

Analysis of Traffic Noise Environment and Impacts

US-91, Park Lawn to Siphon Rd, Chubbuck

**Project Number: A021(860)
Key Number: 21860**

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1.0 Executive Summary

Idaho Transportation Department (ITD) District 5 is proposing intersection improvements at US-91 (Yellowstone Avenue) and Siphon Road/New Day Parkway and associated roadway widening along US-91 from Park Lawn to Southside Way in Chubbuck, Idaho. US-91 is a principal arterial that acts as an alternate route for Interstate 15 (I-15) and passes through the Cities of Pocatello and Chubbuck. The intersection of US-91 and Siphon Road/New Day Parkway connects the urban core of Chubbuck to the Northgate Interchange (Exit 73). Traffic counts and future development indicate that this area will need to accommodate much higher traffic volumes. ITD has identified improvements to the intersection of US-91 and Siphon Road/New Day Parkway and widening of US-91 throughout the project limits to accommodate these projected volumes.

This project is a Type I project as it will increase the number of through lanes on US-91 and Siphon Road/New Day Parkway. Type I projects require traffic noise analysis of potential traffic noise impacts to sensitive receptors. This traffic noise analysis was performed in accordance with Title 23 of the Code of Federal Regulations Part 772 (23 CFR 772). In addition, this report follows the ITD *Traffic Noise Policy*, dated May 2011 in the Environmental Process Manual.

Field measurements were taken, and a computer traffic noise analysis was performed using the Federal Highway Administration (FHWA) Traffic Noise Model (TNM 2.5) to predict traffic noise impacts to sensitive receptors in the study area for the year 2021 and the design year of 2048.

The results indicate a total of five Category B receptors approach or exceed the noise abatement criteria (NAC) with the Build Alternative. Results of the existing condition indicate six Category B receptors approach or exceed the NAC. Overall, the impacts associated with the project show an increase between 2 to 4 dBA (A-weighted decibel) in traffic noise levels within the study area when compared to the existing condition. Per the ITD *Traffic Noise Policy*, this is considered a slightly noticeable increase (3 to 5 dBA). No receptors experience a substantial increase (15 dBA and greater) in noise levels with the project.

Three receptors will be relocated to accommodate the project and will not exist under the Build Alternative.

Traffic noise abatement measures were considered for impacted receptors. Construction of a barrier at Segments 1 and 2 is not feasible. No traffic noise abatement measures will be installed for this project.

ITD staff makes the determination for mitigation based on the feasibility and reasonability worksheets completed during the traffic noise study. Barrier feasibility and reasonability worksheets are located in Appendix F (Checklist 1055). The Noise Abatement Decision Checklists are located in Appendix G (Checklist 1056).

The Information to Local Jurisdictions Letter is included in Appendix H which will be provided by ITD to local jurisdictions within two weeks following approval of the project's environmental determination (date of public knowledge).

2.0 Introduction

This traffic noise analysis was performed in accordance with Title 23 of the Code of Federal Regulations Part 772 (23 CFR 772). In addition, this report follows the ITD *Traffic Noise Policy*, dated May 2011.

2.1 Traffic Noise Criteria

Sound is created by a source that causes the air to vibrate at a frequency that can be heard by the human ear. This sound propagates through the air and is affected by environmental factors such as distance, barriers, atmospherics, and other influences. It is then picked up as sound by the receiver and can also be affected by the sensitivity of that receiver (e.g., human ear, microphone).

The human ear can hear sounds from 20 micro-Pascals (.00002 Pascals, a measure of air pressure) to as much as 6,500,000 micro-Pascals. Because of this wide range, the decibel (dB) was developed as a logarithmic measure of sound specifically heard by the human ear. Using this scale, a doubling of sound will only add 3 dB; for example, doubling the amount of traffic on a road would only increase the sound from 50 to 53 dB. An actual perception of sound being twice as loud would be 10 dB and would be a ten-fold increase in the sound energy. An example of different noise levels is illustrated in Table 1.

Table 1. Common Outdoor and Indoor Noises.

Common Outdoor Noises	Sound Pressure Level (dBA)	Common Indoor Noises
Jet Flyover at 300 meters	110	Rock Band at 5 meters
Gas Lawn Mower at 1 meter	100	Inside Subway Train (New York)
Diesel Truck at 15 meters	90	Food Blender at 1 meter
Noisy Urban Daytime	80	Garbage Disposal at 1 meter or Shouting at 1 meter
Gas Lawn Mower at 30 meters	70	Vacuum Cleaner at 3 meters
Commercial Area	60	Large Business Office and Normal Speech at 1 meter
Quiet Urban Daytime	50	Dishwasher in next room
Quiet Urban Nighttime Quiet Suburban Nighttime	40	Large Conference Room (background)
Quiet Rural Nighttime	30	Bedroom at Night
	20	Recording Studio
	0	Threshold of Hearing

Source: FHWA (<https://highways.dot.gov/public-roads/julyaugust-2003/living-noise>)

Frequency is another component of sound that can be distinguished by the human ear. The frequency range of hearing for the human ear is approximately 20 Hertz (cycles per second) to 20,000 Hertz. A piano ranges from 32 Hertz on the base to 4,000 Hertz on the high end with Middle C being 256 Hertz.

Because the human ear is less sensitive to higher and lower frequencies, the A-weighted scale was developed, and the unit of measurement is known as the A-weighted decibel (dBA). In the A-weighted scale, the lower and higher frequency decibel levels are reduced while the middle decibel levels that the human ear is more sensitive to are increased. All noise levels in this report are stated as hourly L_{eq} (energy-averaged equivalent sound pressure level) in terms of dBA.

As noise spreads out from a source, the sound intensity will drop at a rate of 3 dBA per doubling of distance for a line source such as a road, and at 6 dBA per doubling of distance for a point source such as an idling truck or piece of heavy equipment. The type of ground (hard [asphalt] or soft [grass]) can affect this rate of drop in the sound level as well as natural barriers.

2.2 Regulations

The FHWA has developed criteria for establishing traffic noise impacts and mitigating those impacts in the FHWA's "Procedures for Abatement of Highway Traffic Noise and Construction Noise". The regulations can be found in 23 CFR 772. This project is a Type I project as it will increase the number of through lanes on US-91 and Siphon Road/New Day Parkway. Type I projects require traffic noise analysis of potential traffic noise impacts to sensitive receptors.

The FHWA developed traffic NAC for several categories of land use activities (Table 2). This table depicts different NAC standards for various land uses that must be met in the design year or mitigation must be considered. In addition, ITD policy for a substantial increase in traffic noise level is 15 dBA and greater, or that which would be considered over twice as loud to the human ear. A L_{eq} , A-weighted, 1-hour, (L_{eqah}) traffic noise measurement is used as the basis to assess the impacts that a roadway has on the sensitive receptors that are located along the proposed road.

The FHWA NAC and ITD policy are defined by the predicted traffic noise level approaching (1 dBA below the FHWA Absolute NAC) or exceeding the FHWA NAC. This traffic noise level is an external L_{eq} of 56 dBA for Category A receptors, an external L_{eq} of 66 dBA for Categories B and C receptors and an external L_{eq} of 71 dBA for Category E receptors. Category D receptors require an internal L_{eq} of 51 dBA and categories F and G have no criteria.

Table 2. Federal Highway Administration Noise Abatement Criteria.

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

Source: 23 CFR 772 and ITD Traffic Noise Policy

2.2.1 Model Calibration and Predictions

Traffic noise analysis is performed by physically measuring traffic noise in the field and running a computer analysis to model both the present and future traffic noise levels. The field measurements of traffic noise are compared with the computer model using observed traffic volumes and speeds, local issues are researched, and other noise sources impacting the sensitive receptors are observed. Field measurements are taken to verify the accuracy of the model in predicting traffic noise levels. Modeled results must be within 3 dBA of the field results for the model to be validated; unless it is documented that site conditions or noise from other sources has a noticeable effect on the field measurements. Both a present and a proposed roadway are entered into the computer model along with the design hourly volume (DHV) of traffic to predict Existing, No Build, and Build traffic noise levels.

2.2.2 Abatement Study

The future traffic projections on the proposed road are used to determine if traffic noise levels will approach the FHWA/ITD policy guidelines. These guidelines require that abatement must be considered to reduce the traffic noise levels when they approach (within 1 dBA) or exceed the federal guidelines or when the traffic noise level increases substantially (15 dBA and greater) above the existing traffic noise level. Any proposed abatement needs to be both feasible and reasonable before it is accepted.

According to ITD Noise Policy, feasible means an effective noise wall/berm can be constructed considering acoustical and engineering factors (e.g., topography, access, utilities, safety, maintenance). An effective noise wall is defined as a sound abatement structure that achieves a minimum 5 dBA highway traffic noise reduction at the majority of impacted receptors.

Reasonable means that a feasible traffic noise barrier is appropriate to construct based on an evaluation of the following required factors:

- barrier cost effectiveness (i.e., \$40,000 per benefited receptor),
- viewpoints of benefited property owners and residents of the benefited receptors (i.e., 50% +1 of benefited property owners or 75% of benefited renters must approve a noise barrier), and
- design goal (i.e., 7 dBA noise reduction for the closest receptor to centerline).

A benefited receptor is a receptor which is projected to receive a noise reduction of 5 dBA, or more, as a result of the proposed traffic noise mitigation measures. All benefited receptors should be included whether or not they were identified as impacted. Failure to meet any one of the above required factors means that a noise barrier is not reasonable.

The calculations for the cost of constructing a traffic noise barrier are based on length multiplied by the adjusted height (height of barrier above roadway centerline plus 4 feet). This is then multiplied by \$40.00 per square foot for a barrier over 1,320 feet long and \$48.00 per square foot for a barrier 1,320 feet long or less. The barrier costs can be divided by the number of benefited receptors to determine the cost per receptor. For example, if the total cost of building a barrier in front of five houses was \$90,000, the per benefited receptor cost would be \$18,000. As a result, the barrier would be reasonable to build from a cost standpoint. Other optional factors that may be considered to determine reasonableness include date of development, changes between existing and future build conditions, exposure to higher absolute highway traffic noise levels, design year build dBA levels compared to current and design year no-build, compatibility with local land use plans, local jurisdictional commitments to traffic noise abatement, and type of development to be protected.

3.0 Project Description

ITD District 5 is proposing intersection improvements at US-91 (Yellowstone Avenue) and Siphon Road/New Day Parkway and associated roadway widening along US-91 from Park Lawn to Southside Way in Chubbuck, Idaho. US-91 is a principal arterial that acts as an alternate route for I-15 and passes through the Cities of Pocatello and Chubbuck. The intersection of US-91 and Siphon Road/New Day Parkway connects the urban core of Chubbuck to the Northgate Interchange (Exit 73). Traffic counts and future development indicate that this area will need to accommodate much higher traffic volumes. ITD has identified needed improvements to the intersection of US-91 and Siphon Road/New Day Parkway and widening of US-91 throughout the project limits to accommodate these projected volumes. The project will include:

- Widening the existing US-91 three lane section to five lanes,
- A 12-foot northbound right-turn lane from US-91 onto eastbound New Day Parkway,
- New curb and gutter throughout,
- A 12-foot bicycle/pedestrian shared-use path along the east side of US-91 and both sides of New Day Parkway,
- A five-foot sidewalk along the west side of US-91, south of Siphon Road, and both sides of Siphon Road,
- A six-foot sidewalk along the west side of US-91, north of Siphon Road,
- Widening the existing two-lane and three-lane sections of Siphon Road and New Day Parkway to five lanes,
- Relocating approximately 585 feet of City owned sewer to accommodate the burying of the Chester Drain irrigation wasteway ditch,
- Intersection capacity enhancements (including additional through and turn lanes), traffic signalization, as well as Americans with Disabilities Act compliant curb ramps and crosswalks at the intersection of US-91 and Siphon Road/New Day Parkway,
- Storm sewer for US-91 from milepost (MP) 81.15 to MP 81.66, and a stormwater basin at the southwest corner of the intersection of US-91 and Siphon Road/New Day Parkway,
- A three-lane (36-foot) public approach east of US-91 across from the existing Briscoe Road,
- Signage, street lighting, and landscaping,
- Modifying private approaches on US-91, Siphon Road, and New Day Parkway, and
- Construction of a parking lot for the 107 W Siphon Road property using the vacant field west of the property.

4.0 Study Area and Methodology

4.1 Study Area

The study area includes noise sensitive properties within 500 feet of the project area (Appendix A, Figure 1).

4.1.1 Traffic Noise Model

Projected future traffic noise levels for the “worst case” scenario of the 2048 Design Year Alternative were estimated using the FHWA approved noise model, TNM 2.5. TNM estimates the acoustic intensity at a receptor location resulting from traffic (the source) traveling on a series of straight-line roadway segments. The roadway segment geometry considered is three-dimensional. The program considers characteristics of the path of noise transmitted between the source and the noise receptor by including the effects of intervening barriers, topography, trees, and atmospheric absorption.

The modeling performed for this project included US-91, Siphon Road, and New Day Parkway.

4.1.2 Traffic Model Input Data

Traffic data was provided by ITD and the Bannock Transportation Planning Organization (BTPO) (see Appendix B). TNM was run using the following input data and assumptions:

- The TNM default of “average” pavement type was used.
- Design year 2048 DHVs of traffic were used, as projected by ITD and BTPO.
- Assumed vehicle mix for US-91 to be 98% cars and 2% total trucks. Assumed vehicle mix for Siphon Road to be 93% cars and 7% total trucks. Assumed vehicle mix for New Day Parkway to be 90% cars and 10% total trucks. Heavy and medium truck percentages, 30% and 70% respectively of total trucks, were based on observed volumes.
- Speed limit used for US-91 and New Day Parkway for Existing Condition: 35 miles per hour (mph). Speed limit used for US-91 and New Day Parkway for Design Year Alternative: 35 mph.
- Speed limit used for Siphon Road for Existing Condition: 30 mph. Speed limit used for Siphon Road for Design Year Alternative: 35 mph.

4.1.3 Interior Noise Predictions

FHWA Analysis and Abatement Guidelines provide methodology for determining a noise impact to an interior area. Interior noise levels are predicted by subtracting the modeled exterior noise levels by building noise reduction factors based on the structure’s building type and window condition (see Table 3).

Table 3. Building Noise Reduction Factors.

Building Type	Window Construction	Noise Reduction Due to the Exterior of the Structure
All	Open	10 dB
Light Frame	Ordinary Sash (closed)	20 dB
	Storm Windows	25 dB
Masonry	Single Glazed	25 dB
	Double Glazed	35 dB
Windows shall be considered open unless there is firm knowledge that the windows are in fact kept closed.		
Source: FHWA Analysis and Abatement Guidelines (2011)		

Noise levels were predicted for interior and exterior activity for day care centers and medical facilities identified along the project. At these locations, noise levels were predicted for interior noise levels using the defined noise reduction values in the table above and included in Tables 6 and 7.

5.0 Affected Environment and Impacts

5.1 Land Use

The project is located in the City of Chubbuck. Land use along US-91 (Yellowstone Avenue) ranges between general commercial, single family residential, and industrial. Land use along Siphon Road/New Day Parkway ranges between general commercial, industrial, and limited commercial.

Review of the City of Chubbuck's future land use map indicates a change along US-91 (Yellowstone Avenue) from single family residential to commercial, and from industrial to employment. Along Siphon Road/New Day Parkway, the future land use map indicates a change from general commercial and industrial to employment, and from limited commercial to mixed use. See Appendix I for current and future zoning maps.

5.2 Field Results

Field testing for this traffic noise study was performed along the existing alignment during high traffic volumes, including commercial truck volumes, and a free flow of traffic. Field measurements at representative receptors are used to verify the computer model accuracy. Field measurements can vary from computer modeling results based on factors such as community noise and atmospheric. Modeled results must be within 3 dBA of the field results for the model to be validated; unless it is documented that site conditions or noise from other sources has a noticeable effect on the field measurements. The ambient noise levels were taken using a Brüel & Kjaer Hand-held Analyzer Type 2270 Sound Level Meter. The meter was calibrated in the field before use with meteorological measurements.

Ambient levels in the vicinity of a representative sample of the receptors were taken on November 10, 2023, for the project. The following ambient levels are listed below in Table 4. Appendix C includes photographic documentation of both monitoring locations, and Appendix A, Figures 2 through 4 provide the location in relation to the project.

Table 4. Exterior Field Measurement of Traffic Noise for the US-91, Park Lawn to Siphon Rd, Chubbuck Study Area.

Receptor No.	Receptor Address	Time	Leq (dBA)
M1	5341 Yellowstone AVE	8:40 a.m.	67.0
		8:51 a.m.	64.5
		9:01 a.m.	63.8
M2	105 Abraham ST	10:02 a.m.	66.2
		10:13 a.m.	62.0
		10:24 a.m.	64.8
M3	440 New Day PKWY	10:42 a.m.	54.4
		10:53 a.m.	55.5
		11:05 a.m.	54.8

The results of FHWA TNM 2.5 computer model calibration at representative receptor locations in the study area are noted in Table 5. This shows the field and model results for the existing alignment using observed traffic volumes and speeds. All field readings are within the 3 dBA variance; indicating the model is consistent with the field readings.

Table 5. Calibration of Model to Field Results Based on Observed Traffic Volumes and Speeds.

Receptor No.	Address	L _{eq} (dBA) Field*	L _{eq} (dBA) Model
M1	5341 Yellowstone AVE	65.1	64.7
M2	105 Abraham ST	64.3	62.3
M3	440 New Day PKWY	54.9	57.5

*Average of three field readings taken at all locations.

5.3 Traffic Noise Analysis

5.3.1 Existing Conditions and Build Alternative

The results of FHWA TNM 2.5 computer model analysis for impacts to sensitive receptors in the study area as they approach or exceed the FHWA NAC with the project (Build 2048) are noted in Table 6. Decibel levels in bold indicate NAC exceedances. Table 6 also identifies receptors in the study area, type of receptor, distance to centerline from receptor, and existing conditions (2021). Figures 2 through 4 in Appendix A illustrate receptor locations, and Appendix E shows the complete TNM Sound Level Results.

The results indicate a total of five Category B receptors approach or exceed the NAC with the Build Alternative. Results of the existing condition indicate six Category B receptors approach or exceed the NAC. Overall, the impacts associated with the project show an increase between 2 to 4 dBA in traffic noise levels within the study area when compared to the existing condition. Per the ITD *Traffic Noise Policy*, this is considered a slightly noticeable increase (3 to 5 dBA). No receptors experience a substantial increase (15 dBA and greater) in noise levels with the project.

Three receptors will be relocated to accommodate the project.

Table 6. Receptor Locations, Type of Receptor, Distance to Centerline, Existing Conditions, and Build L_{eq} (dBA) for the Study Area.

