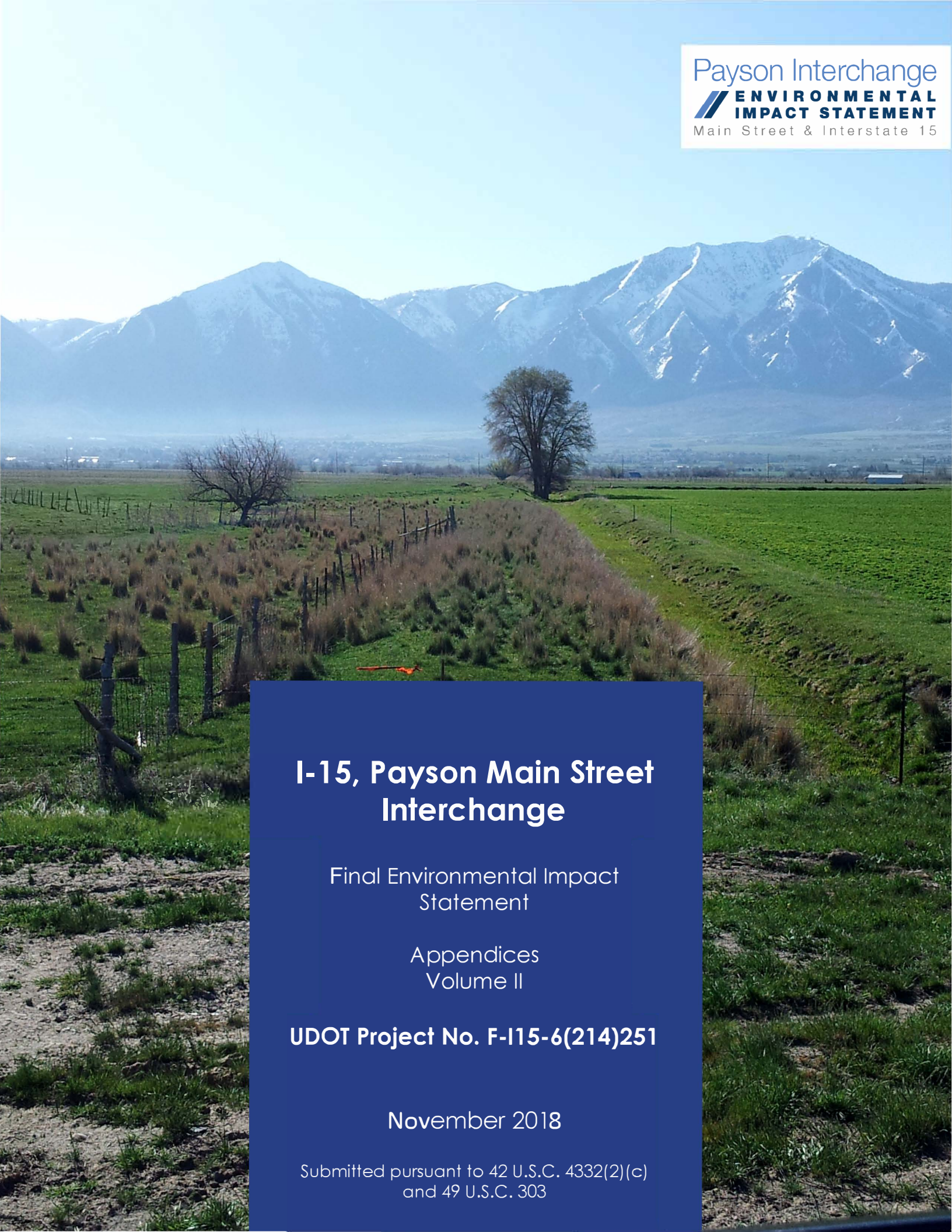

Payson Interchange
ENVIRONMENTAL IMPACT STATEMENT
Main Street & Interstate 15

I-15, Payson Main Street Interchange

Final Environmental Impact Statement

Appendices
Volume II

UDOT Project No. F-I15-6(214)251

November 2018

Submitted pursuant to 42 U.S.C. 4332(2)(c) and 49 U.S.C. 303

APPENDIX B
TECHNICAL REPORTS

The following technical reports have been prepared to support the I-15, Payson Main Street Interchange Environmental Impact Statement (EIS).

Technical Report Title	Prepared By	Contact
An Archeological Assessment for the Interstate 15 Payson Main Street Interchange EIS, Utah County, Utah	Certus Environmental Solutions, LLC Sheri Murray Ellis, MS RPA	Sheri Murray Ellis, MS RPA 655 7th Ave Salt Lake City, UT 84103
An Addendum to: An Archaeological Assessment for the Interstate 15 Payson Main Street Interchange EIS, Utah County, Utah Final	Certus Environmental Solutions, LLC Sheri Murray Ellis, MS RPA	Sheri Murray Ellis, MS RPA 655 7th Ave Salt Lake City, UT 84104
Selective Reconnaissance-Level Historic Structures Assessment for the Interstate 15 Payson Main Street Interchange EIS, Utah County, Utah	Certus Environmental Solutions, LLC Sheri Murray Ellis, MS RPA	Sheri Murray Ellis, MS RPA 655 7th Ave Salt Lake City, UT 84104
Addendum to: Selective Reconnaissance-Level Historic Structures Assessment for the Interstate 15 Payson Main Street Interchange EIS, Utah County, Utah Final	Certus Environmental Solutions, LLC Sheri Murray Ellis, MS RPA	Sheri Murray Ellis, MS RPA 655 7th Ave Salt Lake City, UT 84104
Wetland and Waters of the U.S. Delineation I-15 Payson Main Street Interchange EIS	Wetland Resources Todd Sherman	Todd Sherman 182 East 300 North Logan, UT 84321
Air Quality Assessment I-15, Payson Main Street Interchange EIS	Lochner Dave Shannon, PE	Dave Shannon, PE Lochner 225 West Washington Street Chicago, IL 60606
Project of Air Quality Concern Determination I-15, Payson Main Street Interchange EIS	Lochner Dave Shannon, PE	Dave Shannon, PE Lochner 225 West Washington Street Chicago, IL 60606

Technical Report Title	Prepared By	Contact
Noise Assessment I-15, Payson Main Street Interchange EIS	Lochner Dave Shannon, PE	Dave Shannon, PE 225 West Washington Street Chicago, IL 60606
Economic Impact Technical Report I-15, Payson Main Street Interchange EIS	Leland Consulting Group Ted Kamp Chris Zahas	Ted Kamp, AICP 610 SW Alder Street # 1008 Portland, OR 97205
Wildlife Inventory Report I-15 Payson Main Street Interchange EIS	InterWest Wildlife Glen Gantz	Glen Gantz 11255 North 2000 East Richmond, UT 84333
Sprianthes diluvialis Survey I-15 Payson Main Street Interchange EIS	Wetland Resources Todd Sherman	Todd Sherman 182 East 300 North Logan, UT 84321
I-15 Payson Main Street Interchange Biological Assessment (including Not Likely to Adversely Affect Determination)	Lochner Justin Peterson, AICP	Justin Peterson, AICP 3995 South 700 East, Ste 450 Salt Lake City, UT 84107
Traffic Report I-15, Payson Main Street Interchange EIS	Avenue Consultants Ivan Hooper, PE Bill Hereth, PE	Ivan Hooper, PE 6575 S Redwood Rd., Ste 101 Taylorsville, UT 84123
Bamberger Ranch Sensitivity Analysis	Avenue Consultants Ivan Hooper, PE Bill Hereth, PE	Ivan Hooper, PE 6575 S Redwood Rd., Ste 101 Taylorsville, UT 84123

APPENDIX B
TECHNICAL REPORTS

AIR QUALITY ASSESSMENT I-15, PAYSON MAIN STREET INTERCHANGE ENVIRONMENTAL IMPACT STATEMENT

Payson Interchange

ENVIRONMENTAL IMPACT STATEMENT

Main Street & Interstate 15

Air Quality Assessment

I-15; Payson Main Street Interchange EIS

Project No. F-I15-6(214)251 | PIN 10263

Utah County, Utah

February 17, 2017

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Prepared for:

UDOT Keeping Utah Moving

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1. INTRODUCTION

This study addresses the air quality impacts from the proposed improvement of the I-15 Main Street interchange in Payson, Utah County, Utah. The project involves consideration of various alternatives for the improvement of the interchange, including improving the existing interchange, relocating the interchange to the northeast, and multiple "combination" improvements that would maintain access at the existing Main Street interchange while adding a new interchange with a new arterial connection (Nebo Beltway). Six Build Alternatives, in addition to the No-Build Alternative, were advanced for further consideration from a screening process and are addressed in this Air Quality Assessment. The air quality study area is shown in Figure 1.

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.

No-Build Alternative

The No-Build Alternative includes all other projects that are proposed in the Regional Transportation Plan. The following projects are included in Mountainland Association of Governments' (MAG) TransPlan40:

- Widening of SR-198 to four lanes
- Capacity improvements at SR-164 (8000 South) interchange
- Capacity improvements at SR-178 (Payson 800 South) interchange
- Extension of Elk Ridge Drive from to SR-198 to SR-164 (8000 South)

Alternative C1

Alternative C1 would provide a free-flow connection between the Main Street interchange and a new interchange connecting to the proposed Nebo Beltway. Braided ramps (i.e., ramps that cross over each other) would connect the two interchanges. Motorists traveling on I-15 in either direction would exit I-15 and have the option to take the nearest road (i.e., Main Street for northbound motorists or Nebo Beltway for southbound motorists) or continue to the next road in free-flow/continuous lanes without stopping at a traffic signal. Motorists entering I-15 from Main Street (northbound) or Nebo Beltway (southbound) would utilize the respective on-ramp that would cross over the free-flow continuous lanes and enter I-15 between both interchanges. From the new interchange, motorists would travel on Nebo Beltway until it intersects with SR-198 at 2100 West, thereby avoiding and reducing congestion at Main Street and the existing interchange.

Figure 1: Air Quality Study Area

Main Street would be widened to five lanes at the interchange and taper to its current configuration south of 600 North. Main Street would also be realigned to connect to 9600 South, instead of maintaining its current north-south alignment to improve the skew.

Alternative C3

Alternative C3 would include an additional interchange approximately 0.72 miles northeast of Main Street. However, frontage roads would connect the two interchanges instead of free-flow ramps. Motorists traveling on I-15 in either direction would exit I-15 and stop at the first signalized interchange (i.e., Main Street for northbound motorists or Nebo Beltway for southbound motorists) or continue on the frontage road to the next interchange. Motorists entering I-15 from Main Street (northbound) or Nebo Beltway (southbound) would utilize the frontage road to the next interchange and proceed through the signalized intersection to the respective on-ramp. From the new interchange, motorists would travel on Nebo Beltway until it intersects with SR-198 at 2100 West, thereby avoiding and reducing congestion at Main Street and the existing interchange.

Main Street would be widened to five lanes at the interchange and taper to its current configuration south of 600 North. Main Street would also be realigned to connect to 9600 South, instead of maintaining its current north-south alignment to improve the skew.

Alternative C4

Alternative C4 would function the same as Alternative C3, with frontage roads connecting the Main Street interchange to an additional interchange approximately 0.15 miles northeast of Main Street.

Alternative I1

Alternative I1 improves and adds capacity at the existing interchange and Main Street by widening Main Street to five lanes between the interchange and SR-198. In addition, the on- and off-ramps of the existing interchange would be extended away from I-15, and the turning radius at each ramp also would be increased.

Alternative R1

The R1 Alternative would accommodate the future traffic needs by relocating the interchange northeast along I-15, close to its current location. This would eliminate direct access to Main Street, and direct all traffic onto a new arterial road (Nebo Beltway). Main Street north of I-15 would be slightly realigned to the west, while maintaining its current north-south alignment, to accommodate the intersection with Nebo Beltway.

Alternative R2

The R2 Alternatives would accommodate the future traffic needs by relocating the interchange northeast along I-15, further north than the R1 Alternative. This would eliminate direct access to Main Street, and direct all traffic onto a new arterial road (Nebo Beltway). Main Street would not need to be widened. Alternative R2 also includes a connection between Main Street and Nebo Beltway along the south side of I-15.

2. CRITERIA POLLUTANTS

The Environmental Protection Agency (EPA) has identified six criteria pollutants for which specific standards have been determined, the National Ambient Air Quality Standards (NAAQS). These six criteria pollutants are:

- Particulate matter
- Carbon monoxide
- Ozone
- Nitrogen dioxide
- Sulfur dioxide
- Lead

The three pollutants that are most directly attributable to motor vehicles and are of most concern in the transportation planning and environmental permitting process in Utah are carbon monoxide (CO), particulate matter (PM_{10} and $PM_{2.5}$), and ozone (O_3).

Areas with pollutant levels above the NAAQS are called nonattainment areas. Nonattainment areas must produce a plan for reducing pollutants so they are at or below the NAAQS. These plans are called State Implementation Plans (SIPs) and in Utah, are developed by the State of Utah Division of Air Quality. Maintenance areas are those areas that were formerly nonattainment areas for a criteria pollutant but have since met EPA standards and have a maintenance plan to stay within the standards approved by the EPA pursuant to Title 40 of the Code of Federal Regulations (CFR) Part 51.110 (June 1996).

Air quality analysis occurs at both a regional and project level. Regional-level analysis is concerned with regional air quality conformity and the project's Long Range Plan and Transportation Improvement Program (TIP) status. Project-level analysis is the estimation of air quality impacts of a specific transportation project, and the project's impact on a pollutant's level with respect to the NAAQS (i.e., if a project will cause a new NAAQS violation or worsen an existing violation of the standard).

Carbon Monoxide (CO)

CO is of concern in the transportation planning process as motor vehicles account for a large majority of CO emissions. It tends to be more of a problem in cold temperatures and is a product of incomplete combustion. Poorly functioning intersections have higher levels of CO as cars move slower and idle for longer periods of time. CO is localized in nature, tends to disperse quickly, and is the primary pollutant of concern at the local project level. The one-hour and eight-hour NAAQS for CO is 35.0 parts per million (ppm) and 9.0 ppm, respectively.

The Clean Air Act states that a transportation project cannot cause an exceedance of the NAAQS, and that a project cannot worsen an already-existing exceedance. However, a project might have positive impacts on an existing exceedance, decreasing the level of CO, but still be above the NAAQS. Under these conditions, projects can move forward. The EPA has approved a project-level modeling technique for CO, called CAL3QHC.

Particulate Matter (PM)

Particulate matter, or PM, is the term commonly used for dust, dirt, and smoke in the air, and can be particles either large enough to be seen by the human eye, or small enough to only be seen with an electron microscope. PM is divided into two categories: PM_{10} and $PM_{2.5}$. PM_{10} is particulate matter 10 micrometers in diameter or less, which is about one-seventh the width of a strand of human hair. $PM_{2.5}$ is even smaller and measures 2.5 micrometers in diameter or less.

Sources of PM include direct sources such as diesel exhaust, construction activities, gravel pits, re-entrained road dust and unpaved roads. Indirect sources are chemical reactions from the gases of burning fuels interacting with each other and water vapor to form particles. Motor vehicles are a key source of these gases. PM is of particular concern during the winter months, when temperature inversions trap air in mountain valleys, preventing pollutants from dispersing. PM and other pollutants continue to accumulate, further compromising air quality. The longer the inversion lasts, the worse the air quality will be. Localized impacts of PM may be serious enough in some areas to require project-level conformity.

Ozone (O_3)

O_3 is a key ingredient of summertime smog and results from a chemical reaction between oxides of nitrogen (NOx) and volatile organic compounds (VOCs) with the presence of heat and sunlight. These pollutants necessary to produce O_3 are called precursors. Whether O_3 is “good” or “bad” depends on where in the atmosphere it occurs. O_3 in the stratosphere, 10 to 30 miles from earth, is “good” O_3 and helps to protect us from the sun’s rays. “Bad” O_3 is that which occurs at ground level. O_3 is considered a summertime pollutant as heat and light are necessary to cause the chemical reaction. Vehicle exhaust is a key source of NOx and VOC. While O_3 pollution is generally considered an urban pollutant, rural areas can be affected by O_3 pollution

as well, as it can be carried long distances by wind. Along the Wasatch Front, O_3 is transported by upslope and downslope winds mixing the necessary precursors and carrying them to other areas. Attempts to reduce O_3 and its impacts need to be done at a regional level through such measures as reducing vehicle miles of travel, offering cleaner burning cars, reducing industrial emissions, capturing refueling emissions, etc. Because O_3 is a regional-level pollutant, there are no project-level conformity requirements for O_3.

Other NAAQS Pollutants

The remaining three criteria pollutants, sulfur dioxide (SO_2), nitrogen dioxide (NO_2), and lead (Pb), are not currently pollutants of concern in Utah County. Therefore, there are no project-level conformity requirements.

Urban Air Toxics

In addition to the NAAQS set forth by the EPA for the six criteria pollutants, the EPA has also established a list of 188 urban air toxics. Urban air toxics, also known as hazardous air pollutants, are those pollutants that cause or may cause cancer or other serious health effects or adverse environmental and ecological effects. Most air toxics originate from human-made sources, including road mobile sources (e.g., cars, trucks, buses), non-road mobile sources (e.g., airplanes, lawnmowers) and stationary sources (e.g., factories, refineries, power-plants), as well as indoor sources (e.g., building materials). Some air toxics are also released from natural sources such as volcanic eruptions and forest fires.

These pollutants are in the atmosphere as a result of an industrialized society. Science has been providing more evidence regarding the risks these pollutants pose to human health. The health risks for people exposed to urban air toxics at sufficiently high concentrations or lengthy durations include an increased risk of getting cancer or experiencing other serious health effects. These health effects can include damage to the immune system as well as neurological, reproductive, developmental, respiratory, and other health problems. To better understand the harmful effects that urban air toxics have on human health, the EPA developed a list of 21 mobile source air toxics (MSAT) including acetaldehyde, benzene, formaldehyde, diesel exhaust, acrolein and 1,3-butadiene. They then assessed the risks of various kinds of exposures to these pollutants. In July 1999, the EPA published a strategy to reduce urban air toxics. In March 2001, the EPA issued regulations for the producers of urban air toxics to decrease the amounts of these pollutants by target dates in 2007 and 2020. Under these regulations, between 1990 and 2020, on-highway emissions of benzene, formaldehyde, 1,3-butadiene, and acetaldehyde will be reduced by 67 to 76 percent, and on-highway diesel PM emissions will be reduced by 90 percent. These reductions are due to the impacts of national mobile source control programs including the reformulated gasoline program, a new cap on the toxics content of gasoline, the national low emission vehicle standards, the Tier 2 motor vehicle emissions

standards and gasoline sulfur control requirements, and the heavy-duty engine and vehicle standards and on-highway diesel fuel sulfur control requirements. These are net emission reductions, that is, the reductions that will be experienced even after growth in vehicle miles traveled (VMT) is taken into account.

The EPA has not yet determined how best to evaluate the impact of future roads and intersections on the ambient concentrations of urban air toxics, and no regional or project-level conformity requirements associated with MSATs exist.

Greenhouse Gases

Greenhouse gases are both naturally occurring and by-products of human activities. They contribute to the degradation of the environment by trapping reflected heat in the atmosphere that would otherwise pass through. Industrialization and the burning of fossil fuels are the primary reasons for increased emissions of greenhouse gases. Motor vehicles are a large producer of greenhouse gases, as the burning of petroleum fuels is a primary producer of carbon dioxide, a greenhouse gas. There are no NAAQS for greenhouse gases and no regional or project-level conformity requirements associated with greenhouse gases.

3. REGULATORY ENVIRONMENT

The Clean Air Act requires that federal actions conform to the Long Range Transportation Program (LRTP) and Maintenance Plan approved under Section 110 of the act. The Transportation Conformity Rule, 40 CFR 51 and 93, establishes standards and guidelines to be followed in determining conformity of a proposed transportation project to the LRTP. Specifically, the proposed transportation project must come from the LRTP, which demonstrates that the proposed project, when analyzed regionally with all other proposed transportation improvement projects, conforms to the control strategies and emissions levels outlined in the LRTP or Maintenance Plan.

In addition to this regional analysis, localized project analysis is also required to determine the project's impact on a pollutant's level with respect to the NAAQS.

This project is located within the MAG metropolitan planning area. MAG prepares and updates a five-year Transportation Improvement Plan (TIP). The current TIP covers the years 2016–2019. MAG is also responsible for demonstrating that the current TIP conforms to the SIP for the State of Utah. This project is listed in the current TIP. MAG also prepares and updates a long-range transportation plan. The current long-range plan is called TransPlan40 and includes projects planned through 2040. The I-15, Payson Main Street EIS project is included in TransPlan2040, which was found to conform with the SIP.

4. EXISTING CONDITIONS

Air Quality Standards

The current NAAQS are summarized in Table 1.

Table 1
National Ambient Air Quality Standards (NAAQS)
(ppm = parts per million, ppb = parts per billion)

Pollutant	Primary/ Secondary	Averaging Time	Level	Form
Carbon Monoxide (CO)	Primary	8-Hour	9 ppm	Not to be exceeded more than once per year
		1-Hour	35 ppm	
Lead (Pb)	Primary and Secondary	Rolling 3-Month Average	0.15 µg/m^3 (1)	Not to be exceeded
Nitrogen Dioxide (NO_2)	Primary	1-Hour	100 ppb	98th percentile, averaged over 3 years
	Primary and Secondary	Annual	53 ppb (2)	Annual mean
Ozone (O_3)	Primary and Secondary	8-Hour	0.070 ppm (3)	Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years
Particulate Matter ($PM_{2.5}$)	Primary	Annual	12.0 µg/m^3	Annual mean, averaged over 3 years
	Secondary	Annual	15.0 µg/m^3	Annual mean, averaged over 3 years
	Primary and Secondary	24-Hour	35 µg/m^3	98th percentile, averaged over 3 years
Particulate Matter (PM_{10})	Primary and Secondary	24-Hour	150 µg/m^3	Not to be exceeded more than once per year on average over 3 years
Sulfur Dioxide (SO_2)	Primary	1-Hour	75 ppb (4)	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years
	Secondary	3-Hour	0.5 ppm	Not to be exceeded more than once per year

Source: 40 CFR 50

(1) In areas designated nonattainment for the Pb standards prior to the promulgation of the current (2008) standards, and for which implementation plans to attain or maintain the current (2008) standards have not been submitted and approved, the previous standards (1.5 µg/m^3 as a calendar quarter average) also remain in effect.
(2) The level of the annual NO_2 standard is 0.053 ppm. It is shown here in terms of ppb for the purposes of clearer comparison to the 1-hour standard level.
(3) Final rule signed October 1, 2015, and effective December 28, 2015. The previous (2008) O_3 standards additionally remain in effect in some areas. Revocation of the previous (2008) O_3 standards and transitioning to the current (2015) standards will be addressed in the implementation rule for the current standards.
(4) The previous SO_2 standards (0.14 ppm 24-hour and 0.03 ppm annual) will additionally remain in effect in certain areas: (1) any area for which it is not yet 1 year since the effective date of designation under the current (2010) standards, and (2) any area for which implementation plans providing for attainment of the current (2010) standard have not been submitted and approved and which is designated nonattainment under the previous SO_2 standards or is not meeting the requirements of a SIP call under the previous SO_2 standards (40 CFR 50.4(3)). A SIP call is an EPA action requiring a state to resubmit all or part of its SIP to demonstrate attainment of the required NAAQS.

Attainment Status

Utah County is currently designated as a moderate nonattainment area for course particulate matter (PM_{10}) and as a moderate nonattainment for fine particulate matter ($PM_{2.5}$) according to the EPA (*Green Book: Nonattainment Areas for Criteria Pollutants*, EPA, February 13, 2017). The project area is in attainment for all other criteria pollutants. It should be noted that the City of Provo, also located within Utah County, is currently designated as a maintenance area for CO.

The current attainment status for the project area is listed in Table 2.

Table 2
Project-Area Attainment Status

Pollutant	Status
Carbon Monoxide (CO)	Attainment
Lead (Pb)	Attainment
Nitrogen Dioxide (NO_2)	Attainment
Ozone (O_3)	Attainment
Particulate Matter ($PM_{2.5}$)	Nonattainment (Moderate)
Particulate Matter (PM_{10})	Nonattainment (Moderate)
Sulfur Dioxide (SO_2)	Attainment

Regional Air Quality

For PM_{10}, most high values tend to occur during wintertime inversions. In the summertime, high wind events can also lead to unusually high PM_{10} values. Trends are somewhat difficult to evaluate because weather plays such a large role in the data collected from year to year. Hence, the standard is evaluated over a three-year period.

Like PM_{10}, $PM_{2.5}$ maximum values also tend to occur during wintertime inversions. Also like PM_{10}, trends are somewhat difficult to evaluate because weather plays such a large role in the data collected from year to year. Similar to PM_{10}, the standard is evaluated over a three-year period.

Study Area Air Quality Existing Conditions

The nearest air quality monitoring location to the project area is the Spanish Fork Site (Site ID 490495010), which is located at 312 West 2050 North in Spanish Fork, Utah. The monitoring site collects data related to $PM_{2.5}$ and O_3. Another location farther north from the project area in Provo (Site ID 490490002) collects data related to $PM_{2.5}$, PM_{10}, O_3, NO_x and CO. Additional data for the Spanish Fork and Provo sites are included in Appendix 2.

$PM_{2.5}$

$PM_{2.5}$ monitoring data from the Spanish Fork monitoring station is listed in Table 3 for the last 10 years. In six of the eight years for which an average could be calculated, the three-year average of the 98th percentile value for the 24-hour period was greater than the primary/secondary standard of 35 μg/m³. The three-year averages of the weighted mean were less than both the primary annual standard of 12 μg/m³ and the secondary annual standard of 15 μg/m³.

Table 3
$PM_{2.5}$ Monitoring Data

Year	24-Hour $PM_{2.5}$					Annual $PM_{2.5}$		
	1st Max (μg/m³)	2nd Max (μg/m³)	98th Percentile (μg/m³)	3-Year Average (μg/m³)	Exceeds 35 μg/m³ Standard (Yes/No)	Annual Mean (μg/m³)	3-Year Average (μg/m³)	Exceeds 12/15 μg/m³ Standard (Yes/No)
2006	38.8	22.9	22	N/A	--	7.7	N/A	--
2007	71.2	57.6	55	N/A	--	11.1	N/A	--
2008	43.3	27.6	26	34.3	No	8.2	9.0	No
2009	77.3	59.2	44	41.7	Yes	9.6	9.6	No
2010	59.6	51.7	48	39.3	Yes	8.5	8.8	No
2011	46.0	34.6	33	41.7	Yes	7.4	8.5	No
2012	29.5	28.8	22	34.3	No	7.2	7.7	No
2013	125.9	84.6	82	45.7	Yes	11.0	8.5	No
2014	41.1	28.7	27	43.7	Yes	6.4	8.2	No
2015	37.5	31.4	28	46.5	Yes	6.2	7.9	No

PM_{10}

PM_{10} monitoring data from the Provo monitoring station is listed in Table 4 for the last 10 years. During that period, the only exceedances of the 24-hour value for PM_{10} of the 150 μg/m³ standard occurred in 2010, during which there were 3.5 exceedance days. The rolling three-year averages for the years from 2010 to 2012 were 1.2 exceedances per year, which is above the standard of one exceedance per year on average.

Table 4
PM_{10} Monitoring Data

Year	24-Hour PM_{10}				
	1st Max (µg/m³)	2nd Max (µg/m³)	Estimated Exceedance (Days)	3-Year Exceedance Average (Days)	Exceeds Standard of One Exceedance Averaged Over 3 Years (Yes/No)
2006	123	71	0	0	N/A
2007	146	91	0	0	N/A
2008	141	90	0	0	No
2009	108	80	0	0	No
2010	395	85	3.5	1.2	Yes
2011	59	52	0	1.2	Yes
2012	76	67	0	1.2	Yes
2013	149	107	0	0	No
2014	73	52	0	0	No
2015	47	41	0	0	No

Ozone (O_3)

O_3 data from the Spanish Fork monitoring station is listed in Table 5 for the last 10 years. During that period, the three-year average of the 4th highest 8-hour concentrations exceeded the 0.075 µg/m³ standard in 2008 and 2014.

Table 5
O_3 Monitoring Data

Year	8-Hour O_3					
	1st Max (µg/m³)	2nd Max (µg/m³)	3rd Max (µg/m³)	4th Max (µg/m³)	3-Year Average (µg/m³)	Exceeds 0.075 µg/m³ Standard (Yes/No)
2006	0.082	0.081	0.079	0.079	N/A	N/A
2007	0.091	0.081	0.080	0.077	N/A	N/A
2008	0.091	0.087	0.072	0.071	0.076	Yes
2009	0.076	0.074	0.070	0.069	0.072	No
2010	0.074	0.072	0.071	0.070	0.070	No
2011	0.069	0.066	0.065	0.065	0.068	No
2012	0.088	0.085	0.079	0.076	0.070	No
2013	0.078	0.073	0.070	0.070	0.070	No
2014	0.082	0.082	0.077	0.076	0.076	Yes
2015	0.074	0.073	0.071	0.071	0.071	No

Carbon Monoxide (CO)

CO data from the Provo monitoring station is listed in Table 6 for the last 10 years. During that period, there were no exceedances of the 1-hour standard of 35 ppm or the 8-hour standard of 9 ppm.

Table 6
CO Monitoring Data

Year	1-Hour CO			8-Hour CO		
	1st Max (ppm)	2nd Max (ppm)	Exceeds 35 ppm Standard (Yes/No)	1st Max (ppm)	2nd Max (ppm)	Exceeds 9 ppm Standard (Yes/No)
2006	4.7	4.5	No	2.4	2.1	No
2007	4.2	3.8	No	2.8	2.5	No
2008	5.0	3.9	No	2.0	1.8	No
2009	5.0	3.9	No	2.7	2.5	No
2010	3.4	2.8	No	2.0	1.9	No
2011	3.3	2.9	No	2.0	2.0	No
2012	3.4	2.7	No	2.0	1.8	No
2013	3.7	3.0	No	2.4	2.1	No
2014	2.7	2.7	No	1.9	1.9	No
2015	3.0	2.9	No	2.2	2.1	No

5. REGIONAL CONFORMITY

This section examines the regional effects of the project on concentrations of the criteria pollutants.

Particulate Matter (PM_{10} and $PM_{2.5}$)

This project is located in Utah County, which is a nonattainment area for PM_{10} and $PM_{2.5}$ according to the EPA. In Utah, PM has a strong regional component to it. Utah's climate and geography contribute to the regional impacts of PM when temperature inversions cause particles to become trapped in mountainous valleys. Meteorological conditions combined with changes in the regional land use and transportation patterns might affect PM at a regional level. However, the effects of any individual project are likely to be small and uncertain.

While VMT in Utah County is predicted to gradually increase through 2040, PM emissions are predicted to be below the established emissions budgets for primary and secondary particulates as demonstrated in the conformity determination for TransPlan2040 (MAG 2015a).

Carbon Monoxide (CO)

This project is located in a part of Utah County that is an attainment area for CO according to the EPA. While a vast majority of CO can be attributed to motor vehicles, industrial processes

such as metals processing, forest fires, wood stove emissions, and even cigarette smoke are additional sources of CO emissions. Significant changes in other emissions sources combined with changes in travel patterns and transportation networks might affect CO at a regional level. However, the effects of any individual project are likely to be small and uncertain.

Ozone (O_3)

This project is located in Utah County and is in attainment for O_3 according to the EPA. Although further analysis is not necessary, a short discussion of the regional nature of O_3 is warranted. O_3 is the result of a chemical reaction between NOx, VOCs, and heat and sunlight. Vehicle exhaust, industrial emissions, and gasoline vapors are major sources of NOx, VOCs. Meteorological conditions combined with changes in the regional land use and transportation patterns might affect O_3 at a regional level. However, the effects of any individual project are likely to be small and uncertain.

Nitrogen Dioxide (NO_2)

There are currently no nonattainment or maintenance areas in Utah for NO_2. Due to the regional nature of NO_2 and the minimization of motor vehicles as a source of this pollutant, there is no reason to believe that this project will affect concentrations of this pollutant in the project area.

Sulfur Dioxide (SO_2)

This project is located in Utah County, which is an attainment area for SO_2. SO_2 is primarily produced by sources other than roadway vehicles; therefore, there is no reason to believe that this project will affect concentrations of this pollutant in the project area.

Lead

There are currently no nonattainment or maintenance areas in Utah for lead. Due to changes in fuels, motor vehicles are no longer considered a source of this pollutant. Therefore, there is no reason to believe that this project will affect concentrations of this pollutant in the project area.

Other Pollutants including Greenhouse Gases

At this time, no federal laws or regulations have been enacted and the EPA has not established criteria or thresholds for greenhouse gas emissions. The sources and effects of greenhouse gases are global in nature; to attempt project-level analysis of negligible increases or decreases of carbon dioxide (the primary greenhouse gas transportation-related emission) is technically unfeasible. Because of the high levels of uncertainty, the results of such an analysis would not be likely to inform decision-making at the project level. The scope of such an analysis, with any results being purely speculative, goes far beyond the disclosure impacts needed to make sound transportation decisions.

6. PROJECT-LEVEL CONFORMITY

This section examines the project-level effects on concentrations of PM_{10}, $PM_{2.5}$, and CO. On a project level, these are the air pollutants most associated with a transportation project.

Particulate Matter (PM_{10} and $PM_{2.5}$)

This project is located Utah County, which is an EPA-designated nonattainment area for both PM_{10} and $PM_{2.5}$. PM hot-spot analyses are required for projects of local air quality concern, which include certain highway and transit projects that involve significant levels of diesel vehicle traffic. Section 93.123(b)(1) of the Conformity Rule (40 CFR 51 and 93) defines projects that require a PM hot-spot analysis, including an "expanded highway project that [has] a significant increase in the number of diesel vehicles." The Conformity Rule, however, does not define a threshold for what should be considered a significant amount of diesel traffic.

Appendix B of the EPA's *Transportation Conformity Guidance for Quantitative Hot-Spot Analyses in $PM_{2.5}$ and PM_{10} Nonattainment and Maintenance Areas* (November 2015) includes examples of projects of air quality concern. The first example listed is "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 percent or more of such AADT is diesel truck traffic."

The design-year traffic on I-15 north of the project area is predicted to be 103,000 vehicles. The AADT between the proposed Nebo Beltway and Main Street interchanges ranges from 80,000 under the C4 Alternative to 92,000 under the C1 Alternative and the variation is due largely to the configuration of the ramps. Currently, medium and heavy trucks make up approximately 26% of the total traffic volume on I-15. If diesel truck traffic grows at the same rate as total vehicles, the number of diesel vehicles on I-15 will range from 21,000 to 24,000 per day. None of the Build Alternatives include expanding or adding capacity to I-15, or include facilities that would attract heavy diesel vehicles such as weigh stations or service stations. The proposed improvements under all of the Build Alternatives focus on the Payson Main Street interchange and associated side roads, none of which are predicted to experience ADTs in excess of 24,500 vehicles. Traffic data for the project is attached as Appendix 1.

Traffic volumes under the build and no-build conditions were reviewed to determine if this project is a project of air quality concern. Total traffic and truck traffic volumes remain generally the same under all alternatives, and none of the Build Alternatives are expected to significantly add to traffic volumes on I-15. The purpose of the Build Alternatives is to reduce congestion; thus, vehicles will be traveling at more efficient speeds, and air emissions are expected to be lower under build conditions. Vehicle emissions are continuing to improve/decrease. Federal emission standards for new vehicles are much more stringent than in the past, thus, as the

vehicle fleet turns over (i.e., older vehicles are replaced with newer ones) the amount of pollution will continue to decline.

For these reasons, none of the Build Alternatives are likely to cause an exceedance of the air quality standards and, therefore, the project does not warrant a PM hot-spot analysis.

Carbon Monoxide (CO)

This project is located in a part of Utah County that is in attainment for CO. No additional project-level analysis is required. Since all of the Build Alternatives for the improved interchange and the existing condition are predicted to operate at level of service C or better, it is unlikely that any localized exceedances of the CO standard will occur. Under the No-Build Alternative, the signalized intersection at the southbound I-15 off-ramp and Main Street is predicted to operate at LOS F which indicates a higher level of congestion and subsequently higher levels of CO in the congested area. While that does not mean that an exceedance of the standard is likely, it does indicate that CO levels will likely be higher in that area than under any of the Build Alternatives.

Urban Air Toxics

For the Build Alternatives in this study, the amount of MSATs emitted would be proportional to the VMT, assuming that other variables such as fleet mix are the same for each alternative. The estimated VMT for the I1 Build Alternative is similar to the No-Build Alternative because the roadway network in the project area is not changed. Congestion is predicted to increase substantially under the No-Build Alternative and improvements under the I1 Alternative will reduce congestion substantially. The predicted VMT for the C1, C3, C4, R1 and R2 Alternatives are expected to be approximately 7% higher than the No-Build because drivers will avoid the Main Street congested area via the proposed Nebo Beltway which is a longer route. However, congestion will be reduced substantially below No-Build levels due to the improved network efficiency. MSAT emissions for the Build Alternatives can therefore be expected to be lower due to reduced congestion and increased speeds, even though total VMT is higher. According to the EPA's MOVES2010b, emissions of all of the priority MSATs except for diesel PM decrease as speed increases. Also, emissions will likely be lower than present levels in the design year as a result of the EPA's national control programs that are projected to reduce annual MSAT emissions by 72 percent between 1999 and 2050. 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 (even after accounting for VMT growth) that MSAT emissions in the study area are likely to be lower in the future in nearly all cases.

The changes to the roadway network included in the Build Alternatives will have the effect of moving some traffic closer to nearby homes and businesses. Therefore, under the Build Alternatives there may be localized areas where ambient concentrations of MSAT could be higher than under the No-Build Alternative. However, the magnitude and the duration of these potential increases compared to the No-Build Alternative cannot be reliably quantified due to incomplete or unavailable information in forecasting project-specific MSAT health impacts. In sum, when a roadway is widened or shifted, the localized level of MSAT emissions for the Build Alternatives could be higher relative to the No-Build Alternative, but this could be offset due to increases in speeds and reductions in congestion (which are associated with lower MSAT emissions). Also, MSAT will be lower in other locations when traffic shifts away from them.

On a regional basis, the EPA's vehicle and fuel regulations, coupled with fleet turnover, will over time cause substantial reductions that, in almost all cases, will cause region-wide MSAT levels to be significantly lower than today.

7. NO-BUILD ALTERNATIVE

Under the No-Build Alternative, the proposed project would not be built. However, other regionally significant transportation projects identified in MAG's TransPlan40 would be constructed.

The most recent transportation conformity analyses conducted for the Utah County nonattainment and maintenance areas indicate that in 2040, all regionally significant transportation projects would be within the CO, $PM_{2.5}$, and PM_{10} emission budgets established in the SIP.

8. CONSTRUCTION IMPACTS

Air quality impacts resulting from roadway construction activities are typically not a concern when contractors utilize appropriate control measures. During construction of the proposed project, all materials resulting from clearing and grubbing, demolition or other operations will be removed from the project or otherwise disposed of by the contractor. During construction, measures will be taken to reduce the dust generated by construction when the control of dust is necessary for the protection and comfort of motorists or area residents.

9. MITIGATION

There are no anticipated indirect impacts of any of the Build Alternatives on air quality. The improvements to mobility and resulting reduction in congestion from the project should result in lowered levels of criteria pollutants in the project area.

Since the project is not predicted to cause a new exceedance of the NAAQS or worsen an existing exceedance, no mitigation is required. Nevertheless, best management practices should be employed in all construction phases in accordance with the UDOT *2017 Standard Specifications for Road and Bridge Construction*.

10. REFERENCES

Code of Federal Regulations. Title 40 CFR Parts 50, 51, 81 and 93. July 1, 2016.

[EPA] U.S. Environmental Protection Agency. 2015. *Transportation Conformity Guidance for Quantitative Hot-spot Analyses in $PM_{2.5}$ and PM_{10} Nonattainment and Maintenance Areas*. November.

[EPA] U.S. Environmental Protection Agency. 2016a. *The Green Book Nonattainment Areas for Criteria Pollutants*. Website accessed February 16, 2017.

[EPA] U.S. Environmental Protection Agency. 2016b. AirData website accessed February 16, 2017.

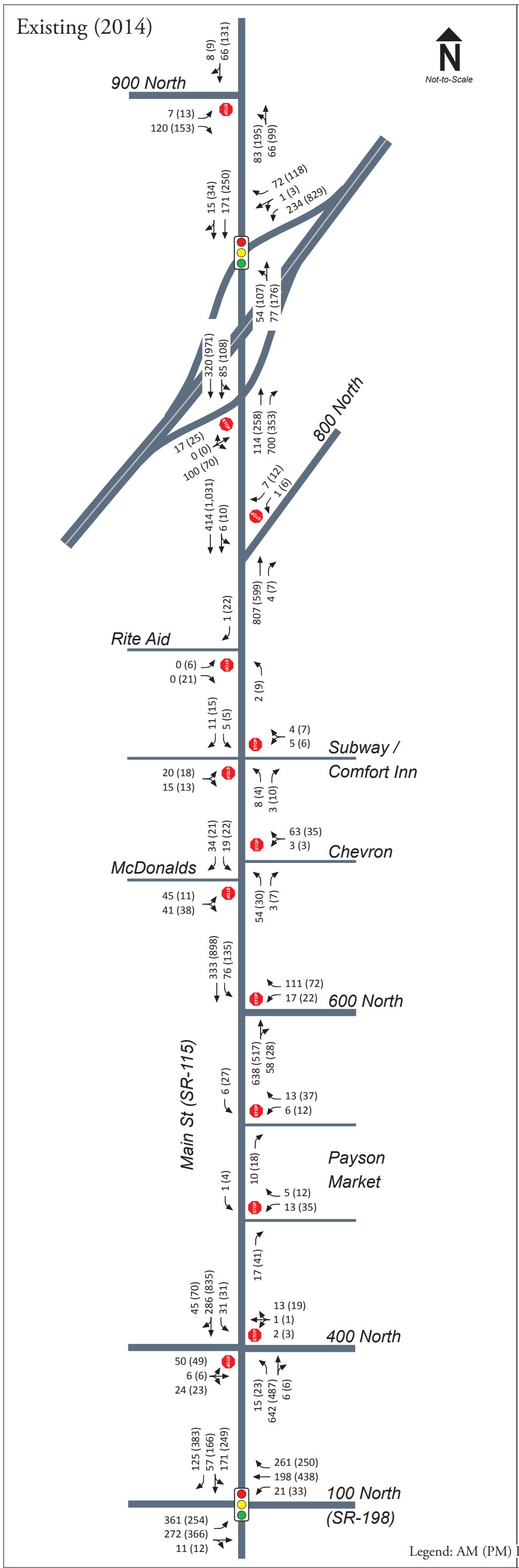
[FHWA] Federal Highway Administration. 2012. *INFORMATION: Interim Guidance Update on Mobile Source Air Toxic Analysis in NEPA*. December 6.

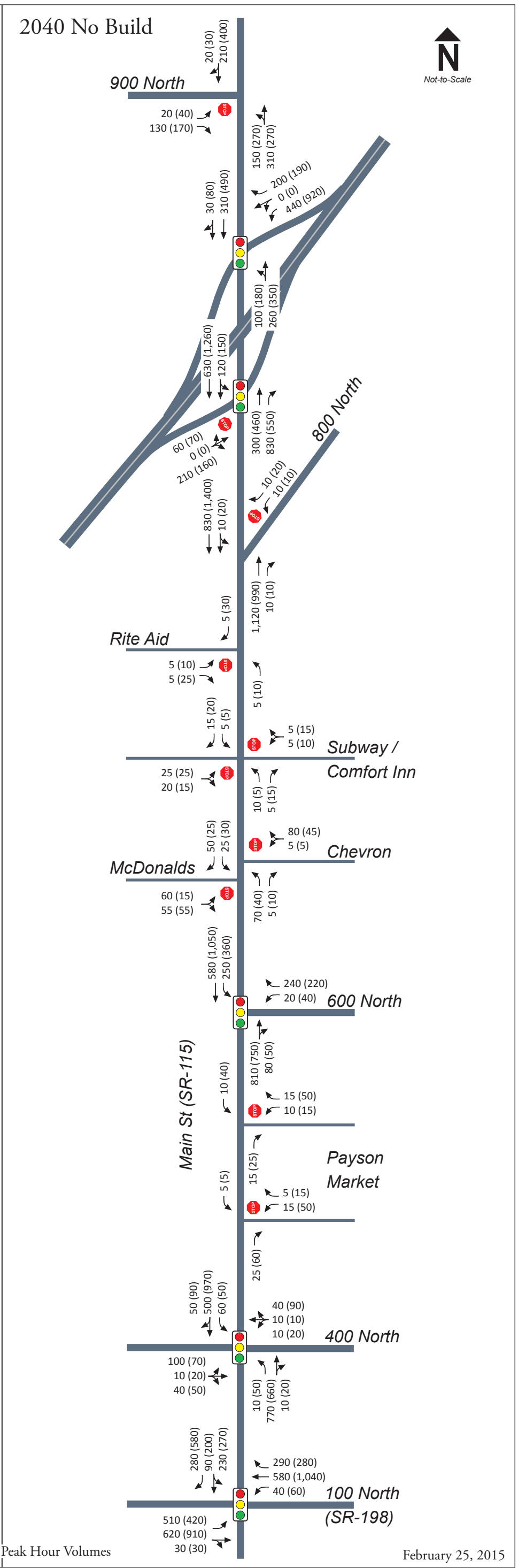
[MAG] Mountainland Association of Governments. 2015a. *TransPlan 40 Regional Transportation Plan*. June.

[MAG] Mountainland Association of Governments. 2015b. *Mountainland MPO TIP 2016-19 Program.* August.

[UDOT] Utah Department of Transportation. 2009. *Environmental Process Manual*. October.

Appendix 1: Traffic Data



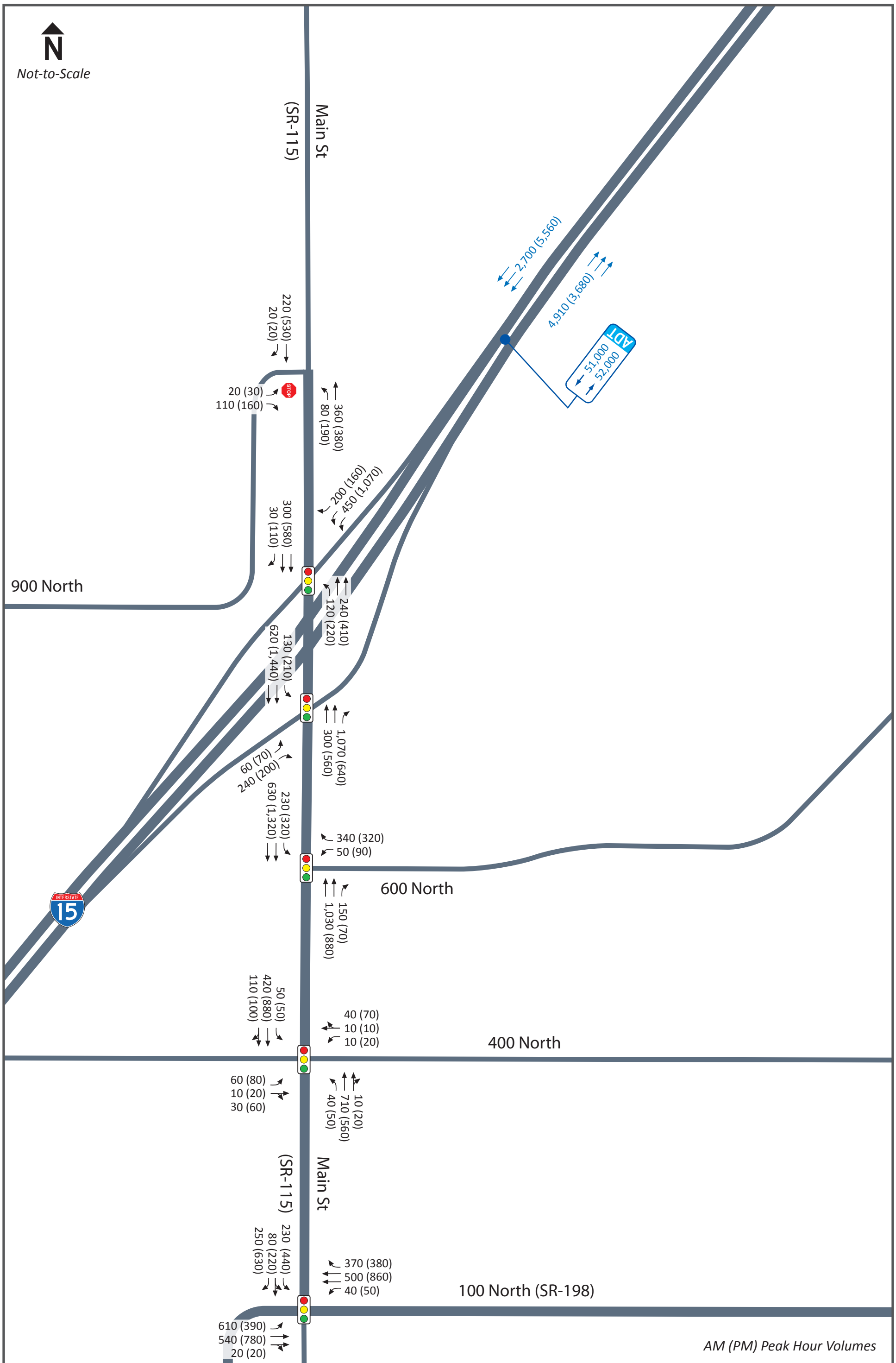


Legend: AM (PM) Peak Hour Volumes

February 25, 2015

Payson Main Street Interchange EIS
Weekday Peak Hour Turning Movement Volumes

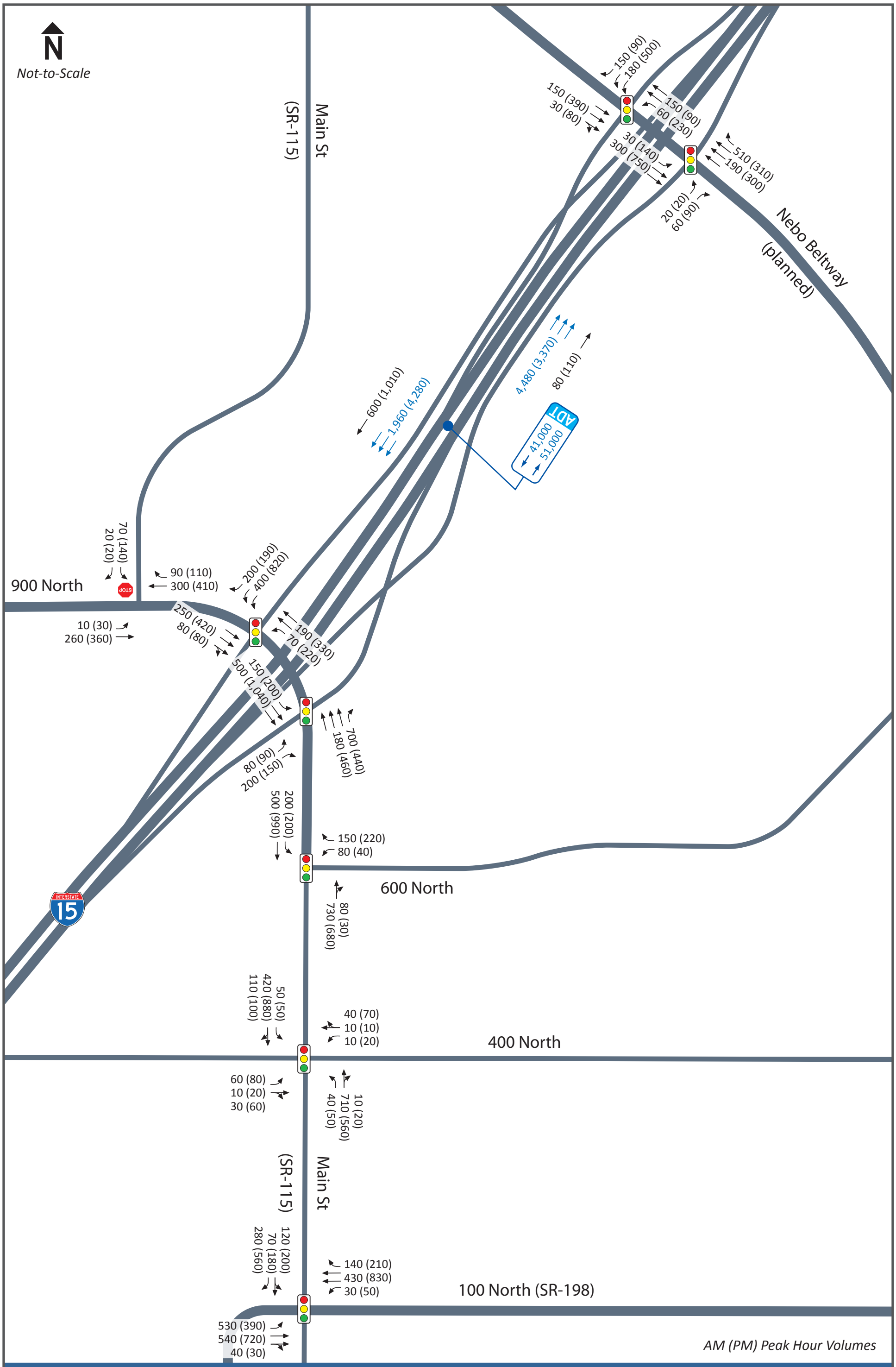
DRAFT



2040 Weekday Peak Hour Turning Movement Volumes

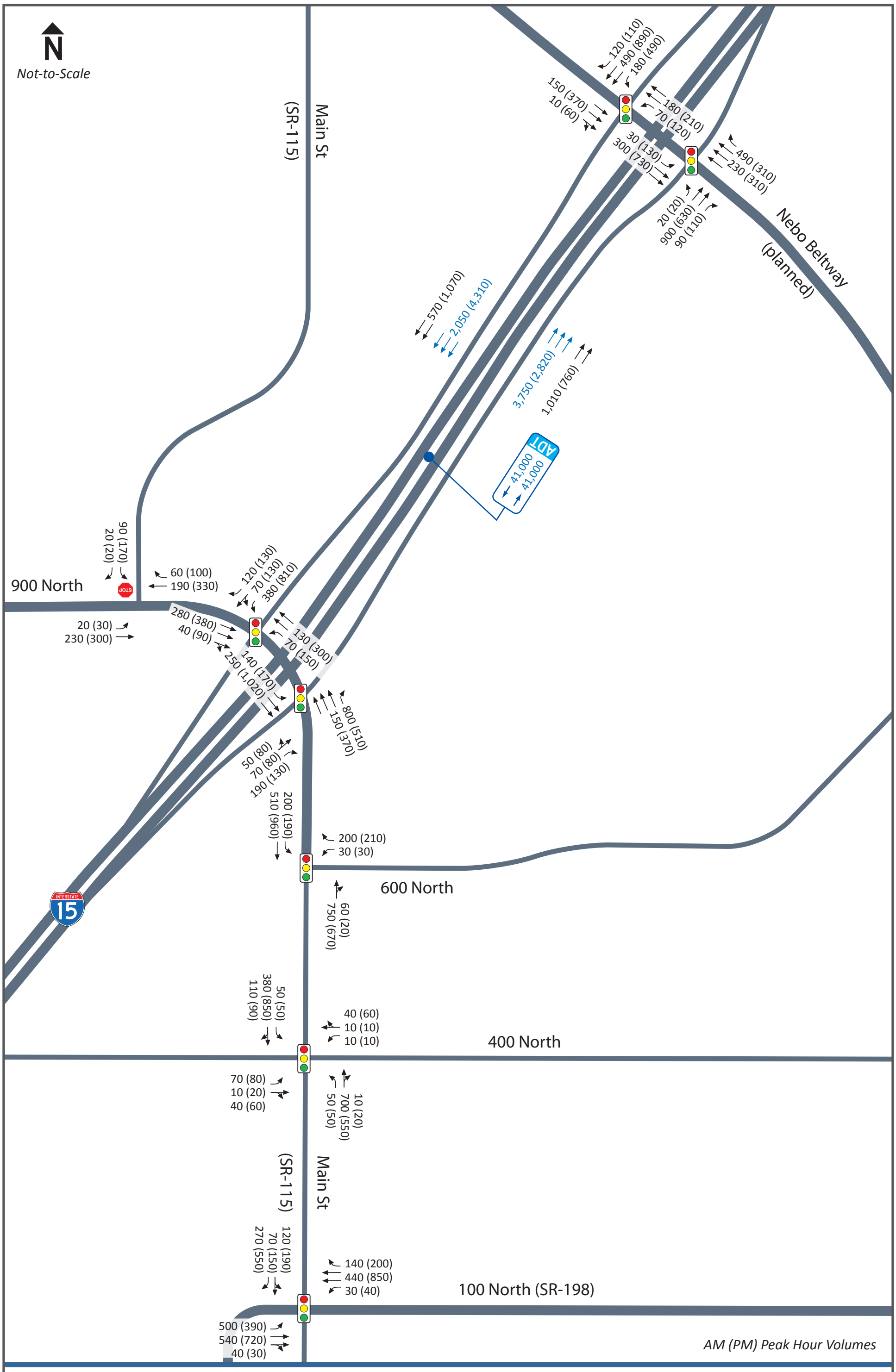
I1 Improve Existing – I-15, Payson Main Street Interchange EIS

June 8, 2016



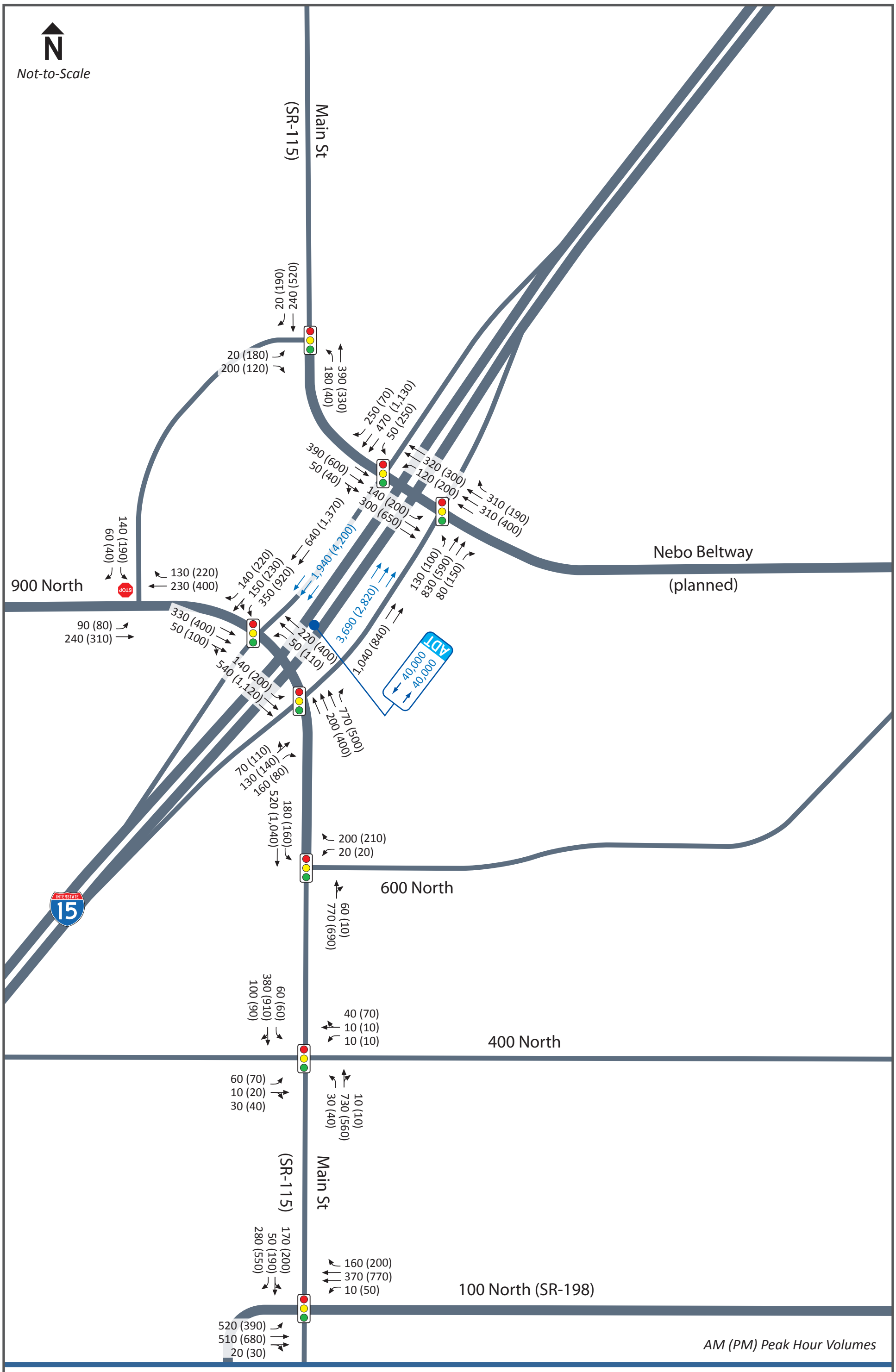
2040 Weekday Peak Hour Turning Movement Volumes
C1 Braided Ramps – I-15, Payson Main Street Interchange EIS

June 8, 2016



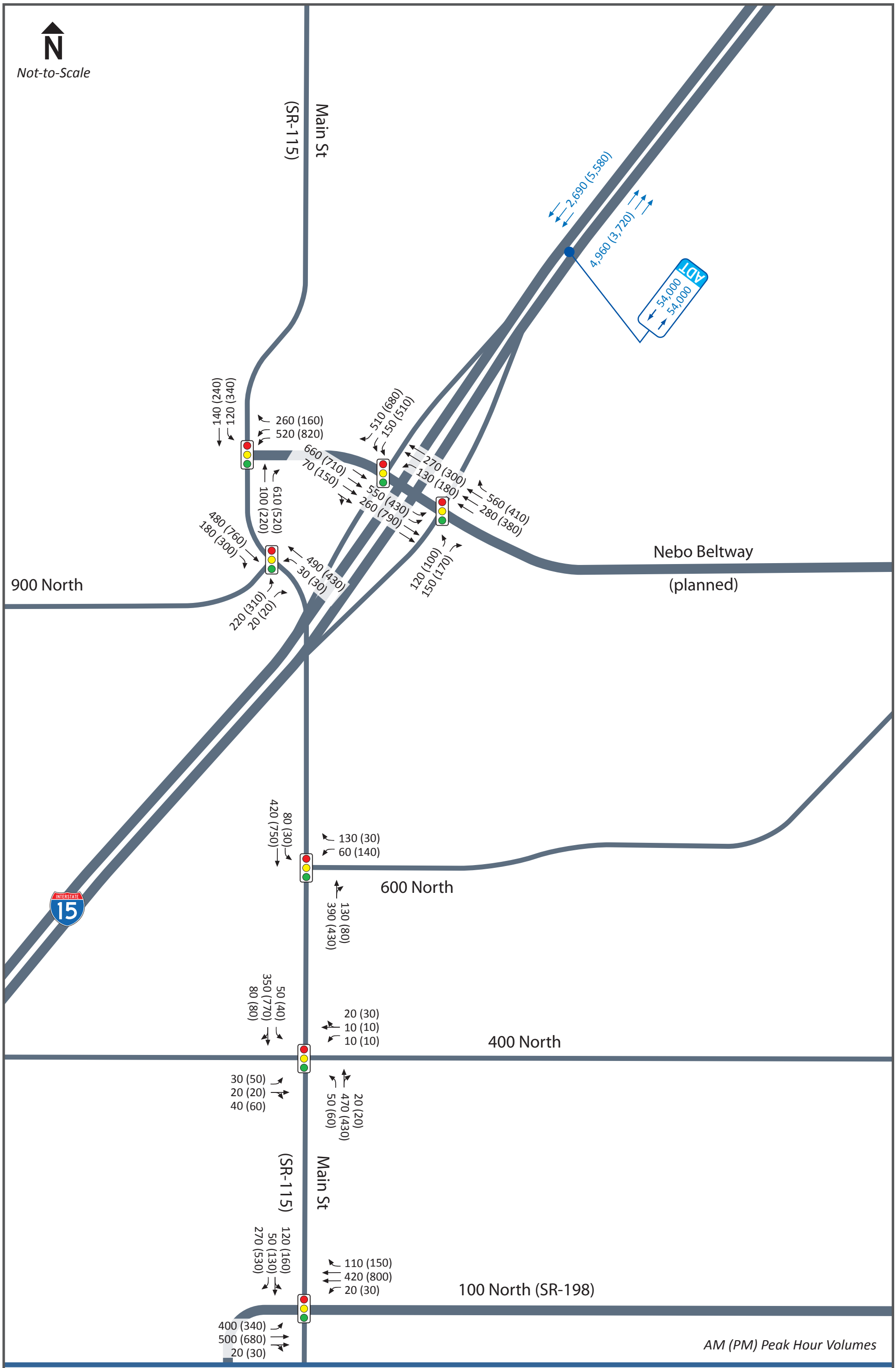
2040 Weekday Peak Hour Turning Movement Volumes
C3 Frontage Roads – I-15, Payson Main Street Interchange EIS

June 8, 2016



2040 Weekday Peak Hour Turning Movement Volumes
C4 Split Diamond – I-15, Payson Main Street Interchange EIS

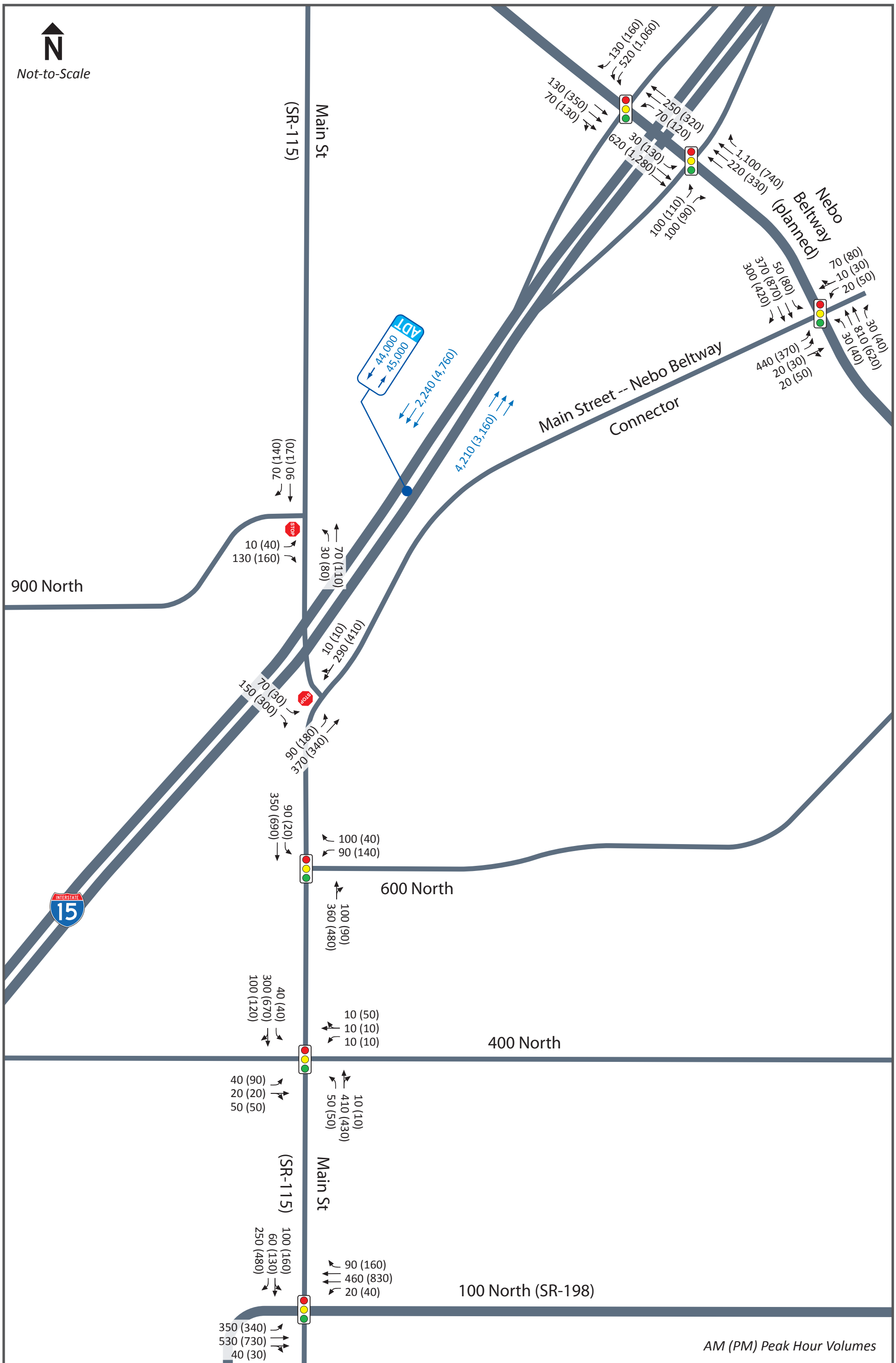
June 8, 2016



2040 Weekday Peak Hour Turning Movement Volumes

R1 Relocate Near – I-15, Payson Main Street Interchange EIS

December 13, 2016



2040 Weekday Peak Hour Turning Movement Volumes
R2 Relocate Far – I-15, Payson Main Street Interchange EIS

December 13, 2016

Appendix 2: Air Monitoring Data

Monitor Values Report

Geographic Area: Provo-Orem, UT
Pollutant: PM10
Year: 2006
Exceptional Events: Included (if any)

Required Days	Valid Days	First Max	Second Max	Days >STD	Est Days >STD	Exc Events	Monitor Number	Site ID	Address	City	County	State	EPA Region
122	120	123	71	0	0	Included	2	490490002	1355 North 200 West Provo Ut	Provo	Utah	UT	08
365	354	116	90	0	0	Included	2	490494001	30 North Main Street, Lindon, Utah	Lindon	Utah	UT	08

Get detailed information about this report, including column descriptions, at http://www.epa.gov/airquality/airdata/ad_about_reports.html#mon

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This report is based on monitor-level summary statistics. Air quality standards for some pollutants (PM2.5 and Pb) allow for combining data from multiple monitors into a site-level summary statistic that can be compared to the standard. In those cases, the site-level statistics may differ from the monitor-level statistics upon which this report is based.

Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: June 15, 2016

Monitor Values Report

Geographic Area: Provo-Orem, UT
Pollutant: PM10
Year: 2007
Exceptional Events: Included (if any)

Required Days	Valid Days	First Max	Second Max	Days >STD	Est Days >STD	Exc Events	Monitor Number	Site ID	Address	City	County	State	EPA Region
121	113	146	91	0	0	None	2	490490002	1355 North 200 West Provo Ut	Provo	Utah	UT	08
365	337	125	112	0	0	None	2	490494001	30 North Main Street, Lindon, Utah	Lindon	Utah	UT	08

Get detailed information about this report, including column descriptions, at http://www.epa.gov/airquality/airdata/ad_about_reports.html#mon

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Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: June 15, 2016

Monitor Values Report

Geographic Area: Provo-Orem, UT
Pollutant: PM10
Year: 2008
Exceptional Events: Included (if any)

Required Days	Valid Days	First Max	Second Max	Days >STD	Est Days >STD	Exc Events	Monitor Number	Site ID	Address	City	County	State	EPA Region
122	113	141	90	0	0	None	2	490490002	1355 North 200 West Provo Ut	Provo	Utah	UT	08
61	53	60	47	0	0	None	3	490490002	1355 North 200 West Provo Ut	Provo	Utah	UT	08
366	341	181	177	4	4	Included	2	490494001	30 North Main Street, Lindon, Utah	Lindon	Utah	UT	08

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Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: June 15, 2016

Monitor Values Report

Geographic Area: Provo-Orem, UT
Pollutant: PM10
Year: 2009
Exceptional Events: Included (if any)

Required Days	Valid Days	First Max	Second Max	Days >STD	Est Days >STD	Exc Events	Monitor Number	Site ID	Address	City	County	State	EPA Region
122	108	108	80	0	0	None	2	490490002	1355 North 200 West Provo Ut	Provo	Utah	UT	08
61	48	75	56	0	0	None	3	490490002	1355 North 200 West Provo Ut	Provo	Utah	UT	08
365	360	200	162	2	2.0574713	Included	2	490494001	30 North Main Street, Lindon, Utah	Lindon	Utah	UT	08

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Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: June 13, 2016

Monitor Values Report

Geographic Area: Provo-Orem, UT
Pollutant: PM10
Year: 2010
Exceptional Events: Included (if any)

Required Days	Valid Days	First Max	Second Max	Days >STD	Est Days >STD	Exc Events	Monitor Number	Site ID	Address	City	County	State	EPA Region
122	107	395	85	1	3.4615385	Included	2	490490002	1355 North 200 West Provo Ut	Provo	Utah	UT	08
30	26	39	38	0	0	None	3	490490002	1355 North 200 West Provo Ut	Provo	Utah	UT	08
365	358	424	108	1	1	Included	2	490494001	30 North Main Street, Lindon, Utah	Lindon	Utah	UT	08

Get detailed information about this report, including column descriptions, at http://www.epa.gov/airquality/airdata/ad_about_reports.html#mon

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Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: June 13, 2016

Monitor Values Report

Geographic Area: Provo-Orem, UT
Pollutant: PM10
Year: 2011
Exceptional Events: Included (if any)

Required Days	Valid Days	First Max	Second Max	Days >STD	Est Days >STD	Exc Events	Monitor Number	Site ID	Address	City	County	State	EPA Region
121	108	59	52	0	0	None	2	490490002	1355 North 200 West Provo Ut	Provo	Utah	UT	08
31	26	52	49	0	0	None	3	490490002	1355 North 200 West Provo Ut	Provo	Utah	UT	08
365	324	71	70	0	0	None	2	490494001	30 North Main Street, Lindon, Utah	Lindon	Utah	UT	08

Get detailed information about this report, including column descriptions, at http://www.epa.gov/airquality/airdata/ad_about_reports.html#mon

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This report is based on monitor-level summary statistics. Air quality standards for some pollutants (PM2.5 and Pb) allow for combining data from multiple monitors into a site-level summary statistic that can be compared to the standard. In those cases, the site-level statistics may differ from the monitor-level statistics upon which this report is based.

Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: June 13, 2016

Monitor Values Report

Geographic Area: Provo-Orem, UT
Pollutant: PM10
Year: 2012
Exceptional Events: Included (if any)

Required Days	Valid Days	First Max	Second Max	Days >STD	Est Days >STD	Exc Events	Monitor Number	Site ID	Address	City	County	State	EPA Region
122	105	76	67	0	0	None	2	490490002	1355 North 200 West Provo Ut	Provo	Utah	UT	08
30	28	57	36	0	0	None	3	490490002	1355 North 200 West Provo Ut	Provo	Utah	UT	08
366	366	80	69	0	0	None	4	490490002	1355 North 200 West Provo Ut	Provo	Utah	UT	08
366	352	68	67	0	0	None	2	490494001	30 North Main Street, Lindon, Utah	Lindon	Utah	UT	08
366	319	82	64	0	0	None	4	490494001	30 North Main Street, Lindon, Utah	Lindon	Utah	UT	08

Get detailed information about this report, including column descriptions, at http://www.epa.gov/airquality/airdata/ad_about_reports.html#mon

AirData reports are produced from a direct query of the AQS Data Mart. The data represent the best and most recent information available to EPA from state agencies. However, some values may be absent due to incomplete reporting, and some values may change due to quality assurance activities. The AQS database is updated daily by state, local, and tribal organizations who own and submit the data. Please contact the appropriate air quality monitoring agency to report any data problems. <http://www.epa.gov/airquality/airdata/ad_contacts.html>

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This report is based on monitor-level summary statistics. Air quality standards for some pollutants (PM2.5 and Pb) allow for combining data from multiple monitors into a site-level summary statistic that can be compared to the standard. In those cases, the site-level statistics may differ from the monitor-level statistics upon which this report is based.

Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: June 13, 2016

Monitor Values Report

Geographic Area: Provo-Orem, UT
Pollutant: PM10
Year: 2013
Exceptional Events: Included (if any)

Required Days	Valid Days	First Max	Second Max	Days >STD	Est Days >STD	Exc Events	Monitor Number	Site ID	Address	City	County	State	EPA Region
122	102	149	107	0	0	None	2	490490002	1355 North 200 West Provo Ut	Provo	Utah	UT	08
31	28	143	65	0	0	None	3	490490002	1355 North 200 West Provo Ut	Provo	Utah	UT	08
365	358	152	135	0	0	None	4	490490002	1355 North 200 West Provo Ut	Provo	Utah	UT	08
365	338	148	136	0	0	None	2	490494001	30 North Main Street, Lindon, Utah	Lindon	Utah	UT	08
365	365	115	95	0	0	None	4	490494001	30 North Main Street, Lindon, Utah	Lindon	Utah	UT	08

Get detailed information about this report, including column descriptions, at http://www.epa.gov/airquality/airdata/ad_about_reports.html#mon

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Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: June 13, 2016

Monitor Values Report

Geographic Area: Provo-Orem, UT
Pollutant: PM10
Year: 2014
Exceptional Events: Included (if any)

Required Days	Valid Days	First Max	Second Max	Days >STD	Est Days >STD	Exc Events	Monitor Number	Site ID	Address	City	County	State	EPA Region
122	108	73	52	0	0	None	2	490490002	1355 North 200 West Provo Ut	Provo	Utah	UT	08
30	26	69	35	0	0	None	3	490490002	1355 North 200 West Provo Ut	Provo	Utah	UT	08
365	328	89	69	0	0	None	4	490490002	1355 North 200 West Provo Ut	Provo	Utah	UT	08
365	341	107	62	0	0	None	2	490494001	30 North Main Street, Lindon, Utah	Lindon	Utah	UT	08
365	354	108	54	0	0	None	4	490494001	30 North Main Street, Lindon, Utah	Lindon	Utah	UT	08

Get detailed information about this report, including column descriptions, at http://www.epa.gov/airquality/airdata/ad_about_reports.html#mon

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Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: June 13, 2016

Monitor Values Report

Geographic Area: Provo-Orem, UT
Pollutant: PM10
Year: 2015
Exceptional Events: Included (if any)

Required Days	Valid Days	First Max	Second Max	Days >STD	Est Days >STD	Exc Events	Monitor Number	Site ID	Address	City	County	State	EPA Region
121	108	47	41	0	0	None	2	490490002	1355 North 200 West Provo Ut	Provo	Utah	UT	08
30	16	46	23	0	0	None	3	490490002	1355 North 200 West Provo Ut	Provo	Utah	UT	08
365	317	112	58	0	0	None	4	490490002	1355 North 200 West Provo Ut	Provo	Utah	UT	08
365	320	194	67	1	1.1234568	Included	2	490494001	30 North Main Street, Lindon, Utah	Lindon	Utah	UT	08
365	270	134	67	0	0	None	4	490494001	30 North Main Street, Lindon, Utah	Lindon	Utah	UT	08

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Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: June 13, 2016

Monitor Values Report

Geographic Area: Provo-Orem, UT
Pollutant: PM2.5
Year: 2006
Exceptional Events: Included (if any)
Note: The * indicates the mean does not satisfy minimum data completeness criteria.

Obs	First Max	Second Max	Third Max	Fourth Max	98th Percentile	Weighted Annual Mean	Exc Events	Monitor Number	Site ID	Address	City	County	State	EPA Region
119	43.9	27.8	25.6	24.5	26	9.1	None	1	490490002	1355 North 200 West Provo Ut	Provo	Utah	UT	08
354	48.8	39.1	37.5	37.4	32	9.3	None	1	490494001	30 North Main Street, Lindon, Utah	Lindon	Utah	UT	08
58	33.9	28.2	28	24	28	9.4	None	2	490494001	30 North Main Street, Lindon, Utah	Lindon	Utah	UT	08
119	48	24.5	23.9	23.4	24	8.5	None	1	490495008	10865 N. 6000 West, Highland, Utah	Highland	Utah	UT	08
106	38.8	22.9	21.6	19.5	22	7.7*	None	1	490495010	312 W. 2050 North, Spanish Fork, Utah	Spanish Fork	Utah	UT	08

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Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: June 15, 2016

Monitor Values Report

Geographic Area: Provo-Orem, UT
Pollutant: PM2.5
Year: 2007
Exceptional Events: Included (if any)
Note: The * indicates the mean does not satisfy minimum data completeness criteria.

Obs	First Max	Second Max	Third Max	Fourth Max	98th Percentile	Weighted Annual Mean	Exc Events	Monitor Number	Site ID	Address	City	County	State	EPA Region
114	74.8	63.5	50.3	47.6	50	11	Included	1	490490002	1355 North 200 West Provo Ut	Provo	Utah	UT	08
338	74.5	73	68.9	68.8	65	11.8	Included	1	490494001	30 North Main Street, Lindon, Utah	Lindon	Utah	UT	08
55	53.5	33.9	29.2	27.9	34	11.0*	None	2	490494001	30 North Main Street, Lindon, Utah	Lindon	Utah	UT	08
110	71.4	56.8	51.5	45.1	52	10.1	Included	1	490495008	10865 N. 6000 West, Highland, Utah	Highland	Utah	UT	08
116	71.2	57.6	55	46.2	55	11.1	Included	1	490495010	312 W. 2050 North, Spanish Fork, Utah	Spanish Fork	Utah	UT	08

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Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: June 15, 2016

Monitor Values Report

Geographic Area: Provo-Orem, UT
Pollutant: PM2.5
Year: 2008
Exceptional Events: Included (if any)
Note: The * indicates the mean does not satisfy minimum data completeness criteria.

Obs	First Max	Second Max	Third Max	Fourth Max	98th Percentile	Weighted Annual Mean	Exc Events	Monitor Number	Site ID	Address	City	County	State	EPA Region
336	49.9	46.1	45.9	39.5	34	9.8	Included	1	490490002	1355 North 200 West Provo Ut	Provo	Utah	UT	08
351	46.3	45.6	44.7	44.7	36	10	Included	1	490494001	30 North Main Street, Lindon, Utah	Lindon	Utah	UT	08
58	46.9	28.9	20.9	19.5	29	9.2	None	2	490494001	30 North Main Street, Lindon, Utah	Lindon	Utah	UT	08
118	38.4	26.2	24.6	21.9	25	7.7	Included	1	490495008	10865 N. 6000 West, Highland, Utah	Highland	Utah	UT	08
122	43.3	27.6	26.2	24.2	26	8.2	None	1	490495010	312 W. 2050 North, Spanish Fork, Utah	Spanish Fork	Utah	UT	08

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Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: June 15, 2016

Monitor Values Report

Geographic Area: Provo-Orem, UT
Pollutant: PM2.5
Year: 2009
Exceptional Events: Included (if any)
Note: The * indicates the mean does not satisfy minimum data completeness criteria.

Obs	First Max	Second Max	Third Max	Fourth Max	98th Percentile	Weighted Annual Mean	Exc Events	Monitor Number	Site ID	Address	City	County	State	EPA Region
354	78.2	72.8	69.3	57.1	42	9.9	None	1	490490002	1355 North 200 West Provo Ut	Provo	Utah	UT	08
342	80.4	75.6	73.1	63.9	49	10.5	None	1	490494001	30 North Main Street, Lindon, Utah	Lindon	Utah	UT	08
55	63.5	46.7	36	33.9	47	10.4	None	2	490494001	30 North Main Street, Lindon, Utah	Lindon	Utah	UT	08
115	58.1	52.8	34.3	31.8	34	8.1	None	1	490495008	10865 N. 6000 West, Highland, Utah	Highland	Utah	UT	08
116	77.3	59.2	43.6	39.9	44	9.6	None	1	490495010	312 W. 2050 North, Spanish Fork, Utah	Spanish Fork	Utah	UT	08

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Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: June 13, 2016

Monitor Values Report

Geographic Area: Provo-Orem, UT
Pollutant: PM2.5
Year: 2010
Exceptional Events: Included (if any)
Note: The * indicates the mean does not satisfy minimum data completeness criteria.

Obs	First Max	Second Max	Third Max	Fourth Max	98th Percentile	Weighted Annual Mean	Exc Events	Monitor Number	Site ID	Address	City	County	State	EPA Region
344	62.6	53.4	53.2	48.9	33	8.6	Included	1	490490002	1355 North 200 West Provo Ut	Provo	Utah	UT	08
334	62.6	55.7	50.5	49.2	37	8.9	Included	1	490494001	30 North Main Street, Lindon, Utah	Lindon	Utah	UT	08
28	32.6	21.6	11.7	10	33	7.3*	None	2	490494001	30 North Main Street, Lindon, Utah	Lindon	Utah	UT	08
109	61	57.6	39	30.1	39	8	Included	1	490495008	10865 N. 6000 West, Highland, Utah	Highland	Utah	UT	08
101	59.6	51.7	48.1	29.9	48	8.5*	Included	1	490495010	312 W. 2050 North, Spanish Fork, Utah	Spanish Fork	Utah	UT	08

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Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: June 13, 2016

Monitor Values Report

Geographic Area: Provo-Orem, UT
Pollutant: PM2.5
Year: 2011
Exceptional Events: Included (if any)
Note: The * indicates the mean does not satisfy minimum data completeness criteria.

Obs	First Max	Second Max	Third Max	Fourth Max	98th Percentile	Weighted Annual Mean	Exc Events	Monitor Number	Site ID	Address	City	County	State	EPA Region
311	50.2	44.8	34.5	33.4	30	7.6	None	1	490490002	1355 North 200 West Provo Ut	Provo	Utah	UT	08
348	49.4	49.3	49	48.3	37	8.1	None	1	490494001	30 North Main Street, Lindon, Utah	Lindon	Utah	UT	08
25	32.5	13.2	9.7	7.8	33	6.1*	None	2	490494001	30 North Main Street, Lindon, Utah	Lindon	Utah	UT	08
10	42.1	33	32.9	22.4	42	21.6*	None	1	490495008	10865 N. 6000 West, Highland, Utah	Highland	Utah	UT	08
114	46	34.6	33.4	31.2	33	7.4	None	1	490495010	312 W. 2050 North, Spanish Fork, Utah	Spanish Fork	Utah	UT	08

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Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: June 13, 2016

Monitor Values Report

Geographic Area: Provo-Orem, UT
Pollutant: PM2.5
Year: 2012
Exceptional Events: Included (if any)
Note: The * indicates the mean does not satisfy minimum data completeness criteria.

Obs	First Max	Second Max	Third Max	Fourth Max	98th Percentile	Weighted Annual Mean	Exc Events	Monitor Number	Site ID	Address	City	County	State	EPA Region
344	34.5	23.9	23.5	23.2	23	8.1	None	1	490490002	1355 North 200 West Provo Ut	Provo	Utah	UT	08
305	32.9	27.3	27.2	26.4	24	7.8*	None	1	490494001	30 North Main Street, Lindon, Utah	Lindon	Utah	UT	08
29	34.1	19.9	13.3	12	34	7.3	None	2	490494001	30 North Main Street, Lindon, Utah	Lindon	Utah	UT	08
119	29.5	28.8	22.4	19.5	22	7.2	None	1	490495010	312 W. 2050 North, Spanish Fork, Utah	Spanish Fork	Utah	UT	08

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Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: June 13, 2016

Monitor Values Report

Geographic Area: Provo-Orem, UT
Pollutant: PM2.5
Year: 2013
Exceptional Events: Included (if any)
Note: The * indicates the mean does not satisfy minimum data completeness criteria.

Obs	First Max	Second Max	Third Max	Fourth Max	98th Percentile	Weighted Annual Mean	Exc Events	Monitor Number	Site ID	Address	City	County	State	EPA Region
349	124.5	119.2	109	97.5	82	11.7	None	1	490490002	1355 North 200 West Provo Ut	Provo	Utah	UT	08
353	123.3	114	111.9	93.3	72	12.5	None	1	490494001	30 North Main Street, Lindon, Utah	Lindon	Utah	UT	08
29	52.5	44.9	44.8	27.9	53	11.5*	None	2	490494001	30 North Main Street, Lindon, Utah	Lindon	Utah	UT	08
117	125.9	84.6	82.2	59.2	82	11	None	1	490495010	312 W. 2050 North, Spanish Fork, Utah	Spanish Fork	Utah	UT	08

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Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: June 13, 2016

Monitor Values Report

Geographic Area: Provo-Orem, UT
Pollutant: PM2.5
Year: 2014
Exceptional Events: Included (if any)
Note: The * indicates the mean does not satisfy minimum data completeness criteria.

Obs	First Max	Second Max	Third Max	Fourth Max	98th Percentile	Weighted Annual Mean	Exc Events	Monitor Number	Site ID	Address	City	County	State	EPA Region
345	43.2	37.3	34.9	33.9	26	7.3	None	1	490490002	1355 North 200 West Provo Ut	Provo	Utah	UT	08
330	39.2	39	37.8	35.3	29	7.4	None	1	490494001	30 North Main Street, Lindon, Utah	Lindon	Utah	UT	08
26	39.4	12.6	12.4	12.3	39	6.9	None	2	490494001	30 North Main Street, Lindon, Utah	Lindon	Utah	UT	08
117	41.1	28.7	26.5	22.9	27	6.4	None	1	490495010	312 W. 2050 North, Spanish Fork, Utah	Spanish Fork	Utah	UT	08

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Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: June 13, 2016

Monitor Values Report

Geographic Area: Provo-Orem, UT
Pollutant: PM2.5
Year: 2015
Exceptional Events: Included (if any)
Note: The * indicates the mean does not satisfy minimum data completeness criteria.

Obs	First Max	Second Max	Third Max	Fourth Max	98th Percentile	Weighted Annual Mean	Exc Events	Monitor Number	Site ID	Address	City	County	State	EPA Region
323	38.6	35.2	29.7	27.8	26	7.1*	None	1	490490002	1355 North 200 West Provo Ut	Provo	Utah	UT	08
336	39.3	32.4	31	30.4	27	7.3	None	1	490494001	30 North Main Street, Lindon, Utah	Lindon	Utah	UT	08
23	16.2	15.5	9.2	9.2	16	5.6*	None	2	490494001	30 North Main Street, Lindon, Utah	Lindon	Utah	UT	08
115	37.5	31.4	28.1	26.5	28	6.2	None	1	490495010	312 W. 2050 North, Spanish Fork, Utah	Spanish Fork	Utah	UT	08

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Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: June 13, 2016

Monitor Values Report

Geographic Area: Provo-Orem, UT
Pollutant: Ozone
Year: 2006
Exceptional Events: Included (if any)

First Max 8hr	Second Max 8hr	Third Max 8hr	Fourth Max 8hr	Days 8hr Max >STD	Required Days 8hr	Valid Days 8hr	Percent Days 8hr	First Max 1hr	Second Max 1hr	Days 1hr Max >STD	Est Days 1hr Max >STD	Required Days 1hr	Valid Days 1hr	Missing Days 1hr	Exc Events	Monitor Number	Site ID	Address	City	County	State	EPA Region
0.08	0.078	0.075	0.074	2	153	136	89	0.099	0.091	0	0	153	137	2	None	2	490490002	1355 North 200 West Provo Ut	Provo	Utah	UT	08
0.081	0.078	0.078	0.077	5	153	147	96	0.104	0.101	0	0	153	148	4	None	1	490495008	10865 N. 6000 West, Highland, Utah	Highland	Utah	UT	08
0.082	0.081	0.079	0.079	7	153	152	99	0.098	0.097	0	0	153	152	1	None	1	490495010	312 W. 2050 North, Spanish Fork, Utah	Spanish Fork	Utah	UT	08

Get detailed information about this report, including column descriptions, at http://www.epa.gov/airquality/airdata/ad_about_reports.html#mon

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This report is based on monitor-level summary statistics. Air quality standards for some pollutants (PM2.5 and Pb) allow for combining data from multiple monitors into a site-level summary statistic that can be compared to the standard. In those cases, the site-level statistics may differ from the monitor-level statistics upon which this report is based.

Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: June 16, 2016

Monitor Values Report

Geographic Area: Provo-Orem, UT
Pollutant: Ozone
Year: 2007
Exceptional Events: Included (if any)

First Max 8hr	Second Max 8hr	Third Max 8hr	Fourth Max 8hr	Days 8hr Max >STD	Required Days 8hr	Valid Days 8hr	Percent Days 8hr	First Max 1hr	Second Max 1hr	Days 1hr Max >STD	Est Days 1hr Max >STD	Required Days 1hr	Valid Days 1hr	Missing Days 1hr	Exc Events	Monitor Number	Site ID	Address	City	County	State	EPA Region
0.087	0.076	0.076	0.075	3	153	152	99	0.096	0.088	0	0	153	152	1	Included	2	490490002	1355 North 200 West Provo Ut	Provo	Utah	UT	08
0.085	0.081	0.08	0.078	6	153	152	99	0.106	0.102	0	0	153	152	1	Included	1	490495008	10865 N. 6000 West, Highland, Utah	Highland	Utah	UT	08
0.091	0.081	0.08	0.077	4	153	152	99	0.122	0.098	0	0	153	152	1	Included	1	490495010	312 W. 2050 North, Spanish Fork, Utah	Spanish Fork	Utah	UT	08

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This report is based on monitor-level summary statistics. Air quality standards for some pollutants (PM2.5 and Pb) allow for combining data from multiple monitors into a site-level summary statistic that can be compared to the standard. In those cases, the site-level statistics may differ from the monitor-level statistics upon which this report is based.

Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: June 16, 2016

Monitor Values Report

Geographic Area: Provo-Orem, UT
Pollutant: Ozone
Year: 2008
Exceptional Events: Included (if any)

First Max 8hr	Second Max 8hr	Third Max 8hr	Fourth Max 8hr	Days 8hr Max >STD	Required Days 8hr	Valid Days 8hr	Percent Days 8hr	First Max 1hr	Second Max 1hr	Days 1hr Max >STD	Est Days 1hr Max >STD	Required Days 1hr	Valid Days 1hr	Missing Days 1hr	Exc Events	Monitor Number	Site ID	Address	City	County	State	EPA Region
0.092	0.088	0.076	0.074	3	153	152	99	0.106	0.105	0	0	153	153	0	Included	2	490490002	1355 North 200 West Provo Ut	Provo	Utah	UT	08
0.088	0.085	0.071	0.071	2	153	147	96	0.098	0.095	0	0	153	148	2	Included	1	490495008	10865 N. 6000 West, Highland, Utah	Highland	Utah	UT	08
0.091	0.087	0.072	0.071	2	153	151	99	0.106	0.105	0	0	153	151	2	Included	1	490495010	312 W. 2050 North, Spanish Fork, Utah	Spanish Fork	Utah	UT	08

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Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: June 16, 2016

Monitor Values Report

Geographic Area: Provo-Orem, UT
Pollutant: Ozone
Year: 2009
Exceptional Events: Included (if any)

First Max 8hr	Second Max 8hr	Third Max 8hr	Fourth Max 8hr	Days 8hr Max >STD	Required Days 8hr	Valid Days 8hr	Percent Days 8hr	First Max 1hr	Second Max 1hr	Days 1hr Max >STD	Est Days 1hr Max >STD	Required Days 1hr	Valid Days 1hr	Missing Days 1hr	Exc Events	Monitor Number	Site ID	Address	City	County	State	EPA Region
0.07	0.069	0.069	0.068	0	153	152	99	0.091	0.08	0	0	153	153	0	None	2	490490002	1355 North 200 West Provo Ut	Provo	Utah	UT	08
0.071	0.07	0.069	0.069	0	153	150	98	0.085	0.082	0	0	153	151	2	None	1	490495008	10865 N. 6000 West, Highland, Utah	Highland	Utah	UT	08
0.076	0.074	0.07	0.069	1	153	152	99	0.087	0.087	0	0	153	152	1	None	1	490495010	312 W. 2050 North, Spanish Fork, Utah	Spanish Fork	Utah	UT	08

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Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: June 16, 2016

Monitor Values Report

Geographic Area: Provo-Orem, UT
Pollutant: Ozone
Year: 2010
Exceptional Events: Included (if any)

First Max 8hr	Second Max 8hr	Third Max 8hr	Fourth Max 8hr	Days 8hr Max >STD	Required Days 8hr	Valid Days 8hr	Percent Days 8hr	First Max 1hr	Second Max 1hr	Days 1hr Max >STD	Est Days 1hr Max >STD	Required Days 1hr	Valid Days 1hr	Missing Days 1hr	Exc Events	Monitor Number	Site ID	Address	City	County	State	EPA Region
0.075	0.072	0.071	0.07	0	153	151	99	0.092	0.085	0	0	153	152	1	None	2	490490002	1355 North 200 West Provo Ut	Provo	Utah	UT	08
0.084	0.074	0.073	0.071	1	153	151	99	0.109	0.085	0	0	153	151	2	None	1	490495008	10865 N. 6000 West, Highland, Utah	Highland	Utah	UT	08
0.074	0.072	0.071	0.07	0	153	127	83	0.092	0.091	0	0	153	127	1	None	1	490495010	312 W. 2050 North, Spanish Fork, Utah	Spanish Fork	Utah	UT	08

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Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: June 16, 2016

Monitor Values Report

Geographic Area: Provo-Orem, UT
Pollutant: Ozone
Year: 2011
Exceptional Events: Included (if any)

First Max 8hr	Second Max 8hr	Third Max 8hr	Fourth Max 8hr	Days 8hr Max >STD	Required Days 8hr	Valid Days 8hr	Percent Days 8hr	First Max 1hr	Second Max 1hr	Days 1hr Max >STD	Est Days 1hr Max >STD	Required Days 1hr	Valid Days 1hr	Missing Days 1hr	Exc Events	Monitor Number	Site ID	Address	City	County	State	EPA Region
0.068	0.066	0.065	0.065	0	153	142	93	0.084	0.075	0	0	153	143	2	None	2	490490002	1355 North 200 West Provo Ut	Provo	Utah	UT	08
0.066	0.064	0.061	0.061	0	153	58	38	0.073	0.072	0	0	153	59	0	None	1	490495008	10865 N. 6000 West, Highland, Utah	Highland	Utah	UT	08
0.069	0.066	0.065	0.065	0	153	151	99	0.083	0.082	0	0	153	152	1	None	1	490495010	312 W. 2050 North, Spanish Fork, Utah	Spanish Fork	Utah	UT	08

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This report is based on monitor-level summary statistics. Air quality standards for some pollutants (PM2.5 and Pb) allow for combining data from multiple monitors into a site-level summary statistic that can be compared to the standard. In those cases, the site-level statistics may differ from the monitor-level statistics upon which this report is based.

Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: June 16, 2016

Monitor Values Report

Geographic Area: Provo-Orem, UT
Pollutant: Ozone
Year: 2012
Exceptional Events: Included (if any)

First Max 8hr	Second Max 8hr	Third Max 8hr	Fourth Max 8hr	Days 8hr Max >STD	Required Days 8hr	Valid Days 8hr	Percent Days 8hr	First Max 1hr	Second Max 1hr	Days 1hr Max >STD	Est Days 1hr Max >STD	Required Days 1hr	Valid Days 1hr	Missing Days 1hr	Exc Events	Monitor Number	Site ID	Address	City	County	State	EPA Region
0.08	0.079	0.077	0.077	4	153	153	100	0.096	0.094	0	0	153	153	0	None	2	490490002	1355 North 200 West Provo Ut	Provo	Utah	UT	08
0.088	0.085	0.079	0.076	4	153	152	99	0.102	0.101	0	0	153	153	0	None	1	490495010	312 W. 2050 North, Spanish Fork, Utah	Spanish Fork	Utah	UT	08

Get detailed information about this report, including column descriptions, at http://www.epa.gov/airquality/airdata/ad_about_reports.html#mon

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Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: June 16, 2016

Monitor Values Report

Geographic Area: Provo-Orem, UT
Pollutant: Ozone
Year: 2013
Exceptional Events: Included (if any)

First Max 8hr	Second Max 8hr	Third Max 8hr	Fourth Max 8hr	Days 8hr Max >STD	Required Days 8hr	Valid Days 8hr	Percent Days 8hr	First Max 1hr	Second Max 1hr	Days 1hr Max >STD	Est Days 1hr Max >STD	Required Days 1hr	Valid Days 1hr	Missing Days 1hr	Exc Events	Monitor Number	Site ID	Address	City	County	State	EPA Region
0.085	0.079	0.077	0.077	4	153	152	99	0.102	0.095	0	0	153	153	0	None	2	490490002	1355 North 200 West Provo Ut	Provo	Utah	UT	08
0.078	0.073	0.07	0.07	1	153	152	99	0.099	0.096	0	0	153	152	1	None	1	490495010	312 W. 2050 North, Spanish Fork, Utah	Spanish Fork	Utah	UT	08

Get detailed information about this report, including column descriptions, at http://www.epa.gov/airquality/airdata/ad_about_reports.html#mon

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Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: June 16, 2016

Monitor Values Report

Geographic Area: Provo-Orem, UT
Pollutant: Ozone
Year: 2014
Exceptional Events: Included (if any)

First Max 8hr	Second Max 8hr	Third Max 8hr	Fourth Max 8hr	Days 8hr Max >STD	Required Days 8hr	Valid Days 8hr	Percent Days 8hr	First Max 1hr	Second Max 1hr	Days 1hr Max >STD	Est Days 1hr Max >STD	Required Days 1hr	Valid Days 1hr	Missing Days 1hr	Exc Events	Monitor Number	Site ID	Address	City	County	State	EPA Region
0.074	0.073	0.072	0.068	0	153	136	89	0.086	0.081	0	0	153	137	1	None	2	490490002	1355 North 200 West Provo Ut	Provo	Utah	UT	08
0.082	0.082	0.077	0.076	4	153	150	98	0.099	0.096	0	0	153	151	2	None	1	490495010	312 W. 2050 North, Spanish Fork, Utah	Spanish Fork	Utah	UT	08

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Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: June 16, 2016

Monitor Values Report

Geographic Area: Provo-Orem, UT
Pollutant: Ozone
Year: 2015
Exceptional Events: Included (if any)

First Max 8hr	Second Max 8hr	Third Max 8hr	Fourth Max 8hr	Days 8hr Max >STD	Required Days 8hr	Valid Days 8hr	Percent Days 8hr	First Max 1hr	Second Max 1hr	Days 1hr Max >STD	Est Days 1hr Max >STD	Required Days 1hr	Valid Days 1hr	Missing Days 1hr	Exc Events	Monitor Number	Site ID	Address	City	County	State	EPA Region
0.076	0.073	0.073	0.073	1	153	148	97	0.088	0.087	0	0	153	148	1	None	2	490490002	1355 North 200 West Provo Ut	Provo	Utah	UT	08
0.074	0.073	0.071	0.071	0	153	145	95	0.088	0.086	0	0	153	145	1	None	1	490495010	312 W. 2050 North, Spanish Fork, Utah	Spanish Fork	Utah	UT	08

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Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: June 16, 2016

Monitor Values Report

Geographic Area: Provo-Orem, UT
Pollutant: CO
Year: 2006
Exceptional Events: Included (if any)

Obs	First Max 8hr	Second Max 8hr	Days 8hr Max >STD	First Max 1hr	Second Max 1hr	Days 1hr Max >STD	Exc Events	Monitor Number	Site ID	Address	City	County	State	EPA Region
3544	2.4	2.1	0	4.7	4.5	0	None	1	490490002	1355 North 200 West Provo Ut	Provo	Utah	UT	08
3575	3.7	3.2	0	5.1	5.1	0	None	1	490490005	363 N. University Ave., Provo, Utah	Provo	Utah	UT	08

Get detailed information about this report, including column descriptions, at http://www.epa.gov/airquality/airdata/ad_about_reports.html#mon

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Readers are cautioned not to rank order geographic areas based on AirData reports. Air pollution levels measured at a particular monitoring site are not necessarily representative of the air quality for an entire county or urban area.

This report is based on monitor-level summary statistics. Air quality standards for some pollutants (PM2.5 and Pb) allow for combining data from multiple monitors into a site-level summary statistic that can be compared to the standard. In those cases, the site-level statistics may differ from the monitor-level statistics upon which this report is based.

Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: June 16, 2016

Monitor Values Report

Geographic Area: Provo-Orem, UT
Pollutant: CO
Year: 2007
Exceptional Events: Included (if any)

Obs	First Max 8hr	Second Max 8hr	Days 8hr Max >STD	First Max 1hr	Second Max 1hr	Days 1hr Max >STD	Exc Events	Monitor Number	Site ID	Address	City	County	State	EPA Region
8518	2.8	2.5	0	4.2	3.8	0	None	1	490490002	1355 North 200 West Provo Ut	Provo	Utah	UT	08

Get detailed information about this report, including column descriptions, at http://www.epa.gov/airquality/airdata/ad_about_reports.html#mon

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Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: June 16, 2016

Monitor Values Report

Geographic Area: Provo-Orem, UT
Pollutant: CO
Year: 2008
Exceptional Events: Included (if any)

Obs	First Max 8hr	Second Max 8hr	Days 8hr Max >STD	First Max 1hr	Second Max 1hr	Days 1hr Max >STD	Exc Events	Monitor Number	Site ID	Address	City	County	State	EPA Region
8455	2	1.8	0	5	3.9	0	None	1	490490002	1355 North 200 West Provo Ut	Provo	Utah	UT	08

Get detailed information about this report, including column descriptions, at http://www.epa.gov/airquality/airdata/ad_about_reports.html#mon

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Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: June 16, 2016

Monitor Values Report

Geographic Area: Provo-Orem, UT
Pollutant: CO
Year: 2009
Exceptional Events: Included (if any)

Obs	First Max 8hr	Second Max 8hr	Days 8hr Max >STD	First Max 1hr	Second Max 1hr	Days 1hr Max >STD	Exc Events	Monitor Number	Site ID	Address	City	County	State	EPA Region
8471	2.7	2.5	0	5	3.9	0	None	1	490490002	1355 North 200 West Provo Ut	Provo	Utah	UT	08

Get detailed information about this report, including column descriptions, at http://www.epa.gov/airquality/airdata/ad_about_reports.html#mon

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Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: June 16, 2016

Monitor Values Report

Geographic Area: Provo-Orem, UT
Pollutant: CO
Year: 2010
Exceptional Events: Included (if any)

Obs	First Max 8hr	Second Max 8hr	Days 8hr Max >STD	First Max 1hr	Second Max 1hr	Days 1hr Max >STD	Exc Events	Monitor Number	Site ID	Address	City	County	State	EPA Region
8439	2	1.9	0	3.4	2.8	0	None	1	490490002	1355 North 200 West Provo Ut	Provo	Utah	UT	08

Get detailed information about this report, including column descriptions, at http://www.epa.gov/airquality/airdata/ad_about_reports.html#mon

AirData reports are produced from a direct query of the AQS Data Mart. The data represent the best and most recent information available to EPA from state agencies. However, some values may be absent due to incomplete reporting, and some values may change due to quality assurance activities. The AQS database is updated daily by state, local, and tribal organizations who own and submit the data. Please contact the appropriate air quality monitoring agency to report any data problems. <http://www.epa.gov/airquality/airdata/ad_contacts.html>

Readers are cautioned not to rank order geographic areas based on AirData reports. Air pollution levels measured at a particular monitoring site are not necessarily representative of the air quality for an entire county or urban area.

This report is based on monitor-level summary statistics. Air quality standards for some pollutants (PM2.5 and Pb) allow for combining data from multiple monitors into a site-level summary statistic that can be compared to the standard. In those cases, the site-level statistics may differ from the monitor-level statistics upon which this report is based.

Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: June 16, 2016

Monitor Values Report

Geographic Area: Provo-Orem, UT
Pollutant: CO
Year: 2011
Exceptional Events: Included (if any)

Obs	First Max 8hr	Second Max 8hr	Days 8hr Max >STD	First Max 1hr	Second Max 1hr	Days 1hr Max >STD	Exc Events	Monitor Number	Site ID	Address	City	County	State	EPA Region
8225	2	2	0	3.3	2.9	0	None	1	490490002	1355 North 200 West Provo Ut	Provo	Utah	UT	08

Get detailed information about this report, including column descriptions, at http://www.epa.gov/airquality/airdata/ad_about_reports.html#mon

AirData reports are produced from a direct query of the AQS Data Mart. The data represent the best and most recent information available to EPA from state agencies. However, some values may be absent due to incomplete reporting, and some values may change due to quality assurance activities. The AQS database is updated daily by state, local, and tribal organizations who own and submit the data. Please contact the appropriate air quality monitoring agency to report any data problems. <http://www.epa.gov/airquality/airdata/ad_contacts.html>

Readers are cautioned not to rank order geographic areas based on AirData reports. Air pollution levels measured at a particular monitoring site are not necessarily representative of the air quality for an entire county or urban area.

This report is based on monitor-level summary statistics. Air quality standards for some pollutants (PM2.5 and Pb) allow for combining data from multiple monitors into a site-level summary statistic that can be compared to the standard. In those cases, the site-level statistics may differ from the monitor-level statistics upon which this report is based.

Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: June 16, 2016

Monitor Values Report

Geographic Area: Provo-Orem, UT
Pollutant: CO
Year: 2012
Exceptional Events: Included (if any)

Obs	First Max 8hr	Second Max 8hr	Days 8hr Max >STD	First Max 1hr	Second Max 1hr	Days 1hr Max >STD	Exc Events	Monitor Number	Site ID	Address	City	County	State	EPA Region
8430	2	1.8	0	3.4	2.7	0	None	1	490490002	1355 North 200 West Provo Ut	Provo	Utah	UT	08

Get detailed information about this report, including column descriptions, at http://www.epa.gov/airquality/airdata/ad_about_reports.html#mon

AirData reports are produced from a direct query of the AQS Data Mart. The data represent the best and most recent information available to EPA from state agencies. However, some values may be absent due to incomplete reporting, and some values may change due to quality assurance activities. The AQS database is updated daily by state, local, and tribal organizations who own and submit the data. Please contact the appropriate air quality monitoring agency to report any data problems. <http://www.epa.gov/airquality/airdata/ad_contacts.html>

Readers are cautioned not to rank order geographic areas based on AirData reports. Air pollution levels measured at a particular monitoring site are not necessarily representative of the air quality for an entire county or urban area.

This report is based on monitor-level summary statistics. Air quality standards for some pollutants (PM2.5 and Pb) allow for combining data from multiple monitors into a site-level summary statistic that can be compared to the standard. In those cases, the site-level statistics may differ from the monitor-level statistics upon which this report is based.

Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: June 16, 2016

Monitor Values Report

Geographic Area: Provo-Orem, UT
Pollutant: CO
Year: 2013
Exceptional Events: Included (if any)

Obs	First Max 8hr	Second Max 8hr	Days 8hr Max >STD	First Max 1hr	Second Max 1hr	Days 1hr Max >STD	Exc Events	Monitor Number	Site ID	Address	City	County	State	EPA Region
8690	2.4	2.1	0	3.7	3	0	None	1	490490002	1355 North 200 West Provo Ut	Provo	Utah	UT	08

Get detailed information about this report, including column descriptions, at http://www.epa.gov/airquality/airdata/ad_about_reports.html#mon

AirData reports are produced from a direct query of the AQS Data Mart. The data represent the best and most recent information available to EPA from state agencies. However, some values may be absent due to incomplete reporting, and some values may change due to quality assurance activities. The AQS database is updated daily by state, local, and tribal organizations who own and submit the data. Please contact the appropriate air quality monitoring agency to report any data problems. <http://www.epa.gov/airquality/airdata/ad_contacts.html>

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This report is based on monitor-level summary statistics. Air quality standards for some pollutants (PM2.5 and Pb) allow for combining data from multiple monitors into a site-level summary statistic that can be compared to the standard. In those cases, the site-level statistics may differ from the monitor-level statistics upon which this report is based.

Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: June 16, 2016

Monitor Values Report

Geographic Area: Provo-Orem, UT
Pollutant: CO
Year: 2014
Exceptional Events: Included (if any)

Obs	First Max 8hr	Second Max 8hr	Days 8hr Max >STD	First Max 1hr	Second Max 1hr	Days 1hr Max >STD	Exc Events	Monitor Number	Site ID	Address	City	County	State	EPA Region
8320	1.9	1.9	0	2.7	2.7	0	None	1	490490002	1355 North 200 West Provo Ut	Provo	Utah	UT	08

Get detailed information about this report, including column descriptions, at http://www.epa.gov/airquality/airdata/ad_about_reports.html#mon

AirData reports are produced from a direct query of the AQS Data Mart. The data represent the best and most recent information available to EPA from state agencies. However, some values may be absent due to incomplete reporting, and some values may change due to quality assurance activities. The AQS database is updated daily by state, local, and tribal organizations who own and submit the data. Please contact the appropriate air quality monitoring agency to report any data problems. <http://www.epa.gov/airquality/airdata/ad_contacts.html>

Readers are cautioned not to rank order geographic areas based on AirData reports. Air pollution levels measured at a particular monitoring site are not necessarily representative of the air quality for an entire county or urban area.

This report is based on monitor-level summary statistics. Air quality standards for some pollutants (PM2.5 and Pb) allow for combining data from multiple monitors into a site-level summary statistic that can be compared to the standard. In those cases, the site-level statistics may differ from the monitor-level statistics upon which this report is based.

Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: June 16, 2016

Monitor Values Report

Geographic Area: Provo-Orem, UT
Pollutant: CO
Year: 2015
Exceptional Events: Included (if any)

Obs	First Max 8hr	Second Max 8hr	Days 8hr Max >STD	First Max 1hr	Second Max 1hr	Days 1hr Max >STD	Exc Events	Monitor Number	Site ID	Address	City	County	State	EPA Region
8720	2.2	2.1	0	3	2.9	0	None	1	490490002	1355 North 200 West Provo Ut	Provo	Utah	UT	08

Get detailed information about this report, including column descriptions, at http://www.epa.gov/airquality/airdata/ad_about_reports.html#mon

AirData reports are produced from a direct query of the AQS Data Mart. The data represent the best and most recent information available to EPA from state agencies. However, some values may be absent due to incomplete reporting, and some values may change due to quality assurance activities. The AQS database is updated daily by state, local, and tribal organizations who own and submit the data. Please contact the appropriate air quality monitoring agency to report any data problems. <http://www.epa.gov/airquality/airdata/ad_contacts.html>

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Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: June 16, 2016

APPENDIX B
TECHNICAL REPORTS

PROJECT OF AIR QUALITY CONCERN DETERMINATION I-15, PAYSON MAIN STREET INTERCHANGE EIS

Payson Interchange

ENVIRONMENTAL IMPACT STATEMENT

Main Street & Interstate 15

Air Quality Assessment

I-15; Payson Main Street Interchange EIS

Project No. F-I15-6(214)251 | PIN 10263

Project of Air Quality Concern Determination

Utah County, Utah

March 13, 2018

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Prepared for:

UDOT Keeping Utah Moving

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1. Introduction

This study addresses the air quality impacts from the proposed improvement of the I-15 Main Street interchange in Payson, Utah County, Utah. The project involves consideration of various alternatives for the improvement of the interchange, including improving the existing interchange, relocating the interchange to the northeast, and multiple "combination" improvements that would maintain access at the existing Main Street interchange while adding a new interchange with a new arterial connection (Nebo Beltway).

The Preferred Alternative (Alternative C1) would provide a free-flow connection between the Main Street interchange and a new interchange connecting to the proposed Nebo Beltway. Braided ramps (i.e., ramps that cross over each other) would connect the two interchanges. Motorists traveling on I-15 in either direction would exit I-15 and have the option to take the nearest road (i.e., Main Street for northbound motorists or Nebo Beltway for southbound motorists) or continue to the next road in free-flow/continuous lanes without stopping at a traffic signal. Motorists entering I-15 from Main Street (northbound) or Nebo Beltway (southbound) would utilize the respective on-ramp that would cross over the free-flow continuous lanes and enter I-15 between both interchanges. From the new interchange, motorists would travel on Nebo Beltway until it intersects with SR-198 at 2100 West, thereby avoiding and reducing congestion at Main Street and the existing interchange. The air quality study area is shown in Figure 1.

The purpose of this report is to document the definition of the Payson Interchange project as not being a project of air quality concern for particulate matter.

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.

2. Purpose of the Project

The purpose of the proposed project is to improve traffic operations in Payson by reducing expected roadway congestion at the Main Street interchange and on Main Street between approximately 900 North and 100 North and to improve design deficiencies to meet current roadway design standards.

3. Need for the Project

The proposed project is needed because the existing infrastructure will not be able to adequately serve the projected transportation demands from a rapidly growing population in and around Payson and because existing design deficiencies compromise vehicle safety and limit the overall functionality of the interchange.

Figure 1: Air Quality Study Area and Alternative C1

4. Attainment Status and Existing Conditions for the Project Area

Attainment Status

An attainment area is an area that meets (or "attains") the National Ambient Air Quality Standards (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.

Table 1 shows the National Ambient Air Quality Standards (NAAQS) (which are also the Utah standards) for $PM_{2.5}$ (particulate matter with a diameter of 2.5 microns or less) and PM_{10} (particulate matter with a diameter of 10 microns or less).

Table 1: National Ambient Air Quality Standards
(ppm = parts per million, ppb = parts per billion)

Pollutant	Primary/ Secondary	Averaging Time	Level	Form
Particulate Matter ($PM_{2.5}$)[1]	Primary	Annual	12.0 µg/m^3	Annual mean, averaged over 3 years
	Secondary	Annual	15.0 µg/m^3	Annual mean, averaged over 3 years
	Primary and Secondary	24-Hour	35 µg/m^3	98th percentile, averaged over 3 years
Particulate Matter (PM_{10})	Primary and Secondary	24-Hour	150 µg/m^3	Not to be exceeded more than once per year on average over 3 years

[1] 2006 NAAQS for Particulate Matter ($PM_{2.5}$)

Utah County is currently designated as a moderate nonattainment area for course particulate matter (PM_{10}) and as a serious nonattainment for fine particulate matter ($PM_{2.5}$) according to the EPA (*Green Book: Nonattainment Areas for Criteria Pollutants*, EPA, September 30, 2017). The project area is in attainment for all other criteria pollutants.

The current attainment status for the project area is listed in Table 2.

Table 2: Project-Area Attainment Status

Pollutant	Status
Carbon Monoxide (CO)	Attainment
Lead (Pb)	Attainment
Nitrogen Dioxide (NO_2)	Attainment
Ozone (O_3)	Attainment
Particulate Matter ($PM_{2.5}$)	Nonattainment (Serious)
Particulate Matter (PM_{10})	Nonattainment (Moderate)
Sulfur Dioxide (SO_2)	Attainment

Regional Air Quality

For PM_{10}, most high values tend to occur during wintertime inversions. In the summertime, high wind events can also lead to unusually high PM_{10} values. Trends are somewhat difficult to evaluate because weather plays such a large role in the data collected from year to year. Hence, the standard is evaluated over a three-year period.

Like PM_{10}, $PM_{2.5}$ maximum values also tend to occur during wintertime inversions. Also like PM_{10}, trends are somewhat difficult to evaluate because weather plays such a large role in the data collected from year to year. Similar to PM_{10}, the standard is evaluated over a three-year period.

Study Area Air Quality Existing Conditions

The Utah Department of Environmental Quality maintains an ambient air monitoring network in Utah. Within Salt Lake County multiple meter locations have collected data over the past 10 years and many are no longer in operation.

The nearest air quality monitoring location to the project area is the Spanish Fork Site (Site ID 490495010), which is located at 312 West 2050 North in Spanish Fork, Utah. The monitoring site collects data related to $PM_{2.5}$ and O_3. Another location farther north from the project area in Provo (Site ID 490490002) collects data related to $PM_{2.5}$, PM_{10}, O_3, NO_x and CO.

Fine Particulate Matter

$PM_{2.5}$ monitoring data from the Spanish Fork monitoring station is listed in Table 3 for the last 10 years.

Table 3: $PM_{2.5}$ Monitoring Data

Year	24-Hour $PM_{2.5}$					Annual $PM_{2.5}$		
	1st Max (µg/m³)	2nd Max (µg/m³)	98th Percentile (µg/m³)	3-Year Average (µg/m³)	Exceeds 35 µg/m³ Standard (Yes/No)	Annual Mean (µg/m³)	3-Year Average (µg/m³)	Exceeds 12/15 µg/m³ Standard (Yes/No)
2006	38.8	22.9	22	N/A	--	7.7	N/A	--
2007	71.2	57.6	55	N/A	--	11.1	N/A	--
2008	43.3	27.6	26	34.3	No	8.2	9.0	No
2009	77.3	59.2	44	41.7	Yes	9.6	9.6	No
2010	59.6	51.7	48	39.3	Yes	8.5	8.8	No
2011	46.0	34.6	33	41.7	Yes	7.4	8.5	No
2012	29.5	28.8	22	34.3	No	7.2	7.7	No
2013	125.9	84.6	82	45.7	Yes	11.0	8.5	No
2014	41.1	28.7	27	43.7	Yes	6.4	8.2	No
2015	37.5	31.4	28	46.5	Yes	6.2	7.9	No

In six of the eight years for which an average could be calculated, the three-year average of the 98th percentile value for the 24-hour period was greater than the primary/secondary standard of 35 μg/m³. The three-year averages of the weighted mean were less than both the primary annual standard of 12 μg/m³ and the secondary annual standard of 15 μg/m³.

Course Particulate Matter

PM_{10} monitoring data from the Provo monitoring station is listed in Table 4 for the last 10 years.

Table 4: PM_{10} Monitoring Data

Year	24-Hour PM_{10}				
	1st Max (μg/m³)	2nd Max (μg/m³)	Estimated Exceedance (Days)	3-Year Exceedance Average (Days)	Exceeds Standard of One Exceedance Averaged Over 3 Years (Yes/No)
2006	123	71	0	0	N/A
2007	146	91	0	0	N/A
2008	141	90	0	0	No
2009	108	80	0	0	No
2010	395	85	3.5	1.2	Yes
2011	59	52	0	1.2	Yes
2012	76	67	0	1.2	Yes
2013	149	107	0	0	No
2014	73	52	0	0	No
2015	47	41	0	0	No

During that period, the only exceedances of the 24-hour value for PM_{10} of the 150 μg/m³ standard occurred in 2010, during which there were 3.5 exceedance days. The rolling three-year averages for the years from 2010 to 2012 were 1.2 exceedances per year, which is above the standard of one exceedance per year on average.

5. 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 EPA. Subchapter C of Title 40 covers air programs such as the Clean Air Act and NAAQS. The Payson Interchange is not an exempt project under either 40 CFR 93.126 or 40 CFR 93.128 because it will potentially relocate an interchange, and therefore requires further review to determine if the project meets the criteria of air quality concern. If a project is of air quality concern it will require a quantitative $PM_{2.5}$ hot-spot analysis.

Projects defined by 40 CFR 93.123(b)(1) as projects of air quality concern include:

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

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

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

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

(v) Projects in or affecting locations, areas, or categories of sites 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.

EPA's Transportation Conformity Guidance for Quantitative Hot-Spot Analyses in $PM_{2.5}$ and PM_{10} Non-attainment and Maintenance Areas (EPA 2015) provides guidance for reviewing transportation projects in the context of Title 40 and clarification on the criteria for determining whether a project is a project of air quality concern. Appendix B of EPA's hot-spot guidance provides the following examples of projects of local air quality concern that would be covered by 40 CFR 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 LOS D, E, or F) that has a significant increase in the number of diesel trucks
- Similar highway projects that involve a significant increase in the number of diesel transit busses and/or diesel trucks.

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

- 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 NAAQS violations.

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

6. Project of Air Quality Concern Evaluation

This section reviews the characteristics of the Payson Interchange project according to the definitions in Section 5.

New Highway Capacity

Definition. Is this a new highway project that has a significant number of diesel vehicles?

Response. No. All of the roadways considered in the project are existing roadways except for the Nebo Beltway. The Nebo Beltway is intended to provide relief to Main Street and serves primarily the same geographic area. Heavy trucks currently make up approximately 2% of the traffic on Main Street and the Nebo Beltway is anticipated to accommodate a similar mix of traffic. For the Preferred Alternative, Main Street is anticipated to accommodate 420 trucks per day and the Nebo Beltway will accommodate 290 trucks per day which are not considered significant volumes of heavy trucks. In addition, no major sources or destinations for heavy diesel vehicles, such as truck service areas, are located along the proposed Nebo Beltway alignment.

Expanded Capacity

Definition. Is this an expanded highway project that has a significant increase in the number of diesel vehicles?

Response. No. Traffic data was collected and analyzed for the project and those studies are documented in a report titled *Traffic Report, I-15, Payson Main Street Interchange EIS.* Using the Mountainland Association of Governments travel demand model, traffic volumes were predicted for the Build Alternatives. The design-year (2040) through-traffic on I-15 at the interchange is 80,000 vehicles. Currently, medium and heavy trucks make up approximately 26% of the total traffic volume on I-15. If diesel truck traffic grows at the same rate as total vehicles, the number of diesel vehicles on I-15 will be 21,000 trucks per day in the design year (2040).

The Preferred Alternative does not include expanding or adding capacity to I-15, or include facilities that would attract heavy diesel vehicles such as weigh stations or service stations. The proposed improvements under the Preferred Alternative focuses on the existing Payson Main

Street interchange, the proposed Nebo Beltway interchange and associated side roads. Main Street is predicted to experience an ADT of 20,900 vehicles which includes 420 trucks and the proposed Nebo Beltway is predicted to experience an ADT of 14,500 vehicles which includes 290 trucks.

Traffic volumes under the build and no-build conditions were reviewed to determine if this project is a project of air quality concern. Total traffic and truck traffic volumes remain generally the same under all Alternatives, and the Preferred Alternative is not expected to significantly add to traffic volumes on I-15. The purpose of the Preferred Alternative is to reduce congestion; thus, vehicles will be traveling at more efficient speeds, and air emissions are expected to be lower under build conditions. Vehicle emissions are continuing to improve/decrease. Federal emission standards for new vehicles are much more stringent than in the past, thus, as the vehicle fleet turns over (i.e., older vehicles are replaced with newer ones) the amount of pollution will continue to decline.

Projects with Congested Intersections

Definition. Does this project affect intersections that are at LOS D, E, or F with a significant number of diesel vehicles, or will this project change an intersection to a LOS D, E, or F because of increased traffic volumes from a significant number of diesel vehicles related to the project?

Response. No. A VISSIM traffic model was used to predict the Level of Service (LOS) for the Existing, No-Build and Build Alternatives. As reported in *Traffic Report, I-15, Payson Main Street Interchange EIS*, the Main Street Interchange currently operates at LOS B and all of the intersections associated with the Preferred Alternative, including those at both the Main Street and Nebo Beltway interchanges, are predicted to operate at LOS C or better. Additionally, large diesel trucks make up approximately 2% of the traffic on Main Street and the Nebo Beltway. Additional volumes of diesel vehicles are not expected to exit I-15 at the either the Main Street or Nebo Beltway interchanges due to the project's construction.

The EPA's guidance indicates that 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 are not projects of air quality concern.

New Bus and Rail Terminals

Definition. Does this project include new bus and rail terminals and transfer points that will have a significant number of diesel vehicles congregating at a single location?

Response. No. The Payson Interchange Project doesn't involve constructing or connecting to new bus or rail terminals or transfer stations.

Expanded Bus and Rail Terminals

Definition. Does this project include expanded bus and rail terminals and transfer points that significantly increase the number of diesel vehicles congregating at a single location?

Response. No. The Payson Interchange Project doesn't involve expanding bus or rail terminals or transfer stations.

Projects in or Affecting PM_{10} or $PM_{2.5}$ Sites of Violation or Possible Violation

Definition. Is this project 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?

