NOISE STUDY REPORT

Florida Department of Transportation

District 7

US 41 (SR 45)

Citrus County, FL

Limits of Project: US 41 (SR 45) from South of Withlacoochee Trail Bridge to North of North Sportsman Point and from North of North Sportsman Point to North of East Arlington Street

Citrus County, Florida

Financial Management Number: 257165-4-52-01 and 257165-5-52-01

ETDM Number: N/A

Date: April 2024

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

Design Noise Study Report

US 41 (SR 45) from South of Withlacoochee Trail Bridge to North of North Sportsman Point
and
US 41 (SR 45) from North of North Sportsman Point to North of East Arlington Street
Citrus County, FL

Financial Project ID # 257165-4-52-01 and 257165-5-52-01

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April 2024

EXECUTIVE SUMMARY

The Florida Department of Transportation (FDOT) District Seven is designing roadway improvements to United States (US) 41 (State Road [SR] 45) from South of the Withlacoochee Trail Bridge to North of North (N.) Sportsman Point (Financial Project Identification Number [FPID] 257165-4-52-01) and US 41 from North of N. Sportsman Point to North of East (E.) Arlington Street (FPID 257165-5-52-01) in Citrus County. A Type 2 Categorical Exclusion (CE) was approved by the Federal Highway Administration (FHWA) on February 21, 1996 and is a total of 16.87 miles. The purpose of the Type 2 CE (Work Program Item [WPI] Segment Number [No.] 237811-1) is to widen US 41 (SR 45) from SR 44 to West Marion County Line from two to fourlanes. A Project Development and Environment (PD&E) Design Change (DC) Re-evaluation (WPI Segment No. 257165-1) was approved on August 4, 1999, which divided the project intothree segments for the purposes of analyzing design alternatives, shifted the alignment from the east side of US 41 (SR 45) to the west side of US 41 (SR 45) and modified the intersection at SR 200.

The design segment being advanced with this DC/Right-of-Way (ROW) Re-evaluation widens approximately 1.194 miles of US 41 (SR 45) from south of Withlacoochee Trail Bridge to north of N. Sportsman Point and approximately 0.804 miles from north of N. Sportsman Point to North of E. Arlington Street for a total of 1.998 miles. The widening will include the reconstruction of an existing two-lane rural section to a four-lane urban section with two 11-foot (ft.) travel lanes, 6 ft. bike lane and 6 ft. sidewalk in both directions separated by an 18 to 22 ft. raised median with a design speed of 45 miles per hour (mph). The existing bridge over the Withlacoochee State Trail (WST) will be replaced with two bridges for northbound and southbound traffic. Shared used paths (SUP) will be provided to connect to the WST in all four quadrants. A new signalized pedestrian crossing with lighting will be provided between E. Live Oak Lane and E. Tangelo Lane. Lighting will be provided under the bridge and the SUP connections to the WST.

The highway traffic noise evaluation performed in support of the 1999 DC Re-evaluation used the STAMINA noise model. Since then, FHWA has released the Traffic Noise Model (TNM; version 2.5). Additionally, FHWA's 23 Code of Federal Regulations (CFR) Part 772 was amended (effective July 13, 2011) to include additional land uses and modify the Noise Abatement Criteria (NAC) levels and land use assignments that were not previously considered. Therefore, this current highway traffic noise analysis was performed using TNM version 2.5 and the amended 23 CFR Part 772 regulations.

This Design phase Noise Study Report (NSR) presents the methodology and results of the highway traffic noise evaluation for improvements to US 41 (SR 45) from South of the Withlacoochee Trail Bridge to North of N. Sportsman Point (FPID 257165-4-52-01) and from North of N. Sportsman Point to North of E. Arlington Street (FPID 257165-5-52-01). Noise levels were predicted at 44 receptor points representing 39 residences and five special land uses (SLUs). For the year 2047

build condition, noise levels are not predicted to approach, meet, or exceed the NAC at any residence or special land use within the project limits. Based on the noise analyses performed to date, there appear to be no impacted areas within the project that require abatement consideration.

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ACRONYMS

CFR	Code of Federal Regulations
CNE	Common Noise Environment
dB	Decibels
DC	Design Change
dB(A)	A-weighted decibels
FDOT	Florida Department of Transportation
FHWA	Federal Highway Administration
ft.	Feet
LOS	Level of Service
NAC	Noise Abatement Criteria
NEPA	National Environmental Policy Act
NRDG	Noise Reduction Design Goal
PD&E	Project Development and Environment
ROW	Right-of-way
SLU	Special Land Use
SR	State Road
TNM	Traffic Noise Model
US	United States

SECTION 1
INTRODUCTION

The Florida Department of Transportation (FDOT) District Seven is designing roadway improvements to United States (US) 41 (State Road [SR] 45) from South of the Withlacoochee Trail Bridge to North of North (N.) Sportsman Point (Financial Project Identification Number [FPID] 257165-4-52-01) and US 41 (SR 45) from North of N. Sportsman Point to North of East (E.) Arlington Street (FPID 257165-5-52-01) in Citrus County. A Type 2 Categorical Exclusion (CE) was approved by the Federal Highway Administration (FHWA) on February 21, 1996 and is a total of 16.87 miles. The purpose of the Type 2 CE (Work Program Item [WPI] Segment Number [No.] 237811-1) is to widen US 41 (SR 45) from SR 44 to West Marion County Line from two to four lanes. A Project Development and Environment (PD&E) Design Change (DC) Re-evaluation (WPI Segment No. 257165-1) was approved on August 4, 1999, which divided the project into three segments for the purposes of analyzing design alternatives, shifted the alignment from the east side of US 41 (SR 45) to the west side of US 41 (SR 45) and modified the intersection at SR 200.

The design segment being advanced with this DC/Right-of-Way (ROW) Re-evaluation widens approximately 1.194 miles of US 41 (SR 45) from South of Withlacoochee Trail Bridge to North of N. Sportsman Point and approximately 0.804 miles from north of N. Sportsman Point to North of E. Arlington Street for a total of 1.998 miles (**Figure 1-1**). The widening will include the reconstruction of an existing two-lane rural section to a four-lane urban section with two 11 foot (ft.) travel lanes, 6 ft. bike lane and 6 ft. sidewalk in both directions separated by an 18 to 22 ft. raised median with a design speed of 45 miles per hour (mph). The existing bridge over the Withlacoochee State Trail (WST) will be replaced with two bridges for northbound and southbound traffic. Shared used paths will be provided to connect to the WST in all four quadrants.

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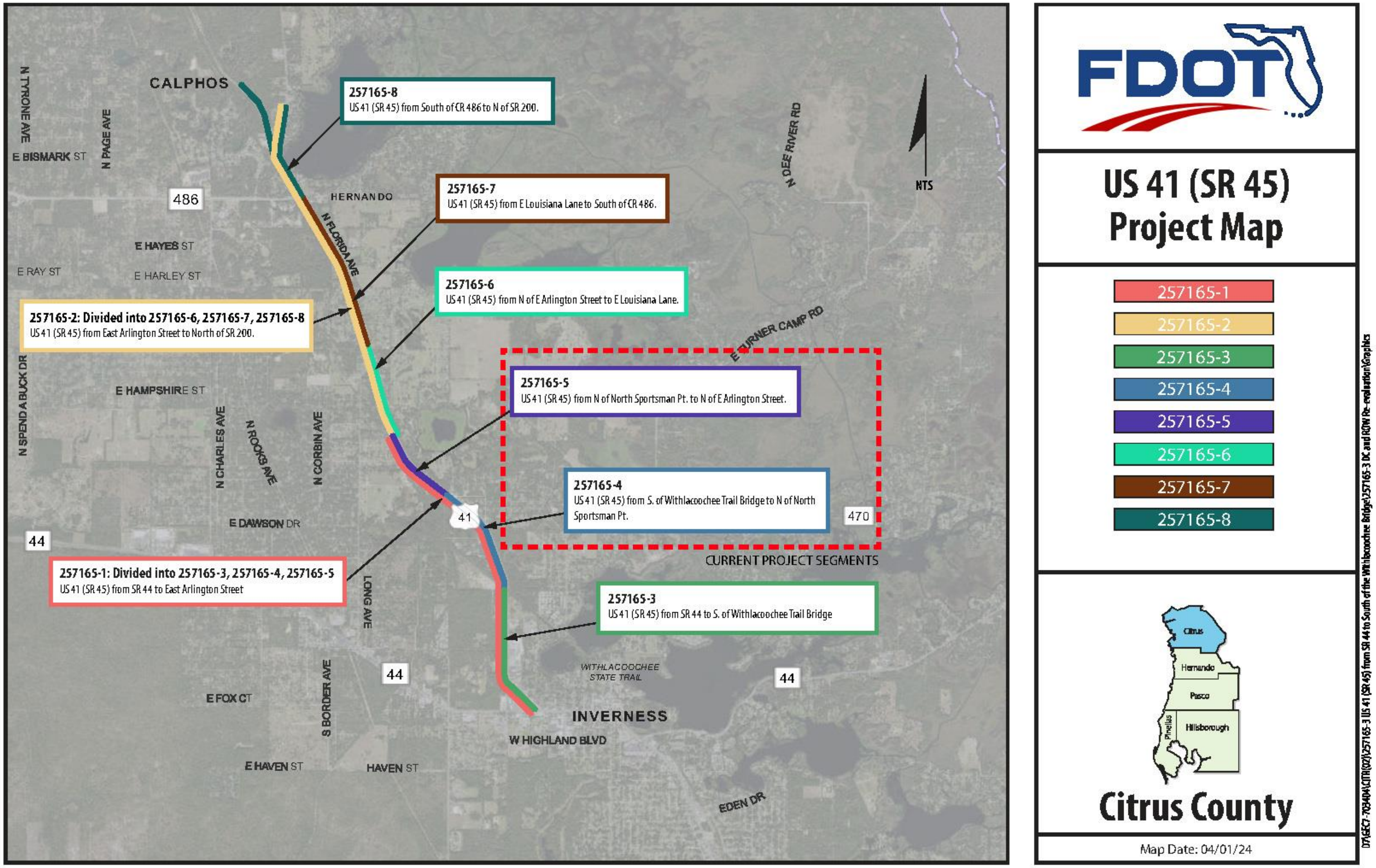


Figure 1-1 Project Location Map

1.1 PREVIOUS EVALUATION RESULTS

1.1.1 237811-1 TYPE II CATEGORIAL EXCLUSION PD&E STUDY RESULTS (FEBRUARY 21, 1996)

A Noise Study Report was conducted and is available in the project file. Sixteen (16) receptors were identified as receiving noise levels which approach or exceed the FHWA NAC for exterior noise. Fourteen (14) of the sixteen (16) sites will have noise level impacts of 3 dB(A) or less. Furthermore, of the fourteen (14) sites, ten (10) of these sites have predicted noise values which approach or exceed the FHWA criteria. Two sites have noise level increases of greater than 3 dB (A). One is a residence that will experience a noise increase from 65 dB(A) to 70 dB(A) with the proposed project. The second site is also a residence and will experience a noise increase from 69 to 73 dB(A) with the project.

Noise abatement measures including traffic management, alignment shifts, and noise barriers were given further consideration for the affected receptors. Traffic management measures were not deemed feasible due to the impact such measures would have on traffic capacity and Level of Service (LOS). Alignment shifts were rejected because there are other environmentally sensitive areas on the other side of the roadway. Noise barriers could not be constructed without impeding access to other properties. Therefore, no noise abatement measures were found which would be reasonable and feasible. Based on the noise analyses performed to date, there appears to be no apparent solutions available to mitigate the noise impacts at the locations identified in the noise study report. Details regarding the analysis are available in the Noise Study Report located in the project file.