Receptor No.	Address	Type ¹	Distance to Centerline (Exist/Build)	Existing L _{eq} dBA 2021	Build L _{eq} dBA 2048
1	5261 Yellowstone AVE	B (66)	125/125	59.2	60.3
2	5262 Yellowstone AVE (Bannock Animal Medical Center)	E (71)	108/108	60.0	61.0
3	181 Adams ST	B (66)	461/461	47.4	50.4
4	155 Adams ST (Apartment Building - 2 Dwellings)	B (66)	303/303	51.5	53.9
5	147 Adams ST (Apartment Building - 2 Dwellings)	B (66)	244/244	53.6	55.3
6	5309 Yellowstone AVE	B (66)	78/78	62.7	63.6
7	182 Adams ST (Apartment Building - 2 Dwellings)	B (66)	459/459	47.1	50.3
8	166 Adams ST (Apartment Building - 2 Dwellings)	B (66)	393/393	48.6	52.0
9	152, 150, 148, 146 Adams ST (Apartment Building - 2 Dwellings)	B (66)	311/311	50.8	53.6
10	120 Adams ST (Apartment Building - 2 Dwellings)	B (66)	230/230	53.6	55.8
11	5325 Yellowstone AVE	B (66)	85/85	61.8	62.9
12	5341 Yellowstone AVE	B (66)	86/88	61.1	62.6

Receptor No.	Address	Type ¹	Distance to Centerline (Exist/Build)	Existing Leq dBA 2021	Build Leq dBA 2048
13	5361 Yellowstone AVE	B (66)	397/404	47.9	51.7
14	150 Park Lawn (Switchback Motorsports)	E (71)	229/229	53.9	55.6
15	172 Park Lawn (Adventures in Daycare - Light Frame Building Type, Ordinary Sash Window)	C (66) Exterior D (51) Interior	436/436	47.5/ ² (27.5)	50.2/ ² (30.2)
16	5328 Yellowstone AVE	B (66)	229/229	53.2	55.8
17	145 E Briscoe RD (Caliber Collision)	E (71)	80/74	61.5	64.0
18	No Address - Legacy Subdivision	B (66)	109/103	59.3	61.6
19	No Address - Legacy Subdivision	B (66)	295/289	50.2	54.5
20	No Address - Legacy Subdivision	B (66)	432/426	46.9	51.1
21	No Address - Legacy Subdivision	B (66)	110/104	59.3	61.9
22	No Address - Legacy Subdivision	B (66)	385/378	47.9	52.4
23	147 Belva LN	B (66)	478/484	46.2	49.9
24	139 Belva LN	B (66)	393/399	47.9	51.9
25	131 Belva LN	B (66)	334/340	49.3	53.2
26	123 Belva LN	B (66)	184/191	54.7	57.2
27	5409 Yellowstone AVE	B (66)	96/102	60.3	61.5
28	144 Belva LN	B (66)	470/477	46.4	50.2
29	124 Belva LN (Imagination Station Daycare - Light Frame Building Type, Ordinary Sash Window)	C (66) Exterior D (51) Interior	260/266	51.4/ ² (31.4)	54.7/ ² (34.7)
30	5423 Yellowstone AVE (Tot Spot Childcare - Light Frame Building Type, Ordinary Sash Window)	C (66) Exterior D (51) Interior	68/74	62.9/ ² (42.9)	64.0/ ² (44.0)
31	141 Briscoe RD	B (66)	433/439	47.2	51.2
32	133 Briscoe RD	B (66)	356/363	48.8	52.8
33	127 Briscoe RD	B (66)	247/253	52.0	55.1
34	138 Briscoe RD	B (66)	434/440	47.3	51.3
35	128 Briscoe RD	B (66)	274/280	51.2	54.5
36	126 Briscoe RD (Apartment Building – 2 Dwellings)	B (66)	199/205	54.1	56.7
37	124 Briscoe RD (Apartment Building – 2 Dwellings)	B (66)	199/206	54.1	56.7
38	102 Briscoe RD (Apartment Building – 2 Dwellings)	B (66)	31/37	67.6	69.2
39	104 Briscoe RD (Apartment Building – 2 Dwellings)	B (66)	30/38	67.6	68.9
40	106 Briscoe RD (Apartment Building – 2 Dwellings)	B (66)	32/42	67.4	68.2

Receptor No.	Address	Type¹	Distance to Centerline (Exist/Build)	Existing L_{eq} dBA 2021	Build L_{eq} dBA 2048
41	122 Briscoe RD (Apartment Building – 2 Dwellings)	B (66)	328/339	49.8	53.5
42	120 Briscoe RD (Apartment Building – 2 Dwellings)	B (66)	328/340	49.9	53.6
43	118 Briscoe RD (Apartment Building – 2 Dwellings)	B (66)	319/332	50.3	53.8
44	116 Briscoe RD (Apartment Building – 2 Dwellings)	B (66)	267/280	51.8	54.9
45	114 Briscoe RD (Apartment Building – 2 Dwellings)	B (66)	213/227	53.7	56.4
46	112 Briscoe RD (Apartment Building – 2 Dwellings)	B (66)	161/175	56.3	58.2
47	110 Briscoe RD (Apartment Building – 2 Dwellings)	B (66)	111/124	59.5	60.5
48	108 Briscoe RD (Apartment Building – 2 Dwellings)	B (66)	57/70	64.4	64.6
49	No Address - Legacy Subdivision	B (66)	122/116	58.8	61.5
50	No Address - Legacy Subdivision	B (66)	388/382	48.1	53.0
51	No Address - Legacy Subdivision	B (66)	125/114	58.8	61.7
52	No Address - Legacy Subdivision	B (66)	387/376	48.5	53.3
53	No Address - Legacy Subdivision	B (66)	128/111	58.9	62.0
54	No Address - Legacy Subdivision	B (66)	390/373	49.0	53.8
55	5555 Yellowstone AVE (Manufactured Home Community)	B (66)	450/469	47.9	51.4
56	5555 Yellowstone AVE (Manufactured Home Community)	B (66)	398/416	48.8	52.4
57	5555 Yellowstone AVE (Manufactured Home Community)	B (66)	352/370	49.8	53.3
58	5555 Yellowstone AVE (Manufactured Home Community)	B (66)	304/322	51.0	54.3
59	5555 Yellowstone AVE (Manufactured Home Community)	B (66)	252/270	52.6	55.5
60	5555 Yellowstone AVE (Manufactured Home Community)	B (66)	219/237	53.8	56.3
61	5555 Yellowstone AVE (Manufactured Home Community)	B (66)	170/188	56.1	58.0
62	5555 Yellowstone AVE (Manufactured Home Community)	B (66)	120/138	60.0	60.8
63	5555 Yellowstone AVE (Manufactured Home Community)	B (66)	61/79	65.5	65.3
64	5555 Yellowstone AVE (Manufactured Home Community)	B (66)	448/466	48.4	51.9
65	5555 Yellowstone AVE (Manufactured Home Community)	B (66)	411/430	49.2	52.7

Receptor No.	Address	Type ¹	Distance to Centerline (Exist/Build)	Existing Leq dBA 2021	Build Leq dBA 2048
66	5555 Yellowstone AVE (Manufactured Home Community)	B (66)	386/404	49.6	53.2
67	5555 Yellowstone AVE (Manufactured Home Community)	B (66)	358/377	50.2	53.7
68	5555 Yellowstone AVE (Manufactured Home Community)	B (66)	326/344	51.0	54.4
69	5555 Yellowstone AVE (Manufactured Home Community)	B (66)	296/314	51.7	54.9
70	5555 Yellowstone AVE (Manufactured Home Community)	B (66)	267/286	52.5	55.6
71	5555 Yellowstone AVE (Manufactured Home Community)	B (66)	213/231	54.5	57.0
72	5555 Yellowstone AVE (Manufactured Home Community)	B (66)	180/198	55.9	57.9
73	5555 Yellowstone AVE (Manufactured Home Community)	B (66)	145/164	57.9	59.4
74	5555 Yellowstone AVE (Manufactured Home Community)	B (66)	91/109	61.5	62.0
75	5555 Yellowstone AVE (Manufactured Home Community)	B (66)	52/70	66.5	65.7
76	5555 Yellowstone AVE (Manufactured Home Community)	B (66)	420/439	49.8	53.2
77	5555 Yellowstone AVE (Manufactured Home Community)	B (66)	394/412	50.4	53.7
78	5555 Yellowstone AVE (Manufactured Home Community)	B (66)	368/386	50.7	54.1
79	5555 Yellowstone AVE (Manufactured Home Community)	B (66)	344/362	51.3	54.7
80	5555 Yellowstone AVE (Manufactured Home Community)	B (66)	298/316	52.3	55.6
81	5555 Yellowstone AVE (Manufactured Home Community)	B (66)	252/270	53.8	56.7
82	5555 Yellowstone AVE (Manufactured Home Community)	B (66)	206/224	55.4	57.8
83	5555 Yellowstone AVE (Manufactured Home Community)	B (66)	152/170	57.9	59.8
84	5555 Yellowstone AVE (Manufactured Home Community)	B (66)	119/137	59.9	61.3
85	5555 Yellowstone AVE (Manufactured Home Community)	B (66)	91/109	61.8	62.7
86	5555 Yellowstone AVE (Manufactured Home Community)	B (66)	62/80	66.4	66.2
87	5555 Yellowstone AVE (Manufactured Home Community)	B (66)	438/456	50.7	53.8
88	5555 Yellowstone AVE (Manufactured Home Community)	B (66)	373/391	51.7	55.1

Receptor No.	Address	Type ¹	Distance to Centerline (Exist/Build)	Existing Leq dBA 2021	Build Leq dBA 2048
89	5555 Yellowstone AVE (Manufactured Home Community)	B (66)	332/350	52.6	56.0
90	5555 Yellowstone AVE (Manufactured Home Community)	B (66)	288/306	53.7	56.8
91	5555 Yellowstone AVE (Manufactured Home Community)	B (66)	242/260	54.9	57.8
92	5555 Yellowstone AVE (Manufactured Home Community)	B (66)	197/214	56.5	59.0
93	5555 Yellowstone AVE (Manufactured Home Community)	B (66)	159/177	58.0	60.1
94	5555 Yellowstone AVE (Manufactured Home Community)	B (66)	108/126	61.0	62.3
95	5555 Yellowstone AVE (Manufactured Home Community)	B (66)	51/69	66.4	66.4
96	107 W Siphon RD (Apartment Building – 2 Dwellings)	B (66)	70/70	56.7	60.0
97	105 W Siphon RD	B (66)	45/45	59.8	Relocation
98	103 W Siphon RD (Monroe Fence Company)	E (71)	47/47	60.2	Relocation
99	5565 Yellowstone AVE (Access Point Family Services)	E (71)	95/89	64.3	Relocation
100	120 W Siphon RD (Apartment Building w/Ground Floor Garage)	B (66)	75/75	56.3	61.2
101	120 W Siphon RD (Apartment Building w/Ground Floor Garage)	B (66)	170/170	52.2	56.4
102	120 W Siphon RD (Apartment Building w/Ground Floor Garage)	B (66)	243/243	51.2	54.6
103	120 W Siphon RD (Apartment Building w/Ground Floor Garage)	B (66)	334/334	50.3	53.5
104	175 Abraham ST	B (66)	508/525	48.1	50.6
105	161 Abraham ST	B (66)	440/457	48.9	51.7
106	147 Abraham ST	B (66)	349/366	51.0	53.6
107	133 Abraham ST	B (66)	283/300	53.2	55.1
108	119 Abraham ST	B (66)	204/221	55.9	57.2
109	105 Abraham ST	B (66)	119/136	59.4	60.9
110	176 Abraham ST	B (66)	509/523	47.1	49.7
111	162 Abraham ST	B (66)	447/461	48.2	50.8
112	148 Abraham ST	B (66)	356/372	50.4	52.8
113	5697 Moses ST	B (66)	304/319	52.1	54.1
114	5698 Moses ST	B (66)	116/133	59.2	61.2

Receptor No.	Address	Type ¹	Distance to Centerline (Exist/Build)	Existing Leq dBA 2021	Build Leq dBA 2048
115	5706 Moses ST	B (66)	119/129	58.9	60.7
116	179 Isaac ST	B (66)	514/522	46.8	49.3
117	165 Isaac ST	B (66)	445/453	48.1	50.6
118	151 Isaac ST	B (66)	364/373	50.1	52.4
119	5707 Moses ST	B (66)	309/316	51.7	53.7
120	5718 Moses ST	B (66)	123/128	58.7	60.3
121	5730 Moses ST	B (66)	125/125	58.6	60.2
122	137 Southside WAY (A & I Distributors)	F (-)	272/255	53.0	56.0
123	167 Southside WAY (Double L/Gem State Machining)	F (-)	517/500	47.0	50.4
124	5695 Industrial WAY (S & S Machine and Welding)	F (-)	488/504	45.6	49.7
125	170 E Siphon RD (RVs and Boats for Less)	E (71)	162/166	53.5	57.4
126	270 New Day PKWY (Builders FirstSource)	E (71)	132/151	52.5	54.0
127	5605 Northside Crossing (Sterling Urgent Care)	E (71)	76/93	56.3	57.7
128	440 New Day PKWY (Grace Assisted Living - Masonry Building Type, Double Glazed Window)	C (66) Exterior D (51) Interior	115/137	53.1/ ²(18.1)	54.7/ ²(19.7)
129	368 Pocano ST	B (66)	251/231	46.5	51.1
130	378 Pocano ST	B (66)	251/231	46.4	51.1
131	388 Pocano ST	B (66)	264/244	46.0	50.7
132	398 Pocano ST	B (66)	269/249	45.8	50.6
133	418 Pocano ST	B (66)	270/250	45.7	50.4
134	428 Pocano ST	B (66)	271/251	45.6	50.3
135	438 Pocano ST	B (66)	264/244	45.8	50.5
136	448 Pocano ST	B (66)	262/242	45.9	50.6
137	468 Pocano ST	B (66)	264/244	45.7	50.4
138	478 Pocano ST	B (66)	266/246	45.6	50.3
139	488 Pocano ST	B (66)	299/279	44.6	49.4
140	369 Pocano ST	B (66)	448/428	42.2	46.4
141	379 Pocano ST	B (66)	444/424	42.2	46.4
142	389 Pocano ST	B (66)	426/406	42.4	46.7
143	5542 Delaware ST	B (66)	443/423	41.9	46.2
144	429 Pocano ST	B (66)	426/406	42.1	46.4
145	439 Pocano ST	B (66)	422/402	42.2	46.4
146	449 Pocano ST	B (66)	420/400	42.1	46.5
147	5531 Shenandoah DR	B (66)	447/427	41.6	45.8

Receptor No.	Address	Type ¹	Distance to Centerline (Exist/Build)	Existing L _{eq} dBA 2021	Build L _{eq} dBA 2048
148	5540 Shenandoah DR	B (66)	421/401	41.9	46.1
149	5530 Shenandoah DR	B (66)	495/475	40.7	44.7
150	Jerry Rowland Park	C (66)	560/540	40.9	44.4
151	5522 Delaware ST	B (66)	523/503	40.9	44.7
152	436 Hampton AVE	B (66)	539/519	40.6	44.3
153	446 Hampton AVE	B (66)	542/522	40.4	44.2
154	456 Hampton AVE	B (66)	537/517	40.4	44.3
155	5521 Shenandoah DR	B (66)	533/513	40.4	44.2
156	5520 Shenandoah DR	B (66)	553/533	40.0	43.6

¹B= Category B, C = Category C, D = Category D, E = Category E, F = Category F

Bolded results indicate the NAC is approached or exceeded.

²(Interior Noise Level)

5.3.2 No Build Alternative

Modeling was performed using the FHWA TNM 2.5 for the No Build Alternative using future predicted traffic volumes and speeds. The results of FHWA TNM 2.5 computer model analysis for the No Build Alternative are noted in Table 7.

The results indicate that with the No Build Alternative, seven Category B receptors approach or exceed the NAC.

Table 7. Receptor Locations, Type of Receptor, Distance to Centerline, and No Build L_{eq} (dBA) for the Study Area.

Receptor No.	Address	Type ¹	Distance to Centerline (Exist)	No Build L _{eq} dBA 2048
1	5261 Yellowstone AVE	B (66)	125	60.4
2	5262 Yellowstone AVE (Bannock Animal Medical Center)	E (71)	108	61.2
3	181 Adams ST	B (66)	461	48.6
4	155 Adams ST (Apartment Building - 2 Dwellings)	B (66)	303	52.7
5	147 Adams ST (Apartment Building - 2 Dwellings)	B (66)	244	54.8
6	5309 Yellowstone AVE	B (66)	78	63.9
7	182 Adams ST (Apartment Building - 2 Dwellings)	B (66)	459	48.4
8	166 Adams ST (Apartment Building - 2 Dwellings)	B (66)	393	49.9
9	152, 150, 148, 146 Adams ST (Apartment Building - 2 Dwellings)	B (66)	311	52.1
10	120 Adams ST (Apartment Building - 2 Dwellings)	B (66)	230	54.8
11	5325 Yellowstone AVE	B (66)	85	62.9
12	5341 Yellowstone AVE	B (66)	86	62.3
13	5361 Yellowstone AVE	B (66)	397	49.2

Receptor No.	Address	Type ¹	Distance to Centerline (Exist)	No Build L _{eq} dBA 2048
14	150 Park Lawn (Switchback Motorsports)	E (71)	229	55.1
15	172 Park Lawn (Adventures in Daycare - Light Frame Building Type, Ordinary Sash Window)	C (66) Exterior D (51) Interior	436	48.8/ ² (28.8)
16	5328 Yellowstone AVE	B (66)	229	54.4
17	145 E Briscoe RD (Caliber Collision)	E (71)	80	62.7
18	No Address - Legacy Subdivision	B (66)	109	60.6
19	No Address - Legacy Subdivision	B (66)	295	51.4
20	No Address - Legacy Subdivision	B (66)	432	48.2
21	No Address - Legacy Subdivision	B (66)	110	60.6
22	No Address - Legacy Subdivision	B (66)	385	49.2
23	147 Belva LN	B (66)	478	47.5
24	139 Belva LN	B (66)	393	49.2
25	131 Belva LN	B (66)	334	50.5
26	123 Belva LN	B (66)	184	55.9
27	5409 Yellowstone AVE	B (66)	96	61.5
28	144 Belva LN	B (66)	470	47.7
29	124 Belva LN (Imagination Station Daycare - Light Frame Building Type, Ordinary Sash Window)	C (66) Exterior D (51) Interior	260	52.7/ ² (32.7)
30	5423 Yellowstone AVE (Tot Spot Childcare - Light Frame Building Type, Ordinary Sash Window)	C (66) Exterior D (51) Interior	68	64.1/ ² (44.1)
31	141 Briscoe RD	B (66)	433	48.5
32	133 Briscoe RD	B (66)	356	50.1
33	127 Briscoe RD	B (66)	247	53.2
34	138 Briscoe RD	B (66)	434	48.7
35	128 Briscoe RD	B (66)	274	52.5
36	126 Briscoe RD (Apartment Building – 2 Dwellings)	B (66)	199	55.3
37	124 Briscoe RD (Apartment Building – 2 Dwellings)	B (66)	199	55.4
38	102 Briscoe RD (Apartment Building – 2 Dwellings)	B (66)	31	68.8
39	104 Briscoe RD (Apartment Building – 2 Dwellings)	B (66)	30	68.9
40	106 Briscoe RD (Apartment Building – 2 Dwellings)	B (66)	32	68.7

Receptor No.	Address	Type ¹	Distance to Centerline (Exist)	No Build L _{eq} dBA 2048
41	122 Briscoe RD (Apartment Building – 2 Dwellings)	B (66)	328	51.2
42	120 Briscoe RD (Apartment Building – 2 Dwellings)	B (66)	328	51.3
43	118 Briscoe RD (Apartment Building – 2 Dwellings)	B (66)	319	51.6
44	116 Briscoe RD (Apartment Building – 2 Dwellings)	B (66)	267	53.2
45	114 Briscoe RD (Apartment Building – 2 Dwellings)	B (66)	213	55.0
46	112 Briscoe RD (Apartment Building – 2 Dwellings)	B (66)	161	57.5
47	110 Briscoe RD (Apartment Building – 2 Dwellings)	B (66)	111	60.7
48	108 Briscoe RD (Apartment Building – 2 Dwellings)	B (66)	57	65.6
49	No Address - Legacy Subdivision	B (66)	122	60.1
50	No Address - Legacy Subdivision	B (66)	388	49.5
51	No Address - Legacy Subdivision	B (66)	125	60.0
52	No Address - Legacy Subdivision	B (66)	387	49.9
53	No Address - Legacy Subdivision	B (66)	128	60.2
54	No Address - Legacy Subdivision	B (66)	390	50.6
55	5555 Yellowstone AVE (Manufactured Home Community)	B (66)	450	49.5
56	5555 Yellowstone AVE (Manufactured Home Community)	B (66)	398	50.3
57	5555 Yellowstone AVE (Manufactured Home Community)	B (66)	352	51.3
58	5555 Yellowstone AVE (Manufactured Home Community)	B (66)	304	52.4
59	5555 Yellowstone AVE (Manufactured Home Community)	B (66)	252	54.0
60	5555 Yellowstone AVE (Manufactured Home Community)	B (66)	219	55.2
61	5555 Yellowstone AVE (Manufactured Home Community)	B (66)	170	57.3
62	5555 Yellowstone AVE (Manufactured Home Community)	B (66)	120	61.3
63	5555 Yellowstone AVE (Manufactured Home Community)	B (66)	61	66.7
64	5555 Yellowstone AVE (Manufactured Home Community)	B (66)	448	50.1
65	5555 Yellowstone AVE (Manufactured Home Community)	B (66)	411	50.8

Receptor No.	Address	Type ¹	Distance to Centerline (Exist)	No Build L _{eq} dBA 2048
66	5555 Yellowstone AVE (Manufactured Home Community)	B (66)	386	51.2
67	5555 Yellowstone AVE (Manufactured Home Community)	B (66)	358	51.8
68	5555 Yellowstone AVE (Manufactured Home Community)	B (66)	326	52.5
69	5555 Yellowstone AVE (Manufactured Home Community)	B (66)	296	53.2
70	5555 Yellowstone AVE (Manufactured Home Community)	B (66)	267	54.0
71	5555 Yellowstone AVE (Manufactured Home Community)	B (66)	213	55.8
72	5555 Yellowstone AVE (Manufactured Home Community)	B (66)	180	57.2
73	5555 Yellowstone AVE (Manufactured Home Community)	B (66)	145	59.1
74	5555 Yellowstone AVE (Manufactured Home Community)	B (66)	91	62.7
75	5555 Yellowstone AVE (Manufactured Home Community)	B (66)	52	67.7
76	5555 Yellowstone AVE (Manufactured Home Community)	B (66)	420	51.6
77	5555 Yellowstone AVE (Manufactured Home Community)	B (66)	394	52.1
78	5555 Yellowstone AVE (Manufactured Home Community)	B (66)	368	52.4
79	5555 Yellowstone AVE (Manufactured Home Community)	B (66)	344	53.0
80	5555 Yellowstone AVE (Manufactured Home Community)	B (66)	298	53.9
81	5555 Yellowstone AVE (Manufactured Home Community)	B (66)	252	55.3
82	5555 Yellowstone AVE (Manufactured Home Community)	B (66)	206	56.8
83	5555 Yellowstone AVE (Manufactured Home Community)	B (66)	152	59.2
84	5555 Yellowstone AVE (Manufactured Home Community)	B (66)	119	61.2
85	5555 Yellowstone AVE (Manufactured Home Community)	B (66)	91	63.1
86	5555 Yellowstone AVE (Manufactured Home Community)	B (66)	62	67.7
87	5555 Yellowstone AVE (Manufactured Home Community)	B (66)	438	52.6
88	5555 Yellowstone AVE (Manufactured Home Community)	B (66)	373	53.6

