MOVES and AP-42 Rates (g/mile) | | | | | | |
|---|---|---|---|---|---|---|
| | | | Direct PM10 | | | |
| year | Distance | NOX | Exhaust Total | Brake | Tire | Dust |
| **2020** | 14,781,622 | 0.478 | 0.0233 | 0.0374 | 0.0104 | 0.1899 |
| **2030** | 18,023,246 | 0.212 | 0.0101 | 0.0378 | 0.0106 | 0.1873 |
| **2040** | 21,847,670 | 0.1576 | 0.0062 | 0.0377 | 0.0110 | 0.1773 |
| **2050** | 27,357,970 | 0.1543 | 0.0060 | 0.0351 | 0.0106 | 0.1757 |

Direct PM10 = Total Exhaust + Brakewear & Tirewear

The table below summarizes the budget test associated with each required year of analysis for the precursor pollutant of NOx and Direct PM10. Direct PM10 is the sum of various component elements related to small particulates resulting from vehicle travel. These include exhaust, brake and tirewear and fugitive dust as results from the EPA AP-42, chapter 13-

Paved Roads model. The Regional Transportation Plan and the Transportation Improvement Program conform to the emissions budget test for all $PM_{10}$ pollutants.

The State air quality rule R307-111 allows a portion of the surplus primary PM10 budget to be applied to the secondary $PM_{10}$ budget for conformity purposes. The table below shows that budget adjustments were necessary for analysis year 2020

## UTAH COUNTY $PM_{10}$ CONFORMITY BUDGET TEST

| Utah County PM10 Conformity Budget test | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | **Pollutants** all facilities, all sources | | | | | | |
| | | **Secondary** tons/weekday | | | **Primary PM10** tons/weekday | | | |
| **year** | **Distance** | **NOX** | **NOX budget** | **Result** | **Direct PM10** | **DUST** | **Primary PM10 Budget** | **Result** |
| **2020 Total** | **14,781,622** | **7.79** | **7.79** | **Pass** | **4.03** | | **7.76** | **Pass** |
| 2020 | | 7.79 | **5.21** | | 1.16 | 2.87 | | |
| | Primary PM - tradec | 2.58+5.21=7.79 | | | | trade - | 10.34 -2.58=7.76 | |
| **2030 Total** | **18,023,246** | **4.22** | **8.34** | **Pass** | **4.64** | | **12.28** | **Pass** |
| 2030 | | | | | 1.19 | 3.45 | | |
| **2040 Total** | **21,847,670** | **3.15** | **8.34** | **Pass** | **5.20** | | **12.28** | **Pass** |
| 2040 | | | | | 1.32 | 3.88 | | |
| **2050 Total** | **27,357,970** | **4.65** | **8.34** | **Pass** | **6.29** | | **12.28** | **Pass** |
| 2050 | | | | | 1.56 | 4.73 | | |

Primary PM = Direct PM10 (Exhaust+Brakewear+Tirewear) + Dust

## UTAH COUNTY $PM_{10}$ CONFORMITY DETERMINATION

**Based on the findings of this report a positive conformity determination for $PM_{10}$ is made for the 2050 Regional Transportation Plan and TIP.**

## UTAH COUNTY $PM_{2.5}$ CONFORMITY DETERMINATION

Conformity determinations for $PM_{2.5}$ is required for NOx, direct $PM_{2.5}$ and VOC.

### UTAH COUNTY $PM_{2.5}$ EMISSION MODELING RESULTS:

| Utah County - PM 2.5 Interim Test - Rates (g/winter day) | | | | | | |
|---|---|---|---|---|---|---|
| year | facility | Source | Distance | NOX | VOC | Direct |
| **2024** | ALL | ALL VEH | 15,471,998 | 0.331 | 0.307 | 0.022 |
| **2034** | ALL | ALL VEH | 19,489,963 | 0.189 | 0.197 | 0.013 |
| **2044** | ALL | ALL VEH | 23,895,160 | 0.161 | 0.173 | 0.013 |
| **2050** | ALL | ALL VEH | 27,357,970 | 0.154 | 0.122 | 0.011 |

Direct= Exhaust + Brake + Tire

## UTAH COUNTY $PM_{2.5}$ CONFORMITY Budget Test

The table below summarizes the results of the interim test (analysis year ≤ 2008) associated with each required year of analysis for $PM_{2.5}$ emissions for the precursor pollutant of NOx and Direct $PM_{2.5}$.

| Utah County PM2.5 Conformity Interim test - ≤ 2008 emissions | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Pollutants** all facilities and sources | | | | | | | |
| | | **Precursor Pollutants** tons/wday | | | | **Direct PM2.5** tons/wday | |
| year | Distance | NOX | Result | VOC | Result | Direct | Result |
| **2008** | | baseline | 40.046 | baseline | 22.108 | baseline | 2.102 |
| **2024** | 15,471,998 | 5.650 | Pass | 5.249 | Pass | 0.378 | Pass |
| **2034** | 19,489,963 | 4.053 | Pass | 4.237 | Pass | 0.270 | Pass |
| **2044** | 23,895,160 | 4.243 | Pass | 4.551 | Pass | 0.334 | Pass |
| **2050** | 27,357,970 | 4.653 | Pass | 3.676 | Pass | 0.342 | Pass |

Direct: Exhaust + Brakewear + Tirewear

The Regional Transportation Plan and the Transportation Improvement Program conform to the emissions interim test for the $PM_{2.5}$ pollutants.

## UTAH COUNTY $PM_{2.5}$ CONFORMITY DETERMINATION

**Based on the findings of this report, a positive conformity determination for $PM_{2.5}$ is made for the TransPlan50 Plan and TIP.**

## UTAH COUNTY OZONE CONFORMITY DETERMINATION

Utah County is a "marginal" non-attainment area for Ozone. Conformity requires an analysis of TransPlan50 projects based on an interim test comparing the plan horizon years results to the OZONE Inventory of 2017 (as base year). The horizon years inventories should be ≤ (less or equal) than the base year. Since OZONE exceedances in Utah County were observed in the summer season the VMTs are adjusted to reflect the Summer season.

Conformity determinations are OZONE is required for NOx, and VOC

### UTAH COUNTY OZONE EMISSION MODELING RESULTS:

| Utah County - OZONE Interim Test - Rates (g/mile) | | | | | |
|---|---|---|---|---|---|
| **Year** | **facility** | **Source** | **Distance** | **NOX** | **VOC** |
| **2024** | ALL | ALL VEH | 16,488,549 | 0.302 | 0.234 |
| **2034** | ALL | ALL VEH | 21,410,945 | 0.153 | 0.112 |
| **2044** | ALL | ALL VEH | 26,250,330 | 0.125 | 0.087 |
| **2050** | ALL | ALL VEH | 30,054,443 | 0.163 | 0.112 |

### UTAH COUNTY OZONE CONFORMITY Interim Budget Test

The table below summarizes the results of the interim test (analysis year ≤ 2017) associated with each required year of analysis for OZONE emissions for the precursor pollutant of NOx and VOC.

| Utah County OZONE Conformity Interim test - ≤ 2017 emissions | | | | | |
|---|---|---|---|---|---|
| | | **Precursor Pollutants** tons/Summer day \| all facilities and sources | | | |
| **year** | **Distance** | **NOX** | **Result** | **VOC** | **Result** |
| **2017** | | **baseline** | **16.110** | **baseline** | **8.310** |
| **2024** | **16,488,549** | **5.460** | **Pass** | **4.260** | **Pass** |
| **2034** | **21,410,945** | **3.613** | **Pass** | **2.649** | **Pass** |
| **2044** | **26,250,330** | **3.615** | **Pass** | **2.523** | **Pass** |
| **2050** | **30,054,443** | **3.584** | **Pass** | **2.446** | **Pass** |

## UTAH COUNTY OZONE CONFORMITY DETERMINATION:

**Based on the findings of this report, a positive conformity determination for OZONE is made for the TransPlan50 Plan and TIP.**

## PROVO CITY CO CONFORMITY DETERMINATION

Effective July 13, 2020, Provo City entered its 2nd 10-year Carbon Monoxide maintenance plan. This plan follows the provisions/requirements of the CO Limited Maintenance Plan (LMP) Policy. The CO LMP does not require a regional emissions test for a conformity determination. According to the EPA, "… it is unreasonable to expect that an LMP area will experience so much growth in that period that a violation of the CO NAAQS would result. Therefore, for the Provo CO maintenance area, all actions that require conformity determinations for CO under our conformity rule provisions are considered to have already satisfied the regional emissions analysis and "budget test" requirements in 40 CFR 93.118."

Based on our analysis, a qualitative conformity determination for Provo City can be made for Carbon Monoxide based on the Limited Maintenance Plan Provisions described under the transportation conformity rule.

## PROVO CITY CO CONFORMITY DETERMINATION

**Based on an analysis consistent with these rules, a positive determination can be made for the TransPlan50 Plan and TIP in the Provo City Carbon Monoxide maintenance area.**

### ADDITIONAL INFORMATION

- **2024-2050 Highway Project List (See www.mountainland.org/TransPlan50)**

The input/and output database files of the Mobile models used in the analysis can be obtained upon request from Mountainland Association of Governments:

- **Highway Networks – See TransPlan50, Appendix B-Travel Demand**

I-15 Interchange
ENVIRONMENTAL ASSESSMENT
Springville/Spanish Fork

# AIR QUALITY MEMO

**Project No. F-I15-6(239)259**
**Pin: 15153**
**August 2020**

The environmental review, consultation, and other actions required by applicable federal environmental laws for this project are being or have been carried out by UDOT pursuant to 23 USC 327 and a Memorandum of Understanding dated January 17,2017, and executed by FHWA and UDOT.

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## Abbreviations and Acronyms

| | |
|---|---|
| AADT | Average Annual Daily Traffic |
| CAAA | Clean Air Act Amendments |
| CFR | Code of Federal Regulations |
| CO | carbon monoxide |
| EA | Environmental Assessment |
| EIA | Energy Information Administration |
| EPA | Environmental Protection Agency |
| GHG | greenhouse gases |
| LOS | Level of Service |
| LRTP | Long-Range Transportation Plan |
| MAG | Mountainland Association of Governments |
| MPO | Metropolitan Planning Organization |
| MSAT | Mobile Source Air Toxics |
| NAAQS | National Ambient Air Quality Standards |
| NATA | National Air Toxics Assessment |
| NEPA | National Environmental Policy Act |
| NO2 | nitrogen dioxide |
| O3 | ozone |
| Pb | lead |
| PM2.5 | particulate matter with a diameter of 2.5 micrometers or less |
| PM10 | particulate matter with a diameter of 10 micrometers or less |
| POAQC | Project of Air Quality Concern |
| RTP | Regional Transportation Plan |
| SIP | State Implementation Plan |
| SO2 | sulfur dioxide |
| WFRC | Wasatch Front Regional Council |
| UDAQ | Utah Division of Air Quality |
| UDEQ | Utah Department of Environmental Quality |
| VOC | volatile organic compounds |
| µg/m3 | micrograms per cubic meter of air |

# 1.0 Project Overview

The Utah Department of Transportation (UDOT) has prepared an Environmental Assessment (EA) to evaluate a new interchange on Interstate 15 (I-15) in Springville and Spanish Fork at 1600 South/2700 North and improvements to 1600 South/2700 North from Main Street in Spanish Fork to State Street (SR-51) in Springville, in Utah County, Utah. The EA considers current and future transportation needs while taking into account any potential impacts to the natural and built environment.

The Proposed Project is located in Utah County, Utah. The study area extends along I-15 In Springville and Spanish Fork from the 400 South Interchange to the Main Street Interchange and along 1600 North from Main Street to SR-51.

The Preferred Alternative includes:

- Constructing a new single-point urban interchange (SPUI) on I-15 at 1600 South/2700 North.
- Realigning the northwest frontage road to the west to accommodate the new interchange and planned local development.
- Realigning the southwest and northeast frontage roads to accommodate the new interchange.
- Constructing a southbound auxiliary lane between US-6 and the new interchange with barrier separation routing traffic entering southbound I-15 from the new interchange through the I-15/US-6 interchange.
- Constructing a northbound auxiliary lane between US-6 and the new interchange.
- Widening 1600 South/2700 North to five lanes between Spanish Fork Main Street and SR-51.
- Grade-separating 1600 South/2700 North over the planned combined Sharp/Tintic Railroad tracks and modifying existing access to adjacent properties.
- Constructing a 10-foot, multi-use trail along 1600 South/2700 North between Spanish Fork Main Street and SR-51.

# 2.0 Purpose and Need

## 2.1 Purpose

The purpose of the proposed action is to:

- Reduce congestion at the I-15 and Springville 400 South Interchange and on mainline I-15 within the study area.
- Improve safety on the 1600 South/2700 North corridor within the study area.
- Accommodate active transportation within the study area.

## 2.2 Need

The need for the proposed action is based on the following:

- Future failing (Level of Service (LOS) **F**) conditions at the I-15 and Springville 400 South Interchange, causing future congestion (LOS F) on mainline I-15.
- Safety concerns due to queuing onto mainline I-15 at the 400 South Interchange.
- Safety concerns due to at-grade rail crossings on 1600 South/2700 North.
- Lack of active transportation facilities in the study area.

# 3.0 Regulatory Background

## 3.1 National Ambient Air Quality Standards

The Clean Air Act Amendments (CAAA) of 1990 (42 USC 7401 et seq.) established the National Ambient Air Quality Standards (NAAQS) for airborne pollutants. The current NAAQS are shown in Table 1 - National Ambient Air Quality Standards.

*Table 1. National Ambient Air Quality Standards*

| POLLUTANT | PRIMARY/ SECONDARY | LEVEL | AVERAGING TIME | VIOLATION DETERMINATION |
|---|---|---|---|---|
| Carbon Monoxide (CO) | Primary | 9 ppm | 8-hour | Not to be exceeded more than once per year |
| | | 35 ppm | 1-hour | |
| Lead (Pb) | Primary/ Secondary | 0.15 µg/m3 | Rolling 3-Mon Average | Not to be exceeded |
| Nitrogen Dioxide ($NO_2$) | Primary/ Secondary | 53 ppb (0.053 ppm) | Annual | Annual mean |
| | Primary | 100 ppb | 1-hour | 98th percentile of 1-hour daily maximum concentrations, averaged over 3 years |
| Particulate Matter ($PM_{10}$) | Primary/ Secondary | 150 µg/m3 | 24-hour | Not to be exceeded more than once per year on average over 3 years |
| Particulate Matter ($PM_{2.5}$) | Primary | 12.0 µg/m3 | Annual | Annual mean, averaged over 3 years |
| | Secondary | 15.0 µg/m3 | Annual | Annual mean, averaged over 3 years |
| | Primary/ Secondary | 35 µg/m3 | 24-hour | 98th percentile, averaged over 3 years |
| Ozone ($O_3$) | Primary/ Secondary | 0.070 ppm (2015)* | 8-hour | Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years |
| Sulfur Dioxide ($SO_2$) | Primary | 75 ppb | 1-hour | 99th percentile of 1-hour daily maximum concentrations, averaged over 3 years |
| | Secondary | 0.5 ppm | 3-hour | Not to be exceeded more than once per year |

*Source: EPA (as of January 30, 2017 (https://www.epa.gov/criteria-air-pollutants/naaqs-table)*

**Final rule signed October 1, 2015, and effective December 28, 2015.*

*Note: Units of measure for the standards are parts per million (ppm) by volume, parts per billion (ppb), and micrograms per cubic meter of air (µg/m3). Primary standards set limits to protect public health, including the health of "sensitive" populations such as asthmatics, children, and the elderly. Secondary standards set limits to protect public welfare, including protection against decreased visibility, damage to animals, crops, vegetation, and buildings.*

If the NAAQS levels are exceeded, the area is designated a non-attainment area and the development of a State Implementation Plan (SIP) is required. The SIP sets allowable emissions levels to be met and identifies control strategies to meet the NAAQS for those specific criteria pollutants that experienced exceedances. All proposed transportation projects must conform to the SIP.

## 3.2 Transportation Conformity

A regional level analysis looks at the Metropolitan Planning Organization's (MPO) Long-Range Transportation Plan (LRTP) to see that all of the projects included in the LRTP, including the proposed project, conform to the control strategies and emissions levels set in the SIP. An individual project is said to conform to the SIP if, both by itself and in combination with the other planned transportation projects in the plan, it would not result in any of the following conditions (see 40 CFR 93.116):

- New violations of the NAAQS
- Increases in the frequency or severity of existing violations of the NAAQS
- Delays in attaining the NAAQS

Utah does not currently have an approved SIP for $PM_{2.5}$. Because Utah does not currently have an approved SIP for $PM_{2.5}$, interim conformity requirements apply, which require that future NOx emissions (a precursor to $PM_{2.5}$) and primary particulate emissions not exceed 2008 levels. (NOx is a generic term for the mono-nitrogen oxides NO and $NO_2$ (nitric oxide and nitrogen dioxide) and are produced from the reaction among nitrogen, oxygen and even hydrocarbons (during combustion), especially at high temperatures.)

## 3.3 Air Toxics

In addition to the criteria air pollutants for which there are NAAQS, the EPA also regulates air toxics. Most air toxics originate from human-made sources, including on-road mobile sources, non-road mobile sources (e.g., airplanes), area sources (e.g., dry cleaners) and stationary sources (e.g., factories or refineries). Mobile Source Air Toxics (MSATs) are a subset of the 188 air toxics defined by the Clean Air Act. MSATs are compounds emitted from highway vehicles and non-road equipment. The seven compounds with significant contributions from mobile sources that are among the national and regional-scale cancer risk drivers from their 1999 National Air Toxics Assessment (NATA) are:

- Acrolein
- Benzene
- 1,3-butadiene
- Diesel exhaust particulate matter plus diesel exhaust organic gases (diesel PM)
- Formaldehyde
- Naphthalene
- Polycyclic organic matter

## 3.4 Greenhouse Gases

The issue of global climate change is an important national and global concern that is being addressed in several ways by the federal government. The transportation sector is the second-largest source of total greenhouse gases (GHGs) in the United States and the largest source of carbon dioxide ($CO_2$) emissions, the predominant greenhouse gas. According to the *Inventory of U.S. Greenhouse Gas Emissions and Sinks* from the EPA, in 2018, the transportation sector was responsible for 28.2% of all CO2 emissions produced in the United States. The principal anthropogenic (human-made) source of carbon emissions is the combustion of fossil fuels, which account for about 80% of anthropogenic emissions of carbon worldwide. Almost all (over 90%) of transportation-related GHG emissions result from the consumption of petroleum products such as gasoline, diesel fuel, jet fuel, and other residual fuels.

# 4.0 Affected Environment

## 4.1 Climate

Utah has a mainly dry, semi-arid and desert climate. Summers are hot, with average high temperatures of 76 degrees Fahrenheit (July), low humidity, and significant temperature variations between day and night times. In the winter, temperatures average 27 degrees Fahrenheit, with temperature inversions that lead to thick haze and fog. Annual precipitation is 1.08 inches per year, with April being the wettest month. (Climate & Weather Average in Utah County, Utah, USA https://www.timeanddate.com/weather/@5784025/climate)

## 4.2 Existing Air Quality Data

UDEQ maintains a network of air quality monitoring stations throughout the area. In general, these monitoring stations are located where there are known air quality problems, usually in or near urban areas or close to specific emission sources. Other stations are located in remote areas to provide an indication of regional air pollution levels. Data from the Spanish Fork air monitoring station (49-049-5010), located at the Spanish Fork airport, for $O_3$ and $PM_{2.5}$ and the Lindon air monitoring station (49-049-4001), located at 50 North Main Street in Lindon, for $PM_{10}$ was used to compile air quality data for the years of 2015-2019 (see Table 2).

*Table 2. Existing Pollutant Data for the Project Area*

| Pollutants | | NAAQS | 2015 | 2016 | 2017 | 2018 | 2019 |
|---|---|---|---|---|---|---|---|
| $O_3$ | 8-hour (ppm) | 0.070 ppm | 0.074 ppm | 0.072 ppm | 0.072 ppm | 0.073 ppm | 0.066 ppm |
| $PM_{10}$ | 24-hr (µg/m3) | 150 µg/m$^3$ | 194 µg/m$^3$<br>134 µg/m$^3$ | 70 µg/m$^3$ | 116 µg/m$^3$ | 96 µg/m$^3$ | 69 µg/m$^3$ |
| $PM_{25}$ | 24-hr (µg/m3) | 35 µg/m$^3$ | 28.1 µg/m$^3$ | 29.2 µg/m$^3$ | 27.6 µg/m$^3$ | 50.7 µg/m$^3$<br>52.8 µg/m$^3$ | 16.1 µg/m$^3$<br>13.9 µg/m$^3$ |

*Source: All Criteria Pollutant Yearly Quicklook Summary Reports, Utah Division of Air Quality website (http://www.airmonitoring.utah.gov/dataarchive/archall.htm)*

## 4.3 Attainment Status

The project area is located in Springville and Spanish Fork, in Utah County. The project area is within Provo, Utah Serious $PM_{2.5}$, the Utah County Moderate $PM_{10}$, and the Wasatch Front Marginal Ozone Non-attainment areas. It is not within a nonattainment area for any other NAAQS.

### 4.3.1 Particulate Matter

In 1997, the EPA strengthened the 24-hour standard for $PM_{2.5}$, lowering it from 65 micrograms per cubic meter (µg/m$^3$) to 35µg/m$^3$. Prior to this change, Utah was in compliance with the 24-hour standard. The new standard went into effect in December 2006. In November 2009, the EPA determined that three areas in Utah were unable to meet the revised 24-hour $PM_{2.5}$ standard, which required the state to prepare State Implementation Plans (SIPs) for each nonattainment area. These plans ultimately became Utah's Moderate Area SIPs. Each plan included an assessment of the likelihood of attaining the 24-hour NAAQS by 2015. The revised plan for the Salt Lake City and Provo nonattainment areas showed that it would be impracticable to attain the standard by the end of 2015. The EPA determined that the Salt Lake City and Provo areas did not demonstrate attainment by December 2015 and reclassified both areas as Serious as of June 9, 2017. This reclassification required Utah to complete new SIP revisions for the Salt Lake City and Provo nonattainment areas and demonstrate attainment of the new $PM_{2.5}$ standard by December 31, 2019. The Serious Area $PM_{2.5}$ SIP is currently under development.

A review of monitored air quality data contained in the 2018 State of the Environment Report (Air Quality) from the Utah Division of Air Quality (UDAQ), shows that the Provo, UT area is attaining the 24-hour $PM_{2.5}$ standard with its two most recent 3-year averages (2014–2016, and 2015–2017). This allows EPA to apply a Clean Data Determination to the area. Under the Clean Data Policy, EPA may issue a determination of attainment (known informally as a Clean Data Determination) after notice and comment rulemaking determining that a specific area is attaining the relevant standard. For such areas, the requirement to submit to EPA those SIP elements related to attaining the NAAQS is suspended for so long as the area continues to attain the standard.

On December 2nd, 2015, the Air Quality Board adopted revisions to the SIP as a maintenance plan for Salt Lake and Utah County nonattainment areas, which demonstrated attainment through the year 2030 for $PM_{10}$. According to the Mountainland Association of Governments (MAG) for the Conformity Determination Report for the TransPlan50 2050 Regional Transportation Plan Amendment (adopted July 2020), Utah County was redesignated to attainment for $PM_{10}$ with the associated Maintenance Plan and 2030 NOx and $PM_{10}$ Motor Vehicle Emissions Budgets (effective March 27, 2020).

### 4.3.2 Ozone

In October 2015, the EPA strengthened the ozone NAAQS from 75 ppb to 70 ppb and in 2018, the EPA designated three nonattainment areas for Utah:

- Portions of Utah County (Southern Wasatch Front Nonattainment Area)
- Portions of Weber, Davis, Tooele, and Salt Lake counties (Northern Wasatch Front Nonattainment Area)
- Portions of the Uinta Basin at or below 6,250 feet in elevation and within jurisdictions subject to state air-quality regulation (Uinta Basin Nonattainment Area)

All of these nonattainment areas are classified as Marginal, meaning a SIP is not required. Utah, along with other western states, has elevated background ozone, often in high-elevation, rural areas far from manmade pollution sources. This background ozone comes from wildfires, stratospheric intrusions, and domestic and intercontinental ozone transport. EPA has indicated that it will work closely with Utah to find ways to comply with the new standard while taking into account exceedances potentially caused by background ozone.

# 5.0 Environmental Consequences

## 5.1 No-action Alternative

The No-action Alternative would not involve the construction activities for the proposed project. The No-action Alternative would have an increase in per vehicle emissions due to continuing congestion and delays in the study area; however, the emissions from the continued congestion would be more than offset by the improved vehicle emission rates. Vehicle emission rates would continue to improve due to increasingly tougher EPA regulations regarding vehicle emissions, which would help to improve air quality in the study area.

There would be no construction activities, so no temporary increase in particulate matter related to such activities would occur.

## 5.2 Proposed Action

### 5.2.1 Regional Level Analysis

Based on the air quality conformity analysis conducted by the Mountainland Association of Governments (MAG) for the Conformity Determination Report for the TransPlan50 2050 Regional Transportation Plan Amendment (adopted July 2020), all the transportation projects in the MAG TransPlan50 conform to the SIP or the EPA interim conformity guidelines. The project is included in MAG's TransPlan50 (a financially-constrained long-range plan) in Phase 1.

### 5.2.2 Project Level Analysis

Project level analysis is performed when a project is located in a non-attainment area for CO or $PM_{10}$ /$PM_{2.5}$ or in an area that was previously designated as non-attainment but has been subsequently re-designated as attainment, otherwise known as a maintenance area. Project level analysis may consist of either a qualitative or quantitative analysis or both.

#### *5.2.2.1 Carbon Monoxide*

The study area is not located in a non-attainment area for carbon monoxide; therefore, no project level analysis is required under transportation conformity rules.

#### *5.2.2.2 Particulate Matter*

A quantitative analysis for $PM_{10}$ and $PM_{2.5}$ is only required for a "project of air quality concern" (see 40 CFR Section 93.123(b)(1)). No hot-spot analysis is required for projects that qualify as exempt (which are those projects consistent with 40 CFR 93.126 or 40 CFR 93.128) or for non-exempt projects that are not determined to be projects of air quality concern since the EPA has determined that these remaining projects would not have an adverse impact on air quality and meet the requirements of the CAA without further local analysis.

Projects of air quality concern are certain highway and transit projects that involve a significant level of diesel vehicle traffic or any other project that is identified in the $PM_{2.5}$ or $PM_{10}$ SIP as a localized air quality concern, such as:

i) new or expanded highway projects that have a significant number of or significant increase in diesel vehicles;
ii) projects affecting intersections that are at Level-of-Service (LOS) D, E, or F with a significant number of diesel vehicles, or those that will change to LOS D, E, or F because of increased traffic volumes from a significant number of diesel vehicles related to the project;
iii) new bus and rail terminals and transfer points that have a significant number of diesel vehicles congregating at a single location;
iv) expanded bus and rail terminals and transfer points that significantly increase the number of diesel vehicles congregating at a single location; and
v) projects in or affecting locations, areas, or categories of sites which are identified in the $PM_{2.5}$ or $PM_{10}$ applicable implementation plan or implementation plan submission, as appropriate, as sites of violation or possible violation.

The FHWA provided examples of projects that would not be considered projects of air quality concern. See the Transportation Conformity Guidance for Qualitative Hot-spot Analyses in $PM_{10}$ and $PM_{2.5}$ Nonattainment and Maintenance Areas, issued March 2006. These examples included:

- Any new or expanded highway project that primarily services gasoline vehicle traffic (i.e., does not involve a significant number or increase in the number of diesel vehicles), including such projects involving congested intersections operating at LOS D, E, or F;
- An intersection channelization project or interchange configuration project that involves either turn lanes or slots, or lanes or movements that are physically separated. These kinds of projects improve freeway operations by smoothing traffic flow and vehicle speeds by improving weave and merge operations, which would not be expected to create or worsen $PM_{2.5}$ or $PM_{10}$ violations; and,
- Intersection channelization projects, traffic circles or roundabouts, intersection signalization projects at individual intersections, and interchange reconfiguration projects that are designed to improve traffic flow and vehicle speeds, and do not involve any increases in idling. Thus, they would be expected to have a neutral or positive influence on $PM_{2.5}$ or $PM_{10}$ emissions.

This project is not exempt under either 40 CFR 93.126 (specific exempt project types) or 40 CFR 93.128 (traffic signal synchronization projects). Further, this project does not qualify as a project of air quality concern since it would not result in a significant increase in diesel traffic in the study area. See Table 3 – AADT and Percent Diesel Truck Traffic.

*Table 3. AADT and Percent Diesel Truck Traffic*

| Roadway | Existing Conditions | | | No-action Alternative | | | Preferred Alternative | | |
|---|---|---|---|---|---|---|---|---|---|
| | AADT | % Trucks | | AADT | % Trucks | | AADT | % Trucks | |
| | | Single Unit | Combo | | Single Unit | Combo | | Single Unit | Combo |
| I-15 | 108,000 | 9% | 5% | 170,000 | 9% | 5% | 176,000 | 9% | 5% |
| 1600 South | 3,900 | 3% | 1% | 8,200 | 3% | 1% | 16,100 | 4% | 2% |

*Source: MAG Travel Model*

The Preferred Alternative would add an interchange on I-15 at 1600 South/2700 North and widen 1600 South/2700 North to five lanes between Spanish Fork Main Street and SR-51. The roadways involved in this project serve primarily gasoline traffic and the project is not expected to influence the vehicle mix in the study area. Although additional lanes are proposed for 1600 South, there would not be a significant increase in diesel vehicles. Table 3 includes the Average Annual Daily Traffic (AADT) and diesel truck percentage estimates. Although the percentage of trucks on 1600 South would increase from existing conditions and from the No-action Alternative, it represents a minimal increase in the actual number of diesel vehicles based upon the AADT for the roadway. The diesel truck percentage on 1600 South would increase by nearly double; however, the total anticipated AADT would be approximately 16,100 so the total number of diesel vehicles would not have a substantial increase, as indicated by Table 3 which shows a 1% increase in diesel trucks for both single-unit and combo diesel vehicles under the Preferred Alternative as compared to the No-action Alternative (i.e., 398 new single-unit and 240 new combo diesel vehicles). For I-15, there would be a minimal increase in AADT, with no increase in diesel truck percentages. While the project would have a nearly doubling increase in traffic on 1600 South, it would not attract a significant number of new diesel vehicles to the area. Existing land uses along 1600 North consist of agricultural, commercial, and industrial uses which are not anticipated to undergo significant changes under future 2050 conditions. Future land uses in the vicinity are anticipated to involve mostly residential and commercial growth. The improved traffic flow that would result from the proposed project would minimize the effects of the additional AADT on I-15 and 1600 North.

UDOT has determined that this project is not a project of air quality concern. See the Project of Air Quality Concern (POAQC) Evaluation prepared in connection with this project. Since the project has been determined to not be a project of air quality concern, no project level analysis is required for conformity purposes.

### 5.2.3 Mobile Source Air Toxics (MSAT)

#### *5.2.3.1 Background*

MSAT analysis is based upon the Interim Guidance Update on MSAT in NEPA (December 6, 2012). FHWA developed a three-tiered approach for analyzing MSAT in National Environmental Policy Act (NEPA) documents, depending on specific project circumstances.

- Tier 1 – No potential for meaningful MSAT effects or exempt projects: No analysis is required, only documentation that the project qualifies as a categorical exclusion or an exempt project
- Tier 2 – Low potential for meaningful MSAT effects: A qualitative analysis is required
- Tier 3 – Higher potential for meaningful MSAT effects: A quantitative analysis is required, analyzing all seven priority MSATs

**Projects with No Meaningful Potential MSAT Effects or Exempt Projects** include:

- Projects qualifying as a categorical exclusion under 23 CFR 771.117;
- Projects exempt under the Clean Air Act conformity rule under 40 CFR 93.126; and
- Other projects with no meaningful impacts on traffic volumes or vehicle mix.

**Projects with Low Potential MSAT Effects** are the types of projects that serve to improve operations of highway, transit, or freight without adding substantial new capacity or without creating a facility that is likely to meaningfully increase MSAT emissions. This category covers a broad range of projects.

**Projects with Higher Potential MSAT Effects** are those projects that have the potential for meaningful differences in MSAT emissions among project alternatives. To fall into this category, a project should:

- Create or significantly alter a major intermodal freight facility that has the potential to concentrate high levels of diesel particulate matter in a single location, involving a significant number of diesel vehicles for new projects or accommodating with a significant increase in the number of diesel vehicles for expansion projects; or
- Create new capacity or add significant capacity to urban highways such as interstates, urban arterials, or urban collector-distributor routes with traffic volumes where the AADT is projected to be in the range of 140,000 to 150,000 or greater by the design year;

*And also*

- Be proposed to be located in proximity to populated areas.

A qualitative analysis provides a basis for identifying and comparing the potential differences among MSAT emissions, if any, from the various alternatives. The qualitative assessment presented below is derived in part from a study conducted by the FHWA entitled "A Methodology for Evaluating Mobile Source Air Toxic Emissions Among Transportation Project Alternatives," found at: www.fhwa.dot.gov/environment/airtoxic/msatcompare/msatemissions.htm.

#### *5.2.3.2 MSAT Analysis*

The improvements included in the Preferred Alternative are intended to reduce congestion at the I-15 and Springville 400 South Interchange and on mainline I-15 within the study area, to improve safety on I-15 and the 1600 South/2700 North corridor, and to improve active transportation facilities in the study area. The Preferred Alternative would not have a meaningful impact on MSAT emissions due to improvements in congestion and the additional travel lane would not be considered as adding substantial new capacity. As indicated in Table 3, traffic on 1600 South under the Preferred Alternative would be nearly double that of the No-action Alternative, yet it still would not result in a substantial increase in diesel truck traffic in the project area due to the relatively low total traffic numbers and the marginal increase in diesel truck traffic.

The amount of MSATs emitted would be proportional to the vehicle miles traveled (VMT), assuming that other variables such as fleet mix are the same for each alternative. The Preferred Alternative results in a relatively minor increase (approximately 15% increase or about 21,400 miles) in VMT on 1600 South over the No-action Alternative. See Table 4 – Vehicle Miles Traveled for Existing, No-action, and Preferred Alternatives. The widening of 1600 South would not add significant capacity to a roadway where the AADT is projected to be in the range of 140,000 to 150,000 or greater by the design year. No capacity is being added to I-15 as part of the project, with the new interchange intended to improve traffic flow in the project area rather than increase capacity. Further, the project would not either create or significantly alter a major intermodal freight facility that would potentially result in concentrations of high levels or diesel particulate matter in a single location or involve a significant increase in the number of diesel vehicles. Therefore, a qualitative MSAT analysis under Tier 2 was performed.

Table 4. Daily Vehicle Miles Traveled for Existing 2018 Conditions, the No-action Alternative, and the Preferred Alternative

| Scenario | VMT | | | Fuel Consumption | |
|---|---|---|---|---|---|
| | Daily MT | Change from Existing | Percent Change from Existing | Daily Total (gallons) | Percent Change from Existing |
| 2018 Travel Demand: Existing Conditions | 145,100 | NA | NA | 4,218 | NA |
| 2050 Travel Demand: No-action Alternative | 232,800 | 87,700 | 60.4% | 5,116.5 | 21.3% |
| 2050 Travel Demand: Preferred Alternative | 254,200 | 109,100 | 75.2% | 5,586.8 | 32.5% |

*Study area included I-15 from the 400 South Interchange to the Main Street Interchange and 1600 North from to Main Street to SR-51*

Regardless of the alternative chosen, emissions would likely be lower than present levels in the design year as a result of EPA's national control programs that are projected to reduce annual MSAT emissions by over 80 percent between 2010 and 2040. The Energy Information Administration (EIA) projects a decline in light-duty vehicle energy use between 2018 and 2040 as improvements in fuel economy more than offset increases in light-duty vehicles (provided that the new fuel economy standards are nor revoked or altered). The EIA predicts that although the miles that light-duty vehicles travel will increase five percent from 2017 to 2025, fuel consumption from those vehicles will decrease 12 percent over the same period. Local conditions may differ from these national projections in terms of fleet mix and turnover, VMT growth rates, and local control measures. However, the magnitude of the EPA-projected reductions is so great that MSAT emissions in the study area are likely to be lower in the future in virtually all locations.

The transportation improvements contemplated as part of the Build Alternative include widening of 1600 South/2700 North closer to existing residential communities north of the roadway and would have the effect of shifting traffic nearer to some local residences, schools and parks. Therefore, there may be localized areas along the corridor where ambient concentrations of MSATs could be higher under the Preferred Alternative than the No-action Alternative. However, the magnitude and the duration of these potential increases on nearby population as compared to the No-action Alternative cannot be reliably quantified due to incomplete or unavailable information in forecasting project-specific MSAT health impacts.

#### *5.2.3.3 Incomplete or Unavailable Information for Project-Specific MSAT Health Impacts Analysis*

In FHWA's view, information is incomplete or unavailable to credibly predict the project-specific health impacts due to changes in MSAT emissions associated with a proposed set of highway alternatives. The outcome of such an assessment, adverse or not, would be influenced more by the uncertainty introduced into the process through assumption and speculation rather than any genuine insight into the actual health impacts directly attributable to MSAT exposure associated with a proposed action.

The EPA is responsible for protecting the public health and welfare from any known or anticipated effect of an air pollutant. They are the lead authority for administering the Clean Air Act and its amendments and have specific statutory obligations with respect to hazardous air pollutants and MSAT. The EPA is in the continual process of assessing human health effects, exposures, and risks posed by air pollutants. They maintain the Integrated Risk Information System (IRIS), which is "a compilation of electronic reports on specific substances found in the environment and their potential to cause human health effects" (EPA, http://www.epa.gov/iris/). Each report contains assessments of non-cancerous and cancerous effects for individual compounds and quantitative estimates of risk levels from lifetime oral and inhalation exposures with uncertainty spanning perhaps an order of magnitude.

Other organizations are also active in the research and analyses of the human health effects of MSAT, including the Health Effects Institute (HEI). Two HEI studies are summarized in Appendix D of FHWA's Interim Guidance Update on Mobile source Air Toxic Analysis in NEPA Documents. Among the adverse health effects linked to MSAT compounds at high exposures are; cancer in humans in occupational settings; cancer in animals; and irritation to the respiratory tract, including the exacerbation of asthma. Less obvious is the adverse human health effects of MSAT compounds at current environmental concentrations (HEI, http://pubs.healtheffects.org/view.php?id=282) or in the future as vehicle emissions substantially decrease (HEI, http://pubs.healtheffects.org/view.php?id=306).

The methodologies for forecasting health impacts include emissions modeling; dispersion modeling; exposure modeling; and then final determination of health impacts - each step in the process building on the model predictions obtained in the previous step. All are encumbered by technical shortcomings or uncertain science that prevents a more complete differentiation of the MSAT health impacts among a set of project alternatives. These difficulties are magnified for lifetime (i.e., 70 year) assessments, particularly because unsupportable assumptions would have to be made regarding changes in travel patterns and vehicle technology (which affects emissions rates) over that time frame, since such information is unavailable.

It is particularly difficult to reliably forecast 70-year lifetime MSAT concentrations and exposure near roadways; to determine the portion of time that people are actually exposed at a specific location; and to establish the extent attributable to a proposed action, especially given that some of the information needed is unavailable.

There are many uncertainties in existing estimates of toxicity of the various MSAT, because of factors such as low-dose extrapolation and translation of occupational exposure data to the general population, as expressed by HEI (http://pubs.healtheffects.org/view.php?id=282). As a result, there is no national consensus on air dose-response values assumed to protect the public health and welfare for MSAT compounds, and in particular for diesel PM. The EPA (http://www.epa.gov/risk/basicinformation.htm#g) and the HEI (http://pubs.healtheffects.org/getfile.php?u=395) have not established a basis for quantitative risk assessment of diesel PM in ambient settings.

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

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

### 5.2.4 Construction-Related Fugitive Dust

Construction-related dust is not identified in the Utah SIP as a Contributor to the $PM_{10}$ non-attainment area. Therefore, there is no conformity requirement for construction dust. Section 93.122(e)(1) of 40 CFR reads as follows:

> "For areas in which the implementation plan does not identify construction-related fugitive $PM_{10}$ as a contributor to the non-attainment problem, the fugitive $PM_{10}$ emissions associated with highway and transit project construction are not required to be considered in the regional emissions analysis."

In the Utah $PM_{10}$ SIP, construction-related $PM_{10}$ is not included in the inventory, nor is it included in the attainment demonstration or control strategies. Control of construction-related $PM_{10}$ emissions are mentioned in qualitative terms in Section IX.A.7 of the SIP as a maintenance measure to preserve attainment of the $PM_{10}$ standard achieved by application of the control strategies identified in the SIP. Section IX.A.7.d of the SIP requires UDOT and local planning agencies to cooperate and review all proposed construction projects for impacts on the $PM_{10}$ standard. This SIP requirement is satisfied through the Utah State Air Quality Rules. R307-309-4 requires that sponsors of any construction activity file a dust control plan with the State Division of Air Quality.

### 5.2.5 Climate Change

Climate change is a critical national and global concern. Carbon dioxide ($CO_2$) is the largest component of human produced emissions; other prominent emissions include methane ($CH_4$), nitrous oxide ($N_2O$) and hydrofluorocarbons (HFCs). These emissions are different from criteria air pollutants since their effects in the atmosphere are global rather than localized, and also since they remain in the atmosphere for decades to centuries, depending on the species.

The National Climate Assessment (NCA), released by the U.S. Global Change Resource Program, contains scenarios for regions and sectors, including energy and transportation. These scenarios discuss potential impacts that may result from climate change, broken down into nationwide sectors or by region of the county. The NCA includes Utah in the Southwest region. The scenario for this region states that this is the hottest and driest region with limited water resources. Climate change is anticipated to increase the heat in this region, affecting precipitation and snowpack and therefore the availability of water for agriculture, energy producers, and other consumers. The NCA scenario states that the decade of 2001-2010 was the warmest in the 110-year instrumental record, with temperatures almost 2 degrees F higher than historic averages and fewer cold air outbreaks. Parts of the Southwest region experienced record-breaking heat in five of the six years from 2012 to 2017. Regional annual average temperatures are projected to rise by 2.5 degrees F to 5.5 degrees F by 2041-2070 (so long as there is continued growth in global emissions) and 2.5 degrees F to 4.5 degrees F in the same period if global emissions are substantially reduced.

For the sector-based scenarios, the nationwide focus means that some of the identified potential impacts are not applicable to the project area (i.e., coastal impacts). Others are somewhat speculative at this point, as there are variations in the scenarios put forward. However, as stated in Chapter 5 – Transportation of the NCA, "[c]limate change will affect transportation systems directly, through infrastructure damage [such as accelerated asphalt deterioration, increased stress on expansion joints on bridges and highways, etc.], and indirectly, through changes in trade flows, agriculture, energy use, and settlement patterns." There may also be changes to snow removal needs and construction schedules.

Due to the location of the project in an urbanized area with minimal chances of flooding, hurricanes, or other major weather disruptions and because this is a new configuration of an existing interchange, there would be no appreciable climate-change related effects to this project versus the No-action Alternative. As for the resiliency of the infrastructure, the roadway structure will be designed to withstand adverse conditions for the anticipated lifespan of the roadway. Asphalt deterioration would occur as anticipated and would be addressed as needed as part of ongoing operational and maintenance activities.

### 5.2.6 Greenhouse Gases

Greenhouse gas emissions have accumulated rapidly as the world has industrialized, with concentration of atmospheric $CO_2$ increasing form roughly 300 parts per million in 1900 to over 400 parts per million today. Over this timeframe, global average temperatures have increased by roughly 1.5 degrees Fahrenheit (1 degree Celsius), and the most rapid increases have occurred over the past 50 years. Scientists have warned that significant and potentially dangerous shifts in climate and weather are possible without substantial reductions in greenhouse gas emissions. They commonly have cited 2 degrees Celsius (1 degree Celsius beyond warming that has already occurred) as the total amount of warming the earth can tolerate without serious and potentially irreversible climate effects. For warming to be limited to this level, atmospheric concentrations of $CO_2$ would need to stabilize at a maximum of 450 ppm, requiring annual global emissions to be reduced 40-70% below 2010 levels by 2050 (see IPCC, 2014: *Climate Change 2014: Synthesis Report Summary for Policymakers.* Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change).

State and national governments in many developed countries have set GHG emissions reduction targets of 80 percent below current levels by 2050, recognizing that post-industrial economies are primarily responsible for GHGs already in the atmosphere. GHG emissions from vehicles using roadways are a function of distance travelled (expressed as vehicle miles travelled, or VMT), vehicle speed, and road grade. GHG emissions are also generated during roadway construction and maintenance activities. An estimate of GHG emissions in the project area is contained in Table 5, which shows that GHG emissions are expected to be similar under both the No-action Alternative and the Preferred Alternative.

*Table 5. Comparison of 2019 and 2050 Greenhouse Gas Emission Estimates*

| Scenario | Daily VMT | Change in Daily VMT | Percent Change in Daily VMT | Fuel Consumption (gallons/day) | GHG Emissions (lbs/day)* | Percent Change |
|---|---|---|---|---|---|---|
| 2019 Travel Demand: Existing Conditions | 145,100 | NA | NA | 4,218.0 | 85,203.60 | NA |
| 2050 Travel Demand: No-action Alternative | 232,800 | 87,700 | 60.4% | 5,116.5 | 103,353.30 | 21.3% |
| 2050 Travel Demand: - Preferred Alternative | 254,200 | 109,100 | 75.2% | 5,586.8 | 112,853.36 | 32.5% |

**GHG Emissions Factor of 20.2 lbs/gallon*

Further, EPA's GHG emissions standards, implemented in concert with national fuel economy standards, would also help to minimize GHG emissions. Tier 3 gasoline is part of the latest generation of jointly-issued vehicle emission and fuel standards developed by the EPA. Under Tier 3, the sulfur content of gasoline will be reduced from an average of 30 parts per million (ppm) down to 10 ppm to enable the more efficient operation of vehicle emission-control systems. The emissions reductions associated with Tier 3 fuel are substantial and apply not only to vehicles that meet the new Tier 3 vehicle standards but to older vehicles as well. The Wasatch Front Regional Council estimates that switching to Tier 3 fuels could reduce total mobile-source emissions by 9.5 percent of nitrogen oxides ($NO_x$) and 3.7 percent of volatile organic compounds (VOCs). The Energy Information Administration (EIA) projects that vehicle energy efficiency (and thus, GHG emissions) on a per-mile basis will improve by 28% between 2012 and 2040. Thus, the project area will see a net reduction in GHG emissions under any of the alternatives.

Construction and subsequent maintenance of the project will generate GHG emissions. Preparation of the roadway corridor (e.g., earth-moving activities) involves a considerable amount of energy consumption and resulting GHG emissions; manufacture of the materials used in construction and fuel used by construction equipment also contribute GHG emissions. Typically, construction emissions associated with a new roadway account for approximately 5% of the total 20-year lifetime emissions from the roadway, although this can vary widely with the extent of construction activity and the number of vehicles that use the roadway.

## 6.0 Conclusion

The proposed project would not result in new violations of the NAAQS, increases in the frequency or severity of existing violations of the NAAQS, or delays in attaining the NAAQS. With highway improvement projects, the localized level of MSAT emissions for the Build Alternative in the project area could be higher relative to the No-action Alternative, but there are also offsets due to increases in speed and reductions in congestion (which are associated with lower MSAT emissions). On a regional basis, EPA's vehicle and fuel regulations, coupled with fleet turnover, would over time cause substantial reductions that, in almost all cases, would cause

region-wide MSAT levels to be substantially lower than today. There would be no appreciable climate-change related effects to this project versus the No-action Alternative. Further, the project area will see a net reduction in GHG emissions under any of the alternatives.

## 7.0 Mitigation

No mitigation is required.

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I-15 Interchange
ENVIRONMENTAL ASSESSMENT
Springville/Spanish Fork

# PROJECT OF AIR QUALITY CONCERN EVALUATION

**Project No. F-I15-6(239)259**
**Pin: 15153**
**December 2020**

The environmental review, consultation, and other actions required by applicable federal environmental laws for this project are being or have been carried out by UDOT pursuant to 23 USC 327 and a Memorandum of Understanding dated January 17,2017, and executed by FHWA and UDOT.

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**Abbreviations and Acronyms**

| | |
|---|---|
| AADT | Average Annual Daily Traffic |
| CAAA | Clean Air Act Amendments |
| CFR | Code of Federal Regulations |
| CO | carbon monoxide |
| EA | Environmental Assessment |
| EIA | Energy Information Administration |
| EPA | Environmental Protection Agency |
| LOS | Level of Service |
| MAG | Mountainland Association of Governments |
| NAAQS | National Ambient Air Quality Standards |
| $N0_2$ | nitrogen dioxide |
| $O_3$ | ozone |
| Pb | lead |
| $PM_{2.5}$ | particulate matter with a diameter of 2.5 micrometers or less |
| $PM_{10}$ | particulate matter with a diameter of 10 micrometers or less |
| POAQC | Project of Air Quality Concern |
| SIP | State Implementation Plan |
| $SO_2$ | sulfur dioxide |
| UDEQ | Utah Department of Environmental Quality |
| $\mu g/m^3$ | micrograms per cubic meter of air |

# 1.0 Introduction

The Utah Department of Transportation (UDOT) has prepared an Environmental Assessment (EA) to evaluate a new interchange on Interstate 15 (I-15) in Springville and Spanish Fork at 1600 South/2700 North and improvements to 1600 South/2700 North from Main Street in Spanish Fork to State Street (SR-51) in Springville, in Utah County, Utah. The EA considers current and future transportation needs while taking into account any potential impacts to the natural and built environment.

## 1.1 Project Study Area

The Proposed Project is located in Utah County, Utah. See Figure 1 - Project Location Map and Figure 2 – Regional Location Map. The study area extends along I-15 In Springville and Spanish Fork from the 400 South Interchange to the Main Street Interchange and along 1600 North from Main Street to SR-51.

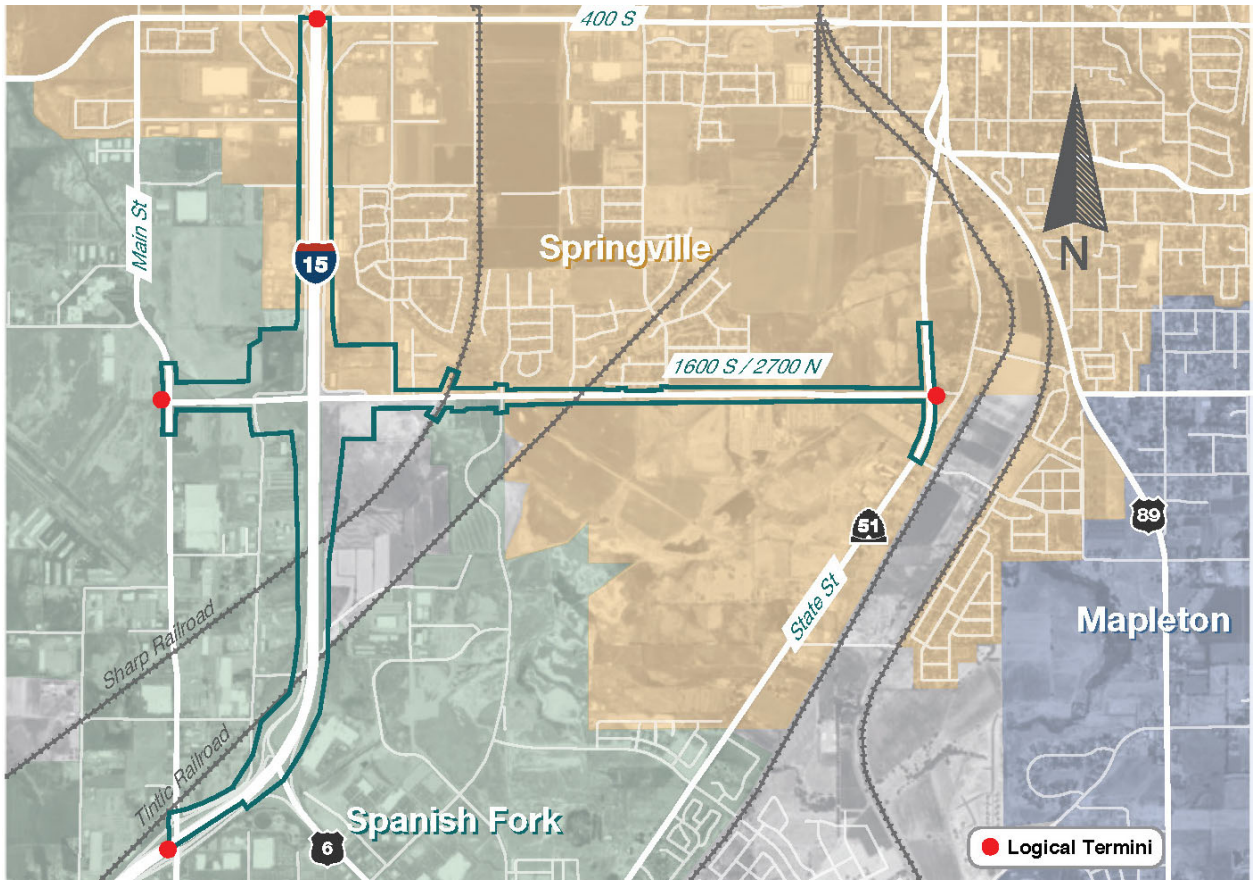


*Figure 1. Project Location Map*

*Figure 2. Regional Location Map*

## 1.2 Proposed Action

The Preferred Alternative includes:

- Constructing a new single-point urban interchange (SPUI) on I-15 at 1600 South/2700 North.
- Realigning the northwest frontage road to the west to accommodate the new interchange and planned local development.
- Realigning the southwest and northeast frontage roads to accommodate the new interchange.
- Constructing a southbound auxiliary lane between US-6 and the new interchange with barrier separation routing traffic entering southbound I-15 from the new interchange through the I-15/US-6 interchange.

- Constructing a northbound auxiliary lane between US-6 and the new interchange.
- Widening 1600 South/2700 North to five lanes between Spanish Fork Main Street and SR-51.
- Grade-separating 1600 South/2700 North over the planned combined Sharp/Tintic Railroad tracks and modifying existing access to adjacent properties.
- Constructing a 10-foot, multi-use trail along 1600 South/2700 North between Spanish Fork Main Street and SR-51.

# 2.0 Purpose and Need

The purpose of the proposed action is to:

- Reduce congestion at the I-15 and Springville 400 South Interchange and on mainline I-15 within the study area.
- Improve safety on the 1600 South/2700 North corridor within the study area.
- Accommodate active transportation within the study area.

The need for the proposed action is based on the following:

- Future failing (Level of Service (LOS) F) conditions at the I-15 and Springville 400 South Interchange, causing future congestion (LOS F) on mainline I-15.
- Safety concerns due to queuing onto mainline I-15 at the 400 South Interchange.
- Safety concerns due to at-grade rail crossings on 1600 South/2700 North.
- Lack of active transportation facilities in the study area.

# 3.0 Attainment Status for the Project Area

## 3.1 National Ambient Air Quality Standards

The Clean Air Act Amendments (CAAA) of 1990 (42 USC 7401 et seq.) established the National Ambient Air Quality Standards (NAAQS) for airborne pollutants. The six criteria pollutants addressed in the NAAQS are:

- carbon monoxide (CO)
- lead (Pb)
- nitrogen dioxide ($NO_2$)
- particulate matter with a diameter of 10 micrometers or less ($PM_{10}$)
- particulate matter with a diameter of 2.5 micrometers or less ($PM_{2.5}$)
- ozone ($O_3$)
- sulfur dioxide ($SO_2$)

This memorandum deals with the potential for the proposed project to impact air quality in the study area for the project and is prepared in connection with the *Transportation Conformity Guidance for Qualitative Hot-spot Analyses in $PM_{2.5}$ and $PM_{10}$ Nonattainment and Maintenance Are*as. Therefore, for the purposes of this analysis, the criteria pollutant included in this analysis is particulate matter, both $PM_{10}$ and $PM_{2.5}$. The current NAAQS for particulate matter are shown in Table 1 - National Ambient Air Quality Standards for Particulate Matter.

*Table 1. National Ambient Air Quality Standards for Particulate Matter*

| Pollutant | Primary/ Secondary | Level | Averaging Time | Violation Determination |
|---|---|---|---|---|
| Particulate Matter ($PM_{10}$) | Primary/ Secondary | 150 µg/$m^3$ | 24-hour | Not to be exceeded more than once per year on average over 3 years |
| Particulate Matter ($PM_{2.5}$) | Primary | 12.0 µg/$m^3$ | Annual | Annual mean, averaged over 3 years |
| | Secondary | 15.0 µg/$m^3$ | Annual | Annual mean, averaged over 3 years |
| | Primary/ Secondary | 35 µg/$m^3$ | 24-hour | 98th percentile, averaged over 3 years |

*Source: EPA (last updated DECEMBER 20, 2016 (https://www.epa.gov/criteria-air-pollutants/naaqs-table); accessed on June 24, 2020*

*Note: Units of measure for the standards are parts per million (ppm) by volume, parts per billion (ppb), and micrograms per cubic meter of air (µg/$m^3$). Primary standards set limits to protect public health, including the health of "sensitive" populations such as asthmatics, children, and the elderly. Secondary standards set limits to protect public welfare, including protection against decreased visibility, damage to animals, crops, vegetation, and buildings.*

## 3.2 Attainment Status of the Project Area

The project area is located in Utah County, Utah, which is within the Provo, Utah Serious $PM_{2.5}$ Non-attainment Area, the Utah County Moderate $PM_{10}$ Maintenance Area, and the Wasatch Front Marginal Ozone Nonattainment Area. The project area is in compliance for all other NAAQS pollutants.

**What are Attainment, Non-Attainment, and Maintenance Areas?**

An attainment area is an area that meets (or "attains") the NAAQS for a given air pollutant.

A non-attainment area is an area that does not meet the NAAQS for a given air pollutant.

A maintenance area is an area previously designated as a non-attainment area that has been redesignated to attainment status and is required to have a maintenance plan.

# 4.0 Definitions and Examples of Projects of Air Quality Concern

Title 40, Protection of Environment, is the section of the Code of Federal Regulations (CFR) that pertains to the environmental regulations implemented by the U.S. Environmental Protection Agency (EPA). Subchapter C of Title 40 covers air quality programs, such as the Clean Air Act and NAAQS. 40 CFR 93.123(b)(1) specifies that projects of air quality concern are certain highway and transit projects that involve significant levels of diesel vehicle traffic, or any other project that is identified in the $PM_{2.5}$ or $PM_{10}$ State Implementation Plan (SIP) as a localized air quality concern. A PM hot-spot analysis is only required for the five types of projects listed in 40 CFR 93.123(b)(1) of the conformity rule: projects of local air quality concern. For all other non-exempt federal projects, state and local project sponsors should document in their project-level conformity determinations that the requirements of the CAA and 40 CFR 93.116 are met without a hot-spot analysis, since such projects have been found not to be of local air quality concern under 40 CFR 93.123(b)(1). (See the *Transportation Conformity Guidance for Quantitative Hot-spot Analyses in $PM_{2.5}$ and $PM_{10}$ Nonattainment and Maintenance Areas*, EPA. November 2015.)

Projects of air quality concern are certain highway and transit projects that involve a significant level of diesel vehicle traffic or any other project that is identified in the $PM_{2.5}$ or $PM_{10}$ SIP as a localized air quality concern, such as:

i) New or expanded highway projects that have a significant number of or significant increase in diesel vehicles;
ii) Projects affecting intersections that are at Level of Service (LOS) D, E, or F with a significant number of diesel vehicles, or those that will change to LOS D, E, or F because of increased traffic volumes from a significant number of diesel vehicles related to the project;
iii) New bus and rail terminals and transfer points that have a significant number of diesel vehicles congregating at a single location;
iv) Expanded bus and rail terminals and transfer points that significantly increase the number of diesel vehicles congregating at a single location; and
v) Projects in or affecting locations, areas, or categories of sites which are identified in the $PM_{10}$ or $PM_{2.5}$ applicable implementation plan or implementation plan submission, as appropriate, as sites of violation or possible violation.

Projects that qualify as exempt under either 40 CFR 93.126 (specific exempt project types) or 40 CFR 93.128 (traffic signal synchronization projects) are not considered projects of air quality concern and no further analysis is necessary.

**What is a hot-spot analysis?**

A hot-spot analysis is a project-level analysis that looks at local air quality impacts, such as intersections or residences near roadways.

If the project qualifies as a project of air quality concern, it requires a project level hot spot analysis, which must be based on both i) quantitative analysis methods in accordance with 40 CFR 93.116(a) and ii) the consultation requirements of 40 CFR 93.105(c)(1)(i). If the project does not qualify as a project of air quality concern, it must be qualitatively shown that the project will not contribute to any new localized violations, increase the frequency or severity of any existing violations, or delay the timely attainment of the NAAQS or any required emission reductions or milestones in any nonattainment or maintenance area.

EPA's *Transportation Conformity Guidance for Qualitative Hot-spot Analyses in $PM_{2.5}$ and $PM_{10}$ Nonattainment and Maintenance Areas* (EPA 2015) provides guidance for reviewing transportation projects in the context of Title 40 and clarification regarding the criteria for determining whether a project is a project of air quality concern. Appendix B of EPA's hot-spot guidance provides the following examples of projects that would be considered projects of air quality concern under 40 CFR 93.123(b)(1)(i) and (ii):

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

- Similar highway projects that involve a significant increase in the number of diesel transit busses and/or diesel trucks.

EPA's hot-spot guidance also provides examples of projects that would not qualify as projects of air quality concern under 40 CFR 93.123)(b)(1)(i) and (ii). These examples include:

- Any new or expanded highway project that primarily services gasoline traffic (i.e., does not involve a significant number or increase in the number of diesel vehicles), including such projects involving congested intersections operating at LOS D, E or F.
- An intersection channelization project or interchange configuration project that involves either turn lanes or slots, or lanes or movements that are physically separated. These kinds of projects improve freeway operations by smoothing traffic flow and vehicle speeds by improving weave and merge operations, which would not be expected to create or worsen $PM_{2.5}$ or $PM_{10}$ violations; and,
- Intersection channelization projects, traffic circles or roundabouts, intersection signalization projects at individual intersections, and interchange reconfiguration projects that are designed to improve traffic flow and vehicle speeds, and do not involve any increases in idling. Thus, they would be expected to have a neutral or positive influence on $PM_{2.5}$ or $PM_{10}$ emissions.

# 5.0 Project of Air Quality Concern Evaluation

This section assesses whether this project qualifies as a project of air quality concern that would require a project level conformity analysis based upon the applicability of the Standards and Examples of Projects of Air Quality Concern.

## 5.1 Exemption

This project is not exempt under either 40 CFR 93.126 or 40 CFR 93.128.

## 5.2 New Highway with Significant Volume of Diesel Truck Traffic

**Standard**: Does the project involve a new highway that has a significant number of diesel vehicles?

**Analysis**: The proposed project does not involve the construction of a new highway.

## 5.3 Expanded Highway with Significant Increase in Diesel Truck Traffic

**Standard**: Does the project involve an expanded highway that has a significant increase in diesel vehicles?

**Analysis**: This project involves widening 1600 South/2700 North to five lanes between Spanish Fork Main Street and SR-51 and constructing a new single-point urban interchange (SPUI) on I-15 at 1600 South/2700 North and two auxiliary lanes; a southbound auxiliary lane between US-6 and the new interchange and a northbound auxiliary lane between US-6 and the new interchange. There will also be a new grade-separation of 1600 South/2700 North over the planned combined Sharp/Tintic Railroad tracks.

Although additional lanes are proposed for 1600 South, there would not be a significant increase in diesel vehicles. Table 2 includes the Average Annual Daily Traffic (AADT) and diesel truck percentage estimates. Although the percentage of trucks on 1600 South would increase from existing conditions and from the No-action Alternative, it represents a minimal increase in the actual number of diesel

vehicles based upon the AADT for the roadway. The diesel truck percentage on 1600 South would increase by nearly double; however, the total anticipated AADT would be approximately 16,100 so the total number of diesel vehicles would not have a substantial increase, as indicated by Table 2 which shows a 1% increase in diesel trucks for both single-unit and combo diesel vehicles under the Preferred Alternative as compared to the No-action Alternative (i.e., 398 new single-unit and 240 new combo diesel vehicles). For I-15, there would be a minimal increase in AADT, with no increase in diesel truck percentages. While the project would have a nearly doubling increase in traffic on 1600 South, it would not attract a significant number of new diesel vehicles to the area. Existing land uses along 1600 North consist of agricultural, commercial, and industrial uses which are not anticipated to undergo significant changes under future 2050 conditions. Future land uses in the vicinity are anticipated to involve mostly residential and commercial growth west of the I-15 interchange.

*Table 2. AADT and Percentage of Diesel Trucks for Existing Conditions, the No-action Alternative, and the Preferred Alternative*

| Roadway | Existing Conditions | | | No-action Alternative | | | Preferred Alternative | | |
|---|---|---|---|---|---|---|---|---|---|
| | AADT | % Trucks | | AADT | % Trucks | | AADT | % Trucks | |
| | | Single Unit | Combo | | Single Unit | Combo | | Single Unit | Combo |
| I-15 | 108,000 | 9% | 5% | 170,000 | 9% | 5% | 176,000 | 9% | 5% |
| 1600 South | 3,900 | 3% | 1% | 8,200 | 3% | 1% | 16,100 | 4% | 2% |

*Source: Mountainland Association of Governments' (MAG) Travel Model*

## 5.4 Projects Affecting Congested Intersections

**Standard**: Does this project affect intersections that are at LOS D, E, or F with a significant number of diesel vehicles, or those that will change to LOS D, E, or F because of increased traffic volumes from a significant number of diesel vehicles related to the project?

**Analysis**: This project would not affect intersections that are at LOS D, E, or F with a significant number of diesel vehicles, nor would it result in a change to LOS D, E, or F because of increased traffic volumes from a significant number of vehicles related to the project. According to the I-15; Springville/Spanish Fork Interchange - Existing and 2050 No Build Traffic Analysis, none of the intersections within the study area currently operate at LOS D, E, or F under existing conditions, although the 2050 No Build would result in LOS D, E, or F for several intersections, absent improvements to address congestion. Under the Preferred Alternative, none of the intersections are expected to become LOS D, E, or F under the Preferred Alternative. Further, as shown in Table 2, there are not currently a significant number of diesel vehicles in the study area, nor will the project result in a significant number of diesel vehicles.

## 5.5 New Bus and Rail Terminals

**Standard**: Does this project involve new bus and rail terminals and transfer points that have a significant number of diesel vehicles congregating at a single location?

**Analysis**: This project does not involve construction of or connections to a new bus or intermodal terminal that accommodates a significant number of diesel vehicles.

## 5.6 Expanded Bus and Rail Terminals

**Standard**: Does this project involve expanded bus and rail terminals and transfer points that significantly increase the number of diesel vehicles congregating at a single location?

**Analysis**: This project does not involve construction of or connections to an expanded bus or intermodal terminal that accommodates a significant number of diesel vehicles.

## 5.7 Projects In or Affecting $PM_{10}$ or $PM_{2.5}$ Sites of Violation or Possible Violation

**Standard**: Is this project in or does it affect locations, areas, or categories of sites which are identified in the $PM_{10}$ or $PM_{2.5}$ applicable implementation plan or implementation plan submission, as appropriate, as sites of violation or possible violation?

**Analysis**: This project is not located in nor does it affect any locations, areas, or categories of sites identified as sites of violation or possible violation.

There are two distinct nonattainment areas for the 2006 $PM_{2.5}$ standards residing entirely within the state of Utah. These are the Salt Lake City, Utah, and Provo, Utah nonattainment areas, which together encompass what is referred to as the Wasatch Front. A third nonattainment area is more or less geographically defined by the Cache Valley, which straddles the border between Utah and Idaho (the Logan, UT – ID nonattainment area). None of these three areas has violated the annual NAAQS for $PM_{2.5}$.

UDEQ maintains a network of air quality monitoring stations throughout the area. In general, these monitoring stations are located where there are known air quality problems, usually in or near urban areas or close to specific emission sources. Other stations are located in remote areas to provide an indication of regional air pollution levels. Data from the Spanish Fork air monitoring station (49-049-5010), located at the Spanish Fork Airport, for $O_3$ and $PM_{2.5}$ and the Lindon air monitoring station (49-049-4001), located at 50 North Main Street in Lindon, for $PM_{10}$ was used to compile air quality data for the years of 2015-2019 (see Table 3).

*Table 3. Existing Pollutant Data for the Project Area*

| Pollutants | | NAAQS | 2015 | 2016 | 2017 | 2018 | 2019 |
|---|---|---|---|---|---|---|---|
| $O_3$ | 8-hour (ppm) | 0.070 ppm | 0.074 ppm | 0.072 ppm | 0.072 ppm | 0.073 ppm | 0.066 ppm |
| $PM_{10}$ | 24-hr (µg/m3) | 150 µg/m$^3$ | 194 µg/m$^3$<br>134 µg/m$^3$ | 70 µg/m$^3$ | 116 µg/m$^3$ | 96 µg/m$^3$ | 69 µg/m$^3$ |
| $PM_{2.5}$ | 24-hr (µg/m3) | 35 µg/m$^3$ | 28.1 µg/m$^3$ | 29.2 µg/m$^3$ | 27.6 µg/m$^3$ | 50.7 µg/m$^3$<br>52.8 µg/m$^3$ | 16.1 µg/m$^3$<br>13.9 µg/m$^3$ |

*Source: All Criteria Pollutant Yearly Quicklook Summary Reports, Utah Division of Air Quality website (http://www.airmonitoring.utah.gov/dataarchive/archall.htm)*

A review of monitored air quality data contained in the 2018 State of the Environment Report (Air Quality) from the Utah Division of Air Quality (UDAQ), shows that the Provo, UT area is attaining the 24-hour $PM_{2.5}$ standard with its two most recent 3-year averages (2014–2016, and 2015–2017). This allows EPA to apply a Clean Data Determination to the area. Under the Clean Data Policy, EPA may issue a determination of attainment (known informally as a Clean Data Determination) after notice and comment rulemaking determining that a specific area is attaining the relevant standard. For such areas, the requirement to submit to EPA those SIP elements related to attaining the NAAQS is suspended for so long as the area continues to attain the standard. Effective April 10, 2019, Utah County was declared a

Clean Data $PM_{2.5}$ non-attainment area. The State, in collaboration with stakeholders, is required to prepare a $PM_{2.5}$ Maintenance Plan. Until the plan is approved by the EPA, the MPO is required to perform interim conformity tests for the 2006 $PM_{2.5}$ non-attainment area.

On December 2nd, 2015, the Air Quality Board adopted revisions to the SIP as a maintenance plan for Salt Lake and Utah County nonattainment areas, which demonstrated attainment through the year 2030 for $PM_{10}$. According to the Mountainland Association of Governments (MAG) for the Conformity Determination Report for the TransPlan50 2050 Regional Transportation Plan Amendment (adopted July 2020), Utah County was redesignated to attainment for $PM_{10}$ with the associated Maintenance Plan and 2030 NOx and $PM_{10}$ Motor Vehicle Emissions Budgets (effective March 27, 2020).

### 5.8 Project of Air Quality Concern Determination

**Standard**: State whether the project is a Project of Air Quality Concern and summarize the support that determination. Document the relevant agencies that require interagency consultation on any input for the determination from federal, state, and local transportation and air agencies as necessary for this project per 40 CFR 93.105. This information will be included in any subsequent air quality analysis and project level conformity determination reports.

**Answer**: This project does not qualify as a project of air quality concern since it would not result in a significant increase in diesel traffic in the project area. The project is not expected to influence the vehicle mix in the project area nor attract a significant number of new diesel vehicles to the area. Therefore, UDOT is presenting this project for interagency consultation per 40 CFR 93.105 as a project that is not a project of air quality concern and thereby will not require a $PM_{10}$ or $PM_{2.5}$ hot-spot analysis.

## 6.0 References


2010 *Transportation Conformity Guidance for Quantitative Hot-spot Analyses in $PM_{2.5}$ and $PM_{10}$ Nonattainment and Maintenance Areas.* *https://www.epa.gov/state-and-local-transportation/project-level-conformity-and-hot-spot-analyses*

2014 Utah State Implementation Plan, Control Measures for Area and point Sources, Fine Particulate Matter, PM 2.5 SIP for the Salt Lake City, UT Nonattainment Area, Section IX. Part A.21. https://deq.utah.gov/legacy/laws-and-rules/air - quality/sip/docs/2014/12Dec/SIP%20IX.A.21_SLC_FINAL_Adopted%2012-3-14.pdf

2019 Utah Department of Environmental Quality. *All Criteria Pollutant Yearly Quicklook Summary Reports, Utah Division of Air Quality website (http://www.airmonitoring.utah.gov/dataarchive/archall.htm)*

2020 EPA NAAQS (*https://www.epa.gov/criteria-air-pollutants/naaqs-table)*

I-15 Interchange
ENVIRONMENTAL ASSESSMENT
Springville/Spanish Fork

# AIR QUALITY PROJECT LEVEL CONFORMITY DETERMINATION

**Project No. F-I15-6(239)259**
**Pin: 15153**
**January 2021**

The environmental review, consultation, and other actions required by applicable federal environmental laws for this project are being or have been carried out by UDOT pursuant to 23 USC 327 and a Memorandum of Understanding dated January 17,2017, and executed by FHWA and UDOT.

U.S. Department
Of Transportation

Federal Transit Administration
Region VIII
1961 Stout Street,
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Naomi Kisen
Utah Department of Transportation
4501 South 2700 West
Salt Lake City, Utah 82119

January 25, 2021

Subject: Project Level Conformity Determination: I-15 Springville Interchange, Utah County, UT

Dear Ms. Kisen:

On December 15, 2020, the Utah Department of Transportation (UDOT) submitted to the Federal Highway Administration (FHWA) a complete request for a project level conformity determination for the I-15 Springville Interchange [S-I15-6(239)259, 15153] in Utah County, UT. The project is in an area that is designated Non-Attainment or Maintenance for Ozone and Particulate Matter (PM10, PM2.5).

The project level conformity analysis submitted by UDOT indicates that the project level conformity requirements of 40 CFR Part 93 have been met. The project is included in the Mountainland Association of Governments (MAG) current, Metropolitan Transportation Plan (MTP) and the Transportation Improvement Program (TIP). The design concept and scope of the preferred alternative have not changed significantly from those assumed in the regional emissions analysis.

As required by 40 CFR 93.116 and 93.123, the localized PM2.5 and PM10 analysis are included in the documentation. The analyses demonstrate that the project will not create any new violations of the standards or increase the severity or number of existing violations.

Based on the information provided, FHWA finds that the I-15 Springville Interchange project in Utah County, UT conforms with the State Implementation Plan (SIP) in accordance with 40 CFR Part 93. If you have any questions pertaining to this conformity finding, please contact Ed Woolford at (801) 955-3524 or by email at edward.woolford@dot.gov.

Sincerely,

Edward Woolford, FHWA

Edward Woolford

CC: Brandon Weston, UDOT
Naomi Kisen, UDOT
Tim Russ, EPA Region 8
Shauna Mecham, MAG

I-15 Interchange
ENVIRONMENTAL ASSESSMENT
Springville/Spanish Fork

# NOISE ANALYSIS

**Project No. F-I15-6(239)259**
**Pin: 15153**
**July 2020**

The environmental review, consultation, and other actions required by applicable federal environmental laws for this project are being or have been carried out by UDOT pursuant to 23 USC 327 and a Memorandum of Understanding dated January 17,2017, and executed by FHWA and UDOT.

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# ACRONYMS, ABBREVIATIONS, AND DEFINITIONS

| | |
|---|---|
| CFR | Code of Federal Regulations |
| dBA | A-weighted decibel |
| FHWA | Federal Highway Administration |
| $L_{eq}$ | equivalent steady-state noise level, which in a stated period of time would contain the same acoustical energy as the time-varying noise level during the same period |
| $L_{eq}(h)$ | energy-average of the A-weighted noise levels occurring during a 1-hour period |
| Noise | unwanted sound |
| Receptor | A discrete or representative location of a noise sensitive area(s) |
| Receiver | A modeling point in TNM |
| TNM | Traffic Noise Model |
| UDOT | Utah Department of Transportation |

# NOISE STUDY

## 1.0 INTRODUCTION

This Noise Analysis was prepared in accordance with the UDOT Noise Abatement Policy (UDOT 2020) and is consistent with federal regulation 23 CFR 772 and Utah Administrative Code R930-3.

## 2.0 DESCRIPTION OF PROJECT

The Preferred Alternative includes:

- Constructing a new Single-Point Urban Interchange (SPUI) on 1-15 at 1600 South/2700 North. This includes dual left turn lanes and free right turn lanes on all legs of the interchange.
- Realigning the existing frontage roads.
- Constructing a southbound auxiliary lane between US-6 and the new interchange, with barrier separation routing traffic entering southbound I-15 from the new interchange through the I-15/US-6 Interchange.
- Constructing an auxiliary lane on northbound I-15 between US-6 and 1600 South/2700 North.
- Widening 1600 South/2700 North to five lanes from Main Street to SR-51.
- Constructing a 10-foot, multiuse trail adjacent to 1600 South/2700 North between Spanish Fork Main Street and SR-51; and sidewalk on the other side.
- Constructing a new grade-separated crossing over the combined Sharp/Tintic Railroad.

For this analysis, the noise study area is defined as the land adjacent to I-15 and 1600 South/2700 North that could be affected by an increase in noise levels to a distance of approximately 600 feet (see Figure 1).

### 2.1 Applicability

The UDOT Noise Abatement Policy states that "noise abatement will be considered for all Type I projects where noise impacts are identified." Type I projects are projects that include any of the following: the construction of a highway at a new location; the physical alteration of an existing highway that substantially alters its alignment; the addition of a through traffic lane; the addition of an auxiliary lane; the addition or relocation of interchange lanes or ramps; or the addition or substantial alteration of a weigh station, rest stop, ride share lot, or toll plaza. This project is considered a Type I project because of the construction of an interchange on a new location, as well as the addition of through traffic lanes on 1600 South/2700 North.

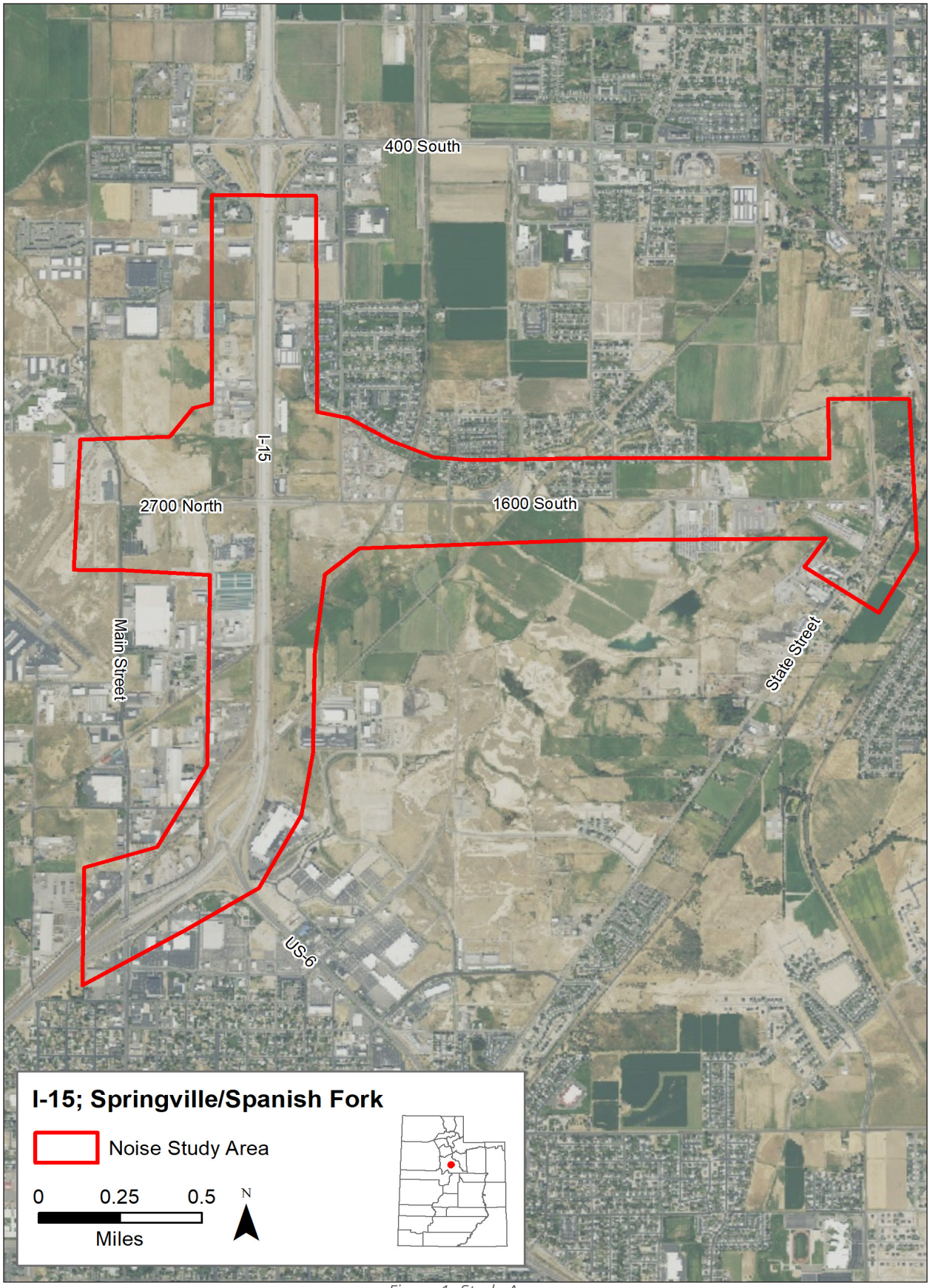



*Figure 1: Study Area*

# 3.0 ANALYSIS OF TRAFFIC NOISE IMPACTS

Traffic noise is measured in A-weighted sound levels in decibels (dBA) which most closely approximates the way the human ear hears sounds at different frequencies (see Figure 2). Since traffic noise varies over time, the sound levels for this noise analysis are expressed as "equivalent levels" or Leq, representing the average sound level over a one hour period of time. Unless noted otherwise, all sound levels in this noise analysis are expressed in the hourly equivalent noise level.

## 3.1 Noise Abatement Criteria

The Federal Highway Administration (FHWA) has established Noise Abatement Criteria for several categories of land use activities (see Table 1). FHWA's noise criteria is based on sound levels that are considered to be an impact to nearby property owners, also known as receptors. Primary consideration is to be given for exterior areas where frequent human use occurs.

UDOT has developed a Noise Abatement Policy for transportation projects, which conforms to FHWA noise abatement requirements outlined in 23 CFR §772.

UDOT's Noise Abatement Criteria is the noise decibel (dBA) value reflecting the approach criteria of 1 dBA below the Noise Abatement Criteria values listed in 23 CFR §772 for each land use category (see Table 1).

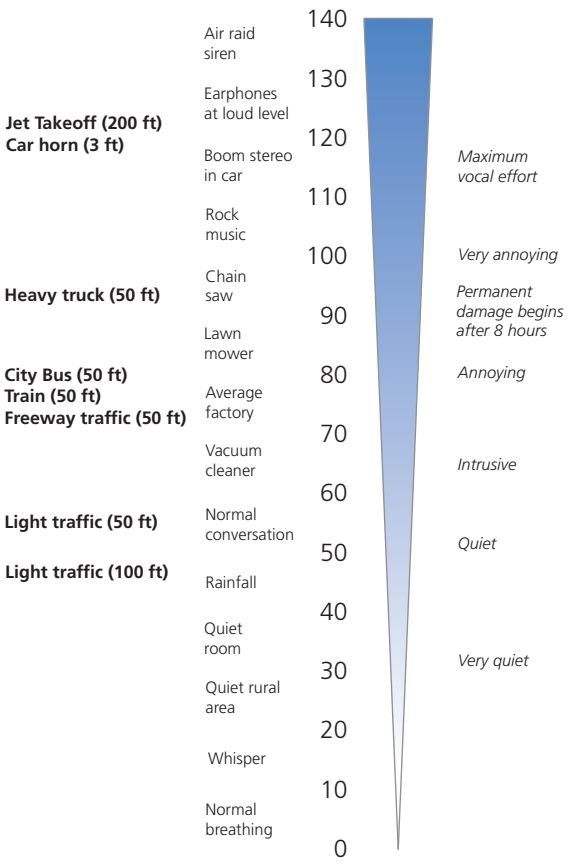



*Figure 2: Sound Levels (in dBA) of Common Sounds (Compiled from Federal Transit Administration and Environmental Protection Agency Data)*

UDOT's Noise Abatement Policy states that a traffic noise impact occurs when either 1) the future worst case noise level is equal to or greater than the UDOT Noise Abatement Criteria 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.

Noise impact and abatement analyses are required within Land Use Activity Categories A, B, C, D, and E (see Table 1) only when development exists or has been permitted (formal building permit issued prior to the date the final environmental decision document is approved). Activity Categories F and G include lands that are

not sensitive to traffic noise. There are no impact criteria for these land use types and an analysis of noise impacts is not required.

For the purposes of this noise analysis, aerial photography and on-site visits were used to identify existing land uses and structure locations.

*Table 1: Noise Abatement Criteria*

| Activity Category | FHWA Criteria Leq(h) | UDOT Criteria Leq(h) | Evaluation Location | Activity Description |
|---|---|---|---|---|
| A | 57 | 56 | Exterior | Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose. |
| B | 67 | 66 | Exterior | Residential. |
| C | 67 | 66 | Exterior | Active sports areas, amphitheaters, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails and trail crossings. |
| D | 52 | 51 | Interior | Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios. |
| E | 72 | 71 | Exterior | Hotels, motels, offices, restaurants/bars, and other developed lands, properties or activities not included in 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 Noise Abatement Policy*

## 3.2 Noise Sensitive Land Uses

Noise sensitive land uses within each of the Activity Categories within the study area can be seen in Table 2.

*Table 2: Noise Sensitive Land Uses*

| Activity Category | Description of Location within Study Area |
|---|---|
| A | • None |
| B | • Residential neighborhoods within the study area |
| C | • North Park at 1185 North 400 East, Spanish Fork<br>• Kelvin Grove Park at 1484 Wallace Drive, Springville<br>• Dry Creek Parkway at 1409 South 1200 West, Springville |
| D | • None |
| E | • Modere Inc. at 588 South 2000 West, Springville |
| F | • Retail facilities<br>• Utilities<br>• Agricultural land |
| G | • Undeveloped land within the study area |

The UDOT Noise Policy states that a noise impact analysis will not be required for Activity Categories F and G. However, for Activity Category G, an estimate of the distance to the approach criteria must be provided to local governments. See Section 6 of this noise analysis for additional information.

## 3.3 Existing Noise

The primary source of noise in the study area is automobile and truck traffic from I-15, 1600 South/2700 North, SR-51, and other roadways in the area.

Existing noise levels were established via noise modeling for receptors located adjacent to, and approximately 600 feet from, I-15 and for neighborhoods located adjacent to 1600 South/2700 North. Existing traffic sound levels for receptors in this area were calculated with the Traffic Noise Model (TNM) 2.5 software using existing conditions (travel lane configurations and the posted speed limit).

On-site measurements were taken on January 7, 2020 with an Extech Instruments SDL600 sound level meter/data logger for a duration of 20 minutes at the locations listed in Table 3 (see Appendix A for data sheets and noise measurement locations). Recorded measurements for locations 1–3 were used to verify the accuracy of the noise model and to ensure it is representative of existing conditions. To be considered accurate, the field noise measurements must be within 3 dBA of the model's predicted noise.

*Table 3: Field Noise Measurements*

| Site # | Location | Field Noise Level (dBA) | TNM Output (dBA) | Difference |
|---|---|---|---|---|
| 1 | North Park; 1185 North 400 East, Spanish Fork | 57 | 57 | 0 |
| 2 | Residence; 1117 West Kingsbury Road, Springville | 60 | 61 | 1 |
| 3 | Residence; 1040 West 1550 South, Springville | 66 | 63 | 3 |

Of the 233 receptors within the study area, two currently experience a noise level above the Noise Abatement Criteria (NAC) threshold (see Existing Noise Levels maps in Appendix A). Both of these receptors were located on the trail at North Park in Spanish Fork (see Existing Noise Levels map 14 in Appendix A).

## 3.4 Preferred Alternative Noise

Projected traffic noise levels for the Preferred Alternative were calculated with TNM 2.5 software using build conditions (travel lane configurations and traffic volumes). Noise levels were determined using the greatest hourly traffic noise conditions likely to occur on a regular basis, or LOS C traffic volumes.

The Preferred Alternative would generally result in a 2 dBA noise level increase throughout the study area. The greatest increase in noise would be 6 dBA at receptors 134B–144B (see Build Noise Impacts maps 6–7 in Appendix B). Of the 233 receptors, 14 would be impacted by Preferred Alternative noise levels. No impacted receptors exhibit noise levels that are greater than 10 dBA above existing levels, while all impacted receptors exhibit noise levels that exceed the NAC. Projected future worst case noise levels and impacted receptors can be seen in the Build Noise Levels maps in Appendix B.

## 3.5 Summary

Table 4 shows a summary of existing and Preferred Alternative noise levels (the letter on the map label represents the activity category). Refer to the maps in Appendix A and Appendix B for receptor locations.

*Table 4: Summary of Existing and Preferred Alternative Noise Levels*

| Map Label | UDOT Noise Abatement Criteria Leq(h) | Existing Noise Levels (dBA) | Existing Exceeds NAC | Preferred Alternative Noise Levels (dBA) | Projected Impact | | Difference |
|---|---|---|---|---|---|---|---|
| | | | | | ≥ 10 dBA Increase From Existing Level | ≥ UDOT Noise Abatement Criteria | |
| 1E | 71 | 60 | No | 60 | No | No | 0 |
| 2B | 66 | 56 | No | 56 | No | No | 0 |
| 3B | 66 | 55 | No | 55 | No | No | 0 |

| Map Label | UDOT Noise Abatement Criteria Leq(h) | Existing Noise Levels (dBA) | Existing Exceeds NAC | Preferred Alternative Noise Levels (dBA) | Projected Impact | | Difference |
|---|---|---|---|---|---|---|---|
| | | | | | ≥ 10 dBA Increase From Existing Level | ≥ UDOT Noise Abatement Criteria | |
| 4B | 66 | 55 | No | 55 | No | No | 0 |
| 5B | 66 | 54 | No | 55 | No | No | 1 |
| 6B | 66 | 56 | No | 57 | No | No | 1 |
| 7B | 66 | 58 | No | 58 | No | No | 0 |
| 8B | 66 | 58 | No | 57 | No | No | -1 |
| 9B | 66 | 57 | No | 57 | No | No | 0 |
| 10B | 66 | 58 | No | 58 | No | No | 0 |
| 11B | 66 | 58 | No | 58 | No | No | 0 |
| 12B | 66 | 58 | No | 57 | No | No | -1 |
| 13B | 66 | 57 | No | 57 | No | No | 0 |
| 14B | 66 | 60 | No | 60 | No | No | 0 |
| 15B | 66 | 59 | No | 59 | No | No | 0 |
| 16B | 66 | 60 | No | 61 | No | No | 1 |
| 17B | 66 | 58 | No | 58 | No | No | 0 |
| 18B | 66 | 57 | No | 58 | No | No | 1 |
| 19B | 66 | 57 | No | 57 | No | No | 0 |
| 20B | 66 | 57 | No | 57 | No | No | 0 |
| 21B | 66 | 58 | No | 58 | No | No | 0 |
| 22B | 66 | 56 | No | 56 | No | No | 0 |
| 23B | 66 | 55 | No | 55 | No | No | 0 |
| 24B | 66 | 58 | No | 59 | No | No | 1 |
| 25B | 66 | 60 | No | 60 | No | No | 0 |
| 26B | 66 | 60 | No | 60 | No | No | 0 |
| 27B | 66 | 59 | No | 60 | No | No | 1 |
| 28B | 66 | 58 | No | 59 | No | No | 1 |
| 29C | 66 | 64 | No | 64 | No | No | 0 |
| 30B | 66 | 57 | No | 58 | No | No | 1 |
| 31B | 66 | 58 | No | 59 | No | No | 1 |
| 32B | 66 | 58 | No | 59 | No | No | 1 |
| 33B | 66 | 59 | No | 60 | No | No | 1 |
| 34B | 66 | 58 | No | 60 | No | No | 2 |
| 35B | 66 | 59 | No | 61 | No | No | 2 |
| 36B | 66 | 57 | No | 57 | No | No | 0 |
| 37B | 66 | 57 | No | 58 | No | No | 1 |

| Map Label | UDOT Noise Abatement Criteria Leq(h) | Existing Noise Levels (dBA) | Existing Exceeds NAC | Preferred Alternative Noise Levels (dBA) | Projected Impact | | Difference |
|---|---|---|---|---|---|---|---|
| | | | | | ≥ 10 dBA Increase From Existing Level | ≥ UDOT Noise Abatement Criteria | |
| 38B | 66 | 58 | No | 58 | No | No | 0 |
| 39B | 66 | 59 | No | 59 | No | No | 0 |
| 40B | 66 | 59 | No | 59 | No | No | 0 |
| 41B | 66 | 59 | No | 60 | No | No | 1 |
| 42B | 66 | 59 | No | 60 | No | No | 1 |
| 43B | 66 | 59 | No | 60 | No | No | 1 |
| 44B | 66 | 59 | No | 60 | No | No | 1 |
| 45B | 66 | 59 | No | 60 | No | No | 1 |
| 46B | 66 | 49 | No | 50 | No | No | 1 |
| 47B | 66 | 50 | No | 50 | No | No | 0 |
| 48B | 66 | 51 | No | 51 | No | No | 0 |
| 49B | 66 | 51 | No | 51 | No | No | 0 |
| 50B | 66 | 48 | No | 48 | No | No | 0 |
| 51B | 66 | 55 | No | 57 | No | No | 2 |
| 52B | 66 | 55 | No | 56 | No | No | 1 |
| 53B | 66 | 55 | No | 56 | No | No | 1 |
| 54B | 66 | 54 | No | 56 | No | No | 2 |
| 55B | 66 | 54 | No | 56 | No | No | 2 |
| 56B | 66 | 54 | No | 55 | No | No | 1 |
| 57B | 66 | 54 | No | 55 | No | No | 1 |
| 58B | 66 | 53 | No | 55 | No | No | 2 |
| 59B | 66 | 53 | No | 55 | No | No | 2 |
| 60B | 66 | 53 | No | 54 | No | No | 1 |
| 61B | 66 | 53 | No | 54 | No | No | 1 |
| 62B | 66 | 52 | No | 53 | No | No | 1 |
| 63B | 66 | 52 | No | 53 | No | No | 1 |
| 64C | 66 | 55 | No | 57 | No | No | 2 |
| 65C | 66 | 52 | No | 53 | No | No | 1 |
| 66B | 66 | 49 | No | 50 | No | No | 1 |
| 67B | 66 | 49 | No | 49 | No | No | 0 |
| 68B | 66 | 50 | No | 51 | No | No | 1 |
| 69B | 66 | 50 | No | 50 | No | No | 0 |
| 70B | 66 | 50 | No | 51 | No | No | 1 |
| 71B | 66 | 50 | No | 51 | No | No | 1 |
| 72C | 66 | 50 | No | 51 | No | No | 1 |

| Map Label | UDOT Noise Abatement Criteria Leq(h) | Existing Noise Levels (dBA) | Existing Exceeds NAC | Preferred Alternative Noise Levels (dBA) | Projected Impact | | Difference |
|---|---|---|---|---|---|---|---|
| | | | | | ≥ 10 dBA Increase From Existing Level | ≥ UDOT Noise Abatement Criteria | |
| 73C | 66 | 52 | No | 54 | No | No | 2 |
| 74C | 66 | 51 | No | 53 | No | No | 2 |
| 75C | 66 | 51 | No | 55 | No | No | 4 |
| 76C | 66 | 51 | No | 54 | No | No | 3 |
| 77B | 66 | 50 | No | 52 | No | No | 2 |
| 78B | 66 | 50 | No | 52 | No | No | 2 |
| 79B | 66 | 50 | No | 51 | No | No | 1 |
| 80B | 66 | 50 | No | 51 | No | No | 1 |
| 81B | 66 | 50 | No | 51 | No | No | 1 |
| 82B | 66 | 50 | No | 51 | No | No | 1 |
| 83B | 66 | 52 | No | 55 | No | No | 3 |
| 84B | 66 | 50 | No | 53 | No | No | 3 |
| 85B | 66 | 50 | No | 52 | No | No | 2 |
| 86B | 66 | 49 | No | 52 | No | No | 3 |
| 87B | 66 | 49 | No | 51 | No | No | 2 |
| 88B | 66 | 49 | No | 51 | No | No | 2 |
| 89B | 66 | 49 | No | 52 | No | No | 3 |
| 90B | 66 | 50 | No | 53 | No | No | 3 |
| 91B | 66 | 50 | No | 53 | No | No | 3 |
| 92B | 66 | 51 | No | 54 | No | No | 3 |
| 93B | 66 | 52 | No | 56 | No | No | 4 |
| 94B | 66 | 52 | No | 56 | No | No | 4 |
| 95B | 66 | 52 | No | 57 | No | No | 5 |
| 96B | 66 | 53 | No | 57 | No | No | 4 |
| 97B | 66 | 53 | No | 57 | No | No | 4 |
| 98B | 66 | 52 | No | 57 | No | No | 5 |
| 99B | 66 | 52 | No | 56 | No | No | 4 |
| 100B | 66 | 51 | No | 55 | No | No | 4 |
| 101B | 66 | 50 | No | 54 | No | No | 4 |
| 102B | 66 | 50 | No | 54 | No | No | 4 |
| 103B | 66 | 49 | No | 53 | No | No | 4 |
| 104B | 66 | 48 | No | 51 | No | No | 3 |
| 105B | 66 | 47 | No | 50 | No | No | 3 |
| 106B | 66 | 48 | No | 51 | No | No | 3 |
| 107B | 66 | 48 | No | 51 | No | No | 3 |

| Map Label | UDOT Noise Abatement Criteria Leq(h) | Existing Noise Levels (dBA) | Existing Exceeds NAC | Preferred Alternative Noise Levels (dBA) | Projected Impact | | Difference |
|---|---|---|---|---|---|---|---|
| | | | | | ≥ 10 dBA Increase From Existing Level | ≥ UDOT Noise Abatement Criteria | |
| 108B | 66 | 48 | No | 51 | No | No | 3 |
| 109B | 66 | 48 | No | 51 | No | No | 3 |
| 110B | 66 | 48 | No | 50 | No | No | 2 |
| 111B | 66 | 49 | No | 51 | No | No | 2 |
| 112B | 66 | 49 | No | 51 | No | No | 2 |
| 113B | 66 | 48 | No | 51 | No | No | 3 |
| 114B | 66 | 48 | No | 51 | No | No | 3 |
| 115B | 66 | 48 | No | 51 | No | No | 3 |
| 116B | 66 | 48 | No | 50 | No | No | 2 |
| 117B | 66 | 47 | No | 51 | No | No | 4 |
| 118B | 66 | 48 | No | 51 | No | No | 3 |
| 119B | 66 | 48 | No | 51 | No | No | 3 |
| 120B | 66 | 48 | No | 51 | No | No | 3 |
| 121B | 66 | 48 | No | 51 | No | No | 3 |
| 122B | 66 | 48 | No | 51 | No | No | 3 |
| 123C | 66 | 48 | No | 50 | No | No | 2 |
| 124B | 66 | 48 | No | 50 | No | No | 2 |
| 125B | 66 | 48 | No | 50 | No | No | 2 |
| 126B | 66 | 48 | No | 50 | No | No | 2 |
| 127B | 66 | 47 | No | 49 | No | No | 2 |
| 128B | 66 | 47 | No | 49 | No | No | 2 |
| 129B | 66 | 48 | No | 49 | No | No | 1 |
| 130B | 66 | 48 | No | 50 | No | No | 2 |
| 131B | 66 | 48 | No | 51 | No | No | 3 |
| 132B | 66 | 50 | No | 53 | No | No | 3 |
| 133B | 66 | 58 | No | 63 | No | No | 5 |
| 134B | 66 | 61 | No | 67 | No | **Yes** | 6 |
| 135B | 66 | 61 | No | 67 | No | **Yes** | 6 |
| 136B | 66 | 61 | No | 67 | No | **Yes** | 6 |
| 137B | 66 | 61 | No | 67 | No | **Yes** | 6 |
| 138B | 66 | 61 | No | 67 | No | **Yes** | 6 |
| 139B | 66 | 61 | No | 67 | No | **Yes** | 6 |
| 140B | 66 | 61 | No | 67 | No | **Yes** | 6 |
| 141B | 66 | 61 | No | 67 | No | **Yes** | 6 |

| Map Label | UDOT Noise Abatement Criteria Leq(h) | Existing Noise Levels (dBA) | Existing Exceeds NAC | Preferred Alternative Noise Levels (dBA) | Projected Impact | | Difference |
|---|---|---|---|---|---|---|---|
| | | | | | ≥ 10 dBA Increase From Existing Level | ≥ UDOT Noise Abatement Criteria | |
| 142B | 66 | 61 | No | 67 | No | **Yes** | 6 |
| 143B | 66 | 61 | No | 67 | No | **Yes** | 6 |
| 144B | 66 | 61 | No | 67 | No | **Yes** | 6 |
| 145B | 66 | 62 | No | 67 | No | **Yes** | 5 |
| 146B | 66 | 51 | No | 55 | No | No | 4 |
| 147B | 66 | 49 | No | 51 | No | No | 2 |
| 148B | 66 | 48 | No | 51 | No | No | 3 |
| 149B | 66 | 49 | No | 52 | No | No | 3 |
| 150B | 66 | 49 | No | 52 | No | No | 3 |
| 151B | 66 | 48 | No | 52 | No | No | 4 |
| 152B | 66 | 48 | No | 52 | No | No | 4 |
| 153B | 66 | 48 | No | 52 | No | No | 4 |
| 154B | 66 | 48 | No | 52 | No | No | 4 |
| 155B | 66 | 48 | No | 52 | No | No | 4 |
| 156B | 66 | 48 | No | 52 | No | No | 4 |
| 157B | 66 | 49 | No | 54 | No | No | 5 |
| 158B | 66 | 48 | No | 51 | No | No | 3 |
| 159B | 66 | 49 | No | 52 | No | No | 3 |
| 160B | 66 | 48 | No | 52 | No | No | 4 |
| 161B | 66 | 49 | No | 52 | No | No | 3 |
| 162B | 66 | 48 | No | 52 | No | No | 4 |
| 163B | 66 | 48 | No | 52 | No | No | 4 |
| 164B | 66 | 48 | No | 52 | No | No | 4 |
| 165B | 66 | 48 | No | 52 | No | No | 4 |
| 166B | 66 | 48 | No | 53 | No | No | 5 |
| 167B | 66 | 48 | No | 50 | No | No | 2 |
| 168B | 66 | 47 | No | 49 | No | No | 2 |
| 169B | 66 | 46 | No | 48 | No | No | 2 |
| 170B | 66 | 46 | No | 48 | No | No | 2 |
| 171B | 66 | 46 | No | 48 | No | No | 2 |
| 172B | 66 | 46 | No | 47 | No | No | 1 |
| 173B | 66 | 45 | No | 46 | No | No | 1 |
| 174B | 66 | 45 | No | 46 | No | No | 1 |
| 175B | 66 | 45 | No | 47 | No | No | 2 |

| Map Label | UDOT Noise Abatement Criteria Leq(h) | Existing Noise Levels (dBA) | Existing Exceeds NAC | Preferred Alternative Noise Levels (dBA) | Projected Impact | | Difference |
|---|---|---|---|---|---|---|---|
| | | | | | ≥ 10 dBA Increase From Existing Level | ≥ UDOT Noise Abatement Criteria | |
| 176B | 66 | 46 | No | 49 | No | No | 3 |
| 177B | 66 | 45 | No | 47 | No | No | 2 |
| 178B | 66 | 46 | No | 48 | No | No | 2 |
| 179B | 66 | 46 | No | 49 | No | No | 3 |
| 180B | 66 | 46 | No | 49 | No | No | 3 |
| 181B | 66 | 46 | No | 49 | No | No | 3 |
| 182B | 66 | 46 | No | 50 | No | No | 4 |
| 183B | 66 | 46 | No | 50 | No | No | 4 |
| 184B | 66 | 46 | No | 50 | No | No | 4 |
| 185B | 66 | 46 | No | 50 | No | No | 4 |
| 186B | 66 | 46 | No | 50 | No | No | 4 |
| 187B | 66 | 46 | No | 50 | No | No | 4 |
| 188B | 66 | 46 | No | 50 | No | No | 4 |
| 189B | 66 | 46 | No | 49 | No | No | 3 |
| 190B | 66 | 46 | No | 49 | No | No | 3 |
| 191B | 66 | 46 | No | 49 | No | No | 3 |
| 192B | 66 | 46 | No | 49 | No | No | 3 |
| 193B | 66 | 46 | No | 49 | No | No | 3 |
| 194B | 66 | 46 | No | 49 | No | No | 3 |
| 195B | 66 | 58 | No | 58 | No | No | 0 |
| 196B | 66 | 56 | No | 56 | No | No | 0 |
| 197B | 66 | 56 | No | 56 | No | No | 0 |
| 198B | 66 | 53 | No | 53 | No | No | 0 |
| 199B | 66 | 58 | No | 58 | No | No | 0 |
| 200B | 66 | 56 | No | 56 | No | No | 0 |
| 201B | 66 | 54 | No | 54 | No | No | 0 |
| 202B | 66 | 54 | No | 54 | No | No | 0 |
| 203B | 66 | 53 | No | 53 | No | No | 0 |
| 204B | 66 | 53 | No | 53 | No | No | 0 |
| 205B | 66 | 52 | No | 53 | No | No | 1 |
| 206B | 66 | 55 | No | 55 | No | No | 0 |
| 207B | 66 | 50 | No | 50 | No | No | 0 |
| 208B | 66 | 54 | No | 54 | No | No | 0 |
| 209B | 66 | 53 | No | 53 | No | No | 0 |

| Map Label | UDOT Noise Abatement Criteria Leq(h) | Existing Noise Levels (dBA) | Existing Exceeds NAC | Preferred Alternative Noise Levels (dBA) | Projected Impact | | Difference |
|---|---|---|---|---|---|---|---|
| | | | | | ≥ 10 dBA Increase From Existing Level | ≥ UDOT Noise Abatement Criteria | |
| 210B | 66 | 53 | No | 53 | No | No | 0 |
| 211B | 66 | 53 | No | 53 | No | No | 0 |
| 212B | 66 | 54 | No | 54 | No | No | 0 |
| 213B | 66 | 55 | No | 55 | No | No | 0 |
| 214B | 66 | 55 | No | 55 | No | No | 0 |
| 215B | 66 | 55 | No | 55 | No | No | 0 |
| 216B | 66 | 55 | No | 55 | No | No | 0 |
| 217B | 66 | 60 | No | 60 | No | No | 0 |
| 218B | 66 | 60 | No | 60 | No | No | 0 |
| 219B | 66 | 58 | No | 58 | No | No | 0 |
| 220B | 66 | 56 | No | 56 | No | No | 0 |
| 221B | 66 | 56 | No | 56 | No | No | 0 |
| 222B | 66 | 57 | No | 57 | No | No | 0 |
| 223B | 66 | 59 | No | 59 | No | No | 0 |
| 224B | 66 | 56 | No | 56 | No | No | 0 |
| 225B | 66 | 65 | No | 65 | No | No | 0 |
| 226C | 66 | 67 | **Yes** | 67 | No | **Yes** | **0** |
| 227C | 66 | 60 | No | 60 | No | No | 0 |
| 228C | 66 | 72 | **Yes** | 73 | No | **Yes** | **1** |
| 229C | 66 | 63 | No | 63 | No | No | 0 |
| 230C | 66 | 62 | No | 62 | No | No | 0 |
| 231C | 66 | 61 | No | 61 | No | No | 0 |
| 232C | 66 | 60 | No | 60 | No | No | 0 |
| 233C | 66 | 60 | No | 61 | No | No | 1 |

## 4.0 NOISE ABATEMENT

According to the UDOT Noise Abatement Policy, specific conditions must be met before traffic noise abatement is implemented. Noise mitigation must be considered feasible and reasonable. The factors considered when determining if mitigation is feasible include:

- **Engineering Considerations:** Engineering considerations such as safety, presence of cross streets, sight distance, access to adjacent properties, wall height, topography, drainage, utilities, maintenance access, and maintenance of the abatement measure must be taken into account as part of establishing

feasibility. Noise abatement measures are not intended to serve as privacy fences or safety barriers. Abatement measures installed on structures will not exceed 10-feet in height measured from the top of deck or roadway to the top of the noise wall. Noise walls will not be installed on structures that require retrofitting to accommodate the noise abatement measure. Noise abatement measures will be considered if the project meets the criteria established in this policy if structure replacement is included as part of the project. Abatement measures shall be consistent with general American Association of State Highway and Transportation Officials (AASHTO) design principles.

