Draft Noise Study Report

Florida Department of Transportation

District 5

SR 535 PD&E Study

From US 192 to North of World Center Drive (SR 536)

Osceola and Orange Counties, Florida

Financial Project ID Number: 437174-2-22-01

ETDM Number: 14325

May 2024

The environmental review, consultation, and other actions required by applicable federal environmental laws for this project are being, or have been, carried out by the Florida Department of Transportation (FDOT) pursuant to 23 U.S.C. §327 and a Memorandum of Understanding dated May 26, 2022, and executed by Federal Highway Administration and FDOT.

EXECUTIVE SUMMARY

This Noise Study Report (NSR) evaluates potential traffic noise impacts associated with the reconstruction and widening of SR 535 from US 192 (in Osceola County) to north of SR 536/World Center Drive (in Orange County).

This report documents a traffic noise study identifying noise-sensitive areas that may be affected by the proposed improvements and evaluates noise barriers as an abatement measure for sensitive areas expected to be impacted because of the planned improvements.

Traffic noise levels were predicted along the project corridor for the Existing Conditions, No Build, and the Preferred Alternative. Under the Preferred Alternative, traffic noise levels for the entire project are predicted to range from 56.0 dB(A) to 69.2 dB(A). The highest traffic noise level increase between the Existing Condition and the Preferred Alternative is 2.7 dB(A). Therefore, traffic noise levels throughout the project corridor are not expected to substantially increase above the existing conditions.

Under the Preferred Alternative only the Hawks Landing Golf Course special land use site would exceed the NAC. Noise abatement is not feasible and/or reasonable at the Hawk's Landing Golf Club due to not meeting the requirements for special land use sites which would not meet the occupancy required to consider the noise wall as reasonable. Noise abatement has no further consideration at the moment.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

APPENDICES

1 Introduction

In November 2017, the Florida Department of Transportation (FDOT) District Five (D-5) completed a Corridor Planning Study (CPS) to evaluate State Road 535 (SR 535) from US 192 in Osceola County to I-4 in Orange County. The purpose of the CPS was to identify specific problem areas along the corridor and evaluate multimodal alternatives that will be carried forward into future phases of project development in order to optimize the operations of the existing facility. Improvements identified as a result of the CPS included widening from four to six lanes, TSM&O and multimodal improvements, and intersection improvements (including innovative intersection designs).

FDOT D-5 is conducting a Project Development and Environment (PD&E) Study to evaluate the recommendations from the CPS including the widening of SR 535 from four to six lanes from US 192 in Osceola County to just north of World Center Drive (SR 536) in Orange County, approximately 2.35 miles. This Noise Study Report (NSR) evaluates potential traffic noise impacts associated with the reconstruction and widening of SR 535.

This report documents a traffic noise study identifying noise-sensitive areas that may be affected by the proposed improvements and evaluates noise barriers as an abatement measure for sensitive areas expected to be impacted because of the planned improvements. This traffic noise analysis was performed following the Code of Federal Regulations Title 23 Part 772 (23 CFR 772), *Procedures for Abatement of Highway Traffic Noise and Construction Noise*[1], using methodology established by FDOT in the *Project Development and Environment Manual*[2], Part 2, Chapter 18 (dated July 1, 2023).

1.1 Project Description

SR 535 is a four-lane divided minor arterial facility located within unincorporated Osceola and Orange Counties in Central Florida. SR 535 is known as Vineland Road in Osceola County and Kissimmee-Vineland Road in Orange County. The project limits extend approximately 2.35 miles from the US 192 intersection in Osceola County to just north of the SR 536 intersection in Orange County, as shown in **Figure 1-1**.

Figure 1-1:Project Location Map

1.2 Purpose & Need

The purpose of the project is to accommodate future projected traffic demand and improve safety. The need for the project is based on addressing future transportation demand and safety concerns.

1.2.1 Transportation Demand

In the existing condition, the section of SR 535 from US 192 to Kyngs Heath Road operates at a Level of Service (LOS) D with an Annual Average Daily Traffic (AADT) of 28,300; the section from Kyngs Heath Road to Poinciana Boulevard operates at LOS D with an AADT of 26,900; the section from Poinciana Boulevard to Polynesian Isle Boulevard operates at LOS D with an AADT of 46,800; the section from Polynesian Isle Boulevard to World Center Drive operates at LOS D with an AADT of 44,300.

In the future year (2045) No-Build condition, the section of SR 535 from US 192 and Kyngs Heath Road is projected to operate at LOS F with an AADT of 42,000; the section

from Kyngs Heath Road to Poinciana Boulevard is projected to operate at LOS E with an AADT of 40,000; the section from Poinciana Boulevard to Polynesian Isle Boulevard is projected to operate at LOS F with an AADT of 69,000; the section from Polynesian Isle Boulevard to World Center Drive is projected to operate at LOS F with an AADT of 66,000.

1.2.2 Safety

A total of 981 crashes were reported on SR 535 from US 192 to Lake Bryan Beach Boulevard in the five-year period from 2014 through 2018. Of those reported crashes, 463 (47%) resulted in injury and four (4) resulted in a fatality. The most frequent crash type was rear end with 605 (62%) total crashes, indicating congestion. Sideswipe crashes were the second highest with 106 (11%), followed by left-turn with 93 (9%) total crashes. Of the 981 crashes, 602 (61%) crashes occurred during daylight conditions. The crash rates along this segment of SR 535 exceed the FDOT statewide averages for similar facilities.

1.3 Project Status

The project is within the jurisdiction of MetroPlan Orlando. The MetroPlan Orlando 2045 Cost Feasible Plan (CFP) includes widening of SR 535 from US 192 in Osceola County to SR 536 in Orange County in years 2031 to 2035 (construction). The SR 535 improvements are funded for design in the Florida Department of Transportation (FDOT) 2024-2029 Five-Year Work Program and MetroPlan Orlando 2023-2028 Transportation Improvement Program (TIP). This project was screened in the Efficient Transportation Decision Making (ETDM) system as ETDM #14325.

1.4 Commitments

This section will be included as part of the Final NSR.

1.5 Alternatives Analysis Summary

The following alternatives were evaluated during the study:

- ‘No-Build’ Alternative
- Construction (‘Build’) Alternatives

The build alternative consists of widening SR 535 from four to six lanes. The study evaluated a range of typical section and intersection alternatives including inside widening and outside widening of the existing roadway. The build alternative analysis included the evaluation of open and closed stormwater drainage conveyance systems together with the evaluation of pond site locations. The study also evaluated Transportation System Management and Operations (TSMO) and multimodal improvements.

1.6 Description of Preferred Alternative

The Preferred Alternative consists of inside widening from four to six lanes with a shared use path along both sides and intersection improvements. The preferred alternative is shown on **Figure 1-2**.

The Preferred Alternative has a design speed of 45-miles per hour (mph) and consists of full reconstruction with the additional lanes constructed towards the median. The typical section consists of three (3) 11-foot travel lanes in each direction separated by a 32-foot to 47-foot median with a 14-foot shared use path on the west side and a 12-foot shared use path on the east side of the roadway. The Preferred Alternative will be constructed within the existing right-of-way width of 200-feet to 224-feet. Swales with ditch bottom inlets in conjunction with flume inlets at the curb line will be provided for drainage conveyance. Stormwater attenuation and floodplain compensation will be provided.

Figure 1-2: Preferred Alternative Typical Section

1.6.1 Intersection Improvements

The Preferred Alternative will also implement intersection improvements including the following innovative intersection concepts.

- Polynesian Isle Boulevard Partial Median U-Turn (PMUT): Implementation of the PMUT involves the removal of northbound and southbound direct left turn movements from SR 535 to Polynesian Isle Boulevard and the addition of signalized U-turns at the existing median openings located just north and south of the intersection along SR 535 to accommodate vehicles wishing to travel east or west on Polynesian Isle Boulevard.
- International Drive Partial Displaced Left Turn (PDLT). Implementation of the PDLT involves the removal of direct eastbound and westbound left turns from Internation Drive at SR 535 with the displaced left turns installed on both legs International Drive. The northbound and southbound left turn movements for SR 535 continue to take place at the main intersection.
- SR 536 (World Center Drive) Partial Displaced Left Turn (PDLT). Implementation of the PDLT involves the removal and replacement of direct northbound and southbound left turns from SR 535 at SR 536 with the displaced left turns installed on both legs of SR 535. The eastbound and westbound left turn movements for the SR 536/World Center Drive continue to take place at the main intersection.

1.6.2 Drainage

There are 4 basins in the existing and proposed condition, and all basins drain to permitted stormwater systems in the existing condition (see **Table 1-1**). Where feasible, stormwater management facilities have been recommended within existing FDOT or County right-of-way (R/W). Below is a summary of the preferred pond alternatives (see **Figure 1-3**).

- Basin 1: Alternative 1A is the Preferred Alternative for Basin 1. Alternative 1A consists of an existing wet detention pond (identified as Exist. Pond 1-1) within FDOT R/W to provide the required water quality treatment and attenuation volumes.
- Basin 2: Alternative 2A is the Preferred Alternative for Basin 2. Alternative 2A consists of 2 ponds, one existing wet detention pond within existing FDOT R/W (identified as Exist. Pond 2-1) interconnected with a second wet detention pond (identified as Pond 2-2) to provide the required water quality treatment and attenuation volumes. Since there is insufficient area within the existing FDOT R/W to provide a stormwater management alternative to meet water quality treatment and attenuation requirements, Pond Alternative 2A will require acquisition of R/W.

- Basin 3: Alternative 3A is the Preferred Alternative for Basin 3. Alternative 3A consists of 2 ponds, one existing wet detention pond within existing FDOT R/W (identified as Exist. Pond 3-1) interconnected with a second wet detention pond (identified as Pond 3-2) to provide the required water quality treatment and attenuation volumes. Since there is insufficient area within the existing FDOT R/W to provide a stormwater management alternative to meet water quality treatment and attenuation requirements, Pond Alternative 3A will require acquisition of R/W.
- Basin 4: Alternative 4A is the Preferred Alternative for Basin 4. Alternative 4A consists of an existing wet detention pond (identified as Exist. Pond 4-1) within existing R/W and easement to provide the required water quality treatment and attenuation volumes.

Table 1-1: Preferred Pond Alternatives

Basin	Preferred Alternative	Ponds	Type	R/W Req'd.	Remarks
1	1A	Exist. Pond 1-1	Wet	0.0	Exist. pond sufficient. Reduced drainage area (30.94 ac to 29.16 ac) from exist. to proposed conditions. Increased freeboard in exist. pond. Pond within exist. R/W
2	2A	Exist. Pond 2-1 and Pond 2-2	Wet	4.3	Interconnected ponds to provide required water quality treatment and attenuation. Utilize Exist. Pond 2-1 outfall to Shingle Creek. Exist. Pond 2-1 within exist. R/W. Estimated R/W needs for Pond 2-2 provided (excluding public R/W used for pond).
3	3A	Exist. Pond 3-1 and Pond 3-2	Wet	3.5	Interconnected ponds to provide required water quality treatment and attenuation. Utilize Exist. Pond 3-1 and Pond 3-2 outfalls to Shingle Creek. Exist. Pond 3-1 within exist. R/W. Estimated R/W needs for Pond 3-2 provided (excluding public R/W used for pond).
4	4A	Exist. Pond 4-1	Wet	0.0	Exist. pond sufficient. Reduced drainage area (8.70 ac to 7.63 ac) from exist. to proposed conditions. Increased freeboard in exist. pond. Pond within exist. R/W

An analysis of floodplain impacts and Floodplain Compensation (FPC) alternatives was performed. Project improvements will impact the 100-year floodplain as a result of longitudinal impacts and transverse impacts. The preferred FPC alternative and anticipated right of way needs associated with the preferred alternative are provided in **Table 1-2**.

Table 1-2: Preferred FPC Site

Name	Floodplain Impacts (ac-ft)	Floodplain compensation Volume Provided (ac-ft)	Estimated Pond R/W Req'd. (including access) (ac)
FPC-1	8.89	14.45	4.3

Figure 1-3: Preferred Alternative Ponds

1.6.3 Right of way and Construction Cost

SR 535 has an existing R/W of 224 feet which is ample R/W to accommodate the Preferred Alternative. Some R/W impacts will be required to accommodate intersection improvements at the International Drive and World Center Drive (SR 536) intersections and for offsite ponds. See **Table 1-3** for cost estimate.

Table 1-3: Cost Estimate

	Cost
Construction	$76.5M
R/W	$38.1M
Utility Relocation	$7M
Sub Total	$121.6M
Design (15%)	$11.5M
CEI (10%)	$7.7M
Total Estimated Project Cost	$140.8M

2 Methodology

This noise analysis was conducted in accordance with *23 CFR Part 772: Procedures for "Abatement of Highway Traffic Noise and Construction Noise, dated July 13, 2010*[1]"; "*Chapter 18 - Highway Traffic Noise of the FDOT Project Development and Environment Manual, dated July 1, 2023*[2]"; "*Highway Traffic Noise: Analysis and Abatement Guidance, dated August 20*[3]*"*; and the "*FDOT Traffic Noise Modeling and Analysis Practitioners Handbook, dated December 31, 2018*[4]".

The procedures, methods, and results of this analysis are summarized as follow:

- Identification of noise-sensitive receptor sites,
- Field measurement of noise levels and noise model validation,
- Prediction of existing and future noise levels,
- Assessment of traffic noise impacts, and
- Consideration of noise abatement measures.

This noise analysis utilized CAD files for the Preferred Alternative to evaluate traffic noise impacts and noise abatement analysis within the limits of the project. Based on the available data, this noise analysis provides a baseline for potential traffic noise impacts associated with the planned improvements and recommended noise barrier locations, if any, for any further consideration in design. The FHWA's Traffic Noise Model (TNM) Version 2.5 (February 2004) was used to predict traffic noise levels and to analyze the effectiveness of noise abatement. This model estimates the noise level at noise sensitive receptor sites from traffic noise sources (i.e., roadways). Model-predicted noise levels are influenced by several factors, such as vehicle speed and distribution of vehicle types. Noise levels are also affected by characteristics of the source to receptor site path, including the effects of intervening barriers, houses, different ground surfaces and topography.

2.1 Noise Metrics

The noise levels presented in this report are expressed in dB(A) which is the scale that most closely approximates the range of frequencies a human ear can hear. All noise levels are reported as equivalent levels [Leq(h)], which is the equivalent sound level that

contains the same acoustic energy as an actual time-varying sound level over a period of one hour.

2.1.1 Traffic Data

Traffic data used in the TNM models is based upon both Level of Service (LOS) C that was obtained from the "June *2023 FDOT Quality/Level of Service Handbook*[5]" and the Turning Movement Volumes (TMVs) sourced from the *March 2023 SR 535 Project Traffic Analysis Report (PTAR) FM# 437174-2 (SR 535 PTAR).* Noise analysis was performed for Existing and Design Year No Build and Build conditions. Design Year is defined as opening year plus 20 years. A vehicle volume resulting in LOS C operating conditions is considered the maximum volume that allows vehicles to travel at the speed limit and, consequently, produces the worst-case traffic noise environment. For both Existing (2022) and Build years (Design Year 2045), traffic data was selected according to *FDOT's Traffic Noise Modeling & Analysis Practitioners Handbook* which compares TMV volumes to LOS C volume from the *2023 FDOT Quality/Level of Service Handbook*. If TMVs were higher than LOS C volume, LOS C volumes were selected. If LOS C volumes were higher than TMVs, TMV volumes were selected. A table showing the comparison and selections is presented in **Appendix A**. For No Build, only LOS C volumes were selected. Furthermore, traffic factors for the project corridor were obtained from classification counts collected for the SR 535 PTAR. Traffic data and traffic factors used for this analysis are presented in **Appendix A.**

2.1.2 Elevation Data

The relationship between the elevation of the road and ground at nearby receptor sites can affect predicted noise levels and the effectiveness of potential noise barriers. Roadway elevations for SR 535 were estimated based on information from survey data provided by FDOT, Google Earth Pro, LIDAR, and/or the U.S. Geological Survey. Ground elevations of other features were also based on these data sources.

