APPENDIX G-2

Noise Impact Analysis Addendum

Noise Impact Analysis Addendum

I–69 Ohio River Crossing Project
Evansville, IN and Henderson, KY

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CHAPTER 1 – PROJECT INTRODUCTION

1.1 NOISE IMPACT ANALYSIS ADDENDUM INTRODUCTION

A Noise Impact Analysis was completed in preparation for the Draft Environmental Impact Statement (DEIS) on the I–69 Ohio River Crossing (ORX) project in the Evansville, IN and Henderson, KY area. The purpose of the analysis was to determine whether the project had the potential for noise impacts on adjacent properties. This analysis evaluated existing noise levels, predicting future noise levels, and when impacts occur, evaluating whether abatement measures are likely. Three build alternatives were studied in the Noise Impact Analysis, the West Alternative 1, West Alternative 2, and the Central Alternative 1. In addition, for West Alternative 1, two tolling scenarios were evaluated that included tolls on both the US 41 and I-69 bridges and a toll on only the I-69 bridge. Similarly, two tolling scenarios were evaluated for Central Alternative 1 that were referred to as A1 (tolls on both the US 41 and I-69 bridges) and 1B (toll on only the I-69 bridge).

The DEIS, published on December 14, 2018, identified Central Alternative 1A and Central Alternative 1B as the Preferred Alternatives. However, based on DEIS comments and subsequent engineering analyses, several design modifications were made to Central Alternative 1B in order to further reduce costs and improve traffic performance and access. The modified alternative was named Central Alternative 1B Modified and was subsequently identified as the Single Preferred Alternative. Due to these modifications, a Noise Impact Analysis Addendum (Addendum) is required for Central Alternative 1B Modified.

This Addendum was conducted in accordance with Federal Highway Administration's (FHWA) 23 CFR Part 772 – *Procedures for Abatement of Highway Traffic Noise and Construction Noise*, Indiana Department of Transportation's (INDOT) *Traffic Noise Analysis Procedure* effective July 1, 2017 (INDOT, 2017), and Kentucky Transportation Cabinet's (KYTC) *Noise Analysis and Abatement Policy* effective July 1, 2020 (KYTC, 2020).

1.2 DESCRIPTION OF CENTRAL ALTERNATIVE 1B MODIFIED (SELECTED)

Following the DEIS, a Value Engineering (VE) Study was conducted on Central Alternatives 1A and 1B (Preferred) via a series of workshops from March 12-14, 2019. The VE Study team consisted of consultant, INDOT, and KYTC engineers that were not part of the I-69 ORX team. The purpose of the VE Study was to identify design modifications that may further reduce costs, improve traffic performance, and minimize impacts.

In 2020, the Kentucky legislature adopted *Kentucky's KY 2020 – 2026 Highway Plan* (KYTC, 2020) that included funding for the first section of the I-69 ORX project. Section 1, which will be constructed first, includes all project work from KY 425 to the US 60 interchange, including the upgrades to existing US 41 and the first 2.9 miles of new terrain highway. Section 2 of the project will include the remainder of the project from the US 60 interchange, across the Ohio River, and connecting to I-69 in Indiana. Upon completion of Section 1, drivers will be able to utilize future I-69 as far north as US 60, but cross-river traffic will still utilize US 41 to cross the river.

Based on the states' current financial plan for the project, construction of Section 1 will begin in 2022 and construction of Section 2 will begin in 2027. The states will continue to review the financial plan and explore funding opportunities with the goal of accelerating the construction of Section 2.

In preparation for construction of Section 1, KYTC led a preliminary design study of that section of the corridor as documented in the *Planning Study Report (Final) for the I-69 Ohio River Crossing Project, Henderson: Section 1* (INDOT and KYTC, 2021). Based on the recommendations from the VE Study and the Section 1 Planning Study, and with consideration to the public and agency comments received on the DEIS, the following design modifications were made to Central Alternative 1B that resulted in the development of Central Alternative 1B Modified. Note: The design modifications to Central Alternative 1B would also have been made to Central Alternative 1A if that alternative would have been selected.

- **Construction Phasing –** As previously discussed, Central Alternative 1B Modified will be constructed in two phases that are referred to as Sections 1 and 2. Section 1 will be constructed first and includes all project work from KY 425 to the US 60 interchange, including the upgrades to existing US 41 and the first 2.9 miles of new terrain highway. Section 2 of the project will include the remainder of the project from the US 60 interchange, across the Ohio River, and connecting to I-69 in Indiana. Upon completion of Section 1, drivers will be able to utilize future I-69 as far north as US 60, but cross-river traffic will still utilize US 41 to cross the river.
- **Interchange with Existing I-69 in Indiana** – The modified design for this interchange eliminates the loop ramp that was previously included to provide access for eastbound traffic from Veterans Memorial Parkway heading north on I-69. The latest modified design provides a more direct route that may include an at-grade intersection of two ramps: (1) eastbound Veterans Memorial Parkway to northbound I-69 and (2) northbound I-69 to westbound Veterans Memorial Parkway. The evaluation of this interchange, and other viable alternatives, is ongoing, and the final layout will require approval of an Interchange Access Document by FHWA.
- **I-69 Bridge –** In order to reduce bridge costs, the width of the I-69 bridge shoulders were reduced from 12 feet to 10 feet on the outside and from 8 feet to 4 feet on the inside. Future traffic projections determined that the option to expand the bridge from four to six lanes via restriping the lanes was not needed.
- **Bowling Lane Extension** – In order to eliminate the long-term maintenance costs that would be associated with the local access bridge over I-69 located north of the US 60 interchange, the bridge was replaced with an extension of Bowling Lane, along with a driveway, east of and parallel to I-69 in order to maintain access to the gas transmission pipeline and surrounding private property.
- **US 60 Interchange** - The design of the east side of this interchange was modified to improve the connection between Tilman-Bethel Road and the relocated US 60 and to remove the existing section of US 60 and the associated bridge over the CSX railroad in

order to eliminate the long-term maintenance cost of the bridge. In addition, the I-69 northbound exit and entrance ramps were shifted to the west to allow sufficient space between the ramp intersection and the Tilman-Bethel Road intersection. The modification also included the relocation of a powerline between the interchange and the historic Ellis-Neville/Lee Baskett House. On the west side, the relocated portion of US 60 was shifted north approximately 130 feet to avoid impacts to a cemetery.

- **Stormwater Detention Basins** - A large stormwater detention basin was added adjacent to and south of I-69 between the US 41 and US 60 interchanges. This basin was added for three reasons: (1) it addresses the project's stormwater management requirements, (2) it provides needed fill material for construction of Section 1 of the project, and (3) it reduces downstream flooding in Henderson.
- **US 41 Interchange** in Kentucky - The modified design of the US 41 interchange will be phased to ensure efficient cross-river travel. The Section 1 construction phase will include a trumpet-style interchange, which maintains two-lanes of free-flow traffic on the connection to existing US 41 for both northbound and southbound cross-river traffic. Once Section 2 and the interstate connection to I-69 in Indiana is complete, the interchange will be modified to a traditional diamond interchange with one loop ramp for the US 41 southbound to I-69 northbound movement. This interchange will provide a direct connection to Kimsey Lane to the east.
- **KY 351 Interchange** - Further analysis of this area indicated that the proximity of the KY 351 interchange to the partial interchange with KY 2084 did not meet interstate design standards. The revised design for this interchange removes the ramps to/from KY 2084 and reconstructs the KY 351 interchange. The northbound bifurcated section of KY 2084 will be relocated along the existing southbound lane. The revised design for the interchange includes roundabouts at each of the ramp intersections and another roundabout at the KY 351/KY 2084 intersection. The revised design also includes shifting the proposed I-69 mainline (i.e., existing US 41) to the west approximately 30 feet. The roundabouts will support the City of Henderson's vision for this gateway corridor as well as provide improved safety and access in this area.
- **Northbound Auxiliary Lane between the Henderson Bypass and Audubon Parkway Interchanges** - In order to improve traffic weaving and safety, a northbound auxiliary lane was added between the Henderson Bypass and Audubon Parkway interchanges.

CHAPTER 2 – POLICY AND GUIDELINES

The proposed project remains a Type 1 project, and therefore this study has been prepared in accordance with FHWA noise standards, *Procedures for Abatement of Highway Traffic Noise and Construction Noise, 23 CFR 772 [1]*, as well as INDOT's *Traffic Noise Analysis Procedure* (INDOT, 2017) and KYTC's *Noise Analysis and Abatement Policy* (KYTC, 2020).

2.1 TRAFFIC NOISE TERMINOLOGY

Traffic noise levels are expressed in terms of the hourly, A–weighted equivalent sound level in decibels (dB[A]). A sound level represents the magnitude of the rapid air pressure fluctuations caused by sources such as traffic that are heard as sound. A decibel (dB) is a unit signifying the amount of pressure fluctuation equivalent to the faintest sound the young human ear can hear.

The A–weighting refers to the amplification or attenuation of the different frequencies of the sound (the pitch) to correspond to the way the human ear "hears" these frequencies. A 9 – 10 dB increase in sound level is typically judged by the listener as twice as loud as the original sound, while a 9 – 10 dB reduction is judged as half as loud.

Because most environmental sound fluctuates from moment to moment, it is standard practice to condense data into a single level called the equivalent sound level (L_{eq}). The L_{eq} represents a steady sound level that would contain the same amount of sound energy as the actual time–varying sound evaluated over the same time period. The L_{eq} averages the louder and quieter moments, but gives much more weight to the louder moments in the averaging. For traffic noise assessment purposes, L_{eq} is typically evaluated over the 1–hour period with the greatest amount of noise generated per 24–hour period. Doubling the number of noise sources (i.e., vehicles) will increase the hourly equivalent sound level by approximately 3 dB, which is usually the smallest change in hourly equivalent A–weighted traffic noise levels that people can perceive.

The first step in any noise impact analysis is identification of areas where there's potential for increased traffic noise levels as a result of the project, called Noise Sensitive Area(s) (NSA). Receptors are then identified within the NSA's. Receptors discrete or representative location of a noise sensitive area for any of the land uses listed in Table 2.3–1. Receptors are represented in the noise modeling software by a receiver point. At some locations, such as a park, cemetery or multi-family dwelling unit, a single receiver can represent multiple receptors within the model. Traffic noise levels are predicted for each receiver and that result is used for each receptor it represents. While the noise value for each receiver is used to determine impacts, the number of benefited receptors is considered when analyzing for noise abatement.

2.2 IDENTIFICATION OF NOISE SENSITIVE AREAS

For this Addendum, the Central Alternative 1B, the preferred alternative, remains as an NSA. For modeling purposes, though, the study area was divided into the specific areas where the design was modified since the original Noise Impact Analysis.

2.3 IDENTIFICATION OF RECEPTORS AND RECEIVERS

Noise receptors identified in the Noise Impact Analysis were carried forward to this Addendum. Land use for the noise receptors, according to FHWA's Activity Category (AC) and described in Table 2.3–1, include residential (AC B), recreational (AC C), places of worship (AC D), and emergency services (AC F).

Table 2.3–1. Activity Category Descriptions

ACTIVITY CATEGORY	ACTIVITY DESCRIPTION
A	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[1]	Residential.
C[1]	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 structure, radio stations, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails, and trail crossings.
D	Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structure, radio studios, recording studios, schools, and television studios.
E[1]	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.

[1] Includes undeveloped lands permitted for this activity category

Source: Procedures for Abatement of Highway Traffic and Construction Noise

A receiver point was placed in the model to represent the identified receptors. See **Appendix A** for mapping of receiver locations. In some cases, a single receiver would represent multiple receptors. For residential receivers, the number of receptors represented by each receiver was determined by examining the number of dwellings in the vicinity of the receiver that were located in similar proximity to the roadway. For certain land uses, such as cemeteries and recreational areas, the number of receptors by Equivalent Residences (ER), a value calculated in accordance with INDOT' and KYTC noise policies.

KYTC and INDOT noise policies provide the following equations to use when calculating ER:

$$\left(\frac{Daily\ \#\ of\ Users}{2.52\ people\ on\ average\ per\ household}\right) X \begin{pmatrix} Percentage\ of\ Property \\ Within\ 500\ feet \end{pmatrix} = \text{Equivalent Residences}$$

Figure 2.3–1. INDOT's Equivalent Residences Formula

$$ER = \left(\frac{X\ Persons}{2.5\ persons\ per\ avg\ household}\right)\left(\frac{X\ hour\ avg\ weekly\ use}{168\ hours\ per\ week}\right) = \text{Equivalent Residences}$$

$$ER = \left(\frac{X\ Persons}{2.5\ persons\ per\ avg\ household}\right)\left(\frac{X\ hour\ avg\ daily\ use}{24\ hours\ per\ day}\right) = \text{Equivalent Residences}$$

Figure 2.3–2. KYTC's Equivalent Residences Formulas

Due to the large number of receivers/receptors identified for this project, a naming convention was established to help represent their location within the study area. Receptors were named by their street, receptor number, dwelling units, and special designator. Figure 2.3–3 provides an explanation of the naming convention, and a legend of each street ID used is provided in **Table 1 of Appendix B**.

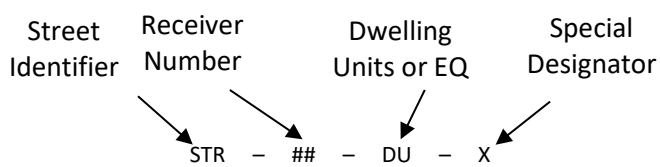


Figure 2.3–3. Receiver Naming Convention

2.4 CRITERIA FOR DETERMINING TRAFFIC NOISE IMPACTS

Noise impacts are determined by comparing future project sound levels: (1) to a set of Noise Abatement Criteria (NAC) for a particular land use category, and (2) to existing sound levels.

2.4.1 NOISE ABATEMENT CRITERIA

FHWA noise standards (contained in 23 CFR 772), as well as INDOT and KYTC noise policies, state that traffic noise impacts require consideration of abatement when worst–hour sound levels approach (within 1 dB[A] L_{eq}) or exceed the NAC listed in Table 2.4–1. Noise impacts will be identified and noise abatement will be considered if design year sound levels at the Category B and C land uses are 66 dB(A) or higher.

Table 2.4–1. Noise Abatement Criteria

ACTIVITY CATEGORY (AC)	L_{EQ} (1H) DB(A)	EVALUATION LOCATION
A	57	Exterior
B	67	Exterior
C	67	Exterior
D	52	Interior
E[1]	72	Exterior
F	—	—
G	—	—

2.4.2 Substantial Increase Definition

FHWA, INDOT, and KYTC noise standards also define impacts to occur if there is a substantial increase in design year sound levels to existing sound levels. INDOT's criteria defines a substantial noise increase as an increase of 15 dB(A) or more over the existing noise level. KYTC's criteria uses 10 dB(A) or more over the existing noise level as it's criteria for substantial noise increase. Noise abatement will be considered when noise impacts are identified due to a substantial increase in existing sound levels.

2.5 NOISE ABATEMENT EVALUATION

Abatement is evaluated when a receiver is predicted to receive impacts. For noise barriers to be included in the project plans for the impacted noise analysis areas, they must be determined to be both feasible and reasonable in accordance with INDOT's and KYTC's noise policy.

2.5.1 Noise Barrier Feasibility

When determining the acoustic feasibility of a proposed noise abatement measure, INDOT considers whether the measure achieves a 5 dB(A) reduction at a majority (greater than 50 percent) of the impacted receivers. KYTC's policy determines the acoustic feasibility of a proposed noise abatement measure by whether the measure provides a substantial reduction (5 dB[A]) for, at a minimum, three impacted receptors. Noise abatement would not be considered when there are less than three impacted receptors.

Engineering or constructability issues may render an abatement measure infeasible if the barrier would pose overriding safety (visibility issues) or maintenance (drainage and right–of–way access) problems as determined by the American Association of State Highway and Transportation Officials (AASHTO) *Green Book*, *Roadside Design Guide*, or *Manual of Uniform Traffic Control Devices* (MUTCD) and with INDOT's and KYTC's noise policy.

FHWA's Traffic Noise Model, Version 2.5 (TNM 2.5) software was used to assess whether a potential noise barrier would be built. Each potential noise barrier must also pass a "reasonableness" test as described below.

2.5.2 Noise Barrier Reasonableness

If a barrier is determined to be feasible, then the barrier is assessed for reasonableness in accordance with either INDOT or KYTC criteria, depending on the location of the wall.

For INDOT, potential noise abatement must meet the following criteria to be considered reasonable. If any of the criteria are not met, noise abatement measures would not be constructed.

- Consideration and Obtaining Views of Residents and Property Owners: The views of the benefited receptors and property owners would be considered in determining the reasonableness of noise barriers. The concerns and opinions of the property owner and the unit occupants would be balanced with other considerations in determining whether a barrier is appropriate for a given location.
- Cost–Effectiveness: To determine cost effectiveness, the estimated cost of constructing a noise barrier (including installation and additional necessary construction such as

foundations or guardrails) would be divided by the number of benefited receptors (those who would receive a reduction of at least 5 dB[A]). A base material and design cost of $25,000 or less per benefited receptor is currently considered to be cost–effective. Development in which a majority (more than 50 percent) of the receptors was in place prior to the initial construction of the roadway in its current state (functional classification) will receive additional consideration for noise abatement. The cost–effectiveness criteria used for these cases will be 20 percent greater (currently $30,000 per benefited receptor).

- INDOT Design Goal for Noise Abatement: The noise reduction design goal for Indiana is 7 dB(A) for a majority (greater than 50 percent) of the benefited first row receptors.

KYTC has similar criteria for noise abatement reasonableness. If any of the criteria are not met, noise abatement measures would not be constructed.

- Desires of Benefited Receptors: The views of the benefited receptors and property owners would be considered in determining the reasonableness of noise barriers. When the majority of benefited receptors and property owners engaged through the public involvement process are opposed to construction of a noise barrier, KYTC will give deference to these opinions in making a final determination regarding the reasonableness of the measure regardless of whether the proposal satisfies all other criteria for consideration. Where the majority of the benefited receptors and property owners involved in the public involvement process are in support of noise barrier construction, and the proposal satisfies all other criteria for consideration outlined in this policy, KYTC shall incorporate the abatement measures into the project.
- Noise Reduction Design Goal: KYTC' s noise reduction design goal is 7 dB(A) for a minimum of 50 percent of front row benefited receptors.
- Cost Effectiveness: The total cost of a noise barrier is estimated based on an average cost of $30 per square foot of barrier wall, as outlined in KYTC's 2020 *Noise Analysis and Abatement Policy* (KYTC, 2020). This cost is then divided by the total number of benefited receptors as determined by the TNM 2.5 barrier analysis, to determine a total "cost per benefited receptor" (CBR). KYTC has established a CBR of $35,000 as a reasonable maximum threshold for this value. Locations where the CBR exceeds this threshold value would not be considered cost effective; locations where the CBR is less than this threshold would be cost effective.

2.5.3 Structural Noise Barrier Analysis Methodology

A structural noise barrier was evaluated to assess potential noise impact mitigation when noise sensitive receptors were identified as impacted from a build alternative as described in Section 2.5. Each structural noise barrier was evaluated in accordance with the feasibility and reasonableness criteria outlined above and these criteria provide a framework for assessing the barriers modeled in TNM 2.5.

1) Each modeled barrier was evaluated for feasibility, in accordance with INDOT and KYTC policies, to determine if further analysis was necessary. Every barrier analyzed met the feasibility requirements.

2) Next, each barrier was evaluated for its ability to provide 7 dB(A) of attenuation for first row benefited receptors, in accordance with the design goals of INDOT and KYTC. If no combination of wall length and height could meet this criterion then the analysis was concluded and the barrier with the greatest attenuation was recorded and presented in this report. If the design goal was achieved, then the cost–effectiveness criterion was evaluated and optimized.
3) If a structural noise barrier design was found to meet the design goal, then the cost of the barrier was compared to the number of benefited receptors and compared to the reasonableness criterion for cost–effectiveness. If the barrier was not cost–effective, then the wall length and/or height was adjusted to increase the number of benefited receptors. If there was still no cost–effective barrier, the analysis continued by looking for a smaller sub–set of the analysis area that might meet the reasonableness criteria. The barriers were reduced to the lower limit of cost, while still meeting the design goal of 7 dB(A) for a majority of impacted first row receptors (i.e., less benefited first row receptors). The barrier was then optimized for benefited receptors and checked against the cost–effectiveness criterion. If the barrier was still not cost–effective, the barrier that was closest to meeting the criteria was recorded and is presented in this report.
4) If a structural noise barrier was found to meet all the feasibility and reasonableness criteria, then the barrier analysis was completed, and that barrier was recorded and presented in this report.

The structural noise barrier analyses presented in this highway traffic noise impact are preliminary in nature and were evaluated to identify locations where structural noise barriers are likely based on the current design, traffic model without considerations of final design criteria that may limit the lengths or locations of structural noise barriers (such as drainage features and sight distance requirements). These preliminary structural noise barrier analyses are utilized for comparing the likeliness of barrier mitigation for noise sensitive receptors by build alternative.

2.6 CONSTRUCTION NOISE

It is expected that for construction in Indiana, construction procedures shall be governed by INDOT's *Standard Specifications* in place at the time of contract letting. Similarly, construction in Kentucky shall be governed by KYTC's latest issue of *Standard Specifications for Road and Bridge Construction* and any applicable supplements issued. The contractor will be bound by each state's standard specifications to observe any noise ordinance in effect within the project limits.

2.7 OUTREACH TO LOCAL OFFICIALS

There are tracts of undeveloped land adjacent to the proposed project. INDOT and KYTC encourage the local governments with jurisdiction over these lands, as well as potential developers of these lands, to practice noise compatibility planning to avoid future noise impacts.

The following language is included in INDOT's noise policy:

> *INDOT understands that it is in a unique position to provide outreach to local government and county planning units. INDOT also understands that it is the local government or county that has the power to regulate land development. INDOT is willing to help the local*

> *government by providing expert guidance on noise–related issues. This can include recommendations on setbacks, how to interpret noise studies that have been provided for FHWA projects, and other general noise concerns so that noise impacts are minimized for areas that are being developed.*

The following language is included in KYTC's noise policy:

> *Coordination with and providing information to local officials is critical to a developing a comprehensive approach to creating livable communities adjacent to highways. Impacts of highway traffic noise can be reduced through a program of shared responsibility. Requests to approve land use changes adjacent to the highways should consider the current and predicted traffic noise. Approval of land uses adjacent to a highway that are particularly noise sensitive should be an informed decision and should only occur after careful consideration. Thus, where local government exercises control over land development through planning and zoning ordinances, KYTC shall share predicted noise levels along highway corridors and techniques that can be used to minimize highway noise related impacts to adjacent properties. KYTC shall provide this information to local officials for all Type I projects developed within these local jurisdictions.*

There are also two guidance documents on noise compatible land use planning that are available from FHWA: *The Audible Landscape: A Manual for Highway Noise and Land Use* (FHWA, 1974) and *Entering the Quiet Zone: Noise Compatibility Land Use Planning* (FHWA, 2002).

Table 2.7–1 presents design year sound levels for areas along the proposed alternatives where vacant and possibly developable lands exist. Noise predictions were made at distances between 50 feet and 500 feet from the edge of pavement of the closest travel lane, at–grade, for the design year 2045. As indicated, sound levels within approximately 50 feet of the edge of pavement of the nearest travel lane do not approach or exceed the NAC of 66 dB(A).

The values in Table 2.7–1 do not represent predicted levels at every location at a particular distance from the roadway. Sound levels will vary with changes in terrain and will be affected by the shielding of objects such as buildings. This information is being included to make local officials and planners aware of anticipated highway noise levels so that future development will be compatible with these levels. More development, particularly commercial development, may occur in the project area after completion of the project, but will most likely be consistent with neighborhood land use and zoning restrictions.

Table 2.7–1. Undeveloped Lands Sound Levels

DISTANCE FROM ROADWAY (FT.)	NOISE LEVEL (DB[A])
50	72.4
100	69.2
200	64.3
300	60.9
400	58.5
500	56.7
600	55.3
700	53.8

DISTANCE FROM ROADWAY (FT.)	NOISE LEVEL (DB[A])
800	52.5

CHAPTER 3 – MODEL VALIDATION AND FIELD MEASUREMENTS

3.1 FIELD MEASUREMENTS

Noise measurements for model validation were completed during the initial field work period in October 2017 and January 2018. On February 9, 2021, additional noise measurements were conducted along the north and south banks of the Ohio River to record the ambient noise environment for these areas where the Central Alternative 1B Modified bridges the river. Short-term, 15-minute noise measurements were conducted during meteorologically appropriate periods (i.e., no rain, wind less than 10 miles per hour [mph]). These ambient readings were then applied to nearby receivers and used for comparison with predicted values to determine if there were any substantial increases in noise levels associated with the proposed alternatives. See Table 3.1–1 and Figure 3.1–1 for the recorded ambient measurement levels and the measurement locations, respectively. Field data sheets are provided in **Appendix C** and the noise meter calibration certifications are provided in **Appendix D**.

Table 3.1–1. Ambient Field Measurement Levels

LOCATION	NOISE LEVEL (DB[A])
FA1	45.2
FA2	48.4

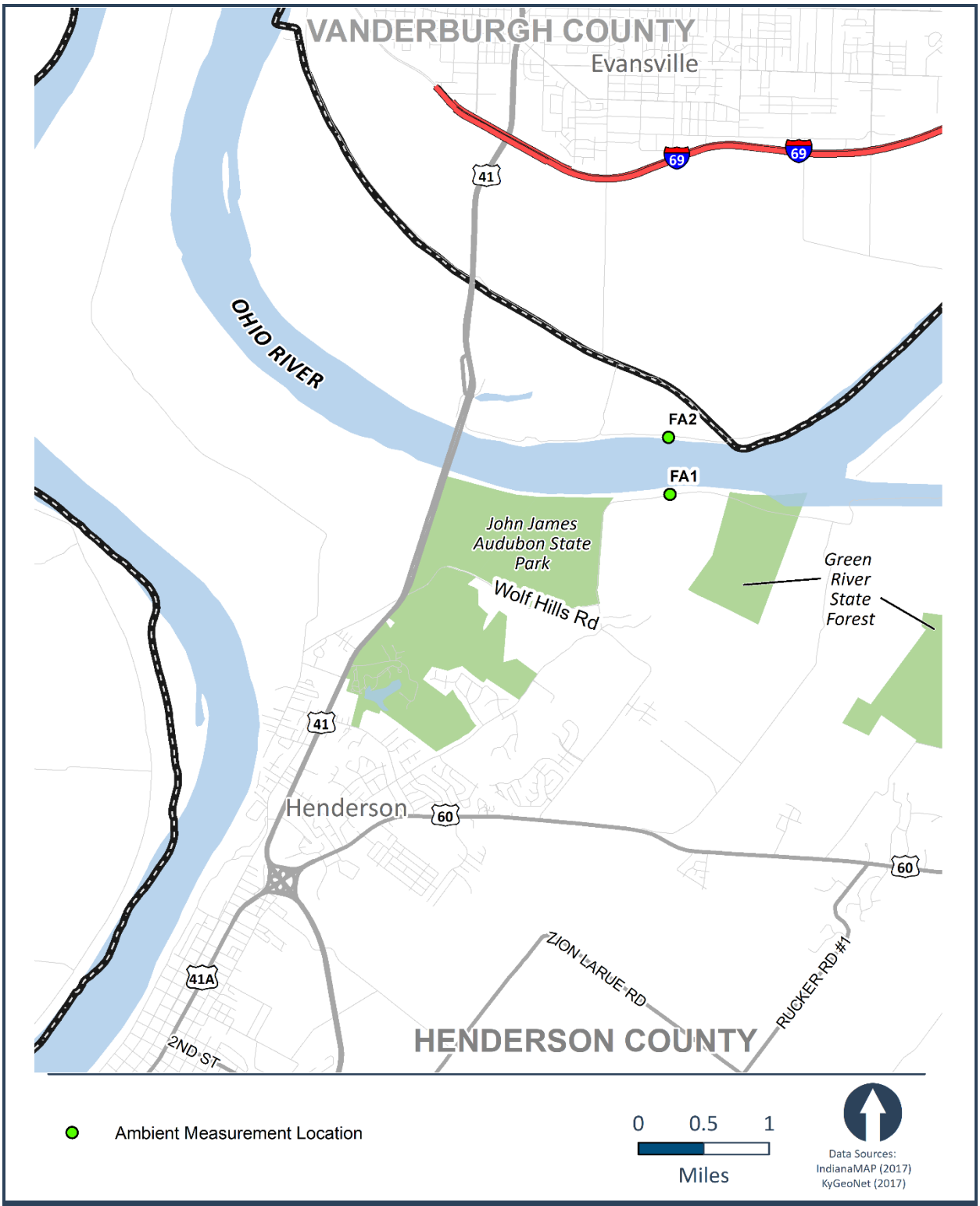


Figure 3.1–1. Ambient Field Measurement Locations

CHAPTER 4 – CENTRAL ALTERNATIVE 1B MODIFIED RESULTS

4.1 CENTRAL ALTERNATIVE 1B MODIFIED

In the original Noise Impact Analysis, Central Alternative 1 was analyzed from the beginning of the project in Indiana to just south of the CSX Railroad in Kentucky. From this point south, where Central Alternative 1 joined West Alternatives 1 and 2, only one analysis was performed for this section. That analysis was referred to as the "Pennyrile Parkway."

For this Addendum, design changes for both the Central Alternative 1 and the Pennyrile Parkway were re-evaluated as Central Alternative 1B Modified. For each design change, TNM models were updated for the new horizontal and vertical alignments to identify impacted receivers. Due to the distance between design change locations, the analyses were completed independently of each other.

Once all impacts were known, they were analyzed to determine locations where a noise abatement evaluation would be necessary. Eleven clusters of impacted receivers were identified, ten in Kentucky and one in Indiana. A barrier evaluation was performed at each location. These clusters are shown in Figure 4.1–1 and Figure 4.1–2 and are identified by a landmark or significant street in the area. Clusters of receivers not identified in Figure 4.1–1 and Figure 4.1–2 do not contain impacted receivers and noise abatement evaluations were not required. TNM output data is provided in **Appendix E.**

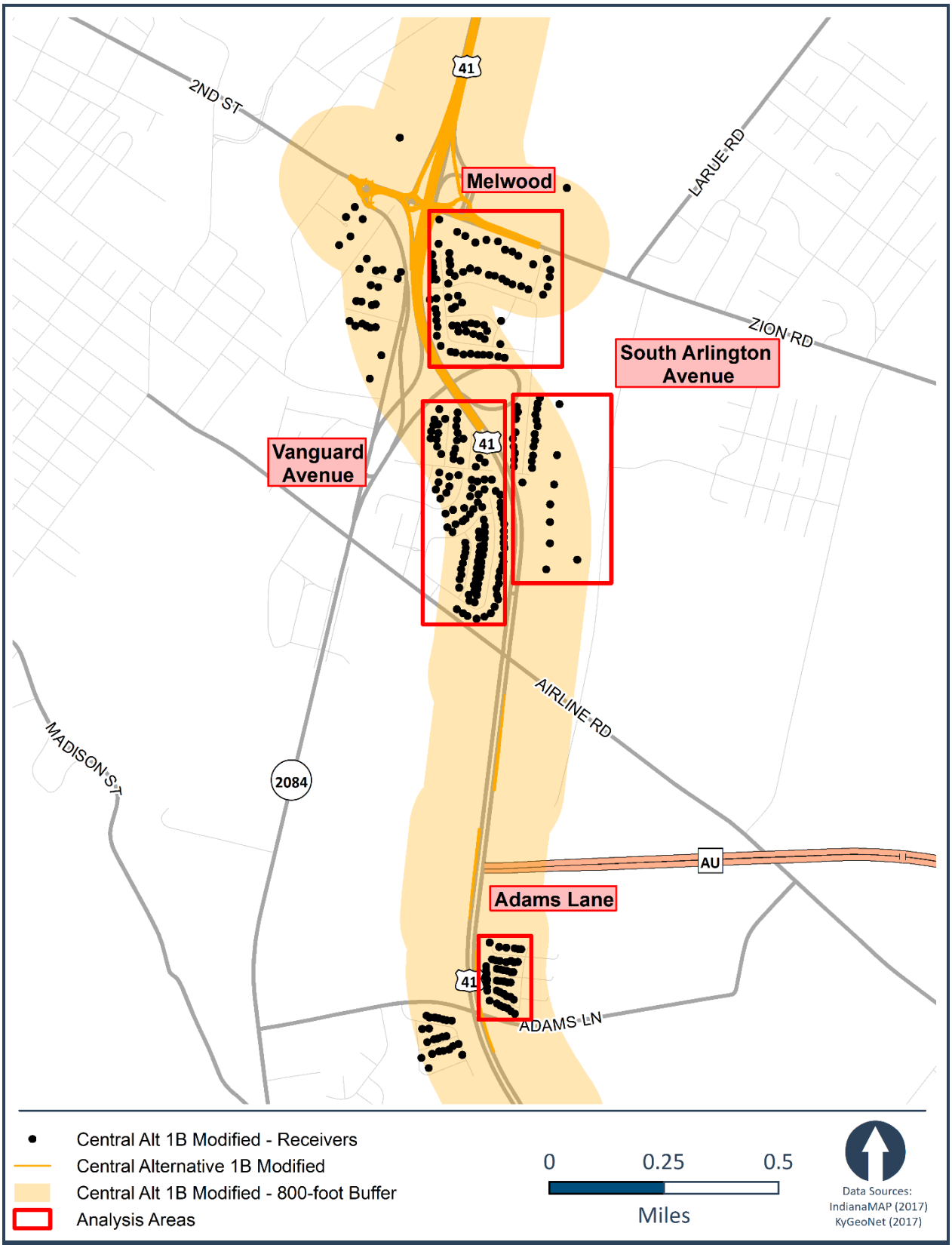


Figure 4.1–1. Central Alternative 1B Modified Noise Impact Analysis Areas (1 of 2)

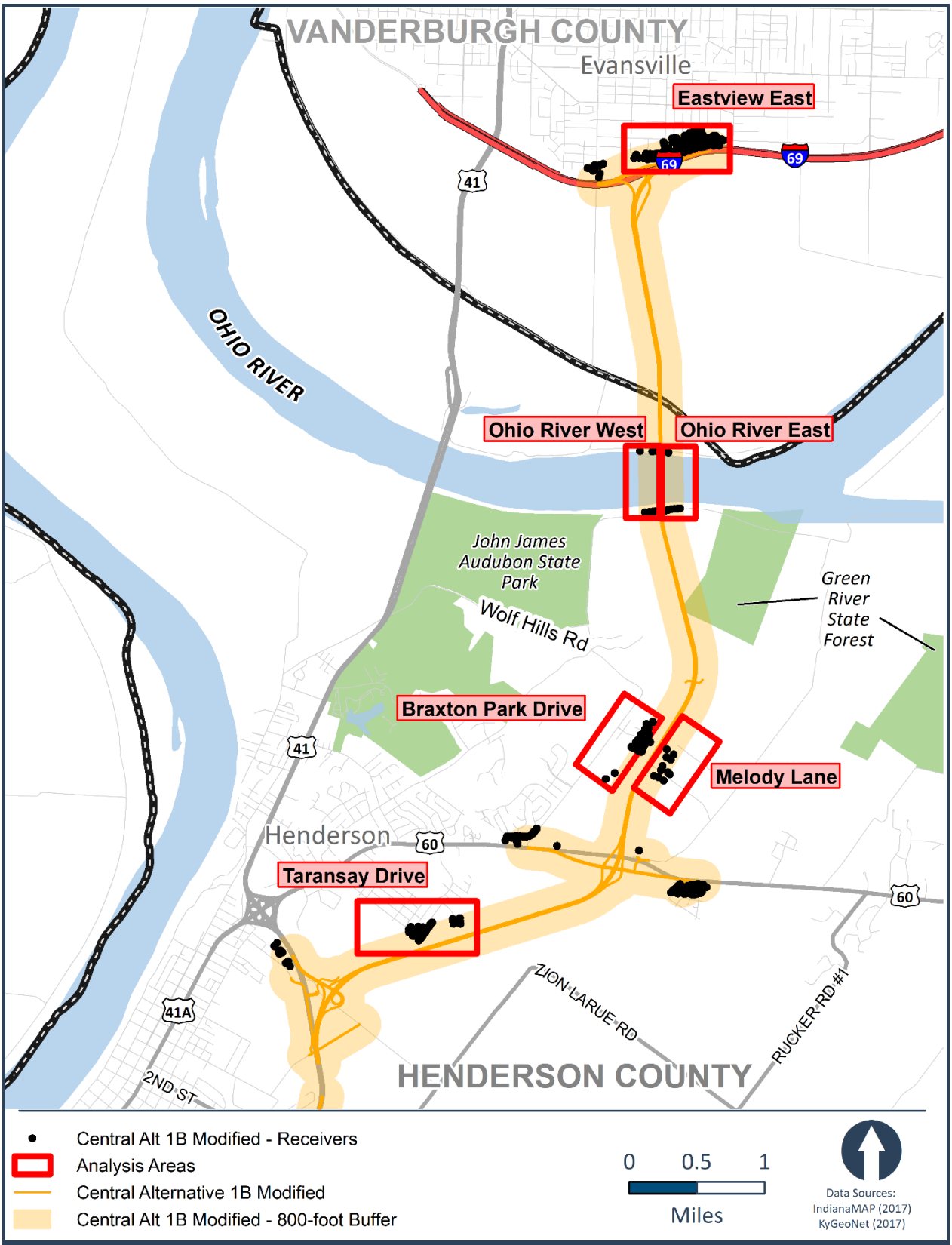


Figure 4.1–2. Central Alternative 1B Modified Noise Impact Analysis Areas (2 of 2)

4.1.1 Analysis Area – Adams Lane (Auxiliary Lane Addition)

This analysis area consisted of mobile homes and permitted vacant lots near Adams Lane. The vacant lots were also included in the analysis as a noise receptor. Modeled receivers, the modeled structural noise barrier location, and the receiver's attenuation level thresholds are presented in Figure 4.1–3. Sound level results, including existing, predicted, and predicted with barrier, are presented in **Table 2 and 3 of Appendix B**. This table also identifies the number of receptors represented by the receiver, front row receiver/receptors, and an impact summary.

Barrier Summary

A single barrier of 1,140 feet in length and average height of 15.47 feet was predicted to benefit 24 of 45 receptors. The barrier demonstrates that it was possible to achieve a 5 dB(A) reduction at three or more impacted receptors, meeting KYTC's feasibility criteria. The cost of the modeled barrier was $529,155, for a cost–effectiveness ratio of $22,047 per benefited receptor. This value is below KYTC's cost–effectiveness criterion of $35,000 per benefited receptor and therefore the modeled barrier does meet KYTC's reasonableness threshold. The barrier provided 7 dB(A) of attenuation for nine of the 17 first row benefited receptors (52.9 percent). This is above the 50 percent design goal threshold per KYTC's noise policy and therefore the barrier meets this reasonableness criterion.

Table 4.1–1. Barrier Description – Adams Lane (Auxiliary Lane Addition)

BARRIER DESCRIPTION	NO. OF IMPACTED RECEPTORS / TOTAL RECEPTORS	BARRIER LENGTH (FT)	AVERAGE BARRIER HEIGHT (FT)	BARRIER AREA (SQ FT)	BARRIER COST @ $30/SQ FT
A Single Barrier on the East Side of the Auxiliary Lane that Connects US 41 to Audubon Parkway	16 / 45	1,140	15.47	17,639	$529,155

Table 4.1–2. Barrier Summary – Adams Lane (Auxiliary Lane Addition)

IS THE BARRIER FEASIBLE?	NO. BENEFITED AND COST PER BENEFITED	IS THE BARRIER COST EFFECTIVE?	NO. OF 1ST–ROW BENEFITED / NO. OF 1ST–ROW BENEFITED W/ 7 DB(A) OR GREATER ATTENUATION (%)	DOES THE BARRIER MEET THE DESIGN GOAL?
Yes	24 Benefited; $22,048/Benefited	Yes	17 / 9 52.9	Yes

Statement of Likelihood

Based on the current project design and traffic projections, a structural noise barrier is both feasible and reasonable in accordance with KYTC's noise policy and is likely for this location.

Figure 4.1–3. Barrier Analysis – Adams Lane (Auxiliary Lane Addition)

4.1.2 Analysis Area – Vanguard Avenue

This analysis area consisted of single-family homes near Vanguard Avenue. Modeled receivers, modeled structural noise barrier location, and the receiver's attenuation level thresholds are presented in Figure 4.1–4. Sound level results, including existing, predicted, and predicted with barrier, are presented in **Table 4 and 5 of Appendix B**. This table also identifies the number of receptors represented by the receiver, front row receiver/receptors, and an impact summary.

Barrier Summary

A single barrier of 3,260 feet in length with an average height of 15.68 was predicted to benefit 100 of 116 receptors. The barrier demonstrated that it was possible to achieve a 5 dB(A) reduction at three or more impacted receptors, meeting KYTC's feasibility criteria. The cost of the modeled barrier was $1,533,423, for a cost–effectiveness ratio of $15,334 per benefited receptor. This value is below KYTC's cost–effectiveness criterion of $35,000 per benefited receptor and therefore the modeled barrier would meet KYTC's reasonableness threshold. The barrier would provide 7 dB(A) of attenuation for 29 of the 33 first row benefited receptors (87.9 percent). This is above the 50 percent design goal threshold per KYTC's noise policy and therefore the barrier would also meet this reasonableness criterion.

Table 4.1–3. Barrier Description – Vanguard Avenue

BARRIER DESCRIPTION	NO. OF IMPACTED RECEPTORS / TOTAL RECEPTORS	BARRIER LENGTH (FT)	AVERAGE BARRIER HEIGHT (FT)	BARRIER AREA (SQ FT)	BARRIER COST @ $30/SQ FT
A Barrier on the West Side of Central Alt. 1B Modified	34 / 116	3,260	15.68	51,114	$1,533,423

Table 4.1–4. Barrier Summary – Vanguard Avenue

IS THE BARRIER FEASIBLE?	NO. BENEFITED AND COST PER BENEFITED	IS THE BARRIER COST EFFECTIVE?	NO. OF 1ST–ROW BENEFITED / NO. OF 1ST–ROW BENEFITED W/ 7 DB(A) OR GREATER ATTENUATION (%)	DOES THE BARRIER MEET THE DESIGN GOAL?
Yes	100 Benefited; $15,334 /Benefitted	Yes	29 / 33 87.9	Yes

Statement of Likelihood

Based on the current project design and traffic projections, a structural noise barrier is reasonable and feasible in accordance with KYTC's noise policy and is likely for this location.

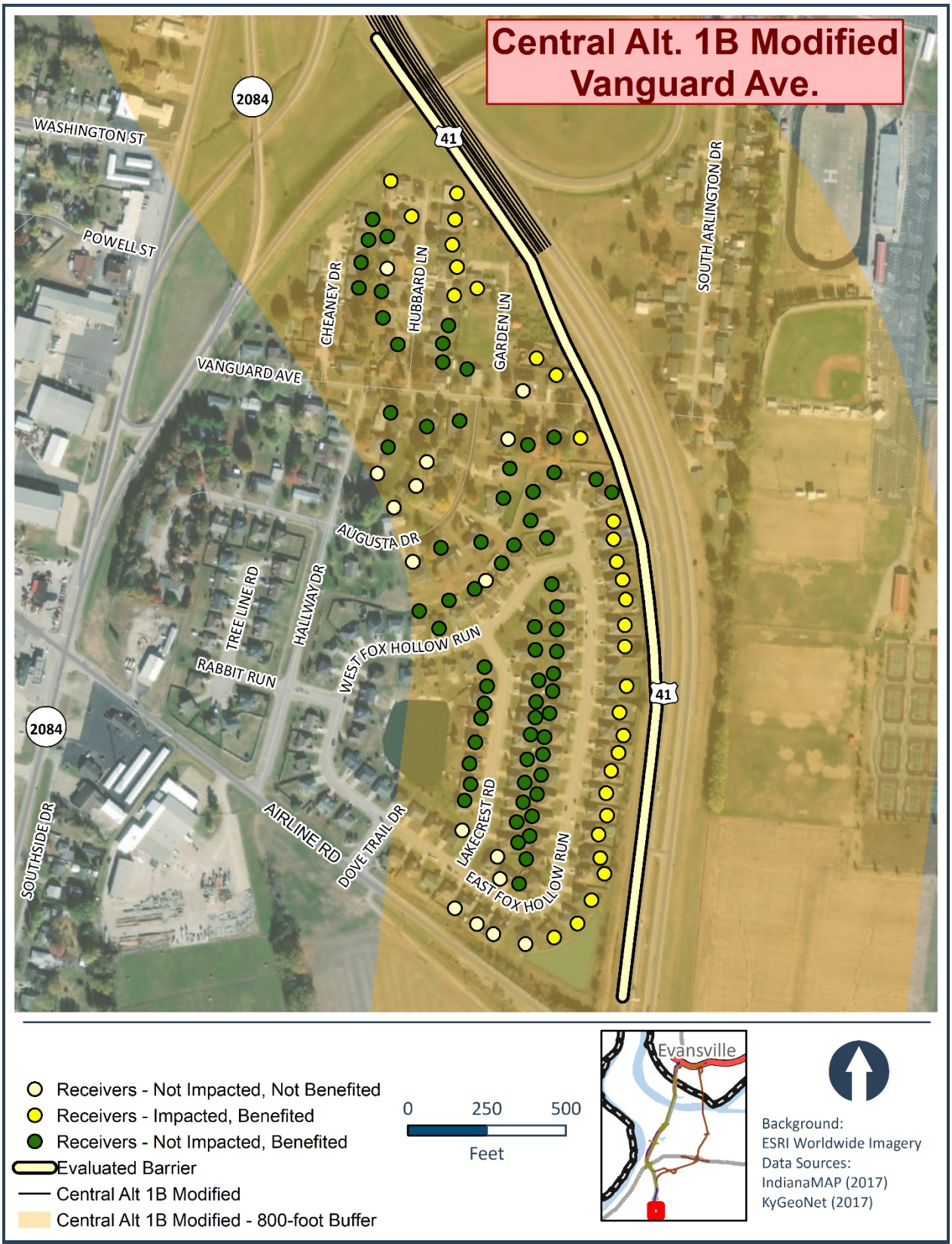


Figure 4.1–4. Barrier Analysis – Vanguard Avenue

4.1.3 Analysis Area – South Arlington Drive

This analysis area consisted of single-family homes and multiple athletic fields near South Arlington Drive. Modeled receivers, modeled structural noise barrier location, and the receiver's attenuation level thresholds are presented in Figure 4.1–5. Equivalent receptor calculations for the athletic fields are provided in **Appendix F**. Sound level results, including existing, predicted, and predicted with barrier, are presented in **Table 4 and 6 of Appendix B**. This table also identifies the number of receptors represented by the receiver, front row receiver/receptors, and an impact summary.

Barrier Summary

A single barrier totaling 2,803 feet with an average height of 15.02 feet was predicted to benefit seven impacted receptors of a total of 47 receptors (represented by 30 receivers). The barrier demonstrated that it was possible to achieve a 5 dB(A) reduction at three or more impacted receptors, meeting KYTC's feasibility criteria. The cost of the modeled barrier was $1,262,632, for a cost–effectiveness ratio of $48,563 per benefited receptor. This value is above KYTC's cost–effectiveness criterion of $35,000 per benefited receptor and therefore the modeled barrier does not meet the KYTC reasonableness threshold. The barrier would provide 7 dB(A) of attenuation for 14 of the 18 of the first row benefited receptors (77.8 percent). This is above the 50 percent design goal threshold per KYTC's noise policy and therefore the barrier would also meet this reasonableness criterion.

Table 4.1–5. Barrier Description – South Arlington Drive

BARRIER DESCRIPTION	NO. OF IMPACTED RECEPTORS / TOTAL RECEPTORS	BARRIER LENGTH (FT)	AVERAGE BARRIER HEIGHT (FT)	BARRIER AREA (SQ FT)	BARRIER COST @ $30/SQ FT
A Single Barrier on the East Side of Central Alt. 1B Modified	7 / 47	2,803	15.02	42,088	$1,262,632

Table 4.1–6. Barrier Summary – South Arlington Drive

IS THE BARRIER FEASIBLE?	NO. BENEFITED AND COST PER BENEFITED	IS THE BARRIER COST EFFECTIVE?	NO. OF 1ST–ROW BENEFITED / NO. OF 1ST–ROW BENEFITED W/ 7 DB(A) OR GREATER ATTENUATION (%)	DOES THE BARRIER MEET THE DESIGN GOAL?
Yes	26 Benefited; $48,563/Benefited	No	14 / 18 77.8	Yes

Statement of Likelihood

Based on the current project design and traffic projections, a structural noise barrier is feasible but is not cost effective in accordance with KYTC's noise policy and is not likely for this location.

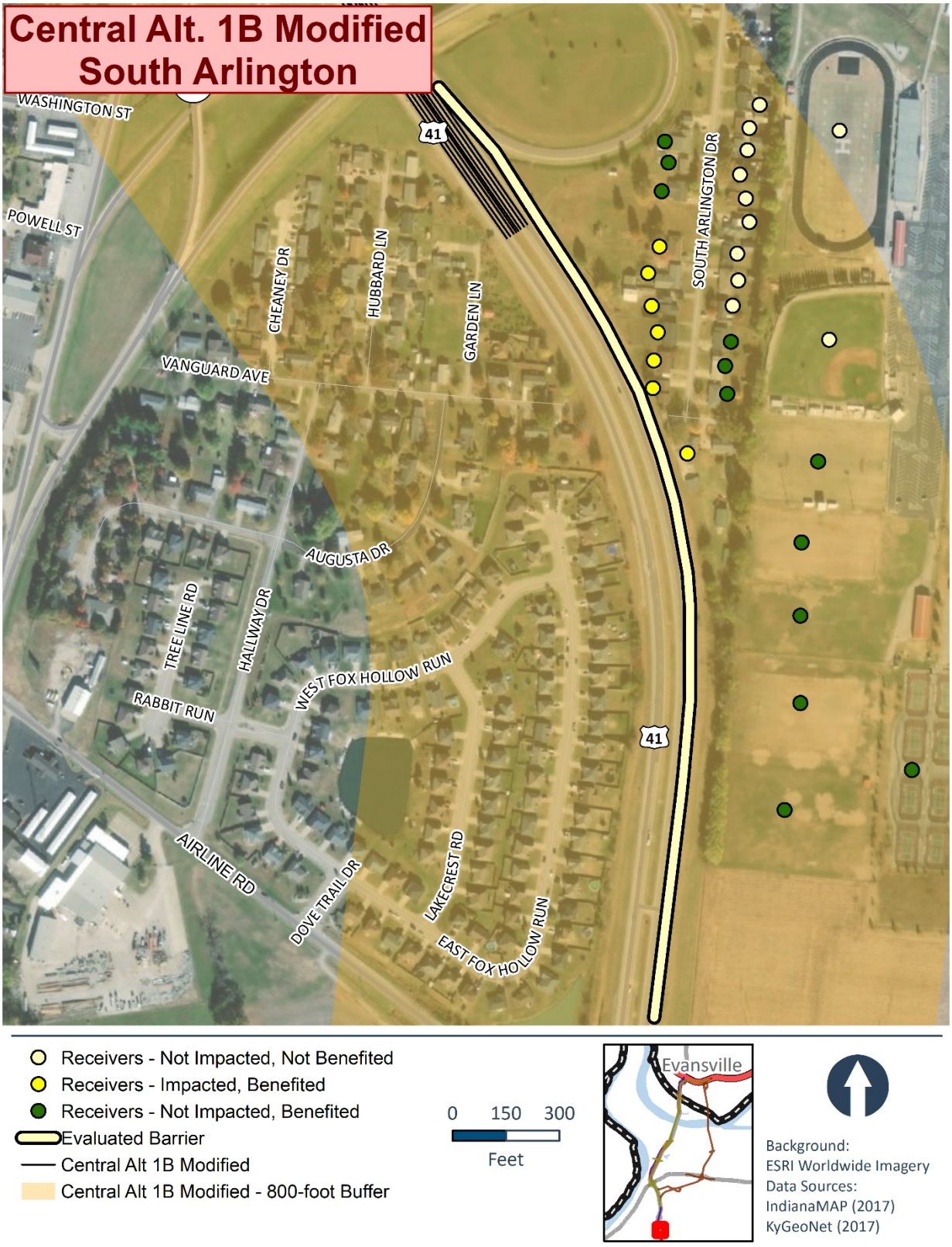


Figure 4.1–5. Barrier Analysis – South Arlington Drive

4.1.4 Analysis Area – Melwood Drive

This analysis area consisted of single-family homes near Melwood Drive. Modeled receivers, modeled structural noise barrier location, and the receiver's attenuation level thresholds are presented in Figure 4.1–6. Sound level results, including existing, predicted, and predicted with barrier, are presented in **Table 4 and 7 of Appendix B**. This table also identifies the number of receptors represented by the receiver, front row receiver/receptors, and an impact summary.

Barrier Summary

Two barriers with a total of 2,000 feet in length with an average height of 14.64 were predicted to benefit 33 of 78 receptors (74 modeled receivers). The barrier demonstrated that it was possible to achieve a 5 dB(A) reduction at three or more impacted receptors, meeting KYTC's feasibility criteria. The cost of the modeled barrier was $933,612, for a cost–effectiveness ratio of $28,291 per benefited receptor. This value is below KYTC's cost–effectiveness criterion of $35,000 per benefited receptor and therefore the modeled barrier meets KYTC's reasonableness threshold. The barrier would provide 7 dB(A) of attenuation for 16 of the 23 first row benefited receptors (69.5 percent). This is above the 50 percent design goal threshold per KYTC's noise policy and therefore the barrier would also meet this reasonableness criterion.

Table 4.1–7. Barrier Description – Melwood Drive

BARRIER DESCRIPTION	NO. OF IMPACTED RECEPTORS / TOTAL RECEPTORS	BARRIER LENGTH (FT)	AVERAGE BARRIER HEIGHT (FT)	BARRIER AREA (SQ FT)	BARRIER COST @ $30/SQ FT
A Barrier on the East Side of Central Alt. 1B Modified	26 / 78	2,000	14.64	31,120	$933,612

Table 4.1–8. Barrier Summary – Melwood Drive

IS THE BARRIER FEASIBLE?	NO. BENEFITED AND COST PER BENEFITED	IS THE BARRIER COST EFFECTIVE?	NO. OF 1ST–ROW BENEFITED / NO. OF 1ST–ROW BENEFITED W/ 7 DB(A) OR GREATER ATTENUATION (%)	DOES THE BARRIER MEET THE DESIGN GOAL?
Yes	33 Benefited; $28,291/Benefited	Yes	23 / 16 69.5	Yes

Statement of Likelihood

Based on the current project design and traffic projections, structural noise barriers are reasonable and feasible in accordance with KYTC's noise policy and is likely for this location.

Figure 4.1–6. Barrier Analysis – Melwood Drive

4.1.5 Analysis Area – Richardson Avenue

This analysis area consisted of multi-family residences and medical facilities near Richardson Avenue, including the Redbanks short–term rehabilitation and Alzheimer's care facility. The results showed no impacted receptor, so a barrier analysis was not required. Sound level results, including existing and predicted, are presented in **Table 8 of Appendix B**.

4.1.6 Analysis Area – Taransay Drive

This analysis area consisted of single-family homes near Taransay Drive. Modeled receivers, modeled structural noise barrier location, and the receiver's attenuation level thresholds are presented in Figure 4.1–7. Sound level results, including existing, predicted, and predicted with barrier, are presented in **Table 10 and 11 of Appendix B**. This table also identifies the number of receptors represented by the receiver, front row receiver/receptors, and an impact summary. The "V" pattern of the residences in relation to the alternative limits the effectiveness of the structural noise barrier, as attenuation falls with depth from the pavement.

Barrier Summary

A single barrier of 3,699 feet in length and average height of 24.00 feet was predicted to benefit 26 of 29 receptors (29 modeled receivers). The barrier demonstrates that it was possible to achieve a 5 dB(A) reduction at three or more impacted receptors, meeting KYTC's feasibility criteria. The cost of the modeled barrier was $2,663,587, for a cost–effectiveness ratio of $102,446 per benefited receptor. This value is above KYTC's cost–effectiveness criterion of $35,000 per benefited receptor and therefore the modeled barrier does not meet KYTC's reasonableness threshold. The barrier provided 7 dB(A) of attenuation for 13 of the 15 first row benefited receptors (86.7 percent). This is above the 50 percent design goal threshold per KYTC's noise policy and therefore the barrier does not meet this reasonableness criterion.

Table 4.1–9. Barrier Description – Taransay Drive

BARRIER DESCRIPTION	NO. OF IMPACTED RECEPTORS / TOTAL RECEPTORS	BARRIER LENGTH (FT)	AVERAGE BARRIER HEIGHT (FT)	BARRIER AREA (SQ FT)	BARRIER COST @ $30/SQ FT
A Single Barrier on the East Side of Central Alt. 1B Modified	29 / 29	3,699	24.00	88,786	$2,663,587

Table 4.1–10. Barrier Summary – Taransay Drive

IS THE BARRIER FEASIBLE?	NO. BENEFITED AND COST PER BENEFITED	IS THE BARRIER COST EFFECTIVE?	NO. OF 1ST–ROW BENEFITED / NO. OF 1ST–ROW BENEFITED W/ 7 DB(A) OR GREATER ATTENUATION (%)	DOES THE BARRIER MEET THE DESIGN GOAL?
Yes	26 Benefited; $102,446/Benefited	No	15 / 13 86.7	Yes

Statement of Likelihood

Based on the current project design and traffic projections, structural noise barriers are not reasonable in accordance with KYTC's noise policy and are not likely for this location.

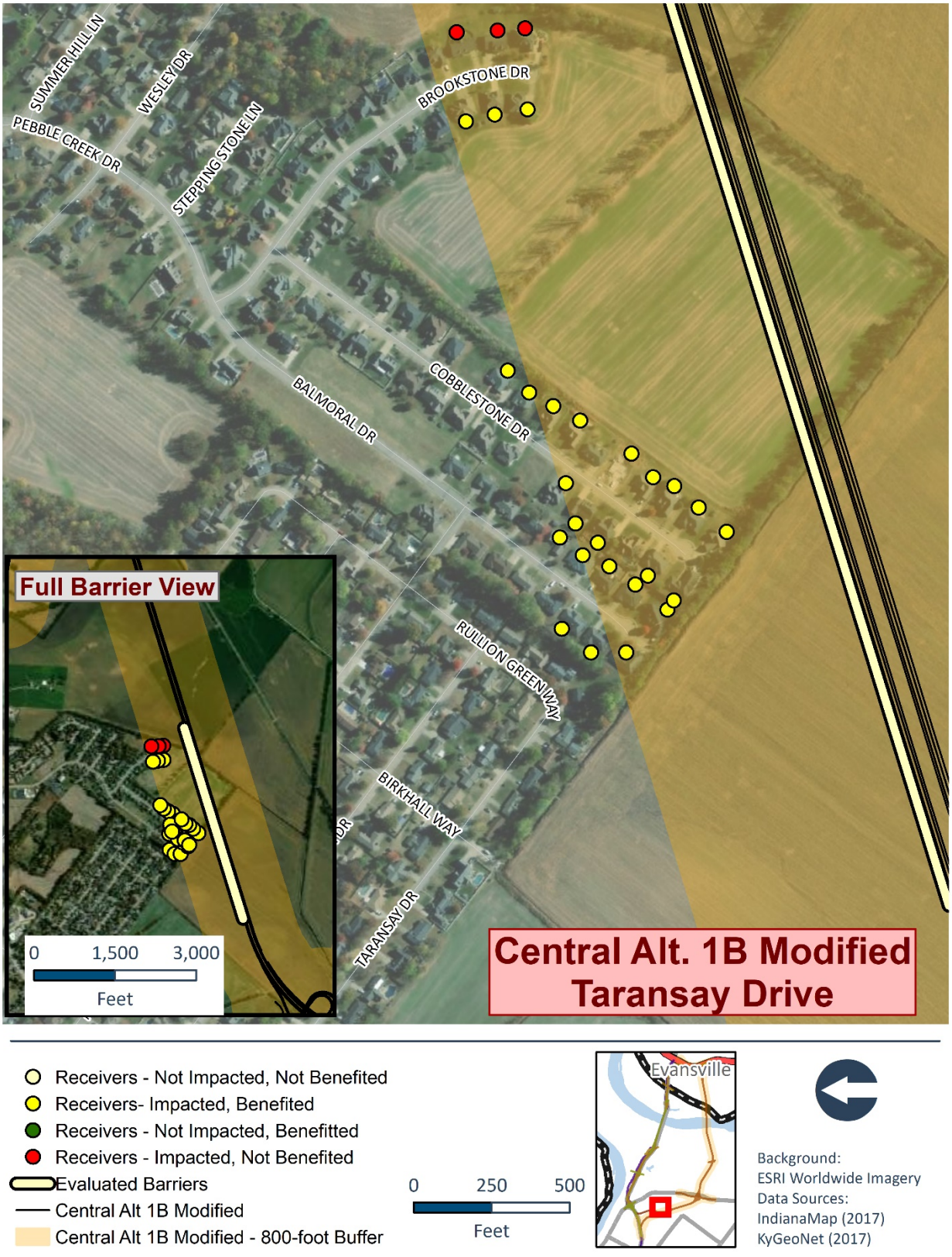


Figure 4.1–7. Barrier Analysis – Taransay Drive

4.1.7 Analysis Area – US 60

This analysis area consisted of single-family homes near US 60. The results showed no impacted receptor, so a barrier analysis was not required. Sound level results, including existing and predicted, are presented in **Table 12 of Appendix B**.

4.1.8 Analysis Area – Braxton Park Drive

This analysis area consisted of single-family homes near Braxton Park Drive. Modeled receivers, modeled structural noise barrier location, and the receiver's attenuation level thresholds are presented in Figure 4.1–8. Sound level results, including existing, predicted, and predicted with barrier, are presented in **Table 13 and 14 of Appendix B**. This table identifies the number of receptors represented by the receiver, front row receiver/receptors, and an impact summary.

Barrier Summary

A single barrier of 4,276 feet in length, with an average height of 20 feet was predicted to benefit 28 of 37 receptors (37 modeled receivers). The barrier demonstrates that it was possible to achieve a 5 dB(A) reduction at three or more impacted receptors, meeting KYTC's feasibility criteria. The cost of the modeled barrier was $2,565,805, for a cost–effectiveness ratio of $91,636 per benefited receptor. This value is above KYTC's cost–effectiveness criterion of $35,000 per benefited receptor and therefore the modeled barrier does not meet the KYTC's reasonableness threshold. The barrier provided 7 dB(A) of attenuation for two of the 12 first row benefited receptors (16.7 percent). This is below the 50 percent design goal threshold per KYTC's noise policy and therefore the barrier does not meet this reasonableness criterion. A structural noise barrier could not meet the design goal and was not reasonable based on the cost–effectiveness criterion. Multiple iterations of length and height were evaluated to increase the number of benefited receptors or reduce cost. No barrier was able to meet the design goal, and subsequently did not meet the reasonable cost–effectiveness criterion.

Table 4.1–11. Barrier Description – Braxton Park Drive

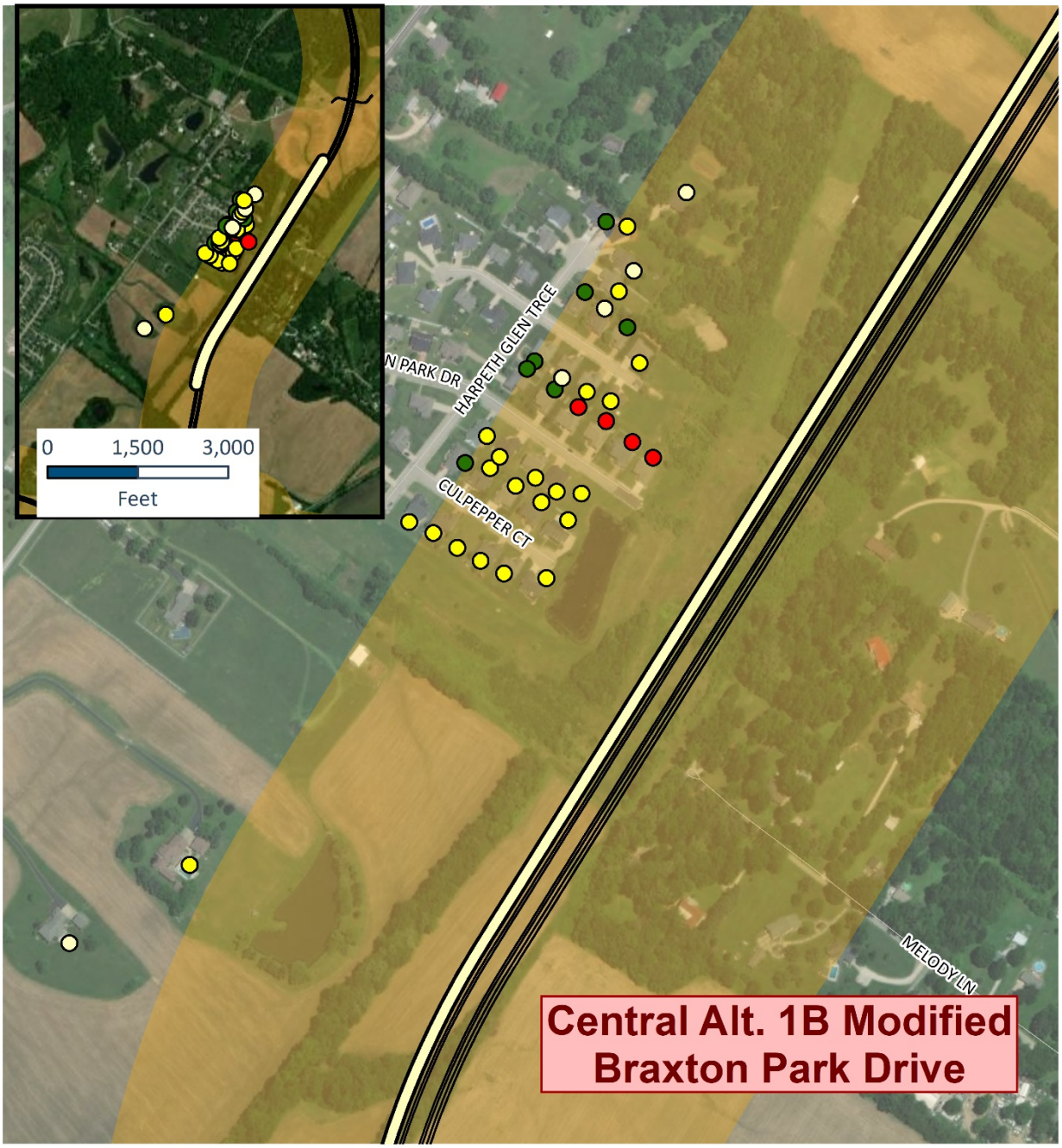
BARRIER DESCRIPTION	NO. OF IMPACTED RECEPTORS / TOTAL RECEPTORS	BARRIER LENGTH (FT)	AVERAGE BARRIER HEIGHT (FT)	BARRIER AREA (SQ FT)	BARRIER COST @ $30/SQ FT
A Single Barrier on the West Side of Central Alt. 1B Mod.	25 / 37	4,276	20.00	85,527	$2,565,805

Table 4.1–12. Barrier Summary – Braxton Park Drive

IS THE BARRIER FEASIBLE?	NO. BENEFITED AND COST PER BENEFITED	IS THE BARRIER COST EFFECTIVE?	NO. OF 1ST–ROW BENEFITED / NO. OF 1ST–ROW BENEFITED W/ 7 DB(A) OR GREATER ATTENUATION (%)	DOES THE BARRIER MEET THE DESIGN GOAL?
Yes	28 Benefited; $63,867/Benefited	No	12 / 2 16.7	No

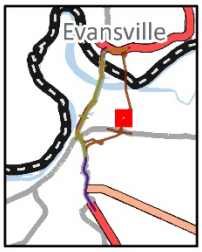
Statement of Likelihood

Based on the current project design and traffic projections, structural noise barriers are not reasonable in accordance with KYTC's noise policy and are not likely for this location.



Receivers - Not Impacted, Not Benefited
Receivers - Impacted, Benefited
Receivers - Not Impacted, Benefited
Receivers - Impacted, Not Benefited
Evaluated Barrier
Central Alt 1B Modified
Central Alt 1B Modified - 800-foot Buffer

0 250 500
Feet



Background:
ESRI Worldwide Imagery
Data Sources:
IndianaMap (2017)
KyGeoNet (2017)

Figure 4.1–8. Barrier Analysis – Braxton Park Drive

4.1.9 Analysis Area – Melody Lane

This analysis area consisted of single-family homes near Melody Lane. Modeled receivers, modeled structural noise barrier location, and the receiver's attenuation level thresholds are presented in Figure 4.1–9. Sound level results, including existing, predicted, and predicted with barrier, are presented in **Table 13 and 15 of Appendix B**. This table also identifies the number of receptors represented by the receiver, front row receiver/receptors, and an impact summary.

Barrier Summary

A single barrier of 2,380 feet in length, with an average height of 19.19 feet was predicted to benefit 10 of 11 receptors (11 modeled receivers). The barrier demonstrated that it was possible to achieve a 5 dB(A) reduction at three or more impacted receptors, meeting KYTC's feasibility criteria. The cost of the modeled barrier was $1,370,364, for a cost–effectiveness ratio of $137,036 per benefited receptor. This value is above KYTC's cost–effectiveness criterion of $35,000 per benefited receptor and therefore the modeled barrier does not meet the KYTC's reasonableness threshold. The barrier would provide 7 dB(A) of attenuation for all five first row benefited receptors (100.0 percent). This meets the 50 percent design goal threshold per KYTC's noise policy and therefore the barrier met this reasonableness criterion.

A long and tall structural noise barrier was able to meet the design goal but the relatively few number of residences in this area limit the number of benefited receptors and therefore for any wall meeting the design goal, attaining a cost–effectiveness ratio that would meet the reasonableness criteria is not achievable based on the current design and modeled traffic.

Table 4.1–13. Barrier Description – Melody Lane

BARRIER DESCRIPTION	NO. OF IMPACTED RECEPTORS / TOTAL RECEPTORS	BARRIER LENGTH (FT)	AVERAGE BARRIER HEIGHT (FT)	BARRIER AREA (SQ FT)	BARRIER COST @ $30/SQ FT
A Single Barrier on the East Side of Central Alt. 1B Modified	11 / 11	2,380	19.19	45,679	$1,370,364

Table 4.1–14. Barrier Summary – Melody Lane

IS THE BARRIER FEASIBLE?	NO. BENEFITED AND COST PER BENEFITED	IS THE BARRIER COST EFFECTIVE?	NO. OF 1ST–ROW BENEFITED / NO. OF 1ST–ROW BENEFITED W/ 7 DB(A) OR GREATER ATTENUATION (%)	DOES THE BARRIER MEET THE DESIGN GOAL?
Yes	10 Benefited; $137,036/Benefited	No	5 / 5 100.0	Yes

Statement of Likelihood

Based on the current project design and traffic projections, structural noise barriers are not reasonable in accordance with KYTC's noise policy and are not likely for this location.

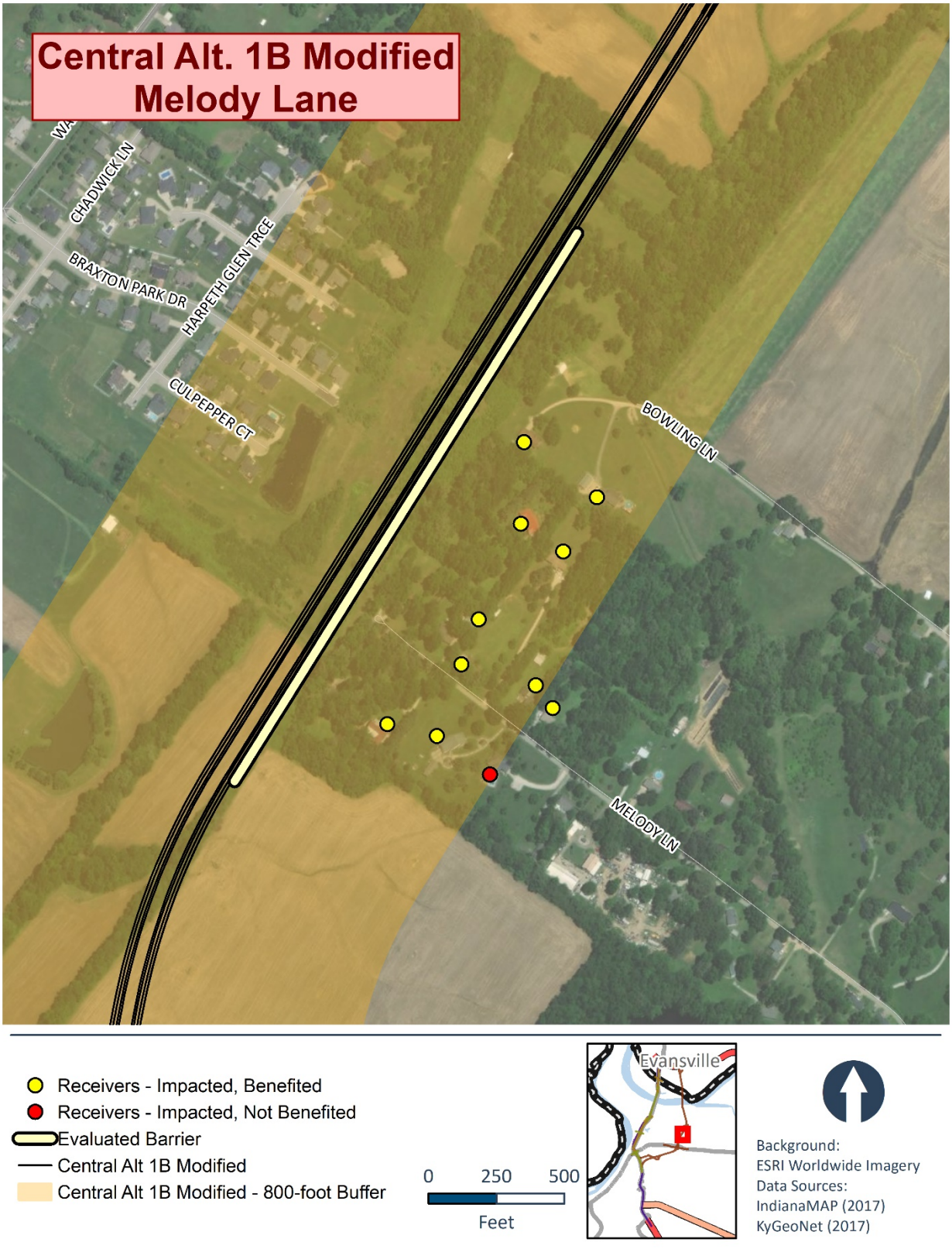


Figure 4.1–9. Barrier Analysis – Melody Lane

4.1.10 Analysis Area – Ohio River East

This analysis area consisted of single-family homes along the northern and southern banks of the Ohio River, east of the I-69 project corridor. Modeled receivers, modeled structural noise barrier location, and the receiver's attenuation level thresholds are presented in Figure 4.1–10. Sound level results, including existing, predicted, and predicted with barrier, are presented in **Table 16 and 17 of Appendix B**. This table also identifies the number of receptors represented by the receiver, front row receiver/receptors, and an impact summary.

Barrier Summary

A single barrier was analyzed that totaled 5,298 feet in length, and averaged 12.00 feet in height, and spanned the whole length of the bridge. Due to weight and wind limitations, 12 feet is the maximum height barriers are permitted on structure. It was predicted to not benefit any of the eight impacted receptors (eight modeled receivers). The barrier demonstrated that it was not possible to achieve a 5 dB(A) reduction at three or more impacted receptors; therefore, not meeting KYTC's feasibility criteria. The cost of the modeled barrier was $1,907,362; a cost-effectiveness ratio was not applicable in this situation since there were no benefited receptors, therefore, the modeled barriers do not meet KYTC's reasonableness threshold. The barriers would provide 7 dB(A) of attenuation for none of the two first row benefited receptors (0.0 percent). This is below the 50 percent design goal threshold per KYTC's noise policy and therefore the barriers do not meet this reasonableness criterion.

Table 4.1–15. Barrier Description – Ohio River East

BARRIER DESCRIPTION	NO. OF IMPACTED RECEPTORS / TOTAL RECEPTORS	BARRIER LENGTH (FT)	AVERAGE BARRIER HEIGHT (FT)	BARRIER AREA (SQ FT)	BARRIER COST @ $30/SQ FT
A Single Barrier on Structure of I-69 Bridge	8 / 8	5,298	12.00	63,579	$1,907,362

Table 4.1–16. Barrier Summary – Ohio River East

IS THE BARRIER FEASIBLE?	NO. BENEFITED AND COST PER BENEFITED	IS THE BARRIER COST EFFECTIVE?	NO. OF 1ST–ROW BENEFITED / NO. OF 1ST–ROW BENEFITED W/ 7 DB(A) OR GREATER ATTENUATION (%)	DOES THE BARRIER MEET THE DESIGN GOAL?
No	0 Benefited; N/A	No	0 / 0 0.0	No

Statement of Likelihood

Based on the current project design and traffic projections, structural noise barriers are not feasible and reasonable in accordance with the KYTC's noise policy and are not likely for this location.

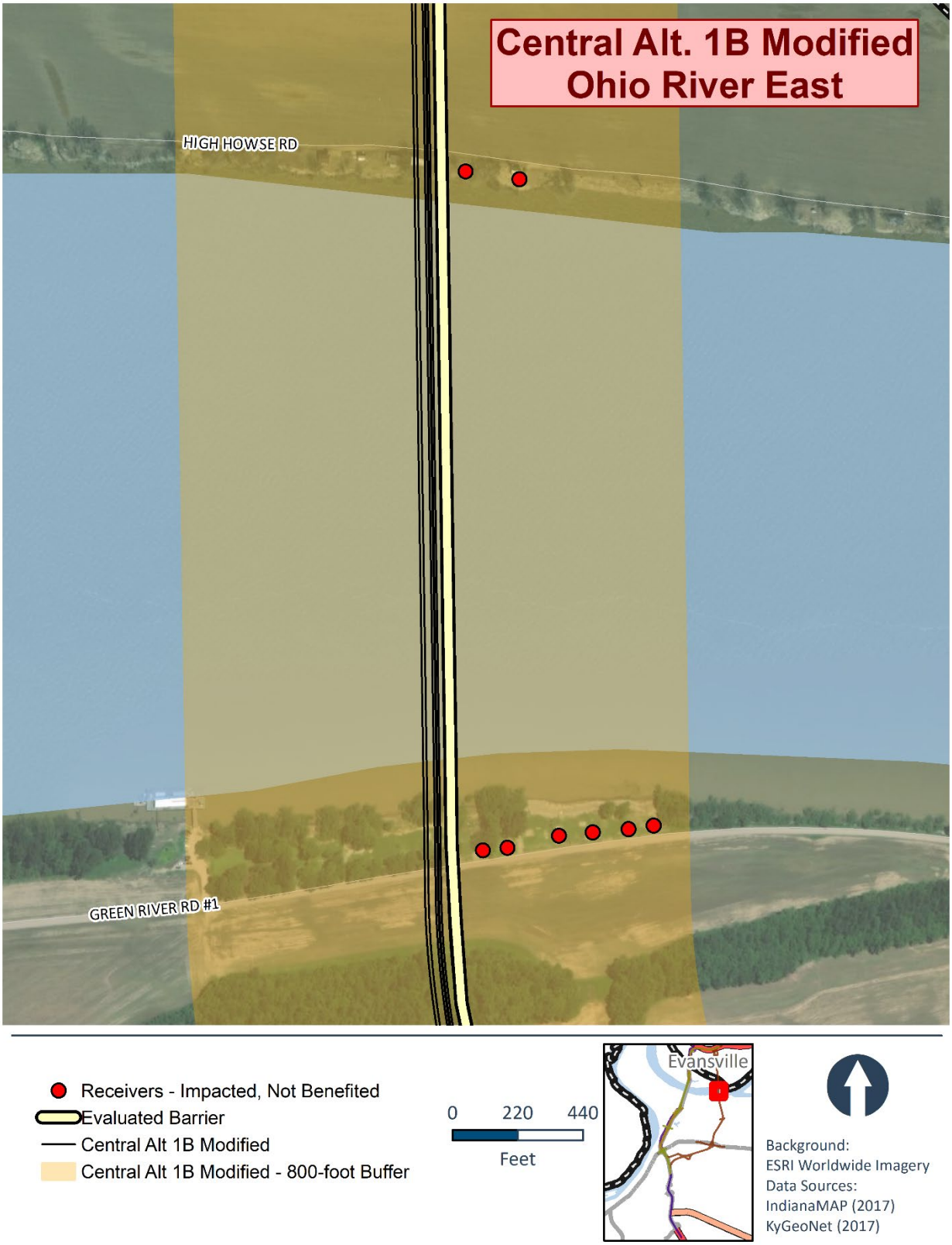


Figure 4.1–10. Barrier Analysis – Ohio River East

4.1.11 Analysis Area – Ohio River West

This analysis area consisted of single-family homes along the northern and southern banks of the Ohio River, west of the I-69 project corridor. Modeled receivers, modeled structural noise barrier location, and the receiver's attenuation level thresholds are presented in Figure 4.1–11. Sound level results, including existing, predicted, and predicted with barrier, are presented in **Table 16 and 18 of Appendix B**. This table also identifies the number of receptors represented by the receiver, front row receiver/receptors, and an impact summary.

Barrier Summary

A single barrier was analyzed that totaled 5,000 feet in length, and averaged 12.00 feet in height, and spanned the whole length of the bridge. Due to weight and wind limitations, 12 feet is the maximum height barriers are permitted on structure. It was predicted to not benefit any of the eight impacted receptors (eight modeled receivers). The barrier demonstrated that it was not possible to achieve a 5 dB(A) reduction at three or more impacted receptors; therefore, not meeting KYTC's feasibility criteria. The cost of the modeled barrier was $1,781,841; a cost-effectiveness ratio was not applicable in this situation since there were no benefited receptors, therefore, the modeled barriers do not meet KYTC's reasonableness threshold. The barriers would provide 7 dB(A) of attenuation for none of the two first row benefited receptors (0.0 percent). This is below the 50 percent design goal threshold per KYTC's noise policy and therefore the barriers do not meet this reasonableness criterion.

Table 4.1–17. Barrier Description – Ohio River West

BARRIER DESCRIPTION	NO. OF IMPACTED RECEPTORS / TOTAL RECEPTORS	BARRIER LENGTH (FT)	AVERAGE BARRIER HEIGHT (FT)	BARRIER AREA (SQ FT)	BARRIER COST @ $30/SQ FT
A Single Barrier on Structure of I-69 Bridge	8 / 8	5,000	12.00	59,395	$1,907,362

Table 4.1–18. Barrier Summary – Ohio River West

IS THE BARRIER FEASIBLE?	NO. BENEFITED AND COST PER BENEFITED	IS THE BARRIER COST EFFECTIVE?	NO. OF 1ST–ROW BENEFITED / NO. OF 1ST–ROW BENEFITED W/ 7 DB(A) OR GREATER ATTENUATION (%)	DOES THE BARRIER MEET THE DESIGN GOAL?
No	0 Benefited; N/A	No	0 / 0 0.0	No

Statement of Likelihood

Based on the current project design and traffic projections, structural noise barriers are not feasible and reasonable in accordance with the KYTC's noise policy and are not likely for this location.

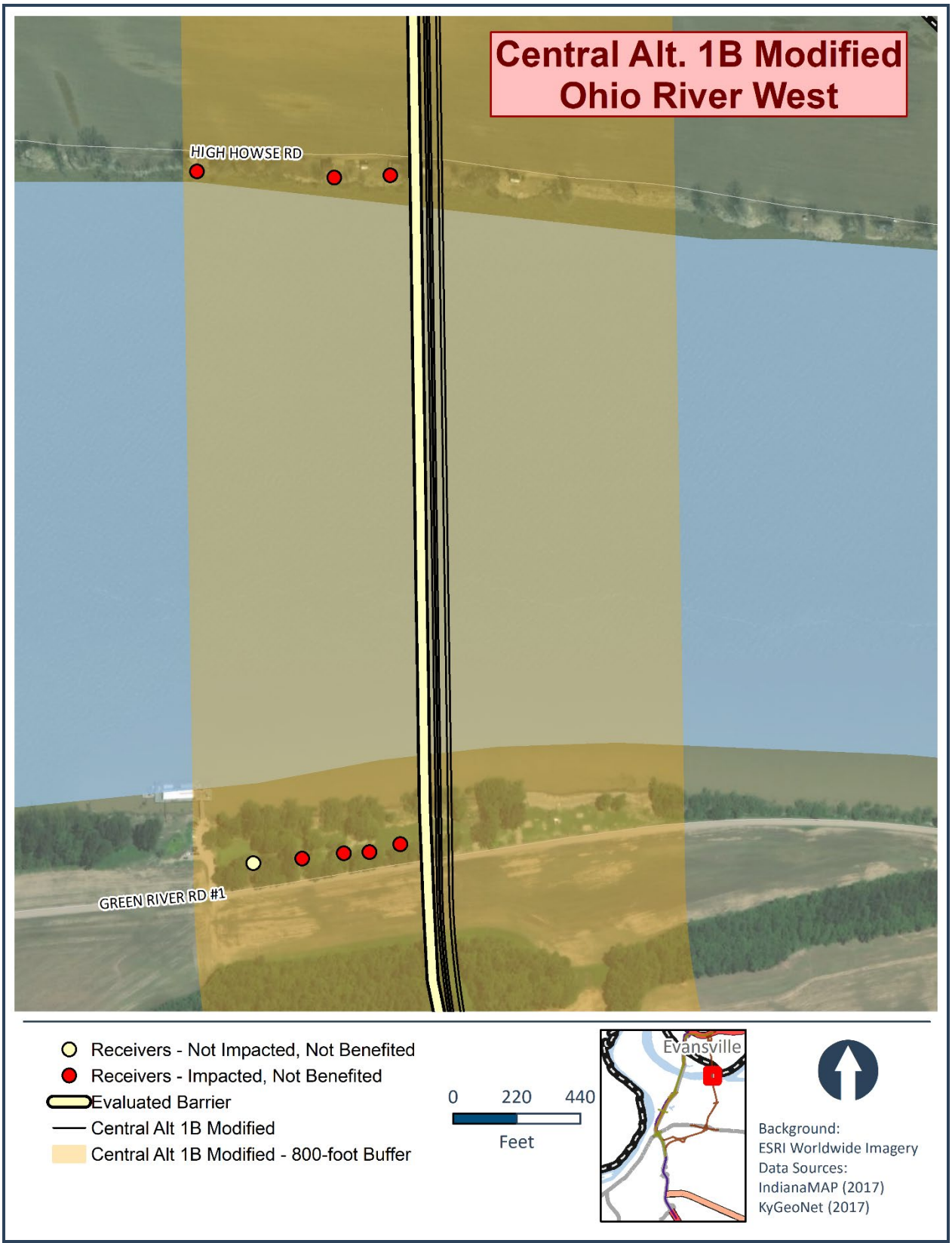


Figure 4.1–11. Barrier Analysis – Ohio River West

4.1.12 Analysis Area – Eastview East

This analysis area consisted of single-family homes in the Eastview East area. Modeled receivers, modeled structural noise barrier location, and the receiver's attenuation level thresholds are presented in Figure 4.1–12. Sound level results, including existing, predicted, and predicted with barrier, are presented in **Table 19 and 20 of Appendix B**. This table also identifies impact summary. Along the existing facility, there currently is a metal barrier, which overlaps with the proposed barrier, and continues further east than this study area. It is suggested to tie-in the proposed barrier into the existing structure.

Barrier Summary

A single of barrier was analyzed that totaled 2,419 feet in length and averaged 12.66 feet in height. It was predicted to benefit 82 of 146 receptors (146 modeled receivers). The barriers demonstrated that it was possible to achieve a 5 dB(A) reduction at a majority (greater than 50 percent) of the impacted receptors, meeting INDOT's feasibility criteria. The cost of the modeled barrier was $918,985, for a cost–effectiveness ratio of $11,207 per benefited receptor. This value is below INDOT's cost–effectiveness criterion of $30,000 per benefited receptor and therefore the modeled barrier meets INDOT's reasonableness threshold. The $30,000 per benefited receptor criteria was used because the majority (greater than 50%) of the homes in this area were in place prior to the initial construction of I-69. The barriers would provide 7 dB(A) of attenuation for 13 of the 25 first row benefited receptors (52.0 percent). This is above the 50 percent design goal threshold per INDOT's noise policy and therefore the barrier meets this reasonableness criterion.

Table 4.1–19. Barrier Description – Eastview East

BARRIER DESCRIPTION	NO. OF IMPACTED RECEPTORS / TOTAL RECEPTORS	BARRIER LENGTH (FT)	AVERAGE BARRIER HEIGHT (FT)	BARRIER AREA (SQ FT)	BARRIER COST @ $30/SQ FT
A Single Barrier on the North Side of Central Alt. 1B Modified	12 / 146	2,419	12.66	30,633	$918,985

Table 4.1–20. Barrier Summary – Eastview East

IS THE BARRIER FEASIBLE?	NO. BENEFITED AND COST PER BENEFITED	IS THE BARRIER COST EFFECTIVE?	NO. OF 1ST–ROW BENEFITED / NO. OF 1ST–ROW BENEFITED W/ 7 DB(A) OR GREATER ATTENUATION (%)	DOES THE BARRIER MEET THE DESIGN GOAL?
Yes	82 Benefited; $11,207 /Benefited	Yes	25 / 13 52.0	Yes

Statement of Likelihood

Based on the current project design and traffic projections, structural noise barriers are reasonable in accordance with the INDOT's noise policy and is likely for this location.

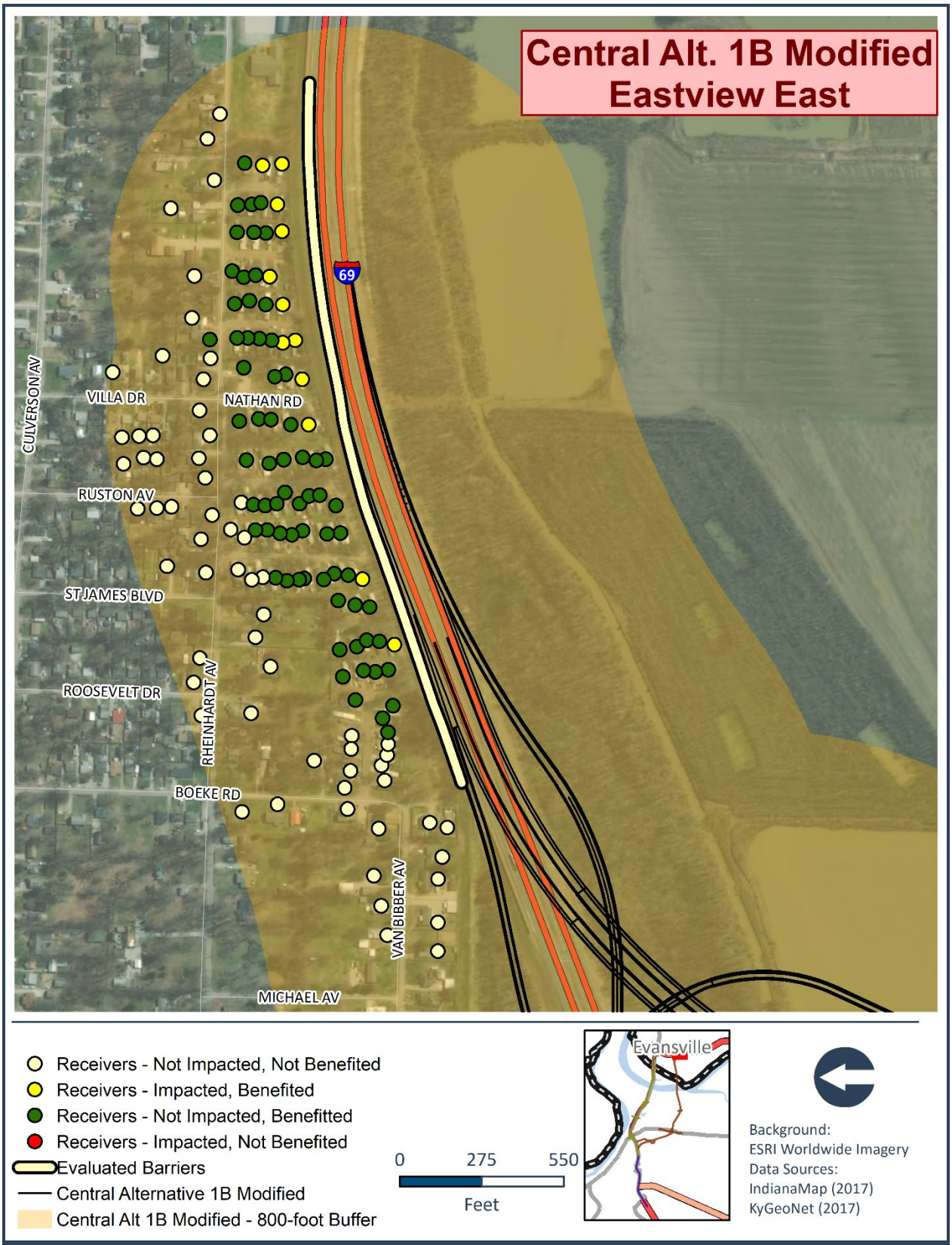


Figure 4.1–12. Barrier Analysis – Eastview East

CHAPTER 5 – SUMMARY

5.1 DIRECT IMPACTS

5.1.1 SUMMARY OF BARRIER ANALYSES

Eleven noise barrier analyses were performed for the Central Alternative 1B Modified alignment that covers the changes made to the alignment since the DEIS. Four of the barriers evaluated met the feasibility, reasonableness, and design goal criteria required by the state's noise policy. Therefore, structural noise barriers are proposed for the Central Alternative 1B Modified alignment and further abatement measures would need to be considered.

Table 5.1–1 below summarizes barriers analyzed and whether they would be likely based on the current design and barrier analyses for the Central Alternative 1B Modified alignment. Also provided is the estimated cost of each likely barrier. The total number of walls and proposed cost for the build alternative is also provided.

Table 5.1–1. Summary of Barrier Analyses

BARRIER LOCATION	FEASIBLE?	COST EFFECTIVE?	MEET DESIGN GOAL?	LIKELY BASED ON PRELIM. BARRIER ANALYSIS?	PROPOSED COST
Central Alternative 1B Modified					
Adams Ln.	Yes	Yes	Yes	Yes	$529,155
Vanguard Ave.	Yes	Yes	Yes	Yes	$1,533,423
South Arlington Dr.	Yes	No	Yes	No	—
Melwood Dr.	Yes	Yes	Yes	Yes	$933,612
Taransay Dr.	Yes	No	Yes	No	—
Braxton Park Dr.	Yes	No	No	No	—
Melody Ln.	Yes	No	Yes	No	—
Ohio River East	No	No	No	No	—
Ohio River West	No	No	No	No	—
Eastview East	Yes	Yes	Yes	Yes	$918,985
Total Number of Walls and Cost					
Central Alternative 1B Modified				4 Walls / $3,915,175	

5.1.2 STATEMENT OF LIKELIHOOD – IF LIKELY

Based on noise studies completed to date, it was determined that noise abatement is likely, but not guaranteed, at the locations listed in Table 5.1–1. Noise abatement recommended at these locations is based upon preliminary design costs and design criteria. Noise abatement in these locations would reduce noise levels to meet the design goals as described in INDOT and KYTC's noise policies. A re-evaluation of the noise analysis for a Preferred Alternative would occur

during final design. If during final design it has been determined that conditions have changed such that noise abatement would not be feasible and reasonable, the abatement measures might not be provided.

The final decision on the installation of any abatement measure(s) would be made upon the completion of the project's final design and the public involvement process. The viewpoints of the benefited residents and property owners would be sought and considered in determining the reasonableness of highway traffic noise abatement measures for proposed highway construction projects.

5.1.3 Statement of Likelihood – If Not Likely

Based on the noise studies, locations where noise abatement is not likely have been identified based on a lack of being both reasonable and feasible. Noise abatement measures that were studied at these locations were based upon preliminary design costs and design criteria. If additional changes occur during future design phases, a re-evaluation of the noise analysis may be necessary. If during final design it has been determined that conditions have changed such that noise abatement is feasible and reasonable, the abatement measures might be provided. The final decision on the installation of any abatement measure(s) will be made upon the completion of the project's final design and the public involvement processes. The viewpoints of the benefited residents and property owners are a major consideration in determining the reasonableness of highway traffic noise abatement measures for proposed highway construction projects.

These viewpoints will be determined and addressed during the environmental phase of project development. The will and desires of the public are an important factor in dealing with the overall problems of highway traffic noise. INDOT and KYTC will incorporate highway traffic noise consideration in on-going activities for public involvement in the highway program, i.e., and will re-examine the residents' and property owners' views on the desirability and acceptability of abatement during project development.

5.1.4 Next Steps and Commitments

The structural noise barrier analyses presented in this Noise Impact Analysis Addendum are preliminary in nature and were evaluated to identify locations where structural noise barriers are likely based on the current design, traffic model without considerations of final design criteria that may limit the lengths or locations of structural noise barriers (such as drainage features and sight distance requirements). These preliminary structural noise barrier analyses are utilized for comparing the likeliness of barrier mitigation for noise sensitive receptors. These findings will be incorporated into the Final Environmental Impact Statement (FEIS).

Moving forward, the following commitments shall be incorporated into the project:

1) Any substantial redesign to a location's horizontal alignment, vertical alignment, or conceptual layout should be reevaluated for noise impacts and barrier mitigation.
2) Final barrier analyses and determinations of feasibility, reasonableness, and engineering considerations will occur as a part of final design. As the project moves to final design and the barriers identified as likely are assessed for incorporation into the project, the final

analysis for mitigation shall consider all impacts within 800 feet of any construction activities occurring within the proposed roadway's edge of pavement.

3) Locations that are identified as likely at that time will have public involvement phases to assess the views of the affected and benefited residents.

5.2 INDIRECT AND CUMULATIVE IMPACTS

Indirect impacts are impacts caused not by the subject project, but rather by another action or actions that have an established relationship or connection to the project. These induced actions are those that would not or could not occur except for the implementation of a project, and cumulative impacts include the total effect on a human community due to past, present, and future activities or actions of federal, non-federal, public, and/or private entities.

The highway traffic noise analysis utilizes design year (2045) traffic generated by the constructed roadway network accounts for the presence of I-69. With the Central Alternative 1B Modified it would be reasonably foreseeable that development of the areas adjacent to the new I-69 facility that are currently undeveloped may add additional vehicle trip near noise sensitive receptors and therefore may indirectly induce additional noise in these areas.

CHAPTER 6 – REFERENCES

Kentucky's KY 2020 – 2026 Highway Plan

2020 Kentucky Transportation Cabinet

Planning Study Report (Final) for the I-69 Ohio River Crossing Project, Henderson: Section 1

2020 Kentucky Transportation Cabinet and the Indiana Department of Transportation

Policy on Highway Traffic Noise Abatement

2020 Kentucky Transportation Cabinet

Traffic Noise Analysis Procedure

2017 Indiana Department of Transportation

Standard Specifications

2018 Indiana Department of Transportation
http://www.in.gov/dot/div/contracts/standards/book/sep17/2018Master.pdf

Standard Specifications for Road and Bridge Construction

2012 Kentucky Transportation Cabinet

The Audible Landscape: A Manual for Highway Noise and Land Use

1974 Federal Highway Administration
https://www.fhwa.dot.gov/environment/noise/noise_compatible_planning/federal_approach/audible_landscape/audible_landscape.pdf.

Entering Quiet Zone: Noise Compatibility Land Use Planning

2002 Federal Highway Administration
https://www.fhwa.dot.gov/ENVIRONMENT/noise/noise_compatible_planning/federal_approach/land_use/quietzone.pdf.