Response. No. The Payson Interchange project area is in the Utah County, $PM_{2.5}$ and PM_{10} non-attainment area. However, the Preferred Alternative would improve traffic flow, reduce vehicle idling, and improve the level of service at intersections compared to the No-Build Alternative.

7. Project of Air Quality Concern Determination

Standard. State whether the project is a project of air quality concern and summarize the support 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.

Response. The Payson Interchange Project doesn't qualify as a project of air quality concern since it wouldn't result in a substantial increase in diesel traffic in the project area compared to the No-Build Alternative. The project is not expected to either influence the vehicle mix in the project area or attract a significant number of new diesel vehicles to the area. The project is intended to improve traffic flow and safety through the Main Street interchange and along Main Street from 900 North to 100 North in Utah County. This project is not a project of air quality concern; therefore, no project-level (hot-spot) analysis is required for conformity purposes under 40 CFR 93.123(b). UDAQ concurs with UDOT that the I-15 Payson Main Street Interchange and Nebo Beltway project is not a project of air quality concern and will not impact the submitted $PM_{2.5}$ nonattaiment SIP plan and PM_{10} maintenance plan SIP revision for Utah County (Kisen 2018).

8. References

Code of Federal Regulations. Title 40 CFR Parts 50, 51, 81 and 93. July 1, 2016.

[EPA] U.S. Environmental Protection Agency

2017 NAAQS Table. https://www.epa.gov/criteria-air-pollutants/naaqs-table

2017 The Green Book Nonattainment Areas for Criteria Pollutants. Website accessed December 8, 2017.

2017 AirData website accessed February 16, 2017.

2015 Transportation Conformity Guidance for Quantitative Hot-Spot Analyses in $PM_{2.5}$ and PM_{10} Non-attainment and Maintenance Areas.

Kisen, Noami.

2018 Personal communication between Naomi Kisen, UDOT, and Justin Peterson, Lochner, regarding response to EPA comments on the draft Project of Air Quality Concern Determination. April 5.

[TRB] Transportation Research Board

2016 Highway Capacity Manual

Avenue Consultants

2017 Traffic Report, I-15, Payson Main Street Interchange EIS

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2015 *TransPlan 40 Regional Transportation Plan*.

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[UDOT] Utah Department of Transportation. 2009. *Environmental Process Manual*

APPENDIX B
TECHNICAL REPORTS

NOISE ASSESSMENT I-15, PAYSON MAIN STREET INTERCHANGE ENVIRONMENTAL IMPACT STATEMENT

Payson Interchange

ENVIRONMENTAL IMPACT STATEMENT

Main Street & Interstate 15

Noise Assessment

I-15; Payson Main Street Interchange EIS

Project No. F-I15-6(214)251 | PIN 10263

Utah County, Utah

March 14, 2017

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Key to Abbreviations

Abbreviations appearing in the TNM printouts

Crit'n	Critical value defining a noise level impact
Crit'n Sub'l Inc	Critical value defining a substantial increase impact
LAeq1h	One-hour, A-weighted equivalent sound energy level
No.	Object Number (Used by TNM)
Snd Lvl	Sound Level
TNM	Traffic Noise Model

1. INTRODUCTION

This study addresses the traffic-generated noise impacts from the proposed improvement of the I-15 Main Street interchange in Payson, Utah County, Utah. The project involves consideration of various alternatives for the improvement of the interchange, including improving the existing interchange in its current location, relocating the interchange to the northeast, and multiple "combination" improvements that would maintain access at the existing Main Street interchange while adding a new interchange with a new arterial connection (Nebo Beltway). The location of the proposed project is shown in Figure 1.

Six Build Alternatives were advanced for further consideration from a screening process and are addressed in this Noise Assessment.

Alternative C1

Alternative C1 would provide a free-flow connection between the Main Street interchange and a new interchange connecting to the proposed Nebo Beltway. Braided ramps (i.e., ramps that cross over each other) would connect the two interchanges. Motorists traveling on I-15 in either direction would exit I-15 and have the option to take the nearest road (i.e., Main Street for northbound motorists or Nebo Beltway for southbound motorists) or continue to the next road in free-flow/continuous lanes without stopping at a traffic signal. Motorists entering I-15 from Main Street (northbound) or Nebo Beltway (southbound) would utilize the respective on-ramp that would cross over the free-flow continuous lanes and enter I-15 between both interchanges. From the new interchange, motorists would travel on Nebo Beltway until it intersects with SR-198 at 2100 West, thereby avoiding and reducing congestion at Main Street and the existing interchange.

Main Street would be widened to five lanes at the interchange and taper to its current configuration south of 600 North. Main Street would also be realigned to connect to 9600 South, instead of maintaining its current north-south alignment to improve the skew.

Alternative C3

Alternative C3 would include an additional interchange approximately 0.72 miles northeast of Main Street. However, frontage roads would connect the two interchanges instead of free-flow ramps. Motorists traveling on I-15 in either direction would exit I-15 and stop at the first signalized interchange (i.e., Main Street for northbound motorists or Nebo Beltway for southbound motorists) or continue on the frontage road to the next interchange. Motorists entering I-15 from Main Street (northbound) or Nebo Beltway (southbound) would utilize the frontage road to the next interchange and proceed through the signalized intersection to the respective on-ramp. From the new interchange, motorists would travel on Nebo Beltway until it

intersects with SR-198 at 2100 West, thereby avoiding and reducing congestion at Main Street and the existing interchange.

Main Street would be widened to five lanes at the interchange and taper to its current configuration south of 600 North. Main Street would also be realigned to connect to 9600 South, instead of maintaining its current north-south alignment to improve the skew.

Alternative C4

Alternative C4 would function the same as Alternative C3, with frontage roads connecting the Main Street interchange to an additional interchange approximately 0.15 miles northeast of Main Street.

Alternative I1

Alternative I1 improves and adds capacity at the existing interchange and Main Street by widening Main Street to five lanes between the interchange and SR-198. In addition, the on- and off-ramps of the existing interchange would be extended away from I-15, and the turning radius at each ramp also would be increased.

Alternative R1

The R1 Alternative would accommodate the future traffic needs by relocating the interchange northeast along I-15, close to its current location. This would eliminate direct access to Main Street, and direct all traffic onto a new arterial road (Nebo Beltway). Main Street north of I-15 would be slightly realigned to the west, while maintaining its current north-south alignment, to accommodate the intersection with Nebo Beltway.

Alternative R2

The R2 Alternatives would accommodate the future traffic needs by relocating the interchange northeast along I-15, further north than the R1 Alternative. This would eliminate direct access to Main Street, and direct all traffic onto a new arterial road (Nebo Beltway). Main Street would not need to be widened. Alternative R2 also includes a connection between Main Street and Nebo Beltway along the south side of I-15.

This project meets the definition of a "Type I Project" as listed in the January 2017 Utah Department of Transportation (UDOT) Draft Noise Abatement Policy (08A2-01) primarily because it adds a new roadway in Alternatives C1, C3, C4, R1 and R2, and in Alternative I1 it adds additional lanes to Main Street and SR-198 (100 North). Current land use along the project is a mix of residential, commercial, and undeveloped. The policy establishes certain noise level criteria for these different land uses. The purpose of this noise analysis is to determine if the improvements associated with this project will cause noise levels to approach or exceed these

criteria, or if there is predicted to be a substantial increase in traffic-generated noise levels due to the improvement.

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.

Construction noise impacts are discussed in Section 7 of this report.

Figure 1: Project Overview

2. FUNDAMENTALS OF TRAFFIC NOISE

The following is a brief discussion of fundamental traffic noise concepts.

Sound, Noise, and Acoustics

Sound can be described as the mechanical energy of a vibrating object transmitted by pressure waves through the air to a hearing organ, such as a human ear. Noise is defined as loud, unexpected, or annoying sound.

In acoustics, the fundamental model consists of a sound source, a receptor, and the propagation path between the two. The loudness of the noise source and obstructions or atmospheric factors affecting the propagation path to the receptor determines the sound level and characteristics of the noise perceived by the receptor.

Frequency

Continuous sound can be described by frequency (pitch) and amplitude (loudness). A low-frequency sound is perceived as low in pitch. Frequency is expressed in terms of cycles per second, or Hertz (Hz). For example, a frequency of 250 cycles per second is referred to as 250 Hz. High frequencies are sometimes more conveniently expressed in kilohertz (kHz), or thousands of Hertz. The audible frequency range for humans is generally between 20 Hz and 20,000 Hz.

Sound Pressure Levels and Decibels

The amplitude of pressure waves generated by a sound source determines the loudness of that source. Sound pressure amplitude is measured in micro-Pascals (mPa). One mPa is approximately one hundred billionth (0.00000000001) of normal atmospheric pressure. Sound pressure amplitudes for different kinds of noise environments can range from less than 100 to 100,000,000 mPa. Because of this huge range of values, sound is rarely expressed in terms of mPa. Instead, a logarithmic scale is used to describe sound pressure level (SPL) in terms of decibels (dB). The threshold of hearing for young people is about 0 dB, which corresponds to 20 mPa.

Addition of Decibels

Because decibels are logarithmic units, SPL cannot be added or subtracted through ordinary arithmetic. Under the decibel scale, a doubling of sound energy corresponds to a 3 dB increase. In other words, when two identical sources are each producing sound of the same loudness, the resulting sound level at a given distance would be 3 dB higher than one source under the same conditions. For example, if one vehicle produces 70 dB when it passes an observer, two vehicles passing simultaneously would not produce 140 dB. Instead, they would combine to produce 73 dB.

A-Weighted Decibels

The decibel scale alone does not adequately characterize how humans perceive noise. The dominant frequencies of a sound have a substantial effect on the human response to that sound. Although the intensity of the sound is a purely physical quantity, the loudness or human response is determined by the characteristics of the human ear.

Human hearing is limited in the range of audible frequencies as well as in the way it perceives the SPL in that range. People are most sensitive to the frequency range of 1,000–8,000 Hz, and perceive sounds within that range better than sounds of the same amplitude in higher or lower frequencies. To approximate the response of the human ear, sound levels of individual frequency bands are weighted, depending on the human sensitivity to those frequencies. Then, an "A-weighted" sound level, or dBA, can be computed based on this information.

The A-weighting network approximates the frequency response of the average young ear when listening to most ordinary sounds. When people make judgments of the relative loudness or annoyance of a sound, their judgments correlate well with the A-scale sound levels of those sounds. Noise levels for traffic noise reports are typically reported in terms of A-weighted decibels or dBA. Table 1 describes typical A-weighted noise levels for various noise sources.

Table 1: Typical A-Weighted Noise Levels

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	— 110 —	Rock band
Jet fly-over at 1,000 feet		
	— 100 —	
Gas lawn mower at 3 feet		
	— 90 —	
Diesel truck at 50 feet at 50 mph		Food blender at 3 feet
	— 80 —	Garbage disposal at 3 feet
Noisy urban area, daytime		
Gas lawn mower, 100 feet	**— 70 —**	Vacuum cleaner at 10 feet
Commercial area		Normal speech at 3 feet
Heavy traffic at 300 feet	**— 60 —**	
		Large business office
Quiet urban daytime	**— 50 —**	Dishwasher next room
Quiet urban nighttime	**— 40 —**	Theater, large conference room (background)
Quiet suburban nighttime		
	— 30 —	Library
Quiet rural nighttime		Bedroom at night, concert hall (background)
	— 20 —	
		Broadcast/recording studio
	— 10 —	
Lowest threshold of human hearing	**— 0 —**	Lowest threshold of human hearing

Source: Caltrans 2013

Human Response to Changes in Noise Levels

As discussed above, doubling sound energy results in a 3 dB increase in sound. Under controlled conditions in a laboratory, the trained, healthy human ear is able to discern 1 dB changes in sound levels, when exposed to steady, pure-tone signals in the mid-frequency (1,000 Hz–8,000 Hz) range. Typical, changes in noise of 1 to 2 dB are generally not perceptible. However, it is widely accepted that people are able to begin to detect sound level increases of 3 dB in most environments. Further, a 5 dB increase is generally perceived as a distinctly noticeable increase, and a 10 dB increase is generally perceived as a doubling of loudness. Therefore, a doubling of sound energy, such as by doubling the volume of traffic on a highway, which would result in a 3 dB increase in sound, would generally be perceived as barely detectable.

Noise Descriptors

Noise in the daily environment fluctuates over time. Some fluctuations are minor, but some are substantial. Some noise levels occur in regular patterns, but others are random. Some noise levels fluctuate rapidly, but others slowly. Some noise levels vary widely, but others are relatively constant. Various noise descriptors have been developed to describe time-varying noise levels. The following are the noise descriptors most commonly used in traffic noise analysis.

- **Equivalent Sound Level (Leq):** Leq represents an average of the sound energy occurring over a specified period. In effect, Leq is the steady-state sound level containing the same acoustical energy as the time-varying sound that actually occurs during the same period. The 1-hour A-weighted equivalent sound level (Leq[h]) is the energy average of A-weighted sound levels occurring during a one-hour period, and is the basis for Noise Abatement Criteria (NAC) used by UDOT and the Federal Highway Administration (FHWA).
- **Percentile-Exceeded Sound Level (Lxx):** Lxx represents the sound level exceeded for a given percentage of a specified period (e.g., L10 is the sound level exceeded 10 percent of the time, and L90 is the sound level exceeded 90 percent of the time).
- **Maximum Sound Level (Lmax):** Lmax is the highest instantaneous sound level measured during a specified period.
- **Day-Night Level (Ldn):** Ldn is the energy average of A-weighted sound levels occurring over a 24-hour period, with a 10 dB penalty applied to A-weighted sound levels occurring during nighttime hours between 10 PM and 7 AM.
- **Community Noise Equivalent Level (CNEL):** Similar to Ldn, CNEL is the energy average of the A-weighted sound levels occurring over a 24-hour period, with a 10 dB penalty applied to A-weighted sound levels occurring during the nighttime

hours between 10 PM and 7 AM, and a 5 dB penalty applied to the A-weighted sound levels occurring during evening hours between 7 PM and 10 PM.

Sound Propagation

When sound propagates over a distance, it changes in level and frequency content. The manner in which noise reduces with distance depends on the following factors.

Geometric Spreading

Sound from a localized source (i.e., a point source) propagates uniformly outward in a spherical pattern. The sound level attenuates (or decreases) at a rate of 6 dB for each doubling of distance from a point source. Highways consist of several localized noise sources on a defined path, and hence can be treated as a line source, which approximates the effect of several point sources. Noise from a line source propagates outward in a cylindrical pattern, often referred to as cylindrical spreading. Sound levels attenuate at a rate of 3 dB for each doubling of distance from a line source.

Ground Absorption

The propagation path of noise from a highway to a receptor is usually very close to the ground. Noise attenuation from ground absorption and reflective-wave canceling adds to the attenuation associated with geometric spreading. Traditionally, the excess attenuation has also been expressed in terms of attenuation per doubling of distance. This approximation is usually sufficiently accurate for distances of less than 200 feet. For acoustically hard sites, such as sites with a reflective surface between the source and the receptor, such as a parking lot or body of water, no excess ground attenuation is assumed. For acoustically absorptive or soft sites such as soft dirt, grass, or scattered bushes and trees, an excess ground-attenuation value of 1.5 dB per doubling of distance is normally assumed. When added to the cylindrical spreading, the excess ground attenuation results in an overall drop-off rate of 4.5 dB per doubling of distance.

Atmospheric Effects

Receptors located downwind from a source can be exposed to increased noise levels relative to calm conditions, whereas locations upwind can have lowered noise levels. Sound levels can be increased at large distances (more than 500 feet) from the highway due to atmospheric temperature inversion when temperatures increase with elevation. Other factors such as air temperature, humidity, and turbulence can also have significant effects.

Shielding by Natural or Human-Made Features

A large object or barrier in the path between a noise source and a receptor can substantially attenuate noise levels at the receptor. The amount of attenuation provided by shielding depends on the size of the object and the frequency content of the noise source. Natural terrain features, such as hills and dense woods, and human-made features such as buildings and walls, can substantially reduce noise levels. Walls are often constructed between a source and a receptor

specifically to reduce noise. A barrier that breaks the line of sight between a source and a receptor will typically result in at least 5 dB of noise reduction. Taller barriers provide increased noise reduction. Vegetation between the highway and receptor is rarely effective in reducing noise because it does not create a solid barrier.

3. FEDERAL REGULATIONS AND STATE POLICIES

This noise report has been assessed in accordance with the federal regulations specified in Title 23 of the Code of Federal Regulations (CFR) Part 772 and state policy (UDOT's January 2017 Draft Noise Abatement Policy (08A2-01)).

Federal Regulations

23 CFR 772

23 CFR 772 provides procedures for preparing operational and construction noise studies and evaluating noise abatement considered for federal and federal-aid highway projects. Under 23 CFR 772.7, projects are categorized as Type I, Type II, or Type III projects.

FHWA defines a Type I project as a proposed federal or federal-aid highway project for the construction of a highway on a new location or the physical alteration of an existing highway which significantly changes either the horizontal or vertical alignment of the highway. The following projects are also considered to be Type I projects:

- The addition of a through-traffic lane(s). This includes the addition of a through-traffic lane that functions as a high-occupancy vehicle (HOV) lane, high-occupancy toll (HOT) lane, bus lane, or truck climbing lane
- The addition of an auxiliary lane, except for when the auxiliary lane is a turn lane
- The addition or relocation of interchange lanes or ramps added to a quadrant to complete an existing partial interchange
- Restriping existing pavement for the purpose of adding a through traffic lane or an auxiliary lane
- The addition of a new or substantial alteration of a weigh station, rest stop, ride-share lot, or toll plaza

If a project is determined to be a Type I project under this definition, the entire project area as defined in the environmental document is a Type I project.

A Type II project is a noise barrier retrofit project that involves no changes to highway capacity or alignment. A Type III project is a project that does not meet the classifications of a Type I or Type II project. Type III projects do not require a noise analysis.

Under 23 CFR 772.11, noise abatement must be considered for Type I projects if the project is predicted to result in a traffic noise impact. In such cases, 23 CFR 772 requires that the project sponsor "consider" noise abatement before adoption of the final National Environmental Policy Act document. This process involves identification of noise abatement measures that are reasonable, feasible, and likely to be incorporated into the project, and of noise impacts for which no apparent solution is available.

Traffic noise impacts, as defined in 23 CFR 772.5, occur when the predicted noise level in the design-year approaches or exceeds the NAC specified in 23 CFR 772, or a predicted noise level substantially exceeds the existing noise level (a "substantial" noise increase). The terms "substantial increase" or "approach" are not specifically defined in 23 CFR 772. The UDOT Noise Abatement Policy defines a "substantial increase" as a 10 dB(A) increase in the predicted noise level over existing noise levels and "approach" as 1 dB(A) below the NAC. These criteria are further described below.

Table 2 summarizes NAC corresponding to various land use activity categories. Activity categories and related traffic noise impacts are determined based on the actual or permitted land use in a given area.

State Regulations and Policies

The noise impacts for the proposed improvements have been assessed in accordance with the January 2017 UDOT Draft Noise Abatement Policy (08A2-01). The policy was developed to be consistent with Type I, II and III projects as defined in 23 CFR 772.

To determine the degree of impact of highway traffic noise on human activity, the NAC put forth in the policy were used. The NAC, listed in Table 2 for various activities, represent noise levels that when approached or exceeded, require consideration of noise abatement. The NAC apply to areas having regular human use and where lowered noise levels would be a benefit. The NAC are given in terms of the A-weighted, hourly equivalent sound level in decibels or dB(A).

The UDOT policy provides a second criterion for assessing impact. For some locations, a project may impose a large increase in noise levels over existing levels, although the levels may not reach the NAC. If the noise level increases 10 dB(A) between the existing and future worst-case conditions then the property is considered impacted and a variety of abatement measures must be considered.

Table 2: Noise Abatement Criteria (NAC)[1]

Activity Category	FHWA Criteria Leq(h)	UDOT Criteria Leq(h)[2]	Description of Activity
A	57 (Exterior)	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 (Exterior)	66 (Exterior)	Residential
C	67 (Exterior)	66 (Exterior)	Active sports areas, amphitheaters, auditoriums, campgrounds, cemeteries, daycare 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 (Interior)	51 (Interior)	Auditoriums, daycare 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 (Exterior)	71 (Exterior)	Hotels, motels, offices, restaurants/bars and other developed lands, properties or activities not included in A–D or F
F	---	---	Agricultural, 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

1. Hourly A-Weighted Sound Level Decibels (dB(A))

2. Hourly A-weighted sound level in decibels reflecting a 1 dB(A) "approach" value below 23 CFR 772 values.

Source: UDOT Draft Noise Policy 2017

4. STUDY METHODS AND PROCEDURES

Methods for Identifying Land Use and Selecting Noise Measurement and Modeling Receiver Locations

An investigation was conducted to identify land uses that could be subject to traffic and construction noise impacts from the proposed project. Existing land uses in the project area were categorized by land use type and Activity Category as defined in Table 2, and extent of frequent human use. As stated in the UDOT policy, noise abatement is only considered where frequent human use occurs and where a lowered noise level would beneficial. Although all land uses are evaluated in this analysis, the focus is on locations of frequent human use that would benefit from a lowered noise level. Accordingly, this impact analysis focuses on locations with defined outdoor activity areas, such as residential backyards and common-use areas at multi-family residences, as well as local parks and outdoor recreation facilities.

The noise-sensitive areas were identified from aerial mapping, taking into consideration the limits and locations of the proposed improvements.

Short-term measurement locations were selected to represent each major developed area within the project area and to serve as representative modeling locations. These measurement locations are identified on Figure 1 as Noise Monitoring Sites.

Field Measurement Procedures

Noise measurements were collected at 10 locations on June 1, 2016, using a Larson Davis 824 Sound Level Meter. Each measurement was a minimum of 20 minutes in length at each location.

Traffic was classified and counted during the measurements (see Appendix A). Vehicles were classified as automobiles, medium-duty trucks and heavy-duty trucks. An automobile was defined as a vehicle with two axles and four tires designed primarily to carry passengers. Small vans and light trucks were included in this category. Medium-duty trucks included all cargo vehicles with two axles and six tires. Heavy-duty trucks included all vehicles with three or more axles. Operating speeds were also noted.

Temperature and wind speed were recorded manually during the measurements. Wind speeds typically ranged from 0 to 5 miles per hour (mph). Temperatures ranged from 70 to 82°F.

Traffic Noise Level Prediction Methods

A FHWA-approved highway noise prediction computer model (FHWA Traffic Noise Model (TNM), Version 2.5) was used to determine the traffic-generated noise for existing (2014) and worst-case future (2040) conditions. The model accounts for such factors as ground absorption, roadway geometry, receptor distance, vehicle volumes and speeds, and volumes of medium trucks (vehicles with two axles/six tires) and heavy trucks (three axles or more).

Noise levels have been predicted for that hour of the day when the vehicle volume, operating speed and number of heavy trucks combine to produce the worst traffic noise conditions. That worst hour typically is experienced when traffic is flowing at level of service C.

AM and PM peak hour traffic volumes were provided for the current year (2014) and the design year (2040) for the Build Alternatives. The peak hour volumes are anticipated to operate at level of service C and were used in the analysis (see Appendix B). Appendix B includes a discussion of how traffic data for the project was developed as well as supporting calculations.

Methods for Identifying Traffic Noise Impacts

The assessment of traffic noise impacts requires two comparisons:

- The noise levels under build conditions must be compared to the applicable NAC. This comparison determines the compatibility of noise levels under build conditions and present land use.
- The noise levels under existing conditions must be compared to those under build conditions. This comparison shows the change in noise level that will occur between the present time and the design year if the project is built.

Methods for Consideration of Abatement

If a noise impact is identified, the abatement measures listed in the policy may be considered. The abatement measures include: traffic management, noise insulation, and construction of noise barriers.

Traffic Management

Traffic management measures that are considered effective to reduce traffic noise include speed reduction and the restriction of heavy truck traffic. Speed reduction along this project is not considered to be a viable option. The reduction of the speed limit in order to reduce traffic noise is very large and would not likely be observed. I-15 serves as a truck route; restricting heavy truck traffic is contrary to one of the purposes of the road and is therefore not feasible.

Noise Insulation

Noise insulation may only routinely be considered for facilities such as public schools. Since none of the impacts occur inside of this type of property, noise insulation was not considered.

Noise Barriers

The construction of noise barriers has been considered for the impacted receptors. Preliminary barrier investigations were performed to determine their feasibility. For a barrier to be effective, it should be continuous along the roadway adjacent to the impacted site or sites. Openings for pedestrian or vehicular access greatly reduce the ability of a noise barrier to reduce noise levels. For safety purposes, a barrier should also not be taller than the distance from the barrier to the curb line in urban areas.

In addition to physical constraints, the feasibility of a noise barrier is based on its effectiveness in reducing traffic noise levels. Per the UDOT Noise Abatement Policy, a minimum reduction of 5 dB(A) at a minimum of 50 percent of the impacted front-row receptors is required for a barrier to be considered feasible.

The cost of a noise abatement measure is considered reasonable by the policy if the cost of the measure per benefitted property does not exceed a set cost index. The cost index varies according to the unit cost of the barrier being recommended. For this study, the cost index is $30,000 per benefitted residence and $360 per linear foot for parks, schools, churches and other Category A, C, D and E land uses. In the analysis, each residential unit is considered a single residential property. To remain in compliance with 23 CFR 772, the cost analysis must also consider properties that are not impacted, but which would also benefit from the construction of a noise barrier. The policy defines "benefitted" as a 5 dB(A) reduction in sound levels. Per the policy, a substantial reduction in noise levels should be attempted with a minimum noise reduction (design goal) of 7 dB(A) or greater for at least 35 percent of front-row receptors for a barrier to be considered reasonable.

Per the Procedures section of the policy, barrier costs are to be estimated at $20 per square foot of noise wall. This estimate is based on a current average unit cost for noise barrier and takes into consideration the undeveloped area and an assumed lack of construction difficulties.

5. EXISTING NOISE ENVIRONMENT

Existing Land Uses

An investigation was conducted to identify land uses that could be subject to traffic and construction noise impacts from the proposed project. The following land uses were identified in the project area:

- Single-family and multi-family residences: Activity Category B
- Places of worship: Activity Category D (interior)
- Commercial properties (i.e., hotel or restaurant): Activity Category E
- Recreational properties: Activity Category C

Other commercial land uses in the project area were found not to have any outdoor activities that would be considered noise-sensitive.

Although all developed land uses are evaluated in this analysis, noise abatement is only considered for areas of frequent human use that would benefit from a lowered noise level. Accordingly, this impact analysis focuses on locations with defined outdoor activity areas, such as residential backyards and common-use areas at multi-family residences, as well as local parks and outdoor facilities.

Existing Noise Wall

There is an existing noise wall located along the east side of I-15 south of the Main Street interchange. The wall is located either along the shoulder of I-15 or near the right-of-way line as

the wall continues to the southwest. The wall reduces noise levels by 6 to 10 dB(A) at receptors located adjacent to I-15.

Noise Measurement Results

The existing noise environment in the project area is characterized in Table 3 based on the noise monitoring that was conducted.

The measurements were used to validate the use of a noise model to predict existing and future noise levels. For all 10 measurement locations, model results, indicated below as TNM predicted noise levels, were within 3 dB(A) of the measured values. These results indicate that the noise model is reasonably accurate. Table 3 compares measured and modeled noise levels at each measurement location. Details of the measurements are included in Appendix A.

Table 3: Comparison of Recorded and Modeled Noise Levels

Site	Field Measured Noise Level dB(A)	TNM Predicted Noise Level dB(A)	Difference
A	55	54	1
B	58	60	-2
C	59	62	-3
D	64	63	1
E	63	62	1
F	52	49	3
G	62	61	1
H	64	64	0
I	69	67	2
J	51	54	-3

6. FUTURE NOISE ENVIRONMENT, IMPACTS, AND ABATEMENT CONSIDERED

Future Noise Environment and Impacts

Impact assessments have been performed for 472 residential properties, three churches, one restaurant with an outdoor seating area and one recreational area. These properties were represented by 234 receptors, which are listed in Table 4 along with their TNM-predicted results, and shown in Exhibits 1 through 6. Included for each study area are the applicable NAC land use category and the worst hourly equivalent sound levels that will occur on a regular basis for the existing and proposed conditions.

Table 4: Noise Analysis Locations and Results[1]

Receptor	Properties Represented	NAC Land Use Category	NAC – dB(A)	Noise Levels dB(A)												
				Existing (2014)	C1[1] (2040)	Increase	C3[1] (2040)	Increase	C4[1] (2040)	Increase	I1[1] (2040)	Increase	R1[1] (2040)	Increase	R2[1] (2040)	Increase
R001	108	B	66	61	55	-6	56	-5	N/A	N/A	N/A	N/A	N/A	N/A	56	-5
R002	1	B	66	59	60	1	60	1	N/A	N/A	63	4	Acquired[2]		N/A	N/A
R003	1	B	66	61	64	3	64	3	64	3	64	3	64	3	N/A	N/A
R004	1	B	66	63	65	2	65	2	65	2	**66**	3	65	2	N/A	N/A
R005	2	B	66	65	**66**	1	**66**	1	**66**	1	**67**	2	**66**	1	N/A	N/A
R006	2	B	66	66	**67**	1	**67**	1	**68**	2	**68**	2	**67**	1	N/A	N/A
R007	2	B	66	67	**69**	2	**69**	2	**69**	2	**69**	2	**69**	2	N/A	N/A
R008	2	B	66	63	65	2	65	2	65	2	65	2	65	2	N/A	N/A
R009	2	B	66	63	65	2	65	2	**66**	3	65	2	65	2	N/A	N/A
R010	3	B	66	65	**67**	2	**67**	2	**67**	2	**67**	2	**67**	2	N/A	N/A
R011	3	B	66	60	62	2	62	2	62	2	62	2	62	2	N/A	N/A
R012	3	B	66	66	**68**	2	**68**	2	**68**	2	**68**	2	**68**	2	N/A	N/A
R013	2	B	66	66	**68**	2	**68**	2	**68**	2	**68**	2	**68**	2	N/A	N/A
R014	2	B	66	64	**67**	3	**67**	3	**67**	3	**67**	3	**68**	4	N/A	N/A
R015	2	B	66	63	**66**	3	**66**	3	**66**	3	**67**	4	**66**	3	N/A	N/A
R016	2	B	66	65	**68**	3	**68**	3	**68**	3	**69**	4	**68**	3	N/A	N/A
R017	1	B	66	66	**68**	2	**68**	2	**68**	2	**69**	3	**69**	3	N/A	N/A
R018	1	B	66	64	**67**	3	**67**	3	**67**	3	**67**	3	**67**	3	N/A	N/A
R019	1	B	66	63	**66**	3	**66**	3	**66**	3	**66**	3	**66**	3	N/A	N/A
R020	1	B	66	64	**66**	2	**66**	2	**66**	2	**67**	3	**67**	3	N/A	N/A
R021	1	B	66	65	**68**	3	**68**	3	**68**	3	**68**	3	**68**	3	N/A	N/A
R022	1	B	66	64	**67**	3	**67**	3	**67**	3	**68**	4	**67**	3	N/A	N/A
R023	1	B	66	65	**68**	3	**67**	2	**67**	2	**68**	3	**68**	3	N/A	N/A
R024	1	B	66	65	**68**	3	**68**	3	**67**	2	**69**	4	**68**	3	N/A	N/A
R025	1	B	66	66	**69**	3	**69**	3	**68**	2	**70**	4	**69**	3	N/A	N/A
R026	1	B	66	63	65	2	65	2	65	2	65	2	**67**	4	N/A	N/A
R027	1	B	66	62	64	2	64	2	64	2	64	2	**66**	4	N/A	N/A
R028	2	B	66	61	64	3	64	3	64	3	64	3	**66**	5	N/A	N/A
R029	2	B	66	61	63	2	63	2	64	3	64	3	65	4	N/A	N/A
R030	1	B	66	60	62	2	62	2	63	3	63	3	64	4	N/A	N/A
R031	1	B	66	61	64	3	64	3	64	3	64	3	65	4	N/A	N/A
R032	1	B	66	61	64	3	64	3	64	3	64	3	65	4	N/A	N/A
R033	1	B	66	62	64	2	64	2	64	2	65	3	65	3	N/A	N/A
R034	2	B	66	60	63	3	63	3	63	3	64	4	64	4	N/A	N/A
R035	1	B	66	63	65	2	65	2	65	2	**66**	3	**66**	3	N/A	N/A
R036	1	B	66	60	62	2	63	3	63	3	63	3	63	3	N/A	N/A
R037	1	B	66	58	60	2	60	2	60	2	61	3	60	2	N/A	N/A
R038	1	B	66	59	61	2	61	2	61	2	62	3	62	3	N/A	N/A

Table 4: Noise Analysis Locations and Results[1]

Receptor	Properties Represented	NAC Land Use Category	NAC – dB(A)	Noise Levels dB(A)												
				Existing (2014)	C1[1] (2040)	Increase	C3[1] (2040)	Increase	C4[1] (2040)	Increase	I1[1] (2040)	Increase	R1[1] (2040)	Increase	R2[1] (2040)	Increase
R039	1	B	66	58	60	2	60	2	60	2	61	3	60	2	N/A	N/A
R040	1	B	66	60	63	3	62	2	63	3	63	3	63	3	N/A	N/A
R041	1	B	66	59	61	2	61	2	61	2	62	3	62	3	N/A	N/A
R042	1	B	66	61	63	2	63	2	63	2	63	2	63	2	N/A	N/A
R043	1	B	66	61	63	2	63	2	63	2	64	3	63	2	N/A	N/A
R044	1	B	66	62	64	2	64	2	64	2	65	3	65	3	N/A	N/A
R045	1	B	66	63	**66**	3	65	2	65	2	**66**	3	**66**	3	N/A	N/A
R046	Acquired[2]		51	68	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
R047	Restaurant	E	71	66	68	2	69	3	69	3	69	3	N/A	N/A	68	2
R048	Acquired[2]		51	66	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
R049	Acquired[2]		51	64	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
R050	3	B	66	65	N/A	N/A	N/A	N/A	N/A	N/A	65	0	N/A	N/A	N/A	N/A
R051	1	B	66	61	N/A	N/A	N/A	N/A	N/A	N/A	63	2	N/A	N/A	N/A	N/A
R052	1	B	66	60	N/A	N/A	N/A	N/A	N/A	N/A	63	3	N/A	N/A	N/A	N/A
R053	1	B	66	68	N/A	N/A	N/A	N/A	N/A	N/A	**67**	-1	N/A	N/A	N/A	N/A
R054	2	B	66	61	N/A	N/A	N/A	N/A	N/A	N/A	62	1	N/A	N/A	N/A	N/A
R055	2	B	66	59	N/A	N/A	N/A	N/A	N/A	N/A	61	2	N/A	N/A	N/A	N/A
R056	2	B	66	58	N/A	N/A	N/A	N/A	N/A	N/A	61	3	N/A	N/A	N/A	N/A
R057	2	B	66	58	N/A	N/A	N/A	N/A	N/A	N/A	60	2	N/A	N/A	N/A	N/A
R058	3	B	66	64	N/A	N/A	N/A	N/A	N/A	N/A	63	-1	N/A	N/A	N/A	N/A
R059	2	B	66	65	N/A	N/A	N/A	N/A	N/A	N/A	63	-2	N/A	N/A	N/A	N/A
R060	1	B	66	64	N/A	N/A	N/A	N/A	N/A	N/A	62	-2	N/A	N/A	N/A	N/A
R061	2	B	66	61	N/A	N/A	N/A	N/A	N/A	N/A	61	0	N/A	N/A	N/A	N/A
R062	2	B	66	58	N/A	N/A	N/A	N/A	N/A	N/A	59	1	N/A	N/A	N/A	N/A
R067	1	B	66	60	N/A	N/A	N/A	N/A	N/A	N/A	62	2	N/A	N/A	N/A	N/A
R068	2	B	66	56	N/A	N/A	N/A	N/A	N/A	N/A	58	2	N/A	N/A	N/A	N/A
R069	2	B	66	66	N/A	N/A	N/A	N/A	N/A	N/A	65	-1	N/A	N/A	N/A	N/A
R070	1	B	66	59	N/A	N/A	N/A	N/A	N/A	N/A	60	1	N/A	N/A	N/A	N/A
R071	1	B	66	64	N/A	N/A	N/A	N/A	N/A	N/A	63	-1	N/A	N/A	N/A	N/A
R072	2	B	66	64	N/A	N/A	N/A	N/A	N/A	N/A	63	-1	N/A	N/A	N/A	N/A
R073	1	B	66	57	N/A	N/A	N/A	N/A	N/A	N/A	59	2	N/A	N/A	N/A	N/A
R074	2	B	66	63	N/A	N/A	N/A	N/A	N/A	N/A	63	0	N/A	N/A	N/A	N/A
R075	2	B	66	58	N/A	N/A	N/A	N/A	N/A	N/A	59	1	N/A	N/A	N/A	N/A
R076	1	B	66	64	N/A	N/A	N/A	N/A	N/A	N/A	64	0	N/A	N/A	N/A	N/A
R077	2	B	66	59	N/A	N/A	N/A	N/A	N/A	N/A	60	1	N/A	N/A	N/A	N/A
R078	2	B	66	57	N/A	N/A	N/A	N/A	N/A	N/A	58	1	N/A	N/A	N/A	N/A

Table 4: Noise Analysis Locations and Results[1]

Receptor	Properties Represented	NAC Land Use Category	NAC – dB(A)	Noise Levels dB(A)												
				Existing (2014)	C1[1] (2040)	Increase	C3[1] (2040)	Increase	C4[1] (2040)	Increase	I1[1] (2040)	Increase	R1[1] (2040)	Increase	R2[1] (2040)	Increase
R079	1	B	66	60	N/A	N/A	N/A	N/A	N/A	N/A	62	2	N/A	N/A	N/A	N/A
R080	1	B	66	57	N/A	N/A	N/A	N/A	N/A	N/A	59	2	N/A	N/A	N/A	N/A
R083	1	B	66	60	N/A	N/A	N/A	N/A	N/A	N/A	62	2	N/A	N/A	N/A	N/A
R084	1	B	66	57	N/A	N/A	N/A	N/A	N/A	N/A	59	2	N/A	N/A	N/A	N/A
R085	2	B	66	56	N/A	N/A	N/A	N/A	N/A	N/A	58	2	N/A	N/A	N/A	N/A
R086	3	B	66	63	N/A	N/A	N/A	N/A	N/A	N/A	63	0	N/A	N/A	N/A	N/A
R087	1	B	66	60	N/A	N/A	N/A	N/A	N/A	N/A	61	1	N/A	N/A	N/A	N/A
R088	2	B	66	58	N/A	N/A	N/A	N/A	N/A	N/A	59	1	N/A	N/A	N/A	N/A
R089	2	B	66	58	N/A	N/A	N/A	N/A	N/A	N/A	59	1	N/A	N/A	N/A	N/A
R090	1	B	66	69	N/A	N/A	N/A	N/A	N/A	N/A	**67**	-2	N/A	N/A	N/A	N/A
R091	1	B	66	61	N/A	N/A	N/A	N/A	N/A	N/A	61	0	N/A	N/A	N/A	N/A
R092	2	B	66	59	N/A	N/A	N/A	N/A	N/A	N/A	60	1	N/A	N/A	N/A	N/A
R093	1	B	66	57	N/A	N/A	N/A	N/A	N/A	N/A	58	1	N/A	N/A	N/A	N/A
R095	1	B	66	59	N/A	N/A	N/A	N/A	N/A	N/A	61	2	N/A	N/A	N/A	N/A
R096	1	B	66	57	N/A	N/A	N/A	N/A	N/A	N/A	59	2	N/A	N/A	N/A	N/A
R097	1	B	66	56	N/A	N/A	N/A	N/A	N/A	N/A	58	2	N/A	N/A	N/A	N/A
R099	1	B	66	58	N/A	N/A	N/A	N/A	N/A	N/A	59	1	N/A	N/A	N/A	N/A
R100	1	B	66	57	N/A	N/A	N/A	N/A	N/A	N/A	58	1	N/A	N/A	N/A	N/A
R101	1	B	66	57	N/A	N/A	N/A	N/A	N/A	N/A	59	2	N/A	N/A	N/A	N/A
R103	1	B	66	61	N/A	N/A	N/A	N/A	N/A	N/A	62	1	N/A	N/A	N/A	N/A
R104	1	B	66	59	N/A	N/A	N/A	N/A	N/A	N/A	61	2	N/A	N/A	N/A	N/A
R105	1	B	66	56	N/A	N/A	N/A	N/A	N/A	N/A	58	2	N/A	N/A	N/A	N/A
R106	Church	D	51	45	N/A	N/A	N/A	N/A	N/A	N/A	44	-1	N/A	N/A	N/A	N/A
R107	2	B	66	57	N/A	N/A	N/A	N/A	N/A	N/A	59	2	N/A	N/A	N/A	N/A
R108	2	B	66	56	N/A	N/A	N/A	N/A	N/A	N/A	57	1	N/A	N/A	N/A	N/A
R109	2	B	66	55	N/A	N/A	N/A	N/A	N/A	N/A	57	2	N/A	N/A	N/A	N/A
R110	1	B	66	56	N/A	N/A	N/A	N/A	N/A	N/A	58	2	N/A	N/A	N/A	N/A
R111	Acquired[2]		51	69	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
R112	1	B	66	64	N/A	N/A	N/A	N/A	N/A	N/A	65	1	N/A	N/A	N/A	N/A
R113	2	B	66	56	N/A	N/A	N/A	N/A	N/A	N/A	58	2	N/A	N/A	N/A	N/A
R114	Acquired[2]		51	61	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
R115	1	B	66	60	N/A	N/A	N/A	N/A	N/A	N/A	62	2	N/A	N/A	N/A	N/A
R116	2	B	66	58	N/A	N/A	N/A	N/A	N/A	N/A	59	1	N/A	N/A	N/A	N/A
R117	2	B	66	57	N/A	N/A	N/A	N/A	N/A	N/A	58	1	N/A	N/A	N/A	N/A
R118	1	B	66	58	N/A	N/A	N/A	N/A	N/A	N/A	59	1	N/A	N/A	N/A	N/A
R119	1	B	66	57	N/A	N/A	N/A	N/A	N/A	N/A	58	1	N/A	N/A	N/A	N/A
R120	2	B	66	58	N/A	N/A	N/A	N/A	N/A	N/A	59	1	N/A	N/A	N/A	N/A

Table 4: Noise Analysis Locations and Results[1]

Receptor	Properties Represented	NAC Land Use Category	NAC – dB(A)	Noise Levels dB(A)												
				Existing (2014)	C1[1] (2040)	Increase	C3[1] (2040)	Increase	C4[1] (2040)	Increase	I1[1] (2040)	Increase	R1[1] (2040)	Increase	R2[1] (2040)	Increase
R121	2	B	66	56	N/A	N/A	N/A	N/A	N/A	N/A	58	2	N/A	N/A	N/A	N/A
R122	1	B	66	57	N/A	N/A	N/A	N/A	N/A	N/A	59	2	N/A	N/A	N/A	N/A
R123	2	B	66	56	N/A	N/A	N/A	N/A	N/A	N/A	57	1	N/A	N/A	N/A	N/A
R124	1	B	66	56	N/A	N/A	N/A	N/A	N/A	N/A	58	2	N/A	N/A	N/A	N/A
R125	1	B	66	55	N/A	N/A	N/A	N/A	N/A	N/A	56	1	N/A	N/A	N/A	N/A
R126	1	B	66	67	N/A	N/A	N/A	N/A	N/A	N/A	65	-2	N/A	N/A	N/A	N/A
R127	2	B	66	59	N/A	N/A	N/A	N/A	N/A	N/A	60	1	N/A	N/A	N/A	N/A
R128	1	B	66	54	N/A	N/A	N/A	N/A	N/A	N/A	56	2	N/A	N/A	N/A	N/A
R129	1	B	66	57	N/A	N/A	N/A	N/A	N/A	N/A	58	1	N/A	N/A	N/A	N/A
R130	1	B	66	55	N/A	N/A	N/A	N/A	N/A	N/A	56	1	N/A	N/A	N/A	N/A
R131	2	B	66	57	N/A	N/A	N/A	N/A	N/A	N/A	57	0	N/A	N/A	N/A	N/A
R132	1	B	66	64	N/A	N/A	N/A	N/A	N/A	N/A	62	-2	N/A	N/A	N/A	N/A
R133	2	B	66	60	N/A	N/A	N/A	N/A	N/A	N/A	59	-1	N/A	N/A	N/A	N/A
R134	1	B	66	57	N/A	N/A	N/A	N/A	N/A	N/A	58	1	N/A	N/A	N/A	N/A
R135	1	B	66	57	N/A	N/A	N/A	N/A	N/A	N/A	58	1	N/A	N/A	N/A	N/A
R136	Church	D	51	47	N/A	N/A	N/A	N/A	N/A	N/A	48	1	N/A	N/A	N/A	N/A
R137	1	B	66	56	N/A	N/A	N/A	N/A	N/A	N/A	57	1	N/A	N/A	N/A	N/A
R138	2	B	66	55	N/A	N/A	N/A	N/A	N/A	N/A	56	1	N/A	N/A	N/A	N/A
R139	2	B	66	55	N/A	N/A	N/A	N/A	N/A	N/A	56	1	N/A	N/A	N/A	N/A
R140	1	B	66	55	N/A	N/A	N/A	N/A	N/A	N/A	56	1	N/A	N/A	N/A	N/A
R141	2	B	66	57	N/A	N/A	N/A	N/A	N/A	N/A	58	1	N/A	N/A	N/A	N/A
R158	1	B	66	52	N/A	N/A	N/A	N/A	64	**12**	N/A	N/A	63	**11**	N/A	N/A
R159	1	B	66	52	N/A	N/A	N/A	N/A	61	9	N/A	N/A	61	9	N/A	N/A
R160	1	B	66	52	N/A	N/A	N/A	N/A	60	8	N/A	N/A	60	8	N/A	N/A
R161	1	B	66	52	N/A	N/A	N/A	N/A	58	6	N/A	N/A	58	6	N/A	N/A
R162	3	B	66	51	N/A	N/A	N/A	N/A	64	**13**	N/A	N/A	64	**13**	N/A	N/A
R163	2	B	66	52	N/A	N/A	N/A	N/A	60	8	N/A	N/A	61	9	N/A	N/A
R164	2	B	66	51	N/A	N/A	N/A	N/A	57	6	N/A	N/A	59	8	N/A	N/A
R165	2	B	66	50	N/A	N/A	N/A	N/A	63	**13**	N/A	N/A	64	**14**	N/A	N/A
R166	2	B	66	50	N/A	N/A	N/A	N/A	59	9	N/A	N/A	60	**10**	N/A	N/A
R167	2	B	66	50	N/A	N/A	N/A	N/A	57	7	N/A	N/A	58	8	N/A	N/A
R168	1	B	66	50	N/A	N/A	N/A	N/A	62	**12**	N/A	N/A	62	**12**	N/A	N/A
R169	1	B	66	54	N/A	N/A	N/A	N/A	59	5	N/A	N/A	60	6	N/A	N/A
R170	1	B	66	49	N/A	N/A	N/A	N/A	57	8	N/A	N/A	58	9	N/A	N/A
R171	1	B	66	49	N/A	N/A	N/A	N/A	56	7	N/A	N/A	57	8	N/A	N/A
R172	1	B	66	49	N/A	N/A	N/A	N/A	56	7	N/A	N/A	56	7	N/A	N/A

Table 4: Noise Analysis Locations and Results[1]

Receptor	Properties Represented	NAC Land Use Category	NAC – dB(A)	Noise Levels dB(A)												
				Existing (2014)	C1[1] (2040)	Increase	C3[1] (2040)	Increase	C4[1] (2040)	Increase	I1[1] (2040)	Increase	R1[1] (2040)	Increase	R2[1] (2040)	Increase
R173	Church	D	51	35	39	4	39	4	40	5	N/A	N/A	39	4	39	4
R174	Park	C	66	54	58	4	58	4	62	8	N/A	N/A	61	7	58	4
R175	1	B	66	60	60	0	60	0	60	0	N/A	N/A	60	0	60	0
R176	16	B	66	58	60	2	60	2	60	2	N/A	N/A	60	2	61	3
R177	2	B	66	63	65	2	65	2	**66**	3	65	2	**66**	3	N/A	N/A
R178	2	B	66	63	65	2	65	2	**66**	3	65	2	**66**	3	N/A	N/A
R179	2	B	66	62	64	2	64	2	64	2	64	2	64	2	N/A	N/A
R180	2	B	66	62	65	3	65	3	65	3	65	3	65	3	N/A	N/A
R181	3	B	66	62	64	2	64	2	64	2	64	2	64	2	N/A	N/A
R182	2	B	66	61	64	3	64	3	64	3	64	3	64	3	N/A	N/A
R183	2	B	66	61	63	2	63	2	63	2	63	2	63	2	N/A	N/A
R184	2	B	66	62	64	2	64	2	65	3	64	2	64	2	N/A	N/A
R185	2	B	66	60	63	3	63	3	63	3	63	3	63	3	N/A	N/A
R186	2	B	66	64	**66**	2	**66**	2	**66**	2	**66**	2	**66**	2	N/A	N/A
R187	2	B	66	67	**68**	1	**68**	1	**69**	2	**68**	1	**69**	2	N/A	N/A
R188	2	B	66	63	65	2	65	2	65	2	65	2	65	2	N/A	N/A
R189	2	B	66	67	**69**	2	**69**	2	**69**	2	**69**	2	**69**	2	N/A	N/A
R190	2	B	66	63	65	2	65	2	65	2	65	2	65	2	N/A	N/A
R191	2	B	66	68	**70**	2	**70**	2	**70**	2	**70**	2	**70**	2	N/A	N/A
R192	2	B	66	61	63	2	63	2	63	2	63	2	63	2	N/A	N/A
R193	1	B	66	64	**67**	3	**67**	3	**68**	4	**67**	3	**68**	4	N/A	N/A
R194	1	B	66	66	**69**	3	**69**	3	**69**	3	**69**	3	**70**	4	N/A	N/A
R195	1	B	66	61	65	4	65	4	N/A	N/A	N/A	N/A	N/A	N/A	64	3
R196	2	B	66	68	**70**	2	**70**	2	**69**	1	**71**	3	**70**	2	N/A	N/A
R197	2	B	66	73	**76**	3	**75**	2	**75**	2	**76**	3	**76**	3	N/A	N/A
R198	2	B	66	76	**79**	3	**78**	2	**79**	3	**79**	3	**79**	3	N/A	N/A
R199	2	B	66	77	**79**	2	**79**	2	**79**	2	**79**	2	**79**	2	N/A	N/A
R200	2	B	66	75	**77**	2	**77**	2	**77**	2	**77**	2	**78**	3	N/A	N/A
R201	2	B	66	76	**78**	2	**78**	2	**78**	2	**78**	2	**79**	3	N/A	N/A
R202	2	B	66	70	**72**	2	**72**	2	**72**	2	**72**	2	**73**	3	N/A	N/A
R203	1	B	66	75	**78**	3	**78**	3	**78**	3	**77**	2	**78**	3	N/A	N/A
R204	1	B	66	74	**76**	2	**76**	2	**77**	3	**76**	2	**77**	3	N/A	N/A
R205	1	B	66	67	**72**	5	**72**	5	**72**	5	**72**	5	**71**	4	N/A	N/A
R206	1	B	66	66	**70**	4	**70**	4	**71**	5	**70**	4	**70**	4	N/A	N/A
R207	2	B	66	65	**68**	3	**68**	3	**69**	4	**68**	3	**68**	3	N/A	N/A

Table 4: Noise Analysis Locations and Results[1]

Receptor	Properties Represented	NAC Land Use Category	NAC – dB(A)	Noise Levels dB(A)												
				Existing (2014)	C1[1] (2040)	Increase	C3[1] (2040)	Increase	C4[1] (2040)	Increase	I1[1] (2040)	Increase	R1[1] (2040)	Increase	R2[1] (2040)	Increase
R208	1	B	66	66	**69**	3	**69**	3	**69**	3	**69**	3	**68**	2	N/A	N/A
R209	1	B	66	62	65	3	65	3	65	3	65	3	65	3	N/A	N/A
R210	1	B	66	64	**66**	2	**66**	2	**66**	2	**66**	2	**66**	2	N/A	N/A
R211	1	B	66	68	**70**	2	**70**	2	**70**	2	**70**	2	**70**	2	N/A	N/A
R212	2	B	66	65	**67**	2	**67**	2	**67**	2	**67**	2	**67**	2	N/A	N/A
R213	2	B	66	63	**66**	3	**66**	3	**66**	3	**66**	3	**66**	3	N/A	N/A
R214	2	B	66	62	65	3	65	3	65	3	65	3	64	2	N/A	N/A
R215	2	B	66	61	64	3	64	3	64	3	64	3	63	2	N/A	N/A
R216	2	B	66	60	62	2	62	2	62	2	63	3	62	2	N/A	N/A
R217	2	B	66	59	61	2	61	2	61	2	61	2	61	2	N/A	N/A
R218	1	B	66	66	**69**	3	**68**	2	**68**	2	**69**	3	**69**	3	N/A	N/A
R219	1	B	66	66	**68**	2	**68**	2	**68**	2	**69**	3	**69**	3	N/A	N/A
R220	1	B	66	60	63	3	63	3	63	3	64	4	63	3	N/A	N/A
R221	1	B	66	62	64	2	64	2	64	2	65	3	64	2	N/A	N/A
R222	1	B	66	60	63	3	63	3	62	2	64	4	63	3	N/A	N/A
R223	2	B	66	60	62	2	62	2	62	2	63	3	62	2	N/A	N/A
R224	2	B	66	59	62	3	61	2	61	2	62	3	61	2	N/A	N/A
R225	1	B	66	67	**69**	2	**69**	2	**69**	2	**69**	2	N/A	N/A	N/A	N/A
R226	1	B	66	66	**68**	2	**68**	2	**68**	2	**68**	2	N/A	N/A	N/A	N/A
R227	1	B	66	68	**70**	2	**70**	2	**70**	2	**70**	2	N/A	N/A	N/A	N/A
R228	2	B	66	64	**66**	2	**66**	2	**66**	2	**66**	2	N/A	N/A	N/A	N/A
R229	2	B	66	65	**67**	2	**67**	2	**67**	2	**67**	2	N/A	N/A	N/A	N/A
R230	1	B	66	68	**70**	2	**70**	2	**70**	2	**70**	2	N/A	N/A	N/A	N/A
R231	2	B	66	69	**71**	2	**71**	2	**71**	2	**71**	2	N/A	N/A	N/A	N/A
R232	2	B	66	65	**67**	2	**67**	2	**67**	2	**67**	2	N/A	N/A	N/A	N/A
R233	2	B	66	66	**68**	2	**68**	2	**68**	2	**68**	2	N/A	N/A	N/A	N/A
R234	1	B	66	72	**73**	1	**73**	1	**73**	1	**73**	1	N/A	N/A	N/A	N/A
R235	1	B	66	66	**68**	2	**69**	3	**69**	3	**69**	3	N/A	N/A	N/A	N/A
R236	2	B	66	66	**69**	3	**69**	3	**69**	3	**69**	3	N/A	N/A	N/A	N/A
R237	1	B	66	67	**69**	2	**69**	2	**69**	2	**69**	2	N/A	N/A	N/A	N/A
R238	2	B	66	65	**67**	2	**67**	2	**67**	2	**67**	2	N/A	N/A	N/A	N/A
R239	2	B	66	66	**68**	2	**68**	2	**68**	2	**68**	2	N/A	N/A	N/A	N/A
R240	1	B	66	68	**71**	3	**71**	3	**71**	3	**71**	3	N/A	N/A	N/A	N/A
R241	2	B	66	67	**69**	2	**70**	3	**70**	3	**70**	3	N/A	N/A	N/A	N/A
R242	1	B	66	65	**67**	2	**67**	2	**67**	2	**67**	2	N/A	N/A	N/A	N/A
R243	1	B	66	71	**73**	2	**73**	2	**73**	2	**73**	2	N/A	N/A	N/A	N/A
R244	2	B	66	70	**71**	1	**71**	1	**71**	1	**71**	1	N/A	N/A	N/A	N/A
R245	2	B	66	60	63	3	63	3	63	3	63	3	N/A	N/A	N/A	N/A
R246	1	B	66	63	65	2	65	2	65	2	65	2	N/A	N/A	N/A	N/A

Table 4: Noise Analysis Locations and Results[1]

Receptor	Properties Represented	NAC Land Use Category	NAC – dB(A)	Noise Levels dB(A)												
				Existing (2014)	C1[1] (2040)	Increase	C3[1] (2040)	Increase	C4[1] (2040)	Increase	I1[1] (2040)	Increase	R1[1] (2040)	Increase	R2[1] (2040)	Increase
R247	2	B	66	62	64	2	64	2	65	3	64	2	N/A	N/A	N/A	N/A
R248	1	B	66	60	62	2	63	3	63	3	62	2	N/A	N/A	N/A	N/A
R249	1	B	66	66	**68**	2	**68**	2	**68**	2	**68**	2	N/A	N/A	N/A	N/A
R250	2	B	66	63	**66**	3	**66**	3	**66**	3	**66**	3	N/A	N/A	N/A	N/A
R251	1	B	66	64	**66**	2	**66**	2	**66**	2	**66**	2	N/A	N/A	N/A	N/A
R252	1	B	66	63	65	2	65	2	65	2	65	2	N/A	N/A	N/A	N/A
R253	2	B	66	64	**66**	2	**66**	2	**66**	2	**66**	2	N/A	N/A	N/A	N/A
R254	2	B	66	62	64	2	64	2	64	2	64	2	N/A	N/A	N/A	N/A
R255	1	B	66	64	65	1	**66**	2	**66**	2	**66**	2	N/A	N/A	N/A	N/A
R256	2	B	66	61	63	2	63	2	63	2	63	2	N/A	N/A	N/A	N/A
R257	2	B	66	63	65	2	**66**	3	**66**	3	**66**	3	N/A	N/A	N/A	N/A
R258	1	B	66	65	**68**	3	**68**	3	**68**	3	**68**	3	N/A	N/A	N/A	N/A
R259	3	B	66	61	63	2	63	2	64	3	63	2	N/A	N/A	N/A	N/A
R260	2	B	66	63	65	2	65	2	65	2	65	2	N/A	N/A	N/A	N/A
R261	2	B	66	62	65	3	65	3	65	3	65	3	N/A	N/A	N/A	N/A
R262	2	B	66	62	64	2	64	2	64	2	64	2	N/A	N/A	N/A	N/A
R263	2	B	66	61	63	2	64	3	64	3	64	3	N/A	N/A	N/A	N/A
R264	2	B	66	60	62	2	62	2	62	2	62	2	N/A	N/A	N/A	N/A

*1. Noise impacts areshown in **BOLD***
2. "Acquired" indicates properties to be acquired as part of the Alternative

A comparison of the design-year build noise levels with the applicable NAC, as shown in Table 2, reveals that 106 residential properties in Alternative C1, 108 residential properties in Alternative C3, 114 residential properties in Alternative C4, 113 residential properties in Alternative I1, 78 residential properties in Alternative R1 and no properties in Alternative R2 are predicted to be impacted by traffic noise. Seven properties in the C4 Alternative and nine properties in the R1 Alternative would be substantially higher than existing levels (defined as a 10 dB(A) increase). See Table 4 and Appendix C for results of the noise modeling.

A summary of the noise modeling results is included in Table 5.

Table 5: Summary of Noise Analysis Results

Alternative	Outdoor				Indoor			
	Noise Level dB(A)		Increase over Existing dB(A)		Noise Level dB(A)		Increase over Existing dB(A)	
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
Existing (No-Build)	49	77	N/A	N/A	35	47	N/A	N/A
C1	55	79	-6	5	39	39	4	4
C3	56	79	-5	5	39	39	4	4
C4	56	79	0	13	40	40	5	5
I1	56	79	-2	5	44	48	-1	1
R1	56	79	0	14	39	39	4	4
R2	56	64	-5	4	39	39	4	4

Preliminary Noise Abatement Analysis

Initially, noise barriers were considered for all properties that were predicted to be impacted by noise. However, noise barriers were found not to be feasible at many locations where driveway access would require a gap in the barrier. A gap would render the barrier ineffective.

A noise barrier was considered to provide noise abatement to the impacted properties located southeast of I-15 behind an existing noise barrier. This wall will likely not be impacted by the proposed improvements and will not need to be relocated or modified. A detailed analysis of mitigating the impacts behind this wall was not performed because it is unlikely that a taller wall could provide meaningful additional reduction in noise levels at a cost below the allowance. The existing barrier provides a 6 to 10 dB(A) reduction in noise levels and a replacement wall would provide similar reductions since the goal of mitigation is not to reduce noise levels below the NAC, but to reduce them by meaningful amounts.

Noise barriers in 12 locations were considered to provide noise abatement to the noise impacted properties. The locations of the investigated noise barriers are shown in Exhibit 7.

Barrier 1 - Alternative C1

A noise barrier was investigated to provide noise abatement to 38 impacted properties on the west side of I-15 represented by receptors R005, R006, R007, R010, R012, R013, R186, R187, R189, R191, R225, R226, R227, R228, R229, R230, R231, R232, R233, R234 and R249 along the C1 Alternative. Since this is a fill section area, the barrier would be located near the edge of shoulder and would require guardrail protection.

A barrier 3,400 feet long and 14 feet high would provide at least a 5 dB(A) reduction in noise levels at 75 properties, 24 of which are impacted front-row properties. The barrier would

provide a 7 dB(A) or greater reduction in noise levels at 25 front-row properties. This barrier would cost approximately $951,660.

Since 24 out of 24, or 100%, of the impacted front-row properties would receive a 5 dB(A) reduction in noise levels this barrier is acoustically feasible.

The barrier would provide an 7 dB(A) reduction in traffic noise at 25 out of 28, or 89%, of the front-row properties and is therefore acoustically reasonable. The barrier would *cost approximately $12,689 per benefited property which is less than the $30,000 allowance and the barrier is therefore considered reasonable* per Section C.2.b.2 of the UDOT Noise Abatement Policy.

Recommendation: This barrier is considered feasible and reasonable. It does produce an 7 dB(A) or greater reduction in noise for 89 percent of front-row receptors and it is cost reasonable, and is therefore recommended for balloting. See Exhibit 7 for the noise barrier location and Appendix D for the barrier analysis.

Barrier 2 - Alternative C1

A noise barrier was investigated to provide noise abatement to 29 impacted properties on the east side of I-15 represented by receptors R196, R197, R198, R199, R200, R201, R202, R203, R204, R205, R206, R207, R208, R210, R211, R212, R213, R218 and R219 along the C1 Alternative.

A barrier 800 feet long and 14 feet high would provide at least a 5 dB(A) reduction in noise levels at 15 properties, 14 of which are impacted front-row properties. The barrier would provide a 7 dB(A) or greater reduction in noise levels at 12 front-row properties. This barrier would cost approximately $224,000.

Since 14 out of 16, or 88%, of the impacted front-row properties would receive a 5 dB(A) reduction in noise levels this barrier is acoustically feasible.

The barrier would provide an 7 dB(A) reduction in traffic noise at 12 out of 16, or 75%, of the front-row properties and is therefore acoustically reasonable. The barrier would *cost approximately $14,933 per benefited property which is less than the $30,000 allowance and the barrier is therefore considered reasonable* per Section C.2.b. of the UDOT Noise Abatement Policy.

Recommendation: This barrier is considered feasible and reasonable. It does produce an 7 dB(A) or greater reduction in noise for 75 percent of front-row receptors and it is cost reasonable, and is therefore recommended for balloting. See Exhibit 7 for the noise barrier location and Appendix D for the barrier analysis.

Barrier 3 - Alternative C3

A noise barrier was investigated to provide noise abatement to 38 impacted properties represented by receptors R005, R006, R007, R010, R012, R013, R186, R187, R189, R191, R225, R226, R227, R228, R229, R230, R231, R232, R233, R234 and R249 along the C3 Alternative. Since this is a fill section area, the barrier would be located near the edge of shoulder and would require guardrail protection.

A barrier 3,400 feet long and 14 feet high would provide at least a 5 dB(A) reduction in noise levels at 75 properties, 24 of which are impacted front-row properties. The barrier would provide an 7 dB(A) or greater reduction in noise levels at 24 front-row properties. This barrier would cost approximately $951,660.

Since 24 out of 24, or 100%, of the impacted front-row properties would receive a 5 dB(A) reduction in noise levels this barrier is acoustically feasible.

The barrier would provide an 7 dB(A) reduction in traffic noise at 24 out of 28 or 86%, of the front-row properties and is therefore acoustically reasonable. The barrier would *cost approximately $12,689 per benefited property which is less than the $30,000 allowance and the barrier is therefore considered reasonable* per Section C.2.b. of the UDOT Noise Abatement Policy.

Recommendation: This barrier is considered feasible and reasonable. It does produce a 7 dB(A) or greater reduction in noise for 86 percent of front-row receptors and it is cost reasonable, and is therefore recommended for balloting. See Exhibit 7 for the noise barrier location and Appendix D for the barrier analysis.

Barrier 4 - Alternative C3

A noise barrier was investigated to provide noise abatement to 29 impacted properties on the east side of I-15 represented by receptors R196, R197, R198, R199, R200, R201, R202, R203, R204, R205, R206, R207, R208, R210, R211, R212, R213, R218 and R219 along the C3 Alternative.

A barrier 800 feet long and 15 feet high would provide at least a 5 dB(A) reduction in noise levels at 17 properties, 14 of which are impacted front-row properties. The barrier would provide a 7 dB(A) or greater reduction in noise levels at 14 front-row properties. This barrier would cost approximately $240,020.

Since 14 out of 16, or 88%, of the impacted front-row properties would receive a 5 dB(A) reduction in noise levels this barrier is acoustically feasible.

The barrier would provide an 7 dB(A) reduction in traffic noise at 14 out of 16, or 88%, of the front-row properties and is therefore acoustically reasonable. The barrier would *cost approximately $14,119 per*

benefited property which is less than the $30,000 allowance and the barrier is therefore considered reasonable per Section C.2.b.2 of the UDOT Noise Abatement Policy.

Recommendation: This barrier is considered feasible and reasonable. It does produce a 7 dB(A) or greater reduction in noise for 88 percent of front-row receptors and it is cost reasonable, and is therefore recommended for balloting. See Exhibit 7 for the noise barrier location and Appendix D for the barrier analysis.

Barrier 5 - Alternative C4

A noise barrier was investigated to provide noise abatement to 44 impacted properties represented by receptors R005, R006, R007, R009, R010, R012, R013, R177, R178, R186, R187, R189, R191, R225, R226, R227, R228, R229, R230, R231, R232, R233, R234 and R249 along the C4 Alternative. Since this is a fill section area, the barrier would be located near the edge of shoulder and would require guardrail protection.

A barrier 3,400 feet long and 14 feet high would provide at least a 5 dB(A) reduction in noise levels at 75 properties, 24 of which are impacted front-row properties. The barrier would provide an 7 dB(A) or greater reduction in noise levels at 26 front-row properties. This barrier would cost approximately $951,660.

Since 24 out of 24, or 100%, of the impacted front-row properties would receive a 5 dB(A) reduction in noise levels this barrier is acoustically feasible.

The barrier would provide an 7 dB(A) reduction in traffic noise at 26 out of 28 or 93%, of the front-row properties and is therefore acoustically reasonable. The barrier would *cost approximately $12,689 per benefited property which is less than the $30,000 allowance and the barrier is therefore considered reasonable* per Section C.2.b. of the UDOT Noise Abatement Policy.

Recommendation: This barrier is considered feasible and reasonable. It does produce a 7 dB(A) or greater reduction in noise for 93 percent of front-row receptors and it is cost reasonable, and is therefore recommended for balloting. See Exhibit 7 for the noise barrier location and Appendix D for the barrier analysis.

Barrier 6 - Alternative C4

A noise barrier was investigated to provide noise abatement to 29 impacted properties on the east side of I-15 represented by receptors R196, R197, R198, R199, R200, R201, R202, R203, R204, R205, R206, R207, R208, R210, R211, R212, R213, R218 and R219 along the C4 Alternative.

A barrier 800 feet long and 15 feet high would provide at least a 5 dB(A) reduction in noise levels at 20 properties, 14 of which are impacted front-row properties. The barrier would

provide a 7 dB(A) or greater reduction in noise levels at 14 front-row properties. This barrier would cost approximately $240,020.

Since 14 out of 16, or 88%, of the impacted front-row properties would receive a 5 dB(A) reduction in noise levels this barrier is acoustically feasible.

The barrier would provide an 7 dB(A) reduction in traffic noise at 14 out of 16, or 88%, of the front-row properties and is therefore acoustically reasonable. The barrier would *cost approximately $12,001 per benefited property which is less than the $30,000 allowance and the barrier is therefore considered reasonable* per Section C.2.b. of the UDOT Noise Abatement Policy.

Recommendation: This barrier is considered feasible and reasonable. It does produce an 7 dB(A) or greater reduction in noise for 88 percent of front-row receptors and it is cost reasonable, and is therefore recommended for balloting. See Exhibit 7 for the noise barrier location and Appendix D for the barrier analysis.

Barrier 7 - Alternative C4

A noise barrier was investigated to provide noise abatement to 7 impacted properties represented by receptors R158, R162, R165 and R168 along the C4 Alternative. Since this is a fill section area, the barrier would be located near the edge of shoulder and would require guardrail protection.

A barrier 1600 feet long and 12 feet high would provide at least a 5 dB(A) reduction in noise levels at 19 properties, 7 of which are impacted front-row properties. The barrier would provide a 7 dB(A) or greater reduction in noise levels at 6 front-row properties. This barrier would cost approximately $384,100.

Since 7 out of 7, or 100%, of the impacted front-row properties would receive a 5 dB(A) reduction in noise levels this barrier is acoustically feasible.

The barrier would provide an 7 dB(A) reduction in traffic noise at 6 out of 7, or 86%, of the front-row properties and is therefore acoustically reasonable. The barrier would *cost approximately $20,216 per benefited property which is less than the $30,000 allowance and the barrier is therefore considered reasonable* per Section C.2.b. of the UDOT Noise Abatement Policy.

Recommendation: This barrier is considered feasible and reasonable. It does produce an 7 dB(A) or greater reduction in noise for 86 percent of front-row receptors and it is cost reasonable, and is therefore recommended for balloting. See Exhibit 7 for the noise barrier location and Appendix D for the barrier analysis.

Barrier 8 - Alternative I1

A noise barrier was investigated to provide noise abatement to 39 impacted properties represented by receptors R004, R005, R006, R007, R010, R012, R013, R186, R187, R189, R191, R225, R226, R227, R228, R229, R230, R231, R232, R233, R234 and R249 along the I1 Alternative. Since this is a fill section area, the barrier would be located near the edge of shoulder and would require guardrail protection.

A barrier 3,400 feet long and 14 feet high would provide at least a 5 dB(A) reduction in noise levels at 75 properties, 25 of which are impacted front-row properties. The barrier would provide an 7 dB(A) or greater reduction in noise levels at 27 front-row properties. This barrier would cost approximately $951,660.

Since 25 out of 25, or 100%, of the impacted front-row properties would receive a 5 dB(A) reduction in noise levels this barrier is acoustically feasible.

The barrier would provide an 7 dB(A) reduction in traffic noise at 27 out of 28 or 96%, of the front-row properties and is therefore acoustically reasonable. The barrier would *cost approximately $12,689 per benefited property which is less than the $30,000 allowance and the barrier is therefore considered reasonable* per Section C.2.b. of the UDOT Noise Abatement Policy.

Recommendation: This barrier is considered feasible and reasonable. It does produce a 7 dB(A) or greater reduction in noise for 96 percent of front-row receptors and it is cost reasonable, and is therefore recommended for balloting. See Exhibit 7 for the noise barrier location and Appendix D for the barrier analysis.

Barrier 9 - Alternative I1

A noise barrier was investigated to provide noise abatement to 29 impacted properties on the east side of I-15 represented by receptors R196, R197, R198, R199, R200, R201, R202, R203, R204, R205, R206, R207, R208, R210, R211, R212, R213, R218 and R219 along the I1 Alternative.

A barrier 800 feet long and 15 feet high would provide at least a 5 dB(A) reduction in noise levels at 18 properties, 14 of which are impacted front-row properties. The barrier would provide a 7 dB(A) or greater reduction in noise levels at 14 front-row properties. This barrier would cost approximately $240,020.

Since 14 out of 16, or 88%, of the impacted front-row properties would receive a 5 dB(A) reduction in noise levels this barrier is acoustically feasible.

The barrier would provide an 7 dB(A) reduction in traffic noise at 14 out of 16, or 88%, of the front-row properties and is therefore acoustically reasonable. The barrier would *cost approximately $13,334 per*

benefited property which is less than the $30,000 allowance and the barrier is therefore considered reasonable per Section C.2.b. of the UDOT Noise Abatement Policy.

Recommendation: This barrier is considered feasible and reasonable. It does produce an 7 dB(A) or greater reduction in noise for 88 percent of front-row receptors and it is cost reasonable, and is therefore recommended for balloting. See Exhibit 7 for the noise barrier location and Appendix D for the barrier analysis.

Barrier 10 - Alternative R1

A noise barrier was investigated to provide noise abatement to 26 impacted properties represented by receptors R005, R006, R007, R010, R012, R013, R177, R178, R186, R187, R189, and R191 along the R1 Alternative. Since this is a fill section area, the barrier would be located near the edge of shoulder and would require guardrail protection.

A barrier 2,000 feet long and 16 feet high would provide at least a 5 dB(A) reduction in noise levels at 48 properties, 16 of which are impacted front-row properties. The barrier would provide an 7 dB(A) or greater reduction in noise levels at 12 front-row properties. This barrier would cost approximately $639,300.

Since 16 out of 18, or 89%, of the impacted front-row properties would receive a 5 dB(A) reduction in noise levels this barrier is acoustically feasible.

The barrier would provide an 7 dB(A) reduction in traffic noise at 12 out of 22 or 55%, of the front-row properties and is therefore acoustically reasonable. The barrier would *cost approximately $13,319 per benefited property which is less than the $30,000 allowance and the barrier is therefore considered reasonable* per Section C.2.b. of the UDOT Noise Abatement Policy.

Recommendation: This barrier is considered feasible and reasonable. It does produce a 7 dB(A) or greater reduction in noise for 52 percent of front-row receptors and it is cost reasonable, and is therefore recommended for balloting. See Exhibit 7 for the noise barrier location and Appendix D for the barrier analysis.

Barrier 11 - Alternative R1

A noise barrier was investigated to provide noise abatement to 29 impacted properties on the east side of I-15 represented by receptors R196, R197, R198, R199, R200, R201, R202, R203, R204, R205, R206, R207, R208, R210, R211, R212, R213, R218 and R219 along the R1 Alternative.

A barrier 800 feet long and 15 feet high would provide at least a 5 dB(A) reduction in noise levels at 17 properties, 14 of which are impacted front-row properties. The barrier would

provide a 7 dB(A) or greater reduction in noise levels at 14 front-row properties. This barrier would cost approximately $240,020.

Since 14 out of 16, or 88%, of the impacted front-row properties would receive a 5 dB(A) reduction in noise levels this barrier is acoustically feasible.

The barrier would provide an 7 dB(A) reduction in traffic noise at 14 out of 16, or 88%, of the front-row properties and is therefore acoustically reasonable. The barrier would *cost approximately $14,119 per benefited property which is less than the $30,000 allowance and the barrier is therefore considered reasonable* per Section C.2.b. of the UDOT Noise Abatement Policy.

Recommendation: This barrier is considered feasible and reasonable. It does produce an 7 dB(A) or greater reduction in noise for 88 percent of front-row receptors and it is cost reasonable, and is therefore recommended for balloting. See Exhibit 7 for the noise barrier location and Appendix D for the barrier analysis.

Barrier 12 - Alternative R1

A noise barrier was investigated to provide noise abatement to 9 impacted properties represented by receptors, R158, R162, R165, R166 and R168 along the R1 Alternative. Since this is a fill section area, the barrier would be located near the edge of shoulder and would require guardrail protection.

A barrier 1600 feet long and 14 feet high would provide at least a 5 dB(A) reduction in noise levels at 21 properties, 7 of which are impacted front-row properties. The barrier would provide a 7 dB(A) or greater reduction in noise levels at 7 front-row properties. This barrier would cost approximately $448,180.

Since 7 out of 7, or 100%, of the impacted front-row properties would receive a 5 dB(A) reduction in noise levels this barrier is acoustically feasible.

The barrier would provide an 7 dB(A) reduction in traffic noise at 7 out of 7, or 100%, of the front-row properties and is therefore acoustically reasonable. The barrier would *cost approximately $21,342 per benefited property which is less than the $30,000 allowance and the barrier is therefore considered reasonable* per Section C.2.b. of the UDOT Noise Abatement Policy.

Recommendation: This barrier is considered feasible and reasonable. It does produce an 7 dB(A) or greater reduction in noise for 100 percent of front-row receptors and it is cost reasonable, and is therefore recommended for balloting. See Exhibit 7 for the noise barrier location and Appendix D for the barrier analysis.

7. CONSTRUCTION NOISE

Land uses that are sensitive to traffic noise are also sensitive to construction noise. Methods of controlling construction noise include establishing the hours that construction equipment can be operated and permissible sound levels at those times. In view of this, UDOT has developed a specification that establishes construction noise control. This specification can be found in the 2017 UDOT *Standard Specifications for Road and Bridge Construction, Specification 01355, Environmental Protection, Part 3, Sub-section 3.6, "Noise Control."* The contractor will be required to conform to this specification to reduce the impact of construction noise on the surrounding community.

8. COORDINATION WITH LOCAL OFFICIALS

To assist local authorities in exercising land use control over the undeveloped lands adjacent to the roadways proposed for this project, land use compatibility noise data was developed. The 66 dB(A) contour will typically fall approximately 580 feet from the I-15 centerline, and the 71 dB(A) contour will typically fall approximately 330 feet from the I-15 centerline. For the Nebo Beltway the 66 dB(A) contour will typically fall approximately 120 feet from the Nebo Beltway centerline and the 71 dB(A) contour will typically fall approximately 60 feet from the Nebo Beltway centerline.

Although the noise contour information is based on the results of the noise modeling, it is not site-specific for any area along proposed I-15. Variations in terrain, the roadway profile, the proximity to intersections and existing development can result in changes to the distances to these noise contours. This information is intended to provide a general guide for future planning, but should not be used in the final design or layout of future development.

9. CONCLUSIONS

A comparison of the design-year build noise levels with the applicable NAC, as shown in Table 2, reveals that 106 residential properties in Alternative C1, 108 residential properties in Alternative C3, 114 residential properties in Alternative C4, 113 residential properties in Alternative I1, 78 residential properties in Alternative R1 and no properties in Alternative R2 are predicted to be impacted by traffic noise. Seven properties in the C4 Alternative and nine properties in the R1 Alternative would be substantially higher than existing levels (defined as a 10 dB(A) increase). See Table 4 and Appendix C for results of the noise modeling.

A barrier was investigated common to each Build Alternative as a replacement for an existing noise wall but was found not to be feasible, and is therefore not recommended for further consideration. Twelve other barriers were found to be both feasible and reasonable and are recommended for balloting.

The final decision to build any of the noise barriers will be made upon completion of the project design, the public involvement process, concurrence with the UDOT Noise Policy and FHWA approval. Barriers identified as recommended for balloting are barriers that have been shown to be both feasible and reasonable. However, that finding is not a commitment to build a barrier.

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.

Exhibit 1: Noise Analysis Locations - Alternative C1

I-15 - PAYSON

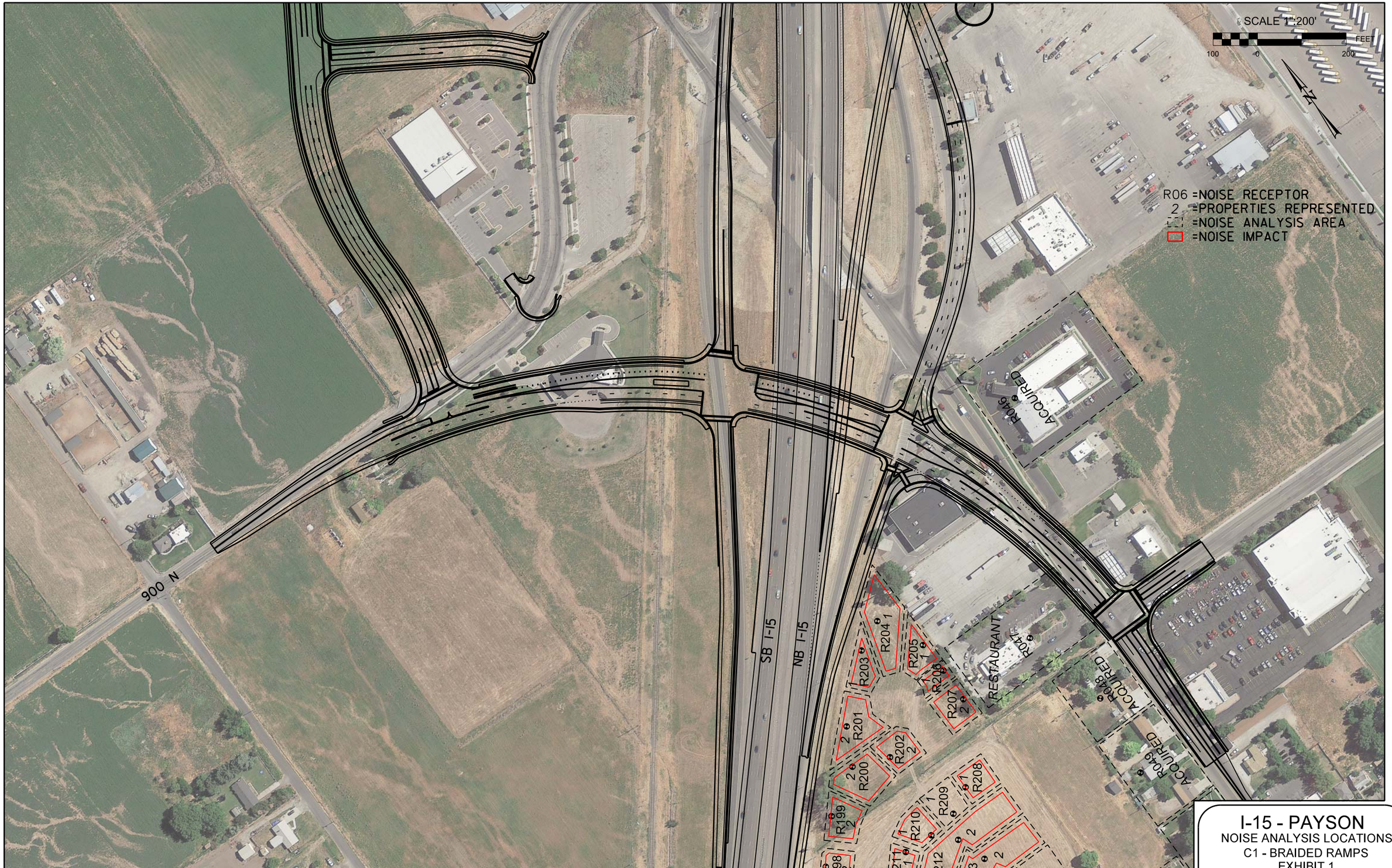
NOISE ANALYSIS LOCATIONS
C1 - BRAIDED RAMPS
EXHIBIT 1
KEY TO SHEETS

I-15 - PAYSON

NOISE ANALYSIS LOCATIONS
C1 - BRAIDED RAMPS
EXHIBIT 1
SHEET 1 OF 11

I-15 - PAYSON

NOISE ANALYSIS LOCATIONS
C1 - BRAIDED RAMPS
EXHIBIT 1
SHEET 2 OF 11

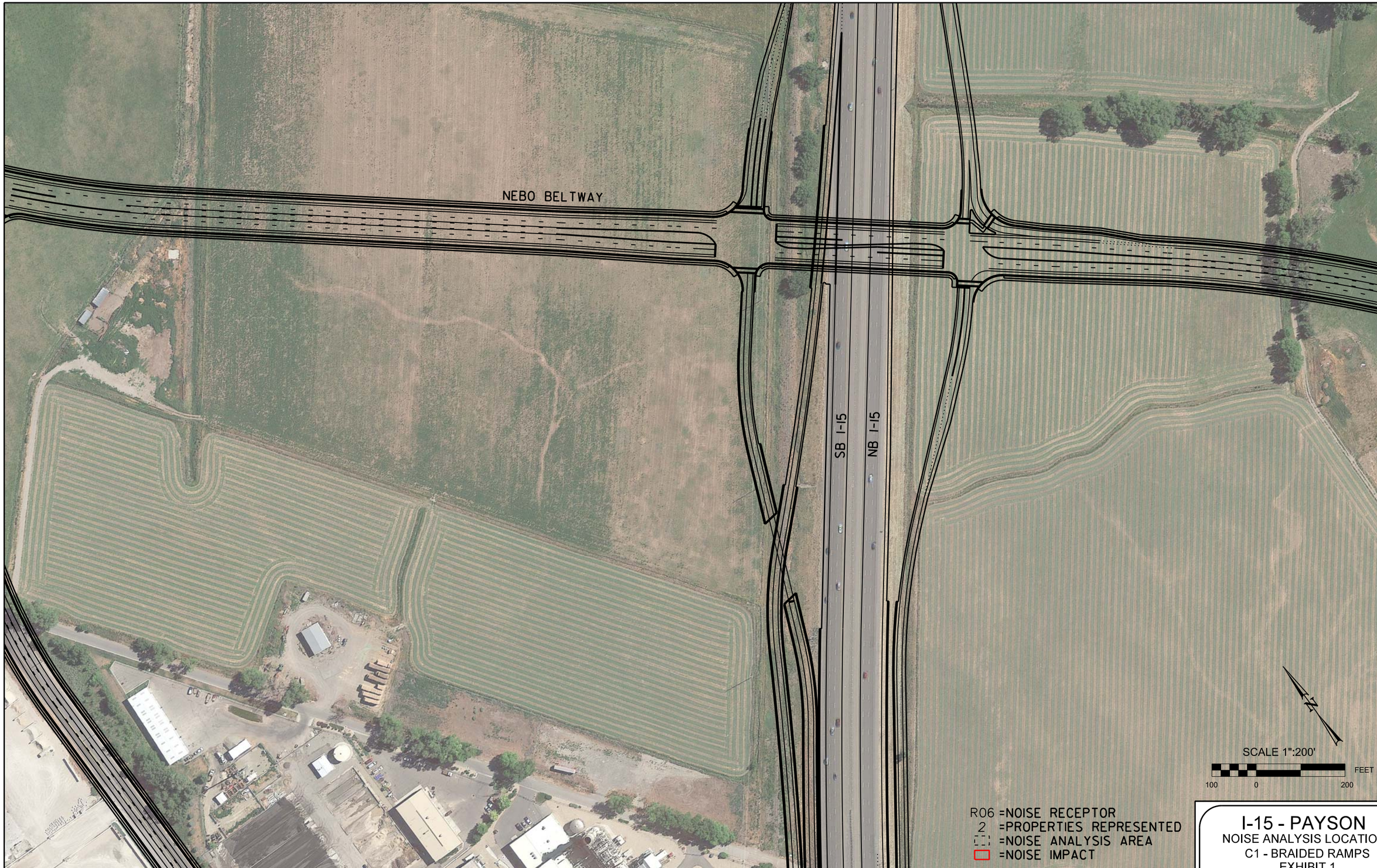


I-15 - PAYSON

NOISE ANALYSIS LOCATIONS
C1 - BRAIDED RAMPS
EXHIBIT 1
SHEET 3 OF 11

I-15 - PAYSON

NOISE ANALYSIS LOCATIONS
C1 - BRAIDED RAMPS
EXHIBIT 1
SHEET 4 OF 11



I-15 - PAYSON

NOISE ANALYSIS LOCATIONS
C1 - BRAIDED RAMPS
EXHIBIT 1
SHEET 5 OF 11

I-15 - PAYSON

NOISE ANALYSIS LOCATIONS
C1 - BRAIDED RAMPS
EXHIBIT 1
SHEET 6 OF 11

I-15 - PAYSON

NOISE ANALYSIS LOCATIONS
C1 - BRAIDED RAMPS
EXHIBIT 1
SHEET 7 OF 11

I-15 - PAYSON

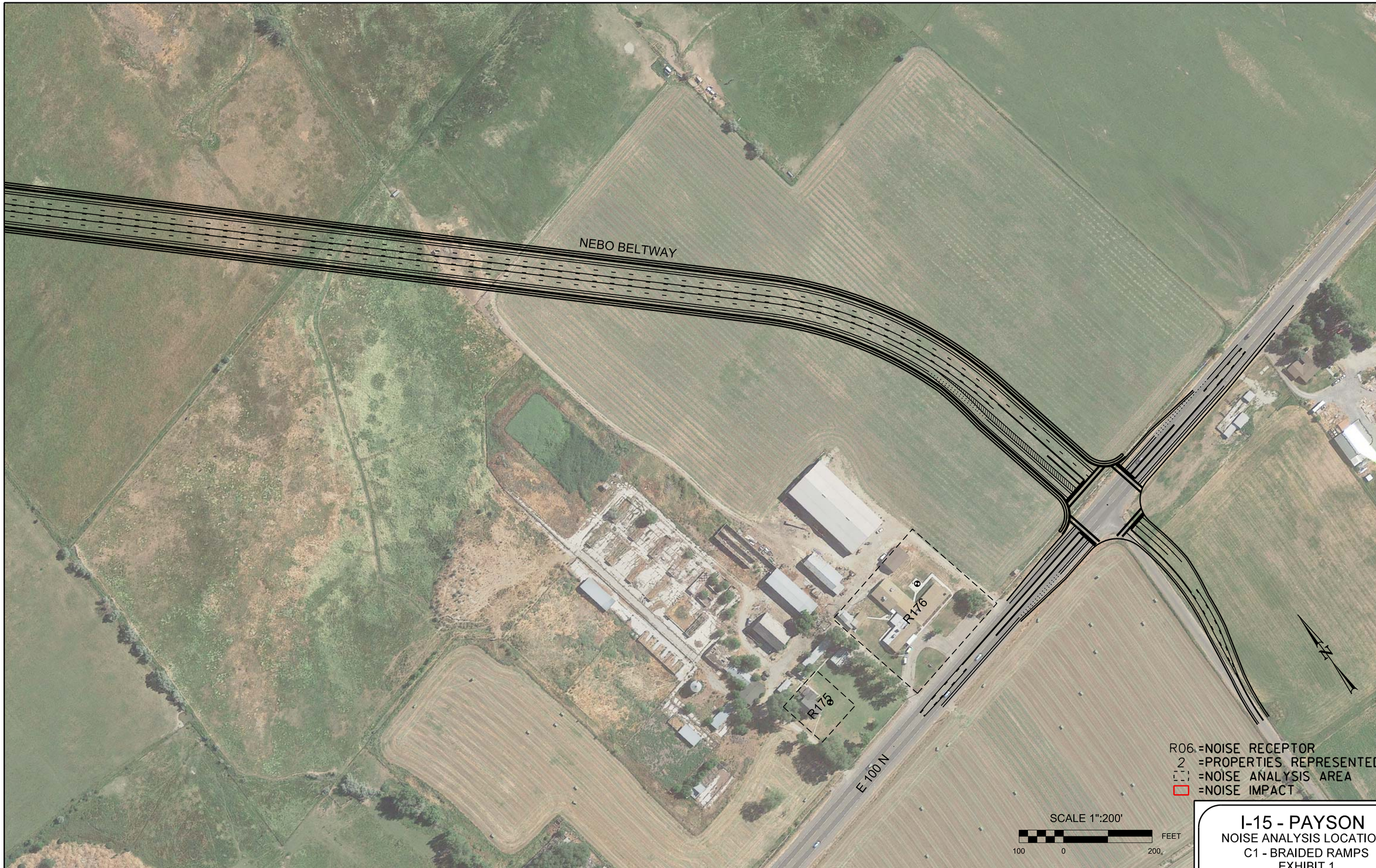
NOISE ANALYSIS LOCATIONS
C1 - BRAIDED RAMPS
EXHIBIT 1
SHEET 8 OF 11

I-15 - PAYSON

NOISE ANALYSIS LOCATIONS
C1 - BRAIDED RAMPS
EXHIBIT 1
SHEET 9 OF 11

I-15 - PAYSON

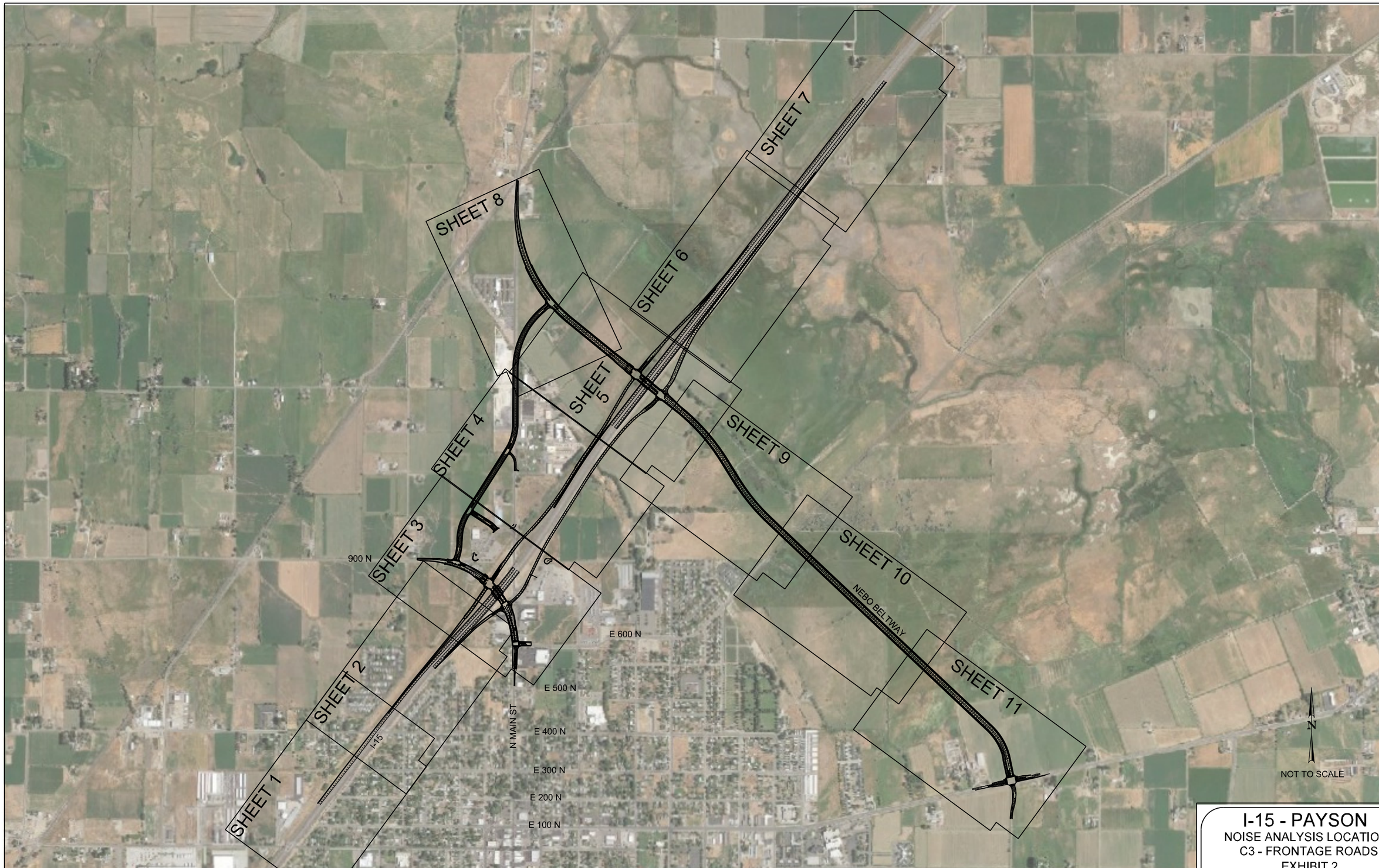
NOISE ANALYSIS LOCATIONS
C1 - BRAIDED RAMPS
EXHIBIT 1
SHEET 10 OF 11



I-15 - PAYSON

NOISE ANALYSIS LOCATIONS
C1 - BRAIDED RAMPS
EXHIBIT 1
SHEET 11 OF 11

Exhibit 2: Noise Analysis Locations- Alternative C3



I-15 - PAYSON

NOISE ANALYSIS LOCATIONS
C3 - FRONTAGE ROADS
EXHIBIT 2
KEY TO SHEETS

I-15 - PAYSON

NOISE ANALYSIS LOCATIONS
C3 - FRONTAGE ROADS
EXHIBIT 2
SHEET 1 OF 11

I-15 - PAYSON

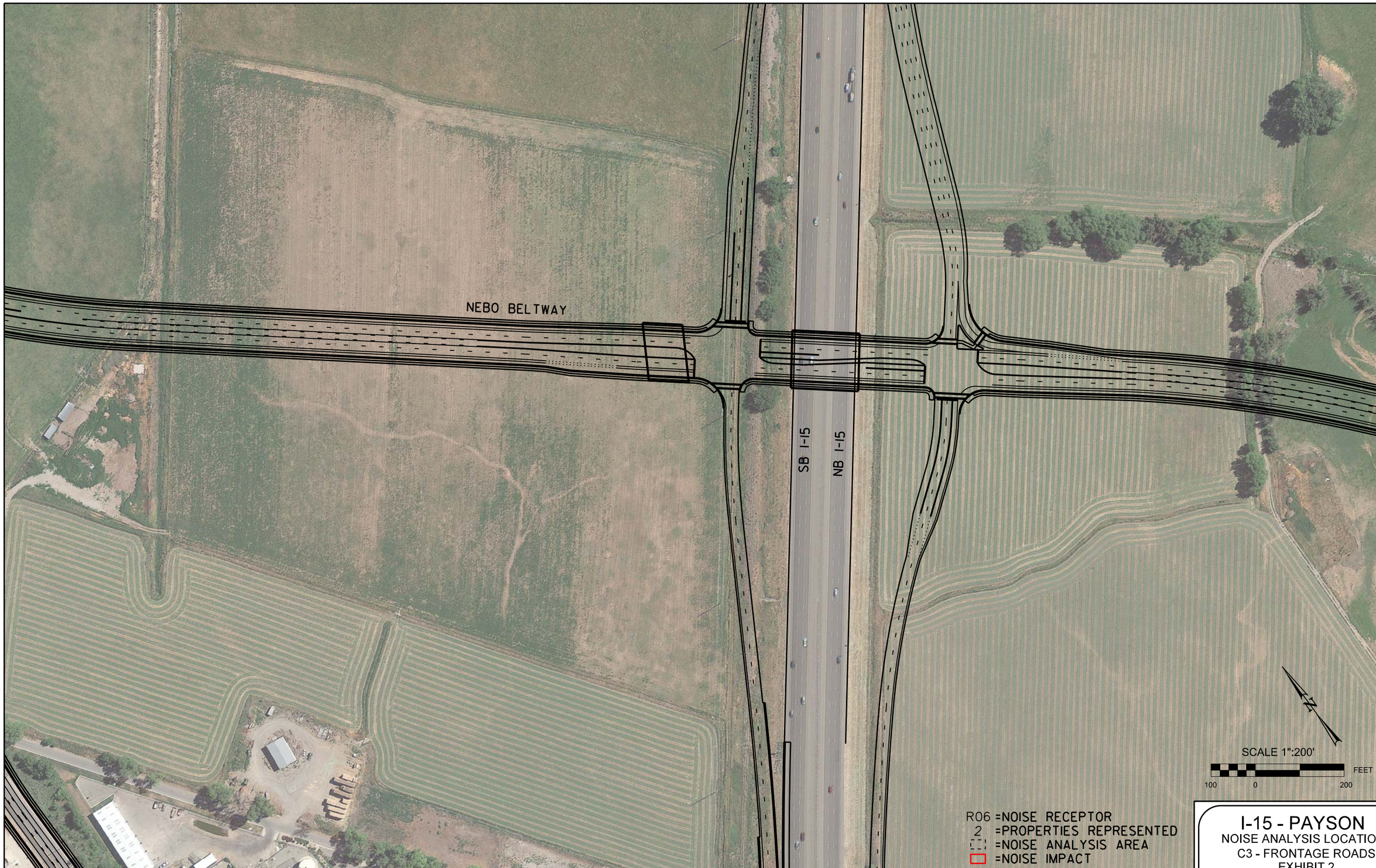
NOISE ANALYSIS LOCATIONS
C3 - FRONTAGE ROADS
EXHIBIT 2
SHEET 2 OF 11

I-15 - PAYSON

NOISE ANALYSIS LOCATIONS
C3 - FRONTAGE ROADS
EXHIBIT 2
SHEET 3 OF 11

I-15 - PAYSON

NOISE ANALYSIS LOCATIONS
C3 - FRONTAGE ROADS
EXHIBIT 2
SHEET 4 OF 11



I-15 - PAYSON

NOISE ANALYSIS LOCATIONS
C3 - FRONTAGE ROADS
EXHIBIT 2
SHEET 5 OF 11

I-15 - PAYSON

NOISE ANALYSIS LOCATIONS
C3 - FRONTAGE ROADS
EXHIBIT 2
SHEET 6 OF 11

I-15 - PAYSON

NOISE ANALYSIS LOCATIONS
C3 - FRONTAGE ROADS
EXHIBIT 2
SHEET 7 OF 11

I-15 - PAYSON

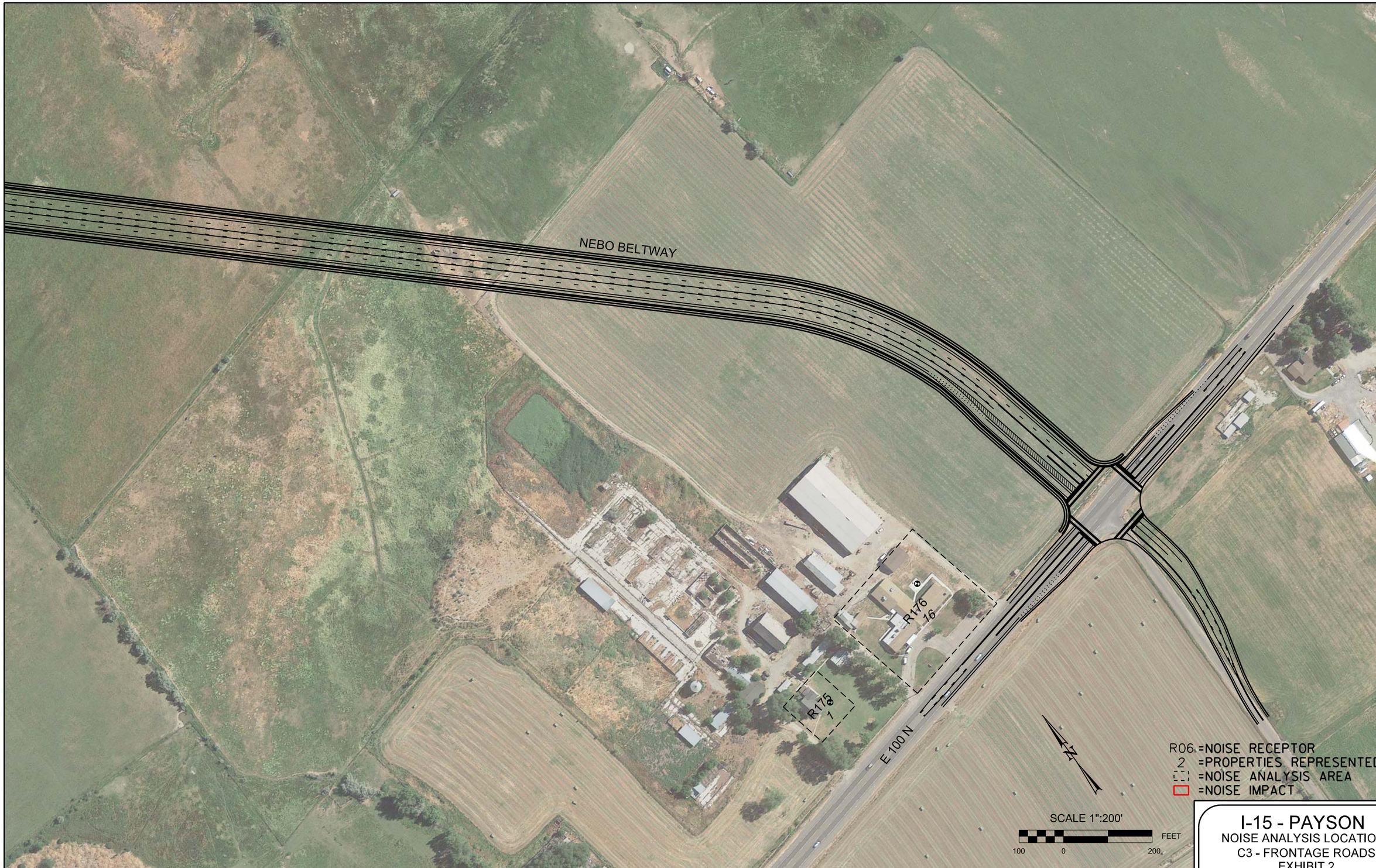
NOISE ANALYSIS LOCATIONS
C3 - FRONTAGE ROADS
EXHIBIT 2
SHEET 8 OF 11

I-15 - PAYSON

NOISE ANALYSIS LOCATIONS
C3 - FRONTAGE ROADS
EXHIBIT 2
SHEET 9 OF 11

I-15 - PAYSON

NOISE ANALYSIS LOCATIONS
C3 - FRONTAGE ROADS
EXHIBIT 2
SHEET 10 OF 11



I-15 - PAYSON

NOISE ANALYSIS LOCATIONS
C3 - FRONTAGE ROADS
EXHIBIT 2
SHEET 11 OF 11

Exhibit 3: Noise Analysis Locations- Alternative C4

I-15 - PAYSON

NOISE ANALYSIS LOCATIONS
C4 - SPLIT DIAMOND
EXHIBIT 3
KEY TO SHEETS

I-15 - PAYSON

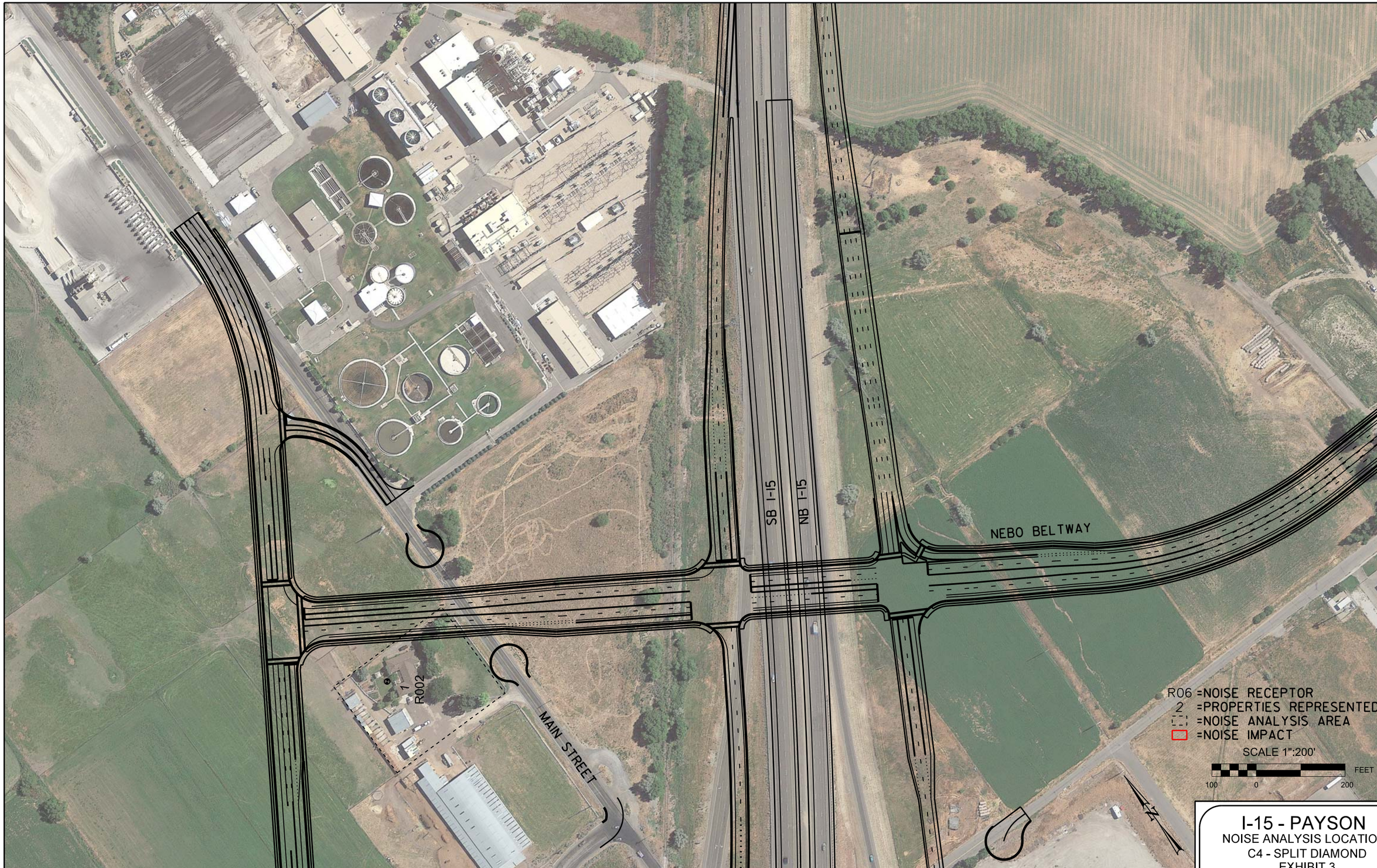
NOISE ANALYSIS LOCATIONS
C4 - SPLIT DIAMOND
EXHIBIT 3
SHEET 1 OF 9

I-15 - PAYSON

NOISE ANALYSIS LOCATIONS
C4 - SPLIT DIAMOND
EXHIBIT 3
SHEET 2 OF 9

I-15 - PAYSON

NOISE ANALYSIS LOCATIONS
C4 - SPLIT DIAMOND
EXHIBIT 3
SHEET 3 OF 9



I-15 - PAYSON

NOISE ANALYSIS LOCATIONS
C4 - SPLIT DIAMOND
EXHIBIT 3
SHEET 4 OF 9

I-15 - PAYSON

NOISE ANALYSIS LOCATIONS
C4 - SPLIT DIAMOND
EXHIBIT 3
SHEET 5 OF 9

I-15 - PAYSON

NOISE ANALYSIS LOCATIONS
C4 - SPLIT DIAMOND
EXHIBIT 3
SHEET 6 OF 9

I-15 - PAYSON

NOISE ANALYSIS LOCATIONS
C4 - SPLIT DIAMOND
EXHIBIT 3
SHEET 7 OF 9

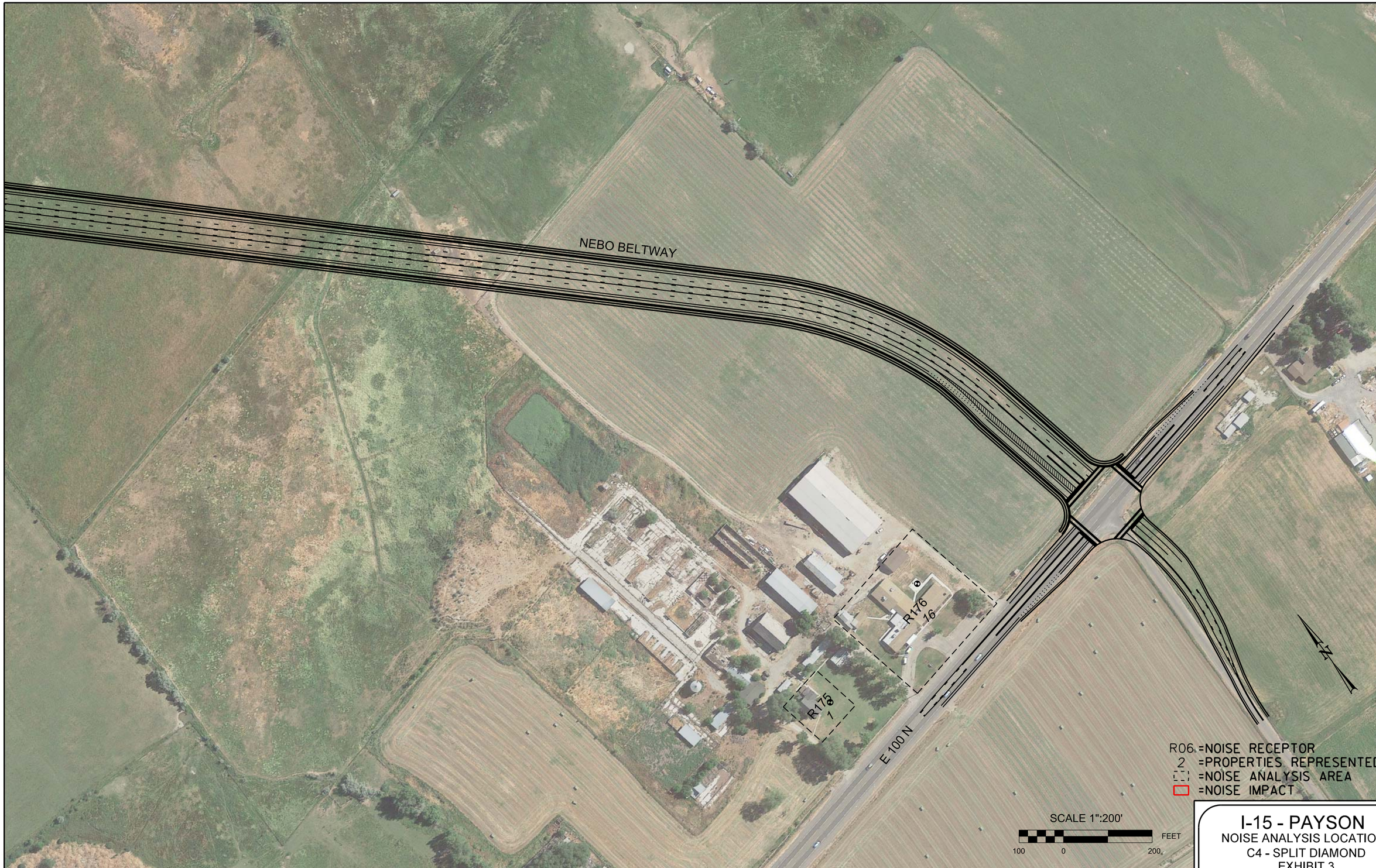
I-15 - PAYSON

NOISE ANALYSIS LOCATIONS

C4 - SPLIT DIAMOND

EXHIBIT 3

SHEET 8 OF 9



I-15 - PAYSON

NOISE ANALYSIS LOCATIONS
C4 - SPLIT DIAMOND
EXHIBIT 3
SHEET 9 OF 9

Exhibit 4: Noise Analysis Locations- Alternative I1

I-15 - PAYSON

NOISE ANALYSIS LOCATIONS
I1 - IMPROVE EXISTING
EXHIBIT 4
KEY TO SHEETS

I-15 - PAYSON

NOISE ANALYSIS LOCATIONS
I1 - IMPROVE EXISTING
EXHIBIT 4
SHEET 1 OF 7

I-15 - PAYSON

NOISE ANALYSIS LOCATIONS
I1 - IMPROVE EXISTING
EXHIBIT 4
SHEET 2 OF 7

I-15 - PAYSON

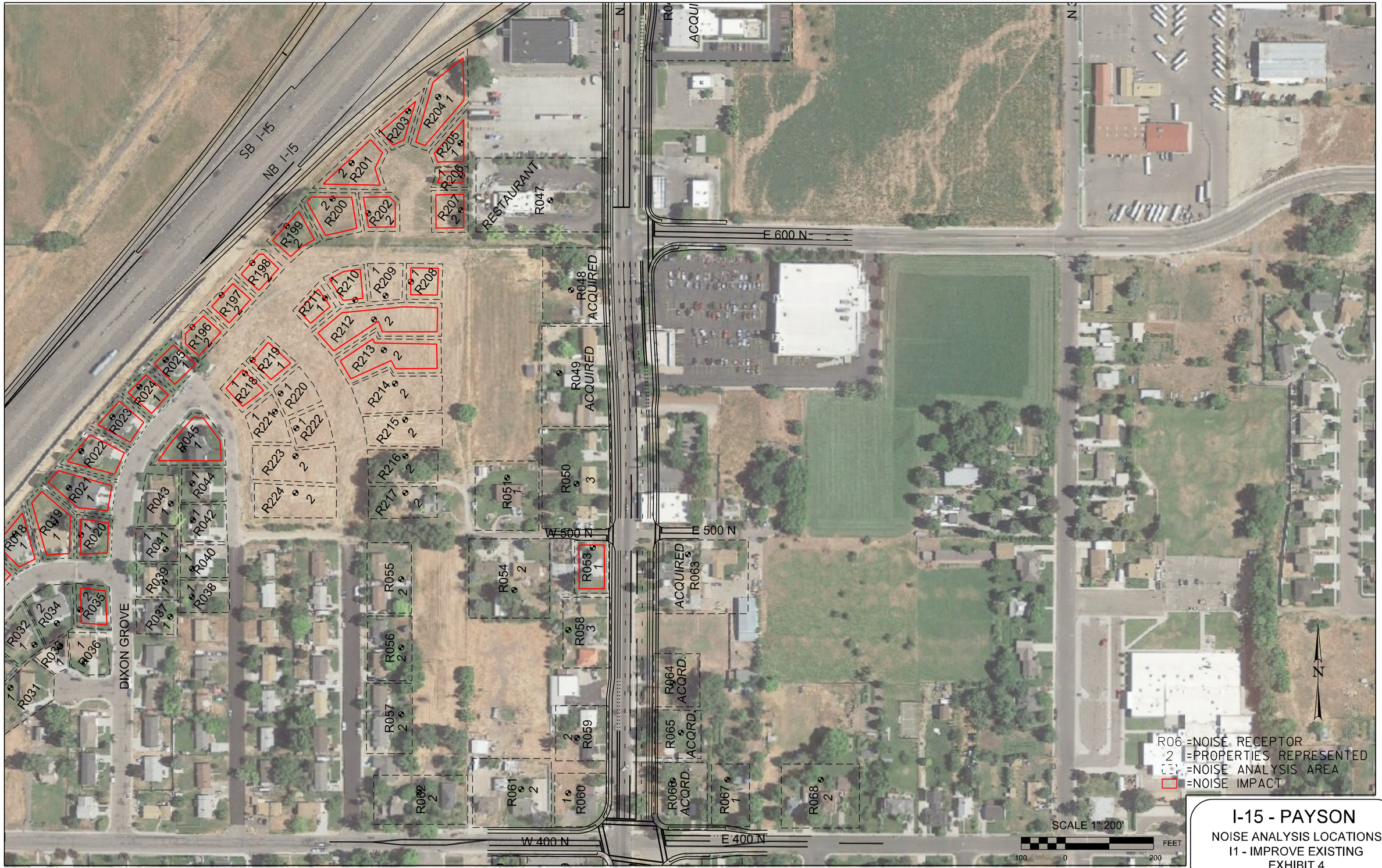
NOISE ANALYSIS LOCATIONS
I1 - IMPROVE EXISTING
EXHIBIT 4
SHEET 3 OF 7

I-15 - PAYSON

NOISE ANALYSIS LOCATIONS
I1 - IMPROVE EXISTING
EXHIBIT 4
SHEET 4 OF 7

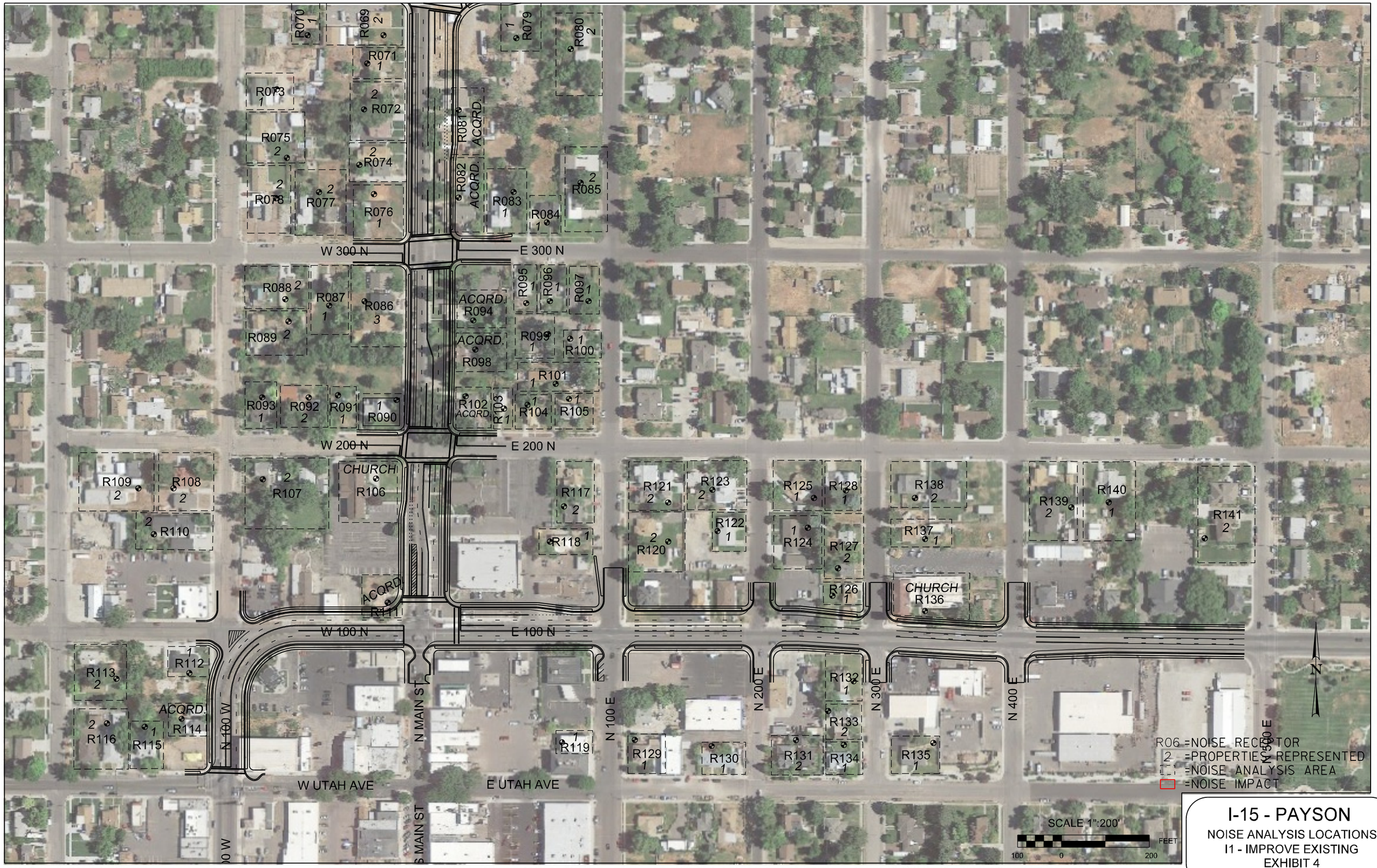
I-15 - PAYSON

NOISE ANALYSIS LOCATIONS
I1 - IMPROVE EXISTING
EXHIBIT 4
SHEET 5 OF 7



I-15 - PAYSON

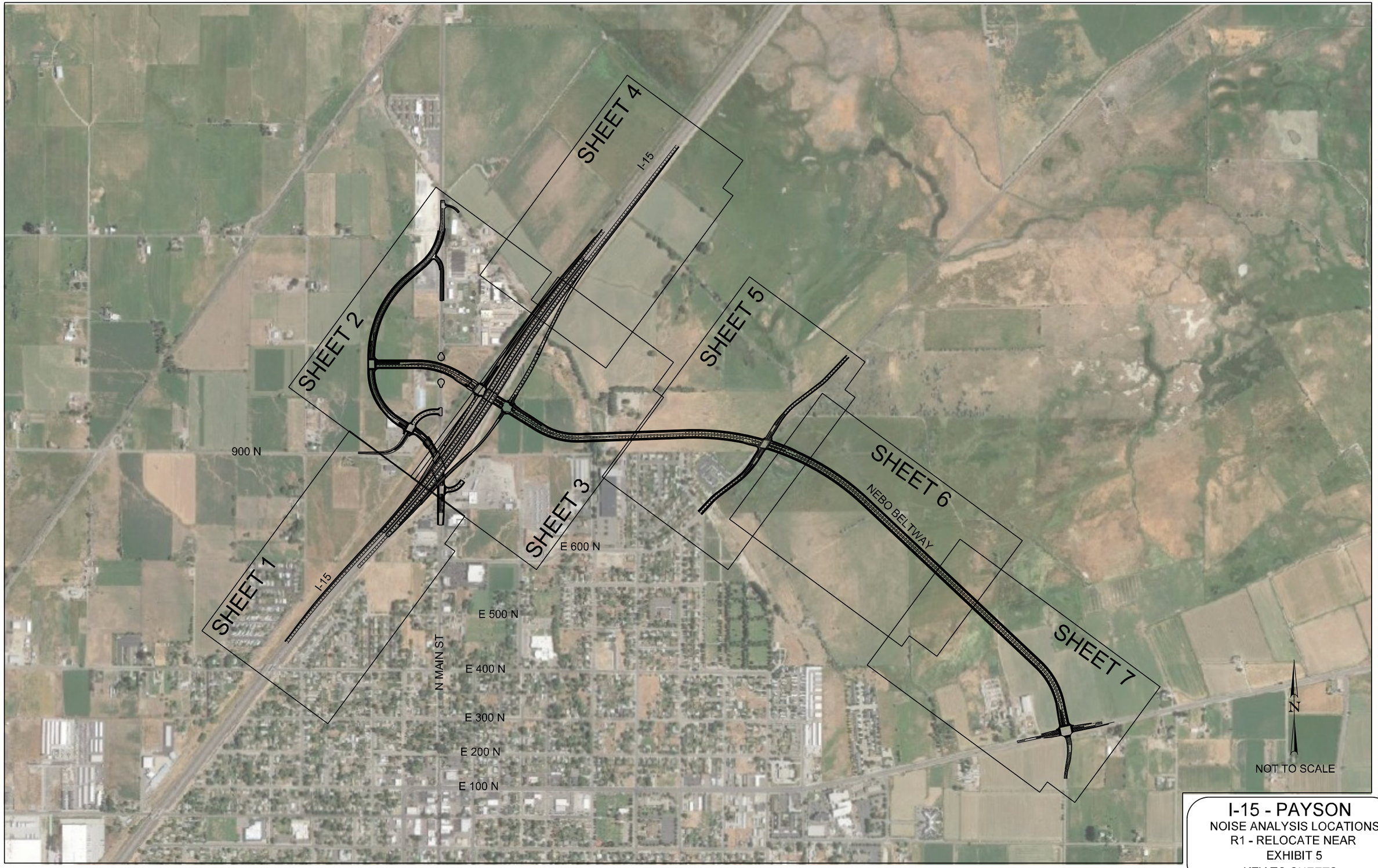
NOISE ANALYSIS LOCATIONS
I1 - IMPROVE EXISTING
EXHIBIT 4
SHEET 6 OF 7



I-15 - PAYSON

NOISE ANALYSIS LOCATIONS
I1 - IMPROVE EXISTING
EXHIBIT 4
SHEET 7 OF 7

Exhibit 5: Noise Analysis Locations- Alternative R1

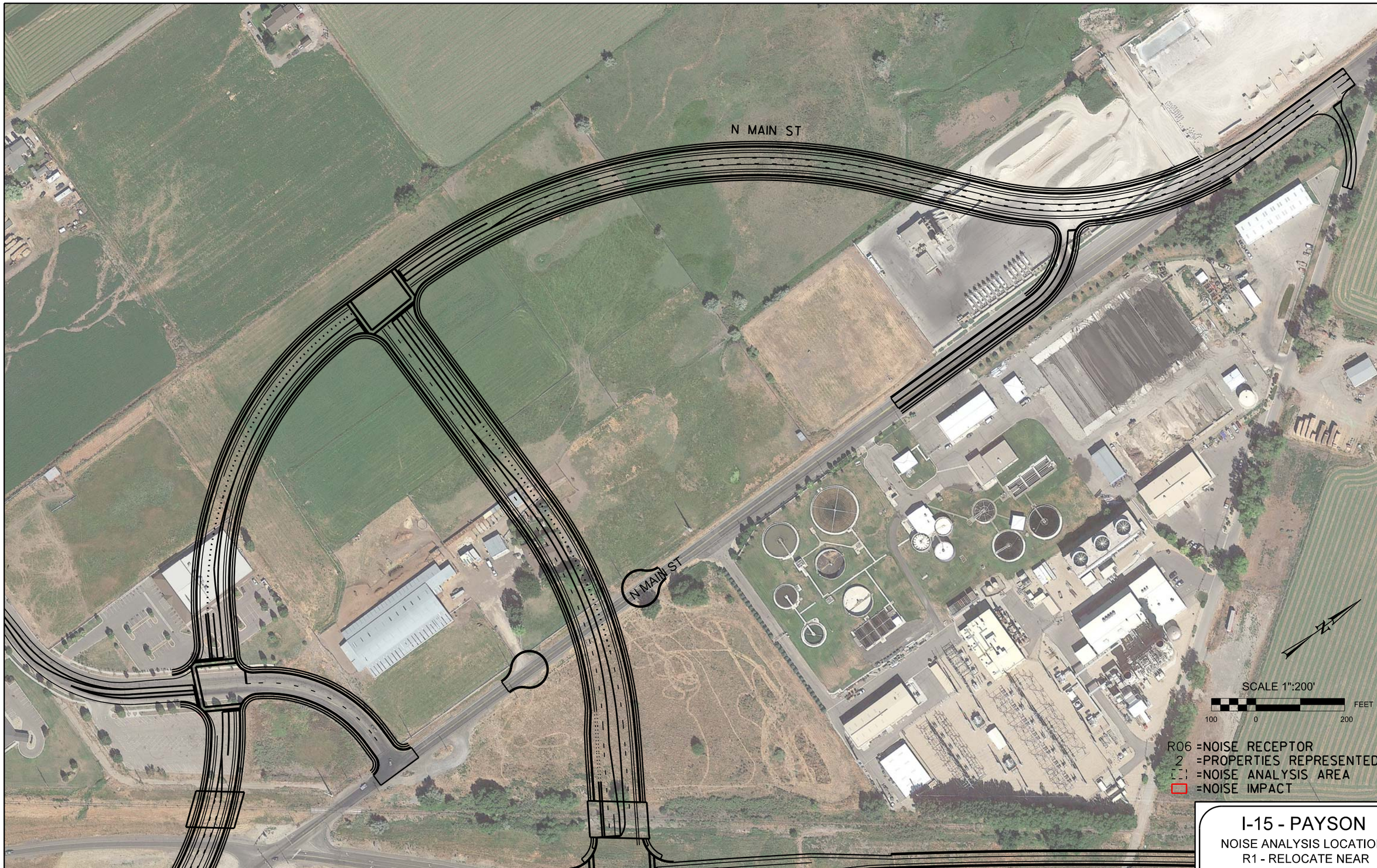


I-15 - PAYSON

NOISE ANALYSIS LOCATIONS
R1 - RELOCATE NEAR
EXHIBIT 5
KEY TO SHEETS

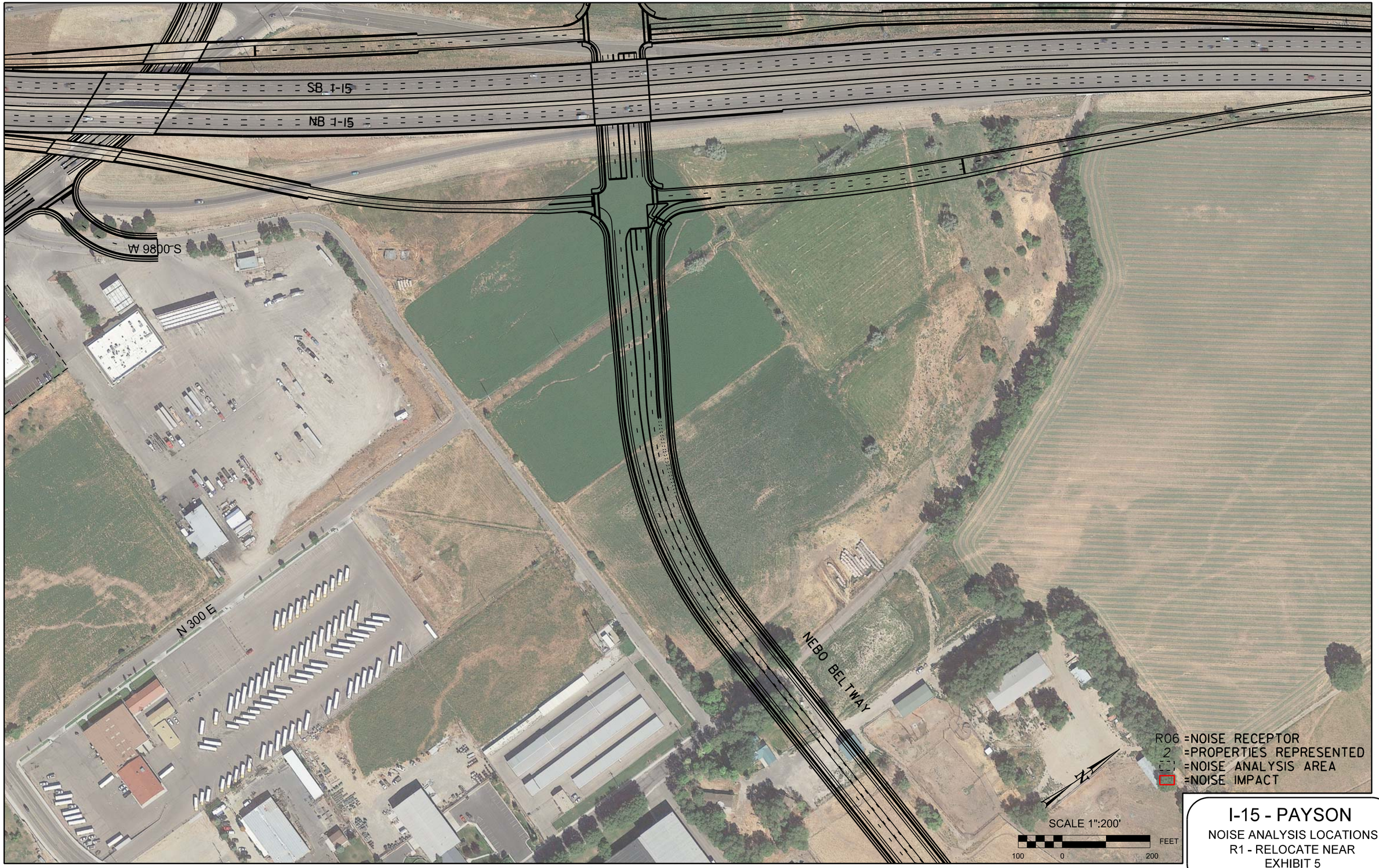
I-15 - PAYSON

NOISE ANALYSIS LOCATIONS
R1 - RELOCATE NEAR
EXHIBIT 5
SHEET 1 OF 7



I-15 - PAYSON

NOISE ANALYSIS LOCATIONS
R1 - RELOCATE NEAR
EXHIBIT 5
SHEET 2 OF 7



I-15 - PAYSON

NOISE ANALYSIS LOCATIONS
R1 - RELOCATE NEAR
EXHIBIT 5
SHEET 3 OF 7

I-15 - PAYSON

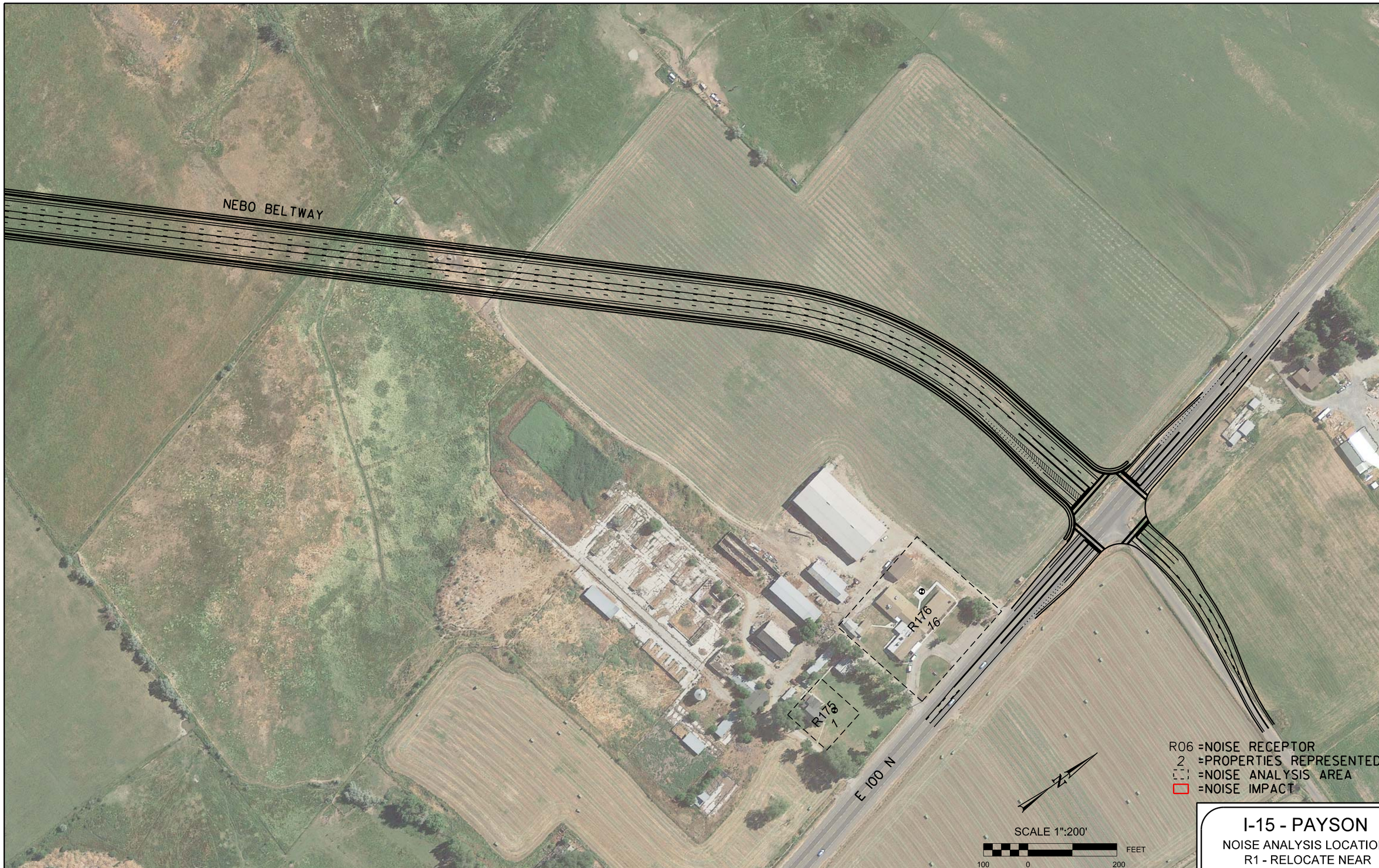
NOISE ANALYSIS LOCATIONS
R1 - RELOCATE NEAR
EXHIBIT 5
SHEET 4 OF 7

I-15 - PAYSON

NOISE ANALYSIS LOCATIONS
R1 - RELOCATE NEAR
EXHIBIT 5
SHEET 5 OF 7

I-15 - PAYSON

NOISE ANALYSIS LOCATIONS
R1 - RELOCATE NEAR
EXHIBIT 5
SHEET 6 OF 7



I-15 - PAYSON

NOISE ANALYSIS LOCATIONS
R1 - RELOCATE NEAR
EXHIBIT 5
SHEET 7 OF 7

Exhibit 6: Noise Analysis Locations- Alternative R2

I-15 - PAYSON

NOISE ANALYSIS LOCATIONS
R2 - RELOCATE FAR
EXHIBIT 6
KEY TO SHEETS

I-15 - PAYSON

NOISE ANALYSIS LOCATIONS
R2 - RELOCATE FAR
EXHIBIT 6
SHEET 1 OF 9

I-15 - PAYSON

NOISE ANALYSIS LOCATIONS
R2 - RELOCATE FAR
EXHIBIT 6
SHEET 2 OF 9

I-15 - PAYSON

NOISE ANALYSIS LOCATIONS
R2 - RELOCATE FAR
EXHIBIT 6
SHEET 3 OF 9

I-15 - PAYSON

NOISE ANALYSIS LOCATIONS
R2 - RELOCATE FAR
EXHIBIT 6
SHEET 4 OF 9

I-15 - PAYSON

NOISE ANALYSIS LOCATIONS
R2 - RELOCATE FAR
EXHIBIT 6
SHEET 5 OF 9

I-15 - PAYSON

NOISE ANALYSIS LOCATIONS
R2 - RELOCATE FAR
EXHIBIT 6
SHEET 6 OF 9

I-15 - PAYSON

NOISE ANALYSIS LOCATIONS
R2 - RELOCATE FAR
EXHIBIT 6
SHEET 7 OF 9

I-15 - PAYSON

NOISE ANALYSIS LOCATIONS
R2 - RELOCATE FAR
EXHIBIT 6
SHEET 8 OF 9

I-15 - PAYSON

NOISE ANALYSIS LOCATIONS
R2 - RELOCATE FAR
EXHIBIT 6
SHEET 9 OF 9

Exhibit 7: Noise Barrier Locations

I-15 - PAYSON

NOISE BARRIER LOCATIONS
C1 - BRAIDED RAMPS
EXHIBIT 7
SHEET 1 OF 11

I-15 - PAYSON

NOISE BARRIER LOCATIONS
C1 - BRAIDED RAMPS
EXHIBIT 7
SHEET 2 OF 11

I-15 - PAYSON

NOISE BARRIER LOCATIONS
C3 - FRONTAGE ROADS
EXHIBIT 7
SHEET 3 OF 11

I-15 - PAYSON

NOISE BARRIER LOCATIONS
C3 - FRONTAGE ROADS
EXHIBIT 7
SHEET 4 OF 11

I-15 - PAYSON

NOISE BARRIER LOCATIONS
C4 - SPLIT DIAMOND
EXHIBIT 7
SHEET 5 OF 11

I-15 - PAYSON

NOISE BARRIER LOCATIONS
C4 - SPLIT DIAMOND
EXHIBIT 7
SHEET 6 OF 11

I-15 - PAYSON

NOISE BARRIER LOCATIONS
C4 - SPLIT DIAMOND
EXHIBIT 7
SHEET 7 OF 11

I-15 - PAYSON

NOISE BARRIER LOCATIONS
I1 - IMPROVE EXISTING
EXHIBIT 7
SHEET 8 OF 11

I-15 - PAYSON

NOISE BARRIER LOCATIONS
I1 - IMPROVE EXISTING
EXHIBIT 7
SHEET 9 OF 11

I-15 - PAYSON

NOISE BARRIER LOCATIONS
R1 - RELOCATE NEAR
EXHIBIT 7
SHEET 10 OF 11

I-15 - PAYSON

NOISE BARRIER LOCATIONS
R1 - RELOCATE NEAR
EXHIBIT 7
SHEET 11 OF 11

Appendix A: Noise Field Measurements

Results of Field Measurements

Site	Field Measured Noise Level dB(A)	TNM Predicted Noise Level dB(A)	Delta	Notes
A	55	54	1	
B	58	61	-3	
C	59	62	-3	
D	64	63	1	
E	63	62	1	
F	52	49	3	
G	62	61	1	
H	64	64	0	
I	69	67	2	
J	51	54	-3	

