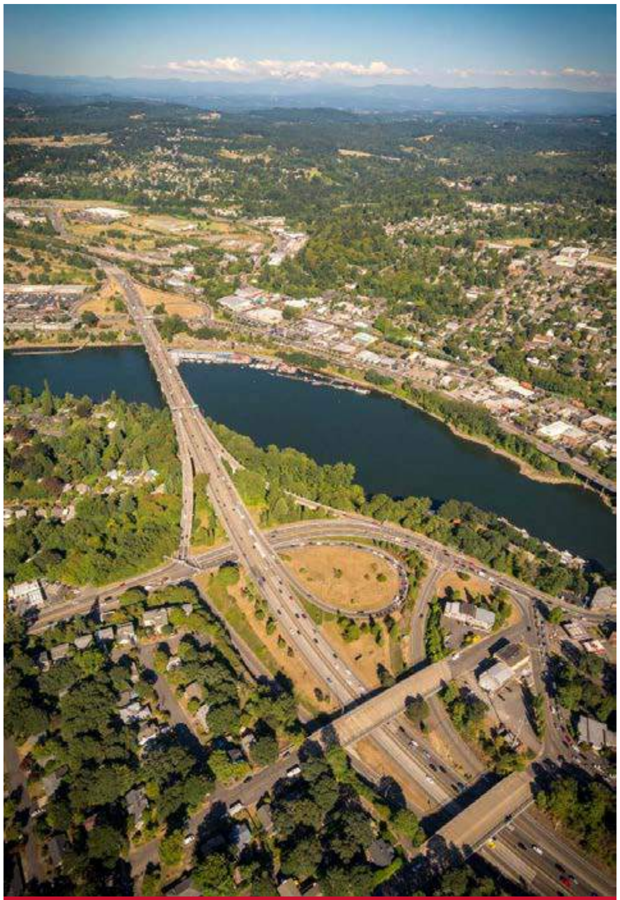

Final Noise Technical Report

ODOT | K19786 I-205: Stafford Rd to OR 213 Corridor Widening & Abernethy Bridge Seismic Retrofit / Widening

ODOT EA: C6035200
HDR Project #10063137

Clackamas County, Oregon

December 4, 2018

Professional Engineer's Stamp

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Acronyms and Initialisms

Consultant	HDR Engineering, Inc. and subconsultant partners
County	Clackamas County, Oregon
dB	Decibel
dB(A)	A-weighted decibels
DD	doubling of distance
FHWA	Federal Highway Administration
I-205	Interstate 205
L_{eq}	equivalent sound level
$L_{eq(h)}$	hourly equivalent sound level
LT-	Long-term measurement location
mph	miles per hour
NAC	noise abatement criteria
NAAC	Noise Abatement Approach Criteria
NB	Northbound
NCHRP	National Cooperative Highway Research Program
NEPA	National Environmental Policy Act
ODOT	Oregon Department of Transportation
OR	Oregon Route
OSMRE	Office of Surface Mining Reclamation and Enforcement
Project	I-205: Stafford Road to OR 99E Corridor Widening & Abernethy Bridge Seismic Retrofit / Widening
SB	Southbound
ST-	Short-term measurement location
TNM	Traffic Noise Model

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Executive Summary

The Interstate 205 (I-205): Stafford Road to Oregon Route (OR) 213 (Project) proposes to widen I-205 from the Stafford Road interchange to just north of the Abernethy Bridge crossing and tie into the existing roadway near the OR 213 interchange. Two new travel lanes would be added, generally to the middle of the facility where a grass median currently exists. Where there is no grass median, such as where the facility approaches the Abernethy Bridge from the west, the roadways would be widened to the south where a rock cut and blasting would be required. North of the Abernethy Bridge only, an auxiliary lane will be added to the facility. The Project also proposes to retrofit several structures including the Abernethy Bridge to accommodate the additional travel lanes.

Noise and vibration levels associated with the construction and operation of the Project Build Alternative (2045) were calculated and where appropriate compared to the Existing Conditions (2017). The No Build Alternative (2045) was also analyzed for the environmental assessment being prepared for the Project pursuant to the National Environmental Policy Act (NEPA).

Existing Condition (2017) noise levels range from 43 A-weighted decibels (dB(A)) hourly equivalent sound level (L_{eq}) to 74 dB(A) L_{eq} and exceed the Oregon Department of Transportation (ODOT) noise abatement approach criteria (NAAC) at 238 residences, the South Lake Church/Pre-School/Daycare, Jon Storm Park, and the Atlas Immersion Academy School.

No Build Alternative (2045) noise levels would range from 45 dB(A) L_{eq} to 74 dB(A) L_{eq} and are predicted to exceed the NAAC at 281 residences, the South Lake Church/Pre-School/Daycare, Jon Storm Park, and the Atlas Immersion Academy School. No Build Alternative noise levels are predicted to increase on average by 1 decibel (dB) over the Existing Conditions and would be due to increases in traffic volumes. Build Alternative (2045) noise levels would range from 45 dB(A) L_{eq} to 75 dB(A) L_{eq} and impacts would occur at 351 residences, the South Lake Church/Pre-School/Daycare, a pool at the Jamestown Apartments, Jon Storm Park, and the Atlas Immersion Academy School. Changes in noise levels predicted under the Build Alternative when compared to the Existing Condition would increase up to 5 dB(A) due to increased traffic and reduced setback distances to the widened roadway.

The Build Alternative noise impacts are predicted throughout the study area and noise abatement measures in the form of noise walls were evaluated in 13 locations for feasibleness and reasonableness. Three of the 13 noise walls (Noise Walls 5, 8, and 9) cannot feasibly reduce noise levels per ODOT policy and five of the 13 noise walls (Noise Walls 1, 3, 6b, and 11) could feasibly reduce noise levels but are unreasonably expensive per ODOT policy. The remaining noise walls (Noise Walls 2, 4, 6a, 7, and 12) are feasible and reasonable per ODOT policy and are recommended for further consideration and inclusion in the Project, specifically:

- Noise Wall 2: North of Blankenship Road located parallel to the southbound (SB) I-205 lanes.
- Noise Wall 4: South of Blankenship Road located parallel to the SB I-205 lanes.
- Noise Wall 6a: 3,697 feet south of the 10th Street interchange and located on a ridge at the SB I-205 right-of-way.
- Noise Wall 7: North of the Sunset Avenue overcrossing and west of the I-205 SB lanes.
- Noise Wall 12: North of the I-205 SB lanes near the Main Street overcrossing in Oregon City.

These noise walls would provide sufficient noise reduction to be classified as “benefitted” (i.e., 5 dB reduction or greater) per ODOT noise regulations at 136 impacted residences. An additional 100 residences would also benefit from the noise abatement that would not be impacted by the project. Preliminary costs for the noise walls would total $2,854,020[1]. Noise impacts are unavoidable at the remaining 223 impacted receptors.

The distance to the 65 dB(A) noise abatement approach criteria (NAAC) on undeveloped lands in the vicinity of I-205 ranges from 420 feet in the western portion of the Project to 480 feet in the eastern portion of the Project. The distance to the 70 dB(A) NAAC would range from 150 feet in the western portion of the Project to 170 feet in the eastern portion of the Project.

The findings of this report will be shared with local governments, such as the cities of West Linn and Oregon City as well as Clackamas County, for their consideration of these sound levels in approving residential land use development in the future.

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[1] ODOT Noise Policy (ODOT 2011) calculates barrier costs to the nearest $10 increment.

1 Introduction

This Noise and Vibration Technical Report has been prepared as a part of the environmental review for the I-205: Stafford Road to Oregon Route 213 (OR 213) (the Project). The section of I-205 from Stafford Road to OR 99E is the last remaining bottleneck on the I-205 corridor and also does not meet seismic resiliency goals. With just two through lanes in each direction, this section of the I-205 freeway currently experiences significant traffic delay. Regional growth is expected to expand the congested peak periods, further reducing the hours that vehicles can move on the system without major delays. The purpose of the project is to reduce congestion in the I-205 corridor by adding additional through-lanes in the northbound (NB) and southbound (SB) directions between Stafford Road and OR 99E, as well as to ensure seismic resiliency of the entire corridor. The Project is also considering an auxiliary lane on I-205 northbound from OR 99E to OR 213. The Project is anticipated to improve mobility and travel time reliability within the corridor, with corridor peak hour travel speeds estimated to increase up to 25 percent over today's speeds.

2 Project Description

The Project area consists of an urban freeway segment that generally includes two travel lanes in each direction with auxiliary lanes at the Abernethy Bridge. The existing third general purpose lane stops at the north end of the Project at the OR 99E interchange area. The Project would add a third through-travel lane in each direction and would minimally adjust affected interchanges to conform to the third lane. It is not the Project's intent to significantly reconfigure any interchange. The Project would also widen and seismically upgrade twelve structures, reconstruct four structures, and remove one structure. Details of the Project are listed below:

- Adding a third through-lane in each direction form Stafford Road to OR 99E.
- Adding a NB auxiliary lane from OR 99E to OR 213.
- Widening with seismic upgrades to the following bridges:
    - I-205 SB over Borland Road
    - I-205 NB over Borland Road
    - I-205 SB over 10th Street (West Linn)
    - I-205 NB over 10th Street (West Linn)
    - I-205 over Willamette River (Abernethy)
    - I-205 SB Connection #2 to Highway 3 (West Linn interchanges)

  - I-205 over Main Street (Oregon City)
- Removal and reconstruction of the following bridges:
  - Sunset Avenue (West Linn) over I-205
  - West A Street (West Linn) over I-205
  - Tualatin River, I-205 SB
  - Tualatin River, I-205 NB
  - I-205 SB over Woodbine Road (removal and reconstruction)
  - I-205 NB over Woodbine Road (removal and reconstruction)
  - I-205 SB over Blankenship Road (removal and reconstruction)
  - I-205 NB over Blankenship Road (removal and reconstruction)
- Removal of the following bridges:
  - Broadway (West Linn) over I-205 & OR 43
  - I-205 NB Connection #1 to OR 99E (Oregon City interchange)

3 Methodology

This section describes the methodology used in the Project's noise and vibration analysis to identify impact conditions consistent with federal, state, and local regulations.

3.1 Noise Standards and Criteria

The noise impact of the Project was assessed in accordance with Federal Highway Administration (FHWA) and ODOT noise assessment regulations and guidelines. The FHWA regulations are set forth in 23 CFR Part 772.[2] On July 13, 2010, FHWA published revised noise regulations that became effective on July 13, 2011. ODOT prepared revisions to its noise policy in accordance with FHWA's requirements and revised policy which became effective July 13, 2011[3].

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[2] 23 CFR Part 772, as amended 75 FR 39820, July 13, 2010; Effective date July 13, 2011 – "Procedures for Abatement of Highway Traffic Noise and Construction Noise," Federal Highway Administration, U.S. Department of Transportation. http://www.fhwa.dot.gov/environment/noise/regulations_and_guidance/

[3] "Oregon Department of Transportation Noise Manual," July 13, 2011. http://www.oregon.gov/ODOT/GeoEnvironmental/Docs_Environmental/Noise-Manual.pdf

3.1.1 Noise Abatement Criteria

To assess the degree of traffic noise impact on human activity, the FHWA established a noise abatement criteria (NAC) for different categories of land use (see Table 1). Per the aforementioned FHWA regulations, these levels “represent the upper limit of acceptable traffic noise conditions” and the NAC “represent a balancing of that which may be desirable with that which may be achievable.” According to ODOT regulations, traffic noise impact occurs when the predicted traffic noise levels *approach or exceed* the NAC, or when the predicted traffic noise levels substantially *exceed* the existing noise levels. ODOT defines the word “approach” in “approach or exceed” as 2 decibels (dB) less than the FHWA NAC and defines this as the Noise Abatement Approach Criteria (NAAC) and identifies a substantial increase as having occurred if the increase is 10 dB or greater above existing conditions. The regulations further state that noise impact should be assessed for the loudest traffic conditions, which are either the peak vehicular hour or the peak truck hour for the design year. The peak truck hour is used in this analysis because the project corridor operates below posted speed limits during peak hour, therefore lower noise levels persist during the peak hour when compared to the peak truck hour. This approach was agreed to with ODOT noise staff during a project meeting held in October of 2017. (ODOT 2017)

The NAAC are expressed in terms of the hourly equivalent A-weighted sound levels. The A-weighted sound level, designated dB(A), is a measure of sound intensity with weighted frequency characteristics that corresponds to human subjective response to noise. Most environmental noise (and the A-weighted sound level) fluctuates from moment to moment, and it is common practice to characterize the fluctuating level by a single number called the equivalent sound level (L_{eq}). The L_{eq} is the value or level of a steady, non-fluctuating sound that represents the same sound energy as the actual time-varying sound evaluated over the same time period. For traffic noise assessment, L_{eq} is typically evaluated over a one-hour period, and may be denoted as L_{eq}(h).

This study evaluated residential (Category B), park/school/recreation areas (Category C), one interior use only retirement home (Category D), and a hotel outdoor use areas (Category E). For Categories B and C, noise impact is assumed to occur when predicted exterior noise levels, due to the Project, approach or exceed 67 dB(A) L_{eq}(h) during the loudest hour of the day. Therefore, the ODOT-defined threshold for noise impact is where exterior noise levels would be 2 dB less than 67 dB(A) L_{eq}(h), or 65 dB(A) L_{eq}(h) for NAAC B and C uses. For commercial properties, noise impact is assumed to occur when predicted exterior noise levels, due to the Project, would approach or exceed 72 dB(A) L_{eq}(h) during the loudest hour of the day. Therefore, the threshold for noise impact is where exterior noise levels would be 2 dB less than 72 dB(A) L_{eq}(h), or 70 dB(A) L_{eq}(h). Noise impact also would occur wherever Project noise causes a substantial increase over existing noise levels. ODOT defines a substantial increase as an increase of 10 dB or more above existing noise levels.

Table 1. FHWA Noise Abatement Criteria and ODOT Approach Criteria

Activity Category	NAC $L_{eq}(h)$[1]	ODOT NAAC $L_{eq}(h)$[1]	Description of Activity Category
A	57 (Exterior)	55 (Exterior)	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose
B[2]	67 (Exterior)	65 (Exterior)	Residential
C[2]	67 (Exterior)	65 (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
D	52 (Interior)	50 (Interior)	Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios
E[2]	72 (Exterior)	70 (Exterior)	Hotels, motels, offices, restaurants/bars, and other developed lands, properties or activities not included in A-D or F
F	–	–	Agriculture, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical), and warehousing
G	–	–	Undeveloped lands that are not permitted (without building permits)

[1] Hourly Equivalent A-weighted Sound Level (dB(A))
[2] Includes undeveloped lands permitted for this activity category
Source: 23 CFR Part 772.

When the predicted design-year Build case noise levels would approach or exceed the NAC during the loudest hour of the day or would cause a substantial increase in existing noise, consideration of traffic noise reduction measures is necessary. If it is found that such mitigation measures would cause adverse social, economic or environmental effects outweighing the benefits received, they may be dismissed from consideration. For this study, noise levels throughout the study area were estimated for Existing (2017) conditions and for the 2045 No Build and Build alternatives.

3.1.2 Local Noise Regulations

Portions of the Project are within the three local jurisdictions of Clackamas County, West Linn, and Oregon City.

3.1.2.1 Clackamas County

Clackamas County prescribes noise regulations via Title 6-10 of the County Code (Clackamas County, 2000). The applicable portions include those relating to construction noise, which the County restricts to daytime hours. Specifically, construction noise is restricted to the hours from 6:00 a.m. to 10:00 p.m. Construction noise associated with blasting is restricted to the hours from 9:00 a.m. to 10:00 p.m., excluding the weekends. Nighttime construction requires a noise variance from the County.

3.1.2.2 West Linn

West Linn prescribes noise regulations via Title 5, section 5.487 of the Municipal Code (City of West Linn, 2004). As with the County, the applicable portions include those relating to construction noise. Construction noise is exempted from the City's noise level limits from 7:00 a.m. to 7:00 p.m. during weekdays and from 9:00 a.m. to 5:00 p.m. on Saturdays. Construction noise may occur outside of these hours provided that it complies with the City's noise level limits which are provided in Table 2. If compliance is not possible, a noise variance is required. Noise-sensitive land uses are defined by the City as "Any use which is adversely affected by ambient sound or noise, as in the use of real property for residential occupancy, schools, churches, public libraries, or hospitals. This definition includes any place where people normally sleep. Impulse sounds include air overpressure associated with blasting.*"* Examples of impulse sounds include noise from pile driving as well as blasting.

Table 2. West Linn Noise-Sensitive Use Property Line Sound Level Limits

Type of Sound	7:00 a.m. to 7:00 p.m.	7:00 p.m. to 7:00 a.m.
Steady Sound [1]	L_{50} = 55 dB(A)	L_{50} = 45 dB(A)
	L_{10} = 60 dB(A)	L_{10} = 50 dB(A)
	L_1 = 70 dB(A)	L_1 = 55 dB(A)
Impulse Sound [2]	95 dB	80 dB

[1] Statistical sound levels represent the percentage of time a sound level is exceeded. For example, the L_{50} is the sound level exceeded 50 percent of the time and the L_{10} is the sound level exceeded 10% of the time.
[2] Impulse sound is typically evaluated in linear decibels (dB).
Source: West Linn Municipal Code, 2004.

3.1.2.3 Oregon City

Oregon City's Public Works Department has published nighttime construction noise restrictions on their website (City of Oregon City, 2018). Specifically, construction is restricted to daytime from 7:00 a.m. to 6:00 p.m. weekdays and from 9:00 a.m. to 6:00 p.m. Saturdays. Construction outside of these time periods requires a variance.

3.2 Noise Prediction Model

HDR partnered with HMMH who used the latest version of the FHWA's Traffic Noise Model (TNM), Version 2.5, to compute existing and future Build case loudest-hour noise levels and develop the preliminary heights, lengths and locations for all potential noise barriers along the project corridor. TNM incorporates state-of-the-art sound emissions and sound propagation algorithms, based on well-established theory or on accepted international standards. The acoustical algorithms contained within the FHWA TNM have been validated with respect to carefully conducted noise measurement programs, and show agreement in most cases for sites with and without noise barriers (Federal Highway Administration, 1998, and US Department of Transportation, 2004).

Available aerial photography from Metro, topographic information from the Project survey effort, tree zones identified visually, and geographic information system (GIS) building information from Metro were used to create a three-dimensional model in the TNM of the geometry of the existing and future roadway configurations and the surrounding terrain and buildings. It should be noted there is considerable topographical change in the Project area, such as where I-205 approaches the Willamette River crossing from the south. These topographic effects and others were included in the modeling to increase the accuracy of TNM's predictions. The noise modeling also accounts for such factors as propagation over different types of ground (acoustically soft and hard ground), elevated roadway sections, shielding effects from local terrain and structures, distance from the road, traffic speed, and hourly traffic volumes including the distribution of roadway traffic in terms of automobiles, medium and heavy trucks, motorcycles, and buses. In some areas, local roadways were included in the models without traffic to help account for topographic and ground effects (i.e., acoustically reflective). To fully characterize existing and future noise levels at all noise-sensitive land uses in the study area, 731 noise prediction receivers were included in the modeling. There is one instance of a receiver representing two noise sensitive properties/sites.

At approximately 11 miles, the Project corridor is relatively long for TNM prediction efforts. Therefore, the project was divided roughly at its midpoint, where there are no noise-sensitive land uses within 500 feet, to improve run times. The modelling was divided up in such a manner to ensure sufficient overlap, which is achieved by extending roadways with traffic on them approximately 1,000 to 2,000 feet beyond where noise-sensitive receptors of interest are located. Noise abatement modelling was also divided up to analyze each individual noise wall. Where noise abatement measures were analyzed in detail the reported noise levels, both abated and unabated, are obtained from those noise models.

Information on noise-sensitive residential land use in the study area (NAAC B, C, D, and E) includes the number of dwelling units, outdoor uses, and interior uses (where applicable) identified from existing mapping and field verification.

3.2.1 Abernethy Bridge Structure-Borne Noise

The Abernethy Bridge spans the Willamette River connecting the Oregon City side of the river to the east with the West Linn side of the river to the west. Clusters of noise-sensitive receptors are located in these areas consisting of mainly residential uses on the West Linn side and a park on the Oregon City side of the river.

TNM does not directly account for noise emanating from aerial structures, such as noise from vehicle vibrations through the bridge's deck. Methodologies developed and documented in the National Cooperative Highway Research Program (NCHRP)

Report 791 were implemented to account for the structure-borne noise from the bridge. The process involved obtaining measurement data at the drip edge of the structure and simultaneously at distances further away from the structure to identify how much structure-borne noise influences sound levels in a given area of sensitive receptors. Studies have shown that structure-borne noise measured under free flow and relatively constant traffic conditions, such as what occurred during the measurement effort, does not vary greatly with increased traffic volumes. For this reason, the measured traffic noise level at drip edge, and as documented in the measurement section of this report, are applied to each of the conditions analyzed (e.g., Existing Conditions, No Build alternative, and Build alternative). Section 5 provides additional detail on these measurements and structure-borne noise.

3.3 Traffic Data for Noise Prediction

The traffic data used in the noise analysis is representative of the loudest hour of the day, which ODOT noise policy identifies as being the louder of either the peak vehicular hour or peak truck hour. Traffic modeling data for the project were derived using ODOT-provided counts combined with traffic predictions made by HDR for the 2016 Existing Conditions and the 2045 No Build and Build Alternatives. Existing traffic was counted on May 3, 2017 to obtain existing volumes (HDR 2017). Hourly volumes, truck percentages and posted speeds were provided for other major intersecting roadways in the local network.

HMMH worked with HDR to compare the peak vehicular hour against the peak truck hour to identify which case yields the higher traffic noise levels. While the peak vehicular hour has higher overall volumes of traffic on the analysis area roadways, traffic under these conditions are traveling well below posted speeds, at 25 miles per hour (mph) or less, along many portions of I-205. Lower traffic speeds, characteristic of the peak vehicular hour, produce considerably lower noise levels than under free flow conditions. Conversely, the peak truck hour conditions occur in the middle of the day, where volumes are lower, but traffic is moving under free flow conditions. Additionally, heavy trucks account for higher single passby noise levels in comparison to automobiles or light trucks. Therefore, the combination of vehicular traffic moving at free flow conditions and the highest percentage of heavy truck traffic on area roadways makes the peak truck hour the worst case traffic noise hour for the project area. This approach was agreed to during a conference call between ODOT noise staff and the HDR/HMMH consulting team. (ODOT 2017)

4 Existing Conditions

Existing noise levels were established using a combination of noise monitoring and modeling efforts. Additionally, existing structure-borne noise from the Abernethy Bridge was measured to identify the amount of structure-related noise that currently exists in areas near the bridge. Existing noise levels were identified at noise sensitive land uses in the analysis area.

4.1 Land Use

The study area, i.e., the area of potential impact, of noise-sensitive land uses for this report extends approximately 500 feet from Project improvements. The southwestern end of the study area from the Stafford Road interchange to the intersection of Johnson Road and Grapevine Road includes lower density development and could be considered more rural than the portion of the study area to the northeast. From approximately 2,000 feet west of the intersection of Johnson Road and Blankenship Road near I-205 to the eastern terminus of the Project at OR 213, the study area has higher density development and would be characterized as being more urban.

Table 3 provides the quantities of land uses by NAAC. Figure 1 and Figure 2, in Section 11 of this report, are zoning and comprehensive plan designation maps, respectively, for the areas analyzed. No noise-sensitive receptors would be displaced as part of the Project. Research was conducted to identify new developments in the noise study area that could be impacted by the Project. The only such development, the Grand Cove Project multi-family complex, is currently under construction in Oregon City. According to the Grand Cove Project Land Use Application with the City of Oregon City (Oregon City, 2015) it will be constructed over a number of years in multiple phases and will comply with all federal, state, and local noise regulations. The first phase of this new development includes 132 multi-family residences and outdoor pool.

The McLean House, and other historic resources on Willamette Drive, are included in the analysis as a NAAC B uses and are located near the West Linn landing of the Abernethy Bridge.

Table 3. Existing Land Uses

Noise Abatement Activity Category and Land Use	Total Number of Uses
B (65)	**713**
Multi-Family Residential	294[1]
Single-Family Residential	419
C (65)	**10**
Church, Daycare, School	1
Jon Storm Park	5
Play Structure at Apts.	1
Pool at Apts.	2
School (Atlas Immersion Academy)	1
D (50)[2]	**71**
Retirement Home (no outdoor use)	71
E (70)	**120**
Best Western	118[3]
Best Western (Outdoor Seating)	1

Noise Abatement Activity Category and Land Use	Total Number of Uses
Best Western (Pool)	1

Notes:
[1] Includes Grand Cove Project future sensitive receptors.
[2] Is an interior noise level limit.
[3] The hotel has 118 rooms.

4.2 Measurements

A noise measurement program, consisting of long-term (LT) and short-term (ST) measurements, was conducted to document existing ambient sound levels and to assist in validating the modeling results Photographs were collected of each measurement location and each measurement was completed with a sound level meter that is classified as an American National Standards Institute (ANSI) Type 1 (precision) sound level meter. The monitoring locations are shown in the figures in Section 11 of this report. Appendix A provides the noise measurement data sheets and photographs for each measurement location. The monitoring equipment was laboratory calibrated within the previous year. Appendix B provides the laboratory calibration sheets for the equipment used in this monitoring effort. Traffic data used in all of the prediction efforts, including the validation efforts, are provided in Appendix C.

The LT and ST measurements are described in the following subsections.

4.2.1 Long-Term (24-hour) Measurements

Two long-term (24-hour) measurements were conducted during weekdays to document existing conditions and diurnal variation. Long-term measurement location 1 (LT-1) was located at a place of worship (South Lake Foursquare Church) and preschool approximately 140 feet south of the I-205 SB lanes and approximately 650 feet east of the crossover of I-205 and SW Borland Road. LT-1 was situated approximately 100 feet east of the play structure at the same perpendicular distance from the highway as the play structure. During deployment of the LT-1 monitoring equipment field engineers anecdotally noted that traffic noise at this location dominated the noise of children on the play structure. Sound levels at LT-1 were measured from 12:19 p.m. on August 29, 2017 to 1:16 p.m. on August 30, 2017.

LT-2 was located at a duplex at 4329 Imperial Drive. This residential structure is located approximately 215 feet north of the I-205 NB lanes and is on top of a bluff with the highway approximately 25 to 35 feet below. Sound levels were measured at LT-2 from 2:14 p.m. on August 30, 2017 to 2:45 p.m. on August 31, 2017. Table 4 provides a summary of the long-term measurement results.

Table 4. Long-Term 24-Hour Measurement Results

Monitoring Location	L_{eq}[1] dB(A) (day)	L_{eq}[1] dB(A) (night)	L_{dn}[1] dB(A)	L_{min} dB(A)	L_{max} dB(A)	L_{10} dB(A)	L_{50} dB(A)	L_{90} dB(A)
LT-1	71.6	68.9	75.6	42.8	88.2	73.0	68.6	63.0
LT-2	59.7	58.8	65.2	48.8	81.2	60.4	58.4	56.4

[1] L_{eq} (day) represents the energy averaged sound level for the hours of 7:00 a.m. to 10:00 p.m., L_{eq} (night) is the energy averaged sound level for the hours of 10:00 p.m. to 7:00 a.m., and the L_{dn} is the Day-Night Average Sound Level which is the energy averaged sound level for the 24-hour monitoring period with 10 dB added to nighttime sound levels. .

4.2.2 Short-term Validation Measurements

The short-term measurements were used to validate the TNM results for the existing conditions scenario. Section 6.3 of the ODOT Noise Manual states a traffic noise model is considered a valid predictor of traffic noise if measured and modeled noise levels agree within ±3 dB(A). The short-term measurements were at least 15 minutes in duration at each of 13 locations throughout the study area. Also, vehicle traffic classification counts were conducted for 10-minutes during each measurement and speeds documented concurrent with each of the short-term noise measurements as shown in Appendix C. Two of these measurements were conducted at the same location as long-term measurements, specifically Short-Term measurement location 1 (ST-1) was collected at the same location as LT-1 and ST-10 was collected at LT-2. Speeds at ST-10 were slower than posted speeds during the validation effort due to unknown causes[4]. Speeds were also slower than posted speeds on I-205 during the ST-7, ST-8, ST-9, and ST-13 validation measurements for unknown reasons. Observed traffic speeds were used in the model validation effort. The remaining short-term validation measurements were completed at the following locations:

- ST-2: This measurement was conducted in the yard of a residence on the side closest to I-205 at 22400 Johnson Road. The measurement was approximately 240 feet south of I-205 SB lanes and 165 feet east of SW Johnson Road.
- ST-3: This measurement was conducted in the yard of a residence on the side closest to I-205 at 22601 Grapevine Road. The measurement was approximately 233 feet northeast of I-205 NB lanes and 80 feet west of S Grapevine Road.
- ST-4: This measurement site was in the yard of a residence on the side closest to I-205 at 23400 Johnson Road. The measurement was approximately 180 feet west of I-205 SB lanes and 525 feet east of Johnson Road.
- ST-5a: This measurement was conducted in the yard of a residence on the side closest to I-205 at 2384 Margery Street. The measurement was approximately 140 feet east of I-205 NB lanes and 84 feet west of Margery Street. This measurement was representative of front row residences in that neighborhood.

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[4] There may have been an accident located further down I 205 out of sight.

- ST-5b: This measurement was conducted at the second row of residences in the same neighborhood as ST-5a and in the yard of a residence on the side closest to I-205 at 2383 Margery Street. The measurement was approximately 275 feet east of I-205 NB lanes and 40 feet east of Margery Street. This measurement was representative of front row residences in that neighborhood.
- ST-6: This measurement site was at the portion of a play structure/swing at the Willamette Terrace Apartments closest to I-205 at 1709 Blankenship Rd. The measurement was approximately 260 feet northeast of I-205 SB lanes and 240 feet south of Blankenship Road.
- ST-7: This measurement was conducted in the yard of a residence on the side closest to I-205 at 1788 Jamie Circle. The measurement was approximately 260 feet southwest of I-205 NB lanes and 100 feet northeast of Jamie Circle.
- ST-8: This measurement site was in the yard of a residence on the side closest to I-205 at 2318 8th Street. The measurement was approximately 455 feet south of the I-205 NB onramp from 10th Street and 90 feet south of Willamette Falls Drive. At this location, noise from I-205 is dominant; however, when traffic is present on Willamette Falls Drive it is audible over the more consistent noise source from I-205.
- ST-9: This measurement was conducted in the yard of a residence on the side closest to I-205 at 4701 Imperial Drive. The measurement was approximately 315 feet north of the I-205 SB lanes and 110 feet south of Imperial Drive.
- ST-11: This measurement site was in the yard of a residence on the side closest to I-205 at 4835 Willamette Falls Drive. The measurement was approximately 380 feet south of the I-205 NB lanes and 70 feet south of Willamette Falls Drive. Due to topography, I-205 is about 35 feet higher in elevation than where the measurement was completed and Willamette Falls Drive is about 10 feet higher in elevation. As a result, line of sight to traffic on I-205 is mostly blocked, its noise is lower in intensity than traffic noise from Willamette Falls Drive.
- ST-12: This measurement was conducted in the yard of a residence on the side closest to I-205 at 5345 Grove Street. The measurement was approximately 90 feet north of the I-205 SB lanes and 90 feet south of Grove Street. I-205 is on structure in this part of the project area at the south end of the Abernethy Bridge crossing of the Willamette River. The main lanes and the exit ramp to OR 43 are both approximately 40 feet above the neighborhood and where the measurement was conducted.
- ST-13: This measurement site was at a picnic table in Jon Storm Park at 1801 Clackamette Drive. The measurement was approximately 118 feet north of the I-205 SB lanes and 260 feet west of highway 99E. I-205 is on-structure in this part of the project area at the north end of the Abernethy Bridge crossing of the Willamette River. The main lanes and the exit ramp to 99E are both approximately 40 feet above where the measurement was conducted.

Observed traffic volumes during each of the short-term measurements were scaled to be hourly equivalents and applied to the roadways in the modeling and run for each measurement location. These traffic volumes are provided in Appendix C.

As Table 5 demonstrates, the measured and modeled noise levels agree within 3 dB(A); therefore, the TNM (and its data inputs) are valid predictors of traffic noise for the Project.

The validation included shielding effects from topographic features, large tree stands, buildings and rows of houses, and reflective surfaces such as water bodies (i.e., the Willamette River).

Upon completion of the validation effort, the TNM implementation of the study area was expanded to include all of the identified noise-sensitive land uses in the study area. This area extended out from the I-205 corridor widening project by about 500 feet, and included all of the noise-sensitive land uses listed in Table 3. The measurement locations are provided on Figures 1 through 32 in Section 11.

Table 5. Short-Term Measurement Validation Results

Monitoring Location	Date/Time of Measurement	Distance to Edge of Roadway (feet)	Measured L_{eq} dB(A)	Modeled L_{eq} dB(A)	Difference (Modeled minus Measured)
ST-01	8/29/2017 12:35 – 12:50	140	72.6	70.1	-2.5
ST-02	8/29/2017 13:24 – 13:52	240	64.5	63.5	-1.0
ST-03	8/30/2017 9:38 – 9:53	233	63.1	65.9	2.8
ST-04	8/30/2017 10:16 – 10:31	180	63.9	66.6	2.7
ST-05a	8/30/2017 10:49 – 11:04	140	69.4	72.2	2.8
ST-05b	8/30/2017 11:06 – 11:21	275	64.9	65.4	0.5
ST-06	8/30/2017 12:36 – 13:01	240	58.0	60.2	2.2
ST-07	8/30/2017 15:06 – 15:21	260	58.1	60.9	2.8
ST-08	8/31/2017 9:38 – 9:57	455	63.2	62.6	-0.6
ST-09	8/31/2017 10:25 – 10:40	315	56.0	58.0	2.0
ST-10	8/30/2017 14:35 – 14:50	215	57.4	58.3	0.9
ST-11	8/31/2017 13:07 – 13:22	380	57.6	57.2	-0.4
ST-12	8/31/2017 13:39 – 14:00	90	59.9	57.0	-2.9
ST-13	8/31/2017 14:14 – 14:32	118	63.4	62.8	-0.6

Note: Traffic counts and speeds for each measurement are provided in Appendix C.

4.2.3 Abernethy Bridge Structure-Borne Noise Measurements

Structure-born noise was measured using the same type of equipment as was used for the long-term measurements. TNM does not calculate structure-borne noise. For this reason, quantifying the structure-borne noise is necessary to properly analyze potential noise mitigation (i.e., a noise wall) that could be needed on the bridge. Specifically, short-term monitoring near the bridge validated within the tolerance of TNM per the ODOT noise manual; however, these measurements were completed at locations away from the structure where noise from vehicular traffic on the bridge alone currently dominates structure-borne noise. If the vehicular traffic noise source was blocked by a noise wall, structure-borne noise would remain and the noise wall would not be as effective as TNM predicts. To identify the contribution of structure-borne noise from the Abernethy Bridge, structure-borne noise measurements were completed implementing the procedures documented in NCHRP Report 791 (NCHRP 2014), specifically Chapter 2 and Appendix A of that report.. The general measurement process and application of the resulting structure-borne noise levels for the project was as follows:

1. Noise measurements were completed at the drip edge of the structure and at least two other locations further away from the structure.
2. Traffic volumes of vehicles using the structure were collected.
3. Drop-off rates of structure-borne noise were calculated using the worksheet provided in Appendix A of the NCHRP 791 report with noise reducing by 3 dB per doubling of distance (dB/DD), 4.5 dB/DD, and 6 dB/DD.
4. The sound level at the two measurement locations that are not the drip edge measurement were calculated using TNM.
5. The calculated sound levels obtained via steps #3 and #4 were logarithmically added.
6. Results of Step #5 was compared to the measured sound levels collected in step #1 to identify what drop-off rate was most appropriate to apply to the structure-borne noise from the structure being analyzed.
7. Using the measured drip edge sound level and the identified drop-off rate, the structure-borne noise level occurring at the noise sensitive receptors of interest was identified by adjusting for distance and using the worksheet from NCHRP 791 (See Table 6 and Appendix A).
8. The resultant levels from step #7 were logarithmically added to the TNM predictions for the existing conditions, No Build Alternative, and Build Alternative.

Amounts of structure-borne noise is present at all receptors near (i.e., within approximately 500 feet) the Abernethy Bridge analyzed as part of the Project. The amount of structure-borne noise varies with distance from the structure with those closest to the structure experiencing higher structure-borne noise than those further away. For example, for receptors along OR 43, noise from OR 43 dominates, but there is also some structure radiated noise. For these receptors the noise from OR 43 is of such significance that the structure-radiated noise only has a negligible effect (less than 1 dB). For receptors closer to the river that are also close to the bridge, such as those on River Street, structure-radiated noise is more significant.

The measurement effort involved three sound level meters. The locations of the measurements are shown on Figure 33. Structure-borne sound levels were measured on the Oregon City side of the crossing in John Storm Park and near the McLean House on River Street on the West Linn side of the crossing. For the Oregon City measurements, one sound level meter was set up at the drip edge of the structure and two other sound level meters were set up at 50 feet and 100 feet, respectively. The Oregon City measurements were completed on June 13, 2018 and the West Linn measurements were completed on June 13, 2018 and June 19, 2018. On the West Linn side of the crossing, two sets of measurements were completed on different days to obtain a second data set under a different traffic condition. The West Linn measurements were completed at the drip edge and at varying distances from the structure, specifically 50 feet, 85 feet, and 120 feet. Traffic conditions (i.e., vehicle counts and speeds) on I-205 were simultaneously collected during each of the measurements and are contained in Appendix C. Traffic volumes were entered into the validated existing conditions TNM run and the differences between measured and modeled sound levels tabulated.

As mentioned earlier in this section, three drop-off rates were analyzed to identify which drop-off rate was most appropriate for a given structure, specifically 3 dB/DD, 4.5 dB/DD, and 6 dB/DD. Equations are provided in NCHRP Report 791 to accomplish these calculations and spreadsheets were used to complete these calculations. Specifically, the following equation was employed for 4.5 dB/DD calculations:

$L_{Ax} = L_{DE} - 15 \times \mathrm{Log}_{10} (D_{AP}/D_{Ref})$, where

- L_{DE} = measured L_{eq} in dB(A) at 5 feet above the ground under the structure drip edge
- $L_{Ax\,=}$ Calculated structure-related noise level at analysis point A_x, located x feet from the drip edge, in dB(A)
- D_{AP} = Distance from point S to the analysis point A_x, in feet
- D_{Ref} = Distance from point S to point A_{ref}, in feet
    - 56 feet on the Oregon City side
    - 82 feet on the West Linn side
- S = Length to the midpoint of the structure, or the width divided in half, in feet.
    - 50 feet on the Oregon City side
    - 70 feet on the West Linn side

See Table 6 for an example of the calculation worksheet where these values were implemented for the Oregon City side of the crossing. Figure 34 provides a schematic drawing of how these variables are used to assess structure related noise.

Table 6. Structure Related Noise Calculation Worksheet for Oregon City

K19786: I-205 Widening and Seismic Improvements				
Oregon City Side of Crossing				
Input Data:				
h: Height of structure, from ground to underside of deck, in feet				50
Aref: Center point between ground and underside of structure (h/2), in feet				25
w: Width of Structure (feet)				100
Mw: Midpoint of structure (w/2) in feet. The underside of the deck at this point is the assumed source of structure noise (S)				50
Dref: Reference distance - from S to Aref, in feet				55.9
Measured Noise Level at Drip Edge, dB(A)				72.3
Set-back Calculations:				
Analysis Point	Distance from Drip Edge (feet)	Distance from Analysis Point (feet)	Measured Noise Level at Drip Edge L_{eq} in dB(A)	Calculated Noise Level with Drop-off Rate = 3.0 dB/DD
Aref	0	55.9	72.3	n/a
A50	50	105.9	n/a	70
A100	100	155.9	n/a	68
Analysis Point	Distance from Drip Edge (feet)	Distance from Analysis Point (feet)	Measured Noise Level at Drip Edge L_{eq} in dB(A)	Calculated Noise Level with Drop-off Rate = 4.5 dB/DD
Aref	0	55.9	72.3	n/a
A50	50	105.9	n/a	68.1
A100	100	155.9	n/a	65.6
Analysis Point	Distance from Drip Edge (feet)	Distance from Analysis Point (feet)	Measured Noise Level at Drip Edge L_{eq} in dB(A)	Calculated Noise Level with Drop-off Rate = 6.0 dB/DD
Aref	0	55.9	72.3	n/a
A50	50	105.9	n/a	67
A100	100	155.9	n/a	63

Source: NCHRP 2014, HMMH 2018

Table 7 presents the results of the structure-borne measurement and analysis effort and demonstrates that structure-borne noise most closely aligns with a drop-off rate of 4.5 dB/DD. Figure 35 is a chart that shows how these sound levels drop off with distance and how they relate to the corresponding measured noise levels. The structure-borne noise levels identified are applied to noise-sensitive land uses near the Abernethy Bridge to properly account for the structure-related noise.

As an example, measurement ST-12, on Figure 14, was conducted in the backyard of a residence 90 feet from the edge of the Abernethy Bridge with a level of 59.9 dB(A) L_{eq}. The TNM-modeled sound level for validation purposes with no adjustments made for structure-borne noise was 57.0 dB(A) L_{eq}, a sound level 2.9 dB less than what was measured. Based on the structure-borne noise analysis, the noise emanating from the structure deck for this location was 60.2 dB(A) L_{eq}. Therefore, adding the structure-borne noise to the TNM-modeled level results in an adjusted sound level of 61.9 dB(A), a level 2 dB higher than what was measured. This is a level that would be considered “valid” for prediction purposes and shows better agreement with the original validation measurement.

Ultimately, the reason why it is necessary to include structure-borne noise in this analysis is because it affects how well potential noise mitigation is estimated to perform on the bridge, as documented in Section 6 of this report. Specifically, if a noise wall is installed on the Abernethy Bridge, the sound emanating from vehicular traffic on the roadway would be blocked; however, the sound from vehicles causing structure-born noise to radiate from below the structure would remain. Accounting for the amount of structure-borne noise that cannot be abated affects how well noise abatement measures perform per ODOT policy. Appendix A provides the measurement results and NCHRP Report 791 analysis sheets.

Table 7. Structure-Borne Noise Measurement and Analysis Results

	Measurement Period		Location of Measurement in Relation to Drip Edge (feet)	Measured L_{eq} Noise Level [dB(A)]	FHWA TNM Modeled $L_{eq(h)}$ Noise Level [dB(A)] due to Highway Traffic Only	Assumed Effect of Structure-Related Noise (dB)	Modeled $L_{eq(h)}$ Noise Level [dB(A)] Assuming Spreadsheet Value Adjustment for Structure-Related Noise and Assuming Drop-Off Rate of:			Measured Minus Modeled Leq Noise Level [dB(A)] Assuming Drop-Off Rate of:		
Measurement Location	**From**	**To**					**3 dB/DD**	**4.5 dB/DD**	**6 dB/DD**	**3 dB/DD**	**4.5 dB/DD**	**6 dB/DD**
Oregon City Side of Crossing (Jon Storm Park (Jon Storm Park/Near SB Lanes)	6/13/2018 11:00	6/13/2018 12:23	Drip Edge	72.3	62.2	10.1	N/A	N/A	N/A	N/A	N/A	N/A
			50	69	63.7	4.8	70.5	69.5	68.5	2.0	1.0	0.0
			100	68	62.6	5.7	69.0	67.4	66.0	0.7	-0.9	-2.3
West Linn Side of Crossing (SB Side of Structure)	6/13/2018 14:14	6/13/2018 14:51	Drip Edge	67.1	57.4	9.7	N/A	N/A	N/A	N/A	N/A	N/A
			50	65.2	56.8	8.4	65.6	64.8	63.9	0.4	-0.4	-1.3
			85	62.5	58.2	4.3	65.0	63.8	62.8	2.5	1.3	0.3
West Linn Side of Crossing (SB Side of Structure)	6/19/2018 11:52	6/19/2018 12:11	Drip Edge	66.0	57.4	8.6	N/A	N/A	N/A	N/A	N/A	N/A
			50	63.7	57.1	6.6	64.8	63.9	63.1	1.1	0.3	-0.5
			120	61.7	59	2.7	63.8	62.6	61.6	2.1	0.9	-0.1

4.3 Existing Conditions (2017)

Existing 2017 peak truck hour traffic data were entered into the Existing Conditions modeled scenario to enable loudest-hour prediction of noise levels at all noise-sensitive land uses. Under the existing 2017 conditions, traffic noise levels range from 43 dB(A) L_{eq} to 74 dB(A) L_{eq} and exceed the NAAC at 238 residences (NAAC B), the South Lake Church/Pre-School/Daycare (NAAC C), Jon Storm Park (NAAC C), and the Atlas Immersion Academy School (NAAC C). Exterior sound levels at the retirement home (NAAC D) are predicted to be 70 dB(A) L_{eq} at the façade closest to I-205. Visual inspections of the building identified that the building window type are what FHWA classifies as “storm windows” which result in an interior sound level 25 dB lower (FHWA 2011a), the interior sound level at the retirement home is predicted to be 45 dB(A) L_{eq} and is therefore not impacted. Traffic noise levels are highest for outdoor use areas located closest to the I-205 facility. Table 8 provides the summary of exceedances for the Existing Conditions, Table 9 provides a tabular list of existing traffic noise levels for the receptors analyzed, and Figures 3 through 17 show the location of each receptor listed in the table.

5 Future Noise Levels

Traffic noise levels were predicted for two future (2045) alternatives: the No Build Alternative and the Build Alternative (Table 10).

5.1 No Build Alternative (2045)

No Build Alternative 2045 traffic noise levels are provided in Table 11 and Figures 3 through 17 in Section 11 show the location of each receptor listed in the table. Under the No Build Alternative 2045 conditions, predicted traffic noise levels would range from 45 dB(A) L_{eq} to 74 dB(A) L_{eq} and would exceed the NAAC at 281 residences (NAAC B), the South Lake Church/Pre-School/Daycare (NAAC C), Jon Storm Park (NAAC C), and the Atlas Immersion Academy School (NAAC C). Traffic noise levels are predicted to increase up to 4 dB under the No Build Alternative due to increased traffic volumes on area roadways. On average, traffic noise would increase by 1 dB over existing conditions. Exterior sound levels at the retirement home (NAAC D) are predicted to be 70 dB(A) L_{eq} at the façade closest to I-205. Visual inspections of the building identified that the building window type are what FHWA classifies as “storm windows” which result in an interior sound level 25 dB(A) lower; therefore, the interior sound level at the retirement home is predicted to be 45 dB(A) L_{eq} and therefore would not be impacted. As with the existing conditions, traffic noise levels would be highest for outdoor use areas located closest to the I-205 facility.

5.2 Build Alternative (2045)

Build Alternative 2045 traffic noise levels are provided in Table 11 and Figures 18 to 32 (Build alt) in Section 11 show the location of each receptor listed in the table.

Under the Build Alternative 2045 conditions, predicted traffic noise levels would range from 45 dB(A) L_{eq} to 75 dB(A) L_{eq}. Traffic noise impacts would occur at 351 residences (NAAC B), the South Lake Church/Pre-School/Daycare (NAAC C), a pool at the Jamestown Plaza Apartments (NAAC C), Jon Storm Park (NAAC C), and at the Atlas Immersion Academy School (NAAC C). No substantial increases in noise would result from the Build Alternative. Exterior sound levels at the retirement home (NAAC D) are predicted to be 70 dB(A) L_{eq} at the façade closest to I-205. Visual inspections of the building identified that the building window type are what FHWA classifies as “storm windows” which result in an interior sound level 25 dB(A) lower (FHWA, 2011); therefore, the interior sound level at the retirement home is predicted to be 45 dB(A) L_{eq} at the closest point to the highway and would not be impacted. Compared to the existing conditions, traffic noise levels are predicted to increase by up to 5 dB(A), depending on the proximity of a receptor to the widened roadway. There are nine receptors where sound levels would be one to three dB lower under the Build Alternative 2045 conditions, specifically R183, R185, R349 to R350, R439, R444, and R445. The reductions in sound levels would occur because of changes in horizontal and/or vertical alignment resulting in increased shielding in some of these locations. Traffic noise levels would be highest for outdoor use areas located closest to the proposed I-205 facility. Traffic noise abatement measures were evaluated for each of the impacts and the results of this analysis are provided in Section 7 of this report.

Each receptor is shown in Figures 18 to 32 with a color-coded dot that indicates the status of each receptor according to its 2045 Build noise level, both with and without a noise barrier, if one is shown opposite the receptor. The color code and corresponding receptor status are as follows:

- Light blue - impacted (without noise barrier) and 5 or 6 dB(A) of insertion loss (with noise barrier);
- Dark blue - impacted (without noise barrier) and 7 dB(A) or more of insertion loss (with noise barrier);
- Red - impacted (without noise barrier) and not benefited, i.e. less than 5 dB(A) of insertion loss (with noise barrier);
- Green - not impacted (without noise barrier) and benefited (with noise barrier); and
- Yellow - not impacted (without noise barrier) or benefited (with noise barrier).

A summary of exceedance conditions for the conditions/alternatives analyzed are provided in Table 8.

Table 8. Summary of Exceedance Conditions for the Existing Conditions and No Build and Build Alternatives

Condition/Alternative	Impact Type	Land Use and NAAC			
		Residential Exterior (B)	Recreational Exterior (C)*	Institutional Interior (D)	Commercial Exterior (E)
Existing (2017)	NAAC	238	7	0	0
No Build Alternative (2045)	NAAC	281	7	0	0
Build Alternative (2045)	NAAC	351	8	0	0

Notes: *Exceedances at NAAC C uses under the Existing and No Build Alternative include the South Lake Church/Pre-School/Daycare, five outdoor uses at Jon Storm Park, and at the Atlas Immersion Academy School and under the Build Alternative include the same uses in addition to a pool at the Jamestown Plaza Apartments.

Table 9. Predicted Noise Levels

Receptor ID	Land Use	ODOT Criteria NAAC	No. of Uses	Structure-Borne Leq dB(A)	Existing 2017 Leq TNM dB(A)	Existing 2017 TNM + Structure-Borne Leq dB(A)	No Build 2040 Alternative Leq dB(A)	No Build 2040 TNM + Structure-Borne Leq dB(A)	No Build 2040 Increase over Existing Noise Level dB	Build Alternative Leq dB(A)	Build 2040 TNM + Structure-Borne Leq dB(A)	Build 2040 Increase over Existing Noise Level dB
LT-1/ST-1	Church, Daycare, School	C (65)	1	N/A	**69**	**69**	**70**	**70**	1	**69**	**69**	0
ST-2	Residence	B (65)	1	N/A	63	63	63	63	0	**66**	**66**	3
ST-3	Residence	B (65)	1	N/A	**67**	**67**	**68**	**68**	1	**70**	**70**	3
ST-4	Residence	B (65)	1	N/A	**67**	**67**	**68**	**68**	1	**69**	**69**	2
ST-5a	Residence	B (65)	1	N/A	**72**	**72**	**73**	**73**	1	**73**	**73**	1
ST-5b	Residence	B (65)	1	N/A	**66**	**66**	**66**	**66**	0	**68**	**68**	2
ST-6	Play Structure at Apts.	C (65)	1	N/A	60	60	61	61	1	63	63	3
ST-7	Residence	B (65)	1	N/A	64	64	64	64	0	**65**	**65**	1
ST-8	Residence	B (65)	1	N/A	63	63	63	63	0	**65**	**65**	2
ST-9	Residence	B (65)	1	N/A	60	60	61	61	1	**65**	**65**	5
LT-2/ST-10	Residence	B (65)	1	N/A	63	63	64	64	1	64	64	1
ST-11	Residence	B (65)	1	N/A	57	57	58	58	1	58	58	1
ST-12	Residence	B (65)	1	60	59	63	59	63	0	60	63	0
ST-13	Jon Storm Park	C (65)	1	64	**66**	**68**	**66**	**68**	0	**66**	**68**	0
R1	Residence	B (65)	1	N/A	**70**	**70**	**71**	**71**	1	**70**	**70**	0
R2	Residence	B (65)	1	N/A	64	64	64	64	0	**65**	**65**	1
R3	Residence	B (65)	2	N/A	60	60	61	61	1	62	62	2
R4	Residence	B (65)	1	N/A	60	60	61	61	1	61	61	1
R5	Residence	B (65)	1	N/A	**70**	**70**	**71**	**71**	1	**71**	**71**	1
R6	Residence	B (65)	1	N/A	64	64	**65**	**65**	1	**66**	**66**	2
R7	Residence	B (65)	1	N/A	**65**	**65**	**65**	**65**	0	**66**	**66**	1

Table 9. Predicted Noise Levels

Receptor ID	Land Use	ODOT Criteria NAAC	No. of Uses	Structure-Borne Leq dB(A)	Existing 2017 Leq TNM dB(A)	Existing 2017 TNM + Structure-Borne Leq dB(A)	No Build 2040 Alternative Leq dB(A)	No Build 2040 TNM + Structure-Borne Leq dB(A)	No Build 2040 Increase over Existing Noise Level dB	Build Alternative Leq dB(A)	Build 2040 TNM + Structure-Borne Leq dB(A)	Build 2040 Increase over Existing Noise Level dB
R8	Residence	B (65)	1	N/A	55	55	56	56	1	57	57	2
R9	Residence	B (65)	1	N/A	58	58	58	58	0	61	61	3
R10	Residence	B (65)	1	N/A	57	57	57	57	0	61	61	4
R11	Residence	B (65)	1	N/A	58	58	59	59	1	62	62	4
R12	Residence	B (65)	1	N/A	**70**	**70**	**70**	**70**	0	**72**	**72**	2
R13	Residence	B (65)	1	N/A	**67**	**67**	**67**	**67**	0	**68**	**68**	1
R14	Residence	B (65)	1	N/A	**66**	**66**	**66**	**66**	0	**66**	**66**	0
R15	Residence	B (65)	1	N/A	**71**	**71**	**71**	**71**	0	**72**	**72**	1
R16	Residence	B (65)	1	N/A	**67**	**67**	**68**	**68**	1	**69**	**69**	2
R17	Residence	B (65)	1	N/A	54	54	54	54	0	55	55	1
R18	Residence	B (65)	1	N/A	58	58	58	58	0	60	60	2
R19	Residence	B (65)	1	N/A	62	62	62	62	0	64	64	2
R20	Residence	B (65)	1	N/A	64	64	**65**	**65**	1	**67**	**67**	3
R21	Residence	B (65)	1	N/A	**70**	**70**	**71**	**71**	1	**72**	**72**	2
R22	Residence	B (65)	1	N/A	**72**	**72**	**72**	**72**	0	**74**	**74**	2
R23	Residence	B (65)	1	N/A	**72**	**72**	**72**	**72**	0	**73**	**73**	1
R24	Residence	B (65)	1	N/A	**72**	**72**	**73**	**73**	1	**74**	**74**	2
R25	Residence	B (65)	1	N/A	**73**	**73**	**73**	**73**	0	**74**	**74**	1
R26	Residence	B (65)	1	N/A	**73**	**73**	**73**	**73**	0	**74**	**74**	1
R27	Residence	B (65)	1	N/A	**73**	**73**	**73**	**73**	0	**74**	**74**	1
R28	Residence	B (65)	1	N/A	**72**	**72**	**73**	**73**	1	**74**	**74**	2

Table 9. Predicted Noise Levels

Receptor ID	Land Use	ODOT Criteria NAAC	No. of Uses	Structure-Borne Leq dB(A)	Existing 2017 Leq TNM dB(A)	Existing 2017 TNM + Structure-Borne Leq dB(A)	No Build 2040 Alternative Leq dB(A)	No Build 2040 TNM + Structure-Borne Leq dB(A)	No Build 2040 Increase over Existing Noise Level dB	Build Alternative Leq dB(A)	Build 2040 TNM + Structure-Borne Leq dB(A)	Build 2040 Increase over Existing Noise Level dB
R29	Residence	B (65)	1	N/A	**73**	**73**	**74**	**74**	1	**75**	**75**	2
R30	Residence	B (65)	1	N/A	**72**	**72**	**72**	**72**	0	**73**	**73**	1
R31	Residence	B (65)	1	N/A	**73**	**73**	**73**	**73**	0	**74**	**74**	1
R32	Residence	B (65)	1	N/A	**73**	**73**	**73**	**73**	0	**74**	**74**	1
R33	Residence	B (65)	1	N/A	**74**	**74**	**74**	**74**	0	**75**	**75**	1
R34	Residence	B (65)	1	N/A	**67**	**67**	**68**	**68**	1	**69**	**69**	2
R35	Residence	B (65)	1	N/A	**67**	**67**	**67**	**67**	0	**69**	**69**	2
R36	Residence	B (65)	1	N/A	**65**	**65**	**66**	**66**	1	**68**	**68**	3
R37	Residence	B (65)	1	N/A	**65**	**65**	**65**	**65**	0	**67**	**67**	2
R38	Residence	B (65)	1	N/A	**65**	**65**	**66**	**66**	1	**67**	**67**	2
R39	Residence	B (65)	1	N/A	**65**	**65**	**65**	**65**	0	**67**	**67**	2
R40	Residence	B (65)	1	N/A	**65**	**65**	**65**	**65**	0	**67**	**67**	2
R41	Residence	B (65)	1	N/A	63	63	63	63	0	**66**	**66**	3
R42	Residence	B (65)	1	N/A	61	61	61	61	0	64	64	3
R43	Residence	B (65)	1	N/A	62	62	62	62	0	64	64	2
R44	Residence	B (65)	1	N/A	62	62	62	62	0	64	64	2
R45	Residence	B (65)	1	N/A	62	62	62	62	0	64	64	2
R46	Residence	B (65)	1	N/A	61	61	62	62	1	64	64	3
R47	Residence	B (65)	1	N/A	62	62	62	62	0	64	64	2
R48	Residence	B (65)	1	N/A	63	63	63	63	0	64	64	1
R49	Residence	B (65)	1	N/A	**65**	**65**	**65**	**65**	0	**66**	**66**	1

Table 9. Predicted Noise Levels

Receptor ID	Land Use	ODOT Criteria NAAC	No. of Uses	Structure-Borne Leq dB(A)	Existing 2017 Leq TNM dB(A)	Existing 2017 TNM + Structure-Borne Leq dB(A)	No Build 2040 Alternative Leq dB(A)	No Build 2040 TNM + Structure-Borne Leq dB(A)	No Build 2040 Increase over Existing Noise Level dB	Build Alternative Leq dB(A)	Build 2040 TNM + Structure-Borne Leq dB(A)	Build 2040 Increase over Existing Noise Level dB
R50	Residence	B (65)	1	N/A	**73**	**73**	**74**	**74**	1	**74**	**74**	1
R51	Residence	B (65)	1	N/A	**70**	**70**	**70**	**70**	0	**70**	**70**	0
R52	Residence	B (65)	1	N/A	**67**	**67**	**68**	**68**	1	**69**	**69**	2
R53	Residence	B (65)	1	N/A	**66**	**66**	**67**	**67**	1	**67**	**67**	1
R54	Residence	B (65)	1	N/A	62	62	62	62	0	63	63	1
R55	Residence	B (65)	1	N/A	**66**	**66**	**67**	**67**	1	**67**	**67**	1
R56	Residence	B (65)	1	N/A	**67**	**67**	**67**	**67**	0	**67**	**67**	0
R57	Residence	B (65)	1	N/A	**67**	**67**	**67**	**67**	0	**67**	**67**	0
R58	Residence	B (65)	1	N/A	**66**	**66**	**67**	**67**	1	**67**	**67**	1
R59	Residence	B (65)	1	N/A	64	64	**65**	**65**	1	**65**	**65**	1
R60	Residence	B (65)	1	N/A	**65**	**65**	**66**	**66**	1	**66**	**66**	1
R61	Residence	B (65)	1	N/A	63	63	64	64	1	64	64	1
R62	Residence	B (65)	1	N/A	**65**	**65**	**65**	**65**	0	**66**	**66**	1
R63	Residence	B (65)	1	N/A	**71**	**71**	**71**	**71**	0	**72**	**72**	1
R64	Residence	B (65)	1	N/A	**72**	**72**	**72**	**72**	0	**73**	**73**	1
R65	Residence	B (65)	1	N/A	**72**	**72**	**73**	**73**	1	**74**	**74**	2
R66	Residence	B (65)	1	N/A	**70**	**70**	**70**	**70**	0	**72**	**72**	2
R67	Residence	B (65)	1	N/A	**66**	**66**	**66**	**66**	0	**68**	**68**	2
R68	Residence	B (65)	1	N/A	**65**	**65**	**65**	**65**	0	**67**	**67**	2
R69	Residence	B (65)	1	N/A	63	63	63	63	0	64	64	1
R70	Residence	B (65)	1	N/A	63	63	64	64	1	**65**	**65**	2

Table 9. Predicted Noise Levels

Receptor ID	Land Use	ODOT Criteria NAAC	No. of Uses	Structure-Borne Leq dB(A)	Existing 2017 Leq TNM dB(A)	Existing 2017 TNM + Structure-Borne Leq dB(A)	No Build 2040 Alternative Leq dB(A)	No Build 2040 TNM + Structure-Borne Leq dB(A)	No Build 2040 Increase over Existing Noise Level dB	Build Alternative Leq dB(A)	Build 2040 TNM + Structure-Borne Leq dB(A)	Build 2040 Increase over Existing Noise Level dB
R71	Residence	B (65)	1	N/A	**65**	**65**	**65**	**65**	0	**66**	**66**	1
R72	Residence	B (65)	1	N/A	63	63	64	64	1	**65**	**65**	2
R73	Residence	B (65)	1	N/A	**65**	**65**	**65**	**65**	0	**67**	**67**	2
R74	Residence	B (65)	1	N/A	64	64	**65**	**65**	1	**66**	**66**	2
R75	Residence	B (65)	1	N/A	**65**	**65**	**66**	**66**	1	**67**	**67**	2
R76	Retirement Home (no outdoor use)	D (50)*	1	N/A	45	45	45	45	0	45	45	0
R77	Pool at Apts.	C (65)	1	N/A	63	63	64	64	1	**66**	**66**	3
R78	Multi-Family	B (65)	1	N/A	**65**	**65**	**65**	**65**	0	**66**	**66**	1
R79	Multi-Family	B (65)	1	N/A	64	64	64	64	0	**65**	**65**	1
R80	Multi-Family	B (65)	1	N/A	**68**	**68**	**69**	**69**	1	**70**	**70**	2
R81	Multi-Family	B (65)	1	N/A	**68**	**68**	**68**	**68**	0	**69**	**69**	1
R82	Multi-Family	B (65)	1	N/A	57	57	57	57	0	59	59	2
R83	Multi-Family	B (65)	1	N/A	57	57	57	57	0	58	58	1
R84	Multi-Family	B (65)	1	N/A	61	61	61	61	0	62	62	1
R85	Multi-Family	B (65)	1	N/A	60	60	61	61	1	61	61	1
R86	Multi-Family	B (65)	1	N/A	50	50	50	50	0	53	53	3
R87	Multi-Family	B (65)	1	N/A	53	53	53	53	0	55	55	2
R88	Multi-Family	B (65)	1	N/A	53	53	54	54	1	55	55	2
R89	Multi-Family	B (65)	1	N/A	56	56	56	56	0	57	57	1
R90	Multi-Family	B (65)	1	N/A	53	53	53	53	0	54	54	1
R91	Multi-Family	B (65)	1	N/A	52	52	53	53	1	54	54	2

Table 9. Predicted Noise Levels

Receptor ID	Land Use	ODOT Criteria NAAC	No. of Uses	Structure-Borne Leq dB(A)	Existing 2017 Leq TNM dB(A)	Existing 2017 TNM + Structure-Borne Leq dB(A)	No Build 2040 Alternative Leq dB(A)	No Build 2040 TNM + Structure-Borne Leq dB(A)	No Build 2040 Increase over Existing Noise Level dB	Build Alternative Leq dB(A)	Build 2040 TNM + Structure-Borne Leq dB(A)	Build 2040 Increase over Existing Noise Level dB
R92	Multi-Family	B (65)	1	N/A	55	55	56	56	1	56	56	1
R93	Multi-Family	B (65)	1	N/A	55	55	55	55	0	56	56	1
R94	Multi-Family	B (65)	1	N/A	60	60	60	60	0	63	63	3
R95	Multi-Family	B (65)	1	N/A	60	60	60	60	0	63	63	3
R96	Multi-Family	B (65)	1	N/A	64	64	64	64	0	**65**	**65**	1
R97	Multi-Family	B (65)	1	N/A	64	64	**65**	**65**	1	**65**	**65**	1
R98	Multi-Family	B (65)	1	N/A	63	63	63	63	0	**65**	**65**	2
R99	Multi-Family	B (65)	1	N/A	63	63	64	64	1	**65**	**65**	2
R100	Multi-Family	B (65)	1	N/A	**68**	**68**	**69**	**69**	1	**69**	**69**	1
R101	Multi-Family	B (65)	1	N/A	**68**	**68**	**68**	**68**	0	**69**	**69**	1
R102	Multi-Family	B (65)	1	N/A	57	57	58	58	1	60	60	3
R103	Multi-Family	B (65)	1	N/A	57	57	58	58	1	61	61	4
R104	Multi-Family	B (65)	1	N/A	62	62	63	63	1	63	63	1
R105	Multi-Family	B (65)	1	N/A	62	62	63	63	1	63	63	1
R106	Multi-Family	B (65)	1	N/A	47	47	47	47	0	52	52	5
R107	Multi-Family	B (65)	1	N/A	47	47	47	47	0	51	51	4
R108	Multi-Family	B (65)	1	N/A	50	50	50	50	0	54	54	4
R109	Multi-Family	B (65)	1	N/A	49	49	50	50	1	54	54	5
R110	Multi-Family	B (65)	1	N/A	52	52	52	52	0	55	55	3
R111	Multi-Family	B (65)	1	N/A	48	48	49	49	1	51	51	3
R112	Multi-Family	B (65)	1	N/A	55	55	56	56	1	57	57	2

Table 9. Predicted Noise Levels

Receptor ID	Land Use	ODOT Criteria NAAC	No. of Uses	Structure-Borne Leq dB(A)	Existing 2017 Leq TNM dB(A)	Existing 2017 TNM + Structure-Borne Leq dB(A)	No Build 2040 Alternative Leq dB(A)	No Build 2040 TNM + Structure-Borne Leq dB(A)	No Build 2040 Increase over Existing Noise Level dB	Build Alternative Leq dB(A)	Build 2040 TNM + Structure-Borne Leq dB(A)	Build 2040 Increase over Existing Noise Level dB
R113	Multi-Family	B (65)	1	N/A	51	51	51	51	0	53	53	2
R114	Residence	B (65)	1	N/A	64	64	64	64	0	**65**	**65**	1
R115	Residence	B (65)	1	N/A	**65**	**65**	**66**	**66**	1	**66**	**66**	1
R116	Residence	B (65)	1	N/A	**66**	**66**	**67**	**67**	1	**67**	**67**	1
R117	Residence	B (65)	1	N/A	**67**	**67**	**68**	**68**	1	**69**	**69**	2
R118	Residence	B (65)	1	N/A	**69**	**69**	**69**	**69**	0	**70**	**70**	1
R119	Residence	B (65)	1	N/A	**68**	**68**	**69**	**69**	1	**70**	**70**	2
R120	Residence	B (65)	1	N/A	**68**	**68**	**68**	**68**	0	**69**	**69**	1
R121	Residence	B (65)	1	N/A	**65**	**65**	**66**	**66**	1	**67**	**67**	2
R122	Residence	B (65)	1	N/A	**67**	**67**	**68**	**68**	1	**68**	**68**	1
R123	Residence	B (65)	1	N/A	**65**	**65**	**66**	**66**	1	**66**	**66**	1
R124	Residence	B (65)	1	N/A	64	64	**65**	**65**	1	**66**	**66**	2
R125	Residence	B (65)	1	N/A	63	63	63	63	0	64	64	1
R126	Residence	B (65)	1	N/A	**66**	**66**	**66**	**66**	0	**68**	**68**	2
R127	Residence	B (65)	1	N/A	64	64	**65**	**65**	1	**66**	**66**	2
R128	Residence	B (65)	1	N/A	**66**	**66**	**66**	**66**	0	**68**	**68**	2
R129	Residence	B (65)	1	N/A	64	64	**65**	**65**	1	**66**	**66**	2
R130	Residence	B (65)	1	N/A	64	64	**65**	**65**	1	**65**	**65**	1
R131	Residence	B (65)	1	N/A	64	64	64	64	0	**65**	**65**	1
R132	Residence	B (65)	1	N/A	60	60	61	61	1	61	61	1
R133	Residence	B (65)	1	N/A	**65**	**65**	**65**	**65**	0	**67**	**67**	2

Table 9. Predicted Noise Levels

Receptor ID	Land Use	ODOT Criteria NAAC	No. of Uses	Structure-Borne Leq dB(A)	Existing 2017 Leq TNM dB(A)	Existing 2017 TNM + Structure-Borne Leq dB(A)	No Build 2040 Alternative Leq dB(A)	No Build 2040 TNM + Structure-Borne Leq dB(A)	No Build 2040 Increase over Existing Noise Level dB	Build Alternative Leq dB(A)	Build 2040 TNM + Structure-Borne Leq dB(A)	Build 2040 Increase over Existing Noise Level dB
R134	Residence	B (65)	1	N/A	**66**	**66**	**66**	**66**	0	**67**	**67**	1
R135	Residence	B (65)	1	N/A	**65**	**65**	**66**	**66**	1	**67**	**67**	2
R136	Residence	B (65)	1	N/A	**66**	**66**	**67**	**67**	1	**68**	**68**	2
R137	Residence	B (65)	1	N/A	**67**	**67**	**68**	**68**	1	**69**	**69**	2
R138	Residence	B (65)	1	N/A	**66**	**66**	**66**	**66**	0	**68**	**68**	2
R139	Residence	B (65)	1	N/A	**65**	**65**	**66**	**66**	1	**68**	**68**	3
R140	Residence	B (65)	1	N/A	**66**	**66**	**67**	**67**	1	**69**	**69**	3
R141	Residence	B (65)	1	N/A	**67**	**67**	**67**	**67**	0	**68**	**68**	1
R142	Residence	B (65)	1	N/A	**66**	**66**	**67**	**67**	1	**68**	**68**	2
R143	Residence	B (65)	1	N/A	**67**	**67**	**68**	**68**	1	**69**	**69**	2
R144	Residence	B (65)	1	N/A	**68**	**68**	**68**	**68**	0	**70**	**70**	2
R145	Residence	B (65)	1	N/A	**67**	**67**	**67**	**67**	0	**68**	**68**	1
R146	Residence	B (65)	1	N/A	**68**	**68**	**68**	**68**	0	**69**	**69**	1
R147	Residence	B (65)	1	N/A	**66**	**66**	**66**	**66**	0	**68**	**68**	2
R148	Residence	B (65)	1	N/A	**65**	**65**	**66**	**66**	1	**68**	**68**	3
R149	Residence	B (65)	1	N/A	**65**	**65**	**66**	**66**	1	**68**	**68**	3
R150	Residence	B (65)	1	N/A	64	64	**65**	**65**	1	**66**	**66**	2
R151	Residence	B (65)	1	N/A	62	62	63	63	1	64	64	2
R152	Residence	B (65)	1	N/A	63	63	63	63	0	**65**	**65**	2
R153	Residence	B (65)	1	N/A	63	63	63	63	0	**65**	**65**	2
R154	Residence	B (65)	1	N/A	62	62	63	63	1	64	64	2

Table 9. Predicted Noise Levels

Receptor ID	Land Use	ODOT Criteria NAAC	No. of Uses	Structure-Borne Leq dB(A)	Existing 2017 Leq TNM dB(A)	Existing 2017 TNM + Structure-Borne Leq dB(A)	No Build 2040 Alternative Leq dB(A)	No Build 2040 TNM + Structure-Borne Leq dB(A)	No Build 2040 Increase over Existing Noise Level dB	Build Alternative Leq dB(A)	Build 2040 TNM + Structure-Borne Leq dB(A)	Build 2040 Increase over Existing Noise Level dB
R155	Residence	B (65)	1	N/A	64	64	64	64	0	**66**	**66**	2
R156	Residence	B (65)	1	N/A	**65**	**65**	**66**	**66**	1	**67**	**67**	2
R157	Residence	B (65)	1	N/A	63	63	64	64	1	**65**	**65**	2
R158	Residence	B (65)	1	N/A	62	62	63	63	1	64	64	2
R159	Residence	B (65)	1	N/A	59	59	60	60	1	61	61	2
R160	Residence	B (65)	1	N/A	63	63	63	63	0	64	64	1
R161	Residence	B (65)	1	N/A	61	61	62	62	1	63	63	2
R162	Residence	B (65)	1	N/A	60	60	61	61	1	63	63	3
R163	Residence	B (65)	1	N/A	61	61	61	61	0	63	63	2
R164	Residence	B (65)	1	N/A	60	60	61	61	1	62	62	2
R165	Residence	B (65)	1	N/A	62	62	63	63	1	64	64	2
R166	Residence	B (65)	1	N/A	62	62	63	63	1	64	64	2
R167	Residence	B (65)	1	N/A	62	62	62	62	0	64	64	2
R168	Multi-Family	B (65)	1	N/A	**65**	**65**	**65**	**65**	0	**68**	**68**	3
R169	Multi-Family	B (65)	1	N/A	**65**	**65**	**65**	**65**	0	**68**	**68**	3
R170	Multi-Family	B (65)	1	N/A	59	59	60	60	1	60	60	1
R171	Multi-Family	B (65)	1	N/A	64	64	64	64	0	**65**	**65**	1
R172	Multi-Family	B (65)	1	N/A	**70**	**70**	**71**	**71**	1	**71**	**71**	1
R173	Multi-Family	B (65)	1	N/A	59	59	59	59	0	60	60	1
R174	Multi-Family	B (65)	1	N/A	63	63	64	64	1	**65**	**65**	2
R175	Multi-Family	B (65)	1	N/A	**69**	**69**	**70**	**70**	1	**71**	**71**	2

Table 9. Predicted Noise Levels

Receptor ID	Land Use	ODOT Criteria NAAC	No. of Uses	Structure-Borne Leq dB(A)	Existing 2017 Leq TNM dB(A)	Existing 2017 TNM + Structure-Borne Leq dB(A)	No Build 2040 Alternative Leq dB(A)	No Build 2040 TNM + Structure-Borne Leq dB(A)	No Build 2040 Increase over Existing Noise Level dB	Build Alternative Leq dB(A)	Build 2040 TNM + Structure-Borne Leq dB(A)	Build 2040 Increase over Existing Noise Level dB
R176	Multi-Family	B (65)	1	N/A	59	59	60	60	1	60	60	1
R177	Multi-Family	B (65)	1	N/A	**65**	**65**	**65**	**65**	0	**65**	**65**	0
R178	Multi-Family	B (65)	1	N/A	**70**	**70**	**70**	**70**	0	**71**	**71**	1
R179	Multi-Family	B (65)	1	N/A	59	59	59	59	0	60	60	1
R180	Multi-Family	B (65)	1	N/A	64	64	**65**	**65**	1	**65**	**65**	1
R181	Multi-Family	B (65)	1	N/A	**69**	**69**	**70**	**70**	1	**71**	**71**	2
R182	Multi-Family	B (65)	1	N/A	57	57	57	57	0	59	59	2
R183	Multi-Family	B (65)	1	N/A	63	63	63	63	0	62	62	-1
R184	Multi-Family	B (65)	1	N/A	57	57	58	58	1	59	59	2
R185	Multi-Family	B (65)	1	N/A	64	64	**65**	**65**	1	63	63	-1
R186	Multi-Family	B (65)	1	N/A	61	61	61	61	0	63	63	2
R187	Multi-Family	B (65)	1	N/A	**65**	**65**	**66**	**66**	1	**67**	**67**	2
R188	Multi-Family	B (65)	1	N/A	61	61	61	61	0	63	63	2
R189	Multi-Family	B (65)	1	N/A	**65**	**65**	**66**	**66**	1	**67**	**67**	2
R190	Multi-Family	B (65)	1	N/A	60	60	61	61	1	63	63	3
R191	Multi-Family	B (65)	1	N/A	**65**	**65**	**66**	**66**	1	**67**	**67**	2
R192	Multi-Family	B (65)	1	N/A	60	60	60	60	0	63	63	3
R193	Multi-Family	B (65)	1	N/A	**65**	**65**	**66**	**66**	1	**67**	**67**	2
R194	Multi-Family	B (65)	1	N/A	59	59	60	60	1	61	61	2
R195	Multi-Family	B (65)	1	N/A	**65**	**65**	**65**	**65**	0	**67**	**67**	2
R196	Multi-Family	B (65)	1	N/A	59	59	60	60	1	61	61	2

Table 9. Predicted Noise Levels

Receptor ID	Land Use	ODOT Criteria NAAC	No. of Uses	Structure-Borne Leq dB(A)	Existing 2017 Leq TNM dB(A)	Existing 2017 TNM + Structure-Borne Leq dB(A)	No Build 2040 Alternative Leq dB(A)	No Build 2040 TNM + Structure-Borne Leq dB(A)	No Build 2040 Increase over Existing Noise Level dB	Build Alternative Leq dB(A)	Build 2040 TNM + Structure-Borne Leq dB(A)	Build 2040 Increase over Existing Noise Level dB
R197	Multi-Family	B (65)	1	N/A	64	64	**65**	**65**	1	**67**	**67**	3
R198	Multi-Family	B (65)	1	N/A	59	59	59	59	0	60	60	1
R199	Multi-Family	B (65)	1	N/A	63	63	64	64	1	**66**	**66**	3
R200	Multi-Family	B (65)	1	N/A	58	58	59	59	1	60	60	2
R201	Multi-Family	B (65)	1	N/A	63	63	63	63	0	**65**	**65**	2
R202	Multi-Family	B (65)	1	N/A	58	58	59	59	1	60	60	2
R203	Multi-Family	B (65)	1	N/A	63	63	63	63	0	**65**	**65**	2
R204	Multi-Family	B (65)	1	N/A	57	57	58	58	1	59	59	2
R205	Multi-Family	B (65)	1	N/A	61	61	62	62	1	64	64	3
R206	Multi-Family	B (65)	1	N/A	58	58	59	59	1	60	60	2
R207	Multi-Family	B (65)	1	N/A	62	62	63	63	1	**65**	**65**	3
R208	Multi-Family	B (65)	1	N/A	58	58	59	59	1	60	60	2
R209	Multi-Family	B (65)	1	N/A	62	62	63	63	1	**65**	**65**	3
R210	Multi-Family	B (65)	1	N/A	64	64	**65**	**65**	1	**67**	**67**	3
R211	Multi-Family	B (65)	1	N/A	64	64	**65**	**65**	1	**67**	**67**	3
R212	Multi-Family	B (65)	1	N/A	58	58	58	58	0	60	60	2
R213	Multi-Family	B (65)	1	N/A	62	62	63	63	1	**65**	**65**	3
R214	Multi-Family	B (65)	1	N/A	58	58	58	58	0	60	60	2
R215	Multi-Family	B (65)	1	N/A	62	62	63	63	1	**65**	**65**	3
R216	Multi-Family	B (65)	1	N/A	64	64	**65**	**65**	1	**66**	**66**	2
R217	Multi-Family	B (65)	1	N/A	64	64	**65**	**65**	1	**67**	**67**	3

Table 9. Predicted Noise Levels

Receptor ID	Land Use	ODOT Criteria NAAC	No. of Uses	Structure-Borne Leq dB(A)	Existing 2017 Leq TNM dB(A)	Existing 2017 TNM + Structure-Borne Leq dB(A)	No Build 2040 Alternative Leq dB(A)	No Build 2040 TNM + Structure-Borne Leq dB(A)	No Build 2040 Increase over Existing Noise Level dB	Build Alternative Leq dB(A)	Build 2040 TNM + Structure-Borne Leq dB(A)	Build 2040 Increase over Existing Noise Level dB
R218	Multi-Family	B (65)	1	N/A	58	58	58	58	0	60	60	2
R219	Multi-Family	B (65)	1	N/A	62	62	63	63	1	64	64	2
R220	Multi-Family	B (65)	1	N/A	58	58	58	58	0	60	60	2
R221	Multi-Family	B (65)	1	N/A	62	62	63	63	1	**65**	**65**	3
R222	Multi-Family	B (65)	1	N/A	64	64	**65**	**65**	1	**66**	**66**	2
R223	Multi-Family	B (65)	1	N/A	64	64	**65**	**65**	1	**66**	**66**	2
R224	Multi-Family	B (65)	1	N/A	57	57	57	57	0	59	59	2
R225	Multi-Family	B (65)	1	N/A	62	62	62	62	0	64	64	2
R226	Multi-Family	B (65)	1	N/A	**70**	**70**	**70**	**70**	0	**71**	**71**	1
R227	Multi-Family	B (65)	1	N/A	58	58	58	58	0	59	59	1
R228	Multi-Family	B (65)	1	N/A	61	61	62	62	1	64	64	3
R229	Multi-Family	B (65)	1	N/A	**69**	**69**	**69**	**69**	0	**71**	**71**	2
R230	Multi-Family	B (65)	1	N/A	57	57	58	58	1	59	59	2
R231	Multi-Family	B (65)	1	N/A	63	63	64	64	1	64	64	1
R232	Multi-Family	B (65)	1	N/A	**70**	**70**	**71**	**71**	1	**71**	**71**	1
R233	Multi-Family	B (65)	1	N/A	58	58	59	59	1	60	60	2
R234	Multi-Family	B (65)	1	N/A	63	63	63	63	0	64	64	1
R235	Multi-Family	B (65)	1	N/A	**69**	**69**	**70**	**70**	1	**70**	**70**	1
R236	Multi-Family	B (65)	1	N/A	57	57	57	57	0	59	59	2
R237	Multi-Family	B (65)	1	N/A	60	60	61	61	1	62	62	2
R238	Multi-Family	B (65)	1	N/A	56	56	57	57	1	58	58	2

Table 9. Predicted Noise Levels

Receptor ID	Land Use	ODOT Criteria NAAC	No. of Uses	Structure-Borne Leq dB(A)	Existing 2017 Leq TNM dB(A)	Existing 2017 TNM + Structure-Borne Leq dB(A)	No Build 2040 Alternative Leq dB(A)	No Build 2040 TNM + Structure-Borne Leq dB(A)	No Build 2040 Increase over Existing Noise Level dB	Build Alternative Leq dB(A)	Build 2040 TNM + Structure-Borne Leq dB(A)	Build 2040 Increase over Existing Noise Level dB
R239	Multi-Family	B (65)	1	N/A	60	60	60	60	0	62	62	2
R240	Multi-Family	B (65)	1	N/A	57	57	57	57	0	58	58	1
R241	Multi-Family	B (65)	1	N/A	61	61	61	61	0	63	63	2
R242	Multi-Family	B (65)	1	N/A	56	56	57	57	1	58	58	2
R243	Multi-Family	B (65)	1	N/A	60	60	61	61	1	63	63	3
R244	Residence	B (65)	1	N/A	60	60	60	60	0	61	61	1
R245	Residence	B (65)	1	N/A	61	61	62	62	1	63	63	2
R246	Residence	B (65)	1	N/A	61	61	61	61	0	62	62	1
R247	Residence	B (65)	1	N/A	60	60	60	60	0	62	62	2
R248	Residence	B (65)	1	N/A	60	60	60	60	0	62	62	2
R249	Residence	B (65)	1	N/A	59	59	59	59	0	61	61	2
R250	Residence	B (65)	1	N/A	57	57	57	57	0	60	60	3
R251	Residence	B (65)	1	N/A	57	57	57	57	0	59	59	2
R252	Residence	B (65)	1	N/A	57	57	57	57	0	59	59	2
R253	Residence	B (65)	1	N/A	56	56	56	56	0	59	59	3
R254	Residence	B (65)	1	N/A	56	56	57	57	1	59	59	3
R255	Residence	B (65)	1	N/A	56	56	57	57	1	59	59	3
R256	Residence	B (65)	1	N/A	63	63	63	63	0	64	64	1
R257	Residence	B (65)	1	N/A	62	62	62	62	0	62	62	0
R258	Residence	B (65)	1	N/A	61	61	61	61	0	61	61	0
R259	Residence	B (65)	1	N/A	60	60	60	60	0	61	61	1

Table 9. Predicted Noise Levels

Receptor ID	Land Use	ODOT Criteria NAAC	No. of Uses	Structure-Borne Leq dB(A)	Existing 2017 Leq TNM dB(A)	Existing 2017 TNM + Structure-Borne Leq dB(A)	No Build 2040 Alternative Leq dB(A)	No Build 2040 TNM + Structure-Borne Leq dB(A)	No Build 2040 Increase over Existing Noise Level dB	Build Alternative Leq dB(A)	Build 2040 TNM + Structure-Borne Leq dB(A)	Build 2040 Increase over Existing Noise Level dB
R260	Residence	B (65)	1	N/A	59	59	59	59	0	60	60	1
R261	Residence	B (65)	1	N/A	58	58	58	58	0	59	59	1
R262	Residence	B (65)	1	N/A	58	58	58	58	0	59	59	1
R263	Residence	B (65)	1	N/A	57	57	57	57	0	59	59	2
R264	Residence	B (65)	1	N/A	58	58	58	58	0	61	61	3
R265	Residence	B (65)	1	N/A	58	58	58	58	0	61	61	3
R266	Residence	B (65)	1	N/A	55	55	55	55	0	58	58	3
R267	Residence	B (65)	1	N/A	57	57	57	57	0	59	59	2
R268	Residence	B (65)	1	N/A	59	59	60	60	1	62	62	3
R269	Residence	B (65)	1	N/A	61	61	61	61	0	63	63	2
R270	Residence	B (65)	1	N/A	61	61	61	61	0	63	63	2
R271	Residence	B (65)	1	N/A	62	62	63	63	1	**65**	**65**	3
R272	Residence	B (65)	1	N/A	64	64	64	64	0	**66**	**66**	2
R273	Residence	B (65)	1	N/A	**66**	**66**	**66**	**66**	0	**67**	**67**	1
R274	Residence	B (65)	1	N/A	62	62	63	63	1	**65**	**65**	3
R275	Residence	B (65)	1	N/A	63	63	63	63	0	**65**	**65**	2
R276	Residence	B (65)	1	N/A	63	63	63	63	0	**65**	**65**	2
R277	Residence	B (65)	1	N/A	63	63	64	64	1	**65**	**65**	2
R278	Residence	B (65)	1	N/A	63	63	64	64	1	**65**	**65**	2
R279	Residence	B (65)	1	N/A	63	63	64	64	1	**65**	**65**	2
R280	Residence	B (65)	1	N/A	63	63	63	63	0	**65**	**65**	2

Table 9. Predicted Noise Levels

Receptor ID	Land Use	ODOT Criteria NAAC	No. of Uses	Structure-Borne Leq dB(A)	Existing 2017 Leq TNM dB(A)	Existing 2017 TNM + Structure-Borne Leq dB(A)	No Build 2040 Alternative Leq dB(A)	No Build 2040 TNM + Structure-Borne Leq dB(A)	No Build 2040 Increase over Existing Noise Level dB	Build Alternative Leq dB(A)	Build 2040 TNM + Structure-Borne Leq dB(A)	Build 2040 Increase over Existing Noise Level dB
R281	Residence	B (65)	1	N/A	63	63	64	64	1	**66**	**66**	3
R282	Residence	B (65)	1	N/A	64	64	64	64	0	**66**	**66**	2
R283	Residence	B (65)	1	N/A	64	64	**65**	**65**	1	**67**	**67**	3
R284	Residence	B (65)	1	N/A	64	64	64	64	0	**67**	**67**	3
R285	Residence	B (65)	1	N/A	64	64	64	64	0	**67**	**67**	3
R286	Residence	B (65)	1	N/A	62	62	63	63	1	64	64	2
R287	Residence	B (65)	1	N/A	62	62	63	63	1	64	64	2
R288	Residence	B (65)	1	N/A	62	62	63	63	1	**65**	**65**	3
R289	Residence	B (65)	1	N/A	62	62	63	63	1	64	64	2
R290	Residence	B (65)	1	N/A	63	63	63	63	0	**65**	**65**	2
R291	Residence	B (65)	1	N/A	63	63	63	63	0	**65**	**65**	2
R292	Residence	B (65)	1	N/A	62	62	63	63	1	64	64	2
R293	Residence	B (65)	1	N/A	63	63	64	64	1	**65**	**65**	2
R294	Residence	B (65)	1	N/A	62	62	63	63	1	64	64	2
R295	Residence	B (65)	1	N/A	62	62	63	63	1	**65**	**65**	3
R296	Residence	B (65)	1	N/A	63	63	64	64	1	**66**	**66**	3
R297	Residence	B (65)	1	N/A	**65**	**65**	**66**	**66**	1	**69**	**69**	4
R298	Residence	B (65)	1	N/A	**68**	**68**	**69**	**69**	1	**71**	**71**	3
R299	Residence	B (65)	1	N/A	**68**	**68**	**69**	**69**	1	**71**	**71**	3
R300	Residence	B (65)	1	N/A	**68**	**68**	**68**	**68**	0	**70**	**70**	2
R301	Residence	B (65)	1	N/A	**66**	**66**	**67**	**67**	1	**69**	**69**	3

Table 9. Predicted Noise Levels

Receptor ID	Land Use	ODOT Criteria NAAC	No. of Uses	Structure-Borne Leq dB(A)	Existing 2017 Leq TNM dB(A)	Existing 2017 TNM + Structure-Borne Leq dB(A)	No Build 2040 Alternative Leq dB(A)	No Build 2040 TNM + Structure-Borne Leq dB(A)	No Build 2040 Increase over Existing Noise Level dB	Build Alternative Leq dB(A)	Build 2040 TNM + Structure-Borne Leq dB(A)	Build 2040 Increase over Existing Noise Level dB
R302	Residence	B (65)	1	N/A	**68**	**68**	**68**	**68**	0	**70**	**70**	2
R303	Residence	B (65)	1	N/A	**66**	**66**	**67**	**67**	1	**69**	**69**	3
R304	Residence	B (65)	1	N/A	**66**	**66**	**67**	**67**	1	**69**	**69**	3
R305	Residence	B (65)	1	N/A	**65**	**65**	**66**	**66**	1	**68**	**68**	3
R306	Residence	B (65)	1	N/A	62	62	63	63	1	**65**	**65**	3
R307	Residence	B (65)	1	N/A	62	62	62	62	0	64	64	2
R308	Residence	B (65)	1	N/A	61	61	62	62	1	64	64	3
R309	Residence	B (65)	1	N/A	62	62	62	62	0	64	64	2
R310	Residence	B (65)	1	N/A	62	62	63	63	1	**65**	**65**	3
R311	Residence	B (65)	1	N/A	62	62	63	63	1	**65**	**65**	3
R312	Residence	B (65)	1	N/A	62	62	63	63	1	64	64	2
R313	Residence	B (65)	1	N/A	62	62	62	62	0	64	64	2
R314	Residence	B (65)	1	N/A	61	61	62	62	1	63	63	2
R315	Residence	B (65)	1	N/A	62	62	63	63	1	64	64	2
R316	Residence	B (65)	1	N/A	62	62	63	63	1	64	64	2
R317	Residence	B (65)	1	N/A	62	62	63	63	1	64	64	2
R318	Residence	B (65)	1	N/A	62	62	63	63	1	64	64	2
R319	Residence	B (65)	1	N/A	62	62	63	63	1	64	64	2
R320	Residence	B (65)	1	N/A	62	62	63	63	1	64	64	2
R321	Residence	B (65)	1	N/A	62	62	63	63	1	64	64	2
R322	Residence	B (65)	1	N/A	62	62	63	63	1	**65**	**65**	3

Table 9. Predicted Noise Levels

Receptor ID	Land Use	ODOT Criteria NAAC	No. of Uses	Structure-Borne Leq dB(A)	Existing 2017 Leq TNM dB(A)	Existing 2017 TNM + Structure-Borne Leq dB(A)	No Build 2040 Alternative Leq dB(A)	No Build 2040 TNM + Structure-Borne Leq dB(A)	No Build 2040 Increase over Existing Noise Level dB	Build Alternative Leq dB(A)	Build 2040 TNM + Structure-Borne Leq dB(A)	Build 2040 Increase over Existing Noise Level dB
R323	Residence	B (65)	1	N/A	64	64	**65**	**65**	1	**68**	**68**	4
R324	Residence	B (65)	1	N/A	64	64	**65**	**65**	1	**68**	**68**	4
R325	Residence	B (65)	1	N/A	64	64	**65**	**65**	1	**67**	**67**	3
R326	Residence	B (65)	1	N/A	64	64	**65**	**65**	1	**67**	**67**	3
R327	Residence	B (65)	1	N/A	64	64	**65**	**65**	1	**68**	**68**	4
R328	Residence	B (65)	1	N/A	64	64	**65**	**65**	1	**68**	**68**	4
R329	Residence	B (65)	1	N/A	**65**	**65**	**66**	**66**	1	**68**	**68**	3
R330	Residence	B (65)	1	N/A	**65**	**65**	**66**	**66**	1	**68**	**68**	3
R331	Residence	B (65)	1	N/A	62	62	63	63	1	64	64	2
R332	Residence	B (65)	1	N/A	61	61	62	62	1	64	64	3
R333	Residence	B (65)	1	N/A	63	63	64	64	1	**65**	**65**	2
R334	Residence	B (65)	1	N/A	61	61	62	62	1	64	64	3
R335	Residence	B (65)	1	N/A	60	60	61	61	1	63	63	3
R336	Residence	B (65)	1	N/A	61	61	62	62	1	64	64	3
R337	Residence	B (65)	1	N/A	**65**	**65**	**66**	**66**	1	**67**	**67**	2
R338	Residence	B (65)	1	N/A	**65**	**65**	**65**	**65**	0	**67**	**67**	2
R339	Residence	B (65)	1	N/A	**65**	**65**	**65**	**65**	0	**66**	**66**	1
R340	Residence	B (65)	1	N/A	**65**	**65**	**66**	**66**	1	**67**	**67**	2
R341	Residence	B (65)	1	N/A	64	64	64	64	0	**67**	**67**	3
R342	Residence	B (65)	1	N/A	63	63	64	64	1	**67**	**67**	4
R343	Residence	B (65)	1	N/A	**66**	**66**	**66**	**66**	0	**69**	**69**	3

Table 9. Predicted Noise Levels

Receptor ID	Land Use	ODOT Criteria NAAC	No. of Uses	Structure-Borne Leq dB(A)	Existing 2017 Leq TNM dB(A)	Existing 2017 TNM + Structure-Borne Leq dB(A)	No Build 2040 Alternative Leq dB(A)	No Build 2040 TNM + Structure-Borne Leq dB(A)	No Build 2040 Increase over Existing Noise Level dB	Build Alternative Leq dB(A)	Build 2040 TNM + Structure-Borne Leq dB(A)	Build 2040 Increase over Existing Noise Level dB
R344	Residence	B (65)	1	N/A	**67**	**67**	**68**	**68**	1	**70**	**70**	3
R345	Residence	B (65)	1	N/A	**65**	**65**	**66**	**66**	1	**68**	**68**	3
R346	Residence	B (65)	1	N/A	**66**	**66**	**67**	**67**	1	**67**	**67**	1
R347	Residence	B (65)	1	N/A	**67**	**67**	**68**	**68**	1	**67**	**67**	0
R348	Residence	B (65)	1	N/A	**65**	**65**	**66**	**66**	1	**66**	**66**	1
R349	Residence	B (65)	1	N/A	**67**	**67**	**68**	**68**	1	**66**	**66**	-1
R350	Residence	B (65)	1	N/A	**68**	**68**	**69**	**69**	1	**67**	**67**	-1
R351	Residence	B (65)	1	N/A	**68**	**68**	**69**	**69**	1	**67**	**67**	-1
R352	Residence	B (65)	1	N/A	**68**	**68**	**69**	**69**	1	**67**	**67**	-1
R353	Residence	B (65)	1	N/A	61	61	62	62	1	64	64	3
R354	Residence	B (65)	1	N/A	56	56	57	57	1	59	59	3
R355	Residence	B (65)	1	N/A	59	59	60	60	1	62	62	3
R356	Residence	B (65)	1	N/A	58	58	59	59	1	61	61	3
R357	Residence	B (65)	1	N/A	55	55	56	56	1	57	57	2
R358	Residence	B (65)	1	N/A	57	57	58	58	1	59	59	2
R359	Residence	B (65)	1	N/A	57	57	58	58	1	58	58	1
R360	Residence	B (65)	1	N/A	**67**	**67**	**68**	**68**	1	**67**	**67**	0
R361	Residence	B (65)	1	N/A	**66**	**66**	**67**	**67**	1	**67**	**67**	1
R362	Residence	B (65)	1	N/A	**66**	**66**	**67**	**67**	1	**67**	**67**	1
R363	Residence	B (65)	1	N/A	**66**	**66**	**67**	**67**	1	**66**	**66**	0
R364	Residence	B (65)	1	N/A	**66**	**66**	**67**	**67**	1	**66**	**66**	0

Table 9. Predicted Noise Levels

Receptor ID	Land Use	ODOT Criteria NAAC	No. of Uses	Structure-Borne Leq dB(A)	Existing 2017 Leq TNM dB(A)	Existing 2017 TNM + Structure-Borne Leq dB(A)	No Build 2040 Alternative Leq dB(A)	No Build 2040 TNM + Structure-Borne Leq dB(A)	No Build 2040 Increase over Existing Noise Level dB	Build Alternative Leq dB(A)	Build 2040 TNM + Structure-Borne Leq dB(A)	Build 2040 Increase over Existing Noise Level dB
R365	Residence	B (65)	1	N/A	55	55	56	56	1	57	57	2
R366	Residence	B (65)	1	N/A	55	55	55	55	0	57	57	2
R367	Residence	B (65)	1	N/A	55	55	56	56	1	55	55	0
R368	Residence	B (65)	1	N/A	51	51	51	51	0	54	54	3
R369	Residence	B (65)	1	N/A	50	50	51	51	1	52	52	2
R370	Residence	B (65)	1	N/A	51	51	52	52	1	53	53	2
R371	Residence	B (65)	1	N/A	**66**	**66**	**67**	**67**	1	**66**	**66**	0
R372	Residence	B (65)	1	N/A	**66**	**66**	**67**	**67**	1	**66**	**66**	0
R373	Residence	B (65)	1	N/A	**69**	**69**	**70**	**70**	1	**71**	**71**	2
R374	Residence	B (65)	1	N/A	**70**	**70**	**71**	**71**	1	**72**	**72**	2
R375	Residence	B (65)	1	N/A	**70**	**70**	**71**	**71**	1	**72**	**72**	2
R376	Residence	B (65)	1	N/A	**70**	**70**	**71**	**71**	1	**72**	**72**	2
R377	Residence	B (65)	1	N/A	**69**	**69**	**70**	**70**	1	**71**	**71**	2
R378	Residence	B (65)	1	N/A	**71**	**71**	**71**	**71**	0	**72**	**72**	1
R379	Residence	B (65)	1	N/A	**68**	**68**	**69**	**69**	1	**71**	**71**	3
R380	Residence	B (65)	1	N/A	**70**	**70**	**71**	**71**	1	**72**	**72**	2
R381	Residence	B (65)	1	N/A	**67**	**67**	**68**	**68**	1	**70**	**70**	3
R382	Residence	B (65)	1	N/A	**66**	**66**	**67**	**67**	1	**69**	**69**	3
R383	Residence	B (65)	1	N/A	**65**	**65**	**66**	**66**	1	**67**	**67**	2
R384	Residence	B (65)	1	N/A	63	63	64	64	1	**66**	**66**	3
R385	Residence	B (65)	1	N/A	64	64	**65**	**65**	1	**66**	**66**	2

Table 9. Predicted Noise Levels

Receptor ID	Land Use	ODOT Criteria NAAC	No. of Uses	Structure-Borne Leq dB(A)	Existing 2017 Leq TNM dB(A)	Existing 2017 TNM + Structure-Borne Leq dB(A)	No Build 2040 Alternative Leq dB(A)	No Build 2040 TNM + Structure-Borne Leq dB(A)	No Build 2040 Increase over Existing Noise Level dB	Build Alternative Leq dB(A)	Build 2040 TNM + Structure-Borne Leq dB(A)	Build 2040 Increase over Existing Noise Level dB
R386	Residence	B (65)	1	N/A	**65**	**65**	**66**	**66**	1	**68**	**68**	3
R387	Residence	B (65)	1	N/A	59	59	60	60	1	62	62	3
R388	Multi-Family	B (65)	1	N/A	61	61	62	62	1	63	63	2
R389	Multi-Family	B (65)	1	N/A	61	61	62	62	1	64	64	3
R390	Multi-Family	B (65)	1	N/A	59	59	59	59	0	61	61	2
R391	Multi-Family	B (65)	1	N/A	58	58	58	58	0	60	60	2
R392	Multi-Family	B (65)	1	N/A	61	61	62	62	1	64	64	3
R393	Multi-Family	B (65)	1	N/A	62	62	63	63	1	64	64	2
R394	Multi-Family	B (65)	1	N/A	60	60	61	61	1	63	63	3
R395	Multi-Family	B (65)	1	N/A	62	62	63	63	1	**65**	**65**	3
R396	Multi-Family	B (65)	1	N/A	61	61	62	62	1	63	63	2
R397	Multi-Family	B (65)	1	N/A	61	61	61	61	0	63	63	2
R398	Multi-Family	B (65)	1	N/A	62	62	63	63	1	64	64	2
R399	Multi-Family	B (65)	1	N/A	62	62	63	63	1	64	64	2
R400	Residence	B (65)	1	N/A	58	58	59	59	1	61	61	3
R401	Residence	B (65)	1	N/A	57	57	58	58	1	60	60	3
R402	Residence	B (65)	1	N/A	56	56	57	57	1	58	58	2
R403	Residence	B (65)	1	N/A	57	57	58	58	1	60	60	3
R404	Residence	B (65)	1	N/A	**65**	**65**	**66**	**66**	1	**68**	**68**	3
R405	Residence	B (65)	1	N/A	**72**	**72**	**72**	**72**	0	**73**	**73**	1
R406	Residence	B (65)	1	N/A	52	52	53	53	1	53	53	1

Table 9. Predicted Noise Levels

Receptor ID	Land Use	ODOT Criteria NAAC	No. of Uses	Structure-Borne Leq dB(A)	Existing 2017 Leq TNM dB(A)	Existing 2017 TNM + Structure-Borne Leq dB(A)	No Build 2040 Alternative Leq dB(A)	No Build 2040 TNM + Structure-Borne Leq dB(A)	No Build 2040 Increase over Existing Noise Level dB	Build Alternative Leq dB(A)	Build 2040 TNM + Structure-Borne Leq dB(A)	Build 2040 Increase over Existing Noise Level dB
R407	Residence	B (65)	1	N/A	52	52	53	53	1	53	53	1
R408	Residence	B (65)	1	N/A	52	52	53	53	1	53	53	1
R409	Residence	B (65)	1	N/A	53	53	53	53	0	54	54	1
R410	Residence	B (65)	1	N/A	54	54	55	55	1	56	56	2
R411	Residence	B (65)	1	N/A	54	54	55	55	1	55	55	1
R412	Residence	B (65)	1	N/A	54	54	55	55	1	56	56	2
R413	Residence	B (65)	1	N/A	55	55	56	56	1	57	57	2
R414	Residence	B (65)	1	N/A	54	54	54	54	0	57	57	3
R415	Residence	B (65)	1	N/A	54	54	55	55	1	58	58	4
R416	Residence	B (65)	1	N/A	57	57	58	58	1	61	61	4
R417	Residence	B (65)	1	N/A	53	53	54	54	1	56	56	3
R418	Residence	B (65)	1	N/A	53	53	54	54	1	56	56	3
R419	Residence	B (65)	1	N/A	53	53	54	54	1	56	56	3
R420	Residence	B (65)	1	N/A	53	53	54	54	1	56	56	3
R421	Residence	B (65)	1	N/A	55	55	56	56	1	59	59	4
R422	Residence	B (65)	1	N/A	61	61	62	62	1	64	64	3
R423	Residence	B (65)	1	N/A	62	62	62	62	0	**65**	**65**	3
R424	Residence	B (65)	1	N/A	59	59	60	60	1	63	63	4
R425	Residence	B (65)	1	N/A	59	59	60	60	1	63	63	4
R426	Residence	B (65)	1	N/A	62	62	63	63	1	**65**	**65**	3
R427	Residence	B (65)	1	N/A	63	63	64	64	1	**66**	**66**	3

Table 9. Predicted Noise Levels

Receptor ID	Land Use	ODOT Criteria NAAC	No. of Uses	Structure-Borne Leq dB(A)	Existing 2017 Leq TNM dB(A)	Existing 2017 TNM + Structure-Borne Leq dB(A)	No Build 2040 Alternative Leq dB(A)	No Build 2040 TNM + Structure-Borne Leq dB(A)	No Build 2040 Increase over Existing Noise Level dB	Build Alternative Leq dB(A)	Build 2040 TNM + Structure-Borne Leq dB(A)	Build 2040 Increase over Existing Noise Level dB
R428	Residence	B (65)	1	N/A	58	58	59	59	1	62	62	4
R429	Residence	B (65)	1	N/A	63	63	64	64	1	**65**	**65**	2
R430	Residence	B (65)	1	N/A	56	56	57	57	1	59	59	3
R431	Residence	B (65)	1	N/A	57	57	58	58	1	60	60	3
R432	Residence	B (65)	1	N/A	63	63	64	64	1	**66**	**66**	3
R433	Residence	B (65)	1	N/A	61	61	62	62	1	64	64	3
R434	Residence	B (65)	1	N/A	54	54	55	55	1	57	57	3
R435	Residence	B (65)	1	N/A	53	53	54	54	1	54	54	1
R436	Residence	B (65)	1	N/A	60	60	61	61	1	62	62	2
R437	Residence	B (65)	1	N/A	53	53	54	54	1	54	54	1
R438	Residence	B (65)	1	N/A	53	53	54	54	1	53	53	0
R439	Residence	B (65)	1	N/A	54	54	54	54	0	53	53	-1
R440	Residence	B (65)	1	N/A	**69**	**69**	**70**	**70**	1	**70**	**70**	1
R441	Residence	B (65)	1	N/A	59	59	60	60	1	63	63	4
R442	Multi-Family	B (65)	1	N/A	**68**	**68**	**69**	**69**	1	**69**	**69**	1
R443	Multi-Family	B (65)	1	N/A	**69**	**69**	**70**	**70**	1	**69**	**69**	0
R444	Multi-Family	B (65)	1	N/A	**69**	**69**	**70**	**70**	1	**67**	**67**	-2
R445	Multi-Family	B (65)	1	N/A	**69**	**69**	**70**	**70**	1	**66**	**66**	-3
R446	Multi-Family	B (65)	1	N/A	**71**	**71**	**72**	**72**	1	**72**	**72**	1
R447	Multi-Family	B (65)	1	N/A	**72**	**72**	**73**	**73**	1	**73**	**73**	1
R448	Multi-Family	B (65)	1	N/A	**72**	**72**	**73**	**73**	1	**73**	**73**	1

Table 9. Predicted Noise Levels

Receptor ID	Land Use	ODOT Criteria NAAC	No. of Uses	Structure-Borne Leq dB(A)	Existing 2017 Leq TNM dB(A)	Existing 2017 TNM + Structure-Borne Leq dB(A)	No Build 2040 Alternative Leq dB(A)	No Build 2040 TNM + Structure-Borne Leq dB(A)	No Build 2040 Increase over Existing Noise Level dB	Build Alternative Leq dB(A)	Build 2040 TNM + Structure-Borne Leq dB(A)	Build 2040 Increase over Existing Noise Level dB
R449	Multi-Family	B (65)	1	N/A	**72**	**72**	**73**	**73**	1	**73**	**73**	1
R450	Multi-Family	B (65)	1	N/A	62	62	63	63	1	63	63	1
R451	Multi-Family	B (65)	1	N/A	63	63	64	64	1	64	64	1
R452	Multi-Family	B (65)	1	N/A	**67**	**67**	**67**	**67**	0	**67**	**67**	0
R453	Multi-Family	B (65)	1	N/A	**69**	**69**	**70**	**70**	1	**69**	**69**	0
R454	Multi-Family	B (65)	1	N/A	58	58	59	59	1	60	60	2
R455	Multi-Family	B (65)	1	N/A	58	58	59	59	1	60	60	2
R456	Multi-Family	B (65)	1	N/A	58	58	59	59	1	60	60	2
R457	Multi-Family	B (65)	1	N/A	61	61	62	62	1	63	63	2
R458	Multi-Family	B (65)	1	N/A	61	61	62	62	1	63	63	2
R459	Multi-Family	B (65)	1	N/A	61	61	62	62	1	63	63	2
R460	Residence	B (65)	1	N/A	55	55	56	56	1	56	56	1
R461	Residence	B (65)	1	N/A	56	56	58	58	2	58	58	2
R462	Residence	B (65)	1	N/A	55	55	56	56	1	57	57	2
R463	Residence	B (65)	1	N/A	56	56	57	57	1	57	57	1
R464	Residence	B (65)	1	N/A	57	57	58	58	1	58	58	1
R465	Residence	B (65)	1	N/A	57	57	58	58	1	59	59	2
R466	School (Atlas Immersion Academy)	C (65)	1	N/A	**65**	**65**	**66**	**66**	1	**66**	**66**	1
R467	Multi-Family	B (65)	1	N/A	**67**	**67**	**69**	**69**	2	**70**	**70**	3
R468	Multi-Family	B (65)	1	N/A	**68**	**68**	**70**	**70**	2	**71**	**71**	3
R469	Multi-Family	B (65)	1	N/A	**66**	**66**	**67**	**67**	1	**69**	**69**	3

Table 9. Predicted Noise Levels

Receptor ID	Land Use	ODOT Criteria NAAC	No. of Uses	Structure-Borne Leq dB(A)	Existing 2017 Leq TNM dB(A)	Existing 2017 TNM + Structure-Borne Leq dB(A)	No Build 2040 Alternative Leq dB(A)	No Build 2040 TNM + Structure-Borne Leq dB(A)	No Build 2040 Increase over Existing Noise Level dB	Build Alternative Leq dB(A)	Build 2040 TNM + Structure-Borne Leq dB(A)	Build 2040 Increase over Existing Noise Level dB
R470	Multi-Family	B (65)	1	N/A	**67**	**67**	**68**	**68**	1	**70**	**70**	3
R471	Multi-Family	B (65)	1	N/A	**68**	**68**	**69**	**69**	1	**70**	**70**	2
R472	Multi-Family	B (65)	1	N/A	**65**	**65**	**66**	**66**	1	**68**	**68**	3
R473	Multi-Family	B (65)	1	N/A	**66**	**66**	**67**	**67**	1	**69**	**69**	3
R474	Multi-Family	B (65)	1	N/A	**67**	**67**	**68**	**68**	1	**70**	**70**	3
R475	Multi-Family	B (65)	1	N/A	64	64	**65**	**65**	1	**67**	**67**	3
R476	Multi-Family	B (65)	1	N/A	**65**	**65**	**66**	**66**	1	**68**	**68**	3
R477	Multi-Family	B (65)	1	N/A	**65**	**65**	**66**	**66**	1	**68**	**68**	3
R478	Multi-Family	B (65)	1	N/A	63	63	64	64	1	**66**	**66**	3
R479	Multi-Family	B (65)	1	N/A	64	64	**65**	**65**	1	**67**	**67**	3
R480	Multi-Family	B (65)	1	N/A	64	64	**65**	**65**	1	**67**	**67**	3
R481	Multi-Family	B (65)	1	N/A	62	62	64	64	2	**65**	**65**	3
R482	Multi-Family	B (65)	1	N/A	63	63	**65**	**65**	2	**66**	**66**	3
R483	Multi-Family	B (65)	1	N/A	64	64	**65**	**65**	1	**66**	**66**	2
R484	Residence	B (65)	1	N/A	56	56	57	57	1	61	61	5
R485	Residence	B (65)	1	N/A	55	55	56	56	1	60	60	5
R486	Residence	B (65)	1	N/A	54	54	55	55	1	58	58	4
R487	Residence	B (65)	1	N/A	54	54	55	55	1	58	58	4
R488	Residence	B (65)	1	N/A	54	54	55	55	1	57	57	3
R489	Residence	B (65)	1	N/A	**72**	**72**	**73**	**73**	1	**74**	**74**	2
R490	Residence	B (65)	1	N/A	**72**	**72**	**73**	**73**	1	**74**	**74**	2

Table 9. Predicted Noise Levels

Receptor ID	Land Use	ODOT Criteria NAAC	No. of Uses	Structure-Borne Leq dB(A)	Existing 2017 Leq TNM dB(A)	Existing 2017 TNM + Structure-Borne Leq dB(A)	No Build 2040 Alternative Leq dB(A)	No Build 2040 TNM + Structure-Borne Leq dB(A)	No Build 2040 Increase over Existing Noise Level dB	Build Alternative Leq dB(A)	Build 2040 TNM + Structure-Borne Leq dB(A)	Build 2040 Increase over Existing Noise Level dB
R491	Residence	B (65)	1	N/A	**69**	**69**	**70**	**70**	1	**71**	**71**	2
R492	Residence	B (65)	1	N/A	**67**	**67**	**68**	**68**	1	**69**	**69**	2
R493	Residence	B (65)	1	N/A	64	64	**65**	**65**	1	**66**	**66**	2
R494	Residence	B (65)	1	N/A	63	63	64	64	1	**65**	**65**	2
R495	Residence	B (65)	1	N/A	62	62	62	62	0	64	64	2
R496	Residence	B (65)	1	N/A	**68**	**68**	**69**	**69**	1	**70**	**70**	2
R497	Residence	B (65)	1	N/A	**67**	**67**	**68**	**68**	1	**69**	**69**	2
R498	Residence	B (65)	1	N/A	64	64	**65**	**65**	1	**66**	**66**	2
R499	Residence	B (65)	1	N/A	62	62	63	63	1	**65**	**65**	3
R500	Residence	B (65)	1	N/A	61	61	62	62	1	63	63	2
R501	Residence	B (65)	1	N/A	**70**	**70**	**71**	**71**	1	**72**	**72**	2
R502	Residence	B (65)	1	N/A	**69**	**69**	**70**	**70**	1	**71**	**71**	2
R503	Residence	B (65)	1	N/A	**69**	**69**	**70**	**70**	1	**71**	**71**	2
R504	Residence	B (65)	1	N/A	**70**	**70**	**71**	**71**	1	**72**	**72**	2
R505	Residence	B (65)	1	N/A	**70**	**70**	**70**	**70**	0	**72**	**72**	2
R506	Residence	B (65)	1	N/A	**69**	**69**	**70**	**70**	1	**72**	**72**	3
R507	Residence	B (65)	1	N/A	63	63	64	64	1	**65**	**65**	2
R508	Residence	B (65)	1	N/A	61	61	62	62	1	63	63	2
R509	Residence	B (65)	1	N/A	62	62	63	63	1	**65**	**65**	3
R510	Residence	B (65)	1	N/A	63	63	64	64	1	**65**	**65**	2
R511	Residence	B (65)	1	N/A	62	62	63	63	1	64	64	2