2.1.3 Receptor Data

Model receptors are used in TNM to predict resulting traffic noise levels at nearby noise sensitive sites and to evaluate the predicted effectiveness of noise barriers. These sites were chosen in accordance with *Chapter 18 of the FDOT PD&E Manual*. Factors that

were considered include: noise sensitivity, proximity to project improvements, frequent outdoor usage, and homogeneity (i.e., the site is representative of other nearby sites). After a desktop analysis of the project corridor and a field review, 19 model receptors representing noise sensitive sites have been selected for this analysis. The number of existing residences represented by each model receptor varies according to site conditions. For residences, traffic noise levels are predicted for the backyards of the residences. Model receptors are in areas of use closest to SR 535. All receptor sites are modeled five feet above ground.

2.2 Noise Abatement Criteria

FDOT uses Noise Abatement Criteria (NAC) established by the FHWA. Specific NAC levels have been developed for five of the FHWA's seven Activity Categories (see **Table 2-1**). These NAC levels represent maximum traffic noise level conditions established for each land use category at which abatement should be considered. Noise abatement measures must be considered when predicted noise levels approach or exceed the FHWA NAC levels or when a substantial noise increase occurs. The FDOT defines "approach" as within one (1) dB(A) of the FHWA criteria. A substantial noise increase is defined as a predicted increase of 15 dB(A) or more above the existing noise levels resulting from a transportation improvement project. As shown in **Table 2-1**, the criteria vary according to a property's Activity Category. Typical noise levels associated with common indoor and outdoor activities are shown in **Table 2-2**.

This space intentionally left blank

Table 2-1: Noise Activity Categories

ACTIVITY CATEGORY	ACTIVITY Leq(h)[1]		EVALUATION LOCATION	DESCRIPTION OF ACTIVITY CATEGORY
	FHWA	FDOT		
A	57	56	Exterior	Lands on which serenity and quiet are of extraordinary significance and serve an important public need, and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B[2]	67	66	Exterior	Residential
C[2]	67	66	Exterior	Active sports areas, amphitheaters, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreational areas, Section 4(f) sites, schools, television studios, trails, and trail crossings.
D	52	51	Interior	Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios.
E[2]	72	71	Exterior	Hotels, motels, offices, restaurants/bars, and other developed lands, properties, or activities not included in A-D or F.
F	–	–	–	Agriculture, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical), and warehousing.
G	–	–	–	Undeveloped lands that are not permitted.

(Based on Table 1 of 23 CFR Part 772)

[1] The Leq(h) Activity Criteria values are for impact determination only and are not design standards for noise abatement measures.

[2] Includes undeveloped lands permitted for this activity category.

This space intentionally left blank

Table 2-2: Typical Noise Levels

COMMON OUTDOOR ACTIVITIES	NOISE LEVEL dB(A)	COMMON OUTDOOR/INDOOR ACTIVITIES
	---110---	Rock Band
Jet Fly-over at 1000 feet		
	---100---	
Gas Lawn Mower at 3 feet		
	---90---	
Diesel Truck at 50 feet, at 50 mph		Food Blender at 3 feet
	---80---	Garbage Disposal at 3 feet
Noise Urban Area (Daytime) Gas Lawn Mower at 100 feet	---70---	Vacuum Cleaner at 10 feet
Commercial Area		Normal Speech at 3 feet
Heavy Traffic at 300 feet	---60---	
		Large Business Office
Quiet Urban Daytime	---50---	Dishwasher Next Room
Quiet Urban Nighttime Quiet Suburban Nighttime	---40---	Theater, Large Conference Room (Background)
	---30---	Library
Quiet Rural Nighttime		Bedroom at Night, Concert Hall (Background)
	---20---	
	---10---	
Lowest Threshold of Human Hearing	---0---	Lowest Threshold of Human Hearing

Source: California Dept. of Transportation Technical Noise Supplement, Oct. 1998, Page 18.

2.3 Noise Abatement Consideration

Noise abatement is considered when the NAC is approached or exceeded. The most common and effective noise abatement measure for projects such as this is construction of a noise barrier as close as possible to the impacted sites or along the outside edges of the roadway. Noise barriers reduce noise by blocking the sound path between a roadway and a noise-sensitive area. To be effective, noise barriers must be long, continuous, and have sufficient height to block the path between the noise source and the receptor site. Other potential noise abatement alternatives include traffic management, creation of alternative roadway alignments, buffer zones, and land use controls.

Noise barriers are evaluated as follows:

- Primary consideration is generally given to ground-mounted noise barriers located outside of the roadway's clear recovery zone and as close as possible within the roadway right-of-way to the impacted noise-sensitive sites. Heights ranging from 8 to 22 feet are evaluated in 2-foot increments. According to the FDOT *Design Manual*[6] referenced for this analysis, a noise barrier located outside of the clear zone should not exceed a maximum height of 22 feet.

- If a ground-mounted noise barrier located outside of the roadway's clear recovery zone cannot provide at least a 5 dB(A) reduction to an impacted noise-sensitive site or is not construction-feasible, then a noise barrier located along the highway shoulder would be evaluated. According to the FDOT *Design Manual*[6], a shoulder-mounted noise barrier should not exceed 14 feet in height when on fill (i.e., embankment) or 8 feet in height when on structure.

- Finally, the length and height of the noise barrier is optimized based on the benefit provided at residences where predicted noise levels approach or exceed the NAC.

A wide range of factors are used to evaluate the feasibility and reasonableness of noise abatement measures.

Feasibility primarily concerns the ability to reduce noise levels by at least 5 dB(A) at the impacted receptor sites using standard construction methods and techniques. In order to be considered feasible according to FDOT criteria, a noise barrier must provide a 5 dB(A) reduction for at least two impacted receptors. Engineering considerations typically assessed during the feasibility analysis include access, drainage, utilities, safety, and maintenance.

Reasonableness implies that common sense and good judgment were applied in a decision related to noise abatement. A reasonableness analysis includes consideration of the cost of abatement, the amount of noise abatement benefit, and consideration of the viewpoints of the impacted and benefited property owners and residents.

FDOT's current statewide average noise barrier unit cost of $30 per square-foot (sf) is used to develop preliminary estimated noise barrier costs. To be deemed reasonable at residential properties, a noise barrier should, at a minimum, meet two important criteria used by FDOT:

- The estimated construction cost cannot exceed the reasonable cost criteria of $42,000 per benefited receptor site, and
- The noise barrier must reduce noise levels by at least 7 dB(A) at one or more impacted receptor sites.

The reasonableness and feasibility of noise abatement measures for non-residential/special use sites are assessed in accordance with the FDOT report *A Method to Determine Reasonableness and Feasibility of Noise Abatement at Special Use Locations*[7] (updated July 22, 2009).

Noise barriers are evaluated based on the benefit provided to impacted noise sensitive locations where the predicted Preferred Alternative traffic noise levels approach or exceed the NAC or result in a substantial increase above existing worst-case traffic noise levels. For the process of evaluating the most cost-effective noise barrier for the maximum number of impacted noise-sensitive sites, various noise barrier design concepts are evaluated to determine the most effective location, length, and height. At some locations, a noise barrier may also benefit additional non-impacted noise-sensitive sites. Furthermore, 23 CFR 772 does not require consideration of noise abatement for non-impacted sites. Thus, noise barriers are not specifically designed to benefit them.

3 Traffic Noise Analysis

The traffic noise analysis includes existing field-monitored noise levels, noise model validation, and prediction of noise levels for design year (2045) of the No Build and Preferred Alternative. Field monitoring sites representing noise-sensitive sites were established by aerial imagery, field reviews, and in coordination with FDOT. The following describes the field monitoring sites:

- FM-1: Exterior areas of use (mainly hotels) adjacent to US 192
- FM-2: Exterior areas of use and homes adjacent to SR 535 between US 192 and Calypso Cay Way.
- FM-3: Exterior areas of use (mainly restaurants) adjacent to SR 535 between Calypso Cay Way and N Poinciana Boulevard.
- FM-4: Areas of public use adjacent to SR 535 between World Center Drive and Lake Bryan Beach Boulevard.
- FM-5: Exterior areas of use (mainly hotels) adjacent to World Center Drive between SR 535 and International Drive.

3.1 Field Measurement Data Collection

All field measurements were conducted following procedures documented in *FHWA's Measurement of Highway-Related Noise*[8] and the *Traffic Noise Modeling and Analysis Practitioner's Handbook*[4]. The results for all of the field measurements are provided in **Table 3-1**. Field monitoring sheets documenting all monitoring events are provided in **Appendix C**.

All measurements were collected using a CEL-246 noise meter. The noise meter was calibrated before and after all measurements using a field calibrator. All measurements were taken at a height of 5 feet above ground level. Traffic data, including vehicle counts, classifications, and speeds, were collected during the sampling periods by the field team.

This space intentionally left blank

Figure 3-1: Field Monitoring Locations

3.2 Computer Noise Model Validation

Site conditions and traffic data gathered during the field measurements were used to develop inputs to the FHWA's TNM 2.5 for computer models representative of the field conditions. Additional geometric information necessary for these models were developed from aerial imagery and MicroStation files of the existing conditions in the project study area. The TNM results were then compared to the noise level data collected during the field measurements (see **Table 3-1**). The model inputs for the field conditions were deemed to be within an acceptable level of accuracy since the predicted noise levels are within ±3.0 dB(A) of the measured noise levels in accordance with *Chapter 18 of the FDOT PD&E Manual*[2], and the 2018 *FDOT Traffic Noise Modeling and Analysis Practitioner's Handbook*[4]. Thus, further use of the TNM model on this project is supported.

Table 3-1: Field Measurement Data

FIELD RECEPTOR SITE NUMBER - LOCATION	SAMPLE RUN	DATE/TIME	DISTANCE FROM EDGE OF NEAR TRAVEL LANE (Feet)	MEASURED NOISE LEVEL [dB(A)]	MODELED TRAFFIC NOISE LEVEL [dB(A)]	DIFFERENCE (Measured - Modeled) [dB(A)]
FR-1	A	8/9/2022 12:22 pm	50	58.4	60.4	-2.0
			100	57.7	57.4	0.3
	B	8/9/2022 12:33 pm	50	61.2	58.2	3.0
			100	58.2	55.5	2.7
	C	8/9/2022 12:44 pm	50	59.4	59.3	0.1
			100	59.0	56.6	2.4
FR-2	A	8/9/2022 1:35 pm	50	65.2	67.5	-2.3
			100	60.8	63.2	-2.4
	B	8/9/2022 1:45 pm	50	61.7	64.1	-2.4
			100	60.5	61.1	-0.6
	C	8/9/2022 1:55 pm	50	63.3	65.4	-2.1
			100	59.2	61.6	-2.4
FR-3	A	8/9/2022 2:28 pm	50	66.3	66.6	-0.3
			100	64.4	62.2	2.2
	B	8/9/2022 2:39 pm	50	64.8	65.0	-0.2
			100	60.1	60.4	-0.3
	C	8/9/2022 2:50 pm	50	64.7	66.5	-1.8
			100	62.7	62.1	0.6
FR-4	A	8/9/2022 3:19 pm	50	65.3	68.0	-2.7
			100	63.0	63.8	-0.8
	B	8/9/2022 3:29 pm	50	64.5	67.3	-2.8
			100	63.9	63.1	0.8
	C	8/9/2022 3:39 pm	50	65.8	68.3	-2.5
			100	64.0	64.0	0.0
FR-5	A	8/9/2022 12:48 pm	50	65.1	65.2	-0.1
			100	61.6	61.1	0.5
	B	8/9/2022 12:58 pm	50	64.6	65.0	-0.4
			100	60.5	60.7	-0.2
	C	8/9/2022 1:09 pm	50	63.3	64.8	-1.5
			100	59.7	60.8	-1.1

3.3 Predicted Noise Levels

Within the project limits, noise-sensitive land uses that are specified in the NAC include:

- **Activity Category B** (residential areas) – Includes 32 single-family homes in the project corridor, part of The Cove.
- **Activity Category C** (exterior areas of public use) – Includes the Hawk's Landing Golf Course
- **Activity Category E** (Outdoor use areas, e.g. restaurants) – Four (4) hotels with exterior areas of use were identified within the project area which include the Golden Link Hotel, Embassy Suites, Hampton Inn Suites, and Buena Vista Suites. Five (5) restaurants with exterior seating were located within the project corridor which include Smokey Bones, Miller's Alehouse, Starbucks, Twistee Treat, and Wendy's.

No Activity Category A lands, which are sites on which serenity and quiet are of extraordinary significance and serve an important public need, and where the preservation of those qualities is essential for the area to continue to serve its intended purpose, are found along the project corridor.

No Activity Category D lands, which are interior locations that require a lower noise threshold (e.g. Auditoriums, medical facilities, libraries, recording studios), are found along the project corridor.

Nineteen (19) model receptor locations which would represent 42 noise-sensitive sites as described previously were input into the TNM model. These locations are described in **Table 3-2**. The identifiers for each model receptor generally include the first several letters of the community or site name along with sequential numbering for sites where more than one model receptor is located. Each line item in the table is a single receptor which represents one or more noise-sensitive site. These locations are shown in **Figure 3-2**.

This space intentionally left blank

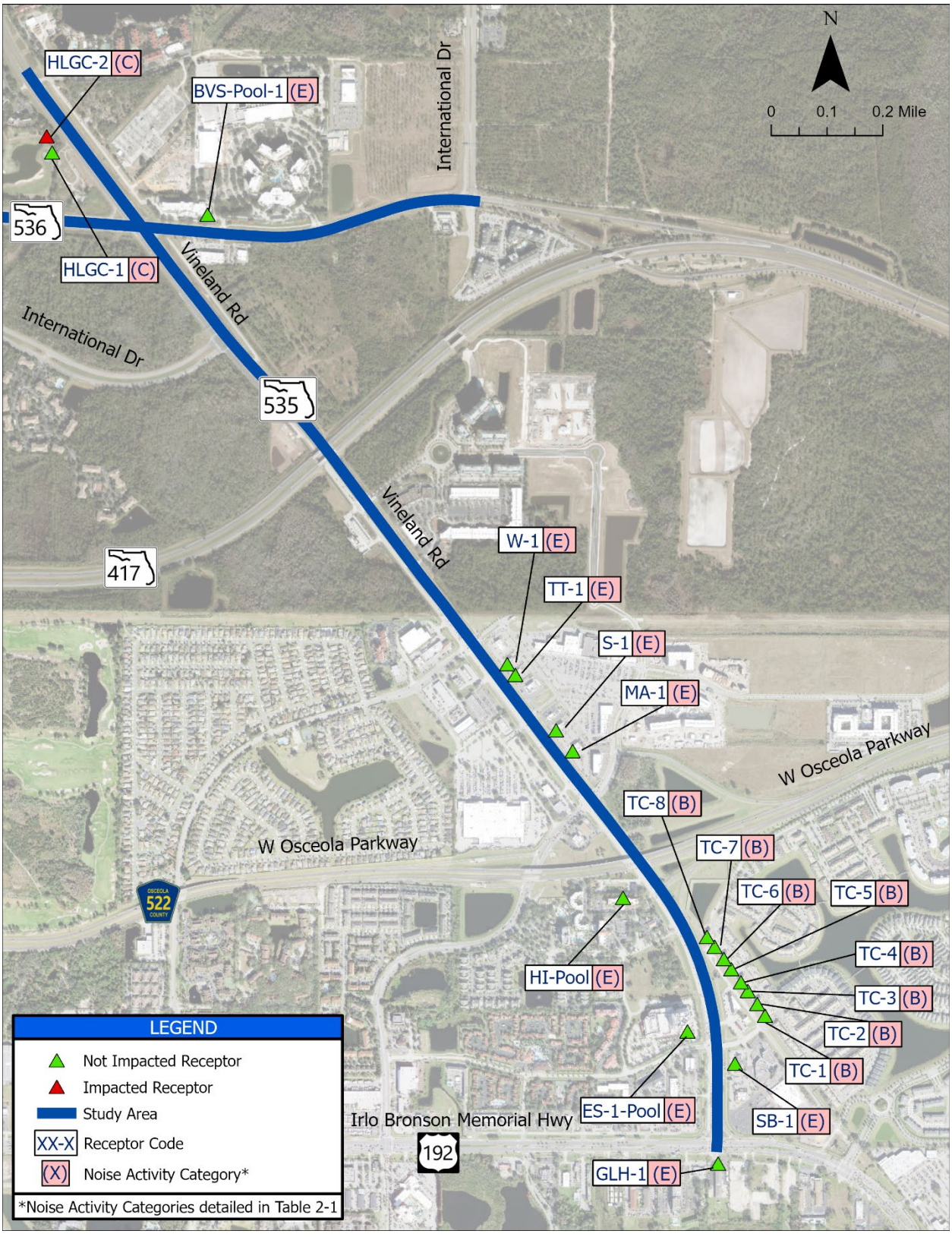

Figure 3-2: Noise Sensitive Receptor Locations

Traffic noise levels were predicted along the project corridor for the Existing Conditions, No Build, and the Preferred Alternative, see **Figure 3-3** for results of the noise analysis and the design of the Preferred Alternative, and **Figures 3-4** to **3-8** for a detailed view of the noise sensitive sites. Existing condition predicted noise levels for the entire project range from 54.3 dB(A) to 67.8 dB(A). Under No Build, traffic noise levels for the entire project are predicted to range from 55.5 dB(A) to 68.9 dB(A). Under the Preferred Alternative, traffic noise levels for the entire project are predicted to range from 56.0 dB(A) to 69.2 dB(A). The highest traffic noise level increase between the Existing Condition and the Preferred Alternative is 2.7 dB(A). Therefore, traffic noise levels throughout the project corridor are not expected to substantially increase above the existing conditions.