H.W. LOCHNER, INC. | NOISE MEASUREMENT DATA SHEET

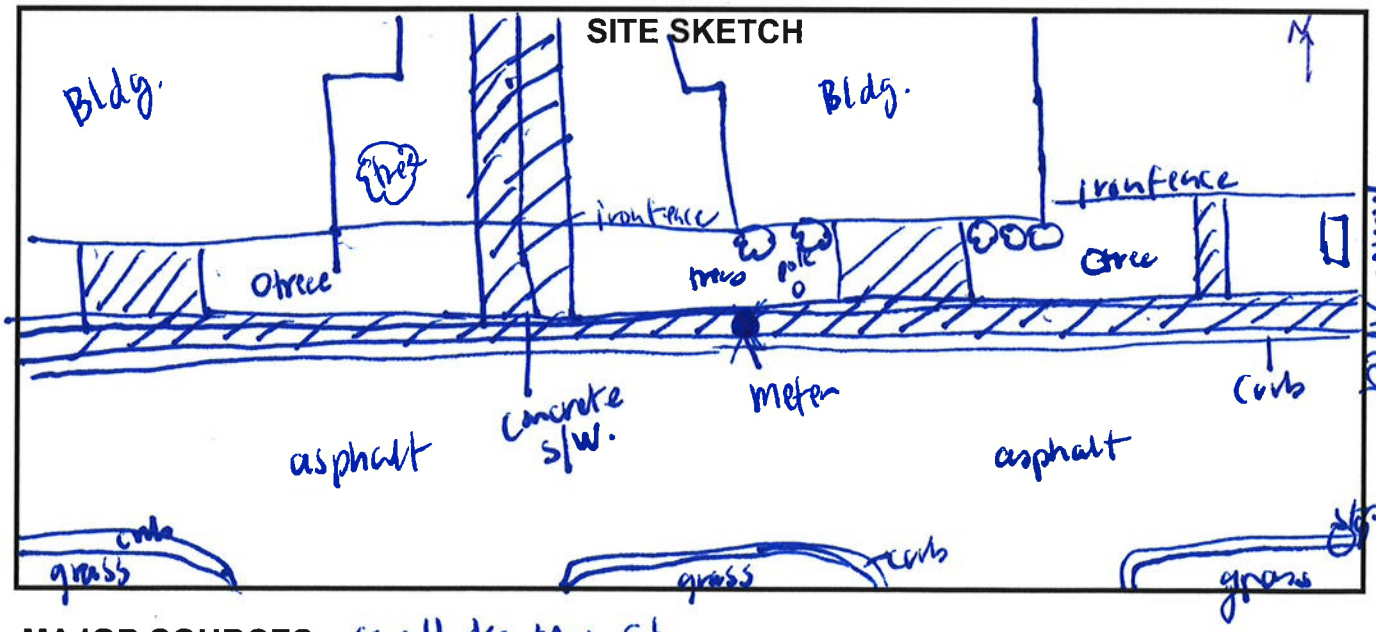
SITE NUMBER: A--1551 N Main St.
PROJECT: 10263--Payson EIS
SITE DESCRIPTION: Residences State Veteran's Home
DATE: 6/1/14
START TIME: 10:48 AM
EVENT NUMBER: #1
END TIME: 11:09 AM
TECHNICIAN: E. Albury
DURATION: 20:36
CALIBRATION: START 94 DB END _____ DB
WEATHER DATA: SKY CONDITION Clear TEMP 70°F
WIND: START 0-5 MPH END _____ MPH DIRECTION W
EQUIPMENT: METER Larson Davis 824 CALIBRATOR Cal 200
RESPONSE: FAST _____ SLOW _____ BATTERY CHECK 99%
RESULTS: Leq 55.0 dBA Lmax 72.9 dBA

TRAFFIC DATA

ROAD	Main Street		Vet. Home Pkg. Lot			
	N	S	E	W		
TRAFFIC SPEED	50	50	5	10		
AUTOMOBILES	20	18	6	5		
MEDIUM TRUCKS	1	3				
HEAVY TRUCKS	1	1				

Includes Light Trucks
2-Axels, 6 Tires
3 or more Axels

SITE SKETCH



MAJOR SOURCES: Cars/trucks Main St.
BACKGROUND NOISE: AC Unit (18:20), talking (17:30) start + throughout, plane (11:53), plane (4:23)
UNUSUAL EVENTS:
OTHER NOTES: people standing close + talking a majority of the time. (start 17:30)

SITE A – LOOKING EAST

SITE A – LOOKING NORTHEAST

SITE A – LOOKING WEST

SITE A – LOOKING NORTH

Integrating Sound Level Meter Summary
Translated: 03-Jun-2016 11:50:36

File Translated: P:\7473 Payson\Noise\Field Measurements\Field Data\10263_PaysonEIS_SiteA_01Jun13i.slmdl
Model Number: 824
Serial Number: A1255
Firmware Rev: 4.290
Software Version: 3.120
Name: H.W. Lochner, Inc.
Descr1: 20 N. Wacker, Suite 1200
Descr2: Chicago, Illinois 60606
Setup: SLM.ism
Setup Descr: Simple Integrating SLM
Location: Site A--Payson
Note 1:
Note 2:

Current Any Data
Start Time: 01-Jun-2016 13:56:56
Elapsed Time: 00:20:36.9

	A Weight		C Weight		Flat	
Leq:	55.0 dBA		64.8 dBC		65.9 dBF	
SEL:	86.0 dBA		95.7 dBC		96.8 dBF	
Peak:	86.9 dBA		94.4 dBC		95.0 dBF	
	01-Jun-2016	14:13:56	01-Jun-2016	14:13:55	01-Jun-2016	14:13:55
Lmax (slow):	72.9 dBA		82.5 dBC		82.8 dBF	
	01-Jun-2016	14:13:56	01-Jun-2016	14:13:56	01-Jun-2016	14:13:56
Lmin (slow):	39.9 dBA		57.2 dBC		59.2 dBF	
	01-Jun-2016	14:00:04	01-Jun-2016	14:10:24	01-Jun-2016	14:10:26
Lmax (fast):	74.9 dBA		84.6 dBC		84.9 dBF	
	01-Jun-2016	14:13:55	01-Jun-2016	14:13:55	01-Jun-2016	14:13:55
Lmin (fast):	38.8 dBA		55.5 dBC		57.4 dBF	
	01-Jun-2016	13:59:55	01-Jun-2016	14:07:45	01-Jun-2016	14:17:24
Lmax (impulse):	75.8 dBA		85.6 dBC		85.9 dBF	
	01-Jun-2016	14:13:55	01-Jun-2016	14:13:55	01-Jun-2016	14:13:55
Lmin (impulse):	39.6 dBA		58.0 dBC		60.1 dBF	
	01-Jun-2016	13:59:21	01-Jun-2016	14:17:24	01-Jun-2016	14:17:24

HWL							3 June 2016					
ECS							TNM 2.5					
							Calculated with TNM 2.5					
RESULTS: SOUND LEVELS												
PROJECT/CONTRACT:		Payson										
RUN:		Payson_SITE A										
BARRIER DESIGN:		INPUT HEIGHTS						Average pavement type shall be used unless				
								a State highway agency substantiates the use				
ATMOSPHERICS:		68 deg F, 50% RH						of a different type with approval of FHWA.				
Receiver												
Name	No.	#DUs	Existing	No Barrier					With Barrier			
			LAeq1h	LAeq1h		Increase over existing		Type	Calculated	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n	Impact	LAeq1h	Calculated	Goal	Calculated
							Sub'l Inc					minus
												Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
SITE A	1	1	0.0	54.2	66	54.2	10	----	54.2	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	1	0.0	0.0	0.0
All Impacted	0	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

H.W. LOCHNER, INC.	NOISE MEASUREMENT DATA SHEET

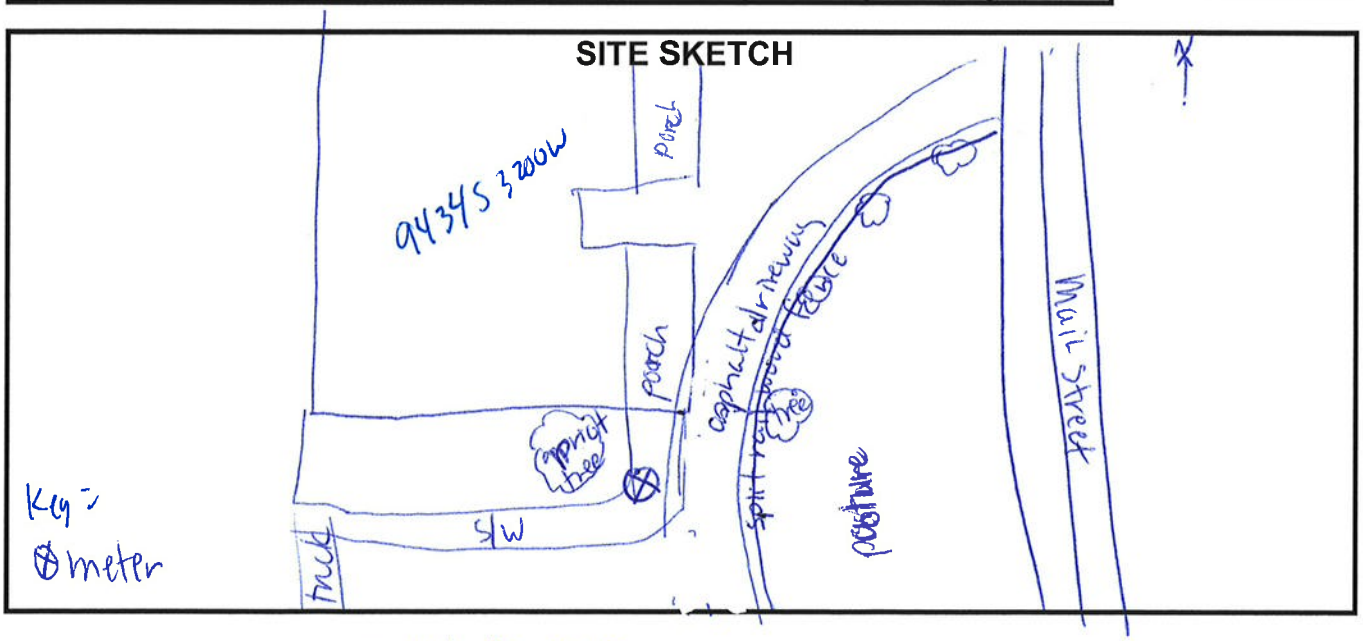
SITE NUMBER: B
PROJECT: 10263--Payson EIS
SITE DESCRIPTION: 9434 S 3200W (Main St front yard of home, even with bldg face
DATE: 6/1/16
START TIME: 11:32 Am
EVENT NUMBER: #2
END TIME: 11:53 Am
TECHNICIAN: E. Albury
DURATION: 20:56
CALIBRATION: START – DB END – DB
WEATHER DATA: SKY CONDITION clear TEMP 70
WIND: START 3 MPH END 3 MPH DIRECTION NW
EQUIPMENT: METER Larson Davis 824 CALIBRATOR
RESPONSE: FAST SLOW BATTERY CHECK
RESULTS: Leq 57.7 Lmax 89.2

TRAFFIC DATA

ROAD	Main Street					
	N	S	E	W		
TRAFFIC SPEED	40	40				
AUTOMOBILES	21	24				
MEDIUM TRUCKS	5	Ø				
HEAVY TRUCKS	2	2				

Includes Light Trucks
2-Axels, 6 Tires
3 or more Axels

SITE SKETCH



MAJOR SOURCES: main St. traffic I-15
BACKGROUND NOISE: Birds
UNUSUAL EVENTS: 15:32 car pull up to barns, 12:56 (truck start up) -10:07
OTHER NOTES:

SITE B – LOOKING EAST

SITE B –LOOKING NORTHEAST

SITE B – LOOKING NORTH

SITE B – LOOKING SOUTHEAST

Integrating Sound Level Meter Summary
Translated: 03-Jun-2016 11:51:33

File Translated: P:\7473 Payson\Noise\Field Measurements\Field Data\10263_PaysonEIS_SiteB_01Jun13i.slmdl
Model Number: 824
Serial Number: A1255
Firmware Rev: 4.290
Software Version: 3.120
Name: H.W. Lochner, Inc.
Descr1: 20 N. Wacker, Suite 1200
Descr2: Chicago, Illinois 60606
Setup: SLM.ism
Setup Descr: Simple Integrating SLM
Location: Payson_Site B
Note 1:
Note 2:

Current Any Data
Start Time: 01-Jun-2016 14:19:31
Elapsed Time: 00:20:56.1

	A Weight	C Weight	Flat
Leq:	57.7 dBA	79.2 dBC	83.1 dBF
SEL:	88.7 dBA	110.2 dBC	114.1 dBF
Peak:	101.6 dBA	126.4 dBC	128.4 dBF
	01-Jun-2016 14:21:04	01-Jun-2016 14:21:04	01-Jun-2016 14:21:04
Lmax (slow):	89.2 dBA	108.1 dBC	112.6 dBF
	01-Jun-2016 14:33:42	01-Jun-2016 14:21:04	01-Jun-2016 14:21:04
Lmin (slow):	44.4 dBA	59.4 dBC	61.4 dBF
	01-Jun-2016 14:19:31	01-Jun-2016 14:43:54	01-Jun-2016 14:43:54
Lmax (fast):	88.8 dBA	115.4 dBC	119.9 dBF
	01-Jun-2016 14:33:42	01-Jun-2016 14:21:04	01-Jun-2016 14:21:04
Lmin (fast):	43.5 dBA	57.6 dBC	59.6 dBF
	01-Jun-2016 14:19:31	01-Jun-2016 14:43:53	01-Jun-2016 14:43:53
Lmax (impulse):	91.5 dBA	118.4 dBC	122.9 dBF
	01-Jun-2016 14:21:04	01-Jun-2016 14:21:04	01-Jun-2016 14:21:04
Lmin (impulse):	42.1 dBA	58.4 dBC	60.9 dBF
	01-Jun-2016 14:19:31	01-Jun-2016 14:19:31	01-Jun-2016 14:19:31

HWL							6 June 2016					
ECS							TNM 2.5					
							Calculated with TNM 2.5					
RESULTS: SOUND LEVELS												
PROJECT/CONTRACT:		Payson										
RUN:		Payson_SITE B										
BARRIER DESIGN:		INPUT HEIGHTS						Average pavement type shall be used unless				
								a State highway agency substantiates the use				
ATMOSPHERICS:		68 deg F, 50% RH						of a different type with approval of FHWA.				
Receiver												
Name	No.	#DUs	Existing	No Barrier					With Barrier			
			LAeq1h	LAeq1h		Increase over existing		Type	Calculated	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n	Impact	LAeq1h	Calculated	Goal	Calculated
							Sub'l Inc					minus
												Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
SITE B	1	1	0.0	60.2	66	60.2	10	----	60.2	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	1	0.0	0.0	0.0
All Impacted	0	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

H.W. LOCHNER, INC.	NOISE MEASUREMENT DATA SHEET

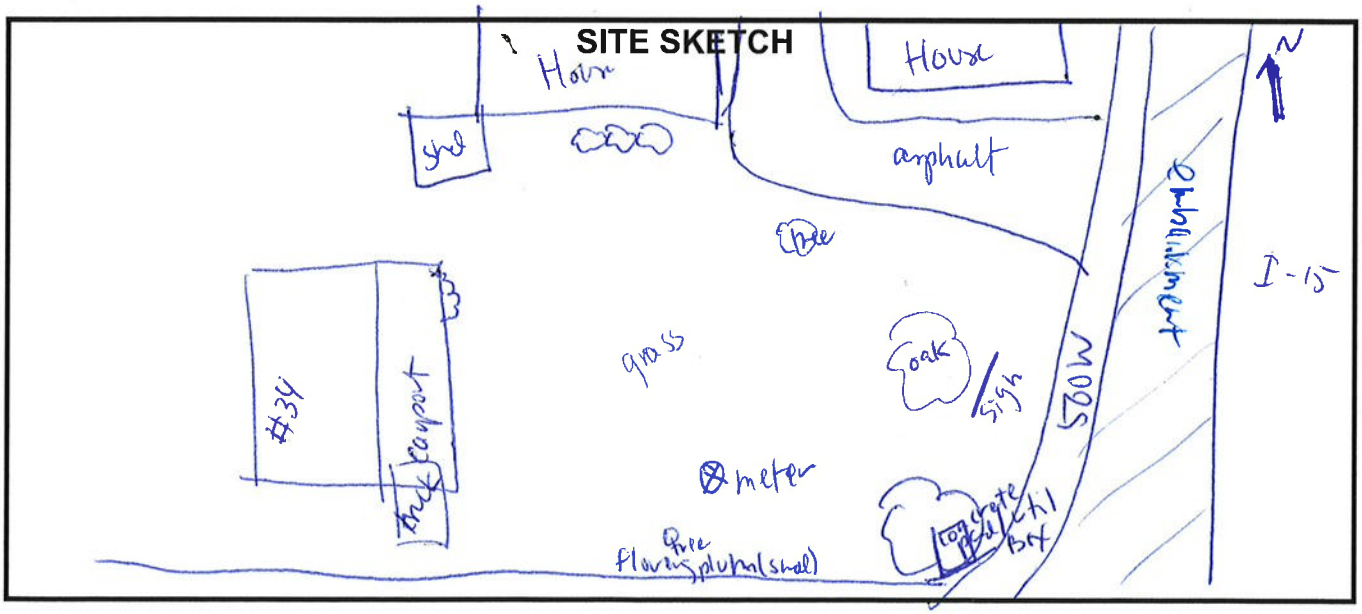
SITE NUMBER: C
PROJECT: 10263--Payson EIS
SITE DESCRIPTION: Shady Oaks 555N 500W on 500W even w/bldg. face to the south
DATE: 6/1/16
START TIME: 12:20 pm
EVENT NUMBER: #3
END TIME: 12:40 pm
TECHNICIAN: E. Albury
DURATION: 20:13
CALIBRATION: START – DB END – DB
WEATHER DATA: SKY CONDITION clear TEMP 76°F
WIND: START Ø-3 MPH END 3-5 MPH DIRECTION W
EQUIPMENT: METER Larson Davis 824 CALIBRATOR –
RESPONSE: FAST ____ SLOW ____ BATTERY CHECK ____
RESULTS: Leq 59.4 Lmax 75.5

TRAFFIC DATA

ROAD	I-15 (video)				500 W	
	N	S	E	W	N	S
TRAFFIC SPEED					20 mph	20 mph
AUTOMOBILES					3	3
MEDIUM TRUCKS						
HEAVY TRUCKS						

Includes Light Trucks
2-Axels, 6 Tires
3 or more Axels

SITE SKETCH



MAJOR SOURCES: I-15 traffic
BACKGROUND NOISE:
UNUSUAL EVENTS: 12:24 Kid bike horn 12:29, 5:24 mower to North – end.
OTHER NOTES:

SITE C – LOOKING EAST

SITE C - LOOKING NORTH

SITE C – LOOKING SOUTH

SITE C – LOOKING WEST

Integrating Sound Level Meter Summary
Translated: 03-Jun-2016 11:51:44

File Translated: P:\7473 Payson\Noise\Field Measurements\Field Data\10263_PaysonEIS_SiteC_01Jun13i.slmdl
Model Number: 824
Serial Number: A1255
Firmware Rev: 4.290
Software Version: 3.120
Name: H.W. Lochner, Inc.
Descr1: 20 N. Wacker, Suite 1200
Descr2: Chicago, Illinois 60606
Setup: SLM.ism
Setup Descr: Simple Integrating SLM
Location: Payson_SiteC
Note 1:
Note 2:

Current Any Data
Start Time: 01-Jun-2016 15:28:14
Elapsed Time: 00:20:13.2

	A Weight	C Weight	Flat
Leq:	59.4 dBA	68.3 dBC	69.6 dBF
SEL:	90.3 dBA	99.2 dBC	100.5 dBF
Peak:	90.2 dBA	91.2 dBC	91.4 dBF
	01-Jun-2016 15:28:17	01-Jun-2016 15:28:15	01-Jun-2016 15:41:31
Lmax (slow):	75.5 dBA	77.5 dBC	78.2 dBF
	01-Jun-2016 15:41:31	01-Jun-2016 15:39:28	01-Jun-2016 15:39:28
Lmin (slow):	47.2 dBA	59.0 dBC	61.5 dBF
	01-Jun-2016 15:31:36	01-Jun-2016 15:31:24	01-Jun-2016 15:31:24
Lmax (fast):	77.3 dBA	80.5 dBC	81.1 dBF
	01-Jun-2016 15:41:31	01-Jun-2016 15:39:28	01-Jun-2016 15:39:28
Lmin (fast):	46.3 dBA	57.8 dBC	59.6 dBF
	01-Jun-2016 15:31:36	01-Jun-2016 15:31:24	01-Jun-2016 15:31:24
Lmax (impulse):	78.7 dBA	81.6 dBC	82.2 dBF
	01-Jun-2016 15:28:17	01-Jun-2016 15:39:28	01-Jun-2016 15:39:28
Lmin (impulse):	46.7 dBA	60.4 dBC	62.8 dBF
	01-Jun-2016 15:31:36	01-Jun-2016 15:31:22	01-Jun-2016 15:31:48

HWL							14 June 2016					
ECS							TNM 2.5					
							Calculated with TNM 2.5					
RESULTS: SOUND LEVELS												
PROJECT/CONTRACT:		Payson										
RUN:		Payson_Site C										
BARRIER DESIGN:		INPUT HEIGHTS						Average pavement type shall be used unless				
								a State highway agency substantiates the use				
ATMOSPHERICS:		68 deg F, 50% RH						of a different type with approval of FHWA.				
Receiver												
Name	No.	#DUs	Existing	No Barrier					With Barrier			
			LAeq1h	LAeq1h		Increase over existing		Type	Calculated	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n	Impact	LAeq1h	Calculated	Goal	Calculated
							Sub'l Inc					minus
												Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
SITE C	1	1	0.0	62.4	66	62.4	10	----	62.4	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	1	0.0	0.0	0.0
All Impacted	0	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

H.W. LOCHNER, INC.	NOISE MEASUREMENT DATA SHEET

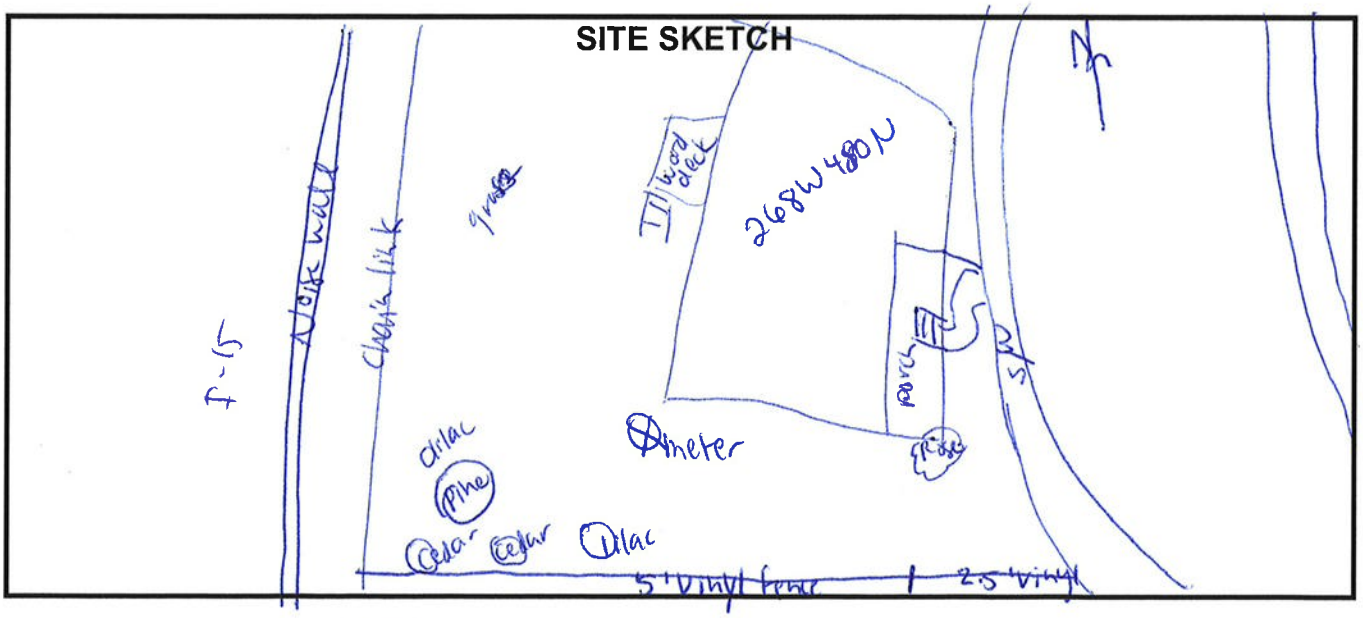
SITE NUMBER: D
PROJECT: 10263--Payson EIS
SITE DESCRIPTION: Res. Nebeker Lane (268 W 480 N)
DATE: 6/1/16
START TIME: 1:49 pm
EVENT NUMBER: #4
END TIME: 2:09 pm
TECHNICIAN: E. Albury
DURATION: 20:15
CALIBRATION: START — DB END — DB
WEATHER DATA: SKY CONDITION clear TEMP 79
WIND: START 5 MPH END MPH DIRECTION N/NW
EQUIPMENT: METER Larson Davis 824 CALIBRATOR —
RESPONSE: FAST SLOW BATTERY CHECK
RESULTS: Leq 63.6 Lmax 72.6 Noise Wall ~12' high concrete panel

TRAFFIC DATA

ROAD	I-15 (video)					
	N	S	E	W		
TRAFFIC SPEED						
AUTOMOBILES						
MEDIUM TRUCKS						
HEAVY TRUCKS						

Includes Light Trucks
2-Axels, 6 Tires
3 or more Axels

SITE SKETCH

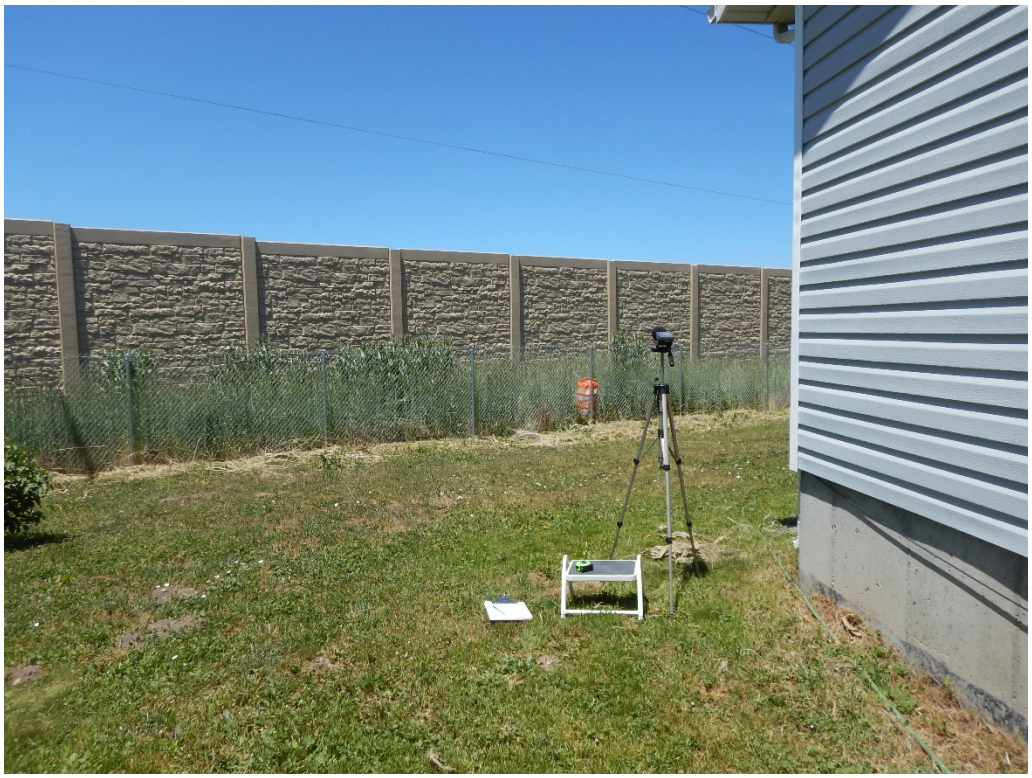


MAJOR SOURCES: I-15
BACKGROUND NOISE: birds, crickets
UNUSUAL EVENTS: 8:40 horn, 6:28 jet overhead,
OTHER NOTES: Noise wall: ~12' high

SITE D – LOOKING EAST

SITE D – LOOKING NORTH

SITE D – LOOKING SOUTH



SITE D – LOOKING WEST

Integrating Sound Level Meter Summary
Translated: 03-Jun-2016 11:51:57

File Translated: P:\7473 Payson\Noise\Field Measurements\Field Data\10263_PaysonEIS_SiteD_01Jun13i.slmdl
Model Number: 824
Serial Number: A1255
Firmware Rev: 4.290
Software Version: 3.120
Name: H.W. Lochner, Inc.
Descr1: 20 N. Wacker, Suite 1200
Descr2: Chicago, Illinois 60606
Setup: SLM.ism
Setup Descr: Simple Integrating SLM
Location: Payson_SiteD
Note 1:
Note 2:

Current Any Data
Start Time: 01-Jun-2016 16:58:10
Elapsed Time: 00:20:15.0

	A Weight	C Weight	Flat
Leq:	63.6 dBA	71.7 dBC	73.5 dBF
SEL:	94.5 dBA	102.6 dBC	104.3 dBF
Peak:	85.5 dBA	91.5 dBC	93.2 dBF
	01-Jun-2016 17:01:28	01-Jun-2016 17:01:28	01-Jun-2016 16:59:12
Lmax (slow):	72.6 dBA	80.1 dBC	81.4 dBF
	01-Jun-2016 17:01:29	01-Jun-2016 17:18:19	01-Jun-2016 16:59:49
Lmin (slow):	49.7 dBA	58.2 dBC	60.1 dBF
	01-Jun-2016 17:15:01	01-Jun-2016 17:15:01	01-Jun-2016 17:15:01
Lmax (fast):	73.9 dBA	83.0 dBC	85.7 dBF
	01-Jun-2016 17:04:48	01-Jun-2016 16:59:49	01-Jun-2016 16:59:49
Lmin (fast):	47.5 dBA	57.1 dBC	58.7 dBF
	01-Jun-2016 17:15:01	01-Jun-2016 17:15:00	01-Jun-2016 17:15:01
Lmax (impulse):	74.9 dBA	85.3 dBC	88.3 dBF
	01-Jun-2016 17:04:48	01-Jun-2016 16:59:49	01-Jun-2016 16:59:12
Lmin (impulse):	48.3 dBA	58.4 dBC	60.7 dBF
	01-Jun-2016 17:15:01	01-Jun-2016 17:15:01	01-Jun-2016 17:15:01

HWL							7 July 2016					
ECS							TNM 2.5					
							Calculated with TNM 2.5					
RESULTS: SOUND LEVELS												
PROJECT/CONTRACT:		Payson										
RUN:		Payson_Site C										
BARRIER DESIGN:		INPUT HEIGHTS						Average pavement type shall be used unless				
								a State highway agency substantiates the use				
ATMOSPHERICS:		68 deg F, 50% RH						of a different type with approval of FHWA.				
Receiver												
Name	No.	#DUs	Existing	No Barrier					With Barrier			
			LAeq1h	LAeq1h		Increase over existing		Type	Calculated	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n	Impact	LAeq1h	Calculated	Goal	Calculated
							Sub'l Inc					minus
												Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
SITE C	1	1	0.0	62.2	66	62.2	10	----	62.2	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	1	0.0	0.0	0.0
All Impacted	0	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

H.W. LOCHNER, INC.	NOISE MEASUREMENT DATA SHEET

SITE NUMBER: E
PROJECT: 10263--Payson EIS
SITE DESCRIPTION: Res. Main St. (452 N. Main St)?/vacant lot
DATE: 6/1/16
START TIME: 2:22 PM
EVENT NUMBER: #5
END TIME: 2:42
TECHNICIAN: E. Albury
DURATION: 20:17
CALIBRATION: START — DB END — DB
WEATHER DATA: SKY CONDITION Clear TEMP 80°F
WIND: START 5 MPH END 0 MPH DIRECTION N.
EQUIPMENT: METER L.D. 824 CALIBRATOR —
RESPONSE: FAST _____ SLOW _____ BATTERY CHECK _____
RESULTS: Leq 63.2 Lmax 72.5

TRAFFIC DATA

ROAD	Main Street					
	N	S	E	W		
TRAFFIC SPEED	30	30				
AUTOMOBILES	180	216				
MEDIUM TRUCKS	4	2				
HEAVY TRUCKS	6	6				

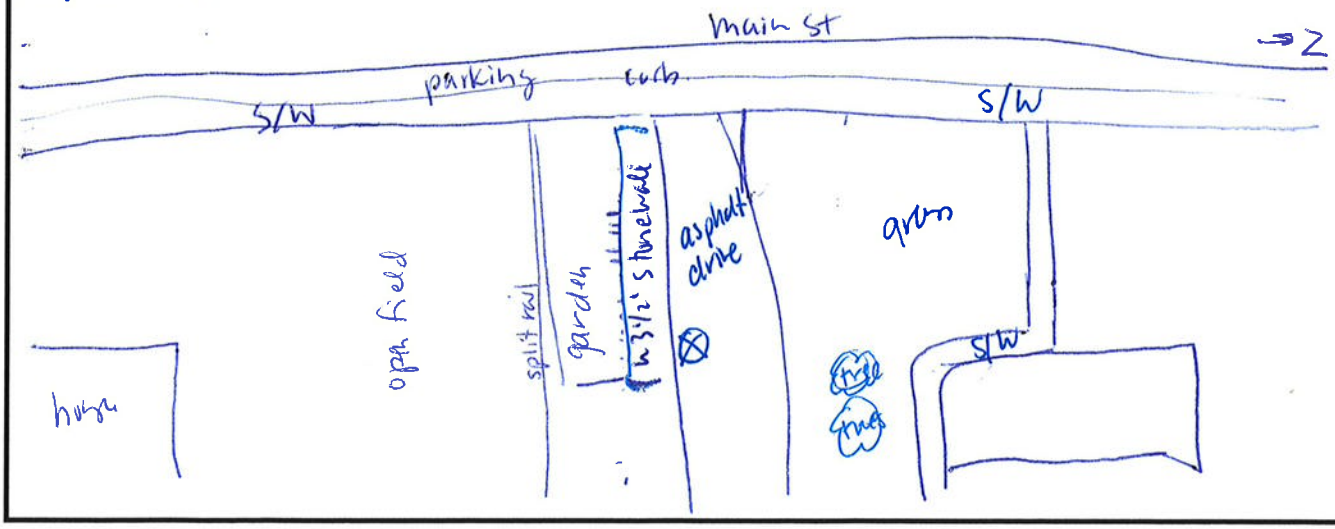
Includes Light Trucks

2-Axels, 6 Tires

3 or more Axels

SITE SKETCH

Key ⊗ = meter



MAJOR SOURCES: main st.
BACKGROUND NOISE: birds
UNUSUAL EVENTS: _____
OTHER NOTES: _____

SITE E – LOOKING EAST

SITE E – LOOKING NORTH

SITE E – LOOKING SOUTH

SITE E – LOOKING WEST

Integrating Sound Level Meter Summary
Translated: 03-Jun-2016 11:52:48

File Translated: P:\7473 Payson\Noise\Field Measurements\Field Data\10263_PaysonEIS_SiteE_01Jun13i.slmdl
Model Number: 824
Serial Number: A1255
Firmware Rev: 4.290
Software Version: 3.120
Name: H.W. Lochner, Inc.
Descr1: 20 N. Wacker, Suite 1200
Descr2: Chicago, Illinois 60606
Setup: SLM.ism
Setup Descr: Simple Integrating SLM
Location: Payson_SiteE
Note 1:
Note 2:

Current Any Data
Start Time: 01-Jun-2016 17:30:15
Elapsed Time: 00:20:17.7

	A Weight	C Weight	Flat
Leq:	63.2 dBA	69.8 dBC	70.6 dBF
SEL:	94.1 dBA	100.7 dBC	101.5 dBF
Peak:	87.6 dBA	94.9 dBC	95.8 dBF
	01-Jun-2016 17:45:50	01-Jun-2016 17:36:21	01-Jun-2016 17:36:20
Lmax (slow):	72.5 dBA	85.4 dBC	85.6 dBF
	01-Jun-2016 17:41:21	01-Jun-2016 17:43:18	01-Jun-2016 17:43:18
Lmin (slow):	47.4 dBA	56.1 dBC	58.3 dBF
	01-Jun-2016 17:39:53	01-Jun-2016 17:33:46	01-Jun-2016 17:33:46
Lmax (fast):	75.6 dBA	88.8 dBC	88.9 dBF
	01-Jun-2016 17:45:50	01-Jun-2016 17:43:18	01-Jun-2016 17:43:18
Lmin (fast):	46.6 dBA	54.1 dBC	56.0 dBF
	01-Jun-2016 17:39:52	01-Jun-2016 17:33:46	01-Jun-2016 17:33:46
Lmax (impulse):	78.4 dBA	89.7 dBC	89.9 dBF
	01-Jun-2016 17:45:50	01-Jun-2016 17:43:18	01-Jun-2016 17:43:18
Lmin (impulse):	47.0 dBA	57.3 dBC	59.2 dBF
	01-Jun-2016 17:39:53	01-Jun-2016 17:33:46	01-Jun-2016 17:33:45

HWL							6 July 2016					
ECS							TNM 2.5					
							Calculated with TNM 2.5					
RESULTS: SOUND LEVELS												
PROJECT/CONTRACT:		Payson										
RUN:		Payson_SITE D										
BARRIER DESIGN:		INPUT HEIGHTS						Average pavement type shall be used unless				
								a State highway agency substantiates the use				
ATMOSPHERICS:		68 deg F, 50% RH						of a different type with approval of FHWA.				
Receiver												
Name	No.	#DUs	Existing	No Barrier					With Barrier			
			LAeq1h	LAeq1h		Increase over existing		Type	Calculated	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n	Impact	LAeq1h	Calculated	Goal	Calculated
							Sub'l Inc					minus
												Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
SITE D	1	1	0.0	63.1	66	63.1	10	----	63.1	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	1	0.0	0.0	0.0
All Impacted	0	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

H.W. LOCHNER, INC.	NOISE MEASUREMENT DATA SHEET

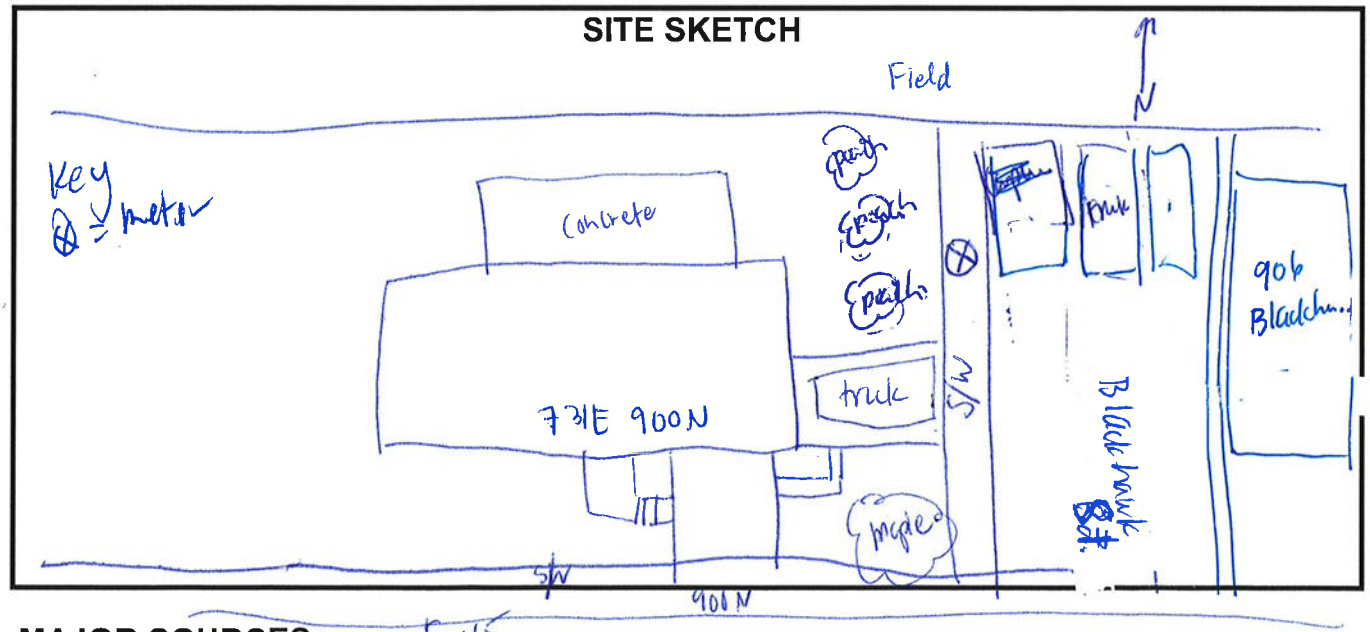
SITE NUMBER: F
PROJECT: 10263--Payson EIS
SITE DESCRIPTION: Res. N end Blackhawk St
DATE: 6/1/16
~~(906 Blackhawk--east)~~ (731 E 900 N)
START TIME: 5:34
EVENT NUMBER: #10
END TIME: 5:55
TECHNICIAN: E. Albury
DURATION: 20:10
CALIBRATION: START — DB END 94.2 DB
WEATHER DATA: SKY CONDITION _____ TEMP 81°F
WIND: START 10 MPH END 7-10 MPH DIRECTION N
EQUIPMENT: METER Larson Davis 824 CALIBRATOR CAL200
RESPONSE: FAST _____ SLOW _____ BATTERY CHECK 13%
RESULTS: Leq 52.4 Lmax 60.9

TRAFFIC DATA

ROAD	Blackhawk St		900 North			
	N	S	E	W		
TRAFFIC SPEED		5 mph				
AUTOMOBILES		1				
MEDIUM TRUCKS						
HEAVY TRUCKS						

Includes Light Trucks
2-Axels, 6 Tires
3 or more Axels

SITE SKETCH



MAJOR SOURCES: I-15
BACKGROUND NOISE: I-15, Birds, Crickets, Breezy
UNUSUAL EVENTS:
OTHER NOTES: Only 1 car on Blackhawk, no cars 900 N during measurement.

SITE F – LOOKING EAST

SITE F – LOOKING NORTH

SITE F – LOOKING SOUTH

SITE F – LOOKING WEST

Integrating Sound Level Meter Summary
Translated: 03-Jun-2016 11:53:02

File Translated: P:\7473 Payson\Noise\Field Measurements\Field Data\10263_PaysonEIS_SiteF_01Jun13i.slmdl
Model Number: 824
Serial Number: A1255
Firmware Rev: 4.290
Software Version: 3.120
Name: H.W. Lochner, Inc.
Descr1: 20 N. Wacker, Suite 1200
Descr2: Chicago, Illinois 60606
Setup: SLM.ism
Setup Descr: Simple Integrating SLM
Location: Payson_SiteF
Note 1:
Note 2:

Current Any Data
Start Time: 01-Jun-2016 20:43:27
Elapsed Time: 00:20:10.2

	A Weight	C Weight	Flat
Leq:	52.4 dBA	60.1 dBC	62.0 dBF
SEL:	83.3 dBA	91.0 dBC	92.9 dBF
Peak:	97.0 dBA	96.4 dBC	97.4 dBF
	01-Jun-2016 20:44:44	01-Jun-2016 20:44:44	01-Jun-2016 20:44:44
Lmax (slow):	60.9 dBA	74.5 dBC	76.7 dBF
	01-Jun-2016 20:44:44	01-Jun-2016 20:45:15	01-Jun-2016 20:43:35
Lmin (slow):	47.1 dBA	55.1 dBC	57.1 dBF
	01-Jun-2016 20:55:20	01-Jun-2016 20:46:48	01-Jun-2016 20:46:48
Lmax (fast):	68.8 dBA	80.6 dBC	83.9 dBF
	01-Jun-2016 20:44:44	01-Jun-2016 20:43:35	01-Jun-2016 20:43:35
Lmin (fast):	46.0 dBA	53.5 dBC	55.2 dBF
	01-Jun-2016 20:53:25	01-Jun-2016 20:46:46	01-Jun-2016 20:46:46
Lmax (impulse):	73.7 dBA	84.0 dBC	86.3 dBF
	01-Jun-2016 20:44:44	01-Jun-2016 20:43:35	01-Jun-2016 20:43:35
Lmin (impulse):	46.7 dBA	55.8 dBC	56.9 dBF
	01-Jun-2016 20:53:25	01-Jun-2016 20:47:03	01-Jun-2016 20:43:27

HWL							14 June 2016					
ECS							TNM 2.5					
							Calculated with TNM 2.5					
RESULTS: SOUND LEVELS												
PROJECT/CONTRACT:		Payson										
RUN:		Payson_SITE F										
BARRIER DESIGN:		INPUT HEIGHTS						Average pavement type shall be used unless				
								a State highway agency substantiates the use				
ATMOSPHERICS:		68 deg F, 50% RH						of a different type with approval of FHWA.				
Receiver												
Name	No.	#DUs	Existing	No Barrier					With Barrier			
			LAeq1h	LAeq1h		Increase over existing		Type	Calculated	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n	Impact	LAeq1h	Calculated	Goal	Calculated
							Sub'l Inc					minus
												Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
SITE F	1	1	0.0	49.0	66	49.0	10	----	49.0	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	1	0.0	0.0	0.0
All Impacted	0	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

H.W. LOCHNER, INC.	NOISE MEASUREMENT DATA SHEET

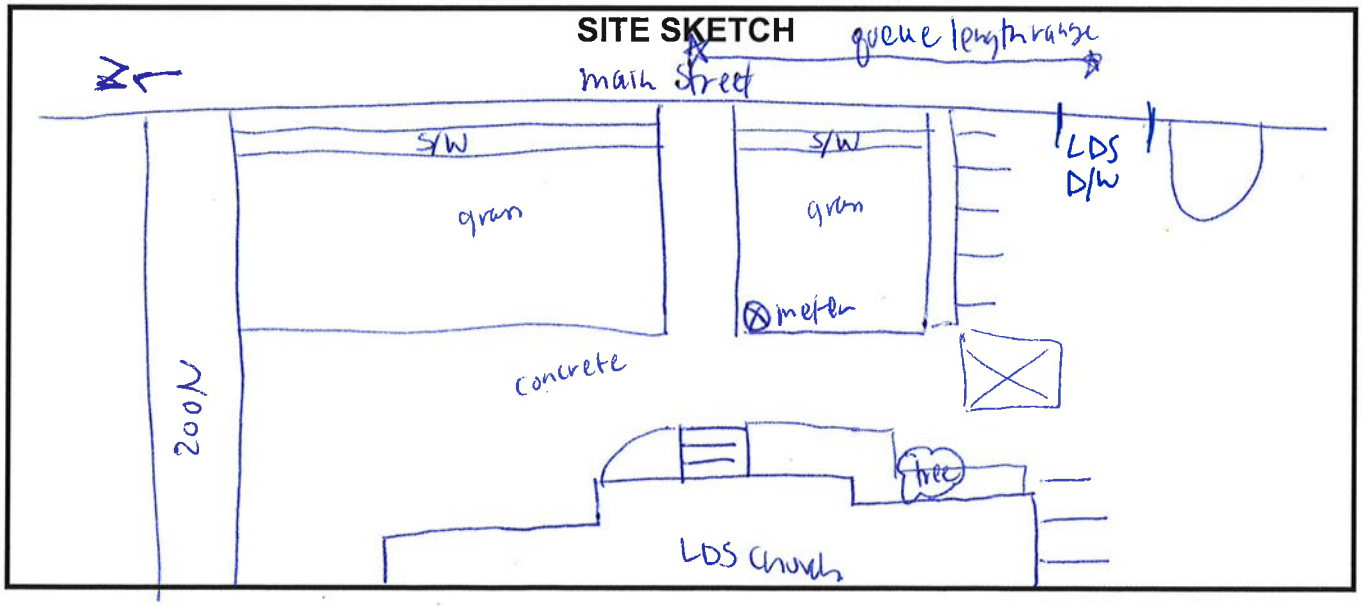
SITE NUMBER: G
PROJECT: 10263--Payson EIS
SITE DESCRIPTION: LDS Church SW N. Main
DATE: 6/1/16
START TIME: 2:56 pm
EVENT NUMBER: #6
END TIME: 3:17 pm
TECHNICIAN: E. Albury
DURATION: 20:12
CALIBRATION: START 114.6 DB END — DB
WEATHER DATA: SKY CONDITION clear TEMP 80°F
WIND: START 0 MPH END 0 MPH DIRECTION n/a
EQUIPMENT: METER L.D. 824 CALIBRATOR —
RESPONSE: FAST ____ SLOW ____ BATTERY CHECK ____
RESULTS: Leq 61.6 Lmax 74.0

NOTES: Traffic SB effects of light

TRAFFIC DATA

ROAD	Main Street					
	N	S	E	W		
TRAFFIC SPEED	30	30				
AUTOMOBILES	151	180				
MEDIUM TRUCKS	7	7				
HEAVY TRUCKS	5	1				

SITE SKETCH



MAJOR SOURCES: Main St.
BACKGROUND NOISE:
UNUSUAL EVENTS:
OTHER NOTES: Effects of light: traffic queues to between LDS Driveway and sidewalk in front of church during each phase of the light @ Main + 100N.

SITE G – LOOKING EAST

SITE G – LOOKING NORTH

SITE G – LOOKING SOUTH

SITE G – LOOKING WEST

Integrating Sound Level Meter Summary
Translated: 03-Jun-2016 11:53:14

File Translated: P:\7473 Payson\Noise\Field Measurements\Field Data\10263_PaysonEIS_SiteG_01Jun13i.slmdl
Model Number: 824
Serial Number: A1255
Firmware Rev: 4.290
Software Version: 3.120
Name: H.W. Lochner, Inc.
Descr1: 20 N. Wacker, Suite 1200
Descr2: Chicago, Illinois 60606
Setup: SLM.ism
Setup Descr: Simple Integrating SLM
Location: Payson_SiteG
Note 1:
Note 2:

Current Any Data
Start Time: 01-Jun-2016 18:05:26
Elapsed Time: 00:20:12.4

	A Weight	C Weight	Flat
Leq:	61.6 dBA	73.6 dBC	74.2 dBF
SEL:	92.4 dBA	104.4 dBC	105.0 dBF
Peak:	87.7 dBA	96.8 dBC	97.3 dBF
	01-Jun-2016 18:25:00	01-Jun-2016 18:25:00	01-Jun-2016 18:25:00
Lmax (slow):	74.0 dBA	85.8 dBC	86.0 dBF
	01-Jun-2016 18:25:00	01-Jun-2016 18:10:34	01-Jun-2016 18:10:34
Lmin (slow):	47.7 dBA	61.7 dBC	62.8 dBF
	01-Jun-2016 18:06:27	01-Jun-2016 18:06:26	01-Jun-2016 18:06:26
Lmax (fast):	76.2 dBA	88.9 dBC	89.0 dBF
	01-Jun-2016 18:25:00	01-Jun-2016 18:10:33	01-Jun-2016 18:10:33
Lmin (fast):	46.8 dBA	60.2 dBC	61.2 dBF
	01-Jun-2016 18:06:26	01-Jun-2016 18:06:26	01-Jun-2016 18:06:26
Lmax (impulse):	77.0 dBA	89.4 dBC	90.0 dBF
	01-Jun-2016 18:25:00	01-Jun-2016 18:10:33	01-Jun-2016 18:15:51
Lmin (impulse):	47.2 dBA	62.3 dBC	63.6 dBF
	01-Jun-2016 18:06:26	01-Jun-2016 18:06:26	01-Jun-2016 18:06:26

HWL							3 June 2016					
ECS							TNM 2.5					
							Calculated with TNM 2.5					
RESULTS: SOUND LEVELS												
PROJECT/CONTRACT:		Payson										
RUN:		Payson_SITE G										
BARRIER DESIGN:		INPUT HEIGHTS						Average pavement type shall be used unless				
								a State highway agency substantiates the use				
ATMOSPHERICS:		68 deg F, 50% RH						of a different type with approval of FHWA.				
Receiver												
Name	No.	#DUs	Existing	No Barrier					With Barrier			
			LAeq1h	LAeq1h		Increase over existing		Type	Calculated	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n	Impact	LAeq1h	Calculated	Goal	Calculated
							Sub'l Inc					minus
												Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
SITE G	1	1	0.0	60.7	66	60.7	10	----	60.7	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	1	0.0	0.0	0.0
All Impacted	0	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

H.W. LOCHNER, INC.	NOISE MEASUREMENT DATA SHEET

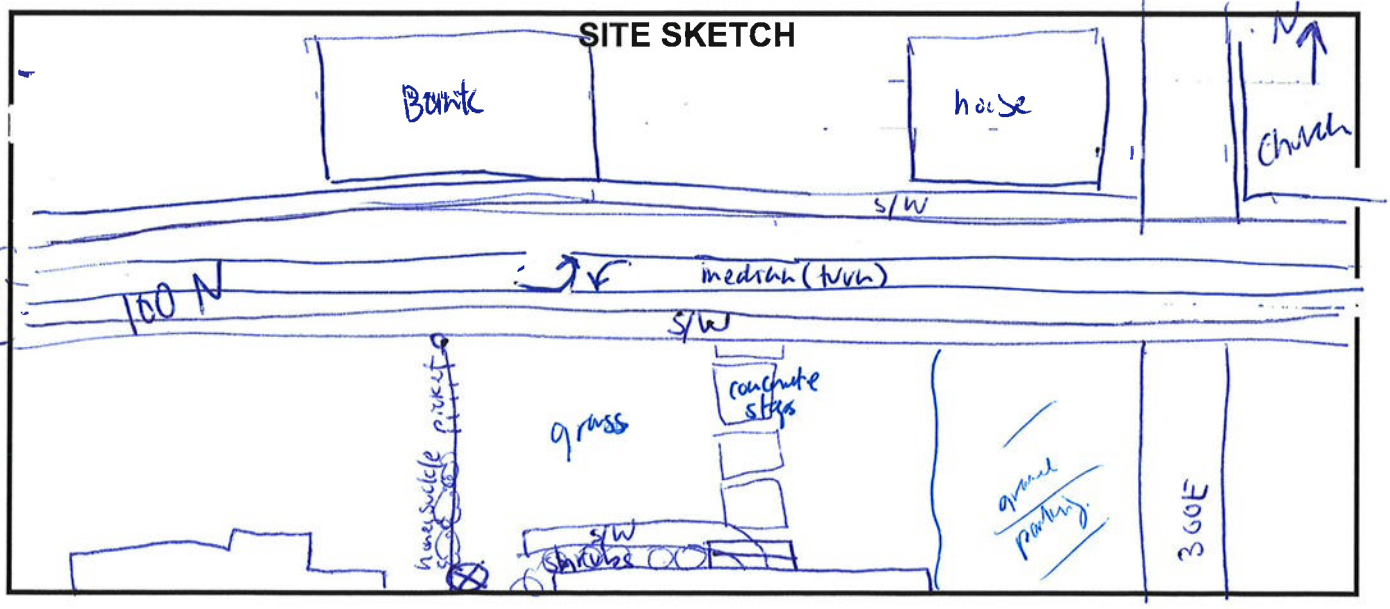
SITE NUMBER: H
PROJECT: 10263--Payson EIS
SITE DESCRIPTION: Either 280 or 240 E 100 N (south side, between 2nd and 3rd)
DATE: 6/1/16
START TIME: 3:52 pm
EVENT NUMBER: #7
END TIME: 4:12
TECHNICIAN: E. Albury
DURATION: 20:18
CALIBRATION: START – DB END – DB
WEATHER DATA: SKY CONDITION clear. TEMP 82°F
WIND: START 5 MPH END 0-3 MPH DIRECTION ~~E~~ E/NE
EQUIPMENT: METER Larson Davis 824 CALIBRATOR –
RESPONSE: FAST ____ SLOW ____ BATTERY CHECK –
RESULTS: Leq 63.7 Lmax 77.6

TRAFFIC DATA

ROAD			100 North			
	N	S	E	W		
TRAFFIC SPEED			35	35		
AUTOMOBILES			187	182		
MEDIUM TRUCKS			2	5		
HEAVY TRUCKS			2	5		

Includes Light Trucks
2-Axels, 6 Tires
3 or more Axels

SITE SKETCH

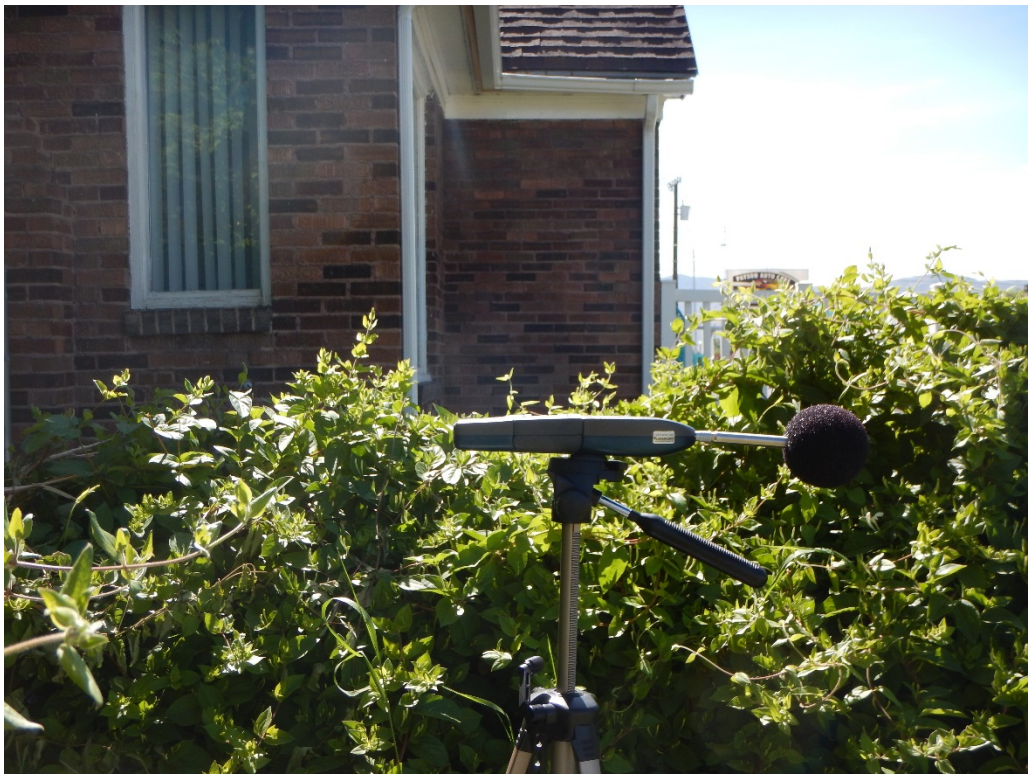


MAJOR SOURCES: 100 N
BACKGROUND NOISE:
UNUSUAL EVENTS: 6:57 trash cans banging, 2:02 ↳ this was actually a resident walking on his swamp cooler. We ended up talking to him while taping. Didn't note the time.
OTHER NOTES:

SITE H – LOOKING EAST

SITE H – LOOKING NORTH

SITE H – LOOKING SOUTH



SITE H – LOOKING WEST

Integrating Sound Level Meter Summary
Translated: 03-Jun-2016 11:53:24

File Translated: P:\7473 Payson\Noise\Field Measurements\Field Data\10263_PaysonEIS_SiteH_01Jun13i.slmdl
Model Number: 824
Serial Number: A1255
Firmware Rev: 4.290
Software Version: 3.120
Name: H.W. Lochner, Inc.
Descr1: 20 N. Wacker, Suite 1200
Descr2: Chicago, Illinois 60606
Setup: SLM.ism
Setup Descr: Simple Integrating SLM
Location: Payson_SiteH
Note 1:
Note 2:

Current Any Data
Start Time: 01-Jun-2016 19:00:21
Elapsed Time: 00:20:18.0

	A Weight	C Weight	Flat
Leq:	63.7 dBA	72.7 dBC	73.3 dBF
SEL:	94.6 dBA	103.6 dBC	104.2 dBF
Peak:	94.1 dBA	102.2 dBC	102.5 dBF
	01-Jun-2016 19:18:30	01-Jun-2016 19:10:12	01-Jun-2016 19:10:12
Lmax (slow):	77.6 dBA	94.1 dBC	94.5 dBF
	01-Jun-2016 19:10:12	01-Jun-2016 19:10:12	01-Jun-2016 19:10:12
Lmin (slow):	45.5 dBA	59.6 dBC	61.2 dBF
	01-Jun-2016 19:12:33	01-Jun-2016 19:02:28	01-Jun-2016 19:02:28
Lmax (fast):	79.2 dBA	96.2 dBC	96.5 dBF
	01-Jun-2016 19:10:11	01-Jun-2016 19:10:12	01-Jun-2016 19:10:12
Lmin (fast):	44.5 dBA	58.6 dBC	59.8 dBF
	01-Jun-2016 19:12:31	01-Jun-2016 19:02:26	01-Jun-2016 19:02:26
Lmax (impulse):	79.8 dBA	97.0 dBC	97.3 dBF
	01-Jun-2016 19:18:29	01-Jun-2016 19:10:12	01-Jun-2016 19:10:12
Lmin (impulse):	45.4 dBA	59.9 dBC	62.1 dBF
	01-Jun-2016 19:12:31	01-Jun-2016 19:02:28	01-Jun-2016 19:06:41

HWL							3 June 2016					
ECS							TNM 2.5					
							Calculated with TNM 2.5					
RESULTS: SOUND LEVELS												
PROJECT/CONTRACT:		Payson										
RUN:		Payson_SITE H										
BARRIER DESIGN:		INPUT HEIGHTS						Average pavement type shall be used unless				
								a State highway agency substantiates the use				
ATMOSPHERICS:		68 deg F, 50% RH						of a different type with approval of FHWA.				
Receiver												
Name	No.	#DUs	Existing	No Barrier					With Barrier			
			LAeq1h	LAeq1h		Increase over existing		Type	Calculated	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n	Impact	LAeq1h	Calculated	Goal	Calculated
							Sub'l Inc					minus
												Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
SITE H	1	1	0.0	63.9	66	63.9	10	----	63.9	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	1	0.0	0.0	0.0
All Impacted	0	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

H.W. LOCHNER, INC.	NOISE MEASUREMENT DATA SHEET

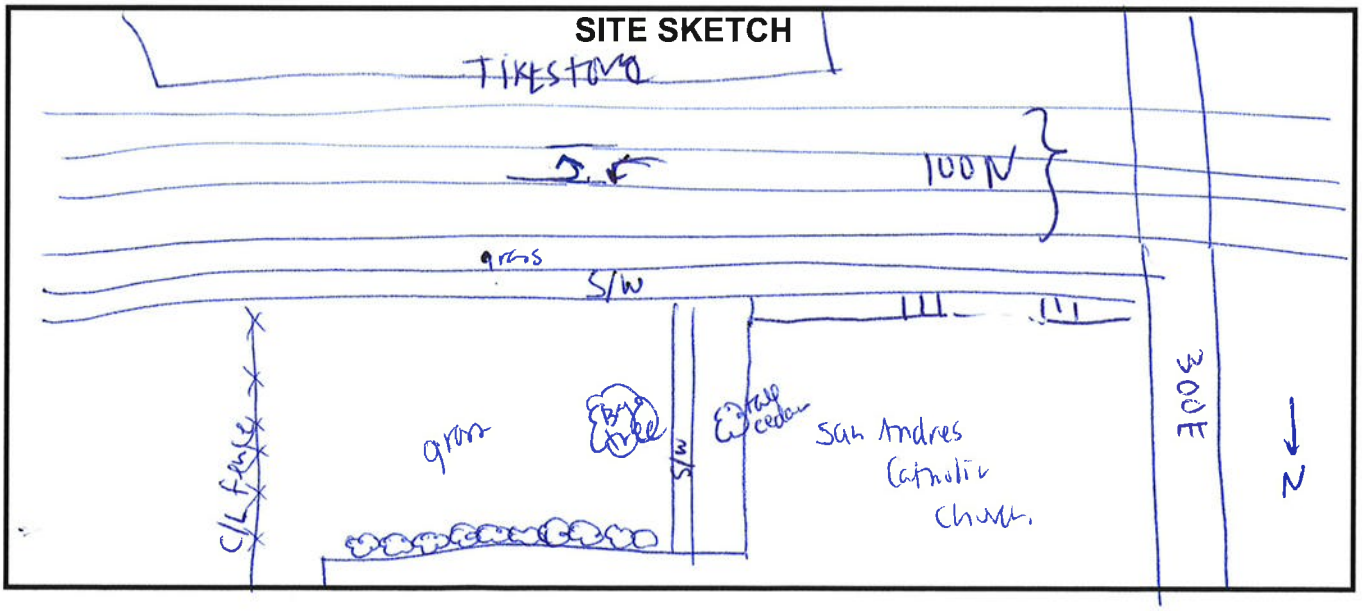
SITE NUMBER: I
PROJECT: 10263--Payson EIS
SITE DESCRIPTION: Catholic Church 315 East 100 North
DATE: 6/1/16
START TIME: 4:21
EVENT NUMBER: #8
END TIME: 4:41
TECHNICIAN: E. Albury
DURATION: 20:12
CALIBRATION: START — DB END — DB
WEATHER DATA: SKY CONDITION clear TEMP
WIND: START 0 MPH END 0 MPH DIRECTION NA
EQUIPMENT: METER Larson Davis 824 CALIBRATOR —
RESPONSE: FAST SLOW BATTERY CHECK
RESULTS: Leq 68.5 Lmax 77.2

TRAFFIC DATA

ROAD			100 North			
	N	S	E	W		
TRAFFIC SPEED			35.40			
AUTOMOBILES			166	245		
MEDIUM TRUCKS			5	4		
HEAVY TRUCKS			4	4		

Includes Light Trucks
2-Axels, 6 Tires
3 or more Axels

SITE SKETCH



MAJOR SOURCES: 100N traffic
BACKGROUND NOISE:
UNUSUAL EVENTS:
OTHER NOTES:

SITE I – LOOKING EAST

SITE I – LOOKING NORTH

SITE I - LOOKING SOUTH

SITE I – LOOKING WEST

Integrating Sound Level Meter Summary
Translated: 03-Jun-2016 11:53:33

File Translated: P:\7473 Payson\Noise\Field Measurements\Field Data\10263_PaysonEIS_SiteI_01Jun13i.slmdl
Model Number: 824
Serial Number: A1255
Firmware Rev: 4.290
Software Version: 3.120
Name: H.W. Lochner, Inc.
Descr1: 20 N. Wacker, Suite 1200
Descr2: Chicago, Illinois 60606
Setup: SLM.ism
Setup Descr: Simple Integrating SLM
Location: Payson_SiteI
Note 1:
Note 2:

Current Any Data
Start Time: 01-Jun-2016 19:29:54
Elapsed Time: 00:20:12.9

	A Weight	C Weight	Flat
Leq:	68.5 dBA	75.1 dBC	75.6 dBF
SEL:	99.3 dBA	105.9 dBC	106.4 dBF
Peak:	97.5 dBA	100.3 dBC	101.2 dBF
	01-Jun-2016 19:39:16	01-Jun-2016 19:45:31	01-Jun-2016 19:45:31
Lmax (slow):	77.2 dBA	89.8 dBC	90.5 dBF
	01-Jun-2016 19:45:14	01-Jun-2016 19:45:32	01-Jun-2016 19:45:32
Lmin (slow):	49.7 dBA	61.0 dBC	62.7 dBF
	01-Jun-2016 19:40:41	01-Jun-2016 19:40:41	01-Jun-2016 19:40:41
Lmax (fast):	81.5 dBA	93.5 dBC	93.6 dBF
	01-Jun-2016 19:39:16	01-Jun-2016 19:34:12	01-Jun-2016 19:34:12
Lmin (fast):	47.8 dBA	59.0 dBC	60.8 dBF
	01-Jun-2016 19:40:39	01-Jun-2016 19:40:39	01-Jun-2016 19:40:40
Lmax (impulse):	84.0 dBA	94.3 dBC	94.5 dBF
	01-Jun-2016 19:39:16	01-Jun-2016 19:34:12	01-Jun-2016 19:34:12
Lmin (impulse):	49.2 dBA	60.5 dBC	62.6 dBF
	01-Jun-2016 19:40:39	01-Jun-2016 19:40:39	01-Jun-2016 19:40:40

HWL							3 June 2016					
ECS							TNM 2.5					
							Calculated with TNM 2.5					
RESULTS: SOUND LEVELS												
PROJECT/CONTRACT:		Payson										
RUN:		Payson_SITE I										
BARRIER DESIGN:		INPUT HEIGHTS						Average pavement type shall be used unless				
								a State highway agency substantiates the use				
ATMOSPHERICS:		68 deg F, 50% RH						of a different type with approval of FHWA.				
Receiver												
Name	No.	#DUs	Existing	No Barrier					With Barrier			
			LAeq1h	LAeq1h		Increase over existing		Type	Calculated	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n	Impact	LAeq1h	Calculated	Goal	Calculated
							Sub'l Inc					minus
												Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
SITE I	1	1	0.0	66.6	66	66.6	10	Snd Lvl	66.6	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	1	0.0	0.0	0.0
All Impacted	1	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

H.W. LOCHNER, INC.	NOISE MEASUREMENT DATA SHEET

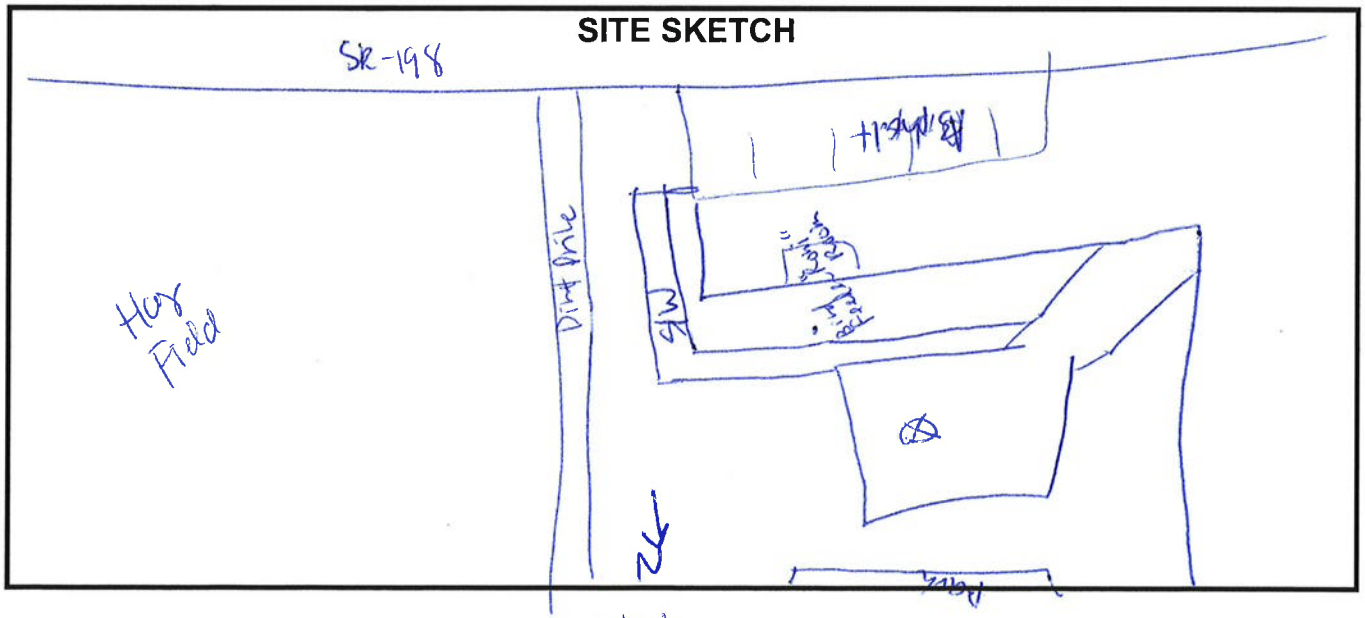
SITE NUMBER: J
PROJECT: 10263--Payson EIS
SITE DESCRIPTION: Medallion Supported Living 2192 W SR-198
DATE: 6/11/16
START TIME:
EVENT NUMBER: #9
END TIME: 5:17
TECHNICIAN: E. Albury
DURATION: 20:27
CALIBRATION: START – DB END – DB
WEATHER DATA: SKY CONDITION TEMP 81
WIND: START 0 MPH END 0 MPH DIRECTION n/a
EQUIPMENT: METER L.D. 824 CALIBRATOR
RESPONSE: FAST SLOW BATTERY CHECK
RESULTS: Leq 51.1 Lmax 62.0

TRAFFIC DATA

ROAD			SR-198			
	N	S	E	W		
TRAFFIC SPEED			50-55	50		
AUTOMOBILES			152	145		
MEDIUM TRUCKS			4	4		
HEAVY TRUCKS			6	2		

Includes Light Trucks
2-Axels, 6 Tires
3 or more Axels

SITE SKETCH



MAJOR SOURCES:
BACKGROUND NOISE: A/C unit (constant), birds chirping
UNUSUAL EVENTS:
OTHER NOTES:

SITE J – LOOKING EAST

SITE J – LOOKING NORTH

SITE J – LOOKING SOUTH

SITE J – LOOKING WEST

Integrating Sound Level Meter Summary
Translated: 03-Jun-2016 11:53:46

File Translated: P:\7473 Payson\Noise\Field Measurements\Field Data\10263_PaysonEIS_SiteJ_01Jun13i.slmdl
Model Number: 824
Serial Number: A1255
Firmware Rev: 4.290
Software Version: 3.120
Name: H.W. Lochner, Inc.
Descr1: 20 N. Wacker, Suite 1200
Descr2: Chicago, Illinois 60606
Setup: SLM.ism
Setup Descr: Simple Integrating SLM
Location: Payson_SiteJ
Note 1:
Note 2:

Current Any Data
Start Time: 01-Jun-2016 20:05:57
Elapsed Time: 00:20:27.9

	A Weight	C Weight	Flat
Leq:	51.1 dBA	62.7 dBC	64.7 dBF
SEL:	82.0 dBA	93.6 dBC	95.6 dBF
Peak:	75.2 dBA	87.8 dBC	88.0 dBF
	01-Jun-2016 20:06:10	01-Jun-2016 20:20:20	01-Jun-2016 20:20:20
Lmax (slow):	62.0 dBA	78.4 dBC	78.7 dBF
	01-Jun-2016 20:20:21	01-Jun-2016 20:20:21	01-Jun-2016 20:20:21
Lmin (slow):	41.6 dBA	56.7 dBC	58.2 dBF
	01-Jun-2016 20:14:23	01-Jun-2016 20:13:23	01-Jun-2016 20:13:23
Lmax (fast):	63.7 dBA	80.7 dBC	81.0 dBF
	01-Jun-2016 20:20:21	01-Jun-2016 20:20:21	01-Jun-2016 20:20:21
Lmin (fast):	41.2 dBA	54.9 dBC	56.9 dBF
	01-Jun-2016 20:14:20	01-Jun-2016 20:14:22	01-Jun-2016 20:11:45
Lmax (impulse):	64.3 dBA	81.3 dBC	81.6 dBF
	01-Jun-2016 20:20:21	01-Jun-2016 20:20:21	01-Jun-2016 20:20:21
Lmin (impulse):	41.5 dBA	57.3 dBC	58.8 dBF
	01-Jun-2016 20:14:23	01-Jun-2016 20:13:22	01-Jun-2016 20:13:22

HWL							3 June 2016					
ECS							TNM 2.5					
							Calculated with TNM 2.5					
RESULTS: SOUND LEVELS												
PROJECT/CONTRACT:		Payson										
RUN:		Payson_SITE J										
BARRIER DESIGN:		INPUT HEIGHTS						Average pavement type shall be used unless				
								a State highway agency substantiates the use				
ATMOSPHERICS:		68 deg F, 50% RH						of a different type with approval of FHWA.				
Receiver												
Name	No.	#DUs	Existing	No Barrier					With Barrier			
			LAeq1h	LAeq1h		Increase over existing		Type	Calculated	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n	Impact	LAeq1h	Calculated	Goal	Calculated
							Sub'l Inc					minus
												Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
SITE J	1	1	0.0	54.1	66	54.1	10	----	54.1	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	1	0.0	0.0	0.0
All Impacted	0	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

Appendix B: Traffic Used in the Noise Analysis

LOCHNER

Lochner
225 West Washington Street
12th Floor
Chicago, IL 60606

T 312.372.3011
F 312.372.5974

Memorandum

To: Project File (HWL #7473)

From: Erica Salutz

Subject: I-15 Payson Interchange

Traffic Data for Use in the Traffic Noise Study

Date: June 10, 2016

The I-15 Payson Interchange project includes the interchange of I-15 and Main Street in Payson, Main Street to 100 North (SR 198) and 100 North to the east. The existing year for traffic is 2014 and the design year for the project is 2040.

Traffic for the study area was provided in the *Payson EIS Transportation Report* (May 13, 2016) as well as supporting exhibits. That data did not include any truck percentages or traffic on I-15. The report and exhibits included peak-hour volumes for the morning and evening periods.

2014 AADT traffic data was collected for I-15 from the UDOT OpenData website. Truck volume data, including a breakdown between medium and heavy trucks, was also obtained from the OpenData site for I-15, Main Street, and 100 N.

Since peak-hour volumes were not provided for I-15, a 50/50 split was assumed and a 10% DHV volume was used to calculate a peak-hour volume. The ADT for 2014 is reported as 37,030 vehicles south of the interchange and 47,875 vehicles north of the interchange. Applying the 50/50 split and 10% DHV, the existing 2014 peak-hour volume south of the interchange is 1,852 vehicles and 2,394 vehicles north of the interchange.

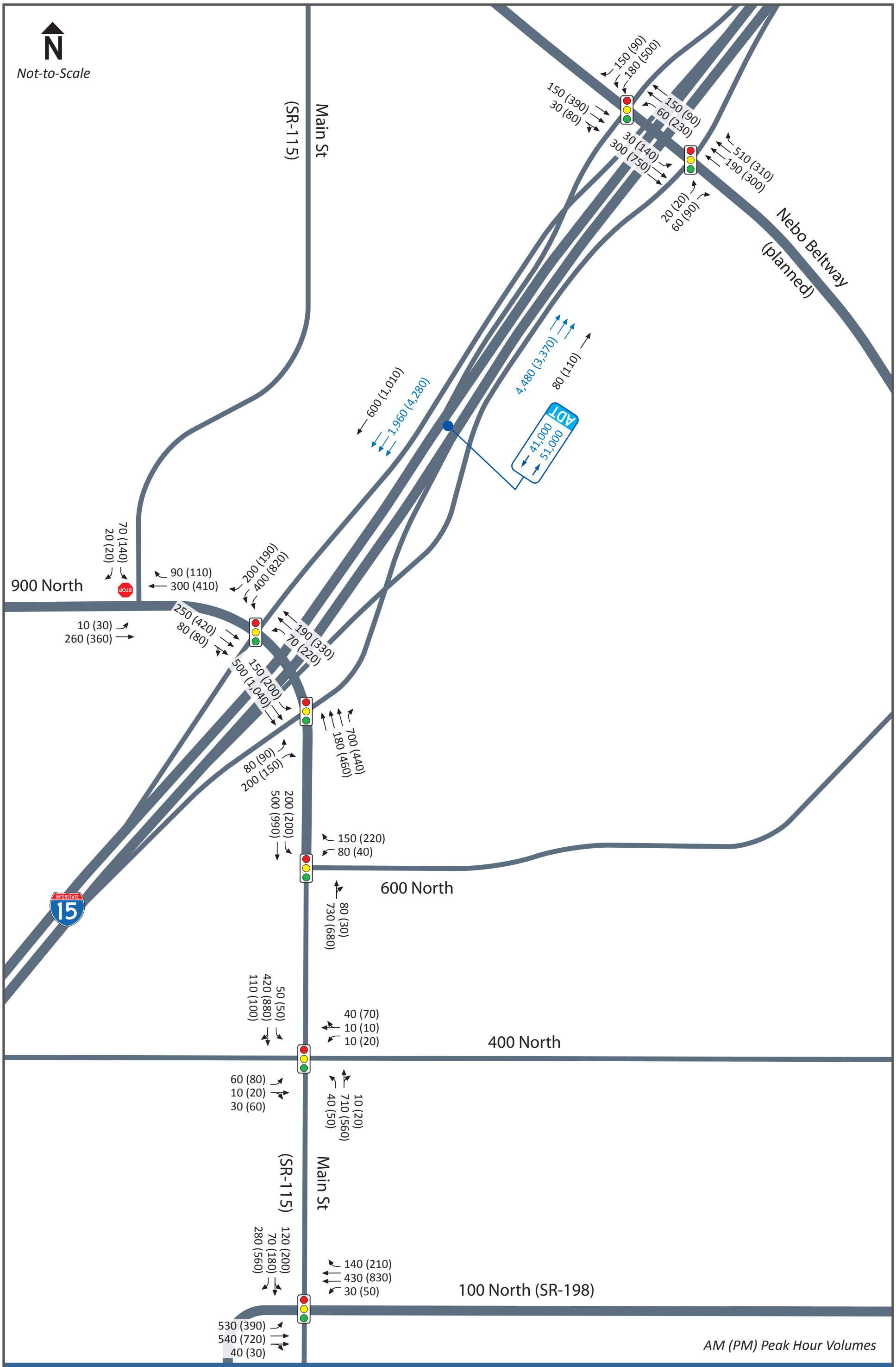
HCS was used to determine the LOS on I-15 for the existing condition. With 1,852 vehicles I-15 is predicted to operate at LOS A and with 2,394 vehicles I-15 is predicted to operate at LOS B. Since this volume is substantially below the LOS C volume, the existing volumes were used since they will yield a more conservative value for the noise impact analysis.

Using HCS, the volume at which I-15 will operate at LOS C was calculated as 4,400 vehicles per hour. Since the LOS C volume is approximately the same as the predicted 2040 volumes for the various build alternatives, the predicted volumes were used in the noise analysis.

For the side-street, the capacity study showed that the interchange and major side roads will generally operate at LOS C. Therefore, the DHV volumes predicted for each alternative were used in the noise analysis.

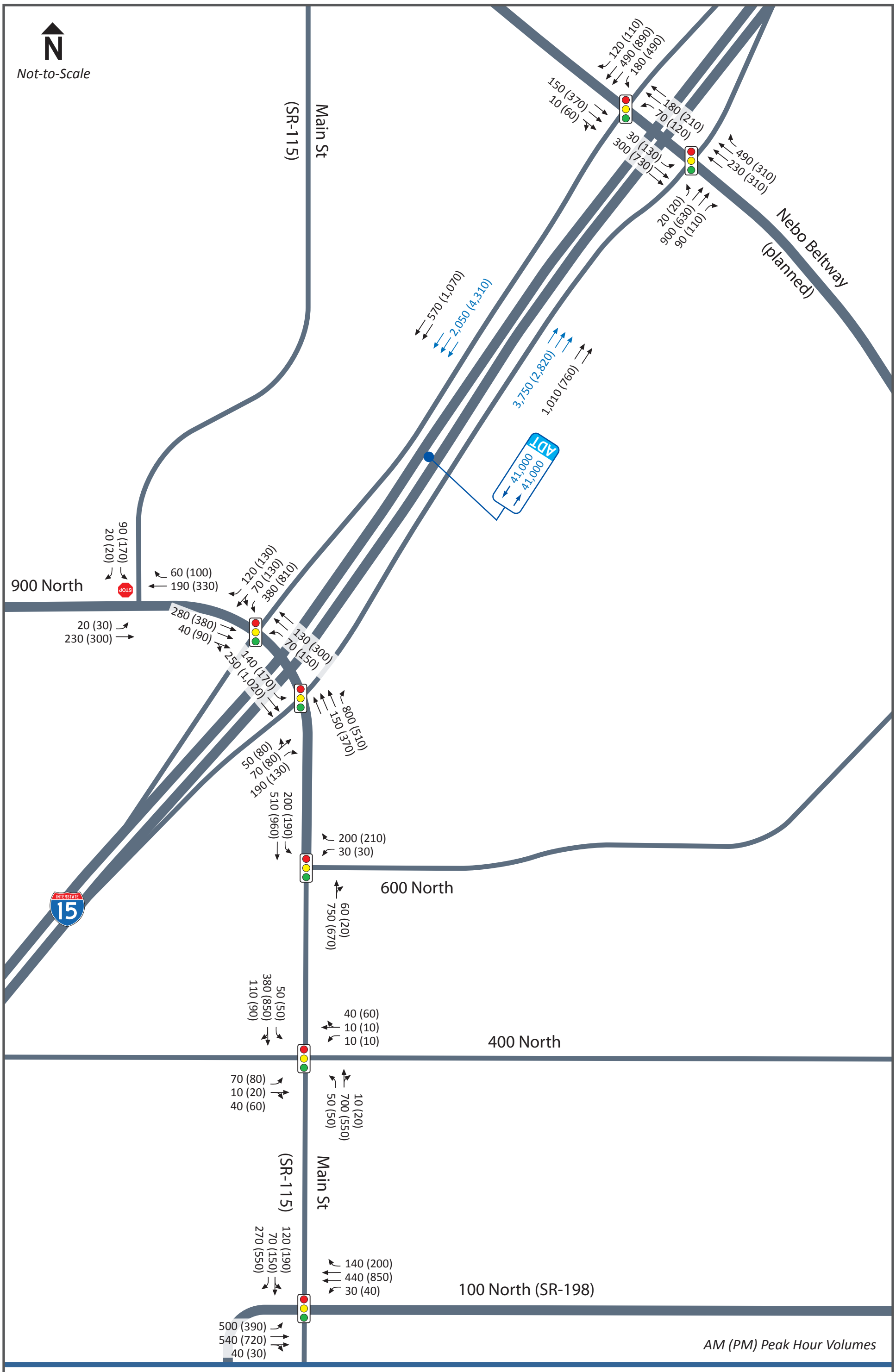
Operating speeds were based on posted limits. I-15 is posted and modelled at 75 mph. Main Street is posted and modelled at 45 mph north of I-15 and 30 mph south of I-15. 100 N is posted and modelled at 30 mph. 900 N is posted and modeled at 40 mph. All other roadways in the project area are modeled at 30 mph. Slip-ramps are modeled at 45 mph and loop ramps are modeled at 30 mph.

A spreadsheet is attached which shows how the traffic was calculated for use in the noise modelling.



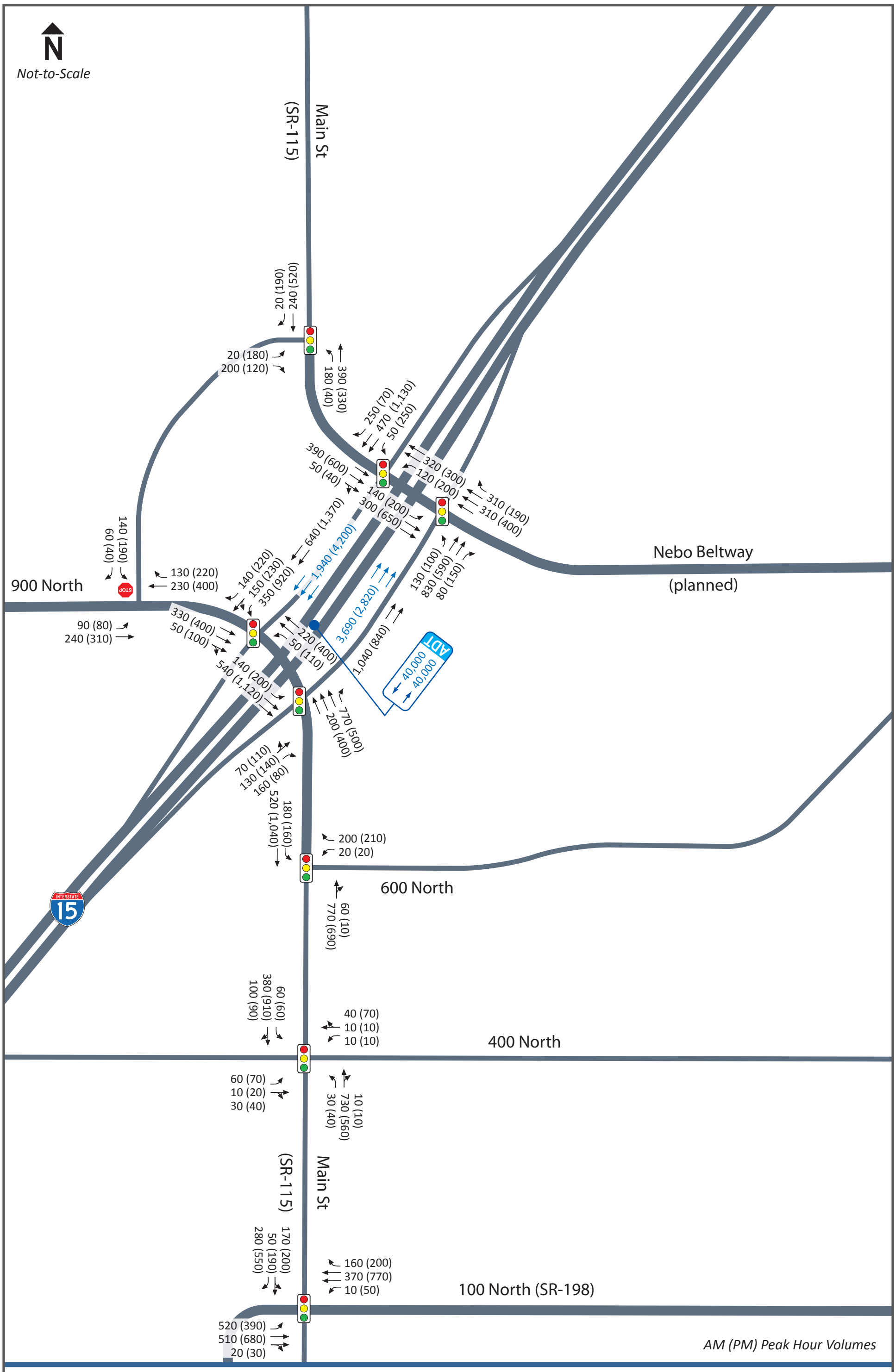
2040 Weekday Peak Hour Turning Movement Volumes
C1 Braided Ramps – I-15, Payson Main Street Interchange EIS

June 8, 2016



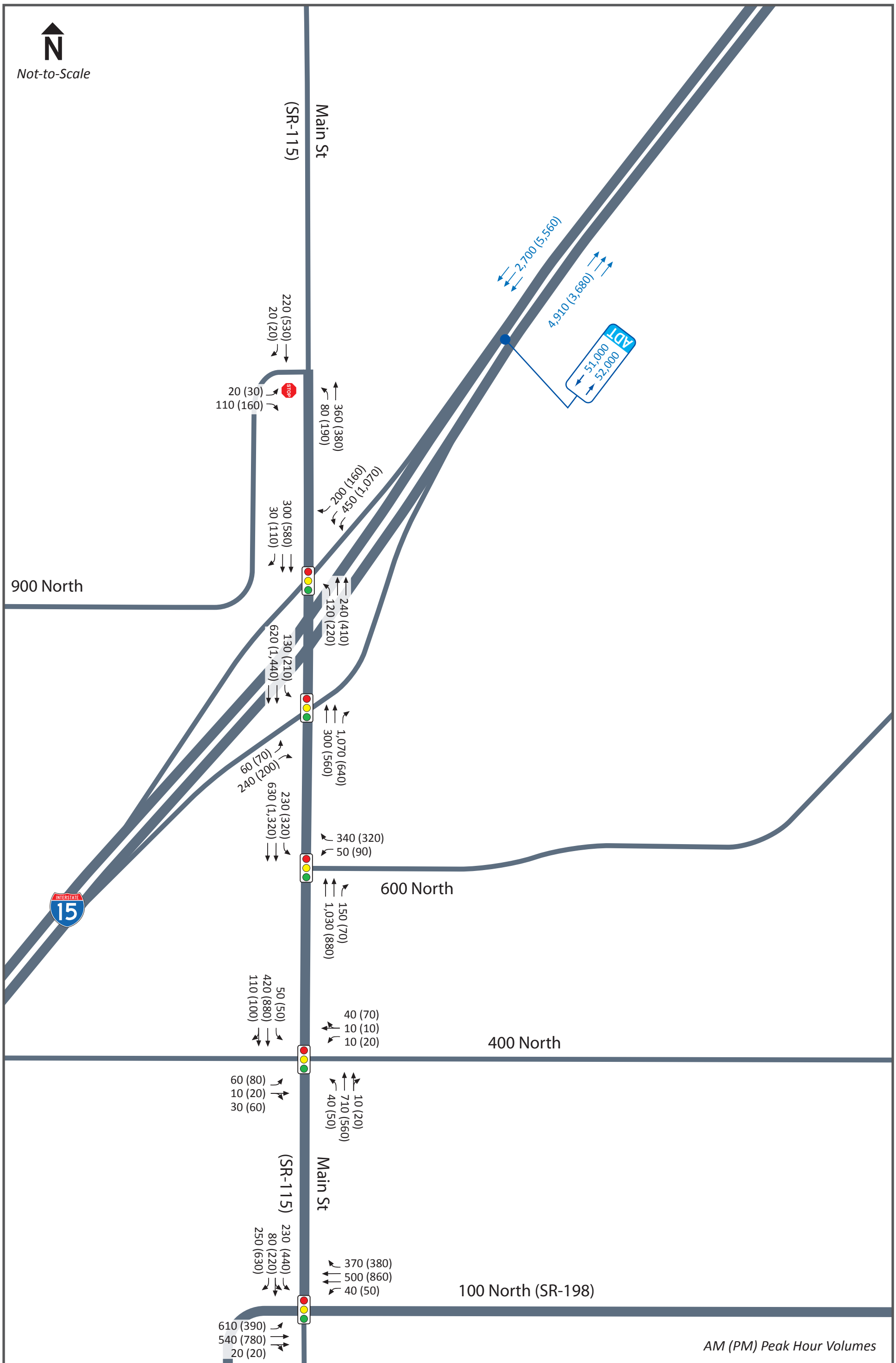
2040 Weekday Peak Hour Turning Movement Volumes
C3 Frontage Roads – I-15, Payson Main Street Interchange EIS

June 8, 2016



2040 Weekday Peak Hour Turning Movement Volumes
C4 Split Diamond – I-15, Payson Main Street Interchange EIS

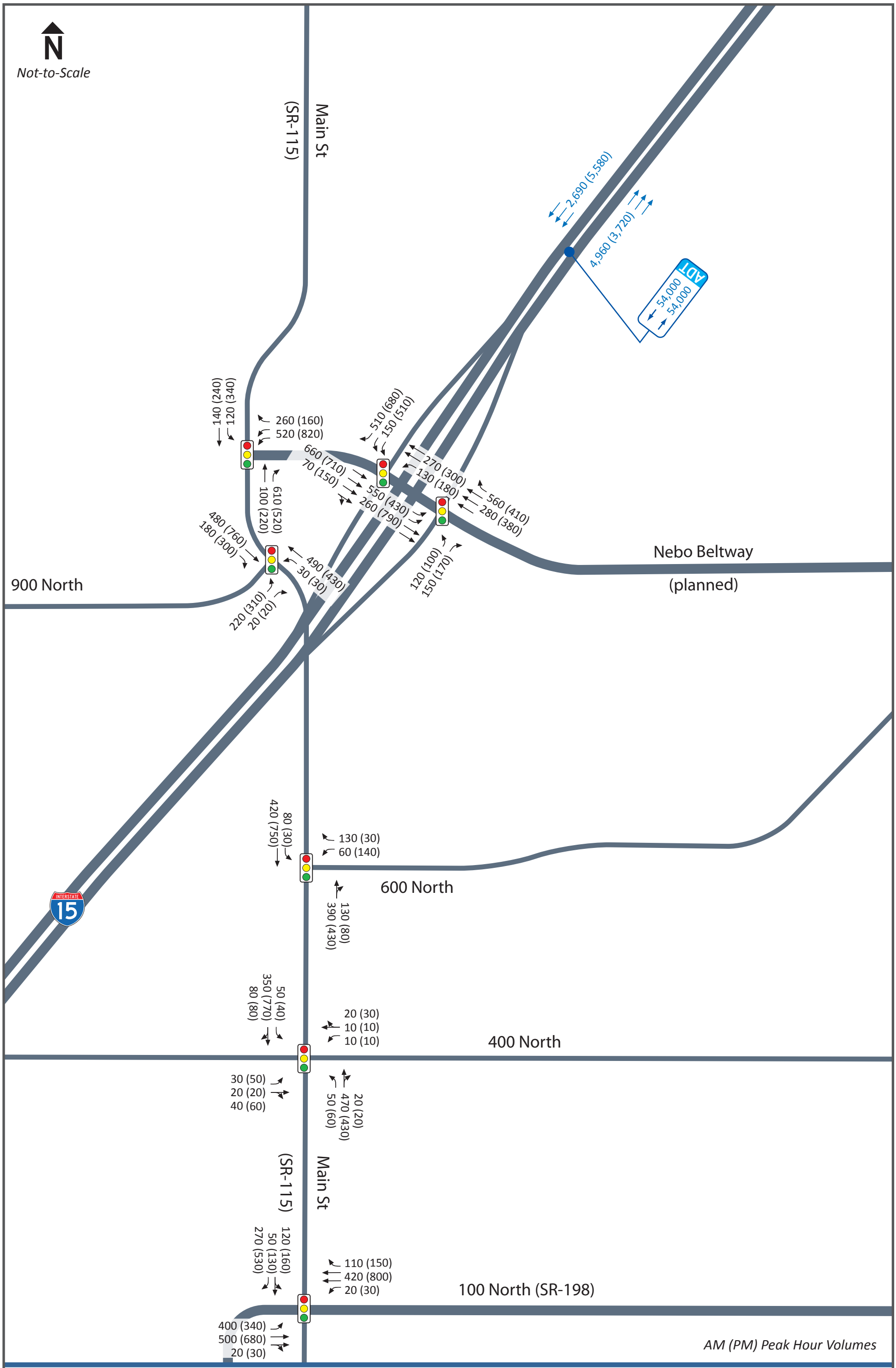
June 8, 2016



2040 Weekday Peak Hour Turning Movement Volumes

I1 Improve Existing – I-15, Payson Main Street Interchange EIS

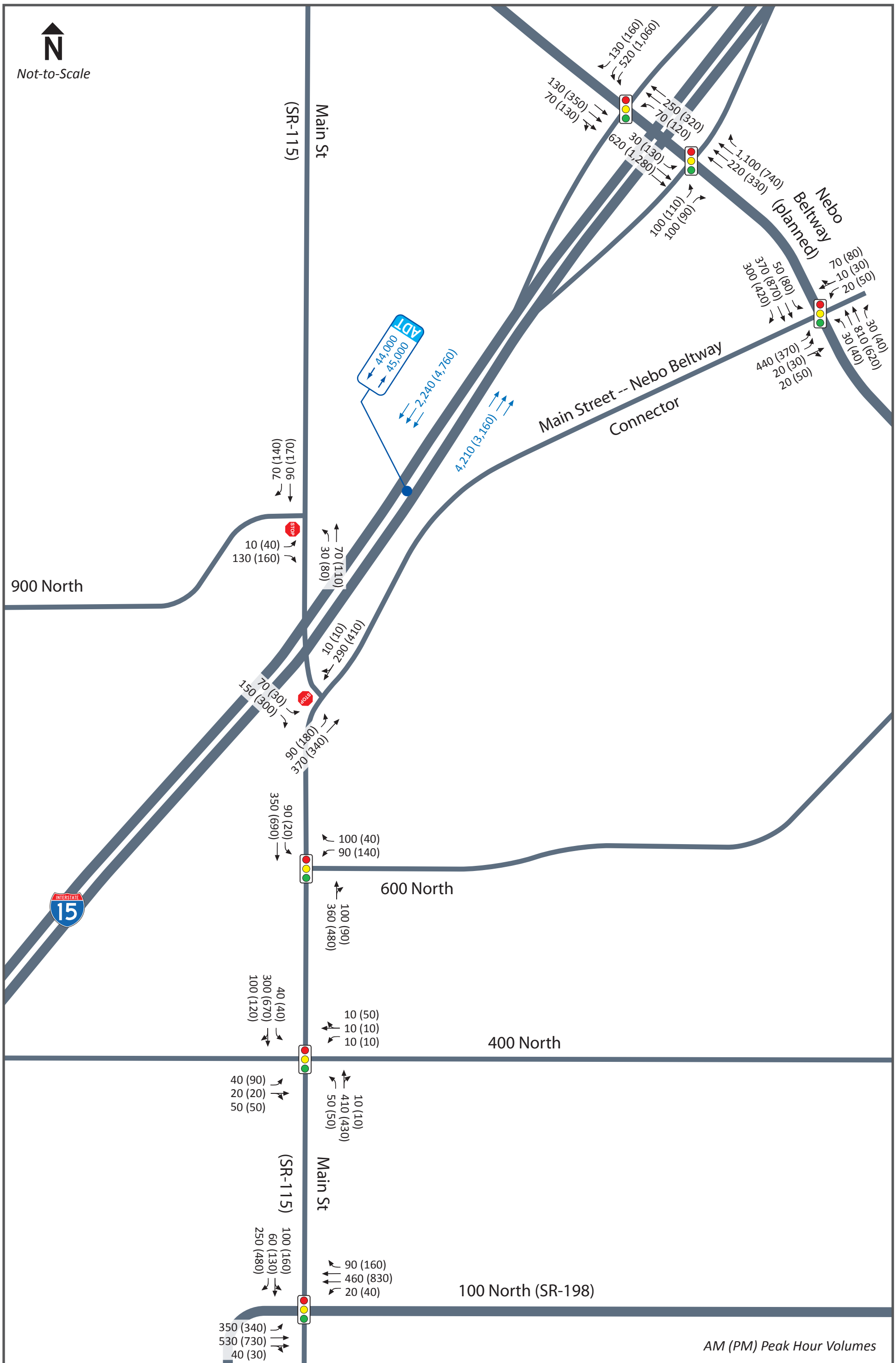
June 8, 2016



2040 Weekday Peak Hour Turning Movement Volumes

R1 Relocate Near – I-15, Payson Main Street Interchange EIS

December 13, 2016



2040 Weekday Peak Hour Turning Movement Volumes
R2 Relocate Far – I-15, Payson Main Street Interchange EIS

December 13, 2016

Payson Main Street Interchange EIS
Noise Study
Traffic for TNM
Existing (2014)

					For TNM		
Roadway Name	**Base DHV**	**MT%**	**HT%**	**Cars**	**MT**	**HT**	**Speed**
600N/700N_EB	94	4	2	88	4	2	30
600N/700N_WB	163	4	2	153	7	3	30
900N_EB	166	4	2	156	7	3	40
900N_WB	204	4	2	192	8	4	40
E 100 N_EB	615	13	7	492	80	43	30
E 100 N_WB	721	13	7	577	94	50	30
E 400N_EB	43	4	2	40	2	1	30
E 400N_WB	23	4	2	22	1	0	30
I-15_NB_Entrance	461	11	13	350	51	60	45
I-15_NB_Exit	95	11	13	73	10	12	45
I-15_NB_Ln 1 Inside Main Int.	586	13	13	434	76	76	75
I-15_NB_Ln 1 North of Main	798	14	12	590	112	96	75
I-15_NB_Ln 1 South of Main	617	13	13	457	80	80	75
I-15_NB_Ln 2 Inside Main Int.	586	13	13	434	76	76	75
I-15_NB_Ln 2 North of Main	798	14	12	590	112	96	75
I-15_NB_Ln 2 South of Main	617	13	13	457	80	80	75
I-15_NB_Ln 3 Inside Main Int.	586	13	13	434	76	76	75
I-15_NB_Ln 3 North of Main	798	14	12	590	112	96	75
I-15_NB_Ln 3 South of Main	617	13	13	457	80	80	75
I-15_SB_Entrance	144	11	13	109	16	19	45
I-15_SB_Exit	950	11	13	721	105	124	45
I-15_SB_Ln 1 Inside Main Int.	481	14	12	356	67	58	75
I-15_SB_Ln 1 North of Main	798	14	12	590	112	96	75
I-15_SB_Ln 1 South of Main	617	13	13	457	80	80	75
I-15_SB_Ln 2 Inside Main Int.	481	14	12	356	67	58	75
I-15_SB_Ln 2 North of Main	798	14	12	590	112	96	75
I-15_SB_Ln 2 South of Main	617	13	13	457	80	80	75
I-15_SB_Ln 3 Inside Main Int.	481	14	12	356	67	58	75
I-15_SB_Ln 3 North of Main	798	14	12	590	112	96	75
I-15_SB_Ln 3 South of Main	617	13	13	457	80	80	75
MainSt_NB_100 to 400	516	11	13	392	57	67	30
MainSt_NB_400 to 600	545	11	13	414	60	71	30
MainSt_NB_600 to I-15	606	11	13	460	67	79	30
MainSt_NB_I-15 to 900	294	11	13	224	32	38	30
MainSt_NB_Inside I-15 Int.	283	11	13	215	31	37	30
MainSt_NB_North of 900	112	11	13	85	12	15	45
MainSt_SB_400 to 100	798	11	13	606	88	104	30
MainSt_SB_600 to 400	936	11	13	711	103	122	30
MainSt_SB_600 to I-15	1033	11	13	785	114	134	30
MainSt_SB_900 to I-15	284	11	13	216	31	37	30

Payson Main Street Interchange EIS
Noise Study
Traffic for TNM
Existing (2014)

					For TNM		
Roadway Name	**Base DHV**	**MT%**	**HT%**	**Cars**	**MT**	**HT**	**Speed**
MainSt_SB_North of 900	140	11	13	107	15	18	45
MainSt_SB_Outside lane in I-15 Int.	1079	11	13	820	119	140	30
MainSt_SB_South of 100	211	4	2	199	8	4	30
S 100 W-NB	632	14	6	506	88	38	30
S 100 W-SB	821	14	6	657	115	49	30
W 400N_EB	78	4	2	73	3	2	30
W 400N_WB	94	4	2	88	4	2	30

Payson Main Street Interchange EIS
Noise Study
Traffic for TNM
C1 Braided Ramps (2040)

					For TNM		
Roadway Name	**Base DHV**	**MT%**	**HT%**	**Cars**	**MT**	**HT**	**Speed**
600N/700N_EB_E of NEBO	280	4	2	263	11	6	30
600N/700N_EB_Main to NEBO	280	4	2	263	11	6	30
600N/700N_WB_E of NEBO	230	4	2	216	9	5	30
600N/700N_WB_Main to NEBO	230	4	2	216	9	5	30
900N_NB	100	4	2	94	4	2	40
900N_SB	90	4	2	84	4	2	40
E 100 N_EB	660	13	7	528	86	46	30
E 100 N_WB	600	13	7	480	78	42	30
E 400N_EB	70	4	2	66	3	1	30
E 400N_WB	60	4	2	57	2	1	30
EB_900	270	4	2	254	11	5	40
I-15_NB_Enter from Main	850	11	13	645	94	111	45
I-15_NB_Enter from NEBO	540	11	13	411	59	70	45
I-15_NB_Exit to Main	280	11	13	213	31	36	45
I-15_NB_Exit to NEBO	80	11	13	61	9	10	45
I-15_NB_Main Enter to NEBO Enter_Ln 1	1493	13	13	1,105	194	194	75
I-15_NB_Main Enter to NEBO Enter_Ln 2	1493	13	13	1,105	194	194	75
I-15_NB_Main Enter to NEBO Enter_Ln 3	1493	13	13	1,105	194	194	75
I-15_NB_Main Exit to NEBO Exit_Ln 1	1237	13	13	915	161	161	75
I-15_NB_Main Exit to NEBO Exit_Ln 2	1237	13	13	915	161	161	75
I-15_NB_Main Exit to NEBO Exit_Ln 3	1237	13	13	915	161	161	75
I-15_NB_N of NEBO_Ln 1	1673	14	12	1,238	234	201	75
I-15_NB_N of NEBO_Ln 2	1673	14	12	1,238	234	201	75
I-15_NB_N of NEBO_Ln 3	1673	14	12	1,238	234	201	75
I-15_NB_NEBO Exit to Main Enter_Ln 1	1210	13	13	896	157	157	75
I-15_NB_NEBO Exit to Main Enter_Ln 2	1210	13	13	896	157	157	75
I-15_NB_NEBO Exit to Main Enter_Ln 3	1210	13	13	896	157	157	75
I-15_NB_S of Main_Ln 1	1330	13	13	984	173	173	75
I-15_NB_S of Main_Ln 2	1330	13	13	984	173	173	75
I-15_NB_S of Main_Ln 3	1330	13	13	984	173	173	75
I-15_SB_Enter from Main	150	11	13	113	17	20	45
I-15_SB_Enter from NEBO	90	11	13	68	10	12	45
I-15_SB_Exit to Main-1	600	11	13	456	66	78	45
I-15_SB_Exit to NEBO	330	11	13	251	36	43	45
I-15_SB_Main Exit to NEBO Enter_Ln 1	623	13	13	461	81	81	75
I-15_SB_Main Exit to NEBO Enter_Ln 2	623	13	13	461	81	81	75
I-15_SB_Main Exit to NEBO Enter_Ln 3	623	13	13	461	81	81	75
I-15_SB_N of NEBO_Ln 1	933	14	12	690	131	112	75
I-15_SB_N of NEBO_Ln 2	933	14	12	690	131	112	75
I-15_SB_N of NEBO_Ln 3	933	14	12	690	131	112	75

Payson Main Street Interchange EIS
Noise Study
Traffic for TNM
C1 Braided Ramps (2040)