Table 9. Predicted Noise Levels

Receptor ID	Land Use	ODOT Criteria NAAC	No. of Uses	Structure-Borne Leq dB(A)	Existing 2017 Leq TNM dB(A)	Existing 2017 TNM + Structure-Borne Leq dB(A)	No Build 2040 Alternative Leq dB(A)	No Build 2040 TNM + Structure-Borne Leq dB(A)	No Build 2040 Increase over Existing Noise Level dB	Build Alternative Leq dB(A)	Build 2040 TNM + Structure-Borne Leq dB(A)	Build 2040 Increase over Existing Noise Level dB
R512	Residence	B (65)	1	N/A	61	61	62	62	1	64	64	3
R513	Residence	B (65)	1	N/A	61	61	62	62	1	63	63	2
R514	Residence	B (65)	1	N/A	60	60	61	61	1	62	62	2
R515	Residence	B (65)	1	N/A	58	58	59	59	1	60	60	2
R516	Residence	B (65)	1	N/A	58	58	59	59	1	60	60	2
R517	Residence	B (65)	1	N/A	57	57	58	58	1	59	59	2
R518	Residence	B (65)	1	N/A	60	60	60	60	0	61	61	1
R519	Residence	B (65)	1	N/A	54	54	55	55	1	56	56	2
R520	Residence	B (65)	1	N/A	53	53	54	54	1	55	55	2
R521	Residence	B (65)	1	N/A	**65**	**65**	**66**	**66**	1	**67**	**67**	2
R522	Residence	B (65)	1	N/A	**65**	**65**	**66**	**66**	1	**67**	**67**	2
R523	Residence	B (65)	1	N/A	64	64	**65**	**65**	1	**66**	**66**	2
R524	Residence	B (65)	1	N/A	64	64	**65**	**65**	1	**66**	**66**	2
R525	Residence	B (65)	1	N/A	63	63	**65**	**65**	2	**65**	**65**	2
R526	Residence	B (65)	1	N/A	59	59	60	60	1	61	61	2
R527	Multi-Family	B (65)	1	N/A	**69**	**69**	**70**	**70**	1	**72**	**72**	3
R528	Multi-Family	B (65)	1	N/A	**68**	**68**	**69**	**69**	1	**71**	**71**	3
R529	Multi-Family	B (65)	1	N/A	**67**	**67**	**68**	**68**	1	**69**	**69**	2
R530	Multi-Family	B (65)	1	N/A	**70**	**70**	**70**	**70**	0	**73**	**73**	3
R531	Multi-Family	B (65)	1	N/A	**69**	**69**	**70**	**70**	1	**71**	**71**	2
R532	Multi-Family	B (65)	1	N/A	**68**	**68**	**68**	**68**	0	**70**	**70**	2

Table 9. Predicted Noise Levels

Receptor ID	Land Use	ODOT Criteria NAAC	No. of Uses	Structure-Borne Leq dB(A)	Existing 2017 Leq TNM dB(A)	Existing 2017 TNM + Structure-Borne Leq dB(A)	No Build 2040 Alternative Leq dB(A)	No Build 2040 TNM + Structure-Borne Leq dB(A)	No Build 2040 Increase over Existing Noise Level dB	Build Alternative Leq dB(A)	Build 2040 TNM + Structure-Borne Leq dB(A)	Build 2040 Increase over Existing Noise Level dB
R533	Multi-Family	B (65)	1	N/A	54	54	57	57	3	56	56	2
R534	Multi-Family	B (65)	1	N/A	60	60	61	61	1	62	62	2
R535	Multi-Family	B (65)	1	N/A	53	53	56	56	3	55	55	2
R536	Residence	B (65)	1	N/A	62	62	64	64	2	64	64	2
R537	Residence	B (65)	1	54	63	64	63	63	-1	64	64	0
R538	Residence	B (65)	1	53	61	62	**66**	**66**	4	62	62	0
R539	Residence	B (65)	1	52	59	60	61	62	2	60	61	1
R540	Residence	B (65)	1	52	59	60	60	61	1	60	61	1
R541	Residence	B (65)	1	53	59	60	60	61	1	60	61	1
R542	Residence	B (65)	1	53	59	60	60	61	1	60	61	1
R543	Residence	B (65)	1	53	59	60	60	61	1	60	61	1
R544	Residence	B (65)	1	53	59	60	59	60	0	60	61	1
R545	Residence	B (65)	1	53	59	60	60	61	1	61	62	2
R546	Residence	B (65)	1	53	61	62	62	62	0	63	63	1
R547	Residence	B (65)	1	53	60	61	61	62	1	62	63	2
R548	Residence	B (65)	1	54	61	62	61	62	0	62	63	1
R549	Residence	B (65)	1	54	61	61	61	62	1	62	63	2
R550	Residence	B (65)	1	55	60	61	61	62	1	62	63	2
R551	Residence	B (65)	1	56	61	62	62	63	1	63	64	2
R552	Residence	B (65)	1	56	62	63	63	64	1	64	**65**	2
R553	Residence	B (65)	1	57	63	64	64	**65**	1	**65**	**66**	2

Table 9. Predicted Noise Levels

Receptor ID	Land Use	ODOT Criteria NAAC	No. of Uses	Structure-Borne Leq dB(A)	Existing 2017 Leq TNM dB(A)	Existing 2017 TNM + Structure-Borne Leq dB(A)	No Build 2040 Alternative Leq dB(A)	No Build 2040 TNM + Structure-Borne Leq dB(A)	No Build 2040 Increase over Existing Noise Level dB	Build Alternative Leq dB(A)	Build 2040 TNM + Structure-Borne Leq dB(A)	Build 2040 Increase over Existing Noise Level dB
R554	Residence	B (65)	1	58	60	62	61	63	1	62	63	1
R555	Residence	B (65)	1	60	58	62	59	63	1	58	62	0
R556	Residence	B (65)	1	59	62	64	62	64	0	62	64	0
R557	Residence	B (65)	1	57	64	**65**	64	**65**	0	64	**65**	0
R558	Residence	B (65)	1	58	59	62	60	62	0	59	62	0
R559	Residence	B (65)	1	59	59	62	59	62	0	59	62	0
R560	Residence	B (65)	1	61	61	64	61	64	0	60	63	-1
R561	Residence	B (65)	1	59	63	64	62	64	0	62	64	0
R562	Residence	B (65)	1	57	64	**65**	64	**65**	0	64	**65**	0
R563	Residence	B (65)	1	56	64	**65**	64	**65**	0	64	**65**	0
R564	Residence	B (65)	1	55	64	64	64	**65**	1	64	**65**	1
R565	Residence	B (65)	1	55	63	63	63	64	1	62	63	0
R566	Residence	B (65)	1	55	63	63	63	64	1	62	63	0
R567	Residence	B (65)	1	55	62	63	62	63	0	62	63	0
R568	Residence	B (65)	1	55	62	62	62	63	1	62	63	1
R569	Residence	B (65)	1	54	63	63	63	63	0	64	64	1
R570	Residence	B (65)	1	53	62	63	63	63	0	63	63	0
R571	Residence	B (65)	1	55	64	64	64	**65**	1	**65**	**65**	1
R572	Residence	B (65)	1	55	63	64	64	64	0	64	64	0
R573	Best Western (Pool)	E (70)	1	54	60	61	61	62	1	61	62	1
R574	Best Western (Outdoor Seating)	E (70)	1	54	59	60	60	61	1	61	62	2

Table 9. Predicted Noise Levels

Receptor ID	Land Use	ODOT Criteria NAAC	No. of Uses	Structure-Borne Leq dB(A)	Existing 2017 Leq TNM dB(A)	Existing 2017 TNM + Structure-Borne Leq dB(A)	No Build 2040 Alternative Leq dB(A)	No Build 2040 TNM + Structure-Borne Leq dB(A)	No Build 2040 Increase over Existing Noise Level dB	Build Alternative Leq dB(A)	Build 2040 TNM + Structure-Borne Leq dB(A)	Build 2040 Increase over Existing Noise Level dB
R575	Best Western	E (70)	1	58	**65**	66	**65**	66	0	**66**	67	1
R693	Residence	B (65)	1	N/A	**65**	**65**	**65**	**65**	0	**66**	**66**	1
R694	Residence	B (65)	1	N/A	**66**	**66**	**66**	**66**	0	**67**	**67**	1
R695	Residence	B (65)	1	N/A	**72**	**72**	**72**	**72**	0	**73**	**73**	1
R696	Residence	B (65)	1	N/A	**68**	**68**	**69**	**69**	1	**69**	**69**	1
R697	Residence	B (65)	1	N/A	**67**	**67**	**68**	**68**	1	**68**	**68**	1
R698	Residence	B (65)	1	N/A	**66**	**66**	**66**	**66**	0	**67**	**67**	1
R699	Residence	B (65)	1	N/A	**74**	**74**	**74**	**74**	0	**75**	**75**	1
R700	Jon Storm Park	C (65)	1	66	**66**	**69**	**65**	**68**	-1	64	**68**	-1
R701	Jon Storm Park	C (65)	1	64	**67**	**68**	**66**	**68**	0	**67**	**69**	1
R702	Jon Storm Park	C (65)	1	63	**67**	**68**	**66**	**68**	0	**68**	**69**	1
R703	Jon Storm Park	C (65)	1	62	**66**	**67**	**66**	**67**	0	**68**	**69**	2
R704	Multi-Family	B (65)	1	N/A	**67**	**67**	**68**	**68**	1	**69**	**69**	2
R705	Multi-Family	B (65)	1	N/A	**67**	**67**	**68**	**68**	1	**69**	**69**	2
R706	Multi-Family	B (65)	1	N/A	**68**	**68**	**69**	**69**	1	**70**	**70**	2
R707	Multi-Family	B (65)	1	N/A	**68**	**68**	**69**	**69**	1	**70**	**70**	2
R708	Multi-Family	B (65)	1	N/A	57	57	58	58	1	58	58	1
R709	Multi-Family	B (65)	1	N/A	54	54	55	55	1	56	56	2
R710	Multi-Family	B (65)	1	N/A	**67**	**67**	**67**	**67**	0	**68**	**68**	1
R711	Multi-Family	B (65)	1	N/A	**66**	**66**	**66**	**66**	0	**67**	**67**	1
R712	Multi-Family	B (65)	1	N/A	48	48	49	49	1	49	49	1

Table 9. Predicted Noise Levels

Receptor ID	Land Use	ODOT Criteria NAAC	No. of Uses	Structure-Borne Leq dB(A)	Existing 2017 Leq TNM dB(A)	Existing 2017 TNM + Structure-Borne Leq dB(A)	No Build 2040 Alternative Leq dB(A)	No Build 2040 TNM + Structure-Borne Leq dB(A)	No Build 2040 Increase over Existing Noise Level dB	Build Alternative Leq dB(A)	Build 2040 TNM + Structure-Borne Leq dB(A)	Build 2040 Increase over Existing Noise Level dB
R713	Multi-Family	B (65)	1	N/A	51	51	52	52	1	53	53	2
R714	Multi-Family	B (65)	1	N/A	55	55	56	56	1	56	56	1
R715	Multi-Family	B (65)	1	N/A	56	56	56	56	0	57	57	1
R716	Multi-Family	B (65)	1	N/A	43	43	45	45	2	45	45	2
R717	Multi-Family	B (65)	1	N/A	43	43	45	45	2	45	45	2
R718	Multi-Family	B (65)	1	N/A	44	44	45	45	1	46	46	2
R719	Multi-Family	B (65)	1	N/A	45	45	46	46	1	46	46	1
R720	Multi-Family	B (65)	1	N/A	61	61	62	62	1	63	63	2
R721	Multi-Family	B (65)	1	N/A	60	60	61	61	1	61	61	1
R722	Multi-Family	B (65)	1	N/A	58	58	59	59	1	59	59	1
R723	Multi-Family	B (65)	1	N/A	57	57	58	58	1	59	59	2
R724	Multi-Family	B (65)	1	N/A	50	50	51	51	1	52	52	2
R725	Multi-Family	B (65)	1	N/A	49	49	51	51	2	52	52	3
R726	Multi-Family	B (65)	1	N/A	49	49	50	50	1	51	51	2
R727	Multi-Family	B (65)	1	N/A	46	46	47	47	1	48	48	2
R728	Multi-Family	B (65)	1	N/A	45	45	46	46	1	47	47	2
R729	Multi-Family	B (65)	1	N/A	45	45	46	46	1	46	46	1
R730	Multi-Family	B (65)	1	N/A	51	51	51	51	0	53	53	2
R731	Multi-Family	B (65)	1	N/A	52	52	52	52	0	54	54	2
R732	Multi-Family	B (65)	1	N/A	52	52	52	52	0	53	53	1
R733	Multi-Family	B (65)	1	N/A	52	52	52	52	0	53	53	1

Table 9. Predicted Noise Levels

Receptor ID	Land Use	ODOT Criteria NAAC	No. of Uses	Structure-Borne Leq dB(A)	Existing 2017 Leq TNM dB(A)	Existing 2017 TNM + Structure-Borne Leq dB(A)	No Build 2040 Alternative Leq dB(A)	No Build 2040 TNM + Structure-Borne Leq dB(A)	No Build 2040 Increase over Existing Noise Level dB	Build Alternative Leq dB(A)	Build 2040 TNM + Structure-Borne Leq dB(A)	Build 2040 Increase over Existing Noise Level dB
R734	Multi-Family	B (65)	1	N/A	44	44	45	45	1	46	46	2
R735	Multi-Family	B (65)	1	N/A	44	44	45	45	1	46	46	2
R736	Multi-Family	B (65)	1	N/A	56	56	57	57	1	57	57	1
R737	Multi-Family	B (65)	1	N/A	56	56	57	57	1	57	57	1
R738	Multi-Family	B (65)	1	N/A	54	54	55	55	1	56	56	2
R739	Multi-Family	B (65)	1	N/A	54	54	55	55	1	56	56	2
R740	Multi-Family	B (65)	1	N/A	59	59	60	60	1	60	60	1
R741	Multi-Family	B (65)	1	N/A	54	54	55	55	1	56	56	2
R742	Multi-Family	B (65)	1	N/A	52	52	53	53	1	53	53	1
R743	Multi-Family	B (65)	1	N/A	51	51	53	53	2	53	53	2
R744	Multi-Family	B (65)	1	N/A	51	51	52	52	1	53	53	2
R745	Multi-Family	B (65)	1	N/A	51	51	52	52	1	53	53	2
R746	Pool at Apts.	C (65)	1	N/A	51	51	52	52	1	53	53	2
R747	Multi-Family	B (65)	1	N/A	51	51	52	52	1	53	53	2
R748	Multi-Family	B (65)	1	N/A	53	53	54	54	1	55	55	2
R749	Multi-Family	B (65)	1	N/A	**69**	**69**	**70**	**70**	1	**71**	**71**	2
R750	Multi-Family	B (65)	1	N/A	**69**	**69**	**70**	**70**	1	**71**	**71**	2
R751	Multi-Family	B (65)	1	N/A	**70**	**70**	**70**	**70**	0	**71**	**71**	1
R752	Multi-Family	B (65)	1	N/A	**70**	**70**	**71**	**71**	1	**71**	**71**	1
R753	Multi-Family	B (65)	1	N/A	58	58	59	59	1	60	60	2
R754	Multi-Family	B (65)	1	N/A	54	54	55	55	1	56	56	2

Table 9. Predicted Noise Levels

Receptor ID	Land Use	ODOT Criteria NAAC	No. of Uses	Structure-Borne Leq dB(A)	Existing 2017 Leq TNM dB(A)	Existing 2017 TNM + Structure-Borne Leq dB(A)	No Build 2040 Alternative Leq dB(A)	No Build 2040 TNM + Structure-Borne Leq dB(A)	No Build 2040 Increase over Existing Noise Level dB	Build Alternative Leq dB(A)	Build 2040 TNM + Structure-Borne Leq dB(A)	Build 2040 Increase over Existing Noise Level dB
R755	Multi-Family	B (65)	1	N/A	**68**	**68**	**68**	**68**	0	**69**	**69**	1
R756	Multi-Family	B (65)	1	N/A	**66**	**66**	**67**	**67**	1	**68**	**68**	2
R757	Multi-Family	B (65)	1	N/A	48	48	48	48	0	49	49	1
R758	Multi-Family	B (65)	1	N/A	51	51	52	52	1	53	53	2
R759	Multi-Family	B (65)	1	N/A	56	56	56	56	0	57	57	1
R760	Multi-Family	B (65)	1	N/A	57	57	58	58	1	58	58	1
R761	Multi-Family	B (65)	1	N/A	45	45	46	46	1	46	46	1
R762	Multi-Family	B (65)	1	N/A	45	45	46	46	1	46	46	1
R763	Multi-Family	B (65)	1	N/A	46	46	47	47	1	47	47	1
R764	Multi-Family	B (65)	1	N/A	46	46	47	47	1	47	47	1
R765	Multi-Family	B (65)	1	N/A	62	62	63	63	1	64	64	2
R766	Multi-Family	B (65)	1	N/A	61	61	62	62	1	63	63	2
R767	Multi-Family	B (65)	1	N/A	59	59	60	60	1	60	60	1
R768	Multi-Family	B (65)	1	N/A	58	58	59	59	1	60	60	2
R769	Multi-Family	B (65)	1	N/A	50	50	51	51	1	53	53	3
R770	Multi-Family	B (65)	1	N/A	50	50	51	51	1	52	52	2
R771	Multi-Family	B (65)	1	N/A	50	50	51	51	1	52	52	2
R772	Multi-Family	B (65)	1	N/A	47	47	48	48	1	49	49	2
R773	Multi-Family	B (65)	1	N/A	46	46	47	47	1	48	48	2
R774	Multi-Family	B (65)	1	N/A	46	46	47	47	1	48	48	2
R775	Multi-Family	B (65)	1	N/A	56	56	56	56	0	57	57	1

Table 9. Predicted Noise Levels

Receptor ID	Land Use	ODOT Criteria NAAC	No. of Uses	Structure-Borne Leq dB(A)	Existing 2017 Leq TNM dB(A)	Existing 2017 TNM + Structure-Borne Leq dB(A)	No Build 2040 Alternative Leq dB(A)	No Build 2040 TNM + Structure-Borne Leq dB(A)	No Build 2040 Increase over Existing Noise Level dB	Build Alternative Leq dB(A)	Build 2040 TNM + Structure-Borne Leq dB(A)	Build 2040 Increase over Existing Noise Level dB
R776	Multi-Family	B (65)	1	N/A	55	55	56	56	1	56	56	1
R777	Multi-Family	B (65)	1	N/A	54	54	54	54	0	55	55	1
R778	Multi-Family	B (65)	1	N/A	54	54	54	54	0	55	55	1
R779	Multi-Family	B (65)	1	N/A	45	45	46	46	1	47	47	2
R780	Multi-Family	B (65)	1	N/A	45	45	46	46	1	47	47	2
R781	Multi-Family	B (65)	1	N/A	57	57	58	58	1	59	59	2
R782	Multi-Family	B (65)	1	N/A	57	57	58	58	1	59	59	2
R783	Multi-Family	B (65)	1	N/A	56	56	57	57	1	58	58	2
R784	Multi-Family	B (65)	1	N/A	56	56	57	57	1	57	57	1
R785	Multi-Family	B (65)	1	N/A	61	61	62	62	1	62	62	1
R786	Multi-Family	B (65)	1	N/A	60	60	61	61	1	61	61	1
R787	Multi-Family	B (65)	1	N/A	54	54	56	56	2	56	56	2
R788	Multi-Family	B (65)	1	N/A	54	54	55	55	1	56	56	2
R789	Multi-Family	B (65)	1	N/A	54	54	55	55	1	56	56	2
R790	Multi-Family	B (65)	1	N/A	54	54	55	55	1	56	56	2
R791	Multi-Family	B (65)	1	N/A	54	54	55	55	1	56	56	2
R792	Multi-Family	B (65)	1	N/A	54	54	55	55	1	56	56	2
R793	Multi-Family	B (65)	1	N/A	**70**	**70**	**71**	**71**	1	**72**	**72**	2
R794	Multi-Family	B (65)	1	N/A	**70**	**70**	**71**	**71**	1	**72**	**72**	2
R795	Multi-Family	B (65)	1	N/A	**71**	**71**	**71**	**71**	0	**72**	**72**	1
R796	Multi-Family	B (65)	1	N/A	**71**	**71**	**72**	**72**	1	**72**	**72**	1

Table 9. Predicted Noise Levels

Receptor ID	Land Use	ODOT Criteria NAAC	No. of Uses	Structure-Borne Leq dB(A)	Existing 2017 Leq TNM dB(A)	Existing 2017 TNM + Structure-Borne Leq dB(A)	No Build 2040 Alternative Leq dB(A)	No Build 2040 TNM + Structure-Borne Leq dB(A)	No Build 2040 Increase over Existing Noise Level dB	Build Alternative Leq dB(A)	Build 2040 TNM + Structure-Borne Leq dB(A)	Build 2040 Increase over Existing Noise Level dB
R797	Multi-Family	B (65)	1	N/A	59	59	60	60	1	61	61	2
R798	Multi-Family	B (65)	1	N/A	55	55	56	56	1	57	57	2
R799	Multi-Family	B (65)	1	N/A	**68**	**68**	**69**	**69**	1	**70**	**70**	2
R800	Multi-Family	B (65)	1	N/A	**67**	**67**	**68**	**68**	1	**69**	**69**	2
R801	Multi-Family	B (65)	1	N/A	51	51	52	52	1	53	53	2
R802	Multi-Family	B (65)	1	N/A	53	53	54	54	1	55	55	2
R803	Multi-Family	B (65)	1	N/A	57	57	57	57	0	58	58	1
R804	Multi-Family	B (65)	1	N/A	58	58	59	59	1	59	59	1
R805	Multi-Family	B (65)	1	N/A	47	47	48	48	1	49	49	2
R806	Multi-Family	B (65)	1	N/A	48	48	49	49	1	50	50	2
R807	Multi-Family	B (65)	1	N/A	49	49	50	50	1	51	51	2
R808	Multi-Family	B (65)	1	N/A	50	50	50	50	0	51	51	1
R809	Multi-Family	B (65)	1	N/A	63	63	64	64	1	**65**	**65**	2
R810	Multi-Family	B (65)	1	N/A	62	62	63	63	1	64	64	2
R811	Multi-Family	B (65)	1	N/A	60	60	61	61	1	61	61	1
R812	Multi-Family	B (65)	1	N/A	59	59	60	60	1	61	61	2
R813	Multi-Family	B (65)	1	N/A	52	52	53	53	1	55	55	3
R814	Multi-Family	B (65)	1	N/A	52	52	53	53	1	54	54	2
R815	Multi-Family	B (65)	1	N/A	53	53	53	53	0	54	54	1
R816	Multi-Family	B (65)	1	N/A	51	51	51	51	0	52	52	1
R817	Multi-Family	B (65)	1	N/A	50	50	51	51	1	52	52	2

Table 9. Predicted Noise Levels

Receptor ID	Land Use	ODOT Criteria NAAC	No. of Uses	Structure-Borne Leq dB(A)	Existing 2017 Leq TNM dB(A)	Existing 2017 TNM + Structure-Borne Leq dB(A)	No Build 2040 Alternative Leq dB(A)	No Build 2040 TNM + Structure-Borne Leq dB(A)	No Build 2040 Increase over Existing Noise Level dB	Build Alternative Leq dB(A)	Build 2040 TNM + Structure-Borne Leq dB(A)	Build 2040 Increase over Existing Noise Level dB
R818	Multi-Family	B (65)	1	N/A	50	50	50	50	0	51	51	1
R819	Multi-Family	B (65)	1	N/A	57	57	58	58	1	59	59	2
R820	Multi-Family	B (65)	1	N/A	57	57	57	57	0	58	58	1
R821	Multi-Family	B (65)	1	N/A	56	56	57	57	1	58	58	2
R822	Multi-Family	B (65)	1	N/A	56	56	57	57	1	58	58	2
R823	Multi-Family	B (65)	1	N/A	49	49	50	50	1	50	50	1
R824	Multi-Family	B (65)	1	N/A	48	48	49	49	1	50	50	2
R825	Multi-Family	B (65)	1	N/A	59	59	60	60	1	61	61	2
R826	Multi-Family	B (65)	1	N/A	60	60	60	60	0	61	61	1
R827	Multi-Family	B (65)	1	N/A	57	57	58	58	1	59	59	2
R828	Multi-Family	B (65)	1	N/A	56	56	57	57	1	58	58	2
R829	Multi-Family	B (65)	1	N/A	62	62	63	63	1	63	63	1
R830	Multi-Family	B (65)	1	N/A	61	61	62	62	1	62	62	1
R831	Multi-Family	B (65)	1	N/A	59	59	60	60	1	61	61	2
R832	Multi-Family	B (65)	1	N/A	58	58	59	59	1	60	60	2
R833	Multi-Family	B (65)	1	N/A	58	58	59	59	1	60	60	2
R834	Multi-Family	B (65)	1	N/A	58	58	59	59	1	60	60	2
R835	Multi-Family	B (65)	1	N/A	58	58	59	59	1	60	60	2
R836	Multi-Family	B (65)	1	N/A	59	59	60	60	1	60	60	1
R837	Multi-Family	B (65)	1	N/A	61	61	62	62	1	63	63	2
R838	Multi-Family	B (65)	1	N/A	**68**	**68**	**69**	**69**	1	**69**	**69**	1

Table 9. Predicted Noise Levels

Receptor ID	Land Use	ODOT Criteria NAAC	No. of Uses	Structure-Borne Leq dB(A)	Existing 2017 Leq TNM dB(A)	Existing 2017 TNM + Structure-Borne Leq dB(A)	No Build 2040 Alternative Leq dB(A)	No Build 2040 TNM + Structure-Borne Leq dB(A)	No Build 2040 Increase over Existing Noise Level dB	Build Alternative Leq dB(A)	Build 2040 TNM + Structure-Borne Leq dB(A)	Build 2040 Increase over Existing Noise Level dB
R839	Multi-Family	B (65)	1	N/A	64	64	**65**	**65**	1	**66**	**66**	2
R840	Multi-Family	B (65)	1	N/A	63	63	64	64	1	**65**	**65**	2
R841	Multi-Family	B (65)	1	N/A	62	62	62	62	0	64	64	2
R842	Multi-Family	B (65)	1	N/A	61	61	62	62	1	63	63	2
R843	Multi-Family	B (65)	1	N/A	**66**	**66**	**66**	**66**	0	**67**	**67**	1
R844	Multi-Family	B (65)	1	N/A	**65**	**65**	**66**	**66**	1	**67**	**67**	2
R845	Multi-Family	B (65)	1	N/A	63	63	64	64	1	**65**	**65**	2
R846	Multi-Family	B (65)	1	N/A	63	63	63	63	0	64	64	1
R847	Multi-Family	B (65)	1	N/A	**65**	**65**	**66**	**66**	1	**67**	**67**	2
R848	Multi-Family	B (65)	1	N/A	64	64	**65**	**65**	1	**66**	**66**	2
R849	Multi-Family	B (65)	1	N/A	63	63	63	63	0	64	64	1
R850	Multi-Family	B (65)	1	N/A	62	62	63	63	1	64	64	2
R851	Multi-Family	B (65)	1	N/A	60	60	61	61	1	62	62	2
R852	Multi-Family	B (65)	1	N/A	60	60	60	60	0	61	61	1
R853	Multi-Family	B (65)	1	N/A	57	57	58	58	1	59	59	2
R854	Multi-Family	B (65)	1	N/A	57	57	57	57	0	59	59	2
R855	Multi-Family	B (65)	1	N/A	61	61	62	62	1	63	63	2
R856	Multi-Family	B (65)	1	N/A	61	61	62	62	1	63	63	2
R857	Multi-Family	B (65)	1	N/A	59	59	60	60	1	61	61	2
R858	Multi-Family	B (65)	1	N/A	59	59	59	59	0	61	61	2
R859	Multi-Family	B (65)	1	N/A	61	61	62	62	1	63	63	2

Table 9. Predicted Noise Levels

Receptor ID	Land Use	ODOT Criteria NAAC	No. of Uses	Structure-Borne Leq dB(A)	Existing 2017 Leq TNM dB(A)	Existing 2017 TNM + Structure-Borne Leq dB(A)	No Build 2040 Alternative Leq dB(A)	No Build 2040 TNM + Structure-Borne Leq dB(A)	No Build 2040 Increase over Existing Noise Level dB	Build Alternative Leq dB(A)	Build 2040 TNM + Structure-Borne Leq dB(A)	Build 2040 Increase over Existing Noise Level dB
R860	Multi-Family	B (65)	1	N/A	61	61	61	61	0	62	62	1
R861	Multi-Family	B (65)	1	N/A	59	59	59	59	0	60	60	1
R862	Multi-Family	B (65)	1	N/A	58	58	59	59	1	60	60	2
R863	Multi-Family	B (65)	1	N/A	**67**	**67**	**67**	**67**	0	**68**	**68**	1
R864	Multi-Family	B (65)	1	N/A	**66**	**66**	**67**	**67**	1	**68**	**68**	2
R865	Multi-Family	B (65)	1	N/A	**66**	**66**	**66**	**66**	0	**67**	**67**	1
R866	Multi-Family	B (65)	1	N/A	**65**	**65**	**66**	**66**	1	**67**	**67**	2
R867	Multi-Family	B (65)	1	N/A	**66**	**66**	**66**	**66**	0	**67**	**67**	1
R868	Multi-Family	B (65)	1	N/A	**66**	**66**	**66**	**66**	0	**67**	**67**	1
R869	Multi-Family	B (65)	1	N/A	**65**	**65**	**65**	**65**	0	**66**	**66**	1
R870	Multi-Family	B (65)	1	N/A	**65**	**65**	**65**	**65**	0	**66**	**66**	1
R871	Multi-Family	B (65)	1	N/A	**69**	**69**	**70**	**70**	1	**71**	**71**	2
R872	Multi-Family	B (65)	1	N/A	**69**	**69**	**70**	**70**	1	**70**	**70**	1
R873	Multi-Family	B (65)	1	N/A	**68**	**68**	**69**	**69**	1	**70**	**70**	2
R874	Multi-Family	B (65)	1	N/A	**68**	**68**	**68**	**68**	0	**69**	**69**	1
R875	Multi-Family	B (65)	1	N/A	**69**	**69**	**69**	**69**	0	**70**	**70**	1
R876	Multi-Family	B (65)	1	N/A	**69**	**69**	**69**	**69**	0	**70**	**70**	1
R877	Multi-Family	B (65)	1	N/A	**68**	**68**	**68**	**68**	0	**69**	**69**	1
R878	Multi-Family	B (65)	1	N/A	**67**	**67**	**68**	**68**	1	**69**	**69**	2
R879(6b)	Residence	B (65)	1	N/A	58	58	57	57	-1	58	58	0
R880(6b)	Residence	B (65)	1	N/A	58	58	57	57	-1	58	58	0

Table 9. Predicted Noise Levels

Receptor ID	Land Use	ODOT Criteria NAAC	No. of Uses	Structure-Borne Leq dB(A)	Existing 2017 Leq TNM dB(A)	Existing 2017 TNM + Structure-Borne Leq dB(A)	No Build 2040 Alternative Leq dB(A)	No Build 2040 TNM + Structure-Borne Leq dB(A)	No Build 2040 Increase over Existing Noise Level dB	Build Alternative Leq dB(A)	Build 2040 TNM + Structure-Borne Leq dB(A)	Build 2040 Increase over Existing Noise Level dB
R881(6b)	Residence	B (65)	1	N/A	61	61	61	61	0	61	61	0
R882(6b)	Residence	B (65)	1	N/A	60	60	60	60	0	60	60	0
R883(6b)	Residence	B (65)	1	N/A	60	60	60	60	0	60	60	0
R884(6b)	Residence	B (65)	1	N/A	60	60	60	60	0	60	60	0
R885(6a)	Residence	B (65)	1	N/A	57	57	58	58	1	60	60	3
R886(6a)	Residence	B (65)	1	N/A	58	58	59	59	1	60	60	2
R887(6a)	Residence	B (65)	1	N/A	58	58	58	58	0	60	60	2
R888(6a)	Residence	B (65)	1	N/A	57	57	58	58	1	60	60	3
R889(6a)	Residence	B (65)	1	N/A	57	57	58	58	1	60	60	3
R890(6a)	Residence	B (65)	1	N/A	57	57	58	58	1	59	59	2
R891(6a)	Residence	B (65)	1	N/A	58	58	59	59	1	60	60	2
R892(6a)	Residence	B (65)	1	N/A	56	56	57	57	1	59	59	3
R893(6a)	Residence	B (65)	1	N/A	57	57	58	58	1	60	60	3
R894(6a)	Residence	B (65)	1	N/A	57	57	58	58	1	60	60	3
R895(6a)	Residence	B (65)	1	N/A	58	58	59	59	1	60	60	2
R896(6a)	Residence	B (65)	1	N/A	59	59	60	60	1	62	62	3

Notes: ## indicates noise level is at or above ODOT NAAC; * visual inspection indicated no outdoor use and construction of the building appears to be light frame with storm windows which FHWA has identified as resulting in 25 dB reduction when going from noise exposure outdoors to indoors (FHWA 2011).

6 Evaluation of Noise Abatement Measures

Build Alternative traffic noise levels would meet or exceed the NAAC for 322 residences (NAAC B) and 8 Category C recreational receptors. Traffic noise mitigation measures were evaluated for all of these receptors.

Traffic noise mitigation must be *feasible* and *reasonable* to be included in the Project's design. ODOT identifies that acoustical feasibility is achieved if a simple majority of impacted receptors achieve a 5 dB(A) or greater insertion loss (reduction) as a result of the mitigation measure. In addition, feasibility also considers engineering factors such as safety, topography, environmental constraints (i.e., presence of wetlands), drainage, and excessive barrier height. For noise abatement to be reasonable, ODOT must consider the viewpoints of the residents and property owners who would benefit from the mitigation measure, the cost-effectiveness of the abatement measure, and the ODOT noise reduction design goal of 7 dB(A) at one or more benefited properties.

6.1 Noise Abatement Considerations

Several noise abatement options were considered for noise impacts under the Build Alternative. Some of these options include speed restrictions, truck restrictions, and alignment changes. The posted speed limits on I-205 range from 65 mph west of the 10th Street interchange and 55 mph east of the 10th Street interchange. Reducing speeds on I-205 would defeat one of the purposes of the Project which is to improve mobility on the facility and reduced traffic speeds are unlikely to reduce noise levels enough to be noticeable. Truck restrictions are not feasible because I-205 is a major truck route for moving goods to, from, and through the Portland metropolitan area.

ODOT also considers changes in Project alignment to abate traffic noise; however, the Project alignment has been identified to minimize property impacts potentially resulting from the Project, such as acquisitions, potentially resulting from the Project. Furthermore, ODOT has found that shifting roadway alignments typically only results in shifting of noise impacts to other properties and is not a reasonable approach for abating traffic noise impacts.

Noise barriers, such as noise walls, are ODOT's preferred method for abating traffic noise impacts from a given project. For this Project, noise barriers in the form of noise walls were evaluated for all impacted receptors. For a noise wall to be feasible it must reduce noise levels at over 50 percent of impacted receptors by 5 dB(A) or greater. In order for a noise wall to be reasonable it must cost no more than $25,000 per benefited receptor and achieve a 7 dB(A) reduction at one or more receptors. For cost estimation purposes one square foot of noise barrier is assumed to cost $20 to construct for walls up to 16 feet in height. For walls taller than 16 feet, it is assumed that they would cost $25 per square foot to construct.

Noise barriers were modeled at ODOT's right of way unless Project engineers indicated that such a location would not be constructible for a variety of reasons. For example, there are several drainages and some steep topography throughout the noise study area that would, in some cases, make siting a noise wall infeasible at the ODOT right of way. In such cases, noise walls have been modeled in locations nearer to the edge of the roadway; such shifts are discussed in the noise barrier narratives in Section 6.3.

As part of this noise analysis, as-built drawings were reviewed for the original I-205 facility to identify if noise barriers, either berms or walls, were included as mitigation in the original facility. This review did not identify any existing noise barriers part of the original I-205 facility.

6.2 Rural and Other Individual Impacted Receptors

Individual impacted receptors, or those that are isolated from more densely developed noise-sensitive land uses, are situated throughout the corridor. For these receptors it is not possible to feasibly provide noise abatement. In general, noise walls cannot be constructed cost effectively since there is not sufficient receptor density to justify the costs. For example, an individually impacted residence is allotted $25,000 for noise abatement, which equates to a 10-foot tall noise wall with a maximum length of 125 feet. The FHWA has found that in order for a noise wall to feasibly reduce noise levels, it must block the line of sight from the receptor to the roadway noise source. To block line of sight, a noise barrier length would need to be roughly equivalent to four times the perpendicular distance from the proposed barrier to the receptor.

- The western portion of the project area, roughly the area from where Woodbine Road crosses beneath I-205 and the areas to the west, includes primarily rural low density developed areas. Impacts occur at the following receptors in this area: LT-1/ST-1, ST-2, ST-3, ST-4, R1, R2, R5 to R7, R12, R13, R14, R15, and R16. Other than LT-1/ST-1, which is a church/preschool/daycare, the remaining receptors are relatively isolated rural residences offset from one another by relatively large distances.
    - For LT-1/ST-1 HMMH completed ODOT's NAAC C calculation table, the results of which are included in Appendix D. LT-1/ST-1 would be located 186 feet from the realigned I-205 facility, further away than it currently is from I-205 as a result of the roadway realignment to cross the Tualatin River. To block the line of sight from LT-1/ST-1 to the roadway a noise wall length would need to be four times the perpendicular distance from the barrier, which equates to 744 feet. Even at a height of 8 feet, a barrier of this length would be unreasonably expensive according to ODOT's NAAC C calculation methodology. Therefore, this barrier is not feasible because it cannot be constructed tall enough and long enough to achieve a 5 dB(A) reduction.

- Another individual impact is predicted at R293, south of the I-205 NB lanes and 2,650 feet east of the 10th Street interchange. This receptor is not clustered with other noise-sensitive receptors; therefore, a noise barrier cannot be feasibly constructed to reduce noise levels in the area.
- Receptor R466 is the Atlas Immersion Academy School. A noise barrier cannot be constructed in this area because it would need to cross three driveways that accessing the school. A noise wall in this area with gaps in it would not feasibly reduce noise levels at the impacted receptor.
- Two receptors, R693 and R694, located northeast of the I-205 and OR 213 interchange, also have driveways accessing the nearby roadway. A noise wall cannot feasibly reduce noise levels because it would have gaps allowing for driveway access.

6.3 Noise Walls

Thirteen noise walls were evaluated to determine if they could feasibly and reasonably reduce noise levels at clusters of impacted receptors. Noise walls were evaluated along the ODOT right of way unless otherwise stated and were analyzed at heights ranging from 10 to 24 feet in height. Detailed noise wall tabular analyses are included in Appendix D. Table 10 provides a summary of the Project noise wall abatement analysis and the subsections that follow provide a narrative descriptions of these analyses. Noise walls identified as being feasible and reasonable per ODOT regulations are shown in red on Figure 18 to Figure 32 in Section 11 of this report. Walls analyzed in detail but not recommended are shown in black on these same figures.

ODOT’s Noise Manual provides a special use area worksheet for NAAC C land uses applicable to some NAAC C uses, such as parks. Other than in the analysis described in Section 6.2, this worksheet was not used in this noise abatement analysis, because each of the NAAC C land uses are co-located behind noise walls with other noise-sensitive land uses, such as NAAC B residences with outdoor uses at apartment complexes (i.e., balconies and patios). For this reason, other impacted NAAC C receptors were treated as being equivalent to “one” residential unit for considerations of cost reasonableness calculations.

Table 10. Noise Wall Analysis Summary

Wall	No. of Impacts	Length (feet)	Height (feet)	No. of Impacts Benefited	Acoustically Feasible?	Achieves Acoustic Design Goal?	Total Benefits	Estimated Cost per Benefit	Cost Reasonable?	Wall Recommended ?
1	16	1,560	16	12	Yes	Yes	15	$33,288	No	No
2	41	2,070	12	24	Yes	Yes	29	$17,147	Yes	Yes
3	41	2,161	20	28	Yes	Yes	35	$30,840	No	No
4	37	1,517	14	33	Yes	Yes	75	$5,668	Yes	Yes
5	18	1,550	24	0	No	N/A	0	N/A	N/A	No
6a	55	3,697	14	45	Yes	Yes	74	$14,024	Yes	Yes
6b	10	1,165	14	10	Yes	Yes	11	$29,625	No	No
7	16	989	14	11	Yes	Yes	12	$22,725	Yes	Yes
8	25	683	24	12	No	N/A	17	N/A	N/A	No
9	17	594	24	8	No	N/A	8	N/A	N/A	No
10	12	3,257	17	7	Yes	No	15	$90,538	N/A	No
11	5	1,145	16	3	Yes	Yes	3	$152,675	No	No
12	43	1,381	18	23	Yes	Yes	46	$13,504	Yes	Yes

6.3.1 Noise Wall 1

Noise wall 1 was evaluated at a location 30 feet from the fog line of the NB I-205 lanes extending north from Blankenship Road 1,560 feet (see Figure 23). The noise wall was evaluated to determine if it could effectively abate noise at impacted residential receptors R49 to R53, R55 to R60, R62, R71, R73, R74, and R75. Analysis of noise walls in this area suggested a barrier positioned along the I-205 right of way cannot effectively block the line of sight to a sufficient number of impacted receptors to be feasible. As a result, ODOT elected to analyze the barrier closer to the I-205 travel lanes, at a position where a small earthen berm currently exists. Design engineers for the project indicated installation of a noise wall in this area would require removal and leveling of the top four feet of the berm. This adjustment in noise wall footing height was taken into consideration in this analysis. Noise modeling, as documented in the detailed tables in Appendix D, shows that a noise wall 14 feet or taller would reduce noise levels by 5 dB(A) or greater at over 50 percent of the impacted receptors and is therefore feasible. A noise wall 16 feet tall and 1,560 feet long, would achieve the design goal of a 7 dB(A) reduction at one or more receptors, would benefit 15 receptors, and would cost $499,320 or $33,288 per benefited receptor. Noise wall 1 would be feasible but not reasonable because it would exceed the ODOT guideline maximum of $25,000 per benefited receptor, and is therefore not recommended for inclusion in the Project design at this time.

6.3.2 Noise Wall 2

Noise wall 2 was evaluated along the north side of the SB I-205 lanes where I-205 is elevated above the surrounding land uses and then would jog further away from I-205 to the facilities right of way (see Figure 23). The noise wall would extend north from where I-205 crosses Blankenship Road approximately 2,070 feet. The noise wall would provide shielding to impacted residential receptors and an apartment pool IDs ST-5a, ST-5b, R20 to R41, R63 to R68, R76 to R81, and R96 to R101. Noise modeling, as documented in the detailed tables in Appendix D, shows that the noise wall at 12 feet would reduce noise levels by 5 dB(A) or greater at over 50 percent of the impacted receptors and is therefore feasible. A 12-foot tall noise wall, 2,070 feet long, would also achieve the design goal of 7 dB(A) reduction at one or more receptors, would benefit 29 receptors, and would cost $497,260 or $17,147 per benefited receptor. Noise wall 2 would be both feasible and reasonable and is recommended for inclusion in the Project design. Note that the residential equivalency for the pool was considered to be one for the purposes of this analysis; however, even without its inclusion the noise wall would still be feasible and reasonable.

6.3.3 Noise Wall 3

Noise wall 3 was evaluated at a location 30 feet from the fog line of the I-205 NB lanes (See Figure 23 and Figure 24). The noise wall would extend south from where I-205 crosses Blankenship Road approximately 2,161 feet. The noise wall was analyzed to evaluate noise abatement at impacted residential receptor IDs ST-7, R114 to R124, R126 to R131, R133 to R150, R152, R153, and R155 to R1557. Initial analysis of noise walls in this area identified that a barrier positioned along the I-205 right of way cannot effectively block the line of sight to a sufficient number of impacted receptors to be feasible. As a result, ODOT elected to analyze the barrier closer to the I-205 travel lanes, at a position where a small earthen berm currently exists. Design engineers for the project indicated installation of a noise wall in this area would require removal and leveling of the top four feet of the berm. This adjustment in noise wall footing height was taken into consideration in this analysis. Noise modeling, as documented in the detailed tables in Appendix D, shows that a noise wall 20 feet tall would reduce noise levels by 5 dB(A) or greater at over 50 percent of the impacted receptors and is therefore feasible. The 20-foot tall noise wall, 2,160 feet long, would achieve the design goal of 7 dB(A) reduction at one or more receptors, would benefit 35 receptors, and would cost $1,079,400 or $30,840 per benefited receptor. Noise wall 3 would be feasible but not reasonable because it would exceed the ODOT guideline maximum of $25,000 per benefited receptor, and is therefore not recommended for inclusion in the Project design at this time.

6.3.4 Noise Wall 4

Noise wall 4 was evaluated along the north side of the SB I-205 lanes where the facility is on elevated topography (See Figure 23 and Figure 24). The noise wall would extend south from where I-205 crosses Blankenship Road approximately 1,518 feet. Preliminary engineering identified that the barrier would need to stop at this point because of utility and/or drainage requirements. The noise wall would provide shielding to impacted residential receptors IDs R168, R169, R171, R172, R174, R175, R177, R178, R180, R181, R183, R187, R189, R191, R193, R195, R197, R199, R201, R203, R207, R209 to R211, R213, R215 to R217, R221 to R223, R226, R229, R232, R235, and R271 to R273. Noise modeling, as documented in the detailed tables in Appendix D, shows that at 10 feet or taller the noise wall would reduce noise levels by 5 dB(A) or greater at over 50 percent of the impacted receptors and therefore would be feasible. A 14-foot tall noise wall, 1,517 feet long, would achieve the design goal of 7 dB(A) reduction at one or more receptors, would benefit 75 receptors, and would cost $425,120 or $5,688 per benefited receptor. Noise wall 4 would be both feasible and reasonable and is recommended for inclusion in the Project design.

6.3.5 Noise Wall 5

Noise wall 5 was evaluated along the NB I-205 right of way extending northwest from 10th Street 1,550 feet (see Figure 24 and Figure 25). The noise wall would provide shielding to impacted residential receptors IDs ST-8, R274 to R285, and R288 to R291. I-205 is at a higher elevation than the impacted receptors in this area and the topography between them is below both. At the ODOT right of way, the barrier would be approximately 10 feet below the elevation of the receptors and further below the highway. The noise wall cannot be located closer to the I-205 mainline due to the on-ramp from 10th Street to I-205 NB. As a result, a noise barrier even at 24 feet tall would not break the line of sight to the receptors and would not reduce noise levels by 5 dB(A) or greater at over 50 percent of the receptors. Therefore, noise wall 5 would not be feasible.

6.3.6 Noise Wall 6a

Noise wall 6a was evaluated along the north side of the SB I-205 lanes 3,697 feet south of the 10th Street Interchange and located on a ridge at the SB I-205 right-of-way (See Figure 26, Figure 27, and Figure 28). Initially noise wall 6a and noise wall 6b were a continuous noise barrier; however, detailed survey of the are identified that an approximately 100 foot wide gap would be needed due to steep topography where a drainage passes through the area. For this reason the noise wall was divided into noise walls 6a and 6b. The noise wall would extend south from the Sunset Avenue overcrossing along a ridge between Imperial Drive and the I-205 SB lanes for 3,697 feet. The noise wall would provide shielding to impacted residential receptors IDs ST-9, R306, R310, R311, R322 to R330, R333, R337 to R352, R360 to R364, R371 to R386, R395, R404, R405, and R423. Noise modeling, as documented in the detailed tables in Appendix D, shows that at 10 feet or taller the noise wall would reduce noise levels by 5 dB(A) or greater at over 50 percent of the impacted receptors and therefore would be feasible. A 14-foot tall noise wall, 3,697 feet long, would achieve the design goal of 7 dB(A) reduction at one or more receptors, would benefit 74 receptors, and would cost $1,037,740 or $14,024 per benefited receptor. Noise wall 6a would be both feasible and reasonable and is recommended for inclusion in the Project design.

6.3.7 Noise Wall 6b

Noise wall 6b was evaluated along the north side of the SB I-205 lanes beginning the drainage gully described in Section 6.3.7. (See Figure 26). The noise wall would extend along a ridge between Imperial Drive and the I-205 SB lanes for 1,165 feet. The noise wall would provide shielding to impacted residential receptors IDs R296 to R305. Noise modeling, as documented in the detailed tables in Appendix D, shows that at 12 feet or taller the noise wall would reduce noise levels by 5 dB(A) or greater at over 50 percent of the impacted receptors and therefore would be feasible. A 14-foot tall noise wall, 1,165 feet long, would achieve the design goal of 7 dB(A) reduction at one or more receptors, would benefit 11 receptors, and would cost $325,880 or $29,625 per benefited receptor. Noise wall 6b would be feasible but not reasonable because it would exceed the ODOT guideline maximum of $25,000 per benefited receptor, and is therefore not recommended for inclusion in the Project design at this time.

6.3.8 Noise Wall 7

Noise wall 7 was evaluated along the north side of the SB I-205 right of way extending 959 feet to the east from where Sunset Avenue crosses I-205 (See Figure 28). The noise wall would provide shielding to impacted residential receptor IDs R423, R426, R427, R429, R432, R440, R442 to R449, R452, and R453. The impacted receptors are situated on a ridge overlooking I-205 below. Detailed topographic survey of the area was conducted to ascertain engineering feasibility. The noise wall location analyzed is the most feasible from an engineering perspective. Noise modeling, as documented in the detailed tables in Appendix D, shows that at 14 feet or taller the noise wall would reduce noise levels by 5 dB(A) or greater at over 50 percent of the impacted receptors and therefore would be feasible. A 14-foot tall noise wall, 989 feet long, would achieve the design goal of 7 dB(A) reduction at one or more receptors, would benefit 12 receptors, and would cost $272,700 or $22,725 per benefited receptor. Noise wall 7 would be both feasible and reasonable and is recommended for inclusion in the Project design.

6.3.9 Noise Wall 8

Noise wall 8 was evaluated north of the I-205 SB lanes between A Street and OR 43, in an area where the existing Broadway Bridge overpass would be removed as part of the project (See Figure 29). ODOT obtained detailed survey data to identify the specific height of the footing of the noise wall in this area since there are steep slopes adjacent to the south between the on-ramp to I-205 SB from OR 43 and the noise sensitive receptors. The noise wall was evaluated to determine if it would effectively abate traffic noise at impacted residential receptor IDs R489 to R493, R496, R497, R501 to R507, R521 to R525, and R527 to R532. The impacted residences are situated on a ridge overlooking I-205 below. Noise modeling, as documented in the detailed tables in Appendix D, shows that even at 24 feet tall the noise wall would not reduce noise levels by 5 dB(A) or greater at over 50 percent of the impacted receptors and therefore would not be feasible per ODOT policy. For this reason noise wall 8 is not recommended for inclusion in the Project design.

6.3.10 Noise Wall 9

Noise Wall 9 would be located along the I-205 NB exit ramp to OR 43 and would provide shielding to impacted residential receptor IDs R467 to 483, apartment units at two separate structures (See Figure 29). Topography in the area includes a relatively steep slope as one moves away from I-205 towards the apartments and down the exit ramp. Noise modeling, as documented in the detailed tables in Appendix D, shows that even at 24 feet the noise wall would not reduce noise levels by 5 dB(A) or greater at over 50 percent of the impacted receptors and therefore would not be feasible. Noise wall 9 is not recommended for inclusion in the Project design at this time.

6.3.11 Noise Wall 10

Noise wall 10 was evaluated along the north side of the I-205 Abernethy Bridge structure adjacent to the SB I-205 lanes and exit ramps to OR 43 and OR 99E (See Figure 29 and Figure 30). The Abernethy structure noise wall would provide shielding to impacted receptors located north of the bridge on both sides of the Willamette River and would be 3,257 feet long. Bridge deck noise that emanates through the deck itself cannot be abated with a noise wall on the structure. For this reason, the contribution of bridge deck noise was analyzed via a noise monitoring effort as described in Section 4.2.1. Structure-borne noise was added to the TNM noise levels for receptors near the bridge as to not overestimate the reductions in traffic noise that would be expected with a noise wall on the bridge. Noise wall heights ranging from 9 feet to 17 feet were evaluated. Design engineers identified (HDR 2017a) that a 17-foot on structure barrier is as tall as feasible without reinforcing the structure to accommodate the barrier which is considered infeasible. The noise wall would provide shielding to impacted residential receptors and Jon Storm Park, specifically:

- Residential IDs: R552, R553, R557, R562 to R564, and R571
- Jon Storm Park outdoor use areas IDs: ST-13 and R700 to R703

Noise modeling, as documented in the detailed tables in Appendix D, shows that even at 15 feet or taller the noise wall would reduce noise levels by 5 dB(A) or greater at over 50 percent of the impacted receptors and is therefore feasible. However, even at 17-feet tall a noise wall would not achieve the design goal of 7 dB(A) reduction at one or more receptors, and at 17-feet tall a noise wall would cost $90,538 per benefitted receptor which is unreasonably expensive for noise abatement. For these reasons noise wall 10 is not recommended for inclusion in the Project design at this time.

6.3.12 Noise Wall 11

Noise wall 11 was evaluated along the north side of the SB I-205 right of way to provide shielding to noise-sensitive receptors situated in the northeast quadrant of the I-205 and OR 213 interchange (See Figure 32). The noise wall would provide shielding to impacted residential receptor IDs R695 to R699. Noise modeling, as documented in the detailed tables in Appendix D, shows that at 16 feet or taller a noise wall would reduce noise levels by 5 dB(A) or greater at over 50 percent of the impacted receptors and therefore would be feasible. A 16-foot tall noise wall, 1,145 feet long, would achieve the design goal of 7 dB(A) reduction at one or more receptors, would benefit three receptors, and would cost $458,025 or $152,675 per benefited receptor. Noise wall 11 would be feasible but would not be reasonable because it would exceed the ODOT guideline maximum of $25,000 per benefited receptor and is therefore not recommended for inclusion in the Project design.

6.3.13 Noise Wall 12

Noise wall 12 was evaluated along the north side of the SB I-205 right of way to provide shielding to the Grand Cove Development, specifically the Edgewater at the Cove Apartments, in Oregon City (See Figure 31). The apartment development is currently under construction and is behind the Oregon City Shopping Center, east of OR 99E. Several units have balconies or patios that will face I-205, resulting in impacts at 43 outdoor use areas (i.e., balconies or patios). Receptor IDs R704 to R706, R710, R711, R749 to R752, R755, R756, R793 to R796, R799, R800, R809, R838 to R840, R843 to R845, R847, R848, and R863 to R878 are predicted to exceed the NAAC at the complex. Noise modeling, as documented in the detailed tables in Appendix D, shows that at 18 feet or taller a noise wall would reduce noise levels by 5 dB(A) or greater at over 50 percent of the impacted receptors and therefore would be feasible. An 18-foot tall noise wall, 1,381 feet long, would achieve the design goal of 7 dB(A) reduction at one or more receptors, would benefit 46 receptors, and would cost $621,200 or $13,504 per benefited receptor. Noise wall 12 would be both feasible and reasonable and is recommended for inclusion in the Project design.

7 Construction Noise and Vibration Analysis

Analysis of temporary construction noise and vibration impacts was completed for the Project. This effort included a qualitative assessment of noise and vibration from general construction of the roadway as well as a semi-quantitative analysis of blasting noise and vibration associated with the rock cut.

7.1 General Construction Noise and Vibration

If the Build Alternative were constructed sensitive land uses and structures would be exposed to temporarily elevated noise and vibration levels which may be a source of annoyance to the public.

Construction noise would be the result of operating construction equipment along the Project right of way. Noise levels from construction equipment would be dependent upon several factors such as the type of equipment, construction schedule, and distance to the equipment in use for the various Project construction activities.

Temporary construction vibration, similar to construction noise, would result in temporary elevated vibration levels; however, construction vibration attenuates more quickly with distance than noise. As a result, only sensitive structures in much closer proximity to the Project could be potentially impacted by construction vibration.

Typical construction equipment maximum noise (L_{max}) and vibration (peak particle velocity in inches per second [ppv]) levels are provided in Table 11 and Table 12, respectively.

Table 11. Typical Construction Equipment Noise Levels

Equipment Description	Impulsive Noise Device?[1]	Acoustical use Factor (%)[2]	Specified L_{max} @ 50ft (dB(A), slow)[3]	Actual Measured L_{max} @ 50ft (dB(A), slow)[4]
All Other Equipment > 5 HP	No	50	85	-N/A-
Auger Drill Rig	No	20	85	84
Backhoe	No	40	80	78

Table 11. Typical Construction Equipment Noise Levels

Equipment Description	Impulsive Noise Device?[1]	Acoustical use Factor (%)[2]	Specified L_{max} @ 50ft (dB(A), slow)[3]	Actual Measured L_{max} @ 50ft (dB(A), slow)[4]
Bar Bender	No	20	80	-N/A-
Blasting	Yes	-N/A-	94	-N/A-
Boring Jack Power Unit	No	50	80	83
Chain Saw	No	20	85	84
Clam Shovel (dropping)	Yes	20	93	87
Compactor (ground)	No	20	80	83
Compressor (air)	No	40	80	78
Concrete Batch Plant	No	15	83	-N/A-
Concrete Mixer Truck	No	40	85	79
Concrete Pump Truck	No	20	82	81
Concrete Saw	No	20	90	90
Crane	No	16	85	81
Dozer	No	40	85	82
Drill Rig Truck	No	20	84	79
Drum Mixer	No	50	80	80
Dump Truck	No	40	84	76
Excavator	No	40	85	81
Flat Bed Truck	No	40	84	74
Front End Loader	No	40	80	79
Generator	No	50	82	81

Table 11. Typical Construction Equipment Noise Levels

Equipment Description	Impulsive Noise Device?[1]	Acoustical use Factor (%)[2]	Specified L_{max} @ 50ft (dB(A), slow)[3]	Actual Measured L_{max} @ 50ft (dB(A), slow)[4]
Generator (<25KVA, VMS signs)	No	50	70	73
Gradall	No	40	85	83
Grader	No	40	85	-N/A-
Grapple (on backhoe)	No	40	85	87
Horizontal Boring Hydr. Jack	No	25	80	82
Hydra Break Ram	Yes	10	90	-N/A-
Impact Pile Driver	Yes	20	95	101
Jackhammer	Yes	20	85	89
Man Lift	No	20	85	75
Mounted Impact hammer (hoe ram)	Yes	20	90	90
Pavement Scarafier	No	20	85	90
Paver	No	50	85	77
Pickup Truck	No	40	55	75
Pneumatic Tools	No	50	85	85
Pumps	No	50	77	81
Refrigerator Unit	No	100	82	73
Rivit Buster/chipping gun	Yes	20	85	79
Rock Drill	No	20	85	81
Roller	No	20	85	80
Sand Blasting (Single Nozzle)	No	20	85	96

Table 11. Typical Construction Equipment Noise Levels

Equipment Description	Impulsive Noise Device?[1]	Acoustical use Factor (%)[2]	Specified L_{max} @ 50ft (dB(A), slow)[3]	Actual Measured L_{max} @ 50ft (dB(A), slow)[4]
Scraper	No	40	85	84
Shears (on backhoe)	No	40	85	96
Slurry Plant	No	100	78	78
Slurry Trenching Machine	No	50	82	80
Soil Mix Drill Rig	No	50	80	-N/A-
Tractor	No	40	84	-N/A-
Vacuum Excavator (Vac-truck)	No	40	85	85
Vacuum Street Sweeper	No	10	80	82
Ventilation Fan	No	100	85	79
Vibrating Hopper	No	50	85	87
Vibratory Concrete Mixer	No	20	80	80
Vibratory Pile Driver	No	20	95	101
Warning Horn	No	5	85	83
Welder/Torch	No	40	73	74

Notes:

[1] An indication as to whether or not the equipment is an impact device.

[2] The acoustical usage factor to assume for modeling purposes.

[3] The specification “spec” limit for each piece of equipment expressed as an Lmax level in dB(A) at a reference distance of 50 feet.

[4] The measured “ACTUAL” noise level at 50 feet for each piece of equipment.

Source: FHWA, 2006

Table 12. Typical Construction Equipment Vibration Levels

Equipment Description		PPV at 25 ft
Pile Driver(impact)	Upper range	1.518
	Typical	0.644
Pile Driver (sonic)	Upper range	0.734
	Typical	0.170
Clam shovel drop (slurry wall)		0.202
Hydromill (slurry wall)	In soil	0.008
	In rock	0.017
Vibratory Roller		0.210
Hoe Ram		0.089
Large bulldozer		0.089
Caisson drilling		0.089
Loaded Trucks		0.076
Jackhammer		0.035
Small bulldozer		0.003
Source: FTA, 2006		

7.2 Rock Cut (Blasting) Noise and Vibration

Blasting would be required to accomplish the rock cut needed to accommodate the widening of the I-205 facility from the Sunset Avenue overpass to the A Street overpass. Consequently, blast noise and vibration could result in impacts to nearby sensitive land uses. Blast vibration is calculated using the methods described in the Department of Interior Office of Surface Mining Reclamation and Enforcement (OSMRE) Blasting Guidance Manual (OSMRE, 1987). This approach uses the Scaled Distance Equation, which describes the relationship between distance in feet from a blast to a receptor point and the maximum explosive charge weight in pounds (lbs) per 8 milliseconds delay period. Using this equation, preliminary engineering determined the rock cut could be accomplished, without damaging nearby structures, with charge weights (per 8-millisecond delay period) ranging from 2 lbs to 40 lbs (Shannon and Wilson, 2017). The estimated range of distances to impact thresholds for vibration damage are provided in Table 13 for these sizes of charges, and include an upper bounds (i.e., worst case) and lower bounds (i.e., best case). The damage thresholds are from the Federal Transmit Administration’s guidance manual (FTA, 2006) and the vibration attenuation rates are based on OSMRE’s construction vibration calculation methodology. The range of distances to air blast damage levels are provided in Table 14. Attenuation rates for air blasts (blast noise) were also calculated assuming a construction detonation. The blasting effort will be designed to avoid structural damage at nearby sensitive areas while minimizing annoyance to the extent practicable.

Table 13. Estimated Blast Vibration Damage Distances

Building Category	Damage Threshold (PPV in/sec)	Lower Bounds		Upper Bounds	
		Distance to Damage Threshold for 2 lb Charge (feet)	Distance to Damage Threshold for 40 lb Charge (feet)	Distance to Damage Threshold for 2 lb Charge (feet)	Distance to Damage Threshold for 40 lb Charge (feet)
Reinforced-concrete, steel, or timber (Category 1)	0.5	16	71	67	300
Engineered concrete and masonry, no plaster (Category 2)	0.3	22	98	92	415
Non-engineered timber and masonry buildings	0.2	28	125	120	535
Buildings extremely susceptible to vibration damage	0.12	38	175	165	720

Source: Shannon and Wilson, 2017 and HMMH, 2018

Table 14. Estimated Blast Noise Levels

Charge Weight (lbs)	Damage Criteria [linear decibels (dBL)]	Annoyance Criteria (dBL)	Distance to Damage Criteria (feet)	Distance to Annoyance Criteria (feet)
9 lbs	151 dBL	120	4	325
40 lbs			7	550

Source: Shannon and Wilson, 2017 and HMMH, 2018

7.3 Construction Noise and Vibration Abatement

To avoid, minimize, and abate temporary adverse noise and vibration impacts the following measures, as described in Section 290.32 of ODOT standard specifications, should be taken to the extent practicable:

- The contractor shall comply with all state and local sound control and noise level rules, regulations, and ordinances that would apply to any work performed pursuant to the contract.

- The contractor must provide a detailed construction noise control plan, which would list all of the proposed construction equipment and types of construction activity.
- All equipment shall comply with pertinent equipment noise standards of the US Environmental Protection Agency (EPA).
- All equipment used shall have sound control devices no less effective than those provided on the original equipment. No equipment shall have unmuffled exhaust.
- All equipment shall comply with the pertinent equipment noise standards found in the FHWA Roadway Construction Noise Model (FHWA 2006).
- No construction shall be performed within 1,000 feet of an occupied dwelling unit on weekends, legal holidays, and between the hours of 10:00 p.m. and 7:00 a.m. on other days without the approval of ODOT's Project Manager.
- No pile driving, hoe ramming, or blasting operations shall be performed within 3,000 feet of any occupied dwelling unit on weekends, legal holidays, and between the hours of 10:00 p.m. and 7:00 a.m. on other days without the approval of ODOT's Project Manager.
- The noise from rock crushing or screening operations within 3,000 feet of any occupied dwelling shall be mitigated by strategic placement of material stockpiles between the operation and the affected dwelling or by other means approved by ODOT's Project Manager.

Should specific noise complaints occur during the construction of the project, one or more of the following noise abatement measures may be required at the Contractor's expense, as directed by ODOT's Project Manager:

- Locate stationary construction equipment as far from the nearby noise-sensitive properties as possible.
- Shut off idling equipment.
- Use alternative methods or equipment which produces less noise.
- Reschedule construction operations to avoid periods of noise annoyance identified in the complaint.
- Notify nearby residences whenever extremely noisy work will be occurring.
- Install temporary or portable acoustic barriers around stationary construction noise sources.
- Operate electric-powered equipment using line voltage power instead of on-site generators.

- Use manually adjustable or new broadband backup alarms which can be localized and focused to the danger zone and set to the low noise setting on all construction vehicles used during nighttime hours.

ODOT employs several methods to ensure successful and safe blasting, specifically (ODOT 2018):

- Require an approved blasting consultant to design/approve the blasting plans
- Perform pre-blast surveys. These are done either by or through the blasting contractor prior to the blast to document the condition of structures, foundations, and windows prior to exposure to vibration from blasting.
- ODOT reviews the submitted blasting plans prior to allowing the blasts to proceed
- Require ground vibration monitoring during the blasts
- Require that blast mats be laid upon the blast area to help contain flying rock • Blasting contractors are licensed and bonded

ODOT will obtain construction noise variances as needed from West Linn, Oregon City, and Clackamas County.

8 Information for Local Government Officials

A copy of this report will be provided to the planning departments of the City of West Linn, the City of Oregon City, and Clackamas County by ODOT. By providing this to the local agencies responsible for planning in the areas analyzed it will be possible for these agencies to inform development.

At the time of the development of this report several vacant lands are located within the study area. Most of the vacant areas are located between the Stafford Road and 10th Street interchanges with several other smaller vacant areas between 10th Avenue and OR 43 as well as between OR 99E and OR 213. Table 15 provides the distances to ODOT's NAAC. Local agencies should consider whether residential (NAAC B), public use such as schools and parks (NAAC C), and commercial uses (NAAC E) are compatible in these areas.

Table 15. Distances to NAACs for Local Planning Agencies

I-205 Segment	Distance to NAAC B & C Threshold (feet)	Distance to NAAC E Threshold (feet)
Stafford Road to 10th Street	420	150
10th Street to OR 43	435	155
OR 99E to OR 213	480	170

9 Statement of Likelihood

Based on the findings of this noise technical report, ODOT will further evaluate traffic noise abatement measures in the form of noise walls during the final design of the roadway. At a minimum, the following seven locations will be reevaluated in detail:

- Noise Wall 2: North of Blankenship Road located parallel to the SB I-205 lanes.
- Noise Wall 4: South of Blankenship Road located parallel to the SB I-205 lanes.
- Noise Wall 6a: 4,750 feet south of the 10th Street interchange and located on a ridge at the SB I-205 right of way.
- Noise Wall 7: North of the Sunset Avenue overcrossing and west of the I-205 SB lanes extending for approximately 960 feet.

These noise walls would abate impacts at 108 residences and would benefit an additional 36 residences and the retirement home. Preliminary costs for the noise walls would total $2,315,640. If during final design of the roadway these conditions have changed substantially, the abatement measure might no longer be feasible and reasonable and therefore not provided. A final decision will be made upon completion of the Project's final design, a cost estimating process, and the public involvement process.

10 References

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11 Figures

Figure 1. Zoning

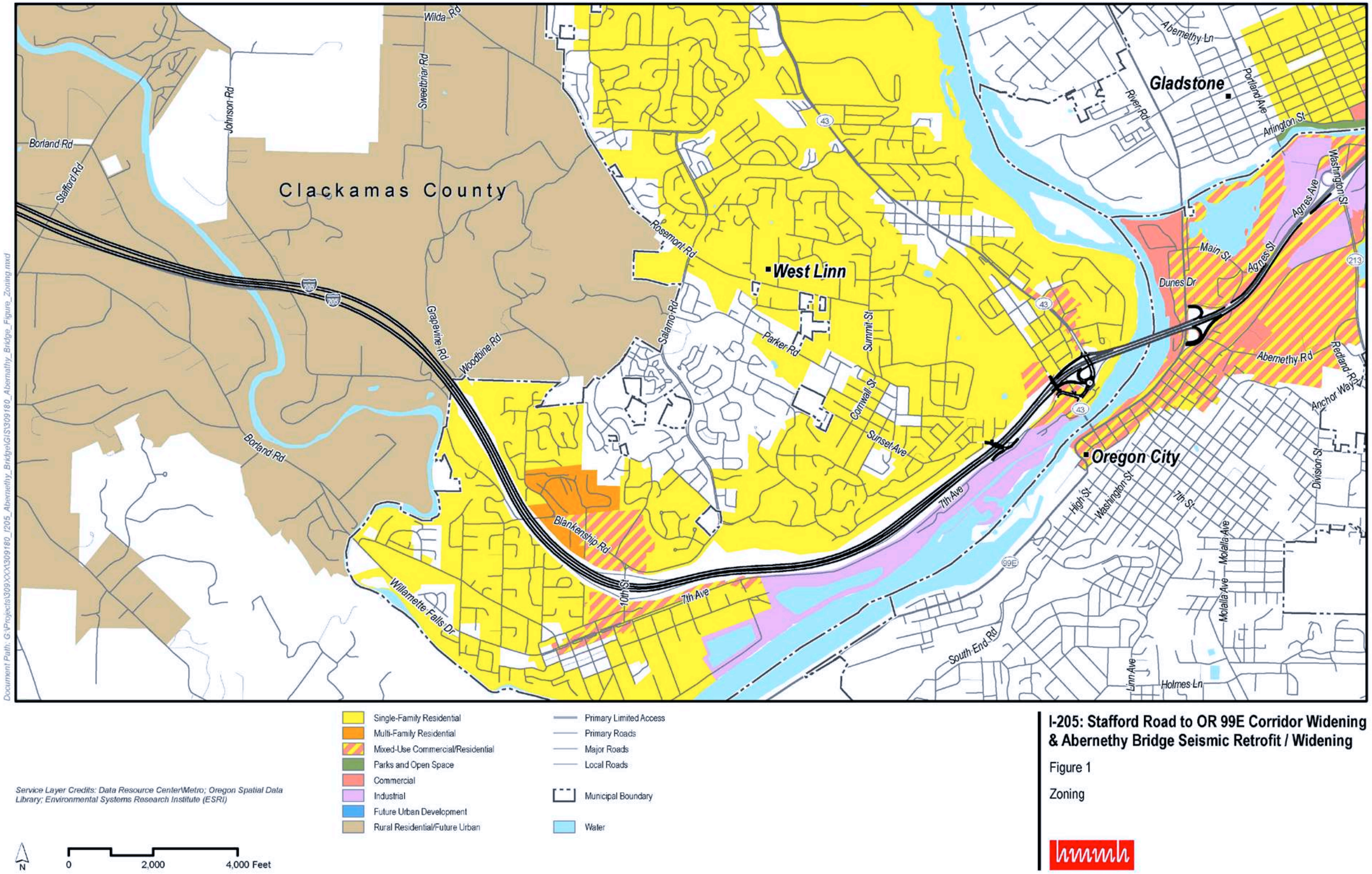


Figure 2. Comprehensive Plan Designations

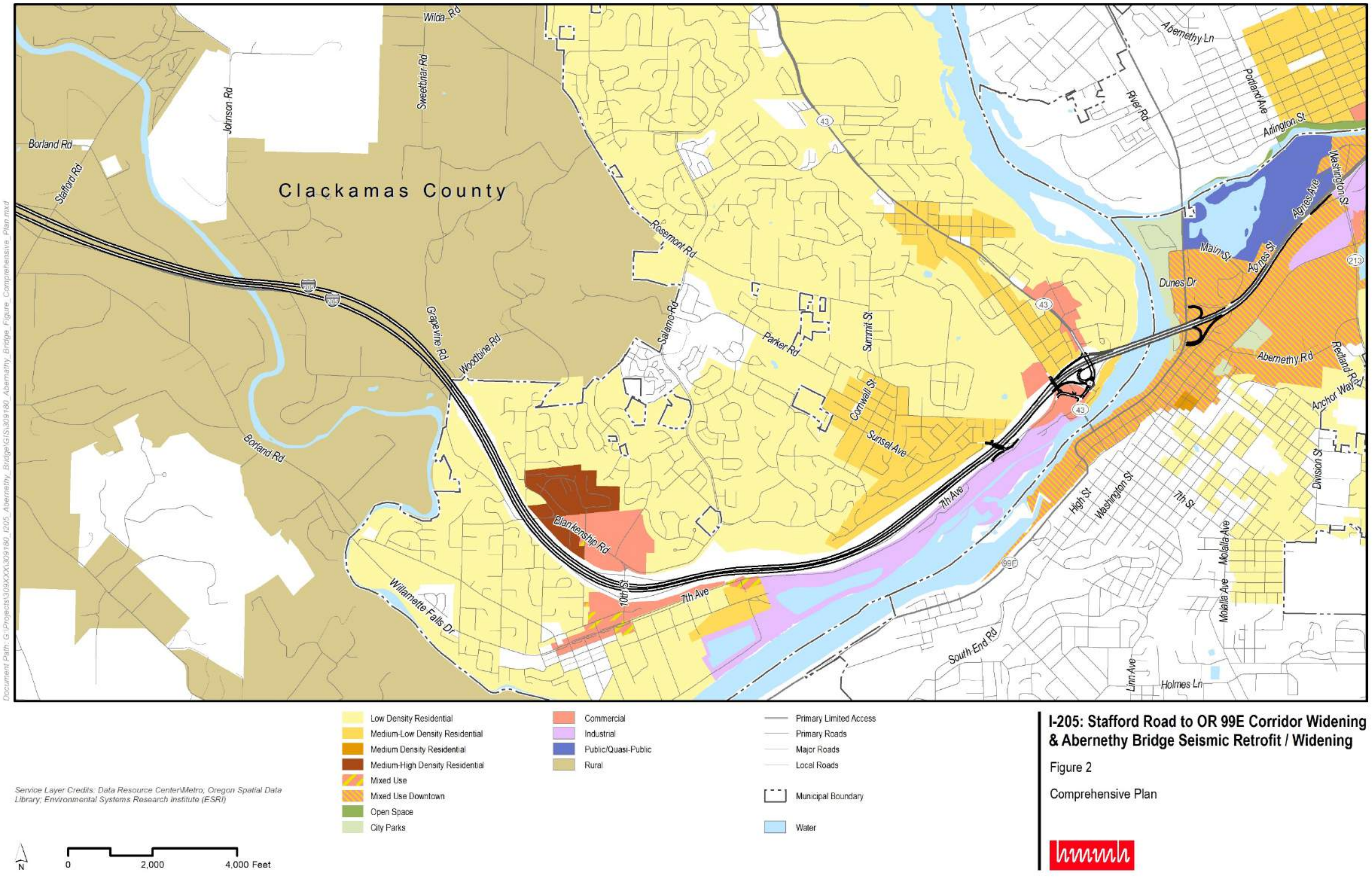


Figure 3. Existing Conditions/No Build Alternative

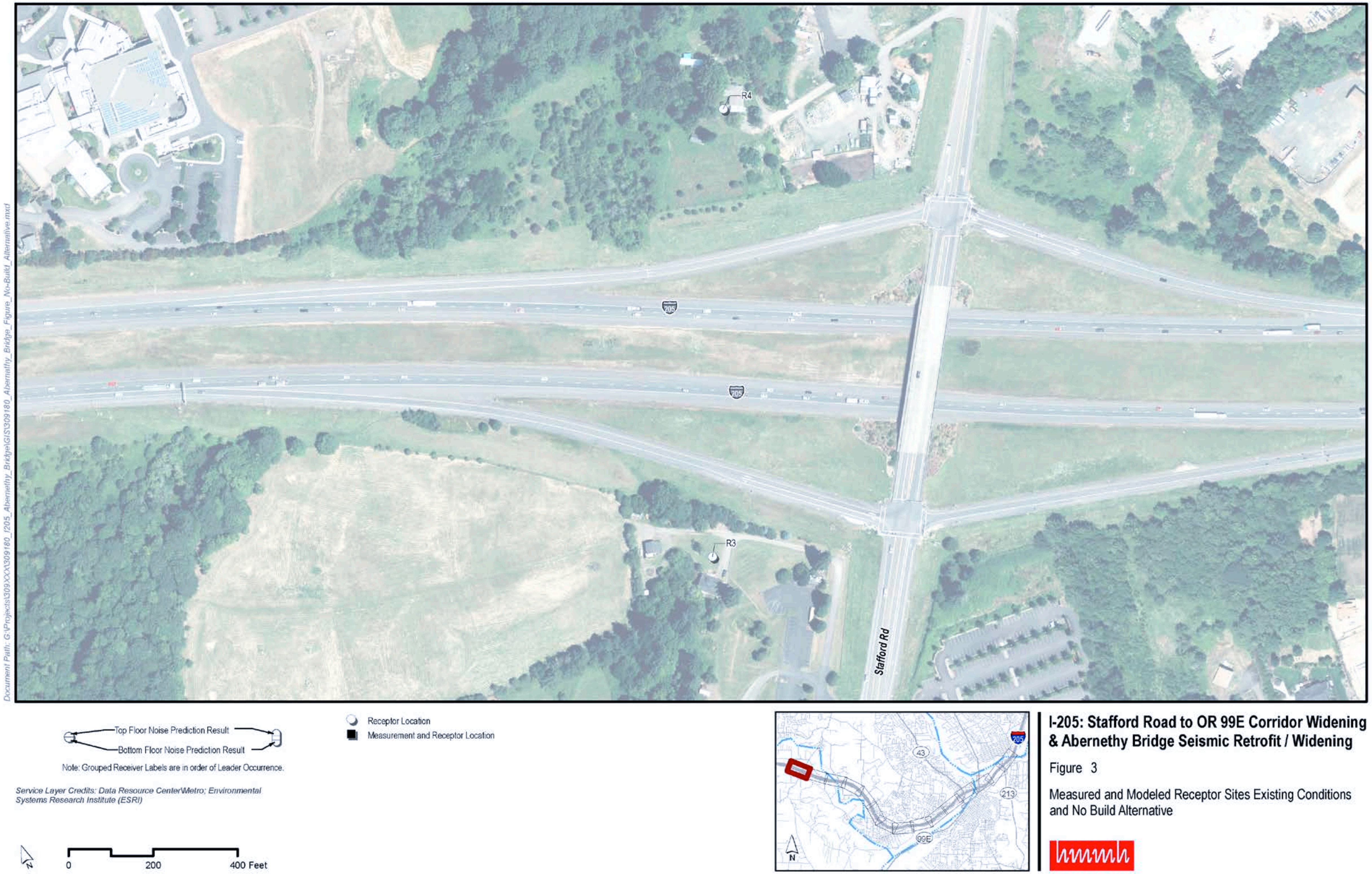


Figure 4. Existing Conditions/No Build Alternative

Figure 5. Existing Conditions/No Build Alternative

Figure 6. Existing Conditions/No Build Alternative

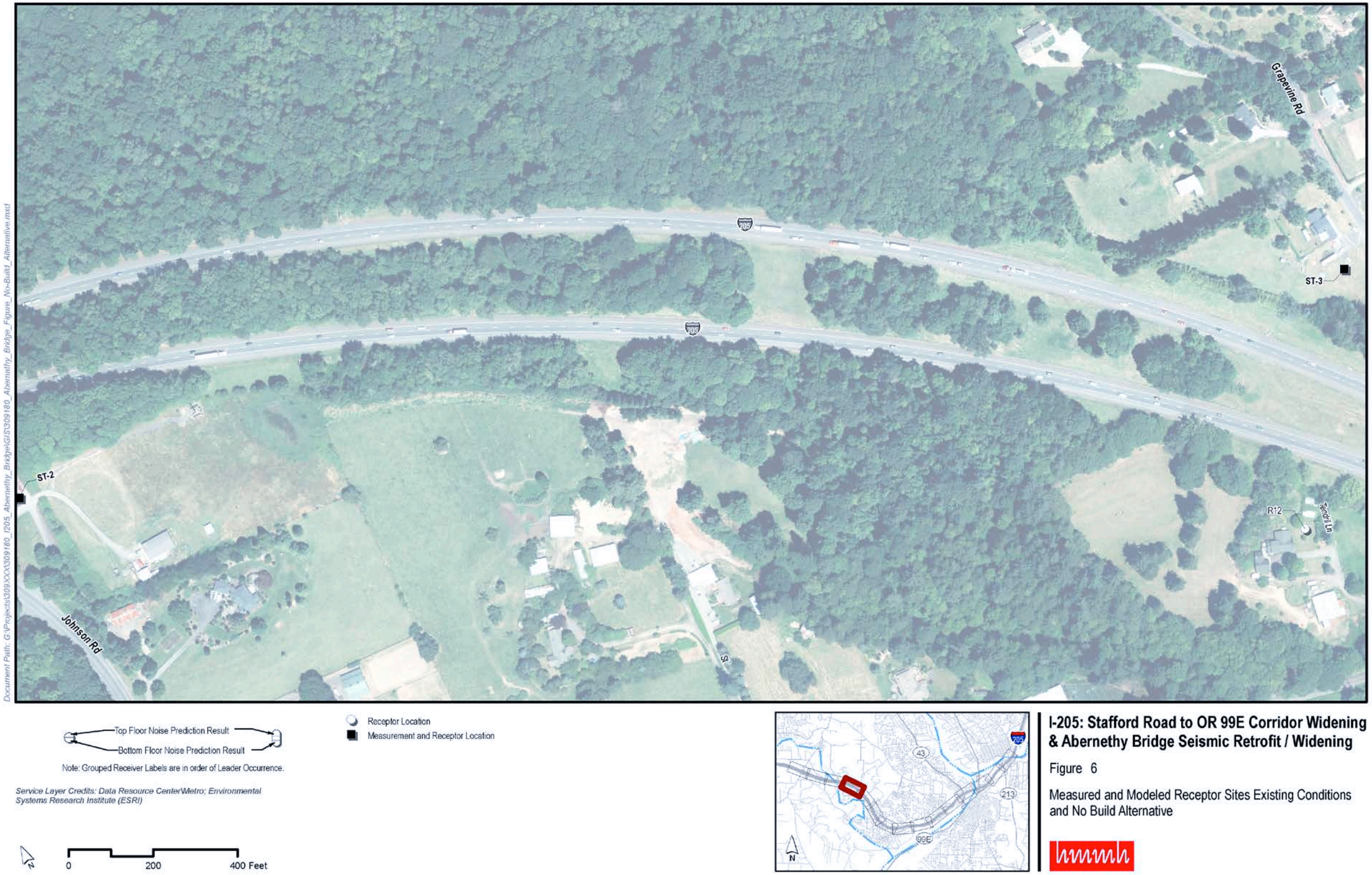
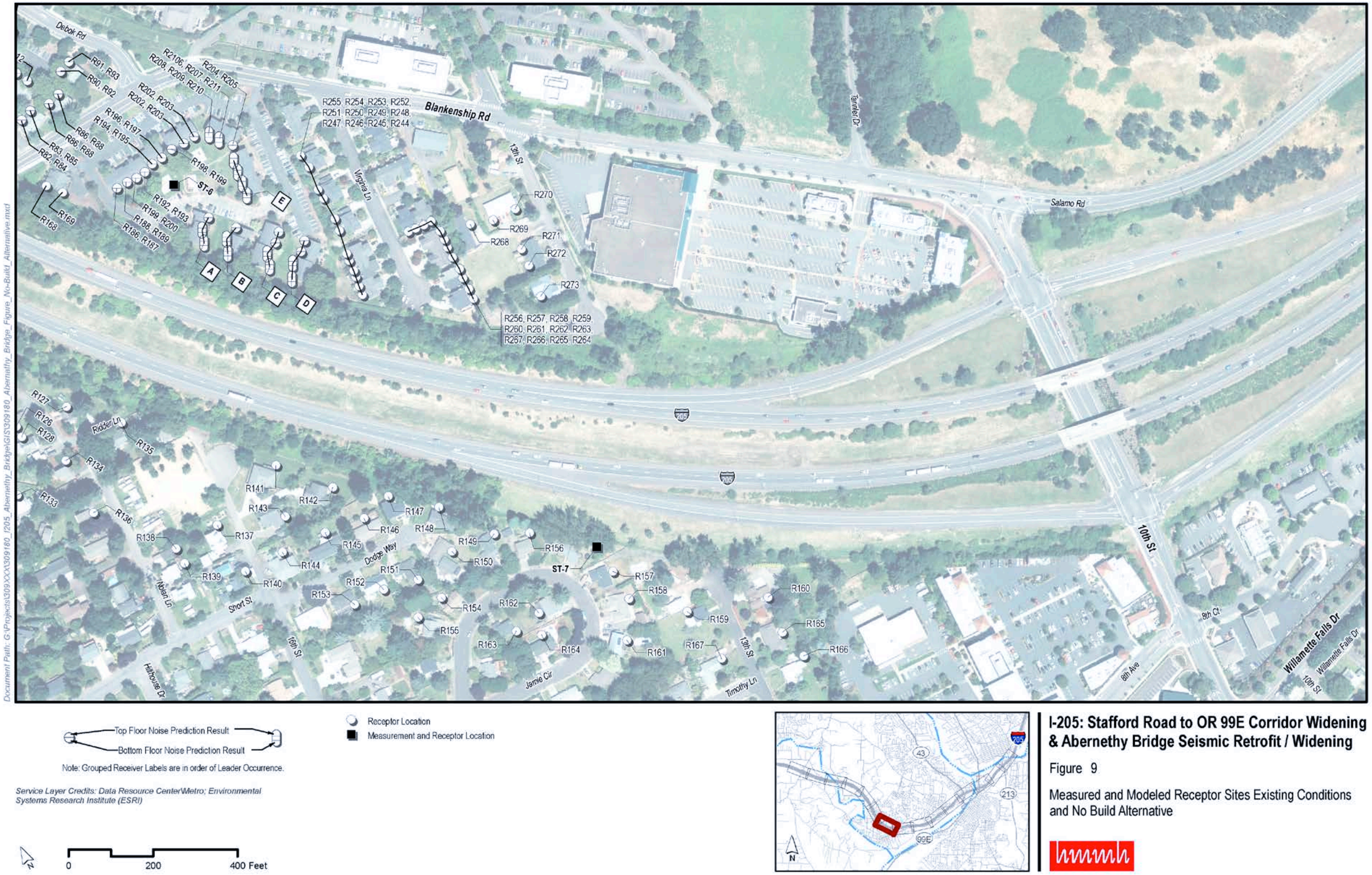


Figure 7. Existing Conditions/No Build Alternative

Figure 8. Existing Conditions/No Build Alternative

Figure 9. Existing Conditions/No Build Alternative



I-205: Stafford Road to OR 99E Corridor Widening & Abernethy Bridge Seismic Retrofit / Widening

Figure 9

Measured and Modeled Receptor Sites Existing Conditions and No Build Alternative

Figure 10. Existing Conditions/No Build Alternative

Figure 11. Existing Conditions/No Build Alternative

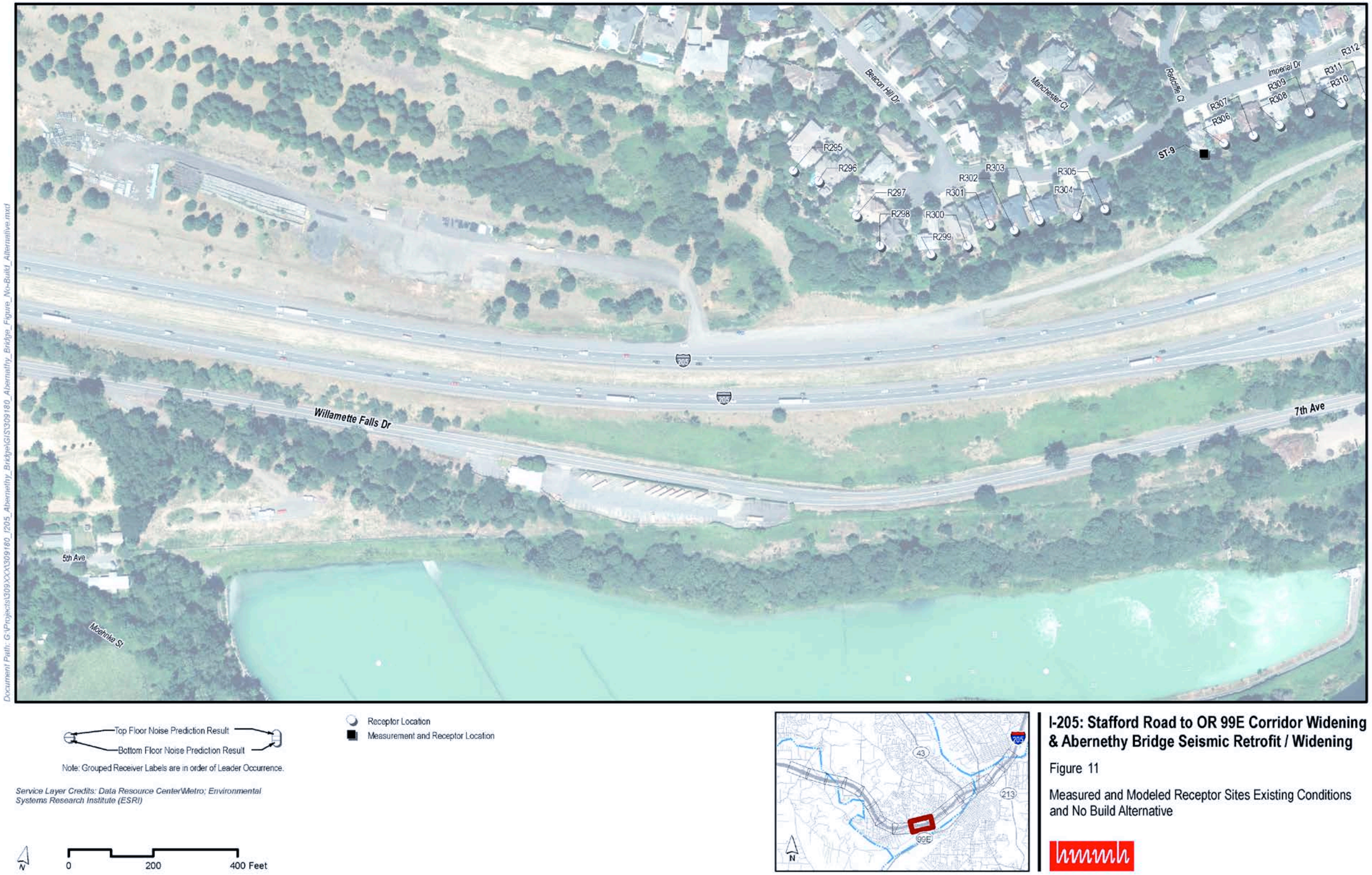


Figure 12. Existing Conditions/No Build Alternative

Figure 13. Existing Conditions/No Build Alternative

Figure 14. Existing Conditions/No Build Alternative

I-205: Stafford Road to OR 99E Corridor Widening & Abernethy Bridge Seismic Retrofit / Widening

Figure 14

Measured and Modeled Receptor Sites Existing Conditions and No Build Alternative

Figure 15. Existing Conditions/No Build Alternative

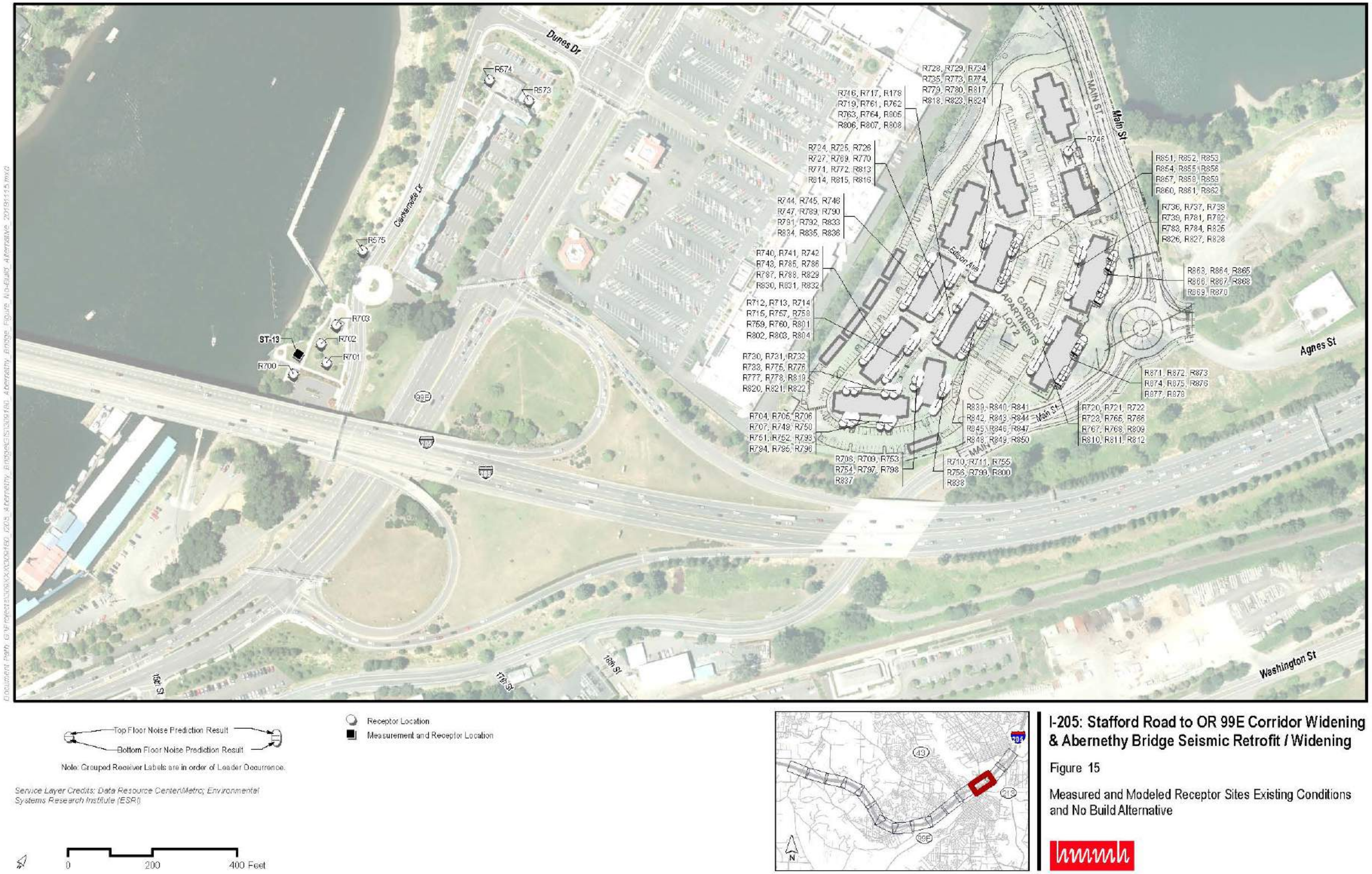


Figure 16. Existing Conditions/No Build Alternative

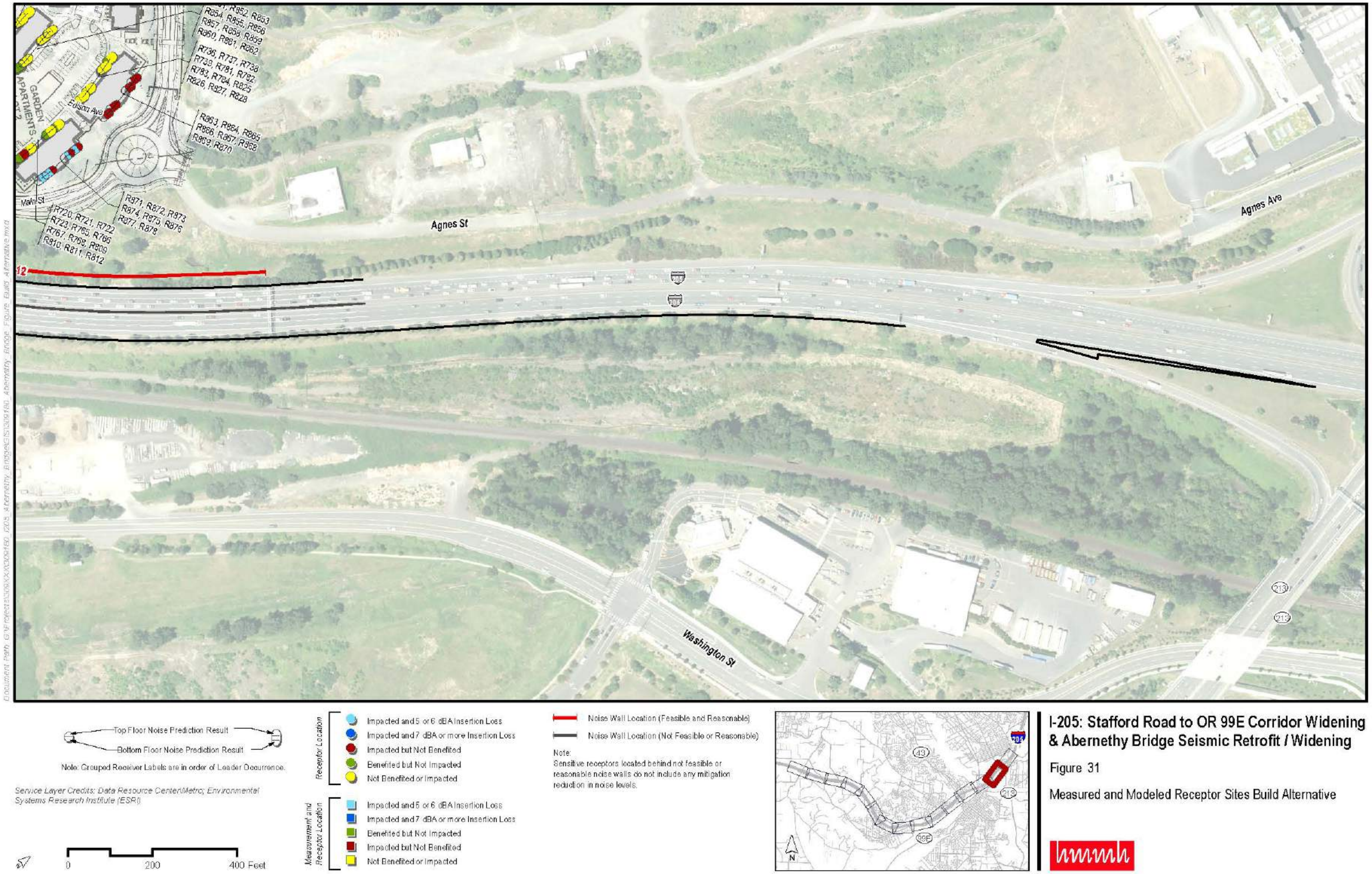
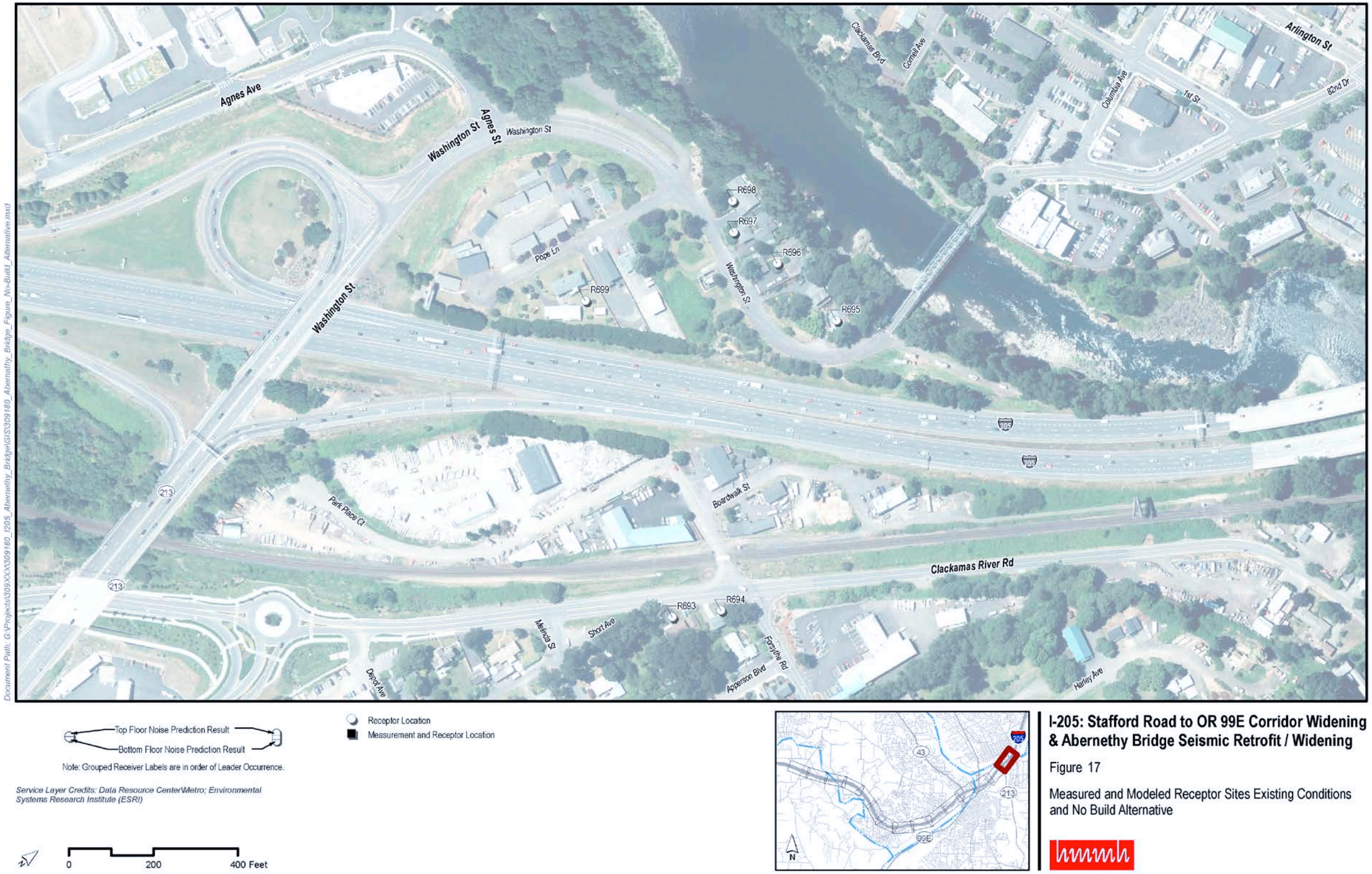


Figure 17. Existing Conditions/No Build Alternative



Service Layer Credits: Data Resource Center\Metro; Environmental Systems Research Institute (ESRI)

I-205: Stafford Road to OR 99E Corridor Widening & Abernethy Bridge Seismic Retrofit / Widening

Figure 17

Measured and Modeled Receptor Sites Existing Conditions and No Build Alternative

Figure 18. Build Alternative

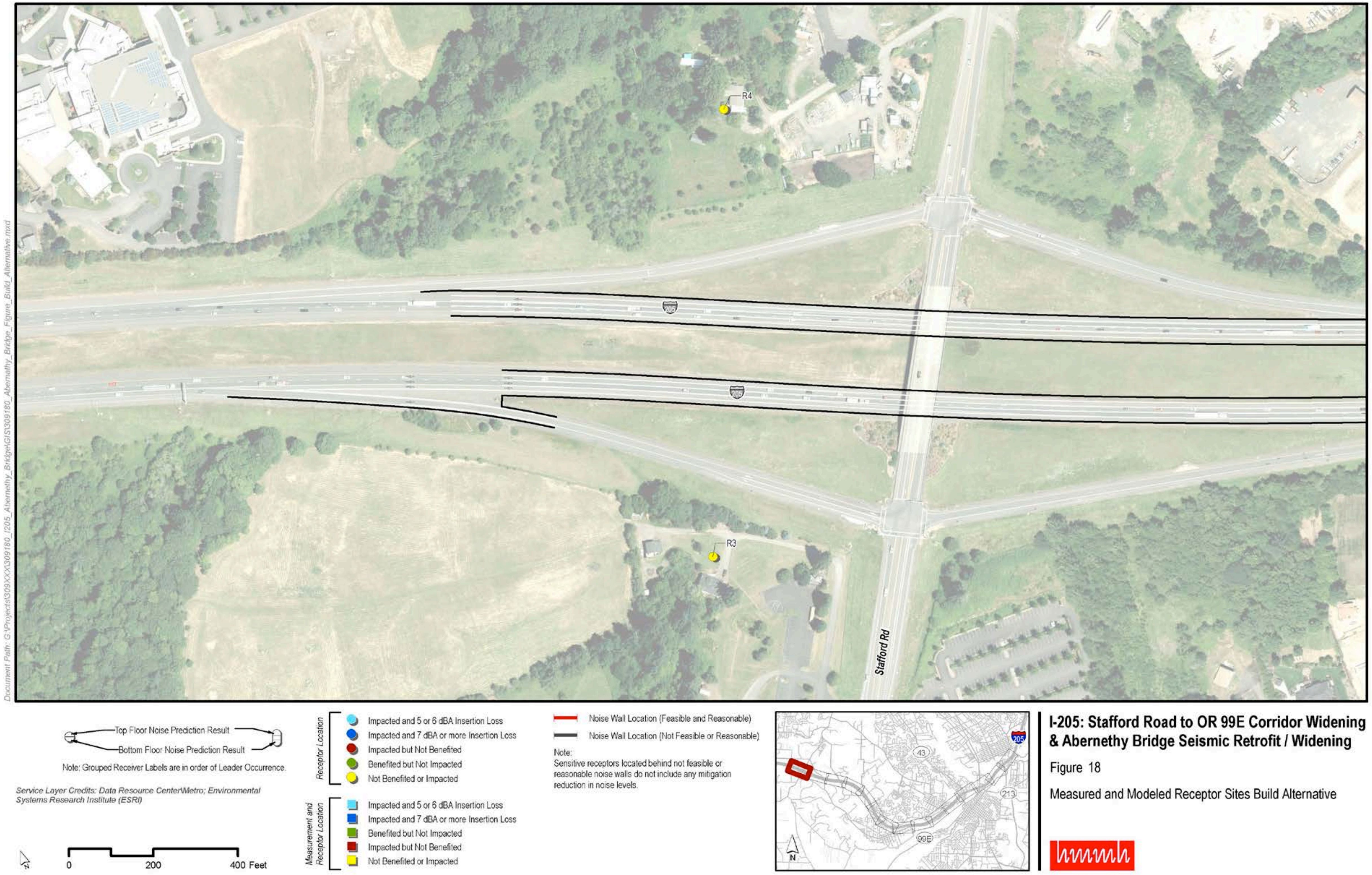


Figure 19. Build Alternative

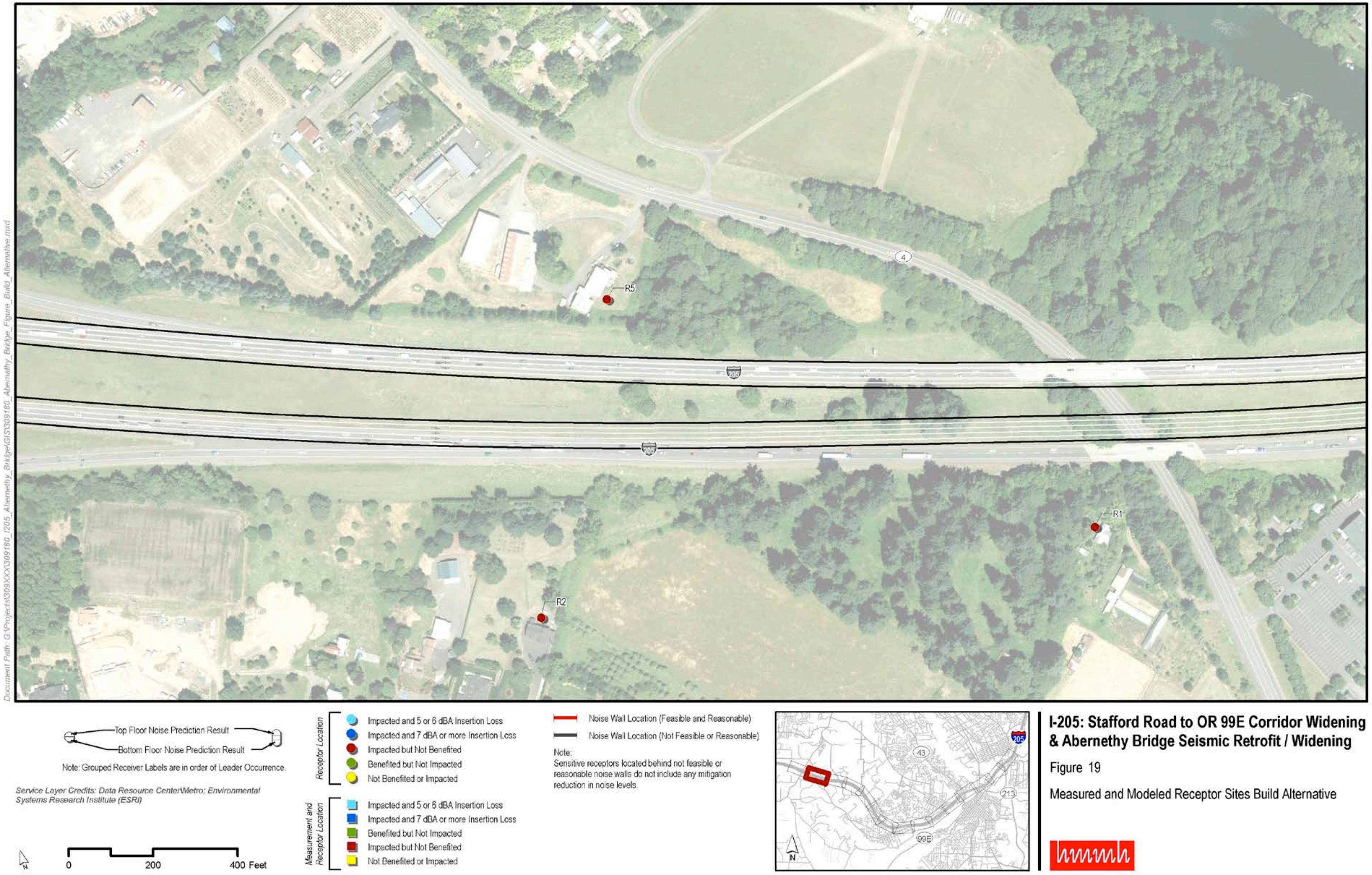


Figure 20. Build Alternative

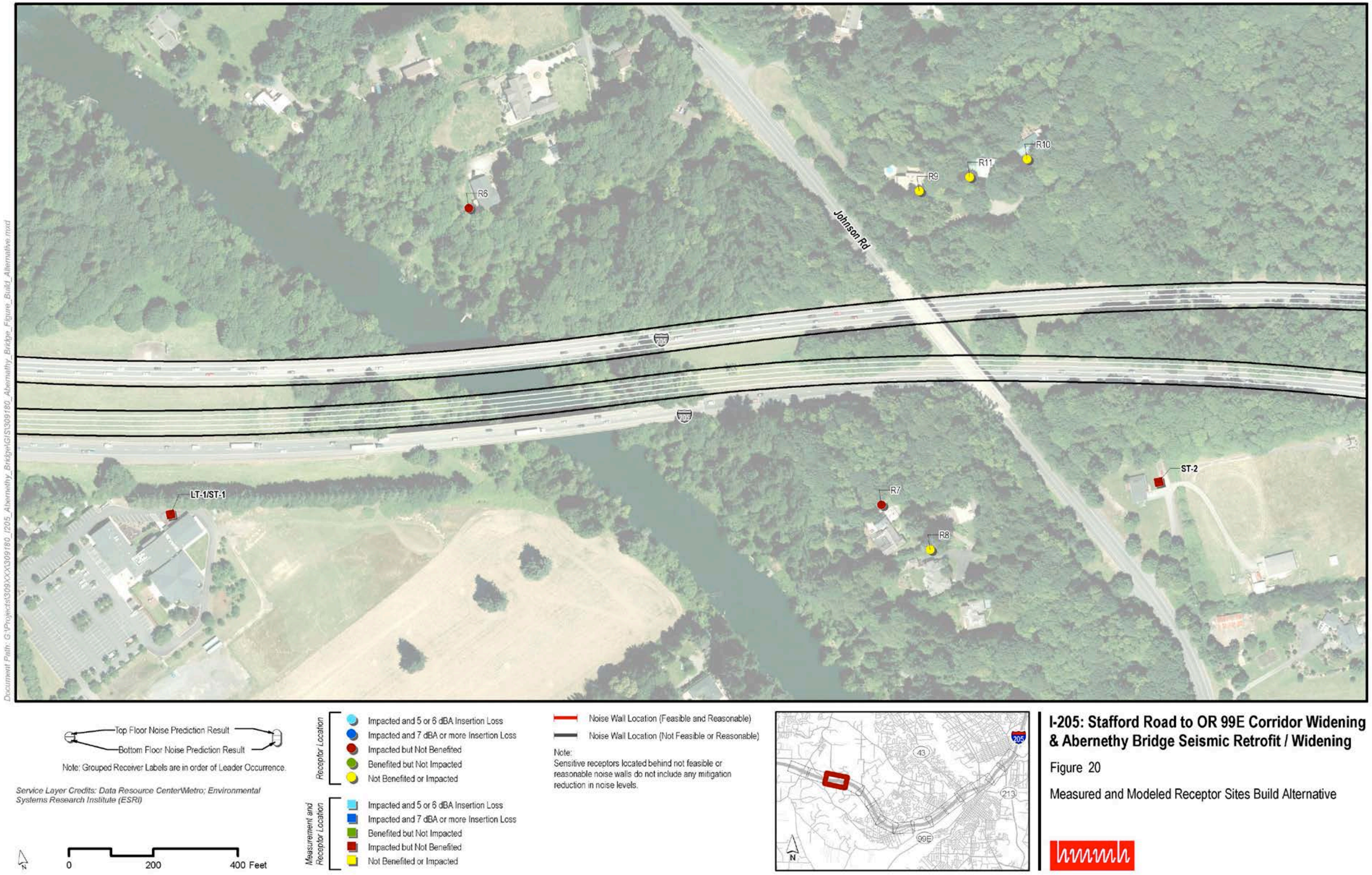


Figure 21. Build Alternative

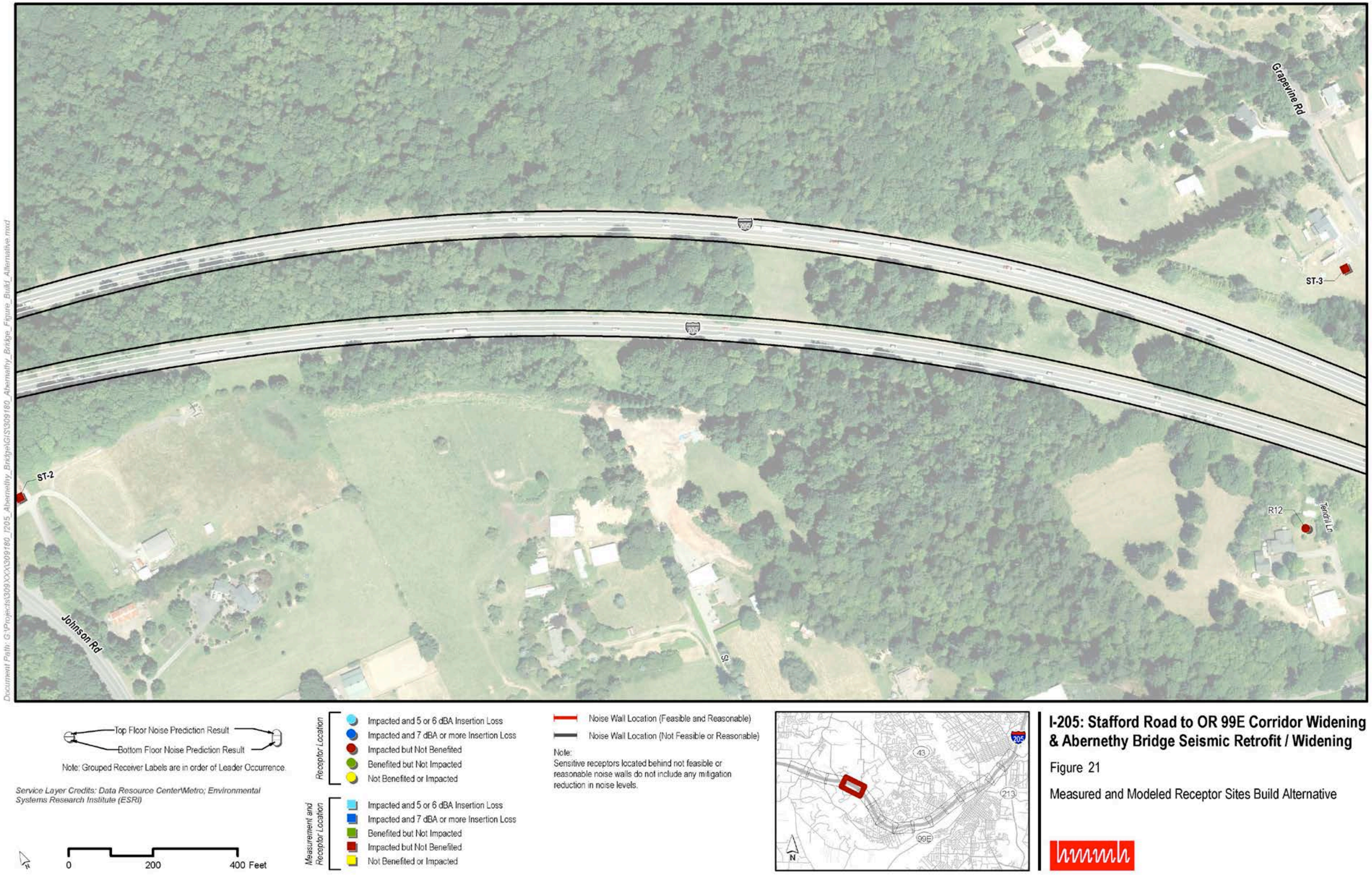
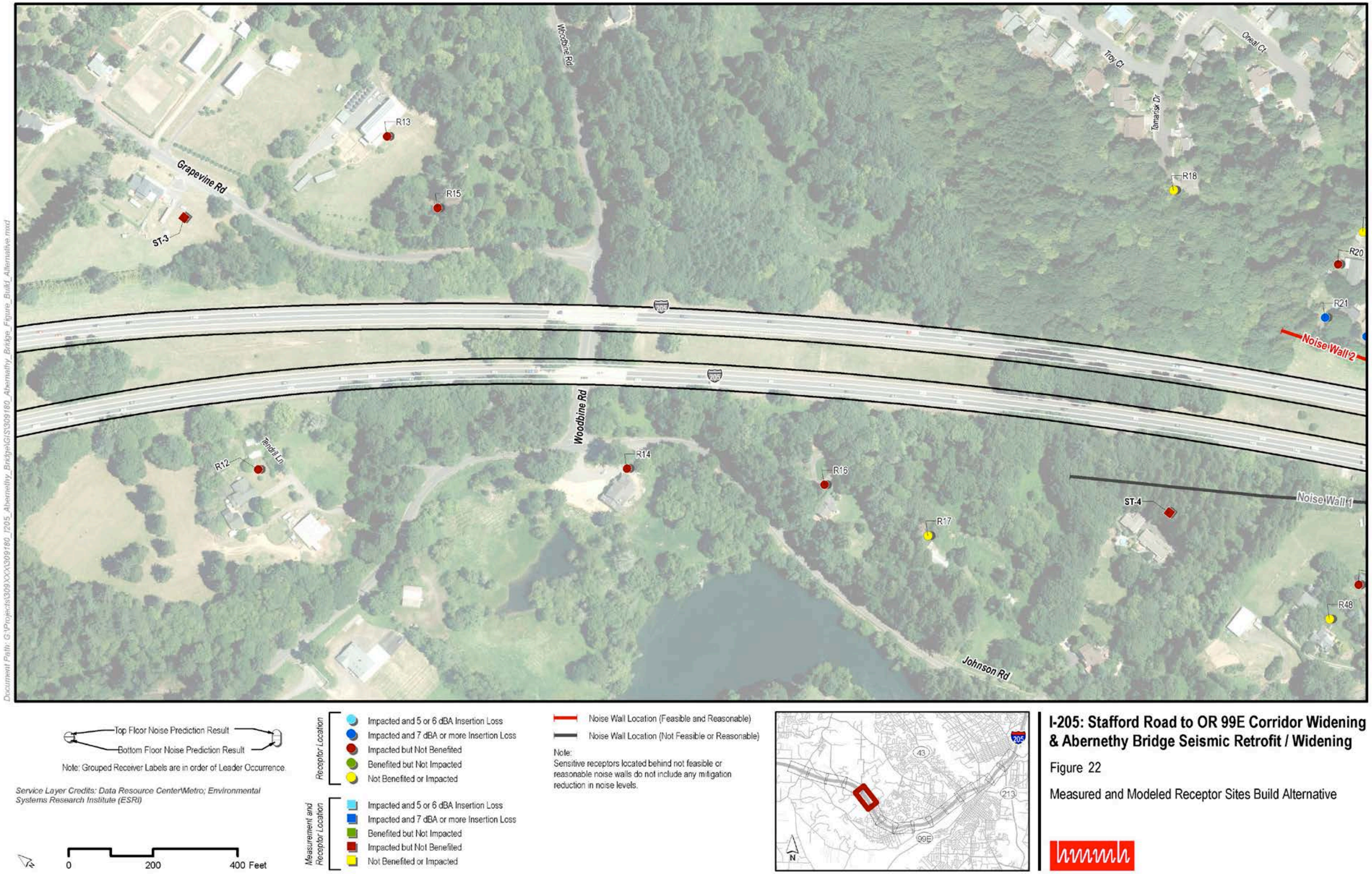


Figure 22. Build Alternative



Note: Grouped Receiver Labels are in order of Leader Occurrence.