Receptor No.	Address	Type¹	Distance to Centerline (Exist)	No Build L_{eq} dBA 2048
89	5555 Yellowstone AVE (Manufactured Home Community)	B (66)	332	54.4
90	5555 Yellowstone AVE (Manufactured Home Community)	B (66)	288	55.4
91	5555 Yellowstone AVE (Manufactured Home Community)	B (66)	242	56.5
92	5555 Yellowstone AVE (Manufactured Home Community)	B (66)	197	58.0
93	5555 Yellowstone AVE (Manufactured Home Community)	B (66)	159	59.3
94	5555 Yellowstone AVE (Manufactured Home Community)	B (66)	108	62.3
95	5555 Yellowstone AVE (Manufactured Home Community)	B (66)	51	67.7
96	107 W Siphon RD (Apartment Building – 2 Dwellings)	B (66)	70	58.8
97	105 W Siphon RD	B (66)	45	62.0
98	103 W Siphon RD (Monroe Fence Company)	E (71)	47	62.3
99	5565 Yellowstone AVE (Access Point Family Services)	E (71)	95	65.6
100	120 W Siphon RD (Apartment Building w/Ground Floor Garage)	B (66)	75	58.5
101	120 W Siphon RD (Apartment Building w/Ground Floor Garage)	B (66)	170	54.1
102	120 W Siphon RD (Apartment Building w/Ground Floor Garage)	B (66)	243	52.9
103	120 W Siphon RD (Apartment Building w/Ground Floor Garage)	B (66)	334	51.9
104	175 Abraham ST	B (66)	508	49.6
105	161 Abraham ST	B (66)	440	50.4
106	147 Abraham ST	B (66)	349	52.4
107	133 Abraham ST	B (66)	283	54.5
108	119 Abraham ST	B (66)	204	57.2
109	105 Abraham ST	B (66)	119	60.6
110	176 Abraham ST	B (66)	509	48.5
111	162 Abraham ST	B (66)	447	49.5
112	148 Abraham ST	B (66)	356	51.7
113	5697 Moses ST	B (66)	304	53.3
114	5698 Moses ST	B (66)	116	60.4

Receptor No.	Address	Type ¹	Distance to Centerline (Exist)	No Build L _{eq} dBA 2048
115	5706 Moses ST	B (66)	119	60.1
116	179 Isaac ST	B (66)	514	48.2
117	165 Isaac ST	B (66)	445	49.5
118	151 Isaac ST	B (66)	364	51.4
119	5707 Moses ST	B (66)	309	53.0
120	5718 Moses ST	B (66)	123	59.9
121	5730 Moses ST	B (66)	125	59.8
122	137 Southside WAY (A & I Distributors)	F (-)	272	54.3
123	167 Southside WAY (Double L/Gem State Machining)	F (-)	517	48.5
124	5695 Industrial WAY (S & S Machine and Welding)	F (-)	488	47.4
125	170 E Siphon RD (RVs and Boats for Less)	E (71)	162	55.6
126	270 New Day PKWY (Builders FirstSource)	E (71)	132	55.1
127	5605 Northside Crossing (Sterling Urgent Care)	E (71)	76	59.0
128	440 New Day PKWY (Grace Assisted Living - Masonry Building Type, Double Glazed Window)	C (66) Exterior D (51) Interior	115	55.7/ ² (20.7)
129	368 Pocano ST	B (66)	251	49.1
130	378 Pocano ST	B (66)	251	49.0
131	388 Pocano ST	B (66)	264	48.6
132	398 Pocano ST	B (66)	269	48.4
133	418 Pocano ST	B (66)	270	48.3
134	428 Pocano ST	B (66)	271	48.2
135	438 Pocano ST	B (66)	264	48.5
136	448 Pocano ST	B (66)	262	48.5
137	468 Pocano ST	B (66)	264	48.4
138	478 Pocano ST	B (66)	266	48.2
139	488 Pocano ST	B (66)	299	47.3
140	369 Pocano ST	B (66)	448	44.7
141	379 Pocano ST	B (66)	444	44.6
142	389 Pocano ST	B (66)	426	44.8
143	5542 Delaware ST	B (66)	443	44.4
144	429 Pocano ST	B (66)	426	44.6
145	439 Pocano ST	B (66)	422	44.7
146	449 Pocano ST	B (66)	420	44.6
147	5531 Shenandoah DR	B (66)	447	44.1

Receptor No.	Address	Type¹	Distance to Centerline (Exist)	No Build L_{eq} dBA 2048
148	5540 Shenandoah DR	B (66)	421	44.5
149	5530 Shenandoah DR	B (66)	495	43.3
150	Jerry Rowland Park	C (66)	560	43.2
151	5522 Delaware ST	B (66)	523	43.3
152	436 Hampton AVE	B (66)	539	43.0
153	446 Hampton AVE	B (66)	542	42.9
154	456 Hampton AVE	B (66)	537	42.9
155	5521 Shenandoah DR	B (66)	533	42.9
156	5520 Shenandoah DR	B (66)	553	42.4

¹B= Category B, C = Category C, D = Category D, E = Category E, F = Category F
 Bolded results indicate the NAC is approached or exceeded.

²(Interior Noise Level)

5.3.3 Construction Noise

The most prevalent construction noise source is equipment powered by internal combustion engines (usually diesel). Noise from equipment likely to be used on this project (including but not limited to heavy equipment such as scrapers, excavators, backhoes, rollers, pavers, dump trucks, loaders, bulldozers, graders, or pile drivers) could reach 95 dBA when measured from a distance of 50 feet. Additional construction noise will be generated by equipment at the staging/stockpiling area, adding to the total project noise levels. Mitigation of potential highway construction noise impacts shall incorporate low-cost, easy-to-implement measures into project plans and specifications (for example, equipment muffler requirements and prohibiting use of air brakes).

Construction time constraints will be determined at the time of project construction. According to the City of Chubbuck's noise ordinance, construction work in or contiguous to residential neighborhoods shall be conducted between 7:00 AM and 7:00 PM. Any construction work outside of these hours may only be authorized by the public works director.

6.0 Abatement Measures Considered

6.1 Abatement Measures Considered

Under the 23 CFR 772.13, NAC require that if a traffic noise impact is identified (that is, a receptor approaches or exceeds FHWA NAC), noise abatement measures shall be considered and evaluated for feasibility and reasonableness.

If a barrier is deemed feasible, ITD will solicit the viewpoints of those affected as part of the reevaluation of reasonableness. Only barriers determined to be both reasonable and feasible will be constructed. Barriers that are not reasonable and feasible will be removed from the project. ITD worksheets for feasibility and reasonability are in Appendix F and Appendix G of this report and were completed using the ITD Traffic Noise Policy guidelines.

6.2 Segment Analysis of Impacts

The study area was divided into segments based on impacted receptors. Barrier reasonability can be calculated on a barrier length of four feet to every one foot in distance from receptor to centerline, if property line allows, and an assumed 5 dBA reduction at 8 feet in height. This calculation is completed for the purpose of initial analysis to eliminate those barriers that would be prohibitively expensive in the best-case scenario. The initial analysis is guided by the FHWA Noise Barrier Design Handbook for barrier design goals/insertion loss (Section 3.5.1) and barrier length guidelines (Section 3.5.2). According to the FHWA Noise Barrier Design Handbook, typically a 5 dBA reduction can be expected for receptors whose line-of-sight to the roadway is blocked by the barrier. A noise barrier needs to be at least tall enough to break the line of sight between the noise source and the receptor. Generally, the height of a truck exhaust is eight to 12 feet. Therefore, an eight-foot barrier was utilized in the barrier cost estimation. Furthermore, noise barriers should be tall enough and long enough so that only a small portion of sound diffracts around the edges. If a barrier is not long enough, degradations in barrier performance up to 5 dBA less than the barriers design noise reduction may be seen for those receptors near the barrier ends. A general guideline taken from the FHWA Noise Barrier Design Handbook is that a barrier should be long enough such that the distance between the receptor and a barrier end is at least four times the perpendicular distance from the receptor to the barrier along a line drawn between the receptor and the roadway.

6.2.1 Segment 1: West of US-91 and South of Siphon Road

Noise modeling indicates Receptors 38, 39, and 40 will be impacted with project design. Receptors 38, 39, and 40 are two-story apartment complexes with two dwelling units on the first floor and two dwelling units on the second floor.

In coordination with project design officials, there is currently only 10 feet from the apartment complex buildings to the back of the sidewalk. ITD is purchasing a 7.5-foot permanent easement from the back of the sidewalk to maintain the sidewalk slope connection. This would leave only 2.5 feet from the building to the permanent easement limit. The first-floor dwelling units have backdoors and if a noise barrier were installed, there would not be enough room to use the backdoor of these units. Construction of a barrier is not feasible. As a result, this barrier is not recommended. See Form 1055, Barrier Checklist, in Appendix F for Receptors 38, 39, and 40.

6.2.2 Segment 2: West of US-91 and South of Siphon Road

Noise modeling indicates Receptors 86 and 95 will be impacted with project design. Receptors 86 and 95 are single-family dwellings located in a manufactured home community.

Currently, the manufactured home community has three access points from US-91. In coordination with project design officials, ITD considered an option to provide access from Siphon Road to the back of the community and reduce access on US-91. However, the configuration of the homes and the access lanes within the community do not allow for a back access from Siphon Road without purchasing a significant amount of ROW from the private landowner behind (west of) and removing at least one manufactured home. The private landowner behind the community is not willing to sell. Therefore, reconfiguration of the site is not currently possible.

To install an effective noise barrier along US-91, two of the three access points to the manufactured home community would be blocked. Based on the configuration of the access lanes and homes within the community, there is not sufficient space to access all the homes within the community from the one access. Construction of a barrier is not feasible. As a result, this barrier is not recommended. See Form 1055, Barrier Checklist, in Appendix F for Receptors 86 and 95.

6.3 Coordination with Local Governments Officials

In accordance with *ITD Traffic Noise Policy*, 10-point transects were modeled for the project at representative locations along the alignment. This data is provided to local officials to prevent future noise impacts on undeveloped lands (see Appendix H). Table 8 shows the distance from the directional centerline of each roadway segment at which traffic noise impacts (66 dBA) are likely to occur.

Table 8. Projected Design Year (2048) DHV L_{eq} Traffic Noise Levels (dBA) at Selected Distances.

Roadway Segment	Transect Distance (ft.)										
	¹ 66 dBA	50	75	100	125	150	200	250	300	400	800
US-91, South of Siphon Road/New Day Parkway	50	63.2	61.3	59.9	58.7	57.6	55.7	54.3	53.2	51.0	45.5
US-91, North of Siphon Road/New Day Parkway	50	64.7	62.6	61.1	60.0	58.9	57.2	55.9	54.8	52.9	49.2
New Day Parkway, East of US-91	50	58.9	56.8	55.4	54.2	53.3	51.3	49.8	48.7	46.8	42.5
Siphon Road, West of US-91	50	61.3	59.6	58.6	57.9	57.1	56.0	55.4	55.0	54.4	53.1

¹Distances from the highway centerline which would be an appropriate distance to construct residential development in order to not approach or exceed FHWA criteria.

6.4 Conclusion

The results indicate a total of five Category B receptors approach or exceed the NAC with the Build Alternative. Results of the existing condition indicate six Category B receptors approach or exceed the NAC. Overall, the impacts associated with the project indicate an increase between 2 to 4 dBA in traffic noise levels within the study area when compared to the existing condition. Per the *ITD Traffic Noise Policy*, this is considered a slightly noticeable increase (3 to 5 dBA). No receptors experience a substantial increase (15 dBA and greater) in noise levels with the project.

Three receptors will be relocated to accommodate the project and will not exist under the Build Alternative.

Traffic noise abatement measures were considered for impacted receptors. Construction of a barrier at Segments 1 and 2 is not feasible. No traffic noise abatement measures will be installed for this project.

ITD staff makes the determination for mitigation based on the feasibility and reasonability worksheets completed during the traffic noise study. Barrier feasibility and reasonability worksheets are located

in Appendix F (Checklist 1055). The Noise Abatement Decision Checklists are located in Appendix G (Checklist 1056).

The Information to Local Jurisdictions Letter is included in Appendix H which will be provided by ITD to local jurisdictions within two weeks following approval of the project's environmental determination (date of public knowledge).

7.0 Preparer Qualifications

Ashley Tarter has 16 years of experience in environmental investigation and assessment. She specializes in field survey, sampling, and report preparation in accordance with state and federal environmental regulations. She has completed Fundamentals of Traffic Noise and Traffic Noise Modeling with FHWA TNM 2.5 training with Bowlby and Associates. She has prepared numerous traffic noise studies throughout Idaho in support of road design projects.

Kaylee Carr has over one year of experience with NEPA compliance regulations, traffic noise analysis, mapping, technical writing, and conducting field surveys, including research, sampling, photography, and documentation. She has completed Fundamentals of Traffic Noise and Traffic Noise Modeling with FHWA TNM 2.5 training with Bowlby and Associates.

Ashley Tarter
Senior Environmental Scientist

Kaylee Carr
Environmental Specialist

David Evans and Associates, Inc.
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Boise, Idaho 83709
(208) 900-9049

8.0 References

City of Chubbuck Zoning and Future Land Use Map. Available at <https://chubbuck.maps.arcgis.com/home/index.html>. Accessed March 22, 2024.

Federal Highway Administration. Common Outdoor and Indoor Noises. Available at highways.dot.gov/public-roads/julyaugust-2003/living-noise.

Federal Highway Administration. February 1998. *FHWA Traffic Noise Model Technical Manual*.

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Federal Register, December 1991. 23 CFR 772.

Idaho Transportation Department (ITD). May 2011. *Traffic Noise Policy*.

Appendix A

Figures

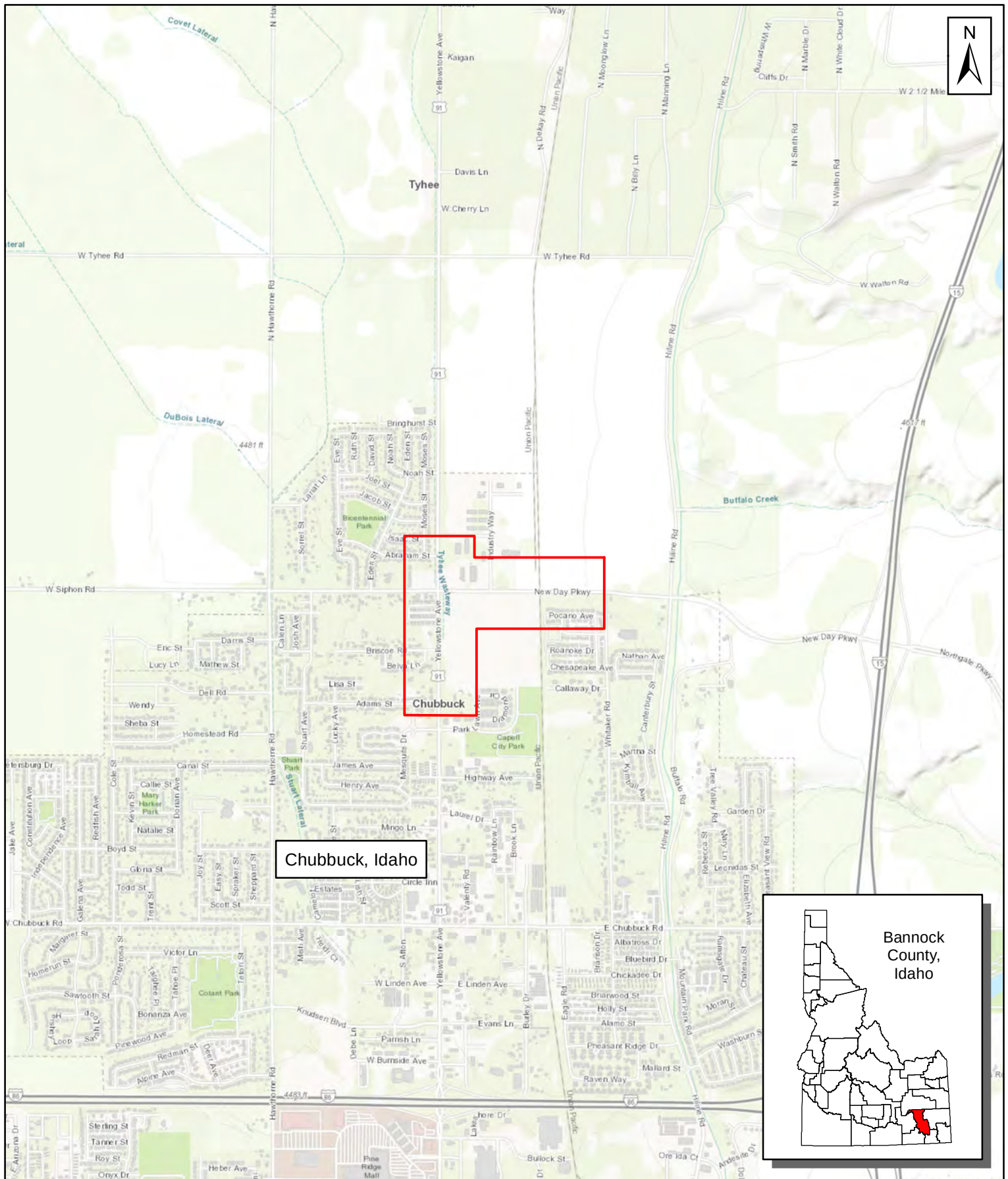


Figure 1. Study Area for US-91, Park Lawn to Siphon Rd, Chubbuck
Project No. A021(860), Key No. 21860

Legend

Study Area

0 0.25 0.5 Miles

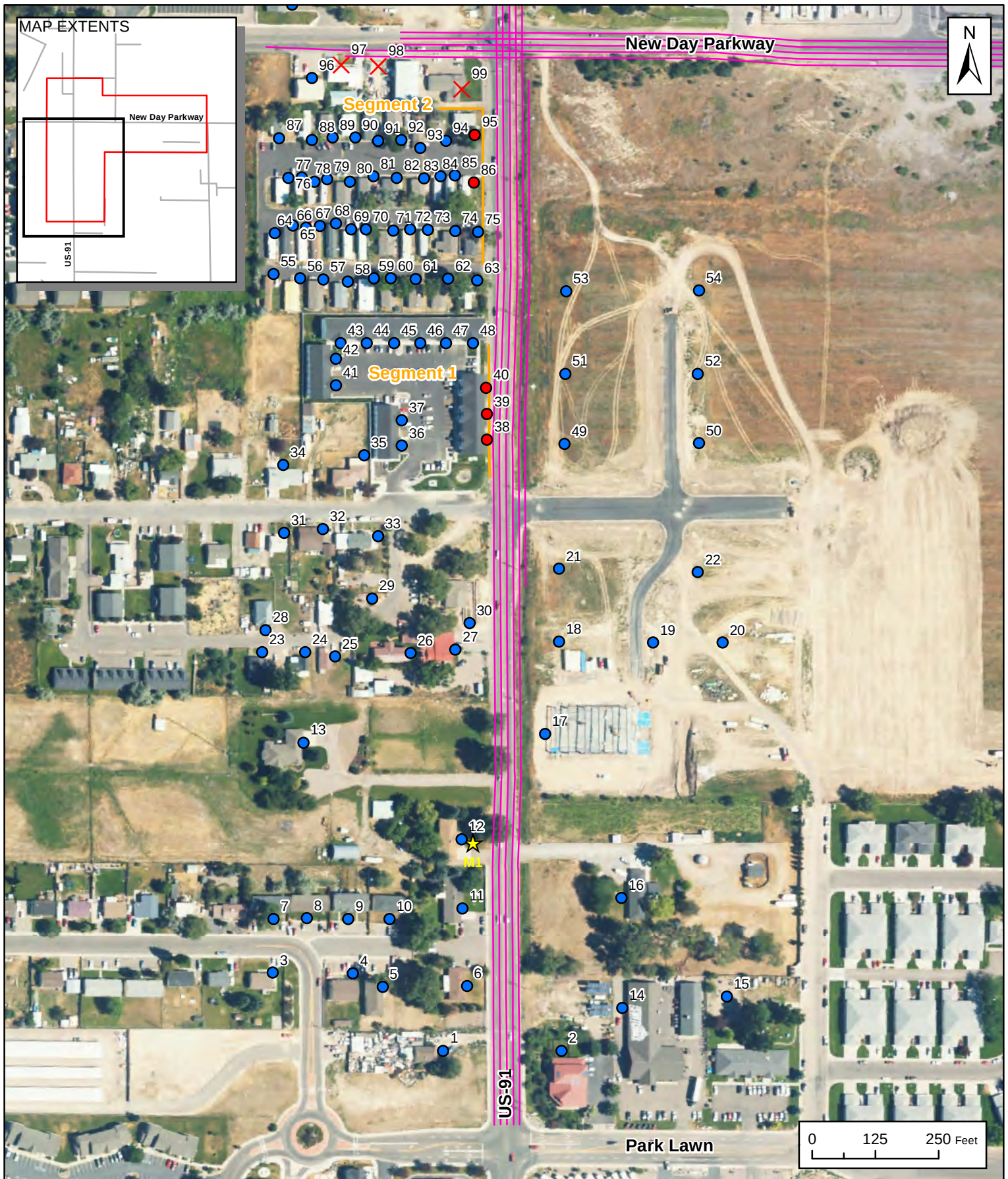


Figure 2. Receptor Locations along the US-91, Park Lawn to Siphon Rd, Chubbuck Study Area
Project No. A021(860), Key No. 21860

Legend

- | | |
|---|--|
| ● Impacted Receptor | — Build Alternative Center Lane |
| ● Non-Impacted Receptor | — Noise Barrier Not Recommended |
| X Relocation | ★ Monitoring Location |

