Dewberry

Design Traffic Noise Analysis Technical Memorandum

SR 417 Widening, CFX Projects 417-151 and 417-150

(from Boggy Creek Road to SR 528)

Orlando, Orange County, Florida

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SUBMITTED BY:

Dewberry Engineers Inc.
800 North Magnolia Avenue
Suite 1000
Orlando, Florida 32803

PREPARED FOR:

Central Florida Expressway Authority
4974 Orl Tower Rd
Orlando, Florida 32807

Version Control Summary

Draft Design Traffic Noise Analysis
Technical Memorandum

SR 417 Widening, CFX Projects 417-151 and 417-150
(from Boggy Creek Road to SR 528)
Orlando, Orange County, Florida

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Version 2	Dewberry	8-20-2020	90% drawings Segment 150 Comments on Version 1	Barrier SBP1 added in response to comments on Version 1 Barriers NBP2, SBP4, NBP4 and SBP5 remodelled for the 90% design drawings.
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1.0 INTRODUCTION

The Central Florida Expressway Authority (CFX) is preparing design plans for the widening of S.R. 417 from Boggy Creek Road to SR 528 encompassing CFX Project 417-151 and 417-150. Specifically, the project will initially widen to the median for the addition of one general-use lane and one Part-Time Shoulder Use (PTSU) lane in each direction to completely close in the existing median. Infrastructure for the PTSU lane will be set up in the initial phase but will not be in operation until future traffic growth dictates its need. The general use lanes are also being designed to allow for an ultimate condition consisting of four general use lanes and one special use lane separated from the mainline with a four-foot buffer. The ultimate condition will be constructed as the need occurs in the future.

The location of these two contiguous projects is shown on Figure 1-1. This Technical Memorandum documents a traffic noise study identifying noise-sensitive areas that may be affected by the proposed ultimate condition. The abatement provided with this design will far exceed the initial need as part of the widening to be conducted for Projects 417-151 and 417-150. The study evaluates various noise barriers as an abatement measure for sensitive areas determined to be impacted.

2.0 METHODOLOGY

The traffic noise analysis was performed following Code of Federal Regulations Title 23 Part 772 (23 CFR 772), Procedures for Abatement of Highway Traffic Noise and Construction Noise, and using methodology established by the Florida Department of Transportation (FDOT) in the Project Development and Environment Manual 2, Part 2, Chapter 18 (January 14, 2019). Consistent with 23 CFR 772, noise level predictions are generated using the Federal Highway Administration's (FHWA) Traffic Noise Model (TNM), version 2.5. TNM Version 2.5 is FHWA's current approved version of the model.

2.1 Noise Metrics

Noise levels developed for this analysis 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 traffic noise. Predicted noise levels documented in this memorandum are reported as hourly equivalent noise levels [Leq(h)]. The Leq(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. These noise metrics are consistent with those established by FHWA in 23 CFR 772.

2.2 Traffic Data

Traffic noise is heavily dependent on the speed of vehicles as the amount of noise generated by traffic is directly proportional to vehicle speed. To predict worst-case hourly equivalent noise levels, the maximum hourly traffic volume that still allows vehicles to travel at the speed limit is used in the noise model. The FDOT's Project Development and Environment Manual identifies the level of service (LOS) C traffic volumes as the level that typically produces worst-case noise conditions. Following FDOT procedure, LOS C traffic volumes have been used in the noise modeling unless forecasted demand traffic volumes are less than those for LOS C. A comparison of forecasted design year (2045) demand traffic volumes to LOS C conditions is provided in Table 2-1. The speed assigned to vehicles is based on existing or proposed speed limits.

Traffic noise is also dependent on the types of vehicles (e.g., automobiles, trucks) traveling the road. An hourly truck factor of 6.2 percent is used. The classification of trucks is further refined by splitting the 6.2 percent between medium trucks (i.e., 5.6 percent for vehicles with two axles and six tires) and heavy trucks (i.e., 0.6 percent for vehicles with more than two axles).

Table 2-1: Traffic Volume Data

SR 417 Roadway Segment	Directional Design Hourly Volume (vehicles/hour)	LOS C Peak Hour Directional (vehicles/hour)	Worst – Case Traffic Condition For Modeling Purposes (LOS C or Demand)	Vehicle Speed (mph)
Design Year (2045) Build Condition				
Boggy Creek to SR 15	7,130	7,020	LOS C	70
SR 15 to SR 528	8,100	7,020	LOS C	70

Source: Revision 2 of the memorandum from Carleen Flynn of CDM Smith to Glenn Pressimore of CFX, dated October 28, 2019.

2.3 Elevation Data

The relationships among the elevation of the road, ground elevations at potential noise barrier locations (e.g., right-of-way [ROW] line), and ground elevation at the noise receptors have an impact on the predicted noise level at residences as well as the amount of noise reduction provided by potential noise barriers. In the vicinity of the highway, elevations for a potential noise barrier location may be based on either the SR 417 Design Plans or U.S. Geological Survey (USGS) elevation data. Ground elevations at the residences and along ROWs are based on the USGS elevation data. Ground elevations for potential shoulder barriers are based on the current design elevations presented in the latest design cross-sections (417-150 60% Submittal, December 2019 and 417-151 30% Submittal, March 2020). The heights of barriers modeled in this analysis are relative to the elevations cited above which were used in the modeling analysis. Should these elevations be revised during the final design of the segments, the ultimate barrier elevation (i.e., elevation from data source plus modeled barrier height) used in the analysis will be maintained.

2.4 Noise Abatement Criteria

FHWA has established noise levels at which noise abatement is considered for various types of noise-sensitive sites. These levels, used for evaluating traffic noise, are referred to as the Noise Abatement Criteria (NAC). As shown in Table 2-2, the NAC vary according to the activity category. Noise abatement measures are considered when predicted traffic noise levels approach or exceed the NAC. Consistent with FDOT methodology, "approach" is defined as within one dB(A) of the FHWA criteria. For comparison purposes, typical noise levels associated with common indoor and outdoor activities are provided in Table 2-3.

Table 2-2: FHWA Noise Abatement Criteria

Activity Category	Activity Criteria Leq(h)		Evaluation Location	Activity Description
	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, daycare 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, daycare 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 through 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: 23 CFR Part 772, Procedures for Abatement of Highway Traffic Noise and Construction Noise, FHWA, 2010.
LEq(h) refers to the equivalent steady-state sound level which in a stated period of time contains the same acoustic energy as the time-varying sound level during the same time period, with Leq(h) being the hourly value of Leq.

Table 2-3: Typical Noise Levels

Common Outdoor Activities	Noise Level dB(A)	Common Indoor Activities
	---110---	Rock Band
Jet Fly-over at 1,000 ft		
	---100---	
Gas Lawn Mower at 3 ft		
	---90---	
Diesel Truck at 50 ft, at 50 mph		Food Blender at 1 m (3 ft)
	---80---	Garbage Disposal at 1 m (3 ft)
Noise Urban Area (Daytime)		
Gas Lawn Mower at 100 ft	---70---	
Commercial Area		
	---60---	Vacuum Cleaner at 10 ft
		Normal Speech at 3 ft
Heavy Traffic at 300 ft		
	---50---	
Quiet Urban Daytime		Large Business Office
	---40---	Dishwasher Next Room
Quiet Urban Nighttime		
	---30---	
Quiet Suburban		Theater, Large Conference Room (Background)
Nighttime	---20---	Library
Quiet Rural Nighttime	---10---	Bedroom at Night, Concert Hall (Background)
Lowest Threshold of Human Hearing	---0---	Lowest Threshold of Human Hearing

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

Noise abatement measures are also considered when a substantial increase in traffic noise would occur as a direct result of the transportation project. Consistent with FDOT methodology, a substantial increase is defined 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 more prevalent component after the project is constructed (e.g., new alignment highway). Since the projects consist of widening of an existing highway, traffic is already predominantly the existing noise source at sensitive sites along the project and a substantial increase in traffic noise attributable to the project will not occur at any sensitive site due to the widening projects' Noise-Sensitive Sites.

2.5 Noise Sensitive Sites

Noise-sensitive sites are modeled as receptor points. Receptor points representing the individual noise-sensitive sites are located in accordance with the FDOT Project Development and Environment Manual, Part 2, Chapter 18 as follows:

- Residential receptor points are located at the egress for the building, which is an area of frequent exterior use, or closest to the major traffic noise source.
- Where residences are clustered together, a single receptor point may represent a group of residences with similar noise propagation path characteristics. The analysis of the modeling data incorporates the number of residences at the single receptor point.
- Receptor points for recreational facilities (e.g., tennis court, community swimming pool) are placed in an area where people would commonly be when using the facility.
- Ground-floor receptor points are assumed to be five feet above the ground elevation. For each additional floor above ground level, where exterior use occurs, the receptor points are assumed to be 10 feet for each additional floor above ground level (i.e., 15 feet for a second-floor receptor).

2.6 Noise Abatement Considerations

The widening project uses the existing alignment of SR 417. In addition, noise-sensitive sites (e.g., residences) are already established along the project. Consequently, noise barriers are the only potentially viable abatement measure that could be implemented as part of the project. Noise barriers reduce noise levels by blocking the sound path between a highway and noise-sensitive site. To effectively reduce traffic noise, a noise barrier must be relatively long, continuous (no intermittent openings), and of sufficient height. For a noise barrier to be feasible as well as reasonable in cost, the following conditions should be utilized and considered:

- A noise barrier should provide a minimum noise reduction of seven dB(A) (noise-reduction design goal) at one or more impacted noise-sensitive sites with at least one additional impacted noise-sensitive site provided with a noise-reduction of five dB(A) or more.
- When evaluating a noise barrier for cost reasonableness, FDOT has established a limit of $42,000 per benefitted residence. A benefitted noise-sensitive site is defined as a site that would experience at least a five dB(A) reduction as a result of providing a noise barrier.
- For this analysis, a unit cost of $30 per square foot for all non-shoulder barriers. For shoulder barriers unit costs of $36 per square foot for 10-foot shoulder barriers, $38 per square foot for 12-foot shoulder barriers, and $40 per square foot for 14-foot shoulder barriers were used. All estimated costs were rounded to the nearest dollar.
- For illustration purposes only, residences that received a “minor benefit” from the proposed noise barrier are indicated on the associated figures for each community. A “minor benefit” is defined as a noise reduction of less than five dB(A) that results in a modeled noise level of less than 66 dB(A), the defined impact level.

Consistent with the FDOT Design Manual, Section 264, limitations on noise barrier heights are as follows:

- Noise barriers on bridge or wall structures are limited to a maximum height of eight feet.
- Ground-mounted noise barriers at the shoulder point are limited to a maximum height of 14 feet.
- Noise barriers located outside the clear recovery zone are limited to a maximum height of 22 feet.

At some locations, noise barriers may provide a benefit at residences where predicted noise levels do not approach or exceed the NAC (see Figure 2-1). Neither the FHWA regulation nor FDOT procedures require abatement consideration at these residences. Consequently, noise barrier lengths or heights are not increased to benefit these residences. However, if experiencing an incidental benefit because of proximity to an impacted residence, these residences are included when determining cost per benefitted residence. This procedure is consistent with FHWA analysis and abatement guidance. Due to design considerations, aesthetics, and/or limitations of the noise modeling methodology, CFX may also propose noise barriers that exceed the cost reasonableness limit presented above. An example would be extending a noise barrier to maintain community continuity (i.e., avoid terminating a noise barrier in the middle of a community).

Because the proposed widening will be performed in phases, it is the preference of CFX to construct noise barriers along the ROW instead of the shoulder in order to avoid potential alteration/reconstruction of barriers during future projects. Accordingly, shoulder barriers have only been considered for locations where a ROW barrier is not considered feasible. Additionally, a combination shoulder/ROW barrier may be proposed for communities located in the vicinity of a bridge due to changes in roadway elevation. The specific rationale for these exceptions will be explained as necessary in the appropriate subsections of 3.4 below.

3.0 TRAFFIC NOISE ANALYSIS

Traffic noise analysis includes the identification of noise-sensitive sites and the prediction of traffic noise levels for design year (2045) ultimate build conditions. Noise barriers are evaluated for those sites with predicted noise levels that approach or exceed the NAC for design year build conditions.

3.1 Noise-Sensitive Site Locations

Noise-sensitive land uses in the vicinity of SR 417 from Boggy Creek Road to State Route 528 include residences with associated common use recreational areas and one school. These noise-sensitive sites are classified by Activity Category of the NAC as follows:

- Residences are classified as Activity Category B.
- Common use recreational areas in residential communities are classified as Activity Category C.
- Schools are classified as Activity Category C.

Discussion regarding the school and the recreational areas is presented with the adjacent communities as presented below:

- Sun Blaze Elementary School (Section 3.4.12, Figure 3-12)

3.2 Noise Model Validation

Noise monitoring activities were performed on May 7, 2019, to verify the accuracy of TNM predictions for the project area within each model segment. Two 3M™ SoundPro Sound Level Meter Kit DL noise monitors (Serial Numbers BIK100005 and BJ1040011) were used to measure noise levels. The monitors were calibrated with QC-10 calibrators (Serial Numbers A02383 and QID20048) prior to measurements. Traffic data was provided by CFX for the time period during each monitoring event and used in the base TNM model (i.e., without proposed noise barriers) to predict noise levels. The model is considered valid if the predicted noise levels are within the acceptance limit of three dB(A). The results of the validation process are summarized in Table 3-1.

Table 3-1: Comparison of Noise Monitoring with Model Predictions

Monitoring Location	Date	Monitoring Results [dB(A)]	Modelling Results [dB(A)]	Difference	Within 3 dB(A)?
NM-4	5/7/2019	60.4	60.8	0.4	Yes
NM-5A	5/7/2019	58.5	56	2.5	Yes
NM-5B	5/7/2019	62.7	61.8	-0.9	Yes
NM-5C	5/7/2019	63.1	61.8	-1.3	Yes
NM-5D	5/7/2019	62.3	60.0	-2.3	Yes

3.3 Predicted Noise Levels

Noise levels are predicted for the year 2045 build conditions at 498 receptor points representing more than 1,240 residences, the one school identified above, and common use areas associated with residential communities (neighborhood gazebo, tennis courts, swimming pool, neighborhood barbecue areas, outdoor seating areas with tables). Predicted noise levels are provided in Appendix A for the receptor point locations depicted on Figures 3-1 through 3-13.

3.4 Noise Barrier Analysis

When evaluating noise barriers, residences, or communities clustered in close proximity to each other are analyzed as a group to lower the cost per benefitted receptor for a particular barrier. For example, the evaluation of a barrier where 33 receptors were modeled may represent 99 residences (three residential units for each receptor). Additionally, the length of each noise barrier is optimized for a particular height in an effort to achieve cost reasonableness while maintaining at least a five dB(A) reduction at impacted noise-sensitive sites.

3.4.1 SBP1 for Southbound Residences on SR 417 in Lake Nona Water Mark and Village Walk at Lake Nona East of Lake Nona Boulevard

Residences border SR 417 on the southbound side to the east of Lake Nona Boulevard. Predicted exterior noise levels range from 61.2 dB(A) to 72.6 dB(A), with noise levels approaching or exceeding the NAC at 86 residences for the year 2045 build condition. The community is comprised of multi-resident structures. Exterior receptor points are placed in an area of frequent exterior use and represent multiple residences occupying the structure. Additionally, some residences have exterior balconies or patios on the first, second, or third-floor levels. The noise modeling addresses these areas of frequent exterior human use.

Each of these communities has an existing screening wall that is incorporated into the noise analysis model but is not evaluated in the model as a barrier. ROW and shoulder barriers were evaluated for this community.