Under the Preferred Alternative, traffic noise levels with the planned improvements are predicted to approach or exceed the relevant NAC at one (1) special use site, the Hawk's Landing Golf Course. The feasibility and reasonableness of providing a noise barrier to reduce traffic noise has been evaluated for the Hawk's Landing Golf Club.

It should be noted that, at the time of submittal for this NSR, progress has been monitored for the site being planned for development on the southeast corner of SR 535 and World Center Drive. No official Building Permits have been approved for construction. However, generalized future noise impact contours for the properties in the immediate vicinity of the project have been developed for Noise Abatement Activity Categories B/C and E (i.e., residential/other sensitive land uses and sensitive commercial, respectively). This is further discussed and presented in **Section 6**.

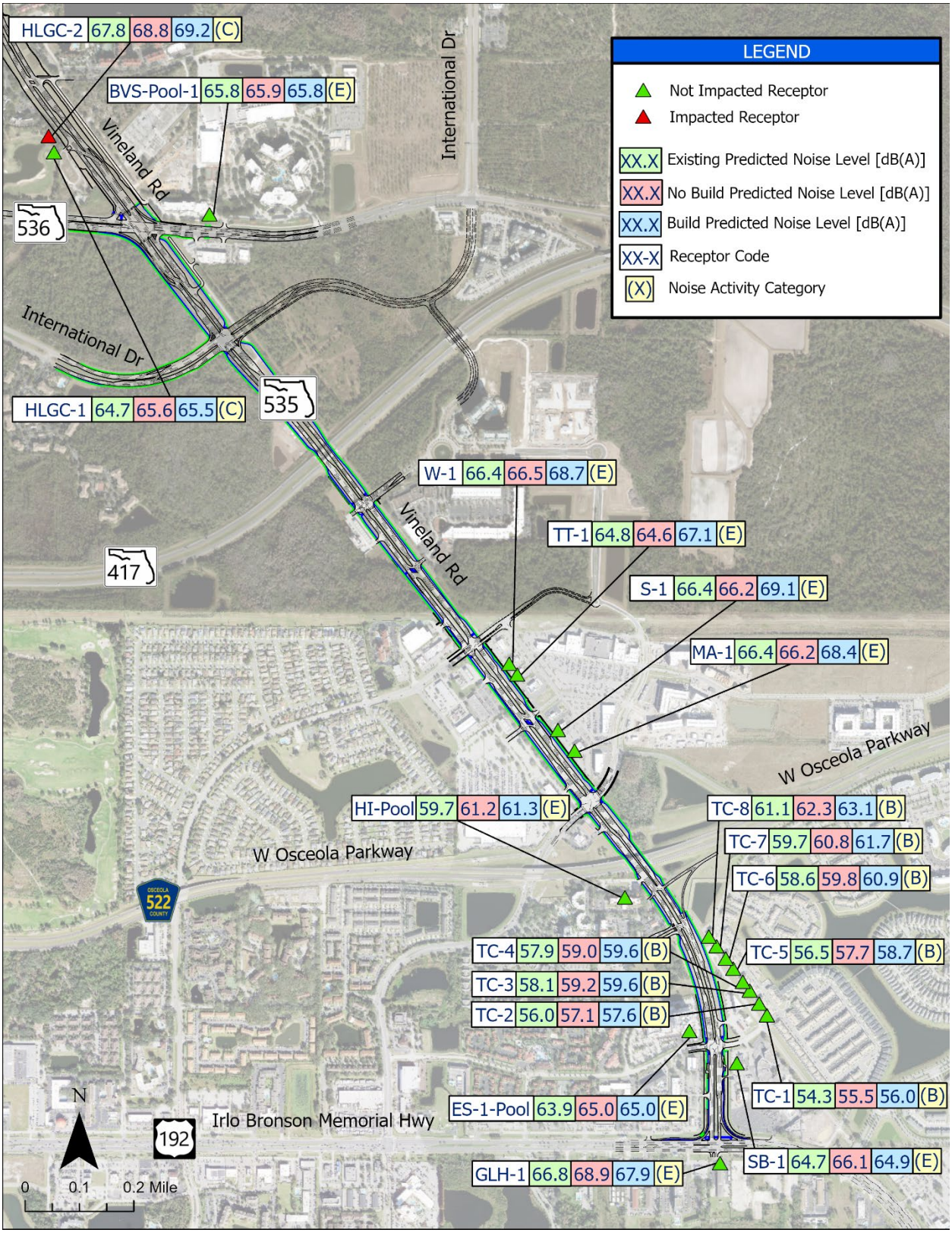

Figure 3-3: Predicted Noise Level Results

Table 3-2: Noise Receptor Locations and Noise Analysis Results

Representative Model Receptor	Site	Location (Station)	Description (Activity Category)	FDOT Noise Abatement [dB(A)]	Number of Noise Sensitive Sites	Distance to Nearest Traffic Lane (Feet)	Predicted Traffic Noise Level [Leq(1h), dB(A)]		
							Existing	No Build	Build
GLH-1	4914 W IRLO BRONSON MEM HWY	100+50.00	Exterior Use (E)	71	1	130	66.8	68.9	67.9
SB-1	2911 VINELAND RD	104+50.00	Exterior Use (E)	71	1	155	64.7	66.1	64.9
ES-1-Pool	4955 KYNGS HEATH RD	111+50.00	Exterior Use (E)	71	1	135	63.9	65.0	65.0
TC-1	4969 WINDERMERE AVE	112+50.00	Residential (B)	66	4	525	54.3	55.5	56.0
TC-2	4961 WINDERMERE AVE	113+25.00	Residential (B)	66	4	485	56.0	57.1	57.6
TC-3	4951 WINDERMERE AVE	114+50.00	Residential (B)	66	4	390	58.1	59.2	59.6
TC-4	4943 WINDERMERE AVE	115+50.00	Residential (B)	66	4	350	57.9	59.0	59.6
TC-5	4931 WINDERMERE AVE	116+75.00	Residential (B)	66	4	275	56.5	57.7	58.7
TC-6	4923 WINDERMERE AVE	117+75.00	Residential (B)	66	4	225	58.6	59.8	60.9
TC-7	4911 WINDERMERE AVE	119+15.00	Residential (B)	66	4	170	59.7	60.8	61.7
TC-8	4903 WINDERMERE AVE	119+85.00	Residential (B)	66	4	100	61.1	62.3	63.1
MA-1	3151 VINELAND RD	141+15.00	Exterior Use (E)	71	1	145	66.4	66.2	68.4
S-1	3173 VINELAND RD	144+50.00	Exterior Use (E)	71	1	115	66.4	66.2	69.1
TT-1	3269 VINELAND RD	151+15.00	Exterior Use (E)	71	1	150	64.8	64.6	67.1
W-1	3271 VINELAND RD	152+50.00	Exterior Use (E)	71	1	120	66.7	66.5	68.7
HLGC-1	8701 WORLD CENTER DR	218+15.00	Public Area (C)	66	1	215	64.7	65.6	65.5
HLGC-2		220+15.00				130	**67.8**	**68.8**	**69.2**
BVS-Pool-1	8203 WORLD CENTER DR	2049+00.00	Exterior Use (E)	71	1	125	65.8	65.9	65.8
HI-Pool	4971 CALYPSO CAY WAY	127+50.00	Exterior Use (E)	71	1	250	59.7	61.2	61.3

