



# **TRAFFIC NOISE REPORT**

SR 1010 (Ten Ten Road / Center Street) Widening

(STIP Project U-5825)

Wake County

WBS Element No. 32572.1.FS10

Prepared for:

North Carolina Department of Transportation  
Environmental Analysis Unit

Prepared by:



June 2019

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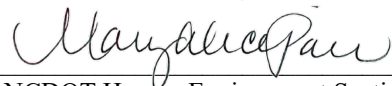
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## Executive Summary

The North Carolina Department of Transportation (NCDOT) proposes to widen SR 1010 (Ten Ten Road) from Kildaire Farm Road in Cary, to Apex Peakway in Apex in Wake County, North Carolina. This will improve traffic flow and reduce travel delay and congestion in the area by widening the existing roadway from two to four/six lanes to accommodate an increase in future condition traffic. The project includes constructing a median and implementing conventional widening at intersections, including additional turn lanes and maintaining full access at major cross streets. The project corridor is about 3.3 miles long from south to north. Federal funding will not be used for this project.

Posted speed limits along SR 1010 vary between 35 mph to 45 mph along the project corridor. From Kildaire Farm Road to Old Grove Lane, the speed limit is 45 mph, while the speed limit reduces to 35 mph from Old Grove Lane to Apex Peakway. These speeds will remain the same in the future design year, thus a design speed of 40 and 50 mph is used as appropriate. A State Environmental Assessment and Finding of No Significant Impact (SEA/FONSI) is anticipated for this project. The Date of Public Knowledge will be the approval date of the SEA/FONSI. After this date, state governments are no longer responsible for proving noise abatement measures for new development within the noise impact area of the proposed project. NCDOT advocates the use of local government authority to regulate land development, planning, design, and construction in such a way that noise impacts are minimized.

Traffic noise impacts and temporary construction noise impacts can be a consequence of transportation projects. This Traffic Noise Report utilized computer models created with the latest Federal Highway Administration's (FHWA's) Traffic Noise Model software (TNM 2.5) to predict noise levels and define impacted receptors along the proposed widening project. VHB examined a total of 1,196 identified receptor locations, including land uses such as residences, restaurants, places of worship, a golf course, daycares, playgrounds, athletic facilities, pools, and a community college for this analysis. Existing traffic noise levels were taken at three (3) locations along the project corridor. The following are descriptions of each NSA:

- NSA 1 begins at the Ten Ten Road/Kildaire Farm Road intersection and extends northeast. This area is mixed use, consisting of a Walgreens, a Shell gas station, a Goodwill retail store and single-family residences in the deVintage neighborhood.
- NSA 2 begins at the Ten Ten Road/Kildaire Farm Road intersection and extends northwest. This area consists of some single-family homes but is primarily the Millpond Village shopping center which also houses Wake Technical Community College.
- NSA 3 begins behind the Millpond Village shopping center and runs northwest along the east side of Ten Ten Road, ending at Penny Road. This NSA has mostly single-family residences, including homes from the Danbury neighborhood and one business near Penny Road.
- NSA 4 begins along Penny Road and extends west along the northwest bound side of Ten Ten Road, ending after Arbordale Court. This area is completely comprised of single-family residences, including the South Chase neighborhood.
- NSA 5 begins at the end of NSA 4 after Arbordale Court and continues west along the northwest bound side of Ten Ten Road, intersecting with US 1 and continues along US 1

eastbound. This area has mixed use, which includes the Avalon Peaks Apartments and commercial uses near US 1.

- NSA 6 begins at the US 1 overpass and extends west along Ten Ten Road and north of the bridge along US 1. This area consists entirely of single-family homes in the Waterford Green neighborhood.
- NSA 7 begins west of Waterford Green Drive and extends west on the northwest bound side of Ten Ten Road, terminating at Parkfield Drive. This area consists primarily of townhomes.
- NSA 8 begins west of Parkfield Drive and continues west on the northwest bound side of Ten Ten Road, ending at Apex Peakway. This area includes commercial businesses, a neighborhood park, single-family homes and townhomes that are part of The Groves Townhomes community.
- NSA 9 begins at Apex Peakway/Ten Ten Road intersection and continues northwest. This area includes businesses, a Mosque and townhomes from Old Mill Village.
- NSA 10 begins at the intersection of Ten Ten Road/Kildaire Farm Road and continues southeast, ending after Andrews Pond Drive along Ten Ten Road and ending at Arthur Pierce Road on Kildaire Farm Road. This area includes various businesses in a shopping center and townhomes that are part of Stonebridge Village.
- NSA 11 begins at the intersection of Ten Ten Road/Kildaire Farm Road and continues southwest, ending at Arthur Pierce Road on Kildaire Farm Road and after the Arium apartment complex on Ten Ten Road. This area primarily consists of the Arium at Kildaire apartments.
- NSA 12 begins behind the Arium at Kildaire apartments and continues west on the southeast bound side of Ten Ten Road, ending at Jessie Drive. This area is comprised entirely of single-family homes, most of which are part of the Summercrest neighborhood.
- NSA 13 begins at Jessie Drive and continues northwest along Ten Ten Road to US 1, including US 1 south of the overpass bridge. This area consists of industrial and commercial businesses, which include Motiva, Public Storage and Sheetz, Lufkin Road Middle School and Knights Play Golf Course.
- NSA 14 begins west of US 1 and continues west along the south side of Ten Ten Road, ending at Investment Boulevard. This area consists of commercial businesses, one restaurant and one church.
- NSA 15 begins west of Investment Boulevard and continues past Apex Peakway, ending at N Tunstall Avenue. This area has mixed-use, consisting of the rest of The Groves Townhomes neighborhood, single-family residences and businesses.

Under the Design Year (2040) Build conditions, 185 receptors are expected to experience noise impacts. One hundred and eighty-one of these impacts are expected to be caused by predicted noise levels that will approach or exceed NCDOT's and FHWA's noise abatement criteria. Six (6) of these impacts are expected to be caused by an increase in noise levels greater than 10 dB(A). Two (2) impacts are predicted to both exceed the NAC threshold and also represent an increase in noise level of greater than 10 dB(A). NCDOT Policy requires the identification as to whether it is



“likely” or “unlikely” that noise abatement will be installed for each noise sensitive area identified. “Likely” does not mean a firm commitment. The final decision on the installation of the abatement measures shall be made upon completion of the project design, the public involvement process, concurrence with the NCDOT Policy and FHWA acceptance.

The following ten (10) noise wall locations were evaluated along the Ten Ten Road widening project:

- NW 3 is located on the northwest bound side of Ten Ten Road, across from Smith Road.
- NW 4-5B starts at Arbordale Court and ends at Kiftsgate Lane.
- NW 4-5C begins at Kiftsgate Lane and ends just before the driveway of Pinnacle Plaza.
- NW 6 begins just east of the Waterford Green Drive intersection with Ten Ten Road running along the northwest bound side of Ten Ten Road ending before US 1.
- NW 7 starts immediately west of Waterford Green Drive on the northwest bound side of Ten Ten Road and ends just before Schieffelin Road.
- NW 8 runs behind a section of The Groves townhomes along the northwest bound side of Ten Ten Road, between Old Grove Lane and Forest Grove Drive.
- NW 11A starts directly north of Grist Valley Lane, runs along the southbound side of Kildaire Farm Road and then curves to continue along the southeast bound side of Ten Ten Road, terminating at the end of the 600 building of the Arium apartments.
- NW 11B begins approximately 100 feet north of Harvest Creek Place, runs along the southbound side of Kildaire Farm Road by Arium Kildaire apartments, and ends at Grist Valley Lane.
- NW 12A is located on the southeast bound side of Ten Ten Road, starting at Jessie Drive and ending at Littleman Lane.
- NW 12B is located on the southeast bound side of Ten Ten Road, starting at Littleman Lane and ending before Smith Road.

Eight (8) of ten (10) evaluated noise barriers preliminarily meet the acoustic and cost reasonable and feasibility criteria detailed in the NCDOT Traffic Noise Policy (October 6, 2016); therefore, noise walls NW3, NW4-5A, NW4-5B, NW6, NW11A, NW11B, NW12A and NW12B, as described above, are considered “likely”. NW7 was determined preliminarily not reasonable. NW 8 was determined preliminarily not feasible. An additional detailed study of these potential abatement measures shall be incorporated into the final design stage of this project through completion of a Design Noise Report.

Construction noise impacts may occur in the proximity of many of the noise-sensitive receptors in the project construction area. All reasonable efforts should be made to minimize exposure of construction noise to noise-sensitive land uses. Such efforts may include, but are not limited to, work-hour limits, equipment exhaust muffler requirements, haul-road locations, elimination of “tail gate banging”, ambient-sensitive backup alarms, construction noise complaint mechanisms, and consistent and transparent community communication.

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## **1.0 PROJECT LOCATION AND DESCRIPTION**

North Carolina Department of Transportation (NCDOT) State Transportation Improvement Program (STIP) U-5825 proposed to widen SR 101 (Center Street / Ten-Ten Road) to a multi-lane facility between SR 1306 (Apex Peakway / Schieffelin Road) and SR 1300 (Kildare Farm Road) in Apex, North Carolina (see **Figure 1 – Project Vicinity Map**). This project is expected to relieve congestion and improve traffic flow. Additionally, the project aims to improve safety along the corridor through the implementation of turning movements and bicycle and pedestrian accommodations.

The length of this project is approximately 3.3 miles, extending from Apex Peakway in Apex to Kildare Farm Road in Cary. The proposed project improvements include a widening to a four lane, median divided, curb and gutter facility with 11-foot lanes, 5-foot bike lanes, 5-foot sidewalks, and a 10-foot asphalt multi-use path (MUP) on the northern segment, spanning from Apex Peakway to Penny Road. Both side of the roadway will have sidewalks southeast of Penny Road. This project also includes improving the interchange bridge over US Highway 1.

Existing SR 1010 is classified as a Minor Arterial. The existing right-of-way on SR 1010 ranges from 60 to 110 feet throughout the corridor. As approximately 100 to 130 feet of right-of-way will be needed to accommodate the proposed improvements, right-of-way acquisition is expected as part of this project beginning in Spring 2021. The existing speed limit throughout the project varies between 35 and 45 miles per hour. The proposed design speed will remain at 45 miles per hour, with a posted speed limit varying between 35 and 45 miles per hour. There is currently no defined control of access along the corridor with numerous single-access driveways along the route.

A State Environmental Assessment and Finding of No Significant Impact (SEA/FONSI) is anticipated for this project. The Date of Public Knowledge will be the approval date of the SEA/FONSI. After this date, state governments are no longer responsible for proving noise abatement measures for new development within the noise impact area of the proposed project. NCDOT advocates the use of local government authority to regulate land development, planning, design, and construction in such a way that noise impacts are minimized.

## **2.0 PROCEDURE**

This Traffic Noise Report represents the preliminary analyses of the probable traffic noise impacts of the SR 1010 improvement project (STIP U-5825). Noise monitoring and traffic data collection for this project was performed on Friday, November 10, 2017. Generally, weather conditions were sunny with light to moderate winds and temperatures in the 50's (°F) during the monitoring sessions. Data collection was completed using Larson-Davis Type 1 Sound Level Meters and Jamar traffic count boards. Ambient sound monitoring data and the corresponding traffic counts were taken per the schedule in Appendix A.

In accordance with NCDOT Traffic Noise Manual, this Traffic Noise Report utilized validated computer models created with the FHWA Traffic Noise Model software (TNM 2.5) to predict noise levels (baseline and future conditions) and define impacted receptors along the proposed new widening project. Validation results are located in Appendix A.

### **3.0 CHARACTERISTICS OF NOISE**

Noise is defined as unwanted sound. Many natural and manmade sources can emit noise. Highway traffic noise is usually a composite of noises from engine exhaust, drive train, and tire-roadway interaction.

The magnitude of noise is usually described by a ratio of its sound pressure to a reference sound pressure, which is usually twenty micro-Pascals (20 $\mu$ Pa). Since the range of sound pressure ratios varies greatly – over many orders of magnitude, a base-10 logarithmic scale is used to express sound levels in dimensionless units of decibels (dB). The commonly accepted limits of detectable human hearing sound magnitudes are between the threshold of hearing at 0 decibels and the threshold of pain at 140 decibels.

Sound frequencies are represented in units of Hertz (Hz), which correspond to the number of vibrations per second of a given tone. A cumulative ‘sound level’ is equivalent to ten times the base-10 logarithm of the ratio of the sum of the sound pressures of all frequencies to the reference sound pressure. To simplify the mathematical process of determining sound levels, sound frequencies are grouped into ranges, or ‘bands.’ Sound levels are then calculated by adding the cumulative sound pressure levels within each band – which are typically defined as one ‘octave’ or ‘1/3 octave’ of the sound frequency spectrum.

The commonly accepted limitation of human hearing to detect sound frequencies is between 20 Hz and 20,000 Hz, and human hearing is most sensitive to the frequencies between 1,000 Hz – 6,000 Hz. Although people are generally not as sensitive to lower-frequency sounds as they are to higher frequencies, most people lose the ability to hear high frequency sounds as they age. To accommodate varying receptor sensitivities, frequency sound levels are commonly adjusted, or ‘filtered’, before being logarithmically added and reported as a single ‘sound level’ magnitude of that filtering scale. The ‘A-weighted’ decibel filtering scale applies numerical adjustments to sound frequencies to emphasize the frequencies at which human hearing is sensitive, and to minimize the frequencies to which human hearing is not as sensitive (refer to Table 1).

Several examples of noise levels expressed in dB(A) are listed in Table 2. As shown, most individuals are exposed to high noise levels from many sources on a regular basis. In order to perceive sounds of greatly varying pressure levels, human hearing has a non-linear sensitivity to sound pressure exposure. For example, doubling the sound pressure results in a three decibel change in the noise level; however, variations of 3 dB(A) or less are commonly considered “barely perceptible” to normal human hearing. A 5 dB(A) change is more readily noticeable. By definition, a ten-fold increase in the sound pressure level correlates to a 10 dB(A) noise level increase; however, most people judge it as only a doubling of the loudness, – sounding “twice as loud”.

The degree of disturbance or annoyance from exposure to unwanted sound – noise – depends upon three factors:

1. The amount, nature, and duration of the intruding noise
2. The relationship between the intruding noise and the existing (ambient) sound environment; and
3. The situation in which one hears the disturbing noise.

**Table 1 Comparison: Flat vs. A-Weighted Frequency Scaling**

Octave-Band Center Frequency (Hz)	A-Weighted Adjustment <sup>1</sup>	Sample Frequency Sound Levels (Flat)	Sample Frequency Sound Levels (A-Weighted)
31	-39.53	90.00	50.47
63	-26.22	80.00	53.78
125	-16.19	70.00	53.81
250	-8.68	65.00	56.32
500	-3.25	60.00	56.75
1000	0.00	60.00	60.00
2000	+1.20	60.00	61.20
4000	+0.96	55.00	55.96
8000	-1.14	50.00	48.86
16000	-6.7	45.00	38.30
<b>Overall Sound Levels:</b>		<b>90.48 dB<sup>2</sup></b>	<b>66.32 dB(A)<sup>2</sup></b>

<sup>1</sup> Based on the ISO 226:2003 standard for normal equal-loudness contours, the A-weighted decibel network filtering scale is defined for a frequency,  $f$ , by the equation:  $20 \times \log_{10} (A(f) / A(1000))$ , where  $A(f) = [12,200^2 \times f^4] / [(f^2 + 20.6^2) \times (f^2 + 12,200^2) \times (f^2 + 107.7^2)^{0.5} \times (f^2 + 737.9^2)^{0.5}]$ .

<sup>2</sup> Although the energy in the flat sound source would create an actual sound level = 90.48 dB, it would be perceived as a sound level of 66.32 dB(A) by human hearing due to the decreased sensitivity of human hearing to lower sound frequencies.

In considering the first of these factors, it is important to note that individuals have varying sensitivity to noise. Loud noises bother some people more than other people. The time patterns and durations of noise(s) also affect perception as to whether or not it is offensive. For example, noises that occur during nighttime (sleeping) hours are typically considered more offensive than the same noises in the daytime.

Regarding the second factor, individuals tend to judge the annoyance of an unwanted noise in terms of its relationship to noise from other sources (background noise). A car horn blowing at night when background noise levels are low would generally be more objectionable than one blowing in the afternoon when background noise levels are typically higher. The response to noise stimulus is analogous to the response to turning on an interior light. During the daytime, an illuminated bulb simply adds to the ambient light, but when eyes are conditioned to the dark of night, a suddenly illuminated bulb can be temporarily blinding.

The third factor – situational noise – is related to the interference of noise with activities of individuals. In a 60 dB(A) environment such as is commonly found in a large business office, normal conversation would be possible, while sleep might be difficult. Loud noises may easily interrupt activities that require a quiet setting for greater mental concentration or rest; however, the same loud noises may not interrupt activities requiring less mental focus or tranquility.

Over time, individuals tend to accept the noises that intrude into their lives on a regular basis. However, exposure to prolonged and/or extremely loud noise(s) can prevent use of exterior and interior spaces. It has also been theorized to pose health risks. Appropriately, regulations exist for noise control or mitigation from many particularly offensive sources, including airplanes, factories, railroads, and highways. For all “Type I” federal, state, or federal-aid highway projects

in the State of North Carolina, traffic and construction noise impact analysis and mitigation assessment is dictated by the applicable North Carolina Department of Transportation Traffic Noise Abatement Policy.

**Table 2 Common Indoor and Outdoor Noise Levels**

<b>Common Outdoor Noise Levels</b>	<b>Noise Level (dB(A))</b>	<b>Common Indoor Noise Levels</b>
	110	Rock Band
Jet Flyover at 1,000 feet	100	Inside Subway Train (NY)
Gas Lawn Mower at 3 feet		
Diesel Truck at 50 feet	90	Food Blender at 3 feet
Noisy Urban Daytime	80	Garbage Disposal at 3 feet
Gas Lawn Mower at 100 feet	70	Vacuum Cleaner at 10 feet
Commercial Area		Normal Speech at 3 feet
	60	
Quiet Urban Daytime	50	Large Business Office
Quiet Urban Nighttime	40	Dishwasher Next Room
Quiet Suburban Nighttime		Small Theater, Large Conference Room (Background)
	30	Library
Quiet Rural Nighttime		Bedroom at Night, Concert Hall (Background)
	20	
	10	Broadcast and Recording Studio
	0	Threshold of Hearing

*Adapted from Guide on Evaluation and Attenuation of Traffic Noise, American Association of State Highway and Transportation Officials (AASHTO), 1974 (revised 1993)*

#### **4.0 NOISE ABATEMENT CRITERIA**

##### **4.1 Title 23 Code of Federal Regulations, Part 772 (23 CFR 772)**

The Federal Highway Administration (FHWA) has developed Noise Abatement Criteria (NAC) and procedures to be used in the planning and design of highways. The purpose of 23 CFR, Part 772 is:

...To provide procedures for noise studies and noise abatement measures to help protect the public's health, welfare and livability, to supply noise abatement criteria, and to establish requirements for information to be given to local officials for use in the planning and design of highways approved pursuant to Title 23 United States Code (U.S.C.).

The abatement criteria and procedures are set forth in Title 23 CFR, Part 772, which also states:

...In determining traffic noise impacts, a highway agency shall give primary consideration to exterior areas where frequent human use occurs.

Table 3 presents a summary of the NAC for various land uses. The  $L_{eq}$ , or equivalent sound level, is the equivalent steady-state sound level, which in a stated period of time contains the same acoustic energy as a time-varying sound level during the same period. With regard to traffic noise, fluctuating sound levels of traffic noise are represented in terms of  $L_{eq}$ , the steady, or 'equivalent', noise level with the same energy.

#### **4.2 North Carolina Department of Transportation Traffic Noise Abatement Policy**

The North Carolina Department of Transportation Traffic Noise Policy effective October 6, 2016 establishes official policy on highway noise. This policy describes the NCDOT process used in determining traffic noise impacts and abatement measures and the equitable and cost-effective expenditure of public funds for traffic noise abatement. Where the FHWA has given highway agencies flexibility in implementing the 23 CFR 772 standards, this policy describes the NCDOT approach to implementation.

#### **4.3 Noise Abatement Criteria**

The two categories of traffic noise impacts are defined as (1) those that "approach" or exceed the FHWA Noise Abatement Criteria (NAC), as shown in Table 3 and (2) those that represent a "substantial increase" over existing noise levels as defined by NCDOT. An impact is defined as "approaching NAC" according to NCDOT as reaching one decibel less than the applicable NAC  $L_{eq(h)}$  values shown in Table 3. An impact that represents a "substantial increase" according to NCDOT is when the predicted design year build condition noise levels exceed the existing noise levels by 10 dB(A) or greater.



**Table 3 Noise Abatement Criteria**

Hourly Equivalent A-Weighted Sound Level (decibels (dB(A)))			
Activity Category	Activity Criteria <sup>1</sup> Leq(h) <sup>2</sup>	Evaluation Location	Activity Description
A	57	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 <sup>3</sup>	67	Exterior	Residential
C <sup>3</sup>	67	Exterior	Active sport 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, Section4(f) sites, schools, television studios, trails, and trail crossings
D	52	Interior	Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios
E <sup>3</sup>	72	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

<sup>1</sup> The Leq(h) Activity Criteria values are for impact determination only, and are not design standards for noise abatement measures.

<sup>2</sup> 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.

<sup>3</sup> Includes undeveloped lands permitted for this activity category.

**5.0 AMBIENT NOISE LEVELS**

Ambient noise is that noise which is all around us, caused by natural and manmade events. It includes the wind, rain, thunder, birds chirping, insects, household appliances, commercial operations, lawn mowers, airplanes, automobiles, etc. It is all noise present in a particular area.

Existing traffic noise exposure varies in the vicinity of the proposed SR 1010 (Ten Ten Road) Project. Dominant roadway noise sources in the project vicinity are located: near the northwest corner of SR 1010 and N Old Grove Lane, near the northeast corner of N Old Grove Lane and Myrtle Grove Lane, near the north end of the parking lot in front of the swimming pool, near the northeast corner of SR 1010 and Waterford Green Drive, adjacent to the southwest corner of 1817 Misty Hollow Lane, near the southeast corner of SR 1010 and Smith Road, between ends of the half-circle driveway along Smith Road and adjacent to the ruins on the east side of Smith Road. With the variations in land use and vehicle speeds, the ambient traffic noise measured ranges from approximately 53 dB(A) to approximately 72 dB(A).

VHB collected traffic noise monitoring data at three (3) sites, each using three meters, for the purpose of this traffic noise report (presented in Appendix A). VHB chose these based upon their proximity to the proposed corridor and were generally located between 10 and 250 feet from the existing roadways. The purpose of collecting noise level information is to quantify the existing acoustic environment and to provide a base for assessing impacts caused by the increase in noise levels in the Build Year. The primary noise source in the project study area is traffic noise along the entire corridor. Secondary noise sources include several small construction sites throughout the project corridor. Field observations indicated that actual speeds along these roads were roughly the same as the posted speed limits, varying by +/- 5 mph. It should also be noted that most traffic along SR 1010 (Ten Ten Road) was traveling in tight clusters between periods of scattered vehicles, so the number of vehicles passing by a point at any given time was not consistent. In the Existing, No-Build, and Build models, roadways were modeled at posted speed plus 5 mph, not to exceed the design speed, as outlined in the 2016 NCDOT Traffic Noise Manual. Average existing noise levels were assessed as the TNM-predicted noise levels based on existing average traffic estimates, or the ambient noise levels obtained at representative locations in the field.<sup>1</sup> These readings and traffic volumes were then used to validate the TNM model. Appendix A contains the ambient noise level monitoring field notes and a summary of adjacent roadway traffic volumes collected during the monitoring effort.

Within the TNM model, a representative receptor was included for each noise sensitive location. Figure 2 illustrates the ambient monitoring locations as well as the receptor locations evaluated in this analysis.

## **6.0 PROCEDURE FOR PREDICTING FUTURE NOISE LEVELS**

Traffic noise emissions are composed of several variables, including the number, types, and travel speeds of the vehicles, as well as the geometry of the roadway(s) on which the vehicles travel. Additionally, variables such as weather and intervening topography affect the transmission of traffic noise from the vehicle(s) to noise sensitive receptors.

In accordance with industry standards and accepted best practices, detailed computer models of the study area were created using the Federal Highway Administration Traffic Noise Model<sup>®</sup> (FHWA TNM v.2.5) software program. These models were then validated to within acceptable tolerances of field-monitored traffic noise data and used them to predict traffic noise levels for

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<sup>1</sup> Per 23 CFR 772.5, existing noise levels are defined as “the average noise hour resulting from the combination of natural and mechanical sources and human activity usually present in a particular area.” If the TNM-predicted existing loudest-hour *traffic* noise levels are lower than the hourly-equivalent noise levels obtained in the field, then existing noise levels are assessed as the latter.

receptor locations near the proposed roadway project. Per FHWA guidance, the models validated within +/- 3dB(A) of the field measured data. Traffic noise consists of three primary parts: tire/pavement noise, engine noise, and exhaust noise. Of these sources, tire/pavement noise is typically the most offensive at unimpeded travel speeds. Sporadic traffic noises such as horns, squealing brakes, screeching tires, etc. are considered aberrant and are not included within the predictive model algorithm. Traffic noise is not constant; it varies in time depending upon the number, speed, type, and frequency of vehicles that pass by a given receptor. Furthermore, since traffic noise emissions are different for various types of vehicles, the TNM algorithm distinguishes between the source emissions from the following vehicle types: automobiles, medium trucks, heavy trucks, buses, and motorcycles, as shown in Table 4. The computer traffic noise prediction model uses the number and type of vehicles on the planned roadway, vehicle speeds, the physical characteristics of the road (curves, hills, depressions, elevations, etc.), receptor location and height, and, if applicable, barrier type, barrier ground elevation, and barrier segment top elevations.

**Table 4 Traffic Noise Model (TNM) Vehicle Classification Types**

<b>TNM Vehicle Type</b>	<b>Description</b>
Autos	All vehicles with two axles and four tires, including passenger cars and light trucks, weighing 9,900 pounds or less
Medium Trucks	All vehicles having two axles and six tires, weighing between 9,900 and 26,400 pounds
Heavy Trucks	All vehicles having three or more axles, weighing more than 26,400 pounds
Buses	All vehicles designed to carry more than nine passengers
Motorcycles	All vehicles with two or three tires and an open-air driver / passenger compartment

**Sources:** FHWA *Measurement of Highway-Related Noise*, § 5.1.3 Vehicle Types.  
 FHWA *Traffic Monitoring Guide*, § 4.1 Classification Schemes

Per FHWA guidance, the predictions documented in this report are based upon the project Design Year (2040) Build Condition traffic conditions (including proposed horizontal alignment) resulting in the predicted hourly-equivalent traffic noise levels for each receptor. These volumes were derived from the Traffic Forecast Report completed by VHB in August 2016. Appendix B contains traffic tables and accompanying figures. Tables B-1, B-2, and B-3 include the forecasted traffic volume for each roadway included in the model, the LOS C volume, and the traffic values used in the TNM models. Because the derived volumes needed for the analysis reflected peak hour traffic volumes, a check was done to compare these derived volumes to the LOS C capacity threshold volumes. It is assumed that traffic at LOS C is free flowing and would therefore have a greater noise impact than traffic that is congested and moving at a slower speed. If the peak hour volume was less than the LOS C capacity threshold, the peak hour volume was applied; if the derived volume exceeded the LOS C capacity threshold, the LOS C threshold volume was utilized. In the

Build Condition traffic volumes, design speed was used instead of posted speed, not to exceed 5 mph over the posted speed per the 2016 Traffic Noise Manual.

The project area is a mixture of receptors falling into NAC B, NAC C, NAC D and NAC E land use categories. The existing land use along the SR 1010 (Ten Ten Road) project corridor is a mix of residential, non-residential and undeveloped land; however, most of the uses fronting the road are non-residential, including churches, commercial establishments, manufacturing, and other industrial services. Various side streets along the Ten Ten Road corridor provide access to residential neighborhoods. VHB determined that there are 464 single-family residences, 693 multi-family residences, 6 mobile homes, 10 restaurants, 6 pools, 6 places of worship, 1 school, 1 community college, 1 athletic facility, 1 daycare, 1 after school facility, 2 tennis courts, 1 park, 2 playgrounds and 1 golf course within the analyzed study area.

See Appendix C for a comprehensive list of receptors as well as existing and predicted Design Year (2040) hourly equivalent traffic noise levels. Appendix D contains illustrations of the Traffic Noise Model.

The project corridor was divided into fifteen (15) NSAs. The following are description of each NSA:

- NSA 1 begins at the Ten Ten Road/Kildaire Farm Road intersection and extends northeast. This area is mixed use, consisting of a Walgreens, a Shell gas station, a Goodwill retail store and single-family residences in the deVintage neighborhood.
- NSA 2 begins at the Ten Ten Road/Kildaire Farm Road intersection and extends northwest. This area consists of some single-family homes but is primarily the Millpond Village shopping center which also houses Wake Technical Community College.
- NSA 3 begins behind the Millpond Village shopping center and runs northwest along the east side of Ten Ten Road, ending at Penny Road. This NSA has mostly single-family residences, including homes from the Danbury neighborhood and one business near Penny Road.
- NSA 4 begins along Penny Road and extends west along the northwest bound side of Ten Ten Road, ending after Arbordale Court. This area is completely comprised of single-family residences, including the South Chase neighborhood.
- NSA 5 begins at the end of NSA 4 after Arbordale Court and continues west along the northwest bound side of Ten Ten Road, intersecting with US 1 and continues along US 1 eastbound. This area has mixed use, which includes the Avalon Peaks Apartments and commercial uses near US 1.
- NSA 6 begins at the US 1 overpass and extends west along Ten Ten Road and north of the bridge along US 1. This area consists entirely of single-family homes in the Waterford Green neighborhood.
- NSA 7 begins west of Waterford Green Drive and extends west on the northwest bound side of Ten Ten Road, terminating at Parkfield Drive. This area consists primarily of townhomes.

- NSA 8 begins west of Parkfield Drive and continues west on the northwest bound side of Ten Ten Road, ending at Apex Peakway. This area includes commercial businesses, a neighborhood park, single-family homes and townhomes that are part of The Groves Townhomes community.
- NSA 9 begins at Apex Peakway/Ten Ten Road intersection and continues northwest. This area includes businesses, a Mosque and townhomes from Old Mill Village.
- NSA 10 begins at the intersection of Ten Ten Road/Kildaire Farm Road and continues southeast, ending after Andrews Pond Drive along Ten Ten Road and ending at Arthur Pierce Road on Kildaire Farm Road. This area includes various businesses in a shopping center and townhomes that are part of Stonebridge Village.
- NSA 11 begins at the intersection of Ten Ten Road/Kildaire Farm Road and continues southwest, ending at Arthur Pierce Road on Kildaire Farm Road and after the Arium apartment complex on Ten Ten Road. This area primarily consists of the Arium at Kildaire apartments.
- NSA 12 begins behind the Arium at Kildaire apartments and continues west on the southeast bound side of Ten Ten Road, ending at Jessie Drive. This area is comprised entirely of single-family homes, most of which are part of the Summercrest neighborhood.
- NSA 13 begins at Jessie Drive and continues northwest along Ten Ten Road to US 1, including US 1 south of the overpass bridge. This area consists of industrial and commercial businesses, which include Motiva, Public Storage and Sheetz, Lufkin Road Middle School and Knights Play Golf Course.
- NSA 14 begins west of US 1 and continues west along the south side of Ten Ten Road, ending at Investment Boulevard. This area consists of commercial businesses, one restaurant and one church.
- NSA 15 begins west of Investment Boulevard and continues past Apex Peakway, ending at N Tunstall Avenue. This area has mixed-use, consisting of the rest of The Groves Townhomes neighborhood, single-family residences and businesses.

## **7.0 TRAFFIC NOISE IMPACTS AND NOISE CONTOURS**

### **7.1 Traffic Noise Impacts Summary**

NCDOT considers traffic noise impacts occur when the predicted traffic noise levels either: [a] approach or exceed the FHWA noise abatement criteria (with "approach" meaning within 1 dB(A) of the NAC values listed in Table 4), or [b] substantially exceed the existing noise levels (plus 10 dB(A) or more). FHWA and NCDOT require that feasible and reasonable measures be considered to abate traffic noise at all predicted traffic noise impacts. Mitigation measures considered include the highway alignment selection, traffic systems management, buffer zones, noise walls, and earth berms.

Predicted noise levels would approach or exceed NCDOT noise abatement criteria under the Design Year (2040) Build Conditions. The potential number and types of predicted traffic noise impacts from the Project are shown in Table 5 with impacts delineated as either approaching or exceeding the FHWA NAC, by a substantial increase in Design Year (2040) Build condition traffic

noise levels over existing ambient noise levels, or by exceeding both criteria. There are 185 total impacted receptors, 166 of those impacts are to NAC “B” land uses, 17 are NAC “C” impacts and two are (2) NAC E impacts. Four (4) of the NAC “B” impacts are due only to a substantial increase.

**Table 5 Traffic Noise Impact<sup>5</sup> Summary**

Alternative	Approximate number of Impacted Receptors Approaching or Exceeding FHWA NAC per Activity Category <sup>1</sup>								Substantial Noise Level Increase <sup>2</sup>	Impacts Due to Both Criteria <sup>3</sup>	Total Traffic Noise Impacts per NCDOT Policy <sup>4</sup>
	A	B	C	D	E	F	G	Total			
Build	0	162	17	0	2	0	0	181	6	2	185

<sup>1</sup> Predicted traffic noise level impact due to approaching or exceeding NAC (refer to Table 3).

<sup>2</sup> Predicted “substantial increase” traffic noise level impact.

<sup>3</sup> Predicted traffic noise level impact due to exceeding NAC and “substantial increase” in build-condition noise levels.

<sup>4</sup> The total number of predicted impacts is not duplicated if receptors are predicted to be impacted by more than one criterion.

<sup>5</sup> Impact totals account for assumed NCDOT property takes along the alternative alignments (i.e., if a receptor is impacted but will be a relocation due to new alignment, it is not counted in the impact total).

## 7.2 Noise Contours

One of the most effective means to prevent future traffic noise impacts is noise-sensitive land-use development. The compatibility of highways and neighboring local areas is essential for continued growth and can be achieved if local governments and developers require and practice noise-sensitive land-use planning.

Although regulation of land use is not within the purview of FHWA or NCDOT, some widely accepted techniques for noise-sensitive land use planning in the vicinity of existing and proposed highway facilities include:

- Locating commercial retail, industrial, manufacturing, warehousing and other noise-compatible land-uses adjacent to highways
- Incorporating effective traffic noise mitigating features, such as earth berms and solid-mass noise walls, as part of residential developments
- Utilization of noise-sensitive architectural design and site planning, such as the orientation of quiet spaces away from roadways
- Required use of sound insulating building materials and construction methods

As indicated in the October 2016 NCDOT Traffic Noise Policy, local jurisdictions with zoning control should use the information contained in this report to develop policies and/or ordinances to limit the growth of noise-sensitive land uses located adjacent to roadways. Furthermore, NCDOT encourages the dissemination of this information to all people who may be affected by, or who might influence others affected by, traffic noise.

Predicted build-condition traffic noise level contours are not a definitive means by which to assess traffic noise level impacts; however, they can aid in future land use planning efforts in presently undeveloped areas. Correlating to NCDOT's traffic noise impact threshold for NAC "B" and "E" land uses, TNM predicts the 66 dB(A) contour to occur at approximately 150 ft from the centerline of Ten Ten Road between Kildaire Farm Road and Arbordale Court, 200 feet from the centerline of Ten Ten Road from Arbordale Court to US 1 and 130 ft from the centerline of Ten Ten Road from US 1 to Apex Peakway. TNM predicts the 71 dB(A) contour to occur at approximately 80 feet from the centerline of Ten Ten Road between Kildaire Farm Road and Arbordale Court, 110 feet from the centerline of Ten Ten Road from Arbordale Court to US 1 and 60 feet from the centerline of Ten Ten Road from US 1 to Apex Peakway.

Many variations in terrain, development types and density contribute to the general distance at which these noise thresholds are likely to occur. Thus, per 23 CFR 772.9(c) and NCDOT Policy, noise contour lines shall not be used for determining highway traffic noise impacts. However, the 66 dB(A) and 71 dB(A) noise level contour information should assist local authorities in exercising land use control over the remaining undeveloped lands, to avoid development of incompatible activities adjacent to the roadways within local jurisdiction.

## **8.0 POTENTIAL TRAFFIC NOISE ABATEMENT MEASURES**

Per NCDOT Policy, the following traffic noise abatement measures are to be considered when impacts are predicted: highway alignment selection, traffic systems management, buffer zones, noise barriers (earth berms and noise walls), and noise insulation of Activity Category D land use facilities.

### **8.1 Highway Alignment Selection**

Highway alignment selection for traffic noise abatement measures involves modifying the horizontal and vertical geometry of the proposed facility to minimize the impact of traffic noise on noise-sensitive receptors. The selection of alternative alignments for noise abatement purposes must consider the balance between noise impacts and other engineering and environmental parameters. For noise abatement, horizontal alignment selection is primarily a matter of locating the roadway at a sufficient distance from noise sensitive receptors. Appreciable reductions in traffic noise transmissions to sensitive receptors can be made by adjusting the vertical highway alignment and/or section geometry. For example, lowering a roadway below existing grade creates a cut section, which could act similarly as an earth berm, depending upon the relative location(s) of noise-sensitive receptor(s). Because the proposed project is an improvement of existing alignment and not a new location project, there is little room for change to the existing alignment for noise abatement purposes.

### **8.2 Traffic Systems Management Measures**

Traffic management measures such as prohibition of truck traffic, lowering speed limits, limiting of traffic volumes, and/or limiting time of operation were considered as possible traffic noise impact abatement measures. The limitations associated with this type of abatement measures would result in a change in use of the road that would no longer serve the purpose and need of the improvements; thus, VHB did not consider this mitigation further.

### **8.3 Buffer Zones**

Buffer zones are typically not practical and/or cost effective for noise mitigation due to the substantial amount of right-of-way required and would not be a feasible noise mitigation measure for this project. Furthermore, if the acquisition of a suitable buffer zone had been feasible, the costs to acquire buffer zones for impacted receptors would likely exceed maximum allowable cost. The NCDOT base dollar value for a buffer zone is \$22,500 per benefited receptor plus the incremental increase of \$7,500 per dB(A) average increase between 5-10 dB(A) and \$15,000 per dB(A) average increase above 10 dB(A) in the modeled exterior noise levels of the impacted receptors of the area. For this reason, this abatement measure is unreasonable.

### **8.4 Noise Barriers**

Passive noise abatement measures are effective because they absorb sound energy, extend the source-to-receptor sound transmission path, or both. Sound absorption is a function of abatement medium (e.g., earth berms absorb more sound energy than noise walls of the same height because earth berms are more massive). The source-to-receptor path is extended by placement of an obstacle, such as a wall, that sufficiently blocks the transmission of sound waves that travel from the source to the receptor.

Highway noise barriers are primarily constructed as earth berms or solid-mass walls adjacent to limited-access freeways that are in close proximity to noise-sensitive land use(s). To be effective, a noise barrier must be long enough and tall enough to shield the benefitted receptors. For this project, VHB did not find earthen berms to be a viable abatement measure at any location because the proposed barrier locations are too narrow for efficient earthen berms. Generally, the noise wall length must be eight times the distance from the barrier to the receptor. For example, if receptors were 200 feet from the roadway, an effective barrier would be approximately 1,600 feet long – with the receptor in the horizontal center. On roadway facilities with direct access for driveways, noise barriers are typically not feasible because the openings render the barrier ineffective in impeding the transmission of traffic noise. Due to the requisite lengths for effectiveness, noise barriers are typically not economical for isolated or most low-density areas.

However, noise barriers may be economical for the benefit of as few as two predicted traffic noise impacts if the barrier can benefit enough total receptors – impacted and non-impacted combined – to meet applicable reasonableness criteria.

VHB analyzed seven (7) potential noise walls; additional technical detail related to these analyses and optimizations can be found in Section 9.3 as well as Appendix E. These walls include:

- NW 3 is located on the northwest bound side of Ten Ten Road, across from Smith Road.
- NW 4-5B starts at Arbordale Court and ends at Kiftsgate Lane.
- NW 4-5C begins at Kiftsgate Lane and ends just before the driveway of Pinnacle Plaza.
- NW 6 begins just east of the Waterford Green Drive intersection with Ten Ten Road running along the northwest bound side of Ten Ten Road ending before US 1.
- NW 7 starts immediately west of Waterford Green Drive on the northwest bound side of Ten Ten Road and ends just before Schieffelin Road.



- NW 8 runs behind a section of The Groves townhomes along the northwest bound side of Ten Ten Road, between Old Grove Lane and Forest Grove Drive.
- NW 11A starts directly north of Grist Valley Lane, runs along the southbound side of Kildaire Farm Road and then curves to continue along the southeast bound side of Ten Ten Road, terminating at the end of the 600 building of the Arium apartments.
- NW 11B begins approximately 100 feet north of Harvest Creek Place, runs along the southbound side of Kildaire Farm Road by Arium Kildaire apartments, and ends at Grist Valley Lane.
- NW 12A is located on the southeast bound side of Ten Ten Road, starting at Jessie Drive and ending at Littleman Lane.
- NW 12B is located on the southeast bound side of Ten Ten Road, starting at Littleman Lane and ending before Smith Road.

## **8.5 Noise Insulation**

Insulating buildings can greatly reduce highway traffic noise, especially when windows are sealed and cracks and other openings are filled. Noise-absorbing material can be placed in the walls of new buildings during construction but is rarely retrofitted into existing buildings. While federal-aid highway project dollars can be used for noise insulation of public-use or non-profit institutional structures, the typical beneficiaries of this type of abatement are school facilities where no other type of abatement is possible.

## **9.0 FEASIBILITY AND REASONABLENESS DETERMINATION**

FHWA and NCDOT require consideration and evaluation of feasible and reasonable noise abatement measures for the benefit of all predicted build-condition traffic noise impacts. Feasibility is the consideration as to whether noise abatement measures *can* be implemented. Reasonableness is the consideration as to whether noise abatement measures *should* be implemented. All of the following conditions regarding feasibility and reasonableness must be met in order for noise abatement to be justified and incorporated into project design, as applicable. Failure to achieve any single element of feasibility or reasonableness will deem the noise abatement measure as not feasible or not reasonable, whichever applies.

### **9.1 Feasibility**

The combination of acoustical and engineering factors considered in the evaluation of a noise abatement measure.

- a) Any receptor that receives a minimum noise level reduction of 5 dB(A) due to noise abatement measures shall be considered a benefited receptor. Noise reduction of 5 dB(A) must be achieved for at least two impacted receptors.
- b) Engineering feasibility of the noise abatement measure(s) shall consider adverse impacts created by or upon property access, drainage, topography, utilities, safety, and maintenance requirements.
- c) The effects of secondary traffic noise (e.g., non-project traffic noise) and non-traffic noise sources on attainable Noise Level Reduction shall be considered when developing effective noise abatement measures.

## 9.2 Reasonableness

The combination of social, economic, and environmental factors considered in the evaluation of a noise abatement measure.

- a) Viewpoints of the property owners and residents of all benefited receptors shall be solicited. One owner ballot and one resident ballot shall be solicited for each benefited receptor. Points per ballot shall be distributed in the following weighted manner:
  - 5 points/ballot for adjacent property owners who reside at property
  - 4 points/ballot for adjacent property owners who rent property
  - 3 points/ballot for all non-adjacent property owners who reside at property
  - 2 points/ballot for all non-adjacent property owners who rent property
  - 1 point/ballot for all tenants of rental property

Where an adjacent receptor is a benefited receptor that either represents a property that shares the highway right of way or has no benefited receptor between it and the highway.

- b) The maximum allowable base quantity of noise walls and/or earthen berms per benefited receptor shall not exceed 1,500 ft<sup>2</sup> and 4,200 yd<sup>3</sup>, respectively. Additionally, an incremental increase of 500 ft<sup>2</sup> for noise walls and 1,400 yd<sup>3</sup> for earthen berms shall be added to the base quantity per the average increase in dB(A) of 5-10 dB(A) between existing and predicted exterior noise levels of all impacted receptors within each noise sensitive area. An incremental increase of 1,000 ft<sup>2</sup> for noise walls and 2,800 yd<sup>3</sup> for earthen berms shall be added to the base quantity per the average noise increase in dB(A) of greater than 10 dB(A) between existing and predicted exterior noise levels of impacted receptors. A base dollar value of \$22,500 plus an incremental increase of \$7,500 for a 5-10 dB(A) increase or \$15,000 for an increase exceeding 10 dB(A) (as defined earlier in Section 8.3) shall be used to determine reasonableness of buffer zones and noise insulation.
- c) A noise reduction design goal of at least 7 dB(A) must be evaluated for all benefited receptors. At least one benefited receptor must achieve the noise reduction design goal of 7 dB(A) to indicate the noise abatement measure effectively reduces traffic noise.

## 9.3 Noise Barrier Recommendations

VHB evaluated the following noise barriers along the project corridor:

- NW3 – Noise Wall 3 is located on the northwest bound side of Ten Ten Road, across from Smith Road. This wall will provide benefits of  $\geq 5$  dB(A) to five (5) receptors, three (3) of which are predicted to be impacted in the Build condition. Overhead powerlines and signal lines are present in the existing condition and underground utilities may be present in the existing condition. These utilities may interfere with the constructability of this wall. Currently, no decisions have been finalized regarding the relocation of the existing utility infrastructure. No conflicts were assumed for the purposes of this TNR, allowing for NW3 to be considered feasible at this time. When the design level noise analysis is performed, further coordination regarding these potential conflicts should be made in order to assess the feasibility of NW3. Four (4) receptors will achieve a benefit of  $\geq 7$  dB(A). NW3 has a length of approximately 500 ft and a total area of 5,300 ft<sup>2</sup>. Because the average increase in sound levels from Existing and Build conditions for impacted receptors is  $<5$  dB(A), the

maximum allowable area per benefit is 1,500 ft<sup>2</sup>. With an area per benefitted receptor of 1,060 ft<sup>2</sup>, this wall is also considered reasonable.

- NW4-5B – Noise Wall 4-5B starts at Arbordale Court and ends at Kiftsgate Lane. This wall will provide benefits of  $\geq 5$  dB(A) to 50 receptors, 28 of which are predicted to be impacted in the Build condition. Overhead powerlines and signal lines are present in the existing condition and underground utilities may be present in the existing condition. These utilities may interfere with the constructability of this wall. Currently, no decisions have been finalized regarding the relocation of the existing utility infrastructure. No conflicts were assumed for the purposes of this TNR, allowing for NW4-5B to be considered feasible at this time. When the design level noise analysis is performed, further coordination regarding these potential conflicts should be made in order to assess the feasibility of NW4-5B. Forty-seven (47) receptors will achieve a benefit of  $\geq 7$  dB(A). NW4-5B has a length of approximately 1,360 ft and a total area of 20,440 ft<sup>2</sup>. Because the average increase in sound levels from Existing and Build conditions for impacted receptors is  $<5$  dB(A), the maximum allowable area per benefit is 1,500 ft<sup>2</sup>. With an area per benefitted receptor of 409 ft<sup>2</sup>, this wall is also considered reasonable.
- NW 4-5C – Noise Wall 4-5C begins at Kiftsgate Lane and ends just before the driveway of Pinnacle Plaza. This wall will provide benefits of  $\geq 5$  dB(A) to 12 receptors, 6 of which are predicted to be impacted in the Build condition. Above ground utilities are not present in the area of the proposed wall location; however, underground utilities may be present in the existing condition. These utilities may interfere with the constructability of this wall. Currently, no decisions have been finalized regarding the relocation of the existing utility infrastructure. No conflicts were assumed for the purposes of this TNR, allowing for NW4-5C to be considered feasible at this time. When the design level noise analysis is performed, further coordination regarding these potential conflicts should be made in order to assess the feasibility of NW4-5C. Eight (8) receptors will achieve a benefit of  $\geq 7$  dB(A). NW4-5C has a length of approximately 400 ft and a total area of 3,280 ft<sup>2</sup>. Because the average increase in sound levels from Existing and Build conditions for impacted receptors is  $<5$  dB(A), the maximum allowable area per benefit is 1,500 ft<sup>2</sup>. With an area per benefitted receptor of 410 ft<sup>2</sup>, this wall is also considered reasonable.
- NW6 – Noise Wall 6 begins just east of the Waterford Green Drive intersection with Ten Ten Road running along the northwest bound side of Ten Ten Road ending before US 1. This wall will provide benefits of  $\geq 5$  dB(A) to 13 receptors, three (3) of which are predicted to be impacted in the Build condition. Overhead powerlines and signal lines are present in the existing condition and underground utilities may be present in the existing condition. These utilities may potentially interfere with the constructability of this wall; however, the proposed design shifts travel lanes away from the existing edge of travel in this location, minimizing potential for utility conflicts. No conflicts were assumed for the purposes of this TNR, allowing for NW6 to be considered feasible at this time. When the design level noise analysis is performed, further coordination regarding these potential conflicts should be made in order to assess the feasibility of NW6. Eight (8) receptors will achieve a benefit of  $\geq 7$  dB(A). NW6 has a length of approximately 720 ft and a total area of 12,000 ft<sup>2</sup>. Because the average increase in sound levels from Existing and Build conditions for impacted receptors is  $<5$  dB(A), the maximum allowable area per benefit is 1,500 ft<sup>2</sup>. With an area per benefitted receptor of 923 ft<sup>2</sup>, this wall is also considered reasonable.