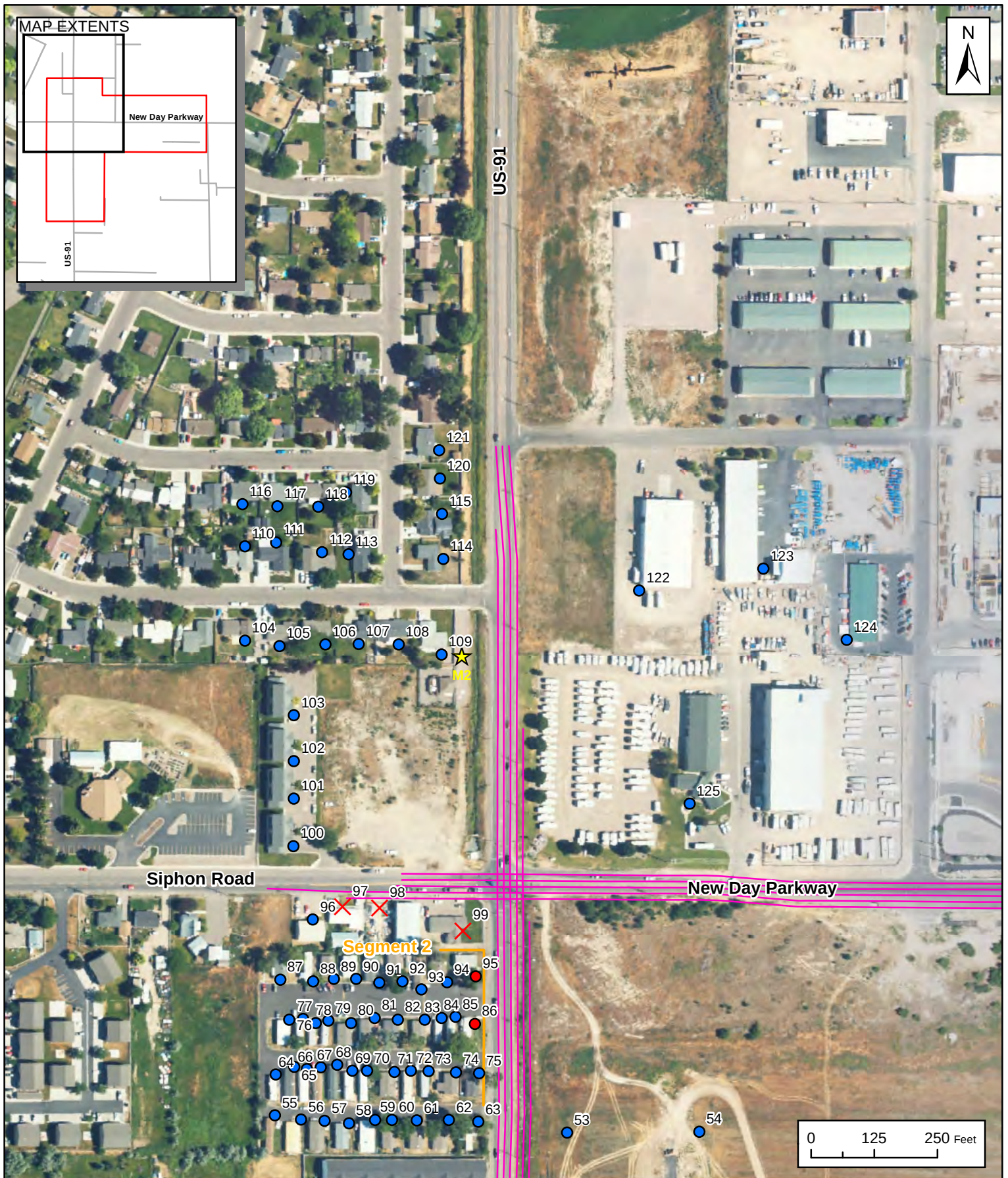


Figure 3. Receptor Locations along the US-91, Park Lawn to Siphon Rd, Chubbuck Study Area Project No. A021(860), Key No. 21860

Legend

- Impacted Receptor
- Non-Impacted Receptor
- X Relocation
- Build Alternative Center Lane
- Noise Barrier Not Recommended
- ★ Monitoring Location

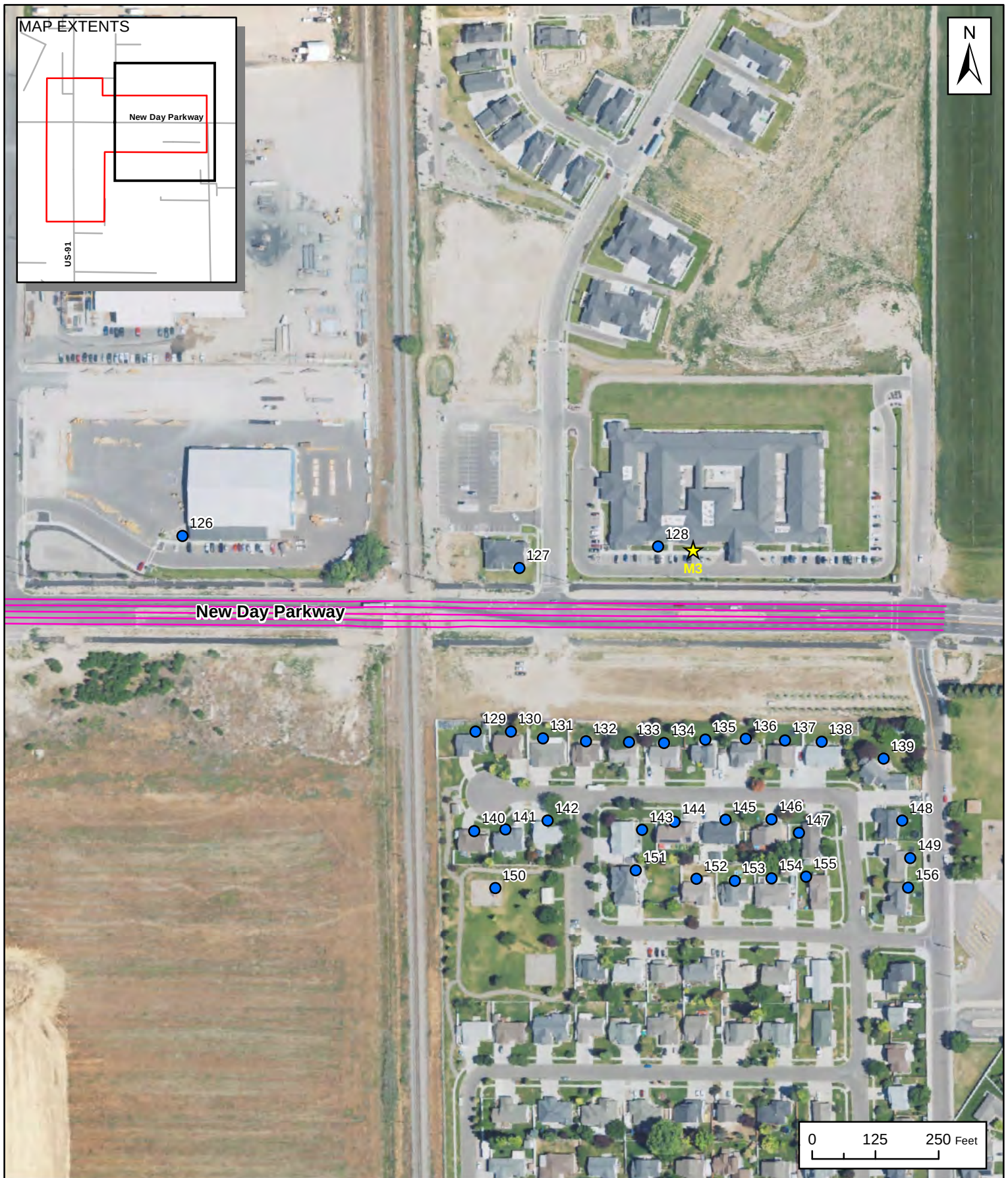


Figure 4. Receptor Locations along the US-91, Park Lawn to Siphon Rd, Chubbuck Study Area
Project No. A021(860), Key No. 21860

Legend

- Impacted Receptor
- Non-Impacted Receptor
- ✕ Relocation
- Build Alternative Center Lane
- ★ Monitoring Location

Appendix B

Traffic Volumes

2021 Existing Traffic Volumes and Speeds Modeled in TNM.

Roadway	Speed	Auto	Medium Trucks	Heavy Trucks
US-91, South of Siphon Road/New Day Parkway	35	1170	14	6
US-91, North of Siphon Road/New Day Parkway	35	1170	14	6
New Day Parkway, East of US-91	35	190	13	5
Siphon Road, West of SH 16	30	240	12	5

2048 No Build Traffic Volumes and Speeds Modeled in TNM.

Roadway	Speed	Auto	Medium Trucks	Heavy Trucks
US-91, South of Siphon Road/New Day Parkway	35	1500	21	9
US-91, North of Siphon Road/New Day Parkway	35	1500	21	9
New Day Parkway, East of US-91	35	346	23	10
Siphon Road, West of SH 16	30	407	20	9

2048 Build Traffic Volumes and Speeds Modeled in TNM.

Roadway	Speed	Auto	Medium Trucks	Heavy Trucks
US-91, South of Siphon Road/New Day Parkway	35	1500	21	9
US-91, North of Siphon Road/New Day Parkway	35	1500	21	9
New Day Parkway, East of US-91	35	346	23	10
Siphon Road, West of SH 16	35	407	20	9

Appendix C

Photographic Documentation



Photograph 1: Monitoring Location 1, looking east, at 5341 Yellowstone Avenue.



Photograph 2: Monitoring Location 2, looking east, at 105 Abraham Street.



Photograph 3: Monitoring Location 3, looking south, at 440 New Day Parkway.

Appendix D

Noise Measurement Data Sheets

NOISE MEASUREMENT DATA SHEET

Project Name:	Part Lawn to Siphon Rd
Key Number:	21860
Date:	11/10/2023
Conducted By:	K. Carr + C. Lucas
Site Location:	5341 Yellowstone Ave
Site ID:	M1

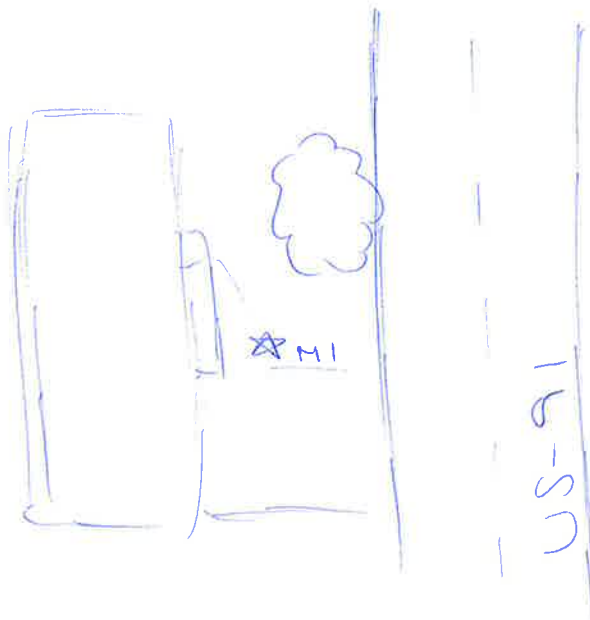
General Measurement Information			
Noise Meter Model: Bruel + Kjaer Type 2270	Response: Fast Slow	Weighting: A C	Calibration Time: 8:31 am Calibration Level: 94 dB

General Meteorological Conditions		
Temperature: 34.2°F	Humidity: 67.2%	Wind Speeds and Direction: max 1.0 mph avg 0.0 mph

Measurement Data			
Event #: M1	Begin Time: 8:40 am	End Time: 9:11 am	Leq (dBA): see below

Vehicle Type:	8:40 am Roadway: US-91		8:51 am Roadway: US-91		9:01 am Roadway: US-91	
	Directional Volume SB	Directional Volume NB	Directional Volume SB	Directional Volume NB	Directional Volume SB	Directional Volume NB
Autos	68	52	67	34	42	45
Medium Trucks	3		1		4	1
Heavy Trucks	2		1	1		
Buses						
Motorcycles						
Speed	35 mph	35 mph	35 mph	35 mph	35 mph	35 mph
Leq (dBA)	67.0		64.5		63.8	

Site Sketch: Please name streets, identify measurement location, make sure your sketch is bright and clearly understandable.



X = 575809.64
Y = 460750.63

Notes:

loud birds during second
reading

NOISE MEASUREMENT DATA SHEET

Project Name:	Park Lawn to Siphon Rd
Key Number:	21860
Date:	11/10/2023
Conducted By:	K. Carr + C. Lucas
Site Location:	105 Abraham St
Site ID:	M2

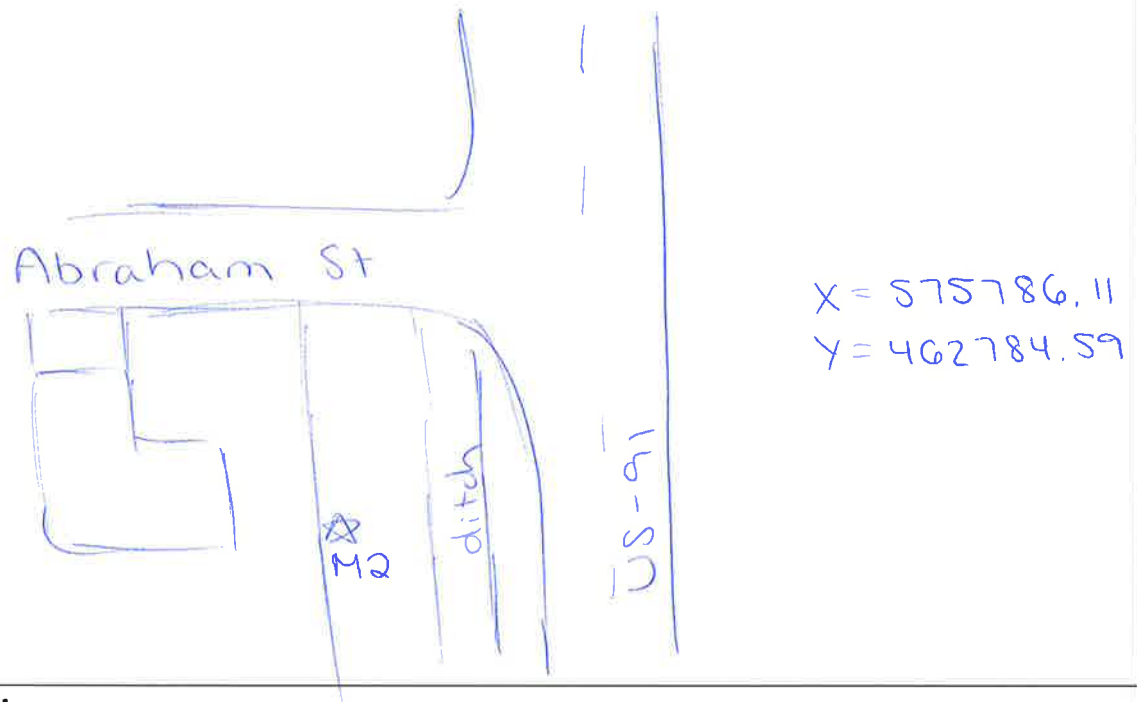
General Measurement Information			
Noise Meter Model:	Response:	Weighting:	Calibration Time:
Brüel + Kjaer Type 2270	Fast Slow	A C	8:31 am
			Calibration Level: 94 dB

General Meteorological Conditions		
Temperature:	Humidity:	Wind Speeds and Direction:
51.2 °F	33.8 %	max 8.3 mph avg 3.1 mph

Measurement Data			
Event #:	Begin Time:	End Time:	Leq (dBA):
M2	10:02 am	10:34 am	see below

Vehicle Type:	10:02 am		10:13 am		10:24 am	
	Roadway: US-91		Roadway: US-91		Roadway: US-91	
	Directional Volume SB	Directional Volume NB	Directional Volume SB	Directional Volume NB	Directional Volume SB	Directional Volume NB
Autos	50	32	43	26	32	32
Medium Trucks				2	3	2
Heavy Trucks	1				1	2
Buses						
Motorcycles						
Speed	35 mph	35 mph	35 mph	35 mph	35 mph	35 mph
Leq (dBA)	66.2		62.0		64.8	

Site Sketch: Please name streets, identify measurement location, make sure your sketch is bright and clearly understandable.



Notes:

train passing during 1st
reading

NOISE MEASUREMENT DATA SHEET

Project Name:	Park Lawn to Siphon Rd
Key Number:	21860
Date:	11/10/2023
Conducted By:	K. Carr + C. Lucas
Site Location:	440 New Day Parkway
Site ID:	M3

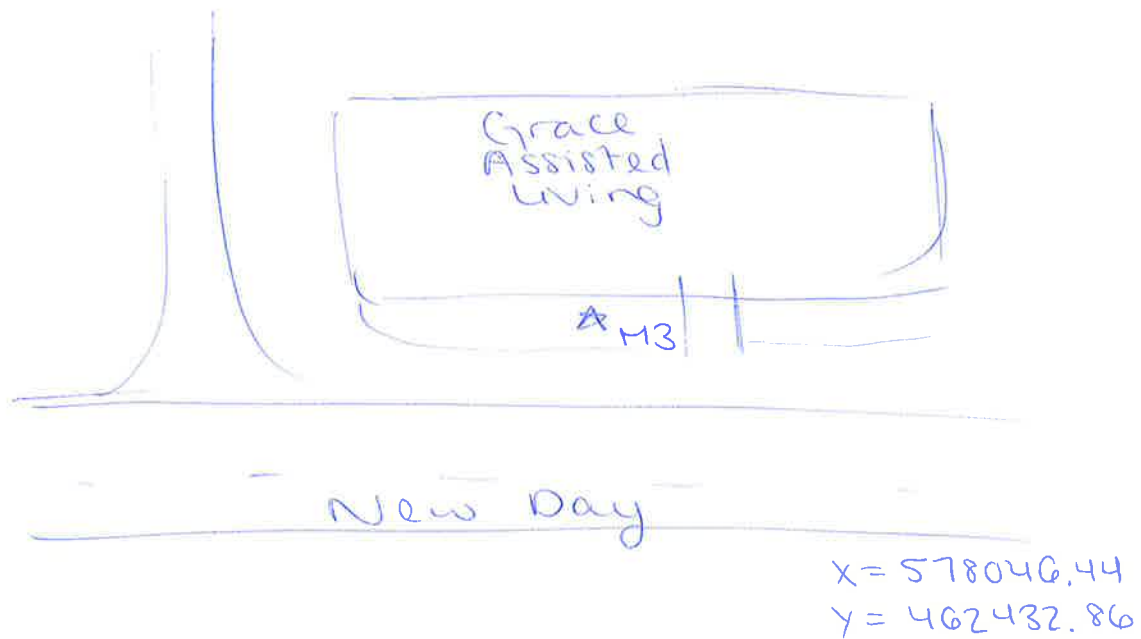
General Measurement Information			
Noise Meter Model:	Response:	Weighting:	Calibration Time:
Brüel + Kjær Type 2270	Fast Slow	A C	8:31 am
			Calibration Level:
			94 dB

General Meteorological Conditions		
Temperature:	Humidity:	Wind Speeds and Direction:
46.3°F	37.6 %	max 7.1 mph avg 2.1 mph

Measurement Data			
Event #:	Begin Time:	End Time:	Leq (dBA):
M3	10:42 am	11:15 am	see below

Vehicle Type:	10:42 am		10:53 am		11:05 am	
	Roadway: New Day		Roadway: New Day		Roadway: New Day	
	Directional Volume EB	Directional Volume WB	Directional Volume EB	Directional Volume WB	Directional Volume EB	Directional Volume WB
Autos	27	22	30	42	49	15
Medium Trucks		2			2	1
Heavy Trucks		2				
Buses						
Motorcycles						
Speed	35 mph	35 mph	35 mph	35 mph	35 mph	35 mph
Leq (dBA)	54.4		55.5		54.8	

Site Sketch: Please name streets, identify measurement location, make sure your sketch is bright and clearly understandable.