					For TNM		
Roadway Name	**Base DHV**	**MT%**	**HT%**	**Cars**	**MT**	**HT**	**Speed**
I-15_SB_NEBO Enter to Main Enter_Ln 1	653	13	13	483	85	85	75
I-15_SB_NEBO Enter to Main Enter_Ln 2	653	13	13	483	85	85	75
I-15_SB_NEBO Enter to Main Enter_Ln 3	653	13	13	483	85	85	75
I-15_SB_NEBO Exit to Main Exit_Ln 1	823	13	13	609	107	107	75
I-15_SB_NEBO Exit to Main Exit_Ln 2	823	13	13	609	107	107	75
I-15_SB_NEBO Exit to Main Exit_Ln 3	823	13	13	609	107	107	75
I-15_SB_S of Main_Ln 1	703	13	13	521	91	91	75
I-15_SB_S of Main_Ln 2	703	13	13	521	91	91	75
I-15_SB_S of Main_Ln 3	703	13	13	521	91	91	75
Main_NB_600 to I-15_Ln1	440	11	13	335	48	57	30
Main_NB_600 to I-15_Ln2	440	11	13	335	48	57	30
Main_NB_I-15 Int_Ln1	130	11	13	99	14	17	30
Main_NB_I-15 Int_Ln2	130	11	13	99	14	17	30
Main_NB_I-15 to 900_Ln1	195	11	13	149	21	25	30
Main_NB_I-15 to 900_Ln2	195	11	13	149	21	25	30
Main_NB_N of NEBO	400	11	13	304	44	52	45
Main_SB_600 to I-15_Ln2	350	11	13	265	39	46	30
Main_SB_600 to I-15-Ln1	350	11	13	265	39	46	30
Main_SB_I-15 Int_Ln1	325	11	13	247	36	42	30
Main_SB_I-15 Int_Ln2	325	11	13	247	36	42	30
Main_SB_I-15 to 900_Ln1	165	11	13	126	18	21	30
Main_SB_I-15 to 900_Ln2	165	11	13	126	18	21	30
Main_SB_N of NEBO	270	11	13	205	30	35	45
MainSt_NB_100 to 400	760	11	13	577	84	99	30
MainSt_NB_400 to 600	810	11	13	616	89	105	30
MainSt_SB_400 to 100	470	11	13	357	52	61	30
MainSt_SB_600 to 400	580	11	13	441	64	75	30
MainSt_SB_South of 100	140	4	2	131	6	3	30
NEBO_NB_600 to 100_Ln 1	350	11	13	265	39	46	45
NEBO_NB_600 to 100_Ln 2	350	11	13	265	39	46	45
NEBO_NB_900 to Main_Ln 1	200	11	13	152	22	26	45
NEBO_NB_900 to Main_Ln 2	200	11	13	152	22	26	45
NEBO_NB_I-15 INT_Ln 1	105	11	13	79	12	14	45
NEBO_NB_I-15 INT_Ln 2	105	11	13	79	12	14	45
NEBO_NB_I-15 to 600_Ln 1	350	11	13	265	39	46	45
NEBO_NB_I-15 to 600_Ln 2	350	11	13	265	39	46	45
NEBO_NB_I-15 to 900_Ln 1	150	11	13	113	17	20	45
NEBO_NB_I-15 to 900_Ln 2	150	11	13	113	17	20	45
NEBO_SB_600 to 100_Ln 1	180	11	13	137	20	23	45
NEBO_SB_600 to 100_Ln2	180	11	13	137	20	23	45

Payson Main Street Interchange EIS
Noise Study
Traffic for TNM
C1 Braided Ramps (2040)

					For TNM		
Roadway Name	**Base DHV**	**MT%**	**HT%**	**Cars**	**MT**	**HT**	**Speed**
NEBO_SB_900 to Main_Ln 1	135	11	13	102	15	18	45
NEBO_SB_900 to Main_Ln 2	135	11	13	102	15	18	45
NEBO_SB_I-15 INT_Ln 1	165	11	13	126	18	21	45
NEBO_SB_I-15 INT_Ln 2	165	11	13	126	18	21	45
NEBO_SB_I-15 to 600_Ln 1	180	11	13	137	20	23	45
NEBO_SB_I-15 to 600_Ln2	180	11	13	137	20	23	45
NEBO_SB_I-15 to 900_Ln 1	90	11	13	68	10	12	45
NEBO_SB_I-15 to 900_Ln 2	90	11	13	68	10	12	45
S 100 W-NB	1110	14	6	888	155	67	30
S 100 W-SB	710	14	6	568	99	43	30
W 400N_EB	100	4	2	94	4	2	30
W 400N_WB	160	4	2	151	6	3	30
WB_900	320	4	2	301	13	6	40

Payson Main Street Interchange EIS
Noise Study
Traffic for TNM
C3 Frontage Roads (2040)

					For TNM		
Roadway Name	**Base DHV**	**MT%**	**HT%**	**Cars**	**MT**	**HT**	**Speed**
600N/700N_EB_E of NEBO	260	4	2	245	10	5	30
600N/700N_EB_Main to NEBO	260	4	2	245	10	5	30
600N/700N_WB_E of NEBO	230	4	2	216	9	5	30
600N/700N_WB_Main to NEBO	230	4	2	216	9	5	30
900N_EB	250	4	2	235	10	5	30
900N_NB	80	4	2	75	3	2	40
900N_SB	110	4	2	104	4	2	40
900N_WB	210	4	2	198	8	4	30
E 100 N_EB	660	13	7	528	86	46	30
E 100 N_WB	610	13	7	488	79	43	30
E 400N_EB	70	4	2	66	3	1	30
E 400N_WB	60	4	2	57	2	1	30
I-15_NB_Enter from NEBO	1420	11	13	1,079	156	185	45
I-15_NB_Exit to Main	310	11	13	236	34	40	45
I-15_NB_Frontage Rd_1	505	11	13	383	56	66	45
I-15_NB_Frontage Rd_2	505	11	13	383	56	66	45
I-15_NB_Main to NEBO_Ln 1	1250	13	13	924	163	163	75
I-15_NB_Main to NEBO_Ln 2	1250	13	13	924	163	163	75
I-15_NB_Main to NEBO_Ln 3	1250	13	13	924	163	163	75
I-15_NB_N of NEBO_Ln 1	1723	14	12	1,275	241	207	75
I-15_NB_N of NEBO_Ln 2	1723	14	12	1,275	241	207	75
I-15_NB_N of NEBO_Ln 3	1723	14	12	1,275	241	207	75
I-15_NB_S of Main_Ln 1	1353	13	13	1,001	176	176	75
I-15_NB_S of Main_Ln 2	1353	13	13	1,001	176	176	75
I-15_NB_S of Main_Ln 3	1353	13	13	1,001	176	176	75
I-15_SB_Enter from Main	180	11	13	137	20	23	45
I-15_SB_Exit to NEBO	790	11	13	600	87	103	45
I-15_SB_Frontage Rd_1	285	11	13	217	31	37	45
I-15_SB_Frontage Rd_2	285	11	13	217	31	37	45
I-15_SB_Main to NEBO_Ln 1	683	13	13	505	89	89	75
I-15_SB_Main to NEBO_Ln 2	683	13	13	505	89	89	75
I-15_SB_Main to NEBO_Ln 3	683	13	13	505	89	89	75
I-15_SB_N of NEBO_Ln 1	947	14	12	700	133	114	75
I-15_SB_N of NEBO_Ln 2	947	14	12	700	133	114	75
I-15_SB_N of NEBO_Ln 3	947	14	12	700	133	114	75
I-15_SB_S of Main_Ln 1	743	13	13	549	97	97	75
I-15_SB_S of Main_Ln 2	743	13	13	549	97	97	75
I-15_SB_S of Main_Ln 3	743	13	13	549	97	97	75
Main_NB_400 to 600	810	11	13	616	89	105	30
Main_NB_I-15 Int_Ln1	100	11	13	76	11	13	30

Payson Main Street Interchange EIS
Noise Study
Traffic for TNM
C3 Frontage Roads (2040)

					For TNM		
Roadway Name	**Base DHV**	**MT%**	**HT%**	**Cars**	**MT**	**HT**	**Speed**
Main_NB_I-15 Int_Ln2	100	11	13	76	11	13	30
Main_NB_I-15 to 600_Ln1	475	11	13	361	52	62	30
Main_NB_I-15 to 600_Ln2	475	11	13	361	52	62	30
Main_NB_I-15 to 900N_Ln1	125	11	13	95	14	16	30
Main_NB_I-15 to 900N_Ln2	125	11	13	95	14	16	30
Main_NB_N of NEBO	380	11	13	289	42	49	45
Main_SB_400 to 600	460	11	13	349	51	60	30
Main_SB_I-15 Int_Ln1	195	11	13	149	21	25	30
Main_SB_I-15 Int_Ln2	195	11	13	149	21	25	30
Main_SB_I-15 to 600_Ln1	355	11	13	270	39	46	30
Main_SB_I-15 to 600_Ln2	355	11	13	270	39	46	30
Main_SB_I-15 to 900N_L1	160	11	13	121	18	21	30
Main_SB_I-15 to 900N_L2	160	11	13	121	18	21	30
Main_SB_N of NEBO	270	11	13	205	30	35	45
MainSt_NB_100 to 400	810	11	13	616	89	105	30
MainSt_NB_S of 100N	170	4	2	160	7	3	30
MainSt_SB_400 to 100	460	11	13	349	51	60	30
MainSt_SB_S of 100N	140	4	2	131	6	3	30
NEBO_NB_600 to 100_Ln1	360	11	13	273	40	47	45
NEBO_NB_600 to 100_Ln2	360	11	13	273	40	47	45
NEBO_NB_900 to I-15_Ln1	150	11	13	113	17	20	45
NEBO_NB_900 to I-15_Ln2	150	11	13	113	17	20	45
NEBO_NB_I-15 to 600_Ln1	360	11	13	273	40	47	45
NEBO_NB_I-15 to 600_Ln2	360	11	13	273	40	47	45
NEBO_NB_N of 900_Ln1	190	11	13	144	21	25	45
NEBO_NB_N of 900_Ln2	190	11	13	144	21	25	45
NEBO_NB_Over 1-15_Ln1	125	11	13	95	14	16	45
NEBO_NB_Over 1-15_Ln2	125	11	13	95	14	16	45
NEBO_SB_600 to 100_Ln1	195	11	13	149	21	25	45
NEBO_SB_600 to 100_Ln2	195	11	13	149	21	25	45
NEBO_SB_900 to I-15_Ln1	80	11	13	61	9	10	45
NEBO_SB_900 to I-15_Ln2	80	11	13	61	9	10	45
NEBO_SB_I-15 to 600_Ln1	195	11	13	149	21	25	45
NEBO_SB_I-15 to 600_Ln2	195	11	13	149	21	25	45
NEBO_SB_N of 900_Ln1	135	11	13	102	15	18	45
NEBO_SB_N of 900_Ln2	135	11	13	102	15	18	45
NEBO_SB_Over 1-15_Ln1	165	11	13	126	18	21	45
NEBO_SB_Over 1-15_Ln2	165	11	13	126	18	21	45
S 100 W-NB	1080	14	6	864	151	65	30
S 100 W-SB	710	14	6	568	99	43	30

Payson Main Street Interchange EIS
Noise Study
Traffic for TNM
C3 Frontage Roads (2040)

					For TNM		
Roadway Name	**Base DHV**	**MT%**	**HT%**	**Cars**	**MT**	**HT**	**Speed**
W 400N_EB	120	4	2	113	5	2	30
W 400N_WB	170	4	2	160	7	3	30

Payson Main Street Interchange EIS
Noise Study
Traffic for TNM
C4 Split Diamond (2040)

					For TNM		
Roadway Name	**Base DHV**	**MT%**	**HT%**	**Cars**	**MT**	**HT**	**Speed**
600N/700N_EB_E of NEBO	240	4	2	225	10	5	30
600N/700N_EB_Main to NEBO	240	4	2	225	10	5	30
600N/700N_WB_E of NEBO	220	4	2	207	9	4	30
600N/700N_WB_Main to NEBO	220	4	2	207	9	4	30
900N_EB	330	4	2	310	13	7	40
900N_WB	290	4	2	272	12	6	40
E 100 N_EB	680	13	7	544	88	48	30
E 100 N_WB	540	13	7	432	70	38	30
E 400N_EB	80	4	2	75	3	2	30
E 400N_WB	60	4	2	57	2	1	30
I-15_NB_Enter from NEBO	1280	11	13	973	141	166	45
I-15_NB_Exit to Main	360	11	13	273	40	47	45
I-15_NB_Frontage Rd_1	520	11	13	395	57	68	45
I-15_NB_Frontage Rd_2	520	11	13	395	57	68	45
I-15_NB_Main to NEBO_Ln 1	1230	13	13	910	160	160	75
I-15_NB_Main to NEBO_Ln 2	1230	13	13	910	160	160	75
I-15_NB_Main to NEBO_Ln 3	1230	13	13	910	160	160	75
I-15_NB_N of NEBO_Ln 1	1657	14	12	1,226	232	199	75
I-15_NB_N of NEBO_Ln 2	1657	14	12	1,226	232	199	75
I-15_NB_N of NEBO_Ln 3	1657	14	12	1,226	232	199	75
I-15_NB_S of Main_Ln 1	1350	13	13	998	176	176	75
I-15_NB_S of Main_Ln 2	1350	13	13	998	176	176	75
I-15_NB_S of Main_Ln 3	1350	13	13	998	176	176	75
I-15_SB_Enter from Main	250	11	13	189	28	33	45
I-15_SB_Exit to NEBO	770	11	13	585	85	100	45
I-15_SB_Frontage Rd_1	320	11	13	243	35	42	45
I-15_SB_Frontage Rd_2	320	11	13	243	35	42	45
I-15_SB_Main to NEBO_Ln 1	647	13	13	479	84	84	75
I-15_SB_Main to NEBO_Ln 2	647	13	13	479	84	84	75
I-15_SB_Main to NEBO_Ln 3	647	13	13	479	84	84	75
I-15_SB_N of NEBO_Ln 1	903	14	12	669	126	108	75
I-15_SB_N of NEBO_Ln 2	903	14	12	669	126	108	75
I-15_SB_N of NEBO_Ln 3	903	14	12	669	126	108	75
I-15_SB_S of Main_Ln 1	730	13	13	540	95	95	75
I-15_SB_S of Main_Ln 2	730	13	13	540	95	95	75
I-15_SB_S of Main_Ln 3	730	13	13	540	95	95	75
Main_NB_400 to 600	830	11	13	631	91	108	30
Main_NB_900 to NEBO	220	11	13	167	24	29	40
Main_NB_I-15 Int_Ln1	135	11	13	102	15	18	30
Main_NB_I-15 Int_Ln2	135	11	13	102	15	18	30

Payson Main Street Interchange EIS
Noise Study
Traffic for TNM
C4 Split Diamond (2040)

					For TNM		
Roadway Name	**Base DHV**	**MT%**	**HT%**	**Cars**	**MT**	**HT**	**Speed**
Main_NB_I-15 to 600_Ln1	485	11	13	369	53	63	30
Main_NB_I-15 to 600_Ln2	485	11	13	369	53	63	30
Main_NB_I-15 to 900N_Ln1	180	11	13	137	20	23	30
Main_NB_I-15 to 900N_Ln2	180	11	13	137	20	23	30
Main_SB_400 to 600	540	11	13	411	59	70	30
Main_SB_900 to NEBO	200	11	13	152	22	26	40
Main_SB_I-15 Int_Ln1	340	11	13	259	37	44	30
Main_SB_I-15 Int_Ln2	340	11	13	259	37	44	30
Main_SB_I-15 to 600_Ln1	350	11	13	265	39	46	30
Main_SB_I-15 to 600_Ln2	350	11	13	265	39	46	30
Main_SB_I-15 to 900N_L1	190	11	13	144	21	25	30
Main_SB_I-15 to 900N_Ln2	190	11	13	144	21	25	30
MainSt_NB_100 to 400	770	11	13	585	85	100	30
MainSt_NB_N of NEBO	410	11	13	312	45	53	45
MainSt_NB_S of 100N	150	4	2	141	6	3	30
MainSt_SB_400 to 100	500	11	13	380	55	65	30
MainSt_SB_N of NEBO	260	11	13	197	29	34	45
MainSt_SB_S of 100N	80	4	2	75	3	2	30
NEBO_NB_100 to 600_Ln1	310	11	13	236	34	40	45
NEBO_NB_100 to 600_Ln2	310	11	13	236	34	40	45
NEBO_NB_I-15 Int_Ln1	220	11	13	167	24	29	45
NEBO_NB_I-15 Int_Ln2	220	11	13	167	24	29	45
NEBO_NB_I-15 to 600_Ln1	310	11	13	236	34	40	45
NEBO_NB_I-15 to 600_Ln2	310	11	13	236	34	40	45
NEBO_NB_Main to I-15_Ln1	285	11	13	217	31	37	45
NEBO_NB_Main to I-15_Ln2	285	11	13	217	31	37	45
NEBO_SB_100 to 600_Ln1	190	11	13	144	21	25	45
NEBO_SB_100 to 600_Ln2	190	11	13	144	21	25	45
NEBO_SB_I-15 Int_Ln1	220	11	13	167	24	29	45
NEBO_SB_I-15 Int_Ln2	220	11	13	167	24	29	45
NEBO_SB_I-15 to 600_Ln1	190	11	13	144	21	25	45
NEBO_SB_I-15 to 600_Ln2	190	11	13	144	21	25	45
NEBO_SB_Main to I-15_Ln1	220	11	13	167	24	29	45
NEBO_SB_Main to I-15_Ln2	220	11	13	167	24	29	45
S 100 W-NB	1050	14	6	840	147	63	30
S 100 W-SB	650	14	6	520	91	39	30
W 400N_EB	100	4	2	94	4	2	30
W 400N_WB	140	4	2	131	6	3	30

Payson Main Street Interchange EIS
Noise Study
Traffic for TNM
I1 Improve Existing (2040)

					For TNM		
Roadway Name	**Base DHV**	**MT%**	**HT%**	**Cars**	**MT**	**HT**	**Speed**
600N/700N_EB	380	4	2	357	15	8	30
600N/700N_WB	390	4	2	366	16	8	30
900N_EB	130	4	2	122	5	3	40
900N_WB	100	4	2	94	4	2	40
E 100 N_EB_E of 400E	770	13	7	616	100	54	30
E 100 N_EB_Main to 400_Ln1	385	13	7	308	50	27	30
E 100 N_EB_Main to 400_Ln2	385	13	7	308	50	27	30
E 100 N_WB_E of 300E	910	13	7	728	118	64	30
E 100 N_WB_Main to 300_Ln1	455	13	7	364	59	32	30
E 100 N_WB_Main to 300_Ln2	455	13	7	364	59	32	30
E 400N_EB	70	4	2	66	3	1	30
E 400N_WB	60	4	2	57	2	1	30
I-15_NB_Entrance	1200	11	13	912	132	156	45
I-15_NB_Exit	300	11	13	228	33	39	45
I-15_NB_Ln 1_Main Int	1237	13	13	915	161	161	75
I-15_NB_Ln 1_North of Main	1637	14	12	1,212	229	196	75
I-15_NB_Ln 1_South of Main	1337	13	13	989	174	174	75
I-15_NB_Ln 2_Main Int	1237	13	13	915	161	161	75
I-15_NB_Ln 2_North of Main	1637	14	12	1,212	229	196	75
I-15_NB_Ln 2_South of Main	1337	13	13	989	174	174	75
I-15_NB_Ln 3_Main Int	1237	13	13	915	161	161	75
I-15_NB_Ln 3_North of Main	1637	14	12	1,212	229	196	75
I-15_NB_Ln 3_South of Main	1337	13	13	989	174	174	75
I-15_SB_Enter from Main	150	11	13	113	17	20	45
I-15_SB_Exit to Main	650	11	13	493	72	85	45
I-15_SB_Ln 1_Main Int	683	13	13	505	89	89	75
I-15_SB_Ln 1_North of Main	900	14	12	666	126	108	75
I-15_SB_Ln 1_South of Main	733	13	13	543	95	95	75
I-15_SB_Ln 2_Main Int	683	13	13	505	89	89	75
I-15_SB_Ln 2_North of Main	900	14	12	666	126	108	75
I-15_SB_Ln 2_South of Main	733	13	13	543	95	95	75
I-15_SB_Ln 3_Main Int	683	13	13	505	89	89	75
I-15_SB_Ln 3_North of Main	900	14	12	666	126	108	75
I-15_SB_Ln 3_South of Main	733	13	13	543	95	95	75
MainSt_NB_100 to 400_Ln1	380	11	13	289	42	49	30
MainSt_NB_100 to 400_Ln2	380	11	13	289	42	49	30
MainSt_NB_400 to 600_Ln1	590	11	13	448	65	77	30
MainSt_NB_400 to 600_Ln2	590	11	13	448	65	77	30
MainSt_NB_600 to I-15_Ln1	685	11	13	521	75	89	30
MainSt_NB_600 to I-15_Ln2	685	11	13	521	75	89	30

Payson Main Street Interchange EIS
Noise Study
Traffic for TNM
I1 Improve Existing (2040)

					For TNM		
Roadway Name	**Base DHV**	**MT%**	**HT%**	**Cars**	**MT**	**HT**	**Speed**
MainSt_NB_I-15 int_Ln1	180	11	13	137	20	23	30
MainSt_NB_I-15 int_Ln2	180	11	13	137	20	23	30
MainSt_NB_I-15 to 900N_Ln1	220	11	13	167	24	29	30
MainSt_NB_I-15 to 900N_Ln2	220	11	13	167	24	29	30
MainSt_NB_N of 900N	440	11	13	335	48	57	45
MainSt_NB_N of Proposed	380	11	13	289	42	49	45
MainSt_NB_S of 100N	200	4	2	188	8	4	30
MainSt_SB_600 to 400_Ln 1	290	11	13	220	32	38	30
MainSt_SB_600 to 400_Ln 2	290	11	13	220	32	38	30
MainSt_SB_600to I-15_Ln 1	430	11	13	327	47	56	30
MainSt_SB_600to I-15_Ln 2	430	11	13	327	47	56	30
MainSt_SB_I-15 int_Ln1	375	11	13	285	41	49	30
MainSt_SB_I-15 int_Ln2	375	11	13	285	41	49	30
MainSt_SB_I-15 to 900N_Ln 1	165	11	13	126	18	21	30
MainSt_SB_I-15 to 900N_Ln 2	165	11	13	126	18	21	30
MainSt_SB_Ln 1_400 to 100	280	11	13	213	31	36	30
MainSt_SB_Ln 2_400 to 100	280	11	13	213	31	36	30
MainSt_SB_N of 900N_Ln 1	120	11	13	91	13	16	45
MainSt_SB_N of 900N_Ln 2	120	11	13	91	13	16	45
MainSt_SB_N of Proposed	240	11	13	183	26	31	45
MainSt_SB_S of 100N	140	4	2	131	6	3	30
S 100 W-NB_S of Utah	1170	13	7	936	152	82	30
S 100 W-SB_S of Utah	750	13	7	599	98	53	30
W 100 N_EB_Ln1	585	13	7	468	76	41	30
W 100 N_EB_Ln2	585	13	7	468	76	41	30
W 100 N_WB_Ln1	375	13	7	300	49	26	30
W 100 N_WB_Ln2	375	13	7	300	49	26	30
W 400N_EB	100	4	2	94	4	2	30
W 400N_WB	160	4	2	151	6	3	30

Payson Main Street Interchange EIS
Noise Study
Traffic for TNM
R1 Relocate Near (2040)

					For TNM		
Roadway Name	**Base DHV**	**MT%**	**HT%**	**Cars**	**MT**	**HT**	**Speed**
600N/700N_EB	210	4	2	198	8	4	30
600N/700N_WB	190	4	2	178	8	4	30
900N_EB	240	4	2	225	10	5	40
900N_WB	210	4	2	198	8	4	40
E 100 N_EB	620	13	7	496	81	43	30
E 100 N_WB	550	13	7	439	72	39	30
E 400N_EB	90	4	2	84	4	2	30
E 400N_WB	40	4	2	37	2	1	30
I-15_NB_Enter from Nebo	1110	11	13	844	122	144	45
I-15_NB_Exit to Nebo	270	11	13	205	30	35	45
I-15_NB_Inside Nebo Int_Ln 1	1283	11	13	975	141	167	75
I-15_NB_Inside Nebo Int_Ln 2	1283	11	13	975	141	167	75
I-15_NB_Inside Nebo Int_Ln 3	1283	11	13	975	141	167	75
I-15_NB_N of Nebo_Ln 1	1653	14	12	1,224	231	198	75
I-15_NB_N of Nebo_Ln 2	1653	14	12	1,224	231	198	75
I-15_NB_N of Nebo_Ln 3	1653	14	12	1,224	231	198	75
I-15_NB_S of Nebo_Ln1	1373	13	13	1,017	178	178	75
I-15_NB_S of Nebo_Ln2	1373	13	13	1,017	178	178	75
I-15_NB_S of Nebo_Ln3	1373	13	13	1,017	178	178	75
I-15_SB_Enter from Nebo	200	11	13	152	22	26	45
I-15_SB_Exit to Nebo	660	11	13	501	73	86	45
I-15_SB_Inside Nebo Int_Ln 1	677	11	13	515	74	88	75
I-15_SB_Inside Nebo Int_Ln 2	677	11	13	515	74	88	75
I-15_SB_Inside Nebo Int_Ln 3	677	11	13	515	74	88	75
I-15_SB_N of Nebo_Ln1	897	14	12	663	126	108	75
I-15_SB_N of Nebo_Ln2	897	14	12	663	126	108	75
I-15_SB_N of Nebo_Ln3	897	14	12	663	126	108	75
I-15_SB_S of Nebo_Ln 1	743	13	13	549	97	97	75
I-15_SB_S of Nebo_Ln 2	743	13	13	549	97	97	75
I-15_SB_S of Nebo_Ln 3	743	13	13	549	97	97	75
MainSt_NB_100 to 400	540	11	13	411	59	70	30
MainSt_NB_400 to 600	520	11	13	395	57	68	30
MainSt_NB_600 to I-15	520	11	13	395	57	68	30
MainSt_SB_400 to 100	440	11	13	335	48	57	30
MainSt_SB_600 to 400	480	11	13	365	53	62	30
MainSt_SB_600 to I-15	500	11	13	380	55	65	30
MainSt_SB_South of 100	90	4	2	84	4	2	30
S 100 W-NB	920	14	6	736	129	55	30
S 100 W-SB	690	14	6	552	97	41	30
W 400N_EB	90	4	2	84	4	2	30

Payson Main Street Interchange EIS
Noise Study
Traffic for TNM
R1 Relocate Near (2040)

					For TNM		
Roadway Name	**Base DHV**	**MT%**	**HT%**	**Cars**	**MT**	**HT**	**Speed**
W 400N_WB	140	4	2	131	6	3	30
600N/700N_EB_at Nebo	210	4	2	198	8	4	30
600N/700N_WB_at Nebo	190	4	2	178	8	4	30
700N_EB_at Nebo	210	4	2	198	8	4	30
700N_WB_at Nebo	190	4	2	178	8	4	30
MainSt_NB_900N to Nebo	710	11	13	540	78	92	45
MainSt_NB_I-15 to 900N	520	11	13	395	57	68	30
MainSt_NB_N of Nebo	360	11	13	273	40	47	45
MainSt_SB_900N to Nebo	660	11	13	501	73	86	45
MainSt_SB_I-15 to 900N	500	11	13	380	55	65	30
MainSt_SB_N of Nebo	260	11	13	197	29	34	45
NEBO_NB_600N to I-15_Ln1	420	11	13	319	46	55	45
NEBO_NB_600N to I-15_Ln2	420	11	13	319	46	55	45
NEBO_NB_600N to North_Ln1	420	11	13	319	46	55	45
NEBO_NB_600N to North_Ln2	420	11	13	319	46	55	45
NEBO_NB_at I-15_Ln1	200	11	13	152	22	26	45
NEBO_NB_at I-15_Ln2	200	11	13	152	22	26	45
NEBO_NB_I-15 to MainSt_Ln1	390	11	13	296	43	51	45
NEBO_NB_I-15 to MainSt_Ln2	390	11	13	296	43	51	45
NEBO_SB_600N to I-15_Ln1	205	11	13	155	23	27	45
NEBO_SB_600N to I-15_Ln2	205	11	13	155	23	27	45
NEBO_SB_600N to North_Ln1	205	11	13	155	23	27	45
NEBO_SB_600N to North_Ln2	205	11	13	155	23	27	45
NEBO_SB_at I-15_Ln1	405	11	13	307	45	53	45
NEBO_SB_at I-15_Ln2	405	11	13	307	45	53	45
NEBO_SB_MainSt to I-15_Ln1	365	11	13	278	40	47	45
NEBO_SB_MainSt to I-15_Ln2	365	11	13	278	40	47	45

Payson Main Street Interchange EIS
Noise Study
Traffic for TNM
R2 Relocate Far (2040)

					For TNM		
Roadway Name	**Base DHV**	**MT%**	**HT%**	**Cars**	**MT**	**HT**	**Speed**
600N/700N_EB_E of NEBO	190	4	2	178	8	4	30
600N/700N_EB_Main to NEBO	190	4	2	178	8	4	30
600N/700N_WB_E of NEBO	190	4	2	178	8	4	30
600N/700N_WB_Main to NEBO	190	4	2	178	8	4	30
E 400N_EB	30	4	2	28	1	1	30
E 400N_WB	70	4	2	66	3	1	30
I-15_NB_Enter from NEBO	1130	11	13	859	124	147	45
Main_NB_400 to 600	460	11	13	349	51	60	30
Main_SB_400 to 600	440	11	13	335	48	57	30
NEBO_NB_600 to 100_Ln1	435	11	13	330	48	57	45
NEBO_NB_600 to 100_Ln2	435	11	13	330	48	57	45
NEBO_NB_I-15 to 600_Ln1-2	660	11	13	501	73	86	45
NEBO_NB_I-15 to 600_Ln2-2	660	11	13	501	73	86	45
NEBO_NB_Over 1-15_Ln1	160	11	13	121	18	21	45
NEBO_NB_Over 1-15_Ln2	160	11	13	121	18	21	45
NEBO_SB_600 to 100_Ln1	205	11	13	155	23	27	45
NEBO_SB_600 to 100_Ln2	205	11	13	155	23	27	45
NEBO_SB_I-15 to 600_Ln1	360	11	13	273	40	47	45
NEBO_SB_I-15 to 600_Ln2	360	11	13	273	40	47	45
NEBO_SB_Over 1-15_Ln1	325	11	13	247	36	42	45
NEBO_SB_Over 1-15_Ln2	325	11	13	247	36	42	45
W 400N_EB	110	4	2	104	4	2	30
W 400N_WB	160	4	2	151	6	3	30
900N_EB_1	140	11	13	107	15	18	30
900N_EB_2	140	11	13	107	15	18	30
900N_EB_3	140	11	13	107	15	18	30
900N_WB_1	100	11	13	76	11	13	30
900N_WB_2	100	11	13	76	11	13	30
900N_WB_3	100	11	13	76	11	13	30
I-15_NB_at NEBO_Ln1	1337	13	13	989	174	174	75
I-15_NB_at NEBO_Ln2	1337	13	13	989	174	174	75
I-15_NB_at NEBO_Ln3	1337	13	13	989	174	174	75
I-15_NB_Exit to NEBO	200	11	13	152	22	26	45
I-15_NB_North of NEBO_Ln1	1713	14	12	1,267	240	206	75
I-15_NB_North of NEBO_Ln2	1713	14	12	1,267	240	206	75
I-15_NB_North of NEBO_Ln3	1713	14	12	1,267	240	206	75
I-15_NB_South of NEBO_Ln1	1403	13	13	1,039	182	182	75
I-15_NB_South of NEBO_Ln2	1403	13	13	1,039	182	182	75
I-15_NB_South of NEBO_Ln3	1403	13	13	1,039	182	182	75
I-15_SB_at NEBO_Ln1	700	13	13	518	91	91	75

Payson Main Street Interchange EIS
Noise Study
Traffic for TNM
R2 Relocate Far (2040)

					For TNM		
Roadway Name	**Base DHV**	**MT%**	**HT%**	**Cars**	**MT**	**HT**	**Speed**
I-15_SB_at NEBO_Ln2	700	13	13	518	91	91	75
I-15_SB_at NEBO_Ln3	700	13	13	518	91	91	75
I-15_SB_Enter from NEBO	140	11	13	107	15	18	45
I-15_SB_Exit to NEBO	650	11	13	493	72	85	45
I-15_SB_North of NEBO_Ln1	917	14	12	679	128	110	75
I-15_SB_North of NEBO_Ln2	917	14	12	679	128	110	75
I-15_SB_North of NEBO_Ln3	917	14	12	679	128	110	75
I-15_SB_South of NEBO_Ln1	747	13	13	553	97	97	75
I-15_SB_South of NEBO_Ln2	747	13	13	553	97	97	75
I-15_SB_South of NEBO_Ln3	747	13	13	553	97	97	75
Main_NB_600N to NEBO Connector	460	11	13	349	51	60	30
Main_NB_NEBO Connector to 900N_1	100	11	13	76	11	13	30
Main_NB_NEBO Connector to 900N_2	100	11	13	76	11	13	30
Main_NB_NEBO Connector to NEBO	480	11	13	365	53	62	40
Main_NB_North of 900N_1	80	11	13	61	9	10	30
Main_NB_North of 900N_2	80	11	13	61	9	10	30
Main_SB_600N to NEBO Connector	440	11	13	335	48	57	30
Main_SB_NEBO Connector to 900N_1	220	11	13	167	24	29	30
Main_SB_NEBO Connector to 900N_2	220	11	13	167	24	29	30
Main_SB_NEBO Connector to NEBO	300	11	13	228	33	39	40
Main_SB_North of 900N_1	160	11	13	121	18	21	30
Main_SB_North of 900N_2	160	11	13	121	18	21	30
NEBO_NB_I-15 to 600_Ln1	435	11	13	330	48	57	45
NEBO_NB_I-15 to 600_Ln2	435	11	13	330	48	57	45
NEBO_NB_I-15 to Main_Ln1	190	11	13	144	21	25	45
NEBO_NB_I-15 to Main_Ln2	190	11	13	144	21	25	45
NEBO_NB_North of Main_1	380	11	13	289	42	49	45
NEBO_NB_North of Main_Ln1	190	11	13	144	21	25	45
NEBO_NB_North of Main_Ln2	190	11	13	144	21	25	45
NEBO_SB_I-15 to 600_Ln1-2	205	11	13	155	23	27	45
NEBO_SB_I-15 to 600_Ln2-2	205	11	13	155	23	27	45
NEBO_SB_I-15 to Main_Ln1	100	11	13	76	11	13	45
NEBO_SB_I-15 to Main_Ln2	100	11	13	76	11	13	45
NEBO_SB_North of Main_1	200	11	13	152	22	26	45
NEBO_SB_North of Main_Ln1	100	11	13	76	11	13	45
NEBO_SB_North of Main_Ln2	100	11	13	76	11	13	45

Appendix C: Traffic Noise Model Results

HWL 16 February 2017
JPW TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: Payson
RUN: Payson_Existing
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
R001	1	1	0.0	61.0	66	61.0	10	----	61.0	0.0	8	-8.0
R002	2	1	0.0	58.8	66	58.8	10	----	58.8	0.0	8	-8.0
R003	3	1	0.0	61.2	66	61.2	10	----	61.2	0.0	8	-8.0
R004	4	1	0.0	63.3	66	63.3	10	----	63.3	0.0	8	-8.0
R005	5	1	0.0	64.5	66	64.5	10	----	64.5	0.0	8	-8.0
R006	6	1	0.0	65.6	66	65.6	10	----	65.6	0.0	8	-8.0
R007	7	1	0.0	67.0	66	67.0	10	Snd Lvl	67.0	0.0	8	-8.0
R008	8	1	0.0	62.8	66	62.8	10	----	62.8	0.0	8	-8.0
R009	9	1	0.0	63.0	66	63.0	10	----	63.0	0.0	8	-8.0
R010	10	1	0.0	64.5	66	64.5	10	----	64.5	0.0	8	-8.0
R011	11	1	0.0	59.6	66	59.6	10	----	59.6	0.0	8	-8.0
R012	12	1	0.0	66.1	66	66.1	10	Snd Lvl	66.1	0.0	8	-8.0
R013	13	1	0.0	65.9	66	65.9	10	----	65.9	0.0	8	-8.0
R014	14	1	0.0	64.2	66	64.2	10	----	64.2	0.0	8	-8.0
R015	15	1	0.0	62.7	66	62.7	10	----	62.7	0.0	8	-8.0
R016	16	1	0.0	65.0	66	65.0	10	----	65.0	0.0	8	-8.0
R017	17	1	0.0	65.5	66	65.5	10	----	65.5	0.0	8	-8.0
R018	18	1	0.0	63.9	66	63.9	10	----	63.9	0.0	8	-8.0
R019	19	1	0.0	62.8	66	62.8	10	----	62.8	0.0	8	-8.0
R020	20	1	0.0	63.7	66	63.7	10	----	63.7	0.0	8	-8.0
R021	21	1	0.0	64.9	66	64.9	10	----	64.9	0.0	8	-8.0
R022	22	1	0.0	64.2	66	64.2	10	----	64.2	0.0	8	-8.0
R023	23	1	0.0	64.8	66	64.8	10	----	64.8	0.0	8	-8.0
R024	24	1	0.0	65.1	66	65.1	10	----	65.1	0.0	8	-8.0

R025	25	1	0.0	66.1	66	66.1	10	Snd Lvl	66.1	0.0	8	-8.0
R026	26	1	0.0	62.7	66	62.7	10	----	62.7	0.0	8	-8.0
R027	27	1	0.0	62.0	66	62.0	10	----	62.0	0.0	8	-8.0
R028	28	1	0.0	61.3	66	61.3	10	----	61.3	0.0	8	-8.0
R029	29	1	0.0	60.9	66	60.9	10	----	60.9	0.0	8	-8.0
R030	30	1	0.0	60.1	66	60.1	10	----	60.1	0.0	8	-8.0
R031	31	1	0.0	61.0	66	61.0	10	----	61.0	0.0	8	-8.0
R032	32	1	0.0	61.0	66	61.0	10	----	61.0	0.0	8	-8.0
R033	33	1	0.0	61.7	66	61.7	10	----	61.7	0.0	8	-8.0
R034	34	1	0.0	60.4	66	60.4	10	----	60.4	0.0	8	-8.0
R035	35	1	0.0	62.6	66	62.6	10	----	62.6	0.0	8	-8.0
R036	36	1	0.0	60.1	66	60.1	10	----	60.1	0.0	8	-8.0
R037	37	1	0.0	57.8	66	57.8	10	----	57.8	0.0	8	-8.0
R038	38	1	0.0	58.8	66	58.8	10	----	58.8	0.0	8	-8.0
R039	39	1	0.0	57.7	66	57.7	10	----	57.7	0.0	8	-8.0
R040	40	1	0.0	60.2	66	60.2	10	----	60.2	0.0	8	-8.0
R041	41	1	0.0	59.1	66	59.1	10	----	59.1	0.0	8	-8.0
R042	42	1	0.0	60.5	66	60.5	10	----	60.5	0.0	8	-8.0
R043	43	1	0.0	60.7	66	60.7	10	----	60.7	0.0	8	-8.0
R044	44	1	0.0	61.8	66	61.8	10	----	61.8	0.0	8	-8.0
R045	45	1	0.0	63.3	66	63.3	10	----	63.3	0.0	8	-8.0
R046	46	1	0.0	68.2	66	68.2	10	Snd Lvl	68.2	0.0	8	-8.0
R047	47	1	0.0	66.1	66	66.1	10	Snd Lvl	66.1	0.0	8	-8.0
R048	48	1	0.0	65.5	66	65.5	10	----	65.5	0.0	8	-8.0
R049	49	1	0.0	64.1	66	64.1	10	----	64.1	0.0	8	-8.0
R050	50	1	0.0	65.3	66	65.3	10	----	65.3	0.0	8	-8.0
R051	51	1	0.0	61.3	66	61.3	10	----	61.3	0.0	8	-8.0
R052	52	1	0.0	59.9	66	59.9	10	----	59.9	0.0	8	-8.0
R053	53	1	0.0	68.0	66	68.0	10	Snd Lvl	68.0	0.0	8	-8.0
R054	54	1	0.0	60.5	66	60.5	10	----	60.5	0.0	8	-8.0
R055	55	1	0.0	58.7	66	58.7	10	----	58.7	0.0	8	-8.0
R056	56	1	0.0	58.3	66	58.3	10	----	58.3	0.0	8	-8.0
R057	57	1	0.0	57.6	66	57.6	10	----	57.6	0.0	8	-8.0
R058	58	1	0.0	64.4	66	64.4	10	----	64.4	0.0	8	-8.0
R059	59	1	0.0	65.0	66	65.0	10	----	65.0	0.0	8	-8.0
R060	60	1	0.0	64.3	66	64.3	10	----	64.3	0.0	8	-8.0
R061	61	1	0.0	60.5	66	60.5	10	----	60.5	0.0	8	-8.0
R062	62	1	0.0	57.8	66	57.8	10	----	57.8	0.0	8	-8.0
R063	63	1	0.0	64.1	66	64.1	10	----	64.1	0.0	8	-8.0
R064	64	1	0.0	64.8	66	64.8	10	----	64.8	0.0	8	-8.0
R065	65	1	0.0	63.9	66	63.9	10	----	63.9	0.0	8	-8.0

R066	66	1	0.0	64.6	66	64.6	10	----	64.6	0.0	8	-8.0
R067	67	1	0.0	59.7	66	59.7	10	----	59.7	0.0	8	-8.0
R068	68	1	0.0	56.1	66	56.1	10	----	56.1	0.0	8	-8.0
R069	69	1	0.0	65.8	66	65.8	10	----	65.8	0.0	8	-8.0
R070	70	1	0.0	58.8	66	58.8	10	----	58.8	0.0	8	-8.0
R071	71	1	0.0	64.0	66	64.0	10	----	64.0	0.0	8	-8.0
R072	72	1	0.0	63.5	66	63.5	10	----	63.5	0.0	8	-8.0
R073	73	1	0.0	57.4	66	57.4	10	----	57.4	0.0	8	-8.0
R074	74	1	0.0	62.8	66	62.8	10	----	62.8	0.0	8	-8.0
R075	75	1	0.0	57.5	66	57.5	10	----	57.5	0.0	8	-8.0
R076	76	1	0.0	64.4	66	64.4	10	----	64.4	0.0	8	-8.0
R077	77	1	0.0	58.8	66	58.8	10	----	58.8	0.0	8	-8.0
R078	78	1	0.0	57.0	66	57.0	10	----	57.0	0.0	8	-8.0
R079	79	1	0.0	60.3	66	60.3	10	----	60.3	0.0	8	-8.0
R080	80	1	0.0	57.2	66	57.2	10	----	57.2	0.0	8	-8.0
R081	81	1	0.0	65.6	66	65.6	10	----	65.6	0.0	8	-8.0
R082	82	1	0.0	65.3	66	65.3	10	----	65.3	0.0	8	-8.0
R083	83	1	0.0	59.8	66	59.8	10	----	59.8	0.0	8	-8.0
R084	84	1	0.0	57.3	66	57.3	10	----	57.3	0.0	8	-8.0
R085	85	1	0.0	56.3	66	56.3	10	----	56.3	0.0	8	-8.0
R086	86	1	0.0	63.3	66	63.3	10	----	63.3	0.0	8	-8.0
R087	87	1	0.0	60.2	66	60.2	10	----	60.2	0.0	8	-8.0
R088	88	1	0.0	57.6	66	57.6	10	----	57.6	0.0	8	-8.0
R089	89	1	0.0	57.7	66	57.7	10	----	57.7	0.0	8	-8.0
R090	90	1	0.0	68.9	66	68.9	10	Snd Lvl	68.9	0.0	8	-8.0
R091	91	1	0.0	60.9	66	60.9	10	----	60.9	0.0	8	-8.0
R092	92	1	0.0	58.7	66	58.7	10	----	58.7	0.0	8	-8.0
R093	93	1	0.0	56.6	66	56.6	10	----	56.6	0.0	8	-8.0
R094	94	1	0.0	63.7	66	63.7	10	----	63.7	0.0	8	-8.0
R095	95	1	0.0	58.8	66	58.8	10	----	58.8	0.0	8	-8.0
R096	96	1	0.0	57.4	66	57.4	10	----	57.4	0.0	8	-8.0
R097	97	1	0.0	55.8	66	55.8	10	----	55.8	0.0	8	-8.0
R098	98	1	0.0	63.5	66	63.5	10	----	63.5	0.0	8	-8.0
R099	99	1	0.0	57.6	66	57.6	10	----	57.6	0.0	8	-8.0
R100	100	1	0.0	56.6	66	56.6	10	----	56.6	0.0	8	-8.0
R101	101	1	0.0	57.1	66	57.1	10	----	57.1	0.0	8	-8.0
R102	102	1	0.0	65.0	66	65.0	10	----	65.0	0.0	8	-8.0
R103	103	1	0.0	60.6	66	60.6	10	----	60.6	0.0	8	-8.0
R104	104	1	0.0	58.9	66	58.9	10	----	58.9	0.0	8	-8.0
R105	105	1	0.0	56.4	66	56.4	10	----	56.4	0.0	8	-8.0
R106	106	1	0.0	65.1	66	65.1	10	----	65.1	0.0	8	-8.0

R107	107	1	0.0	57.1	66	57.1	10	----	57.1	0.0	8	-8.0
R108	108	1	0.0	55.7	66	55.7	10	----	55.7	0.0	8	-8.0
R109	109	1	0.0	55.2	66	55.2	10	----	55.2	0.0	8	-8.0
R110	110	1	0.0	55.9	66	55.9	10	----	55.9	0.0	8	-8.0
R111	111	1	0.0	68.9	66	68.9	10	Snd Lvl	68.9	0.0	8	-8.0
R112	112	1	0.0	64.1	66	64.1	10	----	64.1	0.0	8	-8.0
R113	113	1	0.0	56.4	66	56.4	10	----	56.4	0.0	8	-8.0
R114	114	1	0.0	60.8	66	60.8	10	----	60.8	0.0	8	-8.0
R115	115	1	0.0	60.0	66	60.0	10	----	60.0	0.0	8	-8.0
R116	116	1	0.0	57.8	66	57.8	10	----	57.8	0.0	8	-8.0
R117	117	1	0.0	56.7	66	56.7	10	----	56.7	0.0	8	-8.0
R118	118	1	0.0	57.5	66	57.5	10	----	57.5	0.0	8	-8.0
R119	119	1	0.0	57.1	66	57.1	10	----	57.1	0.0	8	-8.0
R120	120	1	0.0	57.7	66	57.7	10	----	57.7	0.0	8	-8.0
R121	121	1	0.0	56.2	66	56.2	10	----	56.2	0.0	8	-8.0
R122	122	1	0.0	57.1	66	57.1	10	----	57.1	0.0	8	-8.0
R123	123	1	0.0	55.6	66	55.6	10	----	55.6	0.0	8	-8.0
R124	124	1	0.0	56.1	66	56.1	10	----	56.1	0.0	8	-8.0
R125	125	1	0.0	54.7	66	54.7	10	----	54.7	0.0	8	-8.0
R126	126	1	0.0	66.8	66	66.8	10	Snd Lvl	66.8	0.0	8	-8.0
R127	127	1	0.0	59.3	66	59.3	10	----	59.3	0.0	8	-8.0
R128	128	1	0.0	54.4	66	54.4	10	----	54.4	0.0	8	-8.0
R129	129	1	0.0	57.3	66	57.3	10	----	57.3	0.0	8	-8.0
R130	130	1	0.0	55.0	66	55.0	10	----	55.0	0.0	8	-8.0
R131	131	1	0.0	56.7	66	56.7	10	----	56.7	0.0	8	-8.0
R132	132	1	0.0	63.5	66	63.5	10	----	63.5	0.0	8	-8.0
R133	133	1	0.0	59.5	66	59.5	10	----	59.5	0.0	8	-8.0
R134	134	1	0.0	57.3	66	57.3	10	----	57.3	0.0	8	-8.0
R135	135	1	0.0	57.2	66	57.2	10	----	57.2	0.0	8	-8.0
R136	136	1	0.0	67.0	66	67.0	10	Snd Lvl	67.0	0.0	8	-8.0
R137	137	1	0.0	55.7	66	55.7	10	----	55.7	0.0	8	-8.0
R138	138	1	0.0	54.6	66	54.6	10	----	54.6	0.0	8	-8.0
R139	139	1	0.0	55.3	66	55.3	10	----	55.3	0.0	8	-8.0
R140	140	1	0.0	55.1	66	55.1	10	----	55.1	0.0	8	-8.0
R141	141	1	0.0	57.0	66	57.0	10	----	57.0	0.0	8	-8.0
R158	158	1	0.0	52.4	66	52.4	10	----	52.4	0.0	8	-8.0
R159	159	1	0.0	52.2	66	52.2	10	----	52.2	0.0	8	-8.0
R160	160	1	0.0	52.0	66	52.0	10	----	52.0	0.0	8	-8.0
R161	161	1	0.0	51.5	66	51.5	10	----	51.5	0.0	8	-8.0
R162	162	1	0.0	50.6	66	50.6	10	----	50.6	0.0	8	-8.0
R163	163	1	0.0	51.7	66	51.7	10	----	51.7	0.0	8	-8.0

R164	164	1	0.0	50.7	66	50.7	10	----	50.7	0.0	8	-8.0
R165	165	1	0.0	49.8	66	49.8	10	----	49.8	0.0	8	-8.0
R166	166	1	0.0	50.4	66	50.4	10	----	50.4	0.0	8	-8.0
R167	167	1	0.0	49.6	66	49.6	10	----	49.6	0.0	8	-8.0
R168	168	1	0.0	50.4	66	50.4	10	----	50.4	0.0	8	-8.0
R169	169	1	0.0	53.7	66	53.7	10	----	53.7	0.0	8	-8.0
R170	170	1	0.0	49.0	66	49.0	10	----	49.0	0.0	8	-8.0
R171	171	1	0.0	48.6	66	48.6	10	----	48.6	0.0	8	-8.0
R172	172	1	0.0	48.6	66	48.6	10	----	48.6	0.0	8	-8.0
R173	173	1	0.0	55.0	66	55.0	10	----	55.0	0.0	8	-8.0
R174	175	1	0.0	54.2	66	54.2	10	----	54.2	0.0	8	-8.0
R175	177	1	0.0	59.8	66	59.8	10	----	59.8	0.0	8	-8.0
R176	178	1	0.0	58.4	66	58.4	10	----	58.4	0.0	8	-8.0
R177	180	1	0.0	63.4	66	63.4	10	----	63.4	0.0	8	-8.0
R178	181	1	0.0	63.4	66	63.4	10	----	63.4	0.0	8	-8.0
R179	182	1	0.0	61.9	66	61.9	10	----	61.9	0.0	8	-8.0
R180	183	1	0.0	62.4	66	62.4	10	----	62.4	0.0	8	-8.0
R181	184	1	0.0	61.7	66	61.7	10	----	61.7	0.0	8	-8.0
R182	185	1	0.0	61.3	66	61.3	10	----	61.3	0.0	8	-8.0
R183	186	1	0.0	60.7	66	60.7	10	----	60.7	0.0	8	-8.0
R184	187	1	0.0	61.5	66	61.5	10	----	61.5	0.0	8	-8.0
R185	188	1	0.0	60.4	66	60.4	10	----	60.4	0.0	8	-8.0
R186	190	1	0.0	63.6	66	63.6	10	----	63.6	0.0	8	-8.0
R187	191	1	0.0	66.7	66	66.7	10	Snd Lvl	66.7	0.0	8	-8.0
R188	192	1	0.0	63.1	66	63.1	10	----	63.1	0.0	8	-8.0
R189	193	1	0.0	67.1	66	67.1	10	Snd Lvl	67.1	0.0	8	-8.0
R190	194	1	0.0	62.7	66	62.7	10	----	62.7	0.0	8	-8.0
R191	195	1	0.0	67.8	66	67.8	10	Snd Lvl	67.8	0.0	8	-8.0
R192	196	1	0.0	60.5	66	60.5	10	----	60.5	0.0	8	-8.0
R193	197	1	0.0	64.4	66	64.4	10	----	64.4	0.0	8	-8.0
R194	198	1	0.0	66.2	66	66.2	10	Snd Lvl	66.2	0.0	8	-8.0
R195	199	1	0.0	60.8	66	60.8	10	----	60.8	0.0	8	-8.0
R196	201	1	0.0	67.6	66	67.6	10	Snd Lvl	67.6	0.0	8	-8.0
R197	202	1	0.0	73.3	66	73.3	10	Snd Lvl	73.3	0.0	8	-8.0
R198	203	1	0.0	76.3	66	76.3	10	Snd Lvl	76.3	0.0	8	-8.0
R199	204	1	0.0	76.7	66	76.7	10	Snd Lvl	76.7	0.0	8	-8.0
R200	205	1	0.0	75.1	66	75.1	10	Snd Lvl	75.1	0.0	8	-8.0
R201	206	1	0.0	76.2	66	76.2	10	Snd Lvl	76.2	0.0	8	-8.0
R202	207	1	0.0	70.2	66	70.2	10	Snd Lvl	70.2	0.0	8	-8.0
R203	208	1	0.0	75.1	66	75.1	10	Snd Lvl	75.1	0.0	8	-8.0
R204	209	1	0.0	73.7	66	73.7	10	Snd Lvl	73.7	0.0	8	-8.0

R205	210	1	0.0	67.4	66	67.4	10	Snd Lvl	67.4	0.0	8	-8.0
R206	211	1	0.0	66.3	66	66.3	10	Snd Lvl	66.3	0.0	8	-8.0
R207	212	1	0.0	65.0	66	65.0	10	----	65.0	0.0	8	-8.0
R208	213	1	0.0	66.0	66	66.0	10	Snd Lvl	66.0	0.0	8	-8.0
R209	214	1	0.0	62.3	66	62.3	10	----	62.3	0.0	8	-8.0
R210	215	1	0.0	63.7	66	63.7	10	----	63.7	0.0	8	-8.0
R211	216	1	0.0	67.8	66	67.8	10	Snd Lvl	67.8	0.0	8	-8.0
R212	217	1	0.0	64.7	66	64.7	10	----	64.7	0.0	8	-8.0
R213	218	1	0.0	63.4	66	63.4	10	----	63.4	0.0	8	-8.0
R214	219	1	0.0	62.3	66	62.3	10	----	62.3	0.0	8	-8.0
R215	220	1	0.0	61.0	66	61.0	10	----	61.0	0.0	8	-8.0
R216	221	1	0.0	59.8	66	59.8	10	----	59.8	0.0	8	-8.0
R217	222	1	0.0	58.7	66	58.7	10	----	58.7	0.0	8	-8.0
R218	223	1	0.0	66.2	66	66.2	10	Snd Lvl	66.2	0.0	8	-8.0
R219	224	1	0.0	66.0	66	66.0	10	Snd Lvl	66.0	0.0	8	-8.0
R220	225	1	0.0	60.4	66	60.4	10	----	60.4	0.0	8	-8.0
R221	226	1	0.0	62.0	66	62.0	10	----	62.0	0.0	8	-8.0
R222	227	1	0.0	60.3	66	60.3	10	----	60.3	0.0	8	-8.0
R223	229	1	0.0	59.8	66	59.8	10	----	59.8	0.0	8	-8.0
R224	231	1	0.0	59.0	66	59.0	10	----	59.0	0.0	8	-8.0
R225	237	1	0.0	67.4	66	67.4	10	Snd Lvl	67.4	0.0	8	-8.0
R226	238	1	0.0	65.6	66	65.6	10	----	65.6	0.0	8	-8.0
R227	239	1	0.0	68.4	66	68.4	10	Snd Lvl	68.4	0.0	8	-8.0
R228	240	1	0.0	63.7	66	63.7	10	----	63.7	0.0	8	-8.0
R229	241	1	0.0	64.7	66	64.7	10	----	64.7	0.0	8	-8.0
R230	242	1	0.0	68.2	66	68.2	10	Snd Lvl	68.2	0.0	8	-8.0
R231	243	1	0.0	69.1	66	69.1	10	Snd Lvl	69.1	0.0	8	-8.0
R232	244	1	0.0	64.6	66	64.6	10	----	64.6	0.0	8	-8.0
R233	245	1	0.0	66.3	66	66.3	10	Snd Lvl	66.3	0.0	8	-8.0
R234	246	1	0.0	71.6	66	71.6	10	Snd Lvl	71.6	0.0	8	-8.0
R235	247	1	0.0	65.9	66	65.9	10	----	65.9	0.0	8	-8.0
R236	248	1	0.0	66.3	66	66.3	10	Snd Lvl	66.3	0.0	8	-8.0
R237	249	1	0.0	66.5	66	66.5	10	Snd Lvl	66.5	0.0	8	-8.0
R238	250	1	0.0	64.7	66	64.7	10	----	64.7	0.0	8	-8.0
R239	251	1	0.0	54.9	66	54.9	10	----	54.9	0.0	8	-8.0
R240	252	1	0.0	68.0	66	68.0	10	Snd Lvl	68.0	0.0	8	-8.0
R241	253	1	0.0	67.2	66	67.2	10	Snd Lvl	67.2	0.0	8	-8.0
R242	254	1	0.0	65.1	66	65.1	10	----	65.1	0.0	8	-8.0
R243	255	1	0.0	70.6	66	70.6	10	Snd Lvl	70.6	0.0	8	-8.0
R244	256	1	0.0	69.5	66	69.5	10	Snd Lvl	69.5	0.0	8	-8.0
R245	258	1	0.0	60.4	66	60.4	10	----	60.4	0.0	8	-8.0

R246	259	1	0.0	63.1	66	63.1	10	----	63.1	0.0	8	-8.0
R247	260	1	0.0	62.3	66	62.3	10	----	62.3	0.0	8	-8.0
R248	261	1	0.0	60.3	66	60.3	10	----	60.3	0.0	8	-8.0
R249	262	1	0.0	66.0	66	66.0	10	Snd Lvl	66.0	0.0	8	-8.0
R250	263	1	0.0	63.4	66	63.4	10	----	63.4	0.0	8	-8.0
R251	264	1	0.0	63.8	66	63.8	10	----	63.8	0.0	8	-8.0
R252	265	1	0.0	62.6	66	62.6	10	----	62.6	0.0	8	-8.0
R253	266	1	0.0	63.6	66	63.6	10	----	63.6	0.0	8	-8.0
R254	267	1	0.0	61.7	66	61.7	10	----	61.7	0.0	8	-8.0
R255	268	1	0.0	63.5	66	63.5	10	----	63.5	0.0	8	-8.0
R256	269	1	0.0	61.1	66	61.1	10	----	61.1	0.0	8	-8.0
R257	270	1	0.0	63.4	66	63.4	10	----	63.4	0.0	8	-8.0
R258	271	1	0.0	65.1	66	65.1	10	----	65.1	0.0	8	-8.0
R259	272	1	0.0	60.9	66	60.9	10	----	60.9	0.0	8	-8.0
R260	273	1	0.0	63.0	66	63.0	10	----	63.0	0.0	8	-8.0
R261	274	1	0.0	62.2	66	62.2	10	----	62.2	0.0	8	-8.0
R262	275	1	0.0	61.8	66	61.8	10	----	61.8	0.0	8	-8.0
R263	276	1	0.0	61.2	66	61.2	10	----	61.2	0.0	8	-8.0
R264	277	1	0.0	59.9	66	59.9	10	----	59.9	0.0	8	-8.0

Dwelling Units	**# DUs**	**Noise Reduction**		
		Min	**Avg**	**Max**
		dB	**dB**	**dB**
All Selected	248	0.0	0.0	0.0
All Impacted	42	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

HWL 16 February 2017
JPW TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: Payson
RUN: Payson_C1
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
R001	1	1	0.0	54.8	66	54.8	10	----	54.8	0.0	8	-8.0
R002	2	1	0.0	60.2	66	60.2	10	----	60.2	0.0	8	-8.0
R003	3	1	0.0	63.6	66	63.6	10	----	63.6	0.0	8	-8.0
R004	4	1	0.0	65.0	66	65.0	10	----	65.0	0.0	8	-8.0
R005	5	1	0.0	66.0	66	66.0	10	Snd Lvl	66.0	0.0	8	-8.0
R006	6	1	0.0	67.1	66	67.1	10	Snd Lvl	67.1	0.0	8	-8.0
R007	7	1	0.0	68.7	66	68.7	10	Snd Lvl	68.7	0.0	8	-8.0
R008	8	1	0.0	65.2	66	65.2	10	----	65.2	0.0	8	-8.0
R009	9	1	0.0	65.3	66	65.3	10	----	65.3	0.0	8	-8.0
R010	10	1	0.0	67.2	66	67.2	10	Snd Lvl	67.2	0.0	8	-8.0
R011	11	1	0.0	61.9	66	61.9	10	----	61.9	0.0	8	-8.0
R012	12	1	0.0	68.1	66	68.1	10	Snd Lvl	68.1	0.0	8	-8.0
R013	13	1	0.0	68.0	66	68.0	10	Snd Lvl	68.0	0.0	8	-8.0
R014	14	1	0.0	66.9	66	66.9	10	Snd Lvl	66.9	0.0	8	-8.0
R015	15	1	0.0	65.8	66	65.8	10	----	65.8	0.0	8	-8.0
R016	16	1	0.0	67.8	66	67.8	10	Snd Lvl	67.8	0.0	8	-8.0
R017	17	1	0.0	68.3	66	68.3	10	Snd Lvl	68.3	0.0	8	-8.0
R018	18	1	0.0	66.7	66	66.7	10	Snd Lvl	66.7	0.0	8	-8.0
R019	19	1	0.0	65.5	66	65.5	10	----	65.5	0.0	8	-8.0
R020	20	1	0.0	66.3	66	66.3	10	Snd Lvl	66.3	0.0	8	-8.0
R021	21	1	0.0	67.6	66	67.6	10	Snd Lvl	67.6	0.0	8	-8.0
R022	22	1	0.0	67.0	66	67.0	10	Snd Lvl	67.0	0.0	8	-8.0
R023	23	1	0.0	67.5	66	67.5	10	Snd Lvl	67.5	0.0	8	-8.0
R024	24	1	0.0	67.8	66	67.8	10	Snd Lvl	67.8	0.0	8	-8.0

R025	25	1	0.0	68.9	66	68.9	10	Snd Lvl	68.9	0.0	8	-8.0
R026	26	1	0.0	64.8	66	64.8	10	----	64.8	0.0	8	-8.0
R027	27	1	0.0	64.1	66	64.1	10	----	64.1	0.0	8	-8.0
R028	28	1	0.0	63.7	66	63.7	10	----	63.7	0.0	8	-8.0
R029	29	1	0.0	63.3	66	63.3	10	----	63.3	0.0	8	-8.0
R030	30	1	0.0	62.4	66	62.4	10	----	62.4	0.0	8	-8.0
R031	31	1	0.0	63.5	66	63.5	10	----	63.5	0.0	8	-8.0
R032	32	1	0.0	63.6	66	63.6	10	----	63.6	0.0	8	-8.0
R033	33	1	0.0	64.0	66	64.0	10	----	64.0	0.0	8	-8.0
R034	34	1	0.0	63.0	66	63.0	10	----	63.0	0.0	8	-8.0
R035	35	1	0.0	65.0	66	65.0	10	----	65.0	0.0	8	-8.0
R036	36	1	0.0	62.4	66	62.4	10	----	62.4	0.0	8	-8.0
R037	37	1	0.0	60.0	66	60.0	10	----	60.0	0.0	8	-8.0
R038	38	1	0.0	61.1	66	61.1	10	----	61.1	0.0	8	-8.0
R039	39	1	0.0	59.9	66	59.9	10	----	59.9	0.0	8	-8.0
R040	40	1	0.0	62.5	66	62.5	10	----	62.5	0.0	8	-8.0
R041	41	1	0.0	61.4	66	61.4	10	----	61.4	0.0	8	-8.0
R042	42	1	0.0	62.8	66	62.8	10	----	62.8	0.0	8	-8.0
R043	43	1	0.0	62.9	66	62.9	10	----	62.9	0.0	8	-8.0
R044	44	1	0.0	64.0	66	64.0	10	----	64.0	0.0	8	-8.0
R045	45	1	0.0	65.6	66	65.6	10	----	65.6	0.0	8	-8.0
R046	46	1	0.0	69.8	66	69.8	10	Snd Lvl	69.8	0.0	8	-8.0
R047	47	1	0.0	68.4	66	68.4	10	Snd Lvl	68.4	0.0	1	-8.0
R048	48	1	0.0	66.2	66	66.2	10	Snd Lvl	66.2	0.0	8	-8.0
R049	49	1	0.0	64.8	66	64.8	10	----	64.8	0.0	8	-8.0
R175	177	1	0.0	60.1	66	60.1	10	----	60.1	0.0	8	-8.0
R176	178	1	0.0	60.4	66	60.4	10	----	60.4	0.0	8	-8.0
R177	180	1	0.0	65.3	66	65.3	10	----	65.3	0.0	8	-8.0
R178	181	1	0.0	65.3	66	65.3	10	----	65.3	0.0	8	-8.0
R179	182	1	0.0	64.0	66	64.0	10	----	64.0	0.0	8	-8.0
R180	183	1	0.0	64.7	66	64.7	10	----	64.7	0.0	8	-8.0
R181	184	1	0.0	64.1	66	64.1	10	----	64.1	0.0	8	-8.0
R182	185	1	0.0	63.9	66	63.9	10	----	63.9	0.0	8	-8.0
R183	186	1	0.0	63.0	66	63.0	10	----	63.0	0.0	8	-8.0
R184	187	1	0.0	64.3	66	64.3	10	----	64.3	0.0	8	-8.0
R185	188	1	0.0	62.6	66	62.6	10	----	62.6	0.0	8	-8.0
R186	190	1	0.0	65.7	66	65.7	10	----	65.7	0.0	8	-8.0
R187	191	1	0.0	68.3	66	68.3	10	Snd Lvl	68.3	0.0	8	-8.0
R188	192	1	0.0	65.0	66	65.0	10	----	65.0	0.0	8	-8.0
R189	193	1	0.0	69.0	66	69.0	10	Snd Lvl	69.0	0.0	8	-8.0
R190	194	1	0.0	64.6	66	64.6	10	----	64.6	0.0	8	-8.0

R191	195	1	0.0	69.8	66	69.8	10	Snd Lvl	69.8	0.0	8	-8.0
R192	196	1	0.0	62.6	66	62.6	10	----	62.6	0.0	8	-8.0
R193	197	1	0.0	67.4	66	67.4	10	Snd Lvl	67.4	0.0	8	-8.0
R194	198	1	0.0	68.9	66	68.9	10	Snd Lvl	68.9	0.0	8	-8.0
R195	199	1	0.0	64.9	66	64.9	10	----	64.9	0.0	8	-8.0
R173	203	1	0.0	58.8	66	58.8	10	----	58.8	0.0	8	-8.0
R174	205	1	0.0	58.4	66	58.4	10	----	58.4	0.0	8	-8.0
R196	208	1	0.0	70.2	66	70.2	10	Snd Lvl	70.2	0.0	8	-8.0
R197	209	1	0.0	75.9	66	75.9	10	Snd Lvl	75.9	0.0	8	-8.0
R198	210	1	0.0	79.0	66	79.0	10	Snd Lvl	79.0	0.0	8	-8.0
R199	211	1	0.0	79.4	66	79.4	10	Snd Lvl	79.4	0.0	8	-8.0
R200	212	1	0.0	77.2	66	77.2	10	Snd Lvl	77.2	0.0	8	-8.0
R201	213	1	0.0	78.2	66	78.2	10	Snd Lvl	78.2	0.0	8	-8.0
R202	214	1	0.0	72.4	66	72.4	10	Snd Lvl	72.4	0.0	8	-8.0
R203	215	1	0.0	77.5	66	77.5	10	Snd Lvl	77.5	0.0	8	-8.0
R204	216	1	0.0	76.3	66	76.3	10	Snd Lvl	76.3	0.0	8	-8.0
R205	217	1	0.0	71.6	66	71.6	10	Snd Lvl	71.6	0.0	8	-8.0
R206	218	1	0.0	70.2	66	70.2	10	Snd Lvl	70.2	0.0	8	-8.0
R207	219	1	0.0	68.1	66	68.1	10	Snd Lvl	68.1	0.0	8	-8.0
R208	220	1	0.0	68.5	66	68.5	10	Snd Lvl	68.5	0.0	8	-8.0
R209	221	1	0.0	64.7	66	64.7	10	----	64.7	0.0	8	-8.0
R210	222	1	0.0	66.1	66	66.1	10	Snd Lvl	66.1	0.0	8	-8.0
R211	223	1	0.0	70.3	66	70.3	10	Snd Lvl	70.3	0.0	8	-8.0
R212	224	1	0.0	67.0	66	67.0	10	Snd Lvl	67.0	0.0	8	-8.0
R213	225	1	0.0	65.9	66	65.9	10	----	65.9	0.0	8	-8.0
R214	226	1	0.0	64.7	66	64.7	10	----	64.7	0.0	8	-8.0
R215	227	1	0.0	63.5	66	63.5	10	----	63.5	0.0	8	-8.0
R216	228	1	0.0	62.3	66	62.3	10	----	62.3	0.0	8	-8.0
R217	229	1	0.0	61.3	66	61.3	10	----	61.3	0.0	8	-8.0
R218	230	1	0.0	68.5	66	68.5	10	Snd Lvl	68.5	0.0	8	-8.0
R219	231	1	0.0	68.4	66	68.4	10	Snd Lvl	68.4	0.0	8	-8.0
R220	232	1	0.0	62.8	66	62.8	10	----	62.8	0.0	8	-8.0
R221	233	1	0.0	64.4	66	64.4	10	----	64.4	0.0	8	-8.0
R222	234	1	0.0	62.7	66	62.7	10	----	62.7	0.0	8	-8.0
R223	235	1	0.0	62.3	66	62.3	10	----	62.3	0.0	8	-8.0
R224	236	1	0.0	61.5	66	61.5	10	----	61.5	0.0	8	-8.0
R225	238	1	0.0	69.1	66	69.1	10	Snd Lvl	69.1	0.0	8	-8.0
R226	239	1	0.0	67.5	66	67.5	10	Snd Lvl	67.5	0.0	8	-8.0
R227	240	1	0.0	70.2	66	70.2	10	Snd Lvl	70.2	0.0	8	-8.0
R228	241	1	0.0	65.8	66	65.8	10	----	65.8	0.0	8	-8.0
R229	242	1	0.0	66.6	66	66.6	10	Snd Lvl	66.6	0.0	8	-8.0

R230	243	1	0.0	70.0	66	70.0	10	Snd Lvl	70.0	0.0	8	-8.0
R231	244	1	0.0	70.8	66	70.8	10	Snd Lvl	70.8	0.0	8	-8.0
R232	245	1	0.0	66.6	66	66.6	10	Snd Lvl	66.6	0.0	8	-8.0
R233	246	1	0.0	68.2	66	68.2	10	Snd Lvl	68.2	0.0	8	-8.0
R234	247	1	0.0	73.1	66	73.1	10	Snd Lvl	73.1	0.0	8	-8.0
R235	248	1	0.0	68.4	66	68.4	10	Snd Lvl	68.4	0.0	8	-8.0
R236	249	1	0.0	68.8	66	68.8	10	Snd Lvl	68.8	0.0	8	-8.0
R237	250	1	0.0	69.1	66	69.1	10	Snd Lvl	69.1	0.0	8	-8.0
R238	251	1	0.0	67.0	66	67.0	10	Snd Lvl	67.0	0.0	8	-8.0
R239	252	1	0.0	68.1	66	68.1	10	Snd Lvl	68.1	0.0	8	-8.0
R240	253	1	0.0	70.6	66	70.6	10	Snd Lvl	70.6	0.0	8	-8.0
R241	254	1	0.0	69.4	66	69.4	10	Snd Lvl	69.4	0.0	8	-8.0
R242	256	1	0.0	66.9	66	66.9	10	Snd Lvl	66.9	0.0	8	-8.0
R243	257	1	0.0	72.9	66	72.9	10	Snd Lvl	72.9	0.0	8	-8.0
R244	258	1	0.0	71.3	66	71.3	10	Snd Lvl	71.3	0.0	8	-8.0
R245	260	1	0.0	62.5	66	62.5	10	----	62.5	0.0	8	-8.0
R246	261	1	0.0	65.1	66	65.1	10	----	65.1	0.0	8	-8.0
R247	262	1	0.0	64.3	66	64.3	10	----	64.3	0.0	8	-8.0
R248	263	1	0.0	62.3	66	62.3	10	----	62.3	0.0	8	-8.0
R249	264	1	0.0	68.2	66	68.2	10	Snd Lvl	68.2	0.0	8	-8.0
R250	265	1	0.0	65.5	66	65.5	10	----	65.5	0.0	8	-8.0
R251	266	1	0.0	66.1	66	66.1	10	Snd Lvl	66.1	0.0	8	-8.0
R252	267	1	0.0	64.8	66	64.8	10	----	64.8	0.0	8	-8.0
R253	268	1	0.0	65.6	66	65.6	10	----	65.6	0.0	8	-8.0
R254	269	1	0.0	63.7	66	63.7	10	----	63.7	0.0	8	-8.0
R255	270	1	0.0	65.4	66	65.4	10	----	65.4	0.0	8	-8.0
R256	271	1	0.0	63.1	66	63.1	10	----	63.1	0.0	8	-8.0
R257	272	1	0.0	65.4	66	65.4	10	----	65.4	0.0	8	-8.0
R258	273	1	0.0	67.6	66	67.6	10	Snd Lvl	67.6	0.0	8	-8.0
R259	274	1	0.0	63.3	66	63.3	10	----	63.3	0.0	8	-8.0
R260	275	1	0.0	65.3	66	65.3	10	----	65.3	0.0	8	-8.0
R261	276	1	0.0	64.5	66	64.5	10	----	64.5	0.0	8	-8.0
R262	277	1	0.0	64.1	66	64.1	10	----	64.1	0.0	8	-8.0
R263	278	1	0.0	63.4	66	63.4	10	----	63.4	0.0	8	-8.0
R264	279	1	0.0	62.1	66	62.1	10	----	62.1	0.0	8	-8.0

Dwelling Units	**# DUs**	**Noise Reduction**		
		Min	**Avg**	**Max**
		dB	**dB**	**dB**
All Selected	141	0.0	0.0	0.0
All Impacted	64	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

HWL 16 February 2017
JPW TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: Payson
RUN: Payson_C3
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
R001	1	1	0.0	55.6	66	55.6	10	----	55.6	0.0	8	-8.0
R002	2	1	0.0	60.1	66	60.1	10	----	60.1	0.0	8	-8.0
R003	3	1	0.0	63.5	66	63.5	10	----	63.5	0.0	8	-8.0
R004	4	1	0.0	65.0	66	65.0	10	----	65.0	0.0	8	-8.0
R005	5	1	0.0	65.9	66	65.9	10	----	65.9	0.0	8	-8.0
R006	6	1	0.0	67.0	66	67.0	10	Snd Lvl	67.0	0.0	8	-8.0
R007	7	1	0.0	68.6	66	68.6	10	Snd Lvl	68.6	0.0	8	-8.0
R008	8	1	0.0	65.1	66	65.1	10	----	65.1	0.0	8	-8.0
R009	9	1	0.0	65.1	66	65.1	10	----	65.1	0.0	8	-8.0
R010	10	1	0.0	67.1	66	67.1	10	Snd Lvl	67.1	0.0	8	-8.0
R011	11	1	0.0	61.8	66	61.8	10	----	61.8	0.0	8	-8.0
R012	12	1	0.0	68.1	66	68.1	10	Snd Lvl	68.1	0.0	8	-8.0
R013	13	1	0.0	68.0	66	68.0	10	Snd Lvl	68.0	0.0	8	-8.0
R014	14	1	0.0	67.0	66	67.0	10	Snd Lvl	67.0	0.0	8	-8.0
R015	15	1	0.0	65.8	66	65.8	10	----	65.8	0.0	8	-8.0
R016	16	1	0.0	67.9	66	67.9	10	Snd Lvl	67.9	0.0	8	-8.0
R017	17	1	0.0	68.3	66	68.3	10	Snd Lvl	68.3	0.0	8	-8.0
R018	18	1	0.0	66.7	66	66.7	10	Snd Lvl	66.7	0.0	8	-8.0
R019	19	1	0.0	65.5	66	65.5	10	----	65.5	0.0	8	-8.0
R020	20	1	0.0	66.3	66	66.3	10	Snd Lvl	66.3	0.0	8	-8.0
R021	21	1	0.0	67.5	66	67.5	10	Snd Lvl	67.5	0.0	8	-8.0
R022	22	1	0.0	66.9	66	66.9	10	Snd Lvl	66.9	0.0	8	-8.0
R023	23	1	0.0	67.4	66	67.4	10	Snd Lvl	67.4	0.0	8	-8.0
R024	24	1	0.0	67.5	66	67.5	10	Snd Lvl	67.5	0.0	8	-8.0

R025	25	1	0.0	68.5	66	68.5	10	Snd Lvl	68.5	0.0	8	-8.0
R026	26	1	0.0	64.9	66	64.9	10	----	64.9	0.0	8	-8.0
R027	27	1	0.0	64.2	66	64.2	10	----	64.2	0.0	8	-8.0
R028	28	1	0.0	63.7	66	63.7	10	----	63.7	0.0	8	-8.0
R029	29	1	0.0	63.4	66	63.4	10	----	63.4	0.0	8	-8.0
R030	30	1	0.0	62.4	66	62.4	10	----	62.4	0.0	8	-8.0
R031	31	1	0.0	63.5	66	63.5	10	----	63.5	0.0	8	-8.0
R032	32	1	0.0	63.6	66	63.6	10	----	63.6	0.0	8	-8.0
R033	33	1	0.0	64.0	66	64.0	10	----	64.0	0.0	8	-8.0
R034	34	1	0.0	63.1	66	63.1	10	----	63.1	0.0	8	-8.0
R035	35	1	0.0	64.9	66	64.9	10	----	64.9	0.0	8	-8.0
R036	36	1	0.0	62.5	66	62.5	10	----	62.5	0.0	8	-8.0
R037	37	1	0.0	59.9	66	59.9	10	----	59.9	0.0	8	-8.0
R038	38	1	0.0	61.0	66	61.0	10	----	61.0	0.0	8	-8.0
R039	39	1	0.0	59.8	66	59.8	10	----	59.8	0.0	8	-8.0
R040	40	1	0.0	62.4	66	62.4	10	----	62.4	0.0	8	-8.0
R041	41	1	0.0	61.2	66	61.2	10	----	61.2	0.0	8	-8.0
R042	42	1	0.0	62.6	66	62.6	10	----	62.6	0.0	8	-8.0
R043	43	1	0.0	62.7	66	62.7	10	----	62.7	0.0	8	-8.0
R044	44	1	0.0	63.8	66	63.8	10	----	63.8	0.0	8	-8.0
R045	45	1	0.0	65.4	66	65.4	10	----	65.4	0.0	8	-8.0
R046	46	1	0.0	70.0	66	70.0	10	Snd Lvl	70.0	0.0	8	-8.0
R047	47	1	0.0	68.7	66	68.7	10	Snd Lvl	68.7	0.0	8	-8.0
R048	48	1	0.0	66.7	66	66.7	10	Snd Lvl	66.7	0.0	8	-8.0
R049	49	1	0.0	65.2	66	65.2	10	----	65.2	0.0	8	-8.0
R173	173	1	0.0	58.6	66	58.6	10	----	58.6	0.0	8	-8.0
R174	175	1	0.0	58.1	66	58.1	10	----	58.1	0.0	8	-8.0
R175	177	1	0.0	59.7	66	59.7	10	----	59.7	0.0	8	-8.0
R176	178	1	0.0	60.4	66	60.4	10	----	60.4	0.0	8	-8.0
R177	180	1	0.0	65.4	66	65.4	10	----	65.4	0.0	8	-8.0
R178	181	1	0.0	65.3	66	65.3	10	----	65.3	0.0	8	-8.0
R179	182	1	0.0	64.0	66	64.0	10	----	64.0	0.0	8	-8.0
R180	183	1	0.0	64.7	66	64.7	10	----	64.7	0.0	8	-8.0
R181	184	1	0.0	63.8	66	63.8	10	----	63.8	0.0	8	-8.0
R182	185	1	0.0	63.5	66	63.5	10	----	63.5	0.0	8	-8.0
R183	186	1	0.0	62.9	66	62.9	10	----	62.9	0.0	8	-8.0
R184	187	1	0.0	64.1	66	64.1	10	----	64.1	0.0	8	-8.0
R185	188	1	0.0	62.7	66	62.7	10	----	62.7	0.0	8	-8.0
R186	190	1	0.0	65.7	66	65.7	10	----	65.7	0.0	8	-8.0
R187	191	1	0.0	68.3	66	68.3	10	Snd Lvl	68.3	0.0	8	-8.0
R188	192	1	0.0	65.1	66	65.1	10	----	65.1	0.0	8	-8.0

R189	193	1	0.0	69.1	66	69.1	10	Snd Lvl	69.1	0.0	8	-8.0
R190	194	1	0.0	64.7	66	64.7	10	----	64.7	0.0	8	-8.0
R191	195	1	0.0	70.0	66	70.0	10	Snd Lvl	70.0	0.0	8	-8.0
R192	196	1	0.0	62.7	66	62.7	10	----	62.7	0.0	8	-8.0
R193	197	1	0.0	67.4	66	67.4	10	Snd Lvl	67.4	0.0	8	-8.0
R194	198	1	0.0	69.0	66	69.0	10	Snd Lvl	69.0	0.0	8	-8.0
R195	199	1	0.0	64.8	66	64.8	10	----	64.8	0.0	8	-8.0
R196	201	1	0.0	69.7	66	69.7	10	Snd Lvl	69.7	0.0	8	-8.0
R197	202	1	0.0	75.3	66	75.3	10	Snd Lvl	75.3	0.0	8	-8.0
R198	203	1	0.0	78.4	66	78.4	10	Snd Lvl	78.4	0.0	8	-8.0
R199	204	1	0.0	78.8	66	78.8	10	Snd Lvl	78.8	0.0	8	-8.0
R200	205	1	0.0	76.8	66	76.8	10	Snd Lvl	76.8	0.0	8	-8.0
R201	206	1	0.0	78.1	66	78.1	10	Snd Lvl	78.1	0.0	8	-8.0
R202	207	1	0.0	72.3	66	72.3	10	Snd Lvl	72.3	0.0	8	-8.0
R203	208	1	0.0	77.8	66	77.8	10	Snd Lvl	77.8	0.0	8	-8.0
R204	209	1	0.0	76.3	66	76.3	10	Snd Lvl	76.3	0.0	8	-8.0
R205	210	1	0.0	71.7	66	71.7	10	Snd Lvl	71.7	0.0	8	-8.0
R206	211	1	0.0	70.3	66	70.3	10	Snd Lvl	70.3	0.0	8	-8.0
R207	212	1	0.0	68.3	66	68.3	10	Snd Lvl	68.3	0.0	8	-8.0
R208	213	1	0.0	68.5	66	68.5	10	Snd Lvl	68.5	0.0	8	-8.0
R209	214	1	0.0	64.6	66	64.6	10	----	64.6	0.0	8	-8.0
R210	215	1	0.0	65.8	66	65.8	10	----	65.8	0.0	8	-8.0
R211	216	1	0.0	70.0	66	70.0	10	Snd Lvl	70.0	0.0	8	-8.0
R212	217	1	0.0	67.0	66	67.0	10	Snd Lvl	67.0	0.0	8	-8.0
R213	218	1	0.0	65.9	66	65.9	10	----	65.9	0.0	8	-8.0
R214	219	1	0.0	64.8	66	64.8	10	----	64.8	0.0	8	-8.0
R215	220	1	0.0	63.5	66	63.5	10	----	63.5	0.0	8	-8.0
R216	221	1	0.0	62.3	66	62.3	10	----	62.3	0.0	8	-8.0
R217	222	1	0.0	61.3	66	61.3	10	----	61.3	0.0	8	-8.0
R218	223	1	0.0	68.2	66	68.2	10	Snd Lvl	68.2	0.0	8	-8.0
R219	224	1	0.0	68.0	66	68.0	10	Snd Lvl	68.0	0.0	8	-8.0
R220	225	1	0.0	62.6	66	62.6	10	----	62.6	0.0	8	-8.0
R221	226	1	0.0	64.2	66	64.2	10	----	64.2	0.0	8	-8.0
R222	227	1	0.0	62.6	66	62.6	10	----	62.6	0.0	8	-8.0
R223	228	1	0.0	62.2	66	62.2	10	----	62.2	0.0	8	-8.0
R224	229	1	0.0	61.4	66	61.4	10	----	61.4	0.0	8	-8.0
R225	231	1	0.0	69.2	66	69.2	10	Snd Lvl	69.2	0.0	8	-8.0
R226	232	1	0.0	67.6	66	67.6	10	Snd Lvl	67.6	0.0	8	-8.0
R227	233	1	0.0	70.3	66	70.3	10	Snd Lvl	70.3	0.0	8	-8.0
R228	234	1	0.0	65.9	66	65.9	10	----	65.9	0.0	8	-8.0
R229	235	1	0.0	66.8	66	66.8	10	Snd Lvl	66.8	0.0	8	-8.0

R230	236	1	0.0	70.1	66	70.1	10	Snd Lvl	70.1	0.0	8	-8.0
R231	237	1	0.0	71.0	66	71.0	10	Snd Lvl	71.0	0.0	8	-8.0
R232	238	1	0.0	66.7	66	66.7	10	Snd Lvl	66.7	0.0	8	-8.0
R233	239	1	0.0	68.4	66	68.4	10	Snd Lvl	68.4	0.0	8	-8.0
R234	240	1	0.0	73.2	66	73.2	10	Snd Lvl	73.2	0.0	8	-8.0
R235	241	1	0.0	68.5	66	68.5	10	Snd Lvl	68.5	0.0	8	-8.0
R236	242	1	0.0	68.9	66	68.9	10	Snd Lvl	68.9	0.0	8	-8.0
R237	243	1	0.0	69.2	66	69.2	10	Snd Lvl	69.2	0.0	8	-8.0
R238	244	1	0.0	67.1	66	67.1	10	Snd Lvl	67.1	0.0	8	-8.0
R239	245	1	0.0	68.2	66	68.2	10	Snd Lvl	68.2	0.0	8	-8.0
R240	246	1	0.0	70.7	66	70.7	10	Snd Lvl	70.7	0.0	8	-8.0
R241	247	1	0.0	69.5	66	69.5	10	Snd Lvl	69.5	0.0	8	-8.0
R242	248	1	0.0	67.1	66	67.1	10	Snd Lvl	67.1	0.0	8	-8.0
R243	249	1	0.0	73.0	66	73.0	10	Snd Lvl	73.0	0.0	8	-8.0
R244	250	1	0.0	71.4	66	71.4	10	Snd Lvl	71.4	0.0	8	-8.0
R245	252	1	0.0	62.6	66	62.6	10	----	62.6	0.0	8	-8.0
R246	253	1	0.0	65.2	66	65.2	10	----	65.2	0.0	8	-8.0
R247	254	1	0.0	64.4	66	64.4	10	----	64.4	0.0	8	-8.0
R248	255	1	0.0	62.5	66	62.5	10	----	62.5	0.0	8	-8.0
R249	256	1	0.0	68.4	66	68.4	10	Snd Lvl	68.4	0.0	8	-8.0
R250	257	1	0.0	65.7	66	65.7	10	----	65.7	0.0	8	-8.0
R251	258	1	0.0	66.2	66	66.2	10	Snd Lvl	66.2	0.0	8	-8.0
R252	259	1	0.0	64.9	66	64.9	10	----	64.9	0.0	8	-8.0
R253	260	1	0.0	65.7	66	65.7	10	----	65.7	0.0	8	-8.0
R254	261	1	0.0	63.8	66	63.8	10	----	63.8	0.0	8	-8.0
R255	262	1	0.0	65.6	66	65.6	10	----	65.6	0.0	8	-8.0
R256	263	1	0.0	63.3	66	63.3	10	----	63.3	0.0	8	-8.0
R257	264	1	0.0	65.5	66	65.5	10	----	65.5	0.0	8	-8.0
R258	265	1	0.0	67.7	66	67.7	10	Snd Lvl	67.7	0.0	8	-8.0
R259	266	1	0.0	63.4	66	63.4	10	----	63.4	0.0	8	-8.0
R260	267	1	0.0	65.4	66	65.4	10	----	65.4	0.0	8	-8.0
R261	268	1	0.0	64.6	66	64.6	10	----	64.6	0.0	8	-8.0
R262	269	1	0.0	64.2	66	64.2	10	----	64.2	0.0	8	-8.0
R263	270	1	0.0	63.5	66	63.5	10	----	63.5	0.0	8	-8.0
R264	271	1	0.0	62.3	66	62.3	10	----	62.3	0.0	8	-8.0

Dwelling Units	**# DUs**	**Noise Reduction**		
		Min	**Avg**	**Max**
		dB	**dB**	**dB**
All Selected	141	0.0	0.0	0.0
All Impacted	62	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

HWL 16 February 2017
JPW TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: Payson
RUN: Payson_C4
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
R002	2	1	0.0	65.5	66	65.5	10	----	65.5	0.0	8	-8.0
R003	3	1	0.0	63.7	66	63.7	10	----	63.7	0.0	8	-8.0
R004	4	1	0.0	65.2	66	65.2	10	----	65.2	0.0	8	-8.0
R005	5	1	0.0	66.3	66	66.3	10	Snd Lvl	66.3	0.0	8	-8.0
R006	6	1	0.0	67.5	66	67.5	10	Snd Lvl	67.5	0.0	8	-8.0
R007	7	1	0.0	69.2	66	69.2	10	Snd Lvl	69.2	0.0	8	-8.0
R008	8	1	0.0	65.3	66	65.3	10	----	65.3	0.0	8	-8.0
R009	9	1	0.0	65.7	66	65.7	10	----	65.7	0.0	8	-8.0
R010	10	1	0.0	67.3	66	67.3	10	Snd Lvl	67.3	0.0	8	-8.0
R011	11	1	0.0	62.1	66	62.1	10	----	62.1	0.0	8	-8.0
R012	12	1	0.0	68.4	66	68.4	10	Snd Lvl	68.4	0.0	8	-8.0
R013	13	1	0.0	68.1	66	68.1	10	Snd Lvl	68.1	0.0	8	-8.0
R014	14	1	0.0	67.0	66	67.0	10	Snd Lvl	67.0	0.0	8	-8.0
R015	15	1	0.0	65.8	66	65.8	10	----	65.8	0.0	8	-8.0
R016	16	1	0.0	67.9	66	67.9	10	Snd Lvl	67.9	0.0	8	-8.0
R017	17	1	0.0	68.3	66	68.3	10	Snd Lvl	68.3	0.0	8	-8.0
R018	18	1	0.0	66.6	66	66.6	10	Snd Lvl	66.6	0.0	8	-8.0
R019	19	1	0.0	65.5	66	65.5	10	----	65.5	0.0	8	-8.0
R020	20	1	0.0	66.4	66	66.4	10	Snd Lvl	66.4	0.0	8	-8.0
R021	21	1	0.0	67.5	66	67.5	10	Snd Lvl	67.5	0.0	8	-8.0
R022	22	1	0.0	66.8	66	66.8	10	Snd Lvl	66.8	0.0	8	-8.0
R023	23	1	0.0	67.1	66	67.1	10	Snd Lvl	67.1	0.0	8	-8.0
R024	24	1	0.0	67.2	66	67.2	10	Snd Lvl	67.2	0.0	8	-8.0
R025	25	1	0.0	68.1	66	68.1	10	Snd Lvl	68.1	0.0	8	-8.0

R026	26	1	0.0	64.9	66	64.9	10	----	64.9	0.0	8	-8.0
R027	27	1	0.0	64.2	66	64.2	10	----	64.2	0.0	8	-8.0
R028	28	1	0.0	63.9	66	63.9	10	----	63.9	0.0	8	-8.0
R029	29	1	0.0	63.5	66	63.5	10	----	63.5	0.0	8	-8.0
R030	30	1	0.0	62.5	66	62.5	10	----	62.5	0.0	8	-8.0
R031	31	1	0.0	63.6	66	63.6	10	----	63.6	0.0	8	-8.0
R032	32	1	0.0	63.7	66	63.7	10	----	63.7	0.0	8	-8.0
R033	33	1	0.0	64.2	66	64.2	10	----	64.2	0.0	8	-8.0
R034	34	1	0.0	63.2	66	63.2	10	----	63.2	0.0	8	-8.0
R035	35	1	0.0	65.1	66	65.1	10	----	65.1	0.0	8	-8.0
R036	36	1	0.0	62.6	66	62.6	10	----	62.6	0.0	8	-8.0
R037	37	1	0.0	60.0	66	60.0	10	----	60.0	0.0	8	-8.0
R038	38	1	0.0	61.1	66	61.1	10	----	61.1	0.0	8	-8.0
R039	39	1	0.0	59.8	66	59.8	10	----	59.8	0.0	8	-8.0
R040	40	1	0.0	62.5	66	62.5	10	----	62.5	0.0	8	-8.0
R041	41	1	0.0	61.2	66	61.2	10	----	61.2	0.0	8	-8.0
R042	42	1	0.0	62.6	66	62.6	10	----	62.6	0.0	8	-8.0
R043	43	1	0.0	62.6	66	62.6	10	----	62.6	0.0	8	-8.0
R044	44	1	0.0	63.8	66	63.8	10	----	63.8	0.0	8	-8.0
R045	45	1	0.0	65.4	66	65.4	10	----	65.4	0.0	8	-8.0
R046	46	1	0.0	70.1	66	70.1	10	Snd Lvl	70.1	0.0	8	-8.0
R047	47	1	0.0	68.8	66	68.8	10	Snd Lvl	68.8	0.0	8	-8.0
R048	48	1	0.0	66.9	66	66.9	10	Snd Lvl	66.9	0.0	8	-8.0
R049	49	1	0.0	65.3	66	65.3	10	----	65.3	0.0	8	-8.0
R158	158	1	0.0	63.8	66	63.8	10	----	63.8	0.0	8	-8.0
R159	159	1	0.0	61.2	66	61.2	10	----	61.2	0.0	8	-8.0
R160	160	1	0.0	60.4	66	60.4	10	----	60.4	0.0	8	-8.0
R161	161	1	0.0	58.4	66	58.4	10	----	58.4	0.0	8	-8.0
R162	162	1	0.0	63.8	66	63.8	10	----	63.8	0.0	8	-8.0
R163	163	1	0.0	60.1	66	60.1	10	----	60.1	0.0	8	-8.0
R164	164	1	0.0	57.4	66	57.4	10	----	57.4	0.0	8	-8.0
R165	165	1	0.0	63.2	66	63.2	10	----	63.2	0.0	8	-8.0
R166	166	1	0.0	58.7	66	58.7	10	----	58.7	0.0	8	-8.0
R167	167	1	0.0	56.6	66	56.6	10	----	56.6	0.0	8	-8.0
R168	168	1	0.0	61.7	66	61.7	10	----	61.7	0.0	8	-8.0
R169	169	1	0.0	59.2	66	59.2	10	----	59.2	0.0	8	-8.0
R170	170	1	0.0	57.3	66	57.3	10	----	57.3	0.0	8	-8.0
R171	171	1	0.0	56.1	66	56.1	10	----	56.1	0.0	8	-8.0
R172	172	1	0.0	55.5	66	55.5	10	----	55.5	0.0	8	-8.0
R173	173	1	0.0	59.5	66	59.5	10	----	59.5	0.0	8	-8.0
R174	175	1	0.0	61.5	66	61.5	10	----	61.5	0.0	8	-8.0

R175	177	1	0.0	59.9	66	59.9	10	----	59.9	0.0	8	-8.0
R176	178	1	0.0	60.2	66	60.2	10	----	60.2	0.0	8	-8.0
R177	180	1	0.0	65.6	66	65.6	10	----	65.6	0.0	8	-8.0
R178	181	1	0.0	65.6	66	65.6	10	----	65.6	0.0	8	-8.0
R179	182	1	0.0	64.4	66	64.4	10	----	64.4	0.0	8	-8.0
R180	183	1	0.0	65.2	66	65.2	10	----	65.2	0.0	8	-8.0
R181	184	1	0.0	64.2	66	64.2	10	----	64.2	0.0	8	-8.0
R182	185	1	0.0	64.0	66	64.0	10	----	64.0	0.0	8	-8.0
R183	186	1	0.0	63.2	66	63.2	10	----	63.2	0.0	8	-8.0
R184	187	1	0.0	64.5	66	64.5	10	----	64.5	0.0	8	-8.0
R185	188	1	0.0	62.8	66	62.8	10	----	62.8	0.0	8	-8.0
R186	190	1	0.0	65.9	66	65.9	10	----	65.9	0.0	8	-8.0
R187	191	1	0.0	68.5	66	68.5	10	Snd Lvl	68.5	0.0	8	-8.0
R188	192	1	0.0	65.2	66	65.2	10	----	65.2	0.0	8	-8.0
R189	193	1	0.0	69.2	66	69.2	10	Snd Lvl	69.2	0.0	8	-8.0
R190	194	1	0.0	64.9	66	64.9	10	----	64.9	0.0	8	-8.0
R191	195	1	0.0	69.8	66	69.8	10	Snd Lvl	69.8	0.0	8	-8.0
R192	196	1	0.0	62.8	66	62.8	10	----	62.8	0.0	8	-8.0
R193	197	1	0.0	67.5	66	67.5	10	Snd Lvl	67.5	0.0	8	-8.0
R194	198	1	0.0	69.1	66	69.1	10	Snd Lvl	69.1	0.0	8	-8.0
R195	199	1	0.0	65.5	66	65.5	10	----	65.5	0.0	8	-8.0
R196	201	1	0.0	69.0	66	69.0	10	Snd Lvl	69.0	0.0	8	-8.0
R197	202	1	0.0	75.4	66	75.4	10	Snd Lvl	75.4	0.0	8	-8.0
R198	203	1	0.0	78.5	66	78.5	10	Snd Lvl	78.5	0.0	8	-8.0
R199	204	1	0.0	78.9	66	78.9	10	Snd Lvl	78.9	0.0	8	-8.0
R200	199	1	0.0	76.8	66	76.8	10	Snd Lvl	76.8	0.0	8	-8.0
R201	205	1	0.0	78.1	66	78.1	10	Snd Lvl	78.1	0.0	8	-8.0
R202	206	1	0.0	72.3	66	72.3	10	Snd Lvl	72.3	0.0	8	-8.0
R203	207	1	0.0	77.8	66	77.8	10	Snd Lvl	77.8	0.0	8	-8.0
R204	208	1	0.0	76.5	66	76.5	10	Snd Lvl	76.5	0.0	8	-8.0
R205	209	1	0.0	71.9	66	71.9	10	Snd Lvl	71.9	0.0	8	-8.0
R206	210	1	0.0	70.6	66	70.6	10	Snd Lvl	70.6	0.0	8	-8.0
R207	211	1	0.0	68.6	66	68.6	10	Snd Lvl	68.6	0.0	8	-8.0
R208	212	1	0.0	68.5	66	68.5	10	Snd Lvl	68.5	0.0	8	-8.0
R209	213	1	0.0	64.6	66	64.6	10	----	64.6	0.0	8	-8.0
R210	214	1	0.0	65.8	66	65.8	10	----	65.8	0.0	8	-8.0
R211	215	1	0.0	69.9	66	69.9	10	Snd Lvl	69.9	0.0	8	-8.0
R212	216	1	0.0	66.9	66	66.9	10	Snd Lvl	66.9	0.0	8	-8.0
R213	217	1	0.0	65.9	66	65.9	10	----	65.9	0.0	8	-8.0
R214	218	1	0.0	64.7	66	64.7	10	----	64.7	0.0	8	-8.0
R215	219	1	0.0	63.7	66	63.7	10	----	63.7	0.0	8	-8.0

R216	220	1	0.0	62.4	66	62.4	10	----	62.4	0.0	8	-8.0
R217	221	1	0.0	61.4	66	61.4	10	----	61.4	0.0	8	-8.0
R218	222	1	0.0	68.0	66	68.0	10	Snd Lvl	68.0	0.0	8	-8.0
R219	223	1	0.0	67.9	66	67.9	10	Snd Lvl	67.9	0.0	8	-8.0
R220	224	1	0.0	62.5	66	62.5	10	----	62.5	0.0	8	-8.0
R221	225	1	0.0	63.9	66	63.9	10	----	63.9	0.0	8	-8.0
R222	226	1	0.0	62.3	66	62.3	10	----	62.3	0.0	8	-8.0
R223	227	1	0.0	62.0	66	62.0	10	----	62.0	0.0	8	-8.0
R224	229	1	0.0	61.4	66	61.4	10	----	61.4	0.0	8	-8.0
R225	231	1	0.0	69.3	66	69.3	10	Snd Lvl	69.3	0.0	8	-8.0
R226	232	1	0.0	67.7	66	67.7	10	Snd Lvl	67.7	0.0	8	-8.0
R227	233	1	0.0	70.3	66	70.3	10	Snd Lvl	70.3	0.0	8	-8.0
R228	234	1	0.0	66.0	66	66.0	10	Snd Lvl	66.0	0.0	8	-8.0
R229	235	1	0.0	66.8	66	66.8	10	Snd Lvl	66.8	0.0	8	-8.0
R230	236	1	0.0	70.1	66	70.1	10	Snd Lvl	70.1	0.0	8	-8.0
R231	237	1	0.0	71.0	66	71.0	10	Snd Lvl	71.0	0.0	8	-8.0
R232	238	1	0.0	66.7	66	66.7	10	Snd Lvl	66.7	0.0	8	-8.0
R233	239	1	0.0	68.4	66	68.4	10	Snd Lvl	68.4	0.0	8	-8.0
R234	240	1	0.0	73.2	66	73.2	10	Snd Lvl	73.2	0.0	8	-8.0
R235	241	1	0.0	68.6	66	68.6	10	Snd Lvl	68.6	0.0	8	-8.0
R236	242	1	0.0	69.0	66	69.0	10	Snd Lvl	69.0	0.0	8	-8.0
R237	243	1	0.0	69.3	66	69.3	10	Snd Lvl	69.3	0.0	8	-8.0
R238	244	1	0.0	67.1	66	67.1	10	Snd Lvl	67.1	0.0	8	-8.0
R239	245	1	0.0	68.2	66	68.2	10	Snd Lvl	68.2	0.0	8	-8.0
R240	246	1	0.0	70.7	66	70.7	10	Snd Lvl	70.7	0.0	8	-8.0
R241	247	1	0.0	69.6	66	69.6	10	Snd Lvl	69.6	0.0	8	-8.0
R242	248	1	0.0	67.2	66	67.2	10	Snd Lvl	67.2	0.0	8	-8.0
R243	250	1	0.0	73.1	66	73.1	10	Snd Lvl	73.1	0.0	8	-8.0
R244	251	1	0.0	71.4	66	71.4	10	Snd Lvl	71.4	0.0	8	-8.0
R245	252	1	0.0	62.7	66	62.7	10	----	62.7	0.0	8	-8.0
R246	253	1	0.0	65.3	66	65.3	10	----	65.3	0.0	8	-8.0
R247	254	1	0.0	64.5	66	64.5	10	----	64.5	0.0	8	-8.0
R248	255	1	0.0	62.6	66	62.6	10	----	62.6	0.0	8	-8.0
R249	256	1	0.0	68.4	66	68.4	10	Snd Lvl	68.4	0.0	8	-8.0
R250	257	1	0.0	65.7	66	65.7	10	----	65.7	0.0	8	-8.0
R251	258	1	0.0	66.2	66	66.2	10	Snd Lvl	66.2	0.0	8	-8.0
R252	259	1	0.0	65.0	66	65.0	10	----	65.0	0.0	8	-8.0
R253	260	1	0.0	65.9	66	65.9	10	----	65.9	0.0	8	-8.0
R254	261	1	0.0	64.0	66	64.0	10	----	64.0	0.0	8	-8.0
R255	262	1	0.0	65.7	66	65.7	10	----	65.7	0.0	8	-8.0
R256	263	1	0.0	63.4	66	63.4	10	----	63.4	0.0	8	-8.0

R257	264	1	0.0	65.6	66	65.6	10	----	65.6	0.0	8	-8.0
R258	265	1	0.0	67.8	66	67.8	10	Snd Lvl	67.8	0.0	8	-8.0
R259	266	1	0.0	63.5	66	63.5	10	----	63.5	0.0	8	-8.0
R260	267	1	0.0	65.4	66	65.4	10	----	65.4	0.0	8	-8.0
R261	268	1	0.0	64.6	66	64.6	10	----	64.6	0.0	8	-8.0
R262	269	1	0.0	64.3	66	64.3	10	----	64.3	0.0	8	-8.0
R263	271	1	0.0	63.6	66	63.6	10	----	63.6	0.0	8	-8.0
R264	272	1	0.0	62.4	66	62.4	10	----	62.4	0.0	8	-8.0

Dwelling Units	**# DUs**	**Noise Reduction**		
		Min	**Avg**	**Max**
		dB	**dB**	**dB**
All Selected	155	0.0	0.0	0.0
All Impacted	64	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

HWL 16 February 2017
JPW TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: Payson
RUN: Payson_l1
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
R002	2	1	0.0	62.6	66	62.6	10	----	62.6	0.0	8	-8.0
R003	3	1	0.0	63.5	66	63.5	10	----	63.5	0.0	8	-8.0
R004	4	1	0.0	65.5	66	65.5	10	----	65.5	0.0	8	-8.0
R005	5	1	0.0	66.5	66	66.5	10	Snd Lvl	66.5	0.0	8	-8.0
R006	6	1	0.0	67.6	66	67.6	10	Snd Lvl	67.6	0.0	8	-8.0
R007	7	1	0.0	69.0	66	69.0	10	Snd Lvl	69.0	0.0	8	-8.0
R008	8	1	0.0	65.1	66	65.1	10	----	65.1	0.0	8	-8.0
R009	9	1	0.0	65.2	66	65.2	10	----	65.2	0.0	8	-8.0
R010	10	1	0.0	66.6	66	66.6	10	Snd Lvl	66.6	0.0	8	-8.0
R011	11	1	0.0	61.8	66	61.8	10	----	61.8	0.0	8	-8.0
R012	12	1	0.0	68.0	66	68.0	10	Snd Lvl	68.0	0.0	8	-8.0
R013	13	1	0.0	67.7	66	67.7	10	Snd Lvl	67.7	0.0	8	-8.0
R014	14	1	0.0	67.2	66	67.2	10	Snd Lvl	67.2	0.0	8	-8.0
R015	15	1	0.0	66.6	66	66.6	10	Snd Lvl	66.6	0.0	8	-8.0
R016	16	1	0.0	68.6	66	68.6	10	Snd Lvl	68.6	0.0	8	-8.0
R017	17	1	0.0	69.0	66	69.0	10	Snd Lvl	69.0	0.0	8	-8.0
R018	18	1	0.0	67.2	66	67.2	10	Snd Lvl	67.2	0.0	8	-8.0
R019	19	1	0.0	66.2	66	66.2	10	Snd Lvl	66.2	0.0	8	-8.0
R020	20	1	0.0	67.4	66	67.4	10	Snd Lvl	67.4	0.0	8	-8.0
R021	21	1	0.0	68.3	66	68.3	10	Snd Lvl	68.3	0.0	8	-8.0
R022	22	1	0.0	67.6	66	67.6	10	Snd Lvl	67.6	0.0	8	-8.0
R023	23	1	0.0	68.3	66	68.3	10	Snd Lvl	68.3	0.0	8	-8.0
R024	24	1	0.0	68.6	66	68.6	10	Snd Lvl	68.6	0.0	8	-8.0
R025	25	1	0.0	69.8	66	69.8	10	Snd Lvl	69.8	0.0	8	-8.0

R026	26	1	0.0	64.9	66	64.9	10	----	64.9	0.0	8	-8.0
R027	27	1	0.0	64.4	66	64.4	10	----	64.4	0.0	8	-8.0
R028	28	1	0.0	64.0	66	64.0	10	----	64.0	0.0	8	-8.0
R029	29	1	0.0	63.8	66	63.8	10	----	63.8	0.0	8	-8.0
R030	30	1	0.0	62.8	66	62.8	10	----	62.8	0.0	8	-8.0
R031	31	1	0.0	64.1	66	64.1	10	----	64.1	0.0	8	-8.0
R032	32	1	0.0	64.4	66	64.4	10	----	64.4	0.0	8	-8.0
R033	33	1	0.0	64.7	66	64.7	10	----	64.7	0.0	8	-8.0
R034	34	1	0.0	63.6	66	63.6	10	----	63.6	0.0	8	-8.0
R035	35	1	0.0	65.7	66	65.7	10	----	65.7	0.0	8	-8.0
R036	36	1	0.0	63.1	66	63.1	10	----	63.1	0.0	8	-8.0
R037	37	1	0.0	60.6	66	60.6	10	----	60.6	0.0	8	-8.0
R038	38	1	0.0	61.6	66	61.6	10	----	61.6	0.0	8	-8.0
R039	39	1	0.0	60.6	66	60.6	10	----	60.6	0.0	8	-8.0
R040	40	1	0.0	62.9	66	62.9	10	----	62.9	0.0	8	-8.0
R041	41	1	0.0	61.8	66	61.8	10	----	61.8	0.0	8	-8.0
R042	42	1	0.0	63.3	66	63.3	10	----	63.3	0.0	8	-8.0
R043	43	1	0.0	63.8	66	63.8	10	----	63.8	0.0	8	-8.0
R044	44	1	0.0	64.6	66	64.6	10	----	64.6	0.0	8	-8.0
R045	45	1	0.0	66.3	66	66.3	10	Snd Lvl	66.3	0.0	8	-8.0
R046	46	1	0.0	72.7	66	72.7	10	Snd Lvl	72.7	0.0	8	-8.0
R047	47	1	0.0	69.0	66	69.0	10	Snd Lvl	69.0	0.0	8	-8.0
R049	49	1	0.0	65.5	66	65.5	10	----	65.5	0.0	8	-8.0
R050	50	1	0.0	65.2	66	65.2	10	----	65.2	0.0	8	-8.0
R051	51	1	0.0	63.4	66	63.4	10	----	63.4	0.0	8	-8.0
R052	52	1	0.0	62.6	66	62.6	10	----	62.6	0.0	8	-8.0
R053	53	1	0.0	67.3	66	67.3	10	Snd Lvl	67.3	0.0	8	-8.0
R054	54	1	0.0	61.9	66	61.9	10	----	61.9	0.0	8	-8.0
R055	55	1	0.0	61.2	66	61.2	10	----	61.2	0.0	8	-8.0
R056	56	1	0.0	60.7	66	60.7	10	----	60.7	0.0	8	-8.0
R057	57	1	0.0	59.7	66	59.7	10	----	59.7	0.0	8	-8.0
R058	58	1	0.0	63.0	66	63.0	10	----	63.0	0.0	8	-8.0
R059	59	1	0.0	62.8	66	62.8	10	----	62.8	0.0	8	-8.0
R060	60	1	0.0	62.3	66	62.3	10	----	62.3	0.0	8	-8.0
R061	61	1	0.0	61.1	66	61.1	10	----	61.1	0.0	8	-8.0
R062	62	1	0.0	59.3	66	59.3	10	----	59.3	0.0	8	-8.0
R063	63	1	0.0	66.4	66	66.4	10	Snd Lvl	66.4	0.0	8	-8.0
R064	64	1	0.0	67.3	66	67.3	10	Snd Lvl	67.3	0.0	8	-8.0
R065	65	1	0.0	66.0	66	66.0	10	Snd Lvl	66.0	0.0	8	-8.0
R066	66	1	0.0	67.1	66	67.1	10	Snd Lvl	67.1	0.0	8	-8.0
R067	67	1	0.0	61.8	66	61.8	10	----	61.8	0.0	8	-8.0

R068	68	1	0.0	58.3	66	58.3	10	----	58.3	0.0	8	-8.0
R069	69	1	0.0	64.7	66	64.7	10	----	64.7	0.0	8	-8.0
R070	70	1	0.0	60.0	66	60.0	10	----	60.0	0.0	8	-8.0
R071	71	1	0.0	63.2	66	63.2	10	----	63.2	0.0	8	-8.0
R072	72	1	0.0	62.6	66	62.6	10	----	62.6	0.0	8	-8.0
R073	73	1	0.0	58.7	66	58.7	10	----	58.7	0.0	8	-8.0
R074	74	1	0.0	62.6	66	62.6	10	----	62.6	0.0	8	-8.0
R075	75	1	0.0	58.8	66	58.8	10	----	58.8	0.0	8	-8.0
R076	76	1	0.0	63.5	66	63.5	10	----	63.5	0.0	8	-8.0
R077	77	1	0.0	59.6	66	59.6	10	----	59.6	0.0	8	-8.0
R078	78	1	0.0	58.2	66	58.2	10	----	58.2	0.0	8	-8.0
R079	79	1	0.0	62.4	66	62.4	10	----	62.4	0.0	8	-8.0
R080	80	1	0.0	59.2	66	59.2	10	----	59.2	0.0	8	-8.0
R081	81	1	0.0	68.3	66	68.3	10	Snd Lvl	68.3	0.0	8	-8.0
R082	82	1	0.0	68.0	66	68.0	10	Snd Lvl	68.0	0.0	8	-8.0
R083	83	1	0.0	61.6	66	61.6	10	----	61.6	0.0	8	-8.0
R084	84	1	0.0	59.1	66	59.1	10	----	59.1	0.0	8	-8.0
R085	85	1	0.0	58.1	66	58.1	10	----	58.1	0.0	8	-8.0
R086	86	1	0.0	62.9	66	62.9	10	----	62.9	0.0	8	-8.0
R087	87	1	0.0	60.8	66	60.8	10	----	60.8	0.0	8	-8.0
R088	88	1	0.0	58.8	66	58.8	10	----	58.8	0.0	8	-8.0
R089	89	1	0.0	58.9	66	58.9	10	----	58.9	0.0	8	-8.0
R090	90	1	0.0	67.2	66	67.2	10	Snd Lvl	67.2	0.0	8	-8.0
R091	91	1	0.0	61.2	66	61.2	10	----	61.2	0.0	8	-8.0
R092	92	1	0.0	59.5	66	59.5	10	----	59.5	0.0	8	-8.0
R093	93	1	0.0	58.1	66	58.1	10	----	58.1	0.0	8	-8.0
R094	94	1	0.0	65.3	66	65.3	10	----	65.3	0.0	8	-8.0
R095	95	1	0.0	60.6	66	60.6	10	----	60.6	0.0	8	-8.0
R096	96	1	0.0	59.2	66	59.2	10	----	59.2	0.0	8	-8.0
R097	97	1	0.0	57.6	66	57.6	10	----	57.6	0.0	8	-8.0
R098	98	1	0.0	65.2	66	65.2	10	----	65.2	0.0	8	-8.0
R099	99	1	0.0	59.4	66	59.4	10	----	59.4	0.0	8	-8.0
R100	100	1	0.0	58.3	66	58.3	10	----	58.3	0.0	8	-8.0
R101	101	1	0.0	58.7	66	58.7	10	----	58.7	0.0	8	-8.0
R102	102	1	0.0	66.8	66	66.8	10	Snd Lvl	66.8	0.0	8	-8.0
R103	103	1	0.0	62.1	66	62.1	10	----	62.1	0.0	8	-8.0
R104	104	1	0.0	60.6	66	60.6	10	----	60.6	0.0	8	-8.0
R105	105	1	0.0	58.0	66	58.0	10	----	58.0	0.0	8	-8.0
R106	106	1	0.0	64.4	66	64.4	10	----	64.4	0.0	8	-8.0
R107	107	1	0.0	58.7	66	58.7	10	----	58.7	0.0	8	-8.0
R108	108	1	0.0	57.4	66	57.4	10	----	57.4	0.0	8	-8.0

R109	109	1	0.0	56.9	66	56.9	10	----	56.9	0.0	8	-8.0
R110	110	1	0.0	58.0	66	58.0	10	----	58.0	0.0	8	-8.0
R111	111	1	0.0	69.9	66	69.9	10	Snd Lvl	69.9	0.0	8	-8.0
R112	112	1	0.0	65.0	66	65.0	10	----	65.0	0.0	8	-8.0
R113	113	1	0.0	58.1	66	58.1	10	----	58.1	0.0	8	-8.0
R114	114	1	0.0	62.3	66	62.3	10	----	62.3	0.0	8	-8.0
R115	115	1	0.0	61.6	66	61.6	10	----	61.6	0.0	8	-8.0
R116	116	1	0.0	59.4	66	59.4	10	----	59.4	0.0	8	-8.0
R117	117	1	0.0	58.1	66	58.1	10	----	58.1	0.0	8	-8.0
R118	118	1	0.0	58.8	66	58.8	10	----	58.8	0.0	8	-8.0
R119	119	1	0.0	57.8	66	57.8	10	----	57.8	0.0	8	-8.0
R120	120	1	0.0	59.3	66	59.3	10	----	59.3	0.0	8	-8.0
R121	121	1	0.0	57.6	66	57.6	10	----	57.6	0.0	8	-8.0
R122	122	1	0.0	58.6	66	58.6	10	----	58.6	0.0	8	-8.0
R123	123	1	0.0	57.1	66	57.1	10	----	57.1	0.0	8	-8.0
R124	124	1	0.0	57.6	66	57.6	10	----	57.6	0.0	8	-8.0
R125	125	1	0.0	56.1	66	56.1	10	----	56.1	0.0	8	-8.0
R126	126	1	0.0	65.4	66	65.4	10	----	65.4	0.0	8	-8.0
R127	127	1	0.0	60.3	66	60.3	10	----	60.3	0.0	8	-8.0
R128	128	1	0.0	55.7	66	55.7	10	----	55.7	0.0	8	-8.0
R129	129	1	0.0	58.0	66	58.0	10	----	58.0	0.0	8	-8.0
R130	130	1	0.0	55.5	66	55.5	10	----	55.5	0.0	8	-8.0
R131	131	1	0.0	57.4	66	57.4	10	----	57.4	0.0	8	-8.0
R132	132	1	0.0	62.3	66	62.3	10	----	62.3	0.0	8	-8.0
R133	133	1	0.0	59.4	66	59.4	10	----	59.4	0.0	8	-8.0
R134	134	1	0.0	58.2	66	58.2	10	----	58.2	0.0	8	-8.0
R135	135	1	0.0	58.2	66	58.2	10	----	58.2	0.0	8	-8.0
R136	136	1	0.0	68.3	66	68.3	10	Snd Lvl	68.3	0.0	8	-8.0
R137	137	1	0.0	56.8	66	56.8	10	----	56.8	0.0	8	-8.0
R138	138	1	0.0	55.7	66	55.7	10	----	55.7	0.0	8	-8.0
R139	139	1	0.0	56.2	66	56.2	10	----	56.2	0.0	8	-8.0
R140	140	1	0.0	56.1	66	56.1	10	----	56.1	0.0	8	-8.0
R141	141	1	0.0	57.6	66	57.6	10	----	57.6	0.0	8	-8.0
R177	180	1	0.0	65.4	66	65.4	10	----	65.4	0.0	8	-8.0
R178	181	1	0.0	65.3	66	65.3	10	----	65.3	0.0	8	-8.0
R179	182	1	0.0	64.0	66	64.0	10	----	64.0	0.0	8	-8.0
R180	183	1	0.0	64.5	66	64.5	10	----	64.5	0.0	8	-8.0
R181	184	1	0.0	63.8	66	63.8	10	----	63.8	0.0	8	-8.0
R182	185	1	0.0	63.5	66	63.5	10	----	63.5	0.0	8	-8.0
R183	186	1	0.0	62.9	66	62.9	10	----	62.9	0.0	8	-8.0
R184	187	1	0.0	63.8	66	63.8	10	----	63.8	0.0	8	-8.0

R185	188	1	0.0	62.5	66	62.5	10	----	62.5	0.0	8	-8.0
R186	190	1	0.0	65.6	66	65.6	10	----	65.6	0.0	8	-8.0
R187	191	1	0.0	68.3	66	68.3	10	Snd Lvl	68.3	0.0	8	-8.0
R188	192	1	0.0	65.0	66	65.0	10	----	65.0	0.0	8	-8.0
R189	193	1	0.0	69.0	66	69.0	10	Snd Lvl	69.0	0.0	8	-8.0
R190	194	1	0.0	64.6	66	64.6	10	----	64.6	0.0	8	-8.0
R191	195	1	0.0	69.6	66	69.6	10	Snd Lvl	69.6	0.0	8	-8.0
R192	196	1	0.0	62.5	66	62.5	10	----	62.5	0.0	8	-8.0
R193	197	1	0.0	67.3	66	67.3	10	Snd Lvl	67.3	0.0	8	-8.0
R194	198	1	0.0	69.0	66	69.0	10	Snd Lvl	69.0	0.0	8	-8.0
R196	204	1	0.0	70.5	66	70.5	10	Snd Lvl	70.5	0.0	8	-8.0
R197	205	1	0.0	75.9	66	75.9	10	Snd Lvl	75.9	0.0	8	-8.0
R198	206	1	0.0	78.8	66	78.8	10	Snd Lvl	78.8	0.0	8	-8.0
R199	207	1	0.0	79.1	66	79.1	10	Snd Lvl	79.1	0.0	8	-8.0
R200	208	1	0.0	76.8	66	76.8	10	Snd Lvl	76.8	0.0	8	-8.0
R201	209	1	0.0	77.7	66	77.7	10	Snd Lvl	77.7	0.0	8	-8.0
R202	210	1	0.0	72.1	66	72.1	10	Snd Lvl	72.1	0.0	8	-8.0
R203	211	1	0.0	77.1	66	77.1	10	Snd Lvl	77.1	0.0	8	-8.0
R204	212	1	0.0	75.6	66	75.6	10	Snd Lvl	75.6	0.0	8	-8.0
R205	213	1	0.0	71.5	66	71.5	10	Snd Lvl	71.5	0.0	8	-8.0
R206	214	1	0.0	70.1	66	70.1	10	Snd Lvl	70.1	0.0	8	-8.0
R207	215	1	0.0	68.3	66	68.3	10	Snd Lvl	68.3	0.0	8	-8.0
R208	216	1	0.0	68.6	66	68.6	10	Snd Lvl	68.6	0.0	8	-8.0
R209	217	1	0.0	65.1	66	65.1	10	----	65.1	0.0	8	-8.0
R210	218	1	0.0	66.3	66	66.3	10	Snd Lvl	66.3	0.0	8	-8.0
R211	219	1	0.0	70.2	66	70.2	10	Snd Lvl	70.2	0.0	8	-8.0
R212	220	1	0.0	67.2	66	67.2	10	Snd Lvl	67.2	0.0	8	-8.0
R213	221	1	0.0	66.1	66	66.1	10	Snd Lvl	66.1	0.0	8	-8.0
R214	222	1	0.0	65.0	66	65.0	10	----	65.0	0.0	8	-8.0
R215	223	1	0.0	63.8	66	63.8	10	----	63.8	0.0	8	-8.0
R216	224	1	0.0	62.5	66	62.5	10	----	62.5	0.0	8	-8.0
R217	225	1	0.0	61.4	66	61.4	10	----	61.4	0.0	8	-8.0
R218	226	1	0.0	68.7	66	68.7	10	Snd Lvl	68.7	0.0	8	-8.0
R219	227	1	0.0	68.7	66	68.7	10	Snd Lvl	68.7	0.0	8	-8.0
R220	228	1	0.0	63.6	66	63.6	10	----	63.6	0.0	8	-8.0
R221	229	1	0.0	64.8	66	64.8	10	----	64.8	0.0	8	-8.0
R222	230	1	0.0	63.6	66	63.6	10	----	63.6	0.0	8	-8.0
R223	231	1	0.0	62.9	66	62.9	10	----	62.9	0.0	8	-8.0
R224	232	1	0.0	62.2	66	62.2	10	----	62.2	0.0	8	-8.0
R225	234	1	0.0	69.1	66	69.1	10	Snd Lvl	69.1	0.0	8	-8.0
R226	235	1	0.0	67.5	66	67.5	10	Snd Lvl	67.5	0.0	8	-8.0

R227	236	1	0.0	70.2	66	70.2	10	Snd Lvl	70.2	0.0	8	-8.0
R228	237	1	0.0	65.8	66	65.8	10	----	65.8	0.0	8	-8.0
R229	238	1	0.0	66.7	66	66.7	10	Snd Lvl	66.7	0.0	8	-8.0
R230	239	1	0.0	70.0	66	70.0	10	Snd Lvl	70.0	0.0	8	-8.0
R231	240	1	0.0	70.9	66	70.9	10	Snd Lvl	70.9	0.0	8	-8.0
R232	241	1	0.0	66.6	66	66.6	10	Snd Lvl	66.6	0.0	8	-8.0
R233	242	1	0.0	68.3	66	68.3	10	Snd Lvl	68.3	0.0	8	-8.0
R234	243	1	0.0	73.2	66	73.2	10	Snd Lvl	73.2	0.0	8	-8.0
R235	244	1	0.0	68.5	66	68.5	10	Snd Lvl	68.5	0.0	8	-8.0
R236	245	1	0.0	68.9	66	68.9	10	Snd Lvl	68.9	0.0	8	-8.0
R237	246	1	0.0	69.2	66	69.2	10	Snd Lvl	69.2	0.0	8	-8.0
R238	247	1	0.0	67.0	66	67.0	10	Snd Lvl	67.0	0.0	8	-8.0
R239	248	1	0.0	68.1	66	68.1	10	Snd Lvl	68.1	0.0	8	-8.0
R240	249	1	0.0	70.7	66	70.7	10	Snd Lvl	70.7	0.0	8	-8.0
R241	250	1	0.0	69.5	66	69.5	10	Snd Lvl	69.5	0.0	8	-8.0
R242	251	1	0.0	67.2	66	67.2	10	Snd Lvl	67.2	0.0	8	-8.0
R243	252	1	0.0	73.1	66	73.1	10	Snd Lvl	73.1	0.0	8	-8.0
R244	253	1	0.0	71.4	66	71.4	10	Snd Lvl	71.4	0.0	8	-8.0
R245	255	1	0.0	62.7	66	62.7	10	----	62.7	0.0	8	-8.0
R246	256	1	0.0	65.1	66	65.1	10	----	65.1	0.0	8	-8.0
R247	257	1	0.0	64.3	66	64.3	10	----	64.3	0.0	8	-8.0
R248	258	1	0.0	62.4	66	62.4	10	----	62.4	0.0	8	-8.0
R249	259	1	0.0	68.3	66	68.3	10	Snd Lvl	68.3	0.0	8	-8.0
R250	260	1	0.0	65.6	66	65.6	10	----	65.6	0.0	8	-8.0
R251	261	1	0.0	66.1	66	66.1	10	Snd Lvl	66.1	0.0	8	-8.0
R252	262	1	0.0	64.9	66	64.9	10	----	64.9	0.0	8	-8.0
R253	263	1	0.0	65.8	66	65.8	10	----	65.8	0.0	8	-8.0
R254	264	1	0.0	63.8	66	63.8	10	----	63.8	0.0	8	-8.0
R255	265	1	0.0	65.6	66	65.6	10	----	65.6	0.0	8	-8.0
R256	266	1	0.0	63.4	66	63.4	10	----	63.4	0.0	8	-8.0
R257	267	1	0.0	65.6	66	65.6	10	----	65.6	0.0	8	-8.0
R258	268	1	0.0	67.7	66	67.7	10	Snd Lvl	67.7	0.0	8	-8.0
R259	269	1	0.0	63.4	66	63.4	10	----	63.4	0.0	8	-8.0
R260	270	1	0.0	65.4	66	65.4	10	----	65.4	0.0	8	-8.0
R261	271	1	0.0	64.6	66	64.6	10	----	64.6	0.0	8	-8.0
R262	272	1	0.0	64.2	66	64.2	10	----	64.2	0.0	8	-8.0
R263	273	1	0.0	63.5	66	63.5	10	----	63.5	0.0	8	-8.0
R264	274	1	0.0	62.2	66	62.2	10	----	62.2	0.0	8	-8.0
Dwelling Units		**# DUs**	**Noise Reduction**									
			Min	**Avg**	**Max**							
			dB	**dB**	**dB**							

All Selected		226	0.0	0.0	0.0								
All Impacted		78	0.0	0.0	0.0								
All that meet NR Goal		0	0.0	0.0	0.0								

HWL 16 February 2017
JPW TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: Payson
RUN: Payson_R1
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
R003	3	1	0.0	63.5	66	63.5	10	----	63.5	0.0	8	-8.0
R004	4	1	0.0	65.2	66	65.2	10	----	65.2	0.0	8	-8.0
R005	5	1	0.0	66.2	66	66.2	10	Snd Lvl	66.2	0.0	8	-8.0
R006	6	1	0.0	67.3	66	67.3	10	Snd Lvl	67.3	0.0	8	-8.0
R007	7	1	0.0	68.7	66	68.7	10	Snd Lvl	68.7	0.0	8	-8.0
R008	8	1	0.0	65.0	66	65.0	10	----	65.0	0.0	8	-8.0
R009	9	1	0.0	65.1	66	65.1	10	----	65.1	0.0	8	-8.0
R010	10	1	0.0	66.8	66	66.8	10	Snd Lvl	66.8	0.0	8	-8.0
R011	11	1	0.0	61.8	66	61.8	10	----	61.8	0.0	8	-8.0
R012	12	1	0.0	68.2	66	68.2	10	Snd Lvl	68.2	0.0	8	-8.0
R013	13	1	0.0	68.1	66	68.1	10	Snd Lvl	68.1	0.0	8	-8.0
R014	14	1	0.0	67.6	66	67.6	10	Snd Lvl	67.6	0.0	8	-8.0
R015	15	1	0.0	66.1	66	66.1	10	Snd Lvl	66.1	0.0	8	-8.0
R016	16	1	0.0	68.1	66	68.1	10	Snd Lvl	68.1	0.0	8	-8.0
R017	17	1	0.0	68.5	66	68.5	10	Snd Lvl	68.5	0.0	8	-8.0
R018	18	1	0.0	66.7	66	66.7	10	Snd Lvl	66.7	0.0	8	-8.0
R019	19	1	0.0	65.5	66	65.5	10	----	65.5	0.0	8	-8.0
R020	20	1	0.0	66.7	66	66.7	10	Snd Lvl	66.7	0.0	8	-8.0
R021	21	1	0.0	67.6	66	67.6	10	Snd Lvl	67.6	0.0	8	-8.0
R022	22	1	0.0	67.0	66	67.0	10	Snd Lvl	67.0	0.0	8	-8.0
R023	23	1	0.0	67.5	66	67.5	10	Snd Lvl	67.5	0.0	8	-8.0
R024	24	1	0.0	67.7	66	67.7	10	Snd Lvl	67.7	0.0	8	-8.0
R025	25	1	0.0	68.8	66	68.8	10	Snd Lvl	68.8	0.0	8	-8.0
R026	26	1	0.0	66.6	66	66.6	10	Snd Lvl	66.6	0.0	8	-8.0

R027	27	1	0.0	65.7	66	65.7	10	----	65.7	0.0	8	-8.0
R028	28	1	0.0	65.5	66	65.5	10	----	65.5	0.0	8	-8.0
R029	29	1	0.0	64.8	66	64.8	10	----	64.8	0.0	8	-8.0
R030	30	1	0.0	63.8	66	63.8	10	----	63.8	0.0	8	-8.0
R031	31	1	0.0	64.6	66	64.6	10	----	64.6	0.0	8	-8.0
R032	32	1	0.0	64.5	66	64.5	10	----	64.5	0.0	8	-8.0
R033	33	1	0.0	64.9	66	64.9	10	----	64.9	0.0	8	-8.0
R034	34	1	0.0	63.9	66	63.9	10	----	63.9	0.0	8	-8.0
R035	35	1	0.0	65.7	66	65.7	10	----	65.7	0.0	8	-8.0
R036	36	1	0.0	63.3	66	63.3	10	----	63.3	0.0	8	-8.0
R037	37	1	0.0	60.3	66	60.3	10	----	60.3	0.0	8	-8.0
R038	38	1	0.0	61.5	66	61.5	10	----	61.5	0.0	8	-8.0
R039	39	1	0.0	60.2	66	60.2	10	----	60.2	0.0	8	-8.0
R040	40	1	0.0	63.1	66	63.1	10	----	63.1	0.0	8	-8.0
R041	41	1	0.0	61.8	66	61.8	10	----	61.8	0.0	8	-8.0
R042	42	1	0.0	63.4	66	63.4	10	----	63.4	0.0	8	-8.0
R043	43	1	0.0	63.2	66	63.2	10	----	63.2	0.0	8	-8.0
R044	44	1	0.0	64.5	66	64.5	10	----	64.5	0.0	8	-8.0
R045	45	1	0.0	66.0	66	66.0	10	Snd Lvl	66.0	0.0	8	-8.0
R158	158	1	0.0	63.4	66	63.4	10	----	63.4	0.0	8	-8.0
R159	159	1	0.0	61.1	66	61.1	10	----	61.1	0.0	8	-8.0
R160	160	1	0.0	60.2	66	60.2	10	----	60.2	0.0	8	-8.0
R161	161	1	0.0	57.7	66	57.7	10	----	57.7	0.0	8	-8.0
R162	162	1	0.0	63.6	66	63.6	10	----	63.6	0.0	8	-8.0
R163	163	1	0.0	60.7	66	60.7	10	----	60.7	0.0	8	-8.0
R164	164	1	0.0	58.5	66	58.5	10	----	58.5	0.0	8	-8.0
R165	165	1	0.0	64.0	66	64.0	10	----	64.0	0.0	8	-8.0
R166	166	1	0.0	60.4	66	60.4	10	----	60.4	0.0	8	-8.0
R167	167	1	0.0	58.3	66	58.3	10	----	58.3	0.0	8	-8.0
R168	168	1	0.0	62.4	66	62.4	10	----	62.4	0.0	8	-8.0
R169	169	1	0.0	60.3	66	60.3	10	----	60.3	0.0	8	-8.0
R170	170	1	0.0	58.3	66	58.3	10	----	58.3	0.0	8	-8.0
R171	171	1	0.0	57.2	66	57.2	10	----	57.2	0.0	8	-8.0
R172	172	1	0.0	56.4	66	56.4	10	----	56.4	0.0	8	-8.0
R173	173	1	0.0	58.5	66	58.5	10	----	58.5	0.0	8	-8.0
R174	175	1	0.0	60.9	66	60.9	10	----	60.9	0.0	8	-8.0
R175	177	1	0.0	59.8	66	59.8	10	----	59.8	0.0	8	-8.0
R176	178	1	0.0	60.2	66	60.2	10	----	60.2	0.0	8	-8.0
R177	180	1	0.0	65.6	66	65.6	10	----	65.6	0.0	8	-8.0
R178	181	1	0.0	65.6	66	65.6	10	----	65.6	0.0	8	-8.0
R179	182	1	0.0	64.2	66	64.2	10	----	64.2	0.0	8	-8.0

R180	183	1	0.0	64.7	66	64.7	10	----	64.7	0.0	8	-8.0
R181	184	1	0.0	64.0	66	64.0	10	----	64.0	0.0	8	-8.0
R182	185	1	0.0	63.6	66	63.6	10	----	63.6	0.0	8	-8.0
R183	186	1	0.0	62.9	66	62.9	10	----	62.9	0.0	8	-8.0
R184	187	1	0.0	63.8	66	63.8	10	----	63.8	0.0	8	-8.0
R185	188	1	0.0	62.6	66	62.6	10	----	62.6	0.0	8	-8.0
R186	190	1	0.0	65.7	66	65.7	10	----	65.7	0.0	8	-8.0
R187	191	1	0.0	68.7	66	68.7	10	Snd Lvl	68.7	0.0	8	-8.0
R188	192	1	0.0	65.1	66	65.1	10	----	65.1	0.0	8	-8.0
R189	193	1	0.0	69.3	66	69.3	10	Snd Lvl	69.3	0.0	8	-8.0
R190	194	1	0.0	64.8	66	64.8	10	----	64.8	0.0	8	-8.0
R191	195	1	0.0	70.0	66	70.0	10	Snd Lvl	70.0	0.0	8	-8.0
R192	196	1	0.0	62.6	66	62.6	10	----	62.6	0.0	8	-8.0
R193	197	1	0.0	67.8	66	67.8	10	Snd Lvl	67.8	0.0	8	-8.0
R194	198	1	0.0	69.9	66	69.9	10	Snd Lvl	69.9	0.0	8	-8.0
R196	201	1	0.0	70.4	66	70.4	10	Snd Lvl	70.4	0.0	8	-8.0
R197	202	1	0.0	76.2	66	76.2	10	Snd Lvl	76.2	0.0	8	-8.0
R198	203	1	0.0	79.2	66	79.2	10	Snd Lvl	79.2	0.0	8	-8.0
R199	204	1	0.0	79.4	66	79.4	10	Snd Lvl	79.4	0.0	8	-8.0
R200	205	1	0.0	77.6	66	77.6	10	Snd Lvl	77.6	0.0	8	-8.0
R201	206	1	0.0	78.7	66	78.7	10	Snd Lvl	78.7	0.0	8	-8.0
R202	207	1	0.0	72.8	66	72.8	10	Snd Lvl	72.8	0.0	8	-8.0
R203	208	1	0.0	78.1	66	78.1	10	Snd Lvl	78.1	0.0	8	-8.0
R204	209	1	0.0	76.7	66	76.7	10	Snd Lvl	76.7	0.0	8	-8.0
R205	210	1	0.0	71.4	66	71.4	10	Snd Lvl	71.4	0.0	8	-8.0
R206	211	1	0.0	70.0	66	70.0	10	Snd Lvl	70.0	0.0	8	-8.0
R207	212	1	0.0	67.6	66	67.6	10	Snd Lvl	67.6	0.0	8	-8.0
R208	213	1	0.0	68.3	66	68.3	10	Snd Lvl	68.3	0.0	8	-8.0
R209	214	1	0.0	64.5	66	64.5	10	----	64.5	0.0	8	-8.0
R210	215	1	0.0	66.0	66	66.0	10	Snd Lvl	66.0	0.0	8	-8.0
R211	216	1	0.0	70.2	66	70.2	10	Snd Lvl	70.2	0.0	8	-8.0
R212	217	1	0.0	66.9	66	66.9	10	Snd Lvl	66.9	0.0	8	-8.0
R213	218	1	0.0	65.6	66	65.6	10	----	65.6	0.0	8	-8.0
R214	219	1	0.0	64.3	66	64.3	10	----	64.3	0.0	8	-8.0
R215	220	1	0.0	62.9	66	62.9	10	----	62.9	0.0	8	-8.0
R216	221	1	0.0	61.5	66	61.5	10	----	61.5	0.0	8	-8.0
R217	222	1	0.0	60.5	66	60.5	10	----	60.5	0.0	8	-8.0
R218	223	1	0.0	68.8	66	68.8	10	Snd Lvl	68.8	0.0	8	-8.0
R219	224	1	0.0	68.5	66	68.5	10	Snd Lvl	68.5	0.0	8	-8.0
R220	225	1	0.0	62.9	66	62.9	10	----	62.9	0.0	8	-8.0
R221	226	1	0.0	64.4	66	64.4	10	----	64.4	0.0	8	-8.0

R222	227	1	0.0	62.6	66	62.6	10	----	62.6	0.0	8	-8.0
R223	228	1	0.0	62.1	66	62.1	10	----	62.1	0.0	8	-8.0
R224	229	1	0.0	61.2	66	61.2	10	----	61.2	0.0	8	-8.0
Receiver241	241	1	0.0	29.5	66	29.5	10	----	29.5	0.0	8	-8.0
Receiver242	242	1	0.0	30.1	66	30.1	10	----	30.1	0.0	8	-8.0
Receiver243	243	1	0.0	30.4	66	30.4	10	----	30.4	0.0	8	-8.0

Dwelling Units	**# DUs**	**Noise Reduction**		
		Min	**Avg**	**Max**
		dB	**dB**	**dB**
All Selected	112	0.0	0.0	0.0
All Impacted	42	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

HWL							16 February 2017					
JPW							TNM 2.5					
							Calculated with TNM 2.5					
RESULTS: SOUND LEVELS												
PROJECT/CONTRACT:		Payson										
RUN:		Payson_R2										
BARRIER DESIGN:		INPUT HEIGHTS						Average pavement type shall be used unless				
								a State highway agency substantiates the use				
ATMOSPHERICS:		68 deg F, 50% RH						of a different type with approval of FHWA.				
Receiver												
Name	No.	#DUs	Existing	No Barrier					With Barrier			
			LAeq1h	LAeq1h		Increase over existing		Type	Calculated	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n	Impact	LAeq1h	Calculated	Goal	Calculated
							Sub'l Inc					minus
												Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
R001	1	1	0.0	56.1	66	56.1	10	----	56.1	0.0	8	-8.0
R047	47	1	0.0	67.6	66	67.6	10	Snd Lvl	67.6	0.0	8	-8.0
R173	173	1	0.0	58.6	66	58.6	10	----	58.6	0.0	8	-8.0
R174	175	1	0.0	58.1	66	58.1	10	----	58.1	0.0	8	-8.0
R175	177	1	0.0	59.8	66	59.8	10	----	59.8	0.0	8	-8.0
R176	178	1	0.0	60.7	66	60.7	10	----	60.7	0.0	8	-8.0
R195	199	1	0.0	64.2	66	64.2	10	----	64.2	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	7	0.0	0.0	0.0
All Impacted	1	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

Appendix D: Noise Abatement Results

I-15; Payson Main Street Interchange
Noise Analysis

Alternative C1 - Barrier 1

		NAC				Taller Wall			Intermediate Wall			Shorter Wall		
Receptor	First Row	Residences Represented	Land Use Category	Existing dB(A)	Build dB(A)	W/Wall dB(A)	Reduction dB(A)	Benefited Properties	W/Wall dB(A)	Reduction dB(A)	Benefited Properties	W/Wall dB(A)	Reduction dB(A)	Benefited Properties
R003		1	B	61	64	58	6	1	59	5	1	60	4	
R004	Yes	1	B	63	65	60	5	1	60	5	1	61	4	
R005		2	B	65	66	60	6	2	61	5	2	62	4	
R006	Yes	2	B	66	67	61	6	2	61	6	2	63	4	
R007	Yes	2	B	67	69	62	7	2	62	7	2	64	5	2
R008		2	B	63	65	59	6	2	59	6	2	61	4	
R009		2	B	63	65	59	6	2	59	6	2	61	4	
R010	Yes	3	B	65	67	59	8	3	60	7	3	61	6	3
R011	Yes	3	B	60	62	55	7	3	55	7	3	56	6	3
R012	Yes	3	B	66	68	59	9	3	60	8	3	61	7	3
R013	Yes	2	B	66	68	59	9	2	60	8	2	61	7	2
R177		2	B	63	65	58	7	2	58	7	2	58	7	2
R178		2	B	63	65	58	7	2	59	6	2	60	5	2
R179		2	B	62	64	58	6	2	58	6	2	60	4	
R180		2	B	62	65	58	7	2	58	7	2	60	5	2
R181		3	B	62	64	58	6	3	58	6	3	60	4	
R182		2	B	61	64	58	6	2	59	5	2	60	4	
R183		2	B	61	63	57	6	2	58	5	2	59	4	
R184		2	B	62	64	58	6	2	59	5	2	60	4	
R185		2	B	60	63	57	6	2	58	5	2	59	4	
R186		2	B	64	66	58	8	2	58	8	2	59	7	2
R187	Yes	2	B	67	68	60	8	2	60	8	2	61	7	2
R188		2	B	63	65	57	8	2	57	8	2	58	7	2
R189	Yes	2	B	67	69	60	9	2	61	8	2	61	8	2
R190		2	B	63	65	56	9	2	57	8	2	57	8	2
R191	Yes	2	B	68	70	60	10	2	61	9	2	62	8	2
R192		2	B	61	63	56	7	2	56	7	2	57	6	2
R225	Yes	1	B	67	69	60	9	1	61	8	1	62	7	1
R226		1	B	66	68	59	9	1	60	8	1	60	8	1
R227	Yes	1	B	68	70	61	9	1	62	8	1	63	7	1
R228		2	B	64	66	59	7	2	59	7	2	60	6	2
R229		2	B	65	67	60	7	2	60	7	2	61	6	2
R230	Yes	1	B	68	70	62	8	1	62	8	1	63	7	1
R231	Yes	2	B	69	71	62	9	2	63	8	2	64	7	2
R232		2	B	65	67	60	7	2	60	7	2	61	6	2
R233		2	B	66	68	62	6	2	62	6	2	63	5	2
R234	Yes	1	B	72	73	66	7	1	66	7	1	67	6	1
R246		1	B	63	65	58	7	1	58	7	1	59	6	1
R247		2	B	62	64	58	6	2	58	6	2	59	5	2
R248		1	B	60	62	57	5	1	57	5	1	58	4	
R249		1	B	66	68	65	3		65	3		65	3	

= Impacted receptor
= 5 dB(A) reduction or better
= 7 dB(A) reduction or better

Length =	3397	3397	3397
Average Height =	16	14	12
Area of Noise Barrier =	54379	47583	40783
Cost of Noise Barrier=	$ 1,087,580	$ 951,660	$ 815,660
Properties With a 5 dB(A) Reduction =	75	75	51
Impacted Properties =	38	38	38
Impacted Front-Row Properties =	24	24	24
Impacted Front-Row Properties with a 5 dB(A) Reduction =	24	24	22
Percentage of Impacted Front-Row Properties Reduced At Least 5 dB(A) =	100%	100%	92%
Feasible =	Yes	Yes	Yes
First Row Properties =	28	28	28
First Row Properties with 7 dB(A) Reduction=	25	25	16
Percentage of First Row Reduced At Least 7 dB(A) =	89%	89%	57%
Reasonable (Meets Noise Reduction Goal)=	Yes	Yes	Yes
Cost / Benefitted Property =	$ 14,501	$ 12,689	$ 15,993
Cost Reasonable =	Yes	Yes	Yes

UTAH DEPARTMENT OF TRANSPORTATION
NOISE ABATEMENT RECOMMENDATION CHECKLIST

Project Location: I-15; Payson Main Street Interchange EIS
Project Concept: Alternative C1
Project Number: F-115-6(214)251
PIN: 10263
Prepared By: D. Shannon / Lochner
Receptor Name/Description: Barrier 1

Determination of Acoustic Feasibility

Does the noise abatement achieve at least a 5 dBA reduction in highway traffic noise for at least 50 percent of front-row receptors?

