Traffic Noise Study Re-evaluation

Poinciana Parkway Extension (SR 538)

From CR 532 to Ronald Regan Parkway
Osceola and Polk Counties, Florida
CFX Project Numbers: 528-235; 528-234

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ACRONYMS

CFR	Code of Federal Regulations
CFX	Central Florida Expressway Authority
CNE	Common Noise Environment
CR	County Road
dB(A)	Decibel (A-Weighted)
DHV	Design Hourly Volume
EB	Eastbound
EOP	Edge of Pavement
FDOT	Florida Department of Transportation
FHWA	Federal Highway Administration
HCS	Highway Capacity Software
LOS	Level of Service
MP	Milepost
Mph	Miles Per Hour
NAC	Noise Abatement Criteria
NB	Northbound
NRDG	Noise Reduction Design Goal
NSA	Noise Study Area
NSR	Noise Study Report
PD&E	Project Development & Environment
RCMB	Reedy Creek Mitigation Bank
ROW	Right-of-Way
SB	Southbound
SR	State Road
TNM	Traffic Noise Model
WB	Westbound

1.0 INTRODUCTION

Poinciana Parkway (SR 538) is a limited-access toll road that extends from the Polk-Osceola County line at Cypress Parkway (CR 580) in Poinciana to US 17/92. The parkway was initially constructed as a two-lane undivided roadway with room for expansion within the existing right of way (ROW). The Central Florida Expressway Authority (CFX) is now widening the section of SR 538 from Cypress Parkway to the north of Reedy Creek Mitigation Bank (CFX #538-165) to a four-lane divided roadway.

In 2019 CFX completed the Poinciana Parkway Extension Project Development and Environment Study (PD&E), which included an evaluation of alternatives to extend the existing Poinciana Parkway from the existing bridge over the Reedy Creek Mitigation Bank to CR 532. The project proposed a tolled four-lane expressway on a new alignment within approximately 330 feet of ROW. The study also included interchanges with other county and state roads, bridges over wetlands in the Reedy Creek Mitigation Bank, and South Florida Water Management District (SFWMD) owned/managed Upper Lakes Basin Watershed habitat, as well as bridges over local roads and railroads.

A Noise Study Technical Memorandum[1] was prepared as part of the aforementioned PD&E Study, which evaluated the potential for noise impacts related to the proposed PD&E concept based on limited project-related information available at that time.

The objective of this Traffic Noise Study Re-evaluation is to summarize the traffic noise analysis conducted for the Final Design phase of this project to account for various design changes, updated traffic forecasts, and the construction of new housing developments since the conclusion of the PD&E Study. The analysis identifies the noise sensitive receptors within the study corridor and evaluates the noise levels predicted to occur due to the current project. The study corridor consists of the following two separate CFX projects.

- Segment 538-235: CR 532 to US 17/92
- Segment 538-234: US 17/92 to Ronald Regan Parkway

Sites and communities not specifically identified in Appendix D are not within the project limits or located too far from the roadway to be impacted; thus, they were not included in the re-evaluation.The project study corridor is illustrated in **Figure 1** on page 3.

[1] CFX, *Traffic Noise Study Technical Memorandum* (October 2019)

1.1 Build Condition

For the SR 538 mainline, the project will construct two 12-foot travel lanes in each direction separated by a variable-width grassed median. Twelve-foot paved shoulders will be constructed inside and outside the travel lanes in each direction.

The project will include the new construction of the US 17/92 interchange, which will involve reconstructing US 17/92 from a two-lane facility to a four-lane facility through the interchange. Additionally, the project will include slip ramps to/from CR 532 with the SR 538 mainline terminating before overpassing CR 532. The evaluation of the Poinciana Parkway extension north of CR 532 is being conducted by the Florida Department of Transportation (FDOT).

Bridge structures will be constructed over Reedy Creek Mitigation Bank, Delmar Lane, US 17/92, Old Tampa Highway, and the CFX railroad. A substantial amount of Mechanically Stabilized Earth (MSE) walls will be constructed for the overpass embankments from CR 532 to the south of US 17/92.

The project typical sections are illustrated in **Appendix A**.

Figure 1: Project Location Map

2.0 METHODOLOGY

The traffic noise study re-evaluation conducted for this project is consistent with *Code of Federal Regulations* (C.F.R.), Title 23, § 772[2], Chapter 335, Section 335.17, *Florida Statutes*[3], Part II, Chapter 18 of the Florida Department of Transportation's (FDOT) *Project Development and Environment Manual* [4], and Federal Highway Administration's (FHWA) traffic noise analysis guidelines contained in *FHWA-HEP-10-025*[5]. The FHWA Traffic Noise Model (TNM) - version 2.5 was used to predict traffic noise levels for this project following guidelines outlined in the FDOT *Traffic Noise Modeling and Analysis Practitioners Handbook*[6]. The analysis evaluated noise levels for the Existing Condition and the 2045 Build Alternative.

Noise receptor coordinates used in the TNM are located in exterior areas where frequent human use may occur, usually at the edge of the residential structure closest to the project roadways, unless the analyst's professional judgment determined otherwise.

The MicroStation design files, georeferenced to the ortho-rectified 2021 State Plane imagery for Osceola and Polk Counties, were used to determine the design alternative's location for input into TNM. Roadway elevation data for the study was obtained from the design plans[7]. Data for the noise receptors and cross streets were obtained from the Florida Geographic Data Library[8], Google Earth[9].

2.1 NOISE METRICS

Noise levels developed for this analysis are expressed in decibels (dB) using an "A"-scale weighting, expressed as dB(A). 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 [$L_{eq(h)}$]. The $L_{eq(h)}$ is defined as the equivalent steady-state sound level that, in a given hourly period, contains the same acoustic energy as the time-varying sound level for the same hourly period.

2.2 TRAFFIC DATA

Traffic noise is heavily dependent on traffic volume and speed, with the amount of noise generated by traffic increasing as the vehicle speed and number of vehicles increase. Characteristics contributing to the 2045 Design Year's highest traffic noise levels were used to predict project noise levels. Worst-case noise conditions occur with the maximum traffic traveling

[2] Federal Highway Administration, *Code of Federal Regulations*, Title 23 Part 772, "Procedures for Abatement of Highway Traffic Noise and Construction Noise", (July 13, 2010)
[3] *Florida Statutes*, Chapter 335, § 335.17
[4] Florida Department of Transportation, *Project Development and Environment Manual,* Part 2, Chapter 18, (July 1, 2020)
[5] FHWA, *FHWA-HEP-10-025: Highway Traffic Noise: Analysis and Abatement Guidance, (*December 2011)
[6] FDOT, *Traffic Noise Modeling and Analysis Practitioners Handbook*, (December 2018)
[7] CFX, *538-234-PLANS-01-ROADWAY-60.pdf*; *538-235 90% Roadway Plans.pdf*
[8] University of Florida. Florida Geographic Data Library, https://www.fgdl.org/metadataexplorer/about.html
[9] Google Earth 2021

at the posted speed and represent a Level of Service (LOS) C operating condition. However, if the traffic analysis indicates the roadway will operate below LOS C, the project's Demand peak-hour directional traffic volumes are used per Chapter 18 of the FDOT PD&E Manual. Traffic volumes and speeds used in the analysis are included in **Appendix B**.

2.3 NOISE ABATEMENT CRITERIA

Land use also plays an important role in traffic noise analyses. Noise sensitive receptors are any property where frequent exterior or interior human use occurs and where a lowered noise level would provide a benefit. The FHWA has established noise levels at which noise abatement must be considered for various land uses. As shown in **Table 1**, these levels are used to evaluate traffic noise and are referred to as Noise Abatement Criteria (NAC). The FDOT requires noise abatement consideration for noise levels that approach the FHWA criteria by one dB(A) for the corresponding Activity Category. Another criterion for determining project impacts that warrant abatement consideration occurs when project noise levels are below the NAC but show a substantial increase (15.0 dB(A) or more) over existing levels.

Table 1: Noise Abatement Criteria

Hourly A-Weighted Sound Level-decibels (dB(A))				Description of Activity Category
Activity Category	Activity Leq(h) [1]		Evaluation Location	
	FHWA	FDOT		
A	57.0	56.0	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]	67.0	66.0	Exterior	Residential.
C[2]	67.0	66.0	Exterior	Active sports areas, amphitheaters, auditoriums, campgrounds, cemeteries, daycare centers, hospitals, libraries, medical facilities, parks, picnic areas, golf courses, places of worship, playgrounds, public meeting rooms, public/nonprofit institutional structures, radio studios, recording studios, recreational areas, Section 4(f) sites, schools, television studios, trails, and trail crossings.
D	52.0	51.0	Interior	Auditoriums, daycare centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public/nonprofit institutional structures, radio studios, recording studios, schools, and television studios.
E[2]	72.0	71.0	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.

An illustration of typical exterior and interior noises and their corresponding sound level is presented in **Table 2**. This table gives the reader a better understanding of the noise levels discussed herein.

Table 2: Typical Sound Levels

Common Outdoor Activity	dB(A)	Inside Activity
Jet Flyover at 1,000 ft. Gas Lawn Mower at 3 ft.	--110-- --100--	Rock Band
Diesel Truck at 50 ft. (at50 mph) Busy Urban Area Daytime	--90-- --80--	Food Blender at 3 ft. Garbage Disposal at 3 ft.
Gas Mower at 100 ft. Commercial Area Heavy Traffic at 300 ft.	--70-- --60--	Vacuum Cleaner at 10 ft. Normal Speech at 3 ft. Large Business Office
Quiet Urban Daytime Quiet Urban Nighttime Quiet Suburban Nighttime	--50-- --40--	Dishwasher Next Room Theater, Large Conference Room (Background)
Quiet Rural Nighttime	--30-- --20--	Library Bedroom at Night
Lowest Threshold of Human Hearing	--10-- --0--	Lowest Threshold of Human Hearing
Source: *California Dept. of Transportation Technical Noise Supplement, Oct. 1998, Pg. 18*		

2.4 Noise Abatement Measures

When traffic noise impacts are identified, noise abatement must be considered. The potential abatement alternatives include traffic management techniques, alternative roadway alignments, buffer zones, and noise barriers. The most common type of noise abatement measure is the construction of a noise barrier that reduces traffic noise by blocking the sound path between the roadway and the adjacent noise receptor.

Consistent with the FDOT PD&E Manual – Chapter 18, the following factors must be evaluated to determine if a noise barrier is considered feasible and reasonable:

- To be considered acoustically feasible, the barrier must reduce traffic-related noise levels by at least 5.0 dB(A) for at least two impacted receptors. Receptors that receive the 5.0 dB(A) reduction, or higher, are defined as "benefited" by FDOT. Consequently, noise barriers are not evaluated for isolated and single receptors.
- To be considered acoustically reasonable, the noise barrier must achieve the FDOT noise reduction design goal of 7.0 dB(A) for at least one benefited receptor.
- The cost per benefited receptor (CBPR) is calculated by multiplying the barrier total square footage by $30. Per Chapter 18, $30 per/ft^2 is the statewide average used to determine cost reasonableness regardless of barrier type (shoulder/traffic railing mounted, right-of-way post/panel, etc.) To be considered cost reasonable, the total cost of a barrier that meets all acoustical criteria should not exceed the cost of $42,000 per benefited receptor.

In some locations, noise barriers may provide a benefit to non-impacted residences. Due to design considerations or aesthetics, CFX may propose noise barriers exceeding cost reasonableness limits. An example would be extending a noise barrier to maintain community continuity (i.e., avoiding terminating a noise barrier in the middle of a community).

Consistent with the FDOT Design Manual, Section 264[10], noise barrier heights are limited as follows:

- Noise barriers on bridge and retaining wall structures are limited to a maximum height of 8 feet; unless otherwise specified;
- Shoulder-mounted noise barriers at the edge of shoulder pavement are limited to a maximum height of 14 feet; and
- Non-shoulder mounted noise barriers (i.e., post and panel) located outside the clear recovery zone are limited to a maximum height of 22 feet. If a non-shoulder barrier is placed within the clear recovery zone, it must be shielded.

Other factors must also be considered when evaluating a barrier's feasibility, including accessibility, sight distance, and aesthetics. Accessibility refers to the ingress and egress to properties that would be affected by the construction of a noise barrier. Sight distance is a safety issue related to drivers' ability to see far enough in each direction to enter the roadway safely. Aesthetics refers to the noise barrier's physical appearance from both the highway and affected property sides.

[10] FDOT, *FDOT Design Manual*

3.0 TRAFFIC NOISE ANALYSIS

3.1 Identification of Noise Sensitive Sites

Using **Table 1** as a guide, all noise sensitive land uses within the study corridor fall under Activity Category B and Category C. The single Category C land use is associated with the G5 Church in the SW quadrant of the SR 538/US17-92 interchange.

The remainder of the corridor is Activity Category G undeveloped land. A records search of these parcels, conducted in January 2022, did not identify any active permits for buildings considered noise sensitive.

The noise analysis identified 6 Noise Study Areas (NSA) containing 78 noise sensitive sites (76 Category B and two Category C). Project aerials illustrating the corridor and all noise sensitive sites are included in **Appendix D**. Sites not identified are located at too great a distance from the project to be impacted and were not included in the re-evaluation.

3.2 Predicted Noise Levels

A detailed summary of the noise impact analysis is provided in **Appendix C.** This matrix details the TNM-predicted noise levels for the 2020 Existing condition and the 2045 Build Alternative. A summary of the results is provided in **Table 3**.

Currently, three analyzed receptors experience noise levels that meet or exceed the 66.0 dB(A) Noise Abatement Criterion (NAC). With the traffic increase associated with the Build Alternative, 14 residential receptor sites are predicted to have traffic noise impacts because of the project. Eight sites will exceed the 66.0 dB(A) residential NAC, and six sites are predicted to experience a substantial increase (15.0 dB(A) or greater) over the existing condition.

Overall, the noise levels increase an average of 7.8 dB(A) over existing conditions across the study corridor, with the greatest increase being 19.0 dB(A) at receptor 2-1 in NSA 2.

Table 3: Impact Analysis Summary

Project Segment #	Activity Category	2020 Existing	2045 Build	Average Increase Over Existing
538-235 *NSA 1-4*	B	3	9	7.9 dB(A)
	C	0	0	
	E	0	0	
	Impacts Subtotal	***3***	***9***	
538-234 *NSA 5 & 6*	B	0	5	7.7 dB(A)
	C	0	0	
	E	0	0	
	Impacts Subtotal	***0***	***5***	
Impact Totals		***3***	***14***	***7.8 dB(A)***

Each site impacted as a result of the Build Alternative requires noise abatement consideration, discussed below in **Section 3.3**.

3.3 Noise Abatement Consideration

Across the study corridor, two noise barriers were evaluated for the potential to provide abatement to the impacted receptors. The criteria discussed in **Section 2.3** were utilized to determine if barriers met the applicable acoustic and cost reasonableness parameters used by the CFX during the decision-making process. The following barriers are discussed in detail in this section.

- Segment #538-235: Noise Barrier NB 1
- Segment #538-234: Noise Barrier SB 1

Impacted receptors 2-16, 2-17, and 3-1 are considered isolated/single or have engineering constraints (e.g., driveway openings); therefore, a barrier at these locations cannot achieve the minimum noise reduction requirements. Consequently, barriers were not analyzed for these receptors.

NSA 2 - Noise Barrier NB1

Several scenarios were evaluated to determine the effectiveness of a noise barrier's ability to provide abatement for the six impacted homes in NSA 2 (Ivy Mist Lane) near the planned SR 538 Poinciana Parkway Extension. The elevation differences between the receptors and elevated roadway preclude the ability to locate a stand-alone post and panel barrier at or near the ROW line that can meet applicable acoustic criteria (i.e., minimum 5 dB(A) reduction for all six impacted sites).

Of the numerous analyzed noise barrier scenarios, the following option was evaluated to provide abatement to the Ivy Mist Lane neighborhood from an acoustic and cost perspective. All other scenarios provided less abatement and were substantially higher in estimated cost; therefore, they were not advanced for further consideration. The additional evaluted scenarios are described in **Table 4**.