APPENDIX A – FIGURES

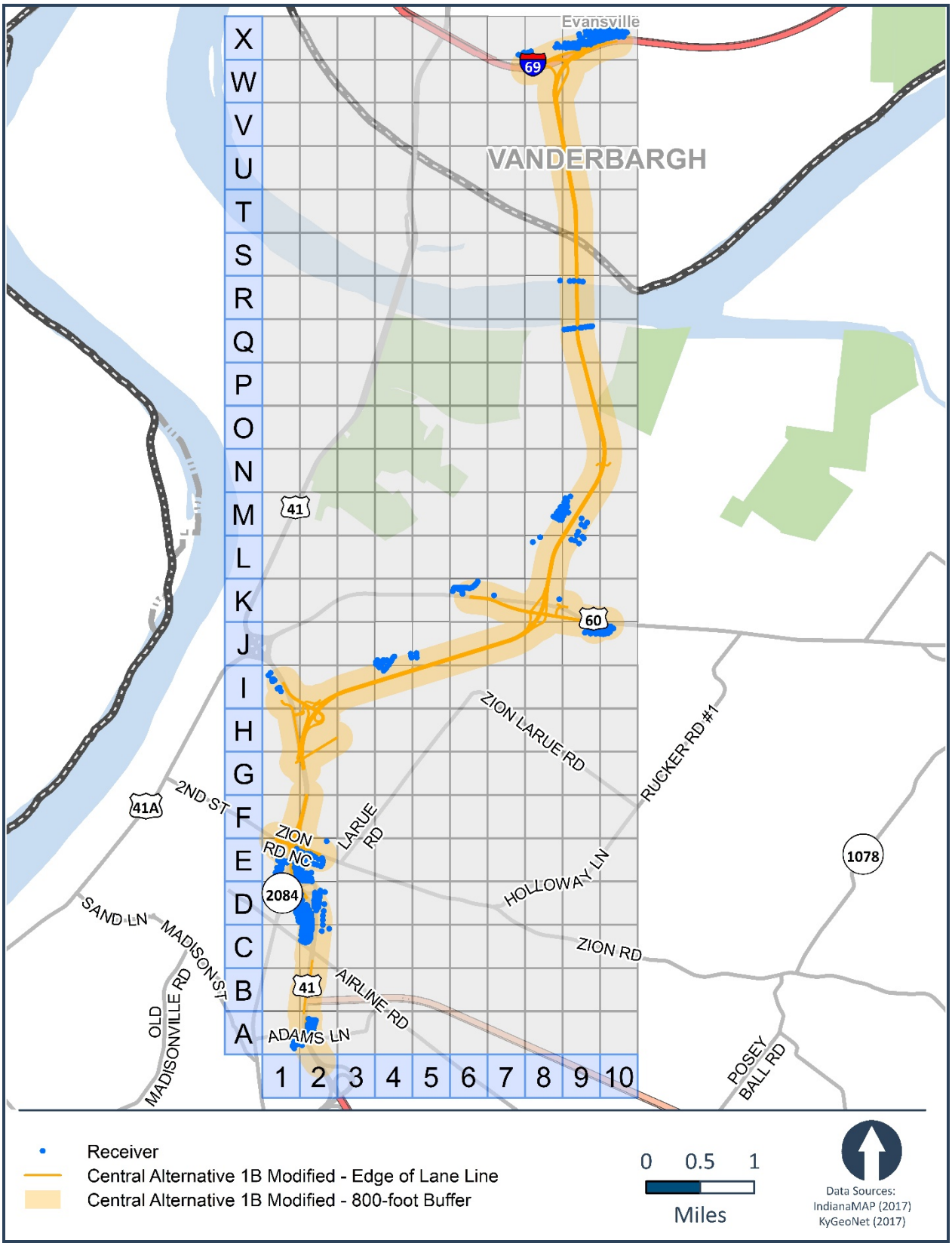
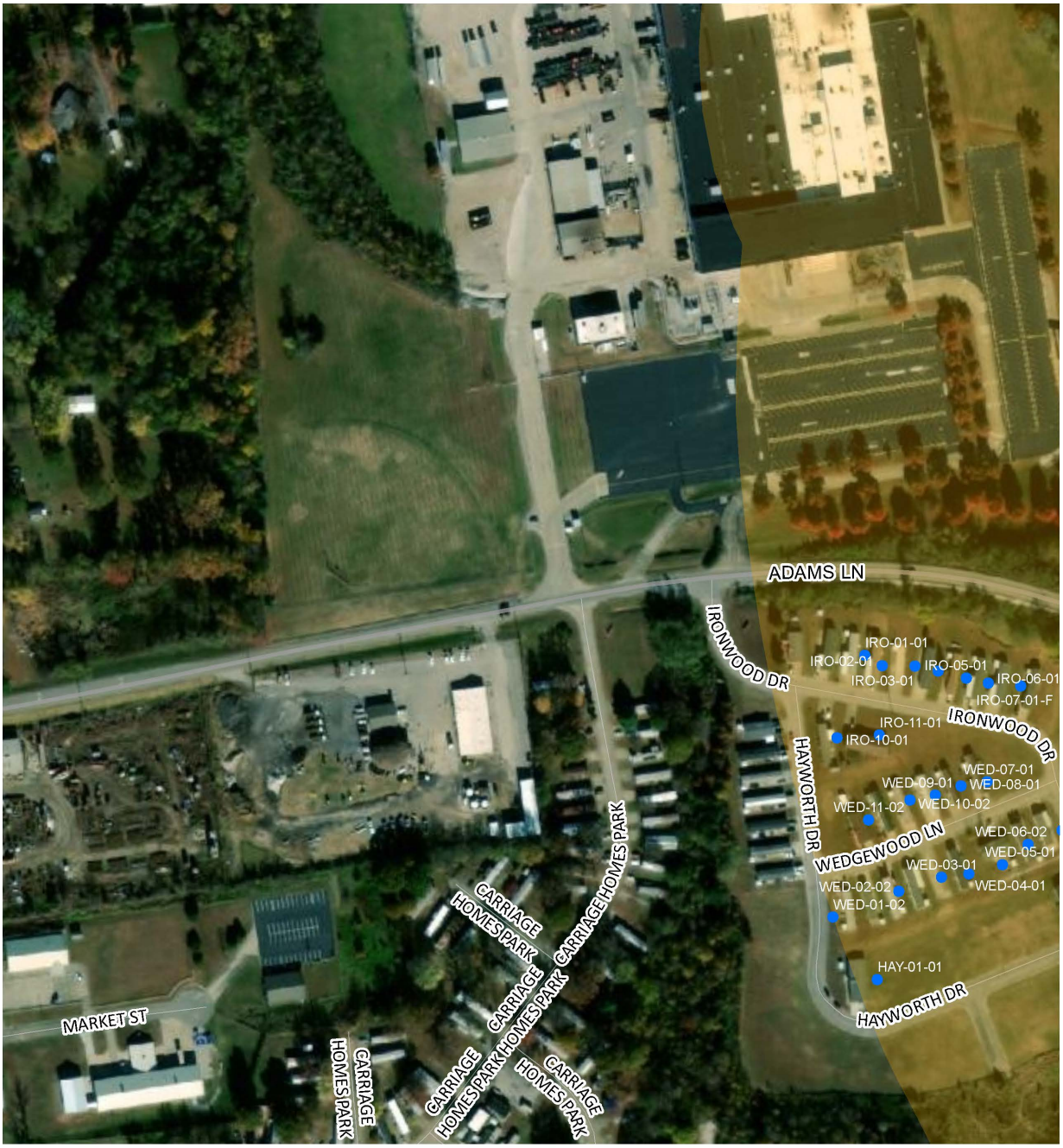


Figure 1. Index Map



Receiver
Central Alternative 1B Modified - Edge of Lane Line
Central Alternative 1B Modified - 800-foot Buffer

A1
0 125 250
Feet

Background:
ESRI Worldwide Imagery
Data Sources:
IndianaMap (2017)
KyGeoNet (2017)

Figure 2. Map A1

Receiver
Central Alternative 1B Modified - Edge of Lane Line
Central Alternative 1B Modified - 800-foot Buffer

A2

0 125 250
Feet

Background:
ESRI Worldwide Imagery
Data Sources:
IndianaMap (2017)
KyGeoNet (2017)

Figure 3. Map A2

Receiver
Central Alternative 1B Modified - Edge of Lane Line
Central Alternative 1B Modified - 800-foot Buffer

C1
0 125 250
Feet

Background:
ESRI Worldwide Imagery
Data Sources:
IndianaMap (2017)
KyGeoNet (2017)

Figure 4. Map C1

Receiver
Central Alternative 1B Modified - Edge of Lane Line
Central Alternative 1B Modified - 800-foot Buffer

C2

0 125 250
Feet

Background:
ESRI Worldwide Imagery
Data Sources:
IndianaMap (2017)
KyGeoNet (2017)

Figure 5. Map C2

Receiver
Central Alternative 1B Modified - Edge of Lane Line
Central Alternative 1B Modified - 800-foot Buffer

D1
0 125 250
Feet

Background:
ESRI Worldwide Imagery
Data Sources:
IndianaMap (2017)
KyGeoNet (2017)

Figure 6. Map D1

Figure 7. Map D2

Figure 8. Map E1

Receiver
Central Alternative 1B Modified - Edge of Lane Line
Central Alternative 1B Modified - 800-foot Buffer

E2

0 125 250
Feet

Background:
ESRI Worldwide Imagery
Data Sources:
IndianaMap (2017)
KyGeoNet (2017)

Figure 9. Map E2

Receiver
Central Alternative 1B Modified - Edge of Lane Line
Central Alternative 1B Modified - 800-foot Buffer

F1
0 125 250
Feet

Background:
ESRI Worldwide Imagery
Data Sources:
IndianaMap (2017)
KyGeoNet (2017)

Figure 10. Map F1

Receiver
Central Alternative 1B Modified - Edge of Lane Line
Central Alternative 1B Modified - 800-foot Buffer

I1
0 125 250
Feet

Background:
ESRI Worldwide Imagery
Data Sources:
IndianaMap (2017)
KyGeoNet (2017)

Figure 11. Map I1

Receiver
Central Alternative 1B Modified - Edge of Lane Line
Central Alternative 1B Modified - 800-foot Buffer

I4
0 125 250
Feet

Background:
ESRI Worldwide Imagery
Data Sources:
IndianaMap (2017)
KyGeoNet (2017)

Figure 12. Map I4

Receiver
Central Alternative 1B Modified - Edge of Lane Line
Central Alternative 1B Modified - 800-foot Buffer

J4

0 125 250
Feet

Background:
ESRI Worldwide Imagery
Data Sources:
IndianaMap (2017)
KyGeoNet (2017)

Figure 13. Map J4

Receiver
Central Alternative 1B Modified - Edge of Lane Line
Central Alternative 1B Modified - 800-foot Buffer

J5
0 125 250
Feet

Background:
ESRI Worldwide Imagery
Data Sources:
IndianaMap (2017)
KyGeoNet (2017)

Figure 14. Map J5

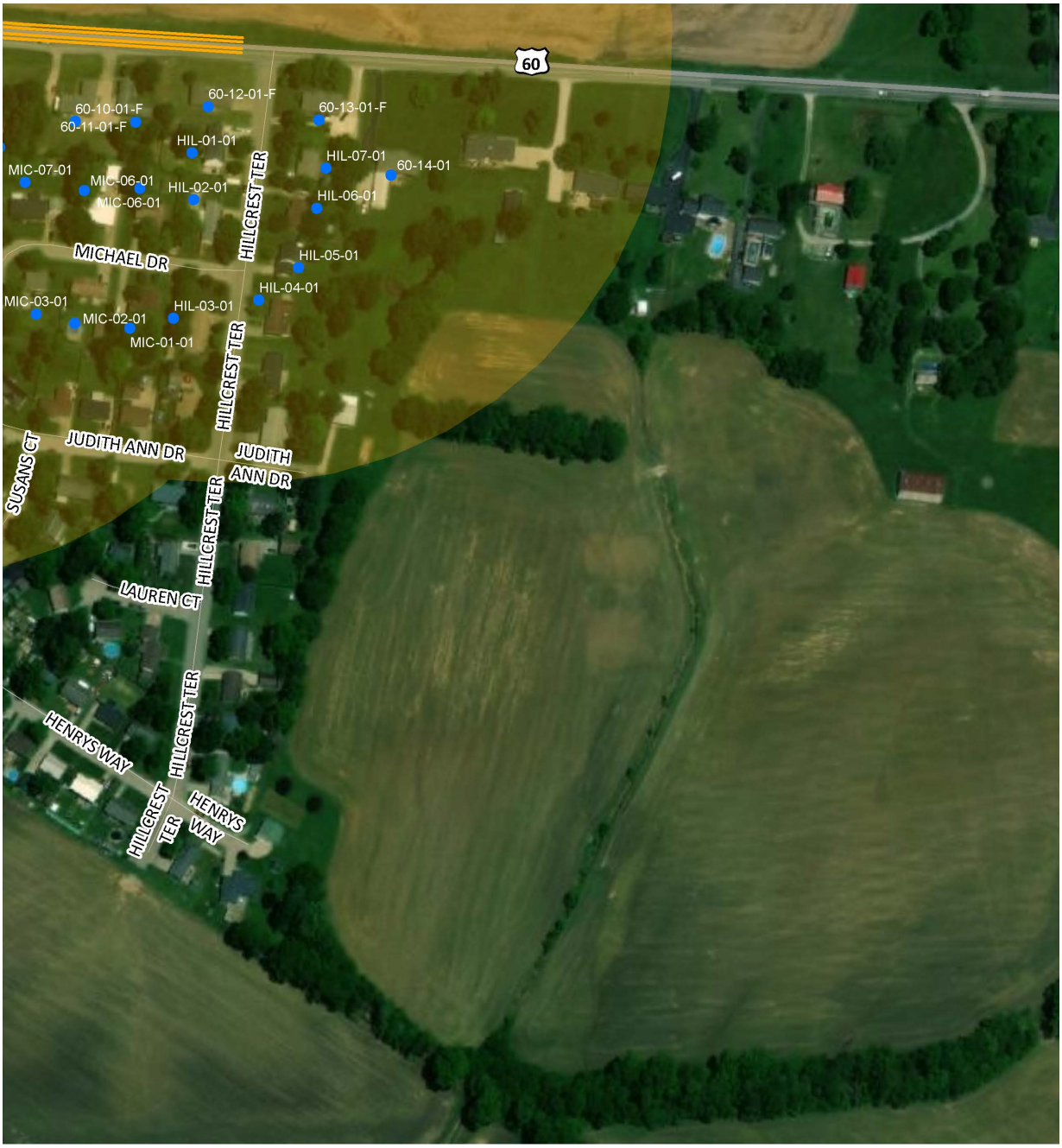
Receiver
Central Alternative 1B Modified - Edge of Lane Line
Central Alternative 1B Modified - 800-foot Buffer

J9

0 125 250
Feet

Background:
ESRI Worldwide Imagery
Data Sources:
IndianaMap (2017)
KyGeoNet (2017)

Figure 15. Map J9



Receiver
Central Alternative 1B Modified - Edge of Lane Line
Central Alternative 1B Modified - 800-foot Buffer

J10
0 125 250
Feet

Background:
ESRI Worldwide Imagery
Data Sources:
IndianaMap (2017)
KyGeoNet (2017)

Figure 16. Map J10

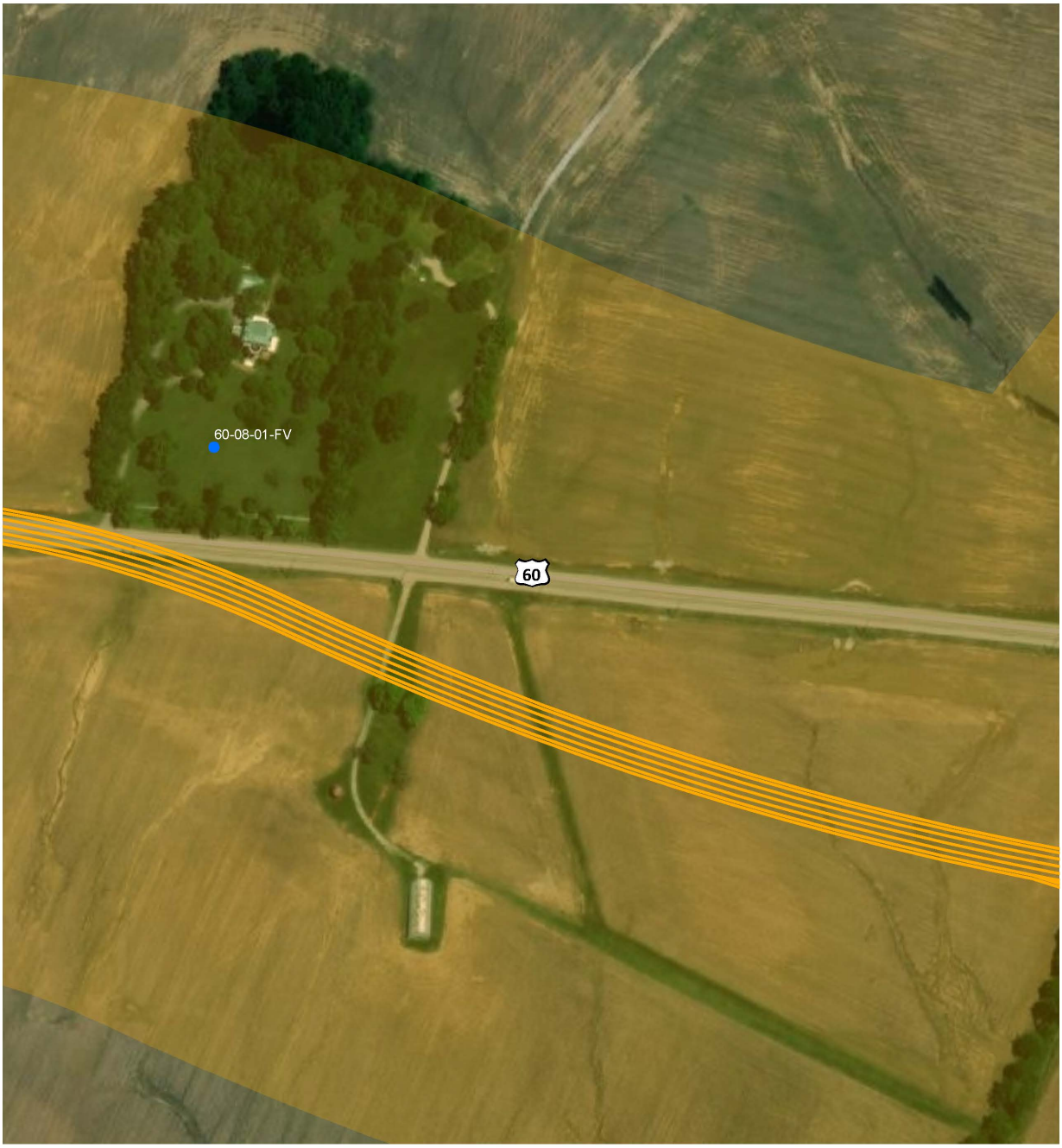
Receiver
Central Alternative 1B Modified - Edge of Lane Line
Central Alternative 1B Modified - 800-foot Buffer

K6

0 125 250
Feet

Background:
ESRI Worldwide Imagery
Data Sources:
IndianaMap (2017)
KyGeoNet (2017)

Figure 17. Map K6

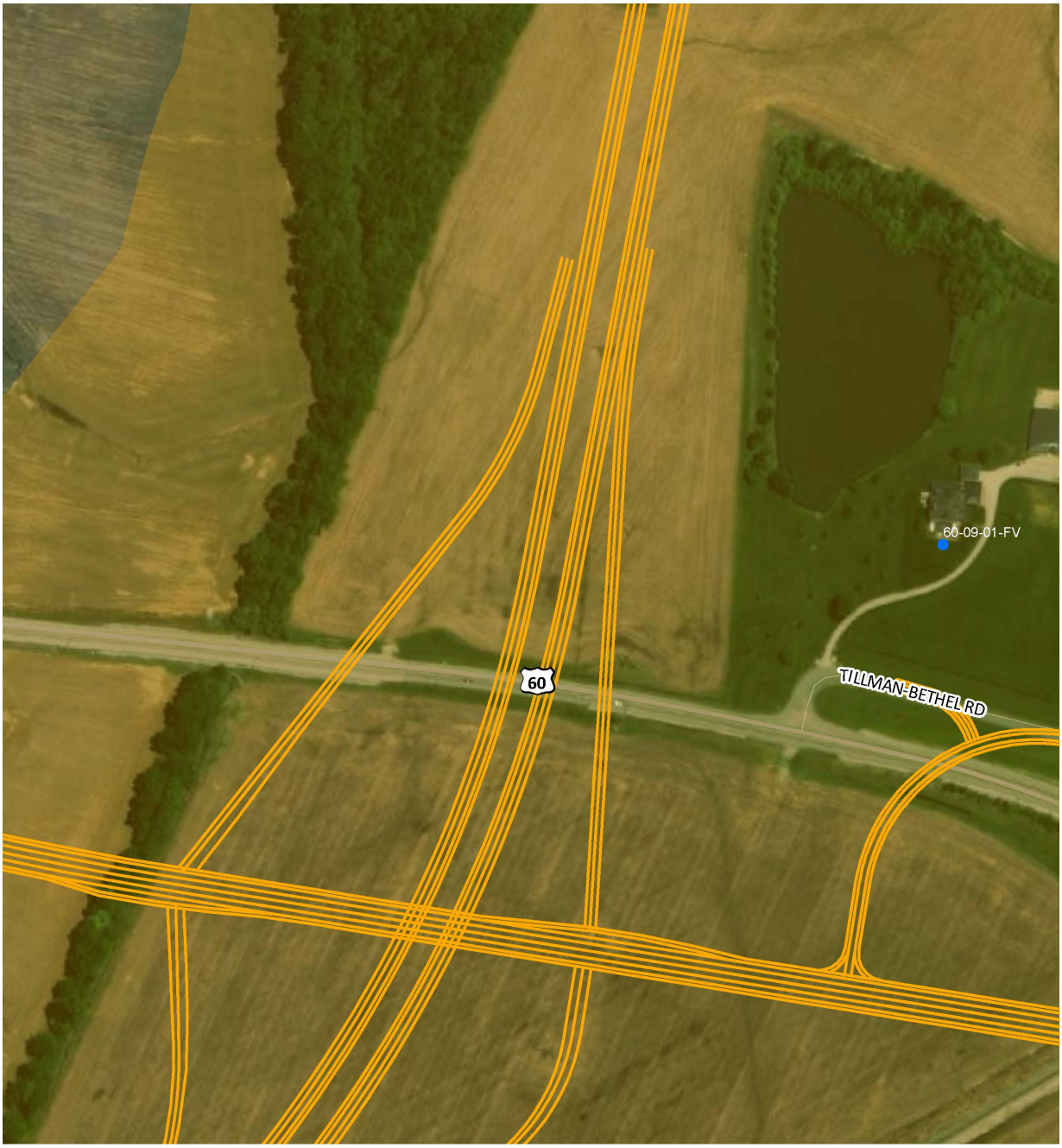


Receiver
Central Alternative 1B Modified - Edge of Lane Line
Central Alternative 1B Modified - 800-foot Buffer

K7
0 125 250
Feet

Background:
ESRI Worldwide Imagery
Data Sources:
IndianaMap (2017)
KyGeoNet (2017)

Figure 18. Map K7



Receiver
Central Alternative 1B Modified - Edge of Lane Line
Central Alternative 1B Modified - 800-foot Buffer

K8
0 125 250
Feet

Background:
ESRI Worldwide Imagery
Data Sources:
IndianaMap (2017)
KyGeoNet (2017)

Figure 19. Map K8

Receiver
Central Alternative 1B Modified - Edge of Lane Line
Central Alternative 1B Modified - 800-foot Buffer

L8
0 125 250
Feet

Background:
ESRI Worldwide Imagery
Data Sources:
IndianaMap (2017)
KyGeoNet (2017)

Figure 20. Map L8

Receiver
Central Alternative 1B Modified - Edge of Lane Line
Central Alternative 1B Modified - 800-foot Buffer

L9
0 125 250
Feet

Background:
ESRI Worldwide Imagery
Data Sources:
IndianaMap (2017)
KyGeoNet (2017)

Figure 21. Map L9

Receiver
Central Alternative 1B Modified - Edge of Lane Line
Central Alternative 1B Modified - 800-foot Buffer

M8

0 125 250
Feet

Background:
ESRI Worldwide Imagery
Data Sources:
IndianaMap (2017)
KyGeoNet (2017)

Figure 22. Map M8

Receiver
Central Alternative 1B Modified - Edge of Lane Line
Central Alternative 1B Modified - 800-foot Buffer

M9

0 125 250
Feet

Background:
ESRI Worldwide Imagery
Data Sources:
IndianaMap (2017)
KyGeoNet (2017)

Figure 23. Map M9

Receiver
Central Alternative 1B Modified - Edge of Lane Line
Central Alternative 1B Modified - 800-foot Buffer

Q9

0 125 250
Feet

Background:
ESRI Worldwide Imagery
Data Sources:
IndianaMap (2017)
KyGeoNet (2017)

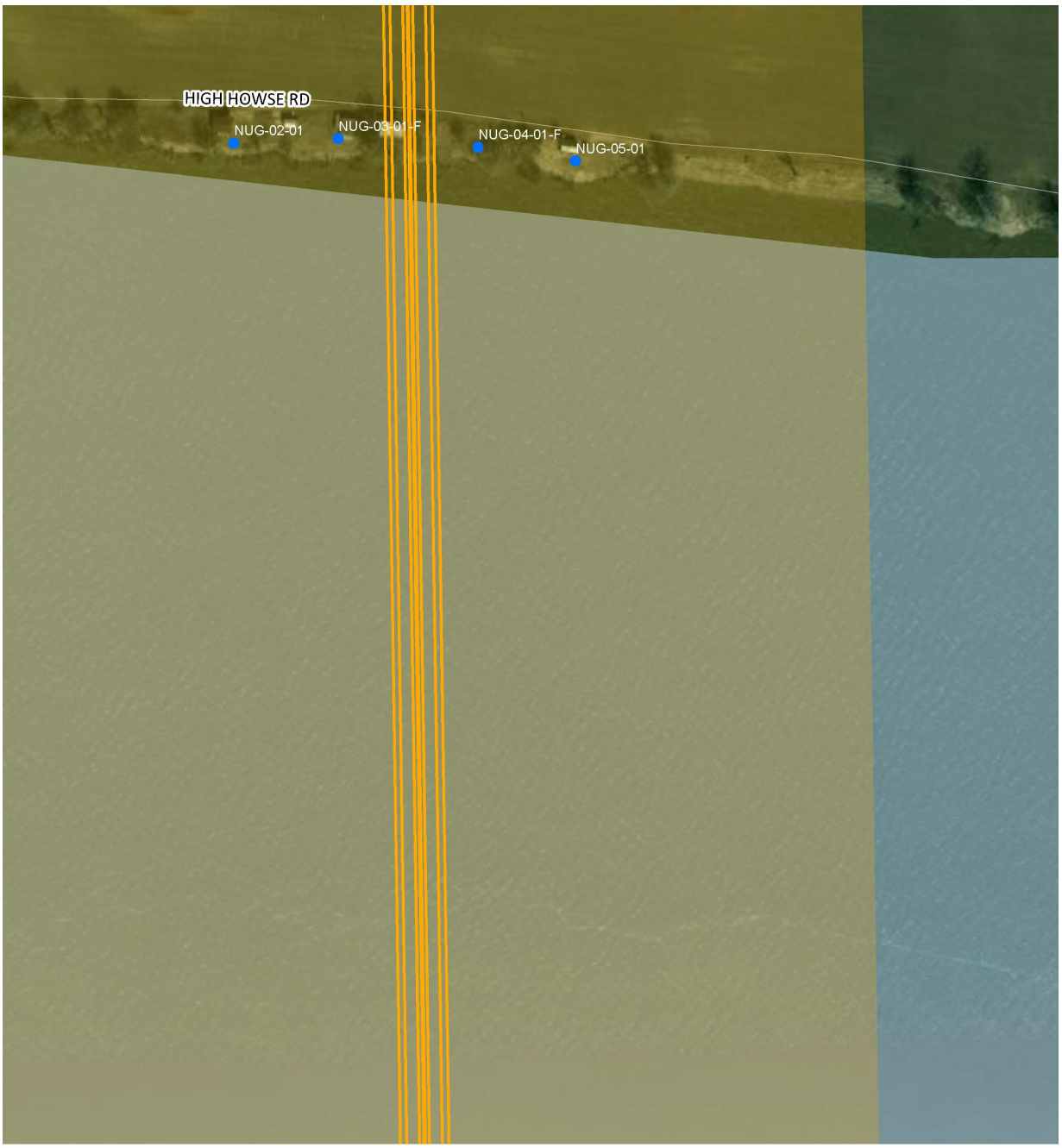
Figure 24. Map Q9

Receiver
Central Alternative 1B Modified - Edge of Lane Line
Central Alternative 1B Modified - 800-foot Buffer

R8
0 125 250
Feet

Background:
ESRI Worldwide Imagery
Data Sources:
IndianaMap (2017)
KyGeoNet (2017)

Figure 25. Map R8

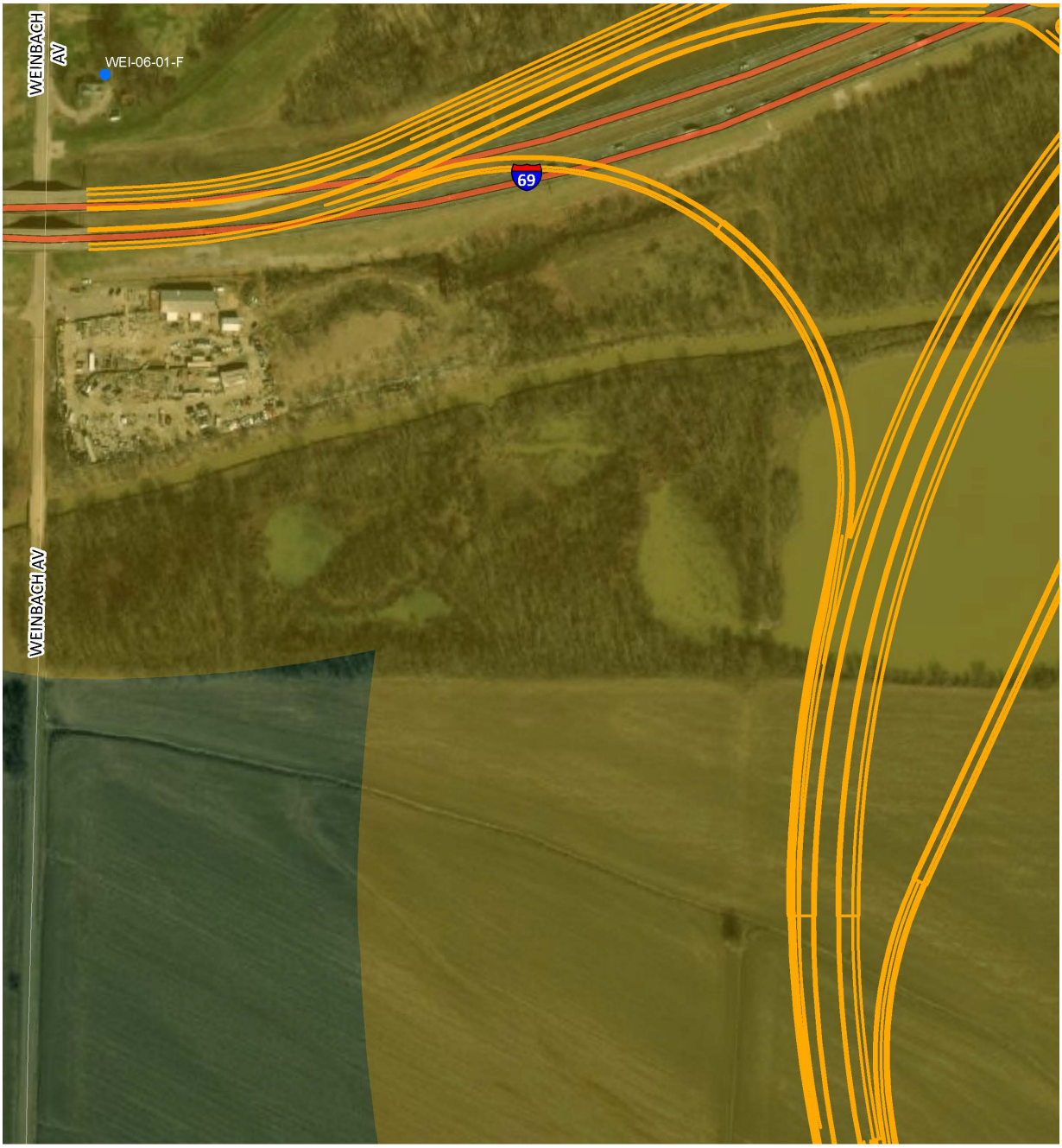


Receiver
Central Alternative 1B Modified - Edge of Lane Line
Central Alternative 1B Modified - 800-foot Buffer

R9
0 125 250
Feet

Background:
ESRI Worldwide Imagery
Data Sources:
IndianaMap (2017)
KyGeoNet (2017)

Figure 26. Map R9

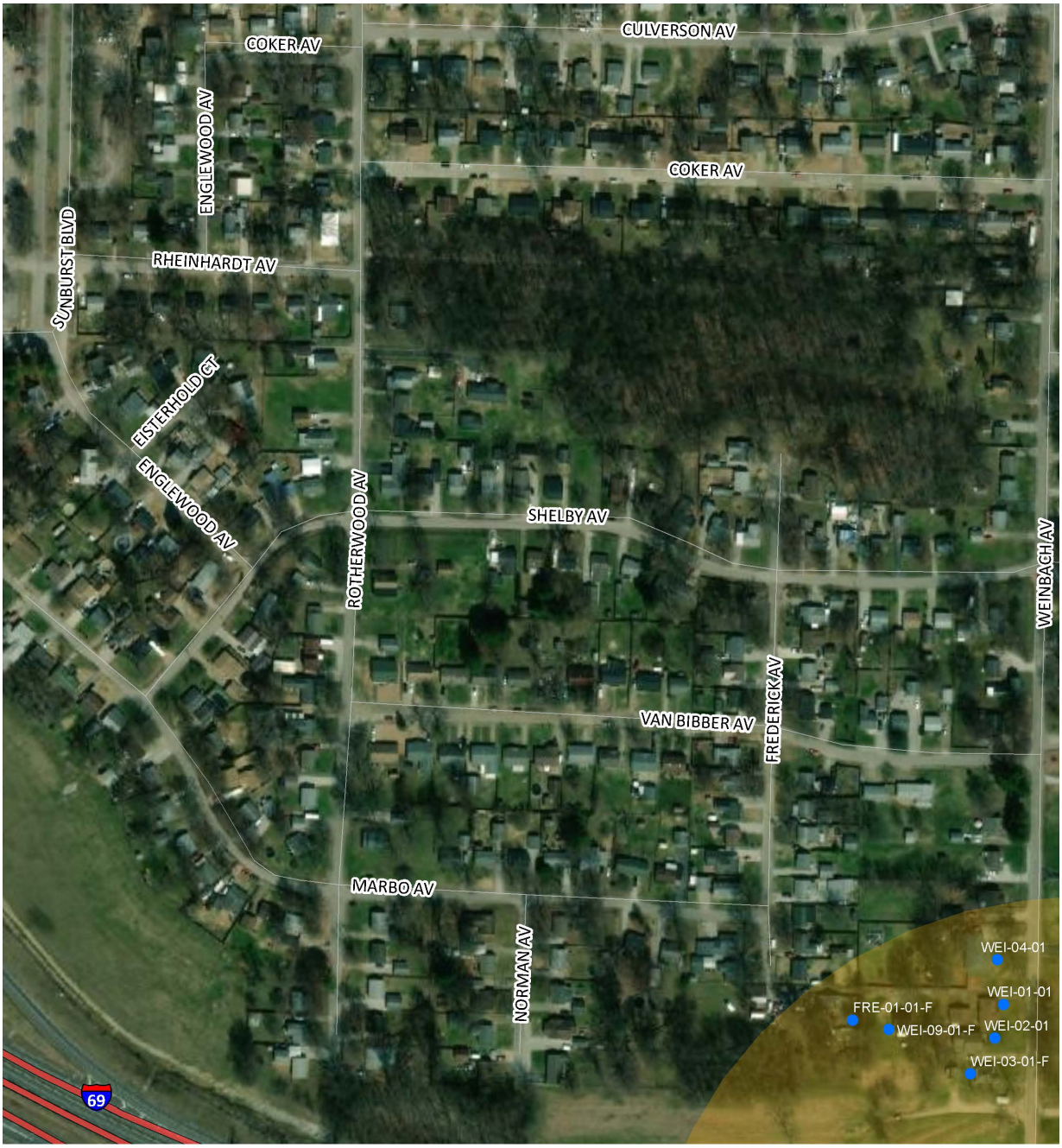


Receiver
Central Alternative 1B Modified - Edge of Lane Line
Central Alternative 1B Modified - 800-foot Buffer

W8
0 125 250
Feet

Background:
ESRI Worldwide Imagery
Data Sources:
IndianaMap (2017)
KyGeoNet (2017)

Figure 27. Map W8



Receiver
Central Alternative 1B Modified - Edge of Lane Line
Central Alternative 1B Modified - 800-foot Buffer

X7
0 125 250
Feet

Background:
ESRI Worldwide Imagery
Data Sources:
IndianaMap (2017)
KyGeoNet (2017)

Figure 28. Map X7

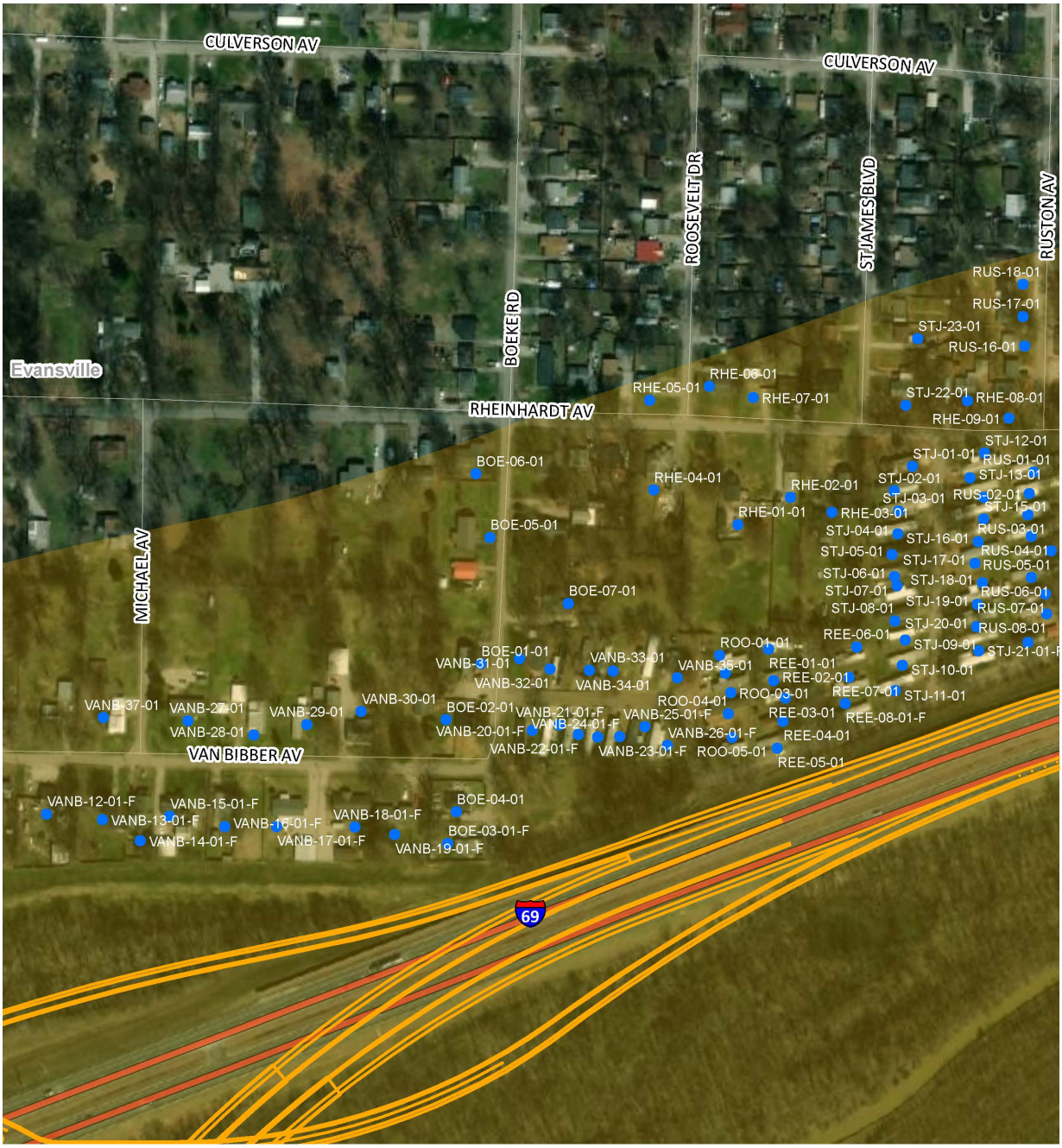
Receiver
Central Alternative 1B Modified - Edge of Lane Line
Central Alternative 1B Modified - 800-foot Buffer

X8

0 125 250
Feet

Background:
ESRI Worldwide Imagery
Data Sources:
IndianaMap (2017)
KyGeoNet (2017)

Figure 29. Map X8



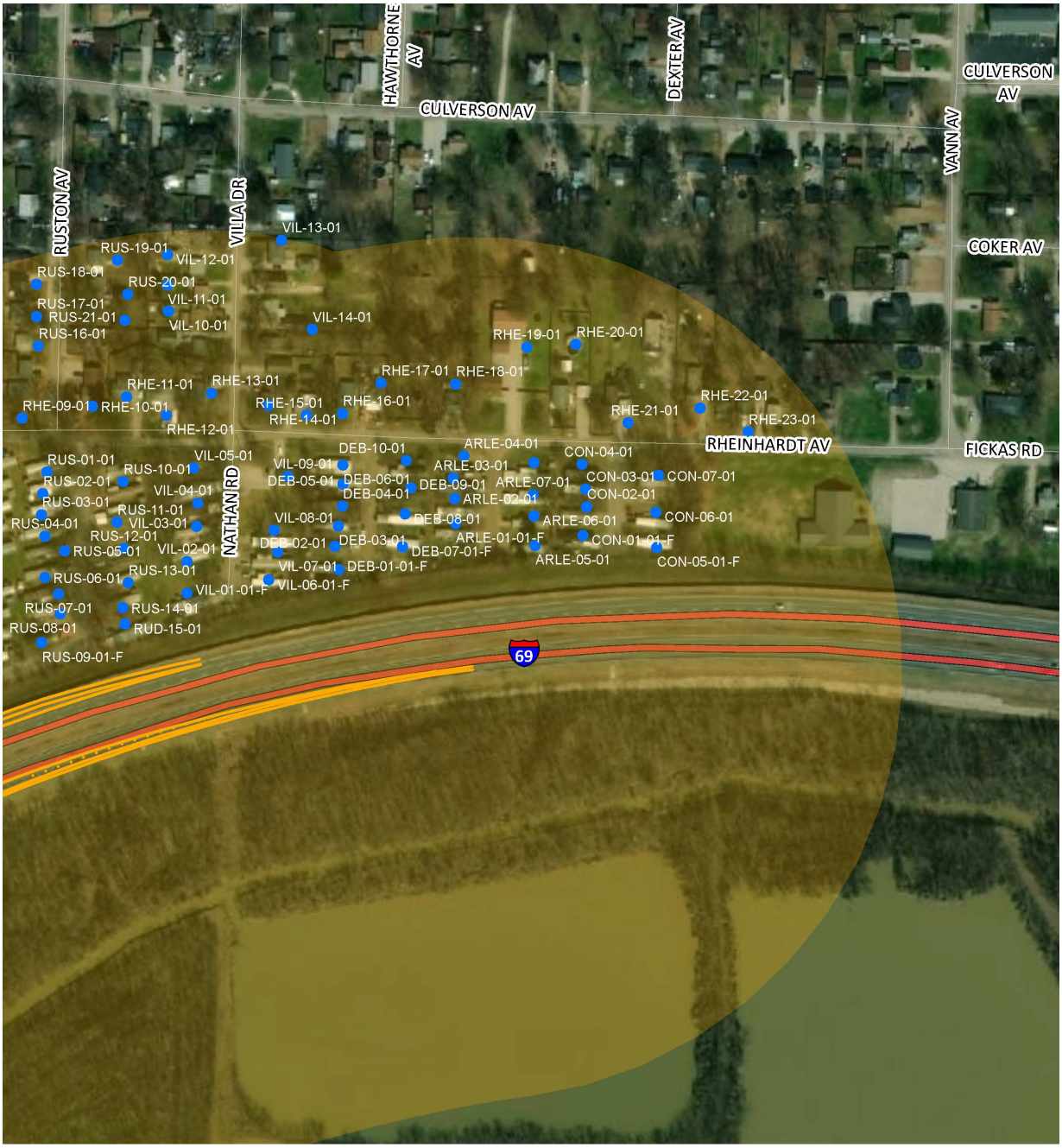
Receiver
Central Alternative 1B Modified - Edge of Lane Line
Central Alternative 1B Modified - 800-foot Buffer

X9

0 125 250
Feet

Background:
ESRI Worldwide Imagery
Data Sources:
IndianaMap (2017)
KyGeoNet (2017)

Figure 30. Map X9



Receiver
Central Alternative 1B Modified - Edge of Lane Line
Central Alternative 1B Modified - 800-foot Buffer

X10
0 125 250
Feet

Background:
ESRI Worldwide Imagery
Data Sources:
IndianaMap (2017)
KyGeoNet (2017)

Figure 31. Map X10

APPENDIX B – TABLES

TABLE 1: STREET IDENTIFIERS USED IN THE RECEIVER NAMING CONVENTION

Table 1: Street Identifiers Used in the Receiver Naming Convention

STREET ID LEGEND	
STREET ID	**STREET NAME**
351	KY-351
2084	KY-2084
414	KY-414
60	US-60
ARLE	Arlene Court
ARL	Arlington Drive
BAL	Balmoral Drive
BOE	Boeke Road
BOW	Bowling Lane
BRA	Braxton Park Drive
BRO	Brookstone Drive
CHE	Cheaney Drive
COB	Cobblestone Drive
CON	Conrad Court
CUL	Culpepper Court
DEB	Debbie Court
FRE	Frederick Avenue
GAR	Garden Lane
GRE	Green River 2 Road
GRED	Greenbriar Drive
HAR	Harpeth Grenn Trace
HAY	Hayworth Drive
HIL	Hillcrest Terrace
HUB	Hubbard Lane
IRO	Ironwood Drive
KEN	Kennedy Circle
KIM	Kimsey Lane
LEX	Lexington Drive
MAG	Magnolia Street
MEL	Melody Lane
MELW	Melwood Place
MIC	Michael Drive
MIL	Millcreek Drive
MOR	Morris Drive
NUG	Nugent Drive
POP	Poplar Avenue
PRI	Private Drive
REE	Ree Street
RHE	Rheinhardt Avenue
ROO	South Roosevelt Drive
RUS	South Ruston Avenue

STREET ID LEGEND	
STREET ID	**STREET NAME**
SAN	Sand Castle Drive
STJ	South Street James Boulevard
VANB	Van Bibber Avenue (West of South Weinbach Avenue)
VAN	Vanguard Avenue
VIL	Villa Drive
WED	Wedgewood Drive
WEI	South Weinback Avenue
WEN	Wentworth Avenue
WES	West Grant Street

TABLE 2: RESULTS FOR ADAMS LANE (AUXILIARY LANE ADDITION)

Table 2: Results for Adams Lane (Auxiliary Lane Addition)

LEGEND	
	Exceeds Noise Abatement Criteria
	Exceeds Substantial Increase Criteria (10 dB(A) in KY, 15 dB(A) in IN)
	Exceeds Both Criteria

RECEIVER	DESCRIPTION (ACTIVITY CATEGORY)	NAC dB(A)	EXISTING		CENTRAL ALT 1B MOD	
			DIST. TO ROAD (ft)	NOISE LEVEL dB(A)	DIST. TO ROAD (ft)	2045 PREDICTED NOISE LEVEL dB(A)
HAY-01-01	Residential (B)	66	672	52.0	672	57.8
IRO-01-01	Residential (B)	66	517	55.0	522	61.0
IRO-02-01	Residential (B)	66	489	55.8	494	61.4
IRO-03-01	Residential (B)	66	430	56.3	435	62.1
IRO-04-01	Residential (B)	66	389	57.0	394	62.8
IRO-05-01	Residential (B)	66	340	57.8	345	63.6
IRO-06-01	Residential (B)	66	302	58.5	307	64.3
IRO-07-01-F	Residential (B)	66	246	59.9	251	65.6
IRO-08-01-F	Residential (B)	66	253	59.7	253	65.3
IRO-09-01-F	Residential (B)	66	254	59.7	254	65.3
IRO-10-01	Residential (B)	66	609	54.0	609	60.0
IRO-11-01	Residential (B)	66	532	55.2	532	61.2
KEN-01-01-F	Residential (B)	66	126	65.4	110	70.3
KEN-02-01-F	Residential (B)	66	126	65.5	111	70.6
KEN-03-01-F	Residential (B)	66	131	65.6	119	70.9
KEN-04-01-F	Residential (B)	66	116	67.0	107	72.4
KEN-05-01-F	Residential (B)	66	124	67.1	114	67.0
KEN-06-01-F	Residential (B)	66	203	62.7	193	65.0
KEN-07-01-F	Residential (B)	66	233	61.6	223	63.8
KEN-08-01-F	Residential (B)	66	268	60.6	259	62.9
KEN-09-01-F	Residential (B)	66	309	59.2	299	61.9
KEN-10-01-F	Residential (B)	66	340	57.9	331	60.9
KEN-11-01-F	Residential (B)	66	374	56.7	365	59.9
KEN-12-01	Residential (B)	66	249	61.8	233	66.8
KEN-13-01	Residential (B)	66	288	60.3	272	65.4
KEN-14-01	Residential (B)	66	323	59.4	308	64.5
KEN-15-01	Residential (B)	66	362	58.5	348	63.6
KEN-16-01	Residential (B)	66	409	57.6	39	62.5
KEN-17-01	Residential (B)	66	438	57.0	425	61.9
KEN-18-01	Residential (B)	66	240	61.6	230	67.1
KEN-19-01	Residential (B)	66	281	60.2	272	65.6
KEN-20-01	Residential (B)	66	321	59.1	312	64.4

RECEIVER	DESCRIPTION (ACTIVITY CATEGORY)	NAC dB(A)	EXISTING		CENTRAL ALT 1B MOD	
			DIST. TO ROAD (ft)	NOISE LEVEL dB(A)	DIST. TO ROAD (ft)	2045 PREDICTED NOISE LEVEL dB(A)
KEN-21-01	Residential (B)	66	359	58.0	349	63.2
KEN-22-01	Residential (B)	66	398	57.3	389	62.2
KEN-23-01	Residential (B)	66	224	62.6	215	66.9
KEN-24-01	Residential (B)	66	260	61.3	251	65.5
KEN-25-01	Residential (B)	66	295	60.1	286	64.3
KEN-26-01	Residential (B)	66	327	59.2	317	63.1
KEN-27-01	Residential (B)	66	371	58.1	361	62.0
KEN-28-01	Residential (B)	66	403	57.4	393	61.1
KEN-29-01-F	Residential (B)	66	123	67.5	109	71.6
KEN-30-01-F	Residential (B)	66	126	67.3	112	72.0
KEN-31-01-F	Residential (B)	66	127	67.1	113	72.2
KEN-32-01-F	Residential (B)	66	136	66.5	122	71.8
WED-01-02	Residential (B)	66	709	51.9	709	57.8
WED-02-02	Residential (B)	66	578	53.8	578	59.6
WED-03-01	Residential (B)	66	494	55.0	494	60.8
WED-04-01	Residential (B)	66	443	55.8	443	61.6
WED-05-01	Residential (B)	66	380	56.9	380	62.6
WED-06-02	Residential (B)	66	320	58.1	320	63.8
WED-07-01	Residential (B)	66	361	57.3	361	63.1
WED-08-01	Residential (B)	66	410	56.4	410	62.2
WED-09-01	Residential (B)	66	459	55.6	459	61.4
WED-10-02	Residential (B)	66	509	54.9	509	60.7
WED-11-02	Residential (B)	66	593	53.7	593	59.6
WES-01-01-F	Residential (B)	66	129	65.4	126	70.2
WES-02-01	Residential (B)	66	246	60.9	240	65.8
WES-03-01	Residential (B)	66	327	58.8	322	63.6
WES-04-01	Residential (B)	66	424	56.7	420	61.7
WES-05-01	Residential (B)	66	462	56.0	457	61.0
WES-06-01	Residential (B)	66	501	55.3	497	60.4
WES-07-01-F	Residential (B)	66	186	63.8	173	68.3
WES-08-01	Residential (B)	66	235	61.7	221	66.1
WES-09-01	Residential (B)	66	277	60.4	264	65.0
WES-10-01	Residential (B)	66	352	58.3	338	63.1
WES-11-01	Residential (B)	66	406	57.3	393	62.2
WES-12-01	Residential (B)	66	443	56.5	429	61.4
WES-13-01	Residential (B)	66	484	55.9	470	60.8

TABLE 3: BARRIER RESULTS FOR ADAMS LANE (AUXILIARY LANE ADDITION)

Table 3: Barrier Results for Adams Lane (Auxiliary Lane Addition)

RECEIVER	NUMBER OF RECEPTORS	FRONT ROW?	EX. NOISE LEVEL dB(A)	2045 PRED. NOISE LEVEL dB(A)	IMPACT ?	PREDICTED NOISE LEVEL WITH BARRIER dB(A)	BENEFITED WITH 5dB(A) or MORE REDUCTION?	MEET DESIGN GOAL: FRONT ROW WITH 7dB(A) or MORE REDUCTION?
KEN-01-01-F	1	Yes	65.4	70.4	Yes	61.9	Yes	Yes
KEN-02-01-F	1	Yes	65.5	70.7	Yes	61.9	Yes	Yes
KEN-03-01-F	1	Yes	65.6	71.0	Yes	62.2	Yes	Yes
KEN-04-01-F	1	Yes	67.0	72.5	Yes	62.4	Yes	Yes
KEN-05-01-F	1	Yes	67.1	67.0	Yes	60.6	Yes	No
KEN-06-01-F	1	Yes	62.7	65.1	No	60.0	Yes	No
KEN-07-01-F	1	Yes	61.6	63.9	No	59.4	No	No
KEN-08-01-F	1	Yes	60.6	63.0	No	58.8	No	No
KEN-09-01-F	1	Yes	59.2	61.9	No	58.1	No	No
KEN-10-01-F	1	Yes	57.9	60.9	No	57.5	No	No
KEN-11-01-F	1	Yes	56.7	60.0	No	56.8	No	No
KEN-12-01	1	No	61.8	66.9	Yes	60.4	Yes	No
KEN-13-01	1	No	60.3	65.5	No	59.5	Yes	No
KEN-14-01	1	No	59.4	64.6	No	59.0	Yes	No
KEN-15-01	1	No	58.5	63.7	No	58.6	Yes	No
KEN-16-01	1	No	57.6	62.6	No	57.9	No	No
KEN-17-01	1	No	57.0	61.9	No	57.5	No	No
KEN-18-01	1	No	61.6	67.2	Yes	60.1	Yes	Yes
KEN-19-01	1	No	60.2	65.7	No	59.2	Yes	No
KEN-20-01	1	No	59.1	64.5	No	58.6	Yes	No
KEN-21-01	1	No	58.0	63.2	No	57.9	Yes	No
KEN-22-01	1	No	57.3	62.3	No	57.4	No	No
KEN-23-01	1	No	62.6	66.9	Yes	60.0	Yes	No
KEN-24-01	1	No	61.3	65.5	No	59.3	Yes	No
KEN-25-01	1	No	60.1	64.3	No	58.6	Yes	No
KEN-26-01	1	No	59.2	63.1	No	58.2	No	No
KEN-27-01	1	No	58.1	62.0	No	57.4	No	No
KEN-28-01	1	No	57.4	61.1	No	56.9	No	No
KEN-29-01-F	1	Yes	67.5	71.6	Yes	62.1	Yes	Yes
KEN-30-01-F	1	Yes	67.3	72.0	Yes	62.0	Yes	Yes
KEN-31-01-F	1	Yes	67.1	72.2	Yes	62.0	Yes	Yes
KEN-32-01-F	1	Yes	66.5	71.8	Yes	61.9	Yes	Yes
WES-01-01-F	1	Yes	65.4	70.4	Yes	63.4	Yes	Yes
WES-02-01	1	No	60.9	66.0	Yes	62.1	No	No
WES-03-01	1	No	58.8	63.8	No	60.8	No	No
WES-04-01	1	No	56.7	61.8	No	59.1	No	No

RECEIVER	NUMBER OF RECEPTORS	FRONT ROW?	EX. NOISE LEVEL dB(A)	2045 PRED. NOISE LEVEL dB(A)	IMPACT ?	PREDICTED NOISE LEVEL WITH BARRIER dB(A)	BENEFITED WITH 5dB(A) or MORE REDUCTION?	MEET DESIGN GOAL: FRONT ROW WITH 7dB(A) or MORE REDUCTION?
WES-05-01	1	No	56.0	61.1	No	58.4	No	No
WES-06-01	1	No	55.3	60.5	No	57.9	No	No
WES-07-01-F	1	Yes	63.8	68.5	Yes	61.6	Yes	No
WES-08-01	1	No	61.7	66.3	Yes	60.7	Yes	No
WES-09-01	1	No	60.4	65.2	No	60.5	No	No
WES-10-01	1	No	58.3	63.2	No	59.4	No	No
WES-11-01	1	No	57.3	62.2	No	58.9	No	No
WES-12-01	1	No	56.5	61.5	No	58.3	No	No
WES-13-01	1	No	55.9	60.9	No	57.9	No	No

TABLE 4: RESULTS FOR VANGUARD AVENUE, SOUTH ARLINGTON DRIVE, AND MELWOOD DRIVE

Table 4: Results for Vanguard Avenue, South Arlington Drive, & Melwood Drive

LEGEND	
	Exceeds Noise Abatement Criteria
	Exceeds Substantial Increase Criteria (10 dB(A) in KY, 15 dB(A) in IN)
	Exceeds Both Criteria

RECEIVER	DESCRIPTION (ACTIVITY CATEGORY)	NAC dB(A)	EXISTING		CENTRAL ALT 1B MOD	
			DIST. TO ROAD (ft)	NOISE LEVEL dB(A)	DIST. TO ROAD (ft)	2045 PREDICTED NOISE LEVEL dB(A)
2084-01-01	Recreation (C)	66	157	57.0	116	61.8
2084-02-01-F	Recreation (C)	66	141	57.1	150	62.0
2084-03-01	Recreation (C)	66	277	54.8	262	59.9
2084-04-01-F	Recreation (C)	66	386	55.7	408	60.5
2084-05-01	Recreation (C)	66	542	54.6	547	59.5
2084-06-01-F	Residential (B)	66	53	64.2	58	67.7
2084-07-01-F	Residential (B)	66	131	56.2	136	61.6
2084-08-01-F	Residential (B)	66	199	51.3	204	57.5
351-01-01-F	School (D)	66	389	57.7	407	63.1
351-02-01-F	Residential (B)	66	82	68.0	54	70.6
351-04-01	Residential (B)	66	218	62.4	148	66.4
351-05-01	Residential (B)	66	247	61.3	182	65.3
351-06-01	Residential (B)	66	262	59.7	191	63.6
351-07-01	Residential (B)	66	184	61.1	116	63.2
351-08-01	Residential (B)	66	209	62.3	88	62.4
351-09-01	Residential (B)	66	327	59.7	149	60.4
351-10-01	Residential (B)	66	394	60.0	141	59.7
351-11-01	Residential (B)	66	472	59.4	160	59.5
351-12-01-F	Residential (B)	66	959	0.0	964	57.3
ARL-01-01	Residential (B)	66	748	63.2	753	61.6
ARL-02-01	Residential (B)	66	853	58.5	858	58.3
ARL-03-01	Residential (B)	66	659	58.5	194	59.1
ARL-04-01	Residential (B)	66	900	56.5	905	56.6
ARL-05-01	Residential (B)	66	961	54.1	966	54.7
ARL-06-01	Residential (B)	66	923	52.7	927	56.0
ARL-16-01-F	Residential (B)	66	245	54.0	245	55.2
ARL-17-01	Residential (B)	66	239	54.6	239	55.5
ARL-18-01	Residential (B)	66	262	54.9	262	55.7
ARL-19-01	Residential (B)	66	283	55.6	283	55.5
ARL-20-01	Residential (B)	66	337	55.9	337	56.5
ARL-21-01	Residential (B)	66	389	56.1	389	56.7

RECEIVER	DESCRIPTION (ACTIVITY CATEGORY)	NAC dB(A)	EXISTING		CENTRAL ALT 1B MOD	
			DIST. TO ROAD (ft)	NOISE LEVEL dB(A)	DIST. TO ROAD (ft)	2045 PREDICTED NOISE LEVEL dB(A)
ARL-22-01	Residential (B)	66	433	57.2	433	57.7
ARL-23-01	Residential (B)	66	407	57.7	407	58.3
ARL-24-01	Residential (B)	66	362	58.7	362	59.0
ARL-25-01	Residential (B)	66	314	59.5	314	61.1
ARL-26-01	Residential (B)	66	273	60.9	273	62.8
ARL-27-01	Residential (B)	66	249	61.5	249	64.3
ARL-28-01-F	Residential (B)	66	90	67.9	90	72.2
ARL-29-01-F	Residential (B)	66	62	71.3	62	75.5
ARL-30-01-F	Residential (B)	66	96	69.3	96	73.3
ARL-31-01-F	Residential (B)	66	135	65.3	140	70.5
ARL-32-01-F	Residential (B)	66	154	64.0	158	69.4
ARL-33-01-F	Residential (B)	66	190	62.5	195	68.2
ARL-34-01-F	Residential (B)	66	257	60.5	261	66.5
ARL-35-01-F	Residential (B)	66	165	59.0	388	65.0
ARL-36-01-F	Residential (B)	66	108	58.2	432	63.9
ARL-37-01-F	Residential (B)	66	58	58.3	450	63.5
AUG-01-01	Residential (B)	66	352	59.7	352	62.2
AUG-02-01	Residential (B)	66	385	58.7	385	62.2
AUGD-03-01	Residential (B)	66	436	58.5	436	61.0
AUGD-08-01	Residential (B)	66	616	51.5	616	58.3
AUGD-09-01	Residential (B)	66	679	50.9	679	57.3
AUGD-10-01	Residential (B)	66	767	51.3	767	56.5
AUGD-11-01	Residential (B)	66	541	53.9	541	59.8
AUGD-12-01	Residential (B)	66	669	53.9	669	56.5
AUGD-13-01	Residential (B)	66	766	53.9	766	55.6
CHE-01-01-F	Residential (B)	66	177	58.7	347	64.4
CHE-02-01	Residential (B)	66	211	58.1	394	64.1
CHE-03-01	Residential (B)	66	240	57.4	454	62.8
CHE-04-01	Residential (B)	66	283	56.7	506	62.1
EFOR-01-01-F	Residential (B)	66	137	66.3	137	69.8
EFOR-02-01-F	Residential (B)	66	101	68.2	101	72.5
EFOR-03-01-F	Residential (B)	66	118	67.5	118	72.1
EFOR-04-01-F	Residential (B)	66	130	66.8	130	71.5
EFOR-05-01-F	Residential (B)	66	130	66.9	130	71.6
EFOR-06-01-F	Residential (B)	66	118	67.5	118	72.1
EFOR-07-01-F	Residential (B)	66	114	67.7	114	72.4
EFOR-08-01-F	Residential (B)	66	120	67.6	120	72.3

RECEIVER	DESCRIPTION (ACTIVITY CATEGORY)	NAC dB(A)	EXISTING		CENTRAL ALT 1B MOD	
			DIST. TO ROAD (ft)	NOISE LEVEL dB(A)	DIST. TO ROAD (ft)	2045 PREDICTED NOISE LEVEL dB(A)
EFOR-09-01-F	Residential (B)	66	120	67.5	120	72.3
EFOR-10-01-F	Residential (B)	66	121	67.4	121	72.3
EFOR-11-01-F	Residential (B)	66	110	67.8	110	72.6
EFOR-12-01-F	Residential (B)	66	126	67.1	126	72.1
EFOR-13-01-F	Residential (B)	66	104	67.9	104	73.0
EFOR-14-01-F	Residential (B)	66	113	67.1	113	72.3
EFOR-15-01-F	Residential (B)	66	129	66.5	129	71.8
EFOR-16-01-F	Residential (B)	66	137	66.2	137	71.5
EFOR-17-01-F	Residential (B)	66	126	66.6	126	71.8
EFOR-18-01-F	Residential (B)	66	144	65.7	144	71.2
EFOR-19-01-F	Residential (B)	66	130	66.5	130	71.8
EFOR-20-01-F	Residential (B)	66	111	67.4	111	72.5
EFOR-21-01-F	Residential (B)	66	143	65.6	143	71.2
EFOR-22-01-F	Residential (B)	66	177	63.9	177	69.9
EFOR-23-01-F	Residential (B)	66	244	61.5	244	67.5
EFOR-24-01-F	Residential (B)	66	332	59.5	332	64.2
EFOR-25-01	Residential (B)	66	437	58.0	437	61.0
EFOR-26-01	Residential (B)	66	492	59.2	492	59.7
EFOR-27-01	Residential (B)	66	568	57.2	568	58.4
EFOR-28-01	Residential (B)	66	257	61.7	257	63.3
EFOR-29-01	Residential (B)	66	340	59.9	340	60.5
EFOR-30-01	Residential (B)	66	373	59.3	373	60.1
EFOR-31-01	Residential (B)	66	335	59.9	335	60.7
EFOR-32-01	Residential (B)	66	342	59.9	342	62.6
EFOR-33-01	Residential (B)	66	334	60.0	334	61.3
EFOR-34-01	Residential (B)	66	337	59.9	337	61.5
EFOR-35-01	Residential (B)	66	336	59.9	336	61.5
EFOR-36-01	Residential (B)	66	344	59.7	344	61.4
EFOR-37-01	Residential (B)	66	343	59.6	343	61.2
EFOR-38-01	Residential (B)	66	345	59.5	345	60.9
EFOR-39-01	Residential (B)	66	352	59.3	352	60.9
EFOR-40-01	Residential (B)	66	350	59.3	350	60.6
EFOR-41-01	Residential (B)	66	348	59.2	348	60.4
EFOR-42-01	Residential (B)	66	354	59.2	354	60.4
EFOR-43-01	Residential (B)	66	361	59.1	361	60.1
EFOR-44-01	Residential (B)	66	361	59.1	361	60.3
EFOR-45-01	Residential (B)	66	362	59.0	362	60.2

RECEIVER	DESCRIPTION (ACTIVITY CATEGORY)	NAC dB(A)	EXISTING		CENTRAL ALT 1B MOD	
			DIST. TO ROAD (ft)	NOISE LEVEL dB(A)	DIST. TO ROAD (ft)	2045 PREDICTED NOISE LEVEL dB(A)
EFOR-46-01	Residential (B)	66	376	58.8	376	62.0
EFOR-47-01	Residential (B)	66	437	58.0	437	61.1
EFOR-48-01	Residential (B)	66	454	57.8	454	56.1
GAR-01-01-F	Residential (B)	66	181	63.7	199	69.5
GAR-02-01-F	Residential (B)	66	144	65.3	149	69.8
GRED-01-02-F	Residential (B)	66	89	69.7	100	74.0
GRED-02-02	Residential (B)	66	164	66.1	175	71.4
GRED-03-01	Residential (B)	66	302	61.3	312	67.2
GRED-04-01	Residential (B)	66	413	59.2	422	64.2
GRED-05-02-F	Residential (B)	66	112	65.3	110	72.6
GRED-06-02	Residential (B)	66	172	68.5	170	70.8
GRED-07-01	Residential (B)	66	308	65.9	308	66.0
GRED-08-01	Residential (B)	66	379	61.2	376	65.5
GRED-09-01	Residential (B)	66	470	58.7	466	63.9
GRED-10-01	Residential (B)	66	545	58.0	488	63.2
GRED-11-01	Residential (B)	66	550	57.0	481	62.0
GRED-12-01	Residential (B)	66	578	56.0	484	60.6
GRED-13-01	Residential (B)	66	590	55.5	472	59.9
GRED-14-01	Residential (B)	66	634	54.8	472	58.8
GRED-15-01	Residential (B)	66	677	54.4	486	58.3
GRED-16-01	Residential (B)	66	728	54.0	493	57.7
GRED-17-01	Residential (B)	66	787	53.6	479	57.2
GRED-18-01	Residential (B)	66	856	53.2	486	56.7
HAL-02-01	Residential (B)	66	649	54.3	649	58.6
HAL-03-01	Residential (B)	66	665	53.5	665	57.3
HCHA-01-09	Recreation (C)	66	480	51.6	480	53.6
HCHA-02-03	Recreation (C)	66	571	54.1	571	55.0
HCHA-03-03	Recreation (C)	66	437	56.2	437	61.0
HCHA-04-02-F	Recreation (C)	66	347	57.9	347	63.4
HCHA-05-02-F	Recreation (C)	66	322	58.4	322	63.9
HCHA-06-02-F	Recreation (C)	66	320	58.6	320	63.6
HCHA-07-02-5	Recreation (C)	66	301	59.9	301	64.9
HCHA-08-02	Recreation (C)	66	644	53.7	644	59.1
HUB-01-01-F	Residential (B)	66	134	61.5	230	68.4
HUB-02-01	Residential (B)	66	222	61.8	240	67.9
HUB-03-01	Residential (B)	66	249	59.1	339	63.6
HUB-04-01	Residential (B)	66	316	58.3	398	62.2

RECEIVER	DESCRIPTION (ACTIVITY CATEGORY)	NAC dB(A)	EXISTING		CENTRAL ALT 1B MOD	
			DIST. TO ROAD (ft)	NOISE LEVEL dB(A)	DIST. TO ROAD (ft)	2045 PREDICTED NOISE LEVEL dB(A)
HUB-05-01	Residential (B)	66	347	57.6	454	61.4
HUB-06-01	Residential (B)	66	401	57.0	498	60.3
HUB-07-01	Residential (B)	66	489	57.0	507	62.1
HUB-08-01-F	Residential (B)	66	62	70.4	80	75.0
HUB-09-01-F	Residential (B)	66	115	67.1	133	72.4
HUB-10-01-F	Residential (B)	66	167	64.3	185	70.2
HUB-11-01-F	Residential (B)	66	196	63.2	213	69.2
HUB-12-01	Residential (B)	66	254	61.2	271	67.2
HUB-13-01	Residential (B)	66	323	59.7	341	65.3
HUB-14-01	Residential (B)	66	370	58.9	393	64.2
LAKR-01-01	Residential (B)	66	404	58.8	404	62.0
LAKR-02-01	Residential (B)	66	389	58.9	389	62.2
LAKR-03-01	Residential (B)	66	391	58.9	391	61.9
LAKR-04-01	Residential (B)	66	388	58.8	388	61.8
LAKR-05-01	Residential (B)	66	397	58.7	397	61.7
LAKR-06-01	Residential (B)	66	397	58.6	397	61.6
LAKR-07-01	Residential (B)	66	397	58.6	397	61.6
LAKR-08-01	Residential (B)	66	394	58.6	394	61.7
LAKR-09-01	Residential (B)	66	408	58.4	408	61.4
LAKR-10-01	Residential (B)	66	395	58.6	395	61.2
LAKR-11-01	Residential (B)	66	575	53.9	575	58.2
LAKR-12-01	Residential (B)	66	558	53.9	558	58.3
LAKR-13-01	Residential (B)	66	567	53.9	567	58.0
LAKR-14-01	Residential (B)	66	577	53.9	577	58.0
LAKR-15-01	Residential (B)	66	567	53.9	567	57.9
LAKR-16-01	Residential (B)	66	578	53.9	578	58.0
LAKR-17-01	Residential (B)	66	553	53.9	553	58.5
LAKR-18-01	Residential (B)	66	552	53.9	552	58.6
LEX-04-01	Residential (B)	66	503	53.6	843	57.9
LEX-05-01	Residential (B)	66	387	55.3	647	60.2
LIN-01-01-F	Residential (B)	66	443	56.8	448	61.8
LIN-02-01	Residential (B)	66	522	55.8	527	60.9
MAG-01-01-F	Residential (B)	66	92	63.2	97	66.8
MAG-02-01	Residential (B)	66	258	59.1	263	64.0
MAG-03-01	Residential (B)	66	336	57.9	341	62.8
MAG-04-01-F	Residential (B)	66	319	57.4	324	62.3
MAG-05-01	Residential (B)	66	404	56.6	409	61.5

RECEIVER	DESCRIPTION (ACTIVITY CATEGORY)	NAC dB(A)	EXISTING		CENTRAL ALT 1B MOD	
			DIST. TO ROAD (ft)	NOISE LEVEL dB(A)	DIST. TO ROAD (ft)	2045 PREDICTED NOISE LEVEL dB(A)
MELW-01-01-F	Residential (B)	66	136	65.9	131	70.6
MELW-02-01-F	Residential (B)	66	87	69.5	83	72.8
MELW-03-01-F	Residential (B)	66	105	68.7	102	72.3
MELW-04-01-F	Residential (B)	66	120	68.1	117	71.9
MELW-05-01-F	Residential (B)	66	132	67.6	129	71.7
MELW-06-01-F	Residential (B)	66	135	67.1	149	72.3
MELW-07-01-F	Residential (B)	66	140	66.4	155	71.8
MELW-08-01-F	Residential (B)	66	120	67.3	136	72.4
MELW-09-01-F	Residential (B)	66	113	67.5	131	72.8
MELW-10-01-F	Residential (B)	66	70	69.4	91	74.4
MELW-11-01-F	Residential (B)	66	66	69.6	90	74.5
MELW-12-01-F	Residential (B)	66	138	66.4	164	71.7
MELW-13-01-F	Residential (B)	66	182	64.6	209	70.0
MELW-14-01-F	Residential (B)	66	196	62.1	279	68.0
MELW-15-01-F	Residential (B)	66	174	59.4	355	66.0
MELW-16-01-F	Residential (B)	66	138	57.7	416	64.6
MELW-17-01-F	Residential (B)	66	123	56.5	470	63.5
MELW-18-01-F	Residential (B)	66	107	55.5	527	62.4
MELW-19-01-F	Residential (B)	66	92	54.4	601	60.9
MELW-20-01-F	Residential (B)	66	86	53.8	653	60.0
MELW-23-01	Residential (B)	66	277	62.3	272	66.4
MELW-24-01	Residential (B)	66	295	61.8	290	65.1
MELW-25-01	Residential (B)	66	310	61.4	307	64.8
MELW-26-01	Residential (B)	66	319	61.2	316	64.7
MELW-27-01	Residential (B)	66	318	60.5	339	66.3
MELW-28-01	Residential (B)	66	399	58.7	422	64.6
MELW-29-01	Residential (B)	66	380	57.5	488	63.4
MELW-30-01	Residential (B)	66	343	56.5	547	61.0
MELW-31-01	Residential (B)	66	297	55.8	578	59.1
MELW-32-01	Residential (B)	66	233	53.8	701	59.3
POP-01-01-F	Residential (B)	66	329	56.4	334	61.4
POP-02-01	Residential (B)	66	369	55.7	374	60.7
POP-03-01	Residential (B)	66	495	54.2	500	59.6
POP-04-01	Residential (B)	66	553	53.9	558	59.2
POP-05-01-F	Residential (B)	66	271	55.5	276	60.5
POP-06-01	Residential (B)	66	331	54.4	336	59.4
POP-07-01	Residential (B)	66	377	53.8	382	58.0

RECEIVER	DESCRIPTION (ACTIVITY CATEGORY)	NAC dB(A)	EXISTING		CENTRAL ALT 1B MOD	
			DIST. TO ROAD (ft)	NOISE LEVEL dB(A)	DIST. TO ROAD (ft)	2045 PREDICTED NOISE LEVEL dB(A)
POP-08-01	Residential (B)	66	428	53.2	433	57.1
POP-09-01	Residential (B)	66	502	52.4	507	57.0
POP-10-01	Residential (B)	66	579	51.8	584	55.5
VAN-01-01-F	Residential (B)	66	121	67.3	126	70.9
VAN-02-01	Residential (B)	66	237	62.1	241	63.9
VAN-03-01	Residential (B)	66	352	59.3	408	64.5
VAN-04-01	Residential (B)	66	403	58.3	435	63.4
VAN-15-01	Residential (B)	66	463	57.9	463	62.2
VAN-16-01	Residential (B)	66	303	61.0	303	63.8
VAN-17-01	Residential (B)	66	217	63.7	217	65.0
VAN-18-01	Residential (B)	66	141	67.3	141	70.6
VAN-19-01	Residential (B)	66	562	56.1	562	60.2
VAN-20-01	Residential (B)	66	597	54.9	597	59.7
WEN-01-01	Residential (B)	66	323	60.5	338	66.0
WEN-02-01	Residential (B)	66	365	59.6	380	65.0
WEN-03-01	Residential (B)	66	451	58.4	465	63.6
WEN-04-01	Residential (B)	66	276	61.6	296	66.6
WEN-05-01	Residential (B)	66	332	60.2	352	65.7
WEN-06-01	Residential (B)	66	410	58.6	431	64.0
WEN-07-01	Residential (B)	66	489	57.4	510	62.5
WEN-08-01	Residential (B)	66	483	56.6	564	61.6
WEN-09-01	Residential (B)	66	457	55.5	643	60.2
WFOR-01-01	Residential (B)	66	407	53.9	407	62.1
WFOR-02-01	Residential (B)	66	564	53.9	564	58.8
WFOR-03-01	Residential (B)	66	442	58.8	442	60.9
WFOR-04-01	Residential (B)	66	491	58.3	491	57.6
WFOR-05-01	Residential (B)	66	548	57.7	548	56.9
WFOR-06-01	Residential (B)	66	588	53.9	588	56.9
WFOR-07-01	Residential (B)	66	672	53.9	672	56.6
WFOR-08-01	Residential (B)	66	709	53.9	709	57.1
WFOR-09-01	Residential (B)	66	768	53.9	768	55.9

TABLE 5: BARRIER RESULTS FOR VANGUARD AVENUE

Table 5: Barrier Results for Vanguard Avenue

RECEIVER	NUMBER OF RECEPTORS	FRONT ROW?	EX. NOISE LEVEL dB(A)	2045 PRED. NOISE LEVEL dB(A)	IMPACT ?	PREDICTED NOISE LEVEL WITH BARRIER dB(A)	BENEFITED WITH 5dB(A) or MORE REDUCTION?	MEET DESIGN GOAL: FRONT ROW WITH 7dB(A) or MORE REDUCTION?
AUG-01-01	1	No	59.7	62.2	No	58.2	No	No
AUG-02-01	1	No	58.7	62.2	No	56.2	Yes	No
AUGD-03-01	1	No	58.5	61.0	No	55.1	Yes	No
AUGD-08-01	1	No	51.5	58.3	No	53.5	No	No
AUGD-09-01	1	No	50.9	57.3	No	53.3	No	No
AUGD-10-01	1	No	51.3	56.5	No	52.4	No	No
AUGD-11-01	1	No	53.9	59.8	No	54.6	Yes	No
AUGD-12-01	1	No	53.9	56.5	No	51.5	Yes	No
AUGD-13-01	1	No	53.9	55.6	No	50.8	No	No
CHE-01-01-F	1	Yes	58.7	64.4	No	59.4	Yes	No
CHE-02-01	1	No	58.1	64.1	No	58.4	Yes	No
CHE-03-01	1	No	57.4	62.8	No	57.1	Yes	No
CHE-04-01	1	No	56.7	62.1	No	56.1	Yes	No
EFOR-01-01-F	1	Yes	66.3	69.8	Yes	59.2	Yes	Yes
EFOR-02-01-F	1	Yes	68.2	72.5	Yes	60.9	Yes	Yes
EFOR-03-01-F	1	Yes	67.5	72.1	Yes	61.2	Yes	Yes
EFOR-04-01-F	1	Yes	66.8	71.5	Yes	61.2	Yes	Yes
EFOR-05-01-F	1	Yes	66.9	71.6	Yes	61.1	Yes	Yes
EFOR-06-01-F	1	Yes	67.5	72.1	Yes	61.5	Yes	Yes
EFOR-07-01-F	1	Yes	67.7	72.4	Yes	61.7	Yes	Yes
EFOR-08-01-F	1	Yes	67.6	72.3	Yes	61.8	Yes	Yes
EFOR-09-01-F	1	Yes	67.5	72.3	Yes	62.2	Yes	Yes
EFOR-10-01-F	1	Yes	67.4	72.3	Yes	62.4	Yes	Yes
EFOR-11-01-F	1	Yes	67.8	72.6	Yes	62.7	Yes	Yes
EFOR-12-01-F	1	Yes	67.1	72.1	Yes	62.2	Yes	Yes
EFOR-13-01-F	1	Yes	67.9	73.0	Yes	62.2	Yes	Yes
EFOR-14-01-F	1	Yes	67.1	72.3	Yes	61.7	Yes	Yes
EFOR-15-01-F	1	Yes	66.5	71.8	Yes	61.3	Yes	Yes
EFOR-16-01-F	1	Yes	66.2	71.5	Yes	61.3	Yes	Yes
EFOR-17-01-F	1	Yes	66.6	71.8	Yes	61.7	Yes	Yes
EFOR-18-01-F	1	Yes	65.7	71.2	Yes	61.6	Yes	Yes
EFOR-19-01-F	1	Yes	66.5	71.8	Yes	62.0	Yes	Yes
EFOR-20-01-F	1	Yes	67.4	72.5	Yes	62.3	Yes	Yes
EFOR-21-01-F	1	Yes	65.6	71.2	Yes	62.8	Yes	Yes
EFOR-22-01-F	1	Yes	63.9	69.9	Yes	63.1	Yes	No
EFOR-23-01-F	1	Yes	61.5	67.5	Yes	62.3	Yes	No

RECEIVER	NUMBER OF RECEPTORS	FRONT ROW?	EX. NOISE LEVEL dB(A)	2045 PRED. NOISE LEVEL dB(A)	IMPACT ?	PREDICTED NOISE LEVEL WITH BARRIER dB(A)	BENEFITED WITH 5dB(A) or MORE REDUCTION?	MEET DESIGN GOAL: FRONT ROW WITH 7dB(A) or MORE REDUCTION?
EFOR-24-01-F	1	Yes	59.5	64.2	No	60.2	No	No
EFOR-25-01	1	No	58.0	61.0	No	57.7	No	No
EFOR-26-01	1	No	59.2	59.7	No	56.8	No	No
EFOR-27-01	1	No	57.2	58.4	No	55.8	No	No
EFOR-28-01	1	No	61.7	63.3	No	55.0	Yes	Yes
EFOR-29-01	1	No	59.9	60.5	No	53.7	Yes	No
EFOR-30-01	1	No	59.3	60.1	No	53.9	Yes	No
EFOR-31-01	1	No	59.9	60.7	No	54.3	Yes	No
EFOR-32-01	1	No	59.9	62.6	No	55.3	Yes	Yes
EFOR-33-01	1	No	60.0	61.3	No	54.7	Yes	No
EFOR-34-10	1	No	59.9	61.5	No	55.1	Yes	No
EFOR-35-01	1	No	59.9	61.5	No	55.2	Yes	No
EFOR-36-01	1	No	59.7	61.4	No	55.2	Yes	No
EFOR-37-01	1	No	59.6	61.2	No	55.2	Yes	No
EFOR-38-01	1	No	59.5	60.9	No	54.9	Yes	No
EFOR-39-01	1	No	59.3	60.9	No	54.9	Yes	No
EFOR-40-01	1	No	59.3	60.6	No	54.7	Yes	No
EFOR-41-01	1	No	59.2	60.4	No	54.5	Yes	No
EFOR-42-01	1	No	59.2	60.4	No	54.5	Yes	No
EFOR-43-01	1	No	59.1	60.1	No	54.2	Yes	No
EFOR-44-01	1	No	59.1	60.3	No	54.8	Yes	No
EFOR-45-01	1	No	59.0	60.2	No	54.8	Yes	No
EFOR-46-01	1	No	58.8	62.0	No	57.0	Yes	No
EFOR-47-01	1	No	58.0	61.1	No	56.6	No	No
EFOR-48-01	1	No	57.8	56.1	No	51.6	No	No
GAR-01-01-F	1	Yes	63.7	69.5	Yes	59.1	Yes	Yes
GAR-02-01-F	1	Yes	47.8	69.8	Yes	60.6	Yes	Yes
HAL-02-01	1	No	54.3	58.6	No	53.6	Yes	No
HAL-03-01	1	No	53.5	57.3	No	52.7	No	No
HUB-01-01-F	1	Yes	61.5	68.4	Yes	61.3	Yes	Yes
HUB-02-01	1	No	61.8	67.9	Yes	60.3	Yes	Yes
HUB-03-01	1	No	59.1	63.6	No	58.5	Yes	No
HUB-04-01	1	No	58.3	62.2	No	57.4	No	No
HUB-05-01	1	No	57.6	61.4	No	56.1	Yes	No
HUB-06-01	1	No	57.0	60.3	No	55.1	Yes	No
HUB-07-01	1	No	57.0	62.1	No	56.1	Yes	No
HUB-08-01-F	1	Yes	70.4	75.0	Yes	61.8	Yes	Yes
HUB-09-01-F	1	Yes	67.1	72.4	Yes	60.6	Yes	Yes

RECEIVER	NUMBER OF RECEPTORS	FRONT ROW?	EX. NOISE LEVEL dB(A)	2045 PRED. NOISE LEVEL dB(A)	IMPACT ?	PREDICTED NOISE LEVEL WITH BARRIER dB(A)	BENEFITED WITH 5dB(A) or MORE REDUCTION?	MEET DESIGN GOAL: FRONT ROW WITH 7dB(A) or MORE REDUCTION?
HUB-10-01-F	1	Yes	64.3	70.2	Yes	59.5	Yes	Yes
HUB-11-01-F	1	Yes	63.2	69.2	Yes	59.0	Yes	Yes
HUB-12-01	1	No	61.2	67.2	Yes	58.2	Yes	Yes
HUB-13-01	1	No	59.7	65.3	No	57.2	Yes	Yes
HUB-14-01	1	No	58.9	64.2	No	57.1	Yes	Yes
LAKR-01-01	1	No	58.8	62.0	No	55.5	Yes	No
LAKR-02-01	1	No	58.9	62.2	No	55.9	Yes	No
LAKR-03-01	1	No	58.9	61.9	No	55.7	Yes	No
LAKR-04-01	1	No	58.8	61.8	No	55.7	Yes	No
LAKR-05-01	1	No	58.7	61.7	No	55.3	Yes	No
LAKR-06-01	1	No	58.6	61.6	No	55.1	Yes	No
LAKR-07-01	1	No	58.6	61.6	No	54.9	Yes	No
LAKR-08-01	1	No	58.6	61.7	No	55.0	Yes	No
LAKR-09-01	1	No	58.4	61.4	No	55.1	Yes	No
LAKR-10-01	1	No	58.6	61.2	No	55.2	Yes	No
LAKR-11-01	1	No	53.9	58.2	No	53.6	No	No
LAKR-12-01	1	No	53.9	58.3	No	52.1	Yes	No
LAKR-13-01	1	No	53.9	58.0	No	52.0	Yes	No
LAKR-14-01	1	No	53.9	58.0	No	52.1	Yes	No
LAKR-15-01	1	No	53.9	57.9	No	52.0	Yes	No
LAKR-16-01	1	No	53.9	58.0	No	52.3	Yes	No
LAKR-17-01	1	No	53.9	58.5	No	52.4	Yes	No
LAKR-18-01	1	No	53.9	58.6	No	52.5	Yes	No
VAN-01-01-F	1	Yes	67.3	70.9	Yes	60.5	Yes	Yes
VAN-02-01	1	No	62.1	63.9	No	61.4	No	No
VAN-03-01	1	No	59.3	64.5	No	56.5	Yes	Yes
VAN-04-01	1	No	58.3	63.4	No	56.7	Yes	No
VAN-15-01	1	No	57.9	62.2	No	55.2	Yes	Yes
VAN-16-01	1	No	61.0	63.8	No	57.5	Yes	No
VAN-17-01	1	No	63.7	65.0	No	58.2	Yes	No
VAN-18-01	1	No	67.3	70.6	Yes	62.1	Yes	Yes
VAN-19-01	1	No	56.1	60.2	No	54.6	Yes	No
VAN-20-01	1	No	54.9	59.7	No	54.4	Yes	No
WFOR-01-01	1	No	60.5	62.1	No	55.7	Yes	No
WFOR-02-01	1	No	59.6	58.8	No	52.8	Yes	No
WFOR-03-01	1	No	58.4	60.9	No	53.6	Yes	Yes
WFOR-04-01	1	No	61.6	57.6	No	51.7	Yes	No
WFOR-05-01	1	No	60.2	56.9	No	52.0	No	No

RECEIVER	NUMBER OF RECEPTORS	FRONT ROW?	EX. NOISE LEVEL dB(A)	2045 PRED. NOISE LEVEL dB(A)	IMPACT ?	PREDICTED NOISE LEVEL WITH BARRIER dB(A)	BENEFITED WITH 5dB(A) or MORE REDUCTION?	MEET DESIGN GOAL: FRONT ROW WITH 7dB(A) or MORE REDUCTION?
WFOR-06-01	1	No	58.6	56.9	No	51.7	Yes	No
WFOR-07-01	1	No	57.4	56.6	No	51.1	Yes	No
WFOR-08-01	1	No	56.6	57.1	No	51.1	Yes	No
WFOR-09-01	1	No	55.5	55.9	No	50.7	Yes	No

TABLE 6: BARRIER RESULTS FOR SOUTH ARLINGTON DRIVE

Table 6: Barrier Results for South Arlington Drive

RECEIVER	NUMBER OF RECEPTORS	FRONT ROW?	EX. NOISE LEVEL dB(A)	2045 PRED. NOISE LEVEL dB(A)	IMPACT ?	PREDICTED NOISE LEVEL WITH BARRIER dB(A)	BENEFITED WITH 5dB(A) or MORE REDUCTION?	MEET DESIGN GOAL: FRONT ROW WITH 7dB(A) or MORE REDUCTION?
ARL-16-01	1	No	54.0	55.2	No	53.1	No	No
ARL-17-01	1	No	54.6	55.5	No	52.7	No	No
ARL-18-01	1	No	54.9	55.7	No	52.8	No	No
ARL-19-01	1	No	55.6	55.5	No	51.8	No	No
ARL-20-01	1	No	55.9	56.5	No	52.8	No	No
ARL-21-01	1	No	56.1	56.7	No	53.4	No	No
ARL-22-01	1	No	57.2	57.7	No	53.6	No	No
ARL-23-01	1	No	57.7	58.3	No	54.4	No	No
ARL-24-01	1	No	58.7	59.0	No	54.6	No	No
ARL-25-01	1	No	59.5	61.1	No	56.0	Yes	No
ARL-26-01	1	No	60.9	62.8	No	57.6	Yes	No
ARL-27-01	1	No	61.5	64.3	No	58.1	Yes	No
ARL-28-01-F	1	Yes	67.9	72.2	Yes	60.6	Yes	Yes
ARL-29-01-F	1	Yes	71.3	75.5	Yes	65.6	Yes	Yes
ARL-30-01-F	1	Yes	69.3	73.3	Yes	63.7	Yes	Yes
ARL-31-01-F	1	Yes	65.3	70.5	Yes	62.2	Yes	Yes
ARL-32-01-F	1	Yes	64.0	69.4	Yes	61.4	Yes	Yes
ARL-33-01-F	1	Yes	62.5	68.2	Yes	60.4	Yes	Yes
ARL-34-01-F	1	Yes	60.5	66.5	Yes	59.5	Yes	Yes
ARL-35-01-F	1	Yes	59.0	65.0	No	58.8	Yes	No
ARL-36-01-F	1	Yes	58.2	63.9	No	58.3	Yes	No
ARL-37-01-F	1	Yes	58.3	63.5	No	58.2	Yes	No
HCHA-01-09	1	No	51.6	53.6	No	52.0	No	No
HCHA-02-03	1	No	54.1	55.0	No	51.2	No	No
HCHA-03-03	1	No	56.2	61.0	No	54.6	Yes	No
HCHA-04-02-F	1	Yes	57.9	63.4	No	56.4	Yes	Yes
HCHA-05-02-F	1	Yes	58.4	63.9	No	56.6	Yes	Yes
HCHA-06-02-F	1	Yes	58.6	63.6	No	56.6	Yes	Yes
HCHA-07-02-F	1	Yes	59.9	64.9	No	57.9	Yes	Yes
HCHA-08-02	1	No	53.7	59.1	No	53.4	Yes	No

Table 7: Barrier Results for Melwood Drive

RECEIVER	NUMBER OF RECEPTORS	FRONT ROW?	EX. NOISE LEVEL dB(A)	2045 PRED. NOISE LEVEL dB(A)	IMPACT ?	PREDICTED NOISE LEVEL WITH BARRIER dB(A)	BENEFITED WITH 5dB(A) or MORE REDUCTION?	MEET DESIGN GOAL: FRONT ROW WITH 7dB(A) or MORE REDUCTION?
351-02-01-F	1	Yes	68.0	70.2	Yes	69.4	No	No
351-03-01	1	No	66.6	69.6	Yes	68.5	No	No
351-04-01	1	No	62.4	66.5	Yes	64.6	No	Yes
351-05-01	1	No	61.3	65.5	No	64.2	No	No
351-06-01	1	No	59.7	63.8	No	62.5	No	No
351-07-01	1	No	61.1	63.3	No	62.7	No	No
351-08-01	1	No	62.3	62.4	No	62.0	No	No
351-09-01	1	No	59.7	60.6	No	59.8	No	No
351-10-01	1	No	60.0	59.8	No	59.2	No	No
351-11-01	1	No	59.4	59.6	No	59.1	No	No
ARL-01-01	1	No	63.2	61.6	No	61.5	No	No
ARL-02-01	1	No	58.5	58.3	No	58.2	No	No
ARL-03-01	1	No	58.5	59.1	No	58.8	No	No
ARL-04-01	1	No	56.5	56.6	No	56.5	No	No
ARL-05-01	1	No	54.1	54.7	No	54.5	No	No
ARL-06-01	1	No	52.7	56.1	No	55.6	No	No
GRED-01-02-F	1	Yes	69.7	74.2	Yes	64.7	Yes	No
GRED-02-02	1	No	66.1	71.6	Yes	64.7	Yes	No
GRED-03-01	1	No	61.3	67.3	Yes	62.5	No	No
GRED-04-01	1	No	59.2	64.1	No	59.8	No	No
GRED-05-02-F	1	Yes	65.3	72.8	Yes	64.3	Yes	No
GRED-06-02	1	No	68.5	71.0	Yes	64.8	Yes	No
GRED-07-01	1	No	65.9	66.1	Yes	62.3	No	No
GRED-08-01	1	No	61.2	65.7	No	62.4	No	No
GRED-09-01	1	No	58.7	64.1	No	61.5	No	Yes
GRED-10-01	1	No	58.0	63.3	No	61.2	No	Yes
GRED-11-01	1	No	57.0	62.1	No	60.3	No	Yes
GRED-12-01	1	No	56.0	60.7	No	59.3	No	Yes
GRED-13-01	1	No	55.5	60.0	No	58.9	No	No
GRED-14-01	1	No	54.8	58.9	No	58.0	No	No
GRED-15-01	1	No	54.4	58.4	No	57.5	No	No
GRED-16-01	1	No	54.0	57.8	No	57.0	No	No
GRED-17-01	1	No	53.6	57.2	No	56.6	No	No
GRED-18-01	1	No	53.2	56.7	No	56.4	No	No
LEX-04-01	1	No	53.6	58.0	No	55.2	No	No
LEX-05-01	1	No	55.3	60.3	No	56.0	No	No

RECEIVER	NUMBER OF RECEPTORS	FRONT ROW?	EX. NOISE LEVEL dB(A)	2045 PRED. NOISE LEVEL dB(A)	IMPACT ?	PREDICTED NOISE LEVEL WITH BARRIER dB(A)	BENEFITED WITH 5dB(A) or MORE REDUCTION?	MEET DESIGN GOAL: FRONT ROW WITH 7dB(A) or MORE REDUCTION?
MELW-01-01-F	1	Yes	65.9	71.0	Yes	66.0	Yes	No
MELW-02-01-F	1	Yes	69.5	73.1	Yes	65.5	Yes	Yes
MELW-03-01-F	1	Yes	68.7	72.5	Yes	65.1	Yes	No
MELW-04-01-F	1	Yes	68.1	72.1	Yes	65.1	Yes	Yes
MELW-05-01-F	1	Yes	67.6	71.9	Yes	65.4	Yes	No
MELW-06-01-F	1	Yes	67.1	72.5	Yes	66.4	Yes	No
MELW-07-01-F	1	Yes	66.4	72.3	Yes	66.8	Yes	No
MELW-08-01-F	1	Yes	67.3	72.9	Yes	65.8	Yes	No
MELW-09-01-F	1	Yes	67.5	73.0	Yes	64.6	Yes	No
MELW-10-01-F	1	Yes	69.4	74.6	Yes	64.4	Yes	No
MELW-11-01-F	1	Yes	69.6	74.7	Yes	63.1	Yes	No
MELW-12-01-F	1	Yes	66.4	71.8	Yes	61.3	Yes	No
MELW-13-01-F	1	Yes	64.6	70.1	Yes	60.5	Yes	No
MELW-14-01-F	1	Yes	62.1	68.2	Yes	59.4	Yes	No
MELW-15-01-F	1	Yes	59.4	66.1	Yes	58.0	Yes	No
MELW-16-01-F	1	Yes	57.7	64.7	No	57.2	Yes	No
MELW-17-01-F	1	Yes	56.5	63.6	No	56.6	Yes	No
MELW-18-01-F	1	Yes	55.5	62.3	No	56.9	Yes	No
MELW-19-01-F	1	Yes	54.4	60.8	No	58.9	No	Yes
MELW-20-01-F	1	Yes	53.8	59.8	No	58.6	No	No
MELW-23-01	1	No	62.3	66.8	Yes	64.5	No	Yes
MELW-24-01	1	No	61.8	65.4	No	63.4	No	Yes
MELW-25-01	1	No	61.4	65.0	No	62.8	No	Yes
MELW-26-01	1	No	61.2	64.9	No	63.0	No	Yes
MELW-27-01	1	No	60.5	66.6	Yes	61.1	Yes	No
MELW-28-01	1	No	58.7	64.9	No	59.4	Yes	No
MELW-29-01	1	No	57.5	63.6	No	58.4	Yes	No
MELW-30-01	1	No	56.5	61.2	No	56.5	No	No
MELW-31-01	1	No	55.8	59.3	No	55.8	No	Yes
MELW-32-01	1	No	53.8	59.3	No	56.5	No	No
WEN-01-01	1	No	60.5	66.1	Yes	62.1	No	No
WEN-02-01	1	No	59.6	65.0	No	61.3	No	Yes
WEN-03-01	1	No	58.4	63.6	No	59.9	No	Yes
WEN-04-01	1	No	61.6	66.9	Yes	62.3	No	No
WEN-05-01	1	No	60.2	65.9	No	60.8	Yes	No
WEN-06-01	1	No	58.6	64.2	No	59.1	Yes	No
WEN-07-01	1	No	57.4	62.7	No	57.6	Yes	No
WEN-08-01	1	No	56.6	61.6	No	56.6	Yes	No

RECEIVER	NUMBER OF RECEPTORS	FRONT ROW?	EX. NOISE LEVEL dB(A)	2045 PRED. NOISE LEVEL dB(A)	IMPACT ?	PREDICTED NOISE LEVEL WITH BARRIER dB(A)	BENEFITED WITH 5dB(A) or MORE REDUCTION?	MEET DESIGN GOAL: FRONT ROW WITH 7dB(A) or MORE REDUCTION?
WEN-09-01	1	No	55.5	60.2	No	55.8	No	No

TABLE 7: BARRIER RESULTS FOR MELWOOD DRIVE

Table 7: Barrier Results for Melwood Drive

RECEIVER	NUMBER OF RECEPTORS	FRONT ROW?	EX. NOISE LEVEL dB(A)	2045 PRED. NOISE LEVEL dB(A)	IMPACT ?	PREDICTED NOISE LEVEL WITH BARRIER dB(A)	BENEFITED WITH 5dB(A) or MORE REDUCTION?	MEET DESIGN GOAL: FRONT ROW WITH 7dB(A) or MORE REDUCTION?
351-02-01-F	1	Yes	68.0	70.2	Yes	69.4	No	No
351-04-01	1	No	62.4	66.5	Yes	64.6	No	Yes
351-05-01	1	No	61.3	65.5	No	64.2	No	No
351-06-01	1	No	59.7	63.8	No	62.5	No	No
351-07-01	1	No	61.1	63.3	No	62.7	No	No
351-08-01	1	No	62.3	62.4	No	62.0	No	No
351-09-01	1	No	59.7	60.6	No	59.8	No	No
351-10-01	1	No	60.0	59.8	No	59.2	No	No
351-11-01	1	No	59.4	59.6	No	59.1	No	No
ARL-01-01	1	No	63.2	61.6	No	61.5	No	No
ARL-02-01	1	No	58.5	58.3	No	58.2	No	No
ARL-03-01	1	No	58.5	59.1	No	58.8	No	No
ARL-04-01	1	No	56.5	56.6	No	56.5	No	No
ARL-05-01	1	No	54.1	54.7	No	54.5	No	No
ARL-06-01	1	No	52.7	56.1	No	55.6	No	No
GRED-01-02-F	1	Yes	69.7	74.2	Yes	64.7	Yes	No
GRED-02-02	1	No	66.1	71.6	Yes	64.7	Yes	No
GRED-03-01	1	No	61.3	67.3	Yes	62.5	No	No
GRED-04-01	1	No	59.2	64.1	No	59.8	No	No
GRED-05-02-F	1	Yes	65.3	72.8	Yes	64.3	Yes	No
GRED-06-02	1	No	68.5	71.0	Yes	64.8	Yes	No
GRED-07-01	1	No	65.9	66.1	Yes	62.3	No	No
GRED-08-01	1	No	61.2	65.7	No	62.4	No	No
GRED-09-01	1	No	58.7	64.1	No	61.5	No	Yes
GRED-10-01	1	No	58.0	63.3	No	61.2	No	Yes
GRED-11-01	1	No	57.0	62.1	No	60.3	No	Yes
GRED-12-01	1	No	56.0	60.7	No	59.3	No	Yes
GRED-13-01	1	No	55.5	60.0	No	58.9	No	No
GRED-14-01	1	No	54.8	58.9	No	58.0	No	No
GRED-15-01	1	No	54.4	58.4	No	57.5	No	No
GRED-16-01	1	No	54.0	57.8	No	57.0	No	No
GRED-17-01	1	No	53.6	57.2	No	56.6	No	No
GRED-18-01	1	No	53.2	56.7	No	56.4	No	No
LEX-04-01	1	No	53.6	58.0	No	55.2	No	No
LEX-05-01	1	No	55.3	60.3	No	56.0	No	No
MELW-01-01-F	1	Yes	65.9	71.0	Yes	66.0	Yes	No

RECEIVER	NUMBER OF RECEPTORS	FRONT ROW?	EX. NOISE LEVEL dB(A)	2045 PRED. NOISE LEVEL dB(A)	IMPACT ?	PREDICTED NOISE LEVEL WITH BARRIER dB(A)	BENEFITED WITH 5dB(A) or MORE REDUCTION?	MEET DESIGN GOAL: FRONT ROW WITH 7dB(A) or MORE REDUCTION?
MELW-02-01-F	1	Yes	69.5	73.1	Yes	65.5	Yes	Yes
MELW-03-01-F	1	Yes	68.7	72.5	Yes	65.1	Yes	No
MELW-04-01-F	1	Yes	68.1	72.1	Yes	65.1	Yes	Yes
MELW-05-01-F	1	Yes	67.6	71.9	Yes	65.4	Yes	No
MELW-06-01-F	1	Yes	67.1	72.5	Yes	66.4	Yes	No
MELW-07-01-F	1	Yes	66.4	72.3	Yes	66.8	Yes	No
MELW-08-01-F	1	Yes	67.3	72.9	Yes	65.8	Yes	No
MELW-09-01-F	1	Yes	67.5	73.0	Yes	64.6	Yes	No
MELW-10-01-F	1	Yes	69.4	74.6	Yes	64.4	Yes	No
MELW-11-01-F	1	Yes	69.6	74.7	Yes	63.1	Yes	No
MELW-12-01-F	1	Yes	66.4	71.8	Yes	61.3	Yes	No
MELW-13-01-F	1	Yes	64.6	70.1	Yes	60.5	Yes	No
MELW-14-01-F	1	Yes	62.1	68.2	Yes	59.4	Yes	No
MELW-15-01-F	1	Yes	59.4	66.1	Yes	58.0	Yes	No
MELW-16-01-F	1	Yes	57.7	64.7	No	57.2	Yes	No
MELW-17-01-F	1	Yes	56.5	63.6	No	56.6	Yes	No
MELW-18-01-F	1	Yes	55.5	62.3	No	56.9	Yes	No
MELW-19-01-F	1	Yes	54.4	60.8	No	58.9	No	Yes
MELW-20-01-F	1	Yes	53.8	59.8	No	58.6	No	No
MELW-23-01	1	No	62.3	66.8	Yes	64.5	No	Yes
MELW-24-01	1	No	61.8	65.4	No	63.4	No	Yes
MELW-25-01	1	No	61.4	65.0	No	62.8	No	Yes
MELW-26-01	1	No	61.2	64.9	No	63.0	No	Yes
MELW-27-01	1	No	60.5	66.6	Yes	61.1	Yes	No
MELW-28-01	1	No	58.7	64.9	No	59.4	Yes	No
MELW-29-01	1	No	57.5	63.6	No	58.4	Yes	No
MELW-30-01	1	No	56.5	61.2	No	56.5	No	No
MELW-31-01	1	No	55.8	59.3	No	55.8	No	Yes
MELW-32-01	1	No	53.8	59.3	No	56.5	No	No
WEN-01-01	1	No	60.5	66.1	Yes	62.1	No	No
WEN-02-01	1	No	59.6	65.0	No	61.3	No	Yes
WEN-03-01	1	No	58.4	63.6	No	59.9	No	Yes
WEN-04-01	1	No	61.6	66.9	Yes	62.3	No	No
WEN-05-01	1	No	60.2	65.9	No	60.8	Yes	No
WEN-06-01	1	No	58.6	64.2	No	59.1	Yes	No
WEN-07-01	1	No	57.4	62.7	No	57.6	Yes	No
WEN-08-01	1	No	56.6	61.6	No	56.6	Yes	No
WEN-09-01	1	No	55.5	60.2	No	55.8	No	No

TABLE 8: RESULTS FOR RICHARDSON AVENUE

Table 8: Results for Richardson Avenue

LEGEND	
	Exceeds Noise Abatement Criteria
	Exceeds Substantial Increase Criteria (10 dB(A) in KY, 15 dB(A) in IN)
	Exceeds Both Criteria

RECEIVER	DESCRIPTION (ACTIVITY CATEGORY)	NAC dB(A)	EXISTING		CENTRAL ALT 1B MOD	
			DIST. TO ROAD (ft)	NOISE LEVEL dB(A)	DIST. TO ROAD (ft)	2045 PREDICTED NOISE LEVEL dB(A)
KIM-01-47-FV	Residential (B)	66	238	61.3	252	62.6
KIM-02-24-F	Residential (B)	66	216	64.4	221	56.5
KIM-03-24	Residential (B)	66	324	60.8	329	53.7
KIM-04-24-F	Residential (B)	66	263	60.7	268	62.5
KIM-05-24	Residential (B)	66	378	58.6	383	59.0
KIM-06-24-F	Residential (B)	66	280	61.2	285	63.5
KIM-07-24	Residential (B)	66	363	59.5	368	61.7
KIM-07-24-F	Residential (B)	66	225	64.6	230	65.6
KIM-08-127	Residential (B)	66	395	60.1	389	62.0

TABLE 9: RESULTS FOR TARANSAY DRIVE

Table 9: Results for Taransay Drive

LEGEND	
	Exceeds Noise Abatement Criteria
	Exceeds Substantial Increase Criteria (10 dB(A) in KY, 15 dB(A) in IN)
	Exceeds Both Criteria

RECEIVER	DESCRIPTION (ACTIVITY CATEGORY)	NAC dB(A)	EXISTING		CENTRAL ALT 1B MOD	
			DIST. TO ROAD (ft)	NOISE LEVEL dB(A)	DIST. TO ROAD (ft)	2045 PREDICTED NOISE LEVEL dB(A)
BAL-01-01-F	Residential (B)	66	NA	40.4	593	57.3
BAL-02-01	Residential (B)	66	NA	40.4	667	56.2
BAL-03-01	Residential (B)	66	NA	40.4	729	55.9
BAL-04-01	Residential (B)	66	NA	40.4	800	55.1
BAL-05-01	Residential (B)	66	NA	40.4	854	53.9
BAL-06-01-F	Residential (B)	66	NA	40.4	760	54.4
BAL-07-01	Residential (B)	66	NA	40.4	868	52.7
BAL-08-01	Residential (B)	66	NA	40.4	935	52.4
BRO-01-01-F	Residential (B)	66	NA	40.4	548	58.2
BRO-02-01-F	Residential (B)	66	NA	40.4	479	58.8
BRO-03-01	Residential (B)	66	NA	40.4	653	54.6
BRO-04-01	Residential (B)	66	NA	40.4	565	56.9
BRO-05-01	Residential (B)	66	NA	40.4	748	53.8
BRO-06-01	Residential (B)	66	NA	40.4	692	56.3
COB-01-01-F	Residential (B)	66	NA	40.4	337	62.3
COB-02-01-F	Residential (B)	66	NA	40.4	400	60.3
COB-03-01-F	Residential (B)	66	NA	40.4	454	58.7
COB-04-01-F	Residential (B)	66	NA	40.4	511	58.3
COB-05-01-F	Residential (B)	66	NA	40.4	555	56.7
COB-06-01-F	Residential (B)	66	NA	40.4	632	56.0
COB-07-01-F	Residential (B)	66	NA	40.4	681	55.9
COB-08-01-F	Residential (B)	66	NA	40.4	749	55.2
COB-09-01-F	Residential (B)	66	NA	40.4	811	54.5
COB-10-01-F	Residential (B)	66	NA	40.4	855	53.9
COB-11-01-F	Residential (B)	66	NA	40.4	564	56.6
COB-12-01	Residential (B)	66	NA	40.4	620	54.4
COB-13-01	Residential (B)	66	NA	40.4	742	52.7
COB-14-01	Residential (B)	66	NA	40.4	493	51.7
COB-15-01	Residential (B)	66	NA	40.4	785	54.6