- NW7 – Noise Wall 7 begins immediately to the west of the Waterford Green Drive intersection and extends west ending directly across from Schieffelin Road. This wall will provide benefits of  $\geq 5$  dB(A) to 5 receptors, only 1 of which is predicted to be impacted in the Build condition. Therefore, this wall is not feasible. A  $\geq 7$  dB(A) reduction can be obtained for at least one impacted receptor and with an area per benefitted receptor of 984 ft<sup>2</sup>, this wall is considered reasonable; however, this wall is not likely because it is not both feasible and reasonable.
- NW8 – Noise Wall 8 runs behind a section of The Groves townhomes along the northwest bound side of Ten Ten Road, between Old Grove Lane and Forest Grove Drive. This barrier would provide benefits of  $\geq 5$  dB(A) to 11 receptors, all of which are predicted to be impacted in the Build condition. Above ground utilities are not present in the area of the proposed wall location; however, underground utilities are likely present in the existing condition. These utilities may interfere with the constructability of this wall. Currently, no decisions have been finalized regarding the relocation of the existing utility infrastructure. There are also constructability concerns related to available space for construction and maintenance of a noise wall here; there are only approximately 18 feet between the proposed mixed-use path and the closest residential structure element behind this proposed wall segment. With this limited area for construction and maintenance and the likely underground utility conflict, this wall is deemed not feasible. When the design level noise analysis is performed, further coordination regarding the constructability and potential utility conflicts should be re-evaluated in relation to the final design in order to assess the feasibility of NW8. Ten (10) receptors would achieve a benefit of  $\geq 7$  dB(A). With an area per benefitted receptor of 349 ft<sup>2</sup>, this wall is considered reasonable; however, this wall is not likely because it is not both feasible and reasonable. There are a number of impacts also along Myrtle Grove Lane, east of the evaluated wall location. A wall was not evaluated for these impacts because there are concerns about access, utility and constructability of this wall due to the homes facing Ten Ten Road in this location; therefore, a wall for those impacts was also deemed not feasible.
- NW11A – Noise Wall 11A starts directly north of Grist Valley Lane, runs along the southbound side of Kildaire Farm Road and then curves to continue along the southeast bound side of Ten Ten Road, terminating at the end of the 600 building of the Arium apartments. This wall will provide benefits of  $\geq 5$  dB(A) to 27 receptors, 17 of which are predicted to be impacted in the Build condition. There are no expected conflicts with topography, access, or utilities with this wall. Therefore, this wall is feasible. Twenty (20) receptors will achieve a benefit of  $\geq 7$  dB(A). NW11A has a length of approximately 600 ft and a total area of 12,000 ft<sup>2</sup>. Because the average increase in sound levels from Existing and Build conditions for impacted receptors is  $<5$  dB(A), the maximum allowable area per benefit is 1,500 ft<sup>2</sup>. With an area per benefitted receptor of 444 ft<sup>2</sup>, this wall is also considered reasonable.
- NW11B – Noise Wall 11B begins approximately 100 feet north of Harvest Creek Place, runs along the southbound side of Kildaire Farm Road by Arium Kildaire apartments, and ends at Grist Valley Lane. This wall will provide benefits of  $\geq 5$  dB(A) to 12 receptors, 6 of which are predicted to be impacted in the Build condition. There are no expected conflicts with topography, access, or utilities with this wall. Therefore, this wall is feasible. Two (2) receptors will achieve a benefit of  $\geq 7$  dB(A). NW11B has a length of approximately 360 ft and a total area of 5,040 ft<sup>2</sup>. Because the average increase in sound

levels from Existing and Build conditions for impacted receptors is  $<5$  dB(A), the maximum allowable area per benefit is 1,500 ft<sup>2</sup>. With an area per benefitted receptor of 420 ft<sup>2</sup>, this wall is also considered reasonable.

- NW12A – Noise Wall 12A is located on the southeast bound side of Ten Ten Road, starting at Jessie Drive and ending at Littleman Lane. This wall will provide benefits of  $\geq 5$  dB(A) to 7 receptors, 3 of which are predicted to be impacted in the Build condition. Overhead powerlines are present in the existing condition and underground utilities may be present in the existing condition. These utilities may interfere with the constructability of this wall. Currently, no decisions have been finalized regarding the relocation of the existing utility infrastructure. No conflicts were assumed for the purposes of this TNR, allowing for NW12A to be considered feasible at this time. When the design level noise analysis is performed, further coordination regarding these potential conflicts should be made in order to assess the feasibility of 12A. Four (4) receptors will achieve a benefit of  $\geq 7$  dB(A). NW12A has a length of approximately 960 ft and a total area of 11,580 ft<sup>2</sup>. Because the average increase in sound levels from Existing and Build conditions for impacted receptors is  $>5$  dB(A), the maximum allowable area per benefit is 2,000 ft<sup>2</sup>. With an area per benefitted receptor of 1,654 ft<sup>2</sup>, this wall is also considered reasonable.
- NW12B – Noise Wall 12B starts at Littleman Lane and ends before Smith Road. This wall will provide benefits of  $\geq 5$  dB(A) to 4 receptors, 2 of which are predicted to be impacted in the Build condition. Overhead powerlines are present in the existing condition and underground utilities may be present in the existing condition. These utilities may interfere with the constructability of this wall. Currently, no decisions have been finalized regarding the relocation of the existing utility infrastructure. No utility conflicts were assumed for the purposes of this TNR. Additionally, Receptor 12-07 is considered an impacted and benefitted receptor for this evaluation. The access and or/right-of way take decision on this property has not yet been finalized, but will be addressed during the next stage of design. With these assumptions, NW12B is considered feasible at this time. When the design level noise analysis is performed, further coordination regarding these potential conflicts and property acquisitions should be made in order to assess the feasibility of NW12B. One (1) receptor will achieve a benefit of  $\geq 7$  dB(A). NW12B has a length of approximately 400 ft and a total area of 6,600 ft<sup>2</sup>. Because the average increase in sound levels from Existing and Build conditions for impacted receptors is  $>5$  dB(A), the maximum allowable area per benefit is 2,000 ft<sup>2</sup>. With an area per benefitted receptor of 1,650 ft<sup>2</sup>, this wall is also considered reasonable.

## **10.0 CONSTRUCTION NOISE**

The predominant construction activities associated with this project are expected to be Earth removal, hauling, grading, and paving. These activities will likely occur because of temporary and localized construction noise impacts. During daytime hours, the predicted effects of these impacts will be temporary speech interference for passers-by and those individuals living or working near the project. During evening and nighttime hours, steady-state construction noise emissions such as from paving operations will be audible, and may cause impacts to activities such as sleep. Sporadic evening and nighttime construction equipment noise emissions such as from backup alarms, lift gate closures (“slamming” of dump truck gates), etc., will be perceived as distinctly louder than the steady-state acoustic environment, and will likely cause severe impacts to the general peace and usage of noise-sensitive areas – particularly residences.

Extremely loud construction noise activities such as usage of impact-hammers (jackhammer, hoe-ram) may provide sporadic and temporary construction noise impacts in the near vicinity of those activities (refer to 7).

Generally, low-cost and easily implemented construction noise control measures should be incorporated into the project plans and specifications to the extent possible. These measures include, but are not limited to, work-hour limits, equipment exhaust muffler requirements, haul-road locations, elimination of “tail gate banging”, ambient-sensitive backup alarms, construction noise complaint mechanisms, and consistent and transparent community communication.

While discrete construction noise level prediction is difficult for a receptor or group of receptors, it can be assessed in a general capacity with respect to distance from known or likely project activities. For this project, earth removal, grading, hauling, and paving is anticipated to occur in the near vicinity of numerous noise-sensitive receptors. Although construction noise impact mitigation should not place an undue burden upon the financial cost of the project or the project construction schedule, pursuant to the requirements of 23 CFR 772.19, it is the recommendation of this traffic noise report that:

- Earth removal, grading, hauling, and paving activities in the vicinity of residences should be limited to weekday daytime hours.

If meeting the project schedule requires that earth removal, grading, hauling and / or paving must occur during evening, nighttime and / or weekend hours in the vicinity of residences neighborhoods, the Contractor shall notify NCDOT as soon as possible. In such instance(s), all reasonable attempts shall be made to notify and to make appropriate arrangements for the mitigation of the predicted construction noise impacts upon the affected property owners and / or residents.

- If construction noise activities must occur during context-sensitive hours near noise-sensitive areas, discrete construction noise abatement measures including, but not limited to portable noise barriers and / or other equipment-quieting devices shall be considered.
- Some construction activities may create extreme noise impacts for nearby noise-sensitive land uses. It is the recommendation of this Traffic Noise Report that considerations be made for any nearby residences for all potentially affected time periods throughout which extremely loud construction activities might occur.

**Table 6 Construction Equipment Typical Noise Level Emissions<sup>1</sup>**

Equipment	Noise Level Emissions (dB(A)) at 50 Feet From Equipment <sup>2</sup>			
	70	80	90	100
Pile Driver <sup>3</sup>				██████████
Jack Hammer			██████████	
Tractor		██████████		
Road Grader			██████████	
Backhoe		██████████		
Truck			██████████	
Paver			██	
Pneumatic Wrench			██	
Crane		██████████		
Concrete Mixer		██████████		
Compressor		██████████		
Front-End Loader		██████████		
Generator		██████████		
Saws		██████████		
Roller (Compactor)		██		

<sup>1</sup> Adapted from "Noise Construction Equipment and Operations, Building Equipment, and Home Appliances". U.S. Environmental Protection Agency. Washington D.C. 1971.

<sup>2</sup> Cited noise level ranges are typical for the equipment cited. Noise energy dissipates as a function of distance between the source and the receptor. For example, if the noise level from a pile driver at a distance of 50 feet = 100 decibels (dB(A)), then at 400 feet, it might be 82 decibels (dB(A)) or less.

<sup>3</sup> Due to project safety and potential construction noise concerns, pile-driving activities are typically limited to daytime hours.

For additional information on construction noise, please refer to the FHWA Construction Noise Handbook (FHWA-HEP-06-015) and the Roadway Construction Noise Model (RCNM), available online at: [https://www.fhwa.dot.gov/environment/noise/construction\\_noise/index.cfm](https://www.fhwa.dot.gov/environment/noise/construction_noise/index.cfm)

## **11.0 CONCLUSION**

Traffic noise and temporary construction noise can be a consequence of transportation projects, especially in areas near high-volume, existing steady-state traffic noise sources. This Traffic Noise Report for NCDOT STIP U-5825 utilized computer models created using TNM 2.5, validated to field-collected ambient traffic noise monitoring data, to predict future noise levels and define expected impacted receptors along the proposed project.

Under the Design Year (2040) Build conditions, there are 185 predicted traffic noise impacts. 181 of these impacts are expected to be caused by predicted noise levels that will approach or exceed NCDOT's and FHWA's noise abatement criteria. Six (6) impacts are expected to be caused by an increase in noise levels greater than 10 dB(A), with two (2) impacts being due to both criteria.

VHB analyzed ten (10) potential barriers. These barriers include:

- NW 3 is located on the northwest bound side of Ten Ten Road, across from Smith Road.
- NW 4-5B starts at Arbordale Court and ends at Kiftsgate Lane.
- NW 4-5C begins at Kiftsgate Lane and ends just before the driveway of Pinnacle Plaza.
- NW 6 begins just east of the Waterford Green Drive intersection with Ten Ten Road running along the northwest bound side of Ten Ten Road ending before US 1.
- NW 7 starts immediately west of Waterford Green Drive on the northwest bound side of Ten Ten Road and ends just before Schieffelin Road.
- NW 8 runs behind a section of The Groves townhomes along the northwest bound side of Ten Ten Road, between Old Grove Lane and Forest Grove Drive.
- NW 11A starts directly north of Grist Valley Lane, runs along the southbound side of Kildaire Farm Road and then curves to continue along the southeast bound side of Ten Ten Road, terminating at the end of the 600 building of the Arium apartments.
- NW 11B begins approximately 100 feet north of Harvest Creek Place, runs along the southbound side of Kildaire Farm Road by Arium Kildaire apartments, and ends at Grist Valley Lane.
- NW 12A is located on the southeast bound side of Ten Ten Road, starting at Jessie Drive and ending at Littleman Lane.
- NW 12B is located on the southeast bound side of Ten Ten Road, starting at Littleman Lane and ending before Smith Road.

Eight (8) of the ten (10) barriers analyzed proved to be both feasible and reasonable and are therefore considered "likely" for implementation. NW7 was determined preliminarily not reasonable. NW 8 was determined preliminarily not feasible. However, further evaluation of their implementation into the project plan should be undertaken during the final design stage of the project. A Design Noise Report is recommended for completion during final design. During that evaluation, the final decision on the installation of the abatement measures shall be made based on project design, the public involvement process, and concurrence with the NCDOT Policy.



## **12.0 REFERENCES**

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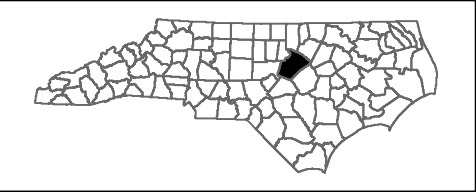
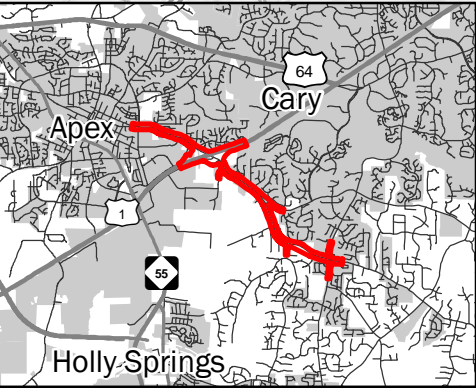
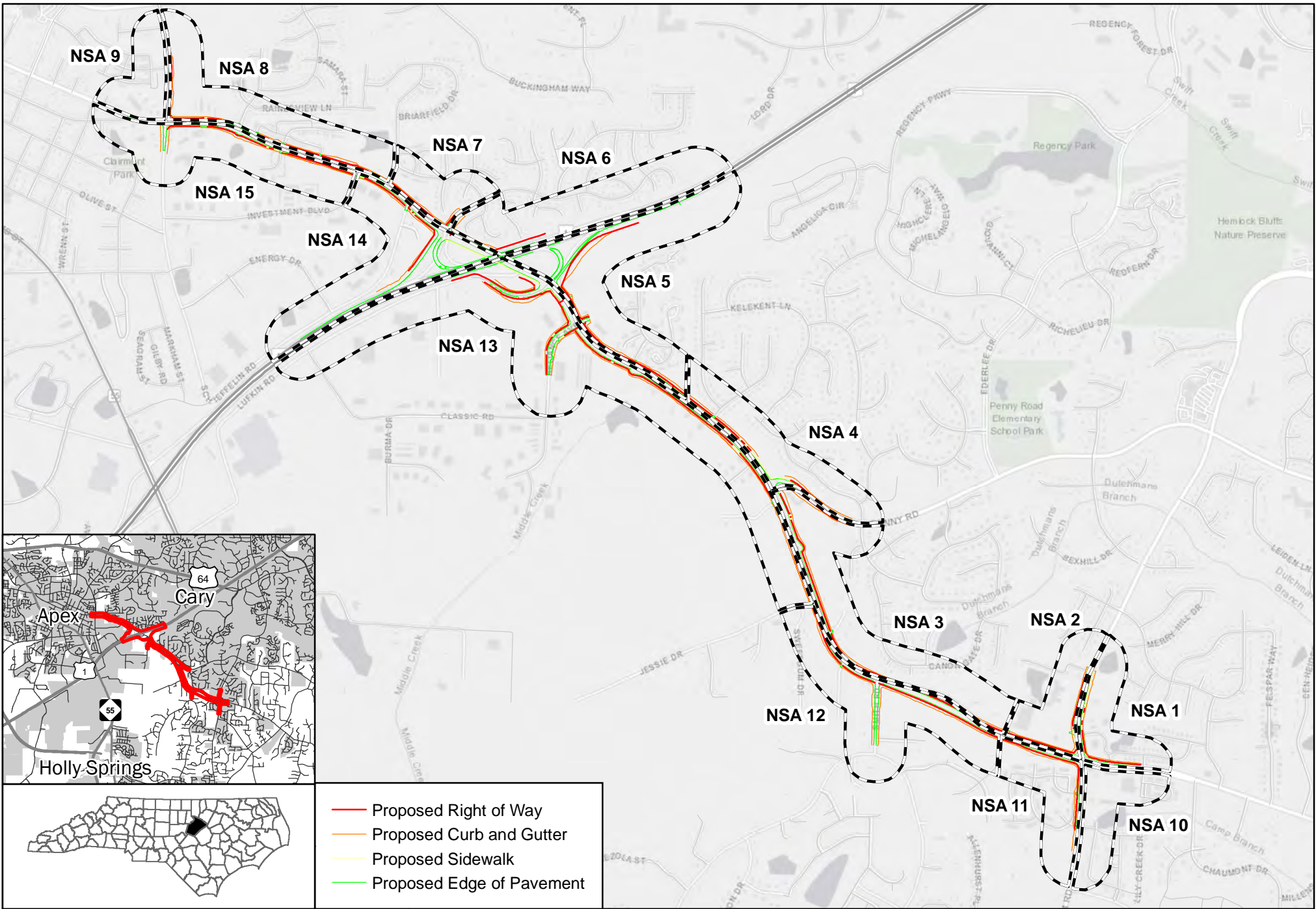
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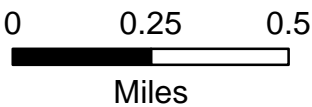
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- Proposed Right of Way
- Proposed Curb and Gutter
- Proposed Sidewalk
- Proposed Edge of Pavement

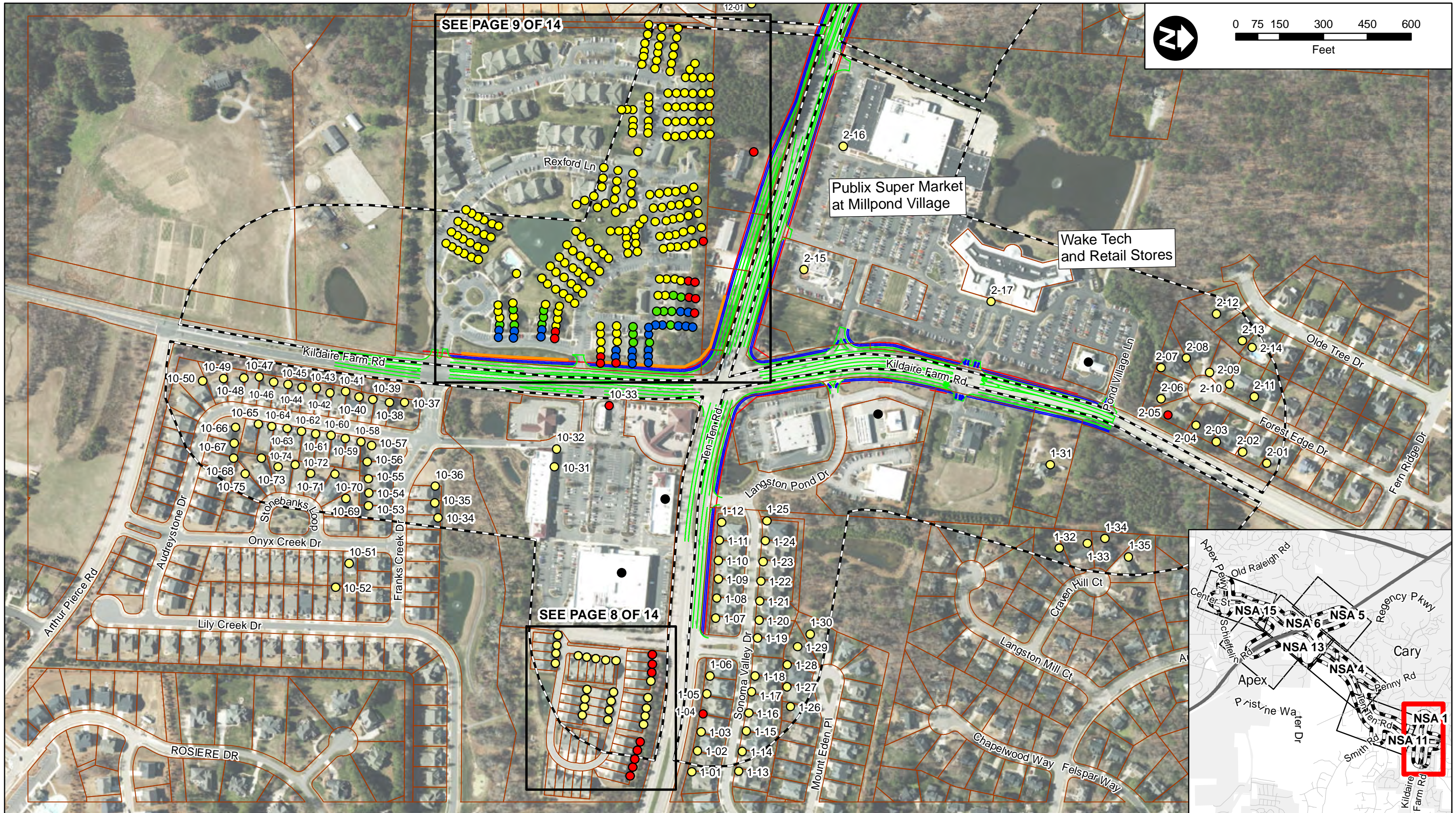


**FIGURE 1**  
**TRAFFIC NOISE ANALYSIS STUDY AREA MAP**  
 June 2019

**Ten Ten Widening Project**  
**Traffic Noise Report**  
**STIP U-5825**  
**Wake County, North Carolina**





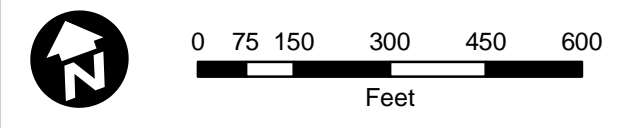
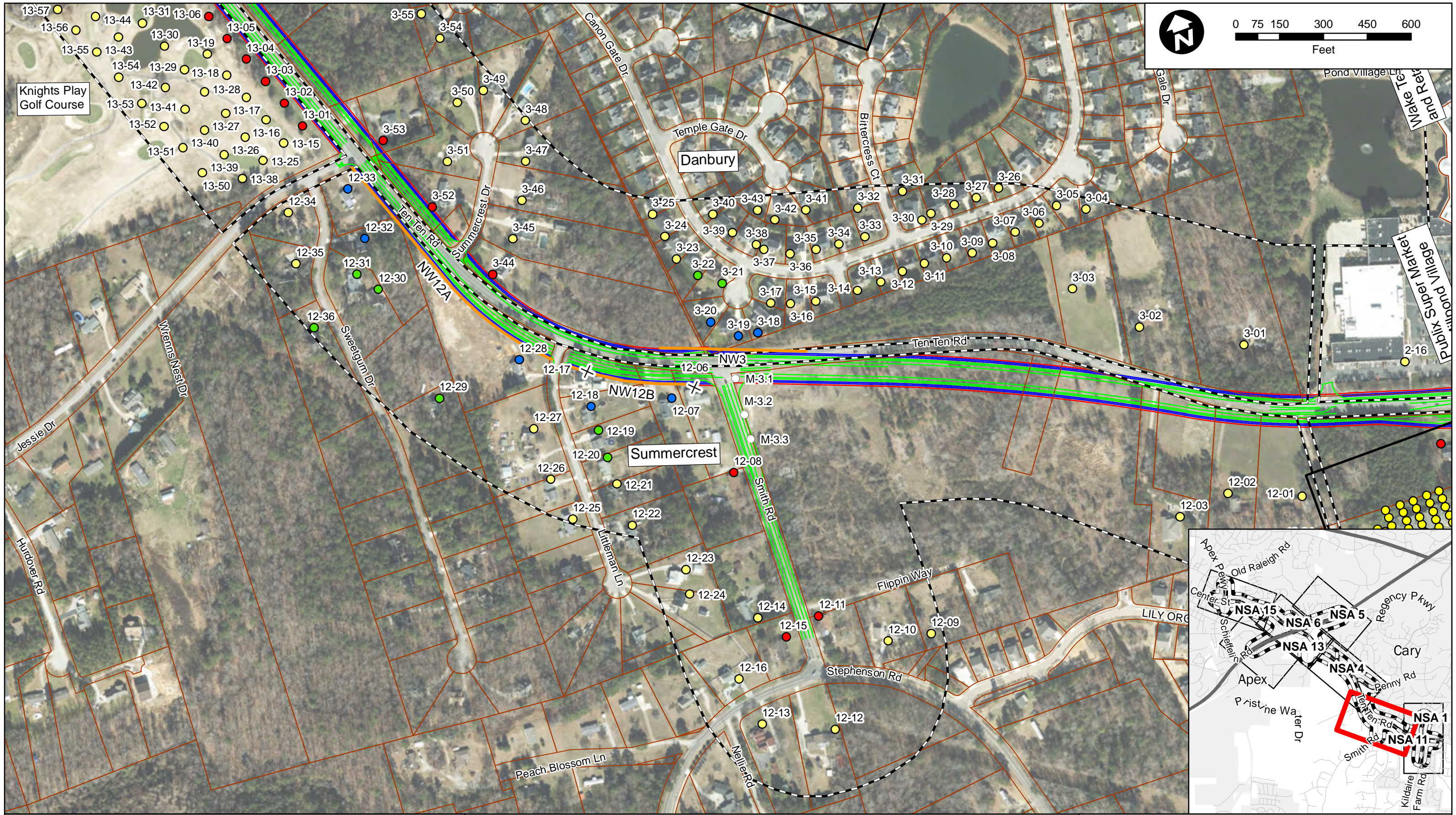


**Ten Ten Road Widening Project  
Traffic Noise Report  
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- |                              |                        |                                      |
|------------------------------|------------------------|--------------------------------------|
| ● Impacted and Benefited     | ○ Monitoring Site      | — Recommended Noise Barriers         |
| ● Not Impacted But Benefited | ✕ Property Acquisition | - - - Not Recommended Noise Barriers |
| ● Impacted Not Benefited     | ⬜ NSAs Revised         | — U-5825 Proposed EOP                |
| ● Not Impacted Not Benefited | ⬜ Parcel Boundary      | — U-5825 Proposed ROW                |
| ● Non-Noise Sensitive Site   |                        | — U-5825 Proposed Sidewalk           |

**FIGURE 2  
TRAFFIC NOISE ANALYSIS MAP**  
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Knights Play Golf Course

Danbury

Summercrest

Public Super Market  
Pond Village Market



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- Impacted and Benefited
- Not Impacted But Benefited
- Impacted Not Benefited
- Not Impacted Not Benefited
- Non-Noise Sensitive Site
- Monitoring Site
- ✕ Property Acquisition
- NSAs Revised
- Parcel Boundary
- Recommended Noise Barriers
- Not Recommended Noise Barriers
- U-5825 Proposed EOP
- U-5825 Proposed ROW
- U-5825 Proposed Sidewalk

**FIGURE 2  
TRAFFIC NOISE ANALYSIS MAP**  
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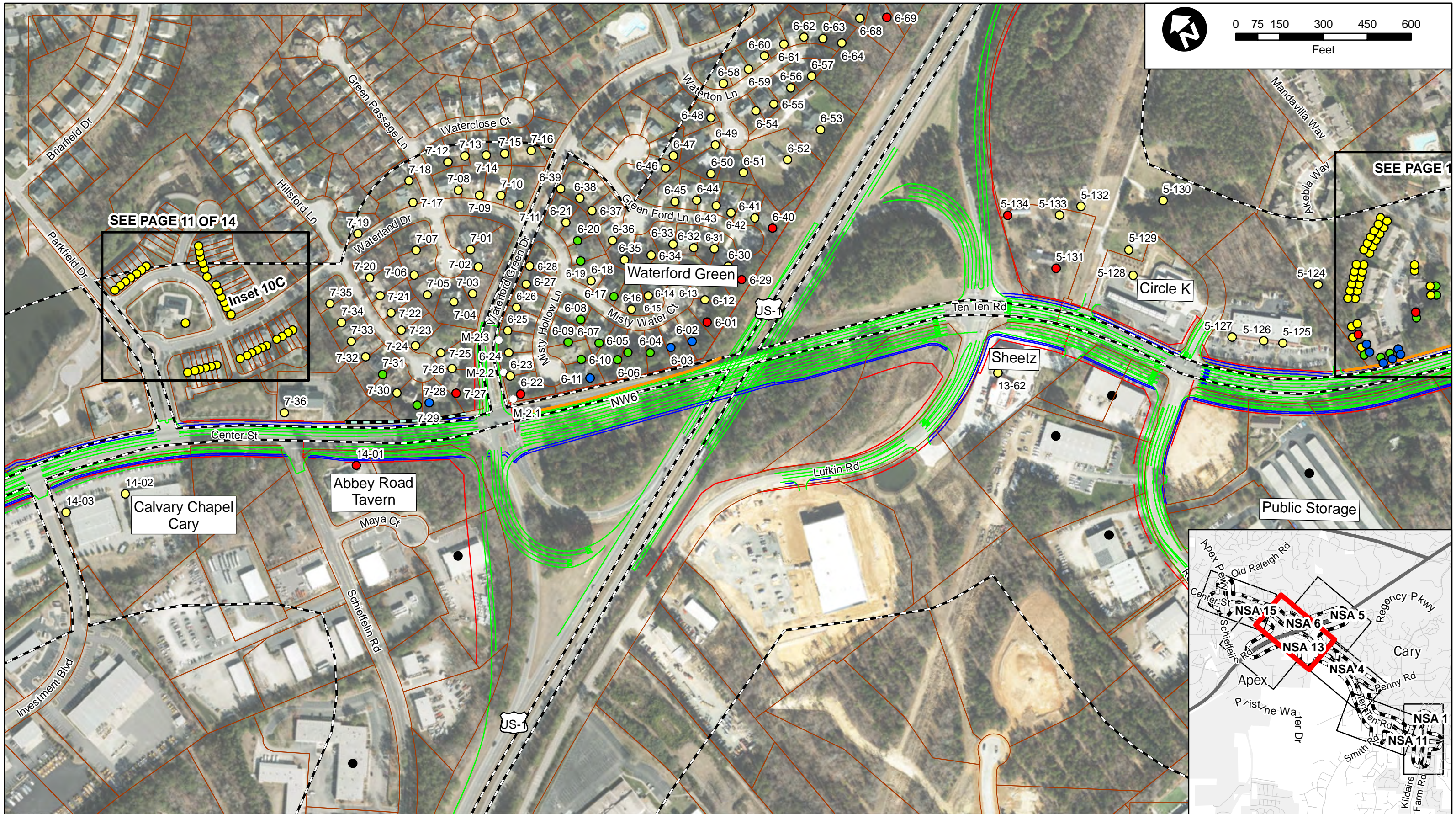


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- |                              |                        |                                    |
|------------------------------|------------------------|------------------------------------|
| ● Impacted and Benefited     | ○ Monitoring Site      | — Recommended Noise Barriers       |
| ● Not Impacted But Benefited | ✕ Property Acquisition | --- Not Recommended Noise Barriers |
| ● Impacted Not Benefited     | ⬜ NSAs Revised         | — U-5825 Proposed EOP              |
| ● Not Impacted Not Benefited | ⬜ Parcel Boundary      | — U-5825 Proposed ROW              |
| ● Non-Noise Sensitive Site   |                        | — U-5825 Proposed Sidewalk         |

**FIGURE 2  
TRAFFIC NOISE ANALYSIS MAP**  
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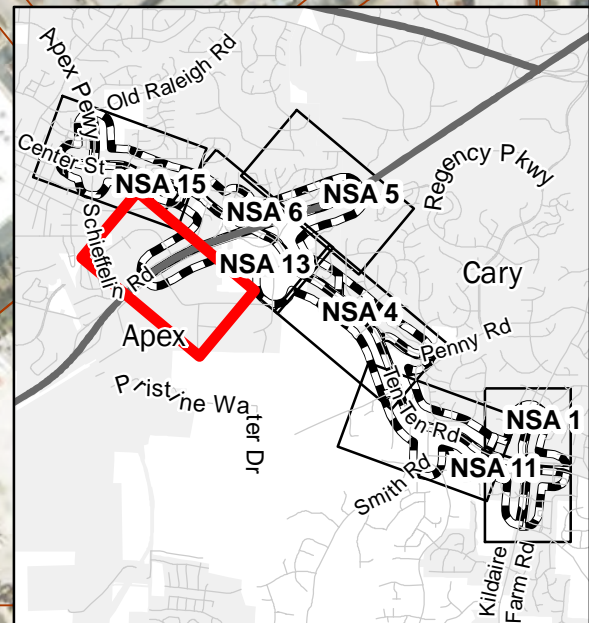


**Ten Ten Road Widening Project  
Traffic Noise Report  
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- |                              |                        |                                    |
|------------------------------|------------------------|------------------------------------|
| ● Impacted and Benefited     | ○ Monitoring Site      | — Recommended Noise Barriers       |
| ● Not Impacted But Benefited | ✕ Property Acquisition | --- Not Recommended Noise Barriers |
| ● Impacted Not Benefited     | ▭ NSAs Revised         | — U-5825 Proposed EOP              |
| ● Not Impacted Not Benefited | ▭ Parcel Boundary      | — U-5825 Proposed ROW              |
| ● Non-Noise Sensitive Site   |                        | — U-5825 Proposed Sidewalk         |

**FIGURE 2  
TRAFFIC NOISE ANALYSIS MAP**  
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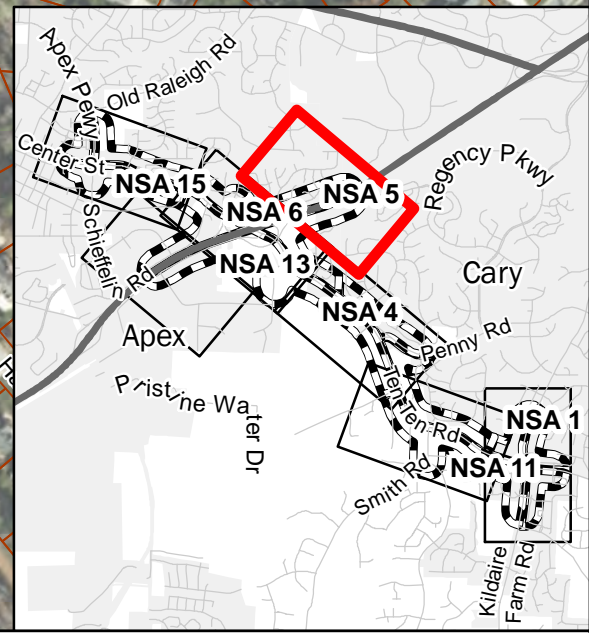
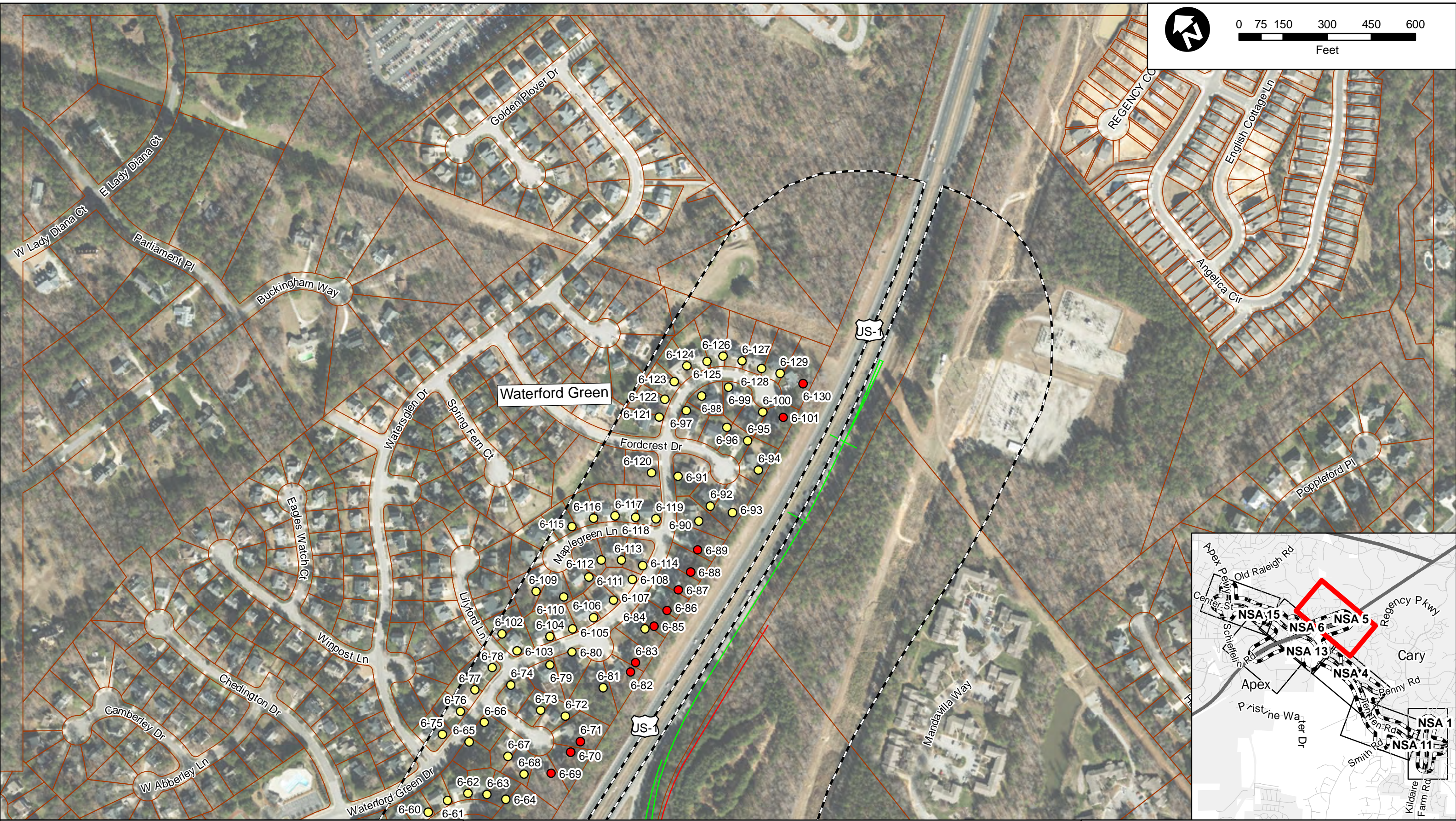


**Ten Ten Road Widening Project  
Traffic Noise Report  
STIP U-5825  
Wake County, North Carolina**

- |  |   |   |
|--|---|---|
| <span style="color: blue;">●</span> Impacted and Benefited       | <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">○</span> Monitoring Site                 | <span style="border-bottom: 2px solid orange; width: 20px; display: inline-block;"></span> Recommended Noise Barriers     |
| <span style="color: green;">●</span> Not Impacted But Benefited  | <span style="font-size: 2em;">×</span> Property Acquisition   | <span style="border-bottom: 2px dashed black; width: 20px; display: inline-block;"></span> Not Recommended Noise Barriers |
| <span style="color: red;">●</span> Impacted Not Benefited        | <span style="border: 2px dashed black; width: 20px; height: 10px; display: inline-block;"></span> NSAs Revised    | <span style="border-bottom: 2px solid green; width: 20px; display: inline-block;"></span> U-5825 Proposed EOP             |
| <span style="color: yellow;">●</span> Not Impacted Not Benefited | <span style="border: 1px solid orange; width: 20px; height: 10px; display: inline-block;"></span> Parcel Boundary | <span style="border-bottom: 2px solid red; width: 20px; display: inline-block;"></span> U-5825 Proposed ROW               |
| <span style="color: black;">●</span> Non-Noise Sensitive Site    |   | <span style="border-bottom: 2px solid blue; width: 20px; display: inline-block;"></span> U-5825 Proposed Sidewalk         |

**FIGURE 2  
TRAFFIC NOISE ANALYSIS MAP**  
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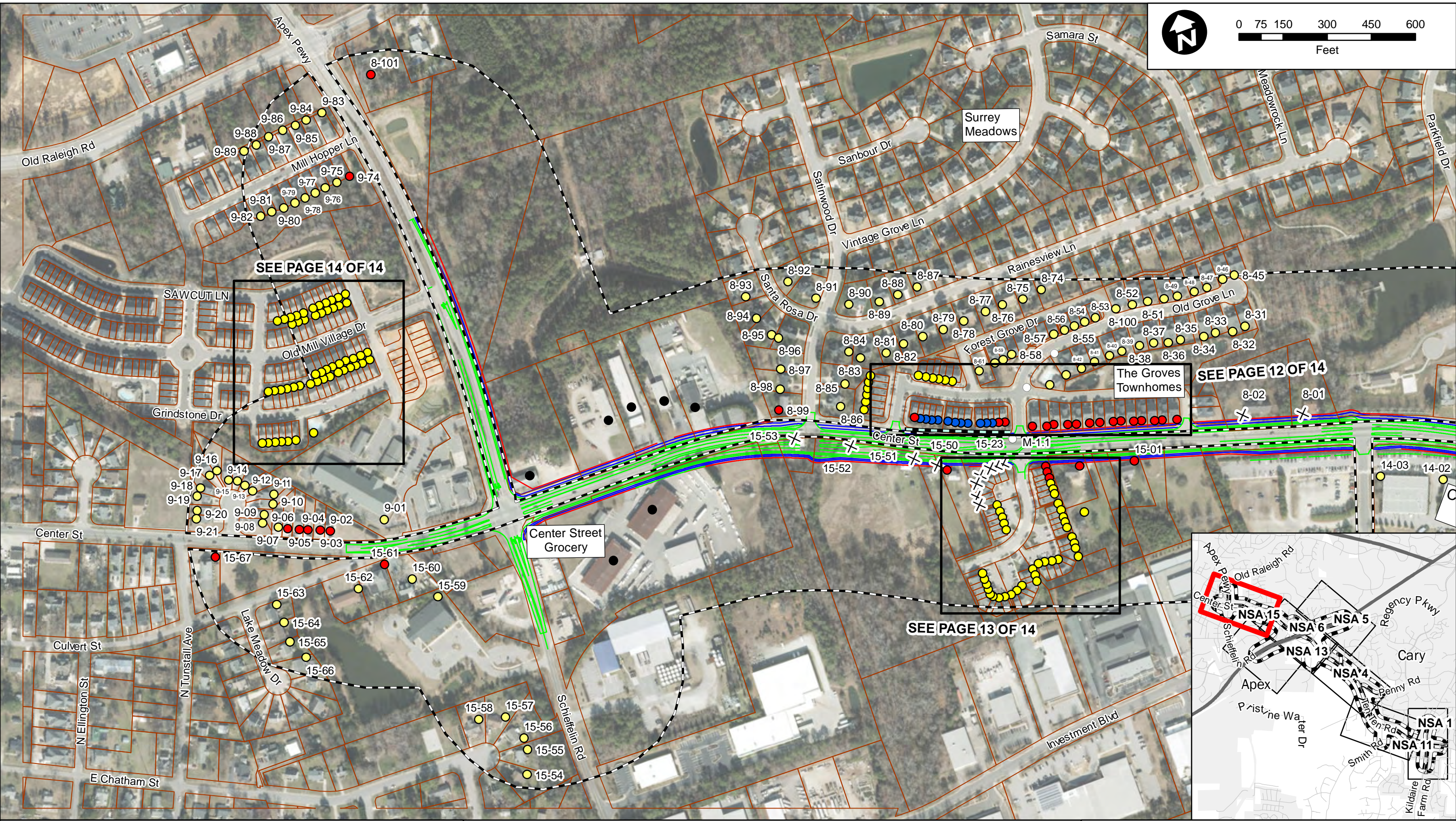


**Ten Ten Road Widening Project  
Traffic Noise Report  
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- |  |   |  |
|--|---|--|
| <span style="color: blue;">●</span> Impacted and Benefited       | <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">○</span> Monitoring Site                 | <span style="border-bottom: 2px solid orange; width: 20px; display: inline-block;"></span> Recommended Noise Barriers    |
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| <span style="color: red;">●</span> Impacted Not Benefited        | <span style="border: 2px dashed black; width: 20px; height: 10px; display: inline-block;"></span> NSAs Revised    | <span style="border-bottom: 2px solid green; width: 20px; display: inline-block;"></span> U-5825 Proposed EOP            |
| <span style="color: yellow;">●</span> Not Impacted Not Benefited | <span style="border: 1px solid orange; width: 20px; height: 10px; display: inline-block;"></span> Parcel Boundary | <span style="border-bottom: 2px solid red; width: 20px; display: inline-block;"></span> U-5825 Proposed ROW              |
| <span style="color: black;">●</span> Non-Noise Sensitive Site    |   | <span style="border-bottom: 2px solid blue; width: 20px; display: inline-block;"></span> U-5825 Proposed Sidewalk        |

**FIGURE 2  
TRAFFIC NOISE ANALYSIS MAP**  
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SEE PAGE 12 OF 14

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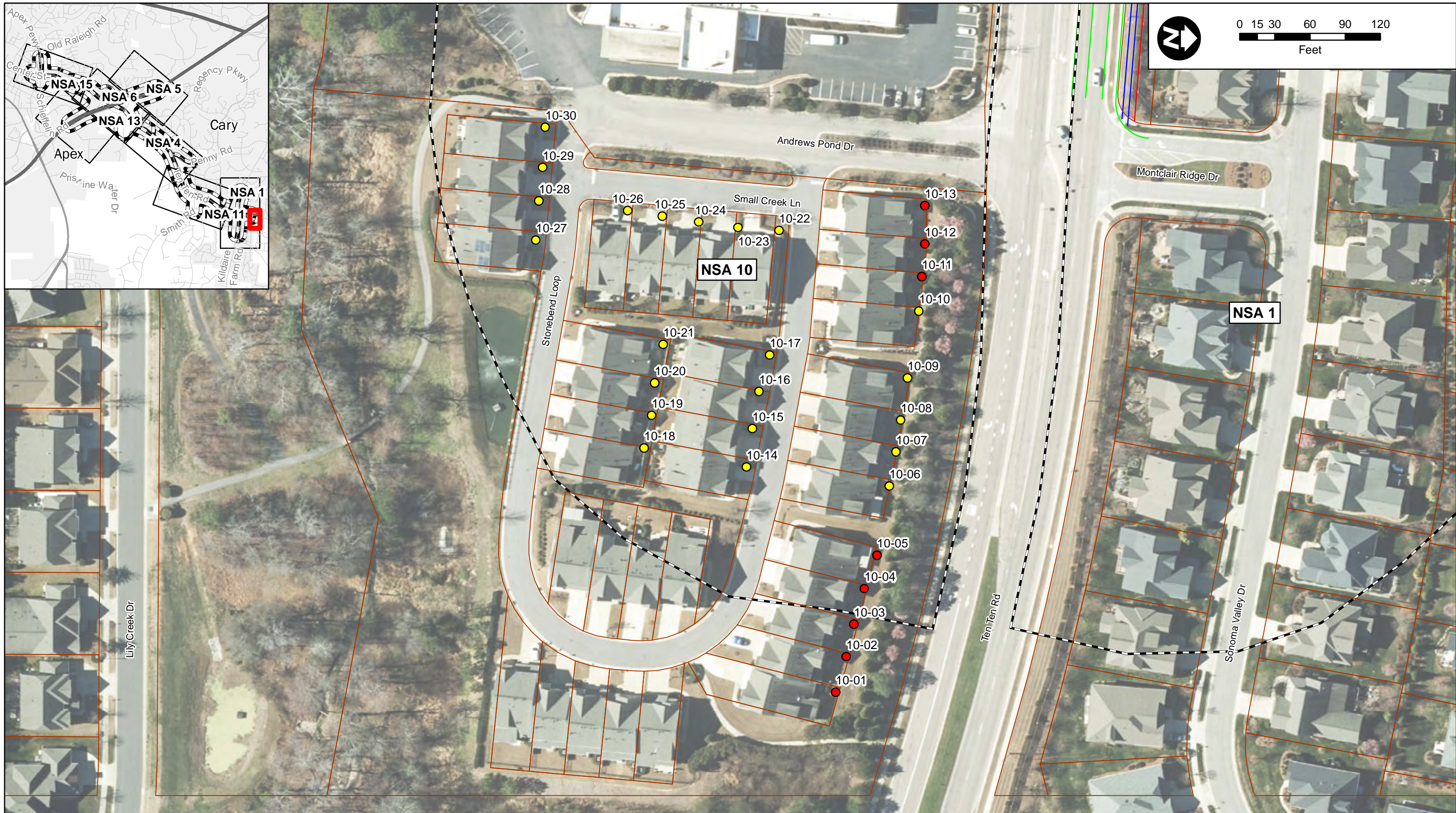
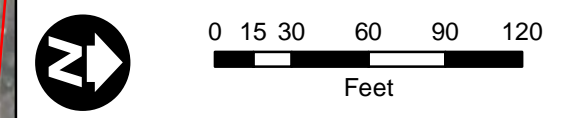
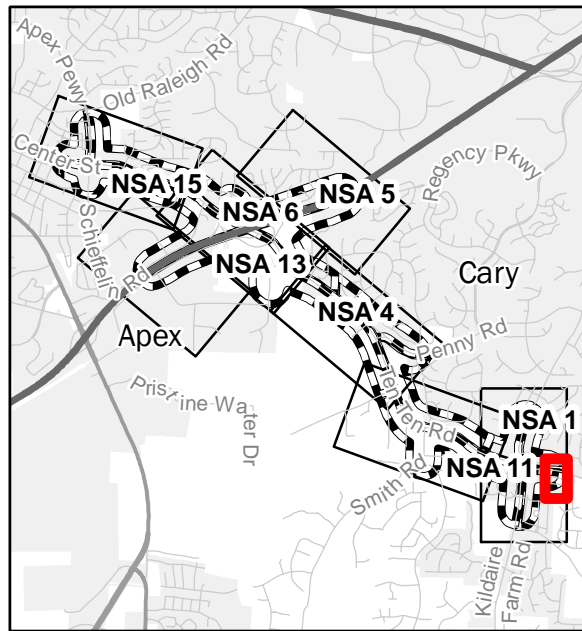