The results of the noise barrier analysis are provided in Table 3-2. The analysis showed that a 1,942-foot-long, 22-foot-high ROW noise barrier met the minimum noise reduction requirement of seven dB(A) for at least one residence. A ROW barrier height of 22 feet is needed to provide a benefit [i.e., noise reduction greater than five dB(A)] to the maximum number of impacted residences (20) for this location. The cost of this option exceeds the FDOT criteria of $42,000 per benefitted residence and has been selected by CFX. The proposed noise barrier is shown on Figure 3-1.

3.4.2 NBP1 Northbound Residences on SR 417 in The Preserve Lake Nona Community West of SR 15 (Narcoossee Road)

Residences in The Preserve Lake Nona Community border SR 417 on the northbound side to the west of SR 15/Narcoossee Road. A baseline analysis of the potential impact of the SR 417 build out was conducted for this community. The predicted exterior noise levels were below 66 dB(A), with no noise levels exceeding the NAC for the year 2045 build condition. Therefore, the evaluation of a noise barrier was not performed. The results of the baseline analysis showing no traffic noise impacts for this community are shown on Figure 3-2.

3.4.3 Barrier SBP2 for Southbound Residences on SR 417 in Village Walk at Lake Nona Community Near Lower Villagewalk Circle

Residences border SR 417 on the southbound side near Villagewalk Circle. Predicted exterior noise levels range from 62.7 dB(A) to 71.3 dB(A), with noise levels approaching or exceeding the NAC at 19 residences for the year 2045 build condition. This community has an existing screening wall that is incorporated into the noise analysis model but is not evaluated in the model as a barrier. A 2,022-foot-long ROW barrier and a 2,022-foot-long shoulder barrier were evaluated for this community.

The results of the noise barrier analysis are provided in Table 3-3. A ROW noise barrier height of at least 22 feet is required to meet the minimum noise reduction requirement of seven dB(A) for at least one residence. A ROW barrier 2,022 feet long and 22 feet high is needed to provide a benefit [i.e., noise reduction greater than five dB(A)] to the maximum number of impacted residences (seven) for this location. The cost of this option is over four times greater than the FDOT criteria of $42,000 per benefitted residence. Therefore, no noise barrier is recommended. The evaluated noise barrier is shown on Figure 3-3.

3.4.4 SBP3 - Southbound Residences on SR 417 in Village Walk at Lake Nona Community Near Savona Way

Residences in Village Walk at Lake Nona border SR 417 on the southbound side near Savona Way. A baseline analysis of the impact of the SR 417 build conditions was conducted for this community. The predicted exterior noise levels were below 66 dB(A), with no noise levels exceeding the NAC for the year 2045 build condition. Therefore, the evaluation of a noise barrier was not performed. The results of the baseline analysis showing no traffic noise impacts for this community are shown on Figure 3-4.

3.4.5 Barrier NBP2 for Northbound Residences on SR 417 in Stratford Pointe Community east of Narcoossee Road

Residences border SR 417 on the northbound side to the east of Narcoossee Road. Predicted exterior noise levels range from 57.8 dB(A) to 74.4 dB(A) with noise levels exceeding the NAC at 34 residences for the year 2045 build condition. The following barriers were evaluated for this community:

- A combination 1,201-foot-long shoulder barrier with a 22-foot-high, 885-foot-long ROW barrier extending the length of the community
- A 2,220-foot-long ROW barrier from Narcoossee Road extending northeast past the edge of the community.

The results of the noise barrier analysis are provided in Table 3-4. A ROW noise barrier height of at least 18 feet is required to meet the minimum noise reduction requirement of seven dB(A) for at least one residence. A ROW barrier 2,220 feet long and 22 feet high is needed to provide a benefit [i.e., noise reduction greater than five dB(A)] to the maximum number (22) of the impacted residences for this community.

The cost of this option is above the FDOT criteria of $42,000 per benefitted residence and has been selected by CFX. The proposed noise barrier is shown on Figure 3-5.

3.4.6 Northbound Residences on SR 417 in Verandas at Lake Hart and North Shore at Lake Hart

Residences in the Verandas at Lake Hart and North Shore at Lake Hart border SR 417 on the northbound side, southeast of the ramp to Moss Park Road. Due to the distance of these communities to SR 417, no identification number was assigned to the community. A baseline analysis of the impact of the SR 417 build-out was conducted for these communities. The predicted exterior noise levels were below 66 dB(A), with no noise levels exceeding the NAC for the year 2045 build condition. Therefore, the evaluation of a noise barrier was not performed. The results of the baseline analysis showing no traffic noise impacts are shown on Figure 3-6.

3.4.7 Barrier SBP4 for Southbound Residences on SR 417 in Nona Terrace Community

Residences border SR 417 on the southbound side near Savannah Landings Circle. Predicted exterior noise levels range from 61.2 dB(A) to 66.9 dB(A) with noise levels approaching or exceeding the NAC at 28 residences for the year 2045 build condition. The following barriers were evaluated for this community:

- A 1,446-foot-long ROW barrier from the southeastern corner of the community north towards Moss Park Road;
- A 1,453-foot-long shoulder barrier from the southeastern corner of the community north towards Moss Park Road; and
- A 1,600-foot-long shoulder barrier from the wooded area at the southeastern corner of the community north towards Moss Park Road.

The results of the noise barrier analysis are provided in Table 3-5. A 10-foot-high shoulder noise barrier is needed to provide a benefit [i.e., noise reduction greater than five dB(A)] to the maximum number of impacted residences (22) for this location. None of the evaluated noise barriers met the minimum noise reduction requirement of seven dB(A) for at least one residence. A 1,600-foot-long, 14-foot-high, shoulder barrier provided an average of 6.0 dB(A) benefit to 22 of the 28 impacted residences. The barrier is below the $42,000 per benefitted residence criteria and has been selected by CFX. The proposed noise barriers are shown on Figure 3-7. To enable the construction of a necessary Mechanically Stabilized Earth (MSE) wall for early phases of construction, the noise barrier will initially be tapered back to 1455 feet. The noise wall will be extended to its full length in the future at the time of the ultimate SR 417 build out.

3.4.8 NBP3 - Northbound Residences on SR 417 in the Savannah Pines Community South of Moss Park Road

Residences in the Savannah Pines Community border SR 417 on the northbound side to the east of the exit ramp to Moss Park Road. A baseline analysis of the impact of the SR 417 build out was conducted for this community. Predicted exterior noise levels were below 66 dB(A), with no noise levels exceeding the NAC for the year 2045 build condition. Therefore, the evaluation of this noise barrier was not performed. The results of the baseline analysis showing no traffic noise impacts for this community are shown on Figure 3-8.

3.4.9 Barrier NBP4 for Northbound Residences on SR 417 in Oasis at Moss Park Community North of Moss Park Road

Residences border SR 417 on the northbound side and to the north of Moss Park Road. Predicted exterior noise levels range from 61.2 dB(A) to 73.4 dB(A) with noise levels approaching or exceeding the NAC at 209 residences for the year 2045 build condition. The community is comprised of multi-resident structures. Exterior receptor points are

placed in an area of frequent exterior use and represent multiple residences occupying the structure. Additionally, some residences have exterior balconies or patios on the first, second, or third-floor levels. The noise modeling addresses these areas of frequent exterior human use.

The following barriers were evaluated for this community:

- A 1, 549-foot-long ROW barrier; and
- A 920-foot-long, 22-foot-high and 670-foot-long, 14-foot-high hybrid barrier.

The results of the noise barrier analysis are provided in Table 3-6. A hybrid noise barrier height of at least 10 feet is required to meet the minimum noise reduction requirement of seven dB(A) for at least one residence. A 920-foot-long, 22-foot high and 670-foot-long 14-foot-high hybrid barrier provides the maximum benefit [i.e., noise reduction greater than five dB(A)] to 176 impacted residences for this location. The cost of this option is below the FDOT criteria of $42,000 per benefitted residence and has been selected by CFX. The proposed noise barriers are shown on Figure 3-9.

3.4.10 Barrier SBP5 for Southbound Residences on SR 417 in the Villas at East Park Community

Residences border SR 417 on the southbound side to the south of Dowden Road. Predicted exterior noise levels range from 59.8 dB(A) to 69.5 dB(A) with noise levels approaching or exceeding the NAC at 63 residences for the year 2045 build condition. The proposed widening project in this section also includes an elevated off-ramp from southbound Florida Turnpike to Moss Park Road. ROW barriers of a variety of lengths were evaluated for this community.

The results of the noise barrier analysis are provided in Table 3-7. A ROW noise barrier height of at least 22 feet is required to meet the minimum noise reduction requirement of seven dB(A) for at least one residence. A ROW barrier 1,800 feet long and 22 feet high is needed to provide a benefit [i.e., noise reduction greater than five dB(A)] to the maximum number of impacted residences (57) for this community. The cost of this option is below the FDOT criteria of $42,000 per benefitted residence and has been selected by CFX. The proposed noise barrier is shown on Figure 3-10.

3.4.11 SBP6 - Southbound Residences on SR 417 in the Randal Walk Community North of Dowden Road and East of Randal Park Boulevard

Residences in the Randal Walk Community that appear under construction, based on 2018 aerial imagery, border SR 417 on the southbound side to the north of Dowden Road and east of Randal Park Boulevard. A baseline analysis of the impact of the SR 417 build out was conducted for this community. The predicted exterior noise levels were below 66 dB(A), with no noise levels exceeding the NAC for the year 2045 build condition.

Therefore, the evaluation of a noise barrier was not performed. The results of the baseline analysis showing no traffic noise impacts for this community are shown on Figure 3-11.

3.4.12 SBP7 - Southbound Residences on SR 417 in the Randal Park Community North and East of Macaris Street

Residences in the Randal Park Community border SR 417 on the southbound side, to the north and east of Macaris Street. A baseline analysis of the impact of the SR 417 build out was conducted for this community. The predicted exterior noise levels were below 66 dB(A), with no noise levels exceeding the NAC for the year 2045 build condition.

Sun Blaze Elementary School is located immediately south of the Randal Park Community. The predicted noise levels for the public use areas of the school are less than the NAC of 66 dB(A) for the year build condition. Therefore, the evaluation of a noise barrier was not performed. The results of the baseline analysis showing no traffic noise impacts for this community are shown on Figure 3-12.

3.4.13 Barrier SBP8 for Southbound Residences on SR 417 in the Randal Park Community South of the SR417 and SR528 Interchange

Residences border SR 417 on the southbound side, to the south of the SR417 and SR528 Interchange. Predicted exterior noise levels range from 61.3 dB(A) to 66.5 dB(A) with noise levels approaching or exceeding the NAC at four residences for the year 2045 build condition. A ROW barrier was evaluated for this community.

The results of the noise barrier analysis are provided in Table 3-8. A ROW noise barrier does not meet the minimum noise reduction requirement of seven dB(A) for at least one residence and does not provide a benefit [i.e., noise reduction greater than five dB(A)] to any of the four impacted residences for this location. Therefore, a barrier is not recommended. The study location is shown on Figure 3-13.

4.0 CONCLUSIONS

Since the projects consist of widening of an existing highway, traffic is already predominantly the existing noise source at sensitive sites along the project and a substantial increase in traffic noise attributable to the project will not occur at any sensitive site due to the widening projects.

For the Year 2045 build condition, noise levels are predicted to approach or exceed the NAC at 443 residences. Noise barriers were not cost-reasonable for several communities with impacted residences because the cost per benefit would far exceed the FDOT standard in each area. These communities are:

- Village Walk at Lake Nona
- Randal Park

Noise barriers were determined to be feasible and reasonable for several communities as detailed in Figure 2-1. Property owners and residents who would be affected by a noise barrier will be surveyed to establish public support or opposition to the construction of a noise barrier. The construction of the proposed highway improvements will proceed as presented to the public during the associated public meetings. The results of the public survey will be documented in an addendum to this Design Traffic Noise Analysis Technical Memorandum. If a majority of affected property owners and residents support the construction of a noise barrier, the noise barriers described in Table 4-1 will be included in the design plans for the project and constructed as part of the project.

5.0 CONSTRUCTION NOISE

Using FDOT's listing of vibration-sensitive sites, residences were identified as the only nearby land use potentially sensitive to vibration generated during construction. During final design, it will be determined whether provisions to control vibration are necessary. The project's construction provisions will be modified as needed.

6.0 PUBLIC COORDINATION

A Pre-Construction Meeting was held on October 7, 2020 to discuss Segments 417-150. The meeting was held virtually with a video presentation and provided an opportunity for the public, especially impacted residences, to ask questions about the project. A second Pre-Construction Meeting was held on November 18, 2020 to address Segment 417-151. This second meeting was also held virtually. Comments received at both meetings were responded to by CFX.

7.0 REFERENCES

Procedures for Abatement of Highway Traffic Noise and Construction Noise; Federal Highway Administration; Washington, DC; July 2010.

Project Development and Environment Manual, Part 2, Chapter 18; Florida Department of Transportation; Tallahassee, Florida; January 14, 2019.

FHWA Traffic Noise Model (FHWA TNM®) Technical Manual, U.S. Department of Transportation, 1998 and updates.

Figures

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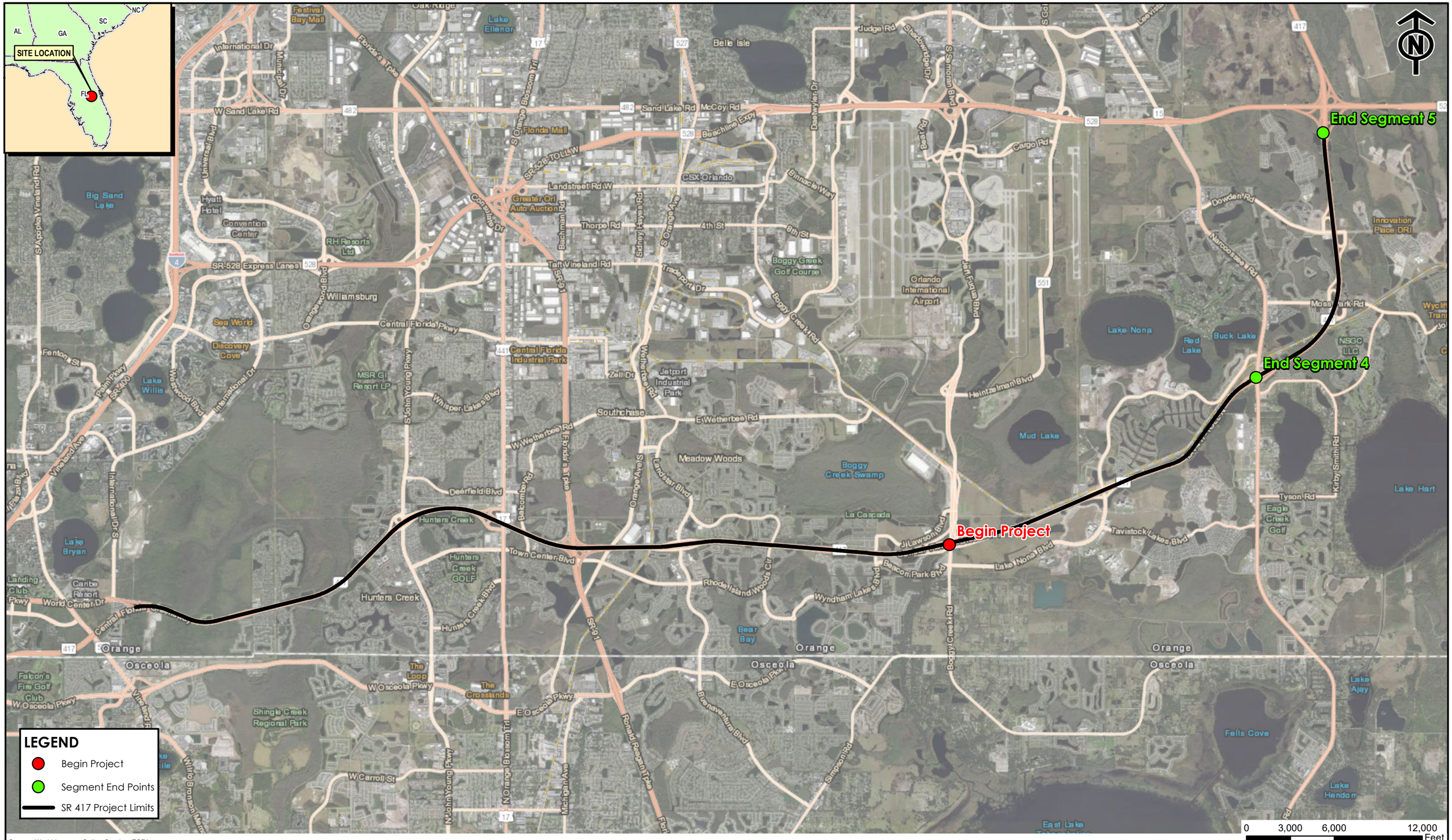
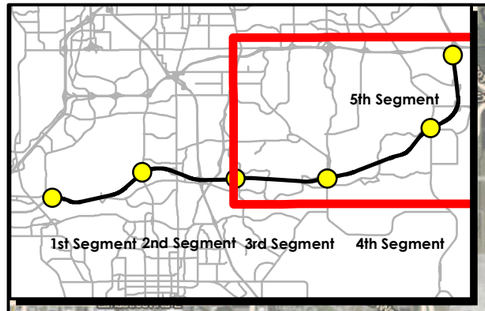