Service Layer Credits: Data Resource Center\Metro; Environmental Systems Research Institute (ESRI)

Note:
Sensitive receptors located behind not feasible or reasonable noise walls do not include any mitigation reduction in noise levels.

Figure 23. Build Alternative

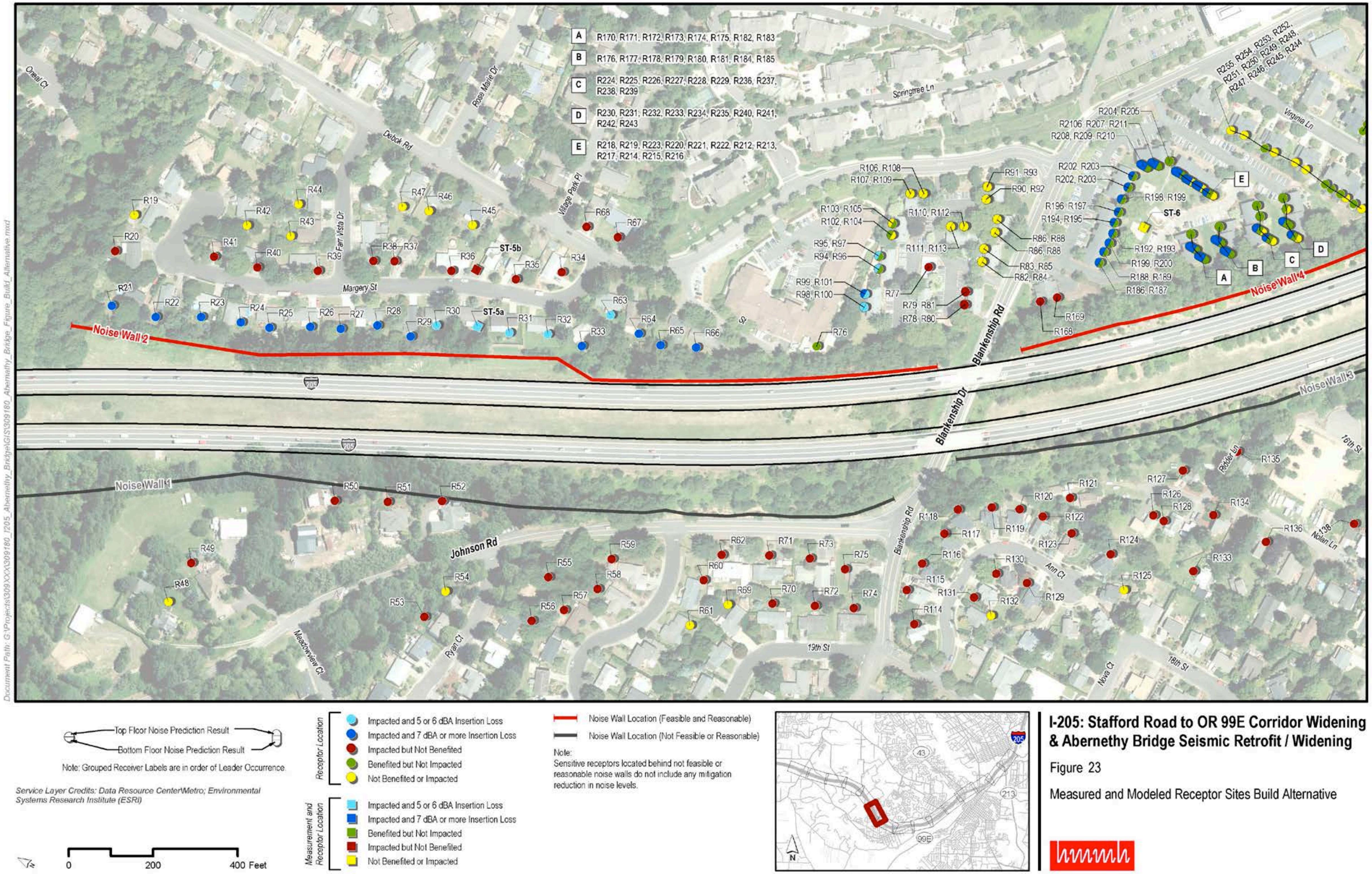


Figure 24. Build Alternative

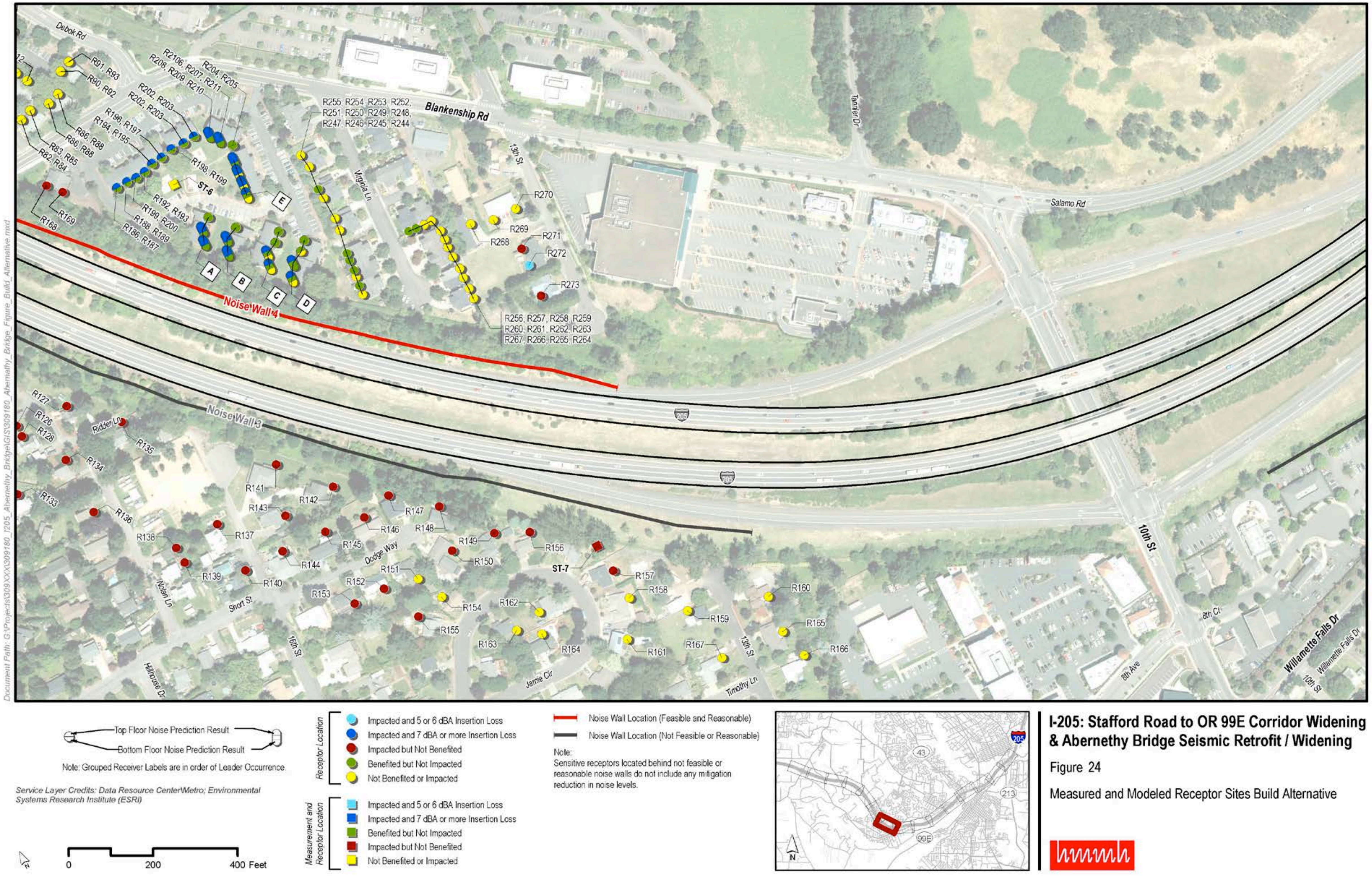
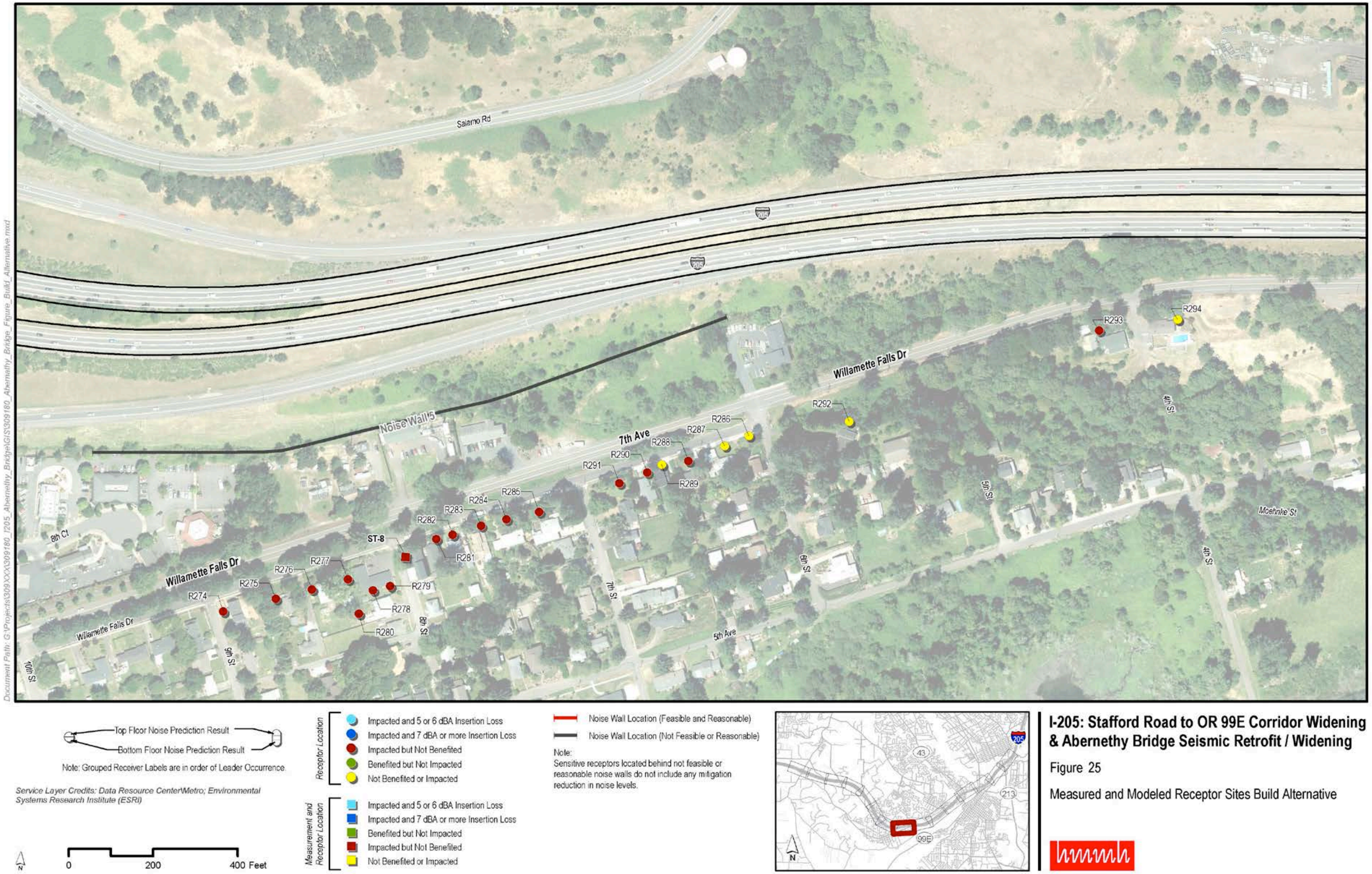


Figure 25. Build Alternative



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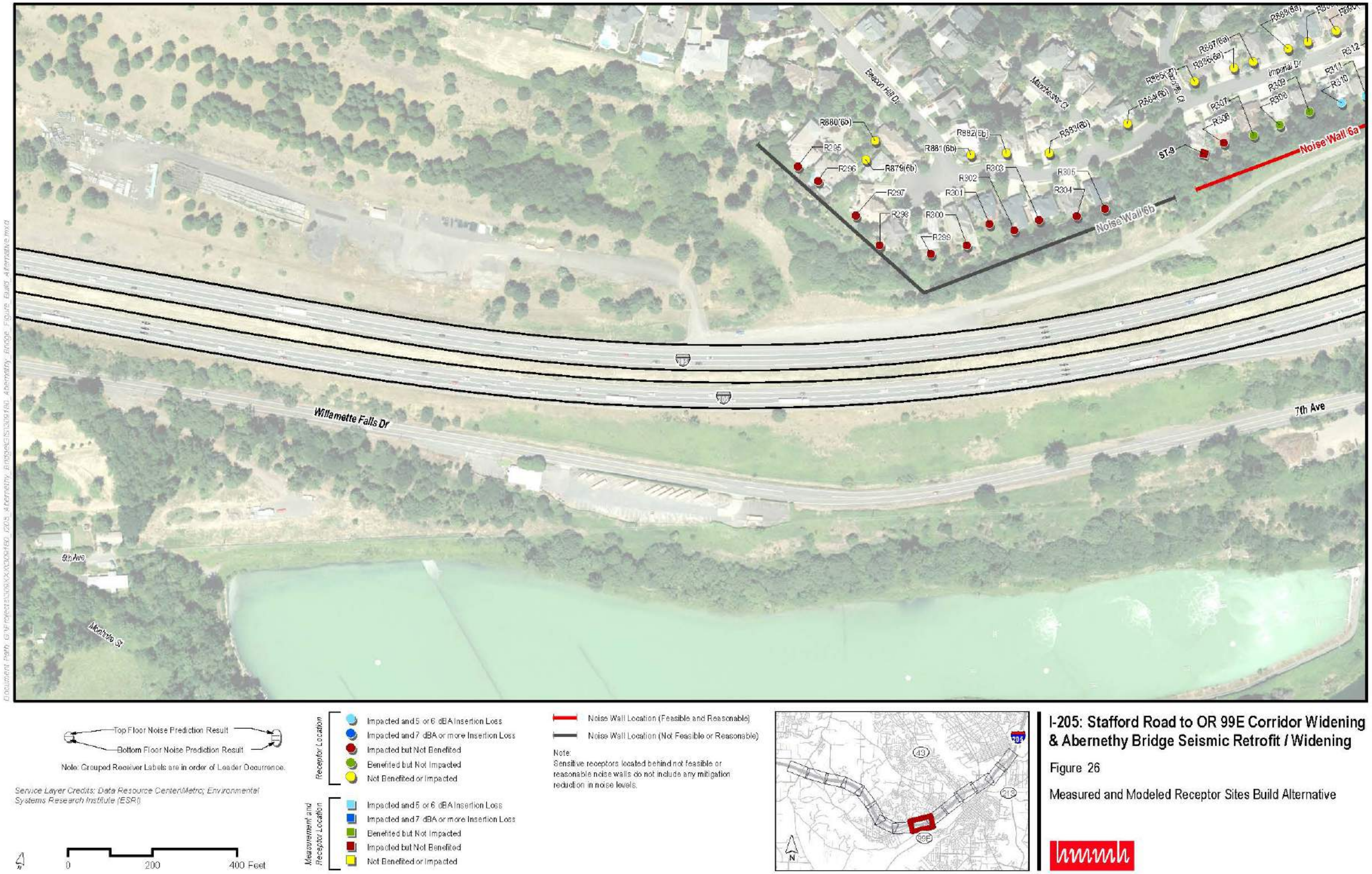


Figure 27. Build Alternative

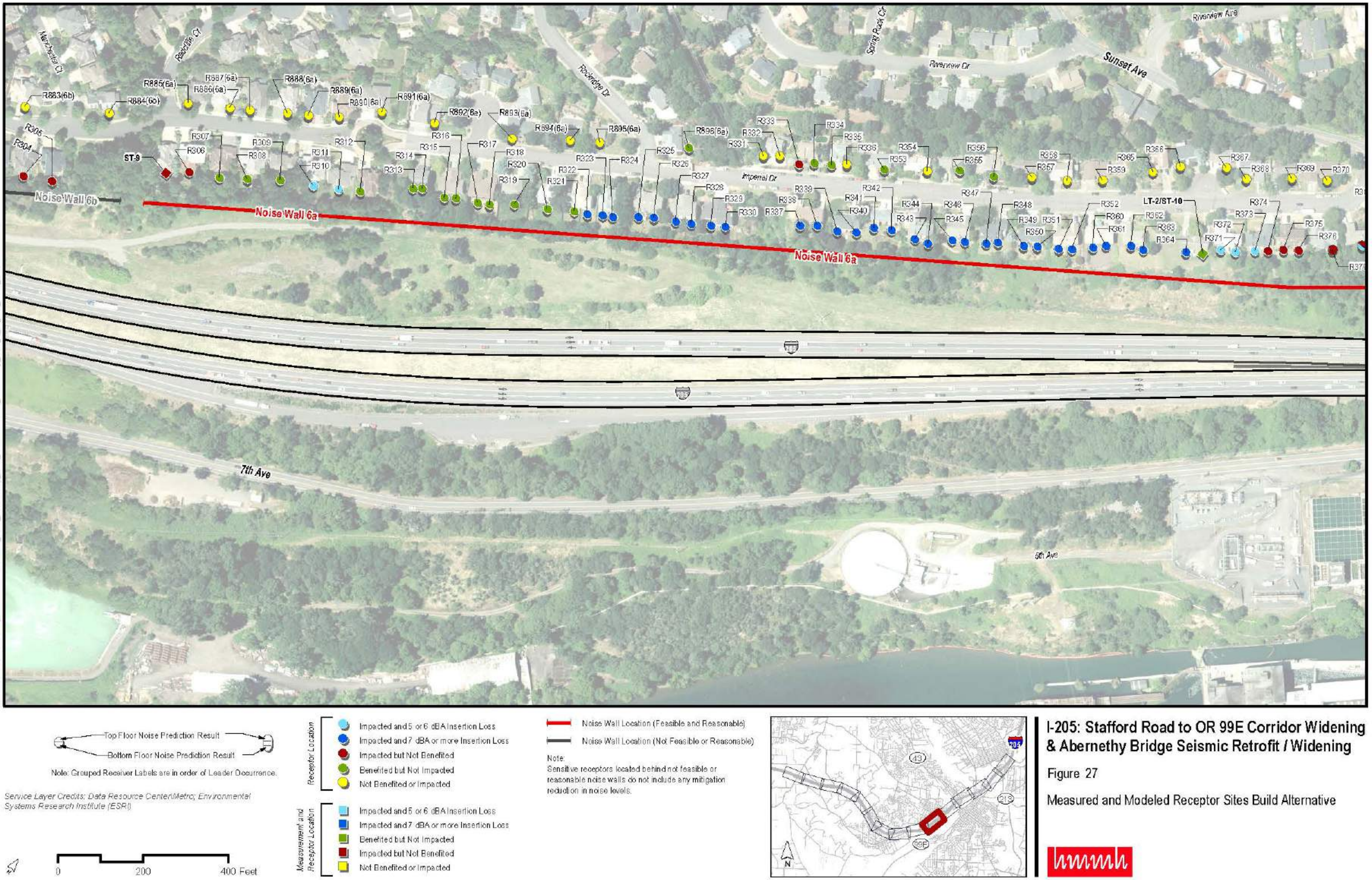


Figure 28. Build Alternative

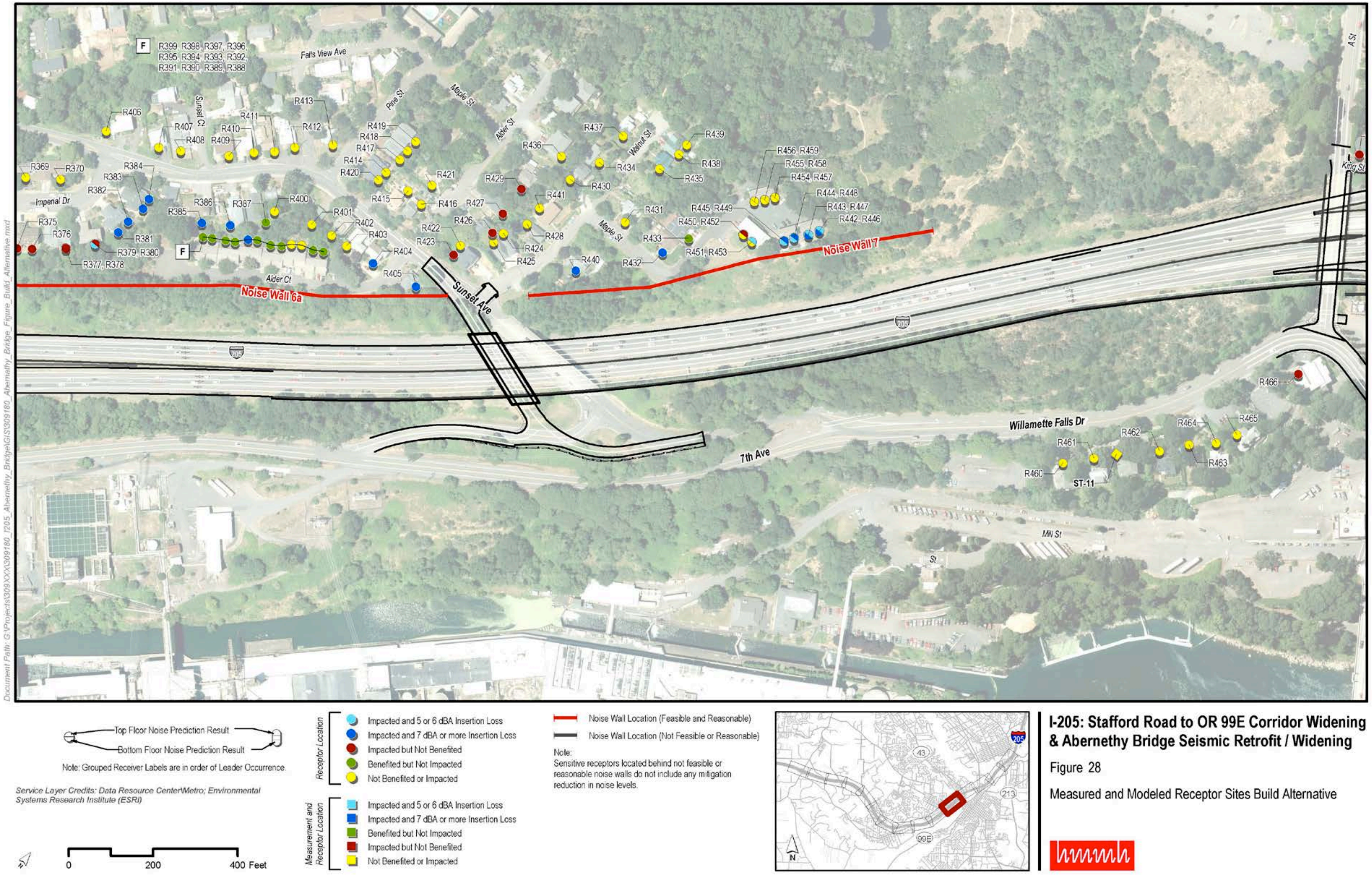


Figure 29. Build Alternative

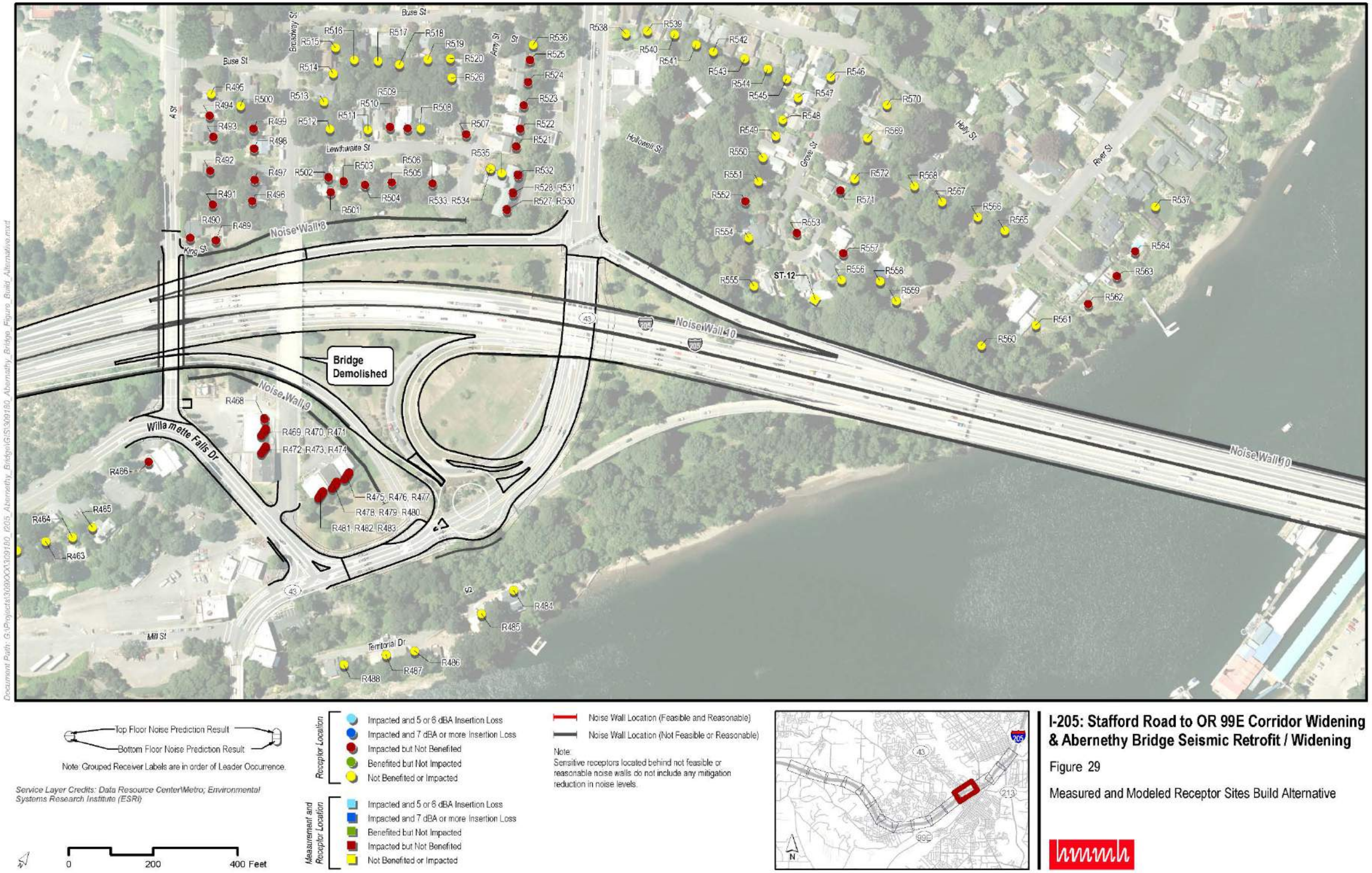


Figure 30. Build Alternative

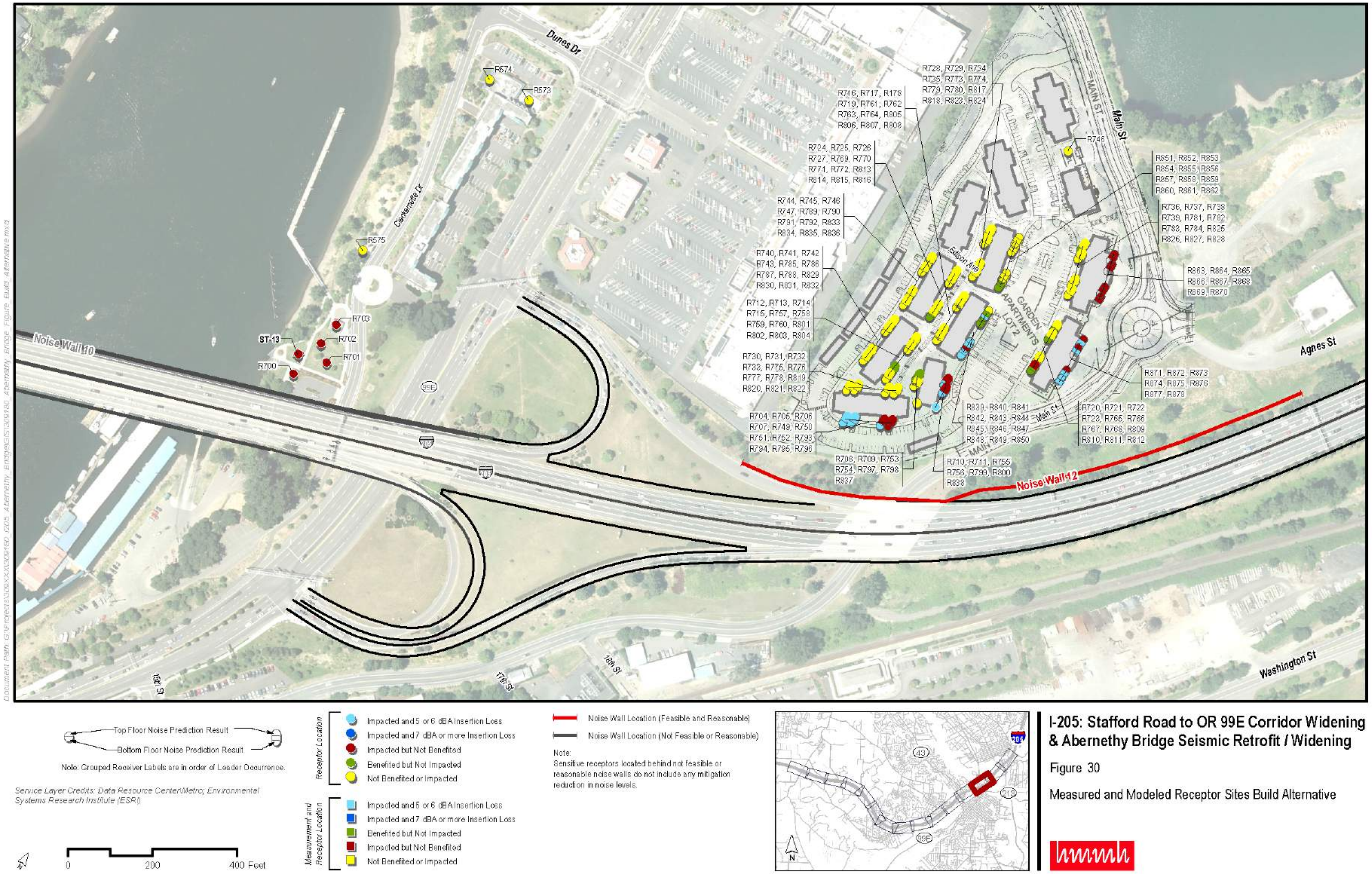


Figure 31. Build Alternative

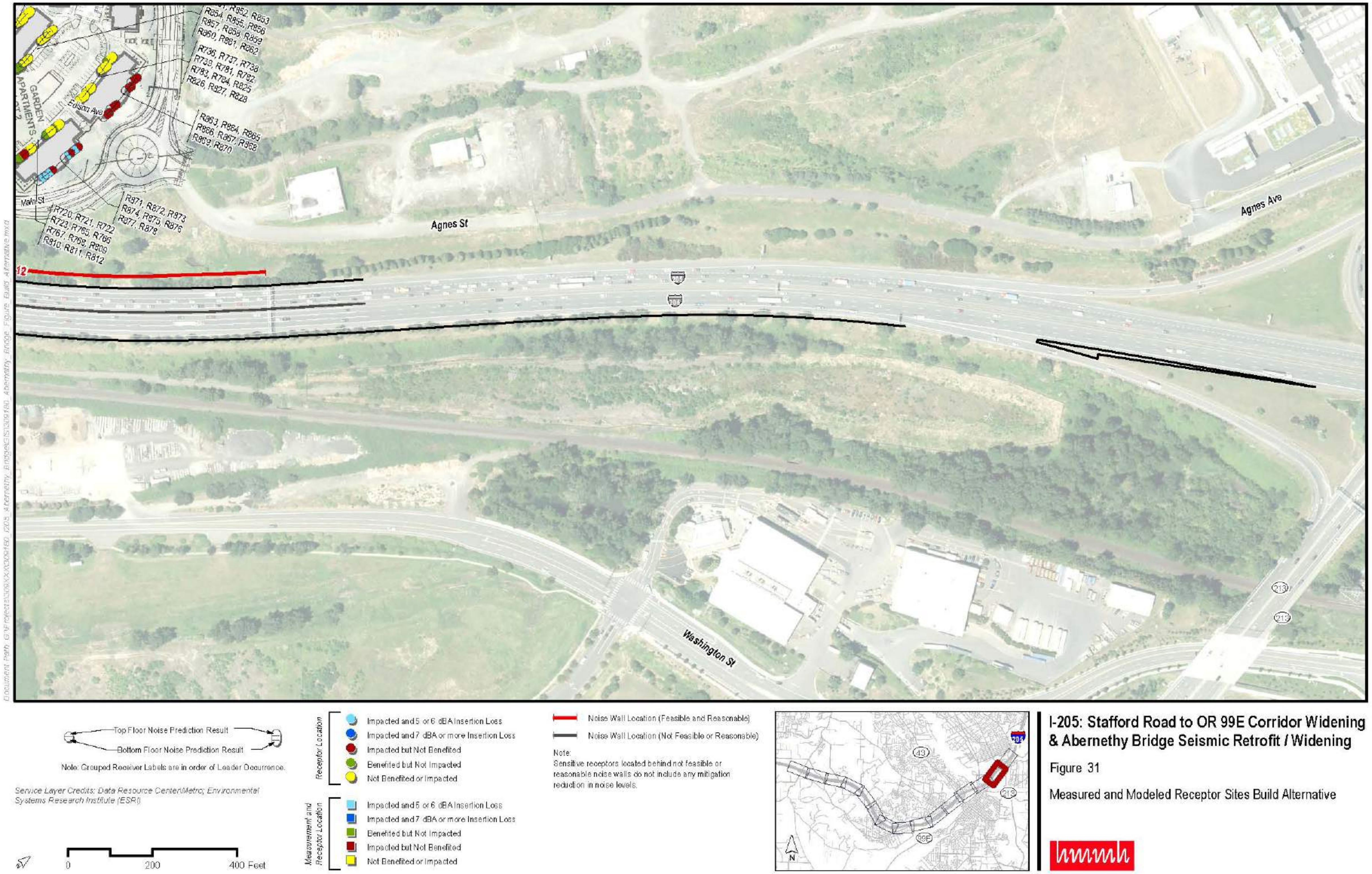


Figure 32. Build Alternative

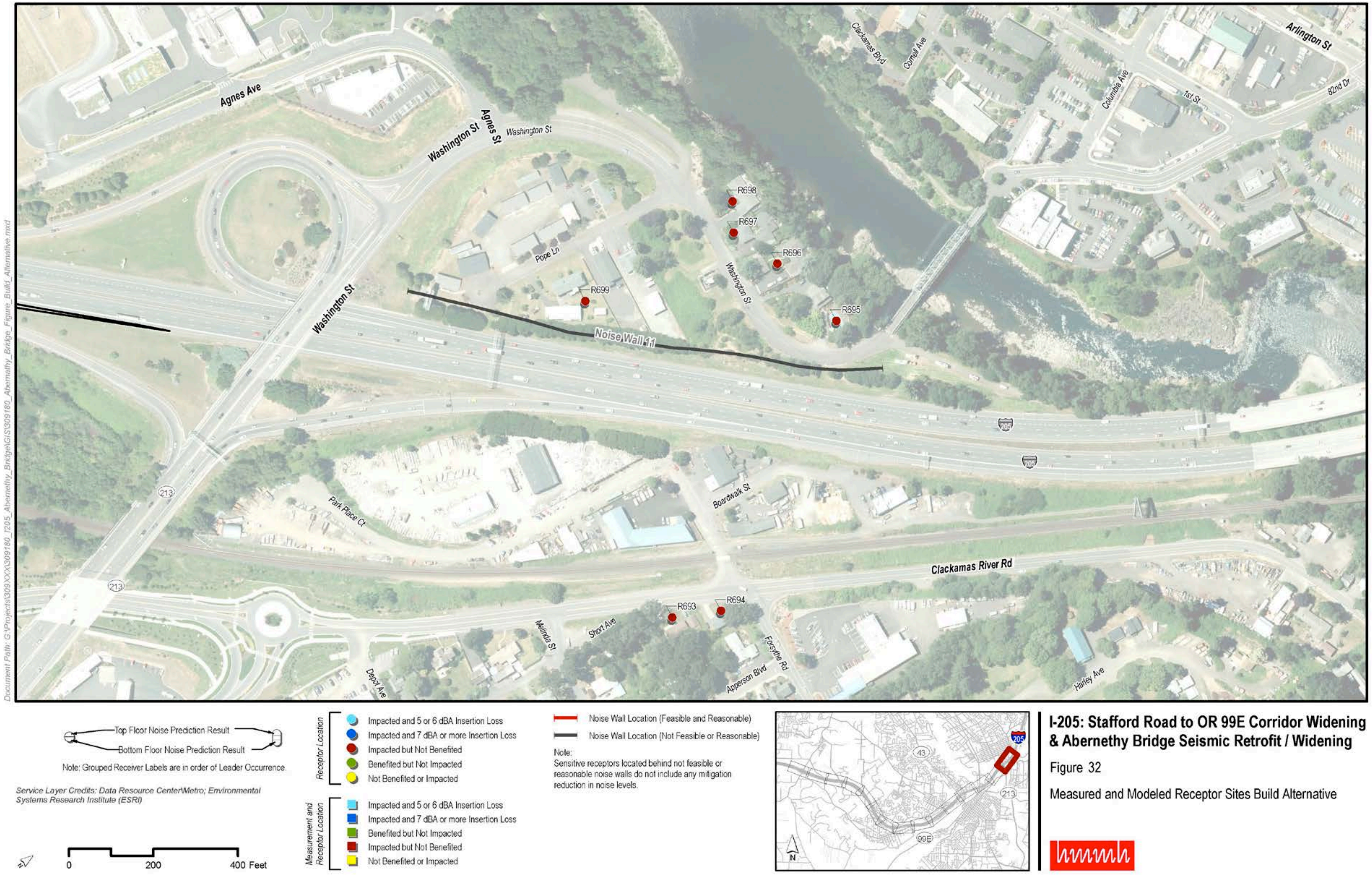


Figure 33. Structure-Borne Noise Measurement Locations

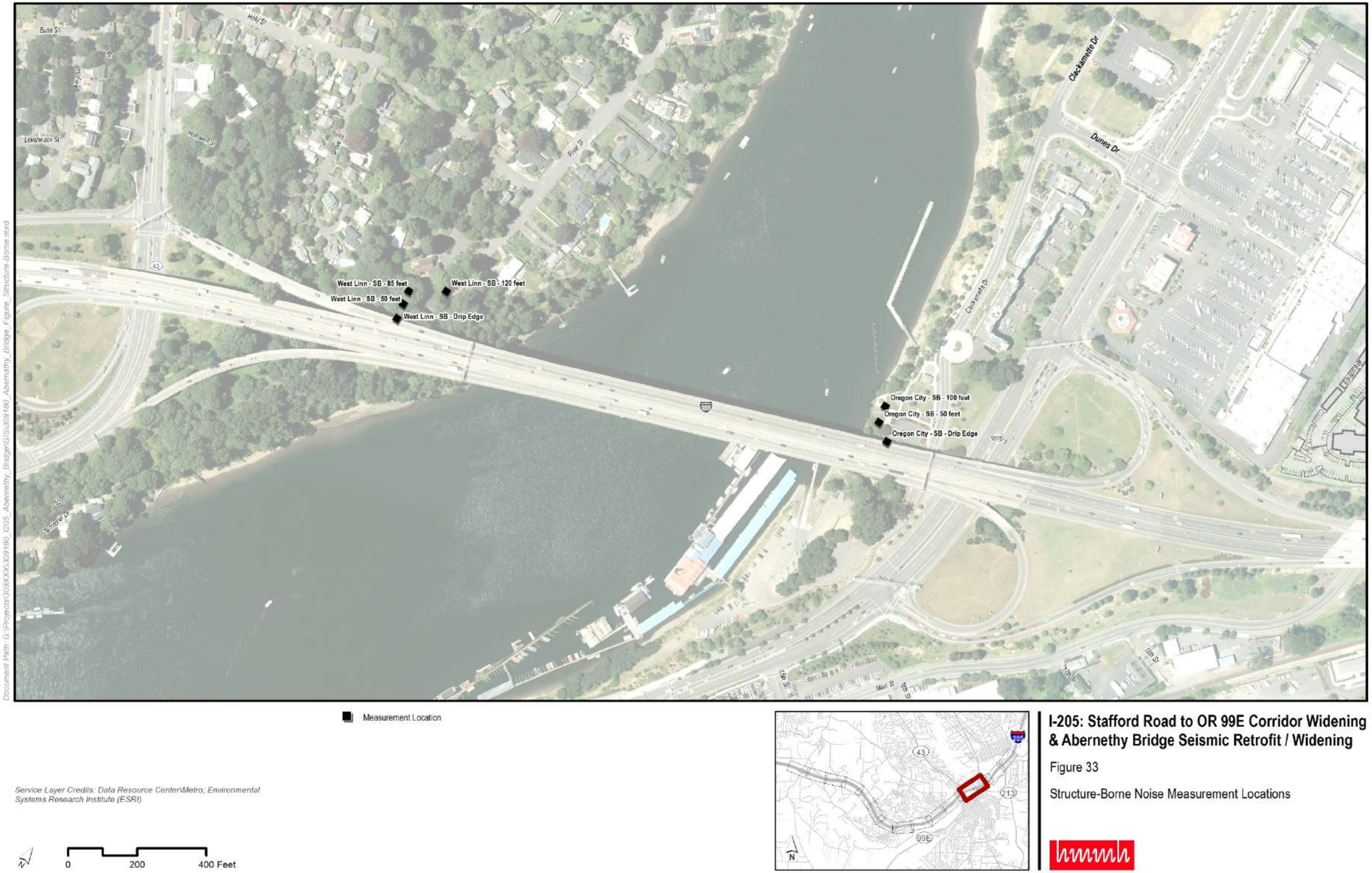


Figure 34. Structure-Borne Analysis Schematic Drawing

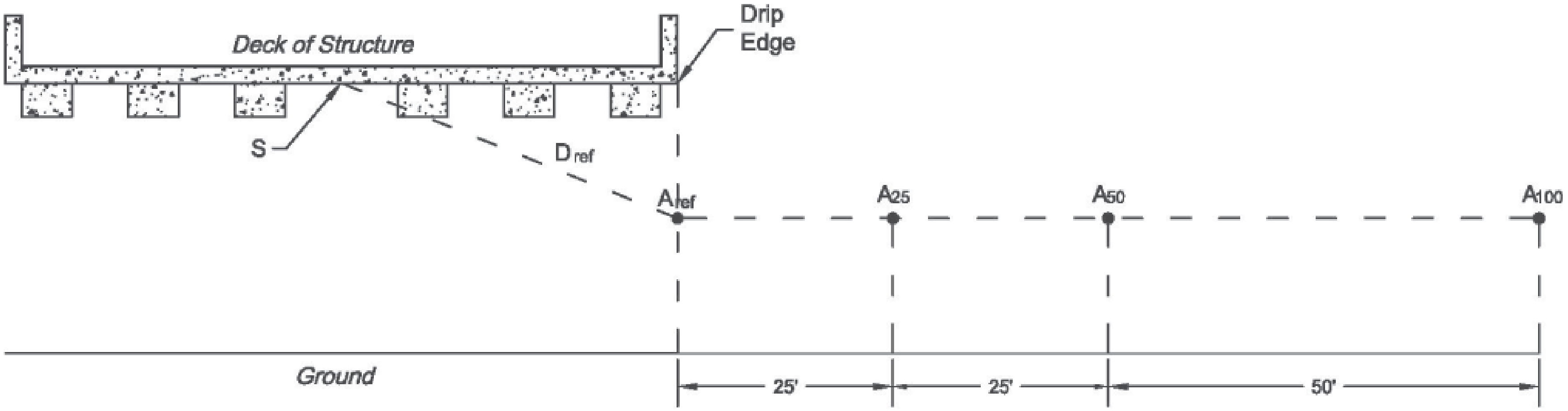
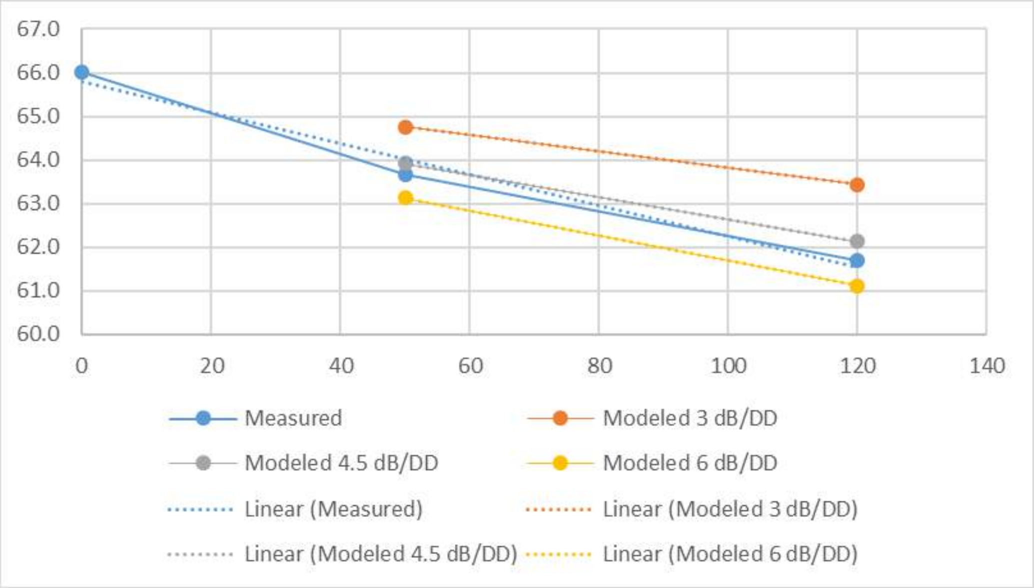


Figure 35. Structure-Borne Analysis Drop of Rates Chart



Appendix A. Noise Measurement Data Sheets, Photographs, and NCHRP 791 Worksheets

SHORT-TERM NOISE MEASUREMENT DATA SHEET

PROJECT: K19786:I-205CW

JOB NO.: 309180.000

MEASUREMENT SITE NO.: ST-1 PERSONNEL: SRN

ADDRESS/DESCRIPTION: Southlake Church and Preschool DATE: 8/29/17

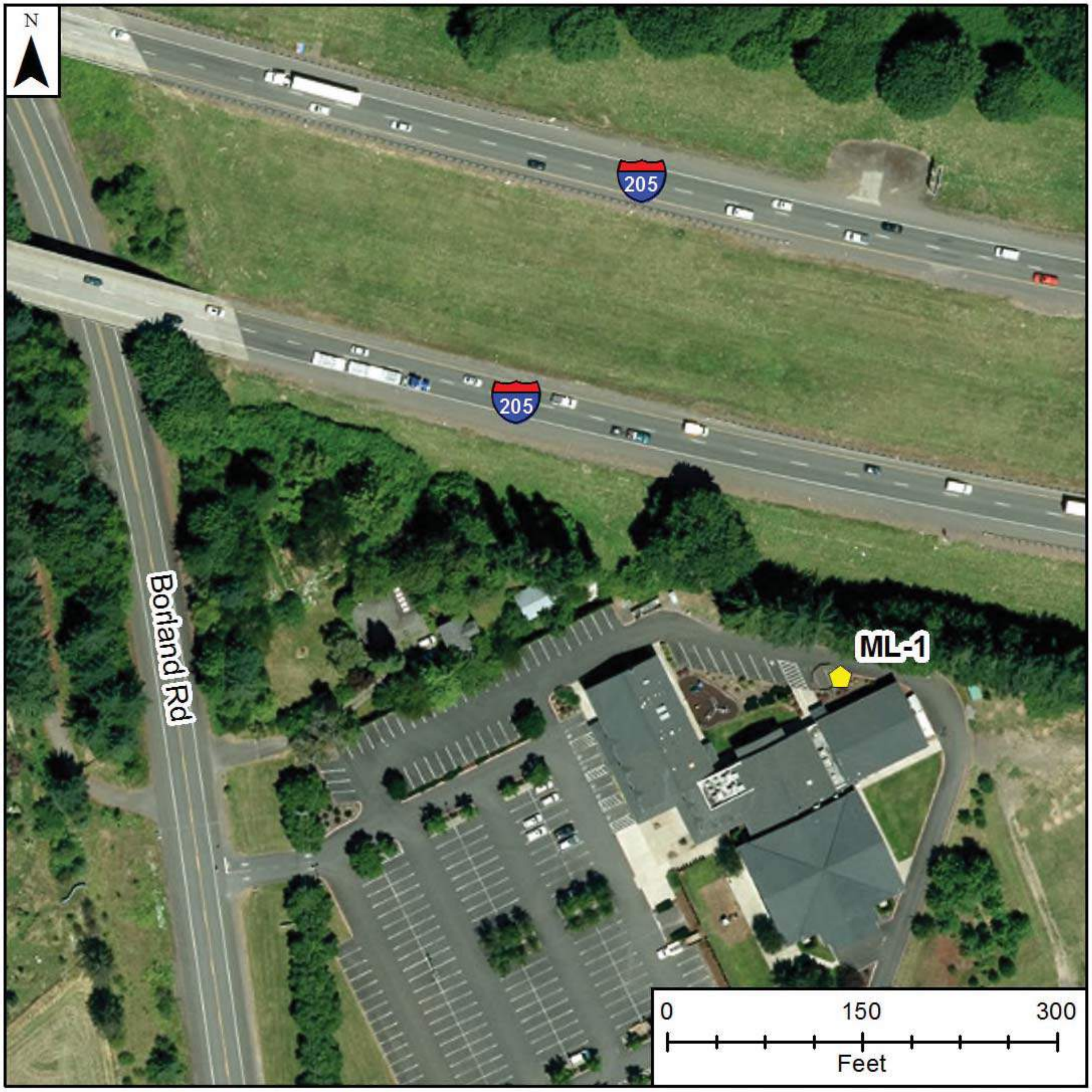
#	Time	L_{eq} (dBA)	L_{min} (dBA)	L_{max} (dBA)	L_{10} (dBA)	L_{33} (dBA)	L_{50} (dBA)	L_{90} (dBA)
1	12:35:00	72.5	68.7	75.3	74.8	72.8	72.0	70.2
2	12:36:00	72.1	65.8	75.2	74.0	72.5	71.9	69.7
3	12:37:00	72.4	63.7	77.7	74.5	72.8	71.9	68.3
4	12:38:00	73.4	67.3	77.4	75.6	74.0	72.9	70.2
5	12:39:00	72.4	66.4	75.6	74.3	73.2	72.4	67.9
6	12:40:00	72.5	69.1	74.8	73.9	72.8	72.3	70.8
7	12:41:00	73.4	64.2	76.2	75.6	74.1	73.2	69.9
8	12:42:00	72.1	65.6	76.0	74.2	72.8	72.1	68.8
9	12:43:00	72.3	66.0	76.5	75.1	72.6	71.6	68.7
10	12:44:00	74.0	68.9	77.9	76.3	74.5	73.5	70.4
11	12:45:00	72.2	64.7	74.8	73.9	72.9	72.4	68.7
12	12:46:00	73.1	68.1	76.8	75.7	73.1	72.3	70.5
13	12:47:00	72.3	69.3	75.2	73.6	72.9	72.4	70.3
14	12:48:00	72.2	65.5	75.2	74.2	72.9	71.9	68.3
15	12:49:00	72.1	63.5	76.1	73.8	72.7	72.0	68.4
16	12:50:00	71.6	67.0	75.1	73.0	72.2	71.4	68.8
Total for Period		**72.6**	**63.5**	**77.9**	**74.5**	**73.1**	**72.3**	**69.4**

PROJECT: K19786:I-205CW
JOB NO.: 309180.000

SHORT-TERM NOISE MEASUREMENT SITE LOG

ASSESSMENT AREA: WEST LINN
MEASUREMENT SITE NO.: ST-1
ADDRESS: 1555 SW BORLAND ROAD
OWNER:
DESCRIPTION: CHURCH AND PRESCHOOL
NOISE SOURCES: I-205 TRAFFIC
NOISE MONITOR: B&K 2250
S/N: 2579777
MICROPHONE: B&K
CALIBRATOR: B&K
TEMP. RANGE (°F): 71
WEATHER CONDITIONS: SUNNY

SITE MAP:



Notes: I-205 dominant. Vehicles are visible in both directions of travel on I-205 from measurement site.

SHORT-TERM NOISE MEASUREMENT DATA SHEET

PROJECT: K19786:I-205CW

JOB NO.: 309180.000

MEASUREMENT SITE NO.: ST-2 PERSONNEL: SRN

ADDRESS/DESCRIPTION: 22400 Johnson Road DATE: 8/29/17

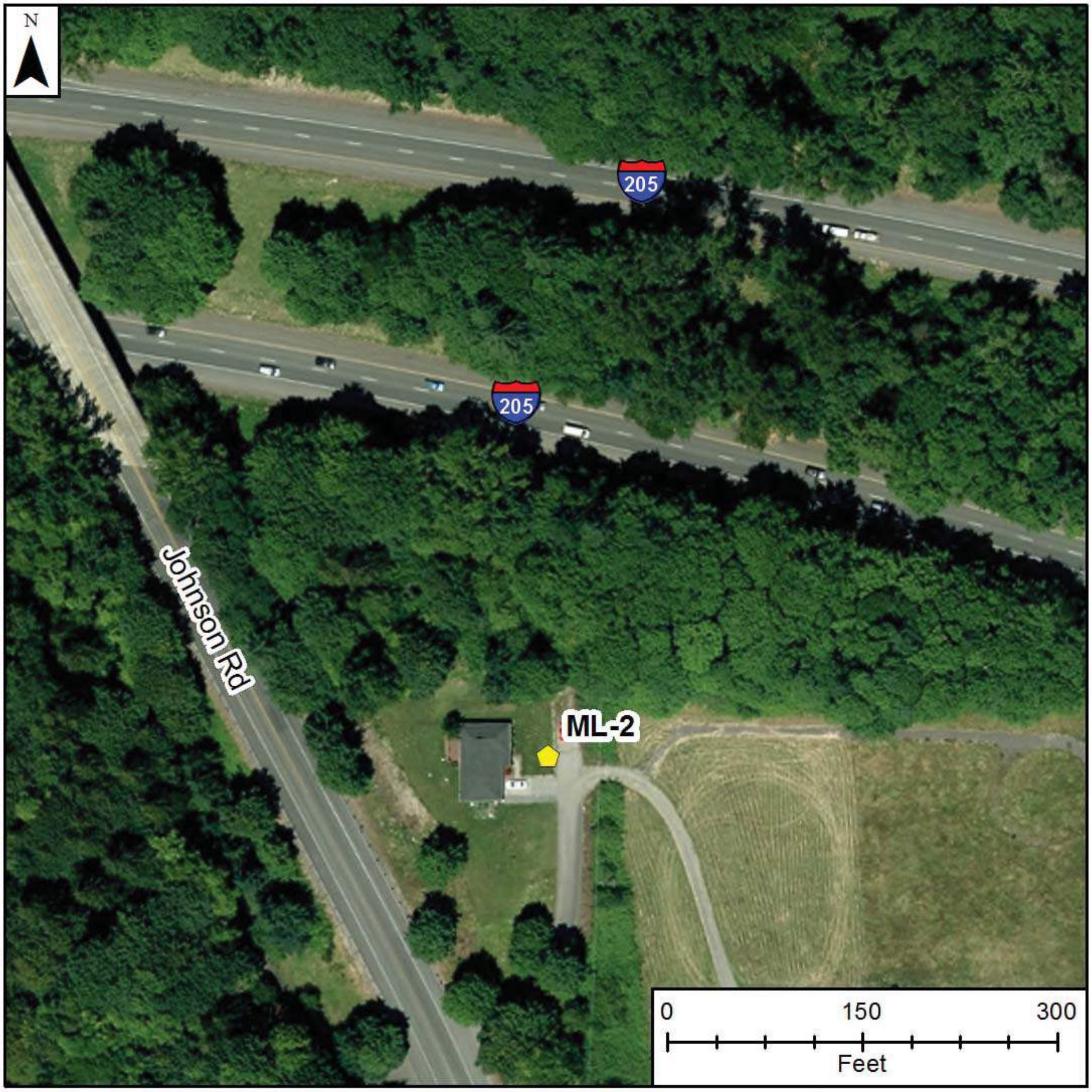
#	Time	L_{eq} (dBA)	L_{min} (dBA)	L_{max} (dBA)	L_{10} (dBA)	L_{33} (dBA)	L_{50} (dBA)	L_{90} (dBA)
1	13:24:00	66.4	63.9	70.1	67.8	66.8	66.3	64.6
2	13:25:00	65.4	62.5	67.4	66.7	65.8	65.4	63.7
3	13:26:00	65.1	62.3	67.2	66.5	65.7	65.2	63.0
4	13:27:00	66.1	64.3	68.4	67.0	66.5	66.1	65.0
5	13:28:00	65.8	62.5	68.6	67.2	66.2	65.7	64.1
6	13:29:00	65.6	62.9	67.3	66.7	65.9	65.5	64.1
7	13:30:00	65.5	63.4	67.5	66.6	65.8	65.4	64.3
8	13:31:00	65.4	60.9	68.1	67.1	65.9	65.2	62.8
9	13:32:00	65.4	63.3	67.8	66.7	65.8	65.1	63.8
10	13:33:00	65.1	62.6	67.0	66.3	65.5	65.1	63.8
11	13:34:00	65.3	63.6	66.9	66.1	65.6	65.3	64.3
12	13:35:00	65.0	62.8	67.0	65.9	65.3	64.9	63.9
13	13:36:00	65.6	63.5	68.0	66.7	65.8	65.4	64.4
14	13:37:00	65.1	61.6	66.9	66.0	65.6	65.3	63.3
15	13:38:00	65.9	63.9	68.5	67.3	66.2	65.7	64.4
16	13:39:00	65.0	61.7	68.1	66.8	65.5	64.9	62.4
17	13:40:00	64.8	61.1	66.7	65.9	65.3	64.9	62.9
18	13:41:00	64.9	62.9	67.2	66.1	65.2	64.8	63.7
19	13:42:00	65.4	63.3	67.1	66.4	65.7	65.4	64.2
20	13:43:00	65.2	62.1	67.0	66.3	65.6	65.2	63.6
21	13:44:00	65.4	62.6	67.5	66.5	65.7	65.4	64.2
22	13:45:00	65.3	61.4	67.5	66.7	65.7	65.2	63.4
23	13:46:00	65.6	63.9	67.8	66.7	65.8	65.4	64.3
24	13:47:00	65.1	62.2	68.4	66.8	65.5	64.8	63.3
25	13:48:00	64.9	62.4	67.5	66.1	65.2	64.7	63.5
26	13:49:00	64.7	59.7	66.9	66.0	65.4	65.0	62.0
27	13:50:00	65.0	62.5	66.5	65.8	65.4	65.0	63.7
28	13:51:00	65.6	63.3	67.4	66.6	65.9	65.5	64.4
29	13:52:00	65.7	63.3	68.0	66.9	66.1	65.6	64.3
Total for Period		**64.5**	**59.7**	**70.1**	**66.6**	**65.8**	**65.3**	**63.8**

PROJECT: K19786:I-205CW
JOB NO.: 309180.000

SHORT-TERM NOISE MEASUREMENT SITE LOG

ASSESSMENT AREA: WEST LINN
MEASUREMENT SITE NO.: ST-2
ADDRESS: 22400 JOHNSON ROAD
OWNER:
DESCRIPTION: SINGLE-FAMILY RESIDENTIAL
NOISE SOURCES: I-205 TRAFFIC
NOISE MONITOR: LD 824
S/N: A3975
MICROPHONE: GRAS
CALIBRATOR: CAL200
TEMP. RANGE (°F): 61
WEATHER CONDITIONS: SMOKEY

SITE MAP:



Notes: Johnson Road is elevated above receptors by 25-30 feet as it approaches overcrossing of I-205.




SHORT-TERM NOISE MEASUREMENT DATA SHEET

PROJECT: K19786:I-205CW

JOB NO.: 309180.000

MEASUREMENT SITE NO.: ST-3 PERSONNEL: SRN

ADDRESS/DESCRIPTION: 22501 S. Grapevine Road DATE: 8/30/17

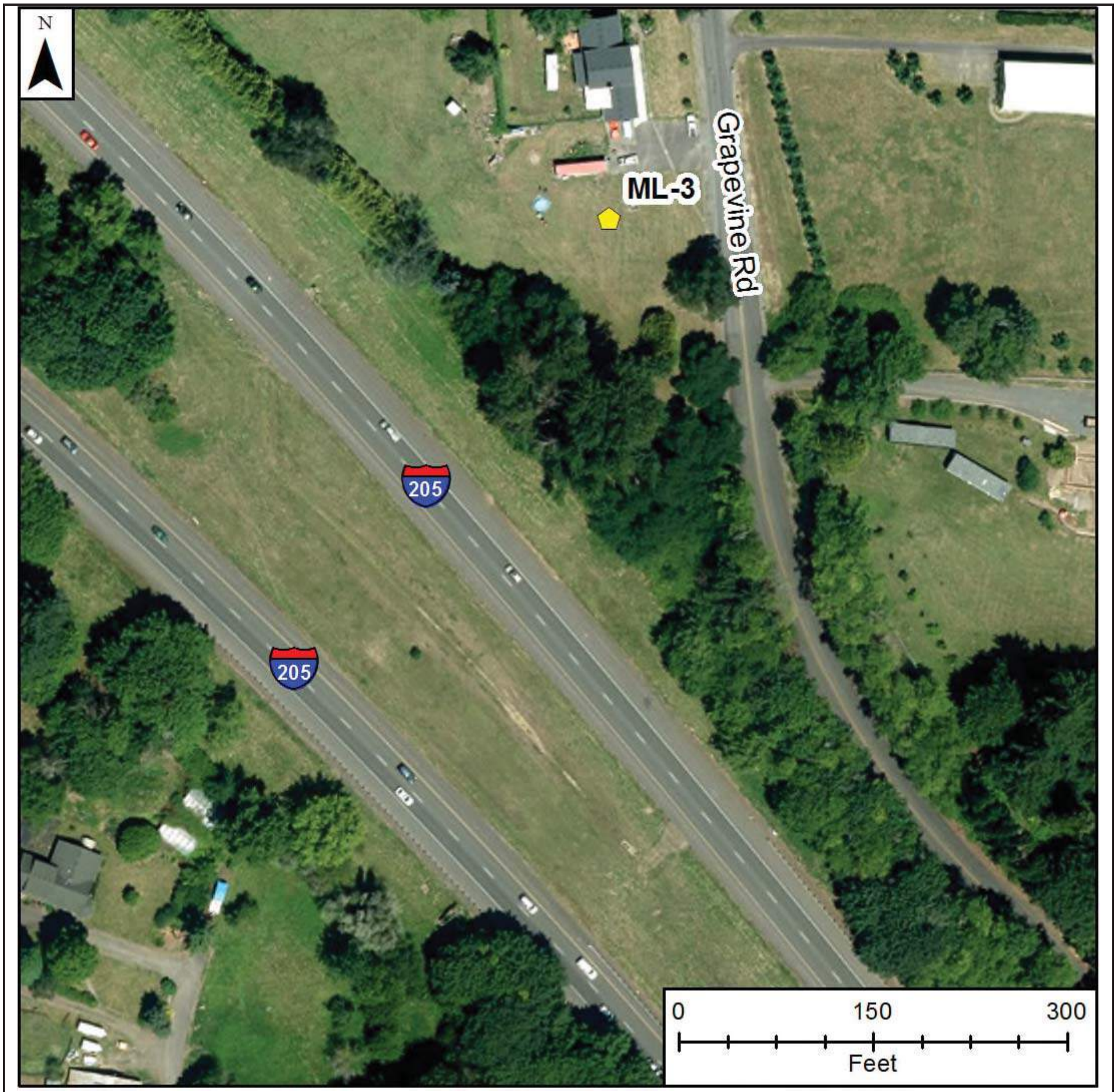
#	Time	L_{eq} (dBA)	L_{min} (dBA)	L_{max} (dBA)	L_{10} (dBA)	L_{33} (dBA)	L_{50} (dBA)	L_{90} (dBA)
1	9:38:07	62.5	60.6	64.4	63.7	63.0	62.5	61.3
2	9:39:07	62.1	60.1	65.3	63.3	62.5	62.0	61.1
3	9:40:07	63.1	61.3	65.2	64.0	63.4	63.0	62.2
4	9:41:07	62.5	60.4	67.1	63.6	62.7	62.3	61.3
5	9:42:07	62.6	60.7	64.1	63.7	63.0	62.6	61.4
6	9:43:07	62.8	60.5	65.2	63.9	63.1	62.7	61.4
7	9:44:07	61.9	60.0	63.9	63.0	62.3	61.8	60.4
8	9:45:07	62.7	61.2	66.6	63.8	62.8	62.4	61.4
9	9:46:07	62.9	61.5	64.6	63.8	63.2	62.8	62.1
10	9:47:07	63.2	61.7	65.5	64.2	63.6	63.2	62.2
11	9:48:07	64.5	61	70.6	67.0	64.3	63.6	62.2
12	9:49:07	63.0	61.3	67.3	63.9	62.9	62.6	62.0
13	9:50:07	62.9	60.9	65.9	64.0	62.9	62.6	61.7
14	9:51:07	65.1	61.1	74.0	68.8	63.6	62.7	61.4
15	9:52:07	63.1	61.1	67.7	64.9	63.0	62.6	61.6
Total for Period		**63.1**	**60.0**	**74.0**	**64.4**	**63.1**	**62.6**	**61.6**

PROJECT: K19786:I-205CW
JOB NO.: 309180.000

SHORT-TERM NOISE MEASUREMENT SITE LOG

ASSESSMENT AREA: WEST LINN
MEASUREMENT SITE NO.: ST-3
ADDRESS: 22501 S. GRAPEVINE ROAD
OWNER:
DESCRIPTION: SINGLE-FAMILY RESIDENTIAL
NOISE SOURCES: I-205 TRAFFIC
NOISE MONITOR: LD 824
S/N: A3975
MICROPHONE: GRAS
CALIBRATOR: CAL200
TEMP. RANGE (°F): 61
WEATHER CONDITIONS: CLOUDY

SITE MAP:



Notes: I-205 dominant. Grapevine Road proceeds south of site to pass under I-205.

SHORT-TERM NOISE MEASUREMENT DATA SHEET

PROJECT: K19786:I-205CW
JOB NO.: 309180.000

MEASUREMENT SITE NO.: ST-4 PERSONNEL: SRN
ADDRESS/DESCRIPTION: 23400 Johnson Road DATE: 8/30/17

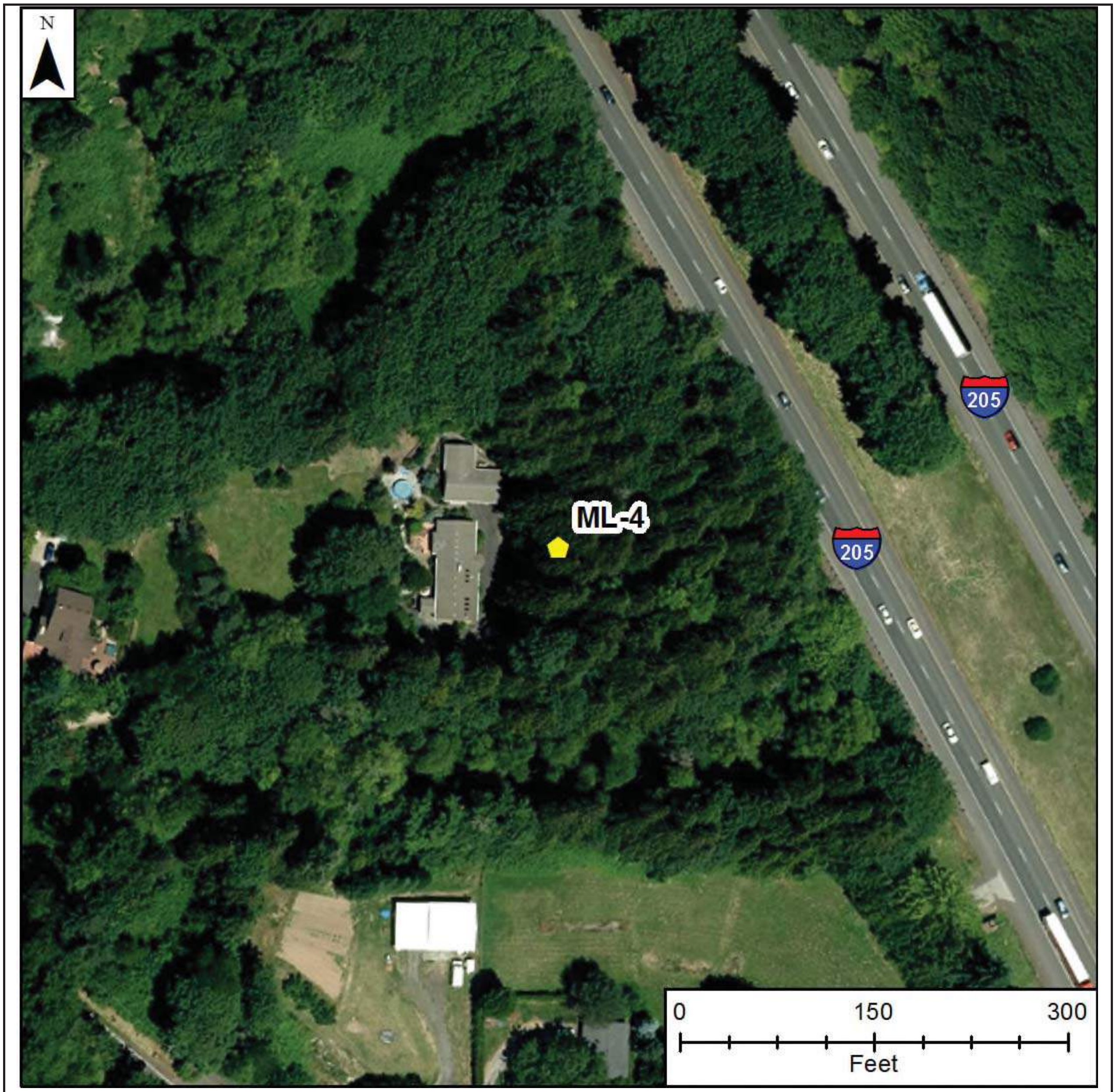
#	Time	L_{eq} (dBA)	L_{min} (dBA)	L_{max} (dBA)	L_{10} (dBA)	L_{33} (dBA)	L_{50} (dBA)	L_{90} (dBA)
1	10:16:00	64.7	62	75.4	65.9	64.7	64.0	63.0
2	10:17:00	64.5	61	67.6	66.1	64.8	64.3	62.5
3	10:18:00	64.2	60.5	66.3	65.4	64.6	64.2	62.5
4	10:19:00	64.6	57.7	69.4	66.2	65.2	64.6	61.1
5	10:20:00	63.2	58.4	65.7	64.7	63.8	63.3	60.3
6	10:21:00	63.5	59.8	66.3	65.4	64.2	63.0	61.1
7	10:22:00	63.5	56	66.8	65.0	64.4	63.8	57.5
8	10:23:00	63.6	58.8	65.9	65.3	64.2	63.4	61.2
9	10:24:00	63.8	59.8	66.5	65.3	64.3	63.8	62.1
10	10:25:00	63.8	60.7	66.9	65.5	64.2	63.6	62.0
11	10:26:00	63.3	55.1	66.1	64.9	64.2	63.4	60.3
12	10:27:00	64.4	54.5	69.1	67.2	64.8	64.2	57.0
13	10:28:00	63.8	61.3	66.2	64.9	64.2	63.7	62.2
14	10:29:00	64.1	57.1	71.6	65.9	64.3	63.5	59.6
15	10:30:00	63.8	60.1	67.7	66.0	64.4	63.4	61.2
Total for Period		**63.9**	**54.5**	**75.4**	**65.6**	**64.4**	**63.8**	**60.9**

PROJECT: K19786:I-205CW
JOB NO.: 309180.000

SHORT-TERM NOISE MEASUREMENT SITE LOG

ASSESSMENT AREA: WEST LINN
MEASUREMENT SITE NO.: ST-4
ADDRESS: 23400 JOHNSON ROAD
OWNER:
DESCRIPTION: SINGLE-FAMILY RESIDENTIAL
NOISE SOURCES: I-205 TRAFFIC
NOISE MONITOR: LD 824
S/N: A3975
MICROPHONE: GRAS
CALIBRATOR: CAL200
TEMP. RANGE (°F): 63
WEATHER CONDITIONS: CLOUDY

SITE MAP:



Notes: I-205 dominant. Vehicles are visible in both directions of travel on I-205 from measurement site.

SHORT-TERM NOISE MEASUREMENT DATA SHEET

PROJECT: K19786:I-205CW
JOB NO.: 309180.000

MEASUREMENT SITE NO.: ST-5a PERSONNEL: SRN
ADDRESS/DESCRIPTION: 2384 Margery Street DATE: 8/30/17

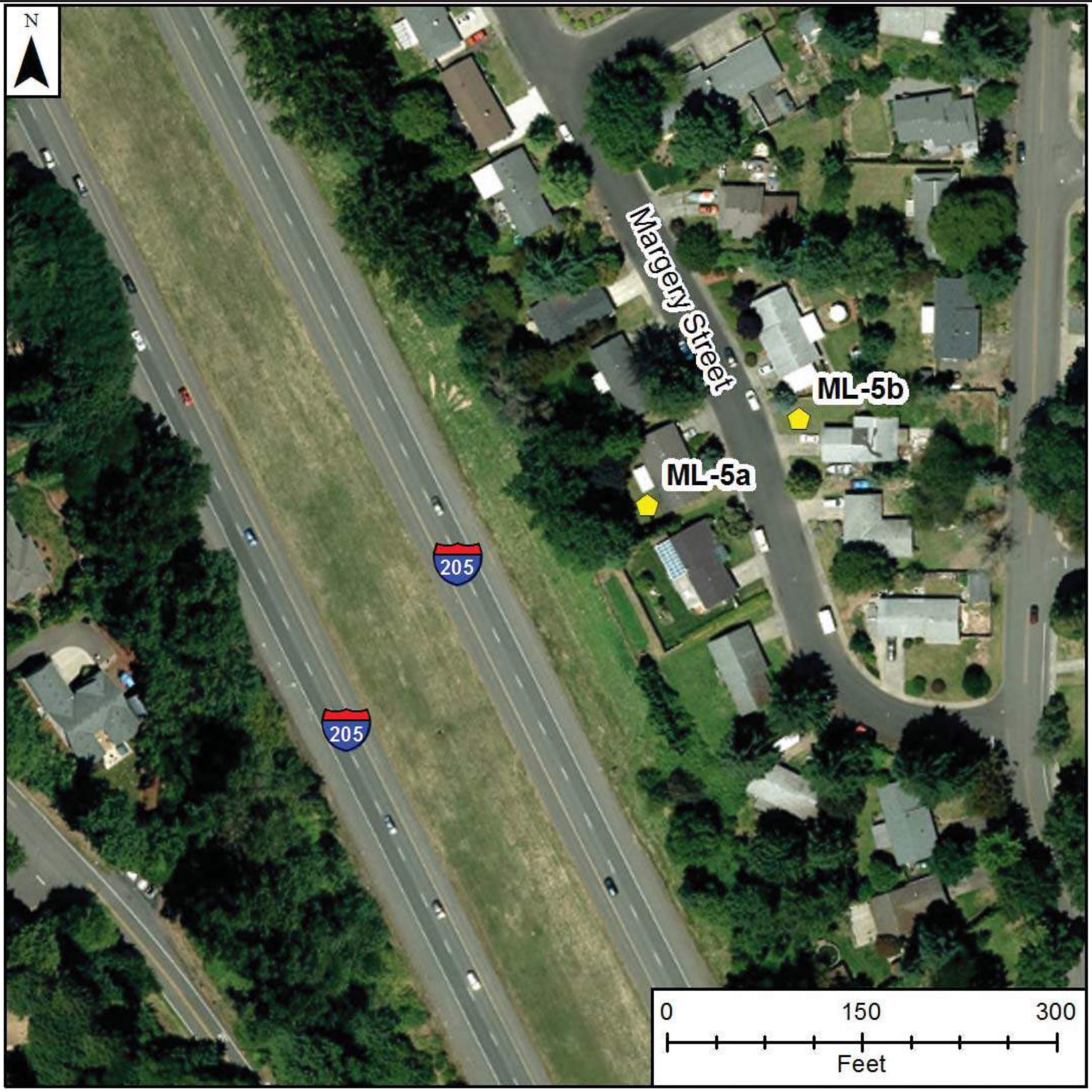
#	Time	L_{eq} (dBA)	L_{min} (dBA)	L_{max} (dBA)	L_{10} (dBA)	L_{33} (dBA)	L_{50} (dBA)	L_{90} (dBA)
1	10:49:04	67.3	63.2	69.9	68.8	68.1	67.4	64.4
2	10:50:04	68	63.6	70.5	69.5	68.6	68.2	65.1
3	10:51:04	69.2	66.1	75.6	71.1	69.4	68.5	66.8
4	10:52:04	69	64.9	73.4	70.6	69.4	68.8	66.6
5	10:53:04	69.9	66.2	76	72.0	69.9	69.0	67.3
6	10:54:04	69.9	65.3	72.9	71.4	70.4	69.9	67.6
7	10:55:04	69.9	66.2	76.1	71.6	70.2	69.6	67.7
8	10:56:04	68.8	65.7	71.6	69.9	69.0	68.6	67.3
9	10:57:04	69.6	66.3	72.8	71.1	70.1	69.3	67.6
10	10:58:04	70	67.9	72.5	71.1	70.4	69.9	68.6
11	10:59:04	69.4	66.3	73.7	71.1	69.6	69.0	67.5
12	11:00:04	69.1	66.4	71.6	70.5	69.5	69.0	67.6
13	11:01:04	69.9	67.3	74.3	71.4	70.2	69.5	68.1
14	11:02:04	70.2	67.1	75.8	72.3	69.9	69.4	68.0
15	11:03:04	69.4	64.6	73.3	71.3	70.0	69.3	66.0
16	11:04:04	70	65.2	73.8	71.5	70.4	69.9	68.0
Total for Period		**69.4**	**63.2**	**76.1**	**71.0**	**69.7**	**69.1**	**67.1**

PROJECT: K19786:I-205CW
JOB NO.: 309180.000

SHORT-TERM NOISE MEASUREMENT SITE LOG

ASSESSMENT AREA: WEST LINN
MEASUREMENT SITE NO.: ST-5A
ADDRESS: 2384 MARGERY STREET
OWNER:
DESCRIPTION: SINGLE-FAMILY RESIDENTIAL
NOISE SOURCES: I-205 TRAFFIC
NOISE MONITOR: LD 824
S/N: A3975
MICROPHONE: GRAS
CALIBRATOR: CAL200
TEMP. RANGE (°F): 63
WEATHER CONDITIONS: PARTLY CLOUDY

SITE MAP:



Notes: I-205 dominant.

SHORT-TERM NOISE MEASUREMENT DATA SHEET

PROJECT: K19786:I-205CW

JOB NO.: 309180.000

MEASUREMENT SITE NO.: ST-5b PERSONNEL: SRN

ADDRESS/DESCRIPTION: 2383 Margery Street DATE: 8/30/17

#	Time	L_{eq} (dBA)	L_{min} (dBA)	L_{max} (dBA)	L_{10} (dBA)	L_{33} (dBA)	L_{50} (dBA)	L_{90} (dBA)
1	11:06:40	64.3	60.8	66.5	65.5	64.7	64.3	62.5
2	11:07:40	64.6	62	67.5	66.0	64.9	64.5	63.1
3	11:08:40	65	62.8	68.4	66.0	65.2	64.7	63.6
4	11:09:40	65.2	63.3	68.9	66.4	65.5	65.1	64.0
5	11:10:40	65.4	62.9	68.5	66.7	65.7	65.2	63.9
6	11:11:40	64.9	61.4	67.6	66.6	65.6	64.7	62.5
7	11:12:40	65.1	61.6	68.4	66.7	65.5	64.8	63.1
8	11:13:40	65	63	67.3	66.1	65.4	64.9	63.6
9	11:14:40	65.5	63	70.2	66.6	65.7	65.3	64.0
10	11:15:40	64.7	61.7	66.7	65.9	65.2	64.8	62.7
11	11:16:40	65.3	63	67.7	66.5	65.7	65.3	63.8
12	11:17:40	63.9	61	66.2	65.0	64.5	64.1	62.2
13	11:18:40	64.7	61.6	68.8	66.1	65.0	64.4	62.5
14	11:19:40	65	62.4	68.2	67.0	65.0	64.5	63.1
15	11:20:40	64.7	60.5	67.3	66.0	65.4	64.9	62.4
Total for Period		**64.9**	**60.5**	**70.2**	**66.2**	**65.3**	**64.8**	**63.1**

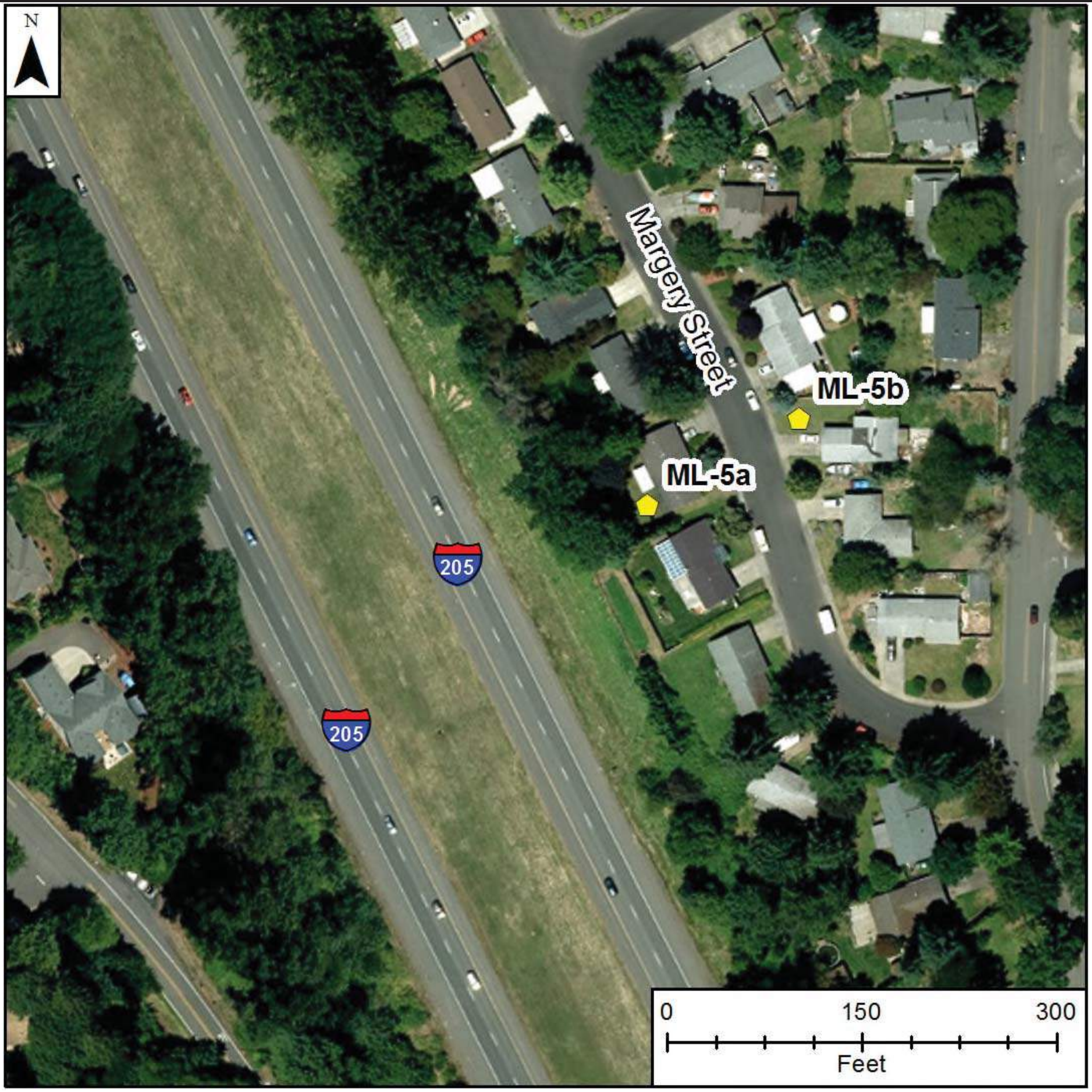
PROJECT: K19786:I-205CW

JOB NO.: 309180.000

SHORT-TERM NOISE MEASUREMENT SITE LOG

ASSESSMENT AREA: WEST LINN
MEASUREMENT SITE NO.: ST-5B
ADDRESS: 2383 MARGERY STREET
OWNER:
DESCRIPTION: SINGLE-FAMILY RESIDENTIAL
NOISE SOURCES: I-205 TRAFFIC
NOISE MONITOR: LD 824
S/N: A3975
MICROPHONE: GRAS
CALIBRATOR: CAL200
TEMP. RANGE (°F): 63
WEATHER CONDITIONS: PARTLY CLOUDY

SITE MAP:



Notes: I-205 dominant.

SHORT-TERM NOISE MEASUREMENT DATA SHEET

PROJECT: K19786:I-205CW

JOB NO.: 309180.000

MEASUREMENT SITE NO.: ST-6 PERSONNEL: SRN

ADDRESS/DESCRIPTION: 1709 Blankenship Rd DATE: 8/30/17

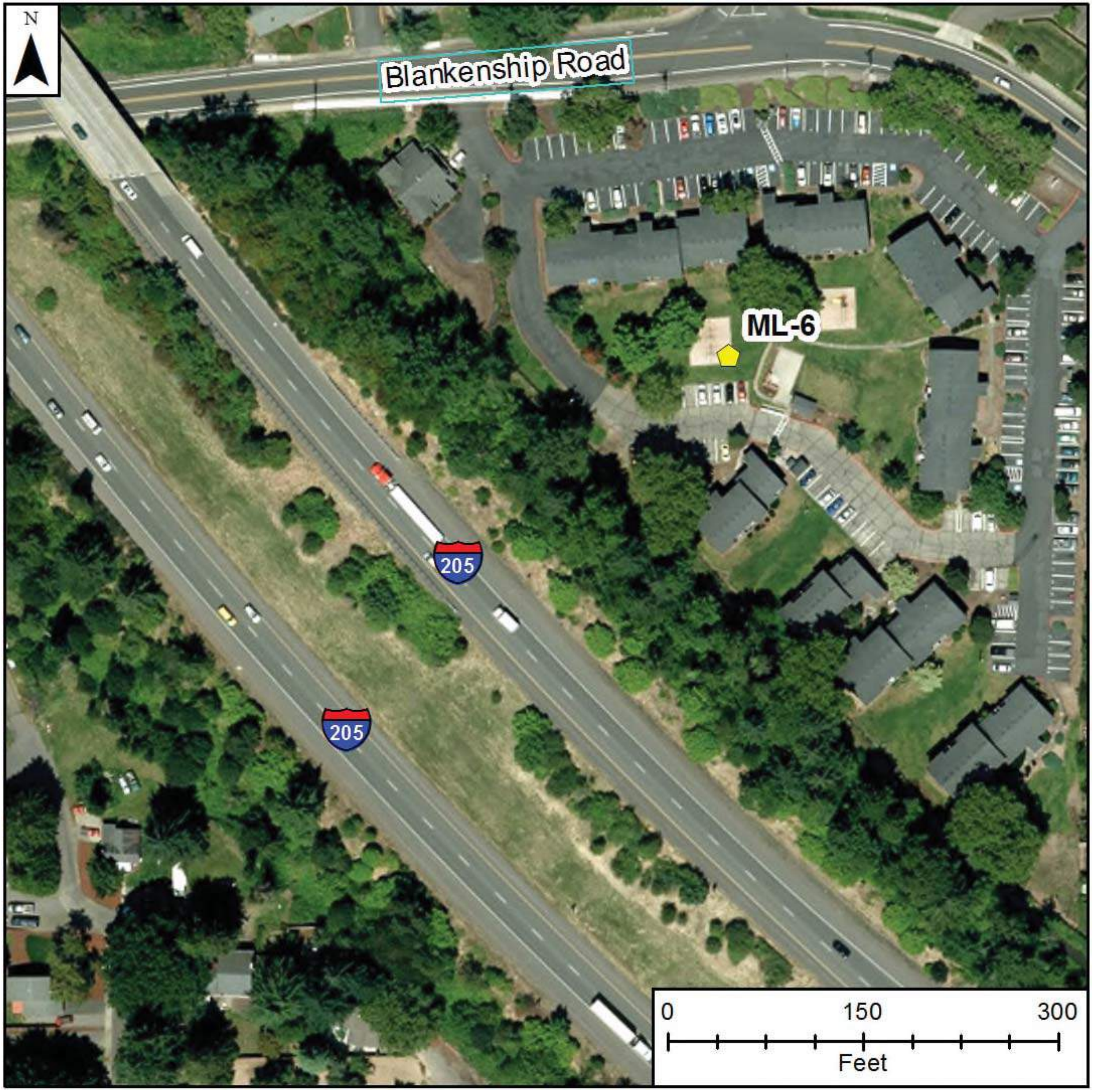
#	Time	L_{eq} (dBA)	L_{min} (dBA)	L_{max} (dBA)	L_{10} (dBA)	L_{33} (dBA)	L_{50} (dBA)	L_{90} (dBA)
1	12:36:36	56.5	55.3	61.8	57.1	56.7	56.4	55.5
2	12:37:36	57.2	55.6	60.2	58.0	57.5	57.2	56.2
3	12:38:36	58.1	55.7	67.5	58.9	57.8	57.4	56.3
4	12:39:36	57.2	55.1	60.1	58.2	57.5	57.0	56.1
5	12:40:36	57.7	54.1	60.3	59.0	58.0	57.6	55.5
6	12:41:36	59.4	54.8	66.6	60.9	59.8	59.2	55.8
7	12:42:36	58.3	56.2	60.2	59.5	58.7	58.3	57.1
8	12:43:36	57.6	54.7	62.3	60.1	57.5	56.9	55.4
9	12:44:36	56.2	54	60.6	57.8	56.4	55.8	54.5
10	12:45:36	55.5	53.6	57.6	56.7	55.8	55.3	54.2
11	12:46:36	56.6	55.4	58.1	57.6	56.9	56.6	55.9
12	12:47:36	56.8	52.3	60.5	58.8	57.6	56.9	53.1
13	12:48:36	58.1	54.9	64.9	60.5	57.5	57.0	56.1
14	12:49:36	57.4	54.5	60.1	58.5	57.7	57.4	56.0
15	12:50:36	58.7	56.9	63.3	59.9	59.0	58.4	57.3
16	12:51:36	59.6	57.3	62.2	60.8	59.8	59.5	58.2
17	12:52:36	59.6	57.8	61.8	60.6	59.9	59.6	58.5
18	12:53:36	58.2	55.9	60.5	59.7	58.8	58.0	56.4
19	12:54:36	59.4	56.4	62.0	60.9	60.0	59.2	57.4
20	12:55:36	58.4	55.5	60.5	59.5	58.7	58.3	56.8
21	12:56:36	58.0	54.6	63.0	59.7	58.4	57.8	56.0
22	12:57:36	58.2	56.7	60.1	58.9	58.5	58.2	57.2
23	12:58:36	58.1	54.5	60.9	59.6	58.8	58.1	56.1
24	12:59:36	55.8	53.8	57.7	56.8	56.1	55.7	54.6
25	13:00:36	61.0	54.7	72.9	62.3	57.3	56.7	55.3
26	13:01:36	55.5	53.4	57.6	56.9	55.9	55.4	54.1
Total for Period		**58.0**	**52.3**	**72.9**	**59.1**	**57.9**	**57.5**	**56.0**

PROJECT: K19786:I-205CW
JOB NO.: 309180.000

SHORT-TERM NOISE MEASUREMENT SITE LOG

ASSESSMENT AREA: WEST LINN MEASUREMENT SITE NO.: ST-6
ADDRESS: 1709 BLANKENSHIP RD (WILLAMETTE TERRACE APTS)
OWNER:
DESCRIPTION: MULITI-FAMILY RESIDENTIAL (76 TOTAL UNITS)
NOISE SOURCES: I-205 TRAFFIC, ENGINE BREAKING ON I-205
NOISE MONITOR: LD 824 S/N: A3975
MICROPHONE: GRAS
CALIBRATOR: CAL200
TEMP. RANGE (°F): 67 WEATHER CONDITIONS: SUNNY

SITE MAP:



Notes: I-205 dominant. Interstate is elevated above the apartments by approximately 25 feet as it crosses over Blankenship Road.

SHORT-TERM NOISE MEASUREMENT DATA SHEET

PROJECT: K19786:I-205CW

JOB NO.: 309180.000

MEASUREMENT SITE NO.: ST-7 PERSONNEL: SRN

ADDRESS/DESCRIPTION: 1788 Jamie Circle DATE: 8/30/17

#	Time	L_{eq} (dBA)	L_{min} (dBA)	L_{max} (dBA)	L_{10} (dBA)	L_{33} (dBA)	L_{50} (dBA)	L_{90} (dBA)
1	15:06:14	59.8	56.8	65.4	61.2	59.8	59.3	57.6
2	15:07:14	58.6	54.7	65.5	62.1	57.8	56.9	55.3
3	15:08:14	55.4	52.6	59.6	56.8	55.9	55.3	53.5
4	15:09:14	56.1	52.9	60.0	58.2	56.4	55.8	53.9
5	15:10:14	57.9	55.5	60.8	59.3	58.3	57.7	56.2
6	15:11:14	58.5	56.4	61.0	59.7	58.8	58.4	57.2
7	15:12:14	58.3	55.4	63.3	59.6	58.7	58.2	56.5
8	15:13:14	57.5	54.3	61.0	59.2	57.8	57.1	55.4
9	15:14:14	58.8	56.2	61.8	60.4	59.2	58.5	57.1
10	15:15:14	57.8	53.9	63.3	59.9	57.8	57.1	54.8
11	15:16:14	55.8	52.6	62.0	57.3	56.1	55.4	53.5
12	15:17:14	56.6	54.3	60.8	58.5	57.1	56.0	54.4
13	15:18:14	58.4	54.9	61.4	60.1	58.8	58.3	56.0
14	15:19:14	59.2	57.2	61.9	60.5	59.6	59.0	57.8
15	15:20:14	59.9	57.5	63.3	61.6	60.1	59.5	58.2
Total for Period		**58.1**	**52.6**	**65.5**	**59.1**	**57.9**	**57.5**	**56.0**

PROJECT: K19786:I-205CW

JOB NO.: 309180.000

SHORT-TERM NOISE MEASUREMENT SITE LOG

ASSESSMENT AREA: WEST LINN MEASUREMENT SITE NO.: ST-7

ADDRESS: 1788 JAMIE CIRCLE

OWNER:

DESCRIPTION: SINGLE-FAMILY RESIDENTIAL

NOISE SOURCES: I-205 TRAFFIC, ENGINE BREAKING ON I-205

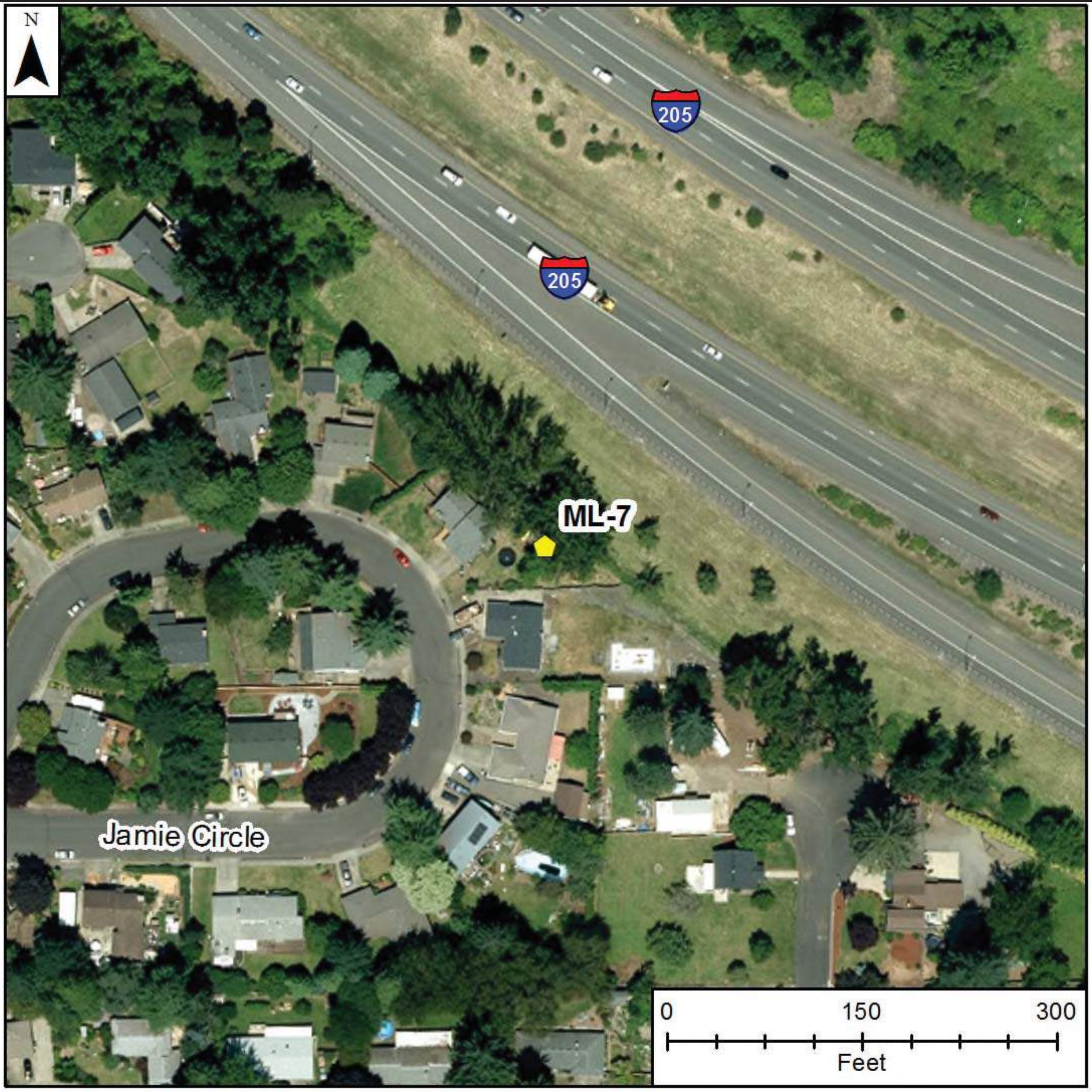
NOISE MONITOR: LD 824 S/N: A3975

MICROPHONE: GRAS

CALIBRATOR: CAL200

TEMP. RANGE (°F): 75 WEATHER CONDITIONS: SUNNY

SITE MAP:



Notes: I-205 dominant. Interstate is elevated above the single family home by approximately 10.

SHORT-TERM NOISE MEASUREMENT DATA SHEET

PROJECT: K19786:I-205CW

JOB NO.: 309180.000

MEASUREMENT SITE NO.: ST-8 PERSONNEL: SRN

ADDRESS/DESCRIPTION: 2318 8th Street DATE: 8/31/17

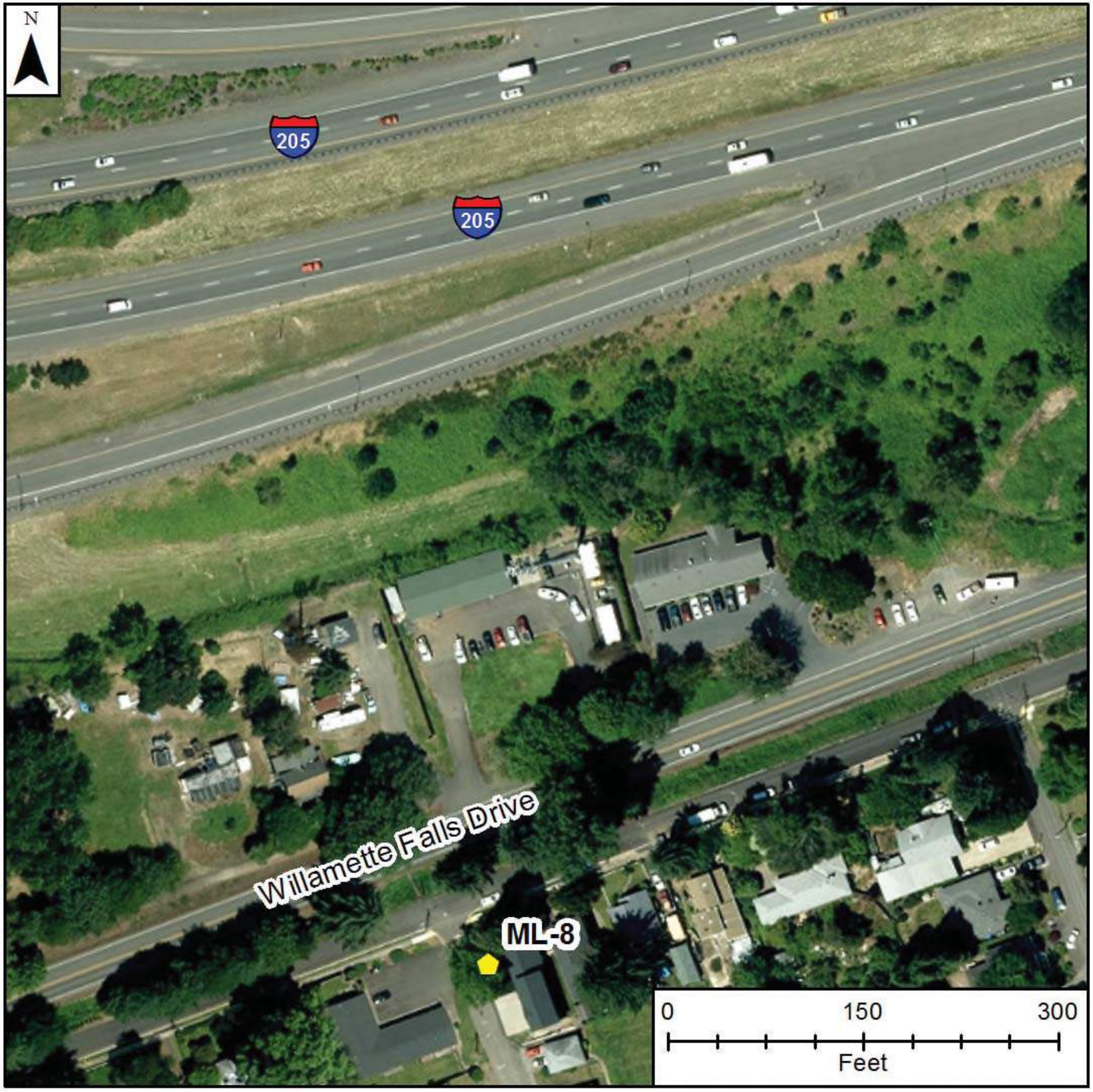
#	Time	L_{eq} (dBA)	L_{min} (dBA)	L_{max} (dBA)	L_{10} (dBA)	L_{33} (dBA)	L_{50} (dBA)	L_{90} (dBA)
1	9:38:10	63.5	58.8	68.3	65.8	63.9	63.1	60.3
2	9:39:10	63.6	60.9	66.1	65.0	64.3	63.6	61.5
3	9:40:10	62.9	59.1	71	64.6	63.2	62.5	60.2
4	9:41:10	63.9	60.7	69.6	65.8	64.0	63.3	61.7
5	9:42:10	62.8	59.8	66.6	64.6	63.2	62.6	60.6
6	9:43:10	64.8	59.9	67.6	66.5	65.4	64.7	62.3
7	9:44:10	64	60.8	68.3	65.9	64.5	63.6	61.6
8	9:45:10	63.1	59.8	67.4	65.5	63.0	62.3	60.9
9	9:46:10	62.1	55.2	66.4	64.9	63.1	61.6	57.1
10	9:47:10	63.5	61	74	64.8	63.7	63.1	62.0
11	9:48:10	63.8	59.2	66.9	65.5	64.4	63.7	61.3
12	9:49:10	62.6	59.1	65.6	64.6	63.1	62.3	59.8
13	9:50:10	62.9	58.7	66.7	65.2	63.6	62.4	59.8
14	9:51:10	63.8	59.7	68.3	66.4	63.8	63.1	61.2
15	9:52:10	62.2	57.3	68.9	64.7	62.7	61.6	58.8
16	9:53:10	64.3	59.5	69.1	66.4	64.9	64.1	60.9
17	9:54:10	62.4	58.7	65.5	63.9	63.0	62.5	59.8
18	9:55:10	62.3	57.5	66.1	63.9	62.8	62.1	59.7
19	9:56:10	62.5	59.4	66.7	64.0	62.9	62.4	60.5
20	9:57:10	61.5	58.6	64.6	63.0	61.9	61.3	59.6
Total for Period		**63.2**	**55.2**	**64.6**	**65.1**	**63.6**	**62.8**	**60.5**

PROJECT: K19786:I-205CW
JOB NO.: 309180.000

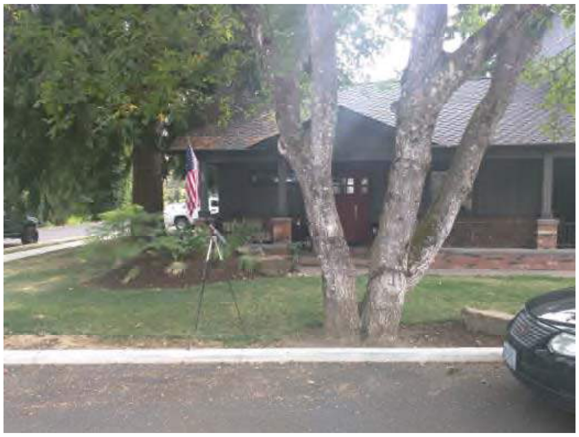
SHORT-TERM NOISE MEASUREMENT SITE LOG

ASSESSMENT AREA: WEST LINN
MEASUREMENT SITE NO.: ST-8
ADDRESS: 2318 8TH STREET
OWNER:
DESCRIPTION: SINGLE-FAMILY RESIDENTIAL
NOISE SOURCES: I-205 TRAFFIC, ENGINE BREAKING ON I-205
NOISE MONITOR: LD 824
S/N: A3975
MICROPHONE: GRAS
CALIBRATOR: CAL200
TEMP. RANGE (°F): 61
WEATHER CONDITIONS: SUNNY

SITE MAP:



Notes: I-205 is audible and dominates; however traffic on Willamette Falls Drive, while lower traffic volumes, is louder when present.




STOP

SHORT-TERM NOISE MEASUREMENT DATA SHEET

PROJECT: K19786:I-205CW

JOB NO.: 309180.000

MEASUREMENT SITE NO.: ST-9 PERSONNEL: SRN

ADDRESS/DESCRIPTION: 4107 Imperial Drive DATE: 8/31/17

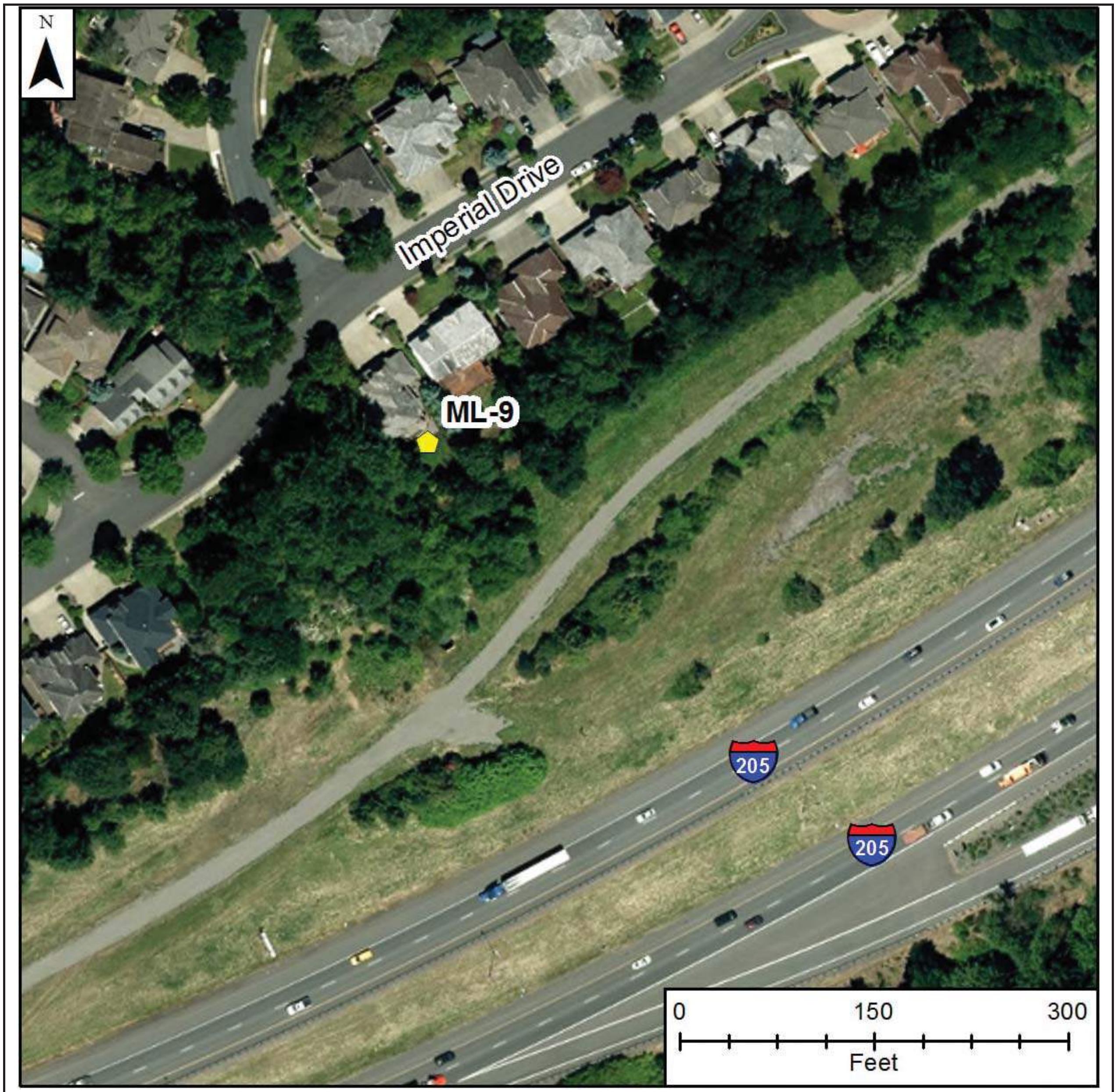
#	Time	L_{eq} (dBA)	L_{min} (dBA)	L_{max} (dBA)	L_{10} (dBA)	L_{33} (dBA)	L_{50} (dBA)	L_{90} (dBA)
1	10:25:06	55.5	53.7	57.5	56.5	55.7	55.4	54.3
2	10:26:06	55.2	53.8	59.2	56.0	55.4	55.0	54.2
3	10:27:06	54.8	52.6	57.9	56.0	55.1	54.7	53.4
4	10:28:06	54.6	52.3	59.1	56.3	55.1	54.3	53.0
5	10:29:06	55.5	52.5	65.0	56.3	55.0	54.6	53.3
6	10:30:06	55.8	52.9	62.1	56.9	55.8	55.3	54.0
7	10:31:06	56.8	54.1	67.3	58.4	55.8	55.5	54.4
8	10:32:06	55.9	53.0	64.0	56.8	56.2	55.8	54.4
9	10:33:06	54.9	53.2	58.2	55.9	54.9	54.6	53.8
10	10:34:06	55.2	53.4	58.9	56.9	55.3	54.7	53.7
11	10:35:06	54.1	51.9	58.6	55.0	54.4	53.9	53.0
12	10:36:06	56.8	53.4	61.9	58.6	57.3	56.6	54.3
13	10:37:06	56.7	54.7	61.0	57.9	57.0	56.5	55.3
14	10:38:06	58.4	54.8	64.0	61.5	58.2	57.4	55.5
15	10:39:06	57.5	55.5	63.1	58.4	57.7	57.4	56.3
16	10:40:06	56.6	55.4	58.5	57.5	56.8	56.5	55.8
Total for Period		**56.0**	**51.9**	**67.3**	**57.2**	**56.0**	**55.5**	**54.3**

PROJECT: K19786:I-205CW
JOB NO.: 309180.000

SHORT-TERM NOISE MEASUREMENT SITE LOG

ASSESSMENT AREA: WEST LINN
MEASUREMENT SITE NO.: ST-9
ADDRESS: 4701 IMPERIAL DRIVE
OWNER:
DESCRIPTION: SINGLE-FAMILY RESIDENTIAL
NOISE SOURCES: I-205 TRAFFIC
NOISE MONITOR: LD 824
S/N: A3975
MICROPHONE: GRAS
CALIBRATOR: CAL200
TEMP. RANGE (°F): 68
WEATHER CONDITIONS: SUNNY

SITE MAP:



Notes: I-205 dominates; however, sound of water flowing in Tanner Creek also audible. I-205 is approximately at grade with receptor.