**Ten Ten Road Widening Project  
Traffic Noise Report  
STIP U-5825  
Wake County, North Carolina**

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|--|--|---|
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| <span style="color: green;">●</span> Not Impacted But Benefited  | <span style="font-size: 2em;">×</span> Property Acquisition  | <span style="border-bottom: 2px dashed black; width: 20px; display: inline-block;"></span> Not Recommended Noise Barriers |
| <span style="color: red;">●</span> Impacted Not Benefited        | <span style="border: 2px dashed black; width: 20px; height: 10px; display: inline-block;"></span> NSAs Revised   | <span style="border-bottom: 2px solid green; width: 20px; display: inline-block;"></span> U-5825 Proposed EOP             |
| <span style="color: yellow;">●</span> Not Impacted Not Benefited | <span style="border: 1px solid black; width: 20px; height: 10px; display: inline-block;"></span> Parcel Boundary | <span style="border-bottom: 2px solid red; width: 20px; display: inline-block;"></span> U-5825 Proposed ROW               |
| <span style="color: black;">●</span> Non-Noise Sensitive Site    |  | <span style="border-bottom: 2px solid blue; width: 20px; display: inline-block;"></span> U-5825 Proposed Sidewalk         |

**FIGURE 2  
TRAFFIC NOISE ANALYSIS MAP**  
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JUNE 2019



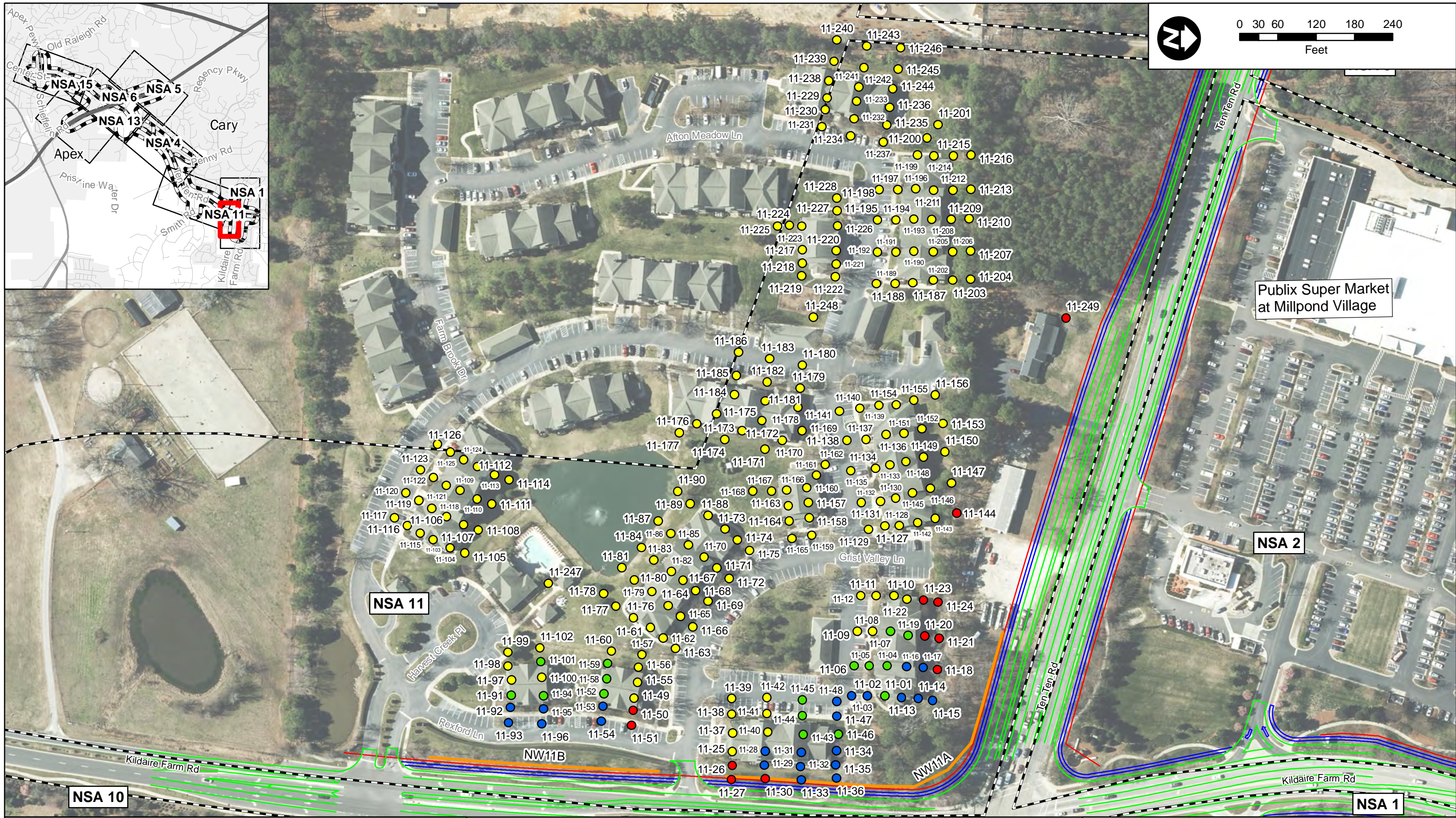
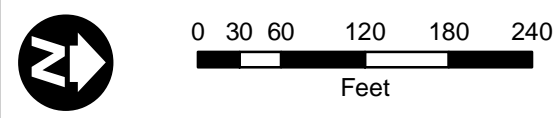
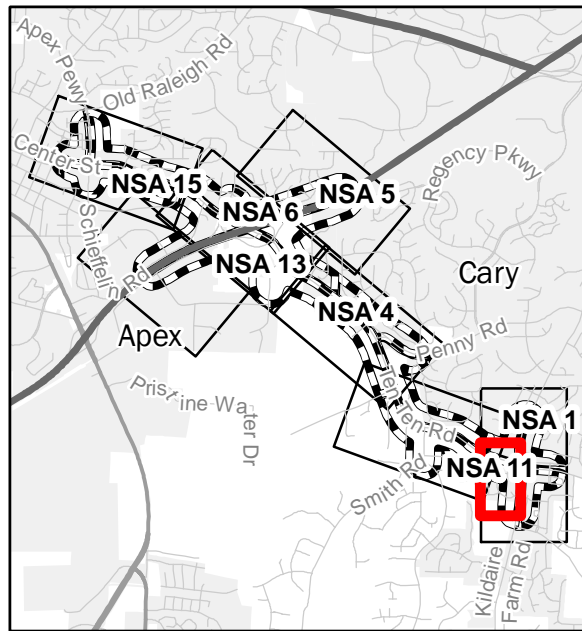


**Ten Ten Road Widening Project  
Traffic Noise Report  
STIP U-5825  
Wake County, North Carolina**

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|--|---|---|
| <span style="color: blue;">●</span> Impacted and Benefited       | <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">○</span> Monitoring Site                 | <span style="border-bottom: 2px solid orange; width: 20px; display: inline-block;"></span> Recommended Noise Barriers     |
| <span style="color: green;">●</span> Not Impacted but Benefited  | <span style="font-size: 2em;">×</span> Property Acquisition   | <span style="border-bottom: 2px dashed black; width: 20px; display: inline-block;"></span> Not Recommended Noise Barriers |
| <span style="color: red;">●</span> Impacted but Not Benefited    | <span style="border: 2px dashed black; width: 20px; height: 10px; display: inline-block;"></span> NSA Boundary    | <span style="border-bottom: 2px solid green; width: 20px; display: inline-block;"></span> U-5825 Proposed EOP             |
| <span style="color: yellow;">●</span> Not Impacted Not Benefited | <span style="border: 1px solid orange; width: 20px; height: 10px; display: inline-block;"></span> Parcel Boundary | <span style="border-bottom: 2px solid red; width: 20px; display: inline-block;"></span> U-5825 Proposed ROW               |
| <span style="color: black;">●</span> Non-Noise Sensitive Site    |   | <span style="border-bottom: 2px solid blue; width: 20px; display: inline-block;"></span> U-5825 Proposed Sidewalk         |

**FIGURE 2  
TRAFFIC NOISE ANALYSIS MAP**  
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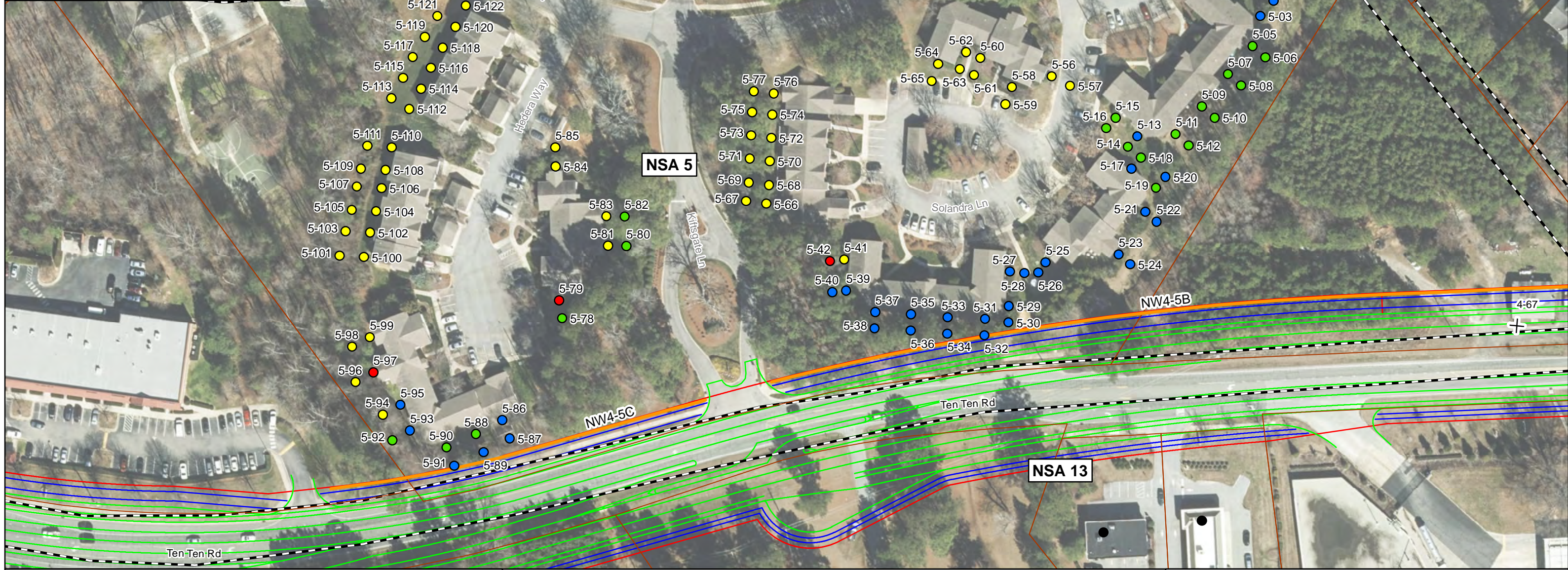
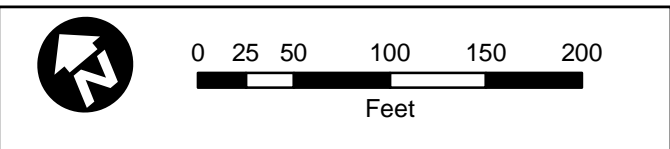
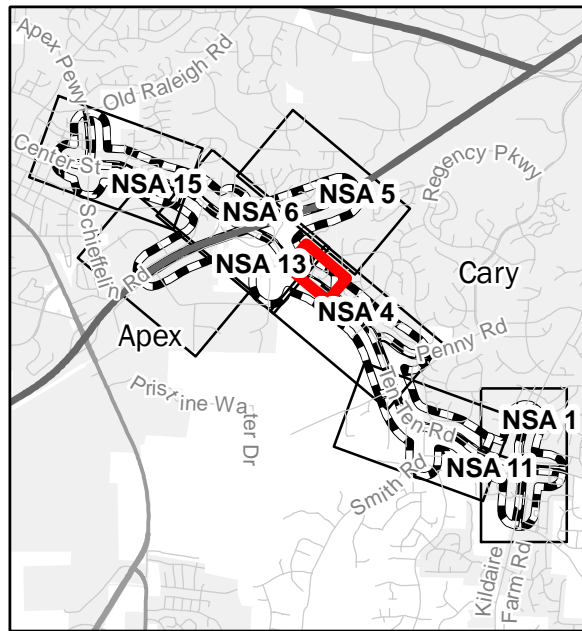


**Ten Ten Road Widening Project  
Traffic Noise Report  
STIP U-5825  
Wake County, North Carolina**

- |                              |                        |                                  |
|------------------------------|------------------------|----------------------------------|
| ● Impacted and Benefited     | ○ Monitoring Site      | — Recommended Noise Barriers     |
| ● Not Impacted but Benefited | × Property Acquisition | — Not Recommended Noise Barriers |
| ● Impacted but Not Benefited | ▭ NSA Boundary         | — U-5825 Proposed EOP            |
| ● Not Impacted Not Benefited | ▭ Parcel Boundary      | — U-5825 Proposed ROW            |
| ● Non-Noise Sensitive Site   |                        | — U-5825 Proposed Sidewalk       |

**FIGURE 2  
TRAFFIC NOISE ANALYSIS MAP**  
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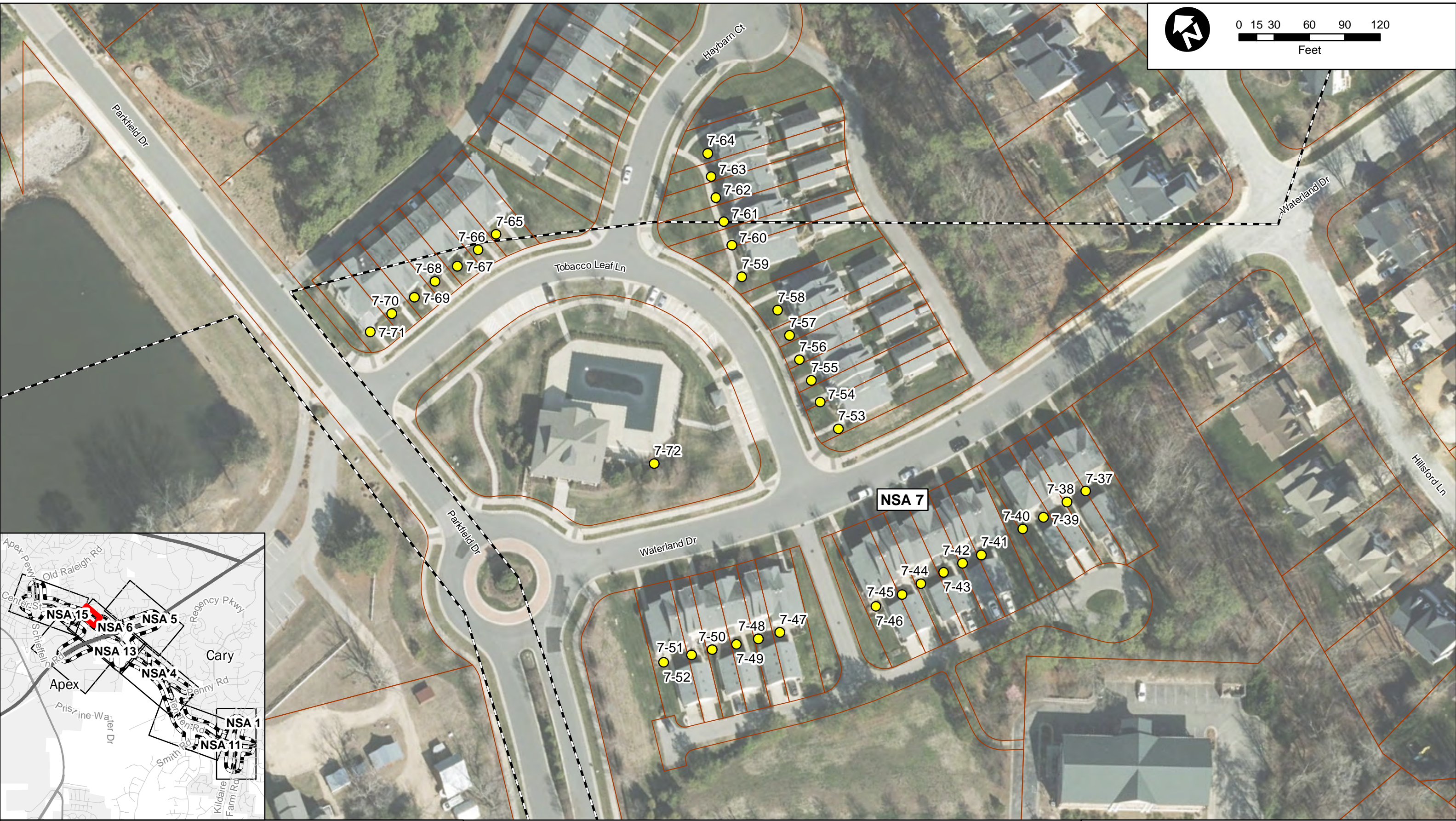
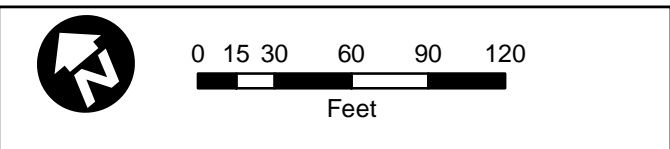


**Ten Ten Road Widening Project  
Traffic Noise Report  
STIP U-5825  
Wake County, North Carolina**

- Impacted and Benefited
- Not Impacted but Benefited
- Impacted but Not Benefited
- Not Impacted Not Benefited
- Non-Noise Sensitive Site
- Monitoring Site
- ✕ Property Acquisition
- ▭ NSA Boundary
- ▭ Parcel Boundary
- Recommended Noise Barriers
- Not Recommended Noise Barriers
- U-5825 Proposed EOP
- U-5825 Proposed ROW
- U-5825 Proposed Sidewalk

**FIGURE 2  
TRAFFIC NOISE ANALYSIS MAP**  
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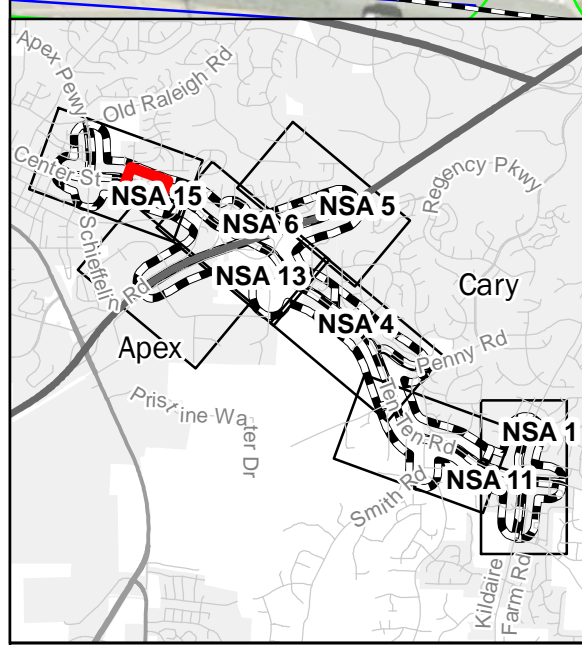
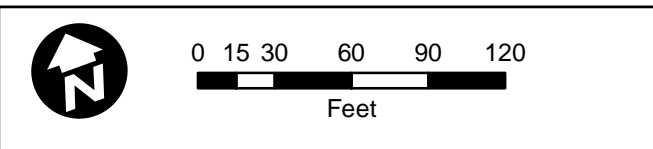
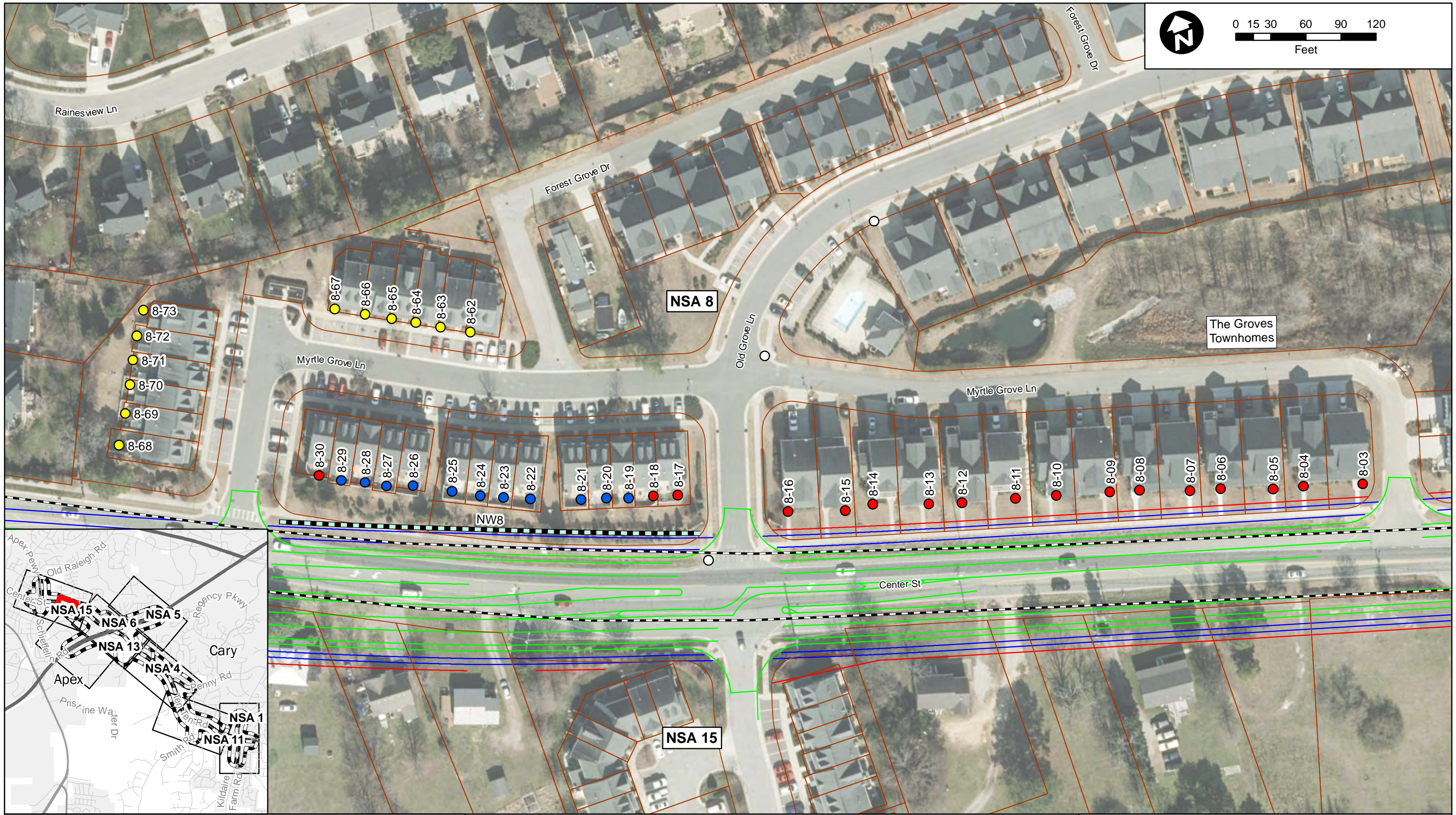



**Ten Ten Road Widening Project  
Traffic Noise Report  
STIP U-5825  
Wake County, North Carolina**

- |  |   |   |
|--|---|---|
| <span style="color: blue;">●</span> Impacted and Benefited       | <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">○</span> Monitoring Site                 | <span style="border-bottom: 2px solid orange; width: 20px; display: inline-block;"></span> Recommended Noise Barriers     |
| <span style="color: green;">●</span> Not Impacted but Benefited  | <span style="font-size: 1.5em;">×</span> Property Acquisition   | <span style="border-bottom: 2px dashed black; width: 20px; display: inline-block;"></span> Not Recommended Noise Barriers |
| <span style="color: red;">●</span> Impacted but Not Benefited    | <span style="border: 2px dashed black; width: 20px; height: 10px; display: inline-block;"></span> NSA Boundary    | <span style="border-bottom: 2px solid green; width: 20px; display: inline-block;"></span> U-5825 Proposed EOP             |
| <span style="color: yellow;">●</span> Not Impacted Not Benefited | <span style="border: 1px solid orange; width: 20px; height: 10px; display: inline-block;"></span> Parcel Boundary | <span style="border-bottom: 2px solid red; width: 20px; display: inline-block;"></span> U-5825 Proposed ROW               |
| <span style="color: black;">●</span> Non-Noise Sensitive Site    |   | <span style="border-bottom: 2px solid blue; width: 20px; display: inline-block;"></span> U-5825 Proposed Sidewalk         |

**FIGURE 2  
TRAFFIC NOISE ANALYSIS MAP**  
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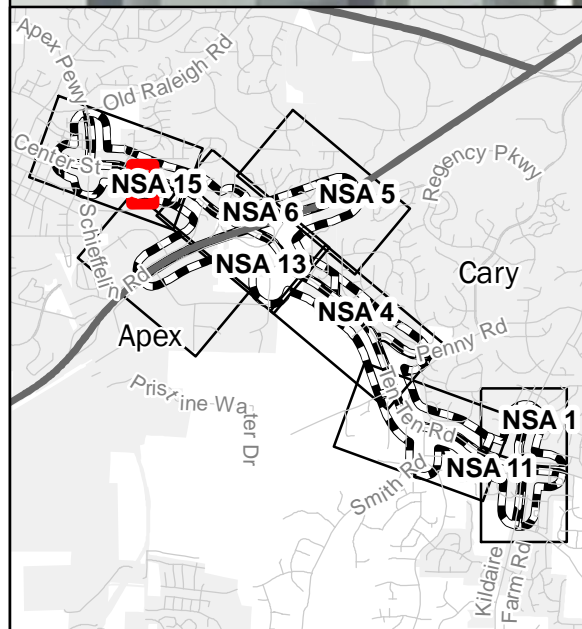
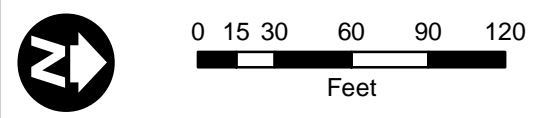
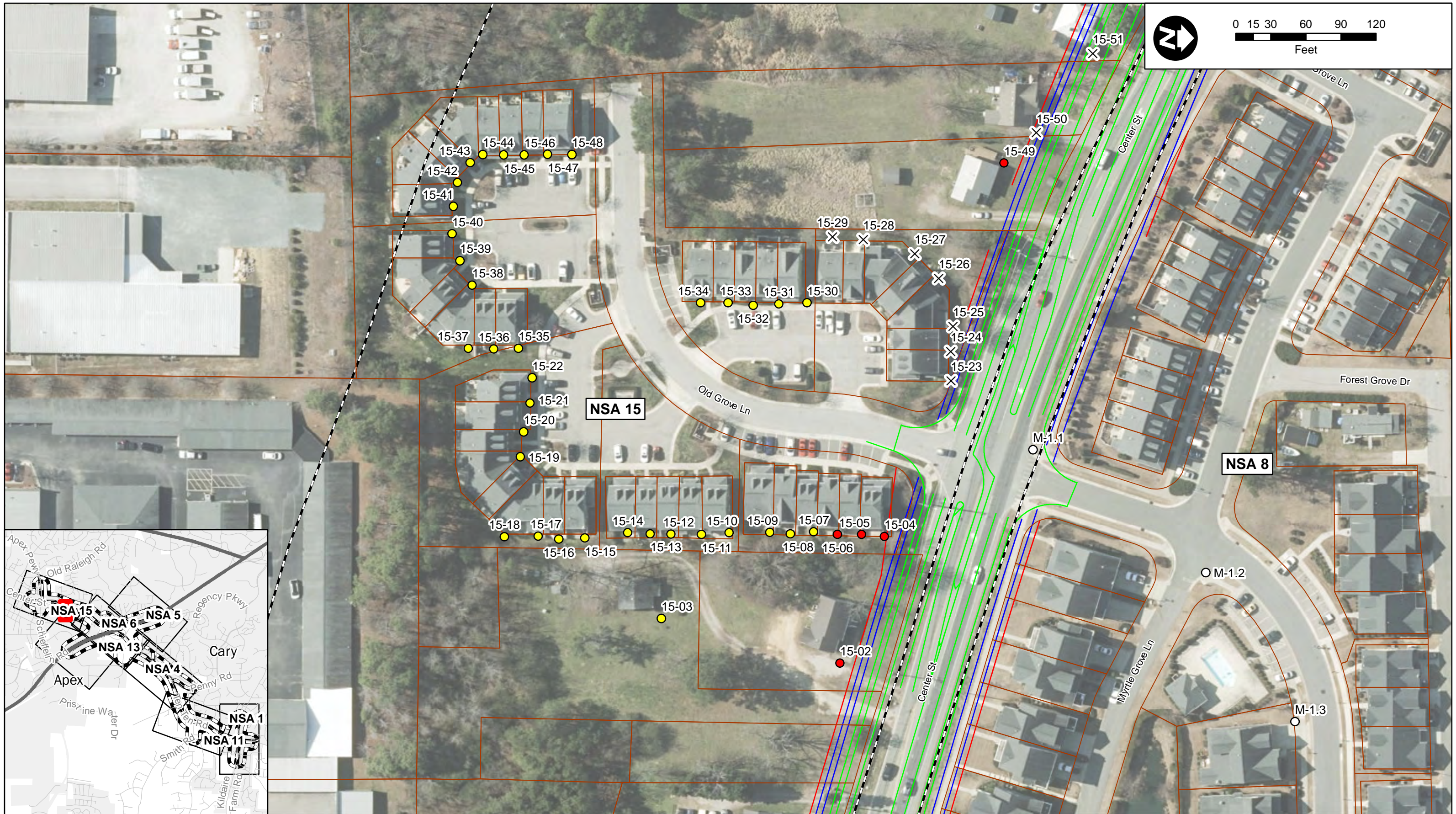



**Ten Ten Road Widening Project**  
**Traffic Noise Report**  
**STIP U-5825**  
**Wake County, North Carolina**

<span style="color: blue;">●</span> Impacted and Benefited	○ Monitoring Site	<span style="color: orange;">—</span> Recommended Noise Barriers
<span style="color: green;">●</span> Not Impacted but Benefited	✕ Property Acquisition	<span style="color: black;">- - -</span> Not Recommended Noise Barriers
<span style="color: red;">●</span> Impacted but Not Benefited	▭ NSA Boundary	<span style="color: green;">—</span> U-5825 Proposed EOP
<span style="color: yellow;">●</span> Not Impacted Not Benefited	▭ Parcel Boundary	<span style="color: red;">—</span> U-5825 Proposed ROW
<span style="color: black;">●</span> Non-Noise Sensitive Site		<span style="color: blue;">—</span> U-5825 Proposed Sidewalk

**FIGURE 2**  
**TRAFFIC NOISE ANALYSIS MAP**  
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 JUNE 2019





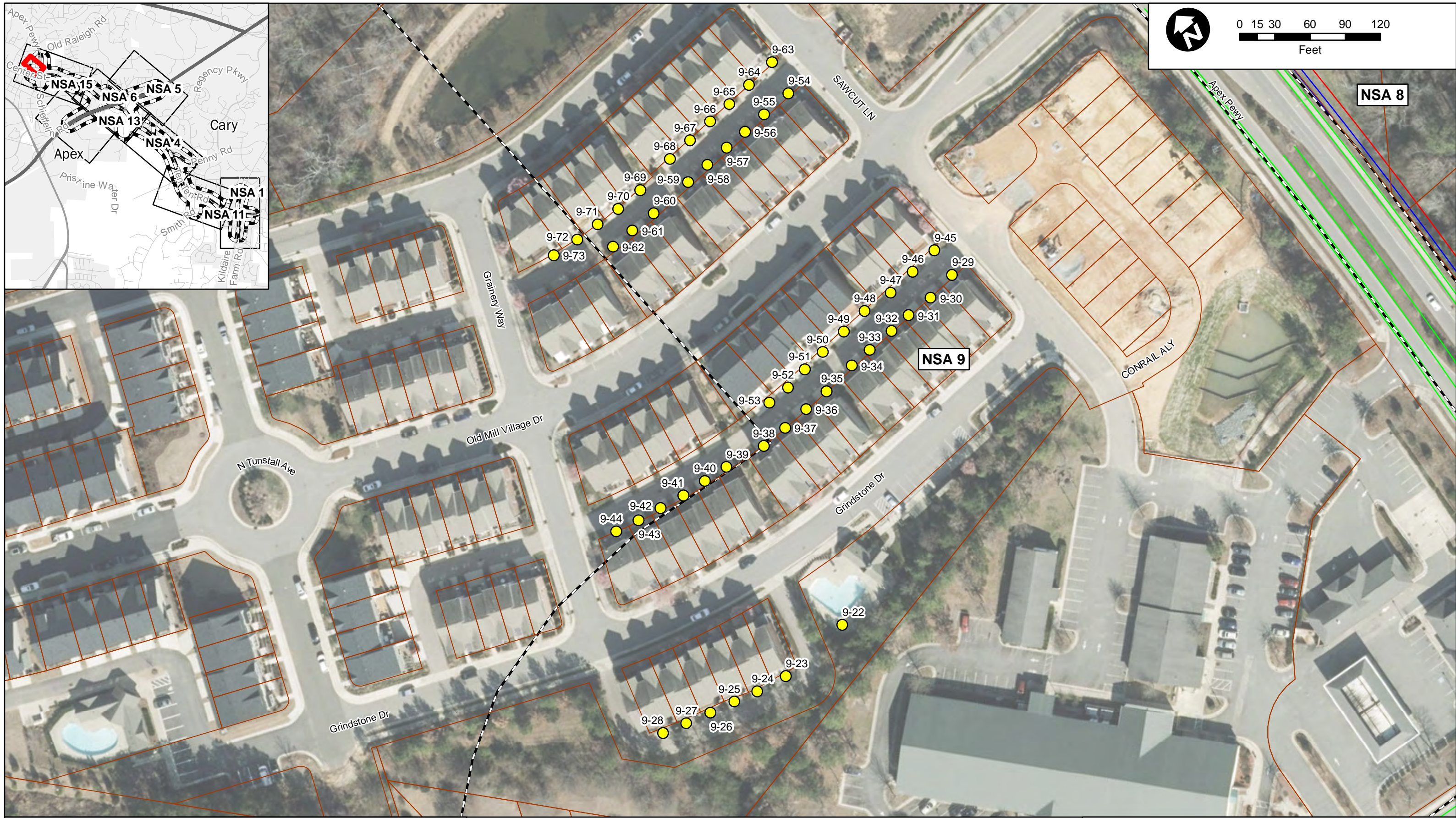
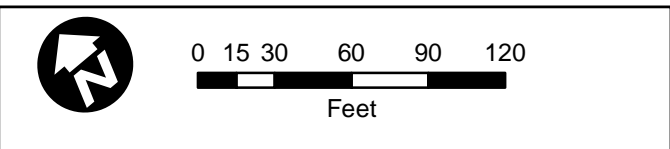
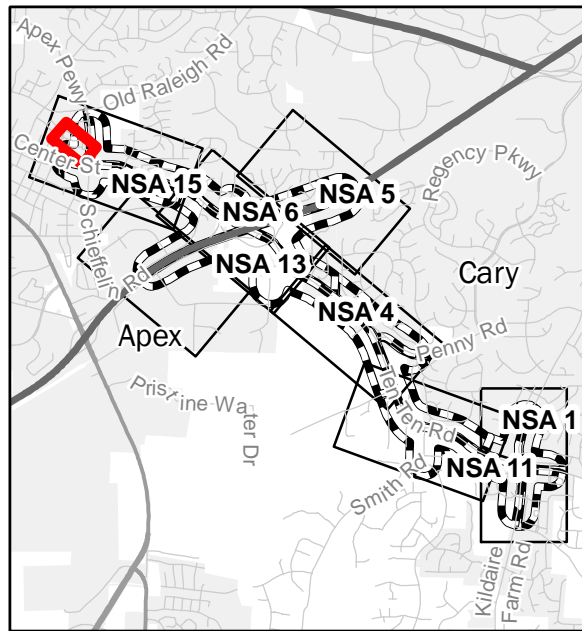
- |  |   |   |
|--|---|---|
| <span style="color: blue;">●</span> Impacted and Benefited       | <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">○</span> Monitoring Site | <span style="border-bottom: 2px solid orange; width: 20px; display: inline-block;"></span> Recommended Noise Barriers     |
| <span style="color: green;">●</span> Not Impacted but Benefited  | <span style="border: 1px dashed black; padding: 2px;">×</span> Property Acquisition               | <span style="border-bottom: 2px dashed black; width: 20px; display: inline-block;"></span> Not Recommended Noise Barriers |
| <span style="color: red;">●</span> Impacted but Not Benefited    | <span style="border: 2px dashed black; padding: 2px;"> </span> NSA Boundary                       | <span style="border-bottom: 2px solid green; width: 20px; display: inline-block;"></span> U-5825 Proposed EOP             |
| <span style="color: yellow;">●</span> Not Impacted Not Benefited | <span style="border: 1px solid orange; padding: 2px;"> </span> Parcel Boundary                    | <span style="border-bottom: 2px solid red; width: 20px; display: inline-block;"></span> U-5825 Proposed ROW               |
| <span style="color: black;">●</span> Non-Noise Sensitive Site    |   | <span style="border-bottom: 2px solid blue; width: 20px; display: inline-block;"></span> U-5825 Proposed Sidewalk         |

**FIGURE 2**  
**TRAFFIC NOISE ANALYSIS MAP**  
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 JUNE 2019



**Ten Ten Road Widening Project**  
**Traffic Noise Report**  
**STIP U-5825**  
**Wake County, North Carolina**





**Ten Ten Road Widening Project  
Traffic Noise Report  
STIP U-5825  
Wake County, North Carolina**

- |  |   |   |
|--|---|---|
| <span style="color: blue;">●</span> Impacted and Benefited       | <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">○</span> Monitoring Site                 | <span style="border-bottom: 2px solid orange; width: 20px; display: inline-block;"></span> Recommended Noise Barriers     |
| <span style="color: green;">●</span> Not Impacted but Benefited  | <span style="font-size: 1.5em;">×</span> Property Acquisition   | <span style="border-bottom: 2px dashed black; width: 20px; display: inline-block;"></span> Not Recommended Noise Barriers |
| <span style="color: red;">●</span> Impacted but Not Benefited    | <span style="border: 2px dashed black; width: 20px; height: 10px; display: inline-block;"></span> NSA Boundary    | <span style="border-bottom: 2px dashed green; width: 20px; display: inline-block;"></span> U-5825 Proposed EOP            |
| <span style="color: yellow;">●</span> Not Impacted Not Benefited | <span style="border: 1px solid orange; width: 20px; height: 10px; display: inline-block;"></span> Parcel Boundary | <span style="border-bottom: 2px solid red; width: 20px; display: inline-block;"></span> U-5825 Proposed ROW               |
| <span style="color: black;">●</span> Non-Noise Sensitive Site    |   | <span style="border-bottom: 2px solid blue; width: 20px; display: inline-block;"></span> U-5825 Proposed Sidewalk         |

**FIGURE 2  
TRAFFIC NOISE ANALYSIS MAP**  
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JUNE 2019



## **APPENDICES**

## **Appendix A**

### **Ambient Noise Level Monitoring**

**Table A-1: Ambient Hourly-Equivalent Sound Levels,  $L_{eq(h)}$ <sup>1</sup>**

Setup	Location	Land Use	Dominant Noise Source <sup>2</sup>	Start	Stop	Duration	$L_{eq(h)}$ (dBA)
1001	Northwest corner of SR 1010 and N Old Grove Ln	Residential	Roadway	1:12 PM	1:46 PM	34 mins	72
1002	Northeast corner of N Old Grove Ln and Myrtle Grove Ln	Residential	Roadway	1:14 PM	1:44 PM	30 mins	53
1003	North end of the parking lot in front of the swimming pool	Residential	Roadway	1:17 PM	1:45 PM	28 mins	48
2001	Northeast corner of SR 1010 and Waterford Green Dr	Residential	Roadway	2:05 PM	2:32 PM	27 mins	68
2002	Adjacent to the southwest corner of 1817 Misty Hollow Ln	Residential	Roadway	2:05 PM	2:32 PM	27 mins	62
2003	Near the end of the fence behind 1813 Misty Hollow Ln	Residential	Roadway	2:08 PM	2:37 PM	29 mins	60
3001	Southeast corner of SR 1010 and Smith Rd	Residential	Roadway	3:05 PM	3:32 PM	27 mins	66
3002	Between ends of the half-circle driveway along Smith Rd	Residential	Roadway	3:06 PM	3:30 PM	24 mins	65
3003	Adjacent to the ruins on the east side of Smith Rd	Residential	Roadway	3:10 PM	3:34 PM	24 mins	67

<sup>1</sup> In accordance with FHWA guidance and accepted industry standards, hourly equivalent sound level,  $L_{eq(h)}$ , were extrapolated from short-term data collection monitoring sessions, and are expressed in units of A-weighted decibels (dB(A)) rounded to the nearest whole number. Data was obtained on Friday, November 10, 2017.

<sup>2</sup> For each Setup, noise meters were located at logical locations for the assessment of existing highway traffic noise.

**Table A-2: Ambient Noise Level Monitoring Traffic Counts**

	<b>Northbound SR 1010 (Ten Ten Road)</b>					<b>Southbound SR 1010 (Ten Ten Road)</b>				
<b>Site</b>	<b>Cars</b>	<b>Medium Trucks</b>	<b>Heavy Trucks</b>	<b>Bus</b>	<b>Motor-cycles</b>	<b>Cars</b>	<b>Medium Trucks</b>	<b>Heavy Trucks</b>	<b>Bus</b>	<b>Motor-cycles</b>
1001	551	11	6	0	0	634	17	0	0	0
2001	871	43	20	0	0	726	40	3	6	0
3001	529	11	3	0	0	549	11	0	0	0
	<b>Eastbound N Old Grove Lane</b>					<b>Westbound N Old Grove Lane</b>				
<b>Site</b>	<b>Cars</b>	<b>Medium Trucks</b>	<b>Heavy Trucks</b>	<b>Bus</b>	<b>Motor-cycles</b>	<b>Cars</b>	<b>Medium Trucks</b>	<b>Heavy Trucks</b>	<b>Bus</b>	<b>Motor-cycles</b>
1001	9	0	0	0	0	3	0	0	0	0
	<b>Eastbound Waterford Green Drive</b>					<b>Westbound Waterford Green Drive</b>				
<b>Site</b>	<b>Cars</b>	<b>Medium Trucks</b>	<b>Heavy Trucks</b>	<b>Bus</b>	<b>Motor-cycles</b>	<b>Cars</b>	<b>Medium Trucks</b>	<b>Heavy Trucks</b>	<b>Bus</b>	<b>Motor-cycles</b>
2001	100	0	0	0	0	103	0	0	0	0
	<b>Northbound Smith Road</b>					<b>Southbound Smith Road</b>				
<b>Site</b>	<b>Cars</b>	<b>Medium Trucks</b>	<b>Heavy Trucks</b>	<b>Bus</b>	<b>Motor-cycles</b>	<b>Cars</b>	<b>Medium Trucks</b>	<b>Heavy Trucks</b>	<b>Bus</b>	<b>Motor-cycles</b>
3001	211	3	0	0	0	411	6	3	0	0

**Table A-3: Validation**

<b>Setup</b>	<b>Location Description</b>	<b>Measured Sound Level</b>	<b>TNM Calculated</b>	<b><math>\Delta</math></b>	<b>Validate?</b>
1001	Northwest corner of SR 1010 and N Old Grove Ln	71.7	69.7	2	<b>YES</b>
1002	Northeast corner of N Old Grove Ln and Myrtle Grove Ln	52.5	51.9	0.6	<b>YES</b>
1003	North end of the parking lot in front of the swimming pool	47.9	47.9	0	<b>YES</b>
2001	Northeast corner of SR 1010 and Waterford Green Dr	67.7	69.6	-1.9	<b>YES</b>
2002	Adjacent to the southwest corner of 1817 Misty Hollow Ln	61.6	61.3	0.3	<b>YES</b>
2003	Near the end of the fence behind 1813 Misty Hollow Ln	59.8	58.1	1.7	<b>YES</b>
3001	Southeast corner of SR 1010 and Smith Rd	65.8	68.2	-2.4	<b>YES</b>
3002	Between ends of the half-circle driveway along Smith Rd	64.7	63.8	0.9	<b>YES</b>
3003	Adjacent to the ruins on the east side of Smith Rd	66.8	63.8	3	<b>YES</b>



Count Number: 1001 / 1002 / 1003  
 County: Wake  
 City: Apex  
 Division: 05

Count Type: NL - Noise Measurement  
 Duration: 21 minutes  
 Method Used: Larson-Davis 831, LxT  
 Completed By: Brownlow/Rhomberg

Location: SR 1010 & Old Grove Lane

Count Date: Friday, November 10, 2017  
 Count Time: 1:21 PM to 1:42 PM

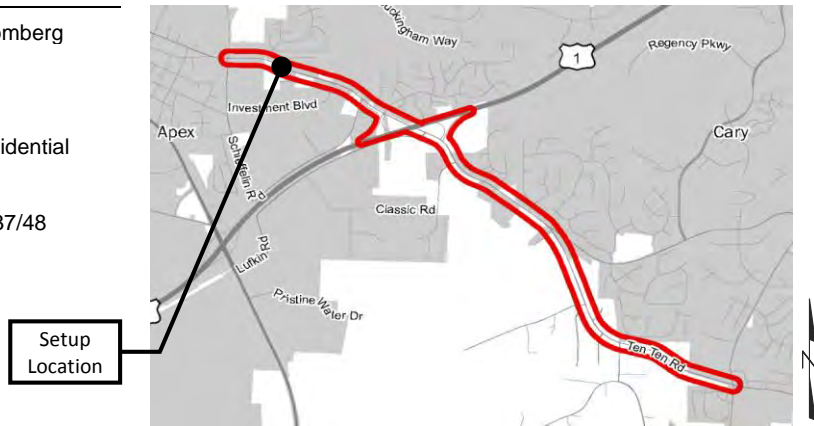
**Weather Conditions**

Temp (°F)	Dew Point (°F)	Pressure (in)	Wind Dir.	Wind Speed (mph)	Relative humidity	Precip. (in)
57	35	30.19	N	10	43%	0

\* Source: Weather Underground (www.wunderground.com) Raleigh-Durham International Station for local weather information

**Comments:**

- 1 Counted By: Rhomberg
- 2 School in Session: Yes
- 3 Instrument Calibrated: Yes
- 4 Surrounding Land-Uses: Residential
- 5 Equipment was working properly: Yes
- 6 Temp high/low/average: 58/37/48
- 7 Wind: 2
- 8 Precipitation: 0



Vicinity Map

**Observed Traffic Volumes:**

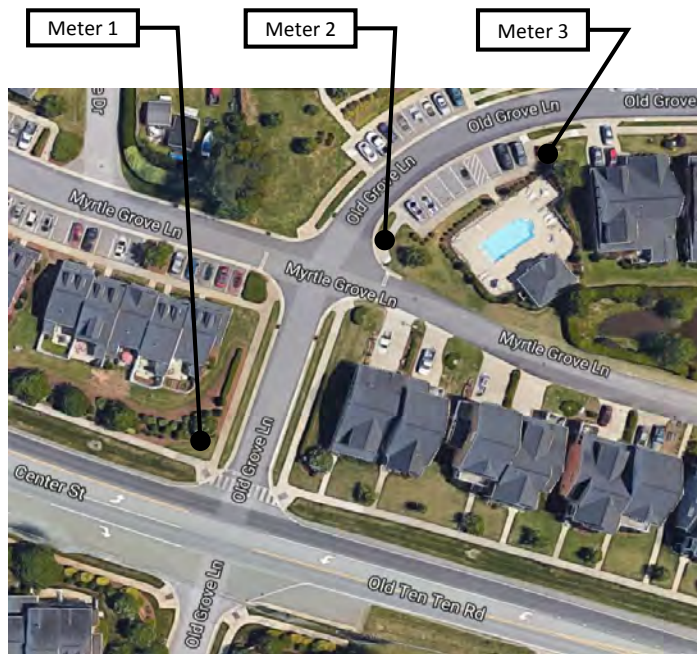
	NB	SB	WB	EB	
Passenger cars	551	634	3	9	vph
Medium Trucks	11	17	0	0	vph
Tractor Trailers	6	0	0	0	vph
Buses	0	0	0	0	vph
Motorcycles	0	0	0	0	vph

Measured Sound Levels: 71.7 / 52.5 / 47.9 dBA

**Event Notes:**

Despiking necessary to remove noise caused by honking car horns and vehicles driving over a raised manhole cover.