- Option 1 – This option was evaluated as a three-segment noise barrier system.
    - Segment 1 is comprised of a variable height barrier located at the edge of the northbound mainline shoulder. For the section between stations 396+00 to 402+40 and 407+10 (approx.), the barrier is at the maximum height of 8 feet due to bridge structures and MSE walls. For the section between stations 402+40 to 407+10 (approx.), the height is 14 feet and does not account for barrier tapering at each end.
    - Segment 2 is comprised of an 8-foot tall barrier located at the edge of the northbound entry ramp shoulder between stations 308+25 and 313+80 (approx.). This barrier segment is located on top of MSE walls and the bridge structure over Old Tampa Highway.
    - Segment 3 is comprised of a 22-foot tall standard post and panel barrier located approximately 15 feet from the CFX ROW line. This segment starts south of Old Tampa Highway and terminates at pond station 1205+00 (approx.).

This scenario meets acoustic abatement criteria for all six impacted residences. Three non-impacted residences are also benefited. This barrier provides an average noise reduction is 6.1 dB(A), with the greatest reduction predicted to be 8.6 dB(A) at receptor 2-1. However, with a total estimated cost of $1,093,020 and associated CPBR of $121,447, this option is nearly 300% over FDOT/CFX cost reasonableness criterion. Therefore, noise barriers for this location are not considered reasonable for further consideration. An illustration of this barrier option is provided in **Appendix E – Page E-1.**

Table 4: Noise Barrier NB1 Evaluation Summary

NSA 2: Barrier NB1 - Ivy Mist Lane Evaluation Summary													
Evaluated Barrier Options				Number of Impacted Sites	Number of Impacted Sites Within a Noise Reduction Range			Number of Benefited Sites [*1]				Total Estimated Cost [*4]	Cost per Benefited Receptor [*5]
Design Option	Barrier Type	Height (feet) [*6]	Total Length (feet)		5-5.9 dB(A)	6-6.9 dB(A)	≥ 7.0 dB(A) [*2]	Impacted	Other [*3]	Total	Avg. Noise Reduction dB(A)		
Option 1 Not Recommended	M/L shoulder	8	910	6	2	1	3	6	3	9	6.1	$ 1,093,020	$ 121,447
		14	469										
	Ramp shoulder	8	607										
	ROW	22	806										
Option 1a Not Recommended	M/L shoulder	8	910	6	2	1	2	5	0	5	6.1	$ 947,340	$ 189,468
		14	469										
	Ramp shoulder	0	0										
		0	0										
	ROW	22	806										
Option 1b Not Recommended	M/L shoulder	0	0	6	0	1	0	1	0	1	6.1	$ 677,640	$ 677,640
		0	0										
	Ramp shoulder	8	175										
		8	432										
	ROW	22	806										
Option 1c Not Recommended	M/L shoulder	0	0	6	0	0	0	0	0	0	< 5.0	$ 531,960	n/a
		0	0										
	Ramp shoulder	0	0										
		0	0										
	ROW	22	806										

*1 = Minimum of 5.0 dB(A) required to be considered benefited by noise barrier.
*2 = FDOT Noise Reduction Design Goal is 7.0 dB(A) at a minimum of 1 benefited receptor.
*3 = Refers to non-impacted noise-sensitive sites.
*4 = Based on FDOT Statewide average of $30 per square foot.
*5 = FDOT/CFX Reasonable Cost Guideline is $42,000.
*6 = 8-foot max height on structures [MSE, bridges] and 14-foot max height on edge of shoulder per FDOT Design Standards

NSA 5/6 - Noise Barrier SB1

None of the analyzed receptors in NSAs 5 and 6 were able to meet the the 66.0 dB(A) NAC or 'substanial' impact criteria. However, the noise increases resulting from this project will constitute a doubling of traffic noise. Because of this, effective and reasonble abatement for the four-lane condition could not be achieved. Consequently, CFX determined that evaluating abatement options for the future eight-lane scenario as part of this project would be prudent. Doing so will allow for the analysis of noise barriers to fulfill barrier dimension location and height/length requirements for a future eight-lane condition but be built now with the construction of the SR 538 roadway extension.

For NSA 5, the average increase over the existing condition is predicted at 6.4 dB(A) and 10.0 dB(A) for the four-lane and eight-lane scenarios, respectively. The increased noise levels range from 1.1 dB(A) to 9.7 dB(A) for the four-lane scenario and 3.7 dB(A) to 14.2 dB(A) for the eight-lane scenario. No receptors exceeded the 66.0 dB(A) NAC for the four-lane scenario but five receptors will meet the NAC with the eight-lane scenario.

For NSA 6, the average increase over the existing condition is predicted at 8.4 dB(A) and 13.2 dB(A) for the four-lane and eight-lane scenarios, respectively. The increased noise levels range from 6.8 dB(A) to 10.3 dB(A) for the four-lane scenario and 11.9 dB(A) to 14.6 dB(A) for the eight-lane scenario. Five receptors exceed the 66.0 dB(A) NAC.

Numerous scenarios were evaluated from the standpoint of acoustics, cost reasonableness, aesthetics, and reducing the potential for project noise barriers to be obsolete when SR 538 is widened to eight lanes at a later date. The additional evaluted scenarios are described in **Table 5**.

- Option 1 – This barrier design provides a 22-foot-tall, 2,914-foot-long barrier located near the CFX ROW line from station 490+50 to 515+20 (approx.). Near the southern terminus, this barrier has a small gap for ingress/egress for the adjacent mitigation bank property. This option meets the acoustic abatement criteria for the five impacted homes in NSA 6. An additional 28 non-impacted homes (three in NSA 5 and 25 in NSA 6) also benefited. The average noise reduction of this barrier is 6.4 dB(A), and the estimated cost is $1,923,040. With a CPBR of $58,280, this option is not within FDOT cost reasonableness standards but is close enough that CFX would consider providing a wall if it would benefit the adjacent community. Lastly, this barrier scenario allows for a maximum height barrier to be constructed with the current project while fulfilling abatement requirements for a future eight-lane scenario.
- Option 2 – This option was evaluated as a two-segment barrier system. Segment 1 consists of a 14-foot-tall, 1,611-foot-long barrier on the edge of the southbound shoulder pavement adjacent to NSA 5 (Sereno Phase 5). Segment 2 consists of a 22-foot-tall, 2,240-foot-long barrier near the CFX ROW line, adjacent to NSA 6 (Sereno Phase 6). This option meets the acoustic abatement criteria for the five impacted homes in NSA 6. An additional

47 non-impacted homes (14 in NSA 5 and 33 in NSA 6) are also benefited. The average noise reduction of this barrier system is 6.5 dB(A), and the estimated cost is $2,155,020. With a CPBR of $41,443, this option is within FDOT cost reasonableness standards. CFX has determiend that the shoulder barrier provides too much of an urban aesthetic for this mostly rural roadway and conficts with the surrounding landscape.

Option 1 is the CFX preferred option to carry forward into the project's final design and bid plans. An illustration of this barrier system is provided in **Appendix E – Page E-2.**

Table 5: Noise Barrier SB1 Evaluation Summary

NSA 5 & 6: Barrier SB1 - Sereno Evaluation Summary													
Evaluated Barrier Options				Number of Impacted Sites	Number of Impacted Sites Within a Noise Reduction Range			Number of Benefited Sites *1				Total Estimated Cost *4	Cost per Benefited Receptor *5
Design Option	Barrier Type	Height (feet)*6	Length (feet)		5-5.9 dB(A)	6-6.9 dB(A)	≥ 7.0 dB(A) *2	Impacted	Other *3	Total	Avg. Noise Reduction dB(A)		
Option 1 CFX Preferred	ROW	22	2,914	**5**	0	0	5	5	28	33	6.4	$ 1,923,240	$ 58,280
Option 2	Shoulder	14	1,611	5	0	0	5	5	47	52	6.5	$ 2,155,020	$ 41,443
	ROW	22	2,240										

*1 = Minimum of 5.0 dB(A) required to be considered benefited by noise barrier.
*2 = FDOT Noise Reduction Design Goal is 7.0 dB(A) at a minimum of 1 benefited receptor.
*3 = Refers to non-impacted noise-sensitive sites.
*4 = Based on FDOT Statewide average of $30 per square foot.
*5 = FDOT Reasonable Cost Guideline is $42,000.
*6 = 14-foot max height on edge of shoulder and 22-foot max height post/panel per FDOT Design Standards

3.4 Segment #538-235 Summary and Recommendations

Traffic noise impacts were predicted for six noise sensitive sites. Several noise barriers were analyzed as abatement measures for the impacted NSA 2. It was determined that the most acoustically effective and economical option (Option 1) was nearly 300% higher than the CFX cost reasonableness standards. All other barrier options were either acoustically less effective or had an even greater total cost and cost per benefited receptor than Option 1. An illustration of this barrier is provided in **Appendix E – Page E-1**. The details of Option 1 are shown below in **Table 6**.

Impacted receptors 2-16 and 2-17 have feasibility constraints that preclude CFX's ability to construct an effective noise barrier (e.g., right-of-way limitations, driveways, and side streets). Because of this, a barrier was not evaluated for these locations. Receptor 3-1 is isolated; therefore, a barrier was not analyzed because it cannot achieve the required minimum noise reduction at two receptors.

Table 6: Project 538-235 Noise Barrier Recommendations

NSA 2: Barrier NB1 - Ivy Mist Lane Evaluation Summary													
Evaluated Barrier Options				Number of Impacted Sites	Number of Impacted Sites Within a Noise Reduction Range			Number of Benefited Sites *1				Total Estimated Cost *4	Cost per Benefited Receptor *5
Design Option	Barrier Type	Height (feet) *6	Total Length (feet)		5-5.9 dB(A)	6-6.9 dB(A)	≥ 7.0 dB(A) *2	Impacted	Other *3	Total	Avg. Noise Reduction dB(A)		
Option 1 *Not Recommended*	M/L shoulder	8	910	6	2	1	3	6	3	9	6.1	$ 1,093,020	$ 121,447
		14	469										
	Ramp shoulder	8	607										
	ROW	22	806										

*1 = Minimum of 5.0 dB(A) required to be considered benefited by noise barrier.
*2 = FDOT Noise Reduction Design Goal is 7.0 dB(A) at a minimum of 1 benefited receptor.
*3 = Refers to non-impacted noise-sensitive sites.
*4 = Based on FDOT Statewide average of $30 per square foot.
*5 = FDOT/CFX Reasonable Cost Guideline is $42,000.
*6 = 8-foot max height on structures [MSE, bridges] and 14-foot max height on edge of shoulder per FDOT Design Standards

3.5 Segment #538-234 Summary and Recommendations

Traffic noise impacts were predicted for five noise sensitive sites in NSAs 5 and 6. Of the evaluated abatement options, the CFX preferred option is Option 1. This option provides abatement to the five impacted and 28 non-impacted homes with an average noise reduction of 6. 4 dB(A).

The barrier's entire length is near the CFX ROW line. This option is most the aesthetically pleasing of the analyzed options when considering its location within a rural environment.

An illustration of this barrier is provided in **Appendix E – Page E-2**. The details of Option 1 are shown below in **Table 7**.

Table 7: Project #538-234 Noise Barrier Recommendations

NSA 5 & 6: Barrier SB1 - Sereno Evaluation Summary													
Evaluated Barrier Options				Number of Impacted Sites	Number of Impacted Sites Within a Noise Reduction Range			Number of Benefited Sites *1				Total Estimated Cost *4	Cost per Benefited Receptor *5
Design Option	Barrier Type	Height (feet)*6	Length (feet)		5-5.9 dB(A)	6-6.9 dB(A)	≥ 7.0 dB(A) *2	Impacted	Other *3	Total	Avg. Noise Reduction dB(A)		
Option 1 CFX Preferred	ROW	22	2,914	**5**	0	0	5	5	28	33	6.4	$ 1,923,240	$ 58,280

*1 = Minimum of 5.0 dB(A) required to be considered benefited by noise barrier.
*2 = FDOT Noise Reduction Design Goal is 7.0 dB(A) at a minimum of 1 benefited receptor.
*3 = Refers to non-impacted noise-sensitive sites.
*4 = Based on FDOT Statewide average of $30 per square foot.
*5 = FDOT Reasonable Cost Guideline is $42,000.
*6 = 14-foot max height on edge of shoulder and 22-foot max height post/panel per FDOT Design Standards

4.0 CONSTRUCTION NOISE AND VIBRATION IMPACTS

Construction of the proposed roadway improvements is not expected to have any significant vibration or construction noise impacts. It is anticipated that applying the *FDOT Standard Specifications for Road and Bridge Construction* will minimize or eliminate most of the potential short-term construction noise and vibration impacts.

Should any construction noise or vibration issues arise during construction, the Project Engineer, in concert with the CFX Noise Specialist and the Contractor, will investigate additional methods of controlling these impacts.

5.0 COMMUNITY COORDINATION

5.1 Public Meetings

Before making any final decisions on the proposed noise barrier, CFX will hold a Sound Wall Information Meeting (SWIM) in which the proposed barrier for #538-234, along with other pertinent project construction-related information, will be presented to the public. To aid in the decision-making process, CFX will directly solicit the opinions of the property owners and renters found to benefit from the proposed noise barrier. The solicitation of viewpoints will be conducted as part of the SWIM and mailed survey. The CFX SWIM process and survey results for this project will be documented under separate cover.

6.0 REFERENCES

FHWA. *Code of Federal Regulations*, Title 23 Part 772, "Procedures for Abatement of Highway Traffic Noise and Construction Noise." July 13, 2010.

FHWA. *Highway Traffic Noise: Analysis and Abatement Guidance, FHWA-HEP-10-025.* December 2011.

FHWA. *Recommended Best Practices for the Use of the FHWA Traffic Noise Model (TNM*. December 8, 2015.

FDOT. A+ Plus Aerial Photo Look-Up System. 2021.

FDOT. *Project Development and Environment Manual:* Part II, Chapter 18. Effective July 1, 2020.

FDOT. *Standard Specifications for Road and Bridge Construction*.

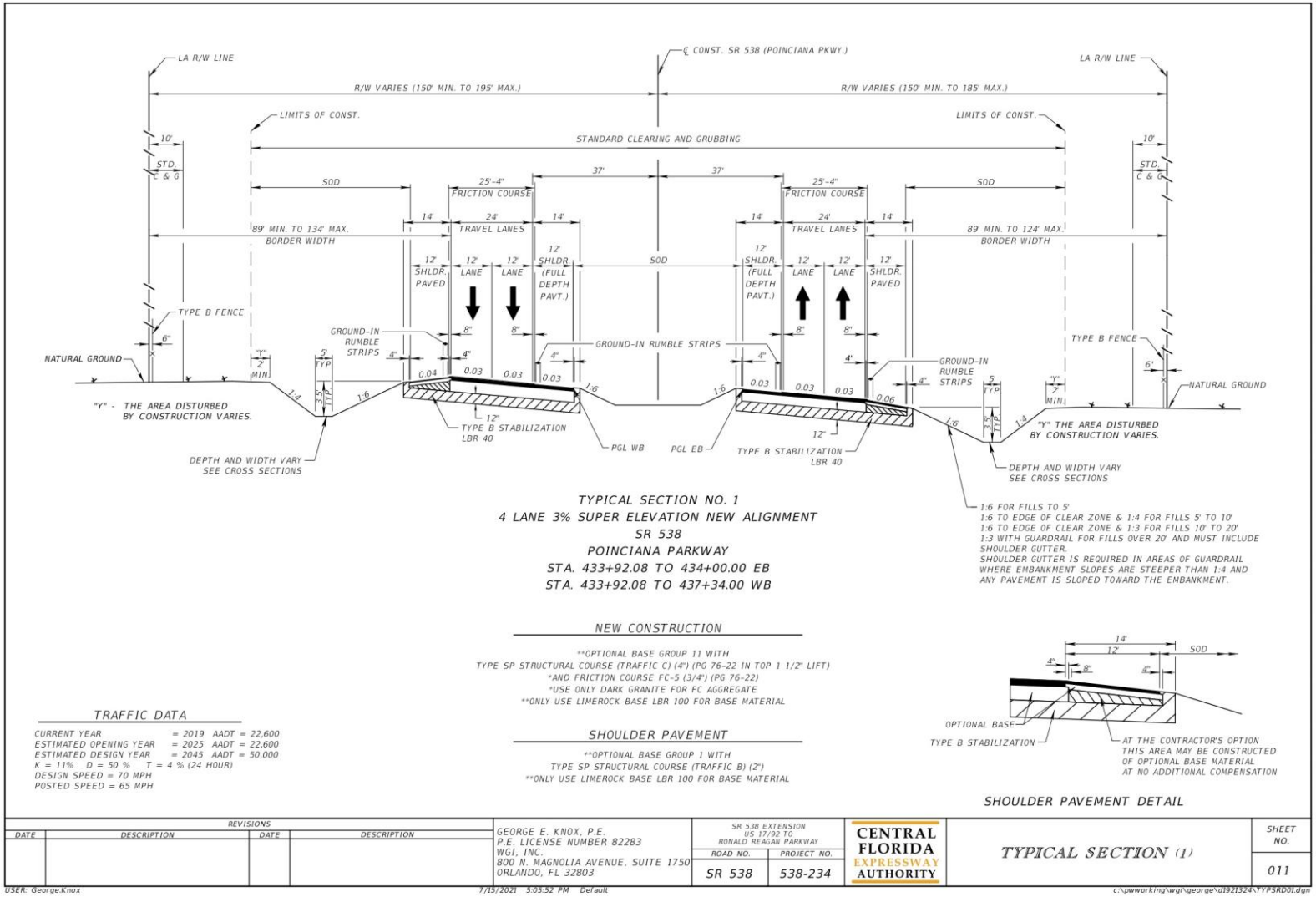
FDOT. *Traffic Noise Modeling and Analysis Practitioners Handbook*. December 2018.