- **Safety on Urban Non-Access Controlled Roadways:** To avoid a damaged wall from becoming a safety hazard, in the event of a failure, wall height shall be no greater than the distance from the back-of-curb to the face of proposed wall. Because the distance from the back-of-curb to the face of a proposed wall varies, wall heights which meet this safety requirement may also vary.
- **Acoustic Feasibility:** Noise abatement must be considered "acoustically feasible." This is defined as achieving at least a 5 dBA highway traffic noise reduction for at least 50% of front-row receptors.

The factors considered when determining if mitigation is reasonable include:

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

  The cost effectiveness calculation needs to take into account the cost of any items associated with the abatement measure that is critical to safety, such as snow storage. Therefore, the cost to construct items necessary for snow storage was taken into consideration as part of the cost effectiveness calculation.

- **Viewpoints of Property Owners and Residents:** As part of the final design phase, public balloting would take place if noise abatement measures appear to meet the criteria outlined in UDOT's Noise Abatement Policy.

## 4.1 Noise Barriers

For a sound wall to be effective, it must be high enough and long enough to block the view of the noise source from the receptor's perspective. The *Highway Traffic Noise Analysis and Abatement Policy and Guidance* states that a good 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 instance, 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.

Openings in noise walls for driveway and cross street access greatly reduce the effectiveness of noise walls. Therefore, impacted receptors with direct access onto 1600 South/2700 North or adjacent to cross streets do not qualify for noise walls.

The anticipated cost of each wall was calculated by multiplying the height of the wall by the total wall length and the wall cost per square foot ($20). The allowable cost was calculated using two variables: 1) Activity Category B allowable cost and, 2) Activity Category C allowable cost. The Activity Category B allowable cost was calculated by multiplying the allowable cost per benefited receptor ($30,000) by the number of receptors benefited by the wall. The Activity Category C allowable cost was calculated by multiplying the length of the wall associated with Activity Category C land use by the allowable cost for Activity Category C land ($360 per linear foot). These two variables, Activity Category B allowable cost and Activity Category C allowable cost, were combined to produce the allowable cost for each wall (see Appendix D for detailed wall analyses).

In an effort to provide an objective analysis of traffic noise reduction to impacted receptors, a variety of noise wall heights were considered. When multiple wall heights met noise abatement requirements, the shortest wall height found to be both feasible and reasonable was recommended for balloting. Mitigation for the impacts to the multi-use recreational trail were not considered as users would likely not expect the trail to be quiet in this location nor would they be on the trail for an extended period of time in the impacted locations. Noise walls considered for this project are discussed below.

## Wall 1

This wall would be built in two segments and would be located on the north side of 1600 South/2700 North, extending from the west side of 1075 West to the west side of 950 West (see Noise Wall map in Appendix C). The wall is approximately 948 feet in length and was evaluated to mitigate noise for 12 impacted receptors on the north side of 1600 South/2700 North (134B–145B). As summarized in Table 5, walls ranging in height from 6 to 14 feet were evaluated (see Appendix D for detailed wall analyses).The analysis was limited to 14 feet as that is the distance from the back-of-curb to the face of the proposed wall.

*Table 5: Summary of Wall 1*

| Barrier Height | Feasibility | | Reasonable | | | | | Is Barrier Feasible & Reasonable? |
|---|---|---|---|---|---|---|---|---|
| | % front-row with 5 dBA reduction | Acoustically feasible? [1] | % front-row with 7 dBA reduction | Noise Abatement Design Goal? [2] | Anticipated Cost | Allowable Cost | Cost Effective? [3] | |
| 6 | 100 | Yes | 46 | Yes | $137,460 | $390,000 | Yes | Yes |
| 8 | 100 | Yes | 92 | Yes | $175,380 | $390,000 | Yes | Yes |
| 10 | 100 | Yes | 92 | Yes | $213,300 | $390,000 | Yes | Yes |
| 12 | 100 | Yes | 92 | Yes | $251,220 | $390,000 | Yes | Yes |
| 14 | 100 | Yes | 100 | Yes | $289,140 | $390,000 | Yes | Yes |

**[1] 5 dBA reduction for at least 50% of front-row receptors**
**[2] 7 dBA for at least 35% of front-row receptors**
**[3] Anticipated cost is less than allowable cost**

Walls ranging in height from 6 to 14 feet are acoustically feasible, meet the noise abatement design goal, and are cost reasonable. **Therefore, a 6 foot tall wall for Wall 1 is recommended for balloting because it is the shortest wall height found to be both feasible and reasonable.**

## 5.0 CONSTRUCTION IMPACTS

Construction noise impacts are considered temporary and will be minimized through adherence to UDOT Special Provision 01355M (Environmental Compliance) and Special Provision 0055 (Prosecution and Progress). Extended disruption of normal activities is not anticipated, since no receptors are expected to be exposed to construction noise for a long duration of time.

## 6.0 INFORMATION FOR LOCAL OFFICIALS

According to the UDOT Noise Abatement Policy, an estimated distance from the edge of pavement to where the worst hour Leq(h) levels of 66 dBA and 71 dBA occurs must be provided to local governments for land uses with Activity Category G. Within the study area 16 tracts of undeveloped land were analyzed.

The first area is located on the west side of I-15 and extends along the proposed southbound off ramp at 1600 South/2700 North. Projected traffic noise levels from the edge of pavement to a level of 66 dBA would occur at distances ranging from 110 to 350 feet (see Undeveloped Land maps 1 and 4 in Appendix E). Projected traffic noise levels from the edge of pavement to a level of 71 dBA would occur at distances ranging from the edge of pavement to 120 feet (see Undeveloped Land maps 1 and 4 in Appendix E).

The second area is located on the north and south sides of the proposed West Frontage Road and north of 1600 South/2700 North. Projected traffic noise levels from the edge of pavement to a level of 66 dBA would occur at distances ranging from the edge of pavement to 20 feet on the north side and from 20 to 80 feet on the south side (see Undeveloped Land map 1 in Appendix E). Projected traffic noise levels 10 feet from the edge of pavement do not exceed 68 dBA on the north or south side.

The third area is located on the west and east sides of the proposed West Frontage road and north of 1600 South/2700 North. Projected traffic noise levels from the edge of pavement to a level of 66 dBA would occur at distances ranging from the edge of pavement to 10 feet on the west side (see Undeveloped Land maps 1 and 3 in Appendix E). Projected traffic noise levels 10 feet from the edge of pavement do not exceed 65 dBA on the east side and 66 dBA on the west side.

The fourth area is located on the north and south sides of 1600 South/2700 North between Main Street and 200 East. Projected traffic noise levels from the edge of pavement to a level of 66 dBA would occur at distances ranging from the edge of pavement to 30 feet on the north side and 10 to 30 feet on the south side (see Undeveloped Land map 3 in Appendix E). Projected traffic noise levels 10 feet from the edge of pavement do not exceed 69 dBA on the north or south side.

The fifth area is located on the east and west sides of the proposed West Frontage road and south of 1600 South/2700 North. Projected traffic noise levels from the edge of pavement to a level of 66 dBA would occur at distances ranging from the edge of pavement to 10 feet on the east and west sides (see Undeveloped land maps 3 and 12 in Appendix E). Projected traffic noise levels 10 feet from the edge of pavement do not exceed 66 dBA on the east or west side.

The sixth area is located on the north and south sides of 1600 South/2700 North between the proposed West Frontage Road and I-15. Projected traffic noise levels 10 feet from the edge of pavement do not exceed 63 dBA on the north or south sides (see Undeveloped Land maps 3–4 in Appendix E).

The seventh area is located west of I-15 and extends along the proposed southbound on ramp at 1600 South/2700 North. Projected traffic noise levels from the edge of pavement to a level of 66 dBA would occur at distances ranging from the edge of pavement to 20 feet (see Undeveloped Land map 4 in Appendix E). Projected traffic noise levels 10 feet from the edge of pavement do not exceed 67 dBA.

The eighth area is located west of I-15 and south of the proposed 1600 South/2700 North Interchange. Projected traffic noise levels from the edge of pavement to a level of 66 dBA would occur at a distance of 300 feet (see Undeveloped Land map 13 in Appendix E). Projected traffic noise levels from the edge of pavement to a level of 71 dBA would occur at distances ranging from 110 to 140 feet (see Undeveloped Land map 13 in Appendix E).

The ninth area is located on the north and south sides of the proposed East Frontage Road on the east side of I-15. Projected traffic noise levels from the edge of pavement to a level of 66 dBA would occur at distances ranging from 20 to 70 feet on the north side and 20 to 50 feet on the south side (see Undeveloped Land map 2 in Appendix E). Projected traffic noise levels from the edge of pavement to a level of 71 dBA would occur at distances ranging from the edge of pavement to 20 feet on the north side (see Undeveloped Land map 2 in Appendix E). Projected traffic noise levels 10 feet from the edge of pavement do not exceed 70 dBA on the south side.

The tenth area is located on the north and south sides of 1600 South/2700 North between I-15 and the Sharp Railroad. Projected traffic noise levels from the edge of pavement to a level of 66 dBA would occur at distances ranging from the edge of pavement to 30 feet on the north side and the edge of pavement to 20 feet on the south side (see Undeveloped Land map 5 in Appendix E). Projected traffic noise levels 10 feet from the edge of pavement do not exceed 68 dBA on the north or south side.

The eleventh area is located on the north and south sides of 1600 South/2700 North and west of Canyon Creek Parkway. Projected traffic noise levels from the edge of pavement to a level of 66 dBA would occur at distances ranging from the edge of pavement to 30 feet on the north side (see Undeveloped Land map 6 in Appendix E). Projected traffic noise levels at 10 feet from the edge of pavement do not exceed 68 dBA on the north side and 62 dBA on the south side.

The twelfth area is located north of 1600 South/2700 North and east of Canyon Creek Parkway. Projected traffic noise levels from the edge of pavement to a level of 66 dBA would occur at a distance of 30 feet (see Undeveloped Land maps 6–9 in Appendix E). Projected traffic noise levels 10 feet from the edge of pavement do not exceed 68 dBA.

The thirteenth area is located north of 1600 South/2700 North and east of 950 West. Projected traffic noise levels from the edge of pavement to a level of 66 dBA would occur at a distance of 30 feet (see Undeveloped Land maps 8–9 in Appendix E). Projected traffic noise levels 10 feet from the edge of pavement do not exceed 68 dBA.

The fourteenth area is located north of 1600 South/2700 North and west of State Street. Projected traffic noise levels from the edge of pavement to a level of 66 dBA would occur at distances ranging from 15 to 30 feet (see Undeveloped Land maps 10–11 in Appendix E). Projected traffic noise levels 10 feet from the edge of pavement do not exceed 68 dBA.

The fifteenth area is located west of I-15 and north of Williams Lane. Projected traffic noise levels 10 feet from the edge of pavement do not exceed 65 dBA (see Undeveloped Land maps 15–16 in Appendix E).

The sixteenth area is located east of I-15 and south of the proposed 1600 South/2700 North Interchange. Projected traffic noise levels from the edge of pavement to a level of 66 dBA would occur at distances ranging from 40 to 140 feet (see Undeveloped Land maps 4 and 13–17 in Appendix E). Projected traffic noise levels from the edge of pavement to a level of 71 dBA would occur at distances ranging from 10 to 20 feet (see Undeveloped Land maps 4 and 13–17 in Appendix E).

# 7.0 CONCLUSION

The Preferred Alternative would generally result in a 2 dBA noise level increase throughout the study area. Of the 233 receptors in the study area, 14 would be impacted by Preferred Alternative noise levels. Recommended noise walls within the study area that met the requirements of the UDOT Noise Abatement Policy are discussed below. The final decision to build a noise barrier will be made upon completion of the project design, the public involvement process, and concurrence with the UDOT Noise Policy. A barrier identified as recommended for balloting is a barrier that has been shown to be both feasible and reasonable. However, that finding is not a commitment to build a barrier.

## Summary of Recommended Walls

### Wall 1

This wall would be built in two segments and would be located on the north side of 1600 South/2700 North, extending from the west side of 1075 West to the west side of 950 West (see Noise Wall map in Appendix C). The wall is approximately 948 feet in length and was evaluated to mitigate noise for 12 impacted receptors on the north side of 1600 South/2700 North (134B–145B). This wall has a proposed height of 6 feet.

# APPENDIX A: NOISE MEASUREMENT DATA AND EXISTING NOISE LEVEL MAPS

# I-15; Springville/Spanish Fork Interchange

## Existing Noise Levels

Map 1 of 14

0 100 200 Feet

N

- Exceeds NAC
- Does Not Exceed NAC
- Monitoring Location

# I-15; Springville/Spanish Fork Interchange

## Existing Noise Levels

Map 2 of 14

0 100 200 Feet

N

- Exceeds NAC
- Does Not Exceed NAC
- Monitoring Location

# I-15; Springville/Spanish Fork Interchange

## Existing Noise Levels

Map 3 of 14

0 100 200 Feet

N

- Exceeds NAC
- Does Not Exceed NAC
- Monitoring Location

# I-15; Springville/Spanish Fork Interchange

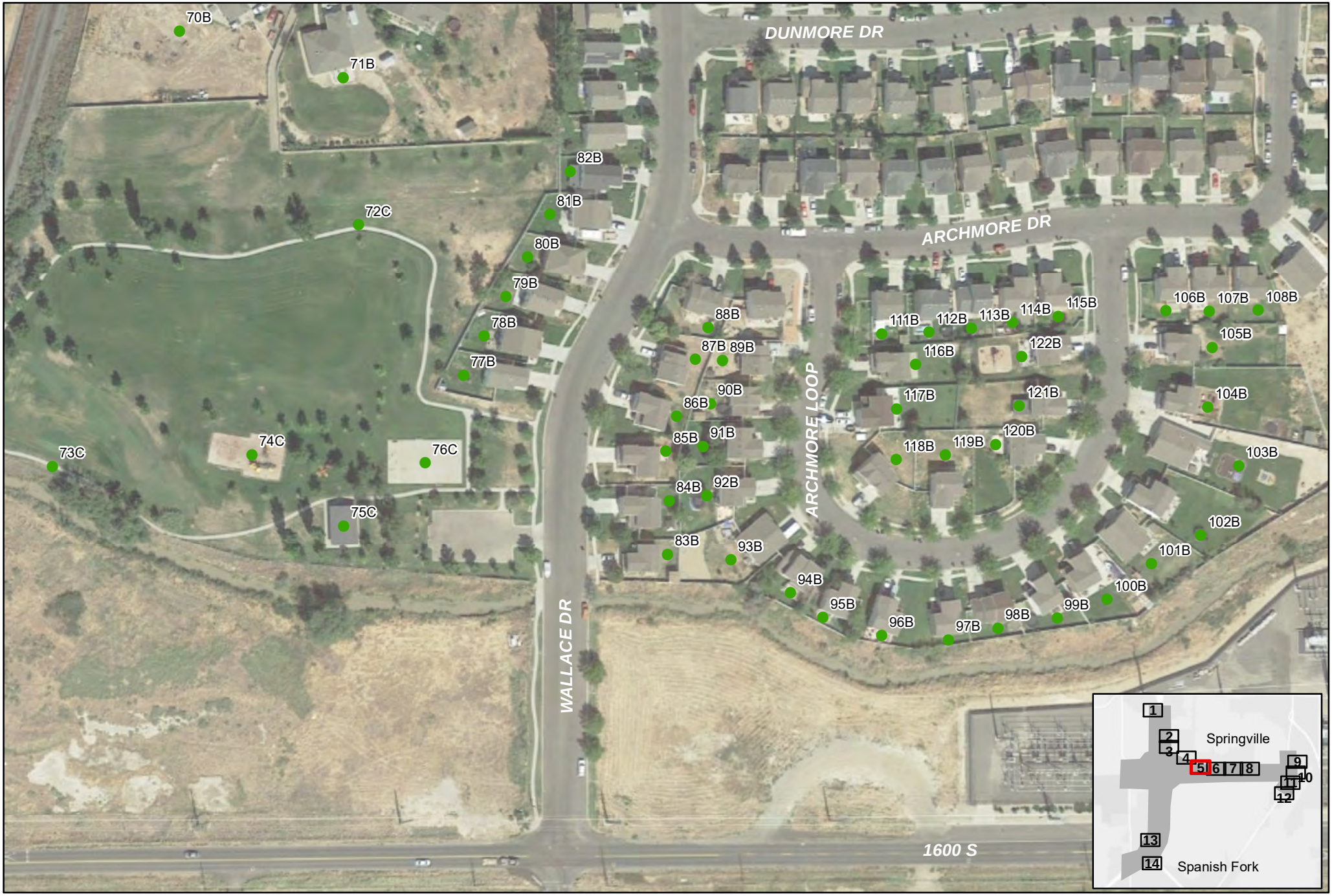
## Existing Noise Levels

Map 4 of 14

0 100 200 Feet

N

- Exceeds NAC
- Does Not Exceed NAC
- Monitoring Location




# I-15; Springville/Spanish Fork Interchange

## Existing Noise Levels

Map 5 of 14

0 100 200 Feet

N

- Exceeds NAC
- Does Not Exceed NAC
- Monitoring Location

# I-15; Springville/Spanish Fork Interchange

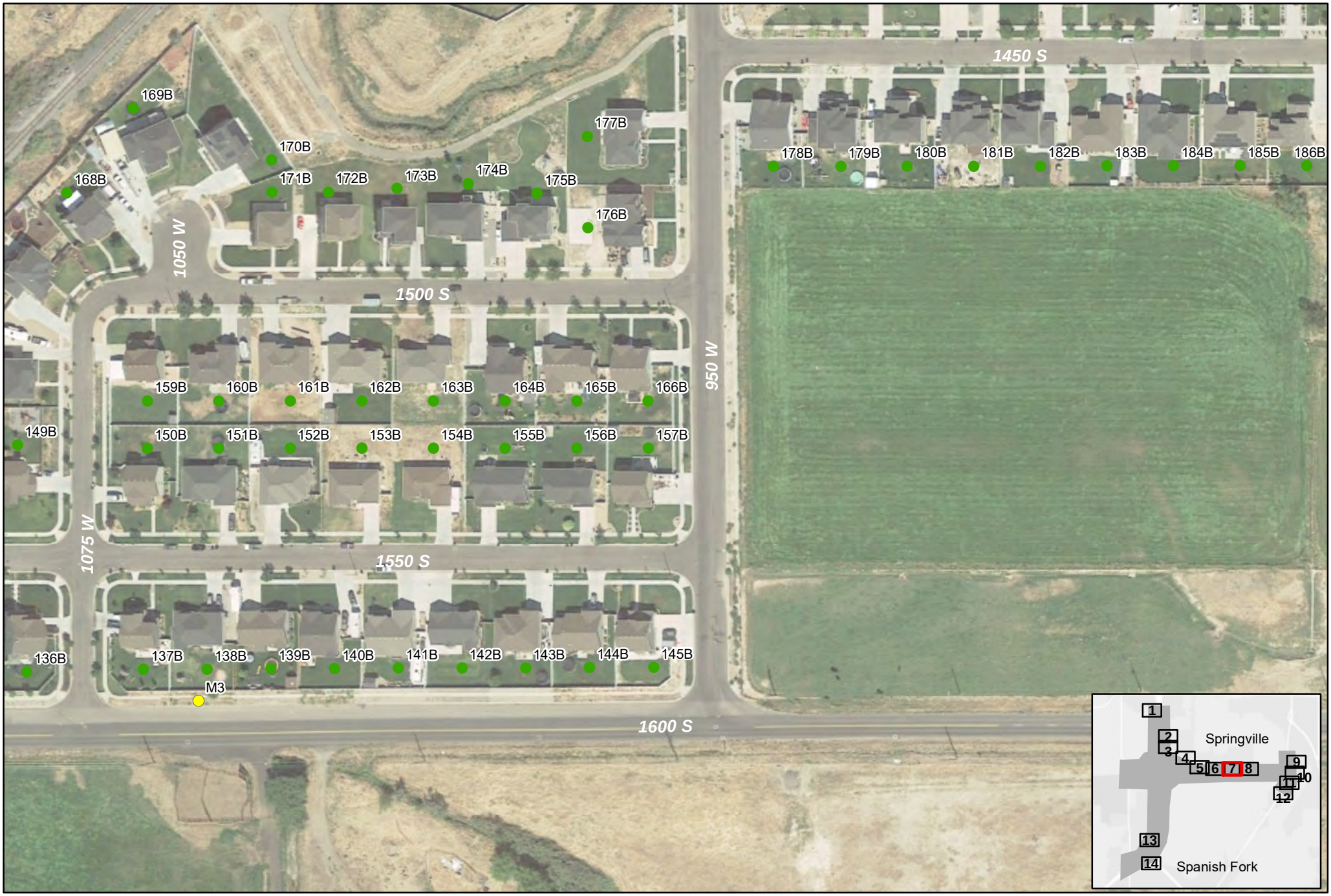
## Existing Noise Levels

Map 6 of 14

0 100 200 Feet

N

- Exceeds NAC
- Does Not Exceed NAC
- Monitoring Location




# I-15; Springville/Spanish Fork Interchange

## Existing Noise Levels

Map 7 of 14

0 100 200 Feet

N

- Exceeds NAC
- Does Not Exceed NAC
- Monitoring Location

# I-15; Springville/Spanish Fork Interchange

## Existing Noise Levels

Map 8 of 14

0 100 200 Feet

N

- Exceeds NAC
- Does Not Exceed NAC
- Monitoring Location

# I-15; Springville/Spanish Fork Interchange

## Existing Noise Levels

Map 9 of 14

0 100 200 Feet

N

- Exceeds NAC
- Does Not Exceed NAC
- Monitoring Location

# I-15; Springville/Spanish Fork Interchange

## Existing Noise Levels

Map 10 of 14

0 100 200 Feet

N

- Exceeds NAC
- Does Not Exceed NAC
- Monitoring Location

# I-15; Springville/Spanish Fork Interchange

## Existing Noise Levels

Map 11 of 14

0 100 200 Feet

N

- Exceeds NAC
- Does Not Exceed NAC
- Monitoring Location

# I-15; Springville/Spanish Fork Interchange

## Existing Noise Levels

Map 12 of 14

0 100 200 Feet

N

- Exceeds NAC
- Does Not Exceed NAC
- Monitoring Location

# I-15; Springville/Spanish Fork Interchange

## Existing Noise Levels

Map 13 of 14

0 100 200 Feet

N

- Exceeds NAC
- Does Not Exceed NAC
- Monitoring Location

# I-15; Springville/Spanish Fork Interchange

## Existing Noise Levels

Map 14 of 14

0 100 200 Feet

N

- Exceeds NAC
- Does Not Exceed NAC
- Monitoring Location

HORROCKS ENGINEERS

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Pleasant Grove, Utah 84062
801-763-5100
www.horrocks.com

**To:** Elisa Albury, UDOT Environmental Program Manager

**From:** Haylie Ferguson, Environmental Specialist

**Date:** November 12, 2019 **Memorandum**

**Subject:** I-15; Springville/Spanish Fork Interchange

PIN: 15153, Project No.: S-I15-6(239)259

**Noise Monitoring Location Memo**

---

**Introduction**

The Utah Department of Transportation (UDOT) is performing an environmental study for a potential new interchange on I-15 at Springville 1600 South/Spanish Fork 2700 North (approximately milepost 258). There is an existing overpass at this location. The environmental study is also considering potential widening of 1600 South/2700 North from Main Street to State Street (SR-51) to meet the increased demand associated with the interchange. In accordance with the UDOT Noise Abatement Policy, this project is a Type I Project and requires a traffic noise analysis.

**Noise Sensitive Land Uses**

Noise sensitive land uses include land uses within Activity Categories A, B, C, D, and E. See Table 1 for a description of the noise sensitive land uses within the study area. See attached Noise Monitoring Location Map for the activity categories where the study team is proposing to take noise measurements.

**Table 1:** Description of Activity Categories within the Study Area

| Activity Category | Description of Location within Study Area |
|---|---|
| A | • None |
| B | • Residential neighborhoods within the study area |
| C | • North Park; 1185 North 400 East, Spanish Fork<br>• Kelvin Grove Park; 1484 Wallace Drive, Springville<br>• Dry Creek Parkway; 1409 South 1200 West, Springville |
| D | • None |
| E | • Mōdere; 588 South 2000 West, Springville |
| F (noise impact analysis not required) | • Retail Facilities<br>• Utilities<br>• Agricultural land |
| G (noise impact analysis not required) | • Undeveloped land within the study area |

**Noise Monitoring Sites**

Noise measurements are proposed at four sites within the study area (see Noise Monitoring Location Map and Table 2). These measurement sites will be used to create a validated traffic noise model for noise-sensitive areas where the potential new interchange ties into 1600 North/2700 North and I-15.

Noise-sensitive areas are defined as areas where frequent exterior human use occurs and where a lowered noise level would be of benefit.

**Table 2:** Noise Monitoring Sites

| Map ID | Activity Category | Address and Description of Site |
|---|---|---|
| M1 | C | North Park; 1185 North 400 East, Spanish Fork |
| M2 | B | Residence; 1117 West Kingsbury Road, Springville |
| M3 | B | Residence; 1040 West 1550 South, Springville |
| M4 | B | Residence; 1718 South Main Street, Springville |

**Noise Measurement Procedures**

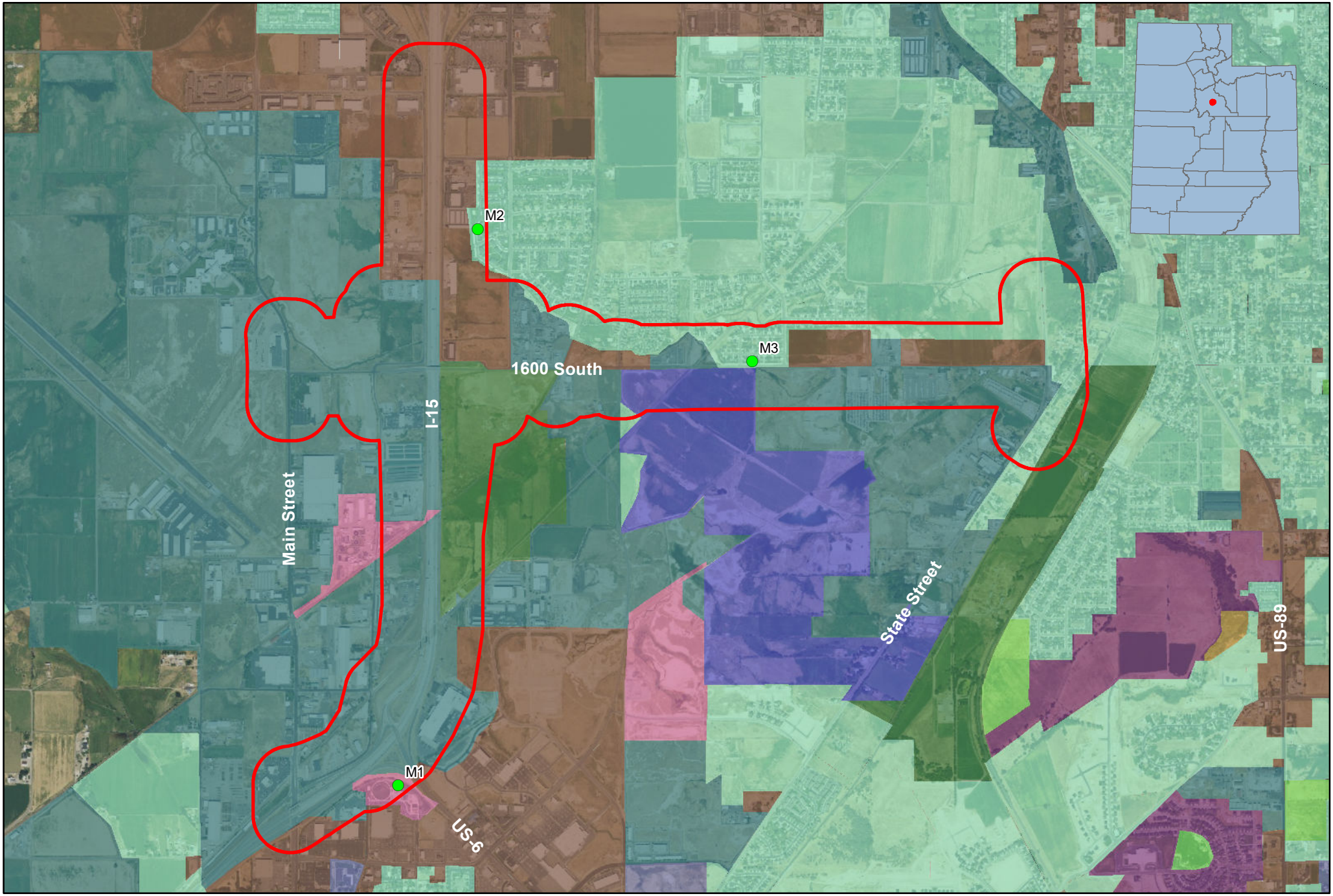
Noise measurements will be taken with an Extech Instruments SDL600 sound level meter/data logger for a duration of 20 minutes at each location. Data will be gathered for noise measurements to establish baseline noise levels and construct a validated noise model, including collecting traffic volumes (from UDOT Performance Measurement System, measurement site traffic counts, and mobile traffic cameras), vehicle mixes (defined by axles), and speeds; noting weather conditions; recording foliage types and density; identifying noise sources other than traffic; and recording any abnormal events which, if included in the data, would skew the results. Sketches showing monitoring locations will be prepared and photographs of the measurement area will be taken.

**Noise Modeling Procedures**

Noise modeling will be completed using the FHWA's Traffic Noise Model (TNM, v2.5) since the newer version of TNM (v3.0) is not currently available for use at this time.

**UDOT Noise Policy**

The noise analysis will comply with the most recent version of the UDOT Noise Abatement Policy released June 2017.




# I-15; Springville/Spanish Fork Interchange

## Noise Monitoring Location Map

Map 1 of 1

0 1,500 3,000 Feet

- Monitoring Location
- Study Area
- Agricultural
- Commercial
- Critical Environment
- Industrial
- Office
- Open Space and Parks
- Public Facilities
- Residential
- Specific Development Plan
- Unincorporated County Areas

# APPENDIX B: BUILD NOISE IMPACT MAPS

# I-15; Springville/Spanish Fork Interchange

## Build Noise Impacts

Map 1 of 14

0 100 200 Feet

N

- Impacted Receptor
- Non-impacted Receptor
- Right-of-way

# I-15; Springville/Spanish Fork Interchange

## Build Noise Impacts

Map 2 of 14

0 100 200 Feet

N

Impacted Receptor

Non-impacted Receptor

Right-of-way

# I-15; Springville/Spanish Fork Interchange

## Build Noise Impacts

Map 3 of 14

0 100 200 Feet

N

- Impacted Receptor
- Non-impacted Receptor
- Right-of-way

# I-15; Springville/Spanish Fork Interchange

## Build Noise Impacts

Map 4 of 14

0 100 200 Feet

N

- Impacted Receptor
- Non-impacted Receptor
- Right-of-way

# I-15; Springville/Spanish Fork Interchange

## Build Noise Impacts

Map 5 of 14

0 100 200 Feet

N

- Impacted Receptor
- Non-impacted Receptor
- Right-of-way

# I-15; Springville/Spanish Fork Interchange

## Build Noise Impacts

Map 6 of 14

0 100 200 Feet

N

- Impacted Receptor
- Non-impacted Receptor
- Right-of-way

# I-15; Springville/Spanish Fork Interchange

## Build Noise Impacts

Map 7 of 14

0 100 200 Feet

N

- Impacted Receptor
- Non-impacted Receptor
- Right-of-way

# I-15; Springville/Spanish Fork Interchange

## Build Noise Impacts

Map 8 of 14

0 100 200 Feet

N

Impacted Receptor

Non-impacted Receptor

Right-of-way

# I-15; Springville/Spanish Fork Interchange

## Build Noise Impacts

Map 9 of 14

0 100 200 Feet

N

- Impacted Receptor
- Non-impacted Receptor
- Right-of-way

# I-15; Springville/Spanish Fork Interchange

## Build Noise Impacts

Map 10 of 14

0 100 200 Feet

N

Impacted Receptor

Non-impacted Receptor

Right-of-way

# I-15; Springville/Spanish Fork Interchange

## Build Noise Impacts

Map 11 of 14

0 100 200 Feet

N

Impacted Receptor

Non-impacted Receptor

Right-of-way

# I-15; Springville/Spanish Fork Interchange

## Build Noise Impacts

Map 12 of 14

0 100 200 Feet

N

Impacted Receptor

Non-impacted Receptor

Right-of-way

# I-15; Springville/Spanish Fork Interchange

## Build Noise Impacts

Map 13 of 14

0 100 200 Feet

N

- Impacted Receptor
- Non-impacted Receptor
- Right-of-way

# I-15; Springville/Spanish Fork Interchange

## Build Noise Impacts

Map 14 of 14

0 100 200 Feet

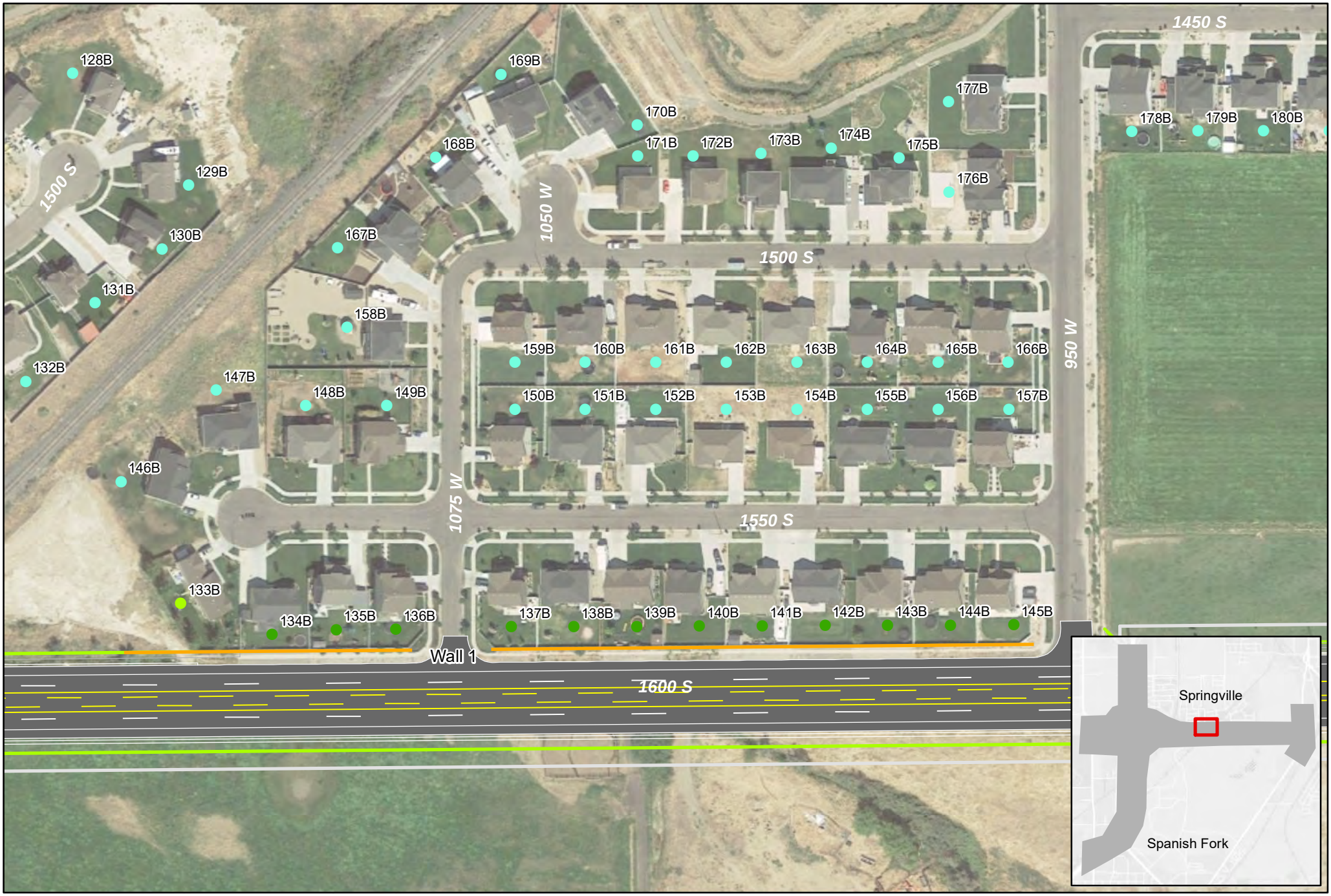
N

Impacted Receptor

Non-impacted Receptor

Right-of-way

# APPENDIX C: NOISE WALL MAP




# I-15; Springville/Spanish Fork Interchange

## Noise Wall

Map 1 of 1

0 100 200 Feet

N

Feasible and Reasonable

Right-of-way

Benefited, Impacted

Benefited, Not Impacted

Not Benefited, Not Impacted

**Benefited/non-benefited receptors reflect the shortest wall height that was acoustically feasible, met the design goal, and (where applicable) was cost reasonable.**

# APPENDIX D: NOISE WALL ANALYSES

## Wall 1

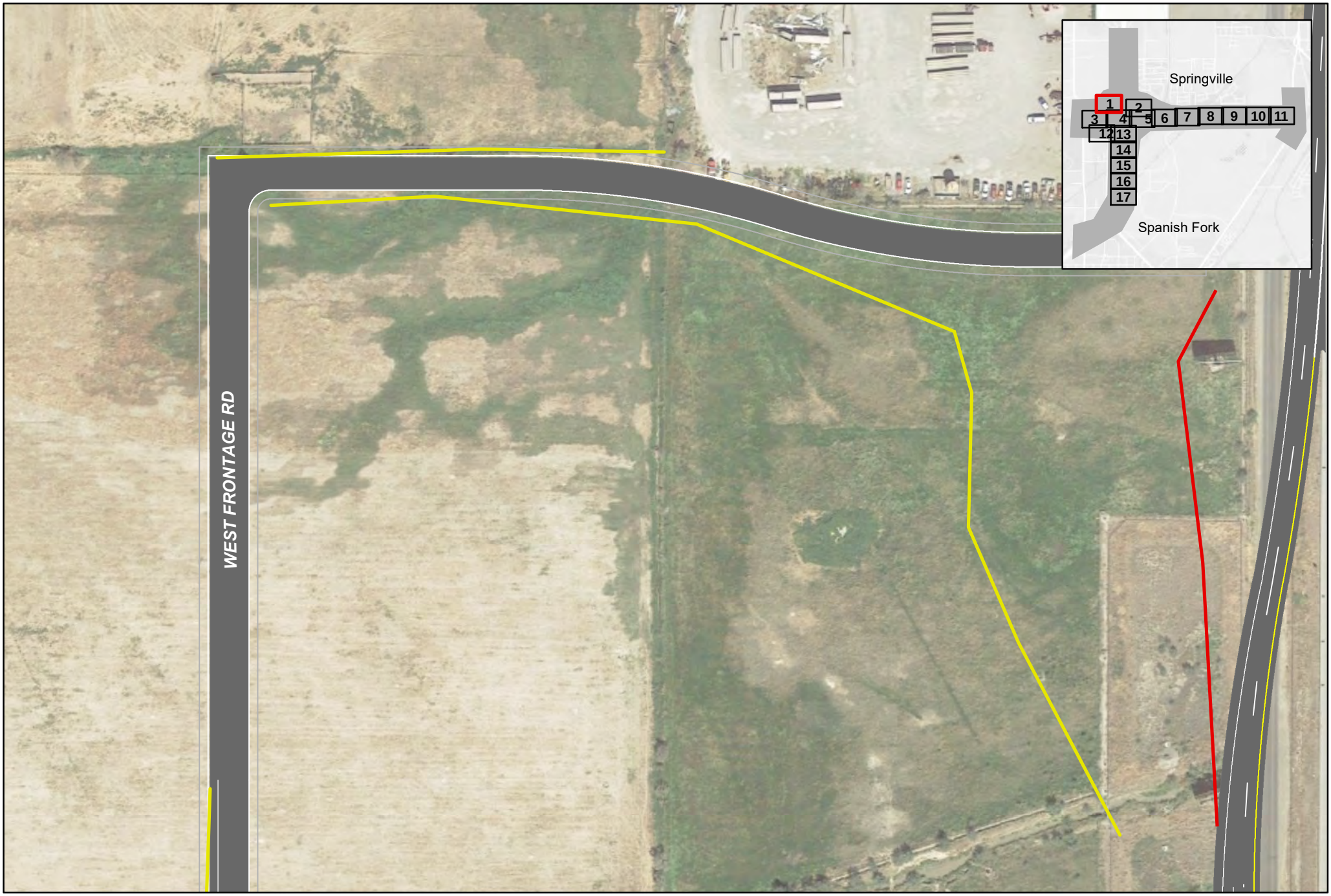
| Receptor Name | No. of DU | Activity Category | 1st Row Receptor | Wall Height (ft) Noise Reduction Values (dBA) 6 | 8 | 10 | 12 | 14 |
|---|---|---|---|---|---|---|---|---|
| 133B | 1 | B | x | 5 | 6 | 6 | 6 | 7 |
| 134B | 1 | B | x | 5 | 8 | 10 | 12 | 13 |
| 135B | 1 | B | x | 7 | 10 | 11 | 12 | 13 |
| 136B | 1 | B | x | 5 | 7 | 7 | 8 | 8 |
| 137B | 1 | B | x | 5 | 7 | 7 | 8 | 8 |
| 138B | 1 | B | x | 7 | 10 | 11 | 13 | 13 |
| 139B | 1 | B | x | 6 | 10 | 12 | 13 | 14 |
| 140B | 1 | B | x | 8 | 11 | 12 | 14 | 15 |
| 141B | 1 | B | x | 6 | 9 | 12 | 13 | 14 |
| 142B | 1 | B | x | 7 | 10 | 12 | 14 | 15 |
| 143B | 1 | B | x | 7 | 10 | 12 | 13 | 14 |
| 144B | 1 | B | x | 7 | 10 | 11 | 13 | 13 |
| 145B | 1 | B | x | 5 | 7 | 8 | 8 | 9 |

**Input Data**

| | | |
|---|---|---|
| Total Wall Length: | 948 | ft |
| Length of Activity Category A/C/D/E Land Use: | 0 | ft |
| Length of Safety Barrier | 0 | ft |
| Wall Cost per sq ft: | $20 | |
| Cost of items critical to safety: | $25 | Note: Snow storage |
| Cost of items critical to safety: | $75 | Note: Safety barrier |
| No. of 1st row receptors: | 13 | |

| | 6 | 8 | 10 | 12 | 14 |
|---|---|---|---|---|---|
| **Feasibility Factors** | | | | | |
| No. of 1st row 5 dBA reduction: | 13 | 13 | 13 | 13 | 13 |
| %. of 1st row 5 dBA reduction: | 100% | 100% | 100% | 100% | 100% |
| **Acoustic Feasibility (5 dBA reduction for 50% of 1st row):** | **Yes** | **Yes** | **Yes** | **Yes** | **Yes** |
| **Reasonableness Factors** | | | | | |
| No. of 1st row Design Goal: | 6 | 12 | 12 | 12 | 13 |
| %. of 1st row Design Goal: | 46% | 92% | 92% | 92% | 100% |
| **Noise Abatement Design Goal (7 dBA reduction for 35% of 1st row):** | **Yes** | **Yes** | **Yes** | **Yes** | **Yes** |
| **Cost Analysis** | | | | | |
| No. of Benefited (Category B): | 13 | 13 | 13 | 13 | 13 |
| Cost of Noise Wall (L x H x $/sq ft): | $113,760 | $151,680 | $189,600 | $227,520 | $265,440 |
| Cost of item critical to safety (snow storage): | $23,700 | $23,700 | $23,700 | $23,700 | $23,700 |
| Cost of item critical to safety (safety barrier): | $0 | $0 | $0 | $0 | $0 |
| Anticipated Cost of Noise Abatement: | $137,460 | $175,380 | $213,300 | $251,220 | $289,140 |
| Activity Category B Allowable Cost ($30k/benefitted receptor): | $390,000 | $390,000 | $390,000 | $390,000 | $390,000 |
| Activity Category A/C/D/E Allowable Cost ($360/linear ft): | $0 | $0 | $0 | $0 | $0 |
| Total Allowable Cost: | $390,000 | $390,000 | $390,000 | $390,000 | $390,000 |
| Allowable - Anticipated Cost: | $252,540 | $214,620 | $176,700 | $138,780 | $100,860 |
| **Cost Effective (Anticipated < Allowable):** | **Yes** | **Yes** | **Yes** | **Yes** | **Yes** |
| **Feasible and Reasonable:** | **Yes** | **Yes** | **Yes** | **Yes** | **Yes** |

# APPENDIX E: NOISE LEVELS ON UNDEVELOPED LAND




# I-15; Springville/Spanish Fork Interchange

## Undeveloped Land

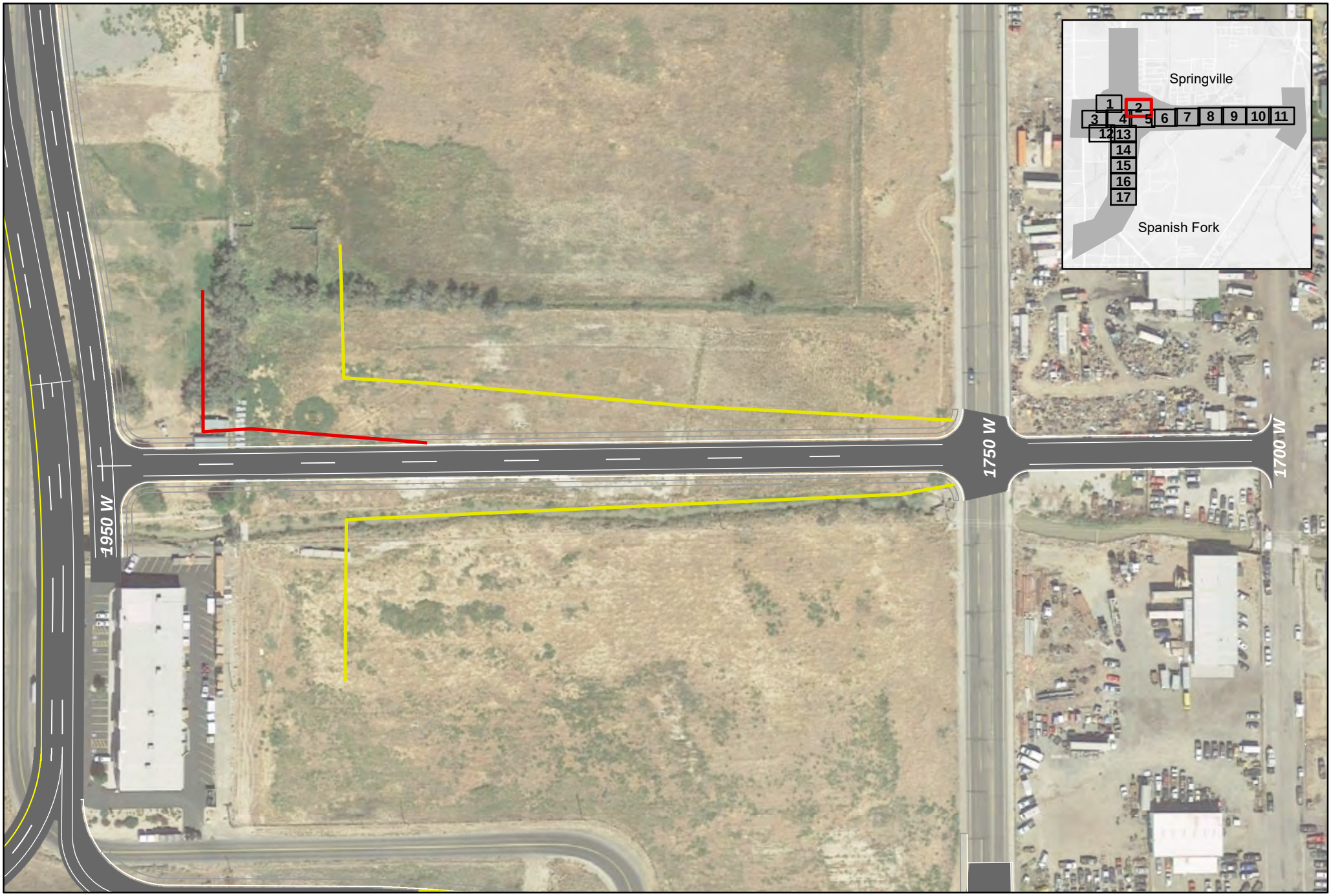
Map 1 of 17

0 100 200 Feet

N

66 dBA

71 dBA




# I-15; Springville/Spanish Fork Interchange

## Undeveloped Land

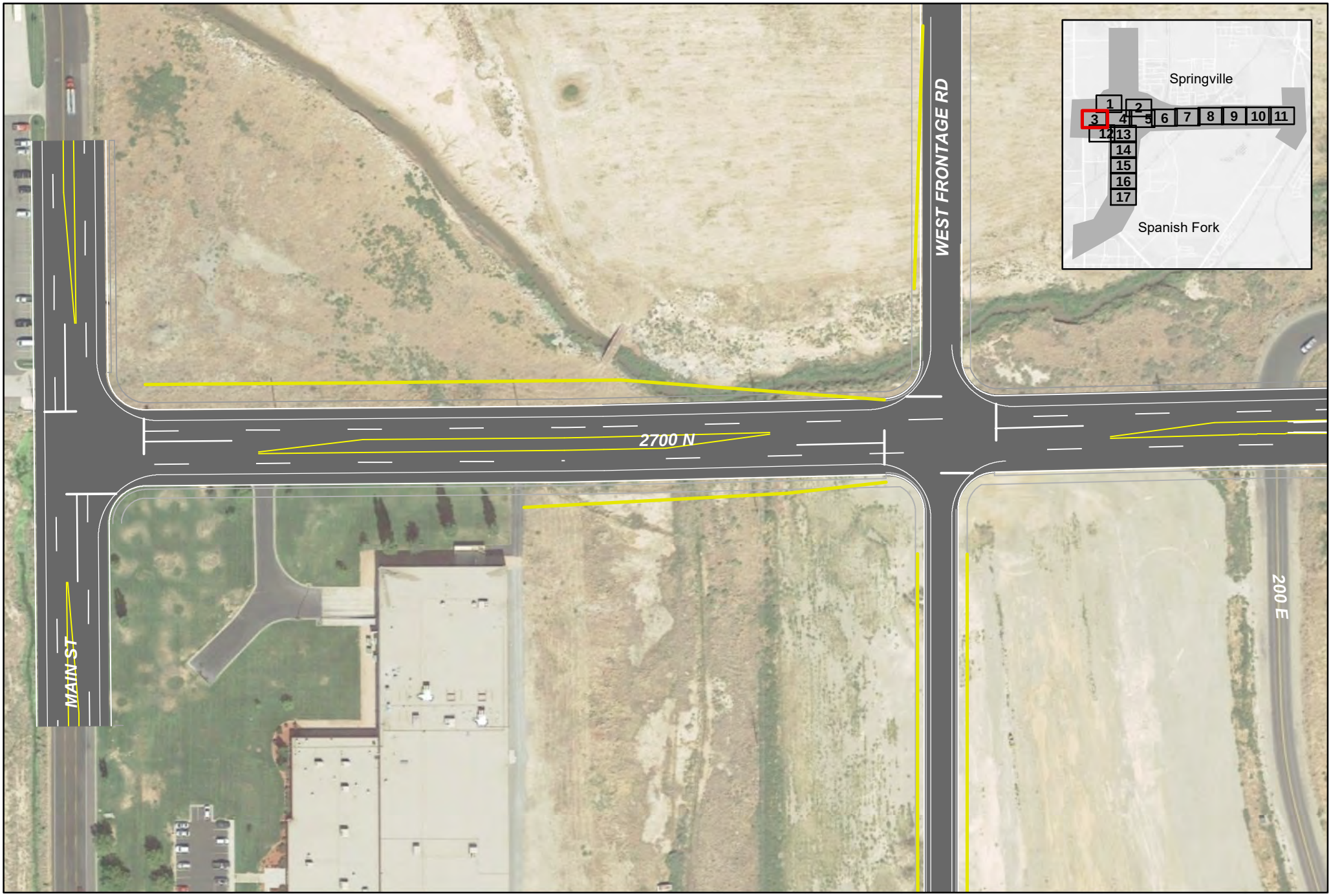
Map 2 of 17

0 100 200 Feet

N

66 dBA

71 dBA




# I-15; Springville/Spanish Fork Interchange

## Undeveloped Land

Map 3 of 17

66 dBA

71 dBA

0 100 200 Feet

N

# I-15; Springville/Spanish Fork Interchange

## Undeveloped Land

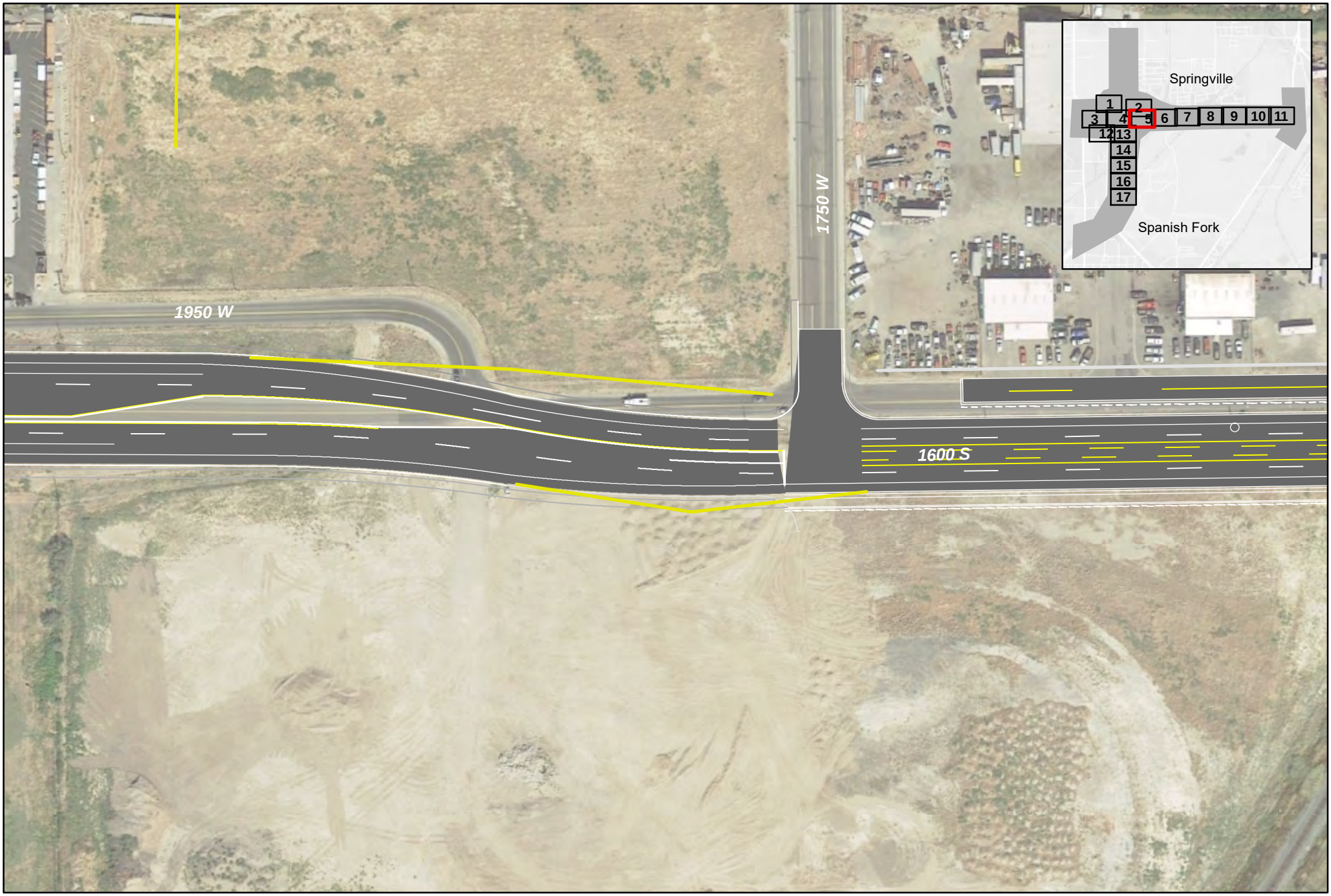
66 dBA

71 dBA

Map 4 of 17

0 100 200 Feet

N




# I-15; Springville/Spanish Fork Interchange

## Undeveloped Land

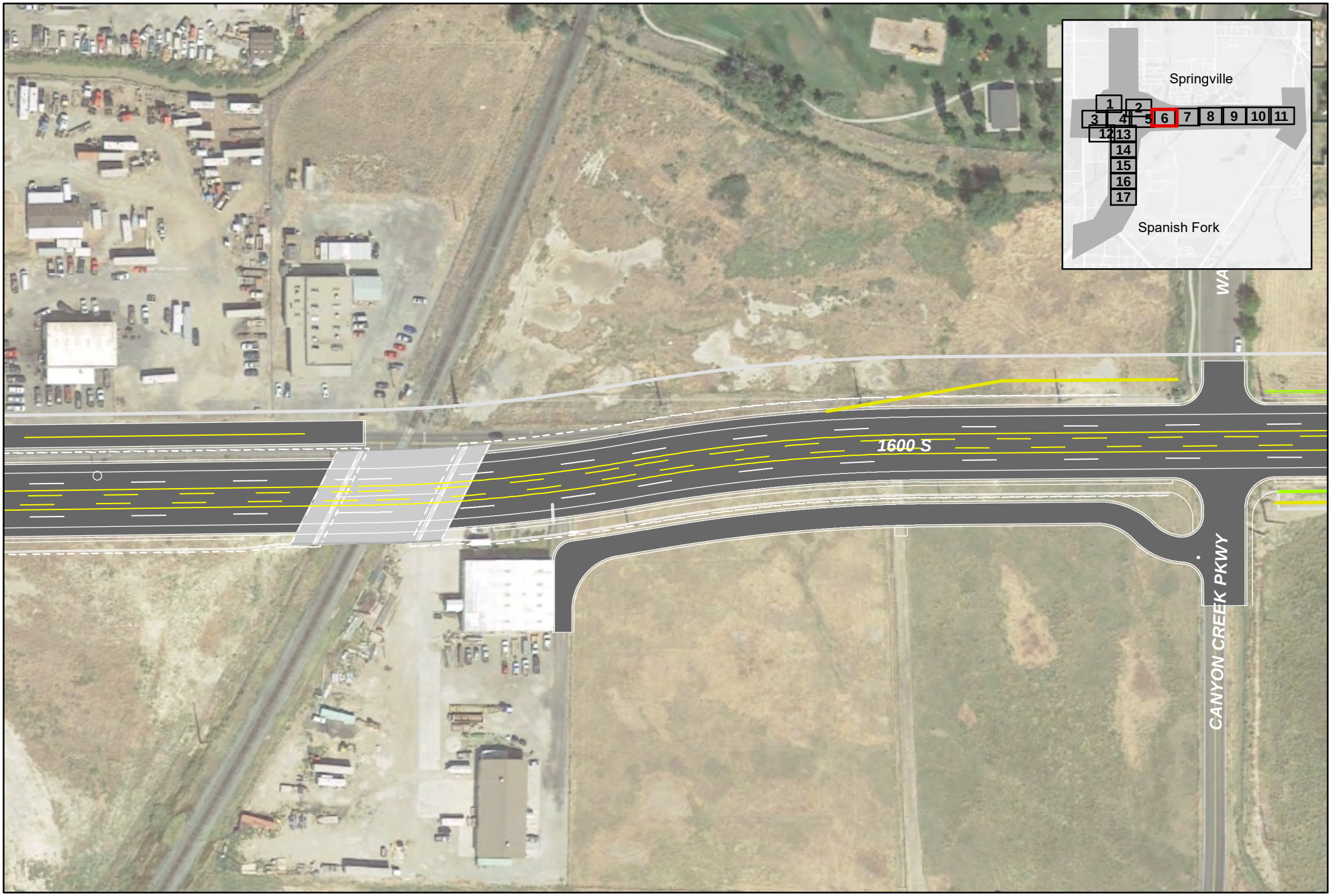
Map 5 of 17

66 dBA

71 dBA

0 100 200 Feet

N




# I-15; Springville/Spanish Fork Interchange

## Undeveloped Land

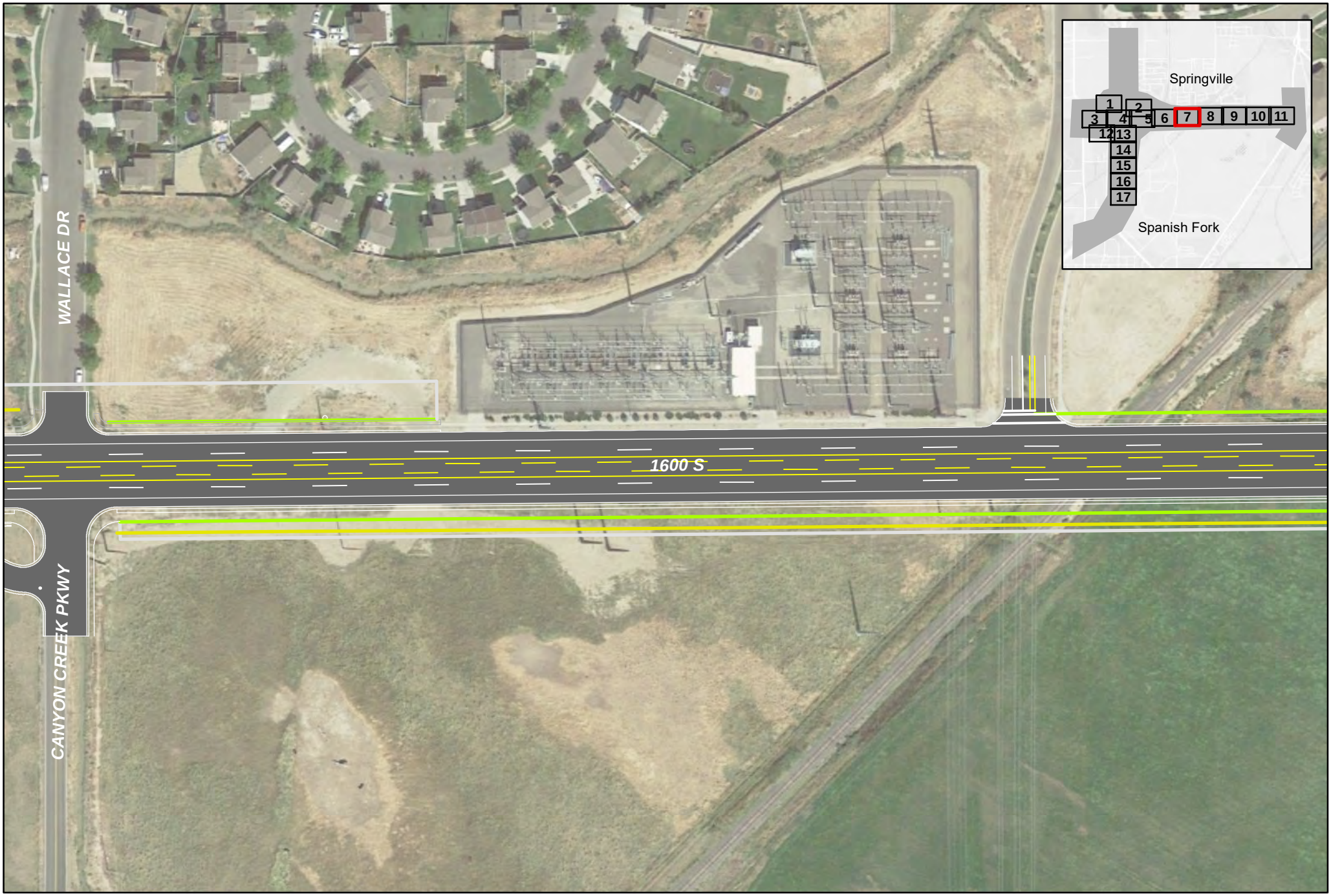
66 dBA

71 dBA

Map 6 of 17

0 100 200 Feet

N




# I-15; Springville/Spanish Fork Interchange

## Undeveloped Land

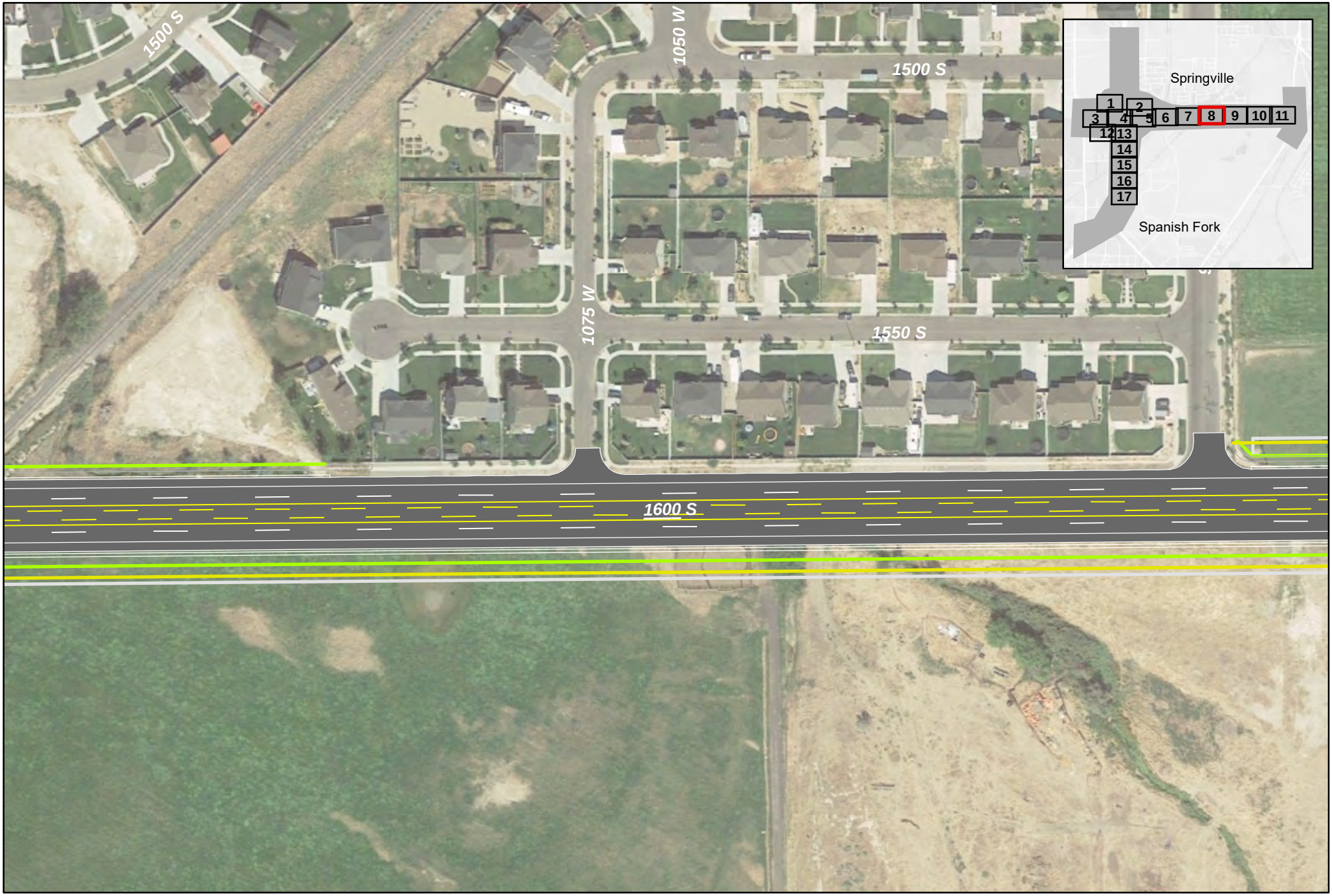
66 dBA

71 dBA

Map 7 of 17

0 100 200 Feet

N




# I-15; Springville/Spanish Fork Interchange

## Undeveloped Land

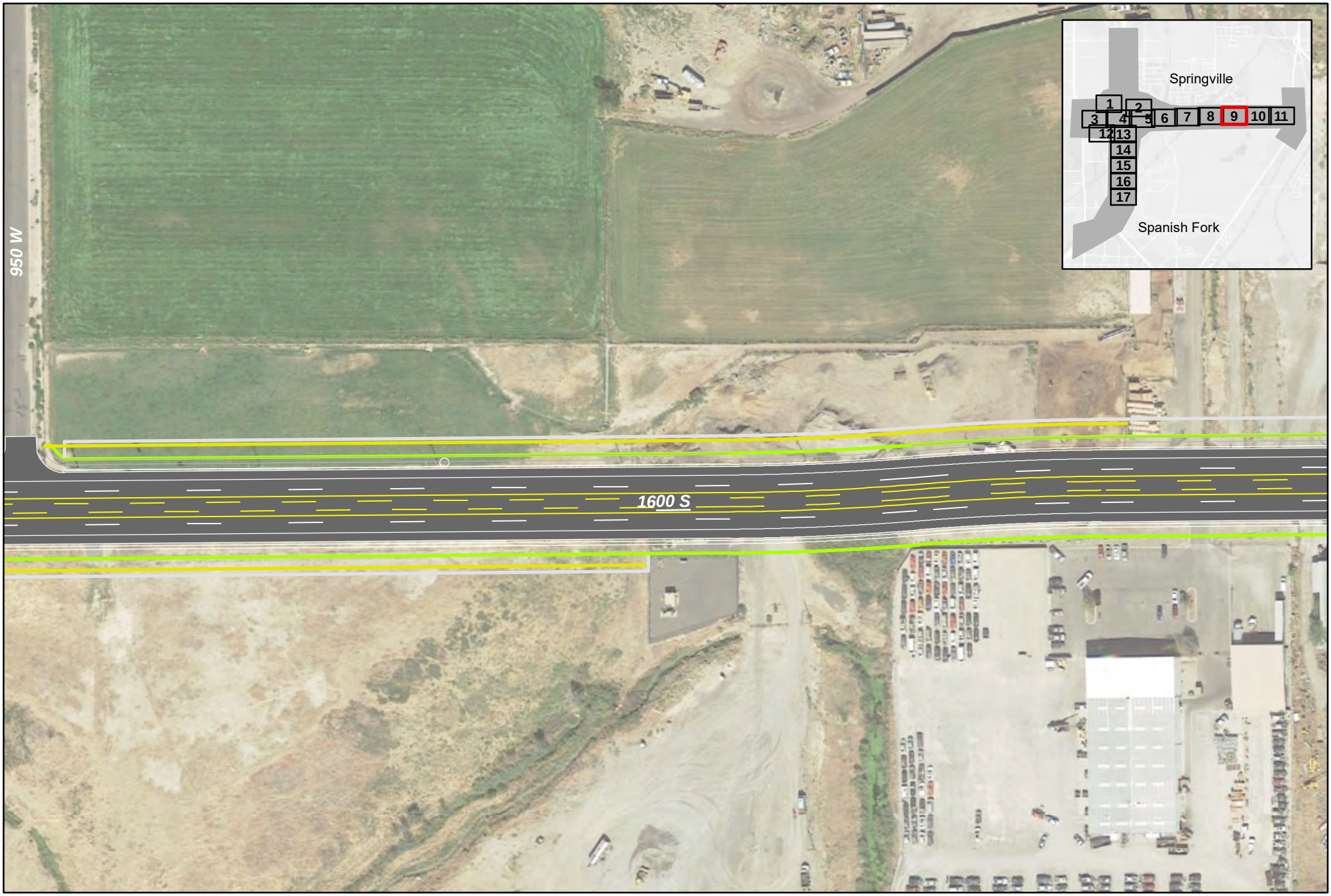
Map 8 of 17

0 100 200 Feet

N

66 dBA

71 dBA




# I-15; Springville/Spanish Fork Interchange

## Undeveloped Land

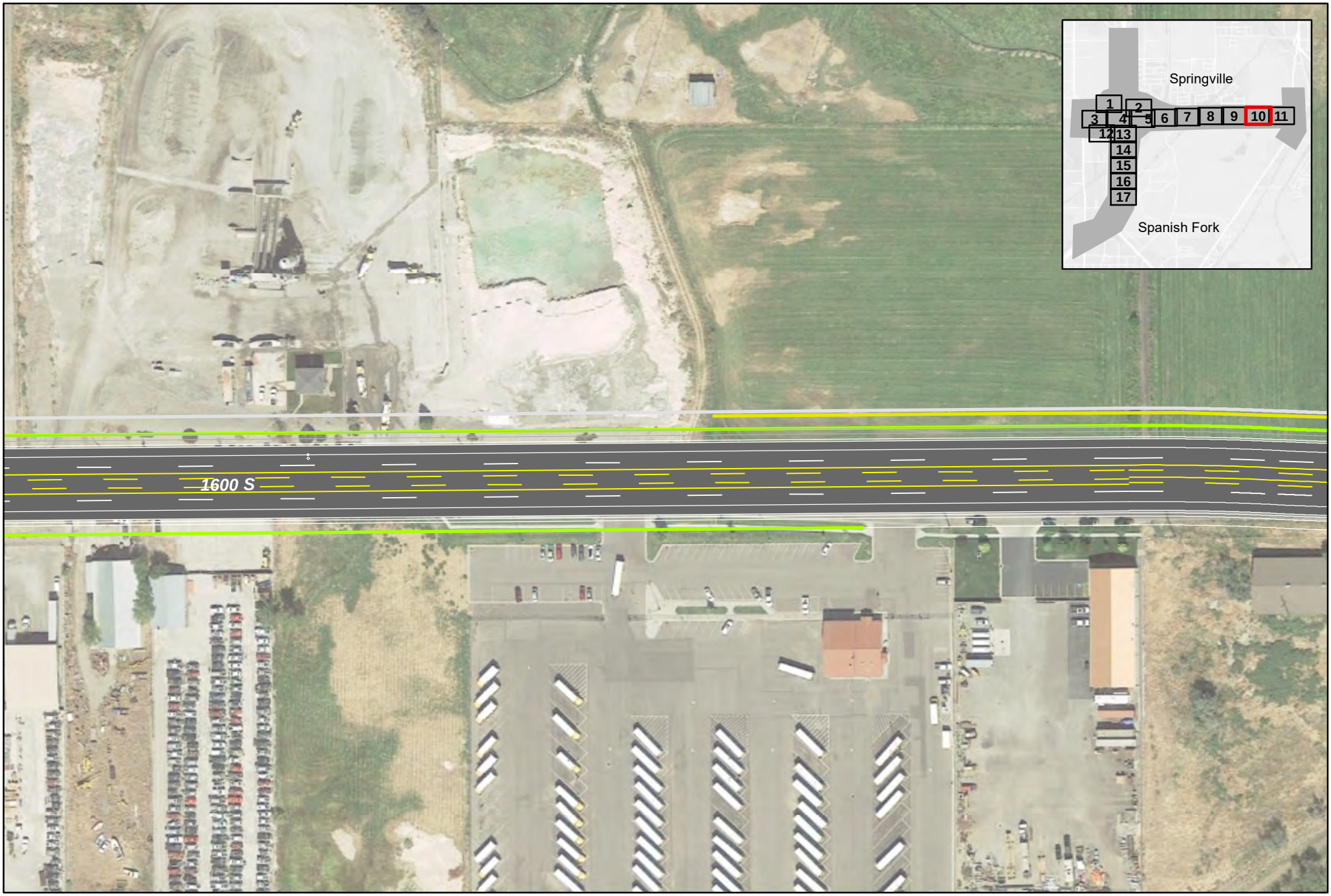
Map 9 of 17

66 dBA

71 dBA

0 100 200 Feet

N




# I-15; Springville/Spanish Fork Interchange

## Undeveloped Land

Map 10 of 17

66 dBA

71 dBA

0 100 200 Feet

N

# I-15; Springville/Spanish Fork Interchange

## Undeveloped Land

Map 11 of 17

66 dBA

71 dBA

0 100 200 Feet

N

# I-15; Springville/Spanish Fork Interchange

## Undeveloped Land

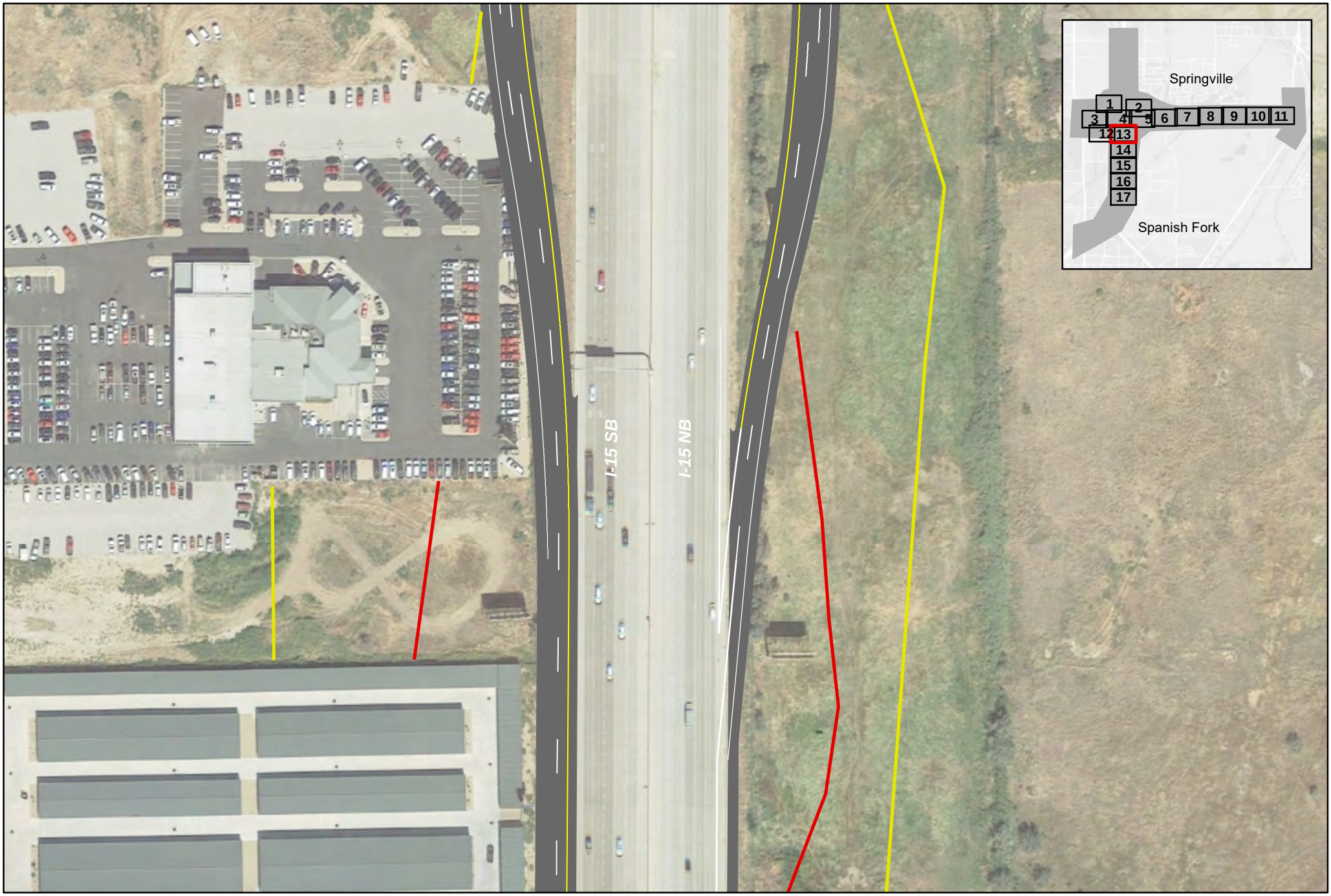
Map 12 of 17

66 dBA

71 dBA

0 100 200 Feet

N




# I-15; Springville/Spanish Fork Interchange

## Undeveloped Land

Map 13 of 17

66 dBA

71 dBA

0 100 200 Feet

N

# I-15; Springville/Spanish Fork Interchange

## Undeveloped Land

66 dBA

71 dBA

Map 14 of 17

0 100 200 Feet

N

# I-15; Springville/Spanish Fork Interchange

## Undeveloped Land

Map 15 of 17

66 dBA

71 dBA

0 100 200 Feet

N

# I-15; Springville/Spanish Fork Interchange

**Undeveloped Land**

66 dBA

71 dBA

Map 16 of 17

0 100 200 Feet

N

# I-15; Springville/Spanish Fork Interchange

## Undeveloped Land

Map 17 of 17

66 dBA

71 dBA

0 100 200 Feet

N

# SELECTIVE RECONNAISSANCE LEVEL SURVEY

## I-15, Springville/Spanish Fork Interchange

Springville-Spanish Fork, Utah County, Utah
PIN 15153, Project No. F-I15-6(239)259

c.1877 Photograph of the Moroni Miner Family in front of their new home on South Main Street in Springville.
*Photo courtesy of Familysearch.org*

Report Prepared by Nancy Calkins, Horrocks Engineers
For Utah Department of Transportation
November 2018

*The environmental review, consultation, and other actions required by applicable Federal environmental laws for this project are being, or have been, carried-out by UDOT pursuant to 23 USC 327 and a Memorandum of Understanding dated January 17, 2017, and executed by FHWA and UDOT.*

# Project Summary

## PROJECT NUMBER AND PIN

PIN 15153, Project No. S-I15-6(239)259

## PROJECT DESCRIPTION

Horrocks Engineers has prepared this report in support of the Utah Department of Transportation's (UDOT) proposal to make improvements to Interstate 15 (I-15) at milepost 258 in Utah County.

## LOCATION

The project is located within the city boundaries of Springville and Spanish Fork as well as a portion between within Utah County boundaries. It contains land under the jurisdiction of those government entities as well as the Utah Department of Transportation (UDOT), and private landowners.

## USGS QUADS

Springville and Provo

## LEGAL LOCATION OF SURVEY

Township 8S, Range 3E Sections 4-9 and 18

## AREA SURVEYED

The survey area includes all historic properties adjacent to 1600 South from Spanish Fork Main Street as well as historic properties adjacent to a small section of South State Street in Springville. The survey is one property deep from both roadways. The only portion of the survey area with historic buildings was the portion of South State Street. (Please see map on page 6 for specific Area of Potential Effect.)

## DATE OF FIELDWORK

October 12, 2018

## PROJECT DATA

Nine newly recorded properties, five of which are eligible for the National Register of Historic Places.

## FEDERAL AGENCY

Utah Department of Transportation for Federal Highway Administration

## REPORT PREPARED FOR

Utah Department of Transportation

## AUTHOR/DATE OF REPORT

Nancy Calkins and Ben Pearson, Horrocks Engineers. November 2018

## HISTORIC CONTEXT

The road, which connects Spanish Fork's North Main Street and South State Street (SR- 51) in Springville at 1600 South, was constructed shortly after a 1936 agreement between the two cities. Spanish Fork had constructed an airport north of town in 1931 and when Springville petitioned in 1935 to construct an airport of their own they were told it would be too close to the Spanish Fork Airport. It was suggested that they should combine resources to share the Spanish Fork facility. As part of the agreement, Springville City committed to construct an access road from Springville to the airport, which they did over a small farm lane running along the section line.[1] It is clear looking at early aerial photographs of the area that the only reason for this road was airport access. Main Street in Spanish Fork did not extend to meet it until the mid-1970s and the surrounding land was marshy pasture.

Although the road is a single east-west road from North Main Street in Spanish Fork to South State Street in Springville, it has had many different names. In Spanish Fork it is 2700 North, in the Utah County numbering system it is 4800 South and in Springville, although currently known as 1600 South it was previously called both The Airport Road and LaMar's Lane.

Fifteen hundred feet before the east end of the road is a place where four sections join (Sections 4, 5, 8, 9). This spot is significant as it marks the center of the Miner family land, much of which is still owned by members of the Miner family. Two brothers, Moroni and Don Carlos (Carl) Miner, who had come to Springville as teenagers in 1851, owned 214 acres in the four quarter-corners of these sections.[2] In 1863 Moroni purchased 96 acres in Section 4 and subsequently homesteaded 40 acres in each of the other three sections with Carl (who was younger and single) living in a cabin on the homestead.[3] Moroni had completed a large brick home for his family by 1877, which is still standing at 1718 S. Main Street (directly behind the Miner Storage Units in this survey.)[4]

Over time each of their children received small farms and built homes along South Main Street. Moroni's son Floyd received land west of his parent's home where he raised cattle and Carl's son Lafayette (Lafe) received land east of what is now South State Street. Although there were over twenty children between Moroni and Carl, only these two are mentioned here as their descendants built the properties in this survey.[5]

Floyd Lee Miner, grandson of Moroni Miner, built a home at 1680 S. State Street in 1936. Lee, along with his wife of three years, Harriett, dug the basement by hand and completed a "hope house" which they lived in for two years. In 1938 they built the upper floors of the house with Harriet completing all of the lath and plaster work, both inside and out. The same year they finished the house they went into the dairy business eventually building a large barn and dairy operation west of their home along The Airport Road. They were the first dairy to provide individual milk bottles to schools in Springville for school lunches, which kept Lee, Harriett and their four children very busy through the 1940s and early 1950s. In 1958, when they could no

[1] www.woodhousefiled.org
[2] Moroni Miner, Autobiography of Moroni Miner, Utah County Land Deeds, BLM/GLO records
[3] History of Don Carlos Smith Miner, Familysearch.org/Don Carlos Smith Miner/Memories
[4] "Grandpa Miner's New House" Familysearch.org/Moroni Miner/Memories
[5] Utah County Abstract of Deeds

longer compete with the highly mechanized larger dairies, they sold their herd and went into the farm equipment business. [6]

Lee and a partner, Reed Rigtrup, constructed a warehouse at 1620 S. State Street, just north of the Miner's home and opened M & R Equipment. This business remains in the Miner family and they have enlarged the original building as well as constructing facilities for storage of equipment on the east (1615 S. State Street) and west of the main building.

Shortly after going into the equipment business, the Miners sold land south of their home and the adjoining land to the west, which had been their dairy operation, to Lester and Hilda Hardy. The Hardys used the dairy buildings for a meat packing facility, which they called Les Hardy and Sons. Les and Hilda built a home on the adjoining land at 1700 South State in 1971 just south of the Miner's home.[7]

Across the highway at 1695 S. State was a busy restaurant built there in 1947 by Lee Miner's younger brother LaMar and his wife Marjorie as a avenue to promote their dairy products. Opened as LaMar's Café, it became a Springville icon, popular with both local citizens and travelers along US Highway 91 (now SR-51). It was such a destination point that it was used through the 1960s to describe an alternate name for The Airport Road, LaMar's Lane.[8]

In 1957 LaMar's cousin Clyde Miner built a home near LaMar's Café on seven acres he received of his father's (Lafe Miner) farm at 1785 South State. This home is still owned by Miner descendants.

Shortly after the construction of I-15, which included an overpass for The Airport Road, an auto racetrack was constructed near the overpass because it was a very isolated area that could handle the noise of racing cars. Originally opened as the Turpin Speedway, the dirt .3-mile oval was paved in 1969 and eventually received NASCAR sanction under the name of Suntana Raceway (later known as Thunder Mountain Raceway) in 1994. However, after the construction of the Rocky Mountain Raceway in Salt Lake County, the fan base at the Springville track dwindled and the track closed in 1999.[9] The buildings and track have all been removed but the location of the track is still visible on aerial photographs.

Other than the Springville Rodeo Grounds constructed in 1974 and a few industrial buildings constructed in the late 1970s and early 1980s, The Airport Road remained open and rural marshy pastures until housing development in Springville moved south from 400 South in the early 2000s. Despite a large housing development, much of the land surrounding the road (now called 1600 South) remains open and undeveloped.

[6] HIdebrandt, Peter and Trish, "The Life Histories of Lee and Harriett Miner," p.29.
[7] Miller, Mark. Interview with the author.
[8] Suntana Raceway Ad, The Daly Herald, May 28, 1968, p. 13.
[9] Grass, Ray, "Sun sets on Suntana Raceway," Deseret News August 23, 1997

## EXPLANATION OF FIELDWORK TECHNIQUES

Prior to conducting the survey a search was conducted of the Utah State Historic Preservation Office database, Preservation Pro and there were no previously recorded properties within the Area of Potential Effect (APE.) The Utah County Assessor's website was searched for construction dates of properties within the APE and a list was compiled of possible historic properties. That list was then compared to historic aerial images from 1947, 1958, 1965, 1969, 1972, and 1980 to verify accuracy of the county data. The Utah County Abstract of Deeds was consulted for conflicting dates/aerial images and the final number of historic properties was determined to be nine. The survey was conducted by Nancy Calkins on October 12, 2018.

## SURVEY RESULTS

All of the historic properties within the APE were at the east end near the intersection of 1600 South and SH-51 in Springville. Nine historic properties were surveyed and five of those were determined eligible for the National Register of Historic Places.

## TABLE OF HISTORIC PROPERTIES SURVEYED

| Address | Description | NRHP Eligibility |
|---|---|---|
| **245 W. 1600 South**<br>Miner Dairy/Les Harvey and Sons Meat Packing Plant | 1950 Concrete block warehouse with non-historic additions and alterations. | Inelig./Non-contributing |
| **1620 S. State**<br>M&R Equipment Company | 1958 concrete block Commercial/Industrial Block with large non-historic steel addition. | Inelig./Non-contributing |
| **1680 S. State**<br>Lee and Harriet Miner House | 1936 Period Cottage clad in stucco. Alterations include vinyl windows, porch awnings front and rear shed addition. | Eligible/Contributing |
| **1700 S. State**<br>Les and Hilda Harvey House | 1971 Ranch with garage constructed of brick and wood sheet. There is a free-standing carport in front of the north garage. | Eligible/Contributing |
| **1785 S. State**<br>Clyde and Donna Miner House | 1957 Ranch/Rambler constructed of striated brick. Has a carport addition from the historic period. | Eligible/Contributing |
| **1695 S. State**<br>LaMar's Café/T-Bone Restaurant | 1947 Restaurant with unclear style clad in synthetic stucco and imitation stone. | Inelig./Non-contributing |
| **1689 S. State**<br>/Anything Auto | 1973 Commercial Service Bay business constructed of steel, unaltered except for paint. | Eligible/Contributing |
| **1615 S. State** (Approx.)<br>Miner Storage | 1972 concrete block 17-unit storage facility associated with M&R Equipment. | Eligible/Contributing |
| **1555 S. State** (Approx.)<br>Miner Farms | 1970 Wood Agricultural Loafing Shed, only historic structure of ten on property with no primary structure or associated residence. | Inelig./Non-contributing |

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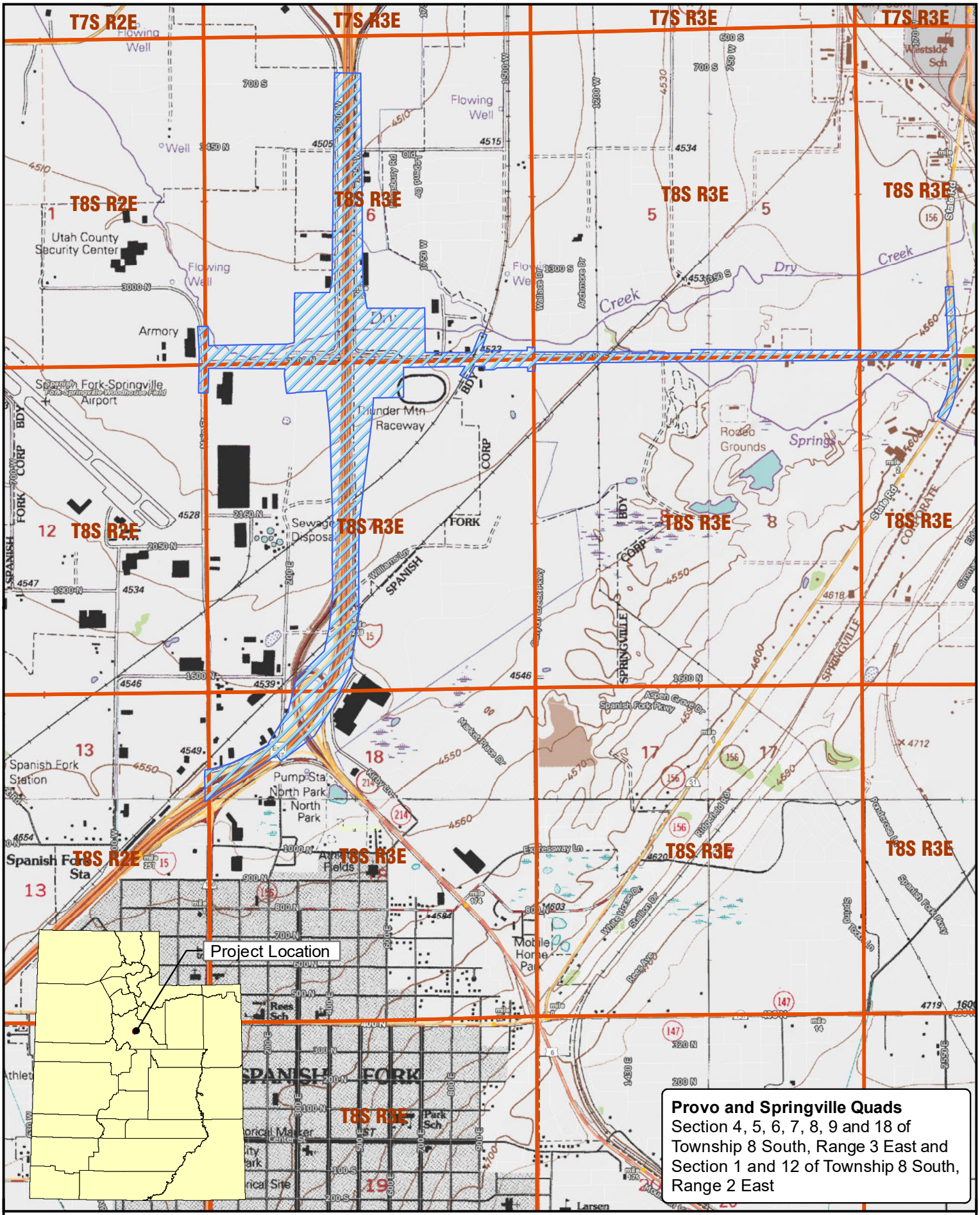
www.woodhousefiled.org, (Spanish Fork-Springville Airport) accessed October 2018.




Coordinate System: NAD 1983 StatePlane Utah Central FIPS 4302 Feet
Projection: Lambert Conformal Conic
Datum: North American 1983

Map Created by Horrocks Engineers on 9/20/2018 11:41:29 AM

APE
1 inch = 2,000 feet
0 2,000 4,000 Feet

I-15; MP 258 Interchange
Project Location Map

# HISTORIC SITE SHORT FORM

(3/12)

UTAH OFFICE OF HISTORIC PRESERVATION
For Section 106 Review Only
(Do not use this form to record archeological sites)

## 1 IDENTIFICATION

*Name of Property:* Miner Dairy/Les Hardy and Sons
*Address:* 245 W. 1600 South
*City, County:* Springville, Utah County

*Geographical Data (optional):*
*Lat/Long (degr dec.):*
*Geographical Description:*

## 2 EVALUATION

*Evaluation* (select one)

☐ *The property is considered* **Eligible** *at this time because it is already listed in the National Register* **or**

- is at least 50 years old **and** retains its historic integrity (minimal alterations to key features), and has potential significance.

☑ *The property is considered* **Not Eligible** *at this time because it:*

- is less than 50 years old **or** is 50 years or older but there have been major alterations to key features, and is known to have no significance.

## 3 DOCUMENTATION

*Required*
☑ *Upload two photos*
☑ *site sketch map (optional)*
☐ *other:*

*Research Sources (optional, check all sources consulted, whether useful or not)*
☑ *abstract of title*
☑ *tax card & photo*
☐ *building permit*
☐ *Sanborn Maps*
☑ *other:*

## 4 ARCHITECTURAL DESCRIPTION AND HISTORY

*Date of Construction:* 1950
*No. of Stories:* one
*Use*
*Building Type:* Agricultural- Misc.
*Building Style:* Modern (1930-1950s)
*Original Use:* Commerical/Trac
*Foundation Material:* concrete
*Wall Material(s):* Concrete
*Current Use:* Commerical/Trac
*Additions:* ☐ *none* ☐ *minor* ☑ *major (describe below)*
*Alterations:* ☐ *none* ☑ *minor* ☐ *major (describe below)*
*No. of contributing outbuildings and/or structures:* 0
*No. of non-contributing outbuildings and/or structures:* 1

*Briefly describe the original building, any major additions or alterations and their dates, and associated outbuildings and structures. Also provide a brief history of the building's construction and use (if known). Use continuation sheets as necessary for additional photos and text.*

This building was constructed by Lee and Harriet Miner in 1950 process and ship the milk produced on their farm. The Miners were the first dairy to bottle single-size servings of milk for local schools. In this facility they washed bottles, pasteurized and homogenized the milk, and bottled the milk, which was then delivered from here to local schools. After the Miner family quit the dairy business in 1958 they sold this parcel and one south of their home to Lester and Hilda Hardy to help finance their new business, M&R Equipment. The Hardys opened a meat packing business called Les Hardy and Sons Meat Packing in the building and over time enlarged the building's space and shipping docks. They also constructed a large concrete block warehouse on the property in the 1980s.

## 5 PROPOSED ACTION

*Describe the impending action (e.g., road widening, rehabilitation, alteration, demolition). Use continuation sheets as necessary for additional photos and text.*

The Utah Department of Transportation (UDOT) has initiated an environmental study regarding improvements to Interstate 15 (I-15) at milepost 258 in Utah County. The project will construct a grade-separated interchange at milepost 258 (1600 South in Springville), which currently has an overpass with no connection to I-15.

The project would include construction of on- and off-ramps, possible reconstruction of replacement of the overpass structure, and improvements to 1600 South between Main Street to the west and State Highway 51 (SR-51) to the east.

*Form completed by:* Nancy Calkins/Horrocks Engineers for UDOT
*Date (mo/yr):* Nov 2018

**6 PHOTO UPLOAD**

*Upload your images. Please upload a current and clear image.*
*If you have additional documents, such as a site sketch map or project area map, please submit those separately as a pdf.*

Miner Dairy/Les Hardy and Sons
**245 West 1600 South**
Springville, Utah County

Utah AGRC
I-15; Springville/Spanish Fork Interchange Study
PIN 15153 Project No. S-I15-6(239)259

Miner Dairy/Les Hardy and Sons
**245 West 1600 South**
Springville, Utah County

Utah AGRC
I-15; Springville/Spanish Fork Interchange Study
PIN 15153 Project No. S-I15-6(239)259

# HISTORIC SITE SHORT FORM

(3/12)

UTAH OFFICE OF HISTORIC PRESERVATION
For Section 106 Review Only
(Do not use this form to record archeological sites)

## 1 IDENTIFICATION

*Name of Property:* M & R Equipment
*Address:* 1620 S. State
*City, County:* Springville, Utah County

*Geographical Data (optional):*
*Lat/Long (degr dec.):*
*Geographical Description:*

## 2 EVALUATION

*Evaluation* (select one)

☐ *The property is considered* **Eligible** *at this time because it is already listed in the National Register* **or**

- is at least 50 years old **and** retains its historic integrity (minimal alterations to key features), and has potential significance.

☑ *The property is considered* **Not Eligible** *at this time because it:*

- is less than 50 years old **or** is 50 years or older but there have been major alterations to key features, and is known to have no significance.

## 3 DOCUMENTATION

*Required*
☑ *Upload two photos*
☑ *site sketch map (optional)*
☐ *other:*

*Research Sources (optional, check all sources consulted, whether useful or not)*
☑ *abstract of title*
☑ *tax card & photo*
☐ *building permit*
☐ *Sanborn Maps*
☑ *other:*

## 4 ARCHITECTURAL DESCRIPTION AND HISTORY

*Date of Construction:* 1958
*No. of Stories:* one
*Use*
*Building Type:* Residence
*Building Style:* Modern (1930-1950s)
*Original Use:* Commerical/Trac
*Foundation Material:* concrete
*Wall Material(s):* Concrete
*Current Use:* Commerical/Trac
*Additions:* ☐ *none* ☐ *minor* ☑ *major (describe below)*
*Alterations:* ☑ *none* ☐ *minor* ☐ *major (describe below)*
*No. of contributing outbuildings and/or structures*: 3
*No. of non-contributing outbuildings and/or structures:* 3

*Briefly describe the original building, any major additions or alterations and their dates, and associated outbuildings and structures. Also provide a brief history of the building's construction and use (if known). Use continuation sheets as necessary for additional photos and text.*

When Lee Miner and his wife Harriet quit the dairy business in 1958, Lee, along with Reed Rigtrup, opened a Case Equipment sales business on the corner of 1600 South and State Street. They called the business M&R Equipment and although Rigtrup left the business in 1960 when Miner's son David Lee Miner became a partner, the name remained and the business is still run by members of the Miner family. The original sales building is constructed of concrete block and remains as it was in 1958 except for two large additions (c.1975 and c.2000) at the rear of the building. Other structures on the property include a farm structure remaining from the Miner's Dairy and three storage structures west of the business on 1600 North.