Traffic volumes were normalized to 1 hour.



Aerial



Count Number: 1001 / 1002 / 1003  
County: Wake  
City: Apex  
Division: 05

VHB | VHB Engineering NC, PC  
Transportation Planning  
Land Development | Engineering

Intersection: SR 1010 & Old Grove Lane

---



**Location 1001 - Looking North**



**Location 1002 - Looking North**



Count Number: 1001 / 1002 / 1003  
County: Wake  
City: Apex  
Division: 05

VHB | VHB Engineering NC, PC  
Transportation Planning  
Land Development | Engineering

Intersection: SR 1010 & Old Grove Lane

---



**Location 1003 - LookingNortheast**





Count Number: 2001 / 2002 / 2003  
 County: Wake  
 City: Apex  
 Division: 05

Count Type: NL - Noise Measurement  
 Duration: 20 minutes  
 Method Used: Larson-Davis 831, LxT  
 Completed By: Brownlow/Rhomberg

Location: SR 1010 & Waterford Green Drive

Count Date: Friday, November 10, 2017      Count Time: 2:10 PM to 2:30 PM

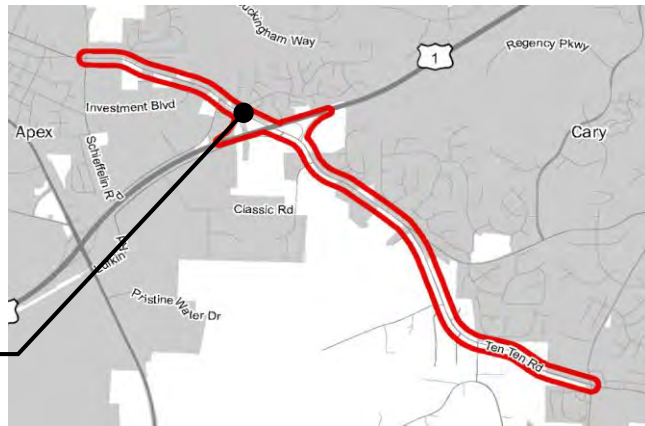
**Weather Conditions**

Temp (°F)	Dew Point (°F)	Pressure (in)	Wind Dir.	Wind Speed (mph)	Relative humidity	Precip. (in)
57	35	30.19	Calm	Calm	43%	0

\* Source: Weather Underground (www.wunderground.com) Raleigh-Durham International Station for local weather information

**Comments:**

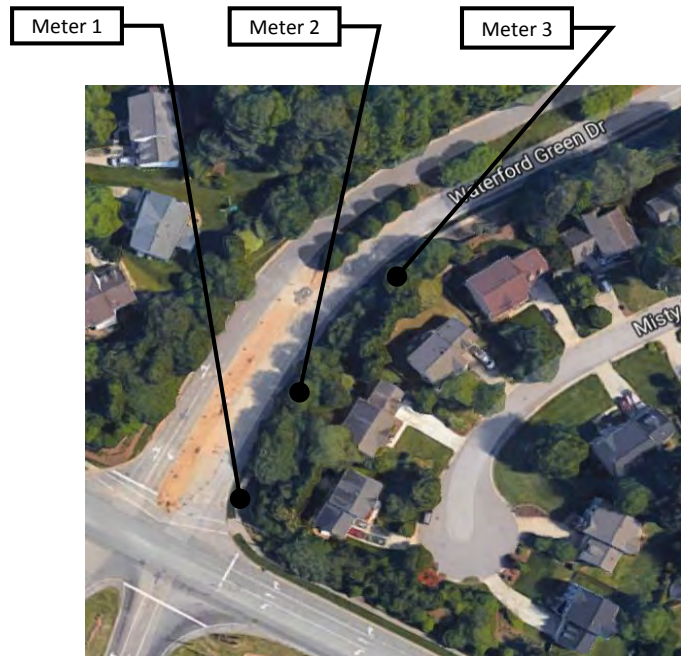
- 1 Counted By: Rhomberg
- 2 School in Session: Yes
- 3 Instrument Calibrated: Yes
- 4 Surrounding Land-Uses: Residential
- 5 Equipment was working properly: Yes
- 6 Temp high/low/average: 58/37/48
- 7 Wind: 2
- 8 Precipitation: 0



Vicinity Map

**Observed Traffic Volumes:**

	NB	SB	WB	EB	
Passenger cars	871	726	103	100	vph
Medium Trucks	43	40	0	0	vph
Tractor Trailers	20	3	0	0	vph
Buses	0	6	0	0	vph
Motorcycles	0	0	0	0	vph



Aerial

Measured Sound Levels: 67.7 / 61.6 / 59.8 dBA

**Event Notes:**

Despiking necessary to remove noise caused by honking car horns and squeaking truck brakes.

Traffic volumes were normalized to 1 hour.



Count Number: 2001 / 2002 / 2003  
County: Wake  
City: Apex  
Division: 05

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Transportation Planning  
Land Development | Engineering

Intersection: SR 1010 & Waterford Green Drive

---



**Location 2001 - Looking Southeast**



**Location 2002 - Looking Southeast**



Count Number: 2001 / 2002 / 2003  
County: Wake  
City: Apex  
Division: 05

VHB | VHB Engineering NC, PC  
Transportation Planning  
Land Development | Engineering

Intersection: SR 1010 & Waterford Green Drive

---



**Location 2003 - Looking Southeast**





Count Number: 3001 / 3002 / 3003  
 County: Wake  
 City: Apex  
 Division: 05

Count Type: NL - Noise Measurement  
 Duration: 22 minutes  
 Method Used: Larson-Davis 831, LxT  
 Completed By: Brownlow/Rhomberg

Location: SR 1010 & Smith Road

Count Date: Friday, November 10, 2017      Count Time: 3:08 PM to 3:30 PM

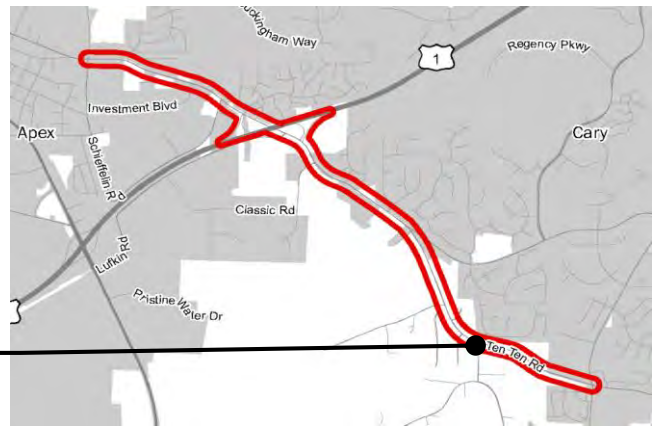
**Weather Conditions**

Temp (°F)	Dew Point (°F)	Pressure (in)	Wind Dir.	Wind Speed (mph)	Relative humidity	Precip. (in)
58	37	30.20	Calm	Calm	45%	0

\* Source: Weather Underground (www.wunderground.com) Raleigh-Durham International Station for local weather information

**Comments:**

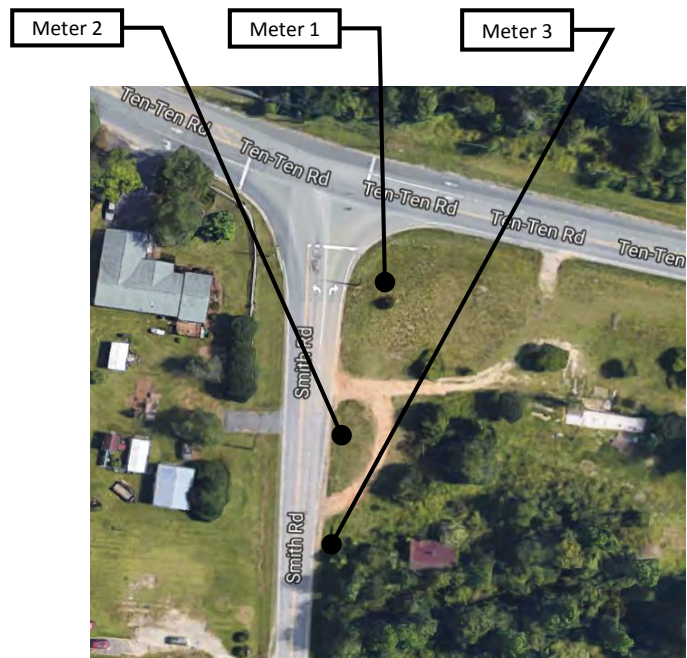
- 1 Counted By: Rhomberg
- 2 School in Session: Yes
- 3 Instrument Calibrated: Yes
- 4 Surrounding Land-Uses: Residential
- 5 Equipment was working properly: Yes
- 6 Temp high/low/average: 58/37/48
- 7 Wind: 2
- 8 Precipitation: 0



Vicinity Map

**Observed Traffic Volumes:**

	WB	EB	SB	NB	
Passenger cars	529	549	411	211	vph
Medium Trucks	11	11	6	3	vph
Tractor Trailers	3	0	3	0	vph
Buses	0	0	0	0	vph
Motorcycles	0	0	0	0	vph



Aerial

Measured Sound Levels: 65.8 / 64.7 / 66.8 dBA

**Event Notes:**

Despiking necessary to remove noise caused by idling cars, construction vehicles, and a car radio.

Traffic volumes were normalized to 1 hour.



Count Number: 3001 / 3002 / 3003  
County: Wake  
City: Apex  
Division: 05

VHB | VHB Engineering NC, PC  
Transportation Planning  
Land Development | Engineering

Intersection: SR 1010 & Smith Road

---



**Location 3001 - Looking North**



**Location 3002 - Looking North**



Count Number: 3001 / 3002 / 3003  
County: Wake  
City: Apex  
Division: 05

VHB | VHB Engineering NC, PC  
Transportation Planning  
Land Development | Engineering

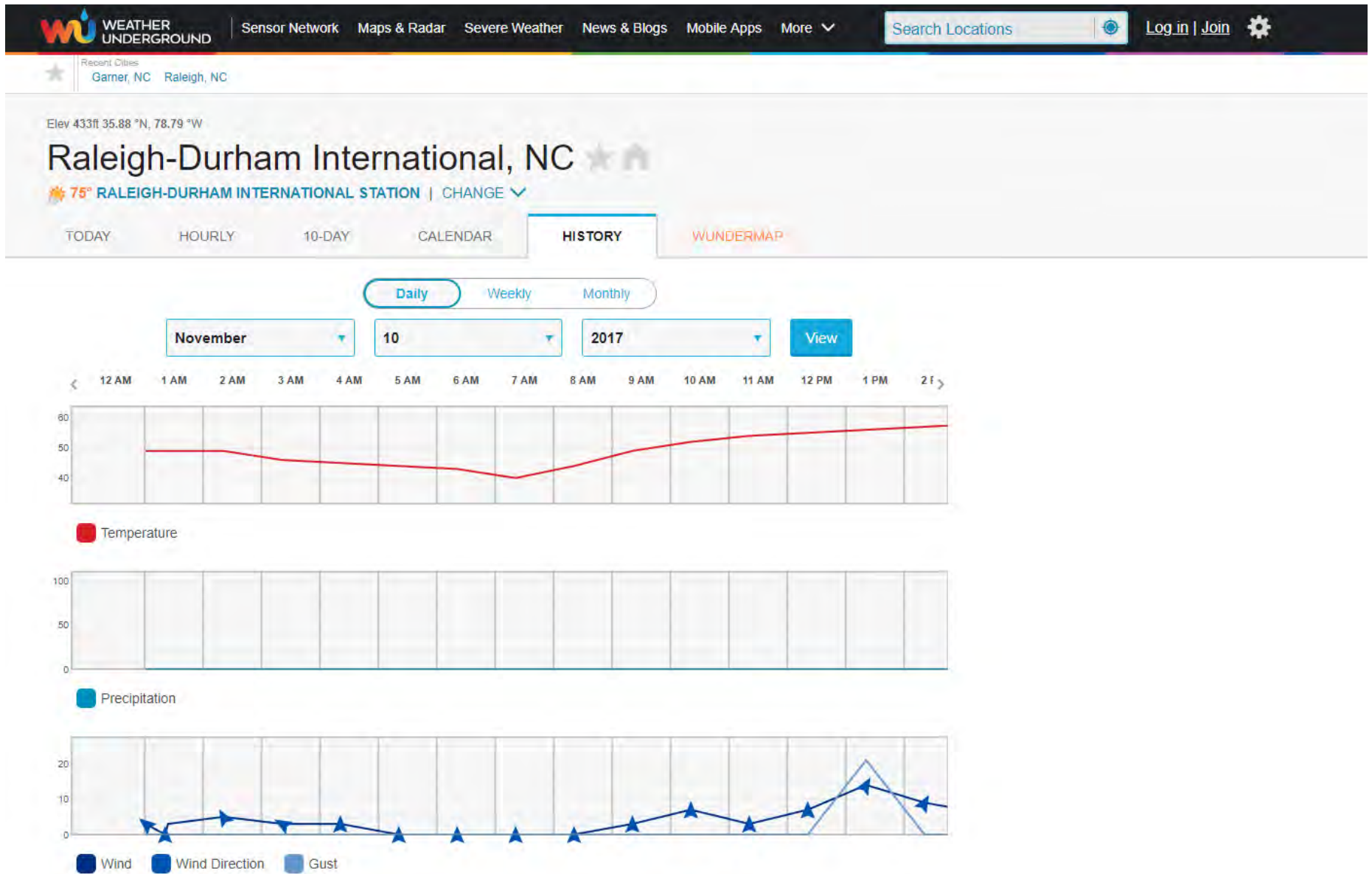
Intersection: SR 1010 & Smith Road

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**Location 3003 - Looking East**

Source: Weather Underground; [https://www.wunderground.com/history/daily/KRDU/date/2017-11-10?req\\_city=Raleigh&req\\_state=NC&req\\_statename=North%20Carolina&reqdb.zip=27601&reqdb.magic=1&reqdb.wmo=99999](https://www.wunderground.com/history/daily/KRDU/date/2017-11-10?req_city=Raleigh&req_state=NC&req_statename=North%20Carolina&reqdb.zip=27601&reqdb.magic=1&reqdb.wmo=99999)





# Summary

Temperature (° F)	Actual	Historic Avg.	Record	▲
High Temp	58	66	81	
Low Temp	35	42	24	
Day Average Temp	47	54	-	
Precipitation (Inches)	Actual	Historic Avg.	Record	▲
Precipitation	0	0.1	1	
Month to Date	0.5	1.06	-	
Year to Date	42.47	38.21	-	
Degree Days (° F)	Actual	Historic Avg.	Record	▲
Heating Degree Days	18	11	-	
HDD Month to Date	81	102	-	
HDD Since July 1	216	291	-	
Cooling Degree Days	0	0	-	
CDD Month to Date	4	1	-	
CDD Year to Date	1968	1721	-	
Growing Degree Days	0	-	-	
Dew Point (° F)	Actual	Historic Avg.	Record	▲
Dew Point	39	-	-	
High	49	-	-	
Low	21	-	-	



Average	39	-	-
<b>Wind (MPH)</b>	Actual	Historic Avg.	Record
Max Wind Speed	22	-	-
Visibility	10	-	-
<b>Sea Level Pressure (Hg)</b>	Actual	Historic Avg.	Record
Sea Level Pressure	30.48	-	-
<b>Astronomy</b>	Day Length	Rise	Set
Actual Time	10h 24m	6:47 AM	5:12 PM
Civil Twilight		6:21 AM	5:39 PM
Nautical Twilight		5:50 AM	6:10 PM
Astronomical Twilight		5:20 AM	6:40 PM
Moon: waning crescent		11:55 PM	12:58 PM

# Daily Observations



Time	Temperature	Dew Point	Humidity	Wind	Wind Speed	Wind Gust	Pressure	Precip.	Precip Accum	Condition
12:31 AM	49 ° F	49 ° F	100 %	NW	3 mph	0 mph	29.6 in	0.0 in	0.0 in	Mostly Cloudy
12:51 AM	49 ° F	49 ° F	100 %	CALM	0 mph	0 mph	29.6 in	0.0 in	0.0 in	Cloudy
12:54 AM	49 ° F	49 ° F	100 %	NW	3 mph	0 mph	29.6 in	0.0 in	0.0 in	Cloudy
1:51 AM	49 ° F	48 ° F	97 %	NNW	5 mph	0 mph	29.6 in	0.0 in	0.0 in	Mostly Cloudy
2:51 AM	46 ° F	46 ° F	100 %	WNW	3 mph	0 mph	29.6 in	0.0 in	0.0 in	Fair
3:51 AM	45 ° F	45 ° F	100 %	VAR	3 mph	0 mph	29.6 in	0.0 in	0.0 in	Fair
4:51 AM	44 ° F	43 ° F	96 %	CALM	0 mph	0 mph	29.6 in	0.0 in	0.0 in	Fair
5:51 AM	43 ° F	41 ° F	93 %	CALM	0 mph	0 mph	29.6 in	0.0 in	0.0 in	Fair
6:51 AM	40 ° F	39 ° F	97 %	CALM	0 mph	0 mph	29.7 in	0.0 in	0.1 in	Fair
7:51 AM	44 ° F	41 ° F	89 %	CALM	0 mph	0 mph	29.7 in	0.0 in	0.0 in	Fair
8:51 AM	49 ° F	42 ° F	77 %	VAR	3 mph	0 mph	29.7 in	0.0 in	0.0 in	Fair
9:51 AM	52 ° F	41 ° F	66 %	VAR	7 mph	0 mph	29.7 in	0.0 in	0.0 in	Fair
10:51 AM	54 ° F	37 ° F	53 %	VAR	3 mph	0 mph	29.8 in	0.0 in	0.0 in	Partly Cloudy
11:51 AM	55 ° F	36 ° F	49 %	VAR	7 mph	0 mph	29.8 in	0.0 in	0.0 in	Partly Cloudy
12:51 PM	56 ° F	36 ° F	47 %	NNE	14 mph	21 mph	29.7 in	0.0 in	0.0 in	Fair
1:51 PM	57 ° F	37 ° F	47 %	NNE	9 mph	0 mph	29.7 in	0.0 in	0.0 in	Fair
2:51 PM	58 ° F	37 ° F	46 %	NNE	6 mph	0 mph	29.7 in	0.0 in	0.0 in	Fair
3:51 PM	57 ° F	36 ° F	45 %	N	7 mph	0 mph	29.8 in	0.0 in	0.0 in	Partly Cloudy
4:51 PM	54 ° F	38 ° F	55 %	NNE	5 mph	0 mph	29.8 in	0.0 in	0.0 in	Mostly Cloudy
5:51 PM	50 ° F	38 ° F	63 %	NNE	5 mph	0 mph	29.8 in	0.0 in	0.0 in	Partly Cloudy
6:51 PM	49 ° F	38 ° F	66 %	ENE	14 mph	0 mph	29.9 in	0.0 in	0.0 in	Partly Cloudy
7:51 PM	45 ° F	33 ° F	63 %	NE	13 mph	0 mph	29.9 in	0.0 in	0.0 in	Partly Cloudy
8:51 PM	43 ° F	30 ° F	60 %	NE	10 mph	0 mph	29.9 in	0.0 in	0.0 in	Mostly Cloudy
9:51 PM	40 ° F	26 ° F	58 %	NE	18 mph	25 mph	30.0 in	0.0 in	0.0 in	Partly Cloudy
10:51 PM	37 ° F	23 ° F	57 %	NE	12 mph	0 mph	30.0 in	0.0 in	0.0 in	Fair
11:51 PM	35 ° F	21 ° F	57 %	ENE	14 mph	0 mph	30.0 in	0.0 in	0.0 in	Fair

# Calibration Certificate

Certificate Number 2017001701

**Customer:**

Vanasse Hangen Brustlin  
101 Walnut Street  
Watertown, MA 02471, United States

**Model Number** 831  
**Serial Number** 0003502  
**Test Results** **Pass**  
**Initial Condition** AS RECEIVED same as shipped  
**Description** Larson Davis Model 831  
Class 1 Sound Level Meter  
Firmware Revision: 2.311

**Procedure Number** D0001.8384  
**Technician** Ron Harris  
**Calibration Date** 14 Feb 2017  
**Calibration Due** 14 Feb 2018  
**Temperature** 23.5 °C ± 0.25 °C  
**Humidity** 50.4 %RH ± 2.0 %RH  
**Static Pressure** 86.91 kPa ± 0.13 kPa

**Evaluation Method**      **Tested with:**      **Data reported in dB re 20 µPa.**

Larson Davis PRM831. S/N 026155  
PCB 377B02. S/N 140815  
Larson Davis CAL200. S/N 9079  
Larson Davis CAL291. S/N 0203

**Compliance Standards** Compliant to Manufacturer Specifications and the following standards when combined with Calibration Certificate from procedure D0001.8378:

IEC 60651:2001 Type 1	ANSI S1.4-2014 Class 1
IEC 60804:2000 Type 1	ANSI S1.4 (R2006) Type 1
IEC 61252:2002	ANSI S1.11 (R2009) Class 1
IEC 61260:2001 Class 1	ANSI S1.25 (R2007)
IEC 61672:2013 Class 1	ANSI S1.43 (R2007) Type 1

Issuing lab certifies that the instrument described above meets or exceeds all specifications as stated in the referenced procedure (unless otherwise noted). It has been calibrated using measurement standards traceable to the International System of Units (SI) through the National Institute of Standards and Technology (NIST), or other national measurement institutes, and meets the requirements of ISO/IEC 17025:2005.

Test points marked with a ‡ in the uncertainties column do not fall within this laboratory's scope of accreditation.

The quality system is registered to ISO 9001:2008.

This calibration is a direct comparison of the unit under test to the listed reference standards and did not involve any sampling plans to complete. No allowance has been made for the instability of the test device due to use, time, etc. Such allowances would be made by the customer as needed.

The uncertainties were computed in accordance with the ISO Guide to the Expression of Uncertainty in Measurement (GUM). A coverage factor of approximately 2 sigma (k=2) has been applied to the standard uncertainty to express the expanded uncertainty at approximately 95% confidence level.

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Correction data from Larson Davis Model 831 Sound Level Meter Manual, I831.01 Rev O, 2016-09-19

For 1/4" microphones, the Larson Davis ADP024 1/4" to 1/2" adaptor is used with the calibrators and the Larson Davis ADP043 1/4" to

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716-684-0001



**LARSON DAVIS**  
A PCB PIEZOTRONICS DIV.



1/2" adaptor is used with the preamplifier.

Calibration Check Frequency: 1000 Hz; Reference Sound Pressure Level: 114 dB re 20 µPa; Reference Range: 0 dB gain

Periodic tests were performed in accordance with procedures from IEC 61672-3:2013 / ANSI/ASA S1.4-2014/Part3.

Pattern approval for IEC 61672-1:2013 / ANSI/ASA S1.4-2014/Part 1 successfully completed by Physikalisch-Technische Bundesanstalt (PTB) on 2016-02-24 certificate number DE-15-M-PTB-0056.

The sound level meter submitted for testing successfully completed the periodic tests of IEC 61672-3:2013 / ANSI/ASA S1.4-2014/Part 3, for the environmental conditions under which the tests were performed. As evidence was publicly available, from an independent testing organization responsible for approving the results of pattern-evaluation tests performed in accordance with IEC 61672-2:2013 / ANSI/ASA S1.4-2014/Part 2, to demonstrate that the model of sound level meter fully conformed to the class 1 specifications in IEC 61672-1:2013 / ANSI/ASA S1.4-2014/Part 1; the sound level meter submitted for testing conforms to the class 1 specifications in IEC 61672-1:2013 / ANSI/ASA S1.4-2014/Part 1.

**Standards Used**

Description	Cal Date	Cal Due	Cal Standard
SRS DS360 Ultra Low Distortion Generator	2016-06-21	2017-06-21	006311
Hart Scientific 2626-S Humidity/Temperature Sensor	2016-06-17	2017-06-17	006946
Larson Davis CAL200 Acoustic Calibrator	2016-07-26	2017-07-26	007027
Larson Davis Model 831	2016-03-01	2017-03-01	007182
PCB 377A13 1/2 inch Prepolarized Pressure Microphone	2016-03-07	2017-03-07	007185
Larson Davis CAL291 Residual Intensity Calibrator	2016-09-22	2017-09-22	007287

**Acoustic Calibration**

Measured according to IEC 61672-3:2013 10 and ANSI S1.4-2014 Part 3: 10

Measurement	Test Result [dB]	Lower Limit [dB]	Upper Limit [dB]	Expanded Uncertainty [dB]	Result
1000 Hz	114.01	113.80	114.20	0.14	Pass

As Received Level: 114.76  
Adjusted Level: 114.01

-- End of measurement results--

**Acoustic Signal Tests, C-weighting**

Measured according to IEC 61672-3:2013 12 and ANSI S1.4-2014 Part 3: 12 using a comparison coupler with Unit Under Test (UUT) and reference SLM using slow time-weighted sound level for compliance to IEC 61672-1:2013 5.5; ANSI S1.4-2014 Part 1: 5.5

Frequency [Hz]	Test Result [dB]	Expected [dB]	Lower Limit [dB]	Upper Limit [dB]	Expanded Uncertainty [dB]	Result
125	-0.17	-0.20	-1.20	0.80	0.23	Pass
1000	0.14	0.00	-0.70	0.70	0.23	Pass
8000	-3.02	-3.00	-5.50	-1.50	0.32	Pass

-- End of measurement results--



## Self-generated Noise

Measured according to IEC 61672-3:2013 11.1 and ANSI S1.4-2014 Part 3: 11.1

Measurement	Test Result [dB]
A-weighted, 20 dB gain	37.85

-- End of measurement results--

-- End of Report--

Signatory: Ron Harris

Larson Davis, a division of PCB Piezotronics, Inc  
1681 West 820 North  
Provo, UT 84601, United States  
716-684-0001



# Calibration Certificate

Certificate Number 2017008405

**Customer:**

Vanasse Hangen Brustlin  
101 Walnut Street  
Watertown, MA 02471, United States

<b>Model Number</b>	831	<b>Procedure Number</b>	D0001.8384
<b>Serial Number</b>	0002555	<b>Technician</b>	Ron Harris
<b>Test Results</b>	<b>Pass</b>	<b>Calibration Date</b>	4 Aug 2017
<b>Initial Condition</b>	AS RECEIVED same as shipped	<b>Calibration Due</b>	4 Aug 2018
<b>Description</b>	Larson Davis Model 831 Class 1 Sound Level Meter Firmware Revision: 2.314	<b>Temperature</b>	23.75 °C ± 0.25 °C
		<b>Humidity</b>	51.1 %RH ± 2.0 %RH
		<b>Static Pressure</b>	86.38 kPa ± 0.13 kPa

**Evaluation Method**      **Tested with:**      **Data reported in dB re 20 µPa.**  
Larson Davis PRM831. S/N 019119  
PCB 377B02. S/N 122951  
Larson Davis CAL200. S/N 9079  
Larson Davis CAL291. S/N 0203

**Compliance Standards**      Compliant to Manufacturer Specifications and the following standards when combined with Calibration Certificate from procedure D0001.8378:

- |                        |                            |
|------------------------|----------------------------|
| IEC 60651:2001 Type 1  | ANSI S1.4-2014 Class 1     |
| IEC 60804:2000 Type 1  | ANSI S1.4 (R2006) Type 1   |
| IEC 61252:2002         | ANSI S1.11 (R2009) Class 1 |
| IEC 61260:2001 Class 1 | ANSI S1.25 (R2007)         |
| IEC 61672:2013 Class 1 | ANSI S1.43 (R2007) Type 1  |

Issuing lab certifies that the instrument described above meets or exceeds all specifications as stated in the referenced procedure (unless otherwise noted). It has been calibrated using measurement standards traceable to the International System of Units (SI) through the National Institute of Standards and Technology (NIST), or other national measurement institutes, and meets the requirements of ISO/IEC 17025:2005.

Test points marked with a ‡ in the uncertainties column do not fall within this laboratory's scope of accreditation.

The quality system is registered to ISO 9001:2008.

This calibration is a direct comparison of the unit under test to the listed reference standards and did not involve any sampling plans to complete. No allowance has been made for the instability of the test device due to use, time, etc. Such allowances would be made by the customer as needed.

The uncertainties were computed in accordance with the ISO Guide to the Expression of Uncertainty in Measurement (GUM). A coverage factor of approximately 2 sigma (k=2) has been applied to the standard uncertainty to express the expanded uncertainty at approximately 95% confidence level.

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Correction data from Larson Davis Model 831 Sound Level Meter Manual, I831.01 Rev O, 2016-09-19

For 1/4" microphones, the Larson Davis ADP024 1/4" to 1/2" adaptor is used with the calibrators and the Larson Davis ADP043 1/4" to

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1/2" adaptor is used with the preamplifier.

Calibration Check Frequency: 1000 Hz; Reference Sound Pressure Level: 114 dB re 20 µPa; Reference Range: 0 dB gain

Periodic tests were performed in accordance with precedures from IEC 61672-3:2013 / ANSI/ASA S1.4-2014/Part3.

Pattern approval for IEC 61672-1:2013 / ANSI/ASA S1.4-2014/Part 1 successfully completed by Physikalisch-Technische Bundesanstalt (PTB) on 2016-02-24 certificate number DE-15-M-PTB-0056.

The sound level meter submitted for testing successfully completed the periodic tests of IEC 61672-3:2013 / ANSI/ASA S1.4-2014/Part 3, for the environmental conditions under which the tests were performed. As evidence was publicly available, from an independent testing organization responsible for approving the results of pattern-evaluation tests performed in accordance with IEC 61672-2:2013 / ANSI/ASA S1.4-2014/Part 2, to demonstrate that the model of sound level meter fully conformed to the class 1 specifications in IEC 61672-1:2013 / ANSI/ASA S1.4-2014/Part 1; the sound level meter submitted for testing conforms to the class 1 specifications in IEC 61672-1:2013 / ANSI/ASA S1.4-2014/Part 1.

**Standards Used**

Description	Cal Date	Cal Due	Cal Standard
SRS DS360 Ultra Low Distortion Generator	2017-06-23	2018-06-23	006311
Hart Scientific 2626-S Humidity/Temperature Sensor	2017-06-11	2018-06-11	006943
Larson Davis CAL200 Acoustic Calibrator	2017-07-25	2018-07-25	007027
Larson Davis Model 831	2017-03-01	2018-03-01	007182
PCB 377A13 1/2 inch Prepolarized Pressure Microphone	2017-03-08	2018-03-08	007185
Larson Davis CAL291 Residual Intensity Calibrator	2016-09-22	2017-09-22	007287

**Acoustic Calibration**

Measured according to IEC 61672-3:2013 10 and ANSI S1.4-2014 Part 3: 10

Measurement	Test Result [dB]	Lower Limit [dB]	Upper Limit [dB]	Expanded Uncertainty [dB]	Result
1000 Hz	114.00	113.80	114.20	0.14	Pass

As Received Level: 114.18  
Adjusted Level: 114.00

-- End of measurement results--

**Acoustic Signal Tests, C-weighting**

Measured according to IEC 61672-3:2013 12 and ANSI S1.4-2014 Part 3: 12 using a comparison coupler with Unit Under Test (UUT) and reference SLM using slow time-weighted sound level for compliance to IEC 61672-1:2013 5.5; ANSI S1.4-2014 Part 1: 5.5

Frequency [Hz]	Test Result [dB]	Expected [dB]	Lower Limit [dB]	Upper Limit [dB]	Expanded Uncertainty [dB]	Result
125	-0.18	-0.20	-1.20	0.80	0.23	Pass
1000	0.09	0.00	-0.70	0.70	0.23	Pass
8000	-2.84	-3.00	-5.50	-1.50	0.32	Pass

-- End of measurement results--



### Self-generated Noise

Measured according to IEC 61672-3:2013 11.1 and ANSI S1.4-2014 Part 3: 11.1

Measurement	Test Result [dB]
A-weighted, 20 dB gain	37.79

-- End of measurement results--

-- End of Report--

Signatory: Ron Harris

Larson Davis, a division of PCB Piezotronics, Inc  
1681 West 820 North  
Provo, UT 84601, United States  
716-684-0001





# Calibration Certificate

Certificate Number 2017000860

**Customer:**

Vanasse Hangen Brustlin  
101 Walnut Street  
Watertown, MA 02471, United States

<b>Model Number</b>	LxT SE	<b>Procedure Number</b>	D0001.8384
<b>Serial Number</b>	0003707	<b>Technician</b>	Ron Harris
<b>Test Results</b>	<b>Pass</b>	<b>Calibration Date</b>	24 Jan 2017
<b>Initial Condition</b>	AS RECEIVED same as shipped	<b>Calibration Due</b>	24 Jan 2018
<b>Description</b>	Sound Expert LxT Class 1 Sound Level Meter Firmware Revision: 2.301	<b>Temperature</b>	23.58 °C ± 0.25 °C
		<b>Humidity</b>	49.8 %RH ± 2.0 %RH
		<b>Static Pressure</b>	85.43 kPa ± 0.13 kPa

**Evaluation Method**      **Tested with:**      **Data reported in dB re 20 µPa.**

Larson Davis PRMLxT1. S/N 035881  
PCB 377C20. S/N 150969  
Larson Davis CAL200. S/N 9079  
Larson Davis CAL291. S/N 0203

**Compliance Standards**      Compliant to Manufacturer Specifications and the following standards when combined with Calibration Certificate from procedure D0001.8378:

IEC 60651:2001 Type 1	ANSI S1.4-2014 Class 1
IEC 60804:2000 Type 1	ANSI S1.4 (R2006) Type 1
IEC 61252:2002	ANSI S1.11 (R2009) Class 1
IEC 61260:2001 Class 1	ANSI S1.25 (R2007)
IEC 61672:2013 Class 1	ANSI S1.43 (R2007) Type 1

Issuing lab certifies that the instrument described above meets or exceeds all specifications as stated in the referenced procedure (unless otherwise noted). It has been calibrated using measurement standards traceable to the International System of Units (SI) through the National Institute of Standards and Technology (NIST), or other national measurement institutes, and meets the requirements of ISO/IEC 17025:2005.

Test points marked with a ‡ in the uncertainties column do not fall within this laboratory's scope of accreditation.

The quality system is registered to ISO 9001:2008.

This calibration is a direct comparison of the unit under test to the listed reference standards and did not involve any sampling plans to complete. No allowance has been made for the instability of the test device due to use, time, etc. Such allowances would be made by the customer as needed.

The uncertainties were computed in accordance with the ISO Guide to the Expression of Uncertainty in Measurement (GUM). A coverage factor of approximately 2 sigma (k=2) has been applied to the standard uncertainty to express the expanded uncertainty at approximately 95% confidence level.

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Correction data from Larson Davis LxT Manual for SoundTrack LxT & SoundExpert Lxt, I770.01 Rev J Supporting Firmware Version 2.301, 2015-04-30

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1681 West 820 North  
Provo, UT 84601, United States  
716-684-0001



**Certificate Number 2017000860**

For 1/4" microphones, the Larson Davis ADP024 1/4" to 1/2" adaptor is used with the calibrators and the Larson Davis ADP043 1/4" to 1/2" adaptor is used with the preamplifier.

Calibration Check Frequency: 1000 Hz; Reference Sound Pressure Level: 114 dB re 20 µPa

Periodic tests were performed in accordance with procedures from IEC 61672-3:2013 / ANSI/ASA S1.4-2014/Part3.

No Pattern approval for IEC 61672-1:2013 / ANSI/ASA S1.4-2014/Part 1 available.

The sound level meter submitted for testing successfully completed the periodic tests of IEC 61672-3:2013 / ANSI/ASA S1.4-2014/Part 3, for the environmental conditions under which the tests were performed. However, no general statement or conclusion can be made about conformance of the sound level meter to the full specifications of IEC 61672-1:2013 / ANSI/ASA S1.4-2014/Part 1 because (a) evidence was not publicly available, from an independent testing organization responsible for pattern approvals, to demonstrate that the model of sound level meter fully conformed to the class 1 specifications in IEC 61672-1:2013 / ANSI/ASA S1.4-2014/Part 1 or correction data for acoustical test of frequency weighting were not provided in the Instruction Manual and (b) because the periodic tests of IEC 61672-3:2013 / ANSI/ASA S1.4-2014/Part 3 cover only a limited subset of the specifications in IEC 61672-1:2013 / ANSI/ASA S1.4-2014/Part 1.

**Standards Used**

Description	Cal Date	Cal Due	Cal Standard
SRS DS360 Ultra Low Distortion Generator	2016-06-21	2017-06-21	006311
Hart Scientific 2626-S Humidity/Temperature Sensor	2016-06-17	2017-06-17	006946
Larson Davis CAL200 Acoustic Calibrator	2016-07-26	2017-07-26	007027
Larson Davis Model 831	2016-03-01	2017-03-01	007182
PCB 377A13 1/2 inch Prepolarized Pressure Microphone	2016-03-07	2017-03-07	007185
Larson Davis CAL291 Residual Intensity Calibrator	2016-09-22	2017-09-22	007287

**Acoustic Calibration**

Measured according to IEC 61672-3:2013 10 and ANSI S1.4-2014 Part 3: 10

Measurement	Test Result [dB]	Lower Limit [dB]	Upper Limit [dB]	Expanded Uncertainty [dB]	Result
1000 Hz	114.00	113.80	114.20	0.14	Pass

As Received Level: 114.42  
Adjusted Level: 114.00

-- End of measurement results--

**Acoustic Signal Tests, C-weighting**

Measured according to IEC 61672-3:2013 12 and ANSI S1.4-2014 Part 3: 12 using a comparison coupler with Unit Under Test (UUT) and reference SLM using slow time-weighted sound level for compliance to IEC 61672-1:2013 5.5; ANSI S1.4-2014 Part 1: 5.5

Frequency [Hz]	Test Result [dB]	Expected [dB]	Lower Limit [dB]	Upper Limit [dB]	Expanded Uncertainty [dB]	Result
125	-0.17	-0.20	-1.20	0.80	0.23	Pass
1000	0.03	0.00	-0.70	0.70	0.23	Pass
8000	-2.15	-3.00	-5.50	-1.50	0.32	Pass

-- End of measurement results--





## Self-generated Noise

Measured according to IEC 61672-3:2013 11.1 and ANSI S1.4-2014 Part 3: 11.1

Measurement	Test Result [dB]
-------------	------------------

A-weighted	40.29
------------	-------

-- End of measurement results--

-- End of Report--

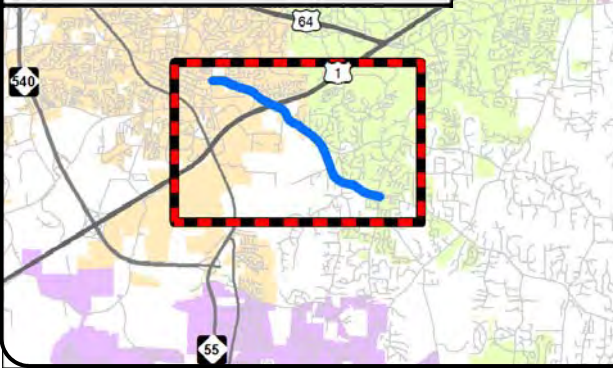
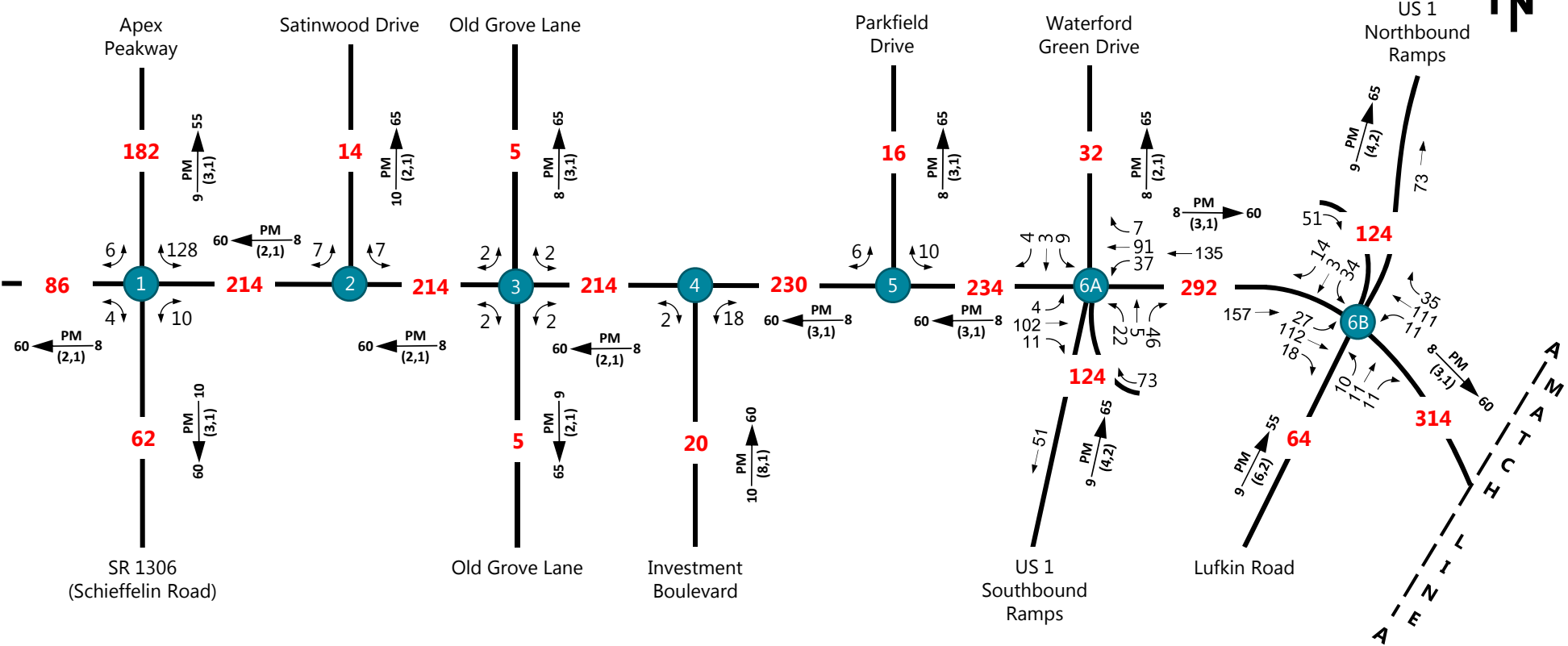
Signatory: Ron Harris



## **Appendix B**

### **Predicted Traffic Volumes**

PROJECT START

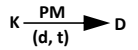


## 2016 Average Annual Daily Traffic

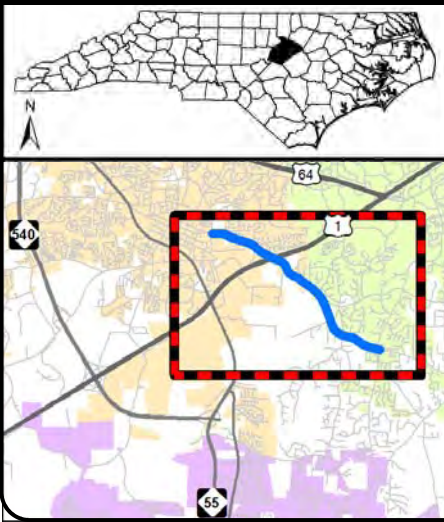
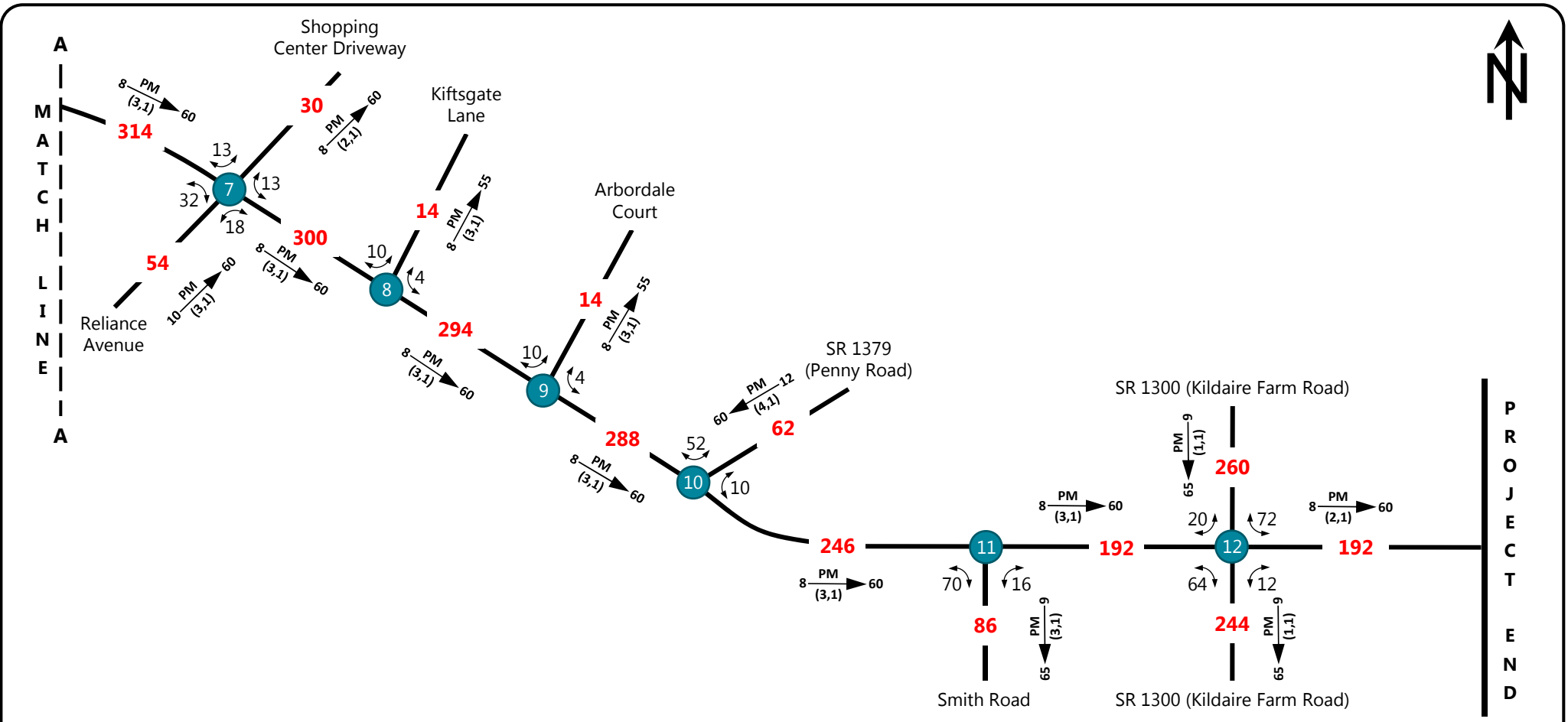
## No-Build Alternative Scenario 1 - SHEET 1 OF 2

### LEGEND

- #### No. of Vehicles per Day (VPD) in 100s
- Existing Roadway
- PM PM Peak Hour
- D Peak Hour Directional Split (%)
- Indicates Direction of D (d,t)
- K Duals, TTSTs (%)
- X Movement Prohibited
- 1- Less than 50 VPD



<b>TIP:</b> U-5825	<b>WBS:</b> 32572.1
<b>COUNTY:</b> Wake	<b>DIVISION:</b> 5
<b>DATE:</b> 08/15/2016	
<b>PREPARED BY:</b> VHB Engineering NC, P.C.	
<b>LOCATION:</b> SR 1010 (Ten-Ten Road) from SR1306/Apex Peakway to SR 1300 (Kildaire Farm Road)	
<b>PROJECT:</b> SR 1010 (Ten-Ten Road) Improvements	