Source: World Imagery Online Service, ESRI

Central Florida Expressway Authority	SR 417 Widening, CFX Projects 417-151 and 417-150 (from Boggy Creek Road to SR 528) Orlando, Orange County, Florida **PROJECT LOCATION**	Dewberry January 2021 **FIGURE 1-1**

Path: Q:\50088262\GIS\Mxd\417-151 - 150 SR417 Widening Boggy Creek Rd to SR 528\9-1-2020\1.1_Site_Location_Map_BoggyCreektoSR528_9_1_2020.mxd



End Segment 5

BARRIER SBP5

BARRIER NBP4

BARRIER SBP4-S

BARRIER NBP4-S

End Segment 4

BARRIER NBP2

BARRIER SBP1

Begin Project

LEGEND

Recommended Noise Barrier Location

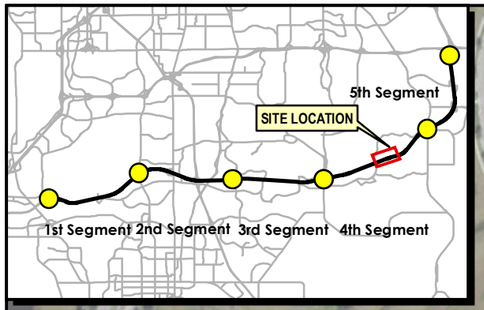
Project Segment Limits

0 2,000 4,000 8,000 Feet

Source: World Imagery Online Service, ESRI

Central Florida Expressway Authority	SR 417 Widening, CFX Projects 417-151 and 417-150 (from Boggy Creek Road to SR 528) Orlando, Orange County, Florida **PROPOSED NOISE BARRIER LOCATIONS**	Dewberry January 2021 **FIGURE 2-1**

Path: Q:\50088262\GIS\Mxd\417-151 - 150 SR417 Widening Boggy Creek Rd to SR 528\9-28-2020\2-1_Noise Barrier Locations_BoggyCreektoSR528_9_28_2020.mxd



LAKE NONA WATER MARK

VILLAGE WALK AT LAKE NONA

EXISTING SCREENING WALL 1

EXISTING SCREENING WALL 2

BARRIER SBP1

BARRIER SBP1-S

NM-4

Gateway Loop

Lower Villagewalk Cir

Water Mark Apartment Access

Triplefall Ln

Aztec Rose Ln

Regal Lily Ln

Pescara Ln

Villagewalk Cir

SR 417-TOLL S

SR 417-TOLL N

Central Florida Greeneway

LEGEND

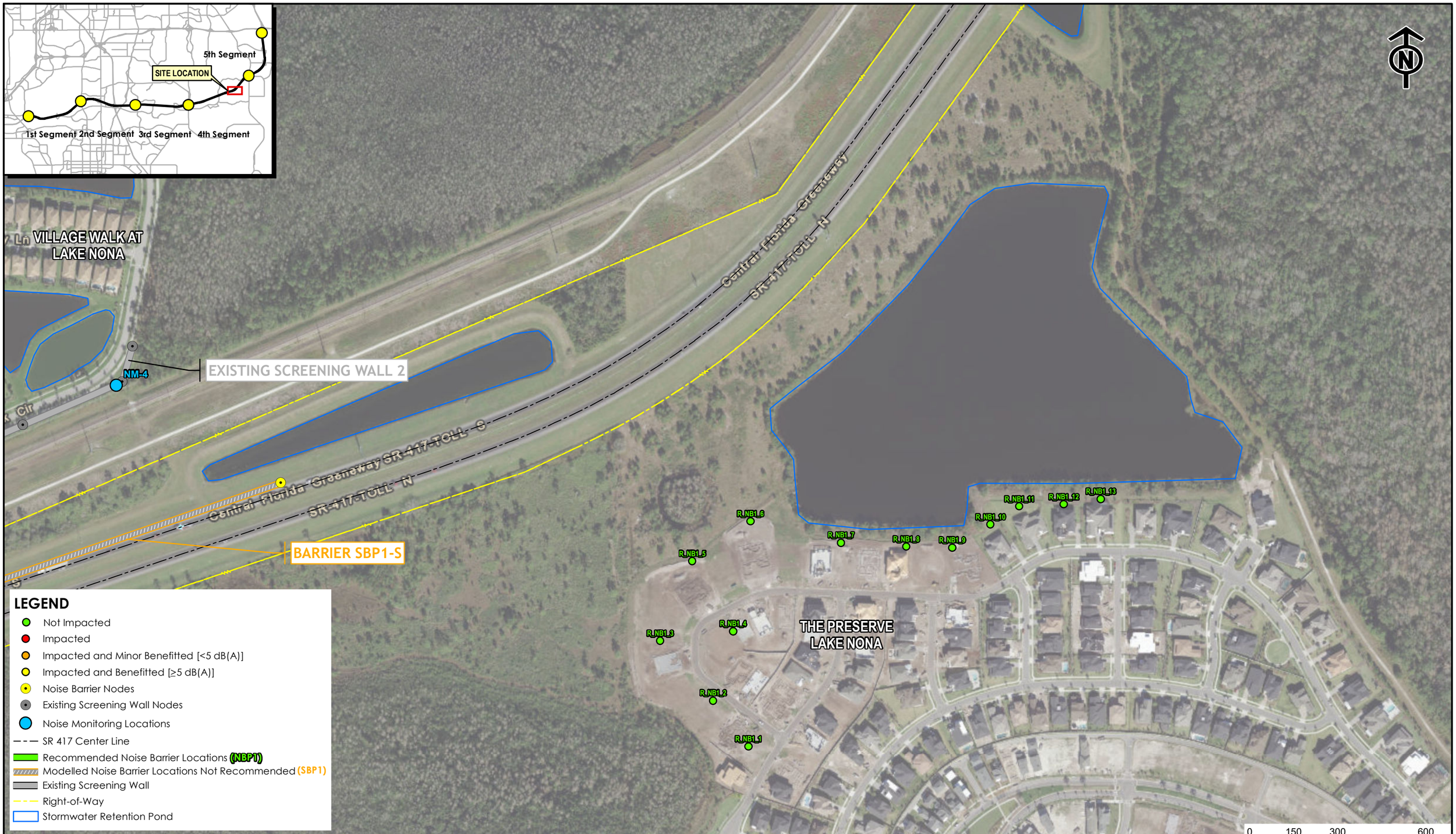
- Not Impacted
- Impacted
- Impacted and Minor Benefitted [<5 dB(A)]
- Impacted and Benefitted [≥5 dB(A)]
- Noise Barrier Nodes
- Existing Screening Wall Nodes
- Noise Monitoring Locations
- SR 417 Center Line
- Recommended Noise Barrier Locations (NBP1)
- Modelled Noise Barrier Locations Not Recommended (SBP1)
- Existing Screening Wall
- Right-of-Way
- Stormwater Retention Pond

0 150 300 600 Feet

Source: World Imagery Online Service, ESRI

Central Florida Expressway Authority	SR 417 Widening, CFX Projects 417-151 and 417-150 (from Boggy Creek Road to SR 528) Orlando, Orange County, Florida **NOISE BARRIER ANALYSIS – LAKE NONA WATER MARK AND VILLAGE WALK AT LAKE NONA COMMUNITIES (SBP1)**	Dewberry January 2021 **FIGURE 3-1**

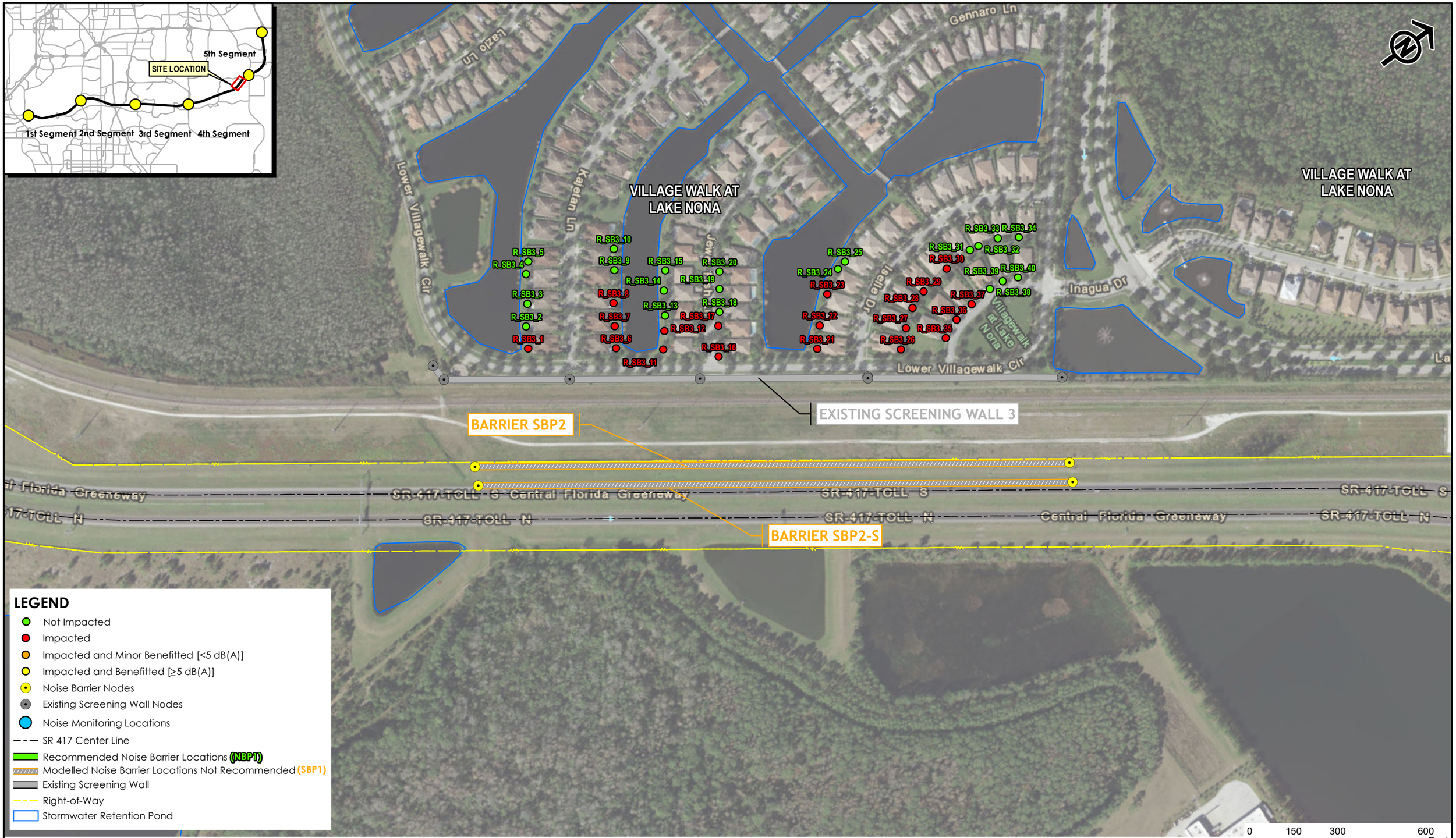
Path: Q:\50088262\GIS\Mxd\417-151 - 150 SR417 Widening Boggy Creek Rd to SR 528\9-1-20202\3-1_NoiseBarrier_151-SBP1_LakeNonaWaterMarkCommunity_9_1_2020.mxd



Source: World Imagery Online Service, ESRI

Central Florida Expressway Authority	SR 417 Widening, CFX Projects 417-151 and 417-150 (from Boggy Creek Road to SR 528) Orlando, Orange County, Florida **NOISE BARRIER ANALYSIS - THE PRESERVE LAKE NONA COMMUNITY**	Dewberry®	January 2021 **FIGURE 3-2**

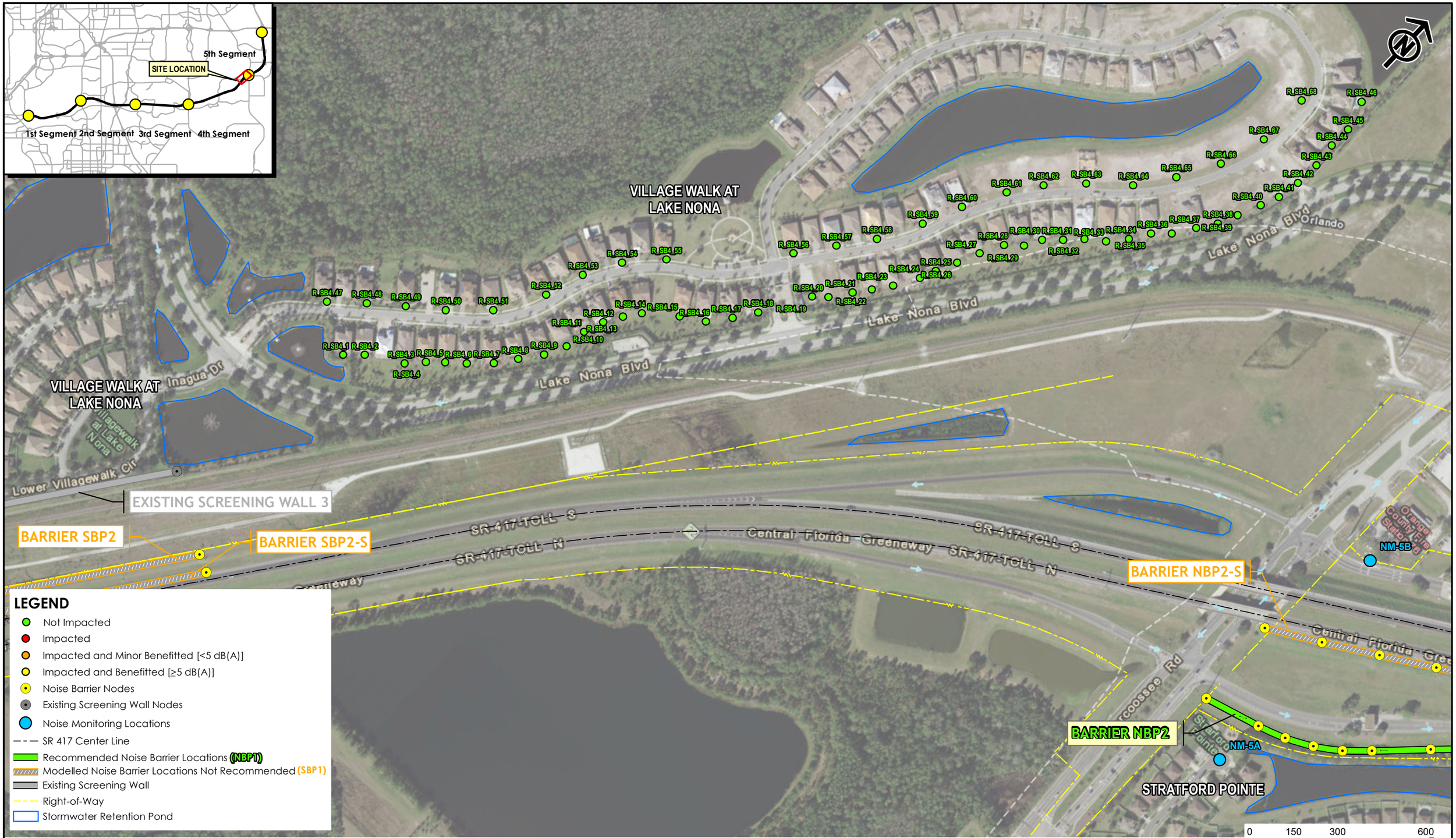
Path: Q:\50088262\GIS\Mxd\417-151 - 150 SR417 Widening Boggy Creek Rd to SR 528\9-1-20202\3-2_NoiseBarrier_151-NBP1_ThePreserveLakeNonaCommunity_9_1_2020.mxd