## 5 PROPOSED ACTION

*Describe the impending action (e.g., road widening, rehabilitation, alteration, demolition). Use continuation sheets as necessary for additional photos and text.*

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*Form completed by:* Nancy Calkins/Horrocks Engineers for UDOT
*Date (mo/yr)*: Nov 2018

**6 PHOTO UPLOAD**

*Upload your images. Please upload a current and clear image.*
*If you have additional documents, such as a site sketch map or project area map, please submit those separately as a pdf.*

M&R Equipment
**1620 S. State Street**
Springville, Utah County

Utah AGRC
I-15; Springville/Spanish Fork Interchange Study
PIN 15153 Project No. S-I15-6(239)259

M&R Equipment
**1620 S. State Street**
Springville, Utah County

Utah AGRC
I-15; Springville/Spanish Fork Interchange Study
PIN 15153 Project No. S-I15-6(239)259

# HISTORIC SITE SHORT FORM

(3/12)

UTAH OFFICE OF HISTORIC PRESERVATION
For Section 106 Review Only
(Do not use this form to record archeological sites)

## 1 IDENTIFICATION

*Name of Property:* Lee and Harriett Miner House
*Address:* 1680 S. State
*City, County:* Springville, Utah County

*Geographical Data (optional):*
*Lat/Long (degr dec.):*
*Geographical Description:*

## 2 EVALUATION

*Evaluation* (select one)

☑ *The property is considered* **Eligible** *at this time because it is already listed in the National Register* **or**

- is at least 50 years old **and** retains its historic integrity (minimal alterations to key features), and has potential significance.

☐ *The property is considered* **Not Eligible** *at this time because it:*

- is less than 50 years old **or** is 50 years or older but there have been major alterations to key features, and is known to have no significance.

## 3 DOCUMENTATION

*Required*
☑ *Upload two photos*
☑ *site sketch map (optional)*
☐ *other:*

*Research Sources (optional, check all sources consulted, whether useful or not)*
☑ *abstract of title*
☑ *tax card & photo*
☐ *building permit*
☐ *Sanborn Maps*
☑ *other:*

## 4 ARCHITECTURAL DESCRIPTION AND HISTORY

*Date of Construction:* 1936
*No. of Stories:* one
*Use*
*Building Type:* Residence
*Building Style:* Early 20th Cent. (1900-1935)
*Original Use:* Residential
*Foundation Material:* concrete
*Wall Material(s):* Other
*Current Use:* Residential
*Additions:* ☐ *none* ☑ *minor* ☐ *major (describe below)*
*Alterations:* ☐ *none* ☑ *minor* ☐ *major (describe below)*
*No. of contributing outbuildings and/or structures*: 1
*No. of non-contributing outbuildings and/or structures:* 0

*Briefly describe the original building, any major additions or alterations and their dates, and associated outbuildings and structures. Also provide a brief history of the building's construction and use (if known). Use continuation sheets as necessary for additional photos and text.*

This Period Cottage style house was constructed by Lee and Harriett Miner, first as a basement house in 1936 and later adding the upper floor two years later. The Miners hand dug the basement in the evening hours after work and moved into the concrete basement when it was completed. When they constructed the upper floor, Lee was busy with their dairy business which he started in 1938 as well, so Harriet did all the lath and plaster work both on the interior and exterior of the house. The Miners raised thier four children here, all working together to process and distribute the milk from their dairy herd. When they quit the dairy business after 20 years, Lee opened and equipment business just north of this house. Alterations to the house include vinyl windows and porch awning on both the front and a shed addition at the rear of the house. The historic outbuildings on the property include a garage and three agricultural buildings from the dairy.

## 5 PROPOSED ACTION

*Describe the impending action (e.g., road widening, rehabilitation, alteration, demolition). Use continuation sheets as necessary for additional photos and text.*

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*Form completed by:* Nancy Calkins/Horrocks Engineers for UDOT
*Date (mo/yr)*: Nov 2018

**6 PHOTO UPLOAD**

*Upload your images. Please upload a current and clear image.*
*If you have additional documents, such as a site sketch map or project area map, please submit those separately as a pdf.*

Lee and Harriett Miner House
**1680 S. State Street**
Springville, Utah County

Utah AGRC
I-15; Springville/Spanish Fork Interchange Study
PIN 15153 Project No. S-I15-6(239)259

Lee and Harriett Miner House
**1680 S. State Street**
Springville, Utah County

Utah AGRC
I-15; Springville/Spanish Fork Interchange Study
PIN 15153 Project No. S-I15-6(239)259

# HISTORIC SITE SHORT FORM

(3/12)

UTAH OFFICE OF HISTORIC PRESERVATION
For Section 106 Review Only
(Do not use this form to record archeological sites)

## 1 IDENTIFICATION

*Name of Property:* Les and Hilda Hardy House
*Address:* 1700 S. State
*City, County:* Springville, Utah County

*Geographical Data (optional):*
*Lat/Long (degr dec.):*
*Geographical Description:*

## 2 EVALUATION

*Evaluation* (select one)

☑ *The property is considered* **Eligible** *at this time because it is already listed in the National Register* **or**

- is at least 50 years old **and** retains its historic integrity (minimal alterations to key features), and has potential significance.

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## 3 DOCUMENTATION

*Required*
☑ *Upload two photos*
☑ *site sketch map (optional)*
☐ *other:*

*Research Sources (optional, check all sources consulted, whether useful or not)*
☑ *abstract of title*
☑ *tax card & photo*
☐ *building permit*
☐ *Sanborn Maps*
☑ *other:*

## 4 ARCHITECTURAL DESCRIPTION AND HISTORY

*Date of Construction:* 1971
*No. of Stories:* one
*Use*
*Building Type:* Residence- Late 20th Cent.
*Building Style:* Modern (1950-1970s)
*Original Use:* Residential
*Foundation Material:* concrete
*Wall Material(s):* Brick
*Current Use:* Residential
*Additions:* ☑ *none* ☐ *minor* ☐ *major (describe below)*
*Alterations:* ☑ *none* ☐ *minor* ☐ *major (describe below)*
*No. of contributing outbuildings and/or structures*: 0
*No. of non-contributing outbuildings and/or structures:* 3

*Briefly describe the original building, any major additions or alterations and their dates, and associated outbuildings and structures. Also provide a brief history of the building's construction and use (if known). Use continuation sheets as necessary for additional photos and text.*

This Ranch with Garage-type house was constructed for Les and Hilda Hardy on land adjacent to their business, Les Hardy and Sons Meat Packing located through the block on 1600 South. The house was constructed of striated brick and wood sheet and retains the original aluminum slider windows. The Hardys purchased this and the business property from Lee and Harriet Miner (next door) in the late 1950s after the Miners quit the dairy business. The Hardys moved from the home after they sold their business in 1994 but retained it as a rental. Their heirs sold the home earlier this year.

## 5 PROPOSED ACTION

*Describe the impending action (e.g., road widening, rehabilitation, alteration, demolition). Use continuation sheets as necessary for additional photos and text.*

The Utah Department of Transportation (UDOT) has initiated an environmental study regarding improvements to Interstate 15 (I-15) at milepost 258 in Utah County. The project will construct a grade-separated interchange at milepost 258 (1600 South in Springville), which currently has an overpass with no connection to I-15.

The project would include construction of on- and off-ramps, possible reconstruction of replacement of the overpass structure, and improvements to 1600 South between Main Street to the west and State Highway 51 (SR-51) to the east.

*Form completed by:* Nancy Calkins/Horrocks Engineers for UDOT
*Date (mo/yr)*: Nov 2018

**6 PHOTO UPLOAD**

*Upload your images. Please upload a current and clear image.*
*If you have additional documents, such as a site sketch map or project area map, please submit those separately as a pdf.*

Les and Hilda Hardy House
**1700 S. State Street**
Springville, Utah County

Utah AGRC
I-15; Springville/Spanish Fork Interchange Study
PIN 15153 Project No. S-I15-6(239)259

Les and Hilda Hardy House
**1700 S. State Street**
Springville, Utah County

Utah AGRC
I-15; Springville/Spanish Fork Interchange Study
PIN 15153 Project No. S-I15-6(239)259

# HISTORIC SITE SHORT FORM

(3/12)

UTAH OFFICE OF HISTORIC PRESERVATION
For Section 106 Review Only
(Do not use this form to record archeological sites)

## 1 IDENTIFICATION

*Name of Property:* Clyde B. and Donna Miner House
*Address:* 1785 S. State
*City, County:* Springville, Utah County

*Geographical Data (optional):*
*Lat/Long (degr dec.):*
*Geographical Description:*

## 2 EVALUATION

*Evaluation* (select one)

☑ *The property is considered* **Eligible** *at this time because it is already listed in the National Register* **or**

- is at least 50 years old **and** retains its historic integrity (minimal alterations to key features), and has potential significance.

☐ *The property is considered* **Not Eligible** *at this time because it:*

- is less than 50 years old **or** is 50 years or older but there have been major alterations to key features, and is known to have no significance.

## 3 DOCUMENTATION

*Required*
☑ *Upload two photos*
☑ *site sketch map (optional)*
☐ *other:*

*Research Sources (optional, check all sources consulted, whether useful or not)*
☑ *abstract of title*
☑ *tax card & photo*
☐ *building permit*
☐ *Sanborn Maps*
☑ *other:*

## 4 ARCHITECTURAL DESCRIPTION AND HISTORY

*Date of Construction:* 1957
*No. of Stories:* one
*Use*
*Building Type:* Residence- Late 20th Cent.
*Building Style:* Modern (1950-1960s)
*Original Use:* Residential
*Foundation Material:* concrete
*Wall Material(s):* Brick
*Current Use:* Residential
*Additions:* ☐ *none* ☑ *minor* ☐ *major (describe below)*
*Alterations:* ☑ *none* ☐ *minor* ☐ *major (describe below)*
*No. of contributing outbuildings and/or structures*: 0
*No. of non-contributing outbuildings and/or structures:* 0

*Briefly describe the original building, any major additions or alterations and their dates, and associated outbuildings and structures. Also provide a brief history of the building's construction and use (if known). Use continuation sheets as necessary for additional photos and text.*

This Ranch/Rambler type house was constructed for Clyde and Donna Miner on family farmland shortly after Clyde's father died in 1957. The house was constructed of striated brick and retains the original materials including the aluminum slider windows. A carport has been added to the south elevation of the house, but is visible in aerial images prior to 1972. The detached garage southeast of the house was constructed of concrete block in 1960. The Miners sold the home to their daughter Debra Kay Johnson and her husband Kurt in 1984, who sold the home to the current owners, Brad and Tina Nusink in 1992 (Brad's mother is Rada Miner, a niece of the original owners.)

## 5 PROPOSED ACTION

*Describe the impending action (e.g., road widening, rehabilitation, alteration, demolition). Use continuation sheets as necessary for additional photos and text.*

The Utah Department of Transportation (UDOT) has initiated an environmental study regarding improvements to Interstate 15 (I-15) at milepost 258 in Utah County. The project will construct a grade-separated interchange at milepost 258 (1600 South in Springville), which currently has an overpass with no connection to I-15.

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*Form completed by:* Nancy Calkins/Horrocks Engineers for UDOT
*Date (mo/yr)*: Nov 2018

**6 PHOTO UPLOAD**

*Upload your images. Please upload a current and clear image.*
*If you have additional documents, such as a site sketch map or project area map, please submit those separately as a pdf.*

Clyde and Donna Miner House
**1785 S. State Street**
Springville, Utah County

Utah AGRC
I-15; Springville/Spanish Fork Interchange Study
PIN 15153 Project No. S-I15-6(239)259

Clyde and Donna Miner House
**1785 S. State Street**
Springville, Utah County

Utah AGRC
I-15; Springville/Spanish Fork Interchange Study
PIN 15153 Project No. S-I15-6(239)259

# HISTORIC SITE SHORT FORM

(3/12)

UTAH OFFICE OF HISTORIC PRESERVATION
For Section 106 Review Only
(Do not use this form to record archeological sites)

## 1 IDENTIFICATION

*Name of Property:* LaMar's Cafe/T-Bone Restaurant
*Address:* 1695 S. State
*City, County:* Springville, Utah County

*Geographical Data (optional):*
*Lat/Long (degr dec.):*
*Geographical Description:*

## 2 EVALUATION

*Evaluation* (select one)

☐ *The property is considered* **Eligible** *at this time because it is already listed in the National Register* **or**

- is at least 50 years old **and** retains its historic integrity (minimal alterations to key features), and has potential significance.

☑ *The property is considered* **Not Eligible** *at this time because it:*

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## 3 DOCUMENTATION

*Required*
☑ *Upload two photos*
☑ *site sketch map (optional)*
☐ *other:*

*Research Sources (optional, check all sources consulted, whether useful or not)*
☑ *abstract of title*
☑ *tax card & photo*
☐ *building permit*
☐ *Sanborn Maps*
☑ *other:*

## 4 ARCHITECTURAL DESCRIPTION AND HISTORY

*Date of Construction:* 1947
*No. of Stories:* one
*Use*
*Building Type:* Commerical/Public Building
*Building Style:* Modern (1930-1950s)
*Original Use:* Commerical/Trac
*Foundation Material:* concrete
*Wall Material(s):* Concrete
*Current Use:* Commerical/Trac
*Additions:* ☐ *none* ☐ *minor* ☑ *major (describe below)*
*Alterations:* ☐ *none* ☐ *minor* ☑ *major (describe below)*
*No. of contributing outbuildings and/or structures:* 0
*No. of non-contributing outbuildings and/or structures:* 0

*Briefly describe the original building, any major additions or alterations and their dates, and associated outbuildings and structures. Also provide a brief history of the building's construction and use (if known). Use continuation sheets as necessary for additional photos and text.*

This building was constructed of concrete block as LaMar's Cafe by LaMar and Marjorie Miner in 1947 on their family farmland at the intersection of Main Street and the State Highway. The cafe was a popular sit-down restaurant with a drive-up window in the rear (north) for auto patrons. The Miners ran the cafe until 1964 when it was sold and renamed Brown's Cafe. In 1967 the Browns added a large dining room on the east elevation, nearly doubling the size of the cafe. In 1977 it was again sold and renamed the T-Bone Cafe after which time the drive through on the north elevation was enclosed the full width of the building and a vestibule was constructed on the southeast corner of the building. More recently the name has been changed to T-Bone Restaurant and the building has been clad in synthetic stucco and imitation stone.

## 5 PROPOSED ACTION

*Describe the impending action (e.g., road widening, rehabilitation, alteration, demolition). Use continuation sheets as necessary for additional photos and text.*

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*Form completed by:* Nancy Calkins/Horrocks Engineers for UDOT
*Date (mo/yr):* Nov 2018

**6 PHOTO UPLOAD**

*Upload your images. Please upload a current and clear image.*
*If you have additional documents, such as a site sketch map or project area map, please submit those separately as a pdf.*

LeMar's Café/T-Bone Restaurant
**1695 S. State Street**
Springville, Utah County

Utah AGRC
I-15; Springville/Spanish Fork Interchange Study
PIN 15153 Project No. S-I15-6(239)259

LeMar's Café/T-Bone Restaurant
**1695 S. State Street**
Springville, Utah County

Utah AGRC
I-15; Springville/Spanish Fork Interchange Study
PIN 15153 Project No. S-I15-6(239)259

# HISTORIC SITE SHORT FORM

(3/12)

UTAH OFFICE OF HISTORIC PRESERVATION
For Section 106 Review Only
(Do not use this form to record archeological sites)

## 1 IDENTIFICATION

*Name of Property:* /Anything Auto
*Address:* 1689 S. State
*City, County:* Springville, Utah County

*Geographical Data (optional):*
*Lat/Long (degr dec.):*
*Geographical Description:*

## 2 EVALUATION

*Evaluation* (select one)

☑ *The property is considered* **Eligible** *at this time because it is already listed in the National Register* **or**

- is at least 50 years old **and** retains its historic integrity (minimal alterations to key features), and has potential significance.

☐ *The property is considered* **Not Eligible** *at this time because it:*

- is less than 50 years old **or** is 50 years or older but there have been major alterations to key features, and is known to have no significance.

## 3 DOCUMENTATION

*Required*
☑ *Upload two photos*
☑ *site sketch map (optional)*
☐ *other:*

*Research Sources (optional, check all sources consulted, whether useful or not)*
☑ *abstract of title*
☑ *tax card & photo*
☐ *building permit*
☐ *Sanborn Maps*
☑ *other:*

## 4 ARCHITECTURAL DESCRIPTION AND HISTORY

*Date of Construction:* 1973
*No. of Stories:* one
*Use*
*Building Type:* Commerical/Public Building
*Building Style:* Late 20th Cent. (1960+)
*Original Use:* Commerical/Trac
*Foundation Material:* concrete
*Wall Material(s):* Metal (structural)
*Current Use:* Commerical/Trac
*Additions:* ☑ *none* ☐ *minor* ☐ *major (describe below)*
*Alterations:* ☑ *none* ☐ *minor* ☐ *major (describe below)*
*No. of contributing outbuildings and/or structures*: 0
*No. of non-contributing outbuildings and/or structures:* 0

*Briefly describe the original building, any major additions or alterations and their dates, and associated outbuildings and structures. Also provide a brief history of the building's construction and use (if known). Use continuation sheets as necessary for additional photos and text.*

This service bay business was constructed of steel in 1973 and has had no alterations since that time except having been painted recently.

## 5 PROPOSED ACTION

*Describe the impending action (e.g., road widening, rehabilitation, alteration, demolition). Use continuation sheets as necessary for additional photos and text.*

The Utah Department of Transportation (UDOT) has initiated an environmental study regarding improvements to Interstate 15 (I-15) at milepost 258 in Utah County. The project will construct a grade-separated interchange at milepost 258 (1600 South in Springville), which currently has an overpass with no connection to I-15.

The project would include construction of on- and off-ramps, possible reconstruction of replacement of the overpass structure, and improvements to 1600 South between Main Street to the west and State Highway 51 (SR-51) to the east.

*Form completed by:* Nancy Calkins/Horrocks Engineers for UDOT
*Date (mo/yr)*: Nov 2018

**6 PHOTO UPLOAD**

*Upload your images. Please upload a current and clear image.*
*If you have additional documents, such as a site sketch map or project area map, please submit those separately as a pdf.*

/Anything Auto
**1689 S. State Street**
Springville, Utah County

Utah AGRC
I-15; Springville/Spanish Fork Interchange Study
PIN 15153 Project No. S-I15-6(239)259

/Anything Auto
**1689 S. State Street**
Springville, Utah County

Utah AGRC
I-15; Springville/Spanish Fork Interchange Study
PIN 15153 Project No. S-I15-6(239)259

# HISTORIC SITE SHORT FORM

(3/12)

UTAH OFFICE OF HISTORIC PRESERVATION
For Section 106 Review Only
(Do not use this form to record archeological sites)

## 1 IDENTIFICATION

*Name of Property:* Miner Storage
*Address:* 1615 S. State
*City, County:* Springville, Utah County

*Geographical Data (optional):*
*Lat/Long (degr dec.):*
*Geographical Description:*

## 2 EVALUATION

*Evaluation* (select one)

☑ *The property is considered* **Eligible** *at this time because it is already listed in the National Register* **or**

- is at least 50 years old **and** retains its historic integrity (minimal alterations to key features), and has potential significance.

☐ *The property is considered* **Not Eligible** *at this time because it:*

- is less than 50 years old **or** is 50 years or older but there have been major alterations to key features, and is known to have no significance.

## 3 DOCUMENTATION

*Required*
☑ *Upload two photos*
☑ *site sketch map (optional)*
☐ *other:*

*Research Sources (optional, check all sources consulted, whether useful or not)*
☑ *abstract of title*
☑ *tax card & photo*
☐ *building permit*
☐ *Sanborn Maps*
☑ *other:*

## 4 ARCHITECTURAL DESCRIPTION AND HISTORY

*Date of Construction:* 1972
*No. of Stories:* one
*Use*
*Building Type:* Commerical/Public Building
*Building Style:* Late 20th Cent. (1960+)
*Original Use:* Commerical/Trac
*Foundation Material:*
*Wall Material(s):* Veneer
*Current Use:* Commerical/Trac
*Additions:* ☑ *none* ☐ *minor* ☐ *major (describe below)*
*Alterations:* ☑ *none* ☐ *minor* ☐ *major (describe below)*
*No. of contributing outbuildings and/or structures*: 0
*No. of non-contributing outbuildings and/or structures:* 0

*Briefly describe the original building, any major additions or alterations and their dates, and associated outbuildings and structures. Also provide a brief history of the building's construction and use (if known). Use continuation sheets as necessary for additional photos and text.*

This concrete block building is a 17-unit storage facility constructed by David Lee Miner, owner (at that time) of M&R Equipment across the road at 1620 S. State. This facility was needed to house equipment either for the business or private owners (farmers.) There are three more storage unit buildings on the west end of the M&R property. There have been no alterations to this building since its construction in 1972.

## 5 PROPOSED ACTION

*Describe the impending action (e.g., road widening, rehabilitation, alteration, demolition). Use continuation sheets as necessary for additional photos and text.*

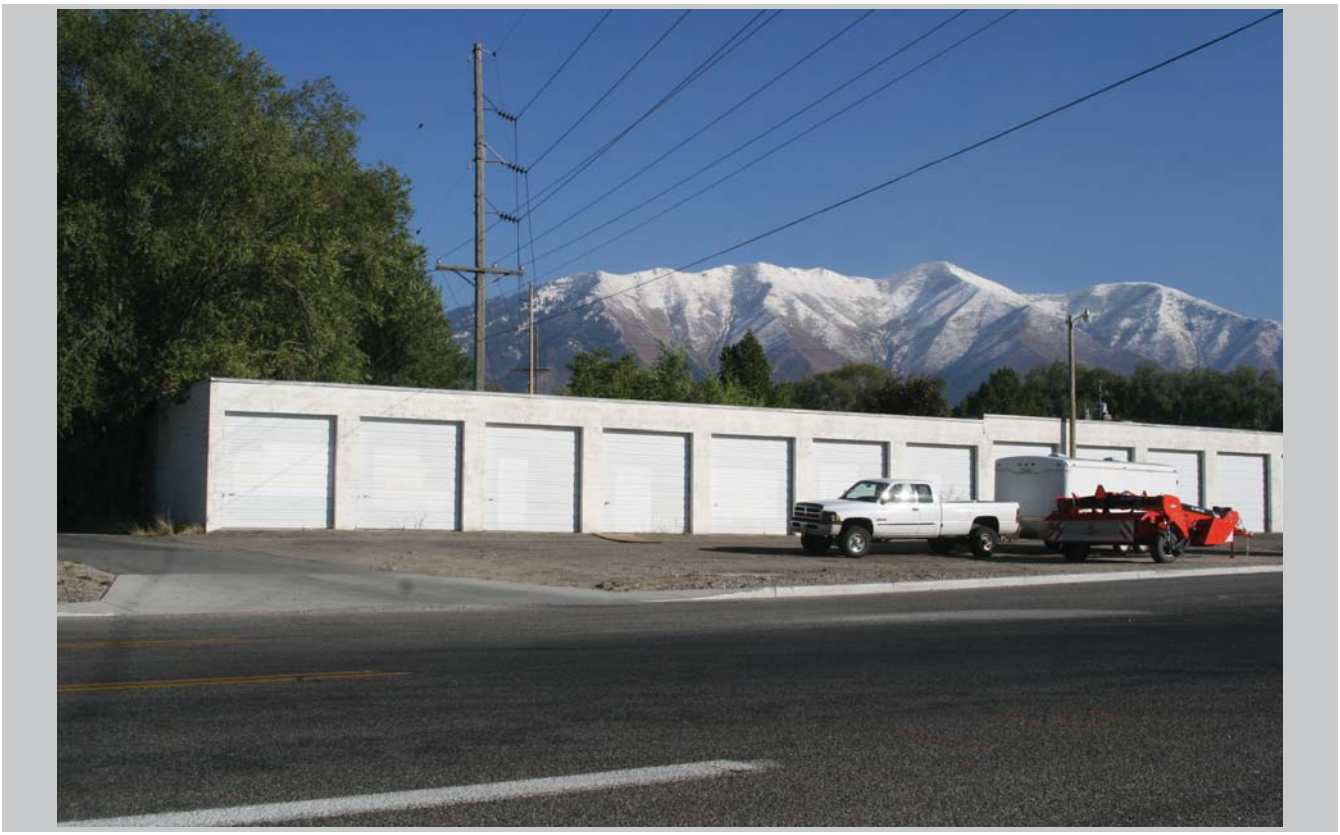
The Utah Department of Transportation (UDOT) has initiated an environmental study regarding improvements to Interstate 15 (I-15) at milepost 258 in Utah County. The project will construct a grade-separated interchange at milepost 258 (1600 South in Springville), which currently has an overpass with no connection to I-15.

The project would include construction of on- and off-ramps, possible reconstruction of replacement of the overpass structure, and improvements to 1600 South between Main Street to the west and State Highway 51 (SR-51) to the east.

*Form completed by:* Nancy Calkins/Horrocks Engineers for UDOT
*Date (mo/yr)*: Nov 2018

**6 PHOTO UPLOAD**

*Upload your images. Please upload a current and clear image.*
*If you have additional documents, such as a site sketch map or project area map, please submit those separately as a pdf.*



Utah AGRC
I-15; Springville/Spanish Fork Interchange Study
PIN 15153 Project No. S-I15-6(239)259

Miner Storage
**1615 S. State Street**
Springville, Utah County

Miner Storage
**1615 S. State Street**
Springville, Utah County

Utah AGRC
I-15; Springville/Spanish Fork Interchange Study
PIN 15153 Project No. S-I15-6(239)259

# HISTORIC SITE SHORT FORM

(3/12)

UTAH OFFICE OF HISTORIC PRESERVATION
For Section 106 Review Only
(Do not use this form to record archeological sites)

## 1 IDENTIFICATION

*Name of Property:* Miner Farms
*Address:* 1555 S. State
*City, County:* Springville, Utah County

*Geographical Data (optional):*
*Lat/Long (degr dec.):*
*Geographical Description:*

## 2 EVALUATION

*Evaluation* (select one)

☐ *The property is considered* **Eligible** *at this time because it is already listed in the National Register* **or**

- is at least 50 years old **and** retains its historic integrity (minimal alterations to key features), and has potential significance.

☑ *The property is considered* **Not Eligible** *at this time because it:*

- is less than 50 years old **or** is 50 years or older but there have been major alterations to key features, and is known to have no significance.

## 3 DOCUMENTATION

*Required*
☑ *Upload two photos*
☑ *site sketch map (optional)*
☐ *other:*

*Research Sources (optional, check all sources consulted, whether useful or not)*
☑ *abstract of title*
☑ *tax card & photo*
☐ *building permit*
☐ *Sanborn Maps*
☑ *other:*

## 4 ARCHITECTURAL DESCRIPTION AND HISTORY

*Date of Construction:* 1970
*No. of Stories:* one
*Use*
*Building Type:* Agricultural- Misc.
*Building Style:* Other
*Original Use:* Agricultural
*Foundation Material:*
*Wall Material(s):* Veneer
*Current Use:* Agricultural
*Additions:* ☑ *none* ☐ *minor* ☐ *major (describe below)*
*Alterations:* ☑ *none* ☐ *minor* ☐ *major (describe below)*
*No. of contributing outbuildings and/or structures:* 0
*No. of non-contributing outbuildings and/or structures:* 9

*Briefly describe the original building, any major additions or alterations and their dates, and associated outbuildings and structures. Also provide a brief history of the building's construction and use (if known). Use continuation sheets as necessary for additional photos and text.*

According to the Utah County Assessor, this property has a total of ten farm structures constructed between 1970 and 2003. The only historic structure is a loafing shed constructed of wood in 1970. There is no residence or primary agricultural building associated with this property. The farm buildings in the rear of the photographs are on an adjacent property.

## 5 PROPOSED ACTION

*Describe the impending action (e.g., road widening, rehabilitation, alteration, demolition). Use continuation sheets as necessary for additional photos and text.*

The Utah Department of Transportation (UDOT) has initiated an environmental study regarding improvements to Interstate 15 (I-15) at milepost 258 in Utah County. The project will construct a grade-separated interchange at milepost 258 (1600 South in Springville), which currently has an overpass with no connection to I-15.

The project would include construction of on- and off-ramps, possible reconstruction of replacement of the overpass structure, and improvements to 1600 South between Main Street to the west and State Highway 51 (SR-51) to the east.

*Form completed by:* Nancy Calkins/Horrocks Engineers for UDOT
*Date (mo/yr):* Nov 2018

**6 PHOTO UPLOAD**

*Upload your images. Please upload a current and clear image.*
*If you have additional documents, such as a site sketch map or project area map, please submit those separately as a pdf.*

Miner Farms
**1615 S. State Street**
Springville, Utah County

Utah AGRC
I-15; Springville/Spanish Fork Interchange Study
PIN 15153 Project No. S-I15-6(239)259

Miner Farms
**1615 S. State Street**
Springville, Utah County

Utah AGRC
I-15; Springville/Spanish Fork Interchange Study
PIN 15153 Project No. S-I15-6(239)259

I-15 Interchange
ENVIRONMENTAL ASSESSMENT
Springville/Spanish Fork

# AQUATIC RESOURCES DELINEATION REPORT

**Project No. F-I15-6(239)259**
**Pin: 15153**
**August 2020**

The environmental review, consultation, and other actions required by applicable federal environmental laws for this project are being or have been carried out by UDOT pursuant to 23 USC 327 and a Memorandum of Understanding dated January 17,2017, and executed by FHWA and UDOT.

# EXECUTIVE SUMMARY

Horrocks Engineers has prepared this Aquatic Resources Delineation Report in support of the Utah Department of Transportation's (UDOT) proposal to make improvements to Interstate 15 (I-15) at milepost 258 in Utah County.

The aquatic resources delineation was completed in accordance with the U.S. Army Corps of Engineers' (USACE) *1987 Wetland Delineation Manual* (USACE 1987) and the *Regional Supplement: Arid West Region Version 2.0* (USACE 2008), and stream channels were delineated by using the USACE delineation manual, *A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States* (Lichvar and McColley 2008).

Eight wetlands and five other WoUS, totaling 8.62-acres, were identified within the 300.8-acre delineation study area. All wetlands are classified as Palustrine Emergent wetlands. The identified waters of the U.S. are associated with Dry Creek, a perennial stream, and man-made irrigation features.

## ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| MP | Milepost |
| NRCS | Natural Resources Conservation Service |
| NWI | National Wetland Inventory |
| OHWM | Ordinary high water mark |
| PEM | Palustrine emergent |
| R5UBH | Riverine, Unknown Perennial, Unconsolidated Bottom, Permanently Flooded |
| R4SBC | Riverine, Intermittent, Streambed, Seasonally Flooded |
| UDOT | Utah Department of Transportation |
| USACE | U.S. Army Corps of Engineers |
| WoUS | Waters of the U.S. |

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## 1.1 INTRODUCTION

The purpose of this report is to identify and map potential wetlands and waters of the U.S. (WoUS) in the delineation study area. Impacts to these features from the proposed improvements, as well as strategies for avoidance and minimization, will need to be considered. See Appendix B for a project location map. Section 404 of the Clean Water Act regulates the discharge of dredged or fill material into navigable waters, which has been defined to include tributaries and adjacent wetlands. The Corps will make final determinations of wetland boundaries and jurisdictions as waters of the U.S. All wetlands are considered protected by the Federal Highway Administration (FHWA) under Executive Order (EO) 11990.

### 1.1.1 Contact Information for the Applicant and Owner

The applicant and owner for this project are the same:

Utah Department of Transportation, Region 3
Darren Bunker, PE
658 N 1500 W
Orem, UT 84057
Ph. (385) 228-5271
dbunker@utah.gov

### 1.1.2 Contact Information for Aquatic Resources Delineation Consultant

Horrocks Engineers
Terry Johnson, PLA
4905 South 1500 West, Suite 100
Riverdale, UT 84405
Ph. (801) 633-1327
terryj@horrocks.com

Horrocks Engineers
Nathan Clarke
2162 West Grove Parkway, Suite 400
Pleasant Grove, UT 84062
Ph. (801) 763-5100
nathanc@horrocks.com

### 1.1.3 Site Description

The approximately 300.8-acre delineation study area is located within the Interior Deserts subregion of the Arid West, approximately 3.5 miles southeast of Utah Lake. The elevation of the study area varies from 4500’ to 4600’.

## 1.2 PROJECT LOCATION

The project is located in Utah County, Utah in Section 4, 5, 6, 7, 8, 9 and 18 of Township 8 South, Range 3 East and Section 1 and 12 of Township 8 South, Range 2 East. The coordinates for the beginning and end of the project are Lat. 40.15756944 and Lng. -111.64666667 and Lat. 40.12500833 and Lng. -111.65500000 respectively.

To arrive at the delineation study area from Salt Lake City, head south on I-15 for 46 miles to reach the northern end of the project (see Appendix A for maps). The delineation results may be field-verified by Corps’ personnel accompanied by a UDOT representative without written permission from the property owners.

## 1.3 AQUATIC RESOURCES DELINEATION METHODOLOGY

### 1.3.1 Delineation Methodology for Wetlands

The aquatic resources delineation was completed in accordance with the U.S. Army Corps of Engineers' (USACE) *1987 Wetland Delineation Manual* (USACE 1987) and *the Regional Supplement: Arid West Region Version 2.0* (USACE 2008). All potential wetland areas were verified for wetland indicators as established in the above delineation manuals. The following procedures were implemented at each sample point to determine presence of wetland indicators, and the collected information was recorded on Arid West Supplement V2 Data Forms. Photographs were also taken to document the sample point (See Appendix C for photos).

#### Hydrophytic Vegetation

All plant species within a five-foot radius area of the sample point were recorded. The percent of relative cover for each species was determined by estimating aerial cover. The indicator status of each species was determined by using the *2016 National Wetland Plant List - Arid West* (USACE 2016). Vegetation species comprising of at least twenty (20) percent of the total aerial cover in its stratum were considered dominant, following the guidelines of the USACE 50/20 rule. If more than fifty (50) percent of the dominant plant species had an indicator status of obligate wetland species (OBL), facultative wetland species (FACW), or facultative species (FAC), the sample point met the hydrophytic vegetation parameter.

#### Hydric Soils

At the sample point, a soil pit was dug to a minimum depth of 18 inches to assess soil characteristics and water conditions. A profile of the soil pit was used to determine soil color, texture and moisture at different depths within the soil profile. Colors of the soil profile and any redox features were identified by comparing a moistened soil sample to the Munsell® Soil Color Charts (Munsell® 2000). Soil texture and moisture were determined by feeling the soil samples. If the soil characteristics met one of the primary hydric soil indicators or two or more secondary hydric soil indicators, identified in the *Arid West Regional Supplement* (USACE 2008) and the *Field Indicators of Hydric Soils in the U.S. Version 8.1* (USDA 2010), the sample point met the hydric soils parameter.

#### Wetland Hydrology

The soil pits were also examined for the presence or absence of hydrologic indicators. These hydrologic indicators are described in the Arid West Regional Supplement. If it was determined that at least one primary hydrologic indicator or two or more secondary hydrologic indicators were present, the sample point met the hydrologic parameter.

#### Wetland Boundary Determination Procedure

Sample points that met all three parameters, hydrophytic vegetation, hydric soils, and wetland hydrology were classified as occurring in a wetland. A second sample point, located in the adjacent upland, was then documented for the presence of the three indicators. If the point did not meet all three parameters, the point was classified as occurring in upland. The next step was to define the wetland boundary occurring between the wetland sample point and the upland sample point. Boundaries were based on information gathered from the two sample points and observable changes in elevation and plant communities. Using a hand-held Trimble GeoExplorer XT global positioning system receiver, the wetland boundary

and sample points were surveyed and data was downloaded into ArcMAP. The data was then used to produce a map that shows delineated wetland boundaries and sample point locations. Acreages for each wetland polygon were included on the map, and the Cowardin Classification System (Cowardin et al. 1979) was used to designate the wetland type.

### 1.3.2 Delineation Methodology for Stream Channels

Stream channels were delineated by using the USACE delineation manual, *A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States* (Lichvar and McColley 2008). These stream channels within the project area were identified, and the OHWM for these waters was surveyed using a hand-held Trimble GeoExplorer XT global positioning system receiver. The survey data was downloaded into ArcMAP to produce a map that depicts the delineated WoUS. The acreage for each WoUS within the project area was included on the map and the Cowardin Classification System was used to designate the WoUS type.

## 1.4 EXISTING CONDITIONS

### 1.4.1 Landscape Setting

The 300.8-acre study area is located on both sides of I-15 between 400 S in Springville and Main St. in Spanish Fork, and along both sides of 2700N/1600S between Main St. and State Rd. The land use surrounding the study area is a mix of industrial, commercial, residential, and undeveloped/agricultural land.

The study area lies approximately 3.5 miles southeast of Utah Lake, a Navigable WoUS. More detailed information regarding the site's existing vegetation, soils, and hydrology is included in the sections below.

### 1.4.2 Field Conditions

The delineation field work was conducted by Terry Johnson and Nathan Clarke, of Horrocks Engineers on September 13 and 19, 2018 and follow-up visits on October 19, 2018 and on June 4, 2020 by Nathan Clarke. The nearby weather station in Spanish Fork, UT, indicates that the area on average receives 21.88 inches of annual precipitation (U.S. climate data). Weather data shows the months of June, July, and August had 1.06 inches less than the average precipitation for this area. In September, the area did not receive any precipitation. In the two weeks leading up to the follow up visit in October, the area received 3.09 inches of precipitation, which is almost an inch above the month's average. On the days of the visits, the temperatures were 81°F, 87°F, 59°F, and 91°F respectfully, which were all close to the average for this area.

## 1.5 AQUATIC RESOURCES

### 1.5.1 Overview

Eight wetlands and five other WoUS, totaling 8.62-acres, were identified within the delineation study area. Many of the wetlands identified within the study are associated with irrigation features and natural hydrology sources in the area. Table 1.1 summarizes the delineated features (see Appendix A for maps, Appendix E for data forms, and Appendix C for photos). All WoUS within the study area were identified, documented, and mapped, and most would likely be considered jurisdictional because they are waters that are a tributary

to a navigable waterway or wetlands adjacent to a tributary. Wetlands 1, 2, 4, 6 and 7 would likely be considered non-jurisdictional because they are isolated and lack any downstream connection to a navigable WoUS. Greater information about delineated features is provided in the paragraphs below the table.

Table 1.1 Summary of Delineated Features

| FEATURE NAME | COWARDIN CLASSIFICATION | LOCATION (LAT/LONG) | ACRES | LINEAR FT |
|---|---|---|---|---|
| **Wetlands** | | | | |
| Wetland 1 | PEM | 40.14373047, -111.6477645 | 1.45 | NA |
| Wetland 2 | PEM | 40.14057002, -111.6461939 | 0.08 | NA |
| Wetland 3 | PEM | 40.1441988, -111.652545 | 0.01 | NA |
| Wetland 4a | PEM | 40.144522612, -111.631861 | 0.02 | NA |
| Wetland 4b | PEM | 40.1444619, -111.6321891 | 0.01 | NA |
| Wetland 4c | PEM | 40.1445560, -111.6320725 | 0.01 | NA |
| Wetland 4d | PEM | 40.1448371, -111.6315019 | 0.01 | NA |
| Wetland 4e | PEM | 40.1448340, -111.6317145 | 0.01 | NA |
| Wetland 5 | PEM | 40.144579459, -111.623149 | 0.09 | NA |
| Wetland 6 | PEM | 40.14743003, -111.649215 | 4.9 | NA |
| Wetland 7 | PEM | 40.1445426, -111.6297306 | 0.09 | NA |
| Wetland 8 | PEM | 40.14493156, -111.613133 | 0.23 | NA |
| *Wetland Total* | | | *6.91* | |
| **Other Waters of the U.S.** | | | | |
| Dry Creek | R4SBC | 40.1459724, -111.6548624 | 1.46 | 3,200 |
| Ditch 1 | R4SBC | 40.143840, -111.655265 | 0.17 | 578 |
| Ditch 2 | R4SBC | 40.144286, -111.6359581 | 0.04 | 163 |
| Ditch 3 | R5UBH | 40.144633, -111.628245 | 0.02 | 463 |
| Ditch 4 | R4SBC | 40.144698, -111.620183 | 0.02 | 112 |
| *Other WoUS Total* | | | *1.71* | *4,516* |
| | | | | |
| **TOTAL** | | | **8.62** | **4,516** |

*PEM *(Palustrine Emergent),* R5UBH *(Riverine, Unknown Perennial, Unconsolidated Bottom, Permanently Flooded),* R4SBC *(Riverine, Intermittent, Streambed, Seasonally Flooded).*

## Wetland Features

During the wetland delineation fieldwork, sample points were established in wetland and upland vegetation communities for sampling of vegetation, soils, and hydrology characteristics. 26 sample points were taken to determine the boundaries between wetlands and uplands (See Appendix E for data sheets). Eight of the 26 sample points met the three parameters indicative of wetlands. Table1.2 summarizes the sample point data.

Table 1.2 Wetland Indicators for each Sample Point

| SAMPLE POINT | HYDROPHYTIC VEGETATION PRESENT | HYDRIC SOIL INDICATORS PRESENT | HYDROLOGY INDICATORS PRESENT | IS THE SAMPLE POINT IN A WETLAND? | MAP # (APPENDIX A) |
|---|---|---|---|---|---|
| 1 | Y | Y | Y | Y | 10 |
| 2 | Y | N | N | N | 10 |
| 3 | N | N | N | N | 10 |
| 4 | Y | N | N | N | 3 |
| 5 | Y | N | N | N | 3 |
| 6 | Y | Y | Y | Y | 3 |
| 7 | Y | N | N | N | 3 |
| 8 | Y | N | N | N | 3 |
| 9 | N | N | N | N | 10 |
| 10 | N | N | N | N | 9 |
| 11 | Y | Y | Y | Y | 9 |
| 12 | N | N | N | N | 9 |
| 13 | Y | N | N | N | 11 |
| 14 | Y | Y | Y | Y | 12 |
| 15 | N | N | N | N | 12 |
| 16 | Y | N | N | N | 13 |
| 17 | Y | Y | Y | Y | 13 |
| 18 | Y | N | N | N | 13 |
| 19 | Y | N | Y | N | 14 |
| 20 | Y | Y | Y | Y | 7 |
| 21 | N | N | N | N | 7 |
| 22 | Y | Y | Y | Y | 14 |
| 23 | Y | N | N | N | 14 |
| 24 | Y | Y | Y | Y | 12 |
| 25 | Y | N | N | N | 4 |
| 26 | N | N | N | N | 4 |
| 27 | Y | Y | Y | Y | 7 |
| 28 | N | N | N | N | 7 |

## 1.5.2 Wetlands

### Wetland 1

Wetland 1 is located south of 2700 N on the west side of I-15 and totals 1.45-acres in size. The depression where the wetland lies appears to have been excavated in an upland at one point and is dominated by *Juncus balticus* and *Schoenoplectus pungens.* The soil did meet the indicator of *Depleted Matrix (F3).* The primary hydrology indicators of *Surface Soil Cracks (B6)* and *Biotic Crust (B12)*, as well as the secondary Indicator of *FAC-Neutral Test (D5)* were met. The area receives its hydrology from precipitation and stormwater runnoff from the adjacent roadways. The paired upland pit was located about 4 feet higher in elevation above the

depression and did not exhibit any of the three indicators. Wetland 1 is classified as a palustrine emergent (PEM) wetland. This wetland would likely be considered non-jurisdictional because it is isolated and lacks any connection to Dry Creek.

### Wetland 2

Wetlands 2 is located on the east side of I-15 adjacent to a well in an open field and totals 0.08-acre in size. The wetland is dominated by *Typha latifolia, Juncus balticus*, and *Phalaris arundinacea*, which met the hydrophytic vegetation indicator. The soil did not meet any hydric indicators, which could be due to the area being disturbed from excavating the adjacent ditch. Primary hydrology indicators of *Surface Water (A1)* and *Saturation (A3)* were present, as well as the secondary Indicator of *FAC-Neutral Test (D5)*. The paired upland pit was dominated by hydrophytic vegetation, but did not meet either of the other two parameters. Wetland 2 is classified as a palustrine emergent (PEM) wetland. This wetland recieves its hydrology from the above mentioned well, which is used for irrigation purposes, and would likely be considered non-jurisdictional because it is isolated and lacks any connection to a navigable WoUS.

### Wetland 3

Wetland 3 is located in a small man-made depression south of 2700 N and totals 0.01-acre in size. The wetland is dominated by *Distichlis spicata* and *Eleocharis palustris*, which met the hydrophytic vegetation indicator. The soil did meet the hydric indicator of *Depleted Matrix (F3)*. The primary hydrology indicator of *Saturation (A3)* was present. The paired upland pit was located about 4 feet higher in elevation above the depression and did not exhibit any of the three indicators. Wetland 3 is classified as a palustrine emergent (PEM) wetland, and would likely be considered jurisdictional because it is hydrologically connected to Dry Creek via culvert.

### Wetland 4 Complex

Wetlands 4a, 4b, 4c, 4d, and 4e are located along both sides of the railroad tracks near 1200 W, on the north and south sides of 1600 S. The Wetland 4 complex totals 0.06-acre in size. The wetlands are dominated by *Schoenoplectus acutus*, which met the hydrophytic vegetation indicator. The soil did meet the hydric indicator of *Hydrogen Sulfide (A4)*. The primary hydrology indicators of *High Water Table (A2), Saturation (A3)*, and *Hydrogen Sulfide Odor* were present, as well as the secondary Indicator of *FAC-Neutral Test (D5)*. Hydrology for this feature is likely from a mixture of stormwater runnoff from the adjacent roadway and groundwater. The paired upland pit did not exhibit any of the three indicators. Wetlands 4a-4e are classified as palustrine emergent (PEM) wetlands, and, while there is a connection to Ditch 3, the hydrology source within Wetland 4 (situated within the Railroad ditch) is groundwater or stormwater runoff. Based on the new Navigable Waters Protection Rule (NWPR) effective June 2020 Wetlands 4 may be considered non-jurisdictional.

### Wetland 5

Wetlands 5 is located in a vegetated depression on the south side of 1600 S and totals 0.09-acre in size. The wetland appears to have had a connections to the adjacent waterway (Ditch 3), which has been cut off/filled in recently. The wetland is dominated by *Phragmites australis,* which met the hydrophytic vegetation indicator. The soil did meet the hydric indicators of *Hydrogen Sulfide (A4)* and *1cm Muck (A9)*. Primary hydrology indicators of *High Water Table (A2)*, *Saturation (A3),* and *Hydrogen Sulfide Odor (C1)* were present. Hydrology for this feature appears to primarily come from stormwater runoff from the adjacent roadway. Because there was an obvious wetland boundary due to a steep grade change at the wetland's edge, no paired pit was dug. Wetland 5 is classified as a palustrine emergent (PEM) wetland, and would likely be considered jurisdictional.

### Wetland 6

Wetland 6 is located in an open field on the west side of 350 E, adjacent to a concrete-lined ditch, and is 4.9-acre in size. The dominant plants include *Paspalum dilatatum, Phalaris*

*arundinacea*, and *Typha latifolia*, which met the hydrophytic vegetation indicator. The soil did not meet any hydric indicators (Sample Point 20), however, problematic soil conditions of Moderately to Very Strongly Alkaline Soils may also occur, reducing redox visibility. The secondary hydrology indicators of *Drainage Patterns (B10)* and *FAC-Neutral Test (D5)* were met. The soil was slightly saturated in the upper levels, likely due to precipitation from the previous week. The wetland is flood irrigated (likely with water from Dry Creek) from the concrete-lined ditch located north of Dry Creek. Water from the ditch flows north through the fields and disappears before reaching Dry Creek. The paired upland pit (Sample Point 21) was located in the same field and did not meet any of the three indicators. Wetland 6 is classified as a palustrine emergent (PEM) wetland, and would likely be considered non-jurisdictional because the water from the wetland stops in the field and it lacks a downstream connection to a navigable WoUS.

#### Wetland 7

Wetland 7 is located in a depression in an open field on the south side of 1600 S. The wetland is 0.09-acre in size and is dominated by *Carex praegracilis* and *Beckmannia syzigachne,* which met the hydrophytic vegetation indicator. The soil did meet the criteria for *Depleted Below Dark Surface (A11)*. The primary hydrology Indicator of *Saturation (A3)* was present and some areas of the wetland had surface water, likely due to recent precipitation. Hydrology for this feature is likely due to seasonal precipitation that collects in the depression. Wetlands 7 is classified as a palustrine emergent (PEM) wetland. This wetland would likely be considered non-jurisdictional because it is isolated and lacks any connection to a navigable WoUS.

#### Wetland 8

Wetland 8 is located in a field north of 1600 S near State Rd, and totals 0.23-acre in size. The wetland is dominated by *Distichlis spicata* and *Juncus balticus*. Soil indicates a mixture of upland and hydric soils, possibly from creating the adjacent berm. The soil did not meet the criteria for hydric soils, however, further excavation would likely show more depletion based on the typical characteristics of the McBeth silt loam soil type. Problematic soil conditions of Moderately to Very Strongly Alkaline Soils may also occur. Primary Hydrology Indicators of *High Water Table (A2)* and *Saturation (A3)* were present. The hydrology source is either from a spring located northeast of the pond, irrigation water, or just a high water table. The paired upland pit was 4 feet higher on the berm of the adjacent pond and was dominated by hydrophytic vegetation, but did not meet either of the other two parameters. Wetland 8 is classified as a palustrine emergent (PEM) wetland, and would likely be considered jurisdictional because it is hydrologically connected to Dry Creek via culverts and field ditches.

### 1.5.3 Other Waters of the U.S.

#### Dry Creek

Dry Creek is a perennial stream that flows from Springville through the study area to Utah Lake. The OHWM of the creek was surveyed and the portions of the creek within the study area total approximately 1.46-acres and 3,200-linear feet in size. The width of creek varies from approximately 15-45 feet, and water was flowing at the time of the field visit. Dry Creek would be classified as R3UBH (Riverine, Upper Perennial, Unconsolidated Bottom, Permanently Flooded), and would likely be considered jurisdictional.

#### Ditch 1

Ditch 1, totaling approximately 0.17-acre and 578-linear feet, is a man-made ditch that runs parallel to Main St. near 2700 N. It was evident that the ditch was been recently dredged. The width of the ditch varies from 12-22 feet. Hydrology for this ditch is likey from stromwater runoff from the airport and the adjacent roadway. Water in this ditch flows north to Dry Creek from Spanish Fork, and there was water present in the ditch at the time of the field visit. Ditch 1 would be classified as R4SBC (Riverine, Intermittent, Streambed, Seasonally Flooded).

### Ditch 2

Ditch 2, totaling approximately 0.04-acre and 163-linear feet, flows parallel to Wallace Dr within the study area. The width of the ditch varies from 8-18 feet. Water was present in the ditch at the time of the field visit. This ditch is part of the Big Hollow Irrigation Company system (see figure in Appendix B) and the hydrology for this feature appears to come from Big Hollow Creek, located southeast of the study area. The water from this ditch flows into Dry Creek. Ditch 2 would be classified as R4SBC (Riverine, Intermittent, Streambed, Seasonally Flooded).

### Ditch 3

Ditch 3, totaling 0.06-acre and 463-linear feet, is located on both sides of 1600 S, east of 1200 W. The width of the feature varies from 4-8 feet and water was flowing at the time of the field visit. This ditch is part of the Big Hollow Irrigation Company system and the hydrology for this feature appears to come from Big Hollow Creek, located southeast of the study area. Water from this ditch flows into Dry Creek on the west side of 1200 W. Ditch 3 would be classified as R5UBH (Riverine, Unknown Perennial, Unconsolidated Bottom, Permanently Flooded).

### Ditch 4

Ditch 4, totaling approximately 0.02-acre and 112-linear feet, flows parallel to 1600 S within the eastern part of the study area. The width of the ditch varies from 6-9 feet. Water was present in the ditch at the time of the field visit. This ditch is part of the Big Hollow Irrigation Company system and the hydrology for this feature appears to come from Big Hollow Creek, located southeast of the study area. The water from this ditch flows north under 1600 S until eventually reaching Dry Creek. Ditch 4 would be classified as R4SBC (Riverine, Intermittent, Streambed, Seasonally Flooded).

## 1.5.4 Hydrology

The study area lies approximately 3.5 miles southeast of Utah Lake. One perennial stream, Dry Creek, and several man-made irrigation ditches are located within the study area. The surrounding area has several seeps and springs that provide hydrology as well. The study area is located in the Spanish Fork watershed (HUC 16020202).

## 1.5.5 Soils

The soil survey information compiled by NRCS identifies 16 soil mapping units within the delineation study area. Eight of these soils are included on the Utah Hydric Soils list (USDA 2010). See Table 1.3 for general soils information obtained from the NRCS Web Soil Survey. For attached soils map and legend, see Appendix B.

Table 1.3 Soils in Delineation Study Area

| SOIL SERIES NAME | ACRES IN STUDY AREA | PERCENT COVERAGE OF STUDY AREA | HYDRIC SOIL? |
|---|---|---|---|
| Benjamin silty clay | 75.8-acres | 25.2% | Yes |
| Benjamin silty clay, moderately alkali | 49.6-acres | 16.5% | Yes |
| Benjamin silty clay, strongly alkali | 20.8-acres | 6% | Yes |
| Bramwell silty clay loam | 2.0-acres | 0.7% | Yes |
| Bramwell silty clay loam, drained | 3.1-acres | 1.0% | Yes |
| Kirkham silty clay loam | 17.7-acres | 5.9% | No |

| SOIL SERIES NAME | ACRES IN STUDY AREA | PERCENT COVERAGE OF STUDY AREA | HYDRIC SOIL? |
|---|---|---|---|
| Kirkham silty clay loam, moderately saline-alkali | 3.5-acres | 1.2% | No |
| Kirkham silty clay loam, strongly saline-alkali | 24-acres | 8% | Yes |
| McBeth silt loam | 19.2-acres | 6.4% | Yes |
| Mixed alluvial land, saline | 15.6-acres | 5.2% | Yes |
| Payson silty clay loam | 11.9-acres | 4% | No |
| Payson-Terrace escarpments complex, 1 to 20 percent slopes, eroded | 18.8-acres | 6.2% | No |
| Sterling gravelly fine sandy loam, 3 to 6 percent slopes | 3.5-acres | 1.2% | No |
| Sunset loam | 24.4-acres | 8.1% | No |
| Taylorsville silty clay loam, 1 to 3 percent slopes | 0.1-acres | 0.0% | No |
| Vineyard fine sandy loam, moderately saline, 0 to 2 percent slopes | 11.0-acres | 3.7% | No |

### 1.5.6 Vegetation

Vegetation within the area includes an upland mix of introduced and native grasses and weedy species (intermediate wheatgrass, smooth brome, whitetop, etc.), whereas the wetter areas support reed canarygrass, cattail, three-square, and other hydrophytic vegetation. Coastal salt grass covers much of the study area in both upland and wetland areas. See Table 1.4 in Appendix D for common plants in the delineation study area

### 1.5.7 Interstate and Foreign Commerce

The jurisdictional waters of the U.S., including wetlands, within the project area do not have a connection to interstate or foreign commerce.

## 1.6 REFERENCES


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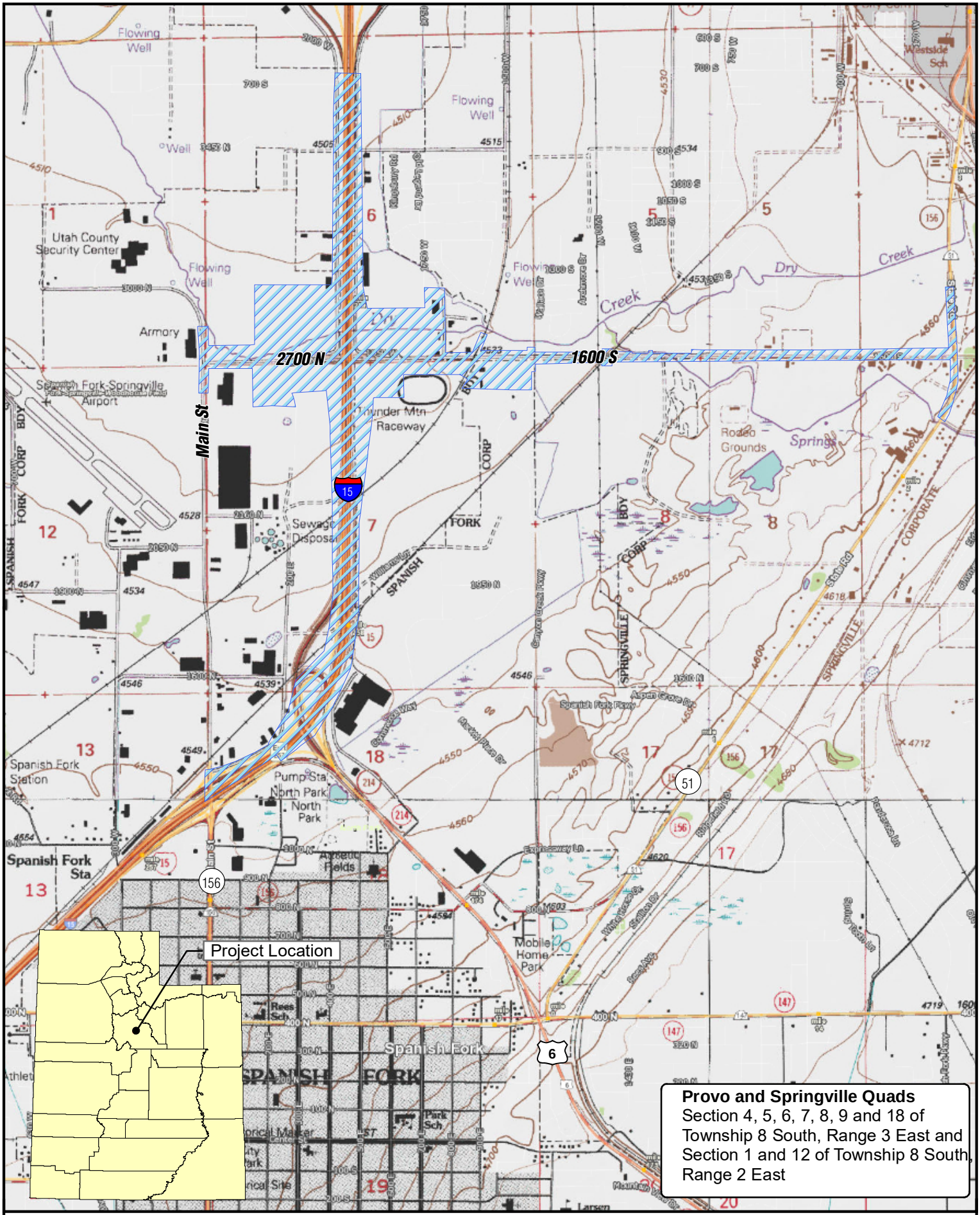
# APPENDIX A: AQUATIC RESOURCES DELINEATION MAPS


2700 N
1600 S
Main St
Project Location
Provo and Springville Quads
Section 4, 5, 6, 7, 8, 9 and 18 of Township 8 South, Range 3 East and Section 1 and 12 of Township 8 South, Range 2 East
Study Area ( 300.8 Acres)
1 inch = 2,000 feet
0
2,000
4,000
Feet
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Coordinate System: NAD 1983 StatePlane Utah Central FIPS 4302 Feet
Projection: Lambert Conformal Conic
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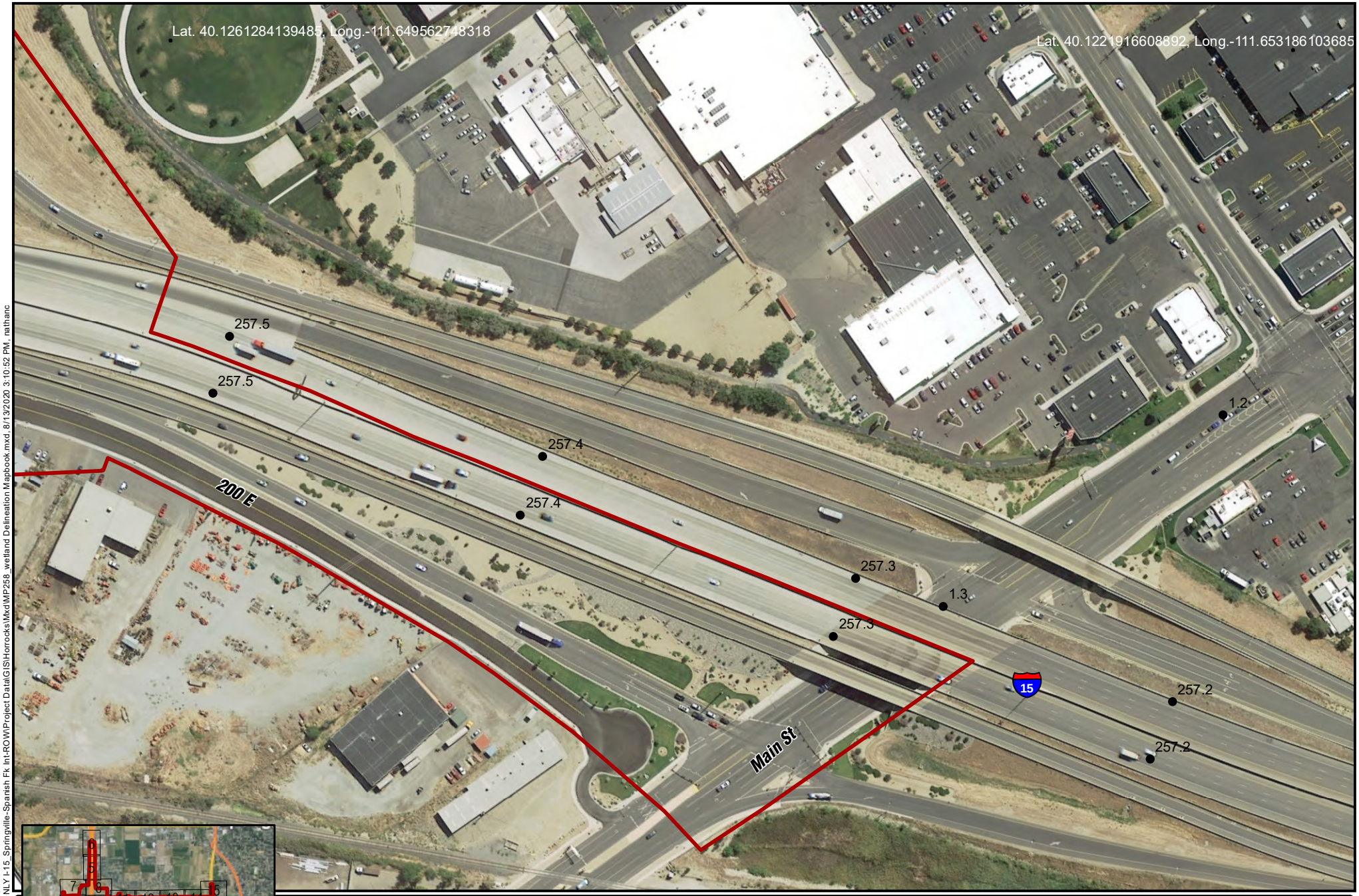
I-15; Springville/Spanish Fork
Interchange Study
Project Location Map

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Projection: Lambert Conformal Conic
Datum: North American 1983
Aerial Imagery:Source ESRI, 2016
Delineation conducted by Terry Johnson and Nathan Clarke on 9/13/2018, 9/19/2018,10/18/2018, and 6/4/2020.
Maps created by Horrocks Engineers on 8/13/2020

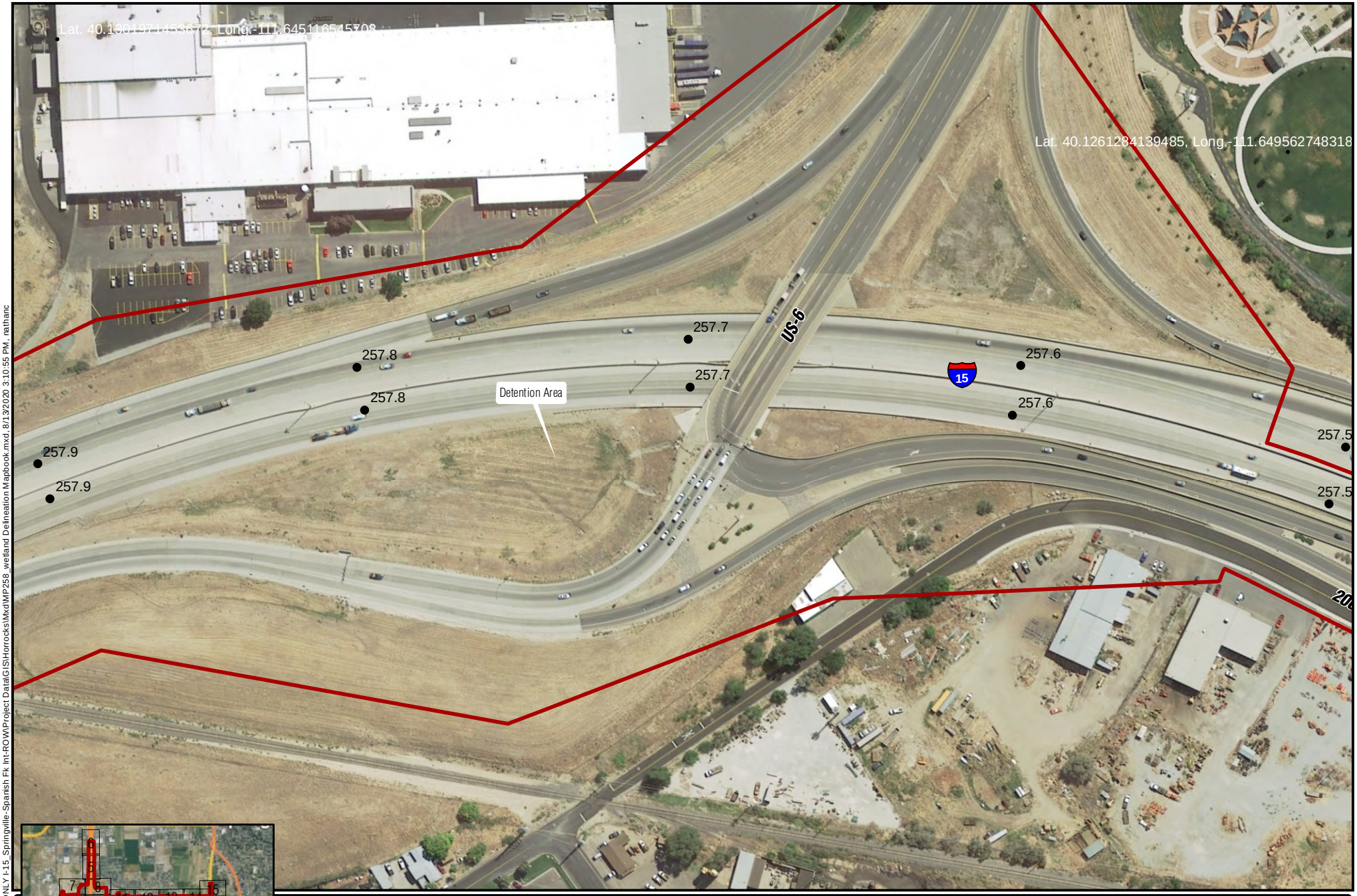
- Study Area ( 300.8 Acres)
- OHWM Date Point
- Upland Sample Point
- Wetland Sample Point
- Tenth Mile Points
- Culvert
- Irrigation/Field Ditch
- PEM Wetland - 6.91 ac.
- Waters of the U.S.- 1.17 ac., 4,516 linear ft.

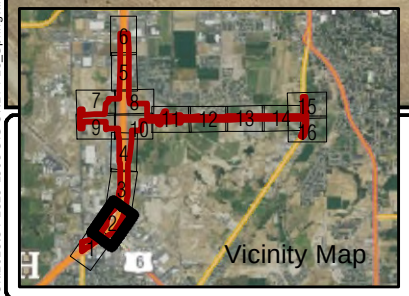
# I-15; Springville/Spanish Fork Interchange Study
## Wetland Delineation Map

1 inch = 200 feet

0 200 400 Feet

Map 1 of 16

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## Wetland Delineation Map

1 inch = 200 feet

0 200 400 Feet

Map 2 of 16

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## Wetland Delineation Map

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Map 3 of 16

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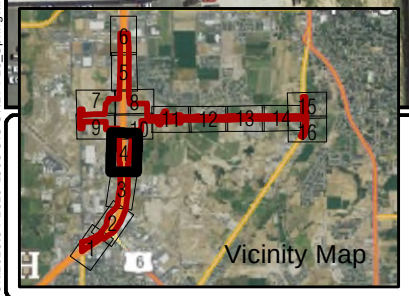


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Tenth Mile Points
Culvert
Irrigation/Field Ditch
PEM Wetland - 6.91 ac.
Waters of the U.S.- 1.17 ac., 4,516 linear ft.

# I-15; Springville/Spanish Fork Interchange Study
## Wetland Delineation Map

1 inch = 200 feet

0 200 400 Feet

Map 4 of 16

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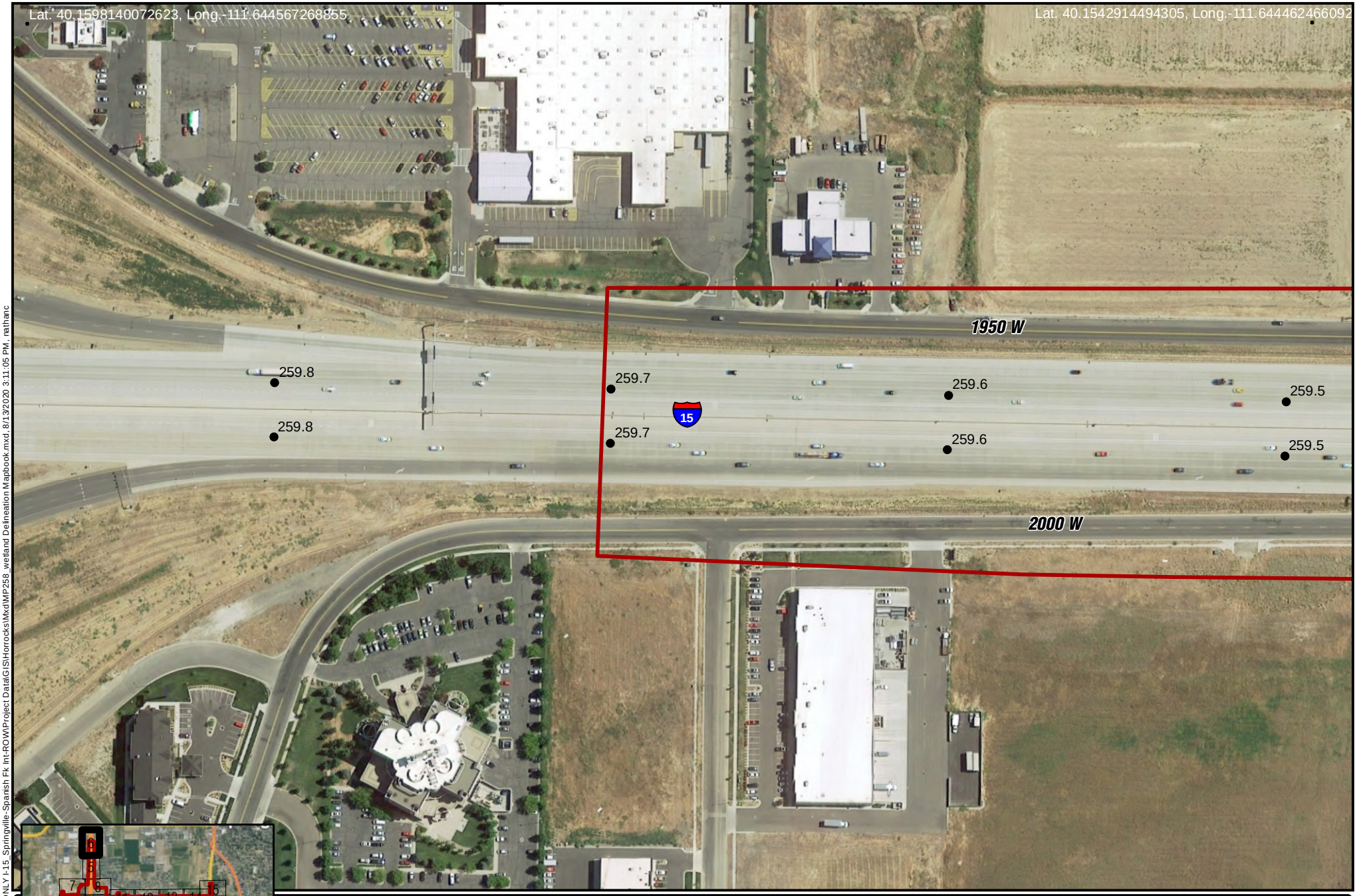
PEM Wetland - 6.91 ac.
Waters of the U.S.- 1.17 ac., 4,516 linear ft.

# I-15; Springville/Spanish Fork Interchange Study
## Wetland Delineation Map

1 inch = 200 feet

0 200 400 Feet

Map 5 of 16

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## Wetland Delineation Map

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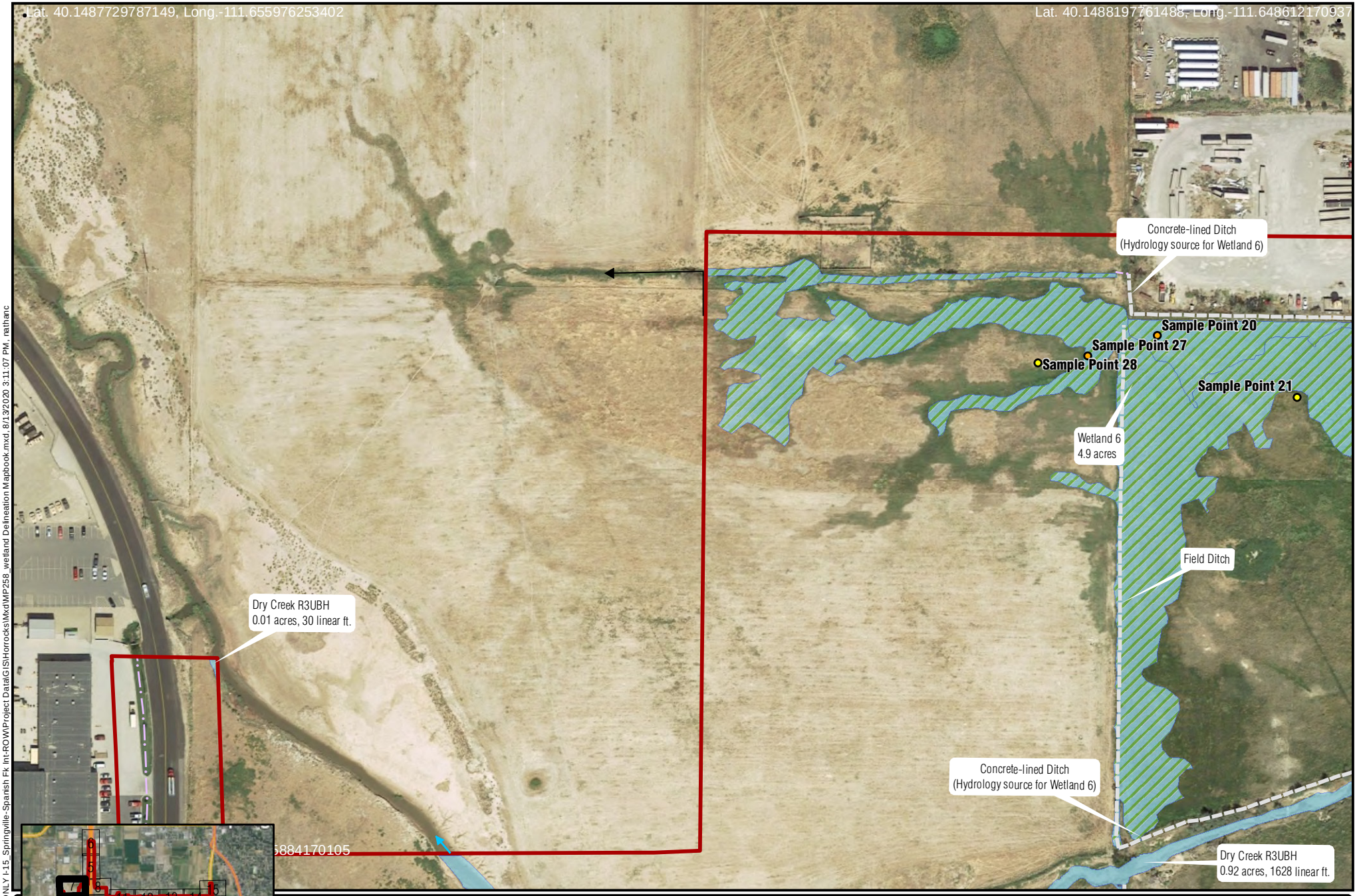
0 200 400 Feet

Map 6 of 16

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Study Area ( 300.8 Acres)
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Wetland Sample Point
Tenth Mile Points
Culvert
Irrigation/Field Ditch
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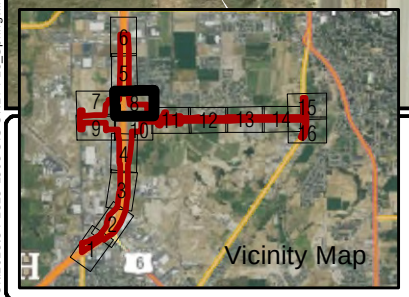


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Map 8 of 16

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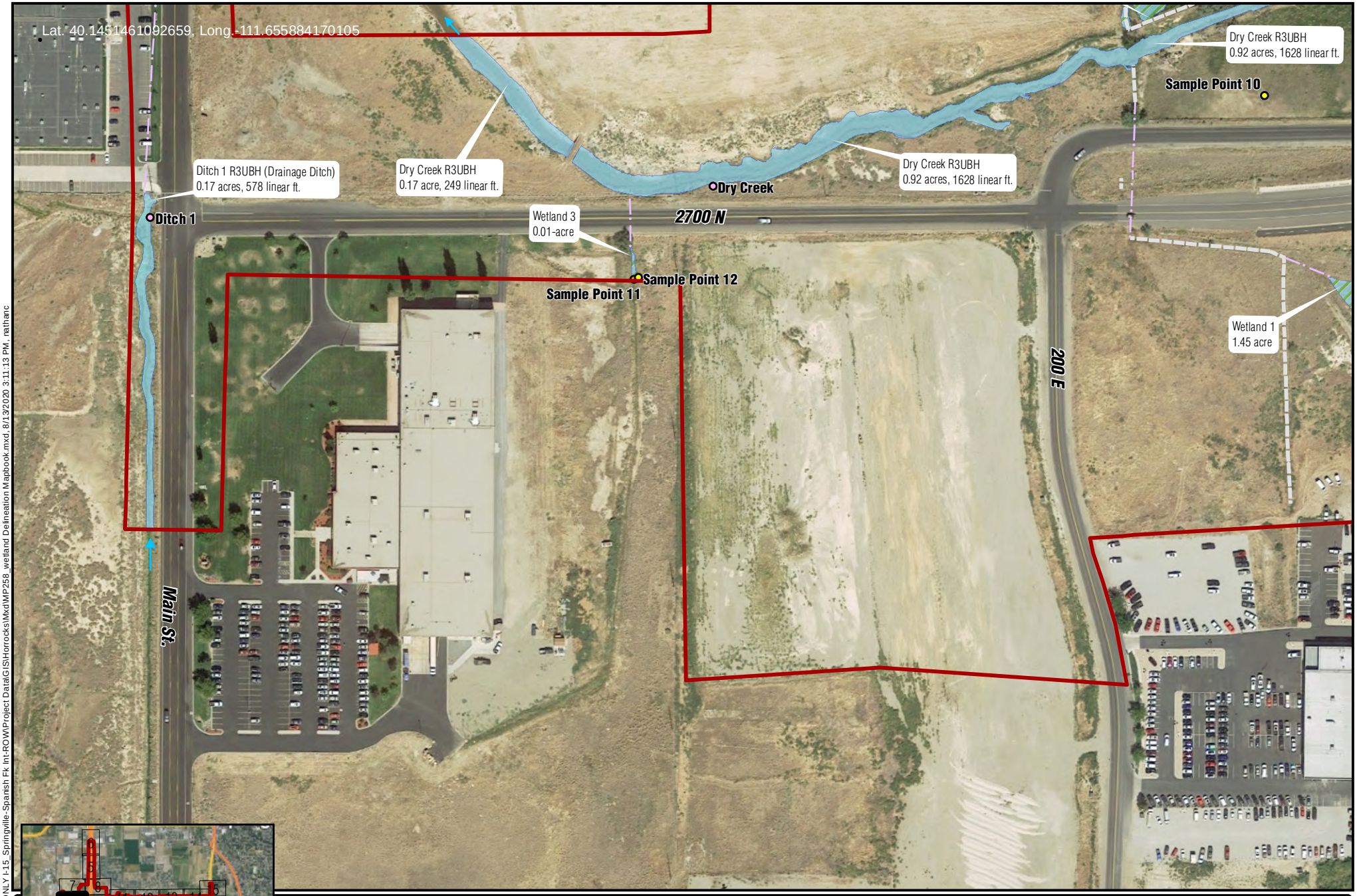


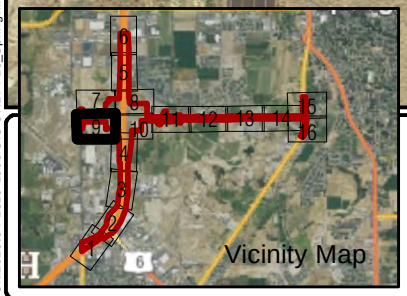


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Datum: North American 1983
Aerial Imagery:Source ESRI, 2016
Delineation conducted by Terry Johnson and Nathan Clarke on 9/13/2018, 9/19/2018,10/18/2018, and 6/4/2020.
Maps created by Horrocks Engineers on 8/13/2020

- Study Area ( 300.8 Acres)
- OHWM Date Point
- Upland Sample Point
- Wetland Sample Point
- Tenth Mile Points
- Culvert
- Irrigation/Field Ditch
- PEM Wetland - 6.91 ac.
- Waters of the U.S.- 1.17 ac., 4,516 linear ft.

# I-15; Springville/Spanish Fork Interchange Study
## Wetland Delineation Map

1 inch = 200 feet

0 200 400 Feet

Map 9 of 16

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Coordinate System: NAD 1983 StatePlane Utah Central FIPS 4302 Feet
Projection: Lambert Conformal Conic
Datum: North American 1983
Aerial Imagery:Source ESRI, 2016
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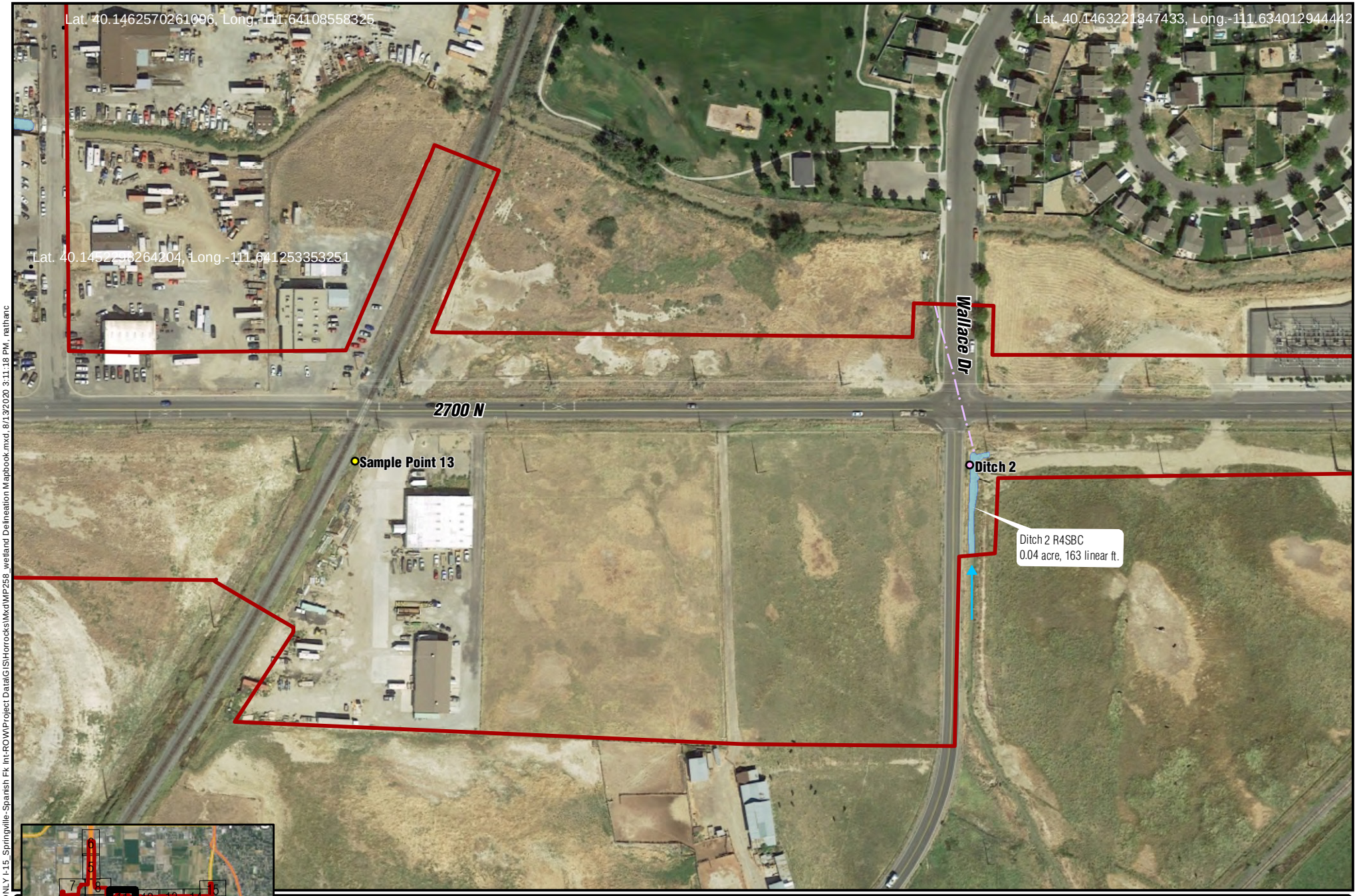


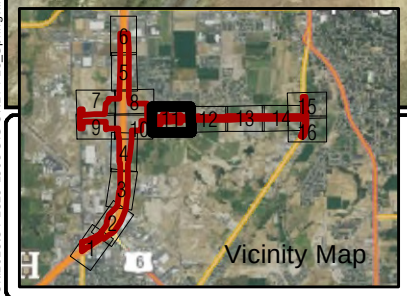


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Map 11 of 16

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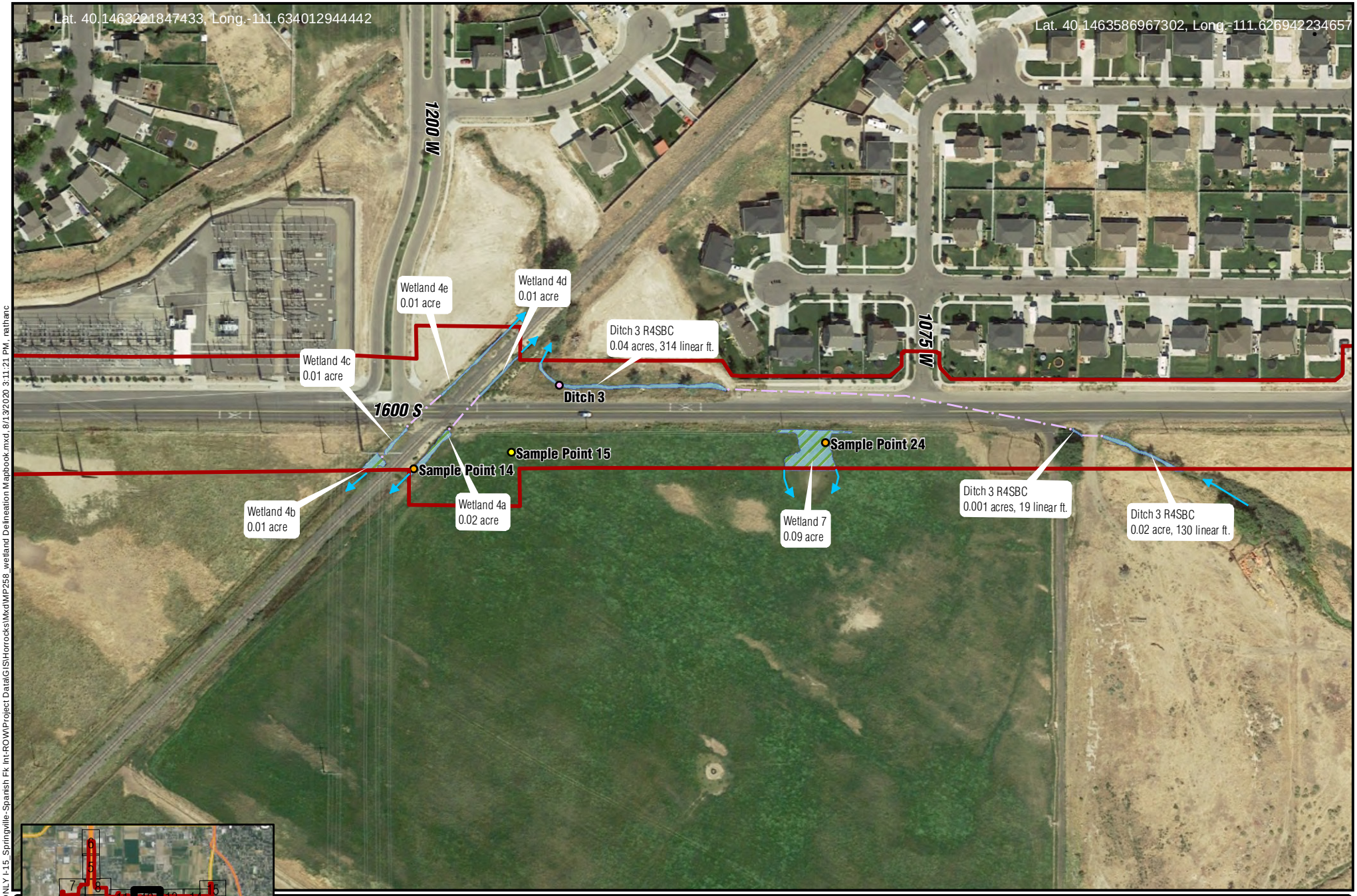


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Aerial Imagery:Source ESRI, 2016
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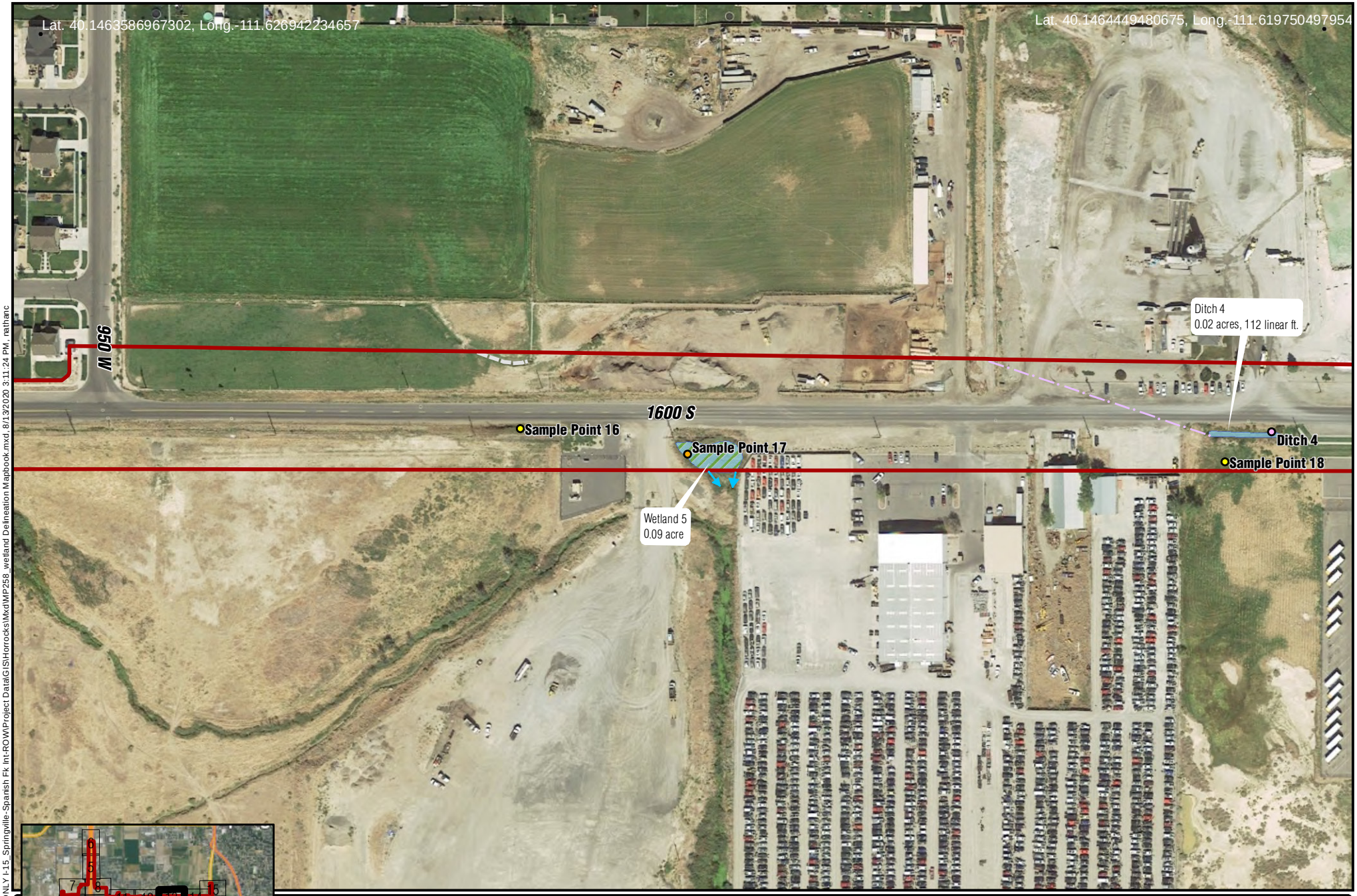


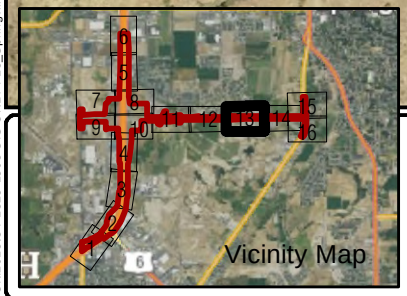


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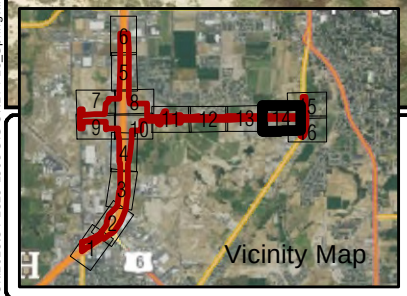
Map 13 of 16

O:\2018\UT-1325-1808 GIS ONLY I-15_Springville-Spanish Fk Int-ROW\Project Data\GIS\Horrocks\Mxd\MP258_wetland Delineation Mapbook.mxd, 8/13/2020 3:11:24 PM, nathanc

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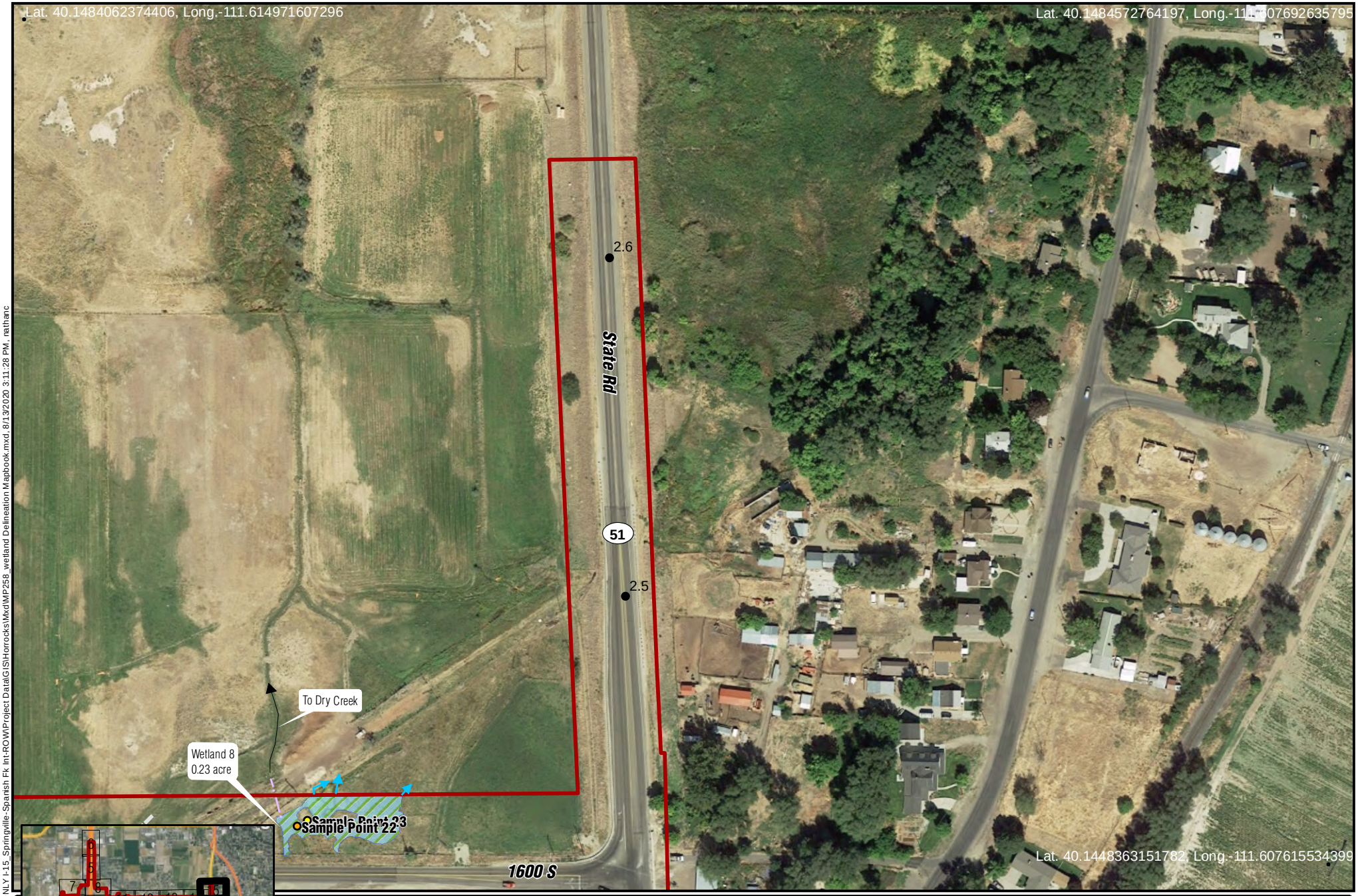
Map 14 of 16

O:\2018\UT-1325-1808 GIS ONLY I-15_Springville-Spanish Fk Int-ROW\Project Data\GIS\Horrocks\Mxd\MP258_wetland Delineation Mapbook.mxd, 8/13/2020 3:11:26 PM, nathanc

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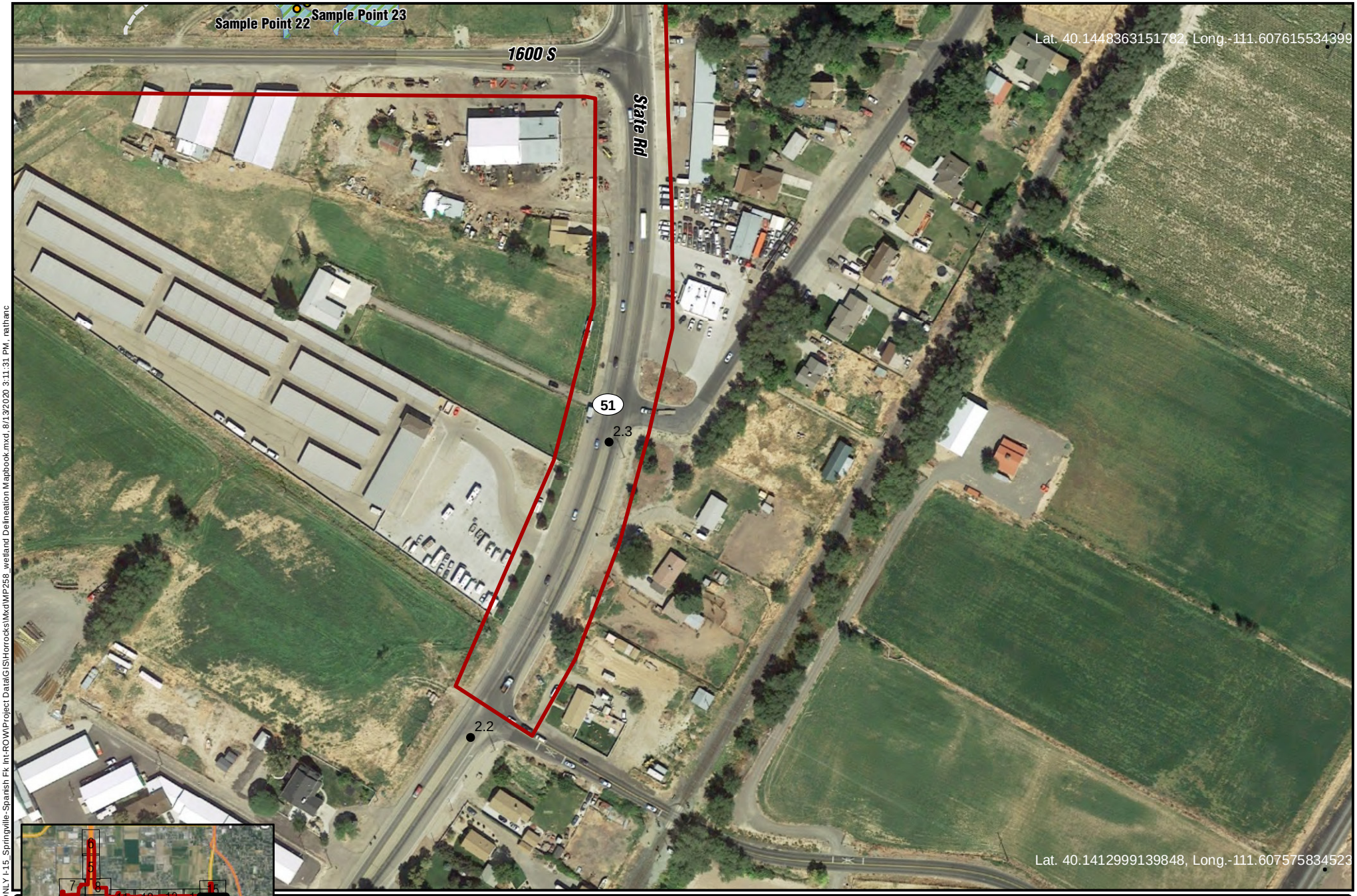