SHORT-TERM NOISE MEASUREMENT DATA SHEET

PROJECT: K19786:I-205CW
JOB NO.: 309180.000

MEASUREMENT SITE NO.: ST-10 PERSONNEL: SRN
ADDRESS/DESCRIPTION: 4329 Imperial Drive DATE: 8/30/17

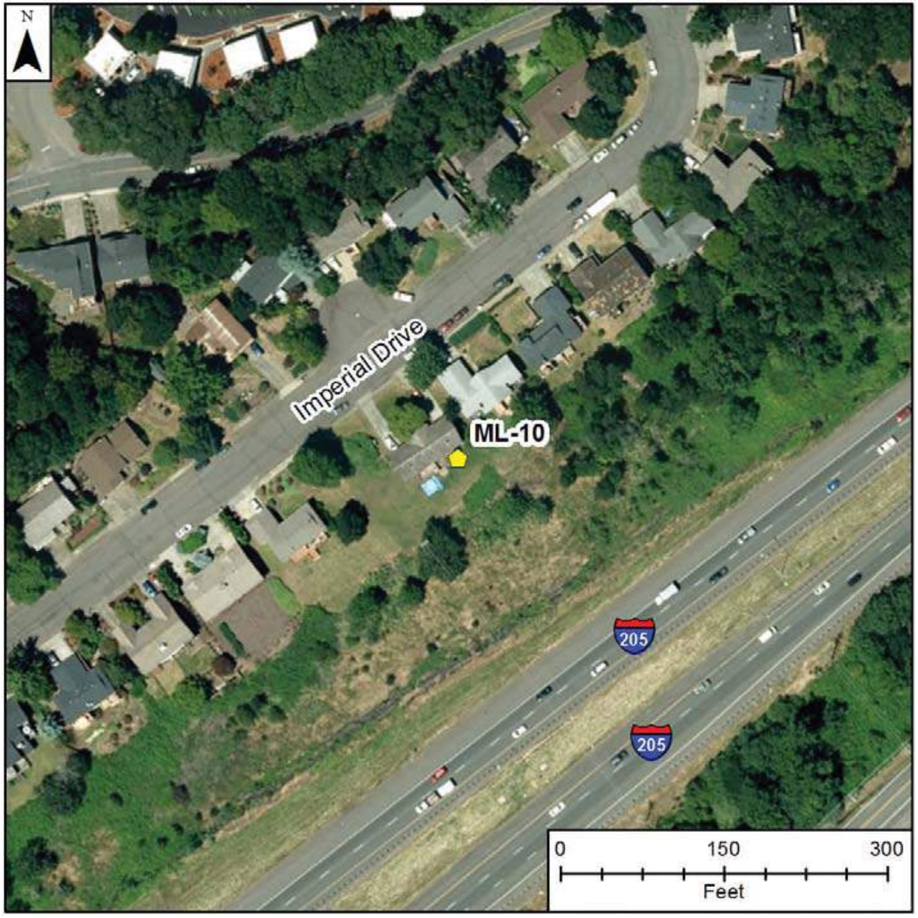
#	Time	L_{eq} (dBA)	L_{min} (dBA)	L_{max} (dBA)	L_{10} (dBA)	L_{33} (dBA)	L_{50} (dBA)	L_{90} (dBA)
1	14:35:00	59.2	57.9	60.7	60.0	59.4	58.9	58.4
2	14:36:00	59.1	57.7	60.7	60.0	59.5	58.9	58.2
3	14:37:00	59.5	58.0	65.0	60.1	59.5	59.1	58.3
4	14:38:00	58.8	57.0	60.9	60.2	58.8	58.6	57.8
5	14:39:00	58.3	57.2	59.6	59.0	58.5	58.3	57.6
6	14:40:00	57.7	56.0	59.3	58.8	58.0	57.5	56.8
7	14:41:00	56.4	55.1	57.4	57.0	56.6	56.4	55.9
8	14:42:00	56.6	54.7	66.6	56.3	55.8	55.6	55.0
9	14:43:00	56.0	54.4	59.6	57.4	55.8	55.6	55.1
10	14:44:00	55.9	55.0	57.0	56.4	56.0	55.9	55.5
11	14:45:00	56.1	55.4	57.0	56.6	56.3	56.1	55.5
12	14:46:00	56.4	54.6	58.8	57.7	56.6	56.4	54.9
13	14:47:00	55.9	55.0	56.8	56.3	56.1	56.0	55.3
14	14:48:00	55.8	54.8	56.7	56.3	56.0	55.8	55.1
15	14:49:00	56.8	56.1	57.9	57.1	56.9	56.8	56.4
16	14:50:00	56.3	54.3	58.8	57.5	56.7	55.8	55.3
Total for Period		**57.4**	**54.3**	**66.6**	**57.9**	**57.3**	**57.0**	**56.3**

PROJECT: K19786:I-205CW
JOB NO.: 309180.000

SHORT-TERM NOISE MEASUREMENT SITE LOG

ASSESSMENT AREA: WEST LINN MEASUREMENT SITE NO.: ST-10
ADDRESS: 4329 IMPERIAL DRIVE
OWNER:
DESCRIPTION: ATTACHED SINGLE-FAMILY RESIDENTIAL (DUPLEX)
NOISE SOURCES: I-205 TRAFFIC
NOISE MONITOR: LD 824 S/N: A3975
MICROPHONE: GRAS
CALIBRATOR: CAL200
TEMP. RANGE (°F): 72 WEATHER CONDITIONS: SUNNY

SITE MAP:



Notes: I-205 dominates, but is not visible from the receptor since the interstate is approximately 25 feet below the receptor which is attop a bluff.

SHORT-TERM NOISE MEASUREMENT DATA SHEET

PROJECT: K19786:I-205CW

JOB NO.: 309180.000

MEASUREMENT SITE NO.: ST-11 PERSONNEL: SRN

ADDRESS/DESCRIPTION: 4835 Willamette Falls Drive DATE: 8/31/17

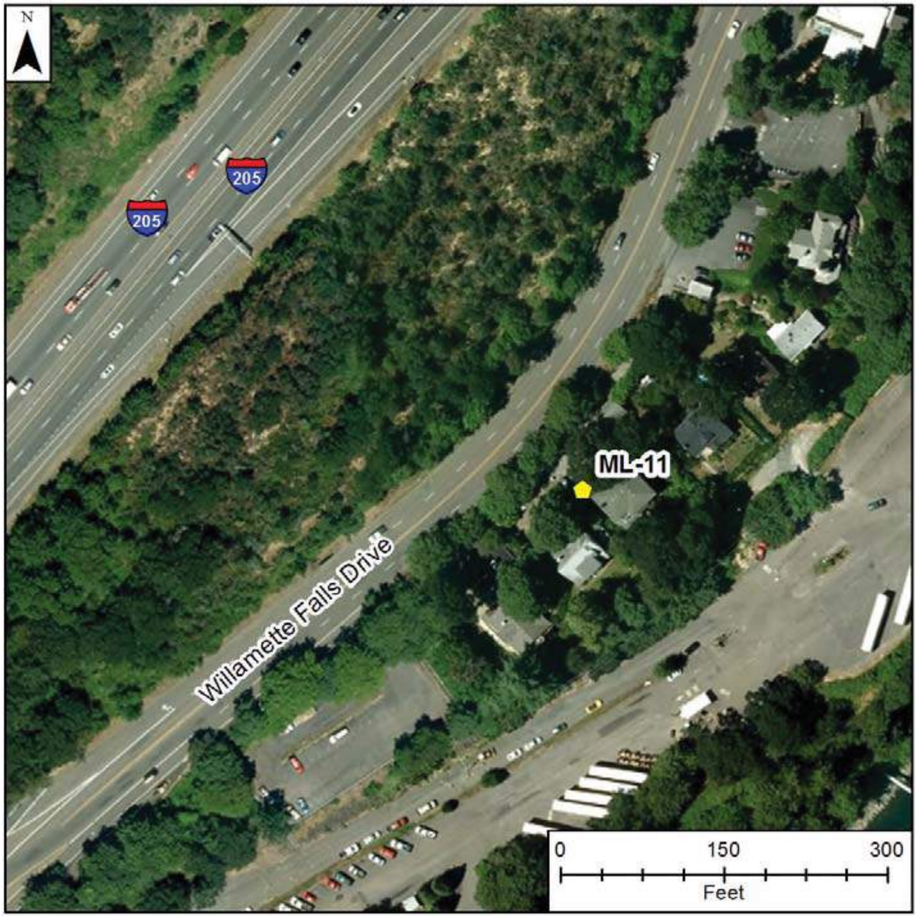
#	Time	L_{eq} (dBA)	L_{min} (dBA)	L_{max} (dBA)	L_{10} (dBA)	L_{33} (dBA)	L_{50} (dBA)	L_{90} (dBA)
1	13:07:00	59.0	50.7	64.3	61.8	59.7	58.3	53.3
2	13:08:00	56.9	50.3	64	59.7	57.4	56.0	52.2
3	13:09:00	57.3	49.8	71.9	59.9	57.4	55.8	50.9
4	13:10:00	57.8	51.4	63.2	60.9	58.4	57.2	52.2
5	13:11:00	55.4	48.6	60.4	58.8	55.9	54.0	50.3
6	13:12:00	58.8	52.3	64.8	62.2	59.2	57.3	53.5
7	13:13:00	56.0	50.3	65.3	59.3	55.5	53.9	51.3
8	13:14:00	54.5	48.8	62.7	58.1	54.0	51.8	49.5
9	13:15:00	55.7	50.4	62.5	58.8	56.5	53.7	51.1
10	13:16:00	59.1	51.4	65.6	62.8	58.9	57.1	53.1
11	13:17:00	56.2	49.9	61.4	59.0	56.3	55.2	51.4
12	13:18:00	60.0	50.9	66.3	62.7	60.9	59.6	52.3
13	13:19:00	57.3	51.3	70.6	59.8	57.3	55.9	52.6
14	13:20:00	58.0	50.7	64.6	61.7	57.9	55.8	52.0
15	13:21:00	58.7	50.7	65.8	61.7	58.9	57.7	52.2
Total for Period		**57.6**	**48.6**	**71.9**	**60.5**	**57.6**	**56.0**	**51.9**

PROJECT: K19786:I-205CW
JOB NO.: 309180.000

SHORT-TERM NOISE MEASUREMENT SITE LOG

ASSESSMENT AREA: WEST LINN MEASUREMENT SITE NO.: ST-11
ADDRESS: 4835 WILLAMETTE FALLS DRIVE
OWNER:
DESCRIPTION: SINGLE-FAMILY RESIDENTIAL
NOISE SOURCES: TRAFFIC ON WILLAMETTE FALLS DRIVE, I-205 TRAFFIC
NOISE MONITOR: LD 824 S/N: A3975
MICROPHONE: GRAS
CALIBRATOR: CAL200
TEMP. RANGE (°F): 72 WEATHER CONDITIONS: SUNNY

SITE MAP:



Notes: I-205 is approximately 30-35 feet above the home and traffic noise from I-205 is audible but not when traffic is present on Willamette Falls Drive. The home is also approximately 10-12 feet lower than Willamette Falls Drive. Terrain is providing sheilding from noise on I-205.

SHORT-TERM NOISE MEASUREMENT DATA SHEET

PROJECT: K19786:I-205CW
JOB NO.: 309180.000

MEASUREMENT SITE NO.: ST-12 PERSONNEL: SRN
ADDRESS/DESCRIPTION: 5345 Grove Street DATE: 8/31/17

#	Time	L_{eq} (dBA)	L_{min} (dBA)	L_{max} (dBA)	L_{10} (dBA)	L_{33} (dBA)	L_{50} (dBA)	L_{90} (dBA)
1	13:39:25	60.8	57.6	66.1	64.1	60.6	59.4	58.1
2	13:40:25	58.9	57.3	61.9	59.9	59.2	58.8	57.7
3	13:41:25	59.6	57.4	63.3	61.0	60.1	59.4	57.9
4	13:42:25	59.8	57.8	62.8	60.9	60.1	59.6	58.4
5	13:43:25	59.4	57.2	61.9	60.6	59.7	59.4	58.0
6	13:44:25	59.5	56.6	63.3	60.9	59.7	59.2	58.0
7	13:45:25	60.0	57.4	62.7	61.6	60.4	59.8	58.3
8	13:46:25	59.5	57.7	62.3	60.7	59.7	59.3	58.2
9	13:47:25	61.0	59.2	62.5	61.8	61.3	61.0	60.0
10	13:48:25	61.5	59.1	67.3	63.8	61.3	60.7	59.4
11	13:49:25	60.8	58.9	64.1	62.2	61.1	60.6	59.4
12	13:50:25	62.2	59.8	65.1	64.0	62.5	61.8	60.5
13	13:51:25	60.0	57.9	62.5	61.0	60.4	59.9	58.8
14	13:52:25	58.2	55.6	60.5	59.2	58.6	58.2	56.8
15	13:53:25	58.7	55.3	63.1	60.4	59.2	58.5	56.4
16	13:54:25	58.7	54.6	64.5	60.4	59.0	58.4	56.5
17	13:55:25	60.2	55.7	71.3	60.9	58.6	58.0	56.9
18	13:56:25	58.8	56.7	62.7	60.0	59.0	58.6	57.4
19	13:57:25	60.2	57.7	63.7	61.7	60.6	60.0	58.4
20	13:58:25	59.1	56.2	62.5	60.5	59.5	59.0	57.5
21	13:59:25	57.8	55.1	63.2	59.4	58.3	57.6	56.1
22	14:00:25	59.2	56.5	64.8	60.5	59.5	58.9	57.3
Total for Period		**59.9**	**54.6**	**71.3**	**61.2**	**59.9**	**59.4**	**58.0**

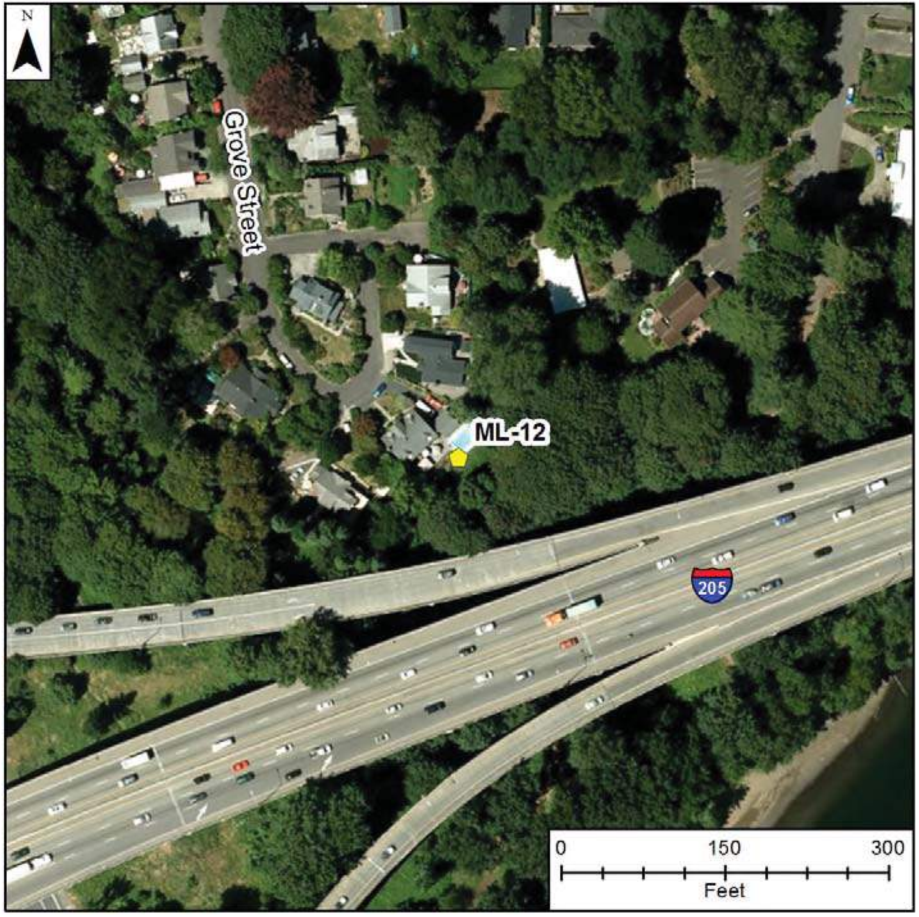
PROJECT: K19786:I-205CW

JOB NO.: 309180.000

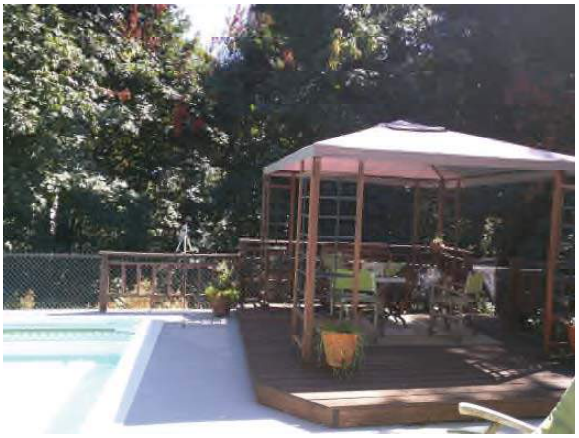
SHORT-TERM NOISE MEASUREMENT SITE LOG

ASSESSMENT AREA: WEST LINN
MEASUREMENT SITE NO.: ST-12
ADDRESS: 5345 GROVE STREET
OWNER:
DESCRIPTION: SINGLE-FAMILY RESIDENTIAL
NOISE SOURCES: I-205 TRAFFIC, BARKING SEALS
NOISE MONITOR: LD 824
S/N: A3975
MICROPHONE: GRAS
CALIBRATOR: CAL200
TEMP. RANGE (°F): 72
WEATHER CONDITIONS: SUNNY

SITE MAP:



Notes: I-205 on Abernathy Bridge 35-40 feet above the home. A number of seals live in the river and bark repeatedly; however, the interstate dominates the acoustic environment.



SHORT-TERM NOISE MEASUREMENT DATA SHEET

PROJECT: K19786:I-205CW

JOB NO.: 309180.000

MEASUREMENT SITE NO.: ST-13 PERSONNEL: SRN

ADDRESS/DESCRIPTION: Jon Storm Park DATE: 8/31/17

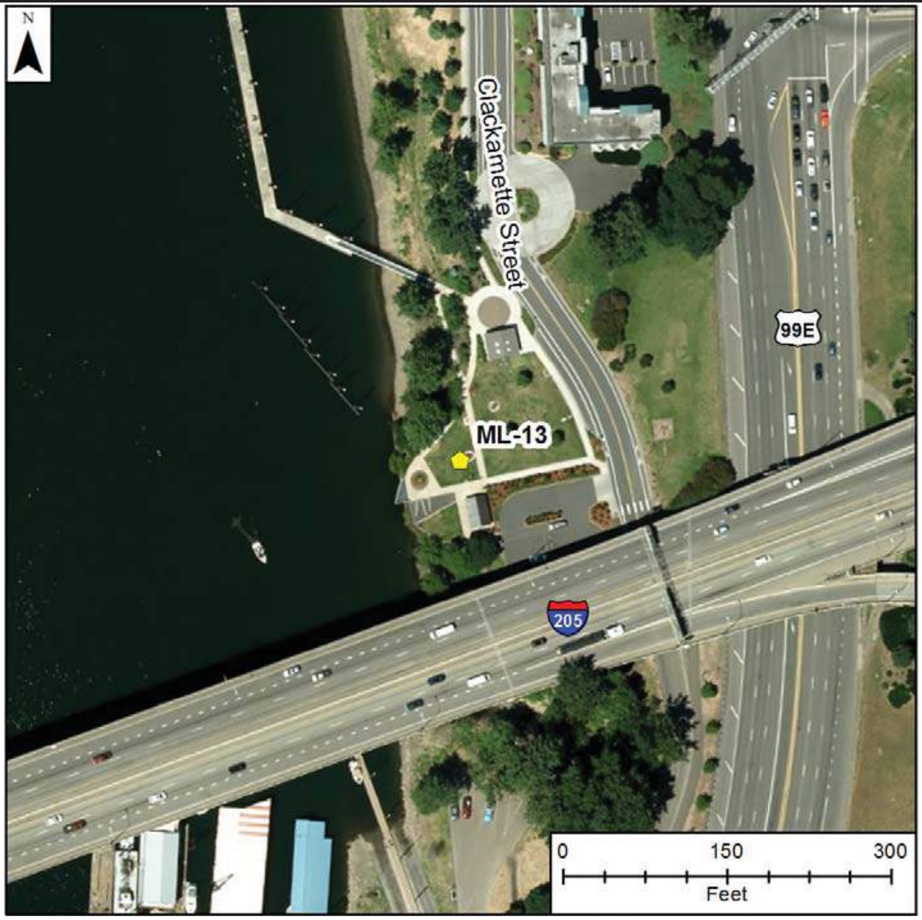
#	Time	L_{eq} (dBA)	L_{min} (dBA)	L_{max} (dBA)	L_{10} (dBA)	L_{33} (dBA)	L_{50} (dBA)	L_{90} (dBA)
1	14:14:46	64.0	61.6	71.2	65.4	64.3	63.8	62.4
2	14:15:46	63.6	60.6	71.3	65.3	62.9	62.3	61.2
3	14:16:46	63.8	61.1	70.1	65.1	63.8	63.4	62.1
4	14:17:46	63.4	61.1	66.3	64.7	63.7	63.3	62.0
5	14:18:46	63.3	60.6	67.3	64.7	63.6	63.2	61.6
6	14:19:46	63.8	60.0	66.9	65.5	64.3	63.7	61.5
7	14:20:46	61.7	59.0	65.3	63.7	62.0	61.2	59.7
8	14:21:46	61.4	58.6	65.2	63.2	61.8	61.0	59.2
9	14:22:46	61.7	57.8	65.5	63.6	62.3	61.5	59.0
10	14:23:46	62.6	59.5	70.2	64.4	62.6	61.8	60.2
11	14:24:46	66.2	59.4	74.2	70.4	64.8	63.9	60.8
12	14:25:46	62.0	58.9	65.9	64.2	62.4	61.1	59.7
13	14:26:46	64.6	61.6	70.1	66.4	64.8	64.1	62.4
14	14:27:46	65.7	60.1	74.3	68.9	64.7	63.4	61.4
15	14:28:46	61.3	58.8	64.8	63.2	61.5	60.8	59.5
16	14:29:46	63.7	60.3	71.9	65.7	63.5	62.7	61.3
17	14:30:46	61.9	59.0	65.4	63.5	62.2	61.6	60.1
18	14:31:46	63.7	59.2	67.5	66.3	63.8	63.2	60.4
19	14:32:46	62.0	58.8	64.2	63.4	62.6	62.2	59.7
Total for Period		**63.4**	**57.8**	**74.3**	**65.1**	**63.2**	**62.5**	**60.7**

PROJECT: K19786:I-205CW
JOB NO.: 309180.000

SHORT-TERM NOISE MEASUREMENT SITE LOG

ASSESSMENT AREA: WEST LINN
MEASUREMENT SITE NO.: ST-13
ADDRESS: 1801 CLACKAMETTE DRIVE
OWNER:
DESCRIPTION: JON STORM PARK
NOISE SOURCES: I-205 TRAFFIC, HIGHWAY 99E
NOISE MONITOR: LD 824
S/N: A3975
MICROPHONE: GRAS
CALIBRATOR: CAL200
TEMP. RANGE (°F): 73
WEATHER CONDITIONS: SUNNY

SITE MAP:



Notes: I-205 on Abernathy Bridge 35-40 feet above the park. Highway 99E is also a major source of traffic noise.

PROJECT: I-205 CW + Abernethy Bridge

JOB NO.: 309180

SHORT-TERM NOISE MEASUREMENT SITE LOG

ASSESSMENT AREA: John Storm PARK (OC) MEASUREMENT SITE NO.:

ADDRESS: John Storm PARK

OWNER: Oregon City

DESCRIPTION: PARK

NOISE SOURCES: Highway/Roadway Noise

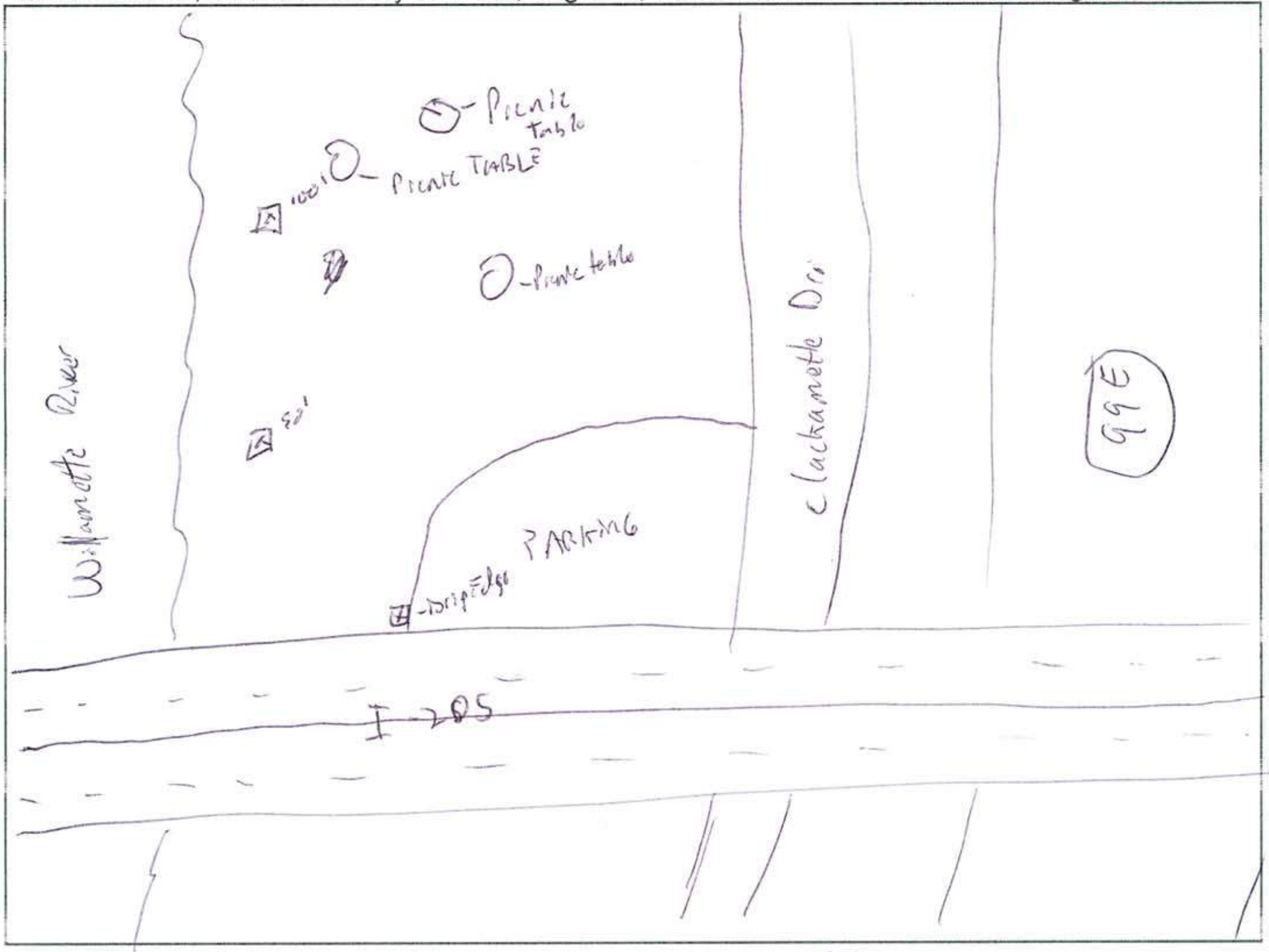
NOISE MONITOR: BK 2250 x 3 S/N: with 4, 5, 6

MICROPHONE: BK S/N: "

CALIBRATOR: BK S/N: "

TEMP. RANGE (°F): 60 WEATHER CONDITIONS: PARTLY Cloudy

SITE SKETCH: Show roadway, homes, local roads, reference distances, arrows for North & wind direction, where roadway is in cut, at grade, elevated, where direct lines of sight exist.



PHOTOS: YES GPS COORDINATES: N/A

hmmh

SHORT-TERM NOISE MEASUREMENT DATA SHEET

PROJECT: K19786:I-205CW
JOB NO.: 309180.000

MEASUREMENT SITE NO.: OC Structure Borne Measurements PERSONNEL: SRN
ADDRESS/DESCRIPTION: John Storm Park DATE: 6-13-18

66 #	~~5~~ Minute Period Starting	Meas'd Leq (dBA)	√ or X	Autos	Medium Trucks	Heavy Trucks	Other Noise Sources	COMMENTS (Include Calibration Data)
1	Drip Edge	72.3						11:17am - 12:23pm
2								
3	50'	68.5						11:17am - 12:23pm
4								
5	100'	68.3						11:17am - 12:23pm
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								

TOTAL Leq = SUBSET Leq =

√ = Other sources contributed to Leq X = Exclude period - contaminated by non-characteristic sources

>> ADD SKETCH AND WEATHER CONDITIONS TO REVERSE OR OTHER SHEET <<

Oregon City – John Storm Park Structure-Borne Noise Measurements

Drip Edge

100 feet

50 feet

Structure Related Noise Calculation Worksheet

K19786: I-205 Widening and Seismic Improvements

Oregon City Side of Crossing

Input Data:

h: Height of structure, from ground to underside of deck	50
Aref: Center point between ground and underside of structure (h/2)	25
w: Width of Structure	100
Mw: Midpoint of structure (w/2) The underside of the deck at this point is the assumed source of structure noise (S)	50
Dref: Reference distance - from S to Aref	55.9
Measured Noise Level at Drip Edge, dB(A)	72.3

Set-back Calculations:

Analysis Point	Distance from Drip Edge (ft.)	Distance from Analysis Point (ft.)	Measured Noise Level at Drip Edge Leq in dB(A)	Calculated Noise Level Drop-off Rate = 3.0 dB/DD
Aref	0	55.9	72.3	
A25	25	80.9		71
A50	50	105.9		70
A100	100	155.9		68
A200	200	255.9		66
A400	400	455.9		63
A500	500	555.9		62

Analysis Point	Distance from Drip Edge (ft.)	Distance from Analysis Point (ft.)	Measured Noise Level at Drip Edge Leq in dB(A)	Calculated Noise Level Drop-off Rate = 4.5 dB/DD
Aref	0	55.9	72.3	
A25	25	80.9		69.9
A50	50	105.9		68.1
A100	100	155.9		65.6
A200	200	255.9		62.4
A400	400	455.9		58.6
A500	500	555.9		57.3

Analysis Point	Distance from Drip Edge (ft.)	Distance from Analysis Point (ft.)	Measured Noise Level at Drip Edge Leq in dB(A)	Calculated Noise Level Drop-off Rate = 6.0 dB/DD
Aref	0	55.9	72.3	
A25	25	80.9		69
A50	50	105.9		67
A100	100	155.9		63
A200	200	255.9		59
A400	400	455.9		54
A500	500	555.9		52

Structure Related Noise Calculation Worksheet

K19786: I-205 Widening and Seismic Improvements

Southbound Side

Input Data:

h: Height of structure, from ground to underside of deck	50
Aref: Center point between ground and underside of structure (h/2)	25
w: Width of Structure	100
Mw: Midpoint of structure (w/2) The underside of the deck at this point is the assumed source of structure noise (S)	50
Dref: Reference distance - from S to Aref	55.9
Measured Noise Level at Drip Edge, dB(A)	72.3

Set-back Calculations:

Analysis Point	Distance from Drip Edge (ft.)	Distance from Analysis Point (ft.)	Measured Noise Level at Drip Edge Leq in dB(A)	Calculated Noise Level Drop-off Rate = 4.5 dB/DD
Aref	0	55.9	72.3	
A1	1	56.9		72.2
A2	2	57.9		72.1
A3	3	58.9		72.0
A4	4	59.9		71.8
A5	5	60.9		71.7
A6	6	61.9		71.6
A7	7	62.9		71.5
A8	8	63.9		71.4
A9	9	64.9		71.3
A10	10	65.9		71.2
A11	11	66.9		71.1
A12	12	67.9		71.0
A13	13	68.9		70.9
A14	14	69.9		70.8
A15	15	70.9		70.8
A16	16	71.9		70.7
A17	17	72.9		70.6
A18	18	73.9		70.5
A19	19	74.9		70.4
A20	20	75.9		70.3
A21	21	76.9		70.2
A22	22	77.9		70.1
A23	23	78.9		70.1
A24	24	79.9		70.0
A25	25	80.9		69.9
A26	26	81.9		69.8
A27	27	82.9		69.7
A28	28	83.9		69.7
A29	29	84.9		69.6
A30	30	85.9		69.5
A31	31	86.9		69.4

Structure Related Noise Calculation Worksheet	
K19786: I-205 Widening and Seismic Improvements	
Southbound Side	
Input Data:	
h: Height of structure, from ground to underside of deck	50
Aref: Center point between ground and underside of structure (h/2)	25
w: Width of Structure	100
Mw: Midpoint of structure (w/2) The underside of the deck at this point is the assumed source of structure noise (S)	50
Dref: Reference distance - from S to Aref	55.9
Measured Noise Level at Drip Edge, dB(A)	72.3
Set-back Calculations:	

Analysis Point	Distance from Drip Edge (ft.)	Distance from Analysis Point (ft.)	Measured Noise Level at Drip Edge Leq in dB(A)	Calculated Noise Level Drop-off Rate = 4.5 dB/DD
A32	32	87.9		69.4
A33	33	88.9		69.3
A34	34	89.9		69.2
A35	35	90.9		69.1
A36	36	91.9		69.1
A37	37	92.9		69.0
A38	38	93.9		68.9
A39	39	94.9		68.9
A40	40	95.9		68.8
A41	41	96.9		68.7
A42	42	97.9		68.6
A43	43	98.9		68.6
A44	44	99.9		68.5
A45	45	100.9		68.5
A46	46	101.9		68.4
A47	47	102.9		68.3
A48	48	103.9		68.3
A49	49	104.9		68.2
A50	50	105.9		68.1
A51	51	106.9		68.1
A52	52	107.9		68.0
A53	53	108.9		68.0
A54	54	109.9		67.9
A55	55	110.9		67.8
A56	56	111.9		67.8
A57	57	112.9		67.7
A58	58	113.9		67.7
A59	59	114.9		67.6
A60	60	115.9		67.6
A61	61	116.9		67.5
A62	62	117.9		67.4
A63	63	118.9		67.4

Structure Related Noise Calculation Worksheet

K19786: I-205 Widening and Seismic Improvements

Southbound Side

Input Data:

h: Height of structure, from ground to underside of deck	50
Aref: Center point between ground and underside of structure (h/2)	25
w: Width of Structure	100
Mw: Midpoint of structure (w/2) The underside of the deck at this point is the assumed source of structure noise (S)	50
Dref: Reference distance - from S to Aref	55.9
Measured Noise Level at Drip Edge, dB(A)	72.3

Set-back Calculations:

Analysis Point	Distance from Drip Edge (ft.)	Distance from Analysis Point (ft.)	Measured Noise Level at Drip Edge Leq in dB(A)	Calculated Noise Level Drop-off Rate = 4.5 dB/DD
A64	64	119.9		67.3
A65	65	120.9		67.3
A66	66	121.9		67.2
A67	67	122.9		67.2
A68	68	123.9		67.1
A69	69	124.9		67.1
A70	70	125.9		67.0
A71	71	126.9		67.0
A72	72	127.9		66.9
A73	73	128.9		66.9
A74	74	129.9		66.8
A75	75	130.9		66.8
A76	76	131.9		66.7
A77	77	132.9		66.7
A78	78	133.9		66.6
A79	79	134.9		66.6
A80	80	135.9		66.5
A81	81	136.9		66.5
A82	82	137.9		66.4
A83	83	138.9		66.4
A84	84	139.9		66.3
A85	85	140.9		66.3
A86	86	141.9		66.2
A87	87	142.9		66.2
A88	88	143.9		66.1
A89	89	144.9		66.1
A90	90	145.9		66.1
A91	91	146.9		66.0
A92	92	147.9		66.0
A93	93	148.9		65.9
A94	94	149.9		65.9
A95	95	150.9		65.8

Structure Related Noise Calculation Worksheet				
K19786: I-205 Widening and Seismic Improvements				
Southbound Side				
Input Data:				
h: Height of structure, from ground to underside of deck				50
Aref: Center point between ground and underside of structure (h/2)				25
w: Width of Structure				100
Mw: Midpoint of structure (w/2) The underside of the deck at this point is the assumed source of structure noise (S)				50
Dref: Reference distance - from S to Aref				55.9
Measured Noise Level at Drip Edge, dB(A)				72.3
Set-back Calculations:				
Analysis Point	Distance from Drip Edge (ft.)	Distance from Analysis Point (ft.)	Measured Noise Level at Drip Edge Leq in dB(A)	Calculated Noise Level Drop-off Rate = 4.5 dB/DD
A96	96	151.9		65.8
A97	97	152.9		65.7
A98	98	153.9		65.7
A99	99	154.9		65.7
A100	100	155.9		65.6
A101	101	156.9		65.6
A102	102	157.9		65.5
A103	103	158.9		65.5
A104	104	159.9		65.5
A105	105	160.9		65.4
A106	106	161.9		65.4
A107	107	162.9		65.3
A108	108	163.9		65.3
A109	109	164.9		65.3
A110	110	165.9		65.2
A111	111	166.9		65.2
A112	112	167.9		65.1
A113	113	168.9		65.1
A114	114	169.9		65.1
A115	115	170.9		65.0
A116	116	171.9		65.0
A117	117	172.9		64.9
A118	118	173.9		64.9
A119	119	174.9		64.9
A120	120	175.9		64.8
A121	121	176.9		64.8
A122	122	177.9		64.8
A123	123	178.9		64.7
A124	124	179.9		64.7
A125	125	180.9		64.6
A126	126	181.9		64.6
A127	127	182.9		64.6

Structure Related Noise Calculation Worksheet

K19786: I-205 Widening and Seismic Improvements

Southbound Side

Input Data:

h: Height of structure, from ground to underside of deck	50
Aref: Center point between ground and underside of structure (h/2)	25
w: Width of Structure	100
Mw: Midpoint of structure (w/2) The underside of the deck at this point is the assumed source of structure noise (S)	50
Dref: Reference distance - from S to Aref	55.9
Measured Noise Level at Drip Edge, dB(A)	72.3

Set-back Calculations:

Analysis Point	Distance from Drip Edge (ft.)	Distance from Analysis Point (ft.)	Measured Noise Level at Drip Edge Leq in dB(A)	Calculated Noise Level Drop-off Rate = 4.5 dB/DD
A128	128	183.9		64.5
A129	129	184.9		64.5
A130	130	185.9		64.5
A131	131	186.9		64.4
A132	132	187.9		64.4
A133	133	188.9		64.4
A134	134	189.9		64.3
A135	135	190.9		64.3
A136	136	191.9		64.3
A137	137	192.9		64.2
A138	138	193.9		64.2
A139	139	194.9		64.2
A140	140	195.9		64.1
A141	141	196.9		64.1
A142	142	197.9		64.1
A143	143	198.9		64.0
A144	144	199.9		64.0
A145	145	200.9		64.0
A146	146	201.9		63.9
A147	147	202.9		63.9
A148	148	203.9		63.9
A149	149	204.9		63.8
A150	150	205.9		63.8
A151	151	206.9		63.8
A152	152	207.9		63.7
A153	153	208.9		63.7
A154	154	209.9		63.7
A155	155	210.9		63.7
A156	156	211.9		63.6
A157	157	212.9		63.6
A158	158	213.9		63.6
A159	159	214.9		63.5

Structure Related Noise Calculation Worksheet	
K19786: I-205 Widening and Seismic Improvements	
Southbound Side	
Input Data:	
h: Height of structure, from ground to underside of deck	50
Aref: Center point between ground and underside of structure (h/2)	25
w: Width of Structure	100
Mw: Midpoint of structure (w/2) The underside of the deck at this point is the assumed source of structure noise (S)	50
Dref: Reference distance - from S to Aref	55.9
Measured Noise Level at Drip Edge, dB(A)	72.3
Set-back Calculations:	

Analysis Point	Distance from Drip Edge (ft.)	Distance from Analysis Point (ft.)	Measured Noise Level at Drip Edge Leq in dB(A)	Calculated Noise Level Drop-off Rate = 4.5 dB/DD
A160	160	215.9		63.5
A161	161	216.9		63.5
A162	162	217.9		63.4
A163	163	218.9		63.4
A164	164	219.9		63.4
A165	165	220.9		63.3
A166	166	221.9		63.3
A167	167	222.9		63.3
A168	168	223.9		63.3
A169	169	224.9		63.2
A170	170	225.9		63.2
A171	171	226.9		63.2
A172	172	227.9		63.1
A173	173	228.9		63.1
A174	174	229.9		63.1
A175	175	230.9		63.1
A176	176	231.9		63.0
A177	177	232.9		63.0
A178	178	233.9		63.0
A179	179	234.9		62.9
A180	180	235.9		62.9
A181	181	236.9		62.9
A182	182	237.9		62.9
A183	183	238.9		62.8
A184	184	239.9		62.8
A185	185	240.9		62.8
A186	186	241.9		62.8
A187	187	242.9		62.7
A188	188	243.9		62.7
A189	189	244.9		62.7
A190	190	245.9		62.6
A191	191	246.9		62.6

Structure Related Noise Calculation Worksheet				
K19786: I-205 Widening and Seismic Improvements				
Southbound Side				
Input Data:				
h: Height of structure, from ground to underside of deck				50
Aref: Center point between ground and underside of structure (h/2)				25
w: Width of Structure				100
Mw: Midpoint of structure (w/2) The underside of the deck at this point is the assumed source of structure noise (S)				50
Dref: Reference distance - from S to Aref				55.9
Measured Noise Level at Drip Edge, dB(A)				72.3
Set-back Calculations:				
Analysis Point	Distance from Drip Edge (ft.)	Distance from Analysis Point (ft.)	Measured Noise Level at Drip Edge Leq in dB(A)	Calculated Noise Level Drop-off Rate = 4.5 dB/DD
A192	192	247.9		62.6
A193	193	248.9		62.6
A194	194	249.9		62.5
A195	195	250.9		62.5
A196	196	251.9		62.5
A197	197	252.9		62.5
A198	198	253.9		62.4
A199	199	254.9		62.4
A200	200	255.9		62.4
A201	201	256.9		62.4
A202	202	257.9		62.3
A203	203	258.9		62.3
A204	204	259.9		62.3
A205	205	260.9		62.3
A206	206	261.9		62.2
A207	207	262.9		62.2
A208	208	263.9		62.2
A209	209	264.9		62.2
A210	210	265.9		62.1
A211	211	266.9		62.1
A212	212	267.9		62.1
A213	213	268.9		62.1
A214	214	269.9		62.0
A215	215	270.9		62.0
A216	216	271.9		62.0
A217	217	272.9		62.0
A218	218	273.9		61.9
A219	219	274.9		61.9
A220	220	275.9		61.9
A221	221	276.9		61.9
A222	222	277.9		61.9
A223	223	278.9		61.8

Structure Related Noise Calculation Worksheet

K19786: I-205 Widening and Seismic Improvements

Southbound Side

Input Data:

h: Height of structure, from ground to underside of deck	50
Aref: Center point between ground and underside of structure (h/2)	25
w: Width of Structure	100
Mw: Midpoint of structure (w/2) The underside of the deck at this point is the assumed source of structure noise (S)	50
Dref: Reference distance - from S to Aref	55.9
Measured Noise Level at Drip Edge, dB(A)	72.3

Set-back Calculations:

Analysis Point	Distance from Drip Edge (ft.)	Distance from Analysis Point (ft.)	Measured Noise Level at Drip Edge Leq in dB(A)	Calculated Noise Level Drop-off Rate = 4.5 dB/DD
A224	224	279.9		61.8
A225	225	280.9		61.8
A226	226	281.9		61.8
A227	227	282.9		61.7
A228	228	283.9		61.7
A229	229	284.9		61.7
A230	230	285.9		61.7
A231	231	286.9		61.6
A232	232	287.9		61.6
A233	233	288.9		61.6
A234	234	289.9		61.6
A235	235	290.9		61.6
A236	236	291.9		61.5
A237	237	292.9		61.5
A238	238	293.9		61.5
A239	239	294.9		61.5
A240	240	295.9		61.4
A241	241	296.9		61.4
A242	242	297.9		61.4
A243	243	298.9		61.4
A244	244	299.9		61.4
A245	245	300.9		61.3
A246	246	301.9		61.3
A247	247	302.9		61.3
A248	248	303.9		61.3
A249	249	304.9		61.2
A250	250	305.9		61.2
A251	251	306.9		61.2
A252	252	307.9		61.2
A253	253	308.9		61.2
A254	254	309.9		61.1
A255	255	310.9		61.1

Structure Related Noise Calculation Worksheet				
K19786: I-205 Widening and Seismic Improvements				
Southbound Side				
Input Data:				
h: Height of structure, from ground to underside of deck				50
Aref: Center point between ground and underside of structure (h/2)				25
w: Width of Structure				100
Mw: Midpoint of structure (w/2) The underside of the deck at this point is the assumed source of structure noise (S)				50
Dref: Reference distance - from S to Aref				55.9
Measured Noise Level at Drip Edge, dB(A)				72.3
Set-back Calculations:				
Analysis Point	Distance from Drip Edge (ft.)	Distance from Analysis Point (ft.)	Measured Noise Level at Drip Edge Leq in dB(A)	Calculated Noise Level Drop-off Rate = 4.5 dB/DD
A256	256	311.9		61.1
A257	257	312.9		61.1
A258	258	313.9		61.1
A259	259	314.9		61.0
A260	260	315.9		61.0
A261	261	316.9		61.0
A262	262	317.9		61.0
A263	263	318.9		61.0
A264	264	319.9		60.9
A265	265	320.9		60.9
A266	266	321.9		60.9
A267	267	322.9		60.9
A268	268	323.9		60.9
A269	269	324.9		60.8
A270	270	325.9		60.8
A271	271	326.9		60.8
A272	272	327.9		60.8
A273	273	328.9		60.8
A274	274	329.9		60.7
A275	275	330.9		60.7
A276	276	331.9		60.7
A277	277	332.9		60.7
A278	278	333.9		60.7
A279	279	334.9		60.6
A280	280	335.9		60.6
A281	281	336.9		60.6
A282	282	337.9		60.6
A283	283	338.9		60.6
A284	284	339.9		60.5
A285	285	340.9		60.5
A286	286	341.9		60.5
A287	287	342.9		60.5

Structure Related Noise Calculation Worksheet

K19786: I-205 Widening and Seismic Improvements

Southbound Side

Input Data:

h: Height of structure, from ground to underside of deck	50
Aref: Center point between ground and underside of structure (h/2)	25
w: Width of Structure	100
Mw: Midpoint of structure (w/2) The underside of the deck at this point is the assumed source of structure noise (S)	50
Dref: Reference distance - from S to Aref	55.9
Measured Noise Level at Drip Edge, dB(A)	72.3

Set-back Calculations:

Analysis Point	Distance from Drip Edge (ft.)	Distance from Analysis Point (ft.)	Measured Noise Level at Drip Edge Leq in dB(A)	Calculated Noise Level Drop-off Rate = 4.5 dB/DD
A288	288	343.9		60.5
A289	289	344.9		60.4
A290	290	345.9		60.4
A291	291	346.9		60.4
A292	292	347.9		60.4
A293	293	348.9		60.4
A294	294	349.9		60.4
A295	295	350.9		60.3
A296	296	351.9		60.3
A297	297	352.9		60.3
A298	298	353.9		60.3
A299	299	354.9		60.3
A300	300	355.9		60.2
A301	301	356.9		60.2
A302	302	357.9		60.2
A303	303	358.9		60.2
A304	304	359.9		60.2
A305	305	360.9		60.2
A306	306	361.9		60.1
A307	307	362.9		60.1
A308	308	363.9		60.1
A309	309	364.9		60.1
A310	310	365.9		60.1
A311	311	366.9		60.0
A312	312	367.9		60.0
A313	313	368.9		60.0
A314	314	369.9		60.0
A315	315	370.9		60.0
A316	316	371.9		60.0
A317	317	372.9		59.9
A318	318	373.9		59.9
A319	319	374.9		59.9

Structure Related Noise Calculation Worksheet

K19786: I-205 Widening and Seismic Improvements

Southbound Side

Input Data:

h: Height of structure, from ground to underside of deck	50
Aref: Center point between ground and underside of structure (h/2)	25
w: Width of Structure	100
Mw: Midpoint of structure (w/2) The underside of the deck at this point is the assumed source of structure noise (S)	50
Dref: Reference distance - from S to Aref	55.9
Measured Noise Level at Drip Edge, dB(A)	72.3

Set-back Calculations:

Analysis Point	Distance from Drip Edge (ft.)	Distance from Analysis Point (ft.)	Measured Noise Level at Drip Edge Leq in dB(A)	Calculated Noise Level Drop-off Rate = 4.5 dB/DD
A320	320	375.9		59.9
A321	321	376.9		59.9
A322	322	377.9		59.9
A323	323	378.9		59.8
A324	324	379.9		59.8
A325	325	380.9		59.8
A326	326	381.9		59.8
A327	327	382.9		59.8
A328	328	383.9		59.7
A329	329	384.9		59.7
A330	330	385.9		59.7
A331	331	386.9		59.7
A332	332	387.9		59.7
A333	333	388.9		59.7
A334	334	389.9		59.6
A335	335	390.9		59.6
A336	336	391.9		59.6
A337	337	392.9		59.6
A338	338	393.9		59.6
A339	339	394.9		59.6
A340	340	395.9		59.5
A341	341	396.9		59.5
A342	342	397.9		59.5
A343	343	398.9		59.5
A344	344	399.9		59.5
A345	345	400.9		59.5
A346	346	401.9		59.4
A347	347	402.9		59.4
A348	348	403.9		59.4
A349	349	404.9		59.4
A350	350	405.9		59.4
A351	351	406.9		59.4

Structure Related Noise Calculation Worksheet

K19786: I-205 Widening and Seismic Improvements

Southbound Side

Input Data:

h: Height of structure, from ground to underside of deck	50
Aref: Center point between ground and underside of structure (h/2)	25
w: Width of Structure	100
Mw: Midpoint of structure (w/2) The underside of the deck at this point is the assumed source of structure noise (S)	50
Dref: Reference distance - from S to Aref	55.9
Measured Noise Level at Drip Edge, dB(A)	72.3

Set-back Calculations:

Analysis Point	Distance from Drip Edge (ft.)	Distance from Analysis Point (ft.)	Measured Noise Level at Drip Edge Leq in dB(A)	Calculated Noise Level Drop-off Rate = 4.5 dB/DD
A352	352	407.9		59.4
A353	353	408.9		59.3
A354	354	409.9		59.3
A355	355	410.9		59.3
A356	356	411.9		59.3
A357	357	412.9		59.3
A358	358	413.9		59.3
A359	359	414.9		59.2
A360	360	415.9		59.2
A361	361	416.9		59.2
A362	362	417.9		59.2
A363	363	418.9		59.2
A364	364	419.9		59.2
A365	365	420.9		59.1
A366	366	421.9		59.1
A367	367	422.9		59.1
A368	368	423.9		59.1
A369	369	424.9		59.1
A370	370	425.9		59.1
A371	371	426.9		59.1
A372	372	427.9		59.0
A373	373	428.9		59.0
A374	374	429.9		59.0
A375	375	430.9		59.0
A376	376	431.9		59.0
A377	377	432.9		59.0
A378	378	433.9		59.0
A379	379	434.9		58.9
A380	380	435.9		58.9
A381	381	436.9		58.9
A382	382	437.9		58.9
A383	383	438.9		58.9

Structure Related Noise Calculation Worksheet

K19786: I-205 Widening and Seismic Improvements

Southbound Side

Input Data:

h: Height of structure, from ground to underside of deck	50
Aref: Center point between ground and underside of structure (h/2)	25
w: Width of Structure	100
Mw: Midpoint of structure (w/2) The underside of the deck at this point is the assumed source of structure noise (S)	50
Dref: Reference distance - from S to Aref	55.9
Measured Noise Level at Drip Edge, dB(A)	72.3

Set-back Calculations:

Analysis Point	Distance from Drip Edge (ft.)	Distance from Analysis Point (ft.)	Measured Noise Level at Drip Edge Leq in dB(A)	Calculated Noise Level Drop-off Rate = 4.5 dB/DD
A384	384	439.9		58.9
A385	385	440.9		58.8
A386	386	441.9		58.8
A387	387	442.9		58.8
A388	388	443.9		58.8
A389	389	444.9		58.8
A390	390	445.9		58.8
A391	391	446.9		58.8
A392	392	447.9		58.7
A393	393	448.9		58.7
A394	394	449.9		58.7
A395	395	450.9		58.7
A396	396	451.9		58.7
A397	397	452.9		58.7
A398	398	453.9		58.7
A399	399	454.9		58.6
A400	400	455.9		58.6
A401	401	456.9		58.6
A402	402	457.9		58.6
A403	403	458.9		58.6
A404	404	459.9		58.6
A405	405	460.9		58.6
A406	406	461.9		58.5
A407	407	462.9		58.5
A408	408	463.9		58.5
A409	409	464.9		58.5
A410	410	465.9		58.5
A411	411	466.9		58.5
A412	412	467.9		58.5
A413	413	468.9		58.4
A414	414	469.9		58.4
A415	415	470.9		58.4

Structure Related Noise Calculation Worksheet				
K19786: I-205 Widening and Seismic Improvements				
Southbound Side				
Input Data:				
h: Height of structure, from ground to underside of deck				50
Aref: Center point between ground and underside of structure (h/2)				25
w: Width of Structure				100
Mw: Midpoint of structure (w/2) The underside of the deck at this point is the assumed source of structure noise (S)				50
Dref: Reference distance - from S to Aref				55.9
Measured Noise Level at Drip Edge, dB(A)				72.3
Set-back Calculations:				
Analysis Point	Distance from Drip Edge (ft.)	Distance from Analysis Point (ft.)	Measured Noise Level at Drip Edge Leq in dB(A)	Calculated Noise Level Drop-off Rate = 4.5 dB/DD
A416	416	471.9		58.4
A417	417	472.9		58.4
A418	418	473.9		58.4
A419	419	474.9		58.4
A420	420	475.9		58.3
A421	421	476.9		58.3
A422	422	477.9		58.3
A423	423	478.9		58.3
A424	424	479.9		58.3
A425	425	480.9		58.3
A426	426	481.9		58.3
A427	427	482.9		58.3
A428	428	483.9		58.2
A429	429	484.9		58.2
A430	430	485.9		58.2
A431	431	486.9		58.2
A432	432	487.9		58.2
A433	433	488.9		58.2
A434	434	489.9		58.2
A435	435	490.9		58.1
A436	436	491.9		58.1
A437	437	492.9		58.1
A438	438	493.9		58.1
A439	439	494.9		58.1
A440	440	495.9		58.1
A441	441	496.9		58.1
A442	442	497.9		58.1
A443	443	498.9		58.0
A444	444	499.9		58.0
A445	445	500.9		58.0
A446	446	501.9		58.0
A447	447	502.9		58.0

Structure Related Noise Calculation Worksheet				
K19786: I-205 Widening and Seismic Improvements				
Southbound Side				
Input Data:				
h: Height of structure, from ground to underside of deck				50
Aref: Center point between ground and underside of structure (h/2)				25
w: Width of Structure				100
Mw: Midpoint of structure (w/2) The underside of the deck at this point is the assumed source of structure noise (S)				50
Dref: Reference distance - from S to Aref				55.9
Measured Noise Level at Drip Edge, dB(A)				72.3
Set-back Calculations:				
Analysis Point	Distance from Drip Edge (ft.)	Distance from Analysis Point (ft.)	Measured Noise Level at Drip Edge Leq in dB(A)	Calculated Noise Level Drop-off Rate = 4.5 dB/DD
A448	448	503.9		58.0
A449	449	504.9		58.0
A450	450	505.9		58.0
A451	451	506.9		57.9
A452	452	507.9		57.9
A453	453	508.9		57.9
A454	454	509.9		57.9
A455	455	510.9		57.9
A456	456	511.9		57.9
A457	457	512.9		57.9
A458	458	513.9		57.8
A459	459	514.9		57.8
A460	460	515.9		57.8
A461	461	516.9		57.8
A462	462	517.9		57.8
A463	463	518.9		57.8
A464	464	519.9		57.8
A465	465	520.9		57.8
A466	466	521.9		57.7
A467	467	522.9		57.7
A468	468	523.9		57.7
A469	469	524.9		57.7
A470	470	525.9		57.7
A471	471	526.9		57.7
A472	472	527.9		57.7
A473	473	528.9		57.7
A474	474	529.9		57.6
A475	475	530.9		57.6
A476	476	531.9		57.6
A477	477	532.9		57.6
A478	478	533.9		57.6
A479	479	534.9		57.6

Structure Related Noise Calculation Worksheet				
K19786: I-205 Widening and Seismic Improvements				
Southbound Side				
Input Data:				
h: Height of structure, from ground to underside of deck				50
Aref: Center point between ground and underside of structure (h/2)				25
w: Width of Structure				100
Mw: Midpoint of structure (w/2) The underside of the deck at this point is the assumed source of structure noise (S)				50
Dref: Reference distance - from S to Aref				55.9
Measured Noise Level at Drip Edge, dB(A)				72.3
Set-back Calculations:				
Analysis Point	Distance from Drip Edge (ft.)	Distance from Analysis Point (ft.)	Measured Noise Level at Drip Edge Leq in dB(A)	Calculated Noise Level Drop-off Rate = 4.5 dB/DD
A480	480	535.9		57.6
A481	481	536.9		57.6
A482	482	537.9		57.6
A483	483	538.9		57.5
A484	484	539.9		57.5
A485	485	540.9		57.5
A486	486	541.9		57.5
A487	487	542.9		57.5
A488	488	543.9		57.5
A489	489	544.9		57.5
A490	490	545.9		57.5
A491	491	546.9		57.4
A492	492	547.9		57.4
A493	493	548.9		57.4
A494	494	549.9		57.4
A495	495	550.9		57.4
A496	496	551.9		57.4
A497	497	552.9		57.4
A498	498	553.9		57.4
A499	499	554.9		57.3
A500	500	555.9		57.3

PROJECT: I-205 CW + Abernethy Bridge

JOB NO.: 309180

SHORT-TERM NOISE MEASUREMENT SITE LOG

ASSESSMENT AREA: WL side MEASUREMENT SITE NO.: WL Structure Barrier

ADDRESS: West Linn (WL) Side of Abernethy Bridge Crossing

OWNER: West Linn

DESCRIPTION: Ped Trail / ROW ODOT

NOISE SOURCES: I-205

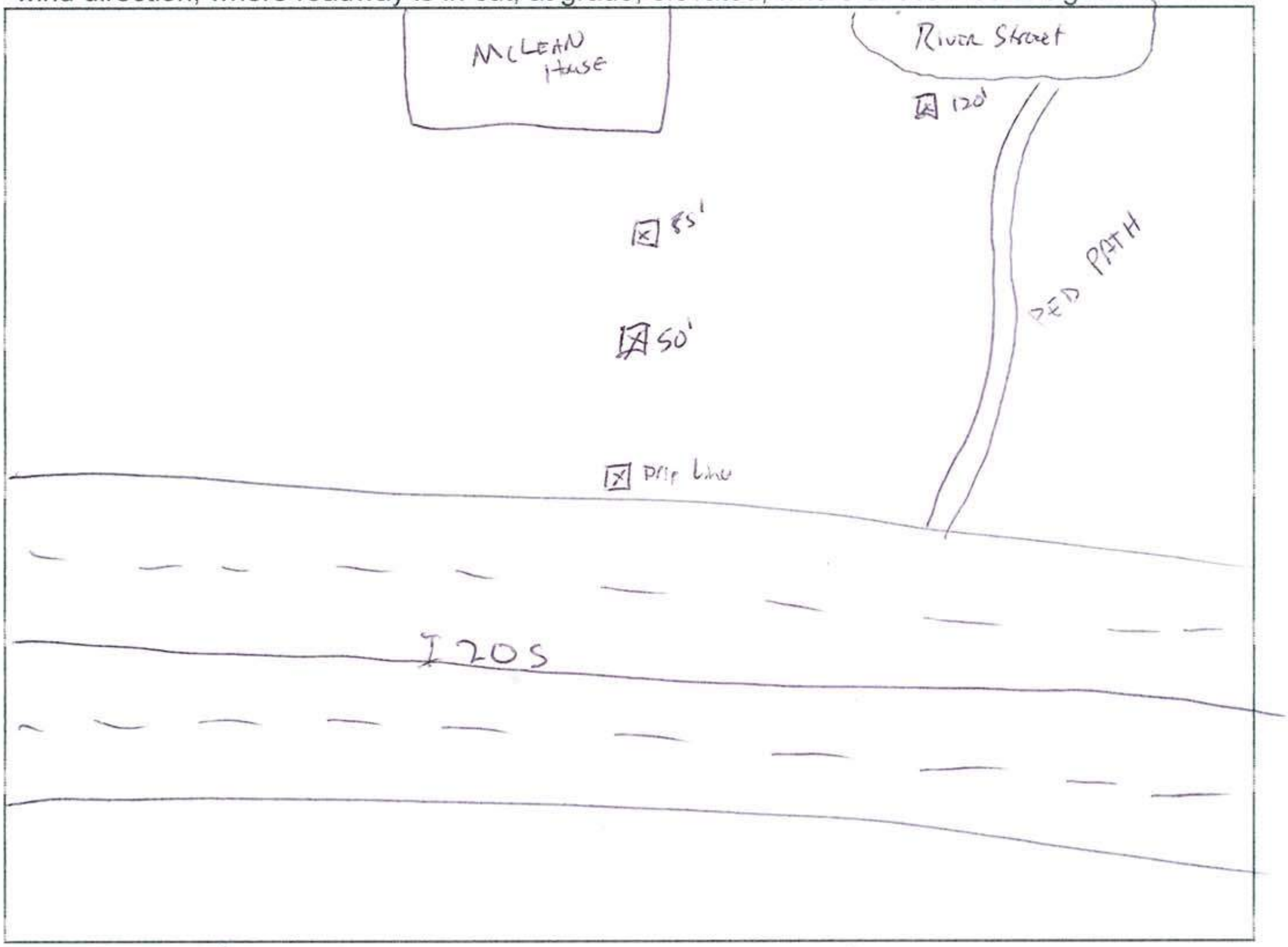
NOISE MONITOR: B+K 2250 S/N: kits 4, 5, 6

MICROPHONE: B+K S/N: "

CALIBRATOR: B+K S/N: "

TEMP. RANGE (°F): 65° WEATHER CONDITIONS: Part Cloud

SITE SKETCH: Show roadway, homes, local roads, reference distances, arrows for North & wind direction, where roadway is in cut, at grade, elevated, where direct lines of sight exist.



PHOTOS: YES GPS COORDINATES: N/A SEE GPS MAP

SHORT-TERM NOISE MEASUREMENT DATA SHEET

PROJECT: K19786:I-205CW

JOB NO.: 309180.000

MEASUREMENT SITE NO.: West Linn Structure Borne Noise

PERSONNEL: SRN

ADDRESS/DESCRIPTION: West Linn Side of Crossing

DATE: 6/13/18-6/19/18

#	~~15 Minute~~ Period Starting	Meas'd Leq (dBA)	√ or X	Autos	Medium Trucks	Heavy Trucks	Other Noise Sources	COMMENTS (Include Calibration Data)
1	Drip Edge	67.1						2:14p - 2:51p 6/13
2								
3	50'	65.2						2:14p - 2:51p 6/13
4								
5	85'	62.5						
6								2:14p - 2:51p 6/13
7								
8								
9	Drip Edge	66.0						11:52am - 12:11p
10								
11	50'	63.7						11:52am - 12:11p
12								
13	120'	61.7						11:52am - 12:11p
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								

TOTAL Leq =

SUBSET Leq =

√ = Other sources contributed to Leq

X = Exclude period - contaminated by non-characteristic sources

>> ADD SKETCH AND WEATHER CONDITIONS TO REVERSE OR OTHER SHEET <<

West Linn- Structure-Borne Noise Measurements

Drip Edge

50 Feet

Drip Edge View 2

85 feet

120 feet

Structure Related Noise Calculation Worksheet
K19786: I-205 Widening and Seismic Improvements
West Linn Abernethy Bridge Northbound Side

Input Data:

h: Height of structure, from ground to underside of deck	85
Aref: Center point between ground and underside of structure (h/2)	42.5
w: Width of Structure	140
Mw: Midpoint of structure (w/2) The underside of the deck at this point is the assumed source of structure noise (S)	70
Dref: Reference distance - from S to Aref	81.9
Measured Noise Level at Drip Edge, dB(A)	67.1

Set-back Calculations:

Analysis Point	Distance from Drip Edge (ft.)	Distance from Analysis Point (ft.)	Measured Noise Level at Drip Edge Leq in dB(A)	Calculated Noise Level Drop-off Rate = 3.0 dB/DD
Aref	0	81.9	67.1	
A25	25	106.9		65.9
A50	50	131.9		65.0
A85	85	166.9		64.0
A150	150	231.9		62.6
A200	200	281.9		61.7
A400	400	481.9		59.4
A500	500	581.9		58.6

Analysis Point	Distance from Drip Edge (ft.)	Distance from Analysis Point (ft.)	Measured Noise Level at Drip Edge Leq in dB(A)	Calculated Noise Level Drop-off Rate = 4.0 dB/DD
Aref	0	81.9	67.1	
A25	25	106.9		65.4
A50	50	131.9		64.0
A85	85	166.9		62.5
A200	200	281.9		59.0
A400	400	481.9		55.6
A500	500	581.9		54.3

Analysis Point	Distance from Drip Edge (ft.)	Distance from Analysis Point (ft.)	Measured Noise Level at Drip Edge Leq in dB(A)	Calculated Noise Level Drop-off Rate = 6.0 dB/DD
Aref	0	81.9	67.1	
A25	25	106.9		65
A50	50	131.9		63
A85	85	166.9		61
A200	200	281.9		56
A400	400	481.9		52
A500	500	581.9		50

Structure Related Noise Calculation Worksheet

K19786: I-205 Widening and Seismic Improvements

West Linn Abernethy Bridge Northbound Side

Input Data:

h: Height of structure, from ground to underside of deck	85
Aref: Center point between ground and underside of structure (h/2)	42.5
w: Width of Structure	140
Mw: Midpoint of structure (w/2) The underside of the deck at this point is the assumed source of structure noise (S)	70
Dref: Reference distance - from S to Aref	81.9
Measured Noise Level at Drip Edge, dB(A)	67.1

Set-back Calculations:

Analysis Point	Distance from Drip Edge (ft.)	Distance from Analysis Point (ft.)	Measured Noise Level at Drip Edge Leq in dB(A)	Calculated Noise Level Drop-off Rate = 4.5 dB/DD
Aref	0	81.9	67.1	
A1	1	82.9		67.0
A2	2	83.9		66.9
A3	3	84.9		66.9
A4	4	85.9		66.8
A5	5	86.9		66.7
A6	6	87.9		66.6
A7	7	88.9		66.6
A8	8	89.9		66.5
A9	9	90.9		66.4
A10	10	91.9		66.3
A11	11	92.9		66.3
A12	12	93.9		66.2
A13	13	94.9		66.1
A14	14	95.9		66.1
A15	15	96.9		66.0
A16	16	97.9		65.9
A17	17	98.9		65.9
A18	18	99.9		65.8
A19	19	100.9		65.7
A20	20	101.9		65.7
A21	21	102.9		65.6
A22	22	103.9		65.5
A23	23	104.9		65.5
A24	24	105.9		65.4
A25	25	106.9		65.4
A26	26	107.9		65.3
A27	27	108.9		65.2
A28	28	109.9		65.2
A29	29	110.9		65.1
A30	30	111.9		65.1
A31	31	112.9		65.0
A32	32	113.9		65.0
A33	33	114.9		64.9
A34	34	115.9		64.8
A35	35	116.9		64.8
A36	36	117.9		64.7
A37	37	118.9		64.7
A38	38	119.9		64.6
A39	39	120.9		64.6
A40	40	121.9		64.5

Structure Related Noise Calculation Worksheet
K19786: I-205 Widening and Seismic Improvements
West Linn Abernethy Bridge Northbound Side

Input Data:

h: Height of structure, from ground to underside of deck	85
Aref: Center point between ground and underside of structure (h/2)	42.5
w: Width of Structure	140
Mw: Midpoint of structure (w/2) The underside of the deck at this point is the assumed source of structure noise (S)	70
Dref: Reference distance - from S to Aref	81.9
Measured Noise Level at Drip Edge, dB(A)	67.1

Set-back Calculations:

Analysis Point	Distance from Drip Edge (ft.)	Distance from Analysis Point (ft.)	Measured Noise Level at Drip Edge Leq in dB(A)	Calculated Noise Level Drop-off Rate = 4.5 dB/DD
A41	41	122.9		64.5
A42	42	123.9		64.4
A43	43	124.9		64.4
A44	44	125.9		64.3
A45	45	126.9		64.2
A46	46	127.9		64.2
A47	47	128.9		64.1
A48	48	129.9		64.1
A49	49	130.9		64.0
A50	50	131.9		64.0
A51	51	132.9		63.9
A52	52	133.9		63.9
A53	53	134.9		63.8
A54	54	135.9		63.8
A55	55	136.9		63.8
A56	56	137.9		63.7
A57	57	138.9		63.7
A58	58	139.9		63.6
A59	59	140.9		63.6
A60	60	141.9		63.5
A61	61	142.9		63.5
A62	62	143.9		63.4
A63	63	144.9		63.4
A64	64	145.9		63.3
A65	65	146.9		63.3
A66	66	147.9		63.2
A67	67	148.9		63.2
A68	68	149.9		63.2
A69	69	150.9		63.1
A70	70	151.9		63.1
A71	71	152.9		63.0
A72	72	153.9		63.0
A73	73	154.9		62.9
A74	74	155.9		62.9
A75	75	156.9		62.9
A76	76	157.9		62.8
A77	77	158.9		62.8
A78	78	159.9		62.7
A79	79	160.9		62.7
A80	80	161.9		62.7
A81	81	162.9		62.6

Structure Related Noise Calculation Worksheet

K19786: I-205 Widening and Seismic Improvements

West Linn Abernethy Bridge Northbound Side

Input Data:

h: Height of structure, from ground to underside of deck	85
Aref: Center point between ground and underside of structure (h/2)	42.5
w: Width of Structure	140
Mw: Midpoint of structure (w/2) The underside of the deck at this point is the assumed source of structure noise (S)	70
Dref: Reference distance - from S to Aref	81.9
Measured Noise Level at Drip Edge, dB(A)	67.1

Set-back Calculations:

Analysis Point	Distance from Drip Edge (ft.)	Distance from Analysis Point (ft.)	Measured Noise Level at Drip Edge Leq in dB(A)	Calculated Noise Level Drop-off Rate = 4.5 dB/DD
A82	82	163.9		62.6
A83	83	164.9		62.5
A84	84	165.9		62.5
A85	85	166.9		62.5
A86	86	167.9		62.4
A87	87	168.9		62.4
A88	88	169.9		62.3
A89	89	170.9		62.3
A90	90	171.9		62.3
A91	91	172.9		62.2
A92	92	173.9		62.2
A93	93	174.9		62.2
A94	94	175.9		62.1
A95	95	176.9		62.1
A96	96	177.9		62.0
A97	97	178.9		62.0
A98	98	179.9		62.0
A99	99	180.9		61.9
A100	100	181.9		61.9
A101	101	182.9		61.9
A102	102	183.9		61.8
A103	103	184.9		61.8
A104	104	185.9		61.8
A105	105	186.9		61.7
A106	106	187.9		61.7
A107	107	188.9		61.7
A108	108	189.9		61.6
A109	109	190.9		61.6
A110	110	191.9		61.6
A111	111	192.9		61.5
A112	112	193.9		61.5
A113	113	194.9		61.5
A114	114	195.9		61.4
A115	115	196.9		61.4
A116	116	197.9		61.4
A117	117	198.9		61.3
A118	118	199.9		61.3
A119	119	200.9		61.3
A120	120	201.9		61.2
A121	121	202.9		61.2
A122	122	203.9		61.2

Structure Related Noise Calculation Worksheet

K19786: I-205 Widening and Seismic Improvements

West Linn Abernethy Bridge Northbound Side

Input Data:

h: Height of structure, from ground to underside of deck	85
Aref: Center point between ground and underside of structure (h/2)	42.5
w: Width of Structure	140
Mw: Midpoint of structure (w/2) The underside of the deck at this point is the assumed source of structure noise (S)	70
Dref: Reference distance - from S to Aref	81.9
Measured Noise Level at Drip Edge, dB(A)	67.1

Set-back Calculations:

Analysis Point	Distance from Drip Edge (ft.)	Distance from Analysis Point (ft.)	Measured Noise Level at Drip Edge Leq in dB(A)	Calculated Noise Level Drop-off Rate = 4.5 dB/DD
A123	123	204.9		61.1
A124	124	205.9		61.1
A125	125	206.9		61.1
A126	126	207.9		61.0
A127	127	208.9		61.0
A128	128	209.9		61.0
A129	129	210.9		60.9
A130	130	211.9		60.9
A131	131	212.9		60.9
A132	132	213.9		60.8
A133	133	214.9		60.8
A134	134	215.9		60.8
A135	135	216.9		60.8
A136	136	217.9		60.7
A137	137	218.9		60.7
A138	138	219.9		60.7
A139	139	220.9		60.6
A140	140	221.9		60.6
A141	141	222.9		60.6
A142	142	223.9		60.5
A143	143	224.9		60.5
A144	144	225.9		60.5
A145	145	226.9		60.5
A146	146	227.9		60.4
A147	147	228.9		60.4
A148	148	229.9		60.4
A149	149	230.9		60.3
A150	150	231.9		60.3
A151	151	232.9		60.3
A152	152	233.9		60.3
A153	153	234.9		60.2
A154	154	235.9		60.2
A155	155	236.9		60.2
A156	156	237.9		60.2
A157	157	238.9		60.1
A158	158	239.9		60.1
A159	159	240.9		60.1
A160	160	241.9		60.0
A161	161	242.9		60.0
A162	162	243.9		60.0
A163	163	244.9		60.0

Structure Related Noise Calculation Worksheet

K19786: I-205 Widening and Seismic Improvements

West Linn Abernethy Bridge Northbound Side

Input Data:

h: Height of structure, from ground to underside of deck	85
Aref: Center point between ground and underside of structure (h/2)	42.5
w: Width of Structure	140
Mw: Midpoint of structure (w/2) The underside of the deck at this point is the assumed source of structure noise (S)	70
Dref: Reference distance - from S to Aref	81.9
Measured Noise Level at Drip Edge, dB(A)	67.1

Set-back Calculations:

Analysis Point	Distance from Drip Edge (ft.)	Distance from Analysis Point (ft.)	Measured Noise Level at Drip Edge Leq in dB(A)	Calculated Noise Level Drop-off Rate = 4.5 dB/DD
A164	164	245.9		59.9
A165	165	246.9		59.9
A166	166	247.9		59.9
A167	167	248.9		59.9
A168	168	249.9		59.8
A169	169	250.9		59.8
A170	170	251.9		59.8
A171	171	252.9		59.8
A172	172	253.9		59.7
A173	173	254.9		59.7
A174	174	255.9		59.7
A175	175	256.9		59.7
A176	176	257.9		59.6
A177	177	258.9		59.6
A178	178	259.9		59.6
A179	179	260.9		59.6
A180	180	261.9		59.5
A181	181	262.9		59.5
A182	182	263.9		59.5
A183	183	264.9		59.5
A184	184	265.9		59.4
A185	185	266.9		59.4
A186	186	267.9		59.4
A187	187	268.9		59.4
A188	188	269.9		59.3
A189	189	270.9		59.3
A190	190	271.9		59.3
A191	191	272.9		59.3
A192	192	273.9		59.2
A193	193	274.9		59.2
A194	194	275.9		59.2
A195	195	276.9		59.2
A196	196	277.9		59.1
A197	197	278.9		59.1
A198	198	279.9		59.1
A199	199	280.9		59.1
A200	200	281.9		59.0
A201	201	282.9		59.0
A202	202	283.9		59.0
A203	203	284.9		59.0
A204	204	285.9		59.0

Structure Related Noise Calculation Worksheet
K19786: I-205 Widening and Seismic Improvements
West Linn Abernethy Bridge Northbound Side

Input Data:

h: Height of structure, from ground to underside of deck	85
Aref: Center point between ground and underside of structure (h/2)	42.5
w: Width of Structure	140
Mw: Midpoint of structure (w/2) The underside of the deck at this point is the assumed source of structure noise (S)	70
Dref: Reference distance - from S to Aref	81.9
Measured Noise Level at Drip Edge, dB(A)	67.1

Set-back Calculations:

Analysis Point	Distance from Drip Edge (ft.)	Distance from Analysis Point (ft.)	Measured Noise Level at Drip Edge Leq in dB(A)	Calculated Noise Level Drop-off Rate = 4.5 dB/DD
A205	205	286.9		58.9
A206	206	287.9		58.9
A207	207	288.9		58.9
A208	208	289.9		58.9
A209	209	290.9		58.8
A210	210	291.9		58.8
A211	211	292.9		58.8
A212	212	293.9		58.8
A213	213	294.9		58.8
A214	214	295.9		58.7
A215	215	296.9		58.7
A216	216	297.9		58.7
A217	217	298.9		58.7
A218	218	299.9		58.6
A219	219	300.9		58.6
A220	220	301.9		58.6
A221	221	302.9		58.6
A222	222	303.9		58.6
A223	223	304.9		58.5
A224	224	305.9		58.5
A225	225	306.9		58.5
A226	226	307.9		58.5
A227	227	308.9		58.5
A228	228	309.9		58.4
A229	229	310.9		58.4
A230	230	311.9		58.4
A231	231	312.9		58.4
A232	232	313.9		58.3
A233	233	314.9		58.3
A234	234	315.9		58.3
A235	235	316.9		58.3
A236	236	317.9		58.3
A237	237	318.9		58.2
A238	238	319.9		58.2
A239	239	320.9		58.2
A240	240	321.9		58.2
A241	241	322.9		58.2
A242	242	323.9		58.1
A243	243	324.9		58.1
A244	244	325.9		58.1
A245	245	326.9		58.1

Structure Related Noise Calculation Worksheet

K19786: I-205 Widening and Seismic Improvements

West Linn Abernethy Bridge Northbound Side

Input Data:

h: Height of structure, from ground to underside of deck	85
Aref: Center point between ground and underside of structure (h/2)	42.5
w: Width of Structure	140
Mw: Midpoint of structure (w/2) The underside of the deck at this point is the assumed source of structure noise (S)	70
Dref: Reference distance - from S to Aref	81.9
Measured Noise Level at Drip Edge, dB(A)	67.1

Set-back Calculations:

Analysis Point	Distance from Drip Edge (ft.)	Distance from Analysis Point (ft.)	Measured Noise Level at Drip Edge Leq in dB(A)	Calculated Noise Level Drop-off Rate = 4.5 dB/DD
A246	246	327.9		58.1
A247	247	328.9		58.0
A248	248	329.9		58.0
A249	249	330.9		58.0
A250	250	331.9		58.0
A251	251	332.9		58.0
A252	252	333.9		57.9
A253	253	334.9		57.9
A254	254	335.9		57.9
A255	255	336.9		57.9
A256	256	337.9		57.9
A257	257	338.9		57.8
A258	258	339.9		57.8
A259	259	340.9		57.8
A260	260	341.9		57.8
A261	261	342.9		57.8
A262	262	343.9		57.8
A263	263	344.9		57.7
A264	264	345.9		57.7
A265	265	346.9		57.7
A266	266	347.9		57.7
A267	267	348.9		57.7
A268	268	349.9		57.6
A269	269	350.9		57.6
A270	270	351.9		57.6
A271	271	352.9		57.6
A272	272	353.9		57.6
A273	273	354.9		57.5
A274	274	355.9		57.5
A275	275	356.9		57.5
A276	276	357.9		57.5
A277	277	358.9		57.5
A278	278	359.9		57.5
A279	279	360.9		57.4
A280	280	361.9		57.4
A281	281	362.9		57.4
A282	282	363.9		57.4
A283	283	364.9		57.4
A284	284	365.9		57.3
A285	285	366.9		57.3
A286	286	367.9		57.3

Structure Related Noise Calculation Worksheet

K19786: I-205 Widening and Seismic Improvements

West Linn Abernethy Bridge Northbound Side

Input Data:

h: Height of structure, from ground to underside of deck	85
Aref: Center point between ground and underside of structure (h/2)	42.5
w: Width of Structure	140
Mw: Midpoint of structure (w/2) The underside of the deck at this point is the assumed source of structure noise (S)	70
Dref: Reference distance - from S to Aref	81.9
Measured Noise Level at Drip Edge, dB(A)	67.1

Set-back Calculations:

Analysis Point	Distance from Drip Edge (ft.)	Distance from Analysis Point (ft.)	Measured Noise Level at Drip Edge Leq in dB(A)	Calculated Noise Level Drop-off Rate = 4.5 dB/DD
A287	287	368.9		57.3
A288	288	369.9		57.3
A289	289	370.9		57.3
A290	290	371.9		57.2
A291	291	372.9		57.2
A292	292	373.9		57.2
A293	293	374.9		57.2
A294	294	375.9		57.2
A295	295	376.9		57.2
A296	296	377.9		57.1
A297	297	378.9		57.1
A298	298	379.9		57.1
A299	299	380.9		57.1
A300	300	381.9		57.1
A301	301	382.9		57.1
A302	302	383.9		57.0
A303	303	384.9		57.0
A304	304	385.9		57.0
A305	305	386.9		57.0
A306	306	387.9		57.0
A307	307	388.9		57.0
A308	308	389.9		56.9
A309	309	390.9		56.9
A310	310	391.9		56.9
A311	311	392.9		56.9
A312	312	393.9		56.9
A313	313	394.9		56.9
A314	314	395.9		56.8
A315	315	396.9		56.8
A316	316	397.9		56.8
A317	317	398.9		56.8
A318	318	399.9		56.8
A319	319	400.9		56.8
A320	320	401.9		56.7
A321	321	402.9		56.7
A322	322	403.9		56.7
A323	323	404.9		56.7
A324	324	405.9		56.7
A325	325	406.9		56.7
A326	326	407.9		56.6
A327	327	408.9		56.6

Structure Related Noise Calculation Worksheet
K19786: I-205 Widening and Seismic Improvements
West Linn Abernethy Bridge Northbound Side

Input Data:

h: Height of structure, from ground to underside of deck	85
Aref: Center point between ground and underside of structure (h/2)	42.5
w: Width of Structure	140
Mw: Midpoint of structure (w/2) The underside of the deck at this point is the assumed source of structure noise (S)	70
Dref: Reference distance - from S to Aref	81.9
Measured Noise Level at Drip Edge, dB(A)	67.1

Set-back Calculations:

Analysis Point	Distance from Drip Edge (ft.)	Distance from Analysis Point (ft.)	Measured Noise Level at Drip Edge Leq in dB(A)	Calculated Noise Level Drop-off Rate = 4.5 dB/DD
A328	328	409.9		56.6
A329	329	410.9		56.6
A330	330	411.9		56.6
A331	331	412.9		56.6
A332	332	413.9		56.5
A333	333	414.9		56.5
A334	334	415.9		56.5
A335	335	416.9		56.5
A336	336	417.9		56.5
A337	337	418.9		56.5
A338	338	419.9		56.5
A339	339	420.9		56.4
A340	340	421.9		56.4
A341	341	422.9		56.4
A342	342	423.9		56.4
A343	343	424.9		56.4
A344	344	425.9		56.4
A345	345	426.9		56.3
A346	346	427.9		56.3
A347	347	428.9		56.3
A348	348	429.9		56.3
A349	349	430.9		56.3
A350	350	431.9		56.3
A351	351	432.9		56.3
A352	352	433.9		56.2
A353	353	434.9		56.2
A354	354	435.9		56.2
A355	355	436.9		56.2
A356	356	437.9		56.2
A357	357	438.9		56.2
A358	358	439.9		56.1
A359	359	440.9		56.1
A360	360	441.9		56.1
A361	361	442.9		56.1
A362	362	443.9		56.1
A363	363	444.9		56.1
A364	364	445.9		56.1
A365	365	446.9		56.0
A366	366	447.9		56.0
A367	367	448.9		56.0
A368	368	449.9		56.0

Structure Related Noise Calculation Worksheet	
K19786: I-205 Widening and Seismic Improvements	
West Linn Abernethy Bridge Northbound Side	
Input Data:	
h: Height of structure, from ground to underside of deck	85
Aref: Center point between ground and underside of structure (h/2)	42.5
w: Width of Structure	140
Mw: Midpoint of structure (w/2) The underside of the deck at this point is the assumed source of structure noise (S)	70
Dref: Reference distance - from S to Aref	81.9
Measured Noise Level at Drip Edge, dB(A)	67.1
Set-back Calculations:	

Analysis Point	Distance from Drip Edge (ft.)	Distance from Analysis Point (ft.)	Measured Noise Level at Drip Edge Leq in dB(A)	Calculated Noise Level Drop-off Rate = 4.5 dB/DD
A369	369	450.9		56.0
A370	370	451.9		56.0
A371	371	452.9		56.0
A372	372	453.9		55.9
A373	373	454.9		55.9
A374	374	455.9		55.9
A375	375	456.9		55.9
A376	376	457.9		55.9
A377	377	458.9		55.9
A378	378	459.9		55.9
A379	379	460.9		55.8
A380	380	461.9		55.8
A381	381	462.9		55.8
A382	382	463.9		55.8
A383	383	464.9		55.8
A384	384	465.9		55.8
A385	385	466.9		55.8
A386	386	467.9		55.7
A387	387	468.9		55.7
A388	388	469.9		55.7
A389	389	470.9		55.7
A390	390	471.9		55.7
A391	391	472.9		55.7
A392	392	473.9		55.7
A393	393	474.9		55.6
A394	394	475.9		55.6
A395	395	476.9		55.6
A396	396	477.9		55.6
A397	397	478.9		55.6
A398	398	479.9		55.6
A399	399	480.9		55.6
A400	400	481.9		55.6
A401	401	482.9		55.5
A402	402	483.9		55.5
A403	403	484.9		55.5
A404	404	485.9		55.5
A405	405	486.9		55.5
A406	406	487.9		55.5
A407	407	488.9		55.5
A408	408	489.9		55.4
A409	409	490.9		55.4

Structure Related Noise Calculation Worksheet

K19786: I-205 Widening and Seismic Improvements

West Linn Abernethy Bridge Northbound Side

Input Data:

h: Height of structure, from ground to underside of deck	85
Aref: Center point between ground and underside of structure (h/2)	42.5
w: Width of Structure	140
Mw: Midpoint of structure (w/2) The underside of the deck at this point is the assumed source of structure noise (S)	70
Dref: Reference distance - from S to Aref	81.9
Measured Noise Level at Drip Edge, dB(A)	67.1

Set-back Calculations:

Analysis Point	Distance from Drip Edge (ft.)	Distance from Analysis Point (ft.)	Measured Noise Level at Drip Edge Leq in dB(A)	Calculated Noise Level Drop-off Rate = 4.5 dB/DD
A410	410	491.9		55.4
A411	411	492.9		55.4
A412	412	493.9		55.4
A413	413	494.9		55.4
A414	414	495.9		55.4
A415	415	496.9		55.4
A416	416	497.9		55.3
A417	417	498.9		55.3
A418	418	499.9		55.3
A419	419	500.9		55.3
A420	420	501.9		55.3
A421	421	502.9		55.3
A422	422	503.9		55.3
A423	423	504.9		55.3
A424	424	505.9		55.2
A425	425	506.9		55.2
A426	426	507.9		55.2
A427	427	508.9		55.2
A428	428	509.9		55.2
A429	429	510.9		55.2
A430	430	511.9		55.2
A431	431	512.9		55.1
A432	432	513.9		55.1
A433	433	514.9		55.1
A434	434	515.9		55.1
A435	435	516.9		55.1
A436	436	517.9		55.1
A437	437	518.9		55.1
A438	438	519.9		55.1
A439	439	520.9		55.0
A440	440	521.9		55.0
A441	441	522.9		55.0
A442	442	523.9		55.0
A443	443	524.9		55.0
A444	444	525.9		55.0
A445	445	526.9		55.0
A446	446	527.9		55.0
A447	447	528.9		54.9
A448	448	529.9		54.9
A449	449	530.9		54.9
A450	450	531.9		54.9

Structure Related Noise Calculation Worksheet	
K19786: I-205 Widening and Seismic Improvements	
West Linn Abernethy Bridge Northbound Side	
Input Data:	
h: Height of structure, from ground to underside of deck	85
Aref: Center point between ground and underside of structure (h/2)	42.5
w: Width of Structure	140
Mw: Midpoint of structure (w/2) The underside of the deck at this point is the assumed source of structure noise (S)	70
Dref: Reference distance - from S to Aref	81.9
Measured Noise Level at Drip Edge, dB(A)	67.1
Set-back Calculations:	

Analysis Point	Distance from Drip Edge (ft.)	Distance from Analysis Point (ft.)	Measured Noise Level at Drip Edge Leq in dB(A)	Calculated Noise Level Drop-off Rate = 4.5 dB/DD
A451	451	532.9		54.9
A452	452	533.9		54.9
A453	453	534.9		54.9
A454	454	535.9		54.9
A455	455	536.9		54.9
A456	456	537.9		54.8
A457	457	538.9		54.8
A458	458	539.9		54.8
A459	459	540.9		54.8
A460	460	541.9		54.8
A461	461	542.9		54.8
A462	462	543.9		54.8
A463	463	544.9		54.8
A464	464	545.9		54.7
A465	465	546.9		54.7
A466	466	547.9		54.7
A467	467	548.9		54.7
A468	468	549.9		54.7
A469	469	550.9		54.7
A470	470	551.9		54.7
A471	471	552.9		54.7
A472	472	553.9		54.6
A473	473	554.9		54.6
A474	474	555.9		54.6
A475	475	556.9		54.6
A476	476	557.9		54.6
A477	477	558.9		54.6
A478	478	559.9		54.6
A479	479	560.9		54.6
A480	480	561.9		54.6
A481	481	562.9		54.5
A482	482	563.9		54.5
A483	483	564.9		54.5
A484	484	565.9		54.5
A485	485	566.9		54.5
A486	486	567.9		54.5
A487	487	568.9		54.5
A488	488	569.9		54.5
A489	489	570.9		54.5
A490	490	571.9		54.4
A491	491	572.9		54.4

Structure Related Noise Calculation Worksheet				
K19786: I-205 Widening and Seismic Improvements				
West Linn Abernethy Bridge Northbound Side				
Input Data:				
h: Height of structure, from ground to underside of deck				85
Aref: Center point between ground and underside of structure (h/2)				42.5
w: Width of Structure				140
Mw: Midpoint of structure (w/2) The underside of the deck at this point is the assumed source of structure noise (S)				70
Dref: Reference distance - from S to Aref				81.9
Measured Noise Level at Drip Edge, dB(A)				67.1
Set-back Calculations:				
Analysis Point	Distance from Drip Edge (ft.)	Distance from Analysis Point (ft.)	Measured Noise Level at Drip Edge Leq in dB(A)	Calculated Noise Level Drop-off Rate = 4.5 dB/DD
A492	492	573.9		54.4
A493	493	574.9		54.4
A494	494	575.9		54.4
A495	495	576.9		54.4
A496	496	577.9		54.4
A497	497	578.9		54.4
A498	498	579.9		54.3
A499	499	580.9		54.3
A500	500	581.9		54.3

Structure Related Noise Calculation Worksheet
K19786: I-205 Widening and Seismic Improvements
West Linn Abernethy Bridge Northbound Side

Input Data:

h: Height of structure, from ground to underside of deck	85
Aref: Center point between ground and underside of structure (h/2)	42.5
w: Width of Structure	140
Mw: Midpoint of structure (w/2) The underside of the deck at this point is the assumed source of structure noise	70
Dref: Reference distance - from S to Aref	81.9
Measured Noise Level at Drip Edge, dB(A)	66.01737413

Set-back Calculations:

Analysis Point	Distance from Drip Edge (ft.)	Distance from Analysis Point (ft.)	Measured Noise Level at Drip Edge Leq in dB(A)	Calculated Noise Level Drop-off Rate = 3.0 dB/DD
Aref	0	81.9	66.01737413	
A25	25	106.9		64.9
A50	50	131.9		63.9
A120	120	201.9		62.1
A150	150	231.9		61.5
A200	200	281.9		60.6
A400	400	481.9		58.3
A500	500	581.9		57.5

Analysis Point	Distance from Drip Edge (ft.)	Distance from Analysis Point (ft.)	Measured Noise Level at Drip Edge Leq in dB(A)	Calculated Noise Level Drop-off Rate = 4.5 dB/DD
Aref	0	81.9	66.01737413	
A25	25	106.9		64.3
A50	50	131.9		62.9
A120	120	201.9		60.1
A150	150	231.9		59.2
A200	200	281.9		58.0
A400	400	481.9		54.5
A500	500	581.9		53.2

Analysis Point	Distance from Drip Edge (ft.)	Distance from Analysis Point (ft.)	Measured Noise Level at Drip Edge Leq in dB(A)	Calculated Noise Level Drop-off Rate = 6.0 dB/DD
Aref	0	81.9	66.01737413	
A25	25	106.9		64
A50	50	131.9		62
A120	120	201.9		58
A150	150	231.9		57
A200	200	281.9		55
A400	400	481.9		51
A500	500	581.9		49

Appendix B. Calibration Certificates

Scantek, Inc.
CALIBRATION LABORATORY
ISO 17025: 2005, ANSI/NCSL Z540:1994 Part 1
ACCREDITED by NVLAP (an ILAC MRA signatory)

NVLAP®
CALIBRATION
NVLAP Lab Code: 200625-0

Calibration Certificate No.38800

Instrument: **Sound Level Meter**
Model: **2250**
Manufacturer: **Brüel and Kjær**
Serial number: **2579777**
Tested with: **Microphone 4189 s/n 2589635**
Preamplifier ZC0032 s/n 7764
Type (class): **1**
Customer: **Harris Miller Miller & Hanson Inc.**
Tel/Fax: **781-229-0707 x3119 / 781-229-7939**

Date Calibrated: **6/28/2017** *Cal Due:*

Status:	**Received**	**Sent**
In tolerance:	**X**	**X**
Out of tolerance:		
See comments:		

Contains non-accredited tests: __ **Yes** _X_ **No**
Calibration service: __ **Basic** _X_ **Standard**
Address: **77 South Bedford Street**
Burlington, MA 01803

Tested in accordance with the following procedures and standards:
Calibration of Sound Level Meters, Scantek Inc., Rev. 6/26/2015
SLM & Dosimeters – Acoustical Tests, Scantek Inc., Rev. 7/6/2011

Instrumentation used for calibration: Nor-1504 Norsonic Test System:

Instrument - Manufacturer	Description	S/N	Cal. Date	Traceability evidence	Cal. Due
				Cal. Lab / Accreditation	
483B-Norsonic	SME Cal Unit	31061	Jul 27, 2016	Scantek, Inc./ NVLAP	Jul 27, 2017
DS-360-SRS	Function Generator	88077	Sep 15, 2016	ACR Env./ A2LA	Sep 15, 2018
34401A-Agilent Technologies	Digital Voltmeter	MY47011118	Sep 15, 2016	ACR Env./ A2LA	Sep 15, 2017
HM30-Thommen	Meteo Station	1040170/39633	Nov 1, 2016	ACR Env./ A2LA	Nov 1, 2017
PC Program 1019 Norsonic	Calibration software	v.6.1T	Validated Nov 2014	Scantek, Inc.	-
1251-Norsonic	Calibrator	30878	Nov 10, 2016	Scantek, Inc./ NVLAP	Nov 10, 2017

Instrumentation and test results are traceable to SI (International System of Units) through standards maintained by NIST (USA) and NPL (UK).

Environmental conditions:

Temperature (°C)	Barometric pressure (kPa)	Relative Humidity (%)
22.7	100.58	47.4

Calibrated by:	Jeremy Gotwalt	**Authorized signatory:**	William D. Gallagher
Signature		Signature	William D Gallagher
Date	6/28/17	Date	6/28/2017

Scantek, Inc.
CALIBRATION LABORATORY

ISO 17025: 2005, ANSI/NCSL Z540:1994 Part 1
ACCREDITED by NVLAP (an ILAC MRA signatory)

NVLAP®
CALIBRATION
NVLAP Lab Code: 200625-0

Calibration Certificate No.38801

Instrument: **Microphone**
Model: **4189**
Manufacturer: **Brüel & Kjær**
Serial number: **2589635**
Composed of:

Date Calibrated: **6/26/2017** *Cal Due:*

Status:	**Received**	**Sent**
In tolerance:	**X**	**X**
Out of tolerance:		
See comments:		

Contains non-accredited tests: __**Yes** _**X** **No**

Customer: **Harris Miller Miller & Hanson Inc.**
Tel/Fax: **781-229-0707 x3119/781-229-7939**

Address: **77 South Bedford Street,**
Burlington, MA 01803

Tested in accordance with the following procedures and standards:

Calibration of Measurement Microphones, Scantek, Inc., Rev. 2/25/2015

Instrumentation used for calibration: N-1504 Norsonic Test System:

Instrument - Manufacturer	Description	S/N	Cal. Date	Traceability evidence Cal. Lab / Accreditation	Cal. Due
483B-Norsonic	SME Cal Unit	25747	Jul 6, 2016	Scantek, Inc./ NVLAP	Jul 6, 2017
DS-360-SRS	Function Generator	61646	Aug 12, 2015	ACR Env./ A2LA	Aug 12, 2017
34401A-Agilent Technologies	Digital Voltmeter	MY41022043	Aug 16, 2016	ACR Env. / A2LA	Aug 16, 2017
DPI 141-Druck	Pressure Indicator	790/00-04	Dec 22, 2016	ACR Env./ A2LA	Dec 22, 2018
HMP233-Vaisala Oyj	Humidity & Temp. Transmitter	V3820001	Apr 19, 2017	ACR Env./ A2LA	Apr 19, 2018
PC Program 1017 Norsonic	Calibration software	v.6.1T	Validated Nov 2014	Scantek, Inc.	-
1253-Norsonic	Calibrator	28326	Nov 10, 2016	Scantek, Inc./ NVLAP	Nov 10, 2017
1203-Norsonic	Preamplifier	21270	May 24, 2017	Scantek, Inc./ NVLAP	May 24, 2018
4180-Brüel&Kjær	Microphone	2246115	Oct 26, 2015	NPL-UK / UKAS	Oct 26, 2017

Instrumentation and test results are traceable to SI - BIPM through standards maintained by NPL (UK) and NIST (USA)

Calibrated by:	Lydon Dawkins	**Authorized signatory:**	William D. Gallagher
Signature	Lydon Dawkins	Signature	William D Gallagher
Date	6/26/2017	Date	6/28/2017

Calibration Certificates or Test Reports shall not be reproduced, except in full, without written approval of the laboratory.
This Calibration Certificate or Test Reports shall not be used to claim product certification, approval or endorsement by NVLAP, NIST, or any agency of the federal government.

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Scantek, Inc.
CALIBRATION LABORATORY
ISO 17025: 2005, ANSI/NCSL Z540:1994 Part 1
ACCREDITED by NVLAP (an ILAC MRA signatory)

NVLAP®
CALIBRATION
NVLAP Lab Code: 200625-0

Calibration Certificate No.38809

Instrument: **Acoustical Calibrator**
Model: **4231**
Manufacturer: **Brüel and Kjær**
Serial number: **2579293**
Class (IEC 60942): **1**
Barometer type:
Barometer s/n:
Customer: **Harris Miller Miller & Hanson Inc.**
Tel/Fax: **781-229-0707 x3119 / 781-229-7939**

Date Calibrated: **6/26/2017** *Cal Due:*

Status:	**Received**	**Sent**
In tolerance:	X	X
Out of tolerance:		
See comments:		

Contains non-accredited tests: __Yes **X** No

Address: **77 South Bedford Street,**
Burlington, MA 01803

Tested in accordance with the following procedures and standards:
Calibration of Acoustical Calibrators, Scantek Inc., Rev. 10/1/2010

Instrumentation used for calibration: Nor-1504 Norsonic Test System:

Instrument - Manufacturer	Description	S/N	Cal. Date	Traceability evidence Cal. Lab / Accreditation	Cal. Due
483B-Norsonic	SME Cal Unit	31052	Oct 26, 2016	Scantek, Inc./ NVLAP	Oct 26, 2017
DS-360-SRS	Function Generator	33584	Oct 20, 2015	ACR Env./ A2LA	Oct 20, 2017
34401A-Agilent Technologies	Digital Voltmeter	US36120731	Oct 12, 2016	ACR Env. / A2LA	Oct 12, 2017
HM30-Thommen	Meteo Station	1040170/39633	Nov 1, 2016	ACR Env./ A2LA	Nov 1, 2017
140-Norsonic	Real Time Analyzer	1406423	Oct 29, 2016	Scantek / NVLAP	Oct 29, 2017
PC Program 1018 Norsonic	Calibration software	v.6.1T	Validated Nov 2014	Scantek, Inc.	-
4134-Brüel&Kjær	Microphone	173368	Nov 10, 2016	Scantek, Inc. / NVLAP	Nov 10, 2017
1203-Norsonic	Preamplifier	14059	Feb 13, 2017	Scantek, Inc./ NVLAP	Feb 13, 2018

Instrumentation and test results are traceable to SI (International System of Units) through standards maintained by NIST (USA) and NPL (UK)

Calibrated by:	Lydon Dawkins	**Authorized signatory:**	William D. Gallagher
Signature	Lydon Dawkins	Signature	William D Gallagher
Date	6/26/2017	Date	6/28/2017

Scantek, Inc.
CALIBRATION LABORATORY
ISO 17025: 2005, ANSI/NCSL Z540:1994 Part 1
ACCREDITED by NVLAP (an ILAC MRA signatory)

NVLAP®
CALIBRATION
NVLAP Lab Code: 200625-0

Calibration Certificate No.38852

Instrument: **Sound Level Meter**
Model: **820**
Manufacturer: **Larson Davis**
Serial number: **1286**
Tested with: **Microphone 40AQ s/n 23040**
Preamplifier PRM828 s/n 1833
Type (class): **1**
Customer: **Harris Miller Miller & Hanson Inc.**
Tel/Fax: **781-229-0707 x3119 / 781-229-7939**

Date Calibrated: **7/6/2017** *Cal Due:*

Status:	**Received**	**Sent**
In tolerance:	**X**	**X**
Out of tolerance:		
See comments:		

Contains non-accredited tests: __ **Yes** **X** **No**
Calibration service: __ **Basic** **X** **Standard**
Address: **77 South Bedford Street,**
Burlington, MA 01803

Tested in accordance with the following procedures and standards:
Calibration of Sound Level Meters, Scantek Inc., Rev. 6/26/2015
SLM & Dosimeters – Acoustical Tests, Scantek Inc., Rev. 7/6/2011

Instrumentation used for calibration: Nor-1504 Norsonic Test System:

Instrument - Manufacturer	Description	S/N	Cal. Date	Traceability evidence Cal. Lab / Accreditation	Cal. Due
483B-Norsonic	SME Cal Unit	25747	Jul 6, 2016	Scantek, Inc./ NVLAP	Jul 6, 2017
DS-360-SRS	Function Generator	61646	Aug 12, 2015	ACR Env./ A2LA	Aug 12, 2017
34401A-Agilent Technologies	Digital Voltmeter	MY41022043	Aug 16, 2016	ACR Env. / A2LA	Aug 16, 2017
DPI 141-Druck	Pressure Indicator	790/00-04	Dec 22, 2016	ACR Env./ A2LA	Dec 22, 2018
HMP233-Vaisala Oyj	Humidity & Temp. Transmitter	V3820001	Apr 19, 2017	ACR Env./ A2LA	Apr 19, 2018
PC Program 1019 Norsonic	Calibration software	v.6.1T	Validated Nov 2014	Scantek, Inc.	-
1251-Norsonic	Calibrator	30878	Nov 10, 2016	Scantek, Inc./ NVLAP	Nov 10, 2017

Instrumentation and test results are traceable to SI (International System of Units) through standards maintained by NIST (USA) and NPL (UK).

Environmental conditions:

Temperature (°C)	Barometric pressure (kPa)	Relative Humidity (%)
22.3	100.52	59.5

Calibrated by:	Lydon Dawkins	**Authorized signatory:**	Steven E. Marshall
Signature	Lydon Dawkins	Signature	Steven E Marshall
Date	7/6/2017	Date	7/7/2017

Scantek, Inc.
CALIBRATION LABORATORY
ISO 17025: 2005, ANSI/NCSL Z540:1994 Part 1
ACCREDITED by NVLAP (an ILAC MRA signatory)

NVLAP®
CALIBRATION
NVLAP Lab Code: 200625-0

Calibration Certificate No.38853

Instrument: **Microphone**
Model: **40AQ**
Manufacturer: **GRAS**
Serial number: **23040**
Composed of:

Date Calibrated: **7/5/2017** *Cal Due:*

Status:	**Received**	**Sent**
In tolerance:	X	X
Out of tolerance:		
See comments:		

Contains non-accredited tests: __**Yes** _X_ **No**

Customer: **Harris Miller Miller & Hanson Inc.**
Tel/Fax: **781-229-0707 x3119/781-229-7939**
Address: **77 South Bedford Street,**
Burlington, MA 01803

Tested in accordance with the following procedures and standards:

Calibration of Measurement Microphones, Scantek, Inc., Rev. 2/25/2015

Instrumentation used for calibration: N-1504 Norsonic Test System:

Instrument - Manufacturer	Description	S/N	Cal. Date	Traceability evidence	Cal. Due
				Cal. Lab / Accreditation	
483B-Norsonic	SME Cal Unit	31052	Oct 26, 2016	Scantek, Inc./ NVLAP	Oct 26, 2017
DS-360-SRS	Function Generator	33584	Oct 20, 2015	ACR Env./ A2LA	Oct 20, 2017
34401A-Agilent Technologies	Digital Voltmeter	US36120731	Oct 12, 2016	ACR Env. / A2LA	Oct 12, 2017
HM30-Thommen	Meteo Station	1040170/39633	Nov 1, 2016	ACR Env./ A2LA	Nov 1, 2017
PC Program 1017 Norsonic	Calibration software	v.6.1T	Validated Nov 2014	Scantek, Inc.	-
1253-Norsonic	Calibrator	28326	Nov 10, 2016	Scantek, Inc./ NVLAP	Nov 10, 2017
1203-Norsonic	Preamplifier	14059	Feb 13, 2017	Scantek, Inc./ NVLAP	Feb 13, 2018
4180-Brüel&Kjær	Microphone	2246115	Oct 26, 2015	NPL-UK / UKAS	Oct 26, 2017

Instrumentation and test results are traceable to SI - BIPM through standards maintained by NPL (UK) and NIST (USA)

Calibrated by:	Lydon Dawkins	**Authorized signatory:**	Steven E. Marshall
Signature	Lydon Dawkins	Signature	Steven E Marshall
Date	7/5/2017	Date	7/7/2017

Scantek, Inc.
CALIBRATION LABORATORY

ISO 17025: 2005, ANSI/NCSL Z540:1994 Part 1
ACCREDITED by NVLAP (an ILAC MRA signatory)

NVLAP®
CALIBRATION
NVLAP Lab Code: 200625-0

Calibration Certificate No.38854

Instrument: **Acoustical Calibrator**
Model: **CAL250**
Manufacturer: **Larson Davis**
Serial number: **2368**
Class (IEC 60942): **1L**
Barometer type:
Barometer s/n:
Customer: **Harris Miller Miller & Hanson Inc.**
Tel/Fax: **781-229-0707 x3119 / 781-229-7939**

Date Calibrated: **6/30/2017** *Cal Due:*

Status:	**Received**	**Sent**
In tolerance:	X	X
Out of tolerance:		
See comments:	X	

Contains non-accredited tests: ___**Yes** _**X**_ **No**

Address: **77 South Bedford Street,**
Burlington, MA 01803

Tested in accordance with the following procedures and standards:
Calibration of Acoustical Calibrators, Scantek Inc., Rev. 10/1/2010

Instrumentation used for calibration: Nor-1504 Norsonic Test System:

Instrument - Manufacturer	Description	S/N	Cal. Date	Traceability evidence Cal. Lab / Accreditation	Cal. Due
483B-Norsonic	SME Cal Unit	31052	Oct 26, 2016	Scantek, Inc./ NVLAP	Oct 26, 2017
DS-360-SRS	Function Generator	33584	Oct 20, 2015	ACR Env./ A2LA	Oct 20, 2017
34401A-Agilent Technologies	Digital Voltmeter	US36120731	Oct 12, 2016	ACR Env. / A2LA	Oct 12, 2017
HM30-Thommen	Meteo Station	1040170/39633	Nov 1, 2016	ACR Env./ A2LA	Nov 1, 2017
140-Norsonic	Real Time Analyzer	1406423	Oct 29, 2016	Scantek / NVLAP	Oct 29, 2017
PC Program 1018 Norsonic	Calibration software	v.6.1T	Validated Nov 2014	Scantek, Inc.	-
4134-Brüel&Kjær	Microphone	173368	Nov 10, 2016	Scantek, Inc. / NVLAP	Nov 10, 2017
1203-Norsonic	Preamplifier	14059	Feb 13, 2017	Scantek, Inc./ NVLAP	Feb 13, 2018

Instrumentation and test results are traceable to SI (International System of Units) through standards maintained by NIST (USA) and NPL (UK)

Calibrated by:	Lydon Dawkins	**Authorized signatory:**	Steven E. Marshall
Signature	Lydon Dawkins	Signature	Steven E Marshall
Date	6/30/2017	Date	7/5/2017

Scantek, Inc.
CALIBRATION LABORATORY

ISO 17025: 2005, ANSI/NCSL Z540:1994 Part 1
ACCREDITED by NVLAP (an ILAC MRA signatory)

NVLAP®
CALIBRATION
NVLAP Lab Code: 200625-0

Calibration Certificate No.40280

Instrument: **Sound Level Meter**
Model: **2250**
Manufacturer: **Brüel and Kjær**
Serial number: **2579777**
Tested with: **Microphone 4189 s/n 2589635**
Preamplifier ZC0032 s/n 7764
Type (class): **1**
Customer: **Harris Miller Miller & Hanson Inc.**
Tel/Fax: **781-229-0707 x3119 / 781-229-7939**

*Date Calibrated:***3/14/2018** *Cal Due:*

Status:	**Received**	**Sent**
In tolerance:	**X**	**X**
Out of tolerance:		
See comments:		

Contains non-accredited tests: __ **Yes** **X** **No**
Calibration service: __ **Basic** **X** **Standard**
Address: **77 South Bedford Street,**
Burlington, MA 01803

Tested in accordance with the following procedures and standards:
Calibration of Sound Level Meters, Scantek Inc., Rev. 6/26/2015
SLM & Dosimeters – Acoustical Tests, Scantek Inc., Rev. 7/6/2011

Instrumentation used for calibration: Nor-1504 Norsonic Test System:

Instrument - Manufacturer	Description	S/N	Cal. Date	Traceability evidence Cal. Lab / Accreditation	Cal. Due
483B-Norsonic	SME Cal Unit	31052	Oct 30, 2017	Scantek, Inc./ NVLAP	Oct 30, 2018
DS-360-SRS	Function Generator	33584	Oct 24, 2017	ACR Env./ A2LA	Oct 24, 2019
34401A-Agilent Technologies	Digital Voltmeter	US36120731	Oct 25, 2017	ACR Env. / A2LA	Oct 25, 2018
HM30-Thommen	Meteo Station	1040170/39633	Oct 25, 2017	ACR Env./ A2LA	Oct 25, 2018
PC Program 1019 Norsonic	Calibration software	v.6.1T	Validated Nov 2014	Scantek, Inc.	-
1251-Norsonic	Calibrator	30878	Nov 10, 2017	Scantek, Inc./ NVLAP	Nov 10, 2018

Instrumentation and test results are traceable to SI (International System of Units) through standards maintained by NIST (USA) and NPL (UK).

Environmental conditions:

Temperature (°C)	Barometric pressure (kPa)	Relative Humidity (%)
23.6	99.19	38.2

Calibrated by:	Lydon Dawkins	**Authorized signatory:**	Steven E. Marshall
Signature	Lydon Dawkins	Signature	Steven E Marshall
Date	3/14/2018	Date	3/15/2018

Calibration Certificates or Test Reports shall not be reproduced, except in full, without written approval of the laboratory.
This Calibration Certificate or Test Reports shall not be used to claim product certification, approval or endorsement by NVLAP, NIST, or any agency of the federal government.