# 2016 Average Annual Daily Traffic

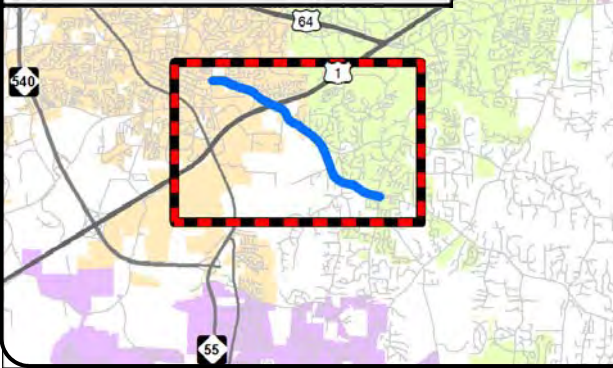
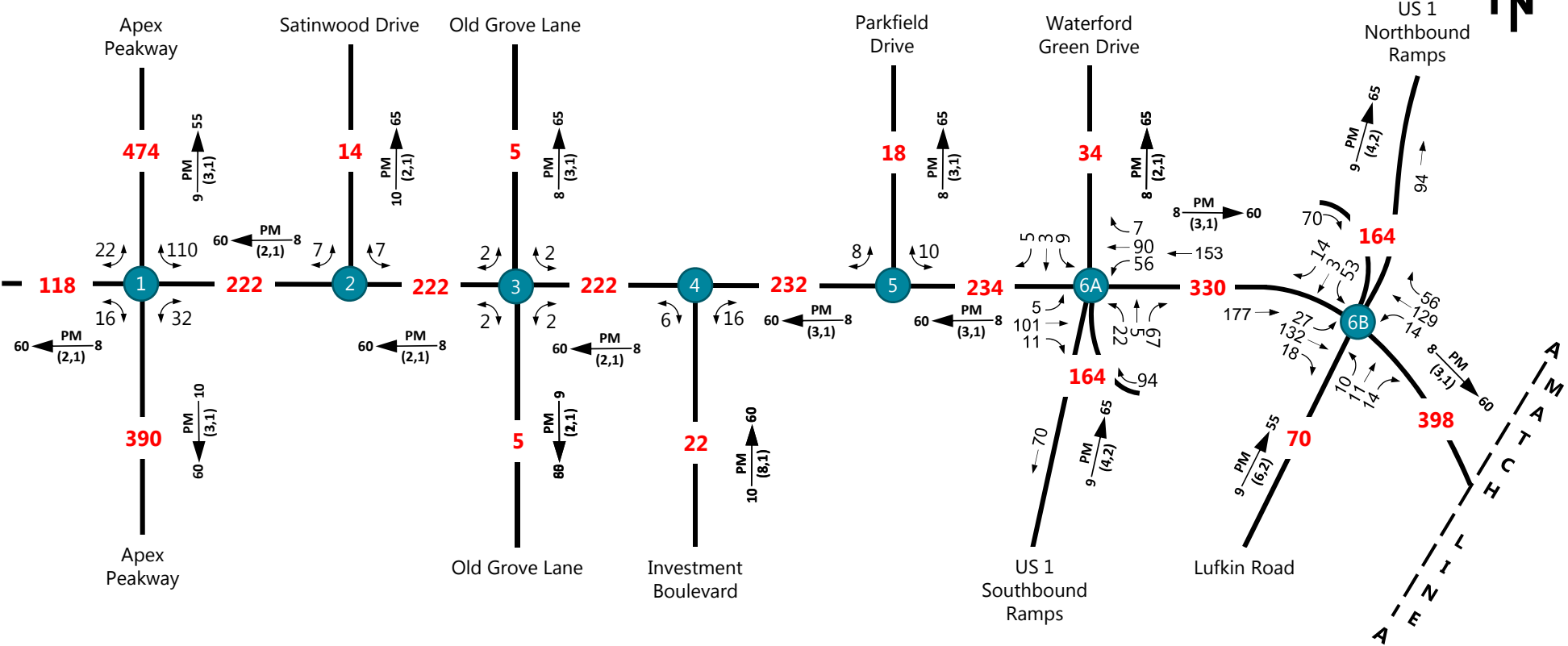
## No-Build Alternative Scenario 1 - SHEET 2 OF 2

### LEGEND

- ### No. of Vehicles per Day (VPD) in 100s
- Existing Roadway
- $K \xrightarrow{PM} D$   
(d, t)
- PM PM Peak Hour
- D Peak Hour Directional Split (%)
- Indicates Direction of D (d,t)
- ↔ Duals, TTSTs (%)
- K Design Hour Factor (%)
- X Movement Prohibited
- 1- Less than 50 VPD

<b>TIP:</b> U-5825	<b>WBS:</b> 32572.1
<b>COUNTY:</b> Wake	<b>DIVISION:</b> 5
<b>DATE:</b> 08/15/2016	
<b>PREPARED BY:</b> VHB Engineering NC, P.C.	
<b>LOCATION:</b> SR 1010 (Ten-Ten Road) from SR1306/Apex Peakway to SR 1300 (Kildaire Farm Road)	
<b>PROJECT:</b> SR 1010 (Ten-Ten Road) Improvements	

PROJECT START

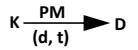


# 2040 Average Annual Daily Traffic

## No-Build Alternative Scenario 3 - SHEET 1 OF 2

### LEGEND

- ### No. of Vehicles per Day (VPD) in 100s
- Existing Roadway
- PM PM Peak Hour
- D Peak Hour Directional Split (%)
- Indicates Direction of D (d,t)
- K Duals, TTSTs (%)
- X Movement Prohibited
- 1- Less than 50 VPD

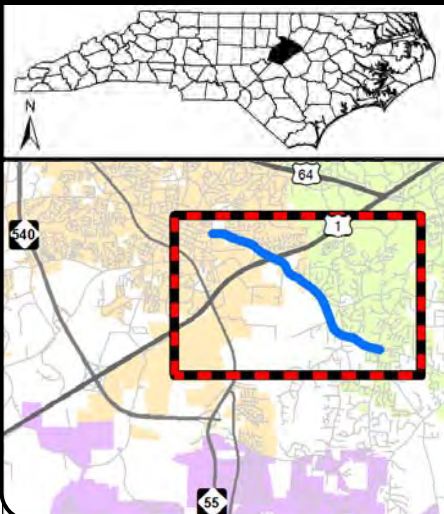
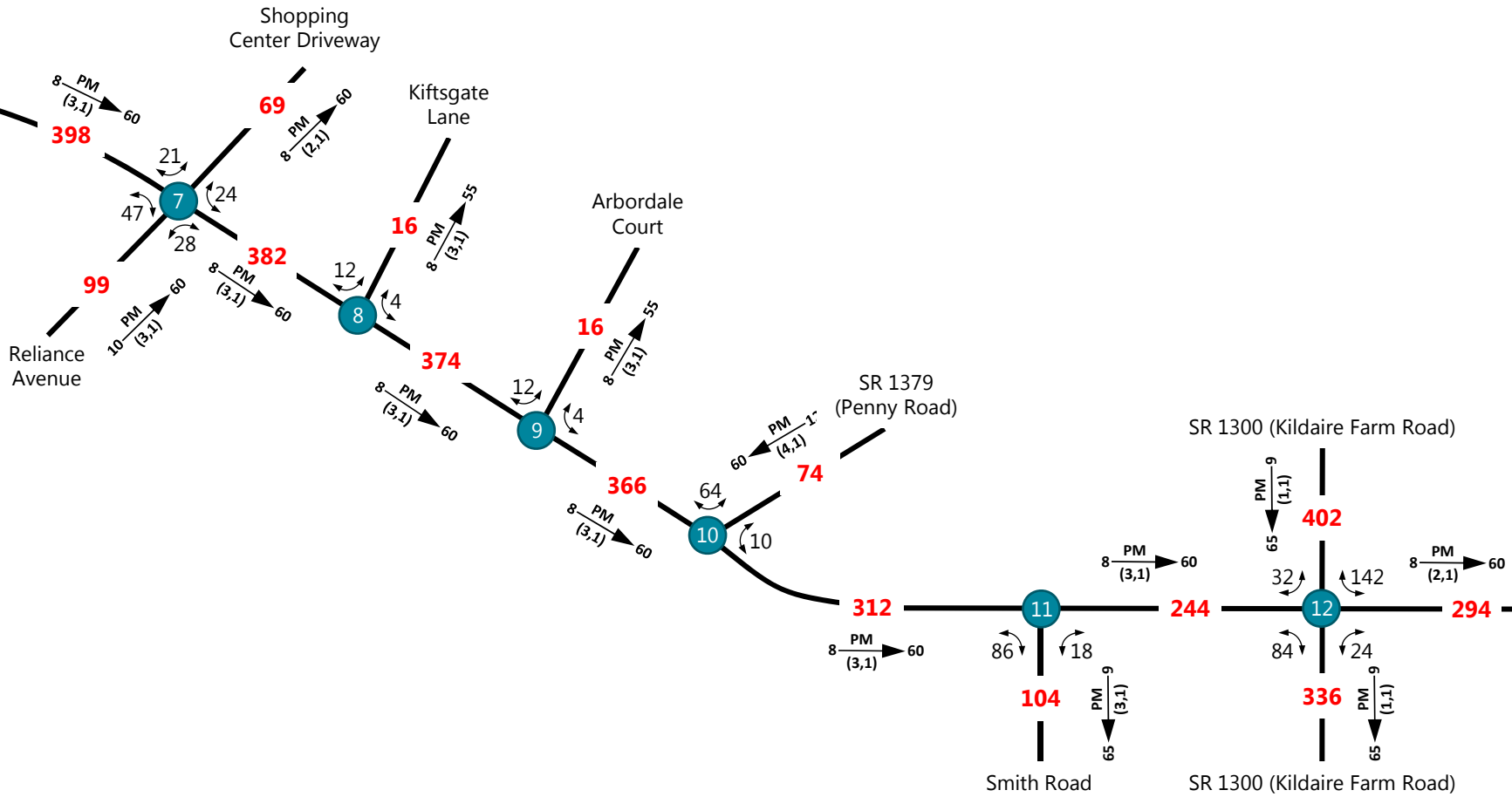


<b>TIP:</b> U-5825	<b>WBS:</b> 32572.1
<b>COUNTY:</b> Wake	<b>DIVISION:</b> 5
<b>DATE:</b> 08/15/2016	
<b>PREPARED BY:</b> VHB Engineering NC, P.C.	
<b>LOCATION:</b> SR 1010 (Ten-Ten Road) from SR1306/Apex Peakway to SR 1300 (Kildaire Farm Road)	
<b>PROJECT:</b> SR 1010 (Ten-Ten Road) Improvements	



MATCHLINE

PROJECT END



# 2040 Average Annual Daily Traffic

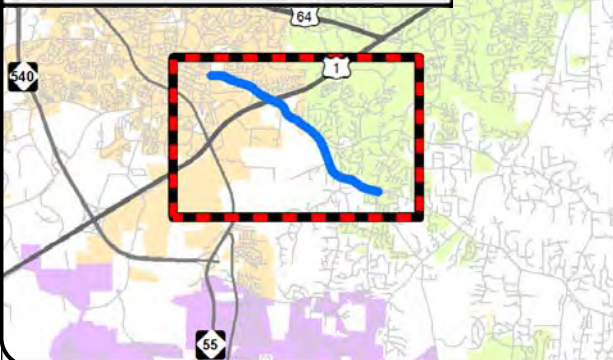
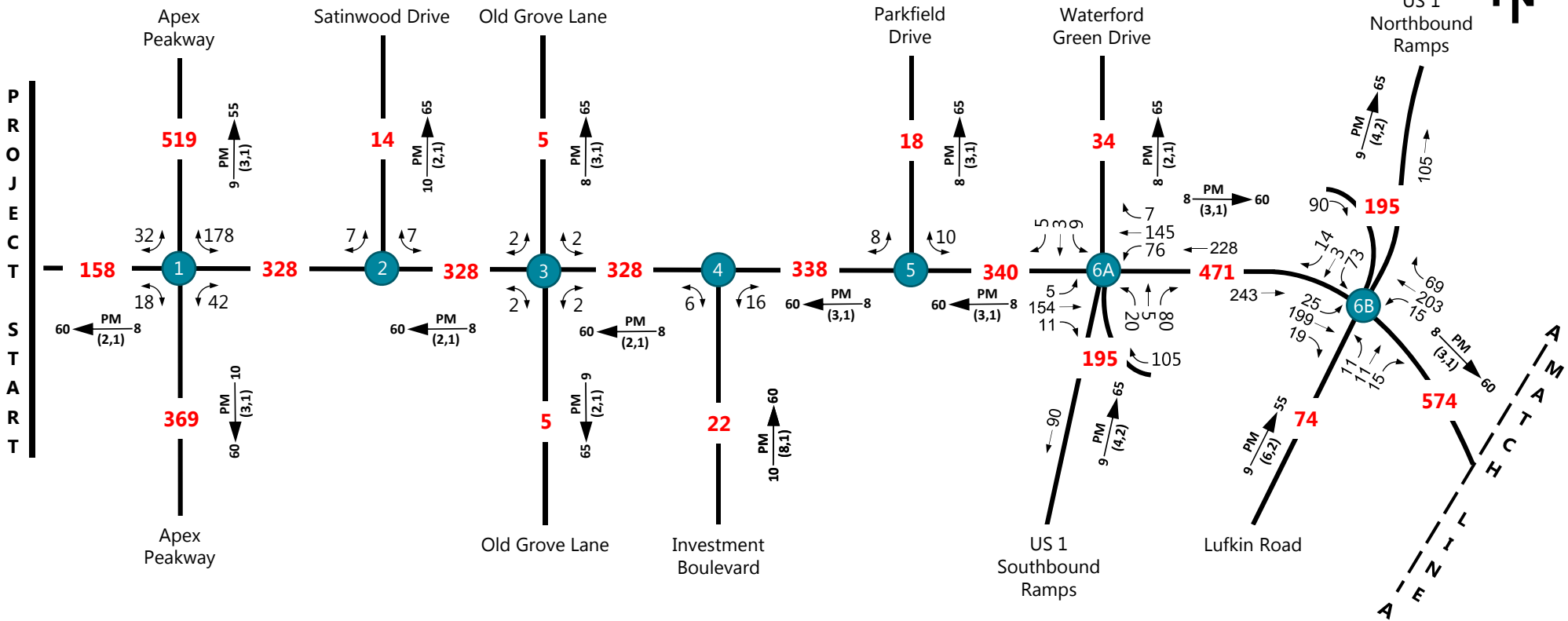
## No-Build Alternative Scenario 3 - SHEET 2 OF 2

### LEGEND

- ### No. of Vehicles per Day (VPD) in 100s
- Existing Roadway
- $K \xrightarrow{PM} D$   
(d, t) PM Peak Hour  
D Peak Hour Directional Split (%)  
→ Indicates Direction of D (d,t)  
Duals, TTSTs (%)  
K Design Hour Factor (%)  
X Movement Prohibited  
1- Less than 50 VPD

<b>TIP:</b> U-5825	<b>WBS:</b> 32572.1
<b>COUNTY:</b> Wake	<b>DIVISION:</b> 5
<b>DATE:</b> 08/15/2016	
<b>PREPARED BY:</b> VHB Engineering NC, P.C.	
<b>LOCATION:</b> SR 1010 (Ten-Ten Road) from SR1306/Apex Peakway to SR 1300 (Kildaire Farm Road)	
<b>PROJECT:</b> SR 1010 (Ten-Ten Road) Improvements	





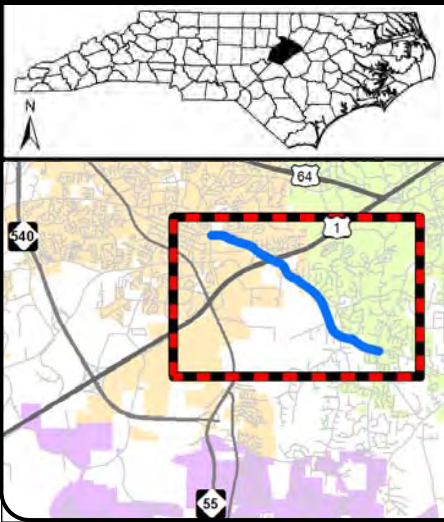
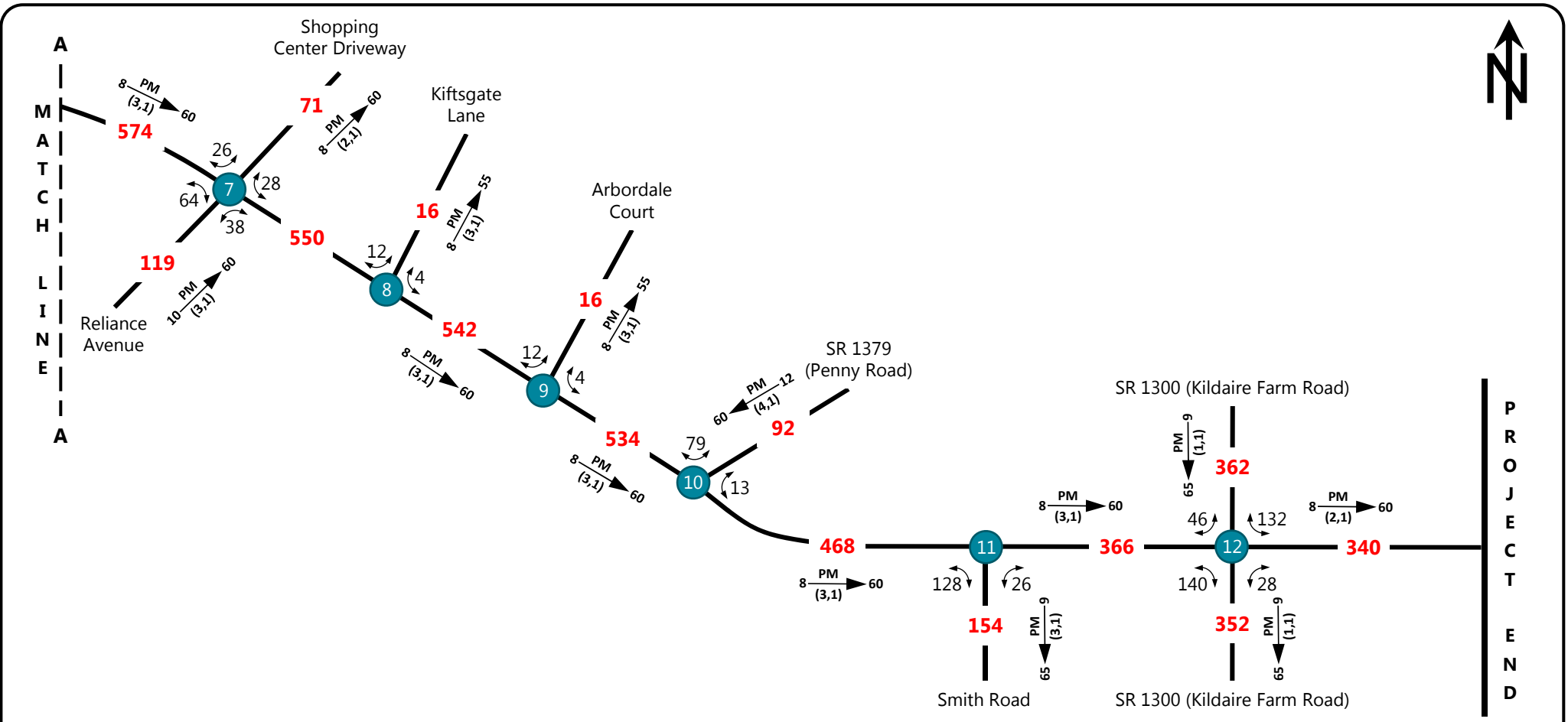
# 2040 Average Annual Daily Traffic

## Build Alternative Scenario 4 - SHEET 1 OF 2

### LEGEND

- ### No. of Vehicles per Day (VPD) in 100s
- Existing Roadway
- PM PM Peak Hour
- D Peak Hour Directional Split (%)
- Indicates Direction of D (d,t)
- K Duals, TTSTs (%)
- X Design Hour Factor (%)
- 1- Movement Prohibited
- Less than 50 VPD

<b>TIP:</b> U-5825	<b>WBS:</b> 32572.1
<b>COUNTY:</b> Wake	<b>DIVISION:</b> 5
<b>DATE:</b> 08/15/2016	
<b>PREPARED BY:</b> VHB Engineering NC, P.C.	
<b>LOCATION:</b> SR 1010 (Ten-Ten Road) from SR1306/Apex Peakway to SR 1300 (Kildaire Farm Road)	
<b>PROJECT:</b> SR 1010 (Ten-Ten Road) Improvements	



# 2040 Average Annual Daily Traffic

## Build Alternative Scenario 4 - SHEET 2 OF 2

### LEGEND

- #### No. of Vehicles per Day (VPD) in 100s
- Existing Roadway
- $K \frac{PM}{(d,t)} \rightarrow D$   
 PM PM Peak Hour  
 D Peak Hour Directional Split (%)  
 $\rightarrow$  Indicates Direction of D (d,t)  
 Duals, TTSTs (%)  
 K Design Hour Factor (%)  
 X Movement Prohibited  
 1- Less than 50 VPD

<b>TIP:</b> U-5825	<b>WBS:</b> 32572.1
<b>COUNTY:</b> Wake	<b>DIVISION:</b> 5
<b>DATE:</b> 08/15/2016	
<b>PREPARED BY:</b> VHB Engineering NC, P.C.	
<b>LOCATION:</b> SR 1010 (Ten-Ten Road) from SR1306/Apex Peakway to SR 1300 (Kildaire Farm Road)	
<b>PROJECT:</b> SR 1010 (Ten-Ten Road) Improvements	

Table B-1: Traffic Data for Noise Modeling - Existing Conditions (Sheet 1 of 2)

Roadway	Intersection to North	Intersection to South	Speed Limit	Forecast Volume (veh/hr)	Level of Service "C" Volume* (veh/hr)	Volume Used in TNM (veh/hr)	Number of Lanes	Autos (veh/lane)	Medium Trucks (veh/lane)	Heavy Trucks (veh/lane)
SR 1010 NB Segment1	Kildaire Farm Rd	---	45	614	920	614	1	596	12	6
SR 1010 NB Segment2	Smith Rd	Kildaire Farm Rd	45	614	910	614	1	590	18	6
SR 1010 NB Segment3	Penny Rd	Smith Rd	45	787	910	787	1	756	24	8
SR 1010 NB Segment4	Arbordale Ct	Penny Rd	45	922	910	910	1	874	27	9
SR 1010 NB Segment5	Kiftsgate Ln	Arbordale Ct	45	941	910	910	1	874	27	9
SR 1010 NB Segment6	Reliance Ave	Kiftsgate Ln	45	960	910	910	1	874	27	9
SR 1010 NB Segment7	US 1	Reliance Ave	45	1005	910	910	1	874	27	9
SR 1010 NB Segment8	Waterford Green Dr	US 1	45	934	910	910	1	874	27	9
SR 1010 NB Segment9	Parkfield Dr	Waterford Green Dr	45	1123	910	910	1	874	27	9
SR 1010 NB Segment10	Investment Blvd	Parkfield Dr	45	1104	910	910	1	874	27	9
SR 1010 NB Segment11	Old Grove Ln	Investment Blvd	45	1027	920	920	1	892	18	9
SR 1010 NB Segment12	Satinwood Dr	Old Grove Ln	35	1027	920	920	1	892	18	9
SR 1010 NB Segment13	Apex Peakway	Satinwood Dr	35	1027	920	920	1	892	18	9
SR 1010 NB Segment14	---	Apex Peakway	35	413	920	413	1	400	8	4
SR 1010 SB Segment1	Kildaire Farm Rd	---	45	922	920	920	1	892	18	9
SR 1010 SB Segment2	Smith Rd	Kildaire Farm Rd	45	922	910	910	1	874	27	9
SR 1010 SB Segment3	Penny Rd	Smith Rd	45	1181	910	910	1	874	27	9
SR 1010 SB Segment4	Arbordale Ct	Penny Rd	45	1382	910	910	1	874	27	9
SR 1010 SB Segment5	Kiftsgate Ln	Arbordale Ct	45	1411	910	910	1	874	27	9
SR 1010 SB Segment6	Reliance Ave	Kiftsgate Ln	45	1440	910	910	1	874	27	9
SR 1010 SB Segment7	US 1	Reliance Ave	45	1507	910	910	1	874	27	9
SR 1010 SB Segment8	Waterford Green Dr	US 1	45	1402	910	910	1	874	27	9
SR 1010 SB Segment9	Parkfield Dr	Waterford Green Dr	45	749	910	749	1	719	22	7
SR 1010 SB Segment10	Investment Blvd	Parkfield Dr	45	736	910	736	1	707	22	7
SR 1010 SB Segment11	Old Grove Ln	Investment Blvd	45	685	920	685	1	664	14	7
SR 1010 SB Segment12	Satinwood Dr	Old Grove Ln	35	685	920	685	1	664	14	7
SR 1010 SB Segment13	Apex Peakway	Satinwood Dr	35	685	920	685	1	664	14	7
SR 1010 SB Segment14	---	Apex Peakway	35	275	920	275	1	267	6	3
SR 1010 NB TurnLeft0 (Kildaire)			45	38	920	38	1	37	1	0
SR 1010 NB TurnRight0 (Kildaire)			45	230	920	230	1	223	5	2
SR 1010 SB TurnLeft0 (Kildaire)			45	96	910	96	1	92	3	1
SR 1010 SB TurnRight0 (Kildaire)			45	307	910	307	1	295	9	3
***SR 1010 SB Segment2***	***After Right Turn***		45	614	910	614	1	590	18	6
N Kildaire Farm Rd NB			45	819	930	410	2	401	4	4
N Kildaire Farm Rd SB			45	1521	930	761	2	745	8	8
N Kildaire Farm Rd TurnLeft			45	421	930	421	1	413	4	4
***N Kildaire Farm Rd SB***	***After Left Turn***		45	1100	930	550	2	539	5	5
S Kildaire Farm Rd NB			45	769	930	384	2	377	4	4
S Kildaire Farm Rd SB			45	1427	930	714	2	699	7	7
S Kildaire Farm Rd TurnLeft			45	202	930	202	1	198	2	2
SR 1010 NB TurnLeft1 (Smith)			45	51	910	51	1	49	2	1
SR 1010 SB TurnRight1 (Smith)			45	336	910	336	1	323	10	3
***SR 1010 SB Segment3***	***After Right Turn***		45	845	910	845	1	811	25	8
Smith Rd NB			35	271	910	271	1	260	8	3
Smith Rd SB			35	503	910	503	1	483	15	5
Smith Rd TurnLeft			35	221	910	221	1	212	7	2
Smith Rd TurnRight			35	50	910	50	1	48	2	1
SR 1010 SB TurnLeft1 (Penny)			45	250	910	250	1	240	7	2
Penny Rd EB			45	446	905	446	1	424	18	4
Penny Rd TurnLeft			45	48	905	48	1	46	2	0
Penny Rd TurnRight			45	250	905	250	1	237	10	2
SR 1010 SB TurnLeft2 (Arbordale)			45	48	910	48	1	46	1	0
Arbordale Ct			25	112	910	56	2	54	2	1
SR 1010 SB TurnLeft3 (Kiftsgate)			45	48	910	48	1	46	1	0
Kiftsgate Ln			15	112	910	56	2	54	2	1
SR 1010 NB TurnLeft2 (Reliance)			45	6	910	6	1	6	0	0
SR 1010 NB TurnRight1 (Reliance)			45	4	910	4	1	4	0	0
SR 1010 SB TurnLeft4 (Reliance)			45	6	910	6	1	6	0	0
SR 1010 SB TurnRight2 (Reliance)			45	15	910	15	1	15	0	0
Reliance Ave NB			25	324	910	324	1	311	10	3
Reliance Ave SB			25	216	910	216	1	207	6	2
Reliance Ave TurnRight			25	108	910	108	1	104	3	1
Shopping Center Dr NB			25	144	920	144	1	140	3	1
Shopping Center Dr SB			25	96	920	96	1	93	2	1
SR 1010 NB TurnRight2 (US1)			45	112	910	112	1	108	3	1
SR 1010 SB TurnLeft5 (US1)			45	130	910	130	1	124	4	1
SR 1010 NB TurnLeft3 (Lufkin)			45	35	910	35	1	34	1	0
SR 1010 SB TurnRight3 (Lufkin)			45	86	910	86	1	83	3	1
Lufkin Rd			35	202	880	101	2	93	6	2
Lufkin Rd TurnLeft			35	59	880	59	1	54	4	1
Lufkin Rd TurnRight			35	64	880	64	1	59	4	1
US1 EB			65	725	900	363	2	341	15	7
US1 WB			65	391	900	195	2	184	8	4
S US1 Loop			35	298	900	298	1	280	12	6
S US1 Loop TurnLeft			35	199	900	199	1	187	8	4
S US1 Ramp			35	230	900	230	1	216	9	5

Table B-1: Traffic Data for Noise Modeling - Existing Conditions (Sheet 2 of 2)

Roadway	Intersection to North	Intersection to South	Speed Limit	Forecast Volume (veh/hr)	Level of Service "C" Volume* (veh/hr)	Volume Used in TNM (veh/hr)	Number of Lanes	Autos (veh/lane)	Medium Trucks (veh/lane)	Heavy Trucks (veh/lane)
N US1 Loop			35	230	900	230	1	216	9	5
N US1 Loop TurnLeft			35	69	900	69	1	65	3	1
N US1 Loop TurnRight			35	145	900	145	1	136	6	3
N US1 Ramp			45	298	900	298	1	280	12	6
SR 1010 NB TurnLeft4 (US1)			45	118	910	118	1	114	4	1
SR 1010 NB TurnRight3 (Waterford)			45	22	910	22	1	22	1	0
SR 1010 SB TurnLeft6 (Waterford)			45	13	910	13	1	12	0	0
SR 1010 SB TurnRight4 (US1)			45	35	910	35	1	34	1	0
Waterford Green Dr NB			25	166	920	166	1	161	3	2
Waterford Green Dr SB			25	90	920	90	1	87	2	1
Waterford Green Dr TurnLeft			25	17	920	17	1	16	0	0
SR 1010 NB TurnRight4 (Parkfield)			45	48	910	48	1	46	1	0
SR 1010 SB TurnLeft7 (Parkfield)			45	19	910	19	1	18	1	0
Parkfield Dr NB			25	83	910	83	1	80	2	1
Parkfield Dr SB			25	45	910	45	1	43	1	0
SR 1010 NB TurnLeft5 (Investment)			45	86	910	86	1	83	3	1
Investment Blvd NB			25	120	875	120	1	109	10	1
Investment Blvd SB			25	80	875	80	1	73	6	1
SR 1010 NB TurnLeft6 (Old Grove)			45	10	920	10	1	9	0	0
SR 1010 SB TurnLeft8 (Old Grove)			45	6	920	6	1	6	0	0
SR 1010 SB TurnRight5 (Old Grove)			35	6	920	6	1	6	0	0
N Old Grove Ln NB			15	26	910	26	1	25	1	0
N Old Grove Ln SB			15	14	910	14	1	13	0	0
S Old Grove Ln NB			15	16	920	16	1	15	0	0
S Old Grove Ln SB			15	29	920	29	1	28	1	0
SR 1010 SB TurnLeft9 (Satinwood)			35	22	920	22	1	22	0	0
Satinwood Dr NB			25	91	920	91	1	88	2	1
Satinwood Dr SB			25	49	920	49	1	48	1	0
SR 1010 NB TurnLeft7 (Peakway)			35	614	920	614	1	596	12	6
***SR 1010 NB Segment13***	***After Left Turn***		35	413	920	413	1	400	8	4
SR 1010 NB TurnRight5 (Peakway)			35	48	920	48	1	47	1	0
SR 1010 SB TurnLeft10 (Peakway)			35	13	920	13	1	12	0	0
Schieffelin Rd NB			35	248	910	248	1	238	7	2
Schieffelin Rd SB			35	372	910	372	1	357	11	4
Schieffelin Rd TurnLeft			35	24	910	24	1	23	1	0
Apex Peakway			35	1638	910	410	4	393	12	4
Apex Peakway TurnLeft			35	1152	910	910	1	874	27	9
***Apex Peakway SB***	***After Left Turn***		35	486	910	243	2	233	7	2

\* LOS "C" Volumes obtained from the generalized tables of NCDOT's Level of Service C Volumes for Traffic Noise Modeling (September 2019).

Table B-2: Traffic Data for Noise Modeling - No Build Conditions (Sheet 1 of 2)

Roadway	Intersection to North	Intersection to South	Speed Limit	Forecast Volume (veh/hr)	Level of Service "C" Volume* (veh/hr)	Volume Used in TNM (veh/hr)	Number of Lanes	Autos (veh/lane)	Medium Trucks (veh/lane)	Heavy Trucks (veh/lane)
SR 1010 NB Segment1	Kildaire Farm Rd	---	45	941	920	920	1	892	18	9
SR 1010 NB Segment2	Smith Rd	Kildaire Farm Rd	45	781	910	781	1	750	23	8
SR 1010 NB Segment3	Penny Rd	Smith Rd	45	998	910	910	1	874	27	9
SR 1010 NB Segment4	Arbordale Ct	Penny Rd	45	1171	910	910	1	874	27	9
SR 1010 NB Segment5	Kiftsgate Ln	Arbordale Ct	45	1197	910	910	1	874	27	9
SR 1010 NB Segment6	Reliance Ave	Kiftsgate Ln	45	1222	910	910	1	874	27	9
SR 1010 NB Segment7	US 1	Reliance Ave	45	1274	910	910	1	874	27	9
SR 1010 NB Segment8	Waterford Green Dr	US 1	45	1056	910	910	1	874	27	9
SR 1010 NB Segment9	Parkfield Dr	Waterford Green Dr	45	1123	910	910	1	874	27	9
SR 1010 NB Segment10	Investment Blvd	Parkfield Dr	45	1114	910	910	1	874	27	9
SR 1010 NB Segment11	Old Grove Ln	Investment Blvd	45	1066	920	920	1	892	18	9
SR 1010 NB Segment12	Satinwood Dr	Old Grove Ln	35	1066	920	920	1	892	18	9
SR 1010 NB Segment13	Apex Peakway	Satinwood Dr	35	1066	920	920	1	892	18	9
SR 1010 NB Segment14	---	Apex Peakway	35	566	920	566	1	549	11	6
SR 1010 SB Segment1	Kildaire Farm Rd	---	45	1411	920	920	1	892	18	9
SR 1010 SB Segment2	Smith Rd	Kildaire Farm Rd	45	1171	910	910	1	874	27	9
SR 1010 SB Segment3	Penny Rd	Smith Rd	45	1498	910	910	1	874	27	9
SR 1010 SB Segment4	Arbordale Ct	Penny Rd	45	1757	910	910	1	874	27	9
SR 1010 SB Segment5	Kiftsgate Ln	Arbordale Ct	45	1795	910	910	1	874	27	9
SR 1010 SB Segment6	Reliance Ave	Kiftsgate Ln	45	1834	910	910	1	874	27	9
SR 1010 SB Segment7	US 1	Reliance Ave	45	1910	910	910	1	874	27	9
SR 1010 SB Segment8	Waterford Green Dr	US 1	45	1584	910	910	1	874	27	9
SR 1010 SB Segment9	Parkfield Dr	Waterford Green Dr	45	749	910	749	1	719	22	7
SR 1010 SB Segment10	Investment Blvd	Parkfield Dr	45	742	910	742	1	713	22	7
SR 1010 SB Segment11	Old Grove Ln	Investment Blvd	45	710	920	710	1	689	14	7
SR 1010 SB Segment12	Satinwood Dr	Old Grove Ln	35	710	920	710	1	689	14	7
SR 1010 SB Segment13	Apex Peakway	Satinwood Dr	35	710	920	710	1	689	14	7
SR 1010 SB Segment14	---	Apex Peakway	35	378	920	378	1	366	8	4
SR 1010 NB TurnLeft0 (Kildaire)			45	77	920	77	1	74	2	1
SR 1010 NB TurnRight0 (Kildaire)			45	454	920	454	1	441	9	5
***SR 1010 NB Segment1***	***After Right Turn***		45	490	910	490	1	470	15	5
SR 1010 SB TurnLeft0 (Kildaire)			45	154	910	154	1	147	5	2
SR 1010 SB TurnRight0 (Kildaire)			45	403	910	403	1	387	12	4
***SR 1010 SB Segment2***	***After Right Turn***		45	768	910	768	1	737	23	8
N Kildaire Farm Rd NB			45	1266	930	633	2	620	6	6
N Kildaire Farm Rd SB			45	2352	930	930	2	911	9	9
N Kildaire Farm Rd TurnLeft			45	831	930	831	1	814	8	8
***N Kildaire Farm Rd SB***	***After Left Turn***		45	1521	930	761	2	745	8	8
S Kildaire Farm Rd NB			45	1058	930	529	2	519	5	5
S Kildaire Farm Rd SB			45	1966	930	930	2	911	9	9
S Kildaire Farm Rd TurnLeft			45	265	930	265	1	259	3	3
***S Kildaire Farm Rd NB***	***After Left Turn***		45	794	930	397	2	389	4	4
SR 1010 NB TurnLeft1 (Smith)			45	58	910	58	1	55	2	1
SR 1010 SB TurnRight1 (Smith)			45	413	910	413	1	396	12	4
***SR 1010 SB Segment3***	***After Right Turn***		45	1085	910	910	1	874	27	9
Smith Rd NB			35	328	910	328	1	314	10	3
Smith Rd SB			35	608	910	608	1	584	18	6
Smith Rd TurnLeft			35	271	910	271	1	260	8	3
Smith Rd TurnRight			35	57	910	57	1	54	2	1
SR 1010 SB TurnLeft1 (Penny)			45	307	910	307	1	295	9	3
***SR 1010 SB Segment4***	***After Left Turn***		45	1450	910	910	1	874	27	9
Penny Rd EB			45	533	910	533	1	511	16	5
Penny Rd TurnLeft			45	48	910	48	1	46	1	0
Penny Rd TurnRight			45	307	910	307	1	295	9	3
SR 1010 SB TurnLeft2 (Arbordale)			45	58	910	58	1	55	2	1
Arbordale Ct			25	128	910	64	2	61	2	1
SR 1010 SB TurnLeft3 (Kiftsgate)			45	58	910	58	1	55	2	1
Kiftsgate Ln			15	128	930	64	2	63	1	1
SR 1010 NB TurnLeft2 (Reliance)			45	9	910	9	1	9	0	0
SR 1010 NB TurnRight1 (Reliance)			45	8	910	8	1	7	0	0
SR 1010 SB TurnLeft4 (Reliance)			45	10	910	10	1	10	0	0
SR 1010 SB TurnRight2 (Reliance)			45	23	910	23	1	22	1	0
Reliance Ave NB			25	594	910	594	1	570	18	6
Reliance Ave SB			25	396	910	396	1	380	12	4
Reliance Ave TurnRight			25	168	910	168	1	161	5	2
Shopping Center Dr NB			25	331	920	331	1	321	7	3
Shopping Center Dr SB			25	221	920	221	1	214	4	2
SR 1010 NB TurnRight2 (US1)			45	179	910	179	1	172	5	2
SR 1010 SB TurnLeft5 (US1)			45	130	910	130	1	124	4	1
SR 1010 NB TurnLeft3 (Lufkin)			45	45	910	45	1	43	1	0
SR 1010 SB TurnRight3 (Lufkin)			45	86	910	86	1	83	3	1
Lufkin Rd			35	630	880	315	2	290	19	6
Lufkin Rd TurnLeft			35	90	880	90	1	83	5	2
Lufkin Rd TurnRight			35	126	880	126	1	116	8	3
US1 EB			65	959	870	480	2	451	19	10
US1 WB			65	517	640	258	2	243	10	5

Table B-2: Traffic Data for Noise Modeling - No Build Conditions (Sheet 2 of 2)

Roadway	Intersection to North	Intersection to South	Speed Limit	Forecast Volume (veh/hr)	Level of Service "C" Volume* (veh/hr)	Volume Used in TNM (veh/hr)	Number of Lanes	Autos (veh/lane)	Medium Trucks (veh/lane)	Heavy Trucks (veh/lane)
S US1 Loop			35	410	640	410	1	385	16	8
S US1 Loop TurnLeft			35	310	900	310	1	291	12	6
***S US1 Loop***	***After Left Turn***		35	99	900	99	1	93	4	2
S US1 Ramp			35	296	870	296	1	278	12	6
N US1 Loop			35	296	640	296	1	278	12	6
N US1 Loop TurnLeft			35	69	900	69	1	65	3	1
N US1 Loop TurnRight			35	211	900	211	1	198	8	4
N US1 Ramp			45	410	870	410	1	385	16	8
SR 1010 NB TurnLeft4 (US1)			45	179	910	179	1	172	5	2
SR 1010 NB TurnRight3 (Waterford)			45	22	910	22	1	22	1	0
SR 1010 SB TurnLeft6 (Waterford)			45	16	910	16	1	15	0	0
SR 1010 SB TurnRight4 (US1)			45	35	910	35	1	34	1	0
Waterford Green Dr NB			25	177	920	177	1	171	4	2
Waterford Green Dr SB			25	95	920	95	1	92	2	1
Waterford Green Dr TurnLeft			25	25	920	25	1	24	1	0
SR 1010 NB TurnRight4 (Parkfield)			45	48	910	48	1	46	1	0
SR 1010 SB TurnLeft7 (Parkfield)			45	26	910	26	1	25	1	0
Parkfield Dr NB			25	94	910	94	1	90	3	1
Parkfield Dr SB			25	50	910	50	1	48	2	1
SR 1010 NB TurnLeft5 (Investment)			45	77	910	77	1	74	2	1
Investment Blvd NB			25	132	875	132	1	120	11	1
Investment Blvd SB			25	88	875	88	1	80	7	1
SR 1010 NB TurnLeft6 (Old Grove)			45	10	920	10	1	9	0	0
SR 1010 SB TurnLeft8 (Old Grove)			45	6	920	6	1	6	0	0
SR 1010 SB TurnRight5 (Old Grove)			45	6	920	6	1	6	0	0
N Old Grove Ln NB			15	26	920	26	1	25	1	0
N Old Grove Ln SB			15	14	920	14	1	14	0	0
S Old Grove Ln NB			15	16	920	16	1	15	0	0
S Old Grove Ln SB			15	29	920	29	1	28	1	0
SR 1010 SB TurnLeft9 (Satinwood)			35	22	920	22	1	22	0	0
Satinwood Dr NB			25	91	920	91	1	88	2	1
Satinwood Dr SB			25	49	920	49	1	48	1	0
SR 1010 NB TurnLeft7 (Peakway)			35	154	920	154	1	149	3	2
SR 1010 NB TurnRight5 (Peakway)			35	528	920	528	1	512	11	5
***SR 1010 NB Segment13***	***After Right Turn***		35	538	920	538	1	521	11	5
SR 1010 SB TurnLeft10 (Peakway)			35	70	920	70	1	68	1	1
Schieffelin Rd NB			35	1560	910	910	1	874	27	9
Schieffelin Rd SB			35	2340	910	910	1	874	27	9
Schieffelin Rd TurnLeft			35	64	910	64	1	61	2	1
Apex Peakway			35	4266	910	910	4	874	27	9
Apex Peakway TurnLeft			35	990	910	910	1	874	27	9
***Apex Peakway SB***	***After Left Turn***		35	1638	910	819	2	786	25	8

\* LOS "C" Volumes obtained from the generalized tables of NCDOT's Level of Service C Volumes for Traffic Noise Modeling (September 2019).

Table B-3: Traffic Data for Noise Modeling - Build Conditions (Sheet 1 of 2)

Roadway	Intersection to North	Intersection to South	Speed Limit	Forecast Volume (veh/hr)	Level of Service "C" Volume* (veh/hr)	Volume Used in TNM (veh/hr)	Number of Lanes	Autos (veh/lane)	Medium Trucks (veh/lane)	Heavy Trucks (veh/lane)
SR 1010 NB Segment1	Kildaire Farm Rd	---	45	1088	920	544	2	528	11	5
SR 1010 NB Segment2	Smith Rd	Kildaire Farm Rd	45	1171	910	586	2	562	18	6
SR 1010 NB Segment3	Penny Rd	Smith Rd	45	1498	910	749	2	719	22	7
SR 1010 NB Segment4	Arbordale Ct	Penny Rd	45	1709	910	570	3	547	17	6
SR 1010 NB Segment5	Kiftsgate Ln	Arbordale Ct	45	1734	910	578	3	555	17	6
SR 1010 NB Segment6	Reliance Ave	Kiftsgate Ln	45	1760	910	587	3	563	18	6
SR 1010 NB Segment7	US 1	Reliance Ave	45	1837	910	612	3	588	18	6
SR 1010 NB Segment8	Waterford Green Dr	US 1	45	1507	910	502	3	482	15	5
SR 1010 NB Segment9	Parkfield Dr	Waterford Green Dr	45	1632	910	544	3	522	16	5
SR 1010 NB Segment10	Investment Blvd	Parkfield Dr	45	1622	910	811	2	779	24	8
SR 1010 NB Segment11	Old Grove Ln	Investment Blvd	45	1574	920	787	2	764	16	8
SR 1010 NB Segment12	Satinwood Dr	Old Grove Ln	35	1574	920	787	2	764	16	8
SR 1010 NB Segment13	Apex Peakway	Satinwood Dr	35	1574	920	787	2	764	16	8
SR 1010 NB Segment14	---	Apex Peakway	35	758	920	758	1	736	15	8
SR 1010 SB Segment1	Kildaire Farm Rd	---	45	1632	920	816	2	792	16	8
SR 1010 SB Segment2	Smith Rd	Kildaire Farm Rd	45	1757	910	586	3	562	18	6
SR 1010 SB Segment3	Penny Rd	Smith Rd	45	2246	910	749	3	719	22	7
SR 1010 SB Segment4	Arbordale Ct	Penny Rd	45	2563	910	854	3	820	26	9
SR 1010 SB Segment5	Kiftsgate Ln	Arbordale Ct	45	2602	910	867	3	833	26	9
SR 1010 SB Segment6	Reliance Ave	Kiftsgate Ln	45	2640	910	880	3	845	26	9
SR 1010 SB Segment7	US 1	Reliance Ave	45	2755	910	910	3	874	27	9
SR 1010 SB Segment8	Waterford Green Dr	US 1	45	2261	910	754	3	723	23	8
SR 1010 SB Segment9	Parkfield Dr	Waterford Green Dr	45	1088	910	544	2	522	16	5
SR 1010 SB Segment10	Investment Blvd	Parkfield Dr	45	1082	910	541	2	519	16	5
SR 1010 SB Segment11	Old Grove Ln	Investment Blvd	45	1050	920	525	2	509	10	5
SR 1010 SB Segment12	Satinwood Dr	Old Grove Ln	35	1050	920	525	2	509	10	5
SR 1010 SB Segment13	Apex Peakway	Satinwood Dr	35	1050	920	525	2	509	10	5
SR 1010 SB Segment14	---	Apex Peakway	35	506	920	253	2	245	5	3
SR 1010 NB TurnLeft0 (Kildaire)			45	90	920	90	1	87	2	1
SR 1010 SB TurnLeft0 (Kildaire)			45	221	910	110	2	106	3	1
SR 1010 NB TurnRight0 (Kildaire)			45	422	920	422	1	410	8	4
***SR 1010 NB Segment1***	***After Right Turn***		45	666	920	333	2	323	7	3
SR 1010 SB TurnRight0 (Kildaire)			45	672	910	336	2	323	10	3
***SR 1010 SB Segment2***	***After Right Turn***		45	1085	910	362	3	347	11	4
N Kildaire Farm Rd NB			45	1140	930	570	2	559	6	6
N Kildaire Farm Rd SB			45	2118	930	930	2	911	9	9
N Kildaire Farm Rd TurnLeft			45	416	930	208	2	204	2	2
N Kildaire Farm Rd TurnRight			45	145	930	145	1	142	1	1
S Kildaire Farm Rd NB			45	1109	930	554	2	543	6	6
S Kildaire Farm Rd SB			45	2059	930	930	2	911	9	9
S Kildaire Farm Rd TurnLeft			45	441	930	221	2	216	2	2
S Kildaire Farm Rd TurnRight			45	88	930	88	1	86	1	1
SR 1010 NB TurnLeft1 (Smith)			45	83	910	83	1	80	2	1
SR 1010 SB TurnRight1 (Smith)			45	614	910	614	1	590	18	6
***SR 1010 SB Segment3***	***After Right Turn***		45	1632	910	544	3	522	16	5
Smith Rd NB			35	485	910	485	1	466	15	5
Smith Rd SB			35	901	910	901	1	865	27	9
Smith Rd TurnLeft			35	403	910	202	2	194	6	2
Smith Rd TurnRight			35	82	910	82	1	79	2	1
SR 1010 NB TurnRight1 (Penny)			45	42	910	42	1	40	1	0
SR 1010 SB TurnLeft1 (Penny)			45	379	910	190	2	182	6	2
Penny Rd EB			45	662	905	331	2	315	13	3
Penny Rd TurnLeft			45	62	905	62	1	59	2	1
Penny Rd TurnRight			45	379	905	379	1	360	15	4
SR 1010 SB TurnLeft2 (Arbordale)			45	58	910	58	1	55	2	1
Arbordale Ct			25	128	910	64	2	61	2	1
SR 1010 SB TurnLeft3 (Kiftsgate)			45	58	910	58	1	55	2	1
Kiftsgate Ln			15	128	910	64	2	61	2	1
SR 1010 NB TurnLeft2 (Reliance)			45	12	910	6	2	6	0	0
SR 1010 NB TurnRight2 (Reliance)			45	9	910	9	1	9	0	0
SR 1010 SB TurnLeft4 (Reliance)			45	12	910	12	1	12	0	0
SR 1010 SB TurnRight2 (Reliance)			45	31	910	31	1	29	1	0
Reliance Ave NB			25	714	910	714	1	685	21	7
Reliance Ave SB			25	476	910	476	1	457	14	5
Reliance Ave TurnLeft			25	384	910	192	2	184	6	2
Reliance Ave TurnRight			25	228	910	228	1	219	7	2
Shopping Center Dr NB			25	341	910	341	1	327	10	3
Shopping Center Dr SB			25	227	910	227	1	218	7	2
Shopping Center Dr TurnLeft			25	90	910	90	1	86	3	1
Shopping Center Dr TurnRight			25	83	910	83	1	80	2	1
SR 1010 NB TurnLeft3 (Lufkin)			45	48	910	48	1	46	1	0
SR 1010 NB TurnRight3 (US1)			45	221	910	221	1	212	7	2
SR 1010 SB TurnLeft5 (US1)			45	120	910	60	2	58	2	1
SR 1010 SB TurnRight3 (Lufkin)			45	91	910	91	1	88	3	1
Lufkin Rd			35	666	880	333	2	306	20	7
Lufkin Rd TurnLeft			35	99	880	99	1	91	6	2

Table B-3: Traffic Data for Noise Modeling - Build Conditions (Sheet 2 of 2)

Roadway	Intersection to North	Intersection to South	Speed Limit	Forecast Volume (veh/hr)	Level of Service "C" Volume* (veh/hr)	Volume Used in TNM (veh/hr)	Number of Lanes	Autos (veh/lane)	Medium Trucks (veh/lane)	Heavy Trucks (veh/lane)
Lufkin Rd TurnRight			35	135	880	135	1	124	8	3
US1 EB			65	1141	870	570	2	536	23	11
US1 WB			65	614	640	307	2	289	12	6
S US1 Loop			35	527	640	527	1	495	21	11
S US1 Loop TurnLeft			35	427	900	142	3	134	6	3
S US1 Ramp			45	331	870	165	2	155	7	3
N US1 Loop			35	331	640	331	1	311	13	7
N US1 Loop TurnLeft			35	63	900	32	2	30	1	1
N US1 Loop TurnRight			35	252	900	252	1	237	10	5
N US1 Ramp			45	527	870	263	2	247	11	5
SR 1010 NB TurnLeft4 (US1)			45	243	910	122	2	117	4	1
SR 1010 SB TurnLeft6 (Waterford)			45	16	910	16	1	15	0	0
SR 1010 SB TurnRight4 (US1)			45	35	910	35	1	34	1	0
Waterford Green Dr NB			25	177	920	177	1	171	4	2
Waterford Green Dr SB			25	95	920	95	1	92	2	1
Waterford Green Dr TurnLeft			25	25	920	25	1	24	1	0
Waterford Green Dr TurnRight			25	14	920	14	1	14	0	0
SR 1010 NB TurnRight5 (Parkfield)			45	48	910	48	1	46	1	0
Parkfield Dr NB			25	94	910	94	1	90	3	1
Parkfield Dr SB			25	50	910	50	1	48	2	1
SR 1010 NB TurnLeft5 (Investment)			45	77	910	77	1	74	2	1
SR 1010 SB TurnRight5 (Investment)			45	19	910	19	1	18	1	0
Investment Blvd NB			25	132	875	132	1	120	11	1
Investment Blvd SB			25	88	875	88	1	80	7	1
SR 1010 NB TurnLeft6 (Old Grove)			45	10	920	10	1	9	0	0
SR 1010 SB TurnLeft6 (Old Grove)			45	6	920	6	1	6	0	0
N Old Grove Ln NB			15	26	910	26	1	25	1	0
N Old Grove Ln SB			15	14	910	14	1	13	0	0
S Old Grove Ln NB			15	16	920	16	1	15	0	0
S Old Grove Ln SB			15	29	920	29	1	28	1	0
SR 1010 SB TurnLeft7 (Satinwood)			35	22	920	22	1	22	0	0
Satinwood Dr NB			25	91	920	91	1	88	2	1
Satinwood Dr SB			25	49	920	49	1	48	1	0
SR 1010 NB TurnLeft6 (Peakway)			35	202	920	202	1	196	4	2
SR 1010 SB TurnLeft8 (Peakway)			35	102	920	102	1	99	2	1
***SR 1010 SB Segment14***	***After Left Turn***		35	403	920	202	2	196	4	2
Schieffelin Rd NB			35	1476	910	910	1	874	27	9
Schieffelin Rd SB			35	2214	910	910	1	874	27	9
Schieffelin Rd TurnLeft			35	72	910	72	1	69	2	1
Apex Peakway			35	4671	910	910	2	874	27	9
Apex Peakway TurnLeft			35	1602	910	801	2	769	24	8
***Apex Peakway SB***	***After Left Turn***		35	3069	910	910	2	874	27	9

\* LOS "C" Volumes obtained from the generalized tables of NCDOT's Level of Service C Volumes for Traffic Noise Modeling (September 2019).