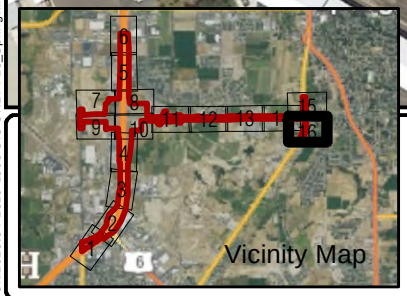


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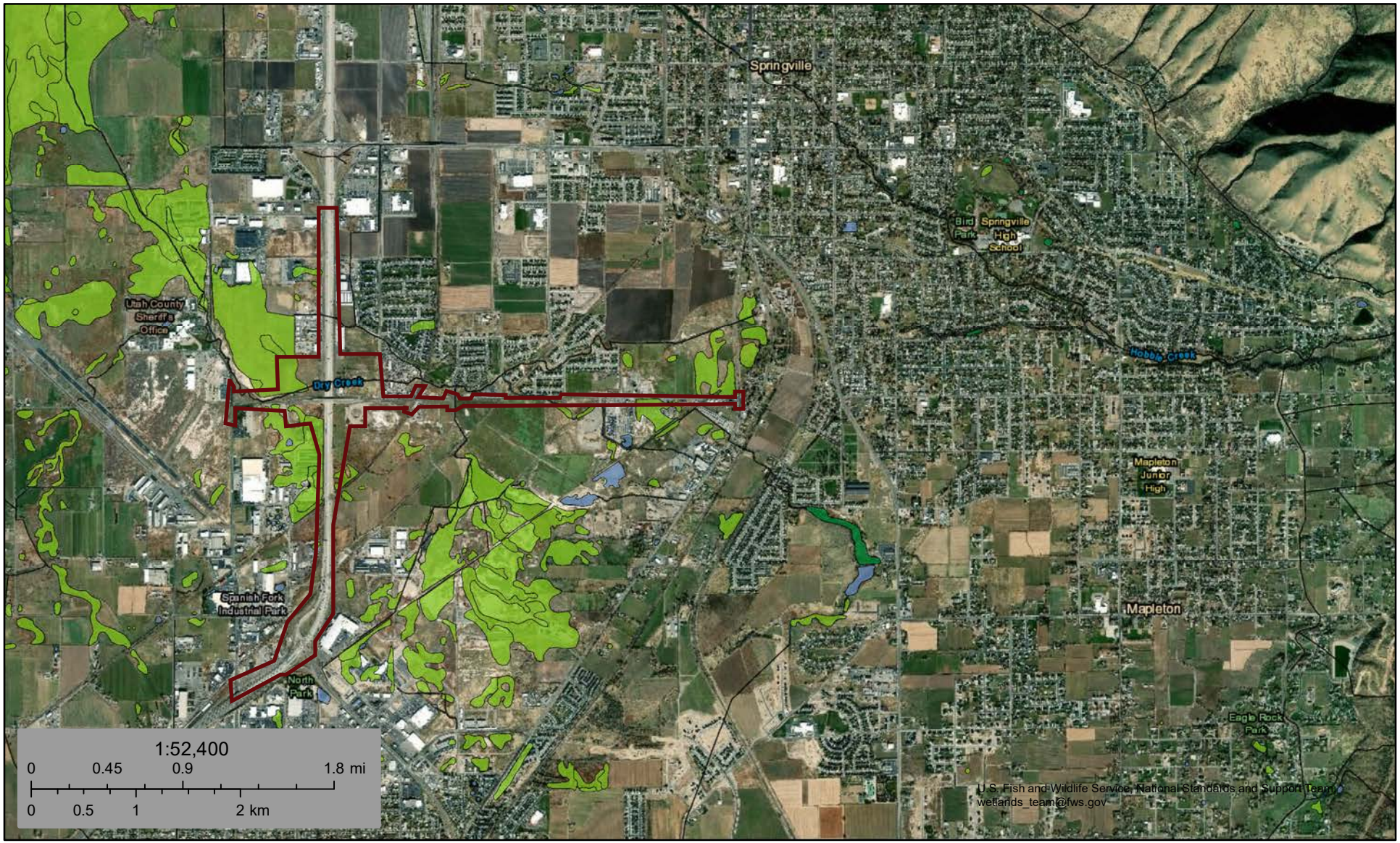
Map 16 of 16

O:\2018\UT-1325-1808 GIS ONLY I-15_Springville-Spanish Fk Int-ROW\Project Data\GIS\Horrocks\Mxd\MP258_wetland Delineation Mapbook.mxd, 8/13/2020 3:11:31 PM, nathanc

# APPENDIX B: SUPPORTING MAPS

U.S. Fish and Wildlife Service
National Wetlands Inventory

# I-15; MP 258 Interchange



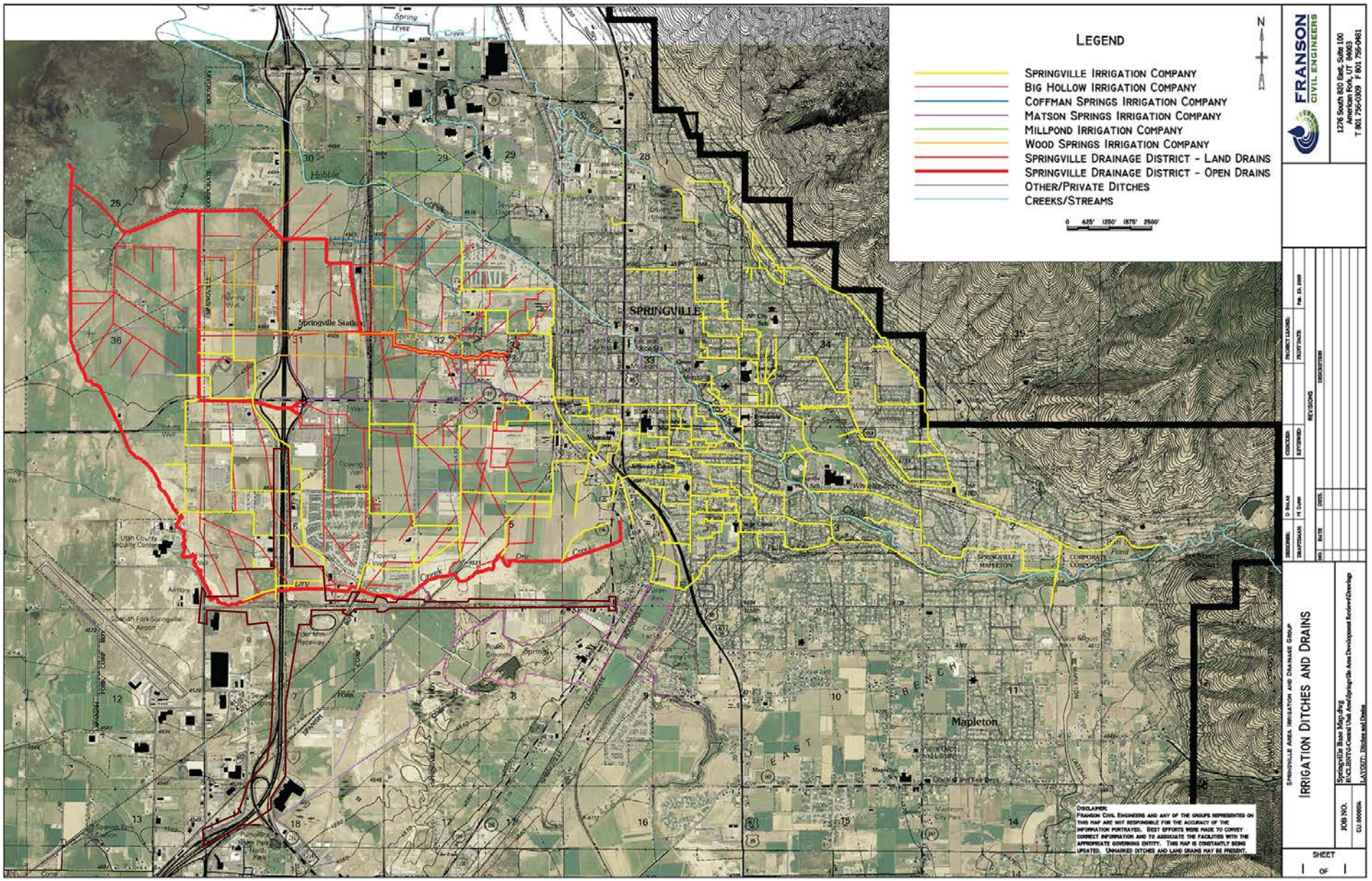

November 1, 2018

**Wetlands**

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine
- Study Area

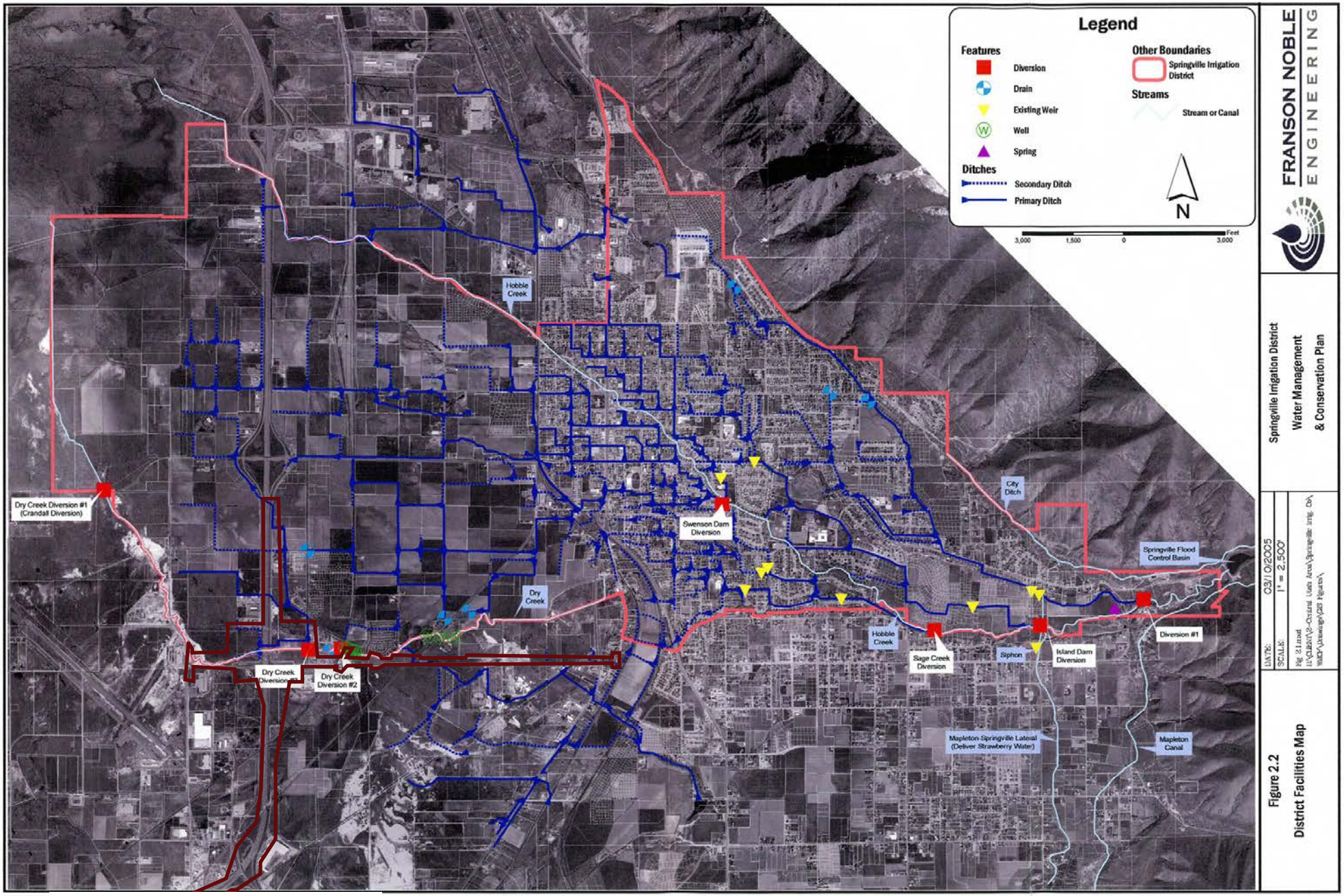
This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

National Wetlands Inventory (NWI)
This page was produced by the NWI mapper




Study Area

Source: http://www.fransoncivil.com/images/pdfs/Springville_Base_Map_24x36.jpg




Study Area

Source: http://www.fransoncivil.com/images/pdfs/Springville%202005%20WMCP.pdf

United States Department of Agriculture

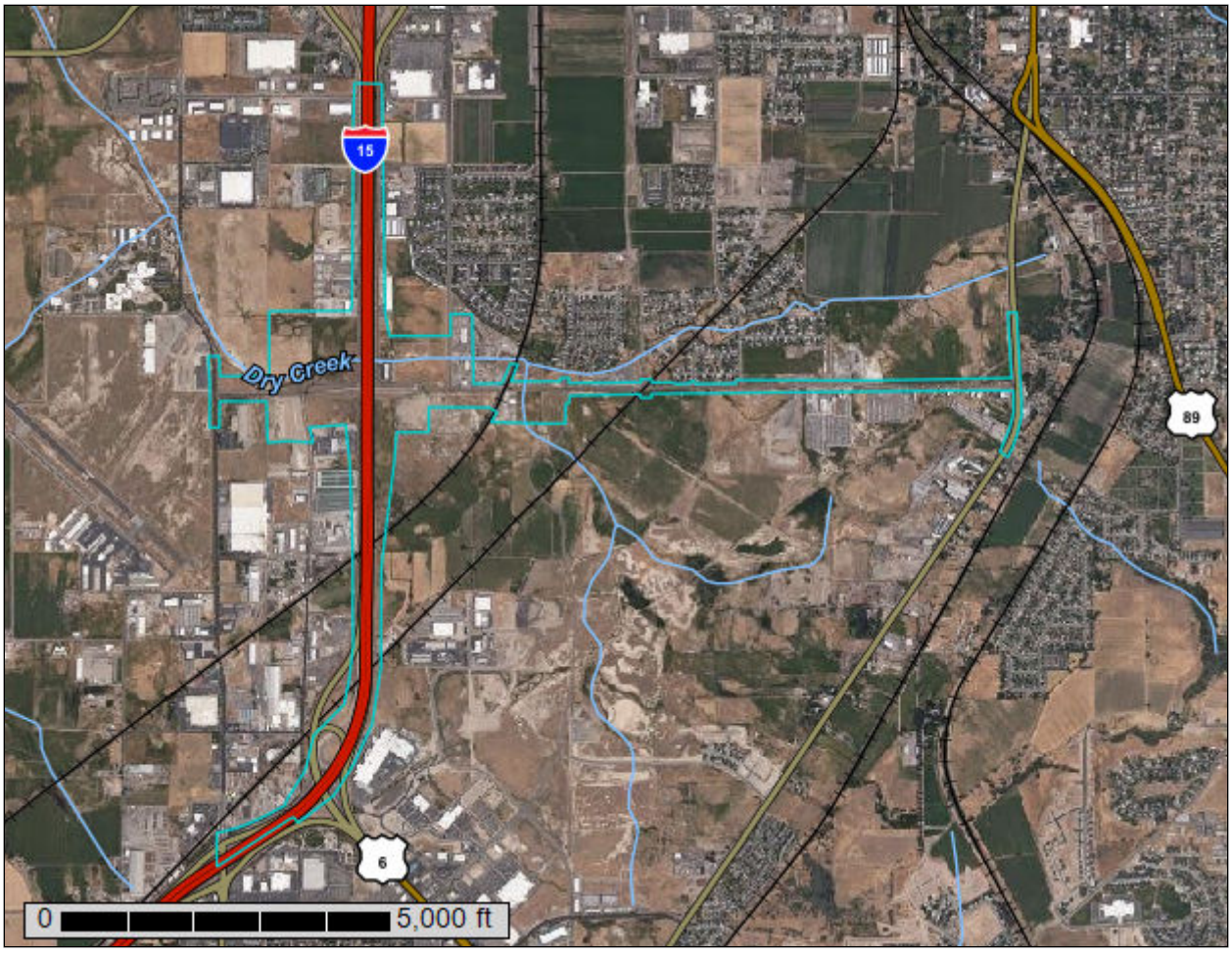
NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

# Custom Soil Resource Report for Utah County, Utah - Central Part

## I-15 MP 258




July 2, 2020

# Contents

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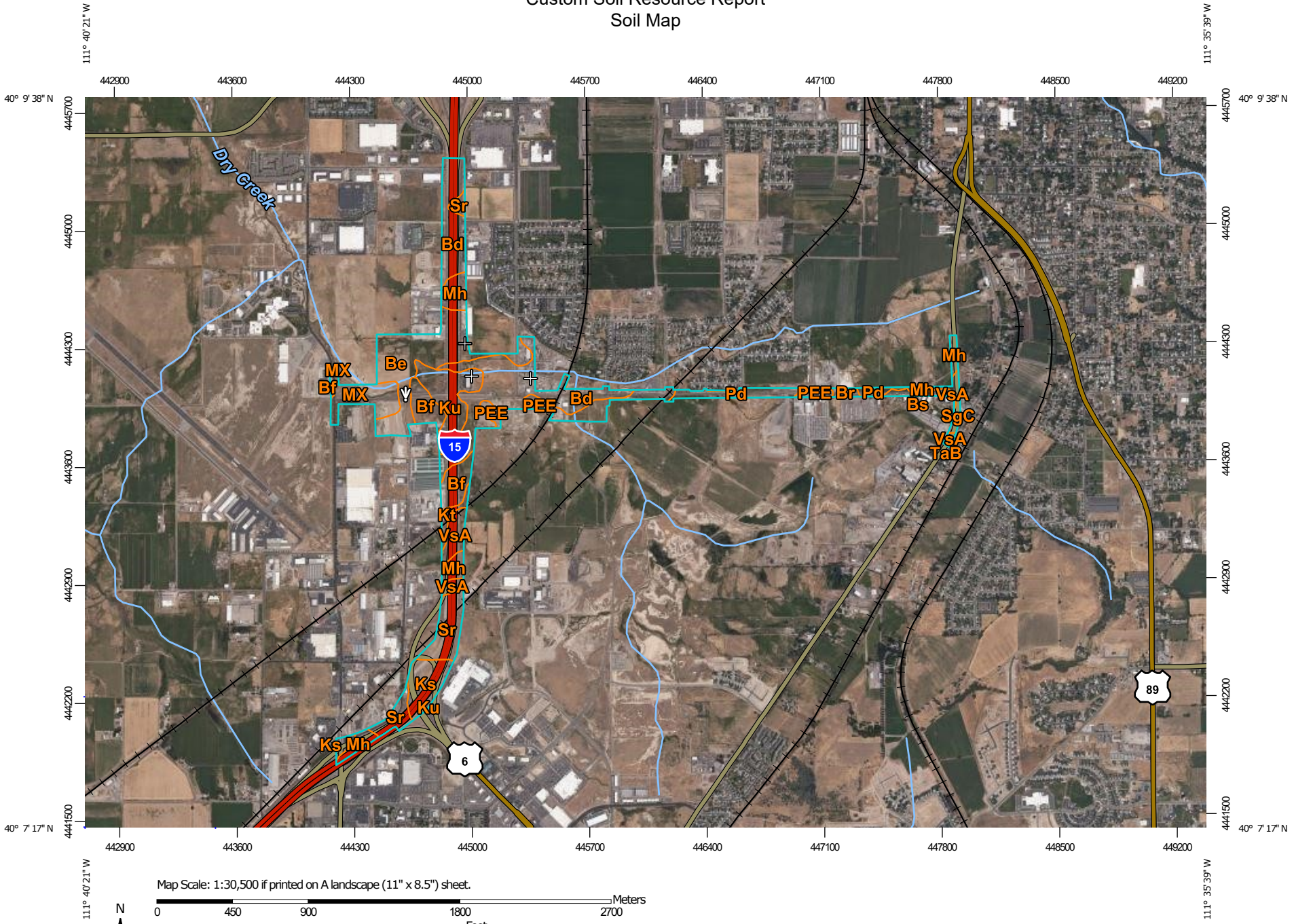
Soil Map.....6
Legend.....7
Map Unit Legend..... 8
Map Unit Descriptions..... 8
Utah County, Utah - Central Part.....11
Bd—Benjamin silty clay..... 11
Be—Benjamin silty clay, moderately alkali..... 12
Bf—Benjamin silty clay, strongly alkali..... 13
Br—Bramwell silty clay loam..... 15
Bs—Bramwell silty clay loam, drained..... 16
Ks—Kirkham silty clay loam..... 17
Kt—Kirkham silty clay loam, moderately saline-alkali..... 19
Ku—Kirkham silty clay loam, strongly saline-alkali..... 20
Mh—McBeth silt loam..... 21
MX—Mixed alluvial land, saline.....22
Pd—Payson silty clay loam..... 23
PEE—Payson-Terrace escarpments complex, 1 to 20 percent slopes, eroded.....24
SgC—Sterling gravelly fine sandy loam, 3 to 6 percent slopes.....26
Sr—Sunset loam..... 27
TaB—Taylorsville silty clay loam, 1 to 3 percent slopes..... 28
VsA—Vineyard fine sandy loam, moderately saline, 0 to 2 percent slopes.....29

# Custom Soil Resource Report
## Soil Map



## MAP LEGEND

**Area of Interest (AOI)**
- Area of Interest (AOI)

**Soils**
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

**Special Point Features**
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

**Water Features**
- Streams and Canals

**Transportation**
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

**Background**
- Aerial Photography

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Utah County, Utah - Central Part
Survey Area Data: Version 13, Jun 8, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 30, 2018—Aug 29, 2018

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

# Map Unit Legend

| Map Unit Symbol | Map Unit Name | Acres in AOI | Percent of AOI |
|---|---|---|---|
| Bd | Benjamin silty clay | 75.8 | 25.2% |
| Be | Benjamin silty clay, moderately alkali | 49.6 | 16.5% |
| Bf | Benjamin silty clay, strongly alkali | 20.8 | 6.9% |
| Br | Bramwell silty clay loam | 2.0 | 0.7% |
| Bs | Bramwell silty clay loam, drained | 3.1 | 1.0% |
| Ks | Kirkham silty clay loam | 17.7 | 5.9% |
| Kt | Kirkham silty clay loam, moderately saline-alkali | 3.5 | 1.2% |
| Ku | Kirkham silty clay loam, strongly saline-alkali | 24.0 | 8.0% |
| Mh | McBeth silt loam | 19.2 | 6.4% |
| MX | Mixed alluvial land, saline | 15.6 | 5.2% |
| Pd | Payson silty clay loam | 11.9 | 4.0% |
| PEE | Payson-Terrace escarpments complex, 1 to 20 percent slopes, eroded | 18.8 | 6.2% |
| SgC | Sterling gravelly fine sandy loam, 3 to 6 percent slopes | 3.5 | 1.2% |
| Sr | Sunset loam | 24.4 | 8.1% |
| TaB | Taylorsville silty clay loam, 1 to 3 percent slopes | 0.1 | 0.0% |
| VsA | Vineyard fine sandy loam, moderately saline, 0 to 2 percent slopes | 11.0 | 3.7% |
| **Totals for Area of Interest** | | **301.0** | **100.0%** |

# APPENDIX C: PHOTOGRAPHS

## Sample Point 1

Photo 1.1 Soil sample point 1

Photo 1.2 General condition of sample point 1 (Wetland 1)

## Wetland 1

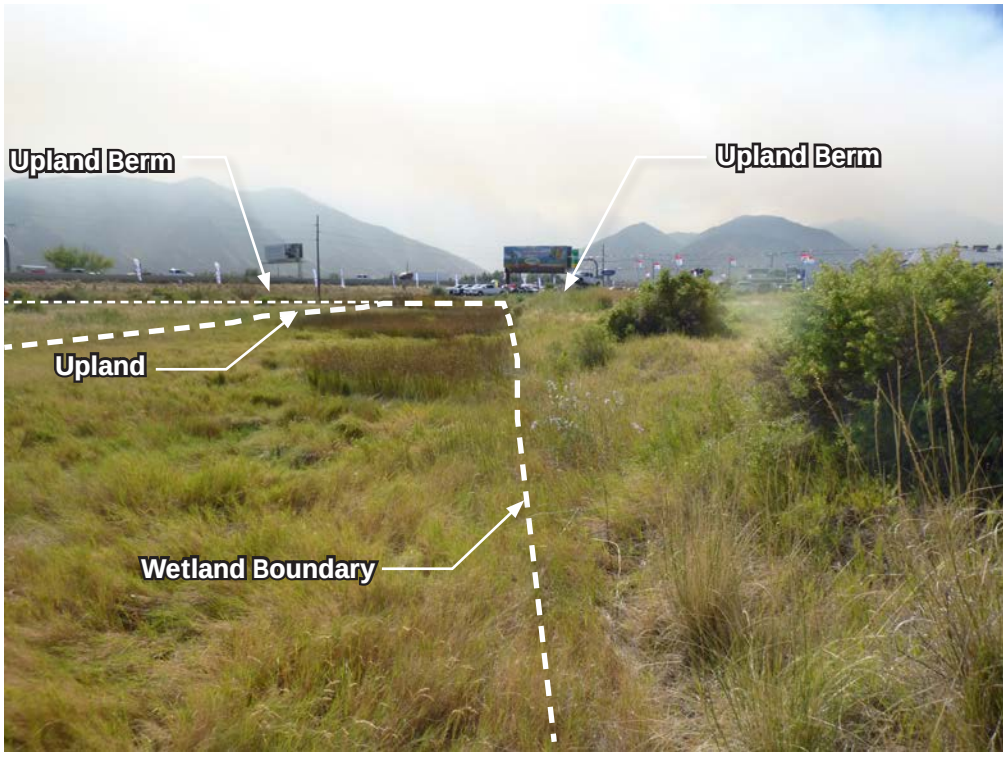



Photo 1.3 General Condition of Wetland 1 looking southeast

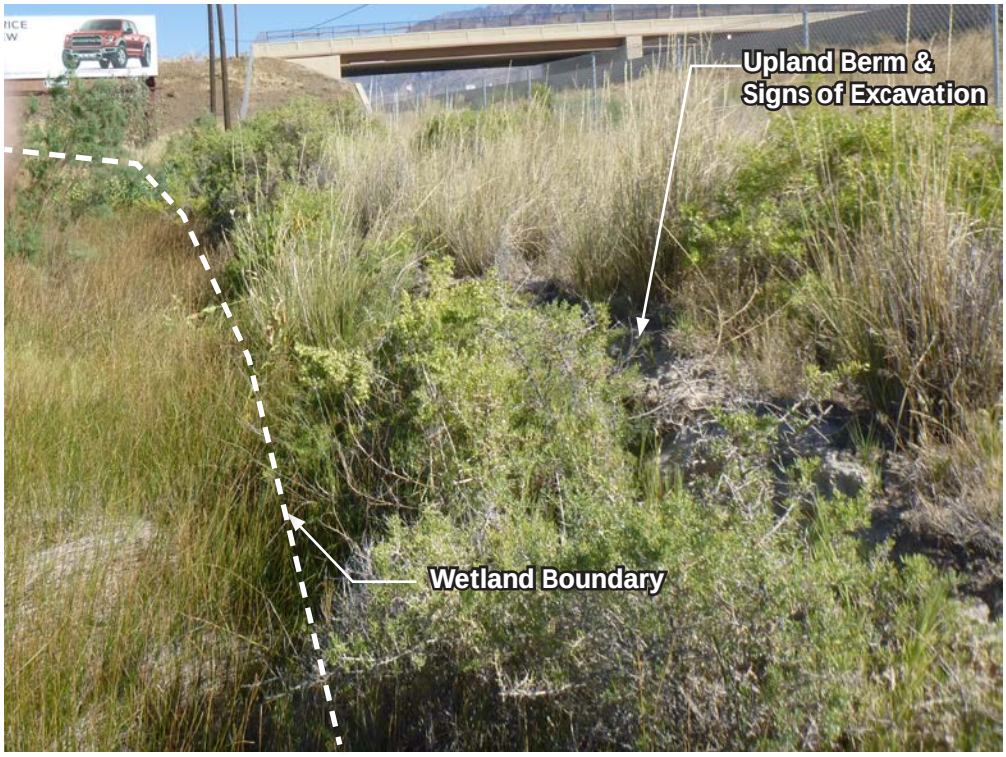



Photo 1.4 General Condition of Wetland 1 looking north

## Sample Point 2

Photo 1.5 Soil sample point 2

Photo 1.6 General condition of sample point 2

## Sample Point 3

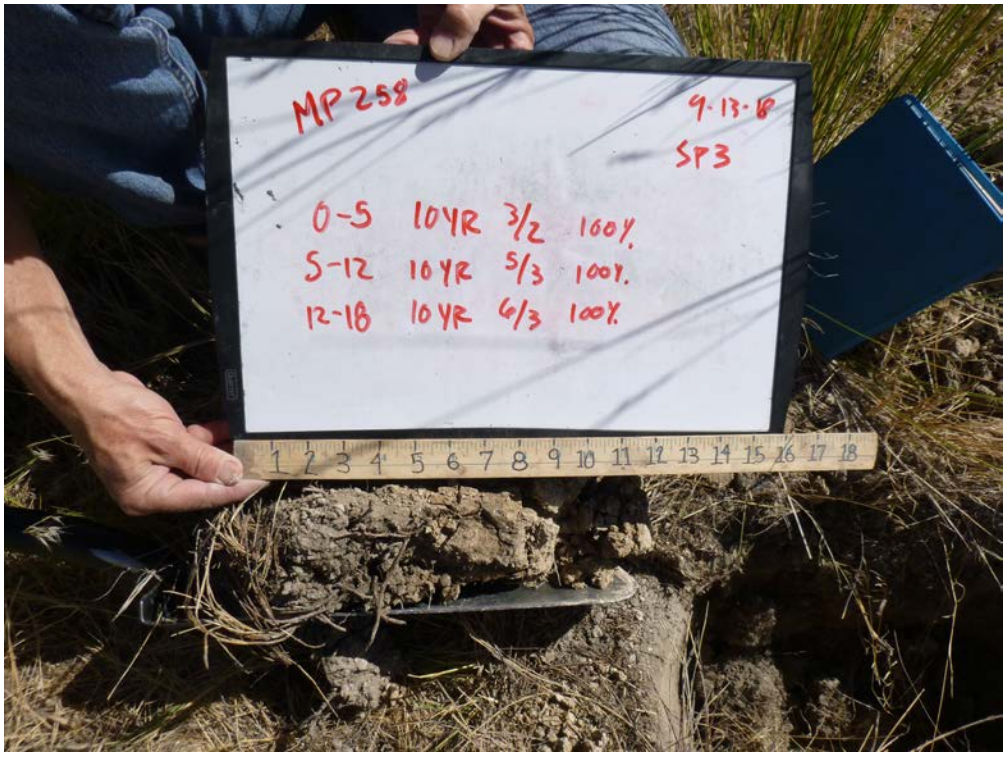



Photo 1.7 Soil sample point 3

Photo 1.8 General condition of sample point 3

## Sample Point 4

Photo 1.9 Soil sample point 4

Photo 1.10 General condition of sample point 4

## Sample Point 5

Photo 1.11 Soil sample point 5

Photo 1.12 General condition of sample point 5

## Sample Point 6

Photo 1.13 Soil sample point 6

Photo 1.14 General condition of sample point 6 (Wetland 2)

## Sample Point 7

Photo 1.15 Soil sample point 7

Photo 1.16 General condition of sample point 7

## Sample Point 8

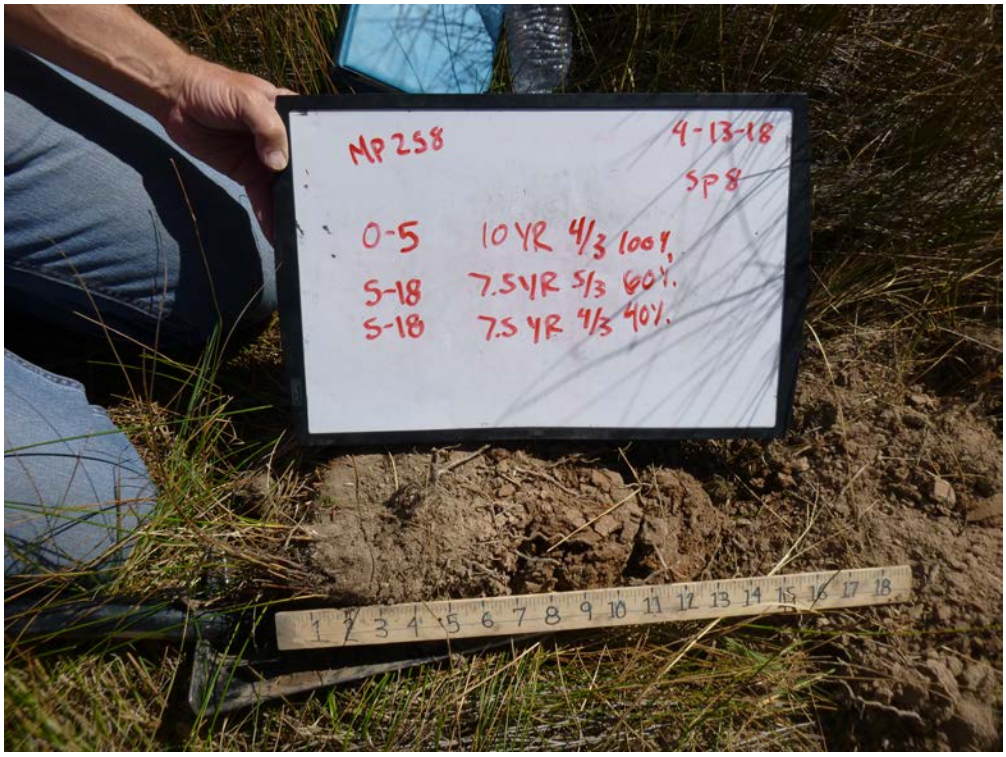



Photo 1.17 Soil sample point 8

Photo 1.18 General condition of sample point 8

## Sample Point 9

Photo 1.19 Soil sample point 9

Photo 1.20 General condition of sample point 9

## Sample Point 10

Photo 1.21 Soil sample point 10

Photo 1.22 General condition of sample point 10

## Sample Point 11

Photo 1.23 Soil sample point 11

Photo 1.24 General condition of sample point 11 (Wetland 3)

## Sample Point 12

Photo 1.25 Soil sample point 12

Photo 1.26 General condition of sample point 12

## Sample Point 13

Photo 1.27 Soil sample point 13

Photo 1.28 General condition of sample point 7

## Sample Point 14

Photo 1.29 Soil sample point 14

Photo 1.30 General condition of sample point 14 (Wetland 4 complex)

## Sample Point 15

Photo 1.31 Soil sample point 15

Photo 1.32 General condition of sample point 15

## Sample Point 16

Photo 1.33 General condition of sample point 16

Photo 1.34 General condition of Sample Point 16

## Sample Point 17

Photo 1.35 Soil sample point 17

Photo 1.36 General condition of sample point 17 (Wetland 5)

## Sample Point 18

Photo 1.37 General condition of sample point 18

Photo 1.38 General condition of sample point 18

## Sample Point 19

Photo 1.39 Soil sample point 19

Photo 1.40 General condition of sample point 19

## Sample Point 20

Photo 1.41 General condition of sample point 20

Photo 1.42 General condition of sample point 20 (Wetland 6)

## Sample Point 21

Photo 1.43 Soil sample point 21

Photo 1.44 General condition of sample point 21

## Sample Point 22

Photo 1.45 General condition of sample point 22

Photo 1.46 General condition of sample point 22 (Wetland 8)

## Sample Point 23

Photo 1.47 Soil sample point 23

Photo 1.48 General condition of sample point 23

## Sample Point 24

Photo 1.49 General condition of sample point 24

Photo 1.50 General condition of sample point 24 (Wetland 7)

## Sample Point 25

Photo 1.51 Soil sample point 25

Photo 1.52 General condition of sample point 25

## Sample Point 26

Photo 1.53 General condition of sample point 26

Photo 1.54 General condition of sample point 26

## Sample Point 27

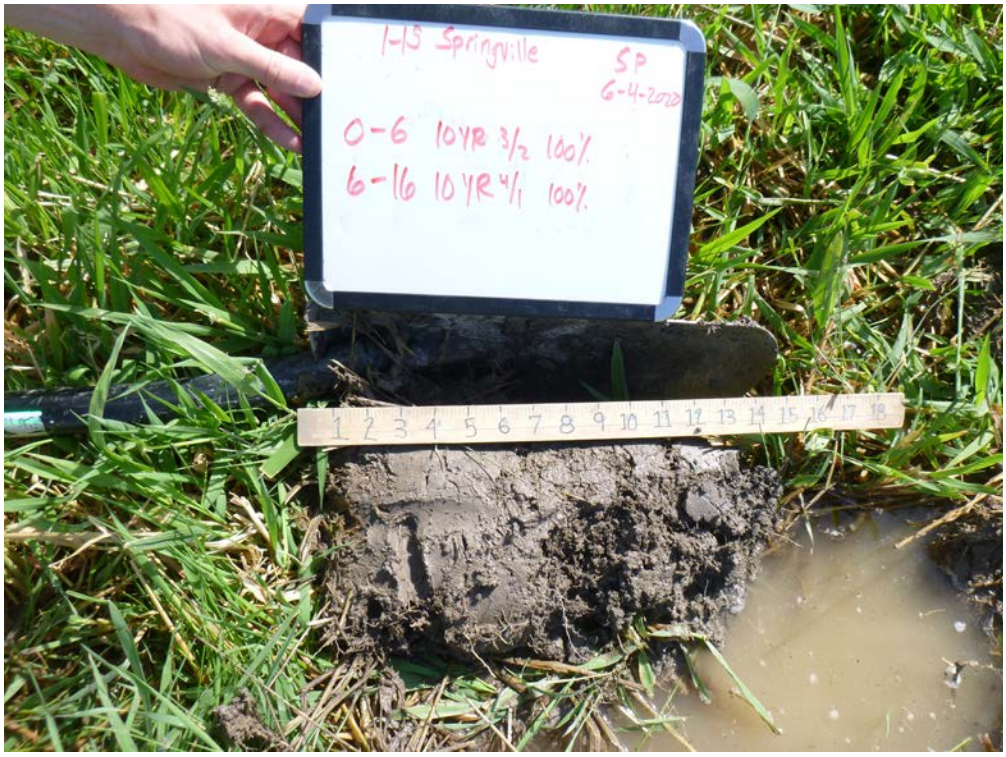



Photo 1.55 Soil sample point 27

Photo 1.56 General condition of sample point 27

## Sample Point 28

Photo 1.57 General condition of sample point 28

Photo 1.58 General condition of sample point 28

## Dry Creek

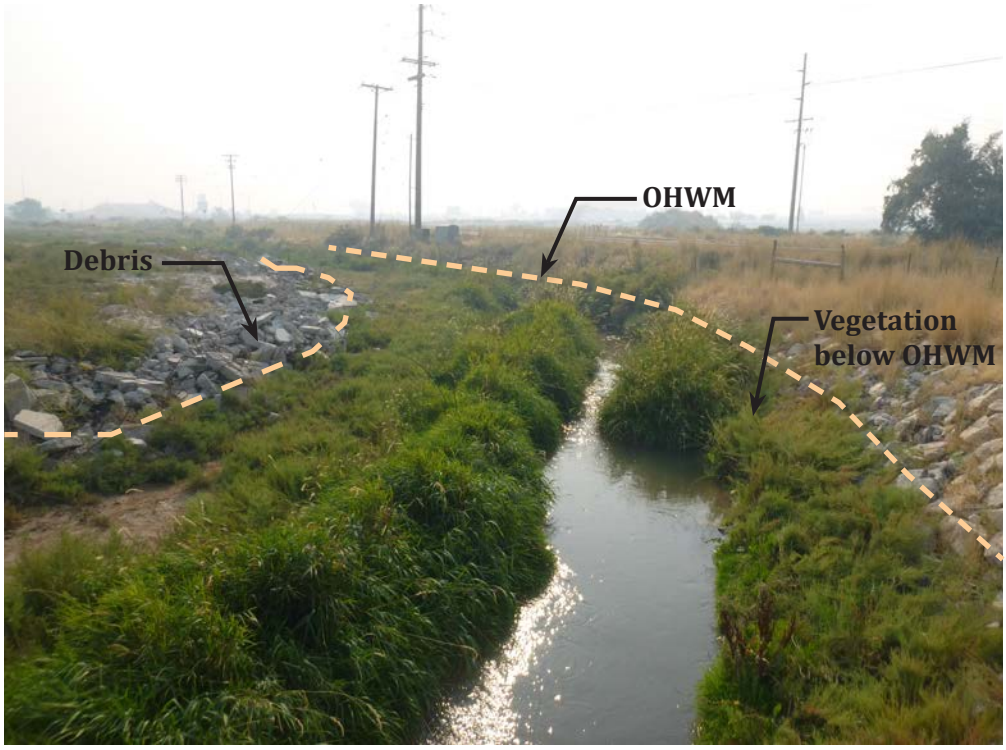



Photo 1.59 General condition of Dry Creek

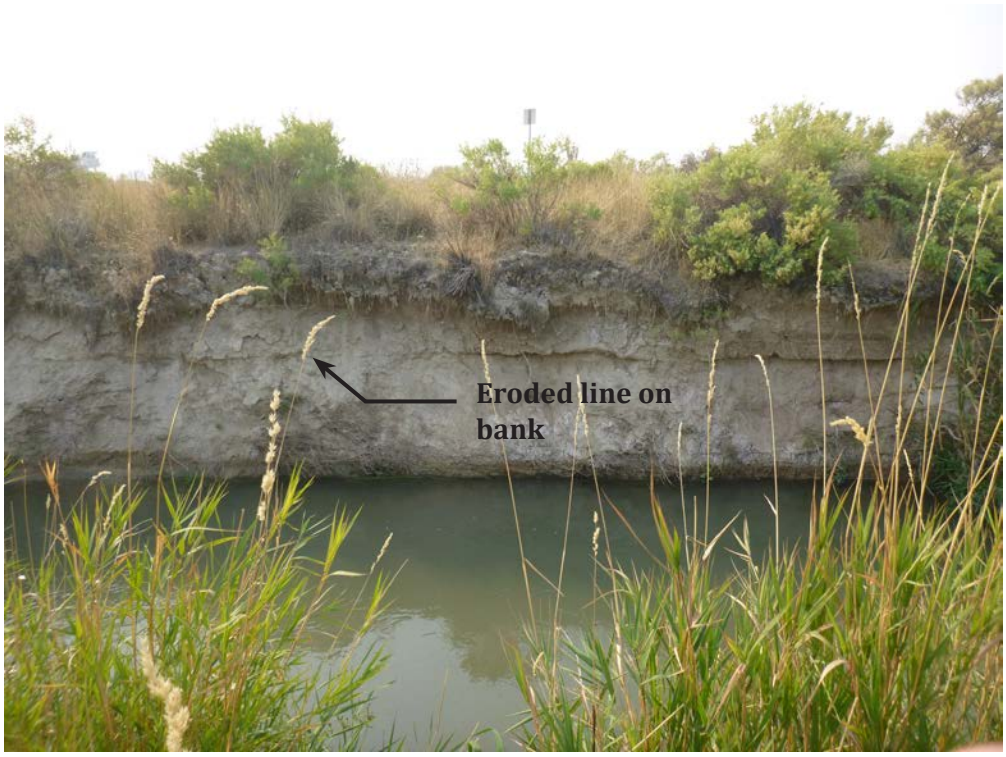



Photo 1.60 General condition of Dry Creek

## Ditch 1

Photo 1.61 Looking south at Ditch 1

Photo 1.62 Looking north at Ditch 1

## Ditch 2

Photo 1.63 Looking south at Ditch 2

Photo 1.64 Looking north at Ditch 2

## Ditch 3

Photo 1.65 Looking west at Ditch 3

Photo 1.66 Looking northwest at Ditch 3

## Ditch 4

Photo 1.67 Looking east at Ditch 4

Photo 1.68 Looking north at Ditch 4

## General Condition

Photo 1.69 Looking east at irrigation field ditch

Photo 1.70 Looking west at concrete-lined ditch near Wetland 6

## General Condition

Photo 1.71 General condition of open fields

Photo 1.72 General condition of concrete-lined ditch near sample point 9

# APPENDIX D: PLANT LIST

Table 1.4 Common Plants in Delineation Study Area

| COMMON NAME | SCIENTIFIC NAME | WETLAND INDICATOR STATUS |
|---|---|---|
| Hydrophytic Plants | | |
| American sloughgrass | *Beckmannia syzigachne* | OBL |
| Nebraska Sedge | *Carex nebrascensis* | OBL |
| Western Water-Hemlock | *Cicuta douglasii* | OBL |
| Common Spike-Rush | *Eleocharis palustris* | OBL |
| Hard-stem Club-rush | *Schoenoplectus acutus* | OBL |
| Saltmarsh Club-Rush | *Schoenoplectus maritimus* | OBL |
| Three-square | *Schoenoplectus pungens* | OBL |
| Broadleaf Cattail | *Typha latifolia* | OBL |
| Halberd-Leaf Orache | *Atriplex patula* | FACW |
| Clustered Field Sedge | *Carex praegracilis* | FACW |
| Willowherb | *Epilobium sp.* | FACW |
| Baltic Rush | *Juncus balticus* | FACW |
| Reed canarygrass | *Phalaris arundinacea* | FACW |
| Common Reed | *Phragmites australis* | FACW |
| Annual Rabbit's-Foot Grass | *Polypogon monspeliensis* | FACW |
| Coyote Willow | *Salix exigua* | FACW |
| Mexican-Fireweed | *Bassia scoparia* | FAC |
| Coastal Salt Grass | *Distichlis spicata* | FAC |
| Fuller's Teasel | *Dipsacus fullonum* | FAC |
| Fox-tail Barley | *Hordeum jubatum* | FAC |
| Dallisgrass | *Paspalum dilatatum* | FAC |
| Lady's-Thumb | *Persicaria maculosa* | FAC |
| Curly Dock | *Rumex crispus* | FAC |
| Enchanter's nightshade | *Solanum dulcamara* | FAC |
| Upland Plants | | |
| Smooth brome | *Bromus inermis* | FACU |
| Canadian Horseweed | *Conyza canadensis* | FACU |
| Tall Fescue | *Festuca arundinacea* | FACU |
| Little Barley | *Hordeum pusillum* | FACU |
| Prickly Lettuce | *Lactuca serriola* | FACU |
| Clasping Pepperwort | *Lepidium perfoliatum* | FACU |
| Strawberry-Head Clover | *Trifolium fragiferum* | FACU |
| Cheat Grass | *Bromus tectorum* | UPL |
| Whitetop | *Lepidium draba* | UPL |
| Intermediate Wheatgrass | *Thinopyrum intermedium* | UPL |

*USACE 2016, National Wetland Plant List – Arid West

OBL: Obligate Wetland – Almost always occur in wetlands
FACW: Facultative Wetland – Usually occur in wetlands, but may occur in non-wetlands
FAC: Facultative – Occur in wetlands and non-wetlands
FACU: Facultative Upland – Usually occur in non-wetland, but may occur in wetlands
UPL: Obligate Upland – Almost never occur in wetlands

# APPENDIX E: WETLAND DATA SHEETS

# WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: I-15; Springville/Spanish Fork Interchange Study City/County: Utah County Sampling Date: 9/13/2018

Applicant/Owner: Utah Department of Transportation State: UT Sampling Point: 1

Investigator(s): T. Johnson, N. Clarke Section, Township, Range: S7 T8S R3E

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): 0

Subregion (LRR): D - Interior Deserts Lat: 40.144103036 Long: -111.647430206 Datum: WGS 1984

Soil Map Unit Name: Ku—Kirkham silty clay loam, strongly saline-alkali NWI classification: N/A

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 ○ | |
| Hydric Soil Present? | Yes ◉ | No ○ | **Is the Sampled Area within a Wetland?** Yes ◉ No ○ |
| Wetland Hydrology Present? | Yes ◉ | No ○ | |

Remarks: Area has experienced a very dry summer. Appears entire area around sample point has been excavated.

## VEGETATION

| Tree Stratum (Use scientific names.) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| Total Cover: | % | | |
| **Sapling/Shrub Stratum** | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| Total Cover: | % | | |
| **Herb Stratum** | | | |
| 1. *Juncus balticus* | 98 | Yes | FACW |
| 2. *Schoenoplectus pungens* | 2 | | OBL |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| Total Cover: | 100 % | | |
| **Woody Vine Stratum** | | | |
| 1. | | | |
| 2. | | | |
| Total Cover: | % | | |

% Bare Ground in Herb Stratum 0 % % 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: 100.0 % (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: | |
|---|---|---|---|
| OBL species | 2 | x 1 = | 2 |
| FACW species | 98 | x 2 = | 196 |
| FAC species | | x 3 = | 0 |
| FACU species | | x 4 = | 0 |
| UPL species | | x 5 = | 0 |
| Column Totals: | 100 (A) | | 198 (B) |

Prevalence Index = B/A = 1.98

**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.

**Hydrophytic Vegetation Present?** Yes ◉ No ○

Remarks:

## SOIL

Sampling Point: 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 Features % | Type[1] | Loc[2] | Texture[3] | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-10 | 10YR 3/1 | 100 | | | | | Silty Clay | |
| 10-18 | 10YR 4/1 | 95 | 10 YR 4/4 | 5 | C | M | Silty Clay | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

**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[4]:**

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present.

**Restrictive Layer (if present):**

Type:

Depth (inches):

**Hydric Soil Present?** Yes ◉ No ○

Remarks:

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (any one indicator is sufficient)

- ☐ 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 Plowed Soils (C6)
- ☐ 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)
- ☐ Thin Muck Surface (C7)
- ☐ 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: Unknown hydrology source

# WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: I-15; Springville/Spanish Fork Interchange Study City/County: Utah County Sampling Date: 9/13/2018

Applicant/Owner: Utah Department of Transportation State: UT Sampling Point: 2

Investigator(s): T. Johnson, N. Clarke Section, Township, Range: S7 T8S R3E

Landform (hillslope, terrace, etc.): above hillslope Local relief (concave, convex, none): None Slope (%): 2

Subregion (LRR): D - Interior Deserts Lat: 40.144153125 Long: -111.647424444 Datum: WGS 1984

Soil Map Unit Name: Ku—Kirkham silty clay loam, strongly saline-alkali NWI classification: N/A

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 ○ | |
| Hydric Soil Present? | Yes ○ | No ◉ | **Is the Sampled Area within a Wetland?** Yes ○ No ◉ |
| Wetland Hydrology Present? | Yes ○ | No ◉ | |

Remarks: Area has experienced a very dry summer. Sample pit located about 4' higher in elevation than paired pit.

## VEGETATION

| Tree Stratum (Use scientific names.) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| Total Cover: | % | | |
| **Sapling/Shrub Stratum** | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| Total Cover: | % | | |
| **Herb Stratum** | | | |
| 1. *Bromus tectorum* | 40 | Yes | UPL |
| 2. *Thinopyrum intermedium* | 30 | Yes | UPL |
| 3. *Distichlis spicata* | 15 | | FAC |
| 4. *Juncus balticus* | 15 | | FACW |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| Total Cover: | 100 % | | |
| **Woody Vine Stratum** | | | |
| 1. | | | |
| 2. | | | |
| Total Cover: | % | | |

% Bare Ground in Herb Stratum 0 % % 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: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0 % (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: | |
|---|---|---|---|
| OBL species | | x 1 = | 0 |
| FACW species | 15 | x 2 = | 30 |
| FAC species | 15 | x 3 = | 45 |
| FACU species | | x 4 = | 0 |
| UPL species | 70 | x 5 = | 350 |
| Column Totals: | 100 (A) | | 425 (B) |

Prevalence Index = B/A = 4.25

**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.

**Hydrophytic Vegetation Present?** Yes ◉ No ○

Remarks:

## SOIL

Sampling Point: 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[3] | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-13 | 10YR 3/1 | 100 | | | | | Silty Clay | |
| 13-18 | 10YR 4/2 | 100 | | | | | Silty Clay | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

**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[4]:**

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present.

**Restrictive Layer (if present):**

Type: _____

Depth (inches): _____

**Hydric Soil Present?** Yes ○ No ◉

Remarks: None

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (any one indicator is sufficient)

- ☐ 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 Plowed Soils (C6)
- ☐ 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)
- ☐ Thin Muck Surface (C7)
- ☐ 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: None

# WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: I-15; Springville/Spanish Fork Interchange Study City/County: Utah County Sampling Date: 9/13/2018

Applicant/Owner: Utah Department of Transportation State: UT Sampling Point: 3

Investigator(s): T. Johnson, N. Clarke Section, Township, Range: S7 T8S R3E

Landform (hillslope, terrace, etc.): Raised area Local relief (concave, convex, none): None Slope (%): 2

Subregion (LRR): D - Interior Deserts Lat: 40.1436798265184 Long: -111.647676232944 Datum: WGS 1984

Soil Map Unit Name: Ku—Kirkham silty clay loam, strongly saline-alkali NWI classification: N/A

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 ◉ | |
| Hydric Soil Present? | Yes ○ | No ◉ | **Is the Sampled Area within a Wetland?** Yes ○ No ◉ |
| Wetland Hydrology Present? | Yes ○ | No ◉ | |

Remarks: Area has experienced a very dry summer.

## VEGETATION

| Tree Stratum (Use scientific names.) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| Total Cover: | % | | |
| **Sapling/Shrub Stratum** | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| Total Cover: | % | | |
| **Herb Stratum** | | | |
| 1. *Bromus tectorum* | 40 | Yes | UPL |
| 2. *Thinopyrum intermedium* | 20 | Yes | UPL |
| 3. *Distichlis spicata* | 20 | Yes | FAC |
| 4. *Lactuca serriola* | 5 | | FACU |
| 5. *Lepidium perfoliatum* | 5 | | FACU |
| 6. *Hordeum jubatum* | 5 | | FAC |
| 7. | | | |
| 8. | | | |
| Total Cover: | 95 % | | |
| **Woody Vine Stratum** | | | |
| 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: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33.3 % (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: | |
|---|---|---|---|
| OBL species | | x 1 = | 0 |
| FACW species | | x 2 = | 0 |
| FAC species | 25 | x 3 = | 75 |
| FACU species | 10 | x 4 = | 40 |
| UPL species | 60 | x 5 = | 300 |
| Column Totals: | 95 (A) | | 415 (B) |

Prevalence Index = B/A = 4.37

**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.

**Hydrophytic Vegetation Present?** Yes ○ No ◉

Remarks:

## SOIL

Sampling Point: 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[3] | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-5 | 10YR 3/2 | 100 | | | | | Silty Clay | |
| 5-12 | 10YR 5/3 | 100 | | | | | Silty Clay | |
| 12-18 | 10 YR 6/3 | 100 | | | | | Silty Clay | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

**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[4]:**

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present.

**Restrictive Layer (if present):**

Type:

Depth (inches):

**Hydric Soil Present?** Yes ○ No ◉

Remarks: None

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (any one indicator is sufficient)

- ☐ 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 Plowed Soils (C6)
- ☐ 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)
- ☐ Thin Muck Surface (C7)
- ☐ 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: None

# WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: I-15; Springville/Spanish Fork Interchange Study City/County: Utah County Sampling Date: 9/13/2018

Applicant/Owner: Utah Department of Transportation State: UT Sampling Point: 4

Investigator(s): T. Johnson, N. Clarke Section, Township, Range: S7 T8S R3E

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): 2

Subregion (LRR): D - Interior Deserts Lat: 40.1377695580998 Long: -111.647505207 Datum: WGS 1984

Soil Map Unit Name: Kt—Kirkham silty clay loam, moderately saline-alkali NWI classification: N/A

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 ○ | |
| Hydric Soil Present? | Yes ○ | No ◉ | **Is the Sampled Area within a Wetland?** Yes ○ No ◉ |
| Wetland Hydrology Present? | Yes ○ | No ◉ | |

Remarks: Area has experienced a very dry summer. Sample pit located adjacent to railroad tracks

## VEGETATION

| Tree Stratum (Use scientific names.) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| Total Cover: | % | | |
| **Sapling/Shrub Stratum** | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| Total Cover: | % | | |
| **Herb Stratum** | | | |
| 1. *Distichlis spicata* | 40 | Yes | FAC |
| 2. *Phragmites australis* | 30 | Yes | FACW |
| 3. *Bassia scoparia* | 20 | Yes | FAC |
| 4. *Juncus balticus* | 10 | | FACW |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| Total Cover: | 100 % | | |
| **Woody Vine Stratum** | | | |
| 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: 100.0 % (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: | |
|---|---|---|---|
| OBL species | | x 1 = | 0 |
| FACW species | 40 | x 2 = | 80 |
| FAC species | 60 | x 3 = | 180 |
| FACU species | | x 4 = | 0 |
| UPL species | | x 5 = | 0 |
| Column Totals: | 100 (A) | | 260 (B) |

Prevalence Index = B/A = 2.60

**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.

**Hydrophytic Vegetation Present?** Yes ◉ No ○

Remarks:

## SOIL

Sampling Point: 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[3] | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-12 | 10 YR 3/1 | 100 | | | | | Silty Clay | |
| 12-18 | 10 YR 4/3 | 100 | | | | | Sandy Clay | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

**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:[4]**

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present.

**Restrictive Layer (if present):**

Type:

Depth (inches):

**Hydric Soil Present?** Yes ○ No ◉

Remarks: None

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (any one indicator is sufficient)

- ☐ 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 Plowed Soils (C6)
- ☐ 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)
- ☐ Thin Muck Surface (C7)
- ☐ 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: Water appears to pond temporarily in this area, but not long enough to establish a wetland

# WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: I-15; Springville/Spanish Fork Interchange Study City/County: Utah County Sampling Date: 9/13/2018

Applicant/Owner: Utah Department of Transportation State: UT Sampling Point: 5

Investigator(s): T. Johnson, N. Clarke Section, Township, Range: S7 T8S R3E

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): 2

Subregion (LRR): D - Interior Deserts Lat: 40.1407118798 Long: -111.646260836 Datum: WGS 1984

Soil Map Unit Name: Bf—Benjamin silty clay, strongly alkali NWI classification: N/A

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 ○ | |
| Hydric Soil Present? | Yes ○ | No ◉ | **Is the Sampled Area within a Wetland?** Yes ○ No ◉ |
| Wetland Hydrology Present? | Yes ○ | No ◉ | |

Remarks: Area has experienced a very dry summer. Sample pit located adjacent to ditch and horse field

## VEGETATION

| Tree Stratum (Use scientific names.) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| Total Cover: | % | | |
| **Sapling/Shrub Stratum** | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| Total Cover: | % | | |
| **Herb Stratum** | | | |
| 1. *Typha latifolia* | 35 | Yes | OBL |
| 2. *Juncus balticus* | 25 | Yes | FACW |
| 3. *Phalaris arundinacea* | 25 | Yes | FACW |
| 4. *Epilobium sp.* | 15 | | FACW |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| Total Cover: | 100 % | | |
| **Woody Vine Stratum** | | | |
| 1. *Solanum dulcamara* | 10 | Yes | FAC |
| 2. | | | |
| Total Cover: | 10 % | | |

% Bare Ground in Herb Stratum % % Cover of Biotic Crust %

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0 % (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: | |
|---|---|---|---|
| OBL species | 35 | x 1 = | 35 |
| FACW species | 65 | x 2 = | 130 |
| FAC species | 10 | x 3 = | 30 |
| FACU species | | x 4 = | 0 |
| UPL species | | x 5 = | 0 |
| Column Totals: | 110 (A) | | 195 (B) |

Prevalence Index = B/A = 1.77

**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.

**Hydrophytic Vegetation Present?** Yes ◉ No ○

Remarks:

## SOIL

Sampling Point: 5

**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[3] | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-8 | 10 YR 3/2 | 100 | | | | | Silty Clay Loam | |
| 8-18 | 7.5 YR 4/3 | 100 | | | | | Sandy Clay Loam | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

**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:[4]**

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present.

**Restrictive Layer (if present):**

Type:

Depth (inches):

**Hydric Soil Present?** Yes ○ No ◉

Remarks: No indicators

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (any one indicator is sufficient)

- ☐ 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 Plowed Soils (C6)
- ☐ 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)
- ☐ Thin Muck Surface (C7)
- ☐ 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: Adjacent ditch had some water

# WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: I-15; Springville/Spanish Fork Interchange Study City/County: Utah County Sampling Date: 9/13/2018

Applicant/Owner: Utah Department of Transportation State: UT Sampling Point: 6

Investigator(s): T. Johnson, N. Clarke Section, Township, Range: S7 T8S R3E

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): 2

Subregion (LRR): D - Interior Deserts Lat: 40.1406916809 Long: -111.646284574 Datum: WGS 1984

Soil Map Unit Name: Bf—Benjamin silty clay, strongly alkali NWI classification: N/A

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 ○ | |
| Hydric Soil Present? | Yes ◉ | No ○ | **Is the Sampled Area within a Wetland?** Yes ◉ No ○ |
| Wetland Hydrology Present? | Yes ◉ | No ○ | |

Remarks: Area has experienced a very dry summer. Sample pit located in wet ditch.

## VEGETATION

| Tree Stratum (Use scientific names.) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| Total Cover: | % | | |
| **Sapling/Shrub Stratum** | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| Total Cover: | % | | |
| **Herb Stratum** | | | |
| 1. *Typha latifolia* | 45 | Yes | OBL |
| 2. *Phalaris arundinacea* | 45 | Yes | FACW |
| 3. *Juncus balticus* | 10 | | FACW |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| Total Cover: | 100 % | | |
| **Woody Vine Stratum** | | | |
| 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: 100.0 % (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: | |
|---|---|---|---|
| OBL species | 45 | x 1 = | 45 |
| FACW species | 55 | x 2 = | 110 |
| FAC species | | x 3 = | 0 |
| FACU species | | x 4 = | 0 |
| UPL species | | x 5 = | 0 |
| Column Totals: | 100 (A) | | 155 (B) |

Prevalence Index = B/A = 1.55

**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.

**Hydrophytic Vegetation Present?** Yes ◉ No ○

Remarks:

## SOIL

Sampling Point: 6

**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[3] | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-9 | 10 YR 3/2 | 100 | | | | | Silty Clay Loam | |
| 9-18 | 10 YR 4/2 | 100 | | | | | Sandy Clay Loam | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

**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[4]:**

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☒ Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present.

**Restrictive Layer (if present):**

Type:

Depth (inches):

**Hydric Soil Present?** Yes ◉ No ○

Remarks: Soil could be disturbed from excavating the ditch. Does not meet indicators, but is counted due to vegetation and hydrology. Problematic soil conditions of Moderately to Very Strongly Alkaline Soils may also occur, reducing redox visibility.

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (any one indicator is sufficient)

- ☒ 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 Plowed Soils (C6)
- ☐ 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)
- ☐ Thin Muck Surface (C7)
- ☐ 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): 1"

Water Table Present? Yes ○ No ◉ Depth (inches):

Saturation Present? (includes capillary fringe) Yes ◉ No ○ Depth (inches): Surface

**Wetland Hydrology Present?** Yes ◉ No ○

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Surface is saturated, but not below 6". Water is associated with the ditch

# WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: I-15; Springville/Spanish Fork Interchange Study City/County: Utah County Sampling Date: 9/13/2018

Applicant/Owner: Utah Department of Transportation State: UT Sampling Point: 7

Investigator(s): T. Johnson, N. Clarke Section, Township, Range: S7 T8S R3E

Landform (hillslope, terrace, etc.): Slight Depression Local relief (concave, convex, none): Concave Slope (%): 2

Subregion (LRR): D - Interior Deserts Lat: 40.1400513941 Long: -111.646285266 Datum: WGS 1984

Soil Map Unit Name: Bf—Benjamin silty clay, strongly alkali NWI classification: N/A

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 ○ | |
| Hydric Soil Present? | Yes ○ | No ◉ | **Is the Sampled Area within a Wetland?** Yes ○ No ◉ |
| Wetland Hydrology Present? | Yes ○ | No ◉ | |

Remarks: Area has experienced a very dry summer. Sample pit located in slight depression in an open field. This is a depressional area in a field where it appears irrigation practices have changed and area is no longer receiving tail water.

## VEGETATION

| Tree Stratum (Use scientific names.) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| Total Cover: | % | | |
| **Sapling/Shrub Stratum** | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| Total Cover: | % | | |
| **Herb Stratum** | | | |
| 1. *Schoenoplectus acutus* | 40 | Yes | OBL |
| 2. *Persicaria maculosa* | 15 | | FAC |
| 3. *Juncus balticus* | 10 | | FACW |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| Total Cover: | 65 % | | |
| **Woody Vine Stratum** | | | |
| 1. | | | |
| 2. | | | |
| Total Cover: | % | | |

% Bare Ground in Herb Stratum 35 % % 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: 100.0 % (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: | |
|---|---|---|---|
| OBL species | 40 | x 1 = | 40 |
| FACW species | 10 | x 2 = | 20 |
| FAC species | 15 | x 3 = | 45 |
| FACU species | | x 4 = | 0 |
| UPL species | | x 5 = | 0 |
| Column Totals: | 65 (A) | | 105 (B) |

Prevalence Index = B/A = 1.62

**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.

**Hydrophytic Vegetation Present?** Yes ◉ No ○

Remarks:

## SOIL

Sampling Point: 7

**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[3] | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-8 | 10 YR 3/2 | 100 | | | | | Silty Clay | |
| 8-18 | 10 YR 5/3 | 60 | | | | | Silty Clay | |
| 8-18 | 7.5 YR 4/4 | 40 | | | | | Silty Clay | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

**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[4]:**

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present.

**Restrictive Layer (if present):**

Type:

Depth (inches):

**Hydric Soil Present?** Yes ○ No ◉

Remarks: None

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (any one indicator is sufficient)

- ☐ 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 Plowed Soils (C6)
- ☐ 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)
- ☐ Thin Muck Surface (C7)
- ☐ 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: Appears to have been flood irrigated in the past

# WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: I-15; Springville/Spanish Fork Interchange Study City/County: Utah County Sampling Date: 9/13/2018

Applicant/Owner: Utah Department of Transportation State: UT Sampling Point: 8

Investigator(s): T. Johnson, N. Clarke Section, Township, Range: S7 T8S R3E

Landform (hillslope, terrace, etc.): Field Local relief (concave, convex, none): none Slope (%): none

Subregion (LRR): D - Interior Deserts Lat: 40.1395434182 Long: -111.64629622 Datum: WGS 1984

Soil Map Unit Name: Bf—Benjamin silty clay, strongly alkali NWI classification: N/A

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 ○ | |
| Hydric Soil Present? | Yes ○ | No ◉ | **Is the Sampled Area within a Wetland?** Yes ○ No ◉ |
| Wetland Hydrology Present? | Yes ○ | No ◉ | |

Remarks: Area has experienced a very dry summer. Area around the sample pit appears to be drying out. This is a depressional area in a field where it appears irrigation practices have changed and area is no longer receiving tail water.

## VEGETATION

| Tree Stratum (Use scientific names.) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| Total Cover: | % | | |
| **Sapling/Shrub Stratum** | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| Total Cover: | % | | |
| **Herb Stratum** | | | |
| 1. *Juncus balticus* | 65 | Yes | FACW |
| 2. *Carex praegracilis* | 25 | Yes | FACW |
| 3. *Distichlis spicata* | 5 | | FAC |
| 4. *Conyza canadensis* | 5 | | FACU |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| Total Cover: | 100 % | | |
| **Woody Vine Stratum** | | | |
| 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: 100.0 % (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: | |
|---|---|---|---|
| OBL species | | x 1 = | 0 |
| FACW species | 90 | x 2 = | 180 |
| FAC species | 5 | x 3 = | 15 |
| FACU species | 5 | x 4 = | 20 |
| UPL species | | x 5 = | 0 |
| Column Totals: | 100 (A) | | 215 (B) |

Prevalence Index = B/A = 2.15

**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.

**Hydrophytic Vegetation Present?** Yes ◉ No ○

Remarks:

## SOIL

Sampling Point: 8

**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[3] | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-5 | 10 YR 4/3 | 100 | | | | | Silty Clay | |
| 5-18 | 7.5 YR 5/3 | 60 | | | | | Silty Clay | |
| 5-18 | 7.5 YR 4/3 | 40 | | | | | Silty Clay | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

**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[4]:**

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present.

**Restrictive Layer (if present):**

Type:

Depth (inches):

**Hydric Soil Present?** Yes ○ No ◉

Remarks: None

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (any one indicator is sufficient)

- ☐ 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 Plowed Soils (C6)
- ☐ 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)
- ☐ Thin Muck Surface (C7)
- ☐ 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: None

# WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: I-15; Springville/Spanish Fork Interchange Study City/County: Utah County Sampling Date: 9/13/2018

Applicant/Owner: Utah Department of Transportation State: UT Sampling Point: 9

Investigator(s): T. Johnson, N. Clarke Section, Township, Range: S7 T8S R3E

Landform (hillslope, terrace, etc.): Ditch bank Local relief (concave, convex, none): none Slope (%): 5

Subregion (LRR): D - Interior Deserts Lat: 40.1427376238 Long: -111.645442661 Datum: WGS 1984

Soil Map Unit Name: Bf—Benjamin silty clay, strongly alkali NWI classification: N/A

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 ◉ | |
| Hydric Soil Present? | Yes ○ | No ◉ | **Is the Sampled Area within a Wetland?** Yes ○ No ◉ |
| Wetland Hydrology Present? | Yes ○ | No ◉ | |

Remarks: Area has experienced a very dry summer. Located adjacent to concrete ditch.

## VEGETATION

| Tree Stratum (Use scientific names.) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| Total Cover: | % | | |
| **Sapling/Shrub Stratum** | | | |
| 1. *Salix exigua* | 40 | Yes | FACW |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| Total Cover: | 40 % | | |
| **Herb Stratum** | | | |
| 1. *Bromus inermis* | 45 | Yes | FACU |
| 2. *Festuca arundinacea* | 45 | Yes | FACU |
| 3. *Lepidium draba* | 5 | | UPL |
| 4. *Cicuta douglasii* | 5 | | OBL |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| Total Cover: | 100 % | | |
| **Woody Vine Stratum** | | | |
| 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: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33.3 % (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: | |
|---|---|---|---|
| OBL species | 5 | x 1 = | 5 |
| FACW species | 40 | x 2 = | 80 |
| FAC species | | x 3 = | 0 |
| FACU species | 90 | x 4 = | 360 |
| UPL species | 5 | x 5 = | 25 |
| Column Totals: | 140 (A) | | 470 (B) |

Prevalence Index = B/A = 3.36

**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.

**Hydrophytic Vegetation Present?** Yes ○ No ◉

Remarks:

## SOIL

Sampling Point: 9

**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[3] | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-18 | 10 YR 3/2 | 100 | | | | | Silty Clay Loam | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

**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[4]:**

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present.

**Restrictive Layer (if present):**

Type:

Depth (inches):

**Hydric Soil Present?** Yes ○ No ◉

Remarks: None

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (any one indicator is sufficient)

- ☐ 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 Plowed Soils (C6)
- ☐ 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)
- ☐ Thin Muck Surface (C7)
- ☐ 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: None

# WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: I-15; Springville/Spanish Fork Interchange Study City/County: Utah County Sampling Date: 9/19/2018

Applicant/Owner: Utah Department of Transportation State: UT Sampling Point: 10

Investigator(s): T. Johnson, N. Clarke Section, Township, Range: S6 T8S R3E

Landform (hillslope, terrace, etc.): Field Local relief (concave, convex, none): none Slope (%): 0

Subregion (LRR): D - Interior Deserts Lat: 40.1449661794 Long: -111.649018687 Datum: WGS 1984

Soil Map Unit Name: Bf—Benjamin silty clay, strongly alkali NWI classification: N/A

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 ◉ | |
| Hydric Soil Present? | Yes ○ | No ◉ | **Is the Sampled Area within a Wetland?** Yes ○ No ◉ |
| Wetland Hydrology Present? | Yes ○ | No ◉ | |

Remarks: Area has experienced a very dry summer. Located in a field near Dry Creek.

## VEGETATION

| Tree Stratum (Use scientific names.) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| Total Cover: | % | | |
| **Sapling/Shrub Stratum** | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| Total Cover: | % | | |
| **Herb Stratum** | | | |
| 1. *Distichlis spicata* | 50 | Yes | FAC |
| 2. *Thinopyrum intermedium* | 20 | Yes | UPL |
| 3. *Hordeum pusillum* | 20 | Yes | FACU |
| 4. *Atriplex patula* | 5 | | FACW |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| Total Cover: | 95 % | | |
| **Woody Vine Stratum** | | | |
| 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: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33.3 % (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: | |
|---|---|---|---|
| OBL species | | x 1 = | 0 |
| FACW species | 5 | x 2 = | 10 |
| FAC species | 50 | x 3 = | 150 |
| FACU species | 20 | x 4 = | 80 |
| UPL species | 20 | x 5 = | 100 |
| Column Totals: | 95 (A) | | 340 (B) |

Prevalence Index = B/A = 3.58

**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.

**Hydrophytic Vegetation Present?** Yes ○ No ◉

Remarks:

## SOIL

Sampling Point: 10

**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[3] | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-18 | 10 YR 5/3 | 100 | | | | | Silty Clay | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

**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[4]:**

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present.

**Restrictive Layer (if present):**

Type:

Depth (inches):

**Hydric Soil Present?** Yes ○ No ◉

Remarks: None

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (any one indicator is sufficient)

- ☐ 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 Plowed Soils (C6)
- ☐ 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)
- ☐ Thin Muck Surface (C7)
- ☐ 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: None

# WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: I-15; Springville/Spanish Fork Interchange Study City/County: Utah County Sampling Date: 9/19/2018

Applicant/Owner: Utah Department of Transportation State: UT Sampling Point: 11

Investigator(s): T. Johnson, N. Clarke Section, Township, Range: S7 T8S R3E

Landform (hillslope, terrace, etc.): Field Local relief (concave, convex, none): none Slope (%): 0

Subregion (LRR): D - Interior Deserts Lat: 40.1441440558 Long: -111.652540262 Datum: WGS 1984

Soil Map Unit Name: MX—Mixed alluvial land, saline NWI classification: N/A

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 ○ | |
| Hydric Soil Present? | Yes ◉ | No ○ | **Is the Sampled Area within a Wetland?** Yes ◉ No ○ |
| Wetland Hydrology Present? | Yes ◉ | No ○ | |

Remarks: Area has experienced a very dry summer. Located in man-made ditch

## VEGETATION

| Tree Stratum (Use scientific names.) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| Total Cover: | % | | |
| **Sapling/Shrub Stratum** | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| Total Cover: | % | | |
| **Herb Stratum** | | | |
| 1. *Distichlis spicata* | 25 | Yes | FAC |
| 2. *Eleocharis palustris* | 25 | Yes | OBL |
| 3. *Typha latifolia* | 15 | | OBL |
| 4. *Bolboschoenus maritimus* | 15 | | UPL |
| 5. *Polypogon monspeliensis* | 10 | | FACW |
| 6. *Hordeum jubatum* | 10 | | FAC |
| 7. | | | |
| 8. | | | |
| Total Cover: | 100 % | | |
| **Woody Vine Stratum** | | | |
| 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: 100.0 % (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: | |
|---|---|---|---|
| OBL species | 40 | x 1 = | 40 |
| FACW species | 10 | x 2 = | 20 |
| FAC species | 35 | x 3 = | 105 |
| FACU species | | x 4 = | 0 |
| UPL species | 15 | x 5 = | 75 |
| Column Totals: | 100 (A) | | 240 (B) |

Prevalence Index = B/A = 2.40

**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.

**Hydrophytic Vegetation Present?** Yes ◉ No ○

Remarks:

## SOIL

Sampling Point: 11

**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[3] | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-6 | 10 YR 4/2 | 100 | | | | | Silty Clay | |
| 6-18 | 10 YR 5/2 | 98 | 10 YR 5/6 | 2 | C | M | Silty Clay | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

**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[4]:**

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present.

**Restrictive Layer (if present):**

Type:

Depth (inches):

**Hydric Soil Present?** Yes ◉ No ○

Remarks:

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (any one indicator is sufficient)

- ☐ 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 Plowed Soils (C6)
- ☐ 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)
- ☐ Thin Muck Surface (C7)
- ☐ 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): Surface

**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: I-15; Springville/Spanish Fork Interchange Study City/County: Utah County Sampling Date: 9/19/2018

Applicant/Owner: Utah Department of Transportation State: UT Sampling Point: 12

Investigator(s): T. Johnson, N. Clarke Section, Township, Range: S7 T8S R3E

Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): none Slope (%): 0

Subregion (LRR): D - Interior Deserts Lat: 40.1441512341 Long: -111.65251792 Datum: WGS 1984

Soil Map Unit Name: MX—Mixed alluvial land, saline NWI classification: N/A

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 ◉ | |
| Hydric Soil Present? | Yes ○ | No ◉ | **Is the Sampled Area within a Wetland?** Yes ○ No ◉ |
| Wetland Hydrology Present? | Yes ○ | No ◉ | |

Remarks: Area has experienced a very dry summer. Located 5' higher in elevation than paired pit.

## VEGETATION

| Tree Stratum (Use scientific names.) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| Total Cover: | % | | |
| **Sapling/Shrub Stratum** | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| Total Cover: | % | | |
| **Herb Stratum** | | | |
| 1. *Hordeum pusillum* | 30 | Yes | FACU |
| 2. *Bromus tectorum* | 20 | Yes | UPL |
| 3. *Distichlis spicata* | 15 | | FAC |
| 4. *Lepidium perfoliatum* | 15 | | FAC |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| Total Cover: | 80 % | | |
| **Woody Vine Stratum** | | | |
| 1. | | | |
| 2. | | | |
| Total Cover: | % | | |

% Bare Ground in Herb Stratum 20 % % 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: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0 % (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: | |
|---|---|---|---|
| OBL species | | x 1 = | 0 |
| FACW species | | x 2 = | 0 |
| FAC species | 30 | x 3 = | 90 |
| FACU species | 30 | x 4 = | 120 |
| UPL species | 20 | x 5 = | 100 |
| Column Totals: | 80 (A) | | 310 (B) |

Prevalence Index = B/A = 3.88

**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.

**Hydrophytic Vegetation Present?** Yes ○ No ◉

Remarks:

## SOIL

Sampling Point: 12

**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[3] | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-9 | 10 YR 4/2 | 100 | | | | | Silty Clay | |
| 9-18 | 10 YR 4/3 | 100 | | | | | Silty Clay | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

**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[4]:**

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present.

**Restrictive Layer (if present):**

Type: _____

Depth (inches): _____

**Hydric Soil Present?** Yes ○ No ◉

Remarks: None

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (any one indicator is sufficient)

- ☐ 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 Plowed Soils (C6)
- ☐ 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)
- ☐ Thin Muck Surface (C7)
- ☐ 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: None

# WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: I-15; Springville/Spanish Fork Interchange Study City/County: Utah County Sampling Date: 9/19/2018

Applicant/Owner: Utah Department of Transportation State: UT Sampling Point: 13

Investigator(s): T. Johnson, N. Clarke Section, Township, Range: S7 T8S R3E

Landform (hillslope, terrace, etc.): depression Local relief (concave, convex, none): concave Slope (%): 0

Subregion (LRR): D - Interior Deserts Lat: 40.1444045245 Long: 111.639425122 Datum: WGS 1984

Soil Map Unit Name: Bd—Benjamin silty clay NWI classification: N/A

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 ○ | |
| Hydric Soil Present? | Yes ○ | No ◉ | **Is the Sampled Area within a Wetland?** Yes ○ No ◉ |
| Wetland Hydrology Present? | Yes ○ | No ◉ | |

Remarks: Area has experienced a very dry summer. Depression near railroad tracks

## VEGETATION

| Tree Stratum (Use scientific names.) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| Total Cover: | % | | |
| **Sapling/Shrub Stratum** | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| Total Cover: | % | | |
| **Herb Stratum** | | | |
| 1. *Distichlis spicata* | 100 | Yes | FAC |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| Total Cover: | 100 % | | |
| **Woody Vine Stratum** | | | |
| 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: 100.0 % (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: | |
|---|---|---|---|
| OBL species | | x 1 = | 0 |
| FACW species | | x 2 = | 0 |
| FAC species | 100 | x 3 = | 300 |
| FACU species | | x 4 = | 0 |
| UPL species | | x 5 = | 0 |
| Column Totals: | 100 (A) | | 300 (B) |

Prevalence Index = B/A = 3.00

**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.

**Hydrophytic Vegetation Present?** Yes ◉ No ○

Remarks:

## SOIL

Sampling Point: 13

**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[3] | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-9 | 10 YR 3/1 | 100 | | | | | Silty Clay | |
| 9-12 | 10 YR 4/2 | 100 | | | | | Silty Clay | |
| 12-18 | 10 YR 5/2 | 100 | | | | | Silty Clay | |
| 18-22 | 10 YR 5/3 | 100 | | | | | Silty Clay | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

**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:[4]**

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present.

**Restrictive Layer (if present):**

Type:

Depth (inches):

**Hydric Soil Present?** Yes ○ No ◉

Remarks: No indicators

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (any one indicator is sufficient)

- ☐ 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 Plowed Soils (C6)
- ☐ 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)
- ☐ Thin Muck Surface (C7)
- ☐ 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): 14

**Wetland Hydrology Present?** Yes ○ No ◉

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: None

# WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: I-15; Springville/Spanish Fork Interchange Study City/County: Utah County Sampling Date: 9/19/2018

Applicant/Owner: Utah Department of Transportation State: UT Sampling Point: 14

Investigator(s): T. Johnson, N. Clarke Section, Township, Range: S7 T8S R3E

Landform (hillslope, terrace, etc.): depression Local relief (concave, convex, none): concave Slope (%): 0

Subregion (LRR): D - Interior Deserts Lat: 40.1444404762 Long: -111.631958074 Datum: WGS 1984

Soil Map Unit Name: Payson-Terrace escarpments complex, 1 to 20 percent slopes, eroded NWI classification: N/A

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 ○ | |
| Hydric Soil Present? | Yes ◉ | No ○ | **Is the Sampled Area within a Wetland?** Yes ◉ No ○ |
| Wetland Hydrology Present? | Yes ◉ | No ○ | |

Remarks: Area has experienced a very dry summer. Depression near railroad tracks

## VEGETATION

| Tree Stratum (Use scientific names.) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| Total Cover: | % | | |
| **Sapling/Shrub Stratum** | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| Total Cover: | % | | |
| **Herb Stratum** | | | |
| 1. *Schoenoplectus acutus* | 100 | Yes | OBL |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| Total Cover: | 100 % | | |
| **Woody Vine Stratum** | | | |
| 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: 100.0 % (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: | |
|---|---|---|---|
| OBL species | 100 | x 1 = | 100 |
| FACW species | | x 2 = | 0 |
| FAC species | | x 3 = | 0 |
| FACU species | | x 4 = | 0 |
| UPL species | | x 5 = | 0 |
| Column Totals: | 100 (A) | | 100 (B) |

Prevalence Index = B/A = 1.00

**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.

**Hydrophytic Vegetation Present?** Yes ◉ No ○

Remarks:

## SOIL

Sampling Point: 14

**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[3] | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-7 | 10 YR 2/1 | 100 | | | | | Silty Clay | |
| 7-18 | 10 YR 4/2 | 100 | | | | | Silty Clay | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

**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[4]:**

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present.

**Restrictive Layer (if present):**

Type:

Depth (inches):

**Hydric Soil Present?** Yes ◉ No ○

Remarks:

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (any one indicator is sufficient)

- ☐ 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 Plowed Soils (C6)
- ☐ 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)
- ☐ Thin Muck Surface (C7)
- ☐ 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): 10 |
| Saturation Present? (includes capillary fringe) | Yes ◉ | No ○ | Depth (inches): 0 |

**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: I-15; Springville/Spanish Fork Interchange Study City/County: Utah County Sampling Date: 9/19/2018

Applicant/Owner: Utah Department of Transportation State: UT Sampling Point: 15

Investigator(s): T. Johnson, N. Clarke Section, Township, Range: S8 T8S R3E

Landform (hillslope, terrace, etc.): depression Local relief (concave, convex, none): concave Slope (%): 0

Subregion (LRR): D - Interior Deserts Lat: 40.1445160186 Long: -111.631414418 Datum: WGS 1984

Soil Map Unit Name: Payson-Terrace escarpments complex, 1 to 20 percent slopes, eroded NWI classification: N/A

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 ◉ | |
| Hydric Soil Present? | Yes ○ | No ◉ | **Is the Sampled Area within a Wetland?** Yes ○ No ◉ |
| Wetland Hydrology Present? | Yes ○ | No ◉ | |

Remarks: Area has experienced a very dry summer. Located in irrigated pasture

## VEGETATION

| Tree Stratum (Use scientific names.) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| Total Cover: | % | | |
| **Sapling/Shrub Stratum** | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| Total Cover: | % | | |
| **Herb Stratum** | | | |
| 1. *Festuca arundinacea* | 65 | Yes | FACU |
| 2. *Carex praegracilis* | 20 | Yes | FACW |
| 3. *Trifolium fragiferum* | 15 | | FACU |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| Total Cover: | 100 % | | |
| **Woody Vine Stratum** | | | |
| 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: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50.0 % (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: | |
|---|---|---|---|
| OBL species | | x 1 = | 0 |
| FACW species | 20 | x 2 = | 40 |
| FAC species | | x 3 = | 0 |
| FACU species | 80 | x 4 = | 320 |
| UPL species | | x 5 = | 0 |
| Column Totals: | 100 (A) | | 360 (B) |

Prevalence Index = B/A = 3.60

**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.

**Hydrophytic Vegetation Present?** Yes ○ No ◉

Remarks:

## SOIL

Sampling Point: 15

**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[3] | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-3 | 10 YR 3/2 | 100 | | | | | Silty Clay | |
| 3-18 | 10 YR 5/3 | 100 | | | | | Silty Clay | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

**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[4]:**

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present.

**Restrictive Layer (if present):**

Type: _____

Depth (inches): _____

**Hydric Soil Present?** Yes ○ No ◉

Remarks: None

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (any one indicator is sufficient)

- ☐ 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 Plowed Soils (C6)
- ☐ 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)
- ☐ Thin Muck Surface (C7)
- ☐ 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: None

# WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: I-15; Springville/Spanish Fork Interchange Study City/County: Utah County Sampling Date: 9/19/2018

Applicant/Owner: Utah Department of Transportation State: UT Sampling Point: 16

Investigator(s): T. Johnson, N. Clarke Section, Township, Range: S5 T8S R3E

Landform (hillslope, terrace, etc.): Roadside ditch Local relief (concave, convex, none): concave Slope (%): 2

Subregion (LRR): D - Interior Deserts Lat: 40.1446818440527 Long: -111.624227690765 Datum: WGS 1984

Soil Map Unit Name: Pd—Payson silty clay loam NWI classification: N/A

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 ○ | |
| Hydric Soil Present? | Yes ○ | No ◉ | **Is the Sampled Area within a Wetland?** Yes ○ No ◉ |
| Wetland Hydrology Present? | Yes ○ | No ◉ | |

Remarks: Area has experienced a very dry summer. Located in roadside ditch

## VEGETATION

| Tree Stratum (Use scientific names.) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| Total Cover: | % | | |
| **Sapling/Shrub Stratum** | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| Total Cover: | % | | |
| **Herb Stratum** | | | |
| 1. *Phalaris arundinacea* | 45 | Yes | FACW |
| 2. *Phragmites australis* | 40 | Yes | FACW |
| 3. *Epilobium sp.* | 10 | | FACW |
| 4. *Conyza canadensis* | 5 | | FACU |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| Total Cover: | 100 % | | |
| **Woody Vine Stratum** | | | |
| 1. *Solanum dulcamara* | 20 | Yes | FAC |
| 2. | | | |
| Total Cover: | 20 % | | |

% 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: 100.0 % (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: | |
|---|---|---|---|
| OBL species | | x 1 = | 0 |
| FACW species | 95 | x 2 = | 190 |
| FAC species | 20 | x 3 = | 60 |
| FACU species | 5 | x 4 = | 20 |
| UPL species | | x 5 = | 0 |
| Column Totals: | 120 (A) | | 270 (B) |

Prevalence Index = B/A = 2.25

**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.

**Hydrophytic Vegetation Present?** Yes ◉ No ○

Remarks:

## SOIL

Sampling Point: 16

**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[3] | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-18 | 10 YR 4/2 | 100 | | | | | Silty Clay | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

**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[4]:**

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present.

**Restrictive Layer (if present):**

Type:

Depth (inches):

**Hydric Soil Present?** Yes ○ No ◉

Remarks: No Indicators

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (any one indicator is sufficient)

- ☐ 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 Plowed Soils (C6)
- ☐ 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)
- ☐ Thin Muck Surface (C7)
- ☐ 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: None

# WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: I-15; Springville/Spanish Fork Interchange Study City/County: Utah County Sampling Date: 9/19/2018

Applicant/Owner: Utah Department of Transportation State: UT Sampling Point: 17

Investigator(s): T. Johnson, N. Clarke Section, Township, Range: S8 T8S R3E

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): concave Slope (%): 5

Subregion (LRR): D - Interior Deserts Lat: 40.144580751 Long: -111.623289156 Datum: WGS 1984

Soil Map Unit Name: Pd—Payson silty clay loam NWI classification: N/A

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 ○ | |
| Hydric Soil Present? | Yes ◉ | No ○ | **Is the Sampled Area within a Wetland?** Yes ◉ No ○ |
| Wetland Hydrology Present? | Yes ◉ | No ○ | |

Remarks: Area has experienced a very dry summer. Located in depression by roadway and driveway. Appears to have had a connections to the adjacent waterway, which has been cut off/filled in recently. No paired pit was dug due to topographic changes.

## VEGETATION

| Tree Stratum (Use scientific names.) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| Total Cover: | % | | |
| **Sapling/Shrub Stratum** | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| Total Cover: | % | | |
| **Herb Stratum** | | | |
| 1. *Phragmites australis* | 100 | Yes | FACW |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| Total Cover: | 100 % | | |
| **Woody Vine Stratum** | | | |
| 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: 100.0 % (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: | |
|---|---|---|---|
| OBL species | | x 1 = | 0 |
| FACW species | 100 | x 2 = | 200 |
| FAC species | | x 3 = | 0 |
| FACU species | | x 4 = | 0 |
| UPL species | | x 5 = | 0 |
| Column Totals: | 100 (A) | | 200 (B) |

Prevalence Index = B/A = 2.00

**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.

**Hydrophytic Vegetation Present?** Yes ◉ No ○

Remarks:

## SOIL

Sampling Point: 17

**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[3] | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-6 | 10 YR 2/1 | 100 | | | | | Silty Clay | Muck present at surface |
| 6-18 | 10 YR 4/1 | 100 | | | | | Silty Clay | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- [ ] Histosol (A1)
- [ ] Histic Epipedon (A2)
- [ ] Black Histic (A3)
- [x] Hydrogen Sulfide (A4)
- [ ] Stratified Layers (A5) (**LRR C**)
- [x] 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[4]:**

- [ ] 1 cm Muck (A9) (**LRR C**)
- [ ] 2 cm Muck (A10) (**LRR B**)
- [ ] Reduced Vertic (F18)
- [ ] Red Parent Material (TF2)
- [ ] Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present.

**Restrictive Layer (if present):**

Type:

Depth (inches):

**Hydric Soil Present?** Yes ◉ No ○

Remarks:

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (any one indicator is sufficient)

- [ ] Surface Water (A1)
- [x] High Water Table (A2)
- [x] 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)
- [x] Hydrogen Sulfide Odor (C1)
- [ ] Oxidized Rhizospheres along Living Roots (C3)
- [ ] Presence of Reduced Iron (C4)
- [ ] Recent Iron Reduction in Plowed Soils (C6)
- [ ] 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)
- [ ] Thin Muck Surface (C7)
- [ ] Crayfish Burrows (C8)
- [ ] Saturation Visible on Aerial Imagery (C9)
- [ ] Shallow Aquitard (D3)
- [x] FAC-Neutral Test (D5)

**Field Observations:**

Surface Water Present? Yes ○ No ◉ Depth (inches):

Water Table Present? Yes ◉ No ○ Depth (inches): 9

Saturation Present? (includes capillary fringe) Yes ◉ No ○ Depth (inches): 0

**Wetland Hydrology Present?** Yes ◉ No ○

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: None

# WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: I-15; Springville/Spanish Fork Interchange Study City/County: Utah County Sampling Date: 9/19/2018

Applicant/Owner: Utah Department of Transportation State: UT Sampling Point: 18

Investigator(s): T. Johnson, N. Clarke Section, Township, Range: S8 T8S R3E

Landform (hillslope, terrace, etc.): Open Field Local relief (concave, convex, none): none Slope (%): 0

Subregion (LRR): D - Interior Deserts Lat: 40.144580751 Long: -111.623289156 Datum: WGS 1984

Soil Map Unit Name: Payson-Terrace escarpments complex, 1 to 20 percent slopes, eroded NWI classification: N/A

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 ○ | |
| Hydric Soil Present? | Yes ○ | No ◉ | **Is the Sampled Area within a Wetland?** Yes ○ No ◉ |
| Wetland Hydrology Present? | Yes ○ | No ◉ | |

Remarks: Area has experienced a very dry summer. Located in open field

## VEGETATION

| Tree Stratum (Use scientific names.) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| Total Cover: | % | | |
| **Sapling/Shrub Stratum** | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| Total Cover: | % | | |
| **Herb Stratum** | | | |
| 1. *Phalaris arundinacea* | 30 | Yes | FACW |
| 2. *Carex nebrascensis* | 30 | Yes | OBL |
| 3. *Distichlis spicata* | 25 | Yes | FAC |
| 4. *Juncus balticus* | 15 | | FAC |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| Total Cover: | 100% | | |
| **Woody Vine Stratum** | | | |
| 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: 100.0% (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: | |
|---|---|---|---|
| OBL species | 30 | x 1 = | 30 |
| FACW species | 30 | x 2 = | 60 |
| FAC species | 40 | x 3 = | 120 |
| FACU species | | x 4 = | 0 |
| UPL species | | x 5 = | 0 |
| Column Totals: | 100 (A) | | 210 (B) |

Prevalence Index = B/A = 2.10

**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.

**Hydrophytic Vegetation Present?** Yes ◉ No ○

Remarks:

## SOIL

Sampling Point: 18

**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[3] | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-3 | 10 YR 4/2 | 100 | | | | | Silty Clay | |
| 3-18 | 10 YR 4/3 | 100 | | | | | Silty Clay | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

**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[4]:**

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present.

**Restrictive Layer (if present):**

Type:

Depth (inches):

**Hydric Soil Present?** Yes ○ No ◉

Remarks: No indicators

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (any one indicator is sufficient)

- ☐ 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 Plowed Soils (C6)
- ☐ 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)
- ☐ Thin Muck Surface (C7)
- ☐ 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: Low point in a field that was once irrigated, but no longer is.

# WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: I-15; Springville/Spanish Fork Interchange Study City/County: Utah County Sampling Date: 9/19/2018

Applicant/Owner: Utah Department of Transportation State: UT Sampling Point: 19

Investigator(s): T. Johnson, N. Clarke Section, Township, Range: S5 T8S R3E

Landform (hillslope, terrace, etc.): roadside ditch Local relief (concave, convex, none): concave Slope (%): 0

Subregion (LRR): D - Interior Deserts Lat: 40.1448045805 Long: -111.617167228 Datum: WGS 1984

Soil Map Unit Name: Pd—Payson silty clay loam NWI classification: N/A

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 ○ | |
| Hydric Soil Present? | Yes ○ | No ◉ | **Is the Sampled Area within a Wetland?** Yes ○ No ◉ |
| Wetland Hydrology Present? | Yes ◉ | No ○ | |

Remarks: Area has experienced a very dry summer. Located in roadside ditch

## VEGETATION

| Tree Stratum (Use scientific names.) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| Total Cover: | % | | |
| **Sapling/Shrub Stratum** | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| Total Cover: | % | | |
| **Herb Stratum** | | | |
| 1. *Phalaris arundinacea* | 80 | Yes | FACW |
| 2. *Phragmites australis* | 20 | Yes | FACW |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| Total Cover: | 100 % | | |
| **Woody Vine Stratum** | | | |
| 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: 100.0 % (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: | |
|---|---|---|---|
| OBL species | | x 1 = | 0 |
| FACW species | 100 | x 2 = | 200 |
| FAC species | | x 3 = | 0 |
| FACU species | | x 4 = | 0 |
| UPL species | | x 5 = | 0 |
| Column Totals: | 100 (A) | | 200 (B) |

Prevalence Index = B/A = 2.00

**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.

**Hydrophytic Vegetation Present?** Yes ◉ No ○

Remarks:

## SOIL

Sampling Point: 19

**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[3] | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-11 | 10 YR 2/2 | 100 | | | | | Silty Clay | |
| 11-18 | 10 YR 3/2 | 100 | | | | | Silty Clay | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

**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[4]:**

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present.

**Restrictive Layer (if present):**

Type:

Depth (inches):

**Hydric Soil Present?** Yes ○ No ◉

Remarks: No indicators

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (any one indicator is sufficient)

- ☒ 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 Plowed Soils (C6)
- ☐ 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)
- ☐ Thin Muck Surface (C7)
- ☐ 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): Surface

Saturation Present? (includes capillary fringe) Yes ◉ No ○ Depth (inches): 0"

**Wetland Hydrology Present?** Yes ◉ No ○

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Collects water from adjacent irrigated field. Hydrology is from surface flow, not groundwater.

# WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: I-15; Springville/Spanish Fork Interchange Study City/County: Utah County Sampling Date: 10/18/2018

Applicant/Owner: Utah Department of Transportation State: UT Sampling Point: 20

Investigator(s): N. Clarke Section, Township, Range: S6, T8S, R3E

Landform (hillslope, terrace, etc.): Open field Local relief (concave, convex, none): concave Slope (%): 0

Subregion (LRR): D - Interior Deserts Lat: 40.1474529753 Long: -111.649606238 Datum: WGS 1984

Soil Map Unit Name: Be—Benjamin silty clay, moderately alkali NWI classification: N/A

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 ○ | |
| Hydric Soil Present? | Yes ◉ | No ○ | **Is the Sampled Area within a Wetland?** Yes ◉ No ○ |
| Wetland Hydrology Present? | Yes ◉ | No ○ | |

Remarks: The area experienced a very dry summer, but received 3" of precipitation in the 2 weeks before this field visit.

## VEGETATION

| Tree Stratum (Use scientific names.) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| Total Cover: | % | | |
| **Sapling/Shrub Stratum** | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| Total Cover: | % | | |
| **Herb Stratum** | | | |
| 1. *Paspalum dilatatum* | 60 | Yes | FAC |
| 2. *Typha latifolia* | 30 | Yes | OBL |
| 3. *Rumex crispus* | 10 | | FAC |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| Total Cover: | 100 % | | |
| **Woody Vine Stratum** | | | |
| 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: 100.0 % (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: | |
|---|---|---|---|
| OBL species | 30 | x 1 = | 30 |
| FACW species | | x 2 = | 0 |
| FAC species | 70 | x 3 = | 210 |
| FACU species | | x 4 = | 0 |
| UPL species | | x 5 = | 0 |
| Column Totals: | 100 (A) | | 240 (B) |

Prevalence Index = B/A = 2.40

**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.

**Hydrophytic Vegetation Present?** Yes ◉ No ○

Remarks:

## SOIL

Sampling Point: 20

**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[3] | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-9 | 10 YR 3/2 | 100 | | | | | Silty Clay | |
| 9-18 | 10 YR 5/2 | 100 | | | | | Silty Clay | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

**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[4]:**

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☒ Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present.

**Restrictive Layer (if present):**

Type:

Depth (inches):

**Hydric Soil Present?** Yes ◉ No ○

Remarks: Further excavation would likely show more depletion based on the typical characteristics of the Benjamin silty clay, moderately alkali, soil type. Problematic soil conditions of Moderately to Very Strongly Alkaline Soils may also occur, reducing redox visibility.

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (any one indicator is sufficient)

- ☐ 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 Plowed Soils (C6)
- ☐ 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)
- ☐ Thin Muck Surface (C7)
- ☐ 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): 2

**Wetland Hydrology Present?** Yes ◉ No ○

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Hydrology may come from adjacent concrete-lined irrigation ditch, or may seasonally pond. Mild saturation throughout may be from recent precipitation, not from the water table.

# WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: I-15; Springville/Spanish Fork Interchange Study City/County: Utah County Sampling Date: 10/18/2018

Applicant/Owner: Utah Department of Transportation State: UT Sampling Point: 21

Investigator(s): N. Clarke Section, Township, Range: S6, T8S, R3E

Landform (hillslope, terrace, etc.): Open field Local relief (concave, convex, none): concave Slope (%): 0

Subregion (LRR): D - Interior Deserts Lat: 40.1471922079 Long: -111.648820233 Datum: WGS 1984

Soil Map Unit Name: Be—Benjamin silty clay, moderately alkali NWI classification: N/A

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 ◉ | |
| Hydric Soil Present? | Yes ○ | No ◉ | **Is the Sampled Area** |
| Wetland Hydrology Present? | Yes ○ | No ◉ | **within a Wetland?** **Yes** ○ **No** ◉ |

Remarks: The area experienced a very dry summer, but received 3" of precipitation in the 2 weeks before this field visit.

## VEGETATION

| Tree Stratum (Use scientific names.) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| Total Cover: | % | | |
| **Sapling/Shrub Stratum** | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| Total Cover: | % | | |
| **Herb Stratum** | | | |
| 1. *Distichlis spicata* | 80 | Yes | FAC |
| 2. *Thinopyrum intermedium* | 20 | Yes | UPL |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| Total Cover: | 100 % | | |
| **Woody Vine Stratum** | | | |
| 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: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50.0 % (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: | |
|---|---|---|---|
| OBL species | | x 1 = | 0 |
| FACW species | | x 2 = | 0 |
| FAC species | 80 | x 3 = | 240 |
| FACU species | | x 4 = | 0 |
| UPL species | 20 | x 5 = | 100 |
| Column Totals: | 100 (A) | | 340 (B) |

Prevalence Index = B/A = 3.40

**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.

**Hydrophytic Vegetation Present?** **Yes** ○ **No** ◉

Remarks:

## SOIL

Sampling Point: 21

**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[3] | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-18 | 10 YR 4/2 | 100 | | | | | Silty Clay | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

**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[4]:**

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present.

**Restrictive Layer (if present):**

Type:

Depth (inches):

**Hydric Soil Present?** Yes ○ No ◉

Remarks: No indicators

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (any one indicator is sufficient)

- ☐ 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 Plowed Soils (C6)
- ☐ 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)
- ☐ Thin Muck Surface (C7)
- ☐ 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 indicators

# WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: I-15; Springville/Spanish Fork Interchange Study City/County: Utah County Sampling Date: 10/18/2018

Applicant/Owner: Utah Department of Transportation State: UT Sampling Point: 22

Investigator(s): N. Clarke Section, Township, Range: S4, T8S, R3E

Landform (hillslope, terrace, etc.): Field Local relief (concave, convex, none): concave Slope (%): 0

Subregion (LRR): D - Interior Deserts Lat: 40.1449479345 Long: -111.613390664 Datum: WGS 1984

Soil Map Unit Name: Mh—McBeth silt loam NWI classification: N/A

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 ○ | |
| Hydric Soil Present? | Yes ◉ | No ○ | **Is the Sampled Area within a Wetland?** Yes ◉ No ○ |
| Wetland Hydrology Present? | Yes ◉ | No ○ | |

Remarks: The area experienced a very dry summer, but received 3" of precipitation in the 2 weeks before this field visit. Sample pit adjacent to pond.

## VEGETATION

| Tree Stratum (Use scientific names.) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| Total Cover: | % | | |
| **Sapling/Shrub Stratum** | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| Total Cover: | % | | |
| **Herb Stratum** | | | |
| 1. *Distichlis spicata* | 50 | Yes | FAC |
| 2. *Juncus balticus* | 50 | Yes | FACW |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| Total Cover: | 100 % | | |
| **Woody Vine Stratum** | | | |
| 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: 100.0 % (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: | |
|---|---|---|---|
| OBL species | | x 1 = | 0 |
| FACW species | 50 | x 2 = | 100 |
| FAC species | 50 | x 3 = | 150 |
| FACU species | | x 4 = | 0 |
| UPL species | | x 5 = | 0 |
| Column Totals: | 100 (A) | | 250 (B) |

Prevalence Index = B/A = 2.50

**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.

**Hydrophytic Vegetation Present?** Yes ◉ No ○

Remarks:

## SOIL

Sampling Point: 22

**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[3] | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-4 | 10 YR 3/3 | 100 | | | | | Silty Clay | |
| 4-8 | 10 YR 4/2 | 100 | | | | | Silty Clay | |
| 8-10 | 10 YR 2/2 | 100 | | | | | Silty Clay | |
| 10-12 | 10 YR 6/3 | 100 | | | | | Sand | |
| 12-18 | 10 YR 3/1 | 100 | | | | | Silty Clay | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

**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[4]:**

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☒ Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present.

**Restrictive Layer (if present):**

Type:

Depth (inches):

**Hydric Soil Present?** Yes ◉ No ○

Remarks: Soil indicates a mixture of upland and hydric soils, possibly from creating the adjacent berm. It is assumed that hydric soils would develop over time. Further excavation would likely show more depletion based on the typical characteristics of the McBeth silt loam soil type. Problematic soil conditions of Moderately to Very Strongly Alkaline Soils may also occur.