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Scantek, Inc.
CALIBRATION LABORATORY

ISO 17025: 2005, ANSI/NCSL Z540:1994 Part 1
ACCREDITED by NVLAP (an ILAC MRA signatory)

NVLAP®
CALIBRATION
NVLAP Lab Code: 200625-0

Calibration Certificate No.40281

Instrument: **Microphone**
Model: **4189**
Manufacturer: **Brüel & Kjær**
Serial number: **2589635**
Composed of:

Date Calibrated: **3/13/2018** *Cal Due:*

Status:	**Received**	**Sent**
In tolerance:	X	X
Out of tolerance:		
See comments:		

Contains non-accredited tests: __Yes _X_ No

Customer: **Harris Miller Miller & Hanson Inc.**
Tel/Fax: **781-229-0707 x3119/781-229-7939**

Address: **77 South Bedford Street,**
Burlington, MA 01803

Tested in accordance with the following procedures and standards:
Calibration of Measurement Microphones, Scantek, Inc., Rev. 2/25/2015

Instrumentation used for calibration: N-1504 Norsonic Test System:

Instrument - Manufacturer	Description	S/N	Cal. Date	Traceability evidence Cal. Lab / Accreditation	Cal. Due
4838-Norsonic	SME Cal Unit	31052	Oct 30, 2017	Scantek, Inc./ NVLAP	Oct 30, 2018
DS-360-SRS	Function Generator	33584	Oct 24, 2017	ACR Env. / A2LA	Oct 24, 2019
34401A-Agilent Technologies	Digital Voltmeter	US36120731	Oct 25, 2017	ACR Env. / A2LA	Oct 25, 2018
HM30-Thommen	Meteo Station	1040170/39633	Oct 25, 2017	ACR Env./ A2LA	Oct 25, 2018
PC Program 1017 Norsonic	Calibration software	v.6.1T	Validated Nov 2014	Scantek, Inc.	-
1253-Norsonic	Calibrator	28326	Nov 10, 2017	Scantek, Inc./ NVLAP	Nov 10, 2018
1203-Norsonic	Preamplifier	14059	Feb 12, 2018	Scantek, Inc./ NVLAP	Feb 12, 2019
4180-Brüel&Kjær	Microphone	2246115	Oct 24, 2017	DANAK / DPLA	Oct 24, 2019

Instrumentation and test results are traceable to SI - BIPM through standards maintained by NPL (UK) and NIST (USA)

Calibrated by:	Lydon Dawkins	**Authorized signatory:**	Steven E. Marshall
Signature	Lydon Dawkins	Signature	Steven E Marshall
Date	3/13/2018	Date	3/15/2018

Scantek, Inc.
CALIBRATION LABORATORY

ISO 17025: 2005, ANSI/NCSL Z540:1994 Part 1
ACCREDITED by NVLAP (an ILAC MRA signatory)

NVLAP®
CALIBRATION
NVLAP Lab Code: 200625-0

Calibration Certificate No.40282

Instrument: **Acoustical Calibrator**
Model: **4231**
Manufacturer: **Brüel and Kjær**
Serial number: **2579293**
Class (IEC 60942): **1**
Barometer type:
Barometer s/n:
Customer: **Harris Miller Miller & Hanson Inc.**
Tel/Fax: **781-229-0707 x3119 / 781-229-7939**

Date Calibrated: **3/12/2018** *Cal Due:*

Status:	**Received**	**Sent**
In tolerance:	**X**	**X**
Out of tolerance:		
See comments:		

Contains non-accredited tests: **__Yes _X_ No**

Address: **77 South Bedford Street,**
Burlington, MA 01803

Tested in accordance with the following procedures and standards:
Calibration of Acoustical Calibrators, Scantek Inc., Rev. 10/1/2010

Instrumentation used for calibration: Nor-1504 Norsonic Test System:

Instrument - Manufacturer	Description	S/N	Cal. Date	Traceability evidence	Cal. Due
				Cal. Lab / Accreditation	
483B-Norsonic	SME Cal Unit	31052	Oct 30, 2017	Scantek, Inc./ NVLAP	Oct 30, 2018
DS-360-SRS	Function Generator	33584	Oct 24, 2017	ACR Env./ A2LA	Oct 24, 2019
34401A-Agilent Technologies	Digital Voltmeter	US36120731	Oct 25, 2017	ACR Env. / A2LA	Oct 25, 2018
HM30-Thommen	Meteo Station	1040170/39633	Oct 25, 2017	ACR Env./ A2LA	Oct 25, 2018
140-Norsonic	Real Time Analyzer	1406423	Oct 31, 2017	Scantek / NVLAP	Oct 31, 2018
PC Program 1018 Norsonic	Calibration software	v.6.1T	Validated Nov 2014	Scantek, Inc.	-
4134-Brüel&Kjær	Microphone	173368	Nov 10, 2017	Scantek, Inc. / NVLAP	Nov 10, 2018
1203-Norsonic	Preamplifier	14059	Feb 12, 2018	Scantek, Inc./ NVLAP	Feb 12, 2019

Instrumentation and test results are traceable to SI (International System of Units) through standards maintained by NIST (USA) and NPL (UK)

Calibrated by:	Lydon Dawkins	**Authorized signatory:**	Steven E. Marshall
Signature	Lydon Dawkins	Signature	Steven E Marshall
Date	3/12/2018	Date	3/15/2018

Scantek, Inc.
CALIBRATION LABORATORY
ISO 17025: 2005, ANSI/NCSL Z540:1994 Part 1
ACCREDITED by NVLAP (an ILAC MRA signatory)

NVLAP®
CALIBRATION
NVLAP Lab Code: 200625-0

Calibration Certificate No.40291

Instrument: **Sound Level Meter**
Model: **2250**
Manufacturer: **Brüel and Kjær**
Serial number: **2619791**
Tested with: **Microphone 4189 s/n 2616506**
Preamplifier ZC0032 s/n 11159
Type (class): **1**
Customer: **Harris Miller Miller & Hanson Inc.**
Tel/Fax: **781-229-0707 x3119 / 781-229-7939**

Date Calibrated: **3/14/2018** *Cal Due:*

Status:	**Received**	**Sent**
In tolerance:	**X**	**X**
Out of tolerance:		
See comments:		

Contains non-accredited tests: __Yes **X** No
Calibration service: __ Basic **X** Standard
Address: **77 South Bedford Street**
Burlington, MA 01803

Tested in accordance with the following procedures and standards:
Calibration of Sound Level Meters, Scantek Inc., Rev. 6/26/2015
SLM & Dosimeters – Acoustical Tests, Scantek Inc., Rev. 7/6/2011

Instrumentation used for calibration: Nor-1504 Norsonic Test System:

Instrument - Manufacturer	Description	S/N	Cal. Date	Traceability evidence	Cal. Due
				Cal. Lab / Accreditation	
483B-Norsonic	SME Cal Unit	31061	Jul 28, 2017	Scantek, Inc./ NVLAP	Jul 28, 2018
DS-360-SRS	Function Generator	88077	Sep 15, 2016	ACR Env./ A2LA	Sep 15, 2018
34401A-Agilent Technologies	Digital Voltmeter	MY47011118	Sep 20, 2017	ACR Env./ A2LA	Sep 20, 2018
HM30-Thommen	Meteo Station	1040170/39633	Oct 25, 2017	ACR Env./ A2LA	Oct 25, 2018
PC Program 1019 Norsonic	Calibration software	v.6.1T	Validated Nov 2014	Scantek, Inc.	-
1251-Norsonic	Calibrator	30878	Nov 10, 2017	Scantek, Inc./ NVLAP	Nov 10, 2018

Instrumentation and test results are traceable to SI (International System of Units) through standards maintained by NIST (USA) and NPL (UK).

Environmental conditions:

Temperature (°C)	Barometric pressure (kPa)	Relative Humidity (%)
22.9	99.31	38.8

Calibrated by:	Jeremy Gotwalt	**Authorized signatory:**	Steven E. Marshall
Signature		Signature	Steven E Marshall
Date	3/14/18	Date	3/15/2018

Calibration Certificates or Test Reports shall not be reproduced, except in full, without written approval of the laboratory.
This Calibration Certificate or Test Reports shall not be used to claim product certification, approval or endorsement by NVLAP, NIST, or any agency of the federal government.

Scantek, Inc.
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ISO 17025: 2005, ANSI/NCSL Z540:1994 Part 1
ACCREDITED by NVLAP (an ILAC MRA signatory)

NVLAP®
CALIBRATION
NVLAP Lab Code: 200625-0

Calibration Certificate No.40292

Instrument: **Microphone**
Model: **4189**
Manufacturer: **Brüel & Kjær**
Serial number: **2616506**
Composed of:

Date Calibrated: **3/12/2018** *Cal Due:*

Status:	**Received**	**Sent**
In tolerance:	X	X
Out of tolerance:		
See comments:		

Contains non-accredited tests: __Yes _X_ No

Customer: **Harris Miller Miller & Hanson Inc.**
Tel/Fax: **781-229-0707 x3119/781-229-7939**

Address: **77 South Bedford Street**
Burlington, MA 01803

Tested in accordance with the following procedures and standards:
Calibration of Measurement Microphones, Scantek, Inc., Rev. 2/25/2015

Instrumentation used for calibration: N-1504 Norsonic Test System:

Instrument - Manufacturer	Description	S/N	Cal. Date	Traceability evidence Cal. Lab / Accreditation	Cal. Due
483B-Norsonic	SME Cal Unit	31061	Jul 28, 2017	Scantek, Inc./ NVLAP	Jul 28, 2018
DS-360-SRS	Function Generator	88077	Sep 15, 2016	ACR Env./ A2LA	Sep 15, 2018
34401A-Agilent Technologies	Digital Voltmeter	MY47011118	Sep 20, 2017	ACR Env./ A2LA	Sep 20, 2018
HM30-Thommen	Meteo Station	1040170/39633	Oct 25, 2017	ACR Env./ A2LA	Oct 25, 2018
PC Program 1017 Norsonic	Calibration software	v.6.1T	Validated Nov 2014	Scantek, Inc.	-
1253-Norsonic	Calibrator	28326	Nov 10, 2017	Scantek, Inc./ NVLAP	Nov 10, 2018
1203-Norsonic	Preamplifier	92268	Oct 18, 2017	Scantek, Inc./ NVLAP	Oct 18, 2018
4180-Brüel&Kjær	Microphone	2246115	Oct 24, 2017	DANAK / DPLA	Oct 24, 2019

Instrumentation and test results are traceable to SI - BIPM through standards maintained by NPL (UK) and NIST (USA)

Calibrated by:	Jeremy Gotwalt	Authorized signatory:	Steven E Marshall
Signature		Signature	Steven E Marshall
Date	3/12/18	Date	3/15/2018

Scantek, Inc.
CALIBRATION LABORATORY

ISO 17025: 2005, ANSI/NCSL Z540:1994 Part 1
ACCREDITED by NVLAP (an ILAC MRA signatory)

NVLAP®
CALIBRATION
NVLAP Lab Code: 200625-0

Calibration Certificate No.40293

Instrument: **Acoustical Calibrator**
Model: **4231**
Manufacturer: **Brüel and Kjær**
Serial number: **2579294**
Class (IEC 60942): **1**
Barometer type:
Barometer s/n:
Customer: **Harris Miller Miller & Hanson Inc.**
Tel/Fax: **781-229-0707 x3119 / 781-229-7939**

Date Calibrated: **3/12/2018** *Cal Due:*

Status:	**Received**	**Sent**
In tolerance:	X	X
Out of tolerance:		
See comments:		

Contains non-accredited tests: __**Yes** _X_ **No**

Address: **77 South Bedford Street**
Burlington, MA 01803

Tested in accordance with the following procedures and standards:
Calibration of Acoustical Calibrators, Scantek Inc., Rev. 10/1/2010

Instrumentation used for calibration: Nor-1504 Norsonic Test System:

Instrument - Manufacturer	Description	S/N	Cal. Date	Traceability evidence Cal. Lab / Accreditation	Cal. Due
483B-Norsonic	SME Cal Unit	31061	Jul 28, 2017	Scantek, Inc./ NVLAP	Jul 28, 2018
DS-360-SRS	Function Generator	88077	Sep 15, 2016	ACR Env./ A2LA	Sep 15, 2018
34401A-Agilent Technologies	Digital Voltmeter	MY47011118	Sep 20, 2017	ACR Env./ A2LA	Sep 20, 2018
HM30-Thommen	Meteo Station	1040170/39633	Oct 25, 2017	ACR Env./ A2LA	Oct 25, 2018
140-Norsonic	Real Time Analyzer	1403978	Mar 22, 2017	Scantek, Inc. / NVLAP	Mar 22, 2018
PC Program 1018 Norsonic	Calibration software	v.6.1T	Validated Nov 2014	Scantek, Inc.	-
4192-Brüel&Kjær	Microphone	2854675	Nov 11, 2017	Scantek, Inc. / NVLAP	Nov 11, 2018
1203-Norsonic	Preamplifier	92268	Oct 18, 2017	Scantek, Inc./ NVLAP	Oct 18, 2018

Instrumentation and test results are traceable to SI (International System of Units) through standards maintained by NIST (USA) and NPL (UK)

Calibrated by:	Jeremy Gotwalt	**Authorized signatory:**	Steven E. Marshall
Signature		Signature	Steven E Marshall
Date	3/12/18	Date	3/15/2018

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NVLAP®
CALIBRATION
NVLAP Lab Code: 200625-0

Calibration Certificate No.40294

Instrument: **Sound Level Meter**
Model: **2250**
Manufacturer: **Brüel and Kjær**
Serial number: **2579776**
Tested with: **Microphone 4189 s/n 2616507**
Preamplifier ZC0032 s/n 18967
Type (class): **1**
Customer: **Harris Miller Miller & Hanson Inc.**
Tel/Fax: **781-229-0707 x3119 / 781-229-7939**

Date Calibrated: **3/14/2018** *Cal Due:*

Status:	**Received**	**Sent**
In tolerance:	**X**	**X**
Out of tolerance:		
See comments:		

Contains non-accredited tests: __**Yes** _X_ **No**
Calibration service: __ **Basic** _X_ **Standard**
Address: **77 South Bedford Street**
Burlington, MA 01803

Tested in accordance with the following procedures and standards:
Calibration of Sound Level Meters, Scantek Inc., Rev. 6/26/2015
SLM & Dosimeters – Acoustical Tests, Scantek Inc., Rev. 7/6/2011

Instrumentation used for calibration: Nor-1504 Norsonic Test System:

Instrument - Manufacturer	**Description**	**S/N**	**Cal. Date**	**Traceability evidence** **Cal. Lab / Accreditation**	**Cal. Due**
483B-Norsonic	SME Cal Unit	31061	Jul 28, 2017	Scantek, Inc./ NVLAP	Jul 28, 2018
DS-360-SRS	Function Generator	88077	Sep 15, 2016	ACR Env./ A2LA	Sep 15, 2018
34401A-Agilent Technologies	Digital Voltmeter	MY47011118	Sep 20, 2017	ACR Env./ A2LA	Sep 20, 2018
HM30-Thommen	Meteo Station	1040170/39633	Oct 25, 2017	ACR Env./ A2LA	Oct 25, 2018
PC Program 1019 Norsonic	Calibration software	v.6.1T	Validated Nov 2014	Scantek, Inc.	-
1251-Norsonic	Calibrator	30878	Nov 10, 2017	Scantek, Inc./ NVLAP	Nov 10, 2018

Instrumentation and test results are traceable to SI (International System of Units) through standards maintained by NIST (USA) and NPL (UK).

Environmental conditions:

Temperature (°C)	Barometric pressure (kPa)	Relative Humidity (%)
23.2	99.31	39.1

Calibrated by:	Jeremy Gotwalt	**Authorized signatory:**	Steven E. Marshall
Signature		Signature	Steven E Marshall
Date	3/14/18	Date	3/15/2018

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NVLAP®
CALIBRATION
NVLAP Lab Code: 200625-0

Calibration Certificate No.40295

Instrument: **Microphone**
Model: **4189**
Manufacturer: **Brüel & Kjær**
Serial number: **2616507**
Composed of:

Date Calibrated: **3/12/2018** *Cal Due:*

Status:	**Received**	**Sent**
In tolerance:	X	X
Out of tolerance:		
See comments:		

Contains non-accredited tests: __Yes _X_ No

Customer: **Harris Miller Miller & Hanson Inc.**
Tel/Fax: **781-229-0707 x3119/781-229-7939**

Address: **77 South Bedford Street**
Burlington, MA 01803

Tested in accordance with the following procedures and standards:

Calibration of Measurement Microphones, Scantek, Inc., Rev. 2/25/2015

Instrumentation used for calibration: N-1504 Norsonic Test System:

Instrument - Manufacturer	Description	S/N	Cal. Date	Traceability evidence	Cal. Due
				Cal. Lab / Accreditation	
483B-Norsonic	SME Cal Unit	31061	Jul 28, 2017	Scantek, Inc./ NVLAP	Jul 28, 2018
DS-360-SRS	Function Generator	88077	Sep 15, 2016	ACR Env./ A2LA	Sep 15, 2018
34401A-Agilent Technologies	Digital Voltmeter	MY47011118	Sep 20, 2017	ACR Env./ A2LA	Sep 20, 2018
HM30-Thommen	Meteo Station	1040170/39633	Oct 25, 2017	ACR Env./ A2LA	Oct 25, 2018
PC Program 1017 Norsonic	Calibration software	v.6.1T	Validated Nov 2014	Scantek, Inc.	-
1253-Norsonic	Calibrator	28326	Nov 10, 2017	Scantek, Inc./ NVLAP	Nov 10, 2018
1203-Norsonic	Preamplifier	92268	Oct 18, 2017	Scantek, Inc./ NVLAP	Oct 18, 2018
4180-Brüel&Kjær	Microphone	2246115	Oct 24, 2017	DANAK / DPLA	Oct 24, 2019

Instrumentation and test results are traceable to SI - BIPM through standards maintained by NPL (UK) and NIST (USA)

Calibrated by:	Jeremy Gotwalt	**Authorized signatory:**	Steven E Marshall
Signature		Signature	Steven E Marshall
Date	3/12/18	Date	3/15/2018

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Scantek, Inc.
CALIBRATION LABORATORY
ISO 17025: 2005, ANSI/NCSL Z540:1994 Part 1
ACCREDITED by NVLAP (an ILAC MRA signatory)

NVLAP®
CALIBRATION
NVLAP Lab Code: 200625-0

Calibration Certificate No.40296

Instrument: **Acoustical Calibrator**
Model: **4231**
Manufacturer: **Brüel and Kjær**
Serial number: **2579295**
Class (IEC 60942): **1**
Barometer type:
Barometer s/n:
Customer: **Harris Miller Miller & Hanson Inc.**
Tel/Fax: **781-229-0707 x3119 / 781-229-7939**

Date Calibrated: **3/12/2018** *Cal Due:*

Status:	**Received**	**Sent**
In tolerance:	X	X
Out of tolerance:		
See comments:		

Contains non-accredited tests: __**Yes** _**X**_ **No**

Address: **77 South Bedford Street**
Burlington, MA 01803

Tested in accordance with the following procedures and standards:
Calibration of Acoustical Calibrators, Scantek Inc., Rev. 10/1/2010

Instrumentation used for calibration: Nor-1504 Norsonic Test System:

Instrument - Manufacturer	Description	S/N	Cal. Date	Traceability evidence Cal. Lab / Accreditation	Cal. Due
483B-Norsonic	SME Cal Unit	31061	Jul 28, 2017	Scantek, Inc./ NVLAP	Jul 28, 2018
DS-360-SRS	Function Generator	88077	Sep 15, 2016	ACR Env./ A2LA	Sep 15, 2018
34401A-Agilent Technologies	Digital Voltmeter	MY47011118	Sep 20, 2017	ACR Env./ A2LA	Sep 20, 2018
HM30-Thommen	Meteo Station	1040170/39633	Oct 25, 2017	ACR Env./ A2LA	Oct 25, 2018
140-Norsonic	Real Time Analyzer	1403978	Mar 22, 2017	Scantek, Inc. / NVLAP	Mar 22, 2018
PC Program 1018 Norsonic	Calibration software	v.6.1T	Validated Nov 2014	Scantek, Inc.	-
4192-Brüel&Kjær	Microphone	2854675	Nov 11, 2017	Scantek, Inc. / NVLAP	Nov 11, 2018
1203-Norsonic	Preamplifier	92268	Oct 18, 2017	Scantek, Inc./ NVLAP	Oct 18, 2018

Instrumentation and test results are traceable to SI (International System of Units) through standards maintained by NIST (USA) and NPL (UK)

Calibrated by:	Jeremy Gotwalt	**Authorized signatory:**	Steven E. Marshall
Signature		Signature	Steven E Marshall
Date	3/12/18	Date	3/15/2018

Appendix C. Traffic Data Used in the Noise Analysis

Table C-1. Short-Term 10-minute Traffic Counts

Measurement Location	Roadway	Vehicle	Counted NB or EB	Counted SB or WB	Hourly Equivalent NB or EB	Hourly Equivalent SB or WB	Speed (mph) NB or EB	Speed (mph) SB or WB
ST01	I-205	Autos	444	296	2664	1776	65	65
		MT	18	18	108	108		
		HT	44	52	264	312		
		Bus	0	0	0	0		
		Moto	3	0	18	0		
	Borland Rd	Autos	8	8	48	48	45	45
		MT	0	0	0	0		
		HT	0	0	0	0		
		Bus	0	0	0	0		
		Moto	0	0	0	0		
ST02	I-205	Autos	516	394	3096	2364	65	65
		MT	26	24	156	144		
		HT	40	30	240	180		
		Bus	3	0	18	0		
		Moto	3	2	18	12		
	Johnson Creek Rd	Autos	14	6	84	36	45	45
		MT	0	0	0	0		
		HT	0	0	0	0		
		Bus	0	0	0	0		
		Moto	0	0	0	0		
ST03	I-205	Autos	332	425	1992	2550	65	65
		MT	14	15	84	90		
		HT	22	42	132	252		
		Bus	0	0	0	0		
		Moto	0	0	0	0		
ST04	I-205	Autos	365	472	2190	2832	65	65
		MT	16	20	96	120		
		HT	28	30	168	180		
		Bus	0	0	0	0		
		Moto	0	0	0	0		
ST05	I-205	Autos	400	462	2400	2772	65	65
		MT	14	26	84	156		
		HT	40	28	240	168		
		Bus	0	0	0	0		

Table C-1. Short-Term 10-minute Traffic Counts

Measurement Location	Roadway	Vehicle	Counted NB or EB	Counted SB or WB	Hourly Equivalent NB or EB	Hourly Equivalent SB or WB	Speed (mph) NB or EB	Speed (mph) SB or WB
		Moto	0	0	0	0		
ST06	I-205	Autos	436	455	2616	2730	65	65
		MT	8	20	48	120		
		HT	28	34	168	204		
		Bus	0	0	0	0		
		Moto	0	0	0	0		
	Blankenship Rd	Autos	10	14	60	84	25	25
		MT	0	0	0	0		
		HT	0	1	0	6		
		Bus	0	0	0	0		
		Moto	0	0	0	0		
ST07	I-205	Autos	412	474	2472	2844	35	55
		MT	15	10	90	60		
		HT	39	23	234	138		
		Bus	0	0	0	0		
		Moto	0	0	0	0		
ST08	I-205	Autos	414	430	2484	2580	55	30
		MT	27	15	162	90		
		HT	41	31	246	186		
		Bus	0	0	0	0		
		Moto	0	0	0	0		
	Willamette Falls Drive	Autos	39	35	234	210	45	45
		MT	0	0	0	0		
		HT	0	0	0	0		
		Bus	0	0	0	0		
		Moto	0	0	0	0		
ST09	I-205	Autos	248	253	1488	1518	55	40
		MT	16	20	96	120		
		HT	36	40	216	240		
		Bus	0	0	0	0		
		Moto	0	0	0	0		
ST10	I-205	Autos	478	556	2868	3336	40	40
		MT	31	28	186	168		
		HT	34	36	204	216		
		Bus	0	0	0	0		
		Moto	0	0	0	0		
ST11	Willamette Falls Drive	Autos	40	59	240	354	40	40

Table C-1. Short-Term 10-minute Traffic Counts

Measurement Location	Roadway	Vehicle	Counted NB or EB	Counted SB or WB	Hourly Equivalent NB or EB	Hourly Equivalent SB or WB	Speed (mph) NB or EB	Speed (mph) SB or WB
		MT	2	0	12	0		
		HT	1	0	6	0		
		Bus	2	1	12	6		
		Moto	0	0	0	0		
ST12	I-205	Autos	444	403	2664	2418	50	55
		MT	18	26	108	156		
		HT	44	25	264	150		
		Bus	0	0	0	0		
		Moto	0	0	0	0		
	I205SB Offramp to OR 43	Autos		20	0	121		25-40
		MT		1	0	8		
		HT		1	0	8		
		Bus		0	0	0		
		Moto		0	0	0		
ST13	I-205	Autos	450	410	2700	2460	55	35
		MT	17	23	102	138		
		HT	45	27	270	162		
		Bus	0	0	0	0		
		Moto	0	0	0	0		
	99E	Autos	216	275	1296	1650	30	20
		MT	4	9	24	54		
		HT	2	4	12	24		
		Bus	0	0	0	0		
		Moto	0	0	0	0		
	Clackamette Drive	Autos	2	5	12	30	20	20
		MT	1	0	6	0		
		HT	0	0	0	0		
		Bus	0	0	0	0		
		Moto	0	0	0	0		
Structure Radiated Noise Measurement Oregon City	I-205	Autos	312	652	1248	2608	55	35
		MT	63	46.5	252	186		
		HT	31	30	124	120		
		Bus	0	0	0	0		
		Moto	0	0	0	0		
	99E	Autos	339	324	1356	1296	30	20
		MT	11	11	44	44		
		HT	12	12	48	48		

Table C-1. Short-Term 10-minute Traffic Counts

Measurement Location	Roadway	Vehicle	Counted NB or EB	Counted SB or WB	Hourly Equivalent NB or EB	Hourly Equivalent SB or WB	Speed (mph) NB or EB	Speed (mph) SB or WB
		Bus	0	0	0	0		
		Moto	0	0	0	0		
Structure Radiated Noise Measurement West Linn 6-13-2018	I-205	Autos	925	689	3700	2756	55	55
		MT	49	34	196	136		
		HT	45	34	180	136		
		Bus	0	0	0	0		
		Moto	0	0	0	0		
	I-205 NB On-Ramp	Autos	156	0	624	0	36	0
		MT	7	0	28	0		
		HT	0	0	0	0		
		Bus	0	0	0	0		
		Moto	0	0	0	0		
	I-205 SB Off-Ramp	Autos	0	194	0	776	0	32
		MT	0	4	0	16		
		HT	0	1	0	4		
		Bus	0	0	0	0		
		Moto	0	0	0	0		
Structure Radiated Noise Measurement West Linn 6-19-2018	I-205	Autos	807	625	3228	2500	50	55
		MT	38	29	152	116		
		HT	54	52	216	208		
		Bus	0	0	0	0		
		Moto	0	0	0	0		
	I-205 NB On-Ramp	Autos	67	0	268	0	30	0
		MT	0	0	0	0		
		HT	0	0	0	0		
		Bus	0	0	0	0		
		Moto	0	0	0	0		
	I-205 SB Off-Ramp	Autos	0	188	0	752	0	32
		MT	0	4	0	16		
		HT	0	2	0	8		
		Bus	0	0	0	0		
		Moto	0	0	0	0		

Source: HMMH, 2018

Notes for the tables that follow:

1. All Vehicles volume from Synchro Network.
2. Assume Autos, Buses, Medium Trucks, Heavy Trucks and Motorcycle percentages calculated using TMC counts during 12-1 p.m. on May 23, 2017.

Existing 2017 Truck Peak Hour (12:00-1:00 PM) I-205 Mainline

Direction	Link	Speed, mph	All Vehicles [1]	Motorcycles [2]	Autos [2]	Buses [2]	Medium Trucks [2]	Heavy Trucks [2]
Northbound	I-5 to Stafford Exit	Car 65; Truck 55	3,025	21	2,610	6	119	269
Northbound	Stafford Exit to Stafford Entrance	Car 65; Truck 55	2,748	19	2,371	5	108	245
Northbound	Stafford Entrance to 10th St Exit	Car 65; Truck 55	3,059	21	2,639	6	120	272
Northbound	10th St Exit to 10th St Entrance	55	2,729	19	2,354	5	107	243
Northbound	10th St Entrance OR 43 Exit	55	3,133	22	2,703	6	123	279
Northbound	OR 43 Exit to OR 43 Loop Entrance	55	2,873	20	2,479	6	113	256
Northbound	OR 43 Loop Entrance to OR 43 Slip Entrance	55	3,382	24	2,918	6	133	301
Northbound	OR 43 Slip Entrance to OR 99E Exit	55	3,585	25	3,093	7	141	319
Northbound	OR 99E Exit to OR 99E Entrance	55	3,010	21	2,597	6	118	268
Northbound	OR 99E Entrance to OR 213 Exit	55	3,957	28	3,414	8	155	352
Northbound	OR 213 Exit to OR 213 Entrance	55	3,124	22	2,695	6	123	278
Northbound	OR 213 Entrance to 82nd Dr Exit	55	4,699	33	4,054	9	184	418
Southbound	82nd Dr Entrance to OR 213 Exit	55	4,492	33	3,941	3	150	364

Existing 2017 Truck Peak Hour (12:00-1:00 PM) I-205 Mainline

Direction	Link	Speed, mph	All Vehicles [1]	Motorcycles [2]	Autos [2]	Buses [2]	Medium Trucks [2]	Heavy Trucks [2]
Southbound	OR 213 Exit to OR 213 Entrance	55	2,822	21	2,476	2	94	229
Southbound	OR 213 Entrance to OR 99E Exit	55	3,516	26	3,085	2	118	285
Southbound	OR 99E Exit to OR 99E Entrance	55	2,661	20	2,335	2	89	216
Southbound	OR 99E Entrance to OR 43 Exit	55	3,276	24	2,874	2	110	266
Southbound	OR 43 Exit to OR 43 Entrance	55	2,582	19	2,265	2	86	209
Southbound	OR 43 Entrance to 10th St Exit	55	2,837	21	2,489	2	95	230
Southbound	10th St Exit to 10th St Entrance	55	2,406	18	2,111	2	81	195
Southbound	10th St Entrance to Stafford Exit	Car 65; Truck 55	2,729	20	2,394	2	91	221
Southbound	Stafford Exit to Stafford Entrance	Car 65; Truck 55	2,433	18	2,135	2	81	197
Southbound	Stafford Entrance to I-5 Exit	Car 65; Truck 55	2,745	20	2,408	2	92	223

Source: HDR, 2017

Existing 2017 Truck Peak Hour (12:00-1:00 PM) I-205 Ramps

Direction	Link	Speed, mph	All Vehicles [1]	Motorcycles [2]	Autos [2]	Buses [2]	Medium Trucks [2]	Heavy Trucks [2]
Northbound	I-205 NB Stafford Exit Ramp	45	277	2	246	0	16	13
Northbound	I-205 NB Stafford Entrance Ramp	Car 65; Truck 55	309	2	281	1	18	7

Existing 2017 Truck Peak Hour (12:00-1:00 PM) I-205 Ramps

Direction	Link	Speed, mph	All Vehicles [1]	Motorcycles [2]	Autos [2]	Buses [2]	Medium Trucks [2]	Heavy Trucks [2]
Northbound	I-205 NB 10th Ave Exit Ramp	45	330	1	319	0	7	3
Northbound	I-205 NB 10th Ave Entrance Ramp	55	402	1	379	0	16	6
Northbound	I-205 NB OR 43 Exit Ramp	35	260	4	247	2	6	1
Northbound	I-205 NB OR 43 Loop Entrance Ramp	55	489	1	462	4	13	10
Northbound	I-205 NB OR 43 Slip Entrance Ramp	55	203	3	184	1	5	10
Northbound	I-205 NB OR99 Exit Ramp	30	575	3	532	6	20	14
Northbound	I-205 NB OR99 Entrance Ramp	55	947	9	853	4	41	40
Northbound	I-205 NB OR 213 Exit Ramp	35	833	4	775	6	31	17
Northbound	I-205 NB OR 213 Entrance Ramp	55	1,575	10	1452	7	51	55
Southbound	I-205 SB OR 213 Exit Ramp	25	1,670	10	1557	5	58	40
Southbound	I-205 SB OR 213 Entrance Ramp	55	694	5	649	1	25	14
Southbound	I-205 SB OR99 Exit Ramp	45	855	9	782	3	21	40
Southbound	I-205 SB OR99 Entrance Ramp	55	615	5	567	6	20	17
Southbound	I-205 SB OR 43 Exit Ramp	40	694	2	642	6	22	22
Southbound	I-205 SB OR 43 Entrance Ramp	55	255	1	243	0	7	4
Southbound	I-205 SB 10th Ave Exit Ramp	45	431	1	410	0	14	6
Southbound	I-205 SB 10th Ave Entrance Ramp	Car 65; Truck 55	320	3	301	3	8	5
Southbound	I-205 SB Stafford Exit Ramp	45	296	5	265	3	15	8
Southbound	I-205 SB Stafford Entrance Ramp	Car 65; Truck 55	312	1	290	2	10	9

Source: HDR, 2017

Existing 2017 Truck Peak Hour (12:00-1:00 PM) Side Street

Road	Direction	Ramp Terminal Intersection Links	Speed, mph	All Vehicles 1	Motorcycles 2	Autos 2	Buses 2	Medium Trucks 2	Heavy Trucks 2
Stafford Rd	Northbound	South of I-205 NB Ramps	45	345	3	333	0	7	2
	Northbound	Between Stafford Ramp Terminals	45	382	3	348	0	18	13
	Northbound	North of I-205 SB Ramps	45	502	6	442	1	32	21
	Southbound	North of I-205 SB Ramps	45	527	5	476	3	29	14
	Southbound	Between Stafford Ramp Terminals	45	405	6	369	3	18	9
	Southbound	South of I-205 NB Ramps	45	334	6	317	2	5	4
10th Ave	Northbound	South of 8th Ct	25	366	3	345	2	11	5
	Northbound	Between 8th Ct and NB Ramp Terminal	25	540	3	517	2	13	5
	Northbound	Between 10th Ramp Terminals	25	507	2	484	3	16	2
	Northbound	Between Blankenship Rd and SB Ramp Terminal	25	616	0	590	2	17	7
	Southbound	Between SB Ramp Terminal and Blankenship	25	628	1	600	2	17	8
	Southbound	Between 10th Ramp Terminals	25	630	1	607	0	16	6
	Southbound	Between NB Ramp Terminal and 8th Ct	25	588	2	571	0	11	4
	Southbound	South of 8th Ct	25	383	0	371	0	10	2
OR 43	Northbound	South of Willamette Falls Dr.	25	422	3	411	0	2	6
	Northbound	Between Willamette Falls Dr. and I-205 NB Ramps	35	461	4	436	1	9	11
	Northbound	Between OR 43 Ramp Terminals	35	369	4	353	1	9	2

Existing 2017 Truck Peak Hour (12:00-1:00 PM) Side Street

Road	Direction	Ramp Terminal Intersection Links	Speed, mph	All Vehicles [1]	Motorcycles [2]	Autos [2]	Buses [2]	Medium Trucks [2]	Heavy Trucks [2]
	Northbound	North of I-205 SB Ramps	35	806	3	754	6	28	15
	Southbound	North of I-205 SB Ramps	35	852	1	807	6	25	13
	Southbound	Between I-205 SB Ramp and NB Loop Ramp	35	854	1	806	7	22	18
	Southbound	Between I-205 Ramp Terminals	35	345	1	323	3	10	8
	Southbound	Between I-205 NB Ramp and Willimatte Falls Dr.	35	494	2	469	4	11	8
	Southbound	South of Willamette Falls Dr.	25	435	1	427	0	2	5
Willamette Falls Dr.	Eastbound	West of W A St	35	274	3	260	2	5	4
	Eastbound	Between W A St and Broadway St	35	296	3	276	1	8	8
	Eastbound	Between Broadway St and OR 43	35	307	4	286	1	8	8
	Westbound	Between OR 43 and Broadway	35	298	3	278	4	8	5
	Westbound	Between Broadway and W A St	35	294	3	277	4	5	5
	Westbound	West of W A St	35	313	3	299	4	5	2
W A St	Northbound	North of Willamette Falls Dr.	20	70	0	64	2	0	4
	Southbound	North of Willamette Falls Dr.	20	111	0	102	1	3	5
Broadway St	Northbound	North of Willamette Falls Dr.	20	17	0	16	0	0	1
	Southbound	North of Willamette Falls Dr.	20	15	0	15	0	0	0
OR 99E	Northbound	South of 14th Ave	30	1,058	9	958	14	38	39
	Northbound	Between 14th Ave and I-205 NB Ramps	30	1,515	14	1,400	17	41	43

Existing 2017 Truck Peak Hour (12:00-1:00 PM) Side Street

Road	Direction	Ramp Terminal Intersection Links	Speed, mph	All Vehicles [1]	Motorcycles [2]	Autos [2]	Buses [2]	Medium Trucks [2]	Heavy Trucks [2]
	Northbound	Between OR99 Ramp Terminals	30	1,357	11	1,271	20	30	25
	Northbound	Between I-205 SB Ramps and Dunes Dr.	30	1,532	11	1,449	18	30	24
	Northbound	North of Dunes Dr.	30	1,222	6	1,160	18	25	13
	Southbound	North of Dunes Dr.	30	1,274	9	1,200	16	34	15
	Southbound	Between Dunes Dr. and I-205 SB Ramps	30	1,474	8	1,388	18	37	23
	Southbound	Between OR99 Ramp Terminals	30	1,559	15	1,438	17	41	48
	Southbound	Between I-205 NB Ramps and 14th Ave	30	1,341	12	1,236	16	32	45
	Southbound	South of 14th Ave	30	988	9	895	14	25	45
OR 213	Northbound	South of I-205 NB Ramps	45	2,288	15	2,117	10	74	72
	Northbound	Between OR 213 Ramp Terminals	45	708	5	660	1	28	14
	Northbound	North of I-205 SB Ramps	45	45	0	41	0	4	0
	Southbound	North of I-205 NB Ramps	45	49	0	43	0	6	0
	Southbound	Between OR 213 Ramp Terminals	45	1,691	6	1,591	3	47	44
	Southbound	South of I-205 NB Ramps	45	2,524	10	2,366	9	78	61

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Future 2045 No Build Truck Peak Hour (12:00-1:00 PM) I-205 Mainline								
Direction	**Link**	**Speed, mph**	**All Vehicles [1]**	**Motorcycles [2]**	**Autos [2]**	**Buses [2]**	**Medium Trucks [2]**	**Heavy Trucks [2]**
Northbound	I-5 to Stafford Exit	Car 65; Truck 55	3,542	25	3,056	7	139	315
Northbound	Stafford Exit to Stafford Entrance	Car 65; Truck 55	3,185	22	2,748	6	125	284
Northbound	Stafford Entrance to 10th St Exit	Car 65; Truck 55	3,557	25	3,069	7	140	317
Northbound	10th St Exit to 10th St Entrance	55	3,178	22	2,742	6	125	283
Northbound	10th St Entrance OR 43 Exit	55	3,648	26	3,147	7	143	325
Northbound	OR 43 Exit to OR 43 Loop Entrance	55	3,364	24	2,902	6	132	300
Northbound	OR 43 Loop Entrance to OR 43 Slip Entrance	55	3,995	28	3,447	8	157	356
Northbound	OR 43 Slip Entrance to OR 99E Exit	55	4,255	30	3,671	8	167	379
Northbound	OR 99E Exit to OR 99E Entrance	55	3,544	25	3,058	7	139	316
Northbound	OR 99E Entrance to OR 213 Exit	55	4,634	33	3,998	9	182	413
Northbound	OR 213 Exit to OR 213 Entrance	55	3,595	25	3,102	7	141	320
Northbound	OR 213 Entrance to 82nd Dr Exit	55	5,372	38	4,635	10	211	478
Southbound	82nd Dr Entrance to OR 213 Exit	55	5,128	38	4,499	4	172	416
Southbound	OR 213 Exit to OR 213 Entrance	55	3,202	24	2,809	2	107	260
Southbound	OR 213 Entrance to OR 99E Exit	55	4,118	30	3,613	3	138	334
Southbound	OR 99E Exit to OR 99E Entrance	55	3,152	23	2,765	2	106	256

Future 2045 No Build Truck Peak Hour (12:00-1:00 PM) I-205 Mainline

Direction	Link	Speed, mph	All Vehicles [1]	Motorcycles [2]	Autos [2]	Buses [2]	Medium Trucks [2]	Heavy Trucks [2]
Southbound	OR 99E Entrance to OR 43 Exit	55	3,953	29	3,468	3	132	320
Southbound	OR 43 Exit to OR 43 Entrance	55	2,967	22	2,603	2	99	241
Southbound	OR 43 Entrance to 10th St Exit	55	3,234	24	2,837	2	108	262
Southbound	10th St Exit to 10th St Entrance	55	2,593	19	2,275	2	87	210
Southbound	10th St Entrance to Stafford Exit	Car 65; Truck 55	2,958	22	2,595	2	99	240
Southbound	Stafford Exit to Stafford Entrance	Car 65; Truck 55	2,600	19	2,281	2	87	211
Southbound	Stafford Entrance to I-5 Exit	Car 65; Truck 55	3,025	22	2,654	2	101	245

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Future 2045 No Build Truck Peak Hour (12:00-1:00 PM) I-205 Ramps

Direction	Link	Speed, mph	All Vehicles [1]	Motorcycles [2]	Autos [2]	Buses [2]	Medium Trucks [2]	Heavy Trucks [2]
Northbound	I-205 NB Stafford Exit Ramp	45	357	3	317	0	21	17
Northbound	I-205 NB Stafford Entrance Ramp	Car 65; Truck 55	372	2	338	1	22	8
Northbound	I-205 NB 10th Ave Exit Ramp	45	379	1	366	0	8	3
Northbound	I-205 NB 10th Ave Entrance Ramp	55	470	1	443	0	19	7
Northbound	I-205 NB OR 43 Exit Ramp	35	284	4	270	2	7	1

Future 2045 No Build Truck Peak Hour (12:00-1:00 PM) I-205 Ramps

Direction	Link	Speed, mph	All Vehicles [1]	Motorcycles [2]	Autos [2]	Buses [2]	Medium Trucks [2]	Heavy Trucks [2]
Northbound	I-205 NB OR 43 Loop Entrance Ramp	55	631	1	596	5	16	13
Northbound	I-205 NB OR 43 Slip Entrance Ramp	55	260	4	236	1	6	13
Northbound	I-205 NB OR99 Exit Ramp	30	711	4	658	7	25	17
Northbound	I-205 NB OR99 Entrance Ramp	55	1,090	10	982	5	47	46
Northbound	I-205 NB OR 213 Exit Ramp	35	1,039	5	967	7	39	21
Northbound	I-205 NB OR 213 Entrance Ramp	55	1,777	11	1638	8	58	62
Southbound	I-205 SB OR 213 Exit Ramp	25	1,926	12	1796	6	67	46
Southbound	I-205 SB OR 213 Entrance Ramp	55	916	7	857	1	33	18
Southbound	I-205 SB OR99 Exit Ramp	45	966	10	884	3	24	45
Southbound	I-205 SB OR99 Entrance Ramp	55	801	7	738	8	26	22
Southbound	I-205 SB OR 43 Exit Ramp	40	986	3	912	9	31	31
Southbound	I-205 SB OR 43 Entrance Ramp	55	267	1	254	0	7	4
Southbound	I-205 SB 10th Ave Exit Ramp	45	641	1	610	0	21	9
Southbound	I-205 SB 10th Ave Entrance Ramp	Car 65; Truck 55	365	3	343	3	9	6
Southbound	I-205 SB Stafford Exit Ramp	45	358	6	321	4	18	10
Southbound	I-205 SB Stafford Entrance Ramp	Car 65; Truck 55	425	1	395	3	14	12

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Future 2045 No Build Truck Peak Hour (12:00-1:00 PM) Side Street

Road	Direction	Ramp Terminal Intersection Links	Speed, mph	All Vehicles [1]	Motorcycles [2]	Autos [2]	Buses [2]	Medium Trucks [2]	Heavy Trucks [2]
Stafford Rd	Northbound	South of I-205 NB Ramps	45	557	5	538	0	11	3
	Northbound	Between Stafford Ramp Terminals	45	606	5	552	0	29	21
	Northbound	North of I-205 SB Ramps	45	666	8	586	1	42	28
	Southbound	North of I-205 SB Ramps	45	756	7	683	4	42	20
	Southbound	Between Stafford Ramp Terminals	45	634	9	578	5	28	14
	Southbound	South of I-205 NB Ramps	45	570	10	541	3	9	7
10th Ave	Northbound	South of 8th Ct	25	421	3	397	2	13	6
	Northbound	Between 8th Ct and NB Ramp Terminal	25	609	3	583	2	15	6
	Northbound	Between 10th Ramp Terminals	25	590	2	563	3	19	2
	Northbound	Between Blankenship Rd and SB Ramp Terminal	25	710	0	680	2	20	8
	Southbound	Between SB Ramp Terminal and Blankenship	25	711	1	679	2	19	9
	Southbound	Between 10th Ramp Terminals	25	803	1	774	0	20	8
	Southbound	Between NB Ramp Terminal and 8th Ct	25	741	3	720	0	14	5
	Southbound	South of 8th Ct	25	537	0	520	0	14	3
OR 43	Northbound	South of Willamette Falls Dr.	25	572	4	557	0	3	8
	Northbound	Between Willamette Falls Dr. and I-205 NB Ramps	35	560	5	530	1	11	13
	Northbound	Between OR 43 Ramp Terminals	35	434	5	415	1	11	2
	Northbound	North of I-205 SB Ramps	35	1,117	4	1,045	8	39	21

Future 2045 No Build Truck Peak Hour (12:00-1:00 PM) Side Street

Road	Direction	Ramp Terminal Intersection Links	Speed, mph	All Vehicles[1]	Motorcycles[2]	Autos[2]	Buses[2]	Medium Trucks[2]	Heavy Trucks[2]
	Southbound	North of I-205 SB Ramps	35	1,127	1	1,067	8	33	17
	Southbound	Between I-205 SB Ramps and NB Loop Ramp	35	1,157	1	1,092	9	30	24
	Southbound	Between I-205 Ramp Terminals	35	526	2	492	5	15	12
	Southbound	Between I-205 NB Ramp and Willimatte Falls Dr.	35	666	3	632	5	15	11
	Southbound	South of Willamette Falls Dr.	25	655	2	643	0	3	8
Willamette Falls Dr.	Eastbound	West of W A St	35	418	5	397	3	8	6
	Eastbound	Between W A St and Broadway St	35	468	5	436	2	13	13
	Eastbound	Between Broadway St and OR 43	35	464	6	432	2	12	12
	Westbound	Between OR 43 and Broadway	35	454	5	424	6	12	8
	Westbound	Between Broadway and W A St	35	507	5	478	7	9	9
	Westbound	West of W A St	35	458	4	438	6	7	3
W A St	Northbound	North of Willamette Falls Dr.	20	191	0	175	5	0	11
	Southbound	North of Willamette Falls Dr.	20	192	0	176	2	5	9
Broadway St	Northbound	North of Willamette Falls Dr.	20	0	0	0	0	0	0
	Southbound	North of Willamette Falls Dr.	20	0	0	0	0	0	0
OR 99E	Northbound	South of 14th Ave	30	1,278	11	1,157	17	46	47
	Northbound	Between 14th Ave and I-205 NB Ramps	30	1,932	18	1,785	22	52	55
	Northbound	Between OR99 Ramp Terminals	30	1,777	14	1,664	26	39	33

Future 2045 No Build Truck Peak Hour (12:00-1:00 PM) Side Street

Road	Direction	Ramp Terminal Intersection Links	Speed, mph	All Vehicles [1]	Motorcycles [2]	Autos [2]	Buses [2]	Medium Trucks [2]	Heavy Trucks [2]
	Northbound	Between I-205 SB Ramps and Dunes Dr.	30	1,463	11	1,384	17	29	23
	Northbound	North of Dunes Dr.	30	1,323	6	1,256	19	27	14
	Southbound	North of Dunes Dr.	30	1,357	10	1,278	17	36	16
	Southbound	Between Dunes Dr. and I-205 SB Ramps	30	1,804	10	1,699	22	45	28
	Southbound	Between OR99 Ramp Terminals	30	1,767	17	1,630	19	46	54
	Southbound	Between I-205 NB Ramps and 14th Ave	30	1,507	13	1,389	18	36	51
	Southbound	South of 14th Ave	30	1,148	10	1,040	16	29	52
OR 213	Northbound	South of I-205 NB Ramps	45	2,920	19	2,702	13	94	92
	Northbound	Between OR 213 Ramp Terminals	45	1,143	8	1,066	2	45	23
	Northbound	North of I-205 SB Ramps	45	350	0	319	0	31	0
	Southbound	North of I-205 NB Ramps	45	139	0	122	0	17	0
	Southbound	Between OR 213 Ramp Terminals	45	1,936	7	1,822	3	54	50
	Southbound	South of I-205 NB Ramps	45	2,975	12	2,789	11	92	72

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Future 2045 Build Truck Peak Hour (12:00-1:00 PM) I-205 Mainline

Direction	Link	Speed, mph	All Vehicles [1]	Motorcycles [2]	Autos [2]	Buses [2]	Medium Trucks [2]	Heavy Trucks [2]
Northbound	I-5 to Stafford Exit	Car 65; Truck 55	4,235	30	3,654	8	166	377
Northbound	Stafford Exit to Stafford Entrance	Car 65; Truck 55	3,958	28	3,415	8	155	352
Northbound	Stafford Entrance to 10th St Exit	Car 65; Truck 55	4,403	31	3,799	8	173	392
Northbound	10th St Exit to 10th St Entrance	55	3,941	28	3,400	8	155	351
Northbound	10th St Entrance OR 43 Exit	55	4,424	31	3,817	8	174	394
Northbound	OR 43 Exit to OR 43 Loop Entrance	55	4,050	28	3,494	8	159	361
Northbound	OR 43 Loop Entrance to OR 43 Slip Entrance	55	4,645	33	4,007	9	182	414
Northbound	OR 43 Slip Entrance to OR 99E Exit	55	4,884	34	4,214	9	192	435
Northbound	OR 99E Exit to OR 99E Entrance	55	4,025	28	3,473	8	158	358
Northbound	OR 99E Entrance to OR 213 Exit	55	5,096	36	4,397	10	200	454
Northbound	OR 213 Exit to OR 213 Entrance	55	3,899	27	3,364	7	153	347
Northbound	OR 213 Entrance to 82nd Dr Exit	55	5,645	40	4,870	11	222	503
Southbound	82nd Dr Entrance to OR 213 Exit	55	5,624	42	4,934	4	188	456
Southbound	OR 213 Exit to OR 213 Entrance	55	3,553	26	3,117	3	119	288
Southbound	OR 213 Entrance to OR 99E Exit	55	4,522	33	3,967	3	151	367
Southbound	OR 99E Exit to OR 99E Entrance	55	3,583	27	3,143	3	120	290
Southbound	OR 99E Entrance to OR 43 Exit	55	4,488	33	3,937	3	150	364
Southbound	OR 43 Exit to OR 43 Entrance	55	3,664	27	3,215	3	123	297
Southbound	OR 43 Entrance to 10th St Exit	55	4,072	30	3,573	3	136	330
Southbound	10th St Exit to 10th St Entrance	55	3,463	26	3,038	2	116	281

Future 2045 Build Truck Peak Hour (12:00-1:00 PM) I-205 Mainline

Direction	Link	Speed, mph	All Vehicles [1]	Motorcycles [2]	Autos [2]	Buses [2]	Medium Trucks [2]	Heavy Trucks [2]
Southbound	10th St Entrance to Stafford Exit	Car 65; Truck 55	3,937	29	3,454	3	132	319
Southbound	Stafford Exit to Stafford Entrance	Car 65; Truck 55	3,427	25	3,007	2	115	278
Southbound	Stafford Entrance to I-5 Exit	Car 65; Truck 55	3,757	28	3,296	3	126	305

HDR, 2017

Future 2045 Build Truck Peak Hour (12:00-1:00 PM) I-205 Ramps

Direction	Link	Speed, mph	All Vehicles [1]	Motorcycles [2]	Autos [2]	Buses [2]	Medium Trucks [2]	Heavy Trucks [2]
Northbound	I-205 NB Stafford Exit Ramp	45	277	2	246	0	16	13
Northbound	I-205 NB Stafford Entrance Ramp	Car 65; Truck 55	445	3	405	1	26	10
Northbound	I-205 NB 10th Ave Exit Ramp	45	462	1	447	0	10	4
Northbound	I-205 NB 10th Ave Entrance Ramp	55	483	1	455	0	19	7
Northbound	I-205 NB OR 43 Exit Ramp	35	374	6	355	3	9	1
Northbound	I-205 NB OR 43 Loop Entrance Ramp	55	595	1	562	5	15	13
Northbound	I-205 NB OR 43 Slip Entrance Ramp	55	239	4	217	1	6	12
Northbound	I-205 NB OR99 Exit Ramp	30	859	4	795	9	30	21
Northbound	I-205 NB OR99 Entrance Ramp	55	1,071	10	965	5	46	45
Northbound	I-205 NB OR 213 Exit Ramp	35	1,197	6	1114	9	45	24
Northbound	I-205 NB OR 213 Entrance Ramp	55	1,746	11	1610	8	57	61
Southbound	I-205 SB OR 213 Exit Ramp	25	2,071	12	1931	6	72	50
Southbound	I-205 SB OR 213 Entrance Ramp	55	969	7	906	1	35	20
Southbound	I-205 SB OR99 Exit Ramp	45	939	10	859	3	23	44
Southbound	I-205 SB OR99 Entrance Ramp	55	905	7	834	9	29	25
Southbound	I-205 SB OR 43 Exit Ramp	40	824	2	762	7	26	26

Future 2045 Build Truck Peak Hour (12:00-1:00 PM) I-205 Ramps

Direction	Link	Speed, mph	All Vehicles [1]	Motorcycles [2]	Autos [2]	Buses [2]	Medium Trucks [2]	Heavy Trucks [2]
Southbound	I-205 SB OR 43 Entrance Ramp	55	408	2	389	0	11	6
Southbound	I-205 SB 10th Ave Exit Ramp	45	609	1	579	0	20	8
Southbound	I-205 SB 10th Ave Entrance Ramp	Car 65; Truck 55	474	4	446	4	12	7
Southbound	I-205 SB Stafford Exit Ramp	45	510	9	457	5	26	14
Southbound	I-205 SB Stafford Entrance Ramp	Car 65; Truck 55	330	1	307	2	11	10

HDR, 2017

Future 2045 Build Truck Peak Hour (12:00-1:00 PM) Side Street

Road	Direction	Ramp Terminal Intersection Links	Speed, mph	All Vehicles [1]	Motorcycles [2]	Autos [2]	Buses [2]	Medium Trucks [2]	Heavy Trucks [2]
Stafford Rd	Northbound	South of I-205 NB Ramps	45	590	5	569	-	12	3
	Northbound	Between Stafford Ramp Terminals	45	548	4	499	-	26	19
	Northbound	North of I-205 SB Ramps	45	654	8	576	1	42	27
	Southbound	North of I-205 SB Ramps	45	683	6	617	4	38	18
	Southbound	Between Stafford Ramp Terminals	45	757	11	690	6	34	17
	Southbound	South of I-205 NB Ramps	45	631	11	599	4	9	8
10th Ave	Northbound	South of 8th Ct	25	435	4	410	2	13	6
	Northbound	Between 8th Ct and NB Ramp Terminal	25	611	3	585	2	15	6
	Northbound	Between 10th Ramp Terminals	25	645	3	616	4	20	3

Future 2045 Build Truck Peak Hour (12:00-1:00 PM) Side Street

Road	Direction	Ramp Terminal Intersection Links	Speed , mph	All Vehicles [1]	Motorcycles [2]	Autos [2]	Buses [2]	Medium Trucks [2]	Heavy Trucks [2]
	Northbound	Between Blankenship Rd and SB Ramp Terminal	25	820	-	785	3	23	9
	Southbound	Between SB Ramp Terminal and Blankenship	25	826	1	789	3	22	11
	Southbound	Between 10th Ramp Terminals	25	786	1	757	-	20	7
	Southbound	Between NB Ramp Terminal and 8th Ct	25	731	2	710	-	14	5
	Southbound	South of 8th Ct	25	527	-	510	-	14	3
OR 43	Northbound	South of Willamette Falls Dr.	25	554	4	540	-	3	8
	Northbound	Between Willamette Falls Dr. and I-205 NB Ramps	35	566	5	535	1	11	14
	Northbound	Between OR 43 Ramp Terminals	35	510	6	488	1	12	3
	Northbound	North of I-205 SB Ramps	35	1,004	4	939	7	35	19
	Southbound	North of I-205 SB Ramps	35	1,122	1	1,063	8	33	17
	Southbound	Between I-205 SB Ramps and NB Loop Ramp	35	1,044	1	985	9	27	22
	Southbound	Between I-205 Ramp Terminals	35	449	1	420	4	13	10
	Southbound	Between I-205 NB Ramp and Willimatte Falls Dr.	35	640	3	608	5	14	10
	Southbound	South of Willamette Falls Dr.	25	597	1	586	-	3	7
Willamette Falls Dr.	Eastbound	West of W A St	35	349	4	331	3	6	5
	Eastbound	Between W A St and Broadway St	35	375	4	350	1	10	10

Future 2045 Build Truck Peak Hour (12:00-1:00 PM) Side Street

Road	Direction	Ramp Terminal Intersection Links	Speed, mph	All Vehicles [1]	Motorcycles [2]	Autos [2]	Buses [2]	Medium Trucks [2]	Heavy Trucks [2]
	Eastbound	Between Broadway St and OR 43	35	382	5	356	1	10	10
	Westbound	Between OR 43 and Broadway	35	392	4	366	5	11	7
	Westbound	Between Broadway and W A St	35	392	4	369	5	7	7
	Westbound	West of W A St	35	319	3	305	4	5	2
W A St	Northbound	North of Willamette Falls Dr.	20	198	-	181	6	-	11
	Southbound	North of Willamette Falls Dr.	20	151	-	139	1	4	7
Broadway St	Northbound	North of Willamette Falls Dr.	20	-	-	-	-	-	-
	Southbound	North of Willamette Falls Dr.	20	-	-	-	-	-	-
OR 99E	Northbound	South of 14th Ave	30	1,300	11	1,177	17	47	48
	Northbound	Between 14th Ave and I-205 NB Ramps	30	1,968	18	1,819	22	53	56
	Northbound	Between OR99 Ramp Terminals	30	1,877	15	1,758	28	41	35
	Northbound	Between I-205 SB Ramps and Dunes Dr.	30	1,974	14	1,867	23	39	31
	Northbound	North of Dunes Dr.	30	1,367	7	1,298	20	28	15
	Southbound	North of Dunes Dr.	30	1,390	10	1,309	17	37	16
	Southbound	Between Dunes Dr. and I-205 SB Ramps	30	1,854	10	1,746	23	47	29
	Southbound	Between OR99 Ramp Terminals	30	1,791	17	1,652	20	47	55
	Southbound	Between I-205 NB Ramps and 14th Ave	30	1,644	15	1,515	20	39	55

Future 2045 Build Truck Peak Hour (12:00-1:00 PM) Side Street

Road	Direction	Ramp Terminal Intersection Links	Speed, mph	All Vehicles [1]	Motorcycles [2]	Autos [2]	Buses [2]	Medium Trucks [2]	Heavy Trucks [2]
	Southbound	South of 14th Ave	30	1,261	11	1,142	18	32	57
OR 213	Northbound	South of I-205 NB Ramps	45	2,935	19	2,716	13	95	92
	Northbound	Between OR 213 Ramp Terminals	45	1,189	8	1,108	2	47	24
	Northbound	North of I-205 SB Ramps	45	349	-	318	-	31	-
	Southbound	North of I-205 NB Ramps	45	147	-	129	-	18	-
	Southbound	Between OR 213 Ramp Terminals	45	2,118	8	1,993	4	59	55
	Southbound	South of I-205 NB Ramps	45	3,315	13	3,107	12	102	80

HDR, 2017

Appendix D. Detailed Noise Abatement Analysis Tables

Detailed Noise Abatement Analysis Acronyms

AFG	Acoustical Feasibility Goal
E/C	Effectiveness/Cost Metric
I.L.	Insertion Loss
NRDG	Noise Reduction Design Goal

Basic Noise Barrier Optimization Tool **8/1/2018**

I205CW Stafford Road to OR212
Wall 1

	10'	12'	14'	16'	18'	20'	22'	24'	Units
Average Wtd I.L. (benefited)		5	5.4	5.9	6.4	6.9	7.2	7.5	**dBA**
Maximum I.L.	4	5	6	7	8	9	9	10	**dBA**
Benefited/Impacted ≥ AFG	0	5	10	12	13	13	13	13	**# of dwelling units**
Benefited/Non Impact ≥ AFG	0	0	1	3	3	4	4	4	**# of dwelling units**
Total Benefited	0	5	11	15	16	17	17	17	**# of dwelling units**
Impacted Units ≥ NRDG	0	0	0	3	6	11	11	11	**# of dwelling units**
Benefited Units ≥ NRDG	0	0	0	3	6	11	12	12	**# of dwelling units**
Percent of impacts ≥ AFG	0%	31%	63%	75%	81%	81%	81%	81%	**%**
Percent of benefits ≥ NRDG		0%	0%	20%	38%	65%	71%	71%	**%**
"Cost-Reasonable" ?		No	No	No	No	No	No	No	**----**
Surface Area	15,601	18,717	21,840	24,966	28,088	31,202	34,323	37,446	**sq-ft**
Surface Area/Ben Rec		3,743	1,985	1,664	1,756	1,835	2,019	2,203	**sq-ft / ben rec**
Barrier Length	1,560	1,560	1,560	1,560	1,560	1,560	1,560	1,560	**ft**
Min Height	10	12	14	16	18	20	22	24	**ft**
Max Height	10	12	14	16	18	20	22	24	**ft**
Avg Height	10	12	14	16	18	20	22	24	**ft**
Total Barrier Cost	312,020	374,340	436,800	499,320	702,200	780,050	858,075	936,150	**$**
Cost/Ben Rec		74,868	39,709	33,288	43,888	45,885	50,475	55,068	**$ / ben rec**
Effectiveness/Cost Metric (E/C)	-	-	-	7.0	13.4	23.4	21.3	19.5	**----**

ODOT Acoustical Feasibilty Goal (dBA)	5
ODOT Acoustical Feasibilty Goal (%)	51%
ODOT Noise Reduction Design Goal (dBA)	7
ODOT Noise Reduction Design Goal (%)	1%

Project Information	No Barrier Analysis
	No Barrier

I205CW Stafford Road to OR212
Contract No. K19786CW
I205CW_Build_Walls1to2
Wall 1
HMMH
Scott Noel
8/1/2018

No Barrier	
Total Units Exposed to Impact	16
# Impacts - NAC only	16
# Impacts - SI only	0
# Impacts - Both NAC & SI	0

10-ft Wall			12-ft Wall			14-ft Wall		
Wall 1 30' off Fog Line			Wall 1 30' off Fog Line			Wall 1 30' off Fog Line		
Average Wtd I.L. (benefited)		dB I.L. Avg	Average Wtd I.L.	5.0	dB I.L. Avg	Average Wtd I.L.	5.4	dB I.L. Avg
Maximum I.L.	4	dB I.L. Max	Maximum I.L.	5	dB I.L. Max	Maximum I.L.	6	dB I.L. Max
Benefited/Impacted ≥ AFG	0	# Prot Units	Benefited/Impacted ≥ AFG	5	# Prot Units	Benefited/Impacted ≥ AFG	10	# Prot Units
Benefited/Non Impact ≥ AFG	0	# Units	Benefited/Non Impact ≥ AFG	0	# Units	Benefited/Non Impact ≥ AFG	1	# Units
Total Benefited	0	# Ben Units	Total Benefited	5	# Ben Units	Total Benefited	11	# Ben Units
Impacted Units ≥ NRDG	0	# Units	Impacted Units ≥ NRDG	0	# Units	Impacted Units ≥ NRDG	0	# Units
Benefited Units ≥ NRDG	0	# Units	Benefited Units ≥ NRDG	0	# Units	Benefited Units ≥ NRDG	0	# Units
Percent of impacts ≥ AFG	0%	% Ben Units	Percent of impacts ≥ AFG	31%	% Ben Units	Percent of impacts ≥ AFG	63%	% Ben Units
Percent of benefits ≥ NRDG		% NRDG Units	Percent of benefits ≥ NRDG	0%	% NRDG Units	Percent of benefits ≥ NRDG	0%	% NRDG Units
"Cost-Reasonable" ?			"Cost-Reasonable" ?	No		"Cost-Reasonable" ?	No	
Surface Area	15601	Sq Feet	Surface Area	18717	Sq Feet	Surface Area	21840	Sq Feet
Surface Area/Ben Rec		Sq Feet	Surface Area/Ben Rec	3743	Sq Feet	Surface Area/Ben Rec	1985	Sq Feet
Barrier Length	1,560	Feet	Barrier Length	1,560	Feet	Barrier Length	1,560	Feet
Min Height	10.0	Feet	Min Height	12.0	Feet	Min Height	14.0	Feet
Max Height	10.0	Feet	Max Height	12.0	Feet	Max Height	14.0	Feet
Avg Height	10.0	Feet	Avg Height	12.0	Feet	Avg Height	14.0	Feet
Total Barrier Cost	$312,020		Total Barrier Cost	$374,340		Total Barrier Cost	$436,800	
Cost/Ben Rec			Cost/Ben Rec	$74,868		Cost/Ben Rec	$39,709	

Enter SI Info

Receiver ID	Row	FHWA Act Cat	No. of Dwelling Units	Type of Impact		Impact?	No. of Impacted Units	With Barrier Sound Levels, Impact and Benefit				With Barrier Sound Levels, Impact and Benefit				With Barrier Sound Levels, Impact and Benefit			
				Bld Leq > NAC?	Sub. Inc.?			Leq(dBA)	IL (db)	Impacted?	No. Benefited	Leq(dBA)	IL (db)	Impacted?	No. Benefited	Leq(dBA)	IL (db)	Impacted?	No. Benefited
R48	1	B	1	64				64	0			64	0			64	0		
R49	1	B	1	66		Impact!	1	66	0	Impact! w/ Bar		66	0	Impact! w/ Bar		65	1	Impact! w/ Bar	
R50	1	B	1	74		Impact!	1	72	2	Impact! w/ Bar		70	4	Impact! w/ Bar		69	**5**	Benefited/Impact	1
R51	1	B	1	71		Impact!	1	70	1	Impact! w/ Bar		69	2	Impact! w/ Bar		67	4	Impact! w/ Bar	
R52	1	B	1	69		Impact!	1	66	3	Impact! w/ Bar		64	**5**	Benefited/Impact	1	63	**6**	Benefited/Impact	1
R53	1	B	1	66		Impact!	1	65	1	Impact! w/ Bar		64	2	Impact! w/ Bar		63	3	Impact! w/ Bar	
R54	1	B	1	64				62	2			61	3			60	4		
R55	1	B	1	67		Impact!	1	63	4	Impact! w/ Bar		62	**5**	Benefited/Impact	1	61	**6**	Benefited/Impact	1
R56	1	B	1	67		Impact!	1	64	3	Impact! w/ Bar		63	4	Impact! w/ Bar		62	**5**	Benefited/Impact	1
R57	1	B	1	67		Impact!	1	64	3	Impact! w/ Bar		63	4	Impact! w/ Bar		62	**5**	Benefited/Impact	1
R58	1	B	1	67		Impact!	1	64	3	Impact! w/ Bar		62	**5**	Benefited/Impact	1	61	**6**	Benefited/Impact	1
R59	1	B	1	65		Impact!	1	62	3	Impact! w/ Bar		61	4	Impact! w/ Bar		60	**5**	Benefited/Impact	1
R60	1	B	1	66		Impact!	1	63	3	Impact! w/ Bar		62	4	Impact! w/ Bar		61	**5**	Benefited/Impact	1
R61	1	B	1	64				62	2			60	4			60	4		
R62	1	B	1	66		Impact!	1	62	4	Impact! w/ Bar		61	**5**	Benefited/Impact	1	61	**5**	Benefited/Impact	1
R69	1	B	1	64				61	3			60	4			59	**5**	Benefited/Non-Imp	1
R70	1	B	1	64				62	2			61	3			60	4		
R71	1	B	1	67		Impact!	1	63	4	Impact! w/ Bar		62	**5**	Benefited/Impact	1	61	**6**	Benefited/Impact	1
R72	1	B	1	64				63	1			62	2			61	3		
R73	1	B	1	67		Impact!	1	64	3	Impact! w/ Bar		63	4	Impact! w/ Bar		63	4	Impact! w/ Bar	
R74	1	B	1	65		Impact!	1	64	1	Impact! w/ Bar		63	2	Impact! w/ Bar		63	2	Impact! w/ Bar	
R75	1	B	1	67		Impact!	1	65	2	Impact! w/ Bar		64	3	Impact! w/ Bar		64	3	Impact! w/ Bar	

Project Information

I205CW Stafford Road to OR212
Contract No. K19786CW
I205CW_Build_Walls1to2
Wall 1
HMMH
Scott Noel
8/1/2018

U.S. Department of Transportation
Federal Highway Administration

16-ft Wall			18-ft Wall			20-ft Wall			22-ft Wall		
Wall 1 30' off Fog Line			**Wall 1 30' off Fog Line**			**Wall 1 30' off Fog Line**			**Wall 1 30' off Fog Line**		
Average Wtd I.L.	5.9	dB I.L. Avg	Average Wtd I.L.	6.4	dB I.L. Avg	Average Wtd I.L.	6.9	dB I.L. Avg	Average Wtd I.L.	7.2	dB I.L. Avg
Maximum I.L.	7	dB I.L. Max	Maximum I.L.	8	dB I.L. Max	Maximum I.L.	9	dB I.L. Max	Maximum I.L.	9	dB I.L. Max
Benefited/Impacted ≥ AFG	12	# Prot Units	Benefited/Impacted ≥ AFG	13	# Prot Units	Benefited/Impacted ≥ AFG	13	# Prot Units	Benefited/Impacted ≥ AFG	13	# Prot Units
Benefited/Non Impact ≥ AFG	3	# Units	Benefited/Non Impact ≥ AFG	3	# Units	Benefited/Non Impact ≥ AFG	4	# Units	Benefited/Non Impact ≥ AFG	4	# Units
Total Benefited	15	# Ben Units	Total Benefited	16	# Ben Units	Total Benefited	17	# Ben Units	Total Benefited	17	# Ben Units
Impacted Units ≥ NRDG	3	# Units	Impacted Units ≥ NRDG	6	# Units	Impacted Units ≥ NRDG	11	# Units	Impacted Units ≥ NRDG	11	# Units
Benefited Units ≥ NRDG	3	# Units	Benefited Units ≥ NRDG	6	# Units	Benefited Units ≥ NRDG	11	# Units	Benefited Units ≥ NRDG	12	# Units
Percent of impacts ≥ AFG	75%	% Ben Units	Percent of impacts ≥ AFG	81%	% Ben Units	Percent of impacts ≥ AFG	81%	% Ben Units	Percent of impacts ≥ AFG	81%	% Ben Units
Percent of benefits ≥ NRDG	20%	% NRDG Units	Percent of benefits ≥ NRDG	38%	% NRDG Units	Percent of benefits ≥ NRDG	65%	% NRDG Units	Percent of benefits ≥ NRDG	71%	% NRDG Units
"Cost-Reasonable" ?	No		"Cost-Reasonable" ?	No		"Cost-Reasonable" ?	No		"Cost-Reasonable" ?	No	
Surface Area	24966	Sq Feet	Surface Area	28088	Sq Feet	Surface Area	31202	Sq Feet	Surface Area	34323	Sq Feet
Surface Area/Ben Rec	1664	Sq Feet	Surface Area/Ben Rec	1756	Sq Feet	Surface Area/Ben Rec	1835	Sq Feet	Surface Area/Ben Rec	2019	Sq Feet
Barrier Length	1,560	Feet	Barrier Length	1,560	Feet	Barrier Length	1,560	Feet	Barrier Length	1,560	Feet
Min Height	16.0	Feet	Min Height	18.0	Feet	Min Height	20.0	Feet	Min Height	22.0	Feet
Max Height	16.0	Feet	Max Height	18.0	Feet	Max Height	20.0	Feet	Max Height	22.0	Feet
Avg Height	16.0	Feet	Avg Height	18.0	Feet	Avg Height	20.0	Feet	Avg Height	22.0	Feet
Total Barrier Cost	$499,320		Total Barrier Cost	$702,200		Total Barrier Cost	$780,050		Total Barrier Cost	$858,075	
Cost/Ben Rec	$33,288.00		Cost/Ben Rec	$43,888		Cost/Ben Rec	$45,885		Cost/Ben Rec	$50,475	

Receiver ID	Row	FHWA Act Cat	No. of Dwelling Units	With Barrier Sound Levels, Impact and Benefit				With Barrier Sound Levels, Impact and Benefit				With Barrier Sound Levels, Impact and Benefit				With Barrier Sound Levels, Impact and Benefit			
				Leq(dBA)	IL (db)	Impacted?	No. Benefited	Leq(dBA)	IL (db)	Impacted?	No. Benefited	Leq(dBA)	IL (db)	Impacted?	No. Benefited	Leq(dBA)	IL (db)	Impacted?	No. Benefited
R48	1	B	1	64	0			63	1			63	1			63	1		
R49	1	B	1	65	1	Impact! w/ Bar		65	1	Impact! w/ Bar		65	1	Impact! w/ Bar		65	1	Impact! w/ Bar	
R50	1	B	1	67	7	Benefited/Impact	1	66	8	Benefited/Impact	1	65	9	Benefited/Impact	1	65	9	Benefited/Impact	1
R51	1	B	1	65	6	Benefited/Impact	1	64	7	Benefited/Impact	1	63	8	Benefited/Impact	1	63	8	Benefited/Impact	1
R52	1	B	1	62	7	Benefited/Impact	1	61	8	Benefited/Impact	1	61	8	Benefited/Impact	1	60	9	Benefited/Impact	1
R53	1	B	1	62	4	Impact! w/ Bar		61	5	Benefited/Impact	1	60	6	Benefited/Impact	1	60	6	Benefited/Impact	1
R54	1	B	1	59	5	Benefited/Non-Imp	1	58	6	Benefited/Non-Imp	1	58	6	Benefited/Non-Imp	1	57	7	Benefited/Non-Imp	1
R55	1	B	1	60	7	Benefited/Impact	1	59	8	Benefited/Impact	1	59	8	Benefited/Impact	1	58	9	Benefited/Impact	1
R56	1	B	1	61	6	Benefited/Impact	1	61	6	Benefited/Impact	1	60	7	Benefited/Impact	1	60	7	Benefited/Impact	1
R57	1	B	1	61	6	Benefited/Impact	1	60	7	Benefited/Impact	1	60	7	Benefited/Impact	1	59	8	Benefited/Impact	1
R58	1	B	1	61	6	Benefited/Impact	1	60	7	Benefited/Impact	1	59	8	Benefited/Impact	1	59	8	Benefited/Impact	1
R59	1	B	1	59	6	Benefited/Impact	1	59	6	Benefited/Impact	1	58	7	Benefited/Impact	1	58	7	Benefited/Impact	1
R60	1	B	1	60	6	Benefited/Impact	1	60	6	Benefited/Impact	1	59	7	Benefited/Impact	1	59	7	Benefited/Impact	1
R61	1	B	1	59	5	Benefited/Non-Imp	1	59	5	Benefited/Non-Imp	1	58	6	Benefited/Non-Imp	1	58	6	Benefited/Non-Imp	1
R62	1	B	1	60	6	Benefited/Impact	1	60	6	Benefited/Impact	1	59	7	Benefited/Impact	1	59	7	Benefited/Impact	1
R69	1	B	1	59	5	Benefited/Non-Imp	1	58	6	Benefited/Non-Imp	1	58	6	Benefited/Non-Imp	1	58	6	Benefited/Non-Imp	1
R70	1	B	1	60	4			60	4			59	5	Benefited/Non-Imp	1	59	5	Benefited/Non-Imp	1
R71	1	B	1	61	6	Benefited/Impact	1	61	6	Benefited/Impact	1	60	7	Benefited/Impact	1	60	7	Benefited/Impact	1
R72	1	B	1	61	3			60	4			60	4			60	4		
R73	1	B	1	62	5	Benefited/Impact	1	62	5	Benefited/Impact	1	62	5	Benefited/Impact	1	61	6	Benefited/Impact	1
R74	1	B	1	63	2	Impact! w/ Bar		62	3	Impact! w/ Bar		62	3	Impact! w/ Bar		62	3	Impact! w/ Bar	
R75	1	B	1	63	4	Impact! w/ Bar		63	4	Impact! w/ Bar		63	4	Impact! w/ Bar		63	4	Impact! w/ Bar	

Project Information	24-ft Wall Wall 1 30' off Fog Line		
	Average Wtd I.L.	7.5	dB I.L. Avg
	Maximum I.L.	10	dB I.L. Max
I205CW Stafford Road to OR212	Benefited/Impacted ≥ AFG	13	# Prot Units
Contract No. K19786CW	Benefited/Non Impact ≥ AFG	4	# Units
I205CW_Build_Walls1to2	Total Benefited	17	# Ben Units
Wall 1	Impacted Units ≥ NRDG	11	# Units
HMMH	Benefited Units ≥ NRDG	12	# Units
Scott Noel	Percent of impacts ≥ AFG	81%	% Ben Units
8/1/2018	Percent of benefits ≥ NRDG	71%	% NRDG Units
	"Cost-Reasonable" ?	No	
	Surface Area	37446	Sq Feet
	Surface Area/Ben Rec	2203	Sq Feet
	Barrier Length	1,560	Feet
	Min Height	24.0	Feet
	Max Height	24.0	Feet
	Avg Height	24.0	Feet
	Total Barrier Cost	$936,150	
	Cost/Ben Rec	$55,068	

Receiver ID	Row	FHWA Act Cat	No. of Dwelling Units	With Barrier Sound Levels, Impact and Benefit Leq(dBA)	IL (db)	Impacted?	No. Benefited
R48	1	B	1	63	1		
R49	1	B	1	65	1	Impact! w/ Bar	
R50	1	B	1	64	**10**	Benefited/Impact	1
R51	1	B	1	62	**9**	Benefited/Impact	1
R52	1	B	1	59	**10**	Benefited/Impact	1
R53	1	B	1	60	**6**	Benefited/Impact	1
R54	1	B	1	57	**7**	Benefited/Non-Imp	1
R55	1	B	1	58	**9**	Benefited/Impact	1
R56	1	B	1	59	**8**	Benefited/Impact	1
R57	1	B	1	59	**8**	Benefited/Impact	1
R58	1	B	1	58	**9**	Benefited/Impact	1
R59	1	B	1	57	**8**	Benefited/Impact	1
R60	1	B	1	59	**7**	Benefited/Impact	1
R61	1	B	1	58	**6**	Benefited/Non-Imp	1
R62	1	B	1	59	**7**	Benefited/Impact	1
R69	1	B	1	58	**6**	Benefited/Non-Imp	1
R70	1	B	1	59	**5**	Benefited/Non-Imp	1
R71	1	B	1	60	**7**	Benefited/Impact	1
R72	1	B	1	60	4		
R73	1	B	1	61	**6**	Benefited/Impact	1
R74	1	B	1	62	3	Impact! w/ Bar	
R75	1	B	1	63	4	Impact! w/ Bar	

U.S. Department of Transportation
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Basic Noise Barrier Optimization Tool **8/7/2018**

I205CW Stafford Road to OR213
Wall 2

	10'	12'	14'	16'	18'	20'	22'	24'	Units
Average Wtd I.L. (benefited)	5.6	6.6	7.7	7.7	8.4	8.9	9.7	10	**dBA**
Maximum I.L.	7	9	10	11	12	13	14	14	**dBA**
Benefited/Impacted ≥ AFG	19	24	26	36	36	36	36	36	**# of dwelling units**
Benefited/Non Impact ≥ AFG	3	5	8	12	16	18	18	19	**# of dwelling units**
Total Benefited	22	29	34	48	52	54	54	55	**# of dwelling units**
Impacted Units ≥ NRDG	3	14	24	24	29	34	35	35	**# of dwelling units**
Benefited Units ≥ NRDG	3	14	26	29	36	43	47	49	**# of dwelling units**
Percent of impacts ≥ AFG	46%	59%	63%	88%	88%	88%	88%	88%	**%**
Percent of benefits ≥ NRDG	14%	48%	76%	60%	69%	80%	87%	89%	**%**
"Cost-Reasonable" ?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	**----**
Surface Area	20,717	24,863	29,004	33,151	37,293	41,436	45,578	49,721	**sq-feet**
Surface Area/Ben Rec	942	857	853	691	717	767	844	904	**sq-ft / ben rec**
Barrier Length	2,070	2,070	2,070	2,070	2,070	2,070	2,070	2,070	**ft**
Min Height	10	12	14	16	18	20	22	24	**ft**
Max Height	10	12	14	16	18	20	22	24	**ft**
Avg Height	10	12	14	16	18	20	22	24	**ft**
Total Barrier Cost	414,340	497,260	580,080	828,775	932,325	1,035,900	1,139,450	1,243,025	**$**
Cost/Ben Rec	18,834	17,147	17,061	17,266	17,929	19,183	21,101	22,600	**$ / ben rec**
Effectiveness/Cost Metric (E/C)	1.9	9.7	16.7	20.7	24.1	26.4	24.7	23.0	**----**

ODOT Acoustical Feasibilty Goal (dBA)	5
ODOT Acoustical Feasibilty Goal (%)	51%
ODOT Noise Reduction Design Goal (dBA)	7
ODOT Noise Reduction Design Goal (%)	1%

Project Information	No Barrier Analysis No Barrier	
I205CW Stafford Road to OR213	Total Units Exposed to Impact	41
Contract No. K19786CW	# Impacts - NAC only	41
I205CW_Build_Walls1to2	# Impacts - SI only	0
Wall 2	# Impacts - Both NAC & SI	0
HMMH		
Scott Noel		
8/7/2018		
	Enter SI Info	

10-ft Wall Wall 2 HDR 8-2018			12-ft Wall Wall 2 HDR 8-2018			14-ft Wall Wall 2 HDR 8-2018		
Average Wtd I.L. (benefited)	5.6	dB I.L. Avg	Average Wtd I.L.	6.6	dB I.L. Avg	Average Wtd I.L.	7.7	dB I.L. Avg
Maximum I.L.	7	dB I.L. Max	Maximum I.L.	9	dB I.L. Max	Maximum I.L.	10	dB I.L. Max
Benefited/Impacted ≥ AFG	19	# Prot Units	Benefited/Impacted ≥ AFG	24	# Prot Units	Benefited/Impacted ≥ AFG	26	# Prot Units
Benefited/Non Impact ≥ AFG	3	# Units	Benefited/Non Impact ≥ AFG	5	# Units	Benefited/Non Impact ≥ AFG	8	# Units
Total Benefited	22	# Ben Units	Total Benefited	29	# Ben Units	Total Benefited	34	# Ben Units
Impacted Units ≥ NRDG	3	# Units	Impacted Units ≥ NRDG	14	# Units	Impacted Units ≥ NRDG	24	# Units
Benefited Units ≥ NRDG	3	# Units	Benefited Units ≥ NRDG	14	# Units	Benefited Units ≥ NRDG	26	# Units
Percent of impacts ≥ AFG	46%	% Ben Units	Percent of impacts ≥ AFG	59%	% Ben Units	Percent of impacts ≥ AFG	63%	% Ben Units
Percent of benefits ≥ NRDG	14%	% NRDG Units	Percent of benefits ≥ NRDG	48%	% NRDG Units	Percent of benefits ≥ NRDG	76%	% NRDG Units
"Cost-Reasonable" ?	Yes		"Cost-Reasonable" ?	Yes		"Cost-Reasonable" ?	Yes	
Surface Area	20717	Sq Feet	Surface Area	24863	Sq Feet	Surface Area	29004	Sq Feet
Surface Area/Ben Rec	942	Sq Feet	Surface Area/Ben Rec	857	Sq Feet	Surface Area/Ben Rec	853	Sq Feet
Barrier Length	2,070	Feet	Barrier Length	2,070	Feet	Barrier Length	2,070	Feet
Min Height	10.0	Feet	Min Height	12.0	Feet	Min Height	14.0	Feet
Max Height	10.0	Feet	Max Height	12.0	Feet	Max Height	14.0	Feet
Avg Height	10.0	Feet	Avg Height	12.0	Feet	Avg Height	14.0	Feet
Total Barrier Cost	$414,340		Total Barrier Cost	$497,260		Total Barrier Cost	$580,080	
Cost/Ben Rec	$18,834		Cost/Ben Rec	$17,147		Cost/Ben Rec	$17,061	

				Type of Impact				With Barrier Sound Levels, Impact and Benefit				With Barrier Sound Levels, Impact and Benefit				With Barrier Sound Levels, Impact and Benefit			
Receiver ID	Row	FHWA Act Cat	No. of Dwelling Units	Bld Leq > NAC?	Sub. Inc.?	Impact?	No. of Impacted Units	Leq(dBA)	IL (db)	Impacted?	No. Benefited	Leq(dBA)	IL (db)	Impacted?	No. Benefited	Leq(dBA)	IL (db)	Impacted?	No. Benefited
ST-5a	1	B	1	73		Impact!	1	70	3	Impact! w/ Bar		68	5	Benefited/Impact	1	66	7	Benefited/Impact	1
ST-5b	1	B	1	68		Impact!	1	67	1	Impact! w/ Bar		65	3	Impact! w/ Bar		64	4	Impact! w/ Bar	
R19	1	B	1	64				63	1			62	2			62	2		
R20	1	B	1	67		Impact!	1	65	2	Impact! w/ Bar		64	3	Impact! w/ Bar		63	4	Impact! w/ Bar	
R21	1	B	1	72		Impact!	1	66	6	Benefited/Impact	1	65	7	Benefited/Impact	1	64	8	Benefited/Impact	1
R22	1	B	1	74		Impact!	1	67	7	Benefited/Impact	1	65	9	Benefited/Impact	1	64	10	Benefited/Impact	1
R23	1	B	1	73		Impact!	1	67	6	Benefited/Impact	1	65	8	Benefited/Impact	1	64	9	Benefited/Impact	1
R24	1	B	1	74		Impact!	1	69	5	Benefited/Impact	1	67	7	Benefited/Impact	1	65	9	Benefited/Impact	1
R25	1	B	1	74		Impact!	1	69	5	Benefited/Impact	1	67	7	Benefited/Impact	1	65	9	Benefited/Impact	1
R26	1	B	1	74		Impact!	1	69	5	Benefited/Impact	1	67	7	Benefited/Impact	1	65	9	Benefited/Impact	1
R27	1	B	1	74		Impact!	1	69	5	Benefited/Impact	1	67	7	Benefited/Impact	1	65	9	Benefited/Impact	1
R28	1	B	1	74		Impact!	1	69	5	Benefited/Impact	1	67	7	Benefited/Impact	1	65	9	Benefited/Impact	1
R29	1	B	1	75		Impact!	1	69	6	Benefited/Impact	1	67	8	Benefited/Impact	1	65	10	Benefited/Impact	1
R30	1	B	1	73		Impact!	1	69	4	Impact! w/ Bar		67	6	Benefited/Impact	1	66	7	Benefited/Impact	1
R31	1	B	1	74		Impact!	1	70	4	Impact! w/ Bar		69	5	Benefited/Impact	1	66	8	Benefited/Impact	1
R32	1	B	1	74		Impact!	1	69	5	Benefited/Impact	1	68	6	Benefited/Impact	1	66	8	Benefited/Impact	1
R33	1	B	1	75		Impact!	1	68	7	Benefited/Impact	1	66	9	Benefited/Impact	1	65	10	Benefited/Impact	1
R34	1	B	1	69		Impact!	1	67	2	Impact! w/ Bar		66	3	Impact! w/ Bar		65	4	Impact! w/ Bar	
R35	1	B	1	69		Impact!	1	67	2	Impact! w/ Bar		65	4	Impact! w/ Bar		64	5	Benefited/Impact	1
R36	1	B	1	68		Impact!	1	66	2	Impact! w/ Bar		65	3	Impact! w/ Bar		64	4	Impact! w/ Bar	
R37	1	B	1	67		Impact!	1	66	1	Impact! w/ Bar		65	2	Impact! w/ Bar		63	4	Impact! w/ Bar	
R38	1	B	1	67		Impact!	1	66	1	Impact! w/ Bar		65	2	Impact! w/ Bar		63	4	Impact! w/ Bar	
R39	1	B	1	67		Impact!	1	66	1	Impact! w/ Bar		65	2	Impact! w/ Bar		63	4	Impact! w/ Bar	
R40	1	B	1	67		Impact!	1	65	2	Impact! w/ Bar		64	3	Impact! w/ Bar		63	4	Impact! w/ Bar	
R41	1	B	1	66		Impact!	1	64	2	Impact! w/ Bar		63	3	Impact! w/ Bar		62	4	Impact! w/ Bar	
R42	1	B	1	64				62	2			61	3			60	4		
R43	1	B	1	64				63	1			62	2			61	3		
R44	1	B	1	64				63	1			62	2			61	3		
R45	1	B	1	64				62	2			62	2			61	3		
R46	1	B	1	64				62	2			62	2			61	3		
R47	1	B	1	64				63	1			62	2			61	3		
R63	1	B	1	72		Impact!	1	67	5	Benefited/Impact	1	66	6	Benefited/Impact	1	64	8	Benefited/Impact	1
R64	1	B	1	73		Impact!	1	67	6	Benefited/Impact	1	65	8	Benefited/Impact	1	64	9	Benefited/Impact	1
R65	1	B	1	74		Impact!	1	67	7	Benefited/Impact	1	65	9	Benefited/Impact	1	64	10	Benefited/Impact	1
R66	1	B	1	72		Impact!	1	66	6	Benefited/Impact	1	64	8	Benefited/Impact	1	64	8	Benefited/Impact	1
R67	1	B	1	68		Impact!	1	65	3	Impact! w/ Bar		64	4	Impact! w/ Bar		63	5	Benefited/Impact	1
R68	1	B	1	67		Impact!	1	65	2	Impact! w/ Bar		64	3	Impact! w/ Bar		63	4	Impact! w/ Bar	
R76	1	D	1	45				40	5	Benefited/Non-Imp	1	39	6	Benefited/Non-Imp	1	39	6	Benefited/Non-Imp	1
R77	1	B	1	66		Impact!	1	66	0	Impact! w/ Bar		66	0	Impact! w/ Bar		65	1	Impact! w/ Bar	
R78	1	B	1	66		Impact!	1	65	1	Impact! w/ Bar		65	1	Impact! w/ Bar		64	2	Impact! w/ Bar	
R79	1	B	1	65		Impact!	1	64	1	Impact! w/ Bar		64	1	Impact! w/ Bar		64	1	Impact! w/ Bar	
R80	1	B	1	70		Impact!	1	68	2	Impact! w/ Bar		67	3	Impact! w/ Bar		67	3	Impact! w/ Bar	
R81	1	B	1	69		Impact!	1	67	2	Impact! w/ Bar		66	3	Impact! w/ Bar		66	3	Impact! w/ Bar	
R82	1	B	1	59				58	1			58	1			57	2		
R83	1	B	1	58				57	1			57	1			56	2		
R84	1	B	1	62				59	3			59	3			59	3		
R85	1	B	1	61				58	3			58	3			57	4		
R86	1	B	1	53				50	3			50	3			49	4		
R87	1	B	1	55				52	3			52	3			50	5	Benefited/Non-Imp	1
R88	1	B	1	55				53	2			52	3			52	3		
R89	1	B	1	57				54	3			53	4			53	4		
R90	1	B	1	54				54	0			54	0			53	1		
R91	1	B	1	54				53	1			53	1			53	1		
R92	1	B	1	56				56	0			55	1			55	1		
R93	1	B	1	56				55	1			55	1			55	1		
R94	1	B	1	63				58	5	Benefited/Non-Imp	1	58	5	Benefited/Non-Imp	1	56	7	Benefited/Non-Imp	1
R95	1	B	1	63				58	5	Benefited/Non-Imp	1	58	5	Benefited/Non-Imp	1	56	7	Benefited/Non-Imp	1
R96	1	B	1	65		Impact!	1	60	5	Benefited/Impact	1	60	5	Benefited/Impact	1	58	7	Benefited/Impact	1
R97	1	B	1	65		Impact!	1	60	5	Benefited/Impact	1	60	5	Benefited/Impact	1	58	7	Benefited/Impact	1

Project Information	No Barrier Analysis
	No Barrier

I205CW Stafford Road to OR213
Contract No. K19786CW
I205CW_Build_Walls1to2
Wall 2
HMMH
Scott Noel
8/7/2018

No Barrier	
Total Units Exposed to Impact	41
# Impacts - NAC only	41
# Impacts - SI only	0
# Impacts - Both NAC & SI	0

Enter SI Info

10-ft Wall Wall 2 HDR 8-2018		
Average Wtd I.L. (benefited)	5.6	dB I.L. Avg
Maximum I.L.	7	dB I.L. Max
Benefited/Impacted ≥ AFG	19	# Prot Units
Benefited/Non Impact ≥ AFG	3	# Units
Total Benefited	22	# Ben Units
Impacted Units ≥ NRDG	3	# Units
Benefited Units ≥ NRDG	3	# Units
Percent of impacts ≥ AFG	46%	% Ben Units
Percent of benefits ≥ NRDG	14%	% NRDG Units
"Cost-Reasonable" ?	Yes	
Surface Area	20717	Sq Feet
Surface Area/Ben Rec	942	Sq Feet
Barrier Length	2,070	Feet
Min Height	10.0	Feet
Max Height	10.0	Feet
Avg Height	10.0	Feet
Total Barrier Cost	$414,340	
Cost/Ben Rec	$18,834	

12-ft Wall Wall 2 HDR 8-2018		
Average Wtd I.L.	6.6	dB I.L. Avg
Maximum I.L.	9	dB I.L. Max
Benefited/Impacted ≥ AFG	24	# Prot Units
Benefited/Non Impact ≥ AFG	5	# Units
Total Benefited	29	# Ben Units
Impacted Units ≥ NRDG	14	# Units
Benefited Units ≥ NRDG	14	# Units
Percent of impacts ≥ AFG	59%	% Ben Units
Percent of benefits ≥ NRDG	48%	% NRDG Units
"Cost-Reasonable" ?	Yes	
Surface Area	24863	Sq Feet
Surface Area/Ben Rec	857	Sq Feet
Barrier Length	2,070	Feet
Min Height	12.0	Feet
Max Height	12.0	Feet
Avg Height	12.0	Feet
Total Barrier Cost	$497,260	
Cost/Ben Rec	$17,147	

14-ft Wall Wall 2 HDR 8-2018		
Average Wtd I.L.	7.7	dB I.L. Avg
Maximum I.L.	10	dB I.L. Max
Benefited/Impacted ≥ AFG	26	# Prot Units
Benefited/Non Impact ≥ AFG	8	# Units
Total Benefited	34	# Ben Units
Impacted Units ≥ NRDG	24	# Units
Benefited Units ≥ NRDG	26	# Units
Percent of impacts ≥ AFG	63%	% Ben Units
Percent of benefits ≥ NRDG	76%	% NRDG Units
"Cost-Reasonable" ?	Yes	
Surface Area	29004	Sq Feet
Surface Area/Ben Rec	853	Sq Feet
Barrier Length	2,070	Feet
Min Height	14.0	Feet
Max Height	14.0	Feet
Avg Height	14.0	Feet
Total Barrier Cost	$580,080	
Cost/Ben Rec	$17,061	

Receiver ID	Row	FHWA Act Cat	No. of Dwelling Units	Type of Impact		Impact?	No. of Impacted Units	10-ft Wall: With Barrier Sound Levels, Impact and Benefit				12-ft Wall: With Barrier Sound Levels, Impact and Benefit				14-ft Wall: With Barrier Sound Levels, Impact and Benefit			
				Bld Leq > NAC?	Sub. Inc.?			Leq(dBA)	IL (db)	Impacted?	No. Benefited	Leq(dBA)	IL (db)	Impacted?	No. Benefited	Leq(dBA)	IL (db)	Impacted?	No. Benefited
R98	1	B	1	65		Impact!	1	62	3	Impact! w/ Bar		59	6	Benefited/Impact	1	58	7	Benefited/Impact	1
R99	1	B	1	65		Impact!	1	62	3	Impact! w/ Bar		59	6	Benefited/Impact	1	58	7	Benefited/Impact	1
R100	1	B	1	69		Impact!	1	63	6	Benefited/Impact	1	63	6	Benefited/Impact	1	60	9	Benefited/Impact	1
R101	1	B	1	69		Impact!	1	63	6	Benefited/Impact	1	62	7	Benefited/Impact	1	60	9	Benefited/Impact	1
R102	1	B	1	60				56	4			56	4			54	6	Benefited/Non-Imp	1
R103	1	B	1	61				57	4			56	5	Benefited/Non-Imp	1	55	6	Benefited/Non-Imp	1
R104	1	B	1	63				59	4			58	5	Benefited/Non-Imp	1	57	6	Benefited/Non-Imp	1
R105	1	B	1	63				60	3			59	4			58	5	Benefited/Non-Imp	1
R106	1	B	1	52				52	0			52	0			52	0		
R107	1	B	1	51				51	0			51	0			51	0		
R108	1	B	1	54				54	0			54	0			54	0		
R109	1	B	1	54				54	0			54	0			54	0		
R110	1	B	1	55				55	0			55	0			55	0		
R111	1	B	1	51				51	0			51	0			51	0		
R112	1	B	1	57				57	0			57	0			57	0		
R113	1	B	1	53				53	0			53	0			53	0		

Project Information

I205CW Stafford Road to OR213
Contract No. K19786CW
I205CW_Build_Walls1to2
Wall 2
HMMH
Scott Noel
8/7/2018

U.S. Department of Transportation
Federal Highway Administration

16-ft Wall			**18-ft Wall**			**20-ft Wall**			**22-ft Wall**		
Wall 2 HDR 8-2018			**Wall 2 HDR 8-2018**			**Wall 2 HDR 8-2018**			**Wall 2 HDR 8-2018**		
Average Wtd I.L.	7.7	dB I.L. Avg	Average Wtd I.L.	8.4	dB I.L. Avg	Average Wtd I.L.	8.9	dB I.L. Avg	Average Wtd I.L.	9.7	dB I.L. Avg
Maximum I.L.	11	dB I.L. Max	Maximum I.L.	12	dB I.L. Max	Maximum I.L.	13	dB I.L. Max	Maximum I.L.	14	dB I.L. Max
Benefited/Impacted ≥ AFG	36	# Prot Units	Benefited/Impacted ≥ AFG	36	# Prot Units	Benefited/Impacted ≥ AFG	36	# Prot Units	Benefited/Impacted ≥ AFG	36	# Prot Units
Benefited/Non Impact ≥ AFG	12	# Units	Benefited/Non Impact ≥ AFG	16	# Units	Benefited/Non Impact ≥ AFG	18	# Units	Benefited/Non Impact ≥ AFG	18	# Units
Total Benefited	48	# Ben Units	Total Benefited	52	# Ben Units	Total Benefited	54	# Ben Units	Total Benefited	54	# Ben Units
Impacted Units ≥ NRDG	24	# Units	Impacted Units ≥ NRDG	29	# Units	Impacted Units ≥ NRDG	34	# Units	Impacted Units ≥ NRDG	35	# Units
Benefited Units ≥ NRDG	29	# Units	Benefited Units ≥ NRDG	36	# Units	Benefited Units ≥ NRDG	43	# Units	Benefited Units ≥ NRDG	47	# Units
Percent of impacts ≥ AFG	88%	% Ben Units	Percent of impacts ≥ AFG	88%	% Ben Units	Percent of impacts ≥ AFG	88%	% Ben Units	Percent of impacts ≥ AFG	88%	% Ben Units
Percent of benefits ≥ NRDG	60%	% NRDG Units	Percent of benefits ≥ NRDG	69%	% NRDG Units	Percent of benefits ≥ NRDG	80%	% NRDG Units	Percent of benefits ≥ NRDG	87%	% NRDG Units
"Cost-Reasonable" ?	Yes		"Cost-Reasonable" ?	Yes		"Cost-Reasonable" ?	Yes		"Cost-Reasonable" ?	Yes	
Surface Area	33151	Sq Feet	Surface Area	37293	Sq Feet	Surface Area	41436	Sq Feet	Surface Area	45578	Sq Feet
Surface Area/Ben Rec	691	Sq Feet	Surface Area/Ben Rec	717	Sq Feet	Surface Area/Ben Rec	767	Sq Feet	Surface Area/Ben Rec	844	Sq Feet
Barrier Length	2,070	Feet	Barrier Length	2,070	Feet	Barrier Length	2,070	Feet	Barrier Length	2,070	Feet
Min Height	16.0	Feet	Min Height	18.0	Feet	Min Height	20.0	Feet	Min Height	22.0	Feet
Max Height	16.0	Feet	Max Height	18.0	Feet	Max Height	20.0	Feet	Max Height	22.0	Feet
Avg Height	16.0	Feet	Avg Height	18.0	Feet	Avg Height	20.0	Feet	Avg Height	22.0	Feet
Total Barrier Cost	$828,775		Total Barrier Cost	$932,325		Total Barrier Cost	$1,035,900		Total Barrier Cost	$1,139,450	
Cost/Ben Rec	$17,266.15		Cost/Ben Rec	$17,929		Cost/Ben Rec	$19,183		Cost/Ben Rec	$21,101	

Receiver ID	Row	FHWA Act Cat	No. of Dwelling Units	With Barrier Sound Levels, Impact and Benefit				With Barrier Sound Levels, Impact and Benefit				With Barrier Sound Levels, Impact and Benefit				With Barrier Sound Levels, Impact and Benefit			
				Leq(dBA)	IL (db)	Impacted?	No. Benefited	Leq(dBA)	IL (db)	Impacted?	No. Benefited	Leq(dBA)	IL (db)	Impacted?	No. Benefited	Leq(dBA)	IL (db)	Impacted?	No. Benefited
ST-5a	1	B	1	64	9	Benefited/Impact	1	63	10	Benefited/Impact	1	62	11	Benefited/Impact	1	62	11	Benefited/Impact	1
ST-5b	1	B	1	63	5	Benefited/Impact	1	61	7	Benefited/Impact	1	60	8	Benefited/Impact	1	59	9	Benefited/Impact	1
R19	1	B	1	61	3			60	4			59	5	Benefited/Non-Imp	1	59	5	Benefited/Non-Imp	1
R20	1	B	1	62	5	Benefited/Impact	1	62	5	Benefited/Impact	1	61	6	Benefited/Impact	1	61	6	Benefited/Impact	1
R21	1	B	1	63	9	Benefited/Impact	1	63	9	Benefited/Impact	1	63	9	Benefited/Impact	1	62	10	Benefited/Impact	1
R22	1	B	1	63	11	Benefited/Impact	1	62	12	Benefited/Impact	1	61	13	Benefited/Impact	1	60	14	Benefited/Impact	1
R23	1	B	1	63	10	Benefited/Impact	1	62	11	Benefited/Impact	1	61	12	Benefited/Impact	1	61	12	Benefited/Impact	1
R24	1	B	1	64	10	Benefited/Impact	1	63	11	Benefited/Impact	1	62	12	Benefited/Impact	1	61	13	Benefited/Impact	1
R25	1	B	1	64	10	Benefited/Impact	1	63	11	Benefited/Impact	1	62	12	Benefited/Impact	1	61	13	Benefited/Impact	1
R26	1	B	1	64	10	Benefited/Impact	1	63	11	Benefited/Impact	1	62	12	Benefited/Impact	1	62	12	Benefited/Impact	1
R27	1	B	1	64	10	Benefited/Impact	1	63	11	Benefited/Impact	1	62	12	Benefited/Impact	1	61	13	Benefited/Impact	1
R28	1	B	1	64	10	Benefited/Impact	1	63	11	Benefited/Impact	1	62	12	Benefited/Impact	1	61	13	Benefited/Impact	1
R29	1	B	1	64	11	Benefited/Impact	1	63	12	Benefited/Impact	1	62	13	Benefited/Impact	1	61	14	Benefited/Impact	1
R30	1	B	1	64	9	Benefited/Impact	1	63	10	Benefited/Impact	1	62	11	Benefited/Impact	1	61	12	Benefited/Impact	1
R31	1	B	1	65	9	Benefited/Impact	1	64	10	Benefited/Impact	1	63	11	Benefited/Impact	1	62	12	Benefited/Impact	1
R32	1	B	1	64	10	Benefited/Impact	1	63	11	Benefited/Impact	1	63	11	Benefited/Impact	1	62	12	Benefited/Impact	1
R33	1	B	1	64	11	Benefited/Impact	1	63	12	Benefited/Impact	1	62	13	Benefited/Impact	1	62	13	Benefited/Impact	1
R34	1	B	1	63	6	Benefited/Impact	1	62	7	Benefited/Impact	1	61	8	Benefited/Impact	1	60	9	Benefited/Impact	1
R35	1	B	1	63	6	Benefited/Impact	1	61	8	Benefited/Impact	1	60	9	Benefited/Impact	1	59	10	Benefited/Impact	1
R36	1	B	1	62	6	Benefited/Impact	1	61	7	Benefited/Impact	1	60	8	Benefited/Impact	1	59	9	Benefited/Impact	1
R37	1	B	1	62	5	Benefited/Impact	1	61	6	Benefited/Impact	1	60	7	Benefited/Impact	1	59	8	Benefited/Impact	1
R38	1	B	1	62	5	Benefited/Impact	1	61	6	Benefited/Impact	1	60	7	Benefited/Impact	1	59	8	Benefited/Impact	1
R39	1	B	1	62	5	Benefited/Impact	1	61	6	Benefited/Impact	1	60	7	Benefited/Impact	1	59	8	Benefited/Impact	1
R40	1	B	1	62	5	Benefited/Impact	1	61	6	Benefited/Impact	1	60	7	Benefited/Impact	1	59	8	Benefited/Impact	1
R41	1	B	1	61	5	Benefited/Impact	1	60	6	Benefited/Impact	1	60	6	Benefited/Impact	1	59	7	Benefited/Impact	1
R42	1	B	1	59	5	Benefited/Non-Imp	1	58	6	Benefited/Non-Imp	1	57	7	Benefited/Non-Imp	1	57	7	Benefited/Non-Imp	1
R43	1	B	1	59	5	Benefited/Non-Imp	1	58	6	Benefited/Non-Imp	1	58	6	Benefited/Non-Imp	1	57	7	Benefited/Non-Imp	1
R44	1	B	1	61	3			59	5	Benefited/Non-Imp	1	59	5	Benefited/Non-Imp	1	58	6	Benefited/Non-Imp	1
R45	1	B	1	60	4			59	5	Benefited/Non-Imp	1	57	7	Benefited/Non-Imp	1	56	8	Benefited/Non-Imp	1
R46	1	B	1	59	5	Benefited/Non-Imp	1	58	6	Benefited/Non-Imp	1	58	6	Benefited/Non-Imp	1	56	8	Benefited/Non-Imp	1
R47	1	B	1	60	4			59	5	Benefited/Non-Imp	1	58	6	Benefited/Non-Imp	1	56	8	Benefited/Non-Imp	1
R63	1	B	1	63	9	Benefited/Impact	1	61	11	Benefited/Impact	1	61	11	Benefited/Impact	1	60	12	Benefited/Impact	1
R64	1	B	1	63	10	Benefited/Impact	1	62	11	Benefited/Impact	1	61	12	Benefited/Impact	1	61	12	Benefited/Impact	1
R65	1	B	1	63	11	Benefited/Impact	1	62	12	Benefited/Impact	1	62	12	Benefited/Impact	1	61	13	Benefited/Impact	1
R66	1	B	1	63	9	Benefited/Impact	1	62	10	Benefited/Impact	1	62	10	Benefited/Impact	1	62	10	Benefited/Impact	1
R67	1	B	1	62	6	Benefited/Impact	1	61	7	Benefited/Impact	1	60	8	Benefited/Impact	1	59	9	Benefited/Impact	1
R68	1	B	1	61	6	Benefited/Impact	1	61	6	Benefited/Impact	1	59	8	Benefited/Impact	1	58	9	Benefited/Impact	1
R76	1	D	1	39	6	Benefited/Non-Imp	1	38	7	Benefited/Non-Imp	1	38	7	Benefited/Non-Imp	1	38	7	Benefited/Non-Imp	1
R77	1	B	1	65	1	Impact! w/ Bar		65	1	Impact! w/ Bar		65	1	Impact! w/ Bar		65	1	Impact! w/ Bar	
R78	1	B	1	64	2	Impact! w/ Bar		64	2	Impact! w/ Bar		64	2	Impact! w/ Bar		64	2	Impact! w/ Bar	
R79	1	B	1	63	2	Impact! w/ Bar		63	2	Impact! w/ Bar		63	2	Impact! w/ Bar		63	2	Impact! w/ Bar	
R80	1	B	1	67	3	Impact! w/ Bar		67	3	Impact! w/ Bar		67	3	Impact! w/ Bar		67	3	Impact! w/ Bar	
R81	1	B	1	66	3	Impact! w/ Bar		66	3	Impact! w/ Bar		66	3	Impact! w/ Bar		66	3	Impact! w/ Bar	
R82	1	B	1	57	2			57	2			57	2			56	3		
R83	1	B	1	56	2			55	3			55	3			55	3		
R84	1	B	1	58	4			58	4			58	4			58	4		
R85	1	B	1	57	4			57	4			57	4			57	4		
R86	1	B	1	49	4			48	5	Benefited/Non-Imp	1	48	5	Benefited/Non-Imp	1	48	5	Benefited/Non-Imp	1
R87	1	B	1	50	5	Benefited/Non-Imp	1	49	6	Benefited/Non-Imp	1	49	6	Benefited/Non-Imp	1	49	6	Benefited/Non-Imp	1
R88	1	B	1	51	4			51	4			50	5	Benefited/Non-Imp	1	50	5	Benefited/Non-Imp	1
R89	1	B	1	52	5	Benefited/Non-Imp	1	51	6	Benefited/Non-Imp	1	51	6	Benefited/Non-Imp	1	51	6	Benefited/Non-Imp	1
R90	1	B	1	53	1			53	1			52	2			52	2		
R91	1	B	1	53	1			52	2			52	2			52	2		
R92	1	B	1	55	1			55	1			54	2			54	2		
R93	1	B	1	55	1			54	2			54	2			54	2		
R94	1	B	1	55	8	Benefited/Non-Imp	1	54	9	Benefited/Non-Imp	1	54	9	Benefited/Non-Imp	1	53	10	Benefited/Non-Imp	1
R95	1	B	1	55	8	Benefited/Non-Imp	1	54	9	Benefited/Non-Imp	1	54	9	Benefited/Non-Imp	1	53	10	Benefited/Non-Imp	1
R96	1	B	1	56	9	Benefited/Impact	1	55	10	Benefited/Impact	1	55	10	Benefited/Impact	1	54	11	Benefited/Impact	1
R97	1	B	1	57	8	Benefited/Impact	1	56	9	Benefited/Impact	1	55	10	Benefited/Impact	1	54	11	Benefited/Impact	1

Project Information	16-ft Wall			18-ft Wall			20-ft Wall			22-ft Wall		
	Wall 2 HDR 8-2018			Wall 2 HDR 8-2018			Wall 2 HDR 8-2018			Wall 2 HDR 8-2018		
	Average Wtd I.L.	7.7	dB I.L. Avg	Average Wtd I.L.	8.4	dB I.L. Avg	Average Wtd I.L.	8.9	dB I.L. Avg	Average Wtd I.L.	9.7	dB I.L. Avg
	Maximum I.L.	11	dB I.L. Max	Maximum I.L.	12	dB I.L. Max	Maximum I.L.	13	dB I.L. Max	Maximum I.L.	14	dB I.L. Max
I205CW Stafford Road to OR213	Benefited/Impacted ≥ AFG	36	# Prot Units	Benefited/Impacted ≥ AFG	36	# Prot Units	Benefited/Impacted ≥ AFG	36	# Prot Units	Benefited/Impacted ≥ AFG	36	# Prot Units
Contract No. K19786CW	Benefited/Non Impact ≥ AFG	12	# Units	Benefited/Non Impact ≥ AFG	16	# Units	Benefited/Non Impact ≥ AFG	18	# Units	Benefited/Non Impact ≥ AFG	18	# Units
I205CW_Build_Walls1to2	Total Benefited	48	# Ben Units	Total Benefited	52	# Ben Units	Total Benefited	54	# Ben Units	Total Benefited	54	# Ben Units
Wall 2	Impacted Units ≥ NRDG	24	# Units	Impacted Units ≥ NRDG	29	# Units	Impacted Units ≥ NRDG	34	# Units	Impacted Units ≥ NRDG	35	# Units
HMMH	Benefited Units ≥ NRDG	29	# Units	Benefited Units ≥ NRDG	36	# Units	Benefited Units ≥ NRDG	43	# Units	Benefited Units ≥ NRDG	47	# Units
Scott Noel	Percent of impacts ≥ AFG	88%	% Ben Units	Percent of impacts ≥ AFG	88%	% Ben Units	Percent of impacts ≥ AFG	88%	% Ben Units	Percent of impacts ≥ AFG	88%	% Ben Units
8/7/2018	Percent of benefits ≥ NRDG	60%	% NRDG Units	Percent of benefits ≥ NRDG	69%	% NRDG Units	Percent of benefits ≥ NRDG	80%	% NRDG Units	Percent of benefits ≥ NRDG	87%	% NRDG Units
	"Cost-Reasonable" ?	Yes		"Cost-Reasonable" ?	Yes		"Cost-Reasonable" ?	Yes		"Cost-Reasonable" ?	Yes	
	Surface Area	33151	Sq Feet	Surface Area	37293	Sq Feet	Surface Area	41436	Sq Feet	Surface Area	45578	Sq Feet
	Surface Area/Ben Rec	691	Sq Feet	Surface Area/Ben Rec	717	Sq Feet	Surface Area/Ben Rec	767	Sq Feet	Surface Area/Ben Rec	844	Sq Feet
	Barrier Length	2,070	Feet	Barrier Length	2,070	Feet	Barrier Length	2,070	Feet	Barrier Length	2,070	Feet
	Min Height	16.0	Feet	Min Height	18.0	Feet	Min Height	20.0	Feet	Min Height	22.0	Feet
	Max Height	16.0	Feet	Max Height	18.0	Feet	Max Height	20.0	Feet	Max Height	22.0	Feet
	Avg Height	16.0	Feet	Avg Height	18.0	Feet	Avg Height	20.0	Feet	Avg Height	22.0	Feet
	Total Barrier Cost	$828,775		Total Barrier Cost	$932,325		Total Barrier Cost	$1,035,900		Total Barrier Cost	$1,139,450	
	Cost/Ben Rec	$17,266.15		Cost/Ben Rec	$17,929		Cost/Ben Rec	$19,183		Cost/Ben Rec	$21,101	