TABLE 10: BARRIER RESULTS FOR TARANSAY DRIVE

Table 10: Barrier Results for Taransay Drive

RECEIVER	NUMBER OF RECEPTORS	FRONT ROW?	EX. NOISE LEVEL dB(A)	2045 PRED. NOISE LEVEL dB(A)	IMPACT ?	PREDICTED NOISE LEVEL WITH BARRIER dB(A)	BENEFITED WITH 5dB(A) or MORE REDUCTION?	MEET DESIGN GOAL: FRONT ROW WITH 7dB(A) or MORE REDUCTION?
COB-01-01-F	1	Yes	40.4	62.3	Yes	50.6	Yes	Yes
COB-02-01-F	1	Yes	40.4	60.4	Yes	50.0	Yes	Yes
BAL-01-01-F	1	Yes	40.4	57.3	Yes	47.2	Yes	Yes
BAL-02-01	1	No	40.4	56.2	Yes	46.2	Yes	Yes
COB-11-01-F	1	Yes	40.4	56.6	Yes	46.7	Yes	Yes
COB-04-01-F	1	Yes	40.4	58.3	Yes	48.8	Yes	Yes
BAL-03-01	1	No	40.4	55.9	Yes	46.5	Yes	Yes
BAL-06-01-F	1	Yes	40.4	54.5	Yes	45.3	Yes	Yes
COB-03-01-F	1	Yes	40.4	58.8	Yes	49.6	Yes	Yes
COB-12-01	1	No	40.4	54.4	Yes	45.3	Yes	Yes
BAL-04-01	1	No	40.4	55.1	Yes	46.1	Yes	Yes
BAL-07-01	1	No	40.4	52.7	Yes	43.7	Yes	Yes
COB-05-01-F	1	Yes	40.4	56.7	Yes	47.8	Yes	Yes
BAL-05-01	1	No	40.4	53.9	Yes	45.1	Yes	Yes
BAL-08-01	1	No	40.4	52.4	Yes	43.6	Yes	Yes
COB-15-01	1	No	40.4	54.6	Yes	45.8	Yes	Yes
COB-13-01	1	No	40.4	52.7	Yes	44.2	Yes	Yes
COB-06-01-F	1	Yes	40.4	56.0	Yes	47.6	Yes	Yes
COB-07-01-F	1	Yes	40.4	55.9	Yes	47.7	Yes	Yes
COB-14-01	1	No	40.4	51.7	Yes	43.5	Yes	Yes
COB-08-01-F	1	Yes	40.4	55.2	Yes	47.3	Yes	Yes
COB-09-01-F	1	Yes	40.4	54.5	Yes	46.9	Yes	Yes
COB-10-01-F	1	Yes	40.4	53.9	Yes	46.8	Yes	Yes
BRO-03-01	1	No	40.4	54.6	Yes	48.1	Yes	No
BRO-05-01	1	No	40.4	53.8	Yes	47.6	Yes	No
BRO-01-01-F	1	Yes	40.4	58.2	Yes	53.1	Yes	No
BRO-02-01-F	1	Yes	40.4	58.8	Yes	54.7	No	No
BRO-04-01	1	No	40.4	56.9	Yes	53.7	No	No
BRO-06-01	1	No	40.4	56.3	Yes	53.4	No	No

TABLE 11: RESULTS FOR US 60

Table 11: Results for US 60

LEGEND	
	Exceeds Noise Abatement Criteria
	Exceeds Substantial Increase Criteria (10 dB(A) in KY, 15 dB(A) in IN)
	Exceeds Both Criteria

RECEIVER	DESCRIPTION (ACTIVITY CATEGORY)	NAC dB(A)	EXISTING		CENTRAL ALT 1B MOD	
			DIST. TO ROAD (ft)	NOISE LEVEL dB(A)	DIST. TO ROAD (ft)	2045 PREDICTED NOISE LEVEL dB(A)
HIL-01-01	Residential (B)	66	193	58.5	192	61.1
HIL-02-01	Residential (B)	66	279	55.2	279	58.6
HIL-03-01	Residential (B)	66	498	50.3	501	50.5
HIL-04-01	Residential (B)	66	487	50.5	462	52.1
HIL-05-01	Residential (B)	66	443	51.7	401	52.6
HIL-06-01	Residential (B)	66	354	54.5	289	56.4
HIL-07-01	Residential (B)	66	300	57.2	213	59.7
MIC-01-01	Residential (B)	66	517	50.2	524	51.2
MIC-02-01	Residential (B)	66	513	50.6	468	51.6
MIC-03-01	Residential (B)	66	501	50.9	406	52.1
MIC-04-01	Residential (B)	66	443	52.7	246	55.4
MIC-05-01	Residential (B)	66	520	51.2	315	53.6
MIC-06-01	Residential (B)	66	266	56.1	275	59.2
MIC-06-01	Residential (B)	66	258	56.0	264	59.6
MIC-07-01	Residential (B)	66	258	56.7	230	59.8
MIL-01-01	Residential (B)	66	342	55.7	348	55.4
MIL-02-01	Residential (B)	66	347	55.5	353	55.2
MIL-03-01	Residential (B)	66	352	55.4	358	55.0
MIL-04-01	Residential (B)	66	351	55.4	357	55.0
MIL-05-01	Residential (B)	66	360	54.9	366	54.4
MIL-06-01	Residential (B)	66	353	55.3	359	54.2
MIL-07-01	Residential (B)	66	355	55.2	361	53.9
MIL-08-01	Residential (B)	66	370	54.7	376	53.6
MIL-09-01	Residential (B)	66	392	53.8	398	55.1
MIL-10-01	Residential (B)	66	387	53.8	393	55.3
MIL-11-01	Residential (B)	66	398	53.3	404	55.8
MIL-12-01	Residential (B)	66	393	53.1	399	56.3
MIL-13-01	Residential (B)	66	394	52.9	400	56.4
MIL-14-01	Residential (B)	66	398	52.6	403	56.5
MIL-15-01	Residential (B)	66	382	53.9	389	57.1
MIL-16-01	Residential (B)	66	416	53.6	413	57.2

RECEIVER	DESCRIPTION (ACTIVITY CATEGORY)	NAC dB(A)	EXISTING		CENTRAL ALT 1B MOD	
			DIST. TO ROAD (ft)	NOISE LEVEL dB(A)	DIST. TO ROAD (ft)	2045 PREDICTED NOISE LEVEL dB(A)
MIL-17-01	Residential (B)	66	447	52.7	443	56.8
MIL-18-01	Residential (B)	66	504	51.3	499	55.8
MIL-19-01	Residential (B)	66	553	50.1	547	54.7
MIL-20-01	Residential (B)	66	609	48.9	603	53.5
MIL-21-01	Residential (B)	66	632	48.4	625	53.1
MIL-22-01	Residential (B)	66	692	47.2	684	51.9
MIL-23-01	Residential (B)	66	754	46.2	746	50.7
MOR-01-01-F	Residential (B)	66	162	58.8	111	59.6
MOR-02-01-F	Residential (B)	66	246	55.6	169	57.3
MOR-03-01-F	Residential (B)	66	317	54.1	221	55.8
MOR-04-01-F	Residential (B)	66	379	53.2	294	55.2
MOR-05-01-F	Residential (B)	66	443	52.2	375	54.4
MOR-06-01-F	Residential (B)	66	501	51.3	447	53.6
MOR-07-01-F	Residential (B)	66	579	50.3	528	52.9
MOR-08-01	Residential (B)	66	553	50.4	360	52.8
MOR-09-01	Residential (B)	66	517	50.7	309	53.0
MOR-10-01	Residential (B)	66	475	51.6	257	54.0
MOR-11-01	Residential (B)	66	383	53.7	163	55.9
MOR-12-01	Residential (B)	66	326	55.0	115	57.6
MOR-13-01	Residential (B)	66	264	56.7	102	59.6
MOR-14-01	Residential (B)	66	196	59.2	154	61.5
60-01-01	Church (C)	66	179	61.3	185	60.9
60-02-04-F	Residential (B)	66	92	65.1	98	65.3
60-03-04-F	Residential (B)	66	136	62.8	142	62.3
60-04-04	Residential (B)	66	207	60.2	213	58.4
60-05-04	Residential (B)	66	256	58.5	262	56.5
60-06-04-F	Residential (B)	66	306	57.0	312	53.6
60-07-04-F	Residential (B)	66	303	57.1	309	54.2
60-08-01-FV	Residential (B)	66	160	62.2	209	61.2
60-09-01-FV	Residential (B)	66	379	56.5	264	59.3
60-10-01-F	Residential (B)	66	139	62.2	147	63.0
60-11-01-F	Residential (B)	66	134	61.7	141	61.0
60-12-01-F	Residential (B)	66	107	63.6	104	62.9
60-13-01-F	Residential (B)	66	118	62.0	124	63.7
60-14-01	Residential (B)	66	212	56.7	218	59.7

TABLE 12: RESULTS FOR BRAXTON PARK DRIVE AND MELODY LANE

Table 12: Results for Braxton Park Drive and Melody Lane

LEGEND	
	Exceeds Noise Abatement Criteria
	Exceeds Substantial Increase Criteria (10 dB(A) in KY, 15 dB(A) in IN)
	Exceeds Both Criteria

RECEIVER	DESCRIPTION (ACTIVITY CATEGORY)	NAC dB(A)	EXISTING		CENTRAL ALT 1B MOD	
			DIST. TO ROAD (ft)	NOISE LEVEL dB(A)	DIST. TO ROAD (ft)	2045 PREDICTED NOISE LEVEL dB(A)
414-01-01-F	Residential (B)	66	N/A	39.8	1,106	46.8
414-02-01-F	Residential (B)	66	N/A	39.8	880	54.3
BOW-01-01-F	Residential (B)	66	N/A	39.8	251	61.9
BOW-02-01-F	Residential (B)	66	N/A	39.8	400	59.1
BOW-03-01	Residential (B)	66	N/A	39.8	586	53.4
BOW-04-01	Residential (B)	66	N/A	39.8	586	55.0
BRA-01-01-F	Residential (B)	66	N/A	39.8	469	53.3
BRA-02-01	Residential (B)	66	N/A	39.8	534	54.4
BRA-03-01	Residential (B)	66	N/A	39.8	609	53.2
BRA-04-01	Residential (B)	66	N/A	39.8	732	51.6
BRA-05-01	Residential (B)	66	N/A	39.8	797	50.8
BRA-06-01	Residential (B)	66	N/A	39.8	421	52.2
BRA-07-01	Residential (B)	66	N/A	39.8	700	49.2
BRA-08-01	Residential (B)	66	N/A	39.8	802	48.2
BRA-09-01	Residential (B)	66	N/A	39.8	520	51.1
BRA-10-01	Residential (B)	66	N/A	39.8	613	50.3
BRA-11-01-F	Residential (B)	66	N/A	39.8	344	53.9
CUL-01-01-FA	Residential (B)	66	N/A	39.8	424	57.6
CUL-02-01	Residential (B)	66	N/A	39.8	538	55.7
CUL-03-01	Residential (B)	66	N/A	39.8	696	53.8
CUL-04-01	Residential (B)	66	N/A	39.8	779	53.2
CUL-05-01	Residential (B)	66	N/A	39.8	858	52.7
CUL-06-01	Residential (B)	66	N/A	39.8	617	54.7
CUL-07-01-F	Residential (B)	66	N/A	39.8	460	55.9
CUL-08-01	Residential (B)	66	N/A	39.8	556	53.9
CUL-09-01	Residential (B)	66	N/A	39.8	738	51.6
CUL-10-01	Residential (B)	66	N/A	39.8	810	50.1
CUL-11-01	Residential (B)	66	N/A	39.8	646	52.7
HAR-01-01-F	Residential (B)	66	N/A	39.8	692	50.3
HAR-02-01-F	Residential (B)	66	N/A	39.8	687	48.8
HAR-03-01-F	Residential (B)	66	N/A	39.8	774	50.2

RECEIVER	DESCRIPTION (ACTIVITY CATEGORY)	NAC dB(A)	EXISTING		CENTRAL ALT 1B MOD	
			DIST. TO ROAD (ft)	NOISE LEVEL dB(A)	DIST. TO ROAD (ft)	2045 PREDICTED NOISE LEVEL dB(A)
HAR-04-01	Residential (B)	66	N/A	39.8	834	49.6
MEL-01-01-F	Residential (B)	66	N/A	39.8	375	60.1
MEL-02-01-F	Residential (B)	66	N/A	39.8	489	56.8
MEL-03-01-F	Residential (B)	66	N/A	39.8	456	57.5
MEL-04-01	Residential (B)	66	N/A	39.8	761	52.9
MEL-05-01	Residential (B)	66	N/A	39.8	552	56.6
MEL-06-01	Residential (B)	66	N/A	39.8	792	52.6
MEL-07-01	Residential (B)	66	N/A	39.8	859	51.3
PRI-01-01-F	Residential (B)	66	N/A	39.8	677	50.0
SAN-01-01-F	Residential (B)	66	N/A	39.8	540	53.1
SAN-02-01	Residential (B)	66	N/A	39.8	615	52.3
SAN-03-01	Residential (B)	66	N/A	39.8	699	50.3
SAN-04-01	Residential (B)	66	N/A	39.8	794	48.9
SAN-05-01-F	Residential (B)	66	N/A	39.8	527	53.3
SAN-06-01	Residential (B)	66	N/A	39.8	615	49.4
SAN-07-01	Residential (B)	66	N/A	39.8	701	48.1
SAN-08-01	Residential (B)	66	N/A	39.8	777	48.8

TABLE 13: BARRIER RESULTS FOR BRAXTON PARK DRIVE

Table 13: Barrier Results for Braxton Park Drive

RECEIVER	NUMBER OF RECEPTORS	FRONT ROW?	EX. NOISE LEVEL dB(A)	2045 PRED. NOISE LEVEL dB(A)	IMPACT ?	PREDICTED NOISE LEVEL WITH BARRIER dB(A)	BENEFITED WITH 5dB(A) or MORE REDUCTION?	MEET DESIGN GOAL: FRONT ROW WITH 7dB(A) or MORE REDUCTION?
414-01-01-F	1	Yes	46.4	6.6	No	43.2	No	No
414-02-01-F	1	Yes	53.6	13.8	Yes	46.2	Yes	Yes
BRA-01-01-F	1	Yes	53.0	13.2	Yes	47.1	Yes	No
BRA-02-01	1	No	53.3	13.5	Yes	46.7	Yes	No
BRA-03-01	1	No	52.3	12.5	Yes	45.9	Yes	No
BRA-04-01	1	No	50.8	11.0	Yes	43.6	Yes	Yes
BRA-05-01	1	No	49.9	10.1	Yes	42.8	Yes	Yes
BRA-06-01	1	No	51.7	11.9	Yes	47.2	No	No
BRA-07-01	1	No	48.9	9.1	No	43.7	Yes	No
BRA-08-01	1	No	47.8	8.0	No	42.4	Yes	No
BRA-09-01	1	No	50.7	10.9	Yes	46.2	No	No

TABLE 14: BARRIER RESULTS FOR MELODY LANE

Table 14: Barrier Results for Melody Lane

RECEIVER	NUMBER OF RECEPTORS	FRONT ROW?	EX. NOISE LEVEL dB(A)	2045 PRED. NOISE LEVEL dB(A)	IMPACT ?	PREDICTED NOISE LEVEL WITH BARRIER dB(A)	BENEFITED WITH 5dB(A) or MORE REDUCTION?	MEET DESIGN GOAL: FRONT ROW WITH 7dB(A) or MORE REDUCTION?
BOW-01-01-F	1	Yes	39.8	61.5	Yes	53.2	Yes	Yes
BOW-02-01-F	1	Yes	39.8	58.4	Yes	50.1	Yes	Yes
BOW-03-01	1	No	39.8	52.8	Yes	47.8	Yes	No
BOW-04-01	1	No	39.8	54.0	Yes	47.5	Yes	No
MEL-01-01-F	1	Yes	39.8	59.3	Yes	52.3	Yes	Yes
MEL-02-01-F	1	Yes	39.8	56.1	Yes	49.0	Yes	Yes
MEL-03-01-F	1	Yes	39.8	56.6	Yes	48.9	Yes	Yes
MEL-04-01	1	No	39.8	51.4	Yes	46.0	Yes	No
MEL-05-01	1	No	39.8	56.1	Yes	50.5	Yes	No
MEL-06-01	1	No	39.8	51.6	Yes	48.0	No	No
MEL-07-01	1	No	39.8	49.9	Yes	44.9	Yes	No

TABLE 15: RESULTS FOR OHIO RIVER EAST AND OHIO RIVER WEST

Table 15: Results for Ohio River East and Ohio River West

LEGEND	
	Exceeds Noise Abatement Criteria
	Exceeds Substantial Increase Criteria (10 dB(A) in KY, 15 dB(A) in IN)
	Exceeds Both Criteria

RECEIVER	DESCRIPTION (ACTIVITY CATEGORY)	NAC dB(A)	EXISTING		CENTRAL ALT 1B MOD	
			DIST. TO ROAD (ft)	NOISE LEVEL dB(A)	DIST. TO ROAD (ft)	2045 PREDICTED NOISE LEVEL dB(A)
GRE-01-01	Residential (B)	66	N/A	45.2	596	59.2
GRE-02-01	Residential (B)	66	N/A	45.2	427	61.3
GRE-03-01	Residential (B)	66	N/A	45.2	283	62.9
GRE-04-01	Residential (B)	66	N/A	45.2	195	63.8
GRE-05-01-F	Residential (B)	66	N/A	45.2	88	64.7
GRE-06-01-F	Residential (B)	66	N/A	45.2	107	64.3
GRE-07-01	Residential (B)	66	N/A	45.2	189	64.0
GRE-08-01	Residential (B)	66	N/A	45.2	363	62.2
GRE-09-01	Residential (B)	66	N/A	45.2	476	60.8
GRE-10-01	Residential (B)	66	N/A	45.2	598	59.3
GRE-11-01	Residential (B)	66	N/A	45.2	682	58.3
NUG-01-01	Residential (B)	66	N/A	48.4	755	57.4
NUG-02-01	Residential (B)	66	N/A	48.4	281	63.1
NUG-03-01-F	Residential (B)	66	N/A	48.4	87	65.1
NUG-04-01-F	Residential (B)	66	N/A	48.4	83	64.0
NUG-05-01	Residential (B)	66	N/A	48.4	263	62.8

TABLE 16: BARRIER RESULTS FOR OHIO RIVER EAST

Table 16: Barrier Results for Ohio River East

RECEIVER	NUMBER OF RECEPTORS	FRONT ROW?	EX. NOISE LEVEL dB(A)	2045 PRED. NOISE LEVEL dB(A)	IMPACT ?	PREDICTED NOISE LEVEL WITH BARRIER dB(A)	BENEFITED WITH 5dB(A) or MORE REDUCTION?	MEET DESIGN GOAL: FRONT ROW WITH 7dB(A) or MORE REDUCTION?
GRE-06-01-F	1	Yes	45.2	64.3	Yes	63.8	No	No
GRE-07-01	1	No	45.2	64.0	Yes	62.6	No	No
GRE-08-01	1	No	45.2	62.2	Yes	60.3	No	No
GRE-09-01	1	No	45.2	60.8	Yes	58.9	No	No
GRE-10-01	1	No	45.2	59.3	Yes	57.4	No	No
GRE-11-01	1	No	45.2	58.3	Yes	56.3	No	No
NUG-04-01-F	1	Yes	48.4	64.0	Yes	63.7	No	No
NUG-05-01	1	No	48.4	62.8	Yes	61.0	No	No

TABLE 17: BARRIER RESULTS FOR OHIO RIVER WEST

Table 17: Barrier Results for Ohio River West

RECEIVER	NUMBER OF RECEPTORS	FRONT ROW?	EX. NOISE LEVEL dB(A)	2045 PRED. NOISE LEVEL dB(A)	IMPACT ?	PREDICTED NOISE LEVEL WITH BARRIER dB(A)	BENEFITED WITH 5dB(A) or MORE REDUCTION?	MEET DESIGN GOAL: FRONT ROW WITH 7dB(A) or MORE REDUCTION?
GRE-01-01	1	No	45.2	59.2	Yes	57.8	No	No
GRE-02-01	1	No	45.2	61.3	Yes	59.9	No	No
GRE-03-01	1	No	45.2	62.9	Yes	61.7	No	No
GRE-04-01	1	No	45.2	63.8	Yes	62.9	No	No
GRE-05-01-F	1	Yes	45.2	64.7	Yes	64.6	No	No
NUG-01-01	1	No	48.4	57.4	No	56.2	No	No
NUG-02-01	1	No	48.4	63.1	Yes	62.0	No	No
NUG-03-01-F	1	Yes	48.4	65.1	Yes	64.9	No	No

TABLE 18: RESULTS FOR EASTVIEW EAST

Table 18: Results for Eastview East

LEGEND	
	Exceeds Noise Abatement Criteria
	Exceeds Substantial Increase Criteria (10 dB(A) in KY, 15 dB(A) in IN)
	Exceeds Both Criteria

RECEIVER	DESCRIPTION (ACTIVITY CATEGORY)	NAC dB(A)	EXISTING		CENTRAL ALT 1B MOD	
			DIST. TO ROAD (ft)	NOISE LEVEL dB(A)	DIST. TO ROAD (ft)	2045 PREDICTED NOISE LEVEL dB(A)
ARLE-01-01-F	Residential (B)	66	168	62.0	168	66.0
ARLE-02-01	Residential (B)	66	215	60.5	215	64.6
ARLE-03-01	Residential (B)	66	252	59.4	252	63.5
ARLE-04-01	Residential (B)	66	291	58.5	291	62.5
ARLE-05-01	Residential (B)	66	112	64.0	112	66.9
ARLE-06-01	Residential (B)	66	167	62.1	167	65.9
ARLE-07-01	Residential (B)	66	206	60.7	206	64.8
ARLE-08-01	Residential (B)	66	266	59.0	266	63.1
BOE-01-01	Residential (B)	66	439	51.3	398	59.4
BOE-02-01	Residential (B)	66	364	52.2	320	60.4
BOE-03-01-F	Residential (B)	66	149	54.7	101	63.9
BOE-04-01	Residential (B)	66	198	54.7	152	63.0
BOE-05-01	Residential (B)	66	652	51.8	615	56.1
BOE-06-01	Residential (B)	66	772	50.4	735	54.6
BOE-07-01	Residential (B)	66	485	50.5	450	58.6
CON-01-01-F	Residential (B)	66	125	63.7	125	66.6
CON-02-01	Residential (B)	66	177	61.7	177	65.7
CON-03-01	Residential (B)	66	210	60.6	210	64.8
CON-04-01	Residential (B)	66	257	59.4	257	63.4
CON-05-01-F	Residential (B)	66	95	64.0	95	67.4
CON-06-01	Residential (B)	66	160	62.2	160	66.5
CON-07-01	Residential (B)	66	228	60.0	228	63.9
DEB-01-01-F	Residential (B)	66	117	64.0	117	66.7
DEB-02-01	Residential (B)	66	161	62.4	161	66.3
DEB-03-01	Residential (B)	66	197	60.9	197	65.0
DEB-04-01	Residential (B)	66	231	59.9	231	64.1
DEB-05-01	Residential (B)	66	272	58.9	272	62.9
DEB-06-01	Residential (B)	66	306	58.0	306	62.0
DEB-07-01-F	Residential (B)	66	139	63.2	139	67.0
DEB-08-01	Residential (B)	66	198	60.9	198	65.1
DEB-09-01	Residential (B)	66	245	59.6	245	63.7

RECEIVER	DESCRIPTION (ACTIVITY CATEGORY)	NAC dB(A)	EXISTING		CENTRAL ALT 1B MOD	
			DIST. TO ROAD (ft)	NOISE LEVEL dB(A)	DIST. TO ROAD (ft)	2045 PREDICTED NOISE LEVEL dB(A)
DEB-10-01	Residential (B)	66	296	58.3	296	62.3
FRE-01-01-F	Residential (B)	66	542	56.6	547	58.4
REE-01-01	Residential (B)	66	273	53.4	248	63.0
REE-02-01	Residential (B)	66	216	54.3	190	64.4
REE-03-01	Residential (B)	66	177	54.9	152	64.9
REE-04-01	Residential (B)	66	139	56.1	113	65.2
REE-05-01	Residential (B)	66	96	55.9	68	66.0
REE-06-01	Residential (B)	66	219	54.0	199	63.9
REE-07-01	Residential (B)	66	171	54.9	151	64.4
REE-08-01-F	Residential (B)	66	128	55.5	107	65.4
RHE-01-01	Residential (B)	66	510	50.0	486	58.0
RHE-02-01	Residential (B)	66	522	49.9	502	57.8
RHE-03-01	Residential (B)	66	469	50.5	450	58.8
RHE-04-01	Residential (B)	66	139	52.9	597	56.3
RHE-05-01	Residential (B)	66	785	50.7	757	54.2
RHE-06-01	Residential (B)	66	770	50.9	746	54.2
RHE-07-01	Residential (B)	66	721	51.5	700	54.8
RHE-08-01	Residential (B)	66	583	53.2	565	56.4
RHE-09-01	Residential (B)	66	529	54.0	513	57.3
RHE-10-01	Residential (B)	66	514	54.3	502	57.6
RHE-11-01	Residential (B)	66	515	54.2	505	57.6
RHE-12-01	Residential (B)	66	464	55.1	457	58.5
RHE-13-01	Residential (B)	66	485	54.6	494	58.1
RHE-14-01	Residential (B)	66	441	55.4	441	59.0
RHE-15-01	Residential (B)	66	410	55.9	410	59.6
RHE-16-01	Residential (B)	66	401	56.0	401	59.8
RHE-17-01	Residential (B)	66	446	55.2	446	58.9
RHE-18-01	Residential (B)	66	426	55.6	426	59.4
RHE-19-01	Residential (B)	66	481	54.6	481	58.1
RHE-20-01	Residential (B)	66	480	54.7	480	58.1
RHE-21-01	Residential (B)	66	329	57.6	329	61.2
RHE-22-01	Residential (B)	66	352	57.0	352	60.3
RHE-23-01	Residential (B)	66	308	58.0	308	61.2
ROO-01-01	Residential (B)	66	296	53.0	266	62.4
ROO-02-01	Residential (B)	66	261	53.6	232	63.3
ROO-03-01	Residential (B)	66	223	54.2	194	64.1
ROO-04-01	Residential (B)	66	188	54.8	158	64.8

RECEIVER	DESCRIPTION (ACTIVITY CATEGORY)	NAC dB(A)	EXISTING		CENTRAL ALT 1B MOD	
			DIST. TO ROAD (ft)	NOISE LEVEL dB(A)	DIST. TO ROAD (ft)	2045 PREDICTED NOISE LEVEL dB(A)
ROO-05-01	Residential (B)	66	144	55.3	114	65.5
RUD-15-01	Residential (B)	66	103	55.8	94	65.6
RUS-01-01	Residential (B)	66	414	50.7	404	59.3
RUS-02-01	Residential (B)	66	378	51.2	367	59.9
RUS-03-01	Residential (B)	66	341	51.7	330	60.7
RUS-04-01	Residential (B)	66	302	52.3	290	61.6
RUS-05-01	Residential (B)	66	265	53.1	254	62.5
RUS-06-01	Residential (B)	66	229	53.6	216	63.5
RUS-07-01	Residential (B)	66	191	54.3	179	64.6
RUS-08-01	Residential (B)	66	156	54.8	143	64.8
RUS-09-01-F	Residential (B)	66	116	55.5	101	65.6
RUS-10-01	Residential (B)	66	359	51.4	353	60.2
RUS-11-01	Residential (B)	66	289	52.5	282	61.9
RUS-12-01	Residential (B)	66	239	53.6	231	63.1
RUS-13-01	Residential (B)	66	175	54.4	167	64.4
RUS-14-01	Residential (B)	66	134	55.2	125	65.0
RUS-16-01	Residential (B)	66	649	52.2	635	55.4
RUS-17-01	Residential (B)	66	703	51.7	689	54.7
RUS-18-01	Residential (B)	66	761	50.9	747	53.8
RUS-19-01	Residential (B)	66	765	50.9	756	53.8
RUS-20-01	Residential (B)	66	699	51.7	691	54.7
RUS-21-01	Residential (B)	66	654	52.2	645	55.3
STJ-01-01	Residential (B)	66	497	49.9	480	58.0
STJ-02-01	Residential (B)	66	466	50.3	448	58.6
STJ-03-01	Residential (B)	66	428	50.7	410	59.2
STJ-04-01	Residential (B)	66	388	51.3	371	60.1
STJ-05-01	Residential (B)	66	356	51.8	339	60.8
STJ-06-01	Residential (B)	66	317	52.3	299	61.6
STJ-07-01	Residential (B)	66	299	52.7	281	62.1
STJ-08-01	Residential (B)	66	239	53.6	221	63.5
STJ-09-01	Residential (B)	66	199	54.7	181	64.5
STJ-10-01	Residential (B)	66	157	55.0	139	64.8
STJ-11-01	Residential (B)	66	117	55.7	98	66.0
STJ-12-01	Residential (B)	66	475	50.0	461	58.2
STJ-13-01	Residential (B)	66	440	50.4	425	58.9
STJ-14-01	Residential (B)	66	397	51.2	383	59.6
STJ-15-01	Residential (B)	66	359	51.5	345	60.4

RECEIVER	DESCRIPTION (ACTIVITY CATEGORY)	NAC dB(A)	EXISTING		CENTRAL ALT 1B MOD	
			DIST. TO ROAD (ft)	NOISE LEVEL dB(A)	DIST. TO ROAD (ft)	2045 PREDICTED NOISE LEVEL dB(A)
STJ-16-01	Residential (B)	66	322	52.1	307	61.2
STJ-17-01	Residential (B)	66	287	52.6	271	62.2
STJ-18-01	Residential (B)	66	248	53.3	232	63.1
STJ-19-01	Residential (B)	66	214	53.9	197	64.1
STJ-20-01	Residential (B)	66	175	54.6	159	64.9
STJ-21-01-F	Residential (B)	66	133	55.4	116	65.2
STJ-22-01	Residential (B)	66	612	52.8	591	56.1
STJ-23-01	Residential (B)	66	720	51.5	701	54.5
VANB-08-01-F	Residential (B)	66	587	48.7	424	56.1
VANB-09-01-F	Residential (B)	66	562	48.7	404	55.5
VANB-10-01-F	Residential (B)	66	526	48.7	371	54.9
VANB-11-01-F	Residential (B)	66	508	49.1	358	55.9
VANB-12-01-F	Residential (B)	66	508	49.6	327	56.1
VANB-13-01-F	Residential (B)	66	421	50.3	291	57.1
VANB-14-01-F	Residential (B)	66	359	51.2	237	58.0
VANB-15-01-F	Residential (B)	66	381	51.2	270	58.8
VANB-16-01-F	Residential (B)	66	327	51.5	230	59.0
VANB-17-01-F	Residential (B)	66	293	52.0	210	60.0
VANB-18-01-F	Residential (B)	66	240	53.7	178	61.7
VANB-19-01-F	Residential (B)	66	200	54.3	145	62.6
VANB-20-01-F	Residential (B)	66	289	53.1	250	62.0
VANB-21-01-F	Residential (B)	66	281	53.2	243	62.2
VANB-22-01-F	Residential (B)	66	251	53.6	215	62.9
VANB-23-01-F	Residential (B)	66	234	53.9	198	63.3
VANB-24-01-F	Residential (B)	66	220	54.2	184	63.8
VANB-25-01-F	Residential (B)	66	220	54.1	185	63.8
VANB-26-01-F	Residential (B)	66	173	55.0	139	65.0
VANB-27-01	Residential (B)	66	536	51.4	437	57.4
VANB-28-01	Residential (B)	66	467	50.5	386	58.2
VANB-29-01	Residential (B)	66	450	51.7	384	58.5
VANB-30-01	Residential (B)	66	436	50.9	383	58.9
VANB-31-01	Residential (B)	66	423	52.0	384	59.7
VANB-32-01	Residential (B)	66	384	50.9	348	60.1
VANB-33-01	Residential (B)	66	355	52.3	320	60.8
VANB-34-01	Residential (B)	66	338	51.2	302	61.2
VANB-35-01	Residential (B)	66	284	53.2	252	62.5
VANB-36-01	Residential (B)	66	700	49.0	542	55.5

RECEIVER	DESCRIPTION (ACTIVITY CATEGORY)	NAC dB(A)	EXISTING		CENTRAL ALT 1B MOD	
			DIST. TO ROAD (ft)	NOISE LEVEL dB(A)	DIST. TO ROAD (ft)	2045 PREDICTED NOISE LEVEL dB(A)
VANB-37-01	Residential (B)	66	597	50.7	476	56.4
VIL-01-01-F	Residential (B)	66	129	55.3	124	66.0
VIL-02-01	Residential (B)	66	186	54.3	183	64.3
VIL-03-01	Residential (B)	66	250	59.5	246	63.2
VIL-04-01	Residential (B)	66	292	58.3	290	62.1
VIL-05-01	Residential (B)	66	357	56.9	355	60.6
VIL-06-01-F	Residential (B)	66	123	64.0	123	66.6
VIL-07-01	Residential (B)	66	170	61.9	170	65.7
VIL-08-01	Residential (B)	66	212	60.5	212	64.6
VIL-09-01	Residential (B)	66	304	58.2	304	62.2
VIL-10-01	Residential (B)	66	652	52.4	649	55.5
VIL-11-01	Residential (B)	66	699	51.7	697	54.7
VIL-12-01	Residential (B)	66	754	51.0	754	54.0
VIL-13-01	Residential (B)	66	738	51.3	738	54.2
VIL-14-01	Residential (B)	66	565	53.4	565	56.8
WEI-01-01	Residential (B)	66	598	56.2	603	58.9
WEI-02-01	Residential (B)	66	535	57.1	540	59.7
WEI-03-01-F	Residential (B)	66	464	58.3	469	60.6
WEI-04-01	Residential (B)	66	608	54.7	685	57.9
WEI-05-01	Residential (B)	66	357	59.7	360	62.1
WEI-06-01-F	Residential (B)	66	208	62.9	211	64.2
WEI-07-01	Residential (B)	66	665	54.7	668	58.7
WEI-08-01	Residential (B)	66	722	53.8	715	58.4
WEI-09-01-F	Residential (B)	66	537	56.5	542	58.9

TABLE 19: BARRIER RESULTS FOR EASTVIEW EAST

Table 19: Barrier Results for Eastview East

RECEIVER	NUMBER OF RECEPTORS	FRONT ROW?	EX. NOISE LEVEL dB(A)	2045 PRED. NOISE LEVEL dB(A)	IMPACT ?	PREDICTED NOISE LEVEL WITH BARRIER dB(A)	BENEFITED WITH 5dB(A) or MORE REDUCTION?	DESIGN GOAL: FRONT ROW WITH 7dB(A) or MORE REDUCTION?
ARLE-01-01-F	1	Yes	62.0	66.0	Yes	57.9	Yes	Yes
ARLE-02-01	1	No	60.5	64.6	No	57.3	Yes	Yes
ARLE-03-01	1	No	59.4	63.5	No	57.2	Yes	No
ARLE-04-01	1	No	58.5	62.5	No	56.3	Yes	No
ARLE-05-01	1	No	64.0	66.9	Yes	58.4	Yes	Yes
ARLE-06-01	1	No	62.1	65.9	No	58.5	Yes	Yes
ARLE-07-01	1	No	60.7	64.8	No	57.5	Yes	Yes
ARLE-08-01	1	No	59.0	63.1	No	56.7	Yes	No
BOE-01-01	1	No	51.3	59.4	No	57.7	No	No
BOE-02-01	1	No	52.2	60.4	No	59.0	No	No
BOE-03-01-F	1	Yes	54.7	64.1	No	63.4	No	No
BOE-04-01	1	No	54.7	63.1	No	62.0	No	No
BOE-05-01	1	No	51.8	56.1	No	54.7	No	No
BOE-06-01	1	No	50.4	54.6	No	53.4	No	No
BOE-07-01	1	No	50.5	58.7	No	56.3	No	No
CON-01-01-F	1	Yes	63.7	66.6	Yes	58.6	Yes	Yes
CON-02-01	1	No	61.7	65.7	No	57.9	Yes	Yes
CON-03-01	1	No	60.6	64.8	No	57.6	Yes	Yes
CON-04-01	1	No	59.4	63.4	No	57.1	Yes	No
CON-05-01-F	1	Yes	64.0	67.4	Yes	59.1	Yes	Yes
CON-06-01	1	No	62.2	66.5	Yes	58.6	Yes	Yes
CON-07-01	1	No	60.0	63.9	No	57.8	Yes	No
DEB-01-01-F	1	Yes	64.0	66.7	Yes	58.3	Yes	Yes
DEB-02-01	1	No	62.4	66.3	Yes	57.8	Yes	Yes
DEB-03-01	1	No	60.9	65.0	No	57.2	Yes	Yes
DEB-04-01	1	No	59.9	64.1	No	56.9	Yes	Yes
DEB-05-01	1	No	58.9	62.9	No	56.4	Yes	No
DEB-06-01	1	No	58.0	62.0	No	55.9	Yes	No
DEB-07-01-F	1	Yes	63.2	67.0	Yes	58.2	Yes	Yes
DEB-08-01	1	No	60.9	65.1	No	57.5	Yes	Yes
DEB-09-01	1	No	59.6	63.7	No	56.8	Yes	No
DEB-10-01	1	No	58.3	62.3	No	56.1	Yes	No
REE-01-01	1	No	53.4	63.0	No	56.8	Yes	No
REE-02-01	1	No	54.3	64.4	No	57.4	Yes	Yes
REE-03-01	1	No	54.9	65.0	No	57.5	Yes	Yes
REE-04-01	1	No	56.1	65.6	No	57.6	Yes	Yes
REE-05-01-F	1	Yes	55.9	67.0	Yes	57.6	Yes	Yes

RECEIVER	NUMBER OF RECEPTORS	FRONT ROW?	EX. NOISE LEVEL dB(A)	2045 PRED. NOISE LEVEL dB(A)	IMPACT ?	PREDICTED NOISE LEVEL WITH BARRIER dB(A)	BENEFITED WITH 5dB(A) or MORE REDUCTION?	DESIGN GOAL: FRONT ROW WITH 7dB(A) or MORE REDUCTION?
REE-06-01	1	No	54.0	63.8	No	56.8	Yes	Yes
REE-07-01	1	No	54.9	64.7	No	57.0	Yes	Yes
REE-08-01-F	1	Yes	55.5	65.9	No	57.6	Yes	Yes
RHE-01-01	1	No	50.0	58.1	No	54.6	No	No
RHE-02-01	1	No	49.9	57.8	No	54.2	No	No
RHE-03-01	1	No	50.5	58.8	No	54.7	No	No
RHE-04-01	1	No	52.9	56.4	No	53.9	No	No
RHE-05-01	1	No	50.7	54.2	No	52.3	No	No
RHE-06-01	1	No	50.9	54.2	No	52.0	No	No
RHE-07-01	1	No	51.5	54.8	No	52.3	No	No
RHE-08-01	1	No	53.2	56.4	No	52.8	No	No
RHE-09-01	1	No	54.0	57.3	No	53.3	No	No
RHE-10-01	1	No	54.3	57.6	No	53.5	No	No
RHE-11-01	1	No	54.2	57.6	No	53.6	No	No
RHE-12-01	1	No	55.1	58.5	No	54.1	No	No
RHE-13-01	1	No	54.6	58.1	No	53.9	No	No
RHE-14-01	1	No	55.4	59.0	No	54.4	No	No
RHE-15-01	1	No	55.9	59.6	No	54.7	No	No
RHE-16-01	1	No	56.0	59.8	No	54.7	Yes	No
RHE-17-01	1	No	55.2	58.9	No	54.4	No	No
RHE-18-01	1	No	55.6	59.4	No	54.8	No	No
RHE-19-01	1	No	54.6	58.1	No	54.0	No	No
RHE-20-01	1	No	54.7	58.1	No	54.2	No	No
RHE-21-01	1	No	57.6	61.2	No	56.3	No	No
RHE-22-01	1	No	57.0	60.3	No	56.2	No	No
RHE-23-01	1	No	58.0	61.2	No	57.5	No	No
ROO-01-01	1	No	53.0	62.5	No	56.9	Yes	No
ROO-02-01	1	No	53.6	63.4	No	57.3	Yes	No
ROO-03-01	1	No	54.2	64.1	No	57.5	Yes	No
ROO-04-01	1	No	54.8	64.9	No	57.7	Yes	Yes
ROO-05-01	1	No	55.3	65.9	No	58.1	Yes	Yes
RUD-15-01	1	No	55.8	65.6	No	57.7	Yes	Yes
RUS-01-01	1	No	50.7	59.3	No	54.4	No	No
RUS-02-01	1	No	51.2	60.0	No	54.6	Yes	No
RUS-03-01	1	No	51.7	60.7	No	55.0	Yes	No
RUS-04-01	1	No	52.3	61.6	No	55.5	Yes	No
RUS-05-01	1	No	53.1	62.4	No	56.2	Yes	No
RUS-06-01	1	No	53.6	63.2	No	56.3	Yes	No
RUS-07-01	1	No	54.3	64.1	No	56.8	Yes	Yes

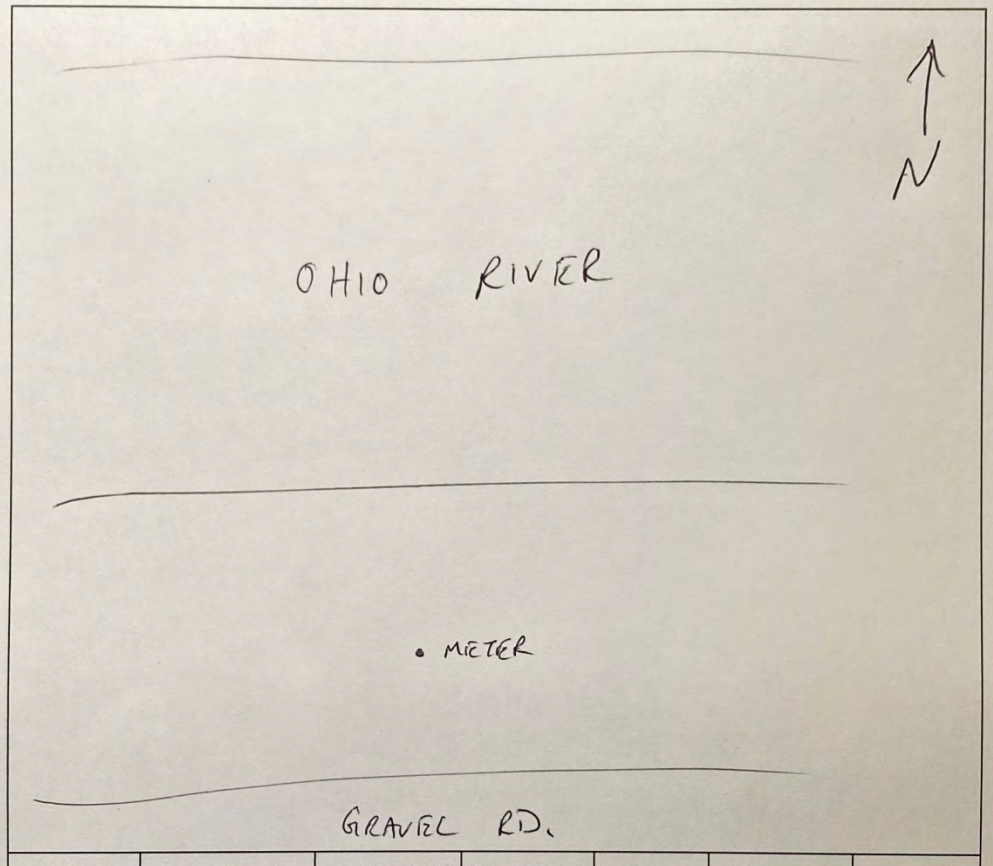
RECEIVER	NUMBER OF RECEPTORS	FRONT ROW?	EX. NOISE LEVEL dB(A)	2045 PRED. NOISE LEVEL dB(A)	IMPACT ?	PREDICTED NOISE LEVEL WITH BARRIER dB(A)	BENEFITED WITH 5dB(A) or MORE REDUCTION?	DESIGN GOAL: FRONT ROW WITH 7dB(A) or MORE REDUCTION?
RUS-08-01	1	No	54.8	64.5	No	57.1	Yes	Yes
RUS-09-01-F	1	Yes	55.5	65.5	No	57.7	Yes	Yes
RUS-10-01	1	No	51.4	60.3	No	54.7	Yes	No
RUS-11-01	1	No	52.5	61.9	No	55.6	Yes	No
RUS-12-01	1	No	53.6	62.9	No	56.2	Yes	No
RUS-13-01	1	No	54.4	64.4	No	56.9	Yes	Yes
RUS-14-01	1	No	55.2	64.9	No	57.4	Yes	Yes
RUS-16-01	1	No	52.2	55.4	No	52.1	No	No
RUS-17-01	1	No	51.7	54.7	No	51.6	No	No
RUS-18-01	1	No	50.9	53.8	No	51.0	No	No
RUS-19-01	1	No	50.9	53.8	No	51.0	No	No
RUS-20-01	1	No	51.7	54.7	No	51.5	No	No
RUS-21-01	1	No	52.2	55.3	No	52.0	No	No
STJ-01-01	1	No	49.9	58.1	No	54.0	No	No
STJ-02-01	1	No	50.3	58.6	No	54.3	No	No
STJ-03-01	1	No	50.7	59.3	No	54.7	No	No
STJ-04-01	1	No	51.3	60.1	No	55.1	Yes	No
STJ-05-01	1	No	51.8	60.8	No	55.4	Yes	No
STJ-06-01	1	No	52.3	61.7	No	55.8	Yes	No
STJ-07-01	1	No	52.7	62.1	No	55.9	Yes	No
STJ-08-01	1	No	53.6	63.5	No	56.5	Yes	Yes
STJ-09-01	1	No	54.7	64.4	No	57.0	Yes	Yes
STJ-10-01	1	No	55.0	65.2	No	57.2	Yes	Yes
STJ-11-01-F	1	Yes	55.7	66.0	Yes	57.5	Yes	Yes
STJ-12-01	1	No	50.0	58.2	No	54.0	No	No
STJ-13-01	1	No	50.4	58.9	No	54.3	No	No
STJ-14-01	1	No	51.2	59.7	No	54.6	Yes	No
STJ-15-01	1	No	51.5	60.4	No	54.9	Yes	No
STJ-16-01	1	No	52.1	61.2	No	55.3	Yes	No
STJ-17-01	1	No	52.6	62.1	No	55.8	Yes	No
STJ-18-01	1	No	53.3	63.0	No	56.1	Yes	No
STJ-19-01	1	No	53.9	63.8	No	56.6	Yes	Yes
STJ-20-01	1	No	54.6	64.8	No	57.1	Yes	Yes
STJ-21-01-F	1	Yes	55.4	65.3	No	57.4	Yes	Yes
STJ-22-01	1	No	52.8	56.1	No	52.7	No	No
STJ-23-01	1	No	51.5	54.5	No	51.6	No	No
VANB-16-01-F	1	Yes	51.5	59.0	No	58.7	No	No
VANB-16-01-F	1	Yes	51.5	59.0	No	58.7	No	No
VANB-17-01-F	1	Yes	52.0	60.0	No	59.6	No	No

RECEIVER	NUMBER OF RECEPTORS	FRONT ROW?	EX. NOISE LEVEL dB(A)	2045 PRED. NOISE LEVEL dB(A)	IMPACT ?	PREDICTED NOISE LEVEL WITH BARRIER dB(A)	BENEFITED WITH 5dB(A) or MORE REDUCTION?	DESIGN GOAL: FRONT ROW WITH 7dB(A) or MORE REDUCTION?
VANB-18-01-F	1	Yes	53.7	61.8	No	61.3	No	No
VANB-19-01-F	1	Yes	54.3	62.7	No	62.1	No	No
VANB-20-01-F	1	Yes	53.1	62.0	No	59.1	No	No
VANB-21-01-F	1	Yes	53.2	62.2	No	58.8	No	No
VANB-22-01-F	1	Yes	53.6	62.9	No	58.8	No	No
VANB-23-01-F	1	Yes	53.9	63.3	No	58.6	No	No
VANB-24-01-F	1	Yes	54.2	63.8	No	58.5	Yes	No
VANB-25-01-F	1	Yes	54.1	63.8	No	58.1	Yes	No
VANB-26-01-F	1	Yes	55.0	65.2	No	58.2	Yes	Yes
VANB-28-01	1	No	50.5	58.2	No	57.8	No	No
VANB-29-01	1	No	51.7	58.6	No	57.9	No	No
VANB-30-01	1	No	50.9	59.0	No	58.1	No	No
VANB-31-01	1	No	52.0	59.7	No	57.6	No	No
VANB-32-01	1	No	50.9	60.2	No	57.5	No	No
VANB-33-01	1	No	52.3	60.8	No	57.4	No	No
VANB-34-01	1	No	51.2	61.2	No	57.4	No	No
VANB-35-01	1	No	53.2	62.6	No	57.4	Yes	No
VIL-01-01-F	1	Yes	55.3	66.1	Yes	57.8	Yes	Yes
VIL-02-01	1	No	54.3	64.5	No	57.0	Yes	Yes
VIL-03-01	1	No	59.5	63.2	No	56.3	Yes	No
VIL-04-01	1	No	58.3	62.1	No	55.9	Yes	No
VIL-05-01	1	No	56.9	60.6	No	55.0	Yes	No
VIL-06-01-F	1	Yes	64.0	66.6	Yes	58.2	Yes	Yes
VIL-07-01	1	No	61.9	65.7	No	57.6	Yes	Yes
VIL-08-01	1	No	60.5	64.6	No	57.0	Yes	Yes
VIL-09-01	1	No	58.2	62.2	No	56.0	Yes	No
VIL-10-01	1	No	52.4	55.5	No	52.3	No	No
VIL-11-01	1	No	51.7	54.7	No	51.6	No	No
VIL-12-01	1	No	51.0	54.0	No	51.0	No	No
VIL-13-01	1	No	51.3	54.2	No	51.1	No	No
VIL-14-01	1	No	53.4	56.8	No	52.9	No	No

APPENDIX C – FIELD DATA SHEETS

NOISE FIELD MEASUREMENT DATA SHEET

PROJECT:	I-69 ORX	TECHNICIAN(S):	MJG, MTM
SITE:	FA1	SPEED LIMIT:	N/A mph
JOB NUMBER:	1294.11	TEMPERATURE:	28°F WIND SPEED: 4.7MPH
DATE:	2/9/21	DURATION:	15 MIN
TIME:	3:15 PM	NOISE LEVEL:	45.2 dBA Leq



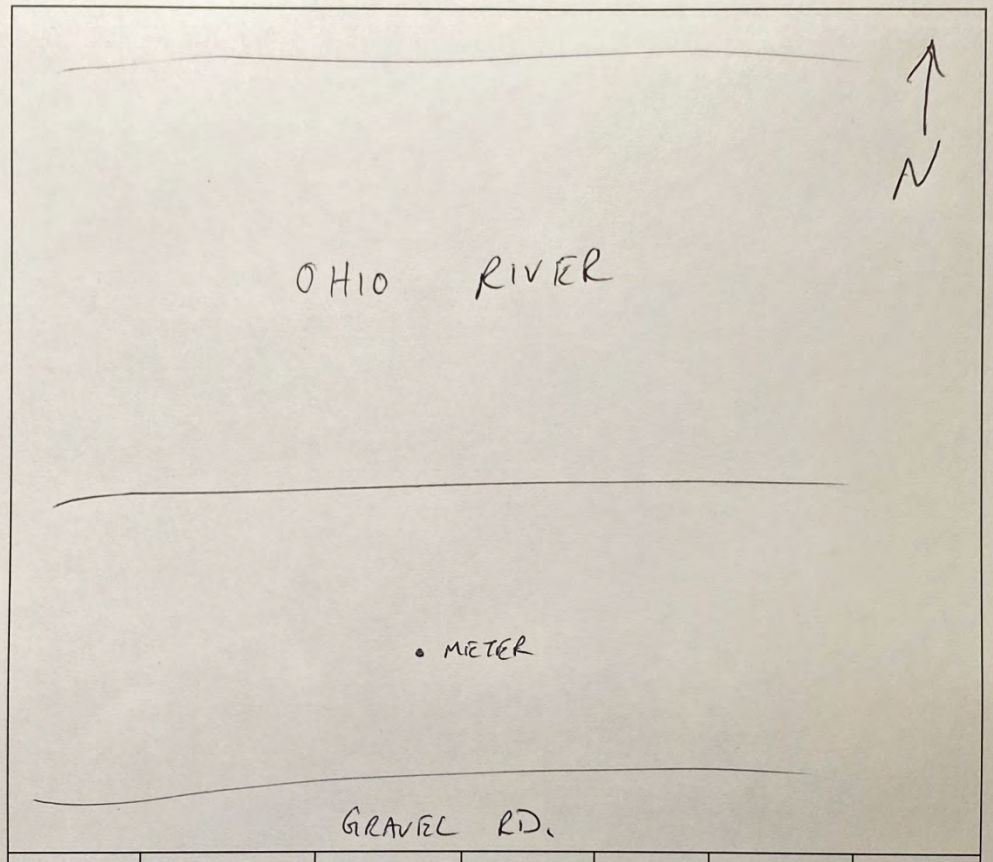
SEGMENT	AUTOMOBILES	MEDIUM TRUCKS	HEAVY TRUCKS	BUSES	MOTORCYCLES	DIRECTION
1						
2						
3						
4						

NOTES: * METER MARKED BY GPS
AMBIENT MEASUREMENT

NOISE FIELD MEASUREMENT DATA SHEET

HMB PROFESSIONAL ENGINEERS, INC

PROJECT:	I-69 ORX	TECHNICIAN(S):	MJG, MTM
SITE:	FA1	SPEED LIMIT:	N/A mph
JOB NUMBER:	1294.11	TEMPERATURE:	28°F WIND SPEED: 4.7MPH
DATE:	2/9/21	DURATION:	15 MIN
TIME:	3:15 PM	NOISE LEVEL:	45.2 dBA Leq



SEGMENT	AUTOMOBILES	MEDIUM TRUCKS	HEAVY TRUCKS	BUSES	MOTORCYCLES	DIRECTION
1						
2						
3						
4						

NOTES: * METER MARKED BY GPS
AMBIENT MEASUREMENT

APPENDIX D – NOISE METER CALIBRATION CERTIFICATION

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.42351

Instrument:	**Sound Level Meter**	*Date Calibrated:* **2/19/2019**	*Cal Due:* **2/19/2021**
Model:	**NL20**	*Status:*	**Received** / **Sent**
Manufacturer:	**Rion**	*In tolerance:*	**X** / **X**
Serial number:	**00110039**	*Out of tolerance:*	
Tested with:	**Microphone UC52 s/n 77412**	*See comments:*	
	Preamplifier NH21 s/n 00177	*Contains non-accredited tests:*	__Yes X No
Type (class):	**2**	*Calibration service:*	__ Basic X Standard
Customer:	**HMB Professional Engineers, Inc.**	*Address:*	**3 HMB Circle US 460**
Tel/Fax:	**502-695-9800 / 502-695-9810**		**Frankfort, KY 40601**

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 31, 2018	Scantek, Inc./ NVLAP	Oct 31, 2019
DS-360-SRS	Function Generator	33584	Oct 24, 2017	ACR Env./ A2LA	Oct 24, 2019
34401A-Agilent Technologies	Digital Voltmeter	MY47011118	Oct 1, 2018	ACR Env. / A2LA	Oct 1, 2019
HM30-Thommen	Meteo Station	1040170/39633	Nov 13, 2018	ACR Env./ A2LA	Nov 13, 2019
PC Program 1019 Norsonic	Calibration software	v.6.1T	Validated Nov 2014	Scantek, Inc.	-
1251-Norsonic	Calibrator	30878	Nov 11, 2018	Scantek, Inc./ NVLAP	Nov 11, 2019
4226-Brüel&Kjær	Multifunction calibrator	2305103	Sep 18, 2018	B&K / A2LA	Sep 18, 2019

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 (%)
23.8	102.05	36.2

Calibrated by:	Lydon Dawkins	**Authorized signatory:**	Steven E. Marshall
Signature	Lydon Dawkins	Signature	Steven E Marshall
Date	2/19/2019	Date	2/19/2019

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.
Document stored Z:\Calibration Lab\SLM 2019\RIONL20_00110039_M1.doc

Results summary: Device complies with following clauses of mentioned specifications:

CLAUSES[1] FROM IEC/ANSI STANDARDS REFERENCED IN PROCEDURES:	RESULT[2,3]	EXPANDED UNCERTAINTY (coverage factor 2) [dB]
INDICATION AT THE CALIBRATION CHECK FREQUENCY - IEC61672-3 ED.2 CLAUSE 10	Passed	0.15
SELF-GENERATED NOISE - IEC 61672-3 ED.2 CLAUSE 11	Passed	0.30
ACOUSTICAL TEST OF A FREQUENCY WEIGHTING - IEC 61672-3 ED.2.0 CLAUSE 12	Passed	0.30
FREQUENCY WEIGHTINGS: A NETWORK - IEC 61672-3 ED.2.0 CLAUSE 13	Passed	0.20
FREQUENCY WEIGHTINGS: C NETWORK - IEC 61672-3 ED.2.0 CLAUSE 13	Passed	0.20
FREQUENCY WEIGHTINGS: Z NETWORK - IEC 61672-3 ED.2.0 CLAUSE 13	Passed	0.20
FREQUENCY AND TIME WEIGHTINGS AT 1 KHZ IEC 61672-3 ED.2.0 CLAUSE 14	Passed	0.20
LEVEL LINEARITY ON THE REFERENCE LEVEL RANGE - IEC 61672-3 ED.2 CLAUSE 16	Passed	0.25
LEVEL LINEARITY INCLUDING THE LEVEL RANGE CONTROL - IEC 61672-3 ED.2.0 CLAUSE 17	Passed	0.25
TONEBURST RESPONSE - IEC 61672-3 ED.2.0 CLAUSE 18	Passed	0.30
OVERLOAD INDICATION - IEC 61672-3 ED.2.0 CLAUSE 20	Passed	0.25
HIGH LEVEL STABILITY TEST - IEC 61672-3 ED.2.0 CLAUSE 21	Passed	0.10
LONG TERM STABILITY TEST - IEC 61672-3 ED.2.0 CLAUSE 15	Passed	0.10

1 The results of this calibration apply only to the instrument type with serial number identified in this report.

2 Parameters are certified at actual environmental conditions.

3 The tests marked with (*) are not covered by the current NVLAP accreditation.

Comments: The sound level meter submitted for testing has successfully completed the class 2 periodic tests of IEC 61672-3, for the environmental conditions under which the tests were performed. However, No general statement or conclusion can be made about conformance of the sound level meter to the full requirements of IEC 61672-1 because evidence was not publicly available, from an independent testing organization responsible for pattern approvals, to demonstrate that the model of sound level meter fully conforms to the requirements of IEC 61672-1:2002, and because the periodic tests of IEC 61672-3 cover only a limited subset of the specifications in IEC 61672-1.

Note: The instrument was tested for the parameters listed in the table above, using the test methods described in the listed standards. All tests were performed around the reference conditions. The test results were compared with the manufacturer's or with the standard's specifications, whichever are larger.
Compliance with any standard cannot be claimed based solely on the periodic tests.

Tests made with the following attachments to the instrument:

Microphone: Rion UC52 s/n 77412 for acoustical test
Preamplifier: Rion NH21 s/n 00177 for all tests
Other: line adaptor ADP005 (18pF) for electrical tests
Accompanying acoustical calibrator: Rion NC-73 s/n 10417585
Windscreen: Rion WS-10

Measured Data: in Test Report # 42351 of 8 + 1 pages.

Place of Calibration: Scantek, Inc.
6430 Dobbin Road, Suite C
Columbia, MD 21045 USA
Ph/Fax: 410-290-7726/ -9167
callab@scantekinc.com

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.

Summary of Test Report No.:42351

Rion Type: NL20 Serial no: 00110039

Customer:	**HMB Professional Engineers, Inc.**
Address:	**3 HMB Circle US 460 Frankfort, KY 40601**
Contact Person:	**Mitchell Green**
Phone No.:	**502-695-9800**
Fax No.:	**502-695-9810**

Microphone:	Rion	Type: UC52	Serial no: 77412	Sens:dB
Preamplifier	Rion	Type: NH21	Serial no: 00177	
Calibrator:	Rion	Type: NC-73	Serial no: 10417585	Level:93.99dB
Wind screen	Rion	Type: WS-10		

Measurement Results:

Indication at the calibration check frequency - IEC61672-3 Ed.2 Clause 10	Passed
Self-generated noise - IEC 61672-3 Ed.2 Clause 11	Passed
Acoustical test of a frequency weighting - IEC 61672-3 Ed.2.0 Clause 12	Passed
Frequency weightings: A Network - IEC 61672-3 Ed.2.0 Clause 13	Passed
Frequency weightings: C Network - IEC 61672-3 Ed.2.0 Clause 13	Passed
Frequency weightings: Z Network - IEC 61672-3 Ed.2.0 Clause 13	Passed
Frequency and time weightings at 1 kHz IEC 61672-3 Ed.2.0 Clause 14	Passed
Level linearity on the reference level range - IEC 61672-3 Ed.2 Clause 16	Passed
Level linearity including the level range control - IEC 61672-3 Ed.2.0 Clause 17	Passed
Toneburst response - IEC 61672-3 Ed.2.0 Clause 18	Passed
Overload indication - IEC 61672-3 Ed.2.0 Clause 20	Passed
High level stability test - IEC 61672-3 Ed.2.0 Clause 21	Passed
Long term stability test - IEC 61672-3 Ed.2.0 Clause 15	Passed

Environmental conditions:

Pressure:	Temperature:	Relative humidity:
102.05	23.8	36.2

Date of calibration: 2/19/2019
Date of issue: 2/19/2019
Supervisor: Steven E. Marshall
Measurements performed by:

LD

Lydon Dawkins

Software version: 6.1 T

Scantek, Inc.
6430 Dobbin Rd., Suite C, Columbia, MD 21045
Ph: 410-290-7726 eMail: callab@scantekinc.com

Test Report No.:42351

Manufacturer:	Rion
Instrument type:	NL20
Serial no:	00110039
Customer:	HMB Professional Engineers, Inc.
Department:	
Order No:	
Contact Person:	Mitchell Green
Address:	3 HMB Circle US 460 Frankfort, KY 40601

Environmental conditions:

Pressure:	102.05
Temperature:	23.8
Relative humidity:	36.2

Supervisor	Steven E. Marshall
Engineer	Lydon Dawkins
Date:	2/19/2019

Measurement Results:

Indication at the calibration check frequency - IEC61672-3 Ed.2 Clause 10

```
Reference Calibrator: WSC4 - NOR1251-30878
Reference calibrator level: 114.04
Before calibration:
  Environmental corrections: 0.00
  Other corrections: -0.2
  Notional level: 113.84
Reference calibrator level before calibration: 114.0
After calibration:
  Environmental corrections: 0.00
  Other corrections: -0.2
  Notional level: 113.84
Reference calibrator level after calibration: 114.0
Associated Calibrator: Rion - NC-73 - 10417585
Associated calibrator level: 93.99
Initial level check:
  Environmental corrections: 0.00
  Other corrections: -0.2
  Notional level: 93.79
Indicated level before calibration: 94.0
Final level statement:
  Environmental corrections after calibration: 0.00
  Other corrections: -0.2
  Notional level: 93.79
Indicated level after calibration: 94.0
This value shall be used for adjusting the sound level meter in the future.
Test Passed
```

Self-generated noise - IEC 61672-3 Ed.2 Clause 11

Network	Level (dB)	Max (dB)	Uncert. (dB)	Result	Comment
A	12.3	20.0	0.3	P	Equivalent capacity
C	17.8	27.0	0.3	P	Equivalent capacity
Z	24.7	32.0	0.3	P	Equivalent capacity

Test Passed

Acoustical test of a frequency weighting - IEC 61672-3 Ed.2.0 Clause 12

A-Weighted results: free field response

Frequency	Response (dB)	Tol. (dB)	(dB)	Uncert. (dB)	Result
125 Hz	-0.2	1.5	-1.5	0.2	P
1 kHz	0.0	1.0	-1.0	0.2	P
4 kHz	-1.4	3.0	-3.0	0.3	P
8 kHz	-2.4	5.0	-5.0	0.5	P

Test Passed

Acoustical test of a frequency weighting - IEC 61672-3 Ed.2.0 Clause 12

The overall frequency response of the sound level meter, typical wind screen response and microphone response has shown to conform with the requirements in IEC 61672-3 for a class 2 sound level meter.
Frequency response test using multi frequency calibrator.
Sources for correction data:
Calibrator levels and uncertainty: B&K
Microphone field corrections and uncertainty:
Case reflections and uncertainty:
Wind screen corrections and uncertainty:
Tabular information

Calibrator =	WSC4 at 94dB
txtMFCL125 =	94.02
txtMFCLU125 =	0.11
txtSU125 =	0.20
txtM125_1 =	78.1
txtM125_2 =	78.2
txtM125_3 =	78.1
txtMFCL1k =	94.03
txtMFCLU1k =	0.11
txtSU1k =	0.15
txtM1k_1 =	93.9
txtM1k_2 =	93.9
txtM1k_3 =	93.9
txtMFCL4k =	93.95
txtMFCLU4k =	0.11
txtSU4k =	0.40
txtM4k_1 =	93.4
txtM4k_2 =	93.4
txtM4k_3 =	93.4
txtMFCL8k =	93.96
txtMFCLU8k =	0.11
txtSU8k =	0.50
txtM8k_1 =	88.1
txtM8k_2 =	88.1
txtM8k_3 =	88.1
txtSLM125 =	78.13
txtNC125 =	16.1
txtSLMU125 =	0.2
txtMic125 =	0.0
txtMicU125 =	0.05
txtCR125 =	
txtCRU125 =	
txtWS125 =	0.0
txtWSU125 =	0.1
txtSLM1k =	93.9
txtNC1k =	0
txtSLMU1k =	0.1
txtMFCL1k =	94.03
txtMFCLU1k =	0.11
txtMic1k =	0.4
txtMicU1k =	0.1
txtCR1k =	
txtCRU1k =	
txtWS1k =	0.1
txtWSU1k =	0.1
txtSLM4k =	93.4
txtNC4k =	-1.0
txtSLMU4k =	0.1
txtMFCL4k =	93.95

Acoustical test of a frequency weighting - IEC 61672-3 Ed.2.0 Clause 12

```
txtMFCLU4k =  0.11
txtMic4k =    0.2
txtMicU4k =   0.2
txtCR4k =
txtCRU4k =
txtWS4k =     0.3
txtWSU4k =    0.2
txtSLM8k =    88.1
txtNC8k =     1.1
txtSLMU8k =   0.1
txtMFCL8k =   93.96
txtMFCLU8k =  0.11
txtMic8k =    2.7
txtMicU8k =   0.4
txtCR8k =
txtCRU8k =
txtWS8k =     0.0
txtWSU8k =    0.3
```

Frequency weightings: A Network - IEC 61672-3 Ed.2.0 Clause 13

Freq (Hz)	Ref. (dB)	Meas. (dB)	Tol. (dB)	Tol. (dB)	Uncert. (dB)	Dev. (dB)	Result
63.1	83.0	83.0	2.0	-2.0	0.2	0.0	P
125.9	83.0	82.9	1.5	-1.5	0.2	-0.1	P
251.2	83.0	82.8	1.5	-1.5	0.2	-0.2	P
501.2	83.0	82.9	1.5	-1.5	0.2	-0.1	P
1000.0	83.0	83.0	1.0	-1.0	0.2	0.0	P
1995.3	83.0	83.0	2.0	-2.0	0.2	0.0	P
3981.1	83.0	83.0	3.0	-3.0	0.2	0.0	P
7943.3	83.0	83.2	5.0	-5.0	0.2	0.2	P

Test Passed

Frequency weightings: C Network - IEC 61672-3 Ed.2.0 Clause 13

Freq (Hz)	Ref. Level (dB)	Meas. Value (dB)	Tol. (dB)	Tol. (dB)	Uncert. (dB)	Dev. (dB)	Result
63.1	83.0	83.0	2.0	-2.0	0.2	0.0	P
125.9	83.0	83.0	1.5	-1.5	0.2	0.0	P
251.2	83.0	82.9	1.5	-1.5	0.2	-0.1	P
501.2	83.0	83.0	1.5	-1.5	0.2	0.0	P
1000.0	83.0	83.0	1.0	-1.0	0.2	0.0	P
1995.3	83.0	83.1	2.0	-2.0	0.2	0.1	P
3981.1	83.0	83.0	3.0	-3.0	0.2	0.0	P
7943.3	83.0	83.2	5.0	-5.0	0.2	0.2	P

Test Passed

Frequency weightings: Z Network - IEC 61672-3 Ed.2.0 Clause 13

Freq (Hz)	Ref. Level (dB)	Meas. Value (dB)	Tol. (dB)	Tol. (dB)	Uncert. (dB)	Dev. (dB)	Result
63.1	83.0	82.9	2.0	-2.0	0.2	-0.1	P
125.9	83.0	83.0	1.5	-1.5	0.2	0.0	P
251.2	83.0	82.9	1.5	-1.5	0.2	-0.1	P
501.2	83.0	83.0	1.5	-1.5	0.2	0.0	P
1000.0	83.0	83.0	1.0	-1.0	0.2	0.0	P
1995.3	83.0	83.1	2.0	-2.0	0.2	0.1	P
3981.1	83.0	83.1	3.0	-3.0	0.2	0.1	P
7943.3	83.0	83.0	5.0	-5.0	0.2	0.0	P

Test Passed

Frequency and time weightings at 1 kHz IEC 61672-3 Ed.2.0 Clause 14

Weightings Time	Netw	Ref. (dB)	Measured (dB)	Tol. (dB)	Tol. (dB)	Uncert. (dB)	Dev. (dB)	Result
Fast	A	94.0	94.0	0.1	-0.1	0.2	0.0	P
Fast	C	94.0	94.0	0.1	-0.1	0.2	0.0	P
Fast	Z	94.0	94.0	0.1	-0.1	0.2	0.0	P
Fast	Flat	94.0	94.0	0.1	-0.1	0.2	0.0	P
Slow	A	94.0	94.0	0.1	-0.1	0.2	0.0	P
Leq	A	94.0	94.0	0.1	-0.1	0.2	0.0	P
SEL	A	104.0	104.0	0.1	-0.1	0.2	0.0	P

Test Passed

Level linearity on the reference level range - IEC 61672-3 Ed.2 Clause 16

Ref. (dB)	Measured (dB)	Tol. (dB)	Tol. (dB)	Uncert. (dB)	Dev. (dB)	Result
Full scale setting: 120dB						
The following measurements are SPL measurements						
Measured at 31.5 Hz						
74.0	74.1	1.1	-1.1	0.25	0.1	P
79.0	79.0	1.1	-1.1	0.25	0.0	P
84.6	84.6	1.1	-1.1	0.25	0.0	P
85.6	85.6	1.1	-1.1	0.25	0.0	P
86.6	86.7	1.1	-1.1	0.25	0.1	P
87.6	87.7	1.1	-1.1	0.25	0.1	P
88.6	88.7	1.1	-1.1	0.25	0.1	P
74.0	75.0	1.1	-1.1	0.25	1.0	P
69.0	69.1	1.1	-1.1	0.25	0.1	P
64.0	64.1	1.1	-1.1	0.25	0.1	P
59.0	59.2	1.1	-1.1	0.25	0.2	P
54.0	54.2	1.1	-1.1	0.25	0.2	P
49.0	49.2	1.1	-1.1	0.25	0.2	P
44.0	44.0	1.1	-1.1	0.25	0.0	P
39.0	39.0	1.1	-1.1	0.25	0.0	P
37.0	37.0	1.1	-1.1	0.25	0.0	P
36.0	36.0	1.1	-1.1	0.25	0.0	P
35.0	35.0	1.1	-1.1	0.25	0.0	P

Level linearity on the reference level range - IEC 61672-3 Ed.2 Clause 16

Ref. (dB)	Measured (dB)	Tol. (dB)	Tol. (dB)	Uncert. (dB)	Dev. (dB)	Result
34.0	33.9	1.1	-1.1	0.25	-0.1	P
33.0	33.0	1.1	-1.1	0.25	0.0	P
Measured at 1 kHz						
94.0	94.0	1.1	-1.1	0.25	0.0	P
99.0	99.0	1.1	-1.1	0.25	0.0	P
104.0	104.0	1.1	-1.1	0.25	0.0	P
109.0	109.0	1.1	-1.1	0.25	0.0	P
114.0	114.0	1.1	-1.1	0.25	0.0	P
119.0	119.0	1.1	-1.1	0.25	0.0	P
124.0	124.0	1.1	-1.1	0.25	0.0	P
125.0	125.0	1.1	-1.1	0.25	0.0	P
126.0	126.0	1.1	-1.1	0.25	0.0	P
127.0	127.0	1.1	-1.1	0.25	0.0	P
128.0	128.0	1.1	-1.1	0.25	0.0	P
94.0	94.0	1.1	-1.1	0.25	0.0	P
89.0	89.0	1.1	-1.1	0.25	0.0	P
84.0	84.0	1.1	-1.1	0.25	0.0	P
79.0	79.0	1.1	-1.1	0.25	0.0	P
74.0	74.0	1.1	-1.1	0.25	0.0	P
69.0	69.0	1.1	-1.1	0.25	0.0	P
64.0	64.0	1.1	-1.1	0.25	0.0	P
59.0	59.0	1.1	-1.1	0.25	0.0	P
54.0	54.0	1.1	-1.1	0.25	0.0	P
49.0	49.0	1.1	-1.1	0.25	0.0	P
44.0	44.0	1.1	-1.1	0.25	0.0	P
39.0	38.9	1.1	-1.1	0.25	-0.1	P
37.0	36.9	1.1	-1.1	0.25	-0.1	P
36.0	35.9	1.1	-1.1	0.25	-0.1	P
35.0	35.0	1.1	-1.1	0.25	0.0	P
34.0	33.9	1.1	-1.1	0.25	-0.1	P
33.0	32.9	1.1	-1.1	0.25	-0.1	P
Measured at 8 kHz						
94.0	94.0	1.1	-1.1	0.25	0.0	P
99.0	99.1	1.1	-1.1	0.25	0.1	P
104.0	104.1	1.1	-1.1	0.25	0.1	P
109.0	109.1	1.1	-1.1	0.25	0.1	P
114.0	114.1	1.1	-1.1	0.25	0.1	P
119.0	119.1	1.1	-1.1	0.25	0.1	P
122.9	123.0	1.1	-1.1	0.25	0.1	P
123.9	124.0	1.1	-1.1	0.25	0.1	P
124.9	125.0	1.1	-1.1	0.25	0.1	P
125.9	126.0	1.1	-1.1	0.25	0.1	P
94.0	94.0	1.1	-1.1	0.25	0.0	P
89.0	89.1	1.1	-1.1	0.25	0.1	P
84.0	84.1	1.1	-1.1	0.25	0.1	P
79.0	79.1	1.1	-1.1	0.25	0.1	P
74.0	74.1	1.1	-1.1	0.25	0.1	P
69.0	69.1	1.1	-1.1	0.25	0.1	P
64.0	64.1	1.1	-1.1	0.25	0.1	P
59.0	59.1	1.1	-1.1	0.25	0.1	P
54.0	54.1	1.1	-1.1	0.25	0.1	P
49.0	49.1	1.1	-1.1	0.25	0.1	P
44.0	44.1	1.1	-1.1	0.25	0.1	P
39.0	39.0	1.1	-1.1	0.25	0.0	P
37.0	37.0	1.1	-1.1	0.25	0.0	P
36.0	36.1	1.1	-1.1	0.25	0.1	P
35.0	35.1	1.1	-1.1	0.25	0.1	P

Level linearity on the reference level range - IEC 61672-3 Ed.2 Clause 16

Ref. (dB)	Measured (dB)	Tol. (dB)	Tol. (dB)	Uncert. (dB)	Dev. (dB)	Result
34.0	34.0	1.1	-1.1	0.25	0.0	P
33.0	33.0	1.1	-1.1	0.25	0.0	P

Test Passed

Level linearity including the level range control - IEC 61672-3 Ed.2.0 Clause 17

Full Scale (dB)	Ref. Value (dB)	Measured Value (dB)	Tol. Value (dB)	Uncert. (dB)	Dev. (dB)	Result
Measured at 1 kHz						
The following measurements are SPL measurements						
Measuring the reference level on the available ranges.						
130	94.0	94.0	1.1	0.25	0.0	P
120	94.0	94.0	1.1	0.25	0.0	P
110	94.0	94.0	1.1	0.25	0.0	P
100	94.0	94.0	1.1	0.25	0.0	P
Measuring 5 dB below full scale on all available ranges.						
130	125.0	125.0	1.1	0.25	0.0	P
120	115.0	115.0	1.1	0.25	0.0	P
110	105.0	105.0	1.1	0.25	0.0	P
100	95.0	95.0	1.1	0.25	0.0	P
90	85.0	85.0	1.1	0.25	0.0	P
80	75.0	75.0	1.1	0.25	0.0	P

Test Passed

Toneburst response - IEC 61672-3 Ed.2.0 Clause 18

Burst type	Ref. (dB)	Measured (dB)	Tol. (dB)	Tol. (dB)	Uncert. (dB)	Dev. (dB)	Result
Fast 200 mSec	125.0	125.0	1.0	-1.0	0.3	0.0	P
Fast 2.0 mSec	108.0	108.0	1.0	-2.5	0.3	0.0	P
Fast 0.25 mSec	99.0	98.9	1.5	-5.0	0.3	-0.1	P
Slow 200 mSec	118.6	118.6	1.0	-1.0	0.3	0.0	P
Slow 2.0 mSec	99.0	99.0	1.0	-5.0	0.3	0.0	P
SEL 200 mSec	119.0	119.0	1.0	-1.0	0.3	0.0	P
SEL 2.0 mSec	99.0	99.0	1.0	-2.5	0.3	0.0	P
SEL 0.25 mSec	90.0	89.9	1.8	-5.0	0.3	-0.1	P

Test Passed

Overload indication - IEC 61672-3 Ed.2.0 Clause 20

	Measured (dB)	Tol. (+/-dB)	Uncert. (dB)	Result
Level difference of positive and negative pulses:	0.1	1.5	0.25	P
Positive 1/2 cycle 4 kHz. Overload occurred at:	139.3			
Negative 1/2 cycle 4 kHz. Overload occurred at:	139.2			

Test Passed

High level stability test - IEC 61672-3 Ed.2.0 Clause 21

Test signal: Sine wave at 1 kHz

Initial level (dB)	Final level (dB)	Diff. (dB)	Tol. value (dB)	Uncert. (dB)	Result
137.0	137.0	0.0	0.3	0.10	P

Test Passed

Long term stability test - IEC 61672-3 Ed.2.0 Clause 15

Test signal: Sine wave at 1 kHz

Time inteval (mm:SS)	StartLevel (dB)	StopLevel (dB)	Difference (dB)	Tolerence (dB)	Result
25:25	94.0	94.0	0.0	0.3	P

Test Passed

LD

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.42352

Instrument:	**Acoustical Calibrator**	*Date Calibrated:* **2/19/2019** *Cal Due:* **2/19/2021**		
Model:	**NC-73**	*Status:*	**Received**	**Sent**
Manufacturer:	**Rion**	*In tolerance:*	**X**	**X**
Serial number:	**10417585**	*Out of tolerance:*		
Class (IEC 60942):	**2**	*See comments:*		
Barometer type:		*Contains non-accredited tests:* __Yes _X_ No		
Barometer s/n:				
Customer:	**HMB Professional Engineers, Inc.**	*Address:*	**3 HMB Circle US 460**	
Tel/Fax:	**502-695-9800 / 502-695-9810**		**Frankfort, KY 40601**	

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 31, 2018	Scantek, Inc./ NVLAP	Oct 31, 2019
DS-360-SRS	Function Generator	33584	Oct 24, 2017	ACR Env./ A2LA	Oct 24, 2019
34401A-Agilent Technologies	Digital Voltmeter	MY47011118	Oct 1, 2018	ACR Env. / A2LA	Oct 1, 2019
HM30-Thommen	Meteo Station	1040170/39633	Nov 13, 2018	ACR Env./ A2LA	Nov 13, 2019
140-Norsonic	Real Time Analyzer	1406423	Nov 3, 2018	Scantek / NVLAP	Nov 3, 2019
PC Program 1018 Norsonic	Calibration software	v.6.1T	Validated Nov 2014	Scantek, Inc.	-
4134-Brüel&Kjær	Microphone	173368	Nov 11, 2018	Scantek, Inc. / NVLAP	Nov 11, 2019
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	2/19/2019	Date	2/19/2019

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.
Document stored as: Z:\Calibration Lab\Cal 2019\RIONNC73_10417585_M1.doc

Results summary: Device was tested and complies with following clauses of mentioned specifications:

CLAUSES[1] FROM STANDARDS REFERENCED IN PROCEDURES:	MET[2]	NOT MET	COMMENTS
Manufacturer specifications			
Manufacturer specifications: Sound pressure level	X		
Manufacturer specifications: Frequency	X		
Manufacturer specifications: Total harmonic distortion	X		
Current standards			
ANSI S1.40:2006 B.3 / IEC 60942: 2003 B.2 - Preliminary inspection	X		
ANSI S1.40:2006 B.4.4 / IEC 60942: 2003 B.3.4 - Sound pressure level	X		
ANSI S1.40:2006 A.5.4 / IEC 60942: 2003 A.4.4 - Sound pressure level stability	-	-	
ANSI S1.40:2006 B.4.5 / IEC 60942: 2003 B.3.5 - Frequency	X		
ANSI S1.40:2006 B.4.6 / IEC 60942: 2003 B.3.6 - Total harmonic distortion	X		

1 The results of this calibration apply only to the instrument type with serial number identified in this report.

2 The tests marked with (*) are not covered by the current NVLAP accreditation.

Main measured parameters [3]:

Measured[4]/Acceptable[5] Tone frequency (Hz):	Measured[4]/Acceptable[5] Total Harmonic Distortion (%):	Measured [4]/Acceptable Level[5] (dB):
994.26 ± 1.0/1000.0 ± 20.0	0.18 ± 0.10/ < 4	93.99 ± 0.12/94.0 ± 0.75

3 The stated level is valid at measurement conditions.

4 The above expanded uncertainties for frequency and distortion are calculated with a coverage factor k=2; for level k=2.00

5 Acceptable parameters values are from the current standards

Environmental conditions:

Temperature (°C)	Barometric pressure (kPa)	Relative Humidity (%)
23.6 ± 1.0	102.08 ± 0.025	36.8 ± 2.1

Tests made with following attachments to instrument:

Calibrator ½" Adaptor Type: NC-71-S02
Other:

Adjustments: Unit was not adjusted.
Comments: The instrument was tested and met all specifications found in the referenced procedures.

Note: The instrument was tested for the parameters listed in the table above, using the test methods described in the listed standards. All tests were performed around the reference conditions. The test results were compared with the manufacturer's or with the standard's specifications, whichever are larger.
Compliance with any standard cannot be claimed based solely on the periodic tests.

Measured Data: in Acoustical Calibrator Test Report # 42352 of one page.

Place of Calibration: Scantek, Inc.
6430 Dobbin Road, Suite C
Columbia, MD 21045 USA
Ph/Fax: 410-290-7726/ -9167
callab@scantekinc.com

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.

Test Report No.:42352

Manufacturer: Rion
Type: NC-73
Serial no: 10417585

Customer: HMB Professional Engineers, Inc.
Department:
Address: 3 HMB Circle US 460 Frankfort, KY 40601
Order No:
Contact Person: Mitchell Green
Phone No.: 502-695-9800
Fax No.: 502-695-9810

Measurement Results:

	Level: (dB)	P. Stab : (dB)	Frequency: (Hz)	F. Stab : (%)	Distortion: (% TD)
1:	94.00	0.02	994.21	0.02	0.18
2:	93.99	0.02	994.31	0.01	0.18
3:	93.99	0.02	994.26	0.01	0.18
Result (Average):	**93.99**	**0.02**	**994.26**	**0.01**	**0.18**
Expanded Uncertainty:	0.12	0.02	1.00	0.01	0.10
Degree of Freedom:	>100	>100	>100	5	>100
Coverage Factor:	2.00	2.00	2.00	2.87	2.00

The stated levels are relative to 20µPa.

The stated level is valid at measurement conditions.
Reference microphone: 4134-173368. Volume correction: 0.000 dB
Records:Z:\Calibration Lab\Cal 2019\RIONNC73_10417585_M1.nmf

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k = 2, which for a normal distribution corresponds to coverage probability of approximately 95%. The standard uncertainty of measurement has been determined in accordance with EA publication EA-4/02.

Environmental conditions:

Pressure:	Temperature:	Relative humidity:
102.077 ± 0.025 kPa	23.6 ± 1.0 °C	36.8 ± 2.1 %RH

Date of calibration: 2/19/2019
Date of issue: 2/19/2019

Supervisor : Steven E. Marshall
Measurements performed by:

LD

Lydon Dawkins
Software version: 6.1T

Scantek, Inc.
6430 Dobbin Rd., Suite C, Columbia, MD 21045
Ph: 410-290-7726 eMail: callab@scantekinc.com

APPENDIX E – TNM OUTPUT

TNM OUTPUT FOR ADAMS LANE (AUXILIARY LANE ADDITION)

HMB Professional Engineers
Mark Gavula

29 March 2021
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: I-69 ORX
RUN: 9005 Interchange Auxiliary Lane
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

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

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
IRO-01-01	1	1	55.0	61.0	66	6.0	10	----	61.0	0.0	8	-8.0
IRO-02-01	2	1	55.8	61.4	66	5.6	10	----	61.4	0.0	8	-8.0
IRO-03-01	3	1	56.3	62.1	66	5.8	10	----	62.1	0.0	8	-8.0
IRO-04-01	4	1	57.0	62.8	66	5.8	10	----	62.8	0.0	8	-8.0
IRO-05-01	5	1	57.8	63.6	66	5.8	10	----	63.6	0.0	8	-8.0
IRO-06-01	6	1	58.5	64.3	66	5.8	10	----	64.3	0.0	8	-8.0
IRO-07-01-F	7	1	59.9	65.6	66	5.7	10	----	65.6	0.0	8	-8.0
KEN-01-01-F	8	1	65.4	70.3	66	4.9	10	Snd Lvl	70.3	0.0	8	-8.0
KEN-02-01-F	9	1	65.5	70.6	66	5.1	10	Snd Lvl	70.6	0.0	8	-8.0
KEN-03-01-F	10	1	65.6	70.9	66	5.3	10	Snd Lvl	70.9	0.0	8	-8.0
KEN-04-01-F	11	1	67.0	72.4	66	5.4	10	Snd Lvl	72.4	0.0	8	-8.0
KEN-05-01-F	12	1	67.1	67.0	66	-0.1	10	Snd Lvl	67.0	0.0	8	-8.0
KEN-06-01-F	13	1	62.7	65.0	66	2.3	10	----	65.0	0.0	8	-8.0
KEN-07-01-F	14	1	61.6	63.8	66	2.2	10	----	63.8	0.0	8	-8.0
KEN-08-01-F	15	1	60.6	62.9	66	2.3	10	----	62.9	0.0	8	-8.0
KEN-09-01-F	16	1	59.2	61.9	66	2.7	10	----	61.9	0.0	8	-8.0
KEN-10-01-F	17	1	57.9	60.9	66	3.0	10	----	60.9	0.0	8	-8.0
KEN-11-01-F	18	1	56.7	59.9	66	3.2	10	----	59.9	0.0	8	-8.0
KEN-12-01	19	1	61.8	66.8	66	5.0	10	Snd Lvl	66.8	0.0	8	-8.0
KEN-13-01	20	1	60.3	65.4	66	5.1	10	----	65.4	0.0	8	-8.0
KEN-14-01	21	1	59.4	64.5	66	5.1	10	----	64.5	0.0	8	-8.0
KEN-15-01	22	1	58.5	63.6	66	5.1	10	----	63.6	0.0	8	-8.0
KEN-16-01	23	1	57.6	62.5	66	4.9	10	----	62.5	0.0	8	-8.0
KEN-17-01	24	1	57.0	61.9	66	4.9	10	----	61.9	0.0	8	-8.0

KEN-18-01	25	1	61.6	67.1	66	5.5	10	Snd Lvl	67.1	0.0	8	-8.0
KEN-19-01	26	1	60.2	65.6	66	5.4	10	----	65.6	0.0	8	-8.0
KEN-20-01	27	1	59.1	64.4	66	5.3	10	----	64.4	0.0	8	-8.0
KEN-21-01	28	1	58.0	63.2	66	5.2	10	----	63.2	0.0	8	-8.0
KEN-22-01	29	1	57.3	62.2	66	4.9	10	----	62.2	0.0	8	-8.0
KEN-23-01	30	1	62.6	66.9	66	4.3	10	Snd Lvl	66.9	0.0	8	-8.0
KEN-24-01	31	1	61.3	65.5	66	4.2	10	----	65.5	0.0	8	-8.0
KEN-25-01	32	1	60.1	64.3	66	4.2	10	----	64.3	0.0	8	-8.0
KEN-26-01	33	1	59.2	63.1	66	3.9	10	----	63.1	0.0	8	-8.0
KEN-27-01	34	1	58.1	62.0	66	3.9	10	----	62.0	0.0	8	-8.0
KEN-28-01	35	1	57.4	61.1	66	3.7	10	----	61.1	0.0	8	-8.0
WES-01-01-F	36	1	65.4	70.2	66	4.8	10	Snd Lvl	70.2	0.0	8	-8.0
WES-02-01	37	1	60.9	65.8	66	4.9	10	----	65.8	0.0	8	-8.0
WES-03-01	38	1	58.8	63.6	66	4.8	10	----	63.6	0.0	8	-8.0
WES-04-01	39	1	56.7	61.7	66	5.0	10	----	61.7	0.0	8	-8.0
WES-05-01	40	1	56.0	61.0	66	5.0	10	----	61.0	0.0	8	-8.0
WES-06-01	41	1	55.3	60.4	66	5.1	10	----	60.4	0.0	8	-8.0
WES-07-01-F	42	1	63.8	68.3	66	4.5	10	Snd Lvl	68.3	0.0	8	-8.0
WES-08-01	43	1	61.7	66.1	66	4.4	10	Snd Lvl	66.1	0.0	8	-8.0
WES-09-01	44	1	60.4	65.0	66	4.6	10	----	65.0	0.0	8	-8.0
WES-10-01	45	1	58.3	63.1	66	4.8	10	----	63.1	0.0	8	-8.0
WES-11-01	46	1	57.3	62.2	66	4.9	10	----	62.2	0.0	8	-8.0
WES-12-01	47	1	56.5	61.4	66	4.9	10	----	61.4	0.0	8	-8.0
WES-13-01	48	1	55.9	60.8	66	4.9	10	----	60.8	0.0	8	-8.0
KEN-29-01-F	50	1	67.5	71.6	66	4.1	10	Snd Lvl	71.6	0.0	8	-8.0
KEN-30-01-F	51	1	67.3	72.0	66	4.7	10	Snd Lvl	72.0	0.0	8	-8.0
KEN-31-01-F	52	1	67.1	72.2	66	5.1	10	Snd Lvl	72.2	0.0	8	-8.0
KEN-32-01-F	53	1	66.5	71.8	66	5.3	10	Snd Lvl	71.8	0.0	8	-8.0

Dwelling Units	**# DUs**	**Noise Reduction**		
		Min	**Avg**	**Max**
		dB	**dB**	**dB**
All Selected	52	0.0	0.0	0.0
All Impacted	15	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

HMB Professional Engineers
Mark Gavula

29 March 2021
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: I-69 ORX
RUN: 9005 Interchange Auxiliary Lane-WEST
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

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

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
IRO-01-01	1	1	55.0	61.0	66	6.0	10	----	61.0	0.0	8	-8.0
IRO-02-01	2	1	55.8	61.4	66	5.6	10	----	61.4	0.0	8	-8.0
IRO-03-01	3	1	56.3	62.1	66	5.8	10	----	62.1	0.0	8	-8.0
IRO-04-01	4	1	57.0	62.8	66	5.8	10	----	62.8	0.0	8	-8.0
IRO-05-01	5	1	57.8	63.6	66	5.8	10	----	63.6	0.0	8	-8.0
IRO-06-01	6	1	58.5	64.3	66	5.8	10	----	64.3	0.0	8	-8.0
IRO-07-01-F	7	1	59.9	65.6	66	5.7	10	----	65.6	0.0	8	-8.0
KEN-01-01-F	8	1	65.4	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
KEN-02-01-F	9	1	65.5	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
KEN-03-01-F	10	1	65.6	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
KEN-04-01-F	11	1	67.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
KEN-05-01-F	12	1	67.1	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
KEN-06-01-F	13	1	62.7	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
KEN-07-01-F	14	1	61.6	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
KEN-08-01-F	15	1	60.6	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
KEN-09-01-F	16	1	59.2	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
KEN-10-01-F	17	1	57.9	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
KEN-11-01-F	18	1	56.7	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
KEN-12-01	19	1	61.8	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
KEN-13-01	20	1	60.3	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
KEN-14-01	21	1	59.4	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
KEN-15-01	22	1	58.5	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
KEN-16-01	23	1	57.6	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
KEN-17-01	24	1	57.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0

KEN-18-01	25	1	61.6	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
KEN-19-01	26	1	60.2	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
KEN-20-01	27	1	59.1	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
KEN-21-01	28	1	58.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
KEN-22-01	29	1	57.3	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
KEN-23-01	30	1	62.6	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
KEN-24-01	31	1	61.3	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
KEN-25-01	32	1	60.1	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
KEN-26-01	33	1	59.2	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
KEN-27-01	34	1	58.1	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
KEN-28-01	35	1	57.4	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
WES-01-01-F	36	1	65.4	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
WES-02-01	37	1	60.9	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
WES-03-01	38	1	58.8	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
WES-04-01	39	1	56.7	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
WES-05-01	40	1	56.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
WES-06-01	41	1	55.3	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
WES-07-01-F	42	1	63.8	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
WES-08-01	43	1	61.7	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
WES-09-01	44	1	60.4	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
WES-10-01	45	1	58.3	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
WES-11-01	46	1	57.3	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
WES-12-01	47	1	56.5	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
WES-13-01	48	1	55.9	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
KEN-29-01-F	50	1	67.5	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
KEN-30-01-F	51	1	67.3	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
KEN-31-01-F	52	1	67.1	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
KEN-32-01-F	53	1	66.5	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
IRO-10-01	55	1	54.0	60.0	66	6.0	10	----	60.0	0.0	8	-8.0
IRO-11-01	56	1	55.2	61.2	66	6.0	10	----	61.2	0.0	8	-8.0
WED-07-01	57	1	57.3	63.1	66	5.8	10	----	63.1	0.0	8	-8.0
IRO-08-01-F	58	1	59.7	65.3	66	5.6	10	----	65.3	0.0	8	-8.0
IRO-09-01-F	59	1	59.7	65.3	66	5.6	10	----	65.3	0.0	8	-8.0
WED-06-01	60	1	58.1	63.8	66	5.7	10	----	63.8	0.0	8	-8.0
WED-05-01	61	1	56.9	62.6	66	5.7	10	----	62.6	0.0	8	-8.0
WED-04-01	62	1	55.8	61.6	66	5.8	10	----	61.6	0.0	8	-8.0
WED-03-01	64	1	55.0	60.8	66	5.8	10	----	60.8	0.0	8	-8.0
WED-02-02	66	2	53.8	59.6	66	5.8	10	----	59.6	0.0	8	-8.0
WED-01-02	67	2	51.9	57.8	66	5.9	10	----	57.8	0.0	8	-8.0
WED-08-01	68	1	56.4	62.2	66	5.8	10	----	62.2	0.0	8	-8.0
WED-09-01	69	1	55.6	61.4	66	5.8	10	----	61.4	0.0	8	-8.0

WED-10-02	71	2	54.9	60.7	66	5.8	10	----	60.7	0.0	8	-8.0
WED-11-02	72	2	53.7	59.6	66	5.9	10	----	59.6	0.0	8	-8.0
HAY-01-01	73	1	52.0	57.8	66	5.8	10	----	57.8	0.0	8	-8.0

Dwelling Units	**# DUs**	**Noise Reduction**		
		Min	**Avg**	**Max**
		dB	**dB**	**dB**
All Selected	72	0.0	0.0	0.0
All Impacted	0	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

TNM OUTPUT FOR ADAMS LANE (AUXILIARY LANE ADDITION) BARRIER WALL

HMB Professional Engineers
Mark Gavula

29 March 2021
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: I-69 ORX
RUN: 9005 Interchange Auxiliary Lane Barrier
BARRIER DESIGN: Aux_Lane-Barrier
ATMOSPHERICS: 68 deg F, 50% RH

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

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
KEN-01-01-F	8	1	65.4	70.4	66	5.0	10	Snd Lvl	61.9	8.5	8	0.5
KEN-02-01-F	9	1	65.5	70.7	66	5.2	10	Snd Lvl	61.9	8.8	8	0.8
KEN-03-01-F	10	1	65.6	71.0	66	5.4	10	Snd Lvl	62.2	8.8	8	0.8
KEN-04-01-F	11	1	67.0	72.5	66	5.5	10	Snd Lvl	62.4	10.1	8	2.1
KEN-05-01-F	12	1	67.1	67.0	66	-0.1	10	Snd Lvl	60.6	6.4	8	-1.6
KEN-06-01-F	13	1	62.7	65.1	66	2.4	10	----	60.0	5.1	8	-2.9
KEN-07-01-F	14	1	61.6	63.9	66	2.3	10	----	59.4	4.5	8	-3.5
KEN-08-01-F	15	1	60.6	63.0	66	2.4	10	----	58.8	4.2	8	-3.8
KEN-09-01-F	16	1	59.2	61.9	66	2.7	10	----	58.1	3.8	8	-4.2
KEN-10-01-F	17	1	57.9	60.9	66	3.0	10	----	57.5	3.4	8	-4.6
KEN-11-01-F	18	1	56.7	60.0	66	3.3	10	----	56.8	3.2	8	-4.8
KEN-12-01	19	1	61.8	66.9	66	5.1	10	Snd Lvl	60.4	6.5	8	-1.5
KEN-13-01	20	1	60.3	65.5	66	5.2	10	----	59.5	6.0	8	-2.0
KEN-14-01	21	1	59.4	64.6	66	5.2	10	----	59.0	5.6	8	-2.4
KEN-15-01	22	1	58.5	63.7	66	5.2	10	----	58.6	5.1	8	-2.9
KEN-16-01	23	1	57.6	62.6	66	5.0	10	----	57.9	4.7	8	-3.3
KEN-17-01	24	1	57.0	61.9	66	4.9	10	----	57.5	4.4	8	-3.6
KEN-18-01	25	1	61.6	67.2	66	5.6	10	Snd Lvl	60.1	7.1	8	-0.9
KEN-19-01	26	1	60.2	65.7	66	5.5	10	----	59.2	6.5	8	-1.5
KEN-20-01	27	1	59.1	64.5	66	5.4	10	----	58.6	5.9	8	-2.1
KEN-21-01	28	1	58.0	63.2	66	5.2	10	----	57.9	5.3	8	-2.7
KEN-22-01	29	1	57.3	62.3	66	5.0	10	----	57.4	4.9	8	-3.1
KEN-23-01	30	1	62.6	66.9	66	4.3	10	Snd Lvl	60.0	6.9	8	-1.1
KEN-24-01	31	1	61.3	65.5	66	4.2	10	----	59.3	6.2	8	-1.8

KEN-25-01	32	1	60.1	64.3	66	4.2	10	----	58.6	5.7	8	-2.3
KEN-26-01	33	1	59.2	63.1	66	3.9	10	----	58.2	4.9	8	-3.1
KEN-27-01	34	1	58.1	62.0	66	3.9	10	----	57.4	4.6	8	-3.4
KEN-28-01	35	1	57.4	61.1	66	3.7	10	----	56.9	4.2	8	-3.8
WES-01-01-F	36	1	65.4	70.4	66	5.0	10	Snd Lvl	63.4	7.0	8	-1.0
WES-02-01	37	1	60.9	66.0	66	5.1	10	Snd Lvl	62.1	3.9	8	-4.1
WES-03-01	38	1	58.8	63.8	66	5.0	10	----	60.8	3.0	8	-5.0
WES-04-01	39	1	56.7	61.8	66	5.1	10	----	59.1	2.7	8	-5.3
WES-05-01	40	1	56.0	61.1	66	5.1	10	----	58.4	2.7	8	-5.3
WES-06-01	41	1	55.3	60.5	66	5.2	10	----	57.9	2.6	8	-5.4
WES-07-01-F	42	1	63.8	68.5	66	4.7	10	Snd Lvl	61.6	6.9	8	-1.1
WES-08-01	43	1	61.7	66.3	66	4.6	10	Snd Lvl	60.7	5.6	8	-2.4
WES-09-01	44	1	60.4	65.2	66	4.8	10	----	60.5	4.7	8	-3.3
WES-10-01	45	1	58.3	63.2	66	4.9	10	----	59.4	3.8	8	-4.2
WES-11-01	46	1	57.3	62.2	66	4.9	10	----	58.9	3.3	8	-4.7
WES-12-01	47	1	56.5	61.5	66	5.0	10	----	58.3	3.2	8	-4.8
WES-13-01	48	1	55.9	60.9	66	5.0	10	----	57.9	3.0	8	-5.0
KEN-29-01-F	50	1	67.5	71.6	66	4.1	10	Snd Lvl	62.1	9.5	8	1.5
KEN-30-01-F	51	1	67.3	72.0	66	4.7	10	Snd Lvl	62.0	10.0	8	2.0
KEN-31-01-F	52	1	67.1	72.2	66	5.1	10	Snd Lvl	62.0	10.2	8	2.2
KEN-32-01-F	53	1	66.5	71.8	66	5.3	10	Snd Lvl	61.9	9.9	8	1.9

Dwelling Units	**# DUs**	**Noise Reduction**		
		Min	**Avg**	**Max**
		dB	**dB**	**dB**
All Selected	45	2.6	5.6	10.2
All Impacted	16	3.9	7.9	10.2
All that meet NR Goal	8	8.5	9.5	10.2

HMB Professional Engineers				**29 March 2021**						
Mark Gavula				**TNM 2.5**						
RESULTS: BARRIER DESCRIPTIONS										
PROJECT/CONTRACT:	**I-69 ORX**									
RUN:	**9005 Interchange Auxiliary Lane Barrier**									
BARRIER DESIGN:	**Aux_Lane-Barrier**									
Barriers										
Name	**Type**	**Heights along Barrier**			**Length**	**If Wall**	**If Berm**			**Cost**
		Min	**Avg**	**Max**		**Area**	**Volume**	**Top**	**Run:Rise**	
								Width		
		ft	ft	ft	ft	sq ft	cu yd	ft	ft:ft	$
Barrier4	W	10.00	15.47	16.00	1140	17639				529155
									Total Cost:	529155

HMB Professional Engineers 29 March 2021
Mark Gavula TNM 2.5
Calculated with TNM 2.5

RESULTS: BARRIER DESIGN
PROJECT/CONTRACT: I-69 ORX
RUN: 9005 Interchange Auxiliary Lane Barrier
BARRIER DESIGN: Aux_Lane-Barrier

ATMOSPHERICS: 68 deg F, 50% RH

Selected Receivers

Name	No.	Calc LAeq1h	Noise Reduction Calc	Goal	Calc-Goal	Barrier Reviewed	Important Segments Name	No.	Height	Partial LAeq1h
		dBA	dB	dB	dB				ft	dBA
KEN-01-01-F	8	61.9	8.5	8	0.5	Barrier4	point149	149	16.0	47.6
						Barrier4	point150	150	16.0	47.6
						Barrier4	point151	151	16.0	47.5
						Barrier4	point152	152	16.0	47.4
						Barrier4	point148	148	16.0	47.4
						Barrier4	point154	154	16.0	47.1
						Barrier4	point153	153	16.0	47.0
						Barrier4	point156	156	16.0	47.0
						Barrier4	point146	146	16.0	47.0
						Barrier4	point147	147	16.0	46.8
KEN-02-01-F	9	61.9	8.8	8	0.8	Barrier4	point146	146	16.0	48.6
						Barrier4	point145	145	16.0	48.4
						Barrier4	point147	147	16.0	48.4
						Barrier4	point148	148	24.0	48.3
						Barrier4	point149	149	24.0	48.1
						Barrier4	point144	144	16.0	47.8
						Barrier4	point151	151	16.0	47.7
						Barrier4	point152	152	16.0	47.5
						Barrier4	point150	150	16.0	47.5
						Barrier4	point143	143	16.0	46.9
KEN-03-01-F	10	62.2	8.8	8	0.8	Barrier4	point144	144	16.0	49.1

						Barrier4	point145	145	16.0	49.1
						Barrier4	point147	147	16.0	49.0
						Barrier4	point146	146	16.0	49.0
						Barrier4	point148	148	16.0	48.6
						Barrier4	point143	143	16.0	48.0
						Barrier4	point149	149	16.0	47.7
						Barrier4	point150	150	16.0	47.0
						Barrier4	point151	151	16.0	46.5
						Barrier4	point142	142	16.0	46.3
KEN-04-01-F	11	62.4	10.1	8	2.1	Barrier4	point144	144	16.0	50.9
						Barrier4	point143	143	16.0	50.3
						Barrier4	point145	145	16.0	50.1
						Barrier4	point146	146	16.0	49.7
						Barrier4	point142	142	16.0	49.2
						Barrier4	point147	147	16.0	48.9
						Barrier4	point141	141	16.0	48.7
						Barrier4	point140	140	16.0	48.0
						Barrier4	point148	148	16.0	47.7
						Barrier4	point139	139	16.0	47.2
KEN-05-01-F	12	60.6	6.4	8	-1.6	Barrier4	point130	130	16.0	48.3
						Barrier4	point129	129	16.0	48.2
						Barrier4	point131	131	16.0	48.2
						Barrier4	point132	132	16.0	48.2
						Barrier4	point133	133	16.0	47.8
						Barrier4	point128	128	16.0	47.5
						Barrier4	point134	134	16.0	47.1
						Barrier4	point135	135	16.0	46.4
						Barrier4	point136	136	16.0	45.9
						Barrier4	point137	137	16.0	45.1
KEN-06-01-F	13	60.0	5.1	8	-2.9	Barrier4	point128	128	16.0	45.7
						Barrier4	point129	129	16.0	45.6
						Barrier4	point130	130	16.0	45.4
						Barrier4	point131	131	16.0	45.2
						Barrier4	point132	132	16.0	45.1
						Barrier4	point127	127	16.0	44.9
						Barrier4	point133	133	16.0	44.8