Yes____X_____ No_____

If yes, proceed to Question #1. If no, abatement measures are not feasible and are not recommended at this site; proceed to decision segment of form.

Determination of Feasible and Reasonable Mitigation

1. Does the design noise level equal or exceed the UDOT Noise Abatement Criteria as defined in Table 1 of this Policy?
   Yes____X_____ No_____

If yes, proceed to Question #3. If no, proceed to Question #2.

2. Does the receptor, as a result of the design noise level, substantially exceed (10 or more dBA) the existing noise levels prior to construction?
   Yes_____ No_____

If yes, proceed to Question #3. If no, then noise abatement is not recommended; proceed to decision segment of form.

3. Can effective noise abatement be constructed which would provide a minimum reduction of 7 dBA for at least 35 percent of front-row receptors?
   Yes_____X_____ No_____

If yes, proceed to Question #4. If no, abatement measures are not reasonable and are not recommended at this site; proceed to decision segment of form.

4. Are there undeveloped lands along the project corridor?
   Yes_____X_____ No_____
   If yes, proceed to Question #5. If no, proceed to Question #6.
5. Were the undeveloped lands permitted (formal building permit issued) for development under Land Use Categories A, B, C, D or E prior to the date the final environmental decision document was approved?
   Yes_____ No____X_____

If yes, proceed to Question #6. If no, implementation of abatement is not reasonable. Noise abatement is the responsibility of the property owner/developer. Proceed to decision segment of form.

6. Can noise abatement measures be constructed without creating a safety hazard to users and residents, and not interfere with operations and maintenance of the highway facility?
Yes_____X_____ No_____

If yes, proceed to Question #7. If no, abatement measures are not recommended at this site; proceed to decision segment of form.

7. Does the cost per impacted and benefited residence exceed $30,000 for residential areas in Land Use Category B or exceed $360 per linear foot for nonresidential areas in Land Use Category A and/or C or commercial and/or industrial zoned areas in Land Use Category E?
Yes_____ No_____X_____

If yes, noise abatement measures are not considered reasonable; proceed to decision segment of form. If no, proceed to Question #8.

8. For urban roadways that are not access-controlled, is the noise barrier height less than or equal to the distance from the wall face to the back of curb?
Yes_____X_____ No_____

If yes, proceed to Question #9. If no, noise abatement measures are not considered feasible based on safety; proceed to decision section of the form.

9. Does public involvement voting result in at least 75 percent of ballots returned?
Yes_____ No_____ To Be Completed _____X_____

If yes, proceed to Question #10. If no, noise abatement measures are not considered reasonable; proceed to decision segment of form.

10. Does the Public Involvement balloting result in at least 75 percent of benefited and end of wall receptors voting in "favor" of the proposed noise abatement measure?
Yes_____ No_____ To Be Completed _____X_____

If yes, proceed to Question #11. If no, noise abatement measures are not considered reasonable; proceed to decision segment of form.

11. Are there any environmental impacts that need special attention as a result of the implementation of the noise abatement?
Yes_____ No_____X_____

If yes, outline these impacts and discuss with the Environmental Manager or Region Project Manager.

Decision

Are Abatement Measures feasible? Yes____X____ No_____
Are Abatement Measures reasonable? Yes____X____ No_____

HWL 15 February 2017
ECS TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: Payson
RUN: Payson_C1_Bar1
BARRIER DESIGN: Bar1-12'
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
R003	3	1	0.0	63.0	66	63.0	10	----	59.8	3.2	8	-4.8
R004	4	1	0.0	64.5	66	64.5	10	----	61.0	3.5	8	-4.5
R005	5	1	0.0	65.6	66	65.6	10	----	61.8	3.8	8	-4.2
R006	6	1	0.0	66.7	66	66.7	10	Snd Lvl	62.6	4.1	8	-3.9
R007	7	1	0.0	68.5	66	68.5	10	Snd Lvl	63.6	4.9	8	-3.1
R008	8	1	0.0	64.8	66	64.8	10	----	60.8	4.0	8	-4.0
R009	9	1	0.0	64.9	66	64.9	10	----	60.7	4.2	8	-3.8
R010	10	1	0.0	66.9	66	66.9	10	Snd Lvl	61.4	5.5	8	-2.5
R011	11	1	0.0	61.6	66	61.6	10	----	56.4	5.2	8	-2.8
R012	12	1	0.0	67.8	66	67.8	10	Snd Lvl	61.0	6.8	8	-1.2
R013	13	1	0.0	67.7	66	67.7	10	Snd Lvl	60.6	7.1	8	-0.9
R177	180	1	0.0	65.0	66	65.0	10	----	58.4	6.6	8	-1.4
R178	181	1	0.0	65.1	66	65.1	10	----	59.6	5.5	8	-2.5
R179	182	1	0.0	63.6	66	63.6	10	----	59.5	4.1	8	-3.9
R180	183	1	0.0	64.3	66	64.3	10	----	59.7	4.6	8	-3.4
R181	184	1	0.0	63.5	66	63.5	10	----	59.5	4.0	8	-4.0
R182	185	1	0.0	63.4	66	63.4	10	----	59.8	3.6	8	-4.4
R183	186	1	0.0	62.6	66	62.6	10	----	59.2	3.4	8	-4.6
R184	187	1	0.0	63.8	66	63.8	10	----	60.2	3.6	8	-4.4
R185	188	1	0.0	62.2	66	62.2	10	----	58.9	3.3	8	-4.7
R186	190	1	0.0	65.5	66	65.5	10	----	58.7	6.8	8	-1.2
R187	191	1	0.0	68.0	66	68.0	10	Snd Lvl	61.1	6.9	8	-1.1
R188	192	1	0.0	64.7	66	64.7	10	----	57.8	6.9	8	-1.1
R189	193	1	0.0	68.7	66	68.7	10	Snd Lvl	61.3	7.4	8	-0.6

R190	194	1	0.0	64.3	66	64.3	10	----	57.3	7.0	8	-1.0
R191	195	1	0.0	69.5	66	69.5	10	Snd Lvl	61.8	7.7	8	-0.3
R192	196	1	0.0	62.3	66	62.3	10	----	56.6	5.7	8	-2.3
R225	198	1	0.0	68.9	66	68.9	10	Snd Lvl	61.7	7.2	8	-0.8
R226	199	1	0.0	67.4	66	67.4	10	Snd Lvl	60.4	7.0	8	-1.0
R227	200	1	0.0	70.0	66	70.0	10	Snd Lvl	62.5	7.5	8	-0.5
R228	201	1	0.0	65.5	66	65.5	10	----	59.8	5.7	8	-2.3
R229	202	1	0.0	66.3	66	66.3	10	Snd Lvl	61.3	5.0	8	-3.0
R230	203	1	0.0	69.7	66	69.7	10	Snd Lvl	63.0	6.7	8	-1.3
R231	204	1	0.0	70.5	66	70.5	10	Snd Lvl	64.0	6.5	8	-1.5
R232	205	1	0.0	66.0	66	66.0	10	Snd Lvl	61.2	4.8	8	-3.2
R233	206	1	0.0	67.6	66	67.6	10	Snd Lvl	63.4	4.2	8	-3.8
R234	207	1	0.0	72.2	66	72.2	10	Snd Lvl	67.3	4.9	8	-3.1
R246	230	1	0.0	64.9	66	64.9	10	----	58.9	6.0	8	-2.0
R247	231	1	0.0	63.6	66	63.6	10	----	59.2	4.4	8	-3.6
R248	232	1	0.0	61.6	66	61.6	10	----	57.8	3.8	8	-4.2
R249	233	1	0.0	67.8	66	67.8	10	Snd Lvl	65.3	2.5	8	-5.5

Dwelling Units	**# DUs**	**Noise Reduction**		
		Min	**Avg**	**Max**
		dB	**dB**	**dB**
All Selected	41	2.5	5.3	7.7
All Impacted	18	2.5	5.9	7.7
All that meet NR Goal	0	0.0	0.0	0.0

HWL 15 February 2017
ECS TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: Payson
RUN: Payson_C1_Bar1
BARRIER DESIGN: Bar1-14'
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
R003	3	1	0.0	63.0	66	63.0	10	----	58.7	4.3	8	-3.7
R004	4	1	0.0	64.5	66	64.5	10	----	59.9	4.6	8	-3.4
R005	5	1	0.0	65.6	66	65.6	10	----	60.6	5.0	8	-3.0
R006	6	1	0.0	66.7	66	66.7	10	Snd Lvl	61.3	5.4	8	-2.6
R007	7	1	0.0	68.5	66	68.5	10	Snd Lvl	62.3	6.2	8	-1.8
R008	8	1	0.0	64.8	66	64.8	10	----	59.4	5.4	8	-2.6
R009	9	1	0.0	64.9	66	64.9	10	----	59.2	5.7	8	-2.3
R010	10	1	0.0	66.9	66	66.9	10	Snd Lvl	59.8	7.1	8	-0.9
R011	11	1	0.0	61.6	66	61.6	10	----	55.3	6.3	8	-1.7
R012	12	1	0.0	67.8	66	67.8	10	Snd Lvl	60.1	7.7	8	-0.3
R013	13	1	0.0	67.7	66	67.7	10	Snd Lvl	59.9	7.8	8	-0.2
R177	180	1	0.0	65.0	66	65.0	10	----	57.8	7.2	8	-0.8
R178	181	1	0.0	65.1	66	65.1	10	----	58.7	6.4	8	-1.6
R179	182	1	0.0	63.6	66	63.6	10	----	58.2	5.4	8	-2.6
R180	183	1	0.0	64.3	66	64.3	10	----	58.4	5.9	8	-2.1
R181	184	1	0.0	63.5	66	63.5	10	----	58.3	5.2	8	-2.8
R182	185	1	0.0	63.4	66	63.4	10	----	58.6	4.8	8	-3.2
R183	186	1	0.0	62.6	66	62.6	10	----	58.0	4.6	8	-3.4
R184	187	1	0.0	63.8	66	63.8	10	----	59.0	4.8	8	-3.2
R185	188	1	0.0	62.2	66	62.2	10	----	57.7	4.5	8	-3.5
R186	190	1	0.0	65.5	66	65.5	10	----	58.1	7.4	8	-0.6
R187	191	1	0.0	68.0	66	68.0	10	Snd Lvl	60.4	7.6	8	-0.4
R188	192	1	0.0	64.7	66	64.7	10	----	57.1	7.6	8	-0.4
R189	193	1	0.0	68.7	66	68.7	10	Snd Lvl	60.5	8.2	8	0.2

R190	194	1	0.0	64.3	66	64.3	10	----	56.6	7.7	8	-0.3
R191	195	1	0.0	69.5	66	69.5	10	Snd Lvl	60.9	8.6	8	0.6
R192	196	1	0.0	62.3	66	62.3	10	----	56.0	6.3	8	-1.7
R225	198	1	0.0	68.9	66	68.9	10	Snd Lvl	60.9	8.0	8	0.0
R226	199	1	0.0	67.4	66	67.4	10	Snd Lvl	59.7	7.7	8	-0.3
R227	200	1	0.0	70.0	66	70.0	10	Snd Lvl	61.7	8.3	8	0.3
R228	201	1	0.0	65.5	66	65.5	10	----	59.1	6.4	8	-1.6
R229	202	1	0.0	66.3	66	66.3	10	Snd Lvl	60.4	5.9	8	-2.1
R230	203	1	0.0	69.7	66	69.7	10	Snd Lvl	62.2	7.5	8	-0.5
R231	204	1	0.0	70.5	66	70.5	10	Snd Lvl	63.0	7.5	8	-0.5
R232	205	1	0.0	66.0	66	66.0	10	Snd Lvl	60.4	5.6	8	-2.4
R233	206	1	0.0	67.6	66	67.6	10	Snd Lvl	62.4	5.2	8	-2.8
R234	207	1	0.0	72.2	66	72.2	10	Snd Lvl	66.2	6.0	8	-2.0
R246	230	1	0.0	64.9	66	64.9	10	----	58.2	6.7	8	-1.3
R247	231	1	0.0	63.6	66	63.6	10	----	58.4	5.2	8	-2.8
R248	232	1	0.0	61.6	66	61.6	10	----	57.2	4.4	8	-3.6
R249	233	1	0.0	67.8	66	67.8	10	Snd Lvl	64.9	2.9	8	-5.1

Dwelling Units	**# DUs**	**Noise Reduction**		
		Min	**Avg**	**Max**
		dB	**dB**	**dB**
All Selected	41	2.9	6.2	8.6
All Impacted	18	2.9	6.8	8.6
All that meet NR Goal	4	8.0	8.3	8.6

HWL 15 February 2017
ECS TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: Payson
RUN: Payson_C1_Bar1
BARRIER DESIGN: Bar1-16'
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
R003	3	1	0.0	63.0	66	63.0	10	----	58.3	4.7	8	-3.3
R004	4	1	0.0	64.5	66	64.5	10	----	59.5	5.0	8	-3.0
R005	5	1	0.0	65.6	66	65.6	10	----	60.0	5.6	8	-2.4
R006	6	1	0.0	66.7	66	66.7	10	Snd Lvl	60.6	6.1	8	-1.9
R007	7	1	0.0	68.5	66	68.5	10	Snd Lvl	61.5	7.0	8	-1.0
R008	8	1	0.0	64.8	66	64.8	10	----	58.8	6.0	8	-2.0
R009	9	1	0.0	64.9	66	64.9	10	----	58.5	6.4	8	-1.6
R010	10	1	0.0	66.9	66	66.9	10	Snd Lvl	59.1	7.8	8	-0.2
R011	11	1	0.0	61.6	66	61.6	10	----	54.9	6.7	8	-1.3
R012	12	1	0.0	67.8	66	67.8	10	Snd Lvl	59.4	8.4	8	0.4
R013	13	1	0.0	67.7	66	67.7	10	Snd Lvl	59.2	8.5	8	0.5
R177	180	1	0.0	65.0	66	65.0	10	----	57.6	7.4	8	-0.6
R178	181	1	0.0	65.1	66	65.1	10	----	58.0	7.1	8	-0.9
R179	182	1	0.0	63.6	66	63.6	10	----	57.5	6.1	8	-1.9
R180	183	1	0.0	64.3	66	64.3	10	----	57.9	6.4	8	-1.6
R181	184	1	0.0	63.5	66	63.5	10	----	57.6	5.9	8	-2.1
R182	185	1	0.0	63.4	66	63.4	10	----	57.9	5.5	8	-2.5
R183	186	1	0.0	62.6	66	62.6	10	----	57.3	5.3	8	-2.7
R184	187	1	0.0	63.8	66	63.8	10	----	58.4	5.4	8	-2.6
R185	188	1	0.0	62.2	66	62.2	10	----	57.1	5.1	8	-2.9
R186	190	1	0.0	65.5	66	65.5	10	----	57.6	7.9	8	-0.1
R187	191	1	0.0	68.0	66	68.0	10	Snd Lvl	59.8	8.2	8	0.2
R188	192	1	0.0	64.7	66	64.7	10	----	56.5	8.2	8	0.2
R189	193	1	0.0	68.7	66	68.7	10	Snd Lvl	59.8	8.9	8	0.9

R190	194	1	0.0	64.3	66	64.3	10	----	56.1	8.2	8	0.2
R191	195	1	0.0	69.5	66	69.5	10	Snd Lvl	60.1	9.4	8	1.4
R192	196	1	0.0	62.3	66	62.3	10	----	55.6	6.7	8	-1.3
R225	198	1	0.0	68.9	66	68.9	10	Snd Lvl	60.3	8.6	8	0.6
R226	199	1	0.0	67.4	66	67.4	10	Snd Lvl	59.1	8.3	8	0.3
R227	200	1	0.0	70.0	66	70.0	10	Snd Lvl	61.1	8.9	8	0.9
R228	201	1	0.0	65.5	66	65.5	10	----	58.6	6.9	8	-1.1
R229	202	1	0.0	66.3	66	66.3	10	Snd Lvl	59.8	6.5	8	-1.5
R230	203	1	0.0	69.7	66	69.7	10	Snd Lvl	61.6	8.1	8	0.1
R231	204	1	0.0	70.5	66	70.5	10	Snd Lvl	62.4	8.1	8	0.1
R232	205	1	0.0	66.0	66	66.0	10	Snd Lvl	59.9	6.1	8	-1.9
R233	206	1	0.0	67.6	66	67.6	10	Snd Lvl	62.0	5.6	8	-2.4
R234	207	1	0.0	72.2	66	72.2	10	Snd Lvl	65.7	6.5	8	-1.5
R246	230	1	0.0	64.9	66	64.9	10	----	57.7	7.2	8	-0.8
R247	231	1	0.0	63.6	66	63.6	10	----	58.0	5.6	8	-2.4
R248	232	1	0.0	61.6	66	61.6	10	----	56.8	4.8	8	-3.2
R249	233	1	0.0	67.8	66	67.8	10	Snd Lvl	64.7	3.1	8	-4.9

Dwelling Units	**# DUs**	**Noise Reduction**		
		Min	**Avg**	**Max**
		dB	**dB**	**dB**
All Selected	41	3.1	6.8	9.4
All Impacted	18	3.1	7.5	9.4
All that meet NR Goal	12	8.1	8.5	9.4

I-15; Payson Main Street Interchange
Noise Analysis

Alternative C1 - Barrier 2

			NAC			Taller Wall			Intermediate Wall			Shorter Wall		
Receptor	First Row	Residences Represented	Land Use Category	Existing dB(A)	Build dB(A)	W/Wall dB(A)	Reduction dB(A)	Benefited Properties	W/Wall dB(A)	Reduction dB(A)	Benefited Properties	W/Wall dB(A)	Reduction dB(A)	Benefited Properties
R196	Yes	2	B	68	70	67	3		67	3		67	3	
R197	Yes	2	B	73	76	68	8	2	68	8	2	68	8	2
R198	Yes	2	B	76	79	68	11	2	69	10	2	69	10	2
R199	Yes	2	B	77	79	68	11	2	69	10	2	70	9	2
R200	Yes	2	B	75	77	67	10	2	67	10	2	68	9	2
R201	Yes	2	B	76	78	66	12	2	67	11	2	67	11	2
R202	Yes	2	B	70	72	65	7	2	65	7	2	66	6	2
R203	Yes	1	B	75	78	65	13	1	66	12	1	66	12	1
R204	Yes	1	B	74	76	65	11	1	66	10	1	66	10	1
R205		1	B	67	72	67	5	1	67	5	1	67	5	1
R206		1	B	66	70	66	4		67	3		67	3	
R207		2	B	65	68	64	4		65	3		65	3	
R208		1	B	66	69	64	5	1	64	5	1	65	4	
R209		1	B	62	65	61	4		62	3		62	3	
R210		1	B	64	66	61	5	1	62	4		63	3	
R211		1	B	68	70	64	6	1	64	6	1	66	4	
R212		2	B	65	67	62	5	2	63	4		64	3	
R213		2	B	63	66	62	4		63	3		63	3	
R214		2	B	62	65	61	4		61	4		62	3	
R215		2	B	61	64	60	4		61	3		61	3	
R216		2	B	60	62	59	3		60	2		60	2	
R217		2	B	59	61	58	3		59	2		59	2	
R218		1	B	66	69	64	5	1	65	4		66	3	
R219		1	B	66	68	64	4		64	4		65	3	
R220		1	B	60	63	61	2		62	1		62	1	
R221		1	B	62	64	61	3		62	2		62	2	
R222		1	B	60	63	61	2		61	2		62	1	
R223		2	B	60	62	60	2		60	2		61	1	
R224		2	B	59	62	60	2		60	2		60	2	

Length =	800	800	800
Average Height =	16	15	14
Area of Noise Barrier =	12800	12000	11200
Cost of Noise Barrier=	$ 256,000	$ 240,000	$ 224,000
Properties With a 5 dB(A) Reduction =	21	17	15
Impacted Properties =	29	29	29
Impacted Front-Row Properties =	16	16	16
Impacted Front-Row Properties with a 5 dB(A) Reduction =	14	14	14
Percentage of Impacted Front-Row Properties Reduced At Least 5 dB(A) =	88%	88%	88%
Feasible =	Yes	Yes	Yes
First Row Properties =	16	16	16
First Row Properties with 7 dB(A) Reduction=	14	14	12
Percentage of First Row Reduced At Least 7 dB(A) =	88%	88%	75%
Reasonable (Meets Noise Reduction Goal)=	Yes	Yes	Yes
Cost / Benefitted Property =	$ 12,190	$ 14,118	$ 14,933
Cost Reasonable =	Yes	Yes	Yes

= Impacted receptor
= 5 dB(A) reduction or better
= 7 dB(A) reduction or better

UTAH DEPARTMENT OF TRANSPORTATION
NOISE ABATEMENT RECOMMENDATION CHECKLIST

Project Location: I-15; Payson Main Street Interchange EIS
Project Concept: Alternative C1
Project Number: F-115-6(214)251
PIN: 10263
Prepared By: D. Shannon / Lochner
Receptor Name/Description: Barrier 2

Determination of Acoustic Feasibility

Does the noise abatement achieve at least a 5 dBA reduction in highway traffic noise for at least 50 percent of front-row receptors?

Yes____X_____ No_____

If yes, proceed to Question #1. If no, abatement measures are not feasible and are not recommended at this site; proceed to decision segment of form.

Determination of Feasible and Reasonable Mitigation

1. Does the design noise level equal or exceed the UDOT Noise Abatement Criteria as defined in Table 1 of this Policy?
   Yes____X_____ No_____

If yes, proceed to Question #3. If no, proceed to Question #2.

2. Does the receptor, as a result of the design noise level, substantially exceed (10 or more dBA) the existing noise levels prior to construction?
   Yes_____ No_____

If yes, proceed to Question #3. If no, then noise abatement is not recommended; proceed to decision segment of form.

3. Can effective noise abatement be constructed which would provide a minimum reduction of 7 dBA for at least 35 percent of front-row receptors?
   Yes_____X_____ No_____

If yes, proceed to Question #4. If no, abatement measures are not reasonable and are not recommended at this site; proceed to decision segment of form.

4. Are there undeveloped lands along the project corridor?
   Yes_____X_____ No_____
   If yes, proceed to Question #5. If no, proceed to Question #6.
5. Were the undeveloped lands permitted (formal building permit issued) for development under Land Use Categories A, B, C, D or E prior to the date the final environmental decision document was approved?
   Yes_____ No____X_____

If yes, proceed to Question #6. If no, implementation of abatement is not reasonable. Noise abatement is the responsibility of the property owner/developer. Proceed to decision segment of form.

6. Can noise abatement measures be constructed without creating a safety hazard to users and residents, and not interfere with operations and maintenance of the highway facility?
Yes_____X_____ No_____

If yes, proceed to Question #7. If no, abatement measures are not recommended at this site; proceed to decision segment of form.

7. Does the cost per impacted and benefited residence exceed $30,000 for residential areas in Land Use Category B or exceed $360 per linear foot for nonresidential areas in Land Use Category A and/or C or commercial and/or industrial zoned areas in Land Use Category E?
Yes_____ No_____X_____

If yes, noise abatement measures are not considered reasonable; proceed to decision segment of form. If no, proceed to Question #8.

8. For urban roadways that are not access-controlled, is the noise barrier height less than or equal to the distance from the wall face to the back of curb?
Yes_____X_____ No_____

If yes, proceed to Question #9. If no, noise abatement measures are not considered feasible based on safety; proceed to decision section of the form.

9. Does public involvement voting result in at least 75 percent of ballots returned?
Yes_____ No_____ To Be Completed _____X_____

If yes, proceed to Question #10. If no, noise abatement measures are not considered reasonable; proceed to decision segment of form.

10. Does the Public Involvement balloting result in at least 75 percent of benefited and end of wall receptors voting in "favor" of the proposed noise abatement measure?
Yes_____ No_____ To Be Completed _____X_____

If yes, proceed to Question #11. If no, noise abatement measures are not considered reasonable; proceed to decision segment of form.

11. Are there any environmental impacts that need special attention as a result of the implementation of the noise abatement?
Yes_____ No_____X_____

If yes, outline these impacts and discuss with the Environmental Manager or Region Project Manager.

Decision

Are Abatement Measures feasible? Yes____X____ No_____
Are Abatement Measures reasonable? Yes____X____ No_____

HWL 15 February 2017
JPW TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: Payson
RUN: Payson_C1_Bar2
BARRIER DESIGN: C1_Bar2_14FT
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
R196	3	1	0.0	70.4	66	70.4	10	Snd Lvl	67.2	3.2	8	-4.8
R197	4	1	0.0	75.8	66	75.8	10	Snd Lvl	68.2	7.6	8	-0.4
R198	5	1	0.0	78.8	66	78.8	10	Snd Lvl	69.4	9.4	8	1.4
R199	6	1	0.0	79.3	66	79.3	10	Snd Lvl	69.7	9.6	8	1.6
R200	7	1	0.0	76.8	66	76.8	10	Snd Lvl	67.9	8.9	8	0.9
R201	8	1	0.0	77.9	66	77.9	10	Snd Lvl	67.2	10.7	8	2.7
R202	9	1	0.0	72.2	66	72.2	10	Snd Lvl	65.8	6.4	8	-1.6
R203	10	1	0.0	77.2	66	77.2	10	Snd Lvl	66.4	10.8	8	2.8
R204	11	1	0.0	76.0	66	76.0	10	Snd Lvl	66.3	9.7	8	1.7
R205	12	1	0.0	71.2	66	71.2	10	Snd Lvl	67.3	3.9	8	-4.1
R206	13	1	0.0	69.8	66	69.8	10	Snd Lvl	66.6	3.2	8	-4.8
R207	180	1	0.0	67.6	66	67.6	10	Snd Lvl	64.9	2.7	8	-5.3
R208	181	1	0.0	68.1	66	68.1	10	Snd Lvl	65.2	2.9	8	-5.1
R209	182	1	0.0	64.2	66	64.2	10	----	62.4	1.8	8	-6.2
R210	183	1	0.0	65.7	66	65.7	10	----	63.1	2.6	8	-5.4
R211	184	1	0.0	69.9	66	69.9	10	Snd Lvl	66.0	3.9	8	-4.1
R212	185	1	0.0	66.5	66	66.5	10	Snd Lvl	64.1	2.4	8	-5.6
R213	186	1	0.0	65.2	66	65.2	10	----	63.2	2.0	8	-6.0
R214	187	1	0.0	63.9	66	63.9	10	----	62.0	1.9	8	-6.1
R215	188	1	0.0	62.4	66	62.4	10	----	61.2	1.2	8	-6.8
R216	190	1	0.0	61.0	66	61.0	10	----	59.9	1.1	8	-6.9
R217	191	1	0.0	59.8	66	59.8	10	----	58.9	0.9	8	-7.1
R218	192	1	0.0	68.4	66	68.4	10	Snd Lvl	65.6	2.8	8	-5.2
R219	193	1	0.0	68.2	66	68.2	10	Snd Lvl	64.5	3.7	8	-4.3

R220	194	1	0.0	63.4	66	63.4	10	----	62.0	1.4	8	-6.6
R221	195	1	0.0	64.6	66	64.6	10	----	62.4	2.2	8	-5.8
R222	196	1	0.0	63.3	66	63.3	10	----	61.8	1.5	8	-6.5
R223	198	1	0.0	62.5	66	62.5	10	----	61.0	1.5	8	-6.5
R224	199	1	0.0	61.6	66	61.6	10	----	60.4	1.2	8	-6.8

Dwelling Units	**# DUs**	**Noise Reduction**		
		Min	**Avg**	**Max**
		dB	**dB**	**dB**
All Selected	29	0.9	4.2	10.8
All Impacted	17	2.4	6.0	10.8
All that meet NR Goal	6	8.9	9.9	10.8

HWL 15 February 2017
JPW TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: Payson
RUN: Payson_C1_Bar2
BARRIER DESIGN: C1_Bar2_15FT
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
R196	3	1	0.0	70.4	66	70.4	10	Snd Lvl	67.0	3.4	8	-4.6
R197	4	1	0.0	75.8	66	75.8	10	Snd Lvl	67.9	7.9	8	-0.1
R198	5	1	0.0	78.8	66	78.8	10	Snd Lvl	68.6	10.2	8	2.2
R199	6	1	0.0	79.3	66	79.3	10	Snd Lvl	68.9	10.4	8	2.4
R200	7	1	0.0	76.8	66	76.8	10	Snd Lvl	67.2	9.6	8	1.6
R201	8	1	0.0	77.9	66	77.9	10	Snd Lvl	66.6	11.3	8	3.3
R202	9	1	0.0	72.2	66	72.2	10	Snd Lvl	65.2	7.0	8	-1.0
R203	10	1	0.0	77.2	66	77.2	10	Snd Lvl	65.8	11.4	8	3.4
R204	11	1	0.0	76.0	66	76.0	10	Snd Lvl	65.8	10.2	8	2.2
R205	12	1	0.0	71.2	66	71.2	10	Snd Lvl	67.1	4.1	8	-3.9
R206	13	1	0.0	69.8	66	69.8	10	Snd Lvl	66.5	3.3	8	-4.7
R207	180	1	0.0	67.6	66	67.6	10	Snd Lvl	64.5	3.1	8	-4.9
R208	181	1	0.0	68.1	66	68.1	10	Snd Lvl	64.3	3.8	8	-4.2
R209	182	1	0.0	64.2	66	64.2	10	----	61.6	2.6	8	-5.4
R210	183	1	0.0	65.7	66	65.7	10	----	61.8	3.9	8	-4.1
R211	184	1	0.0	69.9	66	69.9	10	Snd Lvl	64.3	5.6	8	-2.4
R212	185	1	0.0	66.5	66	66.5	10	Snd Lvl	63.1	3.4	8	-4.6
R213	186	1	0.0	65.2	66	65.2	10	----	62.5	2.7	8	-5.3
R214	187	1	0.0	63.9	66	63.9	10	----	61.4	2.5	8	-5.5
R215	188	1	0.0	62.4	66	62.4	10	----	60.8	1.6	8	-6.4
R216	190	1	0.0	61.0	66	61.0	10	----	59.5	1.5	8	-6.5
R217	191	1	0.0	59.8	66	59.8	10	----	58.6	1.2	8	-6.8
R218	192	1	0.0	68.4	66	68.4	10	Snd Lvl	64.6	3.8	8	-4.2
R219	193	1	0.0	68.2	66	68.2	10	Snd Lvl	64.1	4.1	8	-3.9

R220	194	1	0.0	63.4	66	63.4	10	----	61.6	1.8	8	-6.2
R221	195	1	0.0	64.6	66	64.6	10	----	61.7	2.9	8	-5.1
R222	196	1	0.0	63.3	66	63.3	10	----	61.3	2.0	8	-6.0
R223	198	1	0.0	62.5	66	62.5	10	----	60.4	2.1	8	-5.9
R224	199	1	0.0	61.6	66	61.6	10	----	60.0	1.6	8	-6.4

Dwelling Units	**# DUs**	**Noise Reduction**		
		Min	**Avg**	**Max**
		dB	**dB**	**dB**
All Selected	29	1.2	4.8	11.4
All Impacted	17	3.1	6.6	11.4
All that meet NR Goal	6	9.6	10.5	11.4

HWL 15 February 2017
JPW TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: Payson
RUN: Payson_C1_Bar2
BARRIER DESIGN: C1_Bar2_16FT
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Noise Reduction Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
R196	3	1	0.0	70.4	66	70.4	10	Snd Lvl	66.9	3.5	8	-4.5
R197	4	1	0.0	75.8	66	75.8	10	Snd Lvl	67.5	8.3	8	0.3
R198	5	1	0.0	78.8	66	78.8	10	Snd Lvl	68.0	10.8	8	2.8
R199	6	1	0.0	79.3	66	79.3	10	Snd Lvl	68.2	11.1	8	3.1
R200	7	1	0.0	76.8	66	76.8	10	Snd Lvl	66.6	10.2	8	2.2
R201	8	1	0.0	77.9	66	77.9	10	Snd Lvl	66.0	11.9	8	3.9
R202	9	1	0.0	72.2	66	72.2	10	Snd Lvl	64.7	7.5	8	-0.5
R203	10	1	0.0	77.2	66	77.2	10	Snd Lvl	65.3	11.9	8	3.9
R204	11	1	0.0	76.0	66	76.0	10	Snd Lvl	65.4	10.6	8	2.6
R205	12	1	0.0	71.2	66	71.2	10	Snd Lvl	66.9	4.3	8	-3.7
R206	13	1	0.0	69.8	66	69.8	10	Snd Lvl	66.3	3.5	8	-4.5
R207	180	1	0.0	67.6	66	67.6	10	Snd Lvl	64.3	3.3	8	-4.7
R208	181	1	0.0	68.1	66	68.1	10	Snd Lvl	63.6	4.5	8	-3.5
R209	182	1	0.0	64.2	66	64.2	10	----	61.0	3.2	8	-4.8
R210	183	1	0.0	65.7	66	65.7	10	----	61.4	4.3	8	-3.7
R211	184	1	0.0	69.9	66	69.9	10	Snd Lvl	63.7	6.2	8	-1.8
R212	185	1	0.0	66.5	66	66.5	10	Snd Lvl	62.4	4.1	8	-3.9
R213	186	1	0.0	65.2	66	65.2	10	----	61.8	3.4	8	-4.6
R214	187	1	0.0	63.9	66	63.9	10	----	60.8	3.1	8	-4.9
R215	188	1	0.0	62.4	66	62.4	10	----	60.3	2.1	8	-5.9
R216	190	1	0.0	61.0	66	61.0	10	----	59.1	1.9	8	-6.1
R217	191	1	0.0	59.8	66	59.8	10	----	58.3	1.5	8	-6.5
R218	192	1	0.0	68.4	66	68.4	10	Snd Lvl	64.3	4.1	8	-3.9
R219	193	1	0.0	68.2	66	68.2	10	Snd Lvl	63.8	4.4	8	-3.6

R220	194	1	0.0	63.4	66	63.4	10	----	61.4	2.0	8	-6.0
R221	195	1	0.0	64.6	66	64.6	10	----	61.4	3.2	8	-4.8
R222	196	1	0.0	63.3	66	63.3	10	----	61.0	2.3	8	-5.7
R223	198	1	0.0	62.5	66	62.5	10	----	60.1	2.4	8	-5.6
R224	199	1	0.0	61.6	66	61.6	10	----	59.8	1.8	8	-6.2

Dwelling Units	**# DUs**	**Noise Reduction**		
		Min	**Avg**	**Max**
		dB	**dB**	**dB**
All Selected	29	1.5	5.2	11.9
All Impacted	17	3.3	7.1	11.9
All that meet NR Goal	7	8.3	10.7	11.9

I-15; Payson Main Street Interchange
Noise Analysis

Alternative C3 - Barrier 3

			NAC			Taller Wall			Intermediate Wall			Shorter Wall		
Receptor	First Row	Residences Represented	Land Use Category	Existing dB(A)	Build dB(A)	W/Wall dB(A)	Reduction dB(A)	Benefited Properties	W/Wall dB(A)	Reduction dB(A)	Benefited Properties	W/Wall dB(A)	Reduction dB(A)	Benefited Properties
R003		1	B	61	64	58	6	1	58	6	1		64	1
R004	Yes	1	B	63	65	59	6	1	59	6	1	61	4	
R005		2	B	65	66	60	6	2	60	6	2	62	4	
R006	Yes	2	B	66	67	60	7	2	61	6	2	63	4	
R007	Yes	2	B	67	69	61	8	2	62	7	2	64	5	2
R008		2	B	63	65	59	6	2	59	6	2	61	4	
R009		2	B	63	65	58	7	2	59	6	2	61	4	
R010	Yes	3	B	65	67	59	8	3	60	7	3	62	5	3
R011	Yes	3	B	60	62	55	7	3	55	7	3	56	6	3
R012	Yes	3	B	66	68	59	9	3	60	8	3	61	7	3
R013	Yes	2	B	66	68	59	9	2	60	8	2	61	7	2
R177		2	B	63	65	58	7	2	58	7	2	59	6	2
R178		2	B	63	65	58	7	2	59	6	2	60	5	2
R179		2	B	62	64	57	7	2	58	6	2	60	4	
R180		2	B	62	65	58	7	2	58	7	2	60	5	2
R181		3	B	62	64	57	7	3	58	6	3	60	4	
R182		2	B	61	64	58	6	2	58	6	2	60	4	
R183		2	B	61	63	57	6	2	58	5	2	59	4	
R184		2	B	62	64	58	6	2	59	5	2	60	4	
R185		2	B	60	63	57	6	2	57	6	2	59	4	
R186		2	B	64	66	58	8	2	58	8	2	59	7	2
R187	Yes	2	B	67	68	60	8	2	61	7	2	61	7	2
R188		2	B	63	65	57	8	2	57	8	2	58	7	2
R189	Yes	2	B	67	69	60	9	2	61	8	2	62	7	2
R190		2	B	63	65	56	9	2	57	8	2	57	8	2
R191	Yes	2	B	68	70	60	10	2	61	9	2	62	8	2
R192		2	B	61	63	56	7	2	56	7	2	57	6	2
R225	Yes	1	B	67	69	60	9	1	61	8	1	62	7	1
R226		1	B	66	68	59	9	1	60	8	1	61	7	1
R227	Yes	1	B	68	70	61	9	1	62	8	1	63	7	1
R228		2	B	64	66	59	7	2	59	7	2	60	6	2
R229		2	B	65	67	60	7	2	61	6	2	62	5	2
R230	Yes	1	B	68	70	62	8	1	62	8	1	63	7	1
R231	Yes	2	B	69	71	63	8	2	63	8	2	64	7	2
R232		2	B	65	67	60	7	2	61	6	2	62	5	2
R233		2	B	66	68	62	6	2	63	5	2	64	4	
R234	Yes	1	B	72	73	66	7	1	67	6	1	68	5	1
R246		1	B	63	65	58	7	1	58	7	1	59	6	1
R247		2	B	62	64	58	6	2	59	5	2	60	4	
R248		1	B	60	63	57	6	1	58	5	1	58	5	1
R249		1	B	66	68	65	3		65	3		66	2	

= Impacted receptor
= 5 dB(A) reduction or better
= 7 dB(A) reduction or better

Length =	3397	3397	3397
Average Height =	16	14	12
Area of Noise Barrier =	54379	47583	40783
Cost of Noise Barrier=	$ 1,087,580	$ 951,660	$ 815,660
Properties With a 5 dB(A) Reduction =	75	75	49
Impacted Properties =	38	38	38
Impacted Front-Row Properties =	24	24	24
Impacted Front-Row Properties with a 5 dB(A) Reduction =	24	24	22
Percentage of Impacted Front-Row Properties Reduced At Least 5 dB(A) =	100%	100%	92%
Feasible =	Yes	Yes	Yes
First Row Properties =	28	28	28
First Row Properties with 7 dB(A) Reduction=	27	24	16
Percentage of First Row Reduced At Least 7 dB(A) =	96%	86%	57%
Reasonable (Meets Noise Reduction Goal)=	Yes	Yes	Yes
Cost / Benefitted Property =	$ 14,501	$ 12,689	$ 16,646
Cost Reasonable =	Yes	Yes	Yes

UTAH DEPARTMENT OF TRANSPORTATION
NOISE ABATEMENT RECOMMENDATION CHECKLIST

Project Location: I-15; Payson Main Street Interchange EIS
Project Concept: Alternative C3
Project Number: F-115-6(214)251
PIN: 10263
Prepared By: D. Shannon / Lochner
Receptor Name/Description: Barrier 3

Determination of Acoustic Feasibility

Does the noise abatement achieve at least a 5 dBA reduction in highway traffic noise for at least 50 percent of front-row receptors?

Yes____X_____ No_____

If yes, proceed to Question #1. If no, abatement measures are not feasible and are not recommended at this site; proceed to decision segment of form.

Determination of Feasible and Reasonable Mitigation

1. Does the design noise level equal or exceed the UDOT Noise Abatement Criteria as defined in Table 1 of this Policy?
   Yes____X_____ No_____

If yes, proceed to Question #3. If no, proceed to Question #2.

2. Does the receptor, as a result of the design noise level, substantially exceed (10 or more dBA) the existing noise levels prior to construction?
   Yes_____ No_____

If yes, proceed to Question #3. If no, then noise abatement is not recommended; proceed to decision segment of form.

3. Can effective noise abatement be constructed which would provide a minimum reduction of 7 dBA for at least 35 percent of front-row receptors?
   Yes_____X_____ No_____

If yes, proceed to Question #4. If no, abatement measures are not reasonable and are not recommended at this site; proceed to decision segment of form.

4. Are there undeveloped lands along the project corridor?
   Yes_____X_____ No_____
   If yes, proceed to Question #5. If no, proceed to Question #6.
5. Were the undeveloped lands permitted (formal building permit issued) for development under Land Use Categories A, B, C, D or E prior to the date the final environmental decision document was approved?
   Yes_____ No____X_____

If yes, proceed to Question #6. If no, implementation of abatement is not reasonable. Noise abatement is the responsibility of the property owner/developer. Proceed to decision segment of form.

6. Can noise abatement measures be constructed without creating a safety hazard to users and residents, and not interfere with operations and maintenance of the highway facility?
Yes_____X_____ No_____

If yes, proceed to Question #7. If no, abatement measures are not recommended at this site; proceed to decision segment of form.

7. Does the cost per impacted and benefited residence exceed $30,000 for residential areas in Land Use Category B or exceed $360 per linear foot for nonresidential areas in Land Use Category A and/or C or commercial and/or industrial zoned areas in Land Use Category E?
Yes_____ No_____X_____

If yes, noise abatement measures are not considered reasonable; proceed to decision segment of form. If no, proceed to Question #8.

8. For urban roadways that are not access-controlled, is the noise barrier height less than or equal to the distance from the wall face to the back of curb?
Yes_____X_____ No_____

If yes, proceed to Question #9. If no, noise abatement measures are not considered feasible based on safety; proceed to decision section of the form.

9. Does public involvement voting result in at least 75 percent of ballots returned?
Yes_____ No_____ To Be Completed _____X_____

If yes, proceed to Question #10. If no, noise abatement measures are not considered reasonable; proceed to decision segment of form.

10. Does the Public Involvement balloting result in at least 75 percent of benefited and end of wall receptors voting in "favor" of the proposed noise abatement measure?
Yes_____ No_____ To Be Completed _____X_____

If yes, proceed to Question #11. If no, noise abatement measures are not considered reasonable; proceed to decision segment of form.

11. Are there any environmental impacts that need special attention as a result of the implementation of the noise abatement?
Yes_____ No_____X_____

If yes, outline these impacts and discuss with the Environmental Manager or Region Project Manager.

Decision

Are Abatement Measures feasible? Yes____X____ No_____
Are Abatement Measures reasonable? Yes____X____ No_____

HWL 15 February 2017
ECS TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: Payson
RUN: Payson_C3_Bar3
BARRIER DESIGN: Bar3-12'-C3
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
R003	3	1	0.0	63.0	66	63.0	10	----	59.5	3.5	8	-4.5
R004	4	1	0.0	64.4	66	64.4	10	----	60.8	3.6	8	-4.4
R005	5	1	0.0	65.7	66	65.7	10	----	61.8	3.9	8	-4.1
R006	6	1	0.0	67.0	66	67.0	10	Snd Lvl	62.7	4.3	8	-3.7
R007	7	1	0.0	68.8	66	68.8	10	Snd Lvl	63.8	5.0	8	-3.0
R008	8	1	0.0	64.9	66	64.9	10	----	60.9	4.0	8	-4.0
R009	9	1	0.0	65.0	66	65.0	10	----	60.8	4.2	8	-3.8
R010	10	1	0.0	66.9	66	66.9	10	Snd Lvl	61.5	5.4	8	-2.6
R011	11	1	0.0	61.8	66	61.8	10	----	56.4	5.4	8	-2.6
R012	12	1	0.0	68.1	66	68.1	10	Snd Lvl	61.1	7.0	8	-1.0
R013	13	1	0.0	68.0	66	68.0	10	Snd Lvl	60.7	7.3	8	-0.7
R177	180	1	0.0	65.2	66	65.2	10	----	58.5	6.7	8	-1.3
R178	181	1	0.0	65.2	66	65.2	10	----	59.8	5.4	8	-2.6
R179	182	1	0.0	63.8	66	63.8	10	----	59.6	4.2	8	-3.8
R180	183	1	0.0	64.5	66	64.5	10	----	59.8	4.7	8	-3.3
R181	184	1	0.0	63.6	66	63.6	10	----	59.6	4.0	8	-4.0
R182	185	1	0.0	63.4	66	63.4	10	----	59.8	3.6	8	-4.4
R183	186	1	0.0	62.6	66	62.6	10	----	59.2	3.4	8	-4.6
R184	187	1	0.0	63.7	66	63.7	10	----	60.1	3.6	8	-4.4
R185	188	1	0.0	62.2	66	62.2	10	----	58.8	3.4	8	-4.6
R186	190	1	0.0	65.6	66	65.6	10	----	58.8	6.8	8	-1.2
R187	191	1	0.0	68.2	66	68.2	10	Snd Lvl	61.2	7.0	8	-1.0
R188	192	1	0.0	65.0	66	65.0	10	----	57.9	7.1	8	-0.9
R189	193	1	0.0	69.0	66	69.0	10	Snd Lvl	61.5	7.5	8	-0.5

R190	194	1	0.0	64.5	66	64.5	10	----	57.3	7.2	8	-0.8
R191	195	1	0.0	69.7	66	69.7	10	Snd Lvl	61.9	7.8	8	-0.2
R192	196	1	0.0	62.5	66	62.5	10	----	56.6	5.9	8	-2.1
R225	198	1	0.0	69.0	66	69.0	10	Snd Lvl	61.8	7.2	8	-0.8
R226	199	1	0.0	67.5	66	67.5	10	Snd Lvl	60.6	6.9	8	-1.1
R227	200	1	0.0	70.1	66	70.1	10	Snd Lvl	62.6	7.5	8	-0.5
R228	201	1	0.0	65.7	66	65.7	10	----	59.9	5.8	8	-2.2
R229	202	1	0.0	66.5	66	66.5	10	Snd Lvl	61.5	5.0	8	-3.0
R230	203	1	0.0	69.9	66	69.9	10	Snd Lvl	63.1	6.8	8	-1.2
R231	204	1	0.0	70.7	66	70.7	10	Snd Lvl	64.1	6.6	8	-1.4
R232	205	1	0.0	66.2	66	66.2	10	Snd Lvl	61.6	4.6	8	-3.4
R233	206	1	0.0	67.8	66	67.8	10	Snd Lvl	63.7	4.1	8	-3.9
R234	207	1	0.0	72.2	66	72.2	10	Snd Lvl	67.7	4.5	8	-3.5
R246	230	1	0.0	65.0	66	65.0	10	----	58.9	6.1	8	-1.9
R247	231	1	0.0	63.9	66	63.9	10	----	59.6	4.3	8	-3.7
R248	232	1	0.0	61.9	66	61.9	10	----	58.3	3.6	8	-4.4
R249	233	1	0.0	67.9	66	67.9	10	Snd Lvl	65.5	2.4	8	-5.6

Dwelling Units	**# DUs**	**Noise Reduction**		
		Min	**Avg**	**Max**
		dB	**dB**	**dB**
All Selected	41	2.4	5.3	7.8
All Impacted	18	2.4	5.9	7.8
All that meet NR Goal	0	0.0	0.0	0.0

HWL 15 February 2017
ECS TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: Payson
RUN: Payson_C3_Bar3
BARRIER DESIGN: Bar3-14'-C3
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver												
Name	No.	#DUs	Existing	No Barrier					With Barrier			
			LAeq1h	LAeq1h		Increase over existing		Type	Calculated	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n	Impact	LAeq1h	Calculated	Goal	Calculated
							Sub'l Inc					minus
												Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
R003	3	1	0.0	63.0	66	63.0	10	----	58.1	4.9	8	-3.1
R004	4	1	0.0	64.4	66	64.4	10	----	59.4	5.0	8	-3.0
R005	5	1	0.0	65.7	66	65.7	10	----	60.2	5.5	8	-2.5
R006	6	1	0.0	67.0	66	67.0	10	Snd Lvl	61.1	5.9	8	-2.1
R007	7	1	0.0	68.8	66	68.8	10	Snd Lvl	62.2	6.6	8	-1.4
R008	8	1	0.0	64.9	66	64.9	10	----	59.2	5.7	8	-2.3
R009	9	1	0.0	65.0	66	65.0	10	----	59.0	6.0	8	-2.0
R010	10	1	0.0	66.9	66	66.9	10	Snd Lvl	59.7	7.2	8	-0.8
R011	11	1	0.0	61.8	66	61.8	10	----	55.2	6.6	8	-1.4
R012	12	1	0.0	68.1	66	68.1	10	Snd Lvl	60.1	8.0	8	0.0
R013	13	1	0.0	68.0	66	68.0	10	Snd Lvl	59.9	8.1	8	0.1
R177	180	1	0.0	65.2	66	65.2	10	----	57.9	7.3	8	-0.7
R178	181	1	0.0	65.2	66	65.2	10	----	58.8	6.4	8	-1.6
R179	182	1	0.0	63.8	66	63.8	10	----	58.1	5.7	8	-2.3
R180	183	1	0.0	64.5	66	64.5	10	----	58.2	6.3	8	-1.7
R181	184	1	0.0	63.6	66	63.6	10	----	58.1	5.5	8	-2.5
R182	185	1	0.0	63.4	66	63.4	10	----	58.3	5.1	8	-2.9
R183	186	1	0.0	62.6	66	62.6	10	----	57.7	4.9	8	-3.1
R184	187	1	0.0	63.7	66	63.7	10	----	58.6	5.1	8	-2.9
R185	188	1	0.0	62.2	66	62.2	10	----	57.4	4.8	8	-3.2
R186	190	1	0.0	65.6	66	65.6	10	----	58.2	7.4	8	-0.6
R187	191	1	0.0	68.2	66	68.2	10	Snd Lvl	60.5	7.7	8	-0.3
R188	192	1	0.0	65.0	66	65.0	10	----	57.1	7.9	8	-0.1
R189	193	1	0.0	69.0	66	69.0	10	Snd Lvl	60.5	8.5	8	0.5

R190	194	1	0.0	64.5	66	64.5	10	----	56.6	7.9	8	-0.1
R191	195	1	0.0	69.7	66	69.7	10	Snd Lvl	61.0	8.7	8	0.7
R192	196	1	0.0	62.5	66	62.5	10	----	56.0	6.5	8	-1.5
R225	198	1	0.0	69.0	66	69.0	10	Snd Lvl	61.0	8.0	8	0.0
R226	199	1	0.0	67.5	66	67.5	10	Snd Lvl	59.8	7.7	8	-0.3
R227	200	1	0.0	70.1	66	70.1	10	Snd Lvl	61.8	8.3	8	0.3
R228	201	1	0.0	65.7	66	65.7	10	----	59.2	6.5	8	-1.5
R229	202	1	0.0	66.5	66	66.5	10	Snd Lvl	60.6	5.9	8	-2.1
R230	203	1	0.0	69.9	66	69.9	10	Snd Lvl	62.3	7.6	8	-0.4
R231	204	1	0.0	70.7	66	70.7	10	Snd Lvl	63.1	7.6	8	-0.4
R232	205	1	0.0	66.2	66	66.2	10	Snd Lvl	60.8	5.4	8	-2.6
R233	206	1	0.0	67.8	66	67.8	10	Snd Lvl	62.7	5.1	8	-2.9
R234	207	1	0.0	72.2	66	72.2	10	Snd Lvl	66.5	5.7	8	-2.3
R246	230	1	0.0	65.0	66	65.0	10	----	58.2	6.8	8	-1.2
R247	231	1	0.0	63.9	66	63.9	10	----	58.8	5.1	8	-2.9
R248	232	1	0.0	61.9	66	61.9	10	----	57.7	4.2	8	-3.8
R249	233	1	0.0	67.9	66	67.9	10	Snd Lvl	65.0	2.9	8	-5.1

Dwelling Units	**# DUs**	**Noise Reduction**		
		Min	**Avg**	**Max**
		dB	**dB**	**dB**
All Selected	41	2.9	6.4	8.7
All Impacted	18	2.9	6.9	8.7
All that meet NR Goal	6	8.0	8.3	8.7

HWL 15 February 2017
ECS TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: Payson
RUN: Payson_C3_Bar3
BARRIER DESIGN: Bar3-16'-C3
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver												
Name	No.	#DUs	Existing	No Barrier					With Barrier			
			LAeq1h	LAeq1h		Increase over existing		Type	Calculated	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n	Impact	LAeq1h	Calculated	Goal	Calculated
							Sub'l Inc					minus
												Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
R003	3	1	0.0	63.0	66	63.0	10	----	57.6	5.4	8	-2.6
R004	4	1	0.0	64.4	66	64.4	10	----	58.9	5.5	8	-2.5
R005	5	1	0.0	65.7	66	65.7	10	----	59.5	6.2	8	-1.8
R006	6	1	0.0	67.0	66	67.0	10	Snd Lvl	60.3	6.7	8	-1.3
R007	7	1	0.0	68.8	66	68.8	10	Snd Lvl	61.4	7.4	8	-0.6
R008	8	1	0.0	64.9	66	64.9	10	----	58.5	6.4	8	-1.6
R009	9	1	0.0	65.0	66	65.0	10	----	58.2	6.8	8	-1.2
R010	10	1	0.0	66.9	66	66.9	10	Snd Lvl	58.9	8.0	8	0.0
R011	11	1	0.0	61.8	66	61.8	10	----	54.7	7.1	8	-0.9
R012	12	1	0.0	68.1	66	68.1	10	Snd Lvl	59.3	8.8	8	0.8
R013	13	1	0.0	68.0	66	68.0	10	Snd Lvl	59.2	8.8	8	0.8
R177	180	1	0.0	65.2	66	65.2	10	----	57.6	7.6	8	-0.4
R178	181	1	0.0	65.2	66	65.2	10	----	58.0	7.2	8	-0.8
R179	182	1	0.0	63.8	66	63.8	10	----	57.3	6.5	8	-1.5
R180	183	1	0.0	64.5	66	64.5	10	----	57.7	6.8	8	-1.2
R181	184	1	0.0	63.6	66	63.6	10	----	57.3	6.3	8	-1.7
R182	185	1	0.0	63.4	66	63.4	10	----	57.6	5.8	8	-2.2
R183	186	1	0.0	62.6	66	62.6	10	----	56.9	5.7	8	-2.3
R184	187	1	0.0	63.7	66	63.7	10	----	57.9	5.8	8	-2.2
R185	188	1	0.0	62.2	66	62.2	10	----	56.6	5.6	8	-2.4
R186	190	1	0.0	65.6	66	65.6	10	----	57.7	7.9	8	-0.1
R187	191	1	0.0	68.2	66	68.2	10	Snd Lvl	59.9	8.3	8	0.3
R188	192	1	0.0	65.0	66	65.0	10	----	56.5	8.5	8	0.5
R189	193	1	0.0	69.0	66	69.0	10	Snd Lvl	59.8	9.2	8	1.2

R190	194	1	0.0	64.5	66	64.5	10	----	56.1	8.4	8	0.4
R191	195	1	0.0	69.7	66	69.7	10	Snd Lvl	60.1	9.6	8	1.6
R192	196	1	0.0	62.5	66	62.5	10	----	55.5	7.0	8	-1.0
R225	198	1	0.0	69.0	66	69.0	10	Snd Lvl	60.3	8.7	8	0.7
R226	199	1	0.0	67.5	66	67.5	10	Snd Lvl	59.3	8.2	8	0.2
R227	200	1	0.0	70.1	66	70.1	10	Snd Lvl	61.2	8.9	8	0.9
R228	201	1	0.0	65.7	66	65.7	10	----	58.7	7.0	8	-1.0
R229	202	1	0.0	66.5	66	66.5	10	Snd Lvl	60.0	6.5	8	-1.5
R230	203	1	0.0	69.9	66	69.9	10	Snd Lvl	61.7	8.2	8	0.2
R231	204	1	0.0	70.7	66	70.7	10	Snd Lvl	62.5	8.2	8	0.2
R232	205	1	0.0	66.2	66	66.2	10	Snd Lvl	60.4	5.8	8	-2.2
R233	206	1	0.0	67.8	66	67.8	10	Snd Lvl	62.3	5.5	8	-2.5
R234	207	1	0.0	72.2	66	72.2	10	Snd Lvl	66.1	6.1	8	-1.9
R246	230	1	0.0	65.0	66	65.0	10	----	57.8	7.2	8	-0.8
R247	231	1	0.0	63.9	66	63.9	10	----	58.4	5.5	8	-2.5
R248	232	1	0.0	61.9	66	61.9	10	----	57.4	4.5	8	-3.5
R249	233	1	0.0	67.9	66	67.9	10	Snd Lvl	64.9	3.0	8	-5.0

Dwelling Units	**# DUs**	**Noise Reduction**		
		Min	**Avg**	**Max**
		dB	**dB**	**dB**
All Selected	41	3.0	7.0	9.6
All Impacted	18	3.0	7.5	9.6
All that meet NR Goal	13	8.0	8.6	9.6

I-15; Payson Main Street Interchange
Noise Analysis

Alternative C3 - Barrier 4

			NAC			Taller Wall			Intermediate Wall			Shorter Wall		
Receptor	First Row	Residences Represented	Land Use Category	Existing dB(A)	Build dB(A)	W/Wall dB(A)	Reduction dB(A)	Benefited Properties	W/Wall dB(A)	Reduction dB(A)	Benefited Properties	W/Wall dB(A)	Reduction dB(A)	Benefited Properties
R196	Yes	2	B	68	70	67	3		67	3		67	3	
R197	Yes	2	B	73	75	68	7	2	68	7	2	68	7	2
R198	Yes	2	B	76	78	68	10	2	69	9	2	69	9	2
R199	Yes	2	B	77	79	68	11	2	69	10	2	70	9	2
R200	Yes	2	B	75	77	67	10	2	67	10	2	68	9	2
R201	Yes	2	B	76	78	66	12	2	67	11	2	67	11	2
R202	Yes	2	B	70	72	65	7	2	65	7	2	66	6	2
R203	Yes	1	B	75	78	65	13	1	66	12	1	66	12	1
R204	Yes	1	B	74	76	65	11	1	66	10	1	66	10	1
R205		1	B	67	72	67	5	1	67	5	1	68	4	
R206		1	B	66	70	66	4		66	4		67	3	
R207		2	B	65	68	65	3		65	3		65	3	
R208		1	B	66	69	64	5	1	64	5	1	65	4	
R209		1	B	62	65	61	4		62	3		62	3	
R210		1	B	64	66	61	5	1	62	4		63	3	
R211		1	B	68	70	64	6	1	64	6	1	66	4	
R212		2	B	65	67	63	4		63	4		64	3	
R213		2	B	63	66	62	4		63	3		63	3	
R214		2	B	62	65	61	4		61	4		62	3	
R215		2	B	61	64	60	4		60	4		61	3	
R216		2	B	60	62	59	3		60	2		60	2	
R217		2	B	59	61	58	3		58	3		59	2	
R218		1	B	66	68	64	4		65	3		66	2	
R219		1	B	66	68	64	4		64	4		65	3	
R220		1	B	60	63	62	1		62	1		62	1	
R221		1	B	62	64	62	2		62	2		63	1	
R222		1	B	60	63	62	1		62	1		62	1	
R223		2	B	60	62	60	2		61	1		61	1	
R224		2	B	59	61	60	1		60	1		61		

= Impacted receptor
= 5 dB(A) reduction or better
= 7 dB(A) reduction or better

Length =	800	800	800
Average Height =	16	15	14
Area of Noise Barrier =	12801	12001	11200
Cost of Noise Barrier=	$ 256,020	$ 240,020	$ 224,000
Properties With a 5 dB(A) Reduction =	18	17	14
Impacted Properties =	29	29	29
Impacted Front-Row Properties =	16	16	16
Impacted Front-Row Properties with a 5 dB(A) Reduction =	14	14	14
Percentage of Impacted Front-Row Properties Reduced At Least 5 dB(A) =	88%	88%	88%
Feasible =	Yes	Yes	Yes
First Row Properties =	16	16	16
First Row Properties with 7 dB(A) Reduction=	14	14	12
Percentage of First Row Reduced At Least 7 dB(A) =	88%	88%	86%
Reasonable (Meets Noise Reduction Goal)=	Yes	Yes	Yes
Cost / Benefitted Property =	$ 14,223	$ 14,119	$ 16,000
Cost Reasonable =	Yes	Yes	Yes

UTAH DEPARTMENT OF TRANSPORTATION
NOISE ABATEMENT RECOMMENDATION CHECKLIST

Project Location: I-15; Payson Main Street Interchange EIS
Project Concept: Alternative C3
Project Number: F-115-6(214)251
PIN: 10263
Prepared By: D. Shannon / Lochner
Receptor Name/Description: Barrier 4

Determination of Acoustic Feasibility

Does the noise abatement achieve at least a 5 dBA reduction in highway traffic noise for at least 50 percent of front-row receptors?

Yes____X_____ No_____

If yes, proceed to Question #1. If no, abatement measures are not feasible and are not recommended at this site; proceed to decision segment of form.

Determination of Feasible and Reasonable Mitigation

1. Does the design noise level equal or exceed the UDOT Noise Abatement Criteria as defined in Table 1 of this Policy?
   Yes____X_____ No_____

If yes, proceed to Question #3. If no, proceed to Question #2.

2. Does the receptor, as a result of the design noise level, substantially exceed (10 or more dBA) the existing noise levels prior to construction?
   Yes_____ No_____

If yes, proceed to Question #3. If no, then noise abatement is not recommended; proceed to decision segment of form.

3. Can effective noise abatement be constructed which would provide a minimum reduction of 7 dBA for at least 35 percent of front-row receptors?
   Yes_____X_____ No_____

If yes, proceed to Question #4. If no, abatement measures are not reasonable and are not recommended at this site; proceed to decision segment of form.

4. Are there undeveloped lands along the project corridor?
   Yes_____X_____ No_____
   If yes, proceed to Question #5. If no, proceed to Question #6.
5. Were the undeveloped lands permitted (formal building permit issued) for development under Land Use Categories A, B, C, D or E prior to the date the final environmental decision document was approved?
   Yes_____ No____X_____

If yes, proceed to Question #6. If no, implementation of abatement is not reasonable. Noise abatement is the responsibility of the property owner/developer. Proceed to decision segment of form.

6. Can noise abatement measures be constructed without creating a safety hazard to users and residents, and not interfere with operations and maintenance of the highway facility?
Yes_____X_____ No_____

If yes, proceed to Question #7. If no, abatement measures are not recommended at this site; proceed to decision segment of form.

7. Does the cost per impacted and benefited residence exceed $30,000 for residential areas in Land Use Category B or exceed $360 per linear foot for nonresidential areas in Land Use Category A and/or C or commercial and/or industrial zoned areas in Land Use Category E?
Yes_____ No_____X_____

If yes, noise abatement measures are not considered reasonable; proceed to decision segment of form. If no, proceed to Question #8.

8. For urban roadways that are not access-controlled, is the noise barrier height less than or equal to the distance from the wall face to the back of curb?
Yes_____X_____ No_____

If yes, proceed to Question #9. If no, noise abatement measures are not considered feasible based on safety; proceed to decision section of the form.

9. Does public involvement voting result in at least 75 percent of ballots returned?
Yes_____ No_____ To Be Completed _____X_____

If yes, proceed to Question #10. If no, noise abatement measures are not considered reasonable; proceed to decision segment of form.

10. Does the Public Involvement balloting result in at least 75 percent of benefited and end of wall receptors voting in "favor" of the proposed noise abatement measure?
Yes_____ No_____ To Be Completed _____X_____

If yes, proceed to Question #11. If no, noise abatement measures are not considered reasonable; proceed to decision segment of form.

11. Are there any environmental impacts that need special attention as a result of the implementation of the noise abatement?
Yes_____ No_____X_____

If yes, outline these impacts and discuss with the Environmental Manager or Region Project Manager.

Decision

Are Abatement Measures feasible? Yes____X____ No_____
Are Abatement Measures reasonable? Yes____X____ No_____

HWL 15 February 2017
JPW TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: Payson
RUN: Payson_C3_Bar4
BARRIER DESIGN: Bar4-14'-C3
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver												
Name	No.	#DUs	Existing	No Barrier					With Barrier			
			LAeq1h	LAeq1h		Increase over existing		Type	Calculated	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n	Impact	LAeq1h	Calculated	Goal	Calculated
							Sub'l Inc					minus
												Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
R196	198	1	0.0	70.4	66	70.4	10	Snd Lvl	67.2	3.2	8	-4.8
R197	199	1	0.0	75.7	66	75.7	10	Snd Lvl	68.3	7.4	8	-0.6
R198	200	1	0.0	78.7	66	78.7	10	Snd Lvl	69.4	9.3	8	1.3
R199	201	1	0.0	79.2	66	79.2	10	Snd Lvl	69.8	9.4	8	1.4
R200	202	1	0.0	76.9	66	76.9	10	Snd Lvl	67.9	9.0	8	1.0
R201	203	1	0.0	78.1	66	78.1	10	Snd Lvl	67.2	10.9	8	2.9
R202	204	1	0.0	72.3	66	72.3	10	Snd Lvl	65.7	6.6	8	-1.4
R203	205	1	0.0	77.6	66	77.6	10	Snd Lvl	66.3	11.3	8	3.3
R204	206	1	0.0	76.2	66	76.2	10	Snd Lvl	66.1	10.1	8	2.1
R205	207	1	0.0	71.7	66	71.7	10	Snd Lvl	67.6	4.1	8	-3.9
R206	208	1	0.0	70.2	66	70.2	10	Snd Lvl	66.5	3.7	8	-4.3
R207	209	1	0.0	68.1	66	68.1	10	Snd Lvl	65.3	2.8	8	-5.2
R208	210	1	0.0	68.4	66	68.4	10	Snd Lvl	65.3	3.1	8	-4.9
R209	211	1	0.0	64.3	66	64.3	10	----	62.4	1.9	8	-6.1
R210	212	1	0.0	65.7	66	65.7	10	----	63.1	2.6	8	-5.4
R211	213	1	0.0	70.0	66	70.0	10	Snd Lvl	66.1	3.9	8	-4.1
R212	214	1	0.0	66.7	66	66.7	10	Snd Lvl	64.1	2.6	8	-5.4
R213	215	1	0.0	65.3	66	65.3	10	----	63.2	2.1	8	-5.9
R214	216	1	0.0	64.0	66	64.0	10	----	62.0	2.0	8	-6.0
R215	217	1	0.0	62.5	66	62.5	10	----	60.9	1.6	8	-6.4
R216	218	1	0.0	61.0	66	61.0	10	----	59.9	1.1	8	-6.9
R217	219	1	0.0	59.8	66	59.8	10	----	58.7	1.1	8	-6.9
R218	220	1	0.0	68.5	66	68.5	10	Snd Lvl	65.7	2.8	8	-5.2
R219	221	1	0.0	68.2	66	68.2	10	Snd Lvl	64.6	3.6	8	-4.4

R220	222	1	0.0	63.5	66	63.5	10	----	62.1	1.4	8	-6.6
R221	223	1	0.0	64.6	66	64.6	10	----	62.5	2.1	8	-5.9
R222	224	1	0.0	63.6	66	63.6	10	----	62.2	1.4	8	-6.6
R223	225	1	0.0	62.6	66	62.6	10	----	61.0	1.6	8	-6.4
R224	226	1	0.0	61.8	66	61.8	10	----	60.6	1.2	8	-6.8

Dwelling Units	**# DUs**	**Noise Reduction**		
		Min	**Avg**	**Max**
		dB	**dB**	**dB**
All Selected	29	1.1	4.3	11.3
All Impacted	17	2.6	6.1	11.3
All that meet NR Goal	6	9.0	10.0	11.3

HWL 15 February 2017
JPW TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: Payson
RUN: Payson_C3_Bar4
BARRIER DESIGN: Bar4-15'-C3
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver												
Name	No.	#DUs	Existing	No Barrier					With Barrier			
			LAeq1h	LAeq1h		Increase over existing		Type	Calculated	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n	Impact	LAeq1h	Calculated	Goal	Calculated
							Sub'l Inc					minus
												Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
R196	198	1	0.0	70.4	66	70.4	10	Snd Lvl	67.1	3.3	8	-4.7
R197	199	1	0.0	75.7	66	75.7	10	Snd Lvl	67.9	7.8	8	-0.2
R198	200	1	0.0	78.7	66	78.7	10	Snd Lvl	68.6	10.1	8	2.1
R199	201	1	0.0	79.2	66	79.2	10	Snd Lvl	69.0	10.2	8	2.2
R200	202	1	0.0	76.9	66	76.9	10	Snd Lvl	67.2	9.7	8	1.7
R201	203	1	0.0	78.1	66	78.1	10	Snd Lvl	66.6	11.5	8	3.5
R202	204	1	0.0	72.3	66	72.3	10	Snd Lvl	65.2	7.1	8	-0.9
R203	205	1	0.0	77.6	66	77.6	10	Snd Lvl	65.7	11.9	8	3.9
R204	206	1	0.0	76.2	66	76.2	10	Snd Lvl	65.6	10.6	8	2.6
R205	207	1	0.0	71.7	66	71.7	10	Snd Lvl	67.4	4.3	8	-3.7
R206	208	1	0.0	70.2	66	70.2	10	Snd Lvl	66.2	4.0	8	-4.0
R207	209	1	0.0	68.1	66	68.1	10	Snd Lvl	64.8	3.3	8	-4.7
R208	210	1	0.0	68.4	66	68.4	10	Snd Lvl	64.3	4.1	8	-3.9
R209	211	1	0.0	64.3	66	64.3	10	----	61.6	2.7	8	-5.3
R210	212	1	0.0	65.7	66	65.7	10	----	61.8	3.9	8	-4.1
R211	213	1	0.0	70.0	66	70.0	10	Snd Lvl	64.3	5.7	8	-2.3
R212	214	1	0.0	66.7	66	66.7	10	Snd Lvl	63.1	3.6	8	-4.4
R213	215	1	0.0	65.3	66	65.3	10	----	62.5	2.8	8	-5.2
R214	216	1	0.0	64.0	66	64.0	10	----	61.4	2.6	8	-5.4
R215	217	1	0.0	62.5	66	62.5	10	----	60.4	2.1	8	-5.9
R216	218	1	0.0	61.0	66	61.0	10	----	59.5	1.5	8	-6.5
R217	219	1	0.0	59.8	66	59.8	10	----	58.4	1.4	8	-6.6
R218	220	1	0.0	68.5	66	68.5	10	Snd Lvl	64.7	3.8	8	-4.2
R219	221	1	0.0	68.2	66	68.2	10	Snd Lvl	64.2	4.0	8	-4.0

R220	222	1	0.0	63.5	66	63.5	10	----	61.7	1.8	8	-6.2
R221	223	1	0.0	64.6	66	64.6	10	----	61.8	2.8	8	-5.2
R222	224	1	0.0	63.6	66	63.6	10	----	61.7	1.9	8	-6.1
R223	225	1	0.0	62.6	66	62.6	10	----	60.5	2.1	8	-5.9
R224	226	1	0.0	61.8	66	61.8	10	----	60.2	1.6	8	-6.4

Dwelling Units	**# DUs**	**Noise Reduction**		
		Min	**Avg**	**Max**
		dB	**dB**	**dB**
All Selected	29	1.4	4.9	11.9
All Impacted	17	3.3	6.8	11.9
All that meet NR Goal	6	9.7	10.7	11.9

HWL 15 February 2017
JPW TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: Payson
RUN: Payson_C3_Bar4
BARRIER DESIGN: Bar4-16'-C3
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver												
Name	No.	#DUs	Existing	No Barrier					With Barrier			
			LAeq1h	LAeq1h		Increase over existing		Type	Calculated	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n	Impact	LAeq1h	Calculated	Goal	Calculated
							Sub'l Inc					minus
												Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
R196	198	1	0.0	70.4	66	70.4	10	Snd Lvl	67.0	3.4	8	-4.6
R197	199	1	0.0	75.7	66	75.7	10	Snd Lvl	67.6	8.1	8	0.1
R198	200	1	0.0	78.7	66	78.7	10	Snd Lvl	68.1	10.6	8	2.6
R199	201	1	0.0	79.2	66	79.2	10	Snd Lvl	68.2	11.0	8	3.0
R200	202	1	0.0	76.9	66	76.9	10	Snd Lvl	66.6	10.3	8	2.3
R201	203	1	0.0	78.1	66	78.1	10	Snd Lvl	66.0	12.1	8	4.1
R202	204	1	0.0	72.3	66	72.3	10	Snd Lvl	64.7	7.6	8	-0.4
R203	205	1	0.0	77.6	66	77.6	10	Snd Lvl	65.2	12.4	8	4.4
R204	206	1	0.0	76.2	66	76.2	10	Snd Lvl	65.2	11.0	8	3.0
R205	207	1	0.0	71.7	66	71.7	10	Snd Lvl	67.2	4.5	8	-3.5
R206	208	1	0.0	70.2	66	70.2	10	Snd Lvl	66.0	4.2	8	-3.8
R207	209	1	0.0	68.1	66	68.1	10	Snd Lvl	64.6	3.5	8	-4.5
R208	210	1	0.0	68.4	66	68.4	10	Snd Lvl	63.7	4.7	8	-3.3
R209	211	1	0.0	64.3	66	64.3	10	----	61.0	3.3	8	-4.7
R210	212	1	0.0	65.7	66	65.7	10	----	61.4	4.3	8	-3.7
R211	213	1	0.0	70.0	66	70.0	10	Snd Lvl	63.7	6.3	8	-1.7
R212	214	1	0.0	66.7	66	66.7	10	Snd Lvl	62.5	4.2	8	-3.8
R213	215	1	0.0	65.3	66	65.3	10	----	61.9	3.4	8	-4.6
R214	216	1	0.0	64.0	66	64.0	10	----	60.7	3.3	8	-4.7
R215	217	1	0.0	62.5	66	62.5	10	----	59.9	2.6	8	-5.4
R216	218	1	0.0	61.0	66	61.0	10	----	59.2	1.8	8	-6.2
R217	219	1	0.0	59.8	66	59.8	10	----	58.1	1.7	8	-6.3
R218	220	1	0.0	68.5	66	68.5	10	Snd Lvl	64.4	4.1	8	-3.9
R219	221	1	0.0	68.2	66	68.2	10	Snd Lvl	63.9	4.3	8	-3.7

R220	222	1	0.0	63.5	66	63.5	10	----	61.5	2.0	8	-6.0
R221	223	1	0.0	64.6	66	64.6	10	----	61.5	3.1	8	-4.9
R222	224	1	0.0	63.6	66	63.6	10	----	61.5	2.1	8	-5.9
R223	225	1	0.0	62.6	66	62.6	10	----	60.2	2.4	8	-5.6
R224	226	1	0.0	61.8	66	61.8	10	----	60.0	1.8	8	-6.2

Dwelling Units	**# DUs**	**Noise Reduction**		
		Min	**Avg**	**Max**
		dB	**dB**	**dB**
All Selected	29	1.7	5.3	12.4
All Impacted	17	3.4	7.2	12.4
All that meet NR Goal	7	8.1	10.8	12.4

I-15; Payson Main Street Interchange
Noise Analysis

Alternative C4 - Barrier 5

			NAC			Taller Wall			Intermediate Wall			Shorter Wall		
Receptor	First Row	Residences Represented	Land Use Category	Existing dB(A)	Build dB(A)	W/Wall dB(A)	Reduction dB(A)	Benefited Properties	W/Wall dB(A)	Reduction dB(A)	Benefited Properties	W/Wall dB(A)	Reduction dB(A)	Benefited Properties
R003		1	B	61	64	58	6	1	58	6	1	60	4	
R004	Yes	1	B	63	65	59	6	1	60	5	1	61	4	
R005		2	B	65	66	60	6	2	60	6	2	62	4	
R006	Yes	2	B	66	68	60	8	2	61	7	2	63	5	2
R007	Yes	2	B	67	69	61	8	2	62	7	2	64	5	2
R008		2	B	63	65	59	6	2	59	6	2	61	4	
R009		2	B	63	66	58	8	2	59	7	2	61	5	2
R010	Yes	3	B	65	67	59	8	3	60	7	3	62	5	3
R011	Yes	3	B	60	62	55	7	3	55	7	3	57	5	3
R012	Yes	3	B	66	68	59	9	3	60	8	3	61	7	3
R013	Yes	2	B	66	68	59	9	2	60	8	2	61	7	2
R177		2	B	63	66	58	8	2	58	8	2	59	7	2
R178		2	B	63	66	58	8	2	59	7	2	60	6	2
R179		2	B	62	64	58	6	2	58	6	2	60	4	
R180		2	B	62	65	58	7	2	58	7	2	60	5	2
R181		3	B	62	64	57	7	3	58	6	3	60	4	
R182		2	B	61	64	58	6	2	59	5	2	60	4	
R183		2	B	61	63	57	6	2	58	5	2	59	4	
R184		2	B	62	65	58	7	2	59	6	2	60	5	2
R185		2	B	60	63	57	6	2	58	5	2	59	4	
R186		2	B	64	66	58	8	2	58	8	2	59	7	2
R187	Yes	2	B	67	69	60	9	2	61	8	2	61	8	2
R188		2	B	63	65	57	8	2	57	8	2	58	7	2
R189	Yes	2	B	67	69	60	9	2	61	8	2	62	7	2
R190		2	B	63	65	56	9	2	57	8	2	58	7	2
R191	Yes	2	B	68	70	60	10	2	61	9	2	62	8	2
R192		2	B	61	63	56	7	2	56	7	2	57	6	2
R225	Yes	1	B	67	69	61	8	1	61	8	1	62	7	1
R226		1	B	66	68	59	9	1	60	8	1	61	7	1
R227	Yes	1	B	68	70	61	9	1	62	8	1	63	7	1
R228		2	B	64	66	59	7	2	59	7	2	60	6	2
R229		2	B	65	67	60	7	2	61	6	2	62	5	2
R230	Yes	1	B	68	70	62	8	1	62	8	1	63	7	1
R231	Yes	2	B	69	71	63	8	2	63	8	2	64	7	2
R232		2	B	65	67	61	6	2	61	6	2	62	5	2
R233		2	B	66	68	62	6	2	63	5	2	64	4	
R234	Yes	1	B	72	73	66	7	1	67	6	1	68	5	1
R246		1	B	63	65	58	7	1	58	7	1	59	6	1
R247		2	B	62	65	59	6	2	59	6	2	60	5	2
R248		1	B	60	63	58	5	1	58	5	1	59	4	
R249		1	B	66	68	65	3		65	3		66	2	

Length =	3397	3397	3397
Average Height =	16	14	12
Area of Noise Barrier =	54379	47583	40783
Cost of Noise Barrier=	$ 1,087,580	$ 951,660	$ 815,660
Properties With a 5 dB(A) Reduction =	75	75	55
Impacted Properties =	44	44	44
Impacted Front-Row Properties =	24	24	24
Impacted Front-Row Properties with a 5 dB(A) Reduction =	24	24	24
Percentage of Impacted Front-Row Properties Reduced At Least 5 dB(A) =	100%	100%	100%
Feasible =	Yes	Yes	Yes
First Row Properties =	28	28	28
First Row Properties with 7 dB(A) Reduction=	27	26	16
Percentage of First Row Reduced At Least 7 dB(A) =	96%	93%	57%
Reasonable (Meets Noise Reduction Goal)=	Yes	Yes	Yes
Cost / Benefitted Property =	$ 14,501	$ 12,689	$ 14,830
Cost Reasonable =	Yes	Yes	Yes

= Impacted receptor
= 5 dB(A) reduction or better
= 7 dB(A) reduction or better

UTAH DEPARTMENT OF TRANSPORTATION
NOISE ABATEMENT RECOMMENDATION CHECKLIST

Project Location: I-15; Payson Main Street Interchange EIS
Project Concept: Alternative C4
Project Number: F-115-6(214)251
PIN: 10263
Prepared By: D. Shannon / Lochner
Receptor Name/Description: Barrier 5

Determination of Acoustic Feasibility

Does the noise abatement achieve at least a 5 dBA reduction in highway traffic noise for at least 50 percent of front-row receptors?

Yes____X_____ No_____

If yes, proceed to Question #1. If no, abatement measures are not feasible and are not recommended at this site; proceed to decision segment of form.

Determination of Feasible and Reasonable Mitigation

1. Does the design noise level equal or exceed the UDOT Noise Abatement Criteria as defined in Table 1 of this Policy?
   Yes____X_____ No_____

If yes, proceed to Question #3. If no, proceed to Question #2.

2. Does the receptor, as a result of the design noise level, substantially exceed (10 or more dBA) the existing noise levels prior to construction?
   Yes_____ No_____

If yes, proceed to Question #3. If no, then noise abatement is not recommended; proceed to decision segment of form.

3. Can effective noise abatement be constructed which would provide a minimum reduction of 7 dBA for at least 35 percent of front-row receptors?
   Yes_____X_____ No_____

If yes, proceed to Question #4. If no, abatement measures are not reasonable and are not recommended at this site; proceed to decision segment of form.

4. Are there undeveloped lands along the project corridor?
   Yes_____X_____ No_____
   If yes, proceed to Question #5. If no, proceed to Question #6.
5. Were the undeveloped lands permitted (formal building permit issued) for development under Land Use Categories A, B, C, D or E prior to the date the final environmental decision document was approved?
   Yes_____ No____X_____

If yes, proceed to Question #6. If no, implementation of abatement is not reasonable. Noise abatement is the responsibility of the property owner/developer. Proceed to decision segment of form.

6. Can noise abatement measures be constructed without creating a safety hazard to users and residents, and not interfere with operations and maintenance of the highway facility?
Yes_____X_____ No_____

If yes, proceed to Question #7. If no, abatement measures are not recommended at this site; proceed to decision segment of form.

7. Does the cost per impacted and benefited residence exceed $30,000 for residential areas in Land Use Category B or exceed $360 per linear foot for nonresidential areas in Land Use Category A and/or C or commercial and/or industrial zoned areas in Land Use Category E?
Yes_____ No_____X_____

If yes, noise abatement measures are not considered reasonable; proceed to decision segment of form. If no, proceed to Question #8.

8. For urban roadways that are not access-controlled, is the noise barrier height less than or equal to the distance from the wall face to the back of curb?
Yes_____X_____ No_____

If yes, proceed to Question #9. If no, noise abatement measures are not considered feasible based on safety; proceed to decision section of the form.

9. Does public involvement voting result in at least 75 percent of ballots returned?
Yes_____ No_____ To Be Completed _____X_____

If yes, proceed to Question #10. If no, noise abatement measures are not considered reasonable; proceed to decision segment of form.

10. Does the Public Involvement balloting result in at least 75 percent of benefited and end of wall receptors voting in "favor" of the proposed noise abatement measure?
Yes_____ No_____ To Be Completed _____X_____

If yes, proceed to Question #11. If no, noise abatement measures are not considered reasonable; proceed to decision segment of form.

11. Are there any environmental impacts that need special attention as a result of the implementation of the noise abatement?
Yes_____ No_____X_____

If yes, outline these impacts and discuss with the Environmental Manager or Region Project Manager.

Decision

Are Abatement Measures feasible? Yes____X____ No_____
Are Abatement Measures reasonable? Yes____X____ No_____

HWL 15 February 2017
ECS TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: Payson
RUN: Payson_C4_Bar5
BARRIER DESIGN: Bar5-12'-C4
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver												
Name	No.	#DUs	Existing	No Barrier					With Barrier			
			LAeq1h	LAeq1h		Increase over existing		Type	Calculated	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n	Impact	LAeq1h	Calculated	Goal	Calculated
							Sub'l Inc					minus
												Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
R003	3	1	0.0	63.2	66	63.2	10	----	59.5	3.7	8	-4.3
R004	4	1	0.0	64.7	66	64.7	10	----	60.8	3.9	8	-4.1
R005	5	1	0.0	66.0	66	66.0	10	Snd Lvl	61.8	4.2	8	-3.8
R006	6	1	0.0	67.4	66	67.4	10	Snd Lvl	62.7	4.7	8	-3.3
R007	7	1	0.0	68.9	66	68.9	10	Snd Lvl	63.9	5.0	8	-3.0
R008	8	1	0.0	65.1	66	65.1	10	----	60.9	4.2	8	-3.8
R009	9	1	0.0	65.5	66	65.5	10	----	60.9	4.6	8	-3.4
R010	10	1	0.0	67.1	66	67.1	10	Snd Lvl	61.7	5.4	8	-2.6
R011	11	1	0.0	61.9	66	61.9	10	----	56.6	5.3	8	-2.7
R012	12	1	0.0	68.3	66	68.3	10	Snd Lvl	61.2	7.1	8	-0.9
R013	13	1	0.0	68.1	66	68.1	10	Snd Lvl	60.8	7.3	8	-0.7
R177	180	1	0.0	65.5	66	65.5	10	----	58.7	6.8	8	-1.2
R178	181	1	0.0	65.4	66	65.4	10	----	59.9	5.5	8	-2.5
R179	182	1	0.0	64.0	66	64.0	10	----	59.7	4.3	8	-3.7
R180	183	1	0.0	64.8	66	64.8	10	----	59.9	4.9	8	-3.1
R181	184	1	0.0	63.8	66	63.8	10	----	59.7	4.1	8	-3.9
R182	185	1	0.0	63.6	66	63.6	10	----	59.9	3.7	8	-4.3
R183	186	1	0.0	62.7	66	62.7	10	----	59.3	3.4	8	-4.6
R184	187	1	0.0	63.9	66	63.9	10	----	60.2	3.7	8	-4.3
R185	188	1	0.0	62.3	66	62.3	10	----	58.9	3.4	8	-4.6
R186	190	1	0.0	65.8	66	65.8	10	----	59.0	6.8	8	-1.2
R187	191	1	0.0	68.3	66	68.3	10	Snd Lvl	61.4	6.9	8	-1.1
R188	192	1	0.0	65.1	66	65.1	10	----	58.0	7.1	8	-0.9
R189	193	1	0.0	69.1	66	69.1	10	Snd Lvl	61.6	7.5	8	-0.5

R190	194	1	0.0	64.7	66	64.7	10	----	57.5	7.2	8	-0.8
R191	195	1	0.0	69.7	66	69.7	10	Snd Lvl	62.0	7.7	8	-0.3
R192	196	1	0.0	62.6	66	62.6	10	----	56.8	5.8	8	-2.2
R225	198	1	0.0	69.1	66	69.1	10	Snd Lvl	61.9	7.2	8	-0.8
R226	199	1	0.0	67.6	66	67.6	10	Snd Lvl	60.7	6.9	8	-1.1
R227	200	1	0.0	70.2	66	70.2	10	Snd Lvl	62.8	7.4	8	-0.6
R228	201	1	0.0	65.8	66	65.8	10	----	60.0	5.8	8	-2.2
R229	202	1	0.0	66.6	66	66.6	10	Snd Lvl	61.6	5.0	8	-3.0
R230	203	1	0.0	69.9	66	69.9	10	Snd Lvl	63.2	6.7	8	-1.3
R231	204	1	0.0	70.7	66	70.7	10	Snd Lvl	64.2	6.5	8	-1.5
R232	205	1	0.0	66.3	66	66.3	10	Snd Lvl	61.8	4.5	8	-3.5
R233	206	1	0.0	67.9	66	67.9	10	Snd Lvl	63.8	4.1	8	-3.9
R234	207	1	0.0	72.1	66	72.1	10	Snd Lvl	67.7	4.4	8	-3.6
R246	231	1	0.0	65.1	66	65.1	10	----	59.1	6.0	8	-2.0
R247	232	1	0.0	64.0	66	64.0	10	----	59.8	4.2	8	-3.8
R248	233	1	0.0	62.0	66	62.0	10	----	58.5	3.5	8	-4.5
R249	234	1	0.0	67.9	66	67.9	10	Snd Lvl	65.6	2.3	8	-5.7

Dwelling Units	**# DUs**	**Noise Reduction**		
		Min	**Avg**	**Max**
		dB	**dB**	**dB**
All Selected	41	2.3	5.3	7.7
All Impacted	19	2.3	5.8	7.7
All that meet NR Goal	0	0.0	0.0	0.0

HWL 15 February 2017
ECS TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: Payson
RUN: Payson_C4_Bar5
BARRIER DESIGN: Bar5-14'-C4
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver												
Name	No.	#DUs	Existing	No Barrier					With Barrier			
			LAeq1h	LAeq1h		Increase over existing		Type	Calculated	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n	Impact	LAeq1h	Calculated	Goal	Calculated
							Sub'l Inc					minus
												Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
R003	3	1	0.0	63.2	66	63.2	10	----	58.2	5.0	8	-3.0
R004	4	1	0.0	64.7	66	64.7	10	----	59.5	5.2	8	-2.8
R005	5	1	0.0	66.0	66	66.0	10	Snd Lvl	60.2	5.8	8	-2.2
R006	6	1	0.0	67.4	66	67.4	10	Snd Lvl	61.1	6.3	8	-1.7
R007	7	1	0.0	68.9	66	68.9	10	Snd Lvl	62.2	6.7	8	-1.3
R008	8	1	0.0	65.1	66	65.1	10	----	59.3	5.8	8	-2.2
R009	9	1	0.0	65.5	66	65.5	10	----	59.1	6.4	8	-1.6
R010	10	1	0.0	67.1	66	67.1	10	Snd Lvl	59.7	7.4	8	-0.6
R011	11	1	0.0	61.9	66	61.9	10	----	55.3	6.6	8	-1.4
R012	12	1	0.0	68.3	66	68.3	10	Snd Lvl	60.1	8.2	8	0.2
R013	13	1	0.0	68.1	66	68.1	10	Snd Lvl	59.9	8.2	8	0.2
R177	180	1	0.0	65.5	66	65.5	10	----	58.0	7.5	8	-0.5
R178	181	1	0.0	65.4	66	65.4	10	----	58.9	6.5	8	-1.5
R179	182	1	0.0	64.0	66	64.0	10	----	58.2	5.8	8	-2.2
R180	183	1	0.0	64.8	66	64.8	10	----	58.3	6.5	8	-1.5
R181	184	1	0.0	63.8	66	63.8	10	----	58.2	5.6	8	-2.4
R182	185	1	0.0	63.6	66	63.6	10	----	58.5	5.1	8	-2.9
R183	186	1	0.0	62.7	66	62.7	10	----	57.8	4.9	8	-3.1
R184	187	1	0.0	63.9	66	63.9	10	----	58.7	5.2	8	-2.8
R185	188	1	0.0	62.3	66	62.3	10	----	57.5	4.8	8	-3.2
R186	190	1	0.0	65.8	66	65.8	10	----	58.4	7.4	8	-0.6
R187	191	1	0.0	68.3	66	68.3	10	Snd Lvl	60.6	7.7	8	-0.3
R188	192	1	0.0	65.1	66	65.1	10	----	57.2	7.9	8	-0.1
R189	193	1	0.0	69.1	66	69.1	10	Snd Lvl	60.6	8.5	8	0.5

R190	194	1	0.0	64.7	66	64.7	10	----	56.8	7.9	8	-0.1
R191	195	1	0.0	69.7	66	69.7	10	Snd Lvl	61.0	8.7	8	0.7
R192	196	1	0.0	62.6	66	62.6	10	----	56.1	6.5	8	-1.5
R225	198	1	0.0	69.1	66	69.1	10	Snd Lvl	61.1	8.0	8	0.0
R226	199	1	0.0	67.6	66	67.6	10	Snd Lvl	60.0	7.6	8	-0.4
R227	200	1	0.0	70.2	66	70.2	10	Snd Lvl	62.0	8.2	8	0.2
R228	201	1	0.0	65.8	66	65.8	10	----	59.3	6.5	8	-1.5
R229	202	1	0.0	66.6	66	66.6	10	Snd Lvl	60.7	5.9	8	-2.1
R230	203	1	0.0	69.9	66	69.9	10	Snd Lvl	62.4	7.5	8	-0.5
R231	204	1	0.0	70.7	66	70.7	10	Snd Lvl	63.2	7.5	8	-0.5
R232	205	1	0.0	66.3	66	66.3	10	Snd Lvl	60.9	5.4	8	-2.6
R233	206	1	0.0	67.9	66	67.9	10	Snd Lvl	62.8	5.1	8	-2.9
R234	207	1	0.0	72.1	66	72.1	10	Snd Lvl	66.5	5.6	8	-2.4
R246	231	1	0.0	65.1	66	65.1	10	----	58.4	6.7	8	-1.3
R247	232	1	0.0	64.0	66	64.0	10	----	58.9	5.1	8	-2.9
R248	233	1	0.0	62.0	66	62.0	10	----	57.8	4.2	8	-3.8
R249	234	1	0.0	67.9	66	67.9	10	Snd Lvl	65.1	2.8	8	-5.2

Dwelling Units	**# DUs**	**Noise Reduction**		
		Min	**Avg**	**Max**
		dB	**dB**	**dB**
All Selected	41	2.8	6.4	8.7
All Impacted	19	2.8	6.9	8.7
All that meet NR Goal	6	8.0	8.3	8.7

HWL 15 February 2017
ECS TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: Payson
RUN: Payson_C4_Bar5
BARRIER DESIGN: Bar5-16'-C4
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver												
Name	No.	#DUs	Existing	No Barrier					With Barrier			
			LAeq1h	LAeq1h		Increase over existing		Type	Calculated	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n	Impact	LAeq1h	Calculated	Goal	Calculated
							Sub'l Inc					minus
												Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
R003	3	1	0.0	63.2	66	63.2	10	----	57.6	5.6	8	-2.4
R004	4	1	0.0	64.7	66	64.7	10	----	59.0	5.7	8	-2.3
R005	5	1	0.0	66.0	66	66.0	10	Snd Lvl	59.6	6.4	8	-1.6
R006	6	1	0.0	67.4	66	67.4	10	Snd Lvl	60.3	7.1	8	-0.9
R007	7	1	0.0	68.9	66	68.9	10	Snd Lvl	61.3	7.6	8	-0.4
R008	8	1	0.0	65.1	66	65.1	10	----	58.6	6.5	8	-1.5
R009	9	1	0.0	65.5	66	65.5	10	----	58.3	7.2	8	-0.8
R010	10	1	0.0	67.1	66	67.1	10	Snd Lvl	58.9	8.2	8	0.2
R011	11	1	0.0	61.9	66	61.9	10	----	54.8	7.1	8	-0.9
R012	12	1	0.0	68.3	66	68.3	10	Snd Lvl	59.4	8.9	8	0.9
R013	13	1	0.0	68.1	66	68.1	10	Snd Lvl	59.2	8.9	8	0.9
R177	180	1	0.0	65.5	66	65.5	10	----	57.7	7.8	8	-0.2
R178	181	1	0.0	65.4	66	65.4	10	----	58.1	7.3	8	-0.7
R179	182	1	0.0	64.0	66	64.0	10	----	57.5	6.5	8	-1.5
R180	183	1	0.0	64.8	66	64.8	10	----	57.7	7.1	8	-0.9
R181	184	1	0.0	63.8	66	63.8	10	----	57.4	6.4	8	-1.6
R182	185	1	0.0	63.6	66	63.6	10	----	57.7	5.9	8	-2.1
R183	186	1	0.0	62.7	66	62.7	10	----	57.0	5.7	8	-2.3
R184	187	1	0.0	63.9	66	63.9	10	----	58.0	5.9	8	-2.1
R185	188	1	0.0	62.3	66	62.3	10	----	56.7	5.6	8	-2.4
R186	190	1	0.0	65.8	66	65.8	10	----	57.9	7.9	8	-0.1
R187	191	1	0.0	68.3	66	68.3	10	Snd Lvl	60.0	8.3	8	0.3
R188	192	1	0.0	65.1	66	65.1	10	----	56.6	8.5	8	0.5
R189	193	1	0.0	69.1	66	69.1	10	Snd Lvl	59.9	9.2	8	1.2

R190	194	1	0.0	64.7	66	64.7	10	----	56.2	8.5	8	0.5
R191	195	1	0.0	69.7	66	69.7	10	Snd Lvl	60.2	9.5	8	1.5
R192	196	1	0.0	62.6	66	62.6	10	----	55.6	7.0	8	-1.0
R225	198	1	0.0	69.1	66	69.1	10	Snd Lvl	60.5	8.6	8	0.6
R226	199	1	0.0	67.6	66	67.6	10	Snd Lvl	59.4	8.2	8	0.2
R227	200	1	0.0	70.2	66	70.2	10	Snd Lvl	61.3	8.9	8	0.9
R228	201	1	0.0	65.8	66	65.8	10	----	58.8	7.0	8	-1.0
R229	202	1	0.0	66.6	66	66.6	10	Snd Lvl	60.1	6.5	8	-1.5
R230	203	1	0.0	69.9	66	69.9	10	Snd Lvl	61.8	8.1	8	0.1
R231	204	1	0.0	70.7	66	70.7	10	Snd Lvl	62.5	8.2	8	0.2
R232	205	1	0.0	66.3	66	66.3	10	Snd Lvl	60.5	5.8	8	-2.2
R233	206	1	0.0	67.9	66	67.9	10	Snd Lvl	62.4	5.5	8	-2.5
R234	207	1	0.0	72.1	66	72.1	10	Snd Lvl	66.1	6.0	8	-2.0
R246	231	1	0.0	65.1	66	65.1	10	----	57.9	7.2	8	-0.8
R247	232	1	0.0	64.0	66	64.0	10	----	58.5	5.5	8	-2.5
R248	233	1	0.0	62.0	66	62.0	10	----	57.5	4.5	8	-3.5
R249	234	1	0.0	67.9	66	67.9	10	Snd Lvl	64.9	3.0	8	-5.0

Dwelling Units	**# DUs**	**Noise Reduction**		
		Min	**Avg**	**Max**
		dB	**dB**	**dB**
All Selected	41	3.0	7.1	9.5
All Impacted	19	3.0	7.5	9.5
All that meet NR Goal	13	8.1	8.6	9.5

I-15; Payson Main Street Interchange
Noise Analysis

Alternative C4 - Barrier 6

			NAC			Taller Wall			Intermediate Wall			Shorter Wall		
Receptor	First Row	Residences Represented	Land Use Category	Existing dB(A)	Build dB(A)	W/Wall dB(A)	Reduction dB(A)	Benefited Properties	W/Wall dB(A)	Reduction dB(A)	Benefited Properties	W/Wall dB(A)	Reduction dB(A)	Benefited Properties
R196	Yes	2	B	68	69	67	2		67	2		67	2	
R197	Yes	2	B	73	75	68	7	2	68	7	2	68	7	2
R198	Yes	2	B	76	79	68	11	2	69	10	2	69	10	2
R199	Yes	2	B	77	79	68	11	2	69	10	2	70	9	2
R200	Yes	2	B	75	77	67	10	2	67	10	2	68	9	2
R201	Yes	2	B	76	78	66	12	2	67	11	2	67	11	2
R202	Yes	2	B	70	72	65	7	2	65	7	2	66	6	2
R203	Yes	1	B	75	78	65	13	1	66	12	1	66	12	1
R204	Yes	1	B	74	77	65	12	1	66	11	1	66	11	1
R205		1	B	67	72	67	5	1	67	5	1	67	5	1
R206		1	B	66	71	66	5	1	66	5	1	66	5	1
R207		2	B	65	69	64	5	2	64	5	2	65	4	
R208		1	B	66	69	63	6	1	64	5	1	65	4	
R209		1	B	62	65	61	4		61	4		62	3	
R210		1	B	64	66	61	5	1	62	4		63	3	
R211		1	B	68	70	64	6	1	64	6	1	66	4	
R212		2	B	65	67	62	5	2	63	4		64	3	
R213		2	B	63	66	61	5	2	62	4		63	3	
R214		2	B	62	65	60	5	2	61	4		62	3	
R215		2	B	61	64	59	5	2	60	4		60	4	
R216		2	B	60	62	59	3		59	3		59	3	
R217		2	B	59	61	57	4		58	3		58	3	
R218		1	B	66	68	64	4		65	3		66	2	
R219		1	B	66	68	64	4		64	4		65	3	
R220		1	B	60	63	62	1		62	1		62	1	
R221		1	B	62	64	61	3		62	2		62	2	
R222		1	B	60	62	61	1		61	1		62		
R223		2	B	60	62	60	2		60	2		61	1	
R224		2	B	59	61	60	1		60	1		60	1	

Length =	800	800	800
Average Height =	16	15	14
Area of Noise Barrier =	12801	12001	11200
Cost of Noise Barrier=	$ 256,020	$ 240,020	$ 224,000
Properties With a 5 dB(A) Reduction =	29	20	16
Impacted Properties =	29	29	29
Impacted Front-Row Properties =	16	16	16
Impacted Front-Row Properties with a 5 dB(A) Reduction =	14	14	14
Percentage of Impacted Front-Row Properties Reduced At Least 5 dB(A) =	88%	88%	88%
Feasible =	Yes	Yes	Yes
First Row Properties =	16	16	16
First Row Properties with 7 dB(A) Reduction=	14	14	12
Percentage of First Row Reduced At Least 7 dB(A) =	88%	88%	75%
Reasonable (Meets Noise Reduction Goal)=	Yes	Yes	Yes
Cost / Benefitted Property =	$ 8,828	$ 12,001	$ 14,000
Cost Reasonable =	Yes	Yes	Yes

= Impacted receptor
= 5 dB(A) reduction or better
= 7 dB(A) reduction or better

UTAH DEPARTMENT OF TRANSPORTATION
NOISE ABATEMENT RECOMMENDATION CHECKLIST

Project Location: I-15; Payson Main Street Interchange EIS
Project Concept: Alternative C4
Project Number: F-115-6(214)251
PIN: 10263
Prepared By: D. Shannon / Lochner
Receptor Name/Description: Barrier 6

Determination of Acoustic Feasibility

Does the noise abatement achieve at least a 5 dBA reduction in highway traffic noise for at least 50 percent of front-row receptors?

Yes____X_____ No_____

If yes, proceed to Question #1. If no, abatement measures are not feasible and are not recommended at this site; proceed to decision segment of form.

Determination of Feasible and Reasonable Mitigation

1. Does the design noise level equal or exceed the UDOT Noise Abatement Criteria as defined in Table 1 of this Policy?
   Yes____X_____ No_____

If yes, proceed to Question #3. If no, proceed to Question #2.

2. Does the receptor, as a result of the design noise level, substantially exceed (10 or more dBA) the existing noise levels prior to construction?
   Yes_____ No_____

If yes, proceed to Question #3. If no, then noise abatement is not recommended; proceed to decision segment of form.

3. Can effective noise abatement be constructed which would provide a minimum reduction of 7 dBA for at least 35 percent of front-row receptors?
   Yes_____X_____ No_____

If yes, proceed to Question #4. If no, abatement measures are not reasonable and are not recommended at this site; proceed to decision segment of form.

4. Are there undeveloped lands along the project corridor?
   Yes_____X_____ No_____
   If yes, proceed to Question #5. If no, proceed to Question #6.
5. Were the undeveloped lands permitted (formal building permit issued) for development under Land Use Categories A, B, C, D or E prior to the date the final environmental decision document was approved?
   Yes_____ No____X_____

If yes, proceed to Question #6. If no, implementation of abatement is not reasonable. Noise abatement is the responsibility of the property owner/developer. Proceed to decision segment of form.

6. Can noise abatement measures be constructed without creating a safety hazard to users and residents, and not interfere with operations and maintenance of the highway facility?
Yes_____X_____ No_____

If yes, proceed to Question #7. If no, abatement measures are not recommended at this site; proceed to decision segment of form.

7. Does the cost per impacted and benefited residence exceed $30,000 for residential areas in Land Use Category B or exceed $360 per linear foot for nonresidential areas in Land Use Category A and/or C or commercial and/or industrial zoned areas in Land Use Category E?
Yes_____ No_____X_____

If yes, noise abatement measures are not considered reasonable; proceed to decision segment of form. If no, proceed to Question #8.

8. For urban roadways that are not access-controlled, is the noise barrier height less than or equal to the distance from the wall face to the back of curb?
Yes_____X_____ No_____

If yes, proceed to Question #9. If no, noise abatement measures are not considered feasible based on safety; proceed to decision section of the form.

9. Does public involvement voting result in at least 75 percent of ballots returned?
Yes_____ No_____ To Be Completed _____X_____

If yes, proceed to Question #10. If no, noise abatement measures are not considered reasonable; proceed to decision segment of form.

10. Does the Public Involvement balloting result in at least 75 percent of benefited and end of wall receptors voting in "favor" of the proposed noise abatement measure?
Yes_____ No_____ To Be Completed _____X_____

If yes, proceed to Question #11. If no, noise abatement measures are not considered reasonable; proceed to decision segment of form.

11. Are there any environmental impacts that need special attention as a result of the implementation of the noise abatement?
Yes_____ No_____X_____

If yes, outline these impacts and discuss with the Environmental Manager or Region Project Manager.