Receiver ID	Row	FHWA Act Cat	No. of Dwelling Units	With Barrier Sound Levels, Impact and Benefit				With Barrier Sound Levels, Impact and Benefit				With Barrier Sound Levels, Impact and Benefit				With Barrier Sound Levels, Impact and Benefit			
				Leq(dBA)	IL (db)	Impacted?	No. Benefited	Leq(dBA)	IL (db)	Impacted?	No. Benefited	Leq(dBA)	IL (db)	Impacted?	No. Benefited	Leq(dBA)	IL (db)	Impacted?	No. Benefited
R98	1	B	1	57	**8**	Benefited/Impact	1	56	**9**	Benefited/Impact	1	56	**9**	Benefited/Impact	1	55	**10**	Benefited/Impact	1
R99	1	B	1	57	**8**	Benefited/Impact	1	56	**9**	Benefited/Impact	1	56	**9**	Benefited/Impact	1	55	**10**	Benefited/Impact	1
R100	1	B	1	59	**10**	Benefited/Impact	1	58	**11**	Benefited/Impact	1	57	**12**	Benefited/Impact	1	56	**13**	Benefited/Impact	1
R101	1	B	1	58	**11**	Benefited/Impact	1	58	**11**	Benefited/Impact	1	57	**12**	Benefited/Impact	1	56	**13**	Benefited/Impact	1
R102	1	B	1	54	**6**	Benefited/Non-Imp	1	53	**7**	Benefited/Non-Imp	1	52	**8**	Benefited/Non-Imp	1	52	**8**	Benefited/Non-Imp	1
R103	1	B	1	54	**7**	Benefited/Non-Imp	1	53	**8**	Benefited/Non-Imp	1	53	**8**	Benefited/Non-Imp	1	52	**9**	Benefited/Non-Imp	1
R104	1	B	1	56	**7**	Benefited/Non-Imp	1	55	**8**	Benefited/Non-Imp	1	54	**9**	Benefited/Non-Imp	1	53	**10**	Benefited/Non-Imp	1
R105	1	B	1	56	**7**	Benefited/Non-Imp	1	55	**8**	Benefited/Non-Imp	1	54	**9**	Benefited/Non-Imp	1	53	**10**	Benefited/Non-Imp	1
R106	1	B	1	51	1			51	1			51	1			51	1		
R107	1	B	1	51	0			51	0			51	0			51	0		
R108	1	B	1	54	0			54	0			54	0			54	0		
R109	1	B	1	54	0			54	0			54	0			54	0		
R110	1	B	1	55	0			55	0			55	0			55	0		
R111	1	B	1	51	0			51	0			51	0			51	0		
R112	1	B	1	57	0			56	1			56	1			56	1		
R113	1	B	1	53	0			53	0			53	0			53	0		

Project Information

I205CW Stafford Road to OR213
Contract No. K19786CW
I205CW_Build_Walls1to2
Wall 2
HMMH
Scott Noel
8/7/2018

U.S. Department of Transportation
Federal Highway Administration

24-ft Wall		
Wall 2 HDR 8-2018		
Average Wtd I.L.	10.0	dB I.L. Avg
Maximum I.L.	14	dB I.L. Max
Benefited/Impacted ≥ AFG	36	# Prot Units
Benefited/Non Impact ≥ AFG	19	# Units
Total Benefited	55	# Ben Units
Impacted Units ≥ NRDG	35	# Units
Benefited Units ≥ NRDG	49	# Units
Percent of impacts ≥ AFG	88%	% Ben Units
Percent of benefits ≥ NRDG	89%	% NRDG Units
"Cost-Reasonable" ?	Yes	
Surface Area	49721	Sq Feet
Surface Area/Ben Rec	904	Sq Feet
Barrier Length	2,070	Feet
Min Height	24.0	Feet
Max Height	24.0	Feet
Avg Height	24.0	Feet
Total Barrier Cost	$1,243,025	
Cost/Ben Rec	$22,600	

Receiver ID	Row	FHWA Act Cat	No. of Dwelling Units	With Barrier Sound Levels, Impact and Benefit			
				Leq(dBA)	IL (db)	Impacted?	No. Benefited
ST-5a	1	B	1	61	**12**	Benefited/Impact	1
ST-5b	1	B	1	59	**9**	Benefited/Impact	1
R19	1	B	1	59	**5**	Benefited/Non-Imp	1
R20	1	B	1	61	**6**	Benefited/Impact	1
R21	1	B	1	62	**10**	Benefited/Impact	1
R22	1	B	1	60	**14**	Benefited/Impact	1
R23	1	B	1	60	**13**	Benefited/Impact	1
R24	1	B	1	61	**13**	Benefited/Impact	1
R25	1	B	1	61	**13**	Benefited/Impact	1
R26	1	B	1	61	**13**	Benefited/Impact	1
R27	1	B	1	61	**13**	Benefited/Impact	1
R28	1	B	1	61	**13**	Benefited/Impact	1
R29	1	B	1	61	**14**	Benefited/Impact	1
R30	1	B	1	61	**12**	Benefited/Impact	1
R31	1	B	1	61	**13**	Benefited/Impact	1
R32	1	B	1	61	**13**	Benefited/Impact	1
R33	1	B	1	61	**14**	Benefited/Impact	1
R34	1	B	1	59	**10**	Benefited/Impact	1
R35	1	B	1	59	**10**	Benefited/Impact	1
R36	1	B	1	58	**10**	Benefited/Impact	1
R37	1	B	1	58	**9**	Benefited/Impact	1
R38	1	B	1	59	**8**	Benefited/Impact	1
R39	1	B	1	58	**9**	Benefited/Impact	1
R40	1	B	1	58	**9**	Benefited/Impact	1
R41	1	B	1	59	**7**	Benefited/Impact	1
R42	1	B	1	56	**8**	Benefited/Non-Imp	1
R43	1	B	1	56	**8**	Benefited/Non-Imp	1
R44	1	B	1	57	**7**	Benefited/Non-Imp	1
R45	1	B	1	56	**8**	Benefited/Non-Imp	1
R46	1	B	1	56	**8**	Benefited/Non-Imp	1
R47	1	B	1	56	**8**	Benefited/Non-Imp	1
R63	1	B	1	60	**12**	Benefited/Impact	1
R64	1	B	1	60	**13**	Benefited/Impact	1
R65	1	B	1	61	**13**	Benefited/Impact	1
R66	1	B	1	61	**11**	Benefited/Impact	1
R67	1	B	1	58	**10**	Benefited/Impact	1
R68	1	B	1	57	**10**	Benefited/Impact	1
R76	1	D	1	38	**7**	Benefited/Non-Imp	1
R77	1	B	1	65	1	Impact! w/ Bar	
R78	1	B	1	64	2	Impact! w/ Bar	
R79	1	B	1	63	2	Impact! w/ Bar	
R80	1	B	1	67	3	Impact! w/ Bar	
R81	1	B	1	66	3	Impact! w/ Bar	
R82	1	B	1	56	3		
R83	1	B	1	55	3		
R84	1	B	1	58	4		
R85	1	B	1	56	**5**	Benefited/Non-Imp	1
R86	1	B	1	48	**5**	Benefited/Non-Imp	1
R87	1	B	1	48	**7**	Benefited/Non-Imp	1
R88	1	B	1	50	**5**	Benefited/Non-Imp	1
R89	1	B	1	51	**6**	Benefited/Non-Imp	1
R90	1	B	1	52	2		
R91	1	B	1	52	2		
R92	1	B	1	54	2		
R93	1	B	1	54	2		
R94	1	B	1	52	**11**	Benefited/Non-Imp	1
R95	1	B	1	53	**10**	Benefited/Non-Imp	1
R96	1	B	1	53	**12**	Benefited/Impact	1
R97	1	B	1	53	**12**	Benefited/Impact	1

Project Information

I205CW Stafford Road to OR213
Contract No. K19786CW
I205CW_Build_Walls1to2
Wall 2
HMMH
Scott Noel
8/7/2018

24-ft Wall

Wall 2 HDR 8-2018

Average Wtd I.L.	10.0	dB I.L. Avg
Maximum I.L.	14	dB I.L. Max
Benefited/Impacted ≥ AFG	36	# Prot Units
Benefited/Non Impact ≥ AFG	19	# Units
Total Benefited	55	# Ben Units
Impacted Units ≥ NRDG	35	# Units
Benefited Units ≥ NRDG	49	# Units
Percent of impacts ≥ AFG	88%	% Ben Units
Percent of benefits ≥ NRDG	89%	% NRDG Units
"Cost-Reasonable" ?	Yes	
Surface Area	49721	Sq Feet
Surface Area/Ben Rec	904	Sq Feet
Barrier Length	2,070	Feet
Min Height	24.0	Feet
Max Height	24.0	Feet
Avg Height	24.0	Feet
Total Barrier Cost	$1,243,025	
Cost/Ben Rec	$22,600	

Receiver ID	Row	FHWA Act Cat	No. of Dwelling Units	With Barrier Sound Levels, Impact and Benefit			
				Leq(dBA)	IL (db)	Impacted?	No. Benefited
R98	1	B	1	55	**10**	Benefited/Impact	1
R99	1	B	1	55	**10**	Benefited/Impact	1
R100	1	B	1	56	**13**	Benefited/Impact	1
R101	1	B	1	56	**13**	Benefited/Impact	1
R102	1	B	1	51	**9**	Benefited/Non-Imp	1
R103	1	B	1	52	**9**	Benefited/Non-Imp	1
R104	1	B	1	53	**10**	Benefited/Non-Imp	1
R105	1	B	1	53	**10**	Benefited/Non-Imp	1
R106	1	B	1	51	1		
R107	1	B	1	51	0		
R108	1	B	1	54	0		
R109	1	B	1	54	0		
R110	1	B	1	55	0		
R111	1	B	1	51	0		
R112	1	B	1	56	1		
R113	1	B	1	53	0		

U.S. Department of Transportation
Federal Highway Administration

Basic Noise Barrier Optimization Tool **6/28/2018**

I205CW Stafford Road to OR213
Wall 3 30' from Fog Line

	10'	12'	14'	16'	18'	20'	22'	24'	Units
Average Wtd I.L. (benefited)	5	5.3	5.9	6.2	6.7	7.1	7.3	7.7	dBA
Maximum I.L.	5	6	7	8	9	10	10	11	dBA
Benefited/Impacted ≥ AFG	5	12	16	23	25	28	30	30	# of dwelling units
Benefited/Non Impact ≥ AFG	0	0	2	2	5	7	7	8	# of dwelling units
Total Benefited	5	12	18	25	30	35	37	38	# of dwelling units
Impacted Units ≥ NRDG	0	0	4	10	13	17	21	24	# of dwelling units
Benefited Units ≥ NRDG	0	0	4	10	15	19	23	28	# of dwelling units
Percent of impacts ≥ AFG	12%	29%	39%	56%	61%	68%	73%	73%	%
Percent of benefits ≥ NRDG	0%	0%	22%	40%	50%	54%	62%	74%	%
"Cost-Reasonable" ?	No	No	No	No	No	No	No	No	----
Surface Area	21,586	25,907	30,226	34,537	38,857	43,176	47,497	51,821	sq-feet
Surface Area/Ben Rec	4,317	2,159	1,679	1,381	1,295	1,234	1,284	1,364	sq-ft / ben rec
Barrier Length	2,161	2,161	2,161	2,161	2,161	2,161	2,161	2,161	ft
Min Height	10	12	14	16	18	20	22	24	ft
Max Height	10	12	14	16	18	20	22	24	ft
Avg Height	10	12	14	16	18	20	22	24	ft
Total Barrier Cost	431,720	518,140	604,520	1,079,400	1,187,425	1,079,400	1,187,425	1,295,525	$
Cost/Ben Rec	86,344	43,178	33,584	43,176	39,581	30,840	32,093	34,093	$ / ben rec
Effectiveness/Cost Metric (E/C)	-	-	1.4	4.3	6.0	8.2	9.7	10.5	----

ODOT Acoustical Feasibilty Goal (dBA)	5
ODOT Acoustical Feasibilty Goal (%)	51%
ODOT Noise Reduction Design Goal (dBA)	7
ODOT Noise Reduction Design Goal (%)	1%

Project Information	No Barrier Analysis No Barrier	
I205CW Stafford Road to OR213	Total Units Exposed to Impact	41
Contract No. K19786CW	# Impacts - NAC only	41
I205CW_Build_Wall3to4	# Impacts - SI only	0
Wall 3 30' from Fog Line	# Impacts - Both NAC & SI	0
HMMH		
Scott Noel		
6/28/2018		

U.S. Department of Transportation
Federal Highway Administration

Enter SI Info

10-ft Wall Wall 3 HDR 06-2018			12-ft Wall Wall 3 HDR 06-2018			14-ft Wall Wall 3 HDR 06-2018			16-ft Wall Wall 3 HDR 06-2018		
Average Wtd I.L. (benefited)	5.0	dB I.L. Avg	Average Wtd I.L.	5.3	dB I.L. Avg	Average Wtd I.L.	5.9	dB I.L. Avg	Average Wtd I.L.	6.2	dB I.L. Avg
Maximum I.L.	5	dB I.L. Max	Maximum I.L.	6	dB I.L. Max	Maximum I.L.	7	dB I.L. Max	Maximum I.L.	8	dB I.L. Max
Benefited/Impacted ≥ AFG	5	# Prot Units	Benefited/Impacted ≥ AFG	12	# Prot Units	Benefited/Impacted ≥ AFG	16	# Prot Units	Benefited/Impacted ≥ AFG	23	# Prot Units
Benefited/Non Impact ≥ AFG	0	# Units	Benefited/Non Impact ≥ AFG	0	# Units	Benefited/Non Impact ≥ AFG	2	# Units	Benefited/Non Impact ≥ AFG	2	# Units
Total Benefited	5	# Ben Units	Total Benefited	12	# Ben Units	Total Benefited	18	# Ben Units	Total Benefited	25	# Ben Units
Impacted Units ≥ NRDG	0	# Units	Impacted Units ≥ NRDG	0	# Units	Impacted Units ≥ NRDG	4	# Units	Impacted Units ≥ NRDG	10	# Units
Benefited Units ≥ NRDG	0	# Units	Benefited Units ≥ NRDG	0	# Units	Benefited Units ≥ NRDG	4	# Units	Benefited Units ≥ NRDG	10	# Units
Percent of impacts ≥ AFG	12%	% Ben Units	Percent of impacts ≥ AFG	29%	% Ben Units	Percent of impacts ≥ AFG	39%	% Ben Units	Percent of impacts ≥ AFG	56%	% Ben Units
Percent of benefits ≥ NRDG	0%	% NRDG Units	Percent of benefits ≥ NRDG	0%	% NRDG Units	Percent of benefits ≥ NRDG	22%	% NRDG Units	Percent of benefits ≥ NRDG	40%	% NRDG Units
"Cost-Reasonable" ?	No		"Cost-Reasonable" ?	No		"Cost-Reasonable" ?	No		"Cost-Reasonable" ?	No	
Surface Area	21586	Sq Feet	Surface Area	25907	Sq Feet	Surface Area	30226	Sq Feet	Surface Area	34537	Sq Feet
Surface Area/Ben Rec	4317	Sq Feet	Surface Area/Ben Rec	2159	Sq Feet	Surface Area/Ben Rec	1679	Sq Feet	Surface Area/Ben Rec	1381	Sq Feet
Barrier Length	2,161	Feet	Barrier Length	2,161	Feet	Barrier Length	2,161	Feet	Barrier Length	2,161	Feet
Min Height	10.0	Feet	Min Height	12.0	Feet	Min Height	14.0	Feet	Min Height	16.0	Feet
Max Height	10.0	Feet	Max Height	12.0	Feet	Max Height	14.0	Feet	Max Height	16.0	Feet
Avg Height	10.0	Feet	Avg Height	12.0	Feet	Avg Height	14.0	Feet	Avg Height	16.0	Feet
Total Barrier Cost	$431,720		Total Barrier Cost	$518,140		Total Barrier Cost	$604,520		Total Barrier Cost	$1,079,400	
Cost/Ben Rec	$86,344		Cost/Ben Rec	$43,178		Cost/Ben Rec	$33,584		Cost/Ben Rec	$43,176.00	

Receiver ID	Row	FHWA Act Cat	No. of Dwelling Units	Type of Impact		Impact?	No. of Impacted Units	With Barrier Sound Levels, Impact and Benefit				With Barrier Sound Levels, Impact and Benefit				With Barrier Sound Levels, Impact and Benefit				With Barrier Sound Levels, Impact and Benefit			
				Bld Leq > NAC?	Sub. Inc.?			Leq(dBA)	IL (db)	Impacted?	No. Benefited	Leq(dBA)	IL (db)	Impacted?	No. Benefited	Leq(dBA)	IL (db)	Impacted?	No. Benefited	Leq(dBA)	IL (db)	Impacted?	No. Benefited
ML-7	1	B	1	65		Impact!	1	62	3	Impact! w/ Bar		61	4	Impact! w/ Bar		60	5	Benefited/Impact	1	60	5	Benefited/Impact	1
R114	1	B	1	65		Impact!	1	65	0	Impact! w/ Bar		65	0	Impact! w/ Bar		65	0	Impact! w/ Bar		65	0	Impact! w/ Bar	
R115	1	B	1	66		Impact!	1	66	0	Impact! w/ Bar		66	0	Impact! w/ Bar		66	0	Impact! w/ Bar		66	0	Impact! w/ Bar	
R116	1	B	1	67		Impact!	1	67	0	Impact! w/ Bar		66	1	Impact! w/ Bar		66	1	Impact! w/ Bar		66	1	Impact! w/ Bar	
R117	1	B	1	68		Impact!	1	68	0	Impact! w/ Bar		68	0	Impact! w/ Bar		68	0	Impact! w/ Bar		67	1	Impact! w/ Bar	
R118	1	B	1	70		Impact!	1	69	1	Impact! w/ Bar		69	1	Impact! w/ Bar		68	2	Impact! w/ Bar		68	2	Impact! w/ Bar	
R119	1	B	1	70		Impact!	1	67	3	Impact! w/ Bar		67	3	Impact! w/ Bar		67	3	Impact! w/ Bar		66	4	Impact! w/ Bar	
R120	1	B	1	69		Impact!	1	66	3	Impact! w/ Bar		66	3	Impact! w/ Bar		65	4	Impact! w/ Bar		65	4	Impact! w/ Bar	
R121	1	B	1	66		Impact!	1	63	3	Impact! w/ Bar		63	3	Impact! w/ Bar		62	4	Impact! w/ Bar		62	4	Impact! w/ Bar	
R122	1	B	1	68		Impact!	1	65	3	Impact! w/ Bar		65	3	Impact! w/ Bar		64	4	Impact! w/ Bar		64	4	Impact! w/ Bar	
R123	1	B	1	66		Impact!	1	63	3	Impact! w/ Bar		63	3	Impact! w/ Bar		63	3	Impact! w/ Bar		62	4	Impact! w/ Bar	
R124	1	B	1	65		Impact!	1	63	2	Impact! w/ Bar		63	2	Impact! w/ Bar		62	3	Impact! w/ Bar		62	3	Impact! w/ Bar	
R125	1	B	1	64				62	2			61	3			60	4			60	4		
R126	1	B	1	67		Impact!	1	64	3	Impact! w/ Bar		63	4	Impact! w/ Bar		63	4	Impact! w/ Bar		62	5	Benefited/Impact	1
R127	1	B	1	65		Impact!	1	62	3	Impact! w/ Bar		61	4	Impact! w/ Bar		61	4	Impact! w/ Bar		60	5	Benefited/Impact	1
R128	1	B	1	68		Impact!	1	64	4	Impact! w/ Bar		63	5	Benefited/Impact	1	63	5	Benefited/Impact	1	62	6	Benefited/Impact	1
R129	1	B	1	66		Impact!	1	65	1	Impact! w/ Bar		64	2	Impact! w/ Bar		64	2	Impact! w/ Bar		64	2	Impact! w/ Bar	
R130	1	B	1	65		Impact!	1	64	1	Impact! w/ Bar		64	1	Impact! w/ Bar		64	1	Impact! w/ Bar		64	1	Impact! w/ Bar	
R131	1	B	1	65		Impact!	1	64	1	Impact! w/ Bar		64	1	Impact! w/ Bar		64	1	Impact! w/ Bar		64	1	Impact! w/ Bar	
R132	1	B	1	61				61	0			60	1			60	1			60	1		
R133	1	B	1	67		Impact!	1	65	2	Impact! w/ Bar		64	3	Impact! w/ Bar		63	4	Impact! w/ Bar		63	4	Impact! w/ Bar	
R134	1	B	1	67		Impact!	1	65	2	Impact! w/ Bar		64	3	Impact! w/ Bar		63	4	Impact! w/ Bar		63	4	Impact! w/ Bar	
R135	1	B	1	67		Impact!	1	62	5	Benefited/Impact	1	61	6	Benefited/Impact	1	60	7	Benefited/Impact	1	60	7	Benefited/Impact	1
R136	1	B	1	68		Impact!	1	66	2	Impact! w/ Bar		65	3	Impact! w/ Bar		64	4	Impact! w/ Bar		63	5	Benefited/Impact	1
R137	1	B	1	69		Impact!	1	66	3	Impact! w/ Bar		66	3	Impact! w/ Bar		65	4	Impact! w/ Bar		63	6	Benefited/Impact	1
R138	1	B	1	68		Impact!	1	66	2	Impact! w/ Bar		65	3	Impact! w/ Bar		64	4	Impact! w/ Bar		63	5	Benefited/Impact	1
R139	1	B	1	68		Impact!	1	66	2	Impact! w/ Bar		65	3	Impact! w/ Bar		64	4	Impact! w/ Bar		64	4	Impact! w/ Bar	
R140	1	B	1	69		Impact!	1	67	2	Impact! w/ Bar		66	3	Impact! w/ Bar		65	4	Impact! w/ Bar		64	5	Benefited/Impact	1
R141	1	B	1	68		Impact!	1	63	5	Benefited/Impact	1	62	6	Benefited/Impact	1	61	7	Benefited/Impact	1	60	8	Benefited/Impact	1
R142	1	B	1	67		Impact!	1	62	5	Benefited/Impact	1	61	6	Benefited/Impact	1	61	6	Benefited/Impact	1	60	7	Benefited/Impact	1
R143	1	B	1	69		Impact!	1	65	4	Impact! w/ Bar		64	5	Benefited/Impact	1	62	7	Benefited/Impact	1	61	8	Benefited/Impact	1
R144	1	B	1	70		Impact!	1	66	4	Impact! w/ Bar		66	4	Impact! w/ Bar		64	6	Benefited/Impact	1	63	7	Benefited/Impact	1
R145	1	B	1	68		Impact!	1	64	4	Impact! w/ Bar		63	5	Benefited/Impact	1	62	6	Benefited/Impact	1	61	7	Benefited/Impact	1
R146	1	B	1	68		Impact!	1	63	5	Benefited/Impact	1	62	6	Benefited/Impact	1	61	7	Benefited/Impact	1	60	8	Benefited/Impact	1
R147	1	B	1	66		Impact!	1	62	4	Impact! w/ Bar		61	5	Benefited/Impact	1	60	6	Benefited/Impact	1	60	6	Benefited/Impact	1
R148	1	B	1	66		Impact!	1	61	5	Benefited/Impact	1	61	5	Benefited/Impact	1	60	6	Benefited/Impact	1	59	7	Benefited/Impact	1
R149	1	B	1	68		Impact!	1	64	4	Impact! w/ Bar		63	5	Benefited/Impact	1	62	6	Benefited/Impact	1	61	7	Benefited/Impact	1
R150	1	B	1	66		Impact!	1	62	4	Impact! w/ Bar		61	5	Benefited/Impact	1	60	6	Benefited/Impact	1	59	7	Benefited/Impact	1
R151	1	B	1	64				61	3			60	4			59	5	Benefited/Non-Imp	1	58	6	Benefited/Non-Imp	1
R152	1	B	1	65		Impact!	1	62	3	Impact! w/ Bar		61	4	Impact! w/ Bar		60	5	Benefited/Impact	1	60	5	Benefited/Impact	1
R153	1	B	1	65		Impact!	1	64	1	Impact! w/ Bar		63	2	Impact! w/ Bar		62	3	Impact! w/ Bar		61	4	Impact! w/ Bar	
R154	1	B	1	64				61	3			60	4			59	5	Benefited/Non-Imp	1	59	5	Benefited/Non-Imp	1
R155	1	B	1	66		Impact!	1	63	3	Impact! w/ Bar		62	4	Impact! w/ Bar		61	5	Benefited/Impact	1	60	6	Benefited/Impact	1
R156	1	B	1	67		Impact!	1	63	4	Impact! w/ Bar		62	5	Benefited/Impact	1	61	6	Benefited/Impact	1	61	6	Benefited/Impact	1
R157	1	B	1	65		Impact!	1	63	2	Impact! w/ Bar		62	3	Impact! w/ Bar		61	4	Impact! w/ Bar		60	5	Benefited/Impact	1
R158	1	B	1	64				63	1			62	2			61	3			60	4		
R159	1	B	1	61				60	1			60	1			59	2			58	3		
R160	1	B	1	64				64	0			64	0			64	0			64	0		
R161	1	B	1	63				62	1			61	2			61	2			60	3		
R162	1	B	1	62				61	1			60	2			59	3			58	4		
R163	1	B	1	63				61	2			60	3			60	3			59	4		
R164	1	B	1	62				60	2			59	3			59	3			58	4		
R165	1	B	1	64				64	0			64	0			63	1			63	1		
R166	1	B	1	64				64	0			64	0			63	1			63	1		
R167	1	B	1	64				63	1			63	1			63	1			62	2		

Project Information

I205CW Stafford Road to OR213
Contract No. K19786CW
I205CW_Build_Wall3to4
Wall 3 30' from Fog Line
HMMH
Scott Noel
6/28/2018

U.S. Department of Transportation
Federal Highway Administration

18-ft Wall			20-ft Wall			22-ft Wall			24-ft Wall		
Wall 3 HDR 06-2018			Wall 3 HDR 06-2018			Wall 3 HDR 06-2018			Wall 3 HDR 06-2018		
Average Wtd I.L.	6.7	dB I.L. Avg	Average Wtd I.L.	7.1	dB I.L. Avg	Average Wtd I.L.	7.3	dB I.L. Avg	Average Wtd I.L.	7.7	dB I.L. Avg
Maximum I.L.	9	dB I.L. Max	Maximum I.L.	10	dB I.L. Max	Maximum I.L.	10	dB I.L. Max	Maximum I.L.	11	dB I.L. Max
Benefited/Impacted ≥ AFG	25	# Prot Units	Benefited/Impacted ≥ AFG	28	# Prot Units	Benefited/Impacted ≥ AFG	30	# Prot Units	Benefited/Impacted ≥ AFG	30	# Prot Units
Benefited/Non Impact ≥ AFG	5	# Units	Benefited/Non Impact ≥ AFG	7	# Units	Benefited/Non Impact ≥ AFG	7	# Units	Benefited/Non Impact ≥ AFG	8	# Units
Total Benefited	30	# Ben Units	Total Benefited	35	# Ben Units	Total Benefited	37	# Ben Units	Total Benefited	38	# Ben Units
Impacted Units ≥ NRDG	13	# Units	Impacted Units ≥ NRDG	17	# Units	Impacted Units ≥ NRDG	21	# Units	Impacted Units ≥ NRDG	24	# Units
Benefited Units ≥ NRDG	15	# Units	Benefited Units ≥ NRDG	19	# Units	Benefited Units ≥ NRDG	23	# Units	Benefited Units ≥ NRDG	28	# Units
Percent of impacts ≥ AFG	61%	% Ben Units	Percent of impacts ≥ AFG	68%	% Ben Units	Percent of impacts ≥ AFG	73%	% Ben Units	Percent of impacts ≥ AFG	73%	% Ben Units
Percent of benefits ≥ NRDG	50%	% NRDG Units	Percent of benefits ≥ NRDG	54%	% NRDG Units	Percent of benefits ≥ NRDG	62%	% NRDG Units	Percent of benefits ≥ NRDG	74%	% NRDG Units
"Cost-Reasonable" ?	No		"Cost-Reasonable" ?	No		"Cost-Reasonable" ?	No		"Cost-Reasonable" ?	No	
Surface Area	38857	Sq Feet	Surface Area	43176	Sq Feet	Surface Area	47497	Sq Feet	Surface Area	51821	Sq Feet
Surface Area/Ben Rec	1295	Sq Feet	Surface Area/Ben Rec	1234	Sq Feet	Surface Area/Ben Rec	1284	Sq Feet	Surface Area/Ben Rec	1364	Sq Feet
Barrier Length	2,161	Feet	Barrier Length	2,161	Feet	Barrier Length	2,161	Feet	Barrier Length	2,161	Feet
Min Height	18.0	Feet	Min Height	20.0	Feet	Min Height	22.0	Feet	Min Height	24.0	Feet
Max Height	18.0	Feet	Max Height	20.0	Feet	Max Height	22.0	Feet	Max Height	24.0	Feet
Avg Height	18.0	Feet	Avg Height	20.0	Feet	Avg Height	22.0	Feet	Avg Height	24.0	Feet
Total Barrier Cost	$1,187,425		Total Barrier Cost	$1,079,400		Total Barrier Cost	$1,187,425		Total Barrier Cost	$1,295,525	
Cost/Ben Rec	$39,581		Cost/Ben Rec	$30,840		Cost/Ben Rec	$32,093		Cost/Ben Rec	$34,093	

Receiver ID	Row	FHWA Act Cat	No. of Dwelling Units	With Barrier Sound Levels, Impact and Benefit				With Barrier Sound Levels, Impact and Benefit				With Barrier Sound Levels, Impact and Benefit				With Barrier Sound Levels, Impact and Benefit			
				Leq(dBA)	IL (db)	Impacted?	No. Benefited	Leq(dBA)	IL (db)	Impacted?	No. Benefited	Leq(dBA)	IL (db)	Impacted?	No. Benefited	Leq(dBA)	IL (db)	Impacted?	No. Benefited
ML-7	1	B	1	59	6	Benefited/Impact	1	59	6	Benefited/Impact	1	58	7	Benefited/Impact	1	58	7	Benefited/Impact	1
R114	1	B	1	65	0	Impact! w/ Bar		65	0	Impact! w/ Bar		65	0	Impact! w/ Bar		65	0	Impact! w/ Bar	
R115	1	B	1	66	0	Impact! w/ Bar		66	0	Impact! w/ Bar		66	0	Impact! w/ Bar		66	0	Impact! w/ Bar	
R116	1	B	1	66	1	Impact! w/ Bar		66	1	Impact! w/ Bar		66	1	Impact! w/ Bar		66	1	Impact! w/ Bar	
R117	1	B	1	67	1	Impact! w/ Bar		67	1	Impact! w/ Bar		67	1	Impact! w/ Bar		67	1	Impact! w/ Bar	
R118	1	B	1	68	2	Impact! w/ Bar		68	2	Impact! w/ Bar		68	2	Impact! w/ Bar		68	2	Impact! w/ Bar	
R119	1	B	1	66	4	Impact! w/ Bar		66	4	Impact! w/ Bar		66	4	Impact! w/ Bar		66	4	Impact! w/ Bar	
R120	1	B	1	65	4	Impact! w/ Bar		65	4	Impact! w/ Bar		65	4	Impact! w/ Bar		65	4	Impact! w/ Bar	
R121	1	B	1	62	4	Impact! w/ Bar		61	5	Benefited/Impact	1	61	5	Benefited/Impact	1	61	5	Benefited/Impact	1
R122	1	B	1	64	4	Impact! w/ Bar		64	4	Impact! w/ Bar		63	5	Benefited/Impact	1	63	5	Benefited/Impact	1
R123	1	B	1	62	4	Impact! w/ Bar		62	4	Impact! w/ Bar		61	5	Benefited/Impact	1	61	5	Benefited/Impact	1
R124	1	B	1	61	4	Impact! w/ Bar		61	4	Impact! w/ Bar		61	4	Impact! w/ Bar		61	4	Impact! w/ Bar	
R125	1	B	1	60	4			59	5	Benefited/Non-Imp	1	59	5	Benefited/Non-Imp	1	59	5	Benefited/Non-Imp	1
R126	1	B	1	62	5	Benefited/Impact	1	62	5	Benefited/Impact	1	61	6	Benefited/Impact	1	61	6	Benefited/Impact	1
R127	1	B	1	59	6	Benefited/Impact	1	59	6	Benefited/Impact	1	59	6	Benefited/Impact	1	58	7	Benefited/Impact	1
R128	1	B	1	62	6	Benefited/Impact	1	61	7	Benefited/Impact	1	61	7	Benefited/Impact	1	61	7	Benefited/Impact	1
R129	1	B	1	64	2	Impact! w/ Bar		63	3	Impact! w/ Bar		63	3	Impact! w/ Bar		63	3	Impact! w/ Bar	
R130	1	B	1	64	1	Impact! w/ Bar		63	2	Impact! w/ Bar		63	2	Impact! w/ Bar		63	2	Impact! w/ Bar	
R131	1	B	1	63	2	Impact! w/ Bar		63	2	Impact! w/ Bar		63	2	Impact! w/ Bar		63	2	Impact! w/ Bar	
R132	1	B	1	60	1			60	1			60	1			60	1		
R133	1	B	1	63	4	Impact! w/ Bar		62	5	Benefited/Impact	1	62	5	Benefited/Impact	1	62	5	Benefited/Impact	1
R134	1	B	1	62	5	Benefited/Impact	1	62	5	Benefited/Impact	1	62	5	Benefited/Impact	1	62	5	Benefited/Impact	1
R135	1	B	1	59	8	Benefited/Impact	1	58	9	Benefited/Impact	1	58	9	Benefited/Impact	1	57	10	Benefited/Impact	1
R136	1	B	1	62	6	Benefited/Impact	1	62	6	Benefited/Impact	1	61	7	Benefited/Impact	1	61	7	Benefited/Impact	1
R137	1	B	1	62	7	Benefited/Impact	1	61	8	Benefited/Impact	1	60	9	Benefited/Impact	1	60	9	Benefited/Impact	1
R138	1	B	1	62	6	Benefited/Impact	1	62	6	Benefited/Impact	1	61	7	Benefited/Impact	1	61	7	Benefited/Impact	1
R139	1	B	1	63	5	Benefited/Impact	1	62	6	Benefited/Impact	1	61	7	Benefited/Impact	1	61	7	Benefited/Impact	1
R140	1	B	1	63	6	Benefited/Impact	1	62	7	Benefited/Impact	1	62	7	Benefited/Impact	1	61	8	Benefited/Impact	1
R141	1	B	1	59	9	Benefited/Impact	1	58	10	Benefited/Impact	1	58	10	Benefited/Impact	1	57	11	Benefited/Impact	1
R142	1	B	1	59	8	Benefited/Impact	1	59	8	Benefited/Impact	1	58	9	Benefited/Impact	1	57	10	Benefited/Impact	1
R143	1	B	1	60	9	Benefited/Impact	1	59	10	Benefited/Impact	1	59	10	Benefited/Impact	1	58	11	Benefited/Impact	1
R144	1	B	1	62	8	Benefited/Impact	1	61	9	Benefited/Impact	1	60	10	Benefited/Impact	1	60	10	Benefited/Impact	1
R145	1	B	1	60	8	Benefited/Impact	1	59	9	Benefited/Impact	1	58	10	Benefited/Impact	1	58	10	Benefited/Impact	1
R146	1	B	1	59	9	Benefited/Impact	1	59	9	Benefited/Impact	1	58	10	Benefited/Impact	1	57	11	Benefited/Impact	1
R147	1	B	1	59	7	Benefited/Impact	1	58	8	Benefited/Impact	1	58	8	Benefited/Impact	1	57	9	Benefited/Impact	1
R148	1	B	1	59	7	Benefited/Impact	1	58	8	Benefited/Impact	1	58	8	Benefited/Impact	1	57	9	Benefited/Impact	1
R149	1	B	1	60	8	Benefited/Impact	1	60	8	Benefited/Impact	1	59	9	Benefited/Impact	1	59	9	Benefited/Impact	1
R150	1	B	1	59	7	Benefited/Impact	1	58	8	Benefited/Impact	1	57	9	Benefited/Impact	1	57	9	Benefited/Impact	1
R151	1	B	1	56	8	Benefited/Non-Imp	1	55	9	Benefited/Non-Imp	1	55	9	Benefited/Non-Imp	1	54	10	Benefited/Non-Imp	1
R152	1	B	1	59	6	Benefited/Impact	1	57	8	Benefited/Impact	1	57	8	Benefited/Impact	1	56	9	Benefited/Impact	1
R153	1	B	1	61	4	Impact! w/ Bar		60	5	Benefited/Impact	1	59	6	Benefited/Impact	1	58	7	Benefited/Impact	1
R154	1	B	1	57	7	Benefited/Non-Imp	1	56	8	Benefited/Non-Imp	1	56	8	Benefited/Non-Imp	1	55	9	Benefited/Non-Imp	1
R155	1	B	1	60	6	Benefited/Impact	1	59	7	Benefited/Impact	1	58	8	Benefited/Impact	1	58	8	Benefited/Impact	1
R156	1	B	1	60	7	Benefited/Impact	1	59	8	Benefited/Impact	1	59	8	Benefited/Impact	1	58	9	Benefited/Impact	1
R157	1	B	1	60	5	Benefited/Impact	1	59	6	Benefited/Impact	1	59	6	Benefited/Impact	1	58	7	Benefited/Impact	1
R158	1	B	1	60	4			59	5	Benefited/Non-Imp	1	59	5	Benefited/Non-Imp	1	58	6	Benefited/Non-Imp	1
R159	1	B	1	57	4			57	4			57	4			57	4		
R160	1	B	1	63	1			63	1			63	1			63	1		
R161	1	B	1	59	4			59	4			59	4			58	5	Benefited/Non-Imp	1
R162	1	B	1	57	5	Benefited/Non-Imp	1	56	6	Benefited/Non-Imp	1	56	6	Benefited/Non-Imp	1	55	7	Benefited/Non-Imp	1
R163	1	B	1	58	5	Benefited/Non-Imp	1	57	6	Benefited/Non-Imp	1	57	6	Benefited/Non-Imp	1	56	7	Benefited/Non-Imp	1
R164	1	B	1	57	5	Benefited/Non-Imp	1	56	6	Benefited/Non-Imp	1	56	6	Benefited/Non-Imp	1	56	6	Benefited/Non-Imp	1
R165	1	B	1	63	1			63	1			63	1			63	1		
R166	1	B	1	63	1			63	1			63	1			63	1		
R167	1	B	1	62	2			61	3			61	3			61	3		

U.S. Department of Transportation
Federal Highway Administration

Basic Noise Barrier Optimization Tool **8/5/2018**

I205CW Stafford Road to OR213
Wall 4

	10'	12'	14'	16'	18'	20'	22'	24'	Units
Average Wtd I.L. (benefited)	6.3	7.2	7.4	8	8.5	8.7	9.2	9.5	**dBA**
Maximum I.L.	10	12	13	14	15	16	17	17	**dBA**
Benefited/Impacted ≥ AFG	32	32	33	34	35	35	35	35	**# of dwelling units**
Benefited/Non Impact ≥ AFG	14	25	42	48	51	56	57	59	**# of dwelling units**
Total Benefited	46	57	75	82	86	91	92	94	**# of dwelling units**
Impacted Units ≥ NRDG	16	29	32	32	32	32	32	32	**# of dwelling units**
Benefited Units ≥ NRDG	17	34	43	48	62	72	76	78	**# of dwelling units**
Percent of impacts ≥ AFG	86%	86%	89%	92%	95%	95%	95%	95%	**%**
Percent of benefits ≥ NRDG	37%	60%	57%	59%	72%	79%	83%	83%	**%**
"Cost-Reasonable" ?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	**----**
Surface Area	15,183	18,217	21,256	24,292	27,326	30,361	33,396	36,432	**sq-feet**
Surface Area/Ben Rec	330	320	283	296	318	334	363	388	**sq-ft / ben rec**
Barrier Length	1,517	1,517	1,517	1,517	1,517	1,517	1,517	1,517	**ft**
Min Height	10	12	14	16	18	20	22	24	**ft**
Max Height	10	12	14	16	18	20	22	24	**ft**
Avg Height	10	12	14	16	18	20	22	24	**ft**
Total Barrier Cost	303,660	364,340	425,120	485,840	683,150	759,025	834,900	910,800	**$**
Cost/Ben Rec	6,601	6,392	5,668	5,925	7,944	8,341	9,075	9,689	**$ / ben rec**
Effectiveness/Cost Metric (E/C)	35.4	66.3	82.5	78.9	73.6	70.1	64.4	60.3	**----**

ODOT Acoustical Feasibilty Goal (dBA)	5
ODOT Acoustical Feasibilty Goal (%)	51%
ODOT Noise Reduction Design Goal (dBA)	7
ODOT Noise Reduction Design Goal (%)	1%

Project Information	No Barrier Analysis		10-ft Wall			12-ft Wall			14-ft Wall		
	No Barrier		Wall 4 HDR 12-2017			Wall 4 HDR 12-2017			Wall 4 HDR 12-2017		
			Average Wtd I.L. (benefited)	6.3	dB I.L. Avg	Average Wtd I.L.	7.2	dB I.L. Avg	Average Wtd I.L.	7.4	dB I.L. Avg
			Maximum I.L.	10	dB I.L. Max	Maximum I.L.	12	dB I.L. Max	Maximum I.L.	13	dB I.L. Max
I205CW Stafford Road to OR213	Total Units Exposed to Impact	37	Benefited/Impacted ≥ AFG	32	# Prot Units	Benefited/Impacted ≥ AFG	32	# Prot Units	Benefited/Impacted ≥ AFG	33	# Prot Units
Contract No. K19786CW	# Impacts - NAC only	37	Benefited/Non Impact ≥ AFG	14	# Units	Benefited/Non Impact ≥ AFG	25	# Units	Benefited/Non Impact ≥ AFG	42	# Units
I205CW_Build_Wall3to4	# Impacts - SI only	0	Total Benefited	46	# Ben Units	Total Benefited	57	# Ben Units	Total Benefited	75	# Ben Units
Wall 4	# Impacts - Both NAC & SI	0	Impacted Units ≥ NRDG	16	# Units	Impacted Units ≥ NRDG	29	# Units	Impacted Units ≥ NRDG	32	# Units
HMMH			Benefited Units ≥ NRDG	17	# Units	Benefited Units ≥ NRDG	34	# Units	Benefited Units ≥ NRDG	43	# Units
Scott Noel			Percent of impacts ≥ AFG	86%	% Ben Units	Percent of impacts ≥ AFG	86%	% Ben Units	Percent of impacts ≥ AFG	89%	% Ben Units
8/5/2018			Percent of benefits ≥ NRDG	37%	% NRDG Units	Percent of benefits ≥ NRDG	60%	% NRDG Units	Percent of benefits ≥ NRDG	57%	% NRDG Units
			"Cost-Reasonable" ?	Yes		"Cost-Reasonable" ?	Yes		"Cost-Reasonable" ?	Yes	
			Surface Area	15183	Sq Feet	Surface Area	18217	Sq Feet	Surface Area	21256	Sq Feet
			Surface Area/Ben Rec	330	Sq Feet	Surface Area/Ben Rec	320	Sq Feet	Surface Area/Ben Rec	283	Sq Feet
			Barrier Length	1,517	Feet	Barrier Length	1,517	Feet	Barrier Length	1,517	Feet
			Min Height	10.0	Feet	Min Height	12.0	Feet	Min Height	14.0	Feet
			Max Height	10.0	Feet	Max Height	12.0	Feet	Max Height	14.0	Feet
			Avg Height	10.0	Feet	Avg Height	12.0	Feet	Avg Height	14.0	Feet
			Total Barrier Cost	$303,660		Total Barrier Cost	$364,340		Total Barrier Cost	$425,120	
	Enter SI Info		Cost/Ben Rec	$6,601		Cost/Ben Rec	$6,392		Cost/Ben Rec	$5,668	

Receiver ID	Row	FHWA Act Cat	No. of Dwelling Units	Type of Impact		Impact?	No. of Impacted Units	With Barrier Sound Levels, Impact and Benefit				With Barrier Sound Levels, Impact and Benefit				With Barrier Sound Levels, Impact and Benefit			
				Bld Leq > NAC?	Sub. Inc.?			Leq(dBA)	IL (db)	Impacted?	No. Benefited	Leq(dBA)	IL (db)	Impacted?	No. Benefited	Leq(dBA)	IL (db)	Impacted?	No. Benefited
ST-6	1	C	1	63				60	3			60	3			59	4		
R168	1	B	1	68		Impact!	1	67	1	Impact! w/ Bar		67	1	Impact! w/ Bar		67	1	Impact! w/ Bar	
R169	1	B	1	68		Impact!	1	66	2	Impact! w/ Bar		66	2	Impact! w/ Bar		66	2	Impact! w/ Bar	
R170	1	B	1	60				56	4			56	4			55	5	Benefited/Non-Imp	1
R171	1	B	1	65		Impact!	1	59	6	Benefited/Impact	1	58	7	Benefited/Impact	1	57	8	Benefited/Impact	1
R172	1	B	1	71		Impact!	1	62	9	Benefited/Impact	1	60	11	Benefited/Impact	1	59	12	Benefited/Impact	1
R173	1	B	1	60				56	4			55	5	Benefited/Non-Imp	1	54	6	Benefited/Non-Imp	1
R174	1	B	1	65		Impact!	1	58	7	Benefited/Impact	1	57	8	Benefited/Impact	1	56	9	Benefited/Impact	1
R175	1	B	1	71		Impact!	1	61	10	Benefited/Impact	1	59	12	Benefited/Impact	1	58	13	Benefited/Impact	1
R176	1	B	1	60				56	4			56	4			55	5	Benefited/Non-Imp	1
R177	1	B	1	65		Impact!	1	58	7	Benefited/Impact	1	58	7	Benefited/Impact	1	57	8	Benefited/Impact	1
R178	1	B	1	71		Impact!	1	61	10	Benefited/Impact	1	60	11	Benefited/Impact	1	58	13	Benefited/Impact	1
R179	1	B	1	60				56	4			55	5	Benefited/Non-Imp	1	55	5	Benefited/Non-Imp	1
R180	1	B	1	65		Impact!	1	58	7	Benefited/Impact	1	57	8	Benefited/Impact	1	56	9	Benefited/Impact	1
R181	1	B	1	71		Impact!	1	61	10	Benefited/Impact	1	59	12	Benefited/Impact	1	58	13	Benefited/Impact	1
R182	1	B	1	59				55	4			54	5	Benefited/Non-Imp	1	53	6	Benefited/Non-Imp	1
R183	1	B	1	62				56	6	Benefited/Non-Imp	1	55	7	Benefited/Non-Imp	1	54	8	Benefited/Non-Imp	1
R184	1	B	1	59				55	4			54	5	Benefited/Non-Imp	1	54	5	Benefited/Non-Imp	1
R185	1	B	1	63				56	7	Benefited/Non-Imp	1	55	8	Benefited/Non-Imp	1	54	9	Benefited/Non-Imp	1
R186	1	B	1	63				59	4			58	5	Benefited/Non-Imp	1	57	6	Benefited/Non-Imp	1
R187	1	B	1	67		Impact!	1	61	6	Benefited/Impact	1	59	8	Benefited/Impact	1	59	8	Benefited/Impact	1
R188	1	B	1	63				59	4			58	5	Benefited/Non-Imp	1	57	6	Benefited/Non-Imp	1
R189	1	B	1	67		Impact!	1	61	6	Benefited/Impact	1	59	8	Benefited/Impact	1	58	9	Benefited/Impact	1
R190	1	B	1	63				58	5	Benefited/Non-Imp	1	57	6	Benefited/Non-Imp	1	57	6	Benefited/Non-Imp	1
R191	1	B	1	67		Impact!	1	60	7	Benefited/Impact	1	59	8	Benefited/Impact	1	58	9	Benefited/Impact	1
R192	1	B	1	63				58	5	Benefited/Non-Imp	1	57	6	Benefited/Non-Imp	1	57	6	Benefited/Non-Imp	1
R193	1	B	1	67		Impact!	1	60	7	Benefited/Impact	1	59	8	Benefited/Impact	1	58	9	Benefited/Impact	1
R194	1	B	1	61				57	4			56	5	Benefited/Non-Imp	1	56	5	Benefited/Non-Imp	1
R195	1	B	1	67		Impact!	1	59	8	Benefited/Impact	1	58	9	Benefited/Impact	1	57	10	Benefited/Impact	1
R196	1	B	1	61				57	4			56	5	Benefited/Non-Imp	1	55	6	Benefited/Non-Imp	1
R197	1	B	1	67		Impact!	1	59	8	Benefited/Impact	1	58	9	Benefited/Impact	1	57	10	Benefited/Impact	1
R198	1	B	1	60				57	3			56	4			55	5	Benefited/Non-Imp	1
R199	1	B	1	66		Impact!	1	59	7	Benefited/Impact	1	57	9	Benefited/Impact	1	56	10	Benefited/Impact	1
R200	1	B	1	60				56	4			55	5	Benefited/Non-Imp	1	54	6	Benefited/Non-Imp	1
R201	1	B	1	65		Impact!	1	60	5	Benefited/Impact	1	57	8	Benefited/Impact	1	56	9	Benefited/Impact	1
R202	1	B	1	60				56	4			55	5	Benefited/Non-Imp	1	54	6	Benefited/Non-Imp	1
R203	1	B	1	65		Impact!	1	60	5	Benefited/Impact	1	57	8	Benefited/Impact	1	56	9	Benefited/Impact	1
R204	1	B	1	59				56	3			55	4			54	5	Benefited/Non-Imp	1
R205	1	B	1	64				59	5	Benefited/Non-Imp	1	57	7	Benefited/Non-Imp	1	56	8	Benefited/Non-Imp	1
R206	1	B	1	60				57	3			56	4			55	5	Benefited/Non-Imp	1
R207	1	B	1	65		Impact!	1	60	5	Benefited/Impact	1	58	7	Benefited/Impact	1	56	9	Benefited/Impact	1
R208	1	B	1	60				57	3			56	4			55	5	Benefited/Non-Imp	1
R209	1	B	1	65		Impact!	1	60	5	Benefited/Impact	1	58	7	Benefited/Impact	1	56	9	Benefited/Impact	1
R210	1	B	1	67		Impact!	1	62	5	Benefited/Impact	1	60	7	Benefited/Impact	1	59	8	Benefited/Impact	1
R211	1	B	1	67		Impact!	1	62	5	Benefited/Impact	1	60	7	Benefited/Impact	1	59	8	Benefited/Impact	1
R212	1	B	1	60				57	3			56	4			56	4		
R213	1	B	1	65		Impact!	1	60	5	Benefited/Impact	1	58	7	Benefited/Impact	1	57	8	Benefited/Impact	1
R214	1	B	1	60				57	3			56	4			55	5	Benefited/Non-Imp	1
R215	1	B	1	65		Impact!	1	60	5	Benefited/Impact	1	58	7	Benefited/Impact	1	57	8	Benefited/Impact	1
R216	1	B	1	66		Impact!	1	61	5	Benefited/Impact	1	60	6	Benefited/Impact	1	58	8	Benefited/Impact	1
R217	1	B	1	67		Impact!	1	61	6	Benefited/Impact	1	60	7	Benefited/Impact	1	59	8	Benefited/Impact	1
R218	1	B	1	60				58	2			57	3			57	3		
R219	1	B	1	64				59	5	Benefited/Non-Imp	1	58	6	Benefited/Non-Imp	1	58	6	Benefited/Non-Imp	1
R220	1	B	1	60				57	3			57	3			56	4		
R221	1	B	1	65		Impact!	1	59	6	Benefited/Impact	1	58	7	Benefited/Impact	1	58	7	Benefited/Impact	1
R222	1	B	1	66		Impact!	1	61	5	Benefited/Impact	1	60	6	Benefited/Impact	1	59	7	Benefited/Impact	1
R223	1	B	1	66		Impact!	1	61	5	Benefited/Impact	1	60	6	Benefited/Impact	1	59	7	Benefited/Impact	1

Project Information	No Barrier Analysis		10-ft Wall			12-ft Wall			14-ft Wall		
	No Barrier		Wall 4 HDR 12-2017			Wall 4 HDR 12-2017			Wall 4 HDR 12-2017		
			Average Wtd I.L. (benefited)	6.3	dB I.L. Avg	Average Wtd I.L.	7.2	dB I.L. Avg	Average Wtd I.L.	7.4	dB I.L. Avg
			Maximum I.L.	10	dB I.L. Max	Maximum I.L.	12	dB I.L. Max	Maximum I.L.	13	dB I.L. Max
I205CW Stafford Road to OR213	Total Units Exposed to Impact	37	Benefited/Impacted ≥ AFG	32	# Prot Units	Benefited/Impacted ≥ AFG	32	# Prot Units	Benefited/Impacted ≥ AFG	33	# Prot Units
Contract No. K19786CW	# Impacts - NAC only	37	Benefited/Non Impact ≥ AFG	14	# Units	Benefited/Non Impact ≥ AFG	25	# Units	Benefited/Non Impact ≥ AFG	42	# Units
I205CW_Build_Wall3to4	# Impacts - SI only	0	Total Benefited	46	# Ben Units	Total Benefited	57	# Ben Units	Total Benefited	75	# Ben Units
Wall 4	# Impacts - Both NAC & SI	0	Impacted Units ≥ NRDG	16	# Units	Impacted Units ≥ NRDG	29	# Units	Impacted Units ≥ NRDG	32	# Units
HMMH			Benefited Units ≥ NRDG	17	# Units	Benefited Units ≥ NRDG	34	# Units	Benefited Units ≥ NRDG	43	# Units
Scott Noel			Percent of impacts ≥ AFG	86%	% Ben Units	Percent of impacts ≥ AFG	86%	% Ben Units	Percent of impacts ≥ AFG	89%	% Ben Units
8/5/2018			Percent of benefits ≥ NRDG	37%	% NRDG Units	Percent of benefits ≥ NRDG	60%	% NRDG Units	Percent of benefits ≥ NRDG	57%	% NRDG Units
			"Cost-Reasonable" ?	Yes		"Cost-Reasonable" ?	Yes		"Cost-Reasonable" ?	Yes	
			Surface Area	15183	Sq Feet	Surface Area	18217	Sq Feet	Surface Area	21256	Sq Feet
U.S. Department of Transportation Federal Highway Administration			Surface Area/Ben Rec	330	Sq Feet	Surface Area/Ben Rec	320	Sq Feet	Surface Area/Ben Rec	283	Sq Feet
			Barrier Length	1,517	Feet	Barrier Length	1,517	Feet	Barrier Length	1,517	Feet
			Min Height	10.0	Feet	Min Height	12.0	Feet	Min Height	14.0	Feet
			Max Height	10.0	Feet	Max Height	12.0	Feet	Max Height	14.0	Feet
			Avg Height	10.0	Feet	Avg Height	12.0	Feet	Avg Height	14.0	Feet
			Total Barrier Cost	$303,660		Total Barrier Cost	$364,340		Total Barrier Cost	$425,120	
	Enter SI Info		Cost/Ben Rec	$6,601		Cost/Ben Rec	$6,392		Cost/Ben Rec	$5,668	

Receiver ID	Row	FHWA Act Cat	No. of Dwelling Units	Type of Impact		Impact?	No. of Impacted Units	With Barrier Sound Levels, Impact and Benefit				With Barrier Sound Levels, Impact and Benefit				With Barrier Sound Levels, Impact and Benefit			
				Bld Leq > NAC?	Sub. Inc.?			Leq(dBA)	IL (db)	Impacted?	No. Benefited	Leq(dBA)	IL (db)	Impacted?	No. Benefited	Leq(dBA)	IL (db)	Impacted?	No. Benefited
R224	1	B	1	59				57	2			56	3			56	3		
R225	1	B	1	64				59	5	Benefited/Non-Imp	1	58	6	Benefited/Non-Imp	1	57	7	Benefited/Non-Imp	1
R226	1	B	1	71		Impact!	1	64	7	Benefited/Impact	1	61	10	Benefited/Impact	1	60	11	Benefited/Impact	1
R227	1	B	1	59				57	2			56	3			55	4		
R228	1	B	1	64				59	5	Benefited/Non-Imp	1	58	6	Benefited/Non-Imp	1	57	7	Benefited/Non-Imp	1
R229	1	B	1	71		Impact!	1	63	8	Benefited/Impact	1	60	11	Benefited/Impact	1	59	12	Benefited/Impact	1
R230	1	B	1	59				57	2			56	3			55	4		
R231	1	B	1	64				59	5	Benefited/Non-Imp	1	58	6	Benefited/Non-Imp	1	57	7	Benefited/Non-Imp	1
R232	1	B	1	71		Impact!	1	63	8	Benefited/Impact	1	61	10	Benefited/Impact	1	59	12	Benefited/Impact	1
R233	1	B	1	60				56	4			56	4			55	5	Benefited/Non-Imp	1
R234	1	B	1	64				59	5	Benefited/Non-Imp	1	58	6	Benefited/Non-Imp	1	57	7	Benefited/Non-Imp	1
R235	1	B	1	70		Impact!	1	62	8	Benefited/Impact	1	60	10	Benefited/Impact	1	59	11	Benefited/Impact	1
R236	1	B	1	59				55	4			54	5	Benefited/Non-Imp	1	54	5	Benefited/Non-Imp	1
R237	1	B	1	62				57	5	Benefited/Non-Imp	1	56	6	Benefited/Non-Imp	1	55	7	Benefited/Non-Imp	1
R238	1	B	1	58				55	3			54	4			53	5	Benefited/Non-Imp	1
R239	1	B	1	62				57	5	Benefited/Non-Imp	1	56	6	Benefited/Non-Imp	1	55	7	Benefited/Non-Imp	1
R240	1	B	1	58				55	3			54	4			54	4		
R241	1	B	1	63				57	6	Benefited/Non-Imp	1	56	7	Benefited/Non-Imp	1	55	8	Benefited/Non-Imp	1
R242	1	B	1	58				55	3			54	4			53	5	Benefited/Non-Imp	1
R243	1	B	1	63				57	6	Benefited/Non-Imp	1	56	7	Benefited/Non-Imp	1	55	8	Benefited/Non-Imp	1
R244	1	B	1	61				60	1			60	1			59	2		
R245	1	B	1	63				60	3			59	4			58	5	Benefited/Non-Imp	1
R246	1	B	1	62				59	3			58	4			58	4		
R247	1	B	1	62				59	3			58	4			57	5	Benefited/Non-Imp	1
R248	1	B	1	62				59	3			58	4			57	5	Benefited/Non-Imp	1
R249	1	B	1	61				58	3			57	4			56	5	Benefited/Non-Imp	1
R250	1	B	1	60				57	3			56	4			56	4		
R251	1	B	1	59				57	2			56	3			56	3		
R252	1	B	1	59				58	1			57	2			56	3		
R253	1	B	1	59				57	2			56	3			54	5	Benefited/Non-Imp	1
R254	1	B	1	59				57	2			56	3			55	4		
R255	1	B	1	59				57	2			56	3			56	3		
R256	1	B	1	64				61	3			60	4			60	4		
R257	1	B	1	62				60	2			59	3			59	3		
R258	1	B	1	61				59	2			59	2			59	2		
R259	1	B	1	61				59	2			59	2			58	3		
R260	1	B	1	60				58	2			58	2			58	2		
R261	1	B	1	59				58	1			57	2			57	2		
R262	1	B	1	59				58	1			57	2			57	2		
R263	1	B	1	59				57	2			57	2			57	2		
R264	1	B	1	61				59	2			57	4			56	5	Benefited/Non-Imp	1
R265	1	B	1	61				59	2			57	4			56	5	Benefited/Non-Imp	1
R266	1	B	1	58				57	1			56	2			55	3		
R267	1	B	1	59				58	1			57	2			57	2		
R268	1	B	1	62				60	2			59	3			59	3		
R269	1	B	1	63				61	2			61	2			60	3		
R270	1	B	1	63				62	1			61	2			60	3		
R271	1	B	1	65		Impact!	1	62	3	Impact! w/ Bar		61	4	Impact! w/ Bar		61	4	Impact! w/ Bar	
R272	1	B	1	66		Impact!	1	63	3	Impact! w/ Bar		62	4	Impact! w/ Bar		61	5	Benefited/Impact	1
R273	1	B	1	67		Impact!	1	64	3	Impact! w/ Bar		63	4	Impact! w/ Bar		63	4	Impact! w/ Bar	

Project Information	16-ft Wall			18-ft Wall			20-ft Wall			22-ft Wall		
	Wall 4 HDR 12-2017			Wall 4 HDR 12-2017			Wall 4 HDR 12-2017			Wall 4 HDR 12-2017		
	Average Wtd I.L.	8.0	dB I.L. Avg	Average Wtd I.L.	8.5	dB I.L. Avg	Average Wtd I.L.	8.7	dB I.L. Avg	Average Wtd I.L.	9.2	dB I.L. Avg
	Maximum I.L.	14	dB I.L. Max	Maximum I.L.	15	dB I.L. Max	Maximum I.L.	16	dB I.L. Max	Maximum I.L.	17	dB I.L. Max
I205CW Stafford Road to OR213	Benefited/Impacted ≥ AFG	34	# Prot Units	Benefited/Impacted ≥ AFG	35	# Prot Units	Benefited/Impacted ≥ AFG	35	# Prot Units	Benefited/Impacted ≥ AFG	35	# Prot Units
Contract No. K19786CW	Benefited/Non Impact ≥ AFG	48	# Units	Benefited/Non Impact ≥ AFG	51	# Units	Benefited/Non Impact ≥ AFG	56	# Units	Benefited/Non Impact ≥ AFG	57	# Units
I205CW_Build_Wall3to4	Total Benefited	82	# Ben Units	Total Benefited	86	# Ben Units	Total Benefited	91	# Ben Units	Total Benefited	92	# Ben Units
Wall 4	Impacted Units ≥ NRDG	32	# Units	Impacted Units ≥ NRDG	32	# Units	Impacted Units ≥ NRDG	32	# Units	Impacted Units ≥ NRDG	32	# Units
HMMH	Benefited Units ≥ NRDG	48	# Units	Benefited Units ≥ NRDG	62	# Units	Benefited Units ≥ NRDG	72	# Units	Benefited Units ≥ NRDG	76	# Units
Scott Noel	Percent of impacts ≥ AFG	92%	% Ben Units	Percent of impacts ≥ AFG	95%	% Ben Units	Percent of impacts ≥ AFG	95%	% Ben Units	Percent of impacts ≥ AFG	95%	% Ben Units
8/5/2018	Percent of benefits ≥ NRDG	59%	% NRDG Units	Percent of benefits ≥ NRDG	72%	% NRDG Units	Percent of benefits ≥ NRDG	79%	% NRDG Units	Percent of benefits ≥ NRDG	83%	% NRDG Units
	"Cost-Reasonable" ?	Yes		"Cost-Reasonable" ?	Yes		"Cost-Reasonable" ?	Yes		"Cost-Reasonable" ?	Yes	
	Surface Area	24292	Sq Feet	Surface Area	27326	Sq Feet	Surface Area	30361	Sq Feet	Surface Area	33396	Sq Feet
	Surface Area/Ben Rec	296	Sq Feet	Surface Area/Ben Rec	318	Sq Feet	Surface Area/Ben Rec	334	Sq Feet	Surface Area/Ben Rec	363	Sq Feet
	Barrier Length	1,517	Feet	Barrier Length	1,517	Feet	Barrier Length	1,517	Feet	Barrier Length	1,517	Feet
	Min Height	16.0	Feet	Min Height	18.0	Feet	Min Height	20.0	Feet	Min Height	22.0	Feet
	Max Height	16.0	Feet	Max Height	18.0	Feet	Max Height	20.0	Feet	Max Height	22.0	Feet
	Avg Height	16.0	Feet	Avg Height	18.0	Feet	Avg Height	20.0	Feet	Avg Height	22.0	Feet
	Total Barrier Cost	$485,840		Total Barrier Cost	$683,150		Total Barrier Cost	$759,025		Total Barrier Cost	$834,900	
	Cost/Ben Rec	$5,924.88		Cost/Ben Rec	$7,944		Cost/Ben Rec	$8,341		Cost/Ben Rec	$9,075	

				With Barrier Sound Levels, Impact and Benefit				With Barrier Sound Levels, Impact and Benefit				With Barrier Sound Levels, Impact and Benefit				With Barrier Sound Levels, Impact and Benefit			
Receiver ID	Row	FHWA Act Cat	No. of Dwelling Units	Leq(dBA)	IL (db)	Impacted?	No. Benefited	Leq(dBA)	IL (db)	Impacted?	No. Benefited	Leq(dBA)	IL (db)	Impacted?	No. Benefited	Leq(dBA)	IL (db)	Impacted?	No. Benefited
ST-6	1	C	1	59	4			59	4			58	5	Benefited/Non-Imp	1	58	5	Benefited/Non-Imp	1
R168	1	B	1	67	1	Impact! w/ Bar		67	1	Impact! w/ Bar		67	1	Impact! w/ Bar		67	1	Impact! w/ Bar	
R169	1	B	1	66	2	Impact! w/ Bar		66	2	Impact! w/ Bar		66	2	Impact! w/ Bar		65	3	Impact! w/ Bar	
R170	1	B	1	54	6	Benefited/Non-Imp	1	54	6	Benefited/Non-Imp	1	53	7	Benefited/Non-Imp	1	52	8	Benefited/Non-Imp	1
R171	1	B	1	56	9	Benefited/Impact	1	55	10	Benefited/Impact	1	55	10	Benefited/Impact	1	54	11	Benefited/Impact	1
R172	1	B	1	58	13	Benefited/Impact	1	56	15	Benefited/Impact	1	56	15	Benefited/Impact	1	55	16	Benefited/Impact	1
R173	1	B	1	54	6	Benefited/Non-Imp	1	53	7	Benefited/Non-Imp	1	52	8	Benefited/Non-Imp	1	52	8	Benefited/Non-Imp	1
R174	1	B	1	55	10	Benefited/Impact	1	55	10	Benefited/Impact	1	54	11	Benefited/Impact	1	53	12	Benefited/Impact	1
R175	1	B	1	57	14	Benefited/Impact	1	56	15	Benefited/Impact	1	55	16	Benefited/Impact	1	54	17	Benefited/Impact	1
R176	1	B	1	54	6	Benefited/Non-Imp	1	54	6	Benefited/Non-Imp	1	53	7	Benefited/Non-Imp	1	53	7	Benefited/Non-Imp	1
R177	1	B	1	56	9	Benefited/Impact	1	55	10	Benefited/Impact	1	55	10	Benefited/Impact	1	54	11	Benefited/Impact	1
R178	1	B	1	57	14	Benefited/Impact	1	56	15	Benefited/Impact	1	56	15	Benefited/Impact	1	55	16	Benefited/Impact	1
R179	1	B	1	54	6	Benefited/Non-Imp	1	53	7	Benefited/Non-Imp	1	53	7	Benefited/Non-Imp	1	52	8	Benefited/Non-Imp	1
R180	1	B	1	55	10	Benefited/Impact	1	55	10	Benefited/Impact	1	54	11	Benefited/Impact	1	54	11	Benefited/Impact	1
R181	1	B	1	57	14	Benefited/Impact	1	56	15	Benefited/Impact	1	55	16	Benefited/Impact	1	55	16	Benefited/Impact	1
R182	1	B	1	52	7	Benefited/Non-Imp	1	52	7	Benefited/Non-Imp	1	51	8	Benefited/Non-Imp	1	51	8	Benefited/Non-Imp	1
R183	1	B	1	53	9	Benefited/Non-Imp	1	53	9	Benefited/Non-Imp	1	52	10	Benefited/Non-Imp	1	52	10	Benefited/Non-Imp	1
R184	1	B	1	53	6	Benefited/Non-Imp	1	52	7	Benefited/Non-Imp	1	52	7	Benefited/Non-Imp	1	51	8	Benefited/Non-Imp	1
R185	1	B	1	54	9	Benefited/Non-Imp	1	53	10	Benefited/Non-Imp	1	52	11	Benefited/Non-Imp	1	52	11	Benefited/Non-Imp	1
R186	1	B	1	57	6	Benefited/Non-Imp	1	56	7	Benefited/Non-Imp	1	55	8	Benefited/Non-Imp	1	55	8	Benefited/Non-Imp	1
R187	1	B	1	58	9	Benefited/Impact	1	57	10	Benefited/Impact	1	56	11	Benefited/Impact	1	56	11	Benefited/Impact	1
R188	1	B	1	56	7	Benefited/Non-Imp	1	56	7	Benefited/Non-Imp	1	55	8	Benefited/Non-Imp	1	55	8	Benefited/Non-Imp	1
R189	1	B	1	58	9	Benefited/Impact	1	57	10	Benefited/Impact	1	56	11	Benefited/Impact	1	56	11	Benefited/Impact	1
R190	1	B	1	56	7	Benefited/Non-Imp	1	55	8	Benefited/Non-Imp	1	55	8	Benefited/Non-Imp	1	54	9	Benefited/Non-Imp	1
R191	1	B	1	57	10	Benefited/Impact	1	56	11	Benefited/Impact	1	56	11	Benefited/Impact	1	55	12	Benefited/Impact	1
R192	1	B	1	56	7	Benefited/Non-Imp	1	55	8	Benefited/Non-Imp	1	55	8	Benefited/Non-Imp	1	54	9	Benefited/Non-Imp	1
R193	1	B	1	57	10	Benefited/Impact	1	56	11	Benefited/Impact	1	56	11	Benefited/Impact	1	55	12	Benefited/Impact	1
R194	1	B	1	55	6	Benefited/Non-Imp	1	54	7	Benefited/Non-Imp	1	54	7	Benefited/Non-Imp	1	53	8	Benefited/Non-Imp	1
R195	1	B	1	56	11	Benefited/Impact	1	55	12	Benefited/Impact	1	55	12	Benefited/Impact	1	54	13	Benefited/Impact	1
R196	1	B	1	55	6	Benefited/Non-Imp	1	54	7	Benefited/Non-Imp	1	54	7	Benefited/Non-Imp	1	53	8	Benefited/Non-Imp	1
R197	1	B	1	56	11	Benefited/Impact	1	55	12	Benefited/Impact	1	54	13	Benefited/Impact	1	54	13	Benefited/Impact	1
R198	1	B	1	54	6	Benefited/Non-Imp	1	53	7	Benefited/Non-Imp	1	53	7	Benefited/Non-Imp	1	53	7	Benefited/Non-Imp	1
R199	1	B	1	55	11	Benefited/Impact	1	55	11	Benefited/Impact	1	54	12	Benefited/Impact	1	54	12	Benefited/Impact	1
R200	1	B	1	54	6	Benefited/Non-Imp	1	53	7	Benefited/Non-Imp	1	53	7	Benefited/Non-Imp	1	52	8	Benefited/Non-Imp	1
R201	1	B	1	55	10	Benefited/Impact	1	54	11	Benefited/Impact	1	54	11	Benefited/Impact	1	53	12	Benefited/Impact	1
R202	1	B	1	54	6	Benefited/Non-Imp	1	53	7	Benefited/Non-Imp	1	53	7	Benefited/Non-Imp	1	52	8	Benefited/Non-Imp	1
R203	1	B	1	55	10	Benefited/Impact	1	54	11	Benefited/Impact	1	54	11	Benefited/Impact	1	53	12	Benefited/Impact	1
R204	1	B	1	53	6	Benefited/Non-Imp	1	53	6	Benefited/Non-Imp	1	53	6	Benefited/Non-Imp	1	52	7	Benefited/Non-Imp	1
R205	1	B	1	55	9	Benefited/Non-Imp	1	54	10	Benefited/Non-Imp	1	54	10	Benefited/Non-Imp	1	53	11	Benefited/Non-Imp	1
R206	1	B	1	54	6	Benefited/Non-Imp	1	54	6	Benefited/Non-Imp	1	53	7	Benefited/Non-Imp	1	53	7	Benefited/Non-Imp	1
R207	1	B	1	56	9	Benefited/Impact	1	55	10	Benefited/Impact	1	54	11	Benefited/Impact	1	54	11	Benefited/Impact	1
R208	1	B	1	54	6	Benefited/Non-Imp	1	54	6	Benefited/Non-Imp	1	53	7	Benefited/Non-Imp	1	53	7	Benefited/Non-Imp	1
R209	1	B	1	56	9	Benefited/Impact	1	55	10	Benefited/Impact	1	54	11	Benefited/Impact	1	54	11	Benefited/Impact	1
R210	1	B	1	58	9	Benefited/Impact	1	57	10	Benefited/Impact	1	57	10	Benefited/Impact	1	57	10	Benefited/Impact	1
R211	1	B	1	58	9	Benefited/Impact	1	57	10	Benefited/Impact	1	57	10	Benefited/Impact	1	57	10	Benefited/Impact	1
R212	1	B	1	55	5	Benefited/Non-Imp	1	55	5	Benefited/Non-Imp	1	55	5	Benefited/Non-Imp	1	54	6	Benefited/Non-Imp	1
R213	1	B	1	56	9	Benefited/Impact	1	55	10	Benefited/Impact	1	55	10	Benefited/Impact	1	55	10	Benefited/Impact	1
R214	1	B	1	55	5	Benefited/Non-Imp	1	54	6	Benefited/Non-Imp	1	54	6	Benefited/Non-Imp	1	54	6	Benefited/Non-Imp	1
R215	1	B	1	56	9	Benefited/Impact	1	55	10	Benefited/Impact	1	55	10	Benefited/Impact	1	54	11	Benefited/Impact	1
R216	1	B	1	57	9	Benefited/Impact	1	57	9	Benefited/Impact	1	56	10	Benefited/Impact	1	56	10	Benefited/Impact	1
R217	1	B	1	58	9	Benefited/Impact	1	57	10	Benefited/Impact	1	57	10	Benefited/Impact	1	57	10	Benefited/Impact	1
R218	1	B	1	56	4			56	4			56	4			56	4		
R219	1	B	1	57	7	Benefited/Non-Imp	1	57	7	Benefited/Non-Imp	1	57	7	Benefited/Non-Imp	1	56	8	Benefited/Non-Imp	1
R220	1	B	1	56	4			56	4			55	5	Benefited/Non-Imp	1	55	5	Benefited/Non-Imp	1
R221	1	B	1	57	8	Benefited/Impact	1	57	8	Benefited/Impact	1	56	9	Benefited/Impact	1	56	9	Benefited/Impact	1
R222	1	B	1	58	8	Benefited/Impact	1	58	8	Benefited/Impact	1	58	8	Benefited/Impact	1	57	9	Benefited/Impact	1
R223	1	B	1	58	8	Benefited/Impact	1	58	8	Benefited/Impact	1	58	8	Benefited/Impact	1	58	8	Benefited/Impact	1

Project Information

I205CW Stafford Road to OR213
Contract No. K19786CW
I205CW_Build_Wall3to4
Wall 4
HMMH
Scott Noel
8/5/2018

16-ft Wall Wall 4 HDR 12-2017			18-ft Wall Wall 4 HDR 12-2017			20-ft Wall Wall 4 HDR 12-2017			22-ft Wall Wall 4 HDR 12-2017		
Average Wtd I.L.	8.0	dB I.L. Avg	Average Wtd I.L.	8.5	dB I.L. Avg	Average Wtd I.L.	8.7	dB I.L. Avg	Average Wtd I.L.	9.2	dB I.L. Avg
Maximum I.L.	14	dB I.L. Max	Maximum I.L.	15	dB I.L. Max	Maximum I.L.	16	dB I.L. Max	Maximum I.L.	17	dB I.L. Max
Benefited/Impacted ≥ AFG	34	# Prot Units	Benefited/Impacted ≥ AFG	35	# Prot Units	Benefited/Impacted ≥ AFG	35	# Prot Units	Benefited/Impacted ≥ AFG	35	# Prot Units
Benefited/Non Impact ≥ AFG	48	# Units	Benefited/Non Impact ≥ AFG	51	# Units	Benefited/Non Impact ≥ AFG	56	# Units	Benefited/Non Impact ≥ AFG	57	# Units
Total Benefited	82	# Ben Units	Total Benefited	86	# Ben Units	Total Benefited	91	# Ben Units	Total Benefited	92	# Ben Units
Impacted Units ≥ NRDG	32	# Units	Impacted Units ≥ NRDG	32	# Units	Impacted Units ≥ NRDG	32	# Units	Impacted Units ≥ NRDG	32	# Units
Benefited Units ≥ NRDG	48	# Units	Benefited Units ≥ NRDG	62	# Units	Benefited Units ≥ NRDG	72	# Units	Benefited Units ≥ NRDG	76	# Units
Percent of impacts ≥ AFG	92%	% Ben Units	Percent of impacts ≥ AFG	95%	% Ben Units	Percent of impacts ≥ AFG	95%	% Ben Units	Percent of impacts ≥ AFG	95%	% Ben Units
Percent of benefits ≥ NRDG	59%	% NRDG Units	Percent of benefits ≥ NRDG	72%	% NRDG Units	Percent of benefits ≥ NRDG	79%	% NRDG Units	Percent of benefits ≥ NRDG	83%	% NRDG Units
"Cost-Reasonable" ?	Yes		"Cost-Reasonable" ?	Yes		"Cost-Reasonable" ?	Yes		"Cost-Reasonable" ?	Yes	
Surface Area	24292	Sq Feet	Surface Area	27326	Sq Feet	Surface Area	30361	Sq Feet	Surface Area	33396	Sq Feet
Surface Area/Ben Rec	296	Sq Feet	Surface Area/Ben Rec	318	Sq Feet	Surface Area/Ben Rec	334	Sq Feet	Surface Area/Ben Rec	363	Sq Feet
Barrier Length	1,517	Feet	Barrier Length	1,517	Feet	Barrier Length	1,517	Feet	Barrier Length	1,517	Feet
Min Height	16.0	Feet	Min Height	18.0	Feet	Min Height	20.0	Feet	Min Height	22.0	Feet
Max Height	16.0	Feet	Max Height	18.0	Feet	Max Height	20.0	Feet	Max Height	22.0	Feet
Avg Height	16.0	Feet	Avg Height	18.0	Feet	Avg Height	20.0	Feet	Avg Height	22.0	Feet
Total Barrier Cost	$485,840		Total Barrier Cost	$683,150		Total Barrier Cost	$759,025		Total Barrier Cost	$834,900	
Cost/Ben Rec	$5,924.88		Cost/Ben Rec	$7,944		Cost/Ben Rec	$8,341		Cost/Ben Rec	$9,075	

Receiver ID	Row	FHWA Act Cat	No. of Dwelling Units	With Barrier Sound Levels, Impact and Benefit				With Barrier Sound Levels, Impact and Benefit				With Barrier Sound Levels, Impact and Benefit				With Barrier Sound Levels, Impact and Benefit			
				Leq(dBA)	IL (db)	Impacted?	No. Benefited	Leq(dBA)	IL (db)	Impacted?	No. Benefited	Leq(dBA)	IL (db)	Impacted?	No. Benefited	Leq(dBA)	IL (db)	Impacted?	No. Benefited
R224	1	B	1	55	4			54	5	Benefited/Non-Imp	1	54	5	Benefited/Non-Imp	1	53	6	Benefited/Non-Imp	1
R225	1	B	1	57	7	Benefited/Non-Imp	1	56	8	Benefited/Non-Imp	1	55	9	Benefited/Non-Imp	1	55	9	Benefited/Non-Imp	1
R226	1	B	1	58	13	Benefited/Impact	1	57	14	Benefited/Impact	1	57	14	Benefited/Impact	1	56	15	Benefited/Impact	1
R227	1	B	1	54	5	Benefited/Non-Imp	1	54	5	Benefited/Non-Imp	1	53	6	Benefited/Non-Imp	1	53	6	Benefited/Non-Imp	1
R228	1	B	1	56	8	Benefited/Non-Imp	1	55	9	Benefited/Non-Imp	1	55	9	Benefited/Non-Imp	1	54	10	Benefited/Non-Imp	1
R229	1	B	1	58	13	Benefited/Impact	1	57	14	Benefited/Impact	1	56	15	Benefited/Impact	1	55	16	Benefited/Impact	1
R230	1	B	1	55	4			54	5	Benefited/Non-Imp	1	53	6	Benefited/Non-Imp	1	53	6	Benefited/Non-Imp	1
R231	1	B	1	56	8	Benefited/Non-Imp	1	56	8	Benefited/Non-Imp	1	55	9	Benefited/Non-Imp	1	54	10	Benefited/Non-Imp	1
R232	1	B	1	58	13	Benefited/Impact	1	57	14	Benefited/Impact	1	56	15	Benefited/Impact	1	55	16	Benefited/Impact	1
R233	1	B	1	54	6	Benefited/Non-Imp	1	53	7	Benefited/Non-Imp	1	53	7	Benefited/Non-Imp	1	52	8	Benefited/Non-Imp	1
R234	1	B	1	56	8	Benefited/Non-Imp	1	55	9	Benefited/Non-Imp	1	54	10	Benefited/Non-Imp	1	54	10	Benefited/Non-Imp	1
R235	1	B	1	57	13	Benefited/Impact	1	56	14	Benefited/Impact	1	56	14	Benefited/Impact	1	55	15	Benefited/Impact	1
R236	1	B	1	53	6	Benefited/Non-Imp	1	52	7	Benefited/Non-Imp	1	51	8	Benefited/Non-Imp	1	51	8	Benefited/Non-Imp	1
R237	1	B	1	54	8	Benefited/Non-Imp	1	53	9	Benefited/Non-Imp	1	53	9	Benefited/Non-Imp	1	52	10	Benefited/Non-Imp	1
R238	1	B	1	53	5	Benefited/Non-Imp	1	52	6	Benefited/Non-Imp	1	51	7	Benefited/Non-Imp	1	51	7	Benefited/Non-Imp	1
R239	1	B	1	54	8	Benefited/Non-Imp	1	53	9	Benefited/Non-Imp	1	52	10	Benefited/Non-Imp	1	52	10	Benefited/Non-Imp	1
R240	1	B	1	53	5	Benefited/Non-Imp	1	52	6	Benefited/Non-Imp	1	52	6	Benefited/Non-Imp	1	51	7	Benefited/Non-Imp	1
R241	1	B	1	54	9	Benefited/Non-Imp	1	53	10	Benefited/Non-Imp	1	52	11	Benefited/Non-Imp	1	52	11	Benefited/Non-Imp	1
R242	1	B	1	52	6	Benefited/Non-Imp	1	52	6	Benefited/Non-Imp	1	51	7	Benefited/Non-Imp	1	51	7	Benefited/Non-Imp	1
R243	1	B	1	54	9	Benefited/Non-Imp	1	53	10	Benefited/Non-Imp	1	52	11	Benefited/Non-Imp	1	52	11	Benefited/Non-Imp	1
R244	1	B	1	58	3			58	3			57	4			56	5	Benefited/Non-Imp	1
R245	1	B	1	57	6	Benefited/Non-Imp	1	57	6	Benefited/Non-Imp	1	56	7	Benefited/Non-Imp	1	55	8	Benefited/Non-Imp	1
R246	1	B	1	57	5	Benefited/Non-Imp	1	56	6	Benefited/Non-Imp	1	55	7	Benefited/Non-Imp	1	55	7	Benefited/Non-Imp	1
R247	1	B	1	56	6	Benefited/Non-Imp	1	56	6	Benefited/Non-Imp	1	55	7	Benefited/Non-Imp	1	54	8	Benefited/Non-Imp	1
R248	1	B	1	56	6	Benefited/Non-Imp	1	55	7	Benefited/Non-Imp	1	55	7	Benefited/Non-Imp	1	54	8	Benefited/Non-Imp	1
R249	1	B	1	55	6	Benefited/Non-Imp	1	55	6	Benefited/Non-Imp	1	54	7	Benefited/Non-Imp	1	53	8	Benefited/Non-Imp	1
R250	1	B	1	55	5	Benefited/Non-Imp	1	54	6	Benefited/Non-Imp	1	54	6	Benefited/Non-Imp	1	53	7	Benefited/Non-Imp	1
R251	1	B	1	55	4			54	5	Benefited/Non-Imp	1	54	5	Benefited/Non-Imp	1	54	5	Benefited/Non-Imp	1
R252	1	B	1	55	4			55	4			54	5	Benefited/Non-Imp	1	54	5	Benefited/Non-Imp	1
R253	1	B	1	54	5	Benefited/Non-Imp	1	53	6	Benefited/Non-Imp	1	53	6	Benefited/Non-Imp	1	52	7	Benefited/Non-Imp	1
R254	1	B	1	54	5	Benefited/Non-Imp	1	54	5	Benefited/Non-Imp	1	54	5	Benefited/Non-Imp	1	53	6	Benefited/Non-Imp	1
R255	1	B	1	55	4			55	4			54	5	Benefited/Non-Imp	1	54	5	Benefited/Non-Imp	1
R256	1	B	1	60	4			60	4			59	5	Benefited/Non-Imp	1	59	5	Benefited/Non-Imp	1
R257	1	B	1	59	3			59	3			59	3			59	3		
R258	1	B	1	58	3			58	3			58	3			58	3		
R259	1	B	1	58	3			58	3			58	3			58	3		
R260	1	B	1	57	3			57	3			57	3			57	3		
R261	1	B	1	57	2			57	2			57	2			57	2		
R262	1	B	1	57	2			57	2			57	2			56	3		
R263	1	B	1	57	2			56	3			56	3			56	3		
R264	1	B	1	55	6	Benefited/Non-Imp	1	54	7	Benefited/Non-Imp	1	53	8	Benefited/Non-Imp	1	53	8	Benefited/Non-Imp	1
R265	1	B	1	55	6	Benefited/Non-Imp	1	54	7	Benefited/Non-Imp	1	53	8	Benefited/Non-Imp	1	53	8	Benefited/Non-Imp	1
R266	1	B	1	55	3			54	4			54	4			54	4		
R267	1	B	1	57	2			56	3			56	3			56	3		
R268	1	B	1	58	4			58	4			58	4			58	4		
R269	1	B	1	60	3			59	4			59	4			59	4		
R270	1	B	1	60	3			60	3			59	4			59	4		
R271	1	B	1	60	5	Benefited/Impact	1	60	5	Benefited/Impact	1	60	5	Benefited/Impact	1	60	5	Benefited/Impact	1
R272	1	B	1	61	5	Benefited/Impact	1	61	5	Benefited/Impact	1	61	5	Benefited/Impact	1	60	6	Benefited/Impact	1
R273	1	B	1	63	4	Impact! w/ Bar		62	5	Benefited/Impact	1	62	5	Benefited/Impact	1	62	5	Benefited/Impact	1

Project Information

I205CW Stafford Road to OR213
Contract No. K19786CW
I205CW_Build_Wall3to4
Wall 4
HMMH
Scott Noel
8/5/2018

24-ft Wall

Wall 4 HDR 12-2017

Average Wtd I.L.	9.5	dB I.L. Avg
Maximum I.L.	17	dB I.L. Max
Benefited/Impacted ≥ AFG	35	# Prot Units
Benefited/Non Impact ≥ AFG	59	# Units
Total Benefited	94	# Ben Units
Impacted Units ≥ NRDG	32	# Units
Benefited Units ≥ NRDG	78	# Units
Percent of impacts ≥ AFG	95%	% Ben Units
Percent of benefits ≥ NRDG	83%	% NRDG Units
"Cost-Reasonable" ?	Yes	
Surface Area	36432	Sq Feet
Surface Area/Ben Rec	388	Sq Feet
Barrier Length	1,517	Feet
Min Height	24.0	Feet
Max Height	24.0	Feet
Avg Height	24.0	Feet
Total Barrier Cost	$910,800	
Cost/Ben Rec	$9,689	

Receiver ID	Row	FHWA Act Cat	No. of Dwelling Units	With Barrier Sound Levels, Impact and Benefit			
				Leq(dBA)	IL (db)	Impacted?	No. Benefited
ST-6	1	C	1	58	5	Benefited/Non-Imp	1
R168	1	B	1	66	2	Impact! w/ Bar	
R169	1	B	1	65	3	Impact! w/ Bar	
R170	1	B	1	52	8	Benefited/Non-Imp	1
R171	1	B	1	53	12	Benefited/Impact	1
R172	1	B	1	54	17	Benefited/Impact	1
R173	1	B	1	51	9	Benefited/Non-Imp	1
R174	1	B	1	53	12	Benefited/Impact	1
R175	1	B	1	54	17	Benefited/Impact	1
R176	1	B	1	52	8	Benefited/Non-Imp	1
R177	1	B	1	53	12	Benefited/Impact	1
R178	1	B	1	54	17	Benefited/Impact	1
R179	1	B	1	52	8	Benefited/Non-Imp	1
R180	1	B	1	53	12	Benefited/Impact	1
R181	1	B	1	54	17	Benefited/Impact	1
R182	1	B	1	50	9	Benefited/Non-Imp	1
R183	1	B	1	51	11	Benefited/Non-Imp	1
R184	1	B	1	51	8	Benefited/Non-Imp	1
R185	1	B	1	51	12	Benefited/Non-Imp	1
R186	1	B	1	54	9	Benefited/Non-Imp	1
R187	1	B	1	55	12	Benefited/Impact	1
R188	1	B	1	54	9	Benefited/Non-Imp	1
R189	1	B	1	55	12	Benefited/Impact	1
R190	1	B	1	54	9	Benefited/Non-Imp	1
R191	1	B	1	55	12	Benefited/Impact	1
R192	1	B	1	54	9	Benefited/Non-Imp	1
R193	1	B	1	55	12	Benefited/Impact	1
R194	1	B	1	53	8	Benefited/Non-Imp	1
R195	1	B	1	53	14	Benefited/Impact	1
R196	1	B	1	53	8	Benefited/Non-Imp	1
R197	1	B	1	53	14	Benefited/Impact	1
R198	1	B	1	52	8	Benefited/Non-Imp	1
R199	1	B	1	53	13	Benefited/Impact	1
R200	1	B	1	52	8	Benefited/Non-Imp	1
R201	1	B	1	53	12	Benefited/Impact	1
R202	1	B	1	52	8	Benefited/Non-Imp	1
R203	1	B	1	53	12	Benefited/Impact	1
R204	1	B	1	52	7	Benefited/Non-Imp	1
R205	1	B	1	53	11	Benefited/Non-Imp	1
R206	1	B	1	53	7	Benefited/Non-Imp	1
R207	1	B	1	54	11	Benefited/Impact	1
R208	1	B	1	53	7	Benefited/Non-Imp	1
R209	1	B	1	54	11	Benefited/Impact	1
R210	1	B	1	56	11	Benefited/Impact	1
R211	1	B	1	56	11	Benefited/Impact	1
R212	1	B	1	54	6	Benefited/Non-Imp	1
R213	1	B	1	54	11	Benefited/Impact	1
R214	1	B	1	54	6	Benefited/Non-Imp	1
R215	1	B	1	54	11	Benefited/Impact	1
R216	1	B	1	56	10	Benefited/Impact	1
R217	1	B	1	56	11	Benefited/Impact	1
R218	1	B	1	55	5	Benefited/Non-Imp	1
R219	1	B	1	56	8	Benefited/Non-Imp	1
R220	1	B	1	55	5	Benefited/Non-Imp	1
R221	1	B	1	56	9	Benefited/Impact	1
R222	1	B	1	57	9	Benefited/Impact	1
R223	1	B	1	57	9	Benefited/Impact	1

Project Information

I205CW Stafford Road to OR213
Contract No. K19786CW
I205CW_Build_Wall3to4
Wall 4
HMMH
Scott Noel
8/5/2018

24-ft Wall

Wall 4 HDR 12-2017

Average Wtd I.L.	9.5	dB I.L. Avg
Maximum I.L.	17	dB I.L. Max
Benefited/Impacted ≥ AFG	35	# Prot Units
Benefited/Non Impact ≥ AFG	59	# Units
Total Benefited	94	# Ben Units
Impacted Units ≥ NRDG	32	# Units
Benefited Units ≥ NRDG	78	# Units
Percent of impacts ≥ AFG	95%	% Ben Units
Percent of benefits ≥ NRDG	83%	% NRDG Units
"Cost-Reasonable" ?	Yes	
Surface Area	36432	Sq Feet
Surface Area/Ben Rec	388	Sq Feet
Barrier Length	1,517	Feet
Min Height	24.0	Feet
Max Height	24.0	Feet
Avg Height	24.0	Feet
Total Barrier Cost	$910,800	
Cost/Ben Rec	$9,689	

Receiver ID	Row	FHWA Act Cat	No. of Dwelling Units	With Barrier Sound Levels, Impact and Benefit			
				Leq(dBA)	IL (db)	Impacted?	No. Benefited
R224	1	B	1	53	**6**	Benefited/Non-Imp	1
R225	1	B	1	54	**10**	Benefited/Non-Imp	1
R226	1	B	1	55	**16**	Benefited/Impact	1
R227	1	B	1	52	**7**	Benefited/Non-Imp	1
R228	1	B	1	53	**11**	Benefited/Non-Imp	1
R229	1	B	1	54	**17**	Benefited/Impact	1
R230	1	B	1	52	**7**	Benefited/Non-Imp	1
R231	1	B	1	54	**10**	Benefited/Non-Imp	1
R232	1	B	1	55	**16**	Benefited/Impact	1
R233	1	B	1	52	**8**	Benefited/Non-Imp	1
R234	1	B	1	53	**11**	Benefited/Non-Imp	1
R235	1	B	1	54	**16**	Benefited/Impact	1
R236	1	B	1	50	**9**	Benefited/Non-Imp	1
R237	1	B	1	52	**10**	Benefited/Non-Imp	1
R238	1	B	1	50	**8**	Benefited/Non-Imp	1
R239	1	B	1	51	**11**	Benefited/Non-Imp	1
R240	1	B	1	51	**7**	Benefited/Non-Imp	1
R241	1	B	1	51	**12**	Benefited/Non-Imp	1
R242	1	B	1	50	**8**	Benefited/Non-Imp	1
R243	1	B	1	51	**12**	Benefited/Non-Imp	1
R244	1	B	1	56	**5**	Benefited/Non-Imp	1
R245	1	B	1	55	**8**	Benefited/Non-Imp	1
R246	1	B	1	54	**8**	Benefited/Non-Imp	1
R247	1	B	1	54	**8**	Benefited/Non-Imp	1
R248	1	B	1	53	**9**	Benefited/Non-Imp	1
R249	1	B	1	53	**8**	Benefited/Non-Imp	1
R250	1	B	1	53	**7**	Benefited/Non-Imp	1
R251	1	B	1	53	**6**	Benefited/Non-Imp	1
R252	1	B	1	54	**5**	Benefited/Non-Imp	1
R253	1	B	1	52	**7**	Benefited/Non-Imp	1
R254	1	B	1	53	**6**	Benefited/Non-Imp	1
R255	1	B	1	54	**5**	Benefited/Non-Imp	1
R256	1	B	1	59	**5**	Benefited/Non-Imp	1
R257	1	B	1	58	4		
R258	1	B	1	58	3		
R259	1	B	1	58	3		
R260	1	B	1	57	3		
R261	1	B	1	57	2		
R262	1	B	1	56	3		
R263	1	B	1	56	3		
R264	1	B	1	52	**9**	Benefited/Non-Imp	1
R265	1	B	1	52	**9**	Benefited/Non-Imp	1
R266	1	B	1	53	**5**	Benefited/Non-Imp	1
R267	1	B	1	56	3		
R268	1	B	1	58	4		
R269	1	B	1	59	4		
R270	1	B	1	59	4		
R271	1	B	1	60	**5**	Benefited/Impact	1
R272	1	B	1	60	**6**	Benefited/Impact	1
R273	1	B	1	62	**5**	Benefited/Impact	1

U.S. Department of Transportation
Federal Highway Administration

Basic Noise Barrier Optimization Tool **8/5/2018**

I205CW Stafford Road to OR213
Wall 5

	10'	12'	14'	16'	18'	20'	22'	24'	Units
Average Wtd I.L. (benefited)									dBA
Maximum I.L.	0	0	0	0	0	0	0	0	dBA
Benefited/Impacted ≥ AFG	0	0	0	0	0	0	0	0	# of dwelling units
Benefited/Non Impact ≥ AFG	0	0	0	0	0	0	0	0	# of dwelling units
Total Benefited	0	0	0	0	0	0	0	0	# of dwelling units
Impacted Units ≥ NRDG	0	0	0	0	0	0	0	0	# of dwelling units
Benefited Units ≥ NRDG	0	0	0	0	0	0	0	0	# of dwelling units
Percent of impacts ≥ AFG	0%	0%	0%	0%	0%	0%	0%	0%	%
Percent of benefits ≥ NRDG									%
"Cost-Reasonable" ?									----
Surface Area	15,503	18,603	21,699	24,799	27,906	31,005	34,102	37,203	sq-feet
Surface Area/Ben Rec									sq-ft / ben rec
Barrier Length	1,550	1,550	1,550	1,550	1,550	1,550	1,550	1,550	ft
Min Height	10	12	14	16	18	20	22	24	ft
Max Height	10	12	14	16	18	20	22	24	ft
Avg Height	10	12	14	16	18	20	22	24	ft
Total Barrier Cost	310,060	372,060	433,980	619,975	697,650	775,125	852,550	930,075	$
Cost/Ben Rec									$ / ben rec
Effectiveness/Cost Metric (E/C)	-	-	-	-	-	-	-	-	----

ODOT Acoustical Feasibilty Goal (dBA)	5
ODOT Acoustical Feasibilty Goal (%)	51%
ODOT Noise Reduction Design Goal (dBA)	7
ODOT Noise Reduction Design Goal (%)	1%

U.S. Department of Transportation
Federal Highway Administration

Basic Noise Barrier Optimization Tool **11/10/2018**

I205CW Stafford Road to OR213
Wall 6a

	10'	12'	14'	16'	18'	20'	22'	24'	Units
Average Wtd I.L. (benefited)	6.2	6.6	7	7.5	7.8	8.2	8.4	8.8	dBA
Maximum I.L.	10	11	11	12	13	13	13	14	dBA
Benefited/Impacted ≥ AFG	39	43	45	47	48	52	53	53	# of dwelling units
Benefited/Non Impact ≥ AFG	15	24	29	35	37	40	44	48	# of dwelling units
Total Benefited	54	67	74	82	85	92	97	101	# of dwelling units
Impacted Units ≥ NRDG	21	30	39	44	46	48	51	52	# of dwelling units
Benefited Units ≥ NRDG	21	32	44	55	65	74	80	83	# of dwelling units
Percent of impacts ≥ AFG	71%	78%	82%	85%	87%	95%	96%	96%	%
Percent of benefits ≥ NRDG	39%	48%	59%	67%	76%	80%	82%	82%	%
"Cost-Reasonable" ?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	----
Surface Area	37,066	44,469	51,887	59,294	66,707	74,119	81,538	88,958	sq-feet
Surface Area/Ben Rec	686	664	701	723	785	806	841	881	sq-ft / ben rec
Barrier Length	3,697	3,697	3,697	3,697	3,697	3,697	3,697	3,697	ft
Min Height	10	12	14	16	18	20	22	24	ft
Max Height	10	12	14	16	18	20	22	24	ft
Avg Height	10	12	14	16	18	20	22	24	ft
Total Barrier Cost	741,320	889,380	1,037,740	1,482,350	1,667,675	1,852,975	2,038,450	2,223,950	$
Cost/Ben Rec	13,728	13,274	14,024	18,077	19,620	20,141	21,015	22,019	$ / ben rec
Effectiveness/Cost Metric (E/C)	10.1	14.9	18.4	20.1	19.4	19.7	20.1	19.5	----

ODOT Acoustical Feasibilty Goal (dBA)	5
ODOT Acoustical Feasibilty Goal (%)	51%
ODOT Noise Reduction Design Goal (dBA)	7
ODOT Noise Reduction Design Goal (%)	1%

Project Information	No Barrier Analysis No Barrier	
I205CW Stafford Road to OR213	Total Units Exposed to Impact	55
Contract No. K19786CW	# Impacts - NAC only	55
I205CW_Build_Walls6to9	# Impacts - SI only	0
Wall 6a	# Impacts - Both NAC & SI	0
HMMH		
Scott Noel		
11/10/2018		
U.S. Department of Transportation Federal Highway Administration	Enter SI Info	

10-ft Wall Wall 6a 2018-11			12-ft Wall Wall 6a 2018-11			14-ft Wall Wall 6a 2018-11		
Average Wtd I.L. (benefited)	6.2	dB I.L. Avg	Average Wtd I.L.	6.6	dB I.L. Avg	Average Wtd I.L.	7.0	dB I.L. Avg
Maximum I.L.	10	dB I.L. Max	Maximum I.L.	11	dB I.L. Max	Maximum I.L.	11	dB I.L. Max
Benefited/Impacted ≥ AFG	39	# Prot Units	Benefited/Impacted ≥ AFG	43	# Prot Units	Benefited/Impacted ≥ AFG	45	# Prot Units
Benefited/Non Impact ≥ AFG	15	# Units	Benefited/Non Impact ≥ AFG	24	# Units	Benefited/Non Impact ≥ AFG	29	# Units
Total Benefited	54	# Ben Units	Total Benefited	67	# Ben Units	Total Benefited	74	# Ben Units
Impacted Units ≥ NRDG	21	# Units	Impacted Units ≥ NRDG	30	# Units	Impacted Units ≥ NRDG	39	# Units
Benefited Units ≥ NRDG	21	# Units	Benefited Units ≥ NRDG	32	# Units	Benefited Units ≥ NRDG	44	# Units
Percent of impacts ≥ AFG	71%	% Ben Units	Percent of impacts ≥ AFG	78%	% Ben Units	Percent of impacts ≥ AFG	82%	% Ben Units
Percent of benefits ≥ NRDG	39%	% NRDG Units	Percent of benefits ≥ NRDG	48%	% NRDG Units	Percent of benefits ≥ NRDG	59%	% NRDG Units
"Cost-Reasonable" ?	Yes		"Cost-Reasonable" ?	Yes		"Cost-Reasonable" ?	Yes	
Surface Area	37066	Sq Feet	Surface Area	44469	Sq Feet	Surface Area	51887	Sq Feet
Surface Area/Ben Rec	686	Sq Feet	Surface Area/Ben Rec	664	Sq Feet	Surface Area/Ben Rec	701	Sq Feet
Barrier Length	3,697	Feet	Barrier Length	3,697	Feet	Barrier Length	3,697	Feet
Min Height	10.0	Feet	Min Height	12.0	Feet	Min Height	14.0	Feet
Max Height	10.0	Feet	Max Height	12.0	Feet	Max Height	14.0	Feet
Avg Height	10.0	Feet	Avg Height	12.0	Feet	Avg Height	14.0	Feet
Total Barrier Cost	$741,320		Total Barrier Cost	$889,380		Total Barrier Cost	$1,037,740	
Cost/Ben Rec	$13,728		Cost/Ben Rec	$13,274		Cost/Ben Rec	$14,024	

Receiver ID	Row	FHWA Act Cat	No. of Dwelling Units	Type of Impact		Impact?	No. of Impacted Units	With Barrier Sound Levels, Impact and Benefit				With Barrier Sound Levels, Impact and Benefit				With Barrier Sound Levels, Impact and Benefit			
				Bld Leq > NAC?	Sub. Inc.?			Leq(dBA)	IL (db)	Impacted?	No. Benefited	Leq(dBA)	IL (db)	Impacted?	No. Benefited	Leq(dBA)	IL (db)	Impacted?	No. Benefited
ST-9	1	B	1	65		Impact!	1	62	3	Impact! w/ Bar		62	3	Impact! w/ Bar		62	3	Impact! w/ Bar	
LT-2/ST-10	1	B	1	64				59	5	Benefited/Non-Imp	1	58	6	Benefited/Non-Imp	1	58	6	Benefited/Non-Imp	1
R306	1	B	1	65		Impact!	1	62	3	Impact! w/ Bar		61	4	Impact! w/ Bar		61	4	Impact! w/ Bar	
R307	1	B	1	64				60	4			60	4			59	5	Benefited/Non-Imp	1
R308	1	B	1	64				60	4			59	5	Benefited/Non-Imp	1	59	5	Benefited/Non-Imp	1
R309	1	B	1	64				60	4			59	5	Benefited/Non-Imp	1	59	5	Benefited/Non-Imp	1
R310	1	B	1	65		Impact!	1	60	5	Benefited/Impact	1	59	6	Benefited/Impact	1	59	6	Benefited/Impact	1
R311	1	B	1	65		Impact!	1	60	5	Benefited/Impact	1	59	6	Benefited/Impact	1	59	6	Benefited/Impact	1
R312	1	B	1	64				60	4			59	5	Benefited/Non-Imp	1	58	6	Benefited/Non-Imp	1
R313	1	B	1	64				59	5	Benefited/Non-Imp	1	58	6	Benefited/Non-Imp	1	58	6	Benefited/Non-Imp	1
R314	1	B	1	63				59	4			58	5	Benefited/Non-Imp	1	58	5	Benefited/Non-Imp	1
R315	1	B	1	64				59	5	Benefited/Non-Imp	1	59	5	Benefited/Non-Imp	1	58	6	Benefited/Non-Imp	1
R316	1	B	1	64				59	5	Benefited/Non-Imp	1	59	5	Benefited/Non-Imp	1	58	6	Benefited/Non-Imp	1
R317	1	B	1	64				60	4			59	5	Benefited/Non-Imp	1	59	5	Benefited/Non-Imp	1
R318	1	B	1	64				60	4			59	5	Benefited/Non-Imp	1	58	6	Benefited/Non-Imp	1
R319	1	B	1	64				59	5	Benefited/Non-Imp	1	59	5	Benefited/Non-Imp	1	58	6	Benefited/Non-Imp	1
R320	1	B	1	64				59	5	Benefited/Non-Imp	1	59	5	Benefited/Non-Imp	1	58	6	Benefited/Non-Imp	1
R321	1	B	1	64				59	5	Benefited/Non-Imp	1	59	5	Benefited/Non-Imp	1	58	6	Benefited/Non-Imp	1
R322	1	B	1	65		Impact!	1	59	6	Benefited/Impact	1	59	6	Benefited/Impact	1	58	7	Benefited/Impact	1
R323	1	B	1	68		Impact!	1	64	4	Impact! w/ Bar		62	6	Benefited/Impact	1	61	7	Benefited/Impact	1
R324	1	B	1	68		Impact!	1	63	5	Benefited/Impact	1	62	6	Benefited/Impact	1	60	8	Benefited/Impact	1
R325	1	B	1	67		Impact!	1	61	6	Benefited/Impact	1	60	7	Benefited/Impact	1	59	8	Benefited/Impact	1
R326	1	B	1	67		Impact!	1	61	6	Benefited/Impact	1	60	7	Benefited/Impact	1	60	7	Benefited/Impact	1
R327	1	B	1	68		Impact!	1	61	7	Benefited/Impact	1	60	8	Benefited/Impact	1	59	9	Benefited/Impact	1
R328	1	B	1	68		Impact!	1	60	8	Benefited/Impact	1	59	9	Benefited/Impact	1	59	9	Benefited/Impact	1
R329	1	B	1	68		Impact!	1	60	8	Benefited/Impact	1	60	8	Benefited/Impact	1	59	9	Benefited/Impact	1
R330	1	B	1	68		Impact!	1	60	8	Benefited/Impact	1	59	9	Benefited/Impact	1	59	9	Benefited/Impact	1
R331	1	B	1	64				62	2			61	3			60	4		
R332	1	B	1	64				61	3			60	4			60	4		
R333	1	B	1	65		Impact!	1	63	2	Impact! w/ Bar		62	3	Impact! w/ Bar		61	4	Impact! w/ Bar	
R334	1	B	1	64				61	3			60	4			59	5	Benefited/Non-Imp	1
R335	1	B	1	63				60	3			59	4			58	5	Benefited/Non-Imp	1
R336	1	B	1	64				61	3			61	3			60	4		
R337	1	B	1	67		Impact!	1	60	7	Benefited/Impact	1	59	8	Benefited/Impact	1	59	8	Benefited/Impact	1
R338	1	B	1	67		Impact!	1	60	7	Benefited/Impact	1	59	8	Benefited/Impact	1	59	8	Benefited/Impact	1
R339	1	B	1	66		Impact!	1	60	6	Benefited/Impact	1	59	7	Benefited/Impact	1	58	8	Benefited/Impact	1
R340	1	B	1	67		Impact!	1	60	7	Benefited/Impact	1	59	8	Benefited/Impact	1	59	8	Benefited/Impact	1
R341	1	B	1	67		Impact!	1	60	7	Benefited/Impact	1	59	8	Benefited/Impact	1	59	8	Benefited/Impact	1
R342	1	B	1	67		Impact!	1	60	7	Benefited/Impact	1	59	8	Benefited/Impact	1	59	8	Benefited/Impact	1
R343	1	B	1	69		Impact!	1	61	8	Benefited/Impact	1	60	9	Benefited/Impact	1	59	10	Benefited/Impact	1
R344	1	B	1	70		Impact!	1	62	8	Benefited/Impact	1	61	9	Benefited/Impact	1	60	10	Benefited/Impact	1
R345	1	B	1	68		Impact!	1	61	7	Benefited/Impact	1	60	8	Benefited/Impact	1	59	9	Benefited/Impact	1
R346	1	B	1	67		Impact!	1	60	7	Benefited/Impact	1	60	7	Benefited/Impact	1	59	8	Benefited/Impact	1
R347	1	B	1	67		Impact!	1	60	7	Benefited/Impact	1	60	7	Benefited/Impact	1	59	8	Benefited/Impact	1
R348	1	B	1	66		Impact!	1	60	6	Benefited/Impact	1	59	7	Benefited/Impact	1	59	7	Benefited/Impact	1
R349	1	B	1	66		Impact!	1	60	6	Benefited/Impact	1	59	7	Benefited/Impact	1	59	7	Benefited/Impact	1
R350	1	B	1	67		Impact!	1	60	7	Benefited/Impact	1	59	8	Benefited/Impact	1	59	8	Benefited/Impact	1
R351	1	B	1	67		Impact!	1	60	7	Benefited/Impact	1	59	8	Benefited/Impact	1	59	8	Benefited/Impact	1
R352	1	B	1	67		Impact!	1	60	7	Benefited/Impact	1	59	8	Benefited/Impact	1	59	8	Benefited/Impact	1
R353	1	B	1	64				61	3			60	4			59	5	Benefited/Non-Imp	1
R354	1	B	1	59				57	2			56	3			56	3		
R355	1	B	1	62				58	4			57	5	Benefited/Non-Imp	1	56	6	Benefited/Non-Imp	1
R356	1	B	1	61				57	4			56	5	Benefited/Non-Imp	1	56	5	Benefited/Non-Imp	1
R357	1	B	1	57				56	1			55	2			55	2		
R358	1	B	1	59				56	3			56	3			55	4		
R359	1	B	1	58				56	2			55	3			55	3		
R360	1	B	1	67		Impact!	1	60	7	Benefited/Impact	1	59	8	Benefited/Impact	1	59	8	Benefited/Impact	1
R361	1	B	1	67		Impact!	1	60	7	Benefited/Impact	1	59	8	Benefited/Impact	1	59	8	Benefited/Impact	1
R362	1	B	1	67		Impact!	1	60	7	Benefited/Impact	1	59	8	Benefited/Impact	1	59	8	Benefited/Impact	1
R363	1	B	1	66		Impact!	1	60	6	Benefited/Impact	1	59	7	Benefited/Impact	1	59	7	Benefited/Impact	1

Project Information

I205CW Stafford Road to OR213
Contract No. K19786CW
I205CW_Build_Walls6to9
Wall 6a
HMMH
Scott Noel
11/10/2018

U.S. Department of Transportation
Federal Highway Administration

No Barrier Analysis No Barrier	
Total Units Exposed to Impact	55
# Impacts - NAC only	55
# Impacts - SI only	0
# Impacts - Both NAC & SI	0

Enter SI Info

10-ft Wall Wall 6a 2018-11			12-ft Wall Wall 6a 2018-11			14-ft Wall Wall 6a 2018-11		
Average Wtd I.L. (benefited)	6.2	dB I.L. Avg	Average Wtd I.L.	6.6	dB I.L. Avg	Average Wtd I.L.	7.0	dB I.L. Avg
Maximum I.L.	10	dB I.L. Max	Maximum I.L.	11	dB I.L. Max	Maximum I.L.	11	dB I.L. Max
Benefited/Impacted ≥ AFG	39	# Prot Units	Benefited/Impacted ≥ AFG	43	# Prot Units	Benefited/Impacted ≥ AFG	45	# Prot Units
Benefited/Non Impact ≥ AFG	15	# Units	Benefited/Non Impact ≥ AFG	24	# Units	Benefited/Non Impact ≥ AFG	29	# Units
Total Benefited	54	# Ben Units	Total Benefited	67	# Ben Units	Total Benefited	74	# Ben Units
Impacted Units ≥ NRDG	21	# Units	Impacted Units ≥ NRDG	30	# Units	Impacted Units ≥ NRDG	39	# Units
Benefited Units ≥ NRDG	21	# Units	Benefited Units ≥ NRDG	32	# Units	Benefited Units ≥ NRDG	44	# Units
Percent of impacts ≥ AFG	71%	% Ben Units	Percent of impacts ≥ AFG	78%	% Ben Units	Percent of impacts ≥ AFG	82%	% Ben Units
Percent of benefits ≥ NRDG	39%	% NRDG Units	Percent of benefits ≥ NRDG	48%	% NRDG Units	Percent of benefits ≥ NRDG	59%	% NRDG Units
"Cost-Reasonable" ?	Yes		"Cost-Reasonable" ?	Yes		"Cost-Reasonable" ?	Yes	
Surface Area	37066	Sq Feet	Surface Area	44469	Sq Feet	Surface Area	51887	Sq Feet
Surface Area/Ben Rec	686	Sq Feet	Surface Area/Ben Rec	664	Sq Feet	Surface Area/Ben Rec	701	Sq Feet
Barrier Length	3,697	Feet	Barrier Length	3,697	Feet	Barrier Length	3,697	Feet
Min Height	10.0	Feet	Min Height	12.0	Feet	Min Height	14.0	Feet
Max Height	10.0	Feet	Max Height	12.0	Feet	Max Height	14.0	Feet
Avg Height	10.0	Feet	Avg Height	12.0	Feet	Avg Height	14.0	Feet
Total Barrier Cost	$741,320		Total Barrier Cost	$889,380		Total Barrier Cost	$1,037,740	
Cost/Ben Rec	$13,728		Cost/Ben Rec	$13,274		Cost/Ben Rec	$14,024	