1.1.2 257165-1 DESIGN CHANGE REEVALUATION (AUGUST 4, 1999)

Sixteen (16) receptors were identified in the original PD&E Study Noise Study Report as receiving noise levels which approach or exceed the FHWA noise abatement criteria. Based on the noise analysis conducted for the original study, there were no apparent solutions available to mitigate the noise impacts.

The noise analysis performed for the re-evaluation identified 34 receptors at 19 sites within the project corridor. The analysis indicated that with the Build Alternative, 25 receptors would experience noise levels that meet or exceeds FHWA noise abatement criteria. FDOT evaluated a series of noise abatement measures to reduce noise levels at each of these locations. None of the abatement measures were found to be feasible. Based on the noise analysis performed, there are no solutions available to mitigate the noise level increases at the noise sensitive locations.

1.2 DATE OF PUBLIC KNOWLEDGE

The Date of Public Knowledge is the approval date of the environmental document (i.e., the Type II CE), unless there has been a substantial horizontal or vertical change in the Design (FDOT PD&E Manual, Chapter 18. July 1, 2023). The Type II CE was approved on February 21, 1996.

However, a DC Reevaluation was approved on August 4, 1999. A substantial vertical or horizontal change has not occurred since the 1999 reevaluation. Therefore, the Date of Public Knowledge for this project is August 4, 1999.

SECTION 2
METHODOLOGY

The highway traffic noise study documented in this Noise Study Report was completed in accordance with Title 23, Code of Federal Regulations, Part 772 (23 CFR 772), *Procedures for Abatement of Highway Traffic Noise and Construction Noise* following methodology and procedures established by the FDOT in the PD&E Manual, Part 2, Chapter 18, *Highway Traffic Noise* (July 2023), and the FDOT *Traffic Noise Modeling and Analysis Practitioners Handbook* (December 2018). Predicted highway traffic noise levels were produced using the FHWA's TNM version 2.5. The TNM files used in this analysis can be found in the Project File. This highway traffic noise analysis includes prediction of highway traffic noise levels for the Design year 2047 conditions using Phase III design plans dated June 2023 (FPID 257165-4-52-01) and December 2023 (FPID 257165-5-52-01). The methodology that was used to prepare the analysis is described in the following sections.

2.1 NOISE METRICS

Noise levels developed for this traffic noise study update are expressed in decibels (dB) using an "A"-scale [dB(A)] weighting. This scale most closely approximates the response characteristics of the human ear to typical traffic noise levels. All reported noise levels are hourly equivalent noise levels [Leq(h)]. The Leq(h) is defined as the equivalent steady-state sound level that, in an hourly period, contains the same acoustic energy as the time-varying sound level for the same hourly period. Use of these metrics is consistent with the requirements of 23 CFR 772.

2.2 TRAFFIC DATA

Traffic data for the Design year 2047 conditions were obtained from FDOT and is shown in **Appendix A**. The traffic data was reviewed to identify forecasted traffic volumes that would yield the highest traffic noise impact. Following requirements of the FDOT's *PD&E Manual*, demand volumes were modeled for both roadway segments of US 41 (SR 45), as the predicted hourly traffic demand was less than LOS C traffic volumes.

The total vehicle volume was divided between five classifications: automobiles, medium trucks, heavy trucks, buses, and motorcycles. The percentages of each vehicle type were obtained from FDOT's Florida Traffic Online and are listed in **Table 2-1**. The traffic volumes and speeds used in the analysis are also provided in **Appendix A**.

Table 2-1
Traffic Data Vehicle Percentages

Roadway Segment	Percent (%) of Traffic				
	Automobiles	Medium Trucks	Heavy Trucks	Buses	Motorcycles
US 41 (SR 45) (both segments)	92.22	5.33	1.26	0.60	0.59

Note: Values subject to rounding.
Source FDOT Florida Traffic Online (https://tdaappsprod.dot.state.fl.us/fto/)

2.3 NOISE ABATEMENT CRITERIA

Noise sensitive land uses are properties where there is frequent human use that might be impacted by traffic noise levels that approach, meet, or exceed the NAC (i.e., levels established by the FHWA at which abatement must be considered). Typical noise sensitive land uses include residences, schools, churches, commercial properties with outdoor areas of use, and recreational areas. As shown in **Table 2-2**, the NAC vary by activity category. The FDOT criteria is defined as being within one dB(A) of FHWA's NAC to reflect values that "approach" the FHWA criteria. For perspective, **Table 2-3** provides typical noise levels of common indoor and outdoor activities.

Noise abatement measures must also be considered when a substantial increase in traffic noise is predicted to occur as a direct result of a transportation project. FDOT defines a substantial increase as 15 dB(A) or more above existing conditions. A substantial increase typically occurs in areas where traffic noise is a minor component of the existing noise environment but would become a major component after the project is constructed (e.g., new alignment project). Based upon the noise analyses that were performed in support of the PD&E Study (1996) and the DC Reevaluation (1999), substantial increases are not expected to occur at any receptor along the project corridor.

Table 2-2
Noise Abatement Criteria

Activity Category	Activity Leq(h)		Evaluation Location	Description of Land Use 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	67	66	Exterior	Residential.
C	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, recreation 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	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.

SOURCE: FDOT, PD&E Manual Part 2 Chapter 18, Figure 18-1

Table 2-3
Typical Noise Levels

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

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

2.4 NOISE ABATEMENT MEASURES

Noise abatement is considered at all Noise Sensitive Sites (represented by receptors) predicted to approach/exceed the NAC as stipulated by 23 CFR 772. Abatement measures considered include traffic management, alignment modifications, noise buffer zones through application of land use controls and noise barriers.

Noise abatement measures including traffic management, alignment shifts, buffer zones, and noise barriers were given further consideration for the impacted Noise Sensitive Sites during the PD&E Phase. However, noise barriers were the only reasonable and feasible form of abatement.

2.4.1 BUFFER ZONES

As properties in the vicinity of a highway are developed, providing a buffer between a highway and future noise sensitive development can minimize or eliminate noise impacts. This abatement measure can be implemented through local land use planning. The distances between the proposed highway and location where traffic noise levels approach the NAC for Activity Categories A, B, C and E are determined to facilitate future land use planning that is compatible with the traffic noise environment. For the proposed conceptual Design, the distance between the nearest through lane of US 41 (SR 45) and the location where traffic noise levels would approach a particular NAC is provided in **Table 2-4** and shown in **Figure 2-1**. The distances do not account for any reduction in noise levels that may be provided by berms, privacy walls or intervening structures in the noise propagation path. The noise contours also do not account for any increase in noise resulting from increased highway elevation (e.g., overpasses) or elevated Noise Sensitive Sites (e.g., second floor patios). For any new development occurring in the future, local officials can use the noise contour information to establish buffer zones thereby minimizing or avoiding noise impacts at sensitive land uses.

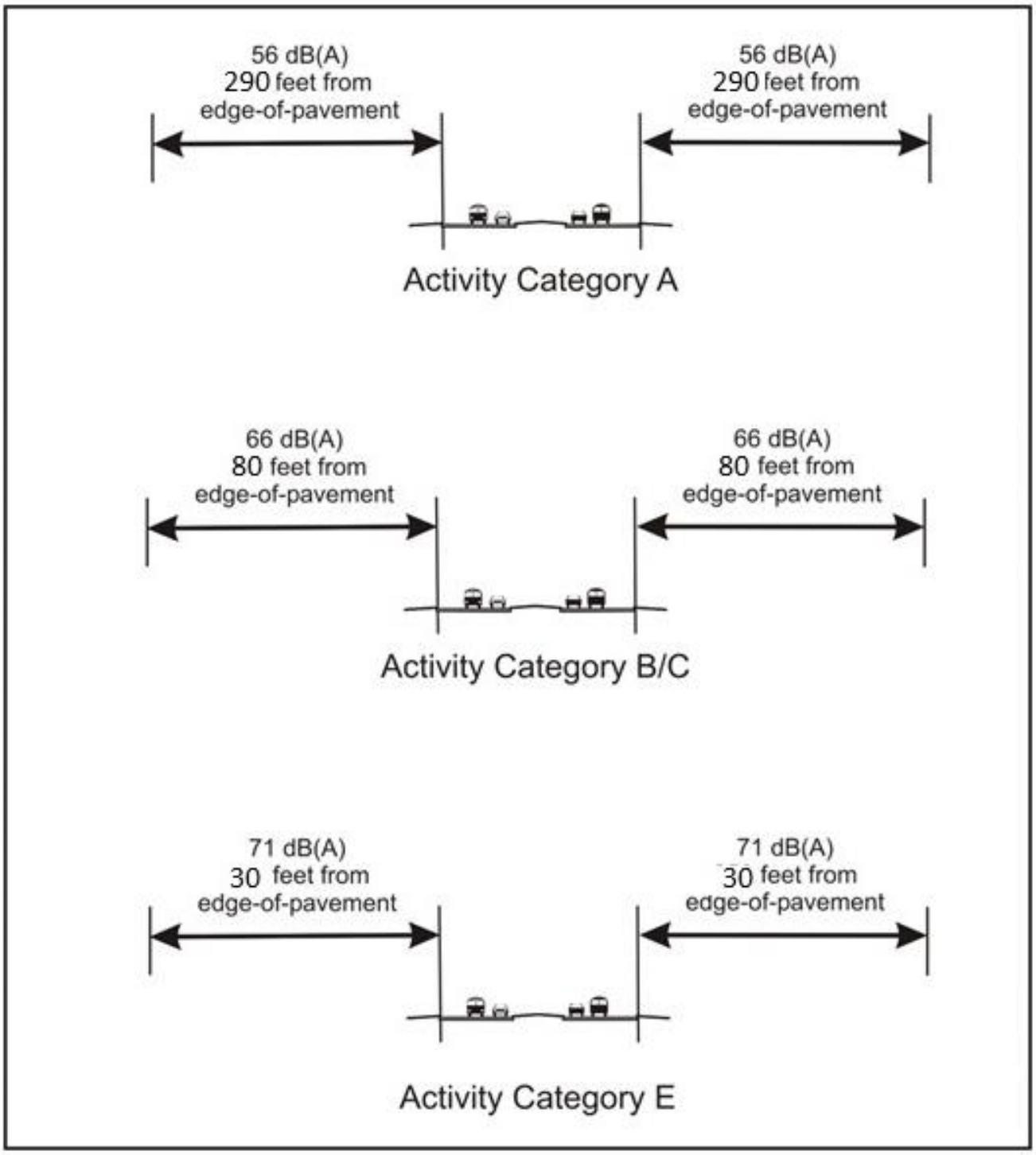
Table 2-4
Noise Abatement Criteria Contours

Roadway Segment	Distance (ft)[1]		
	Activity Category A [56 dB(A)]	Activity Category B & C [66 dB(A)]	Activity Category E [71 dB(A)]
US 41 (SR 45) (both segments)	290	80	30

[1]Distance referenced to the edge of the nearest proposed through lane. Distance does not account for any reduction in noise levels that may be provided by berms, privacy walls or intervening structures.

The use of noise contour lines is allowed for project alternative screening or for land use planning to comply with 23 CFR 772.17, but noise contours shall not be used for determining highway traffic noise impacts or the determination of the feasibility and reasonableness of providing noise abatement.