Source: World Imagery Online Service, ESRI

Central Florida Expressway Authority	SR 417 Widening, CFX Projects 417-151 and 417-150 (from Boggy Creek Road to SR 528) Orlando, Orange County, Florida **NOISE BARRIER ANALYSIS - VILLAGE WALK AT LAKE NONA COMMUNITY (SBP2)**	Dewberry®	January 2021 **FIGURE 3-3**

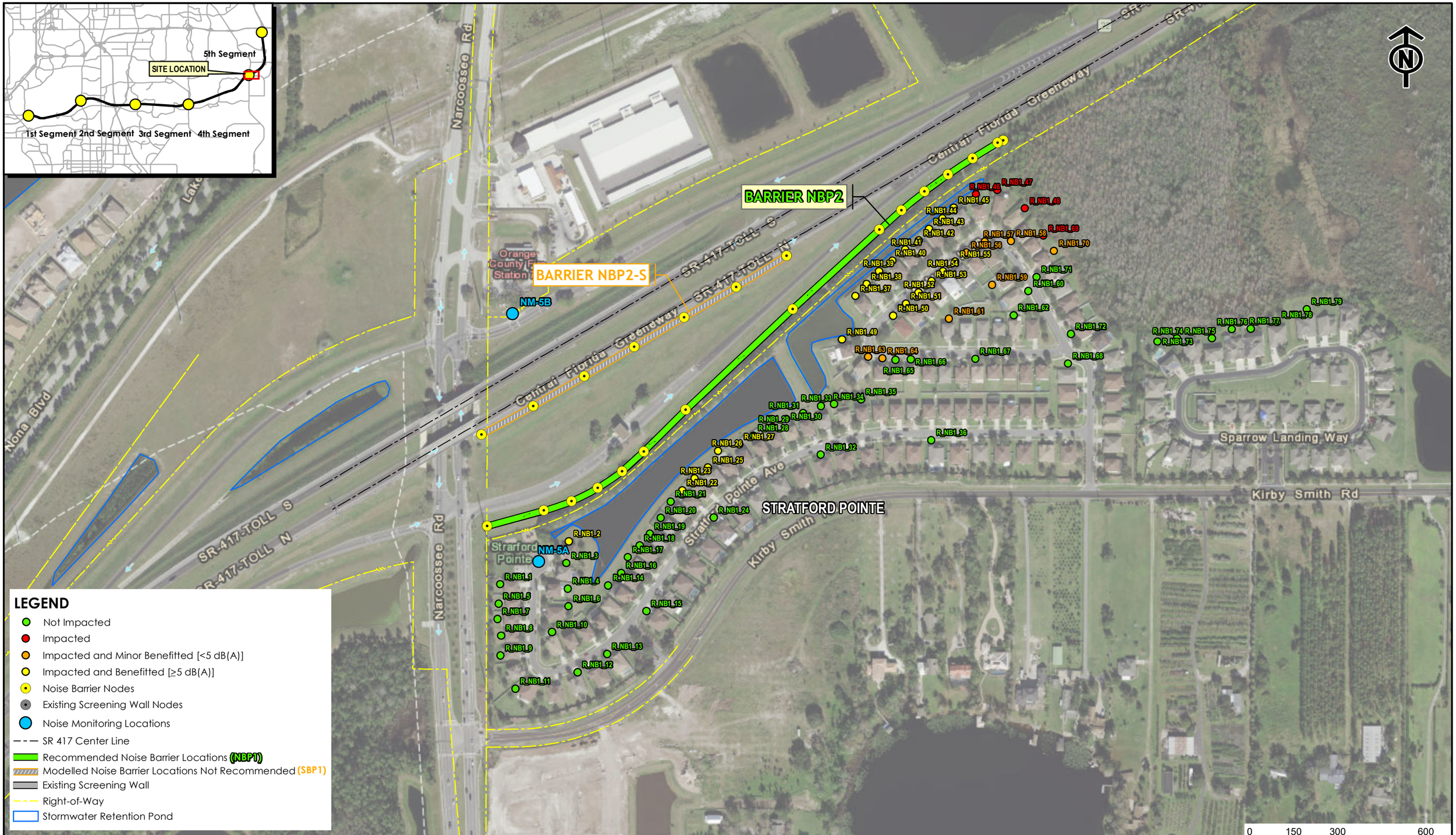
Path: Q:\50088262\GIS\Mxd\417-151 - 150 SR417 Widening Boggy Creek Rd to SR 528\9-1-20202\3-3_NoiseBarrier_151-SBP2_VillageWalkatLakeNonaCommunity_9_1_2020.mxd



Source: World Imagery Online Service, ESRI

Central Florida Expressway Authority	SR 417 Widening, CFX Projects 417-151 and 417-150 (from Boggy Creek Road to SR 528) Orlando, Orange County, Florida **NOISE BARRIER ANALYSIS - VILLAGE WALK AT LAKE NONA COMMUNITY**	Dewberry January 2021 **FIGURE 3-4**

Path: Q:\50088262\GIS\Mxd\417-151 - 150 SR417 Widening Boggy Creek Rd to SR 528\9-1-2020\3-4_NoiseBarrier_151-SBP3_VillageWalkatLakeNonaCommunity_9_1_2020.mxd



Source: World Imagery Online Service, ESRI

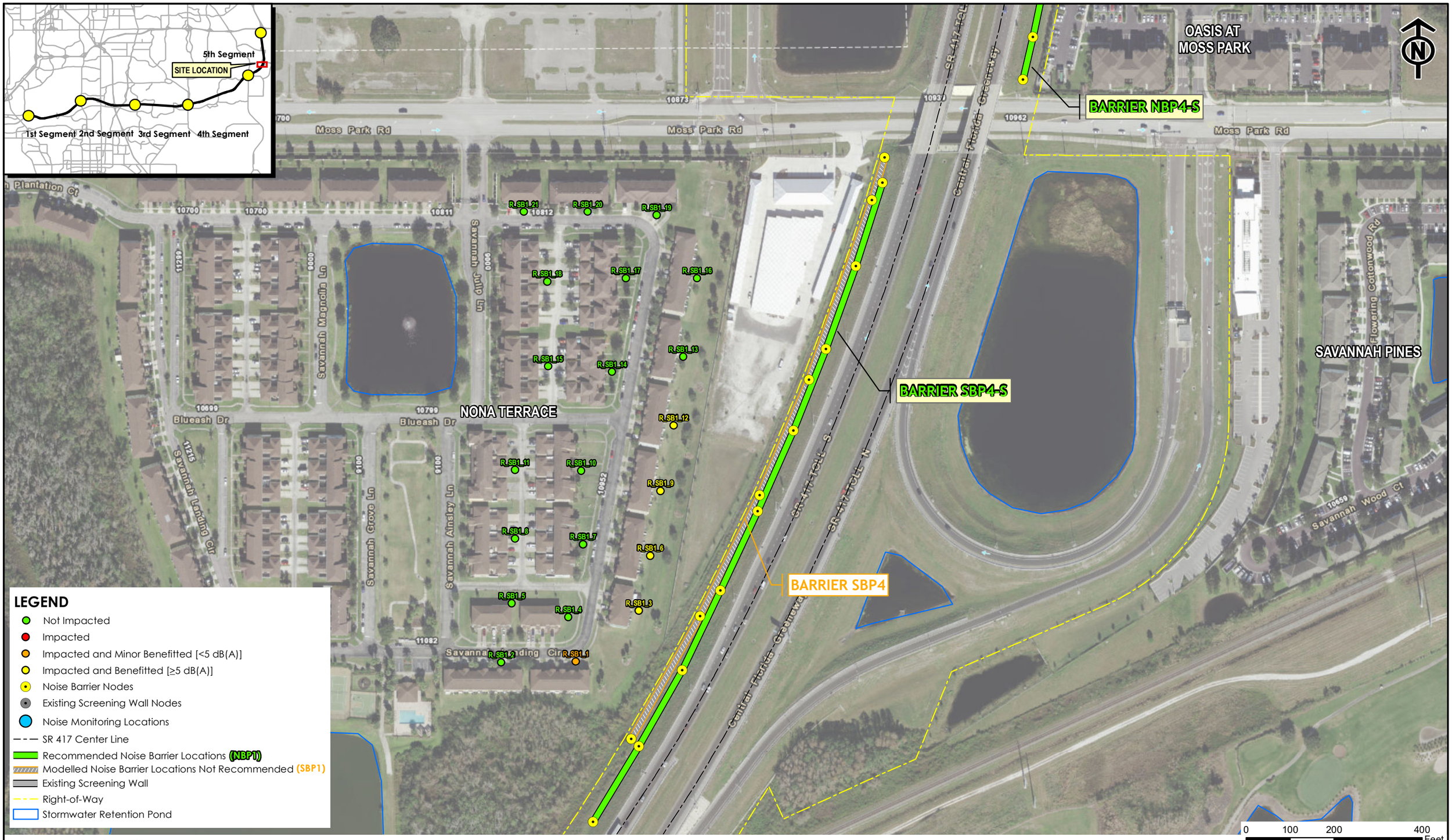
Central Florida Expressway Authority	SR 417 Widening, CFX Projects 417-151 and 417-150 (from Boggy Creek Road to SR 528) Orlando, Orange County, Florida **NOISE BARRIER ANALYSIS - STRATFORD POINTE COMMUNITY (NBP2)**	Dewberry January 2021 **FIGURE 3-5**

Path: Q:\50088262\GIS\Mxd\417-151 - 150 SR417 Widening Boggy Creek Rd to SR 528\9-1-2020\3-5_NoiseBarrier_150-NBP2_StratfordPointeCommunity_9_1_2020.mxd

Source: World Imagery Online Service, ESRI

Central Florida Expressway Authority	SR 417 Widening, CFX Projects 417-151 and 417-150 (from Boggy Creek Road to SR 528) Orlando, Orange County, Florida **NOISE BARRIER ANALYSIS - VERANDAS AT LAKE HART & NORTH SHORE AT LAKE HART COMMUNITIES**	Dewberry January 2021 **FIGURE 3-6**

Path: Q:\50088262\GIS\Mxd\417-151 - 150 SR417 Widening Boggy Creek Rd to SR 528\9-28-2020\3-6_NoiseBarrier_150-VerandasatLakeHart_Community_9_28_2020.mxd



LEGEND

- Not Impacted
- Impacted
- Impacted and Minor Benefitted [<5 dB(A)]
- Impacted and Benefitted [≥5 dB(A)]
- Noise Barrier Nodes
- Existing Screening Wall Nodes
- Noise Monitoring Locations
- SR 417 Center Line
- Recommended Noise Barrier Locations (NBP1)
- Modelled Noise Barrier Locations Not Recommended (SBP1)
- Existing Screening Wall
- Right-of-Way
- Stormwater Retention Pond

Source: World Imagery Online Service, ESRI

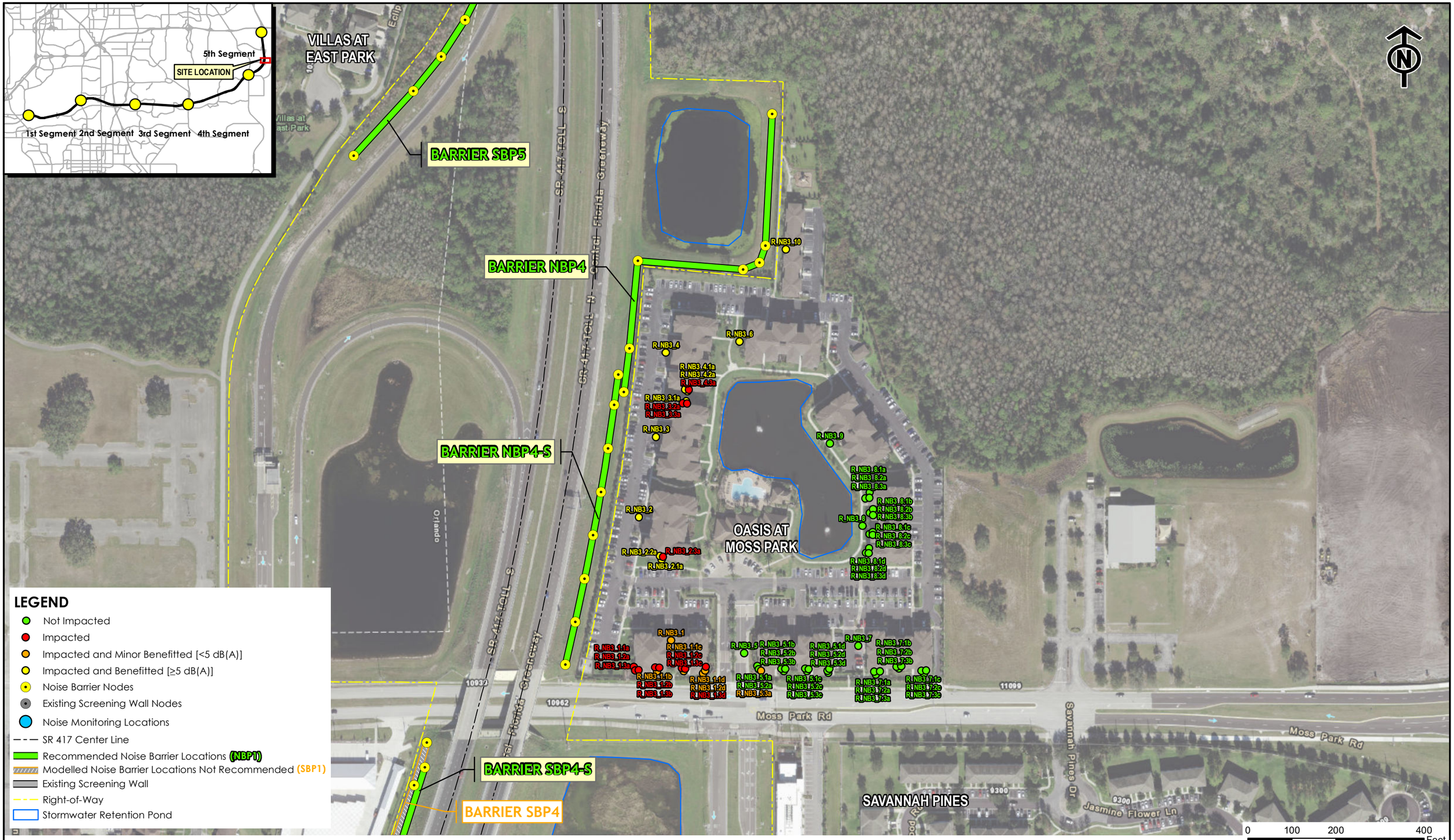
Central Florida Expressway Authority	SR 417 Widening, CFX Projects 417-151 and 417-150 (from Boggy Creek Road to SR 528) Orlando, Orange County, Florida **NOISE BARRIER ANALYSIS - NONA TERRACE COMMUNITY (SBP4)**	Dewberry January 2021 **FIGURE 3-7**