Notes:

people talking walking by during
2nd reading

Appendix E

TNM Sound Level Results

RESULTS: SOUND LEVELS
Park Lawn to Siphon

David Evans and Associates, Inc.												
A. Tarter												
RESULTS: SOUND LEVELS												
PROJECT/CONTRACT: Park Lawn to Siphon												
RUN: Observed												
BARRIER DESIGN: INPUT HEIGHTS												
ATMOSPHERICS: 68 deg F, 50% RH												
Receiver												
Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	With Barrier				
								Type Impact	Calculated LAeq1h	Noise Reduction		
										Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
Monitoring Location 1	1	1	0.0	64.7	66	64.7	15	----	64.7	0.0	5	-5.0
Monitoring Location 2	3	1	0.0	62.3	66	62.3	15	----	62.3	0.0	5	-5.0
Monitoring Location 3	4	1	0.0	57.5	66	57.5	15	----	57.5	0.0	5	-5.0
Dwelling Units		# DUs	Noise Reduction									
			Min dB	Avg dB	Max dB							
All Selected		3	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							

RESULTS: SOUND LEVELS

Park Lawn to Siphon

David Evans and Associates, Inc.												
A. Tarter												
RESULTS: SOUND LEVELS												
PROJECT/CONTRACT: Park Lawn to Siphon												
RUN: Existing												
BARRIER DESIGN: INPUT HEIGHTS												
ATMOSPHERICS: 68 deg F, 50% RH												
Receiver												
Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	existing Crit'n Sub'l Inc	With Barrier				
								Type Impact	Calculated LAeq1h	Noise Reduction		
										Calculated	Goal	Calculated minus Goal
			dBa	dBa	dBa	dB	dB		dBa	dB	dB	dB
Receiver1	1	1	0.0	59.2	66	59.2	15	----	59.2	0.0	5	-5.0
Receiver2	2	1	0.0	60.0	66	60.0	15	----	60.0	0.0	5	-5.0
Receiver3	3	1	0.0	47.4	66	47.4	15	----	47.4	0.0	5	-5.0
Receiver4	4	2	0.0	51.5	66	51.5	15	----	51.5	0.0	5	-5.0
Receiver5	5	2	0.0	53.6	66	53.6	15	----	53.6	0.0	5	-5.0
Receiver6	6	1	0.0	62.7	66	62.7	15	----	62.7	0.0	5	-5.0
Receiver7	7	2	0.0	47.1	66	47.1	15	----	47.1	0.0	5	-5.0
Receiver8	8	2	0.0	48.6	66	48.6	15	----	48.6	0.0	5	-5.0
Receiver9	9	2	0.0	50.8	66	50.8	15	----	50.8	0.0	5	-5.0
Receiver10	10	2	0.0	53.6	66	53.6	15	----	53.6	0.0	5	-5.0
Receiver11	11	1	0.0	61.8	66	61.8	15	----	61.8	0.0	5	-5.0
Receiver12	12	1	0.0	61.1	71	61.1	15	----	61.1	0.0	5	-5.0
Receiver13	13	1	0.0	47.9	66	47.9	15	----	47.9	0.0	5	-5.0
Receiver14	14	1	0.0	53.9	66	53.9	15	----	53.9	0.0	5	-5.0
Receiver15	15	1	0.0	47.5	71	47.5	15	----	47.5	0.0	5	-5.0
Receiver16	16	1	0.0	53.2	66	53.2	15	----	53.2	0.0	5	-5.0
Receiver17	17	1	0.0	61.5	66	61.5	15	----	61.5	0.0	5	-5.0
Receiver18	18	1	0.0	59.3	66	59.3	15	----	59.3	0.0	5	-5.0
Receiver19	19	1	0.0	50.2	66	50.2	15	----	50.2	0.0	5	-5.0
Receiver20	20	1	0.0	46.9	66	46.9	15	----	46.9	0.0	5	-5.0
Receiver21	21	1	0.0	59.3	66	59.3	15	----	59.3	0.0	5	-5.0
Receiver22	22	1	0.0	47.9	66	47.9	15	----	47.9	0.0	5	-5.0
Receiver23	23	1	0.0	46.2	66	46.2	15	----	46.2	0.0	5	-5.0
Receiver24	24	1	0.0	47.9	66	47.9	15	----	47.9	0.0	5	-5.0

RESULTS: SOUND LEVELS
Park Lawn to Siphon

Receiver25	25	1	0.0	49.3	66	49.3	15	----	49.3	0.0	5	-5.0
Receiver26	26	1	0.0	54.7	66	54.7	15	----	54.7	0.0	5	-5.0
Receiver27	27	1	0.0	60.3	66	60.3	15	----	60.3	0.0	5	-5.0
Receiver28	28	1	0.0	46.4	66	46.4	15	----	46.4	0.0	5	-5.0
Receiver29	29	1	0.0	51.4	66	51.4	15	----	51.4	0.0	5	-5.0
Receiver30	30	1	0.0	62.9	66	62.9	15	----	62.9	0.0	5	-5.0
Receiver31	31	1	0.0	47.2	66	47.2	15	----	47.2	0.0	5	-5.0
Receiver32	32	1	0.0	48.8	66	48.8	15	----	48.8	0.0	5	-5.0
Receiver33	33	1	0.0	52.0	66	52.0	15	----	52.0	0.0	5	-5.0
Receiver34	34	1	0.0	47.3	66	47.3	15	----	47.3	0.0	5	-5.0
Receiver35	35	1	0.0	51.2	66	51.2	15	----	51.2	0.0	5	-5.0
Receiver36	36	2	0.0	54.1	66	54.1	15	----	54.1	0.0	5	-5.0
Receiver37	37	2	0.0	54.1	66	54.1	15	----	54.1	0.0	5	-5.0
Receiver38	38	2	0.0	67.6	66	67.6	15	Snd Lvl	67.6	0.0	5	-5.0
Receiver39	39	2	0.0	67.6	66	67.6	15	Snd Lvl	67.6	0.0	5	-5.0
Receiver40	40	2	0.0	67.4	66	67.4	15	Snd Lvl	67.4	0.0	5	-5.0
Receiver41	41	2	0.0	49.8	66	49.8	15	----	49.8	0.0	5	-5.0
Receiver42	42	2	0.0	49.9	66	49.9	15	----	49.9	0.0	5	-5.0
Receiver43	43	2	0.0	50.3	66	50.3	15	----	50.3	0.0	5	-5.0
Receiver44	44	2	0.0	51.8	66	51.8	15	----	51.8	0.0	5	-5.0
Receiver45	45	2	0.0	53.7	66	53.7	15	----	53.7	0.0	5	-5.0
Receiver46	46	2	0.0	56.3	66	56.3	15	----	56.3	0.0	5	-5.0
Receiver47	47	2	0.0	59.5	66	59.5	15	----	59.5	0.0	5	-5.0
Receiver48	48	2	0.0	64.4	66	64.4	15	----	64.4	0.0	5	-5.0
Receiver49	49	1	0.0	58.8	66	58.8	15	----	58.8	0.0	5	-5.0
Receiver50	50	1	0.0	48.1	66	48.1	15	----	48.1	0.0	5	-5.0
Receiver51	51	1	0.0	58.8	66	58.8	15	----	58.8	0.0	5	-5.0
Receiver52	52	1	0.0	48.5	66	48.5	15	----	48.5	0.0	5	-5.0
Receiver53	53	1	0.0	58.9	66	58.9	15	----	58.9	0.0	5	-5.0
Receiver54	54	1	0.0	49.0	66	49.0	15	----	49.0	0.0	5	-5.0
Receiver55	55	1	0.0	47.9	66	47.9	15	----	47.9	0.0	5	-5.0
Receiver56	56	1	0.0	48.8	66	48.8	15	----	48.8	0.0	5	-5.0
Receiver57	57	1	0.0	49.8	66	49.8	15	----	49.8	0.0	5	-5.0
Receiver58	58	1	0.0	51.0	66	51.0	15	----	51.0	0.0	5	-5.0
Receiver59	59	1	0.0	52.6	66	52.6	15	----	52.6	0.0	5	-5.0
Receiver60	60	1	0.0	53.8	66	53.8	15	----	53.8	0.0	5	-5.0
Receiver61	61	1	0.0	56.1	66	56.1	15	----	56.1	0.0	5	-5.0
Receiver62	62	1	0.0	60.0	66	60.0	15	----	60.0	0.0	5	-5.0
Receiver63	63	1	0.0	65.5	66	65.5	15	----	65.5	0.0	5	-5.0
Receiver64	64	1	0.0	48.4	66	48.4	15	----	48.4	0.0	5	-5.0
Receiver65	65	1	0.0	49.2	66	49.2	15	----	49.2	0.0	5	-5.0

RESULTS: SOUND LEVELS
Park Lawn to Siphon

Receiver66	66	1	0.0	49.6	66	49.6	15	----	49.6	0.0	5	-5.0
Receiver67	67	1	0.0	50.2	66	50.2	15	----	50.2	0.0	5	-5.0
Receiver68	68	1	0.0	51.0	66	51.0	15	----	51.0	0.0	5	-5.0
Receiver69	69	1	0.0	51.7	66	51.7	15	----	51.7	0.0	5	-5.0
Receiver70	70	1	0.0	52.5	66	52.5	15	----	52.5	0.0	5	-5.0
Receiver71	71	1	0.0	54.5	66	54.5	15	----	54.5	0.0	5	-5.0
Receiver72	72	1	0.0	55.9	66	55.9	15	----	55.9	0.0	5	-5.0
Receiver73	73	1	0.0	57.9	66	57.9	15	----	57.9	0.0	5	-5.0
Receiver74	74	1	0.0	61.5	66	61.5	15	----	61.5	0.0	5	-5.0
Receiver75	75	1	0.0	66.5	66	66.5	15	Snd Lvl	66.5	0.0	5	-5.0
Receiver76	76	1	0.0	49.8	66	49.8	15	----	49.8	0.0	5	-5.0
Receiver77	77	1	0.0	50.4	66	50.4	15	----	50.4	0.0	5	-5.0
Receiver78	78	1	0.0	50.7	66	50.7	15	----	50.7	0.0	5	-5.0
Receiver79	79	1	0.0	51.3	66	51.3	15	----	51.3	0.0	5	-5.0
Receiver80	80	1	0.0	52.3	66	52.3	15	----	52.3	0.0	5	-5.0
Receiver81	81	1	0.0	53.8	66	53.8	15	----	53.8	0.0	5	-5.0
Receiver82	82	1	0.0	55.4	66	55.4	15	----	55.4	0.0	5	-5.0
Receiver83	83	1	0.0	57.9	66	57.9	15	----	57.9	0.0	5	-5.0
Receiver84	84	1	0.0	59.9	66	59.9	15	----	59.9	0.0	5	-5.0
Receiver85	85	1	0.0	61.8	66	61.8	15	----	61.8	0.0	5	-5.0
Receiver86	86	1	0.0	66.4	66	66.4	15	Snd Lvl	66.4	0.0	5	-5.0
Receiver87	87	1	0.0	50.7	66	50.7	15	----	50.7	0.0	5	-5.0
Receiver88	88	1	0.0	51.7	66	51.7	15	----	51.7	0.0	5	-5.0
Receiver89	89	1	0.0	52.6	66	52.6	15	----	52.6	0.0	5	-5.0
Receiver90	90	1	0.0	53.7	66	53.7	15	----	53.7	0.0	5	-5.0
Receiver91	91	1	0.0	54.9	66	54.9	15	----	54.9	0.0	5	-5.0
Receiver92	92	1	0.0	56.5	66	56.5	15	----	56.5	0.0	5	-5.0
Receiver93	93	1	0.0	58.0	66	58.0	15	----	58.0	0.0	5	-5.0
Receiver94	94	1	0.0	61.0	66	61.0	15	----	61.0	0.0	5	-5.0
Receiver95	95	1	0.0	66.4	66	66.4	15	Snd Lvl	66.4	0.0	5	-5.0
Receiver96	96	2	0.0	56.7	71	56.7	15	----	56.7	0.0	5	-5.0
Receiver97	97	1	0.0	59.8	71	59.8	15	----	59.8	0.0	5	-5.0
Receiver98	98	1	0.0	60.2	66	60.2	15	----	60.2	0.0	5	-5.0
Receiver99	99	1	0.0	64.3	66	64.3	15	----	64.3	0.0	5	-5.0
Receiver100	100	1	0.0	56.3	66	56.3	15	----	56.3	0.0	5	-5.0
Receiver101	101	1	0.0	52.2	66	52.2	15	----	52.2	0.0	5	-5.0
Receiver102	102	1	0.0	51.2	66	51.2	15	----	51.2	0.0	5	-5.0
Receiver103	103	1	0.0	50.3	66	50.3	15	----	50.3	0.0	5	-5.0
Receiver104	104	1	0.0	48.1	66	48.1	15	----	48.1	0.0	5	-5.0
Receiver105	105	1	0.0	48.9	66	48.9	15	----	48.9	0.0	5	-5.0
Receiver106	106	1	0.0	51.0	66	51.0	15	----	51.0	0.0	5	-5.0

RESULTS: SOUND LEVELS
Park Lawn to Siphon

Receiver107	107	1	0.0	53.2	66	53.2	15	----	53.2	0.0	5	-5.0
Receiver108	108	1	0.0	55.9	66	55.9	15	----	55.9	0.0	5	-5.0
Receiver109	109	1	0.0	59.4	66	59.4	15	----	59.4	0.0	5	-5.0
Receiver110	110	1	0.0	47.1	66	47.1	15	----	47.1	0.0	5	-5.0
Receiver111	111	1	0.0	48.2	66	48.2	15	----	48.2	0.0	5	-5.0
Receiver112	112	1	0.0	50.4	66	50.4	15	----	50.4	0.0	5	-5.0
Receiver113	113	1	0.0	52.1	66	52.1	15	----	52.1	0.0	5	-5.0
Receiver114	114	1	0.0	59.2	66	59.2	15	----	59.2	0.0	5	-5.0
Receiver115	115	1	0.0	58.9	66	58.9	15	----	58.9	0.0	5	-5.0
Receiver116	116	1	0.0	46.8	66	46.8	15	----	46.8	0.0	5	-5.0
Receiver117	117	1	0.0	48.1	66	48.1	15	----	48.1	0.0	5	-5.0
Receiver118	118	1	0.0	50.1	66	50.1	15	----	50.1	0.0	5	-5.0
Receiver119	119	1	0.0	51.7	66	51.7	15	----	51.7	0.0	5	-5.0
Receiver120	120	1	0.0	58.7	71	58.7	15	----	58.7	0.0	5	-5.0
Receiver121	121	1	0.0	58.6	71	58.6	15	----	58.6	0.0	5	-5.0
Receiver122	122	1	0.0	53.0	71	53.0	15	----	53.0	0.0	5	-5.0
Receiver123	123	1	0.0	47.0	71	47.0	15	----	47.0	0.0	5	-5.0
Receiver124	124	1	0.0	45.6	71	45.6	15	----	45.6	0.0	5	-5.0
Receiver125	125	1	0.0	53.5	71	53.5	15	----	53.5	0.0	5	-5.0
Receiver126	126	1	0.0	52.5	66	52.5	15	----	52.5	0.0	5	-5.0
Receiver127	127	1	0.0	56.3	66	56.3	15	----	56.3	0.0	5	-5.0
Receiver128	128	1	0.0	53.1	66	53.1	15	----	53.1	0.0	5	-5.0
Receiver129	129	1	0.0	46.5	66	46.5	15	----	46.5	0.0	5	-5.0
Receiver130	130	1	0.0	46.4	66	46.4	15	----	46.4	0.0	5	-5.0
Receiver131	131	1	0.0	46.0	66	46.0	15	----	46.0	0.0	5	-5.0
Receiver132	132	1	0.0	45.8	66	45.8	15	----	45.8	0.0	5	-5.0
Receiver133	133	1	0.0	45.7	66	45.7	15	----	45.7	0.0	5	-5.0
Receiver134	134	1	0.0	45.6	66	45.6	15	----	45.6	0.0	5	-5.0
Receiver135	135	1	0.0	45.8	66	45.8	15	----	45.8	0.0	5	-5.0
Receiver136	136	1	0.0	45.9	66	45.9	15	----	45.9	0.0	5	-5.0
Receiver137	137	1	0.0	45.7	66	45.7	15	----	45.7	0.0	5	-5.0
Receiver138	138	1	0.0	45.6	66	45.6	15	----	45.6	0.0	5	-5.0
Receiver139	139	1	0.0	44.6	66	44.6	15	----	44.6	0.0	5	-5.0
Receiver140	140	1	0.0	42.2	66	42.2	15	----	42.2	0.0	5	-5.0
Receiver141	141	1	0.0	42.2	66	42.2	15	----	42.2	0.0	5	-5.0
Receiver142	142	1	0.0	42.4	66	42.4	15	----	42.4	0.0	5	-5.0
Receiver143	143	1	0.0	41.9	66	41.9	15	----	41.9	0.0	5	-5.0
Receiver144	144	1	0.0	42.1	66	42.1	15	----	42.1	0.0	5	-5.0
Receiver145	145	1	0.0	42.2	66	42.2	15	----	42.2	0.0	5	-5.0
Receiver146	146	1	0.0	42.1	66	42.1	15	----	42.1	0.0	5	-5.0
Receiver147	147	1	0.0	41.6	66	41.6	15	----	41.6	0.0	5	-5.0

RESULTS: SOUND LEVELS
Park Lawn to Siphon

Receiver148	148	1	0.0	41.9	66	41.9	15	----	41.9	0.0	5	-5.0
Receiver149	149	1	0.0	40.7	66	40.7	15	----	40.7	0.0	5	-5.0
Receiver150	150	1	0.0	40.9	66	40.9	15	----	40.9	0.0	5	-5.0
Receiver151	151	1	0.0	40.9	66	40.9	15	----	40.9	0.0	5	-5.0
Receiver152	152	1	0.0	40.6	66	40.6	15	----	40.6	0.0	5	-5.0
Receiver153	153	1	0.0	40.4	66	40.4	15	----	40.4	0.0	5	-5.0
Receiver154	154	1	0.0	40.4	66	40.4	15	----	40.4	0.0	5	-5.0
Receiver155	155	1	0.0	40.4	66	40.4	10	----	40.4	0.0	8	-8.0
Receiver156	156	1	0.0	40.0	66	40.0	10	----	40.0	0.0	8	-8.0
Dwelling Units		# DUs	Noise Reduction									
			Min	Avg	Max							
			dB	dB	dB							
All Selected		176	0.0	0.0	0.0							
All Impacted		9	0.0	0.0	0.0							
All that meet NR Goal		0	0.0	0.0	0.0							

RESULTS: SOUND LEVELS

Park Lawn to Siphon

David Evans and Associates, Inc.												
A. Tarter												
RESULTS: SOUND LEVELS												
PROJECT/CONTRACT: Park Lawn to Siphon												
RUN: Build												
BARRIER DESIGN: INPUT HEIGHTS												
ATMOSPHERICS: 68 deg F, 50% RH												
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
Receiver1	1	1	0.0	60.3	66	60.3	15	----	60.3	0.0	5	-5.0
Receiver2	2	1	0.0	61.0	71	61.0	15	----	61.0	0.0	5	-5.0
Receiver3	3	1	0.0	50.4	66	50.4	15	----	50.4	0.0	5	-5.0
Receiver4	4	2	0.0	53.9	66	53.9	15	----	53.9	0.0	5	-5.0
Receiver5	5	2	0.0	55.3	66	55.3	15	----	55.3	0.0	5	-5.0
Receiver6	6	1	0.0	63.6	66	63.6	15	----	63.6	0.0	5	-5.0
Receiver7	7	2	0.0	50.3	66	50.3	15	----	50.3	0.0	5	-5.0
Receiver8	8	2	0.0	52.0	66	52.0	15	----	52.0	0.0	5	-5.0
Receiver9	9	2	0.0	53.6	66	53.6	15	----	53.6	0.0	5	-5.0
Receiver10	10	2	0.0	55.8	66	55.8	15	----	55.8	0.0	5	-5.0
Receiver11	11	1	0.0	62.9	66	62.9	15	----	62.9	0.0	5	-5.0
Receiver12	12	1	0.0	62.6	71	62.6	15	----	62.6	0.0	5	-5.0
Receiver13	13	1	0.0	51.7	66	51.7	15	----	51.7	0.0	5	-5.0
Receiver14	14	1	0.0	55.6	66	55.6	15	----	55.6	0.0	5	-5.0
Receiver15	15	1	0.0	50.2	71	50.2	15	----	50.2	0.0	5	-5.0
Receiver16	16	1	0.0	55.8	66	55.8	15	----	55.8	0.0	5	-5.0
Receiver17	17	1	0.0	64.0	66	64.0	15	----	64.0	0.0	5	-5.0
Receiver18	18	1	0.0	61.6	66	61.6	15	----	61.6	0.0	5	-5.0
Receiver19	19	1	0.0	54.5	66	54.5	15	----	54.5	0.0	5	-5.0
Receiver20	20	1	0.0	51.1	66	51.1	15	----	51.1	0.0	5	-5.0
Receiver21	21	1	0.0	61.9	66	61.9	15	----	61.9	0.0	5	-5.0
Receiver22	22	1	0.0	52.4	66	52.4	15	----	52.4	0.0	5	-5.0
Receiver23	23	1	0.0	49.9	66	49.9	15	----	49.9	0.0	5	-5.0
Receiver24	24	1	0.0	51.9	66	51.9	15	----	51.9	0.0	5	-5.0