Google Earth, @2021 Google. Imagery and elevation data.

Section 335.17, *Florida Statutes. State Highway Construction; Means of Noise Abatement.* 2012.

Appendix A:

Typical Sections



TYPICAL SECTION NO. 1
4 LANE 3% SUPER ELEVATION NEW ALIGNMENT
SR 538
POINCIANA PARKWAY
STA. 433+92.08 TO 434+00.00 EB
STA. 433+92.08 TO 437+34.00 WB

1:6 FOR FILLS TO 5'
1:6 TO EDGE OF CLEAR ZONE & 1:4 FOR FILLS 5' TO 10'
1:6 TO EDGE OF CLEAR ZONE & 1:3 FOR FILLS 10' TO 20'
1:3 WITH GUARDRAIL FOR FILLS OVER 20' AND MUST INCLUDE SHOULDER GUTTER.
SHOULDER GUTTER IS REQUIRED IN AREAS OF GUARDRAIL WHERE EMBANKMENT SLOPES ARE STEEPER THAN 1:4 AND ANY PAVEMENT IS SLOPED TOWARD THE EMBANKMENT.

NEW CONSTRUCTION

**OPTIONAL BASE GROUP 11 WITH
TYPE SP STRUCTURAL COURSE (TRAFFIC C) (4") (PG 76-22 IN TOP 1 1/2" LIFT)
*AND FRICTION COURSE FC-5 (3/4") (PG 76-22)
*USE ONLY DARK GRANITE FOR FC AGGREGATE
**ONLY USE LIMEROCK BASE LBR 100 FOR BASE MATERIAL

SHOULDER PAVEMENT

**OPTIONAL BASE GROUP 1 WITH
TYPE SP STRUCTURAL COURSE (TRAFFIC B) (2")
**ONLY USE LIMEROCK BASE LBR 100 FOR BASE MATERIAL

TRAFFIC DATA

CURRENT YEAR = 2019 AADT = 22,600
ESTIMATED OPENING YEAR = 2025 AADT = 22,600
ESTIMATED DESIGN YEAR = 2045 AADT = 50,000
K = 11% D = 50 % T = 4 % (24 HOUR)
DESIGN SPEED = 70 MPH
POSTED SPEED = 65 MPH

SHOULDER PAVEMENT DETAIL

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

GEORGE E. KNOX, P.E.
P.E. LICENSE NUMBER 82283
WGI, INC.
800 N. MAGNOLIA AVENUE, SUITE 1750
ORLANDO, FL 32803

SR 538 EXTENSION
US 17/92 TO RONALD REAGAN PARKWAY

ROAD NO.	PROJECT NO.
SR 538	538-234

CENTRAL FLORIDA EXPRESSWAY AUTHORITY

TYPICAL SECTION (1)

SHEET NO. 011

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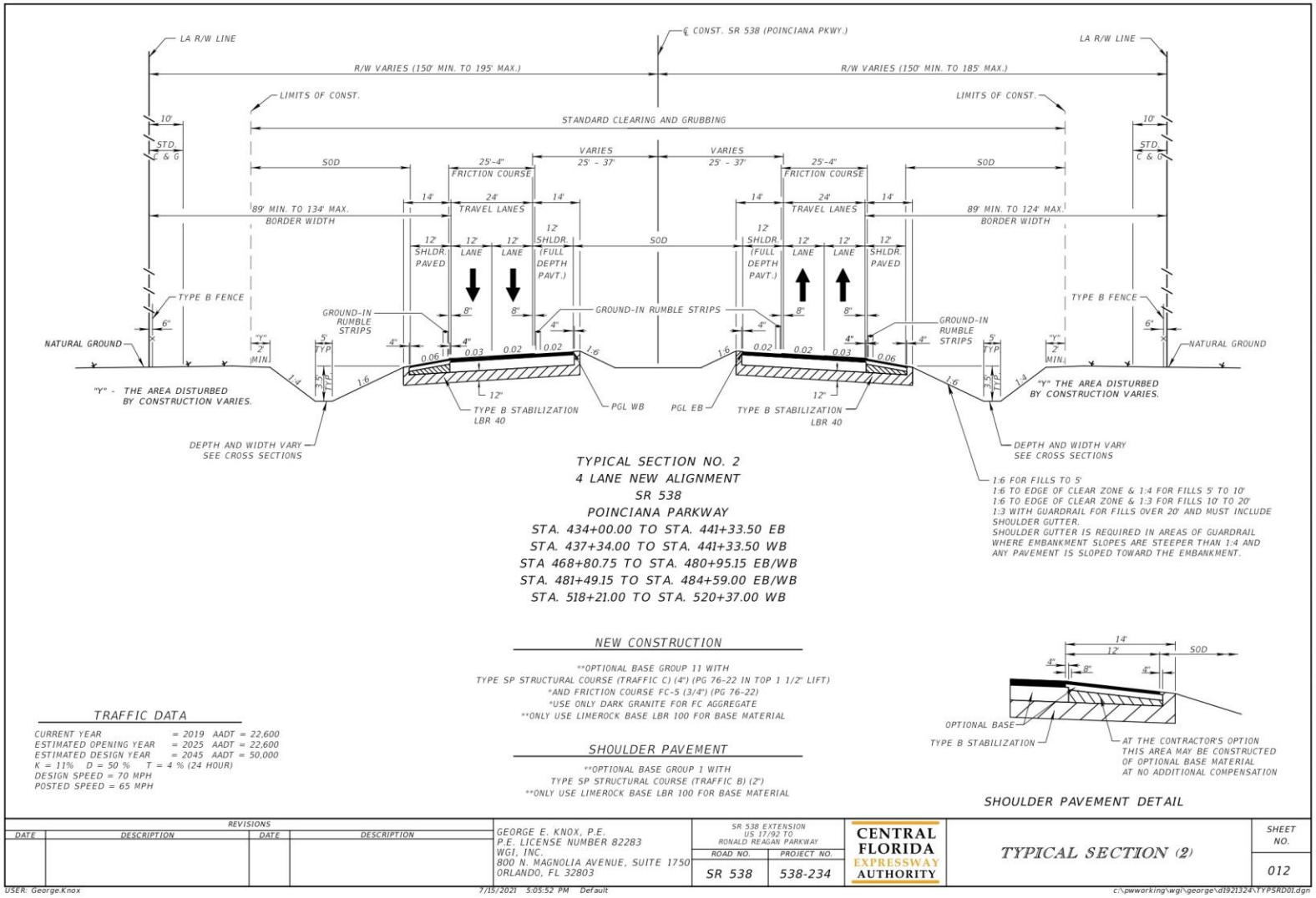

TYPICAL SECTION NO. 2
4 LANE NEW ALIGNMENT
SR 538
POINCIANA PARKWAY
STA. 434+00.00 TO STA. 441+33.50 EB
STA. 437+34.00 TO STA. 441+33.50 WB
STA 468+80.75 TO STA. 480+95.15 EB/WB
STA. 481+49.15 TO STA. 484+59.00 EB/WB
STA. 518+21.00 TO STA. 520+37.00 WB

NEW CONSTRUCTION

**OPTIONAL BASE GROUP 11 WITH
TYPE SP STRUCTURAL COURSE (TRAFFIC C) (4") (PG 76-22 IN TOP 1 1/2" LIFT)
*AND FRICTION COURSE FC-5 (3/4") (PG 76-22)
*USE ONLY DARK GRANITE FOR FC AGGREGATE
**ONLY USE LIMEROCK BASE LBR 100 FOR BASE MATERIAL

SHOULDER PAVEMENT

**OPTIONAL BASE GROUP 1 WITH
TYPE SP STRUCTURAL COURSE (TRAFFIC B) (2")
**ONLY USE LIMEROCK BASE LBR 100 FOR BASE MATERIAL

SHOULDER PAVEMENT DETAIL

TRAFFIC DATA

CURRENT YEAR = 2019 AADT = 22,600
ESTIMATED OPENING YEAR = 2025 AADT = 22,600
ESTIMATED DESIGN YEAR = 2045 AADT = 50,000
K = 11% D = 50 % T = 4 % (24 HOUR)
DESIGN SPEED = 70 MPH
POSTED SPEED = 65 MPH

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

GEORGE E. KNOX, P.E.
P.E. LICENSE NUMBER 82283
WGI, INC.
800 N. MAGNOLIA AVENUE, SUITE 1750
ORLANDO, FL 32803

SR 538 EXTENSION
US 17/92 TO RONALD REAGAN PARKWAY

ROAD NO.	PROJECT NO.
SR 538	538-234

CENTRAL FLORIDA EXPRESSWAY AUTHORITY

TYPICAL SECTION (2)

SHEET NO. 012

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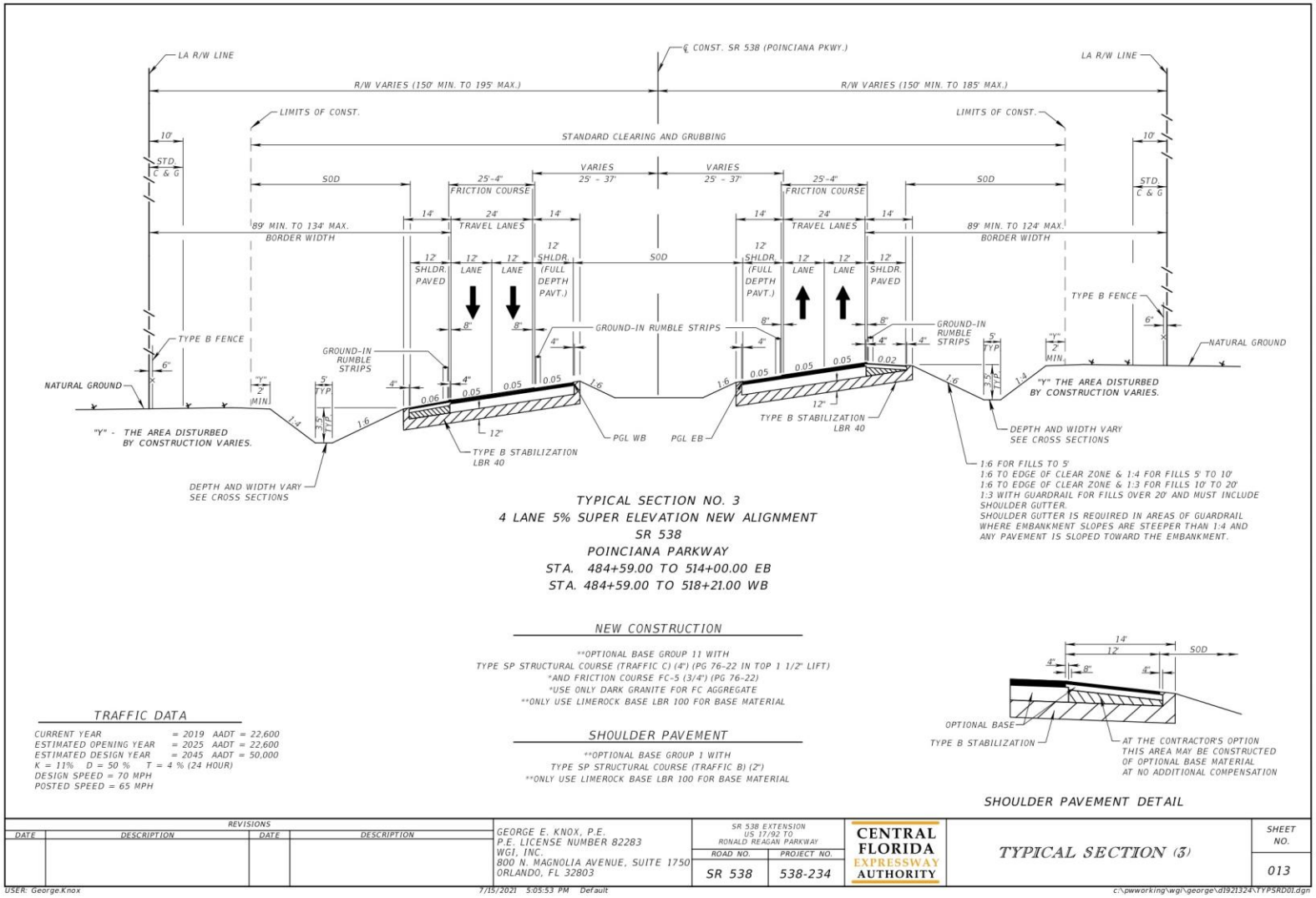

TYPICAL SECTION NO. 3
4 LANE 5% SUPER ELEVATION NEW ALIGNMENT
SR 538
POINCIANA PARKWAY
STA. 484+59.00 TO 514+00.00 EB
STA. 484+59.00 TO 518+21.00 WB

NEW CONSTRUCTION

**OPTIONAL BASE GROUP 11 WITH
TYPE SP STRUCTURAL COURSE (TRAFFIC C) (4") (PG 76-22 IN TOP 1 1/2" LIFT)
*AND FRICTION COURSE FC-5 (3/4") (PG 76-22)
*USE ONLY DARK GRANITE FOR FC AGGREGATE
**ONLY USE LIMEROCK BASE LBR 100 FOR BASE MATERIAL

SHOULDER PAVEMENT

**OPTIONAL BASE GROUP 1 WITH
TYPE SP STRUCTURAL COURSE (TRAFFIC B) (2")
**ONLY USE LIMEROCK BASE LBR 100 FOR BASE MATERIAL

SHOULDER PAVEMENT DETAIL

TRAFFIC DATA

CURRENT YEAR = 2019 AADT = 22,600
ESTIMATED OPENING YEAR = 2025 AADT = 22,600
ESTIMATED DESIGN YEAR = 2045 AADT = 50,000
K = 11% D = 50 % T = 4 % (24 HOUR)
DESIGN SPEED = 70 MPH
POSTED SPEED = 65 MPH

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

GEORGE E. KNOX, P.E.
P.E. LICENSE NUMBER 82283
WGI, INC.
800 N. MAGNOLIA AVENUE, SUITE 1750
ORLANDO, FL 32803

SR 538 EXTENSION
US 17/92 TO RONALD REAGAN PARKWAY

ROAD NO.	PROJECT NO.
SR 538	538-234

CENTRAL FLORIDA EXPRESSWAY AUTHORITY

TYPICAL SECTION (3)