Figure 2-1 Noise Contours Along US 41 (SR 45)



2.4.2 NOISE BARRIERS

Noise barriers reduce noise levels by blocking the sound path between a highway and a receptor. To effectively reduce traffic noise, a barrier must be relatively long, continuous (with no intermittent openings), and of sufficient height. For a noise barrier to be considered feasible and cost reasonable, the following minimum conditions should be met:

- At least two impacted receptors must be provided a noise reduction of 5 dB(A) or more to be considered feasible.
- A noise barrier must also attain the Noise Reduction Design Goal, which states that a minimum noise reduction of 7 dB(A) for at least one benefited receptor must be achieved. Of importance, this receptor may also have been previously identified as meeting the feasibility requirement of receiving a 5 dB(A) reduction (first bullet).
- The cost of the noise barriers should not exceed $42,000 per benefited receptor. This is the upper cost limit established by FDOT. A benefited receptor is defined as a recipient of an abatement measure that experiences at least a 5 dB(A) reduction as a result of providing a noise barrier. The current unit cost used to evaluate cost reasonableness is $30 per square foot (sq. ft.).

Within the project limits, noise barrier locations are evaluated as follows:

- ROW noise barriers located outside the clear recovery zone, but within the right-of-way, are initially considered at heights ranging from 8 ft. to 22 ft. in 2-ft. increments. According to the *FDOT Design Manual,* noise barriers outside the clear zone shall not exceed a maximum height of 22 ft.

The length and height of the noise barriers are optimized based on the benefit provided to receptors with predicted noise levels that approach, meet, or exceed the NAC.

2.5 NOISE MODEL

The highway traffic noise evaluation performed in support of the 1999 DC Re-evaluation used the STAMINA noise model. Since then, FHWA has released TNM (version 2.5).

For this analysis, predicted noise levels were produced using the FHWA's TNM, version 2.5. This model predicts noise levels at noise sensitive receptor sites as a result of highway traffic. Model-predicted noise levels are influenced by several factors including vehicle speed and types, the distance betweenthe noise source and receptor,the effects of intervening barriers, structures (buildings, barriers, etc.), ground surface type, and topography.

The TNM files used in this analysis can be found in the FDOT project file and are available upon request.

2.5.1 MODEL VALIDATION

The previous noise evaluations for this project utilized the previous approved model, STAMINA. As a result, validation measurements have not been performed for this project previously for TNM version 2.5. Therefore, validation is required per 23 CFR Part 772.

Field Testing Procedure

To validate the accuracy of the computer noise model for the project area, field measurements were taken following procedures documented in FHWA's Noise Measurement Handbook (June 2018). All monitoring events were ten minutes in duration, consistent with FDOT procedures.

Date and Instrumentation

Noise monitoring was performed on August 14, 2023 using a SVANTEK noise monitor. Prior to taking noise measurements, the noise monitor was calibrated using a SVANTEK calibrator.

Field Measurement Locations

Validation was performed at two sites along the project corridor. The validation sites were located along the ROW of the existing highway. Traffic volumes by vehicle classification were noted during each monitoring event. Field notes for each monitoring event are provided in **Appendix D**. Locations of monitoring sites are depicted in aerials provided in **Appendix B**.

Model Validation Results

The results for each monitoring event are provided in **Table 2-5**. The variance between measured and predicted noise levels was less than 3 dB(A). Therefore, the noise model is predicting within the level of accuracy specified in FDOT's PD&E Manual, Part 2, Chapter 18.

Table 2-5
Noise Model Validation

Location	Run #	Date	Start Time	Field Measured Level dB(A)	Computer Predicted Level dB(A)	Decibel Difference dB(A)
Monitoring Site #1 ~30' from Edge of Pavement	1	08/14/23	1:12 PM	70.7	68.7	-2.0
	2		1:44 PM	68.5	71.2	2.7
	3		2:00 PM	70.5	70.8	0.3
Monitoring Site #2 ~20' from Edge of Pavement	1	08/14/23	2:56 PM	73.6	73.3	-0.3
	2		3:08 PM	72.9	73.5	0.6
	3		3:25 PM	70.6	73.1	2.5

2.6 NOISE SENSITIVE SITES

Within the project limits, the noise sensitive land uses along US 41 (SR 45) for which there is a NAC include:

- Activity Category B (residential areas) – 39 residences.
- Activity Category C – one school and one cemetery.
- Activity Category D – three places of worship.

Receptors representing noise sensitive land uses were established by a field review performed on August 14, 2023 and verified using data from the Citrus County Property Appraiser[1]. The receptors representing Noise Sensitive land uses are located in accordance with 23 CFR 772, FDOT's PD&E Manual, Part 2, Chapter 18 and the FDOT *Traffic Noise Modeling & Analysis Practitioner's Handbook* as follows:

- Activity Category B and D receptors were located at the edge of the dwellings/buildings that is closest to US 41 (SR 45).
- Receptor points representing Noise Sensitive land uses in Activity Category C were located in exterior areas where frequent human use may occur.
- Ground-floor receptor points were modeled at five feet above the ground elevation.

The locations of the receptors are depicted on aerials in **AppendixB**. The alphanumeric identification for each receptor point was formulated as follows:

- Receptor points along the east side of US 41 (SR 45) are specified by "E" in the receptor identification.
- Receptor points along the west side of US 41 (SR 45) are specified by "W" in the receptor identification.
- The numeric portion of the receptor identification identifies a specific receptor point and generally increase from south to north.

2.6.1 COMMON NOISE ENVIRONMENTS

Receptors were grouped into Common Noise Environments (CNE), following 23 CFR Part 772. A CNE is a group of receptors within the same Activity Category in that are exposed to similar noise sources and levels; traffic volumes, traffic mix, and speed; and topographic features. Generally, CNEs occur between two secondary noise sources, such as interchanges, intersections, and cross-roads.

[1] Citrus County Property Appraiser website: https://www.citruspa.org/_dnn/

2.7 SPECIAL LAND USES

It should be noted that the methodology used to evaluate noise barriers for special land uses (i.e., non-residential land uses) is different than for residential receptors. Noise barriers for special land use were evaluated following procedures documented in *A Method to Determine Reasonableness and Feasibility of Noise Abatement at Special Use Locations* (FDOT 2009). This methodology accounts for the threshold of $42,000 per benefited receptor and translates it to apply to a non-residential receptor based on person-hours-of-use in the following equation:

$$\frac{\$42k}{residence} x \frac{residence}{2.46\ persons} x \frac{usage}{24\ hours} x\ (14ft. x\ 100ft.) = \$995{,}935/\text{person hour/ft}^2$$

The cost of abatement is considered reasonable if the calculated "abatement cost factor" is below the "criteria abatement cost factor" of the above equation ($995,935/person-hour/ft^2).

SECTION 3
TRAFFIC NOISE ANALYSIS RESULTS

Highway traffic noise levels were predicted at 44 receptors representing 39 residences and five Special Land Uses (i.e., nonresidential areas) potentially affected by highway traffic noise. The following section provides the results of the traffic noise analysis, including the identification of impacted receptors and the evaluation of abatement measures.

3.1 NOISE LEVELS, IMPACT DETERMINATION, AND ABATEMENT ANALYSIS

3.1.1 NOISE SENSITIVE SITES EAST OF US 41 (SR 45)

Noise levels were predicted for 2047 Design conditions at 30 residences and five special land uses (Inverness Middle School, Inverness Church of Christ, Victory Baptist Churchof Inverness, Crossroads Baptist Church, and the Van Ness Family Cemetery) along the east side of US 41 (SR 45). The discussions that follow analyze residential communities and special land uses along the northbound lanes of US 41 (SR 45) from south to north.

CNE # 1 – Inverness Middle School

Inverness Middle School (**Appendix B**, Aerial Sheet 1) is located along US 41 (SR 45) and was evaluated as an exterior use area. This school has tennis courts and a sports field that were evaluated for traffic noise impacts as an Activity Category C and was represented by one receptor (E1). Exterior highway traffic noise levels are predicted to be 55.2 dB(A) for the Design year 2047. Build condition highway traffic noise levels do not approach, meet, or exceed the NAC at the school's exterior use area. Therefore, a noise barrier was not evaluated further.

CNE # 2 – Residences from Mimosa Lane to N. Sportsman Point

Residences from Mimosa Lane to N. Sportsman Point along US 41 (SR 45) (**Appendix B**, Aerial Sheets 3and 4) were represented by 27 receptor points representing 27 residences (E2-E10, E12-E13, E15-E24, E26-E31). Exterior traffic noise levels are predicted to range from 48.5 to 57.1 dB(A) for the Design year and do not approach, meet or exceed the NAC at the residences. Therefore, a noise barrier for these residences was not evaluated further.

CNE # 3 – Crossroads Baptist Church

Crossroads Baptist Church (**Appendix B**, Aerial Sheet 3) is located along E. Jasmine Lane and was evaluated as an interior use area, as no exterior area of frequent human use exists. This place of worship was evaluated for traffic noise impacts as an Activity Category D and was represented by one receptor (E11). Including a 20 dB(A) insertion loss provided by the building, interior highway traffic noise levels are predicted to be 29.6 dB(A) for the year 2047. Design year highway

traffic noise levels do not approach, meet, or exceed the NAC at the place of worship's interior use area. Therefore, a noise barrier was not evaluated further.

CNE # 4 – Inverness Church of Christ

Inverness Church of Christ (**Appendix B**, Aerial Sheet 3) is located along US 41 (SR 45) and was evaluated as an interior use area, as no exterior area of frequent human use exists. This place of worship was evaluated for traffic noise impacts as an Activity Category D and was represented by one receptor (E14). Including a 20 dB(A) insertion loss provided by the building, interior highway traffic noise levels are predicted to be 37.9 dB(A) for the year 2047. Design year highway traffic noise levels do not approach, meet, or exceed the NAC at the place of worship's interior use area. Therefore, a noise barrier was not evaluated further.

CNE # 5 – Victory Baptist Church of Inverness

Victory Baptist Church of Inverness (**Appendix B**, Aerial Sheet 4) is located along US 41 (SR 45) and was evaluated as an interior use area, as no exterior area of frequent human use exists. This place of worship was evaluated for traffic noise impacts as an Activity Category D and was represented by one receptor (E25). Including a 20 dB(A) insertion loss provided by the building, interior highway traffic noise levels are predicted to be 33.6 dB(A) for the year 2047. Design year highway traffic noise levels do not approach, meet, or exceed the NAC at the place of worship's interior use area. Therefore, a noise barrier was not evaluated further.

CNE # 6 – Van Ness Family Cemetery

The Van Ness Family Cemetery (**Appendix B**, Aerial Sheet 6) is located along US 41 (SR 45) and was evaluated as an exterior use area. This cemetery was evaluated for traffic noise impacts as an Activity Category C and was represented by one receptor (E32). Exterior highway traffic noise levels are predicted to be 51.2 dB(A) for the year 2047. Design year condition highway traffic noise levels do not approach, meet, or exceed the NAC at the cemetery's exterior use area. Therefore, a noise barrier was not evaluated further.

CNE # 7 – Residences along Sabal Palm Way

Residences along Sabal Palm Way (**Appendix B**, Aerial Sheet 7) were represented by three receptor points representing three residences (E33-E35). Exterior traffic noise levels are predicted to range from 54.1 to 57.9 dB(A) for the Design year and do not approach, meetor exceedthe NAC at the residences. Therefore, a noise barrier for these residences was not evaluated further.

3.1.2 NOISE SENSITIVE SITES WEST OF US 41 (SR 45)

Noise levels were predicted for 2047 Design conditions at nine residences along the west side of US 41 (SR 45). The discussions that follow analyze residential communities and special land uses along the southbound lanes of US 41 (SR 45) from south to north.