RESULTS: SOUND LEVELS
Park Lawn to Siphon

Receiver25	25	1	0.0	53.2	66	53.2	15	----	53.2	0.0	5	-5.0
Receiver26	26	1	0.0	57.2	66	57.2	15	----	57.2	0.0	5	-5.0
Receiver27	27	1	0.0	61.5	66	61.5	15	----	61.5	0.0	5	-5.0
Receiver28	28	1	0.0	50.2	66	50.2	15	----	50.2	0.0	5	-5.0
Receiver29	29	1	0.0	54.7	66	54.7	15	----	54.7	0.0	5	-5.0
Receiver30	30	1	0.0	64.0	66	64.0	15	----	64.0	0.0	5	-5.0
Receiver31	31	1	0.0	51.2	66	51.2	15	----	51.2	0.0	5	-5.0
Receiver32	32	1	0.0	52.8	66	52.8	15	----	52.8	0.0	5	-5.0
Receiver33	33	1	0.0	55.1	66	55.1	15	----	55.1	0.0	5	-5.0
Receiver34	34	1	0.0	51.3	66	51.3	15	----	51.3	0.0	5	-5.0
Receiver35	35	1	0.0	54.5	66	54.5	15	----	54.5	0.0	5	-5.0
Receiver36	36	2	0.0	56.7	66	56.7	15	----	56.7	0.0	5	-5.0
Receiver37	37	2	0.0	56.7	66	56.7	15	----	56.7	0.0	5	-5.0
Receiver38	38	2	0.0	69.2	66	69.2	15	Snd Lvl	69.2	0.0	5	-5.0
Receiver39	39	2	0.0	68.9	66	68.9	15	Snd Lvl	68.9	0.0	5	-5.0
Receiver40	40	2	0.0	68.2	66	68.2	15	Snd Lvl	68.2	0.0	5	-5.0
Receiver41	41	2	0.0	53.5	66	53.5	15	----	53.5	0.0	5	-5.0
Receiver42	42	2	0.0	53.6	66	53.6	15	----	53.6	0.0	5	-5.0
Receiver43	43	2	0.0	53.8	66	53.8	15	----	53.8	0.0	5	-5.0
Receiver44	44	2	0.0	54.9	66	54.9	15	----	54.9	0.0	5	-5.0
Receiver45	45	2	0.0	56.4	66	56.4	15	----	56.4	0.0	5	-5.0
Receiver46	46	2	0.0	58.2	66	58.2	15	----	58.2	0.0	5	-5.0
Receiver47	47	2	0.0	60.5	66	60.5	15	----	60.5	0.0	5	-5.0
Receiver48	48	2	0.0	64.6	66	64.6	15	----	64.6	0.0	5	-5.0
Receiver49	49	1	0.0	61.5	66	61.5	15	----	61.5	0.0	5	-5.0
Receiver50	50	1	0.0	53.0	66	53.0	15	----	53.0	0.0	5	-5.0
Receiver51	51	1	0.0	61.7	66	61.7	15	----	61.7	0.0	5	-5.0
Receiver52	52	1	0.0	53.3	66	53.3	15	----	53.3	0.0	5	-5.0
Receiver53	53	1	0.0	62.0	66	62.0	15	----	62.0	0.0	5	-5.0
Receiver54	54	1	0.0	53.8	66	53.8	15	----	53.8	0.0	5	-5.0
Receiver55	55	1	0.0	51.4	66	51.4	15	----	51.4	0.0	5	-5.0
Receiver56	56	1	0.0	52.4	66	52.4	15	----	52.4	0.0	5	-5.0
Receiver57	57	1	0.0	53.3	66	53.3	15	----	53.3	0.0	5	-5.0
Receiver58	58	1	0.0	54.3	66	54.3	15	----	54.3	0.0	5	-5.0
Receiver59	59	1	0.0	55.5	66	55.5	15	----	55.5	0.0	5	-5.0
Receiver60	60	1	0.0	56.3	66	56.3	15	----	56.3	0.0	5	-5.0
Receiver61	61	1	0.0	58.0	66	58.0	15	----	58.0	0.0	5	-5.0
Receiver62	62	1	0.0	60.8	66	60.8	15	----	60.8	0.0	5	-5.0
Receiver63	63	1	0.0	65.3	66	65.3	15	----	65.3	0.0	5	-5.0
Receiver64	64	1	0.0	51.9	66	51.9	15	----	51.9	0.0	5	-5.0
Receiver65	65	1	0.0	52.7	66	52.7	15	----	52.7	0.0	5	-5.0

RESULTS: SOUND LEVELS
Park Lawn to Siphon

Receiver66	66	1	0.0	53.2	66	53.2	15	----	53.2	0.0	5	-5.0
Receiver67	67	1	0.0	53.7	66	53.7	15	----	53.7	0.0	5	-5.0
Receiver68	68	1	0.0	54.4	66	54.4	15	----	54.4	0.0	5	-5.0
Receiver69	69	1	0.0	54.9	66	54.9	15	----	54.9	0.0	5	-5.0
Receiver70	70	1	0.0	55.6	66	55.6	15	----	55.6	0.0	5	-5.0
Receiver71	71	1	0.0	57.0	66	57.0	15	----	57.0	0.0	5	-5.0
Receiver72	72	1	0.0	57.9	66	57.9	15	----	57.9	0.0	5	-5.0
Receiver73	73	1	0.0	59.4	66	59.4	15	----	59.4	0.0	5	-5.0
Receiver74	74	1	0.0	62.0	66	62.0	15	----	62.0	0.0	5	-5.0
Receiver75	75	1	0.0	65.7	66	65.7	15	----	65.7	0.0	5	-5.0
Receiver76	76	1	0.0	53.2	66	53.2	15	----	53.2	0.0	5	-5.0
Receiver77	77	1	0.0	53.7	66	53.7	15	----	53.7	0.0	5	-5.0
Receiver78	78	1	0.0	54.1	66	54.1	15	----	54.1	0.0	5	-5.0
Receiver79	79	1	0.0	54.7	66	54.7	15	----	54.7	0.0	5	-5.0
Receiver80	80	1	0.0	55.6	66	55.6	15	----	55.6	0.0	5	-5.0
Receiver81	81	1	0.0	56.7	66	56.7	15	----	56.7	0.0	5	-5.0
Receiver82	82	1	0.0	57.8	66	57.8	15	----	57.8	0.0	5	-5.0
Receiver83	83	1	0.0	59.8	66	59.8	15	----	59.8	0.0	5	-5.0
Receiver84	84	1	0.0	61.3	66	61.3	15	----	61.3	0.0	5	-5.0
Receiver85	85	1	0.0	62.7	66	62.7	15	----	62.7	0.0	5	-5.0
Receiver86	86	1	0.0	66.2	66	66.2	15	Snd Lvl	66.2	0.0	5	-5.0
Receiver87	87	1	0.0	53.8	66	53.8	15	----	53.8	0.0	5	-5.0
Receiver88	88	1	0.0	55.1	66	55.1	15	----	55.1	0.0	5	-5.0
Receiver89	89	1	0.0	56.0	66	56.0	15	----	56.0	0.0	5	-5.0
Receiver90	90	1	0.0	56.8	66	56.8	15	----	56.8	0.0	5	-5.0
Receiver91	91	1	0.0	57.8	66	57.8	15	----	57.8	0.0	5	-5.0
Receiver92	92	1	0.0	59.0	66	59.0	15	----	59.0	0.0	5	-5.0
Receiver93	93	1	0.0	60.1	66	60.1	15	----	60.1	0.0	5	-5.0
Receiver94	94	1	0.0	62.3	66	62.3	15	----	62.3	0.0	5	-5.0
Receiver95	95	1	0.0	66.4	66	66.4	15	Snd Lvl	66.4	0.0	5	-5.0
Receiver96	96	2	0.0	60.0	71	60.0	15	----	60.0	0.0	5	-5.0
Receiver97	97	1	0.0	63.7	71	63.7	15	----	63.7	0.0	5	-5.0
Receiver98	98	1	0.0	64.6	66	64.6	15	----	64.6	0.0	5	-5.0
Receiver99	99	1	0.0	65.5	66	65.5	15	----	65.5	0.0	5	-5.0
Receiver100	100	1	0.0	61.2	66	61.2	15	----	61.2	0.0	5	-5.0
Receiver101	101	1	0.0	56.4	66	56.4	15	----	56.4	0.0	5	-5.0
Receiver102	102	1	0.0	54.6	66	54.6	15	----	54.6	0.0	5	-5.0
Receiver103	103	1	0.0	53.5	66	53.5	15	----	53.5	0.0	5	-5.0
Receiver104	104	1	0.0	50.6	66	50.6	15	----	50.6	0.0	5	-5.0
Receiver105	105	1	0.0	51.7	66	51.7	15	----	51.7	0.0	5	-5.0
Receiver106	106	1	0.0	53.6	66	53.6	15	----	53.6	0.0	5	-5.0

RESULTS: SOUND LEVELS
Park Lawn to Siphon

Receiver107	107	1	0.0	55.1	66	55.1	15	----	55.1	0.0	5	-5.0
Receiver108	108	1	0.0	57.2	66	57.2	15	----	57.2	0.0	5	-5.0
Receiver109	109	1	0.0	60.9	66	60.9	15	----	60.9	0.0	5	-5.0
Receiver110	110	1	0.0	49.7	66	49.7	15	----	49.7	0.0	5	-5.0
Receiver111	111	1	0.0	50.8	66	50.8	15	----	50.8	0.0	5	-5.0
Receiver112	112	1	0.0	52.8	66	52.8	15	----	52.8	0.0	5	-5.0
Receiver113	113	1	0.0	54.1	66	54.1	15	----	54.1	0.0	5	-5.0
Receiver114	114	1	0.0	61.2	66	61.2	15	----	61.2	0.0	5	-5.0
Receiver115	115	1	0.0	60.7	66	60.7	15	----	60.7	0.0	5	-5.0
Receiver116	116	1	0.0	49.3	66	49.3	15	----	49.3	0.0	5	-5.0
Receiver117	117	1	0.0	50.6	66	50.6	15	----	50.6	0.0	5	-5.0
Receiver118	118	1	0.0	52.4	66	52.4	15	----	52.4	0.0	5	-5.0
Receiver119	119	1	0.0	53.7	66	53.7	15	----	53.7	0.0	5	-5.0
Receiver120	120	1	0.0	60.3	71	60.3	15	----	60.3	0.0	5	-5.0
Receiver121	121	1	0.0	60.2	71	60.2	15	----	60.2	0.0	5	-5.0
Receiver122	122	1	0.0	56.0	71	56.0	15	----	56.0	0.0	5	-5.0
Receiver123	123	1	0.0	50.4	71	50.4	15	----	50.4	0.0	5	-5.0
Receiver124	124	1	0.0	49.7	71	49.7	15	----	49.7	0.0	5	-5.0
Receiver125	125	1	0.0	57.4	71	57.4	15	----	57.4	0.0	5	-5.0
Receiver126	126	1	0.0	54.0	66	54.0	15	----	54.0	0.0	5	-5.0
Receiver127	127	1	0.0	57.7	66	57.7	15	----	57.7	0.0	5	-5.0
Receiver128	128	1	0.0	54.7	66	54.7	15	----	54.7	0.0	5	-5.0
Receiver129	129	1	0.0	51.1	66	51.1	15	----	51.1	0.0	5	-5.0
Receiver130	130	1	0.0	51.1	66	51.1	15	----	51.1	0.0	5	-5.0
Receiver131	131	1	0.0	50.7	66	50.7	15	----	50.7	0.0	5	-5.0
Receiver132	132	1	0.0	50.6	66	50.6	15	----	50.6	0.0	5	-5.0
Receiver133	133	1	0.0	50.4	66	50.4	15	----	50.4	0.0	5	-5.0
Receiver134	134	1	0.0	50.3	66	50.3	15	----	50.3	0.0	5	-5.0
Receiver135	135	1	0.0	50.5	66	50.5	15	----	50.5	0.0	5	-5.0
Receiver136	136	1	0.0	50.6	66	50.6	15	----	50.6	0.0	5	-5.0
Receiver137	137	1	0.0	50.4	66	50.4	15	----	50.4	0.0	5	-5.0
Receiver138	138	1	0.0	50.3	66	50.3	15	----	50.3	0.0	5	-5.0
Receiver139	139	1	0.0	49.4	66	49.4	15	----	49.4	0.0	5	-5.0
Receiver140	140	1	0.0	46.4	66	46.4	15	----	46.4	0.0	5	-5.0
Receiver141	141	1	0.0	46.4	66	46.4	15	----	46.4	0.0	5	-5.0
Receiver142	142	1	0.0	46.7	66	46.7	15	----	46.7	0.0	5	-5.0
Receiver143	143	1	0.0	46.2	66	46.2	15	----	46.2	0.0	5	-5.0
Receiver144	144	1	0.0	46.4	66	46.4	15	----	46.4	0.0	5	-5.0
Receiver145	145	1	0.0	46.4	66	46.4	15	----	46.4	0.0	5	-5.0
Receiver146	146	1	0.0	46.5	66	46.5	15	----	46.5	0.0	5	-5.0
Receiver147	147	1	0.0	45.8	66	45.8	15	----	45.8	0.0	5	-5.0

RESULTS: SOUND LEVELS
Park Lawn to Siphon

Receiver148	148	1	0.0	46.1	66	46.1	15	----	46.1	0.0	5	-5.0
Receiver149	149	1	0.0	44.7	66	44.7	15	----	44.7	0.0	5	-5.0
Receiver150	150	1	0.0	44.4	66	44.4	15	----	44.4	0.0	5	-5.0
Receiver151	151	1	0.0	44.7	66	44.7	15	----	44.7	0.0	5	-5.0
Receiver152	152	1	0.0	44.3	66	44.3	15	----	44.3	0.0	5	-5.0
Receiver153	153	1	0.0	44.2	66	44.2	15	----	44.2	0.0	5	-5.0
Receiver154	154	1	0.0	44.3	66	44.3	15	----	44.3	0.0	5	-5.0
Receiver155	155	1	0.0	44.2	66	44.2	10	----	44.2	0.0	8	-8.0
Receiver156	156	1	0.0	43.6	66	43.6	10	----	43.6	0.0	8	-8.0
Dwelling Units		# DUs	Noise Reduction									
			Min	Avg	Max							
			dB	dB	dB							
All Selected		176	0.0	0.0	0.0							
All Impacted		8	0.0	0.0	0.0							
All that meet NR Goal		0	0.0	0.0	0.0							

RESULTS: SOUND LEVELS

Park Lawn to Siphon

David Evans and Associates, Inc.												
A. Tarter												
RESULTS: SOUND LEVELS												
PROJECT/CONTRACT: Park Lawn to Siphon												
RUN: No Build												
BARRIER DESIGN: INPUT HEIGHTS												
ATMOSPHERICS: 68 deg F, 50% RH												
Receiver												
Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over Calculated	existing Crit'n Sub'l Inc	With Barrier				
								Type Impact	Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBa	dBa	dBa	dB	dB		dBa	dB	dB	dB
Receiver1	1	1	0.0	60.4	66	60.4	15	----	60.4	0.0	5	-5.0
Receiver2	2	1	0.0	61.2	66	61.2	15	----	61.2	0.0	5	-5.0
Receiver3	3	1	0.0	48.6	66	48.6	15	----	48.6	0.0	5	-5.0
Receiver4	4	2	0.0	52.7	66	52.7	15	----	52.7	0.0	5	-5.0
Receiver5	5	2	0.0	54.8	66	54.8	15	----	54.8	0.0	5	-5.0
Receiver6	6	1	0.0	63.9	66	63.9	15	----	63.9	0.0	5	-5.0
Receiver7	7	2	0.0	48.4	66	48.4	15	----	48.4	0.0	5	-5.0
Receiver8	8	2	0.0	49.9	66	49.9	15	----	49.9	0.0	5	-5.0
Receiver9	9	2	0.0	52.1	66	52.1	15	----	52.1	0.0	5	-5.0
Receiver10	10	2	0.0	54.8	66	54.8	15	----	54.8	0.0	5	-5.0
Receiver11	11	1	0.0	62.9	66	62.9	15	----	62.9	0.0	5	-5.0
Receiver12	12	1	0.0	62.3	71	62.3	15	----	62.3	0.0	5	-5.0
Receiver13	13	1	0.0	49.2	66	49.2	15	----	49.2	0.0	5	-5.0
Receiver14	14	1	0.0	55.1	66	55.1	15	----	55.1	0.0	5	-5.0
Receiver15	15	1	0.0	48.8	71	48.8	15	----	48.8	0.0	5	-5.0
Receiver16	16	1	0.0	54.4	66	54.4	15	----	54.4	0.0	5	-5.0
Receiver17	17	1	0.0	62.7	66	62.7	15	----	62.7	0.0	5	-5.0
Receiver18	18	1	0.0	60.6	66	60.6	15	----	60.6	0.0	5	-5.0
Receiver19	19	1	0.0	51.4	66	51.4	15	----	51.4	0.0	5	-5.0
Receiver20	20	1	0.0	48.2	66	48.2	15	----	48.2	0.0	5	-5.0
Receiver21	21	1	0.0	60.6	66	60.6	15	----	60.6	0.0	5	-5.0
Receiver22	22	1	0.0	49.2	66	49.2	15	----	49.2	0.0	5	-5.0
Receiver23	23	1	0.0	47.5	66	47.5	15	----	47.5	0.0	5	-5.0
Receiver24	24	1	0.0	49.2	66	49.2	15	----	49.2	0.0	5	-5.0

RESULTS: SOUND LEVELS
Park Lawn to Siphon

Receiver25	25	1	0.0	50.5	66	50.5	15	----	50.5	0.0	5	-5.0
Receiver26	26	1	0.0	55.9	66	55.9	15	----	55.9	0.0	5	-5.0
Receiver27	27	1	0.0	61.5	66	61.5	15	----	61.5	0.0	5	-5.0
Receiver28	28	1	0.0	47.7	66	47.7	15	----	47.7	0.0	5	-5.0
Receiver29	29	1	0.0	52.7	66	52.7	15	----	52.7	0.0	5	-5.0
Receiver30	30	1	0.0	64.1	66	64.1	15	----	64.1	0.0	5	-5.0
Receiver31	31	1	0.0	48.5	66	48.5	15	----	48.5	0.0	5	-5.0
Receiver32	32	1	0.0	50.1	66	50.1	15	----	50.1	0.0	5	-5.0
Receiver33	33	1	0.0	53.2	66	53.2	15	----	53.2	0.0	5	-5.0
Receiver34	34	1	0.0	48.7	66	48.7	15	----	48.7	0.0	5	-5.0
Receiver35	35	1	0.0	52.5	66	52.5	15	----	52.5	0.0	5	-5.0
Receiver36	36	2	0.0	55.3	66	55.3	15	----	55.3	0.0	5	-5.0
Receiver37	37	2	0.0	55.4	66	55.4	15	----	55.4	0.0	5	-5.0
Receiver38	38	2	0.0	68.8	66	68.8	15	Snd Lvl	68.8	0.0	5	-5.0
Receiver39	39	2	0.0	68.9	66	68.9	15	Snd Lvl	68.9	0.0	5	-5.0
Receiver40	40	2	0.0	68.7	66	68.7	15	Snd Lvl	68.7	0.0	5	-5.0
Receiver41	41	2	0.0	51.2	66	51.2	15	----	51.2	0.0	5	-5.0
Receiver42	42	2	0.0	51.3	66	51.3	15	----	51.3	0.0	5	-5.0
Receiver43	43	2	0.0	51.6	66	51.6	15	----	51.6	0.0	5	-5.0
Receiver44	44	2	0.0	53.2	66	53.2	15	----	53.2	0.0	5	-5.0
Receiver45	45	2	0.0	55.0	66	55.0	15	----	55.0	0.0	5	-5.0
Receiver46	46	2	0.0	57.5	66	57.5	15	----	57.5	0.0	5	-5.0
Receiver47	47	2	0.0	60.7	66	60.7	15	----	60.7	0.0	5	-5.0
Receiver48	48	2	0.0	65.6	66	65.6	15	----	65.6	0.0	5	-5.0
Receiver49	49	1	0.0	60.1	66	60.1	15	----	60.1	0.0	5	-5.0
Receiver50	50	1	0.0	49.5	66	49.5	15	----	49.5	0.0	5	-5.0
Receiver51	51	1	0.0	60.0	66	60.0	15	----	60.0	0.0	5	-5.0
Receiver52	52	1	0.0	49.9	66	49.9	15	----	49.9	0.0	5	-5.0
Receiver53	53	1	0.0	60.2	66	60.2	15	----	60.2	0.0	5	-5.0
Receiver54	54	1	0.0	50.6	66	50.6	15	----	50.6	0.0	5	-5.0
Receiver55	55	1	0.0	49.5	66	49.5	15	----	49.5	0.0	5	-5.0
Receiver56	56	1	0.0	50.3	66	50.3	15	----	50.3	0.0	5	-5.0
Receiver57	57	1	0.0	51.3	66	51.3	15	----	51.3	0.0	5	-5.0
Receiver58	58	1	0.0	52.4	66	52.4	15	----	52.4	0.0	5	-5.0
Receiver59	59	1	0.0	54.0	66	54.0	15	----	54.0	0.0	5	-5.0
Receiver60	60	1	0.0	55.2	66	55.2	15	----	55.2	0.0	5	-5.0
Receiver61	61	1	0.0	57.3	66	57.3	15	----	57.3	0.0	5	-5.0
Receiver62	62	1	0.0	61.3	66	61.3	15	----	61.3	0.0	5	-5.0
Receiver63	63	1	0.0	66.7	66	66.7	15	Snd Lvl	66.7	0.0	5	-5.0
Receiver64	64	1	0.0	50.1	66	50.1	15	----	50.1	0.0	5	-5.0
Receiver65	65	1	0.0	50.8	66	50.8	15	----	50.8	0.0	5	-5.0