						Barrier4	point134	134	16.0	44.3
						Barrier4	point123	123	14.0	44.0
						Barrier4	point135	135	16.0	43.9
KEN-07-01-F	14	59.4	4.5	8	-3.5	Barrier4	point128	128	16.0	44.6
						Barrier4	point129	129	16.0	44.4
						Barrier4	point130	130	16.0	44.3
						Barrier4	point131	131	16.0	44.1
						Barrier4	point132	132	16.0	43.9
						Barrier4	point127	127	16.0	43.7
						Barrier4	point133	133	16.0	43.5
						Barrier4	point123	123	14.0	43.2
						Barrier4	point134	134	16.0	43.1
						Barrier4	point135	135	16.0	42.8
KEN-08-01-F	15	58.8	4.2	8	-3.8	Barrier4	point128	128	16.0	43.6
						Barrier4	point129	129	16.0	43.3
						Barrier4	point130	130	16.0	43.2
						Barrier4	point131	131	16.0	43.0
						Barrier4	point127	127	16.0	42.9
						Barrier4	point132	132	16.0	42.8
						Barrier4	point123	123	14.0	42.6
						Barrier4	point133	133	16.0	42.4
						Barrier4	point134	134	16.0	42.1
						Barrier4	point135	135	16.0	41.8
KEN-09-01-F	16	58.1	3.8	8	-4.2	Barrier4	point128	128	16.0	42.4
						Barrier4	point129	129	16.0	42.1
						Barrier4	point127	127	16.0	42.0
						Barrier4	point130	130	16.0	42.0
						Barrier4	point131	131	16.0	41.7
						Barrier4	point132	132	16.0	41.6
						Barrier4	point133	133	16.0	41.2
						Barrier4	point123	123	14.0	41.2
						Barrier4	point134	134	16.0	41.0
						Barrier4	point135	135	16.0	40.7
KEN-10-01-F	17	57.5	3.4	8	-4.6	Barrier4	point128	128	16.0	41.2
						Barrier4	point129	129	16.0	41.1
						Barrier4	point130	130	16.0	40.8

						Barrier4	point127	127	16.0	40.6
						Barrier4	point131	131	16.0	40.5
						Barrier4	point132	132	16.0	40.3
						Barrier4	point133	133	16.0	40.0
						Barrier4	point134	134	16.0	39.8
						Barrier4	point123	123	14.0	39.7
						Barrier4	point135	135	16.0	39.5
KEN-11-01-F	18	56.8	3.2	8	-4.8	Barrier4	point128	128	16.0	40.1
						Barrier4	point129	129	16.0	39.8
						Barrier4	point130	130	16.0	39.5
						Barrier4	point131	131	16.0	39.2
						Barrier4	point132	132	16.0	39.1
						Barrier4	point133	133	16.0	38.8
						Barrier4	point134	134	16.0	38.6
						Barrier4	point127	127	16.0	38.4
						Barrier4	point123	123	14.0	38.4
						Barrier4	point136	136	16.0	38.3
KEN-12-01	19	60.4	6.5	8	-1.5	Barrier4	point162	162	16.0	45.3
						Barrier4	point163	163	16.0	45.0
						Barrier4	point164	164	16.0	44.9
						Barrier4	point161	161	16.0	44.8
						Barrier4	point144	144	16.0	44.7
						Barrier4	point145	145	16.0	44.6
						Barrier4	point147	147	16.0	44.6
						Barrier4	point146	146	16.0	44.5
						Barrier4	point148	148	16.0	44.4
						Barrier4	point165	165	16.0	44.1
KEN-13-01	20	59.5	6.0	8	-2.0	Barrier4	point162	162	16.0	44.4
						Barrier4	point160	160	16.0	44.3
						Barrier4	point163	163	16.0	44.0
						Barrier4	point161	161	16.0	43.9
						Barrier4	point144	144	16.0	43.7
						Barrier4	point159	159	16.0	43.6
						Barrier4	point145	145	16.0	43.6
						Barrier4	point146	146	16.0	43.5
						Barrier4	point147	147	16.0	43.4

						Barrier4	point164	164	16.0	43.4
KEN-14-01	21	59.0	5.6	8	-2.4	Barrier4	point161	161	16.0	43.8
						Barrier4	point159	159	16.0	43.7
						Barrier4	point162	162	16.0	43.7
						Barrier4	point160	160	16.0	43.6
						Barrier4	point163	163	16.0	43.5
						Barrier4	point164	164	16.0	43.1
						Barrier4	point144	144	16.0	43.0
						Barrier4	point165	165	16.0	42.8
						Barrier4	point145	145	16.0	42.8
						Barrier4	point143	143	16.0	42.8
KEN-15-01	22	58.6	5.1	8	-2.9	Barrier4	point160	160	16.0	43.7
						Barrier4	point161	161	16.0	43.4
						Barrier4	point162	162	16.0	43.2
						Barrier4	point163	163	16.0	43.1
						Barrier4	point159	159	16.0	42.7
						Barrier4	point164	164	16.0	42.7
						Barrier4	point165	165	16.0	42.5
						Barrier4	point144	144	16.0	42.3
						Barrier4	point166	166	16.0	42.1
						Barrier4	point143	143	16.0	41.9
KEN-16-01	23	57.9	4.7	8	-3.3	Barrier4	point160	160	16.0	42.6
						Barrier4	point159	159	16.0	42.5
						Barrier4	point161	161	16.0	42.3
						Barrier4	point162	162	16.0	42.1
						Barrier4	point163	163	16.0	42.1
						Barrier4	point164	164	16.0	41.8
						Barrier4	point165	165	16.0	41.5
						Barrier4	point144	144	16.0	41.5
						Barrier4	point166	166	16.0	41.2
						Barrier4	point143	143	16.0	41.0
KEN-17-01	24	57.5	4.4	8	-3.6	Barrier4	point159	159	16.0	42.4
						Barrier4	point160	160	16.0	42.1
						Barrier4	point161	161	16.0	41.9
						Barrier4	point163	163	16.0	41.7
						Barrier4	point162	162	16.0	41.7

						Barrier4	point164	164	16.0	41.4
						Barrier4	point165	165	16.0	41.2
						Barrier4	point166	166	16.0	40.9
						Barrier4	point144	144	16.0	40.8
						Barrier4	point167	167	16.0	40.6
KEN-18-01	25	60.1	7.1	8	-0.9	Barrier4	point144	144	16.0	46.0
						Barrier4	point143	143	16.0	45.4
						Barrier4	point145	145	16.0	45.4
						Barrier4	point146	146	16.0	44.9
						Barrier4	point142	142	16.0	44.6
						Barrier4	point141	141	16.0	44.5
						Barrier4	point147	147	16.0	44.5
						Barrier4	point139	139	16.0	44.3
						Barrier4	point140	140	16.0	44.1
						Barrier4	point138	138	16.0	44.0
KEN-19-01	26	59.2	6.5	8	-1.5	Barrier4	point144	144	16.0	44.8
						Barrier4	point143	143	16.0	44.2
						Barrier4	point145	145	16.0	44.1
						Barrier4	point146	146	16.0	43.7
						Barrier4	point147	147	16.0	43.4
						Barrier4	point142	142	16.0	43.3
						Barrier4	point141	141	16.0	43.2
						Barrier4	point140	140	16.0	43.2
						Barrier4	point139	139	16.0	43.1
						Barrier4	point138	138	16.0	42.9
KEN-20-01	27	58.6	5.9	8	-2.1	Barrier4	point144	144	16.0	43.8
						Barrier4	point143	143	16.0	43.1
						Barrier4	point145	145	16.0	43.0
						Barrier4	point161	161	16.0	42.8
						Barrier4	point146	146	16.0	42.7
						Barrier4	point162	162	16.0	42.7
						Barrier4	point147	147	16.0	42.4
						Barrier4	point163	163	16.0	42.4
						Barrier4	point164	164	16.0	42.3
						Barrier4	point142	142	16.0	42.3
KEN-21-01	28	57.9	5.3	8	-2.7	Barrier4	point144	144	16.0	42.8

						Barrier4	point160	160	16.0	42.7
						Barrier4	point143	143	16.0	42.2
						Barrier4	point145	145	16.0	42.1
						Barrier4	point162	162	16.0	42.0
						Barrier4	point159	159	16.0	41.8
						Barrier4	point163	163	16.0	41.8
						Barrier4	point146	146	16.0	41.7
						Barrier4	point147	147	16.0	41.4
						Barrier4	point165	165	16.0	41.3
KEN-22-01	29	57.4	4.9	8	-3.1	Barrier4	point160	160	16.0	42.2
						Barrier4	point144	144	16.0	41.9
						Barrier4	point161	161	16.0	41.9
						Barrier4	point159	159	16.0	41.5
						Barrier4	point143	143	16.0	41.2
						Barrier4	point145	145	16.0	41.2
						Barrier4	point162	162	16.0	41.0
						Barrier4	point146	146	16.0	40.8
						Barrier4	point147	147	16.0	40.5
						Barrier4	point142	142	16.0	40.2
KEN-23-01	30	60.0	6.9	8	-1.1	Barrier4	point137	137	16.0	44.8
						Barrier4	point136	136	16.0	44.8
						Barrier4	point144	144	16.0	44.8
						Barrier4	point135	135	16.0	44.8
						Barrier4	point134	134	16.0	44.7
						Barrier4	point138	138	16.0	44.7
						Barrier4	point133	133	16.0	44.6
						Barrier4	point139	139	16.0	44.5
						Barrier4	point132	132	16.0	44.4
						Barrier4	point131	131	16.0	44.3
KEN-24-01	31	59.3	6.2	8	-1.8	Barrier4	point144	144	16.0	43.8
						Barrier4	point133	133	16.0	43.7
						Barrier4	point135	135	16.0	43.7
						Barrier4	point134	134	16.0	43.7
						Barrier4	point136	136	16.0	43.7
						Barrier4	point137	137	16.0	43.6
						Barrier4	point132	132	16.0	43.6

						Barrier4	point131	131	16.0	43.5
						Barrier4	point138	138	16.0	43.4
						Barrier4	point139	139	16.0	43.4
KEN-25-01	32	58.6	5.7	8	-2.3	Barrier4	point144	144	16.0	42.8
						Barrier4	point132	132	16.0	42.7
						Barrier4	point133	133	16.0	42.7
						Barrier4	point131	131	16.0	42.7
						Barrier4	point134	134	16.0	42.7
						Barrier4	point135	135	16.0	42.6
						Barrier4	point130	130	16.0	42.6
						Barrier4	point136	136	16.0	42.6
						Barrier4	point137	137	16.0	42.5
						Barrier4	point129	129	16.0	42.4
KEN-26-01	33	58.2	4.9	8	-3.1	Barrier4	point130	130	16.0	42.0
						Barrier4	point132	132	16.0	41.9
						Barrier4	point131	131	16.0	41.9
						Barrier4	point133	133	16.0	41.8
						Barrier4	point129	129	16.0	41.8
						Barrier4	point144	144	16.0	41.7
						Barrier4	point134	134	16.0	41.7
						Barrier4	point128	128	16.0	41.7
						Barrier4	point135	135	16.0	41.6
						Barrier4	point127	127	16.0	41.6
KEN-27-01	34	57.4	4.6	8	-3.4	Barrier4	point144	144	16.0	40.9
						Barrier4	point130	130	16.0	40.9
						Barrier4	point132	132	16.0	40.8
						Barrier4	point131	131	16.0	40.8
						Barrier4	point129	129	16.0	40.8
						Barrier4	point133	133	16.0	40.7
						Barrier4	point128	128	16.0	40.7
						Barrier4	point134	134	16.0	40.6
						Barrier4	point127	127	16.0	40.5
						Barrier4	point135	135	16.0	40.5
KEN-28-01	35	56.9	4.2	8	-3.8	Barrier4	point129	129	16.0	40.1
						Barrier4	point130	130	16.0	40.1
						Barrier4	point128	128	16.0	40.0

						Barrier4	point131	131	16.0	39.9
						Barrier4	point132	132	16.0	39.9
						Barrier4	point127	127	16.0	39.9
						Barrier4	point144	144	16.0	39.9
						Barrier4	point133	133	16.0	39.8
						Barrier4	point134	134	16.0	39.7
						Barrier4	point135	135	16.0	39.5
WES-01-01-F	36	63.4	7.0	8	-1.0	Barrier4	point165	165	16.0	51.4
						Barrier4	point164	164	16.0	51.3
						Barrier4	point166	166	16.0	51.1
						Barrier4	point163	163	16.0	50.6
						Barrier4	point167	167	16.0	50.4
						Barrier4	point162	162	16.0	50.1
						Barrier4	point168	168	16.0	49.7
						Barrier4	point171	171	14.0	49.4
						Barrier4	point161	161	16.0	49.2
						Barrier4	point169	169	16.0	49.0
WES-02-01	37	62.1	3.9	8	-4.1	Barrier4	point163	163	16.0	50.6
						Barrier4	point164	164	16.0	50.6
						Barrier4	point165	165	16.0	50.5
						Barrier4	point162	162	16.0	50.5
						Barrier4	point166	166	16.0	49.1
						Barrier4	point161	161	16.0	48.4
						Barrier4	point171	171	14.0	47.6
						Barrier4	point172	172	14.0	47.3
						Barrier4	point173	173	14.0	47.0
						Barrier4	point160	160	16.0	46.8
WES-03-01	38	60.8	3.0	8	-5.0	Barrier4	point163	163	16.0	47.9
						Barrier4	point164	164	16.0	47.9
						Barrier4	point165	165	16.0	47.9
						Barrier4	point166	166	16.0	47.9
						Barrier4	point162	162	16.0	47.8
						Barrier4	point161	161	16.0	47.5
						Barrier4	point171	171	14.0	46.6
						Barrier4	point160	160	16.0	46.2
						Barrier4	point167	167	16.0	46.2

						Barrier4	point172	172	14.0	45.4
WES-04-01	39	59.1	2.7	8	-5.3	Barrier4	point166	166	16.0	45.2
						Barrier4	point163	163	16.0	45.2
						Barrier4	point164	164	16.0	45.2
						Barrier4	point165	165	16.0	45.2
						Barrier4	point162	162	16.0	45.1
						Barrier4	point171	171	14.0	44.6
						Barrier4	point161	161	16.0	44.5
						Barrier4	point160	160	16.0	44.2
						Barrier4	point172	172	14.0	44.1
						Barrier4	point167	167	16.0	43.8
WES-05-01	40	58.4	2.7	8	-5.3	Barrier4	point163	163	16.0	44.3
						Barrier4	point164	164	16.0	44.3
						Barrier4	point166	166	16.0	44.3
						Barrier4	point165	165	16.0	44.2
						Barrier4	point162	162	16.0	44.2
						Barrier4	point171	171	14.0	43.5
						Barrier4	point161	161	16.0	43.3
						Barrier4	point172	172	14.0	43.1
						Barrier4	point167	167	16.0	42.9
						Barrier4	point160	160	16.0	42.8
WES-06-01	41	57.9	2.6	8	-5.4	Barrier4	point166	166	16.0	43.4
						Barrier4	point163	163	16.0	

HMB Professional Engineers 29 March 2021
Mark Gavula TNM 2.5

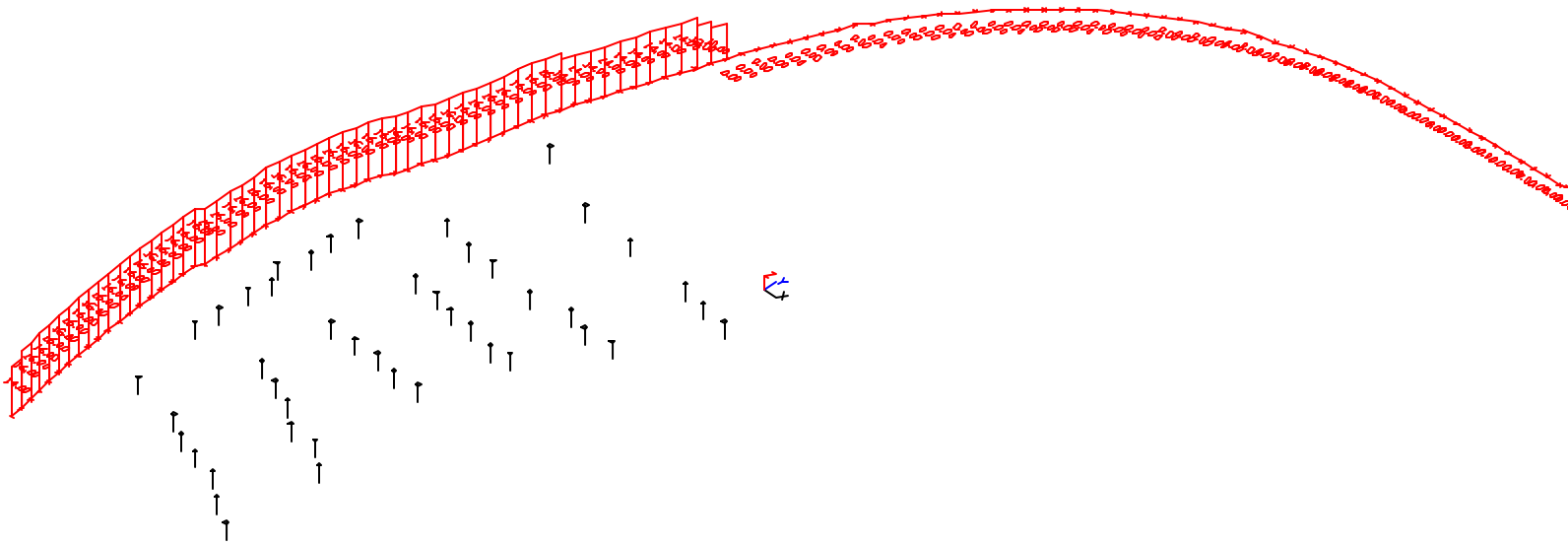
RESULTS: BARRIER-SEGMENT DESCRIPTIONS
PROJECT/CONTRACT: I-69 ORX
RUN: 9005 Interchange Auxiliary Lane Barrier
BARRIER DESIGN: Aux_Lane-Barrier

Barriers		Segments										
Name	Type	Name	No.	Heights			Length	If Wall			If Berm	Cost
				First Point	Average	Second Point		Area	On Struc?	Important Reflections?	Volume	
				ft	ft	ft	ft	sq ft			cu yd	$
Barrier4	W	point123	123	14.00	14.00	14.00	20	279				8361
		point126	126	16.00	16.00	16.00	20	322				9672
		point127	127	16.00	16.00	16.00	20	318				9555
		point128	128	16.00	16.00	16.00	20	318				9555
		point129	129	16.00	16.00	16.00	20	322				9672
		point130	130	16.00	16.00	16.00	20	321				9628
		point131	131	16.00	16.00	16.00	20	317				9510
		point132	132	16.00	16.00	16.00	20	321				9628
		point133	133	16.00	16.00	16.00	20	321				9628
		point134	134	16.00	16.00	16.00	20	320				9589
		point135	135	16.00	16.00	16.00	20	320				9589
		point136	136	16.00	16.00	16.00	20	319				9556
		point137	137	16.00	16.00	16.00	20	324				9707
		point138	138	16.00	16.00	16.00	20	319				9556
		point139	139	16.00	16.00	16.00	20	322				9648
		point140	140	16.00	16.00	16.00	20	319				9556
		point141	141	16.00	16.00	16.00	20	318				9528
		point142	142	16.00	16.00	16.00	20	322				9648
		point143	143	16.00	16.00	16.00	20	322				9648
		point144	144	16.00	16.00	16.00	20	320				9603
		point145	145	16.00	16.00	16.00	20	320				9600
		point146	146	16.00	16.00	16.00	20	320				9603
		point147	147	16.00	16.00	16.00	20	320				9603
		point148	148	16.00	16.00	16.00	20	320				9600
		point149	149	16.00	16.00	16.00	20	320				9603
		point150	150	16.00	16.00	16.00	20	320				9603

		point151	151	16.00	16.00	16.00	20	320				9612
		point152	152	16.00	16.00	16.00	20	320				9612
		point153	153	16.00	16.00	16.00	20	316				9492
		point154	154	16.00	16.00	16.00	20	320				9612
		point155	155	16.00	16.00	16.00	20	320				9612
		point156	156	16.00	16.00	16.00	20	321				9627
		point157	157	16.00	16.00	16.00	20	317				9507
		point158	158	16.00	16.00	16.00	20	322				9648
		point159	159	16.00	16.00	16.00	20	322				9648
		point160	160	16.00	16.00	16.00	20	322				9648
		point161	161	16.00	16.00	16.00	20	318				9528
		point162	162	16.00	16.00	16.00	20	318				9528
		point163	163	16.00	16.00	16.00	20	322				9675
		point164	164	16.00	16.00	16.00	20	319				9556
		point165	165	16.00	16.00	16.00	20	320				9589
		point166	166	16.00	16.00	16.00	20	322				9675
		point167	167	16.00	16.00	16.00	20	320				9589
		point168	168	16.00	16.00	16.00	20	321				9628
		point169	169	16.00	16.00	16.00	20	318				9555
		point170	170	16.00	16.00	16.00	20	318				9555
		point171	171	14.00	14.00	14.00	20	282				8463
		point172	172	14.00	14.00	14.00	20	280				8409
		point173	173	14.00	14.00	14.00	20	280				8409
		point174	174	14.00	14.00	14.00	20	280				8409
		point175	175	14.00	14.00	14.00	20	277				8308
		point176	176	14.00	14.00	14.00	20	284				8510
		point177	177	14.00	14.00	14.00	20	277				8308
		point178	178	14.00	14.00	14.00	20	279				8368
		point179	179	14.00	14.00	14.00	20	281				8434
		point180	180	12.00	12.00	12.00	20	239				7173
		point181	181	10.00	10.00	10.00	20	201				6024
		point182	182	0.00	0.00	0.00	0	0				0
		point183	183	0.00	0.00	0.00	0	0				0
		point184	184	0.00	0.00	0.00	0	0				0
		point185	185	0.00	0.00	0.00	0	0				0
		point186	186	0.00	0.00	0.00	0	0				0
		point187	187	0.00	0.00	0.00	0	0				0
		point188	188	0.00	0.00	0.00	0	0				0
		point189	189	0.00	0.00	0.00	0	0				0

		point190	190	0.00	0.00	0.00	0	0				0
		point191	191	0.00	0.00	0.00	0	0				0
		point192	192	0.00	0.00	0.00	0	0				0
		point193	193	0.00	0.00	0.00	0	0				0
		point194	194	0.00	0.00	0.00	0	0				0
		point195	195	0.00	0.00	0.00	0	0				0
		point196	196	0.00	0.00	0.00	0	0				0
		point197	197	0.00	0.00	0.00	0	0				0
		point198	198	0.00	0.00	0.00	0	0				0
		point199	199	0.00	0.00	0.00	0	0				0
		point200	200	0.00	0.00	0.00	0	0				0
		point201	201	0.00	0.00	0.00	0	0				0
		point202	202	0.00	0.00	0.00	0	0				0
		point203	203	0.00	0.00	0.00	0	0				0
		point204	204	0.00	0.00	0.00	0	0				0
		point205	205	0.00	0.00	0.00	0	0				0
		point206	206	0.00	0.00	0.00	0	0				0
		point207	207	0.00	0.00	0.00	0	0				0
		point208	208	0.00	0.00	0.00	0	0				0
		point209	209	0.00	0.00	0.00	0	0				0
		point210	210	0.00	0.00	0.00	0	0				0
		point211	211	0.00	0.00	0.00	0	0				0
		point212	212	0.00	0.00	0.00	0	0				0
		point213	213	0.00	0.00	0.00	0	0				0
		point214	214	0.00	0.00	0.00	0	0				0
		point215	215	0.00	0.00	0.00	0	0				0
		point216	216	0.00	0.00	0.00	0	0				0
		point217	217	0.00	0.00	0.00	0	0				0
		point218	218	0.00	0.00	0.00	0	0				0
		point219	219	0.00	0.00	0.00	0	0				0
		point220	220	0.00	0.00	0.00	0	0				0
		point221	221	0.00	0.00	0.00	0	0				0
		point222	222	0.00	0.00	0.00	0	0				0
		point223	223	0.00	0.00	0.00	0	0				0
		point124	124	0.00	0.00	0.00	0	0				0
		point224	224	0.00	0.00	0.00	0	0				0
		point225	225	0.00	0.00	0.00	0	0				0
		point226	226	0.00	0.00	0.00	0	0				0
		point227	227	0.00	0.00	0.00	0	0				0

		point228	228	0.00	0.00	0.00	0	0				0
		point229	229	0.00	0.00	0.00	0	0				0
		point230	230	0.00	0.00	0.00	0	0				0
		point231	231	0.00	0.00	0.00	0	0				0
		point232	232	0.00	0.00	0.00	0	0				0
		point233	233	0.00	0.00	0.00	0	0				0
		point234	234	0.00	0.00	0.00	0	0				0
		point235	235	0.00	0.00	0.00	0	0				0



9005 Interchange Auxiliary Lane Barrier	Sheet 1 of 1	29 Mar 2021
	HMB Professional Engineers	
Barrier View-Aux_Lane-Barrier	Project/Contract No. I-69 ORX	
Run name: 9005_AUX_Barrier	TNM Version 2.5, Feb 2004	
Scale: <DNA - due to perspective>	Analysis By: Mark Gavula	

Roadway:		Ground Zone:	polygon
Receiver:		Tree Zone:	dashed polygon
Barrier:		Contour Zone:	polygon
Building Row:		Parallel Barrier:	
Terrain Line:		Skew Section:	

TNM OUTPUT FOR VANGUARD AVENUE, SOUTH ARLINGTON DRIVE, & MELWOOD DRIVE

HMB Professional Engineers
Mark Gavula

29 March 2021
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: I69 ORX
RUN: 351 Impact Run
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

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

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
2084-01-01	1	1	57.0	61.8	66	4.8	10	----	61.8	0.0	8	-8.0
2084-02-01-F	2	1	57.1	62.0	66	4.9	10	----	62.0	0.0	8	-8.0
2084-03-01	3	1	54.8	59.9	66	5.1	10	----	59.9	0.0	8	-8.0
2084-04-01-F	4	1	55.7	60.5	66	4.8	10	----	60.5	0.0	8	-8.0
2084-05-01	5	1	54.6	59.5	66	4.9	10	----	59.5	0.0	8	-8.0
2084-06-01-F	6	1	64.2	67.7	66	3.5	10	Snd Lvl	67.7	0.0	8	-8.0
2084-07-01-F	7	1	56.2	61.6	66	5.4	10	----	61.6	0.0	8	-8.0
2084-08-01-F	8	1	51.3	57.5	66	6.2	10	----	57.5	0.0	8	-8.0
351-01-01-F	9	1	57.7	63.1	66	5.4	10	----	63.1	0.0	8	-8.0
351-02-01-F	10	1	68.0	70.6	66	2.6	10	Snd Lvl	70.6	0.0	8	-8.0
351-03-01	11	1	66.6	69.5	66	2.9	10	Snd Lvl	69.5	0.0	8	-8.0
351-04-01	12	1	62.4	66.4	66	4.0	10	Snd Lvl	66.4	0.0	8	-8.0
351-05-01	13	1	61.3	65.3	66	4.0	10	----	65.3	0.0	8	-8.0
351-06-01	14	1	59.7	63.6	66	3.9	10	----	63.6	0.0	8	-8.0
351-07-01	15	1	61.1	63.2	66	2.1	10	----	63.2	0.0	8	-8.0
351-08-01	16	1	62.3	62.4	66	0.1	10	----	62.4	0.0	8	-8.0
351-09-01	17	1	59.7	60.4	66	0.7	10	----	60.4	0.0	8	-8.0
351-10-01	18	1	60.0	59.7	66	-0.3	10	----	59.7	0.0	8	-8.0
351-11-01	19	1	59.4	59.5	66	0.1	10	----	59.5	0.0	8	-8.0
ARL-01-01	20	1	63.2	61.6	66	-1.6	10	----	61.6	0.0	8	-8.0
ARL-02-01	21	1	58.5	58.3	66	-0.2	10	----	58.3	0.0	8	-8.0
ARL-03-01	22	1	58.5	59.1	66	0.6	10	----	59.1	0.0	8	-8.0
ARL-04-01	23	1	56.5	56.6	66	0.1	10	----	56.6	0.0	8	-8.0
ARL-05-01	24	1	54.1	54.7	66	0.6	10	----	54.7	0.0	8	-8.0

ARL-06-01	25	1	52.7	56.0	66	3.3	10	----	56.0	0.0	8	-8.0
CHE-01-01-F	26	1	58.7	64.0	66	5.3	10	----	64.0	0.0	8	-8.0
CHE-02-01	27	1	58.1	63.7	66	5.6	10	----	63.7	0.0	8	-8.0
GRED-01-02-F	28	1	69.7	74.0	66	4.3	10	Snd Lvl	74.0	0.0	8	-8.0
GRED-02-02	29	1	66.1	71.4	66	5.3	10	Snd Lvl	71.4	0.0	8	-8.0
GRED-03-01	30	1	61.3	67.2	66	5.9	10	Snd Lvl	67.2	0.0	8	-8.0
GRED-04-01	31	1	59.2	64.2	66	5.0	10	----	64.2	0.0	8	-8.0
GRED-05-02-F	32	1	65.3	72.6	66	7.3	10	Snd Lvl	72.6	0.0	8	-8.0
GRED-06-02	33	1	68.5	70.8	66	2.3	10	Snd Lvl	70.8	0.0	8	-8.0
GRED-07-01	34	1	65.9	66.0	66	0.1	10	Snd Lvl	66.0	0.0	8	-8.0
GRED-08-01	35	1	61.2	65.5	66	4.3	10	----	65.5	0.0	8	-8.0
GRED-09-01	36	1	58.7	63.9	66	5.2	10	----	63.9	0.0	8	-8.0
GRED-10-01	37	1	58.0	63.2	66	5.2	10	----	63.2	0.0	8	-8.0
GRED-11-01	38	1	57.0	62.0	66	5.0	10	----	62.0	0.0	8	-8.0
GRED-12-01	39	1	56.0	60.6	66	4.6	10	----	60.6	0.0	8	-8.0
GRED-13-01	40	1	55.5	59.9	66	4.4	10	----	59.9	0.0	8	-8.0
GRED-14-01	41	1	54.8	58.8	66	4.0	10	----	58.8	0.0	8	-8.0
GRED-15-01	42	1	54.4	58.3	66	3.9	10	----	58.3	0.0	8	-8.0
GRED-16-01	43	1	54.0	57.7	66	3.7	10	----	57.7	0.0	8	-8.0
GRED-17-01	44	1	53.6	57.2	66	3.6	10	----	57.2	0.0	8	-8.0
GRED-18-01	45	1	53.2	56.7	66	3.5	10	----	56.7	0.0	8	-8.0
HUB-01-01-F	46	1	61.5	67.8	66	6.3	10	Snd Lvl	67.8	0.0	8	-8.0
HUB-02-01	47	1	61.8	67.7	66	5.9	10	Snd Lvl	67.7	0.0	8	-8.0
HUB-03-01	48	1	59.1	63.1	66	4.0	10	----	63.1	0.0	8	-8.0
HUB-08-01-F	49	1	70.4	75.0	66	4.6	10	Snd Lvl	75.0	0.0	8	-8.0
HUB-09-01-F	50	1	67.1	72.4	66	5.3	10	Snd Lvl	72.4	0.0	8	-8.0
HUB-10-01-F	51	1	64.3	70.2	66	5.9	10	Snd Lvl	70.2	0.0	8	-8.0
LEX-04-01	52	1	53.6	57.9	66	4.3	10	----	57.9	0.0	8	-8.0
LEX-05-01	53	1	55.3	60.2	66	4.9	10	----	60.2	0.0	8	-8.0
LIN-01-01-F	54	1	56.8	61.8	66	5.0	10	----	61.8	0.0	8	-8.0
LIN-02-01	55	1	55.8	60.9	66	5.1	10	----	60.9	0.0	8	-8.0
MAG-01-01-F	56	1	63.2	66.8	66	3.6	10	Snd Lvl	66.8	0.0	8	-8.0
MAG-02-01	57	1	59.1	64.0	66	4.9	10	----	64.0	0.0	8	-8.0
MAG-03-01	58	1	57.9	62.8	66	4.9	10	----	62.8	0.0	8	-8.0
MAG-04-01-F	59	1	57.4	62.3	66	4.9	10	----	62.3	0.0	8	-8.0
MAG-05-01	60	1	56.6	61.5	66	4.9	10	----	61.5	0.0	8	-8.0
MELW-01-01-F	61	1	65.9	70.6	66	4.7	10	Snd Lvl	70.6	0.0	8	-8.0
MELW-02-01-F	10	1	69.5	72.8	66	3.3	10	Snd Lvl	72.8	0.0	8	-8.0
MELW-03-01-F	63	1	68.7	72.3	66	3.6	10	Snd Lvl	72.3	0.0	8	-8.0
MELW-04-01-F	64	1	68.1	71.9	66	3.8	10	Snd Lvl	71.9	0.0	8	-8.0
MELW-05-01-F	65	1	67.6	71.7	66	4.1	10	Snd Lvl	71.7	0.0	8	-8.0

MELW-07-01-F	66	1	66.4	71.8	66	5.4	10	Snd Lvl	71.8	0.0	8	-8.0
MELW-08-01-F	67	1	67.3	72.4	66	5.1	10	Snd Lvl	72.4	0.0	8	-8.0
MELW-09-01-F	68	1	67.5	72.8	66	5.3	10	Snd Lvl	72.8	0.0	8	-8.0
MELW-10-01-F	69	1	69.4	74.4	66	5.0	10	Snd Lvl	74.4	0.0	8	-8.0
MELW-11-01-F	70	1	69.6	74.5	66	4.9	10	Snd Lvl	74.5	0.0	8	-8.0
MELW-12-01-F	71	1	66.4	71.7	66	5.3	10	Snd Lvl	71.7	0.0	8	-8.0
MELW-13-01-F	72	1	64.6	70.0	66	5.4	10	Snd Lvl	70.0	0.0	8	-8.0
MELW-14-01-F	73	1	62.1	68.0	66	5.9	10	Snd Lvl	68.0	0.0	8	-8.0
MELW-15-01-F	74	1	59.4	66.0	66	6.6	10	Snd Lvl	66.0	0.0	8	-8.0
MELW-16-01-F	75	1	57.7	64.6	66	6.9	10	----	64.6	0.0	8	-8.0
MELW-17-01-F	76	1	56.5	63.5	66	7.0	10	----	63.5	0.0	8	-8.0
MELW-18-01-F	77	1	55.5	62.4	66	6.9	10	----	62.4	0.0	8	-8.0
MELW-19-01-F	78	1	54.4	60.9	66	6.5	10	----	60.9	0.0	8	-8.0
MELW-20-01-F	79	1	53.8	60.0	66	6.2	10	----	60.0	0.0	8	-8.0
MELW-23-01	80	1	62.3	66.4	66	4.1	10	Snd Lvl	66.4	0.0	8	-8.0
MELW-24-01	81	1	61.8	65.1	66	3.3	10	----	65.1	0.0	8	-8.0
MELW-25-01	82	1	61.4	64.8	66	3.4	10	----	64.8	0.0	8	-8.0
MELW-26-01	83	1	61.2	64.7	66	3.5	10	----	64.7	0.0	8	-8.0
MELW-27-01	84	1	60.5	66.3	66	5.8	10	Snd Lvl	66.3	0.0	8	-8.0
MELW-28-01	85	1	58.7	64.6	66	5.9	10	----	64.6	0.0	8	-8.0
MELW-29-01	86	1	57.5	63.4	66	5.9	10	----	63.4	0.0	8	-8.0
MELW-30-01	87	1	56.5	61.0	66	4.5	10	----	61.0	0.0	8	-8.0
MELW-31-01	88	1	55.8	59.1	66	3.3	10	----	59.1	0.0	8	-8.0
MELW-32-01	89	1	53.8	59.3	66	5.5	10	----	59.3	0.0	8	-8.0
POP-01-01-F	90	1	56.4	61.4	66	5.0	10	----	61.4	0.0	8	-8.0
POP-02-01	91	1	55.7	60.7	66	5.0	10	----	60.7	0.0	8	-8.0
POP-03-01	92	1	54.2	59.6	66	5.4	10	----	59.6	0.0	8	-8.0
POP-04-01	93	1	53.9	59.2	66	5.3	10	----	59.2	0.0	8	-8.0
POP-05-01-F	94	1	55.5	60.5	66	5.0	10	----	60.5	0.0	8	-8.0
POP-06-01	95	1	54.4	59.4	66	5.0	10	----	59.4	0.0	8	-8.0
POP-07-01	96	1	53.8	58.0	66	4.2	10	----	58.0	0.0	8	-8.0
POP-08-01	97	1	53.2	57.1	66	3.9	10	----	57.1	0.0	8	-8.0
POP-09-01	98	1	52.4	57.0	66	4.6	10	----	57.0	0.0	8	-8.0
POP-10-01	99	1	51.8	55.5	66	3.7	10	----	55.5	0.0	8	-8.0
WEN-03-01	100	1	58.4	63.6	66	5.2	10	----	63.6	0.0	8	-8.0
WEN-04-01	101	1	61.6	66.6	66	5.0	10	Snd Lvl	66.6	0.0	8	-8.0
WEN-05-01	102	1	60.2	65.7	66	5.5	10	----	65.7	0.0	8	-8.0
WEN-06-01	103	1	58.6	64.0	66	5.4	10	----	64.0	0.0	8	-8.0
WEN-07-01	104	1	57.4	62.5	66	5.1	10	----	62.5	0.0	8	-8.0
WEN-08-01	105	1	56.6	61.6	66	5.0	10	----	61.6	0.0	8	-8.0
WEN-09-01	106	1	55.5	60.2	66	4.7	10	----	60.2	0.0	8	-8.0

ARL-31-01-F	108	1	65.3	70.2	66	4.9	10	Snd Lvl	70.2	0.0	8	-8.0
ARL-32-01-F	109	1	64.0	69.2	66	5.2	10	Snd Lvl	69.2	0.0	8	-8.0
ARL-33-01-F	110	1	62.5	67.8	66	5.3	10	Snd Lvl	67.8	0.0	8	-8.0
ARL-34-01-F	111	1	60.5	66.1	66	5.6	10	Snd Lvl	66.1	0.0	8	-8.0
ARL-35-01-F	112	1	59.0	64.6	66	5.6	10	----	64.6	0.0	8	-8.0
ARL-36-01-F	113	1	58.2	63.5	66	5.3	10	----	63.5	0.0	8	-8.0
ARL-37-01-F	106	1	58.3	63.1	66	4.8	10	----	63.1	0.0	8	-8.0
CHE-03-01	114	1	57.4	62.7	66	5.3	10	----	62.7	0.0	8	-8.0
CHE-04-01	115	1	56.7	62.1	66	5.4	10	----	62.1	0.0	8	-8.0
GAR-01-01-F	116	1	63.7	69.6	66	5.9	10	Snd Lvl	69.6	0.0	8	-8.0
GAR-02-01-F	117	1	47.8	70.9	66	23.1	10	Both	70.9	0.0	8	-8.0
HUB-04-01	118	1	58.3	61.8	66	3.5	10	----	61.8	0.0	8	-8.0
HUB-05-01	119	1	57.6	61.3	66	3.7	10	----	61.3	0.0	8	-8.0
HUB-06-01	120	1	57.0	60.3	66	3.3	10	----	60.3	0.0	8	-8.0
HUB-07-01	121	1	57.0	62.2	66	5.2	10	----	62.2	0.0	8	-8.0
HUB-11-01-F	122	1	63.2	69.3	66	6.1	10	Snd Lvl	69.3	0.0	8	-8.0
HUB-12-01	123	1	61.2	67.2	66	6.0	10	Snd Lvl	67.2	0.0	8	-8.0
HUB-13-01	124	1	59.7	65.4	66	5.7	10	----	65.4	0.0	8	-8.0
HUB-14-01	125	1	58.9	64.4	66	5.5	10	----	64.4	0.0	8	-8.0
MELW-06-01-F	126	1	67.1	72.3	66	5.2	10	Snd Lvl	72.3	0.0	8	-8.0
VAN-01-01-F	127	1	67.3	72.3	66	5.0	10	Snd Lvl	72.3	0.0	8	-8.0
VAN-02-01	128	1	62.1	65.0	66	2.9	10	----	65.0	0.0	8	-8.0
VAN-03-01	129	1	59.3	64.8	66	5.5	10	----	64.8	0.0	8	-8.0
VAN-04-01	130	1	58.3	63.7	66	5.4	10	----	63.7	0.0	8	-8.0
WEN-01-01	131	1	60.5	66.0	66	5.5	10	Snd Lvl	66.0	0.0	8	-8.0
WEN-02-01	133	1	59.6	65.0	66	5.4	10	----	65.0	0.0	8	-8.0
351-12-01-F	135	1	0.0	57.3	66	57.3	10	----	57.3	0.0	8	-8.0

Dwelling Units	**# DUs**	**Noise Reduction**		
		Min	**Avg**	**Max**
		dB	**dB**	**dB**
All Selected	133	0.0	0.0	0.0
All Impacted	44	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

TNM OUTPUT FOR VANGUARD AVENUE BARRIER WALL

HMB Professional Engineers
Mark Gavula

14 April 2021
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: I69 ORX
RUN: 351 Barrier Vanguard Alternative
BARRIER DESIGN: Vanguard-Barrier-Extended
ATMOSPHERICS: 68 deg F, 50% RH

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

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
CHE-01-01-F	26	1	58.7	64.4	66	5.7	10	----	59.4	5.0	8	-3.0
CHE-02-01	27	1	58.1	64.1	66	6.0	10	----	58.4	5.7	8	-2.3
HUB-01-01-F	46	1	61.5	68.4	66	6.9	10	Snd Lvl	61.3	7.1	8	-0.9
HUB-02-01	47	1	61.8	67.9	66	6.1	10	Snd Lvl	60.3	7.6	8	-0.4
HUB-03-01	48	1	59.1	63.6	66	4.5	10	----	58.5	5.1	8	-2.9
HUB-08-01-F	49	1	70.4	75.0	66	4.6	10	Snd Lvl	61.8	13.2	8	5.2
HUB-09-01-F	50	1	67.1	72.4	66	5.3	10	Snd Lvl	60.6	11.8	8	3.8
HUB-10-01-F	51	1	64.3	70.2	66	5.9	10	Snd Lvl	59.5	10.7	8	2.7
CHE-03-01	114	1	57.4	62.8	66	5.4	10	----	57.1	5.7	8	-2.3
CHE-04-01	115	1	56.7	62.1	66	5.4	10	----	56.1	6.0	8	-2.0
GAR-01-01-F	116	1	63.7	69.5	66	5.8	10	Snd Lvl	59.1	10.4	8	2.4
GAR-02-01-F	117	1	47.8	69.8	66	22.0	10	Both	60.6	9.2	8	1.2
HUB-04-01	118	1	58.3	62.2	66	3.9	10	----	57.4	4.8	8	-3.2
HUB-05-01	119	1	57.6	61.4	66	3.8	10	----	56.1	5.3	8	-2.7
HUB-06-01	120	1	57.0	60.3	66	3.3	10	----	55.1	5.2	8	-2.8
HUB-07-01	121	1	57.0	62.1	66	5.1	10	----	56.1	6.0	8	-2.0
HUB-11-01-F	122	1	63.2	69.2	66	6.0	10	Snd Lvl	59.0	10.2	8	2.2
HUB-12-01	123	1	61.2	67.2	66	6.0	10	Snd Lvl	58.2	9.0	8	1.0
HUB-13-01	124	1	59.7	65.3	66	5.6	10	----	57.2	8.1	8	0.1
HUB-14-01	125	1	58.9	64.2	66	5.3	10	----	57.1	7.1	8	-0.9
VAN-01-01-F	127	1	67.3	70.9	66	3.6	10	Snd Lvl	60.5	10.4	8	2.4
VAN-02-01	128	1	62.1	63.9	66	1.8	10	----	61.4	2.5	8	-5.5
VAN-03-01	129	1	59.3	64.5	66	5.2	10	----	56.5	8.0	8	0.0
VAN-04-01	130	1	58.3	63.4	66	5.1	10	----	56.7	6.7	8	-1.3

AUG-02-01	137	1	0.0	62.2	66	62.2	10	----	56.2	6.0	8	-2.0
AUG-01-01	138	1	0.0	62.2	66	62.2	10	----	58.2	4.0	8	-4.0
VAN-16-01	139	1	0.0	63.8	66	63.8	10	----	57.5	6.3	8	-1.7
VAN-17-01	140	1	0.0	65.0	66	65.0	10	----	58.2	6.8	8	-1.2
VAN-18-01	141	1	0.0	70.6	66	70.6	10	Snd Lvl	62.1	8.5	8	0.5
VAN-15-01	142	1	0.0	62.2	66	62.2	10	----	55.2	7.0	8	-1.0
VAN-19-01	143	1	0.0	60.2	66	60.2	10	----	54.6	5.6	8	-2.4
HAL-02-01	144	1	0.0	58.6	66	58.6	10	----	53.6	5.0	8	-3.0
VAN-20-01	145	1	0.0	59.7	66	59.7	10	----	54.4	5.3	8	-2.7
HAL-03-01	146	1	0.0	57.3	66	57.3	10	----	52.7	4.6	8	-3.4
AUGD-08-01	147	1	0.0	58.3	66	58.3	10	----	53.5	4.8	8	-3.2
AUGD-09-01	148	1	0.0	57.3	66	57.3	10	----	53.3	4.0	8	-4.0
AUGD-10-01	149	1	0.0	56.5	66	56.5	10	----	52.4	4.1	8	-3.9
AUGD-13-01	150	1	0.0	55.6	66	55.6	10	----	50.8	4.8	8	-3.2
AUGD-12-01	151	1	0.0	56.5	66	56.5	10	----	51.5	5.0	8	-3.0
AUGD-11-01	152	1	0.0	59.8	66	59.8	10	----	54.6	5.2	8	-2.8
AUGD-03-01	153	1	0.0	61.0	66	61.0	10	----	55.1	5.9	8	-2.1
EFOR-29-01	154	1	0.0	60.5	66	60.5	10	----	53.7	6.8	8	-1.2
EFOR-28-01	155	1	0.0	63.3	66	63.3	10	----	55.0	8.3	8	0.3
EFOR-01-01-F	156	1	0.0	69.8	66	69.8	10	Snd Lvl	59.2	10.6	8	2.6
EFOR-02-01-F	157	1	0.0	72.5	66	72.5	10	Snd Lvl	60.9	11.6	8	3.6
LAKR-01-01	158	1	0.0	62.0	66	62.0	10	----	55.5	6.5	8	-1.5
WFOR-01-01	159	1	0.0	62.1	66	62.1	10	----	55.7	6.4	8	-1.6
EFOR-35-01	160	1	0.0	61.5	66	61.5	10	----	55.2	6.3	8	-1.7
EFOR-34-10	161	1	0.0	61.5	66	61.5	10	----	55.1	6.4	8	-1.6
EFOR-33-01	162	1	0.0	61.3	66	61.3	10	----	54.7	6.6	8	-1.4
EFOR-32-01	163	1	0.0	62.6	66	62.6	10	----	55.3	7.3	8	-0.7
EFOR-30-01	164	1	0.0	60.1	66	60.1	10	----	53.9	6.2	8	-1.8
EFOR-31-01	165	1	0.0	60.7	66	60.7	10	----	54.3	6.4	8	-1.6
WFOR-03-01	166	1	0.0	60.9	66	60.9	10	----	53.6	7.3	8	-0.7
WFOR-04-01	167	1	0.0	57.6	66	57.6	10	----	51.7	5.9	8	-2.1
WFOR-05-01	168	1	0.0	56.9	66	56.9	10	----	52.0	4.9	8	-3.1
WFOR-07-01	169	1	0.0	56.6	66	56.6	10	----	51.1	5.5	8	-2.5
WFOR-06-01	170	1	0.0	56.9	66	56.9	10	----	51.7	5.2	8	-2.8
WFOR-09-01	171	1	0.0	55.9	66	55.9	10	----	50.7	5.2	8	-2.8
WFOR-08-01	172	1	0.0	57.1	66	57.1	10	----	51.1	6.0	8	-2.0
EFOR-16-01-F	173	1	0.0	71.5	66	71.5	10	Snd Lvl	61.3	10.2	8	2.2
EFOR-15-01-F	174	1	0.0	71.8	66	71.8	10	Snd Lvl	61.3	10.5	8	2.5
EFOR-14-01-F	175	1	0.0	72.3	66	72.3	10	Snd Lvl	61.7	10.6	8	2.6
EFOR-13-01-F	176	1	0.0	73.0	10	73.0	10	Snd Lvl	62.2	10.8	8	2.8
EFOR-12-01-F	177	1	0.0	72.1	66	72.1	10	Snd Lvl	62.2	9.9	8	1.9

EFOR-11-01-F	178	1	0.0	72.6	66	72.6	10	Snd Lvl	62.7	9.9	8	1.9
EFOR-10-01-F	179	1	0.0	72.3	66	72.3	10	Snd Lvl	62.4	9.9	8	1.9
EFOR-09-01-F	180	1	0.0	72.3	66	72.3	10	Snd Lvl	62.2	10.1	8	2.1
EFOR-08-01-F	181	1	0.0	72.3	66	72.3	10	Snd Lvl	61.8	10.5	8	2.5
EFOR-07-01-F	182	1	0.0	72.4	66	72.4	10	Snd Lvl	61.7	10.7	8	2.7
EFOR-06-01-F	183	1	0.0	72.1	66	72.1	10	Snd Lvl	61.5	10.6	8	2.6
EFOR-05-01-F	184	1	0.0	71.6	66	71.6	10	Snd Lvl	61.1	10.5	8	2.5
EFOR-04-01-F	185	1	0.0	71.5	66	71.5	10	Snd Lvl	61.2	10.3	8	2.3
EFOR-03-01-F	186	1	0.0	72.1	66	72.1	10	Snd Lvl	61.2	10.9	8	2.9
LAKR-09-01	187	1	0.0	61.4	66	61.4	10	----	55.1	6.3	8	-1.7
LAKR-08-01	188	1	0.0	61.7	66	61.7	10	----	55.0	6.7	8	-1.3
LAKR-07-01	189	1	0.0	61.6	66	61.6	10	----	54.9	6.7	8	-1.3
EFOR-43-01	190	1	0.0	60.1	66	60.1	10	----	54.2	5.9	8	-2.1
EFOR-42-01	191	1	0.0	60.4	66	60.4	10	----	54.5	5.9	8	-2.1
EFOR-41-01	192	1	0.0	60.4	66	60.4	10	----	54.5	5.9	8	-2.1
EFOR-40-01	193	1	0.0	60.6	66	60.6	10	----	54.7	5.9	8	-2.1
LAKR-06-01	194	1	0.0	61.6	66	61.6	10	----	55.1	6.5	8	-1.5
LAKR-05-01	195	1	0.0	61.7	66	61.7	10	----	55.3	6.4	8	-1.6
EFOR-39-01	196	1	0.0	60.9	66	60.9	10	----	54.9	6.0	8	-2.0
LAKR-04-01	197	1	0.0	61.8	66	61.8	10	----	55.7	6.1	8	-1.9
EFOR-38-01	198	1	0.0	60.9	66	60.9	10	----	54.9	6.0	8	-2.0
EFOR-37-01	199	1	0.0	61.2	66	61.2	10	----	55.2	6.0	8	-2.0
LAKR-03-01	200	1	0.0	61.9	66	61.9	10	----	55.7	6.2	8	-1.8
LAKR-02-01	201	1	0.0	62.2	66	62.2	10	----	55.9	6.3	8	-1.7
EFOR-36-01	202	1	0.0	61.4	66	61.4	10	----	55.2	6.2	8	-1.8
WFOR-02-01	203	1	0.0	58.8	66	58.8	10	----	52.8	6.0	8	-2.0
LAKR-18-01	204	1	0.0	58.6	66	58.6	10	----	52.5	6.1	8	-1.9
EFOR-46-01	205	1	0.0	62.0	66	62.0	10	----	57.0	5.0	8	-3.0
EFOR-47-01	206	1	0.0	61.1	66	61.1	10	----	56.6	4.5	8	-3.5
EFOR-48-01	207	1	0.0	56.1	66	56.1	10	----	51.6	4.5	8	-3.5
LAKR-10-01	208	1	0.0	61.2	66	61.2	10	----	55.2	6.0	8	-2.0
EFOR-45-01	209	1	0.0	60.2	66	60.2	10	----	54.8	5.4	8	-2.6
EFOR-44-01	210	1	0.0	60.3	66	60.3	10	----	54.8	5.5	8	-2.5
EFOR-21-01-F	211	1	0.0	71.2	66	71.2	10	Snd Lvl	62.8	8.4	8	0.4
EFOR-20-01-F	212	1	0.0	72.5	66	72.5	10	Snd Lvl	62.3	10.2	8	2.2
EFOR-19-01-F	213	1	0.0	71.8	66	71.8	10	Snd Lvl	62.0	9.8	8	1.8
EFOR-18-01-F	214	1	0.0	71.2	66	71.2	10	Snd Lvl	61.6	9.6	8	1.6
EFOR-17-01-F	215	1	0.0	71.8	66	71.8	10	Snd Lvl	61.7	10.1	8	2.1
EFOR-27-01	216	1	0.0	58.4	66	58.4	10	----	55.8	2.6	8	-5.4
EFOR-26-01	217	1	0.0	59.7	66	59.7	10	----	56.8	2.9	8	-5.1
EFOR-25-01	218	1	0.0	61.0	66	61.0	10	----	57.7	3.3	8	-4.7

EFOR-24-01-F	219	1	0.0	64.2	66	64.2	10	----	60.2	4.0	8	-4.0
EFOR-23-01-F	220	1	0.0	67.5	66	67.5	10	Snd Lvl	62.3	5.2	8	-2.8
EFOR-22-01-F	221	1	0.0	69.9	66	69.9	10	Snd Lvl	63.1	6.8	8	-1.2
LAKR-17-01	222	1	0.0	58.5	66	58.5	10	----	52.4	6.1	8	-1.9
LAKR-12-01	223	1	0.0	58.3	66	58.3	10	----	52.1	6.2	8	-1.8
LAKR-13-01	224	1	0.0	58.0	66	58.0	10	----	52.0	6.0	8	-2.0
LAKR-14-01	225	1	0.0	58.0	66	58.0	10	----	52.1	5.9	8	-2.1
LAKR-15-01	226	1	0.0	57.9	66	57.9	10	----	52.0	5.9	8	-2.1
LAKR-16-01	227	1	0.0	58.0	66	58.0	10	----	52.3	5.7	8	-2.3
LAKR-11-01	228	1	0.0	58.2	66	58.2	10	----	53.6	4.6	8	-3.4

Dwelling Units	**# DUs**	**Noise Reduction**		
		Min	**Avg**	**Max**
		dB	**dB**	**dB**
All Selected	116	2.5	6.9	13.2
All Impacted	34	5.2	9.9	13.2
All that meet NR Goal	33	8.0	10.1	13.2

HMB Professional Engineers				12 April 2021						
Mark Gavula				TNM 2.5						
RESULTS: BARRIER DESCRIPTIONS										
PROJECT/CONTRACT:	I69 ORX									
RUN:	351 Barrier Vanguard Alternative									
BARRIER DESIGN:	Vanguard-Barrier-Extended									
Barriers										
Name	Type	Heights along Barrier			Length	If Wall	If Berm			Cost
		Min	Avg	Max		Area	Volume	Top	Run:Rise	
								Width		
		ft	ft	ft	ft	sq ft	cu yd	ft	ft:ft	$
Barrier5	W	12.00	15.68	16.00	3260	51114				1533423
									Total Cost:	1533423

HMB Professional Engineers 14 April 2021
Mark Gavula TNM 2.5
Calculated with TNM 2.5

RESULTS: BARRIER DESIGN
PROJECT/CONTRACT: I69 ORX
RUN: 351 Barrier Vanguard Alternative
BARRIER DESIGN: Vanguard-Barrier-Extended

ATMOSPHERICS: 68 deg F, 50% RH

Selected Receivers

Name	No.	Calc LAeq1h	Noise Reduction Calc	Goal	Calc-Goal	Barrier Reviewed	Important Segments Name	No.	Height	Partial LAeq1h
		dBA	dB	dB	dB				ft	dBA
CHE-01-01-F	26	59.4	5.0	8	-3.0	Barrier5	point353	353	0.0	45.8
						Barrier5	point352	352	0.0	45.8
						Barrier5	point354	354	0.0	45.7
						Barrier5	point356	356	0.0	44.9
						Barrier5	point355	355	0.0	44.9
						Barrier5	point358	358	0.0	44.8
						Barrier5	point363	363	0.0	44.7
						Barrier5	point359	359	0.0	44.7
						Barrier5	point364	364	0.0	44.6
						Barrier5	point357	357	0.0	44.5
CHE-02-01	27	58.4	5.7	8	-2.3	Barrier5	point352	352	0.0	45.6
						Barrier5	point356	356	0.0	44.7
						Barrier5	point362	362	0.0	44.5
						Barrier5	point351	351	0.0	44.1
						Barrier5	point363	363	0.0	44.1
						Barrier5	point353	353	0.0	44.0
						Barrier5	point359	359	0.0	44.0
						Barrier5	point354	354	0.0	43.9
						Barrier5	point357	357	0.0	43.9
						Barrier5	point361	361	0.0	43.9
HUB-01-01-F	46	61.3	7.1	8	-0.9	Barrier5	point359	359	0.0	49.9

						Barrier5	point361	361	0.0	49.4
						Barrier5	point358	358	0.0	49.1
						Barrier5	point360	360	0.0	48.7
						Barrier5	point364	364	0.0	48.2
						Barrier5	point362	362	0.0	48.1
						Barrier5	point363	363	0.0	48.0
						Barrier5	point355	355	0.0	46.4
						Barrier5	point356	356	0.0	46.3
						Barrier5	point357	357	0.0	46.2
HUB-02-01	47	60.3	7.6	8	-0.4	Barrier5	point362	362	0.0	47.9
						Barrier5	point363	363	0.0	47.8
						Barrier5	point364	364	0.0	47.6
						Barrier5	point361	361	0.0	47.3
						Barrier5	point416	416	16.0	46.9
						Barrier5	point417	417	16.0	46.8
						Barrier5	point359	359	0.0	45.4
						Barrier5	point358	358	0.0	44.9
						Barrier5	point360	360	0.0	44.7
						Barrier5	point357	357	0.0	43.7
HUB-03-01	48	58.5	5.1	8	-2.9	Barrier5	point356	356	0.0	47.0
						Barrier5	point357	357	0.0	46.1
						Barrier5	point361	361	0.0	45.2
						Barrier5	point362	362	0.0	45.0
						Barrier5	point364	364	0.0	44.7
						Barrier5	point359	359	0.0	44.6
						Barrier5	point363	363	0.0	44.6
						Barrier5	point360	360	0.0	44.5
						Barrier5	point354	354	0.0	44.0
						Barrier5	point358	358	0.0	44.0
HUB-08-01-F	49	61.8	13.2	8	5.2	Barrier5	point392	392	16.0	49.7
						Barrier5	point393	393	16.0	49.7
						Barrier5	point391	391	16.0	49.2
						Barrier5	point394	394	16.0	48.9
						Barrier5	point390	390	16.0	48.6
						Barrier5	point395	395	16.0	48.2
						Barrier5	point389	389	16.0	47.8

						Barrier5	point396	396	16.0	47.3
						Barrier5	point388	388	16.0	47.0
						Barrier5	point377	377	12.0	46.9
HUB-09-01-F	50	60.6	11.8	8	3.8	Barrier5	point396	396	16.0	46.1
						Barrier5	point395	395	16.0	46.1
						Barrier5	point394	394	16.0	46.0
						Barrier5	point397	397	16.0	46.0
						Barrier5	point393	393	16.0	45.5
						Barrier5	point398	398	16.0	45.4
						Barrier5	point399	399	16.0	45.2
						Barrier5	point370	370	12.0	45.1
						Barrier5	point400	400	16.0	44.9
						Barrier5	point392	392	16.0	44.7
HUB-10-01-F	51	59.5	10.7	8	2.7	Barrier5	point397	397	16.0	43.8
						Barrier5	point398	398	16.0	43.8
						Barrier5	point399	399	16.0	43.7
						Barrier5	point396	396	16.0	43.7
						Barrier5	point400	400	16.0	43.6
						Barrier5	point395	395	16.0	43.4
						Barrier5	point401	401	16.0	43.3
						Barrier5	point402	402	16.0	43.2
						Barrier5	point411	411	16.0	43.2
						Barrier5	point370	370	12.0	43.2
CHE-03-01	114	57.1	5.7	8	-2.3	Barrier5	point350	350	0.0	44.7
						Barrier5	point351	351	0.0	43.9
						Barrier5	point352	352	0.0	43.2
						Barrier5	point349	349	0.0	43.2
						Barrier5	point356	356	0.0	42.5
						Barrier5	point348	348	0.0	42.3
						Barrier5	point353	353	0.0	42.0
						Barrier5	point354	354	0.0	41.9
						Barrier5	point355	355	0.0	41.8
						Barrier5	point345	345	0.0	41.6
CHE-04-01	115	56.1	6.0	8	-2.0	Barrier5	point349	349	0.0	43.8
						Barrier5	point350	350	0.0	42.4
						Barrier5	point348	348	0.0	42.3

						Barrier5	point351	351	0.0	41.8
						Barrier5	point352	352	0.0	41.0
						Barrier5	point344	344	0.0	40.9
						Barrier5	point347	347	0.0	40.9
						Barrier5	point353	353	0.0	40.5
						Barrier5	point359	359	0.0	40.2
						Barrier5	point356	356	0.0	40.1
GAR-01-01-F	116	59.1	10.4	8	2.4	Barrier5	point411	411	16.0	45.5
						Barrier5	point412	412	16.0	45.4
						Barrier5	point410	410	16.0	44.7
						Barrier5	point413	413	16.0	44.6
						Barrier5	point414	414	16.0	44.1
						Barrier5	point409	409	16.0	44.1
						Barrier5	point408	408	16.0	43.7
						Barrier5	point415	415	16.0	43.7
						Barrier5	point407	407	16.0	43.3
						Barrier5	point405	405	16.0	43.2
GAR-02-01-F	117	60.6	9.2	8	1.2	Barrier5	point420	420	16.0	47.1
						Barrier5	point421	421	16.0	46.9
						Barrier5	point418	418	16.0	46.5
						Barrier5	point422	422	16.0	46.5
						Barrier5	point419	419	16.0	46.2
						Barrier5	point417	417	16.0	45.9
						Barrier5	point423	423	16.0	45.8
						Barrier5	point416	416	16.0	45.4
						Barrier5	point424	424	16.0	44.8
						Barrier5	point415	415	16.0	44.8
HUB-04-01	118	57.4	4.8	8	-3.2	Barrier5	point355	355	0.0	45.1
						Barrier5	point357	357	0.0	44.7
						Barrier5	point356	356	0.0	44.6
						Barrier5	point354	354	0.0	44.3
						Barrier5	point358	358	0.0	43.7
						Barrier5	point359	359	0.0	43.0
						Barrier5	point364	364	0.0	42.8
						Barrier5	point363	363	0.0	42.5
						Barrier5	point353	353	0.0	42.4

						Barrier5	point362	362	0.0	42.1
HUB-05-01	119	56.1	5.3	8	-2.7	Barrier5	point353	353	0.0	43.5
						Barrier5	point352	352	0.0	43.5
						Barrier5	point354	354	0.0	42.4
						Barrier5	point355	355	0.0	42.1
						Barrier5	point356	356	0.0	41.6
						Barrier5	point349	349	0.0	41.2
						Barrier5	point351	351	0.0	40.3
						Barrier5	point364	364	0.0	40.0
						Barrier5	point361	361	0.0	39.9
						Barrier5	point362	362	0.0	39.7
HUB-06-01	120	55.1	5.2	8	-2.8	Barrier5	point353	353	0.0	42.9
						Barrier5	point354	354	0.0	42.0
						Barrier5	point352	352	0.0	41.5
						Barrier5	point351	351	0.0	41.4
						Barrier5	point355	355	0.0	40.9
						Barrier5	point348	348	0.0	40.8
						Barrier5	point356	356	0.0	39.6
						Barrier5	point349	349	0.0	39.1
						Barrier5	point361	361	0.0	39.0
						Barrier5	point364	364	0.0	38.8
HUB-07-01	121	56.1	6.0	8	-2.0	Barrier5	point356	356	0.0	43.0
						Barrier5	point355	355	0.0	42.9
						Barrier5	point357	357	0.0	41.9
						Barrier5	point354	354	0.0	40.8
						Barrier5	point358	358	0.0	40.7
						Barrier5	point359	359	0.0	40.5
						Barrier5	point361	361	0.0	40.2
						Barrier5	point350	350	0.0	40.1
						Barrier5	point353	353	0.0	40.1
						Barrier5	point360	360	0.0	39.9
HUB-11-01-F	122	59.0	10.2	8	2.2	Barrier5	point364	364	0.0	44.0
						Barrier5	point411	411	16.0	43.8
						Barrier5	point412	412	16.0	43.6
						Barrier5	point410	410	16.0	43.3
						Barrier5	point413	413	16.0	43.0

						Barrier5	point409	409	16.0	42.9
						Barrier5	point402	402	16.0	42.8
						Barrier5	point408	408	16.0	42.8
						Barrier5	point370	370	12.0	42.8
						Barrier5	point403	403	16.0	42.8
HUB-12-01	123	58.2	9.0	8	1.0	Barrier5	point412	412	16.0	43.3
						Barrier5	point411	411	16.0	43.3
						Barrier5	point364	364	0.0	42.9
						Barrier5	point363	363	0.0	42.7
						Barrier5	point413	413	16.0	42.7
						Barrier5	point410	410	16.0	42.4
						Barrier5	point414	414	16.0	42.1
						Barrier5	point415	415	16.0	41.8
						Barrier5	point409	409	16.0	41.7
						Barrier5	point416	416	16.0	41.4
HUB-13-01	124	57.2	8.1	8	0.1	Barrier5	point364	364	0.0	43.3
						Barrier5	point412	412	16.0	41.9
						Barrier5	point411	411	16.0	41.8
						Barrier5	point361	361	0.0	41.8
						Barrier5	point413	413	16.0	41.5
						Barrier5	point414	414	16.0	41.1
						Barrier5	point415	415	16.0	40.8
						Barrier5	point410	410	16.0	40.7
						Barrier5	point416	416	16.0	40.6
						Barrier5	point363	363	0.0	40.6
HUB-14-01	125	57.1	7.1	8	-0.9	Barrier5	point365	365	12.0	43.7
						Barrier5	point366	366	12.0	43.6
						Barrier5	point367	367	12.0	42.8
						Barrier5	point368	368	12.0	42.7
						Barrier5	point369	369	12.0	41.8
						Barrier5	point363	363	0.0	41.6
						Barrier5	point362	362	0.0	41.2
						Barrier5	point370	370	12.0	41.1
						Barrier5	point364	364	0.0	40.8
						Barrier5	point412	412	16.0	40.7
VAN-01-01-F	127	60.5	10.4	8	2.4	Barrier5	point424	424	16.0	48.2

						Barrier5	point425	425	16.0	48.1
						Barrier5	point423	423	16.0	47.9
						Barrier5	point426	426	16.0	47.5
						Barrier5	point422	422	16.0	47.4
						Barrier5	point421	421	16.0	46.9
						Barrier5	point427	427	16.0	46.9
						Barrier5	point420	420	16.0	46.4
						Barrier5	point428	428	16.0	45.9
						Barrier5	point419	419	16.0	45.2
VAN-02-01	128	61.4	2.5	8	-5.5	Barrier5	point421	421	16.0	53.0
						Barrier5	point422	422	16.0	44.8
						Barrier5	point384	384	16.0	44.6
						Barrier5	point385	385	16.0	44.5
						Barrier5	point383	383	16.0	44.3
						Barrier5	point394	394	24.0	44.2
						Barrier5	point391	391	16.0	44.2
						Barrier5	point386	386	16.0	44.1
						Barrier5	point382	382	16.0	44.1
						Barrier5	point420	420	16.0	44.0
VAN-03-01	129	56.5	8.0	8	-0.0	Barrier5	point362	362	0.0	41.0
						Barrier5	point412	412	16.0	40.9
						Barrier5	point413	413	16.0	40.8
						Barrier5	point414	414	16.0	40.5
						Barrier5	point415	415	16.0	40.5
						Barrier5	point411	411	16.0	40.5
						Barrier5	point416	416	16.0	40.4
						Barrier5	point417	417	16.0	40.4
						Barrier5	point418	418	16.0	40.3
						Barrier5	point419	419	16.0	39.9
VAN-04-01	130	56.7	6.7	8	-1.3	Barrier5	point366	366	12.0	43.5
						Barrier5	point365	365	12.0	43.4
						Barrier5	point368	368	12.0	43.1
						Barrier5	point369	369	12.0	41.9
						Barrier5	point370	370	12.0	40.9
						Barrier5	point362	362	0.0	40.7
						Barrier5	point367	367	12.0	40.7

						Barrier5	point361	361	0.0	40.6
						Barrier5	point363	363	0.0	40.3
						Barrier5	point364	364	0.0	39.9
AUG-02-01	137	56.2	6.0	8	-2.0	Barrier5	point444	444	16.0	39.3
						Barrier5	point443	443	16.0	39.3
						Barrier5	point441	441	16.0	38.8
						Barrier5	point445	445	16.0	38.7
						Barrier5	point442	442	16.0	38.7
						Barrier5	point440	440	16.0	37.9
						Barrier5	point436	436	16.0	37.4
						Barrier5	point439	439	16.0	37.2
						Barrier5	point437	437	16.0	37.1
						Barrier5	point435	435	16.0	37.0
AUG-01-01	138	58.2	4.0	8	-4.0	Barrier5	point399	399	16.0	42.6
						Barrier5	point398	398	16.0	42.5
						Barrier5	point397	397	16.0	42.5
						Barrier5	point391	391	16.0	42.5
						Barrier5	point384	384	16.0	42.0
						Barrier5	point390	390	16.0	41.9
						Barrier5	point393	393	16.0	41.9
						Barrier5	point383	383	16.0	41.8
						Barrier5	point394	394	16.0	41.8
						Barrier5	point385	385	16.0	41.6
VAN-16-01	139	57.5	6.3	8	-1.7	Barrier5	point405	405	16.0	41.5
						Barrier5	point445	445	16.0	40.7
						Barrier5	point439	439	16.0	40.7
						Barrier5	point443	443	16.0	40.7
						Barrier5	point440	440	16.0	40.7
						Barrier5	point447	447	16.0	40.7
						Barrier5	point441	441	16.0	40.6
						Barrier5	point442	442	16.0	40.6
						Barrier5	point446	446	16.0	40.6
						Barrier5	point444	444	16.0	40.6
VAN-17-01	140	58.2	6.8	8	-1.2	Barrier5	point438	438	16.0	43.0
						Barrier5	point437	437	16.0	43.0
						Barrier5	point439	439	16.0	43.0

						Barrier5	point436	436	16.0	42.8
						Barrier5	point440	440	16.0	42.8
						Barrier5	point441	441	16.0	42.7
						Barrier5	point442	442	16.0	42.6
						Barrier5	point443	443	16.0	42.6
						Barrier5	point444	444	16.0	42.2
						Barrier5	point445	445	16.0	42.2
VAN-18-01	141	62.1	8.5	8	0.5	Barrier5	point437	437	16.0	48.0
						Barrier5	point436	436	16.0	47.8
						Barrier5	point438	438	16.0	47.7
						Barrier5	point435	435	16.0	47.4
						Barrier5	point439	439	16.0	47.3
						Barrier5	point440	440	16.0	46.9
						Barrier5	point335	335	16.0	46.8
						Barrier5	point441	441	16.0	46.3
						Barrier5	point434	434	16.0	46.1
						Barrier5	point442	442	16.0	45.7
VAN-15-01	142	55.2	7.0	8	-1.0	Barrier5	point363	363	0.0	41.1
						Barrier5	point362	362	0.0	39.7
						Barrier5	point364	364	0.0	39.3
						Barrier5	point358	358	0.0	38.5
						Barrier5	point370	370	12.0	37.7
						Barrier5	point412	412	16.0	37.5
						Barrier5	point418	418	16.0	37.5
						Barrier5	point417	417	16.0	37.4
						Barrier5	point413	413	16.0	37.4
						Barrier5	point416	416	16.0	37.4
VAN-19-01	143	54.6	5.6	8	-2.4	Barrier5	point356	356	0.0	41.2
						Barrier5	point358	358	0.0	40.7
						Barrier5	point357	357	0.0	40.3
						Barrier5	point360	360	0.0	39.1
						Barrier5	point359	359	0.0	39.0
						Barrier5	point362	362	0.0	38.5
						Barrier5	point363	363	0.0	38.3
						Barrier5	point361	361	0.0	38.2
						Barrier5	point364	364	0.0	38.1

						Barrier5	point352	352	0.0	38.0
HAL-02-01	144	53.6	5.0	8	-3.0	Barrier5	point352	352	0.0	39.7
						Barrier5	point350	350	0.0	39.0
						Barrier5	point351	351	0.0	38.5
						Barrier5	point346	346	0.0	37.5
						Barrier5	point356	356	0.0	37.3
						Barrier5	point353	353	0.0	37.3
						Barrier5	point361	361	0.0	37.1
						Barrier5	point358	358	0.0	37.1
						Barrier5	point360	360	0.0	36.9
						Barrier5	point359	359	0.0	36.9
VAN-20-01	145	54.4	5.3	8	-2.7	Barrier5	point352	352	0.0	40.2
						Barrier5	point351	351	0.0	40.2
						Barrier5	point353	353	0.0	39.4
						Barrier5	point356	356	0.0	38.4
						Barrier5	point347	347	0.0	38.3
						Barrier5	point354	354	0.0	37.8
						Barrier5	point361	361	0.0	37.8
						Barrier5	point355	355	0.0	37.8
						Barrier5	point357	357	0.0	37.7
						Barrier5	point359	359	0.0	37.6
HAL-03-01	146	52.7	4.6	8	-3.4	Barrier5	point348	348	0.0	37.6
						Barrier5	point356	356	0.0	36.7
						Barrier5	point350	350	0.0	36.6
						Barrier5	point364	364	0.0	36.2
						Barrier5	point363	363	0.0	36.2
						Barrier5	point358	358	0.0	36.2
						Barrier5	point357	357	0.0	35.8
						Barrier5	point352	352	0.0	35.8
						Barrier5	point349	349	0.0	35.8
						Barrier5	point359	359	0.0	35.7
AUGD-08-01	147	53.5	4.8	8	-3.2	Barrier5	point357	357	0.0	40.1
						Barrier5	point355	355	0.0	38.8
						Barrier5	point358	358	0.0	38.4
						Barrier5	point356	356	0.0	38.4
						Barrier5	point362	362	0.0	37.4

						Barrier5	point361	361	0.0	37.3
						Barrier5	point363	363	0.0	37.1
						Barrier5	point364	364	0.0	37.1
						Barrier5	point360	360	0.0	36.9
						Barrier5	point359	359	0.0	36.7
AUGD-09-01	148	53.3	4.0	8	-4.0	Barrier5	point417	417	16.0	42.1
						Barrier5	point418	418	16.0	39.9
						Barrier5	point355	355	0.0	39.2
						Barrier5	point353	353	0.0	37.9
						Barrier5	point356	356	0.0	37.5
						Barrier5	point357	357	0.0	37.3
						Barrier5	point354	354	0.0	36.6
						Barrier5	point364	364	0.0	36.4
						Barrier5	point363	363	0.0	36.4
						Barrier5	point358	358	0.0	36.3
AUGD-10-01	149	52.4	4.1	8	-3.9	Barrier5	point417	417	16.0	38.0
						Barrier5	point350	350	0.0	37.7
						Barrier5	point418	418	16.0	37.7
						Barrier5	point352	352	0.0	37.0
						Barrier5	point351	351	0.0	36.9
						Barrier5	point356	356	0.0	36.0
						Barrier5	point361	361	0.0	35.9
						Barrier5	point357	357	0.0	35.8
						Barrier5	point353	353	0.0	35.8
						Barrier5	point362	362	0.0	35.6
AUGD-13-01	150	50.8	4.8	8	-3.2	Barrier5	point354	354	0.0	33.5
						Barrier5	point353	353	0.0	32.5
						Barrier5	point361	361	0.0	32.0
						Barrier5	point362	362	0.0	31.9
						Barrier5	point364	364	0.0	31.7
						Barrier5	point352	352	0.0	31.6
						Barrier5	point360	360	0.0	31.6
						Barrier5	point363	363	0.0	31.5
						Barrier5	point356	356	0.0	31.4
						Barrier5	point348	348	0.0	31.2
AUGD-12-01	151	51.5	5.0	8	-3.0	Barrier5	point357	357	0.0	36.1

						Barrier5	point355	355	0.0	35.2
						Barrier5	point358	358	0.0	34.0
						Barrier5	point356	356	0.0	34.0
						Barrier5	point351	351	0.0	33.8
						Barrier5	point349	349	0.0	32.4
						Barrier5	point359	359	0.0	32.3
						Barrier5	point352	352	0.0	32.3
						Barrier5	point362	362	0.0	32.2
						Barrier5	point375	375	12.0	32.2
AUGD-11-01	152	54.6	5.2	8	-2.8	Barrier5	point396	396	16.0	38.1
						Barrier5	point394	394	16.0	37.9
						Barrier5	point395	395	16.0	37.7
						Barrier5	point393	393	16.0	37.3
						Barrier5	point392	392	16.0	37.2
						Barrier5	point458	458	16.0	37.0
						Barrier5	point457	457	16.0	37.0
						Barrier5	point459	459	16.0	36.8
						Barrier5	point460	460	16.0	36.6
						Barrier5	point452	452	16.0	36.5
AUGD-03-01	153	55.1	5.9	8	-2.1	Barrier5	point440	440	16.0	37.7
						Barrier5	point441	441	16.0	37.4
						Barrier5	point439	439	16.0	37.3
						Barrier5	point475	475	16.0	37.2
						Barrier5	point476	476	16.0	37.2
						Barrier5	point477	477	16.0	37.1
						Barrier5	point438	438	16.0	37.0
						Barrier5	point445	445	16.0	37.0
						Barrier5	point446	446	16.0	36.6
						Barrier5	point478	478	16.0	36.5
EFOR-29-01	154	53.7	6.8	8	-1.2	Barrier5	point440	440	16.0	39.6
						Barrier5	point439	439	16.0	39.3
						Barrier5	point438	438	16.0	38.9
						Barrier5	point437	437	16.0	38.5
						Barrier5	point436	436	16.0	38.0
						Barrier5	point435	435	16.0	37.5
						Barrier5	point335	335	16.0	37.5

						Barrier5	point441	441	16.0	36.4
						Barrier5	point442	442	16.0	36.4
						Barrier5	point443	443	16.0	35.9
EFOR-28-01	155	55.0	8.3	8	0.3	Barrier5	point443	443	16.0	42.3
						Barrier5	point442	442	16.0	42.2
						Barrier5	point445	445	16.0	42.2
						Barrier5	point444	444	16.0	41.8
						Barrier5	point441	441	16.0	41.6
						Barrier5	point440	440	16.0	40.7
						Barrier5	point446	446	16.0	40.4
						Barrier5	point439	439	16.0	40.2
						Barrier5	point438	438	16.0	39.8
						Barrier5	point437	437	16.0	39.4
EFOR-01-01-F	156	59.2	10.6	8	2.6	Barrier5	point443	443	16.0	47.6
						Barrier5	point441	441	16.0	47.4
						Barrier5	point444	444	16.0	47.3
						Barrier5	point442	442	16.0	47.3
						Barrier5	point445	445	16.0	47.0
						Barrier5	point446	446	16.0	46.4
						Barrier5	point447	447	16.0	45.9
						Barrier5	point448	448	16.0	45.2
						Barrier5	point440	440	16.0	44.7
						Barrier5	point449	449	16.0	44.5
EFOR-02-01-F	157	60.9	11.6	8	3.6	Barrier5	point446	446	16.0	50.6
						Barrier5	point445	445	16.0	50.5
						Barrier5	point444	444	16.0	50.1
						Barrier5	point447	447	16.0	49.7
						Barrier5	point443	443	16.0	48.6
						Barrier5	point448	448	16.0	48.5
						Barrier5	point449	449	16.0	47.0
						Barrier5	point442	442	16.0	47.0
						Barrier5	point450	450	16.0	45.9
						Barrier5	point441	441	16.0	45.2
LAKR-01-01	158	55.5	6.5	8	-1.5	Barrier5	point477	477	16.0	43.1
						Barrier5	point476	476	16.0	43.0
						Barrier5	point475	475	16.0	42.1

						Barrier5	point478	478	16.0	41.9
						Barrier5	point474	474	16.0	41.1
						Barrier5	point479	479	16.0	40.3
						Barrier5	point473	473	16.0	40.2
						Barrier5	point472	472	16.0	38.8
						Barrier5	point480	480	16.0	37.3
						Barrier5	point460	460	16.0	36.4
WFOR-01-01	159	55.7	6.4	8	-1.6	Barrier5	point477	477	16.0	42.5
						Barrier5	point476	476	16.0	42.4
						Barrier5	point475	475	16.0	42.0
						Barrier5	point478	478	16.0	41.8
						Barrier5	point474	474	16.0	41.0
						Barrier5	point473	473	16.0	39.9
						Barrier5	point479	479	16.0	39.8
						Barrier5	point472	472	16.0	38.8
						Barrier5	point480	480	16.0	37.0
						Barrier5	point460	460	16.0	36.7
EFOR-35-01	160	55.2	6.3	8	-1.7	Barrier5	point477	477	16.0	42.0
						Barrier5	point476	476	16.0	41.6
						Barrier5	point478	478	16.0	41.0
						Barrier5	point475	475	16.0	40.6
						Barrier5	point474	474	16.0	40.4
						Barrier5	point473	473	16.0	39.9
						Barrier5	point479	479	16.0	39.6
						Barrier5	point472	472	16.0	38.6
						Barrier5	point480	480	16.0	37.2
						Barrier5	point464	464	16.0	36.5
EFOR-34-10	161	55.1	6.4	8	-1.6	Barrier5	point477	477	16.0	41.4
						Barrier5	point476	476	16.0	41.3
						Barrier5	point475	475	16.0	40.0
						Barrier5	point478	478	16.0	39.9
						Barrier5	point474	474	16.0	39.7
						Barrier5	point473	473	16.0	39.2
						Barrier5	point479	479	16.0	38.5
						Barrier5	point472	472	16.0	38.3
						Barrier5	point463	463	16.0	36.9

						Barrier5	point464	464	16.0	36.8
EFOR-33-01	162	54.7	6.6	8	-1.4	Barrier5	point477	477	16.0	40.3
						Barrier5	point476	476	16.0	40.1
						Barrier5	point475	475	16.0	39.1
						Barrier5	point478	478	16.0	39.0
						Barrier5	point474	474	16.0	38.8
						Barrier5	point473	473	16.0	38.3
						Barrier5	point472	472	16.0	37.8
						Barrier5	point479	479	16.0	37.5
						Barrier5	point460	460	16.0	37.2
						Barrier5	point461	461	16.0	37.1
EFOR-32-01	163	55.3	7.3	8	-0.7	Barrier5	point454	454	16.0	40.5
						Barrier5	point453	453	16.0	40.3
						Barrier5	point452	452	16.0	40.0
						Barrier5	point451	451	16.0	39.7
						Barrier5	point477	477	16.0	39.4
						Barrier5	point450	450	16.0	39.3
						Barrier5	point476	476	16.0	39.3
						Barrier5	point449	449	16.0	39.0
						Barrier5	point455	455	16.0	38.8
						Barrier5	point475	475	16.0	38.6
EFOR-30-01	164	53.9	6.2	8	-1.8	Barrier5	point476	476	16.0	38.8
						Barrier5	point475	475	16.0	38.8
						Barrier5	point477	477	16.0	38.7
						Barrier5	point474	474	16.0	38.2
						Barrier5	point478	478	16.0	38.2
						Barrier5	point479	479	16.0	36.7
						Barrier5	point473	473	16.0	35.7
						Barrier5	point450	450	16.0	35.5
						Barrier5	point451	451	16.0	35.5
						Barrier5	point449	449	16.0	35.4
EFOR-31-01	165	54.3	6.4	8	-1.6	Barrier5	point476	476	16.0	40.0
						Barrier5	point477	477	16.0	39.9
						Barrier5	point475	475	16.0	39.8
						Barrier5	point478	478	16.0	39.1
						Barrier5	point474	474	16.0	38.6

						Barrier5	point479	479	16.0	37.3
						Barrier5	point473	473	16.0	37.0
						Barrier5	point467	467	16.0	36.5
						Barrier5	point468	468	16.0	36.4
						Barrier5	point453	453	16.0	36.1
WFOR-03-01	166	53.6	7.3	8	-0.7	Barrier5	point458	458	16.0	38.4
						Barrier5	point457	457	16.0	38.4
						Barrier5	point459	459	16.0	38.1
						Barrier5	point460	460	16.0	37.9
						Barrier5	point475	475	16.0	37.9
						Barrier5	point477	477	16.0	37.8
						Barrier5	point476	476	16.0	37.8
						Barrier5	point456	456	16.0	37.7
						Barrier5	point461	461	16.0	37.7
						Barrier5	point478	478	16.0	37.3
WFOR-04-01	167	51.7	5.9	8	-2.1	Barrier5	point443	443	16.0	34.8
						Barrier5	point444	444	16.0	34.7
						Barrier5	point442	442	16.0	34.5
						Barrier5	point441	441	16.0	34.1
						Barrier5	point456	456	16.0	33.5
						Barrier5	point458	458	16.0	33.5
						Barrier5	point447	447	16.0	33.5
						Barrier5	point457	457	16.0	33.5
						Barrier5	point455	455	16.0	33.4
						Barrier5	point440	440	16.0	33.4
WFOR-05-01	168	52.0	4.9	8	-3.1	Barrier5	point450	450	16.0	34.6
						Barrier5	point451	451	16.0	34.6
						Barrier5	point442	442	16.0	33.4
						Barrier5	point476	476	16.0	33.2
						Barrier5	point477	477	16.0	33.2
						Barrier5	point475	475	16.0	33.0
						Barrier5	point441	441	16.0	32.9
						Barrier5	point456	456	16.0	32.7
						Barrier5	point458	458	16.0	32.7
						Barrier5	point457	457	16.0	32.7
WFOR-07-01	169	51.1	5.5	8	-2.5	Barrier5	point451	451	16.0	33.4

						Barrier5	point450	450	16.0	33.2
						Barrier5	point477	477	16.0	32.8
						Barrier5	point476	476	16.0	32.8
						Barrier5	point475	475	16.0	32.5
						Barrier5	point478	478	16.0	32.3
						Barrier5	point474	474	16.0	31.8
						Barrier5	point443	443	16.0	31.7
						Barrier5	point444	444	16.0	31.7
						Barrier5	point456	456	16.0	31.7
WFOR-06-01	170	51.7	5.2	8	-2.8	Barrier5	point432	432	16.0	36.9
						Barrier5	point450	450	16.0	34.4
						Barrier5	point451	451	16.0	34.0
						Barrier5	point456	456	16.0	33.2
						Barrier5	point477	477	16.0	33.1
						Barrier5	point455	455	16.0	33.1
						Barrier5	point454	454	16.0	33.0
						Barrier5	point453	453	16.0	32.9
						Barrier5	point476	476	16.0	32.9
						Barrier5	point475	475	16.0	32.9
WFOR-09-01	171	50.7	5.2	8	-2.8	Barrier5	point476	476	16.0	34.0
						Barrier5	point477	477	16.0	34.0
						Barrier5	point475	475	16.0	33.7
						Barrier5	point474	474	16.0	33.2
						Barrier5	point473	473	16.0	32.1
						Barrier5	point478	478	16.0	32.1
						Barrier5	point451	451	16.0	32.0
						Barrier5	point450	450	16.0	31.9
						Barrier5	point452	452	16.0	31.4
						Barrier5	point472	472	16.0	31.0
WFOR-08-01	172	51.1	6.0	8	-2.0	Barrier5	point475	475	16.0	36.6
						Barrier5	point474	474	16.0	36.0
						Barrier5	point476	476	16.0	35.5
						Barrier5	point477	477	16.0	35.4
						Barrier5	point478	478	16.0	35.1
						Barrier5	point454	454	16.0	35.1
						Barrier5	point473	473	16.0	34.8

						Barrier5	point453	453	16.0	34.6
						Barrier5	point451	451	16.0	34.5
						Barrier5	point472	472	16.0	34.4
EFOR-16-01-F	173	61.3	10.2	8	2.2	Barrier5	point495	495	16.0	46.0
						Barrier5	point496	496	16.0	46.0
						Barrier5	point494	494	16.0	46.0
						Barrier5	point493	493	16.0	45.8
						Barrier5	point497	497	16.0	45.6
						Barrier5	point492	492	16.0	45.6
						Barrier5	point498	498	16.0	45.5
						Barrier5	point491	491	16.0	45.4
						Barrier5	point490	490	16.0	45.1
						Barrier5	point499	499	16.0	45.0
EFOR-15-01-F	174	61.3	10.5	8	2.5	Barrier5	point489	489	16.0	46.6
						Barrier5	point491	491	16.0	46.5
						Barrier5	point492	492	16.0	46.4
						Barrier5	point493	493	16.0	46.3
						Barrier5	point490	490	16.0	46.3
						Barrier5	point494	494	16.0	45.8
						Barrier5	point486	486	16.0	45.6
						Barrier5	point488	488	16.0	45.6
						Barrier5	point487	487	16.0	45.5
						Barrier5	point495	495	16.0	45.5
EFOR-14-01-F	175	61.7	10.6	8	2.6	Barrier5	point486	486	16.0	47.9
						Barrier5	point488	488	16.0	47.6
						Barrier5	point489	489	16.0	47.2
						Barrier5	point487	487	16.0	47.0
						Barrier5	point485	485	16.0	46.9
						Barrier5	point490	490	16.0	46.9
						Barrier5	point491	491	16.0	46.6
						Barrier5	point492	492	16.0	46.0
						Barrier5	point478	478	16.0	45.8
						Barrier5	point484	484	16.0	45.8
EFOR-13-01-F	176	62.2	10.8	8	2.8	Barrier5	point486	486	16.0	49.2
						Barrier5	point485	485	16.0	49.2
						Barrier5	point484	484	16.0	48.1

						Barrier5	point483	483	16.0	47.8
						Barrier5	point487	487	16.0	47.7
						Barrier5	point479	479	16.0	47.6
						Barrier5	point478	478	16.0	47.6
						Barrier5	point488	488	16.0	47.4
						Barrier5	point482	482	16.0	47.3
						Barrier5	point480	480	16.0	47.2
EFOR-12-01-F	177	62.2	9.9	8	1.9	Barrier5	point478	478	16.0	49.4
						Barrier5	point479	479	16.0	49.2
						Barrier5	point477	477	16.0	49.0
						Barrier5	point476	476	16.0	48.6
						Barrier5	point480	480	16.0	48.5
						Barrier5	point485	485	16.0	48.1
						Barrier5	point481	481	16.0	48.0
						Barrier5	point482	482	16.0	47.6
						Barrier5	point475	475	16.0	47.5
						Barrier5	point483	483	16.0	47.3
EFOR-11-01-F	178	62.7	9.9	8	1.9	Barrier5	point477	477	16.0	51.4
						Barrier5	point476	476	16.0	51.3
						Barrier5	point478	478	16.0	50.8
						Barrier5	point475	475	16.0	50.5
						Barrier5	point479	479	16.0	49.8
						Barrier5	point474	474	16.0	49.4
						Barrier5	point473	473	16.0	48.4
						Barrier5	point480	480	16.0	48.2
						Barrier5	point472	472	16.0	47.4
						Barrier5	point481	481	16.0	47.0
EFOR-10-01-F	179	62.4	9.9	8	1.9	Barrier5	point476	476	16.0	50.6
						Barrier5	point475	475	16.0	50.5
						Barrier5	point474	474	16.0	50.3
						Barrier5	point477	477	16.0	50.1
						Barrier5	point473	473	16.0	49.6
						Barrier5	point478	478	16.0	48.9
						Barrier5	point472	472	16.0	48.4
						Barrier5	point471	471	16.0	48.2
						Barrier5	point470	470	16.0	47.5

						Barrier5	point479	479	16.0	47.5
EFOR-09-01-F	180	62.2	10.1	8	2.1	Barrier5	point471	471	16.0	49.1
						Barrier5	point470	470	16.0	49.0
						Barrier5	point472	472	16.0	49.0
						Barrier5	point473	473	16.0	48.9
						Barrier5	point469	469	16.0	48.8
						Barrier5	point474	474	16.0	48.8
						Barrier5	point475	475	16.0	48.4
						Barrier5	point468	468	16.0	48.3
						Barrier5	point476	476	16.0	48.0
						Barrier5	point467	467	16.0	47.9
EFOR-08-01-F	181	61.8	10.5	8	2.5	Barrier5	point467	467	16.0	49.2
						Barrier5	point466	466	16.0	49.2
						Barrier5	point465	465	16.0	48.9
						Barrier5	point468	468	16.0	48.8
						Barrier5	point464	464	16.0	48.4
						Barrier5	point469	469	16.0	48.0
						Barrier5	point463	463	16.0	47.6
						Barrier5	point470	470	16.0	47.4
						Barrier5	point462	462	16.0	46.9
						Barrier5	point471	471	16.0	46.8
EFOR-07-01-F	182	61.7	10.7	8	2.7	Barrier5	point463	463	16.0	50.2
						Barrier5	point462	462	16.0	50.0
						Barrier5	point464	464	16.0	49.5
						Barrier5	point461	461	16.0	49.4
						Barrier5	point460	460	16.0	48.8
						Barrier5	point465	465	16.0	48.6
						Barrier5	point459	459	16.0	48.0
						Barrier5	point466	466	16.0	47.3
						Barrier5	point458	458	16.0	46.9
						Barrier5	point467	467	16.0	46.3
EFOR-06-01-F	183	61.5	10.6	8	2.6	Barrier5	point459	459	16.0	50.0
						Barrier5	point460	460	16.0	50.0
						Barrier5	point461	461	16.0	49.5
						Barrier5	point458	458	16.0	49.5
						Barrier5	point457	457	16.0	48.7

						Barrier5	point462	462	16.0	48.3
						Barrier5	point456	456	16.0	47.8
						Barrier5	point463	463	16.0	47.5
						Barrier5	point455	455	16.0	47.0
						Barrier5	point454	454	16.0	46.2
EFOR-05-01-F	184	61.1	10.5	8	2.5	Barrier5	point457	457	16.0	49.3
						Barrier5	point456	456	16.0	49.2
						Barrier5	point458	458	16.0	49.0
						Barrier5	point455	455	16.0	48.8
						Barrier5	point459	459	16.0	48.3
						Barrier5	point454	454	16.0	48.3
						Barrier5	point453	453	16.0	47.6
						Barrier5	point460	460	16.0	47.3
						Barrier5	point452	452	16.0	46.7
						Barrier5	point461	461	16.0	46.4
EFOR-04-01-F	185	61.2	10.3	8	2.3	Barrier5	point453	453	16.0	49.1
						Barrier5	point452	452	16.0	48.9
						Barrier5	point454	454	16.0	48.7
						Barrier5	point451	451	16.0	48.3
						Barrier5	point455	455	16.0	48.2
						Barrier5	point456	456	16.0	48.0
						Barrier5	point450	450	16.0	47.6
						Barrier5	point457	457	16.0	47.3
						Barrier5	point449	449	16.0	46.7
						Barrier5	point458	458	16.0	46.6
EFOR-03-01-F	186	61.2	10.9	8	2.9	Barrier5	point450	450	16.0	50.0
						Barrier5	point451	451	16.0	49.7
						Barrier5	point449	449	16.0	49.6
						Barrier5	point452	452	16.0	49.1
						Barrier5	point448	448	16.0	48.8
						Barrier5	point453	453	16.0	48.3
						Barrier5	point447	447	16.0	47.6
						Barrier5	point454	454	16.0	47.3
						Barrier5	point455	455	16.0	46.5
						Barrier5	point446	446	16.0	46.2
LAKR-09-01	187	55.1	6.3	8	-1.7	Barrier5	point527	527	0.0	39.8

						Barrier5	point528	528	0.0	39.5
						Barrier5	point529	529	0.0	39.2
						Barrier5	point478	478	16.0	38.9
						Barrier5	point477	477	16.0	38.8
						Barrier5	point531	531	0.0	38.7
						Barrier5	point476	476	16.0	38.7
						Barrier5	point530	530	0.0	38.5
						Barrier5	point475	475	16.0	37.9
						Barrier5	point474	474	16.0	37.5
LAKR-08-01	188	55.0	6.7	8	-1.3	Barrier5	point478	478	16.0	39.8
						Barrier5	point476	476	16.0	39.5
						Barrier5	point477	477	16.0	39.3
						Barrier5	point527	527	0.0	38.9
						Barrier5	point475	475	16.0	38.8
						Barrier5	point528	528	0.0	38.6
						Barrier5	point530	530	0.0	38.3
						Barrier5	point529	529	0.0	38.2
						Barrier5	point474	474	16.0	38.0
						Barrier5	point479	479	16.0	38.0
LAKR-07-01	189	54.9	6.7	8	-1.3	Barrier5	point477	477	16.0	40.6
						Barrier5	point478	478	16.0	40.5
						Barrier5	point476	476	16.0	40.4
						Barrier5	point475	475	16.0	39.5
						Barrier5	point479	479	16.0	38.8
						Barrier5	point474	474	16.0	38.7
						Barrier5	point527	527	0.0	37.9
						Barrier5	point528	528	0.0	37.9
						Barrier5	point473	473	16.0	37.8
						Barrier5	point530	530	0.0	37.3
EFOR-43-01	190	54.2	5.9	8	-2.1	Barrier5	point474	474	16.0	38.0
						Barrier5	point475	475	16.0	37.9
						Barrier5	point477	477	16.0	37.8
						Barrier5	point478	478	16.0	37.5
						Barrier5	point527	527	0.0	37.1
						Barrier5	point476	476	16.0	37.1
						Barrier5	point473	473	16.0	37.0

						Barrier5	point528	528	0.0	36.8
						Barrier5	point529	529	0.0	36.5
						Barrier5	point472	472	16.0	36.1
EFOR-42-01	191	54.5	5.9	8	-2.1	Barrier5	point477	477	16.0	38.4
						Barrier5	point478	478	16.0	38.2
						Barrier5	point476	476	16.0	38.0
						Barrier5	point475	475	16.0	37.2
						Barrier5	point474	474	16.0	37.1
						Barrier5	point530	530	0.0	37.1
						Barrier5	point529	529	0.0	37.0
						Barrier5	point479	479	16.0	36.7
						Barrier5	point528	528	0.0	36.7
						Barrier5	point531	531	0.0	36.5
EFOR-41-01	192	54.5	5.9	8	-2.1	Barrier5	point477	477	16.0	39.2
						Barrier5	point478	478	16.0	38.9
						Barrier5	point476	476	16.0	38.5
						Barrier5	point475	475	16.0	37.9
						Barrier5	point479	479	16.0	37.5
						Barrier5	point474	474	16.0	37.1
						Barrier5	point527	527	0.0	36.7
						Barrier5	point473	473	16.0	36.5
						Barrier5	point528	528	0.0	36.4
						Barrier5	point530	530	0.0	36.3
EFOR-40-01	193	54.7	5.9	8	-2.1	Barrier5	point477	477	16.0	40.2
						Barrier5	point478	478	16.0	39.8
						Barrier5	point475	475	16.0	38.6
						Barrier5	point479	479	16.0	38.3
						Barrier5	point474	474	16.0	37.9
						Barrier5	point473	473	16.0	37.3
						Barrier5	point472	472	16.0	36.5
						Barrier5	point527	527	0.0	35.8
						Barrier5	point528	528	0.0	35.5
						Barrier5	point476	476	16.0	35.5
LAKR-06-01	194	55.1	6.5	8	-1.5	Barrier5	point477	477	16.0	41.6
						Barrier5	point476	476	16.0	41.4
						Barrier5	point478	478	16.0	41.3

						Barrier5	point475	475	16.0	40.3
						Barrier5	point479	479	16.0	39.7
						Barrier5	point474	474	16.0	39.4
						Barrier5	point473	473	16.0	38.2
						Barrier5	point472	472	16.0	37.1
						Barrier5	point527	527	0.0	36.7
						Barrier5	point530	530	0.0	36.5
LAKR-05-01	195	55.3	6.4	8	-1.6	Barrier5	point476	476	16.0	42.2
						Barrier5	point477	477	16.0	42.1
						Barrier5	point478	478	16.0	41.9
						Barrier5	point475	475	16.0	41.3
						Barrier5	point474	474	16.0	40.3
						Barrier5	point479	479	16.0	40.1
						Barrier5	point473	473	16.0	38.8
						Barrier5	point472	472	16.0	37.2
						Barrier5	point480	480	16.0	36.1
						Barrier5	point527	527	0.0	35.8
EFOR-39-01	196	54.9	6.0	8	-2.0	Barrier5	point477	477	16.0	40.8
						Barrier5	point476	476	16.0	40.5
						Barrier5	point478	478	16.0	40.4
						Barrier5	point475	475	16.0	39.7
						Barrier5	point479	479	16.0	39.1
						Barrier5	point474	474	16.0	38.7
						Barrier5	point473	473	16.0	37.7
						Barrier5	point472	472	16.0	37.0
						Barrier5	point527	527	0.0	35.8
						Barrier5	point528	528	0.0	35.5
LAKR-04-01	197	55.7	6.1	8	-1.9	Barrier5	point476	476	16.0	43.2
						Barrier5	point477	477	16.0	43.1
						Barrier5	point478	478	16.0	42.7
						Barrier5	point475	475	16.0	42.1
						Barrier5	point479	479	16.0	41.2
						Barrier5	point474	474	16.0	41.0
						Barrier5	point473	473	16.0	39.6
						Barrier5	point472	472	16.0	38.0
						Barrier5	point480	480	16.0	37.0

						Barrier5	point483	483	16.0	35.9
EFOR-38-01	198	54.9	6.0	8	-2.0	Barrier5	point477	477	16.0	41.7
						Barrier5	point476	476	16.0	41.2
						Barrier5	point478	478	16.0	40.8
						Barrier5	point475	475	16.0	40.3
						Barrier5	point479	479	16.0	39.8
						Barrier5	point474	474	16.0	39.6
						Barrier5	point473	473	16.0	38.6
						Barrier5	point472	472	16.0	37.1
						Barrier5	point480	480	16.0	36.0
						Barrier5	point486	486	16.0	35.5
EFOR-37-01	199	55.2	6.0	8	-2.0	Barrier5	point477	477	16.0	42.3
						Barrier5	point476	476	16.0	41.8
						Barrier5	point478	478	16.0	41.0
						Barrier5	point475	475	16.0	40.7
						Barrier5	point479	479	16.0	40.0
						Barrier5	point474	474	16.0	40.0
						Barrier5	point473	473	16.0	39.4
						Barrier5	point472	472	16.0	38.1
						Barrier5	point480	480	16.0	36.8
						Barrier5	point465	465	16.0	36.0
LAKR-03-01	200	55.7	6.2	8	-1.8	Barrier5	point477	477	16.0	43.6
						Barrier5	point476	476	16.0	43.4
						Barrier5	point478	478	16.0	42.8
						Barrier5	point475	475	16.0	42.3
						Barrier5	point474	474	16.0	41.3
						Barrier5	point479	479	16.0	41.3
						Barrier5	point473	473	16.0	40.2
						Barrier5	point472	472	16.0	38.6
						Barrier5	point480	480	16.0	37.2
						Barrier5	point486	486	16.0	35.8
LAKR-02-01	201	55.9	6.3	8	-1.7	Barrier5	point477	477	16.0	44.0
						Barrier5	point476	476	16.0	43.6
						Barrier5	point478	478	16.0	43.2
						Barrier5	point475	475	16.0	42.8
						Barrier5	point474	474	16.0	41.6

						Barrier5	point479	479	16.0	41.5
						Barrier5	point473	473	16.0	40.6
						Barrier5	point472	472	16.0	39.6
						Barrier5	point480	480	16.0	37.7
						Barrier5	point470	470	16.0	36.1
EFOR-36-01	202	55.2	6.2	8	-1.8	Barrier5	point477	477	16.0	42.2
						Barrier5	point476	476	16.0	42.0
						Barrier5	point478	478	16.0	40.7
						Barrier5	point475	475	16.0	40.7
						Barrier5	point474	474	16.0	40.3
						Barrier5	point479	479	16.0	39.8
						Barrier5	point473	473	16.0	39.7
						Barrier5	point472	472	16.0	38.9
						Barrier5	point480	480	16.0	36.6
						Barrier5	point462	462	16.0	36.4
WFOR-02-01	203	52.8	6.0	8	-2.0	Barrier5	point477	477	16.0	38.3
						Barrier5	point476	476	16.0	38.2
						Barrier5	point478	478	16.0	37.9
						Barrier5	point475	475	16.0	37.8
						Barrier5	point474	474	16.0	36.9
						Barrier5	point479	479	16.0	36.8
						Barrier5	point473	473	16.0	35.8
						Barrier5	point472	472	16.0	34.8
						Barrier5	point453	453	16.0	34.7
						Barrier5	point452	452	16.0	34.3
LAKR-18-01	204	52.5	6.1	8	-1.9	Barrier5	point477	477	16.0	38.6
						Barrier5	point476	476	16.0	38.4
						Barrier5	point478	478	16.0	38.3
						Barrier5	point475	475	16.0	37.6
						Barrier5	point474	474	16.0	36.9
						Barrier5	point479	479	16.0	36.7
						Barrier5	point473	473	16.0	35.1
						Barrier5	point472	472	16.0	35.0
						Barrier5	point451	451	16.0	33.4
						Barrier5	point450	450	16.0	33.1
EFOR-46-01	205	57.0	5.0	8	-3.0	Barrier5	point527	527	0.0	44.9