CNE # 8 – Isolated Residence along Parkside Avenue

The isolated residence along Parkside Avenue (**Appendix B**, Aerial Sheet 1) was represented by one receptor point (W1). Exterior traffic noise levels are predicted to be 54.4 dB(A) for the Design year and do not approach, meet or exceed the NAC at the residence. Therefore, a noise barrier for this residence was not evaluated further.

CNE # 9 – Residences from Andrew Street to White Lake Drive

Residences from Andrew Street to White Lake Drive (**Appendix B**, Aerial Sheet 2 and 3) were represented by five receptor points representing five residences (W2-W6). Exterior traffic noise levels are predicted to range from 50.7 to 59.1 dB(A) for the Design year and do not approach, meet or exceed the NAC at the residences. Therefore, a noise barrier for these residences was not evaluated further.

CNE # 10 – Residences North of East Arlington Street

Residences north of East Arlington Street (**Appendix B**, Aerial Sheet 6) were represented by three receptor points representing three residences (W7-W9). Exterior traffic noise levels are predicted to range from 51.7 to 51.9 dB(A) for the Design year and do not approach, meet or exceed the NAC at the residences. Therefore, a noise barrier for these residences was not evaluated further.

SECTION 4
CONCLUSIONS

Noise levels were predicted at 44 receptor points representing 39 residences and five Special Land Uses For the year 2047 Build condition, noise levels are not predicted to approach, meet, or exceed the NAC at any residence or special land uses within the project limits. Based on the noise analyses performed to date, there appear to be no impacted areas within the project that require abatement consideration. Therefore, noise barriers are not recommended for further evaluation as part of this project at this time.

SECTION 5
CONSTRUCTION NOISE AND VIBRATION

Based on the existing land uses within the limits of this project, some land uses are identified on the FDOT listing of noise and vibration sensitive sites (found in Figure 18-9 of the FDOT PD&E Manual, Chapter 18). However, construction of the proposed roadway improvements should not have any construction noise or vibration impact. It is anticipated that the application of the FDOT Standard Specifications for Road and Bridge Construction 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 and Project Engineer in concert with the FDOT Noise Specialist and the Contractor, will investigate additional methods of controlling these impacts.

SECTION 6
COMMUNITY COORDINATION

Coordination with local agencies, officials and the general public is ongoing. The public has had the opportunity to comment on the proposed project at public meetings and other outreach efforts. The following outreach efforts have occurred:

- June 28, 1993 Public Hearing at County Commission Chambers, Citrus County Courthouse 7:00 pm
    - Notifications were sent to City Council, City Manager Bruce Banning, other agencies and property owners and ad in the newspaper.
- October 19, 1994 Public Hearing at County Commission Chambers, Citrus County Courthouse 7:00 pm
    - Notifications were sent to City council, City Manager Bruce Banning, other agencies and property owners and ad in the newspaper
- August 1997 – Mail out was sent out.
- November 24, 1997 Workshop to discuss median openings at Inverness Court House, Workshop to discuss median openings; at Inverness Court House
- February 8, 1999 – Public Workshop Ad
- February 16, 1999 Public Workshop at Inverness Middle School (5:00 pm to 8:00 pm)
    - Notifications were sent to City council, City Manager Frank Di Giovanni, other agencies and property owners and ad in the newspaper.
    - This included the PD&E reevaluation to add a 5^{th} lane (Two way left)
- August 4, 1999 – Re-Evaluation signed by FHWA
- December 5, 2023 – Public Meeting

A copy of this Design Noise Study Report will be circulated to the appropriate local planning/ zoning officials for their use. Planning/zoning officials should reference **Table 2-4** in **Section 2.4.1** to plan appropriate noise buffer zones.

REFERENCES

23 CFR Part 772, "Procedures for Abatement of Highway Traffic Noise and Construction Noise", Federal Register, Vol. 75, No. 133, Tuesday, July 13, 2010; pages 39834-39839.

Florida Department of Transportation. "Highway Traffic Noise", Part 2, Chapter 18. Project Development and Environment Manual, Florida Department of Transportation, Tallahassee, July 1, 2023.

Florida Department of Transportation Design Manual Volume 1, Chapter 264, "Noise Walls and Perimeter Walls", January 2023.

Florida Department of Transportation "Standard Specifications for Road and Bridge Construction", January 2023.

Florida Department of Transportation, "2023 FDOT Quality/Level of Service Handbook"; Tallahassee, Florida; January 2023.

Federal Highway Administration Report FHWA-HEP-10-025, "Highway Traffic Noise: Analysis and Abatement Guidance", June 2010 (revised December 2010); 76 pages.

Federal Highway Administration Report FHWA-PD-96-009, "FHWA Traffic Noise Model, Version 1.0 User's Guide", January 1998; 192 pages + supplements.

Federal Highway Administration Report Number FHWA-PD-96-046, "Measurement of Highway-Related Noise", Cynthia S.Y. Lee and Gregg Fleming; May 1996; 206 pages.

Federal Highway Administration Report FHWA-HEP-06-015, "FHWA Highway Construction Noise Handbook: Final Report". August 2006; 185 pages.

Federal Highway Administration. "Consideration of Existing Noise Barrier in a Type I Noise Analysis FHWA-HEP-12-051." https://www.fhwa.dot.gov/ENVIRONMENT/noise/noise_barriers/abatement/existing.cfm

APPENDICES

APPENDIX A Traffic Data

APPENDIX B Project Aerials

APPENDIX C Predicted Noise Levels

APPENDIX D Model Validation Field Sheets

APPENDIX A Traffic Data

MEMORANDUM
FLORIDA DEPARTMENT OF TRANSPORTATION
INTERMODAL SYSTEMS DEVELOPMENT * MS 7-500

DATE: August 9, 2022

TO: Eyra Cash, P.E., Consultant Project Manager

FROM: Andrew J. Tyrell, Systems Planning Coordinator

COPIES: File

SUBJECT: F.P.N. : 257165-4-52-01
Roadway ID: 02-010-000
State Road : US 41/SR 45 (S. of Withlacoochee Trail Bridge to N. of Sportsman Pt.)
County : Citrus

Per your request, enclosed are the projected 2027 2037 and the 2047 AADT traffic, the (K30, D30 & T24) factors, and the 18 KIP Equivalent Single Axle Load Accumulation (ESAL), for the above sections.

K30	9.00%
D30	51.10%
24Hr T	12.10
Design Hr T	6.05

Year	AADT
2021	18,000
2027	19,700
2037	22,500
2047	25,300

The projected 2027, and 2037 AADTs were interpolated between the 2021 and 2045 AADT. The Projected 2047 AADT was extrapolated from 2045 AADT.

The 2045 traffic forecast was developed after reviewing:
A) The 2015 Validation outputs of the Tampa Bay Regional Planning Model (TBRPMv9.2).
B) 2045 TBRPM model output using the 2045 socioeconomic data, and the TBRPMv9.2 2045 Cost Feasible Long Range Transportation Plan (LRTP) network.
C) The model traffic was smoothed and converted to AADT.

I have followed The FDOT Project Traffic Forecasting Procedure.

/AJT
Enclosure

18 kip EQUIVALENT SINGLE AXLE LOAD ANALYSIS

PROJECT TRAFFIC FOR PD&E and DESIGN ANALYSIS INFO / FACTORS

PIN #: 257165-4-52-01
COUNTY: Citrus
ROADWAYID: 02-010-000
PROJECT DESCRIPTION: US 41/SR 45 (S. of Withlacoochee Trail Bridge to N. of Sportsman Pt.)

LOCATION #: 1

LOCATION DESCRIPTION: 0

GROWTH RATE FORMULA

A: Interpolation
B: Enter Growth Rate
C: Enter All AADTs
D: New Facility
If "A" select an interpolation function
If "B" enter rate as decimals (1%=1.01)
If "C", or "D" continue to next section

Choose A, B, C, or D here: C

Linear Growth Rate 1.55 %
Compounded Growth Rate ____ %
Decaying Growth Rate ____ %
(select one)

DESIGN INFORMATION

		AADT
Existing Year	2021	18000
Opening Year	2027	19700
Mid-Design Year	2037	22500
Design Year	2047	25300

Note: AADT values have been rounded to the nearest 100

Daily Direction Split (50% or 100%): 50%
Lanes in One Direction: 2

T24 values
Existing to Opening Year: 12.10%
Opening to Mid-Year: 12.10%
Mid-Year to Design-Year: 12.10%

1995 EQUIVALENCY FACTORS u(1)

(selected with an X)	FLEXIBLE PAVEMENT SN = 5/THICK		RIGID PAVEMENT SN = 12/THICK	
RURAL FREEWAY:	1.050	____	1.600	____
URBAN FREEWAY:	0.900	____	1.270	____
RURAL HIGHWAY:	0.960	____	1.350	____
URBAN HIGHWAY:	0.890	X	1.220	X
OTHER (Enter Factor and X):		____		____

(1) Equivalency Factors are based on Updated Pavement Damage Factors Memorandum, dated July 2, 1998.
Lane Factors developed by Copes equation

I have reviewed the 18 kip Equivalent Single Axle Loads (ESAL's) to be used for pavement design on this project. I hereby attest that these have been developed in accordance with the FDOT Project Traffic Forecasting Procedure using historical traffic data and other available information.

	Name	Title	Org. Unit or Firm	Date
Prepared by:	Andrew J Tyrell	Systems Planning Coordinator	FDOT D7	8/9/2022
	Signature			
Reviewed by:	Elaine Martino	Systems Planning Consultant	FDOT D7	8/9/2022
	Signature			

18 kip EQUIVALENT SINGLE AXLE LOAD ANALYSIS - LOCATION 1

PROJECT TRAFFIC FOR PD&E and DESIGN ANALYSIS INFO / FACTORS

YEARS: *2021 to 2047*

SECTION #: C2-010-000 **COUNTY:** Citrus **PIN #:** 257165-4-52-01

FLEXIBLE PAVEMENT URBAN HIGHWAY 0.890

SN=5/THICK US 41/SR45 (S. of Withlacoochee Trail Bridge to N. of Sportsman Pt.) C

YEAR	AADT	ESAL (1000S)	ACCUM (1000s)	D	T	LF	EF
2021	18000	289	0	0.5	12.10%	0.815	0.890
2022	18200	292	0	0.5	12.10%	0.814	0.890
2023	18500	296	0	0.5	12.10%	0.813	0.890
2024	18800	300	0	0.5	12.10%	0.811	0.890
2025	19100	305	0	0.5	12.10%	0.810	0.890
2026	19400	309	0	0.5	12.10%	0.809	0.890
2027	19700	313	313	0.5	12.10%	0.807	0.890
2028	19900	316	629	0.5	12.10%	0.807	0.890
2029	20200	320	949	0.5	12.10%	0.805	0.890
2030	20500	325	1274	0.5	12.10%	0.804	0.890
2031	20800	329	1603	0.5	12.10%	0.803	0.890
2032	21100	333	1936	0.5	12.10%	0.802	0.890
2033	21300	336	2272	0.5	12.10%	0.801	0.890
2034	21600	340	2612	0.5	12.10%	0.800	0.890
2035	21900	344	2956	0.5	12.10%	0.799	0.890
2036	22200	349	3305	0.5	12.10%	0.798	0.890
2037	22500	353	3658	0.5	12.10%	0.796	0.890
2038	22700	356	4014	0.5	12.10%	0.796	0.890
2039	23000	360	4374	0.5	12.10%	0.795	0.890
2040	23300	364	4738	0.5	12.10%	0.794	0.890
2041	23600	368	5106	0.5	12.10%	0.793	0.890
2042	23900	372	5478	0.5	12.10%	0.792	0.890
2043	24100	375	5853	0.5	12.10%	0.791	0.890
2044	24400	379	6232	0.5	12.10%	0.790	0.890
2045	24700	383	6615	0.5	12.10%	0.789	0.890
2046	25000	388	7003	0.5	12.10%	0.788	0.890
2047	25300	392	7395	0.5	12.10%	0.787	0.890

Opening to Mid-Design Year ESAL Accumulation (1000s): 3345

Opening to Design Year ESAL Accumulation (1000s): 7082

I have reviewed the 18 kip Equivalent Single Axle Loads (ESALs) to be used for pavement design on this project. I hereby attest that these have been developed in accordance with the FDOT Project Traffic Forecasting Procedure using historical traffic data and other available information.