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (any one indicator is sufficient)

- ☐ 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 Plowed Soils (C6)
- ☐ 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)
- ☐ Thin Muck Surface (C7)
- ☐ 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): 11 |
| Saturation Present? (includes capillary fringe) | Yes ◉ | No ○ | Depth (inches): 6 |

**Wetland Hydrology Present?** Yes ◉ No ○

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Hydrology source is either a spring located northeast of the pond, irrigation water, or a high water table

# WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: I-15; Springville/Spanish Fork Interchange Study City/County: Utah County Sampling Date: 10/18/2018

Applicant/Owner: Utah Department of Transportation State: UT Sampling Point: 23

Investigator(s): N. Clarke Section, Township, Range: S4, T8S, R3E

Landform (hillslope, terrace, etc.): Berm of pond Local relief (concave, convex, none): convex Slope (%): 10

Subregion (LRR): D - Interior Deserts Lat: 40.1449721363 Long: -111.613333326 Datum: WGS 1984

Soil Map Unit Name: Mh—McBeth silt loam NWI classification: N/A

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 ○ | |
| Hydric Soil Present? | Yes ○ | No ◉ | **Is the Sampled Area within a Wetland?** Yes ○ No ◉ |
| Wetland Hydrology Present? | Yes ○ | No ◉ | |

Remarks: The area experienced a very dry summer, but received 3" of precipitation in the 2 weeks before this field visit. Sample pit on berm adjacent to pond, 3' higher in elevation than paired pit.

## VEGETATION

| Tree Stratum (Use scientific names.) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| Total Cover: | % | | |
| **Sapling/Shrub Stratum** | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| Total Cover: | % | | |
| **Herb Stratum** | | | |
| 1. *Rumex crispus* | 40 | Yes | FAC |
| 2. *Distichlis spicata* | 35 | Yes | FAC |
| 3. *Thinopyrum intermedium* | 25 | Yes | UPL |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| Total Cover: | 100 % | | |
| **Woody Vine Stratum** | | | |
| 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: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 66.7 % (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: | |
|---|---|---|---|
| OBL species | | x 1 = | 0 |
| FACW species | | x 2 = | 0 |
| FAC species | 75 | x 3 = | 225 |
| FACU species | | x 4 = | 0 |
| UPL species | 25 | x 5 = | 125 |
| Column Totals: | 100 (A) | | 350 (B) |

Prevalence Index = B/A = 3.50

**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.

**Hydrophytic Vegetation Present?** Yes ◉ No ○

Remarks:

## SOIL

Sampling Point: 23

**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[3] | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-8 | 10 YR 5/3 | 100 | | | | | Silty Clay | |
| 8-18 | 10 YR 4/3 | 100 | | | | | Clay loam | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

**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[4]:**

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present.

**Restrictive Layer (if present):**

Type: _____

Depth (inches): _____

**Hydric Soil Present?** Yes ○ No ◉

Remarks: No indicators

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (any one indicator is sufficient)

- ☐ 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 Plowed Soils (C6)
- ☐ 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)
- ☐ Thin Muck Surface (C7)
- ☐ 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 indicators

# WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: I-15; Springville/Spanish Fork Interchange Study City/County: Utah County Sampling Date: 10/18/2018

Applicant/Owner: Utah Department of Transportation State: UT Sampling Point: 24

Investigator(s): N. Clarke Section, Township, Range: S8, T8S, R3E

Landform (hillslope, terrace, etc.): Field depression Local relief (concave, convex, none): concave Slope (%): 2

Subregion (LRR): D - Interior Deserts Lat: 40.1445722013 Long: -111.629652521 Datum: WGS 1984

Soil Map Unit Name: Pd—Payson silty clay loam NWI classification: N/A

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 ○ | |
| Hydric Soil Present? | Yes ◉ | No ○ | **Is the Sampled Area within a Wetland?** Yes ◉ No ○ |
| Wetland Hydrology Present? | Yes ◉ | No ○ | |

Remarks: The area experienced a very dry summer, but received 3" of precipitation in the 2 weeks before this field visit. Sample pit located near ponded water in depression of field. Water likely present due to recent precipitation

## VEGETATION

| Tree Stratum (Use scientific names.) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| Total Cover: | % | | |
| **Sapling/Shrub Stratum** | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| Total Cover: | % | | |
| **Herb Stratum** | | | |
| 1. *Carex praegracilis* | 90 | Yes | FACW |
| 2. *Beckmannia syzigachne* | 10 | | OBL |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| Total Cover: | 100 % | | |
| **Woody Vine Stratum** | | | |
| 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: 100.0 % (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: | |
|---|---|---|---|
| OBL species | 10 | x 1 = | 10 |
| FACW species | 90 | x 2 = | 180 |
| FAC species | | x 3 = | 0 |
| FACU species | | x 4 = | 0 |
| UPL species | | x 5 = | 0 |
| Column Totals: | 100 (A) | | 190 (B) |

Prevalence Index = B/A = 1.90

**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.

**Hydrophytic Vegetation Present?** Yes ◉ No ○

Remarks:

## SOIL

Sampling Point: 24

**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[3] | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-2 | 10 YR 3/2 | 100 | | | | | Silty Clay | |
| 2-11 | 10 YR 4/2 | 100 | | | | | Silty Clay | |
| 11-20 | 10 YR 6/2 | 100 | | | | | Silty Clay | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

**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[4]:**

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present.

**Restrictive Layer (if present):**

Type:

Depth (inches):

**Hydric Soil Present?** Yes ◉ No ○

Remarks:

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (any one indicator is sufficient)

- ☐ 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 Plowed Soils (C6)
- ☐ 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)
- ☐ Thin Muck Surface (C7)
- ☐ 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): 6" |

**Wetland Hydrology Present?** Yes ◉ No ○

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Water likely present due to recent precipitation. Flood irrigation likely causes hydrology earlier in the season. Area does not have water all year.

# WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: I-15; Springville/Spanish Fork Interchange Study City/County: Utah County Sampling Date: 10/18/2018

Applicant/Owner: Utah Department of Transportation State: UT Sampling Point: 25

Investigator(s): N. Clarke Section, Township, Range: S7, T8S, R3E

Landform (hillslope, terrace, etc.): Field Local relief (concave, convex, none): concave Slope (%): 2

Subregion (LRR): D - Interior Deserts Lat: 40.1356684241 Long: -111.647587882 Datum: WGS 1984

Soil Map Unit Name: VsA-Vineyard fine sandy loam, moderately saline, 0 to 2 percent slopes NWI classification: N/A

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 ○ | |
| Hydric Soil Present? | Yes ○ | No ◉ | **Is the Sampled Area within a Wetland?** Yes ○ No ◉ |
| Wetland Hydrology Present? | Yes ○ | No ◉ | |

Remarks: The area experienced a very dry summer, but received 3" of precipitation in the 2 weeks before this field visit. Sample pit located in open field. Area may have been previously disturbed.

## VEGETATION

| Tree Stratum (Use scientific names.) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| Total Cover: | % | | |
| **Sapling/Shrub Stratum** | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| Total Cover: | % | | |
| **Herb Stratum** | | | |
| 1. *Bassia scoparia* | 90 | Yes | FAC |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| Total Cover: | 90 % | | |
| **Woody Vine Stratum** | | | |
| 1. | | | |
| 2. | | | |
| Total Cover: | % | | |

% Bare Ground in Herb Stratum 10 % % 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: 100.0 % (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: | |
|---|---|---|---|
| OBL species | | x 1 = | 0 |
| FACW species | | x 2 = | 0 |
| FAC species | 90 | x 3 = | 270 |
| FACU species | | x 4 = | 0 |
| UPL species | | x 5 = | 0 |
| Column Totals: | 90 (A) | | 270 (B) |

Prevalence Index = B/A = 3.00

**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.

**Hydrophytic Vegetation Present?** Yes ◉ No ○

Remarks:

## SOIL

Sampling Point: 25

**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[3] | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-18 | 10 YR 4/3 | 100 | | | | | Clay loam | mixed w/small cobble |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

**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[4]:**

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present.

**Restrictive Layer (if present):**

Type: _____

Depth (inches): _____

**Hydric Soil Present?** Yes ○ No ◉

Remarks: No indicators

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (any one indicator is sufficient)

- ☐ 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 Plowed Soils (C6)
- ☐ 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)
- ☐ Thin Muck Surface (C7)
- ☐ 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 indicators

# WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: I-15; Springville/Spanish Fork Interchange Study City/County: Utah County Sampling Date: 10/18/2018

Applicant/Owner: Utah Department of Transportation State: UT Sampling Point: 26

Investigator(s): N. Clarke Section, Township, Range: S7, T8S, R3E

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): concave Slope (%): 2

Subregion (LRR): D - Interior Deserts Lat: 40.1361111536 Long: -111.64609386 Datum: WGS 1984

Soil Map Unit Name: Mh—McBeth silt loam NWI classification: N/A

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 ◉ | |
| Hydric Soil Present? | Yes ○ | No ◉ | **Is the Sampled Area within a Wetland?** Yes ○ No ◉ |
| Wetland Hydrology Present? | Yes ○ | No ◉ | |

Remarks: The area experienced a very dry summer, but received 3" of precipitation in the 2 weeks before this field visit. Sample pit located in small depression, possibly an old irrigation ditch, in open field.

## VEGETATION

| Tree Stratum (Use scientific names.) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| Total Cover: | % | | |
| **Sapling/Shrub Stratum** | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| Total Cover: | % | | |
| **Herb Stratum** | | | |
| 1. *Distichlis spicata* | 80 | Yes | FAC |
| 2. *Thinopyrum intermedium* | 20 | Yes | UPL |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| Total Cover: | 100 % | | |
| **Woody Vine Stratum** | | | |
| 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: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50.0 % (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: | |
|---|---|---|---|
| OBL species | | x 1 = | 0 |
| FACW species | | x 2 = | 0 |
| FAC species | 80 | x 3 = | 240 |
| FACU species | | x 4 = | 0 |
| UPL species | 20 | x 5 = | 100 |
| Column Totals: | 100 (A) | | 340 (B) |

Prevalence Index = B/A = 3.40

**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.

**Hydrophytic Vegetation Present?** Yes ○ No ◉

Remarks:

## SOIL

Sampling Point: 26

**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[3] | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-4 | 10 YR 4/2 | 100 | | | | | Clay loam | |
| 4-7 | 10 YR 5/3 | 100 | | | | | Sandy Clay | |
| 7-18 | 10 YR 4/2 | 100 | | | | | Clay loam | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

**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[4]:**

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present.

**Restrictive Layer (if present):**

Type: _____

Depth (inches): _____

**Hydric Soil Present?** Yes ○ No ◉

Remarks: No indicators

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (any one indicator is sufficient)

- ☐ 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 Plowed Soils (C6)
- ☐ 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)
- ☐ Thin Muck Surface (C7)
- ☐ 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 indicators

# WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: I-15; Springville/Spanish Fork Interchange Study City/County: Utah County Sampling Date: 06/04/2020

Applicant/Owner: Utah Department of Transportation State: UT Sampling Point: 27

Investigator(s): N. Clarke, J. Howe Section, Township, Range: S6, T8S, R3E

Landform (hillslope, terrace, etc.): Pasture Local relief (concave, convex, none): concave Slope (%): 2

Subregion (LRR): D - Interior Deserts Lat: 40.1473607528 Long: -111.649995665 Datum: WGS 1984

Soil Map Unit Name: Be—Benjamin silty clay, moderately alkali NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes (●) No ( ) (If no, explain in Remarks.)

Are Vegetation [X] 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 ( ) | |
| Hydric Soil Present? | Yes (●) | No ( ) | **Is the Sampled Area within a Wetland?** Yes (●) No ( ) |
| Wetland Hydrology Present? | Yes (●) | No ( ) | |

Remarks: Some vegetation in the area has been grazed

## VEGETATION

| Tree Stratum (Use scientific names.) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| Total Cover: | % | | |
| **Sapling/Shrub Stratum** | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| Total Cover: | % | | |
| **Herb Stratum** | | | |
| 1. *Phalaris arundinacea* | 95 | Yes | FACW |
| 2. *Juncus balticus* | 5 | Yes | FACW |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| Total Cover: | 100 % | | |
| **Woody Vine Stratum** | | | |
| 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: 100.0 % (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: | |
|---|---|---|---|
| OBL species | | x 1 = | 0 |
| FACW species | 100 | x 2 = | 200 |
| FAC species | | x 3 = | 0 |
| FACU species | | x 4 = | 0 |
| UPL species | | x 5 = | 0 |
| Column Totals: | 100 (A) | | 200 (B) |

Prevalence Index = B/A = 2.00

**Hydrophytic Vegetation Indicators:**

- [X] Dominance Test is >50%
- [X] 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.

**Hydrophytic Vegetation Present?** Yes (●) No ( )

Remarks: Some vegetation has been grazed

## SOIL

Sampling Point: 27

**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[3] | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-6 | 10YR 3/2 | 100 | | | | | silty clay | |
| 7-15 | 10YR 4/1 | 100 | | | | | silty clay | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

**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[4]:**

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present.

**Restrictive Layer (if present):**

Type:

Depth (inches):

**Hydric Soil Present?** Yes ◉ No ○

Remarks: Further excavation would likely show more depletion based on the typical characteristics of the Benjamin silty clay, moderately alkali, soil type. Problematic soil conditions of Moderately to Very Strongly Alkaline Soils may also occur, reducing redox visibility.

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (any one indicator is sufficient)

- ☒ 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 Plowed Soils (C6)
- ☐ 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)
- ☐ Thin Muck Surface (C7)
- ☐ 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): | 2 |
| Water Table Present? | Yes ◉ | No ○ | Depth (inches): | 0 |
| Saturation Present? (includes capillary fringe) | Yes ◉ | No ○ | Depth (inches): | 0 |

**Wetland Hydrology Present?** Yes ◉ No ○

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: 3 hydrology indicators present

# WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: I-15; Springville/Spanish Fork Interchange Study City/County: Utah County Sampling Date: 06/05/2020

Applicant/Owner: Utah Department of Transportation State: UT Sampling Point: 28

Investigator(s): N. Clarke, J. Howe Section, Township, Range: S6 T8S, R3E

Landform (hillslope, terrace, etc.): Pasture Local relief (concave, convex, none): convex Slope (%): 2

Subregion (LRR): D - Interior Deserts Lat: 40.1473276424 Long: -111.6502755 Datum: WGS 1984

Soil Map Unit Name: Be—Benjamin silty clay, moderately alkali NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes (●) No ( ) (If no, explain in Remarks.)

Are Vegetation [X] 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 (●) | |
| Hydric Soil Present? | Yes ( ) | No (●) | **Is the Sampled Area within a Wetland?** Yes ( ) No (●) |
| Wetland Hydrology Present? | Yes ( ) | No (●) | |

Remarks: Some vegetation in the area has been grazed

## VEGETATION

| Tree Stratum (Use scientific names.) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| Total Cover: | % | | |
| **Sapling/Shrub Stratum** | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| Total Cover: | % | | |
| **Herb Stratum** | | | |
| 1. *Elymus repens* | 70 | Yes | FAC |
| 2. *Bromus tectorum* | 20 | Yes | UPL |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| Total Cover: | 90 % | | |
| **Woody Vine Stratum** | | | |
| 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: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50.0 % (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: | |
|---|---|---|---|
| OBL species | | x 1 = | 0 |
| FACW species | | x 2 = | 0 |
| FAC species | 70 | x 3 = | 210 |
| FACU species | | x 4 = | 0 |
| UPL species | 20 | x 5 = | 100 |
| Column Totals: | 90 (A) | | 310 (B) |

Prevalence Index = B/A = 3.44

**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.

**Hydrophytic Vegetation Present?** Yes ( ) No (●)

Remarks: Some vegetation has been grazed

## SOIL

Sampling Point: 28

**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[3] | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-17 | 10YR 4/2 | 100 | | | | | silty clay | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

**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[4]:**

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present.

**Restrictive Layer (if present):**

Type:

Depth (inches):

**Hydric Soil Present?** Yes ○ No ◉

Remarks: No hydric soil indicators present

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (any one indicator is sufficient)

- ☐ 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 Plowed Soils (C6)
- ☐ 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)
- ☐ Thin Muck Surface (C7)
- ☐ 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 present

# Arid West Ephemeral and Intermittent Streams OHWM Datasheet

**Project:** I-15; Springville/Spanish Fork Interchange Study
**Date:** 09/19/2018
**Time:** 11:15am
**Project Number:**
**Town:** Utah County
**State:** Utah
**Stream:** Dry Creek
**Photo begin file#:**
**Photo end file#:**
**Investigator(s):** Terry Johnson, Nathan Clarke

Y ☑ / N ☐ Do normal circumstances exist on the site?

Y ☑ / N ☐ Is the site significantly disturbed?

**Location Details:**

**Projection:** Lambert Conformal Conic **Datum:** NAD 83
**Coordinates:** 40.1445489658, -111.652105409

**Potential anthropogenic influences on the channel system:**

Culvert upstream, concrete debris placed on northern bank of stream, sewer water enters upstream

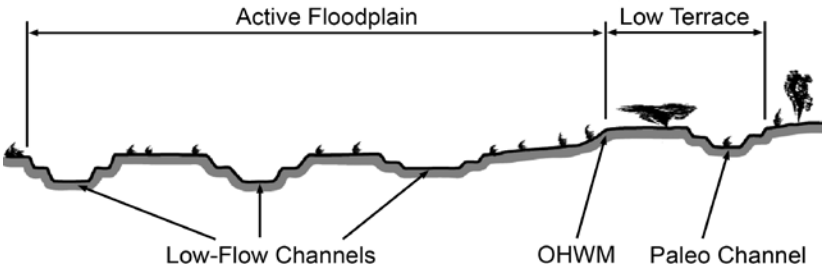
**Brief site description:**

Alluvial flats used for grazing, stream flowing at time of delineation

**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

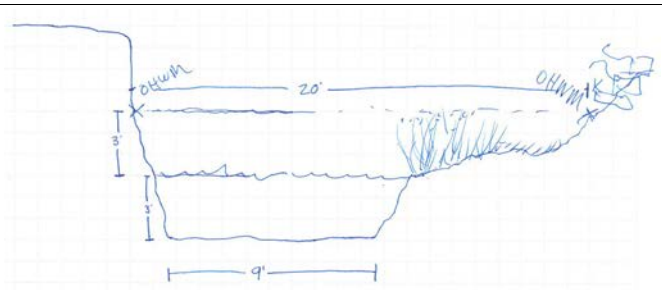



**Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:**

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:

**Project ID:** **Cross section ID:** **Date:** 09/19/2018 **Time:**

**Cross section drawing:**




## OHWM

**GPS point:** 40.1445489658, -111.652105409

**Indicators:**

- ☐ Change in average sediment texture
- ☑ Change in vegetation species
- ☑ Change in vegetation cover
- ☑ Break in bank slope
- ☑ Other: Eroded line on bank
- ☐ Other: _____

**Comments:**

Water flowing at time of delineation

## 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:**

No active floodplain due to steepness of banks. OHWM occurs above some vegetated areas.

**Project ID:** **Cross section ID:** **Date:** 09/19/2018 **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:**

Not present

**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:**

Not present

# Arid West Ephemeral and Intermittent Streams OHWM Datasheet

**Project:** I-15; Springville/Spanish Fork Interchange Study
**Project Number:**
**Stream:** Ditch 1
**Investigator(s):** Terry Johnson, Nathan Clarke

**Date:** 09/19/2018 **Time:** 11:30am
**Town:** Utah County **State:** Utah
**Photo begin file#:** **Photo end file#:**

Y ☑ / N ☐ Do normal circumstances exist on the site?

Y ☑ / N ☐ Is the site significantly disturbed?

**Location Details:**

**Projection:** Lambert Conformal Conic **Datum:** NAD 83
**Coordinates:** 40.1443857023, -111.655256241

**Potential anthropogenic influences on the channel system:**

Manmade drainage ditch

**Brief site description:**

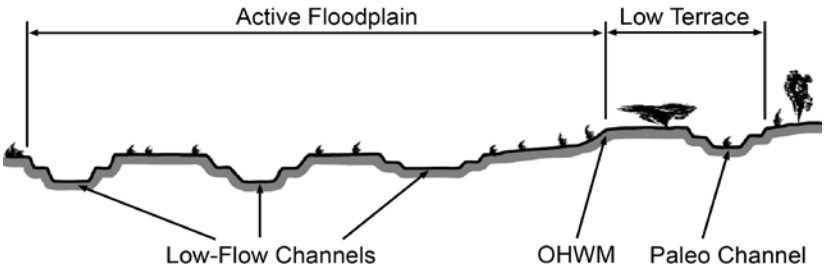
Industrial area adjacent to road and airport. Water slowly flowing at time of delineation.

**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

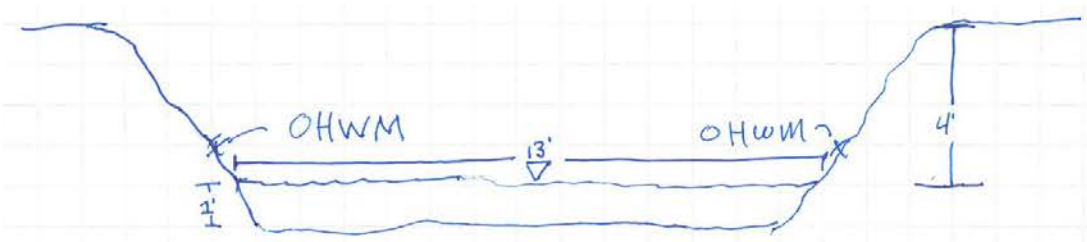



**Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:**

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:

**Project ID:** **Cross section ID:** **Date:** 09/19/2018 **Time:** 11:30am

**Cross section drawing:**




## OHWM

**GPS point:** 40.1443857023, -111.655256241

**Indicators:**

- ☐ Change in average sediment texture
- ☑ Change in vegetation species
- ☑ Change in vegetation cover
- ☑ Break in bank slope
- ☐ Other: _____
- ☐ Other: _____

**Comments:**

Water flowing at time of delineation

## 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:**

No active floodplain due to steepness of banks.

**Project ID:** **Cross section ID:** **Date:** 09/19/2018 **Time:** 11:30am

**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:**

Not present

**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:**

Not present

# Arid West Ephemeral and Intermittent Streams OHWM Datasheet

**Project:** I-15; Springville/Spanish Fork Interchange Study
**Project Number:**
**Stream:** Ditch 2
**Investigator(s):** Terry Johnson, Nathan Clarke

**Date:** 09/19/2018
**Town:** Utah County
**Photo begin file#:**

**Time:** 2:30pm
**State:** Utah
**Photo end file#:**

Y ☑ / N ☐ Do normal circumstances exist on the site?

Y ☐ / N ☑ Is the site significantly disturbed?

**Location Details:**

**Projection:** Lambert Conformal Conic **Datum:** NAD 83
**Coordinates:** 40.1444186956, -111.635979703

**Potential anthropogenic influences on the channel system:**

Ditch adjacent to roadway , flowing during field visit

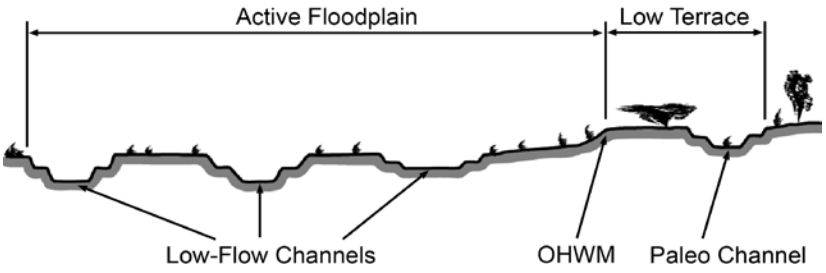
**Brief site description:**

**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

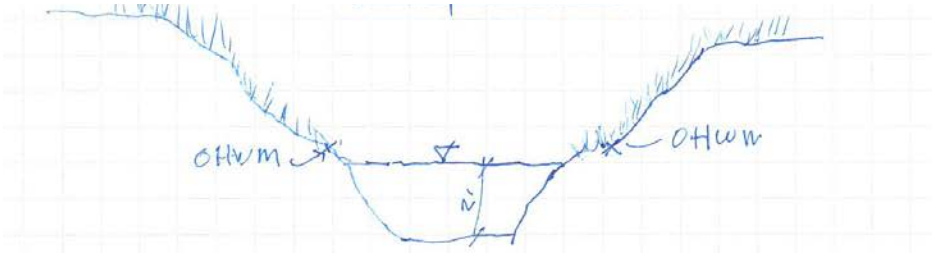



**Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:**

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:

**Project ID:** **Cross section ID:** **Date:** 09/19/2018 **Time:** 2:30pm

**Cross section drawing:**




## OHWM

**GPS point:** 40.1448063957, -111.631151126

**Indicators:**

- ☐ Change in average sediment texture
- ☐ Change in vegetation species
- ☑ Change in vegetation cover
- ☑ Break in bank slope
- ☐ Other: _____
- ☐ Other: _____

**Comments:**

Water flowing at time of delineation

## 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:**

No active floodplain - ditch

**Project ID:** **Cross section ID:** **Date:** 09/19/2018 **Time:** 2:30pm

**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:**

Not present

**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:**

Not present

# Arid West Ephemeral and Intermittent Streams OHWM Datasheet

**Project:** I-15; Springville/Spanish Fork Interchange Study
**Date:** 09/19/2018
**Time:** 3:00pm
**Project Number:**
**Town:** Utah County
**State:** Utah
**Stream:** Ditch 3
**Photo begin file#:**
**Photo end file#:**
**Investigator(s):** Terry Johnson, Nathan Clarke

Y ☑ / N ☐ Do normal circumstances exist on the site?

Y ☐ / N ☑ Is the site significantly disturbed?

**Location Details:**

**Projection:** Lambert Conformal Conic **Datum:** NAD 83
**Coordinates:** 40.1448063957, -111.631151126

**Potential anthropogenic influences on the channel system:**

Ditch adjacent to roadway in a residential area, flowing during field visit

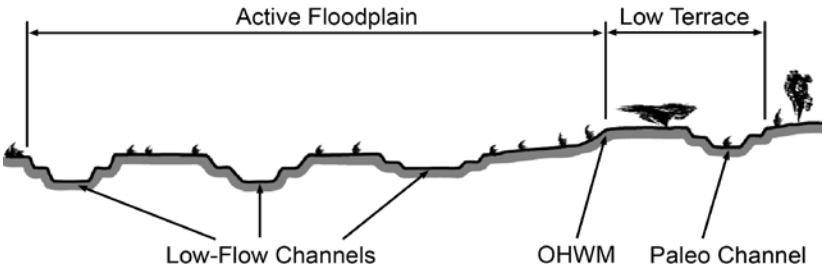
**Brief site description:**

**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

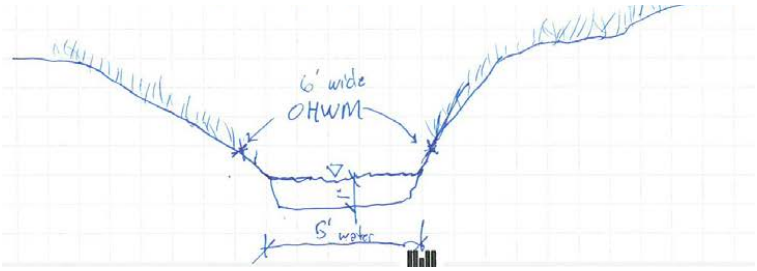



**Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:**

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:

**Project ID:** **Cross section ID:** **Date:** 09/19/2018 **Time:** 3:00pm

**Cross section drawing:**




## OHWM

**GPS point:** 40.1448063957, -111.631151126

**Indicators:**

- ☐ Change in average sediment texture
- ☑ Change in vegetation species
- ☑ Change in vegetation cover
- ☑ Break in bank slope
- ☐ Other: _____
- ☐ Other: _____

**Comments:**

Water flowing at time of delineation

## 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:**

No active floodplain

**Project ID:** **Cross section ID:** **Date:** 09/19/2018 **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:**

Not present

**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:**

Not present

# Arid West Ephemeral and Intermittent Streams OHWM Datasheet

**Project:** I-15; Springville/Spanish Fork Interchange Study
**Date:** 09/19/2018
**Time:** 4:00pm
**Project Number:**
**Town:** Utah County
**State:** Utah
**Stream:** Ditch 4
**Photo begin file#:**
**Photo end file#:**
**Investigator(s):** Terry Johnson, Nathan Clarke

Y ☑ / N ☐ Do normal circumstances exist on the site?

Y ☐ / N ☑ Is the site significantly disturbed?

**Location Details:**

**Projection:** Lambert Conformal Conic **Datum:** NAD 83
**Coordinates:** 40.144706743, -111.620016577

**Potential anthropogenic influences on the channel system:**

Ditch adjacent to roadway flowing during field visit

**Brief site description:**

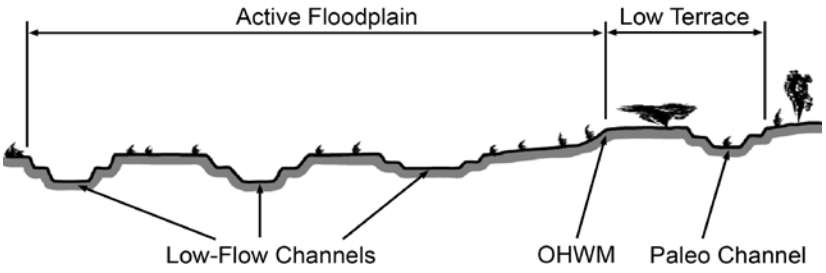
Small ditch adjacent to field and parking lot.

**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

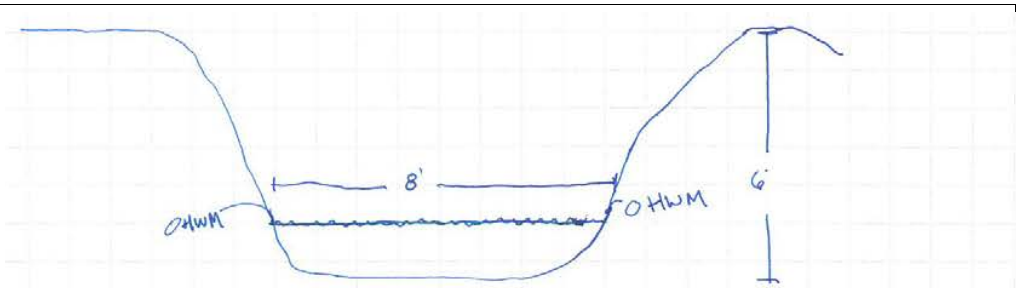



**Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:**

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:

**Project ID:** **Cross section ID:** **Date:** 09/19/2018 **Time:** 4:00pm

**Cross section drawing:**




## OHWM

**GPS point:** 40.1448063957, -111.631151126

**Indicators:**

- ☐ Change in average sediment texture
- ☑ Change in vegetation species
- ☑ Change in vegetation cover
- ☑ Break in bank slope
- ☐ Other: _____
- ☐ Other: _____

**Comments:**

Water flowing at time of delineation

## 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:**

No active floodplain

**Project ID:** **Cross section ID:** **Date:** 09/19/2018 **Time:** 4:00pm

**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:**

Not present

**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:**

Not present

# APPENDIX F: AQUATIC RESOURCE EXCEL SHEET

Table 1.5 Aquatic Resources

| WATER NAME | STATE | COWARDIN CODE | HGM CODE | MEASURMENT TYPE | AMOUNT | UNITS | WATER TYPES | LATITUDE | LONGITUDE | LOCAL WATERWAY |
|---|---|---|---|---|---|---|---|---|---|---|
| Wetland 1 | Utah | PEM | Depressional | Polygon | 1.45 | Acres | Wetland | 40.14373047 | -111.6477645 | Dry Creek |
| Wetland 2 | Utah | PEM | Depressional | Polygon | 0.08 | Acres | Wetland | 40.14057002 | -111.6461939 | Dry Creek |
| Wetland 3 | Utah | PEM | Depressional | Polygon | 0.01 | Acres | Wetland | 40.1441988 | -111.652545 | Dry Creek |
| Wetland 4a | Utah | PEM | Depressional | Polygon | 0.02 | Acres | Wetland | 40.144522612 | -111.631861 | Dry Creek |
| Wetland 4b | Utah | PEM | Depressional | Polygon | 0.01 | Acres | Wetland | 40.1444619 | -111.6321891 | Dry Creek |
| Wetland 4c | Utah | PEM | Depressional | Polygon | 0.01 | Acres | Wetland | 40.1445560 | -111.6320725 | Dry Creek |
| Wetland 4d | Utah | PEM | Depressional | Polygon | 0.01 | Acres | Wetland | 40.1448371 | -111.6315019 | Dry Creek |
| Wetland 4e | Utah | PEM | Depressional | Polygon | 0.01 | Acres | Wetland | 40.1448340 | -111.6317145 | Dry Creek |
| Wetland 5 | Utah | PEM | Depressional | Polygon | 0.09 | Acres | Wetland | 40.144579459 | -111.623149 | Dry Creek |
| Wetland 6 | Utah | PEM | Depressional | Polygon | 4.9 | Acres | Wetland | 40.14743003 | -111.649215 | Dry Creek |
| Wetland 7 | Utah | PEM | Depressional | Polygon | 0.09 | Acres | Wetland | 40.1445426 | -111.6297306 | Dry Creek |
| Wetland 8 | Utah | PEM | Depressional | Polygon | 0.23 | Acres | Wetland | 40.14493156 | -111.613133 | Dry Creek |
| Dry Creek | Utah | R4SBC | | Polygon | 1.46 | Acres | WoUS | 40.1449349 | 40.1449349 | Dry Creek |
| Ditch 1 | Utah | R4SBC | | Polygon | 0.17 | Acres | WoUS | 40.1438404 | -111.65526554 | Dry Creek |
| Ditch 2 | Utah | R4SBC | | Polygon | 0.04 | Acres | WoUS | 40.14428 | -111.635958 | Dry Creek |
| Ditch 3 | Utah | R5UBH | | Polygon | 0.02 | Acres | WoUS | 40.1445514 | -111.627882 | Dry Creek |
| Ditch 4 | Utah | R4SBC | | Polygon | 0.02 | Acres | WoUS | 40.14469853 | -111.620183 | Dry Creek |

I-15 Interchange
ENVIRONMENTAL ASSESSMENT
Springville/Spanish Fork

# Threatened and Endangered Species Evaluation Memo

**Project No. F-I15-6(239)259**
**Pin: 15153**
**August 2020**

The environmental review, consultation, and other actions required by applicable federal environmental laws for this project are being or have been carried out by UDOT pursuant to 23 USC 327 and a Memorandum of Understanding dated January 17,2017, and executed by FHWA and UDOT.

HORROCKS ENGINEERS

2162 West Grove Parkway, Ste 400
Pleasant Grove, Utah 84062
801-763-5100
www.horrocks.com

**To:** Project File

**From:** Haylie Ferguson, Environmental Specialist

**Date:** August 17, 2020

**Memorandum**

**Subject:** Threatened and Endangered Species Evaluation

I-15 Interchange; Springville/Spanish Fork

## Project Background

Horrocks Engineers has prepared this report in support of the Utah Department of Transportation (UDOT), in cooperation with Springville, Spanish Fork, and Mapleton cities, who propose to construct a new single-point urban interchange (SPUI) at 1600 South in Springville Utah. The SPUI will connect 1600 South to Interstate 15. Work will include replacing the existing overpass and the construction of northbound and southbound ramps. Additionally, the Sharp Railroad crossing at 1600 South will be grade-separated.

## Evaluation Methods

The study area has been evaluated for federally listed species and their designated critical habitat protected under the Endangered Species Act (ESA) utilizing information obtained from U.S. Fish and Wildlife Service's (USFWS) Online Information, Planning, and Conservation system (IPaC). A request for reported species was submitted to the Utah Natural Heritage Program (UNHP). Migratory birds and Utah Sensitive Species were accounted for within the study area. Review of study area habitat was conducted using aerial imagery and site surveys were conducted on September 13 and 19, 2018 as well as October 19, 2018.

## Analyses

### Study Area Habitat

The approximately 2.5-mile long study area is located between 400 South in Springville and US-6 in Spanish Fork and is comprised predominantly by undeveloped land, some residential and developed park areas, and industrial and commercial developments (see Study Area map). Observed vegetation consisted of mixed grasses (saltgrass, smooth brome, intermediate wheatgrass, reed canary grass, etc.), weedy species, and a few scattered trees species (Russian olive, willow, and cottonwood). Dry Creek passes through the study area east to west and is located just north of 1600 South/2700 North. A few ditches and multiple wetland features are also located throughout the study area.

### Threatened and Endangered Species

IPaC data list three species for consideration in the study area; no associated critical habitats were identified within the study area (see attached IPaC data). An evaluation of these species preferred habitats and the study area habitat can be seen in Table 1.

**Table 1: IPaC Species for Consideration within the Study Area**

| Species name | Status | Habitat Requirements [1] | Potential Habitat within Study Area? |
|---|---|---|---|
| Birds | | | |
| Yellow-billed Cuckoo (*Coccyzus americanus*) | Threatened | Riparian patches varying in size and shape, ranging from a relatively contiguous stand of mixed native/exotic vegetation to an irregularly shaped mosaic of dense vegetation with open areas. | Riparian habitat has been identified within 0.5 miles of the study area. However, these areas do not meet the criteria outlined by USFWS Guidelines for the identification of suitable habitat for WYBCU in Utah in that there are not large tracts of cottonwood/willow habitats with dense sub-canopies. Habitat within the |

2162 West Grove Parkway, Ste 400
Pleasant Grove, Utah 84062
801-763-5100
www.horrocks.com

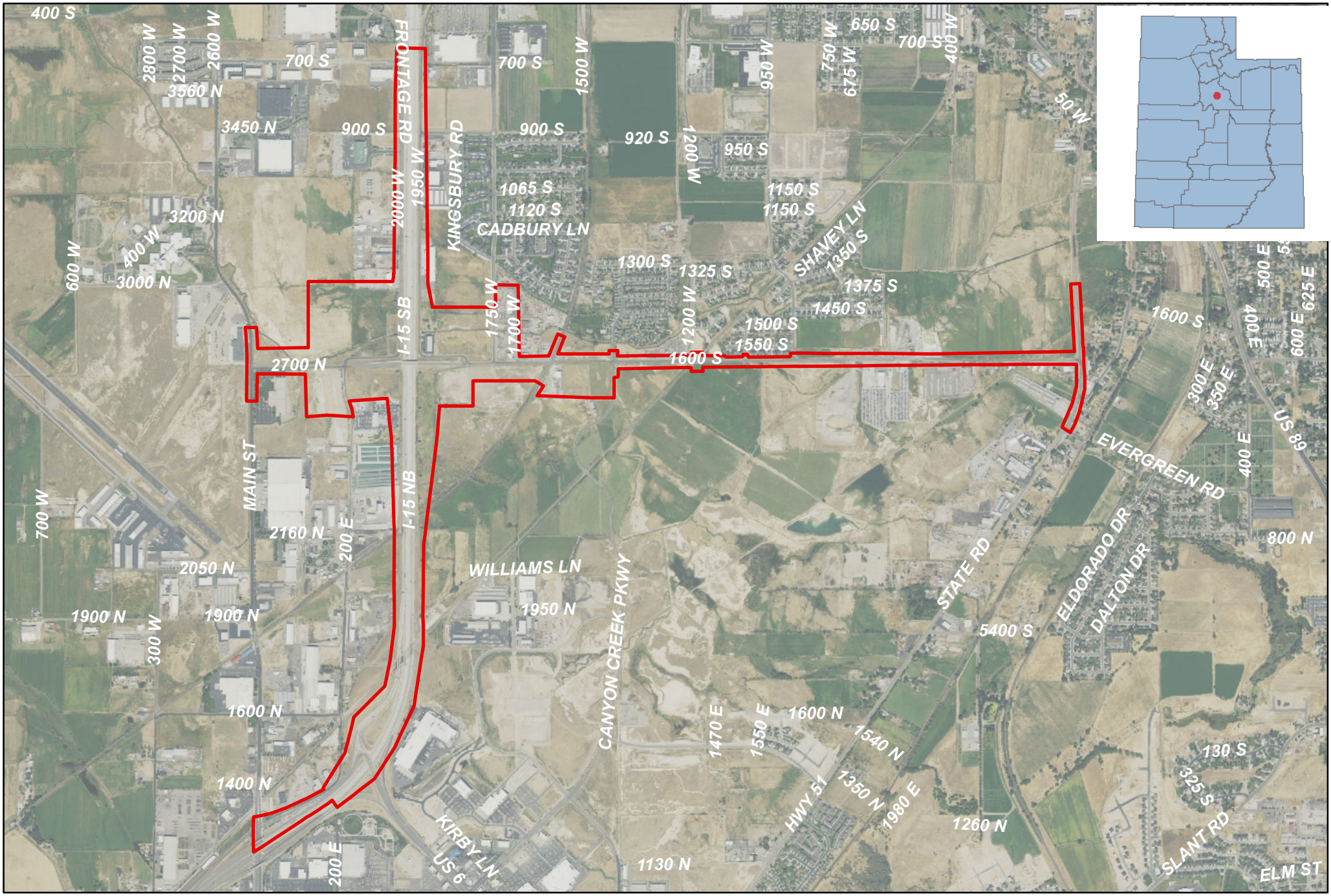
| | | | |
|---|---|---|---|
| | | | study area is lacking the vertical structure that defines suitable cuckoo habitat and most habitat patches are too small (< 5 acres) to support Yellow-billed Cuckoo. Furthermore, the cottonwood (Populus spp.) overstory that ordinarily defines the feeding strata in suitable Cuckoo habitat is lacking within the study area. Therefore, in accordance with USFWS UT Field Office guidance, no suitable habitat has been identified within 0.5 miles of the study area. |
| Fishes | | | |
| June sucker (*Chasmistes liorus*) | Endangered | Endemic to Utah Lake and the Provo River. | IPaC results did not identify any critical habitat within the study area. The required waters are not found within the study area. There is no suitable habitat within the study area. |
| Flowering Plants | | | |
| Ute Ladies'-tresses (*Spiranthes diluvialis*) | Threatened | Found in seasonally moist soils, wet meadows, along streams, in abandoned stream meanders, and near springs, seeps, and lake shores in sandy or loamy soils with mixed gravel. Primarily found in areas where vegetation is relatively open and not overly dense, overgrown, or over grazed. No critical habitat has been designated for this species. | While field observations made during survey identified areas of moist soils, the soil composition was clayey and moderately to strongly saline which is not conducive to Ute Ladies'-tresses. Dry Creek and the ditches within the study area do not contain suitable habitat.[2] |

[1] Sources: UDWR Utah Conservation Data Center (https://dwrcdc.nr.utah.gov/ucdc/) and USFWS Environmental Conservation Online System (ECOS) and Species Fact Sheets
[2] Rangewide Status Review of Ute Ladies'-Tresses, Table 4 - Associated Plant Species List. 2005 and 1992 Interim Survey Requirements for Ute ladies'-tresses Orchid. 1992

**Conclusion**

No potential habitat exist within the study area for yellow-billed cuckoo, June sucker, or Ute Ladies'-tressses.

Ute ladies'-tresses have been found to occupy irrigated meadows, agricultural fields, and managed riparian systems that experience frequent human-influenced disturbances (Fertig 2005 Rangewide Review). While field observations made during preliminary surveys identified areas of moist soils, the soil composition was clayey and moderately to strongly saline, which is not conducive to Ute Ladies-tresses. A review of UNHP data from the last 10 years indicates no known occurrences and/or observations of ULT within or adjacent to the study area. While no suitable habitat was identified within the study area, a species survey was conducted on August 13, 2020. The fieldwork for the species survey fell within the flowering season detailed in the FWS 1992 Interim Survey Guidelines. The species survey followed the FWS 1992 Interim Survey Guidelines and accommodated a 300 foot buffer around potentially disturbed areas. No individuals were located within the surveyed areas (see Ute Ladies'-tresses Survey Areas map).




# I-15; Springville/Spanish Fork Interchange

## Study Area

Study Area

Map 1 of 1

0 1,000 2,000 Feet

N

# I-15; Springville/Spanish Fork Interchange

## Ute Ladies'-tresses Survey Areas

Map 1 of 1

0 700 1,400 Feet

N

ULT Survey Areas

I-15 Interchange
ENVIRONMENTAL ASSESSMENT
Springville/Spanish Fork

# AGENCY AND PUBLIC SCOPING REPORT

**Project No. F-I15-6(239)259**
**Pin: 15153**
**March 2020**

The environmental review, consultation, and other actions required by applicable federal environmental laws for this project are being or have been carried out by UDOT pursuant to 23 USC 327 and a Memorandum of Understanding dated January 17,2017, and executed by FHWA and UDOT.

**I-15 Springville/Spanish Fork Interchange Environmental Assessment**
**AGENCY AND PUBLIC SCOPING REPORT**

The Utah Department of Transportation (UDOT) is preparing an Environmental Assessment (EA) to evaluate a potential new I-15 interchange at 1600 South/2700 North (MP 258) and improvements to 1600 South from Main Street in Spanish Fork to S.R. 51 (State Street) in Springville. The purpose of the EA is to identify the best solution to improve existing and future traffic congestion, access, and safety within the study area while taking into account any potential impacts to the natural and built environments.

## AGENCY SCOPING MEETING

The following is a summary of the preparation and execution of the agency scoping meeting:

| | |
|---|---|
| **Meeting Overview** | An agency scoping meeting (presentation format) was held to educate and inform key agencies about the EA process and to gather input regarding the study. |
| **When/Where** | The meeting was held on Thursday, Nov. 14, 2019, from 3:30 to 4:30 p.m. at the Springville Senior Citizen's Center (65 East 200 South, Springville, Utah, 84663). |
| **Advertisement** | On Nov. 1, 2019, a scoping notice was mailed to key agencies (see Appendixes A and B). |
| **Attendance** | Representatives from 10 agencies signed in at the meeting. Attendees included representatives from Springville City, Springville City Police Department, Spanish Fork City, Spanish Fork City Fire Department, Nebo School District and Utah County. |
| **Information Presented** | A presentation was given by study representatives explaining the NEPA process, the study area, Purpose and Need, existing environmental resources, Alternatives development and the EA schedule. |
| **Agency Comments** | During the meeting, attendees were invited to provide input regarding the study. A summary of these verbal comments/questions are included in this report (see Appendix C). Two agencies sent letters following the agency scoping meeting (see Appendix D). |

## PUBLIC SCOPING MEETING

The following is a summary of the preparation and execution of the public scoping meeting:

| | |
|---|---|
| **Meeting Overview** | A public scoping meeting (open house format) was held to educate and inform the public about the EA process and gather input regarding the study. |
| **When/Where** | The public scoping meeting was held on Thursday, Nov. 14, 2019, from 5 to 7 p.m. at the Springville Senior Citizen's Center (65 East 200 South, Springville, Utah, 84663). |
| **Advertisement** | The following are outreach activities that were implemented in 2019 to inform the public of the scoping meeting and the comment period deadline:<br>• Nov. 1 – Postcards were mailed to businesses and residences in the study area (see Appendix E).<br>• Nov. 4 – Information was posted to the study-specific website.<br>• Nov. 6 – An email blast was sent to the study's email database, 62 recipients (see Appendix F). A notice was published in the Daily Herald (see Appendix G). Email invitations were sent to staff and elected officials for Springville City, Spanish Fork City and Mapleton City, as well as state representatives and Utah County Commissioners.<br>• Nov. 7 – Door hangers were delivered to adjacent residences and businesses (see Appendix H).<br>• Nov. 12 – Information was posted on UDOT Region Three's Twitter account. Information was also posted on Springville City's, Spanish Fork City's, and Mapleton City's Facebook pages. A media advisory was released.<br>• Nov. 25 – An email blast was sent to the study's email database, 106 recipients, to remind them of the comment period deadline (see Appendix I).<br>• Nov. 25 – Information was posted on UDOT Region Three's Twitter account to reminder the public of the comment period deadline. Information was also posted on Springville City's, Spanish Fork City's, and Mapleton City's Facebook pages. |
| **Attendance** | A total of 96 attendees signed in. |
| **Information Presented** | Informational displays were set up around the room and included information about the NEPA process, the study area, Purpose and Need, existing environmental resources and the EA schedule (see Appendix J). Additionally, scroll plots were displayed in the center of the room. This provided attendees an opportunity to see an aerial image of the study area and to point out concerns directly related to a specific area. Study team members were available to explain the EA process, answer questions and listen to comments. |

| | |
|---|---|
| **Public Comments** | The public comment period ran from Nov. 4, 2019, to Nov. 30, 2019. Members of the public were able to comment in the following ways:<br>• Completing comment forms provided at the public scoping meeting (see Appendix K).<br>• Mailing comment forms provided at the public scoping meeting.<br>• Emailing comments to i15springvillespanishfork@utah.gov.<br>• Submitting comments through the study website: udot.utah.gov/i15springvillespanishfork.<br>• Calling the study hotline at 801-704-0899.<br><br>A total of 113 public comments were submitted:<br>• 32 comments were submitted at the public meeting.<br>• 47 comments were submitted by email.<br>• 31 comments were submitted through the study website.<br>• Three comments were submitted by phone.<br><br>All public comments submitted are included in this report (see Appendix L). The following is a summary of the public comments:<br>• 22 people requested a connection from S.R. 51 to U.S. 89.<br>• 21 people were concerned with congestion on 1600 South and how soon it would be alleviated.<br>• 13 people were concerned with the close proximity of the proposed interchange to adjacent interchanges (400 South and U.S. 6/Main Street).<br>• Eight people requested protected bike lanes on 1600 South.<br>• Eight people were concerned that the proposed interchange would only be a temporary fix.<br>• Seven people were concerned with congestion increasing on Evergreen Drive.<br>• Seven people suggested expanding the 400 South interchange.<br>• Five people were concerned with impacts to residents.<br>• Five people suggested that an overpass for bikes be built where the railroad is being discontinued.<br>• Other topics that were mentioned include sidewalk improvements on 1600 South, noise mitigation, increased taxes, congestion near the railroad, impacts to agricultural lands, hospital access, access to public transit, design recommendations for multiple streets. |

State of Utah

GARY R. HERBERT
*Governor*

SPENCER J. COX
*Lieutenant Governor*

DEPARTMENT OF TRANSPORTATION

CARLOS M. BRACERAS, P.E.
*Executive Director*

JASON E. DAVIS, P.E.
*Deputy Director of Engineering and Operations*

TERIANNE S. NEWELL, P.E.
*Deputy Director of Planning and Investment*

November 1, 2019

[Name]
[Title]
[Agency]
[Address]

RE: I-15; Springville/Spanish Fork Interchange Environmental Assessment
Utah County, Utah
UDOT Project No.: S-I15-6(239)259; PIN: 15153
Initiation of Scoping

[Name],

The Utah Department of Transportation (UDOT) is preparing an Environmental Assessment (EA) to evaluate a potential new I-15 interchange at 1600 South/2700 North (MP 258) and improvements to 1600 South from Main Street in Spanish Fork to S.R. 51 (State Street) in Springville (see enclosed Study Area Map). The purpose of the EA is to identify the best solution to improve existing and future traffic congestion, access, and safety within the study area while taking into account any potential impacts to the natural and built environment.

The Federal Highway Administration (FHWA) and UDOT have executed an agreement through which FHWA has formally assigned its legal responsibilities for complying with the National Environmental Policy Act to UDOT. The environmental review, consultation, and other actions required by applicable Federal environmental laws for this project are being, or have been, carried out by UDOT pursuant to 23 U.S.C 327 and a Memorandum of Understanding dated January 17, 2017, and executed by FHWA and UDOT.

**Scoping**
At this time in the environmental process we request your assistance in identifying potential resources that may occur in the study area, as well as any concerns, requirements, or recommendations that you may have in relation to the EA. You are invited to attend a stakeholder scoping meeting on November 14, 2019 in Springville City, Utah at 3:30 p.m. at the following location:

Springville Senior Center
65 East 200 South
Springville, Utah 84663

If you plan to attend, please RSVP to Ryan Pitts with Horrocks Engineers at ryanp@horrocks.com or mail at 2162 W. Grove Parkway, Suite 400, Pleasant Grove, Utah 84062 by November 11, 2019.

Please respond to Ryan Pitts with scoping comments no later than November 30, 2019.

UDOT is also sponsoring a public scoping meeting on November 14, 2019 in Springville City, Utah from 5:00 – 7:00 p.m. at the following location:

Springville Senior Center
65 East 200 South
Springville, Utah 84663

We appreciate your participation during the environmental process and look forward to your input.

Sincerely,

Elisa Sims Albury
UDOT Environmental Program Manager

Cc: Darren Bunker, UDOT Project Manager

I-15 Springville/Spanish Fork Interchange EA
Agency/Stakeholder List

| **Agency** | **Title** |
|---|---|
| Utah Department of Transportation | Environmental Program Manager |
| U.S. Army Corps of Engineers | Chief Utah Regulatory Branch |
| Environmental Protection Agency | Region 8, NEPA Program Director |
| U.S. Fish and Wildlife Services | Field Supervisor |
| State Historical Preservation office | Interim State Historic Preservation Officer |
| Resource Development Coordinating Committee | RDCC Coordinator |
| Confederated Tribes of the Goshute Reservation | |
| Skull Valley Band of Goshute Indians | |
| Northwestern Band of Shoshone Nation | |
| Shoshone-Bannock Tribes of the Fort Hall Reservation | |
| Eastern Shoshone Tribe of the Wind River Reservation | |
| Eastern Shoshone Tribe of the Wind River Reservation | |
| Ute Indian Tribe of the Uintah & Ouray Reservation | |
| Mountainland Association of Governments | Director of Planning |
| Utah Transit Authority | Environmental Compliance Administrator |
| Springville City | Public Works Director |
| Springville City | City Administrator |
| Spanish Fork City | City Manager |
| Spanish Fork City | Public Works Director |
| Spanish Fork City | Engineering Division Manager |
| Utah County | Public Works Director/County Engineer |
| Union Pacific Rail Road | Industry and Public Projects |
| Nebo School District | Superintendent |
| Nebo School District | Legal |
| Nebo School District | Operations |
| Nebo School District | Transportation Supervisor |
| Nebo School District | Route Supervisor |
| Spanish Fork City Police Department | Police Chief |
| Spanish Fork City Fire Department | Fire Chief |
| Spanish Fork City Ambulance | Deputy Chief of Ambulance |
| Springville City Fire Department – Station 41 | Fire Chief |
| Springville City Fire Department – Station 41 | Fire Chief |
| Springville City Police Department | Police Chief |

**I-15 Springville/Spanish Fork Interchange Environmental Assessment**
**Agency Scoping Meeting – Summary of Comments**
**Nov. 14, 2019**

**SPRINGVILLE CITY COMMENTS**

- The City owns property near the proposed interchange that they purchased with MAG funding. They asked if it should be included in the study area.
- The City asked about earlier studies for 1600 South and three possible alignments.
- The City asked if they need to coordinate with MAG more closely. UDOT can only evaluate for what cities have planned.
- The City asked to what degree the study will reiterate MAG's 2050 model because the City's land uses could be impacted by this potential project. UDOT's model is based on MAG's land used development model.
- As the City looks at designs and concepts for the railway and Sharp Tintic, they think there is a significant likelihood that 1750 West would need to shift to the east. The City wasn't planning on doing anything with 1750 West, but are now thinking about it because of this study.
- The City mentioned they have a public E-map on their website that has all of their utilities and field drains available to view.
- They are concerned with freeway access on this road and how it will affect congestion at the railroad crossing.
- Springville would like to maintain the trail on south side of the interchange, 10 ft. paved trail.
- They commented that Tintic will be a rail trail when it's abandoned.
- There is trail on the 1200 West corridor (west side). They just completed it from 1600 South to 400 south. It gets a lot of use. They are already having to do double left turns at 400 South and it only opened a few months ago.
- They said that UTA is bringing Frontrunner to this area.
- They said that their community is still about the car. They do have a councilmember that is interested in active transportation that is starting that discussion.
- They asked about the proximity of U.S. 6 to the proposed interchange.
- At 1200 West, going southbound, you can't make a left-hand turn because of the Tintic island. The City is looking at realigning that and widening it to two lanes in each direction. It would be a fully-signalized, full-directional intersection. They have funding. It can't happen until Tintic gets abandoned. This will tie up to Canyon Creek and 1600 South.

**GENERAL**

- Where does design, right-of-way acquisition and construction come into play?

**SPANISH FORK CITY COMMENTS**

- They wanted to know when the LOS will go from a D to an F.
- Spanish Fork has a trail on the north end of the city, on the west side of S.R. 51. They just approved plans to extend it right up to the city boundaries.
- Spanish Fork police commented that the U.S. 6 interchange is very dangerous for semis. The curve is sharp and semis roll too frequently.
- The U.S. 6 interchange left a connection out and it brought all of the commercial truck traffic to 1000 North, which is a big commercial area. They are concerned with safety in this area.
- They commented that providing opportunities to alleviate congestion is the priority.
- They asked about the connection from S.R. 51 to U.S. 89.

**NEBO SCHOOL DISTRICT**

- Their north compound is on 1600 South. It houses close to 100 buses. At this compound, they all stay there. The majority go east on 1600 South to S.R. 51, and then go north and south from there.
- They currently don't have issues getting in and out of there. It may change with a new interchange. They are concerned for traffic on 1600 South and buses turning onto the busy road.
- Morning schedule: Buses leave as early as 6 a.m. The majority leave at 7 a.m. They are back by 9 a.m.
- Afternoon schedule: Buses leave around 2:00…2:15 p.m. and are back by 5 p.m.
- Access has gotten better since the lights were put in.
- Their need to access I-15 is low.
- They don't have schools west of I-15, but they have students to pick up on the west side.
- They don't have pumps in this location.
- North of their bus compound is a property that they own for a potential school site. The Railroad cuts out a little notch of their property. They don't know what level of school it will be. There aren't any definitive plans for what it would be. When they work with the City on this site, they will seek access onto 1600 South and connectivity across the railroad.

**UTAH COUNTY**

- They asked if UDOT was leaning towards any particular type of interchange: SPUI, DD, partial cloverleaf.

# Memo

To: Samantha Patterson

From: Spanish Fork City Staff

Date: November 27, 2019

Re: I-15 Interchange Environmental Assessment - Spanish Fork 2700 N Springville 1600 S

---

Spanish Fork City appreciates the opportunity to comment on the Environmental Assessment for the future I-15 2700 North Interchange. This is a much needed project and its completion is of utmost importance to Spanish Fork's elected officials . We believe the following is a list of some major benefits of having this new interchange.

1. It will provide a more viable access for heavy trucking to the city's industrial area via the proposed interchange. This will provide significant relief on 1000 North and related intersections, including intersections with US-6 by providing a more direct route to industrial centers which prior to the I-15 CORE project could access Main Street directly from US-6.

2. This interchange will provide a more direct route to Intermountain Healthcare's Spanish Fork Hospital, the Canyon Creek commercial area, the city's industrial area and the Spanish Fork Airport. This will provide much needed relief by lessening traffic on US-6 and parts of Main Street. This relief will help postpone the need to convert US-6 into a freeway facility, a conversion that will be extremely expensive.

3. This interchange will eventually provide a very direct route to Mapleton, South Springville and North Spanish Fork traffic from SR-77 and US-6.

Please consider the following issues in the study.

1. 2700 North from Main Street to proposed interchange needs to be a 5-lane arterial street according to the Spanish Fork City master plan and standards. See www.spanishfork.org.

2. A traffic signal will be needed at the intersection of 2700 North Main Street.

3. Improvements to 1600 South Springville should include a bridge over the existing west railroad track east of I-15. This will be the line used for commuter rail.

4. The east railroad track east of I-15 will soon be abandoned.

5. The trail extending across the existing I-15 bridge needs to remain and continue in both directions as appropriate with this project according to City master plans.

UTAH TRANSIT AUTHORITY

UTA
669 West 200 South
Salt Lake City, UT 8410

November 15, 2019
Ryan Pitts
Horrocks Engineers
ryanp@horrocks.com

Re: I-15; Springville/Spanish Fork Interchange Environmental Assessment
Scoping Comments

Mr. Pitts,

UTA is currently involved with two projects within the I-15 Springville/Spanish Fork Interchange project area. These UTA projects include the Sharp/Tintic Railroad Connection and the Provo to Payson Transit Analysis Study.

The Sharp/Tintic Railroad Connection will construct a new connector railroad line between UTA right-of-way along the Sharp Subdivision rail line and the Tintic Industrial Lead rail line near Springville, Utah. Freight trains using the Tintic Industrial Lead would be diverted to the Sharp Subdivision. The new connection railroad would cross 1600 S at the Sharp Subdivision just east of I-15 (see enclosed site map), adding a second main line track to the existing at-grade crossing. Construction of the new connection railroad would allow removal of freight traffic from 6 existing at-grade railroad crossings on the Tintic Lead including one crossing on 1600 S near 1200 W. The new connection railroad is needed for a possible future extension of FrontRunner commuter rail service from Provo to Payson on existing UTA right-of-way. Project partners include UTA, UDOT, Springville City, and Spanish Fork City. The environmental review for this project has started and preliminary design is expected to start in early 2020. The project will be administered as a Local Government Project through UDOT and has been assigned UDOT Pin 14988.

The Provo to Payson Transit Analysis Study will develop alternatives to improve transit service between Provo and Payson and an implementation plan to advance the Locally Preferred Alternative. One alternative would include the extension of FrontRunner service from Provo to Payson on existing UTA right-of-way as identified in the Mountainland Association of Governments TransPlan50, but other alternatives and modes will be explored. This study will also recommend potential phasing of transit improvements to allow the system to grow over time along with ridership demand. The Provo to Payson Transit Analysis Study is expected to start in early 2020.

Due to the combination of the anticipated increase in train traffic on the Sharp Subdivision and increase in vehicle traffic on 1600 South, UTA recommends that a grade separation be considered at 1600 South as part of the I-15 Springville/Spanish Fork Interchange Project. Depending on the timing of the projects, the Tintic crossing at 1600 S near 1200 W might need to be improved (if it has not been removed by the Sharp/Tintic Railroad Connection project).



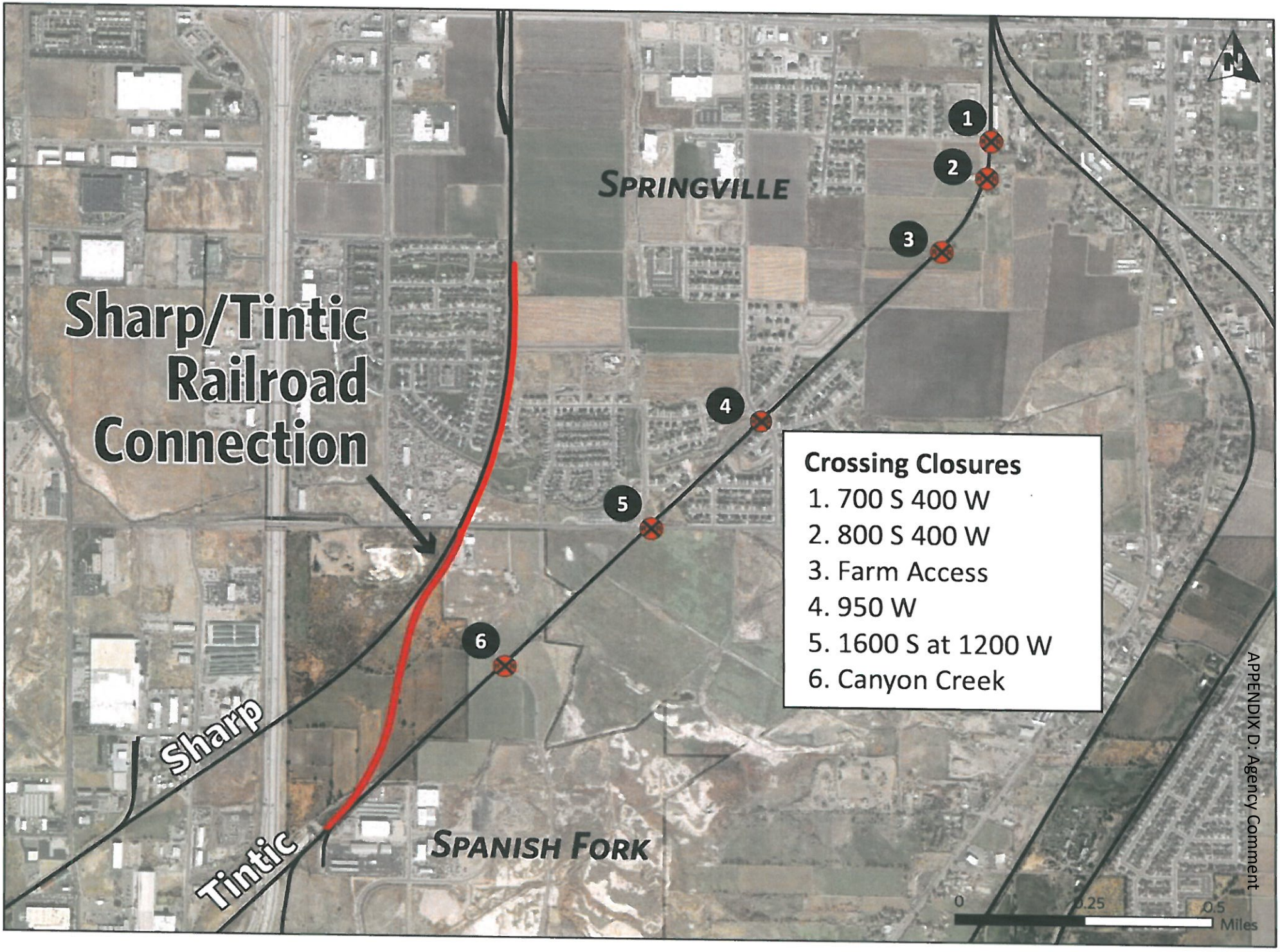
ISO 9001:2008 ISO 14001:2004 OHSAS 18001:2007 1-888-RIDE-UTA www.rideuta.com

Thank you for continuing to coordinate with UTA. Please let me know if you have any questions.

Sincerely,

Autumn Hu
NEPA Project Administrator
Utah Transit Authority
ahu@rideuta.com
(801) 741-8858

Enclosure:
Sharp/Tintic Railroad Connection Site Map


Sharp/Tintic Railroad Connection
SPRINGVILLE
SPANISH FORK
Sharp
Tintic
1
2
3
4
5
6
Crossing Closures
1. 700 S 400 W
2. 800 S 400 W
3. Farm Access
4. 950 W
5. 1600 S at 1200 W
6. Canyon Creek
0
0.25
0.5
Miles
APPENDIX D: Agency Comment

APPENDIX E: Postcard

# YOU ARE INVITED

I-15 Interchange
ENVIRONMENTAL ASSESSMENT
Springville/Spanish Fork

## to a Public Open House

### WHEN

Thursday Nov. 14, 2019
5 - 7 p.m.

### WHERE

Springville Senior Center
65 East 200 South
Springville, UT 84663

A UDOT STUDY

# ABOUT THE STUDY

The Utah Department of Transportation (UDOT) is preparing an Environmental Assessment (EA) to evaluate a potential new I-15 interchange at 1600 South/2700 North and improvements to 1600 South from Main Street in Spanish Fork to S.R. 51 (State Street) in Springville (see reverse side for study area map).

You are invited to attend a public open house to learn about the EA process, a potential new I-15 interchange and improvements to 1600 South, and to meet project representatives. The purpose of the meeting is to gather input from the public on transportation needs and environmental issues that should be considered during the study.

If you need special accommodations during the meeting please contact us at least 48 hours before the meeting.

## CONTACT US

**Email:** i15springvillespanishfork@utah.gov
**Phone:** 801-704-0899
**Website:** udot.utah.gov/i15springvillespanishfork

*The environmental review, consultation, and other actions required by applicable Federal environmental laws for this project are being or have been carried-out by UDOT pursuant to 23 USC 327 and a Memorandum of Understanding dated January 17, 2017, and executed by FHWA and UDOT.*

I-15 Interchange
**ENVIRONMENTAL ASSESSMENT**
Springville/Spanish Fork

Horrocks Engineers
2162 W. Grove Parkway, Suite 400
Pleasant Grove, UT 84062

View this email in your browser

# I-15 Interchange
# ENVIRONMENTAL ASSESSMENT
Springville/Spanish Fork

## STUDY OVERVIEW

The Utah Department of Transportation (UDOT) is preparing an Environmental Assessment (EA) to evaluate a potential new I-15 interchange at 1600 South/2700 North and improvements to 1600 South from Main Street in Spanish Fork to S.R. 51 (State Street) in Springville. *See Study Area Map below*.

## PUBLIC SCOPING MEETING

You are invited to attend a public open house to learn about the EA process, a potential new I-15 interchange and improvements to 1600 South, and to meet project representatives. The purpose of the meeting is to gather input from the public on

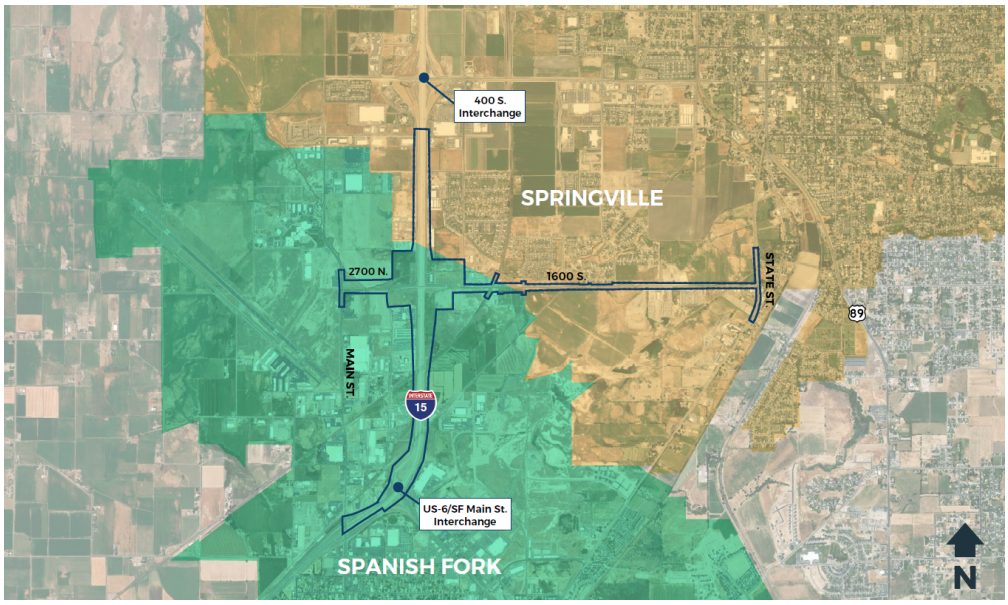
**WHEN**

**Thursday, Nov. 14, 2019**
**5 - 7 p.m.**

**WHERE**

**Springville Senior Center**
**65 East 200 South**
**Springville, UT 84663**

## STUDY AREA MAP

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## SPECIAL ACCOMMODATIONS

APPENDIX F: Email Blast #1

Past Issues

accommodations (including auxiliary communicative aids and services), or language translation services during this meeting should notify the project team at the contact information listed below at least 48 hours in advance of the meeting. Any individuals having questions relating to the environmental document or the public scoping meeting should contact the project team using the contact information below.

For specific language accommodations during the meeting, please contact the project team at the information listed below at least 24 hours in advance.

## CONTACT INFORMATION

**Email:** i15springvillespanishfork@utah.gov
**Phone:** 801-704-0899
**Website:** udot.utah.gov/i15springvillespanishfork

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**Our mailing address is:**
UDOT Region Three
c/o I-15 Springville/Spanish Fork Interchange EA
658 N 1500 W, Orem, UT 84057

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I-15 Interchange
ENVIRONMENTAL ASSESSMENT
Springville/Spanish Fork

# I-15; Springville/Spanish Fork Interchange Environmental Assessment
# Notice of Public Scoping Meeting and Comment Period

The Utah Department of Transportation (UDOT) is preparing an Environmental Assessment (EA) to evaluate a potential new I-15 interchange at 1600 South/2700 North and improvements to 1600 South from Main Street in Spanish Fork to S.R. 51 (State Street) in Springville. The purpose of the EA is to identify the best solution to improve existing and future traffic congestion, access, and safety within the study area while taking into account any potential impacts to the natural and built environment.

The Federal Highway Administration (FHWA) and UDOT have executed an agreement through which FHWA has formally assigned its legal responsibilities for complying with the National Environmental Policy Act to UDOT. The environmental review, consultation, and other actions required by applicable Federal environmental laws for this project are being, or have been, carried out by UDOT pursuant to 23 USC 327 and a Memorandum of Understanding dated January 17, 2017, and executed by FHWA and UDOT.

**Public Scoping Meeting and Comment Period**
UDOT is sponsoring a public scoping meeting on Nov. 14, 2019 from 5 - 7 p.m. at the Springville Senior Center, 65 East 200 South, Springville, Utah 84663. Members of the public are invited to attend the open house to learn about the EA process, provide comments, and meet project representatives.

Written comments should be mailed to Horrocks Engineers at 2162 West Grove Parkway Suite 400, Pleasant Grove, UT 84062, and postmarked by midnight, Nov. 30, 2019. Comments may also be submitted at the public scoping meeting, via email to i15springvillespanishfork@utah.gov, or by calling 801-704-0899.

If you have questions about the study or are interested in receiving email updates throughout the EA, please contact a study team representative at 801-704-0899 or i15springvillespanishfork@utah.gov or visit udot.utah.gov/i15springvillespanishfork.

In compliance with the Americans with Disabilities Act, individuals needing special accommodations (including auxiliary communicative aids and services), or language translation services during this meeting should notify the project team at the contact information listed above at least 48 hours in advance of the meeting. Any individuals having questions relating to the environmental document or the public scoping meeting should contact the project team at the before mentioned number/address/email.

AFFP
46460-NOTICE I-15

# Affidavit of Publication

STATE OF UTAH }
COUNTY OF UTAH } SS

Jayne Dunn, being duly sworn, says:

That she is Legals Billing Clerk of the Daily Herald, a newspaper of general circulation, printed and published in Provo, Utah County, Utah; that the publication, a copy of which is attached hereto, was published in the said newspaper on the following dates:

November 06, 2019

That said newspaper was regularly issued and circulated on those dates. Same was also published online at utahlegals.com, according to Section 45-1-101 - Utah Code Annotated, beginning on the first date of publication, for at least 30 days thereafter and a minimum of 30 days prior to the date of scheduled sale.
SIGNED: Jayne Dunn

Legals Billing Clerk

Subscribed to and sworn to me this 6th day of November 2019.

Willy Shaw, Notary Public, Utah County, Utah

My commission expires: September 24, 2021

NOTICE
I-15; Springville/Spanish Fork
Interchange Environmental Assessment
Notice of Public Scoping Meeting and Comment Period
The Utah Department of Transportation (UDOT) is preparing an Environmental Assessment (EA) to evaluate a potential new I-15 interchange at 1600 South/2700 North and improvements to 1600 South from Main Street in Spanish Fork to S.R. 51 (State Street) in Springville. The purpose of the EA is to identify the best solution to improve existing and future traffic congestion, access, and safety within the study area while taking into account any potential impacts to the natural and built environment.
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Legal Notice 46460 Published in The Daily Herald November 6, 2019.

WILLY SHAW
NOTARY PUBLIC • STATE OF UTAH
COMMISSION# 697006
COMM. EXP. 09-24-2021

00003829 00046460 8017635101

HORROCKS ENGINEERS
HORROCKS ENGINEERS
2162 W GROVE PKWY
Suite 400
PLEASANT GROVE, UT 84062

I-15 Interchange
ENVIRONMENTAL ASSESSMENT
Springville/Spanish Fork

# YOU ARE INVITED

## to a Public Open House

**WHEN**
Thursday Nov. 14, 2019
5 - 7 p.m.

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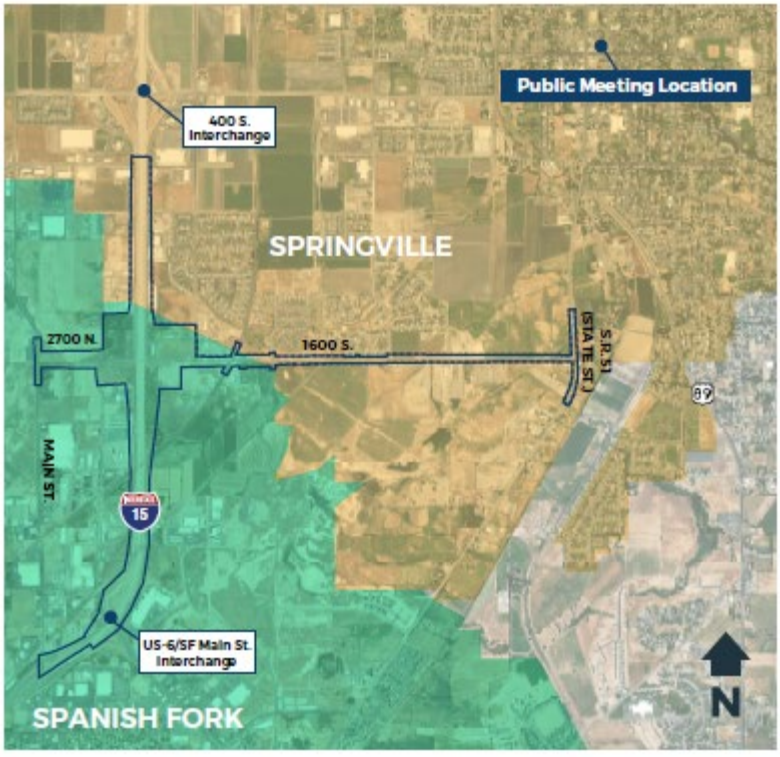
Springville, UT 84663




A UDOT STUDY

## About the Study

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APPENDIX I: Email Blast #2

# Public Comment Period Ending



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I-15 Interchange
ENVIRONMENTAL ASSESSMENT
Springville/Spanish Fork

## PUBLIC SCOPING MEETING

A public meeting was held on Nov. 14, 2019. Members of the public viewed displays outlining the EA process, met with project representatives and provided input on transportation needs and environmental issues that should be considered during the study. If you were unable to attend the meeting, the materials that were displayed are available to view **here**.

## COMMENT PERIOD ENDS NOV. 30, 2019

Comments will be welcome throughout the project, but the official comment period is ending on Nov. 30, 2019. You can submit comments by emailing **i15springvillespanishfork@utah.gov** or clicking **here**.

Public comments are an important part of the environmental process and help guide the decision-making process. Other factors that play a key role in determining solutions are engineering standards, traffic and safety data, environmental resources impacts, budget and coordination with key governmental and environmental agencies.

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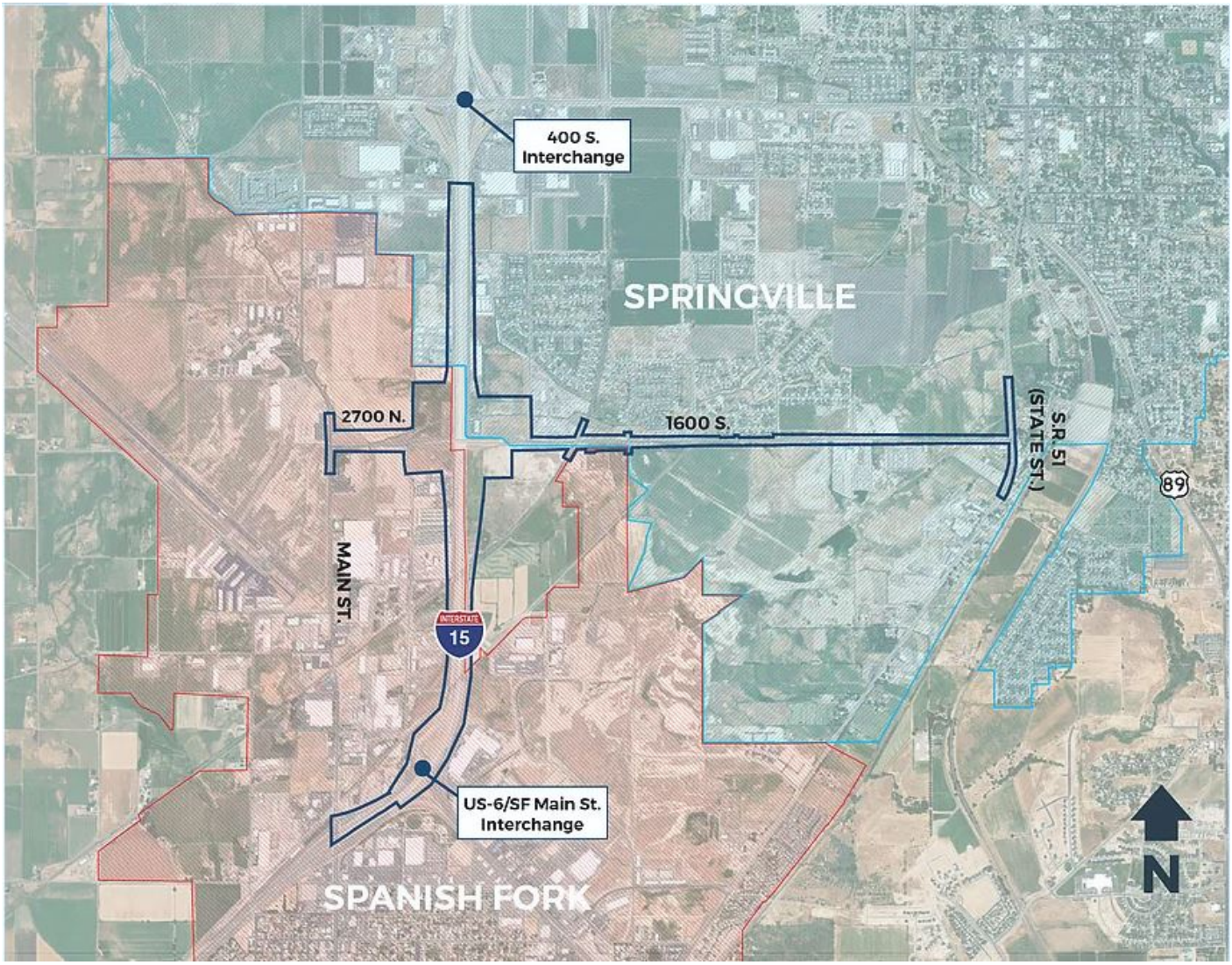
Spanish Fork to S.R. 51 (State Street) in Springville.

## STUDY AREA MAP

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## CONTACT INFORMATION

**Email:** i15springvillespanishfork@utah.gov
**Phone:** 801-704-0899
**Website:** [udot.utah.gov/i15springvillespanishfork](udot.utah.gov/i15springvillespanishfork)

APPENDIX I: Email Blast #2

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658 N 1500 W, Orem, UT 84057

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I-15 Interchange
ENVIRONMENTAL ASSESSMENT
Springville/Spanish Fork

A UDOT Study

# WELCOME

## PUBLIC SCOPING MEETING

### I-15; Springville/Spanish Fork Interchange

Environmental Assessment

## THE PURPOSE OF THE MEETING IS TO:

- Gather public input related to transportation needs and environmental concerns within the study area
- Inform the community of the NEPA process

*The environmental review, consultation, and other actions required by applicable Federal environmental laws for this study are being or have been carried-out by UDOT pursuant to 23 USC 327 and a Memorandum of Understanding dated January 17, 2017, and executed by FHWA and UDOT.*

I-15 Interchange
ENVIRONMENTAL ASSESSMENT
Springville/Spanish Fork

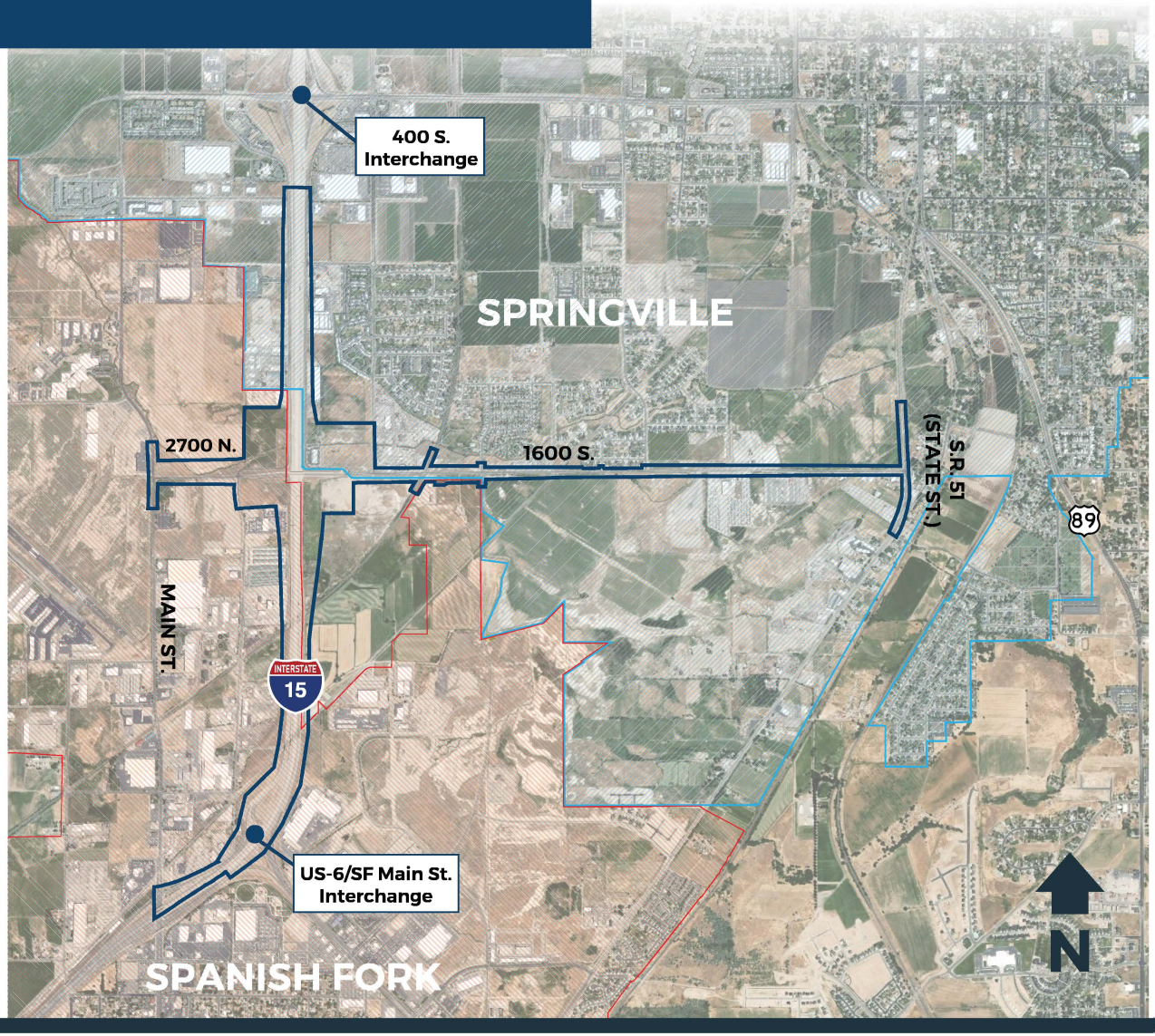
# STUDY OVERVIEW

The Utah Department of Transportation (UDOT) is preparing an Environmental Assessment (EA) to evaluate a potential new I-15 interchange at 1600 South/2700 North and improvements to 1600 South from Main Street in Spanish Fork to S.R. 51 (State Street) in Springville. This study will comply with the requirements of the National Environmental Policy Act (NEPA).

The study area starts just south of the Springville 400 South Interchange and continues south past the Spanish Fork Main Street Interchange. The area includes 2700 North in Spanish Fork west to Main Street, and 1600 South in Springville east to S.R. 51 (State Street). See the Study Area board for additional details.

# STUDY AREA

I-15 Interchange
ENVIRONMENTAL ASSESSMENT
Springville/Spanish Fork



I-15 Interchange
ENVIRONMENTAL ASSESSMENT
Springville/Spanish Fork

# PURPOSE & NEED

## PURPOSE

- Reduce congestion
- Improve mobility and access to I-15
- Enhance safety and improve operations

## NEED

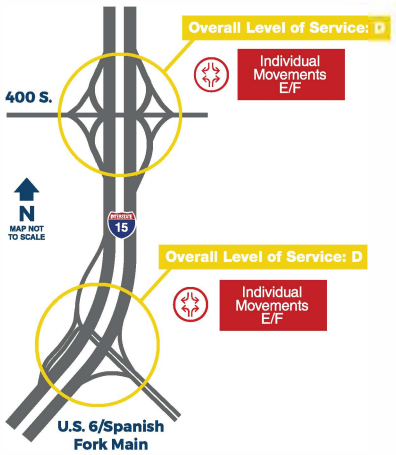
- Current and future 2050 congestion
- Inadequate access to and from I-15 for local traffic
- Reduce delays and conflicts at railroad crossings

I-15 Interchange
ENVIRONMENTAL ASSESSMENT
Springville/Spanish Fork

# TRAFFIC CONDITIONS

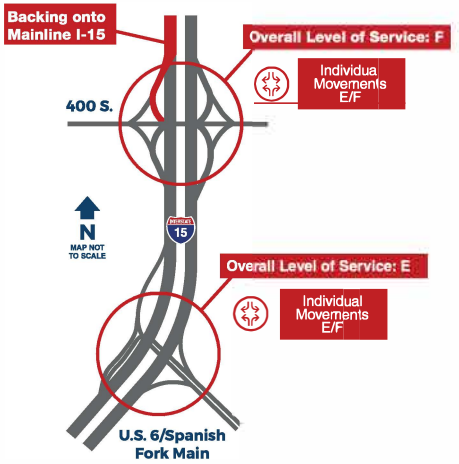
## EXISTING

Existing traffic conditions are operating at LOS D. However, individual movements at the Spanish Fork Main Street Interchange and the Springville 400 South Interchange are operating at LOS E/F.

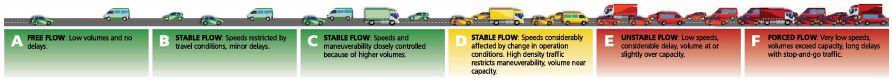



## 2050 NO-BUILD

By 2050, No-Build projections indicate that the Spanish Fork Main Street Interchange will operate at LOS E and the Springville 400 South Interchange will operate at LOS F during PM peak hours. The Springville 400 South Interchange traffic will cause backing onto mainline I-15 from the southbound exit ramp.




## WHAT IS LEVEL OF SERVICE (LOS)?



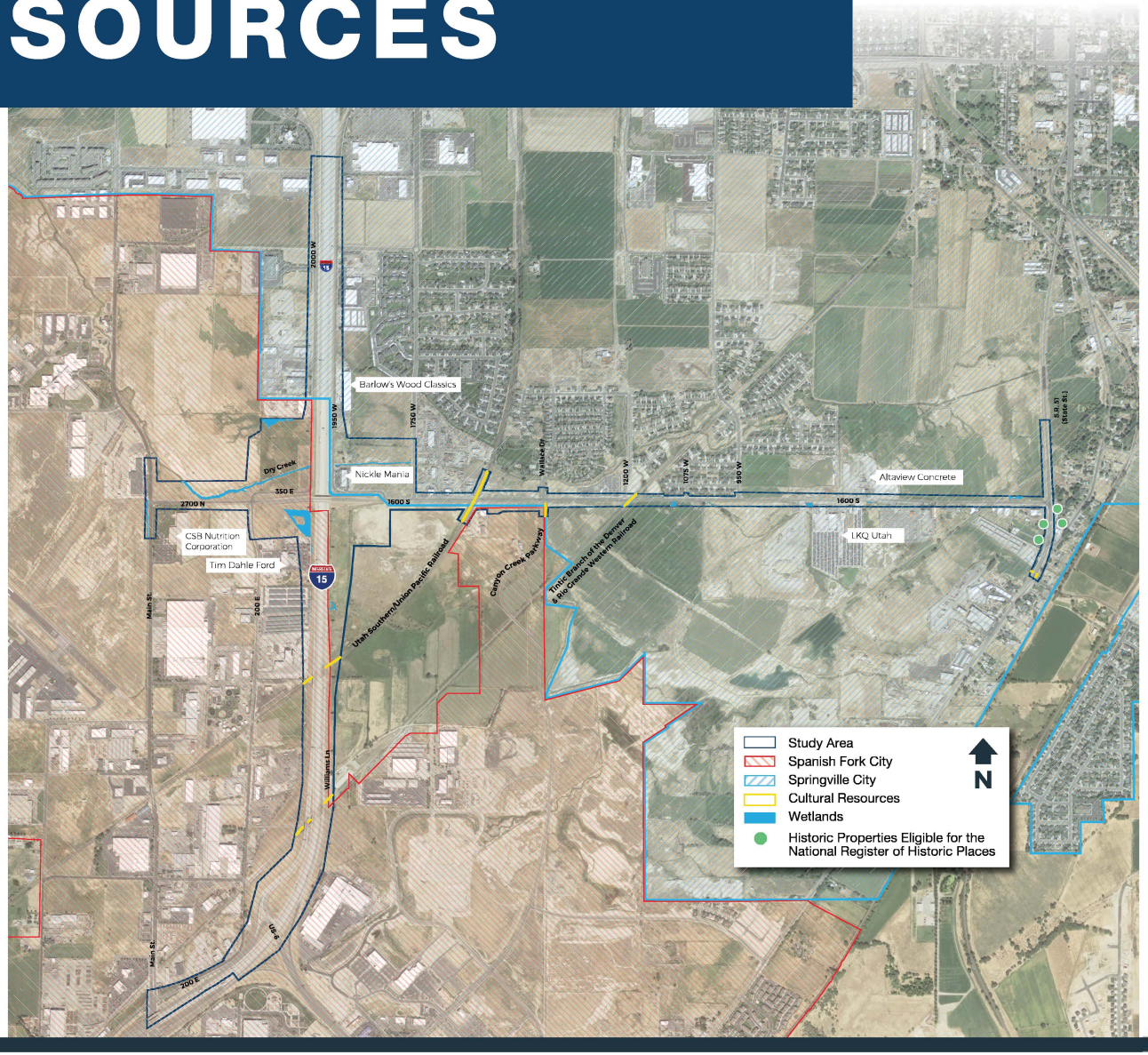
# ENVIRONMENTAL RESOURCES

I-15 Interchange
ENVIRONMENTAL ASSESSMENT
Springville/Spanish Fork

| RESOURCE | RESOURCES PRESENT IN THE STUDY AREA |
|---|---|
| CULTURAL RESOURCES | ■ 3 archaeological sites, 2 eligible for the National Register of Historic Places<br>■ 9 historic architectural properties, 5 eligible for the National Register of Historic Places |
| THREATENED AND ENDANGERED SPECIES | ■ No critical habitat within the study area<br>■ No habitat present for Canada lynx, yellow-billed cuckoo, June sucker and Jones cycladenia<br>■ Potential suitable habitat for Ute ladies'-tresses |
| WETLANDS AND WATERS OF THE U.S. | ■ 8 wetlands totaling 2.32 acres were delineated<br>■ 5 Waters of the U.S. were identified totaling 1.61 acres or 4,242 linear feet |
| HAZARDOUS WASTE | ■ 2 incidents (oil and gasoline spills) were previously reported within the study area |
| RIGHT-OF-WAY | ■ Zoning within the study area includes both heavy and light industrial, agricultural, commercial and residential properties |

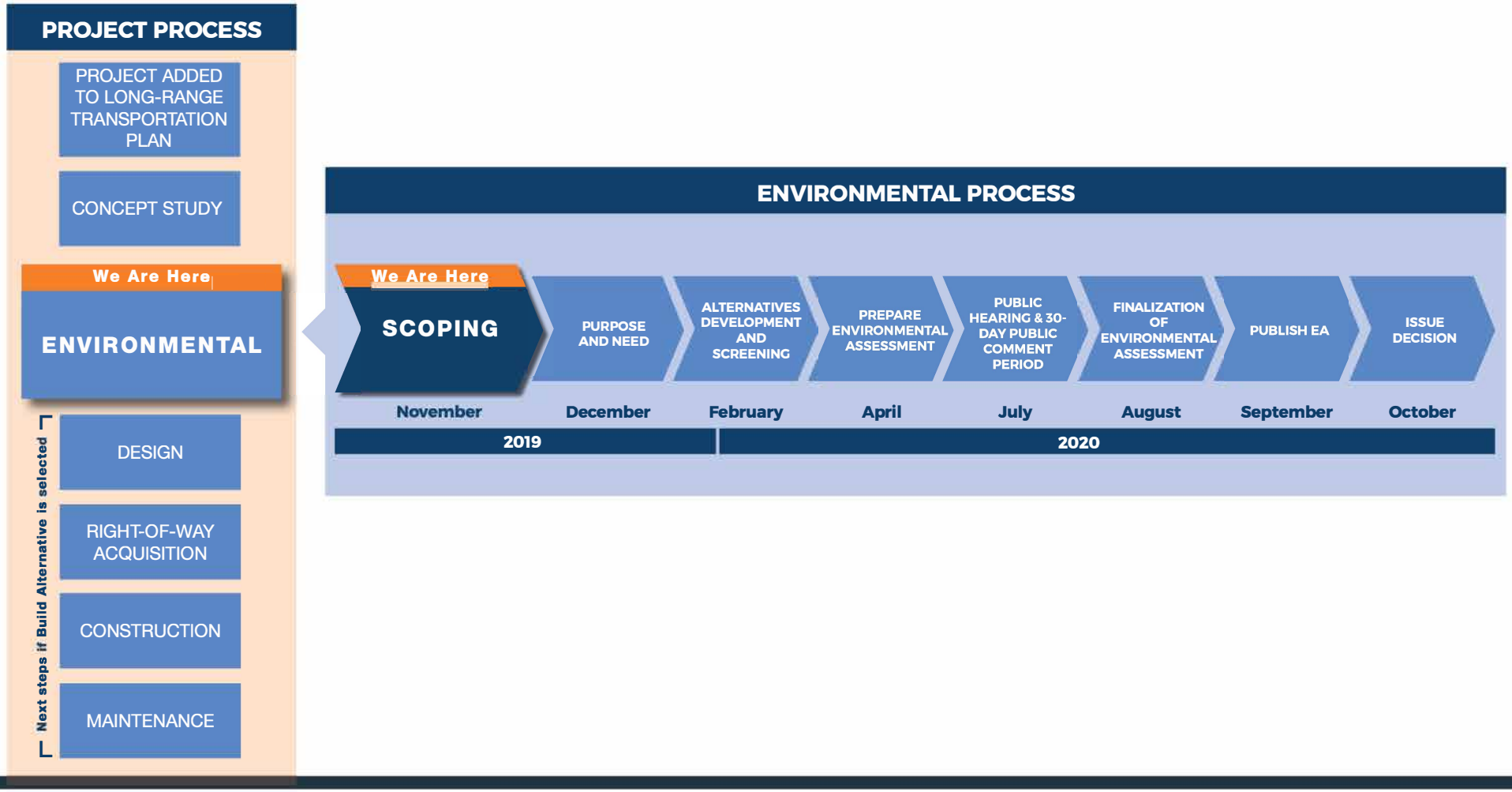
# ENVIRONMENTAL RESOURCES

I-15 Interchange
ENVIRONMENTAL ASSESSMENT
Springville/Spanish Fork



I-15 Interchange
ENVIRONMENTAL ASSESSMENT
Springville/Spanish Fork

# SCHEDULE



I-15 Interchange
ENVIRONMENTAL ASSESSMENT
Springville/Spanish Fork

# COMMENTS

## Due by November 30, 2019

Public comments are an important part of the environmental process and help guide the decision-making process. Other factors that play a key role in determining solutions are engineering standards, traffic and safety data, environmental resources impacts, budget and coordination with key governmental and environmental agencies.

## SUBMIT WRITTEN COMMENTS TONIGHT

**Email:** i15springvillespanishfork@utah.gov

**Phone:** 801-704-0899

**Website:** udot.utah.gov/i15springvillespanishfork

**Mail:**
Horrocks Engineers
Attn: Samantha Patterson
2162 West Grove Parkway, Suite 400
Pleasant Grove, UT 84062

# SUGGESTED COMMENTS

What resources in the area are a concern to you?

What are your concerns regarding the project?

Do you have any suggestions to minimize concerns or impacts you potentially foresee?

Place Postage Stamp Here

Horrocks Engineers
Attn: Samantha Patterson
2162 W. Grove Parkway, Suite 400
Pleasant Grove, UT 84062

Fold Here

I-15 Interchange
ENVIRONMENTAL ASSESSMENT
Springville/Spanish Fork

# COMMENT FORM

## A UDOT Study

## CONTACT INFORMATION

Name: _____ Organization: _____

Address: _____

City: _____ State : _____

Phone Number: _____

Email: _____

## COMMENTS

Comments are due by November 30, 2019

Please provide any input or concerns about the proposed project.

Please provide any other information or comments you feel would be helpful to the study team.