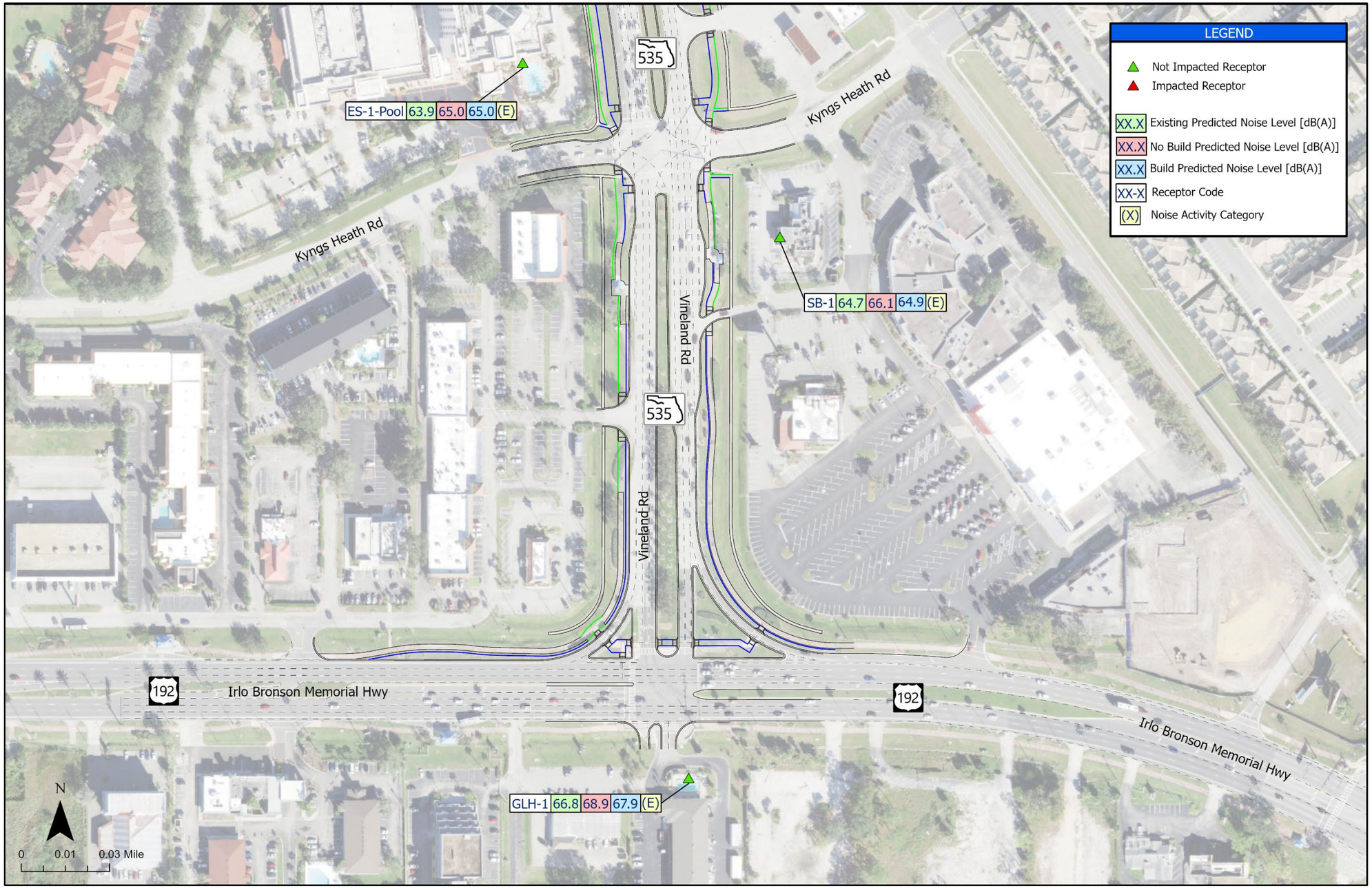

Figure 3-4: Predicted Noise Level Results Detailed - 1 of 4

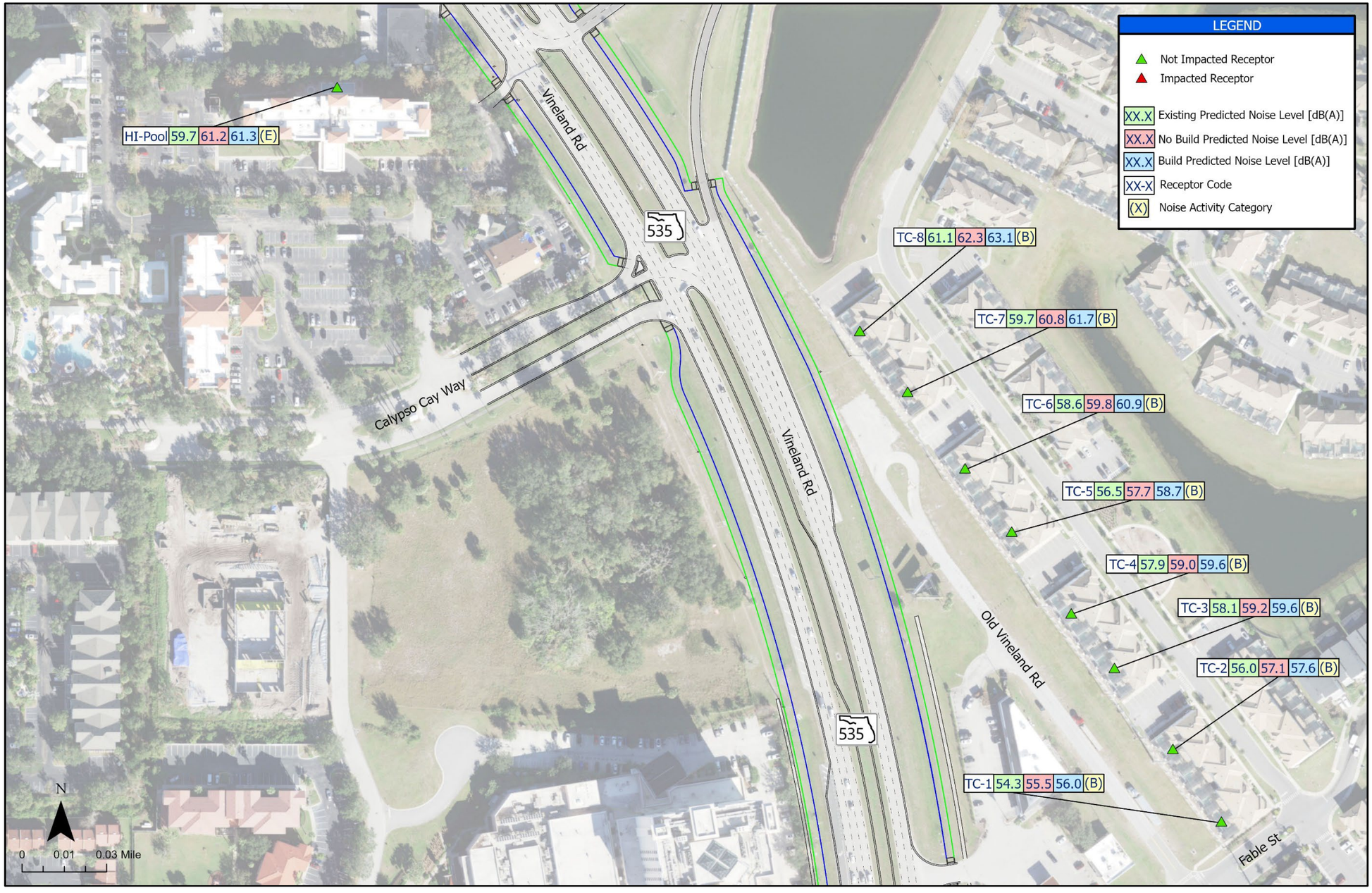

Figure 3-5: Predicted Noise Level Results Detailed - 2 of 4

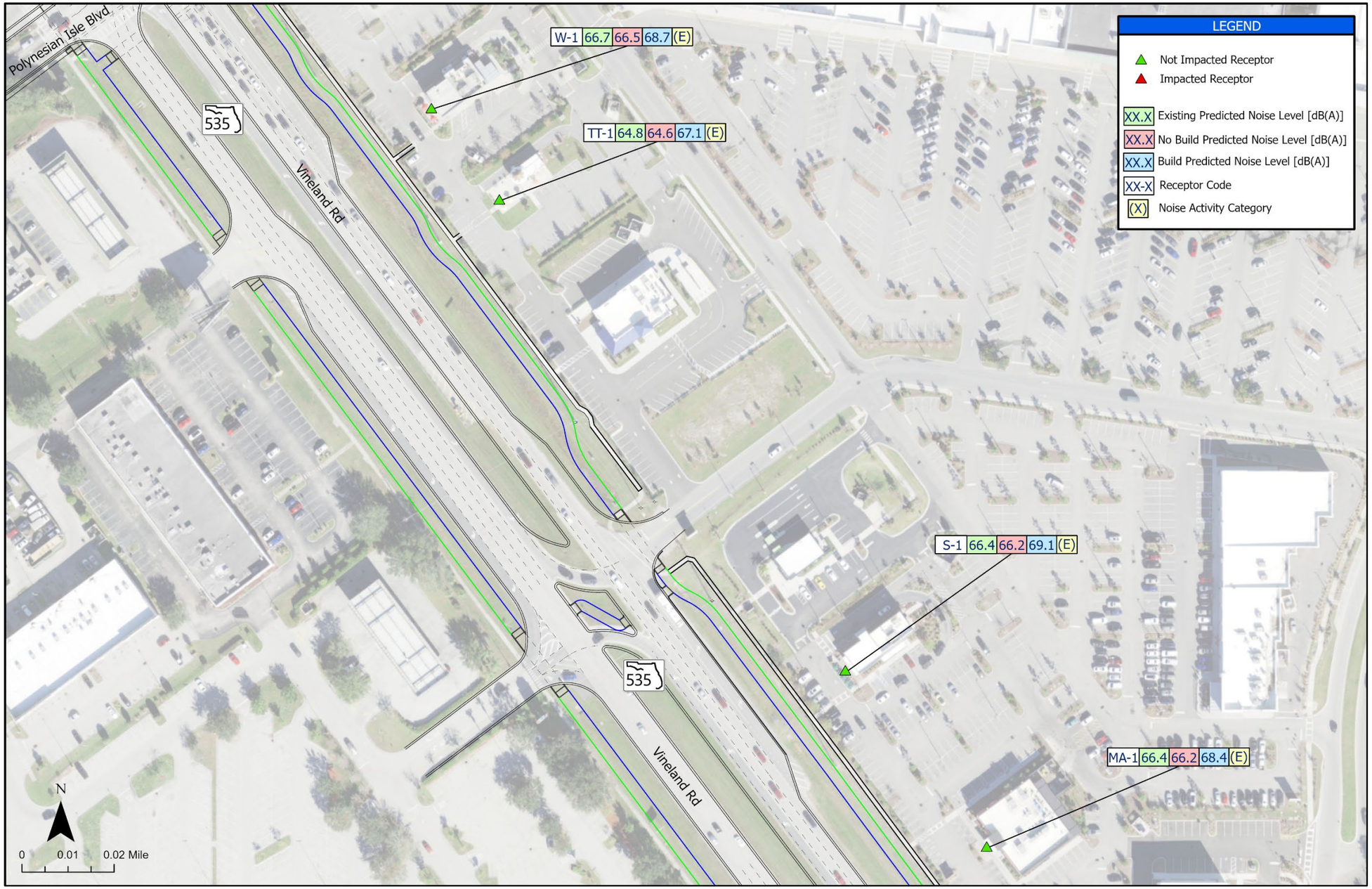

Figure 3-6: Predicted Noise Level Results Detailed - 3 of 4

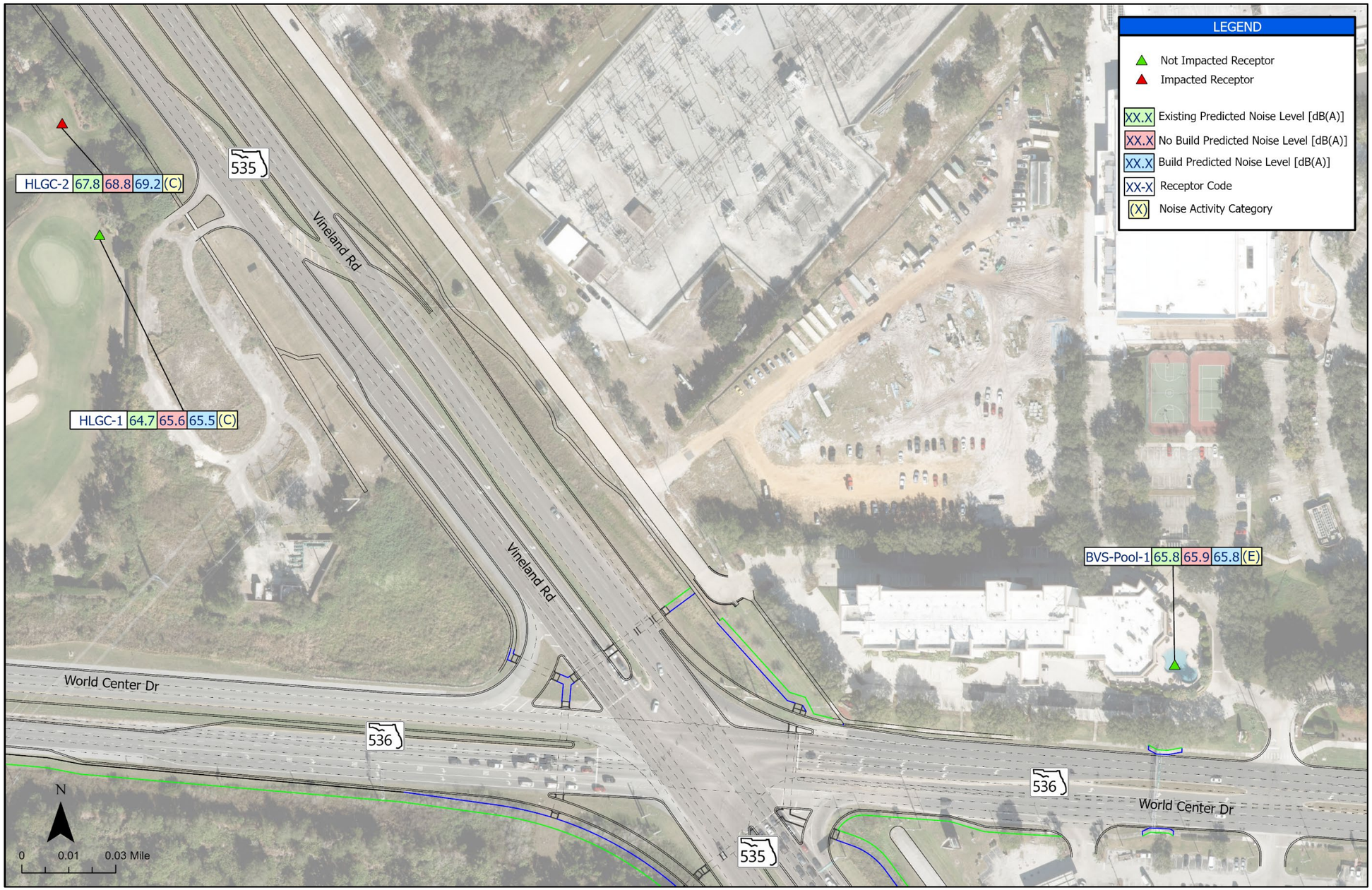

Figure 3-7: Predicted Noise Level Results Detailed - 4 of 4

3.3.1 The Cove

The SR 535 Road residential community consists of a large gated community with multiple single-family homes located on Windermere Avenue adjacent to Old Vineland Road and Kyngs Heath Road. With the planned improvements, the nearest travel lane remains at an equal distance from the residences as widening is occurring on the interior of the roadway. The Preferred Alternative traffic noise levels at these homes are predicted to range from 56.0 dB(A) to 63.1 dB(A). Thirty-two (32) homes within the gated community, all adjacent to Old Vineland Road are not expected to experience noise levels with the planned improvements that approach or exceed the NAC [66.0 dB(A)]. The predicted Preferred Alternative traffic noise levels are expected to increase by no more than 2.3 dB(A) above the existing levels.

This space intentionally left blank

4 Noise Abatement Analysis

Following FDOT policy, it is required that the reasonableness and feasibility of noise abatement be considered when the FHWA NAC is approached or exceeded. The most common and effective noise abatement measure for projects such as this is the construction of noise barriers. The following sections describes the noise abatement analysis performed for the impacted noise sensitive site/area by evaluating the cost reasonableness criteria of providing a noise barrier at the impacted special land use site.

4.1 Special Land Use Sites

The FDOT's special land use methodology was used to determine if the cost of a noise barrier would be reasonable for the impacted recreational areas based on the level of activity expected at the Hawk's Landing Golf Club. The impacted special use included the Hawk's Landing Golf Club. The usage rate of golf course necessary to meet FDOT's cost reasonableness criteria was evaluated based on the average number of peoples per day required to consider a noise barrier as feasible and reasonable. The results of this analysis are summarized in **Table 4-1** and the analyzed noise barrier location is shown in **Figure 4-1**.

Table 4-1: Special Land Use Cost Reasonableness Analysis

Item	Criteria	Input Needed Usage NB-HLGC	Units
1	Enter Length of Proposed Barrier	240	feet
2	Enter Height of Proposed Barrier	8	feet
3	Multiply item 1 by item 2	1,920	$feet^2$
4	Enter the average amount of time that a person stays at the site per visit	1	Hour(s)
5**	Enter the average number of people that use this site per day that will receive at least 5 dB(A) benefit from abatement at the site	**81**	persons
6	Multiply item 4 by item 5	81	person-hours
7	Divide item 3 by item 6	23.70	$feet^2$/person-hours
8	Multiply item 7 by $42,000	$995,400	$/person-hours/$ft^2$
9	Does item 8 exceed the "abatement cost factor" of: $995,935/person-hour/$ft^2$?	Yes	Yes/No
10	If item 9 is no, abatement is reasonable.	No	

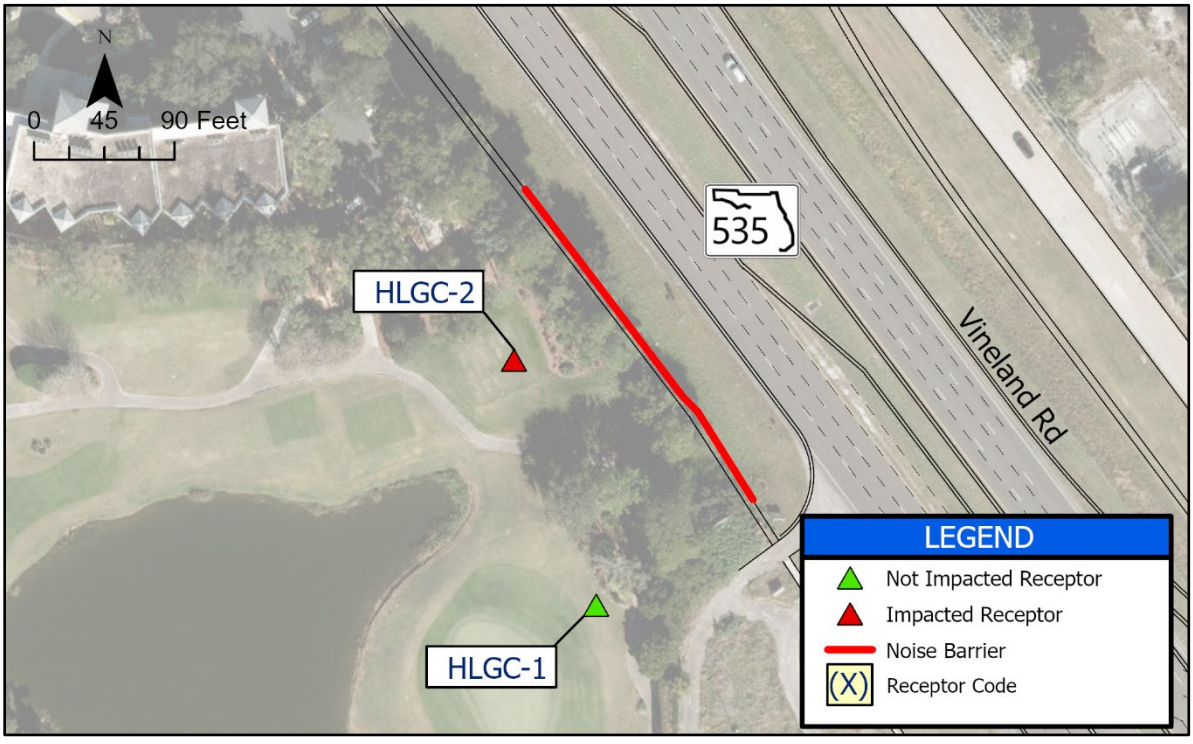

Figure 4-1: Analyzed Noise Barrier Location

Based on the analysis performed, it was determined that at least 81 persons per day, each spending a minimum of an hour at the smaller section of the Hawk's Landing Golf Course, just on the northwest quadrant of SR 535 and SR 536 would need to use the site in order to meet FDOT's cost reasonableness criteria for these noise barriers. It should be noted that individuals utilizing the golf course would utilize the same locations for much less than one hour period. Subsequently, considering the reduced time would greatly increase the amount of persons per day that would be needed to find a noise barrier as feasible and reasonable. Based on the average number of people that would be required to use this site per day, noise barriers at this site were determined to not be reasonable and are not recommended for further consideration or public input.

5 Conclusions and Recommendations

Traffic noise levels were predicted along the project corridor for the Existing Conditions, No Build, and the Preferred Alternative. Throughout the project corridor, 32 single-family homes (Category B/Residential Areas), four (4) hotels along with five (5) restaurants with exterior use (Category E/Outdoor Use Areas) and one (1) non-residential/special land use site consisting of the Hawk's Landing Golf Club (Category C/Recreational Area) were designated as noise sensitive areas. Under the Preferred Alternative, traffic noise levels for the entire project are predicted to range from 56.0 dB(A) to 69.2 dB(A). The highest traffic noise level increase between the Existing Condition and the Preferred Alternative is 2.7 dB(A). Therefore, traffic noise levels throughout the project corridor are not expected to substantially increase above the existing conditions.

Under the Preferred Alternative, traffic noise levels with the planned improvements are predicted to approach or exceed the relevant NAC at one (1) special land use site, the Hawk's Landing Golf Club. The feasibility and reasonableness of providing a noise barrier to reduce traffic noise has been evaluated for the noise-sensitive site predicted to be impacted due to the proposed improvements, no noise abatement measures are recommended as it did not meet the FDOT reasonableness or feasibility criteria.

Based on the noise analyses performed to date, there are no feasible solutions available to mitigate the noise impacts at the locations identified in **Section 4**.

6 Public Involvement

6.1 Land Use Compatibility

To aid in promoting land use compatibility, a copy of the NSR, which provides information that can be used to protect future land development from becoming incompatible with anticipated traffic noise levels, is available to local agencies. In addition, generalized future noise impact contours for the properties in the immediate vicinity of the project have been developed for Noise Abatement Activity Categories B/C and E (i.e., residential/other sensitive land uses and sensitive commercial, respectively). These contours represent the approximate distance from the edge of the nearest proposed travel lane of SR 535 to the limits of the area predicted to approach [i.e., within 1 dB(A)] or exceed the NAC during the design year. These contours do not consider any shielding of noise provided by structures or elevation changes between the receiver and the proposed travel lanes. Within the project corridor, the distances between the proposed edge of the outside travel lane and the contour at various locations are presented in **Table 6-1**.

As previously mentioned, at the time of submittal for this NSR, progress has been monitored for the site being planned for development on the southeast corner of SR 535 and World Center Drive. No official construction permits have been approved for construction, but if that were to change before the NSR is finalized the development will be analyzed further.

Table 6-1: Preferred Alternative Noise Impact Contour Distances

SR 535		Approximate Distance from proposed nearest to SR 535 Lane to Noise Contour Line (feet)	
From	To	71 dB(A) Activity Category E 51 dB(A) Activity Category D	66 dB(A) Activity Category B/C
US 192	Lake Bryan Beach Blvd	50	100

7 Construction Noise and Vibration

Based on the existing land use within the limits of this project, construction of the proposed roadway improvements is not anticipated to have any noise or vibration impact. If noise-sensitive land uses develop adjacent to the roadway prior to construction, additional impacts could result. It is anticipated that the application of the *FDOT Standard Specifications for Road and Bridge Construction*[8] will minimize or eliminate most of the potential construction noise and vibration impacts. However, should unanticipated noise or vibration issues arise during the construction process, the Project Manager, in concert with FDOT's Noise Specialist and the Contractor, will investigate additional methods of controlling these impacts.