	Name	Title	Org.Unit or F	Date
Prepared by:	Andrew J Tyrell	Systems Planning Coordinator	FDOT D7	8/9/2022
	Signature			
Reviewed By:	Elaine Martino	Systems Planning Consultant	FDOT D7	8/9/2022
	Signature			

18 kip EQUIVALENT SINGLE AXLE LOAD ANALYSIS - LOCATION Citrus

PROJECT TRAFFIC FOR PD&E and DESIGN ANALYSIS INFO / FACTORS

YEARS: *2021 to 2047*

SECTION #: C-010-000 **Location #:** 1 **FIN #:** 257165-4-52-01

RIGID PAVEMENT URBAN HIGHWAY 1.220

SN=12/THICK LS 41/SR45 (S. of Withlacoochee Trail Bridge to N. of Sportsman Pt.) C

YEAR	AADT	ESAL (1000S)	ACCUM (1000s)	D	T	LF	EF
2021	18000	396	0	0.5	12.10%	0.815	1.220
2022	18200	400	0	0.5	12.10%	0.814	1.220
2023	18500	406	0	0.5	12.10%	0.813	1.220
2024	18800	411	0	0.5	12.10%	0.811	1.220
2025	19100	417	0	0.5	12.10%	0.810	1.220
2026	19400	423	0	0.5	12.10%	0.809	1.220
2027	19700	429	429	0.5	12.10%	0.807	1.220
2028	19900	433	862	0.5	12.10%	0.807	1.220
2029	20200	439	1301	0.5	12.10%	0.805	1.220
2030	20500	445	1746	0.5	12.10%	0.804	1.220
2031	20800	450	2196	0.5	12.10%	0.803	1.220
2032	21100	456	2652	0.5	12.10%	0.802	1.220
2033	21300	460	3112	0.5	12.10%	0.801	1.220
2034	21600	466	3578	0.5	12.10%	0.800	1.220
2035	21900	472	4050	0.5	12.10%	0.799	1.220
2036	22200	478	4528	0.5	12.10%	0.798	1.220
2037	22500	483	5011	0.5	12.10%	0.796	1.220
2038	22700	487	5498	0.5	12.10%	0.796	1.220
2039	23000	493	5991	0.5	12.10%	0.795	1.220
2040	23300	499	6490	0.5	12.10%	0.794	1.220
2041	23600	504	6994	0.5	12.10%	0.793	1.220
2042	23900	510	7504	0.5	12.10%	0.792	1.220
2043	24100	514	8018	0.5	12.10%	0.791	1.220
2044	24400	520	8538	0.5	12.10%	0.790	1.220
2045	24700	525	9063	0.5	12.10%	0.789	1.220
2046	25000	531	9594	0.5	12.10%	0.788	1.220
2047	25300	537	10131	0.5	12.10%	0.787	1.220

Opening to Mid-Design Year ESAL Accumulation (1000s): 4582

Opening to Design Year ESAL Accumulation (1000s): 9702

I have reviewed the 18 kip Equivalent Single Axle Loads (ESALs) to be used for pavement design on this project. I hereby attest that these have been developed in accordance with the FDOT Project Traffic Forecasting Procedure using historical traffic data and other available information.

Prepared by:	Andrew J Tyrell	Systems Planning Coordir	FDOT D7	8/9/2022
	Name	Title	Firm	Date
	Signature			
	Elaine Martino	Systems Planning Consul	FDOT D7	8/9/2022
	Name	Title	Org.Unit or Firm	Date
	Signature			

COUNTY: 02
STATION: 0020
DESCRIPTION: SR 45/US 41/N FLORIDA AVE, NORTH OF WHITE LAKE DRI
START DATE: 05/18/2021
START TIME: 2000

TIME	DIRECTION: N 1ST	2ND	3RD	4TH	TOTAL	DIRECTION: S 1ST	2ND	3RD	4TH	TOTAL	COMBINED TOTAL
0000	14	12	7	10	43	6	13	8	2	29	72
0100	9	11	7	5	32	8	7	4	5	24	56
0200	7	5	2	10	24	7	2	3	5	17	41
0300	7	6	8	4	25	6	3	9	15	33	58
0400	5	13	15	9	42	10	19	20	28	77	119
0500	17	23	43	39	122	34	31	56	67	188	310
0600	50	64	63	81	258	76	104	123	132	435	693
0700	89	113	132	123	457	189	186	166	180	721	1178
0800	107	115	94	136	452	160	167	181	163	671	1123
0900	135	124	138	124	521	171	144	160	143	618	1139
1000	121	131	115	148	515	168	123	162	132	585	1100
1100	143	134	140	138	555	103	138	145	125	511	1066
1200	150	173	167	154	644	126	148	159	136	569	1213
1300	137	136	131	145	549	182	144	180	173	679	1228
1400	162	156	178	188	684	170	152	157	176	655	1339
1500	204	177	190	194	765	144	136	160	158	598	1363
1600	194	215	207	179	795	162	152	188	154	656	1451
1700	237	235	187	195	854	168	152	126	115	561	1415
1800	177	154	164	110	605	133	109	93	108	443	1048
1900	104	110	93	77	384	75	95	78	78	326	710
2000	71	84	57	79	291	61	55	56	52	224	515
2100	58	45	52	39	194	50	37	33	37	157	351
2200	34	29	27	24	114	25	31	21	22	99	213
2300	18	24	17	12	71	19	17	12	11	59	130
24-HOUR TOTALS:					8996					8935	17931

PEAK VOLUME INFORMATION

	DIRECTION: N HOUR	VOLUME	DIRECTION: S HOUR	VOLUME	COMBINED DIRECTIONS HOUR	VOLUME
A.M.	845	533	700	721	700	1178
P.M.	1630	858	1300	679	1630	1520
DAILY	1630	858	700	721	1630	1520

GENERATED BY SPS 5.0.55P

COUNTY: 02
STATION: 0020
DESCRIPTION: SR 45/US 41/N FLORIDA AVE, NORTH OF WHITE LAKE DRI
START DATE: 05/19/2021
START TIME: 2000

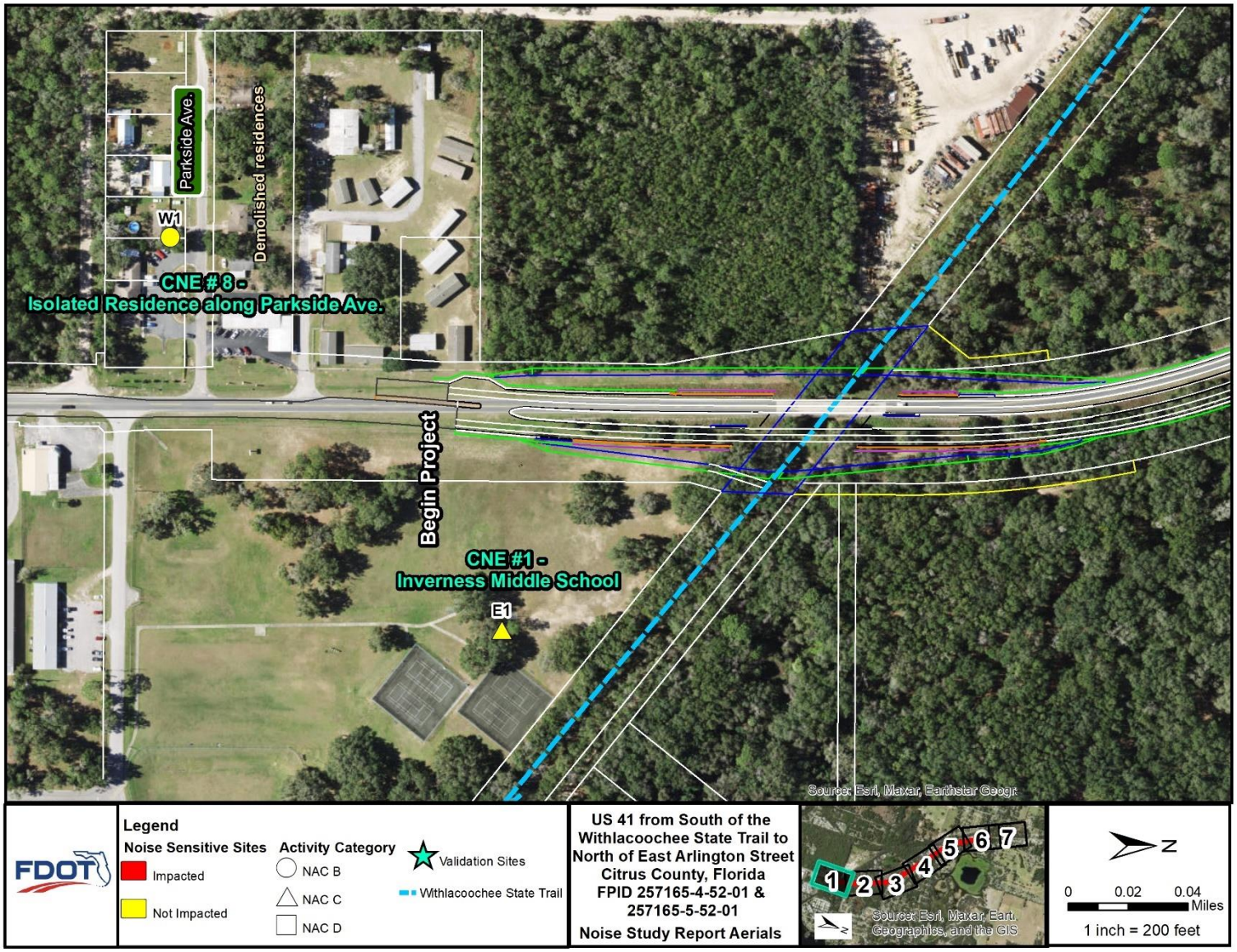
TIME	DIRECTION: N 1ST	2ND	3RD	4TH	TOTAL	DIRECTION: S 1ST	2ND	3RD	4TH	TOTAL	COMBINED TOTAL
0000	11	9	12	15	47	11	9	9	4	33	80
0100	3	12	3	7	25	5	4	3	3	15	40
0200	9	5	4	10	28	6	7	5	4	22	50
0300	4	6	13	4	27	4	8	12	15	39	66
0400	7	8	19	11	45	11	14	31	31	87	132
0500	15	24	26	47	112	29	36	45	79	189	301
0600	49	45	73	88	255	58	113	114	145	430	685
0700	97	105	129	147	478	180	183	184	170	717	1195
0800	107	104	112	134	457	154	125	146	162	587	1044
0900	106	124	117	124	471	140	162	155	144	601	1072
1000	97	128	148	140	513	123	144	116	154	537	1050
1100	129	134	129	131	523	174	163	142	160	639	1162
1200	142	156	156	131	585	172	142	151	168	633	1218
1300	139	166	155	128	588	169	158	151	159	637	1225
1400	160	166	179	184	689	148	148	160	152	608	1297
1500	172	187	163	166	688	137	183	199	130	649	1337
1600	215	190	199	203	807	143	181	165	143	632	1439
1700	256	212	212	182	862	159	160	164	151	634	1496
1800	176	141	126	115	558	128	129	117	95	469	1027
1900	114	103	87	93	397	72	76	103	76	327	724
2000	78	81	86	75	320	68	65	46	57	236	556
2100	74	58	49	46	227	57	49	35	28	169	396
2200	36	42	37	36	151	25	31	17	24	97	248
2300	33	21	27	21	102	23	19	13	13	68	170
24-HOUR TOTALS:					8955					9055	18010