Receiver ID	Row	FHWA Act Cat	No. of Dwelling Units	Type of Impact		Impact?	No. of Impacted Units	With Barrier Sound Levels, Impact and Benefit				With Barrier Sound Levels, Impact and Benefit				With Barrier Sound Levels, Impact and Benefit			
				Bld Leq > NAC?	Sub. Inc.?			Leq(dBA)	IL (db)	Impacted?	No. Benefited	Leq(dBA)	IL (db)	Impacted?	No. Benefited	Leq(dBA)	IL (db)	Impacted?	No. Benefited
R364	1	B	1	66		Impact!	1	60	6	Benefited/Impact	1	59	7	Benefited/Impact	1	59	7	Benefited/Impact	1
R365	1	B	1	57				55	2			54	3			54	3		
R366	1	B	1	57				54	3			54	3			54	3		
R367	1	B	1	55				54	1			54	1			53	2		
R368	1	B	1	54				53	1			53	1			52	2		
R369	1	B	1	52				52	0			52	0			52	0		
R370	1	B	1	53				52	1			52	1			52	1		
R371	1	B	1	66		Impact!	1	61	5	Benefited/Impact	1	60	6	Benefited/Impact	1	60	6	Benefited/Impact	1
R372	1	B	1	66		Impact!	1	61	5	Benefited/Impact	1	60	6	Benefited/Impact	1	60	6	Benefited/Impact	1
R373	1	B	1	71		Impact!	1	68	3	Impact! w/ Bar		67	4	Impact! w/ Bar		66	5	Benefited/Impact	1
R374	1	B	1	72		Impact!	1	70	2	Impact! w/ Bar		69	3	Impact! w/ Bar		69	3	Impact! w/ Bar	
R375	1	B	1	72		Impact!	1	71	1	Impact! w/ Bar		71	1	Impact! w/ Bar		70	2	Impact! w/ Bar	
R376	1	B	1	72		Impact!	1	71	1	Impact! w/ Bar		71	1	Impact! w/ Bar		70	2	Impact! w/ Bar	
R377	1	B	1	71		Impact!	1	70	1	Impact! w/ Bar		69	2	Impact! w/ Bar		67	4	Impact! w/ Bar	
R378	1	B	1	72		Impact!	1	72	0	Impact! w/ Bar		72	0	Impact! w/ Bar		71	1	Impact! w/ Bar	
R379	1	B	1	71		Impact!	1	69	2	Impact! w/ Bar		67	4	Impact! w/ Bar		65	6	Benefited/Impact	1
R380	1	B	1	72		Impact!	1	71	1	Impact! w/ Bar		71	1	Impact! w/ Bar		70	2	Impact! w/ Bar	
R381	1	B	1	70		Impact!	1	66	4	Impact! w/ Bar		64	6	Benefited/Impact	1	63	7	Benefited/Impact	1
R382	1	B	1	69		Impact!	1	65	4	Impact! w/ Bar		63	6	Benefited/Impact	1	61	8	Benefited/Impact	1
R383	1	B	1	67		Impact!	1	62	5	Benefited/Impact	1	61	6	Benefited/Impact	1	60	7	Benefited/Impact	1
R384	1	B	1	66		Impact!	1	60	6	Benefited/Impact	1	59	7	Benefited/Impact	1	58	8	Benefited/Impact	1
R385	1	B	1	66		Impact!	1	60	6	Benefited/Impact	1	59	7	Benefited/Impact	1	59	7	Benefited/Impact	1
R386	1	B	1	68		Impact!	1	64	4	Impact! w/ Bar		62	6	Benefited/Impact	1	61	7	Benefited/Impact	1
R387	1	B	1	62				58	4			58	4			57	5	Benefited/Non-Imp	1
R388	1	B	1	63				58	5	Benefited/Non-Imp	1	58	5	Benefited/Non-Imp	1	57	6	Benefited/Non-Imp	1
R389	1	B	1	64				58	6	Benefited/Non-Imp	1	58	6	Benefited/Non-Imp	1	57	7	Benefited/Non-Imp	1
R390	1	B	1	61				58	3			58	3			57	4		
R391	1	B	1	60				58	2			57	3			57	3		
R392	1	B	1	64				59	5	Benefited/Non-Imp	1	58	6	Benefited/Non-Imp	1	58	6	Benefited/Non-Imp	1
R393	1	B	1	64				58	6	Benefited/Non-Imp	1	58	6	Benefited/Non-Imp	1	57	7	Benefited/Non-Imp	1
R394	1	B	1	63				59	4			58	5	Benefited/Non-Imp	1	57	6	Benefited/Non-Imp	1
R395	1	B	1	65		Impact!	1	59	6	Benefited/Impact	1	59	6	Benefited/Impact	1	58	7	Benefited/Impact	1
R396	1	B	1	63				58	5	Benefited/Non-Imp	1	57	6	Benefited/Non-Imp	1	57	6	Benefited/Non-Imp	1
R397	1	B	1	63				58	5	Benefited/Non-Imp	1	57	6	Benefited/Non-Imp	1	56	7	Benefited/Non-Imp	1
R398	1	B	1	64				58	6	Benefited/Non-Imp	1	57	7	Benefited/Non-Imp	1	57	7	Benefited/Non-Imp	1
R399	1	B	1	64				58	6	Benefited/Non-Imp	1	57	7	Benefited/Non-Imp	1	57	7	Benefited/Non-Imp	1
R400	1	B	1	61				57	4			57	4			57	4		
R401	1	B	1	60				57	3			57	3			57	3		
R402	1	B	1	58				57	1			57	1			56	2		
R403	1	B	1	60				58	2			57	3			57	3		
R404	1	B	1	68		Impact!	1	62	6	Benefited/Impact	1	62	6	Benefited/Impact	1	61	7	Benefited/Impact	1
R405	1	B	1	73		Impact!	1	63	10	Benefited/Impact	1	62	11	Benefited/Impact	1	62	11	Benefited/Impact	1
R406	1	B	1	53				51	2			51	2			51	2		
R407	1	B	1	53				51	2			51	2			51	2		
R408	1	B	1	53				52	1			52	1			52	1		
R409	1	B	1	54				52	2			52	2			52	2		
R410	1	B	1	56				54	2			54	2			54	2		
R411	1	B	1	55				54	1			54	1			54	1		
R412	1	B	1	56				55	1			55	1			55	1		
R413	1	B	1	57				56	1			56	1			56	1		
R414	1	B	1	57				57	0			57	0			57	0		
R415	1	B	1	58				57	1			57	1			57	1		
R416	1	B	1	61				60	1			60	1			60	1		
R417	1	B	1	56				56	0			56	0			56	0		
R418	1	B	1	56				56	0			56	0			56	0		
R419	1	B	1	56				56	0			56	0			56	0		
R420	1	B	1	56				56	0			56	0			56	0		
R421	1	B	1	59				59	0			59	0			59	0		
R422	1	B	1	64				63	1			63	1			63	1		

Project Information	No Barrier Analysis		10-ft Wall			12-ft Wall			14-ft Wall		
	No Barrier		Wall 6a 2018-11			Wall 6a 2018-11			Wall 6a 2018-11		
			Average Wtd I.L. (benefited)	6.2	dB I.L. Avg	Average Wtd I.L.	6.6	dB I.L. Avg	Average Wtd I.L.	7.0	dB I.L. Avg
			Maximum I.L.	10	dB I.L. Max	Maximum I.L.	11	dB I.L. Max	Maximum I.L.	11	dB I.L. Max
I205CW Stafford Road to OR213	Total Units Exposed to Impact	55	Benefited/Impacted ≥ AFG	39	# Prot Units	Benefited/Impacted ≥ AFG	43	# Prot Units	Benefited/Impacted ≥ AFG	45	# Prot Units
Contract No. K19786CW	# Impacts - NAC only	55	Benefited/Non Impact ≥ AFG	15	# Units	Benefited/Non Impact ≥ AFG	24	# Units	Benefited/Non Impact ≥ AFG	29	# Units
I205CW_Build_Walls6to9	# Impacts - SI only	0	Total Benefited	54	# Ben Units	Total Benefited	67	# Ben Units	Total Benefited	74	# Ben Units
Wall 6a	# Impacts - Both NAC & SI	0	Impacted Units ≥ NRDG	21	# Units	Impacted Units ≥ NRDG	30	# Units	Impacted Units ≥ NRDG	39	# Units
HMMH			Benefited Units ≥ NRDG	21	# Units	Benefited Units ≥ NRDG	32	# Units	Benefited Units ≥ NRDG	44	# Units
Scott Noel			Percent of impacts ≥ AFG	71%	% Ben Units	Percent of impacts ≥ AFG	78%	% Ben Units	Percent of impacts ≥ AFG	82%	% Ben Units
11/10/2018			Percent of benefits ≥ NRDG	39%	% NRDG Units	Percent of benefits ≥ NRDG	48%	% NRDG Units	Percent of benefits ≥ NRDG	59%	% NRDG Units
			"Cost-Reasonable" ?	Yes		"Cost-Reasonable" ?	Yes		"Cost-Reasonable" ?	Yes	
			Surface Area	37066	Sq Feet	Surface Area	44469	Sq Feet	Surface Area	51887	Sq Feet
			Surface Area/Ben Rec	686	Sq Feet	Surface Area/Ben Rec	664	Sq Feet	Surface Area/Ben Rec	701	Sq Feet
			Barrier Length	3,697	Feet	Barrier Length	3,697	Feet	Barrier Length	3,697	Feet
			Min Height	10.0	Feet	Min Height	12.0	Feet	Min Height	14.0	Feet
			Max Height	10.0	Feet	Max Height	12.0	Feet	Max Height	14.0	Feet
			Avg Height	10.0	Feet	Avg Height	12.0	Feet	Avg Height	14.0	Feet
			Total Barrier Cost	$741,320		Total Barrier Cost	$889,380		Total Barrier Cost	$1,037,740	
	Enter SI Info		Cost/Ben Rec	$13,728		Cost/Ben Rec	$13,274		Cost/Ben Rec	$14,024	

Receiver ID	Row	FHWA Act Cat	No. of Dwelling Units	Type of Impact		Impact?	No. of Impacted Units	With Barrier Sound Levels, Impact and Benefit				With Barrier Sound Levels, Impact and Benefit				With Barrier Sound Levels, Impact and Benefit			
				Bld Leq > NAC?	Sub. Inc.?			Leq(dBA)	IL (db)	Impacted?	No. Benefited	Leq(dBA)	IL (db)	Impacted?	No. Benefited	Leq(dBA)	IL (db)	Impacted?	No. Benefited
R423	1	B	1	65		Impact!	1	64	1	Impact! w/ Bar		64	1	Impact! w/ Bar		64	1	Impact! w/ Bar	
R885(6a)	1	B	1	60				59	1			59	2			59	2		
R886(6a)	1	B	1	60				59	2			58	2			58	2		
R887(6a)	1	B	1	60				58	2			58	2			58	2		
R888(6a)	1	B	1	60				58	2			57	2			57	3		
R889(6a)	1	B	1	60				58	2			57	2			57	3		
R890(6a)	1	B	1	59				57	2			57	3			56	3		
R891(6a)	1	B	1	60				58	2			57	3			57	3		
R892(6a)	1	B	1	59				56	2			56	3			56	3		
R893(6a)	1	B	1	60				57	2			57	3			56	3		
R894(6a)	1	B	1	60				57	3			56	3			56	4		
R895(6a)	1	B	1	60				57	3			56	4			56	4		
R896(6a)	1	B	1	62				59	3			58	4			57	4		

Project Information	16-ft Wall			18-ft Wall			20-ft Wall			22-ft Wall		
	Wall 6a 2018-11			Wall 6a 2018-11			Wall 6a 2018-11			Wall 6a 2018-11		
	Average Wtd I.L.	7.5	dB I.L. Avg	Average Wtd I.L.	7.8	dB I.L. Avg	Average Wtd I.L.	8.2	dB I.L. Avg	Average Wtd I.L.	8.4	dB I.L. Avg
	Maximum I.L.	12	dB I.L. Max	Maximum I.L.	13	dB I.L. Max	Maximum I.L.	13	dB I.L. Max	Maximum I.L.	13	dB I.L. Max
I205CW Stafford Road to OR213	Benefited/Impacted ≥ AFG	47	# Prot Units	Benefited/Impacted ≥ AFG	48	# Prot Units	Benefited/Impacted ≥ AFG	52	# Prot Units	Benefited/Impacted ≥ AFG	53	# Prot Units
Contract No. K19786CW	Benefited/Non Impact ≥ AFG	35	# Units	Benefited/Non Impact ≥ AFG	37	# Units	Benefited/Non Impact ≥ AFG	40	# Units	Benefited/Non Impact ≥ AFG	44	# Units
I205CW_Build_Walls6to9	Total Benefited	82	# Ben Units	Total Benefited	85	# Ben Units	Total Benefited	92	# Ben Units	Total Benefited	97	# Ben Units
Wall 6a	Impacted Units ≥ NRDG	44	# Units	Impacted Units ≥ NRDG	46	# Units	Impacted Units ≥ NRDG	48	# Units	Impacted Units ≥ NRDG	51	# Units
HMMH	Benefited Units ≥ NRDG	55	# Units	Benefited Units ≥ NRDG	65	# Units	Benefited Units ≥ NRDG	74	# Units	Benefited Units ≥ NRDG	80	# Units
Scott Noel	Percent of impacts ≥ AFG	85%	% Ben Units	Percent of impacts ≥ AFG	87%	% Ben Units	Percent of impacts ≥ AFG	95%	% Ben Units	Percent of impacts ≥ AFG	96%	% Ben Units
11/10/2018	Percent of benefits ≥ NRDG	67%	% NRDG Units	Percent of benefits ≥ NRDG	76%	% NRDG Units	Percent of benefits ≥ NRDG	80%	% NRDG Units	Percent of benefits ≥ NRDG	82%	% NRDG Units
	"Cost-Reasonable" ?	Yes		"Cost-Reasonable" ?	Yes		"Cost-Reasonable" ?	Yes		"Cost-Reasonable" ?	Yes	
	Surface Area	59294	Sq Feet	Surface Area	66707	Sq Feet	Surface Area	74119	Sq Feet	Surface Area	81538	Sq Feet
	Surface Area/Ben Rec	723	Sq Feet	Surface Area/Ben Rec	785	Sq Feet	Surface Area/Ben Rec	806	Sq Feet	Surface Area/Ben Rec	841	Sq Feet
	Barrier Length	3,697	Feet	Barrier Length	3,697	Feet	Barrier Length	3,697	Feet	Barrier Length	3,697	Feet
	Min Height	16.0	Feet	Min Height	18.0	Feet	Min Height	20.0	Feet	Min Height	22.0	Feet
	Max Height	16.0	Feet	Max Height	18.0	Feet	Max Height	20.0	Feet	Max Height	22.0	Feet
	Avg Height	16.0	Feet	Avg Height	18.0	Feet	Avg Height	20.0	Feet	Avg Height	22.0	Feet
	Total Barrier Cost	$1,482,350		Total Barrier Cost	$1,667,675		Total Barrier Cost	$1,852,975		Total Barrier Cost	$2,038,450	
	Cost/Ben Rec	$18,077.44		Cost/Ben Rec	$19,620		Cost/Ben Rec	$20,141		Cost/Ben Rec	$21,015	

Receiver ID	Row	FHWA Act Cat	No. of Dwelling Units	With Barrier Sound Levels, Impact and Benefit				With Barrier Sound Levels, Impact and Benefit				With Barrier Sound Levels, Impact and Benefit				With Barrier Sound Levels, Impact and Benefit			
				Leq(dBA)	IL (db)	Impacted?	No. Benefited	Leq(dBA)	IL (db)	Impacted?	No. Benefited	Leq(dBA)	IL (db)	Impacted?	No. Benefited	Leq(dBA)	IL (db)	Impacted?	No. Benefited
ST-9	1	B	1	62	3	Impact! w/ Bar		62	3	Impact! w/ Bar		62	3	Impact! w/ Bar		62	3	Impact! w/ Bar	
LT-2/ST-10	1	B	1	57	7	Benefited/Non-Imp	1	57	7	Benefited/Non-Imp	1	56	8	Benefited/Non-Imp	1	56	8	Benefited/Non-Imp	1
R306	1	B	1	61	4	Impact! w/ Bar		61	4	Impact! w/ Bar		60	5	Benefited/Impact	1	60	5	Benefited/Impact	1
R307	1	B	1	59	5	Benefited/Non-Imp	1	59	5	Benefited/Non-Imp	1	58	6	Benefited/Non-Imp	1	58	6	Benefited/Non-Imp	1
R308	1	B	1	58	6	Benefited/Non-Imp	1	58	6	Benefited/Non-Imp	1	58	6	Benefited/Non-Imp	1	58	6	Benefited/Non-Imp	1
R309	1	B	1	58	6	Benefited/Non-Imp	1	58	6	Benefited/Non-Imp	1	58	6	Benefited/Non-Imp	1	57	7	Benefited/Non-Imp	1
R310	1	B	1	58	7	Benefited/Impact	1	58	7	Benefited/Impact	1	57	8	Benefited/Impact	1	57	8	Benefited/Impact	1
R311	1	B	1	58	7	Benefited/Impact	1	58	7	Benefited/Impact	1	57	8	Benefited/Impact	1	57	8	Benefited/Impact	1
R312	1	B	1	58	6	Benefited/Non-Imp	1	58	6	Benefited/Non-Imp	1	57	7	Benefited/Non-Imp	1	57	7	Benefited/Non-Imp	1
R313	1	B	1	58	6	Benefited/Non-Imp	1	57	7	Benefited/Non-Imp	1	57	7	Benefited/Non-Imp	1	56	8	Benefited/Non-Imp	1
R314	1	B	1	58	5	Benefited/Non-Imp	1	57	6	Benefited/Non-Imp	1	57	6	Benefited/Non-Imp	1	56	7	Benefited/Non-Imp	1
R315	1	B	1	58	6	Benefited/Non-Imp	1	57	7	Benefited/Non-Imp	1	57	7	Benefited/Non-Imp	1	56	8	Benefited/Non-Imp	1
R316	1	B	1	58	6	Benefited/Non-Imp	1	57	7	Benefited/Non-Imp	1	57	7	Benefited/Non-Imp	1	56	8	Benefited/Non-Imp	1
R317	1	B	1	58	6	Benefited/Non-Imp	1	57	7	Benefited/Non-Imp	1	57	7	Benefited/Non-Imp	1	57	7	Benefited/Non-Imp	1
R318	1	B	1	58	6	Benefited/Non-Imp	1	57	7	Benefited/Non-Imp	1	57	7	Benefited/Non-Imp	1	56	8	Benefited/Non-Imp	1
R319	1	B	1	57	7	Benefited/Non-Imp	1	57	7	Benefited/Non-Imp	1	57	7	Benefited/Non-Imp	1	56	8	Benefited/Non-Imp	1
R320	1	B	1	57	7	Benefited/Non-Imp	1	57	7	Benefited/Non-Imp	1	57	7	Benefited/Non-Imp	1	56	8	Benefited/Non-Imp	1
R321	1	B	1	57	7	Benefited/Non-Imp	1	57	7	Benefited/Non-Imp	1	57	7	Benefited/Non-Imp	1	56	8	Benefited/Non-Imp	1
R322	1	B	1	57	8	Benefited/Impact	1	57	8	Benefited/Impact	1	57	8	Benefited/Impact	1	56	9	Benefited/Impact	1
R323	1	B	1	60	8	Benefited/Impact	1	59	9	Benefited/Impact	1	58	10	Benefited/Impact	1	58	10	Benefited/Impact	1
R324	1	B	1	59	9	Benefited/Impact	1	59	9	Benefited/Impact	1	58	10	Benefited/Impact	1	58	10	Benefited/Impact	1
R325	1	B	1	59	8	Benefited/Impact	1	58	9	Benefited/Impact	1	57	10	Benefited/Impact	1	57	10	Benefited/Impact	1
R326	1	B	1	59	8	Benefited/Impact	1	59	8	Benefited/Impact	1	58	9	Benefited/Impact	1	58	9	Benefited/Impact	1
R327	1	B	1	58	10	Benefited/Impact	1	58	10	Benefited/Impact	1	57	11	Benefited/Impact	1	57	11	Benefited/Impact	1
R328	1	B	1	58	10	Benefited/Impact	1	58	10	Benefited/Impact	1	57	11	Benefited/Impact	1	57	11	Benefited/Impact	1
R329	1	B	1	58	10	Benefited/Impact	1	58	10	Benefited/Impact	1	57	11	Benefited/Impact	1	57	11	Benefited/Impact	1
R330	1	B	1	58	10	Benefited/Impact	1	58	10	Benefited/Impact	1	57	11	Benefited/Impact	1	57	11	Benefited/Impact	1
R331	1	B	1	59	5	Benefited/Non-Imp	1	58	6	Benefited/Non-Imp	1	57	7	Benefited/Non-Imp	1	56	8	Benefited/Non-Imp	1
R332	1	B	1	58	6	Benefited/Non-Imp	1	58	6	Benefited/Non-Imp	1	57	7	Benefited/Non-Imp	1	56	8	Benefited/Non-Imp	1
R333	1	B	1	60	5	Benefited/Impact	1	59	6	Benefited/Impact	1	58	7	Benefited/Impact	1	57	8	Benefited/Impact	1
R334	1	B	1	58	6	Benefited/Non-Imp	1	57	7	Benefited/Non-Imp	1	57	7	Benefited/Non-Imp	1	56	8	Benefited/Non-Imp	1
R335	1	B	1	58	5	Benefited/Non-Imp	1	57	6	Benefited/Non-Imp	1	56	7	Benefited/Non-Imp	1	56	7	Benefited/Non-Imp	1
R336	1	B	1	59	5	Benefited/Non-Imp	1	58	6	Benefited/Non-Imp	1	57	7	Benefited/Non-Imp	1	56	8	Benefited/Non-Imp	1
R337	1	B	1	58	9	Benefited/Impact	1	58	9	Benefited/Impact	1	57	10	Benefited/Impact	1	57	10	Benefited/Impact	1
R338	1	B	1	58	9	Benefited/Impact	1	58	9	Benefited/Impact	1	57	10	Benefited/Impact	1	57	10	Benefited/Impact	1
R339	1	B	1	58	8	Benefited/Impact	1	57	9	Benefited/Impact	1	57	9	Benefited/Impact	1	57	9	Benefited/Impact	1
R340	1	B	1	58	9	Benefited/Impact	1	58	9	Benefited/Impact	1	57	10	Benefited/Impact	1	57	10	Benefited/Impact	1
R341	1	B	1	58	9	Benefited/Impact	1	58	9	Benefited/Impact	1	57	10	Benefited/Impact	1	57	10	Benefited/Impact	1
R342	1	B	1	58	9	Benefited/Impact	1	58	9	Benefited/Impact	1	57	10	Benefited/Impact	1	57	10	Benefited/Impact	1
R343	1	B	1	59	10	Benefited/Impact	1	58	11	Benefited/Impact	1	58	11	Benefited/Impact	1	57	12	Benefited/Impact	1
R344	1	B	1	59	11	Benefited/Impact	1	59	11	Benefited/Impact	1	58	12	Benefited/Impact	1	57	13	Benefited/Impact	1
R345	1	B	1	59	9	Benefited/Impact	1	58	10	Benefited/Impact	1	58	10	Benefited/Impact	1	58	10	Benefited/Impact	1
R346	1	B	1	58	9	Benefited/Impact	1	58	9	Benefited/Impact	1	57	10	Benefited/Impact	1	57	10	Benefited/Impact	1
R347	1	B	1	58	9	Benefited/Impact	1	58	9	Benefited/Impact	1	57	10	Benefited/Impact	1	57	10	Benefited/Impact	1
R348	1	B	1	58	8	Benefited/Impact	1	58	8	Benefited/Impact	1	57	9	Benefited/Impact	1	57	9	Benefited/Impact	1
R349	1	B	1	58	8	Benefited/Impact	1	58	8	Benefited/Impact	1	57	9	Benefited/Impact	1	57	9	Benefited/Impact	1
R350	1	B	1	58	9	Benefited/Impact	1	58	9	Benefited/Impact	1	57	10	Benefited/Impact	1	57	10	Benefited/Impact	1
R351	1	B	1	58	9	Benefited/Impact	1	58	9	Benefited/Impact	1	57	10	Benefited/Impact	1	57	10	Benefited/Impact	1
R352	1	B	1	58	9	Benefited/Impact	1	58	9	Benefited/Impact	1	57	10	Benefited/Impact	1	57	10	Benefited/Impact	1
R353	1	B	1	58	6	Benefited/Non-Imp	1	57	7	Benefited/Non-Imp	1	57	7	Benefited/Non-Imp	1	56	8	Benefited/Non-Imp	1
R354	1	B	1	55	4			55	4			54	5	Benefited/Non-Imp	1	54	5	Benefited/Non-Imp	1
R355	1	B	1	56	6	Benefited/Non-Imp	1	56	6	Benefited/Non-Imp	1	55	7	Benefited/Non-Imp	1	55	7	Benefited/Non-Imp	1
R356	1	B	1	55	6	Benefited/Non-Imp	1	55	6	Benefited/Non-Imp	1	55	6	Benefited/Non-Imp	1	54	7	Benefited/Non-Imp	1
R357	1	B	1	54	3			54	3			53	4			53	4		
R358	1	B	1	55	4			54	5	Benefited/Non-Imp	1	54	5	Benefited/Non-Imp	1	54	5	Benefited/Non-Imp	1
R359	1	B	1	54	4			54	4			54	4			54	4		
R360	1	B	1	58	9	Benefited/Impact	1	58	9	Benefited/Impact	1	57	10	Benefited/Impact	1	57	10	Benefited/Impact	1
R361	1	B	1	58	9	Benefited/Impact	1	58	9	Benefited/Impact	1	57	10	Benefited/Impact	1	57	10	Benefited/Impact	1
R362	1	B	1	58	9	Benefited/Impact	1	58	9	Benefited/Impact	1	57	10	Benefited/Impact	1	57	10	Benefited/Impact	1
R363	1	B	1	58	8	Benefited/Impact	1	58	8	Benefited/Impact	1	57	9	Benefited/Impact	1	57	9	Benefited/Impact	1

Project Information

I205CW Stafford Road to OR213
Contract No. K19786CW
I205CW_Build_Walls6to9
Wall 6a
HMMH
Scott Noel
11/10/2018

U.S. Department of Transportation
Federal Highway Administration

	16-ft Wall		18-ft Wall		20-ft Wall		22-ft Wall	
	Wall 6a 2018-11		**Wall 6a 2018-11**		**Wall 6a 2018-11**		**Wall 6a 2018-11**	
Average Wtd I.L.	7.5	dB I.L. Avg	7.8	dB I.L. Avg	8.2	dB I.L. Avg	8.4	dB I.L. Avg
Maximum I.L.	12	dB I.L. Max	13	dB I.L. Max	13	dB I.L. Max	13	dB I.L. Max
Benefited/Impacted ≥ AFG	47	# Prot Units	48	# Prot Units	52	# Prot Units	53	# Prot Units
Benefited/Non Impact ≥ AFG	35	# Units	37	# Units	40	# Units	44	# Units
Total Benefited	82	# Ben Units	85	# Ben Units	92	# Ben Units	97	# Ben Units
Impacted Units ≥ NRDG	44	# Units	46	# Units	48	# Units	51	# Units
Benefited Units ≥ NRDG	55	# Units	65	# Units	74	# Units	80	# Units
Percent of impacts ≥ AFG	85%	% Ben Units	87%	% Ben Units	95%	% Ben Units	96%	% Ben Units
Percent of benefits ≥ NRDG	67%	% NRDG Units	76%	% NRDG Units	80%	% NRDG Units	82%	% NRDG Units
"Cost-Reasonable" ?	Yes		Yes		Yes		Yes	
Surface Area	59294	Sq Feet	66707	Sq Feet	74119	Sq Feet	81538	Sq Feet
Surface Area/Ben Rec	723	Sq Feet	785	Sq Feet	806	Sq Feet	841	Sq Feet
Barrier Length	3,697	Feet	3,697	Feet	3,697	Feet	3,697	Feet
Min Height	16.0	Feet	18.0	Feet	20.0	Feet	22.0	Feet
Max Height	16.0	Feet	18.0	Feet	20.0	Feet	22.0	Feet
Avg Height	16.0	Feet	18.0	Feet	20.0	Feet	22.0	Feet
Total Barrier Cost	$1,482,350		$1,667,675		$1,852,975		$2,038,450	
Cost/Ben Rec	$18,077.44		$19,620		$20,141		$21,015	

Receiver ID	Row	FHWA Act Cat	No. of Dwelling Units	With Barrier Sound Levels, Impact and Benefit				With Barrier Sound Levels, Impact and Benefit				With Barrier Sound Levels, Impact and Benefit				With Barrier Sound Levels, Impact and Benefit			
				Leq(dBA)	IL (db)	Impacted?	No. Benefited	Leq(dBA)	IL (db)	Impacted?	No. Benefited	Leq(dBA)	IL (db)	Impacted?	No. Benefited	Leq(dBA)	IL (db)	Impacted?	No. Benefited
R364	1	B	1	58	8	Benefited/Impact	1	58	8	Benefited/Impact	1	57	9	Benefited/Impact	1	57	9	Benefited/Impact	1
R365	1	B	1	54	3			54	3			53	4			53	4		
R366	1	B	1	54	3			53	4			53	4			53	4		
R367	1	B	1	53	2			53	2			52	3			52	3		
R368	1	B	1	52	2			52	2			52	2			51	3		
R369	1	B	1	52	0			51	1			51	1			51	1		
R370	1	B	1	52	1			52	1			51	2			51	2		
R371	1	B	1	59	7	Benefited/Impact	1	59	7	Benefited/Impact	1	58	8	Benefited/Impact	1	57	9	Benefited/Impact	1
R372	1	B	1	59	7	Benefited/Impact	1	59	7	Benefited/Impact	1	58	8	Benefited/Impact	1	57	9	Benefited/Impact	1
R373	1	B	1	65	6	Benefited/Impact	1	63	8	Benefited/Impact	1	61	10	Benefited/Impact	1	60	11	Benefited/Impact	1
R374	1	B	1	68	4	Impact! w/ Bar		66	6	Benefited/Impact	1	64	8	Benefited/Impact	1	62	10	Benefited/Impact	1
R375	1	B	1	69	3	Impact! w/ Bar		68	4	Impact! w/ Bar		66	6	Benefited/Impact	1	64	8	Benefited/Impact	1
R376	1	B	1	70	2	Impact! w/ Bar		69	3	Impact! w/ Bar		67	5	Benefited/Impact	1	65	7	Benefited/Impact	1
R377	1	B	1	65	6	Benefited/Impact	1	63	8	Benefited/Impact	1	62	9	Benefited/Impact	1	61	10	Benefited/Impact	1
R378	1	B	1	70	2	Impact! w/ Bar		70	2	Impact! w/ Bar		69	3	Impact! w/ Bar		66	6	Benefited/Impact	1
R379	1	B	1	63	8	Benefited/Impact	1	62	9	Benefited/Impact	1	61	10	Benefited/Impact	1	60	11	Benefited/Impact	1
R380	1	B	1	70	2	Impact! w/ Bar		68	4	Impact! w/ Bar		66	6	Benefited/Impact	1	64	8	Benefited/Impact	1
R381	1	B	1	61	9	Benefited/Impact	1	60	10	Benefited/Impact	1	59	11	Benefited/Impact	1	59	11	Benefited/Impact	1
R382	1	B	1	60	9	Benefited/Impact	1	59	10	Benefited/Impact	1	59	10	Benefited/Impact	1	58	11	Benefited/Impact	1
R383	1	B	1	59	8	Benefited/Impact	1	58	9	Benefited/Impact	1	57	10	Benefited/Impact	1	57	10	Benefited/Impact	1
R384	1	B	1	57	9	Benefited/Impact	1	57	9	Benefited/Impact	1	56	10	Benefited/Impact	1	56	10	Benefited/Impact	1
R385	1	B	1	58	8	Benefited/Impact	1	58	8	Benefited/Impact	1	57	9	Benefited/Impact	1	57	9	Benefited/Impact	1
R386	1	B	1	60	8	Benefited/Impact	1	59	9	Benefited/Impact	1	59	9	Benefited/Impact	1	58	10	Benefited/Impact	1
R387	1	B	1	57	5	Benefited/Non-Imp	1	56	6	Benefited/Non-Imp	1	56	6	Benefited/Non-Imp	1	56	6	Benefited/Non-Imp	1
R388	1	B	1	57	6	Benefited/Non-Imp	1	57	6	Benefited/Non-Imp	1	56	7	Benefited/Non-Imp	1	56	7	Benefited/Non-Imp	1
R389	1	B	1	57	7	Benefited/Non-Imp	1	56	8	Benefited/Non-Imp	1	56	8	Benefited/Non-Imp	1	56	8	Benefited/Non-Imp	1
R390	1	B	1	57	4			56	5	Benefited/Non-Imp	1	56	5	Benefited/Non-Imp	1	56	5	Benefited/Non-Imp	1
R391	1	B	1	56	4			56	4			56	4			55	5	Benefited/Non-Imp	1
R392	1	B	1	57	7	Benefited/Non-Imp	1	57	7	Benefited/Non-Imp	1	56	8	Benefited/Non-Imp	1	56	8	Benefited/Non-Imp	1
R393	1	B	1	57	7	Benefited/Non-Imp	1	56	8	Benefited/Non-Imp	1	56	8	Benefited/Non-Imp	1	56	8	Benefited/Non-Imp	1
R394	1	B	1	57	6	Benefited/Non-Imp	1	56	7	Benefited/Non-Imp	1	56	7	Benefited/Non-Imp	1	56	7	Benefited/Non-Imp	1
R395	1	B	1	58	7	Benefited/Impact	1	57	8	Benefited/Impact	1	57	8	Benefited/Impact	1	57	8	Benefited/Impact	1
R396	1	B	1	56	7	Benefited/Non-Imp	1	56	7	Benefited/Non-Imp	1	55	8	Benefited/Non-Imp	1	55	8	Benefited/Non-Imp	1
R397	1	B	1	56	7	Benefited/Non-Imp	1	55	8	Benefited/Non-Imp	1	55	8	Benefited/Non-Imp	1	55	8	Benefited/Non-Imp	1
R398	1	B	1	56	8	Benefited/Non-Imp	1	56	8	Benefited/Non-Imp	1	55	9	Benefited/Non-Imp	1	55	9	Benefited/Non-Imp	1
R399	1	B	1	56	8	Benefited/Non-Imp	1	56	8	Benefited/Non-Imp	1	55	9	Benefited/Non-Imp	1	55	9	Benefited/Non-Imp	1
R400	1	B	1	56	5	Benefited/Non-Imp	1	56	5	Benefited/Non-Imp	1	56	5	Benefited/Non-Imp	1	55	6	Benefited/Non-Imp	1
R401	1	B	1	56	4			56	4			56	4			55	5	Benefited/Non-Imp	1
R402	1	B	1	56	2			56	2			56	2			55	3		
R403	1	B	1	57	3			56	4			56	4			56	4		
R404	1	B	1	61	7	Benefited/Impact	1	60	8	Benefited/Impact	1	60	8	Benefited/Impact	1	60	8	Benefited/Impact	1
R405	1	B	1	61	12	Benefited/Impact	1	60	13	Benefited/Impact	1	60	13	Benefited/Impact	1	60	13	Benefited/Impact	1
R406	1	B	1	51	2			51	2			52	1			52	1		
R407	1	B	1	51	2			51	2			51	2			52	1		
R408	1	B	1	52	1			51	2			51	2			52	1		
R409	1	B	1	52	2			51	3			51	3			51	3		
R410	1	B	1	53	3			53	3			53	3			53	3		
R411	1	B	1	54	1			54	1			53	2			53	2		
R412	1	B	1	55	1			55	1			55	1			54	2		
R413	1	B	1	56	1			56	1			56	1			56	1		
R414	1	B	1	57	0			56	1			56	1			56	1		
R415	1	B	1	57	1			57	1			57	1			57	1		
R416	1	B	1	60	1			60	1			60	1			60	1		
R417	1	B	1	56	0			56	0			56	0			56	0		
R418	1	B	1	56	0			56	0			56	0			56	0		
R419	1	B	1	56	0			56	0			56	0			56	0		
R420	1	B	1	56	0			56	0			56	0			56	0		
R421	1	B	1	59	0			59	0			59	0			59	0		
R422	1	B	1	63	1			63	1			63	1			63	1		

Project Information

I205CW Stafford Road to OR213
Contract No. K19786CW
I205CW_Build_Walls6to9
Wall 6a
HMMH
Scott Noel
11/10/2018

	16-ft Wall		**18-ft Wall**		**20-ft Wall**		**22-ft Wall**	
	Wall 6a 2018-11		**Wall 6a 2018-11**		**Wall 6a 2018-11**		**Wall 6a 2018-11**	
Average Wtd I.L.	7.5	dB I.L. Avg	7.8	dB I.L. Avg	8.2	dB I.L. Avg	8.4	dB I.L. Avg
Maximum I.L.	12	dB I.L. Max	13	dB I.L. Max	13	dB I.L. Max	13	dB I.L. Max
Benefited/Impacted ≥ AFG	47	# Prot Units	48	# Prot Units	52	# Prot Units	53	# Prot Units
Benefited/Non Impact ≥ AFG	35	# Units	37	# Units	40	# Units	44	# Units
Total Benefited	82	# Ben Units	85	# Ben Units	92	# Ben Units	97	# Ben Units
Impacted Units ≥ NRDG	44	# Units	46	# Units	48	# Units	51	# Units
Benefited Units ≥ NRDG	55	# Units	65	# Units	74	# Units	80	# Units
Percent of impacts ≥ AFG	85%	% Ben Units	87%	% Ben Units	95%	% Ben Units	96%	% Ben Units
Percent of benefits ≥ NRDG	67%	% NRDG Units	76%	% NRDG Units	80%	% NRDG Units	82%	% NRDG Units
"Cost-Reasonable" ?	Yes		Yes		Yes		Yes	
Surface Area	59294	Sq Feet	66707	Sq Feet	74119	Sq Feet	81538	Sq Feet
Surface Area/Ben Rec	723	Sq Feet	785	Sq Feet	806	Sq Feet	841	Sq Feet
Barrier Length	3,697	Feet	3,697	Feet	3,697	Feet	3,697	Feet
Min Height	16.0	Feet	18.0	Feet	20.0	Feet	22.0	Feet
Max Height	16.0	Feet	18.0	Feet	20.0	Feet	22.0	Feet
Avg Height	16.0	Feet	18.0	Feet	20.0	Feet	22.0	Feet
Total Barrier Cost	$1,482,350		$1,667,675		$1,852,975		$2,038,450	
Cost/Ben Rec	$18,077.44		$19,620		$20,141		$21,015	

				With Barrier Sound Levels, Impact and Benefit				**With Barrier Sound Levels, Impact and Benefit**				**With Barrier Sound Levels, Impact and Benefit**				**With Barrier Sound Levels, Impact and Benefit**			
Receiver ID	**Row**	**FHWA Act Cat**	**No. of Dwelling Units**	**Leq(dBA)**	**IL (db)**	**Impacted?**	**No. Benefited**	**Leq(dBA)**	**IL (db)**	**Impacted?**	**No. Benefited**	**Leq(dBA)**	**IL (db)**	**Impacted?**	**No. Benefited**	**Leq(dBA)**	**IL (db)**	**Impacted?**	**No. Benefited**
R423	1	B	1	64	1	Impact! w/ Bar		64	1	Impact! w/ Bar		64	1	Impact! w/ Bar		64	1	Impact! w/ Bar	
R885(6a)	1	B	1	59	2			59	2			59	2			59	2		
R886(6a)	1	B	1	58	3			58	3			58	3			57	3		
R887(6a)	1	B	1	57	3			57	3			57	3			57	3		
R888(6a)	1	B	1	56	3			56	3			56	4			56	4		
R889(6a)	1	B	1	56	3			56	4			56	4			55	4		
R890(6a)	1	B	1	56	3			56	4			55	4			55	4		
R891(6a)	1	B	1	56	4			56	4			56	4			55	**5**	Benefited/Non-Imp	1
R892(6a)	1	B	1	55	4			55	4			54	4			54	**5**	Benefited/Non-Imp	1
R893(6a)	1	B	1	56	4			55	4			55	**5**	Benefited/Non-Imp	1	55	**5**	Benefited/Non-Imp	1
R894(6a)	1	B	1	55	4			55	4			55	**5**	Benefited/Non-Imp	1	55	**5**	Benefited/Non-Imp	1
R895(6a)	1	B	1	56	**5**	Benefited/Non-Imp	1	56	**5**	Benefited/Non-Imp	1	55	**5**	Benefited/Non-Imp	1	55	**5**	Benefited/Non-Imp	1
R896(6a)	1	B	1	57	**5**	Benefited/Non-Imp	1	56	**6**	Benefited/Non-Imp	1	56	**6**	Benefited/Non-Imp	1	55	**6**	Benefited/Non-Imp	1

Project Information	24-ft Wall Wall 6a 2018-11		
	Average Wtd I.L.	8.8	dB I.L. Avg
	Maximum I.L.	14	dB I.L. Max
I205CW Stafford Road to OR213	Benefited/Impacted ≥ AFG	53	# Prot Units
Contract No. K19786CW	Benefited/Non Impact ≥ AFG	48	# Units
I205CW_Build_Walls6to9	Total Benefited	101	# Ben Units
Wall 6a	Impacted Units ≥ NRDG	52	# Units
HMMH	Benefited Units ≥ NRDG	83	# Units
Scott Noel	Percent of impacts ≥ AFG	96%	% Ben Units
11/10/2018	Percent of benefits ≥ NRDG	82%	% NRDG Units
	"Cost-Reasonable" ?	Yes	
	Surface Area	88958	Sq Feet
U.S. Department of Transportation Federal Highway Administration	Surface Area/Ben Rec	881	Sq Feet
	Barrier Length	3,697	Feet
	Min Height	24.0	Feet
	Max Height	24.0	Feet
	Avg Height	24.0	Feet
	Total Barrier Cost	$2,223,950	
	Cost/Ben Rec	$22,019	

Receiver ID	Row	FHWA Act Cat	No. of Dwelling Units	With Barrier Sound Levels, Impact and Benefit			
				Leq(dBA)	IL (db)	Impacted?	No. Benefited
ST-9	1	B	1	62	3	Impact! w/ Bar	
LT-2/ST-10	1	B	1	56	8	Benefited/Non-Imp	1
R306	1	B	1	60	5	Benefited/Impact	1
R307	1	B	1	58	6	Benefited/Non-Imp	1
R308	1	B	1	57	7	Benefited/Non-Imp	1
R309	1	B	1	57	7	Benefited/Non-Imp	1
R310	1	B	1	57	8	Benefited/Impact	1
R311	1	B	1	56	9	Benefited/Impact	1
R312	1	B	1	56	8	Benefited/Non-Imp	1
R313	1	B	1	56	8	Benefited/Non-Imp	1
R314	1	B	1	56	7	Benefited/Non-Imp	1
R315	1	B	1	56	8	Benefited/Non-Imp	1
R316	1	B	1	56	8	Benefited/Non-Imp	1
R317	1	B	1	56	8	Benefited/Non-Imp	1
R318	1	B	1	56	8	Benefited/Non-Imp	1
R319	1	B	1	56	8	Benefited/Non-Imp	1
R320	1	B	1	56	8	Benefited/Non-Imp	1
R321	1	B	1	56	8	Benefited/Non-Imp	1
R322	1	B	1	56	9	Benefited/Impact	1
R323	1	B	1	57	11	Benefited/Impact	1
R324	1	B	1	57	11	Benefited/Impact	1
R325	1	B	1	57	10	Benefited/Impact	1
R326	1	B	1	57	10	Benefited/Impact	1
R327	1	B	1	56	12	Benefited/Impact	1
R328	1	B	1	56	12	Benefited/Impact	1
R329	1	B	1	56	12	Benefited/Impact	1
R330	1	B	1	56	12	Benefited/Impact	1
R331	1	B	1	56	8	Benefited/Non-Imp	1
R332	1	B	1	56	8	Benefited/Non-Imp	1
R333	1	B	1	57	8	Benefited/Impact	1
R334	1	B	1	56	8	Benefited/Non-Imp	1
R335	1	B	1	56	7	Benefited/Non-Imp	1
R336	1	B	1	56	8	Benefited/Non-Imp	1
R337	1	B	1	56	11	Benefited/Impact	1
R338	1	B	1	56	11	Benefited/Impact	1
R339	1	B	1	56	10	Benefited/Impact	1
R340	1	B	1	56	11	Benefited/Impact	1
R341	1	B	1	56	11	Benefited/Impact	1
R342	1	B	1	56	11	Benefited/Impact	1
R343	1	B	1	57	12	Benefited/Impact	1
R344	1	B	1	57	13	Benefited/Impact	1
R345	1	B	1	57	11	Benefited/Impact	1
R346	1	B	1	56	11	Benefited/Impact	1
R347	1	B	1	57	10	Benefited/Impact	1
R348	1	B	1	56	10	Benefited/Impact	1
R349	1	B	1	56	10	Benefited/Impact	1
R350	1	B	1	56	11	Benefited/Impact	1
R351	1	B	1	56	11	Benefited/Impact	1
R352	1	B	1	57	10	Benefited/Impact	1
R353	1	B	1	56	8	Benefited/Non-Imp	1
R354	1	B	1	54	5	Benefited/Non-Imp	1
R355	1	B	1	54	8	Benefited/Non-Imp	1
R356	1	B	1	54	7	Benefited/Non-Imp	1
R357	1	B	1	53	4		
R358	1	B	1	53	6	Benefited/Non-Imp	1
R359	1	B	1	53	5	Benefited/Non-Imp	1
R360	1	B	1	56	11	Benefited/Impact	1
R361	1	B	1	56	11	Benefited/Impact	1
R362	1	B	1	56	11	Benefited/Impact	1
R363	1	B	1	56	10	Benefited/Impact	1

Project Information

I205CW Stafford Road to OR213
Contract No. K19786CW
I205CW_Build_Walls6to9
Wall 6a
HMMH
Scott Noel
11/10/2018

24-ft Wall

Wall 6a 2018-11

Average Wtd I.L.	8.8	dB I.L. Avg
Maximum I.L.	14	dB I.L. Max
Benefited/Impacted ≥ AFG	53	# Prot Units
Benefited/Non Impact ≥ AFG	48	# Units
Total Benefited	101	# Ben Units
Impacted Units ≥ NRDG	52	# Units
Benefited Units ≥ NRDG	83	# Units
Percent of impacts ≥ AFG	96%	% Ben Units
Percent of benefits ≥ NRDG	82%	% NRDG Units
"Cost-Reasonable" ?	Yes	
Surface Area	88958	Sq Feet
Surface Area/Ben Rec	881	Sq Feet
Barrier Length	3,697	Feet
Min Height	24.0	Feet
Max Height	24.0	Feet
Avg Height	24.0	Feet
Total Barrier Cost	$2,223,950	
Cost/Ben Rec	$22,019	

Receiver ID	Row	FHWA Act Cat	No. of Dwelling Units	With Barrier Sound Levels, Impact and Benefit			
				Leq(dBA)	IL (db)	Impacted?	No. Benefited
R364	1	B	1	57	**9**	Benefited/Impact	1
R365	1	B	1	53	4		
R366	1	B	1	52	**5**	Benefited/Non-Imp	1
R367	1	B	1	52	3		
R368	1	B	1	51	3		
R369	1	B	1	51	1		
R370	1	B	1	51	2		
R371	1	B	1	57	**9**	Benefited/Impact	1
R372	1	B	1	57	**9**	Benefited/Impact	1
R373	1	B	1	59	**12**	Benefited/Impact	1
R374	1	B	1	61	**11**	Benefited/Impact	1
R375	1	B	1	62	**10**	Benefited/Impact	1
R376	1	B	1	63	**9**	Benefited/Impact	1
R377	1	B	1	60	**11**	Benefited/Impact	1
R378	1	B	1	64	**8**	Benefited/Impact	1
R379	1	B	1	59	**12**	Benefited/Impact	1
R380	1	B	1	62	**10**	Benefited/Impact	1
R381	1	B	1	58	**12**	Benefited/Impact	1
R382	1	B	1	57	**12**	Benefited/Impact	1
R383	1	B	1	56	**11**	Benefited/Impact	1
R384	1	B	1	55	**11**	Benefited/Impact	1
R385	1	B	1	56	**10**	Benefited/Impact	1
R386	1	B	1	58	**10**	Benefited/Impact	1
R387	1	B	1	56	**6**	Benefited/Non-Imp	1
R388	1	B	1	56	**7**	Benefited/Non-Imp	1
R389	1	B	1	56	**8**	Benefited/Non-Imp	1
R390	1	B	1	55	**6**	Benefited/Non-Imp	1
R391	1	B	1	55	**5**	Benefited/Non-Imp	1
R392	1	B	1	56	**8**	Benefited/Non-Imp	1
R393	1	B	1	56	**8**	Benefited/Non-Imp	1
R394	1	B	1	55	**8**	Benefited/Non-Imp	1
R395	1	B	1	57	**8**	Benefited/Impact	1
R396	1	B	1	55	**8**	Benefited/Non-Imp	1
R397	1	B	1	54	**9**	Benefited/Non-Imp	1
R398	1	B	1	54	**10**	Benefited/Non-Imp	1
R399	1	B	1	54	**10**	Benefited/Non-Imp	1
R400	1	B	1	55	**6**	Benefited/Non-Imp	1
R401	1	B	1	55	**5**	Benefited/Non-Imp	1
R402	1	B	1	55	3		
R403	1	B	1	55	**5**	Benefited/Non-Imp	1
R404	1	B	1	60	**8**	Benefited/Impact	1
R405	1	B	1	59	**14**	Benefited/Impact	1
R406	1	B	1	52	1		
R407	1	B	1	52	1		
R408	1	B	1	52	1		
R409	1	B	1	51	3		
R410	1	B	1	53	3		
R411	1	B	1	53	2		
R412	1	B	1	54	2		
R413	1	B	1	56	1		
R414	1	B	1	56	1		
R415	1	B	1	57	1		
R416	1	B	1	60	1		
R417	1	B	1	56	0		
R418	1	B	1	56	0		
R419	1	B	1	56	0		
R420	1	B	1	56	0		
R421	1	B	1	59	0		
R422	1	B	1	63	1		

Project Information

I205CW Stafford Road to OR213
Contract No. K19786CW
I205CW_Build_Walls6to9
Wall 6a
HMMH
Scott Noel
11/10/2018

24-ft Wall

Wall 6a 2018-11

Average Wtd I.L.	8.8	dB I.L. Avg
Maximum I.L.	14	dB I.L. Max
Benefited/Impacted ≥ AFG	53	# Prot Units
Benefited/Non Impact ≥ AFG	48	# Units
Total Benefited	101	# Ben Units
Impacted Units ≥ NRDG	52	# Units
Benefited Units ≥ NRDG	83	# Units
Percent of impacts ≥ AFG	96%	% Ben Units
Percent of benefits ≥ NRDG	82%	% NRDG Units
"Cost-Reasonable" ?	Yes	
Surface Area	88958	Sq Feet
Surface Area/Ben Rec	881	Sq Feet
Barrier Length	3,697	Feet
Min Height	24.0	Feet
Max Height	24.0	Feet
Avg Height	24.0	Feet
Total Barrier Cost	$2,223,950	
Cost/Ben Rec	$22,019	

Receiver ID	Row	FHWA Act Cat	No. of Dwelling Units	With Barrier Sound Levels, Impact and Benefit			
				Leq(dBA)	IL (db)	Impacted?	No. Benefited
R423	1	B	1	64	1	Impact! w/ Bar	
R885(6a)	1	B	1	58	2		
R886(6a)	1	B	1	57	3		
R887(6a)	1	B	1	57	4		
R888(6a)	1	B	1	55	4		
R889(6a)	1	B	1	55	4		
R890(6a)	1	B	1	55	**5**	Benefited/Non-Imp	1
R891(6a)	1	B	1	55	**5**	Benefited/Non-Imp	1
R892(6a)	1	B	1	54	**5**	Benefited/Non-Imp	1
R893(6a)	1	B	1	54	**5**	Benefited/Non-Imp	1
R894(6a)	1	B	1	54	**5**	Benefited/Non-Imp	1
R895(6a)	1	B	1	55	**6**	Benefited/Non-Imp	1
R896(6a)	1	B	1	55	**7**	Benefited/Non-Imp	1

U.S. Department of Transportation
Federal Highway Administration

Basic Noise Barrier Optimization Tool **11/10/2018**

I205CW Stafford Road to OR213
Wall 6b

	10'	12'	14'	16'	18'	20'	22'	24'	Units
Average Wtd I.L. (benefited)	5.8	6.4	6.8	7.7	8.8	9.1	9.4	9.9	dBA
Maximum I.L.	8	9	10	10	11	11	12	12	dBA
Benefited/Impacted ≥ AFG	4	7	10	10	10	10	10	10	# of dwelling units
Benefited/Non Impact ≥ AFG	1	1	1	1	1	3	4	4	# of dwelling units
Total Benefited	5	8	11	11	11	13	14	14	# of dwelling units
Impacted Units ≥ NRDG	1	3	5	9	10	10	10	10	# of dwelling units
Benefited Units ≥ NRDG	1	3	5	10	11	11	11	11	# of dwelling units
Percent of impacts ≥ AFG	40%	70%	100%	100%	100%	100%	100%	100%	%
Percent of benefits ≥ NRDG	20%	38%	45%	91%	100%	85%	79%	79%	%
"Cost-Reasonable" ?	No	No	No	No	No	No	No	No	----
Surface Area	11,636	13,960	16,294	18,619	20,953	23,268	25,603	27,927	sq-feet
Surface Area/Ben Rec	2,327	1,745	1,481	1,693	1,905	1,790	1,829	1,995	sq-ft / ben rec
Barrier Length	1,165	1,165	1,165	1,165	1,165	1,165	1,165	1,165	ft
Min Height	10	12	14	16	18	20	22	24	ft
Max Height	10	12	14	16	18	20	22	24	ft
Avg Height	10	12	14	16	18	20	22	24	ft
Total Barrier Cost	232,720	279,200	325,880	465,475	523,825	581,700	640,075	698,175	$
Cost/Ben Rec	46,544	34,900	29,625	42,316	47,620	44,746	45,720	49,870	$ / ben rec
Effectiveness/Cost Metric (E/C)	4.3	17.2	33.8	53.2	52.5	55.9	54.7	50.1	----

ODOT Acoustical Feasibilty Goal (dBA)	5
ODOT Acoustical Feasibilty Goal (%)	51%
ODOT Noise Reduction Design Goal (dBA)	7
ODOT Noise Reduction Design Goal (%)	1%

Project Information	No Barrier Analysis	
	No Barrier	
I205CW Stafford Road to OR213	Total Units Exposed to Impact	10
Contract No. K19786CW	# Impacts - NAC only	10
I205CW_Build_Walls6to9	# Impacts - SI only	0
Wall 6b	# Impacts - Both NAC & SI	0
HMMH		
Scott Noel		
11/10/2018		

U.S. Department of Transportation
Federal Highway Administration

Enter SI Info

10-ft Wall			12-ft Wall			14-ft Wall		
Wall 6b 2018-11			Wall 6b 2018-11			Wall 6b 2018-11		
Average Wtd I.L. (benefited)	5.8	dB I.L. Avg	Average Wtd I.L.	6.4	dB I.L. Avg	Average Wtd I.L.	6.8	dB I.L. Avg
Maximum I.L.	8	dB I.L. Max	Maximum I.L.	9	dB I.L. Max	Maximum I.L.	10	dB I.L. Max
Benefited/Impacted ≥ AFG	4	# Prot Units	Benefited/Impacted ≥ AFG	7	# Prot Units	Benefited/Impacted ≥ AFG	10	# Prot Units
Benefited/Non Impact ≥ AFG	1	# Units	Benefited/Non Impact ≥ AFG	1	# Units	Benefited/Non Impact ≥ AFG	1	# Units
Total Benefited	5	# Ben Units	Total Benefited	8	# Ben Units	Total Benefited	11	# Ben Units
Impacted Units ≥ NRDG	1	# Units	Impacted Units ≥ NRDG	3	# Units	Impacted Units ≥ NRDG	5	# Units
Benefited Units ≥ NRDG	1	# Units	Benefited Units ≥ NRDG	3	# Units	Benefited Units ≥ NRDG	5	# Units
Percent of impacts ≥ AFG	40%	% Ben Units	Percent of impacts ≥ AFG	70%	% Ben Units	Percent of impacts ≥ AFG	100%	% Ben Units
Percent of benefits ≥ NRDG	20%	% NRDG Units	Percent of benefits ≥ NRDG	38%	% NRDG Units	Percent of benefits ≥ NRDG	45%	% NRDG Units
"Cost-Reasonable" ?	No		"Cost-Reasonable" ?	No		"Cost-Reasonable" ?	No	
Surface Area	11636	Sq Feet	Surface Area	13960	Sq Feet	Surface Area	16294	Sq Feet
Surface Area/Ben Rec	2327	Sq Feet	Surface Area/Ben Rec	1745	Sq Feet	Surface Area/Ben Rec	1481	Sq Feet
Barrier Length	1,165	Feet	Barrier Length	1,165	Feet	Barrier Length	1,165	Feet
Min Height	10.0	Feet	Min Height	12.0	Feet	Min Height	14.0	Feet
Max Height	10.0	Feet	Max Height	12.0	Feet	Max Height	14.0	Feet
Avg Height	10.0	Feet	Avg Height	12.0	Feet	Avg Height	14.0	Feet
Total Barrier Cost	$232,720		Total Barrier Cost	$279,200		Total Barrier Cost	$325,880	
Cost/Ben Rec	$46,544		Cost/Ben Rec	$34,900		Cost/Ben Rec	$29,625	

Receiver ID	Row	FHWA Act Cat	No. of Dwelling Units	Type of Impact		Impact?	No. of Impacted Units	With Barrier Sound Levels, Impact and Benefit				With Barrier Sound Levels, Impact and Benefit				With Barrier Sound Levels, Impact and Benefit			
				Bld Leq > NAC?	Sub. Inc.?			Leq(dBA)	IL (db)	Impacted?	No. Benefited	Leq(dBA)	IL (db)	Impacted?	No. Benefited	Leq(dBA)	IL (db)	Impacted?	No. Benefited
R295	1	B	1	64				59	5	Benefited/Non-Imp	1	58	6	Benefited/Non-Imp	1	58	6	Benefited/Non-Imp	1
R296	1	B	1	65		Impact!	1	60	5	Benefited/Impact	1	60	5	Benefited/Impact	1	59	6	Benefited/Impact	1
R297	1	B	1	68		Impact!	1	64	4	Impact! w/ Bar		64	4	Impact! w/ Bar		63	5	Benefited/Impact	1
R298	1	B	1	71		Impact!	1	67	4	Impact! w/ Bar		66	5	Benefited/Impact	1	65	6	Benefited/Impact	1
R299	1	B	1	72		Impact!	1	70	2	Impact! w/ Bar		69	3	Impact! w/ Bar		67	5	Benefited/Impact	1
R300	1	B	1	71		Impact!	1	68	3	Impact! w/ Bar		66	5	Benefited/Impact	1	64	7	Benefited/Impact	1
R301	1	B	1	69		Impact!	1	67	2	Impact! w/ Bar		65	4	Impact! w/ Bar		63	6	Benefited/Impact	1
R302	1	B	1	70		Impact!	1	67	3	Impact! w/ Bar		64	6	Benefited/Impact	1	63	7	Benefited/Impact	1
R303	1	B	1	69		Impact!	1	64	5	Benefited/Impact	1	62	7	Benefited/Impact	1	61	8	Benefited/Impact	1
R304	1	B	1	69		Impact!	1	63	6	Benefited/Impact	1	61	8	Benefited/Impact	1	60	9	Benefited/Impact	1
R305	1	B	1	68		Impact!	1	60	8	Benefited/Impact	1	59	9	Benefited/Impact	1	58	10	Benefited/Impact	1
R879(6b)	1	B	1	59				59	0			59	0			59	1		
R880(6b)	1	B	1	59				59	0			59	1			58	1		
R881(6b)	1	B	1	63				62	1			61	2			60	3		
R882(6b)	1	B	1	62				61	1			60	2			59	3		
R883(6b)	1	B	1	62				60	2			59	3			59	3		
R884(6b)	1	B	1	62				60	2			60	2			59	2		

Project Information

I205CW Stafford Road to OR213
Contract No. K19786CW
I205CW_Build_Walls6to9
Wall 6b
HMMH
Scott Noel
11/10/2018

U.S. Department of Transportation
Federal Highway Administration

16-ft Wall			18-ft Wall			20-ft Wall			22-ft Wall		
Wall 6b 2018-11			Wall 6b 2018-11			Wall 6b 2018-11			Wall 6b 2018-11		
Average Wtd I.L.	7.7	dB I.L. Avg	Average Wtd I.L.	8.8	dB I.L. Avg	Average Wtd I.L.	9.1	dB I.L. Avg	Average Wtd I.L.	9.4	dB I.L. Avg
Maximum I.L.	10	dB I.L. Max	Maximum I.L.	11	dB I.L. Max	Maximum I.L.	11	dB I.L. Max	Maximum I.L.	12	dB I.L. Max
Benefited/Impacted ≥ AFG	10	# Prot Units	Benefited/Impacted ≥ AFG	10	# Prot Units	Benefited/Impacted ≥ AFG	10	# Prot Units	Benefited/Impacted ≥ AFG	10	# Prot Units
Benefited/Non Impact ≥ AFG	1	# Units	Benefited/Non Impact ≥ AFG	1	# Units	Benefited/Non Impact ≥ AFG	3	# Units	Benefited/Non Impact ≥ AFG	4	# Units
Total Benefited	11	# Ben Units	Total Benefited	11	# Ben Units	Total Benefited	13	# Ben Units	Total Benefited	14	# Ben Units
Impacted Units ≥ NRDG	9	# Units	Impacted Units ≥ NRDG	10	# Units	Impacted Units ≥ NRDG	10	# Units	Impacted Units ≥ NRDG	10	# Units
Benefited Units ≥ NRDG	10	# Units	Benefited Units ≥ NRDG	11	# Units	Benefited Units ≥ NRDG	11	# Units	Benefited Units ≥ NRDG	11	# Units
Percent of impacts ≥ AFG	100%	% Ben Units	Percent of impacts ≥ AFG	100%	% Ben Units	Percent of impacts ≥ AFG	100%	% Ben Units	Percent of impacts ≥ AFG	100%	% Ben Units
Percent of benefits ≥ NRDG	91%	% NRDG Units	Percent of benefits ≥ NRDG	100%	% NRDG Units	Percent of benefits ≥ NRDG	85%	% NRDG Units	Percent of benefits ≥ NRDG	79%	% NRDG Units
"Cost-Reasonable" ?	No		"Cost-Reasonable" ?	No		"Cost-Reasonable" ?	No		"Cost-Reasonable" ?	No	
Surface Area	18619	Sq Feet	Surface Area	20953	Sq Feet	Surface Area	23268	Sq Feet	Surface Area	25603	Sq Feet
Surface Area/Ben Rec	1693	Sq Feet	Surface Area/Ben Rec	1905	Sq Feet	Surface Area/Ben Rec	1790	Sq Feet	Surface Area/Ben Rec	1829	Sq Feet
Barrier Length	1,165	Feet	Barrier Length	1,165	Feet	Barrier Length	1,165	Feet	Barrier Length	1,165	Feet
Min Height	16.0	Feet	Min Height	18.0	Feet	Min Height	20.0	Feet	Min Height	22.0	Feet
Max Height	16.0	Feet	Max Height	18.0	Feet	Max Height	20.0	Feet	Max Height	22.0	Feet
Avg Height	16.0	Feet	Avg Height	18.0	Feet	Avg Height	20.0	Feet	Avg Height	22.0	Feet
Total Barrier Cost	$465,475		Total Barrier Cost	$523,825		Total Barrier Cost	$581,700		Total Barrier Cost	$640,075	
Cost/Ben Rec	$42,315.91		Cost/Ben Rec	$47,620		Cost/Ben Rec	$44,746		Cost/Ben Rec	$45,720	

Receiver ID	Row	FHWA Act Cat	No. of Dwelling Units	With Barrier Sound Levels, Impact and Benefit				With Barrier Sound Levels, Impact and Benefit				With Barrier Sound Levels, Impact and Benefit				With Barrier Sound Levels, Impact and Benefit			
				Leq(dBA)	IL (db)	Impacted?	No. Benefited	Leq(dBA)	IL (db)	Impacted?	No. Benefited	Leq(dBA)	IL (db)	Impacted?	No. Benefited	Leq(dBA)	IL (db)	Impacted?	No. Benefited
R295	1	B	1	57	**7**	Benefited/Non-Imp	1	56	**8**	Benefited/Non-Imp	1	55	**9**	Benefited/Non-Imp	1	54	**10**	Benefited/Non-Imp	1
R296	1	B	1	58	**7**	Benefited/Impact	1	57	**8**	Benefited/Impact	1	56	**9**	Benefited/Impact	1	55	**10**	Benefited/Impact	1
R297	1	B	1	62	**6**	Benefited/Impact	1	61	**7**	Benefited/Impact	1	60	**8**	Benefited/Impact	1	58	**10**	Benefited/Impact	1
R298	1	B	1	64	**7**	Benefited/Impact	1	62	**9**	Benefited/Impact	1	60	**11**	Benefited/Impact	1	59	**12**	Benefited/Impact	1
R299	1	B	1	65	**7**	Benefited/Impact	1	63	**9**	Benefited/Impact	1	62	**10**	Benefited/Impact	1	61	**11**	Benefited/Impact	1
R300	1	B	1	63	**8**	Benefited/Impact	1	62	**9**	Benefited/Impact	1	61	**10**	Benefited/Impact	1	60	**11**	Benefited/Impact	1
R301	1	B	1	62	**7**	Benefited/Impact	1	61	**8**	Benefited/Impact	1	60	**9**	Benefited/Impact	1	60	**9**	Benefited/Impact	1
R302	1	B	1	62	**8**	Benefited/Impact	1	61	**9**	Benefited/Impact	1	60	**10**	Benefited/Impact	1	60	**10**	Benefited/Impact	1
R303	1	B	1	60	**9**	Benefited/Impact	1	60	**9**	Benefited/Impact	1	59	**10**	Benefited/Impact	1	59	**10**	Benefited/Impact	1
R304	1	B	1	60	**9**	Benefited/Impact	1	59	**10**	Benefited/Impact	1	58	**11**	Benefited/Impact	1	58	**11**	Benefited/Impact	1
R305	1	B	1	58	**10**	Benefited/Impact	1	57	**11**	Benefited/Impact	1	57	**11**	Benefited/Impact	1	56	**12**	Benefited/Impact	1
R879(6b)	1	B	1	58	1			57	2			56	3			56	4		
R880(6b)	1	B	1	58	2			57	2			56	3			56	3		
R881(6b)	1	B	1	59	3			58	4			58	**5**	Benefited/Non-Imp	1	57	**5**	Benefited/Non-Imp	1
R882(6b)	1	B	1	58	4			58	4			57	**5**	Benefited/Non-Imp	1	57	**5**	Benefited/Non-Imp	1
R883(6b)	1	B	1	58	4			58	4			58	4			57	**5**	Benefited/Non-Imp	1
R884(6b)	1	B	1	59	2			59	2			59	3			59	3		

Project Information

I205CW Stafford Road to OR213
Contract No. K19786CW
I205CW_Build_Walls6to9
Wall 6b
HMMH
Scott Noel
11/10/2018

U.S. Department of Transportation
Federal Highway Administration

24-ft Wall		
Wall 6b 2018-11		
Average Wtd I.L.	9.9	dB I.L. Avg
Maximum I.L.	12	dB I.L. Max
Benefited/Impacted ≥ AFG	10	# Prot Units
Benefited/Non Impact ≥ AFG	4	# Units
Total Benefited	14	# Ben Units
Impacted Units ≥ NRDG	10	# Units
Benefited Units ≥ NRDG	11	# Units
Percent of impacts ≥ AFG	100%	% Ben Units
Percent of benefits ≥ NRDG	79%	% NRDG Units
"Cost-Reasonable" ?	No	
Surface Area	27927	Sq Feet
Surface Area/Ben Rec	1995	Sq Feet
Barrier Length	1,165	Feet
Min Height	24.0	Feet
Max Height	24.0	Feet
Avg Height	24.0	Feet
Total Barrier Cost	$698,175	
Cost/Ben Rec	$49,870	

Receiver ID	Row	FHWA Act Cat	No. of Dwelling Units	With Barrier Sound Levels, Impact and Benefit			
				Leq(dBA)	IL (db)	Impacted?	No. Benefited
R295	1	B	1	54	**10**	Benefited/Non-Imp	1
R296	1	B	1	55	**10**	Benefited/Impact	1
R297	1	B	1	57	**11**	Benefited/Impact	1
R298	1	B	1	59	**12**	Benefited/Impact	1
R299	1	B	1	60	**12**	Benefited/Impact	1
R300	1	B	1	59	**12**	Benefited/Impact	1
R301	1	B	1	59	**10**	Benefited/Impact	1
R302	1	B	1	59	**11**	Benefited/Impact	1
R303	1	B	1	58	**11**	Benefited/Impact	1
R304	1	B	1	57	**12**	Benefited/Impact	1
R305	1	B	1	56	**12**	Benefited/Impact	1
R879(6b)	1	B	1	55	4		
R880(6b)	1	B	1	55	4		
R881(6b)	1	B	1	57	**6**	Benefited/Non-Imp	1
R882(6b)	1	B	1	57	**6**	Benefited/Non-Imp	1
R883(6b)	1	B	1	57	**5**	Benefited/Non-Imp	1
R884(6b)	1	B	1	59	3		

U.S. Department of Transportation
Federal Highway Administration

Basic Noise Barrier Optimization Tool **6/28/2018**

I205CW Stafford Road to OR213
Wall 7

	10'	12'	14'	16'	18'	20'	22'	24'	Units
Average Wtd I.L. (benefited)	6.2	6.4	6.7	7.3	8.2	8.8	8.8	9.3	**dBA**
Maximum I.L.	9	9	10	10	11	11	12	13	**dBA**
Benefited/Impacted ≥ AFG	6	8	11	12	12	12	12	12	**# of dwelling units**
Benefited/Non Impact ≥ AFG	0	1	1	1	1	2	4	4	**# of dwelling units**
Total Benefited	6	9	12	13	13	14	16	16	**# of dwelling units**
Impacted Units ≥ NRDG	2	4	6	8	10	11	12	12	**# of dwelling units**
Benefited Units ≥ NRDG	2	4	6	8	10	12	13	13	**# of dwelling units**
Percent of impacts ≥ AFG	38%	50%	69%	75%	75%	75%	75%	75%	**%**
Percent of benefits ≥ NRDG	33%	44%	50%	62%	77%	86%	81%	81%	**%**
"Cost-Reasonable" ?	No	No	Yes	Yes	No	No	No	No	**----**
Surface Area	9,733	11,684	13,635	15,587	17,531	19,476	21,420	23,363	**sq-feet**
Surface Area/Ben Rec	1,622	1,298	1,136	1,199	1,349	1,391	1,339	1,460	**sq-ft / ben rec**
Barrier Length	989	989	989	989	989	989	989	989	**ft**
Min Height	10	12	14	16	18	20	22	24	**ft**
Max Height	10	12	14	16	18	20	22	24	**ft**
Avg Height	10	12	14	16	18	20	22	24	**ft**
Total Barrier Cost	194,660	233,680	272,700	311,740	438,275	486,900	535,500	584,075	**$**
Cost/Ben Rec	32,443	25,964	22,725	23,980	33,713	34,779	33,469	36,505	**$ / ben rec**
Effectiveness/Cost Metric (E/C)	4.8	12.0	20.6	26.1	29.0	30.9	35.0	32.1	**----**

ODOT Acoustical Feasibilty Goal (dBA)	5
ODOT Acoustical Feasibilty Goal (%)	51%
ODOT Noise Reduction Design Goal (dBA)	7
ODOT Noise Reduction Design Goal (%)	1%

Project Information	No Barrier Analysis No Barrier		10-ft Wall Wall 7 HDR 6-28-2018			12-ft Wall Wall 7 HDR 6-28-2018			14-ft Wall Wall 7 HDR 6-28-2018		
			Average Wtd I.L. (benefited)	6.2	dB I.L. Avg	Average Wtd I.L.	6.4	dB I.L. Avg	Average Wtd I.L.	6.7	dB I.L. Avg
			Maximum I.L.	9	dB I.L. Max	Maximum I.L.	9	dB I.L. Max	Maximum I.L.	10	dB I.L. Max
I205CW Stafford Road to OR213	Total Units Exposed to Impact	16	Benefited/Impacted ≥ AFG	6	# Prot Units	Benefited/Impacted ≥ AFG	8	# Prot Units	Benefited/Impacted ≥ AFG	11	# Prot Units
Contract No. K19786CW	# Impacts - NAC only	16	Benefited/Non Impact ≥ AFG	0	# Units	Benefited/Non Impact ≥ AFG	1	# Units	Benefited/Non Impact ≥ AFG	1	# Units
I205CW_Build_Walls6to9	# Impacts - SI only	0	Total Benefited	6	# Ben Units	Total Benefited	9	# Ben Units	Total Benefited	12	# Ben Units
Wall 7	# Impacts - Both NAC & SI	0	Impacted Units ≥ NRDG	2	# Units	Impacted Units ≥ NRDG	4	# Units	Impacted Units ≥ NRDG	6	# Units
HMMH			Benefited Units ≥ NRDG	2	# Units	Benefited Units ≥ NRDG	4	# Units	Benefited Units ≥ NRDG	6	# Units
Scott Noel			Percent of impacts ≥ AFG	38%	% Ben Units	Percent of impacts ≥ AFG	50%	% Ben Units	Percent of impacts ≥ AFG	69%	% Ben Units
6/28/2018			Percent of benefits ≥ NRDG	33%	% NRDG Units	Percent of benefits ≥ NRDG	44%	% NRDG Units	Percent of benefits ≥ NRDG	50%	% NRDG Units
			"Cost-Reasonable" ?	No		"Cost-Reasonable" ?	No		"Cost-Reasonable" ?	Yes	
			Surface Area	9733	Sq Feet	Surface Area	11684	Sq Feet	Surface Area	13635	Sq Feet
U.S. Department of Transportation Federal Highway Administration			Surface Area/Ben Rec	1622	Sq Feet	Surface Area/Ben Rec	1298	Sq Feet	Surface Area/Ben Rec	1136	Sq Feet
			Barrier Length	989	Feet	Barrier Length	989	Feet	Barrier Length	989	Feet
			Min Height	10.0	Feet	Min Height	12.0	Feet	Min Height	14.0	Feet
			Max Height	10.0	Feet	Max Height	12.0	Feet	Max Height	14.0	Feet
			Avg Height	10.0	Feet	Avg Height	12.0	Feet	Avg Height	14.0	Feet
			Total Barrier Cost	$194,660		Total Barrier Cost	$233,680		Total Barrier Cost	$272,700	
	Enter SI Info		Cost/Ben Rec	$32,443		Cost/Ben Rec	$25,964		Cost/Ben Rec	$22,725	

Receiver ID	Row	FHWA Act Cat	No. of Dwelling Units	Type of Impact		Impact?	No. of Impacted Units	With Barrier Sound Levels, Impact and Benefit				With Barrier Sound Levels, Impact and Benefit				With Barrier Sound Levels, Impact and Benefit			
				Bld Leq > NAC?	Sub. Inc.?			Leq(dBA)	IL (db)	Impacted?	No. Benefited	Leq(dBA)	IL (db)	Impacted?	No. Benefited	Leq(dBA)	IL (db)	Impacted?	No. Benefited
R414	1	B	1	56				54	2			54	2			54	2		
R415	1	B	1	56				55	1			55	1			55	1		
R416	1	B	1	61				60	1			60	1			60	1		
R417	1	B	1	54				53	1			53	1			53	1		
R418	1	B	1	54				53	1			53	1			53	1		
R419	1	B	1	54				53	1			53	1			53	1		
R420	1	B	1	55				54	1			54	1			54	1		
R421	1	B	1	58				56	2			56	2			56	2		
R422	1	B	1	64				63	1			63	1			63	1		
R423	1	B	1	65		Impact!	1	65	0	Impact! w/ Bar		65	0	Impact! w/ Bar		65	0	Impact! w/ Bar	
R424	1	B	1	63				61	2			61	2			61	2		
R425	1	B	1	63				62	1			62	1			61	2		
R426	1	B	1	65		Impact!	1	64	1	Impact! w/ Bar		63	2	Impact! w/ Bar		63	2	Impact! w/ Bar	
R427	1	B	1	66		Impact!	1	64	2	Impact! w/ Bar		64	2	Impact! w/ Bar		64	2	Impact! w/ Bar	
R428	1	B	1	62				60	2			60	2			60	2		
R429	1	B	1	65		Impact!	1	63	2	Impact! w/ Bar		63	2	Impact! w/ Bar		62	3	Impact! w/ Bar	
R430	1	B	1	59				56	3			56	3			56	3		
R431	1	B	1	60				57	3			57	3			56	4		
R432	1	B	1	66		Impact!	1	61	**5**	Benefited/Impact	1	60	**6**	Benefited/Impact	1	59	**7**	Benefited/Impact	1
R433	1	B	1	64				60	4			59	**5**	Benefited/Non-Imp	1	59	**5**	Benefited/Non-Imp	1
R434	1	B	1	57				56	1			56	1			55	2		
R435	1	B	1	54				54	0			54	0			54	0		
R436	1	B	1	62				59	3			59	3			58	4		
R437	1	B	1	54				54	0			53	1			53	1		
R438	1	B	1	53				53	0			53	0			53	0		
R439	1	B	1	53				53	0			53	0			53	0		
R440	1	B	1	70		Impact!	1	61	**9**	Benefited/Impact	1	61	**9**	Benefited/Impact	1	60	**10**	Benefited/Impact	1
R441	1	B	1	63				60	3			60	3			59	4		
R442	1	B	1	69		Impact!	1	62	**7**	Benefited/Impact	1	61	**8**	Benefited/Impact	1	61	**8**	Benefited/Impact	1
R443	1	B	1	69		Impact!	1	64	**5**	Benefited/Impact	1	62	**7**	Benefited/Impact	1	61	**8**	Benefited/Impact	1
R444	1	B	1	67		Impact!	1	64	3	Impact! w/ Bar		62	**5**	Benefited/Impact	1	61	**6**	Benefited/Impact	1
R445	1	B	1	66		Impact!	1	63	3	Impact! w/ Bar		62	4	Impact! w/ Bar		61	**5**	Benefited/Impact	1
R446	1	B	1	72		Impact!	1	70	2	Impact! w/ Bar		69	3	Impact! w/ Bar		67	**5**	Benefited/Impact	1
R447	1	B	1	73		Impact!	1	70	3	Impact! w/ Bar		69	4	Impact! w/ Bar		68	**5**	Benefited/Impact	1
R448	1	B	1	73		Impact!	1	68	**5**	Benefited/Impact	1	67	**6**	Benefited/Impact	1	66	**7**	Benefited/Impact	1
R449	1	B	1	73		Impact!	1	67	**6**	Benefited/Impact	1	66	**7**	Benefited/Impact	1	65	**8**	Benefited/Impact	1
R450	1	B	1	63				61	2			61	2			60	3		
R451	1	B	1	64				62	2			61	3			61	3		
R452	1	B	1	67		Impact!	1	64	3	Impact! w/ Bar		63	4	Impact! w/ Bar		63	4	Impact! w/ Bar	
R453	1	B	1	69		Impact!	1	65	4	Impact! w/ Bar		64	**5**	Benefited/Impact	1	63	**6**	Benefited/Impact	1
R454	1	B	1	60				59	1			59	1			59	1		
R455	1	B	1	60				59	1			59	1			59	1		
R456	1	B	1	60				59	1			59	1			59	1		
R457	1	B	1	63				62	1			61	2			61	2		
R458	1	B	1	63				62	1			61	2			61	2		
R459	1	B	1	63				62	1			61	2			61	2		

Project Information

I205CW Stafford Road to OR213
Contract No. K19786CW
I205CW_Build_Walls6to9
Wall 7
HMMH
Scott Noel
6/28/2018

16-ft Wall			18-ft Wall			20-ft Wall			22-ft Wall		
Wall 7 HDR 6-28-2018			**Wall 7 HDR 6-28-2018**			**Wall 7 HDR 6-28-2018**			**Wall 7 HDR 6-28-2018**		
Average Wtd I.L.	7.3	dB I.L. Avg	Average Wtd I.L.	8.2	dB I.L. Avg	Average Wtd I.L.	8.8	dB I.L. Avg	Average Wtd I.L.	8.8	dB I.L. Avg
Maximum I.L.	10	dB I.L. Max	Maximum I.L.	11	dB I.L. Max	Maximum I.L.	11	dB I.L. Max	Maximum I.L.	12	dB I.L. Max
Benefited/Impacted ≥ AFG	12	# Prot Units	Benefited/Impacted ≥ AFG	12	# Prot Units	Benefited/Impacted ≥ AFG	12	# Prot Units	Benefited/Impacted ≥ AFG	12	# Prot Units
Benefited/Non Impact ≥ AFG	1	# Units	Benefited/Non Impact ≥ AFG	1	# Units	Benefited/Non Impact ≥ AFG	2	# Units	Benefited/Non Impact ≥ AFG	4	# Units
Total Benefited	13	# Ben Units	Total Benefited	13	# Ben Units	Total Benefited	14	# Ben Units	Total Benefited	16	# Ben Units
Impacted Units ≥ NRDG	8	# Units	Impacted Units ≥ NRDG	10	# Units	Impacted Units ≥ NRDG	11	# Units	Impacted Units ≥ NRDG	12	# Units
Benefited Units ≥ NRDG	8	# Units	Benefited Units ≥ NRDG	10	# Units	Benefited Units ≥ NRDG	12	# Units	Benefited Units ≥ NRDG	13	# Units
Percent of impacts ≥ AFG	75%	% Ben Units	Percent of impacts ≥ AFG	75%	% Ben Units	Percent of impacts ≥ AFG	75%	% Ben Units	Percent of impacts ≥ AFG	75%	% Ben Units
Percent of benefits ≥ NRDG	62%	% NRDG Units	Percent of benefits ≥ NRDG	77%	% NRDG Units	Percent of benefits ≥ NRDG	86%	% NRDG Units	Percent of benefits ≥ NRDG	81%	% NRDG Units
"Cost-Reasonable" ?	Yes		"Cost-Reasonable" ?	No		"Cost-Reasonable" ?	No		"Cost-Reasonable" ?	No	
Surface Area	15587	Sq Feet	Surface Area	17531	Sq Feet	Surface Area	19476	Sq Feet	Surface Area	21420	Sq Feet
Surface Area/Ben Rec	1199	Sq Feet	Surface Area/Ben Rec	1349	Sq Feet	Surface Area/Ben Rec	1391	Sq Feet	Surface Area/Ben Rec	1339	Sq Feet
Barrier Length	989	Feet	Barrier Length	989	Feet	Barrier Length	989	Feet	Barrier Length	989	Feet
Min Height	16.0	Feet	Min Height	18.0	Feet	Min Height	20.0	Feet	Min Height	22.0	Feet
Max Height	16.0	Feet	Max Height	18.0	Feet	Max Height	20.0	Feet	Max Height	22.0	Feet
Avg Height	16.0	Feet	Avg Height	18.0	Feet	Avg Height	20.0	Feet	Avg Height	22.0	Feet
Total Barrier Cost	$311,740		Total Barrier Cost	$438,275		Total Barrier Cost	$486,900		Total Barrier Cost	$535,500	
Cost/Ben Rec	$23,980.00		Cost/Ben Rec	$33,713		Cost/Ben Rec	$34,779		Cost/Ben Rec	$33,469	

				With Barrier Sound Levels, Impact and Benefit				With Barrier Sound Levels, Impact and Benefit				With Barrier Sound Levels, Impact and Benefit				With Barrier Sound Levels, Impact and Benefit			
Receiver ID	**Row**	**FHWA Act Cat**	**No. of Dwelling Units**	**Leq(dBA)**	**IL (db)**	**Impacted?**	**No. Benefited**	**Leq(dBA)**	**IL (db)**	**Impacted?**	**No. Benefited**	**Leq(dBA)**	**IL (db)**	**Impacted?**	**No. Benefited**	**Leq(dBA)**	**IL (db)**	**Impacted?**	**No. Benefited**
R414	1	B	1	54	2			54	2			54	2			53	3		
R415	1	B	1	55	1			54	2			54	2			54	2		
R416	1	B	1	60	1			60	1			59	2			59	2		
R417	1	B	1	53	1			53	1			53	1			53	1		
R418	1	B	1	53	1			53	1			53	1			53	1		
R419	1	B	1	53	1			53	1			53	1			53	1		
R420	1	B	1	54	1			54	1			54	1			54	1		
R421	1	B	1	56	2			56	2			56	2			56	2		
R422	1	B	1	63	1			63	1			63	1			63	1		
R423	1	B	1	65	0	Impact! w/ Bar		65	0	Impact! w/ Bar		65	0	Impact! w/ Bar		65	0	Impact! w/ Bar	
R424	1	B	1	61	2			61	2			61	2			61	2		
R425	1	B	1	61	2			61	2			61	2			61	2		
R426	1	B	1	63	2	Impact! w/ Bar		63	2	Impact! w/ Bar		63	2	Impact! w/ Bar		63	2	Impact! w/ Bar	
R427	1	B	1	64	2	Impact! w/ Bar		64	2	Impact! w/ Bar		63	3	Impact! w/ Bar		63	3	Impact! w/ Bar	
R428	1	B	1	60	2			60	2			60	2			59	3		
R429	1	B	1	62	3	Impact! w/ Bar		62	3	Impact! w/ Bar		62	3	Impact! w/ Bar		62	3	Impact! w/ Bar	
R430	1	B	1	55	4			55	4			55	4			55	4		
R431	1	B	1	56	4			56	4			56	4			55	**5**	Benefited/Non-Imp	1
R432	1	B	1	58	**8**	Benefited/Impact	1	58	**8**	Benefited/Impact	1	58	**8**	Benefited/Impact	1	57	**9**	Benefited/Impact	1
R433	1	B	1	58	**6**	Benefited/Non-Imp	1	58	**6**	Benefited/Non-Imp	1	57	**7**	Benefited/Non-Imp	1	57	**7**	Benefited/Non-Imp	1
R434	1	B	1	55	2			55	2			55	2			55	2		
R435	1	B	1	53	1			53	1			53	1			53	1		
R436	1	B	1	58	4			58	4			58	4			58	4		
R437	1	B	1	53	1			53	1			53	1			53	1		
R438	1	B	1	53	0			53	0			52	1			52	1		
R439	1	B	1	53	0			53	0			53	0			53	0		
R440	1	B	1	60	**10**	Benefited/Impact	1	59	**11**	Benefited/Impact	1	59	**11**	Benefited/Impact	1	59	**11**	Benefited/Impact	1
R441	1	B	1	59	4			59	4			59	4			59	4		
R442	1	B	1	60	**9**	Benefited/Impact	1	59	**10**	Benefited/Impact	1	59	**10**	Benefited/Impact	1	58	**11**	Benefited/Impact	1
R443	1	B	1	61	**8**	Benefited/Impact	1	60	**9**	Benefited/Impact	1	59	**10**	Benefited/Impact	1	59	**10**	Benefited/Impact	1
R444	1	B	1	61	**6**	Benefited/Impact	1	60	**7**	Benefited/Impact	1	59	**8**	Benefited/Impact	1	59	**8**	Benefited/Impact	1
R445	1	B	1	61	**5**	Benefited/Impact	1	60	**6**	Benefited/Impact	1	59	**7**	Benefited/Impact	1	59	**7**	Benefited/Impact	1
R446	1	B	1	64	**8**	Benefited/Impact	1	62	**10**	Benefited/Impact	1	61	**11**	Benefited/Impact	1	60	**12**	Benefited/Impact	1
R447	1	B	1	66	**7**	Benefited/Impact	1	64	**9**	Benefited/Impact	1	62	**11**	Benefited/Impact	1	61	**12**	Benefited/Impact	1
R448	1	B	1	65	**8**	Benefited/Impact	1	64	**9**	Benefited/Impact	1	62	**11**	Benefited/Impact	1	61	**12**	Benefited/Impact	1
R449	1	B	1	64	**9**	Benefited/Impact	1	63	**10**	Benefited/Impact	1	62	**11**	Benefited/Impact	1	61	**12**	Benefited/Impact	1
R450	1	B	1	60	3			59	4			59	4			58	**5**	Benefited/Non-Imp	1
R451	1	B	1	60	4			60	4			59	**5**	Benefited/Non-Imp	1	59	**5**	Benefited/Non-Imp	1
R452	1	B	1	62	**5**	Benefited/Impact	1	62	**5**	Benefited/Impact	1	61	**6**	Benefited/Impact	1	60	**7**	Benefited/Impact	1
R453	1	B	1	63	**6**	Benefited/Impact	1	62	**7**	Benefited/Impact	1	62	**7**	Benefited/Impact	1	61	**8**	Benefited/Impact	1
R454	1	B	1	58	2			58	2			58	2			58	2		
R455	1	B	1	58	2			58	2			58	2			58	2		
R456	1	B	1	58	2			58	2			58	2			58	2		
R457	1	B	1	60	3			60	3			60	3			60	3		
R458	1	B	1	60	3			60	3			60	3			60	3		
R459	1	B	1	61	2			60	3			60	3			60	3		

Project Information

I205CW Stafford Road to OR213
Contract No. K19786CW
I205CW_Build_Walls6to9
Wall 7
HMMH
Scott Noel
6/28/2018

24-ft Wall

Wall 7 HDR 6-28-2018

Average Wtd I.L.	9.3	dB I.L. Avg
Maximum I.L.	13	dB I.L. Max
Benefited/Impacted ≥ AFG	12	# Prot Units
Benefited/Non Impact ≥ AFG	4	# Units
Total Benefited	16	# Ben Units
Impacted Units ≥ NRDG	12	# Units
Benefited Units ≥ NRDG	13	# Units
Percent of impacts ≥ AFG	75%	% Ben Units
Percent of benefits ≥ NRDG	81%	% NRDG Units
"Cost-Reasonable" ?	No	
Surface Area	23363	Sq Feet
Surface Area/Ben Rec	1460	Sq Feet
Barrier Length	989	Feet
Min Height	24.0	Feet
Max Height	24.0	Feet
Avg Height	24.0	Feet
Total Barrier Cost	$584,075	
Cost/Ben Rec	$36,505	

Receiver ID	Row	FHWA Act Cat	No. of Dwelling Units	With Barrier Sound Levels, Impact and Benefit			
				Leq(dBA)	IL (db)	Impacted?	No. Benefited
R414	1	B	1	53	3		
R415	1	B	1	54	2		
R416	1	B	1	59	2		
R417	1	B	1	53	1		
R418	1	B	1	53	1		
R419	1	B	1	53	1		
R420	1	B	1	54	1		
R421	1	B	1	56	2		
R422	1	B	1	63	1		
R423	1	B	1	65	0	Impact! w/ Bar	
R424	1	B	1	61	2		
R425	1	B	1	61	2		
R426	1	B	1	63	2	Impact! w/ Bar	
R427	1	B	1	63	3	Impact! w/ Bar	
R428	1	B	1	59	3		
R429	1	B	1	62	3	Impact! w/ Bar	
R430	1	B	1	55	4		
R431	1	B	1	55	**5**	Benefited/Non-Imp	1
R432	1	B	1	57	**9**	Benefited/Impact	1
R433	1	B	1	57	**7**	Benefited/Non-Imp	1
R434	1	B	1	55	2		
R435	1	B	1	53	1		
R436	1	B	1	58	4		
R437	1	B	1	53	1		
R438	1	B	1	52	1		
R439	1	B	1	52	1		
R440	1	B	1	58	**12**	Benefited/Impact	1
R441	1	B	1	59	4		
R442	1	B	1	58	**11**	Benefited/Impact	1
R443	1	B	1	58	**11**	Benefited/Impact	1
R444	1	B	1	58	**9**	Benefited/Impact	1
R445	1	B	1	58	**8**	Benefited/Impact	1
R446	1	B	1	60	**12**	Benefited/Impact	1
R447	1	B	1	60	**13**	Benefited/Impact	1
R448	1	B	1	60	**13**	Benefited/Impact	1
R449	1	B	1	61	**12**	Benefited/Impact	1
R450	1	B	1	58	**5**	Benefited/Non-Imp	1
R451	1	B	1	58	**6**	Benefited/Non-Imp	1
R452	1	B	1	60	**7**	Benefited/Impact	1
R453	1	B	1	60	**9**	Benefited/Impact	1
R454	1	B	1	58	2		
R455	1	B	1	58	2		
R456	1	B	1	58	2		
R457	1	B	1	60	3		
R458	1	B	1	60	3		
R459	1	B	1	60	3		

U.S. Department of Transportation
Federal Highway Administration

Basic Noise Barrier Optimization Tool **6/26/2018**

I205CW Stafford Road to OR213
Wall 8

	10'	12'	14'	16'	18'	20'	22'	24'	Units
Average Wtd I.L. (benefited)	6	6.9	7.1	7.8	7.4	7.4	7.4	7.6	dBA
Maximum I.L.	9	10	10	11	11	12	12	13	dBA
Benefited/Impacted ≥ AFG	7	8	10	10	11	12	12	12	# of dwelling units
Benefited/Non Impact ≥ AFG	0	0	0	0	3	4	5	5	# of dwelling units
Total Benefited	7	8	10	10	14	16	17	17	# of dwelling units
Impacted Units ≥ NRDG	2	4	6	7	7	7	7	8	# of dwelling units
Benefited Units ≥ NRDG	2	4	6	7	7	7	7	8	# of dwelling units
Percent of impacts ≥ AFG	28%	32%	40%	40%	44%	48%	48%	48%	%
Percent of benefits ≥ NRDG	29%	50%	60%	70%	50%	44%	41%	47%	%
"Cost-Reasonable" ?	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	----
Surface Area	6,739	8,084	9,426	10,784	12,128	13,475	14,824	16,173	sq-feet
Surface Area/Ben Rec	963	1,011	943	1,078	866	842	872	951	sq-ft / ben rec
Barrier Length	683	683	683	683	683	683	683	683	ft
Min Height	10	12	14	16	18	20	22	24	ft
Max Height	10	12	14	16	18	20	22	24	ft
Avg Height	10	12	14	16	18	20	22	24	ft
Total Barrier Cost	134,780	161,680	188,520	269,600	303,200	336,875	370,600	404,325	$
Cost/Ben Rec	19,254	20,210	18,852	26,960	21,657	21,055	21,800	23,784	$ / ben rec
Effectiveness/Cost Metric (E/C)	3.3	6.3	10.2	10.4	12.9	13.3	12.8	13.5	----

ODOT Acoustical Feasibilty Goal (dBA)	5
ODOT Acoustical Feasibilty Goal (%)	51%
ODOT Noise Reduction Design Goal (dBA)	7
ODOT Noise Reduction Design Goal (%)	1%

Project Information	No Barrier Analysis	10-ft Wall	12-ft Wall	14-ft Wall
	No Barrier	Wall 8 HDR 6-26-2018	Wall 8 HDR 6-26-2018	Wall 8 HDR 6-26-2018

I205CW Stafford Road to OR213
Contract No. K19786CW
I205CW_Build_Walls8to9
Wall 8
HMMH
Scott Noel
2/3/2018

U.S. Department of Transportation
Federal Highway Administration

Total Units Exposed to Impact	25
# Impacts - NAC only	25
# Impacts - SI only	0
# Impacts - Both NAC & SI	0

Enter SI Info

10-ft Wall			12-ft Wall			14-ft Wall		
Average Wtd I.L. (benefited)	6.0	dB I.L. Avg	Average Wtd I.L.	6.9	dB I.L. Avg	Average Wtd I.L.	7.1	dB I.L. Avg
Maximum I.L.	9	dB I.L. Max	Maximum I.L.	10	dB I.L. Max	Maximum I.L.	10	dB I.L. Max
Benefited/Impacted ≥ AFG	7	# Prot Units	Benefited/Impacted ≥ AFG	8	# Prot Units	Benefited/Impacted ≥ AFG	10	# Prot Units
Benefited/Non Impact ≥ AFG	0	# Units	Benefited/Non Impact ≥ AFG	0	# Units	Benefited/Non Impact ≥ AFG	0	# Units
Total Benefited	7	# Ben Units	Total Benefited	8	# Ben Units	Total Benefited	10	# Ben Units
Impacted Units ≥ NRDG	2	# Units	Impacted Units ≥ NRDG	4	# Units	Impacted Units ≥ NRDG	6	# Units
Benefited Units ≥ NRDG	2	# Units	Benefited Units ≥ NRDG	4	# Units	Benefited Units ≥ NRDG	6	# Units
Percent of impacts ≥ AFG	28%	% Ben Units	Percent of impacts ≥ AFG	32%	% Ben Units	Percent of impacts ≥ AFG	40%	% Ben Units
Percent of benefits ≥ NRDG	29%	% NRDG Units	Percent of benefits ≥ NRDG	50%	% NRDG Units	Percent of benefits ≥ NRDG	60%	% NRDG Units
"Cost-Reasonable" ?	Yes		"Cost-Reasonable" ?	Yes		"Cost-Reasonable" ?	Yes	
Surface Area	6739	Sq Feet	Surface Area	8084	Sq Feet	Surface Area	9426	Sq Feet
Surface Area/Ben Rec	963	Sq Feet	Surface Area/Ben Rec	1011	Sq Feet	Surface Area/Ben Rec	943	Sq Feet
Barrier Length	683	Feet	Barrier Length	683	Feet	Barrier Length	683	Feet
Min Height	10.0	Feet	Min Height	12.0	Feet	Min Height	14.0	Feet
Max Height	10.0	Feet	Max Height	12.0	Feet	Max Height	14.0	Feet
Avg Height	10.0	Feet	Avg Height	12.0	Feet	Avg Height	14.0	Feet
Total Barrier Cost	$134,780		Total Barrier Cost	$161,680		Total Barrier Cost	$188,520	
Cost/Ben Rec	$19,254		Cost/Ben Rec	$20,210		Cost/Ben Rec	$18,852	

Receiver ID	Row	FHWA Act Cat	No. of Dwelling Units	Type of Impact		Impact?	No. of Impacted Units	With Barrier Sound Levels, Impact and Benefit				With Barrier Sound Levels, Impact and Benefit				With Barrier Sound Levels, Impact and Benefit			
				Bld Leq > NAC?	Sub. Inc.?			Leq(dBA)	IL (db)	Impacted?	No. Benefited	Leq(dBA)	IL (db)	Impacted?	No. Benefited	Leq(dBA)	IL (db)	Impacted?	No. Benefited
R489	1	B	1	74		Impact!	1	65	9	Benefited/Impact	1	64	10	Benefited/Impact	1	64	10	Benefited/Impact	1
R490	1	B	1	74		Impact!	1	70	4	Impact! w/ Bar		70	4	Impact! w/ Bar		70	4	Impact! w/ Bar	
R491	1	B	1	70		Impact!	1	65	5	Benefited/Impact	1	64	6	Benefited/Impact	1	64	6	Benefited/Impact	1
R492	1	B	1	68		Impact!	1	65	3	Impact! w/ Bar		65	3	Impact! w/ Bar		65	3	Impact! w/ Bar	
R493	1	B	1	65		Impact!	1	63	2	Impact! w/ Bar		62	3	Impact! w/ Bar		62	3	Impact! w/ Bar	
R494	1	B	1	64				63	1			63	1			62	2		
R495	1	B	1	63				62	1			62	1			62	1		
R496	1	B	1	66		Impact!	1	62	4	Impact! w/ Bar		62	4	Impact! w/ Bar		61	5	Benefited/Impact	1
R497	1	B	1	66		Impact!	1	62	4	Impact! w/ Bar		62	4	Impact! w/ Bar		61	5	Benefited/Impact	1
R498	1	B	1	64				61	3			61	3			60	4		
R499	1	B	1	62				61	1			60	2			60	2		
R500	1	B	1	61				60	1			60	1			60	1		
R501	1	B	1	71		Impact!	1	64	7	Benefited/Impact	1	63	8	Benefited/Impact	1	62	9	Benefited/Impact	1
R502	1	B	1	71		Impact!	1	66	5	Benefited/Impact	1	65	6	Benefited/Impact	1	64	7	Benefited/Impact	1
R503	1	B	1	70		Impact!	1	65	5	Benefited/Impact	1	63	7	Benefited/Impact	1	62	8	Benefited/Impact	1
R504	1	B	1	72		Impact!	1	66	6	Benefited/Impact	1	65	7	Benefited/Impact	1	64	8	Benefited/Impact	1
R505	1	B	1	72		Impact!	1	67	5	Benefited/Impact	1	66	6	Benefited/Impact	1	65	7	Benefited/Impact	1
R506	1	B	1	72		Impact!	1	68	4	Impact! w/ Bar		67	5	Benefited/Impact	1	66	6	Benefited/Impact	1
R507	1	B	1	65		Impact!	1	64	1	Impact! w/ Bar		63	2	Impact! w/ Bar		63	2	Impact! w/ Bar	
R508	1	B	1	62				61	1			60	2			60	2		
R509	1	B	1	64				62	2			61	3			60	4		
R510	1	B	1	64				61	3			61	3			60	4		
R511	1	B	1	64				61	3			61	3			60	4		
R512	1	B	1	64				61	3			61	3			60	4		
R513	1	B	1	63				61	2			60	3			60	3		
R514	1	B	1	62				60	2			60	2			60	2		
R515	1	B	1	60				59	1			59	1			59	1		
R516	1	B	1	60				59	1			59	1			59	1		
R517	1	B	1	59				59	0			59	0			59	0		
R518	1	B	1	61				61	0			61	0			61	0		
R519	1	B	1	56				56	0			56	0			56	0		
R520	1	B	1	55				54	1			55	0			55	0		
R521	1	B	1	67		Impact!	1	67	0	Impact! w/ Bar		67	0	Impact! w/ Bar		67	0	Impact! w/ Bar	
R522	1	B	1	67		Impact!	1	67	0	Impact! w/ Bar		67	0	Impact! w/ Bar		67	0	Impact! w/ Bar	
R523	1	B	1	67		Impact!	1	67	0	Impact! w/ Bar		67	0	Impact! w/ Bar		67	0	Impact! w/ Bar	
R524	1	B	1	66		Impact!	1	66	0	Impact! w/ Bar		66	0	Impact! w/ Bar		66	0	Impact! w/ Bar	
R525	1	B	1	65		Impact!	1	65	0	Impact! w/ Bar		65	0	Impact! w/ Bar		65	0	Impact! w/ Bar	
R526	1	B	1	61				61	0			61	0			61	0		
R527	1	B	1	73		Impact!	1	73	0	Impact! w/ Bar		73	0	Impact! w/ Bar		73	0	Impact! w/ Bar	
R528	1	B	1	71		Impact!	1	71	0	Impact! w/ Bar		71	0	Impact! w/ Bar		71	0	Impact! w/ Bar	
R529	1	B	1	70		Impact!	1	70	0	Impact! w/ Bar		70	0	Impact! w/ Bar		70	0	Impact! w/ Bar	
R530	1	B	1	73		Impact!	1	73	0	Impact! w/ Bar		73	0	Impact! w/ Bar		73	0	Impact! w/ Bar	
R531	1	B	1	72		Impact!	1	72	0	Impact! w/ Bar		72	0	Impact! w/ Bar		72	0	Impact! w/ Bar	
R532	1	B	1	70		Impact!	1	70	0	Impact! w/ Bar		70	0	Impact! w/ Bar		70	0	Impact! w/ Bar	
R533	1	B	1	56				56	0			56	0			56	0		
R534	1	B	1	62				62	0			62	0			62	0		
R535	1	B	1	55				55	0			55	0			55	0		
R536	1	B	1	64				64	0			64	0			64	0		

Project Information

I205CW Stafford Road to OR213
Contract No. K19786CW
I205CW_Build_Walls8to9
Wall 8
HMMH
Scott Noel
2/3/2018

16-ft Wall			18-ft Wall			20-ft Wall			22-ft Wall		
Wall 8 HDR 6-26-2018			Wall 8 HDR 6-26-2018			Wall 8 HDR 6-26-2018			Wall 8 HDR 6-26-2018		
Average Wtd I.L.	7.8	dB I.L. Avg	Average Wtd I.L.	7.4	dB I.L. Avg	Average Wtd I.L.	7.4	dB I.L. Avg	Average Wtd I.L.	7.4	dB I.L. Avg
Maximum I.L.	11	dB I.L. Max	Maximum I.L.	11	dB I.L. Max	Maximum I.L.	12	dB I.L. Max	Maximum I.L.	12	dB I.L. Max
Benefited/Impacted ≥ AFG	10	# Prot Units	Benefited/Impacted ≥ AFG	11	# Prot Units	Benefited/Impacted ≥ AFG	12	# Prot Units	Benefited/Impacted ≥ AFG	12	# Prot Units
Benefited/Non Impact ≥ AFG	0	# Units	Benefited/Non Impact ≥ AFG	3	# Units	Benefited/Non Impact ≥ AFG	4	# Units	Benefited/Non Impact ≥ AFG	5	# Units
Total Benefited	10	# Ben Units	Total Benefited	14	# Ben Units	Total Benefited	16	# Ben Units	Total Benefited	17	# Ben Units
Impacted Units ≥ NRDG	7	# Units	Impacted Units ≥ NRDG	7	# Units	Impacted Units ≥ NRDG	7	# Units	Impacted Units ≥ NRDG	7	# Units
Benefited Units ≥ NRDG	7	# Units	Benefited Units ≥ NRDG	7	# Units	Benefited Units ≥ NRDG	7	# Units	Benefited Units ≥ NRDG	7	# Units
Percent of impacts ≥ AFG	40%	% Ben Units	Percent of impacts ≥ AFG	44%	% Ben Units	Percent of impacts ≥ AFG	48%	% Ben Units	Percent of impacts ≥ AFG	48%	% Ben Units
Percent of benefits ≥ NRDG	70%	% NRDG Units	Percent of benefits ≥ NRDG	50%	% NRDG Units	Percent of benefits ≥ NRDG	44%	% NRDG Units	Percent of benefits ≥ NRDG	41%	% NRDG Units
"Cost-Reasonable" ?	No		"Cost-Reasonable" ?	Yes		"Cost-Reasonable" ?	Yes		"Cost-Reasonable" ?	Yes	
Surface Area	10784	Sq Feet	Surface Area	12128	Sq Feet	Surface Area	13475	Sq Feet	Surface Area	14824	Sq Feet
Surface Area/Ben Rec	1078	Sq Feet	Surface Area/Ben Rec	866	Sq Feet	Surface Area/Ben Rec	842	Sq Feet	Surface Area/Ben Rec	872	Sq Feet
Barrier Length	683	Feet	Barrier Length	683	Feet	Barrier Length	683	Feet	Barrier Length	683	Feet
Min Height	16.0	Feet	Min Height	18.0	Feet	Min Height	20.0	Feet	Min Height	22.0	Feet
Max Height	16.0	Feet	Max Height	18.0	Feet	Max Height	20.0	Feet	Max Height	22.0	Feet
Avg Height	16.0	Feet	Avg Height	18.0	Feet	Avg Height	20.0	Feet	Avg Height	22.0	Feet
Total Barrier Cost	$269,600		Total Barrier Cost	$303,200		Total Barrier Cost	$336,875		Total Barrier Cost	$370,600	
Cost/Ben Rec	$26,960.00		Cost/Ben Rec	$21,657		Cost/Ben Rec	$21,055		Cost/Ben Rec	$21,800	

Receiver ID	Row	FHWA Act Cat	No. of Dwelling Units	With Barrier Sound Levels, Impact and Benefit				With Barrier Sound Levels, Impact and Benefit				With Barrier Sound Levels, Impact and Benefit				With Barrier Sound Levels, Impact and Benefit			
				Leq(dBA)	IL (db)	Impacted?	No. Benefited	Leq(dBA)	IL (db)	Impacted?	No. Benefited	Leq(dBA)	IL (db)	Impacted?	No. Benefited	Leq(dBA)	IL (db)	Impacted?	No. Benefited
R489	1	B	1	63	11	Benefited/Impact	1	63	11	Benefited/Impact	1	62	12	Benefited/Impact	1	62	12	Benefited/Impact	1
R490	1	B	1	70	4	Impact! w/ Bar		69	5	Benefited/Impact	1	69	5	Benefited/Impact	1	69	5	Benefited/Impact	1
R491	1	B	1	64	6	Benefited/Impact	1	64	6	Benefited/Impact	1	64	6	Benefited/Impact	1	64	6	Benefited/Impact	1
R492	1	B	1	64	4	Impact! w/ Bar		64	4	Impact! w/ Bar		63	5	Benefited/Impact	1	63	5	Benefited/Impact	1
R493	1	B	1	62	3	Impact! w/ Bar		61	4	Impact! w/ Bar		61	4	Impact! w/ Bar		61	4	Impact! w/ Bar	
R494	1	B	1	62	2			62	2			62	2			62	2		
R495	1	B	1	61	2			61	2			61	2			61	2		
R496	1	B	1	61	5	Benefited/Impact	1	61	5	Benefited/Impact	1	60	6	Benefited/Impact	1	60	6	Benefited/Impact	1
R497	1	B	1	61	5	Benefited/Impact	1	60	6	Benefited/Impact	1	60	6	Benefited/Impact	1	60	6	Benefited/Impact	1
R498	1	B	1	60	4			60	4			59	5	Benefited/Non-Imp	1	59	5	Benefited/Non-Imp	1
R499	1	B	1	60	2			59	3			59	3			59	3		
R500	1	B	1	59	2			59	2			59	2			59	2		
R501	1	B	1	61	10	Benefited/Impact	1	60	11	Benefited/Impact	1	59	12	Benefited/Impact	1	59	12	Benefited/Impact	1
R502	1	B	1	63	8	Benefited/Impact	1	62	9	Benefited/Impact	1	61	10	Benefited/Impact	1	60	11	Benefited/Impact	1
R503	1	B	1	61	9	Benefited/Impact	1	61	9	Benefited/Impact	1	60	10	Benefited/Impact	1	60	10	Benefited/Impact	1
R504	1	B	1	63	9	Benefited/Impact	1	62	10	Benefited/Impact	1	61	11	Benefited/Impact	1	61	11	Benefited/Impact	1
R505	1	B	1	64	8	Benefited/Impact	1	63	9	Benefited/Impact	1	63	9	Benefited/Impact	1	63	9	Benefited/Impact	1
R506	1	B	1	65	7	Benefited/Impact	1	65	7	Benefited/Impact	1	65	7	Benefited/Impact	1	65	7	Benefited/Impact	1
R507	1	B	1	63	2	Impact! w/ Bar		63	2	Impact! w/ Bar		63	2	Impact! w/ Bar		63	2	Impact! w/ Bar	
R508	1	B	1	60	2			60	2			60	2			59	3		
R509	1	B	1	60	4			60	4			60	4			59	5	Benefited/Non-Imp	1
R510	1	B	1	60	4			59	5	Benefited/Non-Imp	1	59	5	Benefited/Non-Imp	1	59	5	Benefited/Non-Imp	1
R511	1	B	1	60	4			59	5	Benefited/Non-Imp	1	59	5	Benefited/Non-Imp	1	59	5	Benefited/Non-Imp	1
R512	1	B	1	60	4			59	5	Benefited/Non-Imp	1	59	5	Benefited/Non-Imp	1	59	5	Benefited/Non-Imp	1
R513	1	B	1	60	3			59	4			59	4			59	4		
R514	1	B	1	60	2			59	3			59	3			59	3		
R515	1	B	1	59	1			59	1			59	1			59	1		
R516	1	B	1	59	1			59	1			59	1			59	1		
R517	1	B	1	58	1			58	1			58	1			58	1		
R518	1	B	1	60	1			60	1			60	1			60	1		
R519	1	B	1	56	0			56	0			56	0			56	0		
R520	1	B	1	55	0			55	0			55	0			55	0		
R521	1	B	1	67	0	Impact! w/ Bar		67	0	Impact! w/ Bar		67	0	Impact! w/ Bar		67	0	Impact! w/ Bar	
R522	1	B	1	67	0	Impact! w/ Bar		67	0	Impact! w/ Bar		67	0	Impact! w/ Bar		67	0	Impact! w/ Bar	
R523	1	B	1	67	0	Impact! w/ Bar		67	0	Impact! w/ Bar		67	0	Impact! w/ Bar		67	0	Impact! w/ Bar	
R524	1	B	1	66	0	Impact! w/ Bar		66	0	Impact! w/ Bar		66	0	Impact! w/ Bar		66	0	Impact! w/ Bar	
R525	1	B	1	65	0	Impact! w/ Bar		65	0	Impact! w/ Bar		65	0	Impact! w/ Bar		65	0	Impact! w/ Bar	
R526	1	B	1	61	0			61	0			61	0			61	0		
R527	1	B	1	73	0	Impact! w/ Bar		73	0	Impact! w/ Bar		73	0	Impact! w/ Bar		73	0	Impact! w/ Bar	
R528	1	B	1	71	0	Impact! w/ Bar		71	0	Impact! w/ Bar		71	0	Impact! w/ Bar		71	0	Impact! w/ Bar	
R529	1	B	1	70	0	Impact! w/ Bar		70	0	Impact! w/ Bar		70	0	Impact! w/ Bar		70	0	Impact! w/ Bar	
R530	1	B	1	73	0	Impact! w/ Bar		73	0	Impact! w/ Bar		73	0	Impact! w/ Bar		73	0	Impact! w/ Bar	
R531	1	B	1	72	0	Impact! w/ Bar		72	0	Impact! w/ Bar		72	0	Impact! w/ Bar		72	0	Impact! w/ Bar	
R532	1	B	1	70	0	Impact! w/ Bar		70	0	Impact! w/ Bar		70	0	Impact! w/ Bar		70	0	Impact! w/ Bar	
R533	1	B	1	56	0			56	0			56	0			56	0		
R534	1	B	1	62	0			62	0			62	0			62	0		
R535	1	B	1	55	0			55	0			55	0			55	0		
R536	1	B	1	64	0			64	0			64	0			64	0		

Project Information

I205CW Stafford Road to OR213
Contract No. K19786CW
I205CW_Build_Walls8to9
Wall 8
HMMH
Scott Noel
2/3/2018

24-ft Wall

Wall 8 HDR 6-26-2018

Average Wtd I.L.	7.6	dB I.L. Avg
Maximum I.L.	13	dB I.L. Max
Benefited/Impacted ≥ AFG	12	# Prot Units
Benefited/Non Impact ≥ AFG	5	# Units
Total Benefited	17	# Ben Units
Impacted Units ≥ NRDG	8	# Units
Benefited Units ≥ NRDG	8	# Units
Percent of impacts ≥ AFG	48%	% Ben Units
Percent of benefits ≥ NRDG	47%	% NRDG Units
"Cost-Reasonable" ?	Yes	
Surface Area	16173	Sq Feet
Surface Area/Ben Rec	951	Sq Feet
Barrier Length	683	Feet
Min Height	24.0	Feet
Max Height	24.0	Feet
Avg Height	24.0	Feet
Total Barrier Cost	$404,325	
Cost/Ben Rec	$23,784	

Receiver ID	Row	FHWA Act Cat	No. of Dwelling Units	With Barrier Sound Levels, Impact and Benefit			
				Leq(dBA)	IL (db)	Impacted?	No. Benefited
R489	1	B	1	62	**12**	Benefited/Impact	1
R490	1	B	1	69	**5**	Benefited/Impact	1
R491	1	B	1	63	**7**	Benefited/Impact	1
R492	1	B	1	63	**5**	Benefited/Impact	1
R493	1	B	1	61	4	Impact! w/ Bar	
R494	1	B	1	61	3		
R495	1	B	1	61	2		
R496	1	B	1	60	**6**	Benefited/Impact	1
R497	1	B	1	60	**6**	Benefited/Impact	1
R498	1	B	1	59	**5**	Benefited/Non-Imp	1
R499	1	B	1	59	3		
R500	1	B	1	59	2		
R501	1	B	1	58	**13**	Benefited/Impact	1
R502	1	B	1	60	**11**	Benefited/Impact	1
R503	1	B	1	59	**11**	Benefited/Impact	1
R504	1	B	1	60	**12**	Benefited/Impact	1
R505	1	B	1	63	**9**	Benefited/Impact	1
R506	1	B	1	65	**7**	Benefited/Impact	1
R507	1	B	1	63	2	Impact! w/ Bar	
R508	1	B	1	59	3		
R509	1	B	1	59	**5**	Benefited/Non-Imp	1
R510	1	B	1	59	**5**	Benefited/Non-Imp	1
R511	1	B	1	59	**5**	Benefited/Non-Imp	1
R512	1	B	1	59	**5**	Benefited/Non-Imp	1
R513	1	B	1	59	4		
R514	1	B	1	59	3		
R515	1	B	1	59	1		
R516	1	B	1	59	1		
R517	1	B	1	58	1		
R518	1	B	1	60	1		
R519	1	B	1	56	0		
R520	1	B	1	55	0		
R521	1	B	1	67	0	Impact! w/ Bar	
R522	1	B	1	67	0	Impact! w/ Bar	
R523	1	B	1	67	0	Impact! w/ Bar	
R524	1	B	1	66	0	Impact! w/ Bar	
R525	1	B	1	65	0	Impact! w/ Bar	
R526	1	B	1	61	0		
R527	1	B	1	73	0	Impact! w/ Bar	
R528	1	B	1	71	0	Impact! w/ Bar	
R529	1	B	1	70	0	Impact! w/ Bar	
R530	1	B	1	73	0	Impact! w/ Bar	
R531	1	B	1	72	0	Impact! w/ Bar	
R532	1	B	1	70	0	Impact! w/ Bar	
R533	1	B	1	56	0		
R534	1	B	1	62	0		
R535	1	B	1	55	0		
R536	1	B	1	64	0		

U.S. Department of Transportation
Federal Highway Administration

Basic Noise Barrier Optimization Tool **8/3/2018**

K19786CW
Wall 9

	10'	12'	14'	16'	18'	20'	22'	24'	Units
Average Wtd I.L. (benefited)	6.3	7.7	7	7.7	8.5	8.7	9.1	9.6	**dBA**
Maximum I.L.	7	9	10	11	11	12	12	13	**dBA**
Benefited/Impacted ≥ AFG	3	3	5	6	6	7	8	8	**# of dwelling units**
Benefited/Non Impact ≥ AFG	0	0	0	0	0	0	0	0	**# of dwelling units**
Total Benefited	3	3	5	6	6	7	8	8	**# of dwelling units**
Impacted Units ≥ NRDG	2	2	2	4	6	6	6	7	**# of dwelling units**
Benefited Units ≥ NRDG	2	2	2	4	6	6	6	7	**# of dwelling units**
Percent of impacts ≥ AFG	18%	18%	29%	35%	35%	41%	47%	47%	**%**
Percent of benefits ≥ NRDG	67%	67%	40%	67%	100%	86%	75%	88%	**%**
"Cost-Reasonable" ?	No	No	No	No	No	No	No	No	**----**
Surface Area	5,940	7,131	8,318	9,506	10,696	11,884	13,070	14,258	**sq-feet**
Surface Area/Ben Rec	1,980	2,377	1,664	1,584	1,783	1,698	1,634	1,782	**sq-ft / ben rec**
Barrier Length	594	594	594	594	594	594	594	594	**ft**
Min Height	10	12	14	16	18	20	22	24	**ft**
Max Height	10	12	14	16	18	20	22	24	**ft**
Avg Height	10	12	14	16	18	20	22	24	**ft**
Total Barrier Cost	118,800	142,620	166,360	190,120	267,400	297,100	326,750	356,450	**$**
Cost/Ben Rec	39,600	47,540	33,272	31,687	44,567	42,443	40,844	44,556	**$ / ben rec**
Effectiveness/Cost Metric (E/C)	3.5	2.9	4.2	8.7	11.6	12.2	12.7	13.6	**----**