8 References

1. 23 CFR Part 772, "*Procedures for Abatement of Highway Traffic Noise and Construction Noise*", Federal Register, Vol. 75, No. 133, Tuesday, July 13, 2010.
2. Florida Department of Transportation, "*Project Development and Environment Manual*, Part 2, *Chapter 18, Noise*", July 1, 2023.
3. Federal Highway Administration Report FHWA-HEP-10-025, "*Highway Traffic Noise: Analysis and Abatement Guidance*", June 2010 (revised December, 2010).
4. *Traffic Noise Modeling and Analysis Practitioner's Handbook; FDOT Environmental Management Office; December 2018*
5. *Florida Department of Transportation, "Quality/ Level of Service Handbook; Systems Planning Office; June 2023.*
6. Florida Department of Transportation, "*Design Manual, Part 2, Chapter 264, Noise Walls and Perimeter Walls*", January 1, 2019.
7. Florida Department of Transportation, "*A Method To Determine Reasonableness and Feasibility of Noise Abatement at Special Use Locations*," July 22. 2009.
8. Florida Department of Transportation, "*Standard Specifications for Road and Bridge Construction*." FY 2024 – 2025.

APPENDIX A

Traffic Data

72 – Hour Classification Counts

ANNUAL VEHICLE CLASSIFICATION REPORT

VHB PROJECT NO: 63311.02 - 2019 Orange County Counts
LOCATION CODE: 1
COUNT LOCATION: SR 535 Btwn EB Ramp to Osceola Pkwy US 192
EQUIPMENT ID: 70

Vehicle Classification	Vehicle Type	Average Daily Statistics	
		Volume	Percentage
Class 1	Motorcycles	279	0.88%
Class 2	Cars	23,472	74.32%
Class 3	Pick-Ups & Vans	4,661	14.76%
Class 4	Buses	156	0.49%
Class 5	2 Axle, Single Unit Trucks	1,344	4.26%
Class 6	3 Axle, Single Unit Trucks	135	0.43%
Class 7	4 Axle, Single Unit Trucks	66	0.21%
Class 8	2 Axle Trctr with 1 or 2 Axle Trlr, 3 Axle Trctr with 1 Axle	672	2.13%
Class 9	3 Axle Tractor with 2 Axle Trailer	89	0.28%
Class 10	3 Axle Tractor with 3 Axle Trailer	105	0.33%
Class 11	5 Axle Multi Trailer	29	0.09%
Class 12	6 Axle Multi Trailer	14	0.04%
Class 13	7 or more Axles	17	0.05%
Class 14	Not Used	543	1.72%
Class 15	Other	0	0.00%
TOTALS		**31,582**	**100.00%**

Vehicle Type	Volume	Percentage
Auto	23,472	75.62%
Medium	6,677	21.51%
Heavy	455	1.47%
Bus	156	0.50%
Motorcycle	279	0.90%
Total	31,039	100.00%

ANNUAL VEHICLE CLASSIFICATION REPORT

VHB PROJECT NO: 63311.02 - 2019 Orange County Counts
LOCATION CODE: 2
COUNT LOCATION: SR 535 between Poinciana Blvd and Polynesian Isle Blvd
EQUIPMENT ID: 70

Vehicle Classification	Vehicle Type	Average Daily Statistics	
		Volume	Percentage
Class 1	Motorcycles	524	1.24%
Class 2	Cars	27,728	65.67%
Class 3	Pick-Ups & Vans	7,717	18.28%
Class 4	Buses	273	0.65%
Class 5	2 Axle, Single Unit Trucks	1,334	3.16%
Class 6	3 Axle, Single Unit Trucks	293	0.69%
Class 7	4 Axle, Single Unit Trucks	150	0.36%
Class 8	2 Axle Trctr with 1 or 2 Axle Trlr, 3 Axle Trctr with 1 Axle	1,476	3.50%
Class 9	3 Axle Tractor with 2 Axle Trailer	234	0.55%
Class 10	3 Axle Tractor with 3 Axle Trailer	264	0.63%
Class 11	5 Axle Multi Trailer	124	0.29%
Class 12	6 Axle Multi Trailer	70	0.17%
Class 13	7 or more Axles	93	0.22%
Class 14	Not Used	1,946	4.61%
Class 15	Other	0	0.00%
TOTALS		**42,226**	**100.00%**

Vehicle Type	Volume	Percentage
Auto	27,728	68.84%
Medium	10,527	26.13%
Heavy	1,228	3.05%
Bus	273	0.68%
Motorcycle	524	1.30%
Total	40,280	100.00%

ANNUAL VEHICLE CLASSIFICATION REPORT

VHB PROJECT NO: 63311.02 - 2019 Orange County Counts
LOCATION CODE: 3
COUNT LOCATION: SR 535 between LBV Factory Stores Dr International Dr
EQUIPMENT ID: 0

Vehicle Classification	Vehicle Type	Average Daily Statistics	
		Volume	Percentage
Class 1	Motorcycles	1,110	2.22%
Class 2	Cars	34,512	68.97%
Class 3	Pick-Ups & Vans	8,423	16.83%
Class 4	Buses	417	0.83%
Class 5	2 Axle, Single Unit Trucks	1,091	2.18%
Class 6	3 Axle, Single Unit Trucks	370	0.74%
Class 7	4 Axle, Single Unit Trucks	238	0.48%
Class 8	2 Axle Trctr with 1 or 2 Axle Trlr, 3 Axle Trctr with 1 Axle	1,180	2.36%
Class 9	3 Axle Tractor with 2 Axle Trailer	243	0.49%
Class 10	3 Axle Tractor with 3 Axle Trailer	374	0.75%
Class 11	5 Axle Multi Trailer	122	0.24%
Class 12	6 Axle Multi Trailer	55	0.11%
Class 13	7 or more Axles	101	0.20%
Class 14	Not Used	1,801	3.60%
Class 15	Other	0	0.00%
TOTALS		**50,037**	**100.00%**

Vehicle Type	Volume	Percentage
Auto	34,512	71.55%
Medium	10,694	22.17%
Heavy	1,503	3.12%
Bus	417	0.86%
Motorcycle	1,110	2.30%
Total	48,236	100.00%

ANNUAL VEHICLE CLASSIFICATION REPORT

VHB PROJECT NO: 63311.02 - 2019 Orange County Counts
LOCATION CODE: 4
COUNT LOCATION: SR 535 between International Dr and SR 536
EQUIPMENT ID: 0

Vehicle Classification	Vehicle Type	Average Daily Statistics	
		Volume	Percentage
Class 1	Motorcycles	235	0.51%
Class 2	Cars	33,261	71.60%
Class 3	Pick-Ups & Vans	5,949	12.81%
Class 4	Buses	565	1.22%
Class 5	2 Axle, Single Unit Trucks	1,332	2.87%
Class 6	3 Axle, Single Unit Trucks	194	0.42%
Class 7	4 Axle, Single Unit Trucks	31	0.07%
Class 8	2 Axle Trctr with 1 or 2 Axle Trlr, 3 Axle Trctr with 1 Axle	1,103	2.37%
Class 9	3 Axle Tractor with 2 Axle Trailer	121	0.26%
Class 10	3 Axle Tractor with 3 Axle Trailer	213	0.46%
Class 11	5 Axle Multi Trailer	231	0.50%
Class 12	6 Axle Multi Trailer	47	0.10%
Class 13	7 or more Axles	71	0.15%
Class 14	Not Used	3,104	6.68%
Class 15	Other	0	0.00%
TOTALS		**46,457**	**100.00%**

Vehicle Type	Volume	Percentage
Auto	33,261	76.72%
Medium	8,384	19.34%
Heavy	908	2.09%
Bus	565	1.30%
Motorcycle	235	0.54%
Total	43,353	100.00%

ANNUAL VEHICLE CLASSIFICATION REPORT

VHB PROJECT NO: 63311.02 - 2019 Orange County Counts
LOCATION CODE: 5
COUNT LOCATION: SR 535 between SR 536 and Lake Bryan Beach
EQUIPMENT ID: 0

Vehicle Classification	Vehicle Type	Average Daily Statistics	
		Volume	Percentage
Class 1	Motorcycles	192	0.44%
Class 2	Cars	28,448	65.93%
Class 3	Pick-Ups & Vans	7,428	17.22%
Class 4	Buses	863	2.00%
Class 5	2 Axle, Single Unit Trucks	1,826	4.23%
Class 6	3 Axle, Single Unit Trucks	144	0.33%
Class 7	4 Axle, Single Unit Trucks	27	0.06%
Class 8	2 Axle Trctr with 1 or 2 Axle Trlr, 3 Axle Trctr with 1 Axle	1,431	3.32%
Class 9	3 Axle Tractor with 2 Axle Trailer	76	0.18%
Class 10	3 Axle Tractor with 3 Axle Trailer	227	0.53%
Class 11	5 Axle Multi Trailer	315	0.73%
Class 12	6 Axle Multi Trailer	17	0.04%
Class 13	7 or more Axles	89	0.21%
Class 14	Not Used	2,064	4.78%
Class 15	Other	0	0.00%
TOTALS		**43,147**	**100.00%**

Vehicle Type	Volume	Percentage
Auto	28,448	69.25%
Medium	10,685	26.01%
Heavy	895	2.18%
Bus	863	2.10%
Motorcycle	192	0.47%
Total	41,083	100.00%

Excerpt from QLOS Handbook

C3C & C3R

Motor Vehicle Arterial Generalized Service Volume Tables

(C3C-Suburban Commercial)

Peak Hour Directional

	B	C	D	E
1 Lane	*	760	1,070	**
2 Lane	*	1,520	1,810	**
3 Lane	*	2,360	2,680	**
4 Lane	*	3,170	3,180	**

Peak Hour Two-Way

	B	C	D	E
2 Lane	*	1,380	1,950	**
4 Lane	*	2,760	3,290	**
6 Lane	*	4,290	4,870	**
8 Lane	*	5,760	5,780	**

AADT

	B	C	D	E
2 Lane	*	15,300	21,700	**
4 Lane	*	30,700	36,600	**
6 Lane	*	47,700	54,100	**
8 Lane	*	64,000	64,200	**

(C3R-Suburban Residential)

	B	C	D	E
1 Lane	*	970	1,110	**
2 Lane	*	1,700	1,850	**
3 Lane	*	2,620	2,730	**

	B	C	D	E
2 Lane	*	1,760	2,020	**
4 Lane	*	3,090	3,360	**
6 Lane	*	4,760	4,960	**

	B	C	D	E
2 Lane	*	19,600	22,400	**
4 Lane	*	34,300	37,300	**
6 Lane	*	52,900	55,100	**

Adjustment Factors

The peak hour directional service volumes should be adjust by multiplying by 1.2 for one-way facilities
The AADT service volumes should be adjusted by multiplying 0.6 for one way facilities 2 Lane Divided Roadway with an Exclusive Left Turn Lane(s): Multiply by 1.05
2 lane Undivided Roadway with No Exclusive Left Turn Lane(s): Multiply by 0.80
Exclusive right turn lane(s): Multiply by 1.05
Multilane Undivided Roadway with an Exclusive Left Turn Lane(s): Multiply by 0.95
Multilane Roadway with No Exclusive Left Turn Lane(s): Multiply by 0.75
Non-State Signalized Roadway: Multiply by 0.90

This table does not constitute a standard and should be used only for general planning applications. The table should not be used for corridor or intersection design, where more refined techniques exist.
* Cannot be achieved using table input value defaults.
** Not applicable for that level of service letter grade. For the automobile mode, volumes greater than level of service D become F because intersection capacities have been reached.

TNM Traffic Data Sources

Existing

Intersection	Segments	Existing										Vehicle Traffic Factors				
		# Lanes Existing	NB-EB Existing TMV (AM)	SB-WB Existing TMV (AM)	NB-EB Existing TMV (PM)	SB-WB Existing TMV (PM)	Existing Peak Hour TMV (NB-EB)	Existing Peak Hour TMV (SB-WB)	QLOS LOS C Volume	TNM Traffic Data Source (NB-EB)	TNM Traffic Data Source (SB-WB)	Auto	Medium	Heavy	Bus	Motorcycle
SR 535@Lake Bryan Beach Blvd	Lake Bryan Beach Blvd, west of SR 535 (Local)	1	0	29	0	51	0	51	760	TMV	TMV	69.2%	26.0%	2.2%	2.1%	0.5%
	Lake Bryan Beach Blvd, East of SR 535 (Local)	1	110	64	54	160	110	160	760	TMV	TMV	69.2%	26.0%	2.2%	2.1%	0.5%
	SR 535, North of Lake Bryan Beach Blvd(Regional)	3	1,932	1,258	1,620	1,796	1932	1796	2360	TMV	TMV	69.2%	26.0%	2.2%	2.1%	0.5%
	SR 535, South of Lake Bryan Beach Blvd(Regional)	3	1,971	1,222	1,602	1,833	1971	1833	2360	TMV	TMV	69.2%	26.0%	2.2%	2.1%	0.5%
SR 535@World Center Dr	World Center Dr, west of SR 535(Regional)	2	620	1,614	1,463	1,406	1463	1614	1520	TMV	QLOS Handbook	76.7%	19.3%	2.1%	1.3%	0.5%
	World Center Dr, East of SR 535(Regional)	2	1,015	1,547	2,148	1,896	2148	1896	1520	QLOS Handbook	QLOS Handbook	76.7%	19.3%	2.1%	1.3%	0.5%
	SR 535, North of World Center Dr(Regional)	3	1,971	1,222	1,602	1,833	1971	1833	2360	TMV	TMV	76.7%	19.3%	2.1%	1.3%	0.5%
	SR 535, South of World Center Dr(Regional)	3	2,379	1,168	2,156	2,192	2379	2192	2360	QLOS Handbook	TMV	76.7%	19.3%	2.1%	1.3%	0.5%
SR 535@International Dr S	International Dr S, West of SR 535(Regional)	3	620	124	1,463	154	1463	154	2360	TMV	TMV	71.5%	22.2%	3.1%	0.9%	2.3%
	International Dr S, East of SR 535(Regional)	3	-	-	-	-	0	0	2360	TMV	TMV	71.5%	22.2%	3.1%	0.9%	2.3%
	SR 535, North of International Dr S(Regional)	3	2,379	1,168	2,156	2,192	2379	2192	2360	QLOS Handbook	TMV	76.7%	19.3%	2.1%	1.3%	0.5%
	SR 535, South of International Dr S(Regional)	2	2,347	1,168	1,714	2,448	2347	2448	1520	QLOS Handbook	QLOS Handbook	71.5%	22.2%	3.1%	0.9%	2.3%
SR 535@LBV Factory Stores Dr	LBV Factory Stores Dr, west of SR 535 (Local)	1	25	63	32	117	32	117	760	TMV	TMV	71.5%	22.2%	3.1%	0.9%	2.3%
	LBV Factory Stores Dr, East of SR 535 (Local)	2	71	71	112	112	112	112	1520	TMV	TMV	71.5%	22.2%	3.1%	0.9%	2.3%
	SR 535, North of LBV Factory Stores Dr(Regional)	2	2,347	1,168	1,714	2,448	2347	2448	1520	QLOS Handbook	QLOS Handbook	71.5%	22.2%	3.1%	0.9%	2.3%
	SR 535, South LBV Factory Stores Dr(Regional)	2	2,309	1,090	1,610	2,367	2309	2367	1520	QLOS Handbook	QLOS Handbook	71.5%	22.2%	3.1%	0.9%	2.3%
SR 535@Polynesian Isle Blvd	Polynesian Isle Blvd, west of SR 535 (Local)	2	395	153	410	527	410	527	1520	TMV	TMV	68.8%	26.1%	3.0%	0.7%	1.3%
	Polynesian Isle Blvd, East of SR 535 (Local)	2	30	200	158	244	158	244	1520	TMV	TMV	68.8%	26.1%	3.0%	0.7%	1.3%
	SR 535, North of Polynesian Isle Blvd(Regional)	2	2,333	1,104	1,648	2,347	2333	2347	1520	QLOS Handbook	QLOS Handbook	68.8%	26.1%	3.0%	0.7%	1.3%
	SR 535, South of Polynesian Isle Blvd(Regional)	2	1,837	1,020	1,288	1,956	1837	1956	1520	QLOS Handbook	QLOS Handbook	68.8%	26.1%	3.0%	0.7%	1.3%
SR 535@Poinciana Blvd	Poinciana Blvd, west of SR 535(Regional)	2	788	450	632	825	788	825	1520	TMV	TMV	68.8%	26.1%	3.0%	0.7%	1.3%
	Poinciana Blvd, East of SR 535(Local)	2	76	236	129	490	129	490	1520	TMV	TMV	68.8%	26.1%	3.0%	0.7%	1.3%
	SR 535, North of Poinciana Blvd(Regional)	2	1,821	998	1,287	1,922	1821	1922	1520	QLOS Handbook	QLOS Handbook	68.8%	26.1%	3.0%	0.7%	1.3%
	SR 535, South of Poinciana Blvd(Regional)	2	1,084	759	784	1,587	1084	1587	1520	TMV	QLOS Handbook	68.8%	26.1%	3.0%	0.7%	1.3%
SR 535@Osceola Pkwy On-Ramps	Calypso Cay Way, west of SR 535(Local)	1	118	76	123	55	123	76	760	TMV	TMV	75.6%	21.5%	1.5%	0.5%	0.9%
	Osceola Pkwy On ramp (WB), East of SR 535	1	196	-	459	-	459	0	760	TMV	TMV	75.6%	21.5%	1.5%	0.5%	0.9%
	SR 535, North of Osceola Pkwy On ramp(Regional)	3	1,134	606	865	1,214	1134	1214	2360	TMV	TMV	75.6%	21.5%	1.5%	0.5%	0.9%
	SR 535, South of Osceola Pkwy On ramp(Regional)	2	1,183	621	888	1,250	1183	1250	1520	TMV	TMV	75.6%	21.5%	1.5%	0.5%	0.9%
SR 535@Kyngs Heath Rd	Kyngs Heath Rd, west of SR 535(Local)	1	137	79	284	140	284	140	760	TMV	TMV	75.6%	21.5%	1.5%	0.5%	0.9%
	Kyngs Heath Rd, East of SR 535(Local)	1	78	79	149	111	149	111	760	TMV	TMV	75.6%	21.5%	1.5%	0.5%	0.9%
	SR 535, North of Kyngs Heath Rd(Regional)	2	1,183	613	888	1,250	1183	1250	1520	TMV	TMV	75.6%	21.5%	1.5%	0.5%	0.9%
	SR 535, South of Kyngs Heath Rd(Regional)	2	1,138	548	806	1,134	1138	1134	1520	TMV	TMV	75.6%	21.5%	1.5%	0.5%	0.9%
SR 535@US 192	US 192, west of SR 535(Regional)	3	880	1,350	1,410	1,313	1410	1350	2360	TMV	TMV	75.6%	21.5%	1.5%	0.5%	0.9%
	US 192, East of SR 535(Regional)	3	1,253	2,308	2,227	1,798	2227	2308	2360	TMV	TMV	75.6%	21.5%	1.5%	0.5%	0.9%
	SR 535, North of US 192(Regional)	2	1,090	502	798	1,130	1090	1130	1520	TMV	TMV	75.6%	21.5%	1.5%	0.5%	0.9%
	SR 535, South of US 192(Local)	1	9	6	7	7	9	7	760	TMV	TMV	75.6%	21.5%	1.5%	0.5%	0.9%