Decision

Are Abatement Measures feasible? Yes____X____ No_____
Are Abatement Measures reasonable? Yes____X____ No_____

HWL 15 February 2017
JPW TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: Payson
RUN: Payson_C4_Bar6
BARRIER DESIGN: Bar6-14'-C4
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
R196	198	1	0.0	70.3	66	70.3	10	Snd Lvl	67.0	3.3	8	-4.7
R197	199	1	0.0	75.8	66	75.8	10	Snd Lvl	67.8	8.0	8	0.0
R198	200	1	0.0	78.9	66	78.9	10	Snd Lvl	68.6	10.3	8	2.3
R199	201	1	0.0	79.3	66	79.3	10	Snd Lvl	68.9	10.4	8	2.4
R200	202	1	0.0	77.1	66	77.1	10	Snd Lvl	67.1	10.0	8	2.0
R201	203	1	0.0	78.3	66	78.3	10	Snd Lvl	66.5	11.8	8	3.8
R202	204	1	0.0	72.4	66	72.4	10	Snd Lvl	65.0	7.4	8	-0.6
R203	205	1	0.0	77.8	66	77.8	10	Snd Lvl	65.7	12.1	8	4.1
R204	206	1	0.0	76.4	66	76.4	10	Snd Lvl	65.5	10.9	8	2.9
R205	207	1	0.0	71.8	66	71.8	10	Snd Lvl	67.1	4.7	8	-3.3
R206	208	1	0.0	70.4	66	70.4	10	Snd Lvl	65.9	4.5	8	-3.5
R207	209	1	0.0	68.2	66	68.2	10	Snd Lvl	64.4	3.8	8	-4.2
R208	210	1	0.0	68.4	66	68.4	10	Snd Lvl	63.9	4.5	8	-3.5
R209	211	1	0.0	64.4	66	64.4	10	----	61.4	3.0	8	-5.0
R210	212	1	0.0	66.0	66	66.0	10	Snd Lvl	61.5	4.5	8	-3.5
R211	213	1	0.0	70.2	66	70.2	10	Snd Lvl	64.1	6.1	8	-1.9
R212	214	1	0.0	66.9	66	66.9	10	Snd Lvl	62.8	4.1	8	-3.9
R213	215	1	0.0	65.5	66	65.5	10	----	62.0	3.5	8	-4.5
R214	216	1	0.0	64.2	66	64.2	10	----	60.8	3.4	8	-4.6
R215	217	1	0.0	62.7	66	62.7	10	----	59.8	2.9	8	-5.1
R216	218	1	0.0	61.0	66	61.0	10	----	58.9	2.1	8	-5.9
R217	219	1	0.0	59.7	66	59.7	10	----	57.7	2.0	8	-6.0
R218	220	1	0.0	68.7	66	68.7	10	Snd Lvl	64.6	4.1	8	-3.9
R219	221	1	0.0	68.5	66	68.5	10	Snd Lvl	64.1	4.4	8	-3.6

R220	222	1	0.0	63.7	66	63.7	10	----	61.7	2.0	8	-6.0
R221	223	1	0.0	64.8	66	64.8	10	----	61.7	3.1	8	-4.9
R222	224	1	0.0	63.6	66	63.6	10	----	61.3	2.3	8	-5.7
R223	225	1	0.0	62.8	66	62.8	10	----	60.4	2.4	8	-5.6
R224	226	1	0.0	61.9	66	61.9	10	----	59.8	2.1	8	-5.9

Dwelling Units	**# DUs**	**Noise Reduction**		
		Min	**Avg**	**Max**
		dB	**dB**	**dB**
All Selected	29	2.0	5.3	12.1
All Impacted	18	3.3	6.9	12.1
All that meet NR Goal	7	8.0	10.5	12.1

HWL 15 February 2017
JPW TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: Payson
RUN: Payson_C4_Bar6
BARRIER DESIGN: Bar6-15'-C4
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
R196	198	1	0.0	70.3	66	70.3	10	Snd Lvl	67.0	3.3	8	-4.7
R197	199	1	0.0	75.8	66	75.8	10	Snd Lvl	67.8	8.0	8	0.0
R198	200	1	0.0	78.9	66	78.9	10	Snd Lvl	68.6	10.3	8	2.3
R199	201	1	0.0	79.3	66	79.3	10	Snd Lvl	68.9	10.4	8	2.4
R200	202	1	0.0	77.1	66	77.1	10	Snd Lvl	67.1	10.0	8	2.0
R201	203	1	0.0	78.3	66	78.3	10	Snd Lvl	66.5	11.8	8	3.8
R202	204	1	0.0	72.4	66	72.4	10	Snd Lvl	65.0	7.4	8	-0.6
R203	205	1	0.0	77.8	66	77.8	10	Snd Lvl	65.7	12.1	8	4.1
R204	206	1	0.0	76.4	66	76.4	10	Snd Lvl	65.5	10.9	8	2.9
R205	207	1	0.0	71.8	66	71.8	10	Snd Lvl	67.1	4.7	8	-3.3
R206	208	1	0.0	70.4	66	70.4	10	Snd Lvl	65.9	4.5	8	-3.5
R207	209	1	0.0	68.2	66	68.2	10	Snd Lvl	64.4	3.8	8	-4.2
R208	210	1	0.0	68.4	66	68.4	10	Snd Lvl	63.9	4.5	8	-3.5
R209	211	1	0.0	64.4	66	64.4	10	----	61.4	3.0	8	-5.0
R210	212	1	0.0	66.0	66	66.0	10	Snd Lvl	61.5	4.5	8	-3.5
R211	213	1	0.0	70.2	66	70.2	10	Snd Lvl	64.1	6.1	8	-1.9
R212	214	1	0.0	66.9	66	66.9	10	Snd Lvl	62.8	4.1	8	-3.9
R213	215	1	0.0	65.5	66	65.5	10	----	62.0	3.5	8	-4.5
R214	216	1	0.0	64.2	66	64.2	10	----	60.8	3.4	8	-4.6
R215	217	1	0.0	62.7	66	62.7	10	----	59.8	2.9	8	-5.1
R216	218	1	0.0	61.0	66	61.0	10	----	58.9	2.1	8	-5.9
R217	219	1	0.0	59.7	66	59.7	10	----	57.7	2.0	8	-6.0
R218	220	1	0.0	68.7	66	68.7	10	Snd Lvl	64.6	4.1	8	-3.9
R219	221	1	0.0	68.5	66	68.5	10	Snd Lvl	64.1	4.4	8	-3.6

R220	222	1	0.0	63.7	66	63.7	10	----	61.7	2.0	8	-6.0
R221	223	1	0.0	64.8	66	64.8	10	----	61.7	3.1	8	-4.9
R222	224	1	0.0	63.6	66	63.6	10	----	61.3	2.3	8	-5.7
R223	225	1	0.0	62.8	66	62.8	10	----	60.4	2.4	8	-5.6
R224	226	1	0.0	61.9	66	61.9	10	----	59.8	2.1	8	-5.9

Dwelling Units	**# DUs**	**Noise Reduction**		
		Min	**Avg**	**Max**
		dB	**dB**	**dB**
All Selected	29	2.0	5.3	12.1
All Impacted	18	3.3	6.9	12.1
All that meet NR Goal	7	8.0	10.5	12.1

HWL 15 February 2017
JPW TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: Payson
RUN: Payson_C4_Bar6
BARRIER DESIGN: Bar6-16'-C4
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
R196	198	1	0.0	70.3	66	70.3	10	Snd Lvl	66.9	3.4	8	-4.6
R197	199	1	0.0	75.8	66	75.8	10	Snd Lvl	67.5	8.3	8	0.3
R198	200	1	0.0	78.9	66	78.9	10	Snd Lvl	68.0	10.9	8	2.9
R199	201	1	0.0	79.3	66	79.3	10	Snd Lvl	68.2	11.1	8	3.1
R200	202	1	0.0	77.1	66	77.1	10	Snd Lvl	66.5	10.6	8	2.6
R201	203	1	0.0	78.3	66	78.3	10	Snd Lvl	65.9	12.4	8	4.4
R202	204	1	0.0	72.4	66	72.4	10	Snd Lvl	64.5	7.9	8	-0.1
R203	205	1	0.0	77.8	66	77.8	10	Snd Lvl	65.2	12.6	8	4.6
R204	206	1	0.0	76.4	66	76.4	10	Snd Lvl	65.0	11.4	8	3.4
R205	207	1	0.0	71.8	66	71.8	10	Snd Lvl	66.9	4.9	8	-3.1
R206	208	1	0.0	70.4	66	70.4	10	Snd Lvl	65.7	4.7	8	-3.3
R207	209	1	0.0	68.2	66	68.2	10	Snd Lvl	64.2	4.0	8	-4.0
R208	210	1	0.0	68.4	66	68.4	10	Snd Lvl	63.3	5.1	8	-2.9
R209	211	1	0.0	64.4	66	64.4	10	----	60.9	3.5	8	-4.5
R210	212	1	0.0	66.0	66	66.0	10	Snd Lvl	61.2	4.8	8	-3.2
R211	213	1	0.0	70.2	66	70.2	10	Snd Lvl	63.5	6.7	8	-1.3
R212	214	1	0.0	66.9	66	66.9	10	Snd Lvl	62.2	4.7	8	-3.3
R213	215	1	0.0	65.5	66	65.5	10	----	61.4	4.1	8	-3.9
R214	216	1	0.0	64.2	66	64.2	10	----	60.1	4.1	8	-3.9
R215	217	1	0.0	62.7	66	62.7	10	----	59.3	3.4	8	-4.6
R216	218	1	0.0	61.0	66	61.0	10	----	58.5	2.5	8	-5.5
R217	219	1	0.0	59.7	66	59.7	10	----	57.4	2.3	8	-5.7
R218	220	1	0.0	68.7	66	68.7	10	Snd Lvl	64.3	4.4	8	-3.6
R219	221	1	0.0	68.5	66	68.5	10	Snd Lvl	63.8	4.7	8	-3.3

R220	222	1	0.0	63.7	66	63.7	10	----	61.5	2.2	8	-5.8
R221	223	1	0.0	64.8	66	64.8	10	----	61.4	3.4	8	-4.6
R222	224	1	0.0	63.6	66	63.6	10	----	61.1	2.5	8	-5.5
R223	225	1	0.0	62.8	66	62.8	10	----	60.1	2.7	8	-5.3
R224	226	1	0.0	61.9	66	61.9	10	----	59.6	2.3	8	-5.7

Dwelling Units	**# DUs**	**Noise Reduction**		
		Min	**Avg**	**Max**
		dB	**dB**	**dB**
All Selected	29	2.2	5.7	12.6
All Impacted	18	3.4	7.4	12.6
All that meet NR Goal	7	8.3	11.0	12.6

I-15; Payson Main Street Interchange
Noise Analysis

Alternative C4 - Barrier 7

			NAC			Taller Wall			Intermediate Wall			Shorter Wall		
Receptor	First Row	Residences Represented	Land Use Category	Existing dB(A)	Build dB(A)	W/Wall dB(A)	Reduction dB(A)	Benefited Properties	W/Wall dB(A)	Reduction dB(A)	Benefited Properties	W/Wall dB(A)	Reduction dB(A)	Benefited Properties
R158	Yes	1	B	52	64	54	10	1	54	10	1	55	9	1
R159		1	B	52	61	52	9	1	53	8	1	54	7	1
R160		1	B	52	60	51	9	1	52	8	1	53	7	1
R161		1	B	52	58	49	9	1	50	8	1	51	7	1
R162	Yes	3	B	51	64	53	11	3	54	10	3	55	9	3
R163		2	B	52	60	51	9	2	52	8	2	55	5	2
R164		2	B	51	57	48	9	2	49	8	2	52	5	2
R165	Yes	2	B	50	63	53	10	2	53	10	2	54	9	2
R166		2	B	50	59	50	9	2	51	8	2	52	7	2
R167		2	B	50	57	48	9	2	49	8	2	50	7	2
R168	Yes	1	B	50	62	56	6	1	56	6	1	56	6	1
R169		1	B	54	59	52	7	1	53	6	1	53	6	1
R170		1	B	49	57	52	5	1	52	5	1	53	4	
R171		1	B	49	56	51	5	1	51	5	1	53	3	
R172		1	B	49	56	51	5	1	51	5	1	52	4	
R173		Church	D	35	40	38	2		38	2		39	1	
R174	Yes	Park	C	54	62	59	3		59	3		60	2	

= Impacted receptor
= 5 dB(A) reduction or better
= 7 dB(A) reduction or better

Length =	1600	1600	1600
Average Height =	16	14	12
Area of Noise Barrier =	25609	22409	19205
Cost of Noise Barrier=	$ 512,180	$ 448,180	$ 384,100
Properties With a 5 dB(A) Reduction =	22	22	19
Impacted Properties =	7	7	7
Impacted Front-Row Properties =	7	7	7
Impacted Front-Row Properties with a 5 dB(A) Reduction =	7	7	7
Percentage of Impacted Front-Row Properties Reduced At Least 5 dB(A) =	100%	100%	100%
Feasible =	Yes	Yes	Yes
First Row Properties =	7	7	7
First Row Properties with 7 dB(A) Reduction=	6	6	6
Percentage of First Row Reduced At Least 7 dB(A) =	86%	86%	86%
Reasonable (Meets Noise Reduction Goal)=	Yes	Yes	Yes
Cost / Benefitted Property =	$ 23,281	$ 20,372	$ 20,216
Cost Reasonable =	Yes	Yes	Yes

UTAH DEPARTMENT OF TRANSPORTATION
NOISE ABATEMENT RECOMMENDATION CHECKLIST

Project Location: I-15; Payson Main Street Interchange EIS
Project Concept: Alternative C4
Project Number: F-115-6(214)251
PIN: 10263
Prepared By: D. Shannon / Lochner
Receptor Name/Description: Barrier 7

Determination of Acoustic Feasibility

Does the noise abatement achieve at least a 5 dBA reduction in highway traffic noise for at least 50 percent of front-row receptors?

Yes____X_____ No_____

If yes, proceed to Question #1. If no, abatement measures are not feasible and are not recommended at this site; proceed to decision segment of form.

Determination of Feasible and Reasonable Mitigation

1. Does the design noise level equal or exceed the UDOT Noise Abatement Criteria as defined in Table 1 of this Policy?
   Yes____X_____ No_____

If yes, proceed to Question #3. If no, proceed to Question #2.

2. Does the receptor, as a result of the design noise level, substantially exceed (10 or more dBA) the existing noise levels prior to construction?
   Yes_____ No_____

If yes, proceed to Question #3. If no, then noise abatement is not recommended; proceed to decision segment of form.

3. Can effective noise abatement be constructed which would provide a minimum reduction of 7 dBA for at least 35 percent of front-row receptors?
   Yes_____X_____ No_____

If yes, proceed to Question #4. If no, abatement measures are not reasonable and are not recommended at this site; proceed to decision segment of form.

4. Are there undeveloped lands along the project corridor?
   Yes_____X_____ No_____
   If yes, proceed to Question #5. If no, proceed to Question #6.
5. Were the undeveloped lands permitted (formal building permit issued) for development under Land Use Categories A, B, C, D or E prior to the date the final environmental decision document was approved?
   Yes_____ No____X_____

If yes, proceed to Question #6. If no, implementation of abatement is not reasonable. Noise abatement is the responsibility of the property owner/developer. Proceed to decision segment of form.

6. Can noise abatement measures be constructed without creating a safety hazard to users and residents, and not interfere with operations and maintenance of the highway facility?
Yes_____X_____ No_____

If yes, proceed to Question #7. If no, abatement measures are not recommended at this site; proceed to decision segment of form.

7. Does the cost per impacted and benefited residence exceed $30,000 for residential areas in Land Use Category B or exceed $360 per linear foot for nonresidential areas in Land Use Category A and/or C or commercial and/or industrial zoned areas in Land Use Category E?
Yes_____ No_____X_____

If yes, noise abatement measures are not considered reasonable; proceed to decision segment of form. If no, proceed to Question #8.

8. For urban roadways that are not access-controlled, is the noise barrier height less than or equal to the distance from the wall face to the back of curb?
Yes_____X_____ No_____

If yes, proceed to Question #9. If no, noise abatement measures are not considered feasible based on safety; proceed to decision section of the form.

9. Does public involvement voting result in at least 75 percent of ballots returned?
Yes_____ No_____ To Be Completed _____X_____

If yes, proceed to Question #10. If no, noise abatement measures are not considered reasonable; proceed to decision segment of form.

10. Does the Public Involvement balloting result in at least 75 percent of benefited and end of wall receptors voting in "favor" of the proposed noise abatement measure?
Yes_____ No_____ To Be Completed _____X_____

If yes, proceed to Question #11. If no, noise abatement measures are not considered reasonable; proceed to decision segment of form.

11. Are there any environmental impacts that need special attention as a result of the implementation of the noise abatement?
Yes_____ No_____X_____

If yes, outline these impacts and discuss with the Environmental Manager or Region Project Manager.

Decision

Are Abatement Measures feasible? Yes____X____ No_____
Are Abatement Measures reasonable? Yes____X____ No_____

HWL							15 February 2017					
ECS							TNM 2.5					
							Calculated with TNM 2.5					
RESULTS: SOUND LEVELS												
PROJECT/CONTRACT:		Payson										
RUN:		Payson_C4_Bar7										
BARRIER DESIGN:		Bar7-12'-C4						Average pavement type shall be used unless				
								a State highway agency substantiates the use				
ATMOSPHERICS:		68 deg F, 50% RH						of a different type with approval of FHWA.				
Receiver												
Name	No.	#DUs	Existing	No Barrier					With Barrier			
			LAeq1h	LAeq1h		Increase over existing		Type	Calculated	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n	Impact	LAeq1h	Calculated	Goal	Calculated
							Sub'l Inc					minus
												Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
R158	158	1	0.0	62.7	66	62.7	10	----	55.3	7.4	8	-0.6
R159	159	1	0.0	59.1	66	59.1	10	----	53.5	5.6	8	-2.4
R160	160	1	0.0	57.7	66	57.7	10	----	53.2	4.5	8	-3.5
R161	161	1	0.0	54.3	66	54.3	10	----	50.9	3.4	8	-4.6
R162	162	1	0.0	63.3	66	63.3	10	----	55.0	8.3	8	0.3
R163	163	1	0.0	58.9	66	58.9	10	----	54.6	4.3	8	-3.7
R164	164	1	0.0	55.9	66	55.9	10	----	51.8	4.1	8	-3.9
R165	165	1	0.0	62.5	66	62.5	10	----	54.0	8.5	8	0.5
R166	166	1	0.0	57.3	66	57.3	10	----	52.2	5.1	8	-2.9
R167	167	1	0.0	55.4	66	55.4	10	----	50.3	5.1	8	-2.9
R168	168	1	0.0	60.2	66	60.2	10	----	56.0	4.2	8	-3.8
R169	169	1	0.0	57.6	66	57.6	10	----	53.2	4.4	8	-3.6
R170	170	1	0.0	56.3	66	56.3	10	----	53.4	2.9	8	-5.1
R171	171	1	0.0	54.9	66	54.9	10	----	52.6	2.3	8	-5.7
R172	172	1	0.0	54.0	66	54.0	10	----	52.0	2.0	8	-6.0
R173	173	1	0.0	58.8	66	58.8	10	----	58.5	0.3	8	-7.7
R174	175	1	0.0	60.2	66	60.2	10	----	59.6	0.6	8	-7.4
Dwelling Units		# DUs	Noise Reduction									
			Min	Avg	Max							
			dB	dB	dB							
All Selected		17	0.3	4.3	8.5							
All Impacted		0	0.0	0.0	0.0							
All that meet NR Goal		2	8.3	8.4	8.5							

HWL 15 February 2017
ECS TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: Payson
RUN: Payson_C4_Bar7
BARRIER DESIGN: Bar7-14'-C4
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver												
Name	No.	#DUs	Existing	No Barrier					With Barrier			
			LAeq1h	LAeq1h		Increase over existing		Type	Calculated	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n	Impact	LAeq1h	Calculated	Goal	Calculated
							Sub'l Inc					minus
												Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
R158	158	1	0.0	62.7	66	62.7	10	----	54.3	8.4	8	0.4
R159	159	1	0.0	59.1	66	59.1	10	----	52.6	6.5	8	-1.5
R160	160	1	0.0	57.7	66	57.7	10	----	51.9	5.8	8	-2.2
R161	161	1	0.0	54.3	66	54.3	10	----	49.6	4.7	8	-3.3
R162	162	1	0.0	63.3	66	63.3	10	----	53.9	9.4	8	1.4
R163	163	1	0.0	58.9	66	58.9	10	----	52.0	6.9	8	-1.1
R164	164	1	0.0	55.9	66	55.9	10	----	49.0	6.9	8	-1.1
R165	165	1	0.0	62.5	66	62.5	10	----	53.2	9.3	8	1.3
R166	166	1	0.0	57.3	66	57.3	10	----	50.9	6.4	8	-1.6
R167	167	1	0.0	55.4	66	55.4	10	----	48.6	6.8	8	-1.2
R168	168	1	0.0	60.2	66	60.2	10	----	55.7	4.5	8	-3.5
R169	169	1	0.0	57.6	66	57.6	10	----	52.6	5.0	8	-3.0
R170	170	1	0.0	56.3	66	56.3	10	----	52.3	4.0	8	-4.0
R171	171	1	0.0	54.9	66	54.9	10	----	51.4	3.5	8	-4.5
R172	172	1	0.0	54.0	66	54.0	10	----	51.1	2.9	8	-5.1
R173	173	1	0.0	58.8	66	58.8	10	----	58.4	0.4	8	-7.6
R174	175	1	0.0	60.2	66	60.2	10	----	59.4	0.8	8	-7.2

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	17	0.4	5.4	9.4
All Impacted	0	0.0	0.0	0.0
All that meet NR Goal	3	8.4	9.0	9.4

HWL 15 February 2017
ECS TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: Payson
RUN: Payson_C4_Bar7
BARRIER DESIGN: Bar7-16'-C4
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver												
Name	No.	#DUs	Existing	No Barrier					With Barrier			
			LAeq1h	LAeq1h		Increase over existing		Type	Calculated	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n	Impact	LAeq1h	Calculated	Goal	Calculated
							Sub'l Inc					minus
												Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
R158	158	1	0.0	62.7	66	62.7	10	----	53.5	9.2	8	1.2
R159	159	1	0.0	59.1	66	59.1	10	----	52.1	7.0	8	-1.0
R160	160	1	0.0	57.7	66	57.7	10	----	51.4	6.3	8	-1.7
R161	161	1	0.0	54.3	66	54.3	10	----	49.2	5.1	8	-2.9
R162	162	1	0.0	63.3	66	63.3	10	----	53.0	10.3	8	2.3
R163	163	1	0.0	58.9	66	58.9	10	----	51.1	7.8	8	-0.2
R164	164	1	0.0	55.9	66	55.9	10	----	48.1	7.8	8	-0.2
R165	165	1	0.0	62.5	66	62.5	10	----	52.5	10.0	8	2.0
R166	166	1	0.0	57.3	66	57.3	10	----	50.3	7.0	8	-1.0
R167	167	1	0.0	55.4	66	55.4	10	----	48.1	7.3	8	-0.7
R168	168	1	0.0	60.2	66	60.2	10	----	55.5	4.7	8	-3.3
R169	169	1	0.0	57.6	66	57.6	10	----	52.3	5.3	8	-2.7
R170	170	1	0.0	56.3	66	56.3	10	----	52.1	4.2	8	-3.8
R171	171	1	0.0	54.9	66	54.9	10	----	51.2	3.7	8	-4.3
R172	172	1	0.0	54.0	66	54.0	10	----	50.9	3.1	8	-4.9
R173	173	1	0.0	58.8	66	58.8	10	----	58.3	0.5	8	-7.5
R174	175	1	0.0	60.2	66	60.2	10	----	59.4	0.8	8	-7.2

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	17	0.5	5.9	10.3
All Impacted	0	0.0	0.0	0.0
All that meet NR Goal	3	9.2	9.8	10.3

I-15; Payson Main Street Interchange
Noise Analysis

Alternative I1 - Barrier 8

			NAC			Taller Wall			Intermediate Wall			Shorter Wall		
Receptor	First Row	Residences Represented	Land Use Category	Existing dB(A)	Build dB(A)	W/Wall dB(A)	Reduction dB(A)	Benefited Properties	W/Wall dB(A)	Reduction dB(A)	Benefited Properties	W/Wall dB(A)	Reduction dB(A)	Benefited Properties
R003		1	B	61	64	58	6	1	58	6	1	60	4	
R004	Yes	1	B	63	66	59	7	1	60	6	1	61	5	1
R005		2	B	65	67	60	7	2	60	7	2	62	5	2
R006	Yes	2	B	66	68	61	7	2	61	7	2	63	5	2
R007	Yes	2	B	67	69	61	8	2	62	7	2	64	5	2
R008		2	B	63	65	59	6	2	59	6	2	61	4	
R009		2	B	63	65	58	7	2	59	6	2	61	4	
R010	Yes	3	B	65	67	59	8	3	60	7	3	62	5	3
R011	Yes	3	B	60	62	55	7	3	55	7	3	57	5	3
R012	Yes	3	B	66	68	59	9	3	60	8	3	61	7	3
R013	Yes	2	B	66	68	59	9	2	60	8	2	61	7	2
R177		2	B	63	65	58	7	2	58	7	2	59	6	2
R178		2	B	63	65	58	7	2	59	6	2	60	5	2
R179		2	B	62	64	58	6	2	58	6	2	60	4	
R180		2	B	62	65	58	7	2	58	7	2	60	5	2
R181		3	B	62	64	58	6	3	58	6	3	60	4	
R182		2	B	61	64	58	6	2	59	5	2	60	4	
R183		2	B	61	63	57	6	2	58	5	2	59	4	
R184		2	B	62	64	58	6	2	59	5	2	60	4	
R185		2	B	60	63	57	6	2	58	5	2	59	4	
R186		2	B	64	66	58	8	2	58	8	2	59	7	2
R187	Yes	2	B	67	68	60	8	2	61	7	2	61	7	2
R188		2	B	63	65	57	8	2	57	8	2	58	7	2
R189	Yes	2	B	67	69	60	9	2	61	8	2	62	7	2
R190		2	B	63	65	56	9	2	57	8	2	57	8	2
R191	Yes	2	B	68	70	60	10	2	61	9	2	62	8	2
R192		2	B	61	63	56	7	2	56	7	2	57	6	2
R225	Yes	1	B	67	69	60	9	1	61	8	1	62	7	1
R226		1	B	66	68	59	9	1	60	8	1	61	7	1
R227	Yes	1	B	68	70	61	9	1	62	8	1	63	7	1
R228		2	B	64	66	59	7	2	59	7	2	60	6	2
R229		2	B	65	67	60	7	2	61	6	2	62	5	2
R230	Yes	1	B	68	70	62	8	1	62	8	1	63	7	1
R231	Yes	2	B	69	71	63	8	2	63	8	2	64	7	2
R232		2	B	65	67	60	7	2	61	6	2	61	6	2
R233		2	B	66	68	62	6	2	63	5	2	64	4	
R234	Yes	1	B	72	73	66	7	1	66	7	1	68	5	1
R246		1	B	63	65	58	7	1	58	7	1	59	6	1
R247		2	B	62	64	58	6	2	59	5	2	59	5	2
R248		1	B	60	62	57	5	1	57	5	1	58	4	
R249		1	B	66	68	65	3		65	3		66	2	

Length =	3397	3397	3397
Average Height =	16	14	12
Area of Noise Barrier =	54379	47583	40783
Cost of Noise Barrier=	$ 1,087,580	$ 951,660	$ 815,660
Properties With a 5 dB(A) Reduction =	75	75	54
Impacted Properties =	39	39	39
Impacted Front-Row Properties =	25	25	25
Impacted Front-Row Properties with a 5 dB(A) Reduction =	25	25	25
Percentage of Impacted Front-Row Properties Reduced At Least 5 dB(A) =	100%	100%	100%
Feasible =	Yes	Yes	Yes
First Row Properties =	28	28	28
First Row Properties with 7 dB(A) Reduction=	28	27	16
Percentage of First Row Reduced At Least 7 dB(A) =	100%	96%	57%
Reasonable (Meets Noise Reduction Goal)=	Yes	Yes	Yes
Cost / Benefitted Property =	$ 14,501	$ 12,689	$ 15,105
Cost Reasonable =	Yes	Yes	Yes

= Impacted receptor
= 5 dB(A) reduction or better
= 7 dB(A) reduction or better

UTAH DEPARTMENT OF TRANSPORTATION
NOISE ABATEMENT RECOMMENDATION CHECKLIST

Project Location: I-15; Payson Main Street Interchange EIS
Project Concept: Alternative I1
Project Number: F-115-6(214)251
PIN: 10263
Prepared By: D. Shannon / Lochner
Receptor Name/Description: Barrier 8

Determination of Acoustic Feasibility

Does the noise abatement achieve at least a 5 dBA reduction in highway traffic noise for at least 50 percent of front-row receptors?

Yes____X_____ No_____

If yes, proceed to Question #1. If no, abatement measures are not feasible and are not recommended at this site; proceed to decision segment of form.

Determination of Feasible and Reasonable Mitigation

1. Does the design noise level equal or exceed the UDOT Noise Abatement Criteria as defined in Table 1 of this Policy?
   Yes____X_____ No_____

If yes, proceed to Question #3. If no, proceed to Question #2.

2. Does the receptor, as a result of the design noise level, substantially exceed (10 or more dBA) the existing noise levels prior to construction?
   Yes_____ No_____

If yes, proceed to Question #3. If no, then noise abatement is not recommended; proceed to decision segment of form.

3. Can effective noise abatement be constructed which would provide a minimum reduction of 7 dBA for at least 35 percent of front-row receptors?
   Yes_____X_____ No_____

If yes, proceed to Question #4. If no, abatement measures are not reasonable and are not recommended at this site; proceed to decision segment of form.

4. Are there undeveloped lands along the project corridor?
   Yes_____X_____ No_____
   If yes, proceed to Question #5. If no, proceed to Question #6.
5. Were the undeveloped lands permitted (formal building permit issued) for development under Land Use Categories A, B, C, D or E prior to the date the final environmental decision document was approved?
   Yes_____ No____X_____

If yes, proceed to Question #6. If no, implementation of abatement is not reasonable. Noise abatement is the responsibility of the property owner/developer. Proceed to decision segment of form.

6. Can noise abatement measures be constructed without creating a safety hazard to users and residents, and not interfere with operations and maintenance of the highway facility?
Yes_____X_____ No_____

If yes, proceed to Question #7. If no, abatement measures are not recommended at this site; proceed to decision segment of form.

7. Does the cost per impacted and benefited residence exceed $30,000 for residential areas in Land Use Category B or exceed $360 per linear foot for nonresidential areas in Land Use Category A and/or C or commercial and/or industrial zoned areas in Land Use Category E?
Yes_____ No_____X_____

If yes, noise abatement measures are not considered reasonable; proceed to decision segment of form. If no, proceed to Question #8.

8. For urban roadways that are not access-controlled, is the noise barrier height less than or equal to the distance from the wall face to the back of curb?
Yes_____X_____ No_____

If yes, proceed to Question #9. If no, noise abatement measures are not considered feasible based on safety; proceed to decision section of the form.

9. Does public involvement voting result in at least 75 percent of ballots returned?
Yes_____ No_____ To Be Completed _____X_____

If yes, proceed to Question #10. If no, noise abatement measures are not considered reasonable; proceed to decision segment of form.

10. Does the Public Involvement balloting result in at least 75 percent of benefited and end of wall receptors voting in "favor" of the proposed noise abatement measure?
Yes_____ No_____ To Be Completed _____X_____

If yes, proceed to Question #11. If no, noise abatement measures are not considered reasonable; proceed to decision segment of form.

11. Are there any environmental impacts that need special attention as a result of the implementation of the noise abatement?
Yes_____ No_____X_____

If yes, outline these impacts and discuss with the Environmental Manager or Region Project Manager.

Decision

Are Abatement Measures feasible? Yes____X____ No_____
Are Abatement Measures reasonable? Yes____X____ No_____

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ECS TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: Payson
RUN: Payson_I1_Bar8
BARRIER DESIGN: Bar8-12'-I1
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
R003	3	1	0.0	63.2	66	63.2	10	----	59.6	3.6	8	-4.4
R004	4	1	0.0	64.8	66	64.8	10	----	60.9	3.9	8	-4.1
R005	5	1	0.0	65.8	66	65.8	10	----	61.8	4.0	8	-4.0
R006	6	1	0.0	66.8	66	66.8	10	Snd Lvl	62.7	4.1	8	-3.9
R007	7	1	0.0	68.1	66	68.1	10	Snd Lvl	63.8	4.3	8	-3.7
R008	8	1	0.0	64.8	66	64.8	10	----	60.8	4.0	8	-4.0
R009	9	1	0.0	64.9	66	64.9	10	----	60.8	4.1	8	-3.9
R010	10	1	0.0	66.5	66	66.5	10	Snd Lvl	61.5	5.0	8	-3.0
R011	11	1	0.0	61.6	66	61.6	10	----	56.5	5.1	8	-2.9
R012	12	1	0.0	67.9	66	67.9	10	Snd Lvl	61.1	6.8	8	-1.2
R013	13	1	0.0	67.7	66	67.7	10	Snd Lvl	60.7	7.0	8	-1.0
R177	180	1	0.0	65.2	66	65.2	10	----	58.6	6.6	8	-1.4
R178	181	1	0.0	65.1	66	65.1	10	----	59.8	5.3	8	-2.7
R179	182	1	0.0	63.9	66	63.9	10	----	59.6	4.3	8	-3.7
R180	183	1	0.0	64.4	66	64.4	10	----	59.8	4.6	8	-3.4
R181	184	1	0.0	63.7	66	63.7	10	----	59.6	4.1	8	-3.9
R182	185	1	0.0	63.4	66	63.4	10	----	59.8	3.6	8	-4.4
R183	186	1	0.0	62.6	66	62.6	10	----	59.2	3.4	8	-4.6
R184	187	1	0.0	63.6	66	63.6	10	----	60.1	3.5	8	-4.5
R185	188	1	0.0	62.2	66	62.2	10	----	58.8	3.4	8	-4.6
R186	190	1	0.0	65.6	66	65.6	10	----	58.8	6.8	8	-1.2
R187	191	1	0.0	68.2	66	68.2	10	Snd Lvl	61.2	7.0	8	-1.0
R188	192	1	0.0	64.9	66	64.9	10	----	58.0	6.9	8	-1.1
R189	193	1	0.0	68.9	66	68.9	10	Snd Lvl	61.5	7.4	8	-0.6

R190	194	1	0.0	64.5	66	64.5	10	----	57.3	7.2	8	-0.8
R191	195	1	0.0	69.6	66	69.6	10	Snd Lvl	62.0	7.6	8	-0.4
R192	196	1	0.0	62.4	66	62.4	10	----	56.7	5.7	8	-2.3
R225	198	1	0.0	69.0	66	69.0	10	Snd Lvl	61.7	7.3	8	-0.7
R226	199	1	0.0	67.5	66	67.5	10	Snd Lvl	60.5	7.0	8	-1.0
R227	200	1	0.0	70.1	66	70.1	10	Snd Lvl	62.6	7.5	8	-0.5
R228	201	1	0.0	65.6	66	65.6	10	----	59.8	5.8	8	-2.2
R229	202	1	0.0	66.4	66	66.4	10	Snd Lvl	61.5	4.9	8	-3.1
R230	203	1	0.0	69.8	66	69.8	10	Snd Lvl	63.0	6.8	8	-1.2
R231	204	1	0.0	70.6	66	70.6	10	Snd Lvl	64.1	6.5	8	-1.5
R232	205	1	0.0	66.1	66	66.1	10	Snd Lvl	61.3	4.8	8	-3.2
R233	206	1	0.0	67.7	66	67.7	10	Snd Lvl	63.5	4.2	8	-3.8
R234	207	1	0.0	72.3	66	72.3	10	Snd Lvl	67.5	4.8	8	-3.2
R246	230	1	0.0	65.0	66	65.0	10	----	58.9	6.1	8	-1.9
R247	231	1	0.0	63.7	66	63.7	10	----	59.3	4.4	8	-3.6
R248	232	1	0.0	61.7	66	61.7	10	----	57.9	3.8	8	-4.2
R249	207	1	0.0	68.0	66	68.0	10	Snd Lvl	65.5	2.5	8	-5.5

Dwelling Units	**# DUs**	**Noise Reduction**		
		Min	**Avg**	**Max**
		dB	**dB**	**dB**
All Selected	41	2.5	5.3	7.6
All Impacted	18	2.5	5.9	7.6
All that meet NR Goal	0	0.0	0.0	0.0

HWL 15 February 2017
ECS TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: Payson
RUN: Payson_I1_Bar8
BARRIER DESIGN: Bar8-14'-I1
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
R003	3	1	0.0	63.2	66	63.2	10	----	58.4	4.8	8	-3.2
R004	4	1	0.0	64.8	66	64.8	10	----	59.8	5.0	8	-3.0
R005	5	1	0.0	65.8	66	65.8	10	----	60.4	5.4	8	-2.6
R006	6	1	0.0	66.8	66	66.8	10	Snd Lvl	61.2	5.6	8	-2.4
R007	7	1	0.0	68.1	66	68.1	10	Snd Lvl	62.2	5.9	8	-2.1
R008	8	1	0.0	64.8	66	64.8	10	----	59.3	5.5	8	-2.5
R009	9	1	0.0	64.9	66	64.9	10	----	59.1	5.8	8	-2.2
R010	10	1	0.0	66.5	66	66.5	10	Snd Lvl	59.7	6.8	8	-1.2
R011	11	1	0.0	61.6	66	61.6	10	----	55.3	6.3	8	-1.7
R012	12	1	0.0	67.9	66	67.9	10	Snd Lvl	60.1	7.8	8	-0.2
R013	13	1	0.0	67.7	66	67.7	10	Snd Lvl	59.9	7.8	8	-0.2
R177	180	1	0.0	65.2	66	65.2	10	----	58.0	7.2	8	-0.8
R178	181	1	0.0	65.1	66	65.1	10	----	58.9	6.2	8	-1.8
R179	182	1	0.0	63.9	66	63.9	10	----	58.2	5.7	8	-2.3
R180	183	1	0.0	64.4	66	64.4	10	----	58.3	6.1	8	-1.9
R181	184	1	0.0	63.7	66	63.7	10	----	58.3	5.4	8	-2.6
R182	185	1	0.0	63.4	66	63.4	10	----	58.5	4.9	8	-3.1
R183	186	1	0.0	62.6	66	62.6	10	----	57.8	4.8	8	-3.2
R184	187	1	0.0	63.6	66	63.6	10	----	58.7	4.9	8	-3.1
R185	188	1	0.0	62.2	66	62.2	10	----	57.6	4.6	8	-3.4
R186	190	1	0.0	65.6	66	65.6	10	----	58.2	7.4	8	-0.6
R187	191	1	0.0	68.2	66	68.2	10	Snd Lvl	60.5	7.7	8	-0.3
R188	192	1	0.0	64.9	66	64.9	10	----	57.2	7.7	8	-0.3
R189	193	1	0.0	68.9	66	68.9	10	Snd Lvl	60.6	8.3	8	0.3

R190	194	1	0.0	64.5	66	64.5	10	----	56.6	7.9	8	-0.1
R191	195	1	0.0	69.6	66	69.6	10	Snd Lvl	61.0	8.6	8	0.6
R192	196	1	0.0	62.4	66	62.4	10	----	56.0	6.4	8	-1.6
R225	198	1	0.0	69.0	66	69.0	10	Snd Lvl	61.0	8.0	8	0.0
R226	199	1	0.0	67.5	66	67.5	10	Snd Lvl	59.7	7.8	8	-0.2
R227	200	1	0.0	70.1	66	70.1	10	Snd Lvl	61.8	8.3	8	0.3
R228	201	1	0.0	65.6	66	65.6	10	----	59.2	6.4	8	-1.6
R229	202	1	0.0	66.4	66	66.4	10	Snd Lvl	60.5	5.9	8	-2.1
R230	203	1	0.0	69.8	66	69.8	10	Snd Lvl	62.2	7.6	8	-0.4
R231	204	1	0.0	70.6	66	70.6	10	Snd Lvl	63.1	7.5	8	-0.5
R232	205	1	0.0	66.1	66	66.1	10	Snd Lvl	60.5	5.6	8	-2.4
R233	206	1	0.0	67.7	66	67.7	10	Snd Lvl	62.5	5.2	8	-2.8
R234	207	1	0.0	72.3	66	72.3	10	Snd Lvl	66.3	6.0	8	-2.0
R246	230	1	0.0	65.0	66	65.0	10	----	58.2	6.8	8	-1.2
R247	231	1	0.0	63.7	66	63.7	10	----	58.5	5.2	8	-2.8
R248	232	1	0.0	61.7	66	61.7	10	----	57.2	4.5	8	-3.5
R249	207	1	0.0	68.0	66	68.0	10	Snd Lvl	65.0	3.0	8	-5.0

Dwelling Units	**# DUs**	**Noise Reduction**		
		Min	**Avg**	**Max**
		dB	**dB**	**dB**
All Selected	41	3.0	6.3	8.6
All Impacted	18	3.0	6.9	8.6
All that meet NR Goal	4	8.0	8.3	8.6

HWL 15 February 2017
ECS TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: Payson
RUN: Payson_I1_Bar8
BARRIER DESIGN: Bar8-16'-I1
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver												
Name	No.	#DUs	Existing	No Barrier					With Barrier			
			LAeq1h	LAeq1h		Increase over existing		Type	Calculated	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n	Impact	LAeq1h	Calculated	Goal	Calculated
							Sub'l Inc					minus
												Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
R003	3	1	0.0	63.2	66	63.2	10	----	57.9	5.3	8	-2.7
R004	4	1	0.0	64.8	66	64.8	10	----	59.2	5.6	8	-2.4
R005	5	1	0.0	65.8	66	65.8	10	----	59.8	6.0	8	-2.0
R006	6	1	0.0	66.8	66	66.8	10	Snd Lvl	60.6	6.2	8	-1.8
R007	7	1	0.0	68.1	66	68.1	10	Snd Lvl	61.4	6.7	8	-1.3
R008	8	1	0.0	64.8	66	64.8	10	----	58.7	6.1	8	-1.9
R009	9	1	0.0	64.9	66	64.9	10	----	58.4	6.5	8	-1.5
R010	10	1	0.0	66.5	66	66.5	10	Snd Lvl	59.0	7.5	8	-0.5
R011	11	1	0.0	61.6	66	61.6	10	----	54.8	6.8	8	-1.2
R012	12	1	0.0	67.9	66	67.9	10	Snd Lvl	59.3	8.6	8	0.6
R013	13	1	0.0	67.7	66	67.7	10	Snd Lvl	59.2	8.5	8	0.5
R177	180	1	0.0	65.2	66	65.2	10	----	57.7	7.5	8	-0.5
R178	181	1	0.0	65.1	66	65.1	10	----	58.1	7.0	8	-1.0
R179	182	1	0.0	63.9	66	63.9	10	----	57.5	6.4	8	-1.6
R180	183	1	0.0	64.4	66	64.4	10	----	57.8	6.6	8	-1.4
R181	184	1	0.0	63.7	66	63.7	10	----	57.5	6.2	8	-1.8
R182	185	1	0.0	63.4	66	63.4	10	----	57.7	5.7	8	-2.3
R183	186	1	0.0	62.6	66	62.6	10	----	57.1	5.5	8	-2.5
R184	187	1	0.0	63.6	66	63.6	10	----	58.1	5.5	8	-2.5
R185	188	1	0.0	62.2	66	62.2	10	----	56.9	5.3	8	-2.7
R186	190	1	0.0	65.6	66	65.6	10	----	57.7	7.9	8	-0.1
R187	191	1	0.0	68.2	66	68.2	10	Snd Lvl	59.9	8.3	8	0.3
R188	192	1	0.0	64.9	66	64.9	10	----	56.6	8.3	8	0.3
R189	193	1	0.0	68.9	66	68.9	10	Snd Lvl	59.8	9.1	8	1.1

R190	194	1	0.0	64.5	66	64.5	10	----	56.0	8.5	8	0.5
R191	195	1	0.0	69.6	66	69.6	10	Snd Lvl	60.2	9.4	8	1.4
R192	196	1	0.0	62.4	66	62.4	10	----	55.6	6.8	8	-1.2
R225	198	1	0.0	69.0	66	69.0	10	Snd Lvl	60.3	8.7	8	0.7
R226	199	1	0.0	67.5	66	67.5	10	Snd Lvl	59.1	8.4	8	0.4
R227	200	1	0.0	70.1	66	70.1	10	Snd Lvl	61.1	9.0	8	1.0
R228	201	1	0.0	65.6	66	65.6	10	----	58.7	6.9	8	-1.1
R229	202	1	0.0	66.4	66	66.4	10	Snd Lvl	59.9	6.5	8	-1.5
R230	203	1	0.0	69.8	66	69.8	10	Snd Lvl	61.6	8.2	8	0.2
R231	204	1	0.0	70.6	66	70.6	10	Snd Lvl	62.5	8.1	8	0.1
R232	205	1	0.0	66.1	66	66.1	10	Snd Lvl	60.0	6.1	8	-1.9
R233	206	1	0.0	67.7	66	67.7	10	Snd Lvl	62.0	5.7	8	-2.3
R234	207	1	0.0	72.3	66	72.3	10	Snd Lvl	65.8	6.5	8	-1.5
R246	230	1	0.0	65.0	66	65.0	10	----	57.8	7.2	8	-0.8
R247	231	1	0.0	63.7	66	63.7	10	----	58.1	5.6	8	-2.4
R248	232	1	0.0	61.7	66	61.7	10	----	56.9	4.8	8	-3.2
R249	207	1	0.0	68.0	66	68.0	10	Snd Lvl	64.9	3.1	8	-4.9

Dwelling Units	**# DUs**	**Noise Reduction**		
		Min	**Avg**	**Max**
		dB	**dB**	**dB**
All Selected	41	3.1	6.9	9.4
All Impacted	18	3.1	7.5	9.4
All that meet NR Goal	12	8.1	8.6	9.4

I-15; Payson Main Street Interchange
Noise Analysis

Alternative I1 - Barrier 9

			NAC			Taller Wall			Intermediate Wall			Shorter Wall		
Receptor	First Row	Residences Represented	Land Use Category	Existing dB(A)	Build dB(A)	W/Wall dB(A)	Reduction dB(A)	Benefited Properties	W/Wall dB(A)	Reduction dB(A)	Benefited Properties	W/Wall dB(A)	Reduction dB(A)	Benefited Properties
R196	Yes	2	B	68	71	67	4		67	4		67	4	
R197	Yes	2	B	73	76	68	8	2	68	8	2	68	8	2
R198	Yes	2	B	76	79	68	11	2	69	10	2	70	9	2
R199	Yes	2	B	77	79	68	11	2	69	10	2	70	9	2
R200	Yes	2	B	75	77	67	10	2	67	10	2	68	9	2
R201	Yes	2	B	76	78	66	12	2	67	11	2	67	11	2
R202	Yes	2	B	70	72	65	7	2	65	7	2	66	6	2
R203	Yes	1	B	75	77	65	12	1	66	11	1	66	11	1
R204	Yes	1	B	74	76	66	10	1	66	10	1	67	9	1
R205		1	B	67	72	66	6	1	67	5	1	67	5	1
R206		1	B	66	70	66	4		66	4		66	4	
R207		2	B	65	68	65	3		65	3		65	3	
R208		1	B	66	69	64	5	1	64	5	1	65	4	
R209		1	B	62	65	61	4		62	3		63	2	
R210		1	B	64	66	62	4		62	4		63	3	
R211		1	B	68	70	64	6	1	64	6	1	66	4	
R212		2	B	65	67	63	4		63	4		64	3	
R213		2	B	63	66	62	4		63	3		63	3	
R214		2	B	62	65	61	4		61	4		62	3	
R215		2	B	61	64	60	4		60	4		61	3	
R216		2	B	60	63	59	4		59	4		60	3	
R217		2	B	59	61	58	3		58	3		58	3	
R218		1	B	66	69	64	5	1	65	4		66	3	
R219		1	B	66	69	64	5	1	64	5	1	65	4	
R220		1	B	60	64	62	2		62	2		62	2	
R221		1	B	62	65	62	3		62	3		63	2	
R222		1	B	60	64	61	3		62	2		62	2	
R223		2	B	60	63	60	3		61	2		61	2	
R224		2	B	59	62	60	2		60	2		61	1	

= Impacted receptor
= 5 dB(A) reduction or better
= 7 dB(A) reduction or better

Length =	800	800	800
Average Height =	16	15	14
Area of Noise Barrier =	12801	12001	11200
Cost of Noise Barrier=	$ 256,020	$ 240,020	$ 224,000
Properties With a 5 dB(A) Reduction =	19	18	15
Impacted Properties =	29	29	29
Impacted Front-Row Properties =	16	16	16
Impacted Front-Row Properties with a 5 dB(A) Reduction =	14	14	14
Percentage of Impacted Front-Row Properties Reduced At Least 5 dB(A) =	88%	88%	88%
Feasible =	Yes	Yes	Yes
First Row Properties =	16	16	16
First Row Properties with 7 dB(A) Reduction=	14	14	12
Percentage of First Row Reduced At Least 7 dB(A) =	88%	88%	75%
Reasonable (Meets Noise Reduction Goal)=	Yes	Yes	Yes
Cost / Benefitted Property =	$ 13,475	$ 13,334	$ 14,933
Cost Reasonable =	Yes	Yes	Yes

UTAH DEPARTMENT OF TRANSPORTATION
NOISE ABATEMENT RECOMMENDATION CHECKLIST

Project Location: I-15; Payson Main Street Interchange EIS
Project Concept: Alternative I1
Project Number: F-115-6(214)251
PIN: 10263
Prepared By: D. Shannon / Lochner
Receptor Name/Description: Barrier 9

Determination of Acoustic Feasibility

Does the noise abatement achieve at least a 5 dBA reduction in highway traffic noise for at least 50 percent of front-row receptors?

Yes____X_____ No_____

If yes, proceed to Question #1. If no, abatement measures are not feasible and are not recommended at this site; proceed to decision segment of form.

Determination of Feasible and Reasonable Mitigation

1. Does the design noise level equal or exceed the UDOT Noise Abatement Criteria as defined in Table 1 of this Policy?
   Yes____X_____ No_____

If yes, proceed to Question #3. If no, proceed to Question #2.

2. Does the receptor, as a result of the design noise level, substantially exceed (10 or more dBA) the existing noise levels prior to construction?
   Yes_____ No_____

If yes, proceed to Question #3. If no, then noise abatement is not recommended; proceed to decision segment of form.

3. Can effective noise abatement be constructed which would provide a minimum reduction of 7 dBA for at least 35 percent of front-row receptors?
   Yes_____X_____ No_____

If yes, proceed to Question #4. If no, abatement measures are not reasonable and are not recommended at this site; proceed to decision segment of form.

4. Are there undeveloped lands along the project corridor?
   Yes_____X_____ No_____
   If yes, proceed to Question #5. If no, proceed to Question #6.
5. Were the undeveloped lands permitted (formal building permit issued) for development under Land Use Categories A, B, C, D or E prior to the date the final environmental decision document was approved?
   Yes_____ No____X_____

If yes, proceed to Question #6. If no, implementation of abatement is not reasonable. Noise abatement is the responsibility of the property owner/developer. Proceed to decision segment of form.

6. Can noise abatement measures be constructed without creating a safety hazard to users and residents, and not interfere with operations and maintenance of the highway facility?
Yes_____X_____ No_____

If yes, proceed to Question #7. If no, abatement measures are not recommended at this site; proceed to decision segment of form.

7. Does the cost per impacted and benefited residence exceed $30,000 for residential areas in Land Use Category B or exceed $360 per linear foot for nonresidential areas in Land Use Category A and/or C or commercial and/or industrial zoned areas in Land Use Category E?
Yes_____ No_____X_____

If yes, noise abatement measures are not considered reasonable; proceed to decision segment of form. If no, proceed to Question #8.

8. For urban roadways that are not access-controlled, is the noise barrier height less than or equal to the distance from the wall face to the back of curb?
Yes_____X_____ No_____

If yes, proceed to Question #9. If no, noise abatement measures are not considered feasible based on safety; proceed to decision section of the form.

9. Does public involvement voting result in at least 75 percent of ballots returned?
Yes_____ No_____ To Be Completed _____X_____

If yes, proceed to Question #10. If no, noise abatement measures are not considered reasonable; proceed to decision segment of form.

10. Does the Public Involvement balloting result in at least 75 percent of benefited and end of wall receptors voting in "favor" of the proposed noise abatement measure?
Yes_____ No_____ To Be Completed _____X_____

If yes, proceed to Question #11. If no, noise abatement measures are not considered reasonable; proceed to decision segment of form.

11. Are there any environmental impacts that need special attention as a result of the implementation of the noise abatement?
Yes_____ No_____X_____

If yes, outline these impacts and discuss with the Environmental Manager or Region Project Manager.

Decision

Are Abatement Measures feasible? Yes____X____ No_____
Are Abatement Measures reasonable? Yes____X____ No_____

HWL 15 February 2017
JPW TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: Payson
RUN: Payson_l1_Bar9
BARRIER DESIGN: Bar9-14'-l1
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
R196	3	1	0.0	70.6	66	70.6	10	Snd Lvl	67.3	3.3	8	-4.7
R197	4	1	0.0	76.1	66	76.1	10	Snd Lvl	68.4	7.7	8	-0.3
R198	5	1	0.0	79.2	66	79.2	10	Snd Lvl	69.5	9.7	8	1.7
R199	6	1	0.0	79.3	66	79.3	10	Snd Lvl	69.8	9.5	8	1.5
R200	7	1	0.0	77.3	66	77.3	10	Snd Lvl	68.0	9.3	8	1.3
R201	8	1	0.0	78.4	66	78.4	10	Snd Lvl	67.3	11.1	8	3.1
R202	9	1	0.0	72.9	66	72.9	10	Snd Lvl	65.7	7.2	8	-0.8
R203	10	1	0.0	77.5	66	77.5	10	Snd Lvl	66.4	11.1	8	3.1
R204	11	1	0.0	76.0	66	76.0	10	Snd Lvl	66.5	9.5	8	1.5
R205	12	1	0.0	71.5	66	71.5	10	Snd Lvl	66.8	4.7	8	-3.3
R206	13	1	0.0	70.2	66	70.2	10	Snd Lvl	66.2	4.0	8	-4.0
R207	180	1	0.0	68.0	66	68.0	10	Snd Lvl	65.1	2.9	8	-5.1
R208	181	1	0.0	68.8	66	68.8	10	Snd Lvl	65.3	3.5	8	-4.5
R209	182	1	0.0	64.8	66	64.8	10	----	62.6	2.2	8	-5.8
R210	183	1	0.0	66.2	66	66.2	10	Snd Lvl	63.2	3.0	8	-5.0
R211	184	1	0.0	70.4	66	70.4	10	Snd Lvl	66.1	4.3	8	-3.7
R212	185	1	0.0	67.2	66	67.2	10	Snd Lvl	64.2	3.0	8	-5.0
R213	186	1	0.0	65.8	66	65.8	10	----	63.3	2.5	8	-5.5
R214	187	1	0.0	64.4	66	64.4	10	----	62.0	2.4	8	-5.6
R215	188	1	0.0	62.7	66	62.7	10	----	60.7	2.0	8	-6.0
R216	190	1	0.0	61.1	66	61.1	10	----	59.5	1.6	8	-6.4
R217	191	1	0.0	59.8	66	59.8	10	----	58.4	1.4	8	-6.6
R218	192	1	0.0	68.9	66	68.9	10	Snd Lvl	65.7	3.2	8	-4.8
R219	193	1	0.0	68.8	66	68.8	10	Snd Lvl	64.6	4.2	8	-3.8

R220	194	1	0.0	64.0	66	64.0	10	----	62.2	1.8	8	-6.2
R221	195	1	0.0	65.1	66	65.1	10	----	62.5	2.6	8	-5.4
R222	196	1	0.0	63.8	66	63.8	10	----	62.0	1.8	8	-6.2
R223	198	1	0.0	62.9	66	62.9	10	----	61.1	1.8	8	-6.2
R224	199	1	0.0	62.0	66	62.0	10	----	60.6	1.4	8	-6.6

Dwelling Units	**# DUs**	**Noise Reduction**		
		Min	**Avg**	**Max**
		dB	**dB**	**dB**
All Selected	29	1.4	4.6	11.1
All Impacted	18	2.9	6.2	11.1
All that meet NR Goal	6	9.3	10.0	11.1

HWL 15 February 2017
JPW TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: Payson
RUN: Payson_l1_Bar9
BARRIER DESIGN: Bar9-15'-l1
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
R196	3	1	0.0	70.6	66	70.6	10	Snd Lvl	67.2	3.4	8	-4.6
R197	4	1	0.0	76.1	66	76.1	10	Snd Lvl	68.0	8.1	8	0.1
R198	5	1	0.0	79.2	66	79.2	10	Snd Lvl	68.8	10.4	8	2.4
R199	6	1	0.0	79.3	66	79.3	10	Snd Lvl	69.1	10.2	8	2.2
R200	7	1	0.0	77.3	66	77.3	10	Snd Lvl	67.4	9.9	8	1.9
R201	8	1	0.0	78.4	66	78.4	10	Snd Lvl	66.8	11.6	8	3.6
R202	9	1	0.0	72.9	66	72.9	10	Snd Lvl	65.1	7.8	8	-0.2
R203	10	1	0.0	77.5	66	77.5	10	Snd Lvl	65.9	11.6	8	3.6
R204	11	1	0.0	76.0	66	76.0	10	Snd Lvl	66.0	10.0	8	2.0
R205	12	1	0.0	71.5	66	71.5	10	Snd Lvl	66.6	4.9	8	-3.1
R206	13	1	0.0	70.2	66	70.2	10	Snd Lvl	65.9	4.3	8	-3.7
R207	180	1	0.0	68.0	66	68.0	10	Snd Lvl	64.7	3.3	8	-4.7
R208	181	1	0.0	68.8	66	68.8	10	Snd Lvl	64.4	4.4	8	-3.6
R209	182	1	0.0	64.8	66	64.8	10	----	61.8	3.0	8	-5.0
R210	183	1	0.0	66.2	66	66.2	10	Snd Lvl	61.9	4.3	8	-3.7
R211	184	1	0.0	70.4	66	70.4	10	Snd Lvl	64.4	6.0	8	-2.0
R212	185	1	0.0	67.2	66	67.2	10	Snd Lvl	63.2	4.0	8	-4.0
R213	186	1	0.0	65.8	66	65.8	10	----	62.5	3.3	8	-4.7
R214	187	1	0.0	64.4	66	64.4	10	----	61.4	3.0	8	-5.0
R215	188	1	0.0	62.7	66	62.7	10	----	60.2	2.5	8	-5.5
R216	190	1	0.0	61.1	66	61.1	10	----	59.1	2.0	8	-6.0
R217	191	1	0.0	59.8	66	59.8	10	----	58.1	1.7	8	-6.3
R218	192	1	0.0	68.9	66	68.9	10	Snd Lvl	64.7	4.2	8	-3.8
R219	193	1	0.0	68.8	66	68.8	10	Snd Lvl	64.3	4.5	8	-3.5

R220	194	1	0.0	64.0	66	64.0	10	----	61.7	2.3	8	-5.7
R221	195	1	0.0	65.1	66	65.1	10	----	61.8	3.3	8	-4.7
R222	196	1	0.0	63.8	66	63.8	10	----	61.5	2.3	8	-5.7
R223	198	1	0.0	62.9	66	62.9	10	----	60.5	2.4	8	-5.6
R224	199	1	0.0	62.0	66	62.0	10	----	60.2	1.8	8	-6.2

Dwelling Units	**# DUs**	**Noise Reduction**		
		Min	**Avg**	**Max**
		dB	**dB**	**dB**
All Selected	29	1.7	5.2	11.6
All Impacted	18	3.3	6.8	11.6
All that meet NR Goal	7	8.1	10.3	11.6

HWL 15 February 2017
JPW TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: Payson
RUN: Payson_l1_Bar9
BARRIER DESIGN: Bar9-16'-l1
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
R196	3	1	0.0	70.6	66	70.6	10	Snd Lvl	67.1	3.5	8	-4.5
R197	4	1	0.0	76.1	66	76.1	10	Snd Lvl	67.7	8.4	8	0.4
R198	5	1	0.0	79.2	66	79.2	10	Snd Lvl	68.2	11.0	8	3.0
R199	6	1	0.0	79.3	66	79.3	10	Snd Lvl	68.3	11.0	8	3.0
R200	7	1	0.0	77.3	66	77.3	10	Snd Lvl	66.8	10.5	8	2.5
R201	8	1	0.0	78.4	66	78.4	10	Snd Lvl	66.2	12.2	8	4.2
R202	9	1	0.0	72.9	66	72.9	10	Snd Lvl	64.6	8.3	8	0.3
R203	10	1	0.0	77.5	66	77.5	10	Snd Lvl	65.4	12.1	8	4.1
R204	11	1	0.0	76.0	66	76.0	10	Snd Lvl	65.6	10.4	8	2.4
R205	12	1	0.0	71.5	66	71.5	10	Snd Lvl	66.4	5.1	8	-2.9
R206	13	1	0.0	70.2	66	70.2	10	Snd Lvl	65.7	4.5	8	-3.5
R207	180	1	0.0	68.0	66	68.0	10	Snd Lvl	64.5	3.5	8	-4.5
R208	181	1	0.0	68.8	66	68.8	10	Snd Lvl	63.7	5.1	8	-2.9
R209	182	1	0.0	64.8	66	64.8	10	----	61.2	3.6	8	-4.4
R210	183	1	0.0	66.2	66	66.2	10	Snd Lvl	61.5	4.7	8	-3.3
R211	184	1	0.0	70.4	66	70.4	10	Snd Lvl	63.8	6.6	8	-1.4
R212	185	1	0.0	67.2	66	67.2	10	Snd Lvl	62.5	4.7	8	-3.3
R213	186	1	0.0	65.8	66	65.8	10	----	62.0	3.8	8	-4.2
R214	187	1	0.0	64.4	66	64.4	10	----	60.7	3.7	8	-4.3
R215	188	1	0.0	62.7	66	62.7	10	----	59.7	3.0	8	-5.0
R216	190	1	0.0	61.1	66	61.1	10	----	58.7	2.4	8	-5.6
R217	191	1	0.0	59.8	66	59.8	10	----	57.8	2.0	8	-6.0
R218	192	1	0.0	68.9	66	68.9	10	Snd Lvl	64.4	4.5	8	-3.5
R219	193	1	0.0	68.8	66	68.8	10	Snd Lvl	64.0	4.8	8	-3.2

R220	194	1	0.0	64.0	66	64.0	10	----	61.6	2.4	8	-5.6
R221	195	1	0.0	65.1	66	65.1	10	----	61.5	3.6	8	-4.4
R222	196	1	0.0	63.8	66	63.8	10	----	61.2	2.6	8	-5.4
R223	198	1	0.0	62.9	66	62.9	10	----	60.2	2.7	8	-5.3
R224	199	1	0.0	62.0	66	62.0	10	----	60.0	2.0	8	-6.0

Dwelling Units	**# DUs**	**Noise Reduction**		
		Min	**Avg**	**Max**
		dB	**dB**	**dB**
All Selected	29	2.0	5.6	12.2
All Impacted	18	3.5	7.3	12.2
All that meet NR Goal	8	8.3	10.5	12.2

I-15; Payson Main Street Interchange
Noise Analysis

Alternative R1 - Barrier 10

			NAC			Taller Wall			Intermediate Wall			Shorter Wall		
Receptor	First Row	Residences Represented	Land Use Category	Existing dB(A)	Build dB(A)	W/Wall dB(A)	Reduction dB(A)	Benefited Properties	W/Wall dB(A)	Reduction dB(A)	Benefited Properties	W/Wall dB(A)	Reduction dB(A)	Benefited Properties
R003		1	B	61	64	58	6	1	59	5	1	60	4	
R004	Yes	1	B	63	65	60	5	1	60	5	1	61	4	
R005		2	B	65	66	60	6	2	61	5	2	62	4	
R006	Yes	2	B	66	67	61	6	2	61	6	2	63	4	
R007	Yes	2	B	67	69	62	7	2	63	6	2	64	5	2
R008		2	B	63	65	59	6	2	60	5	2	61	4	
R009		2	B	63	65	59	6	2	60	5	2	61	4	
R010	Yes	3	B	65	67	60	7	3	61	6	3	62	5	3
R011	Yes	3	B	60	62	57	5	3	57	5	3	58	4	
R012	Yes	3	B	66	68	61	7	3	62	6	3	62	6	3
R013	Yes	2	B	66	68	61	7	2	61	7	2	62	6	2
R177		2	B	63	66	60	6	2	60	6	2	60	6	2
R178		2	B	63	66	60	6	2	61	5	2	61	5	2
R179		2	B	62	64	59	5	2	60	4		61	3	
R180		2	B	62	65	59	6	2	59	6	2	60	5	2
R181		3	B	62	64	59	5	3	60	4		61	3	
R182		2	B	61	64	59	5	2	59	5	2	60	4	
R183		2	B	61	63	58	5	2	59	4		60	3	
R184		2	B	62	64	59	5	2	59	5	2	61	3	
R185		2	B	60	63	58	5	2	59	4		60	3	
R186		2	B	64	66	64	2		64	2		64	2	
R187	Yes	2	B	67	69	65	4		65	4		65	4	
R188		2	B	63	65	61	4		62	3		62	3	
R189	Yes	2	B	67	69	63	6	2	64	5	2	64	5	2
R190		2	B	63	65	61	4		61	4		61	4	
R191	Yes	2	B	68	70	63	7	2	64	6	2	64	6	2
R192		2	B	61	63	58	5	2	59	4		59	4	

= Impacted receptor
= 5 dB(A) reduction or better
= 7 dB(A) reduction or better

Length =	1997	1997	1997
Average Height =	16	14	12
Area of Noise Barrier =	31965	27970	23973
Cost of Noise Barrier=	$ 639,300	$ 559,400	$ 479,460
Properties With a 5 dB(A) Reduction =	48	37	20
Impacted Properties =	26	26	26
Impacted Front-Row Properties =	18	18	18
Impacted Front-Row Properties with a 5 dB(A) Reduction =	16	16	14
Percentage of Impacted Front-Row Properties Reduced At Least 5 dB(A) =	89%	89%	78%
Feasible =	Yes	Yes	Yes
First Row Properties =	22	22	22
First Row Properties with 7 dB(A) Reduction=	12	2	
Percentage of First Row Reduced At Least 7 dB(A) =	55%	9%	
Reasonable (Meets Noise Reduction Goal)=	Yes	No	No
Cost / Benefitted Property =	$ 13,319	$ 15,119	$ 23,973
Cost Reasonable =	Yes	Yes	Yes

UTAH DEPARTMENT OF TRANSPORTATION
NOISE ABATEMENT RECOMMENDATION CHECKLIST

Project Location: I-15; Payson Main Street Interchange EIS
Project Concept: Alternative R1
Project Number: F-115-6(214)251
PIN: 10263
Prepared By: D. Shannon / Lochner
Receptor Name/Description: Barrier 10

Determination of Acoustic Feasibility

Does the noise abatement achieve at least a 5 dBA reduction in highway traffic noise for at least 50 percent of front-row receptors?

Yes____X_____ No_____

If yes, proceed to Question #1. If no, abatement measures are not feasible and are not recommended at this site; proceed to decision segment of form.

Determination of Feasible and Reasonable Mitigation

1. Does the design noise level equal or exceed the UDOT Noise Abatement Criteria as defined in Table 1 of this Policy?
   Yes____X_____ No_____

If yes, proceed to Question #3. If no, proceed to Question #2.

2. Does the receptor, as a result of the design noise level, substantially exceed (10 or more dBA) the existing noise levels prior to construction?
   Yes_____ No_____

If yes, proceed to Question #3. If no, then noise abatement is not recommended; proceed to decision segment of form.

3. Can effective noise abatement be constructed which would provide a minimum reduction of 7 dBA for at least 35 percent of front-row receptors?
   Yes_____X_____ No_____

If yes, proceed to Question #4. If no, abatement measures are not reasonable and are not recommended at this site; proceed to decision segment of form.

4. Are there undeveloped lands along the project corridor?
   Yes_____X_____ No_____
   If yes, proceed to Question #5. If no, proceed to Question #6.
5. Were the undeveloped lands permitted (formal building permit issued) for development under Land Use Categories A, B, C, D or E prior to the date the final environmental decision document was approved?
   Yes_____ No____X_____

If yes, proceed to Question #6. If no, implementation of abatement is not reasonable. Noise abatement is the responsibility of the property owner/developer. Proceed to decision segment of form.

6. Can noise abatement measures be constructed without creating a safety hazard to users and residents, and not interfere with operations and maintenance of the highway facility?
Yes_____X_____ No_____

If yes, proceed to Question #7. If no, abatement measures are not recommended at this site; proceed to decision segment of form.

7. Does the cost per impacted and benefited residence exceed $30,000 for residential areas in Land Use Category B or exceed $360 per linear foot for nonresidential areas in Land Use Category A and/or C or commercial and/or industrial zoned areas in Land Use Category E?
Yes_____ No_____X_____

If yes, noise abatement measures are not considered reasonable; proceed to decision segment of form. If no, proceed to Question #8.

8. For urban roadways that are not access-controlled, is the noise barrier height less than or equal to the distance from the wall face to the back of curb?
Yes_____X_____ No_____

If yes, proceed to Question #9. If no, noise abatement measures are not considered feasible based on safety; proceed to decision section of the form.

9. Does public involvement voting result in at least 75 percent of ballots returned?
Yes_____ No_____ To Be Completed _____X_____

If yes, proceed to Question #10. If no, noise abatement measures are not considered reasonable; proceed to decision segment of form.

10. Does the Public Involvement balloting result in at least 75 percent of benefited and end of wall receptors voting in "favor" of the proposed noise abatement measure?
Yes_____ No_____ To Be Completed _____X_____

If yes, proceed to Question #11. If no, noise abatement measures are not considered reasonable; proceed to decision segment of form.

11. Are there any environmental impacts that need special attention as a result of the implementation of the noise abatement?
Yes_____ No_____X_____

If yes, outline these impacts and discuss with the Environmental Manager or Region Project Manager.

Decision

Are Abatement Measures feasible? Yes____X____ No_____
Are Abatement Measures reasonable? Yes____X____ No_____

HWL 15 February 2017
JPW TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: Payson
RUN: Payson_R10
BARRIER DESIGN: Bar10-12'-R1
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
R003	3	1	0.0	63.1	66	63.1	10	----	59.9	3.2	8	-4.8
R004	4	1	0.0	64.5	66	64.5	10	----	61.1	3.4	8	-4.6
R005	5	1	0.0	65.6	66	65.6	10	----	62.0	3.6	8	-4.4
R006	6	1	0.0	66.7	66	66.7	10	Snd Lvl	62.9	3.8	8	-4.2
R007	7	1	0.0	68.2	66	68.2	10	Snd Lvl	64.0	4.2	8	-3.8
R008	8	1	0.0	64.6	66	64.6	10	----	61.2	3.4	8	-4.6
R009	9	1	0.0	64.7	66	64.7	10	----	61.1	3.6	8	-4.4
R010	10	1	0.0	66.5	66	66.5	10	Snd Lvl	62.1	4.4	8	-3.6
R011	11	1	0.0	61.5	66	61.5	10	----	57.7	3.8	8	-4.2
R012	12	1	0.0	68.1	66	68.1	10	Snd Lvl	62.3	5.8	8	-2.2
R013	13	1	0.0	67.9	66	67.9	10	Snd Lvl	61.8	6.1	8	-1.9
R177	180	1	0.0	65.4	66	65.4	10	----	60.3	5.1	8	-2.9
R178	181	1	0.0	65.4	66	65.4	10	----	61.4	4.0	8	-4.0
R179	182	1	0.0	63.9	66	63.9	10	----	60.5	3.4	8	-4.6
R180	183	1	0.0	64.3	66	64.3	10	----	60.4	3.9	8	-4.1
R181	184	1	0.0	63.7	66	63.7	10	----	60.5	3.2	8	-4.8
R182	185	1	0.0	63.3	66	63.3	10	----	60.3	3.0	8	-5.0
R183	186	1	0.0	62.6	66	62.6	10	----	60.0	2.6	8	-5.4
R184	187	1	0.0	63.4	66	63.4	10	----	60.5	2.9	8	-5.1
R185	188	1	0.0	62.2	66	62.2	10	----	59.7	2.5	8	-5.5
R186	190	1	0.0	65.7	66	65.7	10	----	64.0	1.7	8	-6.3
R187	191	1	0.0	68.6	66	68.6	10	Snd Lvl	65.4	3.2	8	-4.8
R188	192	1	0.0	65.0	66	65.0	10	----	61.7	3.3	8	-4.7
R189	193	1	0.0	69.2	66	69.2	10	Snd Lvl	64.1	5.1	8	-2.9

R190	194	1	0.0	64.6	66	64.6	10	----	60.9	3.7	8	-4.3
R191	195	1	0.0	70.0	66	70.0	10	Snd Lvl	64.3	5.7	8	-2.3
R192	196	1	0.0	62.5	66	62.5	10	----	58.8	3.7	8	-4.3
R225	241	1	0.0	69.3	66	69.3	10	Snd Lvl	68.4	0.9	8	-7.1
R226	242	1	0.0	67.7	66	67.7	10	Snd Lvl	66.6	1.1	8	-6.9
R246	251	1	0.0	65.1	66	65.1	10	----	64.3	0.8	8	-7.2

Dwelling Units	**# DUs**	**Noise Reduction**		
		Min	**Avg**	**Max**
		dB	**dB**	**dB**
All Selected	30	0.8	3.5	6.1
All Impacted	10	0.9	4.0	6.1
All that meet NR Goal	0	0.0	0.0	0.0

HWL 15 February 2017
JPW TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: Payson
RUN: Payson_R10
BARRIER DESIGN: Bar10-14'-R1
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
R003	3	1	0.0	63.1	66	63.1	10	----	58.8	4.3	8	-3.7
R004	4	1	0.0	64.5	66	64.5	10	----	60.0	4.5	8	-3.5
R005	5	1	0.0	65.6	66	65.6	10	----	60.6	5.0	8	-3.0
R006	6	1	0.0	66.7	66	66.7	10	Snd Lvl	61.4	5.3	8	-2.7
R007	7	1	0.0	68.2	66	68.2	10	Snd Lvl	62.5	5.7	8	-2.3
R008	8	1	0.0	64.6	66	64.6	10	----	59.8	4.8	8	-3.2
R009	9	1	0.0	64.7	66	64.7	10	----	59.7	5.0	8	-3.0
R010	10	1	0.0	66.5	66	66.5	10	Snd Lvl	60.5	6.0	8	-2.0
R011	11	1	0.0	61.5	66	61.5	10	----	56.9	4.6	8	-3.4
R012	12	1	0.0	68.1	66	68.1	10	Snd Lvl	61.5	6.6	8	-1.4
R013	13	1	0.0	67.9	66	67.9	10	Snd Lvl	61.2	6.7	8	-1.3
R177	180	1	0.0	65.4	66	65.4	10	----	59.9	5.5	8	-2.5
R178	181	1	0.0	65.4	66	65.4	10	----	60.8	4.6	8	-3.4
R179	182	1	0.0	63.9	66	63.9	10	----	59.5	4.4	8	-3.6
R180	183	1	0.0	64.3	66	64.3	10	----	59.2	5.1	8	-2.9
R181	184	1	0.0	63.7	66	63.7	10	----	59.5	4.2	8	-3.8
R182	185	1	0.0	63.3	66	63.3	10	----	59.2	4.1	8	-3.9
R183	186	1	0.0	62.6	66	62.6	10	----	58.9	3.7	8	-4.3
R184	187	1	0.0	63.4	66	63.4	10	----	59.3	4.1	8	-3.9
R185	188	1	0.0	62.2	66	62.2	10	----	58.7	3.5	8	-4.5
R186	190	1	0.0	65.7	66	65.7	10	----	63.9	1.8	8	-6.2
R187	191	1	0.0	68.6	66	68.6	10	Snd Lvl	65.2	3.4	8	-4.6
R188	192	1	0.0	65.0	66	65.0	10	----	61.5	3.5	8	-4.5
R189	193	1	0.0	69.2	66	69.2	10	Snd Lvl	63.6	5.6	8	-2.4

R190	194	1	0.0	64.6	66	64.6	10	----	60.7	3.9	8	-4.1
R191	195	1	0.0	70.0	66	70.0	10	Snd Lvl	63.8	6.2	8	-1.8
R192	196	1	0.0	62.5	66	62.5	10	----	58.5	4.0	8	-4.0
R225	241	1	0.0	69.3	66	69.3	10	Snd Lvl	68.3	1.0	8	-7.0
R226	242	1	0.0	67.7	66	67.7	10	Snd Lvl	66.6	1.1	8	-6.9
R246	251	1	0.0	65.1	66	65.1	10	----	64.3	0.8	8	-7.2

Dwelling Units	**# DUs**	**Noise Reduction**		
		Min	**Avg**	**Max**
		dB	**dB**	**dB**
All Selected	30	0.8	4.3	6.7
All Impacted	10	1.0	4.8	6.7
All that meet NR Goal	0	0.0	0.0	0.0

HWL 15 February 2017
JPW TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: Payson
RUN: Payson_R10
BARRIER DESIGN: Bar10-16'-R1
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
R003	3	1	0.0	63.1	66	63.1	10	----	58.4	4.7	8	-3.3
R004	4	1	0.0	64.5	66	64.5	10	----	59.5	5.0	8	-3.0
R005	5	1	0.0	65.6	66	65.6	10	----	60.1	5.5	8	-2.5
R006	6	1	0.0	66.7	66	66.7	10	Snd Lvl	60.7	6.0	8	-2.0
R007	7	1	0.0	68.2	66	68.2	10	Snd Lvl	61.8	6.4	8	-1.6
R008	8	1	0.0	64.6	66	64.6	10	----	59.3	5.3	8	-2.7
R009	9	1	0.0	64.7	66	64.7	10	----	59.0	5.7	8	-2.3
R010	10	1	0.0	66.5	66	66.5	10	Snd Lvl	59.9	6.6	8	-1.4
R011	11	1	0.0	61.5	66	61.5	10	----	56.5	5.0	8	-3.0
R012	12	1	0.0	68.1	66	68.1	10	Snd Lvl	61.0	7.1	8	-0.9
R013	13	1	0.0	67.9	66	67.9	10	Snd Lvl	60.7	7.2	8	-0.8
R177	180	1	0.0	65.4	66	65.4	10	----	59.8	5.6	8	-2.4
R178	181	1	0.0	65.4	66	65.4	10	----	60.4	5.0	8	-3.0
R179	182	1	0.0	63.9	66	63.9	10	----	59.0	4.9	8	-3.1
R180	183	1	0.0	64.3	66	64.3	10	----	58.8	5.5	8	-2.5
R181	184	1	0.0	63.7	66	63.7	10	----	58.9	4.8	8	-3.2
R182	185	1	0.0	63.3	66	63.3	10	----	58.6	4.7	8	-3.3
R183	186	1	0.0	62.6	66	62.6	10	----	58.4	4.2	8	-3.8
R184	187	1	0.0	63.4	66	63.4	10	----	58.7	4.7	8	-3.3
R185	188	1	0.0	62.2	66	62.2	10	----	58.1	4.1	8	-3.9
R186	190	1	0.0	65.7	66	65.7	10	----	63.9	1.8	8	-6.2
R187	191	1	0.0	68.6	66	68.6	10	Snd Lvl	65.0	3.6	8	-4.4
R188	192	1	0.0	65.0	66	65.0	10	----	61.3	3.7	8	-4.3
R189	193	1	0.0	69.2	66	69.2	10	Snd Lvl	63.3	5.9	8	-2.1

R190	194	1	0.0	64.6	66	64.6	10	----	60.5	4.1	8	-3.9
R191	195	1	0.0	70.0	66	70.0	10	Snd Lvl	63.4	6.6	8	-1.4
R192	196	1	0.0	62.5	66	62.5	10	----	58.2	4.3	8	-3.7
R225	241	1	0.0	69.3	66	69.3	10	Snd Lvl	68.3	1.0	8	-7.0
R226	242	1	0.0	67.7	66	67.7	10	Snd Lvl	66.6	1.1	8	-6.9
R246	251	1	0.0	65.1	66	65.1	10	----	64.3	0.8	8	-7.2

Dwelling Units	**# DUs**	**Noise Reduction**		
		Min	**Avg**	**Max**
		dB	**dB**	**dB**
All Selected	30	0.8	4.7	7.2
All Impacted	10	1.0	5.1	7.2
All that meet NR Goal	0	0.0	0.0	0.0

I-15; Payson Main Street Interchange
Noise Analysis

Alternative R1 - Barrier 11

			NAC			Taller Wall			Intermediate Wall			Shorter Wall		
Receptor	First Row	Residences Represented	Land Use Category	Existing dB(A)	Build dB(A)	W/Wall dB(A)	Reduction dB(A)	Benefited Properties	W/Wall dB(A)	Reduction dB(A)	Benefited Properties	W/Wall dB(A)	Reduction dB(A)	Benefited Properties
R196	Yes	2	B	68	70	67	3		67	3		67	3	
R197	Yes	2	B	73	76	68	8	2	68	8	2	68	8	2
R198	Yes	2	B	76	79	68	11	2	69	10	2	70	9	2
R199	Yes	2	B	77	79	68	11	2	69	10	2	70	9	2
R200	Yes	2	B	75	78	67	11	2	67	11	2	68	10	2
R201	Yes	2	B	76	79	66	13	2	67	12	2	67	12	2
R202	Yes	2	B	70	73	64	9	2	65	8	2	66	7	2
R203	Yes	1	B	75	78	65	13	1	66	12	1	66	12	1
R204	Yes	1	B	74	77	65	12	1	66	11	1	66	11	1
R205		1	B	67	71	66	5	1	66	5	1	67	4	
R206		1	B	66	70	66	4		66	4		66	4	
R207		2	B	65	68	64	4		64	4		65	3	
R208		1	B	66	68	64	4		65	3		65	3	
R209		1	B	62	65	62	3		62	3		63	2	
R210		1	B	64	66	62	4		62	4		63	3	
R211		1	B	68	70	64	6	1	64	6	1	66	4	
R212		2	B	65	67	63	4		63	4		64	3	
R213		2	B	63	66	62	4		63	3		63	3	
R214		2	B	62	64	61	3		62	2		62	2	
R215		2	B	61	63	60	3		61	2		61	2	
R216		2	B	60	62	59	3		60	2		60	2	
R217		2	B	59	61	59	2		59	2		59	2	
R218		1	B	66	69	64	5	1	65	4		66	3	
R219		1	B	66	69	64	5	1	64	5	1	64	5	1
R220		1	B	60	63	61	2		62	1		62	1	
R221		1	B	62	64	61	3		62	2		62	2	
R222		1	B	60	63	62	1		62	1		62	1	
R223		2	B	60	62	60	2		61	1		61	1	
R224		2	B	59	61	60	1		60	1		61		

Length =	800	800	800
Average Height =	16	15	14
Area of Noise Barrier =	12801	12001	11200
Cost of Noise Barrier=	$ 256,020	$ 240,020	$ 224,000
Properties With a 5 dB(A) Reduction =	18	17	15
Impacted Properties =	29	29	29
Impacted Front-Row Properties =	16	16	16
Impacted Front-Row Properties with a 5 dB(A) Reduction =	14	14	14
Percentage of Impacted Front-Row Properties Reduced At Least 5 dB(A) =	88%	88%	88%
Feasible =	Yes	Yes	Yes
First Row Properties =	16	16	16
First Row Properties with 7 dB(A) Reduction=	14	14	14
Percentage of First Row Reduced At Least 7 dB(A) =	88%	88%	88%
Reasonable (Meets Noise Reduction Goal)=	Yes	Yes	Yes
Cost / Benefitted Property =	$ 14,223	$ 14,119	$ 14,933
Cost Reasonable =	Yes	Yes	Yes

= Impacted receptor
= 5 dB(A) reduction or better
= 7 dB(A) reduction or better

UTAH DEPARTMENT OF TRANSPORTATION
NOISE ABATEMENT RECOMMENDATION CHECKLIST

Project Location: I-15; Payson Main Street Interchange EIS
Project Concept: Alternative R1
Project Number: F-115-6(214)251
PIN: 10263
Prepared By: D. Shannon / Lochner
Receptor Name/Description: Barrier 11

Determination of Acoustic Feasibility

Does the noise abatement achieve at least a 5 dBA reduction in highway traffic noise for at least 50 percent of front-row receptors?

Yes____X_____ No_____

If yes, proceed to Question #1. If no, abatement measures are not feasible and are not recommended at this site; proceed to decision segment of form.

Determination of Feasible and Reasonable Mitigation

1. Does the design noise level equal or exceed the UDOT Noise Abatement Criteria as defined in Table 1 of this Policy?
   Yes____X_____ No_____

If yes, proceed to Question #3. If no, proceed to Question #2.

2. Does the receptor, as a result of the design noise level, substantially exceed (10 or more dBA) the existing noise levels prior to construction?
   Yes_____ No_____

If yes, proceed to Question #3. If no, then noise abatement is not recommended; proceed to decision segment of form.

3. Can effective noise abatement be constructed which would provide a minimum reduction of 7 dBA for at least 35 percent of front-row receptors?
   Yes_____X_____ No_____

If yes, proceed to Question #4. If no, abatement measures are not reasonable and are not recommended at this site; proceed to decision segment of form.

4. Are there undeveloped lands along the project corridor?
   Yes_____X_____ No_____
   If yes, proceed to Question #5. If no, proceed to Question #6.
5. Were the undeveloped lands permitted (formal building permit issued) for development under Land Use Categories A, B, C, D or E prior to the date the final environmental decision document was approved?
   Yes_____ No____X_____

If yes, proceed to Question #6. If no, implementation of abatement is not reasonable. Noise abatement is the responsibility of the property owner/developer. Proceed to decision segment of form.

6. Can noise abatement measures be constructed without creating a safety hazard to users and residents, and not interfere with operations and maintenance of the highway facility?
Yes_____X_____ No_____

If yes, proceed to Question #7. If no, abatement measures are not recommended at this site; proceed to decision segment of form.

7. Does the cost per impacted and benefited residence exceed $30,000 for residential areas in Land Use Category B or exceed $360 per linear foot for nonresidential areas in Land Use Category A and/or C or commercial and/or industrial zoned areas in Land Use Category E?
Yes_____ No_____X_____

If yes, noise abatement measures are not considered reasonable; proceed to decision segment of form. If no, proceed to Question #8.

8. For urban roadways that are not access-controlled, is the noise barrier height less than or equal to the distance from the wall face to the back of curb?
Yes_____X_____ No_____

If yes, proceed to Question #9. If no, noise abatement measures are not considered feasible based on safety; proceed to decision section of the form.

9. Does public involvement voting result in at least 75 percent of ballots returned?
Yes_____ No_____ To Be Completed _____X_____

If yes, proceed to Question #10. If no, noise abatement measures are not considered reasonable; proceed to decision segment of form.

10. Does the Public Involvement balloting result in at least 75 percent of benefited and end of wall receptors voting in "favor" of the proposed noise abatement measure?
Yes_____ No_____ To Be Completed _____X_____

If yes, proceed to Question #11. If no, noise abatement measures are not considered reasonable; proceed to decision segment of form.

11. Are there any environmental impacts that need special attention as a result of the implementation of the noise abatement?
Yes_____ No_____X_____

If yes, outline these impacts and discuss with the Environmental Manager or Region Project Manager.

Decision

Are Abatement Measures feasible? Yes____X____ No_____
Are Abatement Measures reasonable? Yes____X____ No_____

HWL 15 February 2017
JPW TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: Payson
RUN: Payson_R1_R11
BARRIER DESIGN: Bar11-14'-R1
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
R196	201	1	0.0	71.1	66	71.1	10	Snd Lvl	67.1	4.0	8	-4.0
R197	202	1	0.0	76.8	66	76.8	10	Snd Lvl	68.3	8.5	8	0.5
R198	203	1	0.0	79.7	66	79.7	10	Snd Lvl	69.5	10.2	8	2.2
R199	204	1	0.0	79.9	66	79.9	10	Snd Lvl	69.8	10.1	8	2.1
R200	205	1	0.0	78.0	66	78.0	10	Snd Lvl	68.0	10.0	8	2.0
R201	206	1	0.0	79.0	66	79.0	10	Snd Lvl	67.2	11.8	8	3.8
R202	207	1	0.0	73.5	66	73.5	10	Snd Lvl	65.6	7.9	8	-0.1
R203	208	1	0.0	78.4	66	78.4	10	Snd Lvl	66.3	12.1	8	4.1
R204	209	1	0.0	77.0	66	77.0	10	Snd Lvl	66.1	10.9	8	2.9
R205	210	1	0.0	71.8	66	71.8	10	Snd Lvl	66.7	5.1	8	-2.9
R206	211	1	0.0	70.2	66	70.2	10	Snd Lvl	66.2	4.0	8	-4.0
R207	212	1	0.0	67.8	66	67.8	10	Snd Lvl	64.7	3.1	8	-4.9
R208	213	1	0.0	68.7	66	68.7	10	Snd Lvl	65.4	3.3	8	-4.7
R209	214	1	0.0	64.8	66	64.8	10	----	62.9	1.9	8	-6.1
R210	215	1	0.0	66.4	66	66.4	10	Snd Lvl	63.4	3.0	8	-5.0
R211	216	1	0.0	70.8	66	70.8	10	Snd Lvl	66.2	4.6	8	-3.4
R212	217	1	0.0	67.3	66	67.3	10	Snd Lvl	64.3	3.0	8	-5.0
R213	218	1	0.0	65.8	66	65.8	10	----	63.3	2.5	8	-5.5
R214	219	1	0.0	64.5	66	64.5	10	----	62.2	2.3	8	-5.7
R215	220	1	0.0	63.0	66	63.0	10	----	61.0	2.0	8	-6.0
R216	221	1	0.0	61.5	66	61.5	10	----	59.8	1.7	8	-6.3
R217	222	1	0.0	60.3	66	60.3	10	----	58.9	1.4	8	-6.6
R218	223	1	0.0	69.4	66	69.4	10	Snd Lvl	65.6	3.8	8	-4.2
R219	224	1	0.0	69.1	66	69.1	10	Snd Lvl	64.4	4.7	8	-3.3

R220	225	1	0.0	63.8	66	63.8	10	----	62.0	1.8	8	-6.2
R221	226	1	0.0	65.1	66	65.1	10	----	62.4	2.7	8	-5.3
R222	227	1	0.0	64.0	66	64.0	10	----	62.3	1.7	8	-6.3
R223	228	1	0.0	62.8	66	62.8	10	----	61.0	1.8	8	-6.2
R224	229	1	0.0	62.2	66	62.2	10	----	60.8	1.4	8	-6.6

Dwelling Units	**# DUs**	**Noise Reduction**		
		Min	**Avg**	**Max**
		dB	**dB**	**dB**
All Selected	29	1.4	4.9	12.1
All Impacted	18	3.0	6.7	12.1
All that meet NR Goal	7	8.5	10.5	12.1

HWL 15 February 2017
JPW TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: Payson
RUN: Payson_R1_R11
BARRIER DESIGN: Bar11-15'-R1
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
R196	201	1	0.0	71.1	66	71.1	10	Snd Lvl	67.0	4.1	8	-3.9
R197	202	1	0.0	76.8	66	76.8	10	Snd Lvl	67.9	8.9	8	0.9
R198	203	1	0.0	79.7	66	79.7	10	Snd Lvl	68.7	11.0	8	3.0
R199	204	1	0.0	79.9	66	79.9	10	Snd Lvl	69.0	10.9	8	2.9
R200	205	1	0.0	78.0	66	78.0	10	Snd Lvl	67.3	10.7	8	2.7
R201	206	1	0.0	79.0	66	79.0	10	Snd Lvl	66.6	12.4	8	4.4
R202	207	1	0.0	73.5	66	73.5	10	Snd Lvl	65.0	8.5	8	0.5
R203	208	1	0.0	78.4	66	78.4	10	Snd Lvl	65.7	12.7	8	4.7
R204	209	1	0.0	77.0	66	77.0	10	Snd Lvl	65.6	11.4	8	3.4
R205	210	1	0.0	71.8	66	71.8	10	Snd Lvl	66.4	5.4	8	-2.6
R206	211	1	0.0	70.2	66	70.2	10	Snd Lvl	65.7	4.5	8	-3.5
R207	212	1	0.0	67.8	66	67.8	10	Snd Lvl	64.2	3.6	8	-4.4
R208	213	1	0.0	68.7	66	68.7	10	Snd Lvl	64.5	4.2	8	-3.8
R209	214	1	0.0	64.8	66	64.8	10	----	62.0	2.8	8	-5.2
R210	215	1	0.0	66.4	66	66.4	10	Snd Lvl	62.1	4.3	8	-3.7
R211	216	1	0.0	70.8	66	70.8	10	Snd Lvl	64.4	6.4	8	-1.6
R212	217	1	0.0	67.3	66	67.3	10	Snd Lvl	63.3	4.0	8	-4.0
R213	218	1	0.0	65.8	66	65.8	10	----	62.5	3.3	8	-4.7
R214	219	1	0.0	64.5	66	64.5	10	----	61.7	2.8	8	-5.2
R215	220	1	0.0	63.0	66	63.0	10	----	60.5	2.5	8	-5.5
R216	221	1	0.0	61.5	66	61.5	10	----	59.5	2.0	8	-6.0
R217	222	1	0.0	60.3	66	60.3	10	----	58.7	1.6	8	-6.4
R218	223	1	0.0	69.4	66	69.4	10	Snd Lvl	64.5	4.9	8	-3.1
R219	224	1	0.0	69.1	66	69.1	10	Snd Lvl	64.0	5.1	8	-2.9

R220	225	1	0.0	63.8	66	63.8	10	----	61.5	2.3	8	-5.7
R221	226	1	0.0	65.1	66	65.1	10	----	61.6	3.5	8	-4.5
R222	227	1	0.0	64.0	66	64.0	10	----	61.8	2.2	8	-5.8
R223	228	1	0.0	62.8	66	62.8	10	----	60.5	2.3	8	-5.7
R224	229	1	0.0	62.2	66	62.2	10	----	60.4	1.8	8	-6.2

Dwelling Units	**# DUs**	**Noise Reduction**		
		Min	**Avg**	**Max**
		dB	**dB**	**dB**
All Selected	29	1.6	5.5	12.7
All Impacted	18	3.6	7.4	12.7
All that meet NR Goal	8	8.5	10.8	12.7

HWL 15 February 2017
JPW TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: Payson
RUN: Payson_R1_R11
BARRIER DESIGN: Bar11-16'-R1
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
R196	201	1	0.0	71.1	66	71.1	10	Snd Lvl	66.9	4.2	8	-3.8
R197	202	1	0.0	76.8	66	76.8	10	Snd Lvl	67.6	9.2	8	1.2
R198	203	1	0.0	79.7	66	79.7	10	Snd Lvl	68.1	11.6	8	3.6
R199	204	1	0.0	79.9	66	79.9	10	Snd Lvl	68.2	11.7	8	3.7
R200	205	1	0.0	78.0	66	78.0	10	Snd Lvl	66.6	11.4	8	3.4
R201	206	1	0.0	79.0	66	79.0	10	Snd Lvl	66.0	13.0	8	5.0
R202	207	1	0.0	73.5	66	73.5	10	Snd Lvl	64.4	9.1	8	1.1
R203	208	1	0.0	78.4	66	78.4	10	Snd Lvl	65.2	13.2	8	5.2
R204	209	1	0.0	77.0	66	77.0	10	Snd Lvl	65.1	11.9	8	3.9
R205	210	1	0.0	71.8	66	71.8	10	Snd Lvl	66.2	5.6	8	-2.4
R206	211	1	0.0	70.2	66	70.2	10	Snd Lvl	65.5	4.7	8	-3.3
R207	212	1	0.0	67.8	66	67.8	10	Snd Lvl	64.0	3.8	8	-4.2
R208	213	1	0.0	68.7	66	68.7	10	Snd Lvl	63.8	4.9	8	-3.1
R209	214	1	0.0	64.8	66	64.8	10	----	61.5	3.3	8	-4.7
R210	215	1	0.0	66.4	66	66.4	10	Snd Lvl	61.7	4.7	8	-3.3
R211	216	1	0.0	70.8	66	70.8	10	Snd Lvl	63.8	7.0	8	-1.0
R212	217	1	0.0	67.3	66	67.3	10	Snd Lvl	62.6	4.7	8	-3.3
R213	218	1	0.0	65.8	66	65.8	10	----	61.9	3.9	8	-4.1
R214	219	1	0.0	64.5	66	64.5	10	----	61.0	3.5	8	-4.5
R215	220	1	0.0	63.0	66	63.0	10	----	60.1	2.9	8	-5.1
R216	221	1	0.0	61.5	66	61.5	10	----	59.2	2.3	8	-5.7
R217	222	1	0.0	60.3	66	60.3	10	----	58.5	1.8	8	-6.2
R218	223	1	0.0	69.4	66	69.4	10	Snd Lvl	64.2	5.2	8	-2.8
R219	224	1	0.0	69.1	66	69.1	10	Snd Lvl	63.7	5.4	8	-2.6

R220	225	1	0.0	63.8	66	63.8	10	----	61.3	2.5	8	-5.5
R221	226	1	0.0	65.1	66	65.1	10	----	61.3	3.8	8	-4.2
R222	227	1	0.0	64.0	66	64.0	10	----	61.6	2.4	8	-5.6
R223	228	1	0.0	62.8	66	62.8	10	----	60.1	2.7	8	-5.3
R224	229	1	0.0	62.2	66	62.2	10	----	60.2	2.0	8	-6.0

Dwelling Units	**# DUs**	**Noise Reduction**		
		Min	**Avg**	**Max**
		dB	**dB**	**dB**
All Selected	29	1.8	5.9	13.2
All Impacted	18	3.8	7.9	13.2
All that meet NR Goal	8	9.1	11.4	13.2

I-15; Payson Main Street Interchange
Noise Analysis

Alternative R1 - Barrier 12

			NAC			Taller Wall			Intermediate Wall			Shorter Wall		
Receptor	First Row	Residences Represented	Land Use Category	Existing dB(A)	Build dB(A)	W/Wall dB(A)	Reduction dB(A)	Benefited Properties	W/Wall dB(A)	Reduction dB(A)	Benefited Properties	W/Wall dB(A)	Reduction dB(A)	Benefited Properties
R158	Yes	1	B	52	63	55	8	1	56	7	1	57	6	1
R159		1	B	52	61	53	8	1	54	7	1	55	6	1
R160		1	B	52	60	53	7	1	53	7	1	55	5	1
R161		1	B	52	58	50	8	1	51	7	1	53	5	1
R162	Yes	3	B	51	64	54	10	3	55	9	3	56	8	3
R163		2	B	52	61	53	8	2	53	8	2	56	5	2
R164		2	B	51	59	50	9	2	51	8	2	54	5	2
R165	Yes	2	B	50	64	54	10	2	54	10	2	55	9	2
R166		2	B	50	60	51	9	2	52	8	2	53	7	2
R167		2	B	50	58	50	8	2	51	7	2	53	5	2
R168	Yes	1	B	50	62	55	7	1	55	7	1	56	6	1
R169		1	B	54	60	53	7	1	54	6	1	55	5	1
R170		1	B	49	58	53	5	1	53	5	1	54	4	
R171		1	B	49	57	52	5	1	52	5	1	54	3	
R172		1	B	49	56	52	4		52	4		53	3	
R173		Church	D	35	39	37	2		37	2		37	2	
R174	Yes	Park	C	54	61	59	2		59	2		59	2	

= Impacted receptor
= 5 dB(A) reduction or better
= 7 dB(A) reduction or better

Length =	1600	1600	1600
Average Height =	16	14	12
Area of Noise Barrier =	25609	22409	19205
Cost of Noise Barrier=	$ 512,180	$ 448,180	$ 384,100
Properties With a 5 dB(A) Reduction =	21	21	19
Impacted Properties =	9	9	9
Impacted Front-Row Properties =	7	7	7
Impacted Front-Row Properties with a 5 dB(A) Reduction =	7	7	7
Percentage of Impacted Front-Row Properties Reduced At Least 5 dB(A) =	100%	100%	100%
Feasible =	Yes	Yes	Yes
First Row Properties =	7	7	7
First Row Properties with 7 dB(A) Reduction=	7	7	5
Percentage of First Row Reduced At Least 7 dB(A) =	100%	100%	71%
Reasonable (Meets Noise Reduction Goal)=	Yes	Yes	Yes
Cost / Benefitted Property =	$ 24,390	$ 21,342	$ 20,216
Cost Reasonable =	Yes	Yes	Yes

UTAH DEPARTMENT OF TRANSPORTATION
NOISE ABATEMENT RECOMMENDATION CHECKLIST

Project Location: I-15; Payson Main Street Interchange EIS
Project Concept: Alternative R1
Project Number: F-115-6(214)251
PIN: 10263
Prepared By: D. Shannon / Lochner
Receptor Name/Description: Barrier 12

Determination of Acoustic Feasibility

Does the noise abatement achieve at least a 5 dBA reduction in highway traffic noise for at least 50 percent of front-row receptors?

Yes____X_____ No_____

If yes, proceed to Question #1. If no, abatement measures are not feasible and are not recommended at this site; proceed to decision segment of form.

Determination of Feasible and Reasonable Mitigation

1. Does the design noise level equal or exceed the UDOT Noise Abatement Criteria as defined in Table 1 of this Policy?
   Yes____X_____ No_____

If yes, proceed to Question #3. If no, proceed to Question #2.

2. Does the receptor, as a result of the design noise level, substantially exceed (10 or more dBA) the existing noise levels prior to construction?
   Yes_____ No_____

If yes, proceed to Question #3. If no, then noise abatement is not recommended; proceed to decision segment of form.

3. Can effective noise abatement be constructed which would provide a minimum reduction of 7 dBA for at least 35 percent of front-row receptors?
   Yes_____X_____ No_____

If yes, proceed to Question #4. If no, abatement measures are not reasonable and are not recommended at this site; proceed to decision segment of form.

4. Are there undeveloped lands along the project corridor?
   Yes_____X_____ No_____
   If yes, proceed to Question #5. If no, proceed to Question #6.
5. Were the undeveloped lands permitted (formal building permit issued) for development under Land Use Categories A, B, C, D or E prior to the date the final environmental decision document was approved?
   Yes_____ No____X_____

If yes, proceed to Question #6. If no, implementation of abatement is not reasonable. Noise abatement is the responsibility of the property owner/developer. Proceed to decision segment of form.

6. Can noise abatement measures be constructed without creating a safety hazard to users and residents, and not interfere with operations and maintenance of the highway facility?
Yes_____X_____ No_____

If yes, proceed to Question #7. If no, abatement measures are not recommended at this site; proceed to decision segment of form.

7. Does the cost per impacted and benefited residence exceed $30,000 for residential areas in Land Use Category B or exceed $360 per linear foot for nonresidential areas in Land Use Category A and/or C or commercial and/or industrial zoned areas in Land Use Category E?
Yes_____ No_____X_____

If yes, noise abatement measures are not considered reasonable; proceed to decision segment of form. If no, proceed to Question #8.

8. For urban roadways that are not access-controlled, is the noise barrier height less than or equal to the distance from the wall face to the back of curb?
Yes_____X_____ No_____

If yes, proceed to Question #9. If no, noise abatement measures are not considered feasible based on safety; proceed to decision section of the form.

9. Does public involvement voting result in at least 75 percent of ballots returned?
Yes_____ No_____ To Be Completed _____X_____

If yes, proceed to Question #10. If no, noise abatement measures are not considered reasonable; proceed to decision segment of form.

10. Does the Public Involvement balloting result in at least 75 percent of benefited and end of wall receptors voting in "favor" of the proposed noise abatement measure?
Yes_____ No_____ To Be Completed _____X_____

If yes, proceed to Question #11. If no, noise abatement measures are not considered reasonable; proceed to decision segment of form.

11. Are there any environmental impacts that need special attention as a result of the implementation of the noise abatement?
Yes_____ No_____X_____

If yes, outline these impacts and discuss with the Environmental Manager or Region Project Manager.

Decision

Are Abatement Measures feasible? Yes____X____ No_____
Are Abatement Measures reasonable? Yes____X____ No_____

HWL 16 February 2017
JPW TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: Payson
RUN: Payson_R1_Bar12
BARRIER DESIGN: Bar12-12'-R1
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver												
Name	No.	#DUs	Existing	No Barrier					With Barrier			
			LAeq1h	LAeq1h		Increase over existing		Type	Calculated	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n	Impact	LAeq1h	Calculated	Goal	Calculated
							Sub'l Inc					minus
												Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
R158	158	1	0.0	62.7	66	62.7	10	----	56.6	6.1	8	-1.9
R159	159	1	0.0	59.8	66	59.8	10	----	55.2	4.6	8	-3.4
R160	160	1	0.0	58.3	66	58.3	10	----	54.9	3.4	8	-4.6
R161	161	1	0.0	55.0	66	55.0	10	----	52.6	2.4	8	-5.6
R162	162	1	0.0	63.1	66	63.1	10	----	56.2	6.9	8	-1.1
R163	163	1	0.0	59.7	66	59.7	10	----	56.2	3.5	8	-4.5
R164	164	1	0.0	57.1	66	57.1	10	----	53.9	3.2	8	-4.8
R165	165	1	0.0	62.8	66	62.8	10	----	55.2	7.6	8	-0.4
R166	166	1	0.0	58.9	66	58.9	10	----	53.4	5.5	8	-2.5
R167	167	1	0.0	57.0	66	57.0	10	----	52.5	4.5	8	-3.5
R168	168	1	0.0	61.7	66	61.7	10	----	55.9	5.8	8	-2.2
R169	169	1	0.0	59.0	66	59.0	10	----	54.5	4.5	8	-3.5
R170	170	1	0.0	57.7	66	57.7	10	----	54.4	3.3	8	-4.7
R171	171	1	0.0	56.3	66	56.3	10	----	53.6	2.7	8	-5.3
R172	172	1	0.0	55.0	66	55.0	10	----	53.1	1.9	8	-6.1
R173	173	1	0.0	57.8	66	57.8	10	----	57.2	0.6	8	-7.4
R174	175	1	0.0	59.7	66	59.7	10	----	58.8	0.9	8	-7.1

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	17	0.6	4.0	7.6
All Impacted	0	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

HWL 16 February 2017
JPW TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: Payson
RUN: Payson_R1_Bar12
BARRIER DESIGN: Bar12-14'-R1
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver												
Name	No.	#DUs	Existing	No Barrier					With Barrier			
			LAeq1h	LAeq1h		Increase over existing		Type	Calculated	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n	Impact	LAeq1h	Calculated	Goal	Calculated
							Sub'l Inc					minus
												Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
R158	158	1	0.0	62.7	66	62.7	10	----	55.5	7.2	8	-0.8
R159	159	1	0.0	59.8	66	59.8	10	----	53.8	6.0	8	-2.0
R160	160	1	0.0	58.3	66	58.3	10	----	53.1	5.2	8	-2.8
R161	161	1	0.0	55.0	66	55.0	10	----	50.6	4.4	8	-3.6
R162	162	1	0.0	63.1	66	63.1	10	----	55.0	8.1	8	0.1
R163	163	1	0.0	59.7	66	59.7	10	----	53.2	6.5	8	-1.5
R164	164	1	0.0	57.1	66	57.1	10	----	50.9	6.2	8	-1.8
R165	165	1	0.0	62.8	66	62.8	10	----	54.3	8.5	8	0.5
R166	166	1	0.0	58.9	66	58.9	10	----	51.9	7.0	8	-1.0
R167	167	1	0.0	57.0	66	57.0	10	----	50.6	6.4	8	-1.6
R168	168	1	0.0	61.7	66	61.7	10	----	55.2	6.5	8	-1.5
R169	169	1	0.0	59.0	66	59.0	10	----	53.7	5.3	8	-2.7
R170	170	1	0.0	57.7	66	57.7	10	----	53.0	4.7	8	-3.3
R171	171	1	0.0	56.3	66	56.3	10	----	52.2	4.1	8	-3.9
R172	172	1	0.0	55.0	66	55.0	10	----	51.9	3.1	8	-4.9
R173	173	1	0.0	57.8	66	57.8	10	----	56.8	1.0	8	-7.0
R174	175	1	0.0	59.7	66	59.7	10	----	58.6	1.1	8	-6.9

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	17	1.0	5.4	8.5
All Impacted	0	0.0	0.0	0.0
All that meet NR Goal	2	8.1	8.3	8.5

HWL 16 February 2017
JPW TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: Payson
RUN: Payson_R1_Bar12
BARRIER DESIGN: Bar12-16'-R1
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
R158	158	1	0.0	62.7	66	62.7	10	----	54.8	7.9	8	-0.1
R159	159	1	0.0	59.8	66	59.8	10	----	53.2	6.6	8	-1.4
R160	160	1	0.0	58.3	66	58.3	10	----	52.5	5.8	8	-2.2
R161	161	1	0.0	55.0	66	55.0	10	----	50.1	4.9	8	-3.1
R162	162	1	0.0	63.1	66	63.1	10	----	54.1	9.0	8	1.0
R163	163	1	0.0	59.7	66	59.7	10	----	52.5	7.2	8	-0.8
R164	164	1	0.0	57.1	66	57.1	10	----	50.2	6.9	8	-1.1
R165	165	1	0.0	62.8	66	62.8	10	----	53.6	9.2	8	1.2
R166	166	1	0.0	58.9	66	58.9	10	----	51.3	7.6	8	-0.4
R167	167	1	0.0	57.0	66	57.0	10	----	50.1	6.9	8	-1.1
R168	168	1	0.0	61.7	66	61.7	10	----	54.8	6.9	8	-1.1
R169	169	1	0.0	59.0	66	59.0	10	----	53.2	5.8	8	-2.2
R170	170	1	0.0	57.7	66	57.7	10	----	52.6	5.1	8	-2.9
R171	171	1	0.0	56.3	66	56.3	10	----	51.9	4.4	8	-3.6
R172	172	1	0.0	55.0	66	55.0	10	----	51.6	3.4	8	-4.6
R173	173	1	0.0	57.8	66	57.8	10	----	56.8	1.0	8	-7.0
R174	175	1	0.0	59.7	66	59.7	10	----	58.5	1.2	8	-6.8

Dwelling Units	# DUs	Noise Reduction Min dB	Avg dB	Max dB
All Selected	17	1.0	5.9	9.2
All Impacted	0	0.0	0.0	0.0
All that meet NR Goal	2	9.0	9.1	9.2

APPENDIX B
TECHNICAL REPORTS

ECONOMIC IMPACT TECHNICAL REPORT I-15, PAYSON MAIN STREET INTERCHANGE ENVIRONMENTAL IMPACT STATEMENT

LELAND CONSULTING GROUP

Memorandum

Date	15 September 2017
To	Andrea Clayton, Lochner
From	Ted Kamp and Chris Zahas, Leland Consulting Group
CC	Jason Green
	Justin Peterson, Lochner
Subject	Draft Economic Impact Technical Report
Project	I-15 Payson Main Street Interchange EIS
	Project No. F-I15-6(214)251; PIN 10263

The following draft report documents the analysis of expected economic consequences across several alternative approaches to improving the Interstate 15 interchange at Main Street in Payson, UT. This draft *quantifies* anticipated *direct* economic impacts from transportation changes and provides a *qualitative* evaluation of likely *indirect* economic impacts (characterizing direction and relative magnitude of changes to development potential, land values and fiscal revenue streams).

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.

BACKGROUND & GENERAL APPROACH

This analysis is part of the I-15 Payson Main Street Interchange Environmental Impact Statement (EIS), a larger planning effort intended to evaluate a range of options for addressing growing problems with the existing Main Street interchange.

Leland Consulting Group was retained by HW Lochner to review and analyze six candidate build alternatives for improving the Main Street Interchange, specifically in regards to likely economic consequences impacting the identified study area. Each build alternative is considered against other build alternatives as well as against a scenario in which no interchange improvements are developed (the "No Build" alternative).

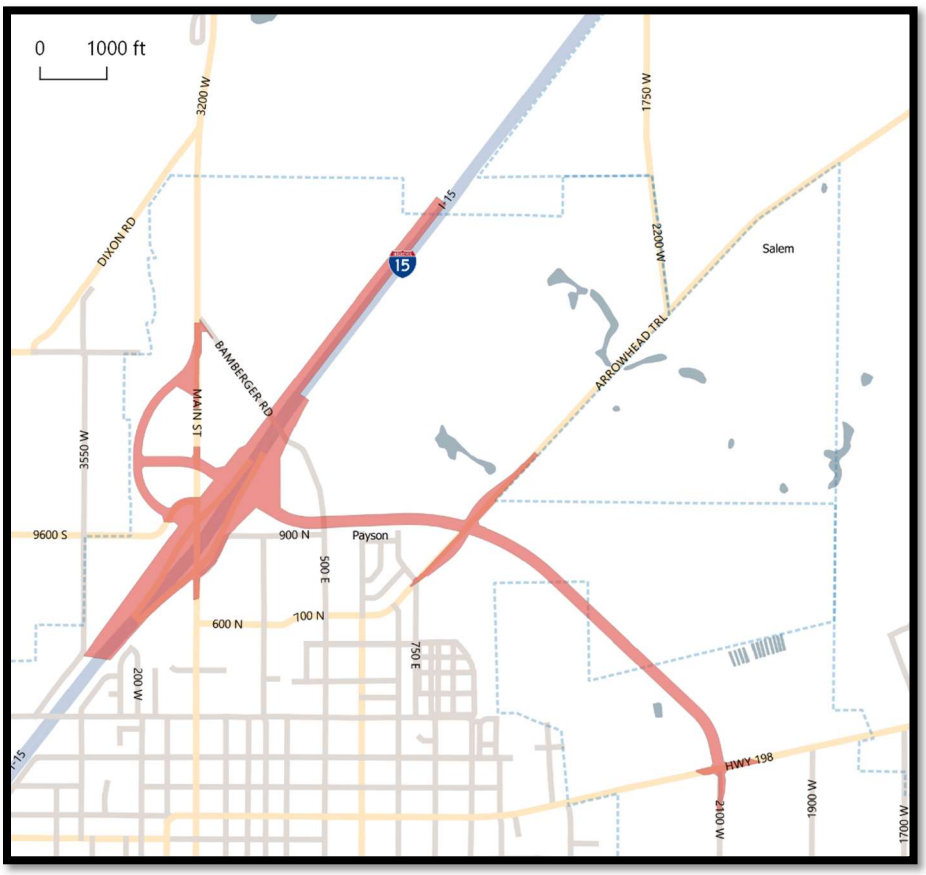
We relied on a variety of sources to inform our evaluations of likely economic impact including both quantitative data (Utah County assessor GIS parcels, U.S. Census Longitudinal Employment & Household Dynamics (LEHD) data, TAZ-level estimates and projections from the Mountainland Area Governments association (MAG), etc.) and important qualitative inputs from senior city staff and stakeholders including landowners, commercial brokers and developers.

Findings from this analysis are presented at the overall study area level and for a set of smaller custom subareas.

Alternatives Considered

The remaining six candidate build alternatives are described elsewhere in the EIS document in greater detail, but are briefly characterized below:

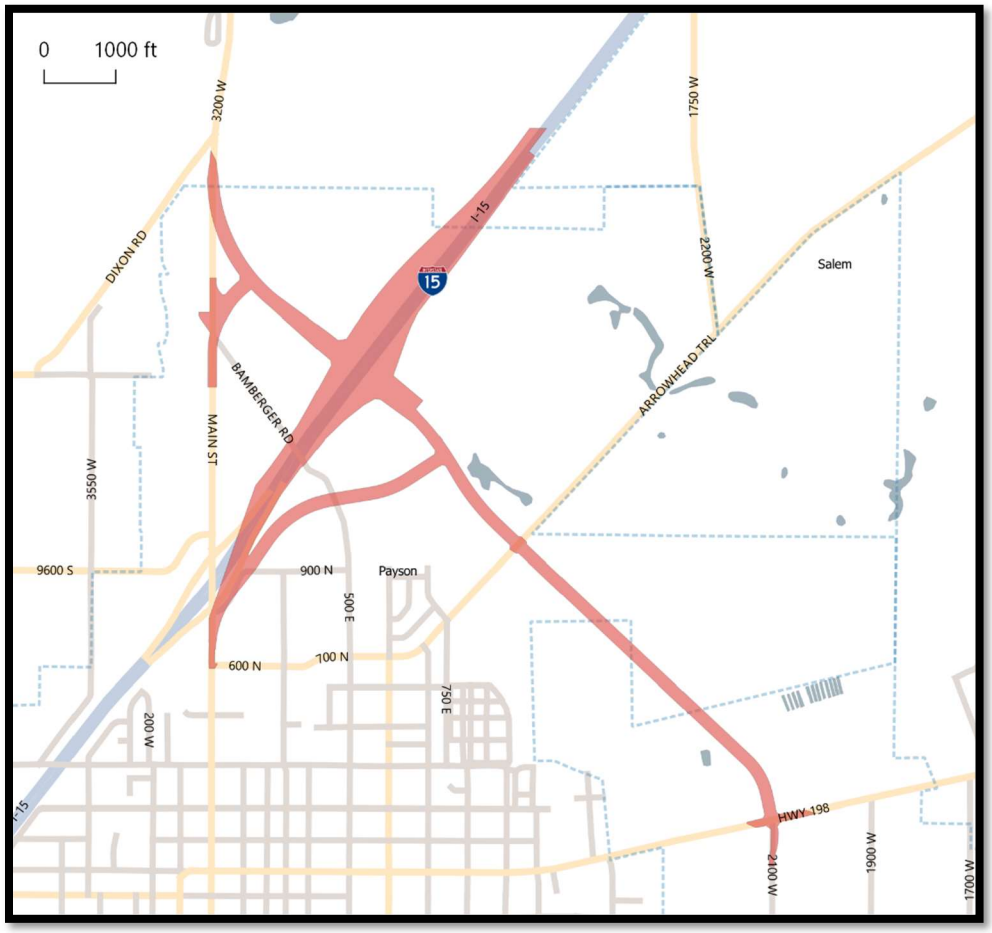
R-1 (footprint shown below)



Description:

Alternatives labeled "R" represent *relocation* approaches, wherein the existing Main Street interchange facilities are removed and a new interchange is constructed in an alternate location. In R-1, the replacement interchange would be built approximately 0.2 miles northeast of the current facility. R-1 would *not* involve widening of Main south of the current interchange (in contrast with I-1, described later). With existing ramps removed, Main St. would cross under the interstate.

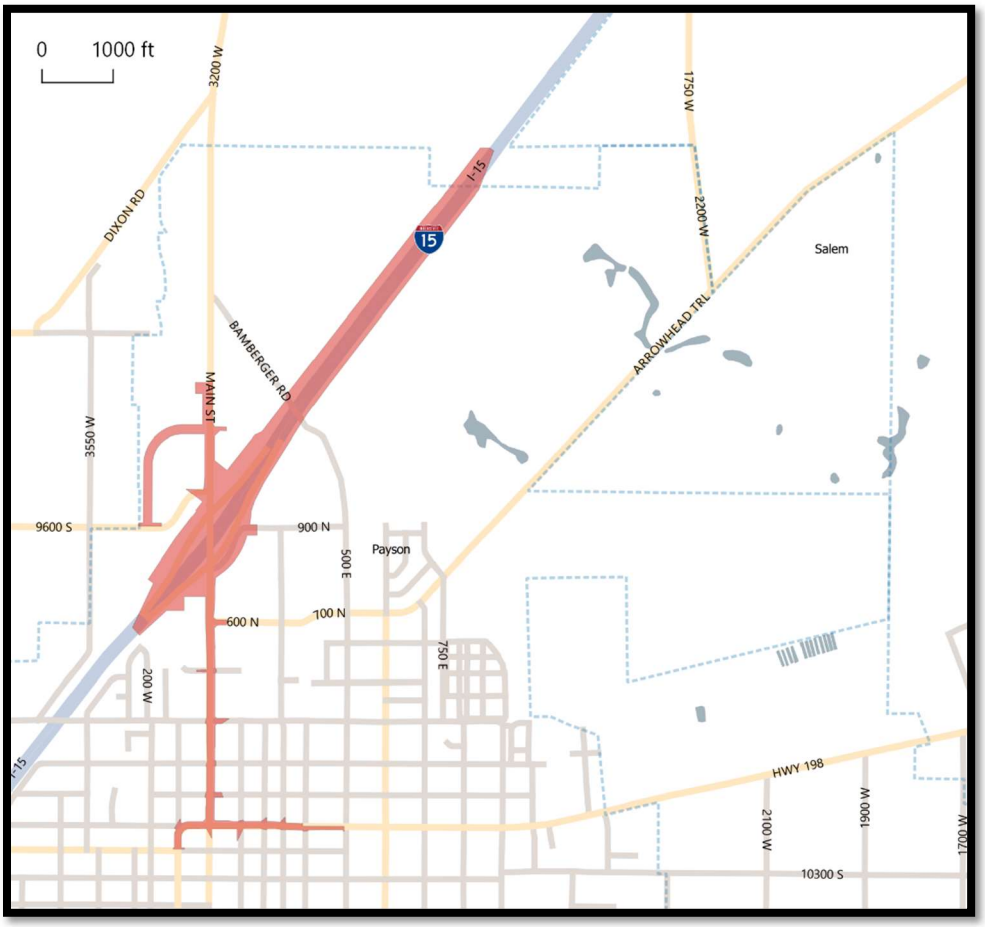
R-2



Description:

R-2 is a replace/relocate alternative similar to R-1, but with the new interchange placed even further (approximately 0.7 miles) to the northeast, increasing the spacing between the new 5-lane Nebo Beltway and the current northern extent of Payson development. This configuration necessitates an additional arterial road, east of the interstate, connecting Main St. with the Nebo Beltway.

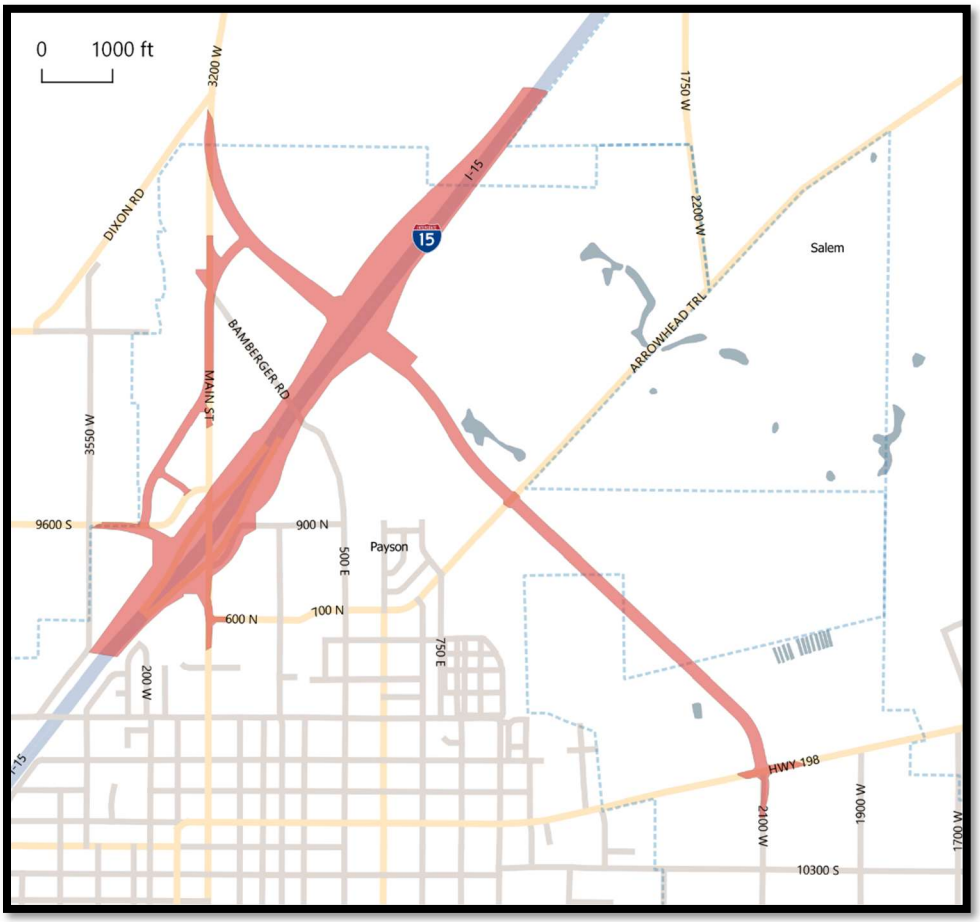
I-1 Improve Existing



Description:

Alternative I-1 does not include an additional interchange that would connect to Nebo Beltway. Instead, Alternative I-1 improves and adds capacity at the existing interchange and Main Street by widening Main Street to five lanes between the interchange and SR-198.

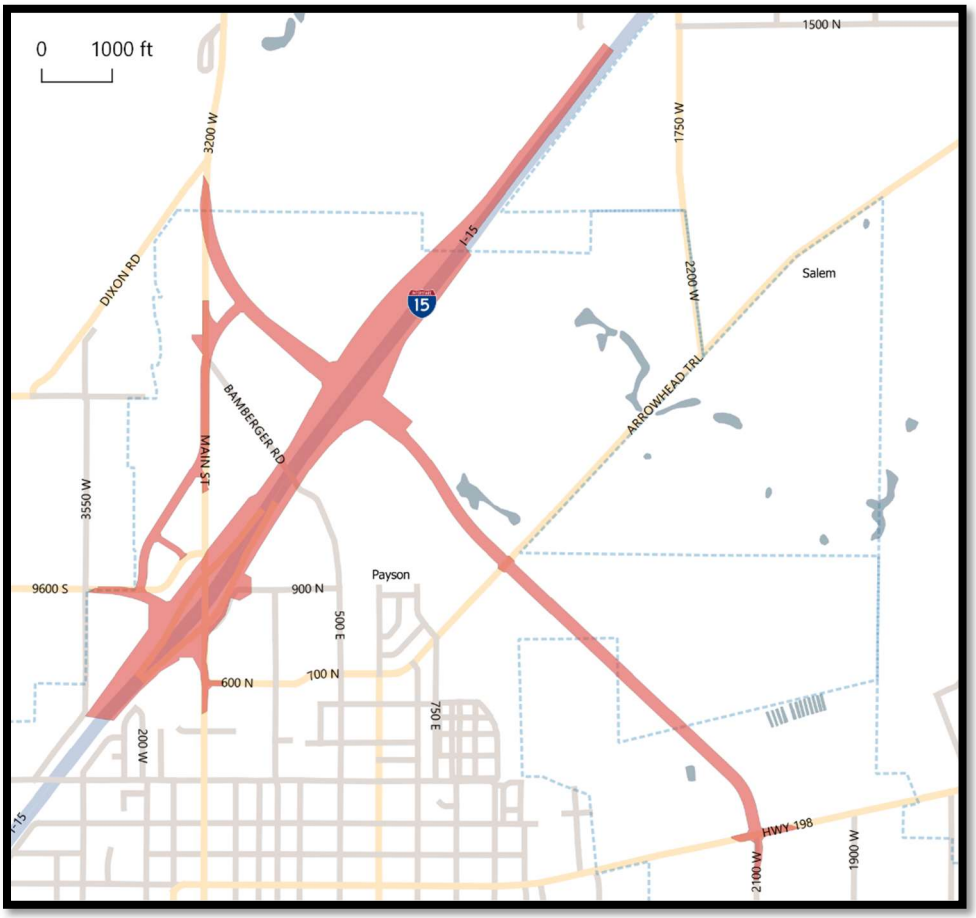
C-1 Braided Ramps



Description:

Alternative C-1 would provide a free-flow connection between the Main Street interchange and a new interchange connecting to the proposed Nebo Beltway. Braided ramps (i.e., ramps that cross over each other) would connect the two interchanges. Motorists traveling on I-15 in either direction would exit I-15 and have the option to take the nearest road (i.e., Main Street for northbound motorists or Nebo Beltway for southbound motorists) or continue to the next road in free-flow/continuous lanes without stopping at a traffic signal. Motorists entering I-15 from Main Street (northbound) or Nebo Beltway (southbound) would utilize the respective on-ramp that would cross over the free-flow continuous lanes and enter I-15 between both interchanges. From the new interchange, motorists could travel on Nebo Beltway until it intersects with SR-198 at 2100 West, thereby avoiding and reducing congestion at Main Street and the existing interchange.

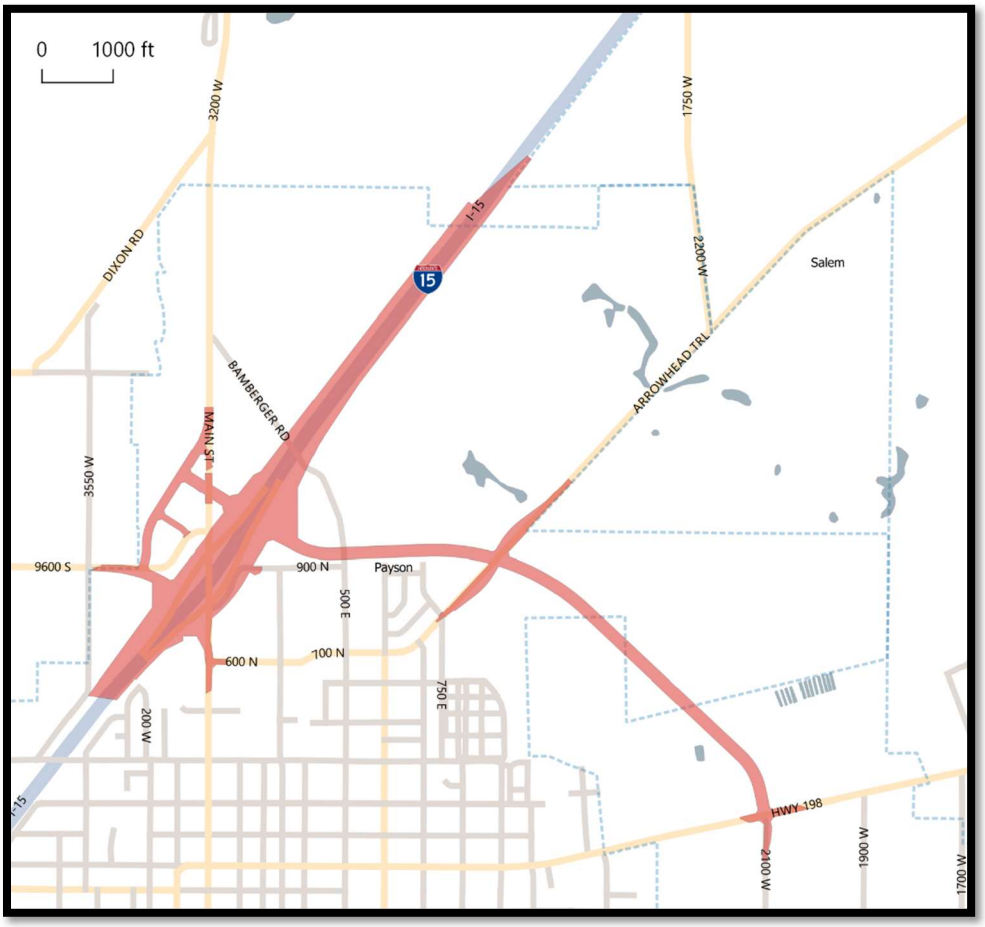
C-3 Frontage Road Ramps



Description:

Similar to Alternative C-1, Alternative C-3 would include an additional interchange approximately 0.72 miles northeast Main Street; however, frontage roads would connect the two interchanges instead of free-flow ramps. Motorists traveling on I-15 in either direction would exit I-15 and stop at the first signalized interchange (i.e., Main Street for northbound motorists or Nebo Beltway for southbound motorists) or continue on the frontage road to the next interchange. Motorists entering I-15 from Main Street (northbound) or Nebo Beltway (southbound) would utilize the frontage road to the next interchange and proceed through the signalized intersection to the respective on-ramp. From the new interchange, motorists could travel on Nebo Beltway until it intersects with SR-198 at 2100 West, thereby avoiding and reducing congestion at Main Street and the existing interchange.