Thank you for your input. We look forward to a successful project. Please email comments to i15springvillespanishfork@utah.gov or fold, secure and stamp this form and mail it to the address on the back. Please postmark the form on or before **November 30, 2019**.

| COMMENT CHANNEL | COMMENT | COMMENT DATE | CONTACT NAME/ ORGANIZATION |
|---|---|---|---|
| Public Meeting Comment Form | Concern regarding nosie mitigation along residential zones. Concern for southbound entrance feasbility from 1600 to I-15 since close to another entrance/exit of SF Main Street and highway 6. How is the safety of residental zones going to be maintained? How does this fit with expansion of commuter rail and other transit expansion? | 11/14/2019 | Tyler James |
| Public Meeting Comment Form | Induced demand is "the great intellectual black hole in city planning; the one professional certainty that everyone thoughtful seems to acknowledge, yet almost no one is willing to act upon." Building this new interchange will only temporarily reduce congestion. Eventually, the roads and interchanges will reach LOSF and we will have to build even more capacity for temporary relief. This cycle will continue until we finally admit what we already know: we cannot outbuild congestion. I'd rather we act upon that knowledge before we've spent millions of dollars and encouraged even more urban sprawl. I know this may sound curmudgeonly, but that isn't my intention. I want to be thoughtful and friendly about this. Please do not build another interchange. I'm opposed to the pollution and destruction that would come about due to the sprawl that this project would enable. We cannot reduce our car use in Springville, Spanish Fork, or Mapleton if we keep building new roads to temporarily eas roadway congestion. P.S. if you do build this, can we please get protected bike lanes? | 11/14/2019 | Logan Millsap |
| Public Meeting Comment Form | I'm so excited about this plan! The traffic to get to Mapleton, you have to turn on Main or go up to 4th South to 400 East. A road study was done on 400 South three years ago and 18,000 cars go in front of my home every day. I t will be so nice to get out of my driveway and not have as many accidents on 400 South. | 11/14/2019 | Marlene Boyer Reed |
| Public Meeting Comment Form | Flyover at 400 South exchange to Mapleton. Fix 400 East on-ramp and Spanish Fork 6th South on-ramp first. Bike lane on 1600 South. Overpass for rail spur being discontinued. | 11/14/2019 | Michael Olds |
| Public Meeting Comment Form | I'm interested in 2000 West. Making the road up to the standard south of my building as is north of my building. I'm at 940 South. Commercial industrial areas growing very fast. | 11/14/2019 | Garth Green/ GW Green LFP |
| Public Meeting Comment Form | Concerned with the changes affecting the residential and agriculture in the area of 1600 South and Canyon Creeky Parkway, and Keliuin Grove residents at Wallace and 1600 South Noise pollution traffic effects residents agriculture, livestock, etc. in area. I would prefer interchange in a more industrial commercial area near I-15 and the new hospital under construction in Spanish Fork. | 11/14/2019 | Linda Behreudt |
| Public Meeting Comment Form | It appears that this proposed project totally ignores the nightmare of congestion this will create at Main Street and 1600 South. | 11/14/2019 | Gary Wood |
| Public Meeting Comment Form | We have rental buildings on 1600 South and 1700 West in the process of construction this interchange, our hope is not to disturb our existing property. When 1750 West went through, we were heavily impacted with cost and taxes from this process. We hope for this to not happen again. | 11/14/2019 | Russell Davies |
| Public Meeting Comment Form | Speed it up! Buy the houses! Get this done in 3 years or less. Thousands of people will benefit from this. The hospital will benefit, Spanish Fork shopping will benefit. The main problem is Mapleton traffic cutting through Springville. Please connect to Hwy 89 ASAP. You guys rock! How does this affect the proposed Springville Front Runner? How does this affect the proposed Tintic Railroad realignment? What traffic metric failures on the Springville Main Street would trigger expediting the connection to Hwy 89? How does the hospital off-ramp connect to this interchange? | 11/14/2019 | Jennifer Grigg |
| Public Meeting Comment Form | We like the idea of freeway access at 1600 South. It would greatly reduce traffic at 400 South. My hope is that there will be good sidewalks on 1600 South - right now it is definitely not pedestrian-friendly. I would also love better access to the UTA buses. I am not looking forward to the construction, but I think it will be worth it in the long run. Thank you for your service and consideration. | 11/14/2019 | Leslie Jay |
| Public Meeting Comment Form | Mapleton people at present exit I-15 onto 400 South eastward in Springville. The new exit onto 1600 South Springville eastward has a dead-end at Main Street, the north end of 1600 South. | 11/14/2019 | Milton Bruening |
| Public Meeting Comment Form | Wish study would extend to Hwy 89. It seems in order to really impact 400 South that a connection to Hwy 89 would be needed to get Mapleton traffic off of 400 South. | 11/14/2019 | Sean Conrut |
| Public Meeting Comment Form | My main concern is the next phase because my home would be affected if the road continues up 1600 South. The proposed road could put the overpass through or hear my home! I see the heed for another road but also worry about its effect on farmland. I think Springville residents should have a say in such an expensive project. | 11/14/2019 | Breckell Condie |
| Public Meeting Comment Form | The project needs to go forward now. The growth out of Mapleton is ruining Springville Main Streets. If the whole project isn't done. It will do no good. All it will cause is more problems. | 11/14/2019 | Luke Day |
| Public Meeting Comment Form | love the idea of a 1600 South exit but I am concerned for the next phase of the project. I live in the neighborhood it will connect to 89 with and was hoping they could find a better alternative than taking our people's homes. | 11/14/2019 | Amber Painter |
| Public Meeting Comment Form | Make room for bicycles on the road going east from the proposed project. "Rails to trails" Make an overpass for bikes over the main road going east when that RR line is disbanded. | 11/14/2019 | Merill Webb |
| Public Meeting Comment Form | 1600 South is very important to cyclists going west of I-15 because 400 South is unsafe. I would strongly urge the inclusion of protected bike lanes on 1600 South in order to preserve a safe corridor when this road is expanded. Also, there are plans for a trail on the old tontoz RR spur that crosses 1600 South. A pedestrian/bicycle overpass seems essential at 1200 West to provide safe passage across what will be a very busy corridor. | 11/14/2019 | Jeff Hardy/ Hobble Creek Bicycle Assoc. |

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| Public Meeting Comment Form | We need protected bike lanes to get to the west side. The traffic on Evergreen is not being planned for. This is already a very congested area that will get worse living in that subdivision to the south, there is only 1 real exit. Please look at extending this all the way to Mapleton as part of the plan. | 11/14/2019 | David Jones |
| Public Meeting Comment Form | I am concerned that the study area doesn't include the possible connections from 89 to 51. Only considering up to 51 is short-sighted. Created a widened road/freeway exit, without a way for the traffic to get to 89/Mapleton will lead to problems on Evergreen and South Main. The two projects need to be done together. | 11/14/2019 | Curtis Kent |
| Public Meeting Comment Form | My concern is the future impact of traffic on 1600 South East of Old South Main, Old South main and Evergreen Road. Mapleton and Springville need to be addressed sooner than later. I recommend an access through-road South of the T Bone towards Spanish Fork. | 11/14/2019 | Melissa Dunley |
| Public Meeting Comment Form | Noise pollution. We live on 1600 South and it is a major truck route with constant dump trucks, cement trucks, and double trailer trucks. We can't keep our south-facing windows open because if we did we can't even hear each other talk. We would love to see a cement sound barrier put in. 1600 south is a major cycling artery to get to the west side of I-15. 400 South is not safe for cyclists to cross at and neither is Spanish Fork Hwy 6. Cyclists need a protected bike lane to cross I-15 because there is no other safe option. | 11/14/2019 | Eric Ellis |
| Public Meeting Comment Form | Need protected bike lane. 400 South over the freeway and highway 89 are too dangerous. I like the train track turning into a bike and jogging path. Please put in a freeway exit there for Mapleton and an easier way to get to North Main in Spanish Fork and the airport. Need to accommodate business growth on 1600 South for Springville and the homes in that area and the ones to come on the Southside of Springville and northeast Spanish fork. That freeway exit has been promised for a long time. It needs to be completed before more homes and businesses come into that area and cause more difficulties. Use the new exit to access Spanish Fork north Main Street instead of the current way to access it. | 11/14/2019 | Jackie Snelson |
| Public Meeting Comment Form | I am concerned about adding a 3rd interchange so close to the existing 400 South and Spanish Fork exits. IT seems that would further complicate the freeway traffic situation by having so many vehicles getting on and off the freeway in a very short area. The added traffic on 1600 South would adversly affect the housing already present. I believe that expanding the 400 South interchange would better benefit the city. | 11/14/2019 | Jonathan Welton |
| Public Meeting Comment Form | We need protected bike lanes the full length of the project. There needs to be an overpass for the Tintic Rails to Trails conversion and a tie-in from the Tintic Rails to Trails to the protected bike lane. Springville City would like to see retail development along the corridor so we need the traffic to justify the development. | 11/14/2019 | Michael Snelson |
| Public Meeting Comment Form | Although I do see a potential need to lighten the traffic load on 400 South, I don't think that a new exit at 1600 South along with widening that road is the way to do it. The exit would be too close together, causing more problems along I-15 with merging and exiting. Also, increasing traffic flow along 1600 South for vehicles to get to Hwy 89 and Mapleton will stop at Sr. 51. This will increase traffic along residential streets that are not designed to handle that much traffic. One of these roads is Evergreen Drive which has two railroad crossings. Significantly increased traffic along this road would be dangerous. Please consider what will happen downstream if this project is approved. Quiet neighborhoods that have been peaceful for 40 years or more (some houses are over 100 years old) will no longer be safe and quiet. Children in those neighborhoods won't e able to safely walk to the park or ride their bikes in the street. Improvements along 400 South could server everyone and be done for a lover price. Also, continuing Front Runner further south will help alleviate traffic. | 11/14/2019 | Victoria VanHorn |
| Public Meeting Comment Form | I'm concerned about the increased traffic pressure this will create along Evergreen drive and 400 east from traffic trying to get over to Mapleton. I'm in favor of the 1600 South exchange in general, but if a direct connection from S.R. 51 to U.S. 89 is not included, then there is potential to cause traffic problems in the neighborhoods east of the intersection at 1600 North and S.R. 51. | 11/14/2019 | Guy Vanhorn |
| Public Meeting Comment Form | With the growing population and increasing congestion on 400 South, some development seems necessary. There is growing foot traffic on 1600 South, partly because UTA operates on SR 51, but there are no sidewalks and very poor lighting. The two railroad tracks will be major considerations. There is also an issue of not being able to turn east on to 1600 South from 1200 West and expanding the road and traffic on 1600 South would present considerable problems (i.e. increased risk of accidents). Given the proximity of the 400 South exit, it seems unnecessary to develop 1600 South on the scale that 400 South is. I would prefer to keep 400 South to two lanes with improvements for pedestrian access and safety. If this would mean not putting in a railway overpass, that would be fine with me. Traffic would divert to 400 South if someone is not interested in waiting for the train to pass. | 11/14/2019 | Hoku Conklin |
| Public Meeting Comment Form | I often observe traffic back-ups at both 400 South and the SF main ramps. This is due in part to the current ramp design where traffic coming off the freeway must stop on the off-ramps for traffic lights to accommodate cross traffic. As part of this study, please consider changing both 400 South and SF main to include fly over. Highway especially will need flyover ramps in the future to speed traffic to and from I-15. The old SF main interchange was more useful to the residents of SF then the current interchanges. The old interchange offered much better traffic flow from Hwy 6 to SF main street. | 11/14/2019 | Doug Hansen |
| Public Meeting Comment Form | Would we lose any frontage to our property? If so, how much? Who would pay to relocate existing plumbing and electrical if necessary? I would appreciate an opportunity to voice concerns before any plans are finalized. | 11/14/2019 | Blaine Fewkes/ Fewkes & Son Machine Co. |

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| Public Meeting Comment Form | Adding an interchange without a plan to connect it to 89 will only cause more problems. I need to know how this will impact my property. | 11/14/2019 0:00 | Stephanie Crandall |
| Public Meeting Comment Form | This project will only make traffic bottlenecks to the intersection at 1600 South and State Street. There needs to be a full plan and study of how to get the traffic through to Mapleton and Hwy 89. Utilize the local farmers and landowners to help get info and input on the land, drainage, and irrigation. | 11/14/2019 | Chase Crandall |
| Public Meeting Comment Form | *Attached several maps and photos | 11/14/2019 | Paul Prior |
| Public Meeting Comment Form | We are retailers/service business of new and used Fork products. My initial response: excitement, better access to our location, improved opportunity to sell and service more vehicles. My immediate concerns: How does proposed on and off ramps effect our property, scope of effected lane/building? How does reconfigured ingress/egress of frontage road impact access? How does "Tim Dahle Ford Property" compensated for lost land - possible re-location of building, and lost revenue during the project? UDOT's long-term vision of site. | 11/14/2019 | Tim Dahle |
| Email | Emailed at 3:05 PM: We are in favor of putting additional freeway access between Springville and Spanish Fork.<br>Pat Lee | 11/15/2019 | John and Patt Lee |
| Public Website | Comment submitted at 8:53 AM: My address is 959w 1550s. I am in favor of an interchange and some development on 1600s, especially for pedestrian access and safety. I would prefer that 1600s remain 2 lanes with some expansion at intersections for left turn lanes. As it is, traffic has to wait for vehicles turning left who have to yield to oncoming traffic. Additionally, installing roundabouts (like the one southeast of Walmart) would be preferable to traffic signals. | 11/15/2019 | Hoku Conklin |
| Public Website | Comment Submitted at 9:14 AM: That looks good. Build it wide, please. 3 lanes East, and 3 West if possible. | 11/15/2019 | William Whitmore |
| Public Website | Comment submitted at 10:31 AM: I am VERY much in favor of the proposed interchange in Springville. I have been a resident in central Springville for almost 4 years and plan to be here for a while. Please keep me in the loop for future updates!<br>Thanks,<br>Parker | 11/15/2019 | Parker Boyack |
| Public Website | Comment Submitted at 7:33 PM: I am for the new I-15 interchange at 1600 South in Springville. There are too many housing developments being built in Springville and Mapleton. The current interchanges at 400 South in Springville and Rt. 6 in Spanish Fork will be too overloaded to handle all the traffic generated by the new developments. | 11/15/2019 | Bunny Whitney |
| Email | Emailed at 2:57 PM: Hello,<br>How would the logistics of freeway traffic be handled for the proposed I-15 Interchange in Springville? Consider:<br>Entering I-15 from 400 S. in Springville to head south, it is already a challenge for those drivers to merge left who don't want to exit at Hwy 6/Main Street in Spanish Fork, or for those already on the freeway who want to merge right and exit at Spanish Fork.<br>Squeezing in a southbound offramp would be difficult (and probably accident prone); it would need a dedicated exit lane and something clever (perhaps an exit south of 1600 S. that loops back) to make it work. A southbound onramp would be impossible because there just isn't enough distance (less than a mile) from 1600 S. and Spanish Fork Hwy6/Main Street. However, a<br>northbound onramp at 1600 S. would probably work.<br>Thanks,<br>J Kelly | 11/15/2019 | J Kelly |
| Phone | Called at 11:04 a.m. Mendy called Mark back. He said when they did the interchange by Walmart there was a public meeting then. He said they live at 463 East 400 South in Springville. He said there are certain times of the day that they can't get onto 400 South. He wanted to know how long the project would take. Mendy explained the environmental process and that we don't know when construction would take place at this time. He said this project should have been done sooner. If we wait, more buildings will go up. He said we need to do it soon. He is concerned that there are other interchanges close by but that we need this one. He said they need a road that connects to Mapleton. He said when they improved 400 South they didn't add a center turn lane which would have helped with access to 400 South. Mendy let him know she would pass his comments to the team for consideration. Mendy asked if he wanted email updates during the study. He said yes and provided his email. | 11/15/2019 | Mark Sumsion |
| Phone | Called at 2:43 p.m. Frank called the hotline back and spoke with Mendy. He said he drives 400 South in Springville everyday. He said it is a dangerous road and there have been several accidents there. He said they need an exit for Springville and Mapleton for safety. He said he can't understand why it takes so long to do environmental studies. Mendy explained that they have to follow federal guidelines for environmental studies. He said he is in favor of this project going ASAP. He is concerned that it is not a mile away from the nearest interchange. Mendy let him know that she would pass this concern to the study team for consideration. | 11/15/2019 | Frank Headman |

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| Phone | Called at 1:13 PM: Ron is the representative at Young Living. They are talking about expanding their facility so they have a large stake in the project as far as accessibility. He says they have an easment agreement with a land-owner just south of them that grants them access to the Frontage Rd. as well as Main St. and he wants the team to know that they would like maintained or expanded access to both of those main vessels. Molly told him she would record his comment and make sure the project team heard his concerns. | 11/18/2019 | Ron Harris |
| Public Website | Emailed at 12:52 AM: We are elated that UDOT is finally considering and taking action to add more east to west connectivity/easy access to I-15 for residents in south Utah County. It is long overdue. I know the citizens of Spanish Fork, like me, are extremely tired of our streets being overwhelmed for years by people driving through the city from Mapleton, Salem, Woodland Hills, and Elk Ridge to access I-15. The situation has worsen each year as the area continues its rapid growth. An additional freeway interchange at 1200 South Springville and its widening to Hwy 89 to Mapleton would definitely be a great first step and welcomed upgrade to begin improving the traffic flow in the South County area. Hopefully, additional improvements will be made to benefit Salem's, Woodland Hills', and Elk Ridge's East to West connectivity as well. Thank you. | 11/23/2019 | Reginald Irvine |
| Email | Emailed at 7:49 PM: This is a much needed addition for the area, however, it needs to continue to HWY 89. | 11/25/2019 | Kent Taylor |
| Email | Emailed at 10:04 AM: Hello,<br>I have some questions regarding the impact of connecting the 1600 S exit to SR 51. How will the connection between SR 51 andn HWY 89 change? | 11/26/2019 | Garrison Jones |
| Email | *Attached letter and image | 11/26/2019 | Joe Beals |
| Public Website | Comment left at 1-:32 AM: I would be really happy to see another interchange put in at 1600 S. I am concerned though about the western most set of Railroad Tracks. Quite frequently, the train will be stopped across these tracks for several minutes up to 20+ while they are unhooking/hooking up additional cars. If this road was to become a major artery to get traffic from I15 to Mapleton, you could potentially have traffic backed up all the way to the freeway. Has an overpass crossing the railroad tracks been considered? Also is there a plan to put in any additional road(s) connecting HWY's 51 and 89? Preferably straight shot roads that don't meander through neighborhoods! | 11/26/2019 | Heather Ash |
| Public Website | Comment submitted at 10:22 AM: Is there any chance that the new road coming onto Highway 51 will eventually extend to Highway 89? It seems once the traffic gets to 51 then it will bottle neck up by the cemetery to get all the Mapleton and South Springville residents to their homes. I am all for the new interchange happening as the 400 South is way crowded. But I am not sure I will use the new one as it will be more time and traffic going through the neighborhood by the cemetery. | 11/26/2019 | Breanne Bringhurst |
| Email | Emailed at 9:25 AM: To whom it may concern,<br>Since the public comment period is ending soon, I thought I'd make a statement.<br>A considerable amount of traffic coming to the 400 South exit in Springville are residents of Mapleton that head east on 400 S (Springville) to Springville Main St and head south, or continue on to 1700 E (Springville) which turns in to Mapleton Main St and then turn south. It would be REALLY great to see this new intersection with a road widening/extension to the east all the way to 1600 N (Mapleton). It appears your current study area stops at highway 51, but to gain the MOST benefit, this new freeway interchange should provide direct connectivity to 1600 N in Mapleton. This additional 0.45-miles would certainly increase the cost of the project (probably be the most expensive section of the project), but it will also yield the greatest benefit distributing traffic south on Highway 89 and further east on 1600 N in Mapleton.<br>Thank you for considering this comment! | 11/26/2019 | Justin Earl |
| Public Website | Comment submitted at 10:29 AM: As a resident of Mapleton, there isn't a fast and direct route from my house to the freeway. It is so inconvenient going left then right down all the small side streets to get to the congestion of 400 s. I would be so happy to have another freeway exit! | 11/26/2019 | Ashley Pritchett |
| Public Website | Comment left at 10:39 AM: I think that would be a great idea! Both of the exits nearby (400 S and Spanish Fork) are always high traffic areas with expected delays.<br>With all of the current and expected growth to the surrounding residential and business areas, adding another exit just makes sense. | 11/26/2019 | April Kirtland |
| Public Website | Comment left at 10:44 AM: I think the new offramp and transportation improvements as proposed are a great idea that's time has come. I can't wait for these improvements to be implemented. | 11/26/2019 | Quinn Koller |
| Public Website | Comment left at 12:15 PM: A new interstate exit at 1600 S is a MUST for Springville. I live west of I-15 and south of 400S. It's a nightmare to get off the exit at 400 S (during rush hour, especially.) Having a new exit at 1600 S will benefit residents of Springville, Mapleton, and northern Spanish Fork and would reduce the traffic at 400 S immensely. | 11/26/2019 | Kaity Gren |
| Public Website | Emailed at 1:32 PM: Please make this happen. With the new hospital and all of the growth both SF and Springville exits are way too busy. This will be such an important addition to the community! | 11/26/2019 | Mike Osborn |
| Public Website | Comment left at 1:39 PM: We are very excited and look forward to having a freeway exit/entrance closer to Mapleton where we live. | 11/26/2019 | Liz Snow |

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| Public Website | Emailed at 4:42 PM: This is very needed, not only to alleviate traffic on 400 S but for quicker and better access to south Springville, Spanish fork, and Mapleton. The sooner the better too | 11/26/2019 | Derek Astle |
| Public Website | Emailed at 4:45 PM: This should be a very high priority. There are so many accidents on 400 south because of the amount of people using this road to get to/from Mapleton | 11/26/2019 | Patrice Bolen |
| Public Website | Comment left at 7:54 PM: YES! I am not much on spending tax dollars but this is a well needed exit. It would alleviate a lot of congestion on 400th south and possible lower the number of accidents. A majority of the traffic is turning down 1700 to go to the homes off of Les Hardy Rd. It is a logical solution. | 11/26/2019 | Dianne Singleton |
| Public Website | Comment left at 8:11 PM: This exit is much needed for all the growth in this area. I was born and raised in Mapleton and it's time to make this addition. Change is hard for some people but this is much needed ASAP. | 11/26/2019 | Lacey Cherrington |
| Public Website | Emailed at 11:11 PM: This has been needed for years! I just hope it can be accomplished without months on end of construction and detours. Lehi construction is a mess! I don't want to deal with that here. | 11/26/2019 | Christi Wolsey |
| Public Website | Comment left at 11:43 AM: Hi,<br>I currently live in Springville and I'll be moving into my new construction home in Mapleton in December 2019. I use 1400 N exit in Springville mostly right now, because 400 N is also backed up and has all the lights. I definitely think the 1600 S exit is needed now and will be even more needed as more people build houses, but it won't benefit near as much as it would if it extended up to the 89. Many cars turn from 400 N onto 89. I think it should go to up to the 89 from the get go, so the exit can be most utilized from the the get go. | 11/26/2019 | Michelle Guymon |
| Public Website | Emailed at 12:29 PM: I would love to have another exit - especially if there was a good way to connect to 89 and Mapleton. | 11/26/2019 | Marsha Fuller |
| Public Website | Comment left at 1:29 PM: Please do | 11/26/2019 | Sonny Sly |
| Public Website | Comment left at 1:33 PM: I am a Springville resident. I believe adding an exit at 1600S (South Springville) is absolutely necessary so that there is ample access to the new hospital that is being built in Spanish Fork. The US-6 interchange sometimes can get snarled, and that is worrisome. | 11/26/2019 | Rebecca Christensen |
| Public Website | Comment left at 9:39 AM: As a resident of Springville, I would love to see another I -15 exit further south. The 400 S exit gets horribly backed up with traffic from I -15 which makes it hard at time to make it to businesses near 400 S. Another exit would definitely ease the congestion! | 11/27/2019 | Angela Stonehocker |
| Public Website | Emailed at 7:31 AM: Get it done...<br>Should of done it 19 years ago,<br>Now it'll cost us/you cause of you not being able to pull the trigger 19 years ago.<br>But it'll be worth it, traffic is terrible. | 11/27/2019 | Brian Stewart |
| Public Website | Emailed at 8:23 AM: I think we need another interchange to support all the traffic going in to Mapleton and Spanish Fork. 400 South is already a mess and getting very busy, with more and more building coming. But I think this needs to have a more direct connect route to Hwy 89 in order to be really effective. I don't see that included in the plan currently. I also worry about having another interchange so close to the Spanish Fork Hwy 6 exit. | 11/27/2019 | Craig Pritchard |
| Public Website | Emailed at 8:45 AM: I love the idea of having another exit, especially to handle the traffic coming to and from Mapleton. As long the exit is able to handle the congestion I'm good with the idea. | 11/27/2019 | Taylor Mitton |
| Public Website | Emailed at 9 AM: Preface: I was not able to attend the community public meeting so this might have been asked and answered.<br>Question: How is traffic going to be handled south-bound on I-15? If this interchange is constructed, vehicles entering south-bound onto I-15 from the proposed 1600 S/2700 N interchange will need to cross three lanes of traffic in less than 3000 feet if they are continuing south-bound on I-15 past the US-6/SF Main Street interchange.<br>I'm not opposed to this interchange. I am for it in every way. | 11/27/2019 | Michael Richins |
| Public Website | Comment left at 9:16 AM: I live in Springville and am on 4th south from I-15 to our home daily. During peek hours. 4th South is so congested with people going to Mapleton and North Spanish Fork, you cannot even use the left lane til you get to main street.. We really need the projected off ramp on 1600 South. | 11/27/2019 | Sandra Richards |
| Public Website | Emailed at 9:17 AM: I own a condo just north of where this new exit will be and feel that this new exit is not needed at all! as there is a freeway exit to springville 400 south that basically services the exact same area and it is not barely three-quarters of a mile away. this will be a huge waste of tax payer money to put this exit in as well as to redo and widen all of the roads that it services. It would be much more cost effective to widen the 400 S exit in Springville and make traffic flow better both to the east and the west as well.<br>Please don't waste my tax payer dollars on this unnessary financial mistake | 11/27/2019 | Wayne Jacksom |
| Public Website | Emailed at 10:33 AM: I don't think adding a freeway entrance/exit on 1600 south springville will make a difference with traffic flow. My concern is that it will be expensive and not make much of a difference for people. I think having a freeway entrance in Spanish Fork would be more practical. Maybe on center street or 100 S. I think the current Spanish fork exit onto Main Street and one at 1600 south Springville would be too close to similar locations. Where, in Spanish Fork, having an exit not on Main but more west, might help clear up the already over congested Main Street. | 11/27/2019 | Holly Davies |

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| Email | Emailed at 11:50 AM: This will make a Evergreen Drive a nightmare. It is already dangerous trying to turn south on SR. This will make nearly impossible, backing up traffic over the railroad tracks. The school buses depend on being able to turn onto SR from evergreen drive. If you go forward with plan without extended it to highway 89, people will use evergreen drive to get to highway 89 and that will cause a traffic nightmare for everyone that already depends on exiting eldorado drive onto evergreen. You would need to take ownership of evergreen drive, turn into 4 lane road and install stop lights at SR and at eldorado. Nobody seems to want to take care of evergreen drive where the railroads cross. Already very dangerous. Pedestrians have been killed on that road. Cars drive off the road into the ditch. If you can not knock down 15 houses to connect to highway 89, then you need to fix Evergreen drive. The state needs to adopt this toad. In addition. When people take Evergreen to get to highway, it is nightmare trying to turn onto highway 89 from 400 East. I feel like I am taking my life into my hands whenever I have to drive my kids to school. I feel sorry for the poor school buses that are driving precious cargo having this stress.<br>This proposal is not a solution yet. Dig deeper and don't make things worse for others when trying to alleviate problems some where else. It is just move the problem over a mile, not fixing it.<br>Sent from my iPhone | 11/27/2019 | Alicia Barwick |
| Public Website | Comment left at 12:41 PM: Surely there is a better solution to the new interchange that is proposed on 1600 south to SR 51 To access Mapleton that would make more sense to come off of Hwy 6 and get those people home .loading up a 2 lane road is not the solution in my mind its a 2 lane road your just moving it 1 mile East from I -15 just load up the surface streets That some of us live on I am a resident living on Hwy 51 as the last Springville resident to the south . its already impossible to make a left hand turn to go north Or for that fact let alone try and turn off of hwy 51 to get to our home the traffic is horrific now its loaded with traffic trying to get to the east bench and Mapleton . Yes, growth is a sure thing it seems but when we try to bring our equipment to our other property it's like taking your life in your hands my wife has been run into 2 times in the last year just to get into our driveway. i realize that its our choice to live there but it is like a speedway now if you do drive the posted speed you get run off the road for going the posted speed We have found that people do not care that it is our rights to be on the road also with Agriculture equipment They have taught us all kinds of new hand gestures . sorry for my rant but there must be a better solution than 1600 south and Hyw 51. please look at it as if this was going on in YOUR front yard I would hope you would voice your opinion | 11/27/2019 | Bruce Bradshaw |
| Email | Emailed at 5:11 PM: See the attached memo for comments from Spanish Fork City.<br>Thanks, Jered *attached document with Spanish Fork's support of the project* | 11/27/2019 | Jered Johnson |
| Public Website | Comment left at 8:05 AM: This will be a welcome improvement to traffic on 400 South in Springville. My concern lies with the connecting roads. There's still a large gap between the end of the improvements on the East end of1600 South and Hwy 89. Those connecting roads are narrow, contain railroad crossings and won't handle an increase in traffic well. Who do we contact about those roads? | 11/28/2019 | Jocelyn Blakey |
| Public Website | Comment left at 9:27 AM: I support the installation of a freeway interchange on 1600 s. I would also, if possible, suggest a speed limit change from 35 to 45 on 1600 s, leading to South Main street in Springville. | 11/28/2019 | Benjamin Krutsch |
| Public Website | Comment left at 7:24 AM: Please! We need this interchange, and the Spanish Fork Center Street interchange. | 11/29/2019 | Paul Liddiard |
| Public Website | Comment left at 9:45 PM: I feel this would be an important contribution to depressurizing traffic on 4th South in Springville and on U.S. 6 going into Spanish Fork. The continued commercial and residential development will put increased pressure on these arteries. Also, this will provide a good access and egress to Mapleton. | 11/29/2019 | Ed Adams |
| Public Website | Comment left at 11:03 PM: Please do this ASAP. I LOVE IT.<br>This is long overdue | 11/29/2019 | Dustin Lane |
| Email | Emailed at 10:30 AM: In reviewing the project, I'm highly in favor of building the interchange at I-15! However, I'm concerned that once the interchange is built a result will be a significant increase in traffic on Evergreen Drive. I live in Mapleton just off 1200 North and already I frequently take Evergreen Drive from State Street to get to US-89 to 1200 North. The two railroad crossings on Evergreen Drive will see significantly more impacts without an additional remedy.<br>I would like to see the project scope adjusted to include extending 1600 S (Springville) to 1600 N (Mapleton) at US-89. This appears to be a logical next step. | 12/1/2019 | Mike Overson |

I-15 Interchange
ENVIRONMENTAL ASSESSMENT
Springville/Spanish Fork

# COMMENT FORM

A UDOT Study

## CONTACT INFORMATION

Name: Joe Beals
Organization:
Address: 1693 S. Main
City: Springville
State : Utah
Phone Number: 801-319-7144
Email: jbeals23@msn.com

## COMMENTS

Comments are due by November 30, 2019

Please provide any input or concerns about the proposed project.

Comments are attached

Please provide any other information or comments you feel would be helpful to the study team.

Thank you for your input. We look forward to a successful project. Please email comments to i15springvillespanishfork@utah.gov or fold, secure and stamp this form and mail it to the address on the back. Please postmark the form on or before **November 30, 2019**.

To Whom It May Concern:

I have a few comments about the open house on Thursday Nov. 14th, concerning an interchange at 1600 So. and improvements to 1600 So. As longtime residents of Springville and Mapleton know, the only future growth area would be to south Mapleton and to the south and west in Springville.

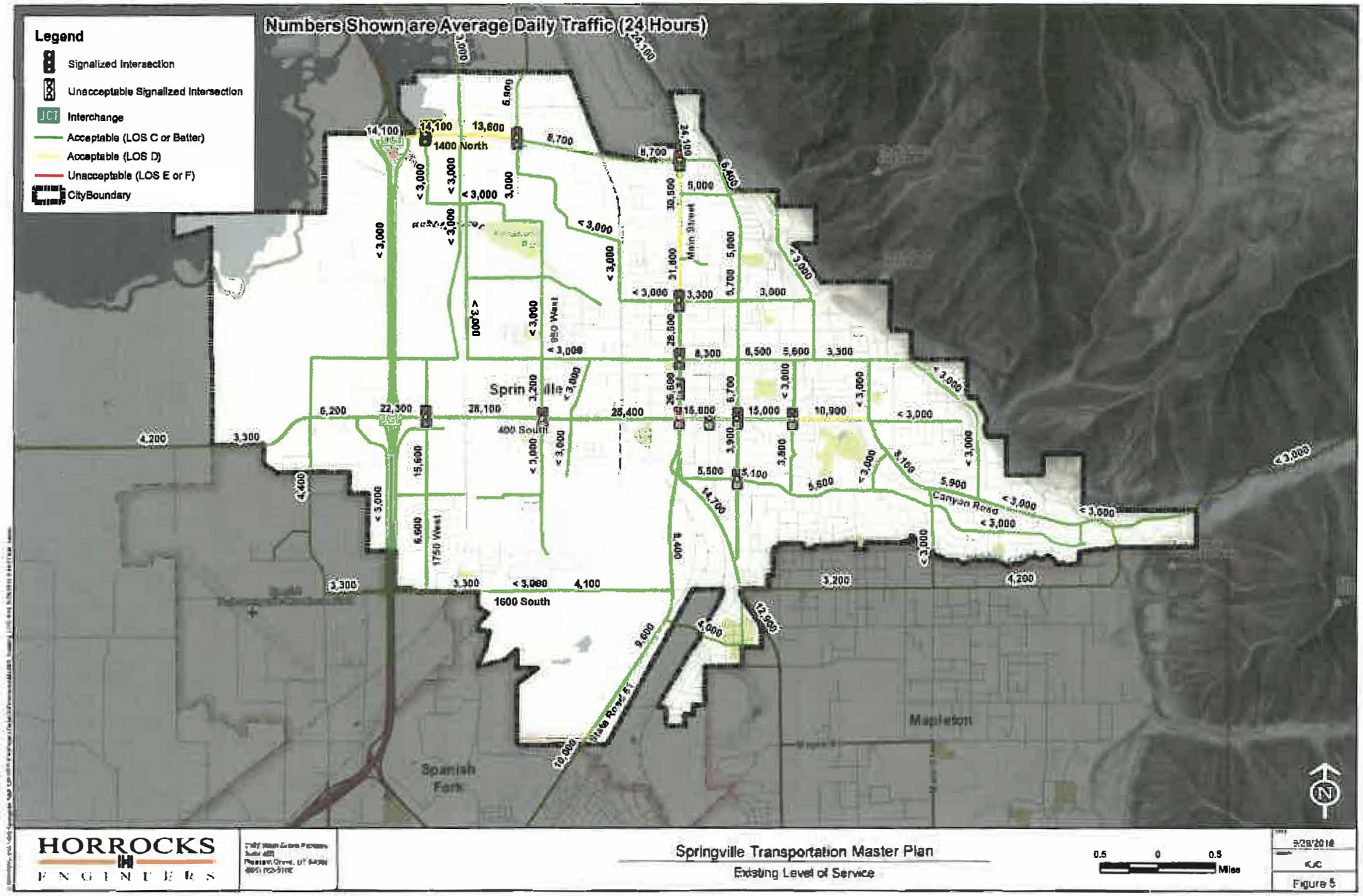
The latest traffic study I can find is dated 9-29-2016 in which I have enclosed a copy of that study. It shows that everything is at LOS-C or better. The only problem area is 400 So. Main to 200 East at LOS – E or F. Because of that information, I feel like the objective of this interchange at 1600 So. is and should be for future transportation needs for south Mapleton.

I have enclosed a map of what Spanish Fork has done to date, showing collector or arterial roadways and highlighting areas that are complete and areas that have not been completed yet. Spanish Fork Parkway goes from US 6 northwesterly to S.R. 51 needing only less than 1000 ft. to complete on the east side of S.R. 51.

Also, I have noted a proper new alignment that achieves the objective I believe you are seeking. It goes through open fields where future growth and development can be built according to the road rather than the road encroaching on established resident's property and lives by using sound walls, added traffic and safety issues.

Thank you,

Joe Beals


Numbers Shown are Average Daily Traffic (24 Hours)
Legend
Signalized Intersection
Unacceptable Signalized Intersection
Interchange
Acceptable (LOS C or Better)
Acceptable (LOS D)
Unacceptable (LOS E or F)
CityBoundary
1400 North
400 South
1600 South
Main Street
Canyon Road
Springville
Spanish Fork
Mapleton
HORROCKS ENGINEERS
Springville Transportation Master Plan
Existing Level of Service
0.5 0 0.5 Miles
9/28/2018
KJC
Figure 5

# Business Opportunity
# 9+ Acres FOR SALE!

---

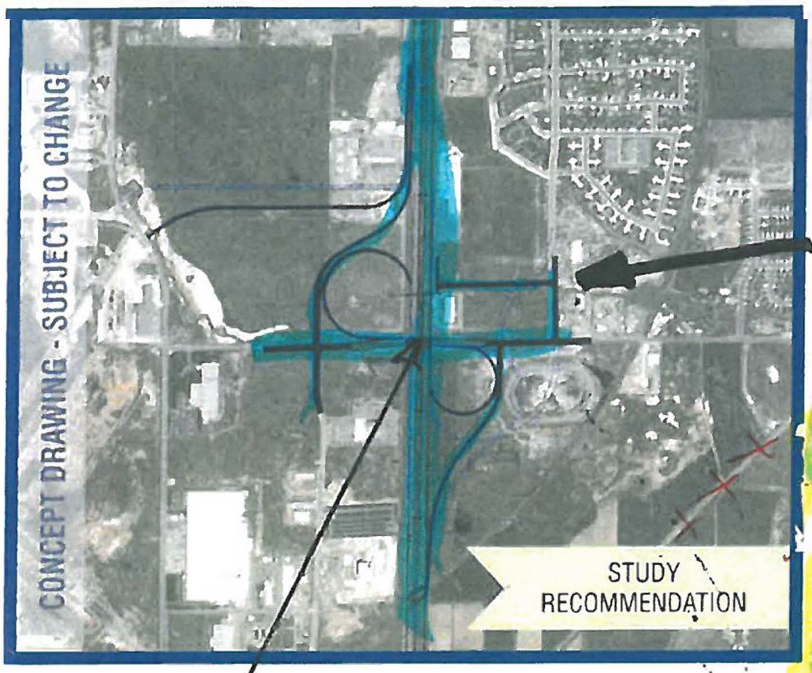
## SOUTH SPRINGVILLE, UTAH
## An Investment Worth Millions!

Offering ***for sale by owner,*** 9.27 acres in South Springville, between SR 51 and 1300-1400 Old South Main. This is a **unique, central county parcel, with easy access to I-15,** where yard and material handling opportunities **estimate income in the millions!** These parcels provide *best use* for **construction, demolition, and investment companies etc!**

- **Ample Yard Space:** At present there is ample yard space available for equipment, etc. adjacent to Old South Main.
- **Peat Bog Deposit:** An existing peat bog deposit on this parcel creates a great business opportunity! A test hole was dug 18 feet deep, an 85,000 year-old peat moss deposit was discovered. There is a small fortune here! Mine and sell the topsoil and peat moss for a potential value of $5,227,200 (9acres X 18 feet = 361,360 cubic yards at $20 per yard).
- **Demolition and Fill Area:** After you mine the peat bog, there will be a hole 51 feet deep between the bottom of the peat bog and the road level (SR 51 on the West and South Main on the East.) This would be worth $11,107,800 as a potential demolition and fill area, (9 acres X 51 feet = 740,520 cubic yards at $15 per yard to fill income.)
- **Prime Commercial/Light Industrial Manufacturing Zoned Land:** Once the property is filled and at road level, it can be subdivided for Commercial/I.L.M. lots, or turned into a public recreation park, or a combination of both! ($1.5 Million value in 2019)
- **Planned Unit Development:** There are also 3 acres to the South for sale. There may be other interested sellers.
- **Potential income and Real Estate 2019 base value worth at approx $18,000,000.**

Sold as is at **$150,000 per acre.** See county tax #26:026:0016 and #26:026:0002. I would like to close January 2, 2020 or soon thereafter, with possible 1031 tax free exchange. Interested buyers please contact **Paul A. Prior at 801-360-7317** to schedule a showing of this area. See map on reverse.

# Ex. Brain Storming Yes S.E Springville & Mapleton Junction

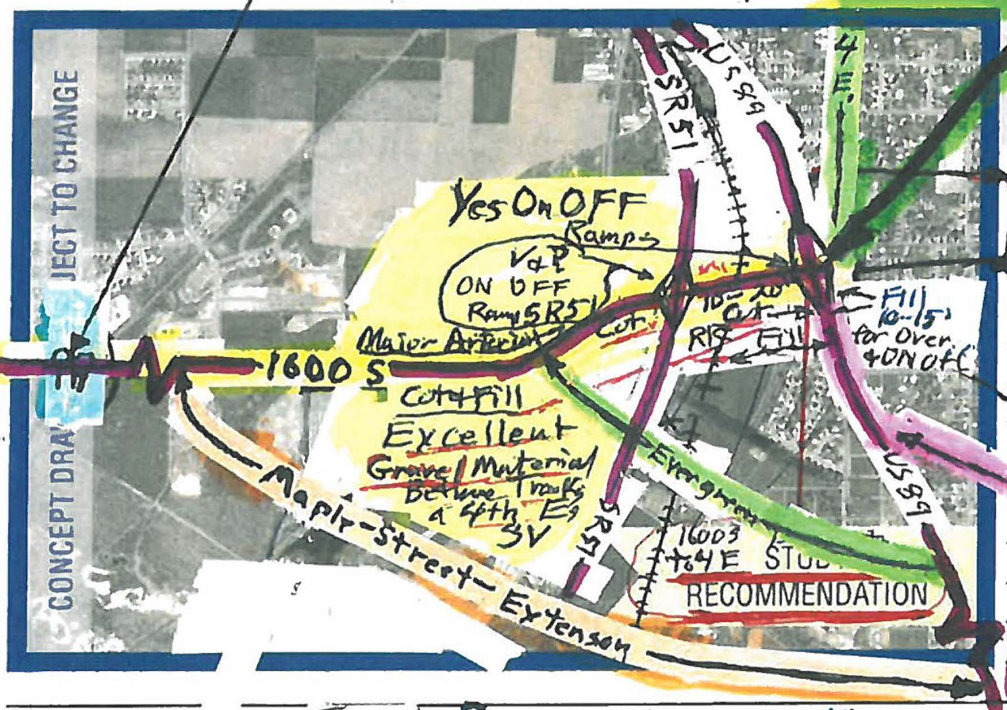



Shown here is the study recommendation for the new interchange at I-15 and 1600 South in Springville. Do you agree with this alternative?

I-15 & 1600 South

Yes On Off Ramps For 1600 S. Springville A Major Arterial Serrieing Springville & Mapleton

Yes 1600S Extension Best at 4th East Sp. Vi. & US 89 Over Pass with ON & Off Ramps




Shown here is the study recommendation for the widening and extension of 1600 South to Mapleton. Do you agree with this alternative?

Yes 4 E. S.V. Over Farm 37.158ac

Yes Best S.V. & Mapleton Major Arterial to & from E. Springville & Mapleton. On Off Ramps @ Study @ 4th East S.V

Recommendation

Very Dangerous!! Many Accidents!! On Slope off Bench Make An Over Pass Cut 10' Add 10' Add On Off Ramps

East Springville & Mapleton Arterials

Also East RR Tracks to be moved parallel with West Track thus enhancing value

These Very Good Brain Stroming Ideas by Paul A. Prior

Paul A. Prior 801-360-7317

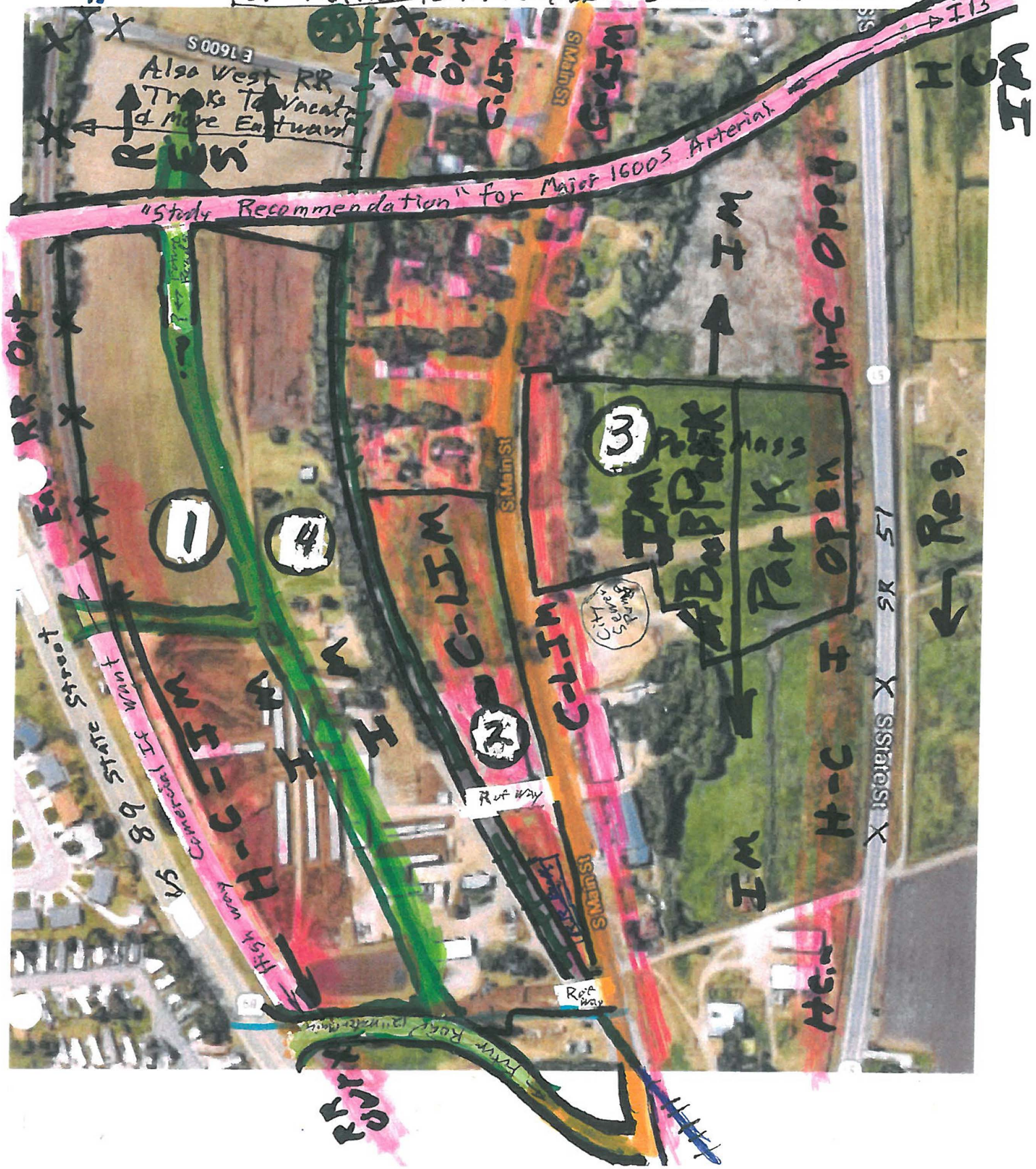
Enclosure (1)

37.158 ac. for Sale In South Springville

4 Parcels For Sale / RR Combines Tracks

/ 1600 S Major Arterial "Study Recommendation"

for Traffic To & From I-15 for Springville & Mapleton



Exit — Ban Storming Idea
US89
4th S
4 East Springs
8th S
Yes 4th South St. Maxed Out NOW
So Accelerate RR114
A Lot of People
4th East Springville
Yes Will use
Yes Best Extension
Much Gravel use Cut + Fill
Over Pass + On to Off Ramps
Many Accidents on slope. Bad
US89
1600 S
Evergreen Street
East
Main Street
By Paul A. Prior
801-360-7317
US89

Enclosure 4

37.158 ac. for Sale In South Springville

4 Parcels For Sale / RR Combines Tracks

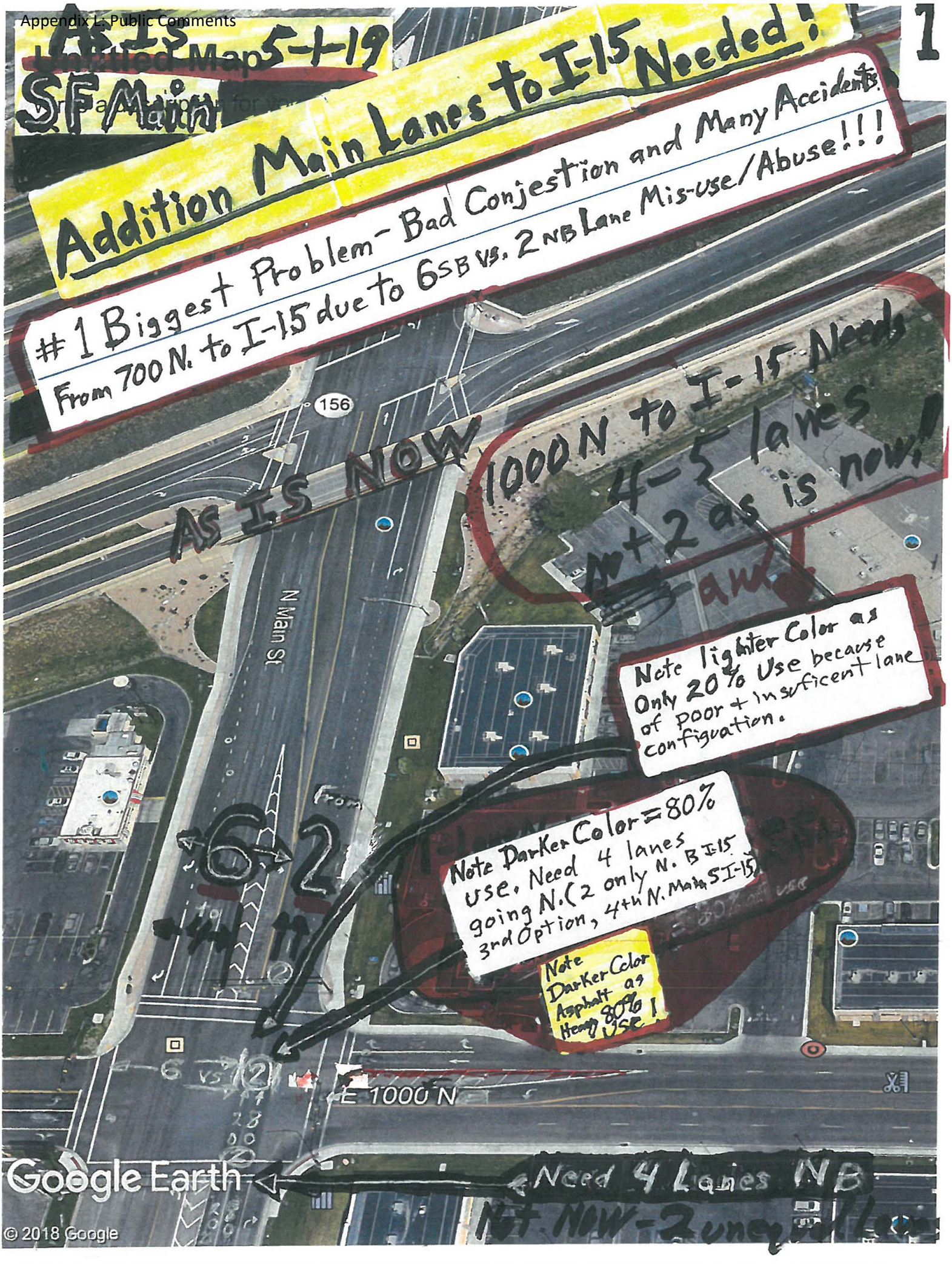
/ 1600S Major Arterial "Study Recommendation"

for Traffic To + From I-15 for Springville & Mapleton

$Mine & Fill 9+ Acres, 51' Deep Hole $

Best use and highest value- MAKE $18,000,000

S.F.
6
Improve Alternate N S Roads To Help Reduce Main Over Crowding
300 W
Key
= Traffic Control Light Intersect Turn Only Lanes
SR = State Rd
1 = Stop Signs
Veterans Memo
US 6
3 Yes for No Bound Main
2 only lanes for N. I-15
Yes
Belt Route
Take Out Side walk & Light Widen 2 only turn lanes. Pedestn
Side Main Only
1000 N
C a L. Post office
No Parking
800 N
8th North
700 N
300 W
Main St
200 E
400 E
600 E
800 E
900 E
Spanish Fork
400 N - SR 147
SR 147
SR 115
Center St - SR 115
Spanish Fork
City Park
1st South
4th East
800 EAST
300 S - SR 198
New Library
BB
Nebo School Dist.
Central Park
Fill Block Turning lanes Already Need to
800 N
1000 N
Fair Parking Expand
WIDER
MAIN SR 198
CEM.
River Bottoms Rd
SR 198
Belt Loop South Canal Road (8800 S.) from US 6
to Wood Hills Blvd IS
Pipe The Canal Under With Road
Make A St Road # ? ? ? ?
SR 51 to POPLAR LANE
Park
Belt Loop
River Bottom Canal Under River Bottom Road


As Is
Updated Map 5-1-19
SF Main
Addition Main Lanes to I-15 Needed!
#1 Biggest Problem - Bad Conjestion and Many Accidents
From 700 N. to I-15 due to 6 SB vs. 2 NB Lane Mis-use/Abuse!!!
As Is Now
1000 N to I-15 Needs 4-5 lanes 4+2 as is now!
Note lighter Color as Only 20% Use because of poor + insufficent lane configuation.
Note Darker Color = 80% use, Need 4 lanes going N. (2 only N. Bd I-15 3rd Option, 4th N. Main SI-15)
Note Darker Color Asphalt as Heavy 80% Use!
From
6 vs 2
to
N Main St
156
E 1000 N
Need 4 Lanes NB
Not Now - 2 unsafe lanes
Google Earth
© 2018 Google

Paul A. Prior
347 East Southfield Rd.
Spanish Fork, UT 84660
(801) 360-7317

July 4, 2019

UDOT, Spanish Fork City (SF,) Mountainland Association of Governments, etc.: Regarding SF Main Street/SR156, SR 198, and 198 Big Traffic Problems/Solutions

## Preface: Big Traffic Problems on Spanish Fork Main Street

Spanish Fork is a beautiful city which is growing rapidly, along with all of South Utah County. Consequently, Spanish Fork Main Street (SR156 and SR198) is also Salem's, Woodland Hill's, Elk Ridge's, and East Payson's Main Street as well! As such, there has been increased congestion, which leads to uncomfortable, frustrating travel, along with increased accidents and deaths along SF Main Street. Enclosed are synergistic suggestions and solutions (A-E) which I feel have merit. I wish to pass these along to authorities, for their consideration.

Concerning Main Street congestion issues, I think most of these changes can be done with relatively little cost in order to receive the biggest bang for the buck. Perhaps little to no construction may be needed as there is currently ample road-way real estate to work with. Changing and adding lanes, with accompanying road paint changes, may be enough.

## The prime problem: North bound East Main lane, one of only two carries 80% of traffic

This uneven balance of 20:80 traffic, sets-up 80% of the Main Street congestion and accidents, most of which are rear-end collisions from 600 N to I-15, as well as accidents at Center and Main. This imbalance starts as far south as the Spanish Fork Fairgrounds. (See maps 1- 6)

Please check the running total of accidents per 100k vehicles on Main Street from 300 S. to I-15. I believe this information would confirm that accidents are increasing in frequency and severity, which would strongly suggest something needs to be done.

## Suggested Brainstorming Solutions:

A. **Add 1-2 additional through lanes Northward from 700th N to I-15. Add two right-turn only lanes for NB I-15 on-ramp from 1000 N to on-ramp!** The Northbound on ramp traffic, in reality, starts at 1,000 North. The sidewalk and pedestrian lanes, east of the

traffic acceleration lanes to I-15 is going 35-40 miles an hour at E bound curve to N I-15. This letter of the law, sidewalk and crosswalk, at this on ramp curve is counterproductive and is a catalyst for deadly accidents, as full momentum traffic has to stop for the rare pedestrian, causing rear end accidents. A variance should be obtained from interstate regulations. The E sidewalk/crosswalks should be taken out and relocated with the west sidewalk/crosswalks. There is very little pedestrian traffic on the east sidewalk and this combination makes good sense. It will reduce costs, give additional lane space, enhance safe traffic and pedestrian flow, and lessen accidents. (See maps 2, 4, &6)

**B-1. Change SR-115 from Benjamin using 100 S SF (the narrow pioneer wagon road) using land E of I-15 (Anderson's Farm Supply Lot) connecting to the spaciously widened Center Street and continue to US-6. Design and do now with I-15 overpass and on/off ramps in mind, accelerate the 30 year plan, so this Interstate improvement can be done sooner.**

2. Many 18-wheelers with 53 foot trailers tie up traffic as non-local truck drivers, who do not know better, try to negotiate, with frustration, this narrow State Road 115 (100 S) junction at Main.

3. Replace the 4-way flashing stop light at 200 W and Center with traffic lights at Center and 300 W, which is at the SE corner from Spanish Fork High School.

4. Remove the counterproductive flower planters and angled parking at the high accident prone Center and Main intersection. These small town improvements were done decades ago to create parking, as none was, or is available to date, within the City Park/Library block. Exchange parking on Main with dotted right turn only lane. Make parking areas within the City Library Park Block. (See E below and Maps 5-6)

5. Reduce mad-dash left turns on yellow/red lights from behind crosswalk lines, particularly at Center Street onto the current intentionally bottlenecked East Center. This narrowing needs to be eliminated, which will reduce careless and reckless T-bone accidents and deaths. Checking the running total accidents at this intersection may be revealing. Also, installing a green-arrow-left-turn-light would help (See C below).

6. Move Food Fridays, Farmers Market, and holiday double parking food van obstructions to the City Office parking, Senior Center parking, the Fair Grounds, the new *Central Park parking lot (See E below),* or the new City Library block between 255 W and 300 W.

7. During holidays (Independence Day, Pioneer Day,) Rodeo stadium events, Radha Krishna color festival etc., supply shuttle buses to transport people from the above city parking lots, to the various events. This will increase safety and the general enjoyment for the citizens who participate in these events. (See E below and Map 6)

**C. By their fruits (faults) you shall know them.** If not already done, police and courts should report accidents to the City road department and UDOT. With computers, this increased information and understanding should be an easy correlation project to pinpoint

problems. Negative trends should be studied out to create solutions that will enhance safety and traffic flow.

**D-1. Alternate North South S.F. collector roads and Belt Loops:** 300 W from Center to, and under I-15. Install three traffic control lights along 300 W one at Center, another at 400 N (SR-147) & finally one at 900 N (this would be an important link in a North Belt Loop to 1000 N and Main see 3 below). Remove unnecessary stop signs; put crosswalks/school crossings at 200 N, Brockbank Elementary, etc.

2. Apply the above enhanced traffic flow suggestions where needed for these additional N-S collector alternates: 200 E; 400 E; 600 E; and 800 E. Put a traffic control light or roundabout at 800 E and 400 N (SR-147) (See map 6)

3. Create a valuable belt loop just south of I-15. It would link the 300 W and 900 S traffic control light intersection then go behind the old ShopKo building to 1000 N. This is a high-benefit but low-cost ratio project!

4. At Poplar Lane and River Bottom Road, improve a north roadway(s) that would more easily connect with Canyon Road and U.S. Highway 6.

5. Also finish a river bottom belt loop from Volunteer Drive (about 900 S) and Main Street traffic control light, build a connecting road to River Bottom Road. River Bottom Road can easily be widened if the irrigation canal is piped and included under the widened roadway.

6. At State Road SR-198 and Woodland Hills Boulevard enhance the intersection with additional lanes; widen a spacious east to west belt loop from I-15 to Spanish Fork Canyon by piping the South Spanish Fork Irrigation Company Water under this widened belt loop. This belt loop would link 8800 S (including the Golfcourse and Strawberry Electric Plant Road) and would go with the canal north/west diagonal to the Woodland Hills Boulevard then west ward to intersection SR 198 and continue on SR 164 to I-15.

**E-1. Existing City Park (hereafter referred to as Central Park) and Library block needs internal parking, yesterday!** The insufficient perimeter parking around the block promotes accidents, particularly at Main and Center, as well as Main and 100 S (old SR-115) intersections.

2. Create ample, well landscaped parking lot(s) within the Central Park Library Block using 40%-50% of the blocks square footage for parking (for example see Springville City's Library and Parking Lot/combo).

3. Better yet, create a separate City Central Park block and a new separate City Library Block! (See below)

- 1. **With an eye to future growth:** Relocate the library across from the High School, using the large block frontage and depth between 255 E and the old 4-plex

to the west. An alternate location would be 630 W and Center. This new synergizing facility can have an outdoor amphitheater and other features which compliment other city facilities and High School activities. For example: High School overflow parking can go to the library parking lot, vice-versa. The site between 255 w and 300 w, my personal favorite and will synergize with High School purposes activities, and upgrade this section of center street (in conjunction with option 2 below).

- **2. Without the Library building, the enlarged open space could become the New Central Park.** This new space can then adequately have the north half (50% of area) converted to an internal parking lot with the South half (50% of area) being used for a pavilion(s), picnic tables, updated and expanded playground and even a splash pad, etc.

- **3. Upgrade the current Central Park/Library block.** Keep the library where it is and remodel and rebuild when needed, however, immediately blend in a spacious parking lot to the North and the East in an upside-down 'L' shape around the NE corner of the library building! This should equal 40% of the Central Park/Library block square footage. The reaming 60% would be divided between the library facility (30% area) and recreational (30% area). This would include pavilions, picnic tables, additional playground equipment, splash pad area, etc. This cheaper solution, however, implies a zero growth compromise! Our children and grandchildren may wish that city authorities planned and built for current accelerated growth trends, which support options 1&2 above.

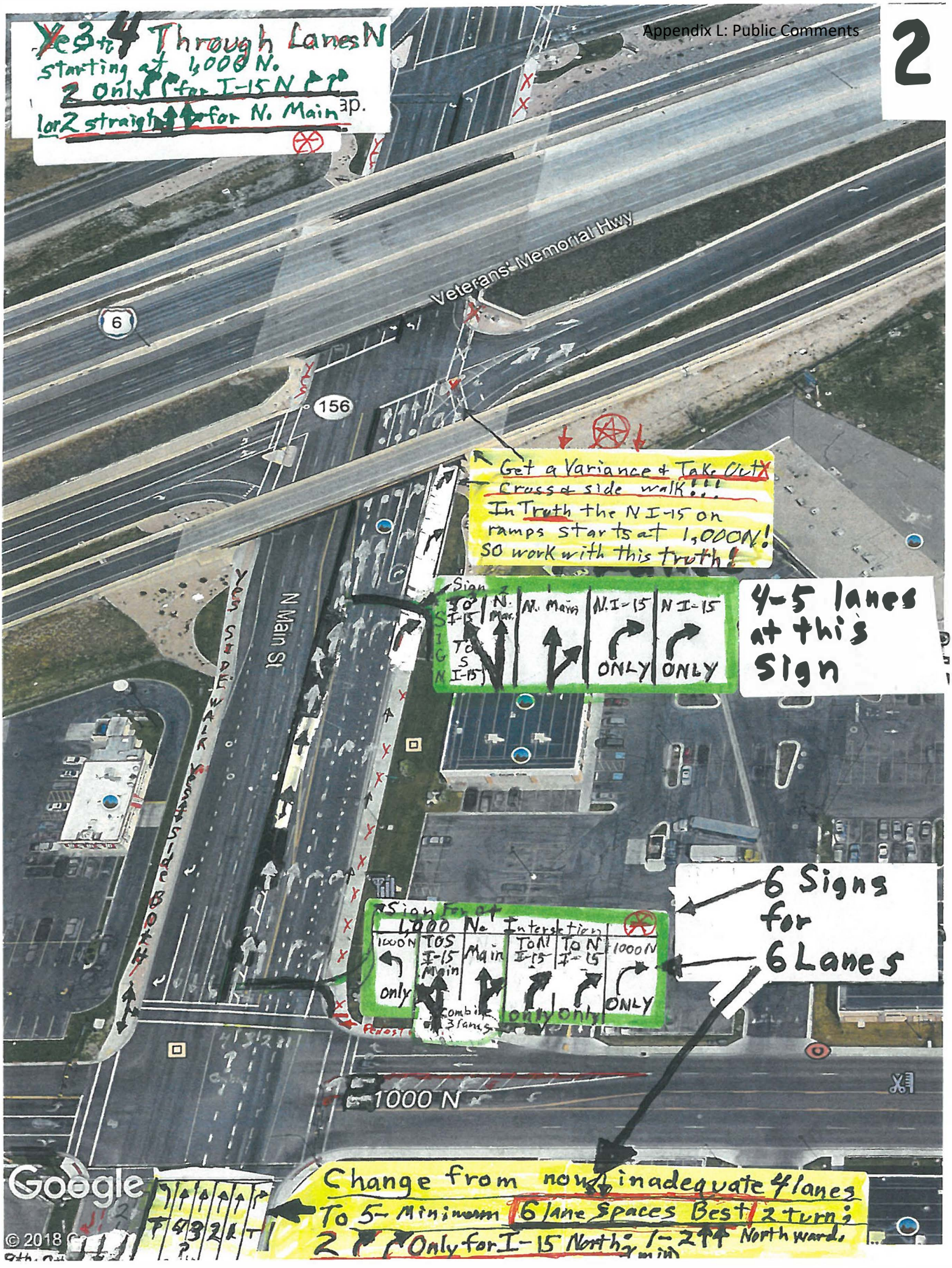
I would be glad to review these brainstorming suggestions in person with team members from the above entities. Please, contact me to let me know when I can share the above concerns and ideas with you. I would be glad to answer questions and be of any further assistance, if needed.

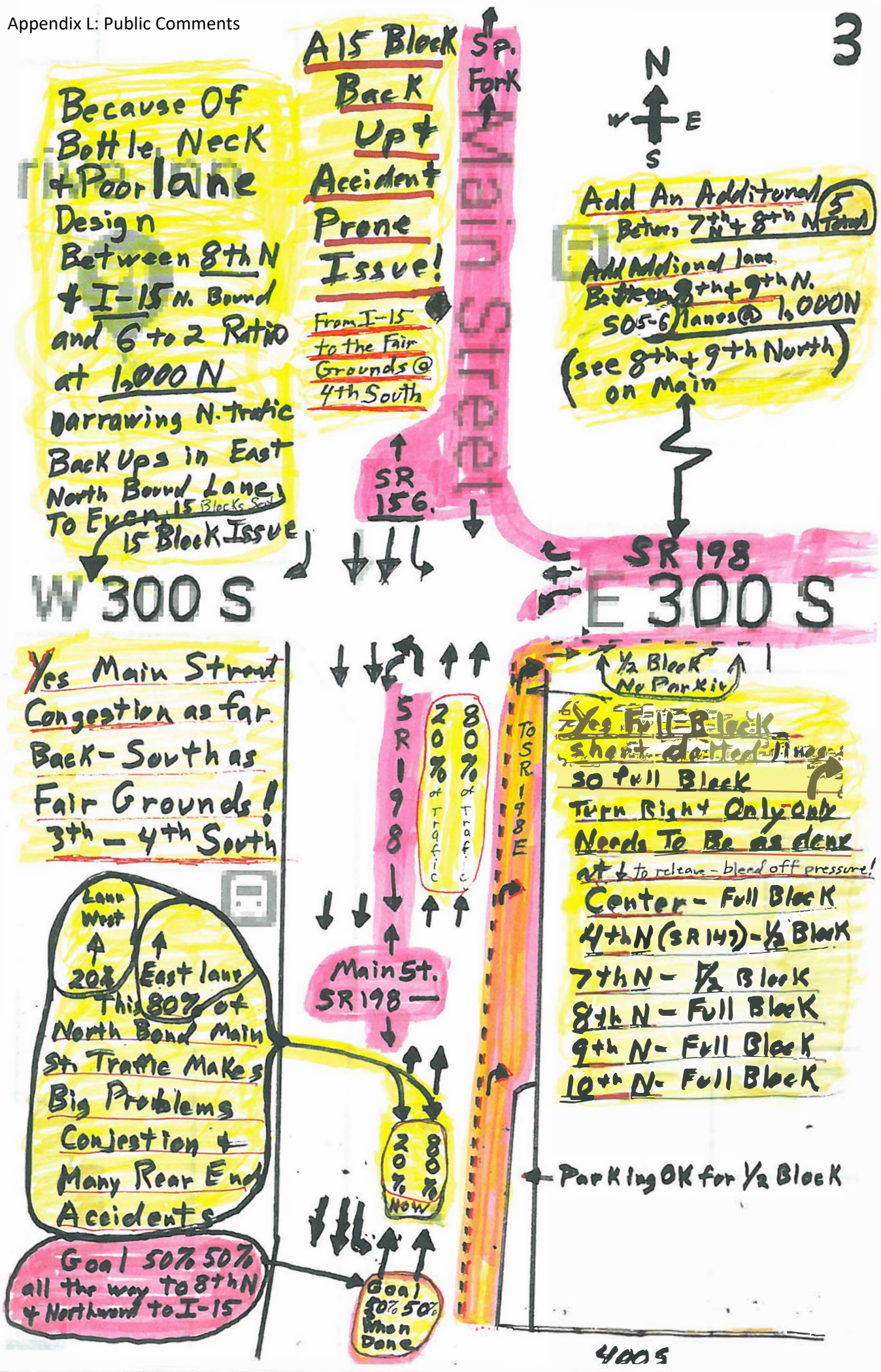
Thank you for your time and consideration of enclosed sound ideas. I strongly feel, if these ideas were implemented there would be reduce traffic, congestion, accidents and deaths while increasing safety, and general well-being of the citizens.

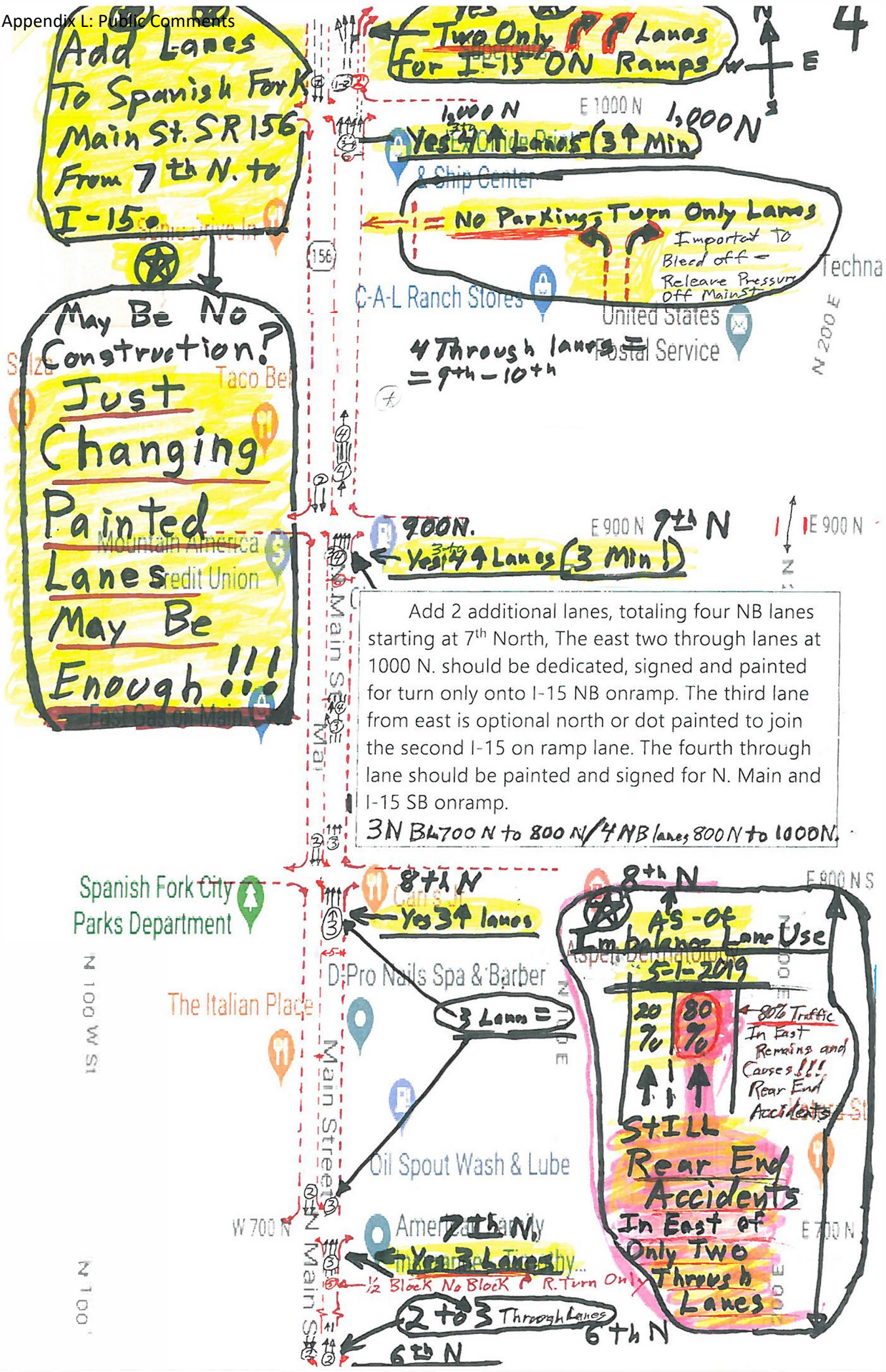
Sincerely,

Paul A. Prior

Paul A. Prior


Yes 3 or 4 Through Lanes N
starting at 1,000 N.
2 Only for I-15 N
1 or 2 straight for N. Main
Veterans' Memorial Hwy
6
156
Get a Variance & Take Out Cross & side walk!!!
In Truth the N I-15 on ramps starts at 1,000N!
So work with this truth!
Sign 1
30 I-15 To S I-15
N. Main
N. Main
N. I-15 ONLY
N I-15 ONLY
4-5 lanes at this Sign
N Main St
Yes 5 ft Del Walk
Yes 5 ft Del Walk
Sign for at 1,000 N Intersection
1000 N only
To S I-15 Main
Main
To N I-15 only
To N I-15 only
1000 N ONLY
Combine 3 lanes
6 Signs for 6 Lanes
1000 N
Google
© 2018
Change from now inadequate 4 lanes
To 5- Minimum 6 lane Spaces Best 2 turn;
2 Only for I-15 North; I-215 North ward.


Because Of Bottle Neck + Poor lane Design Between 8th N + I-15 N. Bound and 6 to 2 Ratio at 1,000 N narrowing N. traffic Back Ups in East North Bound Lane To Even 15 Blocks South
15 Block Issue
A 15 Block Back Up + Accident Prone Issue!
From I-15 to the Fair Grounds @ 4th South
Sp. Fork
Main Street
SR 156
N
W
E
S
Add An Additional 5 Between 7th N + 8th N Travel
Add Additional lane Between 8th + 9th N. 505-6 lanes @ 1,000N
(see 8th + 9th North on Main
SR 198
W 300 S
E 300 S
Yes Main Street Congestion as far Back - South as Fair Grounds! 3rd - 4th South
Lane West
20% This
East lane 80% of North Bound Main St. Traffic Makes Big Problems Congestion + Many Rear End Accidents
Goal 50% 50% all the way to 8th N + Northbound to I-15
SR 198
Main St. SR 198
20% of Traffic
80% of Traffic
20% Now
80%
Goal 50% 50% When Done
To SR 198 E
½ Block No Parking
Yes Full Block short dotted lines
so Full Block Turn Right Only Only Needs To Be as clear at 4 to release - bleed off pressure!
Center - Full Block
4th N (SR 147) - ½ Block
7th N - ½ Block
8th N - Full Block
9th N - Full Block
10th N - Full Block
Parking OK for ½ Block
400 S


Add Lanes To Spanish Fork Main St. SR 156 From 7th N. to I-15
Two Only Lanes For I-15 ON Ramps
1,000 N
E 1000 N
Yes 4 Lanes (3 Min)
No Parking - Turn Only Lanes
Important To Bleed off - Releave Pressure Off Main St
C-A-L Ranch Stores
United States Postal Service
Techna
4 Through lanes = 9th - 10th
May Be No Construction?
Just Changing Painted Lanes May Be Enough!!!
900N.
E 900 N
9th N
Yes 4 Lanes (3 Min!)
Mountain America Credit Union
Main St
Add 2 additional lanes, totaling four NB lanes starting at 7th North, The east two through lanes at 1000 N. should be dedicated, signed and painted for turn only onto I-15 NB onramp. The third lane from east is optional north or dot painted to join the second I-15 on ramp lane. The fourth through lane should be painted and signed for N. Main and I-15 SB onramp.
3N BL 700 N to 800 N / 4 NB lanes 800 N to 1000 N.
Spanish Fork City Parks Department
8th N
Yes 3 lanes
D-Pro Nails Spa & Barber
The Italian Place
3 Lanes =
Oil Spout Wash & Lube
W 700 N
E 700 N
7th N
Yes 3 Lanes
½ Block No Block ½ R. Turn Only
2 to 3 Through Lanes
6th N
4's - Of Imbalance Lane Use
5-1-2019
20 %
80 %
80% Traffic In East Remains and Causes !!! Rear End Accidents
STILL Rear End Accidents In East of Only Two Through Lanes
N 100 W St
N 100
E 900 N S
N 200 E

Reduced mad-dash left turns by changing the law to allow drivers to proceed to the middle of the intersection where they are more easily seen and can make a timely and safer left turn, instead of remaining behind a crosswalk line, then making a frustrated mad-dash for only one or two cars after the light turn yellow/red. These hurried-carless-frustrated turns cause serious T-bone and pedestrian accidents.

Change SR-115 from the narrow 100 S. old pioneer route to Center Street. This new and improved State Road should go N through the present Anderson's Farm Supply lot by I-15 then go eastward to the vacated RailRoad right-of-way and West Center, carrying traffic Eastward to US Highway 6. This is a needed change and improvement which is long overdue. The four-way stop light at 200 W should be removed and a traffic light controlled intersection should be at 300 W. The counterproductive flower planters and angle parking at the high accident prone Center and Main Street (north of Central Park) needs to be removed. There should be no road parking north and west of Central Park and these lanes dot painted for right turns only.

Lift for
New Centeral Parc K
Options & Details

Dear Brian Atkinson.
I enjoyed meeting and talking with you & team the other night in Springville. Of priority interest is II below. I would like to come in and talk with you and/or planning team(s) for a few minutes.
Thank You
Paul A. Prior

Paul A. Prior
347 East Southfield Rd.
Spanish Fork, UT 84660
(801) 360-7317

November 21, 2019

Union Pacific Railroad, UDOT and Utah County Communities

## Preface-Synergize Your Planning Now

**Yes, please plan together now** so when the master plan and construction is done it will be a win-win for everybody! Accomplishing: Best locations; No duplication; Safe and Efficient Movement of Traffic; at Least Cost etc.

### I. Union Pacific Railroad

A. 1. Yes, Abandon the south Springville (SV) east line; and the west Spanish Fork (SF) line and merge them together to the east line in Mapleton (M). RR will save much OP and maintenance.
2. Also, this will cut railroad crossings in half.
3. This will eliminate or reduce double track crossings and accompanying accidents and deaths.
4. Convert these abandon railroad lines into pedestrian and biking trails.
5. Use local gravel deposits (see IV below for RR road base).

### II. UDOT, 100% Yes to 1600 South Arterial to 400 East SV and US-89 Junction

A. Return to the original 2011 "Study Recommendation" to connect 1600 South Arterial from I-15 to the 400 E. SV and US-89 (State Street) intersection.

B. 1. The elevations at this location are ideal for an overpass of US-89 with On Off ramps.
2. A traffic control light intersection at this location could work but it should be second choice.

C. Least cost yet best and safest traffic flow results:
1. Returning to this First "Study Recommendation" makes the best sense as only a small silage concrete bunker and cinder block milk barn would have to be raised with possibly a small wood framed home. This would cost way less than the Quail Hollow Option where dozens of homes would have to be raised.
2. Also, steeper grade roads would be necessary at the Quail Hollow Option an unneeded cost.
3. In addition these steeper grades would be a catalyst for additional accidents, as are now frequently happening on US-89 northward Mapleton accident prone slippery slope combination.

D. **Move the present 1600 south and SR-51 (not State Street) northward about 150 feet** on the best future location for the arterial to 400 East SV and US-89 Junction (see **A** above).

E. 1. **Then continue the arterial just one additional block eastward to SV South Main.** Including this additional block now, will be a big return as it will serve a second SV location.
2. When the railroad has merged the tracks as per I above then US-89 overpass can be finished and 1600 South extension will go underneath US-89 overpass joining with 400 East SV.
3. Yes, large third and fourth service areas, namely southeast SV and north M will be benefited.

### III. I-15 and 1600 South Interchange

A. Yes, keep the existing 1600 South strong and wide existing I-15 overpass but add complementary on and off ramps while the area is as undeveloped as it is.

B. Exit signs on I-15 would read Mapleton South Springville Exit.

C. Collective roads coming from the improved Evergreen Road and Maple Street would join 1600 South at best intersection locations.

**IV. Large Gravel Deposits**

Yes, this local area is rich in gravel deposits from the Lake Bonneville Delta created about 12,000 years ago. Using this cut and fill gravel for the above major projects will reduce costly transportation of higher priced imported road base material.

**V. Upgrade I-15 US-6 Interchange at Spanish Fork (SF)**

A. 1. Yes, redo US-6 and I-15 interchange in North SF for safer and more efficient flow
2. Reduce US-6 stop lights particularly on the accident prone interchange.
3. Create a third level spaghetti bowl scenario as in Salt Lake City at I-15 and I-80 junction.

**VI. SF Main Street SR-156 Congestion and Needs Help**

A. 1. This SF Main Street carries 34,000 vehicles a day. There are many rear end accidents accruing because of the poorly painted lanes/congestion. Redesign and repaint for two additional lanes etc.
2. See my report to UDOT for improving SF Main Street and other suggestions July 4, 2019.

**VII. Finish South County Belt Loops**

A. At Spanish Fork Canyon relocate and finish SR-164 or make a new state road: starting at the Little Acorn US-6 and US-89 junction; go westward enhancing 8800 South paralleling the canal (which if piped and covered would make a great biking/walking trail); at 420 East continue the belt loop northwest on a joint canal/SR road easement to join with Woodland Hills Boulevard and Southfield Road intersections; continue westward 3 blocks to Woodland Hills Boulevard and SR-198 intersection (recently upgraded); then continue to current SR-164 and the Benjamin interchange at I-15. This SF bypass will cut miles off and reduce traffic conjunction at North Spanish Fork.

B. Change SR-115 from 100 South SF to the wide SF Center Street and extend to US-6.

C. SR-147 needs traffic control lights at 3rd West SF and the SR-51 intersections.

Thank you for reviewing and considering these brain storming suggestions. May I be so bold to suggest that if these suggestions are included and fine-tuned in the current planning stages, that the finished results will be far better than if each entity works separately. If you have any questions or I can be of any further assistance please feel free to contact me.

Sincerely,

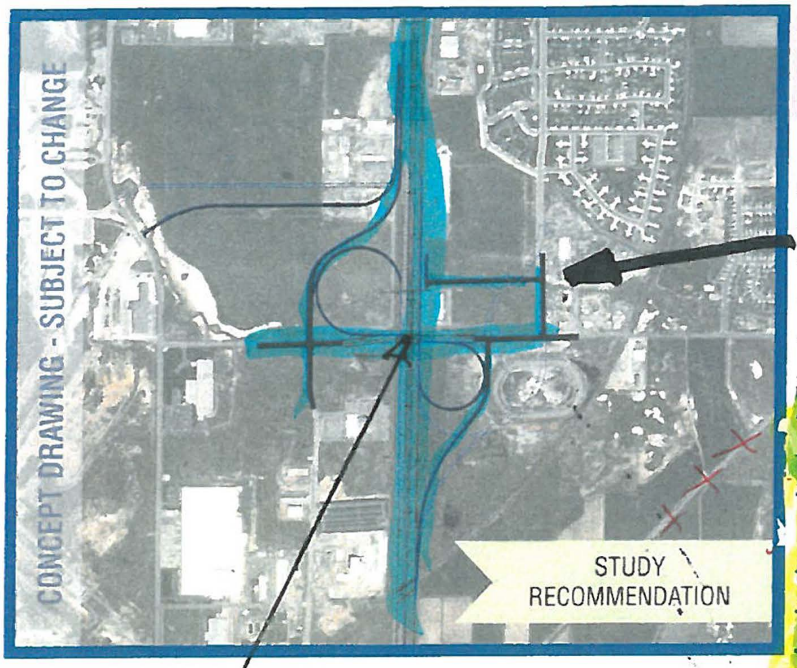
Paul A. Prior

Paul A Prior

Enclosures
1. Union Pacifica Railroad preliminary planning map with my remarks.
2. UDOT's and MAG's preliminary planning map of 2011 "Study Recommendations" plus my notes.
3. South Utah County map denoting South Utah County Belt Loop suggestions.

IMG_5352.JPG
Ex. = Brainstorming Ideas
US89
4th
4th S
Yes 4th South St. Maxed Out NOW
So Accelerate!
RR 11 4
8th S
4 East Springs
A Lot of People
4th East Springville
Yes Will use.
Yes Best
Extension
Over Pass + On + Off Ramps
Many Accidents on slope. Back
US89
Much Gravel use Cut + Fill
1600 S
I 15
Ever Green Street
RR
Main Street
By Paul A. Prior
801-360-7317
US89

# Ex. Brain Storming
# Yes S.E Springville & Mapleton Junction

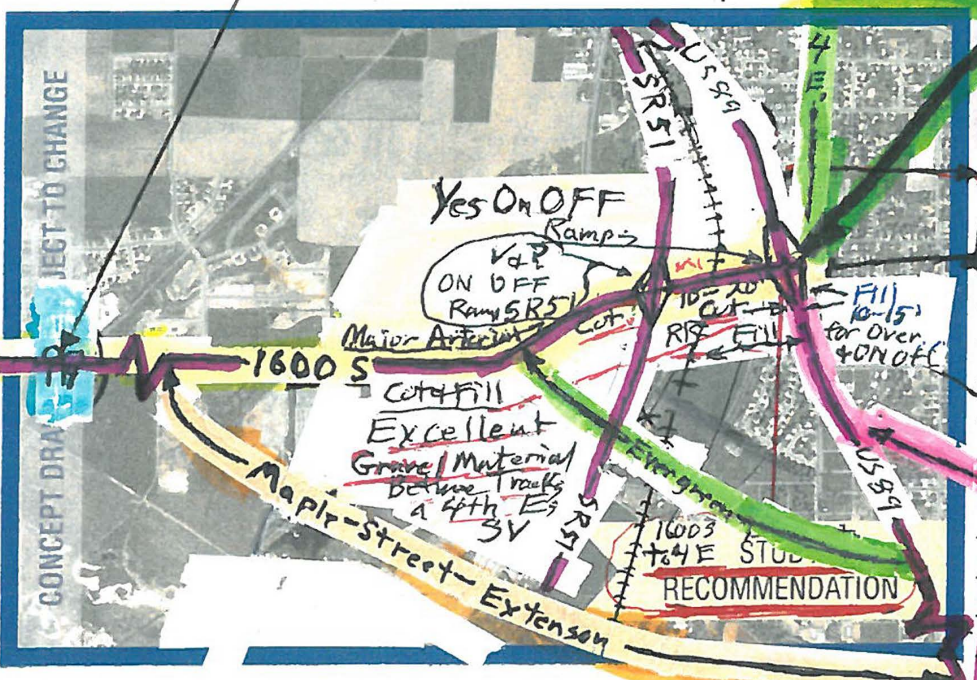



Shown here is the study recommendation for the new interchange at I-15 and 1600 South in Springville. Do you agree with this alternative?

I-15 & 1600 South

Yes On Off Ramps For 1600 S. Springville – A Major Arterial Servicing Springville & Mapleton

Yes 1600S Extension Best at 4th East Sp. Vi. & US 89 Over Pass with ON & Off Ramps




Shown here is the study recommendation for the widening and extension of 1600 South to Mapleton. Do you agree with this alternative? Yes 4 E. S.V.

Over Farm 37.158ac

Yes Best S.V. & Mapleton Major Arterial to & from E. Springville & Mapleton. On Off Ramp

Study @ 4th East S.V.

Recommendation

Very Dangerous ! ! Many Accidents ! On Slope off Bench Make An Over Pass Cut 10' Add 10' Add On Off Ramps

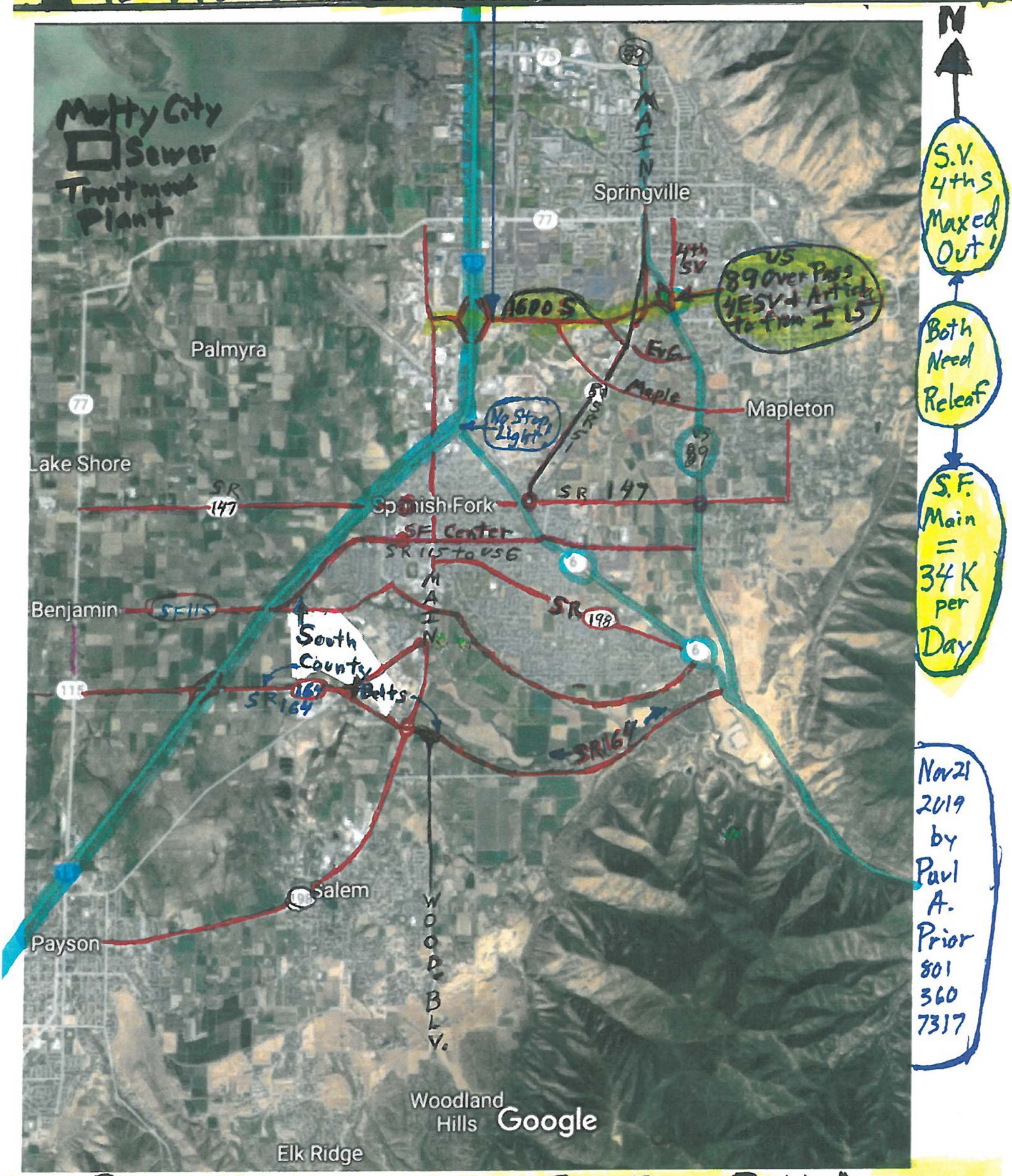
East Springville & Mapleton Arterials

Also East RR Tracks to be moved parallel with West Track thus enhancing value

These Very Good Brain Stroming Ideas by Paul A. Prior

Paul A. Prior 801-360-7317

# Fr. I-15 & 1600 S. SV Arterial to 4th ESV + US89




# & Brain Storming Map For E. W. Belt Loops Fr. S. Utah County. Plus 1600S. Up-Grade!

January 8, 2020

Paul Prior
347 East Southfield Road
Spanish Fork, UT, 84660

**Subject: Public Open House – I-15 Springville/Spanish Fork Interchange Environmental Assessment**

Dear Mr. Prior,

We would like to thank you for your attendance at our public open house on Nov. 14, 2019, for the I-15 Springville/Spanish Fork Interchange Environmental Assessment (EA). We appreciate your participation during the environmental process.

Upon review of the documents you presented, we want to follow up with further information. Many of the ideas fall outside of the scope of the current study area, which is 1600 South from Main Street in Spanish Fork to S.R. 51 in Springville, and I-15 from the U.S. 6/Main Street interchange in Spanish Fork to the 400 South interchange in Springville. Below, we address the ideas you provided that are within the scope of the study area. UDOT Region Three will address the other ideas in a separate document from more of a planning perspective.

1) **I-15** - A potential interchange is being studied at 1600 South. The exact type of interchange is being evaluated as part of this environmental study, and no decisions have been made at this point in the process. More information will be provided to the public as the study progresses.
2) **1600 South** - The ultimate plan for 1600 South include the following:
    a. Widen to five lanes with full shoulders between Main Street in Spanish Fork and S.R. 51 in Springville.
    b. Provide a grade separation to take 1600 South over the railroad tracks at 1600 West.
    c. Remove railroad tracks at 1200 West and consolidate with the tracks at 1600 West.
3) **Intersecting Road Connections** - This study is looking at improving 1600 South to S.R. 51 at its current location. However, a future study may look at extending 1600 South to U.S. 89. This future study may find it beneficial to shift 1600 South north or south to minimize impacts and provide a logical connection at U.S. 89.
4) **S.R. 51 On- & Off-Ramps** - Although grade-separated interchanges with on- and off-ramps are the safest type of intersection, traffic volumes are not at the level that would justify the cost or need at 1600 South and S.R. 51.

UDOT Region Three will address the other ideas you mentioned such as, the railroad consolidation for the Springville and Mapleton Railroad lines, crashes along U.S. 89 in this area, etc., in a separate document and from more of a planning perspective. Thank you again for participating in the environmental process. If you have questions throughout the study, please contact a project representative at 801-704-0899 or i15springvillespanishfork@utah.gov.

Sincerely,

Darren Bunker
UDOT Project Manager

I-15 Interchange
ENVIRONMENTAL ASSESSMENT
Springville/Spanish Fork

# Correspondence and Coordination

Project No. F-I15-6(239)259
Pin: 15153
November 2020

UTAH TRANSIT AUTHORITY

UTA
669 West 200 South
Salt Lake City, UT 84101

November 15, 2019
Ryan Pitts
Horrocks Engineers
ryanp@horrocks.com

Re: I-15; Springville/Spanish Fork Interchange Environmental Assessment
Scoping Comments

Mr. Pitts,

UTA is currently involved with two projects within the I-15 Springville/Spanish Fork Interchange project area. These UTA projects include the Sharp/Tintic Railroad Connection and the Provo to Payson Transit Analysis Study.

The Sharp/Tintic Railroad Connection will construct a new connector railroad line between UTA right-of-way along the Sharp Subdivision rail line and the Tintic Industrial Lead rail line near Springville, Utah. Freight trains using the Tintic Industrial Lead would be diverted to the Sharp Subdivision. The new connection railroad would cross 1600 S at the Sharp Subdivision just east of I-15 (see enclosed site map), adding a second main line track to the existing at-grade crossing. Construction of the new connection railroad would allow removal of freight traffic from 6 existing at-grade railroad crossings on the Tintic Lead including one crossing on 1600 S near 1200 W. The new connection railroad is needed for a possible future extension of FrontRunner commuter rail service from Provo to Payson on existing UTA right-of-way. Project partners include UTA, UDOT, Springville City, and Spanish Fork City. The environmental review for this project has started and preliminary design is expected to start in early 2020. The project will be administered as a Local Government Project through UDOT and has been assigned UDOT Pin 14988.

The Provo to Payson Transit Analysis Study will develop alternatives to improve transit service between Provo and Payson and an implementation plan to advance the Locally Preferred Alternative. One alternative would include the extension of FrontRunner service from Provo to Payson on existing UTA right-of-way as identified in the Mountainland Association of Governments TransPlan50, but other alternatives and modes will be explored. This study will also recommend potential phasing of transit improvements to allow the system to grow over time along with ridership demand. The Provo to Payson Transit Analysis Study is expected to start in early 2020.

Due to the combination of the anticipated increase in train traffic on the Sharp Subdivision and increase in vehicle traffic on 1600 South, UTA recommends that a grade separation be considered at 1600 South as part of the I-15 Springville/Spanish Fork Interchange Project. Depending on the timing of the projects, the Tintic crossing at 1600 S near 1200 W might need to be improved (if it has not been removed by the Sharp/Tintic Railroad Connection project).



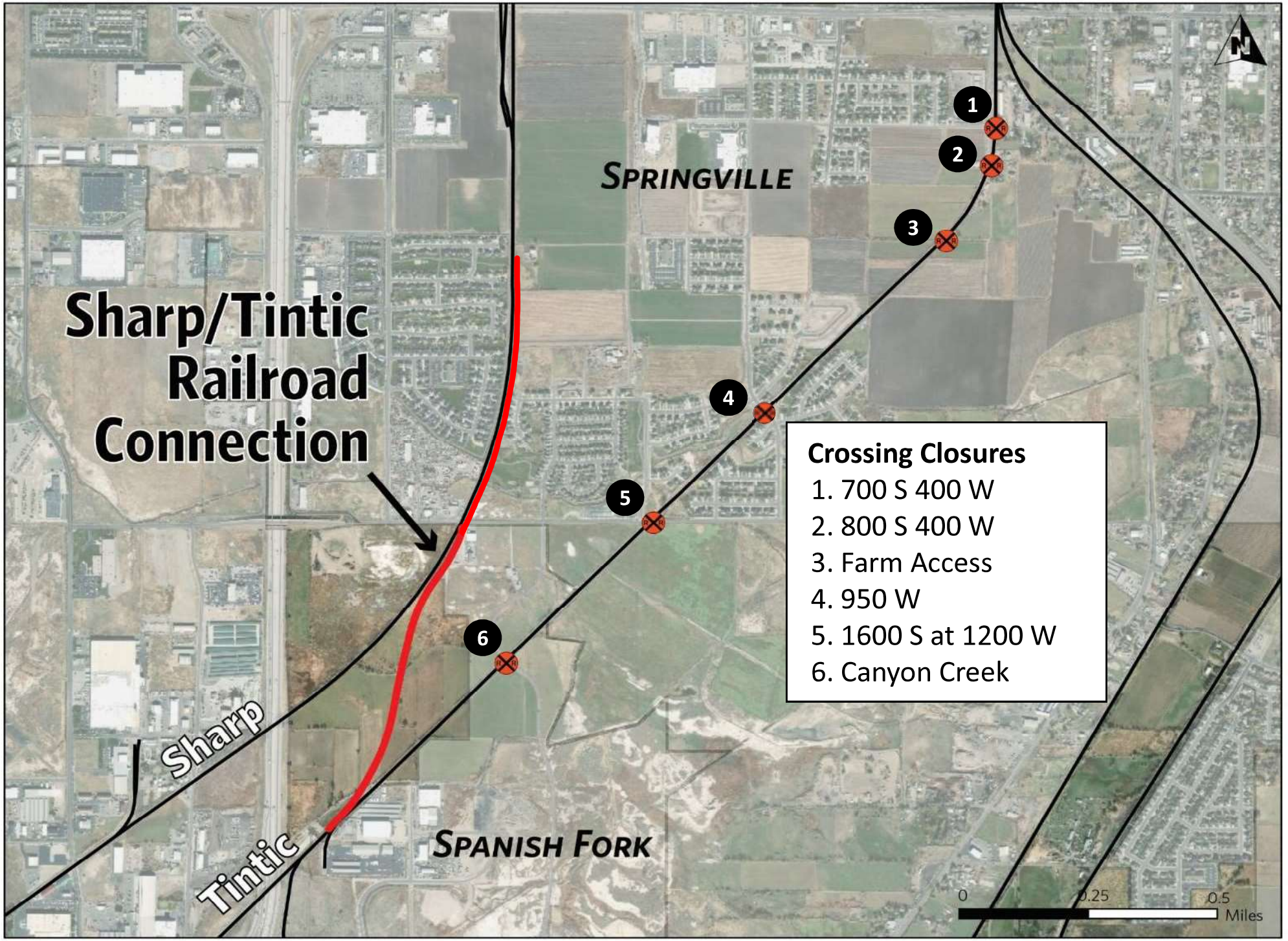
ISO 9001:2008 ISO 14001:2004 OHSAS 18001:2007 1-888-RIDE-UTA www.rideuta.com

Thank you for continuing to coordinate with UTA. Please let me know if you have any questions.

Sincerely,

Autumn Hu
NEPA Project Administrator
Utah Transit Authority
ahu@rideuta.com
(801) 741-8858

Enclosure:
Sharp/Tintic Railroad Connection Site Map


Sharp/Tintic
Railroad
Connection
SPRINGVILLE
SPANISH FORK
Sharp
Tintic
1
2
3
4
5
6
Crossing Closures
1. 700 S 400 W
2. 800 S 400 W
3. Farm Access
4. 950 W
5. 1600 S at 1200 W
6. Canyon Creek
0
0.25
0.5
Miles

**DEPARTMENT OF THE ARMY**
U.S. ARMY CORPS OF ENGINEERS, SACRAMENTO DISTRICT
1325 J STREET
SACRAMENTO CA 95814-2922

November 15, 2019

Regulatory Division (SPK-2019-00821)

Horrocks Engineers
Attn: Mr. Ryan Pitts
2162 West Grove Parkway, Suite 400
Pleasant Grove, Utah 84062
RyanP@horrocks.com

Dear Mr. Pitts:

We are responding to your client's November 1, 2019 request for assistance in identifying potential resources that may occur in the approximately 325-acre generalized study area for the I-15 Springville/Spanish Fork Interchange project. This project may involve activities in waters of the United States to construct transportation improvements. The generalized study area is located along I-15 and 2700 North near the 2700 North Crossing of I-15 in Springville/Spanish Fork, Latitude 40.1450°, Longitude -111.6470°, Springville, Utah County, Utah.

The project has been assigned Corps project identification number SPK-2019-00821. Please refer to this project number in any future correspondence regarding this project.

Our jurisdiction within the study area is under the authority of Section 404 of the Clean Water Act for the discharge of dredged or fill material into waters of the United States. Waters of the United States include, but are not limited to, rivers, perennial or intermittent streams, lakes, ponds, wetlands, vernal pools, marshes, wet meadows, and seeps. Project features that result in the discharge of dredged or fill material into waters of the United States will require Department of the Army authorization prior to starting work.

Preliminary review of your project area suggests the presence of waters of the United States within the corridor which may be affected by your proposed activity. To ascertain the extent of waters on the project site, the applicant should prepare a wetland delineation in accordance with the "Minimum Standards for Acceptance of Preliminary Wetlands Delineations" and "Final Map and Drawing Standards for the South Pacific Division Regulatory Program" under "Jurisdiction" on our website at the address below, and submit it to this office for verification. A list of consultants that prepare wetland delineations and permit application documents is also available on our website at the same location.

The range of alternatives considered for this project should include alternatives that avoid impacts to wetlands or other waters of the United States. Every effort should be made to avoid project features which require the discharge of dredged or fill material into waters of the United States. In the event it can be clearly demonstrated there are no practicable alternatives to filling waters of the United States, mitigation plans should be developed to compensate for the unavoidable losses resulting from project implementation.

Please refer to identification number SPK-2019-00821 in any correspondence concerning this project. If you have any questions, please contact me at the Bountiful Regulatory Office, 533 West 2600 South, Suite 150, Bountiful, Utah 84010-7744, by email at *Matthew.S.Wilson@usace.army.mil*, or telephone at (801) 295-8380 ext. 8311. For more information regarding our program, please visit our website at *www.spk.usace.army.mil/Missions/Regulatory.aspx*.
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Sincerely,

Matt Wilson
Senior Project Manager
Nevada-Utah Section

cc:
Elisa Sims Albury – UDOT (ealbury@utah.gov)

# Memo

To: Samantha Patterson

From: Spanish Fork City Staff

Date: November 27, 2019

Re: I-15 Interchange Environmental Assessment - Spanish Fork 2700 N Springville 1600 S

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Spanish Fork City appreciates the opportunity to comment on the Environmental Assessment for the future I-15 2700 North Interchange. This is a much needed project and its completion is of utmost importance to Spanish Fork's elected officials . We believe the following is a list of some major benefits of having this new interchange.

1. It will provide a more viable access for heavy trucking to the city's industrial area via the proposed interchange. This will provide significant relief on 1000 North and related intersections, including intersections with US-6 by providing a more direct route to industrial centers which prior to the I-15 CORE project could access Main Street directly from US-6.

2. This interchange will provide a more direct route to Intermountain Healthcare's Spanish Fork Hospital, the Canyon Creek commercial area, the city's industrial area and the Spanish Fork Airport. This will provide much needed relief by lessening traffic on US-6 and parts of Main Street. This relief will help postpone the need to convert US-6 into a freeway facility, a conversion that will be extremely expensive.

3. This interchange will eventually provide a very direct route to Mapleton, South Springville and North Spanish Fork traffic from SR-77 and US-6.

Please consider the following issues in the study.

1. 2700 North from Main Street to proposed interchange needs to be a 5-lane arterial street according to the Spanish Fork City master plan and standards. See www.spanishfork.org.

2. A traffic signal will be needed at the intersection of 2700 North Main Street.

3. Improvements to 1600 South Springville should include a bridge over the existing west railroad track east of I-15. This will be the line used for commuter rail.

4. The east railroad track east of I-15 will soon be abandoned.

5. The trail extending across the existing I-15 bridge needs to remain and continue in both directions as appropriate with this project according to City master plans.

GARY R. HERBERT
*Governor*
SPENCER J. COX
*Lieutenant Governor*

# State of Utah
**DEPARTMENT OF NATURAL RESOURCES**
**MICHAEL R. STYLER**
*Executive Director*
**Utah Geological Survey**
**R. William Keach II**
*State Geologist/Division Director*

January 6, 2020

Aaron Woods
Horrocks Engineers
2162 West Grove Parkway, Suite 400
Pleasant Grove UT 84062

RE: Paleontological File Search and Recommendations for the Springville-Spanish Fork Road Widening Project, Utah County, Utah
U.C.A. 79-3-508 (Paleontological) Compliance; Request for Confirmation of Literature Search according to the UDOT/UGS Memorandum of Understanding.

Dear Aaron:

I have conducted a paleontological file search for the Springville-Spanish Fork Road Widening Project in response to your email of January 6, 2020. This project qualifies for treatment under the UDOT/UGS executed Memorandum of Understanding.

There are no paleontological localities recorded in our files for this project area. Quaternary and Recent alluvial and lacustrine deposits that are exposed along this project right-of-way have a low potential for yielding significant fossil localities (PFYC 2). Unless fossils are discovered as a result of construction activities, this project should have no impact on paleontological resources.

If you have any questions, please call me at (801) 537-3311.

Sincerely,

Martha Hayden

Martha Hayden
Paleontological Assistant

1594 West North Temple, Suite 3110, PO Box 146100, Salt Lake City, UT 84114-6100
telephone (801) 537-3300 • facsimile (801) 537-3400 • TTY (801) 538-7458 • *geology.utah.gov*

HORROCKS ENGINEERS

2162 West Grove Parkway, Ste 400
Pleasant Grove, Utah 84062
801-763-5100
www.horrocks.com

To: Matt Howard, UDOT Natural Resource Manager

From: Haylie Ferguson, Horrocks Environmental Specialist

Date: June 9, 2020 **Memorandum**

Subject: Biological Review for Springville/Spanish Fork Interchange; PIN: 15153; Project Number: S-I15-6(239)259

**Project Background**

Horrocks Engineers has prepared this memo in support of UDOT, in cooperation with Springville, Spanish Fork, and Mapleton cities, who propose to construct a new single-point urban interchange (SPUI) at 1600 South in Springville Utah. The SPUI will connect 1600 South to Interstate 15. Work will include replacing the existing overpass and the construction of northbound and southbound ramps. Additionally, the Sharp Railroad crossing at 1600 South will be grade-separated. See attached map for study area location.