						Barrier5	point528	528	0.0	44.5
						Barrier5	point529	529	0.0	44.1
						Barrier5	point530	530	0.0	44.0
						Barrier5	point531	531	0.0	43.6
						Barrier5	point532	532	0.0	41.9
						Barrier5	point508	508	16.0	37.4
						Barrier5	point510	510	16.0	37.4
						Barrier5	point511	511	16.0	37.4
						Barrier5	point509	509	16.0	37.4
EFOR-47-01	206	56.6	4.5	8	-3.5	Barrier5	point527	527	0.0	43.4
						Barrier5	point528	528	0.0	43.2
						Barrier5	point529	529	0.0	42.8
						Barrier5	point530	530	0.0	42.8
						Barrier5	point531	531	0.0	42.6
						Barrier5	point532	532	0.0	40.9
						Barrier5	point478	478	16.0	36.3
						Barrier5	point477	477	16.0	36.2
						Barrier5	point511	511	16.0	35.9
						Barrier5	point512	512	16.0	35.9
EFOR-48-01	207	51.6	4.5	8	-3.5	Barrier5	point527	527	0.0	35.1
						Barrier5	point528	528	0.0	34.8
						Barrier5	point529	529	0.0	34.5
						Barrier5	point530	530	0.0	34.4
						Barrier5	point531	531	0.0	34.0
						Barrier5	point477	477	16.0	33.1
						Barrier5	point476	476	16.0	32.9
						Barrier5	point478	478	16.0	32.7
						Barrier5	point532	532	0.0	32.3
						Barrier5	point474	474	16.0	32.2
LAKR-10-01	208	55.2	6.0	8	-2.0	Barrier5	point527	527	0.0	40.9
						Barrier5	point528	528	0.0	40.6
						Barrier5	point529	529	0.0	40.2
						Barrier5	point530	530	0.0	40.1
						Barrier5	point531	531	0.0	39.7
						Barrier5	point477	477	16.0	38.2
						Barrier5	point532	532	0.0	38.0

						Barrier5	point476	476	16.0	37.8
						Barrier5	point478	478	16.0	37.5
						Barrier5	point475	475	16.0	37.3
EFOR-45-01	209	54.8	5.4	8	-2.6	Barrier5	point527	527	0.0	39.9
						Barrier5	point528	528	0.0	39.6
						Barrier5	point529	529	0.0	39.2
						Barrier5	point530	530	0.0	39.1
						Barrier5	point531	531	0.0	38.7
						Barrier5	point478	478	16.0	38.0
						Barrier5	point477	477	16.0	37.8
						Barrier5	point476	476	16.0	37.6
						Barrier5	point475	475	16.0	37.1
						Barrier5	point532	532	0.0	36.9
EFOR-44-01	210	54.8	5.5	8	-2.5	Barrier5	point478	478	16.0	38.9
						Barrier5	point477	477	16.0	38.9
						Barrier5	point527	527	0.0	38.8
						Barrier5	point476	476	16.0	38.6
						Barrier5	point528	528	0.0	38.5
						Barrier5	point475	475	16.0	38.1
						Barrier5	point529	529	0.0	38.1
						Barrier5	point530	530	0.0	38.0
						Barrier5	point474	474	16.0	37.7
						Barrier5	point531	531	0.0	37.5
EFOR-21-01-F	211	62.8	8.4	8	0.4	Barrier5	point527	527	0.0	50.5
						Barrier5	point528	528	0.0	49.9
						Barrier5	point529	529	0.0	49.0
						Barrier5	point530	530	0.0	48.8
						Barrier5	point531	531	0.0	48.0
						Barrier5	point532	532	0.0	46.5
						Barrier5	point512	512	16.0	45.7
						Barrier5	point511	511	16.0	45.7
						Barrier5	point510	510	16.0	45.6
						Barrier5	point513	513	16.0	45.5
EFOR-20-01-F	212	62.3	10.2	8	2.2	Barrier5	point527	527	0.0	48.0
						Barrier5	point528	528	0.0	47.5
						Barrier5	point507	507	16.0	47.3

						Barrier5	point508	508	16.0	47.3
						Barrier5	point506	506	16.0	47.1
						Barrier5	point509	509	16.0	46.9
						Barrier5	point505	505	16.0	46.7
						Barrier5	point510	510	16.0	46.6
						Barrier5	point530	530	0.0	46.5
						Barrier5	point529	529	0.0	46.5
EFOR-19-01-F	213	62.0	9.8	8	1.8	Barrier5	point527	527	0.0	47.0
						Barrier5	point506	506	16.0	46.6
						Barrier5	point528	528	0.0	46.5
						Barrier5	point505	505	16.0	46.5
						Barrier5	point504	504	16.0	46.4
						Barrier5	point507	507	16.0	46.2
						Barrier5	point503	503	16.0	46.1
						Barrier5	point508	508	16.0	45.9
						Barrier5	point502	502	16.0	45.8
						Barrier5	point530	530	0.0	45.7
EFOR-18-01-F	214	61.6	9.6	8	1.6	Barrier5	point501	501	16.0	45.9
						Barrier5	point502	502	16.0	45.9
						Barrier5	point500	500	16.0	45.8
						Barrier5	point503	503	16.0	45.7
						Barrier5	point499	499	16.0	45.4
						Barrier5	point504	504	16.0	45.4
						Barrier5	point527	527	0.0	45.3
						Barrier5	point498	498	16.0	45.2
						Barrier5	point505	505	16.0	45.2
						Barrier5	point528	528	0.0	45.0
EFOR-17-01-F	215	61.7	10.1	8	2.1	Barrier5	point498	498	16.0	46.5
						Barrier5	point499	499	16.0	46.4
						Barrier5	point497	497	16.0	46.3
						Barrier5	point500	500	16.0	46.2
						Barrier5	point496	496	16.0	46.0
						Barrier5	point501	501	16.0	45.9
						Barrier5	point495	495	16.0	45.6
						Barrier5	point502	502	16.0	45.5
						Barrier5	point494	494	16.0	45.2

						Barrier5	point503	503	16.0	44.8
EFOR-27-01	216	55.8	2.6	8	-5.4	Barrier5	point527	527	0.0	43.0
						Barrier5	point528	528	0.0	42.9
						Barrier5	point529	529	0.0	42.7
						Barrier5	point530	530	0.0	42.3
						Barrier5	point531	531	0.0	42.0
						Barrier5	point532	532	0.0	40.3
						Barrier5	point524	524	16.0	35.1
						Barrier5	point525	525	16.0	35.0
						Barrier5	point526	526	16.0	34.8
						Barrier5	point523	523	16.0	33.4
EFOR-26-01	217	56.8	2.9	8	-5.1	Barrier5	point527	527	0.0	44.8
						Barrier5	point528	528	0.0	44.6
						Barrier5	point529	529	0.0	44.2
						Barrier5	point530	530	0.0	43.7
						Barrier5	point531	531	0.0	43.4
						Barrier5	point532	532	0.0	41.6
						Barrier5	point521	521	16.0	36.8
						Barrier5	point522	522	16.0	36.7
						Barrier5	point523	523	16.0	36.6
						Barrier5	point524	524	16.0	36.6
EFOR-25-01	218	57.7	3.3	8	-4.7	Barrier5	point527	527	0.0	46.3
						Barrier5	point528	528	0.0	46.1
						Barrier5	point529	529	0.0	45.6
						Barrier5	point530	530	0.0	44.9
						Barrier5	point531	531	0.0	44.7
						Barrier5	point532	532	0.0	42.9
						Barrier5	point521	521	16.0	38.1
						Barrier5	point520	520	16.0	38.1
						Barrier5	point518	518	16.0	38.0
						Barrier5	point519	519	16.0	37.9
EFOR-24-01-F	219	60.2	4.0	8	-4.0	Barrier5	point527	527	0.0	49.3
						Barrier5	point528	528	0.0	49.0
						Barrier5	point529	529	0.0	48.7
						Barrier5	point530	530	0.0	48.6
						Barrier5	point531	531	0.0	48.2

						Barrier5	point532	532	0.0	46.3
						Barrier5	point521	521	16.0	40.2
						Barrier5	point520	520	16.0	40.2
						Barrier5	point518	518	16.0	40.1
						Barrier5	point519	519	16.0	40.0
EFOR-23-01-F	220	62.3	5.2	8	-2.8	Barrier5	point527	527	0.0	51.9
						Barrier5	point528	528	0.0	51.5
						Barrier5	point529	529	0.0	51.0
						Barrier5	point530	530	0.0	50.7
						Barrier5	point531	531	0.0	50.2
						Barrier5	point532	532	0.0	48.3
						Barrier5	point520	520	16.0	42.3
						Barrier5	point518	518	16.0	42.3
						Barrier5	point519	519	16.0	42.2
						Barrier5	point521	521	16.0	42.2
EFOR-22-01-F	221	63.1	6.8	8	-1.2	Barrier5	point527	527	0.0	52.3
						Barrier5	point528	528	0.0	51.8
						Barrier5	point529	529	0.0	51.1
						Barrier5	point530	530	0.0	50.8
						Barrier5	point531	531	0.0	50.0
						Barrier5	point532	532	0.0	48.2
						Barrier5	point518	518	16.0	44.0
						Barrier5	point517	517	16.0	44.0
						Barrier5	point516	516	16.0	43.8
						Barrier5	point514	514	16.0	43.7
LAKR-17-01	222	52.4	6.1	8	-1.9	Barrier5	point477	477	16.0	38.4
						Barrier5	point476	476	16.0	38.1
						Barrier5	point478	478	16.0	38.0
						Barrier5	point475	475	16.0	37.6
						Barrier5	point479	479	16.0	36.9
						Barrier5	point474	474	16.0	36.8
						Barrier5	point473	473	16.0	35.6
						Barrier5	point472	472	16.0	34.6
						Barrier5	point527	527	0.0	32.8
						Barrier5	point528	528	0.0	32.5
LAKR-12-01	223	52.1	6.2	8	-1.8	Barrier5	point477	477	16.0	37.9

						Barrier5	point478	478	16.0	37.6
						Barrier5	point476	476	16.0	37.5
						Barrier5	point475	475	16.0	37.0
						Barrier5	point479	479	16.0	36.4
						Barrier5	point474	474	16.0	36.3
						Barrier5	point473	473	16.0	35.1
						Barrier5	point472	472	16.0	33.9
						Barrier5	point527	527	0.0	33.3
						Barrier5	point528	528	0.0	33.1
LAKR-13-01	224	52.0	6.0	8	-2.0	Barrier5	point476	476	16.0	37.8
						Barrier5	point477	477	16.0	37.3
						Barrier5	point478	478	16.0	37.0
						Barrier5	point475	475	16.0	36.7
						Barrier5	point474	474	16.0	35.8
						Barrier5	point479	479	16.0	35.1
						Barrier5	point471	471	16.0	34.6
						Barrier5	point473	473	16.0	34.5
						Barrier5	point527	527	0.0	34.0
						Barrier5	point528	528	0.0	33.8
LAKR-14-01	225	52.1	5.9	8	-2.1	Barrier5	point478	478	16.0	36.9
						Barrier5	point477	477	16.0	36.9
						Barrier5	point476	476	16.0	36.5
						Barrier5	point475	475	16.0	36.0
						Barrier5	point479	479	16.0	35.5
						Barrier5	point474	474	16.0	35.2
						Barrier5	point527	527	0.0	34.7
						Barrier5	point528	528	0.0	34.6
						Barrier5	point530	530	0.0	34.2
						Barrier5	point529	529	0.0	34.2
LAKR-15-01	226	52.0	5.9	8	-2.1	Barrier5	point477	477	16.0	36.3
						Barrier5	point478	478	16.0	36.1
						Barrier5	point476	476	16.0	35.7
						Barrier5	point475	475	16.0	35.4
						Barrier5	point527	527	0.0	35.4
						Barrier5	point528	528	0.0	35.1
						Barrier5	point479	479	16.0	34.8

						Barrier5	point529	529	0.0	34.8
						Barrier5	point530	530	0.0	34.8
						Barrier5	point474	474	16.0	34.7
LAKR-16-01	227	52.3	5.7	8	-2.3	Barrier5	point477	477	16.0	36.0
						Barrier5	point527	527	0.0	36.0
						Barrier5	point478	478	16.0	35.7
						Barrier5	point528	528	0.0	35.7
						Barrier5	point476	476	16.0	35.6
						Barrier5	point530	530	0.0	35.4
						Barrier5	point529	529	0.0	35.4
						Barrier5	point475	475	16.0	35.1
						Barrier5	point531	531	0.0	34.9
						Barrier5	point479	479	16.0	34.6
LAKR-11-01	228	53.6	4.6	8	-3.4	Barrier5	point530	530	0.0	39.6
						Barrier5	point529	529	0.0	39.5
						Barrier5	point528	528	0.0	39.5
						Barrier5	point531	531	0.0	39.3
						Barrier5	point527	527	0.0	38.4
						Barrier5	point532	532	0.0	37.6
						Barrier5	point477	477	16.0	34.9
						Barrier5	point478	478	16.0	34.9
						Barrier5	point476	476	16.0	34.5
						Barrier5	point475	475	16.0	34.0
Total Cost, All Barriers (including additional cost(s))					$1533423					

HMB Professional Engineers 14 April 2021
Mark Gavula TNM 2.5

RESULTS: BARRIER-SEGMENT DESCRIPTIONS
PROJECT/CONTRACT: I69 ORX
RUN: 351 Barrier Vanguard Alternative
BARRIER DESIGN: Vanguard-Barrier-Extended

Barriers		Segments										
Name	Type	Name	No.	Heights			Length	If Wall			If Berm	Cost
				First Point	Average	Second Point		Area	On Struc?	Important Reflections?	Volume	
				ft	ft	ft	ft	sq ft			cu yd	$
Barrier5	W	point334	334	0.00	0.00	0.00	0	0				0
		point337	337	0.00	0.00	0.00	0	0				0
		point338	338	0.00	0.00	0.00	0	0				0
		point339	339	0.00	0.00	0.00	0	0				0
		point340	340	0.00	0.00	0.00	0	0				0
		point341	341	0.00	0.00	0.00	0	0				0
		point342	342	0.00	0.00	0.00	0	0				0
		point343	343	0.00	0.00	0.00	0	0				0
		point344	344	0.00	0.00	0.00	0	0				0
		point345	345	0.00	0.00	0.00	0	0				0
		point346	346	0.00	0.00	0.00	0	0				0
		point347	347	0.00	0.00	0.00	0	0				0
		point348	348	0.00	0.00	0.00	0	0				0
		point349	349	0.00	0.00	0.00	0	0				0
		point350	350	0.00	0.00	0.00	0	0				0
		point351	351	0.00	0.00	0.00	0	0				0
		point352	352	0.00	0.00	0.00	0	0				0
		point353	353	0.00	0.00	0.00	0	0				0
		point354	354	0.00	0.00	0.00	0	0				0
		point355	355	0.00	0.00	0.00	0	0				0
		point356	356	0.00	0.00	0.00	0	0				0
		point357	357	0.00	0.00	0.00	0	0				0
		point358	358	0.00	0.00	0.00	0	0				0
		point359	359	0.00	0.00	0.00	0	0				0
		point360	360	0.00	0.00	0.00	0	0				0
		point361	361	0.00	0.00	0.00	0	0				0

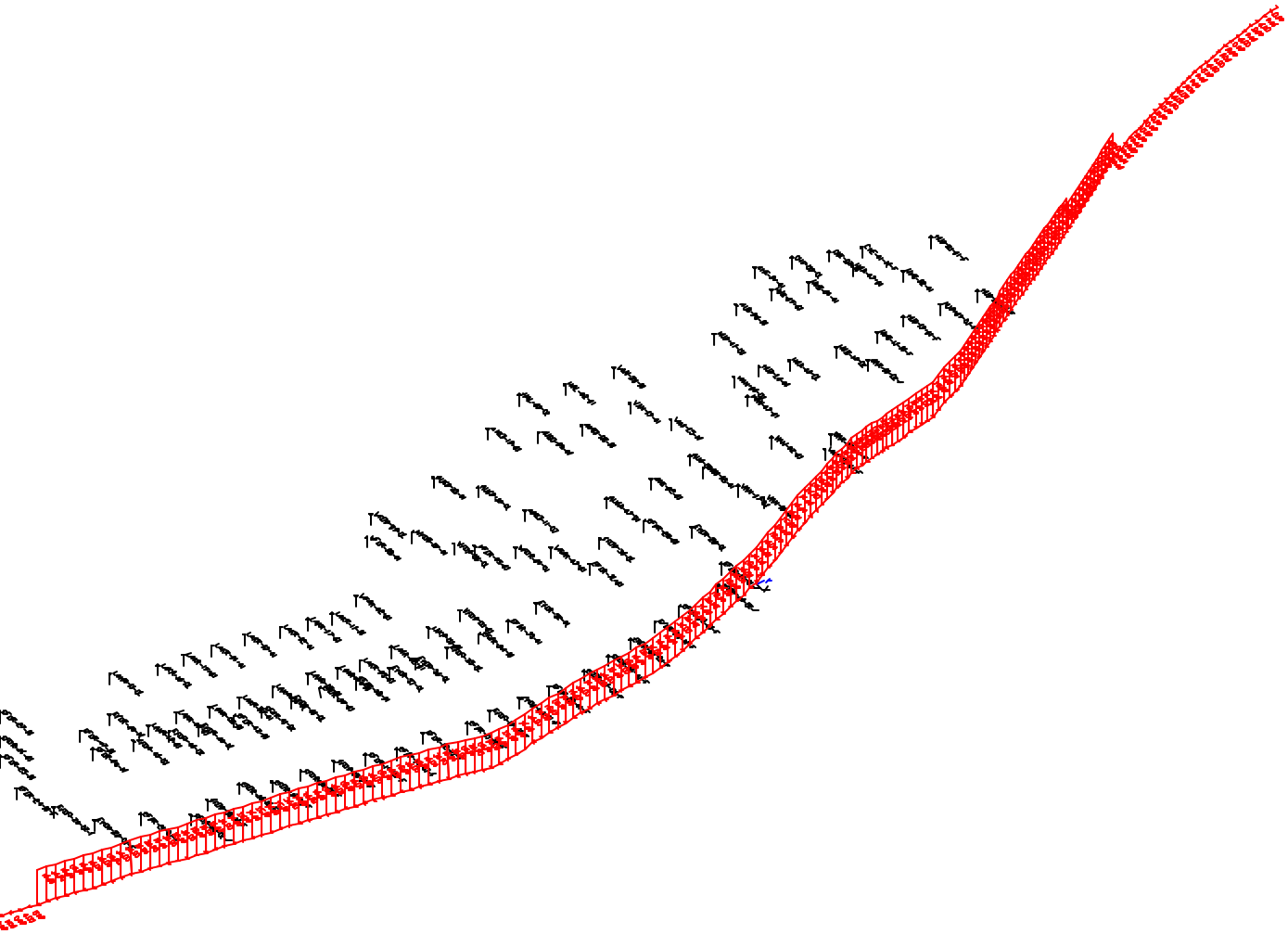
		point362	362	0.00	0.00	0.00	0	0				0
		point363	363	0.00	0.00	0.00	0	0				0
		point364	364	0.00	0.00	0.00	0	0				0
		point365	365	12.00	12.00	12.00	20	240				7214
		point366	366	12.00	12.00	12.00	20	240				7214
		point367	367	12.00	12.00	12.00	20	238				7139
		point368	368	12.00	12.00	12.00	20	244				7314
		point369	369	12.00	12.00	12.00	20	238				7139
		point370	370	12.00	12.00	12.00	20	241				7240
		point371	371	12.00	12.00	12.00	20	239				7167
		point372	372	12.00	12.00	12.00	20	242				7272
		point373	373	12.00	12.00	12.00	20	236				7093
		point374	374	12.00	12.00	12.00	20	241				7240
		point375	375	12.00	12.00	12.00	20	240				7200
		point376	376	12.00	12.00	12.00	20	241				7240
		point377	377	12.00	12.00	12.00	20	236				7093
		point378	378	16.00	16.00	16.00	20	323				9696
		point379	379	16.00	16.00	16.00	20	319				9556
		point380	380	16.00	16.00	16.00	20	322				9654
		point381	381	16.00	16.00	16.00	20	322				9654
		point382	382	16.00	16.00	16.00	20	319				9556
		point383	383	16.00	16.00	16.00	20	317				9519
		point384	384	16.00	16.00	16.00	20	319				9556
		point385	385	16.00	16.00	16.00	20	322				9654
		point386	386	16.00	16.00	16.00	20	322				9654
		point387	387	16.00	16.00	16.00	20	322				9654
		point388	388	16.00	16.00	16.00	20	319				9556
		point389	389	16.00	16.00	16.00	20	317				9519
		point390	390	16.00	16.00	16.00	20	319				9556
		point391	391	16.00	16.00	16.00	20	322				9654
		point392	392	16.00	16.00	16.00	20	322				9654
		point393	393	16.00	16.00	16.00	20	322				9654
		point394	394	16.00	16.00	16.00	20	319				9556
		point395	395	16.00	16.00	16.00	20	317				9519
		point396	396	16.00	16.00	16.00	20	319				9556
		point397	397	16.00	16.00	16.00	20	322				9654
		point398	398	16.00	16.00	16.00	20	322				9654
		point399	399	16.00	16.00	16.00	20	322				9654
		point400	400	16.00	16.00	16.00	20	319				9556

		point401	401	16.00	16.00	16.00	20	317				9519
		point402	402	16.00	16.00	16.00	20	319				9556
		point403	403	16.00	16.00	16.00	20	322				9654
		point404	404	16.00	16.00	16.00	20	322				9654
		point405	405	16.00	16.00	16.00	20	322				9654
		point406	406	16.00	16.00	16.00	20	319				9556
		point407	407	16.00	16.00	16.00	20	315				9453
		point408	408	16.00	16.00	16.00	20	323				9693
		point409	409	16.00	16.00	16.00	20	319				9582
		point410	410	16.00	16.00	16.00	20	319				9582
		point411	411	16.00	16.00	16.00	20	323				9693
		point412	412	16.00	16.00	16.00	20	316				9494
		point413	413	16.00	16.00	16.00	20	319				9582
		point414	414	16.00	16.00	16.00	20	319				9582
		point415	415	16.00	16.00	16.00	20	323				9693
		point416	416	16.00	16.00	16.00	20	319				9582
		point417	417	16.00	16.00	16.00	20	319				9582
		point418	418	16.00	16.00	16.00	20	323				9693
		point419	419	16.00	16.00	16.00	20	316				9471
		point420	420	16.00	16.00	16.00	20	322				9664
		point421	421	16.00	16.00	16.00	20	322				9660
		point422	422	16.00	16.00	16.00	20	318				9553
		point423	423	16.00	16.00	16.00	20	318				9553
		point424	424	16.00	16.00	16.00	20	322				9660
		point425	425	16.00	16.00	16.00	20	318				9553
		point426	426	16.00	16.00	16.00	20	318				9553
		point427	427	16.00	16.00	16.00	20	322				9660
		point428	428	16.00	16.00	16.00	20	318				9553
		point429	429	16.00	16.00	16.00	20	318				9553
		point430	430	16.00	16.00	16.00	20	322				9660
		point431	431	16.00	16.00	16.00	20	318				9553
		point432	432	16.00	16.00	16.00	20	322				9660
		point433	433	16.00	16.00	16.00	20	319				9565
		point434	434	16.00	16.00	16.00	20	320				9607
		point335	335	16.00	16.00	16.00	20	320				9607
		point435	435	16.00	16.00	16.00	20	318				9525
		point436	436	16.00	16.00	16.00	20	320				9607
		point437	437	16.00	16.00	16.00	20	320				9607
		point438	438	16.00	16.00	16.00	20	320				9607

		point439	439	16.00	16.00	16.00	20	320				9607
		point440	440	16.00	16.00	16.00	20	320				9607
		point441	441	16.00	16.00	16.00	20	320				9607
		point442	442	16.00	16.00	16.00	20	320				9607
		point443	443	16.00	16.00	16.00	20	321				9639
		point444	444	16.00	16.00	16.00	20	321				9639
		point445	445	16.00	16.00	16.00	20	318				9547
		point446	446	16.00	16.00	16.00	20	318				9547
		point447	447	16.00	16.00	16.00	20	322				9663
		point448	448	16.00	16.00	16.00	20	318				9547
		point449	449	16.00	16.00	16.00	20	320				9610
		point450	450	16.00	16.00	16.00	20	322				9663
		point451	451	16.00	16.00	16.00	20	318				9547
		point452	452	16.00	16.00	16.00	20	318				9547
		point453	453	16.00	16.00	16.00	20	322				9663
		point454	454	16.00	16.00	16.00	20	318				9547
		point455	455	16.00	16.00	16.00	20	320				9606
		point456	456	16.00	16.00	16.00	20	322				9675
		point457	457	16.00	16.00	16.00	20	319				9556
		point458	458	16.00	16.00	16.00	20	322				9648
		point459	459	16.00	16.00	16.00	20	319				9556
		point460	460	16.00	16.00	16.00	20	319				9556
		point461	461	16.00	16.00	16.00	20	322				9648
		point462	462	16.00	16.00	16.00	20	319				9556
		point463	463	16.00	16.00	16.00	20	322				9648
		point464	464	16.00	16.00	16.00	20	319				9556
		point465	465	16.00	16.00	16.00	20	322				9648
		point466	466	16.00	16.00	16.00	20	322				9648
		point467	467	16.00	16.00	16.00	20	318				9528
		point468	468	16.00	16.00	16.00	20	322				9648
		point469	469	16.00	16.00	16.00	20	318				9528
		point470	470	16.00	16.00	16.00	20	322				9648
		point471	471	16.00	16.00	16.00	20	322				9648
		point472	472	16.00	16.00	16.00	20	317				9507
		point473	473	16.00	16.00	16.00	20	320				9612
		point474	474	16.00	16.00	16.00	20	320				9612
		point475	475	16.00	16.00	16.00	20	320				9603
		point476	476	16.00	16.00	16.00	20	320				9612
		point477	477	16.00	16.00	16.00	20	320				9603

		point478	478	16.00	16.00	16.00	20	320				9612
		point479	479	16.00	16.00	16.00	20	320				9612
		point480	480	16.00	16.00	16.00	20	316				9483
		point481	481	16.00	16.00	16.00	20	320				9600
		point482	482	16.00	16.00	16.00	20	322				9675
		point483	483	16.00	16.00	16.00	20	318				9528
		point484	484	16.00	16.00	16.00	20	322				9675
		point485	485	16.00	16.00	16.00	20	319				9556
		point486	486	16.00	16.00	16.00	20	322				9648
		point487	487	16.00	16.00	16.00	20	319				9556
		point488	488	16.00	16.00	16.00	20	319				9556
		point489	489	16.00	16.00	16.00	20	322				9675
		point490	490	16.00	16.00	16.00	20	319				9556
		point491	491	16.00	16.00	16.00	20	322				9675
		point492	492	16.00	16.00	16.00	20	318				9528
		point493	493	16.00	16.00	16.00	20	322				9675
		point494	494	16.00	16.00	16.00	20	319				9556
		point495	495	16.00	16.00	16.00	20	318				9528
		point496	496	16.00	16.00	16.00	20	322				9675
		point497	497	16.00	16.00	16.00	20	319				9556
		point498	498	16.00	16.00	16.00	20	322				9675
		point499	499	16.00	16.00	16.00	20	319				9556
		point500	500	16.00	16.00	16.00	20	322				9648
		point501	501	16.00	16.00	16.00	20	319				9556
		point502	502	16.00	16.00	16.00	20	319				9556
		point503	503	16.00	16.00	16.00	20	322				9675
		point504	504	16.00	16.00	16.00	20	319				9556
		point505	505	16.00	16.00	16.00	20	319				9556
		point506	506	16.00	16.00	16.00	20	322				9675
		point507	507	16.00	16.00	16.00	20	319				9556
		point508	508	16.00	16.00	16.00	20	322				9648
		point509	509	16.00	16.00	16.00	20	319				9556
		point510	510	16.00	16.00	16.00	20	322				9675
		point511	511	16.00	16.00	16.00	20	319				9556
		point512	512	16.00	16.00	16.00	20	319				9556
		point513	513	16.00	16.00	16.00	20	322				9648
		point514	514	16.00	16.00	16.00	20	319				9556
		point515	515	16.00	16.00	16.00	20	319				9556
		point516	516	16.00	16.00	16.00	20	322				9675

		point517	517	16.00	16.00	16.00	20	319				9556
		point518	518	16.00	16.00	16.00	20	322				9648
		point519	519	16.00	16.00	16.00	20	319				9556
		point520	520	16.00	16.00	16.00	20	322				9675
		point521	521	16.00	16.00	16.00	20	319				9556
		point522	522	16.00	16.00	16.00	20	318				9528
		point523	523	16.00	16.00	16.00	20	322				9675
		point524	524	16.00	16.00	16.00	20	319				9556
		point525	525	16.00	16.00	16.00	20	322				9675
		point526	526	16.00	16.00	16.00	20	318				9528
		point527	527	0.00	0.00	0.00	0	0				0
		point528	528	0.00	0.00	0.00	0	0				0
		point529	529	0.00	0.00	0.00	0	0				0
		point530	530	0.00	0.00	0.00	0	0				0
		point531	531	0.00	0.00	0.00	0	0				0
		point532	532	0.00	0.00	0.00	0	0				0



351 Barrier Vanguard Alternative	Sheet 1 of 1	12 Apr 2021
	HMB Professional Engineers	
Barrier View-Vanguard-Barrier-Extended	Project/Contract No. I69 ORX	
Run name: 351_Vanguard_Alt_Bar	TNM Version 2.5, Feb 2004	
Scale: <DNA - due to perspective>	Analysis By: Mark Gavula	

Roadway:		Ground Zone:	polygon
Receiver:		Tree Zone:	dashed polygon
Barrier:		Contour Zone:	polygon
Building Row:		Parallel Barrier:	
Terrain Line:		Skew Section:	

TNM OUTPUT FOR SOUTH ARLINGTON DRIVE BARRIER WALL

HMB Professional Engineers
Mark Gavula

13 April 2021
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: I69 ORX
RUN: 351 Barrier South Arlington Extended
BARRIER DESIGN: S Arlington BAR-Extended
ATMOSPHERICS: 68 deg F, 50% RH

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

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
ARL-31-01-F	108	1	65.3	70.5	66	5.2	10	Snd Lvl	62.2	8.3	8	0.3
ARL-32-01-F	109	1	64.0	69.4	66	5.4	10	Snd Lvl	61.4	8.0	8	0.0
ARL-33-01-F	110	1	62.5	68.2	66	5.7	10	Snd Lvl	60.4	7.8	8	-0.2
ARL-34-01-F	111	1	60.5	66.5	66	6.0	10	Snd Lvl	59.5	7.0	8	-1.0
ARL-35-01-F	112	1	59.0	65.0	66	6.0	10	----	58.8	6.2	8	-1.8
ARL-36-01-F	113	1	58.2	63.9	66	5.7	10	----	58.3	5.6	8	-2.4
ARL-37-01-F	106	1	58.3	63.5	66	5.2	10	----	58.2	5.3	8	-2.7
ARL-30-01-F	137	1	69.3	73.3	66	4.0	10	Snd Lvl	63.7	9.6	8	1.6
ARL-29-01-F	138	1	71.3	75.5	66	4.2	10	Snd Lvl	65.6	9.9	8	1.9
ARL-28-01-F	139	1	67.9	72.2	66	4.3	10	Snd Lvl	60.6	11.6	8	3.6
ARL-20-01	140	1	55.9	56.5	66	0.6	10	----	52.8	3.7	8	-4.3
ARL-21-01	141	1	56.1	56.7	66	0.6	10	----	53.4	3.3	8	-4.7
ARL-22-01	142	1	57.2	57.7	66	0.5	10	----	53.6	4.1	8	-3.9
ARL-27-01	143	1	61.5	64.3	66	2.8	10	----	58.1	6.2	8	-1.8
ARL-26-01	144	1	60.9	62.8	66	1.9	10	----	57.6	5.2	8	-2.8
ARL-25-01	145	1	59.5	61.1	66	1.6	10	----	56.0	5.1	8	-2.9
ARL-24-01	146	1	58.7	59.0	66	0.3	10	----	54.6	4.4	8	-3.6
ARL-23-01	147	1	57.7	58.3	66	0.6	10	----	54.4	3.9	8	-4.1
ARL-16-01	148	1	54.0	55.2	66	1.2	10	----	53.1	2.1	8	-5.9
ARL-17-01	149	1	54.6	55.5	66	0.9	10	----	52.7	2.8	8	-5.2
ARL-18-01	150	1	54.9	55.7	66	0.8	10	----	52.8	2.9	8	-5.1
ARL-19-01	151	1	55.6	55.5	66	-0.1	10	----	51.8	3.7	8	-4.3
HCHA-08-02	152	1	53.7	59.1	66	5.4	10	----	53.4	5.7	8	-2.3
HCHA-01-09	153	1	51.6	53.6	66	2.0	10	----	52.0	1.6	8	-6.4

HCHA-02-03	154	1	54.1	55.0	66	0.9	10	----	51.2	3.8	8	-4.2
HCHA-03-03	155	1	56.2	61.0	66	4.8	10	----	54.6	6.4	8	-1.6
HCHA-04-02-F	156	1	57.9	63.4	66	5.5	10	----	56.4	7.0	8	-1.0
HCHA-05-02-F	157	1	58.4	63.9	66	5.5	10	----	56.6	7.3	8	-0.7
HCHA-06-02-F	158	1	58.6	63.6	66	5.0	10	----	56.6	7.0	8	-1.0
HCHA-07-02-F	159	1	59.9	64.9	66	5.0	10	----	57.9	7.0	8	-1.0

Dwelling Units	**# DUs**	**Noise Reduction**		
		Min	**Avg**	**Max**
		dB	**dB**	**dB**
All Selected	30	1.6	5.8	11.6
All Impacted	7	7.0	8.9	11.6
All that meet NR Goal	5	8.0	9.5	11.6

HMB Professional Engineers				**13 April 2021**						
Mark Gavula				**TNM 2.5**						
RESULTS: BARRIER DESCRIPTIONS										
PROJECT/CONTRACT:	**I69 ORX**									
RUN:	**351 Barrier South Arlington Extended**									
BARRIER DESIGN:	**S Arlington BAR-Extended**									
Barriers										
Name	**Type**	**Heights along Barrier**			**Length**	**If Wall**	**If Berm**			**Cost**
		Min	**Avg**	**Max**		**Area**	**Volume**	**Top**	**Run:Rise**	
								Width		
		ft	ft	ft	ft	sq ft	cu yd	ft	ft:ft	$
Barrier8-SA-01	W	14.00	15.02	18.00	2803	42088				1262632
									Total Cost:	1262632

HMB Professional Engineers 13 April 2021
Mark Gavula TNM 2.5
Calculated with TNM 2.5

RESULTS: BARRIER DESIGN
PROJECT/CONTRACT: I69 ORX
RUN: 351 Barrier South Arlington Extended
BARRIER DESIGN: S Arlington BAR-Extended

ATMOSPHERICS: 68 deg F, 50% RH

Selected Receivers

Name	No.	Calc LAeq1h	Noise Reduction Calc	Noise Reduction Goal	Noise Reduction Calc-Goal	Barrier Reviewed	Important Segments Name	Important Segments No.	Important Segments Height	Partial LAeq1h
		dBA	dB	dB	dB				ft	dBA
ARL-31-01-F	108	62.2	8.3	8	0.3	Barrier8-SA-01	point308	308	16.0	48.5
						Barrier8-SA-01	point309	309	16.0	48.0
						Barrier8-SA-01	point307	307	16.0	47.9
						Barrier8-SA-01	point305	305	16.0	47.6
						Barrier8-SA-01	point306	306	16.0	47.5
						Barrier8-SA-01	point304	304	16.0	47.1
						Barrier8-SA-01	point310	310	16.0	47.1
						Barrier8-SA-01	point311	311	16.0	46.7
						Barrier8-SA-01	point303	303	16.0	46.6
						Barrier8-SA-01	point302	302	16.0	46.6
ARL-32-01-F	109	61.4	8.0	8	-0.0	Barrier8-SA-01	point309	309	16.0	46.6
						Barrier8-SA-01	point310	310	16.0	46.4
						Barrier8-SA-01	point311	311	16.0	46.4
						Barrier8-SA-01	point308	308	16.0	46.3
						Barrier8-SA-01	point313	313	16.0	46.2
						Barrier8-SA-01	point314	314	16.0	46.2
						Barrier8-SA-01	point312	312	16.0	46.2
						Barrier8-SA-01	point315	315	16.0	45.9
						Barrier8-SA-01	point316	316	16.0	45.7
						Barrier8-SA-01	point307	307	16.0	45.6
ARL-33-01-F	110	60.4	7.8	8	-0.2	Barrier8-SA-01	point315	315	16.0	45.5

						Barrier8-SA-01	point316	316	16.0	45.4
						Barrier8-SA-01	point314	314	16.0	45.2
						Barrier8-SA-01	point317	317	16.0	45.2
						Barrier8-SA-01	point318	318	16.0	45.0
						Barrier8-SA-01	point313	313	16.0	44.9
						Barrier8-SA-01	point312	312	16.0	44.6
						Barrier8-SA-01	point319	319	16.0	44.4
						Barrier8-SA-01	point311	311	16.0	44.3
						Barrier8-SA-01	point321	321	16.0	44.2
ARL-34-01-F	111	59.5	7.0	8	-1.0	Barrier8-SA-01	point317	317	16.0	43.4
						Barrier8-SA-01	point318	318	16.0	43.4
						Barrier8-SA-01	point316	316	16.0	43.3
						Barrier8-SA-01	point315	315	16.0	43.2
						Barrier8-SA-01	point321	321	16.0	43.1
						Barrier8-SA-01	point319	319	16.0	43.0
						Barrier8-SA-01	point322	322	16.0	42.8
						Barrier8-SA-01	point314	314	16.0	42.7
						Barrier8-SA-01	point320	320	16.0	42.7
						Barrier8-SA-01	point324	324	16.0	42.6
ARL-35-01-F	112	58.8	6.2	8	-1.8	Barrier8-SA-01	point354	354	0.0	41.8
						Barrier8-SA-01	point331	331	16.0	41.8
						Barrier8-SA-01	point326	326	16.0	41.7
						Barrier8-SA-01	point330	330	16.0	41.7
						Barrier8-SA-01	point355	355	0.0	41.7
						Barrier8-SA-01	point332	332	16.0	41.7
						Barrier8-SA-01	point333	333	16.0	41.5
						Barrier8-SA-01	point327	327	16.0	41.5
						Barrier8-SA-01	point356	356	0.0	41.5
						Barrier8-SA-01	point328	328	16.0	41.4
ARL-36-01-F	113	58.3	5.6	8	-2.4	Barrier8-SA-01	point354	354	0.0	41.6
						Barrier8-SA-01	point355	355	0.0	41.5
						Barrier8-SA-01	point356	356	0.0	41.1
						Barrier8-SA-01	point357	357	0.0	41.0
						Barrier8-SA-01	point331	331	16.0	41.0
						Barrier8-SA-01	point358	358	0.0	40.9
						Barrier8-SA-01	point332	332	16.0	40.9

						Barrier8-SA-01	point333	333	16.0	40.9
						Barrier8-SA-01	point330	330	16.0	40.8
						Barrier8-SA-01	point359	359	0.0	40.5
ARL-37-01-F	106	58.2	5.3	8	-2.7	Barrier8-SA-01	point354	354	0.0	41.9
						Barrier8-SA-01	point355	355	0.0	41.7
						Barrier8-SA-01	point356	356	0.0	41.4
						Barrier8-SA-01	point357	357	0.0	41.2
						Barrier8-SA-01	point358	358	0.0	41.2
						Barrier8-SA-01	point359	359	0.0	40.9
						Barrier8-SA-01	point333	333	16.0	40.8
						Barrier8-SA-01	point332	332	16.0	40.8
						Barrier8-SA-01	point331	331	16.0	40.7
						Barrier8-SA-01	point330	330	16.0	40.5
ARL-30-01-F	137	63.7	9.6	8	1.6	Barrier8-SA-01	point302	302	16.0	51.5
						Barrier8-SA-01	point301	301	16.0	51.1
						Barrier8-SA-01	point303	303	16.0	50.9
						Barrier8-SA-01	point300	300	16.0	50.8
						Barrier8-SA-01	point304	304	16.0	50.7
						Barrier8-SA-01	point305	305	16.0	50.7
						Barrier8-SA-01	point306	306	16.0	50.0
						Barrier8-SA-01	point299	299	16.0	49.9
						Barrier8-SA-01	point307	307	16.0	49.6
						Barrier8-SA-01	point308	308	16.0	49.5
ARL-29-01-F	138	65.6	9.9	8	1.9	Barrier8-SA-01	point299	299	16.0	55.3
						Barrier8-SA-01	point298	298	16.0	55.1
						Barrier8-SA-01	point300	300	16.0	54.0
						Barrier8-SA-01	point297	297	16.0	53.8
						Barrier8-SA-01	point301	301	16.0	52.1
						Barrier8-SA-01	point292	292	16.0	51.3
						Barrier8-SA-01	point302	302	16.0	51.2
						Barrier8-SA-01	point296	296	16.0	50.7
						Barrier8-SA-01	point295	295	16.0	50.7
						Barrier8-SA-01	point303	303	16.0	50.2
ARL-28-01-F	139	60.6	11.6	8	3.6	Barrier8-SA-01	point287	287	14.0	49.5
						Barrier8-SA-01	point278	278	14.0	49.1
						Barrier8-SA-01	point286	286	14.0	48.6

						Barrier8-SA-01	point288	288	16.0	47.3
						Barrier8-SA-01	point285	285	14.0	47.1
						Barrier8-SA-01	point290	290	16.0	46.9
						Barrier8-SA-01	point291	291	16.0	46.7
						Barrier8-SA-01	point289	289	16.0	46.7
						Barrier8-SA-01	point284	284	14.0	46.5
						Barrier8-SA-01	point283	283	14.0	46.5
ARL-20-01	140	52.8	3.7	8	-4.3	Barrier8-SA-01	point263	263	14.0	35.7
						Barrier8-SA-01	point265	265	14.0	35.6
						Barrier8-SA-01	point320	320	16.0	35.0
						Barrier8-SA-01	point330	330	16.0	34.8
						Barrier8-SA-01	point318	318	16.0	34.6
						Barrier8-SA-01	point317	317	16.0	34.5
						Barrier8-SA-01	point271	271	14.0	34.5
						Barrier8-SA-01	point319	319	16.0	34.5
						Barrier8-SA-01	point321	321	16.0	34.4
						Barrier8-SA-01	point316	316	16.0	34.4
ARL-21-01	141	53.4	3.3	8	-4.7	Barrier8-SA-01	point318	318	16.0	35.4
						Barrier8-SA-01	point317	317	16.0	35.3
						Barrier8-SA-01	point321	321	16.0	35.2
						Barrier8-SA-01	point316	316	16.0	35.2
						Barrier8-SA-01	point326	326	16.0	35.2
						Barrier8-SA-01	point330	330	16.0	35.2
						Barrier8-SA-01	point315	315	16.0	35.2
						Barrier8-SA-01	point325	325	16.0	35.1
						Barrier8-SA-01	point319	319	16.0	35.1
						Barrier8-SA-01	point327	327	16.0	35.1
ARL-22-01	142	53.6	4.1	8	-3.9	Barrier8-SA-01	point264	264	14.0	37.3
						Barrier8-SA-01	point271	271	14.0	36.5
						Barrier8-SA-01	point272	272	14.0	35.9
						Barrier8-SA-01	point273	273	14.0	35.3
						Barrier8-SA-01	point314	314	16.0	35.2
						Barrier8-SA-01	point313	313	16.0	35.0
						Barrier8-SA-01	point315	315	16.0	35.0
						Barrier8-SA-01	point265	265	14.0	34.9
						Barrier8-SA-01	point270	270	14.0	34.8

						Barrier8-SA-01	point316	316	16.0	34.7
ARL-27-01	143	58.1	6.2	8	-1.8	Barrier8-SA-01	point268	268	14.0	43.8
						Barrier8-SA-01	point287	287	14.0	43.7
						Barrier8-SA-01	point261	261	14.0	43.3
						Barrier8-SA-01	point267	267	14.0	43.3
						Barrier8-SA-01	point269	269	14.0	43.1
						Barrier8-SA-01	point286	286	14.0	43.0
						Barrier8-SA-01	point270	270	14.0	42.7
						Barrier8-SA-01	point266	266	14.0	42.6
						Barrier8-SA-01	point263	263	14.0	41.6
						Barrier8-SA-01	point285	285	14.0	41.3
ARL-26-01	144	57.6	5.2	8	-2.8	Barrier8-SA-01	point263	263	14.0	45.0
						Barrier8-SA-01	point269	269	14.0	44.7
						Barrier8-SA-01	point270	270	14.0	44.2
						Barrier8-SA-01	point265	265	14.0	43.4
						Barrier8-SA-01	point268	268	14.0	42.2
						Barrier8-SA-01	point264	264	14.0	42.0
						Barrier8-SA-01	point271	271	14.0	41.4
						Barrier8-SA-01	point272	272	14.0	41.0
						Barrier8-SA-01	point273	273	14.0	40.0
						Barrier8-SA-01	point274	274	14.0	39.8
ARL-25-01	145	56.0	5.1	8	-2.9	Barrier8-SA-01	point269	269	14.0	41.3
						Barrier8-SA-01	point268	268	14.0	41.0
						Barrier8-SA-01	point270	270	14.0	40.5
						Barrier8-SA-01	point264	264	14.0	40.5
						Barrier8-SA-01	point262	262	14.0	39.9
						Barrier8-SA-01	point271	271	14.0	39.6
						Barrier8-SA-01	point263	263	14.0	38.7
						Barrier8-SA-01	point272	272	14.0	37.9
						Barrier8-SA-01	point273	273	14.0	37.4
						Barrier8-SA-01	point274	274	14.0	37.3
ARL-24-01	146	54.6	4.4	8	-3.6	Barrier8-SA-01	point264	264	14.0	39.9
						Barrier8-SA-01	point270	270	14.0	39.3
						Barrier8-SA-01	point265	265	14.0	39.2
						Barrier8-SA-01	point271	271	14.0	39.0
						Barrier8-SA-01	point273	273	14.0	37.6

						Barrier8-SA-01	point272	272	14.0	37.4
						Barrier8-SA-01	point274	274	14.0	35.9
						Barrier8-SA-01	point269	269	14.0	35.8
						Barrier8-SA-01	point275	275	14.0	35.2
						Barrier8-SA-01	point309	309	16.0	35.1
ARL-23-01	147	54.4	3.9	8	-4.1	Barrier8-SA-01	point262	262	14.0	37.3
						Barrier8-SA-01	point264	264	14.0	37.0
						Barrier8-SA-01	point269	269	14.0	36.8
						Barrier8-SA-01	point270	270	14.0	36.7
						Barrier8-SA-01	point271	271	14.0	36.1
						Barrier8-SA-01	point313	313	16.0	35.8
						Barrier8-SA-01	point272	272	14.0	35.8
						Barrier8-SA-01	point314	314	16.0	35.8
						Barrier8-SA-01	point315	315	16.0	35.8
						Barrier8-SA-01	point316	316	16.0	35.7
ARL-16-01	148	53.1	2.1	8	-5.9	Barrier8-SA-01	point333	333	16.0	36.4
						Barrier8-SA-01	point332	332	16.0	35.5
						Barrier8-SA-01	point351	351	14.0	34.9
						Barrier8-SA-01	point334	334	18.0	34.8
						Barrier8-SA-01	point352	352	14.0	34.7
						Barrier8-SA-01	point353	353	14.0	34.7
						Barrier8-SA-01	point344	344	14.0	34.6
						Barrier8-SA-01	point350	350	14.0	34.6
						Barrier8-SA-01	point335	335	18.0	34.6
						Barrier8-SA-01	point347	347	14.0	34.6
ARL-17-01	149	52.7	2.8	8	-5.2	Barrier8-SA-01	point344	344	14.0	34.8
						Barrier8-SA-01	point266	266	14.0	34.3
						Barrier8-SA-01	point345	345	14.0	34.2
						Barrier8-SA-01	point264	264	14.0	34.1
						Barrier8-SA-01	point352	352	14.0	33.7
						Barrier8-SA-01	point330	330	16.0	33.6
						Barrier8-SA-01	point346	346	14.0	33.5
						Barrier8-SA-01	point331	331	16.0	33.5
						Barrier8-SA-01	point354	354	0.0	33.4
						Barrier8-SA-01	point329	329	16.0	33.4
ARL-18-01	150	52.8	2.9	8	-5.1	Barrier8-SA-01	point264	264	14.0	35.0

						Barrier8-SA-01	point266	266	14.0	34.8
						Barrier8-SA-01	point319	319	16.0	34.1
						Barrier8-SA-01	point333	333	16.0	34.0
						Barrier8-SA-01	point332	332	16.0	34.0
						Barrier8-SA-01	point331	331	16.0	34.0
						Barrier8-SA-01	point314	314	16.0	34.0
						Barrier8-SA-01	point320	320	16.0	33.9
						Barrier8-SA-01	point330	330	16.0	33.9
						Barrier8-SA-01	point321	321	16.0	33.8
ARL-19-01	151	51.8	3.7	8	-4.3	Barrier8-SA-01	point267	267	14.0	34.0
						Barrier8-SA-01	point317	317	16.0	33.7
						Barrier8-SA-01	point265	265	14.0	33.4
						Barrier8-SA-01	point316	316	16.0	33.2
						Barrier8-SA-01	point318	318	16.0	33.0
						Barrier8-SA-01	point315	315	16.0	32.7
						Barrier8-SA-01	point331	331	16.0	32.3
						Barrier8-SA-01	point332	332	16.0	32.3
						Barrier8-SA-01	point333	333	16.0	32.3
						Barrier8-SA-01	point314	314	16.0	32.3
HCHA-08-02	152	53.4	5.7	8	-2.3	Barrier8-SA-01	point383	383	0.0	36.4
						Barrier8-SA-01	point382	382	0.0	36.2
						Barrier8-SA-01	point381	381	0.0	35.9
						Barrier8-SA-01	point380	380	0.0	35.8
						Barrier8-SA-01	point379	379	0.0	35.6
						Barrier8-SA-01	point416	416	14.0	35.6
						Barrier8-SA-01	point377	377	0.0	35.4
						Barrier8-SA-01	point378	378	0.0	35.3
						Barrier8-SA-01	point415	415	14.0	34.6
						Barrier8-SA-01	point413	413	14.0	34.6
HCHA-01-09	153	52.0	1.6	8	-6.4	Barrier8-SA-01	point333	333	16.0	33.9
						Barrier8-SA-01	point332	332	16.0	33.8
						Barrier8-SA-01	point331	331	16.0	33.8
						Barrier8-SA-01	point329	329	16.0	33.2
						Barrier8-SA-01	point326	326	16.0	33.2
						Barrier8-SA-01	point327	327	16.0	33.1
						Barrier8-SA-01	point328	328	16.0	33.0

						Barrier8-SA-01	point325	325	16.0	32.8
						Barrier8-SA-01	point321	321	16.0	32.6
						Barrier8-SA-01	point322	322	16.0	32.5
HCHA-02-03	154	51.2	3.8	8	-4.2	Barrier8-SA-01	point280	280	14.0	36.1
						Barrier8-SA-01	point314	314	16.0	33.6
						Barrier8-SA-01	point313	313	16.0	33.5
						Barrier8-SA-01	point327	327	16.0	33.2
						Barrier8-SA-01	point287	287	14.0	33.1
						Barrier8-SA-01	point328	328	16.0	32.9
						Barrier8-SA-01	point293	293	16.0	32.7
						Barrier8-SA-01	point286	286	14.0	32.6
						Barrier8-SA-01	point294	294	16.0	32.6
						Barrier8-SA-01	point277	277	14.0	32.4
HCHA-03-03	155	54.6	6.4	8	-1.6	Barrier8-SA-01	point287	287	14.0	37.8
						Barrier8-SA-01	point283	283	14.0	37.7
						Barrier8-SA-01	point281	281	14.0	37.6
						Barrier8-SA-01	point286	286	14.0	37.4
						Barrier8-SA-01	point280	280	14.0	37.4
						Barrier8-SA-01	point284	284	14.0	37.2
						Barrier8-SA-01	point282	282	14.0	37.2
						Barrier8-SA-01	point279	279	14.0	37.2
						Barrier8-SA-01	point278	278	14.0	37.1
						Barrier8-SA-01	point285	285	14.0	37.0
HCHA-04-02-F	156	56.4	7.0	8	-1.0	Barrier8-SA-01	point275	275	14.0	39.6
						Barrier8-SA-01	point274	274	14.0	39.6
						Barrier8-SA-01	point273	273	14.0	39.6
						Barrier8-SA-01	point276	276	14.0	39.6
						Barrier8-SA-01	point281	281	14.0	39.4
						Barrier8-SA-01	point272	272	14.0	39.4
						Barrier8-SA-01	point277	277	14.0	39.4
						Barrier8-SA-01	point278	278	14.0	39.4
						Barrier8-SA-01	point271	271	14.0	39.3
						Barrier8-SA-01	point270	270	14.0	39.3
HCHA-05-02-F	157	56.6	7.3	8	-0.7	Barrier8-SA-01	point266	266	14.0	39.9
						Barrier8-SA-01	point267	267	14.0	39.9
						Barrier8-SA-01	point268	268	14.0	39.8

						Barrier8-SA-01	point264	264	14.0	39.7
						Barrier8-SA-01	point265	265	14.0	39.7
						Barrier8-SA-01	point269	269	14.0	39.6
						Barrier8-SA-01	point270	270	14.0	39.6
						Barrier8-SA-01	point263	263	14.0	39.5
						Barrier8-SA-01	point271	271	14.0	39.4
						Barrier8-SA-01	point261	261	14.0	39.3
HCHA-06-02-F	158	56.6	7.0	8	-1.0	Barrier8-SA-01	point284	284	14.0	40.8
						Barrier8-SA-01	point246	246	14.0	40.3
						Barrier8-SA-01	point285	285	14.0	40.3
						Barrier8-SA-01	point247	247	14.0	39.7
						Barrier8-SA-01	point254	254	14.0	39.6
						Barrier8-SA-01	point250	250	14.0	39.6
						Barrier8-SA-01	point253	253	14.0	39.5
						Barrier8-SA-01	point251	251	14.0	39.5
						Barrier8-SA-01	point248	248	14.0	39.4
						Barrier8-SA-01	point252	252	14.0	39.4
HCHA-07-02-F	159	57.9	7.0	8	-1.0	Barrier8-SA-01	point415	415	14.0	42.3
						Barrier8-SA-01	point414	414	14.0	42.0
						Barrier8-SA-01	point411	411	14.0	41.6
						Barrier8-SA-01	point412	412	14.0	41.6
						Barrier8-SA-01	point410	410	14.0	41.5
						Barrier8-SA-01	point413	413	14.0	41.5
						Barrier8-SA-01	point409	409	14.0	41.5
						Barrier8-SA-01	point416	416	14.0	41.3
						Barrier8-SA-01	point408	408	14.0	41.3
						Barrier8-SA-01	point407	407	14.0	41.0
Total Cost, All Barriers (including additional cost(s))					$1262632					

HMB Professional Engineers 13 April 2021
Mark Gavula TNM 2.5

RESULTS: BARRIER-SEGMENT DESCRIPTIONS
PROJECT/CONTRACT: I69 ORX
RUN: 351 Barrier South Arlington Extended
BARRIER DESIGN: S Arlington BAR-Extended

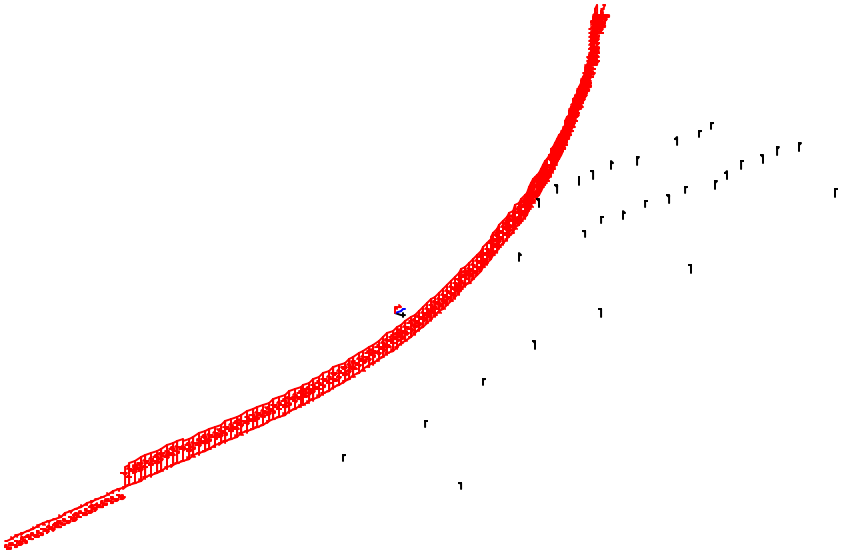
Barriers		Segments										
Name	Type	Name	No.	Heights			Length	If Wall			If Berm	Cost
				First Point	Average	Second Point		Area	On Struc?	Important Reflections?	Volume	
				ft	ft	ft	ft	sq ft			cu yd	$
Barrier8-SA-01	W	point361	361	0.00	0.00	0.00	0	0				0
		point363	363	0.00	0.00	0.00	0	0				0
		point364	364	0.00	0.00	0.00	0	0				0
		point365	365	0.00	0.00	0.00	0	0				0
		point366	366	0.00	0.00	0.00	0	0				0
		point367	367	0.00	0.00	0.00	0	0				0
		point368	368	0.00	0.00	0.00	0	0				0
		point369	369	0.00	0.00	0.00	0	0				0
		point370	370	0.00	0.00	0.00	0	0				0
		point371	371	0.00	0.00	0.00	0	0				0
		point372	372	0.00	0.00	0.00	0	0				0
		point373	373	0.00	0.00	0.00	0	0				0
		point374	374	0.00	0.00	0.00	0	0				0
		point375	375	0.00	0.00	0.00	0	0				0
		point376	376	0.00	0.00	0.00	0	0				0
		point377	377	0.00	0.00	0.00	0	0				0
		point378	378	0.00	0.00	0.00	0	0				0
		point379	379	0.00	0.00	0.00	0	0				0
		point380	380	0.00	0.00	0.00	0	0				0
		point381	381	0.00	0.00	0.00	0	0				0
		point382	382	0.00	0.00	0.00	0	0				0
		point383	383	0.00	0.00	0.00	0	0				0
		point384	384	14.00	14.00	14.00	20	281				8442
		point385	385	16.00	16.00	16.00	20	319				9556
		point386	386	16.00	16.00	16.00	20	319				9556
		point387	387	16.00	16.00	16.00	20	322				9675

		point388	388	16.00	16.00	16.00	20	319				9556
		point389	389	16.00	16.00	16.00	20	319				9556
		point390	390	16.00	16.00	16.00	20	322				9675
		point391	391	16.00	16.00	16.00	20	318				9528
		point392	392	16.00	16.00	16.00	20	322				9675
		point393	393	16.00	16.00	16.00	20	319				9556
		point394	394	16.00	16.00	16.00	20	322				9675
		point395	395	14.00	14.00	14.00	20	278				8337
		point396	396	14.00	14.00	14.00	20	279				8361
		point397	397	14.00	14.00	14.00	20	282				8465
		point398	398	14.00	14.00	14.00	20	278				8337
		point399	399	14.00	14.00	14.00	20	282				8465
		point400	400	14.00	14.00	14.00	20	279				8361
		point401	401	14.00	14.00	14.00	20	282				8465
		point402	402	14.00	14.00	14.00	20	278				8337
		point403	403	14.00	14.00	14.00	20	279				8361
		point404	404	14.00	14.00	14.00	20	282				8465
		point405	405	14.00	14.00	14.00	20	279				8361
		point406	406	14.00	14.00	14.00	20	282				8465
		point407	407	14.00	14.00	14.00	20	279				8361
		point408	408	14.00	14.00	14.00	20	279				8361
		point409	409	14.00	14.00	14.00	20	281				8442
		point410	410	14.00	14.00	14.00	20	279				8361
		point411	411	14.00	14.00	14.00	20	282				8465
		point412	412	14.00	14.00	14.00	20	279				8361
		point413	413	14.00	14.00	14.00	20	279				8361
		point414	414	14.00	14.00	14.00	20	282				8465
		point415	415	14.00	14.00	14.00	20	278				8337
		point416	416	14.00	14.00	14.00	20	281				8442
		point417	417	14.00	14.00	14.00	14	197				5914
		point244	244	14.00	14.00	14.00	15	215				6436
		point246	246	14.00	14.00	14.00	20	281				8424
		point247	247	14.00	14.00	14.00	20	281				8442
		point248	248	14.00	14.00	14.00	20	281				8424
		point249	249	14.00	14.00	14.00	20	278				8337
		point250	250	14.00	14.00	14.00	20	280				8410
		point251	251	14.00	14.00	14.00	20	281				8424
		point252	252	14.00	14.00	14.00	20	281				8424
		point253	253	14.00	14.00	14.00	20	276				8295

		point254	254	14.00	14.00	14.00	20	280				8403
		point255	255	14.00	14.00	14.00	20	280				8403
		point256	256	14.00	14.00	14.00	20	280				8403
		point257	257	14.00	14.00	14.00	20	280				8403
		point258	258	14.00	14.00	14.00	20	280				8400
		point259	259	14.00	14.00	14.00	20	280				8403
		point260	260	14.00	14.00	14.00	20	280				8403
		point261	261	14.00	14.00	14.00	20	280				8410
		point262	262	14.00	14.00	14.00	20	280				8403
		point263	263	14.00	14.00	14.00	20	280				8403
		point264	264	14.00	14.00	14.00	20	281				8424
		point265	265	14.00	14.00	14.00	20	281				8424
		point266	266	14.00	14.00	14.00	20	281				8424
		point267	267	14.00	14.00	14.00	20	277				8319
		point268	268	14.00	14.00	14.00	20	282				8465
		point269	269	14.00	14.00	14.00	20	279				8361
		point270	270	14.00	14.00	14.00	20	282				8465
		point271	271	14.00	14.00	14.00	20	279				8361
		point272	272	14.00	14.00	14.00	20	279				8361
		point273	273	14.00	14.00	14.00	20	280				8390
		point274	274	14.00	14.00	14.00	20	281				8424
		point275	275	14.00	14.00	14.00	20	281				8424
		point276	276	14.00	14.00	14.00	20	280				8390
		point277	277	14.00	14.00	14.00	20	278				8353
		point278	278	14.00	14.00	14.00	20	282				8455
		point279	279	14.00	14.00	14.00	20	278				8353
		point280	280	14.00	14.00	14.00	20	282				8455
		point281	281	14.00	14.00	14.00	21	289				8674
		point282	282	14.00	14.00	14.00	19	260				7805
		point283	283	14.00	14.00	14.00	21	301				9020
		point284	284	14.00	14.00	14.00	20	275				8258
		point285	285	14.00	14.00	14.00	19	263				7895
		point286	286	14.00	14.00	14.00	21	290				8702
		point287	287	14.00	14.00	14.00	23	321				9635
		point288	288	16.00	16.00	16.00	19	304				9107
		point289	289	16.00	16.00	16.00	18	295				8852
		point290	290	16.00	16.00	16.00	20	320				9610
		point291	291	16.00	16.00	16.00	20	318				9547
		point292	292	16.00	16.00	16.00	20	320				9610

		point293	293	16.00	16.00	16.00	20	320				9610
		point294	294	16.00	16.00	16.00	20	321				9639
		point295	295	16.00	16.00	16.00	20	320				9607
		point296	296	16.00	16.00	16.00	20	318				9525
		point297	297	16.00	16.00	16.00	20	321				9639
		point298	298	16.00	16.00	16.00	20	324				9719
		point299	299	16.00	16.00	16.00	20	316				9471
		point300	300	16.00	16.00	16.00	20	322				9664
		point301	301	16.00	16.00	16.00	20	318				9555
		point302	302	16.00	16.00	16.00	20	318				9555
		point303	303	16.00	16.00	16.00	20	322				9664
		point304	304	16.00	16.00	16.00	20	318				9555
		point305	305	16.00	16.00	16.00	20	322				9664
		point306	306	16.00	16.00	16.00	20	318				9555
		point307	307	16.00	16.00	16.00	20	322				9664
		point308	308	16.00	16.00	16.00	20	318				9555
		point309	309	16.00	16.00	16.00	20	322				9664
		point310	310	16.00	16.00	16.00	20	319				9558
		point311	311	16.00	16.00	16.00	20	319				9571
		point312	312	16.00	16.00	16.00	20	319				9571
		point313	313	16.00	16.00	16.00	20	319				9571
		point314	314	16.00	16.00	16.00	20	319				9571
		point315	315	16.00	16.00	16.00	20	323				9693
		point316	316	16.00	16.00	16.00	20	319				9571
		point317	317	16.00	16.00	16.00	20	319				9571
		point318	318	16.00	16.00	16.00	20	320				9591
		point319	319	16.00	16.00	16.00	20	325				9753
		point320	320	16.00	16.00	16.00	20	317				9519
		point321	321	16.00	16.00	16.00	20	321				9619
		point322	322	16.00	16.00	16.00	20	321				9619
		point323	323	16.00	16.00	16.00	20	317				9519
		point324	324	16.00	16.00	16.00	20	321				9619
		point325	325	16.00	16.00	16.00	20	321				9619
		point326	326	16.00	16.00	16.00	20	321				9619
		point327	327	16.00	16.00	16.00	20	321				9619
		point328	328	16.00	16.00	16.00	20	317				9519
		point329	329	16.00	16.00	16.00	20	321				9619
		point330	330	16.00	16.00	16.00	20	321				9619
		point331	331	16.00	16.00	16.00	20	317				9519

		point332	332	16.00	16.00	16.00	20	321				9619
		point333	333	16.00	16.00	16.00	20	321				9619
		point334	334	18.00	18.00	18.00	20	361				10821
		point335	335	18.00	18.00	18.00	20	361				10821
		point336	336	18.00	18.00	18.00	20	358				10753
		point337	337	18.00	18.00	18.00	20	362				10858
		point338	338	18.00	18.00	18.00	13	238				7128
		point339	339	16.00	16.00	16.00	1	18				537
		point340	340	18.00	18.00	18.00	19	341				10218
		point342	342	18.00	18.00	18.00	20	363				10884
		point343	343	18.00	18.00	18.00	20	360				10797
		point344	344	14.00	14.00	14.00	20	277				8321
		point345	345	14.00	14.00	14.00	20	280				8398
		point346	346	14.00	14.00	14.00	20	282				8465
		point347	347	14.00	14.00	14.00	20	280				8398
		point348	348	14.00	14.00	14.00	20	280				8398
		point349	349	14.00	14.00	14.00	20	277				8321
		point350	350	14.00	14.00	14.00	20	279				8363
		point351	351	14.00	14.00	14.00	20	282				8447
		point352	352	14.00	14.00	14.00	20	279				8361
		point353	353	14.00	14.00	14.00	20	282				8447
		point354	354	0.00	0.00	0.00	0	0				0
		point355	355	0.00	0.00	0.00	0	0				0
		point356	356	0.00	0.00	0.00	0	0				0
		point357	357	0.00	0.00	0.00	0	0				0
		point358	358	0.00	0.00	0.00	0	0				0
		point359	359	0.00	0.00	0.00	0	0				0



351 Barrier South Arlington Extended	Sheet 1 of 1	12 Apr 2021
	HMB Professional Engineers	
Barrier View-S Arlington BAR-Extended	Project/Contract No. I69 ORX	
Run name: S_Arlington_Alt_BAR	TNM Version 2.5, Feb 2004	
Scale: <DNA - due to perspective>	Analysis By: Mark Gavula	

Roadway:		Ground Zone:	polygon
Receiver:		Tree Zone:	dashed polygon
Barrier:		Contour Zone:	polygon
Building Row:		Parallel Barrier:	
Terrain Line:		Skew Section:	

TNM OUTPUT FOR MELWOOD DRIVE BARRIER WALL

HMB Professional Engineers
Mark Gavula

29 March 2021
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: I69 ORX
RUN: 351 Mellwood Barrier
BARRIER DESIGN: 351-BAR-C
ATMOSPHERICS: 68 deg F, 50% RH

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

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
351-02-01-F	10	1	68.0	70.2	66	2.2	10	Snd Lvl	69.4	0.8	8	-7.2
351-03-01	11	1	66.6	69.6	66	3.0	10	Snd Lvl	68.5	1.1	8	-6.9
351-04-01	12	1	62.4	66.5	66	4.1	10	Snd Lvl	64.6	1.9	8	-6.1
351-05-01	13	1	61.3	65.5	66	4.2	10	----	64.2	1.3	8	-6.7
351-06-01	14	1	59.7	63.8	66	4.1	10	----	62.5	1.3	8	-6.7
351-07-01	15	1	61.1	63.3	66	2.2	10	----	62.7	0.6	8	-7.4
351-08-01	16	1	62.3	62.4	66	0.1	10	----	62.0	0.4	8	-7.6
351-09-01	17	1	59.7	60.6	66	0.9	10	----	59.8	0.8	8	-7.2
351-10-01	18	1	60.0	59.8	66	-0.2	10	----	59.2	0.6	8	-7.4
351-11-01	19	1	59.4	59.6	66	0.2	10	----	59.1	0.5	8	-7.5
ARL-01-01	20	1	63.2	61.6	66	-1.6	10	----	61.5	0.1	8	-7.9
ARL-02-01	21	1	58.5	58.3	66	-0.2	10	----	58.2	0.1	8	-7.9
ARL-03-01	22	1	58.5	59.1	66	0.6	10	----	58.8	0.3	8	-7.7
ARL-04-01	23	1	56.5	56.6	66	0.1	10	----	56.5	0.1	8	-7.9
ARL-05-01	24	1	54.1	54.7	66	0.6	10	----	54.5	0.2	8	-7.8
ARL-06-01	25	1	52.7	56.1	66	3.4	10	----	55.6	0.5	8	-7.5
GRED-01-02-F	28	1	69.7	74.2	66	4.5	10	Snd Lvl	64.7	9.5	8	1.5
GRED-02-02	29	1	66.1	71.6	66	5.5	10	Snd Lvl	64.7	6.9	8	-1.1
GRED-03-01	30	1	61.3	67.3	66	6.0	10	Snd Lvl	62.5	4.8	8	-3.2
GRED-04-01	31	1	59.2	64.1	66	4.9	10	----	59.8	4.3	8	-3.7
GRED-05-02-F	32	1	65.3	72.8	66	7.5	10	Snd Lvl	64.3	8.5	8	0.5
GRED-06-02	33	1	68.5	71.0	66	2.5	10	Snd Lvl	64.8	6.2	8	-1.8
GRED-07-01	34	1	65.9	66.1	66	0.2	10	Snd Lvl	62.3	3.8	8	-4.2
GRED-08-01	35	1	61.2	65.7	66	4.5	10	----	62.4	3.3	8	-4.7

GRED-09-01	36	1	58.7	64.1	66	5.4	10	----	61.5	2.6	8	-5.4
GRED-10-01	37	1	58.0	63.3	66	5.3	10	----	61.2	2.1	8	-5.9
GRED-11-01	38	1	57.0	62.1	66	5.1	10	----	60.3	1.8	8	-6.2
GRED-12-01	39	1	56.0	60.7	66	4.7	10	----	59.3	1.4	8	-6.6
GRED-13-01	40	1	55.5	60.0	66	4.5	10	----	58.9	1.1	8	-6.9
GRED-14-01	41	1	54.8	58.9	66	4.1	10	----	58.0	0.9	8	-7.1
GRED-15-01	42	1	54.4	58.4	66	4.0	10	----	57.5	0.9	8	-7.1
GRED-16-01	43	1	54.0	57.8	66	3.8	10	----	57.0	0.8	8	-7.2
GRED-17-01	44	1	53.6	57.2	66	3.6	10	----	56.6	0.6	8	-7.4
GRED-18-01	45	1	53.2	56.7	66	3.5	10	----	56.4	0.3	8	-7.7
LEX-04-01	52	1	53.6	58.0	66	4.4	10	----	55.2	2.8	8	-5.2
LEX-05-01	53	1	55.3	60.3	66	5.0	10	----	56.0	4.3	8	-3.7
MELW-01-01-F	61	1	65.9	71.0	66	5.1	10	Snd Lvl	66.0	5.0	8	-3.0
MELW-02-01-F	62	1	69.5	73.1	66	3.6	10	Snd Lvl	65.5	7.6	8	-0.4
MELW-03-01-F	63	1	68.7	72.5	66	3.8	10	Snd Lvl	65.1	7.4	8	-0.6
MELW-04-01-F	64	1	68.1	72.1	66	4.0	10	Snd Lvl	65.1	7.0	8	-1.0
MELW-05-01-F	65	1	67.6	71.9	66	4.3	10	Snd Lvl	65.4	6.5	8	-1.5
MELW-07-01-F	66	1	66.4	72.3	66	5.9	10	Snd Lvl	66.8	5.5	8	-2.5
MELW-08-01-F	67	1	67.3	72.9	66	5.6	10	Snd Lvl	65.8	7.1	8	-0.9
MELW-09-01-F	68	1	67.5	73.0	66	5.5	10	Snd Lvl	64.6	8.4	8	0.4
MELW-10-01-F	69	1	69.4	74.6	66	5.2	10	Snd Lvl	64.4	10.2	8	2.2
MELW-11-01-F	70	1	69.6	74.7	66	5.1	10	Snd Lvl	63.1	11.6	8	3.6
MELW-12-01-F	71	1	66.4	71.8	66	5.4	10	Snd Lvl	61.3	10.5	8	2.5
MELW-13-01-F	72	1	64.6	70.1	66	5.5	10	Snd Lvl	60.5	9.6	8	1.6
MELW-14-01-F	73	1	62.1	68.2	66	6.1	10	Snd Lvl	59.4	8.8	8	0.8
MELW-15-01-F	74	1	59.4	66.1	66	6.7	10	Snd Lvl	58.0	8.1	8	0.1
MELW-16-01-F	75	1	57.7	64.7	66	7.0	10	----	57.2	7.5	8	-0.5
MELW-17-01-F	76	1	56.5	63.6	66	7.1	10	----	56.6	7.0	8	-1.0
MELW-18-01-F	77	1	55.5	62.3	66	6.8	10	----	56.9	5.4	8	-2.6
MELW-19-01-F	78	1	54.4	60.8	66	6.4	10	----	58.9	1.9	8	-6.1
MELW-20-01-F	79	1	53.8	59.8	66	6.0	10	----	58.6	1.2	8	-6.8
MELW-23-01	80	1	62.3	66.8	66	4.5	10	Snd Lvl	64.5	2.3	8	-5.7
MELW-24-01	81	1	61.8	65.4	66	3.6	10	----	63.4	2.0	8	-6.0
MELW-25-01	82	1	61.4	65.0	66	3.6	10	----	62.8	2.2	8	-5.8
MELW-26-01	83	1	61.2	64.9	66	3.7	10	----	63.0	1.9	8	-6.1
MELW-27-01	84	1	60.5	66.6	66	6.1	10	Snd Lvl	61.1	5.5	8	-2.5
MELW-28-01	85	1	58.7	64.9	66	6.2	10	----	59.4	5.5	8	-2.5
MELW-29-01	86	1	57.5	63.6	66	6.1	10	----	58.4	5.2	8	-2.8
MELW-30-01	87	1	56.5	61.2	66	4.7	10	----	56.5	4.7	8	-3.3
MELW-31-01	88	1	55.8	59.3	66	3.5	10	----	55.8	3.5	8	-4.5
MELW-32-01	89	1	53.8	59.3	66	5.5	10	----	56.5	2.8	8	-5.2

WEN-03-01	100	1	58.4	63.6	66	5.2	10	----	59.9	3.7	8	-4.3
WEN-04-01	101	1	61.6	66.9	66	5.3	10	Snd Lvl	62.3	4.6	8	-3.4
WEN-05-01	102	1	60.2	65.9	66	5.7	10	----	60.8	5.1	8	-2.9
WEN-06-01	103	1	58.6	64.2	66	5.6	10	----	59.1	5.1	8	-2.9
WEN-07-01	104	1	57.4	62.7	66	5.3	10	----	57.6	5.1	8	-2.9
WEN-08-01	105	1	56.6	61.6	66	5.0	10	----	56.6	5.0	8	-3.0
WEN-09-01	106	1	55.5	60.2	66	4.7	10	----	55.8	4.4	8	-3.6
MELW-06-01-F	126	1	67.1	72.5	66	5.4	10	Snd Lvl	66.4	6.1	8	-1.9
WEN-01-01	131	1	60.5	66.1	66	5.6	10	Snd Lvl	62.1	4.0	8	-4.0
WEN-02-01	133	1	59.6	65.0	66	5.4	10	----	61.3	3.7	8	-4.3

Dwelling Units	**# DUs**	**Noise Reduction**		
		Min	**Avg**	**Max**
		dB	**dB**	**dB**
All Selected	75	0.1	3.9	11.6
All Impacted	28	0.8	6.4	11.6
All that meet NR Goal	9	8.1	9.5	11.6

HMB Professional Engineers 29 March 2021
Mark Gavula TNM 2.5

RESULTS: BARRIER DESCRIPTIONS

PROJECT/CONTRACT: I69 ORX
RUN: 351 Mellwood Barrier
BARRIER DESIGN: 351-BAR-C

Barriers

Name	Type	Heights along Barrier			Length	If Wall	If Berm			Cost
		Min	Avg	Max		Area	Volume	Top Width	Run:Rise	
		ft	ft	ft	ft	sq ft	cu yd	ft	ft:ft	$
c1	W	12.00	16.30	20.00	1860	30313				909403
C2	W	0.00	13.33	16.00	300	4001				120036
									Total Cost:	1029439

HMB Professional Engineers 29 March 2021
Mark Gavula TNM 2.5
Calculated with TNM 2.5

RESULTS: BARRIER DESIGN
PROJECT/CONTRACT: I69 ORX
RUN: 351 Mellwood Barrier
BARRIER DESIGN: 351-BAR-C

ATMOSPHERICS: 68 deg F, 50% RH

Selected Receivers

Name	No.	Calc LAeq1h	Noise Reduction Calc	Noise Reduction Goal	Noise Reduction Calc-Goal	Barrier Reviewed	Important Segments Name	Important Segments No.	Important Segments Height	Partial LAeq1h
		dBA	dB	dB	dB				ft	dBA
351-02-01-F	10	69.4	0.8	8	-7.2	c1	point188	188	0.0	65.1
						c1	point187	187	0.0	62.8
						c1	point186	186	0.0	60.3
						c1	point189	189	0.0	60.2
						C2	point24	24	0.0	57.0
						C2	point23	23	0.0	56.7
						C2	point22	22	0.0	56.5
						C2	point25	25	0.0	56.5
						C2	point21	21	0.0	56.2
						C2	point26	26	0.0	56.1
351-03-01	11	68.5	1.1	8	-6.9	c1	point189	189	0.0	60.9
						c1	point188	188	0.0	60.5
						c1	point187	187	0.0	59.4
						c1	point186	186	0.0	58.6
						c1	point185	185	0.0	57.6
						c1	point190	190	0.0	57.3
						C2	point24	24	0.0	55.3
						C2	point22	22	0.0	55.1
						C2	point23	23	0.0	55.0
						C2	point25	25	0.0	55.0
351-04-01	12	64.6	1.9	8	-6.1	c1	point181	181	0.0	52.2

						c1	point184	184	0.0	51.8
						c1	point185	185	0.0	51.8
						c1	point182	182	0.0	51.5
						c1	point183	183	0.0	51.5
						C2	point16	16	0.0	51.4
						c1	point187	187	0.0	50.8
						c1	point189	189	0.0	50.6
						C2	point21	21	0.0	50.6
						c1	point186	186	0.0	50.6
351-05-01	13	64.2	1.3	8	-6.7	c1	point185	185	0.0	50.1
						c1	point184	184	0.0	50.1
						c1	point182	182	0.0	50.0
						c1	point183	183	0.0	50.0
						c1	point181	181	0.0	49.9
						C2	point21	21	0.0	49.3
						c1	point186	186	0.0	49.3
						C2	point19	19	0.0	49.1
						C2	point18	18	0.0	49.0
						C2	point20	20	0.0	49.0
351-06-01	14	62.5	1.3	8	-6.7	c1	point185	185	0.0	47.2
						c1	point184	184	0.0	46.9
						c1	point182	182	0.0	46.8
						c1	point183	183	0.0	46.8
						c1	point181	181	0.0	46.8
						c1	point180	180	0.0	46.4
						C2	point22	22	0.0	46.4
						C2	point16	16	0.0	46.1
						c1	point186	186	0.0	46.1
						C2	point19	19	0.0	46.1
351-07-01	15	62.7	0.6	8	-7.4	c1	point185	185	0.0	45.0
						c1	point186	186	0.0	44.9
						c1	point184	184	0.0	44.6
						c1	point181	181	0.0	44.4
						C2	point21	21	0.0	44.4
						c1	point183	183	0.0	44.4
						C2	point22	22	0.0	44.2

						c1	point187	187	0.0	44.2
						C2	point20	20	0.0	44.1
						C2	point16	16	0.0	44.0
351-08-01	16	62.0	0.4	8	-7.6	C2	point36	36	0.0	43.0
						c1	point185	185	0.0	42.8
						C2	point37	37	0.0	42.8
						C2	point38	38	0.0	42.7
						c1	point184	184	0.0	42.6
						c1	point182	182	0.0	42.6
						c1	point181	181	0.0	42.5
						c1	point186	186	0.0	42.5
						c1	point183	183	0.0	42.5
						C2	point39	39	0.0	42.4
351-09-01	17	59.8	0.8	8	-7.2	C2	point36	36	0.0	41.7
						c1	point189	189	0.0	41.5
						C2	point37	37	0.0	41.3
						C2	point38	38	0.0	41.3
						c1	point186	186	0.0	41.2
						C2	point39	39	0.0	41.2
						c1	point184	184	0.0	41.1
						c1	point185	185	0.0	41.1
						c1	point182	182	0.0	41.0
						c1	point183	183	0.0	41.0
351-10-01	18	59.2	0.6	8	-7.4	C2	point36	36	0.0	40.5
						c1	point189	189	0.0	40.1
						c1	point186	186	0.0	40.1
						C2	point37	37	0.0	40.0
						C2	point38	38	0.0	39.9
						c1	point185	185	0.0	39.8
						C2	point35	35	0.0	39.8
						c1	point184	184	0.0	39.7
						c1	point182	182	0.0	39.7
						c1	point183	183	0.0	39.6
351-11-01	19	59.1	0.5	8	-7.5	C2	point36	36	0.0	40.0
						C2	point37	37	0.0	39.7
						c1	point189	189	0.0	39.5

						C2	point35	35	0.0	39.4
						C2	point38	38	0.0	39.4
						C2	point39	39	0.0	39.1
						C2	point40	40	0.0	39.1
						c1	point186	186	0.0	39.0
						c1	point185	185	0.0	38.8
						C2	point41	41	0.0	38.8
ARL-01-01	20	61.5	0.1	8	-7.9	C2	point44	44	0.0	36.5
						C2	point36	36	0.0	36.4
						C2	point40	40	0.0	36.4
						C2	point39	39	0.0	36.4
						C2	point41	41	0.0	36.4
						C2	point38	38	0.0	36.3
						C2	point37	37	0.0	36.2
						C2	point42	42	0.0	36.2
						C2	point43	43	0.0	36.2
						C2	point45	45	0.0	36.1
ARL-02-01	21	58.2	0.1	8	-7.9	C2	point44	44	0.0	33.2
						C2	point45	45	0.0	33.1
						C2	point46	46	0.0	32.8
						C2	point42	42	0.0	32.8
						C2	point43	43	0.0	32.8
						C2	point41	41	0.0	32.7
						C2	point47	47	0.0	32.6
						C2	point40	40	0.0	32.6
						C2	point49	49	0.0	32.4
						C2	point48	48	0.0	32.4
ARL-03-01	22	58.8	0.3	8	-7.7	C2	point36	36	0.0	38.3
						C2	point37	37	0.0	38.0
						C2	point35	35	0.0	37.9
						C2	point38	38	0.0	37.7
						C2	point39	39	0.0	37.7
						c1	point189	189	0.0	37.5
						C2	point44	44	0.0	37.4
						C2	point40	40	0.0	37.4
						C2	point41	41	0.0	37.3

						C2	point45	45	0.0	37.3
ARL-04-01	23	56.5	0.1	8	-7.9	c1	point189	189	0.0	33.0
						C2	point36	36	0.0	32.2
						C2	point37	37	0.0	31.9
						C2	point35	35	0.0	31.9
						c1	point187	187	0.0	31.8
						C2	point44	44	0.0	31.7
						c1	point188	188	0.0	31.7
						C2	point45	45	0.0	31.6
						c1	point186	186	0.0	31.5
						C2	point38	38	0.0	31.4
ARL-05-01	24	54.5	0.2	8	-7.8	c1	point185	185	0.0	32.6
						C2	point36	36	0.0	32.5
						C2	point37	37	0.0	32.4
						c1	point184	184	0.0	32.3
						C2	point22	22	0.0	32.2
						C2	point38	38	0.0	32.2
						C2	point40	40	0.0	32.1
						C2	point39	39	0.0	32.0
						C2	point41	41	0.0	31.9
						C2	point44	44	0.0	31.9
ARL-06-01	25	55.6	0.5	8	-7.5	c1	point150	150	16.0	38.3
						C2	point38	38	0.0	36.4
						C2	point39	39	0.0	36.3
						C2	point40	40	0.0	36.3
						C2	point37	37	0.0	36.2
						C2	point41	41	0.0	36.2
						C2	point36	36	0.0	36.2
						C2	point44	44	0.0	36.1
						c1	point151	151	16.0	36.0
						C2	point42	42	0.0	36.0
GRED-01-02-F	28	64.7	9.5	8	1.5	c1	point134	134	16.0	52.6
						c1	point142	142	16.0	52.3
						c1	point143	143	16.0	52.2
						c1	point133	133	16.0	51.6
						c1	point141	141	16.0	51.2

						c1	point132	132	16.0	50.6
						c1	point144	144	16.0	50.2
						c1	point131	131	16.0	49.9
						c1	point140	140	16.0	49.3
						c1	point130	130	16.0	48.7
GRED-02-02	29	64.7	6.9	8	-1.1	c1	point134	134	16.0	51.6
						c1	point133	133	16.0	51.0
						c1	point132	132	16.0	50.3
						c1	point131	131	16.0	49.8
						c1	point158	158	12.0	49.2
						c1	point130	130	16.0	49.0
						c1	point159	159	12.0	48.6
						c1	point135	135	16.0	48.5
						c1	point129	129	16.0	48.3
						c1	point128	128	16.0	47.7
GRED-03-01	30	62.5	4.8	8	-3.2	c1	point158	158	12.0	47.4
						c1	point159	159	12.0	47.3
						c1	point161	161	12.0	47.3
						c1	point134	134	16.0	47.1
						c1	point160	160	12.0	46.9
						c1	point162	162	12.0	46.9
						c1	point133	133	16.0	46.8
						c1	point132	132	16.0	46.5
						c1	point131	131	16.0	46.3
						c1	point157	157	16.0	46.1
GRED-04-01	31	59.8	4.3	8	-3.7	c1	point134	134	16.0	44.3
						c1	point133	133	16.0	44.1
						c1	point159	159	12.0	43.9
						c1	point132	132	16.0	43.9
						c1	point160	160	12.0	43.8
						c1	point131	131	16.0	43.7
						c1	point158	158	12.0	43.6
						c1	point130	130	16.0	43.5
						c1	point129	129	16.0	43.3
						c1	point128	128	16.0	43.1
GRED-05-02-F	32	64.3	8.5	8	0.5	c1	point159	159	12.0	53.9

						c1	point158	158	12.0	53.4
						c1	point153	153	16.0	51.6
						c1	point154	154	16.0	51.5
						c1	point160	160	24.0	51.2
						c1	point152	152	16.0	51.0
						c1	point155	155	16.0	50.5
						c1	point156	156	16.0	50.2
						c1	point157	157	16.0	49.7
						c1	point151	151	16.0	49.4
GRED-06-02	33	64.8	6.2	8	-1.8	c1	point158	158	12.0	54.3
						c1	point159	159	12.0	54.0
						c1	point160	160	12.0	53.2
						c1	point161	161	12.0	52.7
						c1	point162	162	12.0	51.9
						c1	point157	157	16.0	48.4
						c1	point156	156	16.0	48.3
						c1	point154	154	16.0	48.2
						c1	point155	155	16.0	48.2
						c1	point171	171	0.0	48.1
GRED-07-01	34	62.3	3.8	8	-4.2	c1	point158	158	12.0	48.9
						c1	point153	153	16.0	48.8
						c1	point159	159	12.0	48.5
						c1	point188	188	0.0	46.6
						c1	point189	189	0.0	46.3
						c1	point187	187	0.0	46.3
						c1	point176	176	0.0	45.3
						c1	point177	177	0.0	45.0
						c1	point174	174	0.0	45.0
						c1	point175	175	0.0	44.9
GRED-08-01	35	62.4	3.3	8	-4.7	c1	point189	189	0.0	47.1
						c1	point161	161	12.0	46.9
						c1	point176	176	0.0	46.9
						c1	point162	162	12.0	46.9
						c1	point177	177	0.0	46.9
						c1	point163	163	12.0	46.8
						c1	point160	160	12.0	46.8

						c1	point188	188	0.0	46.6
						c1	point178	178	0.0	46.6
						c1	point159	159	12.0	46.5
GRED-09-01	36	61.5	2.6	8	-5.4	c1	point178	178	0.0	45.7
						c1	point177	177	0.0	45.6
						c1	point179	179	0.0	45.4
						c1	point180	180	0.0	45.3
						c1	point181	181	0.0	45.1
						C2	point16	16	0.0	45.0
						C2	point17	17	0.0	44.9
						c1	point163	163	12.0	44.8
						c1	point165	165	12.0	44.8
						c1	point164	164	12.0	44.7
GRED-10-01	37	61.2	2.1	8	-5.9	c1	point178	178	0.0	45.3
						c1	point179	179	0.0	45.1
						c1	point180	180	0.0	45.0
						c1	point181	181	0.0	44.8
						c1	point182	182	0.0	44.7
						c1	point183	183	0.0	44.6
						C2	point16	16	0.0	44.5
						C2	point17	17	0.0	44.5
						C2	point18	18	0.0	44.4
						C2	point19	19	0.0	44.1
GRED-11-01	38	60.3	1.8	8	-6.2	c1	point180	180	0.0	43.6
						c1	point183	183	0.0	43.4
						c1	point181	181	0.0	43.4
						c1	point182	182	0.0	43.4
						c1	point179	179	0.0	43.1
						c1	point178	178	0.0	43.1
						C2	point18	18	0.0	43.0
						C2	point17	17	0.0	43.0
						C2	point16	16	0.0	42.9
						C2	point19	19	0.0	42.8
GRED-12-01	39	59.3	1.4	8	-6.6	c1	point179	179	0.0	41.7
						c1	point183	183	0.0	41.7
						c1	point180	180	0.0	41.7

						c1	point181	181	0.0	41.6
						c1	point182	182	0.0	41.4
						C2	point36	36	0.0	41.4
						c1	point184	184	0.0	41.3
						C2	point16	16	0.0	41.3
						C2	point17	17	0.0	41.2
						C2	point37	37	0.0	41.2
GRED-13-01	40	58.9	1.1	8	-6.9	c1	point183	183	0.0	41.0
						c1	point180	180	0.0	41.0
						C2	point36	36	0.0	40.9
						c1	point179	179	0.0	40.9
						c1	point181	181	0.0	40.8
						c1	point182	182	0.0	40.8
						c1	point184	184	0.0	40.8
						C2	point16	16	0.0	40.7
						C2	point37	37	0.0	40.7
						C2	point35	35	0.0	40.7
GRED-14-01	41	58.0	0.9	8	-7.1	C2	point36	36	0.0	40.1
						C2	point37	37	0.0	39.9
						c1	point179	179	0.0	39.9
						C2	point38	38	0.0	39.8
						C2	point40	40	0.0	39.8
						c1	point183	183	0.0	39.8
						C2	point35	35	0.0	39.8
						C2	point39	39	0.0	39.7
						c1	point184	184	0.0	39.7
						C2	point16	16	0.0	39.7
GRED-15-01	42	57.5	0.9	8	-7.1	C2	point36	36	0.0	39.5
						C2	point39	39	0.0	39.4
						C2	point38	38	0.0	39.4
						C2	point41	41	0.0	39.3
						C2	point40	40	0.0	39.3
						C2	point37	37	0.0	39.3
						C2	point35	35	0.0	39.2
						C2	point43	43	0.0	39.2
						C2	point42	42	0.0	39.1

						c1	point179	179	0.0	39.1
GRED-16-01	43	57.0	0.8	8	-7.2	C2	point39	39	0.0	38.9
						C2	point40	40	0.0	38.8
						C2	point41	41	0.0	38.8
						C2	point37	37	0.0	38.7
						C2	point36	36	0.0	38.7
						C2	point38	38	0.0	38.7
						C2	point42	42	0.0	38.6
						C2	point35	35	0.0	38.5
						c1	point179	179	0.0	38.5
						C2	point43	43	0.0	38.4
GRED-17-01	44	56.6	0.6	8	-7.4	C2	point40	40	0.0	38.3
						C2	point39	39	0.0	38.2
						C2	point41	41	0.0	38.2
						C2	point37	37	0.0	38.1
						C2	point36	36	0.0	38.0
						C2	point43	43	0.0	38.0
						C2	point42	42	0.0	38.0
						C2	point38	38	0.0	38.0
						C2	point44	44	0.0	37.8
						C2	point45	45	0.0	37.8
GRED-18-01	45	56.4	0.3	8	-7.7	c1	point151	151	16.0	40.7
						c1	point147	147	16.0	38.2
						C2	point38	38	0.0	37.6
						C2	point39	39	0.0	37.5
						C2	point41	41	0.0	37.5
						C2	point37	37	0.0	37.5
						C2	point40	40	0.0	37.4
						C2	point42	42	0.0	37.4
						C2	point43	43	0.0	37.4
						C2	point36	36	0.0	37.3
LEX-04-01	52	55.2	2.8	8	-5.2	c1	point77	77	0.0	40.1
						c1	point76	76	0.0	40.0
						c1	point75	75	0.0	38.9
						c1	point69	69	0.0	38.4
						c1	point74	74	0.0	38.0

						c1	point73	73	0.0	37.9
						c1	point72	72	0.0	37.5
						c1	point118	118	16.0	36.9
						c1	point121	121	16.0	36.7
						c1	point122	122	16.0	36.7
LEX-05-01	53	56.0	4.3	8	-3.7	c1	point93	93	20.0	41.6
						c1	point76	76	0.0	40.5
						c1	point77	77	0.0	40.3
						c1	point118	118	16.0	39.9
						c1	point120	120	16.0	39.8
						c1	point121	121	16.0	39.7
						c1	point119	119	16.0	39.7
						c1	point122	122	16.0	39.7
						c1	point123	123	16.0	39.4
						c1	point124	124	16.0	39.3
MELW-01-01-F	61	66.0	5.0	8	-3.0	c1	point177	177	0.0	56.1
						c1	point178	178	0.0	56.0
						c1	point179	179	0.0	54.8
						C2	point16	16	0.0	54.7
						c1	point180	180	0.0	54.5
						C2	point17	17	0.0	53.3
						C2	point18	18	0.0	52.9
						c1	point181	181	0.0	52.6
						C2	point19	19	0.0	52.3
						c1	point70	70	24.0	52.2
MELW-02-01-F	62	65.5	7.6	8	-0.4	c1	point167	167	12.0	56.6
						c1	point166	166	12.0	54.8
						c1	point172	172	0.0	54.7
						c1	point168	168	12.0	54.0
						c1	point171	171	0.0	53.0
						c1	point170	170	24.0	52.6
						c1	point165	165	12.0	52.3
						c1	point173	173	0.0	52.2
						c1	point169	169	12.0	52.1
						c1	point70	70	12.0	51.5
MELW-03-01-F	63	65.1	7.4	8	-0.6	c1	point163	163	12.0	55.7

						c1	point164	164	12.0	55.7
						c1	point162	162	12.0	54.3
						c1	point165	165	24.0	53.7
						c1	point161	161	12.0	52.8
						c1	point160	160	12.0	51.2
						c1	point171	171	0.0	51.1
						c1	point170	170	0.0	50.7
						c1	point159	159	12.0	49.3
						c1	point172	172	0.0	49.2
MELW-04-01-F	64	65.1	7.0	8	-1.0	c1	point161	161	12.0	55.0
						c1	point162	162	12.0	54.9
						c1	point160	160	12.0	54.3
						c1	point163	163	12.0	54.2
						c1	point159	159	12.0	53.2
						c1	point164	164	24.0	51.9
						c1	point158	158	12.0	51.6
						c1	point170	170	0.0	50.6
						c1	point168	168	12.0	50.4
						c1	point169	169	12.0	49.4
MELW-05-01-F	65	65.4	6.5	8	-1.5	c1	point160	160	12.0	56.2
						c1	point161	161	12.0	55.9
						c1	point162	162	12.0	54.8
						c1	point159	159	12.0	54.2
						c1	point158	158	12.0	53.7
						c1	point157	157	16.0	50.3
						c1	point170	170	0.0	50.3
						c1	point163	163	24.0	50.1
						c1	point156	156	16.0	49.5
						c1	point155	155	16.0	48.8
MELW-07-01-F	66	66.8	5.5	8	-2.5	c1	point132	132	16.0	55.8
						c1	point131	131	16.0	55.7
						c1	point133	133	16.0	55.7
						c1	point130	130	16.0	55.3
						c1	point134	134	16.0	54.9
						c1	point129	129	16.0	54.7
						c1	point128	128	16.0	54.1

						c1	point127	127	16.0	53.5
						c1	point126	126	16.0	52.9
						c1	point125	125	16.0	52.3
MELW-08-01-F	67	65.8	7.1	8	-0.9	c1	point127	127	16.0	55.9
						c1	point126	126	16.0	54.4
						c1	point128	128	16.0	53.8
						c1	point122	122	16.0	52.9
						c1	point123	123	16.0	52.9
						c1	point129	129	16.0	52.7
						c1	point130	130	16.0	52.3
						c1	point121	121	16.0	52.0
						c1	point131	131	16.0	51.7
						c1	point125	125	16.0	51.6
MELW-09-01-F	68	64.6	8.4	8	0.4	c1	point124	124	16.0	52.6
						c1	point123	123	16.0	52.4
						c1	point125	125	16.0	52.3
						c1	point126	126	16.0	52.2
						c1	point127	127	16.0	52.1
						c1	point122	122	16.0	52.1
						c1	point121	121	16.0	51.4
						c1	point128	128	16.0	51.1
						c1	point118	118	16.0	50.5
						c1	point120	120	16.0	50.4
MELW-10-01-F	69	64.4	10.2	8	2.2	c1	point118	118	16.0	54.5
						c1	point119	119	16.0	54.5
						c1	point120	120	16.0	54.1
						c1	point121	121	16.0	53.6
						c1	point122	122	16.0	52.6
						c1	point123	123	16.0	51.2
						c1	point117	117	20.0	50.5
						c1	point124	124	16.0	49.7
						c1	point125	125	16.0	48.6
						c1	point116	116	20.0	48.6
MELW-11-01-F	70	63.1	11.6	8	3.6	c1	point113	113	20.0	52.5
						c1	point112	112	20.0	52.5
						c1	point114	114	20.0	51.4

						c1	point111	111	20.0	51.3
						c1	point110	110	20.0	51.2
						c1	point115	115	20.0	49.9
						c1	point109	109	20.0	49.8
						c1	point116	116	20.0	48.5
						c1	point108	108	20.0	48.4
						c1	point118	118	16.0	48.2
MELW-12-01-F	71	61.3	10.5	8	2.5	c1	point107	107	20.0	48.0
						c1	point108	108	20.0	47.6
						c1	point106	106	20.0	47.5
						c1	point105	105	20.0	47.4
						c1	point111	111	20.0	47.2
						c1	point104	104	20.0	47.0
						c1	point109	109	20.0	47.0
						c1	point112	112	20.0	46.7
						c1	point118	118	16.0	46.6
						c1	point110	110	20.0	46.6
MELW-13-01-F	72	60.5	9.6	8	1.6	c1	point118	118	16.0	46.4
						c1	point119	119	16.0	46.0
						c1	point107	107	20.0	45.7
						c1	point111	111	20.0	45.6
						c1	point103	103	20.0	45.6
						c1	point104	104	20.0	45.4
						c1	point102	102	20.0	45.4
						c1	point108	108	20.0	45.3
						c1	point105	105	20.0	45.3
						c1	point100	100	20.0	45.3
MELW-14-01-F	73	59.4	8.8	8	0.8	c1	point90	90	16.0	46.4
						c1	point91	91	16.0	46.0
						c1	point92	92	16.0	45.7
						c1	point94	94	20.0	43.8
						c1	point93	93	20.0	43.8
						c1	point96	96	20.0	43.4
						c1	point95	95	20.0	43.4
						c1	point98	98	20.0	43.4
						c1	point111	111	20.0	43.4

						c1	point97	97	20.0	43.3
MELW-15-01-F	74	58.0	8.1	8	0.1	c1	point88	88	16.0	45.1
						c1	point87	87	16.0	44.9
						c1	point86	86	16.0	44.7
						c1	point89	89	16.0	43.9
						c1	point90	90	16.0	43.3
						c1	point91	91	16.0	42.7
						c1	point92	92	16.0	42.2
						c1	point93	93	20.0	41.6
						c1	point94	94	20.0	41.6
						c1	point111	111	20.0	41.6
MELW-16-01-F	75	57.2	7.5	8	-0.5	c1	point83	83	16.0	45.7
						c1	point84	84	16.0	44.9
						c1	point85	85	16.0	44.5
						c1	point86	86	16.0	43.2
						c1	point87	87	16.0	42.3
						c1	point88	88	16.0	41.1
						c1	point89	89	16.0	40.2
						c1	point93	93	20.0	40.0
						c1	point111	111	20.0	40.0
						c1	point94	94	20.0	39.8
MELW-17-01-F	76	56.6	7.0	8	-1.0	c1	point80	80	12.0	46.2
						c1	point81	81	12.0	46.0
						c1	point82	82	12.0	45.5
						c1	point83	83	16.0	42.8
						c1	point84	84	16.0	42.0
						c1	point85	85	16.0	40.8
						c1	point86	86	16.0	39.3
						c1	point111	111	20.0	38.8
						c1	point120	120	16.0	38.6
						c1	point118	118	16.0	38.5
MELW-18-01-F	77	56.9	5.4	8	-2.6	c1	point77	77	0.0	50.8
						c1	point78	78	12.0	45.4
						c1	point79	79	12.0	44.6
						c1	point80	80	12.0	43.6
						c1	point76	76	0.0	43.4

						c1	point81	81	12.0	42.2
						c1	point82	82	12.0	41.1
						c1	point83	83	16.0	38.6
						c1	point111	111	20.0	38.2
						c1	point84	84	16.0	37.9
MELW-19-01-F	78	58.9	1.9	8	-6.1	c1	point73	73	0.0	52.0
						c1	point74	74	0.0	51.7
						c1	point72	72	0.0	49.8
						c1	point75	75	0.0	49.8
						c1	point76	76	0.0	47.6
						c1	point77	77	0.0	46.4
						c1	point78	78	12.0	38.7
						c1	point79	79	12.0	38.1
						c1	point111	111	20.0	36.8
						c1	point80	80	12.0	36.7
MELW-20-01-F	79	58.6	1.2	8	-6.8	c1	point69	69	0.0	48.6
						c1	point72	72	0.0	46.4
						c1	point73	73	0.0	45.1
						c1	point74	74	0.0	43.7
						c1	point75	75	0.0	42.5
						c1	point76	76	0.0	41.5
						c1	point77	77	24.0	37.7
						c1	point111	111	20.0	35.9
						c1	point112	112	20.0	35.3
						c1	point120	120	16.0	35.0
MELW-23-01	80	64.5	2.3	8	-5.7	c1	point178	178	0.0	52.0
						c1	point179	179	0.0	51.6
						c1	point173	173	0.0	51.2
						c1	point180	180	0.0	50.8
						c1	point181	181	0.0	50.8
						C2	point16	16	0.0	50.7
						C2	point17	17	0.0	50.5
						C2	point18	18	0.0	50.2
						c1	point174	174	0.0	50.2
						c1	point177	177	0.0	50.0
MELW-24-01	81	63.4	2.0	8	-6.0	c1	point177	177	0.0	50.2

						c1	point178	178	0.0	50.1
						c1	point179	179	0.0	49.6
						c1	point180	180	0.0	49.6
						C2	point17	17	0.0	49.0
						c1	point188	188	0.0	48.8
						C2	point19	19	0.0	48.4
						c1	point172	172	0.0	48.3
						C2	point20	20	0.0	48.2
						C2	point18	18	0.0	48.2
MELW-25-01	82	62.8	2.2	8	-5.8	c1	point177	177	0.0	49.1
						c1	point178	178	0.0	48.8
						c1	point179	179	0.0	48.2
						c1	point176	176	0.0	48.2
						c1	point188	188	0.0	48.0
						C2	point17	17	0.0	47.9
						C2	point16	16	0.0	47.8
						C2	point18	18	0.0	47.7
						c1	point180	180	0.0	47.3
						C2	point19	19	0.0	47.3
MELW-26-01	83	63.0	1.9	8	-6.1	c1	point152	152	16.0	50.9
						c1	point153	153	16.0	50.1
						c1	point188	188	0.0	47.9
						c1	point151	151	16.0	47.7
						c1	point177	177	0.0	47.7
						c1	point176	176	0.0	47.6
						c1	point178	178	0.0	47.5
						c1	point189	189	0.0	47.3
						c1	point165	165	12.0	47.0
						c1	point164	164	12.0	46.8
MELW-27-01	84	61.1	5.5	8	-2.5	c1	point118	118	16.0	47.5
						c1	point120	120	16.0	47.3
						c1	point119	119	16.0	47.3
						c1	point121	121	16.0	47.2
						c1	point122	122	16.0	47.1
						c1	point123	123	16.0	46.9
						c1	point124	124	16.0	46.6

						c1	point125	125	16.0	46.4
						c1	point126	126	16.0	46.2
						c1	point127	127	16.0	46.1
MELW-28-01	85	59.4	5.5	8	-2.5	c1	point118	118	16.0	45.1
						c1	point120	120	16.0	44.9
						c1	point119	119	16.0	44.8
						c1	point121	121	16.0	44.8
						c1	point122	122	16.0	44.7
						c1	point123	123	16.0	44.5
						c1	point124	124	16.0	44.3
						c1	point125	125	16.0	44.1
						c1	point126	126	16.0	44.0
						c1	point127	127	16.0	43.9
MELW-29-01	86	58.4	5.2	8	-2.8	c1	point118	118	16.0	43.2
						c1	point120	120	16.0	43.0
						c1	point119	119	16.0	42.9
						c1	point121	121	16.0	42.9
						c1	point122	122	16.0	42.8
						c1	point123	123	16.0	42.5
						c1	point124	124	16.0	42.3
						c1	point125	125	16.0	42.1
						c1	point127	127	16.0	42.0
						c1	point126	126	16.0	42.0
MELW-30-01	87	56.5	4.7	8	-3.3	c1	point118	118	16.0	41.6
						c1	point120	120	16.0	41.4
						c1	point119	119	16.0	41.4
						c1	point121	121	16.0	41.3
						c1	point122	122	16.0	41.2
						c1	point123	123	16.0	41.0
						c1	point124	124	16.0	40.8
						c1	point125	125	16.0	40.6
						c1	point127	127	16.0	40.4
						c1	point126	126	16.0	40.4
MELW-31-01	88	55.8	3.5	8	-4.5	c1	point93	93	20.0	40.6
						c1	point120	120	16.0	40.4
						c1	point119	119	16.0	40.3

						c1	point121	121	16.0	40.3
						c1	point122	122	16.0	40.1
						c1	point123	123	16.0	39.9
						c1	point124	124	16.0	39.6
						c1	point125	125	16.0	39.5
						c1	point77	77	0.0	39.4
						c1	point127	127	16.0	39.3
MELW-32-01	89	56.5	2.8	8	-5.2	c1	point75	75	0.0	45.8
						c1	point76	76	0.0	45.7
						c1	point77	77	0.0	44.8
						c1	point74	74	0.0	44.8
						c1	point72	72	0.0	44.5
						c1	point73	73	0.0	44.4
						c1	point69	69	0.0	43.8
						c1	point78	78	12.0	38.2
						c1	point79	79	12.0	38.0
						c1	point80	80	12.0	37.4
WEN-03-01	100	59.9	3.7	8	-4.3	c1	point131	131	16.0	43.7
						c1	point134	134	16.0	43.6
						c1	point133	133	16.0	43.6
						c1	point132	132	16.0	43.6
						c1	point130	130	16.0	43.5
						c1	point129	129	16.0	43.4
						c1	point159	159	12.0	43.3
						c1	point128	128	16.0	43.2
						c1	point127	127	16.0	43.2
						c1	point126	126	16.0	43.1
WEN-04-01	101	62.3	4.6	8	-3.4	c1	point122	122	16.0	48.9
						c1	point124	124	16.0	48.8
						c1	point123	123	16.0	48.8
						c1	point121	121	16.0	48.8
						c1	point120	120	16.0	48.7
						c1	point118	118	16.0	48.7
						c1	point125	125	16.0	48.7
						c1	point119	119	16.0	48.6
						c1	point126	126	16.0	48.5

						c1	point127	127	16.0	48.5
WEN-05-01	102	60.8	5.1	8	-2.9	c1	point122	122	16.0	47.1
						c1	point118	118	16.0	47.1
						c1	point121	121	16.0	47.1
						c1	point120	120	16.0	47.0
						c1	point119	119	16.0	47.0
						c1	point123	123	16.0	47.0
						c1	point124	124	16.0	46.9
						c1	point125	125	16.0	46.8
						c1	point126	126	16.0	46.7
						c1	point127	127	16.0	46.6
WEN-06-01	103	59.1	5.1	8	-2.9	c1	point118	118	16.0	45.0
						c1	point121	121	16.0	45.0
						c1	point120	120	16.0	44.9
						c1	point119	119	16.0	44.9
						c1	point122	122	16.0	44.9
						c1	point123	123	16.0	44.8
						c1	point124	124	16.0	44.8
						c1	point125	125	16.0	44.6
						c1	point126	126	16.0	44.6
						c1	point127	127	16.0	44.5
WEN-07-01	104	57.6	5.1	8	-2.9	c1	point118	118	16.0	43.1
						c1	point120	120	16.0	43.0
						c1	point121	121	16.0	43.0
						c1	point119	119	16.0	43.0
						c1	point122	122	16.0	43.0
						c1	point123	123	16.0	42.9
						c1	point124	124	16.0	42.9
						c1	point125	125	16.0	42.8
						c1	point126	126	16.0	42.7
						c1	point127	127	16.0	42.7
WEN-08-01	105	56.6	5.0	8	-3.0	c1	point118	118	16.0	41.9
						c1	point120	120	16.0	41.9
						c1	point121	121	16.0	41.8
						c1	point122	122	16.0	41.8
						c1	point119	119	16.0	41.8

						c1	point123	123	16.0	41.7
						c1	point124	124	16.0	41.6
						c1	point125	125	16.0	41.5
						c1	point126	126	16.0	41.4
						c1	point127	127	16.0	41.4
WEN-09-01	106	55.8	4.4	8	-3.6	c1	point92	92	16.0	42.9
						c1	point77	77	0.0	40.5
						c1	point118	118	16.0	40.3
						c1	point120	120	16.0	40.2
						c1	point121	121	16.0	40.2
						c1	point122	122	16.0	40.1
						c1	point119	119	16.0	40.1
						c1	point123	123	16.0	40.0
						c1	point124	124	16.0	39.9
						c1	point125	125	16.0	39.8
MELW-06-01-F	126	66.4	6.1	8	-1.9	c1	point134	134	16.0	56.0
						c1	point133	133	16.0	55.6
						c1	point132	132	16.0	55.1
						c1	point131	131	16.0	54.5
						c1	point130	130	16.0	53.7
						c1	point135	135	16.0	53.3
						c1	point129	129	16.0	52.9
						c1	point128	128	16.0	52.2
						c1	point127	127	16.0	51.5
						c1	point126	126	16.0	50.9
WEN-01-01	131	62.1	4.0	8	-4.0	c1	point131	131	16.0	47.4
						c1	point133	133	16.0	47.4
						c1	point132	132	16.0	47.4
						c1	point134	134	16.0	47.3
						c1	point130	130	16.0	47.3
						c1	point129	129	16.0	47.1
						c1	point128	128	16.0	46.9
						c1	point127	127	16.0	46.8
						c1	point126	126	16.0	46.6
						c1	point125	125	16.0	46.5
WEN-02-01	133	61.3	3.7	8	-4.3	c1	point131	131	16.0	46.0

						c1	point132	132	16.0	45.9
						c1	point133	133	16.0	45.9
						c1	point134	134	16.0	45.9
						c1	point130	130	16.0	45.8
						c1	point129	129	16.0	45.7
						c1	point128	128	16.0	45.5
						c1	point127	127	16.0	45.4
						c1	point126	126	16.0	45.3
						c1	point125	125	16.0	45.2
Total Cost, All Barriers (including additional cost(s))					$1029439					