SHEET NO. 013

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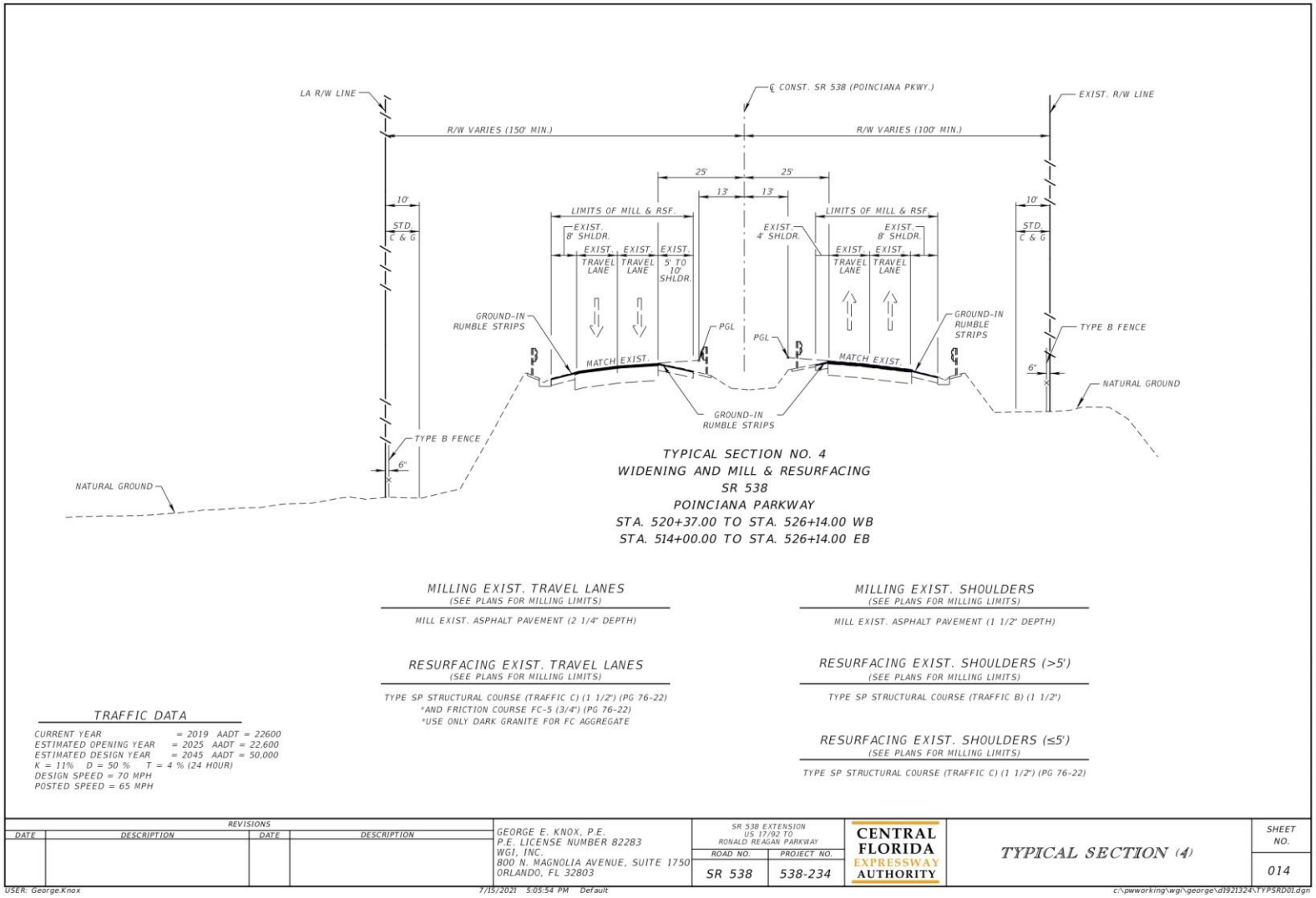

TYPICAL SECTION NO. 4
WIDENING AND MILL & RESURFACING
SR 538
POINCIANA PARKWAY
STA. 520+37.00 TO STA. 526+14.00 WB
STA. 514+00.00 TO STA. 526+14.00 EB

MILLING EXIST. TRAVEL LANES
(SEE PLANS FOR MILLING LIMITS)
MILL EXIST. ASPHALT PAVEMENT (2 1/4" DEPTH)

RESURFACING EXIST. TRAVEL LANES
(SEE PLANS FOR MILLING LIMITS)
TYPE SP STRUCTURAL COURSE (TRAFFIC C) (1 1/2") (PG 76-22)
*AND FRICTION COURSE FC-5 (3/4") (PG 76-22)
*USE ONLY DARK GRANITE FOR FC AGGREGATE

MILLING EXIST. SHOULDERS
(SEE PLANS FOR MILLING LIMITS)
MILL EXIST. ASPHALT PAVEMENT (1 1/2" DEPTH)

RESURFACING EXIST. SHOULDERS (>5')
(SEE PLANS FOR MILLING LIMITS)
TYPE SP STRUCTURAL COURSE (TRAFFIC B) (1 1/2")

RESURFACING EXIST. SHOULDERS (≤5')
(SEE PLANS FOR MILLING LIMITS)
TYPE SP STRUCTURAL COURSE (TRAFFIC C) (1 1/2") (PG 76-22)

TRAFFIC DATA

CURRENT YEAR = 2019 AADT = 22600
ESTIMATED OPENING YEAR = 2025 AADT = 22,600
ESTIMATED DESIGN YEAR = 2045 AADT = 50,000
K = 11% D = 50 % T = 4 % (24 HOUR)
DESIGN SPEED = 70 MPH
POSTED SPEED = 65 MPH

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

GEORGE E. KNOX, P.E.
P.E. LICENSE NUMBER 82283
WGI, INC.
800 N. MAGNOLIA AVENUE, SUITE 1750
ORLANDO, FL 32803

SR 538 EXTENSION
US 17/92 TO
RONALD REAGAN PARKWAY

ROAD NO.	PROJECT NO.
SR 538	538-234

CENTRAL FLORIDA EXPRESSWAY AUTHORITY

TYPICAL SECTION (4)

SHEET NO. 014

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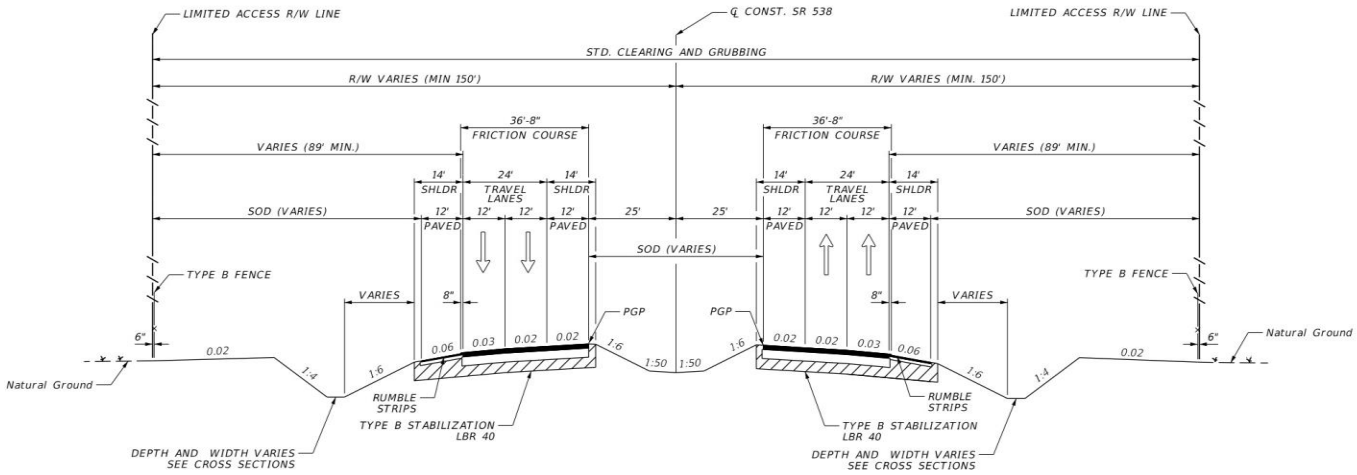

TYPICAL SECTION NO. 1

SR 538

STA. 381+40.00 TO STA. 392+60.94

STA. 394+06.87 TO STA. 401+38.44

STA. 402+42.43 TO STA. 413+12.89

STA. 415+31.89 TO STA 433+00.00

TRAFFIC DATA

CURRENT YEAR = 2020 AADT = N/A
ESTIMATED OPENING YEAR = 2025 AADT = 12,500
ESTIMATED DESIGN YEAR = 2045 AADT = 53,000
K = 11% D = 60% T (24 HOUR) = 6%
DESIGN SPEED = 70 MPH
POSTED SPEED = 65 MPH

TRAVEL LANES

OPTIONAL BASE GROUP 11 WITH
TYPE SP STRUCTURAL COURSE (TRAFFIC C) (2 ½")
TYPE SP STRUCTURAL COURSE (TRAFFIC C) (1 ½") (PG 76-22)
AND FRICTION COURSE FC-5 (PG 76-22)

SHOULDER PAVEMENT

OPTIONAL BASE GROUP 1 WITH
TYPE SP STRUCTURAL COURSE (TRAFFIC B) (2.0")
AND FRICTION COURSE FC-5 (PG 76-22) *

* SEE TYPICAL SECTIONS FOR LIMITS OF FRICTION COURSE ON SHOULDERS

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

ROBERT B. JAMIESON, P.E
P.E. LICENSE NUMBER 63980
GAI CONSULTANTS, INC.
618 E. SOUTH STREET - SUITE 700
ORLANDO, FL 32801

SR 538 EXTENSION
CR 532 to US 17/92

ROAD NO.	PROJECT NO.
SR 538	538-235

CENTRAL FLORIDA EXPRESSWAY AUTHORITY

TYPICAL SECTION

SHEET NO. 18

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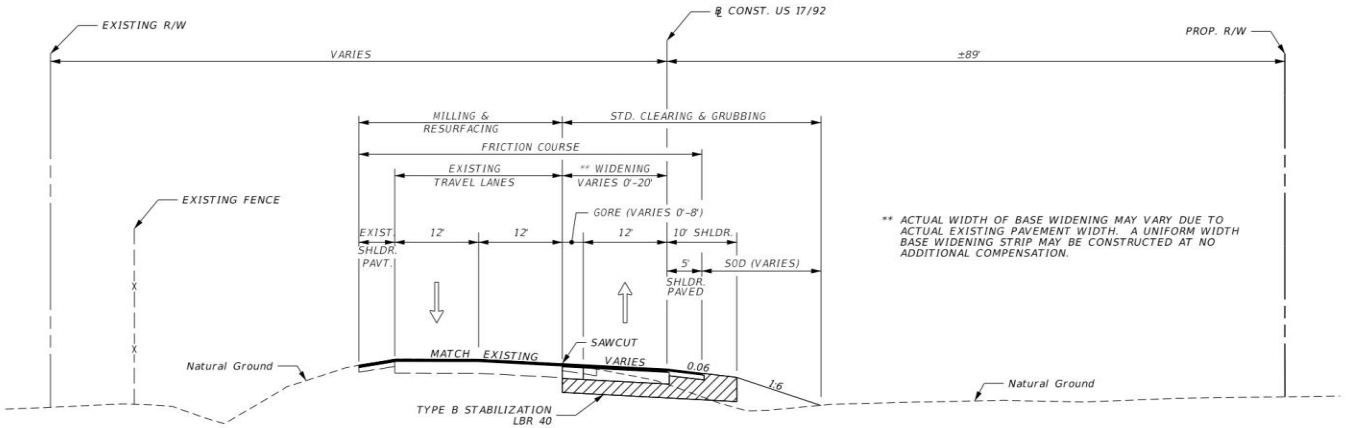

TYPICAL SECTION NO. 21
US 17/92
STA. 532+00.00 TO STA. 539+00.00
STA. 577+00.00 TO STA. 581+18.65

EXISTING SHOULDER
STA. 532+50.00 TO STA. 539+00.00

MILL EXISTING ASPHALT PAVEMENT (¾" DEPTH)
FRICTION COURSE FC-12.5 (TRAFFIC C) (1 ½") (PG 76-22)

EXISTING SHOULDER
STA. 576+50.00 TO STA. 581+18.65

MILL EXISTING ASPHALT PAVEMENT (1 ¼" DEPTH)
FRICTION COURSE FC-12.5 (TRAFFIC C) (1 ½") (PG 76-22)

TRAFFIC DATA

CURRENT YEAR = 2021 AADT = 22,920
ESTIMATED OPENING YEAR = 2025 AADT = 24,100
ESTIMATED DESIGN YEAR = 2045 AADT = 30,000
K = 11% D = 55% T (24 HOUR) = 7%
DESIGN SPEED = 55 MPH
POSTED SPEED = 55 MPH

EXISTING TRAVEL LANES
STA. 576+50.00 TO STA 578+00.00

MILL EXISTING ASPHALT PAVEMENT (5" DEPTH)
TYPE SP STRUCTURAL COURSE (TRAFFIC C) (3 ½")
AND FRICTION COURSE FC-12.5 (TRAFFIC C) (1 ½") (PG 76-22)

EXISTING TRAVEL LANES
STA. 578+00.00 TO STA 581+18.65

MILL EXISTING ASPHALT PAVEMENT (3" DEPTH)
TYPE SP STRUCTURAL COURSE (TRAFFIC C) (1 ½")
AND FRICTION COURSE FC-12.5 (TRAFFIC C) (1 ½") (PG 76-22)

EXISTING TRAVEL LANES
STA. 532+00.00 TO STA 539+00.00

MILL EXISTING ASPHALT PAVEMENT (2 ¾" DEPTH)
TYPE SP STRUCTURAL COURSE (TRAFFIC C) (1 ½")
AND FRICTION COURSE FC-12.5 (TRAFFIC C) (1 ½") (PG 76-22)

NEW SHOULDERS

OPTIONAL BASE GROUP 6 WITH
FRICTION COURSE FC-12.5 (TRAFFIC C) (1 ½") (PG 76-22)

WIDENING

OPTIONAL BASE GROUP 12 WITH
TYPE SP STRUCTURAL COURSE (TRAFFIC C) (3")
AND FRICTION COURSE FC-12.5 (TRAFFIC C) (1 ½") (PG 76-22)

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

ROBERT B. JAMIESON, P.E
P.E. LICENSE NUMBER 63980
GAI CONSULTANTS, INC.
618 E. SOUTH STREET - SUITE 700
ORLANDO, FL 32801

SR 538 EXTENSION
CR 532 to US 17/92

ROAD NO.	PROJECT NO.
SR 538	538-235

CENTRAL FLORIDA EXPRESSWAY AUTHORITY

TYPICAL SECTION

SHEET NO. 29

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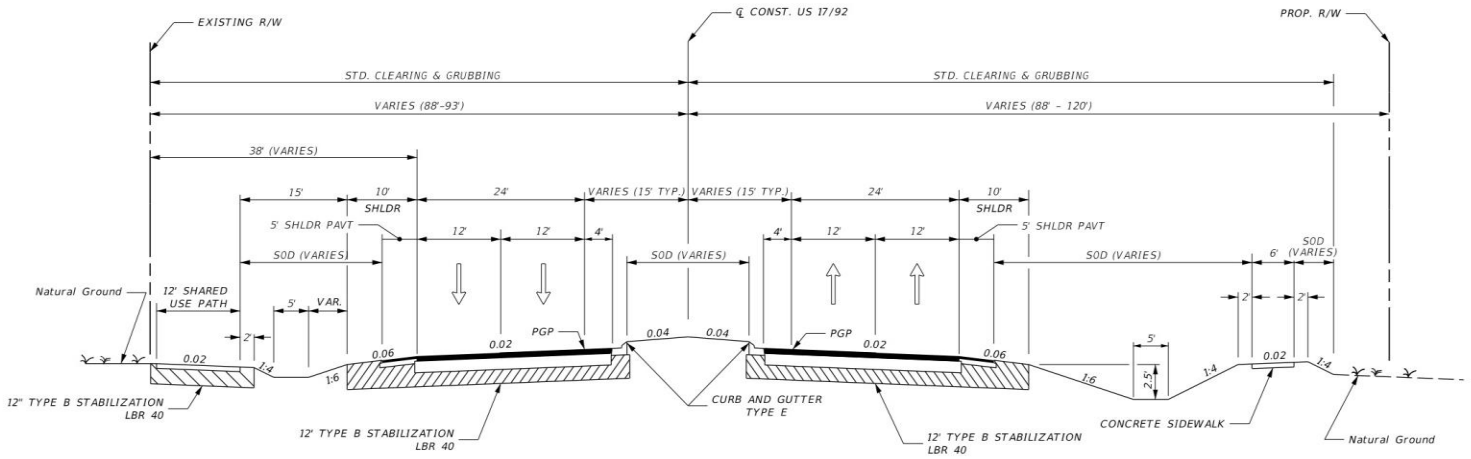