**Appendix C**  
**Hourly Equivalent Traffic Noise Level Tables**

Table C-1: Ten Ten Road Widening (STIP No. U-5825) Receptors, Noise Levels, and Noise Impacts (Page 1 of 15)

NSA	Receptors					Predicted Noise Levels, Leq(h) (dB(A))*			
	Receptor Number	Address	NAC	Use	DUs	Existing	No-Build	Build	Change
1	1-01	212 SONOMA VALLEY DR	B	Single-Family Residential	1	65	65	65	0
	1-02	210 SONOMA VALLEY DR	B	Single-Family Residential	1	65	65	65	0
	1-03	208 SONOMA VALLEY DR	B	Single-Family Residential	1	65	65	65	0
	1-04	206 SONOMA VALLEY DR	B	Single-Family Residential	1	66	66	66	0
	1-05	204 SONOMA VALLEY DR	B	Single-Family Residential	1	65	65	65	0
	1-06	200 SONOMA VALLEY DR	B	Single-Family Residential	1	65	65	65	0
	1-07	112 SONOMA VALLEY DR	B	Single-Family Residential	1	65	65	65	0
	1-08	110 SONOMA VALLEY DR	B	Single-Family Residential	1	65	65	65	0
	1-09	108 SONOMA VALLEY DR	B	Single-Family Residential	1	65	64	65	0
	1-10	106 SONOMA VALLEY DR	B	Single-Family Residential	1	65	64	65	0
	1-11	104 SONOMA VALLEY DR	B	Single-Family Residential	1	64	64	64	0
	1-12	102 SONOMA VALLEY DR	B	Single-Family Residential	1	65	64	65	0
	1-13	211 SONOMA VALLEY DR	B	Single-Family Residential	1	53	53	53	0
	1-14	209 SONOMA VALLEY DR	B	Single-Family Residential	1	52	52	52	0
	1-15	207 SONOMA VALLEY DR	B	Single-Family Residential	1	51	51	51	0
	1-16	205 SONOMA VALLEY DR	B	Single-Family Residential	1	50	50	50	0
	1-17	203 SONOMA VALLEY DR	B	Single-Family Residential	1	52	51	52	0
	1-18	201 SONOMA VALLEY DR	B	Single-Family Residential	1	55	54	55	0
	1-19	113 SONOMA VALLEY DR	B	Single-Family Residential	1	55	54	55	0
	1-20	111 SONOMA VALLEY DR	B	Single-Family Residential	1	54	53	54	0
	1-21	109 SONOMA VALLEY DR	B	Single-Family Residential	1	53	53	53	0
	1-22	107 SONOMA VALLEY DR	B	Single-Family Residential	1	54	54	54	0
	1-23	105 SONOMA VALLEY DR	B	Single-Family Residential	1	57	56	57	0
	1-24	103 SONOMA VALLEY DR	B	Single-Family Residential	1	60	59	60	0
	1-25	101 SONOMA VALLEY DR	B	Single-Family Residential	1	61	60	61	0
	1-26	317 MOUNT EDEN PL	B	Single-Family Residential	1	48	48	48	0
	1-27	319 MOUNT EDEN PL	B	Single-Family Residential	1	48	48	48	0
	1-28	321 MOUNT EDEN PL	B	Single-Family Residential	1	48	48	48	0
	1-29	323 MOUNT EDEN PL	B	Single-Family Residential	1	48	48	48	0
	1-30	325 MOUNT EDEN PL	B	Single-Family Residential	1	49	50	49	0
	1-31	3413 KILDAIRE FARM RD	B	Single-Family Residential	1	63	65	63	0
	1-32	107 CRAVEN HILL CT	B	Single-Family Residential	1	59	59	58	-1
	1-33	109 CRAVEN HILL CT	B	Single-Family Residential	1	59	60	59	0
	1-34	111 CRAVEN HILL CT	B	Single-Family Residential	1	59	60	59	0
	1-35	108 CRAVEN HILL CT	B	Single-Family Residential	1	57	58	57	0
2	2-01	109 FOREST EDGE DR	B	Single-Family Residential	1	65	66	65	0
	2-02	111 FOREST EDGE DR	B	Single-Family Residential	1	62	64	63	1
	2-03	113 FOREST EDGE DR	B	Single-Family Residential	1	61	62	61	0
	2-04	115 FOREST EDGE DR	B	Single-Family Residential	1	62	63	62	0
	2-05	117 FOREST EDGE DR	B	Single-Family Residential	1	65	67	66	1
	2-06	119 FOREST EDGE DR	B	Single-Family Residential	1	61	62	61	0
	2-07	118 FOREST EDGE DR	B	Single-Family Residential	1	54	55	56	2
	2-08	116 FOREST EDGE DR	B	Single-Family Residential	1	48	49	49	1
	2-09	114 FOREST EDGE DR	B	Single-Family Residential	1	50	51	51	1
	2-10	112 FOREST EDGE DR	B	Single-Family Residential	1	52	53	52	0
	2-11	110 FOREST EDGE DR	B	Single-Family Residential	1	52	53	53	1
	2-12	117 OLDE TREE DR	B	Single-Family Residential	1	49	50	51	2
	2-13	115 OLDE TREE DR	B	Single-Family Residential	1	48	48	49	1
2-14	113 OLDE TREE DR	B	Single-Family Residential	1	48	48	48	0	
2-15	3494 KILDAIRE FARM RD McDonalds	E	Restaurant	1	63	63	64	1	
2-16	3490 KILDAIRE FARM RD Jersey Mikes Subs	E	Restaurant	1	65	65	65	0	
2-17	3434 KILDAIRE FARM RD WTCC	D	Educational - Interior	1	35	37	37	2	
3	3-01	3117 TEN TEN RD	B	Single-Family Residential	1	59	61	59	0
	3-02	3105 TEN TEN RD	B	Single-Family Residential	1	60	60	60	0
	3-03	3033 TEN TEN RD	B	Single-Family Residential	1	53	54	56	3
	3-04	614 CANON GATE DR	B	Single-Family Residential	1	49	50	53	4
	3-05	612 CANON GATE DR	B	Single-Family Residential	1	48	49	52	4
	3-06	610 CANON GATE DR	B	Single-Family Residential	1	50	50	54	4
	3-07	608 CANON GATE DR	B	Single-Family Residential	1	49	50	54	5
	3-08	606 CANON GATE DR	B	Single-Family Residential	1	49	50	55	6
	3-09	604 CANON GATE DR	B	Single-Family Residential	1	52	53	57	5
	3-10	602 CANON GATE DR	B	Single-Family Residential	1	53	54	57	4
	3-11	600 CANON GATE DR	B	Single-Family Residential	1	54	55	58	4
	3-12	504 CANON GATE DR	B	Single-Family Residential	1	55	56	59	4
	3-13	502 CANON GATE DR	B	Single-Family Residential	1	58	59	61	3
	3-14	500 CANON GATE DR	B	Single-Family Residential	1	60	61	62	2
	3-15	404 CANON GATE DR	B	Single-Family Residential	1	63	64	63	0
	3-16	402 CANON GATE DR	B	Single-Family Residential	1	61	62	63	2
	3-17	101 SILK LEAF CT	B	Single-Family Residential	1	60	60	60	0
3-18	103 SILK LEAF CT	B	Single-Family Residential	1	68	69	68	0	
3-19	105 SILK LEAF CT	B	Single-Family Residential	1	68	69	69	1	
3-20	102 SILK LEAF CT	B	Single-Family Residential	1	63	64	66	3	
3-21	310 CANON GATE DR	B	Single-Family Residential	1	65	65	65	0	
3-22	308 CANON GATE DR	B	Single-Family Residential	1	60	60	60	0	
3-23	306 CANON GATE DR	B	Single-Family Residential	1	51	52	55	4	
3-24	304 CANON GATE DR	B	Single-Family Residential	1	50	51	53	3	
3-25	302 CANON GATE DR	B	Single-Family Residential	1	50	51	52	2	
3-26	609 CANON GATE DR	B	Single-Family Residential	1	50	50	50	0	
3-27	607 CANON GATE DR	B	Single-Family Residential	1	50	50	50	0	
3-28	605 CANON GATE DR	B	Single-Family Residential	1	48	48	48	0	
3-29	603 CANON GATE DR	B	Single-Family Residential	1	48	48	48	0	
3-30	601 CANON GATE DR	B	Single-Family Residential	1	48	48	48	0	
3-31	102 BITTERCRESS CT	B	Single-Family Residential	1	48	48	48	0	

Table C-1: Ten Ten Road Widening (STIP No. U-5825) Receptors, Noise Levels, and Noise Impacts (Page 2 of 15)

NSA	Receptors					Predicted Noise Levels, Leq(h) (dB(A))*			
	Receptor Number	Address	NAC	Use	DUs	Existing	No-Build	Build	Change
3	3-32	103 BITTERCRESS CT	B	Single-Family Residential	1	48	48	48	0
	3-33	503 CANON GATE DR	B	Single-Family Residential	1	48	49	52	4
	3-34	501 CANON GATE DR	B	Single-Family Residential	1	50	51	54	4
	3-35	405 CANON GATE DR	B	Single-Family Residential	1	50	52	54	4
	3-36	403 CANON GATE DR	B	Single-Family Residential	1	51	52	55	4
	3-37	401 CANON GATE DR	B	Single-Family Residential	1	51	52	55	4
	3-38	309 CANON GATE DR	B	Single-Family Residential	1	50	51	54	4
	3-39	307 CANON GATE DR	B	Single-Family Residential	1	50	50	52	2
	3-40	305 CANON GATE DR	B	Single-Family Residential	1	50	50	50	0
	3-41	207 TEMPLE GATE DR	B	Single-Family Residential	1	50	50	50	0
	3-42	204 TEMPLE GATE DR	B	Single-Family Residential	1	50	50	50	0
	3-43	202 TEMPLE GATE DR	B	Single-Family Residential	1	48	48	48	0
	3-44	7717 SUMMERCREST DR	B	Single-Family Residential	1	70	72	73	3
	3-45	7713 SUMMERCREST DR	B	Single-Family Residential	1	58	60	63	5
	3-46	7709 SUMMERCREST DR	B	Single-Family Residential	1	53	55	59	6
	3-47	7705 SUMMERCREST DR	B	Single-Family Residential	1	50	52	55	5
	3-48	7701 SUMMERCREST DR	B	Single-Family Residential	1	49	51	55	6
	3-49	7700 SUMMERCREST DR	B	Single-Family Residential	1	65	65	65	0
	3-50	7704 SUMMERCREST DR	B	Single-Family Residential	1	51	53	58	7
	3-51	7708 SUMMERCREST DR	B	Single-Family Residential	1	56	58	63	7
	3-52	7712 SUMMERCREST DR	B	Single-Family Residential	1	69	70	74	5
	3-53	2709 TEN TEN RD	B	Single-Family Residential	1	59	60	71	12
	3-54	118 SELLY MANOR CT	B	Single-Family Residential	1	49	50	55	6
	3-55	116 SELLY MANOR CT	B	Single-Family Residential	1	50	51	55	5
	3-56	2629 TEN TEN RD	B	Single-Family Residential	1	56	58	63	7
	3-57	2617 TEN TEN RD	B	Single-Family Residential	1	65	67	R/W	R/W
	3-58	2605 TEN TEN Rd	B	Single-Family Residential	1	69	70	R/W	R/W
	3-59	11225 PENNY RD	B	Single-Family Residential	1	62	62	62	0
	3-60	100 TATTENHALL DR Pool	B	Single-Family Recreational	1	60	59	62	2
	3-61	106 SELLY MANOR CT	B	Single-Family Residential	1	50	51	56	6
	3-62	104 SELLY MANOR CT	B	Single-Family Residential	1	65	65	65	0
	3-63	102 SELLY MANOR CT	B	Single-Family Residential	1	65	65	65	0
	3-64	100 SELLY MANOR CT	B	Single-Family Residential	1	60	60	60	0
	3-65	200 TATTENHALL DR	B	Single-Family Residential	1	60	60	60	0
	3-66	101 TATTENHALL DR	B	Single-Family Residential	1	63	63	66	3
	3-67	103 TATTENHALL DR	B	Single-Family Residential	1	53	53	56	3
	3-68	105 TATTENHALL DR	B	Single-Family Residential	1	50	50	53	3
3-69	104 BOWCASTLE CT	B	Single-Family Residential	1	61	61	63	2	
3-70	105 BOWCASTLE CT	B	Single-Family Residential	1	59	58	61	2	
3-71	103 BOWCASTLE CT	B	Single-Family Residential	1	60	60	60	0	
4	4-01	101 KILLINGSWORTH DR Tennis Court	B	Single-Family Recreational	1	65	66	68	3
	4-02	101 KILLINGSWORTH DR Pool	B	Single-Family Recreational	1	62	63	65	3
	4-03	125 KILLINGSWORTH DR	B	Single-Family Residential	1	60	61	64	4
	4-04	127 KILLINGSWORTH DR	B	Single-Family Residential	1	60	60	63	3
	4-05	129 KILLINGSWORTH DR	B	Single-Family Residential	1	55	56	60	5
	4-06	131 KILLINGSWORTH DR	B	Single-Family Residential	1	55	56	59	4
	4-07	201 KILLINGSWORTH DR	B	Single-Family Residential	1	53	54	57	4
	4-08	203 KILLINGSWORTH DR	B	Single-Family Residential	1	53	55	57	4
	4-09	205 KILLINGSWORTH DR	B	Single-Family Residential	1	54	55	58	4
	4-10	207 KILLINGSWORTH DR	B	Single-Family Residential	1	54	55	58	4
	4-11	209 KILLINGSWORTH DR	B	Single-Family Residential	1	55	56	60	5
	4-12	211 KILLINGSWORTH DR	B	Single-Family Residential	1	55	56	59	4
	4-13	308 LADY MARIAN CT	B	Single-Family Residential	1	56	57	58	2
	4-14	304 LADY MARIAN CT	B	Single-Family Residential	1	56	57	59	3
	4-15	101 ROYAL GLEN DR	B	Single-Family Residential	1	48	48	48	0
	4-16	103 ROYAL GLEN DR	B	Single-Family Residential	1	48	48	48	0
	4-17	118 KILLINGSWORTH DR	B	Single-Family Residential	1	48	48	50	2
	4-18	120 KILLINGSWORTH DR	B	Single-Family Residential	1	48	49	52	4
	4-19	122 KILLINGSWORTH DR	B	Single-Family Residential	1	49	51	55	6
	4-20	124 KILLINGSWORTH DR	B	Single-Family Residential	1	50	52	56	6
	4-21	126 KILLINGSWORTH DR	B	Single-Family Residential	1	51	53	57	6
	4-22	128 KILLINGSWORTH DR	B	Single-Family Residential	1	51	52	57	6
	4-23	130 KILLINGSWORTH DR	B	Single-Family Residential	1	52	53	57	5
	4-24	104 MORNINGHILLS CT	B	Single-Family Residential	1	48	48	50	2
	4-25	102 MORNINGHILLS CT	B	Single-Family Residential	1	48	48	50	2
	4-26	200 KILLINGSWORTH DR	B	Single-Family Residential	1	48	48	53	5
	4-27	202 KILLINGSWORTH DR	B	Single-Family Residential	1	48	48	52	4
	4-28	204 KILLINGSWORTH DR	B	Single-Family Residential	1	48	48	49	1
	4-29	200 SOUTHGLEN DR	B	Single-Family Residential	1	48	48	52	4
	4-30	213 KILLINGSWORTH DR	B	Single-Family Residential	1	48	48	51	3
	4-31	106 SOUTHGLEN DR	B	Single-Family Residential	1	50	50	53	3
	4-32	104 SOUTHGLEN DR	B	Single-Family Residential	1	52	54	57	5
	4-33	102 SOUTHGLEN DR	B	Single-Family Residential	1	50	51	53	3
4-34	100 SOUTHGLEN DR	B	Single-Family Residential	1	50	52	53	3	
4-35	101 BRIMMER CT	B	Single-Family Residential	1	54	55	57	3	
4-36	103 BRIMMER CT	B	Single-Family Residential	1	55	56	59	4	
4-37	105 BRIMMER CT	B	Single-Family Residential	1	54	56	60	6	
4-38	105 SOUTHGLEN DR	B	Single-Family Residential	1	48	48	50	2	
4-39	311 GENTLEWOODS DR	B	Single-Family Residential	1	48	48	50	2	
4-40	100 BRIMMER CT	B	Single-Family Residential	1	48	48	49	1	
4-41	104 BRIMMER CT	B	Single-Family Residential	1	48	49	52	4	
4-42	100 ARBORDALE CT	B	Single-Family Residential	1	68	71	R/W	R/W	
4-43	102 ARBORDALE CT	B	Single-Family Residential	1	60	61	66	6	

Table C-1: Ten Ten Road Widening (STIP No. U-5825) Receptors, Noise Levels, and Noise Impacts (Page 3 of 15)

NSA	Receptors					Predicted Noise Levels, Leq(h) (dB(A))*				
	Receptor Number	Address	NAC	Use	DUs	Existing	No-Build	Build	Change	
4	4-44	104 ARBORDALE CT	B	Single-Family Residential	1	57	58	60	3	
	4-45	106 ARBORDALE CT	B	Single-Family Residential	1	55	56	58	3	
	4-46	108 ARBORDALE CT	B	Single-Family Residential	1	54	54	55	1	
	4-47	110 ARBORDALE CT	B	Single-Family Residential	1	54	54	55	1	
	4-48	101 ARBORDALE CT	B	Single-Family Residential	1	66	68	71	5	
	4-49	103 HASSELLWOOD DR	B	Single-Family Residential	1	65	65	68	3	
	4-50	105 HASSELLWOOD DR	B	Single-Family Residential	1	65	65	66	1	
	4-51	107 HASSELLWOOD DR	B	Single-Family Residential	1	60	60	64	4	
	4-52	109 HASSELLWOOD DR	B	Single-Family Residential	1	60	60	63	3	
	4-53	111 HASSELLWOOD DR	B	Single-Family Residential	1	60	60	63	3	
	4-54	113 HASSELLWOOD DR	B	Single-Family Residential	1	53	55	62	9	
	4-55	115 HASSELLWOOD DR	B	Single-Family Residential	1	52	54	60	8	
	4-56	117 HASSELLWOOD DR	B	Single-Family Residential	1	50	52	58	8	
	4-57	119 HASSELLWOOD DR	B	Single-Family Residential	1	50	50	56	6	
	4-58	109 ARBORDALE CT	B	Single-Family Residential	1	55	55	56	1	
	4-59	107 ARBORDALE CT	B	Single-Family Residential	1	54	55	56	2	
	4-60	105 ARBORDALE CT	B	Single-Family Residential	1	57	58	59	2	
	4-61	102 HASSELLWOOD DR	B	Single-Family Residential	1	52	54	58	6	
	4-62	104 HASSELLWOOD DR	B	Single-Family Residential	1	50	51	57	7	
	4-63	106 HASSELLWOOD DR	B	Single-Family Residential	1	50	50	56	6	
	4-64	110 HASSELLWOOD DR	B	Single-Family Residential	1	48	48	54	6	
	4-65	112 HASSELLWOOD DR	B	Single-Family Residential	1	48	48	51	3	
	4-66	116 HASSELLWOOD DR	B	Single-Family Residential	1	48	48	50	2	
	4-67	2235 TEN REN RD	B	Single-Family Residential	1	65	67	R/W	R/W	
	5	5-01	200 SOLANDRA LN A1a 1st Floor	B	Multi-Family Residential	1	48	48	55	7
		5-02	201 SOLANDRA LN A1b 2nd Floor	B	Multi-Family Residential	1	50	50	57	7
		5-03	200 SOLANDRA LN A2a 1st Floor	B	Multi-Family Residential	1	50	51	60	10
5-04		201 SOLANDRA LN A2b 2nd Floor	B	Multi-Family Residential	1	51	54	62	11	
5-05		200 SOLANDRA LN A3a 1st Floor	B	Multi-Family Residential	1	52	54	61	9	
5-06		201 SOLANDRA LN A3b 2nd Floor	B	Multi-Family Residential	1	60	60	63	3	
5-07		200 SOLANDRA LN A4a 1st Floor	B	Multi-Family Residential	1	53	55	62	9	
5-08		201 SOLANDRA LN A4b 2nd Floor	B	Multi-Family Residential	1	60	60	63	3	
5-09		200 SOLANDRA LN A5a 1st Floor	B	Multi-Family Residential	1	54	56	63	9	
5-10		201 SOLANDRA LN A5b 2nd Floor	B	Multi-Family Residential	1	60	60	64	4	
5-11		200 SOLANDRA LN A6a 1st Floor	B	Multi-Family Residential	1	54	56	63	9	
5-12		201 SOLANDRA LN A6b 2nd Floor	B	Multi-Family Residential	1	60	60	65	5	
5-13		200 SOLANDRA LN A7a 1st Floor	B	Multi-Family Residential	1	52	55	62	10	
5-14		201 SOLANDRA LN A7b 2nd Floor	B	Multi-Family Residential	1	60	60	63	3	
5-15		200 SOLANDRA LN A8a 1st Floor	B	Multi-Family Residential	1	52	54	60	8	
5-16		201 SOLANDRA LN A8b 2nd Floor	B	Multi-Family Residential	1	54	57	62	8	
5-17		200 SOLANDRA LN B1a 1st Floor	B	Multi-Family Residential	1	50	52	60	10	
5-18		200 SOLANDRA LN B1b 2nd Floor	B	Multi-Family Residential	1	53	56	62	9	
5-19		200 SOLANDRA LN B2a 1st Floor	B	Multi-Family Residential	1	60	60	65	5	
5-20		200 SOLANDRA LN B2b 2nd Floor	B	Multi-Family Residential	1	60	62	67	7	
5-21		200 SOLANDRA LN B3a 1st Floor	B	Multi-Family Residential	1	60	61	66	6	
5-22		200 SOLANDRA LN B3b 2nd Floor	B	Multi-Family Residential	1	65	65	68	3	
5-23		200 SOLANDRA LN B4a 1st Floor	B	Multi-Family Residential	1	65	65	68	3	
5-24		200 SOLANDRA LN B4b 2nd Floor	B	Multi-Family Residential	1	65	67	70	5	
5-25		200 SOLANDRA LN B5a 1st Floor	B	Multi-Family Residential	1	65	65	68	3	
5-26		200 SOLANDRA LN B5b 2nd Floor	B	Multi-Family Residential	1	65	67	69	4	
5-27		200 SOLANDRA LN C1a 1st Floor	B	Multi-Family Residential	1	60	65	68	8	
5-28		200 SOLANDRA LN C1b 2nd Floor	B	Multi-Family Residential	1	65	67	70	5	
5-29		200 SOLANDRA LN C2a 1st Floor	B	Multi-Family Residential	1	65	71	72	7	
5-30		200 SOLANDRA LN C2b 2nd Floor	B	Multi-Family Residential	1	65	71	73	8	
5-31		200 SOLANDRA LN C3a 1st Floor	B	Multi-Family Residential	1	70	72	73	3	
5-32		200 SOLANDRA LN C3b 2nd Floor	B	Multi-Family Residential	1	70	72	74	4	
5-33		200 SOLANDRA LN C4a 1st Floor	B	Multi-Family Residential	1	70	71	72	2	
5-34	200 SOLANDRA LN C4b 2nd Floor	B	Multi-Family Residential	1	70	72	73	3		
5-35	200 SOLANDRA LN C5a 1st Floor	B	Multi-Family Residential	1	69	71	71	2		
5-36	200 SOLANDRA LN C5b 2nd Floor	B	Multi-Family Residential	1	70	71	72	2		
5-37	200 SOLANDRA LN C6a 1st Floor	B	Multi-Family Residential	1	69	71	71	2		
5-38	200 SOLANDRA LN C6b 2nd Floor	B	Multi-Family Residential	1	69	71	72	3		
5-39	200 SOLANDRA LN C7a 1st Floor	B	Multi-Family Residential	1	67	69	68	1		
5-40	200 SOLANDRA LN C7b 2nd Floor	B	Multi-Family Residential	1	68	69	70	2		
5-41	200 SOLANDRA LN C8a 1st Floor	B	Multi-Family Residential	1	63	64	64	1		
5-42	200 SOLANDRA LN C8b 2nd Floor	B	Multi-Family Residential	1	65	66	66	1		
5-43	200 SOLANDRA LN D1a 1st Floor	B	Multi-Family Residential	1	48	48	54	6		
5-44	200 SOLANDRA LN D1b 2nd Floor	B	Multi-Family Residential	1	49	51	57	8		
5-45	200 SOLANDRA LN D2a 1st Floor	B	Multi-Family Residential	1	48	48	54	6		
5-46	200 SOLANDRA LN D2b 2nd Floor	B	Multi-Family Residential	1	48	51	56	8		
5-47	200 SOLANDRA LN D3a 1st Floor	B	Multi-Family Residential	1	48	48	54	6		
5-48	200 SOLANDRA LN D3b 2nd Floor	B	Multi-Family Residential	1	48	51	56	8		
5-49	200 SOLANDRA LN D4a 1st Floor	B	Multi-Family Residential	1	48	48	54	6		
5-50	200 SOLANDRA LN D4b 2nd Floor	B	Multi-Family Residential	1	50	51	56	6		
5-51	200 SOLANDRA LN D5a 1st Floor	B	Multi-Family Residential	1	50	50	53	3		
5-52	200 SOLANDRA LN D5b 2nd Floor	B	Multi-Family Residential	1	50	51	56	6		
5-53	200 SOLANDRA LN D6a 1st Floor	B	Multi-Family Residential	1	50	50	51	1		
5-54	200 SOLANDRA LN D6b 2nd Floor	B	Multi-Family Residential	1	50	51	54	4		
5-55	200 SOLANDRA LN E1a 1st Floor	B	Multi-Family Residential	1	50	50	52	2		
5-56	200 SOLANDRA LN E1b 2nd Floor	B	Multi-Family Residential	1	51	54	57	6		
5-57	200 SOLANDRA LN E2a 1st Floor	B	Multi-Family Residential	1	54	57	58	4		
5-58	200 SOLANDRA LN E2b 2nd Floor	B	Multi-Family Residential	1	52	55	58	6		
5-59	200 SOLANDRA LN E3a 1st Floor	B	Multi-Family Residential	1	55	57	59	4		

Table C-1: Ten Ten Road Widening (STIP No. U-5825) Receptors, Noise Levels, and Noise Impacts (Page 4 of 15)

NSA	Receptors					Predicted Noise Levels, Leq(h) (dB(A))*			
	Receptor Number	Address	NAC	Use	DUs	Existing	No-Build	Build	Change
5	5-60	200 SOLANDRA LN E3b 2nd Floor	B	Multi-Family Residential	1	51	54	56	5
	5-61	200 SOLANDRA LN E4a 1st Floor	B	Multi-Family Residential	1	54	56	57	3
	5-62	200 SOLANDRA LN E4b 2nd Floor	B	Multi-Family Residential	1	50	53	56	6
	5-63	200 SOLANDRA LN E5a 1st Floor	B	Multi-Family Residential	1	53	56	57	4
	5-64	200 SOLANDRA LN E5b 2nd Floor	B	Multi-Family Residential	1	50	53	57	7
	5-65	200 SOLANDRA LN F1a 1st Floor	B	Multi-Family Residential	1	54	56	58	4
	5-66	200 SOLANDRA LN F1b 2nd Floor	B	Multi-Family Residential	1	59	61	62	3
	5-67	200 SOLANDRA LN F2a 1st Floor	B	Multi-Family Residential	1	63	64	64	1
	5-68	200 SOLANDRA LN F2b 2nd Floor	B	Multi-Family Residential	1	60	61	61	1
	5-69	200 SOLANDRA LN F3a 1st Floor	B	Multi-Family Residential	1	62	63	63	1
	5-70	200 SOLANDRA LN F3b 2nd Floor	B	Multi-Family Residential	1	56	58	59	3
	5-71	200 SOLANDRA LN F4a 1st Floor	B	Multi-Family Residential	1	60	62	62	2
	5-72	200 SOLANDRA LN F4b 2nd Floor	B	Multi-Family Residential	1	55	57	58	3
	5-73	200 SOLANDRA LN F5a 1st Floor	B	Multi-Family Residential	1	59	61	61	2
	5-74	200 SOLANDRA LN F5b 2nd Floor	B	Multi-Family Residential	1	65	65	65	0
	5-75	200 SOLANDRA LN F6a 1st Floor	B	Multi-Family Residential	1	65	65	65	0
	5-76	200 SOLANDRA LN F6b 2nd Floor	B	Multi-Family Residential	1	65	65	65	0
	5-77	200 SOLANDRA LN G1a 1st Floor	B	Multi-Family Residential	1	65	65	65	0
	5-78	200 SOLANDRA LN G1b 2nd Floor	B	Multi-Family Residential	1	65	65	65	0
	5-79	200 SOLANDRA LN G2a 1st Floor	B	Multi-Family Residential	1	65	65	66	1
	5-80	200 SOLANDRA LN G2b 2nd Floor	B	Multi-Family Residential	1	65	65	65	0
	5-81	200 SOLANDRA LN G3a 1st Floor	B	Multi-Family Residential	1	65	65	65	0
	5-82	200 SOLANDRA LN G3b 2nd Floor	B	Multi-Family Residential	1	65	65	65	0
	5-83	200 SOLANDRA LN G4a 1st Floor	B	Multi-Family Residential	1	65	65	65	0
	5-84	200 SOLANDRA LN G4b 2nd Floor	B	Multi-Family Residential	1	60	60	60	0
	5-85	200 SOLANDRA LN H1a 1st Floor	B	Multi-Family Residential	1	65	65	65	0
	5-86	200 SOLANDRA LN H1b 2nd Floor	B	Multi-Family Residential	1	65	67	66	1
	5-87	200 SOLANDRA LN H2a 1st Floor	B	Multi-Family Residential	1	70	72	72	2
	5-88	200 SOLANDRA LN H2b 2nd Floor	B	Multi-Family Residential	1	64	67	65	1
	5-89	200 SOLANDRA LN H3a 1st Floor	B	Multi-Family Residential	1	70	72	72	2
	5-90	200 SOLANDRA LN H3b 2nd Floor	B	Multi-Family Residential	1	64	67	64	0
	5-91	200 SOLANDRA LN H4a 1st Floor	B	Multi-Family Residential	1	70	72	73	3
	5-92	200 SOLANDRA LN H4b 2nd Floor	B	Multi-Family Residential	1	65	67	63	-2
	5-93	200 SOLANDRA LN H5a 1st Floor	B	Multi-Family Residential	1	67	70	70	3
	5-94	200 SOLANDRA LN H5b 2nd Floor	B	Multi-Family Residential	1	63	66	62	-1
	5-95	200 SOLANDRA LN H6a 1st Floor	B	Multi-Family Residential	1	66	68	68	2
	5-96	200 SOLANDRA LN H6b 2nd Floor	B	Multi-Family Residential	1	61	64	61	0
	5-97	200 SOLANDRA LN H7a 1st Floor	B	Multi-Family Residential	1	64	66	67	3
	5-98	200 SOLANDRA LN H7b 2nd Floor	B	Multi-Family Residential	1	60	63	59	-1
	5-99	200 SOLANDRA LN I1a 1st Floor	B	Multi-Family Residential	1	62	65	65	3
	5-100	200 SOLANDRA LN I1b 2nd Floor	B	Multi-Family Residential	1	58	60	58	0
	5-101	200 SOLANDRA LN I2a 1st Floor	B	Multi-Family Residential	1	60	62	63	3
	5-102	200 SOLANDRA LN I2b 2nd Floor	B	Multi-Family Residential	1	56	59	57	1
	5-103	200 SOLANDRA LN I3a 1st Floor	B	Multi-Family Residential	1	58	61	61	3
	5-104	200 SOLANDRA LN I3b 2nd Floor	B	Multi-Family Residential	1	55	58	56	1
	5-105	200 SOLANDRA LN I4a 1st Floor	B	Multi-Family Residential	1	58	60	60	2
	5-106	200 SOLANDRA LN I4b 2nd Floor	B	Multi-Family Residential	1	55	57	56	1
	5-107	200 SOLANDRA LN I5a 1st Floor	B	Multi-Family Residential	1	57	59	60	3
	5-108	200 SOLANDRA LN I5b 2nd Floor	B	Multi-Family Residential	1	54	57	56	2
	5-109	200 SOLANDRA LN I6a 1st Floor	B	Multi-Family Residential	1	56	59	59	3
5-110	200 SOLANDRA LN I6b 2nd Floor	B	Multi-Family Residential	1	53	56	55	2	
5-111	200 SOLANDRA LN I7a 1st Floor	B	Multi-Family Residential	1	56	58	59	3	
5-112	200 SOLANDRA LN I7b 2nd Floor	B	Multi-Family Residential	1	53	55	56	3	
5-113	200 SOLANDRA LN I8a 1st Floor	B	Multi-Family Residential	1	60	60	60	0	
5-114	200 SOLANDRA LN I8b 2nd Floor	B	Multi-Family Residential	1	60	60	60	0	
5-115	200 SOLANDRA LN I9a 1st Floor	B	Multi-Family Residential	1	60	60	60	0	
5-116	200 SOLANDRA LN I9b 2nd Floor	B	Multi-Family Residential	1	52	54	55	3	
5-117	200 SOLANDRA LN I10a 1st Floor	B	Multi-Family Residential	1	54	56	57	3	
5-118	200 SOLANDRA LN I10b 2nd Floor	B	Multi-Family Residential	1	51	53	54	3	
5-119	200 SOLANDRA LN I11a 1st Floor	B	Multi-Family Residential	1	60	60	60	0	
5-120	200 SOLANDRA LN I11b 2nd Floor	B	Multi-Family Residential	1	51	53	54	3	
5-121	200 SOLANDRA LN I12a 1st Floor	B	Multi-Family Residential	1	53	55	56	3	
5-122	200 SOLANDRA LN I12b 2nd Floor	B	Multi-Family Residential	1	60	60	60	0	
5-123	200 SOLANDRA LN Tennis Court	B	Multi-Family Recreational	1	65	65	65	0	
5-124	200 SOLANDRA LN Basketball Court	B	Multi-Family Recreational	1	65	65	65	0	
5-125	2141 TEN-TEN RD Right On Track	D	Educational - Interior	1	39	42	40	1	
5-126	2135 TEN-TEN RD Imagine That	D	Educational - Interior	1	39	41	39	0	
5-127	2125 TEN-TEN RD Cocina Mexicana	E	Restaurant	1	65	67	65	0	
5-128	2105 TEN-TEN RD Shell Patio	E	Restaurant	1	65	65	65	0	
5-129	2021 TEN TEN RD	B	Single-Family Residential	1	60	60	60	0	
5-130	2023 TEN TEN RD	B	Single-Family Residential	1	55	56	57	2	
5-131	2005A TEN TEN RD	B	Single-Family Residential	1	64	67	67	3	
5-132	2005B TEN TEN RD	B	Single-Family Residential	1	60	60	60	0	
5-133	2005C TEN TEN RD	B	Single-Family Residential	1	65	65	65	0	
5-134	2005D TEN TEN RD	B	Single-Family Residential	1	63	64	66	3	
6	6-01	1915 MISTY WATER CT	B	Single-Family Residential	1	65	66	67	2
	6-02	1913 MISTY WATER CT	B	Single-Family Residential	1	64	66	68	4
	6-03	1911 MISTY WATER CT	B	Single-Family Residential	1	64	66	66	2
	6-04	1909 MISTY WATER CT	B	Single-Family Residential	1	67	69	65	-2
	6-05	1907 MISTY WATER CT	B	Single-Family Residential	1	66	68	64	-2
	6-06	1905 MISTY WATER CT	B	Single-Family Residential	1	67	69	65	-2
	6-07	1903 MISTY WATER CT	B	Single-Family Residential	1	60	62	61	1
	6-08	1810 MISTY HOLLOW LN	B	Single-Family Residential	1	55	57	58	3

Table C-1: Ten Ten Road Widening (STIP No. U-5825) Receptors, Noise Levels, and Noise Impacts (Page 5 of 15)

NSA	Receptors					Predicted Noise Levels, Leq(h) (dB(A))*			
	Receptor Number	Address	NAC	Use	DUs	Existing	No-Build	Build	Change
	6-09	1814 MISTY HOLLOW LN	B	Single-Family Residential	1	52	54	56	4
	6-10	1816 MISTY HOLLOW LN	B	Single-Family Residential	1	65	65	65	0
	6-11	1818 MISTY HOLLOW LN	B	Single-Family Residential	1	70	71	66	-4
	6-12	1915 MISTY WATER CT	B	Single-Family Residential	1	60	60	60	0
	6-13	1916 MISTY WATER CT	B	Single-Family Residential	1	50	52	54	4
	6-14	1914 MISTY WATER CT	B	Single-Family Residential	1	54	56	58	4
	6-15	1910 MISTY WATER CT	B	Single-Family Residential	1	55	56	57	2
	6-16	1906 MISTY WATER CT	B	Single-Family Residential	1	56	57	58	2
	6-17	1902 MISTY WATER CT	B	Single-Family Residential	1	65	65	65	0
	6-18	1900 MISTY WATER CT	B	Single-Family Residential	1	50	50	50	0
	6-19	1804 MISTY HOLLOW LN	B	Single-Family Residential	1	50	50	50	0
	6-20	1802 MISTY HOLLOW LN	B	Single-Family Residential	1	50	50	50	0
	6-21	1800 MISTY HOLLOW LN	B	Single-Family Residential	1	50	50	50	0
	6-22	1819 MISTY HOLLOW LN	B	Single-Family Residential	1	70	71	69	-1
	6-23	1817 MISTY HOLLOW LN	B	Single-Family Residential	1	65	66	65	0
	6-24	1815 MISTY HOLLOW LN	B	Single-Family Residential	1	60	61	62	2
	6-25	1813 MISTY HOLLOW LN	B	Single-Family Residential	1	59	59	60	1
	6-26	1811 MISTY HOLLOW LN	B	Single-Family Residential	1	55	55	56	1
	6-27	1809 MISTY HOLLOW LN	B	Single-Family Residential	1	52	52	52	0
	6-28	1805 MISTY HOLLOW LN	B	Single-Family Residential	1	65	65	65	0
	6-29	1909 GREEN FORD LN	B	Single-Family Residential	1	66	67	68	2
	6-30	1907 GREEN FORD LN	B	Single-Family Residential	1	56	57	60	4
	6-31	1905 GREEN FORD LN	B	Single-Family Residential	1	52	54	56	4
	6-32	1903 GREEN FORD LN	B	Single-Family Residential	1	54	56	57	3
	6-33	1901 GREEN FORD LN	B	Single-Family Residential	1	53	54	56	3
	6-34	1811 GREEN FORD LN	B	Single-Family Residential	1	48	48	48	0
	6-35	1809 GREEN FORD LN	B	Single-Family Residential	1	48	49	51	3
	6-36	1807 GREEN FORD LN	B	Single-Family Residential	1	48	48	48	0
	6-37	1805 GREEN FORD LN	B	Single-Family Residential	1	48	48	48	0
	6-38	1803 GREEN FORD LN	B	Single-Family Residential	1	50	50	50	0
	6-39	1801 GREEN FORD LN	B	Single-Family Residential	1	59	59	59	0
	6-40	1908 GREEN FORD LN	B	Single-Family Residential	1	65	66	66	1
	6-41	1906 GREEN FORD LN	B	Single-Family Residential	1	60	62	62	2
	6-42	1904 GREEN FORD LN	B	Single-Family Residential	1	58	59	60	2
	6-43	1902 GREEN FORD LN	B	Single-Family Residential	1	55	57	58	3
	6-44	1900 GREEN FORD LN	B	Single-Family Residential	1	53	54	56	3
	6-45	1810 GREEN FORD LN	B	Single-Family Residential	1	52	53	55	3
	6-46	903 GREENDALE CT	B	Single-Family Residential	1	48	49	50	2
	6-47	905 GREENDALE CT	B	Single-Family Residential	1	48	48	49	1
	6-48	2005 WATERTON LN	B	Single-Family Residential	1	50	50	52	2
	6-49	2003 WATERDALE CT	B	Single-Family Residential	1	50	50	50	0
	6-50	2005 WATERDALE CT	B	Single-Family Residential	1	52	53	54	2
	6-51	2007 WATERDALE CT	B	Single-Family Residential	1	55	56	57	2
	6-52	2006 WATERDALE CT	B	Single-Family Residential	1	62	63	63	1
	6-53	2004 WATERDALE CT	B	Single-Family Residential	1	63	64	64	1
	6-54	2009 WATERTON LN	B	Single-Family Residential	1	52	54	55	3
	6-55	2011 WATERTON LN	B	Single-Family Residential	1	55	56	57	2
	6-56	2013 WATERTON LN	B	Single-Family Residential	1	56	57	58	2
	6-57	2015 WATERTON LN	B	Single-Family Residential	1	60	60	60	0
	6-58	2002 WATERTON LN	B	Single-Family Residential	1	65	65	65	0
	6-59	2010 WATERTON LN	B	Single-Family Residential	1	65	65	65	0
	6-60	2012 WATERTON LN	B	Single-Family Residential	1	60	60	60	0
	6-61	2014 WATERTON LN	B	Single-Family Residential	1	51	52	53	2
	6-62	2016 WATERTON LN	B	Single-Family Residential	1	53	54	55	2
	6-63	2018 WATERTON LN	B	Single-Family Residential	1	54	56	56	2
	6-64	2020 WATERTON LN	B	Single-Family Residential	1	60	61	62	2
	6-65	1101 WATERFORD GREEN DR	B	Single-Family Residential	1	58	58	58	0
	6-66	2100 CANNONFORD CT	B	Single-Family Residential	1	57	58	58	1
	6-67	2102 CANNONFORD CT	B	Single-Family Residential	1	52	53	53	1
	6-68	2104 CANNONFORD CT	B	Single-Family Residential	1	58	59	60	2
	6-69	2106 CANNONFORD CT	B	Single-Family Residential	1	64	66	66	2
	6-70	2108 CANNONFORD CT	B	Single-Family Residential	1	66	67	68	2
	6-71	2107 CANNONFORD CT	B	Single-Family Residential	1	66	67	67	1
	6-72	2105 CANNONFORD CT	B	Single-Family Residential	1	61	62	62	1
	6-73	2103 CANNONFORD CT	B	Single-Family Residential	1	53	54	55	2
	6-74	2101 CANNONFORD CT	B	Single-Family Residential	1	59	60	60	1
	6-75	2101 WATERSGLEN DR	B	Single-Family Residential	1	55	55	55	0
	6-76	1102 WATERFORD GREEN DR	B	Single-Family Residential	1	55	56	56	1
	6-77	1104 WATERFORD GREEN DR	B	Single-Family Residential	1	55	56	56	1
	6-78	1106 WATERFORD GREEN DR	B	Single-Family Residential	1	55	56	56	1
	6-79	1201 WATERFORD GREEN DR	B	Single-Family Residential	1	59	59	59	0
	6-80	1203 WATERFORD GREEN DR	B	Single-Family Residential	1	59	59	59	0
	6-81	1205 WATERFORD GREEN DR	B	Single-Family Residential	1	63	64	65	2
	6-82	1207 WATERFORD GREEN DR	B	Single-Family Residential	1	67	68	68	1
	6-83	1209 WATERFORD GREEN DR	B	Single-Family Residential	1	66	68	68	2
	6-84	1211 WATERFORD GREEN DR	B	Single-Family Residential	1	64	65	65	1
	6-85	1213 WATERFORD GREEN DR	B	Single-Family Residential	1	65	66	67	2
	6-86	1215 WATERFORD GREEN DR	B	Single-Family Residential	1	65	67	67	2
	6-87	1217 WATERFORD GREEN DR	B	Single-Family Residential	1	65	66	66	1
	6-88	1219 WATERFORD GREEN DR	B	Single-Family Residential	1	65	67	67	2
	6-89	1301 WATERFORD GREEN DR	B	Single-Family Residential	1	64	66	66	2
	6-90	1303 WATERFORD GREEN DR	B	Single-Family Residential	1	57	58	58	1
	6-91	2306 FORDCREST DR	B	Single-Family Residential	1	58	58	58	0

Table C-1: Ten Ten Road Widening (STIP No. U-5825) Receptors, Noise Levels, and Noise Impacts (Page 6 of 15)