HMB Professional Engineers 29 March 2021
Mark Gavula TNM 2.5

RESULTS: BARRIER-SEGMENT DESCRIPTIONS
PROJECT/CONTRACT: I69 ORX
RUN: 351 Mellwood Barrier
BARRIER DESIGN: 351-BAR-C

Barriers		Segments										
Name	Type	Name	No.	Heights			Length	If Wall			If Berm	Cost
				First Point	Average	Second Point		Area	On Struc?	Important Reflections?	Volume	
				ft	ft	ft	ft	sq ft			cu yd	$
c1	W	point69	69	0.00	0.00	0.00	0	0				0
		point72	72	0.00	0.00	0.00	0	0				0
		point73	73	0.00	0.00	0.00	0	0				0
		point74	74	0.00	0.00	0.00	0	0				0
		point75	75	0.00	0.00	0.00	0	0				0
		point76	76	0.00	0.00	0.00	0	0				0
		point77	77	0.00	0.00	0.00	0	0				0
		point78	78	12.00	12.00	12.00	20	236				7077
		point79	79	12.00	12.00	12.00	20	242				7256
		point80	80	12.00	12.00	12.00	20	243				7294
		point81	81	12.00	12.00	12.00	20	239				7185
		point82	82	12.00	12.00	12.00	20	239				7185
		point83	83	16.00	16.00	16.00	20	319				9580
		point84	84	16.00	16.00	16.00	20	319				9580
		point85	85	16.00	16.00	16.00	20	319				9580
		point86	86	16.00	16.00	16.00	20	324				9719
		point87	87	16.00	16.00	16.00	20	315				9453
		point88	88	16.00	16.00	16.00	20	324				9719
		point89	89	16.00	16.00	16.00	20	315				9453
		point90	90	16.00	16.00	16.00	20	324				9719
		point91	91	16.00	16.00	16.00	20	315				9453
		point92	92	16.00	16.00	16.00	20	326				9793
		point93	93	20.00	20.00	20.00	20	392				11765
		point94	94	20.00	20.00	20.00	20	403				12098
		point95	95	20.00	20.00	20.00	20	402				12049
		point96	96	20.00	20.00	20.00	20	402				12049

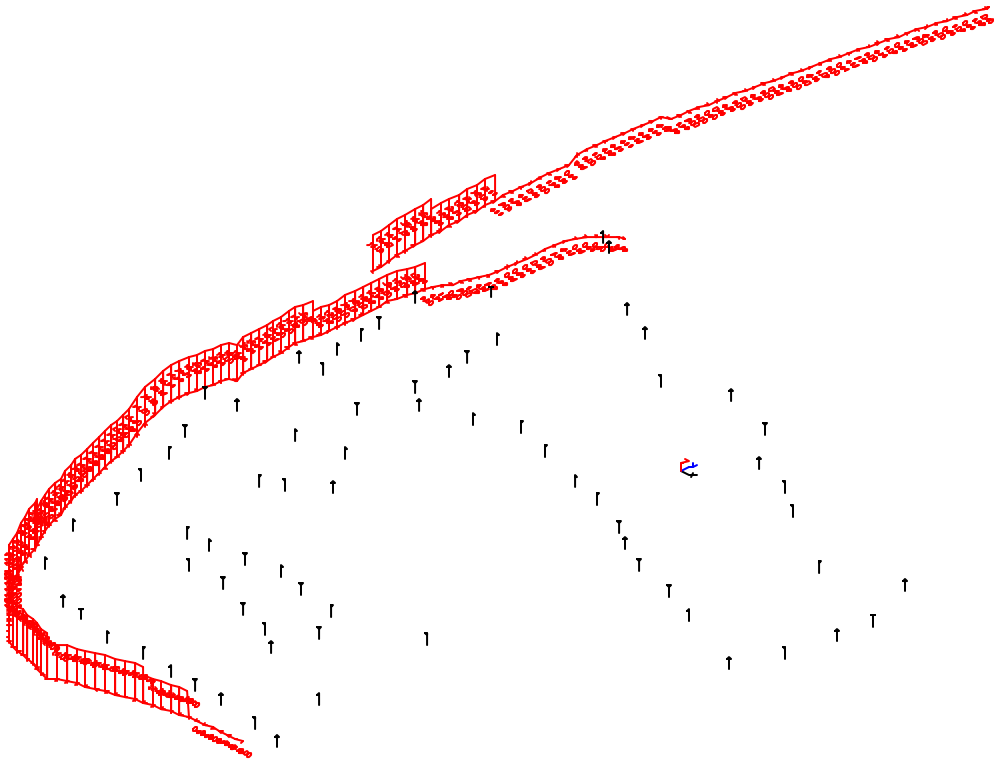
		point97	97	20.00	20.00	20.00	20	392				11765
		point98	98	20.00	20.00	20.00	20	402				12049
		point99	99	20.00	20.00	20.00	20	403				12098
		point100	100	20.00	20.00	20.00	20	402				12049
		point101	101	20.00	20.00	20.00	20	396				11879
		point102	102	20.00	20.00	20.00	20	400				11986
		point103	103	20.00	20.00	20.00	20	400				11986
		point104	104	20.00	20.00	20.00	20	400				11986
		point105	105	20.00	20.00	20.00	20	403				12093
		point106	106	20.00	20.00	20.00	20	396				11879
		point107	107	20.00	20.00	20.00	20	403				12093
		point108	108	20.00	20.00	20.00	20	400				11986
		point109	109	20.00	20.00	20.00	20	400				11986
		point110	110	20.00	20.00	20.00	20	400				11986
		point111	111	20.00	20.00	20.00	20	403				12093
		point112	112	20.00	20.00	20.00	20	399				11956
		point113	113	20.00	20.00	20.00	20	399				11977
		point114	114	20.00	20.00	20.00	20	403				12093
		point115	115	20.00	20.00	20.00	20	399				11956
		point116	116	20.00	20.00	20.00	20	399				11977
		point117	117	20.00	20.00	20.00	20	398				11941
		point118	118	16.00	16.00	16.00	20	322				9664
		point119	119	16.00	16.00	16.00	20	318				9555
		point120	120	16.00	16.00	16.00	20	323				9678
		point121	121	16.00	16.00	16.00	20	320				9610
		point122	122	16.00	16.00	16.00	20	320				9610
		point123	123	16.00	16.00	16.00	20	316				9494
		point124	124	16.00	16.00	16.00	20	323				9678
		point125	125	16.00	16.00	16.00	20	320				9610
		point126	126	16.00	16.00	16.00	20	318				9547
		point127	127	16.00	16.00	16.00	20	322				9672
		point128	128	16.00	16.00	16.00	20	318				9555
		point129	129	16.00	16.00	16.00	20	318				9555
		point130	130	16.00	16.00	16.00	20	318				9555
		point131	131	16.00	16.00	16.00	20	324				9723
		point132	132	16.00	16.00	16.00	20	318				9555
		point133	133	16.00	16.00	16.00	20	318				9555
		point134	134	16.00	16.00	16.00	20	322				9672
		point135	135	16.00	16.00	16.00	20	320				9603

		point136	136	16.00	16.00	16.00	20	318				9528
		point137	137	16.00	16.00	16.00	20	322				9648
		point138	138	16.00	16.00	16.00	20	318				9528
		point139	139	16.00	16.00	16.00	20	322				9648
		point140	140	16.00	16.00	16.00	20	322				9648
		point141	141	16.00	16.00	16.00	20	318				9528
		point142	142	16.00	16.00	16.00	20	322				9648
		point143	143	16.00	16.00	16.00	20	318				9528
		point144	144	16.00	16.00	16.00	20	320				9603
		point145	145	16.00	16.00	16.00	20	320				9600
		point146	146	16.00	16.00	16.00	20	320				9603
		point147	147	16.00	16.00	16.00	20	320				9603
		point148	148	16.00	16.00	16.00	20	320				9600
		point149	149	16.00	16.00	16.00	20	320				9603
		point150	150	16.00	16.00	16.00	20	320				9600
		point151	151	16.00	16.00	16.00	20	320				9612
		point152	152	16.00	16.00	16.00	20	321				9627
		point153	153	16.00	16.00	16.00	20	320				9612
		point154	154	16.00	16.00	16.00	20	321				9627
		point155	155	16.00	16.00	16.00	20	320				9612
		point156	156	16.00	16.00	16.00	20	317				9507
		point157	157	16.00	16.00	16.00	20	321				9627
		point158	158	12.00	12.00	12.00	20	238				7146
		point159	159	12.00	12.00	12.00	20	241				7236
		point160	160	12.00	12.00	12.00	20	241				7220
		point161	161	12.00	12.00	12.00	20	241				7236
		point162	162	12.00	12.00	12.00	20	238				7146
		point163	163	12.00	12.00	12.00	20	241				7220
		point164	164	12.00	12.00	12.00	20	238				7146
		point165	165	12.00	12.00	12.00	20	241				7236
		point166	166	12.00	12.00	12.00	20	241				7220
		point167	167	12.00	12.00	12.00	20	239				7166
		point168	168	12.00	12.00	12.00	20	240				7204
		point169	169	12.00	12.00	12.00	20	240				7204
		point70	70	12.00	12.00	12.00	20	239				7166
		point170	170	0.00	0.00	0.00	0	0				0
		point171	171	0.00	0.00	0.00	0	0				0
		point172	172	0.00	0.00	0.00	0	0				0
		point173	173	0.00	0.00	0.00	0	0				0

		point174	174	0.00	0.00	0.00	0	0				0
		point175	175	0.00	0.00	0.00	0	0				0
		point176	176	0.00	0.00	0.00	0	0				0
		point177	177	0.00	0.00	0.00	0	0				0
		point178	178	0.00	0.00	0.00	0	0				0
		point179	179	0.00	0.00	0.00	0	0				0
		point180	180	0.00	0.00	0.00	0	0				0
		point181	181	0.00	0.00	0.00	0	0				0
		point182	182	0.00	0.00	0.00	0	0				0
		point183	183	0.00	0.00	0.00	0	0				0
		point184	184	0.00	0.00	0.00	0	0				0
		point185	185	0.00	0.00	0.00	0	0				0
		point186	186	0.00	0.00	0.00	0	0				0
		point187	187	0.00	0.00	0.00	0	0				0
		point188	188	0.00	0.00	0.00	0	0				0
		point189	189	0.00	0.00	0.00	0	0				0
		point190	190	0.00	0.00	0.00	0	0				0
C2	W	point1	1	16.00	16.00	16.00	20	322				9648
		point3	3	16.00	16.00	16.00	20	318				9528
		point4	4	16.00	16.00	16.00	20	322				9648
		point5	5	16.00	16.00	16.00	20	322				9648
		point6	6	16.00	16.00	16.00	20	318				9528
		point7	7	16.00	16.00	16.00	20	319				9556
		point8	8	16.00	16.00	16.00	20	322				9675
		point9	9	12.00	12.00	12.00	20	240				7192
		point10	10	12.00	12.00	12.00	20	241				7221
		point11	11	12.00	12.00	12.00	20	240				7192
		point12	12	12.00	12.00	12.00	20	240				7192
		point13	13	12.00	12.00	12.00	20	241				7221
		point14	14	12.00	12.00	12.00	20	241				7221
		point15	15	12.00	12.00	12.00	20	239				7166
		point16	16	0.00	0.00	0.00	0	0				0
		point17	17	0.00	0.00	0.00	0	0				0
		point18	18	0.00	0.00	0.00	0	0				0
		point19	19	0.00	0.00	0.00	0	0				0
		point20	20	0.00	0.00	0.00	0	0				0
		point21	21	0.00	0.00	0.00	0	0				0
		point22	22	0.00	0.00	0.00	0	0				0

		point23	23	0.00	0.00	-8.00	0	0				0
		point24	24	0.00	0.00	0.00	0	0	Y			0
		point25	25	0.00	0.00	0.00	0	0	Y			0
		point26	26	0.00	0.00	0.00	0	0	Y			0
		point27	27	0.00	0.00	0.00	0	0	Y			0
		point28	28	0.00	0.00	0.00	0	0	Y			0
		point29	29	0.00	0.00	0.00	0	0	Y			0
		point30	30	0.00	0.00	0.00	0	0	Y			0
		point31	31	0.00	0.00	0.00	0	0	Y			0
		point32	32	0.00	0.00	0.00	0	0	Y			0
		point33	33	0.00	4.00	8.00	20	80	Y			2401
		point34	34	0.00	0.00	0.00	0	0				0
		point35	35	0.00	0.00	0.00	0	0				0
		point36	36	0.00	0.00	0.00	0	0				0
		point37	37	0.00	0.00	0.00	0	0				0
		point38	0	0.00	0.00	0.00	0	0				0
		point39	39	0.00	0.00	0.00	0	0				0
		point40	40	0.00	0.00	0.00	0	0				0
		point41	41	0.00	0.00	0.00	0	0				0
		point42	42	0.00	0.00	0.00	0	0				0
		point43	43	0.00	0.00	0.00	0	0				0
		point44	44	0.00	0.00	0.00	0	0				0
		point45	45	0.00	0.00	0.00	0	0				0
		point46	46	0.00	0.00	0.00	0	0				0
		point47	47	0.00	0.00	0.00	0	0				0
		point48	48	0.00	0.00	0.00	0	0				0
		point49	49	0.00	0.00	0.00	0	0				0
		point50	50	0.00	0.00	0.00	0	0				0
		point51	51	0.00	0.00	0.00	0	0				0
		point52	52	0.00	0.00	0.00	0	0				0
		point53	53	0.00	0.00	0.00	0	0				0
		point54	54	0.00	0.00	0.00	0	0				0
		point55	55	0.00	0.00	0.00	0	0				0
		point56	56	0.00	0.00	0.00	0	0				0
		point57	57	0.00	0.00	0.00	0	0				0
		point58	58	0.00	0.00	0.00	0	0				0
		point59	59	0.00	0.00	0.00	0	0				0
		point60	60	0.00	0.00	0.00	0	0				0
		point61	61	0.00	0.00	0.00	0	0				0

		point62	62	0.00	0.00	0.00	0	0				0
		point63	63	0.00	0.00	0.00	0	0				0
		point64	64	0.00	0.00	0.00	0	0				0
		point65	65	0.00	0.00	0.00	0	0				0
		point66	66	0.00	0.00	0.00	0	0				0
		point67	67	0.00	0.00	0.00	0	0				0
		point68	68	0.00	0.00	0.00	0	0				0



351 Mellwood Barrier	Sheet 1 of 1	29 Mar 2021
	HMB Professional Engineers	
Barrier View-351-BAR-C	Project/Contract No. I69 ORX	
Run name: 351-Mellwood-Barrier	TNM Version 2.5, Feb 2004	
Scale: <DNA - due to perspective>	Analysis By: Mark Gavula	

Roadway:		Ground Zone:	polygon
Receiver:		Tree Zone:	dashed polygon
Barrier:		Contour Zone:	polygon
Building Row:		Parallel Barrier:	
Terrain Line:		Skew Section:	

TNM OUTPUT FOR RICHARDSON AVENUE

HMB Professional Engineers
Mark Gavula

2 April 2021
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: I-69 ORX
RUN: US41 Impact Run Re-Eval
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

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

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
KIM-03-24	1	24	60.8	62.0	66	1.2	10	----	53.7	8.3	8	0.3
KIM-02-24-F	2	24	64.4	65.3	66	0.9	10	----	56.5	8.8	8	0.8
KIM-07-24	3	24	59.5	62.3	66	2.8	10	----	61.7	0.6	8	-7.4
KIM-05-24	4	24	58.6	61.4	66	2.8	10	----	59.0	2.4	8	-5.6
KIM-04-24-F	5	24	60.7	63.4	66	2.7	10	----	62.5	0.9	8	-7.1
KIM-06-24-F	6	24	61.2	63.9	66	2.7	10	----	63.5	0.4	8	-7.6
KIM-07-01-F	7	1	64.6	65.6	66	1.0	10	----	65.6	0.0	8	-8.0
KIM-01-47-FV	8	47	61.3	66.1	66	4.8	10	Snd Lvl	62.6	3.5	8	-4.5
KIM-08-127	10	127	60.1	62.1	66	2.0	10	----	62.0	0.1	8	-7.9

Dwelling Units	# DUs	Noise Reduction Min	Avg	Max
		dB	dB	dB
All Selected	319	0.0	2.8	8.8
All Impacted	47	3.5	3.5	3.5
All that meet NR Goal	48	8.3	8.6	8.8

TNM OUTPUT FOR US 60

HMB Professional Engineers
Mark Gavula

29 March 2021
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: I69 ORX
RUN: US60 Impact Run
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

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

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
60-01-01	1	1	61.3	60.9	66	-0.4	10	----	60.9	0.0	8	-8.0
60-02-04-F	2	1	65.1	65.3	66	0.2	10	----	65.3	0.0	8	-8.0
60-03-04-F	3	1	62.8	62.3	66	-0.5	10	----	62.3	0.0	8	-8.0
60-04-04	4	1	60.2	58.4	66	-1.8	10	----	58.4	0.0	8	-8.0
60-05-04	5	1	58.5	56.5	66	-2.0	10	----	56.5	0.0	8	-8.0
60-06-04-F	6	1	57.0	53.6	66	-3.4	10	----	53.6	0.0	8	-8.0
60-07-04-F	7	1	57.1	54.2	66	-2.9	10	----	54.2	0.0	8	-8.0
60-08-01-FV	8	1	62.2	61.2	66	-1.0	10	----	61.2	0.0	8	-8.0
60-09-01-FV	9	1	56.5	59.3	66	2.8	10	----	59.3	0.0	8	-8.0
60-10-01-F	10	1	62.2	63.0	66	0.8	10	----	63.0	0.0	8	-8.0
60-11-01-F	11	1	61.7	61.0	66	-0.7	10	----	61.0	0.0	8	-8.0
60-12-01-F	12	1	63.6	62.9	66	-0.7	10	----	62.9	0.0	8	-8.0
60-13-01-F	13	1	62.0	63.7	66	1.7	10	----	63.7	0.0	8	-8.0
60-14-01	14	1	56.7	59.7	66	3.0	10	----	59.7	0.0	8	-8.0
HIL-01-01	15	1	58.5	61.1	66	2.6	10	----	61.1	0.0	8	-8.0
HIL-02-01	16	1	55.2	58.6	66	3.4	10	----	58.6	0.0	8	-8.0
HIL-03-01	17	1	50.3	50.5	66	0.2	10	----	50.5	0.0	8	-8.0
HIL-04-01	18	1	50.5	52.1	66	1.6	10	----	52.1	0.0	8	-8.0
HIL-05-01	19	1	51.7	52.6	66	0.9	10	----	52.6	0.0	8	-8.0
HIL-06-01	20	1	54.5	56.4	66	1.9	10	----	56.4	0.0	8	-8.0
HIL-07-01	21	1	57.2	59.7	66	2.5	10	----	59.7	0.0	8	-8.0
MIC-01-01	22	1	50.2	51.2	66	1.0	10	----	51.2	0.0	8	-8.0
MIC-02-01	23	1	50.6	51.6	66	1.0	10	----	51.6	0.0	8	-8.0
MIC-03-01	24	1	50.9	52.1	66	1.2	10	----	52.1	0.0	8	-8.0

MIC-04-01	25	1	52.7	55.4	66	2.7	10	----	55.4	0.0	8	-8.0
MIC-05-01	26	1	51.2	53.6	66	2.4	10	----	53.6	0.0	8	-8.0
MIC-06-01	27	1	56.1	59.2	66	3.1	10	----	59.2	0.0	8	-8.0
MIC-06-01	28	1	56.0	59.6	66	3.6	10	----	59.6	0.0	8	-8.0
MIC-07-01	29	1	56.7	59.8	66	3.1	10	----	59.8	0.0	8	-8.0
MIL-01-01	30	1	55.7	55.4	66	-0.3	10	----	55.4	0.0	8	-8.0
MIL-02-01	31	1	55.5	55.2	66	-0.3	10	----	55.2	0.0	8	-8.0
MIL-03-01	32	1	55.4	55.0	66	-0.4	10	----	55.0	0.0	8	-8.0
MIL-04-01	33	1	55.4	55.0	66	-0.4	10	----	55.0	0.0	8	-8.0
MIL-05-01	34	1	54.9	54.4	66	-0.5	10	----	54.4	0.0	8	-8.0
MIL-06-01	35	1	55.3	54.2	66	-1.1	10	----	54.2	0.0	8	-8.0
MIL-07-01	36	1	55.2	53.9	66	-1.3	10	----	53.9	0.0	8	-8.0
MIL-08-01	37	1	54.7	53.6	66	-1.1	10	----	53.6	0.0	8	-8.0
MIL-09-01	38	1	53.8	55.1	66	1.3	10	----	55.1	0.0	8	-8.0
MIL-10-01	39	1	53.8	55.3	66	1.5	10	----	55.3	0.0	8	-8.0
MIL-11-01	40	1	53.3	55.8	66	2.5	10	----	55.8	0.0	8	-8.0
MIL-12-01	41	1	53.1	56.3	66	3.2	10	----	56.3	0.0	8	-8.0
MIL-13-01	42	1	52.9	56.4	66	3.5	10	----	56.4	0.0	8	-8.0
MIL-14-01	43	1	52.6	56.5	66	3.9	10	----	56.5	0.0	8	-8.0
MIL-15-01	44	1	53.9	57.1	66	3.2	10	----	57.1	0.0	8	-8.0
MIL-16-01	45	1	53.6	57.2	66	3.6	10	----	57.2	0.0	8	-8.0
MIL-17-01	46	1	52.7	56.8	66	4.1	10	----	56.8	0.0	8	-8.0
MIL-18-01	47	1	51.3	55.8	66	4.5	10	----	55.8	0.0	8	-8.0
MIL-19-01	48	1	50.1	54.7	66	4.6	10	----	54.7	0.0	8	-8.0
MIL-20-01	49	1	48.9	53.5	66	4.6	10	----	53.5	0.0	8	-8.0
MIL-21-01	50	1	48.4	53.1	66	4.7	10	----	53.1	0.0	8	-8.0
MIL-22-01	51	1	47.2	51.9	66	4.7	10	----	51.9	0.0	8	-8.0
MIL-23-01	52	1	46.2	50.7	66	4.5	10	----	50.7	0.0	8	-8.0
MOR-01-01-F	53	1	58.8	59.6	66	0.8	10	----	59.6	0.0	8	-8.0
MOR-02-01-F	54	1	55.6	57.3	66	1.7	10	----	57.3	0.0	8	-8.0
MOR-03-01-F	55	1	54.1	55.8	66	1.7	10	----	55.8	0.0	8	-8.0
MOR-04-01-F	56	1	53.2	55.2	66	2.0	10	----	55.2	0.0	8	-8.0
MOR-05-01-F	57	1	52.2	54.4	66	2.2	10	----	54.4	0.0	8	-8.0
MOR-06-01-F	58	1	51.3	53.6	66	2.3	10	----	53.6	0.0	8	-8.0
MOR-07-01-F	59	1	50.3	52.9	66	2.6	10	----	52.9	0.0	8	-8.0
MOR-08-01	60	1	50.4	52.8	66	2.4	10	----	52.8	0.0	8	-8.0
MOR-09-01	61	1	50.7	53.0	66	2.3	10	----	53.0	0.0	8	-8.0
MOR-10-01	62	1	51.6	54.0	66	2.4	10	----	54.0	0.0	8	-8.0
MOR-11-01	63	1	53.7	55.9	66	2.2	10	----	55.9	0.0	8	-8.0
MOR-12-01	64	1	55.0	57.6	66	2.6	10	----	57.6	0.0	8	-8.0
MOR-13-01	65	1	56.7	59.6	66	2.9	10	----	59.6	0.0	8	-8.0

MOR-14-01	66	1	59.2	61.5	66	2.3	10	----	61.5	0.0	8	-8.0

Dwelling Units	**# DUs**	**Noise Reduction**		
		Min	**Avg**	**Max**
		dB	**dB**	**dB**
All Selected	66	0.0	0.0	0.0
All Impacted	0	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

TNM OUTPUT FOR TARANSAY DRIVE

HMB Professional Engineers
Mark Gavula

29 March 2021
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: I69 ORX
RUN: Taransay Impact Run
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

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

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
BAL-01-01-F	1	1	40.4	57.3	66	16.9	10	Sub'l Inc	57.3	0.0	8	-8.0
BAL-02-01	2	1	40.4	56.2	66	15.8	10	Sub'l Inc	56.2	0.0	8	-8.0
BAL-03-01	3	1	40.4	55.9	66	15.5	10	Sub'l Inc	55.9	0.0	8	-8.0
BAL-04-01	4	1	40.4	55.1	66	14.7	10	Sub'l Inc	55.1	0.0	8	-8.0
BAL-05-01	5	1	40.4	53.9	66	13.5	10	Sub'l Inc	53.9	0.0	8	-8.0
BAL-06-01-F	6	1	40.4	54.4	66	14.0	10	Sub'l Inc	54.4	0.0	8	-8.0
BAL-07-01	7	1	40.4	52.7	66	12.3	10	Sub'l Inc	52.7	0.0	8	-8.0
BAL-08-01	8	1	40.4	52.4	66	12.0	10	Sub'l Inc	52.4	0.0	8	-8.0
BRO-01-01-F	9	1	40.4	58.2	66	17.8	10	Sub'l Inc	58.2	0.0	8	-8.0
BRO-02-01-F	10	1	40.4	58.8	66	18.4	10	Sub'l Inc	58.8	0.0	8	-8.0
BRO-03-01	11	1	40.4	54.6	66	14.2	10	Sub'l Inc	54.6	0.0	8	-8.0
BRO-04-01	12	1	40.4	56.9	66	16.5	10	Sub'l Inc	56.9	0.0	8	-8.0
BRO-05-01	13	1	40.4	53.8	66	13.4	10	Sub'l Inc	53.8	0.0	8	-8.0
BRO-06-01	14	1	40.4	56.3	66	15.9	10	Sub'l Inc	56.3	0.0	8	-8.0
COB-01-01-F	15	1	40.4	62.3	66	21.9	10	Sub'l Inc	62.3	0.0	8	-8.0
COB-02-01-F	16	1	40.4	60.3	66	19.9	10	Sub'l Inc	60.3	0.0	8	-8.0
COB-03-01-F	17	1	40.4	58.7	66	18.3	10	Sub'l Inc	58.7	0.0	8	-8.0
COB-04-01-F	18	1	40.4	58.3	66	17.9	10	Sub'l Inc	58.3	0.0	8	-8.0
COB-05-01-F	19	1	40.4	56.7	66	16.3	10	Sub'l Inc	56.7	0.0	8	-8.0
COB-06-01-F	20	1	40.4	56.0	66	15.6	10	Sub'l Inc	56.0	0.0	8	-8.0
COB-07-01-F	21	1	40.4	55.9	66	15.5	10	Sub'l Inc	55.9	0.0	8	-8.0
COB-08-01-F	22	1	40.4	55.2	66	14.8	10	Sub'l Inc	55.2	0.0	8	-8.0
COB-09-01-F	23	1	40.4	54.5	66	14.1	10	Sub'l Inc	54.5	0.0	8	-8.0
COB-10-01-F	24	1	40.4	53.9	66	13.5	10	Sub'l Inc	53.9	0.0	8	-8.0

COB-11-01-F	25	1	40.4	56.6	66	16.2	10	Sub'l Inc	56.6	0.0	8	-8.0
COB-12-01	26	1	40.4	54.4	66	14.0	10	Sub'l Inc	54.4	0.0	8	-8.0
COB-13-01	27	1	40.4	52.7	66	12.3	10	Sub'l Inc	52.7	0.0	8	-8.0
COB-14-01	28	1	40.4	51.7	66	11.3	10	Sub'l Inc	51.7	0.0	8	-8.0
COB-15-01	29	1	40.4	54.6	66	14.2	10	Sub'l Inc	54.6	0.0	8	-8.0

Dwelling Units	**# DUs**	**Noise Reduction**		
		Min	**Avg**	**Max**
		dB	**dB**	**dB**
All Selected	29	0.0	0.0	0.0
All Impacted	29	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

TNM OUTPUT FOR TARANSAY DRIVE BARRIER WALL

HMB Professional Engineers
Mark Gavula

29 March 2021
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: I69 ORX
RUN: Taransay Barrier Run
BARRIER DESIGN: Taransay-BAR-24'
ATMOSPHERICS: 68 deg F, 50% RH

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

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
BAL-01-01-F	1	1	40.4	57.3	66	16.9	10	Sub'l Inc	47.2	10.1	8	2.1
BAL-02-01	2	1	40.4	56.2	66	15.8	10	Sub'l Inc	46.2	10.0	8	2.0
BAL-03-01	3	1	40.4	55.9	66	15.5	10	Sub'l Inc	46.5	9.4	8	1.4
BAL-04-01	4	1	40.4	55.1	66	14.7	10	Sub'l Inc	46.1	9.0	8	1.0
BAL-05-01	5	1	40.4	53.9	66	13.5	10	Sub'l Inc	45.1	8.8	8	0.8
BAL-06-01-F	6	1	40.4	54.5	66	14.1	10	Sub'l Inc	45.3	9.2	8	1.2
BAL-07-01	7	1	40.4	52.7	66	12.3	10	Sub'l Inc	43.7	9.0	8	1.0
BAL-08-01	8	1	40.4	52.4	66	12.0	10	Sub'l Inc	43.6	8.8	8	0.8
BRO-01-01-F	9	1	40.4	58.2	66	17.8	10	Sub'l Inc	53.1	5.1	8	-2.9
BRO-02-01-F	10	1	40.4	58.8	66	18.4	10	Sub'l Inc	54.7	4.1	8	-3.9
BRO-03-01	11	1	40.4	54.6	66	14.2	10	Sub'l Inc	48.1	6.5	8	-1.5
BRO-04-01	12	1	40.4	56.9	66	16.5	10	Sub'l Inc	53.7	3.2	8	-4.8
BRO-05-01	13	1	40.4	53.8	66	13.4	10	Sub'l Inc	47.6	6.2	8	-1.8
BRO-06-01	14	1	40.4	56.3	66	15.9	10	Sub'l Inc	53.4	2.9	8	-5.1
COB-01-01-F	15	1	40.4	62.3	66	21.9	10	Sub'l Inc	50.6	11.7	8	3.7
COB-02-01-F	16	1	40.4	60.4	66	20.0	10	Sub'l Inc	50.0	10.4	8	2.4
COB-03-01-F	17	1	40.4	58.8	66	18.4	10	Sub'l Inc	49.6	9.2	8	1.2
COB-04-01-F	18	1	40.4	58.3	66	17.9	10	Sub'l Inc	48.8	9.5	8	1.5
COB-05-01-F	19	1	40.4	56.7	66	16.3	10	Sub'l Inc	47.8	8.9	8	0.9
COB-06-01-F	20	1	40.4	56.0	66	15.6	10	Sub'l Inc	47.6	8.4	8	0.4
COB-07-01-F	21	1	40.4	55.9	66	15.5	10	Sub'l Inc	47.7	8.2	8	0.2
COB-08-01-F	22	1	40.4	55.2	66	14.8	10	Sub'l Inc	47.3	7.9	8	-0.1
COB-09-01-F	23	1	40.4	54.5	66	14.1	10	Sub'l Inc	46.9	7.6	8	-0.4
COB-10-01-F	24	1	40.4	53.9	66	13.5	10	Sub'l Inc	46.8	7.1	8	-0.9

COB-11-01-F	25	1	40.4	56.6	66	16.2	10	Sub'l Inc	46.7	9.9	8	1.9
COB-12-01	26	1	40.4	54.4	66	14.0	10	Sub'l Inc	45.3	9.1	8	1.1
COB-13-01	27	1	40.4	52.7	66	12.3	10	Sub'l Inc	44.2	8.5	8	0.5
COB-14-01	28	1	40.4	51.7	66	11.3	10	Sub'l Inc	43.5	8.2	8	0.2
COB-15-01	29	1	40.4	54.6	66	14.2	10	Sub'l Inc	45.8	8.8	8	0.8

Dwelling Units		**# DUs**	**Noise Reduction**		
			Min	**Avg**	**Max**
			dB	**dB**	**dB**
All Selected		29	2.9	8.1	11.7
All Impacted		29	2.9	8.1	11.7
All that meet NR Goal		20	8.2	9.3	11.7

HMB Professional Engineers				29 March 2021						
Mark Gavula				TNM 2.5						
RESULTS: BARRIER DESCRIPTIONS										
PROJECT/CONTRACT:	I69 ORX									
RUN:	Taransay Barrier Run									
BARRIER DESIGN:	Taransay-BAR-24'									
Barriers										
Name	Type	Heights along Barrier			Length	If Wall	If Berm			Cost
		Min	Avg	Max		Area	Volume	Top	Run:Rise	
								Width		
		ft	ft	ft	ft	sq ft	cu yd	ft	ft:ft	$
Barrier2	W	24.00	24.00	24.00	3699	88786				2663587
									Total Cost:	2663587

HMB Professional Engineers 29 March 2021
Mark Gavula TNM 2.5
Calculated with TNM 2.5

RESULTS: BARRIER DESIGN

PROJECT/CONTRACT: I69 ORX
RUN: Taransay Barrier Run
BARRIER DESIGN: Taransay-BAR-24'

ATMOSPHERICS: 68 deg F, 50% RH

Selected Receivers

Name	No.	Calc LAeq1h	Noise Reduction Calc	Noise Reduction Goal	Noise Reduction Calc-Goal	Barrier Reviewed	Important Segments Name	Important Segments No.	Important Segments Height	Partial LAeq1h
		dBA	dB	dB	dB				ft	dBA
BAL-01-01-F	1	47.2	10.1	8	2.1	Barrier2	point96	96	24.0	28.1
						Barrier2	point91	91	24.0	28.1
						Barrier2	point95	95	24.0	28.0
						Barrier2	point97	97	24.0	28.0
						Barrier2	point92	92	24.0	28.0
						Barrier2	point94	94	24.0	28.0
						Barrier2	point100	100	24.0	28.0
						Barrier2	point99	99	24.0	28.0
						Barrier2	point93	93	24.0	28.0
						Barrier2	point90	90	24.0	27.9
BAL-02-01	2	46.2	10.0	8	2.0	Barrier2	point84	84	24.0	26.7
						Barrier2	point82	82	24.0	26.6
						Barrier2	point83	83	24.0	26.5
						Barrier2	point85	85	24.0	26.5
						Barrier2	point81	81	24.0	26.3
						Barrier2	point80	80	24.0	26.2
						Barrier2	point79	79	24.0	26.1
						Barrier2	point77	77	24.0	26.0
						Barrier2	point78	78	24.0	26.0
						Barrier2	point76	76	24.0	25.8
BAL-03-01	3	46.5	9.4	8	1.4	Barrier2	point96	96	24.0	25.4

						Barrier2	point99	99	24.0	25.4
						Barrier2	point97	97	24.0	25.4
						Barrier2	point98	98	24.0	25.4
						Barrier2	point95	95	24.0	25.3
						Barrier2	point77	77	24.0	25.3
						Barrier2	point94	94	24.0	25.3
						Barrier2	point100	100	24.0	25.3
						Barrier2	point90	90	24.0	25.2
						Barrier2	point89	89	24.0	25.2
BAL-04-01	4	46.1	9.0	8	1.0	Barrier2	point82	82	24.0	24.9
						Barrier2	point83	83	24.0	24.7
						Barrier2	point96	96	24.0	24.5
						Barrier2	point97	97	24.0	24.5
						Barrier2	point91	91	24.0	24.5
						Barrier2	point92	92	24.0	24.5
						Barrier2	point79	79	24.0	24.5
						Barrier2	point77	77	24.0	24.5
						Barrier2	point94	94	24.0	24.5
						Barrier2	point95	95	24.0	24.5
BAL-05-01	5	45.1	8.8	8	0.8	Barrier2	point3	3	0.0	23.7
						Barrier2	point91	91	24.0	23.6
						Barrier2	point201	201	0.0	23.5
						Barrier2	point92	92	24.0	23.5
						Barrier2	point93	93	24.0	23.5
						Barrier2	point94	94	24.0	23.4
						Barrier2	point89	89	24.0	23.4
						Barrier2	point200	200	0.0	23.4
						Barrier2	point90	90	24.0	23.4
						Barrier2	point95	95	24.0	23.3
BAL-06-01-F	6	45.3	9.2	8	1.2	Barrier2	point86	86	24.0	26.0
						Barrier2	point91	91	24.0	26.0
						Barrier2	point89	89	24.0	26.0
						Barrier2	point82	82	24.0	26.0
						Barrier2	point85	85	24.0	25.9
						Barrier2	point88	88	24.0	25.9
						Barrier2	point90	90	24.0	25.9

						Barrier2	point92	92	24.0	25.9
						Barrier2	point87	87	24.0	25.9
						Barrier2	point83	83	24.0	25.9
BAL-07-01	7	43.7	9.0	8	1.0	Barrier2	point16	16	0.0	25.0
						Barrier2	point86	86	24.0	24.7
						Barrier2	point15	15	0.0	24.7
						Barrier2	point82	82	24.0	24.6
						Barrier2	point14	14	0.0	24.6
						Barrier2	point84	84	24.0	24.6
						Barrier2	point91	91	24.0	24.6
						Barrier2	point87	87	24.0	24.6
						Barrier2	point85	85	24.0	24.6
						Barrier2	point83	83	24.0	24.5
BAL-08-01	8	43.6	8.8	8	0.8	Barrier2	point16	16	0.0	25.1
						Barrier2	point15	15	0.0	24.7
						Barrier2	point14	14	0.0	24.4
						Barrier2	point82	82	24.0	24.0
						Barrier2	point86	86	24.0	24.0
						Barrier2	point84	84	24.0	24.0
						Barrier2	point77	77	24.0	23.9
						Barrier2	point85	85	24.0	23.9
						Barrier2	point83	83	24.0	23.9
						Barrier2	point80	80	24.0	23.9
BRO-01-01-F	9	53.1	5.1	8	-2.9	Barrier2	point200	200	0.0	37.9
						Barrier2	point3	3	0.0	37.7
						Barrier2	point201	201	0.0	37.5
						Barrier2	point202	202	0.0	37.2
						Barrier2	point203	203	0.0	37.1
						Barrier2	point204	204	0.0	36.8
						Barrier2	point205	205	0.0	36.8
						Barrier2	point206	206	0.0	36.8
						Barrier2	point208	208	0.0	36.4
						Barrier2	point207	207	0.0	36.3
BRO-02-01-F	10	54.7	4.1	8	-3.9	Barrier2	point200	200	0.0	41.2
						Barrier2	point3	3	0.0	41.1
						Barrier2	point201	201	0.0	40.7

						Barrier2	point202	202	0.0	40.5
						Barrier2	point203	203	0.0	40.3
						Barrier2	point204	204	0.0	40.0
						Barrier2	point205	205	0.0	39.8
						Barrier2	point206	206	0.0	39.5
						Barrier2	point207	207	0.0	39.4
						Barrier2	point208	208	0.0	39.4
BRO-03-01	11	48.1	6.5	8	-1.5	Barrier2	point200	200	0.0	31.9
						Barrier2	point3	3	0.0	31.7
						Barrier2	point201	201	0.0	31.3
						Barrier2	point202	202	0.0	31.1
						Barrier2	point203	203	0.0	30.9
						Barrier2	point204	204	0.0	30.8
						Barrier2	point205	205	0.0	30.6
						Barrier2	point206	206	0.0	30.6
						Barrier2	point207	207	0.0	30.3
						Barrier2	point208	208	0.0	30.2
BRO-04-01	12	53.7	3.2	8	-4.8	Barrier2	point200	200	0.0	39.6
						Barrier2	point3	3	0.0	39.5
						Barrier2	point201	201	0.0	39.2
						Barrier2	point202	202	0.0	39.1
						Barrier2	point203	203	0.0	38.9
						Barrier2	point204	204	0.0	38.8
						Barrier2	point205	205	0.0	38.6
						Barrier2	point206	206	0.0	38.5
						Barrier2	point207	207	0.0	38.0
						Barrier2	point209	209	0.0	37.9
BRO-05-01	13	47.6	6.2	8	-1.8	Barrier2	point200	200	0.0	32.6
						Barrier2	point3	3	0.0	31.9
						Barrier2	point201	201	0.0	31.2
						Barrier2	point202	202	0.0	30.0
						Barrier2	point203	203	0.0	29.3
						Barrier2	point204	204	0.0	29.2
						Barrier2	point205	205	0.0	29.0
						Barrier2	point206	206	0.0	28.9
						Barrier2	point207	207	0.0	28.6

						Barrier2	point208	208	0.0	28.5
BRO-06-01	14	53.4	2.9	8	-5.1	Barrier2	point3	3	0.0	38.7
						Barrier2	point200	200	0.0	38.7
						Barrier2	point201	201	0.0	38.5
						Barrier2	point202	202	0.0	38.4
						Barrier2	point203	203	0.0	38.3
						Barrier2	point204	204	0.0	38.3
						Barrier2	point205	205	0.0	38.1
						Barrier2	point206	206	0.0	38.0
						Barrier2	point207	207	0.0	37.9
						Barrier2	point208	208	0.0	37.8
COB-01-01-F	15	50.6	11.7	8	3.7	Barrier2	point103	103	24.0	32.2
						Barrier2	point104	104	24.0	32.2
						Barrier2	point100	100	24.0	32.2
						Barrier2	point102	102	24.0	32.2
						Barrier2	point2	2	24.0	32.1
						Barrier2	point105	105	24.0	32.1
						Barrier2	point106	106	24.0	32.1
						Barrier2	point108	108	24.0	32.1
						Barrier2	point101	101	24.0	32.1
						Barrier2	point107	107	24.0	32.0
COB-02-01-F	16	50.0	10.4	8	2.4	Barrier2	point108	108	24.0	31.0
						Barrier2	point106	106	24.0	30.9
						Barrier2	point111	111	24.0	30.9
						Barrier2	point110	110	24.0	30.9
						Barrier2	point104	104	24.0	30.9
						Barrier2	point107	107	24.0	30.8
						Barrier2	point113	113	24.0	30.8
						Barrier2	point105	105	24.0	30.8
						Barrier2	point109	109	24.0	30.8
						Barrier2	point112	112	24.0	30.8
COB-03-01-F	17	49.6	9.2	8	1.2	Barrier2	point108	108	24.0	29.9
						Barrier2	point111	111	24.0	29.8
						Barrier2	point115	115	24.0	29.8
						Barrier2	point110	110	24.0	29.8
						Barrier2	point116	116	24.0	29.8

						Barrier2	point114	114	24.0	29.8
						Barrier2	point109	109	24.0	29.8
						Barrier2	point118	118	24.0	29.8
						Barrier2	point117	117	24.0	29.7
						Barrier2	point107	107	24.0	29.7
COB-04-01-F	18	48.8	9.5	8	1.5	Barrier2	point118	118	24.0	29.1
						Barrier2	point113	113	24.0	29.1
						Barrier2	point115	115	24.0	29.1
						Barrier2	point116	116	24.0	29.1
						Barrier2	point111	111	24.0	29.0
						Barrier2	point117	117	24.0	29.0
						Barrier2	point108	108	24.0	29.0
						Barrier2	point114	114	24.0	29.0
						Barrier2	point112	112	24.0	29.0
						Barrier2	point120	120	24.0	29.0
COB-05-01-F	19	47.8	8.9	8	0.9	Barrier2	point118	118	24.0	28.0
						Barrier2	point122	122	24.0	28.0
						Barrier2	point119	119	24.0	27.9
						Barrier2	point117	117	24.0	27.9
						Barrier2	point121	121	24.0	27.9
						Barrier2	point120	120	24.0	27.9
						Barrier2	point115	115	24.0	27.9
						Barrier2	point116	116	24.0	27.9
						Barrier2	point113	113	24.0	27.8
						Barrier2	point123	123	24.0	27.8
COB-06-01-F	20	47.6	8.4	8	0.4	Barrier2	point122	122	24.0	27.1
						Barrier2	point118	118	24.0	27.1
						Barrier2	point126	126	24.0	27.1
						Barrier2	point121	121	24.0	27.1
						Barrier2	point123	123	24.0	27.0
						Barrier2	point120	120	24.0	27.0
						Barrier2	point125	125	24.0	27.0
						Barrier2	point127	127	24.0	27.0
						Barrier2	point124	124	24.0	27.0
						Barrier2	point128	128	24.0	27.0
COB-07-01-F	21	47.7	8.2	8	0.2	Barrier2	point127	127	24.0	26.8

						Barrier2	point122	122	24.0	26.8
						Barrier2	point126	126	24.0	26.8
						Barrier2	point128	128	24.0	26.7
						Barrier2	point132	132	24.0	26.7
						Barrier2	point125	125	24.0	26.7
						Barrier2	point124	124	24.0	26.7
						Barrier2	point118	118	24.0	26.7
						Barrier2	point131	131	24.0	26.7
						Barrier2	point123	123	24.0	26.7
COB-08-01-F	22	47.3	7.9	8	-0.1	Barrier2	point200	200	0.0	26.9
						Barrier2	point3	3	0.0	26.9
						Barrier2	point201	201	0.0	26.8
						Barrier2	point203	203	0.0	26.7
						Barrier2	point202	202	0.0	26.5
						Barrier2	point204	204	0.0	26.3
						Barrier2	point206	206	0.0	26.2
						Barrier2	point127	127	24.0	26.0
						Barrier2	point132	132	24.0	26.0
						Barrier2	point131	131	24.0	25.9
COB-09-01-F	23	46.9	7.6	8	-0.4	Barrier2	point200	200	0.0	27.3
						Barrier2	point3	3	0.0	27.3
						Barrier2	point201	201	0.0	27.1
						Barrier2	point203	203	0.0	27.0
						Barrier2	point202	202	0.0	26.8
						Barrier2	point204	204	0.0	26.8
						Barrier2	point206	206	0.0	26.5
						Barrier2	point205	205	0.0	26.5
						Barrier2	point207	207	0.0	26.2
						Barrier2	point208	208	0.0	26.0
COB-10-01-F	24	46.8	7.1	8	-0.9	Barrier2	point200	200	0.0	27.4
						Barrier2	point3	3	0.0	27.4
						Barrier2	point201	201	0.0	27.3
						Barrier2	point202	202	0.0	27.0
						Barrier2	point203	203	0.0	26.9
						Barrier2	point204	204	0.0	26.7
						Barrier2	point206	206	0.0	26.5

						Barrier2	point205	205	0.0	26.4
						Barrier2	point208	208	0.0	26.2
						Barrier2	point207	207	0.0	26.1
COB-11-01-F	25	46.7	9.9	8	1.9	Barrier2	point96	96	24.0	28.4
						Barrier2	point94	94	24.0	28.3
						Barrier2	point97	97	24.0	28.3
						Barrier2	point91	91	24.0	28.3
						Barrier2	point100	100	24.0	28.3
						Barrier2	point98	98	24.0	28.3
						Barrier2	point101	101	24.0	28.2
						Barrier2	point99	99	24.0	28.2
						Barrier2	point95	95	24.0	28.2
						Barrier2	point93	93	24.0	28.2
COB-12-01	26	45.3	9.1	8	1.1	Barrier2	point91	91	24.0	26.0
						Barrier2	point90	90	24.0	25.8
						Barrier2	point89	89	24.0	25.8
						Barrier2	point86	86	24.0	25.7
						Barrier2	point88	88	24.0	25.7
						Barrier2	point74	74	24.0	25.7
						Barrier2	point92	92	24.0	25.6
						Barrier2	point87	87	24.0	25.6
						Barrier2	point72	72	24.0	25.5
						Barrier2	point73	73	24.0	25.5
COB-13-01	27	44.2	8.5	8	0.5	Barrier2	point94	94	24.0	24.0
						Barrier2	point95	95	24.0	24.0
						Barrier2	point91	91	24.0	24.0
						Barrier2	point92	92	24.0	23.9
						Barrier2	point93	93	24.0	23.9
						Barrier2	point90	90	24.0	23.8
						Barrier2	point89	89	24.0	23.8
						Barrier2	point88	88	24.0	23.7
						Barrier2	point87	87	24.0	23.6
						Barrier2	point86	86	24.0	23.5
COB-14-01	28	43.5	8.2	8	0.2	Barrier2	point91	91	24.0	22.9
						Barrier2	point92	92	24.0	22.8
						Barrier2	point90	90	24.0	22.7

						Barrier2	point89	89	24.0	22.7
						Barrier2	point86	86	24.0	22.5
						Barrier2	point88	88	24.0	22.5
						Barrier2	point87	87	24.0	22.5
						Barrier2	point85	85	24.0	22.3
						Barrier2	point84	84	24.0	22.3
						Barrier2	point82	82	24.0	22.2
COB-15-01	29	45.8	8.8	8	0.8	Barrier2	point3	3	0.0	24.9
						Barrier2	point200	200	0.0	24.5
						Barrier2	point201	201	0.0	24.5
						Barrier2	point203	203	0.0	24.3
						Barrier2	point205	205	0.0	23.9
						Barrier2	point202	202	0.0	23.9
						Barrier2	point204	204	0.0	23.9
						Barrier2	point118	118	24.0	23.9
						Barrier2	point206	206	0.0	23.9
						Barrier2	point113	113	24.0	23.8
Total Cost, All Barriers (including additional cost(s))					$2663587					

HMB Professional Engineers 29 March 2021
Mark Gavula TNM 2.5

RESULTS: BARRIER-SEGMENT DESCRIPTIONS
PROJECT/CONTRACT: I69 ORX
RUN: Taransay Barrier Run
BARRIER DESIGN: Taransay-BAR-24'

Barriers		Segments										
Name	Type	Name	No.	Heights			Length	If Wall			If Berm	Cost
				First Point	Average	Second Point		Area	On Struc?	Important Reflections?	Volume	
				ft	ft	ft	ft	sq ft			cu yd	$
Barrier2	W	point1	1	0.00	0.00	0.00	0	0				0
		point5	5	0.00	0.00	0.00	0	0				0
		point6	6	0.00	0.00	0.00	0	0				0
		point7	7	0.00	0.00	0.00	0	0				0
		point8	8	0.00	0.00	0.00	0	0				0
		point9	9	0.00	0.00	0.00	0	0				0
		point10	10	0.00	0.00	0.00	0	0				0
		point11	11	0.00	0.00	0.00	0	0				0
		point12	12	0.00	0.00	0.00	0	0				0
		point13	13	0.00	0.00	0.00	0	0				0
		point14	14	0.00	0.00	0.00	0	0				0
		point15	15	0.00	0.00	0.00	0	0				0
		point16	16	0.00	0.00	0.00	0	0				0
		point17	17	24.00	24.00	24.00	20	478				14346
		point18	18	24.00	24.00	24.00	20	476				14293
		point19	19	24.00	24.00	24.00	20	478				14346
		point20	20	24.00	24.00	24.00	20	478				14346
		point21	21	24.00	24.00	24.00	20	488				14638
		point22	22	24.00	24.00	24.00	20	478				14346
		point23	23	24.00	24.00	24.00	20	476				14293
		point24	24	24.00	24.00	24.00	20	478				14346
		point25	25	24.00	24.00	24.00	20	478				14346
		point26	26	24.00	24.00	24.00	20	488				14638
		point27	27	24.00	24.00	24.00	20	478				14346
		point28	28	24.00	24.00	24.00	20	476				14293
		point29	29	24.00	24.00	24.00	20	478				14346

		point30	30	24.00	24.00	24.00	20	490				14690
		point31	31	24.00	24.00	24.00	20	476				14293
		point32	32	24.00	24.00	24.00	20	478				14346
		point33	33	24.00	24.00	24.00	20	476				14293
		point34	34	24.00	24.00	24.00	20	478				14346
		point35	35	24.00	24.00	24.00	20	490				14690
		point36	36	24.00	24.00	24.00	20	478				14346
		point37	37	24.00	24.00	24.00	20	476				14293
		point38	38	24.00	24.00	24.00	20	478				14346
		point39	39	24.00	24.00	24.00	20	476				14293
		point40	40	24.00	24.00	24.00	20	490				14690
		point41	41	24.00	24.00	24.00	20	478				14346
		point42	42	24.00	24.00	24.00	20	476				14293
		point43	43	24.00	24.00	24.00	20	478				14346
		point44	44	24.00	24.00	24.00	20	488				14638
		point45	45	24.00	24.00	24.00	20	478				14346
		point46	46	24.00	24.00	24.00	20	478				14346
		point47	47	24.00	24.00	24.00	20	476				14293
		point48	48	24.00	24.00	24.00	20	478				14346
		point49	49	24.00	24.00	24.00	20	488				14638
		point50	50	24.00	24.00	24.00	20	478				14346
		point51	51	24.00	24.00	24.00	20	478				14346
		point52	52	24.00	24.00	24.00	20	476				14293
		point53	53	24.00	24.00	24.00	20	478				14346
		point54	54	24.00	24.00	24.00	20	488				14638
		point55	55	24.00	24.00	24.00	20	478				14346
		point56	56	24.00	24.00	24.00	20	478				14346
		point57	57	24.00	24.00	24.00	20	476				14293
		point58	58	24.00	24.00	24.00	20	490				14690
		point59	59	24.00	24.00	24.00	20	476				14293
		point60	60	24.00	24.00	24.00	20	478				14346
		point61	61	24.00	24.00	24.00	20	478				14346
		point62	62	24.00	24.00	24.00	20	476				14293
		point63	63	24.00	24.00	24.00	20	490				14690
		point64	64	24.00	24.00	24.00	20	476				14293
		point65	65	24.00	24.00	24.00	20	478				14346
		point66	66	24.00	24.00	24.00	20	478				14346
		point67	67	24.00	24.00	24.00	20	476				14293
		point68	68	24.00	24.00	24.00	20	490				14690

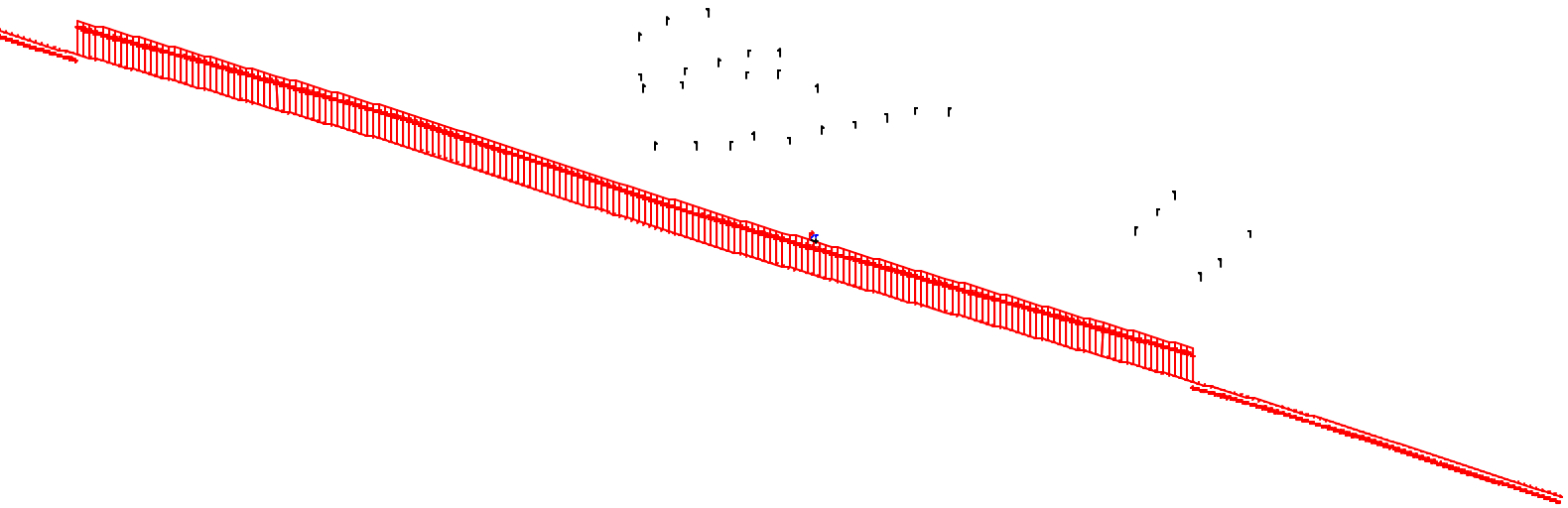
		point69	69	24.00	24.00	24.00	20	476				14293
		point70	70	24.00	24.00	24.00	20	478				14346
		point71	71	24.00	24.00	24.00	20	478				14346
		point72	72	24.00	24.00	24.00	20	488				14638
		point73	73	24.00	24.00	24.00	20	478				14346
		point74	74	24.00	24.00	24.00	20	476				14293
		point75	75	24.00	24.00	24.00	20	478				14346
		point76	76	24.00	24.00	24.00	20	478				14346
		point77	77	24.00	24.00	24.00	20	488				14638
		point78	78	24.00	24.00	24.00	20	478				14346
		point79	79	24.00	24.00	24.00	20	476				14293
		point80	80	24.00	24.00	24.00	20	478				14346
		point81	81	24.00	24.00	24.00	20	478				14346
		point82	82	24.00	24.00	24.00	20	488				14638
		point83	83	24.00	24.00	24.00	20	478				14346
		point84	84	24.00	24.00	24.00	20	476				14293
		point85	85	24.00	24.00	24.00	20	478				14346
		point86	86	24.00	24.00	24.00	20	490				14690
		point87	87	24.00	24.00	24.00	20	478				14346
		point88	88	24.00	24.00	24.00	20	476				14293
		point89	89	24.00	24.00	24.00	20	478				14346
		point90	90	24.00	24.00	24.00	20	476				14293
		point91	91	24.00	24.00	24.00	20	490				14690
		point92	92	24.00	24.00	24.00	20	478				14346
		point93	93	24.00	24.00	24.00	20	476				14293
		point94	94	24.00	24.00	24.00	20	478				14346
		point95	95	24.00	24.00	24.00	20	476				14293
		point96	96	24.00	24.00	24.00	20	490				14690
		point97	97	24.00	24.00	24.00	20	478				14346
		point98	98	24.00	24.00	24.00	20	476				14293
		point99	99	24.00	24.00	24.00	20	478				14346
		point100	100	24.00	24.00	24.00	20	488				14638
		point101	101	24.00	24.00	24.00	20	478				14346
		point102	102	24.00	24.00	24.00	20	478				14346
		point2	2	24.00	24.00	24.00	20	476				14293
		point103	103	24.00	24.00	24.00	20	478				14346
		point104	104	24.00	24.00	24.00	20	488				14638
		point105	105	24.00	24.00	24.00	20	478				14346
		point106	106	24.00	24.00	24.00	20	478				14346

		point107	107	24.00	24.00	24.00	20	476				14293
		point108	108	24.00	24.00	24.00	20	490				14690
		point109	109	24.00	24.00	24.00	20	476				14293
		point110	110	24.00	24.00	24.00	20	478				14346
		point111	111	24.00	24.00	24.00	20	478				14346
		point112	112	24.00	24.00	24.00	20	476				14293
		point113	113	24.00	24.00	24.00	20	490				14690
		point114	114	24.00	24.00	24.00	20	476				14293
		point115	115	24.00	24.00	24.00	20	478				14346
		point116	116	24.00	24.00	24.00	20	478				14346
		point117	117	24.00	24.00	24.00	20	476				14293
		point118	118	24.00	24.00	24.00	20	490				14690
		point119	119	24.00	24.00	24.00	20	476				14293
		point120	120	24.00	24.00	24.00	20	478				14346
		point121	121	24.00	24.00	24.00	20	478				14346
		point122	122	24.00	24.00	24.00	20	488				14638
		point123	123	24.00	24.00	24.00	20	478				14346
		point124	124	24.00	24.00	24.00	20	476				14293
		point125	125	24.00	24.00	24.00	20	478				14346
		point126	126	24.00	24.00	24.00	20	478				14346
		point127	127	24.00	24.00	24.00	20	488				14638
		point128	128	24.00	24.00	24.00	20	478				14346
		point129	129	24.00	24.00	24.00	20	476				14293
		point130	130	24.00	24.00	24.00	20	478				14346
		point131	131	24.00	24.00	24.00	20	478				14346
		point132	132	24.00	24.00	24.00	20	488				14638
		point133	133	24.00	24.00	24.00	20	478				14346
		point134	134	24.00	24.00	24.00	20	476				14293
		point135	135	24.00	24.00	24.00	20	478				14346
		point136	136	24.00	24.00	24.00	20	490				14690
		point137	137	24.00	24.00	24.00	20	478				14346
		point138	138	24.00	24.00	24.00	20	476				14293
		point139	139	24.00	24.00	24.00	20	478				14346
		point140	140	24.00	24.00	24.00	20	476				14293
		point141	141	24.00	24.00	24.00	20	490				14690
		point142	142	24.00	24.00	24.00	20	478				14346
		point143	143	24.00	24.00	24.00	20	476				14293
		point144	144	24.00	24.00	24.00	20	478				14346
		point145	145	24.00	24.00	24.00	20	476				14293

		point146	146	24.00	24.00	24.00	20	490				14690
		point147	147	24.00	24.00	24.00	20	478				14346
		point148	148	24.00	24.00	24.00	20	476				14293
		point149	149	24.00	24.00	24.00	20	478				14346
		point150	150	24.00	24.00	24.00	20	488				14638
		point151	151	24.00	24.00	24.00	20	478				14346
		point152	152	24.00	24.00	24.00	20	478				14346
		point153	153	24.00	24.00	24.00	20	476				14293
		point154	154	24.00	24.00	24.00	20	478				14346
		point155	155	24.00	24.00	24.00	20	488				14638
		point156	156	24.00	24.00	24.00	20	478				14346
		point157	157	24.00	24.00	24.00	20	478				14346
		point158	158	24.00	24.00	24.00	20	476				14293
		point159	159	24.00	24.00	24.00	20	478				14346
		point160	160	24.00	24.00	24.00	20	488				14638
		point161	161	24.00	24.00	24.00	20	478				14346
		point162	162	24.00	24.00	24.00	20	478				14346
		point163	163	24.00	24.00	24.00	20	476				14293
		point164	164	24.00	24.00	24.00	20	490				14690
		point165	165	24.00	24.00	24.00	20	476				14293
		point166	166	24.00	24.00	24.00	20	478				14346
		point167	167	24.00	24.00	24.00	20	478				14346
		point168	168	24.00	24.00	24.00	20	476				14293
		point260	260	24.00	24.00	24.00	20	490				14690
		point169	169	24.00	24.00	24.00	20	476				14293
		point170	170	24.00	24.00	24.00	20	478				14346
		point171	171	24.00	24.00	24.00	20	478				14346
		point172	172	24.00	24.00	24.00	20	476				14293
		point173	173	24.00	24.00	24.00	20	490				14690
		point174	174	24.00	24.00	24.00	20	476				14293
		point175	175	24.00	24.00	24.00	20	478				14346
		point176	176	24.00	24.00	24.00	20	478				14346
		point177	177	24.00	24.00	24.00	20	488				14638
		point178	178	24.00	24.00	24.00	20	478				14346
		point179	179	24.00	24.00	24.00	20	476				14293
		point180	180	24.00	24.00	24.00	20	478				14346
		point181	181	24.00	24.00	24.00	20	478				14346
		point182	182	24.00	24.00	24.00	20	488				14638
		point183	183	24.00	24.00	24.00	20	478				14346

		point184	184	24.00	24.00	24.00	20	476				14293
		point185	185	24.00	24.00	24.00	20	478				14346
		point186	186	24.00	24.00	24.00	20	478				14346
		point187	187	24.00	24.00	24.00	20	490				14690
		point188	188	24.00	24.00	24.00	20	476				14293
		point189	189	24.00	24.00	24.00	20	478				14346
		point190	190	24.00	24.00	24.00	20	476				14293
		point191	191	24.00	24.00	24.00	20	490				14690
		point192	192	24.00	24.00	24.00	20	478				14346
		point193	193	24.00	24.00	24.00	20	476				14293
		point194	194	24.00	24.00	24.00	20	478				14346
		point195	195	24.00	24.00	24.00	20	476				14293
		point196	196	24.00	24.00	24.00	20	490				14690
		point197	197	24.00	24.00	24.00	20	478				14346
		point198	198	24.00	24.00	24.00	20	476				14293
		point199	199	24.00	24.00	24.00	20	478				14346
		point200	200	0.00	0.00	0.00	0	0				0
		point3	3	0.00	0.00	0.00	0	0				0
		point201	201	0.00	0.00	0.00	0	0				0
		point202	202	0.00	0.00	0.00	0	0				0
		point203	203	0.00	0.00	0.00	0	0				0
		point204	204	0.00	0.00	0.00	0	0				0
		point205	205	0.00	0.00	0.00	0	0				0
		point206	206	0.00	0.00	0.00	0	0				0
		point207	207	0.00	0.00	0.00	0	0				0
		point208	208	0.00	0.00	0.00	0	0				0
		point209	209	0.00	0.00	0.00	0	0				0
		point210	210	0.00	0.00	0.00	0	0				0
		point211	211	0.00	0.00	0.00	0	0				0
		point212	212	0.00	0.00	0.00	0	0				0
		point213	213	0.00	0.00	0.00	0	0				0
		point214	214	0.00	0.00	0.00	0	0				0
		point215	215	0.00	0.00	0.00	0	0				0
		point216	216	0.00	0.00	0.00	0	0				0
		point217	217	0.00	0.00	0.00	0	0				0
		point218	218	0.00	0.00	0.00	0	0				0
		point219	219	0.00	0.00	0.00	0	0				0
		point220	220	0.00	0.00	0.00	0	0				0
		point221	221	0.00	0.00	0.00	0	0				0

		point222	222	0.00	0.00	0.00	0	0				0
		point223	223	0.00	0.00	0.00	0	0				0
		point224	224	0.00	0.00	0.00	0	0				0
		point225	225	0.00	0.00	0.00	0	0				0
		point226	226	0.00	0.00	0.00	0	0				0
		point227	227	0.00	0.00	0.00	0	0				0
		point228	228	0.00	0.00	0.00	0	0				0
		point229	229	0.00	0.00	0.00	0	0				0
		point230	230	0.00	0.00	0.00	0	0				0
		point231	231	0.00	0.00	0.00	0	0				0
		point232	232	0.00	0.00	0.00	0	0				0
		point233	233	0.00	0.00	0.00	0	0				0
		point234	234	0.00	0.00	0.00	0	0				0
		point235	235	0.00	0.00	0.00	0	0				0
		point236	236	0.00	0.00	0.00	0	0				0
		point237	237	0.00	0.00	0.00	0	0				0
		point238	238	0.00	0.00	0.00	0	0				0
		point239	239	0.00	0.00	0.00	0	0				0
		point240	240	0.00	0.00	0.00	0	0				0
		point241	241	0.00	0.00	0.00	0	0				0
		point242	242	0.00	0.00	0.00	0	0				0
		point243	243	0.00	0.00	0.00	0	0				0
		point244	244	0.00	0.00	0.00	0	0				0
		point245	245	0.00	0.00	0.00	0	0				0
		point246	246	0.00	0.00	0.00	0	0				0
		point247	247	0.00	0.00	0.00	0	0				0
		point248	248	0.00	0.00	0.00	0	0				0
		point249	249	0.00	0.00	0.00	0	0				0
		point250	250	0.00	0.00	0.00	0	0				0
		point251	251	0.00	0.00	0.00	0	0				0
		point252	252	0.00	0.00	0.00	0	0				0
		point253	253	0.00	0.00	0.00	0	0				0
		point254	254	0.00	0.00	0.00	0	0				0
		point255	255	0.00	0.00	0.00	0	0				0
		point256	256	0.00	0.00	0.00	0	0				0
		point257	257	0.00	0.00	0.00	0	0				0
		point258	258	0.00	0.00	0.00	0	0				0
		point259	259	0.00	0.00	0.00	0	0				0



Tarransay Barrier Run	Sheet 1 of 1	29 Mar 2021
	HMB Professional Engineers	
Barrier View-Taransay-BAR-24'	Project/Contract No. I69 ORX	
Run name: Taransay_Barrier_Run	TNM Version 2.5, Feb 2004	
Scale: <DNA - due to perspective>	Analysis By: Mark Gavula	

Roadway:		Ground Zone:	polygon
Receiver:		Tree Zone:	dashed polygon
Barrier:		Contour Zone:	polygon
Building Row:		Parallel Barrier:	
Terrain Line:		Skew Section:	

TNM OUTPUT FOR BRAXTON PARK DRIVE AND MELODY LANE

HMB Professional Engineers
Mark Gavula

29 March 2021
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: I69 ORX
RUN: US60 Impact Run
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

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

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
60-01-01	1	1	61.3	60.9	66	-0.4	10	----	60.9	0.0	8	-8.0
60-02-04-F	2	1	65.1	65.3	66	0.2	10	----	65.3	0.0	8	-8.0
60-03-04-F	3	1	62.8	62.3	66	-0.5	10	----	62.3	0.0	8	-8.0
60-04-04	4	1	60.2	58.4	66	-1.8	10	----	58.4	0.0	8	-8.0
60-05-04	5	1	58.5	56.5	66	-2.0	10	----	56.5	0.0	8	-8.0
60-06-04-F	6	1	57.0	53.6	66	-3.4	10	----	53.6	0.0	8	-8.0
60-07-04-F	7	1	57.1	54.2	66	-2.9	10	----	54.2	0.0	8	-8.0
60-08-01-FV	8	1	62.2	61.2	66	-1.0	10	----	61.2	0.0	8	-8.0
60-09-01-FV	9	1	56.5	59.3	66	2.8	10	----	59.3	0.0	8	-8.0
60-10-01-F	10	1	62.2	63.0	66	0.8	10	----	63.0	0.0	8	-8.0
60-11-01-F	11	1	61.7	61.0	66	-0.7	10	----	61.0	0.0	8	-8.0
60-12-01-F	12	1	63.6	62.9	66	-0.7	10	----	62.9	0.0	8	-8.0
60-13-01-F	13	1	62.0	63.7	66	1.7	10	----	63.7	0.0	8	-8.0
60-14-01	14	1	56.7	59.7	66	3.0	10	----	59.7	0.0	8	-8.0
HIL-01-01	15	1	58.5	61.1	66	2.6	10	----	61.1	0.0	8	-8.0
HIL-02-01	16	1	55.2	58.6	66	3.4	10	----	58.6	0.0	8	-8.0
HIL-03-01	17	1	50.3	50.5	66	0.2	10	----	50.5	0.0	8	-8.0
HIL-04-01	18	1	50.5	52.1	66	1.6	10	----	52.1	0.0	8	-8.0
HIL-05-01	19	1	51.7	52.6	66	0.9	10	----	52.6	0.0	8	-8.0
HIL-06-01	20	1	54.5	56.4	66	1.9	10	----	56.4	0.0	8	-8.0
HIL-07-01	21	1	57.2	59.7	66	2.5	10	----	59.7	0.0	8	-8.0
MIC-01-01	22	1	50.2	51.2	66	1.0	10	----	51.2	0.0	8	-8.0
MIC-02-01	23	1	50.6	51.6	66	1.0	10	----	51.6	0.0	8	-8.0
MIC-03-01	24	1	50.9	52.1	66	1.2	10	----	52.1	0.0	8	-8.0

MIC-04-01	25	1	52.7	55.4	66	2.7	10	----	55.4	0.0	8	-8.0
MIC-05-01	26	1	51.2	53.6	66	2.4	10	----	53.6	0.0	8	-8.0
MIC-06-01	27	1	56.1	59.2	66	3.1	10	----	59.2	0.0	8	-8.0
MIC-06-01	28	1	56.0	59.6	66	3.6	10	----	59.6	0.0	8	-8.0
MIC-07-01	29	1	56.7	59.8	66	3.1	10	----	59.8	0.0	8	-8.0
MIL-01-01	30	1	55.7	55.4	66	-0.3	10	----	55.4	0.0	8	-8.0
MIL-02-01	31	1	55.5	55.2	66	-0.3	10	----	55.2	0.0	8	-8.0
MIL-03-01	32	1	55.4	55.0	66	-0.4	10	----	55.0	0.0	8	-8.0
MIL-04-01	33	1	55.4	55.0	66	-0.4	10	----	55.0	0.0	8	-8.0
MIL-05-01	34	1	54.9	54.4	66	-0.5	10	----	54.4	0.0	8	-8.0
MIL-06-01	35	1	55.3	54.2	66	-1.1	10	----	54.2	0.0	8	-8.0
MIL-07-01	36	1	55.2	53.9	66	-1.3	10	----	53.9	0.0	8	-8.0
MIL-08-01	37	1	54.7	53.6	66	-1.1	10	----	53.6	0.0	8	-8.0
MIL-09-01	38	1	53.8	55.1	66	1.3	10	----	55.1	0.0	8	-8.0
MIL-10-01	39	1	53.8	55.3	66	1.5	10	----	55.3	0.0	8	-8.0
MIL-11-01	40	1	53.3	55.8	66	2.5	10	----	55.8	0.0	8	-8.0
MIL-12-01	41	1	53.1	56.3	66	3.2	10	----	56.3	0.0	8	-8.0
MIL-13-01	42	1	52.9	56.4	66	3.5	10	----	56.4	0.0	8	-8.0
MIL-14-01	43	1	52.6	56.5	66	3.9	10	----	56.5	0.0	8	-8.0
MIL-15-01	44	1	53.9	57.1	66	3.2	10	----	57.1	0.0	8	-8.0
MIL-16-01	45	1	53.6	57.2	66	3.6	10	----	57.2	0.0	8	-8.0
MIL-17-01	46	1	52.7	56.8	66	4.1	10	----	56.8	0.0	8	-8.0
MIL-18-01	47	1	51.3	55.8	66	4.5	10	----	55.8	0.0	8	-8.0
MIL-19-01	48	1	50.1	54.7	66	4.6	10	----	54.7	0.0	8	-8.0
MIL-20-01	49	1	48.9	53.5	66	4.6	10	----	53.5	0.0	8	-8.0
MIL-21-01	50	1	48.4	53.1	66	4.7	10	----	53.1	0.0	8	-8.0
MIL-22-01	51	1	47.2	51.9	66	4.7	10	----	51.9	0.0	8	-8.0
MIL-23-01	52	1	46.2	50.7	66	4.5	10	----	50.7	0.0	8	-8.0
MOR-01-01-F	53	1	58.8	59.6	66	0.8	10	----	59.6	0.0	8	-8.0
MOR-02-01-F	54	1	55.6	57.3	66	1.7	10	----	57.3	0.0	8	-8.0
MOR-03-01-F	55	1	54.1	55.8	66	1.7	10	----	55.8	0.0	8	-8.0
MOR-04-01-F	56	1	53.2	55.2	66	2.0	10	----	55.2	0.0	8	-8.0
MOR-05-01-F	57	1	52.2	54.4	66	2.2	10	----	54.4	0.0	8	-8.0
MOR-06-01-F	58	1	51.3	53.6	66	2.3	10	----	53.6	0.0	8	-8.0
MOR-07-01-F	59	1	50.3	52.9	66	2.6	10	----	52.9	0.0	8	-8.0
MOR-08-01	60	1	50.4	52.8	66	2.4	10	----	52.8	0.0	8	-8.0
MOR-09-01	61	1	50.7	53.0	66	2.3	10	----	53.0	0.0	8	-8.0
MOR-10-01	62	1	51.6	54.0	66	2.4	10	----	54.0	0.0	8	-8.0
MOR-11-01	63	1	53.7	55.9	66	2.2	10	----	55.9	0.0	8	-8.0
MOR-12-01	64	1	55.0	57.6	66	2.6	10	----	57.6	0.0	8	-8.0
MOR-13-01	65	1	56.7	59.6	66	2.9	10	----	59.6	0.0	8	-8.0

MOR-14-01	66	1	59.2	61.5	66	2.3	10	----	61.5	0.0	8	-8.0

Dwelling Units	**# DUs**	**Noise Reduction**		
		Min	**Avg**	**Max**
		dB	**dB**	**dB**
All Selected	66	0.0	0.0	0.0
All Impacted	0	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

TNM OUTPUT FOR BRAXTON PARK DRIVE BARRIER WALL

HMB Professional Engineers
Mark Gavula

29 March 2021
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: I-69 FEIS
RUN: Braxton Subdivision Run
BARRIER DESIGN: Braxton-BAR-01
ATMOSPHERICS: 68 deg F, 50% RH

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

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
HAR-04-01	2	1	39.8	49.4	66	9.6	10	----	44.2	5.2	8	-2.8
HAR-03-01-F	48	1	39.8	50.0	66	10.2	10	Sub'l Inc	45.0	5.0	8	-3.0
PRI-01-01-F	43	1	39.8	49.7	66	9.9	10	----	45.4	4.3	8	-3.7
HAR-02-01-F	42	1	39.8	48.4	66	8.6	10	----	43.7	4.7	8	-3.3
HAR-01-01-F	41	1	39.8	50.0	66	10.2	10	Sub'l Inc	44.9	5.1	8	-2.9
SAN-08-01	39	1	39.8	48.6	66	8.8	10	----	43.2	5.4	8	-2.6
SAN-07-01	40	1	39.8	47.9	66	8.1	10	----	43.4	4.5	8	-3.5
SAN-06-01	16	1	39.8	49.4	66	9.6	10	----	44.1	5.3	8	-2.7
SAN-05-01-F	14	1	39.8	52.5	66	12.7	10	Sub'l Inc	47.1	5.4	8	-2.6
SAN-01-01-F	1	1	39.8	51.9	66	12.1	10	Sub'l Inc	46.5	5.4	8	-2.6
SAN-02-01	15	1	39.8	51.4	66	11.6	10	Sub'l Inc	45.3	6.1	8	-1.9
SAN-03-01	47	1	39.8	49.5	66	9.7	10	----	45.1	4.4	8	-3.6
SAN-04-01	37	1	39.8	48.1	66	8.3	10	----	42.3	5.8	8	-2.2
BRA-08-01	38	1	39.8	47.8	66	8.0	10	----	42.4	5.4	8	-2.6
BRA-07-01	36	1	39.8	48.9	66	9.1	10	----	43.7	5.2	8	-2.8
BRA-10-01	13	1	39.8	50.0	66	10.2	10	Sub'l Inc	45.2	4.8	8	-3.2
BRA-09-01	12	1	39.8	50.7	66	10.9	10	Sub'l Inc	46.2	4.5	8	-3.5
BRA-06-01	11	1	39.8	51.7	66	11.9	10	Sub'l Inc	47.2	4.5	8	-3.5
BRA-11-01-F	46	1	39.8	53.4	66	13.6	10	Sub'l Inc	48.8	4.6	8	-3.4
BRA-01-01-F	29	1	39.8	53.0	66	13.2	10	Sub'l Inc	47.1	5.9	8	-2.1
CUL-07-01-F	23	1	39.8	55.0	66	15.2	10	Sub'l Inc	48.6	6.4	8	-1.6
BRA-02-01	10	1	39.8	53.3	66	13.5	10	Sub'l Inc	46.7	6.6	8	-1.4
CUL-08-01	8	1	39.8	53.0	66	13.2	10	Sub'l Inc	46.7	6.3	8	-1.7
BRA-03-01	9	1	39.8	52.3	66	12.5	10	Sub'l Inc	45.9	6.4	8	-1.6

CUL-11-01	7	1	39.8	52.1	66	12.3	10	Sub'l Inc	44.7	7.4	8	-0.6
BRA-05-01	35	1	39.8	49.9	66	10.1	10	Sub'l Inc	42.8	7.1	8	-0.9
BRA-04-01	34	1	39.8	50.8	66	11.0	10	Sub'l Inc	43.6	7.2	8	-0.8
CUL-09-01	33	1	39.8	51.0	66	11.2	10	Sub'l Inc	44.0	7.0	8	-1.0
CUL-10-01	32	1	39.8	49.6	66	9.8	10	----	43.1	6.5	8	-1.5
CUL-05-01	31	1	39.8	51.4	66	11.6	10	Sub'l Inc	44.5	6.9	8	-1.1
CUL-04-01	30	1	39.8	51.7	66	11.9	10	Sub'l Inc	44.6	7.1	8	-0.9
CUL-03-01	3	1	39.8	52.4	66	12.6	10	Sub'l Inc	44.8	7.6	8	-0.4
CUL-06-01	6	1	39.8	53.4	66	13.6	10	Sub'l Inc	45.6	7.8	8	-0.2
CUL-02-01	5	1	39.8	54.6	66	14.8	10	Sub'l Inc	47.1	7.5	8	-0.5
CUL-01-01-FA	49	1	39.8	56.5	66	16.7	10	Sub'l Inc	48.9	7.6	8	-0.4
414-02-01-F	44	1	39.8	53.6	66	13.8	10	Sub'l Inc	46.2	7.4	8	-0.6
414-01-01-F	45	1	39.8	46.4	66	6.6	10	----	43.2	3.2	8	-4.8

Dwelling Units	**# DUs**	**Noise Reduction**		
		Min	**Avg**	**Max**
		dB	**dB**	**dB**
All Selected	37	3.2	5.9	7.8
All Impacted	25	4.5	6.3	7.8
All that meet NR Goal	0	0.0	0.0	0.0

HMB Professional Engineers				**29 March 2021**						
Mark Gavula				**TNM 2.5**						
RESULTS: BARRIER DESCRIPTIONS										
PROJECT/CONTRACT:	**I-69 FEIS**									
RUN:	**Braxton Subdivision Run**									
BARRIER DESIGN:	**Braxton-BAR-01**									
Barriers										
Name	**Type**	**Heights along Barrier**			**Length**	**If Wall**	**If Berm**			**Cost**
		Min	**Avg**	**Max**		**Area**	**Volume**	**Top**	**Run:Rise**	
								Width		
		ft	ft	ft	ft	sq ft	cu yd	ft	ft:ft	$
Braxton Barrier - 01	W	20.00	20.00	20.00	4276	85527				2565805
									Total Cost:	2565805

HMB Professional Engineers 29 March 2021
Mark Gavula TNM 2.5
Calculated with TNM 2.5

RESULTS: BARRIER DESIGN
PROJECT/CONTRACT: I-69 FEIS
RUN: Braxton Subdivision Run
BARRIER DESIGN: Braxton-BAR-01

ATMOSPHERICS: 68 deg F, 50% RH

Selected Receivers

Name	No.	Calc LAeq1h	Noise Reduction Calc	Noise Reduction Goal	Noise Reduction Calc-Goal	Barrier Reviewed	Important Segments Name	Important Segments No.	Important Segments Height	Partial LAeq1h
		dBA	dB	dB	dB				ft	dBA
HAR-04-01	2	44.2	5.2	8	-2.8	Braxton Barrier - 01	point125	125	20.0	28.8
						Braxton Barrier - 01	point44	44	20.0	27.5
						Braxton Barrier - 01	point43	43	20.0	27.0
						Braxton Barrier - 01	point132	132	20.0	26.3
						Braxton Barrier - 01	point42	42	20.0	24.4
						Braxton Barrier - 01	point126	126	20.0	24.1
						Braxton Barrier - 01	point133	133	20.0	24.1
						Braxton Barrier - 01	point45	45	20.0	24.0
						Braxton Barrier - 01	point163	163	20.0	23.6
						Braxton Barrier - 01	point162	162	20.0	23.5
HAR-03-01-F	48	45.0	5.0	8	-3.0	Braxton Barrier - 01	point130	130	20.0	32.8
						Braxton Barrier - 01	point129	129	20.0	29.6
						Braxton Barrier - 01	point162	162	20.0	24.7
						Braxton Barrier - 01	point161	161	20.0	24.7
						Braxton Barrier - 01	point160	160	20.0	24.7
						Braxton Barrier - 01	point159	159	20.0	24.5
						Braxton Barrier - 01	point163	163	20.0	24.5
						Braxton Barrier - 01	point164	164	20.0	24.4
						Braxton Barrier - 01	point158	158	20.0	24.4
						Braxton Barrier - 01	point165	165	20.0	24.4
PRI-01-01-F	43	45.4	4.3	8	-3.7	Braxton Barrier - 01	point123	123	20.0	28.6

						Braxton Barrier - 01	point167	167	20.0	25.3
						Braxton Barrier - 01	point166	166	20.0	25.2
						Braxton Barrier - 01	point168	168	20.0	25.2
						Braxton Barrier - 01	point169	169	20.0	25.1
						Braxton Barrier - 01	point124	124	20.0	25.1
						Braxton Barrier - 01	point170	170	20.0	25.0
						Braxton Barrier - 01	point52	52	20.0	25.0
						Braxton Barrier - 01	point171	171	20.0	24.9
						Braxton Barrier - 01	point172	172	20.0	24.9
HAR-02-01-F	42	43.7	4.7	8	-3.3	Braxton Barrier - 01	point144	144	20.0	24.1
						Braxton Barrier - 01	point149	149	20.0	24.0
						Braxton Barrier - 01	point145	145	20.0	24.0
						Braxton Barrier - 01	point143	143	20.0	24.0
						Braxton Barrier - 01	point148	148	20.0	24.0
						Braxton Barrier - 01	point147	147	20.0	24.0
						Braxton Barrier - 01	point146	146	20.0	24.0
						Braxton Barrier - 01	point150	150	20.0	24.0
						Braxton Barrier - 01	point151	151	20.0	23.9
						Braxton Barrier - 01	point153	153	20.0	23.9
HAR-01-01-F	41	44.9	5.1	8	-2.9	Braxton Barrier - 01	point121	121	20.0	31.7
						Braxton Barrier - 01	point192	192	20.0	29.1
						Braxton Barrier - 01	point120	120	20.0	28.7
						Braxton Barrier - 01	point144	144	20.0	25.3
						Braxton Barrier - 01	point142	142	20.0	25.2
						Braxton Barrier - 01	point145	145	20.0	25.2
						Braxton Barrier - 01	point139	139	20.0	25.2
						Braxton Barrier - 01	point143	143	20.0	25.2
						Braxton Barrier - 01	point141	141	20.0	25.2
						Braxton Barrier - 01	point140	140	20.0	25.2
SAN-08-01	39	43.2	5.4	8	-2.6	Braxton Barrier - 01	point119	119	20.0	25.2
						Braxton Barrier - 01	point124	124	20.0	24.0
						Braxton Barrier - 01	point129	129	20.0	23.9
						Braxton Barrier - 01	point125	125	20.0	23.8
						Braxton Barrier - 01	point130	130	20.0	23.8
						Braxton Barrier - 01	point144	144	20.0	23.8
						Braxton Barrier - 01	point131	131	20.0	23.8

						Braxton Barrier - 01	point134	134	20.0	23.8
						Braxton Barrier - 01	point128	128	20.0	23.8
						Braxton Barrier - 01	point126	126	20.0	23.7
SAN-07-01	40	43.4	4.5	8	-3.5	Braxton Barrier - 01	point139	139	20.0	24.7
						Braxton Barrier - 01	point143	143	20.0	24.7
						Braxton Barrier - 01	point144	144	20.0	24.7
						Braxton Barrier - 01	point141	141	20.0	24.7
						Braxton Barrier - 01	point140	140	20.0	24.7
						Braxton Barrier - 01	point138	138	20.0	24.7
						Braxton Barrier - 01	point145	145	20.0	24.6
						Braxton Barrier - 01	point146	146	20.0	24.6
						Braxton Barrier - 01	point137	137	20.0	24.6
						Braxton Barrier - 01	point136	136	20.0	24.6
SAN-06-01	16	44.1	5.3	8	-2.7	Braxton Barrier - 01	point139	139	20.0	26.1
						Braxton Barrier - 01	point142	142	20.0	26.1
						Braxton Barrier - 01	point141	141	20.0	26.1
						Braxton Barrier - 01	point144	144	20.0	26.1
						Braxton Barrier - 01	point140	140	20.0	26.0
						Braxton Barrier - 01	point143	143	20.0	26.0
						Braxton Barrier - 01	point138	138	20.0	26.0
						Braxton Barrier - 01	point137	137	20.0	26.0
						Braxton Barrier - 01	point145	145	20.0	25.9
						Braxton Barrier - 01	point136	136	20.0	25.9
SAN-05-01-F	14	47.1	5.4	8	-2.6	Braxton Barrier - 01	point139	139	20.0	27.8
						Braxton Barrier - 01	point138	138	20.0	27.7
						Braxton Barrier - 01	point137	137	20.0	27.7
						Braxton Barrier - 01	point134	134	20.0	27.7
						Braxton Barrier - 01	point141	141	20.0	27.6
						Braxton Barrier - 01	point140	140	20.0	27.6
						Braxton Barrier - 01	point142	142	20.0	27.6
						Braxton Barrier - 01	point133	133	20.0	27.5
						Braxton Barrier - 01	point143	143	20.0	27.5
						Braxton Barrier - 01	point135	135	20.0	27.5
SAN-01-01-F	1	46.5	5.4	8	-2.6	Braxton Barrier - 01	point117	117	20.0	33.6
						Braxton Barrier - 01	point127	127	20.0	27.3
						Braxton Barrier - 01	point129	129	20.0	27.2

						Braxton Barrier - 01	point132	132	20.0	27.2
						Braxton Barrier - 01	point128	128	20.0	27.1
						Braxton Barrier - 01	point131	131	20.0	27.1
						Braxton Barrier - 01	point130	130	20.0	27.1
						Braxton Barrier - 01	point133	133	20.0	27.1
						Braxton Barrier - 01	point126	126	20.0	27.1
						Braxton Barrier - 01	point134	134	20.0	27.0
SAN-02-01	15	45.3	6.1	8	-1.9	Braxton Barrier - 01	point128	128	20.0	26.4
						Braxton Barrier - 01	point127	127	20.0	26.2
						Braxton Barrier - 01	point129	129	20.0	26.2
						Braxton Barrier - 01	point132	132	20.0	26.0
						Braxton Barrier - 01	point130	130	20.0	25.9
						Braxton Barrier - 01	point131	131	20.0	25.9
						Braxton Barrier - 01	point126	126	20.0	25.9
						Braxton Barrier - 01	point133	133	20.0	25.9
						Braxton Barrier - 01	point134	134	20.0	25.9
						Braxton Barrier - 01	point125	125	20.0	25.8
SAN-03-01	47	45.1	4.4	8	-3.6	Braxton Barrier - 01	point119	119	20.0	37.4
						Braxton Barrier - 01	point120	120	20.0	32.8
						Braxton Barrier - 01	point118	118	20.0	32.2
						Braxton Barrier - 01	point117	117	20.0	31.2
						Braxton Barrier - 01	point129	129	20.0	24.7
						Braxton Barrier - 01	point121	121	20.0	24.6
						Braxton Barrier - 01	point130	130	20.0	24.5
						Braxton Barrier - 01	point131	131	20.0	24.5
						Braxton Barrier - 01	point127	127	20.0	24.5
						Braxton Barrier - 01	point132	132	20.0	24.5
SAN-04-01	37	42.3	5.8	8	-2.2	Braxton Barrier - 01	point122	122	20.0	23.5
						Braxton Barrier - 01	point119	119	20.0	23.4
						Braxton Barrier - 01	point121	121	20.0	23.4
						Braxton Barrier - 01	point120	120	20.0	23.4
						Braxton Barrier - 01	point129	129	20.0	23.3
						Braxton Barrier - 01	point130	130	20.0	23.2
						Braxton Barrier - 01	point137	137	20.0	23.2
						Braxton Barrier - 01	point131	131	20.0	23.2
						Braxton Barrier - 01	point132	132	20.0	23.2

						Braxton Barrier - 01	point128	128	20.0	23.1
BRA-08-01	38	42.4	5.4	8	-2.6	Braxton Barrier - 01	point120	120	20.0	23.5
						Braxton Barrier - 01	point123	123	20.0	23.5
						Braxton Barrier - 01	point121	121	20.0	23.4
						Braxton Barrier - 01	point122	122	20.0	23.3
						Braxton Barrier - 01	point131	131	20.0	23.2
						Braxton Barrier - 01	point119	119	20.0	23.2
						Braxton Barrier - 01	point129	129	20.0	23.2
						Braxton Barrier - 01	point132	132	20.0	23.1
						Braxton Barrier - 01	point128	128	20.0	23.1
						Braxton Barrier - 01	point130	130	20.0	23.1
BRA-07-01	36	43.7	5.2	8	-2.8	Braxton Barrier - 01	point113	113	20.0	29.5
						Braxton Barrier - 01	point122	122	20.0	24.8
						Braxton Barrier - 01	point121	121	20.0	24.7
						Braxton Barrier - 01	point123	123	20.0	24.7
						Braxton Barrier - 01	point131	131	20.0	24.6
						Braxton Barrier - 01	point119	119	20.0	24.6
						Braxton Barrier - 01	point120	120	20.0	24.6
						Braxton Barrier - 01	point129	129	20.0	24.5
						Braxton Barrier - 01	point127	127	20.0	24.5
						Braxton Barrier - 01	point128	128	20.0	24.4
BRA-10-01	13	45.2	4.8	8	-3.2	Braxton Barrier - 01	point116	116	20.0	32.5
						Braxton Barrier - 01	point117	117	20.0	31.7
						Braxton Barrier - 01	point110	110	20.0	30.4
						Braxton Barrier - 01	point109	109	20.0	30.2
						Braxton Barrier - 01	point113	113	20.0	27.3
						Braxton Barrier - 01	point122	122	20.0	26.1
						Braxton Barrier - 01	point119	119	20.0	26.0
						Braxton Barrier - 01	point121	121	20.0	25.9
						Braxton Barrier - 01	point120	120	20.0	25.8
						Braxton Barrier - 01	point129	129	20.0	25.8
BRA-09-01	12	46.2	4.5	8	-3.5	Braxton Barrier - 01	point110	110	20.0	33.4
						Braxton Barrier - 01	point111	111	20.0	32.7
						Braxton Barrier - 01	point119	119	20.0	27.3
						Braxton Barrier - 01	point129	129	20.0	27.2
						Braxton Barrier - 01	point128	128	20.0	27.2

						Braxton Barrier - 01	point120	120	20.0	27.2
						Braxton Barrier - 01	point127	127	20.0	27.2
						Braxton Barrier - 01	point130	130	20.0	27.2
						Braxton Barrier - 01	point126	126	20.0	27.2
						Braxton Barrier - 01	point132	132	20.0	27.1
BRA-06-01	11	47.2	4.5	8	-3.5	Braxton Barrier - 01	point109	109	20.0	32.7
						Braxton Barrier - 01	point110	110	20.0	31.2
						Braxton Barrier - 01	point129	129	20.0	29.2
						Braxton Barrier - 01	point128	128	20.0	29.2
						Braxton Barrier - 01	point127	127	20.0	29.2
						Braxton Barrier - 01	point126	126	20.0	29.2
						Braxton Barrier - 01	point130	130	20.0	29.1
						Braxton Barrier - 01	point131	131	20.0	29.1
						Braxton Barrier - 01	point125	125	20.0	29.1
						Braxton Barrier - 01	point124	124	20.0	29.0
BRA-11-01-F	46	48.8	4.6	8	-3.4	Braxton Barrier - 01	point111	111	20.0	37.5
						Braxton Barrier - 01	point110	110	20.0	35.0
						Braxton Barrier - 01	point129	129	20.0	30.9
						Braxton Barrier - 01	point128	128	20.0	30.9
						Braxton Barrier - 01	point124	124	20.0	30.9
						Braxton Barrier - 01	point123	123	20.0	30.9
						Braxton Barrier - 01	point126	126	20.0	30.8
						Braxton Barrier - 01	point127	127	20.0	30.8
						Braxton Barrier - 01	point122	122	20.0	30.8
						Braxton Barrier - 01	point130	130	20.0	30.8
BRA-01-01-F	29	47.1	5.9	8	-2.1	Braxton Barrier - 01	point109	109	20.0	36.4
						Braxton Barrier - 01	point108	108	20.0	33.1
						Braxton Barrier - 01	point119	119	20.0	29.1
						Braxton Barrier - 01	point118	118	20.0	29.1
						Braxton Barrier - 01	point114	114	20.0	28.9
						Braxton Barrier - 01	point117	117	20.0	28.9
						Braxton Barrier - 01	point115	115	20.0	28.8
						Braxton Barrier - 01	point113	113	20.0	28.8
						Braxton Barrier - 01	point120	120	20.0	28.8
						Braxton Barrier - 01	point116	116	20.0	28.8
CUL-07-01-F	23	48.6	6.4	8	-1.6	Braxton Barrier - 01	point111	111	20.0	38.5

						Braxton Barrier - 01	point110	110	20.0	37.7
						Braxton Barrier - 01	point108	108	20.0	29.4
						Braxton Barrier - 01	point109	109	20.0	29.3
						Braxton Barrier - 01	point114	114	20.0	29.3
						Braxton Barrier - 01	point113	113	20.0	29.2
						Braxton Barrier - 01	point107	107	20.0	29.2
						Braxton Barrier - 01	point112	112	20.0	29.2
						Braxton Barrier - 01	point117	117	20.0	29.2
						Braxton Barrier - 01	point116	116	20.0	29.1
BRA-02-01	10	46.7	6.6	8	-1.4	Braxton Barrier - 01	point121	121	20.0	33.1
						Braxton Barrier - 01	point114	114	20.0	28.4
						Braxton Barrier - 01	point115	115	20.0	28.3
						Braxton Barrier - 01	point117	117	20.0	28.3
						Braxton Barrier - 01	point111	111	20.0	28.3
						Braxton Barrier - 01	point118	118	20.0	28.3
						Braxton Barrier - 01	point113	113	20.0	28.3
						Braxton Barrier - 01	point119	119	20.0	28.2
						Braxton Barrier - 01	point116	116	20.0	28.2
						Braxton Barrier - 01	point110	110	20.0	28.2
CUL-08-01	8	46.7	6.3	8	-1.7	Braxton Barrier - 01	point126	126	20.0	33.3
						Braxton Barrier - 01	point114	114	20.0	28.0
						Braxton Barrier - 01	point113	113	20.0	27.9
						Braxton Barrier - 01	point115	115	20.0	27.9
						Braxton Barrier - 01	point111	111	20.0	27.9
						Braxton Barrier - 01	point117	117	20.0	27.9
						Braxton Barrier - 01	point112	112	20.0	27.9
						Braxton Barrier - 01	point110	110	20.0	27.9
						Braxton Barrier - 01	point108	108	20.0	27.9
						Braxton Barrier - 01	point109	109	20.0	27.8
BRA-03-01	9	45.9	6.4	8	-1.6	Braxton Barrier - 01	point121	121	20.0	34.5
						Braxton Barrier - 01	point122	122	20.0	34.1
						Braxton Barrier - 01	point123	123	20.0	30.6
						Braxton Barrier - 01	point114	114	20.0	27.2
						Braxton Barrier - 01	point115	115	20.0	27.2
						Braxton Barrier - 01	point38	38	20.0	27.2
						Braxton Barrier - 01	point117	117	20.0	27.1