No Build

Intersection	Segments	No Build				Vehicle Traffic Factors				
		# Lanes Existing	QLOS LOS C Volume	TNM Traffic Data Source (NB-EB)	TNM Traffic Data Source (SB-WB)	Auto	Medium	Heavy	Bus	Motorcycle
SR 535@Lake Bryan Beach Blvd	Lake Bryan Beach Blvd, west of SR 535 (Local)	1	760	QLOS Handbook	QLOS Handbook	69.2%	26.0%	2.2%	2.1%	0.5%
	Lake Bryan Beach Blvd, East of SR 535 (Local)	1	760	QLOS Handbook	QLOS Handbook	69.2%	26.0%	2.2%	2.1%	0.5%
	SR 535, North of Lake Bryan Beach Blvd(Regional)	3	2360	QLOS Handbook	QLOS Handbook	69.2%	26.0%	2.2%	2.1%	0.5%
	SR 535, South of Lake Bryan Beach Blvd(Regional)	3	2360	QLOS Handbook	QLOS Handbook	69.2%	26.0%	2.2%	2.1%	0.5%
SR 535@World Center Dr	World Center Dr, west of SR 535(Regional)	2	1520	QLOS Handbook	QLOS Handbook	76.7%	19.3%	2.1%	1.3%	0.5%
	World Center Dr, East of SR 535(Regional)	2	1520	QLOS Handbook	QLOS Handbook	76.7%	19.3%	2.1%	1.3%	0.5%
	SR 535, North of World Center Dr(Regional)	3	2360	QLOS Handbook	QLOS Handbook	76.7%	19.3%	2.1%	1.3%	0.5%
	SR 535, South of World Center Dr(Regional)	3	2360	QLOS Handbook	QLOS Handbook	76.7%	19.3%	2.1%	1.3%	0.5%
SR 535@International Dr S	International Dr S, West of SR 535(Regional)	3	2360	QLOS Handbook	QLOS Handbook	71.5%	22.2%	3.1%	0.9%	2.3%
	International Dr S, East of SR 535(Regional)	3	2360	QLOS Handbook	QLOS Handbook	71.5%	22.2%	3.1%	0.9%	2.3%
	SR 535, North of International Dr S(Regional)	3	2360	QLOS Handbook	QLOS Handbook	76.7%	19.3%	2.1%	1.3%	0.5%
	SR 535, South of International Dr S(Regional)	2	1520	QLOS Handbook	QLOS Handbook	71.5%	22.2%	3.1%	0.9%	2.3%
SR 535@LBV Factory Stores Dr	LBV Factory Stores Dr, west of SR 535 (Local)	1	760	QLOS Handbook	QLOS Handbook	71.5%	22.2%	3.1%	0.9%	2.3%
	LBV Factory Stores Dr, East of SR 535 (Local)	2	1520	QLOS Handbook	QLOS Handbook	71.5%	22.2%	3.1%	0.9%	2.3%
	SR 535, North of LBV Factory Stores Dr(Regional)	2	1520	QLOS Handbook	QLOS Handbook	71.5%	22.2%	3.1%	0.9%	2.3%
	SR 535, South LBV Factory Stores Dr(Regional)	2	1520	QLOS Handbook	QLOS Handbook	71.5%	22.2%	3.1%	0.9%	2.3%
SR 535@Polynesian Isle Blvd	Polynesian Isle Blvd, west of SR 535 (Local)	2	1520	QLOS Handbook	QLOS Handbook	68.8%	26.1%	3.0%	0.7%	1.3%
	Polynesian Isle Blvd, East of SR 535 (Local)	2	1520	QLOS Handbook	QLOS Handbook	68.8%	26.1%	3.0%	0.7%	1.3%
	SR 535, North of Polynesian Isle Blvd(Regional)	2	1520	QLOS Handbook	QLOS Handbook	68.8%	26.1%	3.0%	0.7%	1.3%
	SR 535, South of Polynesian Isle Blvd(Regional)	2	1520	QLOS Handbook	QLOS Handbook	68.8%	26.1%	3.0%	0.7%	1.3%
SR 535@Poinciana Blvd	Poinciana Blvd, west of SR 535(Regional)	2	1520	QLOS Handbook	QLOS Handbook	68.8%	26.1%	3.0%	0.7%	1.3%
	Poinciana Blvd, East of SR 535(Local)	2	1520	QLOS Handbook	QLOS Handbook	68.8%	26.1%	3.0%	0.7%	1.3%
	SR 535, North of Poinciana Blvd(Regional)	3	2360	QLOS Handbook	QLOS Handbook	68.8%	26.1%	3.0%	0.7%	1.3%
	SR 535, South of Poinciana Blvd(Regional)	2	1520	QLOS Handbook	QLOS Handbook	68.8%	26.1%	3.0%	0.7%	1.3%
SR 535@Osceola Pkwy On-Ramps	Calypso Cay Way, west of SR 535(Local)	1	760	QLOS Handbook	QLOS Handbook	75.6%	21.5%	1.5%	0.5%	0.9%
	Osceola Pkwy On ramp (WB), East of SR 535	1	760	QLOS Handbook	QLOS Handbook	75.6%	21.5%	1.5%	0.5%	0.9%
	SR 535, North of Osceola Pkwy On ramp(Regional)	2	1520	QLOS Handbook	QLOS Handbook	75.6%	21.5%	1.5%	0.5%	0.9%
	SR 535, South of Osceola Pkwy On ramp(Regional)	2	1520	QLOS Handbook	QLOS Handbook	75.6%	21.5%	1.5%	0.5%	0.9%
SR 535@Kyngs Heath Rd	Kyngs Heath Rd, west of SR 535(Local)	1	760	QLOS Handbook	QLOS Handbook	75.6%	21.5%	1.5%	0.5%	0.9%
	Kyngs Heath Rd, East of SR 535(Local)	1	760	QLOS Handbook	QLOS Handbook	75.6%	21.5%	1.5%	0.5%	0.9%
	SR 535, North of Kyngs Heath Rd(Regional)	2	1520	QLOS Handbook	QLOS Handbook	75.6%	21.5%	1.5%	0.5%	0.9%
	SR 535, South of Kyngs Heath Rd(Regional)	2	1520	QLOS Handbook	QLOS Handbook	75.6%	21.5%	1.5%	0.5%	0.9%
SR 535@US 192	US 192, west of SR 535(Regional)	3	2360	QLOS Handbook	QLOS Handbook	75.6%	21.5%	1.5%	0.5%	0.9%
	US 192, East of SR 535(Regional)	3	2360	QLOS Handbook	QLOS Handbook	75.6%	21.5%	1.5%	0.5%	0.9%
	SR 535, North of US 192(Regional)	2	1520	QLOS Handbook	QLOS Handbook	75.6%	21.5%	1.5%	0.5%	0.9%
	SR 535, South of US 192(Local)	1	760	QLOS Handbook	QLOS Handbook	75.6%	21.5%	1.5%	0.5%	0.9%

Build

Intersection	Segments	Build										Vehicle Traffic Factors				
		# Lanes Build	NB-EB 2045 TMV (AM)	SB-WB 2045 TMV (AM)	NB-EB 2045 TMV (PM)	SB-WB 2045 TMV (PM)	2045 Peak Hour TMV (NB-EB)	2045 Peak Hour TMV (SB-WB)	QLOS LOS C Volume (2025)	TNM Traffic Data Source (NB-EB)	TNM Traffic Data Source (SB-WB)	Auto	Medium	Heavy	Bus	Motorcycle
SR 535@Lake Bryan Beach Blvd	Lake Bryan Beach Blvd, west of SR 535 (Local)	1	23	39	20	62	23	62	760	TMV	TMV	69.2%	26.0%	2.2%	2.1%	0.5%
	Lake Bryan Beach Blvd, East of SR 535 (Local)	1	129	76	73	173	129	173	760	TMV	TMV	69.2%	26.0%	2.2%	2.1%	0.5%
	SR 535, North of Lake Bryan Beach Blvd(Regional)	3	2,478	2,268	2,366	2,412	2478	2412	2360	QLOS Handbook	QLOS Handbook	69.2%	26.0%	2.2%	2.1%	0.5%
	SR 535, South of Lake Bryan Beach Blvd(Regional)	3	2,515	2,236	2,347	2,451	2515	2451	2360	QLOS Handbook	QLOS Handbook	69.2%	26.0%	2.2%	2.1%	0.5%
SR 535@World Center Dr	World Center Dr, west of SR 535(Regional)	2	2,271	2,537	2,372	2,136	2372	2537	1520	QLOS Handbook	QLOS Handbook	76.7%	19.3%	2.1%	1.3%	0.5%
	World Center Dr, East of SR 535(Regional)	2	1,893	2,459	2,235	2,304	2235	2459	1520	QLOS Handbook	QLOS Handbook	76.7%	19.3%	2.1%	1.3%	0.5%
	SR 535, North of World Center Dr(Regional)	3	2,515	2,236	2,347	2,451	2515	2451	2360	QLOS Handbook	QLOS Handbook	76.7%	19.3%	2.1%	1.3%	0.5%
	SR 535, South of World Center Dr(Regional)	3	2,325	2,346	2,232	2,641	2325	2641	2360	TMV	QLOS Handbook	76.7%	19.3%	2.1%	1.3%	0.5%
SR 535@International Dr S	International Dr S, West of SR 535(Regional)	3	2,271	1,391	2,372	1,226	2372	1391	2360	QLOS Handbook	TMV	71.5%	22.2%	3.1%	0.9%	2.3%
	International Dr S, East of SR 535(Regional)	3	1,883	1,578	1,722	1,350	1883	1578	2360	TMV	TMV	71.5%	22.2%	3.1%	0.9%	2.3%
	SR 535, North of International Dr S(Regional)	3	2,325	2,346	2,232	2,641	2325	2641	2360	TMV	QLOS Handbook	76.7%	19.3%	2.1%	1.3%	0.5%
	SR 535, South of International Dr S(Regional)	3	2,938	2,620	2,505	2,922	2938	2922	2360	QLOS Handbook	QLOS Handbook	71.5%	22.2%	3.1%	0.9%	2.3%
SR 535@LBV Factory Stores Dr	LBV Factory Stores Dr, west of SR 535 (Local)	1	46	111	62	194	62	194	760	TMV	TMV	71.5%	22.2%	3.1%	0.9%	2.3%
	LBV Factory Stores Dr, East of SR 535 (Local)	2	404	404	378	378	404	404	1520	TMV	TMV	71.5%	22.2%	3.1%	0.9%	2.3%
	SR 535, North of LBV Factory Stores Dr(Regional)	3	2,938	2,620	2,505	2,922	2938	2922	2360	QLOS Handbook	QLOS Handbook	71.5%	22.2%	3.1%	0.9%	2.3%
	SR 535, South LBV Factory Stores Dr(Regional)	3	2,920	2,776	2,516	2,994	2920	2994	2360	QLOS Handbook	QLOS Handbook	71.5%	22.2%	3.1%	0.9%	2.3%
SR 535@Polynesian Isle Blvd	Polynesian Isle Blvd, west of SR 535 (Local)	2	688	565	664	721	688	721	1520	TMV	TMV	68.8%	26.1%	3.0%	0.7%	1.3%
	Polynesian Isle Blvd, East of SR 535 (Local)	2	416	476	522	456	522	476	1520	TMV	TMV	68.8%	26.1%	3.0%	0.7%	1.3%
	SR 535, North of Polynesian Isle Blvd(Regional)	3	2,961	2,704	2,516	2,928	2961	2928	2360	QLOS Handbook	QLOS Handbook	68.8%	26.1%	3.0%	0.7%	1.3%
	SR 535, South of Polynesian Isle Blvd(Regional)	3	2,682	2,608	2,456	2,745	2682	2745	2360	QLOS Handbook	QLOS Handbook	68.8%	26.1%	3.0%	0.7%	1.3%
SR 535@Poinciana Blvd	Poinciana Blvd, west of SR 535(Regional)	2	919	699	984	858	984	858	1520	TMV	TMV	68.8%	26.1%	3.0%	0.7%	1.3%
	Poinciana Blvd, East of SR 535(Local)	2	508	881	494	955	508	955	1520	TMV	TMV	68.8%	26.1%	3.0%	0.7%	1.3%
	SR 535, North of Poinciana Blvd(Regional)	3	2,682	2,520	2,498	2,637	2682	2637	2360	QLOS Handbook	QLOS Handbook	68.8%	26.1%	3.0%	0.7%	1.3%
	SR 535, South of Poinciana Blvd(Regional)	3	1,732	2,163	1,405	2,131	1732	2163	2360	TMV	TMV	68.8%	26.1%	3.0%	0.7%	1.3%
SR 535@Osceola Pkwy On-Ramps	Calypso Cay Way, west of SR 535(Local)	1	161	105	152	68	161	105	760	TMV	TMV	75.6%	21.5%	1.5%	0.5%	0.9%
	Osceola Pkwy On ramp (WB), East of SR 535	1	746	-	633	-	746	0	760	TMV	TMV	75.6%	21.5%	1.5%	0.5%	0.9%
	SR 535, North of Osceola Pkwy On ramp(Regional)	3	1,863	1,548	1,538	1,631	1863	1631	2360	TMV	TMV	75.6%	21.5%	1.5%	0.5%	0.9%
	SR 535, South of Osceola Pkwy On ramp(Regional)	3	1,918	1,554	1,567	1,676	1918	1676	2360	TMV	TMV	75.6%	21.5%	1.5%	0.5%	0.9%
SR 535@Kyngs Heath Rd	Kyngs Heath Rd, west of SR 535(Local)	1	346	173	370	182	370	182	760	TMV	TMV	75.6%	21.5%	1.5%	0.5%	0.9%
	Kyngs Heath Rd, East of SR 535(Local)	1	356	465	373	353	373	465	760	TMV	TMV	75.6%	21.5%	1.5%	0.5%	0.9%
	SR 535, North of Kyngs Heath Rd(Regional)	3	1,918	1,554	1,567	1,676	1918	1676	2360	TMV	TMV	75.6%	21.5%	1.5%	0.5%	0.9%
	SR 535, South of Kyngs Heath Rd(Regional)	3	1,664	1,409	1,434	1,529	1664	1529	2360	TMV	TMV	75.6%	21.5%	1.5%	0.5%	0.9%
SR 535@US 192	US 192, west of SR 535(Regional)	3	1,610	1,700	1,836	1,501	1836	1700	2360	TMV	TMV	75.6%	21.5%	1.5%	0.5%	0.9%
	US 192, East of SR 535(Regional)	3	2,276	2,618	2,610	2,177	2610	2618	2360	QLOS Handbook	QLOS Handbook	75.6%	21.5%	1.5%	0.5%	0.9%
	SR 535, North of US 192(Regional)	3	1,664	1,409	1,434	1,529	1664	1529	2360	TMV	TMV	75.6%	21.5%	1.5%	0.5%	0.9%
	SR 535, South of US 192(Local)	1	26	23	17	14	26	23	760	TMV	TMV	75.6%	21.5%	1.5%	0.5%	0.9%