NSA	Receptors					Predicted Noise Levels, Leq(h) (dB(A))*			
	Receptor Number	Address	NAC	Use	DUs	Existing	No-Build	Build	Change
6	6-92	2302 FORDCREST DR	B	Single-Family Residential	1	55	56	56	1
	6-93	2300 FORDCREST DR	B	Single-Family Residential	1	61	62	62	1
	6-94	2301 FORDCREST DR	B	Single-Family Residential	1	59	61	61	2
	6-95	2303 FORDCREST DR	B	Single-Family Residential	1	54	57	56	2
	6-96	2305 FORDCREST DR	B	Single-Family Residential	1	51	53	53	2
	6-97	2307 FORDCREST DR	B	Single-Family Residential	1	58	59	59	1
	6-98	1407 WATERFORD GREEN DR	B	Single-Family Residential	1	57	57	57	0
	6-99	1415 WATERFORD GREEN DR	B	Single-Family Residential	1	58	59	59	1
	6-100	1417 WATERFORD GREEN DR	B	Single-Family Residential	1	59	61	61	2
	6-101	1419 WATERFORD GREEN DR	B	Single-Family Residential	1	66	68	68	2
	6-102	2203 LILYFORD LN	B	Single-Family Residential	1	50	50	50	0
	6-103	2201 LILYFORD LN	B	Single-Family Residential	1	56	56	56	0
	6-104	1202 WATERFORD GREEN DR	B	Single-Family Residential	1	56	57	57	1
	6-105	1204 WATERFORD GREEN DR	B	Single-Family Residential	1	56	57	57	1
	6-106	1206 WATERFORD GREEN DR	B	Single-Family Residential	1	54	55	55	1
	6-107	1210 WATERFORD GREEN DR	B	Single-Family Residential	1	54	54	55	1
	6-108	1214 WATERFORD GREEN DR	B	Single-Family Residential	1	54	55	55	1
	6-109	2314 MAPLEGREEN LN	B	Single-Family Residential	1	48	48	48	0
	6-110	2312 MAPLEGREEN LN	B	Single-Family Residential	1	48	48	48	0
	6-111	2310 MAPLEGREEN LN	B	Single-Family Residential	1	48	48	48	0
	6-112	2308 MAPLEGREEN LN	B	Single-Family Residential	1	48	48	48	0
	6-113	2304 MAPLEGREEN LN	B	Single-Family Residential	1	48	48	48	0
	6-114	1218 WATERFORD GREEN DR	B	Single-Family Residential	1	55	56	56	1
	6-115	2309 MAPLEGREEN LN	B	Single-Family Residential	1	48	48	48	0
	6-116	2307 MAPLEGREEN LN	B	Single-Family Residential	1	48	48	48	0
	6-117	2305 MAPLEGREEN LN	B	Single-Family Residential	1	48	48	48	0
	6-118	2303 MAPLEGREEN LN	B	Single-Family Residential	1	50	50	50	0
	6-119	2301 MAPLEGREEN LN	B	Single-Family Residential	1	57	57	57	0
	6-120	2400 FORDCREST DR	B	Single-Family Residential	1	51	51	51	0
	6-121	1400 WATERFORD GREEN DR	B	Single-Family Residential	1	55	56	56	1
	6-122	1402 WATERFORD GREEN DR	B	Single-Family Residential	1	55	55	55	0
	6-123	1404 WATERFORD GREEN DR	B	Single-Family Residential	1	54	54	54	0
	6-124	1406 WATERFORD GREEN DR	B	Single-Family Residential	1	52	53	53	1
	6-125	1408 WATERFORD GREEN DR	B	Single-Family Residential	1	54	55	55	1
	6-126	1412 WATERFORD GREEN DR	B	Single-Family Residential	1	54	55	54	0
	6-127	1414 WATERFORD GREEN DR	B	Single-Family Residential	1	55	56	57	2
6-128	1416 WATERFORD GREEN DR	B	Single-Family Residential	1	57	58	58	1	
6-129	1418 WATERFORD GREEN DR	B	Single-Family Residential	1	59	60	61	2	
6-130	1420 WATERFORD GREEN DR	B	Single-Family Residential	1	64	66	66	2	
7	7-01	822 GREEN PASSAGE LN	B	Single-Family Residential	1	48	48	48	0
	7-02	824 GREEN PASSAGE LN	B	Single-Family Residential	1	48	48	48	0
	7-03	826 GREEN PASSAGE LN	B	Single-Family Residential	1	53	54	53	0
	7-04	827 GREEN PASSAGE LN	B	Single-Family Residential	1	48	49	51	3
	7-05	825 GREEN PASSAGE LN	B	Single-Family Residential	1	48	48	48	0
	7-06	823 GREEN PASSAGE LN	B	Single-Family Residential	1	48	48	48	0
	7-07	821 GREEN PASSAGE LN	B	Single-Family Residential	1	48	48	48	0
	7-08	1720 WATERLAND DR	B	Single-Family Residential	1	48	48	48	0
	7-09	1722 WATERLAND DR	B	Single-Family Residential	1	48	48	48	0
	7-10	1724 WATERLAND DR	B	Single-Family Residential	1	48	49	50	2
	7-11	1726 WATERLAND DR	B	Single-Family Residential	1	54	54	55	1
	7-12	1701 WATERCLOSE CT	B	Single-Family Residential	1	48	48	48	0
	7-13	1703 WATERCLOSE CT	B	Single-Family Residential	1	48	48	48	0
	7-14	1705 WATERCLOSE CT	B	Single-Family Residential	1	48	48	48	0
	7-15	1707 WATERCLOSE CT	B	Single-Family Residential	1	48	49	50	2
	7-16	1709 WATERCLOSE CT	B	Single-Family Residential	1	51	51	52	1
	7-17	819 GREEN PASSAGE LN	B	Single-Family Residential	1	48	48	48	0
	7-18	817 GREEN PASSAGE LN	B	Single-Family Residential	1	48	48	48	0
	7-19	716 HILLSFORD LN	B	Single-Family Residential	1	48	48	48	0
	7-20	720 HILLSFORD LN	B	Single-Family Residential	1	48	48	49	1
	7-21	722 HILLSFORD LN	B	Single-Family Residential	1	48	48	49	1
	7-22	724 HILLSFORD LN	B	Single-Family Residential	1	48	48	49	1
	7-23	726 HILLSFORD LN	B	Single-Family Residential	1	48	49	51	3
	7-24	728 HILLSFORD LN	B	Single-Family Residential	1	52	53	56	4
	7-25	730 HILLSFORD LN	B	Single-Family Residential	1	51	52	55	4
	7-26	732 HILLSFORD LN	B	Single-Family Residential	1	56	57	58	2
	7-27	734 HILLSFORD LN	B	Single-Family Residential	1	65	66	67	2
	7-28	735 HILLSFORD LN	B	Single-Family Residential	1	65	65	68	3
	7-29	733 HILLSFORD LN	B	Single-Family Residential	1	65	65	65	0
	7-30	731 HILLSFORD LN	B	Single-Family Residential	1	60	60	60	0
	7-31	729 HILLSFORD LN	B	Single-Family Residential	1	60	60	61	1
	7-32	727 HILLSFORD LN	B	Single-Family Residential	1	56	56	58	2
	7-33	725 HILLSFORD LN	B	Single-Family Residential	1	52	53	54	2
	7-34	723 HILLSFORD LN	B	Single-Family Residential	1	51	52	52	1
	7-35	721 HILLSFORD LN	B	Single-Family Residential	1	50	50	51	1
	7-36	1701 CENTER ST Peak City Baptist Church	D	Religious - Interior	1	44	45	45	1
7-37	1521 WATERLAND DR	B	Multi-Family Residential	1	49	49	50	1	
7-38	1519 WATERLAND DR	B	Multi-Family Residential	1	50	51	51	1	
7-39	1517 WATERLAND DR	B	Multi-Family Residential	1	50	51	52	2	
7-40	1515 WATERLAND DR	B	Multi-Family Residential	1	51	51	52	1	
7-41	1511 WATERLAND DR	B	Multi-Family Residential	1	49	49	51	2	
7-42	1509 WATERLAND DR	B	Multi-Family Residential	1	50	51	52	2	
7-43	1507 WATERLAND DR	B	Multi-Family Residential	1	49	50	51	2	
7-44	1505 WATERLAND DR	B	Multi-Family Residential	1	51	52	52	1	



Table C-1: Ten Ten Road Widening (STIP No. U-5825) Receptors, Noise Levels, and Noise Impacts (Page 7 of 15)

NSA	Receptors					Predicted Noise Levels, Leq(h) (dB(A))*			
	Receptor Number	Address	NAC	Use	DUs	Existing	No-Build	Build	Change
7	7-45	1503 WATERLAND DR	B	Multi-Family Residential	1	50	50	52	2
	7-46	1501 WATERLAND DR	B	Multi-Family Residential	1	53	53	55	2
	7-47	1411 WATERLAND DR	B	Multi-Family Residential	1	51	51	52	1
	7-48	1409 WATERLAND DR	B	Multi-Family Residential	1	50	50	52	2
	7-49	1407 WATERLAND DR	B	Multi-Family Residential	1	50	50	50	0
	7-50	1405 WATERLAND DR	B	Multi-Family Residential	1	51	51	52	1
	7-51	1403 WATERLAND DR	B	Multi-Family Residential	1	50	51	52	2
	7-52	1401 WATERLAND DR	B	Multi-Family Residential	1	52	53	54	2
	7-53	100 TOBACCO LEAF LN	B	Multi-Family Residential	1	48	48	50	2
	7-54	102 TOBACCO LEAF LN	B	Multi-Family Residential	1	49	50	50	1
	7-55	104 TOBACCO LEAF LN	B	Multi-Family Residential	1	48	48	48	0
	7-56	106 TOBACCO LEAF LN	B	Multi-Family Residential	1	48	48	48	0
	7-57	108 TOBACCO LEAF LN	B	Multi-Family Residential	1	48	48	48	0
	7-58	110 TOBACCO LEAF LN	B	Multi-Family Residential	1	48	48	48	0
	7-59	114 TOBACCO LEAF LN	B	Multi-Family Residential	1	48	48	48	0
	7-60	116 TOBACCO LEAF LN	B	Multi-Family Residential	1	48	48	48	0
	7-61	118 TOBACCO LEAF LN	B	Multi-Family Residential	1	48	48	48	0
	7-62	120 TOBACCO LEAF LN	B	Multi-Family Residential	1	48	48	48	0
	7-63	122 TOBACCO LEAF LN	B	Multi-Family Residential	1	48	48	48	0
	7-64	124 TOBACCO LEAF LN	B	Multi-Family Residential	1	48	48	48	0
	7-65	204 TOBACCO LEAF LN	B	Multi-Family Residential	1	48	48	48	0
	7-66	206 TOBACCO LEAF LN	B	Multi-Family Residential	1	48	48	48	0
	7-67	208 TOBACCO LEAF LN	B	Multi-Family Residential	1	48	48	48	0
	7-68	210 TOBACCO LEAF LN	B	Multi-Family Residential	1	48	48	48	0
7-69	212 TOBACCO LEAF LN	B	Multi-Family Residential	1	48	48	48	0	
7-70	214 TOBACCO LEAF LN	B	Multi-Family Residential	1	48	48	48	0	
7-71	216 TOBACCO LEAF LN	B	Multi-Family Residential	1	48	48	48	0	
7-72	200 PARKFIELD DR Pool	B	Multi-Family Recreational	1	48	48	48	0	
8	8-01	1508 CENTER ST	B	Multi-Family Residential	1	64	64	R/W	R/W
	8-02	1504 CENTER ST	B	Multi-Family Residential	1	67	68	R/W	R/W
	8-03	1403 CENTER ST	B	Multi-Family Residential	1	69	69	72	3
	8-04	1401 CENTER ST	B	Multi-Family Residential	1	69	69	72	3
	8-05	1333 CENTER ST	B	Multi-Family Residential	1	69	69	72	3
	8-06	1331 CENTER ST	B	Multi-Family Residential	1	69	69	71	2
	8-07	1327 CENTER ST	B	Multi-Family Residential	1	69	70	71	2
	8-08	1325 CENTER ST	B	Multi-Family Residential	1	68	69	71	3
	8-09	1321 CENTER ST	B	Multi-Family Residential	1	69	69	71	2
	8-10	1319 CENTER ST	B	Multi-Family Residential	1	69	70	71	2
	8-11	1315 CENTER ST	B	Multi-Family Residential	1	69	70	71	2
	8-12	1313 CENTER ST	B	Multi-Family Residential	1	69	70	71	2
	8-13	1309 CENTER ST	B	Multi-Family Residential	1	69	70	71	2
	8-14	1307 CENTER ST	B	Multi-Family Residential	1	69	69	71	2
	8-15	1303 CENTER ST	B	Multi-Family Residential	1	69	70	71	2
	8-16	1301 CENTER ST	B	Multi-Family Residential	1	69	70	71	2
	8-17	850 MYRTLE GROVE LN	B	Multi-Family Residential	1	65	66	66	1
	8-18	848 MYRTLE GROVE LN	B	Multi-Family Residential	1	65	65	66	1
	8-19	846 MYRTLE GROVE LN	B	Multi-Family Residential	1	65	66	67	2
	8-20	844 MYRTLE GROVE LN	B	Multi-Family Residential	1	65	66	67	2
	8-21	842 MYRTLE GROVE LN	B	Multi-Family Residential	1	66	67	67	1
	8-22	838 MYRTLE GROVE LN	B	Multi-Family Residential	1	66	67	67	1
	8-23	836 MYRTLE GROVE LN	B	Multi-Family Residential	1	66	67	67	1
	8-24	834 MYRTLE GROVE LN	B	Multi-Family Residential	1	66	67	67	1
	8-25	832 MYRTLE GROVE LN	B	Multi-Family Residential	1	66	67	67	1
	8-26	828 MYRTLE GROVE LN	B	Multi-Family Residential	1	66	67	67	1
	8-27	826 MYRTLE GROVE LN	B	Multi-Family Residential	1	66	67	67	1
	8-28	824 MYRTLE GROVE LN	B	Multi-Family Residential	1	66	67	67	1
	8-29	822 MYRTLE GROVE LN	B	Multi-Family Residential	1	66	67	67	1
	8-30	820 MYRTLE GROVE LN	B	Multi-Family Residential	1	66	67	66	0
	8-31	31 OLD GROVE LN	B	Multi-Family Residential	1	65	65	65	0
	8-32	33 OLD GROVE LN	B	Multi-Family Residential	1	65	65	65	0
	8-33	37 OLD GROVE LN	B	Multi-Family Residential	1	55	56	58	3
8-34	39 OLD GROVE LN	B	Multi-Family Residential	1	56	57	58	2	
8-35	43 OLD GROVE LN	B	Multi-Family Residential	1	56	57	57	1	
8-36	45 OLD GROVE LN	B	Multi-Family Residential	1	55	56	57	2	
8-37	49 OLD GROVE LN	B	Multi-Family Residential	1	54	55	56	2	
8-38	51 OLD GROVE LN	B	Multi-Family Residential	1	53	53	55	2	
8-39	55 OLD GROVE LN	B	Multi-Family Residential	1	52	52	54	2	
8-40	57 OLD GROVE LN	B	Multi-Family Residential	1	52	53	54	2	
8-41	61 OLD GROVE LN	B	Multi-Family Residential	1	51	52	54	3	
8-42	63 OLD GROVE LN	B	Multi-Family Residential	1	50	51	53	3	
8-43	67 OLD GROVE LN	B	Multi-Family Residential	1	51	52	54	3	
8-44	79 OLD GROVE LN	B	Multi-Family Residential	1	52	53	54	2	
8-45	30 OLD GROVE LN	B	Multi-Family Residential	1	50	50	52	2	
8-46	32 OLD GROVE LN	B	Multi-Family Residential	1	50	50	52	2	
8-47	36 OLD GROVE LN	B	Multi-Family Residential	1	49	50	51	2	
8-48	38 OLD GROVE LN	B	Multi-Family Residential	1	49	50	53	4	
8-49	42 OLD GROVE LN	B	Multi-Family Residential	1	49	50	52	3	
8-50	44 OLD GROVE LN	B	Multi-Family Residential	1	48	48	50	2	
8-51	48 OLD GROVE LN	B	Multi-Family Residential	1	48	49	50	2	
8-52	50 OLD GROVE LN	B	Multi-Family Residential	1	48	48	49	1	
8-53	60 OLD GROVE LN	B	Multi-Family Residential	1	48	48	49	1	
8-54	62 OLD GROVE LN	B	Multi-Family Residential	1	48	48	49	1	
8-55	64 OLD GROVE LN	B	Multi-Family Residential	1	48	49	49	1	

Table C-1: Ten Ten Road Widening (STIP No. U-5825) Receptors, Noise Levels, and Noise Impacts (Page 8 of 15)

NSA	Receptors					Predicted Noise Levels, Leq(h) (dB(A))*			
	Receptor Number	Address	NAC	Use	DUs	Existing	No-Build	Build	Change
8	8-56	66 OLD GROVE LN	B	Multi-Family Residential	1	48	49	50	2
	8-57	70 OLD GROVE LN	B	Multi-Family Residential	1	49	50	50	1
	8-58	80 OLD GROVE LN	B	Multi-Family Residential	1	51	53	53	2
	8-59	82 OLD GROVE LN	B	Multi-Family Residential	1	52	53	54	2
	8-60	84 OLD GROVE LN	B	Multi-Family Residential	1	52	53	54	2
	8-61	1300 FOREST GROVE DR	B	Multi-Family Residential	1	51	52	53	2
	8-62	831 MYRTLE GROVE LN	B	Multi-Family Residential	1	50	50	50	0
	8-63	829 MYRTLE GROVE LN	B	Multi-Family Residential	1	50	50	51	1
	8-64	827 MYRTLE GROVE LN	B	Multi-Family Residential	1	50	50	51	1
	8-65	825 MYRTLE GROVE LN	B	Multi-Family Residential	1	50	51	51	1
	8-66	823 MYRTLE GROVE LN	B	Multi-Family Residential	1	51	52	52	1
	8-67	821 MYRTLE GROVE LN	B	Multi-Family Residential	1	52	54	54	2
	8-68	801 MYRTLE GROVE LN	B	Multi-Family Residential	1	66	67	65	-1
	8-69	803 MYRTLE GROVE LN	B	Multi-Family Residential	1	61	63	61	0
	8-70	805 MYRTLE GROVE LN	B	Multi-Family Residential	1	58	60	59	1
	8-71	807 MYRTLE GROVE LN	B	Multi-Family Residential	1	56	58	57	1
	8-72	809 MYRTLE GROVE LN	B	Multi-Family Residential	1	53	55	55	2
	8-73	811 MYRTLE GROVE LN	B	Multi-Family Residential	1	51	52	54	3
	8-74	1304 RAINESVIEW LN	B	Multi-Family Residential	1	65	65	65	0
	8-75	1302 RAINESVIEW LN	B	Multi-Family Residential	1	60	60	60	0
	8-76	1300 RAINESVIEW LN	B	Multi-Family Residential	1	50	50	50	0
	8-77	1206 RAINESVIEW LN	B	Multi-Family Residential	1	50	50	50	0
	8-78	1204 RAINESVIEW LN	B	Multi-Family Residential	1	50	50	50	0
	8-79	1202 RAINESVIEW LN	B	Multi-Family Residential	1	50	50	50	0
	8-80	1200 RAINESVIEW LN	B	Single-Family Residential	1	48	48	48	0
	8-81	1106 RAINESVIEW LN	B	Single-Family Residential	1	48	48	48	0
	8-82	1104 RAINESVIEW LN	B	Single-Family Residential	1	48	48	48	0
	8-83	1102 RAINESVIEW LN	B	Single-Family Residential	1	48	48	49	1
	8-84	1100 RAINESVIEW LN	B	Single-Family Residential	1	48	48	49	1
	8-85	304 SATINWOOD DR	B	Single-Family Residential	1	52	53	54	2
	8-86	300 SATINWOOD DR	B	Single-Family Residential	1	66	67	65	-1
	8-87	1201 RAINESVIEW LN	B	Single-Family Residential	1	48	48	48	0
	8-88	1107 RAINESVIEW LN	B	Single-Family Residential	1	48	48	48	0
	8-89	1105 RAINESVIEW LN	B	Single-Family Residential	1	48	48	48	0
	8-90	400 SATINWOOD DR	B	Single-Family Residential	1	51	51	52	1
	8-91	1013 SANTA ROSA DR	B	Single-Family Residential	1	53	53	54	1
	8-92	1009 SANTA ROSA DR	B	Single-Family Residential	1	65	65	65	0
	8-93	1008 SANTA ROSA DR	B	Single-Family Residential	1	48	48	48	0
	8-94	1010 SANTA ROSA DR	B	Single-Family Residential	1	48	48	48	0
	8-95	1012 SANTA ROSA DR	B	Single-Family Residential	1	49	50	51	2
	8-96	1014 SANTA ROSA DR	B	Single-Family Residential	1	50	50	52	2
8-97	305 SATINWOOD DR	B	Single-Family Residential	1	53	53	55	2	
8-98	303 SATINWOOD DR	B	Single-Family Residential	1	58	58	59	1	
8-99	301 SATINWOOD DR	B	Single-Family Residential	1	67	67	67	0	
8-100	54 OLD GROVE LN Pool	B	Single-Family Recreational	1	48	48	49	1	
8-101	1204 OLD RALEIGH RD	B	Single-Family Residential	1	62	66	66	4	
9-01	733 CENTER ST Apex Mosque	D	Religious - Interior	1	36	38	39	3	
9-02	725 CENTER ST	B	Multi-Family Residential	1	64	65	66	2	
9-03	723 CENTER ST	B	Multi-Family Residential	1	64	65	66	2	
9-04	721 CENTER ST	B	Multi-Family Residential	1	64	65	66	2	
9-05	719 CENTER ST	B	Multi-Family Residential	1	64	65	66	2	
9-06	717 CENTER ST	B	Multi-Family Residential	1	64	65	66	2	
9-07	715 CENTER ST	B	Multi-Family Residential	1	64	65	65	1	
9-08	300 CENTER HEIGHTS CT	B	Multi-Family Residential	1	61	63	62	1	
9-09	302 CENTER HEIGHTS CT	B	Multi-Family Residential	1	60	60	60	0	
9-10	304 CENTER HEIGHTS CT	B	Multi-Family Residential	1	51	53	52	1	
9-11	306 CENTER HEIGHTS CT	B	Multi-Family Residential	1	50	51	50	0	
9-12	308 CENTER HEIGHTS CT	B	Multi-Family Residential	1	51	52	52	1	
9-13	310 CENTER HEIGHTS CT	B	Multi-Family Residential	1	50	51	51	1	
9-14	312 CENTER HEIGHTS CT	B	Multi-Family Residential	1	49	50	50	1	
9-15	314 CENTER HEIGHTS CT	B	Multi-Family Residential	1	49	50	50	1	
9-16	311 CENTER HEIGHTS CT	B	Multi-Family Residential	1	48	49	49	1	
9-17	309 CENTER HEIGHTS CT	B	Multi-Family Residential	1	48	50	50	2	
9-18	307 CENTER HEIGHTS CT	B	Multi-Family Residential	1	50	52	51	1	
9-19	305 CENTER HEIGHTS CT	B	Multi-Family Residential	1	52	54	54	2	
9-20	303 CENTER HEIGHTS CT	B	Multi-Family Residential	1	57	58	58	1	
9-21	301 CENTER HEIGHTS CT	B	Multi-Family Residential	1	61	63	63	2	
9-22	216 GRINDSTONE DR	B	Multi-Family Residential	1	60	60	60	0	
9-23	210 GRINDSTONE DR	B	Multi-Family Recreational	1	48	49	49	1	
9-24	208 GRINDSTONE DR	B	Multi-Family Residential	1	48	48	48	0	
9-25	206 GRINDSTONE DR	B	Multi-Family Residential	1	48	48	48	0	
9-26	204 GRINDSTONE DR	B	Multi-Family Residential	1	48	48	48	0	
9-27	202 GRINDSTONE DR	B	Multi-Family Residential	1	48	48	48	0	
9-28	200 GRINDSTONE DR	B	Multi-Family Residential	1	48	48	48	0	
9-29	237 GRINDSTONE DR	B	Multi-Family Residential	1	53	57	57	4	
9-30	235 GRINDSTONE DR	B	Multi-Family Residential	1	50	53	53	3	
9-31	233 GRINDSTONE DR	B	Multi-Family Residential	1	50	52	52	2	
9-32	231 GRINDSTONE DR	B	Multi-Family Residential	1	50	51	51	1	
9-33	229 GRINDSTONE DR	B	Multi-Family Residential	1	50	50	50	0	
9-34	227 GRINDSTONE DR	B	Multi-Family Residential	1	50	50	50	0	
9-35	223 GRINDSTONE DR	B	Multi-Family Residential	1	48	48	48	0	
9-36	221 GRINDSTONE DR	B	Multi-Family Residential	1	48	48	48	0	
9-37	219 GRINDSTONE DR	B	Multi-Family Residential	1	48	48	48	0	

Table C-1: Ten Ten Road Widening (STIP No. U-5825) Receptors, Noise Levels, and Noise Impacts (Page 9 of 15)

NSA	Receptors					Predicted Noise Levels, Leq(h) (dB(A))*			
	Receptor Number	Address	NAC	Use	DUs	Existing	No-Build	Build	Change
9	9-38	217 GRINDSTONE DR	B	Multi-Family Residential	1	48	48	48	0
	9-39	213 GRINDSTONE DR	B	Multi-Family Residential	1	48	48	48	0
	9-40	211 GRINDSTONE DR	B	Multi-Family Residential	1	48	48	48	0
	9-41	209 GRINDSTONE DR	B	Multi-Family Residential	1	48	48	48	0
	9-42	207 GRINDSTONE DR	B	Multi-Family Residential	1	48	48	48	0
	9-43	205 GRINDSTONE DR	B	Multi-Family Residential	1	48	48	48	0
	9-44	203 GRINDSTONE DR	B	Multi-Family Residential	1	48	48	48	0
	9-45	301 OLD MILL VILLAGE DR	B	Multi-Family Residential	1	53	57	57	4
	9-46	303 OLD MILL VILLAGE DR	B	Multi-Family Residential	1	50	53	53	3
	9-47	305 OLD MILL VILLAGE DR	B	Multi-Family Residential	1	48	50	50	2
	9-48	307 OLD MILL VILLAGE DR	B	Multi-Family Residential	1	48	48	48	0
	9-49	309 OLD MILL VILLAGE DR	B	Multi-Family Residential	1	48	48	48	0
	9-50	311 OLD MILL VILLAGE DR	B	Multi-Family Residential	1	48	48	48	0
	9-51	315 OLD MILL VILLAGE DR	B	Multi-Family Residential	1	48	48	48	0
	9-52	317 OLD MILL VILLAGE DR	B	Multi-Family Residential	1	48	48	48	0
	9-53	319 OLD MILL VILLAGE DR	B	Multi-Family Residential	1	48	48	48	0
	9-54	300 OLD MILL VILLAGE DR	B	Multi-Family Residential	1	52	57	57	5
	9-55	302 OLD MILL VILLAGE DR	B	Multi-Family Residential	1	50	52	53	3
	9-56	304 OLD MILL VILLAGE DR	B	Multi-Family Residential	1	48	49	49	1
	9-57	306 OLD MILL VILLAGE DR	B	Multi-Family Residential	1	48	48	48	0
	9-58	308 OLD MILL VILLAGE DR	B	Multi-Family Residential	1	48	48	48	0
	9-59	310 OLD MILL VILLAGE DR	B	Multi-Family Residential	1	48	48	48	0
	9-60	314 OLD MILL VILLAGE DR	B	Multi-Family Residential	1	48	48	48	0
	9-61	316 OLD MILL VILLAGE DR	B	Multi-Family Residential	1	48	48	48	0
	9-62	318 OLD MILL VILLAGE DR	B	Multi-Family Residential	1	48	48	48	0
	9-63	622 SAWCUT LN	B	Multi-Family Residential	1	52	57	57	5
	9-64	620 SAWCUT LN	B	Multi-Family Residential	1	50	53	53	3
	9-65	618 SAWCUT LN	B	Multi-Family Residential	1	48	51	51	3
	9-66	616 SAWCUT LN	B	Multi-Family Residential	1	48	50	49	1
	9-67	614 SAWCUT LN	B	Multi-Family Residential	1	48	48	48	0
	9-68	612 SAWCUT LN	B	Multi-Family Residential	1	48	48	48	0
	9-69	608 SAWCUT LN	B	Multi-Family Residential	1	48	48	48	0
	9-70	606 SAWCUT LN	B	Multi-Family Residential	1	48	48	48	0
	9-71	604 SAWCUT LN	B	Multi-Family Residential	1	48	48	48	0
	9-72	602 SAWCUT LN	B	Multi-Family Residential	1	48	48	48	0
	9-73	600 SAWCUT LN	B	Multi-Family Residential	1	48	48	48	0
	9-74	526 MILL HOPPER LN	B	Multi-Family Residential	1	62	66	66	4
	9-75	524 MILL HOPPER LN	B	Multi-Family Residential	1	56	60	61	5
	9-76	522 MILL HOPPER LN	B	Multi-Family Residential	1	53	57	59	6
9-77	520 MILL HOPPER LN	B	Multi-Family Residential	1	52	56	57	5	
9-78	518 MILL HOPPER LN	B	Multi-Family Residential	1	50	55	56	6	
9-79	516 MILL HOPPER LN	B	Multi-Family Residential	1	49	54	55	6	
9-80	514 MILL HOPPER LN	B	Multi-Family Residential	1	48	52	54	6	
9-81	512 MILL HOPPER LN	B	Multi-Family Residential	1	48	51	52	4	
9-82	510 MILL HOPPER LN	B	Multi-Family Residential	1	48	48	49	1	
9-83	525 MILL HOPPER LN	B	Multi-Family Residential	1	58	63	62	4	
9-84	523 MILL HOPPER LN	B	Multi-Family Residential	1	60	60	60	0	
9-85	521 MILL HOPPER LN	B	Multi-Family Residential	1	52	56	56	4	
9-86	519 MILL HOPPER LN	B	Multi-Family Residential	1	50	55	55	5	
9-87	517 MILL HOPPER LN	B	Multi-Family Residential	1	49	53	54	5	
9-88	515 MILL HOPPER LN	B	Multi-Family Residential	1	48	51	51	3	
9-89	513 MILL HOPPER LN	B	Multi-Family Residential	1	48	51	51	3	
10	10-01	3616 STONEBEND LP	B	Multi-Family Residential	1	66	67	68	2
	10-02	3618 STONEBEND LP	B	Multi-Family Residential	1	66	67	68	2
	10-03	3620 STONEBEND LP	B	Multi-Family Residential	1	65	67	67	2
	10-04	3622 STONEBEND LP	B	Multi-Family Residential	1	65	67	66	1
	10-05	3624 STONEBEND LP	B	Multi-Family Residential	1	65	66	66	1
	10-06	3702 STONEBEND LP	B	Multi-Family Residential	1	65	65	65	0
	10-07	3704 STONEBEND LP	B	Multi-Family Residential	1	65	65	65	0
	10-08	3706 STONEBEND LP	B	Multi-Family Residential	1	65	65	65	0
	10-09	3708 STONEBEND LP	B	Multi-Family Residential	1	65	65	65	0
	10-10	3712 STONEBEND LP	B	Multi-Family Residential	1	65	65	65	0
	10-11	3714 STONEBEND LP	B	Multi-Family Residential	1	65	65	66	1
	10-12	3716 STONEBEND LP	B	Multi-Family Residential	1	66	67	67	1
	10-13	3718 STONEBEND LP	B	Multi-Family Residential	1	66	67	68	2
	10-14	3701 STONEBEND LP	B	Multi-Family Residential	1	50	50	51	1
	10-15	3703 STONEBEND LP	B	Multi-Family Residential	1	50	51	51	1
	10-16	3705 STONEBEND LP	B	Multi-Family Residential	1	50	51	51	1
	10-17	3707 STONEBEND LP	B	Multi-Family Residential	1	51	52	53	2
	10-18	3519 STONEBEND LP	B	Multi-Family Residential	1	48	48	48	0
	10-19	3517 STONEBEND LP	B	Multi-Family Residential	1	48	48	48	0
	10-20	3515 STONEBEND LP	B	Multi-Family Residential	1	48	48	48	0
	10-21	3513 STONEBEND LP	B	Multi-Family Residential	1	48	48	48	0
	10-22	510 SMALL CREEK LN	B	Multi-Family Residential	1	56	57	58	2
10-23	508 SMALL CREEK LN	B	Multi-Family Residential	1	55	56	57	2	
10-24	506 SMALL CREEK LN	B	Multi-Family Residential	1	54	56	56	2	
10-25	504 SMALL CREEK LN	B	Multi-Family Residential	1	53	55	55	2	
10-26	502 SMALL CREEK LN	B	Multi-Family Residential	1	53	54	55	2	
10-27	3508 STONEBEND LP	B	Multi-Family Residential	1	50	52	52	2	
10-28	3506 STONEBEND LP	B	Multi-Family Residential	1	51	53	54	3	
10-29	3504 STONEBEND LP	B	Multi-Family Residential	1	52	53	54	2	
10-30	3502 STONEBEND LP	B	Multi-Family Residential	1	53	54	55	2	
10-31	3460 TEN-TEN RD MyBerry	E	Restaurant	1	58	60	60	2	

Table C-1: Ten Ten Road Widening (STIP No. U-5825) Receptors, Noise Levels, and Noise Impacts (Page 10 of 15)

NSA	Receptors					Predicted Noise Levels, Leq(h) (dB(A))*			
	Receptor Number	Address	NAC	Use	DUs	Existing	No-Build	Build	Change
10	10-32	3460 TEN-TEN RD Chef's Palette	E	Restaurant	1	60	61	62	2
	10-33	3511 KILDAIRE FARM RD Dunkin Donuts	E	Restaurant	1	70	71	71	1
	10-34	4029 FRANKS CREEK DR	B	Single-Family Residential	1	52	54	54	2
	10-35	4025 FRANKS CREEK DR	B	Single-Family Residential	1	53	55	55	2
	10-36	4021 FRANKS CREEK DR	B	Single-Family Residential	1	54	56	56	2
	10-37	5008 AUDREYSTONE DR Playground	B	Single-Family Recreational	1	65	65	65	0
	10-38	5012 AUDREYSTONE DR	B	Single-Family Residential	1	62	63	63	1
	10-39	5016 AUDREYSTONE DR	B	Single-Family Residential	1	60	61	61	1
	10-40	5020 AUDREYSTONE DR	B	Single-Family Residential	1	60	61	61	1
	10-41	5024 AUDREYSTONE DR	B	Single-Family Residential	1	60	61	61	1
	10-42	5028 AUDREYSTONE DR	B	Single-Family Residential	1	60	60	60	0
	10-43	5032 AUDREYSTONE DR	B	Single-Family Residential	1	60	60	60	0
	10-44	5036 AUDREYSTONE DR	B	Single-Family Residential	1	60	60	60	0
	10-45	5040 AUDREYSTONE DR	B	Single-Family Residential	1	60	60	60	0
	10-46	5044 AUDREYSTONE DR	B	Single-Family Residential	1	60	60	60	0
	10-47	5048 AUDREYSTONE DR	B	Single-Family Residential	1	60	60	60	0
	10-48	5052 AUDREYSTONE DR	B	Single-Family Residential	1	60	60	60	0
	10-49	5056 AUDREYSTONE DR	B	Single-Family Residential	1	60	60	60	0
	10-50	5100 AUDREYSTONE DR	B	Single-Family Residential	1	55	57	57	2
	10-51	5104 AUDREYSTONE DR	B	Single-Family Residential	1	56	57	57	1
	10-52	5108 AUDREYSTONE DR	B	Single-Family Residential	1	52	54	54	2
	10-53	4028 FRANKS CREEK DR	B	Single-Family Residential	1	50	50	50	0
	10-54	4024 FRANKS CREEK DR	B	Single-Family Residential	1	50	50	50	0
	10-55	4020 FRANKS CREEK DR	B	Single-Family Residential	1	50	50	50	0
	10-56	4016 FRANKS CREEK DR	B	Single-Family Residential	1	50	50	50	0
	10-57	4012 FRANKS CREEK DR	B	Single-Family Residential	1	54	55	56	2
	10-58	5017 AUDREYSTONE DR	B	Single-Family Residential	1	54	55	56	2
	10-59	5021 AUDREYSTONE DR	B	Single-Family Residential	1	53	54	55	2
	10-60	5025 AUDREYSTONE DR	B	Single-Family Residential	1	51	53	53	2
	10-61	5029 AUDREYSTONE DR	B	Single-Family Residential	1	51	52	52	1
	10-62	5033 AUDREYSTONE DR	B	Single-Family Residential	1	50	51	51	1
	10-63	5037 AUDREYSTONE DR	B	Single-Family Residential	1	50	50	50	0
	10-64	5041 AUDREYSTONE DR	B	Single-Family Residential	1	48	49	49	1
	10-65	5045 AUDREYSTONE DR	B	Single-Family Residential	1	48	48	49	1
	10-66	5057 AUDREYSTONE DR	B	Single-Family Residential	1	48	48	48	0
10-67	5109 AUDREYSTONE DR	B	Single-Family Residential	1	48	48	48	0	
10-68	5113 AUDREYSTONE DR	B	Single-Family Residential	1	48	48	48	0	
10-69	1837 STONEBANKS LP	B	Single-Family Residential	1	48	48	48	0	
10-70	1833 STONEBANKS LP	B	Single-Family Residential	1	48	48	48	0	
10-71	1829 STONEBANKS LP	B	Single-Family Residential	1	48	48	48	0	
10-72	1825 STONEBANKS LP	B	Single-Family Residential	1	48	48	48	0	
10-73	1821 STONEBANKS LP	B	Single-Family Residential	1	48	48	48	0	
10-74	1817 STONEBANKS LP	B	Single-Family Residential	1	48	48	48	0	
10-75	1813 STONEBANKS LP	B	Single-Family Residential	1	48	48	48	0	
11	11-01	400A1 AFTON MEADOW LN First Floor	B	Multi-Family Residential	1	63	65	65	2
	11-02	400A2 AFTON MEADOW LN Second Floor	B	Multi-Family Residential	1	66	67	67	1
	11-03	400A3 AFTON MEADOW LN Third Floor	B	Multi-Family Residential	1	66	67	68	2
	11-04	400B1 AFTON MEADOW LN First Floor	B	Multi-Family Residential	1	56	58	59	3
	11-05	400B2 AFTON MEADOW LN Second Floor	B	Multi-Family Residential	1	59	60	61	2
	11-06	400B3 AFTON MEADOW LN Third Floor	B	Multi-Family Residential	1	60	61	62	2
	11-07	400C1 AFTON MEADOW LN First Floor	B	Multi-Family Residential	1	53	54	56	3
	11-08	400C2 AFTON MEADOW LN Second Floor	B	Multi-Family Residential	1	56	57	58	2
	11-09	400C3 AFTON MEADOW LN Third Floor	B	Multi-Family Residential	1	58	59	60	2
	11-10	400D1 AFTON MEADOW LN First Floor	B	Multi-Family Residential	1	54	55	57	3
	11-11	400D2 AFTON MEADOW LN Second Floor	B	Multi-Family Residential	1	58	59	60	2
	11-12	400D3 AFTON MEADOW LN Third Floor	B	Multi-Family Residential	1	60	61	62	2
	11-13	4000 AFTON MEADOW LN First Floor	B	Multi-Family Residential	1	65	66	67	2
	11-14	40000 AFTON MEADOW LN Second Floor	B	Multi-Family Residential	1	68	69	69	1
	11-15	400000 AFTON MEADOW LN Third Floor	B	Multi-Family Residential	1	68	69	70	2
	11-16	400F1 AFTON MEADOW LN First Floor	B	Multi-Family Residential	1	64	65	66	2
	11-17	400F2 AFTON MEADOW LN Second Floor	B	Multi-Family Residential	1	67	67	68	1
	11-18	400F3 AFTON MEADOW LN Third Floor	B	Multi-Family Residential	1	67	68	69	2
	11-19	400G1 AFTON MEADOW LN First Floor	B	Multi-Family Residential	1	63	64	65	2
	11-20	400G2 AFTON MEADOW LN Second Floor	B	Multi-Family Residential	1	66	67	67	1
	11-21	400G3 AFTON MEADOW LN Third Floor	B	Multi-Family Residential	1	66	67	68	2
	11-22	400H1 AFTON MEADOW LN First Floor	B	Multi-Family Residential	1	62	63	64	2
	11-23	400H2 AFTON MEADOW LN Second Floor	B	Multi-Family Residential	1	65	66	66	1
	11-24	400H3 AFTON MEADOW LN Third Floor	B	Multi-Family Residential	1	65	66	67	2
	11-25	200A1 AFTON MEADOW LN First Floor	B	Multi-Family Residential	1	65	65	65	0
	11-26	200A2 AFTON MEADOW LN Second Floor	B	Multi-Family Residential	1	65	65	71	6
	11-27	200A3 AFTON MEADOW LN Third Floor	B	Multi-Family Residential	1	67	68	72	5
	11-28	200B1 AFTON MEADOW LN First Floor	B	Multi-Family Residential	1	66	68	72	6
	11-29	200B2 AFTON MEADOW LN Second Floor	B	Multi-Family Residential	1	69	70	72	3
	11-30	200B3 AFTON MEADOW LN Third Floor	B	Multi-Family Residential	1	69	71	72	3
11-31	200C1 AFTON MEADOW LN First Floor	B	Multi-Family Residential	1	67	69	72	5	
11-32	200C2 AFTON MEADOW LN Second Floor	B	Multi-Family Residential	1	69	71	72	3	
11-33	200C3 AFTON MEADOW LN Third Floor	B	Multi-Family Residential	1	69	71	72	3	
11-34	200D1 AFTON MEADOW LN First Floor	B	Multi-Family Residential	1	67	68	71	4	
11-35	200D2 AFTON MEADOW LN Second Floor	B	Multi-Family Residential	1	69	71	72	3	
11-36	200D3 AFTON MEADOW LN Third Floor	B	Multi-Family Residential	1	70	71	72	2	
11-37	2000 AFTON MEADOW LN First Floor	B	Multi-Family Residential	1	60	61	61	1	
11-38	20000 AFTON MEADOW LN Second Floor	B	Multi-Family Residential	1	62	63	65	3	
11-39	200000 AFTON MEADOW LN Third Floor	B	Multi-Family Residential	1	63	64	65	2	

Table C-1: Ten Ten Road Widening (STIP No. U-5825) Receptors, Noise Levels, and Noise Impacts (Page 11 of 15)

NSA	Receptors					Predicted Noise Levels, Leq(h) (dB(A))*			
	Receptor Number	Address	NAC	Use	DUs	Existing	No-Build	Build	Change
	11-40	200F1 AFTON MEADOW LN First Floor	B	Multi-Family Residential	1	51	52	54	3
	11-41	200F2 AFTON MEADOW LN Second Floor	B	Multi-Family Residential	1	54	56	58	4
	11-42	200F3 AFTON MEADOW LN Third Floor	B	Multi-Family Residential	1	56	58	59	3
	11-43	200G1 AFTON MEADOW LN First Floor	B	Multi-Family Residential	1	53	54	57	4
	11-44	200G2 AFTON MEADOW LN Second Floor	B	Multi-Family Residential	1	57	58	60	3
	11-45	200G3 AFTON MEADOW LN Third Floor	B	Multi-Family Residential	1	58	60	61	3
	11-46	200H1 AFTON MEADOW LN First Floor	B	Multi-Family Residential	1	62	64	65	3
	11-47	200H2 AFTON MEADOW LN Second Floor	B	Multi-Family Residential	1	65	66	67	2
	11-48	200H3 AFTON MEADOW LN Third Floor	B	Multi-Family Residential	1	66	67	68	2
	11-49	2290A1 REXFORD LN First Floor	B	Multi-Family Residential	1	63	65	65	2
	11-50	2290A2 REXFORD LN Second Floor	B	Multi-Family Residential	1	66	67	68	2
	11-51	2290A3 REXFORD LN Third Floor	B	Multi-Family Residential	1	66	68	69	3
	11-52	2290B1 REXFORD LN First Floor	B	Multi-Family Residential	1	63	65	65	2
	11-53	2290B2 REXFORD LN Second Floor	B	Multi-Family Residential	1	66	67	68	2
	11-54	2290B3 REXFORD LN Third Floor	B	Multi-Family Residential	1	66	68	69	3
	11-55	2290C1 REXFORD LN First Floor	B	Multi-Family Residential	1	48	48	48	0
	11-56	2290C2 REXFORD LN Second Floor	B	Multi-Family Residential	1	49	50	53	4
	11-57	2290C3 REXFORD LN Third Floor	B	Multi-Family Residential	1	62	63	64	2
	11-58	2290D1 REXFORD LN First Floor	B	Multi-Family Residential	1	48	48	51	3
	11-59	2290D2 REXFORD LN Second Floor	B	Multi-Family Residential	1	49	50	55	6
	11-60	2290D3 REXFORD LN Third Floor	B	Multi-Family Residential	1	62	63	63	1
	11-61	500A1 GRIST VALLEY LN First Floor	B	Multi-Family Residential	1	55	57	58	3
	11-62	500A2 GRIST VALLEY LN Second Floor	B	Multi-Family Residential	1	58	60	61	3
	11-63	500A3 GRIST VALLEY LN Third Floor	B	Multi-Family Residential	1	61	62	63	2
	11-64	500B1 GRIST VALLEY LN First Floor	B	Multi-Family Residential	1	54	56	56	2
	11-65	500B2 GRIST VALLEY LN Second Floor	B	Multi-Family Residential	1	57	59	59	2
	11-66	500B3 GRIST VALLEY LN Third Floor	B	Multi-Family Residential	1	59	60	61	2
	11-67	500C1 GRIST VALLEY LN First Floor	B	Multi-Family Residential	1	53	55	56	3
	11-68	500C2 GRIST VALLEY LN Second Floor	B	Multi-Family Residential	1	56	58	58	2
	11-69	500C3 GRIST VALLEY LN Third Floor	B	Multi-Family Residential	1	58	59	60	2
	11-70	500D1 GRIST VALLEY LN First Floor	B	Multi-Family Residential	1	51	53	54	3
	11-71	500D2 GRIST VALLEY LN Second Floor	B	Multi-Family Residential	1	55	57	57	2
	11-72	500D3 GRIST VALLEY LN Third Floor	B	Multi-Family Residential	1	57	58	59	2
	11-73	5000 GRIST VALLEY LN First Floor	B	Multi-Family Residential	1	51	53	53	2
	11-74	50000 GRIST VALLEY LN Second Floor	B	Multi-Family Residential	1	55	57	57	2
	11-75	500000 GRIST VALLEY LN Third Floor	B	Multi-Family Residential	1	57	58	59	2
	11-76	500F1 GRIST VALLEY LN First Floor	B	Multi-Family Residential	1	53	55	54	1
	11-77	500F2 GRIST VALLEY LN Second Floor	B	Multi-Family Residential	1	56	58	58	2
	11-78	500F3 GRIST VALLEY LN Third Floor	B	Multi-Family Residential	1	59	60	61	2
	11-79	500G1 GRIST VALLEY LN First Floor	B	Multi-Family Residential	1	49	51	50	1
	11-80	500G2 GRIST VALLEY LN Second Floor	B	Multi-Family Residential	1	51	53	52	1
	11-81	500G3 GRIST VALLEY LN Third Floor	B	Multi-Family Residential	1	54	55	55	1
	11-82	500H1 GRIST VALLEY LN First Floor	B	Multi-Family Residential	1	48	50	49	1
	11-83	500H2 GRIST VALLEY LN Second Floor	B	Multi-Family Residential	1	50	51	51	1
	11-84	500H3 GRIST VALLEY LN Third Floor	B	Multi-Family Residential	1	52	54	54	2
	11-85	500I1 GRIST VALLEY LN First Floor	B	Multi-Family Residential	1	48	50	49	1
	11-86	500I2 GRIST VALLEY LN Second Floor	B	Multi-Family Residential	1	50	52	50	0
	11-87	500I3 GRIST VALLEY LN Third Floor	B	Multi-Family Residential	1	52	53	53	1
	11-88	500J1 GRIST VALLEY LN First Floor	B	Multi-Family Residential	1	48	50	50	2
	11-89	500J2 GRIST VALLEY LN Second Floor	B	Multi-Family Residential	1	50	52	52	2
	11-90	500J3 GRIST VALLEY LN Third Floor	B	Multi-Family Residential	1	52	54	54	2
	11-91	2400A1 REXFORD LN First Floor	B	Multi-Family Residential	1	64	66	64	0
	11-92	2400A2 REXFORD LN Second Floor	B	Multi-Family Residential	1	67	68	69	2
	11-93	2400A3 REXFORD LN Third Floor	B	Multi-Family Residential	1	67	68	69	2
	11-94	2400B1 REXFORD LN First Floor	B	Multi-Family Residential	1	63	66	65	2
	11-95	2400B2 REXFORD LN Second Floor	B	Multi-Family Residential	1	67	68	69	2
	11-96	2400B3 REXFORD LN Third Floor	B	Multi-Family Residential	1	67	68	69	2
	11-97	2400C1 REXFORD LN First Floor	B	Multi-Family Residential	1	58	60	58	0
	11-98	2400C2 REXFORD LN Second Floor	B	Multi-Family Residential	1	61	62	62	1
	11-99	2400C3 REXFORD LN Third Floor	B	Multi-Family Residential	1	63	65	65	2
	11-100	2400D1 REXFORD LN First Floor	B	Multi-Family Residential	1	56	58	58	2
	11-101	2400D2 REXFORD LN Second Floor	B	Multi-Family Residential	1	60	61	62	2
	11-102	2400D3 REXFORD LN Third Floor	B	Multi-Family Residential	1	62	64	64	2
	11-103	2800A1 REXFORD LN First Floor	B	Multi-Family Residential	1	55	57	56	1
	11-104	2800A2 REXFORD LN Second Floor	B	Multi-Family Residential	1	57	59	58	1
	11-105	2800A3 REXFORD LN Third Floor	B	Multi-Family Residential	1	59	60	60	1
	11-106	2800B1 REXFORD LN First Floor	B	Multi-Family Residential	1	52	54	53	1
	11-107	2800B2 REXFORD LN Second Floor	B	Multi-Family Residential	1	55	58	56	1
	11-108	2800B3 REXFORD LN Third Floor	B	Multi-Family Residential	1	57	58	58	1
	11-109	2800C1 REXFORD LN First Floor	B	Multi-Family Residential	1	50	52	51	1
	11-110	2800C2 REXFORD LN Second Floor	B	Multi-Family Residential	1	54	57	54	0
	11-111	2800C3 REXFORD LN Third Floor	B	Multi-Family Residential	1	55	57	56	1
	11-112	2800D1 REXFORD LN First Floor	B	Multi-Family Residential	1	50	51	50	0
	11-113	2800D2 REXFORD LN Second Floor	B	Multi-Family Residential	1	53	55	53	0
	11-114	2800D3 REXFORD LN Third Floor	B	Multi-Family Residential	1	54	56	55	1
	11-115	2800F1 REXFORD LN First Floor	B	Multi-Family Residential	1	54	56	55	1
	11-116	2800F2 REXFORD LN Second Floor	B	Multi-Family Residential	1	56	59	57	1
	11-117	2800F3 REXFORD LN Third Floor	B	Multi-Family Residential	1	58	59	59	1
	11-118	2800G1 REXFORD LN First Floor	B	Multi-Family Residential	1	50	51	51	1
	11-119	2800G2 REXFORD LN Second Floor	B	Multi-Family Residential	1	52	53	53	1
	11-120	2800G3 REXFORD LN Third Floor	B	Multi-Family Residential	1	53	54	55	2
	11-121	2800H1 REXFORD LN First Floor	B	Multi-Family Residential	1	50	50	50	0
	11-122	2800H2 REXFORD LN Second Floor	B	Multi-Family Residential	1	50	51	51	1