						Braxton Barrier - 01	point113	113	20.0	27.1
						Braxton Barrier - 01	point116	116	20.0	27.1
						Braxton Barrier - 01	point118	118	20.0	27.1
CUL-11-01	7	44.7	7.4	8	-0.6	Braxton Barrier - 01	point114	114	20.0	26.7
						Braxton Barrier - 01	point113	113	20.0	26.7
						Braxton Barrier - 01	point115	115	20.0	26.7
						Braxton Barrier - 01	point111	111	20.0	26.6
						Braxton Barrier - 01	point117	117	20.0	26.6
						Braxton Barrier - 01	point108	108	20.0	26.6
						Braxton Barrier - 01	point116	116	20.0	26.6
						Braxton Barrier - 01	point110	110	20.0	26.6
						Braxton Barrier - 01	point112	112	20.0	26.6
						Braxton Barrier - 01	point109	109	20.0	26.6
BRA-05-01	35	42.8	7.1	8	-0.9	Braxton Barrier - 01	point116	116	20.0	24.7
						Braxton Barrier - 01	point114	114	20.0	24.6
						Braxton Barrier - 01	point115	115	20.0	24.6
						Braxton Barrier - 01	point113	113	20.0	24.5
						Braxton Barrier - 01	point112	112	20.0	24.5
						Braxton Barrier - 01	point111	111	20.0	24.5
						Braxton Barrier - 01	point110	110	20.0	24.4
						Braxton Barrier - 01	point109	109	20.0	24.4
						Braxton Barrier - 01	point108	108	20.0	24.3
						Braxton Barrier - 01	point103	103	20.0	24.2
BRA-04-01	34	43.6	7.2	8	-0.8	Braxton Barrier - 01	point114	114	20.0	25.5
						Braxton Barrier - 01	point115	115	20.0	25.5
						Braxton Barrier - 01	point117	117	20.0	25.4
						Braxton Barrier - 01	point113	113	20.0	25.4
						Braxton Barrier - 01	point116	116	20.0	25.4
						Braxton Barrier - 01	point112	112	20.0	25.3
						Braxton Barrier - 01	point110	110	20.0	25.3
						Braxton Barrier - 01	point111	111	20.0	25.3
						Braxton Barrier - 01	point118	118	20.0	25.3
						Braxton Barrier - 01	point108	108	20.0	25.3
CUL-09-01	33	44.0	7.0	8	-1.0	Braxton Barrier - 01	point126	126	20.0	31.0
						Braxton Barrier - 01	point122	122	20.0	25.7
						Braxton Barrier - 01	point121	121	20.0	25.6

						Braxton Barrier - 01	point114	114	20.0	25.6
						Braxton Barrier - 01	point123	123	20.0	25.5
						Braxton Barrier - 01	point113	113	20.0	25.5
						Braxton Barrier - 01	point115	115	20.0	25.5
						Braxton Barrier - 01	point117	117	20.0	25.5
						Braxton Barrier - 01	point108	108	20.0	25.5
						Braxton Barrier - 01	point107	107	20.0	25.4
CUL-10-01	32	43.1	6.5	8	-1.5	Braxton Barrier - 01	point122	122	20.0	24.9
						Braxton Barrier - 01	point124	124	20.0	24.8
						Braxton Barrier - 01	point123	123	20.0	24.8
						Braxton Barrier - 01	point114	114	20.0	24.6
						Braxton Barrier - 01	point115	115	20.0	24.6
						Braxton Barrier - 01	point111	111	20.0	24.6
						Braxton Barrier - 01	point125	125	20.0	24.6
						Braxton Barrier - 01	point112	112	20.0	24.6
						Braxton Barrier - 01	point117	117	20.0	24.6
						Braxton Barrier - 01	point110	110	20.0	24.6
CUL-05-01	31	44.5	6.9	8	-1.1	Braxton Barrier - 01	point106	106	20.0	24.8
						Braxton Barrier - 01	point2	2	20.0	24.8
						Braxton Barrier - 01	point105	105	20.0	24.8
						Braxton Barrier - 01	point103	103	20.0	24.8
						Braxton Barrier - 01	point102	102	20.0	24.7
						Braxton Barrier - 01	point107	107	20.0	24.7
						Braxton Barrier - 01	point104	104	20.0	24.7
						Braxton Barrier - 01	point108	108	20.0	24.5
						Braxton Barrier - 01	point101	101	20.0	24.5
						Braxton Barrier - 01	point98	98	20.0	24.2
CUL-04-01	30	44.6	7.1	8	-0.9	Braxton Barrier - 01	point2	2	20.0	25.6
						Braxton Barrier - 01	point103	103	20.0	25.6
						Braxton Barrier - 01	point102	102	20.0	25.6
						Braxton Barrier - 01	point105	105	20.0	25.6
						Braxton Barrier - 01	point104	104	20.0	25.5
						Braxton Barrier - 01	point101	101	20.0	25.3
						Braxton Barrier - 01	point100	100	20.0	25.3
						Braxton Barrier - 01	point99	99	20.0	25.0
						Braxton Barrier - 01	point98	98	20.0	25.0

						Braxton Barrier - 01	point97	97	20.0	25.0
CUL-03-01	3	44.8	7.6	8	-0.4	Braxton Barrier - 01	point103	103	20.0	26.5
						Braxton Barrier - 01	point2	2	20.0	26.5
						Braxton Barrier - 01	point102	102	20.0	26.4
						Braxton Barrier - 01	point104	104	20.0	26.4
						Braxton Barrier - 01	point100	100	20.0	26.3
						Braxton Barrier - 01	point101	101	20.0	26.2
						Braxton Barrier - 01	point97	97	20.0	26.1
						Braxton Barrier - 01	point98	98	20.0	26.0
						Braxton Barrier - 01	point99	99	20.0	25.9
						Braxton Barrier - 01	point105	105	20.0	25.8
CUL-06-01	6	45.6	7.8	8	-0.2	Braxton Barrier - 01	point2	2	20.0	27.4
						Braxton Barrier - 01	point102	102	20.0	27.4
						Braxton Barrier - 01	point103	103	20.0	27.4
						Braxton Barrier - 01	point104	104	20.0	27.3
						Braxton Barrier - 01	point99	99	20.0	27.3
						Braxton Barrier - 01	point100	100	20.0	27.3
						Braxton Barrier - 01	point101	101	20.0	27.2
						Braxton Barrier - 01	point105	105	20.0	27.2
						Braxton Barrier - 01	point96	96	20.0	27.1
						Braxton Barrier - 01	point97	97	20.0	27.1
CUL-02-01	5	47.1	7.5	8	-0.5	Braxton Barrier - 01	point35	35	20.0	28.6
						Braxton Barrier - 01	point103	103	20.0	28.5
						Braxton Barrier - 01	point2	2	20.0	28.5
						Braxton Barrier - 01	point99	99	20.0	28.5
						Braxton Barrier - 01	point105	105	20.0	28.4
						Braxton Barrier - 01	point101	101	20.0	28.4
						Braxton Barrier - 01	point100	100	20.0	28.4
						Braxton Barrier - 01	point106	106	20.0	28.4
						Braxton Barrier - 01	point104	104	20.0	28.4
						Braxton Barrier - 01	point98	98	20.0	28.4
CUL-01-01-FA	49	48.9	7.6	8	-0.4	Braxton Barrier - 01	point112	112	20.0	35.4
						Braxton Barrier - 01	point46	46	20.0	31.1
						Braxton Barrier - 01	point47	47	20.0	30.3
						Braxton Barrier - 01	point103	103	20.0	30.3
						Braxton Barrier - 01	point105	105	20.0	30.2

						Braxton Barrier - 01	point106	106	20.0	30.2
						Braxton Barrier - 01	point2	2	20.0	30.2
						Braxton Barrier - 01	point104	104	20.0	30.2
						Braxton Barrier - 01	point107	107	20.0	30.1
						Braxton Barrier - 01	point108	108	20.0	30.1
414-02-01-F	44	46.2	7.4	8	-0.6	Braxton Barrier - 01	point14	14	20.0	26.5
						Braxton Barrier - 01	point64	64	20.0	24.2
						Braxton Barrier - 01	point63	63	20.0	24.1
						Braxton Barrier - 01	point62	62	20.0	24.1
						Braxton Barrier - 01	point67	67	20.0	24.1
						Braxton Barrier - 01	point68	68	20.0	24.1
						Braxton Barrier - 01	point66	66	20.0	24.1
						Braxton Barrier - 01	point65	65	20.0	24.1
						Braxton Barrier - 01	point57	57	20.0	24.1
						Braxton Barrier - 01	point59	59	20.0	24.1
414-01-01-F	45	43.2	3.2	8	-4.8	Braxton Barrier - 01	point29	29	20.0	19.6
						Braxton Barrier - 01	point27	27	20.0	19.6
						Braxton Barrier - 01	point32	32	20.0	19.6
						Braxton Barrier - 01	point31	31	20.0	19.6
						Braxton Barrier - 01	point30	30	20.0	19.6
						Braxton Barrier - 01	point28	28	20.0	19.5
						Braxton Barrier - 01	point26	26	20.0	19.5
						Braxton Barrier - 01	point24	24	20.0	19.5
						Braxton Barrier - 01	point25	25	20.0	19.4
						Braxton Barrier - 01	point22	22	20.0	19.3
Total Cost, All Barriers (including additional cost(s))					$2565805					

HMB Professional Engineers 29 March 2021
Mark Gavula TNM 2.5

RESULTS: BARRIER-SEGMENT DESCRIPTIONS
PROJECT/CONTRACT: I-69 FEIS
RUN: Braxton Subdivision Run
BARRIER DESIGN: Braxton-BAR-01

Barriers		Segments										
Name	Type	Name	No.	Heights			Length	If Wall			If Berm	Cost
				First Point	Average	Second Point		Area	On Struc?	Important Reflections?	Volume	
				ft	ft	ft	ft	sq ft			cu yd	$
Braxton Barrier - 01	W	point1	1	20.00	20.00	20.00	20	398				11944
		point5	5	20.00	20.00	20.00	20	403				12091
		point6	6	20.00	20.00	20.00	20	398				11944
		point7	7	20.00	20.00	20.00	20	398				11944
		point8	8	20.00	20.00	20.00	20	400				12007
		point9	9	20.00	20.00	20.00	20	400				12007
		point10	10	20.00	20.00	20.00	20	400				12007
		point11	11	20.00	20.00	20.00	20	403				12078
		point12	12	20.00	20.00	20.00	20	398				11933
		point13	13	20.00	20.00	20.00	20	398				11933
		point14	14	20.00	20.00	20.00	20	405				12156
		point15	15	20.00	20.00	20.00	20	393				11788
		point16	16	20.00	20.00	20.00	20	403				12098
		point17	17	20.00	20.00	20.00	20	400				12012
		point18	18	20.00	20.00	20.00	20	398				11955
		point19	19	20.00	20.00	20.00	20	403				12098
		point20	20	20.00	20.00	20.00	20	398				11955
		point21	21	20.00	20.00	20.00	20	398				11955
		point22	22	20.00	20.00	20.00	20	402				12049
		point23	23	20.00	20.00	20.00	20	397				11907
		point24	24	20.00	20.00	20.00	20	405				12149
		point25	25	20.00	20.00	20.00	20	397				11907
		point26	26	20.00	20.00	20.00	20	400				12008
		point27	27	20.00	20.00	20.00	20	404				12117
		point28	28	20.00	20.00	20.00	20	396				11868
		point29	29	20.00	20.00	20.00	20	404				12117

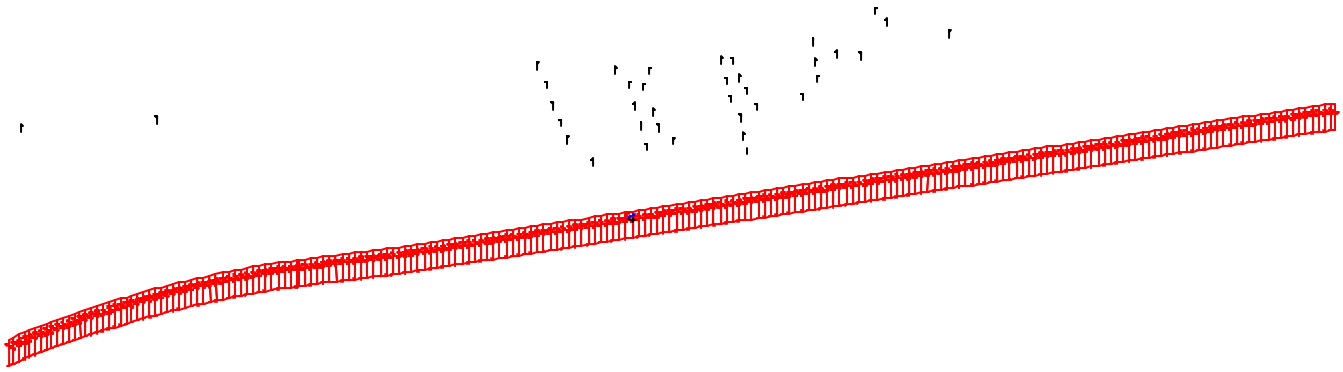
		point30	30	20.00	20.00	20.00	20	399				11977
		point31	31	20.00	20.00	20.00	20	395				11839
		point32	32	20.00	20.00	20.00	20	403				12093
		point33	33	20.00	20.00	20.00	20	399				11956
		point34	34	20.00	20.00	20.00	20	403				12093
		point35	35	20.00	20.00	20.00	20	398				11944
		point36	36	20.00	20.00	20.00	20	399				11956
		point37	37	20.00	20.00	20.00	20	398				11944
		point38	38	20.00	20.00	20.00	20	407				12209
		point39	39	20.00	20.00	20.00	20	394				11808
		point40	40	20.00	20.00	20.00	20	402				12075
		point41	41	20.00	20.00	20.00	20	398				11941
		point42	42	20.00	20.00	20.00	20	403				12079
		point43	43	20.00	20.00	20.00	20	398				11941
		point44	44	20.00	20.00	20.00	20	398				11947
		point45	45	20.00	20.00	20.00	20	403				12079
		point46	46	20.00	20.00	20.00	20	403				12093
		point47	47	20.00	20.00	20.00	20	399				11963
		point48	48	20.00	20.00	20.00	20	403				12093
		point49	49	20.00	20.00	20.00	20	394				11834
		point50	50	20.00	20.00	20.00	20	399				11963
		point51	51	20.00	20.00	20.00	20	404				12117
		point52	52	20.00	20.00	20.00	20	400				11989
		point53	53	20.00	20.00	20.00	4	76				2290
		point54	54	20.00	20.00	20.00	20	405				12149
		point55	55	20.00	20.00	20.00	20	400				11989
		point56	56	20.00	20.00	20.00	20	400				11989
		point57	57	20.00	20.00	20.00	20	400				11989
		point58	58	20.00	20.00	20.00	20	395				11861
		point59	59	20.00	20.00	20.00	20	405				12149
		point60	60	20.00	20.00	20.00	20	400				11989
		point61	61	20.00	20.00	20.00	20	400				11989
		point62	62	20.00	20.00	20.00	20	400				11989
		point63	63	20.00	20.00	20.00	20	400				11989
		point64	64	20.00	20.00	20.00	20	405				12149
		point65	65	20.00	20.00	20.00	20	395				11861
		point66	66	20.00	20.00	20.00	20	400				11989
		point67	67	20.00	20.00	20.00	20	400				11989
		point68	68	20.00	20.00	20.00	20	400				11989

		point69	69	20.00	20.00	20.00	20	405				12149
		point70	70	20.00	20.00	20.00	20	395				11861
		point71	71	20.00	20.00	20.00	20	400				11989
		point72	72	20.00	20.00	20.00	20	400				11989
		point73	73	20.00	20.00	20.00	20	400				11989
		point74	74	20.00	20.00	20.00	20	405				12149
		point75	75	20.00	20.00	20.00	20	400				11989
		point76	76	20.00	20.00	20.00	20	400				11989
		point77	77	20.00	20.00	20.00	20	395				11861
		point78	78	20.00	20.00	20.00	20	400				11989
		point79	79	20.00	20.00	20.00	20	405				12149
		point80	80	20.00	20.00	20.00	20	400				11989
		point81	81	20.00	20.00	20.00	20	400				11989
		point82	82	20.00	20.00	20.00	20	395				11861
		point83	83	20.00	20.00	20.00	20	400				11989
		point84	84	20.00	20.00	20.00	20	405				12149
		point85	85	20.00	20.00	20.00	20	400				11989
		point86	86	20.00	20.00	20.00	20	400				11989
		point87	87	20.00	20.00	20.00	20	400				11989
		point88	88	20.00	20.00	20.00	20	400				11989
		point89	89	20.00	20.00	20.00	20	401				12023
		point90	90	20.00	20.00	20.00	20	400				11989
		point91	91	20.00	20.00	20.00	20	400				11989
		point92	92	20.00	20.00	20.00	20	400				11989
		point93	93	20.00	20.00	20.00	20	400				11989
		point94	94	20.00	20.00	20.00	20	401				12023
		point95	95	20.00	20.00	20.00	20	400				11989
		point96	96	20.00	20.00	20.00	20	400				11989
		point97	97	20.00	20.00	20.00	20	400				11989
		point98	98	20.00	20.00	20.00	20	400				11989
		point99	99	20.00	20.00	20.00	20	405				12149
		point100	100	20.00	20.00	20.00	20	400				11989
		point101	101	20.00	20.00	20.00	20	395				11861
		point102	102	20.00	20.00	20.00	20	400				11989
		point2	2	20.00	20.00	20.00	20	400				11989
		point103	103	20.00	20.00	20.00	20	405				12149
		point104	104	20.00	20.00	20.00	20	395				11861
		point105	105	20.00	20.00	20.00	20	400				11989
		point106	106	20.00	20.00	20.00	20	400				11989

		point107	107	20.00	20.00	20.00	20	400				11989
		point108	108	20.00	20.00	20.00	20	405				12149
		point109	109	20.00	20.00	20.00	20	400				11989
		point110	110	20.00	20.00	20.00	20	400				11989
		point111	111	20.00	20.00	20.00	20	400				11989
		point112	112	20.00	20.00	20.00	20	395				11861
		point113	113	20.00	20.00	20.00	20	400				11989
		point114	114	20.00	20.00	20.00	20	405				12149
		point115	115	20.00	20.00	20.00	20	400				11989
		point116	116	20.00	20.00	20.00	20	395				11861
		point117	117	20.00	20.00	20.00	20	400				11989
		point118	118	20.00	20.00	20.00	20	400				11989
		point119	119	20.00	20.00	20.00	20	405				12149
		point120	120	20.00	20.00	20.00	20	400				11989
		point121	121	20.00	20.00	20.00	20	400				11989
		point122	122	20.00	20.00	20.00	20	400				11989
		point123	123	20.00	20.00	20.00	20	395				11861
		point124	124	20.00	20.00	20.00	20	405				12149
		point125	125	20.00	20.00	20.00	20	400				11989
		point126	126	20.00	20.00	20.00	20	400				11989
		point127	127	20.00	20.00	20.00	20	400				11989
		point128	128	20.00	20.00	20.00	20	395				11861
		point129	129	20.00	20.00	20.00	20	405				12149
		point130	130	20.00	20.00	20.00	20	400				11989
		point131	131	20.00	20.00	20.00	20	400				11989
		point132	132	20.00	20.00	20.00	20	400				11989
		point133	133	20.00	20.00	20.00	20	400				11989
		point134	134	20.00	20.00	20.00	20	405				12149
		point135	135	20.00	20.00	20.00	20	395				11861
		point136	136	20.00	20.00	20.00	20	400				11989
		point137	137	20.00	20.00	20.00	20	400				11989
		point138	138	20.00	20.00	20.00	20	400				11989
		point139	139	20.00	20.00	20.00	20	405				12149
		point140	140	20.00	20.00	20.00	20	395				11861
		point141	141	20.00	20.00	20.00	20	400				11989
		point142	142	20.00	20.00	20.00	20	400				11989
		point143	143	20.00	20.00	20.00	20	400				11989
		point144	144	20.00	20.00	20.00	20	405				12149
		point145	145	20.00	20.00	20.00	20	400				11989

		point146	146	20.00	20.00	20.00	20	400				11989
		point147	147	20.00	20.00	20.00	20	395				11861
		point148	148	20.00	20.00	20.00	20	400				11989
		point149	149	20.00	20.00	20.00	20	405				12149
		point150	150	20.00	20.00	20.00	20	400				11989
		point151	151	20.00	20.00	20.00	20	400				11989
		point152	152	20.00	20.00	20.00	20	395				11861
		point153	153	20.00	20.00	20.00	20	400				11989
		point154	154	20.00	20.00	20.00	20	405				12149
		point155	155	20.00	20.00	20.00	20	400				11989
		point156	156	20.00	20.00	20.00	20	400				11989
		point157	157	20.00	20.00	20.00	20	400				11989
		point158	158	20.00	20.00	20.00	20	400				11989
		point159	159	20.00	20.00	20.00	20	401				12023
		point160	160	20.00	20.00	20.00	20	400				11989
		point161	161	20.00	20.00	20.00	20	400				11989
		point162	162	20.00	20.00	20.00	20	400				11989
		point163	163	20.00	20.00	20.00	20	400				11989
		point164	164	20.00	20.00	20.00	20	401				12023
		point165	165	20.00	20.00	20.00	20	400				11989
		point166	166	20.00	20.00	20.00	20	400				11989
		point167	167	20.00	20.00	20.00	20	400				11989
		point168	168	20.00	20.00	20.00	20	400				11989
		point169	169	20.00	20.00	20.00	20	405				12149
		point170	170	20.00	20.00	20.00	20	400				11989
		point171	171	20.00	20.00	20.00	20	395				11861
		point172	172	20.00	20.00	20.00	20	400				11989
		point173	173	20.00	20.00	20.00	20	400				11989
		point174	174	20.00	20.00	20.00	20	405				12149
		point175	175	20.00	20.00	20.00	20	400				11989
		point176	176	20.00	20.00	20.00	20	395				11861
		point177	177	20.00	20.00	20.00	20	400				11989
		point178	178	20.00	20.00	20.00	20	400				11989
		point179	179	20.00	20.00	20.00	20	405				12149
		point180	180	20.00	20.00	20.00	20	400				11989
		point181	181	20.00	20.00	20.00	20	400				11989
		point182	182	20.00	20.00	20.00	20	400				11989
		point183	183	20.00	20.00	20.00	20	395				11861
		point184	184	20.00	20.00	20.00	20	405				12149

		point185	185	20.00	20.00	20.00	20	400				11989
		point186	186	20.00	20.00	20.00	20	400				11989
		point187	187	20.00	20.00	20.00	20	400				11989
		point188	188	20.00	20.00	20.00	20	395				11861
		point189	189	20.00	20.00	20.00	20	405				12149
		point190	190	20.00	20.00	20.00	20	400				11989
		point191	191	20.00	20.00	20.00	20	400				11989
		point192	192	20.00	20.00	20.00	20	400				11989
		point193	193	20.00	20.00	20.00	20	400				11989
		point194	194	20.00	20.00	20.00	20	405				12149
		point195	195	20.00	20.00	20.00	20	395				11861
		point196	196	20.00	20.00	20.00	20	400				11989
		point197	197	20.00	20.00	20.00	20	400				11989
		point198	198	20.00	20.00	20.00	20	400				11989
		point199	199	20.00	20.00	20.00	20	401				12023
		point200	200	20.00	20.00	20.00	20	400				11989
		point3	3	20.00	20.00	20.00	20	400				11989
		point201	201	20.00	20.00	20.00	20	400				11989
		point202	202	20.00	20.00	20.00	20	400				11989
		point203	203	20.00	20.00	20.00	20	405				12149
		point204	204	20.00	20.00	20.00	20	400				11989
		point205	205	20.00	20.00	20.00	20	400				11989
		point206	206	20.00	20.00	20.00	20	395				11861
		point207	207	20.00	20.00	20.00	20	400				11989
		point208	208	20.00	20.00	20.00	20	405				12149
		point209	209	20.00	20.00	20.00	20	400				11989
		point210	210	20.00	20.00	20.00	20	395				11861
		point211	211	20.00	20.00	20.00	20	400				11989
		point212	212	20.00	20.00	20.00	20	400				11989
		point213	213	20.00	20.00	20.00	20	405				12149
		point214	214	20.00	20.00	20.00	20	400				11989
		point215	215	20.00	20.00	20.00	20	400				11989
		point216	216	20.00	20.00	20.00	13	251				7537



Braxton Subdivision Run	Sheet 1 of 1	29 Mar 2021
	HMB Professional Engineers	
Barrier View-Braxton-BAR-01	Project/Contract No. I-69 FEIS	
Run name: Braxton_Barrier_Run	TNM Version 2.5, Feb 2004	
Scale: <DNA - due to perspective>	Analysis By: Mark Gavula	

Roadway:		Ground Zone:	polygon
Receiver:		Tree Zone:	dashed polygon
Barrier:		Contour Zone:	polygon
Building Row:		Parallel Barrier:	
Terrain Line:		Skew Section:	

TNM OUTPUT FOR MELODY LANE BARRIER WALL

HMB Professional Engineers
Mark Gavula

29 March 2021
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: I-69 FEIS
RUN: Braxton Subdivision Run
BARRIER DESIGN: Braxton-BAR-02
ATMOSPHERICS: 68 deg F, 50% RH

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

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
MEL-01-01-F	20	1	39.8	59.3	66	19.5	10	Sub'l Inc	52.3	7.0	8	-1.0
MEL-05-01	28	1	39.8	56.1	66	16.3	10	Sub'l Inc	50.5	5.6	8	-2.4
MEL-06-01	27	1	39.8	51.6	66	11.8	10	Sub'l Inc	48.0	3.6	8	-4.4
MEL-07-01	26	1	39.8	49.9	66	10.1	10	Sub'l Inc	44.9	5.0	8	-3.0
MEL-04-01	25	1	39.8	51.4	66	11.6	10	Sub'l Inc	46.0	5.4	8	-2.6
MEL-02-01-F	21	1	39.8	56.1	66	16.3	10	Sub'l Inc	49.0	7.1	8	-0.9
MEL-03-01-F	22	1	39.8	56.6	66	16.8	10	Sub'l Inc	48.9	7.7	8	-0.3
BOW-04-01	24	1	39.8	54.0	66	14.2	10	Sub'l Inc	47.5	6.5	8	-1.5
BOW-02-01-F	18	1	39.8	58.4	66	18.6	10	Sub'l Inc	50.1	8.3	8	0.3
BOW-03-01	19	1	39.8	52.8	66	13.0	10	Sub'l Inc	47.8	5.0	8	-3.0
BOW-01-01-F	17	1	39.8	61.5	66	21.7	10	Sub'l Inc	53.2	8.3	8	0.3

Dwelling Units	# DUs	Noise Reduction Min	Avg	Max
		dB	dB	dB
All Selected	11	3.6	6.3	8.3
All Impacted	11	3.6	6.3	8.3
All that meet NR Goal	2	8.3	8.3	8.3

HMB Professional Engineers				**29 March 2021**						
Mark Gavula				**TNM 2.5**						
RESULTS: BARRIER DESCRIPTIONS										
PROJECT/CONTRACT:	**I-69 FEIS**									
RUN:	**Braxton Subdivision Run**									
BARRIER DESIGN:	**Braxton-BAR-02**									
Barriers										
Name	**Type**	**Heights along Barrier**			**Length**	**If Wall**	**If Berm**			**Cost**
		Min	**Avg**	**Max**		**Area**	**Volume**	**Top**	**Run:Rise**	
								Width		
		ft	ft	ft	ft	sq ft	cu yd	ft	ft:ft	$
Barrier2	W	12.00	19.19	20.00	2380	45679				1370364
									Total Cost:	1370364

HMB Professional Engineers 29 March 2021
Mark Gavula TNM 2.5
Calculated with TNM 2.5

RESULTS: BARRIER DESIGN
PROJECT/CONTRACT: I-69 FEIS
RUN: Braxton Subdivision Run
BARRIER DESIGN: Braxton-BAR-02

ATMOSPHERICS: 68 deg F, 50% RH

Selected Receivers

Name	No.	Calc LAeq1h	Noise Reduction Calc	Goal	Calc-Goal	Barrier Reviewed	Important Segments Name	No.	Height	Partial LAeq1h
		dBA	dB	dB	dB				ft	dBA
MEL-01-01-F	20	52.3	7.0	8	-1.0	Barrier2	point266	266	0.0	36.8
						Barrier2	point265	265	0.0	36.7
						Barrier2	point256	256	0.0	35.4
						Barrier2	point262	262	0.0	34.9
						Barrier2	point261	261	0.0	34.8
						Barrier2	point259	259	0.0	34.8
						Barrier2	point260	260	0.0	34.7
						Barrier2	point263	263	0.0	34.7
						Barrier2	point258	258	0.0	34.6
						Barrier2	point264	264	0.0	34.3
MEL-05-01	28	50.5	5.6	8	-2.4	Barrier2	point260	260	0.0	34.8
						Barrier2	point261	261	0.0	34.7
						Barrier2	point262	262	0.0	34.3
						Barrier2	point281	281	18.0	34.2
						Barrier2	point263	263	0.0	33.9
						Barrier2	point264	264	0.0	33.9
						Barrier2	point265	265	0.0	33.8
						Barrier2	point266	266	0.0	32.7
						Barrier2	point258	258	0.0	32.0
						Barrier2	point259	259	0.0	31.8
MEL-06-01	27	48.0	3.6	8	-4.4	Barrier2	point278	278	18.0	33.6

						Barrier2	point277	277	18.0	29.5
						Barrier2	point346	346	20.0	29.2
						Barrier2	point261	261	0.0	28.4
						Barrier2	point254	254	0.0	27.9
						Barrier2	point253	253	0.0	27.8
						Barrier2	point264	264	0.0	27.6
						Barrier2	point265	265	0.0	27.6
						Barrier2	point248	248	0.0	27.3
						Barrier2	point247	247	0.0	27.2
MEL-07-01	26	44.9	5.0	8	-3.0	Barrier2	point261	261	0.0	28.3
						Barrier2	point262	262	0.0	28.1
						Barrier2	point263	263	0.0	27.6
						Barrier2	point264	264	0.0	27.3
						Barrier2	point265	265	0.0	27.1
						Barrier2	point266	266	0.0	26.1
						Barrier2	point260	260	0.0	25.8
						Barrier2	point255	255	0.0	25.7
						Barrier2	point259	259	0.0	25.6
						Barrier2	point254	254	0.0	25.4
MEL-04-01	25	46.0	5.4	8	-2.6	Barrier2	point260	260	0.0	27.8
						Barrier2	point262	262	0.0	27.7
						Barrier2	point263	263	0.0	27.7
						Barrier2	point261	261	0.0	27.7
						Barrier2	point264	264	0.0	27.6
						Barrier2	point265	265	0.0	27.4
						Barrier2	point259	259	0.0	27.4
						Barrier2	point342	342	20.0	26.9
						Barrier2	point258	258	0.0	26.4
						Barrier2	point266	266	0.0	26.2
MEL-02-01-F	21	49.0	7.1	8	-0.9	Barrier2	point265	265	0.0	31.1
						Barrier2	point264	264	0.0	30.8
						Barrier2	point266	266	0.0	30.5
						Barrier2	point263	263	0.0	30.4
						Barrier2	point262	262	0.0	30.4
						Barrier2	point261	261	0.0	30.0
						Barrier2	point354	354	20.0	29.3

						Barrier2	point306	306	20.0	29.1
						Barrier2	point308	308	20.0	29.1
						Barrier2	point307	307	20.0	29.0
MEL-03-01-F	22	48.9	7.7	8	-0.3	Barrier2	point273	273	18.0	32.2
						Barrier2	point272	272	18.0	31.4
						Barrier2	point356	356	20.0	30.2
						Barrier2	point315	315	20.0	29.7
						Barrier2	point316	316	20.0	29.7
						Barrier2	point313	313	20.0	29.6
						Barrier2	point314	314	20.0	29.6
						Barrier2	point318	318	20.0	29.6
						Barrier2	point317	317	20.0	29.6
						Barrier2	point218	218	20.0	29.5
BOW-04-01	24	47.5	6.5	8	-1.5	Barrier2	point385	385	0.0	27.4
						Barrier2	point331	331	20.0	27.2
						Barrier2	point329	329	20.0	27.2
						Barrier2	point330	330	20.0	27.2
						Barrier2	point332	332	20.0	27.1
						Barrier2	point334	334	20.0	27.1
						Barrier2	point333	333	20.0	27.1
						Barrier2	point328	328	20.0	27.1
						Barrier2	point327	327	20.0	27.0
						Barrier2	point335	335	20.0	27.0
BOW-02-01-F	18	50.1	8.3	8	0.3	Barrier2	point421	421	0.0	31.5
						Barrier2	point334	334	20.0	31.2
						Barrier2	point333	333	20.0	31.2
						Barrier2	point331	331	20.0	31.2
						Barrier2	point332	332	20.0	31.1
						Barrier2	point330	330	20.0	31.1
						Barrier2	point335	335	20.0	31.1
						Barrier2	point329	329	20.0	31.1
						Barrier2	point336	336	20.0	31.0
						Barrier2	point337	337	20.0	30.9
BOW-03-01	19	47.8	5.0	8	-3.0	Barrier2	point356	356	20.0	35.0
						Barrier2	point355	355	20.0	33.2
						Barrier2	point337	337	20.0	28.8

						Barrier2	point386	386	0.0	28.6
						Barrier2	point385	385	0.0	28.6
						Barrier2	point387	387	0.0	28.5
						Barrier2	point388	388	0.0	28.4
						Barrier2	point389	389	0.0	28.4
						Barrier2	point390	390	0.0	28.0
						Barrier2	point391	391	0.0	27.8
BOW-01-01-F	17	53.2	8.3	8	0.3	Barrier2	point345	345	20.0	35.3
						Barrier2	point346	346	20.0	35.3
						Barrier2	point344	344	20.0	35.2
						Barrier2	point347	347	20.0	35.2
						Barrier2	point348	348	20.0	35.1
						Barrier2	point343	343	20.0	35.1
						Barrier2	point349	349	20.0	35.1
						Barrier2	point414	414	0.0	35.0
						Barrier2	point342	342	20.0	34.9
						Barrier2	point341	341	20.0	34.8
Total Cost, All Barriers (including additional cost(s))					$1370364					

HMB Professional Engineers 29 March 2021
Mark Gavula TNM 2.5

RESULTS: BARRIER-SEGMENT DESCRIPTIONS
PROJECT/CONTRACT: I-69 FEIS
RUN: Braxton Subdivision Run
BARRIER DESIGN: Braxton-BAR-02

Barriers		Segments										
Name	Type	Name	No.	Heights			Length	If Wall			If Berm	Cost
				First Point	Average	Second Point		Area	On Struc?	Important Reflections?	Volume	
				ft	ft	ft	ft	sq ft			cu yd	$
Barrier2	W	point217	217	0.00	0.00	0.00	0	0				0
		point221	221	0.00	0.00	0.00	0	0				0
		point222	222	0.00	0.00	0.00	0	0				0
		point223	223	0.00	0.00	0.00	0	0				0
		point224	224	0.00	0.00	0.00	0	0				0
		point225	225	0.00	0.00	0.00	0	0				0
		point226	226	0.00	0.00	0.00	0	0				0
		point227	227	0.00	0.00	0.00	0	0				0
		point228	228	0.00	0.00	0.00	0	0				0
		point229	229	0.00	0.00	0.00	0	0				0
		point230	230	0.00	0.00	0.00	0	0				0
		point231	231	0.00	0.00	0.00	0	0				0
		point232	232	0.00	0.00	0.00	0	0				0
		point233	233	0.00	0.00	0.00	0	0				0
		point234	234	0.00	0.00	0.00	0	0				0
		point235	235	0.00	0.00	0.00	0	0				0
		point236	236	0.00	0.00	0.00	0	0				0
		point237	237	0.00	0.00	0.00	0	0				0
		point238	238	0.00	0.00	0.00	0	0				0
		point239	239	0.00	0.00	0.00	0	0				0
		point240	240	0.00	0.00	0.00	0	0				0
		point241	241	0.00	0.00	0.00	0	0				0
		point242	242	0.00	0.00	0.00	0	0				0
		point243	243	0.00	0.00	0.00	0	0				0
		point244	244	0.00	0.00	0.00	0	0				0
		point245	245	0.00	0.00	0.00	0	0				0

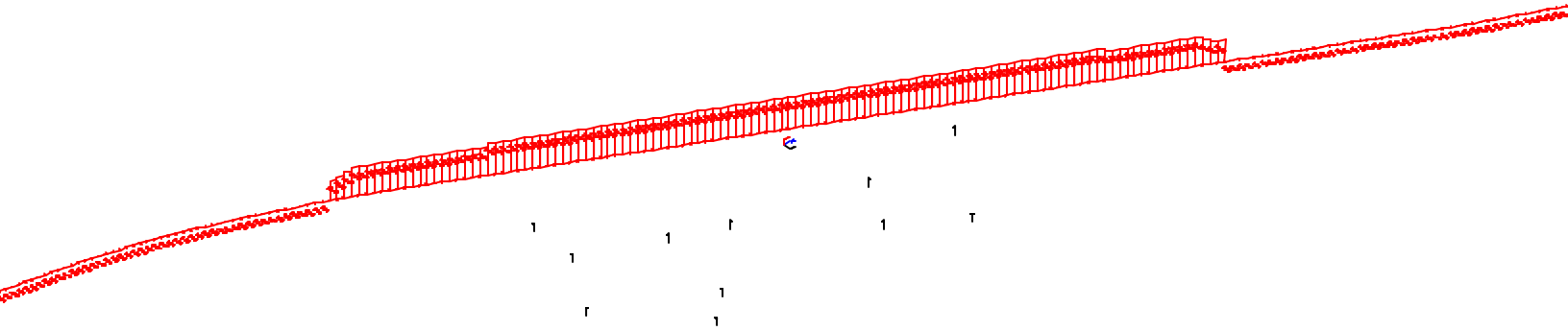
		point246	246	0.00	0.00	0.00	0	0				0
		point247	247	0.00	0.00	0.00	0	0				0
		point248	248	0.00	0.00	0.00	0	0				0
		point249	249	0.00	0.00	0.00	0	0				0
		point250	250	0.00	0.00	0.00	0	0				0
		point251	251	0.00	0.00	0.00	0	0				0
		point252	252	0.00	0.00	0.00	0	0				0
		point253	253	0.00	0.00	0.00	0	0				0
		point254	254	0.00	0.00	0.00	0	0				0
		point255	255	0.00	0.00	0.00	0	0				0
		point256	256	0.00	0.00	0.00	0	0				0
		point257	257	0.00	0.00	0.00	0	0				0
		point258	258	0.00	0.00	0.00	0	0				0
		point259	259	0.00	0.00	0.00	0	0				0
		point260	260	0.00	0.00	0.00	0	0				0
		point261	261	0.00	0.00	0.00	0	0				0
		point262	262	0.00	0.00	0.00	0	0				0
		point263	263	0.00	0.00	0.00	0	0				0
		point264	264	0.00	0.00	0.00	0	0				0
		point265	265	0.00	0.00	0.00	0	0				0
		point266	266	0.00	0.00	0.00	0	0				0
		point267	267	12.00	12.00	12.00	20	240				7193
		point268	268	14.00	14.00	14.00	20	280				8392
		point269	269	16.00	16.00	16.00	20	320				9591
		point270	270	18.00	18.00	18.00	20	361				10821
		point271	271	18.00	18.00	18.00	20	360				10790
		point272	272	18.00	18.00	18.00	20	360				10790
		point273	273	18.00	18.00	18.00	20	360				10790
		point274	274	18.00	18.00	18.00	20	360				10790
		point275	275	18.00	18.00	18.00	20	364				10934
		point276	276	18.00	18.00	18.00	20	360				10790
		point277	277	18.00	18.00	18.00	20	356				10675
		point278	278	18.00	18.00	18.00	20	360				10790
		point279	279	18.00	18.00	18.00	20	360				10790
		point280	280	18.00	18.00	18.00	20	364				10934
		point281	281	18.00	18.00	18.00	20	360				10790
		point282	282	18.00	18.00	18.00	20	356				10675
		point283	283	18.00	18.00	18.00	20	360				10790
		point284	284	18.00	18.00	18.00	20	360				10790

		point285	285	18.00	18.00	18.00	20	364				10934
		point286	286	18.00	18.00	18.00	20	360				10790
		point287	287	18.00	18.00	18.00	20	360				10790
		point288	288	20.00	20.00	20.00	20	400				11989
		point289	289	20.00	20.00	20.00	20	395				11861
		point290	290	20.00	20.00	20.00	20	405				12149
		point291	291	20.00	20.00	20.00	20	400				11989
		point292	292	20.00	20.00	20.00	20	400				11989
		point293	293	20.00	20.00	20.00	20	395				11861
		point294	294	20.00	20.00	20.00	20	400				11989
		point295	295	20.00	20.00	20.00	20	405				12149
		point296	296	20.00	20.00	20.00	20	400				11989
		point297	297	20.00	20.00	20.00	20	400				11989
		point298	298	20.00	20.00	20.00	20	400				11989
		point299	299	20.00	20.00	20.00	20	400				11989
		point300	300	20.00	20.00	20.00	20	405				12149
		point301	301	20.00	20.00	20.00	20	395				11861
		point302	302	20.00	20.00	20.00	20	400				11989
		point303	303	20.00	20.00	20.00	20	400				11989
		point304	304	20.00	20.00	20.00	20	400				11989
		point305	305	20.00	20.00	20.00	20	401				12023
		point306	306	20.00	20.00	20.00	20	400				11989
		point307	307	20.00	20.00	20.00	20	400				11989
		point308	308	20.00	20.00	20.00	20	400				11989
		point309	309	20.00	20.00	20.00	20	400				11989
		point310	310	20.00	20.00	20.00	20	405				12149
		point311	311	20.00	20.00	20.00	20	400				11989
		point312	312	20.00	20.00	20.00	20	395				11861
		point313	313	20.00	20.00	20.00	20	400				11989
		point314	314	20.00	20.00	20.00	20	400				11989
		point315	315	20.00	20.00	20.00	20	405				12149
		point316	316	20.00	20.00	20.00	20	400				11989
		point317	317	20.00	20.00	20.00	20	395				11861
		point318	318	20.00	20.00	20.00	20	400				11989
		point218	218	20.00	20.00	20.00	20	400				11989
		point319	319	20.00	20.00	20.00	20	405				12149
		point320	320	20.00	20.00	20.00	20	400				11989
		point321	321	20.00	20.00	20.00	20	400				11989
		point322	322	20.00	20.00	20.00	20	400				11989

		point323	323	20.00	20.00	20.00	20	395				11861
		point324	324	20.00	20.00	20.00	20	405				12149
		point325	325	20.00	20.00	20.00	20	400				11989
		point326	326	20.00	20.00	20.00	20	400				11989
		point327	327	20.00	20.00	20.00	20	400				11989
		point328	328	20.00	20.00	20.00	20	395				11861
		point329	329	20.00	20.00	20.00	20	405				12149
		point330	330	20.00	20.00	20.00	20	400				11989
		point331	331	20.00	20.00	20.00	20	400				11989
		point332	332	20.00	20.00	20.00	20	400				11989
		point333	333	20.00	20.00	20.00	20	400				11989
		point334	334	20.00	20.00	20.00	20	405				12149
		point335	335	20.00	20.00	20.00	20	395				11861
		point336	336	20.00	20.00	20.00	20	400				11989
		point337	337	20.00	20.00	20.00	20	400				11989
		point338	338	20.00	20.00	20.00	20	400				11989
		point339	339	20.00	20.00	20.00	20	405				12149
		point340	340	20.00	20.00	20.00	20	395				11861
		point341	341	20.00	20.00	20.00	20	400				11989
		point342	342	20.00	20.00	20.00	20	400				11989
		point343	343	20.00	20.00	20.00	20	400				11989
		point344	344	20.00	20.00	20.00	20	405				12149
		point345	345	20.00	20.00	20.00	20	400				11989
		point346	346	20.00	20.00	20.00	20	400				11989
		point347	347	20.00	20.00	20.00	20	395				11861
		point348	348	20.00	20.00	20.00	20	400				11989
		point349	349	20.00	20.00	20.00	20	405				12149
		point350	350	20.00	20.00	20.00	20	400				11989
		point351	351	20.00	20.00	20.00	20	400				11989
		point352	352	20.00	20.00	20.00	20	395				11861
		point353	353	20.00	20.00	20.00	20	400				11989
		point354	354	20.00	20.00	20.00	20	405				12149
		point355	355	20.00	20.00	20.00	20	400				11989
		point356	356	20.00	20.00	20.00	20	400				11989
		point357	357	20.00	20.00	20.00	20	400				11989
		point358	358	20.00	20.00	20.00	20	400				11989
		point359	359	20.00	20.00	20.00	20	401				12023
		point360	360	20.00	20.00	20.00	20	400				11989
		point361	361	20.00	20.00	20.00	20	400				11989

		point362	362	20.00	20.00	20.00	20	400				11989
		point363	363	20.00	20.00	20.00	20	400				11989
		point364	364	20.00	20.00	20.00	20	401				12023
		point365	365	20.00	20.00	20.00	20	400				11989
		point366	366	20.00	20.00	20.00	20	400				11989
		point367	367	20.00	20.00	20.00	20	400				11989
		point368	368	20.00	20.00	20.00	20	400				11989
		point369	369	18.00	18.00	18.00	20	364				10934
		point370	370	18.00	18.00	18.00	20	360				10790
		point371	371	18.00	18.00	18.00	20	356				10675
		point372	372	18.00	18.00	18.00	20	360				10790
		point373	373	18.00	18.00	18.00	20	360				10790
		point374	374	18.00	18.00	18.00	20	364				10934
		point375	375	18.00	18.00	18.00	20	360				10790
		point376	376	18.00	18.00	18.00	20	356				10675
		point377	377	18.00	18.00	18.00	20	360				10790
		point378	378	18.00	18.00	18.00	20	360				10790
		point379	379	18.00	18.00	18.00	20	364				10934
		point380	380	18.00	18.00	18.00	20	360				10790
		point381	381	18.00	18.00	18.00	20	360				10790
		point382	382	16.00	16.00	16.00	20	320				9591
		point383	383	14.00	14.00	14.00	20	277				8303
		point384	384	14.00	14.00	14.00	20	283				8504
		point385	385	0.00	0.00	0.00	0	0				0
		point386	386	0.00	0.00	0.00	0	0				0
		point387	387	0.00	0.00	0.00	0	0				0
		point388	388	0.00	0.00	0.00	0	0				0
		point389	389	0.00	0.00	0.00	0	0				0
		point390	390	0.00	0.00	0.00	0	0				0
		point391	391	0.00	0.00	0.00	0	0				0
		point392	392	0.00	0.00	0.00	0	0				0
		point393	393	0.00	0.00	0.00	0	0				0
		point394	394	0.00	0.00	0.00	0	0				0
		point395	395	0.00	0.00	0.00	0	0				0
		point396	396	0.00	0.00	0.00	0	0				0
		point397	397	0.00	0.00	0.00	0	0				0
		point398	398	0.00	0.00	0.00	0	0				0
		point399	399	0.00	0.00	0.00	0	0				0
		point400	400	0.00	0.00	0.00	0	0				0

		point401	401	0.00	0.00	0.00	0	0				0
		point402	402	0.00	0.00	0.00	0	0				0
		point403	403	0.00	0.00	0.00	0	0				0
		point404	404	0.00	0.00	0.00	0	0				0
		point405	405	0.00	0.00	0.00	0	0				0
		point406	406	0.00	0.00	0.00	0	0				0
		point407	407	0.00	0.00	0.00	0	0				0
		point408	408	0.00	0.00	0.00	0	0				0
		point409	409	0.00	0.00	0.00	0	0				0
		point410	410	0.00	0.00	0.00	0	0				0
		point411	411	0.00	0.00	0.00	0	0				0
		point412	412	0.00	0.00	0.00	0	0				0
		point413	413	0.00	0.00	0.00	0	0				0
		point414	414	0.00	0.00	0.00	0	0				0
		point415	415	0.00	0.00	0.00	0	0				0
		point416	416	0.00	0.00	0.00	0	0				0
		point219	219	0.00	0.00	0.00	0	0				0
		point417	417	0.00	0.00	0.00	0	0				0
		point418	418	0.00	0.00	0.00	0	0				0
		point419	419	0.00	0.00	0.00	0	0				0
		point420	420	0.00	0.00	0.00	0	0				0
		point421	421	0.00	0.00	0.00	0	0				0
		point422	422	0.00	0.00	0.00	0	0				0
		point423	423	0.00	0.00	0.00	0	0				0
		point424	424	0.00	0.00	0.00	0	0				0
		point425	425	0.00	0.00	0.00	0	0				0
		point426	426	0.00	0.00	0.00	0	0				0
		point427	427	0.00	0.00	0.00	0	0				0
		point428	428	0.00	0.00	0.00	0	0				0
		point429	429	0.00	0.00	0.00	0	0				0



Braxton Subdivision Run	Sheet 1 of 1	29 Mar 2021
	HMB Professional Engineers	
Barrier View-Braxton-BAR-02	Project/Contract No. I-69 FEIS	
Run name: Braxton_Barrier_Run	TNM Version 2.5, Feb 2004	
Scale: <DNA - due to perspective>	Analysis By: Mark Gavula	

Roadway:		Ground Zone:	polygon
Receiver:		Tree Zone:	dashed polygon
Barrier:		Contour Zone:	polygon
Building Row:		Parallel Barrier:	
Terrain Line:		Skew Section:	

TNM OUTPUT FOR OHIO RIVER

HMB Professional Engineers
Mark Gavula

29 March 2021
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: I69 ORX
RUN: River House Impact Run
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

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

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
GRE-01-01	1	1	45.2	60.6	66	15.4	10	Sub'l Inc	60.6	0.0	7	-7.0
GRE-02-01	2	1	45.2	62.7	66	17.5	10	Sub'l Inc	62.7	0.0	7	-7.0
GRE-03-01	3	1	45.2	64.6	66	19.4	10	Sub'l Inc	64.6	0.0	7	-7.0
GRE-04-01	4	1	45.2	65.8	66	20.6	10	Sub'l Inc	65.8	0.0	7	-7.0
GRE-05-01-F	5	1	45.2	67.6	66	22.4	10	Both	67.6	0.0	7	-7.0
GRE-06-01-F	6	1	45.2	67.5	66	22.3	10	Both	67.5	0.0	7	-7.0
GRE-07-01	7	1	45.2	66.1	66	20.9	10	Both	66.1	0.0	7	-7.0
GRE-08-01	8	1	45.2	63.7	66	18.5	10	Sub'l Inc	63.7	0.0	7	-7.0
GRE-09-01	9	1	45.2	62.2	66	17.0	10	Sub'l Inc	62.2	0.0	7	-7.0
GRE-10-01	10	1	45.2	60.7	66	15.5	10	Sub'l Inc	60.7	0.0	7	-7.0
GRE-11-01	11	1	45.2	59.7	66	14.5	10	Sub'l Inc	59.7	0.0	7	-7.0
NUG-01-01	12	1	48.4	58.7	66	10.3	10	Sub'l Inc	58.7	0.0	7	-7.0
NUG-02-01	13	1	48.4	64.5	66	16.1	10	Sub'l Inc	64.5	0.0	7	-7.0
NUG-03-01-F	14	1	48.4	67.6	66	19.2	10	Both	67.6	0.0	7	-7.0
NUG-04-01-F	15	1	48.4	67.7	66	19.3	10	Both	67.7	0.0	7	-7.0
NUG-05-01	16	1	48.4	64.8	66	16.4	10	Sub'l Inc	64.8	0.0	7	-7.0

Dwelling Units	# DUs	Noise Reduction Min	Avg	Max
		dB	dB	dB
All Selected	16	0.0	0.0	0.0
All Impacted	16	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

TNM OUTPUT FOR OHIO RIVER EAST BARRIER WALL

HMB Professional Engineers
Mark Gavula

29 March 2021
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: I69 ORX
RUN: River House Barrier Run-100ft Segments
BARRIER DESIGN: Barrier02
ATMOSPHERICS: 68 deg F, 50% RH

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

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
GRE-11-01	11	1	45.2	58.3	66	13.1	10	Sub'l Inc	56.3	2.0	7	-5.0
GRE-10-01	10	1	45.2	59.3	66	14.1	10	Sub'l Inc	57.4	1.9	7	-5.1
GRE-09-01	9	1	45.2	60.8	66	15.6	10	Sub'l Inc	58.9	1.9	7	-5.1
GRE-08-01	8	1	45.2	62.2	66	17.0	10	Sub'l Inc	60.3	1.9	7	-5.1
GRE-07-01	7	1	45.2	64.0	66	18.8	10	Sub'l Inc	62.6	1.4	7	-5.6
GRE-06-01-F	6	1	45.2	64.3	66	19.1	10	Sub'l Inc	63.8	0.5	7	-6.5
NUG-04-01-F	15	1	48.4	64.0	66	15.6	10	Sub'l Inc	63.7	0.3	7	-6.7
NUG-05-01	16	1	48.4	62.8	66	14.4	10	Sub'l Inc	61.0	1.8	7	-5.2

Dwelling Units	# DUs	Noise Reduction Min	Avg	Max
		dB	dB	dB
All Selected	8	0.3	1.5	2.0
All Impacted	8	0.3	1.5	2.0
All that meet NR Goal	0	0.0	0.0	0.0

HMB Professional Engineers				29 March 2021						
Mark Gavula				TNM 2.5						
RESULTS: BARRIER DESCRIPTIONS										
PROJECT/CONTRACT:	I69 ORX									
RUN:	River House Barrier Run-100ft Segments									
BARRIER DESIGN:	Barrier02									
Barriers										
Name	Type	Heights along Barrier			Length	If Wall	If Berm			Cost
		Min	Avg	Max		Area	Volume	Top	Run:Rise	
								Width		
		ft	ft	ft	ft	sq ft	cu yd	ft	ft:ft	$
East	W	12.00	12.00	12.00	5298	63579				1907362
									Total Cost:	1907362

HMB Professional Engineers 29 March 2021
Mark Gavula TNM 2.5
Calculated with TNM 2.5

RESULTS: BARRIER DESIGN
PROJECT/CONTRACT: I69 ORX
RUN: River House Barrier Run-100ft Segments
BARRIER DESIGN: Barrier02

ATMOSPHERICS: 68 deg F, 50% RH

Selected Receivers

Name	No.	Calc LAeq1h	Noise Reduction Calc	Noise Reduction Goal	Noise Reduction Calc-Goal	Barrier Reviewed	Important Segments Name	Important Segments No.	Important Segments Height	Partial LAeq1h
		dBA	dB	dB	dB				ft	dBA
GRE-11-01	11	56.3	2.0	7	-5.0	East	point21	21	12.0	31.9
						East	point18	18	12.0	31.9
						East	point20	20	12.0	31.5
						East	point19	19	12.0	31.4
						East	point17	17	12.0	31.2
						East	point16	16	12.0	31.1
						East	point22	22	12.0	30.8
						East	point15	15	12.0	30.6
						East	point13	13	12.0	30.1
						East	point14	14	12.0	30.1
GRE-10-01	10	57.4	1.9	7	-5.1	East	point18	18	12.0	33.0
						East	point21	21	12.0	32.9
						East	point20	20	12.0	32.7
						East	point19	19	12.0	32.6
						East	point17	17	12.0	32.3
						East	point16	16	12.0	32.1
						East	point15	15	12.0	31.7
						East	point22	22	12.0	31.7
						East	point14	14	12.0	31.1
						East	point13	13	12.0	30.9
GRE-09-01	9	58.9	1.9	7	-5.1	East	point18	18	12.0	34.6

						East	point21	21	12.0	34.3
						East	point20	20	12.0	34.2
						East	point19	19	12.0	34.2
						East	point17	17	12.0	33.9
						East	point16	16	12.0	33.5
						East	point15	15	12.0	33.1
						East	point22	22	12.0	33.0
						East	point14	14	12.0	32.1
						East	point13	13	12.0	31.8
GRE-08-01	8	60.3	1.9	7	-5.1	East	point18	18	12.0	36.1
						East	point19	19	12.0	35.7
						East	point20	20	12.0	35.6
						East	point21	21	12.0	35.3
						East	point17	17	12.0	35.2
						East	point16	16	12.0	34.7
						East	point15	15	12.0	33.9
						East	point22	22	12.0	33.8
						East	point14	14	12.0	33.2
						East	point13	13	12.0	32.8
GRE-07-01	7	62.6	1.4	7	-5.6	East	point18	18	12.0	38.7
						East	point19	19	12.0	38.3
						East	point17	17	12.0	37.6
						East	point20	20	12.0	37.3
						East	point16	16	12.0	36.6
						East	point21	21	12.0	36.5
						East	point15	15	12.0	35.6
						East	point22	22	12.0	34.7
						East	point14	14	12.0	34.5
						East	point13	13	12.0	33.6
GRE-06-01-F	6	63.8	0.5	7	-6.5	East	point18	18	12.0	40.9
						East	point19	19	12.0	39.9
						East	point17	17	12.0	38.6
						East	point20	20	12.0	37.7
						East	point16	16	12.0	36.7
						East	point21	21	12.0	36.1
						East	point15	15	12.0	35.2

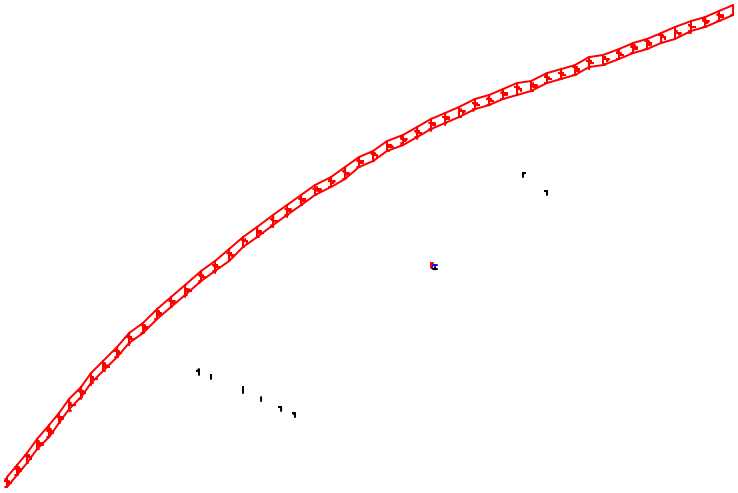
						East	point22	22	12.0	34.1
						East	point14	14	12.0	34.0
						East	point13	13	12.0	33.4
NUG-04-01-F	15	63.7	0.3	7	-6.7	East	point41	41	12.0	41.7
						East	point42	42	12.0	40.0
						East	point40	40	12.0	39.0
						East	point43	43	12.0	37.1
						East	point39	39	12.0	36.1
						East	point44	44	12.0	35.0
						East	point38	38	12.0	33.9
						East	point45	45	12.0	33.6
						East	point46	46	12.0	32.2
						East	point37	37	12.0	32.1
NUG-05-01	16	61.0	1.8	7	-5.2	East	point42	42	12.0	37.2
						East	point41	41	12.0	37.0
						East	point40	40	12.0	36.9
						East	point43	43	12.0	36.1
						East	point39	39	12.0	35.7
						East	point44	44	12.0	35.0
						East	point45	45	12.0	34.7
						East	point38	38	12.0	34.7
						East	point37	37	12.0	33.9
						East	point46	46	12.0	33.5
Total Cost, All Barriers (including additional cost(s))					$1907362					

HMB Professional Engineers 29 March 2021
Mark Gavula TNM 2.5

RESULTS: BARRIER-SEGMENT DESCRIPTIONS
PROJECT/CONTRACT: I69 ORX
RUN: River House Barrier Run-100ft Segments
BARRIER DESIGN: Barrier02

Barriers		Segments										
Name	Type	Name	No.	Heights			Length	If Wall			If Berm	Cost
				First Point	Average	Second Point		Area	On Struc?	Important Reflections?	Volume	
				ft	ft	ft	ft	sq ft			cu yd	$
East	W	point1	1	12.00	12.00	12.00	100	1198	Y			35929
		point5	5	12.00	12.00	12.00	100	1199	Y			35974
		point6	6	12.00	12.00	12.00	100	1202	Y			36061
		point7	7	12.00	12.00	12.00	100	1201	Y			36017
		point8	8	12.00	12.00	12.00	100	1199	Y			35974
		point9	9	12.00	12.00	12.00	100	1198	Y			35929
		point10	10	12.00	12.00	12.00	100	1201	Y			36018
		point11	11	12.00	12.00	12.00	100	1201	Y			36044
		point12	12	12.00	12.00	12.00	100	1199	Y			35984
		point13	13	12.00	12.00	12.00	100	1200	Y			35995
		point14	14	12.00	12.00	12.00	100	1198	Y			35949
		point15	15	12.00	12.00	12.00	100	1200	Y			36011
		point16	16	12.00	12.00	12.00	100	1201	Y			36036
		point17	17	12.00	12.00	12.00	100	1200	Y			36004
		point18	18	12.00	12.00	12.00	100	1200	Y			36004
		point19	19	12.00	12.00	12.00	100	1200	Y			36004
		point20	20	12.00	12.00	12.00	100	1197	Y			35914
		point21	21	12.00	12.00	12.00	100	1200	Y			36004
		point22	22	12.00	12.00	12.00	100	1200	Y			36004
		point23	23	12.00	12.00	12.00	100	1200	Y			36004
		point24	24	12.00	12.00	12.00	100	1200	Y			36004
		point25	25	12.00	12.00	12.00	100	1200	Y			36004
		point26	26	12.00	12.00	12.00	100	1200	Y			36004
		point27	27	12.00	12.00	12.00	100	1200	Y			36004
		point28	28	12.00	12.00	12.00	100	1200	Y			36004
		point29	29	12.00	12.00	12.00	100	1200	Y			36004

		point30	30	12.00	12.00	12.00	100	1200	Y			36004
		point31	31	12.00	12.00	12.00	100	1200	Y			36004
		point32	32	12.00	12.00	12.00	100	1200	Y			36004
		point33	33	12.00	12.00	12.00	100	1200	Y			36004
		point34	34	12.00	12.00	12.00	100	1197	Y			35914
		point35	35	12.00	12.00	12.00	100	1200	Y			36004
		point36	36	12.00	12.00	12.00	100	1200	Y			36004
		point37	37	12.00	12.00	12.00	100	1200	Y			36004
		point38	38	12.00	12.00	12.00	100	1200	Y			36004
		point39	39	12.00	12.00	12.00	100	1200	Y			36004
		point40	40	12.00	12.00	12.00	100	1200	Y			36004
		point41	41	12.00	12.00	12.00	100	1200	Y			36004
		point42	42	12.00	12.00	12.00	100	1200	Y			36004
		point43	43	12.00	12.00	12.00	100	1200	Y			36004
		point44	44	12.00	12.00	12.00	100	1197	Y			35914
		point45	45	12.00	12.00	12.00	100	1200	Y			36004
		point46	46	12.00	12.00	12.00	100	1200	Y			36004
		point47	47	12.00	12.00	12.00	100	1200	Y			36002
		point48	48	12.00	12.00	12.00	100	1200	Y			36004
		point49	49	12.00	12.00	12.00	100	1200	Y			36004
		point50	50	12.00	12.00	12.00	100	1200	Y			36004
		point51	51	12.00	12.00	12.00	100	1200	Y			36004
		point52	52	12.00	12.00	12.00	100	1200	Y			36004
		point53	53	12.00	12.00	12.00	100	1200	Y			36004
		point54	54	12.00	12.00	12.00	100	1200	Y			36004
		point55	55	12.00	12.00	12.00	100	1200	Y			36004
		point56	56	12.00	12.00	12.00	99	1185	Y			35554



River House Barrier Run-100ft Segments	Sheet 1 of 1	29 Mar 2021
	HMB Professional Engineers	
Barrier View-Barrier02	Project/Contract No. I69 ORX	
Run name: 0-BridgeBarrier_100ftSegements	TNM Version 2.5, Feb 2004	
Scale: <DNA - due to perspective>	Analysis By: Mark Gavula	

Roadway:		Ground Zone:	polygon
Receiver:		Tree Zone:	dashed polygon
Barrier:		Contour Zone:	polygon
Building Row:		Parallel Barrier:	
Terrain Line:		Skew Section:	

TNM OUTPUT FOR OHIO RIVER WEST BARRIER WALL

HMB Professional Engineers
Mark Gavula

29 March 2021
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: I69 ORX
RUN: River House Barrier Run-100ft Segments
BARRIER DESIGN: Barrier01
ATMOSPHERICS: 68 deg F, 50% RH

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

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
NUG-03-01-F	14	1	48.4	65.1	66	16.7	10	Sub'l Inc	64.9	0.2	7	-6.8
NUG-02-01	13	1	48.4	63.1	66	14.7	10	Sub'l Inc	62.0	1.1	7	-5.9
NUG-01-01	12	1	48.4	57.4	66	9.0	10	----	56.2	1.2	7	-5.8
GRE-01-01	1	1	45.2	59.2	66	14.0	10	Sub'l Inc	57.8	1.4	7	-5.6
GRE-02-01	2	1	45.2	61.3	66	16.1	10	Sub'l Inc	59.9	1.4	7	-5.6
GRE-03-01	3	1	45.2	62.9	66	17.7	10	Sub'l Inc	61.7	1.2	7	-5.8
GRE-04-01	4	1	45.2	63.8	66	18.6	10	Sub'l Inc	62.9	0.9	7	-6.1
GRE-05-01-F	5	1	45.2	64.7	66	19.5	10	Sub'l Inc	64.6	0.1	7	-6.9

Dwelling Units	# DUs	Noise Reduction Min	Avg	Max
		dB	dB	dB
All Selected	8	0.1	0.9	1.4
All Impacted	7	0.1	0.9	1.4
All that meet NR Goal	0	0.0	0.0	0.0

HMB Professional Engineers				29 March 2021						
Mark Gavula				TNM 2.5						
RESULTS: BARRIER DESCRIPTIONS										
PROJECT/CONTRACT:	I69 ORX									
RUN:	River House Barrier Run-100ft Segments									
BARRIER DESIGN:	Barrier01									
Barriers										
Name	Type	Heights along Barrier			Length	If Wall	If Berm			Cost
		Min	Avg	Max		Area	Volume	Top	Run:Rise	
								Width		
		ft	ft	ft	ft	sq ft	cu yd	ft	ft:ft	$
1	W	0.00	11.88	12.00	5000	59395				1781841
									Total Cost:	1781841

HMB Professional Engineers 29 March 2021
Mark Gavula TNM 2.5
Calculated with TNM 2.5

RESULTS: BARRIER DESIGN
PROJECT/CONTRACT: I69 ORX
RUN: River House Barrier Run-100ft Segments
BARRIER DESIGN: Barrier01

ATMOSPHERICS: 68 deg F, 50% RH

Selected Receivers

Name	No.	Calc LAeq1h	Noise Reduction Calc	Noise Reduction Goal	Noise Reduction Calc-Goal	Barrier Reviewed	Important Segments Name	Important Segments No.	Important Segments Height	Partial LAeq1h
		dBA	dB	dB	dB				ft	dBA
NUG-03-01-F	14	64.9	0.2	7	-6.8	1	point93	93	12.0	40.1
						1	point94	94	12.0	39.5
						1	point92	92	12.0	37.0
						1	point95	95	12.0	36.6
						1	point91	91	12.0	34.7
						1	point96	96	12.0	34.4
						1	point90	90	12.0	32.8
						1	point97	97	12.0	32.4
						1	point89	89	12.0	31.2
						1	point98	98	12.0	31.1
NUG-02-01	13	62.0	1.1	7	-5.9	1	point94	94	12.0	35.8
						1	point93	93	12.0	35.4
						1	point95	95	12.0	35.3
						1	point92	92	12.0	34.6
						1	point91	91	12.0	33.8
						1	point96	96	12.0	33.7
						1	point90	90	12.0	33.3
						1	point89	89	12.0	32.6
						1	point97	97	12.0	32.5
						1	point98	98	12.0	31.9
NUG-01-01	12	56.2	1.2	7	-5.8	1	point95	95	12.0	29.8

						1	point94	94	12.0	29.6
						1	point105	105	12.0	29.0
						1	point93	93	12.0	28.8
						1	point96	96	12.0	28.7
						1	point91	91	12.0	28.2
						1	point92	92	12.0	28.1
						1	point90	90	12.0	28.0
						1	point89	89	12.0	27.9
						1	point97	97	12.0	27.5
GRE-01-01	1	57.8	1.4	7	-5.6	1	point70	70	12.0	32.0
						1	point73	73	12.0	32.0
						1	point71	71	12.0	31.9
						1	point72	72	12.0	31.6
						1	point69	69	12.0	31.5
						1	point68	68	12.0	30.7
						1	point74	74	12.0	30.2
						1	point67	67	12.0	29.9
						1	point66	66	12.0	29.7
						1	point65	65	12.0	28.7
GRE-02-01	2	59.9	1.4	7	-5.6	1	point70	70	12.0	34.2
						1	point71	71	12.0	34.1
						1	point69	69	12.0	33.7
						1	point73	73	12.0	33.7
						1	point72	72	12.0	33.6
						1	point68	68	12.0	32.9
						1	point67	67	12.0	32.0
						1	point74	74	12.0	31.7
						1	point66	66	12.0	31.3
						1	point65	65	12.0	30.6
GRE-03-01	3	61.7	1.2	7	-5.8	1	point70	70	12.0	36.1
						1	point71	71	12.0	35.8
						1	point69	69	12.0	35.5
						1	point72	72	12.0	35.0
						1	point73	73	12.0	35.0
						1	point68	68	12.0	34.3
						1	point67	67	12.0	33.3

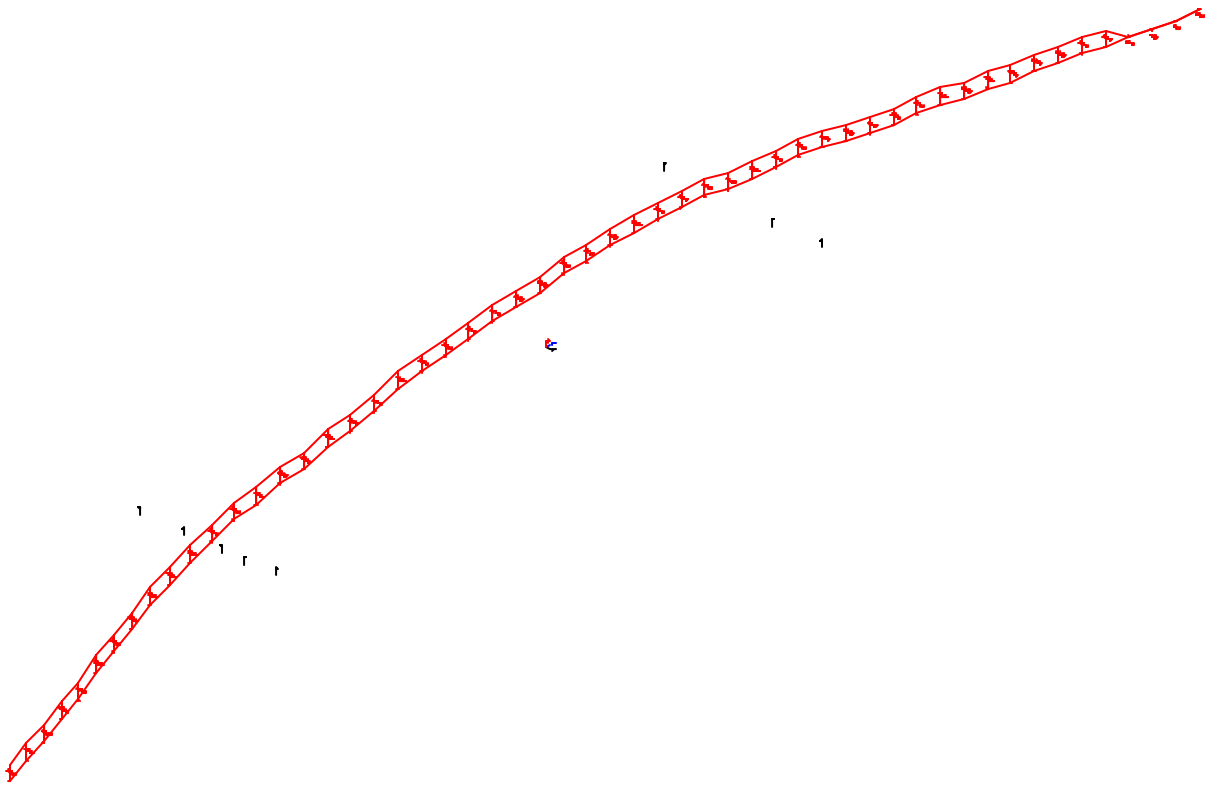
						1	point74	74	12.0	33.0
						1	point66	66	12.0	32.6
						1	point65	65	12.0	31.6
GRE-04-01	4	62.9	0.9	7	-6.1	1	point70	70	12.0	37.6
						1	point71	71	12.0	37.0
						1	point69	69	12.0	36.7
						1	point72	72	12.0	35.9
						1	point68	68	12.0	35.4
						1	point73	73	12.0	35.3
						1	point67	67	12.0	34.0
						1	point74	74	12.0	33.3
						1	point66	66	12.0	32.9
						1	point65	65	12.0	31.9
GRE-05-01-F	5	64.6	0.1	7	-6.9	1	point70	70	12.0	40.6
						1	point71	71	12.0	39.4
						1	point69	69	12.0	37.7
						1	point72	72	12.0	36.6
						1	point68	68	12.0	35.2
						1	point73	73	12.0	34.8
						1	point66	66	12.0	33.9
						1	point67	67	12.0	33.2
						1	point74	74	12.0	32.3
						1	point75	75	12.0	30.3
Total Cost, All Barriers (including additional cost(s))					$1781841					

HMB Professional Engineers 29 March 2021
Mark Gavula TNM 2.5

RESULTS: BARRIER-SEGMENT DESCRIPTIONS
PROJECT/CONTRACT: I69 ORX
RUN: River House Barrier Run-100ft Segments
BARRIER DESIGN: Barrier01

Barriers		Segments										
Name	Type	Name	No.	Heights			Length	If Wall			If Berm	Cost
				First Point	Average	Second Point		Area	On Struc?	Important Reflections?	Volume	
				ft	ft	ft	ft	sq ft			cu yd	$
1	W	point3	3	12.00	12.00	12.00	100	1202	Y			36061
		point57	57	12.00	12.00	12.00	100	1198	Y			35929
		point58	58	12.00	12.00	12.00	100	1202	Y			36061
		point59	59	12.00	12.00	12.00	100	1198	Y			35929
		point60	60	12.00	12.00	12.00	100	1202	Y			36061
		point61	61	12.00	12.00	12.00	100	1198	Y			35929
		point62	62	12.00	12.00	12.00	100	1199	Y			35976
		point63	63	12.00	12.00	12.00	100	1200	Y			36007
		point64	64	12.00	12.00	12.00	100	1201	Y			36043
		point65	65	12.00	12.00	12.00	100	1200	Y			35995
		point66	66	12.00	12.00	12.00	100	1201	Y			36019
		point67	67	12.00	12.00	12.00	100	1200	Y			36011
		point68	68	12.00	12.00	12.00	100	1198	Y			35939
		point69	69	12.00	12.00	12.00	100	1200	Y			36007
		point70	70	12.00	12.00	12.00	100	1200	Y			36004
		point71	71	12.00	12.00	12.00	100	1200	Y			36004
		point72	72	12.00	12.00	12.00	100	1200	Y			36004
		point73	73	12.00	12.00	12.00	100	1200	Y			36004
		point74	74	12.00	12.00	12.00	100	1200	Y			36004
		point75	75	12.00	12.00	12.00	100	1197	Y			35914
		point76	76	12.00	12.00	12.00	100	1200	Y			36004
		point77	77	12.00	12.00	12.00	100	1200	Y			36004
		point78	78	12.00	12.00	12.00	100	1200	Y			36004
		point79	79	12.00	12.00	12.00	100	1200	Y			36004
		point80	80	12.00	12.00	12.00	100	1200	Y			36004
		point81	81	12.00	12.00	12.00	100	1200	Y			36004

		point82	82	12.00	12.00	12.00	100	1200	Y			36004
		point83	83	12.00	12.00	12.00	100	1200	Y			36004
		point84	84	12.00	12.00	12.00	100	1200	Y			36004
		point85	85	12.00	12.00	12.00	100	1200	Y			36004
		point86	86	12.00	12.00	12.00	100	1200	Y			36004
		point87	87	12.00	12.00	12.00	100	1200	Y			36004
		point88	88	12.00	12.00	12.00	100	1200	Y			36004
		point89	89	12.00	12.00	12.00	100	1200	Y			36004
		point90	90	12.00	12.00	12.00	100	1197	Y			35914
		point91	91	12.00	12.00	12.00	100	1200	Y			36004
		point92	92	12.00	12.00	12.00	100	1200	Y			36004
		point93	93	12.00	12.00	12.00	100	1200	Y			36004
		point94	94	12.00	12.00	12.00	100	1200	Y			36004
		point95	95	12.00	12.00	12.00	100	1200	Y			36002
		point96	96	12.00	12.00	12.00	100	1200	Y			36004
		point97	97	12.00	12.00	12.00	100	1200	Y			36004
		point98	98	12.00	12.00	12.00	100	1200	Y			36004
		point99	99	12.00	12.00	12.00	100	1197	Y			35914
		point100	100	12.00	12.00	12.00	100	1200	Y			36004
		point101	101	12.00	12.00	12.00	100	1200	Y			36004
		point102	102	12.00	12.00	12.00	100	1200	Y			36004
		point103	103	12.00	12.00	12.00	100	1200	Y			36004
		point104	104	12.00	12.00	12.00	100	1200	Y			36004
		point105	105	12.00	6.00	0.00	100	600	Y			18002
		point106	106	0.00	0.00	0.00	0	0	Y			0
		point107	107	0.00	0.00	0.00	0	0	Y			0
		point108	108	0.00	0.00	0.00	0	0	Y			0
		point109	109	0.00	0.00	0.00	0	0	Y			0



River House Barrier Run-100ft Segments	Sheet 1 of 1	29 Mar 2021
	HMB Professional Engineers	
Barrier View-Barrier01	Project/Contract No. I69 ORX	
Run name: 0-BridgeBarrier_100ftSegements	TNM Version 2.5, Feb 2004	
Scale: <DNA - due to perspective>	Analysis By: Mark Gavula	

Roadway:		Ground Zone:	polygon
Receiver:		Tree Zone:	dashed polygon
Barrier:		Contour Zone:	polygon
Building Row:		Parallel Barrier:	
Terrain Line:		Skew Section:	

TNM OUTPUT FOR EASTVIEW EAST

HMB Professional Engineers
Mark Gavula

31 March 2021
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: I69 ORX
RUN: Indiana_Barrier_Run_Final
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

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

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
BOE-01-01	2	1	51.3	59.4	66	8.1	15	----	57.2	2.2	8	-5.8
BOE-02-01	3	1	52.2	60.4	66	8.2	15	----	58.1	2.3	8	-5.7
BOE-03-01-F	4	1	54.7	64.1	66	9.4	15	----	57.5	6.6	8	-1.4
BOE-04-01	5	1	54.7	63.1	66	8.4	15	----	58.9	4.2	8	-3.8
BOE-05-01	6	1	51.8	56.1	66	4.3	15	----	54.4	1.7	8	-6.3
BOE-06-01	7	1	50.4	54.6	66	4.2	15	----	53.1	1.5	8	-6.5
BOE-07-01	8	1	50.5	58.7	66	8.2	15	----	55.9	2.8	8	-5.2
FRE-01-01-F	9	1	56.6	58.4	66	1.8	15	----	58.4	0.0	8	-8.0
REE-01-01	10	1	53.4	63.0	66	9.6	15	----	56.6	6.4	8	-1.6
REE-02-01	11	1	54.3	64.4	66	10.1	15	----	57.2	7.2	8	-0.8
REE-03-01	12	1	54.9	65.0	66	10.1	15	----	57.3	7.7	8	-0.3
REE-04-01	13	1	56.1	65.6	66	9.5	15	----	57.4	8.2	8	0.2
REE-05-01-F	14	1	55.9	67.0	66	11.1	15	Snd Lvl	57.5	9.5	8	1.5
REE-06-01	15	1	54.0	63.8	66	9.8	15	----	56.5	7.3	8	-0.7
REE-07-01	16	1	54.9	64.7	66	9.8	15	----	56.8	7.9	8	-0.1
REE-08-01-F	17	1	55.5	65.9	66	10.4	15	----	57.4	8.5	8	0.5
RHE-01-01	18	1	50.0	58.1	66	8.1	15	----	54.2	3.9	8	-4.1
RHE-02-01	19	1	49.9	57.8	66	7.9	15	----	53.7	4.1	8	-3.9
RHE-03-01	20	1	50.5	58.8	66	8.3	15	----	54.2	4.6	8	-3.4
RHE-04-01	21	1	52.9	56.4	66	3.5	15	----	53.5	2.9	8	-5.1
RHE-05-01	22	1	50.7	54.2	66	3.5	15	----	51.9	2.3	8	-5.7
RHE-06-01	23	1	50.9	54.2	66	3.3	15	----	51.6	2.6	8	-5.4
RHE-07-01	24	1	51.5	54.8	66	3.3	15	----	51.8	3.0	8	-5.0
ROO-01-01	25	1	53.0	62.5	66	9.5	15	----	56.6	5.9	8	-2.1

ROO-02-01	26	1	53.6	63.4	66	9.8	15	----	57.0	6.4	8	-1.6
ROO-03-01	27	1	54.2	64.1	66	9.9	15	----	57.3	6.8	8	-1.2
ROO-04-01	28	1	54.8	64.9	66	10.1	15	----	57.5	7.4	8	-0.6
ROO-05-01	29	1	55.3	65.9	66	10.6	15	----	57.9	8.0	8	0.0
RUD-15-01	30	1	55.8	65.6	66	9.8	15	----	56.9	8.7	8	0.7
RUS-01-01	31	1	50.7	59.3	66	8.6	15	----	53.3	6.0	8	-2.0
RUS-02-01	32	1	51.2	60.0	66	8.8	15	----	53.7	6.3	8	-1.7
RUS-03-01	33	1	51.7	60.7	66	9.0	15	----	54.1	6.6	8	-1.4
RUS-04-01	34	1	52.3	61.6	66	9.3	15	----	54.7	6.9	8	-1.1
RUS-05-01	35	1	53.1	62.4	66	9.3	15	----	55.4	7.0	8	-1.0
RUS-06-01	36	1	53.6	63.2	66	9.6	15	----	55.5	7.7	8	-0.3
RUS-07-01	37	1	54.3	64.1	66	9.8	15	----	55.9	8.2	8	0.2
RUS-08-01	38	1	54.8	64.5	66	9.7	15	----	56.3	8.2	8	0.2
RUS-09-01-F	39	1	55.5	65.5	66	10.0	15	----	57.0	8.5	8	0.5
RUS-10-01	40	1	51.4	60.3	66	8.9	15	----	53.6	6.7	8	-1.3
RUS-11-01	41	1	52.5	61.9	66	9.4	15	----	54.6	7.3	8	-0.7
RUS-12-01	42	1	53.6	62.9	66	9.3	15	----	55.2	7.7	8	-0.3
RUS-13-01	43	1	54.4	64.4	66	10.0	15	----	55.9	8.5	8	0.5
RUS-14-01	44	1	55.2	64.9	66	9.7	15	----	56.5	8.4	8	0.4
STJ-01-01	45	1	49.9	58.1	66	8.2	15	----	53.3	4.8	8	-3.2
STJ-02-01	46	1	50.3	58.6	66	8.3	15	----	53.6	5.0	8	-3.0
STJ-03-01	47	1	50.7	59.3	66	8.6	15	----	54.0	5.3	8	-2.7
STJ-04-01	48	1	51.3	60.1	66	8.8	15	----	54.4	5.7	8	-2.3
STJ-05-01	49	1	51.8	60.8	66	9.0	15	----	54.9	5.9	8	-2.1
STJ-06-01	50	1	52.3	61.7	66	9.4	15	----	55.3	6.4	8	-1.6
STJ-07-01	51	1	52.7	62.1	66	9.4	15	----	55.4	6.7	8	-1.3
STJ-08-01	52	1	53.6	63.5	66	9.9	15	----	56.1	7.4	8	-0.6
STJ-09-01	53	1	54.7	64.4	66	9.7	15	----	56.6	7.8	8	-0.2
STJ-10-01	54	1	55.0	65.2	66	10.2	15	----	56.8	8.4	8	0.4
STJ-11-01-F	55	1	55.7	66.0	66	10.3	15	Snd Lvl	57.2	8.8	8	0.8
STJ-12-01	56	1	50.0	58.2	66	8.2	15	----	53.0	5.2	8	-2.8
STJ-13-01	57	1	50.4	58.9	66	8.5	15	----	53.4	5.5	8	-2.5
STJ-14-01	58	1	51.2	59.7	66	8.5	15	----	53.7	6.0	8	-2.0
STJ-15-01	59	1	51.5	60.4	66	8.9	15	----	54.1	6.3	8	-1.7
STJ-16-01	60	1	52.1	61.2	66	9.1	15	----	54.6	6.6	8	-1.4
STJ-17-01	61	1	52.6	62.1	66	9.5	15	----	55.1	7.0	8	-1.0
STJ-18-01	62	1	53.3	63.0	66	9.7	15	----	55.4	7.6	8	-0.4
STJ-19-01	63	1	53.9	63.8	66	9.9	15	----	55.9	7.9	8	-0.1
STJ-20-01	64	1	54.6	64.8	66	10.2	15	----	56.4	8.4	8	0.4
STJ-21-01-F	65	1	55.4	65.3	66	9.9	15	----	56.8	8.5	8	0.5
VANB-08-01-F	66	1	48.7	56.1	66	7.4	15	----	55.9	0.2	8	-7.8

VANB-09-01-F	67	1	48.7	55.5	66	6.8	15	----	55.2	0.3	8	-7.7
VANB-10-01-F	68	1	48.7	54.9	66	6.2	15	----	54.5	0.4	8	-7.6
VANB-11-01-F	69	1	49.1	55.9	66	6.8	15	----	55.4	0.5	8	-7.5
VANB-12-01-F	70	1	49.6	56.1	66	6.5	15	----	55.4	0.7	8	-7.3
VANB-13-01-F	71	1	50.3	57.1	66	6.8	15	----	56.2	0.9	8	-7.1
VANB-14-01-F	72	1	51.2	58.1	66	6.9	15	----	56.9	1.2	8	-6.8
VANB-15-01-F	73	1	51.2	58.8	66	7.6	15	----	57.7	1.1	8	-6.9
VANB-16-01-F	74	1	51.5	59.0	66	7.5	15	----	57.1	1.9	8	-6.1
VANB-17-01-F	75	1	52.0	60.0	66	8.0	15	----	57.5	2.5	8	-5.5
VANB-18-01-F	76	1	53.7	61.8	66	8.1	15	----	58.9	2.9	8	-5.1
VANB-19-01-F	77	1	54.3	62.7	66	8.4	15	----	59.0	3.7	8	-4.3
VANB-20-01-F	78	1	53.1	62.0	66	8.9	15	----	58.3	3.7	8	-4.3
VANB-21-01-F	79	1	53.2	62.2	66	9.0	15	----	58.0	4.2	8	-3.8
VANB-22-01-F	80	1	53.6	62.9	66	9.3	15	----	58.0	4.9	8	-3.1
VANB-23-01-F	81	1	53.9	63.3	66	9.4	15	----	57.9	5.4	8	-2.6
VANB-24-01-F	82	1	54.2	63.8	66	9.6	15	----	57.9	5.9	8	-2.1
VANB-25-01-F	83	1	54.1	63.8	66	9.7	15	----	57.7	6.1	8	-1.9
VANB-26-01-F	84	1	55.0	65.2	66	10.2	15	----	57.9	7.3	8	-0.7
VANB-27-01	85	1	51.4	57.4	66	6.0	15	----	56.7	0.7	8	-7.3
VANB-28-01	86	1	50.5	58.2	66	7.7	15	----	57.0	1.2	8	-6.8
VANB-29-01	87	1	51.7	58.6	66	6.9	15	----	57.1	1.5	8	-6.5
VANB-30-01	88	1	50.9	59.0	66	8.1	15	----	57.4	1.6	8	-6.4
VANB-31-01	89	1	52.0	59.7	66	7.7	15	----	57.1	2.6	8	-5.4
VANB-32-01	90	1	50.9	60.2	66	9.3	15	----	57.1	3.1	8	-4.9
VANB-33-01	91	1	52.3	60.8	66	8.5	15	----	57.0	3.8	8	-4.2
VANB-34-01	92	1	51.2	61.2	66	10.0	15	----	57.1	4.1	8	-3.9
VANB-35-01	93	1	53.2	62.6	66	9.4	15	----	57.1	5.5	8	-2.5
VANB-36-01	94	1	49.0	55.5	66	6.5	15	----	55.3	0.2	8	-7.8
VANB-37-01	95	1	50.7	56.4	66	5.7	15	----	55.9	0.5	8	-7.5
VIL-01-01-F	96	1	55.3	66.1	66	10.8	15	Snd Lvl	56.7	9.4	8	1.4
VIL-02-01	97	1	54.3	64.5	66	10.2	15	----	55.9	8.6	8	0.6
WEI-01-01	98	1	56.2	58.9	66	2.7	15	----	58.9	0.0	8	-8.0
WEI-02-01	99	1	57.1	59.7	66	2.6	15	----	59.7	0.0	8	-8.0
WEI-03-01-F	100	1	58.3	60.6	66	2.3	15	----	60.6	0.0	8	-8.0
WEI-04-01	101	1	54.7	57.9	66	3.2	15	----	57.8	0.1	8	-7.9
WEI-05-01	102	1	59.7	62.1	66	2.4	15	----	62.1	0.0	8	-8.0
WEI-06-01-F	103	1	62.9	64.2	66	1.3	15	----	64.2	0.0	8	-8.0
WEI-07-01	104	1	54.7	58.7	66	4.0	15	----	58.6	0.1	8	-7.9
WEI-08-01	106	1	53.8	58.4	66	4.6	15	----	58.4	0.0	8	-8.0
WEI-09-01-F	109	1	54.0	58.9	66	4.9	15	----	58.8	0.1	8	-7.9
VIL-03-01	111	1	59.5	63.2	66	3.7	15	----	55.1	8.1	8	0.1

VIL-04-01	112	1	58.3	62.1	66	3.8	15	----	54.8	7.3	8	-0.7
VIL-05-01	113	1	56.9	60.6	66	3.7	15	----	53.7	6.9	8	-1.1
VIL-06-01-F	114	1	64.0	66.6	66	2.6	15	Snd Lvl	57.0	9.6	8	1.6
VIL-07-01	115	1	61.9	65.7	66	3.8	15	----	56.3	9.4	8	1.4
VIL-08-01	116	1	60.5	64.6	66	4.1	15	----	55.7	8.9	8	0.9
VIL-09-01	117	1	58.2	62.2	66	4.0	15	----	54.5	7.7	8	-0.3
DEB-06-01	118	1	58.0	62.0	66	4.0	15	----	54.4	7.6	8	-0.4
DEB-05-01	119	1	58.9	62.9	66	4.0	15	----	55.0	7.9	8	-0.1
DEB-04-01	120	1	59.9	64.1	66	4.2	15	----	55.4	8.7	8	0.7
DEB-03-01	121	1	60.9	65.0	66	4.1	15	----	55.8	9.2	8	1.2
DEB-02-01	122	1	62.4	66.3	66	3.9	15	Snd Lvl	56.5	9.8	8	1.8
DEB-01-01-F	123	1	64.0	66.7	66	2.7	15	Snd Lvl	57.1	9.6	8	1.6
DEB-07-01-F	124	1	63.2	67.0	66	3.8	15	Snd Lvl	56.9	10.1	8	2.1
DEB-08-01	125	1	60.9	65.1	66	4.2	15	----	55.9	9.2	8	1.2
DEB-09-01	126	1	59.6	63.7	66	4.1	15	----	55.2	8.5	8	0.5
DEB-10-01	127	1	58.3	62.3	66	4.0	15	----	54.5	7.8	8	-0.2
ARLE-04-01	128	1	58.5	62.5	66	4.0	15	----	54.7	7.8	8	-0.2
ARLE-03-01	129	1	59.4	63.5	66	4.1	15	----	55.8	7.7	8	-0.3
ARLE-02-01	130	1	60.5	64.6	66	4.1	15	----	55.7	8.9	8	0.9
ARLE-01-01-F	131	1	62.0	66.0	66	4.0	15	Snd Lvl	56.3	9.7	8	1.7
ARLE-08-01	132	1	59.0	63.1	66	4.1	15	----	55.0	8.1	8	0.1
ARLE-07-01	133	1	60.7	64.8	66	4.1	15	----	56.0	8.8	8	0.8
ARLE-06-01	134	1	62.1	65.9	66	3.8	15	----	57.3	8.6	8	0.6
ARLE-05-01	135	1	64.0	66.9	66	2.9	15	Snd Lvl	57.1	9.8	8	1.8
CON-04-01	136	1	59.4	63.4	66	4.0	15	----	55.4	8.0	8	0.0
CON-03-01	137	1	60.6	64.8	66	4.2	15	----	56.0	8.8	8	0.8
CON-02-01	138	1	61.7	65.7	66	4.0	15	----	56.4	9.3	8	1.3
CON-01-01-F	139	1	63.7	66.6	66	2.9	15	Snd Lvl	57.2	9.4	8	1.4
CON-07-01	140	1	60.0	63.9	66	3.9	15	----	56.2	7.7	8	-0.3
CON-06-01	141	1	62.2	66.5	66	4.3	15	Snd Lvl	57.2	9.3	8	1.3
CON-05-01-F	142	1	64.0	67.4	66	3.4	15	Snd Lvl	57.9	9.5	8	1.5
RHE-23-01	143	1	58.0	61.2	66	3.2	15	----	56.0	5.2	8	-2.8
RHE-22-01	144	1	57.0	60.3	66	3.3	15	----	54.6	5.7	8	-2.3
RHE-21-01	145	1	57.6	61.2	66	3.6	15	----	54.5	6.7	8	-1.3
RHE-20-01	146	1	54.7	58.1	66	3.4	15	----	52.1	6.0	8	-2.0
RHE-19-01	147	1	54.6	58.1	66	3.5	15	----	52.0	6.1	8	-1.9
RHE-18-01	148	1	55.6	59.4	66	3.8	15	----	52.7	6.7	8	-1.3
RHE-17-01	149	1	55.2	58.9	66	3.7	15	----	52.4	6.5	8	-1.5
RHE-16-01	150	1	56.0	59.8	66	3.8	15	----	53.0	6.8	8	-1.2
RHE-15-01	151	1	55.9	59.6	66	3.7	15	----	52.9	6.7	8	-1.3
RHE-14-01	152	1	55.4	59.0	66	3.6	15	----	52.7	6.3	8	-1.7

STJ-22-01	153	1	52.8	56.1	66	3.3	15	----	52.0	4.1	8	-3.9
RHE-08-01	154	1	53.2	56.4	66	3.2	15	----	51.9	4.5	8	-3.5
RHE-09-01	155	1	54.0	57.3	66	3.3	15	----	52.3	5.0	8	-3.0
RHE-10-01	156	1	54.3	57.6	66	3.3	15	----	52.2	5.4	8	-2.6
RHE-11-01	157	1	54.2	57.6	66	3.4	15	----	52.1	5.5	8	-2.5
RHE-12-01	158	1	55.1	58.5	66	3.4	15	----	52.5	6.0	8	-2.0
RHE-13-01	159	1	54.6	58.1	66	3.5	15	----	52.3	5.8	8	-2.2
STJ-23-01	160	1	51.5	54.5	66	3.0	15	----	50.7	3.8	8	-4.2
RUS-16-01	161	1	52.2	55.4	66	3.2	15	----	51.0	4.4	8	-3.6
RUS-17-01	162	1	51.7	54.7	66	3.0	15	----	50.5	4.2	8	-3.8
RUS-18-01	163	1	50.9	53.8	66	2.9	15	----	49.9	3.9	8	-4.1
RUS-19-01	164	1	50.9	53.8	66	2.9	15	----	49.6	4.2	8	-3.8
RUS-20-01	165	1	51.7	54.7	66	3.0	15	----	50.1	4.6	8	-3.4
RUS-21-01	166	1	52.2	55.3	66	3.1	15	----	50.6	4.7	8	-3.3
VIL-10-01	167	1	52.4	55.5	66	3.1	15	----	50.7	4.8	8	-3.2
VIL-11-01	168	1	51.7	54.7	66	3.0	15	----	50.1	4.6	8	-3.4
VIL-12-01	169	1	51.0	54.0	66	3.0	15	----	49.6	4.4	8	-3.6
VIL-14-01	170	1	53.4	56.8	66	3.4	15	----	51.0	5.8	8	-2.2
VIL-13-01	171	1	51.3	54.2	66	2.9	15	----	49.5	4.7	8	-3.3

Dwelling Units	**# DUs**	**Noise Reduction**		
		Min	**Avg**	**Max**
		dB	**dB**	**dB**
All Selected	166	0.0	5.6	10.1
All Impacted	12	8.8	9.5	10.1
All that meet NR Goal	39	8.0	8.9	10.1

TNM OUTPUT FOR EASTVIEW EAST

HMB Professional Engineers
Mark Gavula

31 March 2021
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: I69 ORX
RUN: Indiana_Barrier_Run_Final
BARRIER DESIGN: IN_FINAL_BARRIER
ATMOSPHERICS: 68 deg F, 50% RH

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

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
BOE-01-01	2	1	51.3	59.4	66	8.1	15	----	57.7	1.7	8	-6.3
BOE-02-01	3	1	52.2	60.4	66	8.2	15	----	59.0	1.4	8	-6.6
BOE-03-01-F	4	1	54.7	64.1	66	9.4	15	----	63.4	0.7	8	-7.3
BOE-04-01	5	1	54.7	63.1	66	8.4	15	----	62.0	1.1	8	-6.9
BOE-05-01	6	1	51.8	56.1	66	4.3	15	----	54.7	1.4	8	-6.6
BOE-06-01	7	1	50.4	54.6	66	4.2	15	----	53.4	1.2	8	-6.8
BOE-07-01	8	1	50.5	58.7	66	8.2	15	----	56.3	2.4	8	-5.6
REE-01-01	10	1	53.4	63.0	66	9.6	15	----	56.8	6.2	8	-1.8
REE-02-01	11	1	54.3	64.4	66	10.1	15	----	57.4	7.0	8	-1.0
REE-03-01	12	1	54.9	65.0	66	10.1	15	----	57.5	7.5	8	-0.5
REE-04-01	13	1	56.1	65.6	66	9.5	15	----	57.6	8.0	8	0.0
REE-05-01-F	14	1	55.9	67.0	66	11.1	15	Snd Lvl	57.6	9.4	8	1.4
REE-06-01	15	1	54.0	63.8	66	9.8	15	----	56.8	7.0	8	-1.0
REE-07-01	16	1	54.9	64.7	66	9.8	15	----	57.0	7.7	8	-0.3
REE-08-01-F	17	1	55.5	65.9	66	10.4	15	----	57.6	8.3	8	0.3
RHE-01-01	18	1	50.0	58.1	66	8.1	15	----	54.6	3.5	8	-4.5
RHE-02-01	19	1	49.9	57.8	66	7.9	15	----	54.2	3.6	8	-4.4
RHE-03-01	20	1	50.5	58.8	66	8.3	15	----	54.7	4.1	8	-3.9
RHE-04-01	21	1	52.9	56.4	66	3.5	15	----	53.9	2.5	8	-5.5
RHE-05-01	22	1	50.7	54.2	66	3.5	15	----	52.3	1.9	8	-6.1
RHE-06-01	23	1	50.9	54.2	66	3.3	15	----	52.0	2.2	8	-5.8
RHE-07-01	24	1	51.5	54.8	66	3.3	15	----	52.3	2.5	8	-5.5
ROO-01-01	25	1	53.0	62.5	66	9.5	15	----	56.9	5.6	8	-2.4
ROO-02-01	26	1	53.6	63.4	66	9.8	15	----	57.3	6.1	8	-1.9

ROO-03-01	27	1	54.2	64.1	66	9.9	15	----	57.5	6.6	8	-1.4
ROO-04-01	28	1	54.8	64.9	66	10.1	15	----	57.7	7.2	8	-0.8
ROO-05-01	29	1	55.3	65.9	66	10.6	15	----	58.1	7.8	8	-0.2
RUD-15-01	30	1	55.8	65.6	66	9.8	15	----	57.7	7.9	8	-0.1
RUS-01-01	31	1	50.7	59.3	66	8.6	15	----	54.4	4.9	8	-3.1
RUS-02-01	32	1	51.2	60.0	66	8.8	15	----	54.6	5.4	8	-2.6
RUS-03-01	33	1	51.7	60.7	66	9.0	15	----	55.0	5.7	8	-2.3
RUS-04-01	34	1	52.3	61.6	66	9.3	15	----	55.5	6.1	8	-1.9
RUS-05-01	35	1	53.1	62.4	66	9.3	15	----	56.2	6.2	8	-1.8
RUS-06-01	36	1	53.6	63.2	66	9.6	15	----	56.3	6.9	8	-1.1
RUS-07-01	37	1	54.3	64.1	66	9.8	15	----	56.8	7.3	8	-0.7
RUS-08-01	38	1	54.8	64.5	66	9.7	15	----	57.1	7.4	8	-0.6
RUS-09-01-F	39	1	55.5	65.5	66	10.0	15	----	57.7	7.8	8	-0.2
RUS-10-01	40	1	51.4	60.3	66	8.9	15	----	54.7	5.6	8	-2.4
RUS-11-01	41	1	52.5	61.9	66	9.4	15	----	55.6	6.3	8	-1.7
RUS-12-01	42	1	53.6	62.9	66	9.3	15	----	56.2	6.7	8	-1.3
RUS-13-01	43	1	54.4	64.4	66	10.0	15	----	56.9	7.5	8	-0.5
RUS-14-01	44	1	55.2	64.9	66	9.7	15	----	57.4	7.5	8	-0.5
STJ-01-01	45	1	49.9	58.1	66	8.2	15	----	54.0	4.1	8	-3.9
STJ-02-01	46	1	50.3	58.6	66	8.3	15	----	54.3	4.3	8	-3.7
STJ-03-01	47	1	50.7	59.3	66	8.6	15	----	54.7	4.6	8	-3.4
STJ-04-01	48	1	51.3	60.1	66	8.8	15	----	55.1	5.0	8	-3.0
STJ-05-01	49	1	51.8	60.8	66	9.0	15	----	55.4	5.4	8	-2.6
STJ-06-01	50	1	52.3	61.7	66	9.4	15	----	55.8	5.9	8	-2.1
STJ-07-01	51	1	52.7	62.1	66	9.4	15	----	55.9	6.2	8	-1.8
STJ-08-01	52	1	53.6	63.5	66	9.9	15	----	56.5	7.0	8	-1.0
STJ-09-01	53	1	54.7	64.4	66	9.7	15	----	57.0	7.4	8	-0.6
STJ-10-01	54	1	55.0	65.2	66	10.2	15	----	57.2	8.0	8	0.0
STJ-11-01-F	55	1	55.7	66.0	66	10.3	15	Snd Lvl	57.5	8.5	8	0.5
STJ-12-01	56	1	50.0	58.2	66	8.2	15	----	54.0	4.2	8	-3.8
STJ-13-01	57	1	50.4	58.9	66	8.5	15	----	54.3	4.6	8	-3.4
STJ-14-01	58	1	51.2	59.7	66	8.5	15	----	54.6	5.1	8	-2.9
STJ-15-01	59	1	51.5	60.4	66	8.9	15	----	54.9	5.5	8	-2.5
STJ-16-01	60	1	52.1	61.2	66	9.1	15	----	55.3	5.9	8	-2.1
STJ-17-01	61	1	52.6	62.1	66	9.5	15	----	55.8	6.3	8	-1.7
STJ-18-01	62	1	53.3	63.0	66	9.7	15	----	56.1	6.9	8	-1.1
STJ-19-01	63	1	53.9	63.8	66	9.9	15	----	56.6	7.2	8	-0.8
STJ-20-01	64	1	54.6	64.8	66	10.2	15	----	57.1	7.7	8	-0.3
STJ-21-01-F	65	1	55.4	65.3	66	9.9	15	----	57.4	7.9	8	-0.1
VANB-16-01-F	74	1	51.5	59.0	66	7.5	15	----	58.7	0.3	8	-7.7
VANB-17-01-F	75	1	52.0	60.0	66	8.0	15	----	59.6	0.4	8	-7.6