APPENDIX B

Field Monitoring Sheets

Site/Run #

Noise Measurement Data Sheet

Date: 8/9/2022 **Measurement Taken by:** SE

Project: SR 535

Site ID: FR1 Run 1

Weather Conditions	Clear	Partly Cloudy	✓	Cloudy	Other

Temperature	Start:	90.8	End:	95.1	(°F)	
Wind Direction	Start:	SSE	End:	SSE		
Wind Speed (Start):	Min:	1.1	Max:	8.9	Average:	3.8 (mph)
Wind Speed (End):	Min:	2.3	Max:	5.5	Average:	4.1 (mph)
Humidity	Start:	58.1	End:	62.2	(%)	

Equipment Data

			50' Run 1	**100'** Run 1
Sound Level Meter:	CEL-246	Serial Number	1443727	3173221

Date of Last Traceable Calibration: 8/9/2022

Calibration:	Start:	✓	End:	✓	Difference: 0.0
Battery:	Start:	Full	End:	Full	
Weighting Scale:	A	Response:			
Calibrator:	CEL-120	Serial Number:	3574097		

Results: Leq: 58.4/57.7
in dB(A)

Major Noise Sources:

Background Noise Sources:

Other Notes/Observations:

Site/Run #

Noise Measurement Data Sheet

Date: 8/9/2022 **Measurement Taken by:** SE 12:33 PM

Project: SR 535

Site ID: FR 1 Run 2

Weather Conditions	Clear		Partly Cloudy	✓	Cloudy		Other
Temperature	Start:	90.5	End:	90.6	(°F)		
Wind Direction	Start:	SSE	End:	SSE			
Wind Speed (Start):	Min:	0.4	Max:	4.3	Average:	3.3	(mph)
Wind Speed (End):	Min:	1.3	Max:	7.2	Average:	2.3	(mph)
Humidity	Start:	57.6	End:	57.2	(%)		

Equipment Data

			50' Run 2	**100'** Run 2
Sound Level Meter:	CEL-246	Serial Number	1443727	3173221

Date of Last Traceable Calibration: 8/9/2022

Calibration:	Start:	✓	End:	✓	Difference:	0.0	
Battery:	Start:	Full	End:	Full			
Weighting Scale:	A		Response:				
Calibrator:	CEL-120		Serial Number:	3574097			

Results: Leq: 61.2/58.2
in dB(A)

Major Noise Sources: SR 535 and US 192 traffic

Background Noise Sources: Helicopter distant 9:20 and 7:10

Other Notes/Observations:

Site/Run #

Noise Measurement Data Sheet

Date: 8/9/2022 **Measurement Taken by:** SE 12:44 PM

Project: SR 535

Site ID: FR1 Run 3

Weather Conditions	Clear	Partly Cloudy	✓	Cloudy	Other
Temperature	Start: 96.5	End: 93.4	(°F)		
Wind Direction	Start: SSE	End: SSE			
Wind Speed (Start):	Min: 1.8	Max: 6.9		Average: 2.2	(mph)
Wind Speed (End):	Min: 0.6	Max: 6.8		Average: 2.7	(mph)
Humidity	Start: 54.8	End: 51.6	(%)		

Equipment Data

			50' Run 3	**100'** Run 3
Sound Level Meter:	CEL-246	Serial Number	1443727	3173221

Date of Last Traceable Calibration: 8/9/2022

Calibration:	Start: ✓	End: ✓		Difference: 0.0	
Battery:	Start: Full	End: Full			
Weighting Scale:	A	Response:			
Calibrator:	CEL-120	Serial Number: 3574097			

Results: Leq: 59.4/59
in dB(A)

Major Noise Sources: SR 535 and US 192

Background Noise Sources: Helicopter 5:04

Other Notes/Observations:

Observed Traffic Data Site #: Run#:

Sample Detailed Data	FR1-1										FR1-2									
Vehicle Types	Auto (mph)		Med. Truck (mph)		Heavy Truck (mph)		Bus (mph)		Motorcycle (mph)		Auto (mph)		Med. Truck (mph)		Heavy Truck (mph)		Bus (mph)		Motorcycle (mph)	
Orientation	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB
Samples																				
Speed	27	27	21	20	26			19			25	22		20	30	19				
	29	15	33		28						28	17				18				
	33	18									29	15								
	35	16									23	19								
	38	15									27	14								
	37	24									31	13								
	28	33									34	13								
	25	15									26	16								
	35	16									27									
	29	16									25									
	28										20									
Average Speed	31	20	27	20	27			19			27	16		20	30	19				
Speed percentile (85%)																				

Sample Detailed Data	FR1-3										FR1-4									
Vehicle Types	Auto (mph)		Med. Truck (mph)		Heavy Truck (mph)		Bus (mph)		Motorcycle (mph)		Auto (mph)		Med. Truck (mph)		Heavy Truck (mph)		Bus (mph)		Motorcycle (mph)	
Orientation	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB
Samples																				
Speed	26	15	27	18	22	25														
	26	16		24		19														
	34	12				19														
	22	17				22														
	25	18																		
	32	22																		
	34	15																		
	30																			
	29																			
	27																			
	28																			
	32																			
Average Speed	29	16	27	21	22	21														
Speed percentile (85%)																				

Observed Traffic Data

Observed Traffic Data Site #: FR1 Run #: 1-3

Vehicle Types	FR1-1		FR1-2		FR1-3	
	Volume	Speed	Volume	Speed	Volume	Speed
Auto	NB: 124 SB: 120	NB: 30 SB: 20	NB: 106 SB: 101	NB: 27 SB: 16	NB: 116 SB: 113	NB: 29 SB: 16
Medium Truck	NB: 2 SB: 1	NB: 27 SB: 20	NB: 0 SB: 1	NB: 0 SB: 25	NB: 1 SB: 2	NB: 29 SB: 16
Heavy Truck	NB: 3 SB: 0	NB: 27 SB: 0	NB: 1 SB: 2	NB: 30 SB: 19	NB: 1 SB: 3	NB: 22 SB: 21
Bus	NB: 0 SB: 1	NB: 0 SB: 19	NB: 0 SB: 0	NB: 0 SB: 0	NB: 0 SB: 0	NB: 0 SB: 0
Motorcycle	NB: 0 SB: 0	NB: 0 SB: 0	NB: 0 SB: 0	NB: 0 SB: 0	NB: 0 SB: 0	NB: 0 SB: 0

Site Sketch

Site/Run #

Noise Measurement Data Sheet

Date: 8/9/2022 **Measurement Taken by:** SE 1:35 PM

Project: SR 535

Site ID: FR 2 Run 1

Weather Conditions	Clear	Partly Cloudy	✓	Cloudy	Other
Temperature	Start: 94.4	End: 95.2	(°F)		
Wind Direction	Start: SSE	End: SSE			
Wind Speed (Start):	Min: 1.6	Max: 4.8		Average: 1.2	(mph)
Wind Speed (End):	Min: 0.9	Max: 7.7		Average: 2.3	(mph)
Humidity	Start: 51.8	End: 48.3	(%)		

Equipment Data

			50' Run 4	**100'** Run 4
Sound Level Meter:	CEL-246	Serial Number	1443727	3173221

Date of Last Traceable Calibration: 8/9/2022

Calibration:	Start: ✓	End: ✓	Difference: 0.0		
Battery:	Start: Full	End: Full			
Weighting Scale:	A	Response:			
Calibrator:	CEL-120	Serial Number: 3574097			

Results: Leq: 65.2/60.8
in dB(A)

Major Noise Sources: SR 535 traffic

Background Noise Sources: Helicopter at 4:38 and 1:45

Other Notes/Observations:

50' noise meter height is at about the same height as the NB SR 535 pavement

Site/Run #

Noise Measurement Data Sheet

Date: 8/9/2022 **Measurement Taken by:** SE 1:45 PM

Project: SR 535

Site ID: FR 2 Run 2

Weather Conditions	Clear	Partly Cloudy	✓	Cloudy	Other

Temperature	Start:	100.4	End:	99.6	(°F)	
Wind Direction	Start:	SSE	End:	SSE		
Wind Speed (Start):	Min:	0.7	Max:	7.7	Average:	3.4 (mph)
Wind Speed (End):	Min:	0.4	Max:	5.4	Average:	3.3 (mph)
Humidity	Start:	45.7	End:	49.8	(%)	

Equipment Data

			50' Run 5	**100'** Run 5
Sound Level Meter:	CEL-246	Serial Number	1443727	3173221

Date of Last Traceable Calibration: 8/9/2022

Calibration:	Start:	✓	End:	✓	Difference: 0.0
Battery:	Start:	Full	End:	Full	
Weighting Scale:	A	Response:			
Calibrator:	CEL-120	Serial Number:	3574097		

Results: Leq: 61.7/60.5
in dB(A)

Major Noise Sources:

Background Noise Sources:

Other Notes/Observations:

Site/Run #

Noise Measurement Data Sheet

Date: 8/9/2022 **Measurement Taken by:** SE 1:55 PM

Project: SR 535

Site ID: FR 2 Run 3

Weather Conditions	Clear	Partly Cloudy	✓	Cloudy	Other

Temperature	Start:	98.4	End:	99.5	(°F)	
Wind Direction	Start:	SSE	End:	SSE		
Wind Speed (Start):	Min:	1.1	Max:	5.8	Average:	2.8 (mph)
Wind Speed (End):	Min:	1.6	Max:	6.2	Average:	3.4 (mph)
Humidity	Start:	49.8	End:	48.2	(%)	

Equipment Data

			50'	**100'**
Sound Level Meter:	CEL-246	Serial Number	1443727	3173221

Date of Last Traceable Calibration: 8/9/2022

Calibration:	Start:	✓	End:	✓	Difference: 0.0
Battery:	Start:	Full	End:	Full	
Weighting Scale:	A	Response:			
Calibrator:	CEL-120	Serial Number:	3574097		

Results: Leq: 63.3/59.2
in dB(A)

Major Noise Sources: SR 535

Background Noise Sources:

Other Notes/Observations:

Observed Traffic Data Site #: Run#:

Sample Detailed Data	FR2-1										FR2-2									
Vehicle Types	Auto (mph)		Med. Truck (mph)		Heavy Truck (mph)		Bus (mph)		Motorcycle (mph)		Auto (mph)		Med. Truck (mph)		Heavy Truck (mph)		Bus (mph)		Motorcycle (mph)	
Orientation	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB
Samples																38				
Speed	48	35	43		52	22	39		45	44	38	43				37				
	43	47	30		56	26	40		44	43	39	44								
	45	33	47		35						45	46								
	43	36	37		36						46	45								
	52	42	46		31						53	42								
	45	43									44	40								
	46	45									43	38								
	47	39									46	47								
	43	43									44	37								
	48	44									46	38								
	40											35								
Average Speed	45	41	41		42	24	40		45	44	44	41				37				
Speed percentile (85%)																				

Sample Detailed Data	FR2-3																			
Vehicle Types	Auto (mph)		Med. Truck (mph)		Heavy Truck (mph)		Bus (mph)		Motorcycle (mph)		Auto (mph)		Med. Truck (mph)		Heavy Truck (mph)		Bus (mph)		Motorcycle (mph)	
Orientation	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB
Samples																				
Speed	46	38	47			51														
	37	33				35														
	33	52																		
	38	40																		
	39	44																		
	37	49																		
	47	41																		
	52	48																		
	41	41																		
	39	44																		
	40	46																		
Average Speed	41	43	47			43														
Speed percentile (85%)																				

Observed Traffic Data

Observed Traffic Data Site #: FR2 Run #: 1-3

Vehicle Types	FR2-1		FR2-2		FR2-3	
	Volume	Speed	Volume	Speed	Volume	Speed
Auto	NB: 148 SB: 140	NB: 45 SB: 41	NB: 116 SB: 155	NB: 44 SB: 41	NB: 160 SB: 135	NB: 41 SB: 43
Medium Truck	NB: 2 SB: 0	NB: 41 SB: 0	NB: 0 SB: 0	NB: 0 SB: 0	NB: 1 SB: 0	NB: 47 SB: 0
Heavy Truck	NB: 5 SB: 0	NB: 42 SB: 0	NB: 0 SB: 0	NB: 0 SB: 0	NB: 0 SB: 2	NB: 0 SB: 43
Bus	NB: 2 SB: 0	NB: 40 SB: 0	NB: 0 SB: 1	NB: 0 SB: 37	NB: 0 SB: 0	NB: 0 SB: 0
Motorcycle	NB: 2 SB: 2	NB: 45 SB: 44	NB: 0 SB: 0	NB: 0 SB: 0	NB: 0 SB: 0	NB: 0 SB: 0

Site Sketch

Site/Run #

Noise Measurement Data Sheet

Date: 8/9/2022 **Measurement Taken by:** SE 2:28 PM

Project: SR 535

Site ID: FR3 Run 1

Weather Conditions	Clear		Partly Cloudy	✓	Cloudy		Other
Temperature	Start:	92.6	End:	97	(°F)		
Wind Direction	Start:	SSE	End:	SSE			
Wind Speed (Start):	Min:	0.1	Max:	3.2	Average:	0.6	(mph)
Wind Speed (End):	Min:	0.4	Max:	2.8	Average:	1.4	(mph)
Humidity	Start:	56.4	End:	48.3	(%)		

Equipment Data

			50' Run 7	**100'** Run 7
Sound Level Meter:	CEL-246	Serial Number	1443727	3173221

Date of Last Traceable Calibration: 8/9/2022

Calibration:	Start:	✓	End:	✓	Difference:	0.0	
Battery:	Start:	Full	End:	Full			
Weighting Scale:	A		Response:				
Calibrator:	CEL-120		Serial Number:	3574097			

Results: Leq: 66.3/64.4
in dB(A)

Major Noise Sources: SR 535

Background Noise Sources:

Other Notes/Observations:

Site/Run #

Noise Measurement Data Sheet

Date: 8/9/2022 **Measurement Taken by:** SE 2:39 PM

Project: SR 535

Site ID: FR3 Run 2

Weather Conditions	Clear	Partly Cloudy	✓	Cloudy	Other

Temperature	Start: 99.1	End:	98.3	(°F)		
Wind Direction	Start: SSE	End:	SSE			
Wind Speed (Start):	Min: 0.3	Max:	6.4	Average:	0.9	(mph)
Wind Speed (End):	Min: 1.4	Max:	3.9	Average:	3	(mph)
Humidity	Start: 47.8	End:	52.8	(%)		

Equipment Data

			50' Run 8	**100'** Run 8
Sound Level Meter:	CEL-246	Serial Number	1443727	3173221