ODOT Acoustical Feasibilty Goal (dBA)	5
ODOT Acoustical Feasibilty Goal (%)	51%
ODOT Noise Reduction Design Goal (dBA)	7
ODOT Noise Reduction Design Goal (%)	1%

Project Information

K19786CW
309180
I205CW_Build_Walls9
Wall 9
HMMH
Scott Noel
8/3/2018

No Barrier Analysis	
No Barrier	
Total Units Exposed to Impact	17
# Impacts - NAC only	17
# Impacts - SI only	0
# Impacts - Both NAC & SI	0

Enter SI Info

10' Wall			**12' Wall**			**14' Wall**		
Wall 9v2			**Wall 9v2**			**Wall 9v2**		
Average Wtd I.L. (benefited)	6.3	dB I.L. Avg	Average Wtd I.L.	7.7	dB I.L. Avg	Average Wtd I.L.	7.0	dB I.L. Avg
Maximum I.L.	7	dB I.L. Max	Maximum I.L.	9	dB I.L. Max	Maximum I.L.	10	dB I.L. Max
Benefited/Impacted ≥ AFG	3	# Prot Units	Benefited/Impacted ≥ AFG	3	# Prot Units	Benefited/Impacted ≥ AFG	5	# Prot Units
Benefited/Non Impact ≥ AFG	0	# Units	Benefited/Non Impact ≥ AFG	0	# Units	Benefited/Non Impact ≥ AFG	0	# Units
Total Benefited	3	# Ben Units	Total Benefited	3	# Ben Units	Total Benefited	5	# Ben Units
Impacted Units ≥ NRDG	2	# Units	Impacted Units ≥ NRDG	2	# Units	Impacted Units ≥ NRDG	2	# Units
Benefited Units ≥ NRDG	2	# Units	Benefited Units ≥ NRDG	2	# Units	Benefited Units ≥ NRDG	2	# Units
Percent of impacts ≥ AFG	18%	% Ben Units	Percent of impacts ≥ AFG	18%	% Ben Units	Percent of impacts ≥ AFG	29%	% Ben Units
Percent of benefits ≥ NRDG	67%	% NRDG Units	Percent of benefits ≥ NRDG	67%	% NRDG Units	Percent of benefits ≥ NRDG	40%	% NRDG Units
"Cost-Reasonable" ?	No		"Cost-Reasonable" ?	No		"Cost-Reasonable" ?	No	
Surface Area	5940	Sq Feet	Surface Area	7131	Sq Feet	Surface Area	8318	Sq Feet
Surface Area/Ben Rec	1980	Sq Feet	Surface Area/Ben Rec	2377	Sq Feet	Surface Area/Ben Rec	1664	Sq Feet
Barrier Length	594	Feet	Barrier Length	594	Feet	Barrier Length	594	Feet
Min Height	10.0	Feet	Min Height	12.0	Feet	Min Height	14.0	Feet
Max Height	10.0	Feet	Max Height	12.0	Feet	Max Height	14.0	Feet
Avg Height	10.0	Feet	Avg Height	12.0	Feet	Avg Height	14.0	Feet
Total Barrier Cost	$118,800		Total Barrier Cost	$142,620		Total Barrier Cost	$166,360	
Cost/Ben Rec	$39,600		Cost/Ben Rec	$47,540		Cost/Ben Rec	$33,272	

Receiver ID	Row	FHWA Act Cat	No. of Dwelling Units	Type of Impact		Impact?	No. of Impacted Units	With Barrier Sound Levels, Impact and Benefit				With Barrier Sound Levels, Impact and Benefit				With Barrier Sound Levels, Impact and Benefit			
				Bld Leq > NAC?	Sub. Inc.?			Leq(dBA)	IL (db)	Impacted?	No. Benefited	Leq(dBA)	IL (db)	Impacted?	No. Benefited	Leq(dBA)	IL (db)	Impacted?	No. Benefited
R467	1	B	1	70		Impact!	1	63	7	Benefited/Impact	1	61	9	Benefited/Impact	1	60	10	Benefited/Impact	1
R468	1	B	1	71		Impact!	1	70	1	Impact! w/ Bar		69	2	Impact! w/ Bar		67	4	Impact! w/ Bar	
R469	1	B	1	68		Impact!	1	61	7	Benefited/Impact	1	60	8	Benefited/Impact	1	59	9	Benefited/Impact	1
R470	1	B	1	70		Impact!	1	67	3	Impact! w/ Bar		66	4	Impact! w/ Bar		65	5	Benefited/Impact	1
R471	1	B	1	70		Impact!	1	70	0	Impact! w/ Bar		70	0	Impact! w/ Bar		70	0	Impact! w/ Bar	
R472	1	B	1	66		Impact!	1	61	5	Benefited/Impact	1	60	6	Benefited/Impact	1	60	6	Benefited/Impact	1
R473	1	B	1	69		Impact!	1	66	3	Impact! w/ Bar		65	4	Impact! w/ Bar		64	5	Benefited/Impact	1
R474	1	B	1	70		Impact!	1	69	1	Impact! w/ Bar		68	2	Impact! w/ Bar		68	2	Impact! w/ Bar	
R475	1	B	1	68		Impact!	1	67	1	Impact! w/ Bar		67	1	Impact! w/ Bar		67	1	Impact! w/ Bar	
R476	1	B	1	68		Impact!	1	68	0	Impact! w/ Bar		68	0	Impact! w/ Bar		68	0	Impact! w/ Bar	
R477	1	B	1	68		Impact!	1	68	0	Impact! w/ Bar		68	0	Impact! w/ Bar		68	0	Impact! w/ Bar	
R478	1	B	1	66		Impact!	1	66	0	Impact! w/ Bar		66	0	Impact! w/ Bar		66	0	Impact! w/ Bar	
R479	1	B	1	67		Impact!	1	67	0	Impact! w/ Bar		66	1	Impact! w/ Bar		66	1	Impact! w/ Bar	
R480	1	B	1	67		Impact!	1	67	0	Impact! w/ Bar		67	0	Impact! w/ Bar		67	0	Impact! w/ Bar	
R481	1	B	1	65		Impact!	1	65	0	Impact! w/ Bar		65	0	Impact! w/ Bar		65	0	Impact! w/ Bar	
R482	1	B	1	66		Impact!	1	66	0	Impact! w/ Bar		66	0	Impact! w/ Bar		66	0	Impact! w/ Bar	
R483	1	B	1	66		Impact!	1	66	0	Impact! w/ Bar		66	0	Impact! w/ Bar		66	0	Impact! w/ Bar	

Project Information	16' Wall			18' Wall			20' Wall			22' Wall		
	Wall 9v2			Wall 9v2			Wall 9v2			Wall 9v2		
	Average Wtd I.L.	7.7	dB I.L. Avg	Average Wtd I.L.	8.5	dB I.L. Avg	Average Wtd I.L.	8.7	dB I.L. Avg	Average Wtd I.L.	9.1	dB I.L. Avg
	Maximum I.L.	11	dB I.L. Max	Maximum I.L.	11	dB I.L. Max	Maximum I.L.	12	dB I.L. Max	Maximum I.L.	12	dB I.L. Max
K19786CW	Benefited/Impacted ≥ AFG	6	# Prot Units	Benefited/Impacted ≥ AFG	6	# Prot Units	Benefited/Impacted ≥ AFG	7	# Prot Units	Benefited/Impacted ≥ AFG	8	# Prot Units
309180	Benefited/Non Impact ≥ AFG	0	# Units	Benefited/Non Impact ≥ AFG	0	# Units	Benefited/Non Impact ≥ AFG	0	# Units	Benefited/Non Impact ≥ AFG	0	# Units
I205CW_Build_Walls9	Total Benefited	6	# Ben Units	Total Benefited	6	# Ben Units	Total Benefited	7	# Ben Units	Total Benefited	8	# Ben Units
Wall 9	Impacted Units ≥ NRDG	4	# Units	Impacted Units ≥ NRDG	6	# Units	Impacted Units ≥ NRDG	6	# Units	Impacted Units ≥ NRDG	6	# Units
HMMH	Benefited Units ≥ NRDG	4	# Units	Benefited Units ≥ NRDG	6	# Units	Benefited Units ≥ NRDG	6	# Units	Benefited Units ≥ NRDG	6	# Units
Scott Noel	Percent of impacts ≥ AFG	35%	% Ben Units	Percent of impacts ≥ AFG	35%	% Ben Units	Percent of impacts ≥ AFG	41%	% Ben Units	Percent of impacts ≥ AFG	47%	% Ben Units
8/3/2018	Percent of benefits ≥ NRDG	67%	% NRDG Units	Percent of benefits ≥ NRDG	100%	% NRDG Units	Percent of benefits ≥ NRDG	86%	% NRDG Units	Percent of benefits ≥ NRDG	75%	% NRDG Units
	"Cost-Reasonable" ?	No		"Cost-Reasonable" ?	No		"Cost-Reasonable" ?	No		"Cost-Reasonable" ?	No	
	Surface Area	9506	Sq Feet	Surface Area	10696	Sq Feet	Surface Area	11884	Sq Feet	Surface Area	13070	Sq Feet
	Surface Area/Ben Rec	1584	Sq Feet	Surface Area/Ben Rec	1783	Sq Feet	Surface Area/Ben Rec	1698	Sq Feet	Surface Area/Ben Rec	1634	Sq Feet
	Barrier Length	594	Feet	Barrier Length	594	Feet	Barrier Length	594	Feet	Barrier Length	594	Feet
	Min Height	16.0	Feet	Min Height	18.0	Feet	Min Height	20.0	Feet	Min Height	22.0	Feet
	Max Height	16.0	Feet	Max Height	18.0	Feet	Max Height	20.0	Feet	Max Height	22.0	Feet
	Avg Height	16.0	Feet	Avg Height	18.0	Feet	Avg Height	20.0	Feet	Avg Height	22.0	Feet
	Total Barrier Cost	$190,120		Total Barrier Cost	$267,400		Total Barrier Cost	$297,100		Total Barrier Cost	$326,750	
	Cost/Ben Rec	$31,686.67		Cost/Ben Rec	$44,567		Cost/Ben Rec	$42,443		Cost/Ben Rec	$40,844	

Receiver ID	Row	FHWA Act Cat	No. of Dwelling Units	With Barrier Sound Levels, Impact and Benefit				With Barrier Sound Levels, Impact and Benefit				With Barrier Sound Levels, Impact and Benefit				With Barrier Sound Levels, Impact and Benefit			
				Leq(dBA)	IL (db)	Impacted?	No. Benefited	Leq(dBA)	IL (db)	Impacted?	No. Benefited	Leq(dBA)	IL (db)	Impacted?	No. Benefited	Leq(dBA)	IL (db)	Impacted?	No. Benefited
R467	1	B	1	59	**11**	Benefited/Impact	1	59	**11**	Benefited/Impact	1	58	**12**	Benefited/Impact	1	58	**12**	Benefited/Impact	1
R468	1	B	1	65	**6**	Benefited/Impact	1	63	**8**	Benefited/Impact	1	61	**10**	Benefited/Impact	1	60	**11**	Benefited/Impact	1
R469	1	B	1	59	**9**	Benefited/Impact	1	58	**10**	Benefited/Impact	1	58	**10**	Benefited/Impact	1	57	**11**	Benefited/Impact	1
R470	1	B	1	63	**7**	Benefited/Impact	1	62	**8**	Benefited/Impact	1	61	**9**	Benefited/Impact	1	59	**11**	Benefited/Impact	1
R471	1	B	1	69	1	Impact! w/ Bar		67	3	Impact! w/ Bar		66	4	Impact! w/ Bar		65	**5**	Benefited/Impact	1
R472	1	B	1	59	**7**	Benefited/Impact	1	59	**7**	Benefited/Impact	1	59	**7**	Benefited/Impact	1	58	**8**	Benefited/Impact	1
R473	1	B	1	63	**6**	Benefited/Impact	1	62	**7**	Benefited/Impact	1	61	**8**	Benefited/Impact	1	60	**9**	Benefited/Impact	1
R474	1	B	1	67	3	Impact! w/ Bar		66	4	Impact! w/ Bar		65	**5**	Benefited/Impact	1	64	**6**	Benefited/Impact	1
R475	1	B	1	67	1	Impact! w/ Bar		67	1	Impact! w/ Bar		67	1	Impact! w/ Bar		66	2	Impact! w/ Bar	
R476	1	B	1	68	0	Impact! w/ Bar		68	0	Impact! w/ Bar		68	0	Impact! w/ Bar		68	0	Impact! w/ Bar	
R477	1	B	1	68	0	Impact! w/ Bar		68	0	Impact! w/ Bar		68	0	Impact! w/ Bar		68	0	Impact! w/ Bar	
R478	1	B	1	66	0	Impact! w/ Bar		65	1	Impact! w/ Bar		65	1	Impact! w/ Bar		65	1	Impact! w/ Bar	
R479	1	B	1	66	1	Impact! w/ Bar		66	1	Impact! w/ Bar		66	1	Impact! w/ Bar		66	1	Impact! w/ Bar	
R480	1	B	1	67	0	Impact! w/ Bar		67	0	Impact! w/ Bar		67	0	Impact! w/ Bar		67	0	Impact! w/ Bar	
R481	1	B	1	65	0	Impact! w/ Bar		65	0	Impact! w/ Bar		65	0	Impact! w/ Bar		65	0	Impact! w/ Bar	
R482	1	B	1	66	0	Impact! w/ Bar		66	0	Impact! w/ Bar		66	0	Impact! w/ Bar		66	0	Impact! w/ Bar	
R483	1	B	1	66	0	Impact! w/ Bar		66	0	Impact! w/ Bar		66	0	Impact! w/ Bar		66	0	Impact! w/ Bar	

Project Information

K19786CW
309180
I205CW_Build_Walls9
Wall 9
HMMH
Scott Noel
8/3/2018

24' Wall

Wall 9v2

Average Wtd I.L.	9.6	dB I.L. Avg
Maximum I.L.	13	dB I.L. Max
Benefited/Impacted ≥ AFG	8	# Prot Units
Benefited/Non Impact ≥ AFG	0	# Units
Total Benefited	8	# Ben Units
Impacted Units ≥ NRDG	7	# Units
Benefited Units ≥ NRDG	7	# Units
Percent of impacts ≥ AFG	47%	% Ben Units
Percent of benefits ≥ NRDG	88%	% NRDG Units
"Cost-Reasonable" ?	No	
Surface Area	14258	Sq Feet
Surface Area/Ben Rec	1782	Sq Feet
Barrier Length	594	Feet
Min Height	24.0	Feet
Max Height	24.0	Feet
Avg Height	24.0	Feet
Total Barrier Cost	$356,450	
Cost/Ben Rec	$44,556	

Receiver ID	Row	FHWA Act Cat	No. of Dwelling Units	With Barrier Sound Levels, Impact and Benefit			
				Leq(dBA)	IL (db)	Impacted?	No. Benefited
R467	1	B	1	57	**13**	Benefited/Impact	1
R468	1	B	1	59	**12**	Benefited/Impact	1
R469	1	B	1	57	**11**	Benefited/Impact	1
R470	1	B	1	59	**11**	Benefited/Impact	1
R471	1	B	1	64	**6**	Benefited/Impact	1
R472	1	B	1	58	**8**	Benefited/Impact	1
R473	1	B	1	60	**9**	Benefited/Impact	1
R474	1	B	1	63	**7**	Benefited/Impact	1
R475	1	B	1	65	3	Impact! w/ Bar	
R476	1	B	1	68	0	Impact! w/ Bar	
R477	1	B	1	68	0	Impact! w/ Bar	
R478	1	B	1	65	1	Impact! w/ Bar	
R479	1	B	1	66	1	Impact! w/ Bar	
R480	1	B	1	66	1	Impact! w/ Bar	
R481	1	B	1	65	0	Impact! w/ Bar	
R482	1	B	1	66	0	Impact! w/ Bar	
R483	1	B	1	66	0	Impact! w/ Bar	

U.S. Department of Transportation
Federal Highway Administration

Basic Noise Barrier Optimization Tool **8/27/2018**

K19786CW
Wall 10

	9'	11'	13'	15'	17'	Units
Average Wtd I.L. (benefited)		5.0	5.3	5.3636364	5.3333333	**dBA**
Maximum I.L.	4.0	5.0	6.0	6.0	6.0	**dBA**
Benefited/Impacted ≥ AFG	0	4	6	7	7	**# of dwelling units**
Benefited/Non Impact ≥ AFG	0	0	0	4	8	**# of dwelling units**
Total Benefited	0	4	6	11	15	**# of dwelling units**
Impacted Units ≥ NRDG	0	0	0	0	0	**# of dwelling units**
Benefited Units ≥ NRDG	0	0	0	0	0	**# of dwelling units**
Percent of impacts ≥ AFG	0%	33%	50%	58%	58%	**%**
Percent of benefits ≥ NRDG		0%	0%	0%	0%	**%**
"Cost-Reasonable" ?		No	No	No	No	**----**
Surface Area	28,255	34,773	41,285	47,805	54,323	**sq-feet**
Surface Area/Ben Rec		8,693	6,881	4,346	3,622	**sq-ft / ben rec**
Barrier Length	3,257	3,257	3,257	3,257	3,257	**ft**
Min Height	9	11	13	15	17	**ft**
Max Height	9	11	13	15	17	**ft**
Avg Height	9	11	13	15	17	**ft**
Total Barrier Cost	565,100	695,460	825,700	956,100	1,358,075	**$**
Cost/Ben Rec		173,865	137,617	86,918	90,538	**$ / ben rec**
Effectiveness/Cost Metric (E/C)	-	-	-	-	-	**----**

ODOT Acoustical Feasibilty Goal (dBA)	5
ODOT Acoustical Feasibilty Goal (%)	51%
ODOT Noise Reduction Design Goal (dBA)	7
ODOT Noise Reduction Design Goal (%)	1%

Project Information

K19786CW
309180
I205CW_Build_Wall10
Wall 10
HMMH
Scott Noel
8/27/2018

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Federal Highway Administration

No Barrier Analysis

No Barrier

Total Units Exposed to Impact	12
# Impacts - NAC only	12
# Impacts - SI only	0
# Impacts - Both NAC & SI	0

Enter SI Info

9' Wall Wall 10			11' Wall Wall 10		
Average Wtd I.L. (benefited)		dB I.L. Avg	Average Wtd I.L.	5.0	dB I.L. Avg
Maximum I.L.	4	dB I.L. Max	Maximum I.L.	5	dB I.L. Max
Benefited/Impacted ≥ AFG	0	# Prot Units	Benefited/Impacted ≥ AFG	4	# Prot Units
Benefited/Non Impact ≥ AFG	0	# Units	Benefited/Non Impact ≥ AFG	0	# Units
Total Benefited	0	# Ben Units	Total Benefited	4	# Ben Units
Impacted Units ≥ NRDG	0	# Units	Impacted Units ≥ NRDG	0	# Units
Benefited Units ≥ NRDG	0	# Units	Benefited Units ≥ NRDG	0	# Units
Percent of impacts ≥ AFG	0%	% Ben Units	Percent of impacts ≥ AFG	33%	% Ben Units
Percent of benefits ≥ NRDG		% NRDG Units	Percent of benefits ≥ NRDG	0%	% NRDG Units
"Cost-Reasonable" ?			"Cost-Reasonable" ?	No	
Surface Area	28255	Sq Feet	Surface Area	34773	Sq Feet
Surface Area/Ben Rec		Sq Feet	Surface Area/Ben Rec	8693	Sq Feet
Barrier Length	3,257	Feet	Barrier Length	3,257	Feet
Min Height	8.7	Feet	Min Height	10.7	Feet
Max Height	8.7	Feet	Max Height	10.7	Feet
Avg Height	8.7	Feet	Avg Height	10.7	Feet
Total Barrier Cost	$565,100		Total Barrier Cost	$695,460	
Cost/Ben Rec			Cost/Ben Rec	$173,865	

						Type of Impact				With Barrier Sound Levels, Impact and Benefit					With Barrier Sound Levels, Impact and Benefit				
Receiver ID	Row	FHWA Act Cat	No. of Dwelling Units	TNM Predicted Bld Leq	Sructure Noise	TNM Predicted + Structure-Borne Noise Adjustment Factor Bld Leq > NAC?	Sub. Inc.?	Impact?	No. of Impacted Units	TNM Abated Leq	Mitigated TNM + Structure Noise Leq(dBA)	IL (db)	Impacted?	No. Benefited	TNM Abated Leq	Mitigated TNM + Structure Noise Leq(dBA)	IL (db)	Impacted?	No. Benefited
ST-12	1	B	1	59	60	63				56	62	1			55	61	2		
ST-13	1	C	1	67	64	69		Impact!	1	64	67	2	Impact! w/ Bar		64	67	2	Impact! w/ Bar	
R537	1	B	1	63	54	63				60	61	2			59	60	3		
R538	1	B	1	62	53	62				61	62	0			60	61	1		
R539	1	B	1	59	52	60				58	59	1			57	59	1		
R540	1	B	1	59	52	60				58	59	1			57	58	2		
R541	1	B	1	59	53	60				57	58	2			56	58	2		
R542	1	B	1	59	53	60				57	58	2			56	57	3		
R543	1	B	1	59	53	60				57	58	2			56	57	3		
R544	1	B	1	59	53	60				57	58	2			55	57	3		
R545	1	B	1	59	53	60				58	59	1			56	58	2		
R546	1	B	1	61	53	62				60	60	2			58	59	3		
R547	1	B	1	60	53	61				58	60	1			57	59	2		
R548	1	B	1	61	54	62				59	60	2			58	59	3		
R549	1	B	1	61	54	62				59	60	2			57	59	3		
R550	1	B	1	60	55	61				58	60	1			57	59	2		
R551	1	B	1	61	56	62				58	60	2			57	59	3		
R552	1	B	1	64	56	65		Impact!	1	59	61	4	Impact! w/ Bar		58	60	**5**	Benefited/Impact	1
R553	1	B	1	65	57	66		Impact!	1	60	62	4	Impact! w/ Bar		59	61	**5**	Benefited/Impact	1
R554	1	B	1	61	58	63				58	61	2			57	60	3		
R555	1	B	1	56	60	62				55	61	1			54	61	1		
R556	1	B	1	61	59	63				59	62	1			58	61	2		
R557	1	B	1	64	57	65		Impact!	1	60	62	3	Impact! w/ Bar		59	61	4	Impact! w/ Bar	
R558	1	B	1	59	58	62				56	60	2			56	60	2		
R559	1	B	1	59	59	62				57	61	1			56	61	1		
R560	1	B	1	59	61	63				58	62	1			57	62	1		
R561	1	B	1	62	59	64				58	61	3			57	61	3		
R562	1	B	1	64	57	65		Impact!	1	59	61	4	Impact! w/ Bar		58	61	4	Impact! w/ Bar	
R563	1	B	1	64	56	65		Impact!	1	60	61	4	Impact! w/ Bar		58	60	**5**	Benefited/Impact	1
R564	1	B	1	64	55	65		Impact!	1	60	61	4	Impact! w/ Bar		59	60	**5**	Benefited/Impact	1
R565	1	B	1	62	55	63				59	60	3			58	60	3		
R566	1	B	1	62	55	63				59	60	3			58	59	4		
R567	1	B	1	61	55	62				58	60	2			57	59	3		
R568	1	B	1	61	55	62				58	60	2			57	59	3		
R569	1	B	1	63	54	63				61	62	1			59	60	3		
R570	1	B	1	62	53	63				60	61	2			59	60	3		
R571	1	B	1	64	55	65		Impact!	1	61	62	3	Impact! w/ Bar		59	61	4	Impact! w/ Bar	
R572	1	B	1	63	55	64				61	62	2			59	60	4		
R573	1	B	1	61	54	62				61	62	0			61	62	0		
R574	1	B	1	60	54	61				58	59	2			57	59	2		
R575	1	E	1	66	58	67				64	65	2			63	64	3		
R700	1	C	1	64	66	68		Impact!	1	64	68	0	Impact! w/ Bar		63	68	0	Impact! w/ Bar	
R701	1	C	1	68	64	69		Impact!	1	65	68	1	Impact! w/ Bar		65	67	2	Impact! w/ Bar	
R702	1	C	1	68	63	69		Impact!	1	65	67	2	Impact! w/ Bar		64	67	2	Impact! w/ Bar	
R703	1	C	1	68	62	69		Impact!	1	66	67	2	Impact! w/ Bar		64	66	3	Impact! w/ Bar	

Project Information

K19786CW
309180
I205CW_Build_Wall10
Wall 10
HMMH
Scott Noel
8/27/2018

	13' Wall		15' Wall		17' Wall	
	Wall 10		Wall 10		Wall 10	
Average Wtd I.L.	5.3	dB I.L. Avg	5.4	dB I.L. Avg	5.3	dB I.L. Avg
Maximum I.L.	6	dB I.L. Max	6	dB I.L. Max	6	dB I.L. Max
Benefited/Impacted ≥ AFG	6	# Prot Units	7	# Prot Units	7	# Prot Units
Benefited/Non Impact ≥ AFG	0	# Units	4	# Units	8	# Units
Total Benefited	6	# Ben Units	11	# Ben Units	15	# Ben Units
Impacted Units ≥ NRDG	0	# Units	0	# Units	0	# Units
Benefited Units ≥ NRDG	0	# Units	0	# Units	0	# Units
Percent of impacts ≥ AFG	50%	% Ben Units	58%	% Ben Units	58%	% Ben Units
Percent of benefits ≥ NRDG	0%	% NRDG Units	0%	% NRDG Units	0%	% NRDG Units
"Cost-Reasonable" ?	No		No		No	
Surface Area	41285	Sq Feet	47805	Sq Feet	54323	Sq Feet
Surface Area/Ben Rec	6881	Sq Feet	4346	Sq Feet	3622	Sq Feet
Barrier Length	3,257	Feet	3,257	Feet	3,257	Feet
Min Height	12.7	Feet	14.7	Feet	16.7	Feet
Max Height	12.7	Feet	14.7	Feet	16.7	Feet
Avg Height	12.7	Feet	14.7	Feet	16.7	Feet
Total Barrier Cost	$825,700		$956,100		$1,358,075	
Cost/Ben Rec	$137,617		$86,918.18		$90,538	

				With Barrier Sound Levels, Impact and Benefit					With Barrier Sound Levels, Impact and Benefit					With Barrier Sound Levels, Impact and Benefit				
Receiver ID	**Row**	**FHWA Act Cat**	**No. of Dwelling Units**	**TNM Abated Leq**	**Mitigated TNM + Structure Noise Leq(dBA)**	**IL (db)**	**Impacted?**	**No. Benefited**	**TNM Abated Leq**	**Mitigated TNM + Structure Noise Leq(dBA)**	**IL (db)**	**Impacted?**	**No. Benefited**	**TNM Abated Leq**	**Mitigated TNM + Structure Noise Leq(dBA)**	**IL (db)**	**Impacted?**	**No. Benefited**
ST-12	1	B	1	54	61	2			53	61	2			53	61	2		
ST-13	1	C	1	64	67	2	Impact! w/ Bar		63	67	2	Impact! w/ Bar		63	67	2	Impact! w/ Bar	
R537	1	B	1	57	59	4			57	58	**5**	Benefited/Non-Imp	1	56	58	**5**	Benefited/Non-Imp	1
R538	1	B	1	60	61	1			60	61	1			60	61	1		
R539	1	B	1	57	58	2			56	58	2			56	58	2		
R540	1	B	1	56	58	2			56	57	3			56	57	3		
R541	1	B	1	55	57	3			55	57	3			54	56	4		
R542	1	B	1	54	56	4			54	56	4			53	56	4		
R543	1	B	1	54	56	4			53	56	4			53	56	4		
R544	1	B	1	54	56	4			53	56	4			53	56	4		
R545	1	B	1	54	57	3			53	56	4			53	56	4		
R546	1	B	1	56	58	4			56	57	**5**	Benefited/Non-Imp	1	55	57	**5**	Benefited/Non-Imp	1
R547	1	B	1	55	57	4			55	57	4			54	57	4		
R548	1	B	1	56	58	4			55	58	4			55	57	**5**	Benefited/Non-Imp	1
R549	1	B	1	56	58	4			55	58	4			55	58	4		
R550	1	B	1	55	58	3			55	58	3			54	58	3		
R551	1	B	1	56	59	3			55	58	4			55	58	4		
R552	1	B	1	56	59	**6**	Benefited/Impact	1	56	59	**6**	Benefited/Impact	1	55	59	**6**	Benefited/Impact	1
R553	1	B	1	58	60	**6**	Benefited/Impact	1	57	60	**6**	Benefited/Impact	1	57	60	**6**	Benefited/Impact	1
R554	1	B	1	56	60	3			56	60	3			55	60	3		
R555	1	B	1	54	61	1			53	61	1			53	61	1		
R556	1	B	1	57	61	2			56	61	2			56	61	2		
R557	1	B	1	58	61	4	Impact! w/ Bar		57	60	**5**	Benefited/Impact	1	56	60	**5**	Benefited/Impact	1
R558	1	B	1	55	60	2			54	60	2			53	59	3		
R559	1	B	1	55	60	2			54	60	2			53	60	2		
R560	1	B	1	56	62	1			56	62	1			56	62	1		
R561	1	B	1	57	61	3			56	61	3			56	61	3		
R562	1	B	1	58	60	**5**	Benefited/Impact	1	57	60	**5**	Benefited/Impact	1	57	60	**5**	Benefited/Impact	1
R563	1	B	1	58	60	**5**	Benefited/Impact	1	57	60	**5**	Benefited/Impact	1	57	59	**6**	Benefited/Impact	1
R564	1	B	1	58	60	**5**	Benefited/Impact	1	57	59	**6**	Benefited/Impact	1	57	59	**6**	Benefited/Impact	1
R565	1	B	1	57	59	4			56	59	4			56	58	**5**	Benefited/Non-Imp	1
R566	1	B	1	57	59	4			56	59	4			56	58	**5**	Benefited/Non-Imp	1
R567	1	B	1	57	59	3			56	58	4			56	58	4		
R568	1	B	1	56	58	4			55	58	4			55	58	4		
R569	1	B	1	58	59	4			57	59	4			57	58	**5**	Benefited/Non-Imp	1
R570	1	B	1	57	59	4			57	58	**5**	Benefited/Non-Imp	1	56	58	**5**	Benefited/Non-Imp	1
R571	1	B	1	58	60	**5**	Benefited/Impact	1	57	59	**6**	Benefited/Impact	1	57	59	**6**	Benefited/Impact	1
R572	1	B	1	58	60	4			57	59	**5**	Benefited/Non-Imp	1	57	59	**5**	Benefited/Non-Imp	1
R573	1	B	1	61	62	0			61	62	0			61	62	0		
R574	1	B	1	56	58	3			55	57	4			54	57	4		
R575	1	E	1	62	63	4			61	63	4			61	63	4		
R700	1	C	1	63	68	0	Impact! w/ Bar		63	68	0	Impact! w/ Bar		63	68	0	Impact! w/ Bar	
R701	1	C	1	65	67	2	Impact! w/ Bar		65	67	2	Impact! w/ Bar		64	67	2	Impact! w/ Bar	
R702	1	C	1	64	67	2	Impact! w/ Bar		64	66	3	Impact! w/ Bar		64	66	3	Impact! w/ Bar	
R703	1	C	1	64	66	3	Impact! w/ Bar		64	66	3	Impact! w/ Bar		64	66	3	Impact! w/ Bar	

U.S. Department of Transportation
Federal Highway Administration

Basic Noise Barrier Optimization Tool **8/3/2018**

K19786CW
Wall 11

	10'	**12'**	**14'**	**16'**	**18'**	**20'**	**22'**	**24'**	**Units**
Average Wtd I.L. (benefited)	5	6	7.5	7	7.7	7.3	7.5	7.5	**dBA**
Maximum I.L.	5	7	9	10	11	11	12	12	**dBA**
Benefited/Impacted ≥ AFG	1	2	2	3	3	4	4	4	**# of dwelling units**
Benefited/Non Impact ≥ AFG	0	0	0	0	0	0	0	0	**# of dwelling units**
Total Benefited	1	2	2	3	3	4	4	4	**# of dwelling units**
Impacted Units ≥ NRDG	0	1	1	1	2	2	2	2	**# of dwelling units**
Benefited Units ≥ NRDG	0	1	1	1	2	2	2	2	**# of dwelling units**
Percent of impacts ≥ AFG	20%	40%	40%	60%	60%	80%	80%	80%	**%**
Percent of benefits ≥ NRDG	0%	50%	50%	33%	67%	50%	50%	50%	**%**
"Cost-Reasonable" ?	No	No	No	No	No	No	No	No	**----**
Surface Area	11,451	13,741	16,032	18,321	20,612	22,902	25,192	27,482	**sq-feet**
Surface Area/Ben Rec	11,451	6,871	8,016	6,107	6,871	5,726	6,298	6,871	**sq-ft / ben rec**
Barrier Length	1,145	1,145	1,145	1,145	1,145	1,145	1,145	1,145	**ft**
Min Height	10	12	14	16	18	20	22	24	**ft**
Max Height	10	12	14	16	18	20	22	24	**ft**
Avg Height	10	12	14	16	18	20	22	24	**ft**
Total Barrier Cost	229,020	274,820	320,640	458,025	515,300	572,550	629,800	687,050	**$**
Cost/Ben Rec	229,020	137,410	160,320	152,675	171,767	143,138	157,450	171,763	**$ / ben rec**
Effectiveness/Cost Metric (E/C)	-	5.8	5.0	6.5	11.6	14.0	12.7	11.6	**----**

ODOT Acoustical Feasibilty Goal (dBA)	5
ODOT Acoustical Feasibilty Goal (%)	51%
ODOT Noise Reduction Design Goal (dBA)	7
ODOT Noise Reduction Design Goal (%)	1%

Project Information	No Barrier Analysis		10' Wall			12' Wall			14' Wall		
	No Barrier		Wall 11			Wall 11			Wall 11		
			Average Wtd I.L. (benefited)	5.0	dB I.L. Avg	Average Wtd I.L.	6.0	dB I.L. Avg	Average Wtd I.L.	7.5	dB I.L. Avg
			Maximum I.L.	5	dB I.L. Max	Maximum I.L.	7	dB I.L. Max	Maximum I.L.	9	dB I.L. Max
K19786CW	Total Units Exposed to Impact	5	Benefited/Impacted ≥ AFG	1	# Prot Units	Benefited/Impacted ≥ AFG	2	# Prot Units	Benefited/Impacted ≥ AFG	2	# Prot Units
309180	# Impacts - NAC only	5	Benefited/Non Impact ≥ AFG	0	# Units	Benefited/Non Impact ≥ AFG	0	# Units	Benefited/Non Impact ≥ AFG	0	# Units
I205CW_Build_Wall11	# Impacts - SI only	0	Total Benefited	1	# Ben Units	Total Benefited	2	# Ben Units	Total Benefited	2	# Ben Units
Wall 11	# Impacts - Both NAC & SI	0	Impacted Units ≥ NRDG	0	# Units	Impacted Units ≥ NRDG	1	# Units	Impacted Units ≥ NRDG	1	# Units
HMMH			Benefited Units ≥ NRDG	0	# Units	Benefited Units ≥ NRDG	1	# Units	Benefited Units ≥ NRDG	1	# Units
Scott Noel			Percent of impacts ≥ AFG	20%	% Ben Units	Percent of impacts ≥ AFG	40%	% Ben Units	Percent of impacts ≥ AFG	40%	% Ben Units
8/3/2018			Percent of benefits ≥ NRDG	0%	% NRDG Units	Percent of benefits ≥ NRDG	50%	% NRDG Units	Percent of benefits ≥ NRDG	50%	% NRDG Units
			"Cost-Reasonable" ?	No		"Cost-Reasonable" ?	No		"Cost-Reasonable" ?	No	
			Surface Area	11451	Sq Feet	Surface Area	13741	Sq Feet	Surface Area	16032	Sq Feet
			Surface Area/Ben Rec	11451	Sq Feet	Surface Area/Ben Rec	6871	Sq Feet	Surface Area/Ben Rec	8016	Sq Feet
			Barrier Length	1,145	Feet	Barrier Length	1,145	Feet	Barrier Length	1,145	Feet
			Min Height	10.0	Feet	Min Height	12.0	Feet	Min Height	14.0	Feet
			Max Height	10.0	Feet	Max Height	12.0	Feet	Max Height	14.0	Feet
			Avg Height	10.0	Feet	Avg Height	12.0	Feet	Avg Height	14.0	Feet
			Total Barrier Cost	$229,020		Total Barrier Cost	$274,820		Total Barrier Cost	$320,640	
	Enter SI Info		Cost/Ben Rec	$229,020		Cost/Ben Rec	$137,410		Cost/Ben Rec	$160,320	

Receiver ID	Row	FHWA Act Cat	No. of Dwelling Units	Type of Impact		Impact?	No. of Impacted Units	With Barrier Sound Levels, Impact and Benefit				With Barrier Sound Levels, Impact and Benefit				With Barrier Sound Levels, Impact and Benefit			
				Bld Leq > NAC?	Sub. Inc.?			Leq(dBA)	IL (db)	Impacted?	No. Benefited	Leq(dBA)	IL (db)	Impacted?	No. Benefited	Leq(dBA)	IL (db)	Impacted?	No. Benefited
R699	1	B	1	74		Impact!	1	69	5	Benefited/Impact	1	67	7	Benefited/Impact	1	65	9	Benefited/Impact	1
R695	1	B	1	72		Impact!	1	68	4	Impact! w/ Bar		67	5	Benefited/Impact	1	66	6	Benefited/Impact	1
R696	1	B	1	68		Impact!	1	67	1	Impact! w/ Bar		66	2	Impact! w/ Bar		64	4	Impact! w/ Bar	
R697	1	B	1	67		Impact!	1	66	1	Impact! w/ Bar		65	2	Impact! w/ Bar		64	3	Impact! w/ Bar	
R698	1	B	1	66		Impact!	1	64	2	Impact! w/ Bar		64	2	Impact! w/ Bar		63	3	Impact! w/ Bar	

Project Information	16' Wall			18' Wall			20' Wall			22' Wall		
	Wall 11			Wall 11			Wall 11			Wall 11		
	Average Wtd I.L.	7.0	dB I.L. Avg	Average Wtd I.L.	7.7	dB I.L. Avg	Average Wtd I.L.	7.3	dB I.L. Avg	Average Wtd I.L.	7.5	dB I.L. Avg
	Maximum I.L.	10	dB I.L. Max	Maximum I.L.	11	dB I.L. Max	Maximum I.L.	11	dB I.L. Max	Maximum I.L.	12	dB I.L. Max
K19786CW	Benefited/Impacted ≥ AFG	3	# Prot Units	Benefited/Impacted ≥ AFG	3	# Prot Units	Benefited/Impacted ≥ AFG	4	# Prot Units	Benefited/Impacted ≥ AFG	4	# Prot Units
309180	Benefited/Non Impact ≥ AFG	0	# Units	Benefited/Non Impact ≥ AFG	0	# Units	Benefited/Non Impact ≥ AFG	0	# Units	Benefited/Non Impact ≥ AFG	0	# Units
I205CW_Build_Wall11	Total Benefited	3	# Ben Units	Total Benefited	3	# Ben Units	Total Benefited	4	# Ben Units	Total Benefited	4	# Ben Units
Wall 11	Impacted Units ≥ NRDG	1	# Units	Impacted Units ≥ NRDG	2	# Units	Impacted Units ≥ NRDG	2	# Units	Impacted Units ≥ NRDG	2	# Units
HMMH	Benefited Units ≥ NRDG	1	# Units	Benefited Units ≥ NRDG	2	# Units	Benefited Units ≥ NRDG	2	# Units	Benefited Units ≥ NRDG	2	# Units
Scott Noel	Percent of impacts ≥ AFG	60%	% Ben Units	Percent of impacts ≥ AFG	60%	% Ben Units	Percent of impacts ≥ AFG	80%	% Ben Units	Percent of impacts ≥ AFG	80%	% Ben Units
8/3/2018	Percent of benefits ≥ NRDG	33%	% NRDG Units	Percent of benefits ≥ NRDG	67%	% NRDG Units	Percent of benefits ≥ NRDG	50%	% NRDG Units	Percent of benefits ≥ NRDG	50%	% NRDG Units
	"Cost-Reasonable" ?	No		"Cost-Reasonable" ?	No		"Cost-Reasonable" ?	No		"Cost-Reasonable" ?	No	
	Surface Area	18321	Sq Feet	Surface Area	20612	Sq Feet	Surface Area	22902	Sq Feet	Surface Area	25192	Sq Feet
	Surface Area/Ben Rec	6107	Sq Feet	Surface Area/Ben Rec	6871	Sq Feet	Surface Area/Ben Rec	5726	Sq Feet	Surface Area/Ben Rec	6298	Sq Feet
	Barrier Length	1,145	Feet	Barrier Length	1,145	Feet	Barrier Length	1,145	Feet	Barrier Length	1,145	Feet
	Min Height	16.0	Feet	Min Height	18.0	Feet	Min Height	20.0	Feet	Min Height	22.0	Feet
	Max Height	16.0	Feet	Max Height	18.0	Feet	Max Height	20.0	Feet	Max Height	22.0	Feet
	Avg Height	16.0	Feet	Avg Height	18.0	Feet	Avg Height	20.0	Feet	Avg Height	22.0	Feet
	Total Barrier Cost	$458,025		Total Barrier Cost	$515,300		Total Barrier Cost	$572,550		Total Barrier Cost	$629,800	
	Cost/Ben Rec	$152,675.00		Cost/Ben Rec	$171,767		Cost/Ben Rec	$143,138		Cost/Ben Rec	$157,450	

Receiver ID	Row	FHWA Act Cat	No. of Dwelling Units	With Barrier Sound Levels, Impact and Benefit				With Barrier Sound Levels, Impact and Benefit				With Barrier Sound Levels, Impact and Benefit				With Barrier Sound Levels, Impact and Benefit			
				Leq(dBA)	IL (db)	Impacted?	No. Benefited	Leq(dBA)	IL (db)	Impacted?	No. Benefited	Leq(dBA)	IL (db)	Impacted?	No. Benefited	Leq(dBA)	IL (db)	Impacted?	No. Benefited
R699	1	B	1	64	**10**	Benefited/Impact	1	63	**11**	Benefited/Impact	1	63	**11**	Benefited/Impact	1	62	**12**	Benefited/Impact	1
R695	1	B	1	66	**6**	Benefited/Impact	1	65	**7**	Benefited/Impact	1	65	**7**	Benefited/Impact	1	65	**7**	Benefited/Impact	1
R696	1	B	1	63	**5**	Benefited/Impact	1	63	**5**	Benefited/Impact	1	62	**6**	Benefited/Impact	1	62	**6**	Benefited/Impact	1
R697	1	B	1	64	3	Impact! w/ Bar		63	4	Impact! w/ Bar		63	4	Impact! w/ Bar		63	4	Impact! w/ Bar	
R698	1	B	1	62	4	Impact! w/ Bar		62	4	Impact! w/ Bar		61	**5**	Benefited/Impact	1	61	**5**	Benefited/Impact	1

Project Information

K19786CW
309180
I205CW_Build_Wall11
Wall 11
HMMH
Scott Noel
8/3/2018

24' Wall

Wall 11		
Average Wtd I.L.	7.5	dB I.L. Avg
Maximum I.L.	12	dB I.L. Max
Benefited/Impacted ≥ AFG	4	# Prot Units
Benefited/Non Impact ≥ AFG	0	# Units
Total Benefited	4	# Ben Units
Impacted Units ≥ NRDG	2	# Units
Benefited Units ≥ NRDG	2	# Units
Percent of impacts ≥ AFG	80%	% Ben Units
Percent of benefits ≥ NRDG	50%	% NRDG Units
"Cost-Reasonable" ?	No	
Surface Area	27482	Sq Feet
Surface Area/Ben Rec	6871	Sq Feet
Barrier Length	1,145	Feet
Min Height	24.0	Feet
Max Height	24.0	Feet
Avg Height	24.0	Feet
Total Barrier Cost	$687,050	
Cost/Ben Rec	$171,763	

				With Barrier Sound Levels, Impact and Benefit			
Receiver ID	Row	FHWA Act Cat	No. of Dwelling Units	Leq(dBA)	IL (db)	Impacted?	No. Benefited
R699	1	B	1	62	**12**	Benefited/Impact	1
R695	1	B	1	65	**7**	Benefited/Impact	1
R696	1	B	1	62	**6**	Benefited/Impact	1
R697	1	B	1	63	4	Impact! w/ Bar	
R698	1	B	1	61	**5**	Benefited/Impact	1

U.S. Department of Transportation
Federal Highway Administration

Basic Noise Barrier Optimization Tool **11/15/2018**

K19786CW
Wall 12

	10'	12'	14'	16'	18'	20'	22'	24'	Units
Average Wtd I.L. (benefited)		5	6	5.5	5.3	5.7	6	6.3	dBA
Maximum I.L.	3	5	7	8	9	9	10	10	dBA
Benefited/Impacted ≥ AFG	0	0	0	4	23	31	35	38	# of dwelling units
Benefited/Non Impact ≥ AFG	0	1	3	9	23	35	41	43	# of dwelling units
Total Benefited	0	1	3	13	46	66	76	81	# of dwelling units
Impacted Units ≥ NRDG	0	0	0	0	0	6	14	19	# of dwelling units
Benefited Units ≥ NRDG	0	0	1	2	3	11	23	35	# of dwelling units
Percent of impacts ≥ AFG	0%	0%	0%	9%	53%	72%	81%	88%	%
Percent of benefits ≥ NRDG		0%	33%	15%	7%	17%	30%	43%	%
"Cost-Reasonable" ?		No	No	No	Yes	Yes	Yes	Yes	----
Surface Area	13,805	16,565	19,326	22,087	24,848	27,607	30,369	33,133	sq-feet
Surface Area/Ben Rec		16,565	6,442	1,699	540	418	400	409	sq-ft / ben rec
Barrier Length	1,381	1,381	1,381	1,381	1,381	1,381	1,381	1,381	ft
Min Height	10	12	14	16	18	20	22	24	ft
Max Height	10	12	14	16	18	20	22	24	ft
Avg Height	10	12	14	16	18	20	22	24	ft
Total Barrier Cost	276,100	331,300	386,520	441,740	621,200	690,175	759,225	828,325	$
Cost/Ben Rec		331,300	128,840	33,980	13,504	10,457	9,990	10,226	$ / ben rec
Effectiveness/Cost Metric (E/C)	-	-	-	-	-	7.8	18.9	25.1	----

ODOT Acoustical Feasibilty Goal (dBA)	5
ODOT Acoustical Feasibilty Goal (%)	51%
ODOT Noise Reduction Design Goal (dBA)	7
ODOT Noise Reduction Design Goal (%)	1%

Project Information

K19786CW
309180
I205CW_Build_Wall12
Wall 12
HMMH
Scott Noel
11/15/2018

No Barrier Analysis
No Barrier

Total Units Exposed to Impact	43
# Impacts - NAC only	43
# Impacts - SI only	0
# Impacts - Both NAC & SI	0

Enter SI Info

10' Wall
Wall 12 Rev 11/13/2018

Average Wtd I.L. (benefited)		dB I.L. Avg
Maximum I.L.	3	dB I.L. Max
Benefited/Impacted ≥ AFG	0	# Prot Units
Benefited/Non Impact ≥ AFG	0	# Units
Total Benefited	0	# Ben Units
Impacted Units ≥ NRDG	0	# Units
Benefited Units ≥ NRDG	0	# Units
Percent of impacts ≥ AFG	0%	% Ben Units
Percent of benefits ≥ NRDG		% NRDG Units
"Cost-Reasonable" ?		
Surface Area	13805	Sq Feet
Surface Area/Ben Rec		Sq Feet
Barrier Length	1,381	Feet
Min Height	10.0	Feet
Max Height	10.0	Feet
Avg Height	10.0	Feet
Total Barrier Cost	$276,100	
Cost/Ben Rec		

12' Wall
Wall 12 Rev 11/13/2018

Average Wtd I.L.	5.0	dB I.L. Avg
Maximum I.L.	5	dB I.L. Max
Benefited/Impacted ≥ AFG	0	# Prot Units
Benefited/Non Impact ≥ AFG	1	# Units
Total Benefited	1	# Ben Units
Impacted Units ≥ NRDG	0	# Units
Benefited Units ≥ NRDG	0	# Units
Percent of impacts ≥ AFG	0%	% Ben Units
Percent of benefits ≥ NRDG	0%	% NRDG Units
"Cost-Reasonable" ?	No	
Surface Area	16565	Sq Feet
Surface Area/Ben Rec	16565	Sq Feet
Barrier Length	1,381	Feet
Min Height	12.0	Feet
Max Height	12.0	Feet
Avg Height	12.0	Feet
Total Barrier Cost	$331,300	
Cost/Ben Rec	$331,300	

14' Wall
Wall 12 Rev 11/13/2018

Average Wtd I.L.	6.0	dB I.L. Avg
Maximum I.L.	7	dB I.L. Max
Benefited/Impacted ≥ AFG	0	# Prot Units
Benefited/Non Impact ≥ AFG	3	# Units
Total Benefited	3	# Ben Units
Impacted Units ≥ NRDG	0	# Units
Benefited Units ≥ NRDG	1	# Units
Percent of impacts ≥ AFG	0%	% Ben Units
Percent of benefits ≥ NRDG	33%	% NRDG Units
"Cost-Reasonable" ?	No	
Surface Area	19326	Sq Feet
Surface Area/Ben Rec	6442	Sq Feet
Barrier Length	1,381	Feet
Min Height	14.0	Feet
Max Height	14.0	Feet
Avg Height	14.0	Feet
Total Barrier Cost	$386,520	
Cost/Ben Rec	$128,840	

Receiver ID	Row	FHWA Act Cat	No. of Dwelling Units	Type of Impact		Impact?	No. of Impacted Units	With Barrier Sound Levels, Impact and Benefit (10' Wall)				With Barrier Sound Levels, Impact and Benefit (12' Wall)				With Barrier Sound Levels, Impact and Benefit (14' Wall)			
				Bld Leq > NAC?	Sub. Inc.?			Leq(dBA)	IL (db)	Impacted?	No. Benefited	Leq(dBA)	IL (db)	Impacted?	No. Benefited	Leq(dBA)	IL (db)	Impacted?	No. Benefited
R704	1	B	1	69		Impact!	1	67	2	Impact! w/ Bar		66	3	Impact! w/ Bar		65	4	Impact! w/ Bar	
R705	1	B	1	69		Impact!	1	67	2	Impact! w/ Bar		66	3	Impact! w/ Bar		65	4	Impact! w/ Bar	
R706	1	B	1	70		Impact!	1	68	2	Impact! w/ Bar		67	3	Impact! w/ Bar		67	3	Impact! w/ Bar	
R707	1	B	1	70		Impact!	1	68	2	Impact! w/ Bar		68	2	Impact! w/ Bar		67	3	Impact! w/ Bar	
R708	1	B	1	58				57	1			57	1			56	2		
R709	1	B	1	56				53	3			51	5	Benefited/Non-Imp	1	50	6	Benefited/Non-Imp	1
R710	1	B	1	68		Impact!	1	66	2	Impact! w/ Bar		66	2	Impact! w/ Bar		65	3	Impact! w/ Bar	
R711	1	B	1	67		Impact!	1	65	2	Impact! w/ Bar		65	2	Impact! w/ Bar		64	3	Impact! w/ Bar	
R712	1	B	1	49				49	0			49	0			49	0		
R713	1	B	1	53				51	2			50	3			49	4		
R714	1	B	1	56				56	0			56	0			55	1		
R715	1	B	1	57				56	1			56	1			56	1		
R716	1	B	1	45				45	0			44	1			44	1		
R717	1	B	1	45				45	0			45	0			44	1		
R718	1	B	1	46				46	0			46	0			45	1		
R719	1	B	1	46				46	0			46	0			46	0		
R720	1	B	1	63				60	3			60	3			59	4		
R721	1	B	1	61				59	2			59	2			58	3		
R722	1	B	1	59				57	2			55	4			55	4		
R723	1	B	1	59				57	2			56	3			55	4		
R724	1	B	1	52				50	2			50	2			48	4		
R725	1	B	1	52				50	2			50	2			48	4		
R726	1	B	1	51				50	1			50	1			50	1		
R727	1	B	1	48				48	0			48	0			48	0		
R728	1	B	1	47				47	0			46	1			46	1		
R729	1	B	1	46				46	0			46	0			46	0		
R730	1	B	1	53				53	0			53	0			53	0		
R731	1	B	1	54				54	0			53	1			53	1		
R732	1	B	1	53				53	0			53	0			53	0		
R733	1	B	1	53				53	0			53	0			53	0		
R734	1	B	1	46				46	0			45	1			45	1		
R735	1	B	1	46				45	1			45	1			45	1		
R736	1	B	1	57				56	1			56	1			55	2		
R737	1	B	1	57				56	1			56	1			55	2		
R738	1	B	1	56				55	1			55	1			54	2		
R739	1	B	1	56				54	2			54	2			53	3		
R740	1	B	1	60				60	0			60	0			60	0		
R741	1	B	1	56				56	0			56	0			56	0		
R742	1	B	1	53				53	0			53	0			53	0		
R743	1	B	1	53				53	0			53	0			53	0		
R744	1	B	1	53				53	0			52	1			52	1		
R745	1	B	1	53				53	0			52	1			52	1		
R746	1	C	1	53				53	0			52	1			52	1		
R747	1	B	1	53				53	0			53	0			53	0		
R748	1	B	1	55				55	0			55	0			54	1		
R749	1	B	1	71		Impact!	1	68	3	Impact! w/ Bar		68	3	Impact! w/ Bar		67	4	Impact! w/ Bar	
R750	1	B	1	71		Impact!	1	69	2	Impact! w/ Bar		68	3	Impact! w/ Bar		67	4	Impact! w/ Bar	
R751	1	B	1	71		Impact!	1	70	1	Impact! w/ Bar		69	2	Impact! w/ Bar		68	3	Impact! w/ Bar	
R752	1	B	1	71		Impact!	1	70	1	Impact! w/ Bar		69	2	Impact! w/ Bar		69	2	Impact! w/ Bar	
R753	1	B	1	60				58	2			58	2			58	2		
R754	1	B	1	56				53	3			52	4			49	7	Benefited/Non-Imp	1
R755	1	B	1	69		Impact!	1	68	1	Impact! w/ Bar		67	2	Impact! w/ Bar		66	3	Impact! w/ Bar	
R756	1	B	1	68		Impact!	1	66	2	Impact! w/ Bar		66	2	Impact! w/ Bar		65	3	Impact! w/ Bar	
R757	1	B	1	49				49	0			49	0			49	0		
R757	1	B	1	49				49	0			49	0			49	0		
R758	1	B	1	53				50	3			50	3			49	4		
R759	1	B	1	57				56	1			56	1			56	1		
R760	1	B	1	58				57	1			56	2			56	2		
R761	1	B	1	46				46	0			46	0			46	0		

Project Information	No Barrier Analysis		10' Wall			12' Wall			14' Wall		
	No Barrier		Wall 12 Rev 11/13/2018			Wall 12 Rev 11/13/2018			Wall 12 Rev 11/13/2018		
			Average Wtd I.L. (benefited)		dB I.L. Avg	Average Wtd I.L.	5.0	dB I.L. Avg	Average Wtd I.L.	6.0	dB I.L. Avg
			Maximum I.L.	3	dB I.L. Max	Maximum I.L.	5	dB I.L. Max	Maximum I.L.	7	dB I.L. Max
K19786CW	Total Units Exposed to Impact	43	Benefited/Impacted ≥ AFG	0	# Prot Units	Benefited/Impacted ≥ AFG	0	# Prot Units	Benefited/Impacted ≥ AFG	0	# Prot Units
309180	# Impacts - NAC only	43	Benefited/Non Impact ≥ AFG	0	# Units	Benefited/Non Impact ≥ AFG	1	# Units	Benefited/Non Impact ≥ AFG	3	# Units
I205CW_Build_Wall12	# Impacts - SI only	0	Total Benefited	0	# Ben Units	Total Benefited	1	# Ben Units	Total Benefited	3	# Ben Units
Wall 12	# Impacts - Both NAC & SI	0	Impacted Units ≥ NRDG	0	# Units	Impacted Units ≥ NRDG	0	# Units	Impacted Units ≥ NRDG	0	# Units
HMMH			Benefited Units ≥ NRDG	0	# Units	Benefited Units ≥ NRDG	0	# Units	Benefited Units ≥ NRDG	1	# Units
Scott Noel			Percent of impacts ≥ AFG	0%	% Ben Units	Percent of impacts ≥ AFG	0%	% Ben Units	Percent of impacts ≥ AFG	0%	% Ben Units
11/15/2018			Percent of benefits ≥ NRDG		% NRDG Units	Percent of benefits ≥ NRDG	0%	% NRDG Units	Percent of benefits ≥ NRDG	33%	% NRDG Units
			"Cost-Reasonable" ?			"Cost-Reasonable" ?	No		"Cost-Reasonable" ?	No	
			Surface Area	13805	Sq Feet	Surface Area	16565	Sq Feet	Surface Area	19326	Sq Feet
			Surface Area/Ben Rec		Sq Feet	Surface Area/Ben Rec	16565	Sq Feet	Surface Area/Ben Rec	6442	Sq Feet
			Barrier Length	1,381	Feet	Barrier Length	1,381	Feet	Barrier Length	1,381	Feet
			Min Height	10.0	Feet	Min Height	12.0	Feet	Min Height	14.0	Feet
			Max Height	10.0	Feet	Max Height	12.0	Feet	Max Height	14.0	Feet
			Avg Height	10.0	Feet	Avg Height	12.0	Feet	Avg Height	14.0	Feet
			Total Barrier Cost	$276,100		Total Barrier Cost	$331,300		Total Barrier Cost	$386,520	
	Enter SI Info		Cost/Ben Rec			Cost/Ben Rec	$331,300		Cost/Ben Rec	$128,840	

Receiver ID	Row	FHWA Act Cat	No. of Dwelling Units	Type of Impact		Impact?	No. of Impacted Units	With Barrier Sound Levels, Impact and Benefit				With Barrier Sound Levels, Impact and Benefit				With Barrier Sound Levels, Impact and Benefit			
				Bld Leq > NAC?	Sub. Inc.?			Leq(dBA)	IL (db)	Impacted?	No. Benefited	Leq(dBA)	IL (db)	Impacted?	No. Benefited	Leq(dBA)	IL (db)	Impacted?	No. Benefited
R762	1	B	1	46				46	0			46	0			46	0		
R763	1	B	1	47				47	0			47	0			47	0		
R764	1	B	1	47				47	0			47	0			47	0		
R765	1	B	1	64				62	2			62	2			61	3		
R766	1	B	1	63				61	2			61	2			60	3		
R767	1	B	1	60				58	2			58	2			56	4		
R768	1	B	1	60				58	2			57	3			56	4		
R769	1	B	1	53				50	3			50	3			50	3		
R770	1	B	1	52				51	1			50	2			49	3		
R771	1	B	1	52				52	0			52	0			51	1		
R772	1	B	1	49				49	0			48	1			48	1		
R773	1	B	1	48				48	0			48	0			48	0		
R774	1	B	1	48				48	0			47	1			47	1		
R775	1	B	1	57				57	0			57	0			57	0		
R776	1	B	1	56				56	0			56	0			56	0		
R777	1	B	1	55				55	0			55	0			55	0		
R778	1	B	1	55				55	0			55	0			55	0		
R779	1	B	1	47				47	0			47	0			47	0		
R780	1	B	1	47				47	0			47	0			47	0		
R781	1	B	1	59				58	1			57	2			57	2		
R782	1	B	1	59				57	2			57	2			57	2		
R783	1	B	1	58				56	2			56	2			55	3		
R784	1	B	1	57				56	1			55	2			55	2		
R785	1	B	1	62				62	0			62	0			62	0		
R786	1	B	1	61				61	0			61	0			61	0		
R787	1	B	1	56				56	0			56	0			56	0		
R788	1	B	1	56				56	0			56	0			56	0		
R789	1	B	1	56				56	0			56	0			55	1		
R790	1	B	1	56				55	1			55	1			55	1		
R791	1	B	1	56				55	1			55	1			55	1		
R792	1	B	1	56				56	0			56	0			56	0		
R793	1	B	1	72		Impact!	1	70	2	Impact! w/ Bar		69	3	Impact! w/ Bar		69	3	Impact! w/ Bar	
R794	1	B	1	72		Impact!	1	70	2	Impact! w/ Bar		69	3	Impact! w/ Bar		69	3	Impact! w/ Bar	
R795	1	B	1	72		Impact!	1	71	1	Impact! w/ Bar		70	2	Impact! w/ Bar		70	2	Impact! w/ Bar	
R796	1	B	1	72		Impact!	1	71	1	Impact! w/ Bar		71	1	Impact! w/ Bar		70	2	Impact! w/ Bar	
R797	1	B	1	61				60	1			59	2			59	2		
R798	1	B	1	57				54	3			53	4			52	**5**	Benefited/Non-Imp	1
R799	1	B	1	70		Impact!	1	69	1	Impact! w/ Bar		68	2	Impact! w/ Bar		67	3	Impact! w/ Bar	
R800	1	B	1	69		Impact!	1	68	1	Impact! w/ Bar		67	2	Impact! w/ Bar		66	3	Impact! w/ Bar	
R801	1	B	1	53				53	0			52	1			52	1		
R802	1	B	1	55				53	2			52	3			52	3		
R803	1	B	1	58				58	0			57	1			57	1		
R804	1	B	1	59				58	1			58	1			57	2		
R805	1	B	1	49				49	0			49	0			49	0		
R806	1	B	1	50				50	0			50	0			50	0		
R807	1	B	1	51				51	0			51	0			51	0		
R808	1	B	1	51				51	0			51	0			51	0		
R809	1	B	1	65		Impact!	1	63	2	Impact! w/ Bar		63	2	Impact! w/ Bar		62	3	Impact! w/ Bar	
R810	1	B	1	64				62	2			62	2			62	2		
R811	1	B	1	61				59	2			59	2			58	3		
R812	1	B	1	61				59	2			58	3			58	3		
R813	1	B	1	55				53	2			53	2			52	3		
R814	1	B	1	54				53	1			53	1			53	1		
R815	1	B	1	54				54	0			54	0			54	0		
R816	1	B	1	52				52	0			52	0			52	0		
R817	1	B	1	52				52	0			52	0			52	0		
R818	1	B	1	51				51	0			51	0			51	0		
R819	1	B	1	59				59	0			59	0			59	0		
R820	1	B	1	58				58	0			58	0			58	0		

Project Information	No Barrier Analysis No Barrier	
K19786CW	Total Units Exposed to Impact	43
309180	# Impacts - NAC only	43
I205CW_Build_Wall12	# Impacts - SI only	0
Wall 12	# Impacts - Both NAC & SI	0
HMMH		
Scott Noel		
11/15/2018		

U.S. Department of Transportation
Federal Highway Administration

Enter SI Info

10' Wall Wall 12 Rev 11/13/2018			12' Wall Wall 12 Rev 11/13/2018			14' Wall Wall 12 Rev 11/13/2018		
Average Wtd I.L. (benefited)		dB I.L. Avg	Average Wtd I.L.	5.0	dB I.L. Avg	Average Wtd I.L.	6.0	dB I.L. Avg
Maximum I.L.	3	dB I.L. Max	Maximum I.L.	5	dB I.L. Max	Maximum I.L.	7	dB I.L. Max
Benefited/Impacted ≥ AFG	0	# Prot Units	Benefited/Impacted ≥ AFG	0	# Prot Units	Benefited/Impacted ≥ AFG	0	# Prot Units
Benefited/Non Impact ≥ AFG	0	# Units	Benefited/Non Impact ≥ AFG	1	# Units	Benefited/Non Impact ≥ AFG	3	# Units
Total Benefited	0	# Ben Units	Total Benefited	1	# Ben Units	Total Benefited	3	# Ben Units
Impacted Units ≥ NRDG	0	# Units	Impacted Units ≥ NRDG	0	# Units	Impacted Units ≥ NRDG	0	# Units
Benefited Units ≥ NRDG	0	# Units	Benefited Units ≥ NRDG	0	# Units	Benefited Units ≥ NRDG	1	# Units
Percent of impacts ≥ AFG	0%	% Ben Units	Percent of impacts ≥ AFG	0%	% Ben Units	Percent of impacts ≥ AFG	0%	% Ben Units
Percent of benefits ≥ NRDG		% NRDG Units	Percent of benefits ≥ NRDG	0%	% NRDG Units	Percent of benefits ≥ NRDG	33%	% NRDG Units
"Cost-Reasonable" ?			"Cost-Reasonable" ?	No		"Cost-Reasonable" ?	No	
Surface Area	13805	Sq Feet	Surface Area	16565	Sq Feet	Surface Area	19326	Sq Feet
Surface Area/Ben Rec		Sq Feet	Surface Area/Ben Rec	16565	Sq Feet	Surface Area/Ben Rec	6442	Sq Feet
Barrier Length	1,381	Feet	Barrier Length	1,381	Feet	Barrier Length	1,381	Feet
Min Height	10.0	Feet	Min Height	12.0	Feet	Min Height	14.0	Feet
Max Height	10.0	Feet	Max Height	12.0	Feet	Max Height	14.0	Feet
Avg Height	10.0	Feet	Avg Height	12.0	Feet	Avg Height	14.0	Feet
Total Barrier Cost	$276,100		Total Barrier Cost	$331,300		Total Barrier Cost	$386,520	
Cost/Ben Rec			Cost/Ben Rec	$331,300		Cost/Ben Rec	$128,840	

Receiver ID	Row	FHWA Act Cat	No. of Dwelling Units	Type of Impact		Impact?	No. of Impacted Units	With Barrier Sound Levels, Impact and Benefit				With Barrier Sound Levels, Impact and Benefit				With Barrier Sound Levels, Impact and Benefit			
				Bld Leq > NAC?	Sub. Inc.?			Leq(dBA)	IL (db)	Impacted?	No. Benefited	Leq(dBA)	IL (db)	Impacted?	No. Benefited	Leq(dBA)	IL (db)	Impacted?	No. Benefited
R821	1	B	1	58				57	1			57	1			57	1		
R822	1	B	1	58				58	0			58	0			57	1		
R823	1	B	1	50				50	0			50	0			50	0		
R824	1	B	1	50				50	0			50	0			50	0		
R825	1	B	1	61				60	1			60	1			59	2		
R826	1	B	1	61				61	0			60	1			60	1		
R827	1	B	1	59				58	1			57	2			57	2		
R828	1	B	1	58				57	1			56	2			56	2		
R829	1	B	1	63				63	0			63	0			63	0		
R830	1	B	1	62				62	0			62	0			62	0		
R831	1	B	1	61				61	0			61	0			61	0		
R832	1	B	1	60				60	0			60	0			60	0		
R833	1	B	1	60				60	0			60	0			60	0		
R834	1	B	1	60				59	1			59	1			59	1		
R835	1	B	1	60				60	0			60	0			60	0		
R836	1	B	1	60				60	0			60	0			60	0		
R837	1	B	1	63				62	1			62	2			62	2		
R838	1	B	1	69		Impact!	1	67	2	Impact! w/ Bar		67	3	Impact! w/ Bar		66	3	Impact! w/ Bar	
R839	1	B	1	66		Impact!	1	64	2	Impact! w/ Bar		63	3	Impact! w/ Bar		62	4	Impact! w/ Bar	
R840	1	B	1	65		Impact!	1	63	2	Impact! w/ Bar		62	3	Impact! w/ Bar		62	4	Impact! w/ Bar	
R841	1	B	1	64				62	2			61	3			60	3		
R842	1	B	1	63				61	2			61	2			60	3		
R843	1	B	1	67		Impact!	1	65	2	Impact! w/ Bar		65	3	Impact! w/ Bar		64	3	Impact! w/ Bar	
R844	1	B	1	67		Impact!	1	65	2	Impact! w/ Bar		64	3	Impact! w/ Bar		63	4	Impact! w/ Bar	
R845	1	B	1	65		Impact!	1	63	2	Impact! w/ Bar		62	3	Impact! w/ Bar		62	3	Impact! w/ Bar	
R846	1	B	1	64				63	2			62	2			61	3		
R847	1	B	1	67		Impact!	1	64	2	Impact! w/ Bar		64	3	Impact! w/ Bar		63	4	Impact! w/ Bar	
R848	1	B	1	66		Impact!	1	64	2	Impact! w/ Bar		63	3	Impact! w/ Bar		62	4	Impact! w/ Bar	
R849	1	B	1	64				62	2			62	3			61	3		
R850	1	B	1	64				62	2			61	3			61	3		
R851	1	B	1	62				60	2			60	2			59	3		
R852	1	B	1	61				60	2			59	2			59	3		
R853	1	B	1	59				58	1			58	2			57	2		
R854	1	B	1	59				58	1			57	1			57	2		
R855	1	B	1	63				62	1			61	2			60	3		
R856	1	B	1	63				61	1			61	2			60	3		
R857	1	B	1	61				60	1			59	2			59	2		
R858	1	B	1	61				60	1			59	2			59	2		
R859	1	B	1	63				61	2			60	2			60	3		
R860	1	B	1	62				61	2			60	2			59	3		
R861	1	B	1	60				59	1			58	2			58	3		
R862	1	B	1	60				59	1			58	2			58	2		
R863	1	B	1	68		Impact!	1	67	1	Impact! w/ Bar		66	2	Impact! w/ Bar		65	2	Impact! w/ Bar	
R864	1	B	1	68		Impact!	1	67	1	Impact! w/ Bar		66	1	Impact! w/ Bar		66	2	Impact! w/ Bar	
R865	1	B	1	67		Impact!	1	66	1	Impact! w/ Bar		66	1	Impact! w/ Bar		65	2	Impact! w/ Bar	
R866	1	B	1	67		Impact!	1	66	1	Impact! w/ Bar		65	1	Impact! w/ Bar		65	2	Impact! w/ Bar	
R867	1	B	1	67		Impact!	1	66	1	Impact! w/ Bar		65	2	Impact! w/ Bar		64	3	Impact! w/ Bar	
R868	1	B	1	67		Impact!	1	66	1	Impact! w/ Bar		66	2	Impact! w/ Bar		65	2	Impact! w/ Bar	
R869	1	B	1	66		Impact!	1	65	1	Impact! w/ Bar		65	2	Impact! w/ Bar		64	2	Impact! w/ Bar	
R870	1	B	1	66		Impact!	1	65	1	Impact! w/ Bar		65	1	Impact! w/ Bar		64	2	Impact! w/ Bar	
R871	1	B	1	71		Impact!	1	69	1	Impact! w/ Bar		68	2	Impact! w/ Bar		68	3	Impact! w/ Bar	
R872	1	B	1	70		Impact!	1	69	1	Impact! w/ Bar		68	2	Impact! w/ Bar		68	3	Impact! w/ Bar	
R873	1	B	1	70		Impact!	1	69	1	Impact! w/ Bar		68	2	Impact! w/ Bar		67	3	Impact! w/ Bar	
R874	1	B	1	69		Impact!	1	68	1	Impact! w/ Bar		67	2	Impact! w/ Bar		66	3	Impact! w/ Bar	
R875	1	B	1	70		Impact!	1	68	2	Impact! w/ Bar		67	3	Impact! w/ Bar		66	4	Impact! w/ Bar	
R876	1	B	1	70		Impact!	1	68	2	Impact! w/ Bar		67	3	Impact! w/ Bar		66	4	Impact! w/ Bar	
R877	1	B	1	69		Impact!	1	67	2	Impact! w/ Bar		66	3	Impact! w/ Bar		66	3	Impact! w/ Bar	
R878	1	B	1	69		Impact!	1	67	2	Impact! w/ Bar		66	3	Impact! w/ Bar		65	3	Impact! w/ Bar	

Project Information	16' Wall			18' Wall			20' Wall			22' Wall		
	Wall 12 Rev 11/13/2018			Wall 12 Rev 11/13/2018			Wall 12 Rev 11/13/2018			Wall 12 Rev 11/13/2018		
	Average Wtd I.L.	5.5	dB I.L. Avg	Average Wtd I.L.	5.3	dB I.L. Avg	Average Wtd I.L.	5.7	dB I.L. Avg	Average Wtd I.L.	6.0	dB I.L. Avg
	Maximum I.L.	8	dB I.L. Max	Maximum I.L.	9	dB I.L. Max	Maximum I.L.	9	dB I.L. Max	Maximum I.L.	10	dB I.L. Max
K19786CW	Benefited/Impacted ≥ AFG	4	# Prot Units	Benefited/Impacted ≥ AFG	23	# Prot Units	Benefited/Impacted ≥ AFG	31	# Prot Units	Benefited/Impacted ≥ AFG	35	# Prot Units
309180	Benefited/Non Impact ≥ AFG	9	# Units	Benefited/Non Impact ≥ AFG	23	# Units	Benefited/Non Impact ≥ AFG	35	# Units	Benefited/Non Impact ≥ AFG	41	# Units
I205CW_Build_Wall12	Total Benefited	13	# Ben Units	Total Benefited	46	# Ben Units	Total Benefited	66	# Ben Units	Total Benefited	76	# Ben Units
Wall 12	Impacted Units ≥ NRDG	0	# Units	Impacted Units ≥ NRDG	0	# Units	Impacted Units ≥ NRDG	6	# Units	Impacted Units ≥ NRDG	14	# Units
HMMH	Benefited Units ≥ NRDG	2	# Units	Benefited Units ≥ NRDG	3	# Units	Benefited Units ≥ NRDG	11	# Units	Benefited Units ≥ NRDG	23	# Units
Scott Noel	Percent of impacts ≥ AFG	9%	% Ben Units	Percent of impacts ≥ AFG	53%	% Ben Units	Percent of impacts ≥ AFG	72%	% Ben Units	Percent of impacts ≥ AFG	81%	% Ben Units
11/15/2018	Percent of benefits ≥ NRDG	15%	% NRDG Units	Percent of benefits ≥ NRDG	7%	% NRDG Units	Percent of benefits ≥ NRDG	17%	% NRDG Units	Percent of benefits ≥ NRDG	30%	% NRDG Units
	"Cost-Reasonable" ?	No		"Cost-Reasonable" ?	Yes		"Cost-Reasonable" ?	Yes		"Cost-Reasonable" ?	Yes	
	Surface Area	22087	Sq Feet	Surface Area	24848	Sq Feet	Surface Area	27607	Sq Feet	Surface Area	30369	Sq Feet
	Surface Area/Ben Rec	1699	Sq Feet	Surface Area/Ben Rec	540	Sq Feet	Surface Area/Ben Rec	418	Sq Feet	Surface Area/Ben Rec	400	Sq Feet
	Barrier Length	1,381	Feet	Barrier Length	1,381	Feet	Barrier Length	1,381	Feet	Barrier Length	1,381	Feet
	Min Height	16.0	Feet	Min Height	18.0	Feet	Min Height	20.0	Feet	Min Height	22.0	Feet
	Max Height	16.0	Feet	Max Height	18.0	Feet	Max Height	20.0	Feet	Max Height	22.0	Feet
	Avg Height	16.0	Feet	Avg Height	18.0	Feet	Avg Height	20.0	Feet	Avg Height	22.0	Feet
	Total Barrier Cost	$441,740		Total Barrier Cost	$621,200		Total Barrier Cost	$690,175		Total Barrier Cost	$759,225	
	Cost/Ben Rec	$33,980.00		Cost/Ben Rec	$13,504		Cost/Ben Rec	$10,457		Cost/Ben Rec	$9,990	

Receiver ID	Row	FHWA Act Cat	No. of Dwelling Units	With Barrier Sound Levels, Impact and Benefit				With Barrier Sound Levels, Impact and Benefit				With Barrier Sound Levels, Impact and Benefit				With Barrier Sound Levels, Impact and Benefit			
				Leq(dBA)	IL (db)	Impacted?	No. Benefited	Leq(dBA)	IL (db)	Impacted?	No. Benefited	Leq(dBA)	IL (db)	Impacted?	No. Benefited	Leq(dBA)	IL (db)	Impacted?	No. Benefited
R704	1	B	1	64	**5**	Benefited/Impact	1	64	**5**	Benefited/Impact	1	64	**5**	Benefited/Impact	1	63	**6**	Benefited/Impact	1
R705	1	B	1	65	4	Impact! w/ Bar		64	**5**	Benefited/Impact	1	64	**5**	Benefited/Impact	1	64	**5**	Benefited/Impact	1
R706	1	B	1	66	4	Impact! w/ Bar		65	**5**	Benefited/Impact	1	65	**5**	Benefited/Impact	1	65	**5**	Benefited/Impact	1
R707	1	B	1	66	4	Impact! w/ Bar		66	4	Impact! w/ Bar		66	4	Impact! w/ Bar		65	**5**	Benefited/Impact	1
R708	1	B	1	56	2			55	3			55	3			55	3		
R709	1	B	1	49	**7**	Benefited/Non-Imp	1	49	**7**	Benefited/Non-Imp	1	48	**8**	Benefited/Non-Imp	1	48	**8**	Benefited/Non-Imp	1
R710	1	B	1	64	4	Impact! w/ Bar		63	**5**	Benefited/Impact	1	62	**6**	Benefited/Impact	1	62	**6**	Benefited/Impact	1
R711	1	B	1	63	4	Impact! w/ Bar		62	**5**	Benefited/Impact	1	61	**6**	Benefited/Impact	1	60	**7**	Benefited/Impact	1
R712	1	B	1	49	0			48	1			48	1			47	2		
R713	1	B	1	49	4			48	**5**	Benefited/Non-Imp	1	48	**5**	Benefited/Non-Imp	1	47	**6**	Benefited/Non-Imp	1
R714	1	B	1	55	1			55	1			55	1			54	2		
R715	1	B	1	54	3			54	3			54	3			53	4		
R716	1	B	1	44	1			43	2			43	2			43	2		
R717	1	B	1	44	1			44	1			43	2			43	2		
R718	1	B	1	45	1			45	1			45	1			44	2		
R719	1	B	1	45	1			45	1			45	1			45	1		
R720	1	B	1	58	**5**	Benefited/Non-Imp	1	57	**6**	Benefited/Non-Imp	1	57	**6**	Benefited/Non-Imp	1	57	**6**	Benefited/Non-Imp	1
R721	1	B	1	57	4			57	4			56	**5**	Benefited/Non-Imp	1	56	**5**	Benefited/Non-Imp	1
R722	1	B	1	55	4			54	**5**	Benefited/Non-Imp	1	54	**5**	Benefited/Non-Imp	1	54	**5**	Benefited/Non-Imp	1
R723	1	B	1	54	**5**	Benefited/Non-Imp	1	54	**5**	Benefited/Non-Imp	1	54	**5**	Benefited/Non-Imp	1	54	**5**	Benefited/Non-Imp	1
R724	1	B	1	47	**5**	Benefited/Non-Imp	1	47	**5**	Benefited/Non-Imp	1	46	**6**	Benefited/Non-Imp	1	46	**6**	Benefited/Non-Imp	1
R725	1	B	1	48	4			47	**5**	Benefited/Non-Imp	1	46	**6**	Benefited/Non-Imp	1	46	**6**	Benefited/Non-Imp	1
R726	1	B	1	50	1			50	1			49	2			49	2		
R727	1	B	1	47	1			47	1			47	1			46	2		
R728	1	B	1	46	1			46	1			45	2			45	2		
R729	1	B	1	46	0			45	1			45	1			45	1		
R730	1	B	1	53	0			53	0			53	0			52	1		
R731	1	B	1	53	1			53	1			53	1			53	1		
R732	1	B	1	53	0			53	0			53	0			53	0		
R733	1	B	1	53	0			53	0			53	0			52	1		
R734	1	B	1	45	1			45	1			44	2			44	2		
R735	1	B	1	45	1			45	1			44	2			44	2		
R736	1	B	1	54	3			54	3			53	4			53	4		
R737	1	B	1	54	3			53	4			53	4			53	4		
R738	1	B	1	52	4			52	4			52	4			51	**5**	Benefited/Non-Imp	1
R739	1	B	1	52	4			51	**5**	Benefited/Non-Imp	1	51	**5**	Benefited/Non-Imp	1	51	**5**	Benefited/Non-Imp	1
R740	1	B	1	60	0			60	0			60	0			60	0		
R741	1	B	1	56	0			56	0			56	0			56	0		
R742	1	B	1	53	0			53	0			53	0			53	0		
R743	1	B	1	53	0			53	0			52	1			52	1		
R744	1	B	1	52	1			52	1			52	1			52	1		
R745	1	B	1	52	1			52	1			52	1			52	1		
R746	1	C	1	52	1			52	1			52	1			52	1		
R747	1	B	1	53	0			52	1			52	1			52	1		
R748	1	B	1	54	1			54	1			54	1			54	1		
R749	1	B	1	67	4	Impact! w/ Bar		66	**5**	Benefited/Impact	1	66	**5**	Benefited/Impact	1	65	**6**	Benefited/Impact	1
R750	1	B	1	67	4	Impact! w/ Bar		66	**5**	Benefited/Impact	1	66	**5**	Benefited/Impact	1	66	**5**	Benefited/Impact	1
R751	1	B	1	68	3	Impact! w/ Bar		67	4	Impact! w/ Bar		67	4	Impact! w/ Bar		66	**5**	Benefited/Impact	1
R752	1	B	1	68	3	Impact! w/ Bar		68	3	Impact! w/ Bar		67	4	Impact! w/ Bar		67	4	Impact! w/ Bar	
R753	1	B	1	58	2			57	3			57	3			57	3		
R754	1	B	1	48	**8**	Benefited/Non-Imp	1	47	**9**	Benefited/Non-Imp	1	47	**9**	Benefited/Non-Imp	1	46	**10**	Benefited/Non-Imp	1
R755	1	B	1	65	4	Impact! w/ Bar		65	4	Impact! w/ Bar		64	**5**	Benefited/Impact	1	63	**6**	Benefited/Impact	1
R756	1	B	1	64	4	Impact! w/ Bar		63	**5**	Benefited/Impact	1	62	**6**	Benefited/Impact	1	61	**7**	Benefited/Impact	1
R757	1	B	1	48	1			48	1			47	2			47	2		
R757	1	B	1	48	1			48	1			47	2			47	2		
R758	1	B	1	47	**6**	Benefited/Non-Imp	1	47	**6**	Benefited/Non-Imp	1	46	**7**	Benefited/Non-Imp	1	46	**7**	Benefited/Non-Imp	1
R759	1	B	1	56	1			55	2			55	2			55	2		
R760	1	B	1	56	2			54	4			54	4			54	4		
R761	1	B	1	46	0			45	1			45	1			44	2		

Project Information

K19786CW
309180
I205CW_Build_Wall12
Wall 12
HMMH
Scott Noel
11/15/2018

	16' Wall			18' Wall			20' Wall			22' Wall	
Wall 12 Rev 11/13/2018			Wall 12 Rev 11/13/2018			Wall 12 Rev 11/13/2018			Wall 12 Rev 11/13/2018		
Average Wtd I.L.	5.5	dB I.L. Avg	Average Wtd I.L.	5.3	dB I.L. Avg	Average Wtd I.L.	5.7	dB I.L. Avg	Average Wtd I.L.	6.0	dB I.L. Avg
Maximum I.L.	8	dB I.L. Max	Maximum I.L.	9	dB I.L. Max	Maximum I.L.	9	dB I.L. Max	Maximum I.L.	10	dB I.L. Max
Benefited/Impacted ≥ AFG	4	# Prot Units	Benefited/Impacted ≥ AFG	23	# Prot Units	Benefited/Impacted ≥ AFG	31	# Prot Units	Benefited/Impacted ≥ AFG	35	# Prot Units
Benefited/Non Impact ≥ AFG	9	# Units	Benefited/Non Impact ≥ AFG	23	# Units	Benefited/Non Impact ≥ AFG	35	# Units	Benefited/Non Impact ≥ AFG	41	# Units
Total Benefited	13	# Ben Units	Total Benefited	46	# Ben Units	Total Benefited	66	# Ben Units	Total Benefited	76	# Ben Units
Impacted Units ≥ NRDG	0	# Units	Impacted Units ≥ NRDG	0	# Units	Impacted Units ≥ NRDG	6	# Units	Impacted Units ≥ NRDG	14	# Units
Benefited Units ≥ NRDG	2	# Units	Benefited Units ≥ NRDG	3	# Units	Benefited Units ≥ NRDG	11	# Units	Benefited Units ≥ NRDG	23	# Units
Percent of impacts ≥ AFG	9%	% Ben Units	Percent of impacts ≥ AFG	53%	% Ben Units	Percent of impacts ≥ AFG	72%	% Ben Units	Percent of impacts ≥ AFG	81%	% Ben Units
Percent of benefits ≥ NRDG	15%	% NRDG Units	Percent of benefits ≥ NRDG	7%	% NRDG Units	Percent of benefits ≥ NRDG	17%	% NRDG Units	Percent of benefits ≥ NRDG	30%	% NRDG Units
"Cost-Reasonable" ?	No		"Cost-Reasonable" ?	Yes		"Cost-Reasonable" ?	Yes		"Cost-Reasonable" ?	Yes	
Surface Area	22087	Sq Feet	Surface Area	24848	Sq Feet	Surface Area	27607	Sq Feet	Surface Area	30369	Sq Feet
Surface Area/Ben Rec	1699	Sq Feet	Surface Area/Ben Rec	540	Sq Feet	Surface Area/Ben Rec	418	Sq Feet	Surface Area/Ben Rec	400	Sq Feet
Barrier Length	1,381	Feet	Barrier Length	1,381	Feet	Barrier Length	1,381	Feet	Barrier Length	1,381	Feet
Min Height	16.0	Feet	Min Height	18.0	Feet	Min Height	20.0	Feet	Min Height	22.0	Feet
Max Height	16.0	Feet	Max Height	18.0	Feet	Max Height	20.0	Feet	Max Height	22.0	Feet
Avg Height	16.0	Feet	Avg Height	18.0	Feet	Avg Height	20.0	Feet	Avg Height	22.0	Feet
Total Barrier Cost	$441,740		Total Barrier Cost	$621,200		Total Barrier Cost	$690,175		Total Barrier Cost	$759,225	
Cost/Ben Rec	$33,980.00		Cost/Ben Rec	$13,504		Cost/Ben Rec	$10,457		Cost/Ben Rec	$9,990	

Receiver ID	Row	FHWA Act Cat	No. of Dwelling Units	With Barrier Sound Levels, Impact and Benefit				With Barrier Sound Levels, Impact and Benefit				With Barrier Sound Levels, Impact and Benefit				With Barrier Sound Levels, Impact and Benefit			
				Leq(dBA)	IL (db)	Impacted?	No. Benefited	Leq(dBA)	IL (db)	Impacted?	No. Benefited	Leq(dBA)	IL (db)	Impacted?	No. Benefited	Leq(dBA)	IL (db)	Impacted?	No. Benefited
R762	1	B	1	46	0			45	1			45	1			44	2		
R763	1	B	1	47	0			46	1			46	1			46	1		
R764	1	B	1	47	0			46	1			46	1			46	1		
R765	1	B	1	60	4			59	**5**	Benefited/Non-Imp	1	59	**5**	Benefited/Non-Imp	1	58	**6**	Benefited/Non-Imp	1
R766	1	B	1	60	3			59	4			58	**5**	Benefited/Non-Imp	1	58	**5**	Benefited/Non-Imp	1
R767	1	B	1	56	4			56	4			55	**5**	Benefited/Non-Imp	1	55	**5**	Benefited/Non-Imp	1
R768	1	B	1	56	4			55	**5**	Benefited/Non-Imp	1	55	**5**	Benefited/Non-Imp	1	55	**5**	Benefited/Non-Imp	1
R769	1	B	1	48	**5**	Benefited/Non-Imp	1	48	**5**	Benefited/Non-Imp	1	47	**6**	Benefited/Non-Imp	1	47	**6**	Benefited/Non-Imp	1
R770	1	B	1	48	4			48	4			47	**5**	Benefited/Non-Imp	1	47	**5**	Benefited/Non-Imp	1
R771	1	B	1	51	1			51	1			51	1			51	1		
R772	1	B	1	48	1			48	1			48	1			47	2		
R773	1	B	1	48	0			47	1			47	1			46	2		
R774	1	B	1	47	1			47	1			46	2			46	2		
R775	1	B	1	57	0			57	0			57	0			57	0		
R776	1	B	1	56	0			56	0			56	0			56	0		
R777	1	B	1	55	0			55	0			55	0			54	1		
R778	1	B	1	55	0			55	0			55	0			55	0		
R779	1	B	1	47	0			46	1			46	1			45	2		
R780	1	B	1	46	1			46	1			46	1			45	2		
R781	1	B	1	56	3			55	4			55	4			55	4		
R782	1	B	1	56	3			55	4			55	4			55	4		
R783	1	B	1	55	3			54	4			53	**5**	Benefited/Non-Imp	1	53	**5**	Benefited/Non-Imp	1
R784	1	B	1	54	3			53	4			53	4			52	**5**	Benefited/Non-Imp	1
R785	1	B	1	62	0			62	0			62	0			62	0		
R786	1	B	1	61	0			61	0			61	0			61	0		
R787	1	B	1	56	0			56	0			56	0			56	0		
R788	1	B	1	56	0			55	1			55	1			55	1		
R789	1	B	1	55	1			55	1			55	1			55	1		
R790	1	B	1	55	1			55	1			55	1			55	1		
R791	1	B	1	55	1			55	1			55	1			55	1		
R792	1	B	1	56	0			55	1			55	1			55	1		
R793	1	B	1	68	4	Impact! w/ Bar		67	**5**	Benefited/Impact	1	67	**5**	Benefited/Impact	1	67	**5**	Benefited/Impact	1
R794	1	B	1	68	4	Impact! w/ Bar		67	**5**	Benefited/Impact	1	67	**5**	Benefited/Impact	1	67	**5**	Benefited/Impact	1
R795	1	B	1	69	3	Impact! w/ Bar		69	3	Impact! w/ Bar		68	4	Impact! w/ Bar		68	4	Impact! w/ Bar	
R796	1	B	1	69	3	Impact! w/ Bar		69	3	Impact! w/ Bar		68	4	Impact! w/ Bar		68	4	Impact! w/ Bar	
R797	1	B	1	59	2			59	2			58	3			58	3		
R798	1	B	1	51	**6**	Benefited/Non-Imp	1	50	**7**	Benefited/Non-Imp	1	49	**8**	Benefited/Non-Imp	1	48	**9**	Benefited/Non-Imp	1
R799	1	B	1	67	3	Impact! w/ Bar		66	4	Impact! w/ Bar		65	**5**	Benefited/Impact	1	65	**5**	Benefited/Impact	1
R800	1	B	1	65	4	Impact! w/ Bar		65	4	Impact! w/ Bar		64	**5**	Benefited/Impact	1	63	**6**	Benefited/Impact	1
R801	1	B	1	52	1			52	1			51	2			51	2		
R802	1	B	1	51	4			50	**5**	Benefited/Non-Imp	1	49	**6**	Benefited/Non-Imp	1	49	**6**	Benefited/Non-Imp	1
R803	1	B	1	57	1			57	1			56	2			56	2		
R804	1	B	1	57	2			56	3			55	4			55	4		
R805	1	B	1	49	0			49	0			48	1			48	1		
R806	1	B	1	49	1			49	1			49	1			48	2		
R807	1	B	1	51	0			51	0			51	0			50	1		
R808	1	B	1	51	0			51	0			51	0			50	1		
R809	1	B	1	62	3	Impact! w/ Bar		61	4	Impact! w/ Bar		60	**5**	Benefited/Impact	1	60	**5**	Benefited/Impact	1
R810	1	B	1	61	3			61	3			60	4			60	4		
R811	1	B	1	57	4			57	4			57	4			56	**5**	Benefited/Non-Imp	1
R812	1	B	1	57	4			57	4			56	**5**	Benefited/Non-Imp	1	56	**5**	Benefited/Non-Imp	1
R813	1	B	1	52	3			51	4			51	4			50	**5**	Benefited/Non-Imp	1
R814	1	B	1	53	1			52	2			51	3			50	4		
R815	1	B	1	54	0			54	0			53	1			53	1		
R816	1	B	1	52	0			52	0			51	1			51	1		
R817	1	B	1	52	0			51	1			51	1			51	1		
R818	1	B	1	51	0			51	0			51	0			50	1		
R819	1	B	1	59	0			58	1			58	1			58	1		
R820	1	B	1	58	0			58	0			58	0			58	0		

Project Information	16' Wall			18' Wall			20' Wall			22' Wall		
	Wall 12 Rev 11/13/2018			Wall 12 Rev 11/13/2018			Wall 12 Rev 11/13/2018			Wall 12 Rev 11/13/2018		
	Average Wtd I.L.	5.5	dB I.L. Avg	Average Wtd I.L.	5.3	dB I.L. Avg	Average Wtd I.L.	5.7	dB I.L. Avg	Average Wtd I.L.	6.0	dB I.L. Avg
	Maximum I.L.	8	dB I.L. Max	Maximum I.L.	9	dB I.L. Max	Maximum I.L.	9	dB I.L. Max	Maximum I.L.	10	dB I.L. Max
K19786CW	Benefited/Impacted ≥ AFG	4	# Prot Units	Benefited/Impacted ≥ AFG	23	# Prot Units	Benefited/Impacted ≥ AFG	31	# Prot Units	Benefited/Impacted ≥ AFG	35	# Prot Units
309180	Benefited/Non Impact ≥ AFG	9	# Units	Benefited/Non Impact ≥ AFG	23	# Units	Benefited/Non Impact ≥ AFG	35	# Units	Benefited/Non Impact ≥ AFG	41	# Units
I205CW_Build_Wall12	Total Benefited	13	# Ben Units	Total Benefited	46	# Ben Units	Total Benefited	66	# Ben Units	Total Benefited	76	# Ben Units
Wall 12	Impacted Units ≥ NRDG	0	# Units	Impacted Units ≥ NRDG	0	# Units	Impacted Units ≥ NRDG	6	# Units	Impacted Units ≥ NRDG	14	# Units
HMMH	Benefited Units ≥ NRDG	2	# Units	Benefited Units ≥ NRDG	3	# Units	Benefited Units ≥ NRDG	11	# Units	Benefited Units ≥ NRDG	23	# Units
Scott Noel	Percent of impacts ≥ AFG	9%	% Ben Units	Percent of impacts ≥ AFG	53%	% Ben Units	Percent of impacts ≥ AFG	72%	% Ben Units	Percent of impacts ≥ AFG	81%	% Ben Units
11/15/2018	Percent of benefits ≥ NRDG	15%	% NRDG Units	Percent of benefits ≥ NRDG	7%	% NRDG Units	Percent of benefits ≥ NRDG	17%	% NRDG Units	Percent of benefits ≥ NRDG	30%	% NRDG Units
	"Cost-Reasonable" ?	No		"Cost-Reasonable" ?	Yes		"Cost-Reasonable" ?	Yes		"Cost-Reasonable" ?	Yes	
	Surface Area	22087	Sq Feet	Surface Area	24848	Sq Feet	Surface Area	27607	Sq Feet	Surface Area	30369	Sq Feet
U.S. Department of Transportation Federal Highway Administration	Surface Area/Ben Rec	1699	Sq Feet	Surface Area/Ben Rec	540	Sq Feet	Surface Area/Ben Rec	418	Sq Feet	Surface Area/Ben Rec	400	Sq Feet
	Barrier Length	1,381	Feet	Barrier Length	1,381	Feet	Barrier Length	1,381	Feet	Barrier Length	1,381	Feet
	Min Height	16.0	Feet	Min Height	18.0	Feet	Min Height	20.0	Feet	Min Height	22.0	Feet
	Max Height	16.0	Feet	Max Height	18.0	Feet	Max Height	20.0	Feet	Max Height	22.0	Feet
	Avg Height	16.0	Feet	Avg Height	18.0	Feet	Avg Height	20.0	Feet	Avg Height	22.0	Feet
	Total Barrier Cost	$441,740		Total Barrier Cost	$621,200		Total Barrier Cost	$690,175		Total Barrier Cost	$759,225	
	Cost/Ben Rec	$33,980.00		Cost/Ben Rec	$13,504		Cost/Ben Rec	$10,457		Cost/Ben Rec	$9,990	

Receiver ID	Row	FHWA Act Cat	No. of Dwelling Units	With Barrier Sound Levels, Impact and Benefit				With Barrier Sound Levels, Impact and Benefit				With Barrier Sound Levels, Impact and Benefit				With Barrier Sound Levels, Impact and Benefit			
				Leq(dBA)	IL (db)	Impacted?	No. Benefited	Leq(dBA)	IL (db)	Impacted?	No. Benefited	Leq(dBA)	IL (db)	Impacted?	No. Benefited	Leq(dBA)	IL (db)	Impacted?	No. Benefited
R821	1	B	1	57	1			57	1			57	1			57	1		
R822	1	B	1	57	1			57	1			57	1			57	1		
R823	1	B	1	50	0			50	0			50	0			49	1		
R824	1	B	1	50	0			50	0			49	1			49	1		
R825	1	B	1	59	2			59	2			58	3			58	3		
R826	1	B	1	60	1			60	1			59	2			59	2		
R827	1	B	1	57	2			56	3			56	3			55	4		
R828	1	B	1	55	3			55	3			54	4			54	4		
R829	1	B	1	63	0			63	0			63	0			63	0		
R830	1	B	1	62	0			62	0			62	0			62	0		
R831	1	B	1	61	0			60	1			60	1			60	1		
R832	1	B	1	60	0			60	0			60	0			60	0		
R833	1	B	1	59	1			59	1			59	1			59	1		
R834	1	B	1	59	1			59	1			59	1			59	1		
R835	1	B	1	60	0			60	0			60	0			60	0		
R836	1	B	1	60	0			60	0			60	0			60	0		
R837	1	B	1	61	2			61	3			61	3			60	3		
R838	1	B	1	65	4	Impact! w/ Bar		64	5	Benefited/Impact	1	64	6	Benefited/Impact	1	63	6	Benefited/Impact	1
R839	1	B	1	61	5	Benefited/Impact	1	60	6	Benefited/Impact	1	59	7	Benefited/Impact	1	59	7	Benefited/Impact	1
R840	1	B	1	60	5	Benefited/Impact	1	59	6	Benefited/Impact	1	58	7	Benefited/Impact	1	58	7	Benefited/Impact	1
R841	1	B	1	59	5	Benefited/Non-Imp	1	58	6	Benefited/Non-Imp	1	57	7	Benefited/Non-Imp	1	57	7	Benefited/Non-Imp	1
R842	1	B	1	59	4			57	6	Benefited/Non-Imp	1	57	6	Benefited/Non-Imp	1	56	7	Benefited/Non-Imp	1
R843	1	B	1	63	4	Impact! w/ Bar		63	5	Benefited/Impact	1	62	6	Benefited/Impact	1	61	7	Benefited/Impact	1
R844	1	B	1	63	4	Impact! w/ Bar		62	5	Benefited/Impact	1	60	6	Benefited/Impact	1	60	7	Benefited/Impact	1
R845	1	B	1	61	4	Impact! w/ Bar		60	5	Benefited/Impact	1	59	6	Benefited/Impact	1	58	6	Benefited/Impact	1
R846	1	B	1	61	4			60	4			59	5	Benefited/Non-Imp	1	58	6	Benefited/Non-Imp	1
R847	1	B	1	62	4	Impact! w/ Bar		61	5	Benefited/Impact	1	60	7	Benefited/Impact	1	59	7	Benefited/Impact	1
R848	1	B	1	61	5	Benefited/Impact	1	60	6	Benefited/Impact	1	59	7	Benefited/Impact	1	59	7	Benefited/Impact	1
R849	1	B	1	60	4			59	5	Benefited/Non-Imp	1	58	6	Benefited/Non-Imp	1	57	7	Benefited/Non-Imp	1
R850	1	B	1	60	4			59	5	Benefited/Non-Imp	1	58	6	Benefited/Non-Imp	1	57	7	Benefited/Non-Imp	1
R851	1	B	1	58	4			57	5	Benefited/Non-Imp	1	56	6	Benefited/Non-Imp	1	56	6	Benefited/Non-Imp	1
R852	1	B	1	58	4			56	5	Benefited/Non-Imp	1	55	6	Benefited/Non-Imp	1	55	7	Benefited/Non-Imp	1
R853	1	B	1	56	3			55	4			54	5	Benefited/Non-Imp	1	54	6	Benefited/Non-Imp	1
R854	1	B	1	56	3			55	4			54	5	Benefited/Non-Imp	1	54	5	Benefited/Non-Imp	1
R855	1	B	1	60	3			59	4			59	5	Benefited/Non-Imp	1	58	5	Benefited/Non-Imp	1
R856	1	B	1	59	3			59	4			58	5	Benefited/Non-Imp	1	57	6	Benefited/Non-Imp	1
R857	1	B	1	58	3			57	4			57	4			56	5	Benefited/Non-Imp	1
R858	1	B	1	58	2			58	3			57	4			56	4		
R859	1	B	1	59	4			58	5	Benefited/Non-Imp	1	57	5	Benefited/Non-Imp	1	57	6	Benefited/Non-Imp	1
R860	1	B	1	59	4			58	5	Benefited/Non-Imp	1	56	6	Benefited/Non-Imp	1	56	6	Benefited/Non-Imp	1
R861	1	B	1	57	3			56	4			56	5	Benefited/Non-Imp	1	55	5	Benefited/Non-Imp	1
R862	1	B	1	57	3			56	3			56	4			55	5	Benefited/Non-Imp	1
R863	1	B	1	65	3	Impact! w/ Bar		65	3	Impact! w/ Bar		64	4	Impact! w/ Bar		63	5	Benefited/Impact	1
R864	1	B	1	65	3	Impact! w/ Bar		65	3	Impact! w/ Bar		64	3	Impact! w/ Bar		64	4	Impact! w/ Bar	
R865	1	B	1	65	2	Impact! w/ Bar		64	3	Impact! w/ Bar		64	3	Impact! w/ Bar		63	4	Impact! w/ Bar	
R866	1	B	1	64	2	Impact! w/ Bar		64	3	Impact! w/ Bar		64	3	Impact! w/ Bar		63	4	Impact! w/ Bar	
R867	1	B	1	64	3	Impact! w/ Bar		63	4	Impact! w/ Bar		62	5	Benefited/Impact	1	62	6	Benefited/Impact	1
R868	1	B	1	64	3	Impact! w/ Bar		64	3	Impact! w/ Bar		63	4	Impact! w/ Bar		62	5	Benefited/Impact	1
R869	1	B	1	64	3	Impact! w/ Bar		63	3	Impact! w/ Bar		62	4	Impact! w/ Bar		62	4	Impact! w/ Bar	
R870	1	B	1	64	2	Impact! w/ Bar		63	3	Impact! w/ Bar		63	4	Impact! w/ Bar		62	4	Impact! w/ Bar	
R871	1	B	1	67	4	Impact! w/ Bar		66	5	Benefited/Impact	1	65	6	Benefited/Impact	1	63	8	Benefited/Impact	1
R872	1	B	1	67	4	Impact! w/ Bar		66	4	Impact! w/ Bar		65	5	Benefited/Impact	1	63	7	Benefited/Impact	1
R873	1	B	1	66	3	Impact! w/ Bar		66	4	Impact! w/ Bar		65	5	Benefited/Impact	1	63	6	Benefited/Impact	1
R874	1	B	1	66	4	Impact! w/ Bar		65	4	Impact! w/ Bar		64	5	Benefited/Impact	1	63	6	Benefited/Impact	1
R875	1	B	1	66	4	Impact! w/ Bar		64	6	Benefited/Impact	1	63	7	Benefited/Impact	1	62	8	Benefited/Impact	1
R876	1	B	1	66	4	Impact! w/ Bar		64	6	Benefited/Impact	1	63	7	Benefited/Impact	1	62	8	Benefited/Impact	1
R877	1	B	1	65	4	Impact! w/ Bar		64	5	Benefited/Impact	1	63	6	Benefited/Impact	1	62	7	Benefited/Impact	1
R878	1	B	1	65	4	Impact! w/ Bar		64	5	Benefited/Impact	1	62	6	Benefited/Impact	1	62	7	Benefited/Impact	1

Project Information

K19786CW
309180
I205CW_Build_Wall12
Wall 12
HMMH
Scott Noel
11/15/2018

24' Wall
Wall 12 Rev 11/13/2018

Average Wtd I.L.	6.3	dB I.L. Avg
Maximum I.L.	10	dB I.L. Max
Benefited/Impacted ≥ AFG	38	# Prot Units
Benefited/Non Impact ≥ AFG	43	# Units
Total Benefited	81	# Ben Units
Impacted Units ≥ NRDG	19	# Units
Benefited Units ≥ NRDG	35	# Units
Percent of impacts ≥ AFG	88%	% Ben Units
Percent of benefits ≥ NRDG	43%	% NRDG Units
"Cost-Reasonable" ?	Yes	
Surface Area	33133	Sq Feet
Surface Area/Ben Rec	409	Sq Feet
Barrier Length	1,381	Feet
Min Height	24.0	Feet
Max Height	24.0	Feet
Avg Height	24.0	Feet
Total Barrier Cost	$828,325	
Cost/Ben Rec	$10,226	

Receiver ID	Row	FHWA Act Cat	No. of Dwelling Units	With Barrier Sound Levels, Impact and Benefit			
				Leq(dBA)	IL (db)	Impacted?	No. Benefited
R704	1	B	1	63	**6**	Benefited/Impact	1
R705	1	B	1	63	**6**	Benefited/Impact	1
R706	1	B	1	65	**5**	Benefited/Impact	1
R707	1	B	1	65	**5**	Benefited/Impact	1
R708	1	B	1	55	3		
R709	1	B	1	47	**9**	Benefited/Non-Imp	1
R710	1	B	1	61	**7**	Benefited/Impact	1
R711	1	B	1	60	**7**	Benefited/Impact	1
R712	1	B	1	47	2		
R713	1	B	1	47	**6**	Benefited/Non-Imp	1
R714	1	B	1	54	2		
R715	1	B	1	53	4		
R716	1	B	1	42	3		
R717	1	B	1	42	3		
R718	1	B	1	44	2		
R719	1	B	1	44	2		
R720	1	B	1	56	**7**	Benefited/Non-Imp	1
R721	1	B	1	56	**5**	Benefited/Non-Imp	1
R722	1	B	1	54	**5**	Benefited/Non-Imp	1
R723	1	B	1	54	**5**	Benefited/Non-Imp	1
R724	1	B	1	45	**7**	Benefited/Non-Imp	1
R725	1	B	1	45	**7**	Benefited/Non-Imp	1
R726	1	B	1	49	2		
R727	1	B	1	45	3		
R728	1	B	1	45	2		
R729	1	B	1	45	1		
R730	1	B	1	52	1		
R731	1	B	1	53	1		
R732	1	B	1	53	0		
R733	1	B	1	52	1		
R734	1	B	1	44	2		
R735	1	B	1	44	2		
R736	1	B	1	53	4		
R737	1	B	1	53	4		
R738	1	B	1	51	**5**	Benefited/Non-Imp	1
R739	1	B	1	51	**5**	Benefited/Non-Imp	1
R740	1	B	1	60	0		
R741	1	B	1	56	0		
R742	1	B	1	53	0		
R743	1	B	1	52	1		
R744	1	B	1	52	1		
R745	1	B	1	52	1		
R746	1	C	1	52	1		
R747	1	B	1	52	1		
R748	1	B	1	54	1		
R749	1	B	1	65	**6**	Benefited/Impact	1
R750	1	B	1	65	**6**	Benefited/Impact	1
R751	1	B	1	66	**5**	Benefited/Impact	1
R752	1	B	1	67	4	Impact! w/ Bar	
R753	1	B	1	56	4		
R754	1	B	1	46	**10**	Benefited/Non-Imp	1
R755	1	B	1	63	**6**	Benefited/Impact	1
R756	1	B	1	61	**7**	Benefited/Impact	1
R757	1	B	1	47	2		
R757	1	B	1	47	2		
R758	1	B	1	45	**8**	Benefited/Non-Imp	1
R759	1	B	1	55	2		
R760	1	B	1	54	4		
R761	1	B	1	44	2		

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Wall 12
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24' Wall

Wall 12 Rev 11/13/2018

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Maximum I.L.	10	dB I.L. Max
Benefited/Impacted ≥ AFG	38	# Prot Units
Benefited/Non Impact ≥ AFG	43	# Units
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Impacted Units ≥ NRDG	19	# Units
Benefited Units ≥ NRDG	35	# Units
Percent of impacts ≥ AFG	88%	% Ben Units
Percent of benefits ≥ NRDG	43%	% NRDG Units
"Cost-Reasonable" ?	Yes	
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Surface Area/Ben Rec	409	Sq Feet
Barrier Length	1,381	Feet
Min Height	24.0	Feet
Max Height	24.0	Feet
Avg Height	24.0	Feet
Total Barrier Cost	$828,325	
Cost/Ben Rec	$10,226	

Receiver ID	Row	FHWA Act Cat	No. of Dwelling Units	With Barrier Sound Levels, Impact and Benefit			
				Leq(dBA)	IL (db)	Impacted?	No. Benefited
R762	1	B	1	44	2		
R763	1	B	1	45	2		
R764	1	B	1	45	2		
R765	1	B	1	58	**6**	Benefited/Non-Imp	1
R766	1	B	1	58	**5**	Benefited/Non-Imp	1
R767	1	B	1	55	**5**	Benefited/Non-Imp	1
R768	1	B	1	55	**5**	Benefited/Non-Imp	1
R769	1	B	1	46	**7**	Benefited/Non-Imp	1
R770	1	B	1	47	**5**	Benefited/Non-Imp	1
R771	1	B	1	50	2		
R772	1	B	1	47	2		
R773	1	B	1	46	2		
R774	1	B	1	45	3		
R775	1	B	1	56	1		
R776	1	B	1	56	0		
R777	1	B	1	54	1		
R778	1	B	1	54	1		
R779	1	B	1	45	2		
R780	1	B	1	45	2		
R781	1	B	1	55	4		
R782	1	B	1	54	**5**	Benefited/Non-Imp	1
R783	1	B	1	53	**5**	Benefited/Non-Imp	1
R784	1	B	1	52	**5**	Benefited/Non-Imp	1
R785	1	B	1	62	0		
R786	1	B	1	61	0		
R787	1	B	1	56	0		
R788	1	B	1	55	1		
R789	1	B	1	55	1		
R790	1	B	1	55	1		
R791	1	B	1	55	1		
R792	1	B	1	55	1		
R793	1	B	1	66	**6**	Benefited/Impact	1
R794	1	B	1	66	**6**	Benefited/Impact	1
R795	1	B	1	67	**5**	Benefited/Impact	1
R796	1	B	1	68	4	Impact! w/ Bar	
R797	1	B	1	58	3		
R798	1	B	1	47	**10**	Benefited/Non-Imp	1
R799	1	B	1	64	**6**	Benefited/Impact	1
R800	1	B	1	62	**7**	Benefited/Impact	1
R801	1	B	1	50	3		
R802	1	B	1	48	**7**	Benefited/Non-Imp	1
R803	1	B	1	56	2		
R804	1	B	1	55	4		
R805	1	B	1	47	2		
R806	1	B	1	48	2		
R807	1	B	1	50	1		
R808	1	B	1	50	1		
R809	1	B	1	60	**5**	Benefited/Impact	1
R810	1	B	1	60	4		
R811	1	B	1	56	**5**	Benefited/Non-Imp	1
R812	1	B	1	56	**5**	Benefited/Non-Imp	1
R813	1	B	1	50	**5**	Benefited/Non-Imp	1
R814	1	B	1	50	4		
R815	1	B	1	53	1		
R816	1	B	1	50	2		
R817	1	B	1	50	2		
R818	1	B	1	50	1		
R819	1	B	1	58	1		
R820	1	B	1	58	0		

Project Information

24' Wall

Wall 12 Rev 11/13/2018

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Receiver ID	Row	FHWA Act Cat	No. of Dwelling Units	With Barrier Sound Levels, Impact and Benefit			
				Leq(dBA)	IL (db)	Impacted?	No. Benefited
R821	1	B	1	57	1		
R822	1	B	1	57	1		
R823	1	B	1	49	1		
R824	1	B	1	49	1		
R825	1	B	1	58	3		
R826	1	B	1	59	2		
R827	1	B	1	55	4		
R828	1	B	1	54	4		
R829	1	B	1	63	0		
R830	1	B	1	62	0		
R831	1	B	1	60	1		
R832	1	B	1	60	0		
R833	1	B	1	59	1		
R834	1	B	1	59	1		
R835	1	B	1	60	0		
R836	1	B	1	60	0		
R837	1	B	1	60	3		
R838	1	B	1	63	**6**	Benefited/Impact	1
R839	1	B	1	58	**7**	Benefited/Impact	1
R840	1	B	1	58	**7**	Benefited/Impact	1
R841	1	B	1	56	**7**	Benefited/Non-Imp	1
R842	1	B	1	56	**7**	Benefited/Non-Imp	1
R843	1	B	1	60	**7**	Benefited/Impact	1
R844	1	B	1	59	**7**	Benefited/Impact	1
R845	1	B	1	58	**7**	Benefited/Impact	1
R846	1	B	1	58	**7**	Benefited/Non-Imp	1
R847	1	B	1	59	**7**	Benefited/Impact	1
R848	1	B	1	58	**8**	Benefited/Impact	1
R849	1	B	1	57	**7**	Benefited/Non-Imp	1
R850	1	B	1	57	**7**	Benefited/Non-Imp	1
R851	1	B	1	55	**6**	Benefited/Non-Imp	1
R852	1	B	1	55	**7**	Benefited/Non-Imp	1
R853	1	B	1	53	**6**	Benefited/Non-Imp	1
R854	1	B	1	53	**5**	Benefited/Non-Imp	1
R855	1	B	1	57	**6**	Benefited/Non-Imp	1
R856	1	B	1	57	**6**	Benefited/Non-Imp	1
R857	1	B	1	56	**5**	Benefited/Non-Imp	1
R858	1	B	1	56	**5**	Benefited/Non-Imp	1
R859	1	B	1	56	**6**	Benefited/Non-Imp	1
R860	1	B	1	55	**7**	Benefited/Non-Imp	1
R861	1	B	1	54	**6**	Benefited/Non-Imp	1
R862	1	B	1	55	**5**	Benefited/Non-Imp	1
R863	1	B	1	63	**5**	Benefited/Impact	1
R864	1	B	1	63	**5**	Benefited/Impact	1
R865	1	B	1	63	4	Impact! w/ Bar	
R866	1	B	1	63	4	Impact! w/ Bar	
R867	1	B	1	62	**6**	Benefited/Impact	1
R868	1	B	1	62	**5**	Benefited/Impact	1
R869	1	B	1	62	**5**	Benefited/Impact	1
R870	1	B	1	62	4	Impact! w/ Bar	
R871	1	B	1	63	**8**	Benefited/Impact	1
R872	1	B	1	63	**8**	Benefited/Impact	1
R873	1	B	1	63	**7**	Benefited/Impact	1
R874	1	B	1	63	**7**	Benefited/Impact	1
R875	1	B	1	62	**8**	Benefited/Impact	1
R876	1	B	1	62	**8**	Benefited/Impact	1
R877	1	B	1	62	**7**	Benefited/Impact	1
R878	1	B	1	62	**7**	Benefited/Impact	1