VANB-18-01-F	76	1	53.7	61.8	66	8.1	15	----	61.3	0.5	8	-7.5
VANB-19-01-F	77	1	54.3	62.7	66	8.4	15	----	62.1	0.6	8	-7.4
VANB-20-01-F	78	1	53.1	62.0	66	8.9	15	----	59.1	2.9	8	-5.1
VANB-21-01-F	79	1	53.2	62.2	66	9.0	15	----	58.8	3.4	8	-4.6
VANB-22-01-F	80	1	53.6	62.9	66	9.3	15	----	58.8	4.1	8	-3.9
VANB-23-01-F	81	1	53.9	63.3	66	9.4	15	----	58.6	4.7	8	-3.3
VANB-24-01-F	82	1	54.2	63.8	66	9.6	15	----	58.5	5.3	8	-2.7
VANB-25-01-F	83	1	54.1	63.8	66	9.7	15	----	58.1	5.7	8	-2.3
VANB-26-01-F	84	1	55.0	65.2	66	10.2	15	----	58.2	7.0	8	-1.0
VANB-28-01	86	1	50.5	58.2	66	7.7	15	----	57.8	0.4	8	-7.6
VANB-29-01	87	1	51.7	58.6	66	6.9	15	----	57.9	0.7	8	-7.3
VANB-30-01	88	1	50.9	59.0	66	8.1	15	----	58.1	0.9	8	-7.1
VANB-31-01	89	1	52.0	59.7	66	7.7	15	----	57.6	2.1	8	-5.9
VANB-32-01	90	1	50.9	60.2	66	9.3	15	----	57.5	2.7	8	-5.3
VANB-33-01	91	1	52.3	60.8	66	8.5	15	----	57.4	3.4	8	-4.6
VANB-34-01	92	1	51.2	61.2	66	10.0	15	----	57.4	3.8	8	-4.2
VANB-35-01	93	1	53.2	62.6	66	9.4	15	----	57.4	5.2	8	-2.8
VIL-01-01-F	96	1	55.3	66.1	66	10.8	15	Snd Lvl	57.8	8.3	8	0.3
VIL-02-01	97	1	54.3	64.5	66	10.2	15	----	57.0	7.5	8	-0.5
VIL-03-01	111	1	59.5	63.2	66	3.7	15	----	56.3	6.9	8	-1.1
VIL-04-01	112	1	58.3	62.1	66	3.8	15	----	55.9	6.2	8	-1.8
VIL-05-01	113	1	56.9	60.6	66	3.7	15	----	55.0	5.6	8	-2.4
VIL-06-01-F	114	1	64.0	66.6	66	2.6	15	Snd Lvl	58.2	8.4	8	0.4
VIL-07-01	115	1	61.9	65.7	66	3.8	15	----	57.6	8.1	8	0.1
VIL-08-01	116	1	60.5	64.6	66	4.1	15	----	57.0	7.6	8	-0.4
VIL-09-01	117	1	58.2	62.2	66	4.0	15	----	56.0	6.2	8	-1.8
DEB-06-01	118	1	58.0	62.0	66	4.0	15	----	55.9	6.1	8	-1.9
DEB-05-01	119	1	58.9	62.9	66	4.0	15	----	56.4	6.5	8	-1.5
DEB-04-01	120	1	59.9	64.1	66	4.2	15	----	56.9	7.2	8	-0.8
DEB-03-01	121	1	60.9	65.0	66	4.1	15	----	57.2	7.8	8	-0.2
DEB-02-01	122	1	62.4	66.3	66	3.9	15	Snd Lvl	57.8	8.5	8	0.5
DEB-01-01-F	123	1	64.0	66.7	66	2.7	15	Snd Lvl	58.3	8.4	8	0.4
DEB-07-01-F	124	1	63.2	67.0	66	3.8	15	Snd Lvl	58.2	8.8	8	0.8
DEB-08-01	125	1	60.9	65.1	66	4.2	15	----	57.5	7.6	8	-0.4
DEB-09-01	126	1	59.6	63.7	66	4.1	15	----	56.8	6.9	8	-1.1
DEB-10-01	127	1	58.3	62.3	66	4.0	15	----	56.1	6.2	8	-1.8
ARLE-04-01	128	1	58.5	62.5	66	4.0	15	----	56.3	6.2	8	-1.8
ARLE-03-01	129	1	59.4	63.5	66	4.1	15	----	57.2	6.3	8	-1.7
ARLE-02-01	130	1	60.5	64.6	66	4.1	15	----	57.3	7.3	8	-0.7
ARLE-01-01-F	131	1	62.0	66.0	66	4.0	15	Snd Lvl	57.9	8.1	8	0.1
ARLE-08-01	132	1	59.0	63.1	66	4.1	15	----	56.7	6.4	8	-1.6

ARLE-07-01	133	1	60.7	64.8	66	4.1	15	----	57.5	7.3	8	-0.7
ARLE-06-01	134	1	62.1	65.9	66	3.8	15	----	58.5	7.4	8	-0.6
ARLE-05-01	135	1	64.0	66.9	66	2.9	15	Snd Lvl	58.4	8.5	8	0.5
CON-04-01	136	1	59.4	63.4	66	4.0	15	----	57.1	6.3	8	-1.7
CON-03-01	137	1	60.6	64.8	66	4.2	15	----	57.6	7.2	8	-0.8
CON-02-01	138	1	61.7	65.7	66	4.0	15	----	57.9	7.8	8	-0.2
CON-01-01-F	139	1	63.7	66.6	66	2.9	15	Snd Lvl	58.6	8.0	8	0.0
CON-07-01	140	1	60.0	63.9	66	3.9	15	----	57.8	6.1	8	-1.9
CON-06-01	141	1	62.2	66.5	66	4.3	15	Snd Lvl	58.6	7.9	8	-0.1
CON-05-01-F	142	1	64.0	67.4	66	3.4	15	Snd Lvl	59.1	8.3	8	0.3
RHE-23-01	143	1	58.0	61.2	66	3.2	15	----	57.5	3.7	8	-4.3
RHE-22-01	144	1	57.0	60.3	66	3.3	15	----	56.2	4.1	8	-3.9
RHE-21-01	145	1	57.6	61.2	66	3.6	15	----	56.3	4.9	8	-3.1
RHE-20-01	146	1	54.7	58.1	66	3.4	15	----	54.2	3.9	8	-4.1
RHE-19-01	147	1	54.6	58.1	66	3.5	15	----	54.0	4.1	8	-3.9
RHE-18-01	148	1	55.6	59.4	66	3.8	15	----	54.8	4.6	8	-3.4
RHE-17-01	149	1	55.2	58.9	66	3.7	15	----	54.4	4.5	8	-3.5
RHE-16-01	150	1	56.0	59.8	66	3.8	15	----	54.7	5.1	8	-2.9
RHE-15-01	151	1	55.9	59.6	66	3.7	15	----	54.7	4.9	8	-3.1
RHE-14-01	152	1	55.4	59.0	66	3.6	15	----	54.4	4.6	8	-3.4
STJ-22-01	153	1	52.8	56.1	66	3.3	15	----	52.7	3.4	8	-4.6
RHE-08-01	154	1	53.2	56.4	66	3.2	15	----	52.8	3.6	8	-4.4
RHE-09-01	155	1	54.0	57.3	66	3.3	15	----	53.3	4.0	8	-4.0
RHE-10-01	156	1	54.3	57.6	66	3.3	15	----	53.5	4.1	8	-3.9
RHE-11-01	157	1	54.2	57.6	66	3.4	15	----	53.6	4.0	8	-4.0
RHE-12-01	158	1	55.1	58.5	66	3.4	15	----	54.1	4.4	8	-3.6
RHE-13-01	159	1	54.6	58.1	66	3.5	15	----	53.9	4.2	8	-3.8
STJ-23-01	160	1	51.5	54.5	66	3.0	15	----	51.6	2.9	8	-5.1
RUS-16-01	161	1	52.2	55.4	66	3.2	15	----	52.1	3.3	8	-4.7
RUS-17-01	162	1	51.7	54.7	66	3.0	15	----	51.6	3.1	8	-4.9
RUS-18-01	163	1	50.9	53.8	66	2.9	15	----	51.0	2.8	8	-5.2
RUS-19-01	164	1	50.9	53.8	66	2.9	15	----	51.0	2.8	8	-5.2
RUS-20-01	165	1	51.7	54.7	66	3.0	15	----	51.5	3.2	8	-4.8
RUS-21-01	166	1	52.2	55.3	66	3.1	15	----	52.0	3.3	8	-4.7
VIL-10-01	167	1	52.4	55.5	66	3.1	15	----	52.3	3.2	8	-4.8
VIL-11-01	168	1	51.7	54.7	66	3.0	15	----	51.6	3.1	8	-4.9
VIL-12-01	169	1	51.0	54.0	66	3.0	15	----	51.0	3.0	8	-5.0
VIL-14-01	170	1	53.4	56.8	66	3.4	15	----	52.9	3.9	8	-4.1
VIL-13-01	171	1	51.3	54.2	66	2.9	15	----	51.1	3.1	8	-4.9
VANB-16-01-F	74	1	51.5	59.0	66	7.5	15	----	58.7	0.3	8	-7.7
Dwelling Units		**# DUs**	**Noise Reduction**									

RESULTS: SOUND LEVELS **I69 ORX**

			Min	Avg	Max
			dB	dB	dB
All Selected		146	0.3	5.2	9.4
All Impacted		12	7.9	8.4	9.4
All that meet NR Goal		14	8.0	8.4	9.4

HMB Professional Engineers				31 March 2021						
Mark Gavula				TNM 2.5						
RESULTS: BARRIER DESCRIPTIONS										
PROJECT/CONTRACT:	I69 ORX									
RUN:	Indiana_Barrier_Run_Final									
BARRIER DESIGN:	INPUT HEIGHTS									
Barriers										
Name	Type	Heights along Barrier			Length	If Wall	If Berm			Cost
		Min	Avg	Max		Area	Volume	Top	Run:Rise	
								Width		
		ft	ft	ft	ft	sq ft	cu yd	ft	ft:ft	$
Barrier4	W	14.00	14.00	14.00	3099	43379				1301382
									Total Cost:	1301382

HMB Professional Engineers 31 March 2021
Mark Gavula TNM 2.5
Calculated with TNM 2.5

RESULTS: BARRIER DESIGN
PROJECT/CONTRACT: I69 ORX
RUN: Indiana_Barrier_Run_Final
BARRIER DESIGN: IN_FINAL_BARRIER

ATMOSPHERICS: 68 deg F, 50% RH

Selected Receivers

Name	No.	Calc LAeq1h	Noise Reduction Calc	Noise Reduction Goal	Noise Reduction Calc-Goal	Barrier Reviewed	Important Segments Name	Important Segments No.	Important Segments Height	Partial LAeq1h
		dBA	dB	dB	dB				ft	dBA
BOE-01-01	2	57.7	1.7	8	-6.3	Barrier4	point188	188	0.0	42.9
						Barrier4	point190	190	0.0	42.8
						Barrier4	point189	189	0.0	42.8
						Barrier4	point187	187	0.0	42.8
						Barrier4	point183	183	0.0	42.6
						Barrier4	point184	184	0.0	42.5
						Barrier4	point185	185	0.0	42.5
						Barrier4	point186	186	0.0	42.5
						Barrier4	point182	182	0.0	42.5
						Barrier4	point181	181	0.0	42.3
BOE-02-01	3	59.0	1.4	8	-6.6	Barrier4	point187	187	0.0	44.9
						Barrier4	point188	188	0.0	44.9
						Barrier4	point184	184	0.0	44.8
						Barrier4	point186	186	0.0	44.7
						Barrier4	point189	189	0.0	44.7
						Barrier4	point185	185	0.0	44.7
						Barrier4	point190	190	0.0	44.6
						Barrier4	point182	182	0.0	44.6
						Barrier4	point183	183	0.0	44.6
						Barrier4	point181	181	0.0	44.5
BOE-03-01-F	4	63.4	0.7	8	-7.3	Barrier4	point184	184	0.0	53.3

						Barrier4	point183	183	0.0	53.0
						Barrier4	point185	185	0.0	53.0
						Barrier4	point182	182	0.0	52.5
						Barrier4	point186	186	0.0	52.4
						Barrier4	point181	181	0.0	51.8
						Barrier4	point187	187	0.0	51.6
						Barrier4	point180	180	0.0	51.0
						Barrier4	point188	188	0.0	50.5
						Barrier4	point189	189	0.0	49.8
BOE-04-01	5	62.0	1.1	8	-6.9	Barrier4	point184	184	0.0	50.6
						Barrier4	point186	186	0.0	50.6
						Barrier4	point185	185	0.0	50.5
						Barrier4	point187	187	0.0	50.3
						Barrier4	point188	188	0.0	50.0
						Barrier4	point183	183	0.0	50.0
						Barrier4	point182	182	0.0	49.6
						Barrier4	point189	189	0.0	49.6
						Barrier4	point190	190	0.0	49.0
						Barrier4	point181	181	0.0	49.0
BOE-05-01	6	54.7	1.4	8	-6.6	Barrier4	point181	181	0.0	38.3
						Barrier4	point182	182	0.0	38.2
						Barrier4	point180	180	0.0	38.2
						Barrier4	point183	183	0.0	38.2
						Barrier4	point178	178	0.0	38.0
						Barrier4	point179	179	0.0	38.0
						Barrier4	point184	184	0.0	37.9
						Barrier4	point188	188	0.0	37.9
						Barrier4	point176	176	0.0	37.8
						Barrier4	point190	190	0.0	37.8
BOE-06-01	7	53.4	1.2	8	-6.8	Barrier4	point181	181	0.0	36.4
						Barrier4	point178	178	0.0	36.3
						Barrier4	point180	180	0.0	36.3
						Barrier4	point182	182	0.0	36.3
						Barrier4	point179	179	0.0	36.2
						Barrier4	point176	176	0.0	36.2
						Barrier4	point177	177	0.0	36.1

						Barrier4	point183	183	0.0	36.1
						Barrier4	point175	175	0.0	36.1
						Barrier4	point171	171	0.0	36.0
BOE-07-01	8	56.3	2.4	8	-5.6	Barrier4	point190	190	0.0	40.5
						Barrier4	point189	189	0.0	40.4
						Barrier4	point187	187	0.0	40.4
						Barrier4	point188	188	0.0	40.3
						Barrier4	point186	186	0.0	40.3
						Barrier4	point183	183	0.0	40.0
						Barrier4	point184	184	0.0	40.0
						Barrier4	point182	182	0.0	39.9
						Barrier4	point185	185	0.0	39.8
						Barrier4	point181	181	0.0	39.8
REE-01-01	10	56.8	6.2	8	-1.8	Barrier4	point192	192	14.0	41.0
						Barrier4	point188	188	0.0	41.0
						Barrier4	point190	190	0.0	40.6
						Barrier4	point194	194	14.0	40.5
						Barrier4	point193	193	14.0	40.3
						Barrier4	point195	195	14.0	40.2
						Barrier4	point196	196	14.0	39.9
						Barrier4	point189	189	0.0	39.9
						Barrier4	point221	221	14.0	39.7
						Barrier4	point197	197	14.0	39.7
REE-02-01	11	57.4	7.0	8	-1.0	Barrier4	point192	192	14.0	41.8
						Barrier4	point196	196	14.0	41.7
						Barrier4	point217	217	14.0	41.3
						Barrier4	point216	216	14.0	41.2
						Barrier4	point218	218	14.0	41.2
						Barrier4	point197	197	14.0	41.2
						Barrier4	point220	220	14.0	41.1
						Barrier4	point221	221	14.0	41.1
						Barrier4	point219	219	14.0	41.0
						Barrier4	point215	215	14.0	41.0
REE-03-01	12	57.5	7.5	8	-0.5	Barrier4	point217	217	14.0	42.4
						Barrier4	point216	216	14.0	42.3
						Barrier4	point220	220	14.0	42.2

						Barrier4	point219	219	14.0	42.2
						Barrier4	point221	221	14.0	42.0
						Barrier4	point218	218	14.0	42.0
						Barrier4	point195	195	14.0	41.9
						Barrier4	point215	215	14.0	41.9
						Barrier4	point222	222	14.0	41.7
						Barrier4	point213	213	14.0	41.5
REE-04-01	13	57.6	8.0	8	-0.0	Barrier4	point216	216	14.0	44.1
						Barrier4	point217	217	14.0	44.1
						Barrier4	point218	218	14.0	43.8
						Barrier4	point215	215	14.0	43.7
						Barrier4	point219	219	14.0	43.3
						Barrier4	point214	214	14.0	43.1
						Barrier4	point213	213	14.0	43.1
						Barrier4	point220	220	14.0	43.0
						Barrier4	point221	221	14.0	42.4
						Barrier4	point212	212	14.0	42.3
REE-05-01-F	14	57.6	9.4	8	1.4	Barrier4	point215	215	14.0	46.4
						Barrier4	point216	216	14.0	46.2
						Barrier4	point214	214	14.0	45.8
						Barrier4	point217	217	14.0	45.5
						Barrier4	point213	213	14.0	45.3
						Barrier4	point218	218	14.0	44.3
						Barrier4	point212	212	14.0	44.0
						Barrier4	point211	211	14.0	43.2
						Barrier4	point219	219	14.0	43.1
						Barrier4	point220	220	14.0	42.3
REE-06-01	15	56.8	7.0	8	-1.0	Barrier4	point224	224	14.0	41.1
						Barrier4	point223	223	14.0	41.1
						Barrier4	point222	222	14.0	41.0
						Barrier4	point221	221	14.0	40.8
						Barrier4	point225	225	14.0	40.7
						Barrier4	point232	232	12.0	40.7
						Barrier4	point226	226	14.0	40.6
						Barrier4	point233	233	12.0	40.5
						Barrier4	point227	227	14.0	40.5

						Barrier4	point220	220	14.0	40.4
REE-07-01	16	57.0	7.7	8	-0.3	Barrier4	point223	223	14.0	42.6
						Barrier4	point222	222	14.0	42.6
						Barrier4	point224	224	14.0	42.4
						Barrier4	point221	221	14.0	42.3
						Barrier4	point225	225	14.0	42.1
						Barrier4	point220	220	14.0	41.9
						Barrier4	point226	226	14.0	41.6
						Barrier4	point227	227	14.0	41.5
						Barrier4	point219	219	14.0	41.2
						Barrier4	point228	228	14.0	41.2
REE-08-01-F	17	57.6	8.3	8	0.3	Barrier4	point222	222	14.0	44.7
						Barrier4	point223	223	14.0	44.6
						Barrier4	point221	221	14.0	44.5
						Barrier4	point224	224	14.0	44.2
						Barrier4	point220	220	14.0	43.8
						Barrier4	point225	225	14.0	43.4
						Barrier4	point219	219	14.0	43.1
						Barrier4	point226	226	14.0	42.9
						Barrier4	point227	227	14.0	42.8
						Barrier4	point218	218	14.0	42.5
RHE-01-01	18	54.6	3.5	8	-4.5	Barrier4	point178	178	0.0	37.8
						Barrier4	point181	181	0.0	37.8
						Barrier4	point182	182	0.0	37.1
						Barrier4	point189	189	0.0	36.9
						Barrier4	point190	190	0.0	36.8
						Barrier4	point191	191	14.0	36.8
						Barrier4	point183	183	0.0	36.7
						Barrier4	point187	187	0.0	36.7
						Barrier4	point180	180	0.0	36.6
						Barrier4	point186	186	0.0	36.6
RHE-02-01	19	54.2	3.6	8	-4.4	Barrier4	point179	179	0.0	37.2
						Barrier4	point183	183	0.0	36.9
						Barrier4	point234	234	12.0	36.6
						Barrier4	point233	233	12.0	36.4
						Barrier4	point232	232	12.0	36.2

						Barrier4	point184	184	0.0	36.0
						Barrier4	point191	191	14.0	35.8
						Barrier4	point190	190	0.0	35.8
						Barrier4	point180	180	0.0	35.8
						Barrier4	point185	185	0.0	35.7
RHE-03-01	20	54.7	4.1	8	-3.9	Barrier4	point187	187	0.0	38.8
						Barrier4	point182	182	0.0	38.3
						Barrier4	point234	234	12.0	38.2
						Barrier4	point233	233	12.0	37.7
						Barrier4	point183	183	0.0	37.5
						Barrier4	point232	232	12.0	37.4
						Barrier4	point186	186	0.0	37.4
						Barrier4	point235	235	12.0	36.7
						Barrier4	point191	191	14.0	36.5
						Barrier4	point188	188	0.0	36.5
RHE-04-01	21	53.9	2.5	8	-5.5	Barrier4	point183	183	0.0	36.6
						Barrier4	point181	181	0.0	36.4
						Barrier4	point187	187	0.0	36.3
						Barrier4	point188	188	0.0	36.3
						Barrier4	point175	175	0.0	36.2
						Barrier4	point176	176	0.0	36.2
						Barrier4	point174	174	0.0	36.2
						Barrier4	point182	182	0.0	36.2
						Barrier4	point184	184	0.0	36.1
						Barrier4	point186	186	0.0	36.1
RHE-05-01	22	52.3	1.9	8	-6.1	Barrier4	point171	171	0.0	35.3
						Barrier4	point180	180	0.0	34.9
						Barrier4	point168	168	0.0	34.8
						Barrier4	point181	181	0.0	34.3
						Barrier4	point178	178	0.0	34.2
						Barrier4	point176	176	0.0	34.1
						Barrier4	point183	183	0.0	34.1
						Barrier4	point179	179	0.0	34.0
						Barrier4	point182	182	0.0	34.0
						Barrier4	point177	177	0.0	34.0
RHE-06-01	23	52.0	2.2	8	-5.8	Barrier4	point171	171	0.0	34.3

						Barrier4	point174	174	0.0	33.9
						Barrier4	point181	181	0.0	33.8
						Barrier4	point175	175	0.0	33.7
						Barrier4	point182	182	0.0	33.7
						Barrier4	point173	173	0.0	33.7
						Barrier4	point176	176	0.0	33.6
						Barrier4	point178	178	0.0	33.6
						Barrier4	point183	183	0.0	33.5
						Barrier4	point180	180	0.0	33.4
RHE-07-01	24	52.3	2.5	8	-5.5	Barrier4	point176	176	0.0	34.8
						Barrier4	point177	177	0.0	34.6
						Barrier4	point173	173	0.0	34.5
						Barrier4	point234	234	12.0	33.9
						Barrier4	point232	232	12.0	33.8
						Barrier4	point180	180	0.0	33.7
						Barrier4	point233	233	12.0	33.7
						Barrier4	point178	178	0.0	33.7
						Barrier4	point183	183	0.0	33.7
						Barrier4	point188	188	0.0	33.7
ROO-01-01	25	56.9	5.6	8	-2.4	Barrier4	point188	188	0.0	42.0
						Barrier4	point189	189	0.0	41.1
						Barrier4	point191	191	14.0	40.9
						Barrier4	point190	190	0.0	40.8
						Barrier4	point192	192	14.0	40.8
						Barrier4	point185	185	0.0	40.8
						Barrier4	point194	194	14.0	40.6
						Barrier4	point193	193	14.0	40.6
						Barrier4	point197	197	14.0	40.3
						Barrier4	point195	195	14.0	40.2
ROO-02-01	26	57.3	6.1	8	-1.9	Barrier4	point190	190	0.0	42.4
						Barrier4	point187	187	0.0	41.9
						Barrier4	point193	193	14.0	41.6
						Barrier4	point194	194	14.0	41.3
						Barrier4	point192	192	14.0	41.2
						Barrier4	point191	191	14.0	41.1
						Barrier4	point195	195	14.0	41.0

						Barrier4	point196	196	14.0	40.7
						Barrier4	point197	197	14.0	40.6
						Barrier4	point188	188	0.0	40.3
ROO-03-01	27	57.5	6.6	8	-1.4	Barrier4	point189	189	0.0	42.6
						Barrier4	point193	193	14.0	42.2
						Barrier4	point190	190	0.0	41.9
						Barrier4	point194	194	14.0	41.8
						Barrier4	point195	195	14.0	41.6
						Barrier4	point196	196	14.0	41.4
						Barrier4	point209	209	14.0	41.1
						Barrier4	point214	214	14.0	41.1
						Barrier4	point210	210	14.0	41.0
						Barrier4	point215	215	14.0	40.9
ROO-04-01	28	57.7	7.2	8	-0.8	Barrier4	point195	195	14.0	42.8
						Barrier4	point191	191	14.0	42.5
						Barrier4	point209	209	14.0	42.2
						Barrier4	point194	194	14.0	42.1
						Barrier4	point210	210	14.0	42.0
						Barrier4	point214	214	14.0	42.0
						Barrier4	point196	196	14.0	41.9
						Barrier4	point211	211	14.0	41.8
						Barrier4	point215	215	14.0	41.8
						Barrier4	point208	208	14.0	41.7
ROO-05-01	29	58.1	7.8	8	-0.2	Barrier4	point210	210	14.0	43.7
						Barrier4	point211	211	14.0	43.7
						Barrier4	point209	209	14.0	43.6
						Barrier4	point213	213	14.0	43.5
						Barrier4	point214	214	14.0	43.4
						Barrier4	point212	212	14.0	43.4
						Barrier4	point208	208	14.0	43.1
						Barrier4	point215	215	14.0	43.1
						Barrier4	point207	207	14.0	42.6
						Barrier4	point216	216	14.0	42.4
RUD-15-01	30	57.7	7.9	8	-0.1	Barrier4	point246	246	12.0	44.8
						Barrier4	point245	245	12.0	44.7
						Barrier4	point248	248	12.0	44.4

						Barrier4	point247	247	12.0	44.2
						Barrier4	point249	249	12.0	44.1
						Barrier4	point250	250	12.0	43.8
						Barrier4	point244	244	12.0	43.8
						Barrier4	point243	243	12.0	43.2
						Barrier4	point251	251	12.0	42.6
						Barrier4	point242	242	12.0	42.1
RUS-01-01	31	54.4	4.9	8	-3.1	Barrier4	point234	234	12.0	37.5
						Barrier4	point256	256	12.0	36.9
						Barrier4	point257	257	12.0	36.8
						Barrier4	point239	239	12.0	36.6
						Barrier4	point233	233	12.0	36.6
						Barrier4	point192	192	14.0	36.6
						Barrier4	point245	245	12.0	36.6
						Barrier4	point241	241	12.0	36.6
						Barrier4	point235	235	12.0	36.5
						Barrier4	point238	238	12.0	36.5
RUS-02-01	32	54.6	5.4	8	-2.6	Barrier4	point234	234	12.0	37.8
						Barrier4	point241	241	12.0	37.4
						Barrier4	point239	239	12.0	37.4
						Barrier4	point245	245	12.0	37.3
						Barrier4	point238	238	12.0	37.3
						Barrier4	point244	244	12.0	37.1
						Barrier4	point236	236	12.0	37.1
						Barrier4	point233	233	12.0	37.0
						Barrier4	point240	240	12.0	37.0
						Barrier4	point242	242	12.0	36.9
RUS-03-01	33	55.0	5.7	8	-2.3	Barrier4	point241	241	12.0	38.2
						Barrier4	point239	239	12.0	38.1
						Barrier4	point245	245	12.0	38.1
						Barrier4	point238	238	12.0	38.0
						Barrier4	point240	240	12.0	37.9
						Barrier4	point244	244	12.0	37.9
						Barrier4	point233	233	12.0	37.8
						Barrier4	point236	236	12.0	37.8
						Barrier4	point234	234	12.0	37.8

						Barrier4	point237	237	12.0	37.8
RUS-04-01	34	55.5	6.1	8	-1.9	Barrier4	point241	241	12.0	39.1
						Barrier4	point239	239	12.0	39.0
						Barrier4	point245	245	12.0	38.9
						Barrier4	point238	238	12.0	38.9
						Barrier4	point240	240	12.0	38.8
						Barrier4	point244	244	12.0	38.8
						Barrier4	point237	237	12.0	38.6
						Barrier4	point243	243	12.0	38.6
						Barrier4	point242	242	12.0	38.6
						Barrier4	point236	236	12.0	38.5
RUS-05-01	35	56.2	6.2	8	-1.8	Barrier4	point245	245	12.0	39.8
						Barrier4	point239	239	12.0	39.8
						Barrier4	point241	241	12.0	39.7
						Barrier4	point244	244	12.0	39.6
						Barrier4	point243	243	12.0	39.4
						Barrier4	point238	238	12.0	39.4
						Barrier4	point240	240	12.0	39.2
						Barrier4	point246	246	12.0	39.1
						Barrier4	point237	237	12.0	39.0
						Barrier4	point236	236	12.0	38.5
RUS-06-01	36	56.3	6.9	8	-1.1	Barrier4	point241	241	12.0	40.8
						Barrier4	point239	239	12.0	40.8
						Barrier4	point240	240	12.0	40.6
						Barrier4	point238	238	12.0	40.6
						Barrier4	point245	245	12.0	40.5
						Barrier4	point244	244	12.0	40.5
						Barrier4	point242	242	12.0	40.4
						Barrier4	point243	243	12.0	40.4
						Barrier4	point237	237	12.0	40.3
						Barrier4	point236	236	12.0	40.1
RUS-07-01	37	56.8	7.3	8	-0.7	Barrier4	point241	241	12.0	41.9
						Barrier4	point239	239	12.0	41.9
						Barrier4	point245	245	12.0	41.7
						Barrier4	point244	244	12.0	41.7
						Barrier4	point242	242	12.0	41.6

						Barrier4	point243	243	12.0	41.5
						Barrier4	point238	238	12.0	41.5
						Barrier4	point240	240	12.0	41.3
						Barrier4	point237	237	12.0	40.8
						Barrier4	point246	246	12.0	40.6
RUS-08-01	38	57.1	7.4	8	-0.6	Barrier4	point241	241	12.0	43.0
						Barrier4	point239	239	12.0	42.8
						Barrier4	point245	245	12.0	42.7
						Barrier4	point244	244	12.0	42.7
						Barrier4	point242	242	12.0	42.6
						Barrier4	point243	243	12.0	42.5
						Barrier4	point240	240	12.0	42.4
						Barrier4	point238	238	12.0	42.2
						Barrier4	point246	246	12.0	41.2
						Barrier4	point237	237	12.0	41.1
RUS-09-01-F	39	57.7	7.8	8	-0.2	Barrier4	point240	240	12.0	45.2
						Barrier4	point239	239	12.0	45.1
						Barrier4	point238	238	12.0	44.7
						Barrier4	point241	241	12.0	44.6
						Barrier4	point242	242	12.0	44.2
						Barrier4	point237	237	12.0	43.8
						Barrier4	point243	243	12.0	43.7
						Barrier4	point236	236	12.0	43.0
						Barrier4	point244	244	12.0	42.8
						Barrier4	point235	235	12.0	42.5
RUS-10-01	40	54.7	5.6	8	-2.4	Barrier4	point257	257	12.0	37.9
						Barrier4	point256	256	12.0	37.7
						Barrier4	point245	245	12.0	37.2
						Barrier4	point260	260	12.0	37.2
						Barrier4	point158	158	12.0	37.1
						Barrier4	point261	261	12.0	37.1
						Barrier4	point246	246	12.0	37.0
						Barrier4	point244	244	12.0	37.0
						Barrier4	point243	243	12.0	37.0
						Barrier4	point259	259	12.0	37.0
RUS-11-01	41	55.6	6.3	8	-1.7	Barrier4	point257	257	12.0	39.3

						Barrier4	point256	256	12.0	39.2
						Barrier4	point245	245	12.0	39.0
						Barrier4	point246	246	12.0	38.8
						Barrier4	point244	244	12.0	38.8
						Barrier4	point243	243	12.0	38.7
						Barrier4	point251	251	12.0	38.4
						Barrier4	point250	250	12.0	38.3
						Barrier4	point241	241	12.0	38.3
						Barrier4	point158	158	12.0	38.3
RUS-12-01	42	56.2	6.7	8	-1.3	Barrier4	point256	256	12.0	40.2
						Barrier4	point257	257	12.0	40.2
						Barrier4	point245	245	12.0	40.1
						Barrier4	point244	244	12.0	39.9
						Barrier4	point246	246	12.0	39.9
						Barrier4	point243	243	12.0	39.6
						Barrier4	point251	251	12.0	39.6
						Barrier4	point250	250	12.0	39.5
						Barrier4	point248	248	12.0	39.4
						Barrier4	point252	252	12.0	39.4
RUS-13-01	43	56.9	7.5	8	-0.5	Barrier4	point245	245	12.0	41.7
						Barrier4	point246	246	12.0	41.6
						Barrier4	point244	244	12.0	41.5
						Barrier4	point250	250	12.0	41.2
						Barrier4	point251	251	12.0	41.1
						Barrier4	point248	248	12.0	41.1
						Barrier4	point256	256	12.0	41.0
						Barrier4	point249	249	12.0	41.0
						Barrier4	point257	257	12.0	40.9
						Barrier4	point247	247	12.0	40.9
RUS-14-01	44	57.4	7.5	8	-0.5	Barrier4	point245	245	12.0	43.3
						Barrier4	point246	246	12.0	43.3
						Barrier4	point244	244	12.0	42.9
						Barrier4	point248	248	12.0	42.7
						Barrier4	point247	247	12.0	42.6
						Barrier4	point249	249	12.0	42.6
						Barrier4	point250	250	12.0	42.4

						Barrier4	point243	243	12.0	42.3
						Barrier4	point251	251	12.0	42.1
						Barrier4	point255	255	12.0	42.0
STJ-01-01	45	54.0	4.1	8	-3.9	Barrier4	point234	234	12.0	37.9
						Barrier4	point233	233	12.0	37.5
						Barrier4	point189	189	0.0	37.1
						Barrier4	point235	235	12.0	37.0
						Barrier4	point232	232	12.0	36.5
						Barrier4	point184	184	0.0	36.0
						Barrier4	point236	236	12.0	35.8
						Barrier4	point185	185	0.0	35.6
						Barrier4	point238	238	12.0	35.6
						Barrier4	point239	239	12.0	35.5
STJ-02-01	46	54.3	4.3	8	-3.7	Barrier4	point234	234	12.0	38.6
						Barrier4	point233	233	12.0	38.1
						Barrier4	point235	235	12.0	37.6
						Barrier4	point232	232	12.0	37.3
						Barrier4	point190	190	0.0	37.1
						Barrier4	point185	185	0.0	36.9
						Barrier4	point189	189	0.0	36.4
						Barrier4	point236	236	12.0	35.9
						Barrier4	point238	238	12.0	35.9
						Barrier4	point237	237	12.0	35.8
STJ-03-01	47	54.7	4.6	8	-3.4	Barrier4	point234	234	12.0	39.3
						Barrier4	point233	233	12.0	38.4
						Barrier4	point235	235	12.0	38.3
						Barrier4	point232	232	12.0	38.1
						Barrier4	point186	186	0.0	37.7
						Barrier4	point191	191	14.0	37.1
						Barrier4	point187	187	0.0	36.9
						Barrier4	point189	189	0.0	36.7
						Barrier4	point236	236	12.0	36.6
						Barrier4	point238	238	12.0	36.6
STJ-04-01	48	55.1	5.0	8	-3.0	Barrier4	point234	234	12.0	39.5
						Barrier4	point233	233	12.0	39.2
						Barrier4	point232	232	12.0	39.1

						Barrier4	point189	189	0.0	38.4
						Barrier4	point188	188	0.0	38.4
						Barrier4	point235	235	12.0	38.0
						Barrier4	point193	193	14.0	37.7
						Barrier4	point190	190	0.0	37.4
						Barrier4	point237	237	12.0	37.3
						Barrier4	point236	236	12.0	37.2
STJ-05-01	49	55.4	5.4	8	-2.6	Barrier4	point233	233	12.0	39.6
						Barrier4	point232	232	12.0	39.5
						Barrier4	point189	189	0.0	39.2
						Barrier4	point190	190	0.0	39.0
						Barrier4	point235	235	12.0	38.4
						Barrier4	point194	194	14.0	38.3
						Barrier4	point234	234	12.0	38.2
						Barrier4	point236	236	12.0	37.9
						Barrier4	point237	237	12.0	37.8
						Barrier4	point223	223	14.0	37.5
STJ-06-01	50	55.8	5.9	8	-2.1	Barrier4	point233	233	12.0	39.7
						Barrier4	point232	232	12.0	39.6
						Barrier4	point234	234	12.0	39.2
						Barrier4	point191	191	14.0	39.0
						Barrier4	point235	235	12.0	38.9
						Barrier4	point236	236	12.0	38.7
						Barrier4	point237	237	12.0	38.4
						Barrier4	point223	223	14.0	38.2
						Barrier4	point224	224	14.0	38.2
						Barrier4	point196	196	14.0	38.2
STJ-07-01	51	55.9	6.2	8	-1.8	Barrier4	point234	234	12.0	40.1
						Barrier4	point233	233	12.0	40.0
						Barrier4	point232	232	12.0	40.0
						Barrier4	point235	235	12.0	39.2
						Barrier4	point236	236	12.0	39.1
						Barrier4	point237	237	12.0	38.7
						Barrier4	point223	223	14.0	38.6
						Barrier4	point224	224	14.0	38.6
						Barrier4	point192	192	14.0	38.6

						Barrier4	point197	197	14.0	38.6
STJ-08-01	52	56.5	7.0	8	-1.0	Barrier4	point232	232	12.0	41.2
						Barrier4	point233	233	12.0	41.2
						Barrier4	point234	234	12.0	40.9
						Barrier4	point235	235	12.0	40.6
						Barrier4	point224	224	14.0	40.2
						Barrier4	point231	231	14.0	40.1
						Barrier4	point236	236	12.0	40.0
						Barrier4	point223	223	14.0	40.0
						Barrier4	point227	227	14.0	39.9
						Barrier4	point225	225	14.0	39.9
STJ-09-01	53	57.0	7.4	8	-0.6	Barrier4	point232	232	12.0	42.4
						Barrier4	point233	233	12.0	42.3
						Barrier4	point234	234	12.0	41.9
						Barrier4	point235	235	12.0	41.6
						Barrier4	point231	231	14.0	41.2
						Barrier4	point224	224	14.0	40.9
						Barrier4	point227	227	14.0	40.9
						Barrier4	point228	228	14.0	40.9
						Barrier4	point230	230	14.0	40.9
						Barrier4	point225	225	14.0	40.8
STJ-10-01	54	57.2	8.0	8	-0.0	Barrier4	point232	232	12.0	43.3
						Barrier4	point233	233	12.0	42.8
						Barrier4	point234	234	12.0	42.6
						Barrier4	point231	231	14.0	42.6
						Barrier4	point230	230	14.0	42.5
						Barrier4	point227	227	14.0	42.5
						Barrier4	point228	228	14.0	42.4
						Barrier4	point229	229	14.0	42.2
						Barrier4	point225	225	14.0	42.1
						Barrier4	point226	226	14.0	42.0
STJ-11-01-F	55	57.5	8.5	8	0.5	Barrier4	point227	227	14.0	44.8
						Barrier4	point228	228	14.0	44.4
						Barrier4	point226	226	14.0	44.4
						Barrier4	point225	225	14.0	44.2
						Barrier4	point229	229	14.0	44.1

						Barrier4	point230	230	14.0	43.8
						Barrier4	point224	224	14.0	43.8
						Barrier4	point232	232	12.0	43.4
						Barrier4	point223	223	14.0	43.1
						Barrier4	point231	231	14.0	43.1
STJ-12-01	56	54.0	4.2	8	-3.8	Barrier4	point234	234	12.0	37.4
						Barrier4	point188	188	0.0	36.8
						Barrier4	point233	233	12.0	36.3
						Barrier4	point256	256	12.0	35.9
						Barrier4	point235	235	12.0	35.8
						Barrier4	point232	232	12.0	35.7
						Barrier4	point239	239	12.0	35.7
						Barrier4	point236	236	12.0	35.7
						Barrier4	point237	237	12.0	35.6
						Barrier4	point238	238	12.0	35.6
STJ-13-01	57	54.3	4.6	8	-3.4	Barrier4	point234	234	12.0	38.5
						Barrier4	point235	235	12.0	37.8
						Barrier4	point189	189	0.0	37.3
						Barrier4	point233	233	12.0	37.2
						Barrier4	point232	232	12.0	36.6
						Barrier4	point239	239	12.0	36.6
						Barrier4	point236	236	12.0	36.6
						Barrier4	point237	237	12.0	36.5
						Barrier4	point240	240	12.0	36.3
						Barrier4	point238	238	12.0	36.1
STJ-14-01	58	54.6	5.1	8	-2.9	Barrier4	point234	234	12.0	38.7
						Barrier4	point235	235	12.0	38.1
						Barrier4	point233	233	12.0	38.0
						Barrier4	point239	239	12.0	37.3
						Barrier4	point232	232	12.0	37.3
						Barrier4	point236	236	12.0	37.2
						Barrier4	point237	237	12.0	37.2
						Barrier4	point240	240	12.0	37.1
						Barrier4	point191	191	14.0	37.0
						Barrier4	point238	238	12.0	37.0
STJ-15-01	59	54.9	5.5	8	-2.5	Barrier4	point234	234	12.0	38.5

						Barrier4	point233	233	12.0	38.2
						Barrier4	point239	239	12.0	38.1
						Barrier4	point235	235	12.0	38.1
						Barrier4	point236	236	12.0	38.0
						Barrier4	point237	237	12.0	37.9
						Barrier4	point232	232	12.0	37.7
						Barrier4	point238	238	12.0	37.7
						Barrier4	point240	240	12.0	37.7
						Barrier4	point241	241	12.0	37.3
STJ-16-01	60	55.3	5.9	8	-2.1	Barrier4	point235	235	12.0	39.0
						Barrier4	point239	239	12.0	39.0
						Barrier4	point234	234	12.0	38.9
						Barrier4	point236	236	12.0	38.9
						Barrier4	point237	237	12.0	38.8
						Barrier4	point238	238	12.0	38.5
						Barrier4	point233	233	12.0	38.4
						Barrier4	point240	240	12.0	38.4
						Barrier4	point232	232	12.0	38.1
						Barrier4	point241	241	12.0	38.0
STJ-17-01	61	55.8	6.3	8	-1.7	Barrier4	point235	235	12.0	40.0
						Barrier4	point239	239	12.0	39.9
						Barrier4	point234	234	12.0	39.9
						Barrier4	point236	236	12.0	39.8
						Barrier4	point237	237	12.0	39.7
						Barrier4	point238	238	12.0	39.6
						Barrier4	point233	233	12.0	39.3
						Barrier4	point232	232	12.0	39.0
						Barrier4	point240	240	12.0	39.0
						Barrier4	point241	241	12.0	38.8
STJ-18-01	62	56.1	6.9	8	-1.1	Barrier4	point235	235	12.0	40.7
						Barrier4	point239	239	12.0	40.7
						Barrier4	point236	236	12.0	40.7
						Barrier4	point237	237	12.0	40.5
						Barrier4	point234	234	12.0	40.5
						Barrier4	point238	238	12.0	40.4
						Barrier4	point233	233	12.0	40.0

						Barrier4	point240	240	12.0	39.9
						Barrier4	point232	232	12.0	39.8
						Barrier4	point241	241	12.0	39.7
STJ-19-01	63	56.6	7.2	8	-0.8	Barrier4	point235	235	12.0	41.8
						Barrier4	point236	236	12.0	41.7
						Barrier4	point234	234	12.0	41.6
						Barrier4	point238	238	12.0	41.4
						Barrier4	point237	237	12.0	41.4
						Barrier4	point239	239	12.0	41.3
						Barrier4	point233	233	12.0	41.0
						Barrier4	point232	232	12.0	40.7
						Barrier4	point240	240	12.0	40.5
						Barrier4	point241	241	12.0	40.2
STJ-20-01	64	57.1	7.7	8	-0.3	Barrier4	point235	235	12.0	43.0
						Barrier4	point236	236	12.0	43.0
						Barrier4	point234	234	12.0	42.8
						Barrier4	point238	238	12.0	42.6
						Barrier4	point237	237	12.0	42.5
						Barrier4	point233	233	12.0	42.2
						Barrier4	point239	239	12.0	42.0
						Barrier4	point232	232	12.0	41.9
						Barrier4	point240	240	12.0	41.2
						Barrier4	point241	241	12.0	40.9
STJ-21-01-F	65	57.4	7.9	8	-0.1	Barrier4	point235	235	12.0	44.8
						Barrier4	point236	236	12.0	44.5
						Barrier4	point234	234	12.0	44.4
						Barrier4	point237	237	12.0	44.2
						Barrier4	point238	238	12.0	43.8
						Barrier4	point233	233	12.0	43.6
						Barrier4	point232	232	12.0	43.1
						Barrier4	point239	239	12.0	43.1
						Barrier4	point240	240	12.0	42.2
						Barrier4	point241	241	12.0	41.6
VANB-16-01-F	74	58.7	0.3	8	-7.7	Barrier4	point166	166	0.0	45.6
						Barrier4	point167	167	0.0	45.4
						Barrier4	point165	165	0.0	45.2

						Barrier4	point164	164	0.0	45.1
						Barrier4	point168	168	0.0	45.0
						Barrier4	point163	163	0.0	44.9
						Barrier4	point169	169	0.0	44.3
						Barrier4	point162	162	0.0	44.3
						Barrier4	point161	161	0.0	44.2
						Barrier4	point170	170	0.0	44.0
VANB-17-01-F	75	59.6	0.4	8	-7.6	Barrier4	point168	168	0.0	46.8
						Barrier4	point169	169	0.0	46.6
						Barrier4	point167	167	0.0	46.6
						Barrier4	point166	166	0.0	46.4
						Barrier4	point170	170	0.0	46.2
						Barrier4	point171	171	0.0	46.1
						Barrier4	point172	172	0.0	45.8
						Barrier4	point165	165	0.0	45.7
						Barrier4	point173	173	0.0	45.4
						Barrier4	point174	174	0.0	45.1
VANB-18-01-F	76	61.3	0.5	8	-7.5	Barrier4	point175	175	0.0	48.4
						Barrier4	point176	176	0.0	48.4
						Barrier4	point177	177	0.0	48.3
						Barrier4	point174	174	0.0	48.2
						Barrier4	point173	173	0.0	48.1
						Barrier4	point178	178	0.0	48.1
						Barrier4	point172	172	0.0	47.8
						Barrier4	point179	179	0.0	47.6
						Barrier4	point171	171	0.0	47.5
						Barrier4	point180	180	0.0	47.3
VANB-19-01-F	77	62.1	0.6	8	-7.4	Barrier4	point179	179	0.0	50.1
						Barrier4	point178	178	0.0	50.1
						Barrier4	point180	180	0.0	49.9
						Barrier4	point177	177	0.0	49.8
						Barrier4	point181	181	0.0	49.6
						Barrier4	point176	176	0.0	49.4
						Barrier4	point182	182	0.0	49.3
						Barrier4	point175	175	0.0	48.9
						Barrier4	point183	183	0.0	48.7

						Barrier4	point184	184	0.0	48.7
VANB-20-01-F	78	59.1	2.9	8	-5.1	Barrier4	point190	190	0.0	46.7
						Barrier4	point189	189	0.0	46.5
						Barrier4	point188	188	0.0	46.1
						Barrier4	point187	187	0.0	45.9
						Barrier4	point186	186	0.0	45.6
						Barrier4	point185	185	0.0	45.1
						Barrier4	point184	184	0.0	44.9
						Barrier4	point183	183	0.0	44.5
						Barrier4	point191	191	14.0	44.2
						Barrier4	point193	193	14.0	44.2
VANB-21-01-F	79	58.8	3.4	8	-4.6	Barrier4	point190	190	0.0	46.0
						Barrier4	point189	189	0.0	45.7
						Barrier4	point188	188	0.0	45.5
						Barrier4	point187	187	0.0	45.2
						Barrier4	point186	186	0.0	44.7
						Barrier4	point185	185	0.0	44.4
						Barrier4	point193	193	14.0	44.1
						Barrier4	point191	191	14.0	44.0
						Barrier4	point192	192	14.0	43.9
						Barrier4	point184	184	0.0	43.9
VANB-22-01-F	80	58.8	4.1	8	-3.9	Barrier4	point190	190	0.0	46.2
						Barrier4	point189	189	0.0	45.9
						Barrier4	point188	188	0.0	45.7
						Barrier4	point187	187	0.0	45.2
						Barrier4	point186	186	0.0	44.7
						Barrier4	point192	192	14.0	44.4
						Barrier4	point191	191	14.0	44.3
						Barrier4	point193	193	14.0	44.1
						Barrier4	point185	185	0.0	44.1
						Barrier4	point195	195	14.0	43.8
VANB-23-01-F	81	58.6	4.7	8	-3.3	Barrier4	point190	190	0.0	45.9
						Barrier4	point189	189	0.0	45.8
						Barrier4	point188	188	0.0	45.0
						Barrier4	point187	187	0.0	44.7
						Barrier4	point192	192	14.0	44.3

						Barrier4	point186	186	0.0	44.2
						Barrier4	point193	193	14.0	44.0
						Barrier4	point191	191	14.0	44.0
						Barrier4	point184	184	0.0	43.8
						Barrier4	point194	194	14.0	43.8
VANB-24-01-F	82	58.5	5.3	8	-2.7	Barrier4	point190	190	0.0	45.5
						Barrier4	point189	189	0.0	44.9
						Barrier4	point188	188	0.0	44.4
						Barrier4	point186	186	0.0	44.4
						Barrier4	point187	187	0.0	44.1
						Barrier4	point191	191	14.0	43.9
						Barrier4	point193	193	14.0	43.9
						Barrier4	point192	192	14.0	43.8
						Barrier4	point194	194	14.0	43.6
						Barrier4	point183	183	0.0	43.6
VANB-25-01-F	83	58.1	5.7	8	-2.3	Barrier4	point190	190	0.0	44.3
						Barrier4	point188	188	0.0	44.0
						Barrier4	point189	189	0.0	43.9
						Barrier4	point187	187	0.0	43.6
						Barrier4	point193	193	14.0	43.4
						Barrier4	point191	191	14.0	43.3
						Barrier4	point192	192	14.0	43.2
						Barrier4	point185	185	0.0	43.1
						Barrier4	point194	194	14.0	42.9
						Barrier4	point195	195	14.0	42.9
VANB-26-01-F	84	58.2	7.0	8	-1.0	Barrier4	point189	189	0.0	44.6
						Barrier4	point192	192	14.0	43.8
						Barrier4	point193	193	14.0	43.7
						Barrier4	point190	190	0.0	43.6
						Barrier4	point205	205	14.0	43.4
						Barrier4	point204	204	14.0	43.3
						Barrier4	point206	206	14.0	43.3
						Barrier4	point203	203	14.0	43.3
						Barrier4	point194	194	14.0	43.0
						Barrier4	point207	207	14.0	42.9
VANB-28-01	86	57.8	0.4	8	-7.6	Barrier4	point161	161	0.0	43.0

						Barrier4	point162	162	0.0	43.0
						Barrier4	point163	163	0.0	42.8
						Barrier4	point168	168	0.0	42.6
						Barrier4	point169	169	0.0	42.6
						Barrier4	point167	167	0.0	42.4
						Barrier4	point166	166	0.0	42.3
						Barrier4	point165	165	0.0	42.3
						Barrier4	point170	170	0.0	42.3
						Barrier4	point171	171	0.0	42.2
VANB-29-01	87	57.9	0.7	8	-7.3	Barrier4	point164	164	0.0	42.9
						Barrier4	point171	171	0.0	42.7
						Barrier4	point165	165	0.0	42.6
						Barrier4	point170	170	0.0	42.6
						Barrier4	point175	175	0.0	42.6
						Barrier4	point172	172	0.0	42.6
						Barrier4	point169	169	0.0	42.6
						Barrier4	point173	173	0.0	42.5
						Barrier4	point176	176	0.0	42.5
						Barrier4	point178	178	0.0	42.5
VANB-30-01	88	58.1	0.9	8	-7.1	Barrier4	point179	179	0.0	43.1
						Barrier4	point178	178	0.0	43.1
						Barrier4	point180	180	0.0	43.1
						Barrier4	point177	177	0.0	42.9
						Barrier4	point175	175	0.0	42.9
						Barrier4	point182	182	0.0	42.9
						Barrier4	point181	181	0.0	42.9
						Barrier4	point183	183	0.0	42.8
						Barrier4	point173	173	0.0	42.7
						Barrier4	point184	184	0.0	42.7
VANB-31-01	89	57.6	2.1	8	-5.9	Barrier4	point190	190	0.0	43.0
						Barrier4	point189	189	0.0	42.8
						Barrier4	point188	188	0.0	42.8
						Barrier4	point187	187	0.0	42.6
						Barrier4	point186	186	0.0	42.5
						Barrier4	point183	183	0.0	42.3
						Barrier4	point184	184	0.0	42.2

						Barrier4	point185	185	0.0	42.2
						Barrier4	point182	182	0.0	42.0
						Barrier4	point181	181	0.0	41.7
VANB-32-01	90	57.5	2.7	8	-5.3	Barrier4	point190	190	0.0	43.4
						Barrier4	point189	189	0.0	43.2
						Barrier4	point188	188	0.0	43.0
						Barrier4	point187	187	0.0	42.9
						Barrier4	point186	186	0.0	42.7
						Barrier4	point185	185	0.0	42.2
						Barrier4	point184	184	0.0	42.2
						Barrier4	point183	183	0.0	42.1
						Barrier4	point182	182	0.0	41.8
						Barrier4	point191	191	14.0	41.8
VANB-33-01	91	57.4	3.4	8	-4.6	Barrier4	point190	190	0.0	43.1
						Barrier4	point189	189	0.0	42.8
						Barrier4	point188	188	0.0	42.8
						Barrier4	point187	187	0.0	42.7
						Barrier4	point186	186	0.0	42.2
						Barrier4	point191	191	14.0	42.1
						Barrier4	point185	185	0.0	41.8
						Barrier4	point176	176	0.0	41.7
						Barrier4	point195	195	14.0	41.7
						Barrier4	point196	196	14.0	41.7
VANB-34-01	92	57.4	3.8	8	-4.2	Barrier4	point188	188	0.0	42.7
						Barrier4	point190	190	0.0	42.7
						Barrier4	point189	189	0.0	42.7
						Barrier4	point187	187	0.0	42.3
						Barrier4	point186	186	0.0	41.9
						Barrier4	point192	192	14.0	41.8
						Barrier4	point191	191	14.0	41.8
						Barrier4	point196	196	14.0	41.8
						Barrier4	point195	195	14.0	41.7
						Barrier4	point193	193	14.0	41.6
VANB-35-01	93	57.4	5.2	8	-2.8	Barrier4	point186	186	0.0	42.7
						Barrier4	point187	187	0.0	42.2
						Barrier4	point183	183	0.0	42.2

						Barrier4	point190	190	0.0	42.0
						Barrier4	point191	191	14.0	41.9
						Barrier4	point189	189	0.0	41.8
						Barrier4	point188	188	0.0	41.7
						Barrier4	point192	192	14.0	41.6
						Barrier4	point193	193	14.0	41.6
						Barrier4	point196	196	14.0	41.5
VIL-01-01-F	96	57.8	8.3	8	0.3	Barrier4	point257	257	12.0	44.4
						Barrier4	point256	256	12.0	44.1
						Barrier4	point254	254	12.0	43.7
						Barrier4	point253	253	12.0	43.4
						Barrier4	point158	158	12.0	43.4
						Barrier4	point252	252	12.0	42.9
						Barrier4	point258	258	12.0	42.8
						Barrier4	point251	251	12.0	42.5
						Barrier4	point255	255	12.0	42.4
						Barrier4	point259	259	12.0	42.4
VIL-02-01	97	57.0	7.5	8	-0.5	Barrier4	point257	257	12.0	42.7
						Barrier4	point158	158	12.0	41.8
						Barrier4	point256	256	12.0	41.8
						Barrier4	point260	260	12.0	41.5
						Barrier4	point259	259	12.0	41.5
						Barrier4	point258	258	12.0	41.5
						Barrier4	point254	254	12.0	41.5
						Barrier4	point261	261	12.0	41.2
						Barrier4	point253	253	12.0	41.1
						Barrier4	point252	252	12.0	40.7
VIL-03-01	111	56.3	6.9	8	-1.1	Barrier4	point257	257	12.0	41.4
						Barrier4	point260	260	12.0	40.7
						Barrier4	point158	158	12.0	40.6
						Barrier4	point261	261	12.0	40.6
						Barrier4	point259	259	12.0	40.6
						Barrier4	point258	258	12.0	40.3
						Barrier4	point262	262	12.0	40.1
						Barrier4	point254	254	12.0	39.9
						Barrier4	point256	256	12.0	39.7

						Barrier4	point255	255	12.0	39.7
VIL-04-01	112	55.9	6.2	8	-1.8	Barrier4	point257	257	12.0	40.3
						Barrier4	point260	260	12.0	39.9
						Barrier4	point261	261	12.0	39.8
						Barrier4	point158	158	12.0	39.7
						Barrier4	point259	259	12.0	39.7
						Barrier4	point258	258	12.0	39.3
						Barrier4	point262	262	12.0	39.3
						Barrier4	point263	263	12.0	39.0
						Barrier4	point264	264	12.0	39.0
						Barrier4	point254	254	12.0	38.9
VIL-05-01	113	55.0	5.6	8	-2.4	Barrier4	point257	257	12.0	38.7
						Barrier4	point260	260	12.0	38.5
						Barrier4	point261	261	12.0	38.5
						Barrier4	point259	259	12.0	38.2
						Barrier4	point158	158	12.0	38.1
						Barrier4	point262	262	12.0	38.0
						Barrier4	point258	258	12.0	37.8
						Barrier4	point263	263	12.0	37.7
						Barrier4	point264	264	12.0	37.6
						Barrier4	point254	254	12.0	37.3
VIL-06-01-F	114	58.2	8.4	8	0.4	Barrier4	point261	261	12.0	45.4
						Barrier4	point260	260	12.0	45.3
						Barrier4	point262	262	12.0	44.9
						Barrier4	point259	259	12.0	44.7
						Barrier4	point263	263	12.0	44.5
						Barrier4	point264	264	12.0	44.3
						Barrier4	point158	158	12.0	44.1
						Barrier4	point258	258	12.0	44.0
						Barrier4	point265	265	12.0	43.4
						Barrier4	point257	257	12.0	43.2
VIL-07-01	115	57.6	8.1	8	0.1	Barrier4	point261	261	12.0	43.5
						Barrier4	point262	262	12.0	43.4
						Barrier4	point260	260	12.0	43.2
						Barrier4	point263	263	12.0	43.2
						Barrier4	point264	264	12.0	43.0

						Barrier4	point265	265	12.0	42.6
						Barrier4	point259	259	12.0	42.6
						Barrier4	point266	266	12.0	42.3
						Barrier4	point158	158	12.0	42.3
						Barrier4	point267	267	12.0	42.2
VIL-08-01	116	57.0	7.6	8	-0.4	Barrier4	point261	261	12.0	42.4
						Barrier4	point262	262	12.0	42.2
						Barrier4	point260	260	12.0	42.1
						Barrier4	point263	263	12.0	41.9
						Barrier4	point264	264	12.0	41.9
						Barrier4	point265	265	12.0	41.5
						Barrier4	point259	259	12.0	41.5
						Barrier4	point266	266	12.0	41.3
						Barrier4	point268	268	12.0	41.2
						Barrier4	point267	267	12.0	41.2
VIL-09-01	117	56.0	6.2	8	-1.8	Barrier4	point261	261	12.0	40.0
						Barrier4	point264	264	12.0	39.8
						Barrier4	point262	262	12.0	39.8
						Barrier4	point260	260	12.0	39.7
						Barrier4	point268	268	12.0	39.7
						Barrier4	point263	263	12.0	39.7
						Barrier4	point269	269	12.0	39.5
						Barrier4	point265	265	12.0	39.5
						Barrier4	point267	267	12.0	39.5
						Barrier4	point266	266	12.0	39.4
DEB-06-01	118	55.9	6.1	8	-1.9	Barrier4	point273	273	12.0	40.0
						Barrier4	point268	268	12.0	39.8
						Barrier4	point274	274	12.0	39.7
						Barrier4	point271	271	12.0	39.7
						Barrier4	point275	275	12.0	39.6
						Barrier4	point272	272	12.0	39.5
						Barrier4	point270	270	12.0	39.5
						Barrier4	point269	269	12.0	39.3
						Barrier4	point267	267	12.0	39.3
						Barrier4	point264	264	12.0	39.2
DEB-05-01	119	56.4	6.5	8	-1.5	Barrier4	point273	273	12.0	40.7

						Barrier4	point268	268	12.0	40.5
						Barrier4	point269	269	12.0	40.5
						Barrier4	point271	271	12.0	40.4
						Barrier4	point272	272	12.0	40.4
						Barrier4	point274	274	12.0	40.3
						Barrier4	point270	270	12.0	40.2
						Barrier4	point275	275	12.0	40.2
						Barrier4	point267	267	12.0	40.1
						Barrier4	point264	264	12.0	40.0
DEB-04-01	120	56.9	7.2	8	-0.8	Barrier4	point268	268	12.0	41.6
						Barrier4	point269	269	12.0	41.5
						Barrier4	point273	273	12.0	41.5
						Barrier4	point271	271	12.0	41.4
						Barrier4	point272	272	12.0	41.4
						Barrier4	point267	267	12.0	41.2
						Barrier4	point270	270	12.0	41.2
						Barrier4	point274	274	12.0	41.2
						Barrier4	point264	264	12.0	41.0
						Barrier4	point266	266	12.0	41.0
DEB-03-01	121	57.2	7.8	8	-0.2	Barrier4	point268	268	12.0	42.4
						Barrier4	point269	269	12.0	42.4
						Barrier4	point267	267	12.0	42.2
						Barrier4	point271	271	12.0	42.2
						Barrier4	point270	270	12.0	42.0
						Barrier4	point266	266	12.0	42.0
						Barrier4	point273	273	12.0	42.0
						Barrier4	point272	272	12.0	42.0
						Barrier4	point264	264	12.0	41.9
						Barrier4	point265	265	12.0	41.9
DEB-02-01	122	57.8	8.5	8	0.5	Barrier4	point268	268	12.0	43.7
						Barrier4	point267	267	12.0	43.5
						Barrier4	point269	269	12.0	43.5
						Barrier4	point266	266	12.0	43.4
						Barrier4	point265	265	12.0	43.2
						Barrier4	point264	264	12.0	43.1
						Barrier4	point270	270	12.0	43.0

						Barrier4	point271	271	12.0	43.0
						Barrier4	point263	263	12.0	42.8
						Barrier4	point272	272	12.0	42.7
DEB-01-01-F	123	58.3	8.4	8	0.4	Barrier4	point268	268	12.0	45.3
						Barrier4	point267	267	12.0	45.2
						Barrier4	point269	269	12.0	45.0
						Barrier4	point266	266	12.0	45.0
						Barrier4	point265	265	12.0	44.6
						Barrier4	point264	264	12.0	44.5
						Barrier4	point270	270	12.0	44.4
						Barrier4	point271	271	12.0	43.9
						Barrier4	point263	263	12.0	43.8
						Barrier4	point272	272	12.0	43.4
DEB-07-01-F	124	58.2	8.8	8	0.8	Barrier4	point273	273	12.0	44.9
						Barrier4	point274	274	12.0	44.7
						Barrier4	point275	275	12.0	44.7
						Barrier4	point272	272	12.0	44.5
						Barrier4	point271	271	12.0	44.2
						Barrier4	point276	276	12.0	44.2
						Barrier4	point270	270	12.0	43.7
						Barrier4	point277	277	12.0	43.6
						Barrier4	point269	269	12.0	43.4
						Barrier4	point278	278	12.0	43.2
DEB-08-01	125	57.5	7.6	8	-0.4	Barrier4	point275	275	12.0	42.9
						Barrier4	point273	273	12.0	42.9
						Barrier4	point274	274	12.0	42.8
						Barrier4	point276	276	12.0	42.6
						Barrier4	point272	272	12.0	42.5
						Barrier4	point271	271	12.0	42.3
						Barrier4	point277	277	12.0	42.2
						Barrier4	point278	278	12.0	42.1
						Barrier4	point270	270	12.0	41.8
						Barrier4	point279	279	12.0	41.7
DEB-09-01	126	56.8	6.9	8	-1.1	Barrier4	point275	275	12.0	41.7
						Barrier4	point273	273	12.0	41.6
						Barrier4	point274	274	12.0	41.6

						Barrier4	point276	276	12.0	41.4
						Barrier4	point272	272	12.0	41.2
						Barrier4	point277	277	12.0	41.1
						Barrier4	point278	278	12.0	41.1
						Barrier4	point271	271	12.0	40.9
						Barrier4	point279	279	12.0	40.8
						Barrier4	point280	280	12.0	40.5
DEB-10-01	127	56.1	6.2	8	-1.8	Barrier4	point275	275	12.0	40.6
						Barrier4	point273	273	12.0	40.5
						Barrier4	point274	274	12.0	40.4
						Barrier4	point276	276	12.0	40.3
						Barrier4	point272	272	12.0	40.1
						Barrier4	point278	278	12.0	40.0
						Barrier4	point277	277	12.0	40.0
						Barrier4	point271	271	12.0	39.8
						Barrier4	point279	279	12.0	39.8
						Barrier4	point269	269	12.0	39.4
ARLE-04-01	128	56.3	6.2	8	-1.8	Barrier4	point278	278	12.0	40.4
						Barrier4	point279	279	12.0	40.3
						Barrier4	point275	275	12.0	40.3
						Barrier4	point281	281	12.0	40.3
						Barrier4	point276	276	12.0	40.2
						Barrier4	point280	280	12.0	40.2
						Barrier4	point277	277	12.0	40.2
						Barrier4	point284	284	12.0	40.1
						Barrier4	point282	282	12.0	40.1
						Barrier4	point283	283	12.0	40.1
ARLE-03-01	129	57.2	6.3	8	-1.7	Barrier4	point275	275	12.0	41.3
						Barrier4	point278	278	12.0	41.3
						Barrier4	point279	279	12.0	41.2
						Barrier4	point276	276	12.0	41.2
						Barrier4	point277	277	12.0	41.1
						Barrier4	point280	280	12.0	41.0
						Barrier4	point274	274	12.0	41.0
						Barrier4	point281	281	12.0	40.9
						Barrier4	point273	273	12.0	40.9

						Barrier4	point282	282	12.0	40.8
ARLE-02-01	130	57.3	7.3	8	-0.7	Barrier4	point278	278	12.0	42.2
						Barrier4	point275	275	12.0	42.1
						Barrier4	point279	279	12.0	42.1
						Barrier4	point276	276	12.0	42.1
						Barrier4	point277	277	12.0	42.0
						Barrier4	point280	280	12.0	42.0
						Barrier4	point281	281	12.0	41.8
						Barrier4	point274	274	12.0	41.8
						Barrier4	point282	282	12.0	41.6
						Barrier4	point273	273	12.0	41.6
ARLE-01-01-F	131	57.9	8.1	8	0.1	Barrier4	point278	278	12.0	43.5
						Barrier4	point279	279	12.0	43.4
						Barrier4	point275	275	12.0	43.3
						Barrier4	point277	277	12.0	43.3
						Barrier4	point276	276	12.0	43.3
						Barrier4	point280	280	12.0	43.2
						Barrier4	point281	281	12.0	43.0
						Barrier4	point274	274	12.0	42.9
						Barrier4	point282	282	12.0	42.8
						Barrier4	point273	273	12.0	42.6
ARLE-08-01	132	56.7	6.4	8	-1.6	Barrier4	point284	284	12.0	41.1
						Barrier4	point288	288	12.0	40.9
						Barrier4	point287	287	12.0	40.9
						Barrier4	point285	285	12.0	40.9
						Barrier4	point286	286	12.0	40.7
						Barrier4	point289	289	12.0	40.7
						Barrier4	point283	283	12.0	40.7
						Barrier4	point282	282	12.0	40.6
						Barrier4	point281	281	12.0	40.5
						Barrier4	point290	290	12.0	40.2
ARLE-07-01	133	57.5	7.3	8	-0.7	Barrier4	point284	284	12.0	42.5
						Barrier4	point285	285	12.0	42.3
						Barrier4	point287	287	12.0	42.3
						Barrier4	point288	288	12.0	42.2
						Barrier4	point286	286	12.0	42.2

						Barrier4	point283	283	12.0	42.1
						Barrier4	point289	289	12.0	41.9
						Barrier4	point282	282	12.0	41.9
						Barrier4	point281	281	12.0	41.7
						Barrier4	point280	280	12.0	41.4
ARLE-06-01	134	58.5	7.4	8	-0.6	Barrier4	point284	284	12.0	43.5
						Barrier4	point285	285	12.0	43.4
						Barrier4	point286	286	12.0	43.3
						Barrier4	point287	287	12.0	43.2
						Barrier4	point288	288	12.0	43.1
						Barrier4	point283	283	12.0	43.0
						Barrier4	point282	282	12.0	42.9
						Barrier4	point289	289	12.0	42.9
						Barrier4	point281	281	12.0	42.7
						Barrier4	point290	290	12.0	42.3
ARLE-05-01	135	58.4	8.5	8	0.5	Barrier4	point284	284	12.0	45.6
						Barrier4	point285	285	12.0	45.5
						Barrier4	point286	286	12.0	45.3
						Barrier4	point287	287	12.0	45.1
						Barrier4	point283	283	12.0	45.1
						Barrier4	point288	288	12.0	44.8
						Barrier4	point282	282	12.0	44.7
						Barrier4	point281	281	12.0	44.1
						Barrier4	point289	289	12.0	44.0
						Barrier4	point280	280	12.0	43.2
CON-04-01	136	57.1	6.3	8	-1.7	Barrier4	point289	289	12.0	41.4
						Barrier4	point311	311	0.0	41.4
						Barrier4	point288	288	12.0	41.3
						Barrier4	point287	287	12.0	41.1
						Barrier4	point290	290	12.0	41.0
						Barrier4	point293	293	12.0	41.0
						Barrier4	point292	292	12.0	41.0
						Barrier4	point294	294	12.0	40.8
						Barrier4	point312	312	0.0	40.8
						Barrier4	point284	284	12.0	40.8
CON-03-01	137	57.6	7.2	8	-0.8	Barrier4	point289	289	12.0	42.5

						Barrier4	point288	288	12.0	42.4
						Barrier4	point290	290	12.0	42.2
						Barrier4	point293	293	12.0	42.1
						Barrier4	point287	287	12.0	42.1
						Barrier4	point292	292	12.0	42.0
						Barrier4	point291	291	12.0	42.0
						Barrier4	point294	294	12.0	41.8
						Barrier4	point284	284	12.0	41.6
						Barrier4	point286	286	12.0	41.6
CON-02-01	138	57.9	7.8	8	-0.2	Barrier4	point289	289	12.0	43.2
						Barrier4	point288	288	12.0	43.1
						Barrier4	point290	290	12.0	43.0
						Barrier4	point292	292	12.0	42.8
						Barrier4	point287	287	12.0	42.7
						Barrier4	point291	291	12.0	42.7
						Barrier4	point293	293	12.0	42.7
						Barrier4	point294	294	12.0	42.5
						Barrier4	point286	286	12.0	42.3
						Barrier4	point295	295	12.0	42.1
CON-01-01-F	139	58.6	8.0	8	0.0	Barrier4	point289	289	12.0	45.1
						Barrier4	point288	288	12.0	45.0
						Barrier4	point290	290	12.0	44.9
						Barrier4	point287	287	12.0	44.6
						Barrier4	point291	291	12.0	44.5
						Barrier4	point292	292	12.0	44.4
						Barrier4	point286	286	12.0	44.1
						Barrier4	point293	293	12.0	44.0
						Barrier4	point285	285	12.0	43.5
						Barrier4	point294	294	12.0	43.4
CON-07-01	140	57.8	6.1	8	-1.9	Barrier4	point311	311	0.0	44.1
						Barrier4	point312	312	0.0	43.7
						Barrier4	point299	299	12.0	41.9
						Barrier4	point310	310	10.0	41.8
						Barrier4	point295	295	12.0	41.7
						Barrier4	point294	294	12.0	41.7
						Barrier4	point298	298	12.0	41.7

						Barrier4	point296	296	12.0	41.6
						Barrier4	point300	300	12.0	41.5
						Barrier4	point293	293	12.0	41.5
CON-06-01	141	58.6	7.9	8	-0.1	Barrier4	point311	311	0.0	45.1
						Barrier4	point312	312	0.0	43.8
						Barrier4	point295	295	12.0	43.5
						Barrier4	point299	299	12.0	43.5
						Barrier4	point296	296	12.0	43.5
						Barrier4	point294	294	12.0	43.5
						Barrier4	point298	298	12.0	43.4
						Barrier4	point297	297	12.0	43.3
						Barrier4	point293	293	12.0	43.2
						Barrier4	point300	300	12.0	43.1
CON-05-01-F	142	59.1	8.3	8	0.3	Barrier4	point296	296	12.0	46.4
						Barrier4	point295	295	12.0	46.3
						Barrier4	point297	297	12.0	46.1
						Barrier4	point298	298	12.0	45.8
						Barrier4	point294	294	12.0	45.8
						Barrier4	point299	299	12.0	45.3
						Barrier4	point312	312	0.0	44.9
						Barrier4	point293	293	12.0	44.8
						Barrier4	point300	300	12.0	44.6
						Barrier4	point311	311	0.0	44.5
RHE-23-01	143	57.5	3.7	8	-4.3	Barrier4	point311	311	0.0	45.5
						Barrier4	point312	312	0.0	44.9
						Barrier4	point310	310	10.0	42.9
						Barrier4	point309	309	12.0	41.3
						Barrier4	point307	307	12.0	40.8
						Barrier4	point306	306	12.0	40.6
						Barrier4	point308	308	12.0	40.4
						Barrier4	point299	299	12.0	40.4
						Barrier4	point300	300	12.0	40.1
						Barrier4	point303	303	12.0	39.4
RHE-22-01	144	56.2	4.1	8	-3.9	Barrier4	point311	311	0.0	42.8
						Barrier4	point312	312	0.0	42.5
						Barrier4	point310	310	10.0	40.6

						Barrier4	point300	300	12.0	40.0
						Barrier4	point299	299	12.0	39.8
						Barrier4	point307	307	12.0	39.3
						Barrier4	point309	309	12.0	39.2
						Barrier4	point306	306	12.0	38.9
						Barrier4	point297	297	12.0	38.3
						Barrier4	point308	308	12.0	38.3
RHE-21-01	145	56.3	4.9	8	-3.1	Barrier4	point311	311	0.0	41.5
						Barrier4	point312	312	0.0	41.0
						Barrier4	point299	299	12.0	40.8
						Barrier4	point300	300	12.0	39.5
						Barrier4	point294	294	12.0	39.4
						Barrier4	point293	293	12.0	39.4
						Barrier4	point295	295	12.0	39.3
						Barrier4	point285	285	12.0	39.2
						Barrier4	point296	296	12.0	39.2
						Barrier4	point292	292	12.0	39.2
RHE-20-01	146	54.2	3.9	8	-4.1	Barrier4	point289	289	12.0	38.1
						Barrier4	point288	288	12.0	38.0
						Barrier4	point311	311	0.0	37.9
						Barrier4	point287	287	12.0	37.7
						Barrier4	point312	312	0.0	37.5
						Barrier4	point299	299	12.0	37.2
						Barrier4	point284	284	12.0	37.1
						Barrier4	point293	293	12.0	36.9
						Barrier4	point279	279	12.0	36.9
						Barrier4	point278	278	12.0	36.8
RHE-19-01	147	54.0	4.1	8	-3.9	Barrier4	point288	288	12.0	38.0
						Barrier4	point289	289	12.0	37.8
						Barrier4	point278	278	12.0	37.4
						Barrier4	point284	284	12.0	37.4
						Barrier4	point275	275	12.0	37.0
						Barrier4	point274	274	12.0	36.7
						Barrier4	point311	311	0.0	36.7
						Barrier4	point273	273	12.0	36.6
						Barrier4	point279	279	12.0	36.5

						Barrier4	point299	299	12.0	36.4
RHE-18-01	148	54.8	4.6	8	-3.4	Barrier4	point275	275	12.0	39.2
						Barrier4	point273	273	12.0	38.9
						Barrier4	point274	274	12.0	38.9
						Barrier4	point276	276	12.0	38.7
						Barrier4	point284	284	12.0	38.6
						Barrier4	point288	288	12.0	38.5
						Barrier4	point278	278	12.0	38.4
						Barrier4	point289	289	12.0	38.2
						Barrier4	point272	272	12.0	38.2
						Barrier4	point277	277	12.0	38.1
RHE-17-01	149	54.4	4.5	8	-3.5	Barrier4	point275	275	12.0	38.9
						Barrier4	point273	273	12.0	38.9
						Barrier4	point274	274	12.0	38.8
						Barrier4	point276	276	12.0	37.9
						Barrier4	point277	277	12.0	37.9
						Barrier4	point278	278	12.0	37.7
						Barrier4	point272	272	12.0	37.7
						Barrier4	point268	268	12.0	37.4
						Barrier4	point269	269	12.0	37.3
						Barrier4	point261	261	12.0	37.3
RHE-16-01	150	54.7	5.1	8	-2.9	Barrier4	point273	273	12.0	39.9
						Barrier4	point274	274	12.0	39.7
						Barrier4	point275	275	12.0	39.6
						Barrier4	point272	272	12.0	39.0
						Barrier4	point276	276	12.0	38.4
						Barrier4	point261	261	12.0	38.0
						Barrier4	point268	268	12.0	37.6
						Barrier4	point269	269	12.0	37.5
						Barrier4	point271	271	12.0	37.5
						Barrier4	point262	262	12.0	37.3
RHE-15-01	151	54.7	4.9	8	-3.1	Barrier4	point261	261	12.0	39.3
						Barrier4	point273	273	12.0	39.3
						Barrier4	point274	274	12.0	39.0
						Barrier4	point275	275	12.0	38.9
						Barrier4	point272	272	12.0	38.7

						Barrier4	point276	276	12.0	37.7
						Barrier4	point260	260	12.0	37.6
						Barrier4	point262	262	12.0	37.5
						Barrier4	point268	268	12.0	37.5
						Barrier4	point257	257	12.0	37.4
RHE-14-01	152	54.4	4.6	8	-3.4	Barrier4	point261	261	12.0	38.9
						Barrier4	point273	273	12.0	38.1
						Barrier4	point262	262	12.0	37.9
						Barrier4	point274	274	12.0	37.8
						Barrier4	point275	275	12.0	37.8
						Barrier4	point268	268	12.0	37.8
						Barrier4	point272	272	12.0	37.6
						Barrier4	point260	260	12.0	37.5
						Barrier4	point257	257	12.0	37.2
						Barrier4	point269	269	12.0	36.8
STJ-22-01	153	52.7	3.4	8	-4.6	Barrier4	point185	185	0.0	36.6
						Barrier4	point234	234	12.0	35.7
						Barrier4	point233	233	12.0	35.3
						Barrier4	point235	235	12.0	34.8
						Barrier4	point186	186	0.0	34.7
						Barrier4	point181	181	0.0	34.6
						Barrier4	point232	232	12.0	34.2
						Barrier4	point182	182	0.0	34.1
						Barrier4	point236	236	12.0	33.7
						Barrier4	point239	239	12.0	33.5
RHE-08-01	154	52.8	3.6	8	-4.4	Barrier4	point234	234	12.0	35.7
						Barrier4	point188	188	0.0	35.5
						Barrier4	point235	235	12.0	35.0
						Barrier4	point184	184	0.0	34.8
						Barrier4	point189	189	0.0	34.8
						Barrier4	point233	233	12.0	34.4
						Barrier4	point232	232	12.0	34.3
						Barrier4	point256	256	12.0	34.2
						Barrier4	point257	257	12.0	34.1
						Barrier4	point236	236	12.0	33.9
RHE-09-01	155	53.3	4.0	8	-4.0	Barrier4	point234	234	12.0	36.0

						Barrier4	point256	256	12.0	35.6
						Barrier4	point235	235	12.0	35.5
						Barrier4	point187	187	0.0	35.2
						Barrier4	point232	232	12.0	35.2
						Barrier4	point233	233	12.0	35.0
						Barrier4	point257	257	12.0	34.7
						Barrier4	point188	188	0.0	34.7
						Barrier4	point261	261	12.0	34.6
						Barrier4	point238	238	12.0	34.6
RHE-10-01	156	53.5	4.1	8	-3.9	Barrier4	point256	256	12.0	36.5
						Barrier4	point261	261	12.0	36.1
						Barrier4	point257	257	12.0	36.1
						Barrier4	point190	190	0.0	35.5
						Barrier4	point260	260	12.0	35.4
						Barrier4	point262	262	12.0	35.2
						Barrier4	point234	234	12.0	35.0
						Barrier4	point253	253	12.0	34.8
						Barrier4	point254	254	12.0	34.7
						Barrier4	point245	245	12.0	34.6
RHE-11-01	157	53.6	4.0	8	-4.0	Barrier4	point257	257	12.0	37.2
						Barrier4	point261	261	12.0	36.6
						Barrier4	point256	256	12.0	36.5
						Barrier4	point260	260	12.0	36.0
						Barrier4	point262	262	12.0	35.8
						Barrier4	point254	254	12.0	35.3
						Barrier4	point263	263	12.0	35.3
						Barrier4	point253	253	12.0	35.0
						Barrier4	point191	191	14.0	34.7
						Barrier4	point158	158	12.0	34.7
RHE-12-01	158	54.1	4.4	8	-3.6	Barrier4	point261	261	12.0	38.1
						Barrier4	point257	257	12.0	37.6
						Barrier4	point256	256	12.0	37.2
						Barrier4	point260	260	12.0	37.2
						Barrier4	point262	262	12.0	36.4
						Barrier4	point254	254	12.0	36.3
						Barrier4	point268	268	12.0	36.1

						Barrier4	point255	255	12.0	36.1
						Barrier4	point273	273	12.0	35.9
						Barrier4	point259	259	12.0	35.9
RHE-13-01	159	53.9	4.2	8	-3.8	Barrier4	point261	261	12.0	37.9
						Barrier4	point260	260	12.0	36.9
						Barrier4	point257	257	12.0	36.6
						Barrier4	point262	262	12.0	36.6
						Barrier4	point256	256	12.0	36.5
						Barrier4	point273	273	12.0	36.4
						Barrier4	point268	268	12.0	36.4
						Barrier4	point272	272	12.0	36.3
						Barrier4	point274	274	12.0	36.1
						Barrier4	point275	275	12.0	36.0
STJ-23-01	160	51.6	2.9	8	-5.1	Barrier4	point234	234	12.0	33.9
						Barrier4	point233	233	12.0	33.5
						Barrier4	point183	183	0.0	33.4
						Barrier4	point178	178	0.0	33.1
						Barrier4	point235	235	12.0	32.9
						Barrier4	point232	232	12.0	32.7
						Barrier4	point179	179	0.0	32.7
						Barrier4	point182	182	0.0	32.4
						Barrier4	point184	184	0.0	32.1
						Barrier4	point236	236	12.0	31.9
RUS-16-01	161	52.1	3.3	8	-4.7	Barrier4	point188	188	0.0	33.9
						Barrier4	point257	257	12.0	33.8
						Barrier4	point189	189	0.0	33.8
						Barrier4	point184	184	0.0	33.7
						Barrier4	point256	256	12.0	33.7
						Barrier4	point234	234	12.0	33.5
						Barrier4	point260	260	12.0	33.4
						Barrier4	point261	261	12.0	33.2
						Barrier4	point235	235	12.0	33.1
						Barrier4	point232	232	12.0	33.0
RUS-17-01	162	51.6	3.1	8	-4.9	Barrier4	point187	187	0.0	34.4
						Barrier4	point188	188	0.0	33.7
						Barrier4	point257	257	12.0	33.1

						Barrier4	point182	182	0.0	33.1
						Barrier4	point234	234	12.0	32.8
						Barrier4	point256	256	12.0	32.8
						Barrier4	point260	260	12.0	32.7
						Barrier4	point261	261	12.0	32.5
						Barrier4	point232	232	12.0	32.4
						Barrier4	point235	235	12.0	32.4
RUS-18-01	163	51.0	2.8	8	-5.2	Barrier4	point186	186	0.0	34.1
						Barrier4	point257	257	12.0	32.2
						Barrier4	point181	181	0.0	32.1
						Barrier4	point260	260	12.0	31.9
						Barrier4	point234	234	12.0	31.9
						Barrier4	point256	256	12.0	31.8
						Barrier4	point261	261	12.0	31.7
						Barrier4	point185	185	0.0	31.7
						Barrier4	point182	182	0.0	31.6
						Barrier4	point232	232	12.0	31.5
RUS-19-01	164	51.0	2.8	8	-5.2	Barrier4	point257	257	12.0	32.5
						Barrier4	point260	260	12.0	32.4
						Barrier4	point261	261	12.0	32.3
						Barrier4	point189	189	0.0	32.0
						Barrier4	point262	262	12.0	31.8
						Barrier4	point264	264	12.0	31.7
						Barrier4	point268	268	12.0	31.6
						Barrier4	point183	183	0.0	31.5
						Barrier4	point256	256	12.0	31.4
						Barrier4	point188	188	0.0	31.3
RUS-20-01	165	51.5	3.2	8	-4.8	Barrier4	point257	257	12.0	33.6
						Barrier4	point260	260	12.0	33.5
						Barrier4	point261	261	12.0	33.4
						Barrier4	point262	262	12.0	32.9
						Barrier4	point268	268	12.0	32.7
						Barrier4	point256	256	12.0	32.5
						Barrier4	point271	271	12.0	32.2
						Barrier4	point185	185	0.0	32.2
						Barrier4	point273	273	12.0	32.1

						Barrier4	point272	272	12.0	32.1
RUS-21-01	166	52.0	3.3	8	-4.7	Barrier4	point257	257	12.0	34.5
						Barrier4	point260	260	12.0	34.2
						Barrier4	point261	261	12.0	34.1
						Barrier4	point262	262	12.0	33.5
						Barrier4	point256	256	12.0	33.4
						Barrier4	point268	268	12.0	33.3
						Barrier4	point271	271	12.0	32.9
						Barrier4	point254	254	12.0	32.6
						Barrier4	point273	273	12.0	32.6
						Barrier4	point272	272	12.0	32.6
VIL-10-01	167	52.3	3.2	8	-4.8	Barrier4	point260	260	12.0	34.6
						Barrier4	point257	257	12.0	34.6
						Barrier4	point261	261	12.0	34.5
						Barrier4	point262	262	12.0	34.1
						Barrier4	point264	264	12.0	34.0
						Barrier4	point268	268	12.0	33.9
						Barrier4	point271	271	12.0	33.5
						Barrier4	point273	273	12.0	33.4
						Barrier4	point263	263	12.0	33.4
						Barrier4	point269	269	12.0	33.4
VIL-11-01	168	51.6	3.1	8	-4.9	Barrier4	point260	260	12.0	33.7
						Barrier4	point261	261	12.0	33.7
						Barrier4	point257	257	12.0	33.6
						Barrier4	point268	268	12.0	33.1
						Barrier4	point271	271	12.0	32.7
						Barrier4	point273	273	12.0	32.6
						Barrier4	point269	269	12.0	32.6
						Barrier4	point263	263	12.0	32.5
						Barrier4	point272	272	12.0	32.5
						Barrier4	point262	262	12.0	32.4
VIL-12-01	169	51.0	3.0	8	-5.0	Barrier4	point260	260	12.0	32.7
						Barrier4	point261	261	12.0	32.7
						Barrier4	point257	257	12.0	32.6
						Barrier4	point264	264	12.0	32.3
						Barrier4	point268	268	12.0	32.2

						Barrier4	point271	271	12.0	31.9
						Barrier4	point269	269	12.0	31.8
						Barrier4	point273	273	12.0	31.8
						Barrier4	point272	272	12.0	31.7
						Barrier4	point262	262	12.0	31.6
VIL-14-01	170	52.9	3.9	8	-4.1	Barrier4	point273	273	12.0	36.1
						Barrier4	point275	275	12.0	36.0
						Barrier4	point274	274	12.0	36.0
						Barrier4	point272	272	12.0	35.9
						Barrier4	point261	261	12.0	35.8
						Barrier4	point276	276	12.0	35.8
						Barrier4	point277	277	12.0	35.5
						Barrier4	point278	278	12.0	35.5
						Barrier4	point279	279	12.0	35.3
						Barrier4	point268	268	12.0	35.3
VIL-13-01	171	51.1	3.1	8	-4.9	Barrier4	point273	273	12.0	32.9
						Barrier4	point268	268	12.0	32.9
						Barrier4	point271	271	12.0	32.9
						Barrier4	point261	261	12.0	32.8
						Barrier4	point274	274	12.0	32.8
						Barrier4	point272	272	12.0	32.8
						Barrier4	point275	275	12.0	32.8
						Barrier4	point260	260	12.0	32.8
						Barrier4	point276	276	12.0	32.7
						Barrier4	point278	278	12.0	32.4
VANB-16-01-F	74	58.7	0.3	8	-7.7	Barrier4	point166	166	0.0	45.6
						Barrier4	point167	167	0.0	45.4
						Barrier4	point165	165	0.0	45.2
						Barrier4	point164	164	0.0	45.1
						Barrier4	point168	168	0.0	45.0
						Barrier4	point163	163	0.0	44.9
						Barrier4	point169	169	0.0	44.3
						Barrier4	point162	162	0.0	44.3
						Barrier4	point161	161	0.0	44.2
						Barrier4	point170	170	0.0	44.0

Total Cost, All Barriers (including additional cost(s))	$918985					

HMB Professional Engineers 31 March 2021
Mark Gavula TNM 2.5

RESULTS: BARRIER-SEGMENT DESCRIPTIONS
PROJECT/CONTRACT: I69 ORX
RUN: Indiana_Barrier_Run_Final
BARRIER DESIGN: IN_FINAL_BARRIER

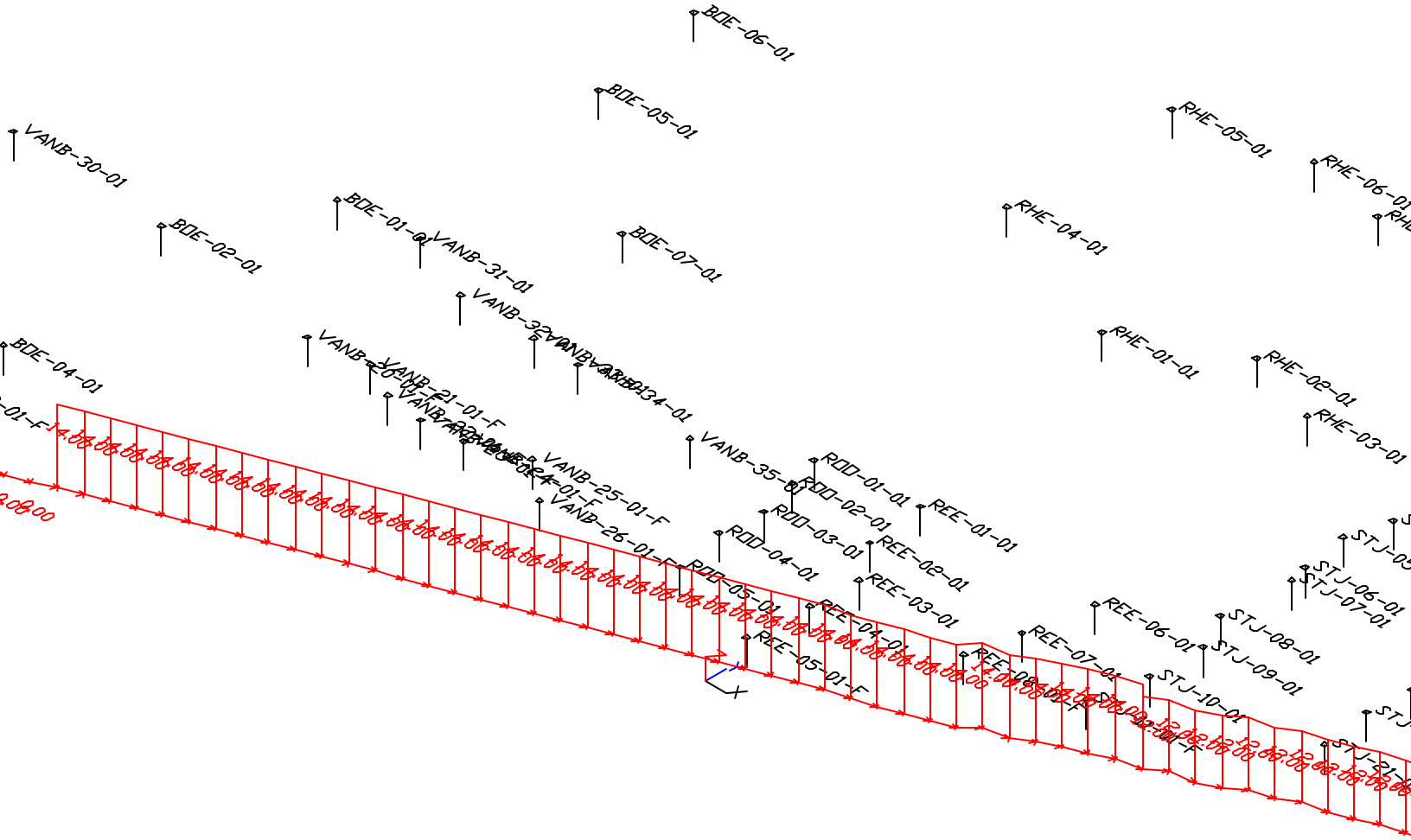
Barriers		Segments										
Name	Type	Name	No.	Heights			Length	If Wall			If Berm	Cost
				First Point	Average	Second Point		Area	On Struc?	Important Reflections?	Volume	
				ft	ft	ft	ft	sq ft			cu yd	$
Barrier4	W	point157	157	0.00	0.00	0.00	0	0				0
		point160	160	0.00	0.00	0.00	0	0				0
		point161	161	0.00	0.00	0.00	0	0				0
		point162	162	0.00	0.00	0.00	0	0				0
		point163	163	0.00	0.00	0.00	0	0				0
		point164	164	0.00	0.00	0.00	0	0				0
		point165	165	0.00	0.00	0.00	0	0				0
		point166	166	0.00	0.00	0.00	0	0				0
		point167	167	0.00	0.00	0.00	0	0				0
		point168	168	0.00	0.00	0.00	0	0				0
		point169	169	0.00	0.00	0.00	0	0				0
		point170	170	0.00	0.00	0.00	0	0				0
		point171	171	0.00	0.00	0.00	0	0				0
		point172	172	0.00	0.00	0.00	0	0				0
		point173	173	0.00	0.00	0.00	0	0				0
		point174	174	0.00	0.00	0.00	0	0				0
		point175	175	0.00	0.00	0.00	0	0				0
		point176	176	0.00	0.00	0.00	0	0				0
		point177	177	0.00	0.00	0.00	0	0				0
		point178	178	0.00	0.00	0.00	0	0				0
		point179	179	0.00	0.00	0.00	0	0				0
		point180	180	0.00	0.00	0.00	0	0				0
		point181	181	0.00	0.00	0.00	0	0				0
		point182	182	0.00	0.00	0.00	0	0				0
		point183	183	0.00	0.00	0.00	0	0				0
		point184	184	0.00	0.00	0.00	0	0				0

		point185	185	0.00	0.00	0.00	0	0				0
		point186	186	0.00	0.00	0.00	0	0				0
		point187	187	0.00	0.00	0.00	0	0				0
		point188	188	0.00	0.00	0.00	0	0				0
		point189	189	0.00	0.00	0.00	0	0				0
		point190	190	0.00	0.00	0.00	0	0				0
		point191	191	14.00	14.00	14.00	20	281				8434
		point192	192	14.00	14.00	14.00	20	273				8201
		point193	193	14.00	14.00	14.00	20	281				8434
		point194	194	14.00	14.00	14.00	20	280				8401
		point195	195	14.00	14.00	14.00	20	281				8434
		point196	196	14.00	14.00	14.00	20	281				8434
		point197	197	14.00	14.00	14.00	20	280				8401
		point198	198	14.00	14.00	14.00	20	281				8434
		point199	199	14.00	14.00	14.00	20	278				8345
		point200	200	14.00	14.00	14.00	20	277				8308
		point201	201	14.00	14.00	14.00	20	283				8504
		point202	202	14.00	14.00	14.00	20	278				8345
		point203	203	14.00	14.00	14.00	20	285				8541
		point204	204	14.00	14.00	14.00	20	275				8236
		point205	205	14.00	14.00	14.00	20	280				8401
		point206	206	14.00	14.00	14.00	20	281				8434
		point207	207	14.00	14.00	14.00	20	280				8401
		point208	208	14.00	14.00	14.00	20	281				8434
		point209	209	14.00	14.00	14.00	20	281				8434
		point210	210	14.00	14.00	14.00	20	281				8434
		point211	211	14.00	14.00	14.00	20	280				8401
		point212	212	14.00	14.00	14.00	20	275				8236
		point213	213	14.00	14.00	14.00	20	281				8434
		point214	214	14.00	14.00	14.00	20	280				8401
		point215	215	14.00	14.00	14.00	20	281				8434
		point216	216	14.00	14.00	14.00	20	281				8434
		point217	217	14.00	14.00	14.00	20	281				8434
		point218	218	14.00	14.00	14.00	20	281				8434
		point219	219	14.00	14.00	14.00	20	275				8236
		point220	220	14.00	14.00	14.00	20	281				8434
		point221	221	14.00	14.00	14.00	20	281				8434
		point222	222	14.00	14.00	14.00	20	281				8434
		point223	223	14.00	14.00	14.00	20	281				8434

		point224	224	14.00	14.00	14.00	20	275				8236
		point225	225	14.00	14.00	14.00	20	281				8434
		point226	226	14.00	14.00	14.00	20	281				8434
		point227	227	14.00	14.00	14.00	20	282				8469
		point228	228	14.00	14.00	14.00	20	281				8434
		point229	229	14.00	14.00	14.00	20	275				8236
		point230	230	14.00	14.00	14.00	20	282				8469
		point231	231	14.00	14.00	14.00	20	283				8504
		point232	232	12.00	12.00	12.00	20	236				7089
		point233	233	12.00	12.00	12.00	20	242				7259
		point234	234	12.00	12.00	12.00	20	237				7121
		point235	235	12.00	12.00	12.00	20	242				7259
		point236	236	12.00	12.00	12.00	20	241				7229
		point237	237	12.00	12.00	12.00	20	236				7089
		point238	238	12.00	12.00	12.00	20	241				7229
		point239	239	12.00	12.00	12.00	20	244				7319
		point240	240	12.00	12.00	12.00	20	237				7121
		point241	241	12.00	12.00	12.00	20	243				7294
		point242	242	12.00	12.00	12.00	20	237				7096
		point243	243	12.00	12.00	12.00	20	242				7270
		point244	244	12.00	12.00	12.00	20	237				7096
		point245	245	12.00	12.00	12.00	20	242				7247
		point246	246	12.00	12.00	12.00	20	242				7247
		point247	247	12.00	12.00	12.00	20	236				7073
		point248	248	12.00	12.00	12.00	20	241				7225
		point249	249	12.00	12.00	12.00	20	241				7225
		point250	250	12.00	12.00	12.00	20	240				7204
		point251	251	12.00	12.00	12.00	20	240				7204
		point252	252	12.00	12.00	12.00	20	240				7204
		point253	253	12.00	12.00	12.00	20	239				7166
		point254	254	12.00	12.00	12.00	20	242				7256
		point255	255	12.00	12.00	12.00	20	243				7281
		point256	256	12.00	12.00	12.00	20	236				7077
		point257	242	12.00	12.00	12.00	20	244				7309
		point158	158	12.00	12.00	12.00	20	237				7117
		point258	258	12.00	12.00	12.00	20	238				7149
		point259	259	12.00	12.00	12.00	20	239				7166
		point260	260	12.00	12.00	12.00	20	245				7361
		point261	261	12.00	12.00	12.00	20	239				7185

		point262	262	12.00	12.00	12.00	20	239				7185
		point263	263	12.00	12.00	12.00	20	239				7166
		point264	264	12.00	12.00	12.00	20	239				7166
		point265	265	12.00	12.00	12.00	20	238				7149
		point266	266	12.00	12.00	12.00	20	244				7325
		point267	267	12.00	12.00	12.00	20	238				7149
		point268	268	12.00	12.00	12.00	20	238				7132
		point269	269	12.00	12.00	12.00	20	244				7309
		point270	270	12.00	12.00	12.00	20	237				7103
		point271	271	12.00	12.00	12.00	20	243				7294
		point272	272	12.00	12.00	12.00	20	237				7103
		point273	273	12.00	12.00	12.00	20	243				7294
		point274	274	12.00	12.00	12.00	20	237				7103
		point275	275	12.00	12.00	12.00	20	242				7268
		point276	276	12.00	12.00	12.00	20	242				7256
		point277	277	12.00	12.00	12.00	20	236				7077
		point278	278	12.00	12.00	12.00	20	242				7256
		point279	279	12.00	12.00	12.00	20	242				7245
		point280	280	12.00	12.00	12.00	20	236				7077
		point281	281	12.00	12.00	12.00	20	241				7236
		point282	282	12.00	12.00	12.00	20	241				7236
		point283	283	12.00	12.00	12.00	20	242				7245
		point284	284	12.00	12.00	12.00	20	241				7228
		point285	285	12.00	12.00	12.00	20	235				7041
		point286	286	12.00	12.00	12.00	20	240				7214
		point287	287	12.00	12.00	12.00	20	240				7214
		point288	288	12.00	12.00	12.00	20	241				7220
		point289	289	12.00	12.00	12.00	20	240				7214
		point290	290	12.00	12.00	12.00	20	240				7214
		point291	291	12.00	12.00	12.00	20	240				7209
		point292	292	12.00	12.00	12.00	20	240				7214
		point293	293	12.00	12.00	12.00	20	240				7214
		point294	294	12.00	12.00	12.00	20	240				7214
		point295	295	12.00	12.00	12.00	20	240				7214
		point296	296	12.00	12.00	12.00	20	240				7209
		point297	297	12.00	12.00	12.00	20	240				7201
		point298	298	12.00	12.00	12.00	20	240				7201
		point299	299	12.00	12.00	12.00	20	240				7200
		point300	300	12.00	12.00	12.00	20	240				7200

		point301	301	12.00	12.00	12.00	20	240				7200
		point302	302	12.00	12.00	12.00	20	240				7200
		point303	303	12.00	12.00	12.00	20	240				7202
		point304	304	12.00	12.00	12.00	20	240				7201
		point305	305	12.00	12.00	12.00	20	240				7201
		point306	306	12.00	12.00	12.00	20	240				7201
		point307	307	12.00	12.00	12.00	20	240				7202
		point308	308	12.00	12.00	12.00	20	234				7022
		point309	309	12.00	12.00	12.00	20	240				7205
		point310	310	10.00	10.00	10.00	20	200				6002
		point311	311	0.00	0.00	0.00	0	0				0
		point312	312	0.00	0.00	0.00	0	0				0



Indiana_Barrier_Run_Final		Sheet 1 of 1	31 Mar 2021
		HMB Professional Engineers	
Barrier View-IN_FINAL_BARRIER		Project/Contract No. I69 ORX	
Run name: IN_Final_Barrier_Run		TNM Version 2.5, Feb 2004	
Scale: <DNA - due to perspective>		Analysis By: Mark Gavula	
Roadway:		Ground Zone:	polygon
Receiver:		Tree Zone:	dashed polygon
Barrier:		Contour Zone:	polygon
Building Row:		Parallel Barrier:	
Terrain Line:		Skew Section:	

APPENDIX F – EQUIVALENT RECEPTOR CALCULATION

CALCULATIONS FOR SOUTH ARLINGTON DRIVE – ATHLETIC FIELDS

To determine use of the athletic fields located adjacent to the South Arlington analysis area, a phone call was placed on April 13, 2021 to Henderson County High School. The principal provided the following information:

- 300-500 people use the facilities a day after school until around 7pm, and up until 10pm if there are games
- The capacity of the football stadium is 4,000-5,000 people, but they average around 2,500-3,000 people.
- There is a summer dead period.

Using this information a few additional assumptions were made:

- Its reasonable to assume the winter months (December, January, and February) are not used in addition to the summer months (June and July), so a total of 7 out of 12 months are used for a total of 58% of the year
- Six weeks is about a season's worth of home games (6 weeks) in a year which is about 12% of a year
- School ends around 3pm

To determine the usage of the fields for practice, 500 people were divided among the eight fields represented by eight receivers.

500/8= 63 people on a given day at each field.

If school ends around 3pm and the fields are used until 7pm, the fields are used 4 hours a day, and if they are used daily after school the weekly total is 20 hours per field. Using the Equivalent Receptor equation:

(63/2.5)(20/168)= 3 Equivalent Receptors (ER)

To adjust for time these fields are not used, 3 is multiplied by 0.58 equaling 1.75 which can be rounded up to 2 Equivalent Receptors for each field.

After reviewing aerials receivers HCHA-04-02-F, HCHA-05-02-F, HCHA-06-02-F, and HCHA-07-02-F appear to strictly be practice fields and the final equivalent receptors for these locations are two. The other locations can also host games in addition to practice so more calculations are necessary.

For football games, the average capacity is 3,000 people per game, and if junior varsity and varsity play on a weekly basis, a total of 8 hours of weekly use was assumed.

(3,000/2.5)(8/168)= 57.13 (.12) = 6.85 ER + 1.75 ER (from practice) = 8.60 or 9 ER.

The receiver designated HCHA-01-09 has 9 equivalent receptors.

For soccer and baseball games it was assumed a total of 200 people attend each game, and if junior varsity and varsity play on a weekly basis, a total of 6 hours a week assumed.

(200/2.5)(6/168)= 2.85 (.12) = 0.3 or 1 ER + 1.75 ER (from practice) = 2.75 or 3 ER

Receivers designated HCHA-02-03 and HCHA-03-03 have three equivalent receptors.

For tennis matches it was assumed a total of 80 people attend the matches, and if junior varsity and varsity play on a weekly basis, a total of 6 hours a week assumed.

(80/2.5)(6/168)= 1.14 (.12) = 0.13 or 1 ER + 1.75 ER (from practice) = 1.89 or 2 ER

The receiver designated HCHA-08-02 has two equivalent receptors.