Path: Q:\50088262\GIS\Mxd\417-151 - 150 SR417 Widening Boggy Creek Rd to SR 528\9-28-2020\3-7_NoiseBarrier_150-SBP4_NonaTerraceCommunity_9_28_2020.mxd

Source: World Imagery Online Service, ESRI

Central Florida Expressway Authority	SR 417 Widening, CFX Projects 417-151 and 417-150 (from Boggy Creek Road to SR 528) Orlando, Orange County, Florida **NOISE BARRIER ANALYSIS - SAVANNAH PINES COMMUNITY**	Dewberry January 2021 **FIGURE 3-8**

Path: Q:\50088262\GIS\Mxd\417-151 - 150 SR417 Widening Boggy Creek Rd to SR 528\9-28-2020\3-8_NoiseBarrier_150-NBP3_SavannahPinesCommunity_9_28_2020.mxd



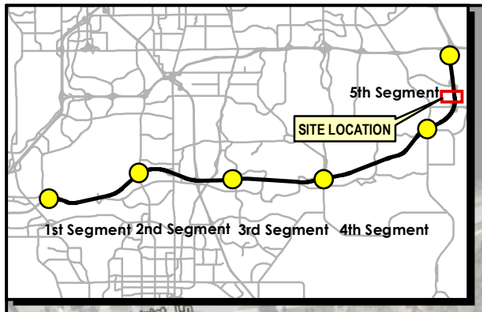
LEGEND

- Not Impacted
- Impacted
- Impacted and Minor Benefitted [<5 dB(A)]
- Impacted and Benefitted [≥5 dB(A)]
- Noise Barrier Nodes
- Existing Screening Wall Nodes
- Noise Monitoring Locations
- SR 417 Center Line
- Recommended Noise Barrier Locations (NBP1)
- Modelled Noise Barrier Locations Not Recommended (SBP1)
- Existing Screening Wall
- Right-of-Way
- Stormwater Retention Pond

Source: World Imagery Online Service, ESRI

Central Florida Expressway Authority	SR 417 Widening, CFX Projects 417-151 and 417-150 (from Boggy Creek Road to SR 528) Orlando, Orange County, Florida **NOISE BARRIER ANALYSIS - OASIS AT MOSS PARK COMMUNITY (NBP4)**	Dewberry January 2021 **FIGURE 3-9**

Path: \\par-fs\Parsippany\Projects-ENV\50088262\GIS\Mxd\417-151 - 150 SR417 Widening Boggy Creek Rd to SR 528\9-28-2020\3-9_NoiseBarrier_150-NBP4_OasisatMossParkCommunity_9_28_2020.mxd



VILLAS AT EAST PARK

BARRIER SBP5

BARRIER NBP4

NM-5C

R_SB2_33 R_SB2_32 R_SB2_30 R_SB2_37 R_SB2_36 R_SB2_35 R_SB2_31 R_SB2_28 R_SB2_34 R_SB2_29 R_SB2_25 R_SB2_26 R_SB2_18 R_SB2_24 R_SB2_17 R_SB2_27 R_SB2_23 R_SB2_16 R_SB2_22 R_SB2_15 R_SB2_21 R_SB2_14 R_SB2_20 R_SB2_13 R_SB2_19 R_SB2_7 R_SB2_12 R_SB2_6 R_SB2_11 R_SB2_10 R_SB2_5 R_SB2_4 R_SB2_9 R_SB2_3 R_SB2_8 R_SB2_2 R_SB2_1

LEGEND

- Not Impacted
- Impacted
- Impacted and Minor Benefitted [<5 dB(A)]
- Impacted and Benefitted [≥5 dB(A)]
- Noise Barrier Nodes
- Existing Screening Wall Nodes
- Noise Monitoring Locations
- SR 417 Center Line
- Recommended Noise Barrier Locations (NBP1)
- Modelled Noise Barrier Locations Not Recommended (SBP1)
- Existing Screening Wall
- Right-of-Way
- Stormwater Retention Pond

0 125 250 500 Feet

Source: World Imagery Online Service, ESRI

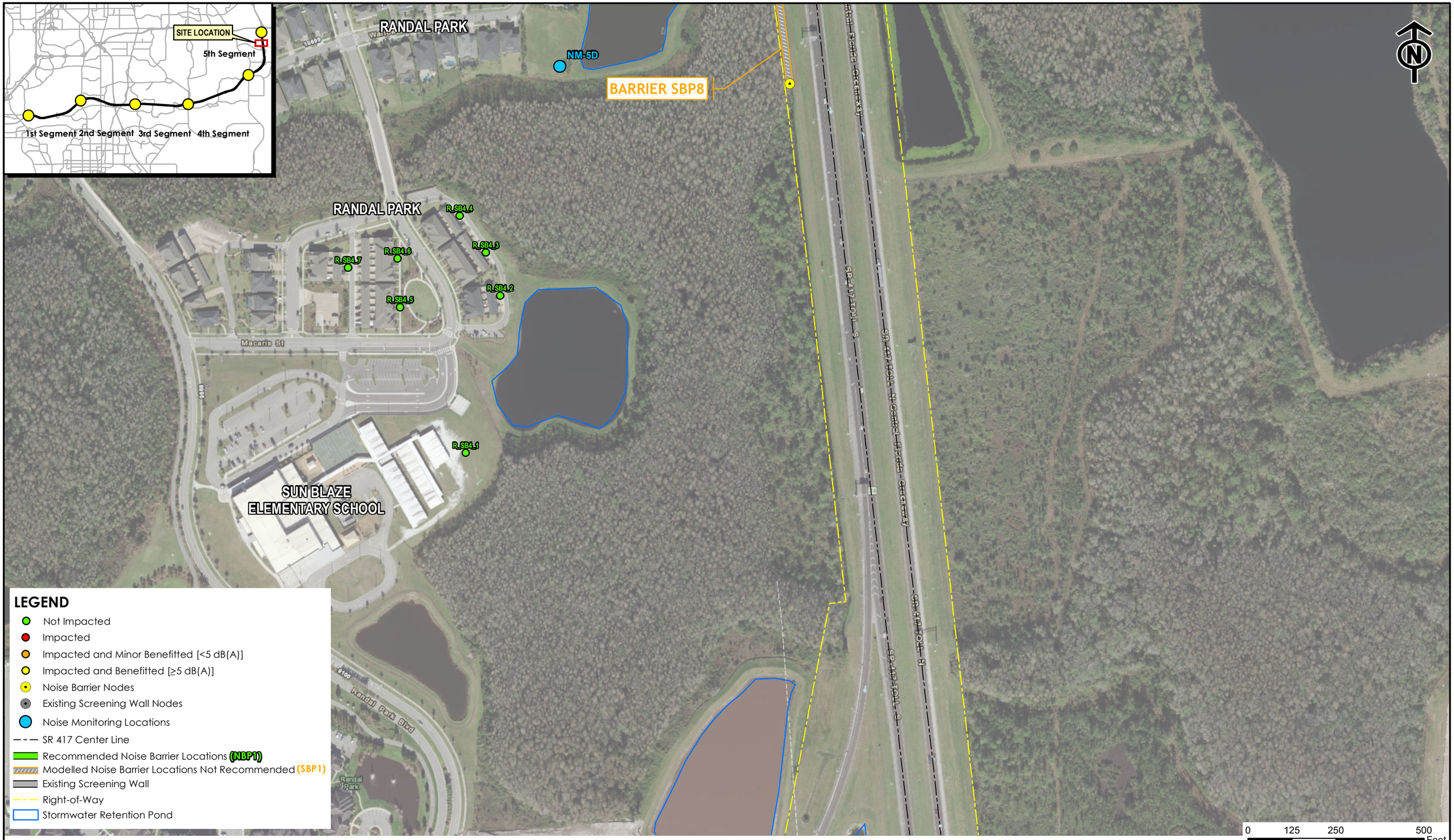
Central Florida Expressway Authority	SR 417 Widening, CFX Projects 417-151 and 417-150 (from Boggy Creek Road to SR 528) Orlando, Orange County, Florida **NOISE BARRIER ANALYSIS - VILLAS AT EAST PARK COMMUNITY (SBP5)**	Dewberry January 2021 **FIGURE 3-10**

Path: Q:\50088262\GIS\Mxd\417-151 - 150 SR417 Widening Boggy Creek Rd to SR 528\9-1-20202\3-10_NoiseBarrier_150-SBP5_VillasatEastParkCommunity_9_1_2020.mxd

Source: World Imagery Online Service, ESRI

Central Florida Expressway Authority	SR 417 Widening, CFX Projects 417-151 and 417-150 (from Boggy Creek Road to SR 528) Orlando, Orange County, Florida **NOISE BARRIER ANALYSIS - RANDAL WALK COMMUNITY**	Dewberry January 2021 **FIGURE 3-11**

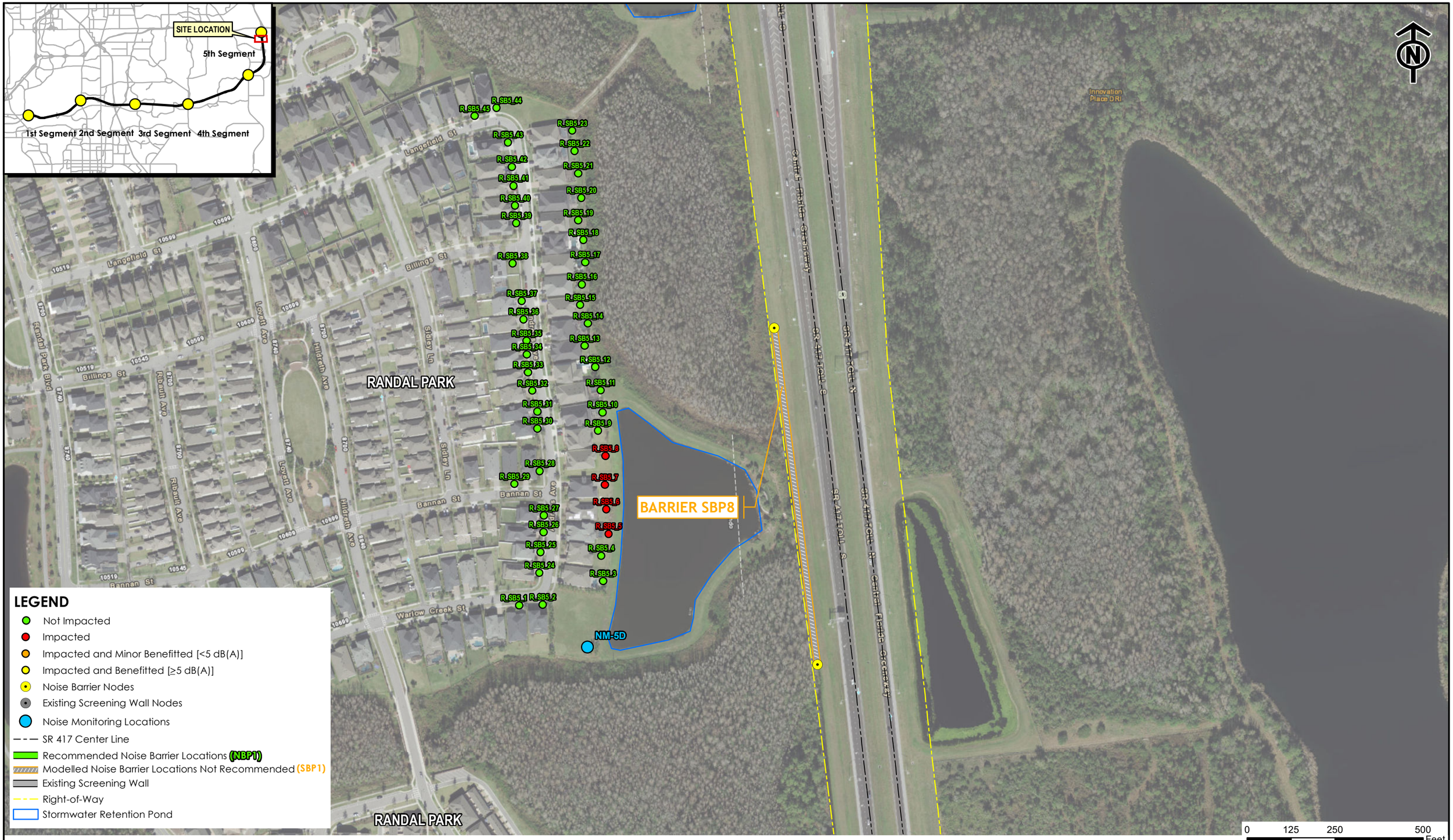
Path: Q:\50088262\GIS\Mxd\417-151 - 150 SR417 Widening Boggy Creek Rd to SR 528\9-1-20202\3-11_NoiseBarrier_150-SBP6_RandallWalkCommunity_9_1_2020.mxd



Source: World Imagery Online Service, ESRI

Central Florida Expressway Authority	SR 417 Widening, CFX Projects 417-151 and 417-150 (from Boggy Creek Road to SR 528) Orlando, Orange County, Florida **NOISE BARRIER ANALYSIS - RANDAL PARK COMMUNITY**	Dewberry®	January 2021 **FIGURE 3-12**

Path: Q:\50088262\GIS\Mxd\417-151 - 150 SR417 Widening Boggy Creek Rd to SR 528\9-1-20202\3-12_NoiseBarrier_150-SBP7_RandallParkCommunity_9_1_2020.mxd



Source: World Imagery Online Service, ESRI

Central Florida Expressway Authority	SR 417 Widening, CFX Projects 417-151 and 417-150 (from Boggy Creek Road to SR 528) Orlando, Orange County, Florida **NOISE BARRIER ANALYSIS - RANDAL PARK COMMUNITY (SBP8)**	Dewberry January 2021 **FIGURE 3-13**

Path: Q:\50088262\GIS\Mxd\417-151 - 150 SR417 Widening Boggy Creek Rd to SR 528\9-1-2020\3-13_NoiseBarrier_150-SBP8_RandallParkCommunity_9_1_2020.mxd

Tables

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Table 3-2
Noise Barrier Analysis
Barrier SBP1 Lake Nona Water Mark and Village Walk at Lake Nona Communities

Barrier Alternative	Barrier Height (feet)	Est. Barrier Length[1] (feet)	Barrier Location	Number of Impacted Residences	Number of Impacted Residences within a Noise Reduction Range			Total Number of Benefited Residences	Average Reduction dB(A)	Total Estimated Cost	Cost Per Benefitted Residence
					5-5.9 dB(A)	6-6.9 dB(A)	≥7 dB(A)				
1	10	1,942	Right of Way	86	0	0	0	0	1.9	$582,600	N/A
2	12	1,942	Right of Way		2	0	0	2	2.5	$699,120	$349,560
3	14	1,942	Right of Way		2	0	0	2	3.1	$815,640	$407,820
4	16	1,942	Right of Way		4	1	0	5	3.7	$932,160	$186,432
5	18	1,942	Right of Way		6	2	0	8	4.1	$1,048,680	$131,085
6	20	1,942	Right of Way		11	4	0	15	4.6	$1,165,200	$77,680
7	22	1,942	Right of Way		12	7	1	20	4.9	$1,281,720	$64,086
8	14	3,735	Shoulder		5	4	1	10	4.0	$2,091,600	$209,160

Notes on Noise Barrier Modelling for Barrier SBP1 (includes 88 Receptor Points representing a total of 196 residences in Lake Nona Water Mark and the adjacent Village Walk at Lake Nona Community):

1. Barrier lengths obtained from TNM Program.
2. Impacted residences are defined as residences where the modelled noise levels with no barrier exceeds the Noise Abatement Criteria [≥ 66 dB(A)]
3. Benefitted residences are defined as residences where the modelled noise reduction with the barrier is at least > 5dB(A).
4. **A 1,942-foot long, 22-foot high Right of Way barrier** is recommended for this location. Results for modelled barrier location at maximum height is shown on corresponding table.