C-4 Split Diamond



Description:

Alternative C-4 would function the same as Alternative C-3, with frontage roads connecting the Main Street interchange to an additional interchange approximately 0.15 miles northeast of Main Street (compared to 0.72 miles under Alternative C-3).

At the time of this economic analysis, the six alternatives described above were still in preliminary design phases, with potential shifts in project "footprint." Any such change should be minor and not materially affect the general location and traffic flow concept.

Table 1: Summary of Salient Design Features by Alternative

	R-1	R-2	I-1	C-1	C-3	C-4
Existing I-15 & Main ramps removed	X	X				
Main St. widened south of existing interchange to SR-198			X			
New interchange added northeast of existing to serve Nebo Beltway arterial						
near (~0.2 mi.)	X					X
far (~0.7 mi)		X		X	X	
Extra stoplight for some exiting interstate traffic					X	X
Free-flowing ramp entrance & exit for all traffic				X		

Impacts Considered

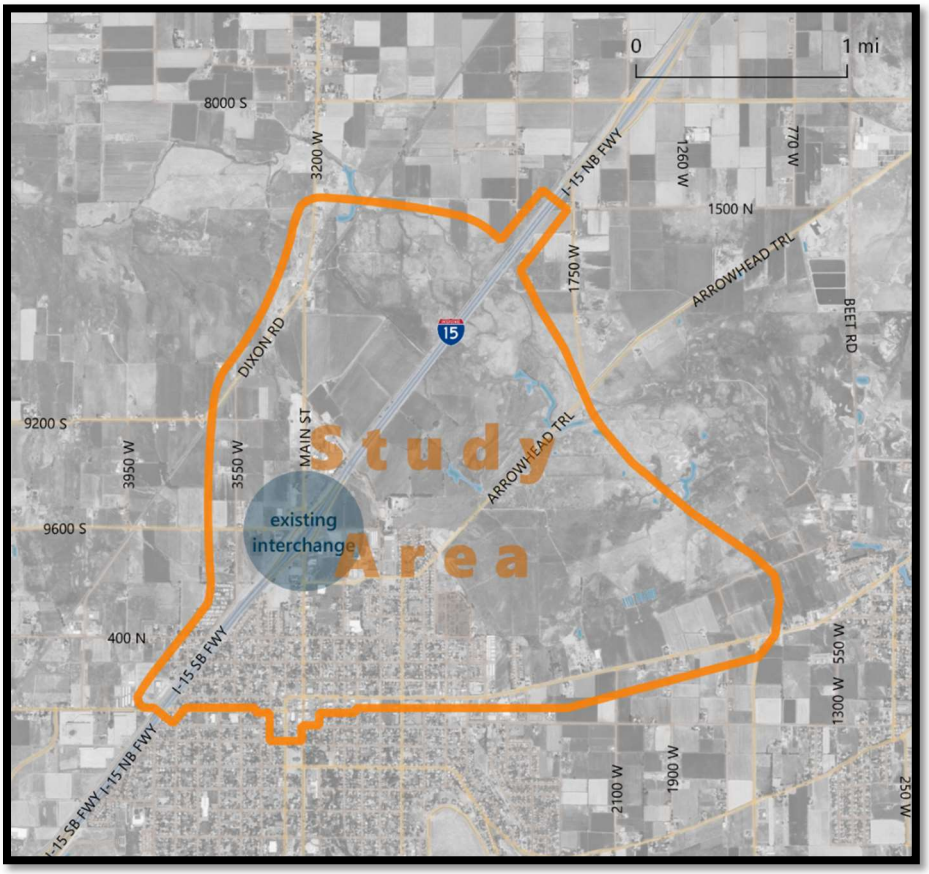
Key economic consequences analyzed here include both direct and indirect impacts:

- *Direct impacts* are those stemming from project site acquisition (through partial or complete "takings") and conversion of land from other existing or planned land uses to a transportation use.
- *Indirect impacts*, on the other hand, include changes to the pace, timing or nature of development likely to occur because of modifications to access, visibility, traffic volume, parcel geometry, aesthetics or other related variables as a result of a given alternative scenario.

While direct impacts may entail additional direct project costs, indirect impacts can involve other measures such as changes to private sector construction/real estate development (e.g. housing units, commercial square footage), property values, rents, employment levels and wages, and retail sales. Public sector revenue flows may also be impacted by changes to property tax and sales tax revenue.

Study Area Definition

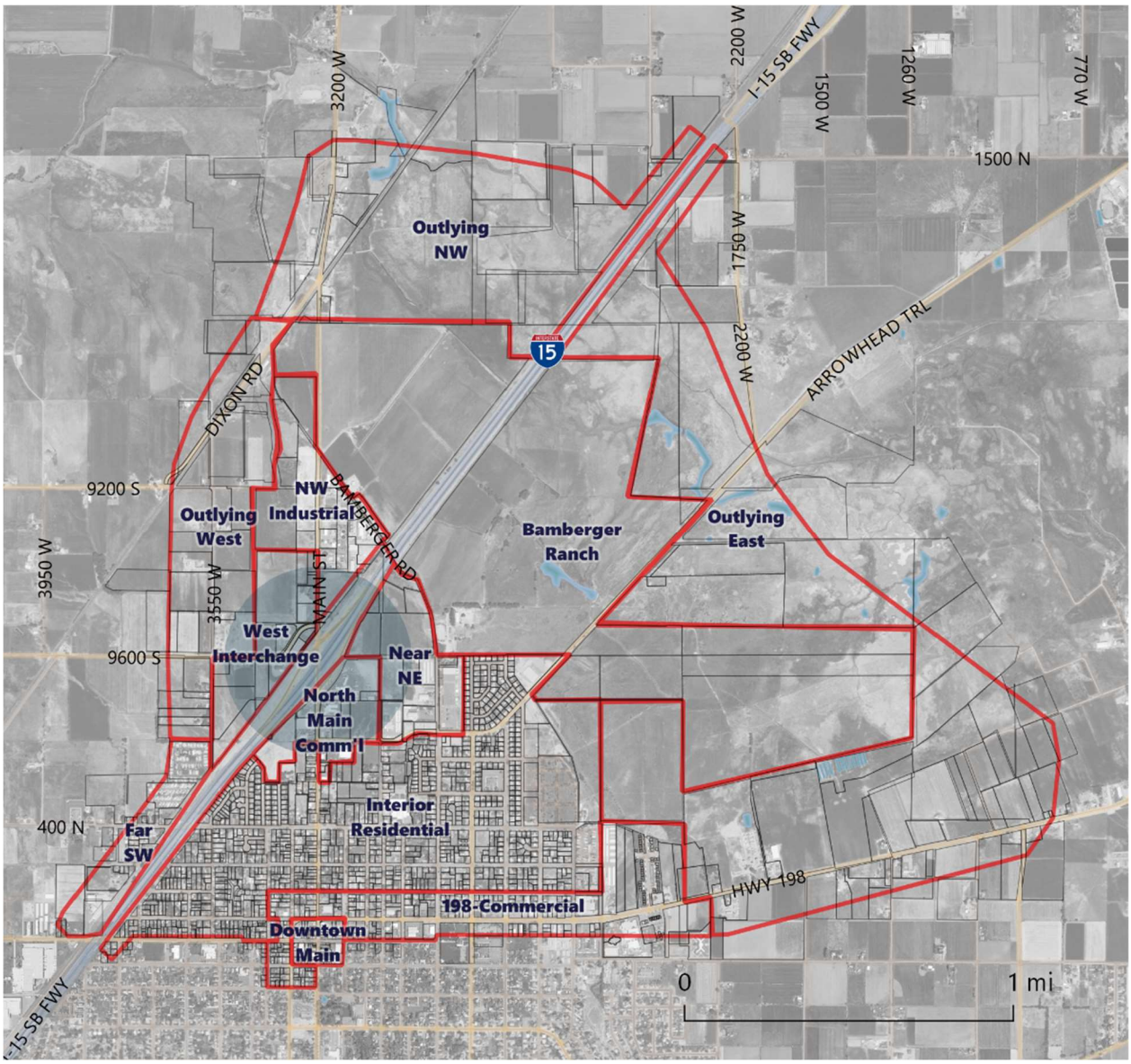
Figure 1: Study Area Boundary



For each alternative, the immediate economic impact area is considered limited to parcels intersecting the roadways and systems that would be altered under a given alternative. As such, each alternative will have a different immediate Impact area). The indirect economic impact area, then is defined as remainder of overall Study Area shown in Figure 1.

Subarea Analysis Approach

Figure 2: Economic Impact Subareas



To ensure close, systematic consideration of potential impacts of different types, we further divided the study area into 12 smaller geographic subareas, shown in Figure 2, grouping together parcels sharing similar character and land use mixes.

EXISTING CONDITIONS

Economic Context

Population Growth and Residential Construction

Residential construction, as reflected in local building permits (Figure 3) and the region (Figure 4), shows Utah County as a whole keeping pace with Salt Lake County, despite being approximately half as populous. Utah County's annual growth rate from 2010 to 2015 is almost three times the national rate, as shown in Table 2.

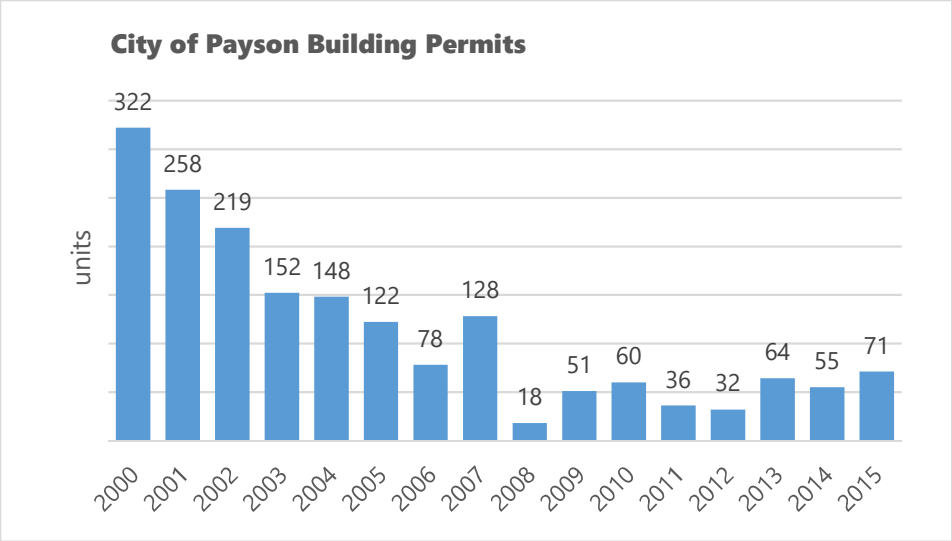
Table 2: Population Growth Comparisons, 2010 to 2015

	Payson	Utah County	Salt Lake County	US
2010 Population	18,512	516,640	1,029,581	308,758,105
2015 Population	19,548	575,205	1,107,314	321,418,820
Growth	1,036	58,565	77,733	12,660,715
Annual Growth Rate	1.10%	2.17%	1.47%	0.81%

Source: U.S. Census

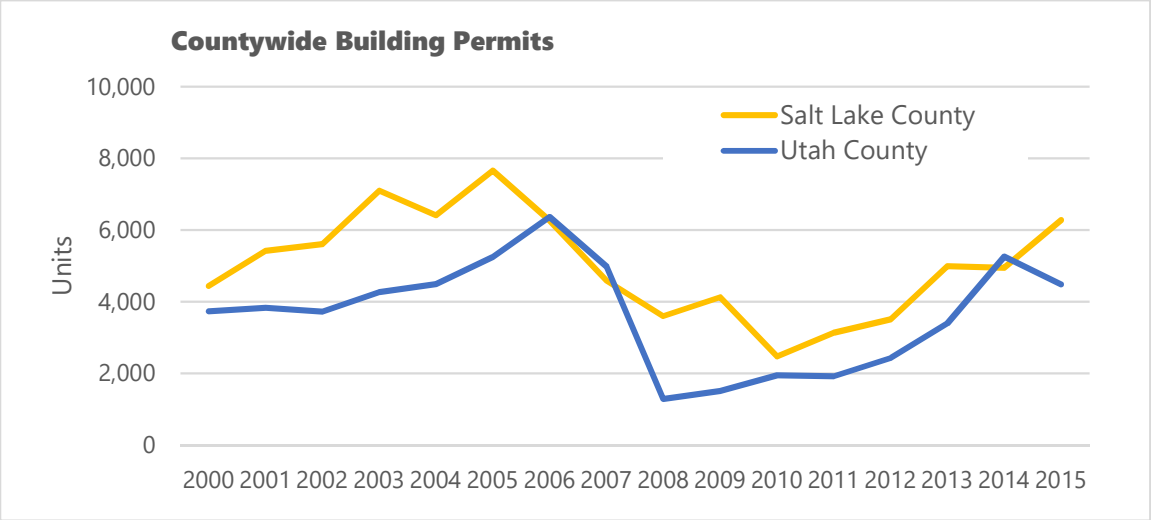
Payson's growth, though higher than the national average, trails the Utah County total, as reflected in both Table 2 and Figure 3. This slowdown in construction activity, extending into a period marked by economic recovery elsewhere in the region, is likely related to a lack of properties of sufficient size to accommodate major residential projects.

Figure 3: Payson Building Permit Trends



Source: U.S. Census, based on information from local permit-issuing jurisdictions

Figure 4: Regional Building Permit Trends



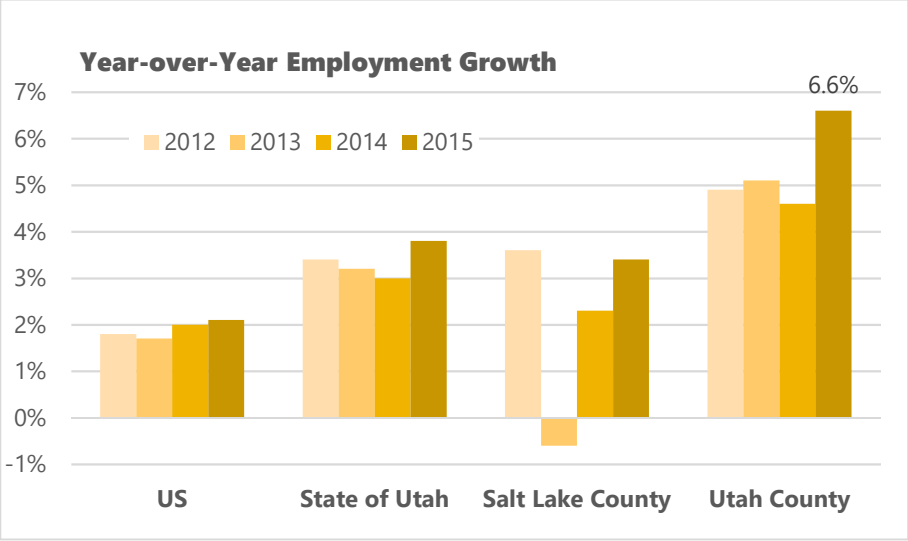
Source: U.S. Census, based on information for local permit-issuing jurisdictions

Employment Growth

Utah County is one of the fastest growing counties in the nation. Figure 5 shows Utah County outpacing the State of Utah, which in turn is growing at roughly twice the national rate. 2015 was an especially robust year for job growth, with Utah County growing by 6.6 percent over 2014.

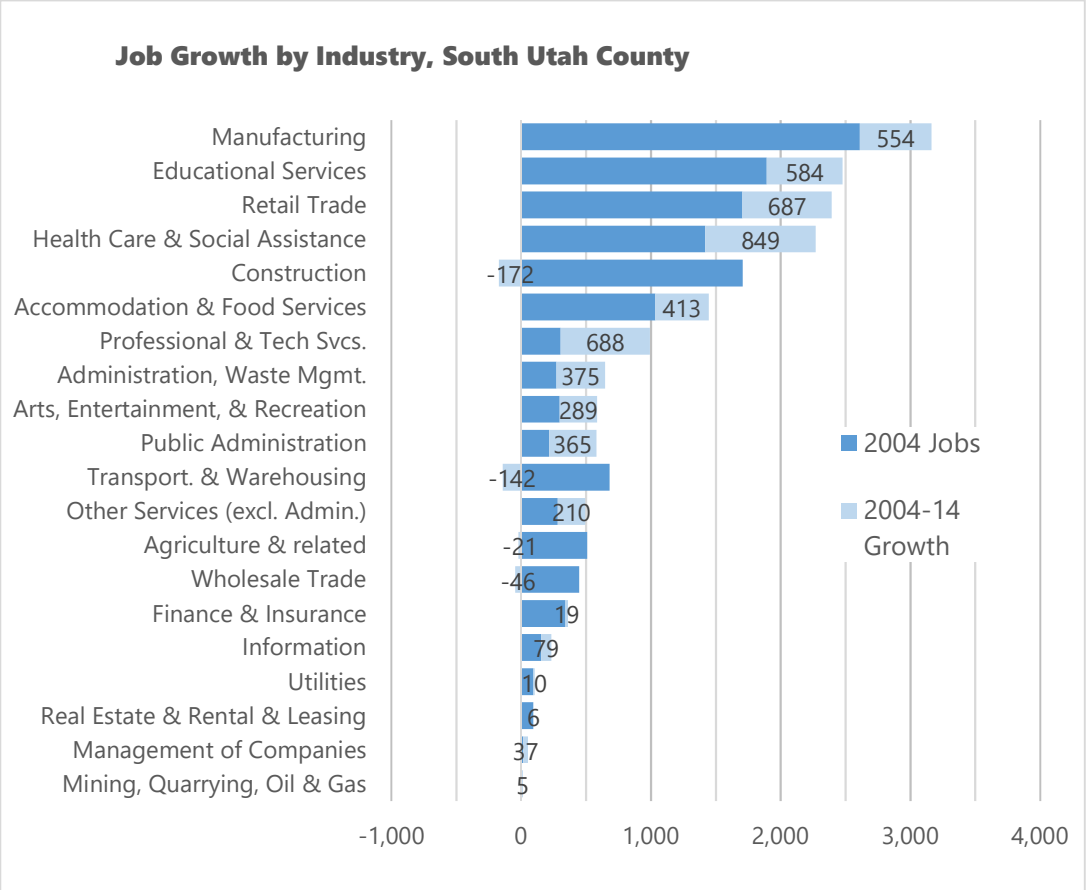
Figure 6 looks at growth in employment across major industry sectors in southern Utah County (an area defined for this analysis as including Spanish Fork, Salem, Payson and Santaquin (along with smaller nearby jurisdictions) for the period covering 2004 to 2014. Overall job growth has been brisk in this immediate region – notably so health care, education, retail, professional services, and even manufacturing – a sector that lags nationally.

Figure 5: Employment Growth Comparisons



Source: Leland Consulting Group, using U.S. BLS annualized QCEW data

*Figure 6: 10-year Employment Growth by Industry, South Utah County**



**includes Payson, Spanish Fork, Salem, Santaquin and smaller surrounding communities*

Source: U.S. Census Longitudinal Employment & Housing Database (LEHD)

Study Area Existing Conditions

The following set of tables and figures describes the existing conditions, including parcel counts, acreage, land uses, major properties, zoning, vacancy status and notes on development plans (if any). Economic existing conditions including an estimate of current jobs by industry type, estimated current taxable sales and estimated market values (total, land and improvement only).

An appendix also includes maps of each subarea showing land use and zoning, with more detailed tables of land use acreages by zone designation.

Table 3: Jobs & Households by Subarea (Parcel-based)

Subarea	Est. Current Households	Est. Current Jobs
198-Commercial	164	1,183
Bamberger Ranch	1	0
Downtown Main	10	122
Far SW	115	38
Interior Residential	972	314
Near NE	8	345
North Main Comm'l	3	141
NW Industrial	0	12
Outlying East	15	8
Outlying NW	10	1
Outlying West	14	8
West Interchange	1	10
Study Area Total	**1,313**	**2,164**

Source: Utah County Assessor, U.S. Census Longitudinal Employment & Housing Database (LEHD); and Leland Consulting Group

Note: Household count estimates are based on Utah County parcel counts by land use for subarea parcels. Totals for multifamily properties are estimates based on ranges shown in Assessor land use classifications.

Job counts are based on U.S. Census LEHD figures available at the census block level. This data includes some intentional "blurring" (minor shifting of geographies and job counts) to protect data privacy for individual firms.

Leland Consulting Group made manual adjustments of point locations to adjust for obvious cases of data-blurring. As a result, we believe the LEHD job counts used here to be reasonably accurate at the Study Area level and potentially less accurate but still acceptable at the subarea level, for purposes of this report.

Nearly three-quarters of the approximately 1,300 study area households lie within the *Interior Residential* subarea, with most of the remainder living in the *Far SW* (primarily in trailer park homes) and *198 Commercial* subareas.

The *198 Commercial* subarea, with nearly 1,200 jobs (more than half of which are in the health care sector), is the leading employer among subarea, followed by the *Near NE*, with 345 jobs, primarily in the Transportation & Warehousing sector. Despite its small physical size, the North Main Commercial subarea employs just under 150, largely in retail and lodging jobs. The sprawling Interior Residential area, though primarily single family homes, actually employs over 300 workers across a variety of sectors.

Table 4: TAZ-based Estimates and Projections for Study Area Growth

	2011 est.	2040 proj.	Projected Growth	Annual Growth Rate
Population	4,228	9,761	5,533	2.9%
Households	1,288	3,184	1,896	3.2%
Employment	2,827	6,553	3,726	2.9%

Source: Leland Consulting Group, using MAG estimates and projections, applying manual splits to TAZ geographies (to match study area geography.

Note: Study area household counts are quite consistent between the parcel-based estimate and TAZ-based estimate. The discrepancy in employment totals is likely due to differences in industry coverage and job counting definitions. Also, inherent difficulty in accurately allocating TAZ-level estimates across smaller custom geographies could contribute to error.

Basic Property Information

Parcel acreage, primary existing land uses and major properties by subarea are summarized in the table below, with overall study area totals below.

Table 5: Summary of Basic Property Information by Subarea

Subarea	Parcels	Parcel Acres	Primary Land Uses	Major Properties
198-Commercial	266	92.9	Arterial commercial with some public/civic and some higher-density residential	Post office, West Mountain Hospital, Walgreens, Wells Fargo Bank, Peteetneet School, LDS Church, Catholic Church
Bamberger Ranch	9	734.2	Vacant/ag land planned & approved for mixed-use	Bamberger Ranch PUD
Downtown Main	73	10.6	downtown commercial	Main St. storefronts
Far SW	30	34.7	mainly SF residential and trailer homes with some light industrial & vacant	
Interior Residential	1024	383.5	Single family residential with some multifamily, public/civic; also 31 ac vacant and 4 ac comm'l	
Near NE	31	68.4	Vacant comm'l land north of 900N; mix of vacant & lt. industrial, transport & utilities south of 900N	Nebo school district transport facility; Loveless Land LLC vacant commercial assemblage (19 ac)
North Main Comm'l	23	43.4	Commercial and vacant comm'l land & under-utilized comm'l	Rite Aid, Quality Inn, Payson Diesel (vac), Gas & Dash (Chevron) Subway, Payson Market, McDonalds, vacant Ainge parcel
NW Industrial	25	93.7	Power & sewer plants; vacant industrial land	Power and sewer plants
Outlying East	63	811.7	Vacant/ag	
Outlying NW	17	333.6	Vacant/ag	
Outlying West	32	170.6	Vacant/ag	
West Interchange	31	64.3	Bowling, ag industrial, veterinary clinic & vacant land (industrial, comm'l & MF)	South County Lanes, West Mountain Veterinary Clinic
Overall Study Area Total	**1,624**	**2,841**	*Note, totals limited to parcels with centroids falling inside Study Area.*	

Source: Utah County Assessor; and Leland Consulting Group

Table 6: Summary of Property Values by Subarea

Subarea	Current Land Value	Current Improvement (Building) Value	Current Total Market Value	Current Total Taxable Value*	Current Annual Property Tax Revenues
198-Commercial	$21,857,500	$56,612,300	**$78,469,800**	$62,427,752	$801,260
Bamberger Ranch	$11,069,600	$212,600	**$11,282,200**	$368,112	$4,725
Downtown Main	$4,119,200	$7,591,185	**$11,710,385**	$11,089,430	$142,333
Far SW	$3,677,300	$4,797,600	**$8,474,900**	$5,372,251	$68,953
Interior Residential	$44,627,000	$100,189,500	**$144,816,500**	$81,765,842	$1,049,465
Near NE	$6,946,000	$4,679,700	**$11,625,700**	$7,261,552	$93,202
North Main Comm'l	$8,282,400	$6,960,500	**$15,242,900**	$12,663,464	$162,536
NW Industrial	$1,462,400	$0	**$1,462,400**	$741,958	$9,523
Outlying East	$18,605,100	$3,425,700	**$22,030,800**	$3,557,868	$45,665
Outlying NW	$8,228,300	$1,661,900	**$9,890,200**	$1,382,414	$17,743
Outlying West	$3,440,700	$2,309,800	**$5,750,500**	$2,137,411	$27,434
West Interchange	$3,350,000	$2,081,600	**$5,431,600**	$3,874,504	$49,729
Overall Study Area Total	**$135,665,500**	**$190,522,385**	**$326,187,885**	**$192,642,558**	**$2,472,567**

Source: Utah County Assessor parcel-level estimates of market value, aggregated by Leland Consulting Group across study subareas

**A reduced value, based on varying adjustments by land use, used for calculating taxes due at the current total rate of 1.2835%*

In terms of overall property value, the large Interior Residential subarea contributes approximately 44 percent of the study area total, with the 198 Commercial subarea accounting for approximately 24 percent.

Even with favorable assessment rates for residential properties, the Interior Residential subarea also contributes the most in terms of property tax revenue, at just over $1,000,000 annually.

Table 7: Estimates of Sales Tax Revenues by Subarea

Subarea	Est. Current Annual Taxable Sales	Est. Current Annual Sales Tax Revenues
198-Commercial	$37,745,690	$2,547,834
Bamberger Ranch	$0	$0
Downtown Main	$8,059,545	$544,019
Far SW	$745,257	$50,305
Interior Residential	$5,326,152	$359,515
Near NE	$2,699,798	$182,236
North Main Comm'l	$15,095,086	$1,018,918
NW Industrial	$912,908	$61,621
Outlying East	$568,439	$38,370
Outlying NW	$71,055	$4,796
Outlying West	$34,921	$2,357
West Interchange	$113,023	$7,629
Overall Study Area Total	**$71,371,872**	**$4,817,601**

Source: Leland Consulting Group, Utah State Tax Commission, Utah County Assessor, U.S. Census LEHD

Notes: Data from the Utah State Tax Commission on taxable sales and tax revenues by industry in the City of Payson was used to calculate an average taxable sales per employee across various types.

This multiplier was applied to study area estimates of current employment (from Census LEHD data) to arrive at taxable sales and multiplied by Payson's 6.75% rate to calculate revenues.

Property tax revenue estimates used Utah County data on taxable value by parcel, multiplied by the prevailing 1.2835% total tax rate.

Just over one-half of estimated study area taxable sales (and sales tax revenue) comes from the 198 Commercial subarea, with 21 percent produced by firms in the North Main Commercial subarea, as shown in Table 7.

Subareas Characterized by Relationship to Interchange

Economic impacts for a given alternative will vary depending on how nearby properties currently (or potentially) relate to the affected transportation systems. Table 8 provides a qualitative summary of how each subarea in the overall study area current relates, economically, with the I-15 & Main Street interchange.

Table 8: Subareas by Relation to Existing Interchange

Subarea	Current Interchange Relationship
198-Commercial	Businesses along 198, in general, do not appear to be primarily dependent on direct access to interstate traffic. Widening of 198 is planned to occur independent of subject interchange configuration (and, in fact, is the subject of a separate parallel study). Most vacant commercial land is well east of Main St., with potential land uses relatively unrelated to I-15. Value upside for those parcels lies in proximity to the possible future Nebo Beltway arterial alignment.
Bamberger Ranch	Planned development (and current land values) depend on future interchange with I-15, connected to future arterial spine (Nebo Beltway). Approved site plans show a Nebo arterial in line with R-2, C-1 and C-3 options.
Downtown Main	Existing business types (especially shops & dining) generally traffic-dependent, but probably based more on planned trips rather than spontaneous freeway drive-by. Upside of future re-development & sales potential is tied more to historic charm, place-making & cultivation of atypical retail-dining-arts "destination" offerings.
Far SW	Low-intensity industrial development near south end of subarea benefits from reasonable freeway access, but subarea is otherwise generally independent of interchange.
Interior Residential	Existing interchange is a primary point of regional access for interior residents. Traffic congestion around current configuration is increasingly inconvenient.
Near NE	Adjacent to both Bamberger Ranch and the North Main commercial parcels.
North Main Commercial	Most freeway-dependent subarea, with McDonalds, Chevron Gas & Dash, Subway and Quality Inn being fully dependent on I-15 traffic. Payson Market is less dependent on freeway traffic in general and relies more on northbound than southbound customer traffic (due to lack of grocery competition to the south). This subarea, more than others, will likely suffer from stagnant real estate investment until planning issues surrounding this interchange are resolved, with uncertainty concerning extent of likely takings and final configuration possibilities until that time.
NW Industrial	Power and water treatment facilities are not dependent on the interchange. Vacant lots stand to benefit in terms of development timing if access is improved.
Outlying East	No significant economic relationship currently
Outlying NW	No significant economic relationship currently
Outlying West	No significant economic relationship with current interchange
West Interchange	Limited economic relationship, despite proximity. Current vet clinic and bowling alley customers likely view those properties as destinations – made somewhat more convenient by the current exit, but not dependent.

Source: Leland Consulting Group, based in part on discussions with Payson city staff and interviews with local stakeholders

LIKELY ECONOMIC IMPACTS TO STUDY AREA

This section lays out, in qualitative, directional terms, the economic impacts likely to occur within the study area (and each of its constituent subareas) resulting directly or indirectly from each of various considered interchange alternatives. Three subareas within the overall study area may involve potential economic impacts that are both relatively complex and particularly important to weighing the overall consequences of the considered alternatives. Thus, for *Bamberger Ranch*, *Downtown Main Street* and *North Main Street*, we devote a somewhat lengthier narrative of expected economic impacts.

Bamberger Ranch Impacts

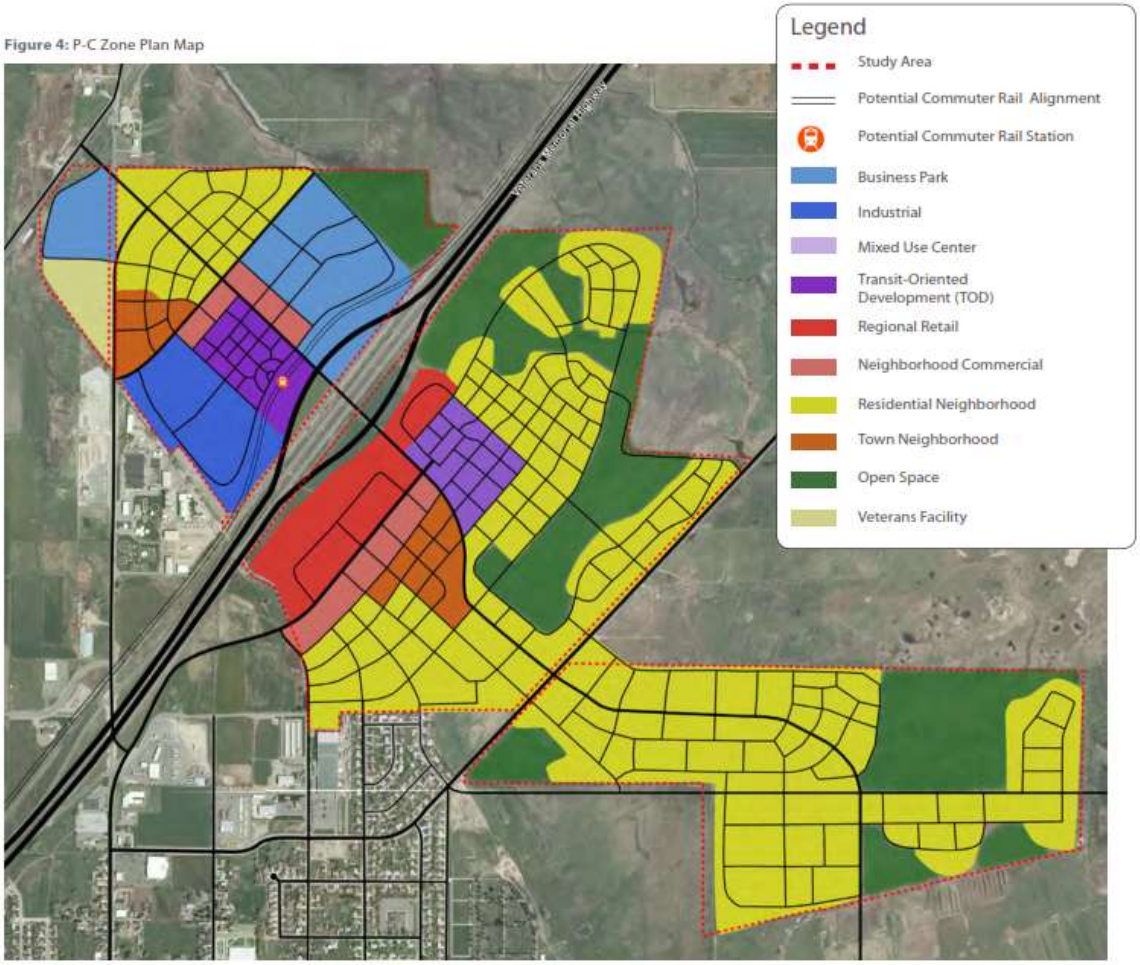
With a Planned Community (P-C) Zone approved by the City of Payson in 2011 the 740-acre, single-owner Bamberger Ranch Property represents what would be, by far, the largest single development in Payson (or any nearby south Utah County municipality) to date. The approved P-C zone allows flexibility in project build-out, depending in part on supporting infrastructure. Site plans for a "Maximum Development Scenario" show the proposed Nebo Beltway acting as an arterial spine running through the center of the development, connecting to a new I-15 interchange (approximately aligned with the R-2, C-1 and C-3 alternatives considered here), in addition to a FrontRunner commuter rail stop.

Under this Maximum Development Scenario, the project would include a broad mix of land uses at considerably higher overall densities than would be expected if developed piecemeal as suburban/exurban land. This envisioned mix, depicted in Figure 7, would include the following land uses:

- Business Park
- Industrial
- Mixed Use Center
- Transit-Oriented Development
- Regional Retail
- Neighborhood Commercial
- Residential Neighborhood
- Town Neighborhood
- Open Space
- Veteran's Facility

In all, the vested buildout program could accommodate nearly 3,600 new households and 2.7 million new square feet of commercial development, with highest land use densities clustered around the potential Nebo Beltway and I-15 interchange.

Figure 7: Bamberger Ranch "Maximum Development Scenario"



The Nebo Beltway (A.K.A Nebo Connector) is currently depicted in the MAG *2040 Metropolitan Transportation Plan* as lying to the north of the Bamberger Ranch property (approximately halfway between the existing Main St. and Benjamin exits). That same plan document gives a Nebo Beltway construction timeframe of 2021-2030. As such, all the alternatives considered here, except for I-1 would stand to benefit Bamberger Ranch development in at least two key ways: 1) by moving the Nebo Beltway path southward into alignment as an arterial spine for the project, and 2) by potentially accelerating the development of a project-serving interchange by several years.

If either No-Build or I-1 alternatives are chosen for the current Main Street Interchange project (with no new northern arterial added), the Bamberger Ranch property could not develop as envisioned in Figure 7 until a later interchange project – most likely one connected with the Nebo Beltway construction – enables access to and from I-15. If a Nebo interchange were to be built as currently shown in the MAG plan (north of Payson's annexation area), it is highly unlikely that a future interchange would also be added to serve the Bamberger property directly. Thus, the No-Build and I-1 would likely result in either substantially delayed Bamberger development or reversion to a more typical low-density build-out, with no direct freeway connection and little chance for transit-oriented development.

Payson's somewhat anemic post-recession rebound in growth, especially relative to neighboring Utah County municipalities (as evidenced in Figure 3) has likely been due in part to insufficient development-ready land supply, especially in the form of large, master-planned parcels as found elsewhere in the region.

The reduced spacing between Main Street and Nebo Beltway connections required in the C-4 and R-1 alternatives are potentially nearly as detrimental to development prospects for Bamberger Ranch as either No-Build or I-1. While it would accelerate timing of a Nebo Beltway connection, C-4 and R-1 would align that connection in such a way as to restrict the functionality of Nebo Beltway as a central arterial for the Bamberger project. Some higher-density land uses could still occur on the north side of the new arterial, but the south side parcels would be under different, more fragmented ownership, with greatly reduced depth for development due to existing land uses to the south (especially on the west side of I-15).

The C-1 alternative would be arguably at least *somewhat* more conducive than C-3 to maximizing competitiveness of commercial developments on the Bamberger Ranch property simply due to the superior free-flow access afforded by the flyover ramps. Would-be customers of drive-by businesses traveling northbound on I-15 would have more convenient options for exiting at 800 South, Main Street or Benjamin, relative to Bamberger Ranch under the C-3 alternative, which required an additional stop and lengthier frontage road drive for those vehicles. R-2 would result in approximately the same alignment of Nebo Beltway as C-1 and C-3, while also entailing removal of existing Main St. access ramps.

Main Street Impacts (Downtown and North Main)

Like many smaller suburban cities that began as free-standing small towns and have gradually been encompassed by an expanding metropolitan area, Payson has a downtown Main Street area which has retained its charming storefronts and other historical structures, but has seen much of its commercial vitality migrate towards more modern centers with better automobile access. Since I-15 was originally constructed in the 1950s and 1960s, traffic-dependent commercial activity on Main Street has gravitated north from downtown to current locations near the Main St. interchange. Remaining downtown businesses now depend far less on drive-by traffic and rely more on destination appeal (or, in many cases, internet shopping with such "back door" transactions becoming as important as traditional in-store shopping[1]).

Some businesses on Main Street, such as the Rite Aid, the new Walgreen's and the 45,000 square foot Payson Market grocery, arguably benefit from the convenience of a well-functioning Main St. interchange, but are predominantly destination retailers, rather than traffic-dependent drive-by retailers.

Generally speaking, the Main St. businesses relying on drive-by visibility and access (e.g. McDonalds, Chevron, Subway) are at least somewhat more dependent on south-bound traffic originating from the more populous metro area to the north. The same is true for destination retailers and restaurants catering to niche markets. Conversely, stores like Payson Market and Walgreens probably have more northbound customers, due to lack of grocery and pharmacy competition in Utah county towns to the south of Payson.

[1] According to stakeholders familiar with Main Street, increasingly specialized retailers downtown (such as trikes and quilting supplies) now conduct a substantial portion of their sales by internet, with UPS/FedEx/USPS delivery beginning to replace customer walk-ins as the mode of transaction.

The likely impacts of the various considered interchange alternatives on the Main Street properties vary according to the nature of customer appeal (drive-by versus destination), the predominant direction of freeway customer traffic and the general vulnerability of businesses to new competition.

Main Street business operations and redevelopment prospects are arguably linked to the nature and timing of future growth of Bamberger Ranch. Timely, rapid and high-value (high density) development of Bamberger Ranch stands to increase competition for certain Main Street businesses while greatly increasing the local rooftop customer base. Drive-by, traffic-dependent retailers with little product differentiation or destination appeal would be particularly vulnerable to new Bamberger competition, while well-differentiated retail and dining destinations would largely benefit from the added area spending power.

With few exceptions[2], any business closed or relocated to accommodate new interchange right-of-way, is likely to reappear elsewhere in Payson or the immediate vicinity due to continued robust growth in underlying household and traffic-based demand in south Utah County.

A No-Build scenario would presumably be detrimental to all Main Street businesses, as congestion delays worsen over time. Secondarily, because No-Build is among the worst options for Bamberger Ranch, destination retailers (including, potentially, all of downtown) would be far less likely to benefit from the accelerated local growth spurred by that development.

While it will help to alleviate growing congestion along Main St., I-1 is potentially detrimental to Main Street economic prospects in several ways. First, it requires substantial direct takings to allow for project right-of-way, including likely demolition of several historic and otherwise distinctive existing structures. Such takings are costly in their own right, but also degrade the existing aesthetic and cultural appeal – a key "place-making" asset for differentiating Main Street from other, more mainstream retail competition. I-1 is also likely detrimental to Bamberger Ranch development, limiting customer growth potential.

Although C-1 also entails several takings/closures for North Main businesses, that alternative is likely to have moderate to strong positive long-term economic impacts on Main Street, by reducing congestion over the No-Build, providing maximal support for Bamberger Ranch development, and preserving historic properties that would be taken/removed under I-1, By allowing free-flowing access to the Main Street exit for south-bound freeway customers, the braided ramps of C-1 also help to level the competitive playing field for drive-by traffic relative to competition at 800 South and the new Nebo Beltway exit.

C-3 may help Main Street destination businesses, primarily by supporting the maximum potential Bamberger Ranch development (i.e. adding more rooftops to the local market), but would likely put drive-by retailers on Main Street at a some slight disadvantage, relative to competitors at other exits, due to the added inconvenience of an additional stop and frontage drive for southbound freeway customers. This alternative would probably result in a neutral long-term economic impact on Main Street, Payson.

C-4, despite helping to alleviate growing congestion on Main St., is likely to disrupt the sound development of Bamberger Ranch (as discussed above) and, like C-3, may reduce drive-by retail competitiveness due to the

[2] The Rite Aid is an example of a store that might be removed through takings but unlikely to relocate or be replaced by another, similar store in the near future. In fact, the Payson location for that chain appears likely to close anyway, due to underperformance and redundancy given Rite Aid's new corporate owners, Walgreen's.

addition of an extra stop for southbound freeway customer traffic. As such, the overall impact of C-4 is likely to be detrimental to the Main Street economy, although not quite to the extent as I-1 (or No-Build).

Under either the R-1 or R-2 alternative designs, the competitiveness and economic viability of freeway-dependent parcels, currently positioned to serve I-15 travelers exiting at Main Street, would be seriously weakened. Under C-1 and C-3, those prospective customers would have the option of exiting either at Nebo (presumably to patronize new Bamberger businesses) or at Main Street (albeit in a somewhat less convenient fashion under C-3 for southbound vehicles). With no Main Street exit, businesses like the Quality Inn, Chevron, McDonalds and Subway (or future businesses occupying those parcels) would face a major competitive disadvantage relative to options at the Bamberger/Nebo exit as well as other options at the 800S exit to the south and the 8000S/1900S exit to the north.

Whereas those businesses would be "full takes" under C-1 and other potential build alternatives, they would likely be partial takes under either R alternative. On the surface, this seems like a potential advantage of R-1 and R-2. However, the prospect of partially compensating these owners, while allowing them to remain in operation (despite seriously weakened competitiveness) carries a potential worst-case risk that they may slowly "die on the vine," rather than be removed/relocated/replaced in more sound locations. Slow decline of this sort could result in a creeping blight, potentially threatening the viability and redevelopment prospects of nearby businesses such as Payson Market and vacant holdings such as the Ainge and Zeeman properties.

Other Main Street and Highway 198 businesses (including Payson Market and all Downtown Main St. shops), while not *directly* dependent on freeway travelers, certainly benefit from the convenience of the existing Main Street interchange to serve their local customer base – which generally spans to include all of Payson in addition to nearby smaller communities (particularly those to the south with less retail options). Removal of the Main St. access point would have the potential to weaken the competitive viability of the 45,000 s.f. Payson Market, as well as businesses in and around downtown Main Street. Firms along eastern portions of Hwy 198 would still enjoy decent access via the new Nebo interchange, but those further west would see somewhat weakened demand due to decreased convenience (assuming regional competitors exist).

Summary of Likely Impacts Across Subareas

The tables below provide qualitative summaries of likely economic impacts, for all study area subareas, stemming from each of the interchange alternatives.

Table 9: Likely Consequences by Subarea: R-1 Alternative

Subarea	R-1 Impacts
198-Commercial	Nebo Beltway "short cut" becomes less beneficial due to closer spacing relative to Main St. exit, but connection between Nebo Beltway and 198 could still spur somewhat faster development of existing vacant properties on eastern portion of subarea. Westernmost portions of 198 could see depressed land values and development prospects due to degraded access via Main St.
Bamberger Ranch	Slower pace of development and likely reduced upside to land values, due to shifted Nebo Beltway alignment (resulting in elimination of some important project frontage on south side of Nebo near I-15.
Downtown Main	Reduced taking of historic and attractive properties along Main (because no widening entailed) helps keep gateway aesthetics generally intact. However, likely economic disruption of north Main businesses due to downgraded access may offset this benefit.
Far SW	Negligible differences in relative impacts across alternatives
Interior Residential	Northernmost homes in this subarea could be adversely impacted in terms of value if loss of existing access ramps leads to economic decline on North Main.
Near NE	Several key vacant parcels would be split and reshaped with reduced developable acreage (and uncertain possibility for curb cuts). That said, remaining portions of those parcels would gain favorable visibility and potential land value due to Nebo frontage.
North Main Comm'l	Loss of direct access to I-15 from existing ramps is most disruptive for this subarea, although more for **R-2** than **R-1**, which retains better proximity to the replacement facility. Access and wayfinding will likely become less convenient and less straightforward and traffic volumes on Main St. will likely drop (reflected in Transportation Impact findings). Strong likelihood of reduced property values and diminished development/re-development prospects.
NW Industrial	May be best alternative, in terms of direct access, for supporting development on vacant parcels in this subarea. That said, the detrimental effects on Bamberger development because of the misaligned Nebo Beltway connection, may mitigate new access benefits.
Outlying East	Nebo arterial "short cut" becomes less beneficial due to closer spacing relative to Main St. exit, but connection between Nebo and 198 should still spur somewhat faster development of existing vacant properties.
Outlying NW	Minor improvement to development prospects as Bamberger project brings development west of I-15, but not as significant as **C-1** alternative.
Outlying West	Minor improvement to development prospects as Bamberger project brings development west of I-15, but not as significant as **C-1** alternative.
West Interchange	Likely disruptive in terms of direct takings, especially on the northern half. The southern portion, on the other hand, will see substantially improved access and visibility for southbound traffic.

Source: Leland Consulting Group, based in part on discussions with Payson city staff and interviews with local stakeholders

Table 10: Likely Consequences by Subarea: R-2 Alternative

Subarea	R-2 Impacts
198-Commercial	Could improve development prospects on eastern portions due to relative convenience of new Nebo Beltway access at 2100 W. Commercial development closer to Main St. will likely be harmed by removal of existing freeway access ramps.
Bamberger Ranch	Supports well-spaced spine arterial, and generally consistent with development goals for this subarea.
Downtown Main	Removal of existing access facilities at Main St., together with more distant placement of Nebo Beltway replacement access would make downtown Main even further removed from convenient free access. Thus, any gains for downtown due to facilitating healthy Bamberger rooftop growth could be offset by degraded access.
Far SW	Negligible differences in relative impacts across alternatives
Interior Residential	Northernmost homes in this subarea could be adversely impacted in terms of value if loss of existing access ramps leads to economic decline on North Main.
Near NE	Some direct takings from new arterial road connecting Main with Nebo Beltway, but otherwise this alternative should accelerate development potential for this Bamberger-adjacent subarea due to improved access.
North Main Comm'l	Loss of direct access to I-15 from existing ramps is most disruptive for this subarea, more for **R-2** than **R-1**, which retains better proximity to the replacement facility. Access and wayfinding will likely become less convenient and less straightforward and traffic volumes on Main St. will likely drop (reflected in Transportation Impact findings). Very strong likelihood of reduced property values and diminished development/re-development prospects.
NW Industrial	Avoids potentially troublesome takings related to power and water treatment facilities. Leaves vacant parcel west of interstate intact.
Outlying East	Creates substantial shortcut access to I-15 via proposed Nebo arterial, speeding development of remaining vacant commercial & rent/value growth for existing development.
Outlying NW	Faster development timing and pace with higher value upside due to much improved access.
Outlying West	Minor improvement to development prospects as Bamberger project brings development west of I-15
West Interchange	No direct takings, but downgraded access due to removal of existing ramps, likely resulting in somewhat reduced values and development prospects.

Source: Leland Consulting Group, based in part on discussions with Payson city staff and interviews with local stakeholders

Table 11: Likely Consequences by Subarea: I-1 Alternative (Improved Interchange)

Subarea	I-1 Impacts
198-Commercial	Widens Hwy. 198 to 4-lanes from 100W to 500E, requiring numerous direct takings[3] Some direct costs due to takings along western portion of subarea. Somewhat slowed pace of rent and development growth due to likely delay of Bamberger project & Nebo Beltway arterial
Bamberger Ranch	Delayed development start relative to C alternatives (waiting for separate interchange project to serve spine arterial, or, developing without interstate access to spine arterial). With no new arterial connection, Bamberger ranch will likely build out more slowly and to much lower than planned densities.
Downtown Main	Takings required to widen Main St. would remove key historic & aesthetic elements, limiting the upside and slowing pace of re-development & rent/sales growth.
Far SW	Negligible impacts likely
Interior Residential	Somewhat mitigated congestion along Main St. and Hwy 198. Takings required along Main St. to allow widening could broaden the appeal of Downtown to mainstream retail tenants, but would erode the "charm appeal" of central Payson, likely weakening its full development potential (as a civic/retail/dining destination distinct from more auto-oriented competition).
Near NE	Negligible direct or indirect impacts (although development prospects for vacant properties are probably better under other alternatives)
North Main Comm'l	Employment and sales from McDonalds, Chevron, Subway and Quality Inn will be removed due to takings, but likely to reappear elsewhere in Payson to serve underlying demand. Rite-Aid property is underperforming and is likely to close anyway in light of new corporate ownership by Walgreens. Businesses not taken as a result of infrastructure needs under this alterative will have reduced competition (for longer, at least) relative to C alternatives, but will also not benefit from robust north Payson household and traffic growth.
NW Industrial	Negligible direct or indirect impacts (although development prospects for vacant properties are probably better under other alternatives)
Outlying East	Negligible direct or indirect impacts (although development prospects for vacant properties are probably better under other alternatives)
Outlying NW	Negligible direct or indirect impacts (although development prospects for vacant properties are probably better under other alternatives)
Outlying West	Negligible direct or indirect impacts (although development prospects for vacant properties are probably better under other alternatives)
West Interchange	Widespread direct takings, but otherwise, little impact on development prospects.

Source: Leland Consulting Group, based in part on discussions with Payson city staff and interviews with local stakeholders

[3] This assumes subject interchange is constructed prior to separately planned widening of Hwy 198. If Hwy 198 widening project takes place first, these impacts will have already occurred.

Table 12: Likely Consequences by Subarea: C-1 Alternative (Braided Ramps)

Subarea	C-1 Impacts
198-Commercial	Creates substantial shortcut access to I-15 via proposed Nebo arterial, speeding development of remaining vacant commercial & rent/value growth for existing development
Bamberger Ranch	Optimal for project development, with well-spaced Nebo arterial and easy freeway on-off flow. Project would likely build out with higher density land uses similar to the site plan.
Downtown Main	Added competition from optimized Bamberger retail & dining additions could be offset by growth in potential customer rooftops.
Far SW	Negligible direct or indirect impacts
Interior Residential	Geographic insulation makes direct impacts impossible. Any indirect impacts are likely inconsequential relative to those possible in other subareas.
Near NE	Takings from new northbound ramps have an increased footprint, but otherwise this alternative could accelerate development potential for this Bamberger-adjacent subarea more than any other alternative.
North Main Commercial	Employment and sales from McDonalds, Chevron, Subway and Quality Inn would be removed due to takings, but likely to reappear elsewhere in Payson to serve underlying demand. Rite-Aid property is underperforming and is likely to close anyway in light of new corporate ownership. By preserving the ability to exit and stop only once to reach Main St., this alternative should be marginally better than **C-3** or **C-4** for North Main retailers.
NW Industrial	Improved visibility, but not necessarily access for current vacant parcels
Outlying East	This alternative's alignment of Nebo arterial could significantly boost development prospects for existing vacant parcels east of the Hospital along 198.
Outlying NW	Faster development timing and pace with higher value upside due to much improved access.
Outlying West	Somewhat improved development prospects as Bamberger Ranch project (here optimized) extends activity west of interstate.
West Interchange	As with other C-alternatives, this configuration would be very disruptive in terms of direct takings, especially on the northern half. The southern portion, on the other hand, would see substantially improved access and visibility for southbound traffic.

Source: Leland Consulting Group, based in part on discussions with Payson city staff and interviews with local stakeholders

Table 13: Likely Consequences by Subarea: C-3 Alternative (Frontage Ramps)

Subarea	C-3 Impacts
198-Commercial	Same as C-1, except for addition of suboptimal 2-stop exit for some visitors arriving by freeway (southbound drivers wanting to exit at Main and northbound drivers wanting to exit at Nebo). While not a major inconvenience in-and-of itself, the additional delay could discourage use of the Main St. exit relative to competing exits at 800 S. and Nebo Beltway.
Bamberger Ranch	Supports well-spaced spine arterial, but sub-optimal traffic flow because of early exit & stop required for northbound I-15 traffic. Development could occur roughly along site plan lines, but scale, timing and intensity would likely be reduced versus **C-1**.
Downtown Main	Similar to **C-1**, with moderately improved development upside due to a faster citywide growth.
Far SW	Negligible differences in relative impacts across alternatives
Interior Residential	Geographic insulation makes direct impacts impossible. Any indirect impacts are likely inconsequential relative to those possible in other subareas.
Near NE	Substantial direct takings from added ramps, but otherwise this alternative should accelerate development potential for this Bamberger-adjacent subarea.
North Main Comm'l	Many direct takings (but see comments on **C-1**). As with **C-4**, the additional inconvenience of a required extra stop for southbound shoppers, may be marginally detrimental to freeway-depended businesses that remain (after direct takings) in this subarea. This alternative is slightly more inconvenient than **C-4** for those drivers, given the added ramp lengths
NW Industrial	Improved visibility, but not necessarily access, for current vacant parcels
Outlying East	Creates substantial shortcut access to I-15 via proposed Nebo Beltway, speeding development of remaining vacant commercial & rent/value growth for existing development.
Outlying NW	Faster development timing and pace with higher value upside due to much improved access.
Outlying West	Minor improvement to development prospects as Bamberger project brings development west of I-15.
West Interchange	As with other C-alternatives, this configuration would be very disruptive in terms of direct takings, especially on the northern half. The southern portion, on the other hand, will see substantially improved access and visibility for southbound traffic.

Source: Leland Consulting Group, based in part on discussions with Payson city staff and interviews with local stakeholders

Table 14: Likely Consequences by Subarea: C-4 Alternative (Split Diamond)

Subarea	C-4 Impacts
198-Commercial	Nebo Beltway "short cut" becomes less beneficial due to closer spacing relative to Main St. exit, but connection between Nebo and 198 should still spur somewhat faster development of existing vacant properties.
Bamberger Ranch	Slower pace of development and somewhat reduced upside to land values, due to shifted Nebo Beltway alignment & inconvenient 2-stop exit flow for northbound I-15 arrivals
Downtown Main	Similar to **C-1**, although upside & pace of growth may be slightly muted by slower-growing Bamberger.
Far SW	Negligible differences in relative impacts across alternatives
Interior Residential	Geographic insulation makes direct impacts impossible. Any indirect impacts are likely inconsequential relative to those possible in other subareas.
Near NE	This alternative is most disruptive for the development potential of the triangle of vacant lands lying adjacent to Bamberger Ranch, north of 900N. Those parcels would be split and reshaped with reduced developable acreage (and uncertain possibility for curb cuts).
North Main Comm'l	Many direct takings (but see comments on **C-1**). May be marginally detrimental to remaining traffic-dependent business given the added stop required for southbound would-be shoppers on I-15 (although it is possible that the shortened access ramp may allow better/sooner visibility for subarea parcels relative to the **C-3** option – mitigating the problem somewhat.)
NW Industrial	May be best alternative, in terms of direct access, for supporting development on vacant parcels in this subarea. That said, the detrimental effects on Bamberger development because of the misaligned Nebo arterial connection, may outweigh new access benefits.
Outlying East	Nebo arterial "short cut" becomes less beneficial due to closer spacing relative to Main St. exit, but connection between Nebo and 198 should still spur somewhat faster development of existing vacant properties.
Outlying NW	Minor improvement to development prospects as Bamberger project brings development west of I-15.
Outlying West	Minor improvement to development prospects as Bamberger project brings development west of I-15.
West Interchange	As with other C-alternatives, this configuration would be very disruptive in terms of direct takings, especially on the northern half. The southern portion, on the other hand, will see substantially improved access and visibility for southbound traffic.

Source: Leland Consulting Group, based in part on discussions with Payson city staff and interviews with local stakeholders

Impacts Due to General Congestion Alleviation

All six considered alternatives are expected to address the underlying problem of increasing congestion (along Main Street in particular, as well as system-wide spill-over delays). Thus, each considered alternative results in positive economic impacts, relative to the No-Build scenario, to the extent that vehicles spend less time stuck in delayed traffic. In terms of relative comparisons across alternatives, however, the economic differences due to congestion relief appear to be somewhat minor. (based on *February 2017 Transportation Technical Report* estimates by Avenue Inc.)

- Applying a blended value-of-time estimate across cars and trucks of $25.80 per hour[4] of delay time, multiplied by 260 typical weekdays per year, the 3,320 hours of daily delay in 2040 under the No Build scenario would represent annual economic costs of $24.6 million
- Congestion is expected to be minimized under the C-1 alternative, with 430 hours of daily vehicle delay, by 2040. R-2 would perform nearly as well, with 460 remaining delay hours.
- Even the worst-performing built alternative, the C-4 split diamond, with 570 hours of remaining daily delays by 2040, represents nearly a six-fold decrease in delay hours over the No Build.
- Projected annual cost avoidance (relative to No Build) is similar across build alternatives, ranging from $20.4 million for C-4 to $21.4 million for C-1.

Taken on an annual basis, this total appears relatively minor in the context of project construction costs and other potential economic impacts (on development potential, for example), but multiplied

Table 15: Impacts of Remaining System-Wide Traffic Delays by Alternative

Alternative		Daily VMT	Daily Vehicle Delay (hr)	Economic Cost of 1 Delay Hour	Total Annual Economic Costs from Annual Weekday Congestion Delay	Annual Cost Avoided vs. No Build (by 2040)
EX	*Existing Condition*	*128,000*	*150*	$28.52	*$1,112,280*	
		Levels by 2040				
NB	No Build	272,000	3,320	$28.52	$24,618,464	$0
I1	Widen Main Street	274,000	520	$28.52	$3,855,904	$20,762,560
R1	Relocate Near	291,000	510	$28.52	$3,781,752	$20,836,712
R2	Relocate Far	290,000	460	$28.52	$3,410,992	$21,207,472
C1	Braided Ramps	291,000	430	$28.52	$3,188,536	$21,429,928
C3	Frontage Roads	289,000	500	$28.52	$3,707,600	$20,910,864
C4	Split Diamond	290,000	570	$28.52	$4,226,664	$20,391,800

Source: Leland Consulting Group, based on traffic modeling estimates from Avenue Inc. and time-value multiplier based on UDOT and HDR work on West Davis Corridor EIS. Hourly economic cost adjusted from 2010 to 2016 dollars using BLS inflation calculator.

[4] Following the method applied in the West Davis Corridor EIS, which arrived at $25.80/hour rate based on conversations with UDOT officials in 2010. While that study multiplied daily delays by 365 to annualize, this analysis multiplies by 260 (annual weekdays), resulting in a more conservative estimate.

CONCLUSIONS

Impacts on Existing Development

Direct Impacts

- By failing to address growing traffic congestion and safety concerns, a No Build scenario is likely to gradually weaken the competitive position of North Main Street businesses, especially relative to shopping options to the south along the 800 South interchange.
- Employment, sales and property values (and related tax revenues) from businesses adjacent to the existing Main Street interchange will all dip, at least temporarily, as a result of direct takings required for construction under all considered alternatives (other than No Build).
- The impact on owners of those affected properties may vary considerably, with some simply choosing to relocate (especially national or chain establishments -- likely either to 800 South or north to Bamberger Ranch) and others opting for permanent closure (more likely for local owner/operators).
- Over the 24-year time horizon of this analysis, however, the overall direct impacts from takings should be fairly minimal in terms of measurable economic indicators, as Utah County's robust growth should ensure continued demand for any relocated firms (or, in the case of closed businesses, sufficient demand to support replacements).
- The extent and nature of takings required for the I-1 alternative, especially along Main Street and Hwy 198, should have more negative economic impacts than other Build alternatives.

Indirect Impacts

- R-1 and R-2, because they require removal of existing ramps, stand to have particularly adverse economic consequences for businesses currently dependent of easy access from I-15 to Main St.
- Any remaining (not relocated or closed) North Main businesses or lots reliant on easy access for freeway traffic – in particular, the Chevron and related convenience store, along with the former truck stop parcel – would become arguably less competitive under the C-3 and C-4 alternatives (relative to C-1, which will require an additional stop and longer exit drive for southbound freeway customers.
- Other substantial indirect impacts on existing developments stem from the extent to which each alternative helps (or hinders) full, timely development of the approved Bamberger Ranch project. While that project may naturally add competition for existing businesses, the new prospect of large scale development should "lift all boats" locally, by adding new rooftop density and generally helping Payson to catch up with the pace of surrounding south Utah County growth.
- This spill-over effect from Bamberger Ranch should be strongest from parcels adjacent to that development, but could potentially extend to Downtown Main Street (especially if supported by strategic redevelopment efforts).
- Numerous additional takings of historic and signature properties along Main and Hwy 198 required by I-1 alternative could constrain the full revitalization potential for Downtown, by degrading the charm and authenticity of that potential gateway approach.

Opportunities for New Development

Direct Impacts

- A number of vacant land properties lie within the footprint of the various considered alternatives, and should result in partial or complete takings to allow for interchange construction. For some, however, development potential will remain, albeit in a different configuration due to added transportation infrastructure.
- Because of the ample volume of vacant land within the study area, the reconfiguration (and even some outright removal) of buildable properties due to takings should have little *net* economic effect on overall development prospects.

Indirect Impacts

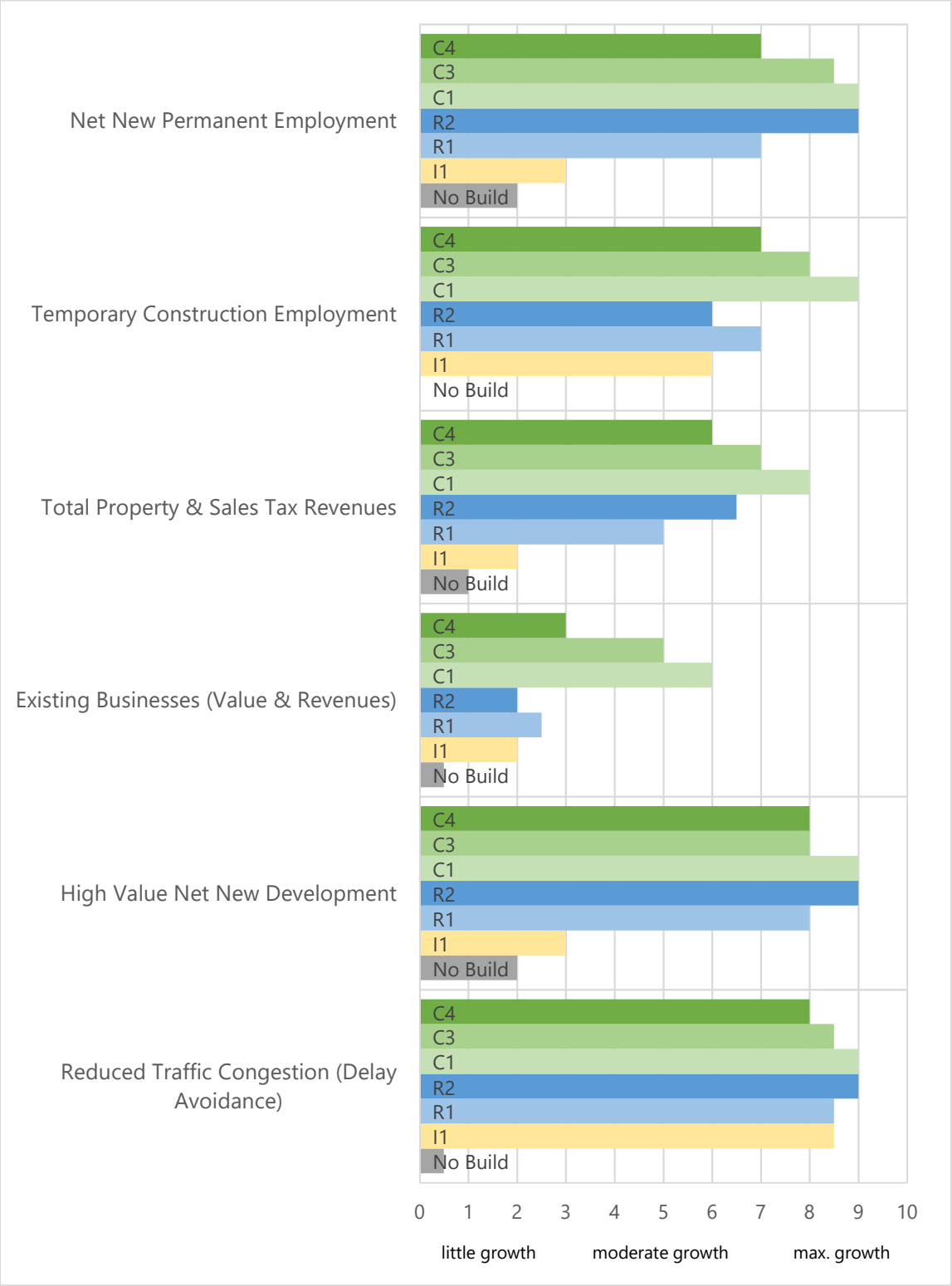
- The C-1 (Braided Ramps) alternative with free-flowing access to and from both Main Street and a new, well-spaced, Nebo arterial road, is the most conducive to ensuring rapid absorption of Bamberger Ranch to the planned mix and density of land uses. R-2 is potentially equally advantageous to Bamberger as C-1
- C-3 (Frontage Roads), by preserving the spacing between Main and Nebo Beltway, can still advance Bamberger towards its envisioned build-out, but the loss of free-flowing ingress and egress slow development and constrain value up-side, at least relative to C-1.
- C-4 (Split Diamond) and R-1 could still allow for eventual development of Bamberger, but compromised spacing of the Nebo Beltway "spine" will require site redesign and likely constrain attainable property values and rents for the important western portion of that development.
- Both R-1 and (especially) R-2 have the potential to seriously damage property values and redevelopment prospects for the North Main subarea, due to the relocation of currently convenient Main St. ramps.
- Both I-1 and No Build threaten to derail or at least seriously delay Bamberger, as currently conceived, by failing to provide the primary arterial connection. As such, those scenarios also increase the competitive threat from potential similar large-scale projects in the area (particularly in Salem).
- Development prospects for Bamberger-adjacent properties should rise or fall in general accordance with Bamberger itself. A possible exception includes certain parcels that would gain Nebo Beltway frontage at the expense of Bamberger Ranch under C-3 and R-2. The frontage in question (south side of Nebo Beltway, near I-15) is part of the highest value portion of Bamberger Ranch current site plans – value probably optimized under a coordinated site plan rather left to develop under fragmented ownership).
- Development prospects, under I-1, for vacant infill land elsewhere in the study area should generally improve along with general growth of Payson's economy.

SUMMARY OF OVERALL STUDY AREA ECONOMIC IMPACTS

Table 16: Recap of Key Factors Influencing Summary of Impacts

Congestion Relief	New Development	Existing Development	Property & Sales Tax	Construction Employment	Permanent Employment
All alternatives provide significant relief vs. No-Build C-1 has smallest remaining daily delays, but differences across alternatives is minimal	Bamberger Ranch is by far the most salient potential new development and, if developed in full, should support future demand for other, smaller developments C-1 and R-2 provide optimal support for Bamberger Ranch (accelerates build and ensures favorable alignment of Nebo Beltway) C-3 and R-1 are favorable to Bamberger, but less so than C-1, due do addition of frontage road stops (C-3) or tight spacing (R-1) C-4 combines tight spacing *and* additional stops I-1 is potentially very harmful to Bamberger timing, pace and value	Demand from continued regional growth should ensure local replacement of most closed or relocated existing businesses Alternatives benefitting full Bamberger build-out should, in turn, benefit most standing businesses (especially along Main St., but also along Hwy 198). Addition of frontage stops (C-3, C-4) have potential minor negative impact on N. Main businesses Removal of Main St. exits (R-1, R-2) is potentially very detrimental to N. Main (and surrounding) properties	Impacts on fiscal revenue flows are generally a function of new development (timing, pace and value) and performance of existing businesses, discussed at left. For the study area under consideration, future development is weighted somewhat more heavily than existing businesses.	Temporary jobs, generally a linear function of project costs, currently estimated at: I-1 $105M R-1 $144M R-2 $108M C-1 - $180M C-3 - $155M C-4 - $141M	Generally, a function of the performance of new and existing development with non-residential components. Due to the potential scale of fully-realized Bamberger Ranch development and relatively moderate net long-term impacts to existing businesses, prospects for overall study area permanent employment is largely driven by impacts on Bamberger

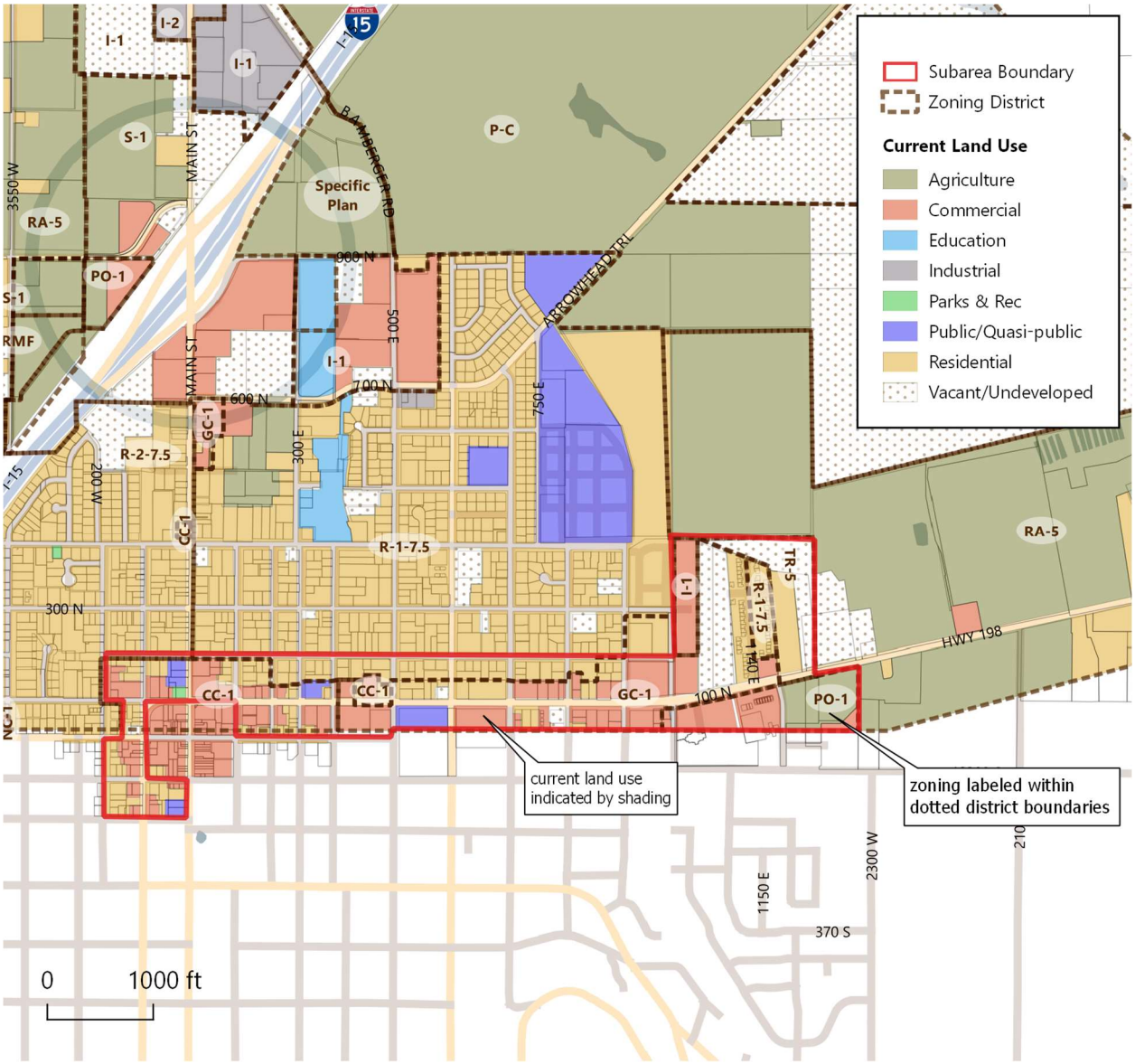
Figure 8: Expected Change in Study Area Economic Attributes (through 2040)



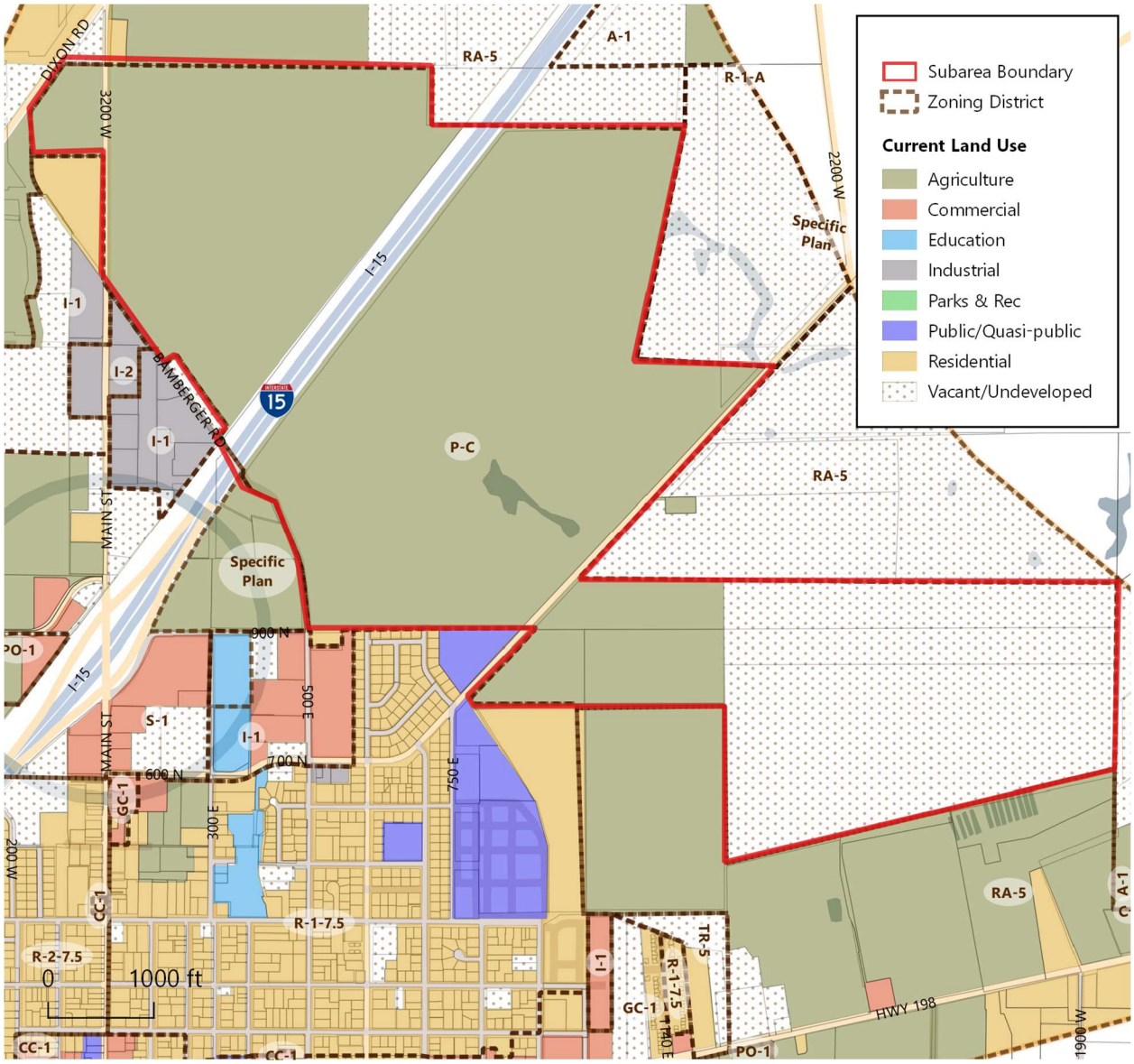
APPENDIX 1: ZONING AND LAND USE BY SUBAREA

Each page in this appendix corresponds to one of the 12 analytic subareas within the overall study area. For each, the subarea boundary is outlined over a shaded current land use map, with zoning districts demarcated and labeled

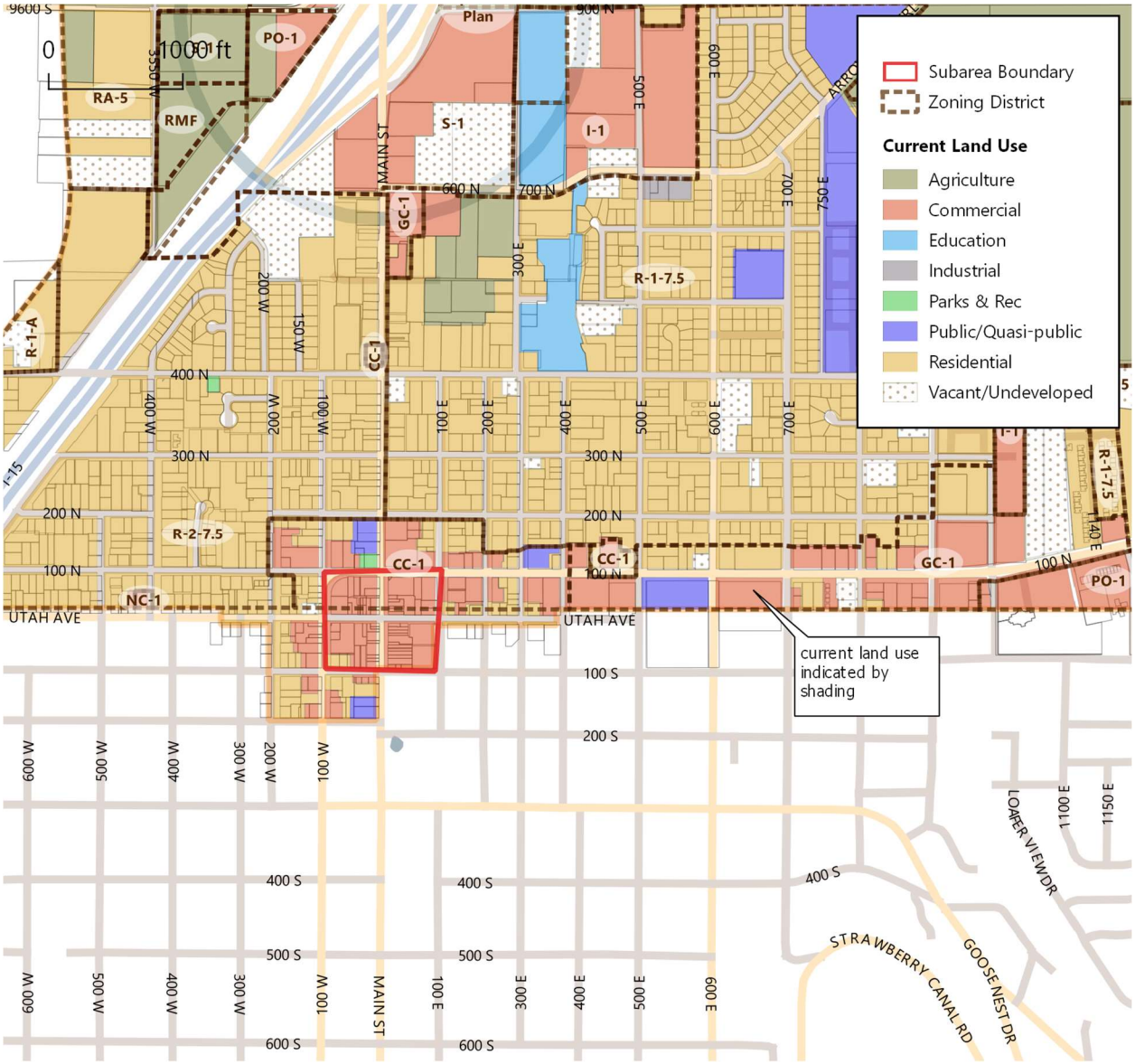
198 Commercial Subarea, Land Use & Zoning



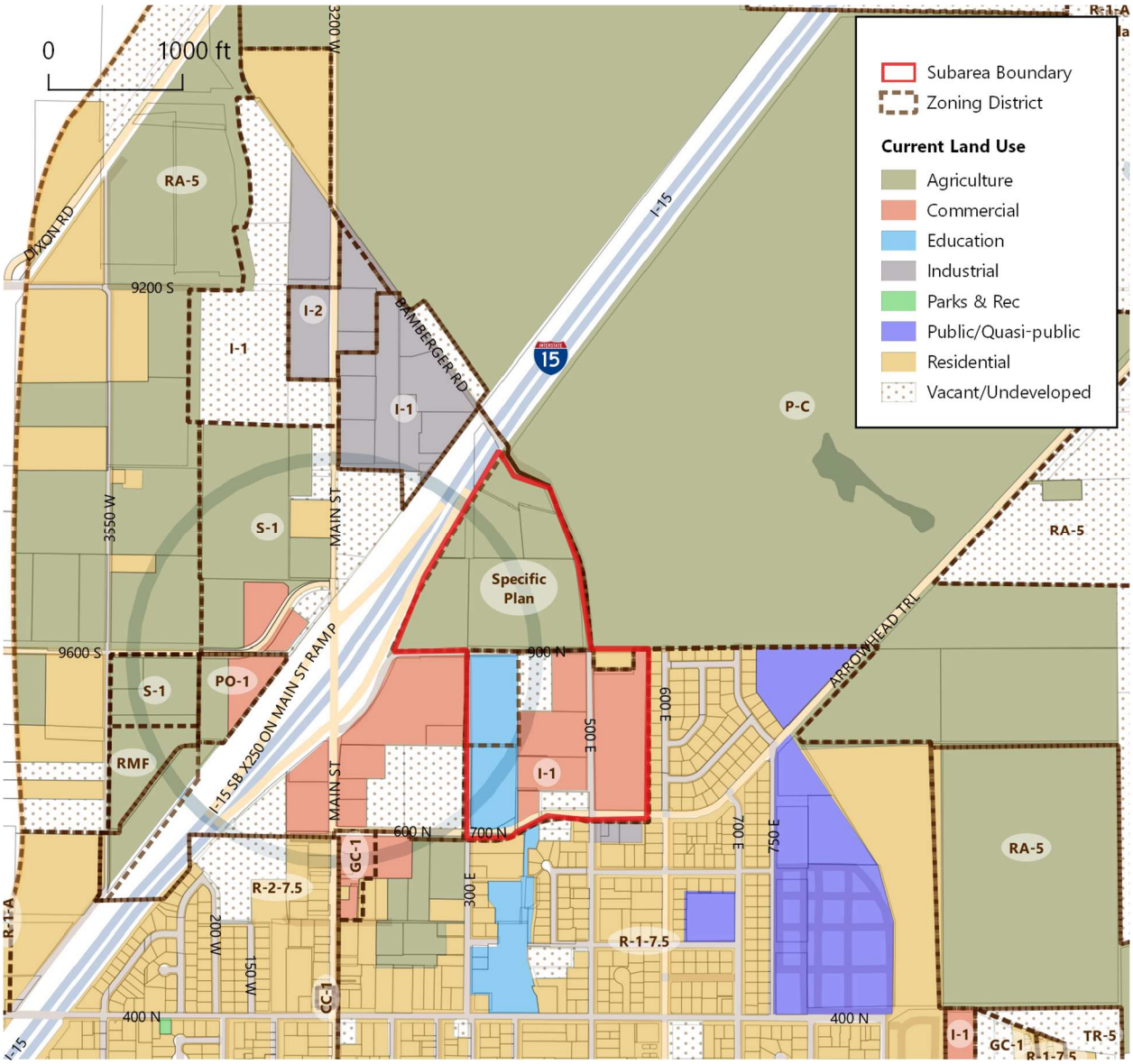
Bamberger Ranch Subarea, Land Use & Zoning



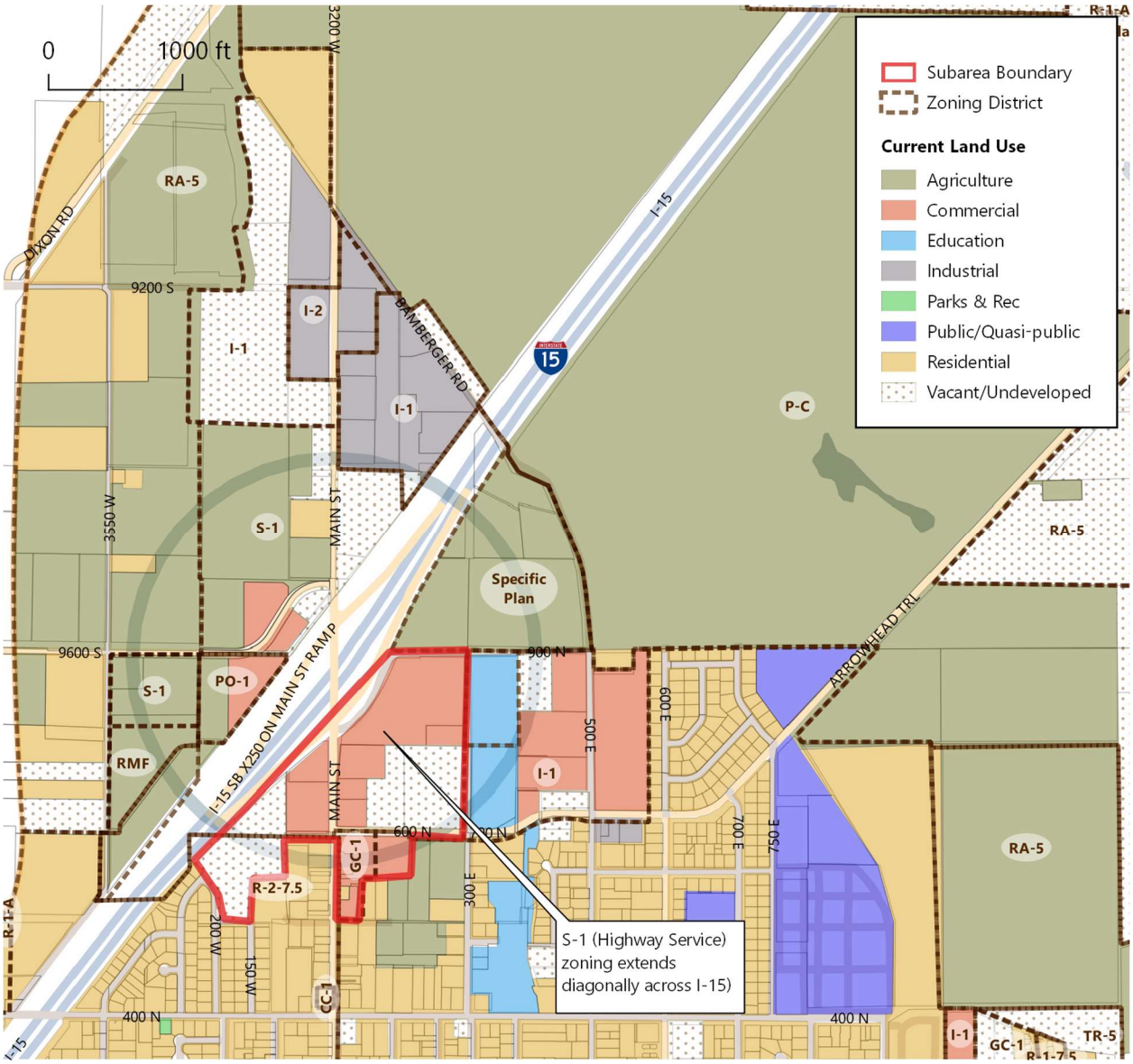
Downtown Main Street Subarea, Land Use & Zoning



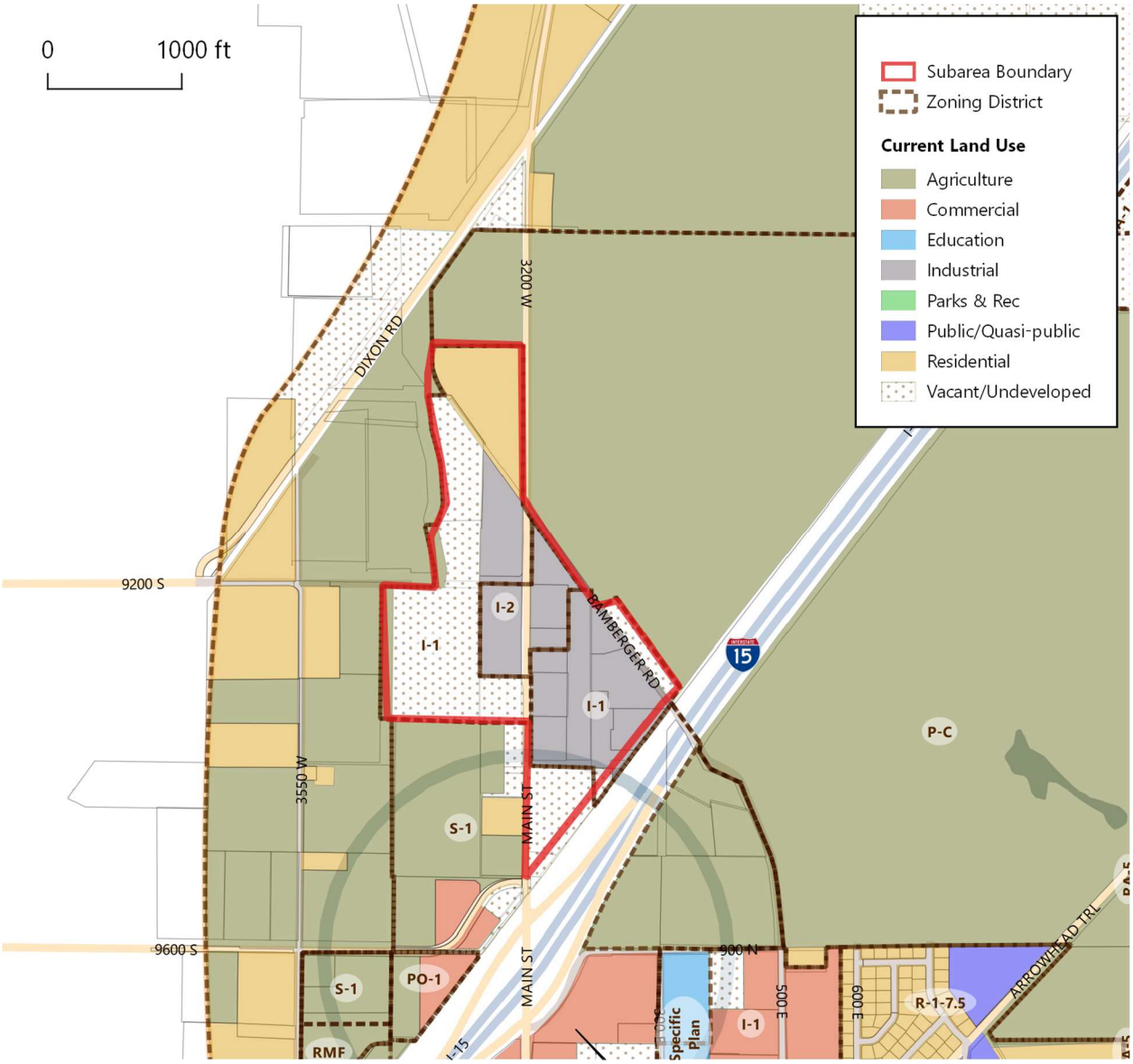
Near Northeast Subarea, Land Use & Zoning



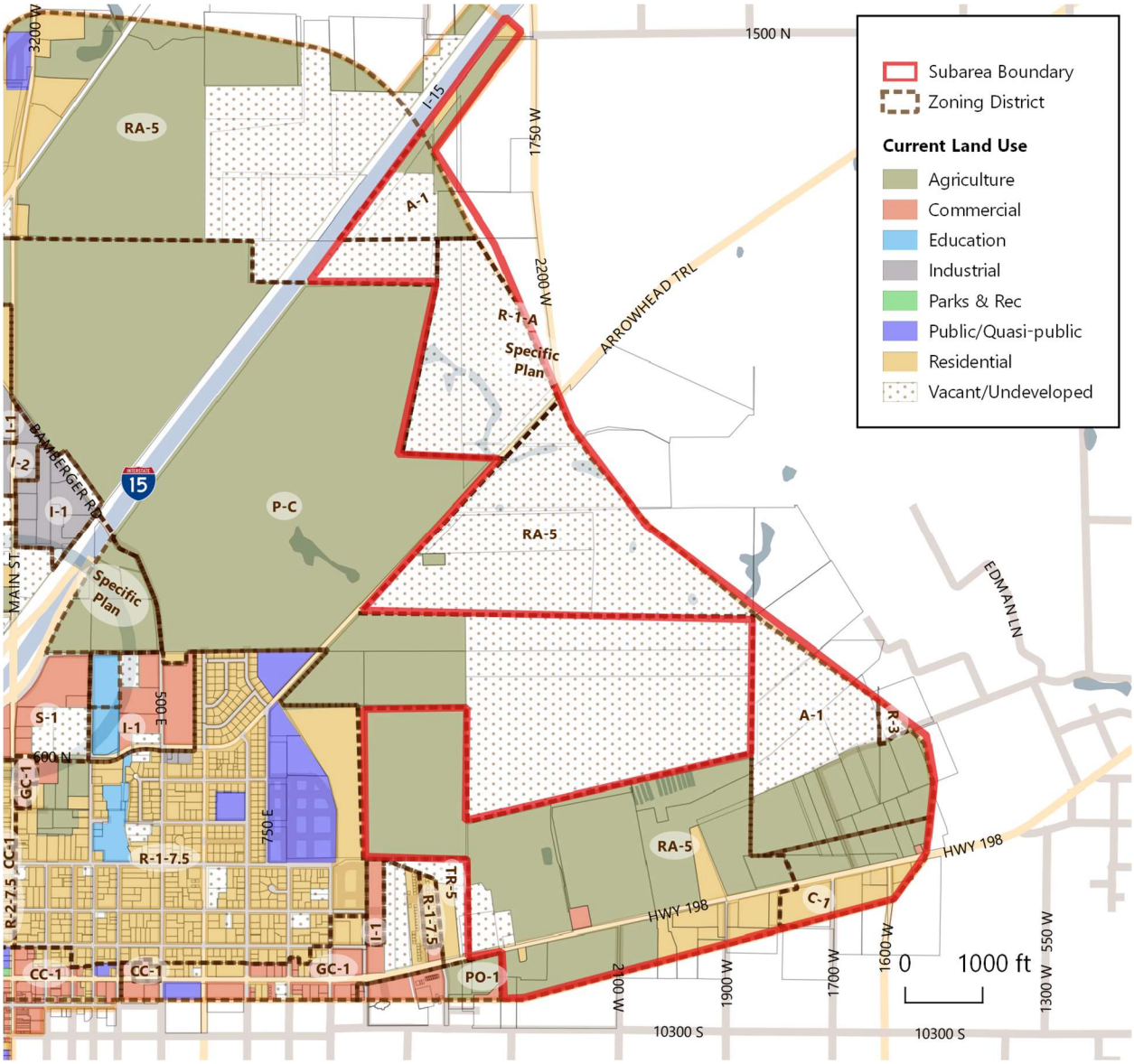
North Main Subarea, Land Use & Zoning



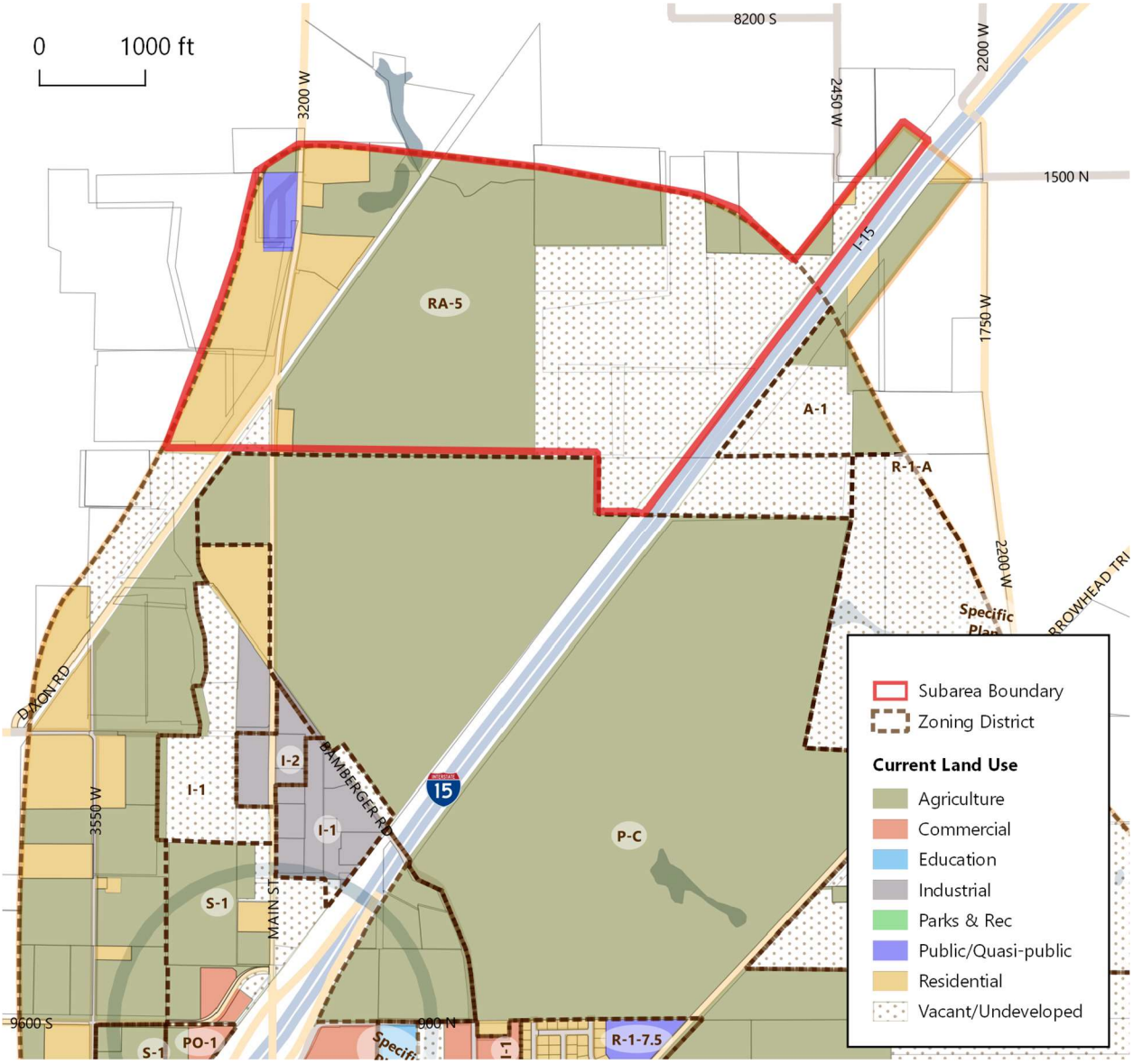
Northwest Industrial Subarea, Land Use & Zoning



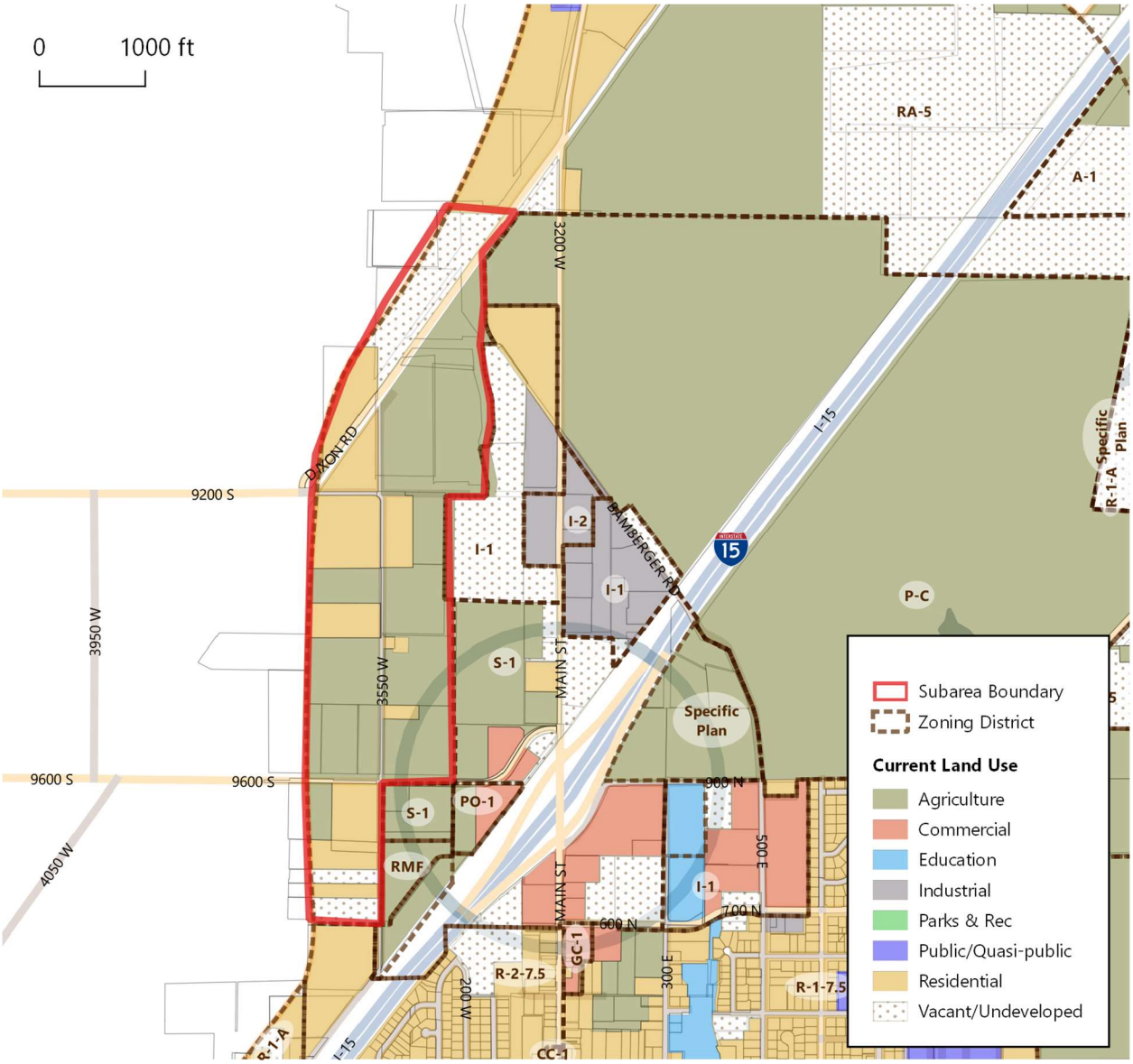
Outlying East Subarea, Land Use & Zoning



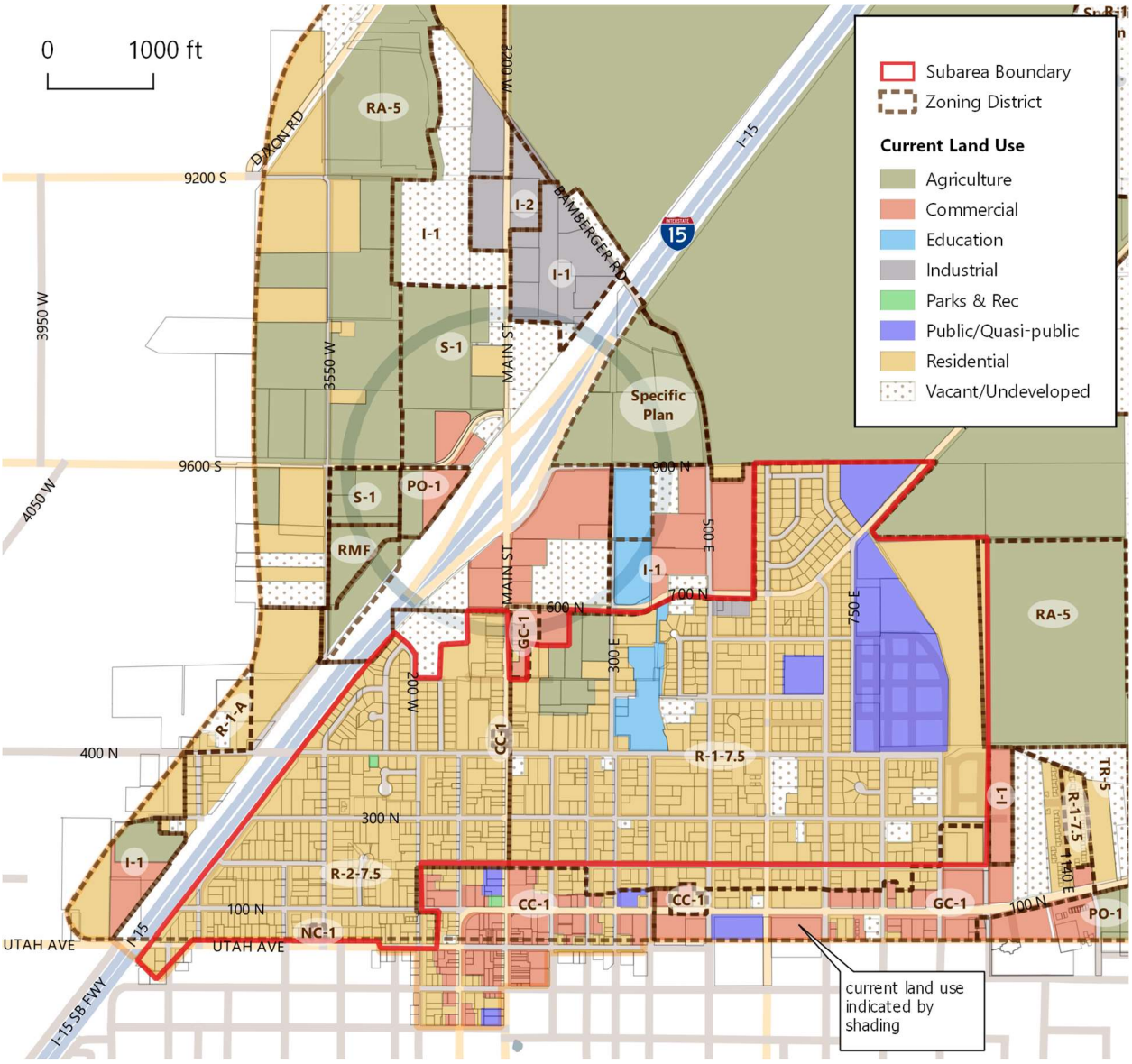
Outlying Northwest Subarea, Land Use & Zoning



Outlying West Subarea, Land Use & Zoning

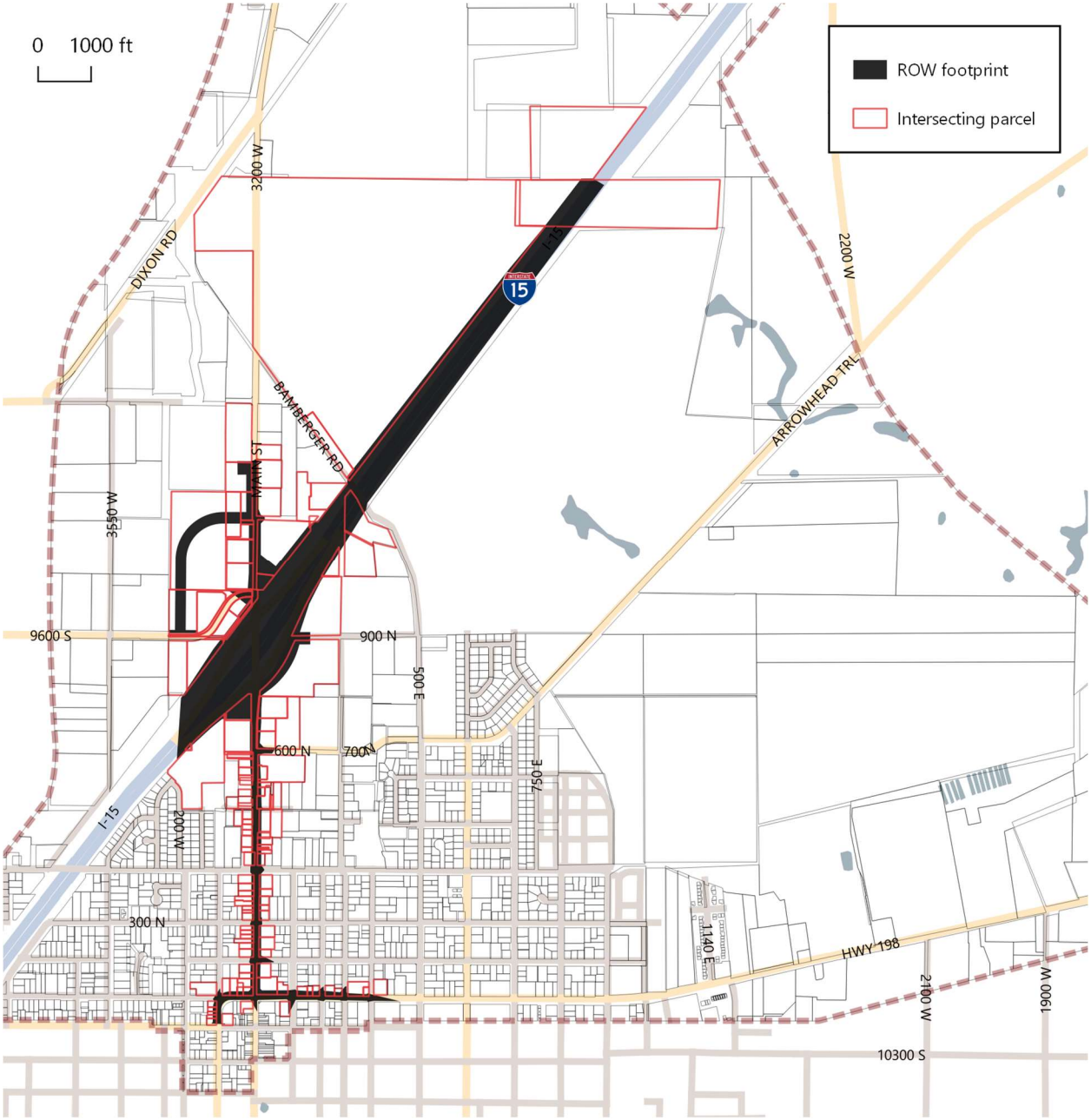


Residential Interior Subarea, Land Use & Zoning



APPENDIX 2: RIGHT-OF-WAY FOOTPRINTS BY ALTERNATIVE, SHOWING INTERSECTING PARCELS

I1 – Improved Existing



C1 – Braided Ramps

C3 - Frontage Ramps

C4 – Split Diamond

APPENDIX B
TECHNICAL REPORTS

WILDLIFE INVENTORY REPORT I-15 PAYSON MAIN STREET INTERCHANGE ENVIRONMENTAL IMPACT STATEMENT

Wildlife Inventory Report

I-15 Payson Main Street Interchange EIS

UDOT Project No. F-I15-6(214)251; PIN 10263

Utah County, Utah

June 2016

Prepared for:

Lochner Engineering
1245 East Brickyard Road, Suite 400
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1.0 INTRODUCTION

A wildlife survey was conducted on March 31 and April 1, 2015 for a potential new interchange on Interstate 15 (I-15) in Payson, Utah (Appendix A: Map 1). This wildlife report was prepared for Lochner Engineering who is providing environmental and engineering services for the Utah Department of Transportation on the project. The project area is located in the vicinity of the existing Payson Main Street interchange on I-15, and includes mostly agricultural lands with a few residential areas. The project area includes numerous wetland areas and one natural stream, Beer Creek.

2.0 WILDLIFE

2.1 THREATENED AND ENDANGERED SPECIES

Table 2-1 includes the USFWS list of the three threatened and endangered wildlife and fish species that could potentially occur on the project area (USFWS IPaC, Appendix B). The Project area is within the potential geographic distribution for western yellow-billed cuckoo (*Coccyzus americanus*), June sucker (*Chasmistes liorus*), and Canada lynx (*Lynx canadensis*).

Table 2-1. USFWS list of threatened and endangered species with the potential to occur in the project area (USFWS IPaC)**.**

Common Name	Scientific Name	Status	Potential to Occur in the Project Area
Western yellow-billed cuckoo	*Coccyzus americanus*	Threatened	No; no suitable habitat in the project area
June sucker	*Chasmistes liorus*	Endangered	No; no suitable habitat in the project area
Canada lynx	*Lynx canadensis*	Threatened	No; no suitable habitat in the project area

2.1.1 Yellow-billed Cuckoo

Yellow-billed cuckoo is a USFWS threatened species. The yellow-billed cuckoo is known or believed to occur in the western US, including Utah, and north into Canada and south into Mexico (USFWS 2011). The Yellow-billed Cuckoo's habitat preference includes forested stream sides dominated by cottonwood and willow species that is composed of dense, low, shrubby vegetation. The project area is on the fringe of the yellow-billed cuckoo breeding range in Utah and deviates from habitat requirements documented in published scientific

literature. In Utah, yellow-billed cuckoos use and nest within areas comprised of small cottonwood galleries with an understory of Russian olive (*Elaeagnus angustifolia*) with occasional inclusions of tamarisk (*Tamarisk ramosissima)* (Howe 2013 and Maxfield 2013). Yellow-billed cuckoos have also been documented in Utah using Russian olive stands with no over-story (Maxfield 2013).

2.1.2 June Sucker

The June sucker is listed as an endangered species. This species is endemic to Utah Lake and the Provo River, and nowhere else in the world.

2.1.3 Canada Lynx

Canada lynx is listed as a threatened species. This species is associated with montane coniferous forests dominated by spruce and fir species. The Canada lynx is a highly specialized predator of snowshoe hares and requires large, contiguous forest habitats that support snowshoe hare populations (USFWS 2014).

2.1.4 Critical Habitat

There is no designated or proposed critical habitat on or near the project area.

2.2 UTAH SENSITIVE SPECIES

Table 2-2 lists the one State Sensitive Species that was identified by the Utah Division of Wildlife Resources (UDWR) as having occurred within a 2-mile radius of the project area. The letter from the UDWR documenting the records search of the Natural Heritage Database is provided in Appendix C.

Table 2-2. Utah Sensitive Species records of occurrence on or near the project area.

Common Name	Scientific Name	Location	Potential to Occur in the Project Area
Leatherside Chub	*Lepidomeda aliciae*	Within 2 miles of project area	Low; marginal habitat in the project area

2.3 RAPTORS

Table 2-3 includes the USFWS list of the eight species of raptors that could potentially occur in the project area (USFWS IPaC, Appendix B). The project area is within the potential geographic distribution for all eight species.

Table 2-3. USFWS list of raptor species with the potential to occur in the project area.

Common Name	Scientific Name	Season	Potential to Occur in the Project Area
Bald eagle	*Haliaeetus leucocephalus*	Wintering	Low; no roosting or foraging habitat on site
Burrowing owl	*Athene cunicularia*	Breeding	Low; no nesting habitat on site, possible to use site for foraging
Ferruginous hawk	*Buteo regalis*	Year-round	Low; marginal nesting habitat on site, possible to use site for foraging
Flammulated Owl	*Otis flammeolus*	Breeding	Low; no suitable habitat on or near site
Golden eagle	*Aquila chrysaetos*	Year-round	Low; marginal nesting habitat on site, possible to use site for foraging
Peregrine falcon	*Falco peregrinus*	Year-round	Low; no nesting habitat on site, possible to use site for foraging
Short-eared owl	*Asio flammeus*	Wintering	Medium; potential foraging area
Swainson's hawk	*Buteo swainsoni*	Breeding	Medium; nesting available in Russian olive, potential foraging area

Raptors (eagles, hawks, owls, etc.) are migratory birds and are protected under several federal and state legal mandates, the most important being the Migratory Bird Treaty Act (MBTA), 16 U.S.C. 703-712, but also the Eagle Protection Act; 16 U.S.C. 668, the Endangered Species Act (ESA); 16 U.S.C. 1513-1543, and The Wildlife Resources Code of Utah; Title 23, Utah State Code. These laws apply to federal, state, tribal and private land.

In order to allow development and manage raptors protected under these laws, federal, tribal, and state agencies in Utah have developed comprehensive guidelines specific to Utah. The document is referred to as the Utah Raptor Guidelines (Romin 2002) and is included in Appendix D. In order to protect raptors and at the same time and allow development, spatial and seasonal buffers were developed. Surveys are required within these spatial buffers to locate any raptor nests and monitor these nests during the nesting

season. Any nest that is or becomes occupied during the nesting season is afforded protection from disturbance within the spatial buffer.

The spatial buffers for the most commonly nesting raptors in Utah is either ¼ or ½ mile. The start of the nesting season is generally early February for great-horned owls, late March for hawks, to late April or early May for Swainson's hawks and burrowing owls. The nesting season ends the end of August for most of the common raptors.

The spatial and seasonal buffers only apply to occupied raptor nests. Therefore it is important to monitor raptor nests throughout the nesting season to determine if a raptor nest is occupied anytime during the nesting season. Consultation with federal state and tribal agencies are required for raptor nesting issues. The wildlife surveys conducted for this project included locating raptor nests within the project area and within the surrounding buffer.

Exceptions may be granted for occupied raptor nests if there are extenuating circumstances such as: a raptor moves in during construction which may show that the individual has some level of tolerance to disturbance (commonly red-tailed and Swainson's hawks), or a nest that is close to the limit of the spatial buffer is occupied and there are some visual barriers so that the nest is not in direct line-of-sight of the development. The agency may require some monitoring of nests granted an exception.

2.4 Migratory Birds

Table 2-4 contains the seventeen species of migratory birds that appear on the USFWS IPaC list (Appendix B). The eight species of raptors listed in Table 2-3 are also considered migratory birds and are protected under the Migratory Bird Treaty Act.

The Migratory Bird Treaty Act makes it illegal for anyone to take, possess, import, export, transport, sell, purchase, barter, or offer for sale, purchase, or barter, any migratory bird, or the parts, nests, or eggs of such a bird except under the terms of a valid permit issued pursuant to Federal regulations. The migratory bird species protected by the Act are listed in 50 CFR 10.13. The U.S. Fish and Wildlife Service (USFWS) has developed a document titled "Migratory Bird Conservation Actions for Projects to Reduce the Risk of Take during the Nesting Season" which is provided in Appendix E.

Table 2-4. USFWS list of migratory bird species with the potential to occur in the project area.

Common Name	Scientific Name	Season	Status
Black Rosy-finch	*Leucosticte atrata*	Year-round	Bird of conservation concern
Brewer's Sparrow	*Spizella breweri*	Breeding	Bird of conservation concern

Calliope Hummingbird	*Stellula calliope*	Breeding	Bird of conservation concern
Cassin's Finch	*Carpodacus cassinii*	Year-round	Bird of conservation concern
Eared Grebe	*Podiceps nigricollis*	Breeding	Bird of conservation concern
Fox Sparrow	*Passerella iliaca*	Breeding	Bird of conservation concern
Greater Sage-grouse	*Centrocercus urophasianus*	Year-round	Bird of conservation concern
Loggerhead Shrike	*Lanius ludovicianus*	Year-round	Bird of conservation concern
Long-billed Curlew	*Numenius americanus*	Wintering	Bird of conservation concern
Olive-sided Flycatcher	*Contopus cooperi*	Breeding	Bird of conservation concern
Pinyon Jay	*Gymnorhinus cyanocephalus*	Year-round	Bird of conservation concern
Sage Thrasher	*Oreoscoptes montanus*	Breeding	Bird of conservation concern
Snowy Plover	*Charadrius alexandrinus*	Breeding	Bird of conservation concern
Virginia Warbler	*Vermivora virginiae*	Breeding	Bird of conservation concern
Western Grebe	*Amophorus occidentalisech*	Breeding	Bird of conservation concern
Williamson's Sapsucker	*Sphyrapicus thyroideus*	Breeding	Bird of conservation concern
Willow Flycatcher	*Empidonax traillii*	Breeding	Bird of conservation concern

3.0 WILDLIFE RESULTS

3.1 THREATENED AND ENDANGERED SPECIES

3.1.1 Yellow-billed Cuckoo

There is no suitable habitat within the project area or in the vicinity for yellow-billed cuckoos. The few scattered Russian olive trees within the project area are not suitable habitat and there is no suitable habitat surrounding the project area. There are no known historical occurrences of yellow-billed cuckoos in the immediate area (UDWR, Appendix C).

3.1.2 June Sucker

There is no suitable habitat within the project area. There are no known historical occurrences of June suckers in the immediate area (UDWR, Appendix C).

3.1.3 Canada Lynx

There is no suitable habitat within the project area or in the vicinity. There are no known historical occurrences of Canada lynx in the immediate area (UDWR, Appendix C).

3.1.4 Critical Habitat

There is no designated or proposed critical habitat on or near the project area (USFWS, Appendix B).

3.2 UTAH SENSITIVE SPECIES

3.2.1 Leatherside Chub

There is marginal habitat within the project area for the leatherside chub in Beer Creek. Beer Creek is on the northern end of the project area and a large portion of Beer Creek in the project area is in a culvert under I-15. Leatherside chubs occur in streams with a broad range of temperatures and have habitat requirements of healthy riparian vegetation and intact streambanks (UDWR 2010). The banks of Beer Creek within the project area are incised and unstable, and do not support any woody riparian vegetation.

3.3 RAPTORS

There are no previously recorded raptor nests within one mile of the project area according to the Utah Natural Heritage Database (UDWR, Appendix C). However, one raptor nest was located during the site survey in 2015, and it appeared to be occupied (Appendix A, Map 2). The nest is located in a cottonwood tree within the ½-mile buffer around the project area that is required for raptor nest surveys. The nest was in good condition. Based upon the size of the nest, it was possibly used by a buteo (red-tailed hawk or Swainson's hawk) or an owl (great horned owl, short-eared owl). The site does provide suitable nesting habitat for ground nesting raptors (northern harrier) but there is no suitable burrowing owl nesting habitat within the project area or within the ¼-mile buffer around the project area that is required for burrowing owl surveys.

There are no documented raptor sightings on or near the project area in the Utah Natural Heritage Database (UDWR, Appendix C). Red-tailed hawk, northern harrier, and American kestrel were observed on-site during the site survey.

The one raptor nest located within ½-mile of the project area could potentially become active each year as early as December (if used by a great horned owl) or later in the nesting

season and could remain active until the end of August (Utah Raptor Guidelines, Appendix D). These guidelines were developed for the entire state of Utah, but great horned owls likely don't start nesting in northern Utah until January. Therefore, if project activities occur between January and August, a survey for nesting raptors should be conducted according to the Utah Raptor Guidelines (Appendix D) to prevent "take" under the Migratory Bird Treaty Act (Appendix E).

3.4 MIGRATORY BIRDS

The project area does contain suitable habitat for some of the non-raptor migratory birds listed in Table 2-4. Table 3-1 list the species that potentially occur on the project area by habitat and their potential to occur on the project area.

It would be best to begin construction between September and mid-March when most migratory birds are not breeding and nesting. If project activities begin between mid-March and August, then a survey for migratory bird nests should be conducted to prevent "take" under the Migratory Bird Treaty Act (Appendix E).

Table 3-1. Non-raptor migratory birds and their potential to occur on the project area.

Common Name	Breeding Habitat	Winter Habitat	Potential to Occur in the Project Area
Black Rosy-finch	Alpine	Grasslands	Low, minimal grasslands on site
Brewer's Sparrow	shrubsteppe	Migrant	Low, minimal habitat present on site
Calliope Hummingbird	Mountain riparian, Mountain shrub	Migrant	No, no mountain habitats on site
Cassin's Finch	Aspen, Sub-alpine	Lowland riparian	No, no suitable habitat on site
Eared Grebe	Wetland, Water	Water	Low, marginal habitat on site
Fox Sparrow	Mountain riparian, Mountain shrub	Migrant	No, no mountain habitats on site
Greater Sage-grouse	Shrubsteppe	Shrubsteppe	Low, Minimal habitat present on site
Loggerhead Shrike	High desert scrub, Pinyon-juniper	High desert scrub	No, no suitable habitat on site
Long-billed Curlew	Grassland, Agriculture	Migrant	Medium, Habitat present on site
Olive-sided Flycatcher	Sub-alpine conifer, Ponderosa pine	Migrant	No, no suitable habitat on site
Pinyon Jay	Pinyon-juniper, Ponderosa pine	Pinyon-juniper	No, no suitable habitat on site
Sage Thrasher	Shrubsteppe, High desert scrub	Migrant	Low, marginal habitat on site
Snowy Plover	Playa	Migrant	No, no suitable habitat on site
Virginia Warbler	Northern oak, Pinyon-juniper	Migrant	No, no suitable habitat on site
Western Grebe	Wetlands, Water	Migrant	Low, marginal habitat on site
Williamson's Sapsucker	Sub-alpine conifer, Aspen	Migrant	No, no suitable habitat on site
Willow Flycatcher	Riparian	Migrant	No, no suitable habitat on site

4.0 REFERENCES

Howe, F. 2013. Personal communication with Glen Gantz. November 2013.

Maxfield, B. 2013. Personal communication with glen Gantz. November 2013.