RESULTS: SOUND LEVELS
Park Lawn to Siphon

Receiver66	66	1	0.0	51.2	66	51.2	15	----	51.2	0.0	5	-5.0
Receiver67	67	1	0.0	51.8	66	51.8	15	----	51.8	0.0	5	-5.0
Receiver68	68	1	0.0	52.5	66	52.5	15	----	52.5	0.0	5	-5.0
Receiver69	69	1	0.0	53.2	66	53.2	15	----	53.2	0.0	5	-5.0
Receiver70	70	1	0.0	54.0	66	54.0	15	----	54.0	0.0	5	-5.0
Receiver71	71	1	0.0	55.8	66	55.8	15	----	55.8	0.0	5	-5.0
Receiver72	72	1	0.0	57.2	66	57.2	15	----	57.2	0.0	5	-5.0
Receiver73	73	1	0.0	59.1	66	59.1	15	----	59.1	0.0	5	-5.0
Receiver74	74	1	0.0	62.7	66	62.7	15	----	62.7	0.0	5	-5.0
Receiver75	75	1	0.0	67.7	66	67.7	15	Snd Lvl	67.7	0.0	5	-5.0
Receiver76	76	1	0.0	51.6	66	51.6	15	----	51.6	0.0	5	-5.0
Receiver77	77	1	0.0	52.1	66	52.1	15	----	52.1	0.0	5	-5.0
Receiver78	78	1	0.0	52.4	66	52.4	15	----	52.4	0.0	5	-5.0
Receiver79	79	1	0.0	53.0	66	53.0	15	----	53.0	0.0	5	-5.0
Receiver80	80	1	0.0	53.9	66	53.9	15	----	53.9	0.0	5	-5.0
Receiver81	81	1	0.0	55.3	66	55.3	15	----	55.3	0.0	5	-5.0
Receiver82	82	1	0.0	56.8	66	56.8	15	----	56.8	0.0	5	-5.0
Receiver83	83	1	0.0	59.2	66	59.2	15	----	59.2	0.0	5	-5.0
Receiver84	84	1	0.0	61.2	66	61.2	15	----	61.2	0.0	5	-5.0
Receiver85	85	1	0.0	63.1	66	63.1	15	----	63.1	0.0	5	-5.0
Receiver86	86	1	0.0	67.7	66	67.7	15	Snd Lvl	67.7	0.0	5	-5.0
Receiver87	87	1	0.0	52.6	66	52.6	15	----	52.6	0.0	5	-5.0
Receiver88	88	1	0.0	53.6	66	53.6	15	----	53.6	0.0	5	-5.0
Receiver89	89	1	0.0	54.4	66	54.4	15	----	54.4	0.0	5	-5.0
Receiver90	90	1	0.0	55.4	66	55.4	15	----	55.4	0.0	5	-5.0
Receiver91	91	1	0.0	56.5	66	56.5	15	----	56.5	0.0	5	-5.0
Receiver92	92	1	0.0	58.0	66	58.0	15	----	58.0	0.0	5	-5.0
Receiver93	93	1	0.0	59.3	66	59.3	15	----	59.3	0.0	5	-5.0
Receiver94	94	1	0.0	62.3	66	62.3	15	----	62.3	0.0	5	-5.0
Receiver95	95	1	0.0	67.7	66	67.7	15	Snd Lvl	67.7	0.0	5	-5.0
Receiver96	96	2	0.0	58.8	71	58.8	15	----	58.8	0.0	5	-5.0
Receiver97	97	1	0.0	62.0	71	62.0	15	----	62.0	0.0	5	-5.0
Receiver98	98	1	0.0	62.3	66	62.3	15	----	62.3	0.0	5	-5.0
Receiver99	99	1	0.0	65.6	66	65.6	15	----	65.6	0.0	5	-5.0
Receiver100	100	1	0.0	58.5	66	58.5	15	----	58.5	0.0	5	-5.0
Receiver101	101	1	0.0	54.1	66	54.1	15	----	54.1	0.0	5	-5.0
Receiver102	102	1	0.0	52.9	66	52.9	15	----	52.9	0.0	5	-5.0
Receiver103	103	1	0.0	51.9	66	51.9	15	----	51.9	0.0	5	-5.0
Receiver104	104	1	0.0	49.6	66	49.6	15	----	49.6	0.0	5	-5.0
Receiver105	105	1	0.0	50.4	66	50.4	15	----	50.4	0.0	5	-5.0
Receiver106	106	1	0.0	52.4	66	52.4	15	----	52.4	0.0	5	-5.0

RESULTS: SOUND LEVELS
Park Lawn to Siphon

Receiver107	107	1	0.0	54.5	66	54.5	15	----	54.5	0.0	5	-5.0
Receiver108	108	1	0.0	57.2	66	57.2	15	----	57.2	0.0	5	-5.0
Receiver109	109	1	0.0	60.6	66	60.6	15	----	60.6	0.0	5	-5.0
Receiver110	110	1	0.0	48.5	66	48.5	15	----	48.5	0.0	5	-5.0
Receiver111	111	1	0.0	49.5	66	49.5	15	----	49.5	0.0	5	-5.0
Receiver112	112	1	0.0	51.7	66	51.7	15	----	51.7	0.0	5	-5.0
Receiver113	113	1	0.0	53.3	66	53.3	15	----	53.3	0.0	5	-5.0
Receiver114	114	1	0.0	60.4	66	60.4	15	----	60.4	0.0	5	-5.0
Receiver115	115	1	0.0	60.1	66	60.1	15	----	60.1	0.0	5	-5.0
Receiver116	116	1	0.0	48.2	66	48.2	15	----	48.2	0.0	5	-5.0
Receiver117	117	1	0.0	49.5	66	49.5	15	----	49.5	0.0	5	-5.0
Receiver118	118	1	0.0	51.4	66	51.4	15	----	51.4	0.0	5	-5.0
Receiver119	119	1	0.0	53.0	66	53.0	15	----	53.0	0.0	5	-5.0
Receiver120	120	1	0.0	59.9	71	59.9	15	----	59.9	0.0	5	-5.0
Receiver121	121	1	0.0	59.8	71	59.8	15	----	59.8	0.0	5	-5.0
Receiver122	122	1	0.0	54.3	71	54.3	15	----	54.3	0.0	5	-5.0
Receiver123	123	1	0.0	48.5	71	48.5	15	----	48.5	0.0	5	-5.0
Receiver124	124	1	0.0	47.4	71	47.4	15	----	47.4	0.0	5	-5.0
Receiver125	125	1	0.0	55.6	71	55.6	15	----	55.6	0.0	5	-5.0
Receiver126	126	1	0.0	55.1	66	55.1	15	----	55.1	0.0	5	-5.0
Receiver127	127	1	0.0	59.0	66	59.0	15	----	59.0	0.0	5	-5.0
Receiver128	128	1	0.0	55.7	66	55.7	15	----	55.7	0.0	5	-5.0
Receiver129	129	1	0.0	49.1	66	49.1	15	----	49.1	0.0	5	-5.0
Receiver130	130	1	0.0	49.0	66	49.0	15	----	49.0	0.0	5	-5.0
Receiver131	131	1	0.0	48.6	66	48.6	15	----	48.6	0.0	5	-5.0
Receiver132	132	1	0.0	48.4	66	48.4	15	----	48.4	0.0	5	-5.0
Receiver133	133	1	0.0	48.3	66	48.3	15	----	48.3	0.0	5	-5.0
Receiver134	134	1	0.0	48.2	66	48.2	15	----	48.2	0.0	5	-5.0
Receiver135	135	1	0.0	48.5	66	48.5	15	----	48.5	0.0	5	-5.0
Receiver136	136	1	0.0	48.5	66	48.5	15	----	48.5	0.0	5	-5.0
Receiver137	137	1	0.0	48.4	66	48.4	15	----	48.4	0.0	5	-5.0
Receiver138	138	1	0.0	48.2	66	48.2	15	----	48.2	0.0	5	-5.0
Receiver139	139	1	0.0	47.3	66	47.3	15	----	47.3	0.0	5	-5.0
Receiver140	140	1	0.0	44.7	66	44.7	15	----	44.7	0.0	5	-5.0
Receiver141	141	1	0.0	44.6	66	44.6	15	----	44.6	0.0	5	-5.0
Receiver142	142	1	0.0	44.8	66	44.8	15	----	44.8	0.0	5	-5.0
Receiver143	143	1	0.0	44.4	66	44.4	15	----	44.4	0.0	5	-5.0
Receiver144	144	1	0.0	44.6	66	44.6	15	----	44.6	0.0	5	-5.0
Receiver145	145	1	0.0	44.7	66	44.7	15	----	44.7	0.0	5	-5.0
Receiver146	146	1	0.0	44.6	66	44.6	15	----	44.6	0.0	5	-5.0
Receiver147	147	1	0.0	44.1	66	44.1	15	----	44.1	0.0	5	-5.0

RESULTS: SOUND LEVELS
Park Lawn to Siphon

Receiver148	148	1	0.0	44.5	66	44.5	15	----	44.5	0.0	5	-5.0
Receiver149	149	1	0.0	43.3	66	43.3	15	----	43.3	0.0	5	-5.0
Receiver150	150	1	0.0	43.2	66	43.2	15	----	43.2	0.0	5	-5.0
Receiver151	151	1	0.0	43.3	66	43.3	15	----	43.3	0.0	5	-5.0
Receiver152	152	1	0.0	43.0	66	43.0	15	----	43.0	0.0	5	-5.0
Receiver153	153	1	0.0	42.9	66	42.9	15	----	42.9	0.0	5	-5.0
Receiver154	154	1	0.0	42.9	66	42.9	15	----	42.9	0.0	5	-5.0
Receiver155	155	1	0.0	42.9	66	42.9	10	----	42.9	0.0	8	-8.0
Receiver156	156	1	0.0	42.4	66	42.4	10	----	42.4	0.0	8	-8.0
Dwelling Units		# DUs	Noise Reduction									
			Min	Avg	Max							
			dB	dB	dB							
All Selected		176	0.0	0.0	0.0							
All Impacted		10	0.0	0.0	0.0							
All that meet NR Goal		0	0.0	0.0	0.0							

RESULTS: SOUND LEVELS

Park Lawn to Siphon

David Evans and Associates, Inc.												
A. Tarter												
RESULTS: SOUND LEVELS												
PROJECT/CONTRACT: Park Lawn to Siphon												
RUN: Transects US-91, S of Siphon Rd												
BARRIER DESIGN: INPUT HEIGHTS												
ATMOSPHERICS: 68 deg F, 50% RH												
Receiver												
Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	With Barrier				
								Type Impact	Calculated LAeq1h	Noise Reduction		
										Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
Transect 50	1	1	0.0	63.2	66	63.2	15	----	63.2	0.0	5	-5.0
Transect 75	2	1	0.0	61.3	66	61.3	15	----	61.3	0.0	5	-5.0
Transect 100	3	1	0.0	59.9	66	59.9	15	----	59.9	0.0	5	-5.0
Transect 125	4	1	0.0	58.7	66	58.7	15	----	58.7	0.0	5	-5.0
Transect 150	5	1	0.0	57.6	66	57.6	15	----	57.6	0.0	5	-5.0
Transect 200	6	1	0.0	55.7	66	55.7	15	----	55.7	0.0	5	-5.0
Transect 250	7	1	0.0	54.3	66	54.3	15	----	54.3	0.0	5	-5.0
Transect 300	8	1	0.0	53.2	66	53.2	15	----	53.2	0.0	5	-5.0
Transect 400	9	1	0.0	51.0	66	51.0	15	----	51.0	0.0	5	-5.0
Transect 800	10	1	0.0	45.5	66	45.5	15	----	45.5	0.0	5	-5.0
Dwelling Units		# DUs	Noise Reduction									
			Min	Avg	Max							
			dB	dB	dB							
All Selected		10	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							

RESULTS: SOUND LEVELS
Park Lawn to Siphon

David Evans and Associates, Inc.												
A. Tarter												
RESULTS: SOUND LEVELS												
PROJECT/CONTRACT: Park Lawn to Siphon												
RUN: Transects US-91, N of Siphon Rd												
BARRIER DESIGN: INPUT HEIGHTS												
ATMOSPHERICS: 68 deg F, 50% RH												
Receiver												
Name	No.	#DUs	Existing	No Barrier	With Barrier							
			LAeq1h	LAeq1h								
				Calculated	Crit'n	Increase over existing		Type	Calculated	Noise Reduction		
						Calculated	Crit'n	Impact	LAeq1h	Calculated	Goal	Calculated
							Sub'l Inc					minus
												Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
Transect 50	1	1	0.0	64.7	66	64.7	15	----	64.7	0.0	5	-5.0
Transect 75	2	1	0.0	62.6	66	62.6	15	----	62.6	0.0	5	-5.0
Transect 100	3	1	0.0	61.1	66	61.1	15	----	61.1	0.0	5	-5.0
Transect 125	4	1	0.0	60.0	66	60.0	15	----	60.0	0.0	5	-5.0
Transect 150	5	1	0.0	58.9	66	58.9	15	----	58.9	0.0	5	-5.0
Transect 200	6	1	0.0	57.2	66	57.2	15	----	57.2	0.0	5	-5.0
Transect 250	7	1	0.0	55.9	66	55.9	15	----	55.9	0.0	5	-5.0
Transect 300	8	1	0.0	54.8	66	54.8	15	----	54.8	0.0	5	-5.0
Transect 400	9	1	0.0	52.9	66	52.9	15	----	52.9	0.0	5	-5.0
Transect 800	10	1	0.0	49.2	66	49.2	15	----	49.2	0.0	5	-5.0
Dwelling Units			# DUs	Noise Reduction								
				Min	Avg	Max						
				dB	dB	dB						
All Selected		10	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							

RESULTS: SOUND LEVELS
Park Lawn to Siphon

David Evans and Associates, Inc.												
A. Tarter												
RESULTS: SOUND LEVELS												
PROJECT/CONTRACT: Park Lawn to Siphon												
RUN: Transects New Day Pkwy												
BARRIER DESIGN: INPUT HEIGHTS												
ATMOSPHERICS: 68 deg F, 50% RH												
Receiver												
Name	No.	#DUs	Existing	No Barrier	With Barrier							
			LAeq1h	LAeq1h								
				Calculated	Crit'n	Increase over existing		Type	Calculated	Noise Reduction		
						Calculated	Crit'n	Impact	LAeq1h	Calculated	Goal	Calculated
							Sub'l Inc					minus
												Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
Transect 50	1	1	0.0	58.9	66	58.9	15	----	58.9	0.0	5	-5.0
Transect 75	2	1	0.0	56.8	66	56.8	15	----	56.8	0.0	5	-5.0
Transect 100	3	1	0.0	55.4	66	55.4	15	----	55.4	0.0	5	-5.0
Transect 125	4	1	0.0	54.2	66	54.2	15	----	54.2	0.0	5	-5.0
Transect 150	5	1	0.0	53.3	66	53.3	15	----	53.3	0.0	5	-5.0
Transect 200	6	1	0.0	51.3	66	51.3	15	----	51.3	0.0	5	-5.0
Transect 250	7	1	0.0	49.8	66	49.8	15	----	49.8	0.0	5	-5.0
Transect 300	8	1	0.0	48.7	66	48.7	15	----	48.7	0.0	5	-5.0
Transect 400	9	1	0.0	46.8	66	46.8	15	----	46.8	0.0	5	-5.0
Transect 800	10	1	0.0	42.5	66	42.5	15	----	42.5	0.0	5	-5.0
Dwelling Units			# DUs	Noise Reduction								
				Min	Avg	Max						
				dB	dB	dB						
All Selected		10	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							

RESULTS: SOUND LEVELS
Park Lawn to Siphon

David Evans and Associates, Inc.												
A. Tarter												
RESULTS: SOUND LEVELS												
PROJECT/CONTRACT: Park Lawn to Siphon												
RUN: Transects Siphon												
BARRIER DESIGN: INPUT HEIGHTS												
ATMOSPHERICS: 68 deg F, 50% RH												
Receiver												
Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	With Barrier				
								Type Impact	Calculated LAeq1h	Noise Reduction		
										Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
Transect 50	1	1	0.0	61.3	66	61.3	15	----	61.3	0.0	5	-5.0
Transect 75	2	1	0.0	59.6	66	59.6	15	----	59.6	0.0	5	-5.0
Transect 100	3	1	0.0	58.6	66	58.6	15	----	58.6	0.0	5	-5.0
Transect 125	4	1	0.0	57.9	66	57.9	15	----	57.9	0.0	5	-5.0
Transect 150	5	1	0.0	57.1	66	57.1	15	----	57.1	0.0	5	-5.0
Transect 200	6	1	0.0	56.0	66	56.0	15	----	56.0	0.0	5	-5.0
Transect 250	7	1	0.0	55.4	66	55.4	15	----	55.4	0.0	5	-5.0
Transect 300	8	1	0.0	55.0	66	55.0	15	----	55.0	0.0	5	-5.0
Transect 400	9	1	0.0	54.4	66	54.4	15	----	54.4	0.0	5	-5.0
Transect 800	10	1	0.0	53.1	66	53.1	15	----	53.1	0.0	5	-5.0
Dwelling Units		# DUs	Noise Reduction									
			Min	Avg	Max							
			dB	dB	dB							
All Selected		10	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 F

Barrier Checklists



Noise Barrier Abatement Checklist

Idaho Transportation Department

ITD 1055 (Rev. 11-24)
itd.idaho.gov

Key Number 21860	Project Number A021(860)	Project Name US-91, Park Lawn to Siphon Rd, Chubbuck
Impacted Receptor Number Segment 1 (Receptors 38, 39, and 40)	Design Year "Build" dBA Level(s) Without Barrier 69.2, 68.9, and 68.2	

Barrier Feasibility

	Yes	No
1. Can the barrier achieve at least a 5 dBA sound level reduction at the majority of impacted receptors without limiting property or neighborhood access?	☒	☐
2. Does the barrier conform to project standards regarding traffic safety, maintenance, and drainage concerns, considering that these issues can often be resolved through use of good design practices?	☐	☒
3. Can an effective barrier be constructed considering the existing site characteristics and topography, and without reconfiguring the site or neighborhood (not including minor access modifications)?	☐	☒

If No to any of the above, the barrier is not feasible - do not continue with this checklist.

If Yes to all of the above, the barrier is feasible - complete the following.

Factors Required for Barrier Reasonability Decisions

Number of benefitted receptors	_____
Estimated barrier cost	\$ _____
Closest benefitted receptor to centerline insertion loss	dBA _____
Percentage of benefitted property owners who want a traffic noise barrier	% _____
Percentage of benefitted renters who want a traffic noise barrier	% _____

Optional Barrier Reasonability Factors

No Single optional factor can be used to determine reasonableness. The assessment results of the 7 factors below are used to increase the cost per benefitted receptor.

	Yes		No	
	High	Low	Low	High
1. Development pre-dated highway construction	☐ >75%	☐ 25-75%	☐ 10-24%	☐ <10%
2. Development in place before 1976	☐ >75%	☐ 25-75%	☐ 10-24%	☐ <10%
3. Type of development*	☐ Dwelling	☐ School	☐ Office	☐ Retail
4. Exposure to higher absolute traffic noise levels	☐ >10dBA	☐ 5-9dBA	☐ 3-4dBA	☐ <3dBA
5. Changes between existing and build (design year) conditions	☐ >10dBA	☐ 4-9dBA	☐ 0-3dBA	☐ <0dBA
6. Effort of local officials to use noise compatible development	☐ Major	☐ Moderate	☐ Minor	☐ None
7. Project generated traffic noise is the dominant noise source	☐ Primary	☐ Major	☐ Secondary	☐ Minor

Adjusted Value [(THY+TLY-TLN-THN)1000]

(THY - Total High Yes; TLY - Total Low Yes; TLN - Total Low No; THN - Total High No)

0

Adjusted Cost Per Benefitted Receptor (Adjusted Value + \$40,000)

\$40,000.00

- * **Dwelling** - includes residences, condos, apartments, areas of frequent outdoor use associated with quiet and "Cat. A" uses
School - includes libraries, churches, hospitals, and outdoor areas associated with infrequent or noisier activities
Office - includes low volume commercial uses, and motels/hotels with outdoor accommodations for guests
Retail - includes parking lots, industrial uses, shopping centers, convenience stores, highway businesses, etc.



Noise Barrier Abatement Checklist

Idaho Transportation Department

ITD 1055 (Rev. 11-24)
itd.idaho.gov

Key Number 21860	Project Number A021(860)	Project Name US-91, Park Lawn to Siphon Rd, Chubbuck
Impacted Receptor Number Segment 2 (Receptors 86 and 95)	Design Year "Build" dBA Level(s) Without Barrier 66.2 and 66.4	

Barrier Feasibility

	Yes	No
1. Can the barrier achieve at least a 5 dBA sound level reduction at the majority of impacted receptors without limiting property or neighborhood access?	☒	☐
2. Does the barrier conform to project standards regarding traffic safety, maintenance, and drainage concerns, considering that these issues can often be resolved through use of good design practices?	☒	☐
3. Can an effective barrier be constructed considering the existing site characteristics and topography, and without reconfiguring the site or neighborhood (not including minor access modifications)?	☐	☒

If No to any of the above, the barrier is not feasible - do not continue with this checklist.

If Yes to all of the above, the barrier is feasible - complete the following.

Factors Required for Barrier Reasonability Decisions

Number of benefitted receptors	_____
Estimated barrier cost	\$ _____
Closest benefitted receptor to centerline insertion loss	dBA _____
Percentage of benefitted property owners who want a traffic noise barrier	% _____
Percentage of benefitted renters who want a traffic noise barrier	% _____

Optional Barrier Reasonability Factors

No Single optional factor can be used to determine reasonableness. The assessment results of the 7 factors below are used to increase the cost per benefitted receptor.

	Yes		No	
	High	Low	Low	High
1. Development pre-dated highway construction	☐ >75%	☐ 25-75%	☐ 10-24%	☐ <10%
2. Development in place before 1976	☐ >75%	☐ 25-75%	☐ 10-24%	☐ <10%
3. Type of development*	☐ Dwelling	☐ School	☐ Office	☐ Retail
4. Exposure to higher absolute traffic noise levels	☐ >10dBA	☐ 5-9dBA	☐ 3-4dBA	☐ <3dBA
5. Changes between existing and build (design year) conditions	☐ >10dBA	☐ 4-9dBA	☐ 0-3dBA	☐ <0dBA
6. Effort of local officials to use noise compatible development	☐ Major	☐ Moderate	☐ Minor	☐ None
7. Project generated traffic noise is the dominant noise source	☐ Primary	☐ Major	☐ Secondary	☐ Minor

Adjusted Value [(THY+TLY-TLN-THN)1000]

(THY - Total High Yes; TLY - Total Low Yes; TLN - Total Low No; THN - Total High No)

0

Adjusted Cost Per Benefitted Receptor (Adjusted Value + \$40,000)

\$40,000.00

- * **Dwelling** - includes residences, condos, apartments, areas of frequent outdoor use associated with quiet and "Cat. A" uses
School - includes libraries, churches, hospitals, and outdoor areas associated with infrequent or noisier activities
Office - includes low volume commercial uses, and motels/hotels with outdoor accommodations for guests
Retail - includes parking lots, industrial uses, shopping centers, convenience stores, highway businesses, etc.