Table 3-3
Noise Barrier Analysis
Barrier SBP2 Village Walk at Lake Nona Community

Barrier Alternative	Barrier Height (feet)	Est. Barrier Length[1] (feet)	Barrier Location	Number of Impacted Residences	Number of Impacted Residences within a Noise Reduction Range			Total Number of Benefited Residences	Average Reduction dB(A)	Total Estimated Cost	Cost Per Benefitted Residence
					5-5.9 dB(A)	6-6.9 dB(A)	≥7 dB(A)				
1	10	2,022	Right of Way	19	0	0	0	0	0.8	$606,600	N/A
2	12	2,022	Right of Way		0	0	0	0	1.1	$727,920	N/A
3	14	2,022	Right of Way		0	0	0	0	1.4	$849,240	N/A
4	16	2,022	Right of Way		2	0	0	2	2.1	$970,560	$485,280
5	18	2,022	Right of Way		5	1	0	6	2.7	$1,091,880	$181,980
6	20	2,022	Right of Way		3	4	0	7	3.2	$1,213,200	$173,314
7	22	2,022	Right of Way		2	4	1	7	3.5	$1,334,520	$190,646
8	10	2,022	Shoulder		0	0	0	0	1.6	$727,920	N/A
9	12	2,022	Shoulder		2	0	0	2	1.9	$922,032	$461,016
10	14	2,022	Shoulder		5	0	0	5	2.2	$1,132,320	$226,464

Notes on Noise Barrier Modelling for Barrier SBP2 (includes 40 Receptor Points in Village Walk at Lake Nona Community):

1. Barrier lengths obtained from TNM Program.
2. Impacted residences are defined as residences where the modelled noise levels with no barrier exceeds the Noise Abatement Criteria [≥ 66 dB(A)].
3. Benefitted residences are defined as residences where the modelled noise reduction with the barrier is ≥ 5 dB(A).
4. **No barrier** is recommended for this location. Results for modelled barrier location at maximum height shown are on corresponding table.

Table 3-4
Noise Barrier Analysis
Barrier NBP2 Stratford Pointe Community

Barrier Alternative	Barrier Height (feet)	Est. Barrier Length[1] (feet)	Barrier Location	Number of Impacted Residences	Number of Impacted Residences within a Noise Reduction Range			Total Number of Benefited Residences	Average Reduction dB(A)	Total Estimated Cost	Cost Per Benefitted Residence
					5-5.9 dB(A)	6-6.9 dB(A)	≥7 dB(A)				
1	10	2,220	Right of Way	34	0	0	0	0	1.5	$666,000	N/A
2	12	2,220	Right of Way		0	0	0	0	2.3	$799,200	N/A
3	14	2,220	Right of Way		3	0	0	3	3.2	$932,400	$310,800
4	16	2,220	Right of Way		3	4	0	7	3.9	$1,065,600	$152,229
5	18	2,220	Right of Way		1	8	1	10	4.5	$1,198,800	$119,880
6	20	2,220	Right of Way		5	2	7	14	5.0	$1,332,000	$95,143
7	22	2,220	Right of Way		10	2	10	22	5.5	$1,465,200	$66,600

Notes on Noise Barrier Modelling for Barrier NBP2 (includes 79 Receptor Points in the Stratford Pointe Community):

1. Barrier lengths obtained from TNM Program.
2. Impacted residences are defined as residences where the modelled noise levels with no barrier exceeds the Noise Abatement Criteria ≥66 dB(A).
3. Benefitted residences are defined as residences where the modelled noise reduction with the barrier is ≥ 5dB(A).
4. **A 2,220-foot long, 22-foot high Right of Way barrier** is shown on the corresponding figure and highlighted above.

Table 3-5
Noise Barrier Analysis
Barrier SBP4 Near Nona Terrace Community

Barrier Alternative	Barrier Height (feet)	Est. Barrier Length[1] (feet)	Barrier Location	Number of Impacted Residences	Number of Impacted Residences within a Noise Reduction Range			Total Number of Benefited Residences	Average Reduction dB(A)	Total Estimated Cost	Cost Per Benefitted Residence
					5-5.9 dB(A)	6-6.9 dB(A)	≥7 dB(A)				
1	10	1,600	Shoulder	28	12	10	0	22	5.8	$576,000	$26,182
2	12	1,600	Shoulder		6	16	0	22	5.8	$729,600	$33,164
3	14	1,600	Shoulder		0	22	0	22	6.0	$896,000	$40,727

Notes on Noise Barrier Modelling for Barrier SBP4 (includes 21 Receptor Points in the Nona Terrace Community representing 124 residences):

1. Barrier lengths obtained from TNM Program.
2. Impacted residences are defined as residences where the modelled noise levels with no barrier exceeds the Noise Abatement Criteria [≥ 66 dB(A)].
3. Benefitted residences are defined as residences where the modelled noise reduction with the barrier is ≥ 5dB(A).
4. **The Shoulder barrier 1,600-feet long and 10-feet high is suggested as the best alternative for consideration by CFX although it does not reduce any residence by 7 dB(A).**

Table 3-6
Noise Barrier Analysis
Barrier NBP4 Near Oasis at Moss Park Community

Barrier Alternative	Barrier Height (feet)	Est. Barrier Length[1] (feet)	Barrier Location	Number of Impacted Residences	Number of Impacted Residences within a Noise Reduction Range			Total Number of Benefited Residences	Average Reduction dB(A)	Total Estimated Cost	Cost Per Benefitted Residence
					5-5.9 dB(A)	6-6.9 dB(A)	≥7 dB(A)				
1	18	1,549	Right of Way	209	1	38	135	174	2.6	$836,460	$4,807
2	20	1,549	Right of Way		0	39	136	175	3.2	$929,400	$5,311
3	22	1,549	Right of Way		0	1	176	177	3.8	$1,022,340	$5,776
4	22/10	920/670	Hybrid		0	39	135	174	4.7	$848,400	$4,876
5	22/12	920/670	Hybrid		0	40	136	176	5.0	$912,720	$5,186
6	22/14	920/670	Hybrid		0	0	176	176	5.4	$982,400	$5,582

Notes on Noise Barrier Modelling for Barrier NBP4 (includes 64 Receptor Points in Oasis at Moss Park Community representing 340 residences):

1. Barrier lengths obtained from TNM Program.

2. Impacted residences are defined as residences where the modelled noise levels with no barrier exceeds the Noise Abatement Criteria [≥ 66 dB(A)]

3. Benefitted residences are defined as residences where the modelled noise reduction with the barrier is ≥ 5 dB(A).

4. **A hybrid barrier 920-foot long, 22-foot high, and a 670-foot long 14-foot high is recommended for this location.** Results for modeled barrier location at maximum height are shown on the corresponding figure and highlighted above.

Table 3-7
Noise Barrier Analysis
Barrier SBP5 Near Villas At East Park Community

Barrier Alternative	Barrier Height (feet)	Est. Barrier Length[1] (feet)	Barrier Location	Number of Impacted Residences	Number of Impacted Residences within a Noise Reduction Range			Total Number of Benefited Residences	Average Reduction dB(A)	Total Estimated Cost	Cost Per Benefitted Residence
					5-5.9 dB(A)	6-6.9 dB(A)	≥7 dB(A)				
1	20	1,700	Right of Way	63	12	27	21	60	6.3	$1,020,000	$17,000
2	22	1,700	Right of Way		9	24	30	63	6.7	$1,122,000	$17,810
3	20	1,800	Right of Way		33	21	0	54	5.5	$1,080,000	$20,000
4	22	1,800	Right of Way		24	24	9	57	6.1	$1,188,000	$20,842

Notes on Noise Barrier Modelling for Barrier SBP5 (includes 37 receptors in the Villas at East Park Community representing 111 residences):

1. Barrier lengths obtained from TNM Program.
2. Impacted residences are defined as residences where the modelled noise levels with no barrier exceeds the Noise Abatement Criteria [≥ 66 dB(A)].
3. Benefitted residences are defined as residences where the modelled noise reduction with the barrier is ≥ 5 dB(A).
4. A **1,800-foot long, 22-foot high Right of Way barrier** is recommended in this location. Results for modelled barrier location at maximum height are shown on corresponding figure.

Table 3-8
Noise Barrier Analysis
Barrier SBP8 Near Randal Park Community

Barrier Alternative	Barrier Height (feet)	Est. Barrier Length[1] (feet)	Barrier Location	Number of Impacted Residences	Number of Impacted Residences within a Noise Reduction Range			Total Number of Benefited Residences	Average Reduction dB(A)	Total Estimated Cost	Cost Per Benefitted Residence
					5-5.9 dB(A)	6-6.9 dB(A)	≥7 dB(A)				
1	10	962	Right of Way	4	0	0	0	0	2.3	$288,600	N/A
2	12	962	Right of Way		0	0	0	0	2.7	$346,320	N/A
3	14	962	Right of Way		0	0	0	0	3.1	$404,040	N/A
4	16	962	Right of Way		0	0	0	0	3.3	$461,760	N/A
5	18	962	Right of Way		0	0	0	0	3.5	$519,480	N/A
6	20	962	Right of Way		0	0	0	0	3.7	$577,200	N/A
7	22	962	Right of Way		0	0	0	0	3.8	$634,920	N/A

Notes on Noise Barrier Modelling for Barrier SBP8:

1. Barrier lengths obtained from TNM Program.

2. Impacted residences are defined as residences where the modelled noise levels with no barrier exceeds the Noise Abatement Criteria [≥ 66 dB(A)].

3. Benefitted residences are defined as residences where the modelled noise reduction with the barrier is ≥ 5dB(A).

4. There are no barriers suggested as the best alternative.

Table 4-1
Summary of Proposed Revised Noise Barriers For SR 417 Widening, Project No. 417-150 and 417-151

Community Name	Barrier ID	Barrier Height (feet)	Est, Barrier Length[1] (feet)	Barrier Location	Number of Impacted Residences	Number of Impacted Residences Within a Noise Reduction Range			Total Number of Benefited Residences	Average Reduction dB(A)	Total Estimated Cost	Cost Per Benefited Residence
						5-5.9 dB(A)	6-6.9 dB(A)	≥ 7 dB(A)				
Lake Nona Water Mark	SBP1	22	1,942	Right of Way	86	12	7	1	20	4.9	$1,281,720	$64,086
Stratford Pointe	NBP2	22	2,220	Right of Way	34	10	2	10	22	5.5	$1,465,200	$66,600
Nona Terrace	SBP4	14	1,600	Shoulder	28	0	22	0	22	6	$896,000	$40,727
Oasis at Moss Park	NBP4	22/14	920/670	Hybrid	209	0	0	176	176	5.4	$982,400	$5,582
Villas at East Park	SBP5	22	1,800	Right of Way	63	24	24	9	57	6.1	$1,188,000	$20,842

Notes on Proposed Noise Summary:

1. Impacted residences are defined as residences where the modelled noise levels with no barrier exceeds the Noise Abatement Criteria [≥ 66 dB(A)].
2. Benefitted residences are defined as residences where the modelled noise reduction with the barrier is ≥ 5 dB(A).
3. All estimated costs rounded to the nearest dollar.

Appendix A: Predicted Noise Levels

SBP1 22ft ROW					
Receptor Name	No of Units	Predicted w/o barrier	Exceed Standard	Predicted w/ barrier	Reduction
R_SB1_1	14	64.1	----	61.1	3
R_SB1_2"	14	65.8	----	61.9	3.9
R_SB1_3"	14	66.1	Snd Lvl	62.8	3.3
R_SB1_4"	14	67.1	Snd Lvl	62.9	4.2
R_SB1_5"	2	65.6	----	63.9	1.7
R_SB1_6"	2	65.4	----	61	4.4
R_SB1_7"	14	64	----	61.5	2.5
R_SB1_8"	14	66.9	Snd Lvl	62	4.9
R_SB1_9"	14	63.9	----	60.1	3.8
R_SB1_10"	14	63.1	----	60	3.1
R_SB2_1"	1	63.5	----	60.2	3.3
R_SB2_2"	1	64.7	----	60.7	4
R_SB2_3"	1	63.1	----	59.7	3.4
R_SB2_4"	1	66	Snd Lvl	62.6	3.4
R_SB2_5"	1	68.8	Snd Lvl	64.5	4.3
R_SB2_6"	1	67.4	Snd Lvl	63.4	4
R_SB2_7"	1	65.8	----	60.4	5.4
R_SB2_8"	1	65.5	----	61.1	4.4
R_SB2_9"	1	64.4	----	60.5	3.9
R_SB2_10"	1	63.6	----	60.1	3.5
R_SB2_11"	1	63.3	----	59.9	3.4
R_SB2_12"	1	63	----	59.1	3.9
R_SB2_13"	1	66	----	61.4	4.6
R_SB2_14"	1	65.4	----	60.9	4.5
R_SB2_15"	1	64.5	----	60.5	4
R_SB2_16"	1	63.9	----	60.3	3.6
R_SB2_17"	1	63.5	----	60.1	3.4
R_SB2_18"	1	63.1	----	59.9	3.2
R_SB2_19"	1	63.6	----	61.9	1.7
R_SB2_20"	1	62.9	----	61	1.9
R_SB2_21"	1	62.9	----	60.7	2.2
R_SB2_22"	1	62.5	----	60.4	2.1
R_SB2_23"	1	62.8	----	60.5	2.3
R_SB2_24"	1	63	----	60.2	2.8
R_SB2_25"	1	62.1	----	60.4	1.7
R_SB2_26"	1	61.6	----	60	1.6
R_SB2_27"	1	61.4	----	59.8	1.6
R_SB2_28"	1	61.3	----	59.5	1.8
R_SB2_29"	1	61.2	----	59.3	1.9
R_SB2_30"	1	61.3	----	59.2	2.1
R_SB1_1.1a	1	65.4	----	61.3	4.1
R_SB1_1.2a	1	66.2	Snd Lvl	63.2	3
R_SB1_1.3a	1	67.3	Snd Lvl	64	3.3

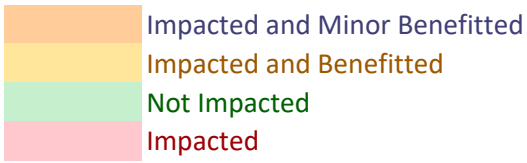
Impacted and Minor Benefitted
Impacted and Benefitted
Not Impacted
Impacted