TYPICAL SECTION NO. 22
US 17/92
STA. 539+00.00 TO STA. 545+64.64
STA. 569+10.40 TO STA. 577+00.00

SHARED USE PATH

OPTIONAL BASE GROUP 1 WITH
FRICTION COURSE FC-12.5 (TRAFFIC C) (1.5")

TRAVEL LANES & INSIDE SHOULDER

OPTIONAL BASE GROUP 9 WITH
TYPE SP STRUCTURAL COURSE (TRAFFIC C) (3")
AND FRICTION COURSE FC-12.5 (TRAFFIC C) (1 ½") (PG 76-22)

OUTSIDE SHOULDER PAVEMENT

OPTIONAL BASE GROUP 4 WITH
FRICTION COURSE FC-12.5 (TRAFFIC C) (1 ½") (PG 76-22)

TRAFFIC DATA

CURRENT YEAR = 2021 AADT = 22,920
ESTIMATED OPENING YEAR = 2025 AADT = 24,100
ESTIMATED DESIGN YEAR = 2045 AADT = 30,000
K = 11% D = 55% T (24 HOUR) = 7%
DESIGN SPEED = 55 MPH
POSTED SPEED = 55 MPH

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

ROBERT B. JAMIESON, P.E
P.E. LICENSE NUMBER 63980
GAI CONSULTANTS, INC.
618 E. SOUTH STREET - SUITE 700
ORLANDO, FL 32801

SR 538 EXTENSION
CR 532 to US 17/92

ROAD NO.	PROJECT NO.
SR 538	538-235

CENTRAL FLORIDA EXPRESSWAY AUTHORITY

TYPICAL SECTION

SHEET NO. 30

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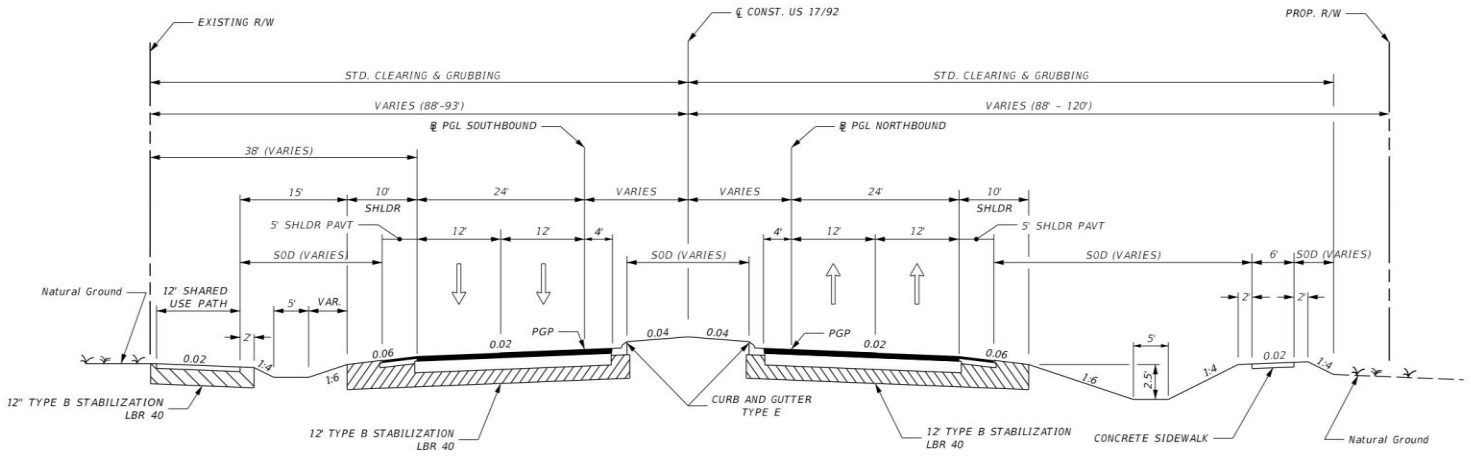

TYPICAL SECTION NO. 23
US 17/92
STA. 545+64.64 TO STA. 554+00.00
STA. 562+00.00 TO STA. 569+10.40

SHARED USE PATH

OPTIONAL BASE GROUP 1 WITH
TYPE SP STRUCTURAL COURSE (TRAFFIC C) (1.5")

TRAVEL LANES & INSIDE SHOULDER

OPTIONAL BASE GROUP 9 WITH
TYPE SP STRUCTURAL COURSE (TRAFFIC C) (3")
AND FRICTION COURSE FC-12.5 (TRAFFIC C) (1 ½") (PG 76-22)

OUTSIDE SHOULDER PAVEMENT

OPTIONAL BASE GROUP 4 WITH
FRICTION COURSE FC-12.5 (TRAFFIC C) (1 ½") (PG 76-22)

TRAFFIC DATA

CURRENT YEAR = 2021 AADT = 22,920
ESTIMATED OPENING YEAR = 2025 AADT = 24,100
ESTIMATED DESIGN YEAR = 2045 AADT = 30,000
K = 11% D = 55% T (24 HOUR) = 7%
DESIGN SPEED = 55 MPH
POSTED SPEED = 55 MPH

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

ROBERT B. JAMIESON, P.E
P.E. LICENSE NUMBER 63980
GAI CONSULTANTS, INC.
618 E. SOUTH STREET - SUITE 700
ORLANDO, FL 32801

SR 538 EXTENSION
CR 532 to US 17/92

ROAD NO.	PROJECT NO.
SR 538	538-235

CENTRAL FLORIDA EXPRESSWAY AUTHORITY

TYPICAL SECTION

SHEET NO. 31

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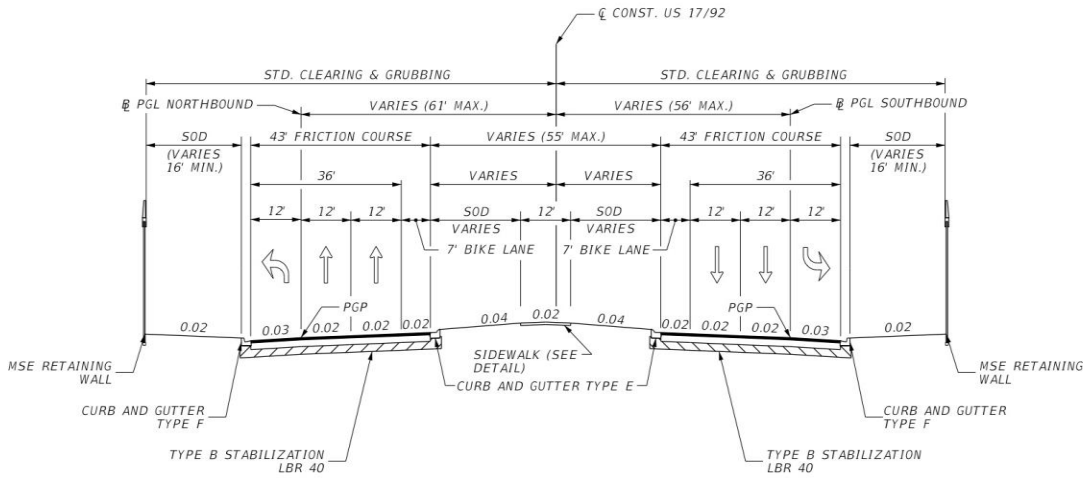
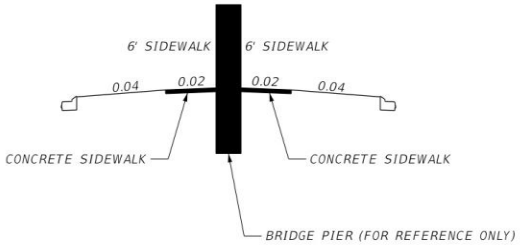


TYPICAL SECTION NO. 24
US 17/92
STA. 554+00.00 TO STA. 562+00.00

TRAVEL LANES & SHOULDERS

OPTIONAL BASE GROUP 9 WITH
TYPE SP STRUCTURAL COURSE (TRAFFIC C) (3")
AND FRICTION COURSE FC-12.5 (TRAFFIC C) (1 ½") (PG 76-22)



TRAFFIC DATA

CURRENT YEAR = 2021 AADT = 22,920
ESTIMATED OPENING YEAR = 2025 AADT = 24,100
ESTIMATED DESIGN YEAR = 2045 AADT = 30,000
K = 11% D = 55% T = 7% (24 HOUR)
DESIGN SPEED = 35 MPH
POSTED SPEED = 35 MPH

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

ROBERT B. JAMIESON, P.E
P.E. LICENSE NUMBER 63980
GAI CONSULTANTS, INC.
618 E. SOUTH STREET - SUITE 700
ORLANDO, FL 32801

SR 538 EXTENSION
CR 532 to US 17/92

ROAD NO.	PROJECT NO.
SR 538	538-235

CENTRAL FLORIDA EXPRESSWAY AUTHORITY

TYPICAL SECTION

SHEET NO. 32

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Appendix B:

Noise Study Traffic Data

TRAFFIC DATA FOR NOISE STUDIES

Red denotes volumes used in modeling

Project Description: Poinciana Parkway (SR 538) Extension

CFX Project #: 538-235 & 538-234

Segment Description: **Poinciana Pkwy Extension/Mainline**

	Extension from CR 532 to US 17-92				Extension from US 17-92 to 538-234/538-165 Project Limits			
Data (Directional)	**Existing Facility**	**No-Build (Design Year)**	**Build (Design Year)**	**Hypothetical Future*5**	**Existing Facility**	**No-Build (Design Year)**	**Build (Design Year)**	**Hypothetical Future*5**
Year	n/a	n/a	2045	n/a	n/a	n/a	2045	n/a
Number of Lanes Each Direction	n/a	n/a	2	4	n/a	n/a	2	4
LOS C Peak Hour Directional Volume *1	n/a	n/a	**3100**	6030	n/a	n/a	**3100**	6030
Demand Peak Hour Directional Volume *2	n/a	n/a	3500	not available	n/a	n/a	3305	not available
Demand Off-Peak Hour Directional Volume *2	n/a	n/a	2335	not available	n/a	n/a	2200	not available
Posted Speed*4	n/a	n/a	65	65	n/a	n/a	65	65
D%*3	n/a	n/a	60	60	n/a	n/a	60	60
Tpeak (DHV%)*3	n/a	n/a	4.03	4.03	n/a	n/a	4.03	4.03
MT(DHV%)*3	n/a	n/a	2.4	2.4	n/a	n/a	2.4	2.4
HT (DHV%)*3	n/a	n/a	1.63	1.63	n/a	n/a	1.63	1.63
Buses (DHV%)	n/a	n/a	0.6	0.6	n/a	n/a	0.6	0.6
Motorcycles (DHV%)	n/a	n/a	0.5	0.5	n/a	n/a	0.5	0.5

Data Sources:

*1 = LOS C Directional Volumes per FDOT *Generalized Service Volume Tables* January 2020 (Table 7)

*2 = Demand Peak Hour Dir. Volumes per Dewberry/CDM Smith: *Figure 2045_DDHV_PPW_Full Build_Jan2021.pdf* (corrected version of 6-24-20 report)

*3 = Class distribution per CDM Smith *PP Design Traffic_Report_Revised* 6-24-2020 (Table 1-5)

*4 = Posted Speed per *538-235 Roadway Plans.pdf* 7-30-2021

*5 = Need for anlaysis TBD by CFX/Dewberry

TRAFFIC DATA FOR NOISE STUDIES

Red denotes volumes used in modeling

Project Description: Poinciana Parkway (SR 538) Extension

CFX Project #: 538-235 & 538-234

Segment Description: Kinney Harmon Road/Ronald Regan Pkwy

	Kinney Harmon Road/Ronald Regan Pkwy		
Data (Directional)	**Existing Facility**	**No-Build (Design Year)**	**Build (Design Year)**
Year	2020	2045	2045
Number of Lanes Each Direction	1	1	1
LOS C Peak Hour Directional Volume *1	**747**	**747**	**747**
Demand Peak Hour Directional Volume *2	998	1560	not available
Demand Off-Peak Hour Directional Volume *2	286	1040	not available
Posted Speed*4	45	45	45
D%*3	60	60	60
Tpeak (DHV%)*3	4.03	4.03	4.03
MT(DHV%)*3	2.4	2.4	2.4
HT (DHV%)*3	1.63	1.63	1.63
Buses (DHV%)	0.6	0.6	0.6
Motorcycles (DHV%)	0.5	0.5	0.5

Data Sources:

*1 = LOS C Directional Volumes per FDOT *Generalized Service Volume Tables* January 2020 (Table 7)

*2 = Demand Peak Hour Dir. Volumes per Dewberry/CDM Smith: *Figure 2045_DDHV_PPW_Full Build_Jan2021.pdf*

*3 = Class distribution per CDM Smith *PP Design Traffic_Report_Revised* 6-24-2020 (Table 1-5)

*4 = Field Observed

TRAFFIC DATA FOR NOISE STUDIES

Red denotes volumes used in modeling

Project Description: Poinciana Parkway (SR 538) Extension

CFX Project #: 538-235 & 538-234

Segment Description: US 17-92

	US 17-92		
Data (Directional)	**Existing Facility**	**No-Build (Design Year)**	**Build (Design Year)**
Year	2020	2045	2045
Number of Lanes Each Direction	1	1	2
LOS C Peak Hour Directional Volume *1	**830**	**830**	1910
Demand Peak Hour Directional Volume *2	1231	1550	**1340**
Demand Off-Peak Hour Directional Volume *2	474	1055	**1140**
Posted Speed*4	55	55	55 & 35
D%*3	60	60	60
Tpeak (DHV%)*3	10.2	10.2	10.2
MT(DHV%)*3	3.2	3.2	3.2
HT (DHV%)*3	7	7	7
Buses (DHV%)	1.5	1.5	1.5
Motorcycles (DHV%)	0.7	0.7	0.7

Data Sources:

*1 = LOS C Directional Volumes per FDOT *Generalized Service Volume Tables* January 2020 (Table 7)

*2 = Demand Peak Hour Dir. Volumes per Dewberry/CDM Smith: *Figure 2045_DDHV_PPW_Full Build_Jan2021.pdf*

*3 = Class distribution per CDM Smith *PP Design Traffic_Report_Revised* 6-24-2020 (Table 1-5)

*4 = Posted Speed per *538-235 Roadway Plans.pdf* 7-30-2021

TRAFFIC DATA FOR NOISE STUDIES

Red denotes volumes used in modeling

Project Description: Poinciana Parkway (SR 538) Extension

CFX Project #: 538-235 & 538-234

Segment Description: CR 532/Osceola Polk Line Road

	CR 532		
Data (Directional)	**Existing Facility**	**No-Build (Design Year)**	**Build (Design Year)**
Year	2020	2045	2045
Number of Lanes Each Direction	1	1	1
LOS C Peak Hour Directional Volume *1	**747**	**747**	**747**
Demand Peak Hour Directional Volume *2	not available	1265	1160
Demand Off-Peak Hour Directional Volume *2	not available	805	940
Posted Speed*4	55	55	55
D%*3	60	60	60
Tpeak (DHV%)*3	10.2	10.2	10.9
MT(DHV%)*3	2.8	2.8	2.8
HT (DHV%)*3	8.1	8.1	8.1
Buses (DHV%)	0.9	0.9	0.9
Motorcycles (DHV%)	0.5	0.5	0.5

Data Sources:

*1 = LOS C Directional Volumes per FDOT *Generalized Service Volume Tables* January 2020 (Table 7)

*2 = Demand Peak Hour Dir. Volumes per Dewberry/CDM Smith: *Figure 2045_DDHV_PPW_Full Build_Jan2021.pdf* (corrected version of 6-24-20 report)

*3 = Class distribution per CDM Smith *PP Design Traffic_Report_Revised* 6-24-2020; Dewberry email 8-24-21