Appendix G

Noise Abatement Decision Checklists



Noise Abatement Decision Checklist

Idaho Transportation Department

ITD 1056 (Rev. 05-11)
itd.idaho.gov

District or Sponsor Decision regarding the following receptor(s) Receptors 38, 39, and 40 (Segment 1)

	Yes	No
A traffic noise impact has been identified [23 CFR 772.15(a)(1)] ☐ Relative ☒ Absolute	☒	☐
The noise abatement measures will effectively reduce the traffic noise impact [23 CFR 772.15(a)(2)]	☐	☒
The impacts for which the mitigation is proposed actually result from the Administration action [23 CFR 771.105(d)(1)]	☒	☐
The proposed mitigation represents a reasonable public expenditure after considering the impacts of the action and the benefits of the proposed mitigation measures [23 CFR 771.105(d)(2)] and [23 CFR 772.13(d)(2)]	☐	☒

If the answer to any of the above is No, go to Section 2.

Section 1 - Intention to Install Noise Abatement Measures

Based on the studies so far, the state/local jurisdiction intends to install noise abatement with the following preliminary design. If these conditions substantially change during final design, the abatement measures may not be provided. A final decision on abatement measure(s) will be made upon completion of the project design and the public involvement process.

Type of Noise Abatement	Location	Cost \$	Noise Level Reduction dBA	Number of Residents Benefitted

Section 2 - Noise Abatement Measures Not Intended to be Installed

Based on the studies so far, the state/local jurisdiction does not intend to install noise abatement measures because

☒ An effective barrier is not feasible

or

For the following reason(s)

Required Reasonableness Considerations

The measures are determined to be unreasonable because of the following reason(s).

- ☐ Cost per benefitted receptor is excessive
- ☐ Abatement measures do not meet the design goal
- ☐ Abatement measures are not desired

Optional Reasonableness Considerations

No single optional factor can be used to determine reasonableness. The assessment results of the factors below are used to increase the cost per benefitted receptor.

- ☐ Abatement measures conflict with the purpose of the project (re.: non-barrier measures)
- ☐ Traffic noise impacts are a result of development occurring after the highway was constructed
- ☐ Traffic noise impacts resulted from development occurring after the 1976 NAC became effective
- ☐ Receptors are considered noise tolerant (i.e., commercial, highway business, industrial, etc.)
- ☐ Exposure to higher absolute traffic noise levels is not a noticeable change (<3dBA)
- ☐ There is a positive change in noise levels between design year build and no-build alternatives
- ☐ Local ordinances allow development along the highways without consideration for noise abatement
- ☐ Project traffic noise is not the dominate noise source
- ☐ Other (explain)

Prepared By

District/Sponsor Environmental Planner/Engineer's Printed Name	District/Sponsor Environmental Planner/Engineer's Signature	Date
Alissa Salmore	Alissa Salmore Digitally signed by Alissa Salmore Date: 2024.11.15 10:12:00 -07'00'	



Noise Abatement Decision Checklist

Idaho Transportation Department

ITD 1056 (Rev. 05-11)
itd.idaho.gov

District or Sponsor Decision regarding the following receptor(s) Receptors 86 and 95 (Segment 2)

	Yes	No
A traffic noise impact has been identified [23 CFR 772.15(a)(1)] ☐ Relative ☒ Absolute	☒	☐
The noise abatement measures will effectively reduce the traffic noise impact [23 CFR 772.15(a)(2)]	☐	☒
The impacts for which the mitigation is proposed actually result from the Administration action [23 CFR 771.105(d)(1)]	☒	☐
The proposed mitigation represents a reasonable public expenditure after considering the impacts of the action and the benefits of the proposed mitigation measures [23 CFR 771.105(d)(2)] and [23 CFR 772.13(d)(2)]	☐	☒

If the answer to any of the above is No, go to Section 2.

Section 1 - Intention to Install Noise Abatement Measures

Based on the studies so far, the state/local jurisdiction intends to install noise abatement with the following preliminary design. If these conditions substantially change during final design, the abatement measures may not be provided. A final decision on abatement measure(s) will be made upon completion of the project design and the public involvement process.

Type of Noise Abatement	Location	Cost \$	Noise Level Reduction dBA	Number of Residents Benefitted

Section 2 - Noise Abatement Measures Not Intended to be Installed

Based on the studies so far, the state/local jurisdiction does not intend to install noise abatement measures because

☒ An effective barrier is not feasible

or

For the following reason(s)

Required Reasonableness Considerations

The measures are determined to be unreasonable because of the following reason(s).

- ☐ Cost per benefitted receptor is excessive
- ☐ Abatement measures do not meet the design goal
- ☐ Abatement measures are not desired

Optional Reasonableness Considerations

No single optional factor can be used to determine reasonableness. The assessment results of the factors below are used to increase the cost per benefitted receptor.

- ☐ Abatement measures conflict with the purpose of the project (re.: non-barrier measures)
- ☐ Traffic noise impacts are a result of development occurring after the highway was constructed
- ☐ Traffic noise impacts resulted from development occurring after the 1976 NAC became effective
- ☐ Receptors are considered noise tolerant (i.e., commercial, highway business, industrial, etc.)
- ☐ Exposure to higher absolute traffic noise levels is not a noticeable change (<3dBA)
- ☐ There is a positive change in noise levels between design year build and no-build alternatives
- ☐ Local ordinances allow development along the highways without consideration for noise abatement
- ☐ Project traffic noise is not the dominate noise source
- ☐ Other (explain)

Prepared By

District/Sponsor Environmental Planner/Engineer's Printed Name	District/Sponsor Environmental Planner/Engineer's Signature	Date
Alissa Salmore	Alissa Salmore Digitally signed by Alissa Salmore Date: 2024.11.15 10:12:22 -0700	

Appendix H

Information to Local Jurisdiction

[Add Addressee from List]

Idaho Transportation Department (ITD) District 5 is proposing intersection improvements at US-91 (Yellowstone Avenue) and Siphon Road/New Day Parkway and associated roadway widening along US-91 from Park Lawn to Southside Way in Chubbuck, Idaho. US-91 is a principal arterial that acts as an alternate route for Interstate 15 (I-15) and passes through the Cities of Pocatello and Chubbuck. The intersection of US-91 and Siphon Road/New Day Parkway connects the urban core of Chubbuck to the Northgate Interchange (Exit 73). Traffic counts and future development indicate that this area will need to accommodate much higher traffic volumes. ITD had identified needed improvements to the intersection of US-91 and Siphon Road/New Day Parkway and widening of US-91 throughout the project limits to accommodate these projected volumes.

Sound is created by a source that causes the air to vibrate at a frequency that can be heard by the human ear. This sound propagates through the air and is affected by environmental factors such as distance, barriers, atmospheric, and other influences. It is then picked up as sound by the receiver and can also be affected by the sensitivity of that receiver (e.g., human ear, microphone).

The human ear can hear sounds from 20 micro-Pascals (.00002 Pascals, a measure of air pressure) to as much as 6,500,000 micro-Pascals. Because of this wide range, the decibel (dB) was developed as a logarithmic measure of sound specifically heard by the human ear. Using this scale, a doubling of sound will only add 3 dB; for example, doubling the amount of traffic on a road would only increase the sound from 50 to 53 dB. An actual perception of sound being twice as loud would be 10 dB and would be a ten-fold increase in the sound energy. An example of different noise levels is illustrated in Table 1.

Table 1. Common Outdoor and Indoor Noises.

Common Outdoor Noises	Sound Pressure Level (dB)	Common Indoor Noises
Jet Flyover at 300 meters	110	Rock Band at 5 meters
Gas Lawn Mower at 1 meter	100	Inside Subway Train (New York)
Diesel Truck at 15 meters	90	Food Blender at 1 meter
Noisy Urban Daytime	80	Garbage Disposal at 1 meter or Shouting at 1 meter
Gas Lawn Mower at 30 meters	70	Vacuum Cleaner at 3 meters
Commercial Area	60	Large Business Office and Normal Speech at 1 meter
Quiet Urban Daytime	50	Dishwasher in next room
Quiet Urban Nighttime Quiet Suburban Nighttime	40	Large Conference Room (background)
Quiet Rural Nighttime	30	Bedroom at Night
	20	Recording Studio
	0	Threshold of Hearing
<i>Source: Federal Highway Administration (FHWA) (https://highways.dot.gov/public-roads/julyaugust-2003/living-noise)</i>		

Frequency is another component of sound that can be distinguished by the human ear. The frequency range of hearing for the human ear is approximately 20 Hertz (cycles per second) to 20,000 Hertz. A piano ranges from 32 Hertz on the base to 4,000 Hertz on the high end with Middle C being 256 Hertz.

Because the human ear is less sensitive to higher and lower frequencies, the A-weighted scale was developed, and the unit of measurement is known as the A-weighted decibel (dBA). In the A-weighted

scale, the lower and higher frequency decibel levels are reduced while the middle decibel levels that the human ear is more sensitive to are increased. All noise levels in this report are stated as hourly L_{eq} (energy-averaged equivalent sound pressure level) in terms of dBA.

As noise spreads out from a source, the sound intensity will drop at a rate of 3 dBA per doubling of distance for a line source such as a road, and at 6 dBA per doubling of distance for a point source such as an idling truck or piece of heavy equipment. The type of ground (hard [asphalt] or soft [grass]) can affect this rate of drop in the sound level as well as natural barriers.

The attached table of transects (Table 2) was completed during the course of the traffic noise studies for this project. This information depicts the traffic noise level anticipated to be produced by the projected design year traffic volume (year 2048). Any vacant properties along this section of US-91 that may be developed over the next several years with construction close to the travel lanes may result in a volume of traffic noise sufficient to exceed Federal traffic noise abatement criteria (see next page). In planning for future development along the US-91, Park Lawn to Siphon Rd project limits, please note that traffic noise may become a factor and that any building or development plans should take this issue into consideration. After the date of public knowledge (the approval date of the environmental determination), the FHWA and the Idaho Transportation Department are no longer responsible for providing traffic noise abatement for new development adjacent to the highway project that is not already permitted.

The date of public knowledge for this project is: _____

This notification of future traffic noise impacts and the possibility of Federal funding for traffic noise abatement are issued in accordance with 23 Code of Federal Regulations 772.15. If you have any questions I will be available at (208) XXX-XXXX.

Sincerely,

ADD PROJECT MANAGER HERE
Enclosures

INFORMATION for LOCAL OFFICIALS

In Accordance with 23 CFR 772.15

The FHWA has established absolute traffic noise level guidelines for several categories of land use activities which include the following L_{eq} traffic noise levels:

Category A	$L_{eq} = 57$ dBA	Exterior	Land on which serenity and quiet are of extraordinary significance and serve an important need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
Category B	$L_{eq} = 67$ dBA	Exterior	Residential
Category C	$L_{eq} = 67$ dBA	Exterior	campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails, and trail crossings
Category D	$L_{eq} = 52$ dBA	Interior	Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios
Category E	$L_{eq} = 72$ dBA	Exterior	Hotels, motels, offices, restaurants/bars, and other developed lands, properties or activities not included in A-D or F
Category F	No Criteria		Agriculture, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical), and warehousing
Category G	No Criteria		Undeveloped lands that are not permitted
Substantial Increase	L_{eq} of 15 dBA		A substantial increase of 15 dBA over the existing traffic noise levels

Table 2
Projected Design Year (2048) DHV L_{eq} Traffic Noise Levels (dBA) @ Selected Distances and
Posted Speed of 35 miles per hour (mph),
US-91, Park Lawn to Siphon Rd, Chubbuck Project

Roadway Segment	Transect Distance (ft.)										
	<66 ¹ dBA	50	75	100	125	150	200	250	300	400	800
US-91, South of Siphon Road/New Day Parkway	50	63.2	61.3	59.9	58.7	57.6	55.7	54.3	53.2	51.0	45.5
US-91, North of Siphon Road/New Day Parkway	50	64.7	62.6	61.1	60.0	58.9	57.2	55.9	54.8	52.9	49.2
New Day Parkway, East of US-91	50	58.9	56.8	55.4	54.2	53.3	51.3	49.8	48.7	46.8	42.5
Siphon Road, West of US-91	50	61.3	59.6	58.6	57.9	57.1	56.0	55.4	55.0	54.4	53.1

¹Distances from the highway centerline which would be an appropriate distance to construct residential development in order to not approach or exceed FHWA criteria.

Traffic noise abatement measures recommended for consideration by the local jurisdiction in the study area:

- (1) Requiring developers to implement suitable traffic noise abatement measures in those cases where adequate setbacks or buffer zones are not maintained (e.g., berms, sound barriers, insulation, double/triple pane windows, etc.).
- (2) Requiring acceptable setbacks or buffer zones for new residential units or developments (see Table 2).
- (3) Maintaining appropriate zoning for non-sensitive land uses adjacent to the route.
- (4) Lowering or maintaining (not raising) the current posted speed limits.
- (5) Include a statement on any development/building permit indicating that the developer will be responsible for either avoiding traffic noise impacts or providing any associated abatement.

List of Local Jurisdictions to Receive Letter

Bannock County Commissioners
624 East Center Street, Room 101
Pocatello, Idaho 83201

Bannock County Planning and Development Services
5500 South 5th Avenue
Pocatello, Idaho 83204

Kevin England, Mayor
City of Chubbuck
290 East Linden Avenue
Chubbuck, Idaho 83202

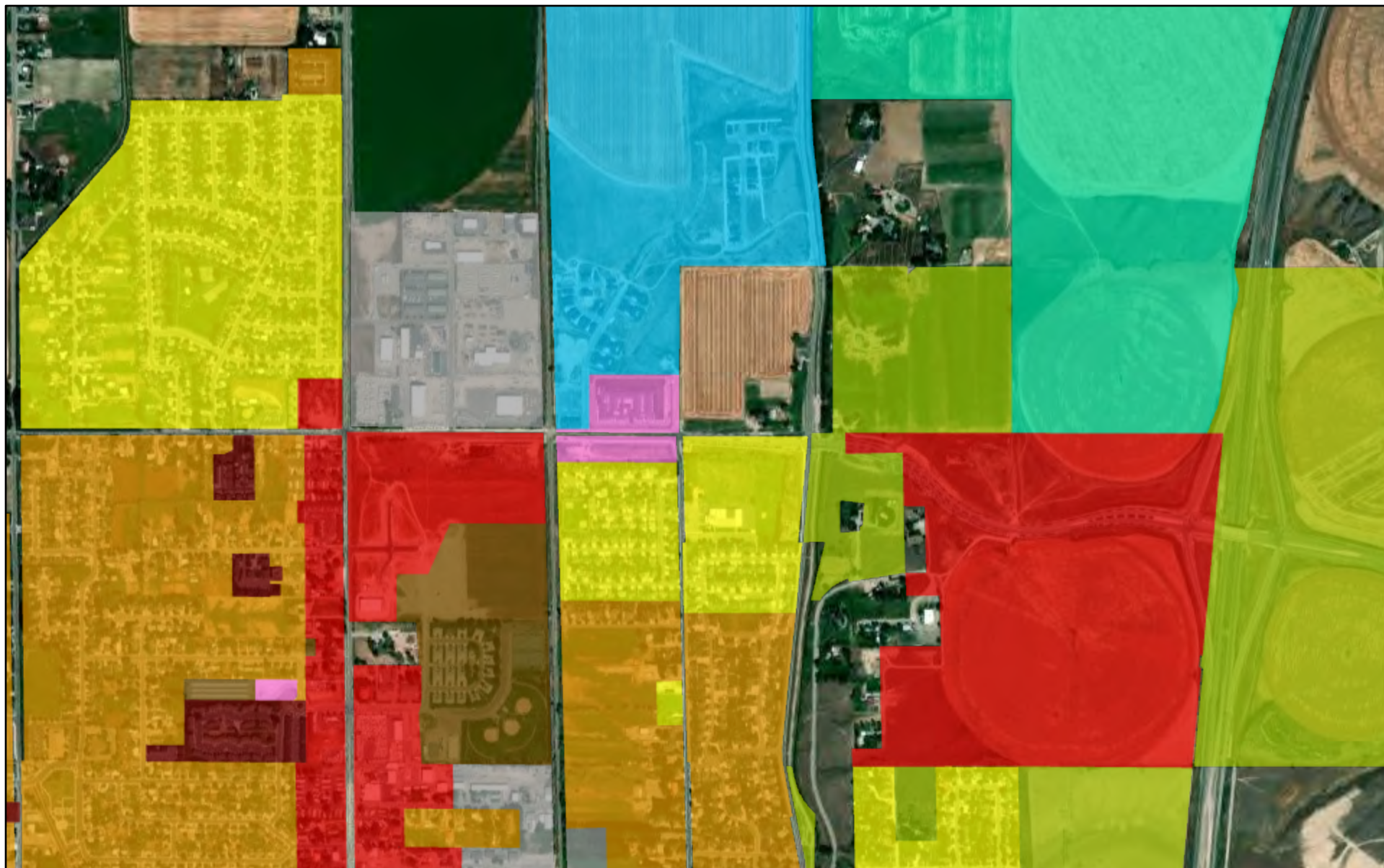
Bridger Morrison, City Engineer
City of Chubbuck
290 East Linden Avenue
Chubbuck, Idaho 83202

Don Matson, Planning Manager
City of Chubbuck
290 East Linden Avenue
Chubbuck, Idaho 83202

Appendix I

Zoning Maps

Chubbuck Current Zoning



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Zoning

 Agriculture (A)

 Single Family Residential (R-1)

 Limited Residential (R-2)

 Dense Residential (R-4)

 Limited Commercial (C-1)

 General Commercial (C-2)

Industrial (I)

 Dense Residential (R-4)

 Limited Commercial (C-1)

 General Commercial (C-2)

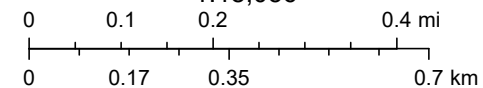
Industrial (I)

Planned Unit Development (PUD)

 Creative Community-Northside Crossing (CC-NC)

Creative Community-Harvest Springs (CC-HS)

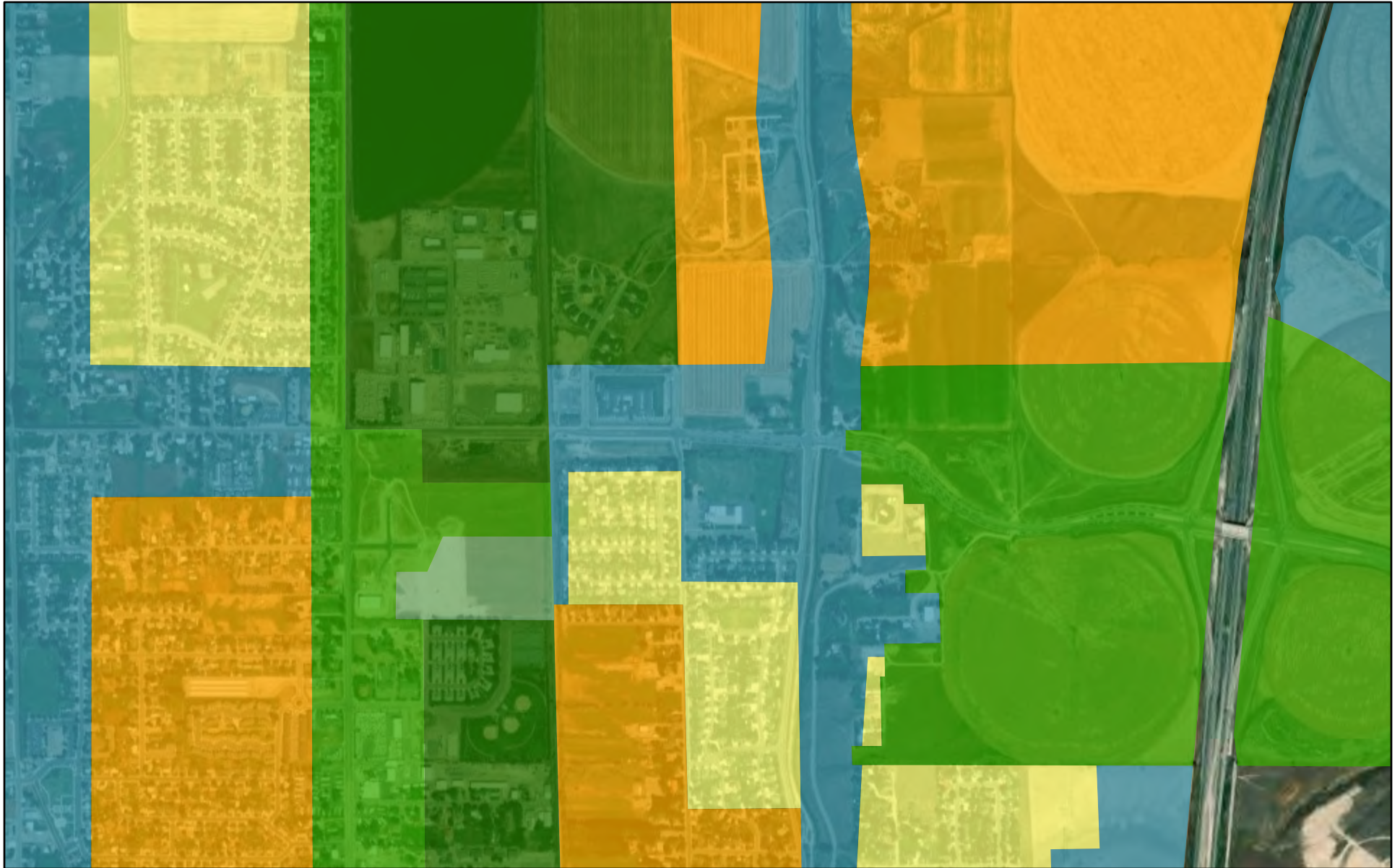
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Chubbuck Future Land Use



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Future Land Use Designation