SBP1 22ft ROW					
R_SB1_1.1b	1	65.1	----	60.8	4.3
R_SB1_1.2b	1	66.1	Snd Lvl	62.8	3.3
R_SB1_1.3b	1	67.2	Snd Lvl	63.6	3.6
R_SB1_2.1a	1	67	Snd Lvl	63.7	3.3
R_SB1_2.2a	1	68.2	Snd Lvl	64.6	3.6
R_SB1_2.3a	1	69.1	Snd Lvl	65.1	4
R_SB1_2.1b	1	68.1	Snd Lvl	64.1	4
R_SB1_2.2b	1	69.2	Snd Lvl	65	4.2
R_SB1_2.3b	1	70.1	Snd Lvl	65.5	4.6
R_SB1_3.1a	1	68.7	Snd Lvl	63.8	4.9
R_SB1_3.2a	1	69.8	Snd Lvl	64.4	5.4
R_SB1_3.3a	1	71.1	Snd Lvl	65.5	5.6
R_SB1_3.1b	1	69.8	Snd Lvl	64.1	5.7
R_SB1_3.2b	1	70.7	Snd Lvl	65	5.7
R_SB1_3.3b	1	72.2	Snd Lvl	66.2	6
R_SB1_4.1a	1	68.6	Snd Lvl	63.2	5.4
R_SB1_4.2a	1	69.7	Snd Lvl	64.2	5.5
R_SB1_4.3a	1	71	Snd Lvl	65.3	5.7
R_SB1_4.1b	1	69.2	Snd Lvl	63.4	5.8
R_SB1_4.2b	1	70.3	Snd Lvl	64.3	6
R_SB1_4.3b	1	71.7	Snd Lvl	65.6	6.1
R_SB1_7.1a	1	67.9	Snd Lvl	62.2	5.7
R_SB1_7.2a	1	68.6	Snd Lvl	63.3	5.3
R_SB1_7.3a	1	69.7	Snd Lvl	64.3	5.4
R_SB1_7.1b	1	66	Snd Lvl	61.8	4.2
R_SB1_7.2b	1	67.8	Snd Lvl	62.9	5.0
R_SB1_7.3b	1	68.9	Snd Lvl	63.9	5
R_SB1_8.1a	1	70.4	Snd Lvl	63.4	7
R_SB1_8.2a	1	71.2	Snd Lvl	64.5	6.7
R_SB1_8.3a	1	72.6	Snd Lvl	65.8	6.8
R_SB1_8.1b	1	70.1	Snd Lvl	63.3	6.8
R_SB1_8.2b	1	70.9	Snd Lvl	64.4	6.5
R_SB1_8.3b	1	72.5	Snd Lvl	65.7	6.8
R_SB1_9.1a	1	65.1	----	64.1	1.1
R_SB1_9.2a	1	66.5	Snd Lvl	62.4	4.1
R_SB1_9.3a	1	67.5	Snd Lvl	63.3	4.2
R_SB1_9.1b	1	66	Snd Lvl	62	4
R_SB1_9.2b	1	67.3	Snd Lvl	62.9	4.4
R_SB1_9.3b	1	68.2	Snd Lvl	63.7	4.5
R_SB1_10.1	1	63.3	----	59.7	3.6
R_SB1_10.2	1	65.2	----	61.1	4.1
R_SB1_10.3	1	66.5	Snd Lvl	62.5	4
R_SB1_10.1	1	63.6	----	60	3.6
R_SB1_10.2	1	65.3	----	60.5	4.8
R_SB1_10.3	1	66.5	Snd Lvl	62.6	3.9

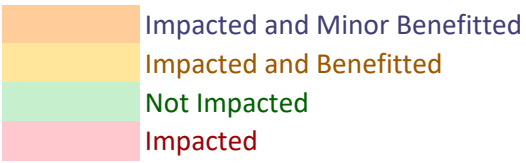
Northbound The Preserve Lake Nona Community				
Receptor Name	**No of Units**	**Predicted w/o barrier**	**Exceed Standard**	**Predicted w/ barrier**
R_NB1_1"	1	59.8	----	----
R_NB1_2"	1	60.7	----	----
R_NB1_3"	1	62.9	----	----
R_NB1_4"	1	62.3	----	----
R_NB1_5"	1	64.9	----	----
R_NB1_6"	1	65.3	----	----
R_NB1_7"	1	65.5	----	----
R_NB1_8"	1	65.6	----	----
R_NB1_9"	1	65.3	----	----
R_NB1_10"	1	65.4	----	----
R_NB1_11"	1	65.4	----	----
R_NB1_12"	1	64.9	----	----
R_NB1_13"	1	64.6	----	----

Impacted and Minor Benefitted
Impacted and Benefitted
Not Impacted
Impacted

Southbound Village Walk at Lake Nona Community				
Receptor Name	**No of Units**	**Predicted w/o barrier**	**Exceed Standard**	**Predicted w/ barrier**
R_SB3_1"	1	66.7	Snd Lvl	----
R_SB3_2"	1	65.9	----	----
R_SB3_3"	1	65.1	----	----
R_SB3_4"	1	64.4	----	----
R_SB3_5"	1	64	----	----
R_SB3_6"	1	67.5	Snd Lvl	----
R_SB3_7"	1	68.2	Snd Lvl	----
R_SB3_8"	1	66	Snd Lvl	----
R_SB3_9"	1	64.4	----	----
R_SB3_10"	1	62.7	----	----
R_SB3_11"	1	67.6	Snd Lvl	----
R_SB3_12"	1	66.3	Snd Lvl	----
R_SB3_13"	1	65.4	----	----
R_SB3_14"	1	64.4	----	----
R_SB3_15"	1	63.6	----	----
R_SB3_16"	1	71	Snd Lvl	----
R_SB3_17"	1	66.4	Snd Lvl	----
R_SB3_18"	1	65.6	----	----
R_SB3_19"	1	64.3	----	----
R_SB3_20"	1	63.5	----	----
R_SB3_21"	1	71.2	Snd Lvl	----
R_SB3_22"	1	69.8	Snd Lvl	----
R_SB3_23"	1	66.4	Snd Lvl	----
R_SB3_24"	1	64.6	----	----
R_SB3_25"	1	64.1	----	----
R_SB3_26"	1	71.3	Snd Lvl	----
R_SB3_27"	1	70	Snd Lvl	----
R_SB3_28"	1	68.8	Snd Lvl	----
R_SB3_29"	1	67.5	Snd Lvl	----
R_SB3_30"	1	66.1	Snd Lvl	----
R_SB3_31"	1	65.7	----	----
R_SB3_32"	1	65.4	----	----
R_SB3_33"	1	64.8	----	----
R_SB3_34"	1	64.6	----	----
R_SB3_35"	1	70.4	Snd Lvl	----
R_SB3_36"	1	66.9	Snd Lvl	----
R_SB3_37"	1	68	Snd Lvl	----
R_SB3_38"	1	65.8	----	----
R_SB3_39"	1	65.4	----	----
R_SB3_40"	1	65.4	----	----



Southbound Village Walk at Lake Nona Community				
Receptor Name	**No of Units**	**Predicted w/o barrier**	**Exceed Standard**	**Predicted w/ barrier**
R_SB4_1"	1	64.9	----	----
R_SB4_2"	1	64.1	----	----
R_SB4_3"	1	63.5	----	----
R_SB4_4"	1	63.6	----	----
R_SB4_5"	1	63.8	----	----
R_SB4_6"	1	63.8	----	----
R_SB4_7"	1	64	----	----
R_SB4_8"	1	64.6	----	----
R_SB4_9"	1	65.1	----	----
R_SB4_10"	1	63.6	----	----
R_SB4_11"	1	62.8	----	----
R_SB4_12"	1	61.9	----	----
R_SB4_13"	1	61.5	----	----
R_SB4_14"	1	61.4	----	----
R_SB4_15"	1	61.3	----	----
R_SB4_16"	1	60.8	----	----
R_SB4_17"	1	60.9	----	----
R_SB4_18"	1	63.9	----	----
R_SB4_19"	1	63.2	----	----
R_SB4_20"	1	61.9	----	----
R_SB4_21"	1	59.6	----	----
R_SB4_22"	1	58.3	----	----
R_SB4_23"	1	57.8	----	----
R_SB4_24"	1	57.8	----	----
R_SB4_25"	1	57.8	----	----
R_SB4_26"	1	57.8	----	----
R_SB4_27"	1	57.5	----	----
R_SB4_28"	1	59.7	----	----
R_SB4_29"	1	59.3	----	----
R_SB4_30"	1	58.8	----	----
R_SB4_31"	1	57.5	----	----
R_SB4_32"	1	57.2	----	----
R_SB4_33"	1	56.6	----	----
R_SB4_34"	1	55.8	----	----
R_SB4_35"	1	55.4	----	----
R_SB4_36"	1	54.9	----	----
R_SB4_37"	1	54.3	----	----
R_SB4_38"	1	53.8	----	----
R_SB4_39"	1	53.5	----	----
R_SB4_40"	1	53.4	----	----
R_SB4_41"	1	53.2	----	----
R_SB4_42"	1	53	----	----
R_SB4_43"	1	53.2	----	----



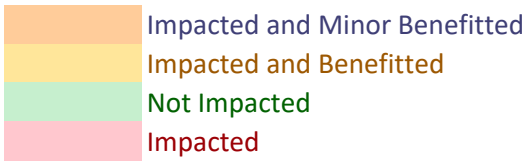
Southbound Village Walk at Lake Nona Community				
R_SB4_44"	1	52	----	----
R_SB4_45"	1	51.8	----	----
R_SB4_46"	1	52.4	----	----
R_SB4_47"	1	63.2	----	----
R_SB4_48"	1	62.8	----	----
R_SB4_49"	1	62.4	----	----
R_SB4_50"	1	62.7	----	----
R_SB4_51"	1	62.2	----	----
R_SB4_52"	1	61.4	----	----
R_SB4_53"	1	60.6	----	----
R_SB4_54"	1	60.6	----	----
R_SB4_55"	1	60.2	----	----
R_SB4_56"	1	60.3	----	----
R_SB4_57"	1	59.5	----	----
R_SB4_58"	1	59.1	----	----
R_SB4_59"	1	59.2	----	----
R_SB4_60"	1	58.9	----	----
R_SB4_61"	1	58.8	----	----
R_SB4_62"	1	58.5	----	----
R_SB4_63"	1	57.7	----	----
R_SB4_64"	1	56.9	----	----
R_SB4_65"	1	55.4	----	----
R_SB4_66"	1	54.3	----	----
R_SB4_67"	1	52.8	----	----
R_SB4_68"	1	52.6	----	----

NBP2 22ft ROW					
Receptor Name	No of Units	Predicted w/o barrier	Exceed Standard	Predicted w/ barrier	Reduction
R_NB1_1	1	65.4	----	62.8	2.6
R_NB1_2"	1	66.2	Snd Lvl	58.1	8.1
R_NB1_3"	1	65.7	----	59.4	6.3
R_NB1_4"	1	64.6	----	59.6	5
R_NB1_5"	1	64.4	----	62.3	2.1
R_NB1_6"	1	63.9	----	59.6	4.3
R_NB1_7"	1	63.5	----	61.7	1.8
R_NB1_8"	1	62.7	----	60.8	1.9
R_NB1_9"	1	61.8	----	60	1.8
R_NB1_10"	1	62.7	----	59.5	3.2
R_NB1_11"	1	60.2	----	58.5	1.7
R_NB1_12"	1	60.6	----	58.2	2.4
R_NB1_13"	1	61.2	----	58.3	2.9
R_NB1_14"	1	63.8	----	58.7	5.1
R_NB1_15"	1	62.2	----	58.9	3.3
R_NB1_16"	1	64.3	----	59.1	5.2
R_NB1_17"	1	64.9	----	59	5.9
R_NB1_18"	1	65.1	----	59.3	5.8
R_NB1_19"	1	65.3	----	59.5	5.8
R_NB1_20"	1	65.6	----	59.6	6
R_NB1_21"	1	65.8	----	59.8	6
R_NB1_22"	1	66.1	Snd Lvl	60.1	6
R_NB1_23"	1	66.2	Snd Lvl	60.3	5.9
R_NB1_24"	1	63.9	----	60.1	3.8
R_NB1_25"	1	66	Snd Lvl	60.6	5.4
R_NB1_26"	1	66.1	Snd Lvl	60.3	5.8
R_NB1_27"	1	66.1	Snd Lvl	60.7	5.4
R_NB1_28"	1	65.6	----	60.7	4.9
R_NB1_29"	1	65.5	----	61	4.5
R_NB1_30"	1	65.4	----	60.8	4.6
R_NB1_31"	1	65.6	----	61	4.6
R_NB1_32"	1	63.6	----	61	2.6
R_NB1_33"	1	65.2	----	61.1	4.1
R_NB1_34"	1	64.9	----	61.2	3.7
R_NB1_35"	1	64.7	----	61.3	3.4
R_NB1_36"	1	61.8	----	59.9	1.9
R_NB1_37"	1	69.5	Snd Lvl	62.5	7.0
R_NB1_38"	1	69.9	Snd Lvl	62.7	7.2
R_NB1_39"	1	70.5	Snd Lvl	63	7.5
R_NB1_40"	1	71	Snd Lvl	63.3	7.7
R_NB1_41"	1	71.3	Snd Lvl	63.7	7.6
R_NB1_42"	1	71.6	Snd Lvl	64	7.6
R_NB1_43"	1	72.6	Snd Lvl	64.5	8.1

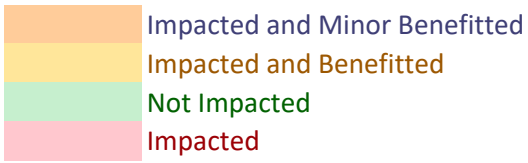
Impacted and Minor Benefitted
Impacted and Benefitted
Not Impacted
Impacted

NBP2 22ft ROW					
R_NB1_44"	1	72.3	Snd Lvl	65	7.3
R_NB1_45"	1	73.2	Snd Lvl	65.6	7.6
R_NB1_46"	1	74.4	Snd Lvl	69.2	5.2
R_NB1_47"	1	73	Snd Lvl	68.5	4.5
R_NB1_48"	1	69.7	Snd Lvl	67.5	2.2
R_NB1_49"	1	67.6	Snd Lvl	61.6	6
R_NB1_50"	1	67.7	Snd Lvl	62.3	5.4
R_NB1_51"	1	68.1	Snd Lvl	62.6	5.5
R_NB1_52"	1	68.2	Snd Lvl	62.8	5.4
R_NB1_53"	1	68.4	Snd Lvl	63.1	5.3
R_NB1_54"	1	68.7	Snd Lvl	63.5	5.2
R_NB1_55"	1	68.9	Snd Lvl	63.9	5
R_NB1_56"	1	69	Snd Lvl	64.5	4.5
R_NB1_57"	1	69.2	Snd Lvl	65.3	3.9
R_NB1_58"	1	68.4	Snd Lvl	65.5	2.9
R_NB1_59"	1	66.7	Snd Lvl	63.5	3.2
R_NB1_60"	1	65.4	----	63	2.4
R_NB1_61"	1	66	Snd Lvl	62	4
R_NB1_62"	1	64.4	----	61.5	2.9
R_NB1_63"	1	66.4	Snd Lvl	61.8	4.6
R_NB1_64"	1	66	Snd Lvl	61.6	4.4
R_NB1_65"	1	65.7	----	61.6	4.1
R_NB1_66"	1	65.4	----	61.5	3.9
R_NB1_67"	1	63.9	----	61.2	2.7
R_NB1_68"	1	61.4	----	60.1	1.3
R_NB1_69"	1	68.2	Snd Lvl	66.1	2.1
R_NB1_70"	1	67.1	Snd Lvl	65.2	1.9
R_NB1_71"	1	65.9	----	63.7	2.2
R_NB1_72"	1	62.4	----	60.9	1.5
R_NB1_73"	1	60.1	----	59.2	0.9
R_NB1_74"	1	60.3	----	59.4	0.9
R_NB1_75"	1	59.6	----	58.8	0.8
R_NB1_76"	1	58.2	----	57.1	1.1
R_NB1_77"	1	57.8	----	56.9	0.9
R_NB1_78"	1	58.7	----	58.1	0.6
R_NB1_79"	1	58.7	----	58.1	0.6