**Evaluation Methods**

The study area has been evaluated for federally listed species and designated critical habitat protected under the Endangered Species Act utilizing information from the U.S. Fish and Wildlife Service, including species life history and a species list from the Information for Planning and Consultation (IPaC) system. A request for reported species was submitted to the Utah Natural Heritage Program (UNHP). Migratory birds and Utah Sensitive Species were accounted for within the study area. Review of study area habitat was conducted using aerial imagery and site surveys were conducted on September 13 and 19, 2018 as well as October 19, 2018. Vegetative and hydrological features were documented.

**Analyses**

Study Area Setting

The approximately 2.5-mile long study area is located between 400 South in Springville and US-6 in Spanish Fork and is comprised predominantly by undeveloped land, some residential and developed park areas, and industrial and commercial developments. Observed vegetation consists of mixed grasses (saltgrass, smooth brome, intermediate wheatgrass, reed canary grass, etc.), weedy species, a few scattered trees species (Russian olive, willow, and cottonwood), and several hydrophytic species including cattail and three-square. Dry Creek passes through the study area east to west and is located just north of 1600 South. Several ditches and wetland features are also located throughout the study area.

Threatened and Endangered Species

IPaC data includes three species for consideration in the study area; no critical habitats were identified. An evaluation of these species preferred habitats and their potential to occur within the study area can be seen in Table 1.

Table 1: IPaC Species of Consideration within the Study Area

| Species Name | Status | Habitat Requirements[1] | Is Suitable Habitat within the Study Area? |
|---|---|---|---|
| Birds | | | |
| Yellow-billed Cuckoo *Coccyzus americanus* | Threatened | Riparian patches varying in size and shape, ranging from a relatively contiguous stand of mixed native/exotic vegetation to an irregularly shaped mosaic of dense vegetation with open areas. | Riparian habitat has been identified within 0.5 miles of the study area. However, these areas do not meet the criteria outlined by USFWS *Guidelines for the identification of suitable habitat for WYBCU in Utah* in that there are not large tracts of cottonwood/willow habitats with dense sub-canopies. Habitat within the study area is lacking the vertical structure that defines suitable cuckoo habitat and most habitat patches are too small (< 5 acres) to support Yellow-billed Cuckoo. Furthermore, the cottonwood (*Populus* spp.) overstory that ordinarily defines the feeding strata in suitable Cuckoo habitat is lacking within the study area. Therefore, in accordance with USFWS UT Field Office guidance, **no suitable habitat** has been identified within 0.5 miles of the study area. |
| Fishes | | | |
| June Sucker *Chasmistes liorus* | Endangered | Endemic to Utah Lake and its major tributaries, the lower Provo and Spanish Fork River. | IPaC results did not identify any critical habitat within the study area. The required waters are not found within the study area. There is **no suitable habitat** within the study area. |
| Flowering Plants | | | |
| Ute Ladies'-tresses *Spiranthes diluvialis* | Threatened | Found in seasonally moist soils, wet meadows, along streams, in abandoned stream meanders, and near springs, seeps, and lake shores in sandy or loamy soils with mixed gravel. Primarily found in areas where vegetation is relatively open and not overly dense, overgrown, or over grazed. No critical habitat has been designated for this species. | While field observations made during survey identified areas of moist soils, the soil composition was clayey and moderately to strongly saline, which is not conducive to Ute ladies'-tresses. There is **no suitable habitat** within the study area. |

[1] Sources: UDWR Utah Conservation Data Center (https://dwrcdc.nr.utah.gov/ucdc/) and USFWS Environmental Conservation Online System (ECOS) and Species Fact Sheets

Utah Sensitive Species

The 2017 UDWR Utah's State Listed Species was reviewed to aid in the evaluation of potentially occurring, non-federal Utah sensitive species for the study area. A review of known location data from the Utah Natural Heritage Program (UNHP), species life history, and aerial imagery was also conducted. UNHP data includes two species receiving special management under a Conservation Agreement within a half-mile radius of the study area (see Table 2).

Table 2: Utah Sensitive Species

| Species Name | State Status |
|---|---|
| Least Chub<br>*Iotichithys phlegethontis* | Receiving special management under a Conservation Agreement |
| Columbia Spotted Frog<br>*Rana luteiventris* | Receiving special management under a Conservation Agreement |

Life histories for the species found within Table 2 were reviewed and compared against the setting of the study area. Based on this evaluation, it is unlikely the study area would support the species listed in Table 2. A review of UNHP data from the last 10 years indicates no known occurrences and/or observations of Least Chub within or adjacent to the study area. The last recorded observation year for Columbia Spotted Frog within two miles of the study area was 2012. Impacts to these species are not expected.

Migratory Birds

Migratory bird habitat (trees, structures, etc.) is available within the study area along 1600 South, I-15, and within developed park areas.

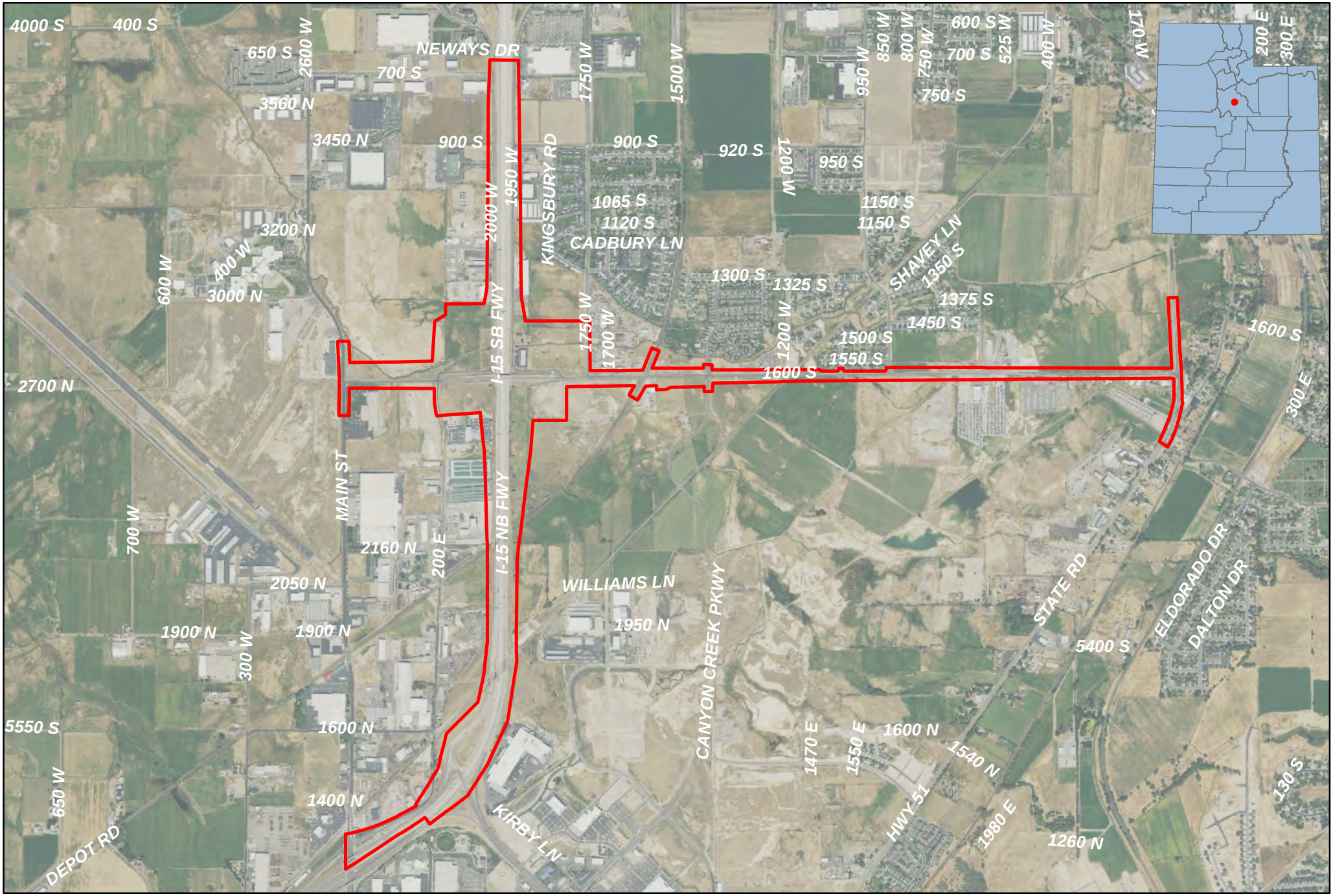
Ute Ladies'-Tresses

IPaC data included Ute ladies'-tresses (ULT) for consideration within the study area. ULT is found in seasonally moist soils, wet meadows, along streams, in abandoned stream meanders, and near springs, seeps, and lake shores in sandy or loamy soils with mixed gravel. It is primarily found in areas where vegetation is relatively open and not overly dense, overgrown, or over grazed. No critical habitat has been designated for this species. A review of UNHP data from the last 10 years indicates no known occurrences and/or observations of ULT within or adjacent to the study area. The last recorded observation year for Ute ladies'-treses within two miles of the study area was 2006.

Mesic areas exist within the study area but they support vegetation not commonly associated with ULT in Utah, do not contain the appropriate soils, or are too saline. Dry Creek and the ditches within the study area do not contain suitable habitat.

**Results**

Based on the above information, no suitable habitat exists within the study area for Yellow-billed cuckoo, JJune sucker, or Ute ladies'-tresses. Migratory bird habitat is present within the study area. The project is unlikely to affect Utah Sensitive Species.




**I-15; Springville/Spanish Fork Interchange**

**Study Area**

Map 1 of 1

0 0.25 0.5 Miles

N

# IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

NOT FOR CONSULTATION

## Location

Utah County, Utah

## Local office

Utah Ecological Services Field Office

(801) 975-3330
(801) 975-3331

2369 West Orton Circle, Suite 50
West Valley City, UT 84119-7603

http://www.fws.gov
http://www.fws.gov/utahfieldoffice/

# Endangered species

**This resource list is for informational purposes only and does not constitute an analysis of project level impacts.**

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population, even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

NOT FOR CONSULTATION

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1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information.
2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

## Birds

| NAME | STATUS |
|---|---|

| | |
|---|---|
| Yellow-billed Cuckoo Coccyzus americanus<br>There is **proposed** critical habitat for this species. Your location is outside the critical habitat.<br>https://ecos.fws.gov/ecp/species/3911 | Threatened |

## Fishes

| NAME | STATUS |
|---|---|
| June Sucker Chasmistes liorus<br>There is **final** critical habitat for this species. Your location is outside the critical habitat.<br>https://ecos.fws.gov/ecp/species/4133 | Endangered |

## Flowering Plants

| NAME | STATUS |
|---|---|
| Ute Ladies'-tresses Spiranthes diluvialis<br>No critical habitat has been designated for this species.<br>https://ecos.fws.gov/ecp/species/2159 | Threatened |

## Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

THERE ARE NO CRITICAL HABITATS AT THIS LOCATION.

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# Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Birds of Conservation Concern http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php

- Measures for avoiding and minimizing impacts to birds http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Nationwide conservation measures for birds http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

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| NAME | BREEDING SEASON (IF A BREEDING SEASON IS INDICATED FOR A BIRD ON YOUR LIST, THE BIRD MAY BREED IN YOUR PROJECT AREA SOMETIME WITHIN THE TIMEFRAME SPECIFIED, WHICH IS A VERY LIBERAL ESTIMATE OF THE DATES INSIDE WHICH THE BIRD BREEDS ACROSS ITS ENTIRE RANGE. "BREEDS ELSEWHERE" INDICATES THAT THE BIRD DOES NOT LIKELY BREED IN YOUR PROJECT AREA.) |
|---|---|
| **Bald Eagle** *Haliaeetus leucocephalus*<br>This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.<br>https://ecos.fws.gov/ecp/species/1626 | Breeds Dec 1 to Aug 31 |
| **Brewer's Sparrow** *Spizella breweri*<br>This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA<br>https://ecos.fws.gov/ecp/species/9291 | Breeds May 15 to Aug 10 |

| | |
|---|---|
| Golden Eagle Aquila chrysaetos<br>This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA<br>https://ecos.fws.gov/ecp/species/1680 | Breeds Dec 1 to Aug 31 |
| Green-tailed Towhee Pipilo chlorurus<br>This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA<br>https://ecos.fws.gov/ecp/species/9444 | Breeds May 1 to Aug 10 |
| Lesser Yellowlegs Tringa flavipes<br>This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.<br>https://ecos.fws.gov/ecp/species/9679 | Breeds elsewhere |
| Long-billed Curlew Numenius americanus<br>This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.<br>https://ecos.fws.gov/ecp/species/5511 | Breeds Apr 1 to Jul 31 |
| Marbled Godwit Limosa fedoa<br>This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.<br>https://ecos.fws.gov/ecp/species/9481 | Breeds elsewhere |
| Olive-sided Flycatcher Contopus cooperi<br>This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.<br>https://ecos.fws.gov/ecp/species/3914 | Breeds May 20 to Aug 31 |
| Sage Thrasher Oreoscoptes montanus<br>This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA<br>https://ecos.fws.gov/ecp/species/9433 | Breeds Apr 15 to Aug 10 |
| Willet Tringa semipalmata<br>This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. | Breeds Apr 20 to Aug 5 |

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# Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

**Probability of Presence (■)**

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

**Breeding Season** (■)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

**Survey Effort** (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

To see a bar's survey effort range, simply hover your mouse cursor over the bar.

**No Data** (–)
A week is marked as having no data if there were no survey events for that week.

**Survey Timeframe**
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.

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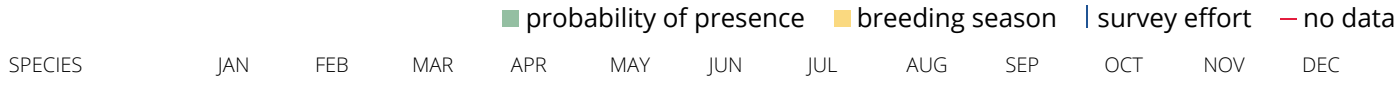
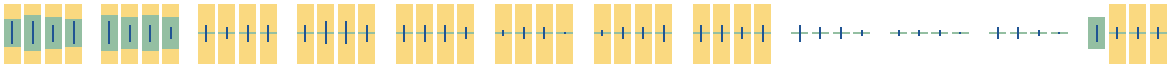
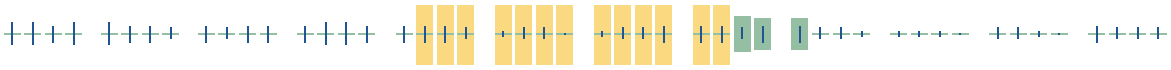


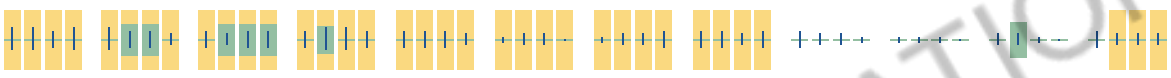
Bald Eagle
Non-BCC Vulnerable (This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.)



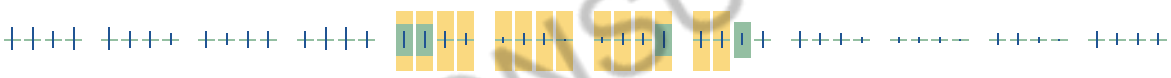
Brewer's Sparrow
BCC - BCR (This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA)



Golden Eagle
BCC - BCR (This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA)

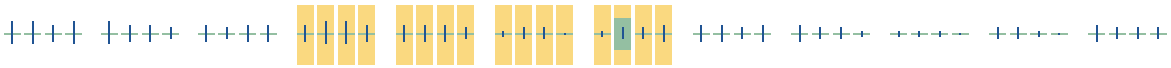


Green-tailed Towhee
BCC - BCR (This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA)



Lesser Yellowlegs
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Long-billed Curlew
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



Marbled Godwit
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

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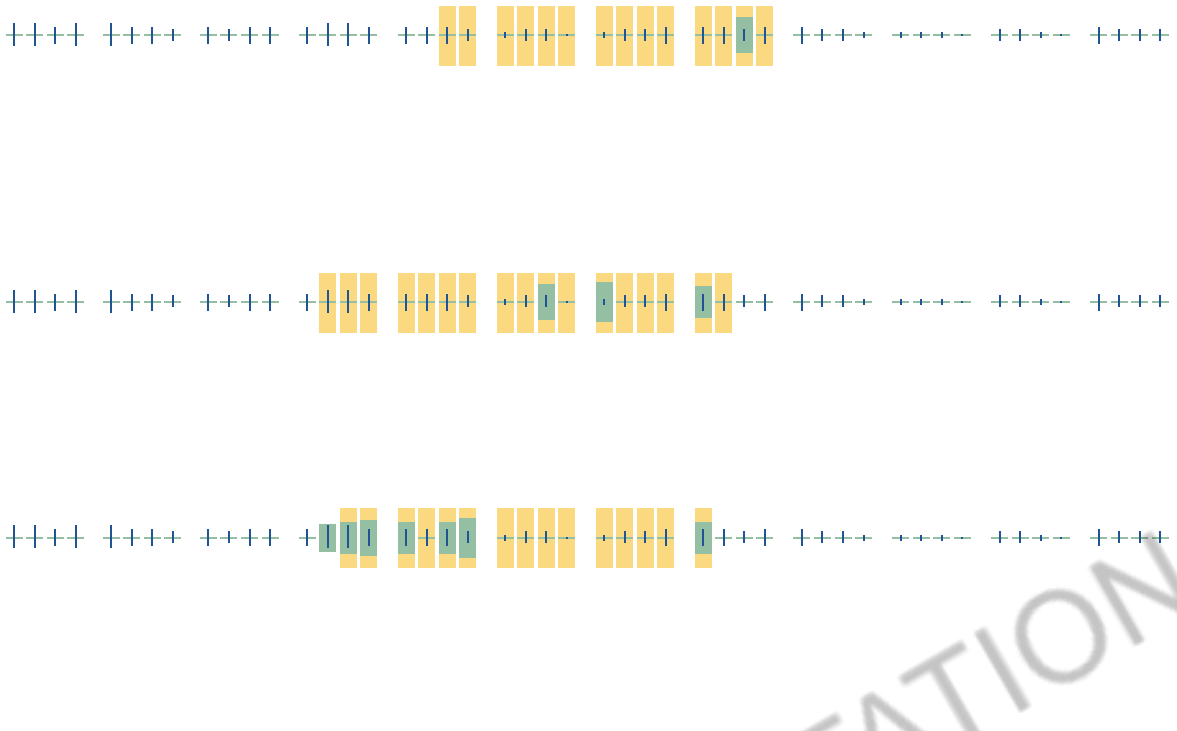

Olive-sided Flycatcher
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Sage Thrasher
BCC - BCR (This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA)

Willet
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

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**Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.**

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures and/or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

**What does IPaC use to generate the migratory birds potentially occurring in my specified location?**

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the AKN Phenology Tool.

**What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?**

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets .

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

**How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?**

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: The Cornell Lab of Ornithology All About Birds Bird Guide, or (if you are unsuccessful in locating the bird of interest there), the Cornell Lab of Ornithology Neotropical Birds guide. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

**What are the levels of concern for migratory birds?**

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

**Details about birds that are potentially affected by offshore projects**

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

**What if I have eagles on my list?**

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

**Proper Interpretation and Use of Your Migratory Bird Report**

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ “What does IPaC use to generate the migratory birds potentially occurring in my specified location”. Please be aware this report provides the “probability of presence” of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look

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carefully at the survey effort (indicated by the black vertical bar) and for the existence of the “no data” indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ “Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds” at the bottom of your migratory bird trust resources page.

# Facilities

## National Wildlife Refuge lands

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS AT THIS LOCATION.

## Fish hatcheries

THERE ARE NO FISH HATCHERIES AT THIS LOCATION.

# Wetlands in the National Wetlands Inventory

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

This location overlaps the following wetlands:

FRESHWATER EMERGENT WETLAND

- PEM1C
- PEM1A
- PEM1Cx

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RIVERINE

- R4SBCx
- R5UBH
- R4SBC

A full description for each wetland code can be found at the National Wetlands Inventory website

**Data limitations**

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

**Data exclusions**

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

**Data precautions**

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

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Utah Division of Wildlife Resources
Utah Natural Heritage Program
1594 W. North Temple
PO Box 146301
Salt Lake City, UT 84116

Report Number: 11390
May 21, 2020

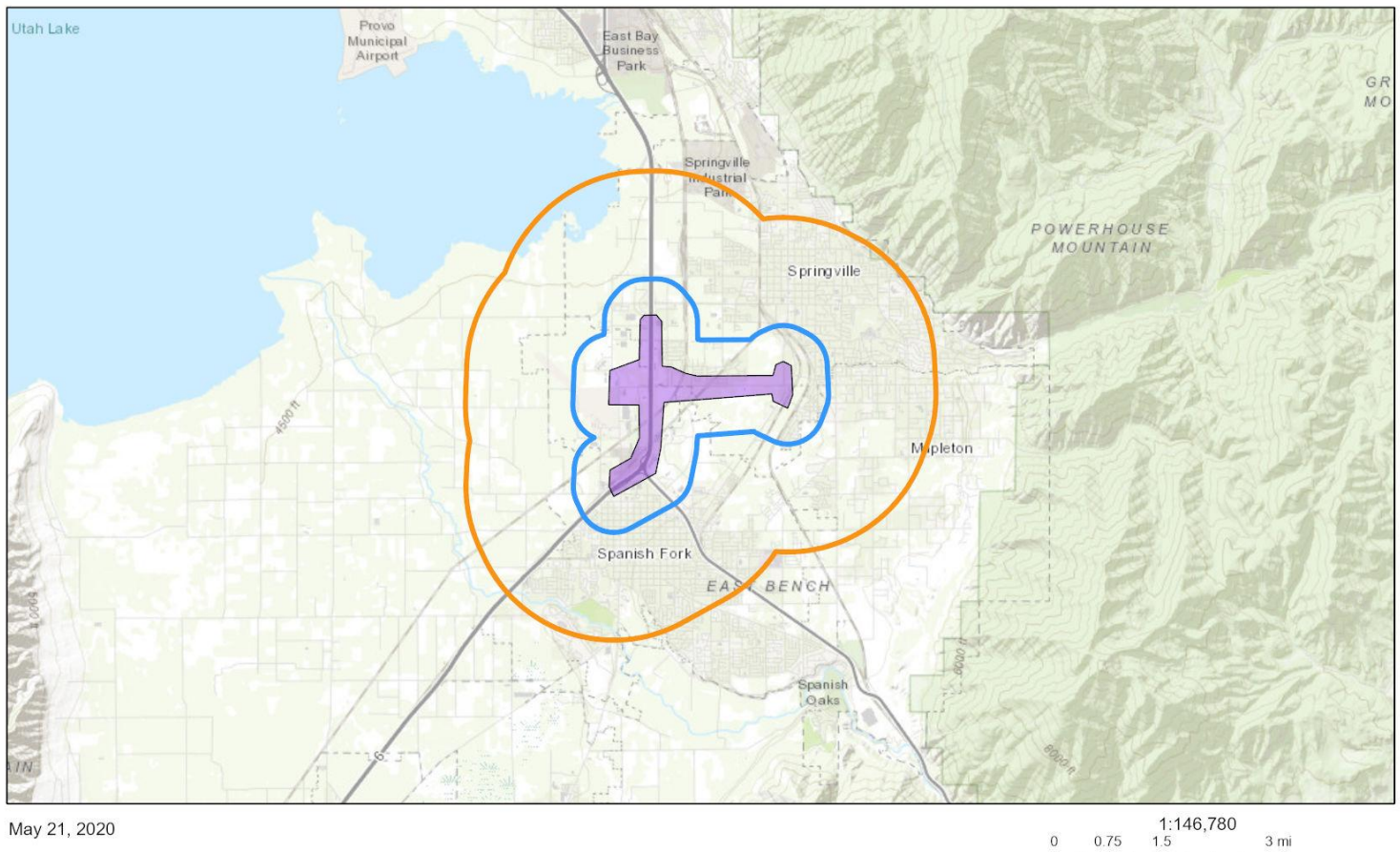
# Utah Natural Heritage Program Online Species Search Report

## Project Information

**Project Name**
Springville/Spanish Fork Interchange

**Project Description**
New interchange at I-15 and 1600 South in Springville, Utah

**Location Description**
Springville, Utah




May 21, 2020

1:146,780
0 0.75 1.5 3 mi
0 1.5 3 6 km

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

## Animals within a ½ mile radius

| Common Name | Scientific Name | State Protection Status | U.S. ESA Status | Last Observation Year |
|---|---|---|---|---|
| Bobolink | Dolichonyx oryzivorus | SPC | | 2003 |

## Plants within a ½ mile radius

| Common Name | Scientific Name | State Protection Status | U.S. ESA Status | Last Observation Year |
|---|---|---|---|---|
| **No Species Found** | | | | |

## Animals within a 2 mile radius

| Common Name | Scientific Name | State Protection Status | U.S. ESA Status | Last Observation Year |
|---|---|---|---|---|
| Columbia Spotted Frog | Rana luteiventris | CS | | 2012 |
| Townsend's Big-eared Bat | Corynorhinus townsendii | SPC | | 2012 |
| Long-billed Curlew | Numenius americanus | SPC | | 2008 |
| Bald Eagle | Haliaeetus leucocephalus | SPC | | 2006 |
| June Sucker | Chasmistes liorus | S-ESA | LE | 2006 |
| American White Pelican | Pelecanus erythrorhynchos | SPC | | 2005 |
| Bobolink | Dolichonyx oryzivorus | SPC | | 2003 |
| Least Chub | Iotichthys phlegethontis | CS | | 1931 |

## Plants within a 2 mile radius

| Common Name | Scientific Name | State Protection Status | U.S. ESA Status | Last Observation Year |
|---|---|---|---|---|
| Ute Ladies' Tresses | Spiranthes diluvialis | | LT | 2006 |

## Definitions

### State Protection Status

| | |
|---|---|
| S-ESA | Federally-listed or candidate species under the Endangered Species Act |
| SPC | Wildlife species of concern |
| CS | Species receiving special management under a Conservation Agreement in order to preclude the need for Federal listing |

### U.S. Endangered Species Act

| | |
|---|---|
| LE | A taxon that is listed by the U.S. Fish and Wildlife Service as "endangered" with the probability of worldwide extinction |
| LT | A taxon that is listed by the U.S. Fish and Wildlife Service as "threatened" with becoming endangered |
| LE;XN | An "endangered" taxon that is considered by the U.S. Fish and Wildlife Service to be "experimental and nonessential" in its designated use areas in Utah |
| C | A taxon for which the U.S. Fish and Wildlife Service has on file sufficient information on biological vulnerability and threats to justify it being a "candidate" for listing as endangered or threatened |
| PT/PE | A taxon "proposed" to be listed as "endangered" or "threatened" by the U.S. Fish and Wildlife Service |

## Disclaimer

The information provided in this report 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, any given response is only appropriate for its respective request.

The UDWR provides no warranty, nor accepts any liability, occurring from any incorrect, incomplete, or misleading data, or from any incorrect, incomplete, or misleading use of these data.

The results are a query of species tracked by the Utah Natural Heritage Program, which includes all species listed under the U.S. Endangered Species Act and species on the Utah Sensitive Species List. Other significant wildlife values might also be present on the designated site. Please contact UDWR's regional habitat manager if you have any questions.

Contact the U.S. Fish and Wildlife Service at (801) 975-3330 for the purpose of consultation under the Endangered Species Act.

Please contact our office at (801) 538-4759 or habitat@utah.gov if you require further assistance.

Your project is located in the following UDWR region(s): Central region

---

**Report generated for:**
Haylie Ferguson
Horrocks Engineers
2162 W Grove Parkway #400
Pleasant Grove, UT 84062
(801) 763-5316
haylief@horrocks.com

UTAH DNR WILDLIFE RESOURCES

# Memorandum

*Environmental Services*

**DATE:** June 16, 2020

**TO:** Haylie Ferguson, Horrocks Environmental Specialist

**FROM:** Matt Howard, Natural Resources Manager

**SUBJECT:** S-I15-6(239)259 Springville/Spanish Fork Interchange; PIN 15153

---

Haylie,

I have reviewed the biological review regarding a single-point interchange at 1600 South in Springville and the project's potential impacts to species protected by the Endangered Species Act (ESA) and concur with its findings. I agree with the summary's findings that the project would have no effect on species protected by the ESA, MBTA, or BGEPA. I have also reviewed the project to assess impacts to greater sage-grouse and have found that the project would have no impact on sage-grouse.

Sincerely,

Matt Howard
Natural Resource Manager

**UDOT Region 3 Project**
**I-15;Springville/SpanishFork Interchange Study, Utah County**
**Project Number S-I15-6-(239)259; PIN 15153**

# *MEMORANDUM*

**Date:** Thursday, September 3, 2020

**To:** Elisa Albury
UDOT Environmental Program Manager

**From:** Rod Hess
UDOT Senior Landscape Architect

**RE: DRAFT ENVIRONMENTAL ASSESSMENT (EA) REVIEW OF THE AQUATIC RESOURCES DELINEATION REPORT**

I have been able to review the Aquatic Resources Delineation Report completed by Horrocks Engineers that identifies potentially jurisdictional Waters of the United States (WOTUS), including Wetlands within the environmental study area for the above referenced project.

Based on my review, the Aquatic Resources Delineation Report included in the Draft EA is accurate and would satisfy the Minimum Standards for Acceptance of Aquatic Resources Delineation Report as identified by the U.S. Army Corps of Engineers in their letter dated January 2016.

State of Utah

GARY R. HERBERT
*Governor*

SPENCER J. COX
*Lieutenant Governor*

DEPARTMENT OF TRANSPORTATION

CARLOS M. BRACERAS, P.E.
*Executive Director*

JASON E. DAVIS, P.E.
*Deputy Director of Engineering and Operations*

TERIANNE S. NEWELL, P.E.
*Deputy Director of Planning and Investment*

August 3, 2020

Mr. Cory Jensen
Senior Historic Preservation Specialist
Utah Division of State History
300 Rio Grande
Salt Lake City, UT 84101-1182

RE: UDOT Project No. S-I15-6(239)259; I-15;Springville/Spanish Fork Interchange Study, Utah County, Utah (PIN 15153).
**Determination of Eligibility and Finding of No Historic Properties Affected.**

Dear Mr. Jensen:

The Utah Department of Transportation (UDOT) is preparing to undertake the subject federal-aid project. In accordance with Parts 3.1.1 and 3.2 of the *Memorandum of Understanding Between the Federal Highway Administration and the Utah Department of Transportation Concerning State of Utah's Participation in the Surface Transportation Project Delivery Program Pursuant to 23 USC §327* (executed January 17, 2017), the UDOT assumes responsibility, assigned by the Federal Highway Administration (FHWA), for ensuring compliance with Section 106 of the NHPA and with Section 4(f) of the DOT Act of 1966, as amended. Also in accordance with the *Third Amended Programmatic Agreement among the FHWA, the Utah State Historic Preservation Officer, the Advisory Council on Historic Preservation, the USACE Sacramento District, and the UDOT Regarding Section 106 Implementation for Federal-Aid Transportation Projects in the State of Utah* (executed August 23, 2017), Section 106 of the National Historic Preservation Act of 1966, as amended (54 U.S.C. § 300101 et seq.), and U.C.A.9-8-404, 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. Additionally, this submission is in compliance with Section 4(f) of the Department of Transportation Act of 1966, 23 U.S.C. § 138 (as amended) and 49 U.S.C. § 303 (as amended).

**PROJECT DESCRIPTION**

The UDOT is preparing an Environmental Assessment (EA) consistent with the National Environmental Policy Act (NEPA) to evaluate a new interchange on Interstate 15 (I-15) in Springville and Spanish Fork at 1600 South/2700 North and improvements to 1600 South/2700 North from Main Street in Spanish Fork to State Street (SR-51) in Springville, in Utah County, Utah. The study area includes the intersection of I-15 and 2700 North in Springville and extends to Main St. on the west, along 1600 South to State St. (SR-51) on the east, and along I-15 from just south of the 400 South interchange to the Main St. (SR-156) interchange. Potential improvements could include: a new I-15 interchange at 2700 North, a frontage road system and a reconfigured access with US-6. Safety and transportation improvements are needed to address current identified design deficiencies and current and projected 2040 travel demand.

The area of potential affects (APE) has been defined as the footprint of all active alternatives studied under the EA, and is located on I-15 and 1600 South/2700 North in Springville/Spanish Fork. The portion on I-15 runs from the Spanish Fork Main Street Interchange to the Springville 400 South Interchange. The section along 1600 South/2700 North runs from Spanish Fork Main Street to Springville State Street.

The APE has been surveyed for archaeology by Horrocks Engineers, under State Antiquities Project Number U18HX0769 and U20HX0433, and the results are reported in *An Archaeological Investigation of the I-15; Milepost 258 Interchange Project* and *An Archaeological Investigation of Additional Areas for the I-15; Milepost 258 Interchange Project* (see enclosed reports). An intensive level pedestrian survey was conducted using 15 meter transects to identify archaeological resources. A reconnaissance selective level survey was conducted to record architectural properties, and the results are reported in *Selective Reconnaissance Level Survey I-15, Springville/Spanish Fork Interchange; Springville-Spanish Fork, Utah County, Utah* (see enclosed report)

The surveys have resulted in the identification of 3 archaeological sites and 9 architectural properties. Of these, 2 archaeological sites and 5 architectural properties are eligible to the National Register of Historic Places (NRHP). No known traditional cultural properties are located in the APE. The Determinations of Eligibility and Findings of Effects (for both Section 106 and Section 4(f)) are provided in Table 1 for archaeological resources and in Table 2 for architectural properties. Please see attached notification letter regarding Section 4(f) *de minimis* impacts.

## ARCHAEOLOGICAL RESOURCES

Table 1. Determinations of Eligibility and Findings of Effect for Archaeological Resources.

| Site | Name or Description | NRHP Eligibility | Finding of Effect | Section 4(f) Use | Section 4(f) Impact |
|---|---|---|---|---|---|
| 42UT1029 | Utah Southern/Union Pacific Railroad | Eligible | No Historic Properties Affected | No | No |
| 42UT1194 | Branch of the Denver & Rio Grande Western Railroad | Eligible | No Historic Properties Affected | No | No |
| 42UT1451 | Big Hollow Irrigation Ditch | Not Eligible | No Historic Properties Affected | N/A | N/A |

***Description of Effects:*** All of the archaeological sites will be avoided by this project. The project will construct a new grade-separated crossing over Site 42UT1029 with no bridge elements present in the site boundaries. The at-grade crossing at 42UT1194 qualifies under the ACHP Program Comment to Exempt Consideration of Effects to Rail Properties Within Rail Rights-of-Way (83FR42920) under Exemption E.

## ARCHITECTURAL PROPERTIES

Table 2. Determinations of Eligibility and Findings of Effect for Architectural Properties.

| Address | Date | Style | NRHP Eligibility/ SHPO Rating | Finding of Effect | Section 4(f) Use | Section 4(f) Impact |
|---|---|---|---|---|---|---|
| 245 W. 1600 South | 1950 | Concrete block warehouse | Ineligible/NC | No Historic Properties Affected | N/A | N/A |
| 1620 S. State | 1958 | Concrete block Commercial/Industrial | Ineligible/NC | No Historic Properties Affected | N/A | N/A |
| 1680 S. State | 1936 | Block | Eligible/EC | No Historic Properties Affected | No | None |
| 1700 S. State | 1971 | Period Cottage | Eligible/EC | No Historic Properties Affected | No | None |
| 1785 S. State | 1957 | Ranch House with garage | Eligible/EC | No Historic Properties Affected | No | None |
| 1695 S. State | 1947 | Ranch/Rambler | Ineligible/NC | No Historic Properties Affected | N/A | N/A |

| | | | | | | |
|---|---|---|---|---|---|---|
| 1689 S. State | 1973 | Restaurant, unclear style | Eligible/EC | No Historic Properties Affected | No | None |
| 1615 S. State | 1972 | Commercial Building | Eligible/EC | No Historic Properties Affected | No | None |
| 1555 S. State | 1970 | Commercial Buildings | Ineligible/NC | No Historic Properties Affected | N/A | N/A |

***Description of Effects:*** All of the properties with historic architecture will be avoided by this project.

**CONSULTATION EFFORTS**

Native American consultation was initiated through letters sent to the Confederated Bands of the Goshute Tribe, Skull Valley Band of Goshute, Uintah and Ouray Ute Tribes, Shoshone-Bannock Tribes, Eastern Shoshone Tribe of the Wind River Reservation, Northwestern Band of Shoshone Nation, and the Cedar and Shivwits Bands of the Paiute (sent September 26, 2018). An open house scoping meeting was held on November 14, 2019 and additional public meetings are planned to notify the public of the impacts to cultural resources. No responses or comments concerning cultural resources were received to date.

**SUMMARY**

To summarize, the project will result in a finding of **No Historic Properties Affected** and no Section 4(f) use for all architectural properties and archaeological sites. Therefore, the Finding of Effect for the proposed UDOT Project No. S-I15-6(239)259; I-15; Springville/Spanish Fork Interchange Study, Utah County, Utah, is **No Historic Properties Affected**.

The environmental review, consultation, and other actions required by applicable Federal environmental laws for this project are being, or have been, carried out by UDOT pursuant to 23 *USC §327* and a Memorandum of Understanding dated January 17, 2017, and executed by FHWA and UDOT.

Please review this document and, providing you agree with the findings contained herein, provide written concurrence. Should you have any questions or need additional information, please feel free to contact Liz Robinson at 801-910-2035 or lizrobinson@utah.gov; or Elizabeth Giraud at 801-965-4917 or egiraud@utah.gov.

Sincerely,

Liz Robinson

Liz Robinson, M.A., RPA
Cultural Resources Program Manager
UDOT Environmental Services

Elizabeth Giraud

Elizabeth Giraud, AICP
Architectural Historian
UDOT Environmental Services

Enclosures

cc: Darren Bunker, Project Manager
Elisa Albury, Environmental Manager

GARY R. HERBERT
*Governor*

SPENCER J. COX
*Lieutenant Governor*

Jill Remington Love
*Executive Director*
*Department of*
*Heritage & Arts*

Utah Division of State History

Christopher Merritt
*State Historic Preservation Officer*

Kevin Fayles
*Interim Director*

August 4, 2020

Liz Robinson
Cultural Resources Program Manager
Utah Dept of Transportation (UDOT)
4501 Constitution Blvd
Salt Lake City, UT 84119

RE: PIN 15153_ I-15, Springville/Spanish Fork Interchange Study_ S-I15-6(239)259

For future correspondence, please reference Case No. 20-2672

Dear Ms Robinson,

The Utah State Historic Preservation Office received your submission and request for our comment on the above-referenced project on August 04, 2020. Based on the information provided to our office, we concur with your determination of eligibility and finding of No Historic Properties Effected for the proposed undertaking.

This information is provided to assist with Section 106 responsibilities as per §36CFR800. If you have questions, please contact me at (801) 245-7242 or by email at coryjensen@utah.gov.

Sincerely,

Cory Jensen
National Register & Survey Coordinator

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 of Engineering and Operations*

TERIANNE S. NEWELL, P.E.
*Deputy Director of Planning and Investment*

September 26, 2018

Mr. Rupert Steele
Confederated Tribes of the Goshute Reservation
P.O. BOX 6104/195 Tribal Center Rd.
Ibapah, UT 84034

RE: UDOT Project No. S-I15-6(239)259; I-15;Springville/Spanish Fork Interchange Study, Utah County, Utah (PIN 15153).
**Notification of Project and Invitation to be a Section 106 Consulting Party**

Dear Mr. Steele,

The Utah Department of Transportation (UDOT) is preparing to undertake the subject project. In accordance with Parts 3.1.1 and 3.2 of the *Memorandum of Understanding Between the Federal Highway Administration and the Utah Department of Transportation Concerning State of Utah's Participation in the Surface Transportation Project Delivery Program Pursuant to 23 USC §327* (executed January 17, 2017), the UDOT assumes responsibility, assigned by the Federal Highway Administration (FHWA), for ensuring compliance with Section 106 of the NHPA and with Section 4(f) of the DOT Act of 1966, as amended. FHWA retains the responsibility for government-to-government consultation with Indian Tribes and this notification is sent on behalf of FHWA. Direct government-to-government consultation with FHWA is available upon request.

The environmental review, consultation, and other actions required by applicable Federal environmental laws for this project are being, or have been, carried out by UDOT pursuant to 23 *USC §327* and a Memorandum of Understanding dated January 17, 2017, and executed by FHWA and UDOT.

In compliance with Section 106 of the National Historic Preservation Act, 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. Please be assured that, in accordance with confidentiality and disclosure stipulations in Section 304 of the NHPA, the UDOT will maintain strict confidentiality about certain types of information regarding traditional religious and/or cultural places that may be affected by this proposed undertaking.

The study area includes the intersection of I-15 and 2700 North in Springville and extends to Main St. on the west, along 1600 South to State St. (SR-51) on the east, and along I-15 from just south of the 400 South interchange to the Main St. (SR-156) interchange. Potential improvements could include: a new I-15 interchange at 2700 North, a frontage road system and a reconfigured access with US-6. Some of the proposed construction work (e.g. bridge construction) would include work below the existing imported roadbase materials in original (or native) ground.
Safety and transportation improvements are needed to address current identified design deficiencies and current and projected 2040 travel demand.

This project is being developed with a phased approach, with Phase I including resource identification and concept-level design, then continuing on to Phase II where project alternatives will be developed and impacts determined. Phase I is estimated to be complete in February 2019.

The APE for cultural resources will include the proposed footprint of the current study area as well as all adjoining parcels (see attached map). The APE generally extends one parcel deep from the roadway centerlines. This area has a low potential for cultural resources due to industrial use and modern development. Several historic linear archaeological sites are known in this area but it is anticipated that few additional sites or properties with historic architecture will be present in the APE.

Horrocks Engineers will conduct a cultural resources inventory for the project identifying archaeological sites and historic buildings within the project APE. As project design progresses in Phase II, UDOT will determine how the historic properties would be affected and will consult with the Utah State Historic Preservation Officer regarding those effects. A copy of the cultural resources inventory results report will be kept on file at the UDOT Region Three Headquarters in Orem, Utah and will be available for your review upon request.

At your request, the FHWA and the UDOT staff will be available to meet with you to discuss any concerns you might have about the project. Should you have any questions or concerns about this project and/or wish to be a consulting party, feel free to contact me at lizrobinson@utah.gov or 801-910-2035. We would also appreciate any suggestions you might have about other groups or individuals that we should contact regarding this project or ways that we may more effectively consult with your Tribe/Band.

To facilitate our consultation with you regarding this project, we would greatly appreciate a response to this letter within 30 days of receipt.

Thank you for your attention to this project notification and any comments you may have.

Sincerely,

Liz Robinson
Cultural Resources Program Manager
UDOT Central Environmental

Enclosures

cc: Ms. Mary Pete-Freeman, Tribal Transportation Planner

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 of Engineering and Operations*

TERIANNE S. NEWELL, P.E.
*Deputy Director of Planning and Investment*

September 26, 2018

Ms. Mary Pete-Freeman
Confederated Tribes of the Goshute Reservation
P.O. BOX 6104/195 Tribal Center Rd.
Ibapah, UT 84034

RE: UDOT Project No. S-I15-6(239)259; I-15;Springville/Spanish Fork Interchange Study, Utah County, Utah (PIN 15153).
**Notification of Project and Invitation to be a Section 106 Consulting Party**

Dear Ms. Pete-Freeman,

The Utah Department of Transportation (UDOT) is preparing to undertake the subject project. In accordance with Parts 3.1.1 and 3.2 of the *Memorandum of Understanding Between the Federal Highway Administration and the Utah Department of Transportation Concerning State of Utah's Participation in the Surface Transportation Project Delivery Program Pursuant to 23 USC §327* (executed January 17, 2017), the UDOT assumes responsibility, assigned by the Federal Highway Administration (FHWA), for ensuring compliance with Section 106 of the NHPA and with Section 4(f) of the DOT Act of 1966, as amended. FHWA retains the responsibility for government-to-government consultation with Indian Tribes and this notification is sent on behalf of FHWA. Direct government-to-government consultation with FHWA is available upon request.

The environmental review, consultation, and other actions required by applicable Federal environmental laws for this project are being, or have been, carried out by UDOT pursuant to 23 *USC §327* and a Memorandum of Understanding dated January 17, 2017, and executed by FHWA and UDOT.

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The study area includes the intersection of I-15 and 2700 North in Springville and extends to Main St. on the west, along 1600 South to State St. (SR-51) on the east, and along I-15 from just south of the 400 South interchange to the Main St. (SR-156) interchange. Potential improvements could include: a new I-15 interchange at 2700 North, a frontage road system and a reconfigured access with US-6. Some of the proposed construction work (e.g. bridge construction) would include work below the existing imported roadbase materials in original (or native) ground.
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Horrocks Engineers will conduct a cultural resources inventory for the project identifying archaeological sites and historic buildings within the project APE. As project design progresses in Phase II, UDOT will determine how the historic properties would be affected and will consult with the Utah State Historic Preservation Officer regarding those effects. A copy of the cultural resources inventory results report will be kept on file at the UDOT Region Three Headquarters in Orem, Utah and will be available for your review upon request.

At your request, the FHWA and the UDOT staff will be available to meet with you to discuss any concerns you might have about the project. Should you have any questions or concerns about this project and/or wish to be a consulting party, feel free to contact me at lizrobinson@utah.gov or 801-910-2035. We would also appreciate any suggestions you might have about other groups or individuals that we should contact regarding this project or ways that we may more effectively consult with your Tribe/Band.

To facilitate our consultation with you regarding this project, we would greatly appreciate a response to this letter within 30 days of receipt.

Thank you for your attention to this project notification and any comments you may have.

Sincerely,

Liz Robinson
Cultural Resources Program Manager
UDOT Central Environmental

Enclosures

cc: Mr. Rupert Steele, Chairman

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 of Engineering and Operations*

TERIANNE S. NEWELL, P.E.
*Deputy Director of Planning and Investment*

September 26, 2018

Ms. Candace Bear
Skull Valley Band of Goshute Indians
407 Skull Valley Rd.
Skull Valley, UT 84029

RE: UDOT Project No. S-I15-6(239)259; I-15;Springville/Spanish Fork Interchange Study, Utah County, Utah (PIN 15153).
**Notification of Project and Invitation to be a Section 106 Consulting Party**

Dear Ms. Bear,

The Utah Department of Transportation (UDOT) is preparing to undertake the subject project. In accordance with Parts 3.1.1 and 3.2 of the *Memorandum of Understanding Between the Federal Highway Administration and the Utah Department of Transportation Concerning State of Utah's Participation in the Surface Transportation Project Delivery Program Pursuant to 23 USC §327* (executed January 17, 2017), the UDOT assumes responsibility, assigned by the Federal Highway Administration (FHWA), for ensuring compliance with Section 106 of the NHPA and with Section 4(f) of the DOT Act of 1966, as amended. FHWA retains the responsibility for government-to-government consultation with Indian Tribes and this notification is sent on behalf of FHWA. Direct government-to-government consultation with FHWA is available upon request.

The environmental review, consultation, and other actions required by applicable Federal environmental laws for this project are being, or have been, carried out by UDOT pursuant to 23 *USC §327* and a Memorandum of Understanding dated January 17, 2017, and executed by FHWA and UDOT.

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Safety and transportation improvements are needed to address current identified design deficiencies and current and projected 2040 travel demand.

This project is being developed with a phased approach, with Phase I including resource identification and concept-level design, then continuing on to Phase II where project alternatives will be developed and impacts determined. Phase I is estimated to be complete in February 2019.

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At your request, the FHWA and the UDOT staff will be available to meet with you to discuss any concerns you might have about the project. Should you have any questions or concerns about this project and/or wish to be a consulting party, feel free to contact me at lizrobinson@utah.gov or 801-910-2035. We would also appreciate any suggestions you might have about other groups or individuals that we should contact regarding this project or ways that we may more effectively consult with your Tribe/Band.

To facilitate our consultation with you regarding this project, we would greatly appreciate a response to this letter within 30 days of receipt.

Thank you for your attention to this project notification and any comments you may have.

Sincerely,

Liz Robinson
Cultural Resources Program Manager
UDOT Central Environmental

Enclosures

cc:

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 of Engineering and Operations*

TERIANNE S. NEWELL, P.E.
*Deputy Director of Planning and Investment*

September 26, 2018

Mr. Darren Parry
Northwestern Band of Shoshone Nation
707 North Main Street
Brigham City, UT 84302

RE: UDOT Project No. S-I15-6(239)259; I-15;Springville/Spanish Fork Interchange Study, Utah County, Utah (PIN 15153).
**Notification of Project and Invitation to be a Section 106 Consulting Party**

Dear Mr. Parry,

The Utah Department of Transportation (UDOT) is preparing to undertake the subject project. In accordance with Parts 3.1.1 and 3.2 of the *Memorandum of Understanding Between the Federal Highway Administration and the Utah Department of Transportation Concerning State of Utah's Participation in the Surface Transportation Project Delivery Program Pursuant to 23 USC §327* (executed January 17, 2017), the UDOT assumes responsibility, assigned by the Federal Highway Administration (FHWA), for ensuring compliance with Section 106 of the NHPA and with Section 4(f) of the DOT Act of 1966, as amended. FHWA retains the responsibility for government-to-government consultation with Indian Tribes and this notification is sent on behalf of FHWA. Direct government-to-government consultation with FHWA is available upon request.

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Thank you for your attention to this project notification and any comments you may have.

Sincerely,

Liz Robinson
Cultural Resources Program Manager
UDOT Central Environmental

Enclosures

cc: Ms. Patty Timbimboo-Madsen, Cultural and Natural Resource Manager

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 of Engineering and Operations*

TERIANNE S. NEWELL, P.E.
*Deputy Director of Planning and Investment*

September 26, 2018

Ms. Patty Timbimboo-Madsen
Northwestern Band of Shoshone Nation
707 North Main Street
Brigham City, UT 84302

RE: UDOT Project No. S-I15-6(239)259; I-15;Springville/Spanish Fork Interchange Study, Utah County, Utah (PIN 15153).
**Notification of Project and Invitation to be a Section 106 Consulting Party**

Dear Ms. Timbimboo-Madsen,

The Utah Department of Transportation (UDOT) is preparing to undertake the subject project. In accordance with Parts 3.1.1 and 3.2 of the *Memorandum of Understanding Between the Federal Highway Administration and the Utah Department of Transportation Concerning State of Utah's Participation in the Surface Transportation Project Delivery Program Pursuant to 23 USC §327* (executed January 17, 2017), the UDOT assumes responsibility, assigned by the Federal Highway Administration (FHWA), for ensuring compliance with Section 106 of the NHPA and with Section 4(f) of the DOT Act of 1966, as amended. FHWA retains the responsibility for government-to-government consultation with Indian Tribes and this notification is sent on behalf of FHWA. Direct government-to-government consultation with FHWA is available upon request.

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Thank you for your attention to this project notification and any comments you may have.

Sincerely,

Liz Robinson
Cultural Resources Program Manager
UDOT Central Environmental

Enclosures

cc: Mr. Daren Parry, Chairman

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 of Engineering and Operations*

TERIANNE S. NEWELL, P.E.
*Deputy Director of Planning and Investment*

September 26, 2018

Mr. Blaine Edmo
Shoshone-Bannock Tribes of the Fort Hall Reservation
P.O. Box 306 Pima Drive
Fort Hall, ID 83203

RE: UDOT Project No. S-I15-6(239)259; I-15;Springville/Spanish Fork Interchange Study, Utah County, Utah (PIN 15153).
**Notification of Project and Invitation to be a Section 106 Consulting Party**

Dear Mr. Edmo,

The Utah Department of Transportation (UDOT) is preparing to undertake the subject project. In accordance with Parts 3.1.1 and 3.2 of the *Memorandum of Understanding Between the Federal Highway Administration and the Utah Department of Transportation Concerning State of Utah's Participation in the Surface Transportation Project Delivery Program Pursuant to 23 USC §327* (executed January 17, 2017), the UDOT assumes responsibility, assigned by the Federal Highway Administration (FHWA), for ensuring compliance with Section 106 of the NHPA and with Section 4(f) of the DOT Act of 1966, as amended. FHWA retains the responsibility for government-to-government consultation with Indian Tribes and this notification is sent on behalf of FHWA. Direct government-to-government consultation with FHWA is available upon request.

The environmental review, consultation, and other actions required by applicable Federal environmental laws for this project are being, or have been, carried out by UDOT pursuant to 23 *USC §327* and a Memorandum of Understanding dated January 17, 2017, and executed by FHWA and UDOT.

In compliance with Section 106 of the National Historic Preservation Act, 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. Please be assured that, in accordance with confidentiality and disclosure stipulations in Section 304 of the NHPA, the UDOT will maintain strict confidentiality about certain types of information regarding traditional religious and/or cultural places that may be affected by this proposed undertaking.

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Liz Robinson
Cultural Resources Program Manager
UDOT Central Environmental

Enclosures

cc: Ms. Carolyn Smith, Cultural Resources/Heritage Tribal Office (HeTO)

State of Utah

GARY R. HERBERT
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SPENCER J. COX
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DEPARTMENT OF TRANSPORTATION

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TERIANNE S. NEWELL, P.E.
*Deputy Director of Planning and Investment*

September 26, 2018

Ms. Carolyn Smith
Shoshone-Bannock Tribes of the Fort Hall Reservation
P.O. Box 306 Pima Drive
Fort Hall, ID 83203

RE: UDOT Project No. S-I15-6(239)259; I-15;Springville/Spanish Fork Interchange Study, Utah County, Utah (PIN 15153).
**Notification of Project and Invitation to be a Section 106 Consulting Party**

Dear Ms. Smith,

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Cultural Resources Program Manager
UDOT Central Environmental

Enclosures

cc: Mr. Blaine Edmo, Chairman

State of Utah

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*Governor*

SPENCER J. COX
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DEPARTMENT OF TRANSPORTATION

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*Deputy Director of Planning and Investment*

September 26, 2018

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

RE: UDOT Project No. S-I15-6(239)259; I-15;Springville/Spanish Fork Interchange Study, Utah County, Utah (PIN 15153).
**Notification of Project and Invitation to be a Section 106 Consulting Party**

Dear Mr. St. Clair, Jr. ,

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Enclosures

cc: Ms. Glenda Trosper, Director, Cultural Center
Mr. Joshua Mann, Tribal Historic Presevation Officer

State of Utah

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September 26, 2018

Ms. Glenda Trosper
Eastern Shoshone Tribe of the Wind River Reservation
P.O. Box 538/15 North Fork Rd
Fort Washakie, WY 82514

RE: UDOT Project No. S-I15-6(239)259; I-15;Springville/Spanish Fork Interchange Study, Utah County, Utah (PIN 15153).
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Cultural Resources Program Manager
UDOT Central Environmental

Enclosures

cc: Mr. Darwin St. Clair, Jr., Chairman
Mr. Joshua Mann, Tribal Historic Presevation Officer

State of Utah

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Liz Robinson
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Enclosures

cc: Mr. Darwin St. Clair, Jr., Chairman
Ms. Glenda Trosper, Director, Cultural Center

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*Deputy Director of Planning and Investment*

September 26, 2018

Mr. Luke Dunkin
Ute Indian Tribe of the Uintah & Ouray Reservation
P.O. Box 190
Fort Duchesne, UT 84026

RE: UDOT Project No. S-I15-6(239)259; I-15;Springville/Spanish Fork Interchange Study, Utah County, Utah (PIN 15153).
**Notification of Project and Invitation to be a Section 106 Consulting Party**

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Sincerely,

Liz Robinson
Cultural Resources Program Manager
UDOT Central Environmental

Enclosures

cc: Ms. Betsy Chapoose, Director, Cultural Rights & Protection

State of Utah

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**Notification of Project and Invitation to be a Section 106 Consulting Party**

Dear Ms. Chapoose,

The Utah Department of Transportation (UDOT) is preparing to undertake the subject project. In accordance with Parts 3.1.1 and 3.2 of the *Memorandum of Understanding Between the Federal Highway Administration and the Utah Department of Transportation Concerning State of Utah's Participation in the Surface Transportation Project Delivery Program Pursuant to 23 USC §327* (executed January 17, 2017), the UDOT assumes responsibility, assigned by the Federal Highway Administration (FHWA), for ensuring compliance with Section 106 of the NHPA and with Section 4(f) of the DOT Act of 1966, as amended. FHWA retains the responsibility for government-to-government consultation with Indian Tribes and this notification is sent on behalf of FHWA. Direct government-to-government consultation with FHWA is available upon request.

The environmental review, consultation, and other actions required by applicable Federal environmental laws for this project are being, or have been, carried out by UDOT pursuant to 23 *USC §327* and a Memorandum of Understanding dated January 17, 2017, and executed by FHWA and UDOT.

In compliance with Section 106 of the National Historic Preservation Act, 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. Please be assured that, in accordance with confidentiality and disclosure stipulations in Section 304 of the NHPA, the UDOT will maintain strict confidentiality about certain types of information regarding traditional religious and/or cultural places that may be affected by this proposed undertaking.

The study area includes the intersection of I-15 and 2700 North in Springville and extends to Main St. on the west, along 1600 South to State St. (SR-51) on the east, and along I-15 from just south of the 400 South interchange to the Main St. (SR-156) interchange. Potential improvements could include: a new I-15 interchange at 2700 North, a frontage road system and a reconfigured access with US-6. Some of the proposed construction work (e.g. bridge construction) would include work below the existing imported roadbase materials in original (or native) ground.
Safety and transportation improvements are needed to address current identified design deficiencies and current and projected 2040 travel demand.

This project is being developed with a phased approach, with Phase I including resource identification and concept-level design, then continuing on to Phase II where project alternatives will be developed and impacts determined. Phase I is estimated to be complete in February 2019.

The APE for cultural resources will include the proposed footprint of the current study area as well as all adjoining parcels (see attached map). The APE generally extends one parcel deep from the roadway centerlines. This area has a low potential for cultural resources due to industrial use and modern development. Several historic linear archaeological sites are known in this area but it is anticipated that few additional sites or properties with historic architecture will be present in the APE.

Horrocks Engineers will conduct a cultural resources inventory for the project identifying archaeological sites and historic buildings within the project APE. As project design progresses in Phase II, UDOT will determine how the historic properties would be affected and will consult with the Utah State Historic Preservation Officer regarding those effects. A copy of the cultural resources inventory results report will be kept on file at the UDOT Region Three Headquarters in Orem, Utah and will be available for your review upon request.

At your request, the FHWA and the UDOT staff will be available to meet with you to discuss any concerns you might have about the project. Should you have any questions or concerns about this project and/or wish to be a consulting party, feel free to contact me at lizrobinson@utah.gov or 801-910-2035. We would also appreciate any suggestions you might have about other groups or individuals that we should contact regarding this project or ways that we may more effectively consult with your Tribe/Band.

To facilitate our consultation with you regarding this project, we would greatly appreciate a response to this letter within 30 days of receipt.

Thank you for your attention to this project notification and any comments you may have.

Sincerely,

Liz Robinson
Cultural Resources Program Manager
UDOT Central Environmental

Enclosures

cc: Mr. Luke Dunkin, Chairperson

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 of Engineering and Operations*

TERIANNE S. NEWELL, P.E.
*Deputy Director of Planning and Investment*

September 26, 2018

Mr. Travis Parashonts
Cedar Band of Paiute Indians
600 North 100 East
Cedar City, UT 84721

RE: UDOT Project No. S-I15-6(239)259; I-15;Springville/Spanish Fork Interchange Study, Utah County, Utah (PIN 15153).
**Notification of Project and Invitation to be a Section 106 Consulting Party**

Dear Mr. Parashonts,

The Utah Department of Transportation (UDOT) is preparing to undertake the subject project. In accordance with Parts 3.1.1 and 3.2 of the *Memorandum of Understanding Between the Federal Highway Administration and the Utah Department of Transportation Concerning State of Utah's Participation in the Surface Transportation Project Delivery Program Pursuant to 23 USC §327* (executed January 17, 2017), the UDOT assumes responsibility, assigned by the Federal Highway Administration (FHWA), for ensuring compliance with Section 106 of the NHPA and with Section 4(f) of the DOT Act of 1966, as amended. FHWA retains the responsibility for government-to-government consultation with Indian Tribes and this notification is sent on behalf of FHWA. Direct government-to-government consultation with FHWA is available upon request.

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Thank you for your attention to this project notification and any comments you may have.

Sincerely,

Liz Robinson
Cultural Resources Program Manager
UDOT Central Environmental

Enclosures

cc: Ms. Vala Parashonts, Cultural Resources Representative

State of Utah

GARY R. HERBERT
*Governor*

SPENCER J. COX
*Lieutenant Governor*

DEPARTMENT OF TRANSPORTATION

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*Deputy Director of Planning and Investment*

September 26, 2018

Ms. Vala Parashonts
Cedar Band of Paiute Indians
533 South 640 West
Cedar City, UT 84721

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Thank you for your attention to this project notification and any comments you may have.

Sincerely,

Liz Robinson
Cultural Resources Program Manager
UDOT Central Environmental

Enclosures

cc: Mr. Travis Parashonts, Chairman

State of Utah

GARY R. HERBERT
*Governor*

SPENCER J. COX
*Lieutenant Governor*

DEPARTMENT OF TRANSPORTATION

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*Executive Director*

SHANE M. MARSHALL, P.E.
*Deputy Director of Engineering and Operations*

TERIANNE S. NEWELL, P.E.
*Deputy Director of Planning and Investment*

September 26, 2018

Mr. Patrick Charles
Shivwits Band of Paiute Indians
6060 West 3650 North
Ivins, UT 84738

RE: UDOT Project No. S-I15-6(239)259; I-15;Springville/Spanish Fork Interchange Study, Utah County, Utah (PIN 15153).
**Notification of Project and Invitation to be a Section 106 Consulting Party**

Dear Mr. Charles,

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Thank you for your attention to this project notification and any comments you may have.

Sincerely,

Liz Robinson
Cultural Resources Program Manager
UDOT Central Environmental

Enclosures

cc: Ms. Sabrina Redfoot, Cultural Resource Director

State of Utah

GARY R. HERBERT
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SPENCER J. COX
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DEPARTMENT OF TRANSPORTATION

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*Deputy Director of Planning and Investment*

September 26, 2018

Ms. Sabrina Redfoot
Shivwits Band of Paiute Indians
6060 West 3650 North
Ivins, UT 84738

RE: UDOT Project No. S-I15-6(239)259; I-15;Springville/Spanish Fork Interchange Study, Utah County, Utah (PIN 15153).
**Notification of Project and Invitation to be a Section 106 Consulting Party**

Dear Ms. Redfoot,

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To facilitate our consultation with you regarding this project, we would greatly appreciate a response to this letter within 30 days of receipt.

Thank you for your attention to this project notification and any comments you may have.

Sincerely,

Liz Robinson
Cultural Resources Program Manager
UDOT Central Environmental

Enclosures

cc: Mr. Partrick Charles, Chairman

**Liz Robinson <lizrobinson@utah.gov>**

# Section 106 Consultation

2 messages

**Sabrina Redfoot** <mohave_paiute@yahoo.com> Wed, Oct 31, 2018 at 2:48 PM
Reply-To: Sabrina Redfoot <mohave_paiute@yahoo.com>
To: Liz Robinson <lizrobinson@utah.gov>

September 26, 2018
UDOT Project No. S-115-6(239)259;Springville/Spanish Fork Interchange Study, Utah County, Utah (PIN 15153)
Confirmation to receipt of notification. Not Sure of any historic properties of traditional, religious and/or cultural importance. Please keep me updated if there are any archaeological findings. Thank you.

October 9, 2018.
UDOT Project No. F-0012(43)15; SR-12 Emergency Stabilization Phase 2, Garfield County, Utah (PIN 15632)
Confirmation of receipt of Notification of Project and Invitation to be a Section 106 Consulting Party.
I would like to request a copy of the cultural resources inventory results report for our records. Thank you.
I was recently informed that the Cedar Band of Paiutes has a new Cultural Resources Representative, it is Mr. Robert Pete. The Cedar Band of Paiutes is located in Cedar City, Utah. He may be a person to share this information with also.

Sincerely,

Sabrina Redfoot
Shivwits Band of Paiutes
Cultural Resources Director

**Liz Robinson** <lizrobinson@utah.gov> Fri, Sep 11, 2020 at 11:29 AM
To: Sabrina Redfoot <mohave_paiute@yahoo.com>

Hello Sabrina,

I know it has been a while since you made this request but as the project design progressed additional survey was required. The original and addendum inventory reports you requested for this project are attached. All of the resources identified are from the historic period and are generally associated with railroad and irrigation activities. Fortunately all cultural resources will be avoided. I will also forward these reports on to the Cedar Band as you mentioned. The draft EA for this project will be released mid-October with a 30 day public comment period. If you have any other questions, comments, or require additional information, please feel free to contact me at the numbers below.

Thank you, we appreciate your participation in this project!

Liz Robinson
UDOT Cultural Resources Manager
801-910-2035
4501S, 2700 West
Salt Lake City UT 84114
[Quoted text hidden]
--

Liz Robinson

UDOT Cultural Resources Program Manager
4501 South 2700 West
PO Box 148450
Salt Lake City, Utah 84114
801-910-2035

**2 attachments**

**U20HX0433.pdf**
1076K

**U18HX0769.pdf**
2139K

**Liz Robinson <lizrobinson@utah.gov>**

# UDOT I-15 Springville Interchange EA

1 message

**Liz Robinson** <lizrobinson@utah.gov> Fri, Sep 11, 2020 at 11:33 AM
To: cbcletom@gmail.com

Hello Chariwoman Tom,

Sabrina Redfoot with the Shivwits Band suggested that you may be interested in the cultural resources survey reports for the I-15 Springville Interchange EA. The original and addendum inventory reports for this project are attached. All of the resources identified are from the historic period and are generally associated with railroad and irrigation activities. Fortunately all cultural resources will be avoided. The draft EA for this project will be released mid-October with a 30 day public comment period. If you have any other questions, comments, or require additional information, please feel free to contact me at the numbers below.

Thank you, we appreciate your participation in this project!

Liz Robinson

UDOT Cultural Resources Program Manager
4501 South 2700 West
PO Box 148450
Salt Lake City, Utah 84114
801-910-2035

**2 attachments**

**U20HX0433.pdf**
1076K

**U18HX0769.pdf**
2139K

UTAH TRANSIT AUTHORITY

UTA
669 West 200 South
Salt Lake City, UT 84101

October 29, 2020

UDOT I-15 Springville/Spanish Fork Interchange EA Project Team
i15springvillespanishfork@utah.gov

Re: I-15 Springville/Spanish Fork Interchange EA Comments

Dear Project Team:

The Utah Transit Authority (UTA) appreciates the opportunity to review and comment on the I-15 Springville/Spanish Fork Interchange Environmental Assessment (EA), dated October 2020. UTA had originally provided comments in 2019 during the scoping phase, which included a recommendation for a grade-separated railroad crossing at 1600 South/2700 North to accommodate future expansion of Frontrunner commuter rail service and future increase in vehicle traffic at this location. We are pleased to see that the grade-separated railroad crossing was included in the Build Alternative for this project.

At this time, we do not have any additional comments for this EA.

Sincerely,

Autumn Hu
NEPA Project Administrator
Utah Transit Authority
ahu@rideuta.com
(801) 741-8858

cc:
Patti Garver, UTA Environmental Program Manager

I-15 Interchange
ENVIRONMENTAL ASSESSMENT
Springville/Spanish Fork

# PUBLIC HEARING SUMMARY

**Project No. F-I15-6(239)259**
**Pin: 15153**
**November 2020**

The environmental review, consultation, and other actions required by applicable federal environmental laws for this project are being or have been carried out by UDOT pursuant to 23 USC 327 and a Memorandum of Understanding dated January 17,2017, and executed by FHWA and UDOT.

**I-15 Springville/Spanish Fork Interchange Environmental Assessment**

**Public Hearing Summary**

**October 28, 2020**

The following is a summary of the preparation and execution of the online Public Hearing for the I-15 Springville/Spanish Fork Interchange Environmental Assessment (EA).

**Meeting Type:** UDOT held an online Public Hearing to present the Preferred Alternative and gather input regarding the environmental study. Additionally, UDOT published an opportunity for an in-person Public Hearing that was advertised in the Legal Notices.

**When/Where:** The Public Hearing was held on Wednesday, Oct. 28, 2020, from 6 - 7:30 p.m. via PublicInput.com, an online platform specifically designed to host online public hearings. The Public Hearing was streamed through YouTube and was available to view on the PublicInput.com website, separate from the study website. The public accessed the PublicInput.com website through a link on the study website. A recording of the meeting is available to view on the PublicInput.com website at https://publicinput.com/N3083, the study website, and the UDOT YouTube account.

**Advertisement:** A variety of methods were employed to advertise the Public Hearing (see Appendix 1).

- The study team presented a study overview and invited elected city officials and all other attendees to the Public Hearing at the Springville City Council working session on Oct. 6, 2020, the Mapleton City Council on Oct. 7, 2020, and the Spanish Fork City Council on Oct. 20, 2020.
- Approximately 600 postcards were mailed to residents in or near the environmental study area on Oct. 12, 2020.
- A Legal Notice for the online Public Hearing and an opportunity for the public to request an in-person Public Hearing was advertised in the Salt Lake Tribune, Daily Herald, and Deseret News on Oct. 13, 2020, and Oct. 21, 2020.
- The study website was updated with Public Hearing and public comment period advertisement content on Oct. 13, 2020.
- UDOT Region Three, Springville City, Spanish Fork City, and Mapleton City published social media posts to advertise the Public Hearing and public comment period between Oct. 13, 2020, and Oct. 28, 2020.
- A notification email was sent to agencies that participated during the scoping phase, including Nebo School District, U.S. Army Corp of Engineers, Mountainland Association of Governments (MAG), and Utah Transit Authority (UTA).
- An email was sent to stakeholders in the study database on Oct. 14, 2020.
- Approximately 250 door hangers were delivered to residents in or near the environmental study area on Oct. 19, 2020.
- The Public Hearing was advertised in the Spanish Fork City, Springville City, and Mapleton City October newsletters.

**Attendance:** 47 people filled out the sign-in form on PublicInput.com (see Appendix 2). The online Public Hearing had 62 participants, or unique individuals who performed at least one action such as answering

a survey question, submitting a comment, or calling into the meeting. The online Public Hearing page had 172 non-unique views (anyone who visited the page). The Public Hearing stream had 86 views on YouTube, which includes those who viewed it live from the PublicInput.com website and those who viewed the recording of the event.

**Information Presented at the Meeting:** The meeting boards outlined the following items:

- Public Hearing Agenda
- Participant Instructions for Q&A Chat and Comments
- Meeting Purpose
- Project Overview
- Environmental Schedule
- Purpose and Need
- Alternatives Development
- Alternatives Process
- Alternatives Screening Process
- Preferred Alternative
- Key Environmental Resources
- Right-of-Way/Relocations
- Pedestrians and Bicyclists
- Noise
- Next Steps
- Phasing

See Appendix 3 for the Public Hearing materials.

**Comments:** Comments were accepted in a variety of ways during the formal comment period (Oct. 13 - Nov. 13, 2020):

- Email: i15springvillespanishfork@utah.gov
- Website: udot.utah.gov/i15springvillespanishfork/
- Mail: I-15 Springville/Spanish Fork Interchange EA
  c/o Horrocks Engineers
  2162 West Grove Parkway, Suite 400
  Pleasant Grove, UT 84062
- Verbal comments during the online Public Hearing.

During the formal comment period (Oct. 13 - Nov. 13, 2020), the study team received one agency comment and 37 comments from the public (see Appendix 4).

The agency comment was from the Utah Transit Authority (UTA) noting that they originally commented during the 2019 scoping phase and that they are pleased to see the recommendation for a grade-separated railroad crossing at 1600 South/2700 North incorporated as part of the Preferred Alternative.

The comments received from the public included written comments received via the website (GIS Comment Map), email, and mail. Comments also included verbal comments received via voicemail during the online Public Hearing. These comments were played during the Public Hearing and transcribed by a court reporter for inclusion in the environmental document. This served as the open microphone portion of the Public Hearing.

During the formal comment period (Oct. 13–Nov. 13), the study team received one agency comment and 37 comments from the public. Of the 38 comments received, 13 were received through the website, 17 through email, 4 as verbal comments during the open microphone period of the Public Hearing, and 4 were mailed. The comments have been summarized into the following general categories (some comments address multiple categories):

- Connection to U.S. 89: 11 (29%)
- Increased traffic between S.R. 51 and U.S. 89: 10 (26%)
- Support for the project: 5 (13%)
- Railroad: 4 (11%)
- Desire for signals on 1600 South/2700 North: 4 (11%)
- Schedule: 3 (8%)
- Construction: 3 (8%)
- Improvements to Canyon Creek Parkway: 2 (5%)
- Access to southbound I-15: 2 (5%)
- Noise: 2 (5%)
- Active transportation: 2 (5%)
- Not in favor of the project: 2 (5%)
- Visual impacts: 2 (5%)
- Improvements to S.R. 51: 2 (5%)
- Freeway signage: 1 (3%)
- Business relocations: 1 (3%)
- Air quality: 1 (3%)
- Property value: 1 (3%)

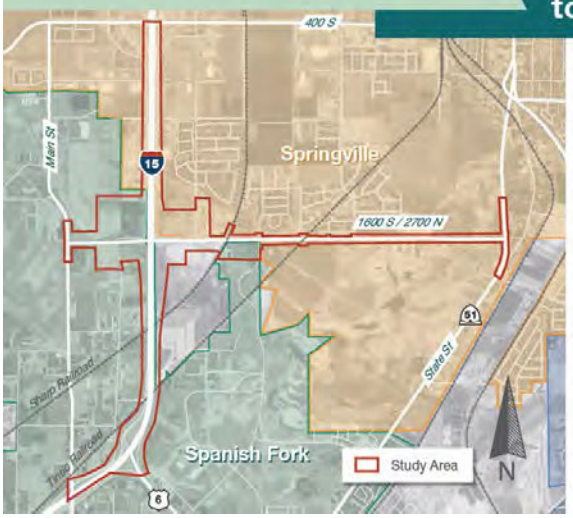
**Appendix 1: Public Hearing Advertisement**

*Mailer - Oct. 12, 2020*

# YOU ARE INVITED

I-15 Interchange
ENVIRONMENTAL ASSESSMENT
Springville/Spanish Fork

## to an online Public Hearing




The Utah Department of Transportation (UDOT) invites you to participate in an online Public Hearing regarding a proposed I-15 interchange at 1600 South/2700 North and improvements to 1600 South/2700 North from Main Street in Spanish Fork to State Street (S.R. 51) in Springville.

### WHEN

Wednesday, Oct. 28, 2020

- 6-6:45 p.m. - Presentation and Live Q&A Chat
- 6:45-7:30 p.m. - Verbal Comments

### WHERE

To join, visit udot.utah.gov/i15springvillespanishfork and follow the step-by-step instructions. If you do not have access to the internet, call 801-704-0899 prior to the meeting to discuss additional options.

*The environmental review, consultation, and other actions required by applicable Federal environmental laws for this study are being or have been carried out by UDOT pursuant to 23 USC 327 and a Memorandum of Understanding dated Jan. 17, 2017, and executed by FHWA and UDOT.*

A UDOT STUDY

## FORMAL COMMENT PERIOD: Oct. 13 - Nov. 13

- The public can email, mail or visit the website to submit formal written comments from Oct. 13 - Nov. 13, 2020.
- Formal verbal comments will be accepted during the online Public Hearing on Oct. 28, 2020.

The Environmental Assessment (EA) is available to view at udot.utah.gov/i15springvillespanishfork beginning Oct. 13, 2020. Hard copies are also available for review by appointment, at:

- Spanish Fork City Hall, 40 South Main Street, Spanish Fork, UT
- Springville City Hall, 110 South Main Street, Springville, UT
- Mapleton City Hall, 125 West 400 North, Mapleton, UT
- UDOT Region 3, 658 North 1500 West, Orem, UT
- UDOT Central Complex, 4501 South Constitution Blvd., Taylorsville, UT

Please call or email the study team to schedule an appointment.

### CONTACT INFORMATION

801-704-0899
i15springvillespanishfork@utah.gov
udot.utah.gov/i15springvillespanishfork

*Para información en español, llame al 801-361-5587.*

*NOTICE OF SPECIAL ACCOMMODATION DURING PUBLIC HEARINGS. Any individual needing special accommodations (including auxiliary communicative aids and services) during this meeting should contact the project team five days in advance using the contact information above.*

I-15 Interchange
ENVIRONMENTAL ASSESSMENT
Springville/Spanish Fork

2162 W. Grove Parkway, Suite 400
Pleasant Grove, UT 84062

*Legal Notices – Oct. 13 and Oct. 21, 2020*

Deseret News Utah Media Group The Salt Lake Tribune

Remit to:
Utah Media Group
4770 S 5600 W
West Valley City, UT 84118

[redacted]

g - I-15 Interchange; Springville/SF

Text: Notice of UDOT Public Hearing - I-15 Interchange; Springville/Spanish Fork

| Ad Number | 0001301448-01 | Ad Type | Legal Liner |
|---|---|---|---|
| Ad Size | 3 X 79 li | Color | |

**WYSIWYG Content**

**I-15; Springville/Spanish Fork Interchange Environmental Assessment**
**Notice of Public Hearing and Comment Period**

The Utah Department of Transportation (UDOT) has prepared an Environmental Assessment (EA) to evaluate a new Interstate 15 interchange at 1600 South/2700 North and improvements to 1600 South/2700 North from Main Street in Spanish Fork to State Street (S.R. 51) in Springville, Utah. The purpose of the EA is to identify the best solution to improve existing and future traffic congestion, access, and safety within the study area while taking into account any potential impacts to the natural and built environments.

The Federal Highway Administration (FHWA) and UDOT have executed an agreement through which FHWA has formally assigned its legal responsibilities for complying with the National Environmental Policy Act (NEPA) to UDOT. The environmental review, consultation, and other actions required by applicable federal environmental laws for this project are being, or have been, carried out by UDOT pursuant to 23 USC 327 and a Memorandum of Understanding dated January 17, 2017, and executed by FHWA and UDOT.

The EA will be available on the study website starting on Oct. 13, 2020, at udot.utah.gov/i15springvillespanishfork. A hardcopy of the EA is available to view, by appointment only, at Spanish Fork City Hall (40 South Main Street, Spanish Fork, UT), Springville City Hall (110 S Main Street, Springville, UT), Mapleton City Hall (125 West 400 North, Mapleton, UT), UDOT Region 3 (658 N 1500 W, Orem, UT), and UDOT Central Complex (4501 South Constitution Blvd., Taylorsville, UT). Please email i15springvillespanishfork@utah.gov or call 801-704-0899 to schedule an appointment.

Written comments can be submitted via email, mail, or the study website. All comments must be received or postmarked by 11:59 p.m. on Nov. 13, 2020.

Email: i15springvillespanishfork@utah.gov

Mail: I-15 Springville/Spanish Fork Interchange EA
c/o Horrocks Engineers
2162 West Grove Parkway, Suite 400
Pleasant Grove, UT 84062

Website: udot.utah.gov/i15springvillespanishfork

**Online Public Hearing**
When: Wednesday, Oct. 28, 2020, from 6-7:30 p.m.
Where: Visit udot.utah.gov/i15springvillespanishfork for instructions on how to join online. If you do not have access to the internet, call 801-704-0899 prior to the meeting to discuss additional options.

UDOT invites the public to attend an online public hearing and encourages them to provide comment about the study. Information to be presented at the hearing will include the purpose and need for the study, the No-action Alternative and the Preferred Alternative, and environmental resource impacts.

During the hearing, verbal comments will be received from all interested persons or groups regarding the EA. Physical and electronic comment forms are available at udot.utah.gov/i15springvillespanishfork for those who would like to submit written comments.

Comments provided to the study team will be reviewed and considered by UDOT. All comments received will be documented in the project record. The study team will contact you if they need additional information or clarification.

UDOT's responses to comments made during the formal EA comment period will be included in the Final EA.

If you have questions about the study, please contact a study team representative at 801-704-0899 or i15springvillespanishfork@utah.gov, or visit udot.utah.gov/i15springvillespanishfork.

In compliance with the Americans with Disabilities Act (ADA), individuals needing special accommodations (including auxiliary communicative aids and services) or language translation services during this meeting should notify the project team five days in advance at the contact information provided above.

Para información en español, llame al 801-361-5587.

**Notice of Opportunity**
UDOT is providing an opportunity for an in-person public hearing upon request. To request an in-person public hearing, contact the study team by Oct. 28, 2020, at 801-704-0899 or at i15springvillespanishfork@utah.gov.

1301448 UPAXLP

| Product | Placement | Position |
|---|---|---|
| Salt Lake Tribune | Legal Liner Notice | 998 |
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| Scheduled Date(s): | 10/13/2020 | |
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| Scheduled Date(s): | 10/13/2020 | |
| Deseret News | Legal Liner Notice | 998 |
| Scheduled Date(s): | 10/21/2020 | |
| utahlegals.com | utahlegals.com | utahlegals.com |
| Scheduled Date(s): | 10/21/2020 | |
| Salt Lake Tribune | Legal Liner Notice | 998 |
| Scheduled Date(s): | 10/21/2020 | |

10/9/2020 10:58:36AM

Standard-Examiner/Daily Herald Legals Print Ad Proof

[redacted]

Category: 10 Class: 1000 Rate: LE-0 Start: 10-13-2020 Stop: 10-21-2020
Lines: 126 Inches: 13.13 Words: 581

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Credit Card: Expire:
Order Number:

[redacted]

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**NOTICE OF PUBLIC HEARING AND COMMENT PERIOD**
I-15; Springville/Spanish Fork Interchange Environmental Assessment

The Utah Department of Transportation (UDOT) has prepared an Environmental Assessment (EA) to evaluate a new Interstate 15 interchange at 1600 South/2700 North and improvements to 1600 South/2700 North from Main Street in Spanish Fork to State Street (S.R. 51) in Springville, Utah. The purpose of the EA is to identify the best solution to improve existing and future traffic congestion, access, and safety within the study area while taking into account any potential impacts to the natural and built environments.

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Written comments can be submitted via email, mail, or the study website. All comments must be received or postmarked by 11:59 p.m. on Nov. 13, 2020.

Email: i15springvillespanishfork@utah.gov
Mail: I-15 Springville/Spanish Fork Interchange EA c/o Horrocks Engineers 2162 West Grove Parkway, Suite 400 Pleasant Grove, UT 84062
Website: udot.utah.gov/i15springvillespanishfork

Online Public Hearing

When: Wednesday, Oct. 28, 2020, from 6-7:30 p.m. Where: Visit udot.utah.gov/i15springvillespanishfork for instructions on how to join online. If you do not have access to the internet, call 801-704-0899 prior to the meeting to discuss additional options.

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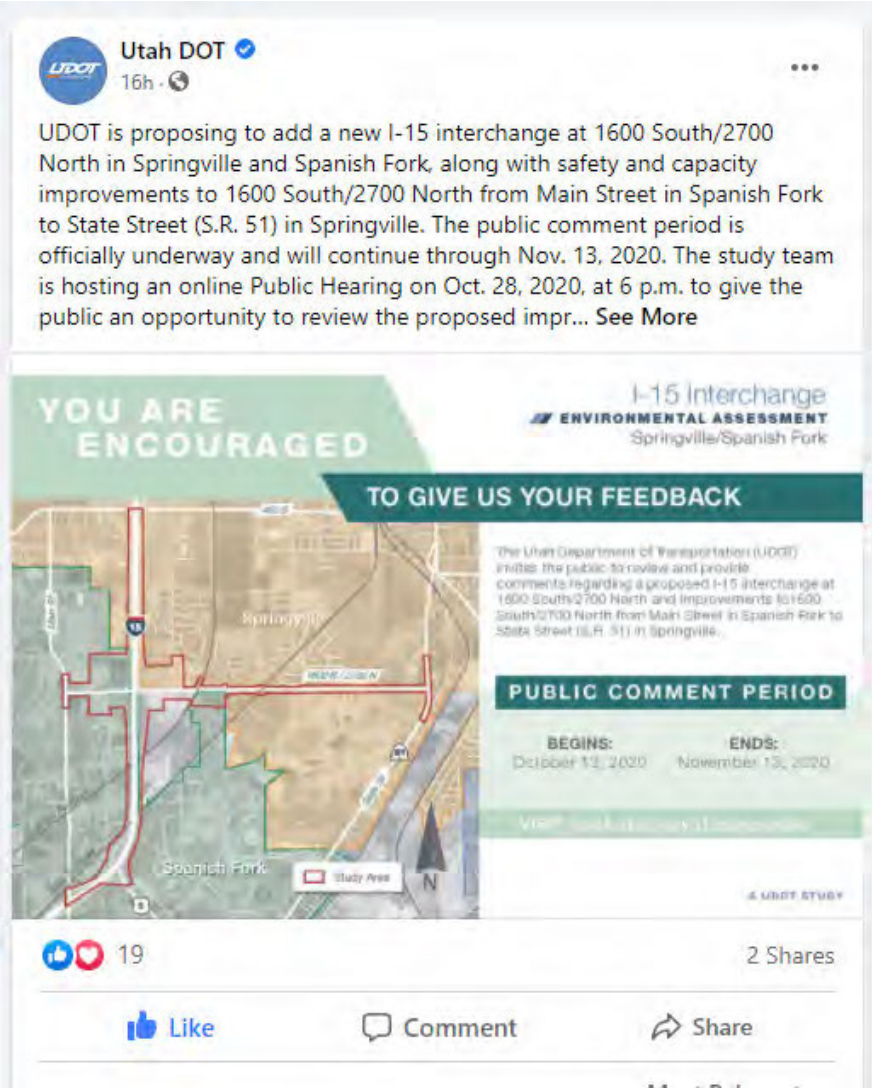
Legal Notice 5762 Published in Daily Herald on October 13, 21, 2020

*Social Media*

UDOT Facebook – Oct. 13, 2020



UDOT Region Three Twitter – Oct. 13, Oct. 26, and Oct. 28, 2020

**UDOT Region Three**
@UDOTRegionthree

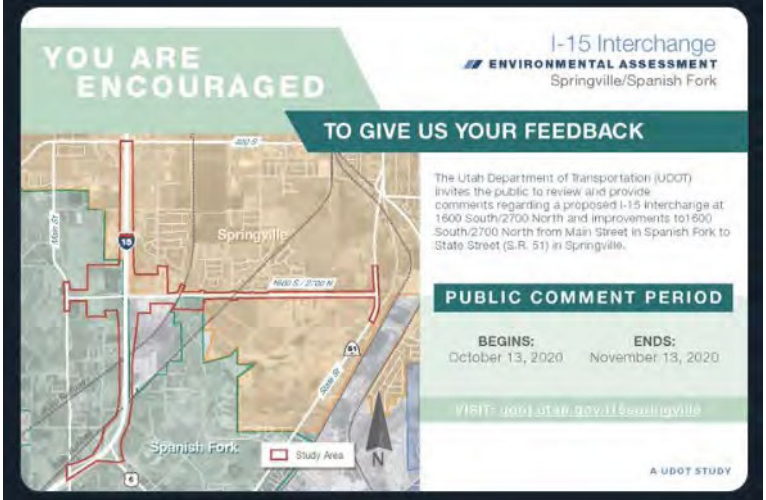
The public comment period for the I-15 Springville/Spanish Fork Interchange Environmental Assessment is now open! Visit udot.utah.gov/i15springville... to review the study and find out how to submit a comment. All comments are due on Fri. Nov. 13. @SpringvilleCity @SpanishForkCity

9:10 AM · Oct 13, 2020 · Twitter Web App

**3** Retweets **5** Likes

**UDOT Region Three**
@UDOTRegionthree

Reminder! Join us online for the I-15 Springville/Spanish Fork Interchange EA public hearing, Oct. 28, from 6-7:30 p.m. to learn about a proposed new I-15 exit in Springville/Spanish Fork. Find out more by visiting udot.utah.gov/i15springville... @UtahDOT @SpanishForkCity @mapletoncity

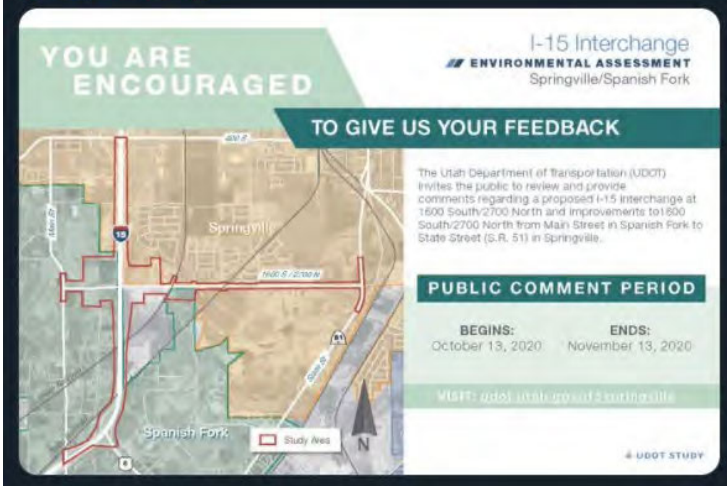



4:49 PM · Oct 26, 2020 · TweetDeck

**1** Like

**UDOT Region Three**
@UDOTRegionthree

Join us online tonight from 6-7:30 p.m. for the I-15 Springville/Spanish Fork Interchange EA public hearing and learn about a proposed new I-15 exit in Springville/Spanish Fork. Visit udot.utah.gov/i15springville... to find out how to participate. @UtahDOT @SpanishForkCity @mapletoncity




11:20 AM · Oct 28, 2020 · Twitter Web App

**2** Retweets **4** Likes

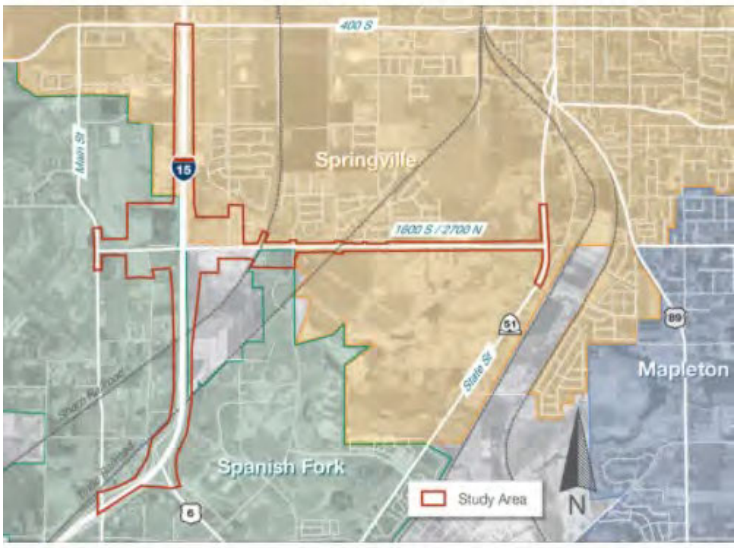
Springville Facebook – Oct. 19 and Oct. 26, 2020

**Springville City**
October 19 at 3:42 PM ·

Interested in a new I-15 interchange between Springville and Spanish Fork?

Join @UtahDOT on Oct. 28 from 6-7:30 p.m. for an online Public Hearing to learn about the environmental study and provide input on the proposed improvements.

For instructions on how to participate in the hearing, visit udot.utah.gov/i15springvillespanishfork or contact the project team at i15springvillespanishfork@utah.gov or 801-704-0899.



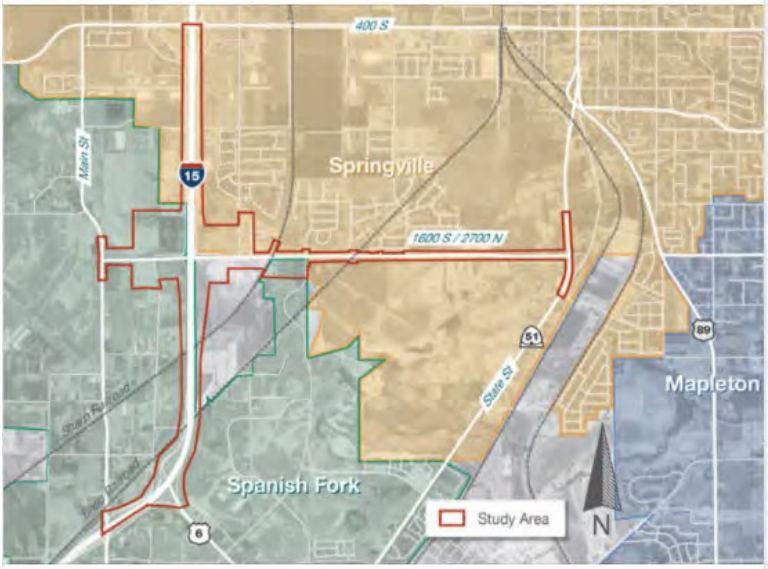

74 39 Comments 31 Shares

Like Comment Share

**Springville City**
October 26 at 11:30 AM ·

Don't miss an opportunity to learn about a proposed I-15 interchange between Springville and Spanish Fork. Join @UtahDOT this Wednesday, Oct. 28, from 6-7:30 p.m. for an online Public Hearing to learn more about the environmental study and provide your input.

For instructions on how to join the hearing, visit udot.utah.gov/i15springvillespanishfork. Questions? Contact the study team at i15springvillespanishfork@utah.gov or 801-704-0899.



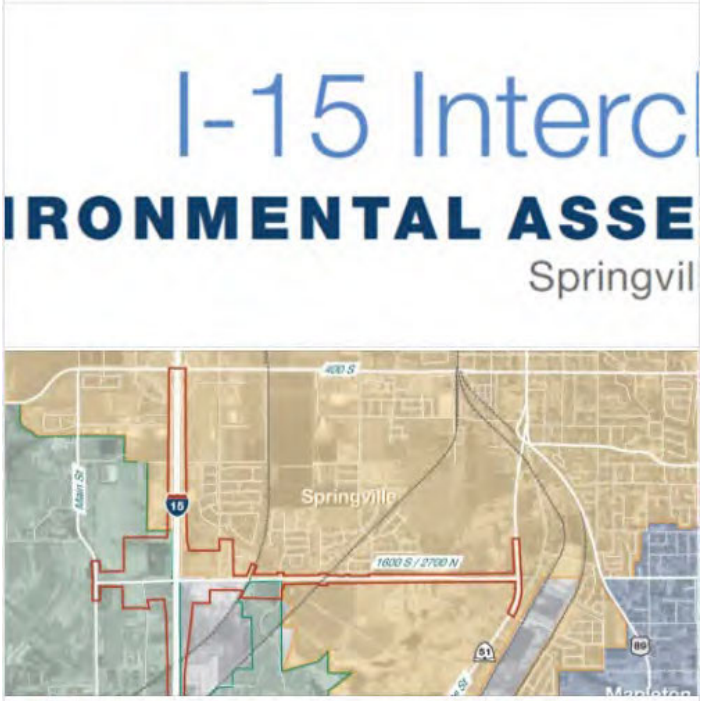

20 7 Comments 9 Shares

Spanish Fork Facebook – Oct. 15 and Oct. 26, 2020

Spanish Fork City
October 15 at 9:20 AM ·

UDOT invites you to give feedback regarding a proposed I-15 interchange at 1600 South/2700 North and surrounding improvements.

Online Public Hearing: 10/28, 6 p.m.
Comment period open thru 11/13
Info: http://ow.ly/bjz450BTrV0




48 23 Comments 5 Shares

Spanish Fork City
October 26 at 8:40 AM ·

Don't miss an opportunity to learn about a proposed I-15 interchange between Springville and Spanish Fork. Join @UtahDOT this Wednesday, Oct. 28, from 6-7:30 p.m. for an online Public Hearing to learn more about the environmental study and provide your input. For instructions on how to join the hearing, visit udot.utah.gov/i15springvillespanishfork. Questions? Contact the study team at i15springvillespanishfork@utah.gov or 801-704-0899.

23 19 Comments 10 Shares

Like Comment Share

All Comments

Write a comment...

Keshia Allred
This is currently my "back road" travelling choice to take kids to school, because the springville exit is often backed up all the way to the freeway. Hopefully this change will improve that. I believe it will.

Like · Reply · 1w

Spanish Fork Twitter – Oct. 13, Oct. 15, and Oct. 28, 2020

Spanish Fork City Retweeted

**UDOT Region Three**
@UDOTRegionthree

The public comment period for the I-15 Springville/Spanish Fork Interchange Environmental Assessment is now open! Visit udot.utah.gov/i15springville... to review the study and find out how to submit a comment. All comments are due on Fri. Nov. 13. @SpringvilleCity @SpanishForkCity

9:10 AM · Oct 13, 2020 · Twitter Web App

**3** Retweets **5** Likes

**Spanish Fork City**
@SpanishForkCity

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Online Public Hearing: 10/28, 6 p.m.
Comment period open thru 11/13
Info: ow.ly/9cpS50BTrV1

9:20 AM · Oct 15, 2020 · Hootsuite Inc.

**1** Retweet **6** Likes

Spanish Fork City Retweeted

**UDOT Region Three**
@UDOTRegionthree

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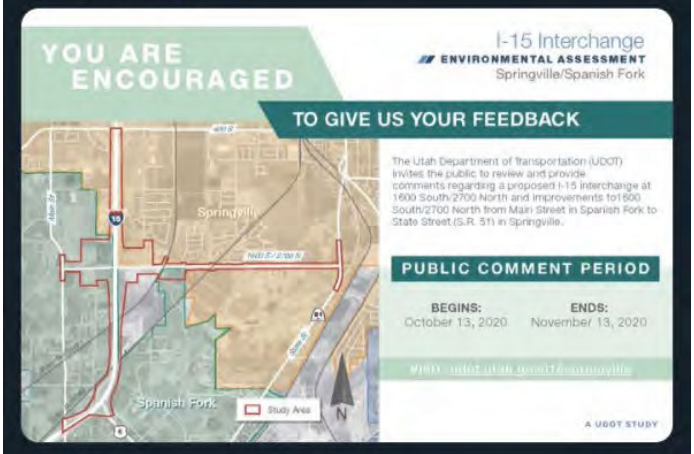


11:20 AM · Oct 28, 2020 · Twitter Web App

**2** Retweets **4** Likes

Mapleton Facebook – Oct. 17, 2020

*Stakeholder Email – Oct. 14, 2020*

I-15 Interchange
ENVIRONMENTAL ASSESSMENT
Springville/Spanish Fork

## ONLINE PUBLIC HEARING

The Utah Department of Transportation (UDOT) invites you to participate in an online Public Hearing regarding a proposed I-15 interchange at 1600 South/2700 North and improvements to 1600 South/2700 North from Main Street in Spanish Fork to State Street (S.R. 51) in Springville.

## WHEN

Wednesday, Oct. 28, 2020 from 6-7:30 p.m.

- 6-6:45 p.m. - Presentation and Live Q&A Chat
- 6:45-7:30 p.m. - Verbal Comments

## WHERE

To join, visit udot.utah.gov/i15springvillespanishfork and follow the step-by-step instructions.

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## OFFICIAL COMMENT PERIOD: Oct. 13 - Nov. 13

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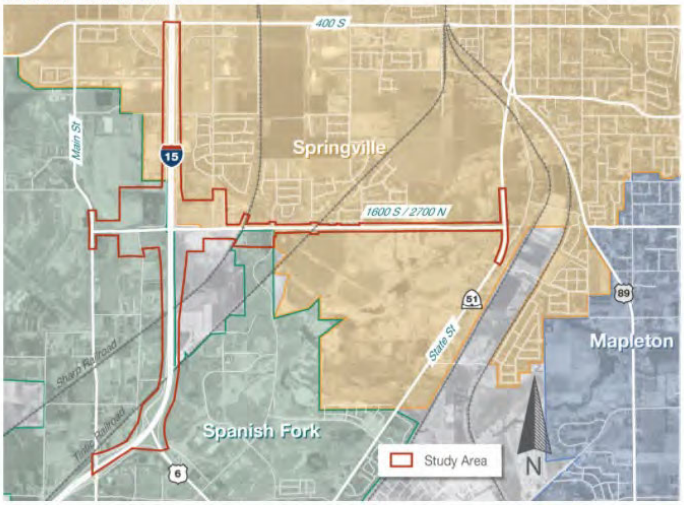
- UDOT Region 3, 658 North 1500 West, Orem, UT
- UDOT Central Complex, 4501 South Constitution Boulevard, Taylorsville, UT

## STUDY AREA MAP

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## CONTACT INFORMATION

**Email:** i15springvillespanishfork@utah.gov
**Phone:** 801-704-0899
**Website:** udot.utah.gov/i15springvillespanishfork

*Door Hanger - Oct. 19, 2020*

I-15 Interchange
ENVIRONMENTAL ASSESSMENT
Springville/Spanish Fork

# YOU ARE INVITED to an online Public Hearing

The Utah Department of Transportation (UDOT) invites you to participate in an online Public Hearing regarding a proposed I-15 interchange at 1600 South/2700 North and improvements to 1600 South/2700 North from Main Street in Spanish Fork to State Street (S.R. 51) in Springville.

## WHEN

Wednesday, Oct. 28, 2020

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- 6:45-7:30 p.m. - Verbal Comments

## WHERE

Visit udot.utah.gov/i15springvillespanishfork for step-by-step instructions on how to join.

## Additional Information

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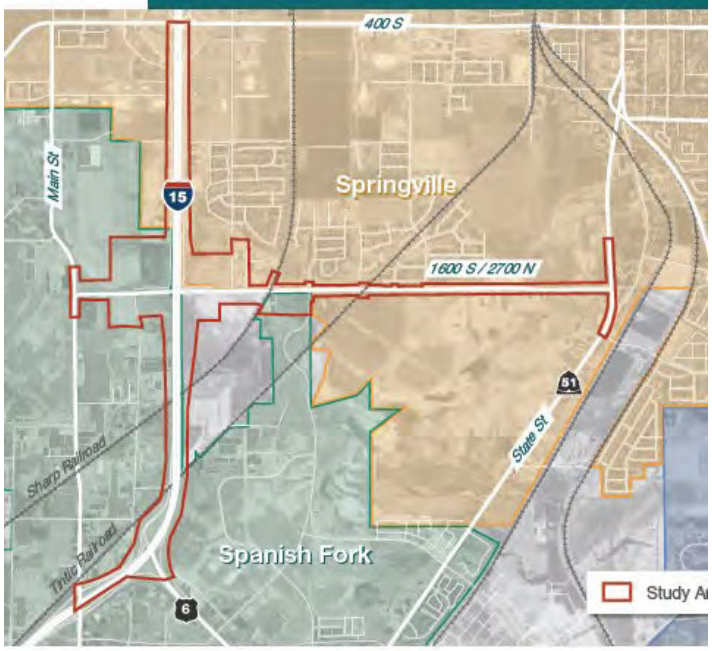
- The Environmental Assessment (EA) will be available beginning Oct. 13 at udot.utah.gov/i15springvillespanishfork.

A UDOT STUDY

I-15 Interchange
ENVIRONMENTAL ASSESSMENT
Springville/Spanish Fork

# SPRINGVILLE/ SPANISH FORK Online Public Hearing

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801-704-0899
i15springvillespanishfork@utah.gov
udot.utah.gov/i15springvillespanishfork

Para información en español, llame al 801-361-5587.