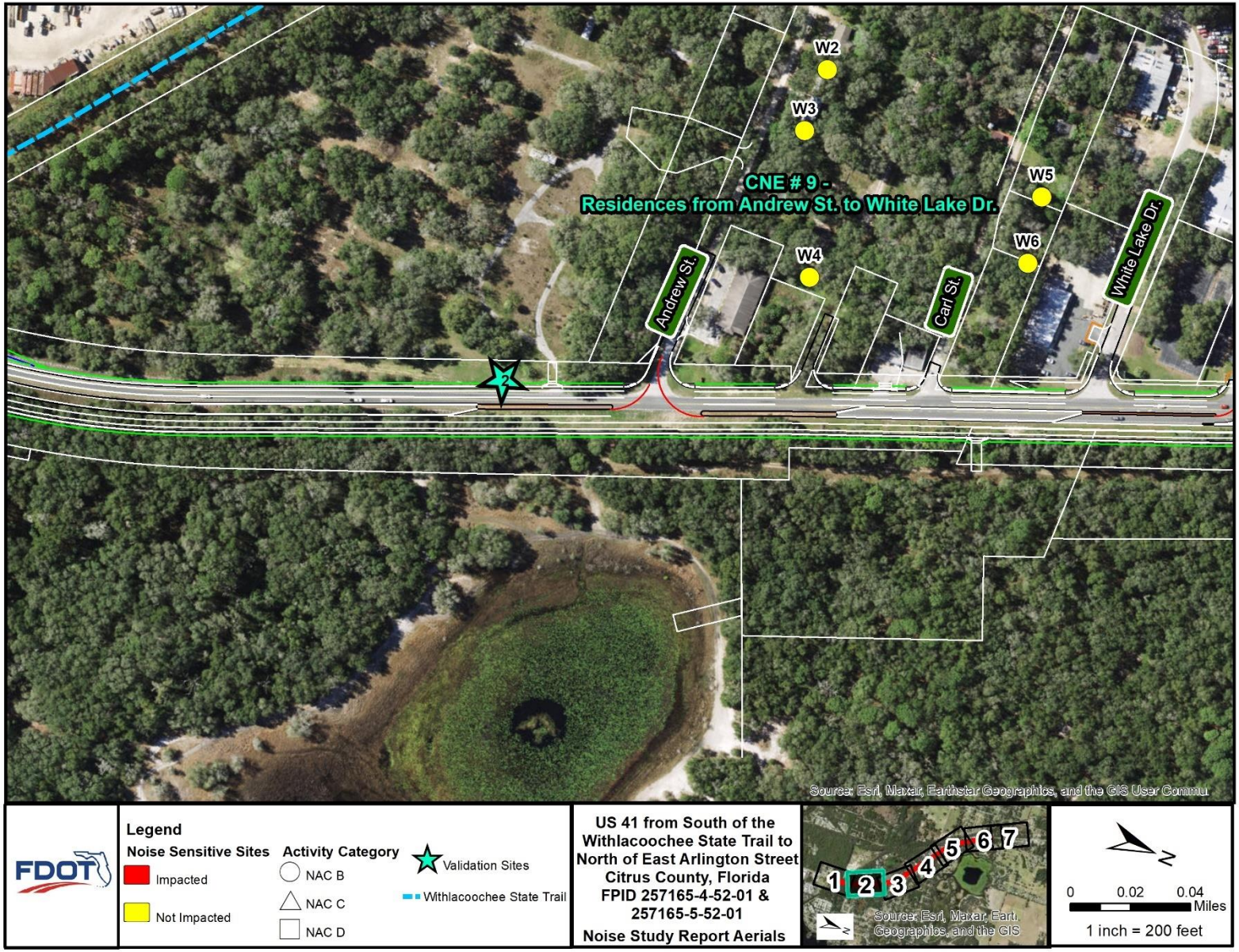
PEAK VOLUME INFORMATION

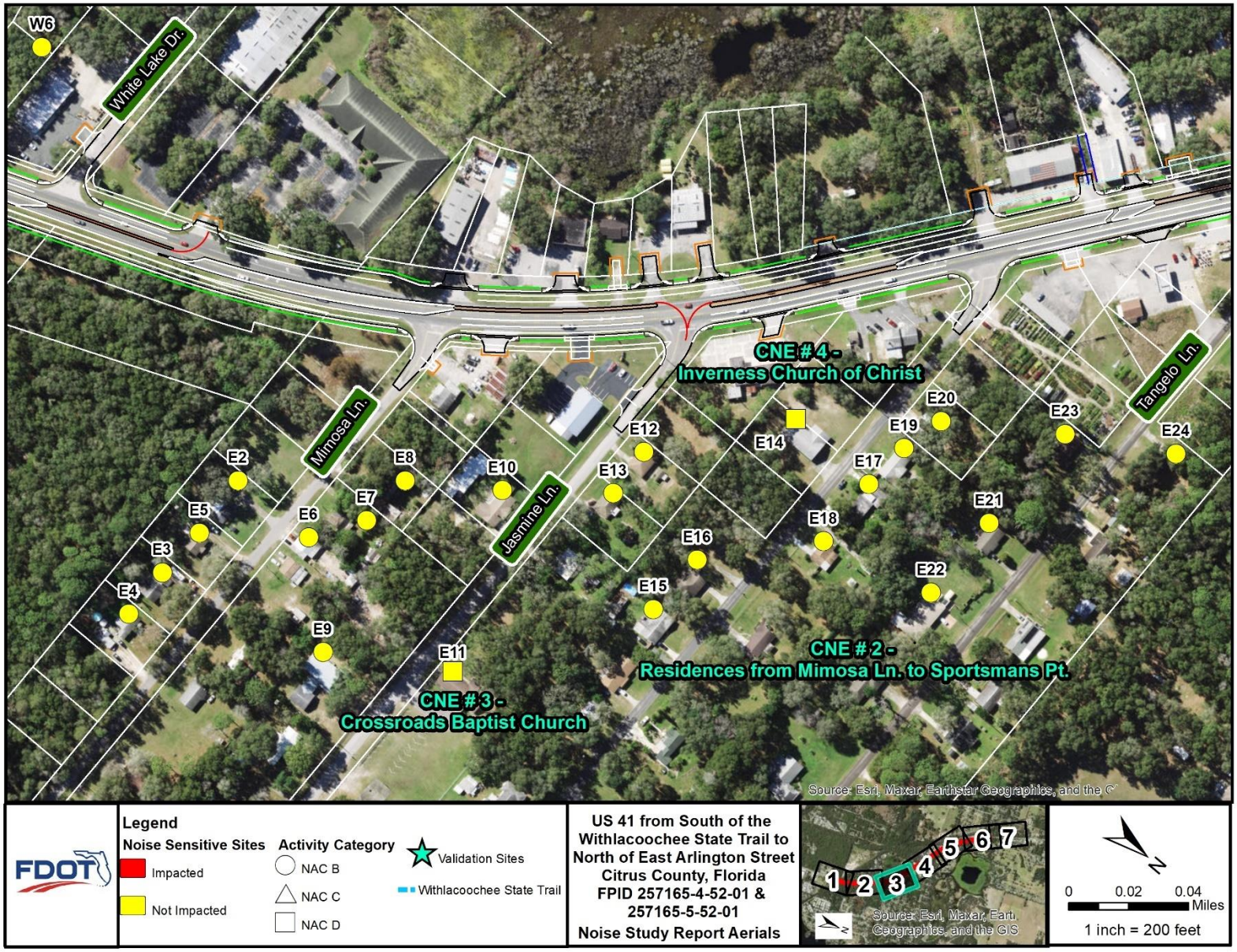
	DIRECTION: N HOUR	VOLUME	DIRECTION: S HOUR	VOLUME	COMBINED DIRECTIONS HOUR	VOLUME
A.M.	715	488	700	717	700	1195
P.M.	1645	883	1445	671	1645	1509
DAILY	1645	883	700	717	1645	1509