Date of Last Traceable Calibration: 8/9/2022

Calibration:	Start: ✓	End:	✓	Difference:	0.0
Battery:	Start: Full	End:	Full		
Weighting Scale:	A	Response:			
Calibrator:	CEL-120	Serial Number:	3574097		

Results: Leq: 64.8/60.1
in dB(A)

Major Noise Sources:

Background Noise Sources:

Other Notes/Observations:

Site/Run #

Noise Measurement Data Sheet

Date: 8/9/2022 **Measurement Taken by:** SE 2:50 PM

Project: SR 535

Site ID: FR3 Run 3

Weather Conditions	Clear	Partly Cloudy	✓	Cloudy	Other

Temperature	Start:	102.8	End:	99.4	(°F)	
Wind Direction	Start:	SSE	End:	SSE		
Wind Speed (Start):	Min:	1.6	Max:	5.5	Average:	3.2 (mph)
Wind Speed (End):	Min:	1.4	Max:	7.3	Average:	4.1 (mph)
Humidity	Start:	49.1	End:	50.4	(%)	

Equipment Data

			50' Run 9	**100'** Run 9
Sound Level Meter:	CEL-246	Serial Number	1443727	3173221

Date of Last Traceable Calibration: 8/9/2022

Calibration:	Start:	✓	End:	✓	Difference: 0.0
Battery:	Start:	Full	End:	Full	
Weighting Scale:	A	Response:			
Calibrator:	CEL-120	Serial Number:	3574097		

Results: Leq: 64.7/62.7
in dB(A)

Major Noise Sources:

Background Noise Sources:

Other Notes/Observations:

Observed Traffic Data Site #: Run#:

Sample Detailed Data	FR3-1										FR3-2									
Vehicle Types	Auto (mph)		Med. Truck (mph)		Heavy Truck (mph)		Bus (mph)		Motorcycle (mph)		Auto (mph)		Med. Truck (mph)		Heavy Truck (mph)		Bus (mph)		Motorcycle (mph)	
Orientation	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB
Samples																				
Speed	26	44	25	39	27	23			45		31	27	32	39	32	22				
	26	40	42		15	36					33	32	35			38				
	30	42			13						35	31								
	37	37									31	25								
	42	38									32	22								
	37	41									27	18								
	42										29	25								
	41										35	26								
	41										39	28								
	32										30									
	44										35									
Average Speed	36	40	34	39	18	30			45		32	26	34	39	32	30				
Speed percentile (85%)																				

Sample Detailed Data	FR3-3																			
Vehicle Types	Auto (mph)		Med. Truck (mph)		Heavy Truck (mph)		Bus (mph)		Motorcycle (mph)		Auto (mph)		Med. Truck (mph)		Heavy Truck (mph)		Bus (mph)		Motorcycle (mph)	
Orientation	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB
Samples																				
Speed	37	25		43	32	43														
	32	44		25																
	39	26																		
	37	37																		
	34	38																		
	34	41																		
	33	29																		
	35	32																		
	37																			
	30																			
	41																			
Average Speed	35	34		34	32	43														
Speed percentile (85%)																				

Observed Traffic Data

Observed Traffic Data Site #: FR3 Run #: 1-3

Vehicle Types	FR3-1		FR3-2		FR3-3	
	Volume	Speed	Volume	Speed	Volume	Speed
Auto	NB: 236 SB: 217	NB: 36 SB: 40	NB: 273 SB: 280	NB: 32 SB: 26	NB: 279 SB: 248	NB: 35 SB: 34
Medium Truck	NB: 4 SB: 0	NB: 18 SB: 0	NB: 4 SB: 1	NB: 34 SB: 39	NB: 0 SB: 1	NB: 0 SB: 34
Heavy Truck	NB: 1 SB: 7	NB: 38 SB: 30	NB: 2 SB: 3	NB: 32 SB: 30	NB: 1 SB: 8	NB: 32 SB: 43
Bus	NB: 0 SB: 0	NB: 0 SB: 0	NB: 0 SB: 0	NB: 0 SB: 0	NB: 0 SB: 0	NB: 0 SB: 0
Motorcycle	NB: 1 SB: 0	NB: 45 SB: 0	NB: 0 SB: 0	NB: 0 SB: 0	NB: 0 SB: 0	NB: 0 SB: 0

Site Sketch

Site/Run #

Noise Measurement Data Sheet

Date: 8/9/2022 **Measurement Taken by:** SE 3:19 PM

Project: SR 535

Site ID: FR4 Run 1

Weather Conditions	Clear	Partly Cloudy	✓	Cloudy	Other
Temperature	Start: 99.4	End: 98.9	(°F)		
Wind Direction	Start: SSE	End: SSE			
Wind Speed (Start):	Min: 1	Max: 8.1		Average: 5	(mph)
Wind Speed (End):	Min: 0.2	Max: 4.1		Average: 2.7	(mph)
Humidity	Start: 47.1	End: 50.8	(%)		

Equipment Data

			50' Run 10	**100'** Run 10
Sound Level Meter:	CEL-246	Serial Number	1443727	3173221

Date of Last Traceable Calibration: 8/9/2022

Calibration:	Start: ✓	End: ✓		Difference: 0.0	
Battery:	Start: Full	End: Full			
Weighting Scale:	A	Response:			
Calibrator:	CEL-120	Serial Number: 3574097			

Results: Leq: 65.3/63
in dB(A)

Major Noise Sources: SR 535

Background Noise Sources:

Other Notes/Observations: Car near 100' at min 3

Site/Run #

Noise Measurement Data Sheet

Date: 8/9/2022 **Measurement Taken by:** SE 3:29 PM

Project: SR 535

Site ID: FR4 Run 2

Weather Conditions	Clear		Partly Cloudy	✓	Cloudy		Other
Temperature	Start:	96.5	End:	95.8	(°F)		
Wind Direction	Start:	SSE	End:	SSE			
Wind Speed (Start):	Min:	0.8	Max:	5.6	Average:	3.6	(mph)
Wind Speed (End):	Min:	1.2	Max:	7.9	Average:	5.4	(mph)
Humidity	Start:	51.4	End:	52.3	(%)		

Equipment Data

			50' Run 11	**100'** Run 11
Sound Level Meter:	CEL-246	Serial Number	1443727	3173221

Date of Last Traceable Calibration: 8/9/2022

Calibration:	Start:	✓	End:	✓	Difference:	0.0	
Battery:	Start:	Full	End:	Full			
Weighting Scale:	A		Response:				
Calibrator:	CEL-120		Serial Number:	3574097			

Results: Leq: 64.5/63.9
in dB(A)

Major Noise Sources:

Background Noise Sources:

Other Notes/Observations:

Site/Run #

Noise Measurement Data Sheet

Date: 8/9/2022 **Measurement Taken by:** SE 3:39 PM

Project: SR 535

Site ID: FR 4 Run 3

Weather Conditions	Clear	Partly Cloudy	✓	Cloudy	Other
Temperature	Start: 96	End: 96.2	(°F)		
Wind Direction	Start: SSE	End: SSE			
Wind Speed (Start):	Min: 1.4	Max: 4.2		Average: 2.3	(mph)
Wind Speed (End):	Min: 1.1	Max: 7		Average: 3.4	(mph)
Humidity	Start: 50.8	End: 55.5	(%)		

Equipment Data

			50' Run 12	**100'** Run 12
Sound Level Meter:	CEL-246	Serial Number	1443727	3173221

Date of Last Traceable Calibration: 8/9/2022

Calibration:	Start: ✓	End: ✓		Difference: 0.0	
Battery:	Start: Full	End: Full			
Weighting Scale:	A	Response:			
Calibrator:	CEL-120	Serial Number: 3574097			

Results: Leq: 65.8/64
in dB(A)

Major Noise Sources:

Background Noise Sources:

Other Notes/Observations:

Observed Traffic Data Site #: Run#:

Sample Detailed Data	FR3-1										FR3-2									
Vehicle Types	Auto (mph)		Med. Truck (mph)		Heavy Truck (mph)		Bus (mph)		Motorcycle (mph)		Auto (mph)		Med. Truck (mph)		Heavy Truck (mph)		Bus (mph)		Motorcycle (mph)	
Orientation	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB
Samples																				
Speed	54	53	39	33	42						30	37	44	22	39	46		30		
	51	39		34	38						37	39	45			20				
	47	41									35	25								
	45	33									32	34								
	41	34									48	30								
	10	37									50	32								
	46	36									48	40								
	51	39									41	39								
	50										51									
											45									
											60									
Average Speed	44	39	39	34	40						43	35	45	22	39	33		30		
Speed percentile (85%)																				

Sample Detailed Data	FR3-3																			
Vehicle Types	Auto (mph)		Med. Truck (mph)		Heavy Truck (mph)		Bus (mph)		Motorcycle (mph)		Auto (mph)		Med. Truck (mph)		Heavy Truck (mph)		Bus (mph)		Motorcycle (mph)	
Orientation	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB
Samples																				
Speed	60	45			36		39													
	51	47			32															
	45	38																		
	50	47																		
	39	33																		
	39	37																		
	42	41																		
	49	33																		
	42																			
	44																			
Average Speed	46	40				34		39												
Speed percentile (85%)																				

Observed Traffic Data

Observed Traffic Data Site #: FR3 Run #: 1-3

Vehicle Types	FR3-1		FR3-2		FR3-3	
	Volume	Speed	Volume	Speed	Volume	Speed
Auto	NB: 258 SB: 258	NB: 44 SB: 39	NB: 249 SB: 284	NB: 43 SB: 35	NB: 264 SB: 289	NB: 46 SB: 40
Medium Truck	NB: 1 SB: 2	NB: 39 SB: 34	NB: 1 SB: 2	NB: 45 SB: 22	NB: 0 SB: 5	NB: 0 SB: 41
Heavy Truck	NB: 4 SB: 1	NB: 40 SB: 40	NB: 1 SB: 5	NB: 39 SB: 33	NB: 1 SB: 1	NB: 41 SB: 34
Bus	NB: 0 SB: 0	NB: 0 SB: 0	NB: 0 SB: 1	NB: 0 SB: 30	NB: 0 SB: 1	NB: 0 SB: 39
Motorcycle	NB: 0 SB: 0	NB: 0 SB: 0	NB: 1 SB: 1	NB: 35 SB: 35	NB: 0 SB: 0	NB: 0 SB: 0

Site Sketch

Site/Run #

Noise Measurement Data Sheet

Date: 8/9/2022 **Measurement Taken by:** SE 12:48

Project: SR 535

Site ID: FR5 Run 1

Weather Conditions	Clear	Partly Cloudy	✓	Cloudy	Other
Temperature	Start: 92.6	End: 93	(°F)		
Wind Direction	Start: SSE	End: SSE			
Wind Speed (Start):	Min: 0	Max: 3.5		Average: 1.4	(mph)
Wind Speed (End):	Min: 0.4	Max: 4.6		Average: 1.3	(mph)
Humidity	Start: 63.1	End: 59.3	(%)		

Equipment Data

			50' Run 13	**100'** Run 13
Sound Level Meter:	CEL-246	Serial Number	1443727	3173221

Date of Last Traceable Calibration: 8/9/2022

Calibration:	Start: ✓	End: ✓		Difference: 0.0	
Battery:	Start: Full	End: Full			
Weighting Scale:	A	Response:			
Calibrator:	CEL-120	Serial Number: 3574097			

Results: Leq: 65.1/61.6
in dB(A)

Major Noise Sources:

Background Noise Sources: Helicopter min 9:55, 6:00

Other Notes/Observations:

Site/Run #

Noise Measurement Data Sheet

Date: 8/9/2022 **Measurement Taken by:** SE 12:58 PM

Project: SR 535

Site ID: FR5 Run 2

Weather Conditions	Clear	Partly Cloudy ✓	Cloudy	Other
Temperature	Start: 92.7	End: 93.6 (°F)		
Wind Direction	Start: SSE	End: SSE		
Wind Speed (Start):	Min: 0.4	Max: 6.7	Average: 2.3	(mph)
Wind Speed (End):	Min: 0.4	Max: 3.7	Average: 2.1	(mph)
Humidity	Start: 55.3	End: 55.3 (%)		

Equipment Data

			50' Run 14	**100'** Run 14
Sound Level Meter:	CEL-246	Serial Number	1443727	3173221

Date of Last Traceable Calibration: 8/9/2022

Calibration:	Start: ✓	End: ✓	Difference: 0.0		
Battery:	Start: Full	End: Full			
Weighting Scale:	A	Response:			
Calibrator:	CEL-120	Serial Number: 3574097			

Results: Leq: 64/60.5
in dB(A)

Major Noise Sources:

Background Noise Sources:

Other Notes/Observations:

Site/Run #

Noise Measurement Data Sheet

Date: 8/9/2022 **Measurement Taken by:** SE 1:09 PM

Project: SR 535

Site ID: FR5 Run 3

Weather Conditions	Clear	Partly Cloudy	✓	Cloudy	Other
Temperature	Start: 94.9	End: 95.6	(°F)		
Wind Direction	Start: SSE	End: SSE			
Wind Speed (Start):	Min: 0.5	Max: 3.6		Average: 0.9	(mph)
Wind Speed (End):	Min: 0	Max: 1.6		Average: 0.7	(mph)
Humidity	Start: 55.4	End: 54.5	(%)		

Equipment Data

			50' Run15	**100'** Run15
Sound Level Meter:	CEL-246	Serial Number	1443727	3173221

Date of Last Traceable Calibration: 8/9/2022

Calibration:	Start: ✓	End: ✓		Difference: 0.0	
Battery:	Start: Full	End: Full			
Weighting Scale:	A	Response:			
Calibrator:	CEL-120	Serial Number: 3574097			

Results: Leq: 63.3/59.7
in dB(A)

Major Noise Sources:

Background Noise Sources:

Other Notes/Observations:

Observed Traffic Data Site #: Run#:

Sample Detailed Data	FR3-1										FR3-2									
Vehicle Types	Auto (mph)		Med. Truck (mph)		Heavy Truck (mph)		Bus (mph)		Motorcycle (mph)		Auto (mph)		Med. Truck (mph)		Heavy Truck (mph)		Bus (mph)		Motorcycle (mph)	
Orientation	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB
Samples																				
Speed	44	31		45	33	30					38	45		40		34	30			58
	36	38		42	30	35					45	33		32						
	37	47				38					32	38								
	40	34									37	37								
	39	48									38	43								
	38	41									47	38								
	39	33									42	45								
	46	41									40	45								
		52									40	39								
		37									45	43								
		35										48								
Average Speed	40	40		44	32	34					40	41		36		34	30			58
Speed percentile (85%)																				

Sample Detailed Data	FR3-3																			
Vehicle Types	Auto (mph)		Med. Truck (mph)		Heavy Truck (mph)		Bus (mph)		Motorcycle (mph)		Auto (mph)		Med. Truck (mph)		Heavy Truck (mph)		Bus (mph)		Motorcycle (mph)	
Orientation	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB
Samples																				
Speed	37	37	39		37				40											
	50	42	35																	
	36	38																		
	39	40																		
	42	36																		
	44	48																		
	39	41																		
	36	39																		
	46	40																		
	47	41																		
	45	35																		
Average Speed	42	40	37		37				40											
Speed percentile (85%)																				

Observed Traffic Data

Observed Traffic Data Site #: FR3 Run #: 1-3

Vehicle Types	FR3-1		FR3-2		FR3-3	
	Volume	Speed	Volume	Speed	Volume	Speed
Auto	NB: 145 SB: 124	NB: 40 SB: 40	NB: 130 SB: 118	NB: 40 SB: 41	NB: 204 SB: 131	NB: 42 SB: 40
Medium Truck	NB: 2 SB: 2	NB: 44 SB: 44	NB: 0 SB: 1	NB: 0 SB: 36	NB: 1 SB: 2	NB: 37 SB: 37
Heavy Truck	NB: 4 SB: 3	NB: 32 SB: 34	NB: 1 SB: 1	NB: 34 SB: 34	NB: 3 SB: 0	NB: 37 SB: 0
Bus	NB: 0 SB: 0	NB: 0 SB: 0	NB: 1 SB: 1	NB: 30 SB: 30	NB: 0 SB: 0	NB: 0 SB: 0
Motorcycle	NB: 1 SB: 0	NB: 38 SB: 0	NB: 0 SB: 1	NB: 0 SB: 58	NB: 1 SB: 0	NB: 40 SB: 0

Site Sketch