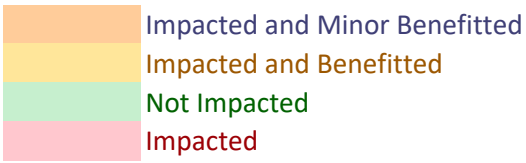
Northbound Verandas at Lake Hart and North Shore Lake Hart Communities				
Receptor Name	**No of Units**	**Predicted w/o barrier**	**Exceed Standard**	**Predicted w/ barrier**
R_NB2A_1"	5	59.7	----	---
R_NB2A_2"	6	59.4	----	---
R_NB2A_3"	1	56	----	---
R_NB2A_4"	1	56.2	----	---
R_NB2A_5"	1	56.5	----	---
R_NB2A_6"	1	56.4	----	---
R_NB2A_7"	1	56.1	----	---
R_NB2A_8"	1	55.8	----	---
R_NB2A_9"	1	55.3	----	---



SBP4 14ft SB					
Receptor Name	**No of Units**	**Predicted w/o barrier**	**Exceed Standard**	**Predicted w/ barrier**	**Reduction**
R_SB1_1"	6	66.3	Snd Lvl	61.7	4.6
R_SB1_2"	6	64.3	----	60.9	3.4
R_SB1_3"	4	66.9	Snd Lvl	60.6	6.3
R_SB1_4"	4	65.6	----	60.7	4.9
R_SB1_5"	4	63.6	----	59.9	3.7
R_SB1_6"	6	66.4	Snd Lvl	60.3	6.1
R_SB1_7"	6	64.9	----	59.7	5.2
R_SB1_8"	6	62.9	----	59	3.9
R_SB1_9"	6	66.6	Snd Lvl	59.9	6.7
R_SB1_10"	6	64	----	59.1	4.9
R_SB1_11"	6	62.3	----	58.4	3.9
R_SB1_12"	6	66	Snd Lvl	60	6
R_SB1_13"	6	65.7	----	60.6	5.1
R_SB1_14"	6	63.8	----	59.4	4.4
R_SB1_15"	6	62.1	----	58.4	3.7
R_SB1_16"	8	65.4	----	61.7	3.7
R_SB1_17"	8	63.7	----	60.1	3.6
R_SB1_18"	8	61.8	----	58.6	3.2
R_SB1_19"	6	64.6	----	61.6	3
R_SB1_20"	6	62.4	----	59.8	2.6
R_SB1_21"	4	61.2	----	58.9	2.3



Northbound Savannah Pines Community				
Receptor Name	**No of Units**	**Predicted w/o barrier**	**Exceed Standard**	**Predicted w/ barrier**
R_NB2_1"	8	61.1	----	---
R_NB2_2"	8	61.3	----	---
R_NB2_3"	8	61.6	----	---
R_NB2_4"	8	62	----	---
R_NB2_5"	6	59.6	----	---
R_NB2_6"	6	59.8	----	---
R_NB2_7"	6	59.9	----	---
R_NB2_8"	8	60.2	----	---
R_NB2_9"	8	60.9	----	---
R_NB2_10'	8	59.4	----	---
R_NB2_11'	8	59.1	----	---
R_NB2_12'	6	56.8	----	---
R_NB2_13'	6	58.4	----	---
R_NB2_14'	8	56.8	----	---
R_NB2_15'	6	60.3	----	---
R_NB2_16'	4	59.7	----	---
R_NB2_17'	6	58.9	----	---
R_NB2_18'	6	58.4	----	---
R_NB2_19'	6	57.5	----	---
R_NB2_20'	6	56	----	---

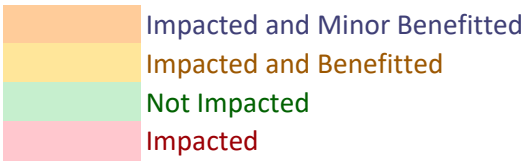


NBP4 22ft ROW & 14ft SB Hybrid					
Receptor Name	No of Units	Predicted w/o barrier	Exceed Standard	Predicted w/ barrier	Reduction
R_NB3_1"	16	67.5	Snd Lvl	63.6	3.9
R_NB3_1.1a"	1	70	Snd Lvl	66.8	3.2
R_NB3_1.2a"	1	71.8	Snd Lvl	68.6	3.2
R_NB3_1.3a"	1	72.2	Snd Lvl	69.2	3
R_NB3_1.1b"	1	68.7	Snd Lvl	65.5	3.2
R_NB3_1.2b"	1	70.5	Snd Lvl	67.3	3.2
R_NB3_1.3b"	1	71	Snd Lvl	68.1	2.9
R_NB3_1.1c"	1	67.5	Snd Lvl	64.4	3.1
R_NB3_1.2c"	1	69	Snd Lvl	66	3
R_NB3_1.3c"	1	69.7	Snd Lvl	67.1	2.6
R_NB3_1.1d"	1	66.8	Snd Lvl	63.8	3
R_NB3_1.2d"	1	67.9	Snd Lvl	65.2	2.7
R_NB3_1.3d"	1	68.6	Snd Lvl	66	2.6
R_NB3_2"	35	70.7	Snd Lvl	61.1	9.6
R_NB3_2.1a"	1	70.4	Snd Lvl	63.2	7.2
R_NB3_2.2a"	1	72.4	Snd Lvl	65.3	7.1
R_NB3_2.3a"	1	72.7	Snd Lvl	67.4	5.3
R_NB3_3"	35	71.6	Snd Lvl	61.5	10.1
R_NB3_3.1a"	1	71.9	Snd Lvl	62.8	9.1
R_NB3_3.2a"	1	73.4	Snd Lvl	66.2	7.2
R_NB3_3.3a"	1	73.4	Snd Lvl	69.9	3.5
R_NB3_4"	35	71.9	Snd Lvl	60.9	11
R_NB3_4.1a"	1	71.5	Snd Lvl	62.3	9.2
R_NB3_4.2a"	1	73.2	Snd Lvl	65.5	7.7
R_NB3_4.3a"	1	73.4	Snd Lvl	69.4	4
R_NB3_5"	16	65.1	----	61.9	3.2
R_NB3_5.1a"	1	65.2	----	62.4	2.8
R_NB3_5.2a"	1	65.8	----	63.4	2.4
R_NB3_5.3a"	1	66.4	Snd Lvl	64.4	2
R_NB3_5.1b"	1	64.6	----	61.8	2.8
R_NB3_5.2b"	1	65.1	----	62.9	2.2
R_NB3_5.3b"	1	65.6	----	63.7	1.9
R_NB3_5.1c"	1	63.9	----	61.3	2.6
R_NB3_5.2c"	1	64.4	----	62.2	2.2
R_NB3_5.3c"	1	64.9	----	63.2	1.7
R_NB3_5.1d"	1	63.4	----	60.9	2.5
R_NB3_5.2d"	1	63.7	----	61.7	2
R_NB3_5.3d"	1	64.3	----	62.7	1.6
R_NB3_6"	38	67.6	Snd Lvl	60.4	7.2
R_NB3_7"	19	62.5	----	59.7	2.8
R_NB3_7.1a"	1	62.3	----	59.8	2.5
R_NB3_7.2a"	1	62.7	----	60.6	2.1
R_NB3_7.3a"	1	63.1	----	61.6	1.5

Impacted and Minor Benefitted
Impacted and Benefitted
Not Impacted
Impacted

NBP4 22ft ROW & 14ft SB Hybrid					
R_NB3_7.1b"	1	61.8	----	59.4	2.4
R_NB3_7.2b"	1	62.2	----	60.1	2.1
R_NB3_7.3b"	1	62.8	----	61.5	1.3
R_NB3_7.1c"	1	61.2	----	58.9	2.3
R_NB3_7.2c"	1	61.6	----	59.5	2.1
R_NB3_7.3c"	1	61.9	----	60.7	1.2
R_NB3_8"	26	63.4	----	59.3	4.1
R_NB3_8.1a"	1	63.9	----	59.8	4.1
R_NB3_8.2a"	1	64.3	----	60.9	3.4
R_NB3_8.3a"	1	64.7	----	62.8	1.9
R_NB3_8.1b"	1	63.8	----	59.6	4.2
R_NB3_8.2b"	1	64.2	----	60.7	3.5
R_NB3_8.3b"	1	64.5	----	62.6	1.9
R_NB3_8.1c"	1	63.6	----	59.5	4.1
R_NB3_8.2c"	1	63.9	----	60.6	3.3
R_NB3_8.3c"	1	64.4	----	62.3	2.1
R_NB3_8.1d"	1	63.4	----	59.6	3.8
R_NB3_8.2d"	1	63.9	----	60.6	3.3
R_NB3_8.3d"	1	64.3	----	62.1	2.2
R_NB3_9"	38	64.8	----	59.3	5.5
R_NB3_10"	28	66.8	Snd Lvl	57.2	9.6

SBP5 22ft ROW					
Receptor Name	No of Units	Predicted w/o barrier	Exceed Standard	Predicted w/ barrier	Reduction
R_SB2_1"	3	66.6	Snd Lvl	60	6.6
R_SB2_2"	3	67.2	Snd Lvl	60.5	6.7
R_SB2_3"	3	67.8	Snd Lvl	60.9	6.9
R_SB2_4"	3	68.1	Snd Lvl	61.2	6.9
R_SB2_5"	3	68.9	Snd Lvl	61.6	7.3
R_SB2_6"	3	69.4	Snd Lvl	62	7.4
R_SB2_7"	3	69.5	Snd Lvl	62.3	7.2
R_SB2_8"	3	64.9	----	59.6	5.3
R_SB2_9"	3	65.7	----	60.1	5.6
R_SB2_10"	3	66	Snd Lvl	60.4	5.6
R_SB2_11"	3	66.5	Snd Lvl	60.7	5.8
R_SB2_12"	3	66.8	Snd Lvl	61	5.8
R_SB2_13"	3	68.6	Snd Lvl	62.2	6.4
R_SB2_14"	3	68.2	Snd Lvl	62	6.2
R_SB2_15"	3	68	Snd Lvl	61.9	6.1
R_SB2_16"	3	67.7	Snd Lvl	61.7	6
R_SB2_17"	3	67.4	Snd Lvl	61.7	5.7
R_SB2_18"	3	66.9	Snd Lvl	61.6	5.3
R_SB2_19"	3	66.7	Snd Lvl	60.9	5.8
R_SB2_20"	3	66.2	Snd Lvl	60.7	5.5
R_SB2_21"	3	66	Snd Lvl	60.6	5.4
R_SB2_22"	3	65.6	----	60.4	5.2
R_SB2_23"	3	65.3	----	60.3	5
R_SB2_24"	3	64.9	----	60.2	4.7
R_SB2_25"	3	66.2	Snd Lvl	61.4	4.8
R_SB2_26"	3	64	----	59.8	4.2
R_SB2_27"	3	61.7	----	57.7	4
R_SB2_28"	3	63.5	----	59.8	3.7
R_SB2_29"	3	62.2	----	58.7	3.5
R_SB2_30"	3	63.6	----	61.2	2.4
R_SB2_31"	3	59.9	----	56.8	3.1
R_SB2_32"	3	61.1	----	58.9	2.2
R_SB2_33"	3	59.8	----	57.6	2.2
R_SB2_34"	3	66	Snd Lvl	61.3	4.7
R_SB2_35"	3	65.3	----	61.2	4.1
R_SB2_36"	3	64.9	----	61.2	3.7
R_SB2_37"	3	64.5	----	61.2	3.3



Southbound Randal Walk Community				
Receptor Name	**No of Units**	**Predicted w/o barrier**	**Exceed Standard**	**Predicted w/ barrier**
R_SB3_1"	6	61.2	----	---
R_SB3_2"	6	63.3	----	---
R_SB3_3"	6	64.6	----	---
R_SB3_4"	6	65.2	----	---
R_SB3_5"	6	64.2	----	---
R_SB3_6"	6	61.4	----	---
R_SB3_7"	6	59.6	----	---

Impacted and Minor Benefitted
Impacted and Benefitted
Not Impacted
Impacted

Southbound Randal Park Community				
Receptor Name	**No of Units**	**Predicted w/o barrier**	**Exceed Standard**	**Predicted w/ barrier**
R_SB4_1"	1	58.7	----	---
R_SB4_2"	4	60.1	----	---
R_SB4_3"	6	59.4	----	---
R_SB4_4"	4	58.8	----	---
R_SB4_5"	6	57.2	----	---
R_SB4_6"	6	57.2	----	---
R_SB4_7"	4	56.1	----	---

Impacted and Minor Benefitted
Impacted and Benefitted
Not Impacted
Impacted

Southbound Randal Park Community				
Receptor Name	**No of Units**	**Predicted w/o barrier**	**Exceed Standard**	**Predicted w/ barrier**
R_SB5_1"	1	61.3	----	---
R_SB5_2"	1	62.3	----	---
R_SB5_3"	1	65.7	----	---
R_SB5_4"	1	65.9	----	---
R_SB5_5"	1	66.5	Snd Lvl	---
R_SB5_6"	1	66.4	Snd Lvl	---
R_SB5_7"	1	66.3	Snd Lvl	---
R_SB5_8"	1	66.3	Snd Lvl	---
R_SB5_9"	1	65.8	----	---
R_SB5_10"	1	65.9	----	---
R_SB5_11"	1	65.6	----	---
R_SB5_12"	1	65.3	----	---
R_SB5_13"	1	64.8	----	---
R_SB5_14"	1	65	----	---
R_SB5_15"	1	64.8	----	---
R_SB5_16"	1	64.9	----	---
R_SB5_17"	1	65.2	----	---
R_SB5_18"	1	65.2	----	---
R_SB5_19"	1	64.8	----	---
R_SB5_20"	1	65.3	----	---
R_SB5_21"	1	65.3	----	---
R_SB5_22"	1	65.2	----	---
R_SB5_23"	1	65.2	----	---
R_SB5_24"	1	62.4	----	---
R_SB5_25"	1	62.6	----	---
R_SB5_26"	1	62.8	----	---
R_SB5_27"	1	62.9	----	---
R_SB5_28"	1	62.8	----	---
R_SB5_29"	1	61.8	----	---
R_SB5_30"	1	62.8	----	---
R_SB5_31"	1	62.9	----	---
R_SB5_32"	1	62.7	----	---
R_SB5_33"	1	62.5	----	---
R_SB5_34"	1	62.5	----	---
R_SB5_35"	1	62.6	----	---
R_SB5_36"	1	62.5	----	---
R_SB5_37"	1	62.5	----	---
R_SB5_38"	1	62.2	----	---
R_SB5_39"	1	62.5	----	---
R_SB5_40"	1	62.6	----	---
R_SB5_41"	1	62.6	----	---
R_SB5_42"	1	62.6	----	---
R_SB5_43"	1	62.5	----	---

Impacted and Minor Benefitted
Impacted and Benefitted
Not Impacted
Impacted

Southbound Randal Park Community				
R_SB5_44"	1	62.4	----	---
R_SB5_45"	1	61.5	----	---

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