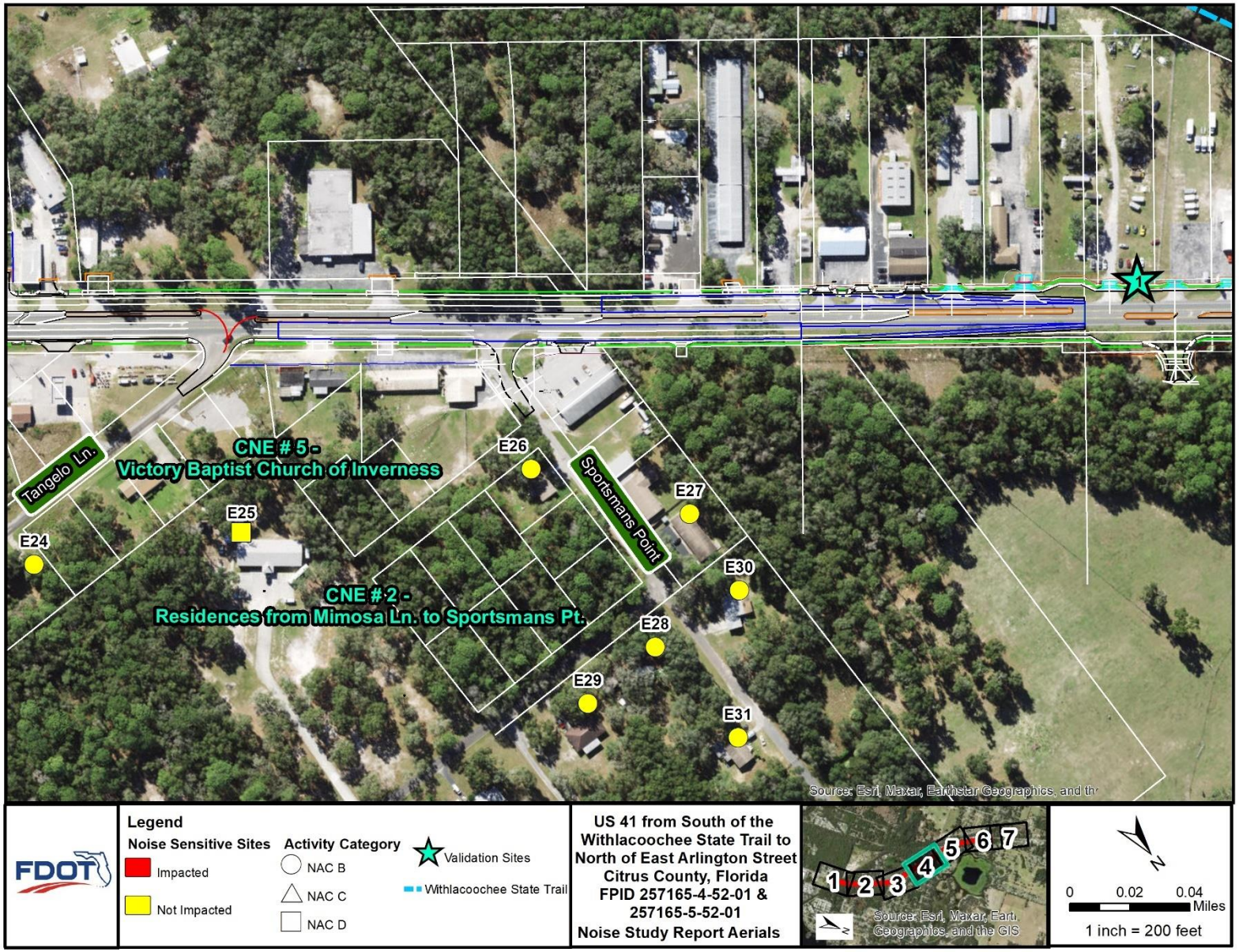
GENERATED BY SPS 5.0.55P

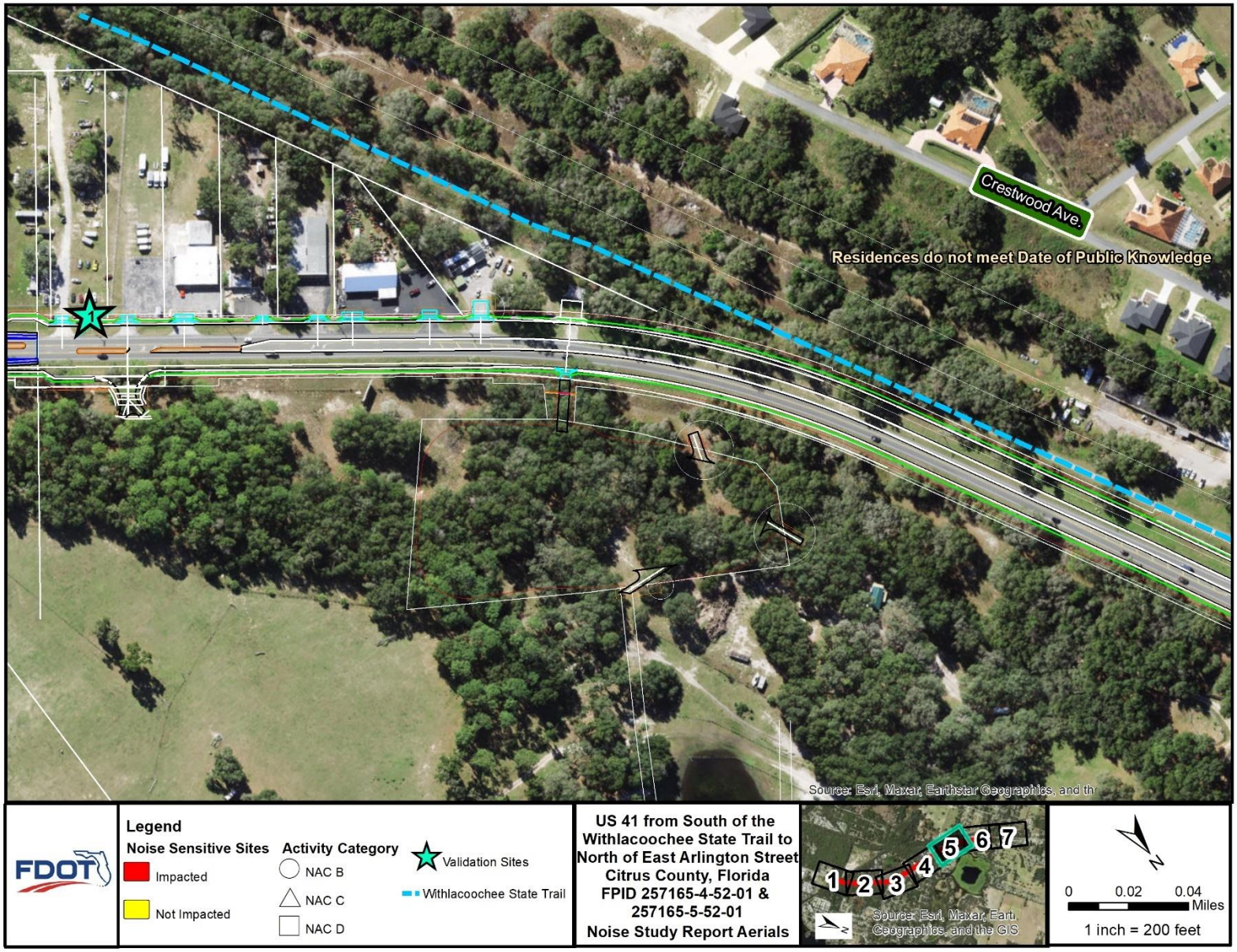
APPENDIX B Project Aerials

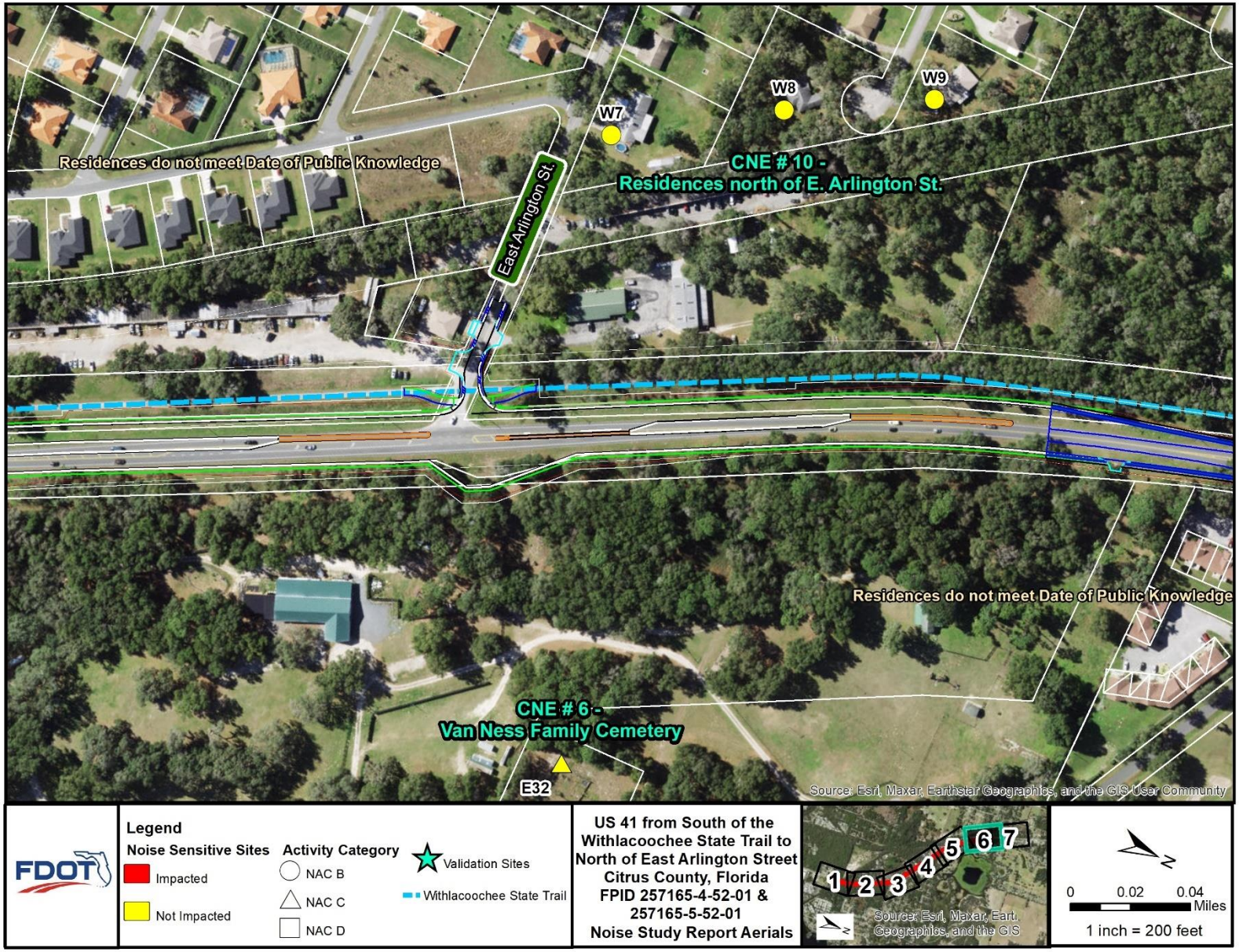

Parkside Ave.
Demolished residences
W1
CNE # 8 -
Isolated Residence along Parkside Ave.
Begin Project
CNE #1 -
Inverness Middle School
E1
Source: Esri, Maxar, Earthstar Geogr
FDOT
Legend
Noise Sensitive Sites
Impacted
Not Impacted
Activity Category
NAC B
NAC C
NAC D
Validation Sites
Withlacoochee State Trail
US 41 from South of the Withlacoochee State Trail to North of East Arlington Street
Citrus County, Florida
FPID 257165-4-52-01 & 257165-5-52-01
Noise Study Report Aerials
1 2 3 4 5 6 7
Source: Esri, Maxar, Eart, Geographics, and the GIS
N
0 0.02 0.04
Miles
1 inch = 200 feet