*4 = Observed via Google Street View

TRAFFIC DATA FOR NOISE STUDIES

Red denotes volumes used in modeling

Project Description: Poinciana Parkway (SR 538) Extension

CFX Project #: 538-235 & 538-234

Segment Description: Poinciana Pkwy Extension at US 17-92 Ramps

Data	NB On (Ramps C1/C2)			NB Off (Ramps F1/F2)			SB On (Ramps E1/E2)			SB Off (Ramps D1/D2)		
	Existing Facility	No-Build	Build	Existing Facility	No-Build	Build	Existing Facility	No-Build	Build	Existing Facility	No-Build	Build
Year	2020	2045	2045	2020	2045	2045	2020	2045	2045	2020	2045	2045
Number of Lanes	n/a	na	1	n/a	na	1	n/a	na	1	n/a	na	1
Demand Peak Hour Directional Volume *1	n/a	na	**740**	n/a	na	**545**	n/a	na	**545**	n/a	na	**740**
Posted Speed *3	n/a	na	50	n/a	na	50	n/a	na	50	n/a	na	50
Tpeak (DHV%)*2	n/a	na	4.03	n/a	na	4.03	n/a	na	4.03	n/a	na	4.03
MT(DHV%)*2	n/a	na	2.4	n/a	na	2.4	n/a	na	2.4	n/a	na	2.4
HT (DHV%)*2	n/a	na	1.63	n/a	na	1.63	n/a	na	1.63	n/a	na	1.63
Buses (DHV%)*2	n/a	na	0.5	n/a	na	0.5	n/a	na	0.5	n/a	na	0.5
Motorcycles (DHV%)*2	n/a	na	0.4	n/a	na	0.4	n/a	na	0.4	n/a	na	0.4

Data Sources:

*1 = Demand Peak Hour Dir. Volumes per Dewberry/CDM Smith: *Figure 2045_DDHV_PPW_Full Build_Jan2021.pdf* (corrected version of 6-24-20 report)

*2 = Class distribution per CDM Smith *PP Design Traffic_Report_Revised* 6-24-2020

*3 = Ramp speeds per Dewberry email 8-18-21

Appendix C:

Noise Impact Comparison Matrix

Noise-Sensitive Sites			Predicted Noise Levels (dB(A)) *Red = Noise Level above NAC/Substantial Increase*			
Receptor ID	**# Sites Represented**	**NAC Impact Criterion (dB(A))**	**2020 Existing**	**2045 Build Alternative** *4-lane*	**Build Change From Existing**	***Consider Abatement***
NSA 1: CR 532 to US 17-92 (West) - Illustrated on Pages D-1, D-2, and D-8 - Appendix D						
1-1	1	66.0	44.5	58.6	14.1	-
1-2	1	66.0	44.0	58.6	14.6	-
1-3	1	66.0	49.0	59.5	10.5	-
1-4	1	66.0	52.5	58.8	6.3	-
1-5	1	66.0	55.0	58.6	3.6	-
1-6	1	66.0	55.4	58.6	3.2	-
1-7	1	66.0	59.5	60.5	1.0	-
1-8	1	66.0	55.0	57.7	2.7	-
NSA Summary (Totals/Averages)	***8***		***51.9***	***58.9***	***7.0***	***0***
NSA 2: CR 532 to US 17-92 (East) - Illustrated on Pages D-1, D-2, and D-8 - Appendix D						
2-1	1	66.0	46.0	65.0	**19.0**	Yes
2-2	1	66.0	47.2	63.4	**16.2**	Yes
2-3	1	66.0	48.5	65.3	**16.8**	Yes
2-4	1	66.0	48.9	64.4	**15.5**	Yes
2-5	1	66.0	48.5	63.6	**15.1**	Yes
2-6	1	66.0	47.3	63.3	**16.0**	Yes
2-7	1	66.0	48.4	63.2	14.8	-
2-8	1	66.0	48.7	62.4	13.7	-
2-9	1	66.0	50.6	62.5	11.9	-
2-10	1	66.0	51.9	62.4	10.5	-
2-11	1	66.0	53.8	61.8	8.0	-
2-12	1	66.0	50.1	60.9	10.8	-
2-13	1	66.0	52.5	59.5	7.0	
2-14	1	66.0	53.5	59.6	6.1	-
2-15	1	66.0	65.3	65.1	-0.2	-
2-16	1	66.0	***66.4***	***67.8***	1.4	Yes
2-17	1	66.0	***66.8***	***68.6***	1.8	Yes
NSA Summary (Totals/Averages)	***17***		***52.6***	***63.5***	***10.8***	***8***
NSA 3: US 17-92 to Delmar Lane (West) - Illustrated on Page D-2 thru D-5, and D-7 - Appendix D						
3-1	1	66.0	***67.9***	***70.0***	2.1	Yes
3-2	1	66.0	63.6	63.5	-0.1	-
3-3	1	66.0	64.7	64.7	0.0	-
3-4	1	66.0	64.9	64.9	0.0	-
3-5	1	66.0	65.2	65.5	0.3	-
3-6	1	66.0	59.1	60.3	1.2	-
3-7	1	66.0	50.7	57.8	7.1	-

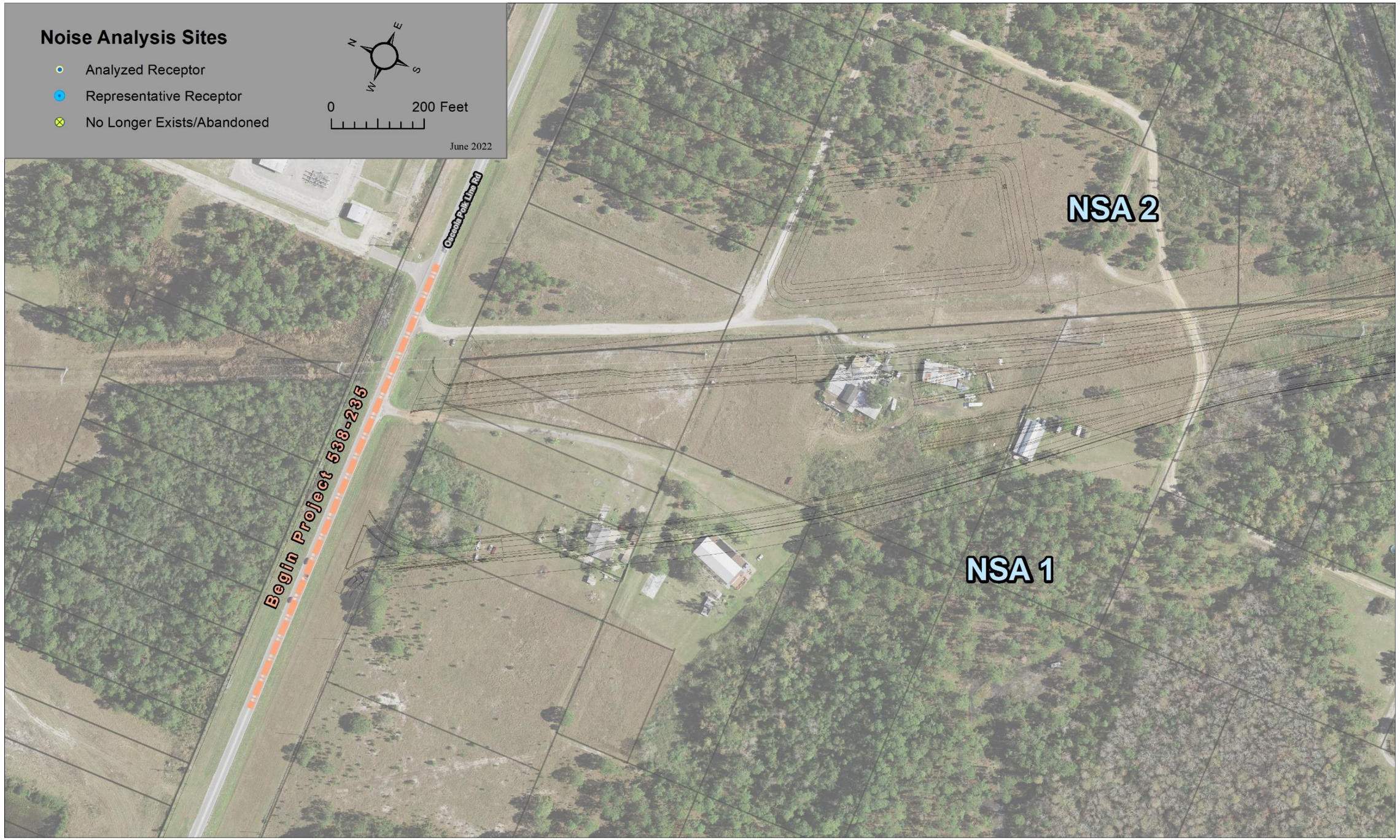
Noise-Sensitive Sites			Predicted Noise Levels (dB(A)) *Red = Noise Level above NAC/Substantial Increase*			
Receptor ID	**# Sites Represented**	**NAC Impact Criterion (dB(A))**	**2020 Existing**	**2045 Build Alternative** *4-lane*	**Build Change From Existing**	***Consider Abatement***
3-8	1	66.0	43.5	51.2	7.7	-
NSA Summary (Totals/Averages)	***8***		***60.0***	***62.2***	***2.3***	***0***
NSA 4: US 17-92 to Delmar Lane (East) - Illustrated on Page D-2 thru D-5, and D-7 - Appendix D						
4-1 Category C	1	66.0	53.6	62.6	9.0	-
NSA Summary (Totals/Averages)	***1***		***53.6***	***62.6***	***9.0***	***0***
NSA 5: Delmar Lane to Project Limits (West)- Illustrated on Pages D-5 - Appendix D						
5-1	1	66.0	51.7	61.4	9.7	-
5-2	1	66.0	51.5	60.9	9.4	-
5-3	1	66.0	51.5	60.5	9.0	-
5-4	1	66.0	50.6	59.8	9.2	-
5-5	1	66.0	50.6	59.6	9.0	-
5-6	1	66.0	51.2	59.5	8.3	-
5-7	1	66.0	51.1	59.1	8.0	-
5-8	1	66.0	52.0	58.7	6.7	-
5-9	1	66.0	48.9	58.8	9.9	-
5-10	1	66.0	47.7	57.6	9.9	-
5-11	1	66.0	57.7	60.8	3.1	-
5-12	1	66.0	56.8	60.3	3.5	-
5-13	1	66.0	56.8	60.1	3.3	
5-14	1	66.0	57.0	59.7	2.7	-
5-15	1	66.0	57.0	59.3	2.3	
5-16	1	66.0	56.9	59.0	2.1	
5-17	1	66.0	57.9	59.0	1.1	-
5-18	1	66.0	53.3	57.9	4.6	-
5-19	1	66.0	48.8	57.3	8.5	-
5-20	1	66.0	49.5	56.8	7.3	-
5-21	1	66.0	50.0	56.3	6.3	-
NSA Summary (Totals/Averages)	***21***		***52.8***	***59.2***	***6.4***	***0***
NSA 6: Delmar Lane to Project Limits (West)- Illustrated on Pages D-5 - Appendix D						
6-1	1	66.0	50.3	57.2	6.9	-
6-2	1	66.0	50.7	57.6	6.9	-
6-3	1	66.0	51.2	58.0	6.8	-
6-4	1	66.0	51.7	58.5	6.8	-
6-5	1	66.0	51.8	58.8	7.0	-

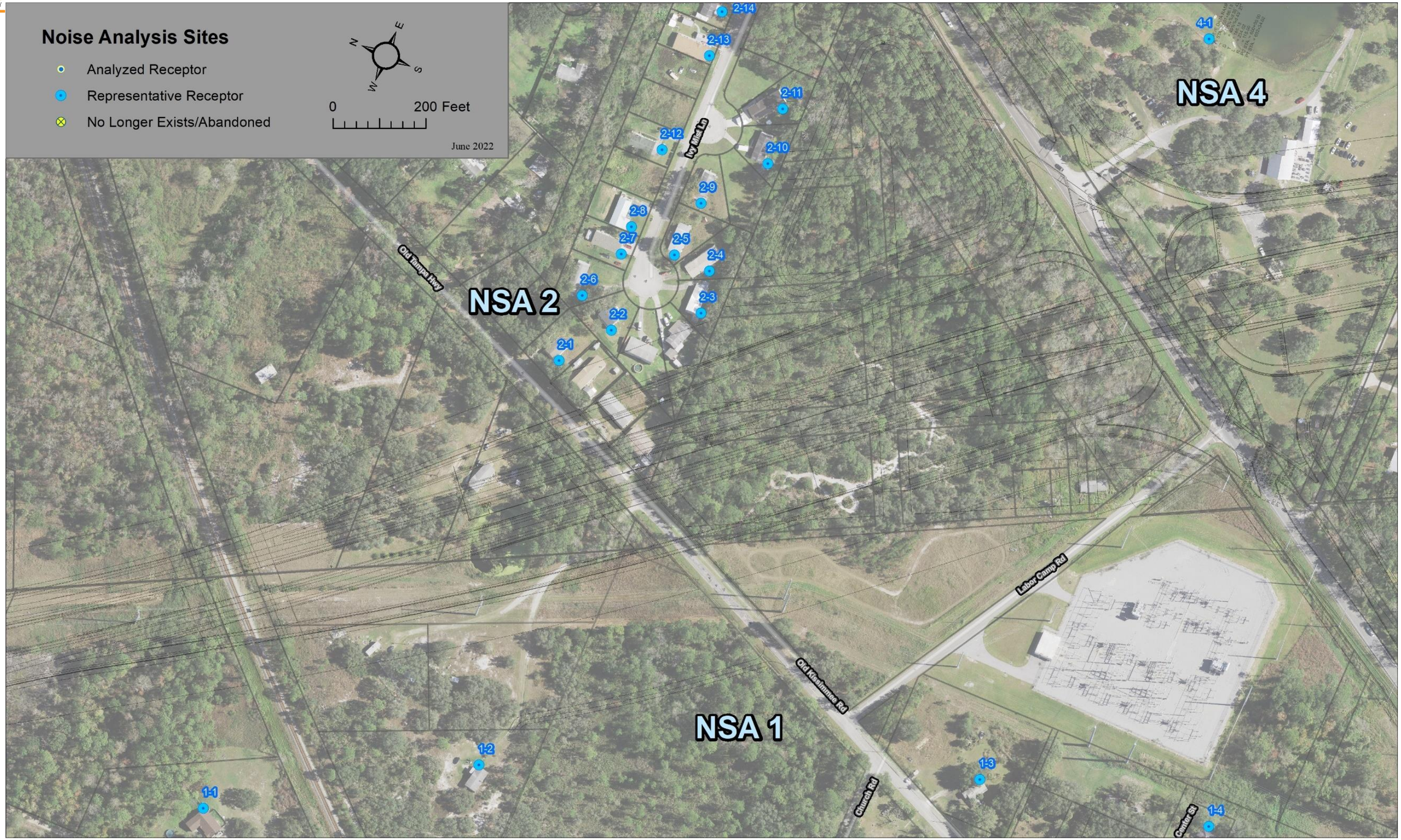
Noise-Sensitive Sites			Predicted Noise Levels (dB(A)) *Red = Noise Level above NAC/Substantial Increase*			
Receptor ID	**# Sites Represented**	**NAC Impact Criterion (dB(A))**	**2020 Existing**	**2045 Build Alternative** *4-lane*	**Build Change From Existing**	***Consider Abatement***
6-6	1	66.0	53.0	59.9	6.9	-
6-7	1	66.0	53.8	60.6	6.8	*Yes**
6-8	1	66.0	54.3	61.2	6.9	*Yes**
6-9	1	66.0	55.0	62.0	7.0	*Yes**
6-10	1	66.0	54.5	62.2	7.7	*Yes**
6-11	1	66.0	53.9	62.1	8.2	*Yes**
6-12	1	66.0	51.4	60.4	9.0	-
6-13	1	66.0	50.2	59.3	9.1	-
6-14	1	66.0	49.2	58.6	9.4	-
6-15	1	66.0	48.1	57.6	9.5	-
6-16	1	66.0	47.5	57.2	9.7	-
6-17	1	66.0	46.6	56.9	10.3	-
6-18	1	66.0	49.1	56.8	7.7	-
6-19	1	66.0	49.2	57.0	7.8	-
6-20	1	66.0	48.4	56.4	8.0	-
6-21	1	66.0	48.3	56.7	8.4	-
6-22	1	66.0	48.0	56.1	8.1	-
6-23	1	66.0	50.7	59.2	8.5	-
6-24	1	66.0	50.5	58.5	8.0	-
6-25	1	66.0	49.8	58.2	8.4	-
6-26	1	66.0	49.3	57.6	8.3	-
6-27	1	66.0	49.0	57.1	8.1	-
6-28	1	66.0	48.7	56.9	8.2	-
6-29	1	66.0	48.3	56.8	8.5	-
6-30	1	66.0	48.2	57.5	9.3	-
6-31	1	66.0	47.1	56.6	9.5	-
6-32	1	66.0	46.2	55.4	9.2	-
6-33	1	66.0	46.1	55.4	9.3	-
6-34	1	66.0	45.5	55.1	9.6	-
6-35	1	66.0	46.7	56.3	9.6	-
6-36	1	66.0	45.9	56.2	10.3	-
6-37	1	66.0	46.4	56.0	9.6	-
6-38	1	66.0	47.0	56.2	9.2	-
6-39	1	66.0	47.4	56.3	8.9	-
6-40 Cat C	1	66.0	48.3	56.9	8.6	-
NSA Summary (Totals/Averages)	***23***		***49.4***	***57.8***	***8.4***	***5****