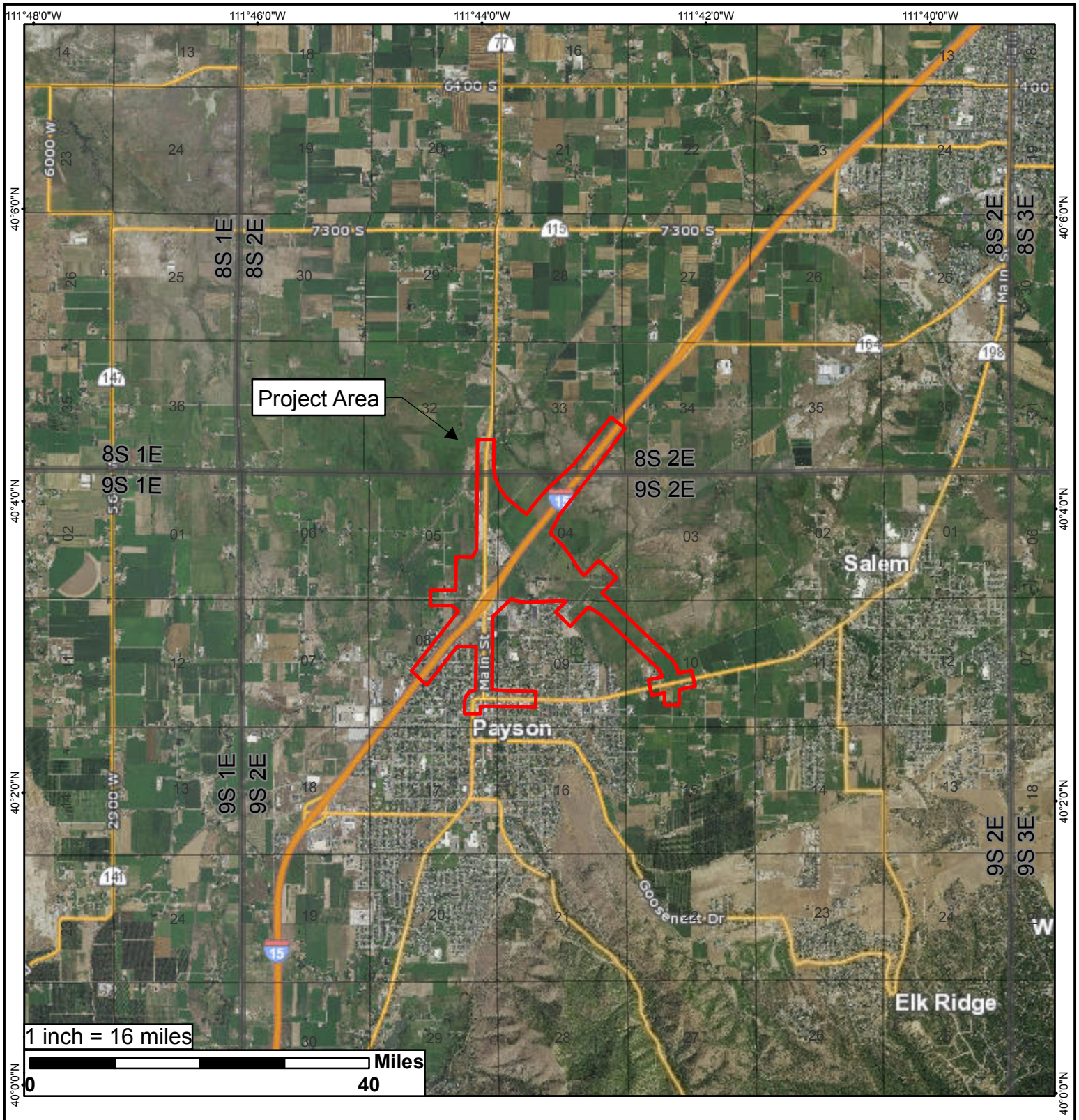
Romin, L. and J. Muck. 2002. Utah Field Office Guidelines for Raptor Protection from Human and Land Use Disturbances. U.S. Fish and Wildlife Service. Salt Lake City, Utah. 42pp

UDWR. 2010. Conservation Agreement and Strategy for Southern Leatherside (*Lepidomeda aliciae*) in the State of Utah. Publication Number 10-19

USFWS. 2014. Endangered and Threatened Wildlife and Plants; Revised Designation of Critical Habitat for the Contiguous United States Distinct Population Segment of the Canada Lynx and Revised Distinct Population Segment Boundary; Final Rule. Federal Register Vol. 79 No. 177 (September 12, 2014), pp. 54782.

USFWS. 2011. U.S. Fish and Wildlife Service (USFWS) Utah Field Office Guidelines for Conducting and Reporting Botanical Inventories and Monitoring of Federally Listed, Proposed and Candidate Plants. Memorandum dated August 31, 2011. Utah Field Office, Salt Lake City, Utah.

APPENDIX A - Maps



Project Location

I-15;
Payson Interchange

Sections 32, 33, 34
in T8S, R2E
Sections 4, 5, 8, 9, 10
in T9S, R2E

Legend

Project Area

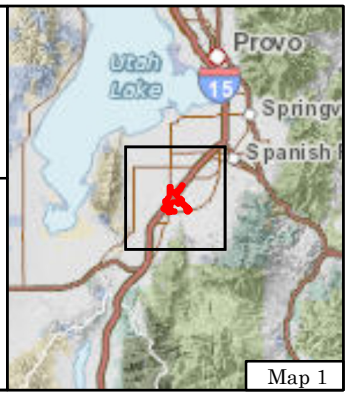
Projection:
NAD 83 UTM Zone 12N

Source:
Utah AGRC Basemap-Hybrid

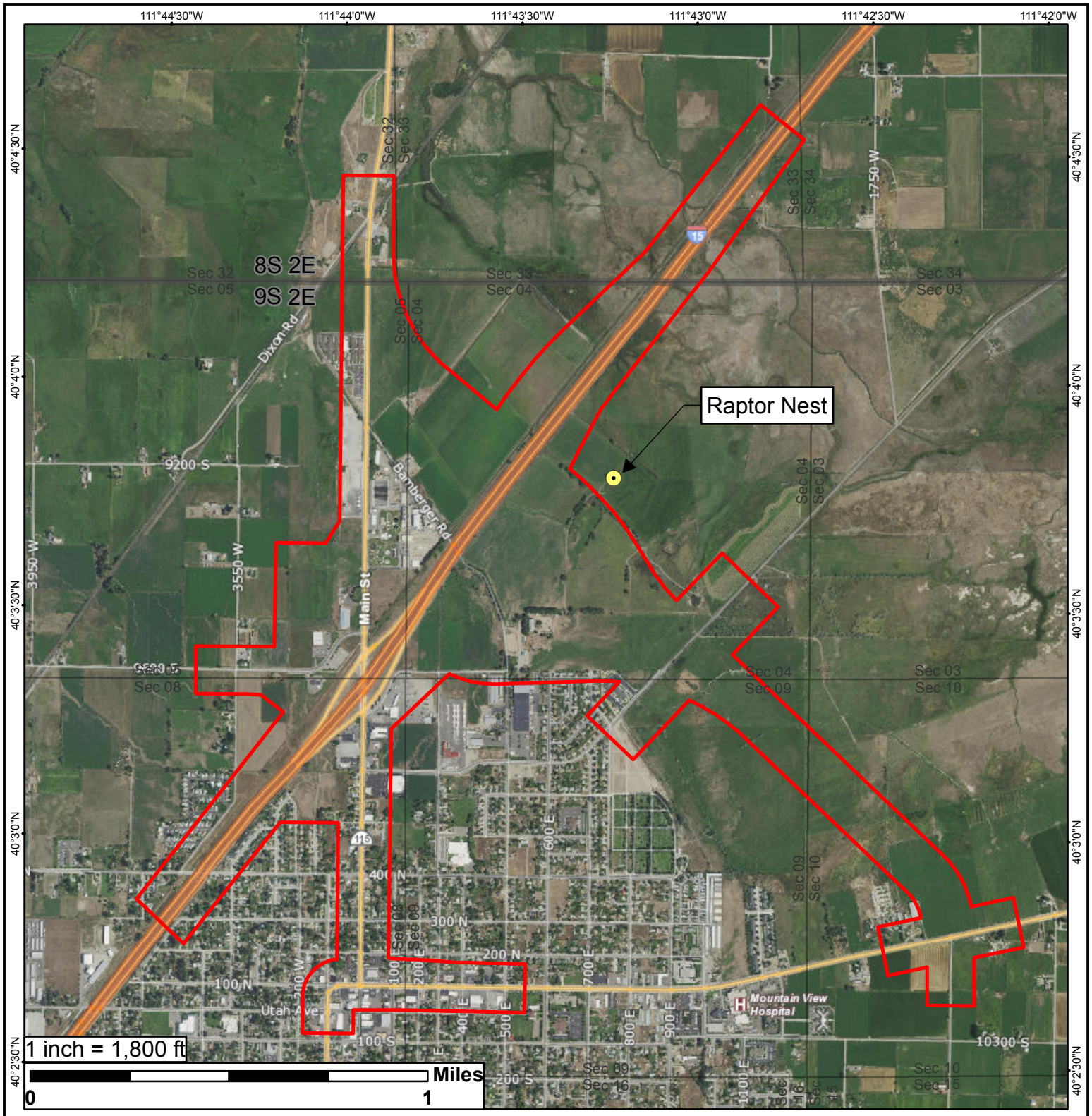
Survey Performed by
Glen Gantz

Wetland Resources, Inc.

Created: 6/16/2016
Author: CMM



Map 1



Survey Results

I-15;
Payson Interchange

Sections 32, 33, 34
in T8S, R2E
Sections 4, 5, 8, 9, 10
in T9S, R2E

Legend

- Project Area
- Raptor Nest

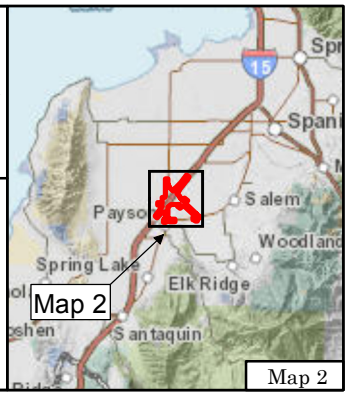
Projection:
NAD 83 UTM Zone 12N

Source:
Utah AGRC Basemap-Hybrid

Survey Performed by
Glen Gantz

Wetland Resources, Inc.

Created: 6/16/2016
Author: CMM



Map 2

APPENDIX B - IPaC Trust Resource Report

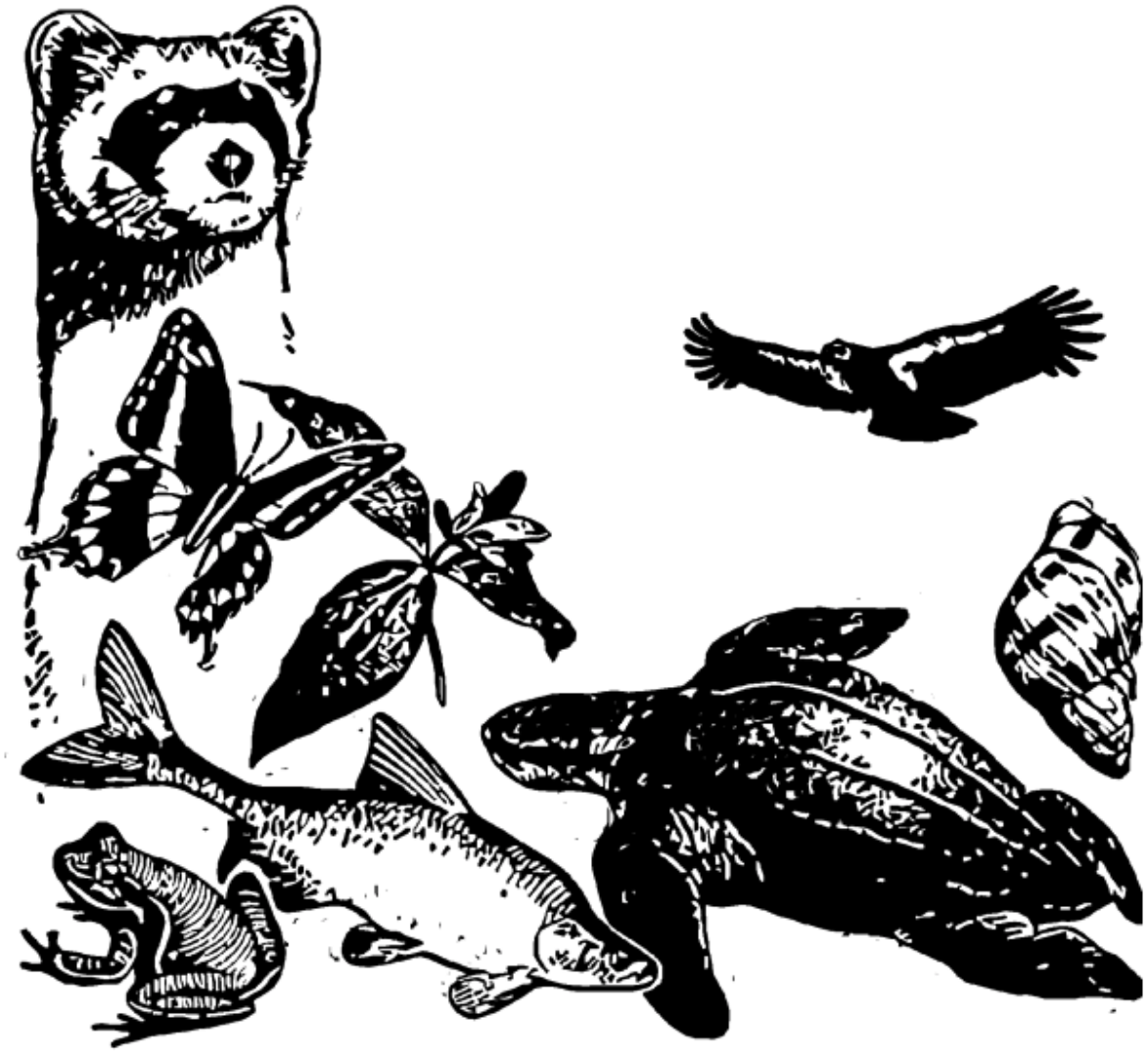
U.S. Fish & Wildlife Service

I-15 Payson Interchange

IPaC Trust Resources Report

Generated May 24, 2016 12:44 PM MDT, IPaC v3.0.7

This report is for informational purposes only and should not be used for planning or analyzing project level impacts. For project reviews that require U.S. Fish & Wildlife Service review or concurrence, please return to the IPaC website and request an official species list from the Regulatory Documents page.



IPaC - Information for Planning and Conservation (https://ecos.fws.gov/ipac/): A project planning tool to help streamline the U.S. Fish & Wildlife Service environmental review process.

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Wetlands 8

U.S. Fish & Wildlife Service

IPaC Trust Resources Report

NAME

I-15 Payson Interchange

LOCATION

Utah County, Utah

IPAC LINK

https://ecos.fws.gov/ipac/project/6ODK6-WFP7R-HTHMT-J4OHP-LN3YAM

U.S. Fish & Wildlife Service Contact Information

Trust resources in this location are managed by:

Utah Ecological Services Field Office
2369 West Orton Circle, Suite 50
West Valley City, UT 84119-7603
(801) 975-3330

Endangered Species

Proposed, candidate, threatened, and endangered species are managed by the Endangered Species Program of the U.S. Fish & Wildlife Service.

This USFWS trust resource report is for informational purposes only and should not be used for planning or analyzing project level impacts.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list from the Regulatory Documents section.

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 either from the Regulatory Documents section in IPaC or from the local field office directly.

The list of species below are those that may occur or could potentially be affected by activities in this location:

Birds

Yellow-billed Cuckoo Coccyzus americanus — Threatened

CRITICAL HABITAT
There is **proposed** critical habitat designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B06R

Fishes

June Sucker Chasmistes liorus — Endangered

CRITICAL HABITAT
There is **final** critical habitat designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=E050

Flowering Plants

Ute Ladies'-tresses Spiranthes diluvialis — Threatened

CRITICAL HABITAT
No critical habitat has been designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=Q2WA

Mammals

Canada Lynx Lynx canadensis — Threatened

CRITICAL HABITAT

There is **final** critical habitat designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=A073

Critical Habitats

There are no critical habitats in this location

Migratory Birds

Birds are protected by the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act.

Any activity that results in the take of migratory birds or eagles is prohibited unless authorized by the U.S. Fish & Wildlife Service.[1] There are no provisions for allowing the take of migratory birds that are unintentionally killed or injured.

Any person or organization who plans or conducts activities that may result in the take of migratory birds is responsible for complying with the appropriate regulations and implementing appropriate conservation measures.

---

1. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

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
- Conservation measures for birds
  http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Year-round bird occurrence data
  http://www.birdscanada.org/birdmon/default/datasummaries.jsp

The following species of migratory birds could potentially be affected by activities in this location:

Bald Eagle Haliaeetus leucocephalus — Bird of conservation concern
Season: Wintering
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B008

Black Rosy-finch Leucosticte atrata — Bird of conservation concern
Year-round
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0J4

Brewer's Sparrow Spizella breweri — Bird of conservation concern
Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0HA

Burrowing Owl Athene cunicularia — Bird of conservation concern
Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0NC

Calliope Hummingbird Stellula calliope — Bird of conservation concern
Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0K3

Cassin's Finch Carpodacus cassinii — Bird of conservation concern
Year-round
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0J6

Eared Grebe Podiceps nigricollis — Bird of conservation concern
Season: Breeding

Ferruginous Hawk Buteo regalis — Bird of conservation concern
Year-round
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B06X

Flammulated Owl Otus flammeolus — Bird of conservation concern
Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0DK

Fox Sparrow Passerella iliaca — Bird of conservation concern
Season: Breeding

Golden Eagle Aquila chrysaetos — Bird of conservation concern
Year-round
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0DV

Greater Sage-grouse Centrocercus urophasianus — Bird of conservation concern
Year-round
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B06W

Loggerhead Shrike Lanius ludovicianus — Bird of conservation concern
Year-round
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0FY

Long-billed Curlew Numenius americanus — Bird of conservation concern
Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B06S

Olive-sided Flycatcher Contopus cooperi — Bird of conservation concern
Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0AN

Peregrine Falcon Falco peregrinus — Bird of conservation concern
Year-round
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0FU

Pinyon Jay Gymnorhinus cyanocephalus — Bird of conservation concern
Year-round
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0I0

Sage Thrasher Oreoscoptes montanus — Bird of conservation concern
Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0ID

Short-eared Owl Asio flammeus — Bird of conservation concern
Season: Wintering
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0HD

Snowy Plover Charadrius alexandrinus — Bird of conservation concern
Season: Breeding

Swainson's Hawk Buteo swainsoni — Bird of conservation concern
Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B070

Virginia's Warbler Vermivora virginiae — Bird of conservation concern
Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0IL

Western Grebe aechmophorus occidentalis — Bird of conservation concern
Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0EA

Williamson's Sapsucker Sphyrapicus thyroideus — Bird of conservation concern
Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0FX

Willow Flycatcher Empidonax traillii — Bird of conservation concern
Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0F6

Wildlife refuges and fish hatcheries

There are no refuges or fish hatcheries in 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.

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.

This location overlaps all or part of the following wetlands:

Freshwater Emergent Wetland

PEMA
PEMC
PEMFh

Freshwater Pond

PABKx

PUBFx

A full description for each wetland code can be found at the National Wetlands Inventory website: http://107.20.228.18/decoders/wetlands.aspx

APPENDIX C – Natural Heritage Database Search Results

GARY R. HERBERT
Governor

SPENCER J. COX
Lieutenant Governor

State of Utah

DEPARTMENT OF NATURAL RESOURCES

MICHAEL R. STYLER
Executive Director

Division of Wildlife Resources

GREGORY SHEEHAN
Division Director

January 26, 2015

Todd Sherman
Wetland Resources
182 East 300 North
Logan, Utah 84321

Subject: Species of Concern Near Payson, Utah

Dear Todd Sherman:

I am writing in response to your email dated January 15, 2015 regarding information on species of special concern proximal to Sections 32 and 33 of Township 8 South, Range 2 East, and Sections 3, 4, 5, 8, 9, 10 and 11 of Township 9 South, Range 2 East, SLB&M in Payson, Utah.

The Utah Division of Wildlife Resources (UDWR) does not have records of occurrence for any threatened, endangered, or sensitive species within the project area noted above. However, within a two-mile radius there are recent records of occurrence for southern leatherside chub, a species included on the *Utah Sensitive Species List*.

The information provided in this letter is based on data existing in the Utah Division of Wildlife Resources' central database at the time of the request. It should not be regarded as a final statement on the occurrence of any species on or near the designated site, nor should it be considered a substitute for on-the-ground biological surveys. Moreover, because the Utah Division of Wildlife Resources' central database is continually updated, and because data requests are evaluated for the specific type of proposed action, any given response is only appropriate for its respective request.

In addition to the information you requested, other significant wildlife values might also be present on the designated site. Please contact UDWR's habitat manager for the central region, Mark Farmer, at (801) 491-5653 if you have any questions.

Please contact our office at (801) 538-4759 if you require further assistance.

Sincerely,

Sarah Lindsey

Sarah Lindsey
Information Manager
Utah Natural Heritage Program

cc: Mark Farmer

1594 West North Temple, Suite 2110, PO Box 146301, Salt Lake City, UT 84114-6301
telephone (801) 538-4700 • facsimile (801) 538-4709 • TTY (801) 538-7458 • *www.wildlife.utah.gov*

APPENDIX D - Utah Raptor Guidelines

Table D-1. Nesting periods and recommended buffers for raptors in Utah.

Species	Spatial Buffer (miles)	Seasonal Buffer	Incubation, # Days	Brooding, # Days Post-Hatch	Fledging, # Days Post-Hatch	Post-fledge Dependency to Nest, # Days[1]
Bald eagle	1.0	1/1-8/31	34-36	21-28	70-80	14-20
Golden eagle	0.5	1/1-8/31	43-45	30-40	66-75	14-20
N. Goshawk	0.5	3/1-8/15	36-38	20-22	34-41	20-22
N. Harrier	0.5	4/1-8/15	32-38	21-28	42	7
Cooper's hawk	0.5	3/15-8/31	32-36	14	27-34	10
Ferruginous hawk	0.5	3/1-8/1	32-33	21	38-48	7-10
Red-tailed hawk	0.5	3/15-8/15	30-35	35	45-46	14-18
Sharp-shinned hawk	0.5	3/15-8/31	32-35	15	24-27	12-16
Swainson's hawk	0.5	3/1-8/31	33-36	20	36-40	14
Turkey vulture	0.5	5/1-8/15	38-41	14	63-88	10-12
California condor	1.0	NN yet	56-58	5-8 weeks	5-6 months	2 months
Peregrine falcon	1.0	2/1-8/31	33-35	14-21	35-49	21
Prairie falcon	0.25	4/1-8/31	29-33	28	35-42	7-14
Merlin	0.5	4/1-8/31	28-32	7	30-35	7-19
American kestrel	NN[2]	4/1-8/15	26-32	8-10	27-30	12
Osprey	0.5	4/1-8/31	37-38	30-35	48-59	45-50
Boreal owl	0.25	2/1-7/31	25-32	20-24	28-36	12-14
Burrowing owl	0.25	3/1-8/31	27-30	20-22	40-45	21-28
Flammulated owl	0.25	4/1-9/30	21-22	12	22-25	7-14
Great horned owl	0.25	12/1-9/31	30-35	21-28	40-50	7-14
Long-eared owl	0.25	2/1-8/15	26-28	20-26	30-40	7-14
N. saw-whet owl	0.25	3/1-8/31	26-28	20-22	27-34	7-14
Short-eared owl	0.25	3/1-8/1	24-29	12-18	24-27	7-14
Mex. Spotted owl	0.5	3/1-8/31	28-32	14-21	34-36	10-12
N. Pygmy owl	0.25	4/1-8/1	27-31	10-14	28-30	7-14
W. Screech owl	0.25	3/1-8/15	21-30	10-14	30-32	7-14
Common Barn-owl	NN[2]	2/1-9/15	30-34	20-22	56-62	7-14

[1] Length of post-fledge dependency period to parents is longer than reported in this table. Reported dependency periods reflect the amount of time the young are still dependent on the nest site; i.e. they return to the nest for feeding.
[2] Due to apparent high population densities and ability to adapt to human activity, a spatial buffer is not currently considered necessary for maintenance of American kestrel or Common barn-owl populations. Actions resulting in direct mortality of individual birds or take of known nest sites is unlawful.

APPENDIX E - Migratory Bird Conservation Actions

Migratory Bird Conservation Actions for Projects to Reduce the Risk of Take during the Nesting Season*

U.S. Fish and Wildlife Service (USFWS) Region 6, Migratory Bird Management

June 2014

Goal: Avoid take of migratory birds and/or minimize the loss, destruction, or degradation of migratory bird habitat while completing the proposed project or action. Under the Migratory Bird Treaty Act (MBTA) take is defined as "pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to pursue, hunt, shoot, wound, kill, trap, capture or collect" a migratory bird (50 CFR § 10.12). **

Determine if the proposed project or action will involve below- and/or above-ground construction or habitat-altering activities, because recommended practices and timing of surveys could differ accordingly.

If the proposed project or action includes a reasonable likelihood that take of migratory birds will occur, then complete the project or those actions expected to take migratory birds outside of their nesting season to the greatest extent possible. Examples of actions that may take migratory birds include, clearing or cutting of vegetation, burning vegetation, driving or parking equipment on vegetation that may harbor nesting birds, etc. The primary nesting season for migratory birds varies greatly among species and geographic locations, but generally extends from early April to mid-July. However, the maximum time period for the migratory bird nesting season can extend from early January through late August. Due to this variability, project proponents should consult with the USFWS for specific nesting seasons of birds in your project or action area. As early as possible please consult the USFWS in the planning stages of your project for other input on conservation measures to avoid and minimize the take of migratory birds.

Complete all project activities that could result in migratory bird take outside the maximum migratory bird nesting season (early January through late August) to the greatest extent possible. If this is not possible, then avoid any habitat alteration, removal, or destruction during the primary nesting season for migratory birds (early April to mid- July).

If a proposed project or action includes the potential for take of migratory birds and/or the loss or degradation of migratory bird habitat, and work cannot occur outside the migratory bird nesting season (either the maximum or primary nesting season), project proponents should provide USFWS with an explanation for why work has to occur during the migratory bird nesting season. Further, in these cases, project proponents also should demonstrate that all efforts to complete work outside the migratory bird nesting season were attempted, and that the reasons work needs to be completed during the nesting season were beyond the proponent's control.

Where project work must occur during the migratory bird nesting season, project proponents should utilize a qualified biologist to survey those portions of the project area during the nesting

season (but prior to the project or action occurring) to determine if migratory birds are present and nesting in those areas. These bird surveys should occur no more than 7-10 days prior to when work actually begins on the project area. In addition to conducting surveys during the nesting season, entities may also benefit from conducting surveys during the previous nesting season. Such surveys will serve to inform the likely presence of nesting migratory birds in the proposed project or work area. While individual migratory birds will not necessarily return to nest at the exact site as in previous years, a survey in the nesting season the year before the project or action allows the company to become familiar with bird species and numbers present in the project area well before the nesting season in the year of proposed action. Migratory bird surveys also should be completed during the best timeframe for detecting the presence of nesting migratory birds, using accepted bird survey protocols. USFWS Offices can be contacted for recommendations on appropriate survey guidance. Project proponents should also be aware that results of migratory bird surveys are subject to spatial and temporal variability.

If no migratory birds are found nesting in proposed project or action areas immediately prior to the time when construction and associated activities are to occur, then proceed with your project activity as planned.

If migratory birds are present and nesting in the proposed project or action area, contact your nearest USFWS Ecological Services Field Office and/or USFWS Regional Migratory Bird Management Office for guidance on appropriate next steps to avoid and minimize impacts to (and take of) migratory birds associated with the proposed project or action. Although bald and golden eagles are protected under MBTA they are also covered under BGEPA. Please consult USFWS if there are eagles or eagle nests in or near your proposed project area ***.

* Note: these recommended conservation measures assume that there are no Endangered or Threatened migratory bird species present in the project/action area, or any other Endangered or Threatened animal or plant species, or any designated critical habitat for Endangered or Threatened species present in this area. If Endangered or Threatened species or designated critical habitat are present, or they could potentially be present, and the project/action may affect these species or designated critical habitat for them, then consult with your nearest USFWS Ecological Services Office before proceeding with any project/action.

** The Migratory Bird Treaty Act (MBTA) prohibits the taking, killing, possession, and transportation, (among other actions) of migratory birds, their eggs, parts, and nests, except when specifically permitted by regulations. While the MBTA has no provision for allowing unauthorized take, the USFWS realizes that some birds may be killed during construction or through other project activities, even if all known reasonable and effective measures to protect birds are used. The USFWS Office of Law Enforcement carries out its mission to protect migratory birds through investigations and enforcement, as well as by fostering relationships with individuals, companies, and industries that have taken effective steps to avoid take of migratory birds and by encouraging others to implement measures to avoid take of migratory birds. It is not possible to absolve individuals, companies, or agencies from liability even if they implement bird mortality avoidance, or other similar protective measures. However, the Office of Law Enforcement focuses its resources on investigating and undertaking enforcement actions against individuals and companies that take migratory birds without identifying and implementing all reasonable, prudent, and effective measures to avoid that take. Companies are

encouraged to work closely with USFWS biologists to identify available protective measures when developing project plans and/or avian protection plans, and to implement those measures prior to/during construction or similar activities.

*** Also note that Bald and Golden Eagles receive additional protection under the Bald and Golden Eagle Protection Act (BGEPA). BGEPA prohibits the take, possession, sale, purchase, barter, offer to sell, purchase, or barter, transport, export or import, of any Bald or Golden Eagle, alive or dead, including any part, nest, or egg, unless allowed by permit. BGEPA also defines take to include "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb," 16 U.S.C. 668c, and includes criminal and civil penalties for violating the statute.
Further, activities that would disturb Bald or Golden Eagles are prohibited under BGEPA. "Disturb" means to agitate or bother a Bald or Golden Eagle to a degree that causes, or is likely to cause, based on the best scientific information available, (1) injury to an Eagle, (2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior. If a proposed project or action would occur in areas where nesting, feeding, or roosting eagles occur, then project proponents may need to take additional conservation measures to achieve compliance with BGEPA. New regulations (50 CFR § 22.26 and § 22.27) allow the take of bald and golden eagles and their nests, respectively, to protect interests in a particular locality provided that the USFWS finds that such take is compatible with the goal of maintaining stable or increasing eagle breeding populations. However, consultation with the USFWS Migratory Bird, Ecological Services, and Law Enforcement programs will be required before a permit may be issued.

APPENDIX F - Qualifications

GLEN GANTZ – WILDLIFE BIOLOGIST and COMMERCIAL PILOT

Mr. Gantz is a Certified Wildlife Biologist and commercial pilot with 35 years of experience leading and conducting wildlife surveys throughout the United States, with the last 25 years focused in the Intermountain west. He has 25 years of experience conducting aerial surveys and aerial telemetry studies in the Intermountain west and is an experienced mountain pilot. Mr. Gantz has been conducting both aerial and terrestrial wildlife surveys in Utah for the past 18 years, with the past several years focusing on projects for the energy industry. Wildlife surveys are focused mainly on raptors and migratory birds, as well as threatened, endangered and sensitive species. Mr. Gantz led the wildlife surveys on 240 miles of the Ruby Pipeline in Wyoming, Utah, and portions of Nevada from 2009 to 2011. This project included:

- Conducting and managing greater sage-grouse lek surveys and monitoring these leks;
- Surveying and weekly monitoring of raptor nest via helicopter;
- Conducing migratory bird nest surveys;
- Conducing pygmy rabbit surveys, including telemetry monitoring and scientific study design
- Mapping white-tailed prairie dog towns and surveying burrowing owl and black-footed ferret in the mapped towns
- Conducting yellow-billed cuckoo surveys

Mr. Gantz manages the biological data for the wildlife surveys including data transfer to/from GPS units and GIS. He also compiles summaries and results of field data, produces maps for field use and reports, and prepares NEPA documents, including Biological Assessments, Biological Reports and wildlife portions of EIS. Mr. Gantz is trained in Mexican Spotted Owl surveys, Utah Prairie Dog surveys, Southwestern Willow Flycatcher surveys, Black-footed Ferret surveys, as well as several other endorsements. Mr. Gantz holds a B.S. in Wildlife Science from The Pennsylvania State University, University Park Pennsylvania and an M.S. in Wildlife Ecology from Utah State University, Logan Utah.

APPENDIX B
TECHNICAL REPORTS

SPRIANTHES DILUVIALIS SURVEY I-15 PAYSON MAIN STREET INTERCHANGE ENVIRONMENTAL IMPACT STATEMENT

Spiranthes diluvialis Survey

I-15 Payson Main Street Interchange EIS
Utah County, Utah

August 2017
Wetland Resources

Spiranthes diluvialis Survey

I-15 Payson Main Street Interchange EIS

UDOT Project No. F-I15-6(214)251; PIN 10263

Prepared for:

Utah Department of Transportation
Region 3
658 North 1500 West
Orem, Utah 84057

Prepared by:

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August 2017

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A. INTRODUCTION

Wetland Resources conducted a survey for Ute ladies'-tresses (*Spiranthes diluvialis*) (ULT) for a potential new interchange on Interstate 15 in Payson, Utah. The survey was conducted August 14 through 17, 2017 during the ULT blooming season. A previously undocumented population of 13 ULT individuals was found during the 2017 survey.

The project area is located in Utah County in Sections 3, 4 ,5, 8, 9, and 10 of Township 9 South Range 2 East, and in Sections 32, 33, and 34 of Township 8 South Range 2 East (Appendix A: Maps 1 and 2). The project area is in the vicinity of the Payson Main Street interchange on Interstate 15 and includes all areas that are within 300 feet of the edge of disturbance for all alternatives that were still being considered as of August 2017.

The project area is situated in the Utah Valley approximately 7 miles east of Utah Lake. Elevations in the project area range from 4520 feet above mean sea level to 4665 feet above mean sea level. A majority of the project area is currently used for agriculture, including livestock grazing and cultivated fields. The southwest portion of the project area is primarily residential and commercial development.

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.

B. METHODOLOGY

The assessment of ULT suitable habitat criteria and disqualifiers were conducted in accordance with the U.S. Fish and Wildlife Service (USFWS) protocol (USFWS 1992, 2007, and 2011) and supplemental publications and studies (Arft 1995; Fertig 2005).

It was determined that ULT was blooming in the region by a visit on August 2, 2017 to the known ULT site in Springville, Utah (Photo 1). The Mendon ULT site was visited a week after completing the survey (8/24/17), and the plants were still in partial bloom (Photo 2).

Spiranthes diluvialis is typically found associated with alluvial deposits of silty, sandy, gravelly, or cobbly soil (USFWS 1992). The species may occasionally also be found in highly organic soils or peat. The species seems to prefer well drained soils with fairly high moisture content. Soils may exhibit some gleying or mottling but are generally not strongly anaerobic. Spiranthes diluvialis is found in some heavily disturbed sites, for example, old gravel mines that have since been developed into wetlands, and along well traveled footpaths built on old berms. The species is also found in grazed pastures with introduced pasture grasses. Spiranthes diluvialis is found with grasses, sedges, and rushes, in shrubs, and riparian trees such as willow species. It rarely occurs in deeply shaded sites and prefers partially shaded open glades or pastures and meadows in full sunlight. Specifically, the following criteria was used to determine suitable ULT habitat (USFWS 1992):

1. Seasonally high water table (within 18 inches of the soil surface for at least one week sometime during the growing season, growing season defined as when soil temperatures are above 41 degrees Fahrenheit).
2. In or near wet meadows, stream channels, or flood plains.
3. Vegetation falling into the Facultative Wet or Obligate Wet classification, including introduced pasture grasses.
4. Jurisdictional wetlands as specified under the Clean Water Act.

The following criteria was used to disqualify certain habitats within the project area that do not support potential ULT habitat (USFWS 2007):

1. Appropriate hydrology not present, typically indicated by:
   - area is comprised of mostly upland vegetation
   - area dries up by mid-July, with water table lower than 12 - 18 inches below the soil surface
2. Heavy clay soils present
3. Soils strongly alkaline
4. Site heavily disturbed, such as, for example:
   - stream banks channelized and stabilized by heavy rip-rap
   - highway rights-of-way built on filled or compacted soil or rock material
   - construction sites where construction has either stripped the topsoil or where construction has been completed within the last 5 years but the area has not been revegetated
5. Stream banks steep, transition from stream margin to upland areas abrupt
6. Site characterized by standing water with cattails, bulrushes, and other emergent aquatic vegetation (note that margins of such areas may be suitable habitat).
7. Riparian areas, stream banks, or wetlands vegetated with dense rhizomatous species such as reed canary grass (Phalaris arundinacea), tamarisk or salt cedar (Tamarix ramosissima), teasel (Dipsacus sylvestris), common reed (Phragmites australis), or saltgrass (Distichlis spicata)
8. Riparian areas overgrazed or otherwise managed such that the vegetation community is comprised of upland native or weedy species or is unvegetated. (note that the orchid can tolerate rather extreme overgrazing as long as it has not resulted in a drop in the water table as indicated by conversion of the riparian or wet meadow pasture vegetation community to mostly upland species).
9. Potential habitat is no longer in a natural condition, for example, has been converted to agricultural uses and is now plowed and cropped, or has been converted to lawns or golf courses (note that wet meadow pastures with a mix of native and non-native pasture grasses, including pastures that are regularly hayed, are suitable potential habitat).
10. Wetland is a brackish playa or pothole not fed by springs or not in the floodplain of or hydrologically connected with a riparian system or other source of fresh water (note that fens and wetlands associated fresh water springs are suitable potential habitat).

Areas that were determined to contain suitable ULT habitat included all of the wetlands, groundwater seeps, and irrigation ditches within the project area. These areas were surveyed using a 100% coverage pedestrian survey with transect widths of 5 feet. Surveyor qualifications are provided in Appendix C.

C. RESULTS AND DISCUSSION

The project area includes many Palustrine emergent wetlands that provide varying degrees of suitability for ULT habitat. A detailed description of each surveyed area is provided below. The new population was discovered in wetland W20, which is located in an area that was added to the project area in 2017, so this is the first year that wetland was surveyed for ULT. In addition to the wetlands, the streambanks of Beer Creek and all the irrigation ditches and canals within the project area were also surveyed for ULT. The corresponding survey areas can be found on Maps 1 and 2 in Appendix A. Photos of the surveyed areas are provided in Appendix B.

The areas that were not surveyed for ULT met the criteria provided by the USFWS for disqualified habitat (USFWS 2007). Primarily these areas were dominated by upland vegetation and did not have appropriate hydrology to support ULT. These areas were primarily agricultural fields dominated by upland grasses, and developed areas that were dominated by buildings and hard surfaces. Two wetland areas, W-11 and W-14 were also disqualified as suitable habitat. W-11 is dominated by a thick stand of cattails and does not support a wet meadow fri20147nge, and W-14 is dominated by thick stands of coyote willow and common reed.

W1 – Borrow ditches on both sides of railroad tracks contain some areas of suitable ULT habitat. Many areas within this wetland are heavily disturbed by the railroad, and are either too dry or too dense of vegetation for suitable ULT habitat. The areas of suitable ULT habitat are dominated by Baltic rush, spikerush, and showy milkweed. Photo 3.

W2 – Large wetland complex on the west side of I-15 contains areas with varying degrees of suitability for ULT. The areas with the most suitable ULT habitat are dominated by Baltic rush, clustered field sedge, Nebraska sedge, spikerush, rabbitfoot grass, and redtop. Some areas are too dry and are dominated by saltgrass. Photo 4.

W3 – Wet meadow on the east side of I-15 supports suitable ULT habitat dominated by Baltic rush, Nebraska sedge, clustered field sedge, spikerush, and redtop. Some areas of this wet meadow contain peat soils, which are typically good quality ULT habitat. Photo 5.

W4 – This emergent marsh is dominated by a dense stand of cattails with standing water, but the periphery does contain suitable ULT habitat. There are slope seeps along the south edge of the wetland that support Baltic rush, sedges, and spikerush. The area is moderately grazed. Photo 6.

W5 – These two groundwater seeps support a wetland area with suitable ULT habitat. The lowest areas of the wetland support hardstem bulrush and are characterized by standing water, but the edges of the wetland support Nebraska sedge, Baltic rush, and spikerush. Photo 7.

W6 – This emergent marsh is supported by a groundwater seep and contains some suitable ULT

habitat. The lowest areas of the wetland support hardstem bulrush and are characterized by standing water, but the edges of the wetland support Nebraska sedge, Baltic rush, and spikerush. The suitable habitat is a narrow strip that has been heavily grazed. Photo 8.

W7 – This wet meadow/emergent marsh occurs in a drainage swale that contains a groundwater seep that provides some suitable ULT habitat. The swale is mostly too dry above the seep, and too wet below the seep for ULT habitat, but there are some areas of suitable ULT habitat. The swale is dominated by hardstem bulrush, broadleaf arrowhead, and spikerush. Photo 9.

W8 – This small wetland area is supported by two artesian wells that flow into a ditch. The habitat is mostly too wet, but there are a few areas of suitable ULT habitat dominated by spikerush and rabbitfoot grass. Photo 10.

W9 – This large wet meadow/emergent marsh complex contains suitable ULT habitat. Most of the suitable ULT habitat is located adjacent to the emergent marsh areas and is dominated mostly by Baltic rush with some Nebraska sedge, smartweed, foxtail barley, and redtop. Other areas of the wetland are too wet to support ULT, characterized by cattails, hardstem bulrush, and standing water. Other areas appear too dry to support ULT and are dominated by saltgrass, alkali muhly, and foxtail barley. Photo 11.

W10 – This grazed pasture supports some Nebraska sedge, but is dominated by meadow fescue and is mostly too dry for ULT habitat. There is a drainage swale along the fence that does contain some suitable ULT habitat and is dominated by Baltic rush, redtop, rabbitfoot grass, and reed canary grass. Photo 12.

W11 – This small isolated emergent marsh is dominated by thick cattails and common reed and does not contain any suitable ULT habitat. It is included in this report to document that the wetland was assessed for ULT habitat. Photo 13.

W12 – This small open water pond in a grazed pasture contains some suitable ULT habitat around its periphery. The fringe wetland around the pond supports Nebraska sedge, clustered field sedge, Baltic rush, and redtop. Photo 14.

W13 – This wet meadow/marsh complex is located in a grazed pasture and is supported by a groundwater seep. Some of the areas are too wet for suitable ULT habitat, supporting thick stands of cattails and bulrush, but there is some suitable ULT habitat dominated by spikerush, threesquare bulrush, Nebraska sedge, and paintbrush. Photo 15.

W14 – This is primarily a shrub wetland with a few areas of emergent wetland adjacent to the Payson City wastewater treatment facility. There is no suitable ULT habitat within this wetland area due to thick willows and common reed. It is included in this report to document that the wetland was assessed for ULT habitat. Photo 16.

W15 – This isolated groundwater seep is located in a hay field and contains some suitable ULT habitat on the hummocks that are above the water level. Much of the area is characterized by standing water supporting hardstem bulrush, but the hummocks are comprised of a thick peat layer

that supports spikerush and provide suitable ULT habitat. Photo 17.

W16 – This is an emergent marsh/wet meadow mix located around a flowing artesian well pipe in a grazed pasture. Most of the area has standing water all year from the flowing well, which creates conditions too wet for ULT, but there are some associated species including Nebraska sedge and spikerush that indicate possible suitability for ULT. Photo 18.

W17 – This is an emergent marsh/wet meadow mix located in a grazed pasture. Some areas have standing water and are dominated by cattails, but there is some suitable ULT habitat dominated by spotted ladysthumb, Nebraska sedge, clustered field sedge, and spikerush. Photo 19.

W18 – This is an isolated emergent marsh dominated by cattails. There is some potential ULT habitat around the periphery of the marsh, but a majority of the area is characterized by standing water and cattails, which is not suitable ULT habitat. The suitable habitat is dominated by Nebraska sedge, clustered field sedge, lady's thumb, and spikerush. Photo 20.

W19 – This wetland area is supported by an artesian well. Much of the wetland area is too dense with weedy species and an overstory of Russian olive to provide suitable habitat, but there are patches of Baltic rush and alkali muhly that support marginal ULT habitat. Photo 21.

W20 – This emergent marsh/wet meadow complex is located in a lightly to moderately grazed pasture (Photos 22 and 23) in an area that was added to the project area in 2017, so this is the first year this wetland has been surveyed for ULT. A new population of 13 ULT individuals was discovered during the 2017 survey in this wetland. The individuals were found growing in an approximately 2,000 square foot area comprised of wet meadow habitat. The associated species found growing with the ULT were clustered field sedge, Olney's threesquare, Baltic rush, annual ragweed, rabbitfoot grass, spikerush, marsh paintbrush, and strawberry clover. The soils in the area where the individuals were found were saturated at or near the surface at the time of the survey. The soil is classified as McBeth silt loam, and is poorly drained, non-saline, with an average depth to water table of 12 to 24 inches. The Ecological Site for this soil type is Semiwet Fresh Meadow (NRCS 2017). Three of the individuals were still in nearly full bloom (Photo 24), three of them were at approximately 50-70% past bloom (Photo 25), and the remainder were nearly past bloom, with only a few white flowers still visible (Photo 26). The locations of each of the plants were surveyed with a sub-meter accuracy GPS unit and the data is provided on Map 3 in Appendix A.

The streambanks of Beer Creek (Photo 27) and all of the ditches and canals (Photos 28 and 29) in the project area were also surveyed for ULT. Many of the ditch banks were too steep, and too dense with reed canary grass to provide suitable ULT habitat. There were some flatter bench areas that supported associated species, but no individuals were found.

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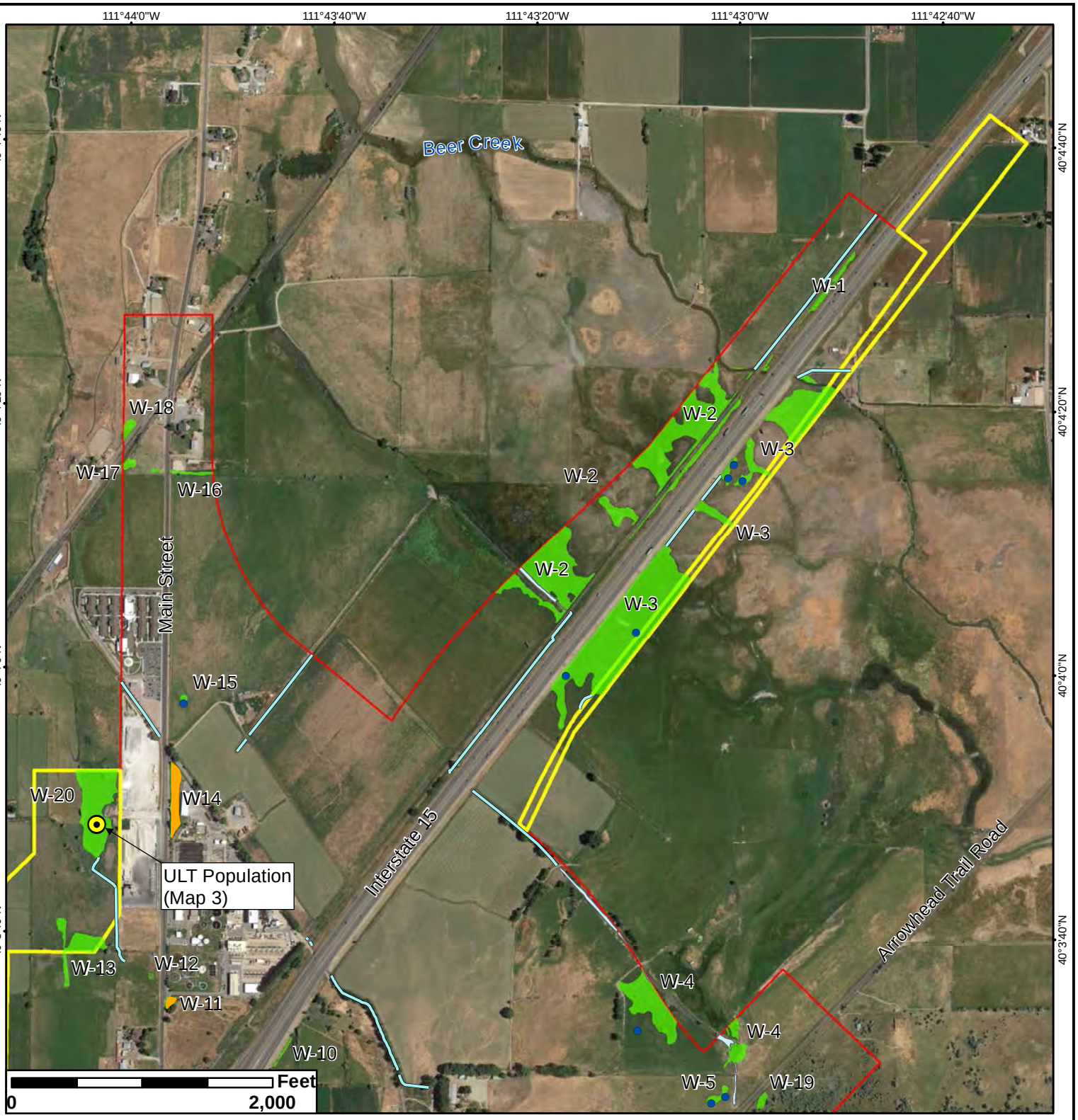
APPENDIX A: MAPS



Ute ladies'-tresses Survey Map

I-15 Payson Interchange 2017

Project Dimensions:

Note: dimensions include entire project area

ULT Survey Area
= 968.439 ac
ULT Suitable Habitat
= 37.047 ac
Wetland w/out Suitable ULT Habitat
= 0.876 ac

Legend

- ULT Survey Area
- 2017 Expanded Project Area
- ULT Population
- Wetland without Suitable ULT Habitat
- ULT Suitable Habitat
- Groundwater Seeps
- Ditches

Projection:

NAD 83 UTM Zone 12N

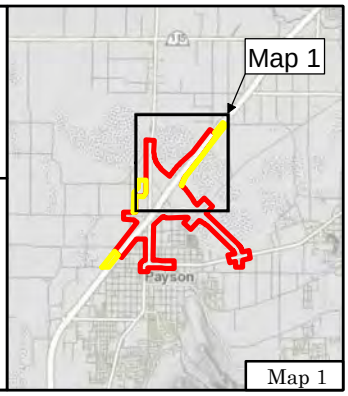
Source:

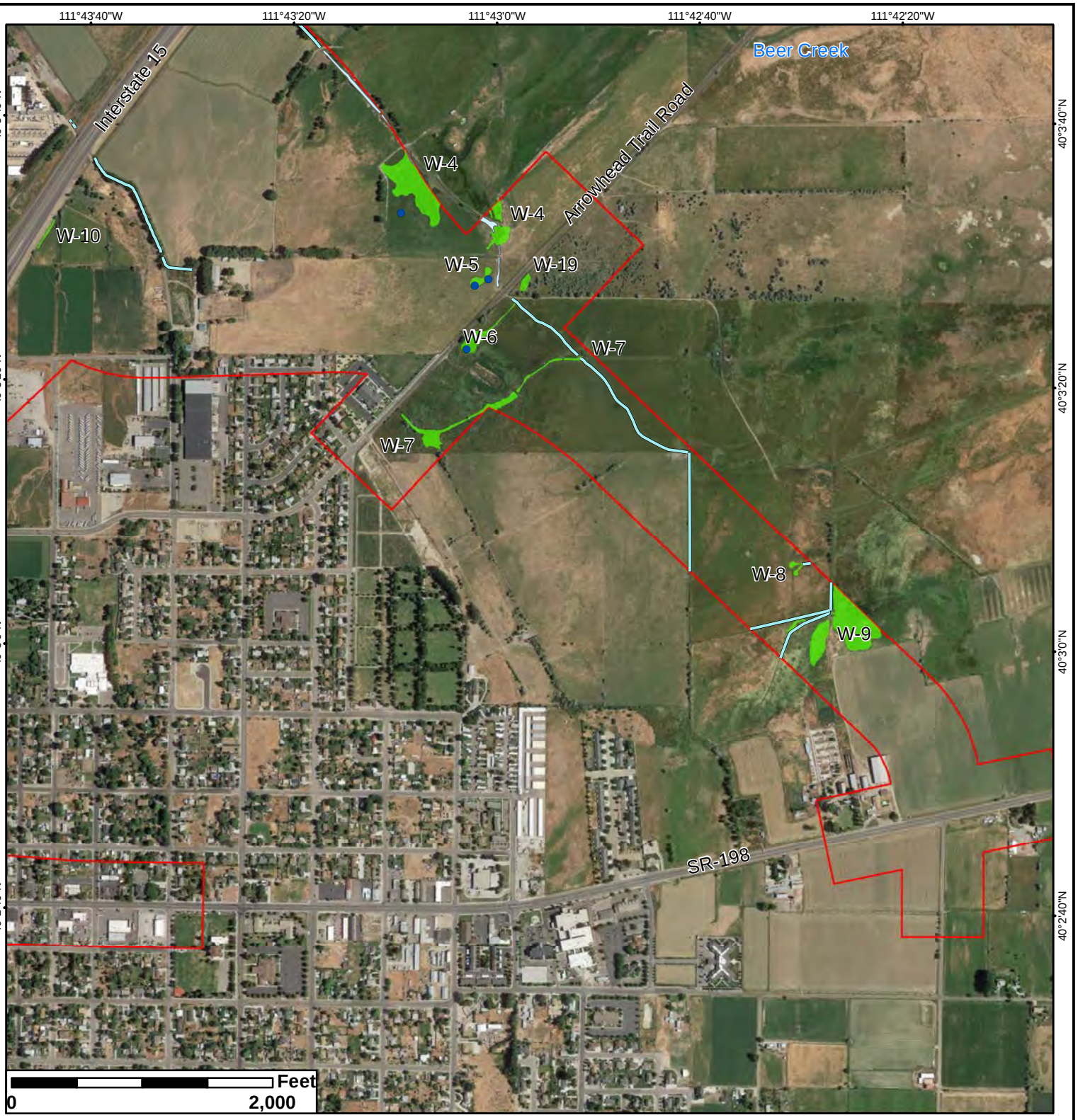
2017 Google Imagery

Survey Performed by
Todd Sherman

Wetland Resources, Inc.

Created: 8/26/2017
Author: CMM





Ute ladies'-tresses Survey Map

I-15 Payson Interchange 2017

Project Dimensions:

Note: dimensions include entire project area

ULT Survey Area
= 968.439 ac
ULT Suitable Habitat
= 37.047 ac
Wetland w/out Suitable ULT Habitat
= 0.876 ac

Legend

- ULT Survey Area
- 2017 Expanded Project Area
- ULT Population
- Wetland without Suitable ULT Habitat
- ULT Suitable Habitat
- Groundwater Seeps
- Ditches

Projection:

NAD 83 UTM Zone 12N

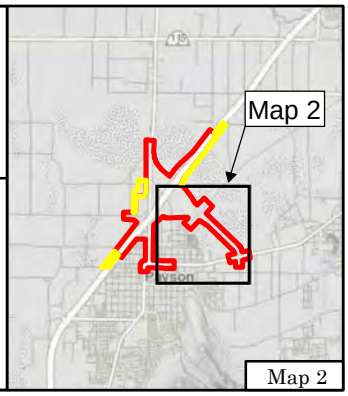
Source:

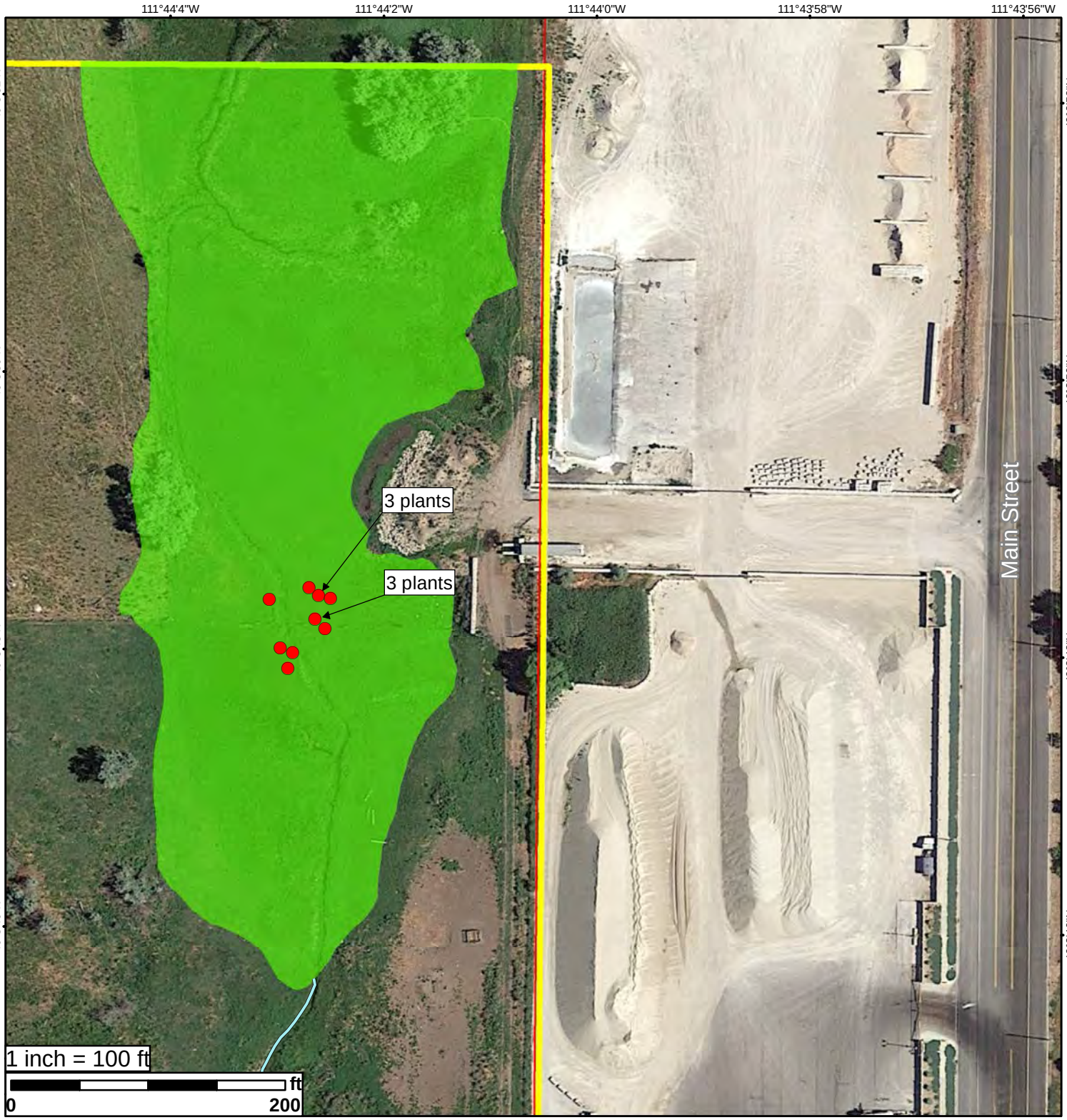
2017 Google Imagery

Survey Performed by
Todd Sherman

Wetland Resources, Inc.

Created: 8/26/2017
Author: CMM





Ute ladies'-tresses Survey Map

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Wetland w/out Suitable ULT Habitat
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Legend

- ULT Survey Area
- 2017 Expanded Project Area
- ULT Plant Location (each point represents one plant unless denoted otherwise)
- Wetland without Suitable ULT Habitat
- ULT Suitable Habitat
- Groundwater Seeps
- Ditches

Projection:

NAD 83 UTM Zone 12N

N W E S

Source:

2017 Google Imagery

Survey Performed by
Todd Sherman

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Created: 8/26/2017
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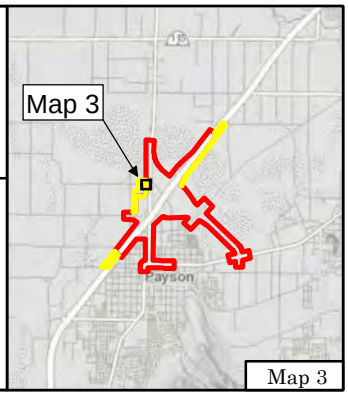

APPENDIX B: PHOTOS

Photo 1.
ULT blooming at the Springville ULT site on 8/2/17.

Photo 2.
ULT blooming at the Mendon ULT site on 8/24/17.

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Survey area W1.

Photo 4.
Survey area W2.

Photo 5.
Survey area W3.

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Photo 22.
W20. Wet meadow habitat where new ULT population was discovered. ULT in photo.

Photo 23.
W20. Wet meadow habitat where new ULT population was discovered. ULT in photo.

Photo 24.
ULT in W20 in full bloom.

Photo 25.
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Photo 26.
ULT in W20 past bloom.

Photo 27.
Beer Creek.

Photo 28.
Irrigation ditch.

Photo 29.
Irrigation ditch.

APPENDIX C: SURVEYOR QUALIFICATIONS

TODD SHERMAN - WETLAND ECOLOGIST

Todd received his Masters from Utah State University's Department of Landscape Architecture and Environmental Planning in 1996 where his research focused on wetland ecosystems of the Intermountain West, and the planning issues associated with these unique environments. Todd is a certified Professional Wetland Scientist (PWS #1345) whose experience includes ULT surveys, jurisdictional wetland delineation, wetland functional assessment, vegetation analysis and plant community mapping, Section 404 permitting, wetland restoration design, construction supervision and long-term monitoring of wetland mitigation sites, and stream revegetation design. Todd has been conducting ULT surveys since 2001 on over 60 projects throughout the Intermountain West.

APPENDIX B
TECHNICAL REPORTS

I-15 PAYSON MAIN STREET INTERCHANGE BIOLOGICAL ASSESSMENT (INCLUDING NOT LIKELY TO ADVERSELY AFFECT DETERMINATION)

January 2018

I-15 PAYSON MAIN STREET INTERCHANGE
BIOLOGICAL ASSESSMENT

UTAH DEPARTMENT OF TRANSPORTATION

UDOT PROJECT NO.: F-I15-6(214)251

UDOT PIN 10263

LOCHNER

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1.0 Introduction

The Utah Department of Transportation (UDOT) is proposing to improve traffic and safety operations at the I-15, Payson Main Street Interchange. A draft environmental impact statement (DEIS) was prepared and published in September 2017, to comply with the National Environmental Policy Act (NEPA), Title 23 of the Code of Federal Regulations (CFR) Part 771 and 40 CFR 1500-1508. The DEIS was published prior to this Biological Assessment (BA); the Final EIS will be updated to include the BA. This BA is necessary because Ute ladies'-tresses, a federally listed species, was identified shortly before the DEIS was published. Therefore, the *I-15, Payson Main Street Interchange DEIS* did not fully evaluate potential effects the action may have on federally-listed species protected by the Endangered Species Act (ESA). This BA complies with the Endangered Species Act (ESA) of 1973 (16 United States Code [USC] 1531-1543) and evaluates in greater detail the potential effects on federally-listed species.

UDOT has assumed the Federal Highway Administration's (FHWA) responsibilities under NEPA for environmental review and approval of highway projects within Utah. These responsibilities have been assigned in the *Memorandum of Understanding between the FHWA and the UDOT concerning the State of Utah's Participation in the Surface Transportation Project Delivery Program Pursuant to 23 USC 327*, executed on January 17, 2017. As such, 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 the Memorandum of Understanding (MOU).

2.0 Project Description

2.1 Purpose and Need

The need for the I-15, Payson Main Street Interchange project is summarized below (see Chapter 1 of the *I-15, Payson Main Street Interchange DEIS* for more information):

- The existing infrastructure will not be able to adequately serve the projected transportation demands from a rapidly growing population in and around Payson.
- Existing design deficiencies compromise vehicle safety and limit the overall functionality of the interchange.

Based on the needs presented above, the project is needed to achieve the following objectives:

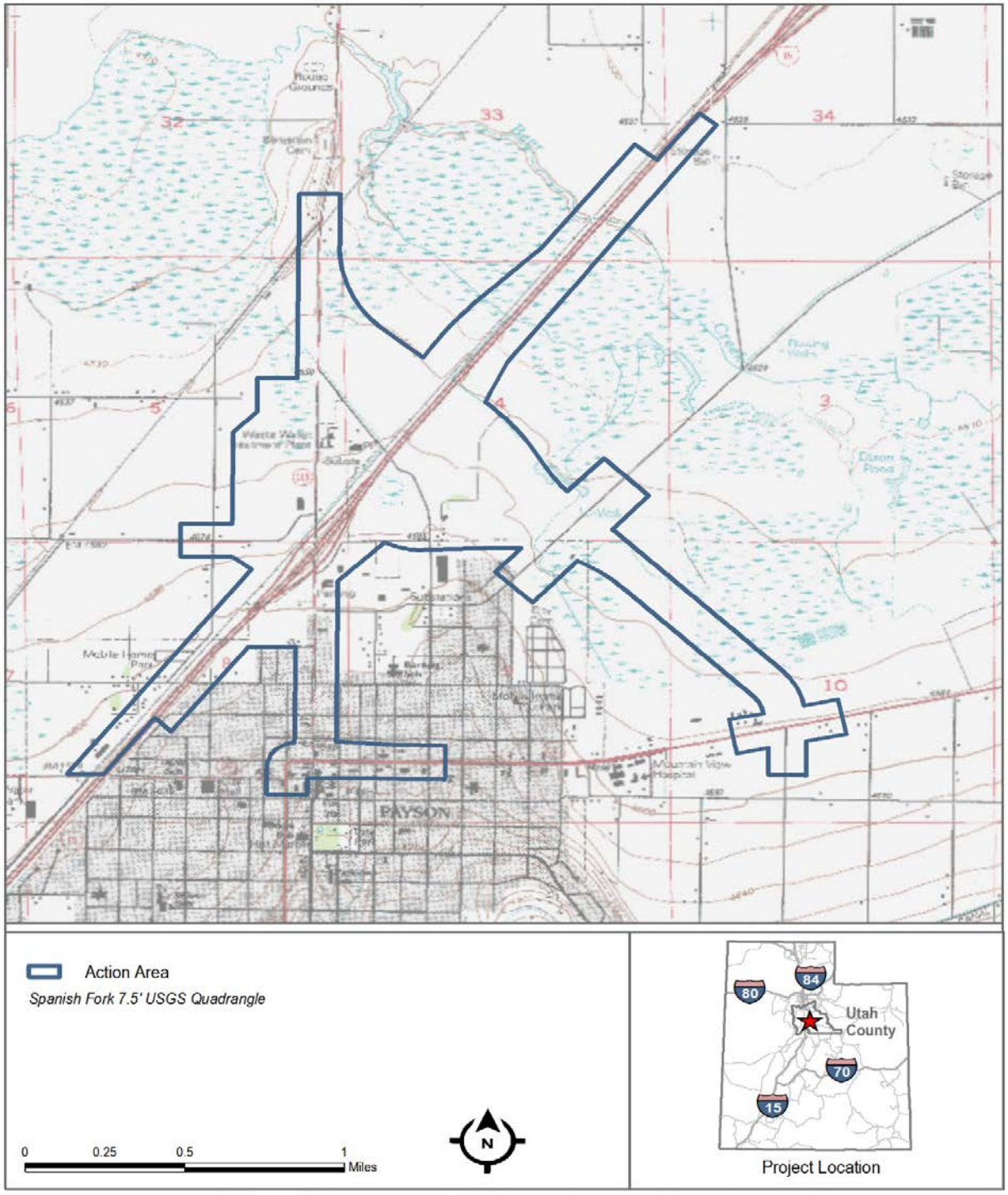
- Improve traffic operations in Payson by reducing expected roadway congestion at the Main Street interchange and on Main Street between approximately 900 North and 100 North.
- Accommodate future travel demand for automobile and freight traffic by improving level of service at the interchange and along Main Street compared to the no-build conditions.
- Address design deficiencies to meet current roadway design standards.
- Address the identified safety and operational inadequacies and meet UDOT and American Association of State Highway and Transportation Officials design standards, thereby improving the functionality and safety of the interchange compared to the no-build conditions.

2.2 Project Location & Action Area

The project is centered within Utah County in Payson, Utah on I-15 Exit 250 (see Figure 1). The action area encompassed a large enough area to include the six build alternatives considered in the *I-15, Payson Main Street Interchange DEIS* and assess indirect effects on federally-listed species. The U.S. Fish and Wildlife

Service recommended the action area include a 300-foot buffer from the edge of the right-of-way for all alternatives evaluated in detail (UDOT 2015). The action area is located in Sections 32, 33, and 34, Township 8 South, Range 2 East and Sections 3, 4, 5, 8, 9, 10, Township 9 South, Range 2 East, Salt Lake Baseline and Meridian on the Spanish Fork 7.5 minute U.S. Geological Survey topographic map (see Figure 1). All land within the action area is privately owned.

Figure 1. Action Area



2.3 Proposed Action

Seven alternatives, including the No-build Alternative, were considered for detailed study. The following briefly describes each alternative (see Chapter 2 of the *I-15, Payson Main Street Interchange DEIS* for more information).

Alternative I1 (Long Span Structure) would improve and add capacity at the existing interchange and Main Street. Main Street would widen to five lanes between the interchange and SR-198. The I-15 bridge over Main Street would be lengthened to accommodate five lanes. To improve the skew of the existing interchange, the on- and off-ramps would be extended away from I-15, and the turning radius at each ramp would also be increased (see Figure 2).

Alternative R1 (Relocate Near (0.2 Miles)) would close the existing Main Street interchange and replace it with a new diamond interchange approximately 0.2 miles northeast of its current location (see Figure 3).

Alternative R2 (Relocate Far (0.7 miles)) would close the existing Main Street interchange and replace it with a new diamond interchange approximately 0.7 miles northeast of its current location (see Figure 4). A new three-lane arterial road east of I-15 would provide access between Main Street and Nebo Beltway.

Alternative C1 (Braided Ramps) (Preferred Alternative) would provide a free-flow connection between the Main Street interchange and a new interchange approximately 0.7 miles to the northeast. The new interchange would connect to the proposed Nebo Beltway. Braided ramps (i.e., ramps that cross over each other) would connect the two interchanges. From the new interchange, motorists would travel on Nebo Beltway until it intersects with SR-198 at 2100 West (see Figure 5).

Alternative C3 (Frontage Road Ramps) is similar to Alternative CI and includes an additional interchange approximately 0.7 miles northeast of Main Street. However, frontage roads would connect the two interchanges instead of free-flow ramps. From the new interchange, motorists would travel on Nebo Beltway until it intersects with SR-198 at 2100 West, thereby avoiding and reducing congestion at Main Street and the existing interchange (see Figure 6).

Alternative C4 (Split Diamond) would function the same as Alternative C3, with frontage roads connecting the Main Street interchange to an additional interchange approximately 0.15 miles northeast of Main Street (compared to 0.7 miles under Alternative C3) (see Figure 7).

Figure 2. Alternative I1 (Long Span Structure)

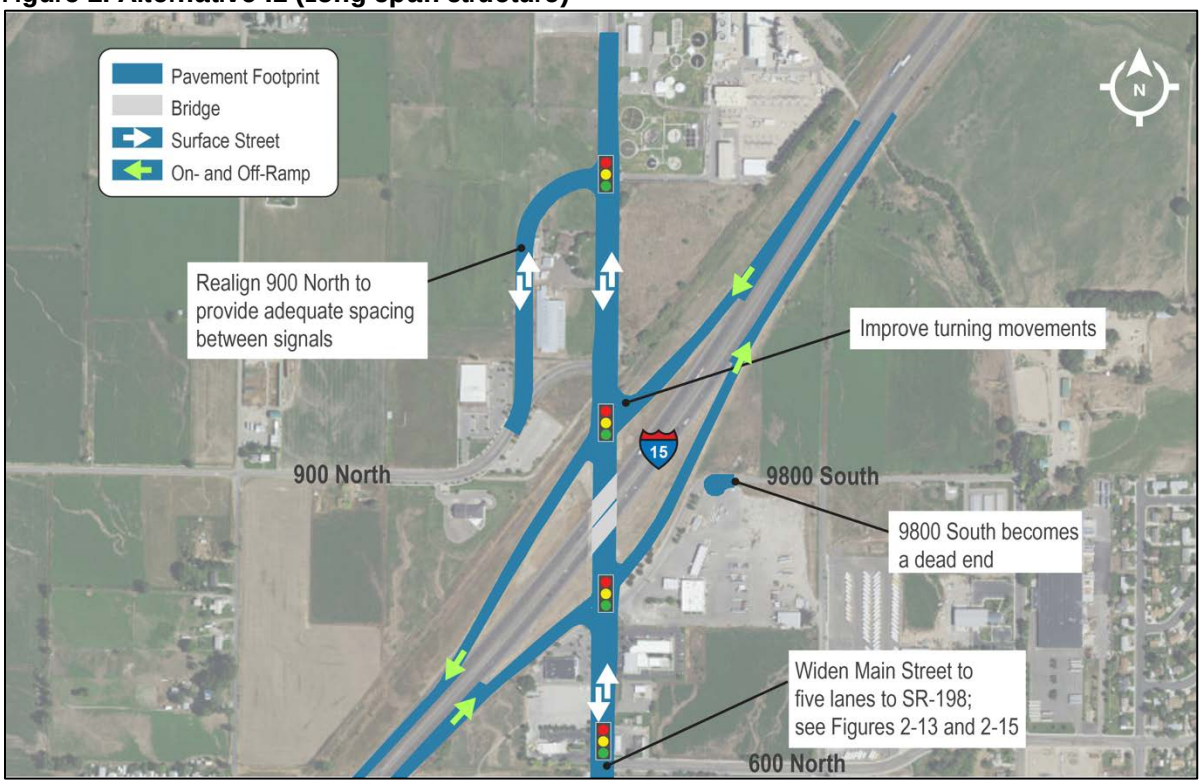


Figure 3. Alternative R1 (Relocate Near 0.2 Miles)

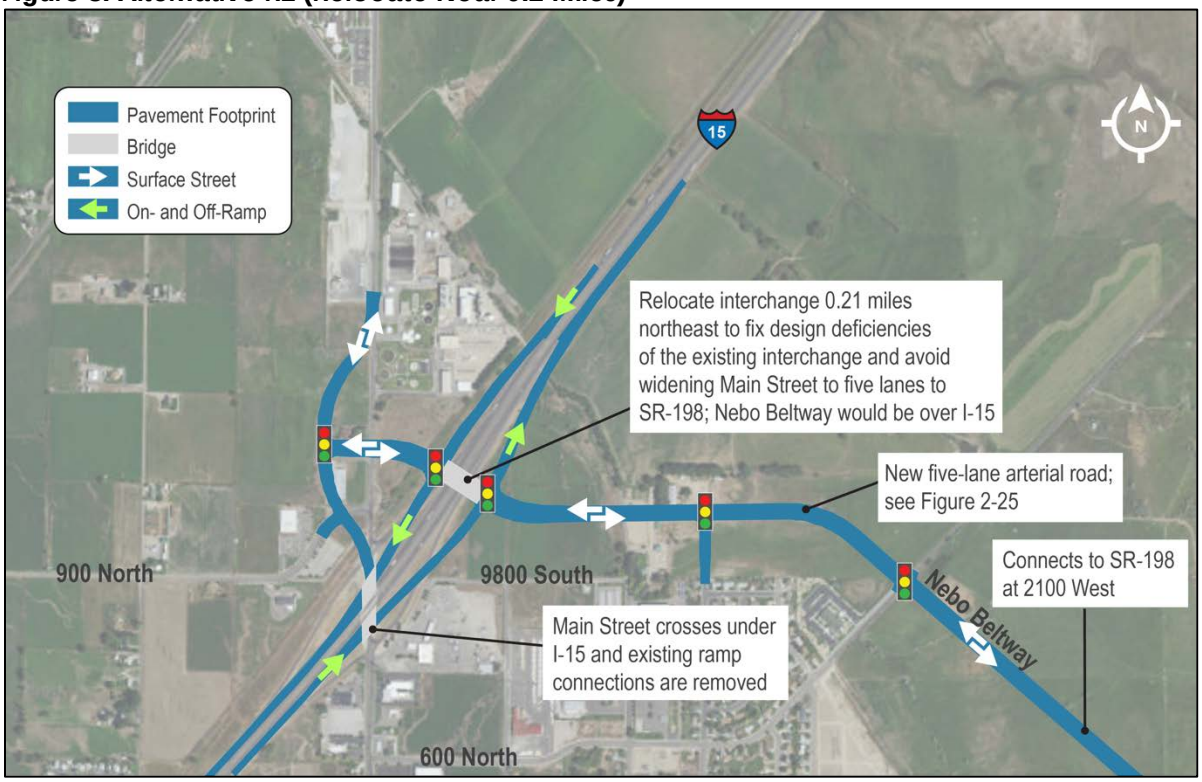


Figure 4. Alternative R2 (Relocate Far 0.7 Miles)

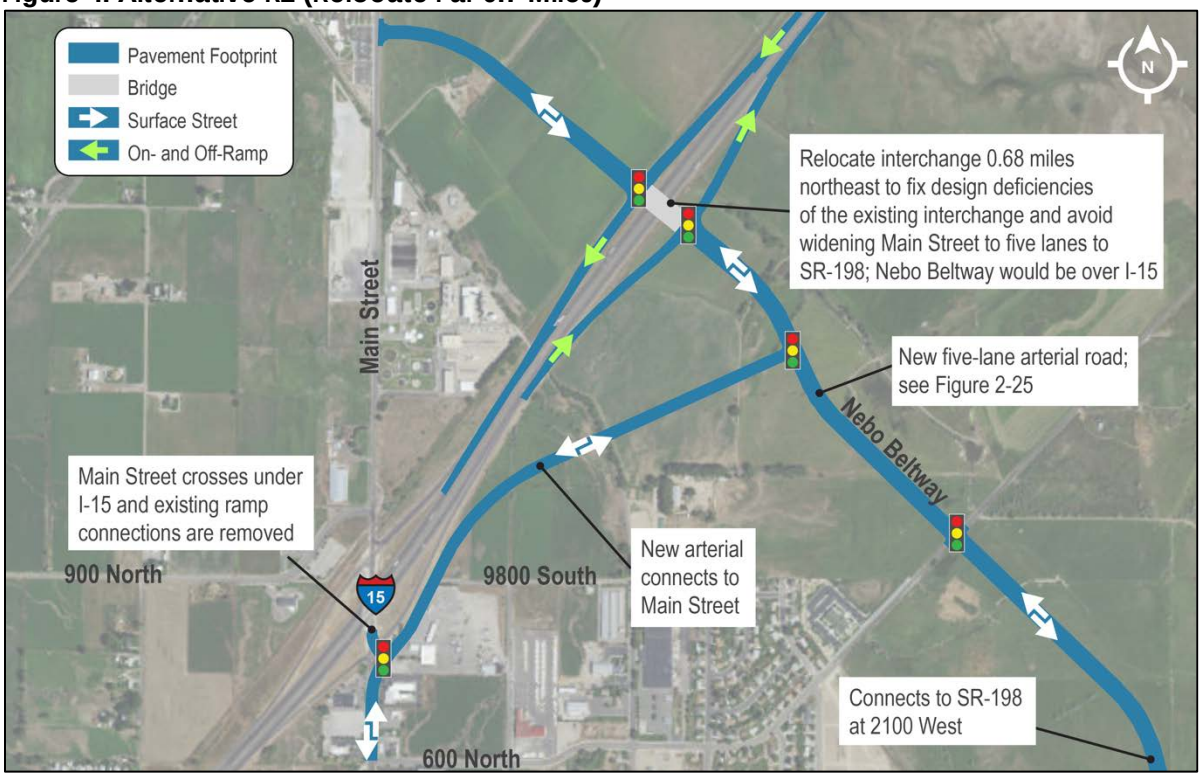


Figure 5. Alternative C1 (Braided Ramps)

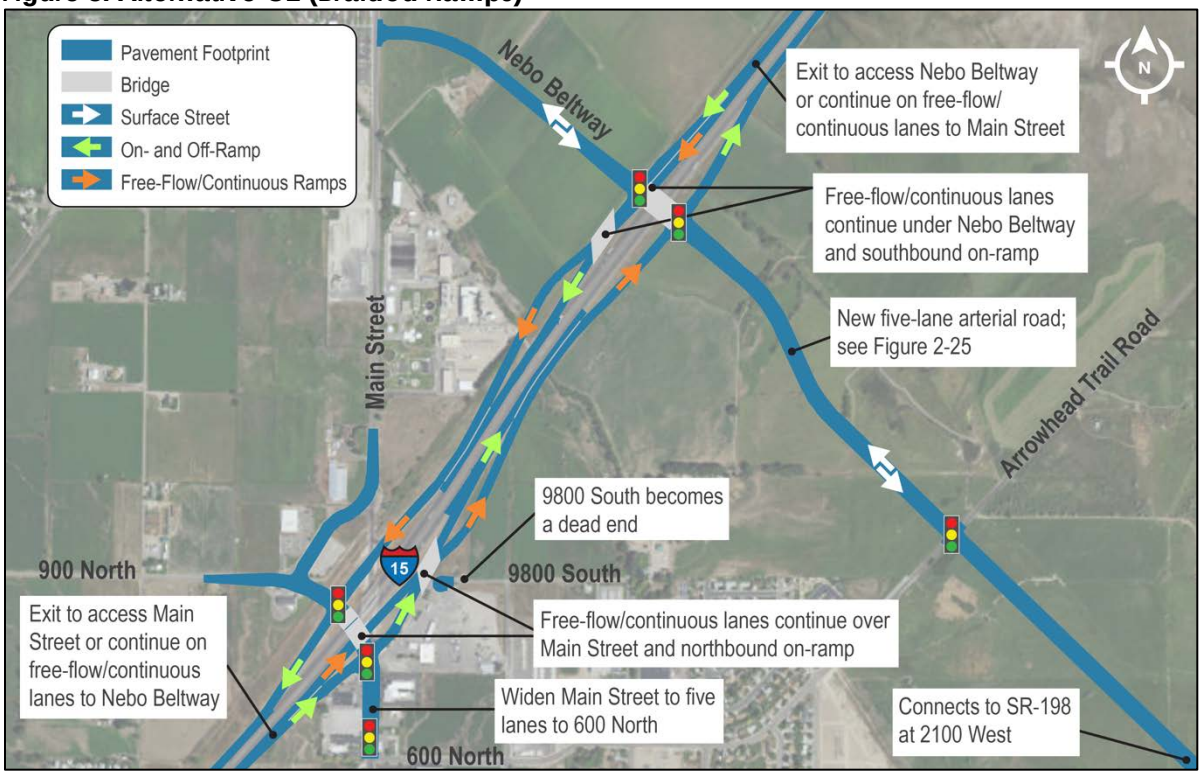


Figure 6. Alternative C3 (Frontage Road Ramps)

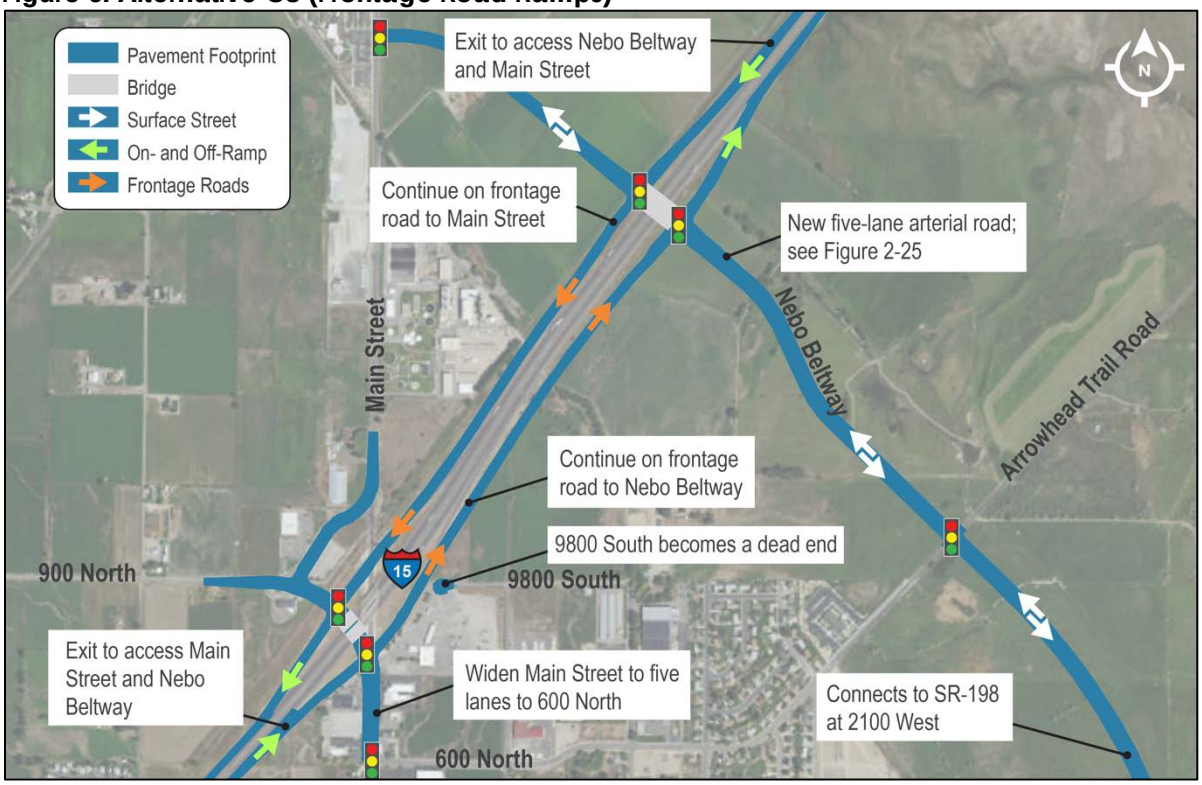
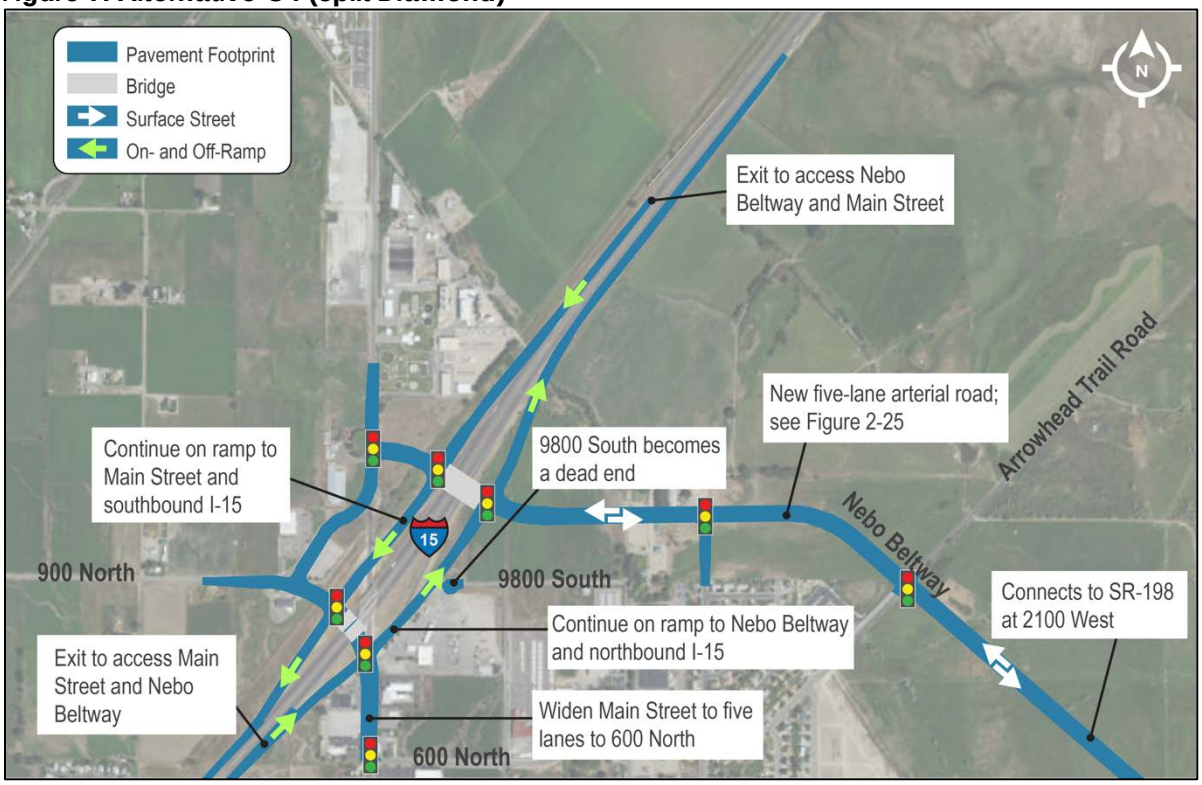


Figure 7. Alternative C4 (Split Diamond)



All six candidate build alternatives—to varying degrees—would satisfy the project's purpose and need and would result in different impacts to the natural and built environment. Identification of the Preferred Alternative was based on balancing multiple considerations, including the purpose and need, engineering design and traffic operations, impacts, community and economic considerations, cost, and public and agency input. After considering all these factors, UDOT identified Alternative C1 Braided Ramps as the Preferred Alternative (see Figure 8).

Alternative C1 would provide additional capacity at two locations—the existing Main Street interchange and a new interchange to the northeast. The new interchange would connect to Nebo Beltway—a new five lane arterial road, which would draw some traffic away from Main Street. Main Street would still have direct access to and from I-15, and would need to be widened to five lanes to 600 North. Main Street would also be realigned to connect to 900 North, instead of maintaining its current north south alignment to improve the skew.

Braided ramps (i.e., ramps that cross over each other) would connect the Main Street Interchange and the new Nebo Beltway Interchange. Motorists traveling on I-15 in either direction would exit I-15 and have the option to take the nearest road (i.e., Main Street for northbound motorists or Nebo Beltway for southbound motorists) or continue to the next road in free flow/continuous lanes without stopping at a traffic signal. Motorists entering I-15 from Main Street (northbound) or Nebo Beltway (southbound) would utilize the respective on ramp that would cross over the free flow continuous lanes and enter I-15 between both interchanges. From the new interchange, motorists would travel on Nebo Beltway until it intersects with SR-198 at 2100 West, thereby avoiding and reducing congestion at Main Street and the existing interchange.

Figure 8. Preferred Alternative

3.0 Affected Environment

The action area is situated along the Moist Wasatch Front Footslopes of the Central Basin and Range ecological region (Environmental Protection Agency [EPA] 2000). The area is fed by perennial streams and aqueducts from the adjacent Wasatch Mountains. The area is predominately irrigated cropland outside of developed areas. Urbanization and irrigation have reduced stream flows (EPA 2000). Elevation ranges between 4,520 feet above mean sea level to 4,665 feet above mean sea level (Wetland Resources 2017).

The action area consists of both urban and non-urban land uses. The southwest portion is the most urbanized and developed. Urban land uses include residential, commercial, industrial, education, public/quasi-public (e.g., churches, cemeteries, museums), and parks and recreation. The northeast portion is the most undeveloped and consists of various forms of agriculture and undeveloped lands.

3.1 Vegetation

The primary vegetation type outside of the developed areas is agricultural vegetation (U.S. Geologic Service [USGS] 2011). Field observations most recently conducted in August 2017 confirmed the area is primarily used for agriculture, including livestock grazing and cultivated fields (alfalfa) (Wetland Resources 2017). Palustrine emergent wetlands described throughout the agricultural areas also contain Baltic rush (*Juncus balticus*), spikerush (*Eleocharis palustris*), showy milkweed (*Asclepias speciosa)*, field sedge (*Carex praegracilis*), Nebraska sedge (*Carex nebrascensis*), rabbitsfoot grass (*Polypogon monspeliensis*), redtop (*Agrostis stolonifera*), hardstem bulrush (*Schoenoplectus acutus*), broadleaf arrowhead (*Sagittaria latifolia*), cattail (*Typha latifolia*), saltgrass (*Distichlis spicata*), alkali muhly (*Muhlenbergia asperifolia*), foxtail barley (*Hordeum jubatum*), reed canary grass (*Phalaris arundinacea*), common reed (*Phragmites australis*), lady's thumb (*Polygonum persicaria*), Olney's three-square (*Schoenoplectus americanus)*, annual ragweed (*Ambrosia artemisiifolia*), and strawberry clover (*Trifolium fragiferum*) (Wetland Resources 2017).

3.2 Soils

The majority of soils within the action area are considered vineyard fine sandy loam on 0 to 2 percent slopes and consists of very deep, somewhat poorly drained soils that were formed in mixed lacustrine sediments from mainly sedimentary rocks. Other notable soil types include Benjamin silty clay, Ironton loam, Logan silty clay loam, and Sunset loam. Each soil type is described below (Natural Resource Conservation Service 2015):

- *Benjamin silty clay* consists of very deep, somewhat poorly drained soils that formed in alluvium.
- *Ironton loam* is very deep, somewhat poorly drained soils that formed in alluvium and lacustrine deposits derived from mixed rocks.
- *Ironton soils* are on low lake terraces and flood plains.
- *Logan silty clay loam* consist of very deep, poorly drained, slowly permeable soils. These soils formed in alluvium and lake sediments from many kinds of rocks, but mostly from quartzite, sandstone, and limestone gneiss on flood plains, low smooth undulating lake terraces, and stream terraces.
- *Sunset loam* are very deep, somewhat poorly drained or moderately well drained soils that formed in alluvium derived from mixed rocks. Sunset soils are on flood plains and low stream terraces.

3.3 Water Resources

Approximately 37.92 acres of wetlands from 20 wetland complexes were described within the action area to the support the DEIS. Most of the wetlands are palustrine emergent wetlands (37.69 acres), with one small area of palustrine scrub shrub wetland (0.23 acres). Wetlands are largely confined to three locations:

- The northeast portion of the action area surrounding I-15
- A central undeveloped area in the eastern portion of the action area
- Several small complexes surrounding Main Street, north of the I-15/Main Street interchange

Wetlands are hydrologically supported by a combination of high water table, groundwater seeps or discharge, adjacent irrigation ditches, artesian wells, or stormwater runoff (Wetland Resources 2016).

Two natural waterways intersect the action area: Beer Creek and Peteetneet Creek. Beer Creek crosses under I-15 at the northern end of the action area in a concrete box culvert. The channel averages 21 feet wide and 1 to 3 feet deep at the ordinary high water mark. Beer Creek maintains a perennial flow and is a tributary to Benjamin Slough, which is a tributary to Utah Lake. U.S. Geological Survey topographic maps show Peteetneet Creek ending in downtown Payson at approximately 100 South and 100 East. The Peteetneet Creek channel is piped for much of its length and potentially flows into an irrigation tailwater ditch just south of I-15 (Wetland Resources 2016).

4.0 Species and Critical Habitat Considered

An Information for Planning and Conservation (IPaC) Resources report was prepared using the USFWS IPaC tool to identify threatened and endangered species and migratory birds that might be present in the overall study area evaluated in the *I-15, Payson Main Street Interchange DEIS* (the study area also encompassed the action area) (USFWS 2016). The IPaC report identified four threatened and endangered species that could be present: western yellow-billed cuckoo (*Coccyzus americanus*), June sucker (*Chasmistes liorus*), Canada lynx (*Lynx canadensis*), and Ute ladies'-tresses (ULT) (*Spiranthes diluvialis*). A wildlife survey was conducted on March 31 and April 1, 2015. Surveys for ULT were conducted in 2015, 2016, and 2017. All surveys aimed to identify the potential presence and suitable habitat of federally-listed species in the IPaC report. Table 1 identifies the likelihood for these listed species to occur in the action area. Species that are not likely to occur in the action area are not discussed further.

Table 1. Threatened and Endangered Species, Critical Habitat, and Likelihood to Occur in the Action Area

Common Name (*scientific name*)	Status / Date Listed	Designated Critical Habitat	Habitat	Likely to Occur in the Action area
Western yellow-billed cuckoo (*Coccyzus americanus*)	Threatened / November 3, 2014	Not within action area	Small cottonwood stands with intermittent presence of tamarisk and occasional sightings in Russian olive stands with no over-story	No; no suitable habitat in the action area
June sucker (*Chasmistes liorus*)	Endangered/ March 31, 1986	Not within action area	Endemic to Utah Lake and Provo River	No; no suitable habitat in the action area
Canada lynx (*Lynx canadensis*)	Threatened / March 24, 2000	Not within action area	Boreal forests that have density populations of snowshoe hares	No; no suitable habitat in the action area
Ute ladies'-tresses (*Spiranthes diluvialis*)	Threatened / January 17, 1992	No critical habitat is associated with this species.	Alluvial deposits of silty, sandy, gravelly, or cobbly soil; wetlands; grazed pastures with introduced pasture grasses (see Section 4.1 for more information)	Yes; individuals identified

Source: USFWS 2016; Wetland Resources 2016a, 2017

ULT is the only listed species discussed in greater detail because all other species have no likelihood of occurring in the action area.

4.1 Ute Ladies'-tresses

The ULT is a perennial, terrestrial orchid. It has stems 8 to 20 inches tall, and narrow leaves about 11 inches long at the base of the stem that reduce in size going up the stem. The flowers consist of 3 to 15 small white or ivory colored flowers clustered into a spike arrangement at the top of the stem. ULT is endemic to moist soils in mesic or wet meadows near springs, lakes, or perennial streams. The species occurs primarily in areas where the vegetation is relatively open and not overly dense, overgrown, or overgrazed (USFWS 1990). Populations are generally found between 4,300 feet and 6,850 feet above mean sea level (Fertig, et al 2005). The species may occasionally be found in highly organic soils or peat. ULT seems to prefer well-drained soils with fairly high moisture content. ULT is sometimes found in heavily disturbed sites, such as old gravel mines that have since been developed into wetlands, and along well traveled footpaths built on old berms. The species is also found in grazed pastures with introduced pasture grasses. ULT occurs among grasses, sedges, rushes, shrubs, and riparian trees such as willow species. It rarely occurs in deeply shaded sites and prefers partially shaded open glades, pastures, and meadows in full sunlight (Wetland Resources 2017).

Critical Habitat

The USFWS determined in final rule 57 FR 2048 205 that designation of critical habitat was not prudent because of the flower's popularity for collection. Publication of critical habitat descriptions and maps would make the flower more vulnerable to collection. If individual plants or flowers were collected, it could adversely impact the reproductive potential of the affected population (USFWS 1992).

Life History

ULT is a perennial forb that is believed to reproduce by seed with the potential to also reproduce asexually from a single root mass or broken root segment. Its life cycle can be divided into four stages: seedling, dormant, vegetative, and reproductive (flowering or fruiting). The flower generally blooms August through September, and seeds shed shortly thereafter. Flowering typically occurs earlier in sites that have an open canopy and later in well-shaded sites (USFWS No date).

Ute ladies'-tresses blooming at the Springville, Utah Ute ladies'-tresses site, August 1, 2016.

ULT seeds are microscopic, almost dust-like, and are easily dispersed by wind, water, and pollinators with bees being the primary pollinator. Seeds contain small amounts of stored food to sustain embryos and, as result, are short-lived if germination does not occur immediately. Germinated seedlings must quickly establish a symbiotic relationship with mycorrhizal soil fungi to survive. The absence or rarity of fungal symbionts may be a major factor limiting the establishment of new ULT populations (USFWS No date).

New shoots are produced in October, persist through the winter, and resume growth through the spring until they have developed into short-stemmed, leafy, photosynthetic plants. Depending on site productivity and conditions, vegetative shoots may remain in this state all summer or develop inflorescences. Vegetative individuals die back in the winter to subterranean roots or persist as winter rosettes (USFWS No date).

Population Dynamics

In 1992, 10 extant populations and seven historical localities with an overall population of approximately 6,000 plants were identified in Colorado, Utah, and Nevada (USFWS 1992). In 2005, 61 ULT populations, 52 of which were extant, had been identified and documented with an estimated population of 83,300 plants. The current population (i.e., individual plants) is unknown. Estimating the rangewide population size is difficult because of inconsistent monitoring and survey methods of existing habitat, potential habitat, and known population localities. In addition, counts are based only on flowering individuals and do not take into account vegetative, fruiting, and below-ground plants, which tends to result in large annual fluctuations. Flowering plants from previous years that were presumed to be dead or missing may have actually been dormant in following years and are not counted, thus affecting overall population counts. However, the overall population trend seems to be relatively stable (Fertig, et al 2005).

Status and Distribution

ULT was listed in 1992 because fewer than 6,000 known plants existed at the time of listing throughout its entire range, which includes north-central Colorado, northern and south-central Utah, southeastern Nevada, southeastern Wyoming, southwestern Montana, western Nebraska, eastern Idaho, and north-central Washington (USFWS 1992; Fertig, et al 2005). ULT populations were declining as a result of the following factors (USFWS 1992):

- Modification of its riparian habitat
- Herbicides
- Agricultural activities and livestock grazing and trampling
- Overcollection, especially near urban areas, by wildflower enthusiasts
- Urbanization

The action area is located along the Wasatch Front. Habitat along the Wasatch Front has been modified by urbanization, stream channelization, and construction projects in and adjacent to the Jordan and Weber Rivers and their tributaries in wetlands and meadows adjacent to the Great Salt Lake (USFWS 1992).

New threats include impacts from recreation (i.e., increased access to riparian areas), competition from invasive species, construction of roads and other infrastructure, late season haying, reduction in pollinators, and pollution. These threats, in addition to continued urbanization, are now the primary factors threatening the existence of ULT. Recent research, however, indicates that ULT are not as sensitive to human disturbances as assumed in the 1992 ruling (Fertig, et al 2005).

5.0 Environmental Baseline

The action area has experienced steady urbanization since Payson was settled in the early 1850s. Population projections predict the population will increase by approximately 31,000 people by 2040 (UDOT 2017). The result of this growth will be the conversion of existing farmland and undeveloped land to various urban uses and, consequently, a reduction in suitable ULT habitat.

5.1 Ute Ladies'-tresses Status in the Action area

The action area was surveyed three consecutive years—2015 through 2017—to identify suitable habitat and individual plants. The survey area consisted of a 300-foot buffer around alternatives that were under consideration at the time of each survey. The survey area was slightly different each year as alternatives were revised throughout the alternative development and screening process. The following explains the rationale for each survey area:

- **2015 Survey Area**: The approximately 1,193-acre survey area was based on the overall footprint of 21 conceptual alternatives initially considered in the *I-15, Payson Main Street Interchange DEIS.* These alternatives were designed at a high level and included numerous alignments of Nebo Beltway.
- **2016 Survey Area**: By the 2016 survey season, the number of conceptual alternatives had been reduced to four. These alternatives were refined and designed in greater detail, and a single alignment of Nebo Beltway had been identified. The survey area was reduced from the 2015 survey area to approximately 902 acres.
- **2017 Survey Area**: The 2017 survey area was expanded from the 2016 survey area to approximately 968 acres because alternatives R1 and R2 were brought back for detailed analysis in the *I-15, Payson*

Main Street Interchange DEIS (both alternatives had previously been eliminated for further consideration). The survey area was expanded west of the Payson Power Plant to provide a 300-foot buffer from the realignment of Main Street under Alternative R1. In addition, UDOT adopted new design standards in early 2017, which lengthened the on- and off-ramps under all alternatives that were under consideration at the time (see Section 2.3); the survey area around I-15 was expanded to accommodate this change.

The assessment of ULT suitable habitat criteria and disqualifiers was conducted in accordance with the U.S. Fish and Wildlife Service protocol and supplemental publications and studies (Wetland Resources 2017). Site visits to known ULT sites in Springville and Mendon occurred at the time of each survey to determine when plants were blooming in the region (Wetland Resources 2017). The following criteria were used to disqualify certain areas within the action area that do not support potential ULT habitat (Wetland Resources 2017):

1. Appropriate hydrology not present, typically indicated by:
    a. comprised of mostly upland vegetation
    b. area dries up by mid-July, with water table lower than 12 to 18 inches below the soil surface
2. Heavy clay soils present
3. Soils strongly alkaline
4. Site heavily disturbed, such as, for example:
    a. stream banks channelized and stabilized by heavy rip-rap
    b. highway rights-of-way built on filled or compacted soil or rock material
    c. construction sites where construction has either stripped the topsoil or where construction has been completed within the last 5 years but the area has not been revegetated
5. Stream banks steep, transition from stream margin to upland areas abrupt
6. Site characterized by standing water with cattails, bulrushes, and other emergent aquatic vegetation (note that margins of such areas may be suitable habitat).
7. Riparian areas, stream banks, or wetlands vegetated with dense rhizomatous species such as reed canary grass, tamarisk or salt cedar, teasel, common reed, or saltgrass
8. Riparian areas overgrazed or otherwise managed such that the vegetation community is comprised of upland native or weedy species or is unvegetate. ULT can, however, tolerate rather extreme overgrazing as long as a drop in the water table has resulted as indicated by conversion of the riparian or wet meadow pasture vegetation community to mostly upland species.
9. Potential habitat is no longer in a natural condition, for example, has been converted to agricultural uses and is now plowed and cropped, or has been converted to lawns or golf courses. Wet meadow pastures, however, with a mix of native and non-native pasture grasses, including pastures that are regularly hayed, are suitable potential habitat.
10. Wetland is a brackish playa or pothole not fed by springs or not in the floodplain of, or hydrologically connected with, a riparian system or other source of fresh water (note that fens and wetlands associated fresh water springs are suitable potential habitat).

Figure 9 illustrates the differences between each survey area and highlights areas within 300 feet of the Preferred Alternative that were not surveyed for three consecutive years; suitable habitat was not identified in any of these areas.

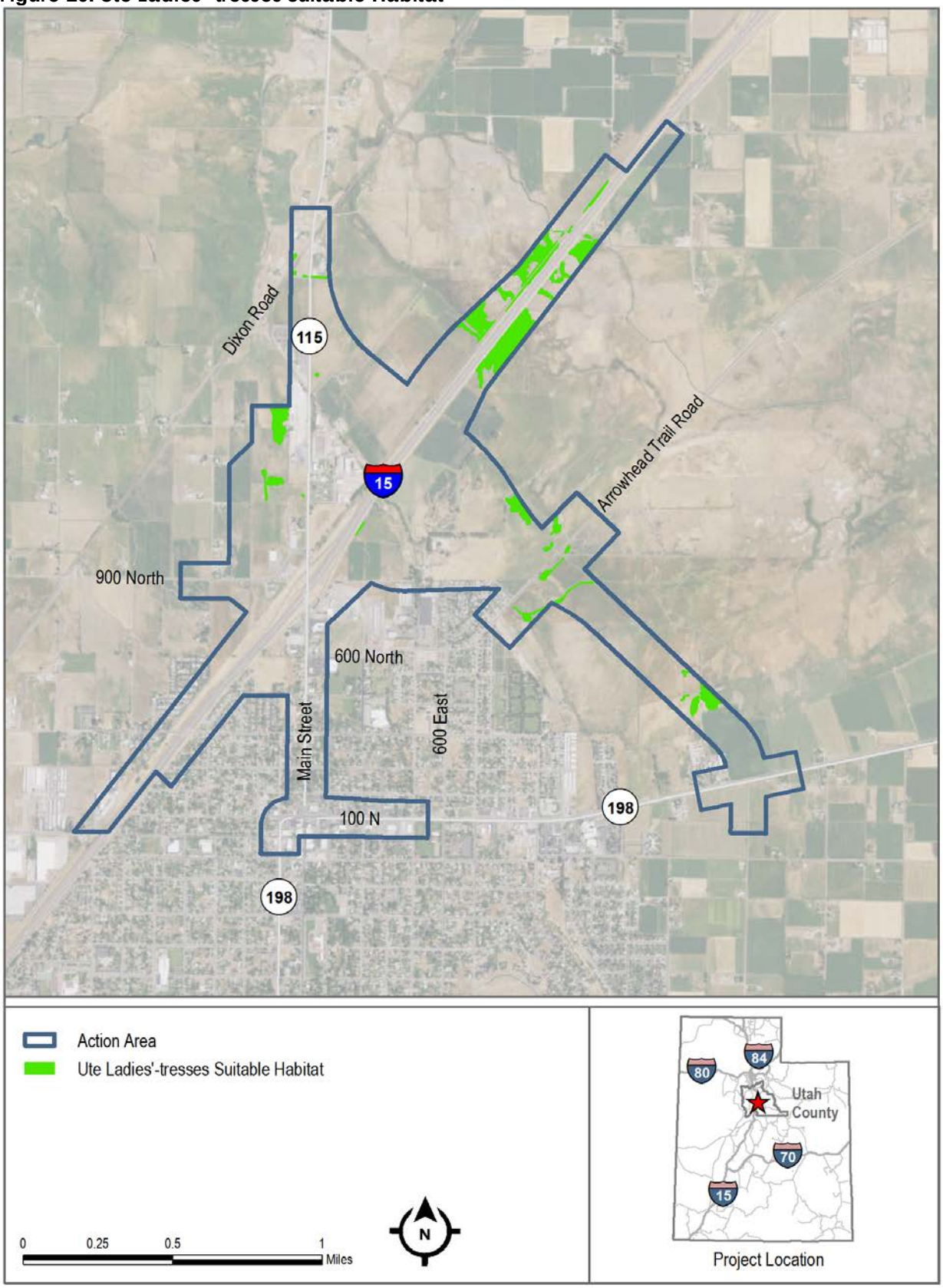
Figure 9. Ute Ladies'-tresses Survey Areas

The action area includes many palustrine emergent wetlands that provide varying degrees of suitability for ULT habitat (see Figure 3). All of the wetland areas within the action area, regardless of suitability, were surveyed August 25 through 28, 2015; a second time on August 1 through 3, and 10, 2016; and a third time on August 14 through 17, 2017 (Wetland Resources 2016; Wetland Resources 2017). The banks of Beer Creek, 19 wetlands, and all irrigation ditches and canals within the action area were also surveyed. All surveys occurred during the ULT blooming season (Wetland Resources 2017).

Areas not surveyed for ULT met the criteria provided for disqualified habitat. These areas were dominated by upland vegetation and did not have appropriate hydrology to support ULT. More specifically, these areas were primarily agricultural fields dominated by upland grasses, and developed areas that were dominated by buildings and hard surfaces. Two wetland areas were surveyed but disqualified as suitable habitat because they were dominated by either a thick stand of cattails that does not support a wet meadow fringe or by thick stands of coyote willow and common reed. (Wetland Resources 2017)

Suitable habitat areas were surveyed using a 100 percent coverage pedestrian survey with 5-foot transect widths within a smaller survey area compared to the action area (see Figure 10). Approximately 30.8 acres of suitable habitat were identified in the survey area. No ULT individuals were identified during the 2015 or 2016 surveys. A new population, however, of 13 plants was discovered during the 2017 survey in an area that was added to account for the R1 Alternative and which was not surveyed in 2015 or 2016. Individuals were found growing in an approximately 2,000 square-foot area comprised of wet meadow habitat, which included clustered field sedge, Olney's three-square bulrush, Baltic rush, annual ragweed, rabbitsfoot grass, spikerush, marsh paintbrush, and strawberry clover. Soils were saturated at or near the surface and classified as McBeth silt loam, which is poorly drained, non-saline, with an average water table depth of 12 to 24 inches (Wetland Resources 2017).

Figure 10. Ute Ladies'-tresses Suitable Habitat



5.2 Factors Affecting Ute Ladies'-tresses in the Action area

Existing agricultural activities, such as grazing, late season haying, and continued urbanization are current activities affecting the ULT's environment. Undeveloped areas containing suitable habitat are planned for various industrial, commercial, and residential urban land uses. Of particular interest is the planned 740-acre mixed-use development northeast of the existing Main Street interchange on both sides of I-15 called Bamberger Ranch. The development would encompass most ULT suitable habit in the survey area. Development will be guided by the *Bamberger Ranch P-C Zone Plan* (i.e., master plan). The plan identifies the Maximum Development Scenario, which is dependent on the I-15 Main Street interchange and the proposed Nebo Beltway moving onto Bamberger Ranch property. The plan acknowledges that UDOT may not relocate the interchange on Bamberger Ranch property. If this is the case, the plan would adapt to provide lower intensity development (i.e., fewer commercial areas and lower density residential development) compared to the Maximum Development Scenario (Bamberger Ranch 2011). The Preferred Alternative would add an interchange to connect to the new Nebo Beltway; therefore, this analysis and the *I-15, Payson Main Street Interchange DEIS* assumes the Maximum Development Scenario would be implemented. There are no other known state or federal actions in the action area.

6.0 Effects of the Action

6.1 Direct Effects

There would be no direct effects to known ULT populations under the Preferred Alternative. The only identified plant population is located in the vicinity of an existing road that would be widened to accommodate a center turn lane. The nearest roadway improvements would occur approximately 470 feet west of the population (see Figure 11). Direct effects to ULT suitable habitat are anticipated under the Preferred Alternative. The Preferred Alternative would permanently remove approximately 3.76 acres or 10.1 percent of surveyed suitable habitat (see Figure 12). However, the likelihood of the Preferred Alternative affecting individual plants is low considering that individuals were not identified in these areas through three years of survey.

Figure 11Individual Ute Ladies'-Tresses and Preferred Alternative

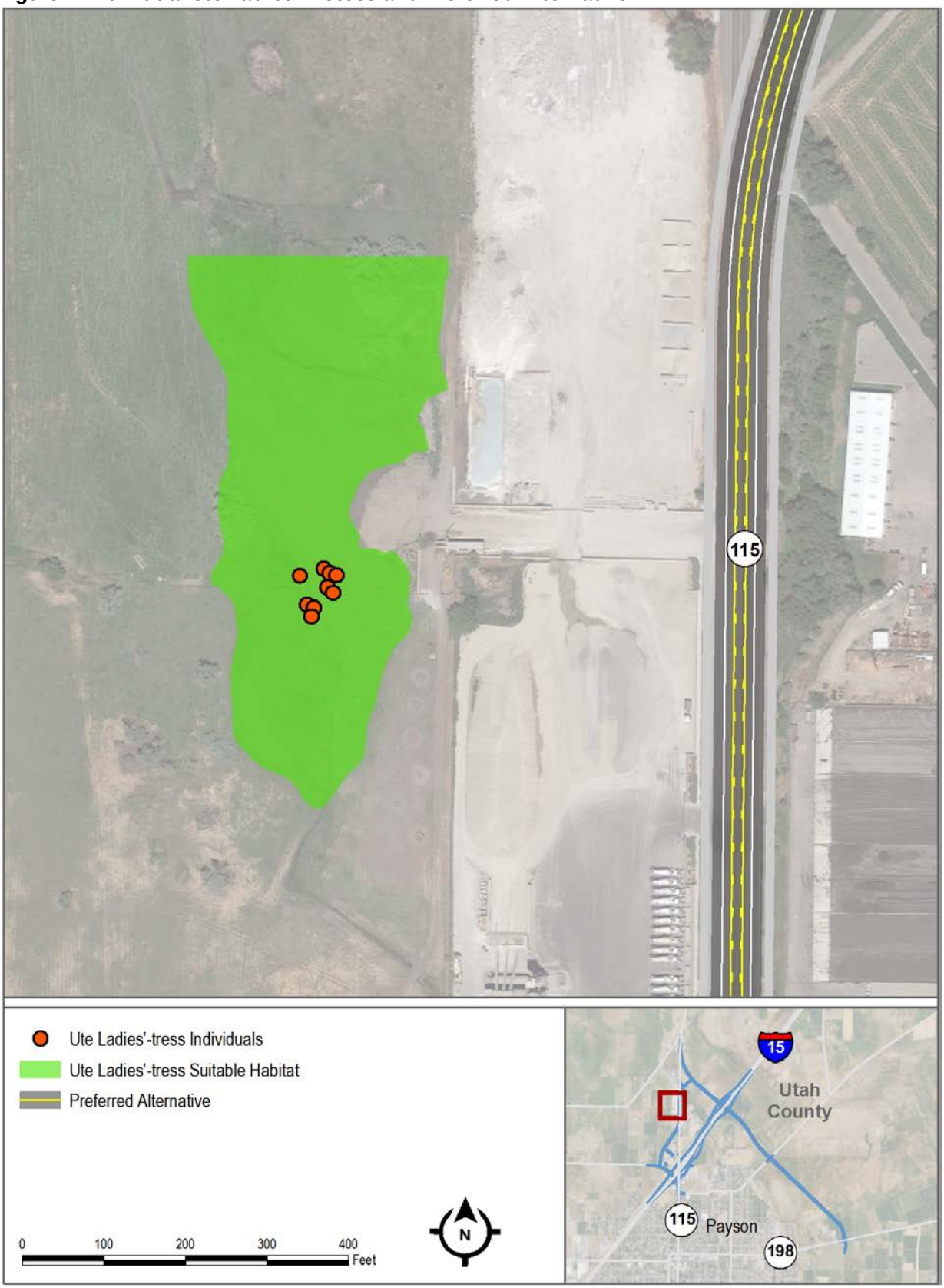
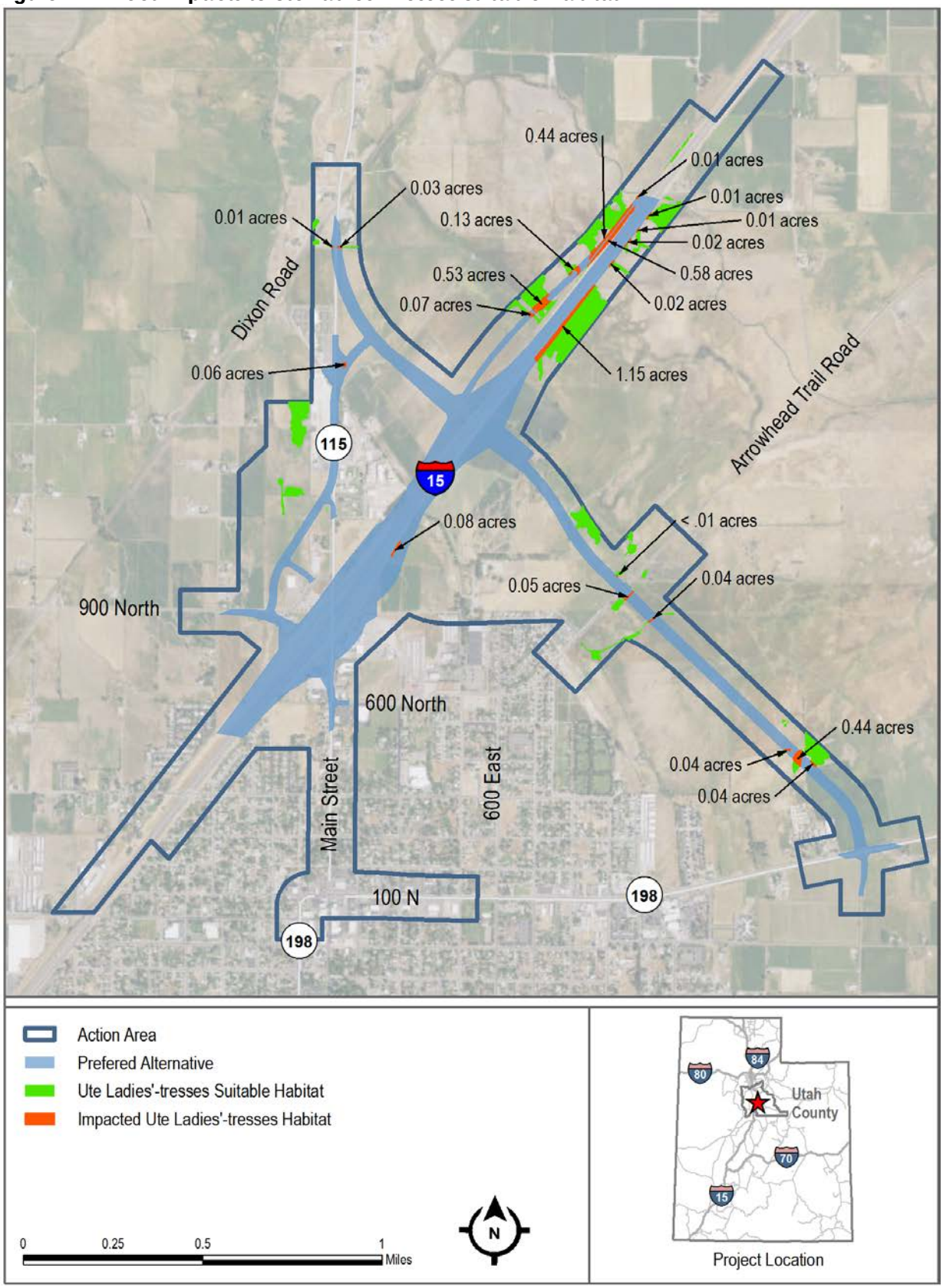


Figure 12. Direct Impacts to Ute Ladies'-Tresses Suitable Habitat



6.2 Indirect Effects

The DEIS analyzed the potential indirect effects, including growth inducing effects, that could result under the Preferred Alternative. The induced growth analysis recognized that development is also dependent on several other factors in addition to improved access provided by transportation projects. Market conditions; access to water, sewer, gas, and electric utilities; land use ordinances; and political climate play an important role in determining the timing, location, and type of development. Development could not occur without the alignment of all these factors. In addition, the action area, with or without the Preferred Alternative, would most likely be fully developed by 2040, but the Preferred Alternative could influence the type, intensity, and timing of development (See Chapter 3 in *I-15, Payson Main Street Interchange DEIS* for more information) (UDOT 2017).

Although the known plant population is within the action area (approximately 470 feet west of Main Street, north of the I-15 Main Street Interchange; see Figure 11), it is unlikely that the Preferred Alternative would influence development in this area and indirectly affect known ULT populations for the following reasons:

- The road network is an established grid, and the Preferred Alternative would not alter the alignment of the road network (i.e., Main Street) in proximity to the known plant population.
- A concrete batch plant separates and limits access to the known plant population from the Preferred Alternative (i.e., Main Street).
- Payson City has zoned this area S-1 Special Highway Service Zone, which allows for a variety of large scale commercial service and retail uses (City of Payson 2014, 2016). These land uses typically require street front visibility to be economically viable. The Preferred Alternative would not provide street front visibility near the known plant population and, therefore, is unlikely to increase development in this area.
- Access to the known plant population from the existing road network under the Preferred Alternative would require additional infrastructure improvements beyond the scope of this project.

In addition, it is unlikely that the Preferred Alternative would indirectly affect known plant populations during construction and operation. Construction equipment and activities would be restricted to the right-of-way. Stormwater runoff from realigning Main Street would not infiltrate the wetlands supporting known plant populations. Stormwater from the Preferred Alternative would be conveyed via curb and gutter to a retention pond northeast of the known plant population. The pond would outfall to a tailwater ditch that flows north towards Utah Lake and away from the known plant population (UDOT 2017).

The Preferred Alternative, more specifically the additional interchange and Nebo Beltway, could indirectly result in the loss of identified suitable habitat as the result of induced growth and other effects, such as increased runoff, construction dust, introduction of noxious weeds, and pollinator displacement (UDOT 2015). Unlike realigning Main Street, the road network east of I-15 is not as extensive. The introduction of Nebo Beltway would expose ULT suitable habitat to increased human activities associated with the new roadway and development. Increased development in the regional study area could result in suitable habitat loss, increased traffic volumes, increased human activity, and a greater number of domestic pets and plants. Increased development could result in an increase in noxious weeds that could invade existing ULT suitable habitat.

6.3 Cumulative Effects

Potential cumulative impacts to ULT individual plants and suitable habitat include a reduction of wetlands which serve as potential habitat. The loss of wetlands as a result of direct and indirect impacts could contribute to the cumulative loss of wetlands in Utah County, and corresponding loss of potential habitat for ULT. However, the project proposes to mitigate for direct wetland impacts from the UDOT Northern Utah County Mitigation Bank which provides similar wetland habitat that would be filled by the Preferred Alternative. As a result, there would be no net loss in wetlands, and therefore no cumulative effects of the project.

7.0 Determination of Effects

Table 2 summarizes the determination of effect by species. The Preferred Alternative would result in a determination of *may affect, not likely to adversely affect* for ULT because: 1) Individual ULT plants identified during the third year of survey would not be directly impacted by the Preferred Alternative; 2) Individual plants are extremely unlikely to be indirectly affected by the Preferred Alternative; and 3) Effects to ULT suitable habitat impacted by the Preferred Alternative are discountable because no plants were identified in these areas during three years of survey.

Although the Preferred Alternative could influence development patterns, the action area would be fully developed even if the Preferred Alternative is not constructed in response to projected population growth. Therefore, it is not reasonable to attribute the conversion of suitable ULT habitat to various urban uses solely to the Preferred Alternative.

Table 2. Determination of Effect by Species

Species	Species Effect Determination	Basis for Determination
Western yellow-billed cuckoo (*Coccyzus americanus*)	No effect	Not within action area
June sucker (*Chasmistes liorus*)	No effect	Not within action area
Canada lynx (*Lynx canadensis*)	No effect	Not within action area
Ute ladies'-tresses (*Spiranthes diluvialis*)	May affect, not likely to adversely affect	No individual plants directly or indirectly affected; suitable habitat exists within the action area

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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

RECEIVED
FEB 2018

☐ Concur No Effect
Species:
☒ Concur Not Likely to Adversely Affect
Species: Ute ladies'-tresses
☐ No Comment
Paul D. Abate
U.S. FWS Utah Field Supervisor
Date 2-8-18

February 2, 2018

Larry Crist
Utah Field Supervisor
Utah Ecological Services Field Office
2369 Orton Circle, Suite 50
West Valley City, Utah 84119

Subject: Request for Concurrence with the Utah Department of Transportation's Determination that the I-15 Payson Main Street Interchange Project is Not Likely to Adversely Affect Ute Ladies' Tresses

Dear Mr. Crist:

The Utah Department of Transportation (UDOT) presents its Biological Assessment (BA) of the I-15 Payson Main Street Interchange project for your office's consideration. The BA has been prepared to comply with Section 7 of the Endangered Species Act of 1973 (ESA), as amended, and to support the Environmental Impact Statement (EIS) UDOT is preparing for the Project. With this letter, we are requesting the U.S. Fish and Wildlife Service's (FWS) concurrence with UDOT's determination that the proposed project is not likely to adversely affect Ute ladies' tresses.

The I-15 Payson Main Street Interchange project is located in Utah County, Utah and is centered on I-15 Exit 250 in Payson, Utah. The western boundary of the 4.6 mile study area follows the Union Pacific railroad tracks west of I-15; the southern boundary parallels SR-198. The eastern boundary crosses agricultural fields for approximately 2.3 miles until meeting I-15, with the northern boundary continuing east along 1500 North before terminating west of Dixon Road. The Preferred Alternative, C1- Braided Ramps, would provide a free-flow connection between the existing Main Street interchange and a new interchange.

UDOT evaluated the potential impacts of the Preferred Alternative to four species identified by the Information for Planning and Consultation (IPaC) system. These species are: Canada lynx (*Lynx canadensis*), June sucker (*Chamistes liorus*), yellow-billed cuckoo (*Coccyzus americanus*), and Ute ladies' tresses (*Spiranthes diluvialis*). In the attached BA, UDOT finds that Ute ladies' tresses and its suitable habitat are present in the Action Area representing the six build alternatives considered and that impacts to Ute ladies' tresses resulting from the Preferred Alternative would be discountable. UDOT concludes that the project "may affect, but is not likely to adversely affect" Ute ladies' tresses. UDOT determined that Canada lynx, June sucker and yellow-billed cuckoo along with their designated critical habitats, do not occur within the project's

Action Area. Suitable habitat for these species was also found to be absent. For these species, UDOT determined the proposed project would have "no effect".

For your additional information, UDOT is preparing the EIS in accordance with the National Environmental Policy Act (NEPA) and under a Memorandum of Understanding (MOU) with the Federal Highway Administration (FHWA). Under this MOU, UDOT has been assigned FHWA's responsibilities for compliance with the requirements of Section 7 of the Endangered Species Act as part of the environmental review process for highway projects in Utah. A DEIS was released for agency and public comment on September 29th, 2017. UDOT anticipates issuing a combined Final Environmental Impact Statement (FEIS) and Record of Decision (ROD) in June of 2018.

Should you have any questions about this letter or the Biological Assessment, please contact me, Naomi Kisen, at 385.226.7614 or via email to nkisen@utah.gov.

Sincerely,

Naomi Kisen

Naomi Kisen,
Environmental Program Manager
Utah Department of Transportation

Cc via email:
Andrea Clayton, Lochner
Amy Defreese, USFWS