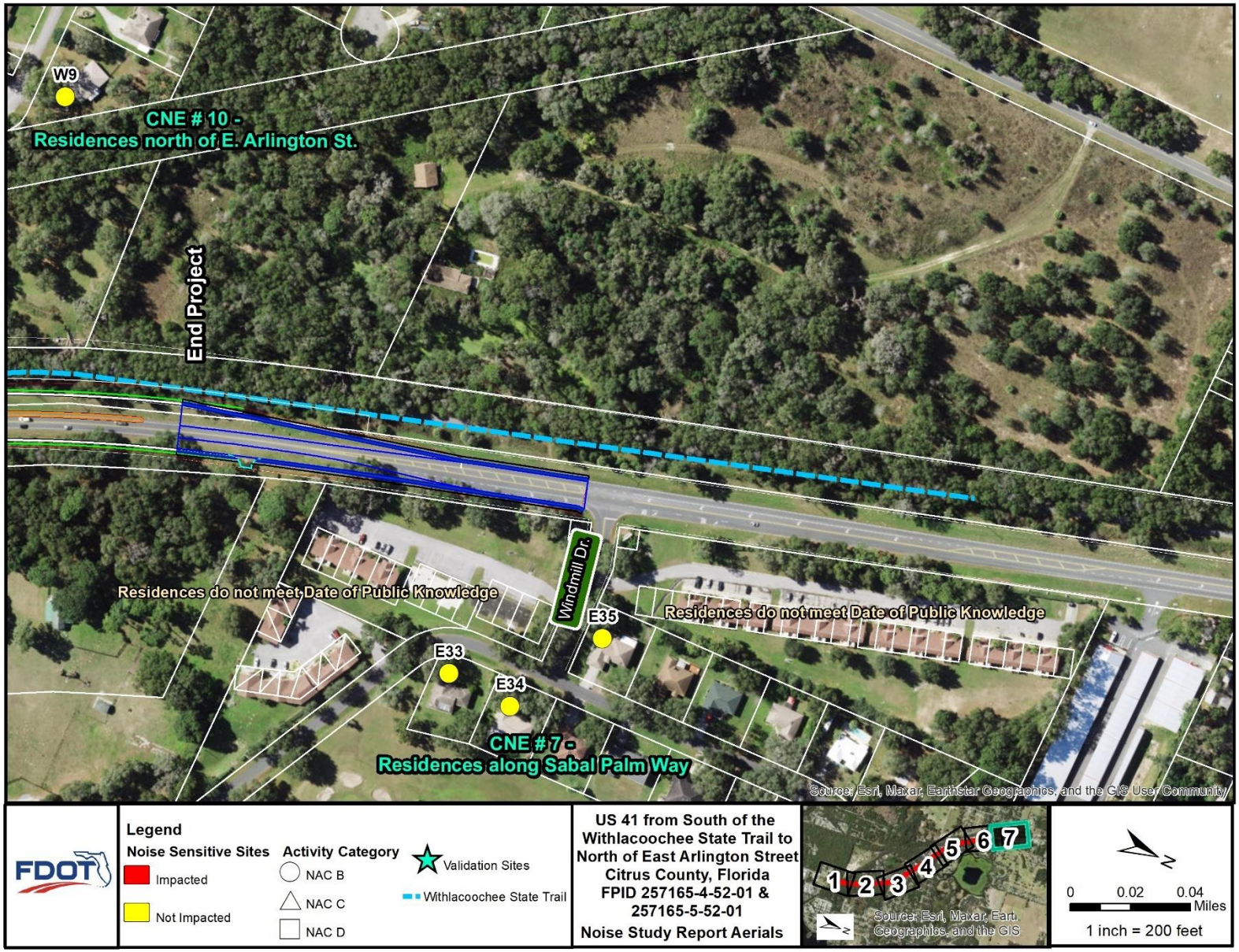

W2
W3
CNE # 9 -
Residences from Andrew St. to White Lake Dr.
W5
W6
W4
Andrew St.
Carl St.
White Lake Dr.
Source: Esri, Maxar, Earthstar Geographics, and the GIS User Commu
FDOT
Legend
Noise Sensitive Sites
Impacted
Not Impacted
Activity Category
NAC B
NAC C
NAC D
Validation Sites
Withlacoochee State Trail
US 41 from South of the Withlacoochee State Trail to North of East Arlington Street
Citrus County, Florida
FPID 257165-4-52-01 & 257165-5-52-01
Noise Study Report Aerials
1
2
3
4
5
6
7
Source: Esri, Maxar, Earth, Geographics, and the GIS
0
0.02
0.04
Miles
1 inch = 200 feet


W6
White Lake Dr.
Mimosa Ln.
Jasmine Ln.
Tangelo Ln.
CNE # 4 -
Inverness Church of Christ
CNE # 2 -
Residences from Mimosa Ln. to Sportsmans Pt.
CNE # 3 -
Crossroads Baptist Church
E2
E3
E4
E5
E6
E7
E8
E9
E10
E11
E12
E13
E14
E15
E16
E17
E18
E19
E20
E21
E22
E23
E24
Source: Esri, Maxar, Earthstar Geographics, and the G
Legend
Noise Sensitive Sites
Impacted
Not Impacted
Activity Category
NAC B
NAC C
NAC D
Validation Sites
Withlacoochee State Trail
US 41 from South of the Withlacoochee State Trail to North of East Arlington Street
Citrus County, Florida
FPID 257165-4-52-01 &
257165-5-52-01
Noise Study Report Aerials
1
2
3
4
5
6
7
Source: Esri, Maxar, Eart, Geographics, and the GIS
0
0.02
0.04
Miles
1 inch = 200 feet


CNE # 5 -
Victory Baptist Church of Inverness
CNE # 2 -
Residences from Mimosa Ln. to Sportsmans Pt.
Tangelo Ln.
Sportsmans Point
E24
E25
E26
E27
E28
E29
E30
E31
1
Source: Esri, Maxar, Earthstar Geographics, and th
FDOT
Legend
Noise Sensitive Sites
Impacted
Not Impacted
Activity Category
NAC B
NAC C
NAC D
Validation Sites
Withlacoochee State Trail
US 41 from South of the Withlacoochee State Trail to North of East Arlington Street
Citrus County, Florida
FPID 257165-4-52-01 & 257165-5-52-01
Noise Study Report Aerials
1
2
3
4
5
6
7
Source: Esri, Maxar, Earthstar Geographics, and the GIS
N
0
0.02
0.04
Miles
1 inch = 200 feet


Crestwood Ave.
Residences do not meet Date of Public Knowledge
1
Source: Esri, Maxar, Earthstar Geographics, and th
Legend
Noise Sensitive Sites
Impacted
Not Impacted
Activity Category
NAC B
NAC C
NAC D
Validation Sites
Withlacoochee State Trail
US 41 from South of the Withlacoochee State Trail to North of East Arlington Street
Citrus County, Florida
FPID 257165-4-52-01 &
257165-5-52-01
Noise Study Report Aerials
1
2
3
4
5
6
7
Source: Esri, Maxar, Eart
Geographics, and the GIS
N
0
0.02
0.04
Miles
1 inch = 200 feet


W7
W8
W9
Residences do not meet Date of Public Knowledge
East Arlington St.
CNE # 10 -
Residences north of E. Arlington St.
Residences do not meet Date of Public Knowledge
CNE # 6 -
Van Ness Family Cemetery
E32
Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community
Legend
Noise Sensitive Sites
Impacted
Not Impacted
Activity Category
NAC B
NAC C
NAC D
Validation Sites
Withlacoochee State Trail
US 41 from South of the Withlacoochee State Trail to North of East Arlington Street
Citrus County, Florida
FPID 257165-4-52-01 &
257165-5-52-01
Noise Study Report Aerials
1
2
3
4
5
6
7
Source: Esri, Maxar, Eart, Geographics, and the GIS
0
0.02
0.04
Miles
1 inch = 200 feet


W9
CNE # 10 -
Residences north of E. Arlington St.
End Project
Windmill Dr.
Residences do not meet Date of Public Knowledge
Residences do not meet Date of Public Knowledge
E35
E33
E34
CNE # 7 -
Residences along Sabal Palm Way
Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community
FDOT
Legend
Noise Sensitive Sites
Impacted
Not Impacted
Activity Category
NAC B
NAC C
NAC D
Validation Sites
Withlacoochee State Trail
US 41 from South of the Withlacoochee State Trail to North of East Arlington Street
Citrus County, Florida
FPID 257165-4-52-01 &
257165-5-52-01
Noise Study Report Aerials
1
2
3
4
5
6
7
Source: Esri, Maxar, Earthstar Geographics, and the GIS
0
0.02
0.04
Miles
1 inch = 200 feet

APPENDIX C Predicted Noise Levels

Common Noise Environment	Aerial Sheet Number	Receptor ID	Activity Category	Property Type	Number of Residences Represented	Predicted 2047 Build Condition dB(A)	NAC Approached or Exceeded?
CNE # 1 - Inverness Middle School	1	E1	C	School (exterior)	0	55.2	NO
CNE # 2 - Residences from Mimosa Ln. to N. Sportsman Pt.	3	E2	B	Residence	1	55.7	NO
	3	E3	B	Residence	1	51.7	NO
	3	E4	B	Residence	1	50.3	NO
	3	E5	B	Residence	1	52.8	NO
	3	E6	B	Residence	1	53.7	NO
	3	E7	B	Residence	1	54.4	NO
	3	E8	B	Residence	1	56.2	NO
	3	E9	B	Residence	1	49.9	NO
	3	E10	B	Residence	1	55.6	NO
	3	E12	B	Residence	1	57.1	NO
	3	E13	B	Residence	1	54.1	NO
	3	E15	B	Residence	1	50.6	NO
	3	E16	B	Residence	1	51.8	NO
	3	E17	B	Residence	1	53.3	NO
	3	E18	B	Residence	1	51.1	NO
	3	E19	B	Residence	1	54.7	NO
	3	E20	B	Residence	1	55.8	NO
	3	E21	B	Residence	1	51.2	NO
	3	E22	B	Residence	1	49.7	NO

	3	E23	B	Residence	1	54.1	NO
	3	E24	B	Residence	1	52.7	NO
	4	E25	B	Residence	1	56.3	NO
	4	E27	B	Residence	1	55.2	NO
	4	E28	B	Residence	1	50.5	NO
	4	E29	B	Residence	1	49.1	NO
	4	E30	B	Residence	1	52.5	NO
	4	E31	B	Residence	1	48.5	NO
CNE # 3 - Crossroads Baptist Church	3	E11	D	Place of Worship (interior)	0	29.6	NO
CNE # 4 - Inverness Church of Christ	3	E14	D	Place of Worship (interior)	0	37.9	NO
CNE # 5 - Victory Baptist Church of Inverness	4	E25	D	Place of Worship (interior)	0	33.6	NO
CNE # 6 - Van Ness Family Cemetery	6	E32	C	Cemetery	0	51.2	NO
CNE # 7 - Residences along Sabal Palm Way	7	E33	B	Residence	1	55.0	NO
	7	E34	B	Residence	1	54.1	NO
	7	E35	B	Residence	1	57.9	NO
CNE # 8 - Isolated Residence along Parkside Avenue	1	W1	B	Residence	1	54.4	NO
CNE # 9 - Residences from Andrew St. to White Lake Dr.	2	W2	B	Residence	1	50.7	NO
	2	W3	B	Residence	1	52.3	NO
	2	W4	B	Residence	1	59.1	NO
	2	W5	B	Residence	1	54.6	NO
	2	W6	B	Residence	1	56.4	NO
CNE # 10 - Residences north of E. Arlington St.	6	W7	B	Residence	1	51.7	NO
	6	W8	B	Residence	1	51.8	NO
	6	W9	B	Residence	1	51.9	NO

APPENDIX D Model Validation Sheets

Table D-1
Measured Noise Levels and Traffic Data for Validation

Project	**257165-4 &-5 US 41** (SR 45)**Withlacoochee State Trail to Sportsman to Arlington**
Date	8/14/2023
Name of Observer(s)	Cristina Schoonard
Wind Speed	2 mph
Temperature	98 F
Humidity	50%
Cloud Cover	20%
Sound Level Meter Model/Serial #	Svantek Svan SV971 (Serial #44564) Svantek SV34 (Serial #33102)
Calibration Performed	Passed

Site #	**1 – Baby Bargain area (See Aerial Sheet # 4)**								
Repetition	**File Name**	**Start Time**	**Roadway Direction**	**Cars**	**Medium Trucks**	**Heavy Trucks**	**Motor-cycles**	**Buses**	**Sound Level dB(A)**
1	001	1:12 PM	SB	79	3	0	0	0	70.7
			NB	83	5	0	0	1	
2	002	1:44 PM	SB	118	5	4	0	0	68.5
			NB	91	4	2	1	1	
3	003	2:00 PM	SB	102	6	3	0	0	70.5
			NB	101	4	2	0	0	

Repetition	**Notes**
1	
2	
3	

Project	**257165-4 &-5 US 41** (SR 45) **Withlacoochee State Trail to Sportsman to Arlington**
Date	8/14/2023
Name of Observer(s)	Cristina Schoonard
Wind Speed	2 mph
Temperature	101 F
Humidity	50%
Cloud Cover	20%
Sound Level Meter Model/Serial #	Svantek Svan SV971 (Serial #44564) Svantek SV34 (Serial #33102)
Calibration Performed	Passed

Site #	**2 – South of Andrew Street (See Aerial Sheet # 2)**

Repetition	**File Name**	**Start Time**	**Roadway Direction**	**Cars**	**Medium Trucks**	**Heavy Trucks**	**Motor-cycles**	**Buses**	**Sound Level dB(A)**
1	004	2:56 PM	SB	82	3	4	0	0	73.6
			NB	120	1	0	0	1	
2	005	3:08 PM	SB	100	7	0	0	1	72.9
			NB	124	3	3	0	0	
3	006	3:25 PM	SB	93	2	2	0	0	70.6
			NB	112	8	0	0	0	

Repetition	**Notes**
1	
2	
3	