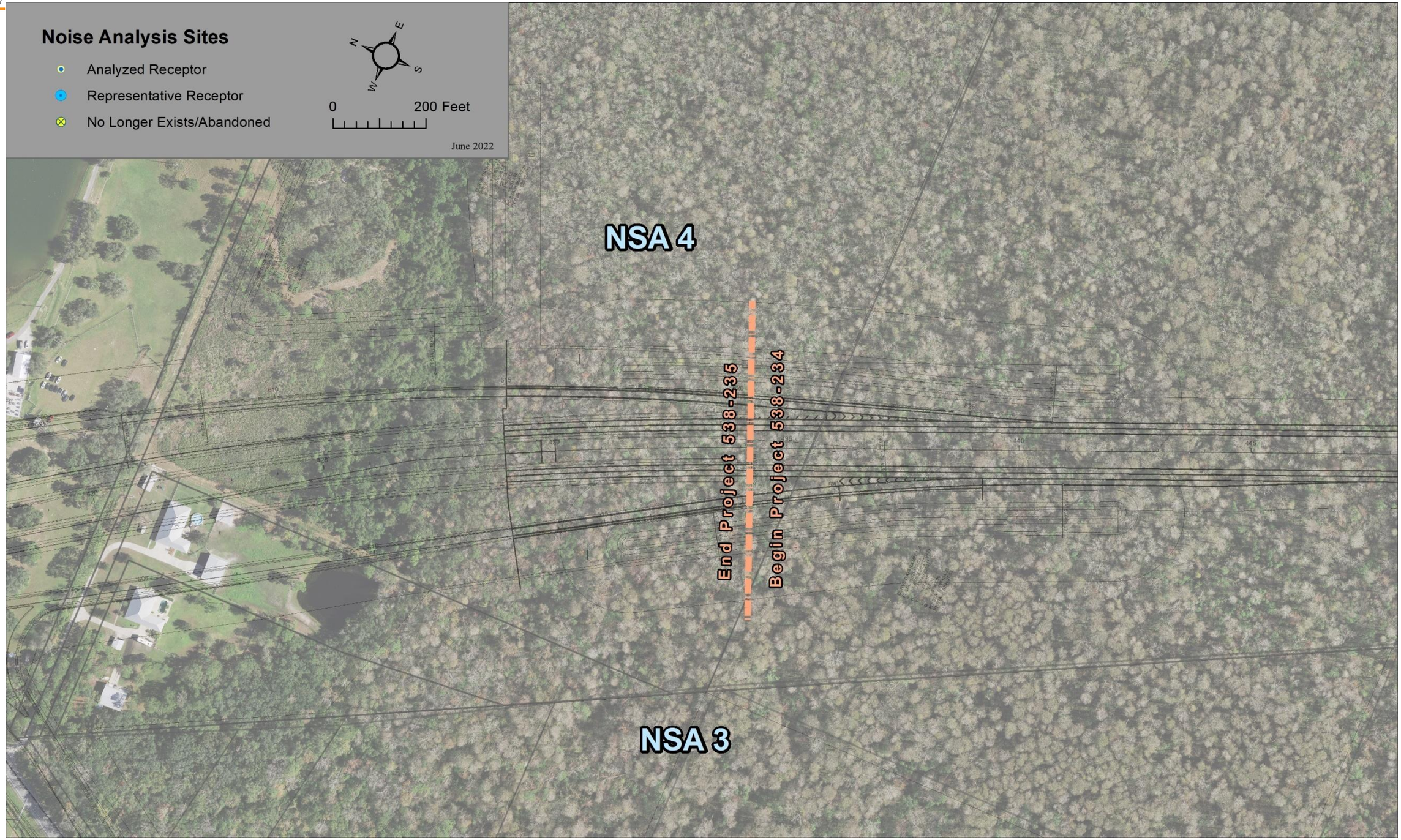
* Exceeds NAC under the 8-lane scenario for barrier analysis

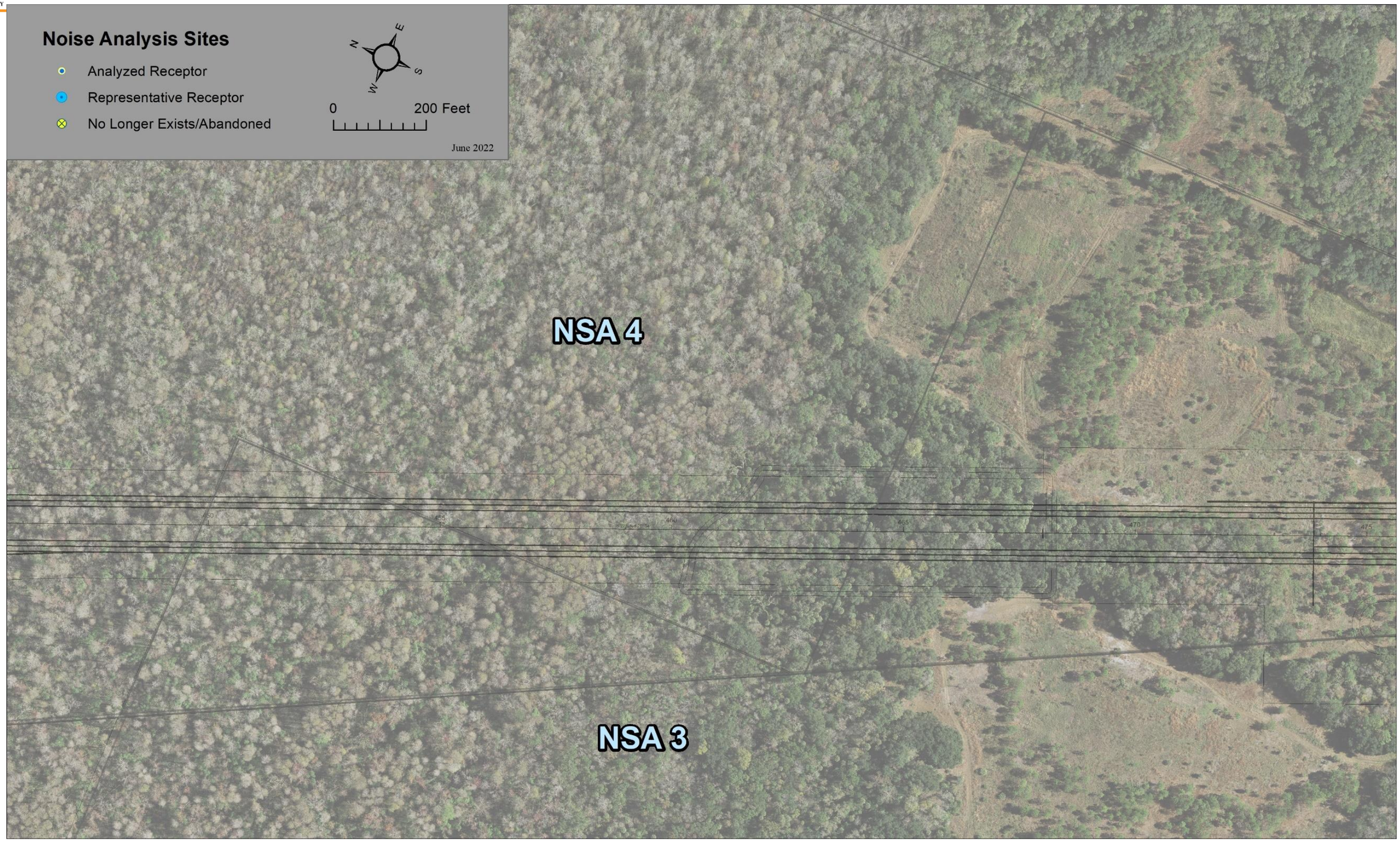
Appendix D:

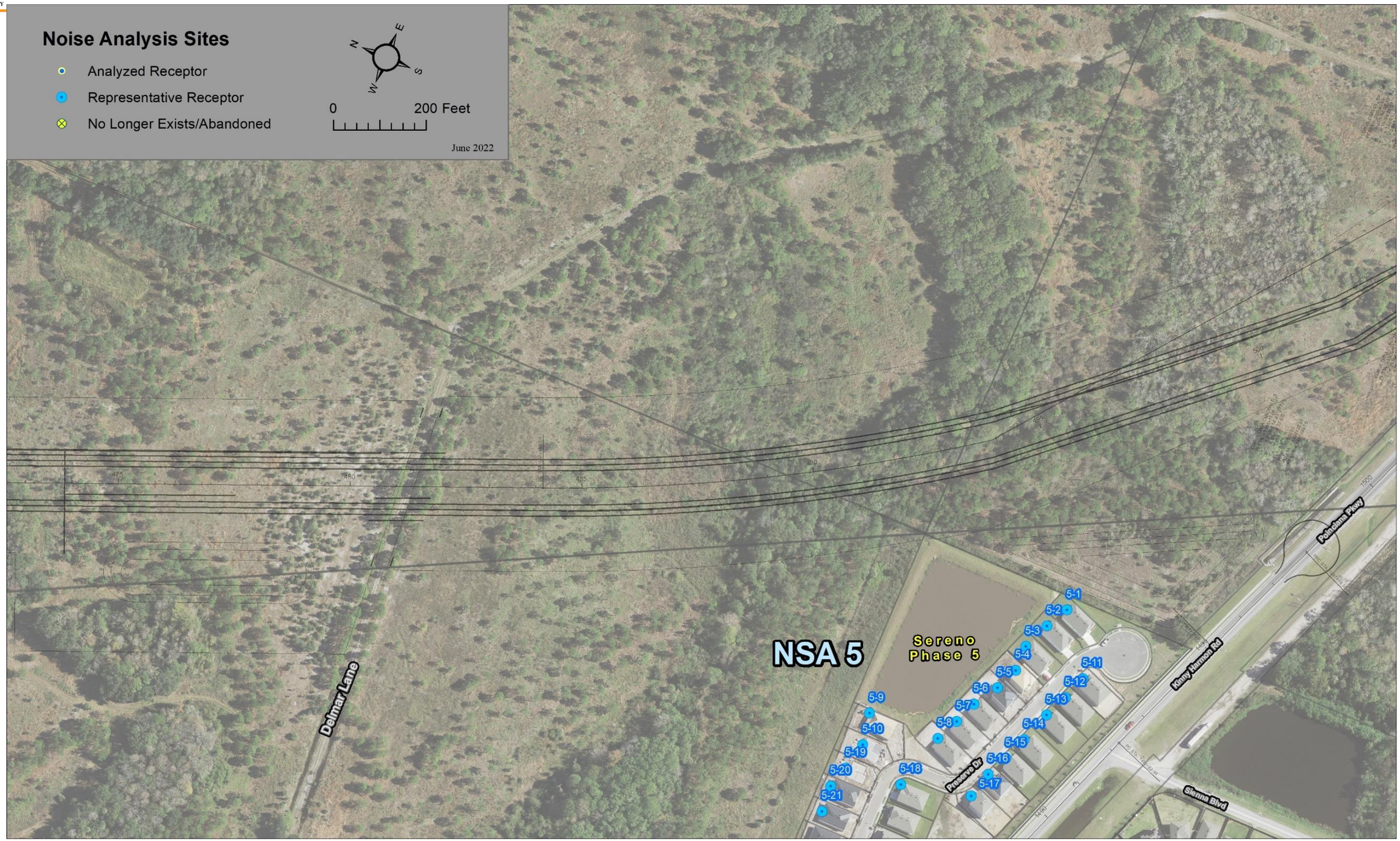
Project Aerials

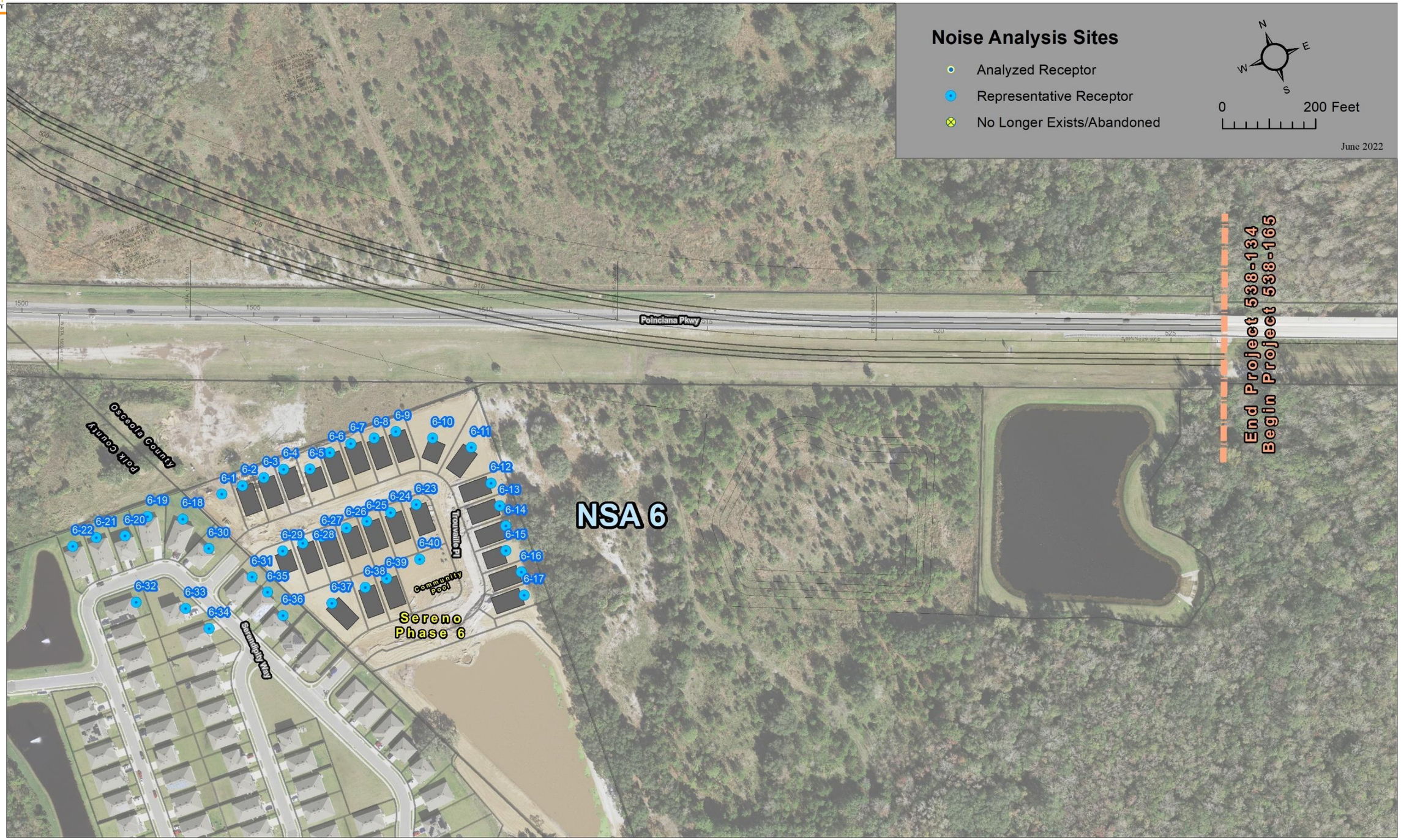

Noise Analysis Sites
Analyzed Receptor
Representative Receptor
No Longer Exists/Abandoned
N
E
S
W
0
200 Feet
June 2022
Osceola Polk Line Rd
Begin Project 538-235
NSA 2
NSA 1


Noise Analysis Sites
Analyzed Receptor
Representative Receptor
No Longer Exists/Abandoned
N
E
S
W
0
200 Feet
June 2022
NSA 1
NSA 2
NSA 4
1-1
1-2
1-3
1-4
2-1
2-2
2-3
2-4
2-5
2-6
2-7
2-8
2-9
2-10
2-11
2-12
2-13
2-14
4-1
Old Tampa Hwy
Ivy Mist Ln
Old Kissimmee Rd
Labor Camp Rd
Church Rd
Center St