A UDOT STUDY

**Appendix 2: Public Hearing Attendance**

| Name | |
|---|---|
| Adam Crop | Sheldon Larkin |
| Tyler James | Corin Piacenti |
| David Efros | Trent Weight |
| Gary Wood | Autumn Hu, Utah Transit Authority |
| Mary | [Left blank] |
| Michael & Shauna Olds | Jeanette Welton |
| Dave Johnson | Jason Green |
| Jeff M | Calvin Crandall |
| [Left blank] | Jeffrey Anderson |
| Katherine Osborn | Ariel Johnson |
| Jonathan Duncan | Brady Levingston |
| Mike Poulson | Ben and Lori Montague |
| Michael Florence | Gordon Daines |
| Vern Keeslar | [Left blank] |
| TJ | [Left blank] |
| [Left blank] | Kayla Dinsdale |
| Sam Thompson | [Left blank] |
| Cory | Molly Betebenner |
| Logan Millsap | Samantha Patterson |
| Katie Kourianos | Brad Davies |
| Doug | Jay Dawkins |
| James Hall | Curtis Kent |
| Jeff Michaelis | Blaine Fewkes |
| Michael Owens | Teri Newell |
| Cathy Allen | Linda Fewkes |
| Anna | Guymon Travis |
| BRADLEY STAPLEY | Child Enterpris |
| [Left blank] | Shumway Kristen |
| Thomas Uriona | Farr Corey |
| Matt Wildauer | Kellen Hyer |
| Dinsdale Kayla | Keeslar Vern |

**Appendix 3: Public Hearing Materials**

**Public Hearing Presentation**

I-15 Interchange
ENVIRONMENTAL ASSESSMENT
Springville/Spanish Fork

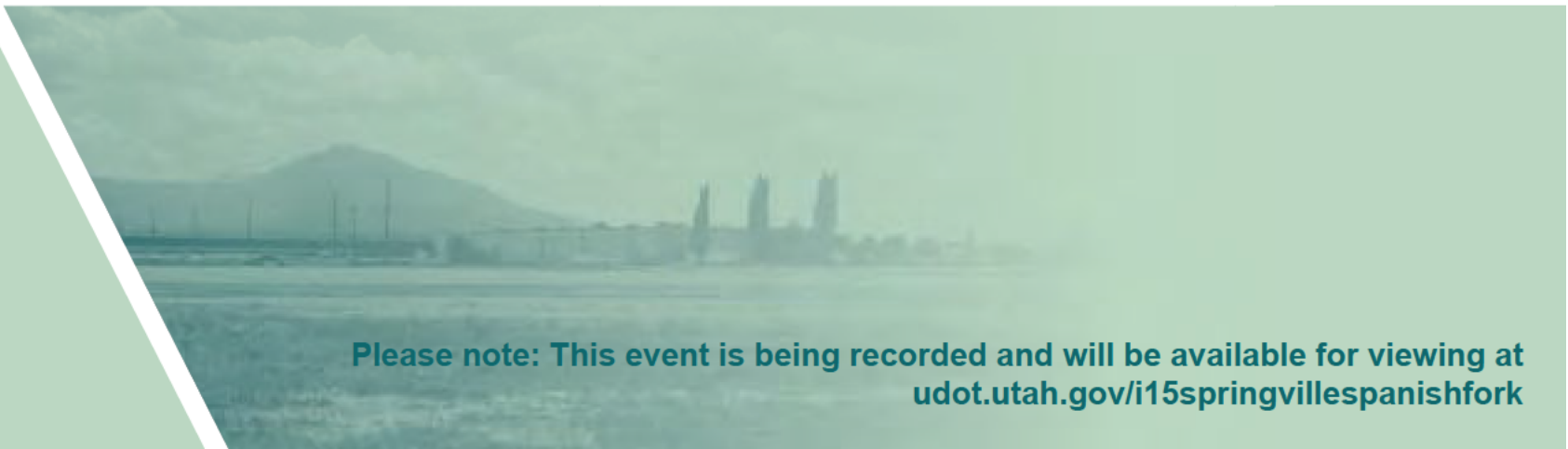
# WELCOME

## I-15 SPRINGVILLE/SPANISH FORK INTERCHANGE EA

# ONLINE PUBLIC HEARING

**THE PUBLIC HEARING WILL BEGIN AT 6 P.M.**

**If you are here early, please sign in and review the Environmental Assessment (EA) and supporting materials located under the "EA and Supporting Materials" tab.**



**Please note: This event is being recorded and will be available for viewing at udot.utah.gov/i15springvillespanishfork**

I-15 Interchange
ENVIRONMENTAL ASSESSMENT
Springville/Spanish Fork

# WELCOME

## I-15 SPRINGVILLE/SPANISH FORK INTERCHANGE EA

# ONLINE PUBLIC HEARING

### PRESENTATION 6 - 6:45 p.m.

At 6 p.m. the study team will begin introductions and at 6:05 p.m. the team will start the presentation. Feel free to type questions into the chat box to the right of your screen. We will monitor the chat and answer questions live throughout the public hearing.

### VERBAL COMMENTS 6:45 - 7:30 p.m.

From 6:45 to 7:30 p.m., verbal comments that have been received via phone will be played into the meeting. To leave a verbal comment, scroll down for calling instructions and more information. Verbal comments made during the public hearing will be included and responded to in the Final EA.

### WRITTEN COMMENTS October 13 to November 13

Comments can also be emailed, mailed, or submitted on the website through Nov. 13, 2020. Written comments received during the comment period will be included in the Final EA.

**Please note: This event is being recorded and will be available for viewing at udot.utah.gov/i15springvillespanishfork**

# LIVE Q&A CHAT



- Type a question into the chat box to the right of the video screen. We will be monitoring the chat and answering questions throughout the meeting.
- Question response times will vary. We will attempt to answer all questions, as time permits.
- If your question is not answered, please visit the website on Nov. 2nd to view the chat questions and responses. Or contact the study team after the event at **801-704-0899** or **i15springvillespanishfork@utah.gov**.

**Note:** Comments that are publicly displayed through online tools must follow UDOT Social Media Policy Participant Code of Conduct (https://www.udot.utah.gov/main_old/uconowner.gf?n=9966024694955721). Comments that are unacceptable under that policy may be removed at the administrator's discretion.

# VERBAL COMMENTS



**To provide a verbal comment, enter the call-in number listed below and record a voicemail.**

- Please mute your computer speakers before you call in.
- Dial **855-925-2801** and enter code **9774**. Press * for more options. Then, press **2**.
- State and spell your name and record your comment, for up to three minutes.
- All voicemail recordings will be played into the public hearing in the order they are received.

**Written comments can be submitted via email, the study website, or by mail.**

# WRITTEN COMMENTS

**Comments must be submitted by NOV. 13, 2020 to be considered in the Final EA. Comments are welcome throughout the environmental process.**

- **Email** i15springvillespanishfork@utah.gov
- **Website** udot.utah.gov/i15springvillespanishfork
- **Mail** I-15 Springville/Spanish Fork Interchange EA
  c/o Horrocks Engineers
  2162 West Grove Parkway, Suite 400
  Pleasant Grove, UT 84062

# WELCOME

## I-15 SPRINGVILLE/SPANISH FORK INTERCHANGE EA

# ONLINE PUBLIC HEARING

## MEETING PURPOSE

- Present Environmental Assessment results
- Show the Preferred Alternative
- Gather public input

The environmental review, consultation, and other actions required by applicable Federal environmental laws for this study are being or have been carried-out by UDOT pursuant to 23 USC 327 and a Memorandum of Understanding dated Jan. 17, 2017, and executed by FHWA and UDOT.

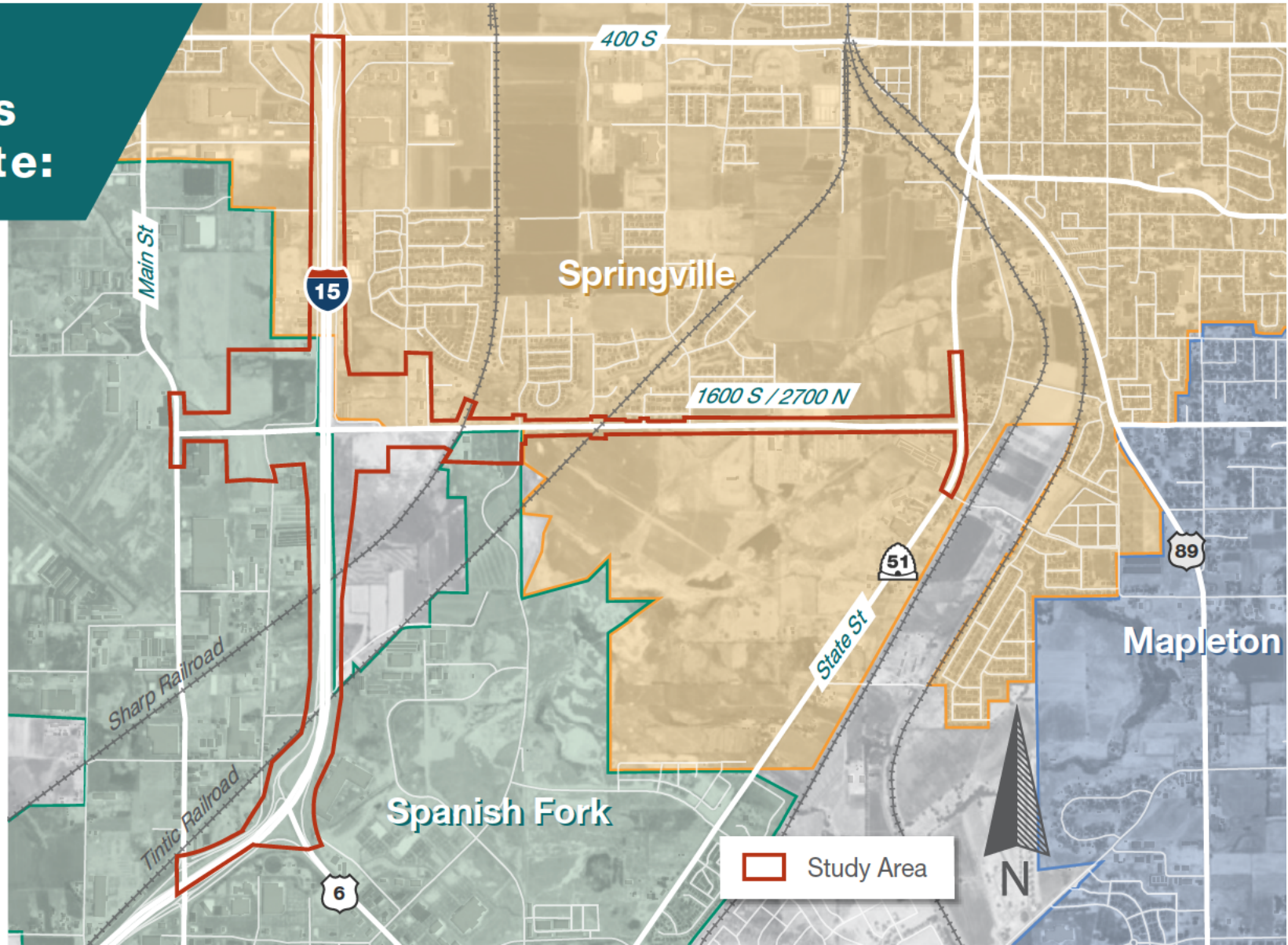
**Please note: This event is being recorded and will be available for viewing at udot.utah.gov/i15springvillespanishfork**

# OVERVIEW



**The Utah Department of Transportation (UDOT) has prepared an EA to evaluate:**

1. A new interchange on I-15 at 1600 South/2700 North
2. Improvements to 1600 South/2700 North from Main Street in Spanish Fork to State Street (S.R. 51) in Springville



# ENVIRONMENTAL SCHEDULE



## ENVIRONMENTAL PROCESS

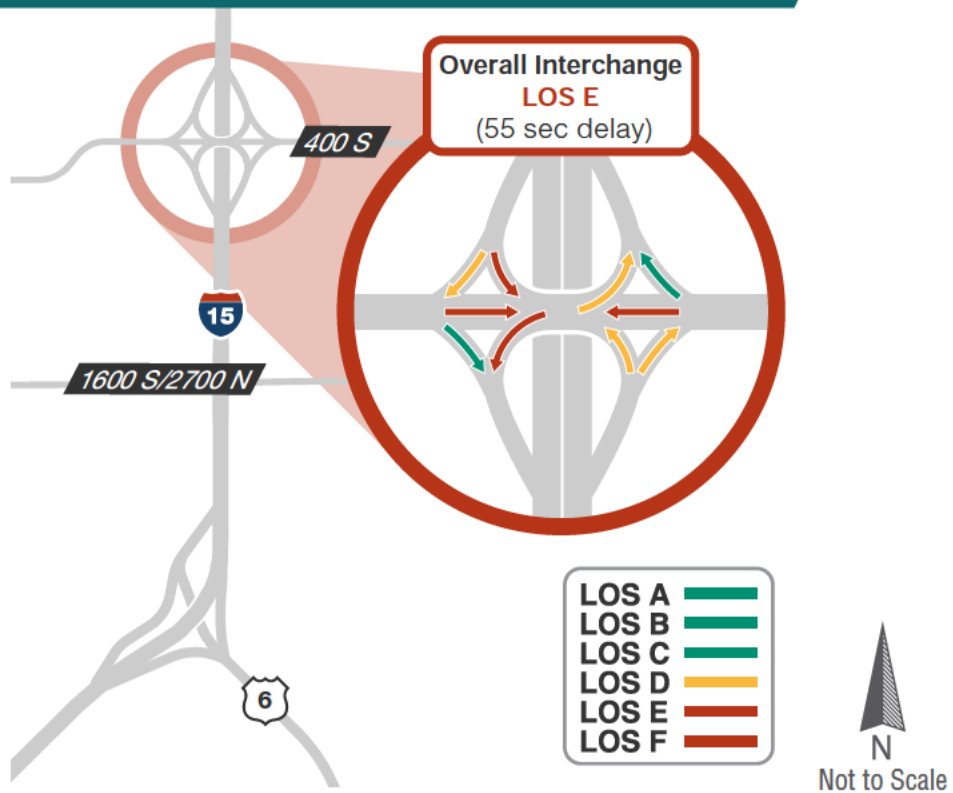
# PURPOSE & NEED



## NEED

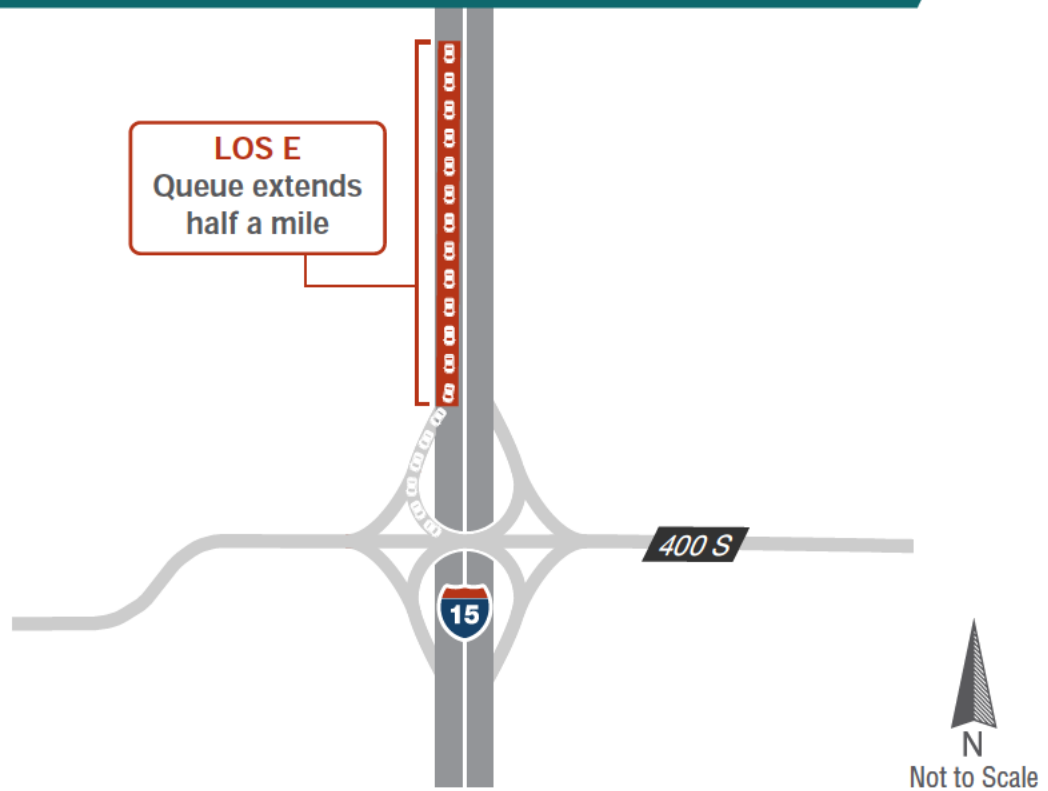
- Future failing conditions at the Springville 400 South Interchange, causing congestion on I-15

### 2050 PM PEAK HOUR




- Unsafe conditions caused by traffic extending onto southbound I-15 at the 400 South Interchange

### 2050 NO BUILD CONDITIONS



# PURPOSE & NEED



## NEED

- Safety concerns due to at-grade railroad crossings on 1600 South/2700 North

- Lack of bike and pedestrian facilities in the study area

# PURPOSE & NEED



## PURPOSE

- **Reduce delay**
  - I-15 and 400 South Interchange
  - I-15 Mainline
- **Improve safety**
  - I-15 Mainline
  - 1600 South/2700 North
- **Provide bike and pedestrian improvements within the study area**

# ALTERNATIVES DEVELOPMENT



## NO-ACTION ALTERNATIVE

1. An alternative where no improvements are made beyond safety and maintenance activities
2. Used as a comparison for the build alternative

## BUILD ALTERNATIVE

1. Alternatives or options developed to address the transportation needs
2. Multiple build alternatives can be developed

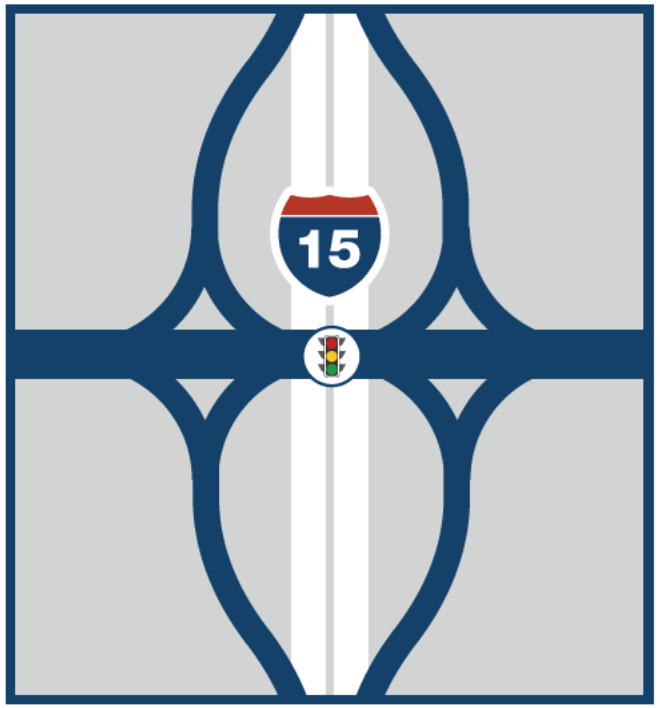
Except for the improvements that are the subject of this EA, each alternative assumes that the identified projects in area transportation plans would be operational by 2050.

# ALTERNATIVES PROCESS

## INTERCHANGE OPTIONS

### DIAMOND

### Single-Point Urban Interchange (SPUI)



# ALTERNATIVES PROCESS



## WHY INCLUDE IMPROVEMENTS TO THE CORRIDOR?

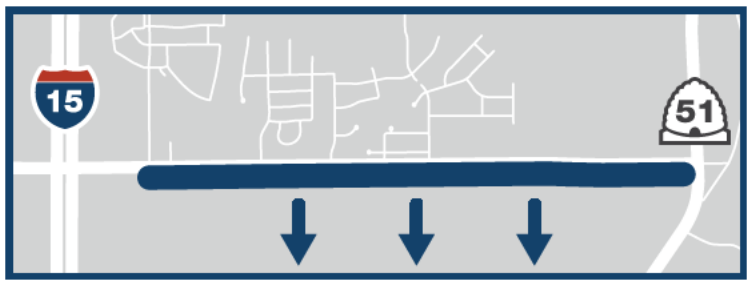
**Constructing an interchange will:**

- Increase traffic on 1600 South/2700 North
- Increase safety concerns at the current Sharp Railroad crossing

## CORRIDOR OPTIONS

### NORTH

### SOUTH




### MEANDER

# ALTERNATIVES SCREENING PROCESS



## SCREENING CRITERIA

### LEVEL 1:
**Purpose and Need**

**Does the option meet the purpose and need?**

### LEVEL 2:
**Key Environmental Resources**

**When compared to other options, does the option minimize environmental impacts to:**

- Wetlands and other waters of the U.S.?
- Relocations?
- Right-of-way acquisition?

### LEVEL 3:
**Additional (Interchange Only)**

**How well does the interchange option perform?**

**How much does the interchange option cost?**

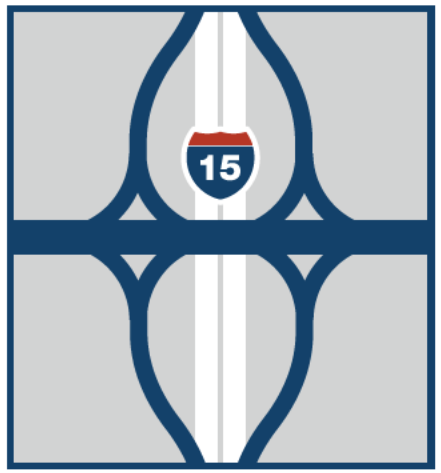
**How well does the interchange option serve traffic beyond 2050?**

# ALTERNATIVES SCREENING PROCESS



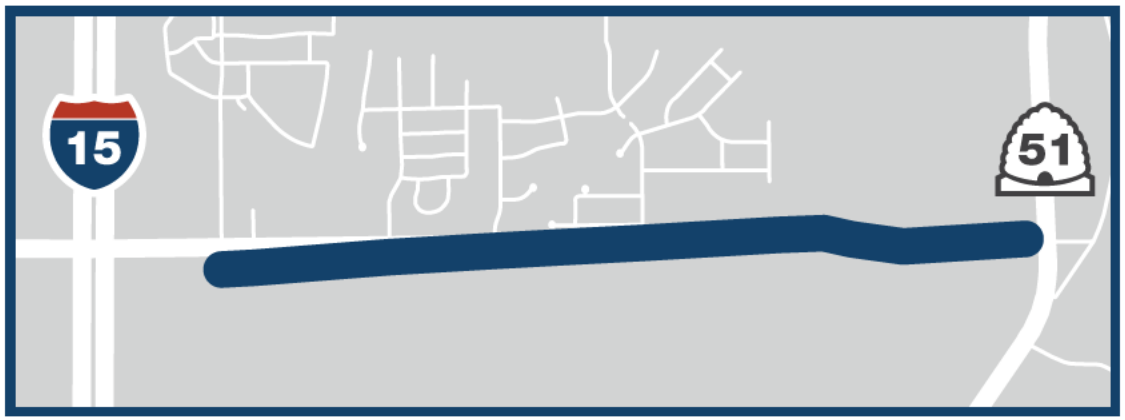
## ADVANCED FOR DETAILED ANALYSIS

### SPUI




- Meets Purpose and Need
- Similar environmental impacts, operational results, and costs as the Diamond Interchange Option
- **Serves traffic needs beyond 2050**

### MEANDER



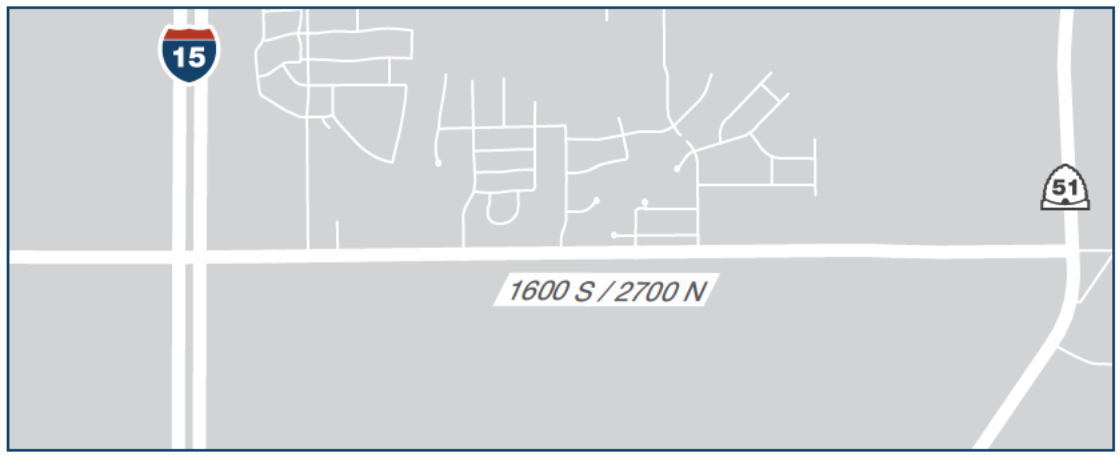

- Meets Purpose and Need
- **Fewer relocations and right-of-way acquisitions required compared to other corridor options**

# ALTERNATIVES SCREENING PROCESS



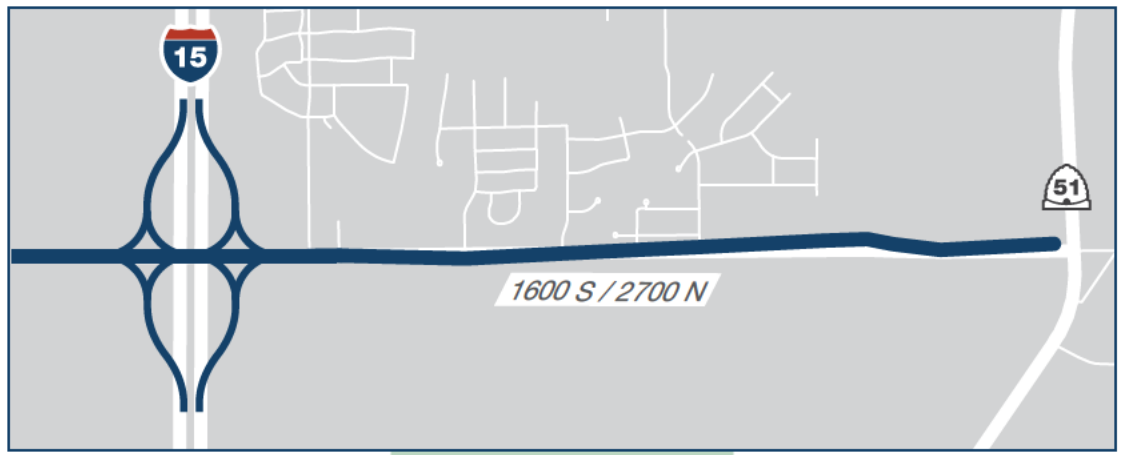
## ALTERNATIVES

### NO-ACTION ALTERNATIVE




Combined into

### BUILD ALTERNATIVE




Identified as
**PREFERRED ALTERNATIVE**

# PREFERRED ALTERNATIVE

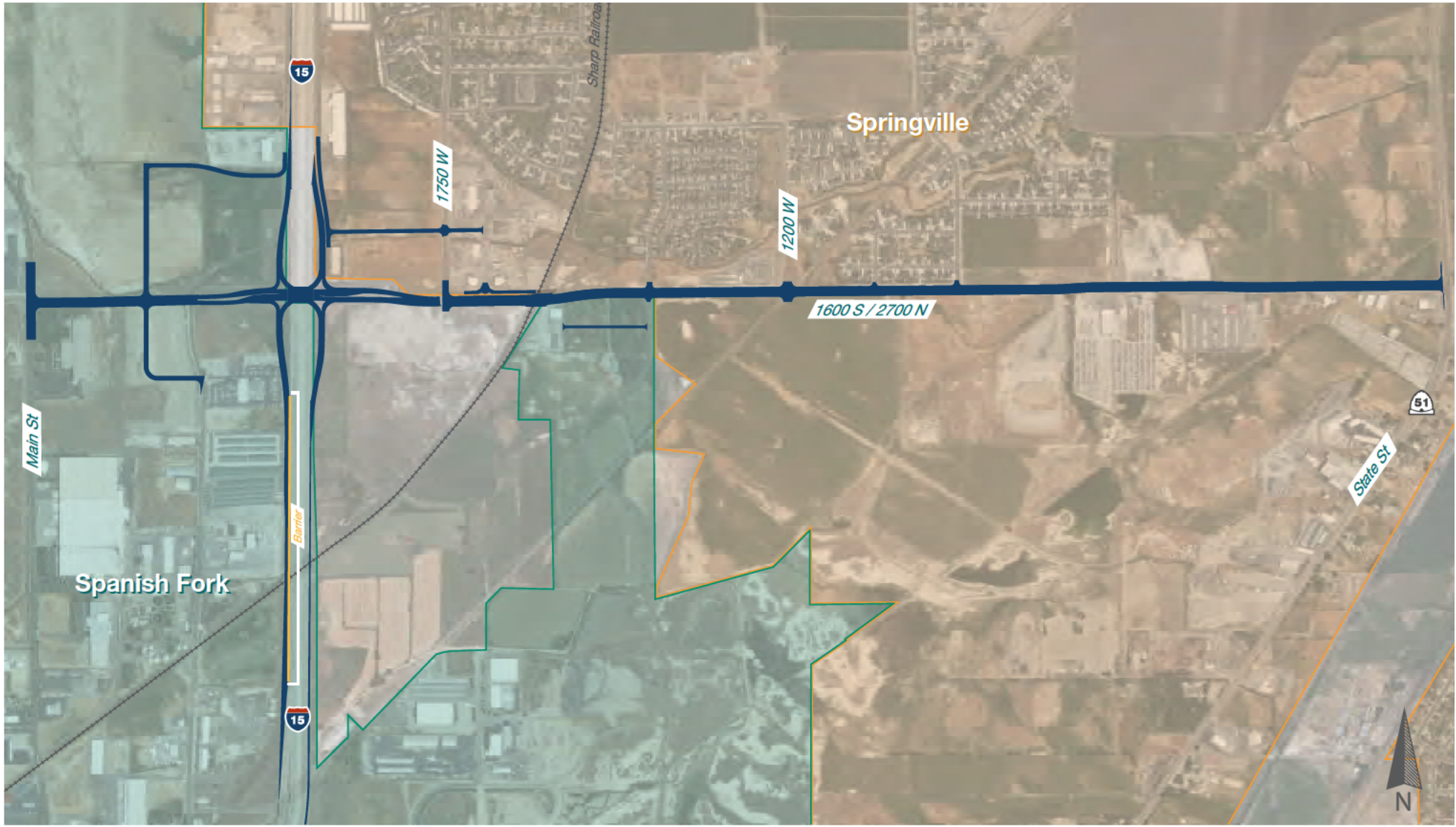


## I-15 Improvements

- SPUI
- Auxiliary Lanes
- Frontage Roads

## 1600 South/2700 North Improvements

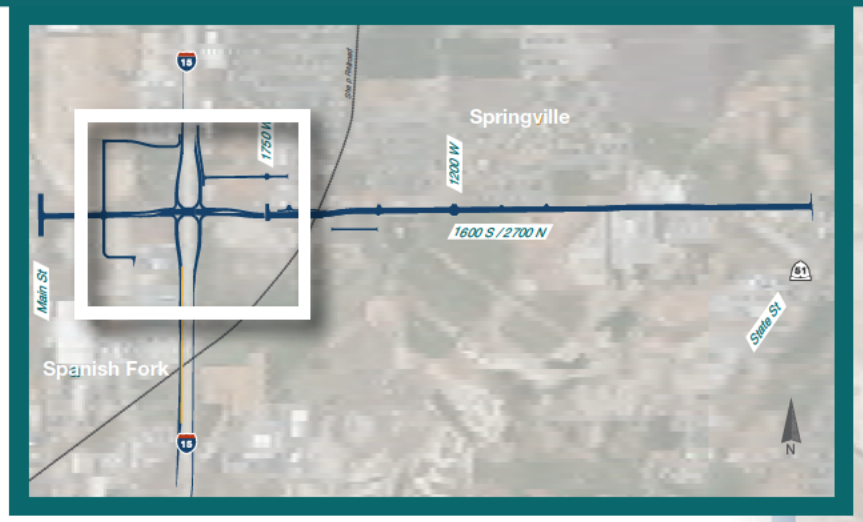
- Grade-separated Railroad Crossing
- Access Roads
- Pedestrian and Bicycle Improvements



# PREFERRED ALTERNATIVE

I-15 Interchange
**ENVIRONMENTAL ASSESSMENT**
Springville/Spanish Fork

## INTERCHANGE



Realign frontage roads

Construct SPUI

Construct auxiliary lanes

Main St

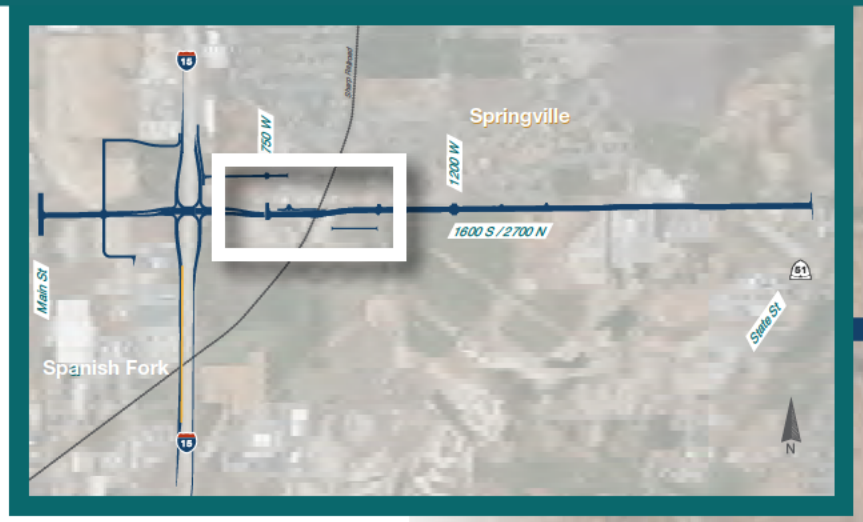
Barrier

Canyon Creek Pkwy

# PREFERRED ALTERNATIVE



## GRADE-SEPARATED CROSSING and ACCESS ROADS



1750 W

Construct grade-separated railroad crossing

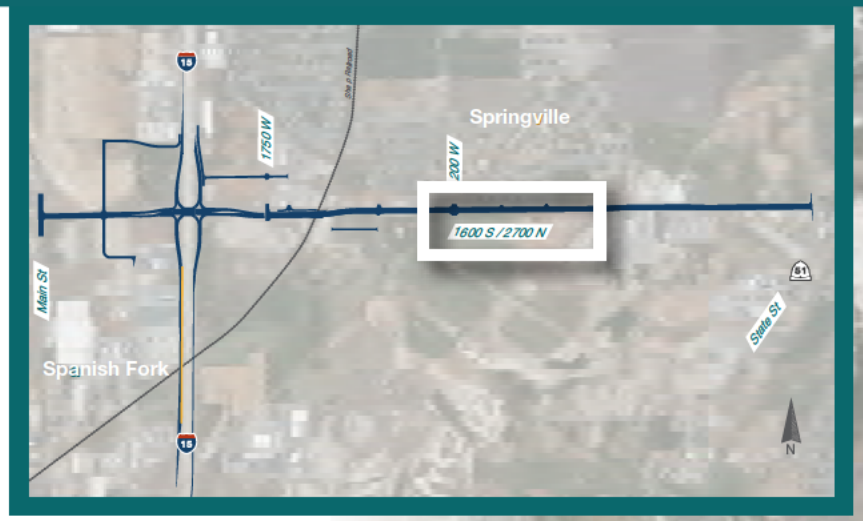
1600 S / 2700 N

Canyon Creek Pkwy

# PREFERRED ALTERNATIVE

I-15 Interchange
**ENVIRONMENTAL ASSESSMENT**
Springville/Spanish Fork

## 1600 SOUTH/2700 NORTH



Construct 6-foot sidewalk

1600 S / 2700 N

Construct 10-foot trail

# PREFERRED ALTERNATIVE



## ADDITIONAL DETAILS ARE AVAILABLE

- 3D DESIGN VIDEO
- PREFERRED ALTERNATIVE MAP

# KEY ENVIRONMENTAL RESOURCES



- Land Use
- Right-of-way and Relocations
- Pedestrians and Bicyclists
- Air Quality
- Noise
- Wetlands and Other Waters of the U.S.
- Water Resources
- Threatened and Endangered Species/ Other Wildlife
- Visual and Aesthetic
- Utilities and Emergency Services

**Additional details regarding the resources listed along with other resources included in the study are located in Chapter 3 of the Environmental Assessment.**

# RIGHT-OF-WAY/RELOCATIONS



- Acquire approximately 35 acres from 63 parcels
- Relocate two commercial properties, impacting 3 businesses
- Change access for some businesses due to the grade-separated railroad crossing

# PEDESTRIANS AND BICYCLISTS



- Construct a new, 10-foot-wide multiuse trail on the south side of 1600 South/2700 North
- Construct a 6-foot-wide sidewalk on the north side of 1600 South/2700 North

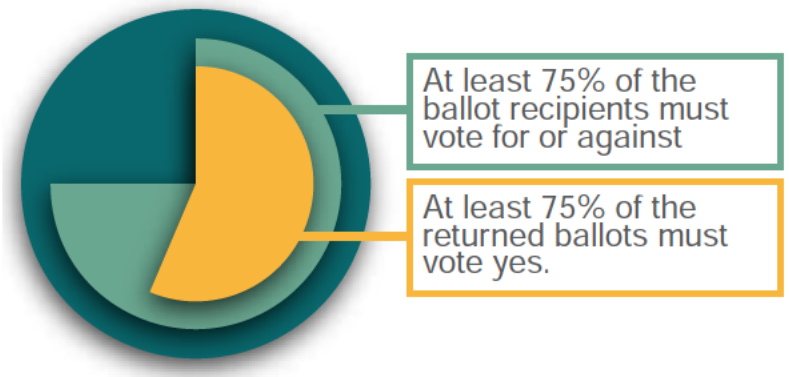
# NOISE



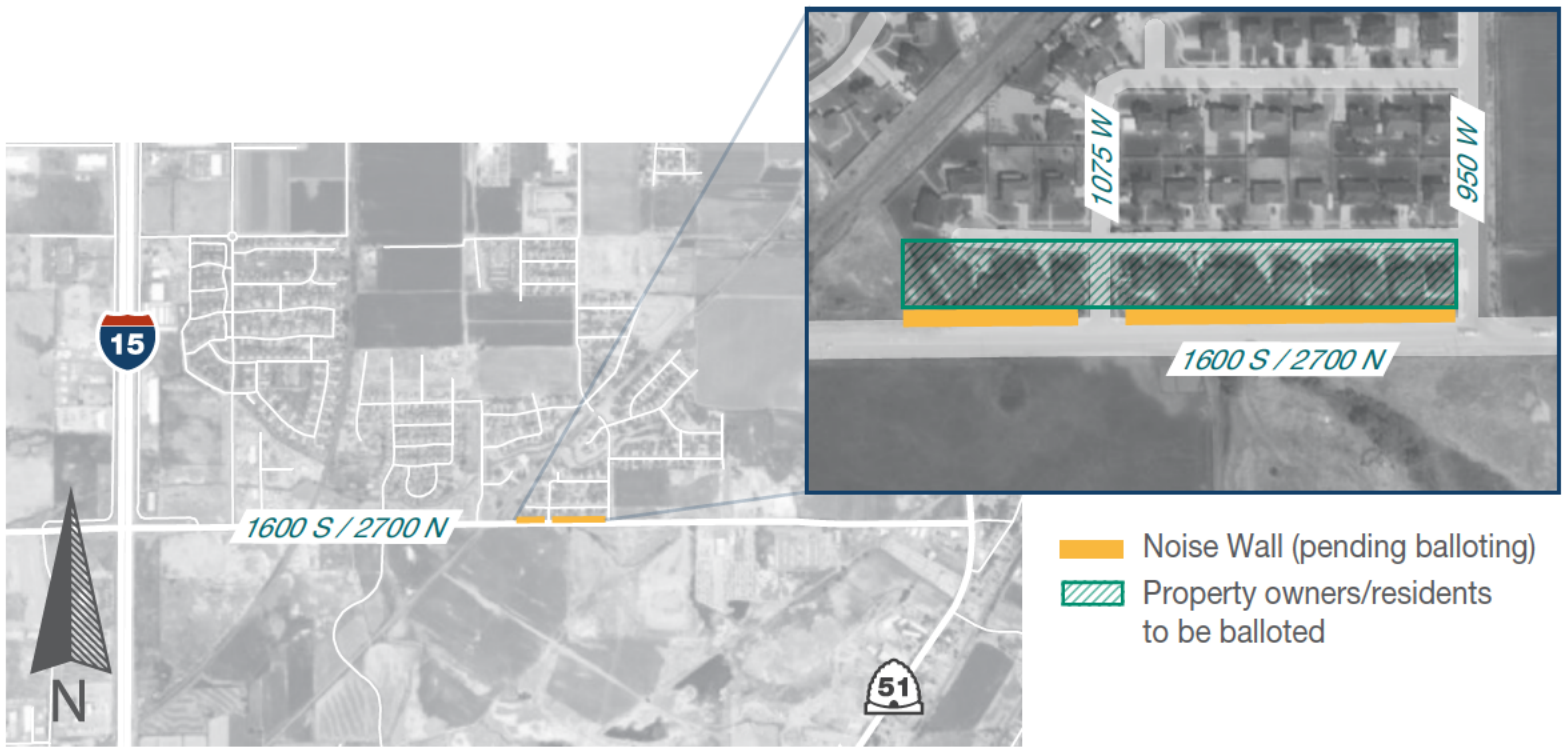
## Noise Wall Balloting

Noise wall balloting would be conducted as part of the final design phase. Property owners and residents who are either directly adjacent to the noise wall or benefited by the noise wall (receive at least a 5 dBA reduction) would receive a ballot.

Balloting requirements to obtain the noise wall include:




## Proposed Noise Wall




Note: Noise abatement measures are still subject to final design and balloting.

# NEXT STEPS



## PROJECT PROCESS

PROJECT ADDED TO LONG-RANGE TRANSPORTATION PLAN

CONCEPT STUDY

We Are Here

ENVIRONMENTAL

Next steps if Preferred Alternative is selected

- DESIGN
- RIGHT-OF-WAY ACQUISITION
- CONSTRUCTION
- MAINTENANCE

## ENVIRONMENTAL PROCESS

- SCOPING
- PURPOSE AND NEED
- ALTERNATIVES DEVELOPMENT AND SCREENING
- PREPARE ENVIRONMENTAL ASSESSMENT
- We Are Here — PUBLIC HEARING & 30-DAY PUBLIC COMMENT PERIOD
- FINALIZE EA AND RESPOND TO COMMENTS
- PUBLISH EA AND DECISION DOCUMENT

November — December — June — July — October — November — January

2019 — 2020 — 2021

The 30-day comment period ends
**Nov. 13, 2020**

# PHASING



## PHASE 1
**Currently Funded**

- Construct a diamond interchange
- Realign the northwest, southwest, and northeast frontage roads
- Improve roadway shoulder widths on 1600 South/2700 North
- Construction is anticipated between 2022 - 2030

## PHASE 2
**Not Funded**

- Construct a grade-separated railroad crossing on 1600 South/2700 North across the consolidated Sharp/Tintic Railroad

## PHASE 3
**Not Funded**

- Construct a SPUI and replace the existing 1600 South/2700 North structure
- Construct a northbound and southbound auxiliary lane between U.S. 6 and the new interchange
- Widen 1600 South/2700 North to five lanes with 10-foot shoulders between Main Street and S.R. 51
- Construct a sidewalk on the north side of 1600 South/2700 North
- Construct a 10-foot, multiuse trail on the south side of 1600 South/2700 North

# VERBAL COMMENTS



**To provide a verbal comment, enter the call-in number listed below and record a voicemail.**

- Please mute your computer speakers before you call in.
- Dial **855-925-2801** and enter code **9774**. Press * for more options. Then, press **2**.
- State and spell your name and record your comment, for up to three minutes.
- All voicemail recordings will be played into the public hearing in the order they are received.

**Written comments can be submitted via email, the study website, or by mail.**

# WRITTEN COMMENTS

**Comments must be submitted by NOV. 13, 2020 to be considered in the Final EA. Comments are welcome throughout the environmental process.**

- **Email** i15springvillespanishfork@utah.gov
- **Website** udot.utah.gov/i15springvillespanishfork
- **Mail** I-15 Springville/Spanish Fork Interchange EA
  c/o Horrocks Engineers
  2162 West Grove Parkway, Suite 400
  Pleasant Grove, UT 84062

**Public Comment Form**

Place
Postage
Stamp
Here

I-15 Springville/Spanish Fork Interchange EA
c/o Horrocks Engineers
2162 W. Grove Parkway, Suite 400
Pleasant Grove, UT 84062

Fold Here

# COMMENT FORM

## CONTACT INFORMATION

Name: _____ Organization: _____

Address: _____ City: _____

State: _____ ZIP: _____

Phone Number: _____ Email: _____

## COMMENTS

Comments are due by Nov. 13, 2020

Please provide input or concerns regarding the proposed interchange and the 1600 South/2700 North improvements.

Please provide any other information or comments you feel would be helpful to the study team.

Thank you for your input. Please email comments to i15springvillespanishfork@utah.gov or fold, secure, and stamp this form and mail it to the address on the back. Please postmark the form on or before **Nov. 13, 2020**.

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**Appendix 4: Public Hearing Comments and Responses**

333 South Rio Grande
Salt Lake City, Utah 84101
www.DepoMaxMerit.com

Toll Free 800-337-6629
Phone 801-328-1188
Fax 801-328-1189

# I-15 SPRINGVILLE/SPANISH FORK INTERCHANGE

## V O I C E M A I L  P U B L I C  C O M M E N T S

October 28, 2020
Online Public Hearing
6:00 p.m. to 7:30 p.m.

Reported By: Rossann J. Morgan
- Certified Court Reporter -
- Registered Professional Reporter -

ORIGINAL

October 28, 2020

P R O C E E D I N G S

MR. CROFT: My name is Adam Croft (phonetic). My question is, if everything goes perfectly with engineering plans, funding, when is the earliest you think this project would begin construction? Would it be one year, two years, three years?

ADAM: My name is Adam. I have two questions. One, it says that there will be a six-foot sound wall put up to help with the noise reduction. I back to that road of 1600 South and I don't feel that a six-foot sound wall will be sufficient. Our houses are built a couple feet above grade as is due to the high water table, and I think that we need a higher than a six-foot sound barrier.

Also, I wanted to know what the odds or chances are that this road does not get built at all. Is there any possibility that that will happen? Thank you.

CORY: Hi. My name is Cory. I'm calling in wondering if the two rail lines would actually be joined with one so that we only need one overpass. Thanks.

MR. MILLSAP: Hi. My name is Logan Millsap. That's L-O-G-A-N M-I-L-L-S-A-P. I am particularly curious about the pedestrian/bicyclist improvements to 1600 South in conjunction with this project. I am

worried about the fact that these improvements aren't scheduled to take place until, like, you know, ten or 20 -- ten or 15 years from now.

I know a lot of people already use that road for cycling, for commuting to and from work, for recreation. It seems to me that the construction of off-ramps without improvements to the road - you know, real improvements, not just shoulder widenings - would very much reduce the use of that road for pedestrians and cyclists. And so I would hope that maybe instead of kind of going through this project without being -- let's see. How do I say this.

I would hope that instead of doing this project in such a long-drawn-out, multiphase way, maybe we could wait some time and just kind of do it all at once. And then maybe we could also coordinate that with the connection to Highway 89 that people are very worried about. Maybe you can address these in the public hearing, but if not, thanks so much for your time.

(The online hearing concluded at 7:30 p.m.)

* * *

C E R T I F I C A T E

STATE OF UTAH )
: ss.
COUNTY OF SALT LAKE)

THIS IS TO CERTIFY that the foregoing online proceedings, in the foregoing cause named, was taken before me, ROSSANN J. MORGAN, Registered Professional Reporter, Certified Shorthand Reporter in and for the State of Utah, residing at West Jordan, Utah.

That the statements of said speakers were reported by me in Stenotype and thereafter caused by me to be transcribed into typewriting, and that a full, true and correct transcription of said statements so taken and transcribed is set forth in the foregoing pages and said speakers in the foregoing proceedings.

I further certify that I am not of kin or otherwise associated with any of the parties to said cause of action, and that I am not interested in the event thereof.

WITNESS MY HAND at Salt Lake City, Utah, this 2nd day of November, 2020.

ROSSANN J. MORGAN, CCR, RPR

License No.:
4948384-7801

I-15 Interchange
ENVIRONMENTAL ASSESSMENT
Springville/Spanish Fork

# COMMENT FORM

## CONTACT INFORMATION

Name: Shannon Girvin Organization: _____

Address: [redacted] City: [redacted]

State: Ut. ZIP: [redacted]

Phone Number: [redacted] Email: [redacted]

## COMMENTS

Comments are due by Nov. 13, 2020

Please provide input or concerns regarding the proposed interchange and the 1600 South/2700 North improvements.

I'm completly opposed to this! For those of us that work on the other side of the freeway, this would be a complete nightmare to get to work. You won't be relieving any congestion off of 400 S. due to all of the businesses going in there. Also, when you shut down one of the two exits in and out of town, no wonder it's busy. If this happens you're not only adding residents of Mapleton, but also N Spanish Fork because Hwy 6 is such a mess to drive on. You need to address the messes you already have before adding to them.

Please provide any other information or comments you feel would be helpful to the study team.

Thank you for your input. Please email comments to i15springvillespanishfork@utah.gov or fold, secure, and stamp this form and mail it to the address on the back. Please postmark the form on or before **Nov. 13, 2020**.

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I-15 Interchange
ENVIRONMENTAL ASSESSMENT
Springville/Spanish Fork

# COMMENT FORM

## CONTACT INFORMATION

Name: Dr. Peter Fawson Organization: [redacted]

Address: [redacted] City: [redacted]

State: Utah ZIP: [redacted]

Phone Number: [redacted] Email: [redacted]

## COMMENTS

Comments are due by Nov. 13, 2020

Please provide input or concerns regarding the proposed interchange and the 1600 South/2700 North improvements.

Overall I'm glad to see an interchange go in at 1600 S. I have two concerns: One is the end of construction of 4 lane road at State Steet (Springville). All the 4 lanes will be trying to get on 5 State street and create traffic nightmares at 1650 S., 5 Main St, & Evergreen roads with cars trying to enter 5 State Street. I feel that the 4 lane 1600 S. road needs to continue over 5 State Street and be bumped through to S. Hwy 89 where the traffic meets another 4 Lane Highway thus eliminating bottleneck on 5 Tate Street. Please Do NOT create

Please provide any other information or comments you feel would be helpful to the study team.

a major problem for local commuters now & in the future by stopping the expansion too soon into Mapleton.
Also, S. State Road needs to be 4 lane from Springville to Spanish Fork. Thanx for listening.

Thank you for your input. Please email comments to i15springvillespanishfork@utah.gov or fold, secure, and stamp this form and mail it to the address on the back. Please postmark the form on or before **Nov. 13, 2020**.

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I-15 Interchange
ENVIRONMENTAL ASSESSMENT
Springville/Spanish Fork

# COMMENT FORM

## CONTACT INFORMATION

Name: Shirley Anderson Organization:

Address: [redacted] City: [redacted]

State: UT ZIP: [redacted]

Phone Number: [redacted] Email:

## COMMENTS

Comments are due by Nov. 13, 2020

**Please provide input or concerns regarding the proposed interchange and the 1600 South/2700 North improvements.**

With all the continued growth, it is very much needed.

Thank You.

**Please provide any other information or comments you feel would be helpful to the study team.**

Thank you for your input. Please email comments to i15springvillespanishfork@utah.gov or fold, secure, and stamp this form and mail it to the address on the back. Please postmark the form on or before **Nov. 13, 2020.**

Comments provided to the study team will be reviewed and considered by UDOT. All comments received will be documented in the study record. The study team will contact you if they need additional information or clarification.

UDOT's responses to comments made during the formal Environmental Study comment period will be included in the Final Environmental Study.

Comments provided during the National Environmental Policy Act (NEPA) process to UDOT are a matter of public record and subject to public release, if requested. For more information, see **Terms of Use** at the bottom of the **Utah.gov** website.

I-15 Interchange
ENVIRONMENTAL ASSESSMENT
Springville/Spanish Fork

# COMMENT FORM

## CONTACT INFORMATION

Name: Thad Anderson Organization:

Address [redacted] City: [redacted]

State: Utah ZIP: [redacted]

Phone Number: [redacted] Email: [redacted]

## COMMENTS

Comments are due by Nov. 13, 2020

Please provide input or concerns regarding the proposed interchange and the 1600 South/2700 North improvements.

I am very much in favor of the proposed interchange.
I think it would be a great addition to the Freeway/Highway system here in central Utah County.

My vote is yes.

Please provide any other information or comments you feel would be helpful to the study team.

With all of the new housing that is being added to this area we need additional ways to deal with increased traffic.
Many time, during evening rush hour traffic, the off ramp for 400 South Springville is backed up to the freeway and even sometimes on to the freeway.
This additional ramp system would help ease the traffic on 400 South.
I am sure that many drivers would go on down to 1600 South to avoid the heavy traffic on 400 South because of the added pressure from the business traffic of shoppers. I am one driver who would prefer the South exit because of where I live and to avoid going into Springville to go on to Mapleton.
To me it seems like a win win situation for all concerned. Commercial and citizens.

Thank you for your input. Please email comments to i15springvillespanishfork@utah.gov or fold, secure, and stamp this form and mail it to the address on the back. Please postmark the form on or before **Nov. 13, 2020.**

Comments provided to the study team will be reviewed and considered by UDOT. All comments received will be documented in the study record. The study team will contact you if they need additional information or clarification.

UDOT's responses to comments made during the formal Environmental Study comment period will be included in the Final Environmental Study.

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Formal Comment Period Comments and Responses
Oct. 13, 2020 - Nov. 13, 2020

## RESPONSES TO AGENCY COMMENTS

10/29/2020, 6:18 PM — Email with Attached Letter

Autumn Hu - UTA NEPA Project Administrator

Comment: The Utah Transit Authority (UTA) appreciates the opportunity to review and comment on the I-15 Springville/Spanish Fork Interchange Environmental Assessment (EA), dated October 2020. UTA had originally provided comments in 2019 during the scoping phase, which included a recommendation for a grade-separated railroad crossing at 1600 South/2700 North to accommodate future expansion of Frontrunner commuter rail service and future increase in vehicle traffic at this location. We are pleased to see that the grade-separated railroad crossing was included in the Build Alternative for this project. At this time, we do not have any additional comments for this EA.

Response: The comment has been recognized.

## RESPONSES TO PUBLIC COMMENTS

10/13/2020, 8:54 PM — Website

Riley Stauffer

Comment: I would like to see improvements made to canyon creek parkway so that a vehicle could take the new 1600 S/2700 N exit and have a direct route to the hospital and canyon creek shopping area. The current road is a small, winding road and has an annoying railroad crossing. If this road was directly connected to the new interchange and not so small and winding, a vehicle could access the hospital and shopping area quicker and more safely than by taking the highway 6 exit and trying to turn left. that left turn lane on highway 6 is always backed up and is dangerous to turn left because of the high speeds.

Response: Canyon Creek Parkway is owned, operated, and maintained by Spanish Fork City. Improvements to this road would be under the direction of the City and would go through the City's planning process. Spanish Fork City has identified relocating Canyon Creek Parkway east so that it aligns with 1200 West as a future project on the City's Transportation Plan.

10/15/2020, 8:50 PM — Email

Nick Glasgow

Comment: Why is this not going all the way to highway 89? Mapleton needs direct access to the freeway, this will cause even more congestion on side streets for Mapleton residents who try to use it without a direct path. Is the direct connection to Highway 89 a phase 2?

Response: The I-15 Springville/Spanish Fork Interchange project includes rational endpoints. These points are Main Street in Spanish Fork (on the west) and S.R. 51 (State Street) (on the east) in Springville. Both of these roads form T-intersections with 1600 South/2700 North and are established north-south routes.

UDOT acknowledges the need for a direct connection to U.S. 89 from 1600 South/2700 North. The Mountainland Association of Government's (MAG) Regional Transportation Plan (RTP) shows a future connection between S.R. 51 and U.S. 89. MAG is responsible for developing a 30-year regional transportation plan based on a comprehensive, region-wide systems analysis. The RTP evaluates and prioritizes needs throughout all of Utah County. The I-15 Springville/Spanish Fork EA is evaluating two projects listed on MAG's RTP – a new interchange at 1600 South/2700 North and widening 1600 South/2700 North from Spanish Fork Main Street to S.R. 51. According to the RTP and the associated traffic analysis, both projects are needed between 2019 and 2030. The future connection between State Street and U.S. 89 is needed between 2031 and 2040. This future connection project and other planned projects within or near the study area were included in the 2050 traffic analysis performed for this EA. The connection will be analyzed in a separate, future environmental study.

10/18/2020, 7:55 PM Website

John Higgins

Comment I am supportive of the new interchange and widening of 1600 S. I think that there will be alot of traffic to/from Mapleton/north Spanish Fork/south Springville that will use this road in lieu of 400 S. The SPUI is a great alternate and provides a lot of capacity. I am concerned about the traffic going to/from Mapleton overloading Evergreen Dr/400E/ and Mapleton 800 N. This will be the main route used and will increase traffic drastically on that road. I realize that this is outside of the study area, but you can expect an increase in traffic. Since it is a residential roadway there could be safety and operational problems. I see a signal at SR51 and Evergreen and one at US 89/800N. I think that this will continue until 1600 S is punched thru to US 89 (which will be years due to the RR).

Response UDOT acknowledges the need for a direct connection to U.S. 89 from 1600 South/2700 North. The Mountainland Association of Government's (MAG) Regional Transportation Plan (RTP) shows a future connection between S.R. 51 and U.S. 89. MAG is responsible for developing a 30-year regional transportation plan based on a comprehensive, region-wide systems analysis. The RTP evaluates and prioritizes needs throughout all of Utah County. The I-15 Springville/Spanish Fork EA is evaluating two projects listed on MAG's RTP – a new interchange at 1600 South/2700 North and widening 1600 South/2700 North from Spanish Fork Main Street to S.R. 51. According to the RTP and the associated traffic analysis, both projects are needed between 2019 and 2030. The future connection between State Street and U.S. 89 is needed between 2031 and 2040. This future connection project and other planned projects within or near the study area were included in the 2050 traffic analysis performed for this EA. The connection will be analyzed in a separate, future environmental study.

Traffic modeling projects minor increases to local traffic volumes between S.R. 51 and U.S. 89 with a phased implementation approach for the construction of the Preferred Alternative. UDOT will monitor traffic conditions in this area and will work with Springville City and Spanish Fork City to make improvements as needed.

10/18/2020, 8:06 PM Website

John Higgins

Comment I think that there is going to be push back unless the SB movement from 1600 S can get onto I-15. I don't believe that there will be much use for this movement if it can only go onto US6. Most folks will use other roads (canyon Creek Parkway, SR-51 and Freeway Lane) to get to US6. We need another movement onto I15 SB. I know that this will cause the US6/I15 interchange to be redesigned and constructed, and this is outside of the scope of this project, but it needs to be identified as an important future project

Response If the Preferred Alternative is selected, it is anticipated that the project could be constructed in multiple phases as funding becomes available. The initial Phase I construction scenario assumes that traffic will merge directly onto I-15 going southbound (see Section 2.4 Construction Phasing in Chapter 2 of the EA). However, beyond 2035 traffic volumes are projected to be large enough that a southbound merge would lead to failure on I-15 resulting from conflict between motorists merging southbound and motorists changing lanes to exit at the U.S. 6/Main Street Interchange. Southbound traffic will travel parallel to I-15 along an auxiliary lane between the new interchange and U.S. 6, with barrier separation routing traffic entering southbound I-15 from the new interchange through the I-15/U.S. 6 Interchange. The traffic analysis shows that the U.S. 6 Interchange would operate acceptably with the additional traffic.

10/19/2020, 11:57 AM Email

Justin Earl

Comment Love this project…please don't stop at SR-51 eastbound…really need to get this road to US-89 connecting into Mapleton 1600 North. Of course this would require eminent domain of existing homes and bridging 2 railroad tracks which is expensive and takes time which is probably why the design stops at SR-51. But to make the biggest impact, this road needs to go all the way to US-89. We'll love this first phase, but look forward to a second phase going to US-89.

Response UDOT acknowledges the need for a direct connection to U.S. 89 from 1600 South/2700 North. The Mountainland Association of Government's (MAG) Regional Transportation Plan (RTP) shows a future connection between S.R. 51 and U.S. 89. MAG is responsible for developing a 30-year regional transportation plan based on a comprehensive, region-wide systems analysis. The RTP evaluates and prioritizes needs throughout all of Utah County. The I-15 Springville/Spanish Fork EA is evaluating two projects listed on MAG's RTP – a new interchange at 1600 South/2700 North and widening 1600 South/2700 North from Spanish Fork Main Street to S.R. 51. According to the RTP and the associated traffic analysis, both projects are needed between 2019 and 2030. The future connection between State Street and U.S. 89 is needed between 2031 and 2040. This future connection project and other planned projects within or near the study area were included in the 2050 traffic analysis performed for this EA. The connection will be analyzed in a separate, future environmental study.

10/19/2020, 2:16 PM Email

Andrew Orme

Comment I live just off 1600 south in Springville. There are some sections of 1600 south that don't have a sidewalk. Would all of 1600 south have a sidewalk after this project? If not, which sections would have a sidewalk after this?

Response The Preferred Alternative includes constructing a 6-foot wide sidewalk along the north side and a 10-foot wide multiuse trail along the south side of 1600 South/2700 North between Spanish Fork Main Street (on the west side of I-15) and S.R. 51. If the Preferred Alternative is selected, it is anticipated that the project could be constructed in multiple phases as funding becomes available. Some improvements could occur within five years, while others could happen over the next 15 to 20 years. It is anticipated that the construction of sidewalk and the multiuse trail would be built as part of a future construction phase (see Section 2.4 Construction Phasing in Chapter 2 of the EA).

10/19/2020, 7:03 PM Email

Don Olsen

Comment I urge you to connect that road all the way through to the east to Highway 89. You will lose much of the value this project could provide without that connection.

Response The I-15 Springville/Spanish Fork Interchange project includes rational endpoints. These points are Main Street in Spanish Fork (on the west) and S.R. 51 (State Street) (on the east) in Springville. Both of these roads form T-intersections with 1600 South/2700 North and are established north-south routes.

UDOT acknowledges the need for a direct connection to U.S. 89 from 1600 South/2700 North. The Mountainland Association of Government's (MAG) Regional Transportation Plan (RTP) shows a future connection between S.R. 51 and U.S. 89. MAG is responsible for developing a 30-year regional transportation plan based on a comprehensive, region-wide systems analysis. The RTP evaluates and prioritizes needs throughout all of Utah County. The I-15 Springville/Spanish Fork EA is evaluating two projects listed on MAG's RTP – a new interchange at 1600 South/2700 North and widening 1600 South/2700 North from Spanish Fork Main Street to S.R. 51. According to the RTP and the associated traffic analysis, both projects are needed between 2019 and 2030. The future connection between State Street and U.S. 89 is needed between 2031 and 2040. This future connection project and other planned projects within or near the study area were included in the 2050 traffic analysis performed for this EA. The connection will be analyzed in a separate, future environmental study.

10/20/2020, 3:40 PM Website

Ryan Wood

Comment What is the purpose of forcing the southbound traffic to exit at U.S. 6/SF Main. It looks like there will either be people shooting across three lanes of exiting traffic to try and stay of I-15 or it will be redundant as people could just take SF Main to get on I-15 without having to worry about weaving around all the exiting traffic.

Response If the Preferred Alternative is selected, it is anticipated that the project could be constructed in multiple phases as funding becomes available. The initial Phase I construction scenario assumes that traffic will merge directly onto I-15 going southbound (see Section 2.4 Construction Phasing in Chapter 2 of the EA). However, beyond 2035 traffic volumes are projected to be large enough that a southbound merge would lead to failure on I-15, which is why the ultimate design does not include the merge. The traffic analysis shows that the U.S. 6 Interchange would operate acceptably with the additional traffic.

10/22/2020, 2:34 PM Website

Katherine Rollins

Comment There is not any indication on any green freeway sign that this is Springville city. Not until you reach Spanish Fork do you realize you have passed Springville. Please add Springville, or even Spvl to a freeway sign.

Response Green freeway signs reading “Springville Next 2 Exits” currently exist just south of the University Avenue southbound entrance ramp (southbound) and just north of the Spanish Fork Main Street entrance ramp (northbound).

10/24/2020, 2:10 PM Email

Jorg Bachmann

Comment Hi, we need the new access to i15. I drive I-15 everyday and 400 South is too busy, blocking often the traffic into I15. Please build the access

Response Your comment has been recognized.

10/28/2020, 12:03 AM Website

Mike Christensen, Utah Rail Passengers Association

Comment The loss of railroad right of way will limit options for future passenger rail expansion in Utah!

Response Accommodating the future expansion of passenger rail is cited as an additional goal of the project (see Section 1.9 Additional Goals and Objectives in Chapter 1 of the EA). UTA was consulted on the proposed improvements during the planning process. The proposed grade-separated railroad crossing has been designed to be large enough to accommodate the expansion of the Utah Transit Authority (UTA) FrontRunner Line from Provo to Payson.

10/28/2020, 6:46 PM Email

Dave Johnson

Comment Can someone please let me know what this means for my business here at Take A Break Spas? I do not own the land but have a signed lease till 2023 I believe it is. Where would I move to? When will this happen? I do not want to move any farther than I have to!
Will I get relocation help from the State?
I Rent from the Ortle’s
Thank you in Advance

Response Right-of-way acquisitions would be part of final design and could begin as early as 2021. Property owners and tenants that could be impacted by right-of-way acquisitions or relocations will be communicated with individually. If you are a property owner or tenant in this area and have questions about the right-of-way process, we ask that you please contact the study team at 801-704-0899 or at the project email using i15springvillespanishfork@utah.gov. Your information will be shared with the right-of-way acquisition team.

10/28/2020, 5:31 PM Verbal

Adam Crop

Comment My name is Adam Crop. My question is, if everything goes perfectly with engineering plans, funding, when is the earliest you think this project would begin construction? Would it be one year, two years, three years?

Response If the Preferred Alternative is selected, it is anticipated that the project could be constructed in multiple phases as funding becomes available. Some improvements could occur within five years, while others could happen over the next 15 to 20 years. Based on current funding, the earliest construction could begin would be 2022 (see Section 2.4 Construction Phasing in Chapter 2 of the EA).

10/28/2020, 5:35 PM Verbal

Adam Crop

Comment My name is Adam. I have two questions. One, it says that there will be a six-foot sound wall put up to help with the noise reduction. I back to that road of 1600 South and I don't feel that a six-foot sound wall will be sufficient. Our houses are built a couple feet above grade as is due to the high water table, and I think that we need a higher than a six-foot sound barrier.

Also, I wanted to know what the odds or chances are that this road does not get built at all. Is there any possibility that that will happen? Thank you.

Response The study team evaluated one noise wall adjacent to 1600 South/2700 North. A 6-foot tall wall on the north side of 1600 South/2700 North, between just west of 1075 West and 950 West, meets the requirements of the UDOT Noise Abatement Policy. A 6-foot wall provides at least a 5 dBA reduction for all the residences adjacent to the noise wall. A 5 dBA reduction corresponds to a readily perceptible change in sound levels. The wall is still subject to final design and balloting (see Section 3.11 Noise in Chapter 3 of the EA and the Noise Analysis in the EA Appendix).

The decision whether to build or not to build an interchange and make improvements to 1600 S/2700 N will be made once the public comment period has ended and UDOT has reviewed and addressed the comments received. A decision document will be published indicating whether or not UDOT will proceed with the Preferred Alternative.

10/28/2020, 7:08 PM Verbal

Cory

Comment Hi. My name is Cory. I'm calling in wondering if the two rail lines would actually be joined with one so that we only need one overpass. Thanks.

Response According to the Mountainland Association of Government's (MAG) Regional Transportation Plan (RTP), the two rail lines are planned to be consolidated, leaving a single crossing (combined Sharp/Tintic Railroad) with up to three tracks at approximately 1500 West. The MAG RTP also calls for the extension of Utah Transit Authority (UTA) FrontRunner commuter rail service south from Provo to Payson along this consolidated rail line. The proposed bridge over the rail lines has been designed to accommodate both the consolidation and the FrontRunner extension.

10/28/2020, 7:14 PM Verbal

Logan Millsap

Comment Hi. My name is Logan Millsap. That's L-O-G-A-N M-I-L-L-S-A-P. I am particularly curious about the pedestrian/bicyclist improvements to 1600 South in conjunction with this project. I am worried about the fact that these improvements aren't scheduled to take place until, like, you know, ten or 20 -- ten or 150 years from now.

I know a lot of people already use that road for cycling, for commuting to and from work, for recreation. It seems to me that the construction of off-ramps without improvements to the road – you know, real improvements, not just shoulder widenings – would very much reduce the use of that road for pedestrians and cyclists. And so I would hope that maybe instead of kind of going through this project without being -- let's see. How do I say this.

I would hope that instead of doing this project in such a long-drawn-out, multiphase way, maybe we could wait some time and just kind of do it all at once. And then maybe we could also coordinate that with the connection to Highway 89 that people are very worried about. Maybe you can address these in the public hearing, but if not, thanks so much for your time.

Response At this time, UDOT does not have the funds necessary to construct the entire Preferred Alternative at one time. With this in mind, a phased construction approach was explored in the EA. There is no guarantee that the proposed phasing approach would be implemented. As funds and needs change with time, elements of the Preferred Alternative may be constructed earlier or later than suggested in the EA as priorities change. Delaying the project until all necessary funds are in place does not address the immediate need for the project.

10/28/2020, 9:13 PM and 9:19 PM Email

Adam Crop

Comment I live at [address redacted] in Springville, my house backs to 1600 south. I have a few thoughts and comments.

1. I vote this interchange does not happen!
2. If it does happen, an 8ft sound wall or higher needs to be installed. Our homes are higher grade due to water table, I know a 6ft reduces noise per regulations and it is only an increase of a few decibals but it will be a consistent noise.
3. I don't think air pollution has been considered enough, my kids playing in the back yard will be inhaling more exhaust due to the increased traffic
4. IF this happens, the railroad bridge needs to be in place before the interchange or it will cause great issues as the train stops for increased periods of time.
5. I feel a traffic light will need to be installed at 950 w, and even over by kelvin grove park to allow safe left hand turns into the developments.
6. i live on a corner lot, so the noise fence will only cover the back part of my property and noise will come in from the corner, therefore not reducing the noise.
7. Visual, it was stated this won't affect visual, right now we have rancher fields behind out home, with this road and re-zoning it will make it commercial and industrial which will affect the visual of my home.
8. This road will decrease the value of my home significantly. How do I recoup this? Why am I responsible for a $30-$40K hit?!

Most importantly is SAFETY! It is known that most child/human traffickers use areas close to freeway access. This freeway access goes straight into residential neighborhood with young kids and have an easy and quick get away. Also, my kids are active and will kick throw balls over the fence that can cause traffic accidents or lead to kids wondering in the road.

Response Between 2020 and 2050, the populations of Springville City and Spanish Fork City are estimated to grow by 55 percent and 62 percent respectively. Increased growth of an area requires continual transportation planning to identify projects that would maintain mobility of the transportation system. The Mountainland Association of Governments (MAG) is responsible for high-level regional transportation in Utah County. Traffic modeling by MAG predicts failing conditions at the 400 South interchange if no improvements to existing infrastructure are made. Substantial delays at the I-15 and Springville City 400 South Interchange would lead to congestion and queuing on mainline I-15 which in turn leads to safety issues. MAG has identified the need for an additional Springville/Spanish Fork interchange to alleviate congestion. A new interchange at 1600 South/2700 North would lead to additional traffic along this corridor which, if left in its current condition, would result in failing conditions. If an interchange is constructed, this corridor would need to be widened to accommodate increased traffic.

1. Please remember that commenting is not a form of “voting.” The number of positive or negative comments received does influence the decision on the proposed action.

2. A Noise Analysis identified 14 locations that would be impacted by noise as a result of the project (greater than or equal to 66 dBA). These include the residences directly adjacent to 1600 South/2700 North west of 1075 West and between 1075 West and 950 West (see Section 3.11 Noise in Chapter 3 of the EA and the Noise Analysis in the EA Appendix).

   Your residence was identified as an impacted receptor during the noise analysis. Current sound levels were modeled at 61 dBA at your home. If the Preferred Alternative were to be constructed it is estimated that decibel levels would increase by 6 dBA to 67 dBA, one dBA higher than the level considered to be an impact. To mitigate impacts at your residence a noise wall was considered. A 6-foot noise wall meets the requirements of the UDOT Noise Abatement Policy. Specifically, a 6-foot noise wall would reduce noise levels at your residence by 5 dBA. A 5 dBA reduction corresponds to a readily perceptible change in sound levels. It should be noted that the proposed noise wall is still subject to final design and balloting.

3. The project does not qualify as a project of air quality concern. The Preferred Alternative would not result in a significant increase in diesel traffic and adheres to a larger conforming air quality plan. For more information, see the Project of Air Quality Concern Memo in the EA Appendices.

4. The project team is aware of the importance of constructing the grade-separated rail crossing. Timing of constructing the phases of the Preferred Alternative will be determined by funding availability.

5. Traffic modeling shows low to moderate traffic increases on side streets that connect to 1600 South/2700 North. If the Preferred Alternative is selected, UDOT, Springville City, and Spanish Fork City will continue to monitor traffic conditions along the 1600 South/2700 North corridor and the connecting side streets to evaluate the timing and phases of potential intersection improvements (including potential traffic signals).

   UDOT constructs signals at intersections once those intersections meet certain conditions or warrants. There are eight warrants, which include considerations such as crash history, traffic volumes, and intersection delay. If an intersection meets any one of the eight warrants, a signal may be installed. Once an intersection meets traffic signal warrants, UDOT and/or the cities may install a signal.

6. If the proposed noise wall is approved and installed as currently conceived, the traffic noise model predicts that it would reduce noise on your property (see the discussion in item 2 above).

7. Development of the area south of 1600 South/2700 North is currently occurring and would continue to occur regardless of whether the proposed widening of 1600 South/2700 North is constructed. As these impacts are not directly caused by the project, it has been determined that the project would have no impact to visual aesthetics in the area.

8. A variety of factors go into determining the value of a home. Due to this and the tendency of the housing market to change over time, it is impossible to determine an exact financial impact (positive or negative) that any transportation project would have on a location. By state law, UDOT cannot compensate for indirect impacts if there are no direct impacts to the property. In this case, the perceived financial impact to property owners (from air, noise, and traffic) would be considered an indirect impact. UDOT is also not authorized to acquire property to mitigate for actual or perceived decrease in resale value.

10/29/2020 Mailed

Shannon Girvin

Comment I'm completely opposed to this! For those of us that work on the other side of the freeway, this would be a complete nightmare to get to work. You won't be relieving any congestion off of 400 S. due to all of the businesses going in there. Also, when you shut down one of the two exits in and out of town, no wonder it's busy. If this happens you're not only adding residents of Mapleton, but also NE Spanish Fork because Hwy 6 is such a mess to drive on. You need to address the messes you already have before adding to them.

Response Projected traffic congestion assumes that all construction projects currently planned or currently under construction are completed (see Section 1.6 Reasonably Foreseeable Transportation Improvements in Chapter 1 of the EA). Even with these proposed improvements, traffic models predict failing conditions at the I-15 and 400 South Interchange. Analysis shows that the construction of the Preferred Alternative would alleviate this congestion (see Existing and No-Build (2050) Traffic Report in the EA Appendix). The potential selection and construction of the Preferred Alternative does not limit other transportation improvements within the area, it is simply one element of the RTP developed to improve access and mobility within the study area.

10/29/2020, 3:30 PM Email

David Efros

Comment I would appreciate a confirmation that this comment has been received.
Having come from a Public Works background in the Las Vegas area, I understand the nature of funding for capital improvement projects. There is seldom enough money to do everything in the most timely or efficient manner.

The need for the overall project is well identified in the project documents. However, some impacts of the proposed extended timeframe for the second and third phases are not given sufficient attention.

The traffic on 1600 South has already increased significantly in the past year due to continued rapid residential development to the north and commercial development to the south in Spanish Fork. Increased traffic on 1600 South is expected to continue to increase as that surrounding growth continues. Not even considering the railroad crossings, during peak periods the existing two-lane road has periods where left turn drivers bring traffic to a standstill, sometimes for as long as 90 seconds. This is occurring at Canyon Creek Pkwy and sometimes at 950 West. This will only become worse even before opening the Phase 1 interchange. Then as stated in the project documents, the goal is to divert significant amounts of new traffic from 400 South onto 1600 South. When this new load is added to already increasing loads from intersecting collectors, without new lanes or signals, 1600 South will no longer be a good or safe route for travel.

The next two concerns are directly tied to this project even though they may be under the control of the City of Springville. They should be addressed jointly:

The Canyon Creek Pkwy northbound approach to 1600 South also experiences significant delays during peak periods. A left turn driver in the single traffic lane brings traffic to a standstill sometimes for longer than 90 seconds, during which time the backup continues to grow. Total wait time in line already can be two minutes or longer. With more local residences and businesses directly accessed primarily via this road, wait times are becoming unreasonable. If we add to that the increased impacts of more traffic from the Phase 1 interchange, wait times will only get worse.

The intersection of 1200 West and 1600 South is also problematic. 1200 West is designed and being built to carry an increasing amount of traffic, but the intersection at

1600 South forces all southbound traffic into a right turn only. This is inconvenient, but of greater concern, the traffic lane leaves drivers facing west, at a stop or low speed, trying to look over their shoulder 180 degrees so they can try to merge into a single traffic lane. This is a dangerous design and should be addressed sooner rather than later. This issue does not appear to be addressed in either UDOT or City of Springville project plans.

The current 1600 South situation is somewhat unique. 1600 South has a single traffic lane each way fed from multiple collectors (950 West, Canyon Creek Pkwy, and 1750 West) also with single traffic lanes in each direction. All of these roads do not have turn lanes except at 1600 South and State. Four of the five intersections are non-signalized (with stop signs). The collector feeds result in spread out, often persistent moderate volumes on 1600 South with intermittently denser daytime volumes of traffic. With a near consistent but spread out flow of traffic between State and Main at different times during the day a left turn driver is looking at these oncoming vehicles traveling at speeds of 35-40 mph, and often must stop to yield to oncoming traffic while waiting for a break. These stops are occurring at each of the non-signalized intersections. From my experience, these types of intersections have moderate traffic counts and are slow to be considered for traffic signals due to warrant process requirements. With otherwise moderate traffic volumes, long wait times on the collectors or sudden stops in the single traffic lane as frequently occurs on 1600 S do not necessarily help justify signalized intersections under the warrant process in some jurisdictions. However, these are valid impacts that will only get worse with the completion of Phase 1.

Bottom line:
For residents in my growing neighborhood, which feeds into 1600 South from 750 West, our primary access to Spanish Fork is highly impacted by the proposed plan. There are no good alternate routes without going to either Main (no signal planned there) or State, which currently more than doubles travel time and triples travel distance. Adding traffic with the new interchange will further slow down our daily routine at each intersection crossing 1600 South, while reducing safety.

Although a phased project may be proposed because of funding, without:

1. additional turn lanes or through lanes (not in the plan until Phase 3, 10-30 years from now), or
2. traffic signals at these intersections (none are planned at this time),the Phase 1 interchange will result in significant negative impacts on residents like me who use 1600 South, sometimes multiple times a day. These impacts are not sufficiently identified in the current project documents, so neither are there appropriate mitigations proposed.

David Efros, resident
[Address Redacted]
Springville, UT 84663
cell: [Phone Number Redacted]

Response

1. If the Preferred Alternative is selected, UDOT does not have the funds necessary to construct all of the proposed improvements at one time. With this in mind, a

phased construction approach was explored in the EA. There is no guarantee that the proposed phased approach would be used. As funds and needs change with time, elements of the Preferred Alternative could be constructed earlier or later than suggested in the EA as priorities change.

2. Traffic modeling shows low to moderate traffic increases on side streets that connect to 1600 South/2700 North. If the Preferred Alternative is selected, UDOT, Springville City, and Spanish Fork City will continue to monitor traffic conditions along the 1600 South/2700 North corridor and the connecting side streets to evaluate the timing and phases of potential intersection improvements (including potential traffic signals).

3. UDOT constructs signals at intersections once those intersections meet certain conditions or warrants. There are eight warrants, which include considerations such as crash history, traffic volumes, and intersection delay. If an intersection meets any one of the eight warrants, a signal may be installed. Once an intersection meets traffic signal warrants, UDOT and/or the cities may install a signal. Springville and Spanish Fork City are responsible for improvements to local roads and intersections. Spanish Fork City has identified relocating Canyon Creek Parkway east so that it aligns with 1200 West as a future project on the City's Transportation Plan.

10/31/2020, 11:34 PM Website

Jeremiah Maughan

Comment It would be amazing for 1600 S to make a clean connect to 1600 N Mapleton, but obviously the neighborhood makes that difficult. Perhaps a road south or north to get to 89?

Response UDOT acknowledges the need for a direct connection to U.S. 89 from 1600 South/2700 North. The Mountainland Association of Government's (MAG) Regional Transportation Plan (RTP) shows a future connection between S.R. 51 and U.S. 89. MAG is responsible for developing a 30-year regional transportation plan based on a comprehensive, region-wide systems analysis. The RTP evaluates and prioritizes needs throughout all of Utah County. The I-15 Springville/Spanish Fork EA is evaluating two projects listed on MAG's RTP – a new interchange at 1600 South/2700 North and widening 1600 South/2700 North from Spanish Fork Main Street to S.R. 51. According to the RTP and the associated traffic analysis, both projects are needed between 2019 and 2030. The future connection between State Street and U.S. 89 is needed between 2031 and 2040. This future connection project and other planned projects within or near the study area were included in the 2050 traffic analysis performed for this EA. The connection will be analyzed in a separate, future environmental study.

10/31/2020, 11:36 PM Website

Jeremiah Maughan

Comment Glad to see this project being made. The southbound I-15 exit onto 400 S is getting dangerous at 5:30pm due to the spill out onto I-15 for a half mile or more from the exit. Thank you for doing this!

Response Your comment has been recognized.

11/2/2020, 4:31 PM Email

Timothy Smith

Comment Due to the high volume of traffic to and from Mapleton that quickly converges on US 89 with the intent of accessing I-15 it would substantially improve access in both directions by bringing the proposed interchange connection east to US Highway 89 rather than ending it at State Street. The multiple major east and west roads of Mapleton all connect to Highway 89 while the routes from Mapleton to State Street are few in number and small in size providing very limited access should the I-15 connection end at State Street.

Please try to find a way to make the east access point US Highway 89.

Response UDOT acknowledges the need for a direct connection to U.S. 89 from 1600 South/2700 North. The Mountainland Association of Government's (MAG) Regional Transportation Plan (RTP) shows a future connection between S.R. 51 and U.S. 89. MAG is responsible for developing a 30-year regional transportation plan based on a comprehensive, region-wide systems analysis. The RTP evaluates and prioritizes needs throughout all of Utah County. The I-15 Springville/Spanish Fork EA is evaluating two projects listed on MAG's RTP – a new interchange at 1600 South/2700 North and widening 1600 South/2700 North from Spanish Fork Main Street to S.R. 51. According to the RTP and the associated traffic analysis, both projects are needed between 2019 and 2030. The future connection between State Street and U.S. 89 is needed between 2031 and 2040. This future connection project and other planned projects within or near the study area were included in the 2050 traffic analysis performed for this EA. The connection will be analyzed in a separate, future environmental study.

11/2/2020, 2:08 PM Website

Julie Lewis

Comment What consideration is being given to connecting the proposed new interchange to US-89 in Mapleton. I think that a lot of the new traffic that will be using this widened 1600 S will be trying to access US-89 in Mapleton, and I'm not seeing any improvements or great options for that.

Response UDOT acknowledges the need for a direct connection to U.S. 89 from 1600 South/2700 North. The Mountainland Association of Government's (MAG) Regional Transportation Plan (RTP) shows a future connection between S.R. 51 and U.S. 89. MAG is responsible for developing a 30-year regional transportation plan based on a comprehensive, region-wide systems analysis. The RTP evaluates and prioritizes needs throughout all of Utah County. The I-15 Springville/Spanish Fork EA is evaluating two projects listed on MAG's RTP – a new interchange at 1600 South/2700 North and widening 1600 South/2700 North from Spanish Fork Main Street to S.R. 51. According to the RTP and the associated traffic analysis, both projects are needed between 2019 and 2030. The future connection between State Street and U.S. 89 is needed between 2031 and 2040. This future connection project and other planned projects within or near the study area were included in the 2050 traffic analysis performed for this EA. The connection will be analyzed in a separate, future environmental study.

11/2/2020, 9:26 PM Website

Mike Overson

Comment The location passes immediately south of the electrical substation. Having a major access road passing this site contributes to the rapid gentrification of the surrounding community. The wider road is a vital improvement, but the placement should accommodate a visual barrier that will avoid the perception of industrialization of the corridor. I suggest shifting the roadway further south and adding a berm with trees to enhance the vitality of the area.

Response Decisions regarding corridor aesthetics would be evaluated during the final design phase. At the electric substation, the widening has been designed to make use of the existing curb and gutter.

11/2/2020, 9:40 PM Website

Mike Overson

Comment If built as proposed, this project will drive significantly more traffic directly onto Evergreen Rd as drivers seek a way to access US89 from SR51. The project team is avoiding this issue, citing the MAG RTP which does not envision a project to provide that access until after 2030. However, I believe this project should be paused until that need is addressed! With the rate of growth in the area, this problem cannot be ignored and must be considered at the same time as the new I-15 interchange. The additional traffic on Evergreen Rd will likely include heavy vehicles that are trying to find an alternate route to US6 that avoids congestion in Spanish Fork.

Response Traffic modeling projects minor increases to local traffic volumes between S.R. 51 and U.S. 89. The Preferred Alternative would be constructed in phases due to funding constraints (see Section 2.4 Construction Phasing in Chapter 2 of the EA). Widening 1600 South/2700 North is anticipated to be finished sometime between the years 2040 and 2050. MAG anticipates that the connection will be needed between 2031 and 2040. UDOT will monitor traffic conditions in this area and will work with Springville City and Spanish Fork City to make improvements as needed.

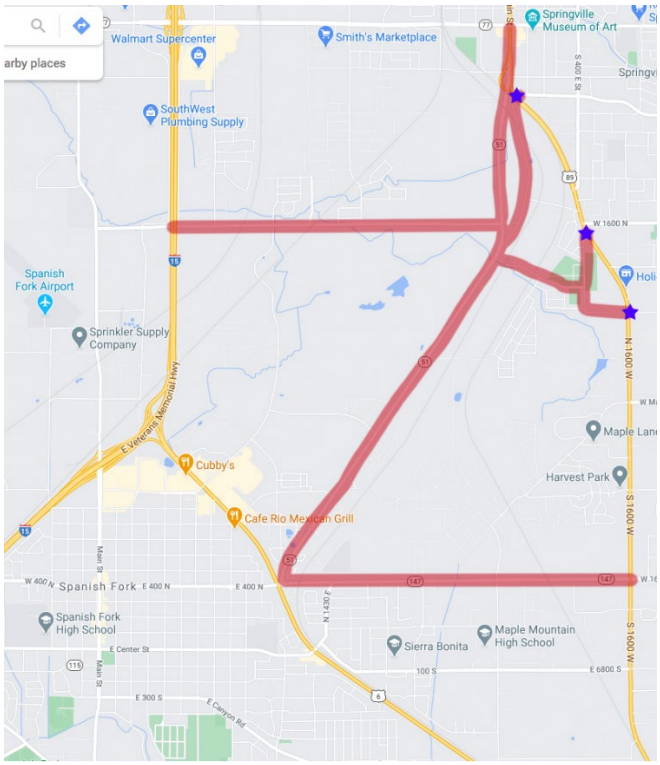
11/3/2020, 9:12 AM Email

Rachel Cochran

Comment Dear UDOT,

Thank you for creating a new interchange in the southern end of Utah county. It is needed! I was surprised that the project didn't include a way for motorists traveling east to get safely across highway 89 from the new interchange. The options for going east are extremely limited and only one has a traffic light. If you notice on the map I sent, the purple stars are the areas where motorists will have to try to get across or onto Highway 89 without the help of a traffic light. You only have Evergreen Road, Main Street, 400 North in Spanish Fork (which is quite a ways to the South) and the crazy interchange of Highway 89, State Road and Springville Main Street to the North. Evergreen is going to be the road many people choose. This small residential road has already seen a large increase of traffic before the interchange is even built (and it's not a safe road). The increase with a new freeway interchange is going to make this road dangerous and I fear we will have accidents and probable fatalities. 800 North in Mapleton already gets backed up with cars trying to enter highway 89 (there is not a traffic light to help traffic). I don't live in this area, (I live in the South end of Mapleton) but I imagine the residents

are extremely concerned for the safety of their families. Also the intersection to the North in Spanish Fork where Main Street and Highway 89 meets is scary to get across. It is a very dangerous section of road. I assume this new interchange is to aid in relieving the traffic on 400 South in Springville. If so, the interchange will only be effective if there is a way for motorists to get to the east side of the valley quickly and safely. I encourage you to study how motorists who live to the east are going to use this new interchange. How can we make sure it is safe and we don't have any more fatalities on Highway 89? Part of this new interchange needs to include a way for motorists to get safely to and across highway 89.
Thank you for your time
Rachel Cochran
[Phone Number Redacted]




Response UDOT acknowledges the need for a direct connection to U.S. 89 from 1600 South/2700 North. The Mountainland Association of Government's (MAG) Regional Transportation Plan (RTP) shows a future connection between S.R. 51 and U.S. 89. MAG is responsible for developing a 30-year regional transportation plan based on a comprehensive, region-wide systems analysis. The RTP evaluates and prioritizes needs throughout all of Utah County. The I-15 Springville/Spanish Fork EA is evaluating two projects listed on MAG's RTP – a new interchange at 1600 South/2700 North and widening 1600 South/2700 North from Spanish Fork Main Street to S.R. 51. According to the RTP and the associated traffic analysis, both projects are needed between 2019 and 2030. The future connection between State Street and U.S. 89 is needed between 2031 and 2040. This future connection project and other planned projects within or near the study area were included in the 2050 traffic analysis performed for this EA. The connection will be analyzed in a separate, future environmental study.

Traffic modeling projects minor increases to local traffic volumes between S.R. 51 and U.S. 89. The Preferred Alternative would be constructed in phases due to funding constraints (see Section 2.4 Construction Phasing in Chapter 2 of the EA). Widening 1600 South/2700 North is anticipated to be finished sometime between the years 2040 and 2050. MAG anticipates that the connection will be needed between 2031 and 2040. UDOT will monitor traffic conditions in this area and will work with Springville City and Spanish Fork City to make improvements as needed.

11/3/2020, 1:23 PM Website

Grant McQueen

Comment Shame not to connect 1600 S in Springville to (a) highway 89 and (b) 1600 N in Mapleton. You are so close! Finish the last mile!

Response UDOT acknowledges the need for a direct connection to U.S. 89 from 1600 South/2700 North. The Mountainland Association of Government's (MAG) Regional Transportation Plan (RTP) shows a future connection between S.R. 51 and U.S. 89. MAG is responsible for developing a 30-year regional transportation plan based on a comprehensive, region-wide systems analysis. The RTP evaluates and prioritizes needs throughout all of Utah County. The I-15 Springville/Spanish Fork EA is evaluating two projects listed on MAG's RTP – a new interchange at 1600 South/2700 North and widening 1600 South/2700 North from Spanish Fork Main Street to S.R. 51. According to the RTP and the associated traffic analysis, both projects are needed between 2019 and 2030. The future connection between State Street and U.S. 89 is needed between 2031 and 2040. This future connection project and other planned projects within or near the study area were included in the 2050 traffic analysis performed for this EA. The connection will be analyzed in a separate, future environmental study.

11/4/2020, 12:29 PM Email

Sheldon Larkin

Comment I had the opportunity to listen to the webinar about the new interchange for Mapleton to be built along 1600 South in Springville. I did not hear anyone address how a future rail line for the UTA "Front Runner" would impact the design of rail bridges/underpasses, etc along the corridor.

I am a little concerned about all the traffic on 1600 South being dumped onto State Route 51 at the T-Bone Cafe. I understand that at some point in time the corridor would be extended to U. S. 89 in Springville. If the traffic congestion we see at 5 pm on 400 South in Springville is any indication of how much traffic will use the 1600 South interchange going to Mapleton, how can Evergreen Road handle it for the time being?

I like the overall design of the corridor and what it will look like when all the phases have been completed. I would have to guess that the phases will need to be completed sooner rather than later.

I am a current resident of Springville and have lived in the community for 40+ years.

Response Current railroad plans call for the two rail lines to be consolidated, leaving a single crossing (combined Sharp/Tintic Railroad) with up to three tracks at approximately 1500 West (MAG, 2019). The MAG RTP also currently calls for the extension of Utah Transit

Authority (UTA) FrontRunner commuter rail service south from Provo to Payson along this consolidated rail line. The proposed above grade crossing has been designed to accommodate both the consolidation and the FrontRunner extension.

Traffic modeling projects minor increases to local traffic volumes between S.R. 51 and U.S. 89. The Preferred Alternative would be constructed in phases due to funding constraints (see Section 2.4 Construction Phasing in Chapter 2 of the EA). Widening 1600 South/2700 North is anticipated to be finished sometime between the years 2040 and 2050. MAG anticipates that the connection will be needed between 2031 and 2040. UDOT will monitor traffic conditions in this area and will work with Springville City and Spanish Fork City to make improvements as needed.

11/5/2020, 7:33 AM Website

Darci Blackett

Comment This is a beautiful and much needed interchange! However, I believe it will direct more Mapleton traffic to Springville's SR 51. My suggestions are to (1) add an additional stoplight at the intersection of SR51 and Evergreen Rd with dedicated left turn lane(s) (2) construct a roundabout at the intersection of Evergreen Rd and 400 E, and (3) add an additional, much needed stop light at the intersection of 800 N and Highway 89 in Mapleton with dedicated left and right turning lanes. Also any necessary road widening and improvements to accommodate these new features. There was a fatal accident at the intersection of 800 N and Highway 89 earlier this week. That intersection definitely needs looked at for improvements.

Response The construction of the Preferred Alternative does not limit other transportation improvements within the area, it is simply one element of the Regional Transportation Plan developed to improve access and mobility within and near the study area.

11/6/2020 Mailed

Dr. Peter Fawson

Comment [Address Redacted
Mapleton, UT 84664
[Phone Number Redacted
[Email Address Redacted]
Overall I'm glad to see an interchange go in at 1600 S. I have two concerns: one is the end of construction of 4 lane road at State Steet (Springville). All the 4 lanes will be trying to get on S State Street and create traffic nightmares at 1650 S., S Main St, & Evergreen roads with cars trying to enter S State Street. I feel that the 4 lane 1600 S. road needs to continue over S State Street and be bumped through to S. Hwy 89 where the traffic meets another 4 Lane Highway thus eliminating bottleneck on State Street. Please DO NOT create a major problem for local commuters now & in the future by stopping the expansion too soon into Mapleton. Also, S. State Road needs to be 4 lane from Springville to Spanish Fork. Thanx for listening.

Response UDOT acknowledges the need for a direct connection to U.S. 89 from 1600 South/2700 North. The Mountainland Association of Government's (MAG) Regional Transportation Plan (RTP) shows a future connection between S.R. 51 and U.S. 89. MAG is responsible for developing a 30-year regional transportation plan based on a comprehensive, region-wide systems analysis. The RTP evaluates and prioritizes needs

throughout all of Utah County. The I-15 Springville/Spanish Fork EA is evaluating two projects listed on MAG's RTP – a new interchange at 1600 South/2700 North and widening 1600 South/2700 North from Spanish Fork Main Street to S.R. 51. According to the RTP and the associated traffic analysis, both projects are needed between 2019 and 2030. The future connection between State Street and U.S. 89 is needed between 2031 and 2040. This future connection project and other planned projects within or near the study area were included in the 2050 traffic analysis performed for this EA. The connection will be analyzed in a separate, future environmental study.

The construction of the Preferred Alternative does not limit other transportation improvements within the area, it is simply one element of the regional transportation plan developed to improve access and mobility within and near the study area.

11/7/2020, 8:51 PM Email

Hoku Conklin

Comment I am a resident of Springville. My residence is adjacent to 1600s [Address Redacted]. In reviewing the proposed changes on your website, I want to share with you some concerns and also suggestions. Given the development in Springville and the increased traffic congestion at 400s, I believe the addition of another interchange is necessary. The 400s exit is the primary artery for most of Springville and much of Mapleton as well. The new interchange will serve more of the neighborhoods south of 400s, however, I don't see how a 5 lane highway will be necessary from the interchange all the way to SR-51, especially since SR-51 is currently only 2 lanes (with a left turn lane at intersections). I believe that 1600s should not be any larger than the current SR-51, especially east of 1200w. I only say that, because 1200w is already 4 lanes. There needs to be better pedestrian access on 1600s. East of 1200w, the two lanes in either direction should merge to one with a left turn lane for intersections and business access. It does not seem like there are any major plans for SR-51. Additionally, developing 1600s on the scale proposed would behove the city to develop the area even further, which would really change the identity of Springville. I love Springville because it has both a city and rural feel. South of 1600s is the city rodeo and also cattle fields. Developing on this level would likely change all of this. Thanks for your consideration. If you have any questions for me or if I can clarify any of these suggestions, please let me know.

Response According to the Mountainland Association of Governments' (MAG) Regional Transportation Plan (RTP), both the I-15 interchange project and the 1600 South/2700 North widening project are necessary to accommodate projected growth in the Springville and Spanish Fork communities. Because the interchange would increase traffic on 1600 South/2700 North, causing intersections on the corridor to operate at failing conditions, the Preferred Alternative includes the of widening the 1600 South/2700 North corridor (see 1.5.1 Automatically Triggers Other Actions in Chapter 1 of the EA).

Springville City and Spanish Fork City are projected to steadily increase in population between 2020 and 2050, with an estimated growth of 55 percent and 62 percent, respectively. This growth will drive development within both communities.

If selected, it is anticipated that the Preferred Alternative would be constructed in phases. Currently it is projected that the widening of 1600 South/2700 North would occur in the final phase and be completed sometime between (2040 and 2050).

11/9/2020 Mailed
Shirley Anderson
Comment With all the continued growth, it is very much needed. Thank you.
Response Your comment has been recognized.

11/9/2020
Thad Anderson Mailed
Comment I am very much in favor of the proposed interchange. I think it would be a great addition to the Freeway/Highway system here in central Utah County. My vote is yes. With all of the new housing that is being added to this area we need additional ways to deal with increased traffic. Many time, during evening rush hour traffic, the off ramp for 400 South Springville is backed up to the freeway and even sometimes on to the freeway. This additional ramp system would help ease the traffic on 400 South. I am sure that many drivers would go on down to 1600 South to avoid the heavy traffic on 400 South because of the added pressure from the business traffic of shoppers. I am one driver who would prefer the South exit because of where I live and to avoid going into Springville to go on to Mapleton. To me it seems like a win win situation for all concerned. Commercial and citizens.
Response Your comment has been recognized.

Please remember that commenting is not a form of “voting.” The number of positive or negative comments received does not influence the decision on the proposed action.

11/10/2020, 9:28 AM Website
Gary Calder
Comment This is a great project. The problem is that you need a connection to HWY 89. Without a connection to HWY 89 other conflicts will happen on the local roads and neighborhoods.
Response UDOT acknowledges the need for a direct connection to U.S. 89 from 1600 South/2700 North. The Mountainland Association of Government’s (MAG) Regional Transportation Plan (RTP) shows a future connection between S.R. 51 and U.S. 89. MAG is responsible for developing a 30-year regional transportation plan based on a comprehensive, region-wide systems analysis. The RTP evaluates and prioritizes needs throughout all of Utah County. The I-15 Springville/Spanish Fork EA is evaluating two projects listed on MAG’s RTP – a new interchange at 1600 South/2700 North and widening 1600 South/2700 North from Spanish Fork Main Street to S.R. 51. According to the RTP and the associated traffic analysis, both projects are needed between 2019 and 2030. The future connection between State Street and U.S. 89 is needed between 2031 and 2040. This future connection project and other planned projects within or near the study area were included in the 2050 traffic analysis performed for this EA. The connection will be analyzed in a separate, future environmental study.

Traffic modeling projects minor increases to local traffic volumes between S.R. 51 and U.S. 89. The Preferred Alternative would be constructed in phases due to funding

constraints (see Section 2.4 Construction Phasing in Chapter 2 of the EA). Widening 1600 South/2700 North is anticipated to be finished sometime between the years 2040 and 2050. MAG anticipates that the connection will be needed between 2031 and 2040. UDOT will monitor traffic conditions in this area and will work with Springville City and Spanish Fork City to make improvements as needed.

11/13/2020, 8:33 AM Email

Jon Jay

Comment Are there any concepts drawings of the potential alignment of the new exit?

Response You can find concept drawings on our website at udot.utah.gov/i15springvillespanishfork. On the home page you will find a 3D animation conceptually illustrating the Preferred Alternative. Additional information can be found under the Environmental Assessment tab in the EA documents and the Preferred Alternative Map.

11/13/20, 4:28 PM Email

Michael Florence

Comment Good evening, I wanted to provide my comment to the 1-15 Interchange Environmental Assessment. I have two main concerns. As I reviewed the EA and listened to the public hearing presentation, ]te  Build Alternative only shows improvements to the interchange and improvements along 1600 S./2700 N. One of the major items missing from this scope is that traffic improvements need to be made to SR51. By now introducing all of the interchange traffic onto SR51, it will make SR51 even more dangerous to vehicles trying to gain access to the road from Evergreen Drive and the intersection by the T-bone. For example, Evergreen Drive already backs up to the East and over the railroad tracks at peak hours. Similar issues occur at the intersection at the T-bone restaurant. Drivers heading southbound from both intersections have very little time to react with 50 MPH speeds on SR 51. UDOT and the consultant team have to include improvements to these intersections in their study. It would be extremely negligent to not include this as part of the study.

Thank you for consideration of my comments

Michael Florence
[Address Redacted]
Springville, UT

Response Traffic modeling shows low to moderate traffic increases on side streets that connect to 1600 South/2700 North. If the Preferred Alternative is selected, UDOT, Springville City, and Spanish Fork City will continue to monitor traffic conditions along the 1600 South/2700 North corridor and the connecting side streets to evaluate the timing and phases of potential intersection improvements (including potential traffic signals).

Traffic modeling projects minor increases to local traffic volumes between S.R. 51 and U.S. 89. The Preferred Alternative would be constructed in phases due to funding constraints (see Section 2.4 Construction Phasing in Chapter 2 of the EA). Widening 1600 South/2700 North is anticipated to be finished sometime between the years 2040

and 2050. MAG anticipates that the connection will be needed between 2031 and 2040. UDOT will monitor traffic conditions in this area and will work with Springville City and Spanish Fork City to make improvements as needed.

If selected, it is anticipated that the Preferred Alternative would be constructed in phases. Currently it is projected that the widening of 1600 South/2700 North would occur in the final phase and be completed sometime between (2040 and 2050). Construction of the Preferred Alternative does not preclude traffic improvements in the surrounding area. UDOT will monitor traffic conditions in this area and will work with Springville City and Spanish Fork City to make improvements as needed.

11/14/20, 9:36 AM Email
Heidi Reed
Comment Greetings,

It is exciting that Springville/Spanish Fork are getting a new freeway interchange. Yesterday there was an accident that blocked an entire lane near the top of the furthest west overpasses, westbound. Traffic was backed up nearly to 89 in Springville—the slow down started as you descended the first overpass after 89.

However there are a few concerns our household has about the new overpass.

First, the connectors should not be throttled down to 35

Second, a larger concern is how the connecting road, 1600 S/2700 N. The proposal for widening 1600 S/2700 N and the lights etc seem to be sufficient on the East side. What is most concerning are the secondary roads that will be funneling drivers to 89 for Mapleton or through to Spanish Fork.

Canyon Creek Parkway is a narrow two lane road that really cannot be widened for increased traffic without impact to wetlands there. 51 to East, and Main Street would need to be made appealing.

The other concern is how to get Mapleton residents from 51 to 89. All the roads that connect 51 to 89, without heading back to 400 S on 51, are narrow roads or intersections where there are accidents and/or deaths too regularly.

A common connection route is to take Evergreen Road of 51 through past the cemetery and meet 89 at 400 E Springville. (An aside, Evergreen road, like Canyon Creek really is not built to handle secondary connector traffic. But it serves as such.)

Or residents can continue straight through across 51 to 1650 S Springville to S Main, to 1600 S, which would eventually hit 89 at 350 E.

The combination of those three intersection now, 350 E and 400 E Springville, and the light at 1600 N Mapleton already make that area awful to travel through. There's even a merge right there as one heads up the hill allowing people coming off 350 or 400 E to pull out in front of those going highway speeds.

In short, it's already bad, and since it's really the only way to get from 51 to 89 and not under/overshoot Mapleton, it is a big concern.

An annotated screenshot has been attached. In case the street names were mixed up in the text.

Thank you for your time,

Reed Family
Mapleton

Response

If selected, it is anticipated that the Preferred Alternative would be constructed in phases. Currently it is projected that the widening of 1600 South/2700 North would occur in the final phase and be completed sometime between (2040 and 2050). Construction of the Preferred Alternative does not preclude traffic improvements in the surrounding area.

Traffic modeling projects minor increases to local traffic volumes between S.R. 51 and U.S. 89. The Preferred Alternative would be constructed in phases due to funding constraints (see Section 2.4 Construction Phasing in Chapter 2 of the EA). Widening 1600 South/2700 North is anticipated to be finished sometime between the years 2040

and 2050. MAG anticipates that the connection will be needed between 2031 and 2040. UDOT will monitor traffic conditions in this area and will work with Springville City and Spanish Fork City to make improvements as needed.