Noise Analysis Sites
Analyzed Receptor
Representative Receptor
No Longer Exists/Abandoned
N
E
S
W
0
200 Feet
June 2022
NSA 4
End Project 538-235
Begin Project 538-234
NSA 3


Noise Analysis Sites
Analyzed Receptor
Representative Receptor
No Longer Exists/Abandoned
N
E
S
W
0
200 Feet
June 2022
NSA 4
NSA 3


Noise Analysis Sites
Analyzed Receptor
Representative Receptor
No Longer Exists/Abandoned
N
E
S
W
0
200 Feet
June 2022
NSA 5
Sereno
Phase 5
Delmar Lane
Preserve Dr
Kinny Harmon Rd
Poinciana Pkwy
Sienna Blvd
5-1
5-2
5-3
5-4
5-5
5-6
5-7
5-8
5-9
5-10
5-11
5-12
5-13
5-14
5-15
5-16
5-17
5-18
5-19
5-20
5-21


Noise Analysis Sites
Analyzed Receptor
Representative Receptor
No Longer Exists/Abandoned
N
E
S
W
0
200 Feet
June 2022
Poinciana Pkwy
Osceola County
Polk County
NSA 6
Sereno Phase 6
Community Pool
Serendipity Way
Trouville Pl
End Project 538-134
Begin Project 538-165
6-1
6-2
6-3
6-4
6-5
6-6
6-7
6-8
6-9
6-10
6-11
6-12
6-13
6-14
6-15
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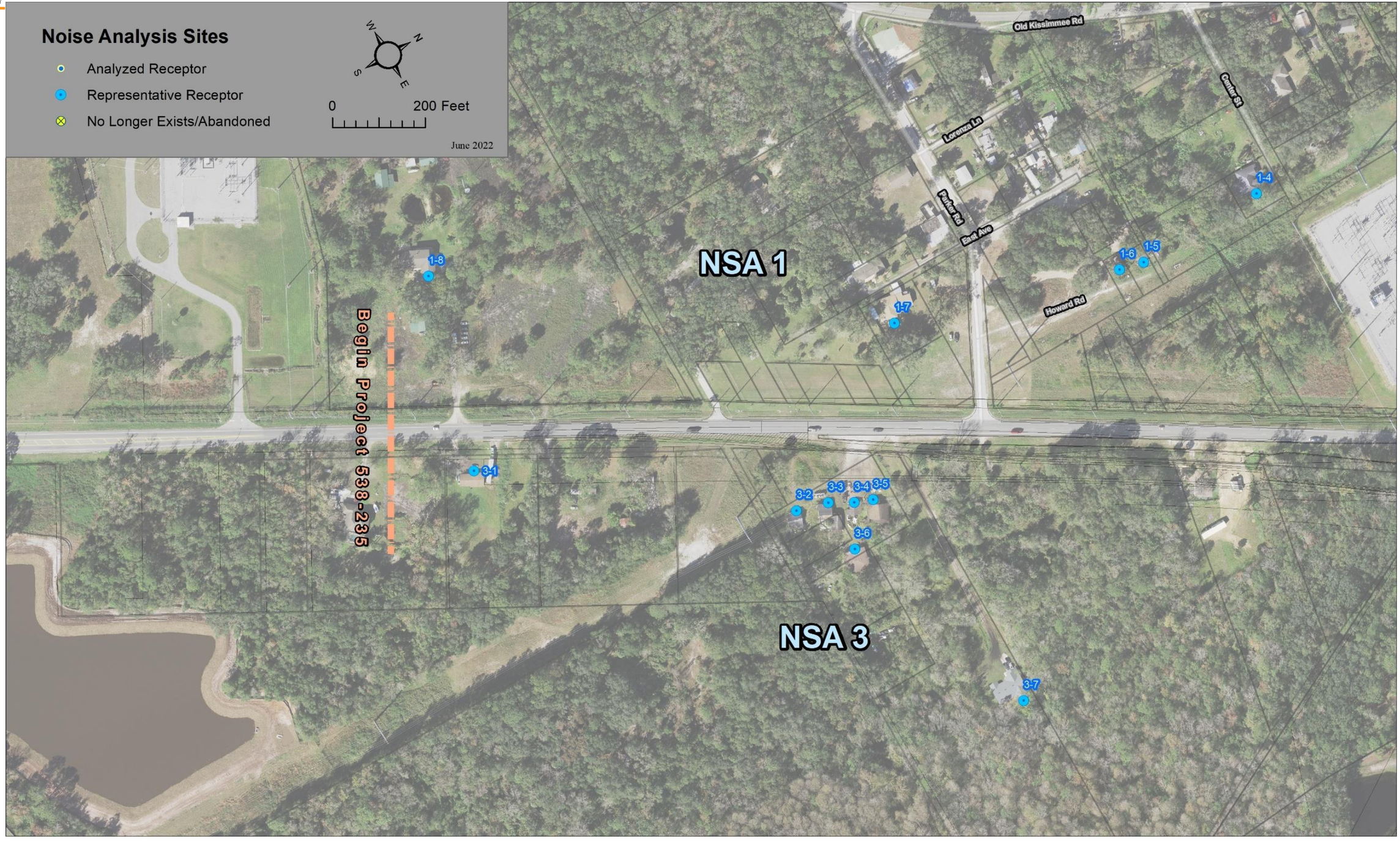

Noise Analysis Sites
Analyzed Receptor
Representative Receptor
No Longer Exists/Abandoned
N
S
E
0
200 Feet
June 2022
Old Kissimmee Rd
Lorenza Ln
Parker Rd
Bart Ave
Howard Rd
Collier St
NSA 1
1-4
1-5
1-6
1-7
1-8
Begin Project 538-235
3-1
3-2
3-3
3-4
3-5
3-6
3-7
NSA 3


Noise Analysis Sites
Analyzed Receptor
Representative Receptor
No Longer Exists/Abandoned
N
E
S
0
200 Feet
June 2022
2-4
2-5
2-8
2-9
2-12
2-10
2-13
2-11
2-14
2-15
2-16
2-17
Twilight Ct
Dusk Ct
Sundown Dr
My Mind Ln
NSA 2
NSA 4
Project 538-235
End Project 538-235

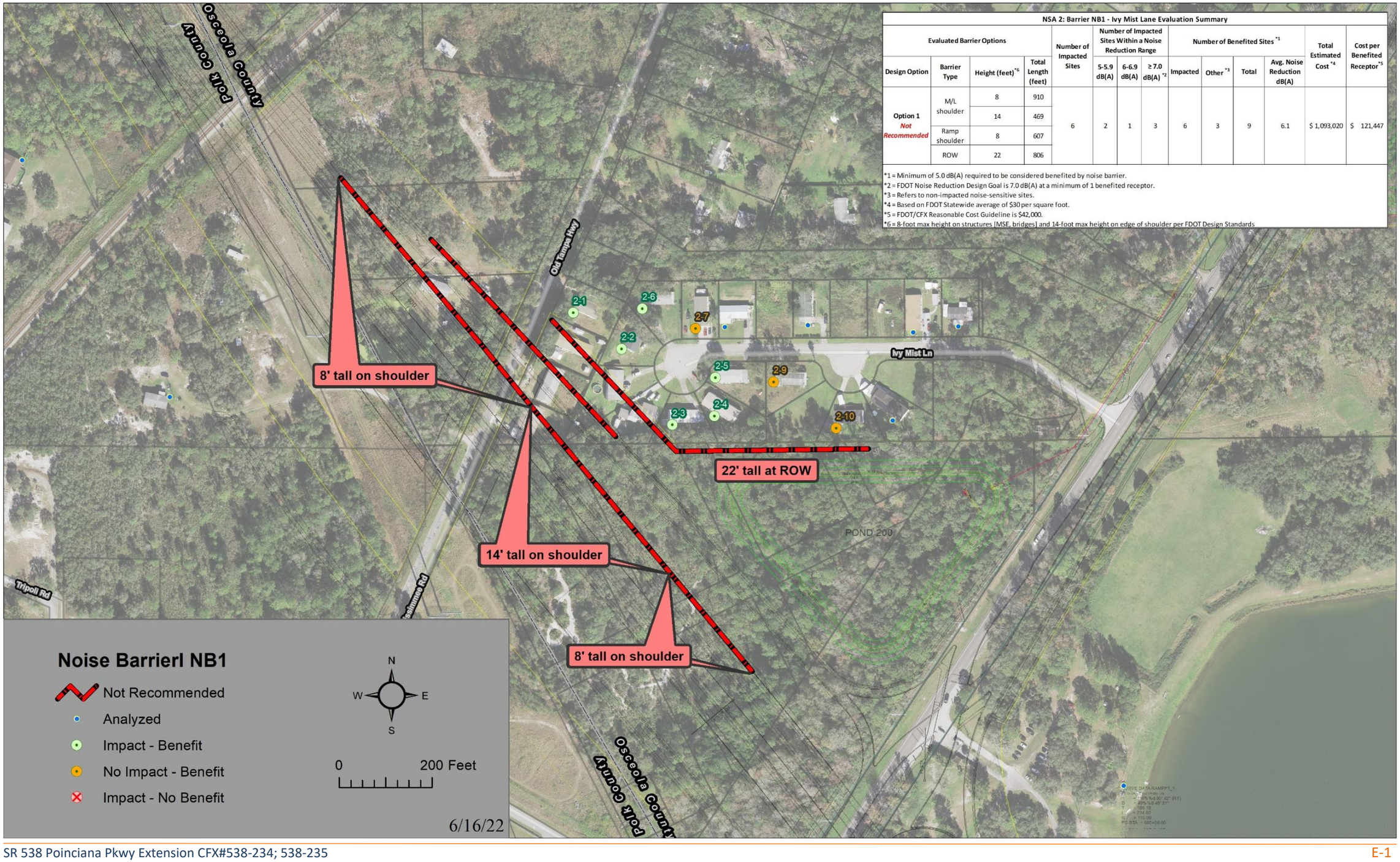
Appendix E:

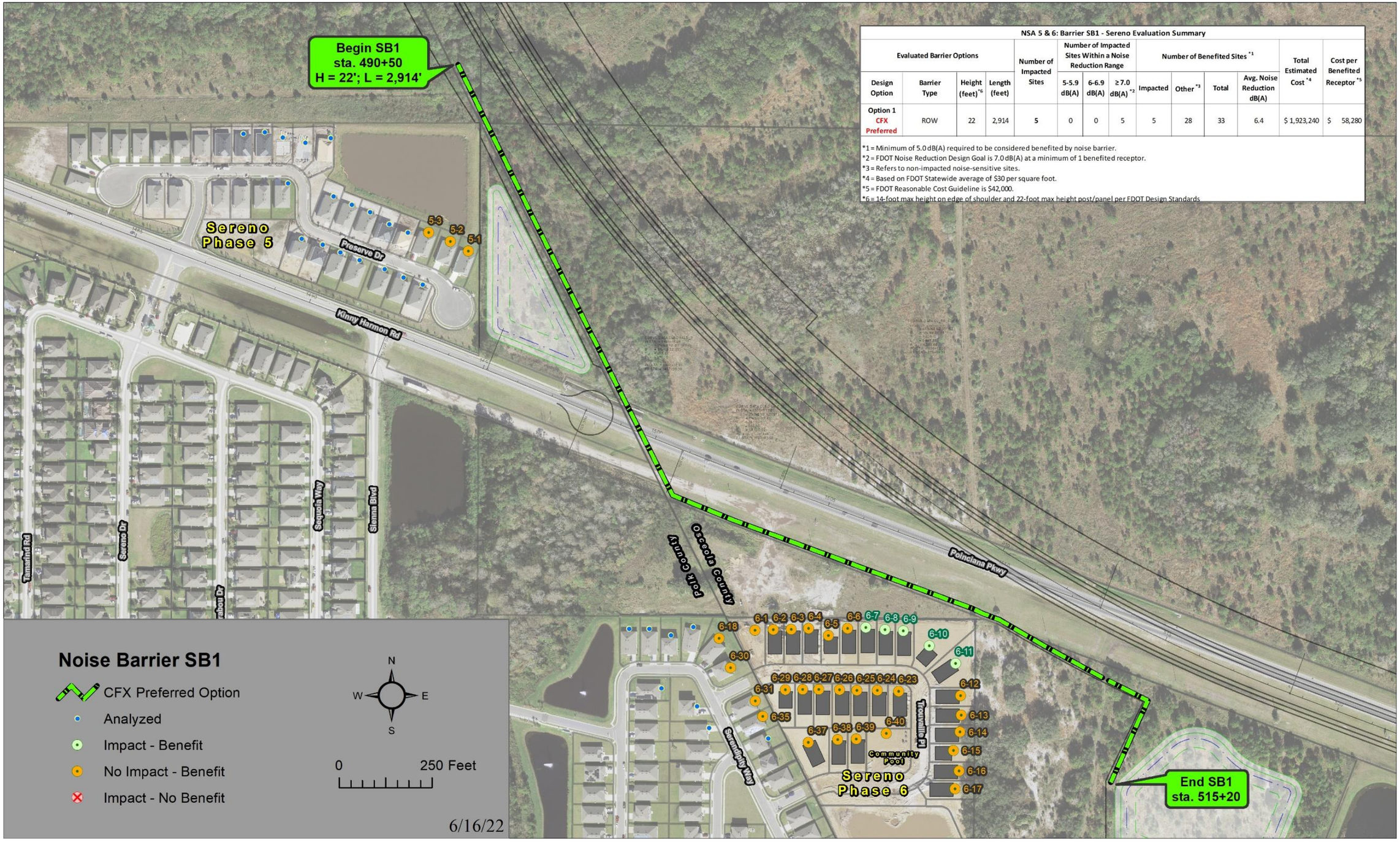
Noise Barrier Maps

NSA 2: Barrier NB1 - Ivy Mist Lane Evaluation Summary

Evaluated Barrier Options				Number of Impacted Sites	Number of Impacted Sites Within a Noise Reduction Range			Number of Benefited Sites *1				Total Estimated Cost *4	Cost per Benefited Receptor*5
Design Option	Barrier Type	Height (feet) *6	Total Length (feet)		5-5.9 dB(A)	6-6.9 dB(A)	≥ 7.0 dB(A) *2	Impacted	Other *3	Total	Avg. Noise Reduction dB(A)		
Option 1 *Not Recommended*	M/L shoulder	8	910	6	2	1	3	6	3	9	6.1	$ 1,093,020	$ 121,447
		14	469										
	Ramp shoulder	8	607										
	ROW	22	806										

*1 = Minimum of 5.0 dB(A) required to be considered benefited by noise barrier.
*2 = FDOT Noise Reduction Design Goal is 7.0 dB(A) at a minimum of 1 benefited receptor.
*3 = Refers to non-impacted noise-sensitive sites.
*4 = Based on FDOT Statewide average of $30 per square foot.
*5 = FDOT/CFX Reasonable Cost Guideline is $42,000.
*6 = 8-foot max height on structures (MSE, bridges) and 14-foot max height on edge of shoulder per FDOT Design Standards





NSA 5 & 6: Barrier SB1 - Sereno Evaluation Summary

Evaluated Barrier Options				Number of Impacted Sites	Number of Impacted Sites Within a Noise Reduction Range			Number of Benefited Sites *1				Total Estimated Cost *4	Cost per Benefited Receptor *5
Design Option	Barrier Type	Height (feet) *6	Length (feet)		5-5.9 dB(A)	6-6.9 dB(A)	≥ 7.0 dB(A) *2	Impacted	Other *3	Total	Avg. Noise Reduction dB(A)		
Option 1 CFX Preferred	ROW	22	2,914	5	0	0	5	5	28	33	6.4	$ 1,923,240	$ 58,280

*1 = Minimum of 5.0 dB(A) required to be considered benefited by noise barrier.
*2 = FDOT Noise Reduction Design Goal is 7.0 dB(A) at a minimum of 1 benefited receptor.
*3 = Refers to non-impacted noise-sensitive sites.
*4 = Based on FDOT Statewide average of $30 per square foot.
*5 = FDOT Reasonable Cost Guideline is $42,000.
*6 = 14-foot max height on edge of shoulder and 22-foot max height post/panel per FDOT Design Standards