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Table C-1: Ten Ten Road Widening (STIP No. U-5825) Receptors, Noise Levels, and Noise Impacts (Page 12 of 15)

NSA	Receptors					Predicted Noise Levels, Leq(h) (dB(A))*			
	Receptor Number	Address	NAC	Use	DUs	Existing	No-Build	Build	Change
	11-123	2800H3 REXFORD LN Third Floor	B	Multi-Family Residential	1	52	53	53	1
	11-124	2800I1 REXFORD LN First Floor	B	Multi-Family Residential	1	50	50	50	0
	11-125	2800I2 REXFORD LN Second Floor	B	Multi-Family Residential	1	49	50	50	1
	11-126	2800I3 REXFORD LN Third Floor	B	Multi-Family Residential	1	50	52	52	2
	11-127	600A1 AFTON MEADOW LN First Floor	B	Multi-Family Residential	1	59	60	61	2
	11-128	600A2 AFTON MEADOW LN Second Floor	B	Multi-Family Residential	1	61	62	63	2
	11-129	600A3 AFTON MEADOW LN Third Floor	B	Multi-Family Residential	1	62	63	64	2
	11-130	600B1 AFTON MEADOW LN First Floor	B	Multi-Family Residential	1	50	51	52	2
	11-131	600B2 AFTON MEADOW LN Second Floor	B	Multi-Family Residential	1	52	54	54	2
	11-132	600B3 AFTON MEADOW LN Third Floor	B	Multi-Family Residential	1	54	56	56	2
	11-133	600C1 AFTON MEADOW LN First Floor	B	Multi-Family Residential	1	50	51	52	2
	11-134	600C2 AFTON MEADOW LN Second Floor	B	Multi-Family Residential	1	51	53	54	3
	11-135	600C3 AFTON MEADOW LN Third Floor	B	Multi-Family Residential	1	60	60	60	0
	11-136	600D1 AFTON MEADOW LN First Floor	B	Multi-Family Residential	1	60	60	60	0
	11-137	600D2 AFTON MEADOW LN Second Floor	B	Multi-Family Residential	1	50	52	53	3
	11-138	600D3 AFTON MEADOW LN Third Floor	B	Multi-Family Residential	1	53	55	55	2
	11-139	6000 AFTON MEADOW LN First Floor	B	Multi-Family Residential	1	50	50	50	0
	11-140	60000 AFTON MEADOW LN Second Floor	B	Multi-Family Residential	1	51	53	54	3
	11-141	600000 AFTON MEADOW LN Third Floor	B	Multi-Family Residential	1	55	56	57	2
	11-142	600F1 AFTON MEADOW LN First Floor	B	Multi-Family Residential	1	61	62	63	2
	11-143	600F2 AFTON MEADOW LN Second Floor	B	Multi-Family Residential	1	64	65	65	1
	11-144	600F3 AFTON MEADOW LN Third Floor	B	Multi-Family Residential	1	65	66	67	2
	11-145	600G1 AFTON MEADOW LN First Floor	B	Multi-Family Residential	1	59	60	61	2
	11-146	600G2 AFTON MEADOW LN Second Floor	B	Multi-Family Residential	1	62	63	63	1
	11-147	600G3 AFTON MEADOW LN Third Floor	B	Multi-Family Residential	1	64	65	65	1
	11-148	600H1 AFTON MEADOW LN First Floor	B	Multi-Family Residential	1	58	59	59	1
	11-149	600H2 AFTON MEADOW LN Second Floor	B	Multi-Family Residential	1	61	62	62	1
	11-150	600H3 AFTON MEADOW LN Third Floor	B	Multi-Family Residential	1	63	64	64	1
	11-151	600I1 AFTON MEADOW LN First Floor	B	Multi-Family Residential	1	60	60	60	0
	11-152	600I2 AFTON MEADOW LN Second Floor	B	Multi-Family Residential	1	60	61	62	2
	11-153	600I3 AFTON MEADOW LN Third Floor	B	Multi-Family Residential	1	62	63	64	2
	11-154	600J1 AFTON MEADOW LN First Floor	B	Multi-Family Residential	1	60	60	60	0
	11-155	600J2 AFTON MEADOW LN Second Floor	B	Multi-Family Residential	1	59	60	61	2
	11-156	600J3 AFTON MEADOW LN Third Floor	B	Multi-Family Residential	1	61	62	62	1
	11-157	700A1 AFTON MEADOW LN First Floor	B	Multi-Family Residential	1	60	60	60	0
	11-158	700A2 AFTON MEADOW LN Second Floor	B	Multi-Family Residential	1	57	58	59	2
	11-159	700A3 AFTON MEADOW LN Third Floor	B	Multi-Family Residential	1	59	60	60	1
	11-160	700B1 AFTON MEADOW LN First Floor	B	Multi-Family Residential	1	60	60	60	0
	11-161	700B2 AFTON MEADOW LN Second Floor	B	Multi-Family Residential	1	54	56	56	2
	11-162	700B3 AFTON MEADOW LN Third Floor	B	Multi-Family Residential	1	56	58	58	2
	11-163	700C1 AFTON MEADOW LN First Floor	B	Multi-Family Residential	1	60	60	60	0
11	11-164	700C2 AFTON MEADOW LN Second Floor	B	Multi-Family Residential	1	54	56	56	2
	11-165	700C3 AFTON MEADOW LN Third Floor	B	Multi-Family Residential	1	58	59	60	2
	11-166	700D1 AFTON MEADOW LN First Floor	B	Multi-Family Residential	1	50	50	51	1
	11-167	700D2 AFTON MEADOW LN Second Floor	B	Multi-Family Residential	1	51	53	53	2
	11-168	700D3 AFTON MEADOW LN Third Floor	B	Multi-Family Residential	1	57	59	59	2
	11-169	3200A1 REXFORD LN First Floor	B	Multi-Family Residential	1	50	50	51	1
	11-170	3200A2 REXFORD LN Second Floor	B	Multi-Family Residential	1	52	53	53	1
	11-171	3200A3 REXFORD LN Third Floor	B	Multi-Family Residential	1	56	58	58	2
	11-172	3200B1 REXFORD LN First Floor	B	Multi-Family Residential	1	50	50	50	0
	11-173	3200B2 REXFORD LN Second Floor	B	Multi-Family Residential	1	50	52	52	2
	11-174	3200B3 REXFORD LN Third Floor	B	Multi-Family Residential	1	55	57	57	2
	11-175	3200C1 REXFORD LN First Floor	B	Multi-Family Residential	1	50	51	50	0
	11-176	3200C2 REXFORD LN Second Floor	B	Multi-Family Residential	1	51	53	53	2
	11-177	3200C3 REXFORD LN Third Floor	B	Multi-Family Residential	1	54	56	56	2
	11-178	3200F1 REXFORD LN First Floor	B	Multi-Family Residential	1	50	51	51	1
	11-179	3200F2 REXFORD LN Second Floor	B	Multi-Family Residential	1	51	53	53	2
	11-180	3200F3 REXFORD LN Third Floor	B	Multi-Family Residential	1	55	57	56	1
	11-181	3200G1 REXFORD LN First Floor	B	Multi-Family Residential	1	50	50	50	0
	11-182	3200G2 REXFORD LN Second Floor	B	Multi-Family Residential	1	48	48	48	0
	11-183	3200G3 REXFORD LN Third Floor	B	Multi-Family Residential	1	50	54	54	4
	11-184	3200H1 REXFORD LN First Floor	B	Multi-Family Residential	1	50	50	50	0
	11-185	3200H2 REXFORD LN Second Floor	B	Multi-Family Residential	1	48	48	48	0
	11-186	3200H3 REXFORD LN Third Floor	B	Multi-Family Residential	1	50	53	52	2
	11-187	2400 1A1 AFTON MEADOW LN First Floor	B	Multi-Family Residential	1	51	52	53	2
	11-188	2400 1A2 AFTON MEADOW LN Second Floor	B	Multi-Family Residential	1	56	57	57	1
	11-189	2400 1A3 AFTON MEADOW LN Third Floor	B	Multi-Family Residential	1	58	59	59	1
	11-190	2400 1B1 AFTON MEADOW LN First Floor	B	Multi-Family Residential	1	50	50	50	0
	11-191	2400 1B2 AFTON MEADOW LN Second Floor	B	Multi-Family Residential	1	48	48	48	0
	11-192	2400 1B3 AFTON MEADOW LN Third Floor	B	Multi-Family Residential	1	49	51	51	2
	11-193	2400 1C1 AFTON MEADOW LN First Floor	B	Multi-Family Residential	1	50	50	50	0
	11-194	2400 1C2 AFTON MEADOW LN Second Floor	B	Multi-Family Residential	1	48	48	48	0
	11-195	2400 1C3 AFTON MEADOW LN Third Floor	B	Multi-Family Residential	1	48	50	50	2
	11-196	2400 1D1 AFTON MEADOW LN First Floor	B	Multi-Family Residential	1	48	48	48	0
	11-197	2400 1D2 AFTON MEADOW LN Second Floor	B	Multi-Family Residential	1	48	48	48	0
	11-198	2400 1D3 AFTON MEADOW LN Third Floor	B	Multi-Family Residential	1	48	50	50	2
	11-199	2400 10 AFTON MEADOW LN First Floor	B	Multi-Family Residential	1	48	49	51	3
	11-200	2400 100 AFTON MEADOW LN Second Floor	B	Multi-Family Residential	1	51	52	54	3
	11-201	2400 1000 AFTON MEADOW LN Third Floor	B	Multi-Family Residential	1	54	55	56	2
	11-202	2400 1F1 AFTON MEADOW LN First Floor	B	Multi-Family Residential	1	55	57	58	3
	11-203	2400 1F2 AFTON MEADOW LN Second Floor	B	Multi-Family Residential	1	60	61	61	1
	11-204	2400 1F3 AFTON MEADOW LN Third Floor	B	Multi-Family Residential	1	62	63	63	1
	11-205	2400 1G1 AFTON MEADOW LN First Floor	B	Multi-Family Residential	1	55	56	57	2



Table C-1: Ten Ten Road Widening (STIP No. U-5825) Receptors, Noise Levels, and Noise Impacts (Page 13 of 15)

NSA	Receptors					Predicted Noise Levels, Leq(h) (dB(A))*				
	Receptor Number	Address	NAC	Use	DUs	Existing	No-Build	Build	Change	
11	11-206	2400 1G2 AFTON MEADOW LN Second Floor	B	Multi-Family Residential	1	59	60	61	2	
	11-207	2400 1G3 AFTON MEADOW LN Third Floor	B	Multi-Family Residential	1	61	62	62	1	
	11-208	2400 1H1 AFTON MEADOW LN First Floor	B	Multi-Family Residential	1	54	56	57	3	
	11-209	2400 1H2 AFTON MEADOW LN Second Floor	B	Multi-Family Residential	1	59	60	61	2	
	11-210	2400 1H3 AFTON MEADOW LN Third Floor	B	Multi-Family Residential	1	61	62	62	1	
	11-211	2400 1I1 AFTON MEADOW LN First Floor	B	Multi-Family Residential	1	54	55	56	2	
	11-212	2400 1I2 AFTON MEADOW LN Second Floor	B	Multi-Family Residential	1	59	60	60	1	
	11-213	2400 1I3 AFTON MEADOW LN Third Floor	B	Multi-Family Residential	1	61	62	62	1	
	11-214	2400 1J1 AFTON MEADOW LN First Floor	B	Multi-Family Residential	1	54	55	56	2	
	11-215	2400 1J2 AFTON MEADOW LN Second Floor	B	Multi-Family Residential	1	58	59	60	2	
	11-216	2400 1J3 AFTON MEADOW LN Third Floor	B	Multi-Family Residential	1	60	61	61	1	
	11-217	800 1A1 AFTON MEADOW LN First Floor	B	Multi-Family Residential	1	48	48	48	0	
	11-218	800 1A2 AFTON MEADOW LN Second Floor	B	Multi-Family Residential	1	51	52	52	1	
	11-219	800 1A3 AFTON MEADOW LN Third Floor	B	Multi-Family Residential	1	54	55	55	1	
	11-220	800 1B1 AFTON MEADOW LN First Floor	B	Multi-Family Residential	1	50	50	50	0	
	11-221	800 1B2 AFTON MEADOW LN Second Floor	B	Multi-Family Residential	1	52	53	54	2	
	11-222	800 1B3 AFTON MEADOW LN Third Floor	B	Multi-Family Residential	1	55	56	56	1	
	11-223	800 1C1 AFTON MEADOW LN First Floor	B	Multi-Family Residential	1	50	50	50	0	
	11-224	800 1C2 AFTON MEADOW LN Second Floor	B	Multi-Family Residential	1	60	60	60	0	
	11-225	800 1C3 AFTON MEADOW LN Third Floor	B	Multi-Family Residential	1	53	55	55	2	
	11-226	800 1D1 AFTON MEADOW LN First Floor	B	Multi-Family Residential	1	50	50	50	0	
	11-227	800 1D2 AFTON MEADOW LN Second Floor	B	Multi-Family Residential	1	60	60	60	0	
	11-228	800 1D3 AFTON MEADOW LN Third Floor	B	Multi-Family Residential	1	52	54	55	3	
	11-229	900 2B1 AFTON MEADOW LN First Floor	B	Multi-Family Residential	1	50	50	50	0	
	11-230	900 2B2 AFTON MEADOW LN Second Floor	B	Multi-Family Residential	1	60	60	60	0	
	11-231	900 2B3 AFTON MEADOW LN Third Floor	B	Multi-Family Residential	1	50	52	52	2	
	11-232	900 2C1 AFTON MEADOW LN First Floor	B	Multi-Family Residential	1	50	50	50	0	
	11-233	900 2C2 AFTON MEADOW LN Second Floor	B	Multi-Family Residential	1	60	60	60	0	
	11-234	900 2C3 AFTON MEADOW LN Third Floor	B	Multi-Family Residential	1	52	53	54	2	
	11-235	900 2D1 AFTON MEADOW LN First Floor	B	Multi-Family Residential	1	50	50	50	0	
	11-236	900 2D2 AFTON MEADOW LN Second Floor	B	Multi-Family Residential	1	52	53	54	2	
	11-237	900 2D3 AFTON MEADOW LN Third Floor	B	Multi-Family Residential	1	55	56	57	2	
	11-238	900 2F1 AFTON MEADOW LN First Floor	B	Multi-Family Residential	1	48	48	48	0	
	11-239	900 2F2 AFTON MEADOW LN Second Floor	B	Multi-Family Residential	1	50	50	52	2	
	11-240	900 2F3 AFTON MEADOW LN Third Floor	B	Multi-Family Residential	1	53	54	55	2	
	11-241	900 2G1 AFTON MEADOW LN First Floor	B	Multi-Family Residential	1	50	50	50	0	
	11-242	900 2G2 AFTON MEADOW LN Second Floor	B	Multi-Family Residential	1	50	52	53	3	
	11-243	900 2G3 AFTON MEADOW LN Third Floor	B	Multi-Family Residential	1	53	55	56	3	
	11-244	900 2H1 AFTON MEADOW LN First Floor	B	Multi-Family Residential	1	49	50	51	2	
	11-245	900 2H2 AFTON MEADOW LN Second Floor	B	Multi-Family Residential	1	53	55	55	2	
	11-246	900 2H3 AFTON MEADOW LN Third Floor	B	Multi-Family Residential	1	57	57	58	1	
	11-247	2400 REXFORD LN Pool	B	Multi-Family Recreational	1	53	55	54	1	
	11-248	2400 REXFORD LN Playground	B	Multi-Family Recreational	1	48	49	50	2	
	11-249	3212 TEN TEN RD	B	Multi-Family Residential	1	65	66	67	2	
	12	12-01	3116 TEN TEN RD	B	Single-Family Residential	1	55	56	58	3
		12-02	3114 TEN TEN RD	B	Single-Family Residential	1	54	56	59	5
		12-03	3112 TEN TEN RD	B	Multi-Family Residential	1	50	52	54	4
		12-04	4917 LILY GARDEN DR	B	Multi-Family Residential	1	50	51	53	3
		12-05	4913 LILY GARDEN DR	B	Multi-Family Residential	1	49	50	53	4
12-06		2920 TEN TEN RD_ROW	B	Single-Family Residential	1	69	71	R/W	R/W	
12-07		2916 TEN TEN RD	B	Multi-Family Residential	1	66	67	70	4	
12-08		7812 SMITH RD	B	Multi-Family Residential	1	63	65	68	5	
12-09		7809 STEPHENSON RD	B	Multi-Family Residential	1	50	50	50	0	
12-10		8005 STEPHENSON RD	B	Single-Family Residential	1	50	50	52	2	
12-11		7836 SMITH RD	B	Multi-Family Residential	1	62	64	67	5	
12-12		8000 STEPHENSON RD	B	Multi-Family Residential	1	51	53	55	4	
12-13		7909 SMITH RD	B	Multi-Family Residential	1	50	50	51	1	
12-14		7828 SMITH RD	B	Single-Family Residential	1	55	57	61	6	
12-15		7836 SMITH RD	B	Multi-Family Residential	1	61	63	66	5	
12-16		7908 SMITH RD	B	Multi-Family Residential	1	50	50	53	3	
12-17		7801 LITTLEMAN LN	B	Multi-Family Residential	1	67	69	R/W	R/W	
12-18		7809 LITTLEMAN LN	B	Single-Family Residential	1	59	61	66	7	
12-19		7813 LITTLEMAN LN	B	Multi-Family Residential	1	55	57	61	6	
12-20		7817 LITTLEMAN LN	B	Multi-Family Residential	1	52	54	58	6	
12-21		7821 LITTLEMAN LN	B	Multi-Family Residential	1	50	52	57	7	
12-22		7829 LITTLEMAN LN	B	Single-Family Residential	1	48	49	53	5	
12-23		7833 LITTLEMAN LN	B	Multi-Family Residential	1	48	49	53	5	
12-24		7837 LITTLEMAN LN	B	Multi-Family Residential	1	49	50	54	5	
12-25		7824 LITTLEMAN LN	B	Single-Family Residential	1	48	49	52	4	
12-26		7820 LITTLEMAN LN	B	Multi-Family Residential	1	49	50	54	5	
12-27		7816 LITTLEMAN LN	B	Single-Family Residential	1	54	56	61	7	
12-28		7808 LITTLEMAN LN	B	Single-Family Residential	1	62	64	70	8	
12-29		2601 SWEETGUM DR	B	Single-Family Residential	1	50	50	55	5	
12-30		2521A SWEETGUM DR	B	Single-Family Residential	1	56	58	59	3	
12-31		2521B SWEETGUM DR	B	Single-Family Residential	1	56	58	61	5	
12-32		2509 SWEETGUM DR	B	Single-Family Residential	1	62	64	66	4	
12-33		4801 JESSIE DR	B	Single-Family Residential	1	66	68	70	4	
12-34		2500 SWEETGUM DR	B	Single-Family Residential	1	53	54	58	5	
12-35		2512 SWEETGUM DR	B	Single-Family Residential	1	49	50	53	4	
12-36		2528 SWEETGUM DR	B	Single-Family Residential	1	50	52	55	5	
13	13-01	2512 TEN-TEN RD Golf Course	C	Golf Course	1	67	68	71	4	
	13-02	2512 TEN-TEN RD Golf Course	C	Golf Course	1	63	63	71	8	
	13-03	2512 TEN-TEN RD Golf Course	C	Golf Course	1	62	63	71	9	



Table C-1: Ten Ten Road Widening (STIP No. U-5825) Receptors, Noise Levels, and Noise Impacts (Page 14 of 15)

NSA	Receptors					Predicted Noise Levels, Leq(h) (dB(A))*				
	Receptor Number	Address	NAC	Use	DUs	Existing	No-Build	Build	Change	
13	13-04	2512 TEN-TEN RD Golf Course	C	Golf Course	1	62	62	71	9	
	13-05	2512 TEN-TEN RD Golf Course	C	Golf Course	1	61	62	71	10	
	13-06	2512 TEN-TEN RD Golf Course	C	Golf Course	1	62	62	71	9	
	13-07	2512 TEN-TEN RD Golf Course	C	Golf Course	1	63	63	71	8	
	13-08	2512 TEN-TEN RD Golf Course	C	Golf Course	1	64	64	72	8	
	13-09	2512 TEN-TEN RD Golf Course	C	Golf Course	1	66	66	70	4	
	13-10	2512 TEN-TEN RD Golf Course	C	Golf Course	1	67	67	70	3	
	13-11	2512 TEN-TEN RD Golf Course	C	Golf Course	1	68	68	71	3	
	13-12	2512 TEN-TEN RD Golf Course	C	Golf Course	1	68	68	71	3	
	13-13	2512 TEN-TEN RD Golf Course	C	Golf Course	1	68	68	71	3	
	13-14	2512 TEN-TEN RD Golf Course	C	Golf Course	1	68	68	71	3	
	13-15	2512 TEN-TEN RD Golf Course	C	Golf Course	1	55	55	61	6	
	13-16	2512 TEN-TEN RD Golf Course	C	Golf Course	1	53	54	60	7	
	13-17	2512 TEN-TEN RD Golf Course	C	Golf Course	1	54	54	59	5	
	13-18	2512 TEN-TEN RD Golf Course	C	Golf Course	1	55	55	62	7	
	13-19	2512 TEN-TEN RD Golf Course	C	Golf Course	1	56	56	64	8	
	13-20	2512 TEN-TEN RD Golf Course	C	Golf Course	1	59	59	64	5	
	13-21	2512 TEN-TEN RD Golf Course	C	Golf Course	1	60	60	65	5	
	13-22	2512 TEN-TEN RD Golf Course	C	Golf Course	1	61	61	67	6	
	13-23	2512 TEN-TEN RD Golf Course	C	Golf Course	1	61	61	67	6	
	13-24	2512 TEN-TEN RD Golf Course	C	Golf Course	1	63	63	68	5	
	13-25	2512 TEN-TEN RD Golf Course	C	Golf Course	1	55	55	62	7	
	13-26	2512 TEN-TEN RD Golf Course	C	Golf Course	1	53	54	60	7	
	13-27	2512 TEN-TEN RD Golf Course	C	Golf Course	1	53	54	61	8	
	13-28	2512 TEN-TEN RD Golf Course	C	Golf Course	1	55	55	63	8	
	13-29	2512 TEN-TEN RD Golf Course	C	Golf Course	1	55	55	63	8	
	13-30	2512 TEN-TEN RD Golf Course	C	Golf Course	1	56	56	64	8	
	13-31	2512 TEN-TEN RD Golf Course	C	Golf Course	1	56	57	64	8	
	13-32	2512 TEN-TEN RD Golf Course	C	Golf Course	1	57	57	64	7	
	13-33	2512 TEN-TEN RD Golf Course	C	Golf Course	1	55	55	60	5	
	13-34	2512 TEN-TEN RD Golf Course	C	Golf Course	1	56	56	63	7	
	13-35	2512 TEN-TEN RD Golf Course	C	Golf Course	1	56	57	64	8	
	13-36	2512 TEN-TEN RD Golf Course	C	Golf Course	1	57	58	64	7	
	13-37	2512 TEN-TEN RD Golf Course	C	Golf Course	1	58	58	64	6	
	13-38	2512 TEN-TEN RD Golf Course	C	Golf Course	1	53	53	60	7	
	13-39	2512 TEN-TEN RD Golf Course	C	Golf Course	1	52	53	60	8	
	13-40	2512 TEN-TEN RD Golf Course	C	Golf Course	1	53	53	60	7	
	13-41	2512 TEN-TEN RD Golf Course	C	Golf Course	1	54	54	62	8	
	13-42	2512 TEN-TEN RD Golf Course	C	Golf Course	1	53	54	61	8	
	13-43	2512 TEN-TEN RD Golf Course	C	Golf Course	1	55	55	62	7	
	13-44	2512 TEN-TEN RD Golf Course	C	Golf Course	1	55	55	62	7	
	13-45	2512 TEN-TEN RD Golf Course	C	Golf Course	1	52	53	58	6	
	13-46	2512 TEN-TEN RD Golf Course	C	Golf Course	1	53	54	60	7	
	13-47	2512 TEN-TEN RD Golf Course	C	Golf Course	1	54	54	62	8	
	13-48	2512 TEN-TEN RD Golf Course	C	Golf Course	1	54	54	62	8	
	13-49	2512 TEN-TEN RD Golf Course	C	Golf Course	1	55	55	62	7	
	13-50	2512 TEN-TEN RD Golf Course	C	Golf Course	1	51	51	58	7	
	13-51	2512 TEN-TEN RD Golf Course	C	Golf Course	1	51	52	59	8	
	13-52	2512 TEN-TEN RD Golf Course	C	Golf Course	1	53	53	60	7	
	13-53	2512 TEN-TEN RD Golf Course	C	Golf Course	1	52	53	60	8	
	13-54	2512 TEN-TEN RD Golf Course	C	Golf Course	1	53	53	60	7	
	13-55	2512 TEN-TEN RD Golf Course	C	Golf Course	1	53	54	61	8	
	13-56	2512 TEN-TEN RD Golf Course	C	Golf Course	1	52	53	60	8	
	13-57	2512 TEN-TEN RD Golf Course	C	Golf Course	1	51	52	58	7	
	13-58	2512 TEN-TEN RD Golf Course	C	Golf Course	1	52	52	60	8	
	13-59	2512 TEN-TEN RD Golf Course	C	Golf Course	1	52	52	60	8	
	13-60	2512 TEN-TEN RD Golf Course	C	Golf Course	1	52	53	60	8	
	13-61	2512 TEN-TEN RD Golf Course	C	Golf Course	1	52	53	60	8	
	13-62	4000 LUFKIN RD Sheetz	E	Restaurant	1	64	65	65	1	
	13-63	1002 LUFKIN RD Middle School	C	Educational	1	63	64	65	2	
	14	14-01	1700 CENTER ST Abbey Road Tavern	E	Restaurant	1	67	68	71	4
		14-02	1600 CENTER ST A Calvary Chapel	D	Religious - Interior	1	40	40	39	-1
		14-03	1600 CENTER ST B Calvary Chapel	D	Religious - Interior	1	40	40	39	-1
15	15-01	1328 CENTER ST	B	Single-Family Residential	1	68	69	72	4	
	15-02	1314 CENTER ST	B	Single-Family Residential	1	67	69	71	4	
	15-03	1316 CENTER ST	B	Single-Family Residential	1	55	57	58	3	
	15-04	101 OLD GROVE LN	B	Multi-Family Residential	1	68	69	72	4	
	15-05	105 OLD GROVE LN	B	Multi-Family Residential	1	65	66	68	3	
	15-06	109 OLD GROVE LN	B	Multi-Family Residential	1	63	64	66	3	
	15-07	113 OLD GROVE LN	B	Multi-Family Residential	1	61	62	63	2	
	15-08	117 OLD GROVE LN	B	Multi-Family Residential	1	59	61	62	3	
	15-09	121 OLD GROVE LN	B	Multi-Family Residential	1	58	59	61	3	
	15-10	125 OLD GROVE LN	B	Multi-Family Residential	1	56	58	59	3	
	15-11	129 OLD GROVE LN	B	Multi-Family Residential	1	55	57	58	3	
	15-12	133 OLD GROVE LN	B	Multi-Family Residential	1	54	56	57	3	
	15-13	137 OLD GROVE LN	B	Multi-Family Residential	1	53	54	57	4	
	15-14	141 OLD GROVE LN	B	Multi-Family Residential	1	51	53	55	4	
	15-15	145 OLD GROVE LN	B	Multi-Family Residential	1	50	52	54	4	
	15-16	149 OLD GROVE LN	B	Multi-Family Residential	1	50	51	53	3	
	15-17	153 OLD GROVE LN	B	Multi-Family Residential	1	49	51	53	4	
15-18	157 OLD GROVE LN	B	Multi-Family Residential	1	49	50	53	4		
15-19	161 OLD GROVE LN	B	Multi-Family Residential	1	48	48	51	3		
15-20	165 OLD GROVE LN	B	Multi-Family Residential	1	48	48	51	3		

Table C-1: Ten Ten Road Widening (STIP No. U-5825) Receptors, Noise Levels, and Noise Impacts (Page 15 of 15)

NSA	Receptors					Predicted Noise Levels, Leq(h) (dB(A))*			
	Receptor Number	Address	NAC	Use	DUs	Existing	No-Build	Build	Change
15	15-21	169 OLD GROVE LN	B	Multi-Family Residential	1	48	48	52	4
	15-22	173 OLD GROVE LN	B	Multi-Family Residential	1	48	48	52	4
	15-23	100 OLD GROVE LN	B	Multi-Family Residential	1	69	70	R/W	R/W
	15-24	104 OLD GROVE LN	B	Multi-Family Residential	1	67	69	R/W	R/W
	15-25	108 OLD GROVE LN	B	Multi-Family Residential	1	67	68	R/W	R/W
	15-26	112 OLD GROVE LN	B	Multi-Family Residential	1	64	65	R/W	R/W
	15-27	116 OLD GROVE LN	B	Multi-Family Residential	1	61	62	R/W	R/W
	15-28	120 OLD GROVE LN	B	Multi-Family Residential	1	56	57	R/W	R/W
	15-29	124 OLD GROVE LN	B	Multi-Family Residential	1	53	54	R/W	R/W
	15-30	128 OLD GROVE LN	B	Multi-Family Residential	1	52	53	60	8
	15-31	132 OLD GROVE LN	B	Multi-Family Residential	1	52	53	57	5
	15-32	136 OLD GROVE LN	B	Multi-Family Residential	1	51	52	56	5
	15-33	140 OLD GROVE LN	B	Multi-Family Residential	1	50	51	55	5
	15-34	144 OLD GROVE LN	B	Multi-Family Residential	1	50	50	55	5
	15-35	201 OLD GROVE LN	B	Multi-Family Residential	1	48	48	52	4
	15-36	205 OLD GROVE LN	B	Multi-Family Residential	1	48	48	48	0
	15-37	209 OLD GROVE LN	B	Multi-Family Residential	1	48	48	48	0
	15-38	213 OLD GROVE LN	B	Multi-Family Residential	1	48	48	49	1
	15-39	217 OLD GROVE LN	B	Multi-Family Residential	1	48	48	50	2
	15-40	221 OLD GROVE LN	B	Multi-Family Residential	1	48	48	49	1
	15-41	225 OLD GROVE LN	B	Multi-Family Residential	1	48	48	48	0
	15-42	229 OLD GROVE LN	B	Multi-Family Residential	1	48	48	48	0
	15-43	233 OLD GROVE LN	B	Multi-Family Residential	1	48	48	48	0
	15-44	237 OLD GROVE LN	B	Multi-Family Residential	1	48	48	48	0
	15-45	241 OLD GROVE LN	B	Multi-Family Residential	1	48	48	48	0
	15-46	245 OLD GROVE LN	B	Multi-Family Residential	1	48	48	48	0
	15-47	249 OLD GROVE LN	B	Multi-Family Residential	1	48	48	50	2
	15-48	253 OLD GROVE LN	B	Multi-Family Residential	1	48	49	53	5
	15-49	1132 CENTER ST	B	Single-Family Residential	1	65	66	68	3
	15-50	1110 CENTER ST	B	Single-Family Residential	1	66	67	R/W	R/W
	15-51	1100 CENTER ST	B	Single-Family Residential	1	67	69	R/W	R/W
	15-52	1100 CENTER ST	B	Single-Family Residential	1	68	70	R/W	R/W
	15-53	924 CENTER ST	B	Single-Family Residential	1	70	71	R/W	R/W
	15-54	902 E CHATHAM ST	B	Single-Family Residential	1	52	60	56	4
	15-55	904 E CHATHAM ST	B	Single-Family Residential	1	54	61	58	4
	15-56	905 E CHATHAM ST	B	Single-Family Residential	1	60	61	60	0
	15-57	903 E CHATHAM ST	B	Single-Family Residential	1	52	59	57	5
	15-58	901 E CHATHAM ST	B	Single-Family Residential	1	50	55	53	3
	15-59	1010 SCHIEFFELIN RD Ambassador Presbyterian	D	Religious - Interior	1	30	33	33	3
	15-60	738 CULVERT ST	B	Single-Family Residential	1	60	62	62	2
	15-61	734 CULVERT ST	B	Single-Family Residential	1	64	66	66	2
	15-62	720 CULVERT ST	B	Single-Family Residential	1	53	55	54	1
	15-63	112 LAKE MEADOW DR	B	Single-Family Residential	1	53	55	55	2
	15-64	110 LAKE MEADOW DR	B	Single-Family Residential	1	50	53	52	2
	15-65	108 LAKE MEADOW DR	B	Single-Family Residential	1	50	51	50	0
	15-66	106 LAKE MEADOW DR	B	Single-Family Residential	1	50	50	50	0
	15-67	700 CENTER ST	B	Single-Family Residential	1	64	66	66	2
<b>Impact Totals:</b>						<b>N/A</b>	<b>N/A</b>	<b>181</b>	<b>6</b>
<b>Notes:</b>									
*All noise level results were filtered based upon ambient noise measurements collected in the field to compensate for the fact that TNM does not account for non-traffic noise sources.									
Right-of-Way Acquisitions = <span style="background-color: #FFD700;">R/W</span> Impacts = <span style="background-color: #FF0000;">Impact</span>									

NSA 2 Wake Technical Community College Interior (Activity Category D)		
<b>CASE:</b>	Wake Technical Community College has a current enrollment of 3000 students and staff. NCDOT assumes that the number of students shall be assessed as the greater of the school's capacity or its existing enrollment. Operating hours of the school are set at 18 hours each day, accommodating early morning classes and evening classes. Referring to the academic calendar, the college is open for 48 weeks out of the year. It is predicted that 0 percent of the school building's use areas will be impacted by noise from the project. There are no exterior use activities that occur in the immediate vicinity of the school building.	
Line	<b>For an Average Single Family Residential Unit in North Carolina</b>	
A	People per Residence	3.0
B	Hours Available for Use per Year	8760
C	<b>Person-hours per Year Available for Use = A x B</b>	<b>26280</b>
	<b>For the School Being Evaluated</b>	
D	Capacity of School (maximum occupancy, including students and staff)	5000
E	Current Enrollment at School (students and staff)	3000
F	<b>Total Number of Occupants per Day = Maximum of D and E</b>	<b>5000</b>
G	Daily Hours Used	18
H	Instructional Days per Week	5
I	Instructional Weeks per Year	50
J	<b>Instuctional Days per Year = H X I</b>	<b>250</b>
K	<b>Person-hours per Year Available for Use = F x G x J</b>	<b>22,500,000</b>
L	Percent of Building Use Areas Impacted by Project	0%
M	Percent of Building Use Areas Benefited by Project Abatement	0%
N	<b>Percentage of Building Use Value = Maximum of L and M</b>	<b>0%</b>
O	<b>EQUIVALENT RECEPTOR VALUE = (K/C) x N</b>	<b>0.0</b>
P	*If more than one exterior receptor point was used to model the school building, enter the number of receptor points (3 points assumed here).	1
Q	<b>Equivalent Receptor Value Assigned to Each Receptor = O/P</b>	<b>0.00</b>
R	Number of Votes Assigned to School Building in Barrier Voting Process = O	0
	*A receptor point is located at the building façade closest to the highway. This exterior noise level is then reduced by the appropriate building reduction factor to determine if there is an interior noise impact. Where there is an interior noise impact, a noise wall will be considered. If no interior areas of frequent human use are present in the building, further noise analysis is not required.	
<b>NOTE:</b>	Wake Tech Campus enrollment number was determined by calling the campus. <a href="https://www.waketech.edu/calendar/list">https://www.waketech.edu/calendar/list</a> It is assumed the college is open for 50 weeks out of the year.	

**NSA 3\_Danbury Community Pool (Activity Category B)**

<b>CASE:</b>	The Danbury Community subdivision has an outdoor pool area, located south of Penny Road . Based on field observation, the pool has an average hourly use of three (3) persons. The pool is located near the main subdivision entrance off of Penny Road. NCDOT assumes that the pool is open 12 hours a day, 7 days a week for 5 months. <b>The pool area is expected to not be impacted by traffic noise associated with this project.</b>	
<b>Line</b>	<b>For an Average Single Family Residential Unit in North Carolina</b>	
A	People per Residence	3
B	Hours Available for Use per Year	8,760
C	<b>Person-hours per Year Available for Use = A x B</b>	<b>26,280</b>
	<b>For the Apartment Pool Area</b>	
D	Average Hourly Occupancy for Pool Area	3
E	Hours Per Day Pool is Available for Use	12
F	Days per Month Pool is Available for Use	30
G	Months per Year Pool is Available for Use	5
H	<b>Person-hours per Year Available for Use = D x E x F x G</b>	<b>5,400</b>
I	<b>Equivalent Receptor Unit Value for Pool Area = H/C</b>	<b>0.2</b>
J	For most pool areas in apartment complexes, using one receptor point in TNM placed closest to the proposed highway project is sufficient. If more than one exterior receptor point was used to model large pool areas, enter the number of receptor points.	1
K	<b>Equivalent Receptor Value Assigned to Each Receiver = I/J</b>	<b>0.2</b>
L	Number of Votes Assigned to Pool Area in Barrier Voting Process = I	0
<b>KEY:</b>	<b>Notes:</b> <a href="https://www.regencycommunities.com/faq.html">https://www.regencycommunities.com/faq.html</a> Contacted 2/7/2019, pool is open April to September. Pool has small crowd occupants, except for parties/events/swim team. <a href="https://www.regencycommunities.com/community-maps.html">https://www.regencycommunities.com/community-maps.html</a>	

**NSA 4 Killingsworth Community Tennis Courts (Activity Category B)**

<b>CASE:</b>	Killingsworth Community subdivision has a tennis court area with two courts, located north of Penny Road. Based on field observations and information provided by the operators of the recreational area (Regency Communities - contacted on Feb 7, 2019) , the tennis court area has an average hourly use of six (6) persons. NCDOT assumes that recreational areas are open 12 hours a day, 7 days a week for 5 months of the year. <b>The tennis court area is expected to be impacted by traffic noise associated with the project.</b> An estimated 30 percent of the park's usable area is predicted to be impacted by noise from the highway project and 0 percent of the usable area is predicted to benefit from a proposed noise wall.	
Line	<b>For an Average Single Family Residential Unit in North Carolina</b>	
A	People per Residence	3
B	Hours Available for Use per Year	8,760
C	<b>Person-hours per Year Available for Use = A x B</b>	<b>26,280</b>
	<b>For the Apartment Pool Area</b>	
D	Average Hourly Occupancy for Court Area	6
E	Hours Per Day Court is Available for Use	12
F	Days per Month Court is Available for Use	30
G	Months per Year Court is Available for Use	7
H	<b>Person-hours per Year Available for Use = D x E x F x G</b>	<b>15,120</b>
I	<b>Equivalent Receptor Unit Value for Court Area = H/C</b>	<b>0.6</b>
J	For most Court areas in apartment complexes, using one receptor point in TNM placed closest to the proposed highway project is sufficient. If more than one exterior receptor point was used to model large pool areas, enter the number of receptor points.	1
K	<b>Equivalent Receptor Value Assigned to Each Receiver = I/J</b>	<b>0.6</b>
L	Number of Votes Assigned to Pool Area in Barrier Voting Process = I	1
<b>KEY:</b>	<b>Notes:</b> <a href="https://www.regencycommunities.com/community-maps.html">https://www.regencycommunities.com/community-maps.html</a> , part of Regency Communities: <a href="https://www.regencycommunities.com/faq.html">https://www.regencycommunities.com/faq.html</a> Contacted 2/7/2019 Pool has small crowd of occupants, except for parties/events/swim team. Pool is open April to September.	

NSA 4 Killingsworth Community Pool (Activity Category B)		
<b>CASE:</b>	Killingsworth Community subdivision has an outdoor pool area, located north of Penny Road. Based on field observations and information provided by the operators of the recreational area (Regency Communities - contacted on Feb 7, 2019), the pool area has an average hourly use of five (5) persons. NCDOT assumes that recreational areas are open 12 hours a day, 7 days a week for 5 months of the year. <b>The pool area is expected to not be impacted by traffic noise associated with the project.</b>	
Line	<b>For an Average Single Family Residential Unit in North Carolina</b>	
A	People per Residence	3
B	Hours Available for Use per Year	8,760
C	<b>Person-hours per Year Available for Use = A x B</b>	<b>26,280</b>
	<b>For the Apartment Pool Area</b>	
D	Average Hourly Occupancy for Pool Area	5
E	Hours Per Day Pool is Available for Use	12
F	Days per Month Pool is Available for Use	30
G	Months per Year Pool is Available for Use	5
H	<b>Person-hours per Year Available for Use = D x E x F x G</b>	<b>9,000</b>
I	<b>Equivalent Receptor Unit Value for Pool Area = H/C</b>	<b>0.3</b>
J	For most pool areas in apartment complexes, using one receptor point in TNM placed closest to the proposed highway project is sufficient. If more than one exterior receptor point was used to model large pool areas, enter the number of receptor points.	1
K	<b>Equivalent Receptor Value Assigned to Each Receiver = I/J</b>	<b>0.3</b>
L	Number of Votes Assigned to Pool Area in Barrier Voting Process = I	0
<b>KEY:</b>	<b>Notes:</b> <a href="https://www.regencycommunities.com/community-maps.html">https://www.regencycommunities.com/community-maps.html</a> , part of Regency Communities: <a href="https://www.regencycommunities.com/faq.html">https://www.regencycommunities.com/faq.html</a> Contacted 2/7/2019 Pool has small crowd of occupants, except for parties/events/swim team. Pool is open April to September.	

**NSA 5\_Avalon Peaks Apartments\_Tennis Court (Activity Category B)**

<b>CASE:</b>	There is a tennis court associated with the Avalon Peaks Apartment complex, located north of Ten Ten Road. The court has an average hourly use of six (6) persons. Based on field observations the tennis court area has an average hourly use of six (6) persons. NCDOT assumes that recreational areas are open 12 hours a day, 7 days a week for 5 months of the year. An estimated 40 percent of the park's usable area is predicted to be impacted by noise from the highway project and 0 percent of the usable area is predicted to benefit from a proposed noise wall.	
<b>Line</b>	<b>For an Average Single Family Residential Unit in North Carolina</b>	
A	People per Residence	3
B	Hours Available for Use per Year	8,760
C	<b>Person-hours per Year Available for Use = A x B</b>	<b>26,280</b>
	<b>For the Apartment Pool Area</b>	
D	Average Hourly Occupancy for Pool Area	6
E	Hours Per Day Pool is Available for Use	12
F	Days per Month Pool is Available for Use	30
G	Months per Year Pool is Available for Use	7
H	<b>Person-hours per Year Available for Use = D x E x F x G</b>	<b>15,120</b>
I	<b>Equivalent Receptor Unit Value for Pool Area = H/C</b>	<b>0.6</b>
J	For most pool areas in apartment complexes, using one receptor point in TNM placed closest to the proposed highway project is sufficient. If more than one exterior receptor point was used to model large pool areas, enter the number of receptor points.	1
K	<b>Equivalent Receptor Value Assigned to Each Receiver = I/J</b>	<b>0.6</b>



**NSA 5\_Avalon Peaks Apartments\_Basketball Court (Activity Category B)**

<b>CASE:</b>	There is a basketball court associated with the Avalon Peaks Apartment complex, located north of Ten Ten Road. The court has an average hourly use of eight (8) persons. Based on field observations the basketball court area has an average hourly use of six (6) persons. NCDOT assumes that recreational areas are open 12 hours a day, 7 days a week for 5 months of the year. An estimated 0 percent of the park's usable area is predicted to be impacted by noise from the highway project and 0 percent of the usable area is predicted to benefit from a proposed noise wall.	
<b>Line</b>	<b>For an Average Single Family Residential Unit in North Carolina</b>	
A	People per Residence	3
B	Hours Available for Use per Year	8,760
C	<b>Person-hours per Year Available for Use = A x B</b>	<b>26,280</b>
	<b>For the Apartment Pool Area</b>	
D	Average Hourly Occupancy for Pool Area	8
E	Hours Per Day Pool is Available for Use	12
F	Days per Month Pool is Available for Use	30
G	Months per Year Pool is Available for Use	5
H	<b>Person-hours per Year Available for Use = D x E x F x G</b>	<b>14,400</b>
I	<b>Equivalent Receptor Unit Value for Pool Area = H/C</b>	<b>0.5</b>
J	For most pool areas in apartment complexes, using one receptor point in TNM placed closest to the proposed highway project is sufficient. If more than one exterior receptor point was used to model large pool areas, enter the number of receptor points.	1
K	<b>Equivalent Receptor Value Assigned to Each Receiver = I/J</b>	<b>0.5</b>

**NSA 5 Right on Track Age Center (Activity Category D)**

<b>CASE:</b>	Right on Track Age Center is a small day care facility with a maximum enrollment of 68 students. The facility operates before and after school care five days a week year-round. The facility has no outdoor area of use. Approximately 50 percent of the classrooms have openable windows that face the highway and are not predicted to experience interior noise levels above the Activity Category D NAC.	
<b>Line</b>	<b>For an Average Single Family Residential Unit in North Carolina</b>	
A	People per Residence	3
B	Hours Available for Use per Year	8,760
C	<b>Person-hours per Year Available for Use = A x B</b>	<b>26,280</b>
	<b>**For the Interior Uses at the Day Care Facility Being Evaluated</b>	
J	Average Number of Users (Students and Staff) per Day	68
K	Daily Hours Used	6
L	Days per Week Open	5
M	Weeks per Year Open	48
N	<b>Days per Year Open = L x M</b>	<b>240</b>
O	<b>Person-hours per Year Available for Use = J x K x N</b>	<b>97,920</b>
P	Percent of Building Use Areas Impacted by Project	0%
Q	Percent of Building Use Areas Benefited by Project Abatement	0%
R	<b>Percentage of Building Use Value = Maximum of P and Q</b>	<b>0%</b>
S	<b>EQUIVALENT RECEPTOR VALUE = (O/C) x R</b>	<b>0.0</b>
T	<b>Number of Votes Assigned to Daycare Facility in Barrier Voting Process = Maximum of I and S</b>	<b>1</b>
<b>KEY:</b>	Input Values	
	Calculated Values in Bold Text	
	<p>**A receptor point is located at the building façade closest to the highway. This exterior noise level is then reduced by the appropriate building reduction factor to determine if there is an interior noise impact. Where there is an interior impact, a noise wall will be considered. If no interior areas of frequent human use are present in the building, further noise analysis is not required.</p> <p><b>Notes:</b> contacted 2/7, twice and email, no response. Estimates are based on student-teacher ratio which is posted on their website.</p>	

**NSA 5 Imagine That Learning Center (Activity Category D)**

**CASE:** Imagine That Learning Center is located north of Ten Ten Road and east of US 1. This small pre-school facility has no outdoor areas of use. The hours of operation are from 9:15 - 1:15 Monday through Friday. No information was able to be ascertained from the facility on the enrollment, however, due to the size of the building, it is assumed that there can be no more than 40 children and 10 staff members associated with the facility. Approximately 50 percent of the classrooms have openable windows that face the highway and are predicted to experience interior noise levels above the Activity Category D NAC and are estimated to receive benefits from a noise wall.

Line	For an Average Single Family Residential Unit in North Carolina	
A	People per Residence	3
B	Hours Available for Use per Year	8,760
C	<b>Person-hours per Year Available for Use = A x B</b>	<b>26,280</b>
<b>**For the Interior Uses at the Day Care Facility Being Evaluated</b>		
J	Average Number of Users (Students and Staff) per Day	50
K	Daily Hours Used	5
L	Days per Week Open	5
M	Weeks per Year Open	48
N	<b>Days per Year Open = L x M</b>	<b>240</b>
O	<b>Person-hours per Year Available for Use = J x K x N</b>	<b>60,000</b>
P	Percent of Building Use Areas Impacted by Project	15%
Q	Percent of Building Use Areas Benefited by Project Abatement	15%
R	<b>Percentage of Building Use Value = Maximum of P and Q</b>	<b>15%</b>
S	<b>EQUIVALENT RECEPTOR VALUE = (O/C) x R</b>	<b>0.3</b>
T	<b>Number of Votes Assigned to Daycare Facility in Barrier Voting Process = Maximum of I and S</b>	<b>1</b>

\*\*A receptor point is located at the building façade closest to the highway. This exterior noise level is then reduced by the appropriate building reduction factor to determine if there is an interior noise impact. Where there is an interior impact, a noise wall will be considered. If no interior areas of frequent human use are present in the building, further noise analysis is not required.

**Notes:** <http://www.imaginathtatpreschool.com/about-us-1.html> contacted 2/7, twice and email, no response. Estimates are based on student-teacher ratio which is posted on their website linked above.

**NSA 7\_Seagrove's Farm Townhomes Community Pool (Activity Category B)**

<b>CASE:</b>	Seafoam's Farm Townhome Community includes a pool area, located north of Ten Ten Road and east of Parkfield Drive. Based on field observation and contact with the community pool operator, the pool has an average hourly use of 10 persons and operates for five months out of the year, seven days a week, for approximately 15 hour per day. Most of the townhomes near the pool area have front porches capable of seating 1 person. <b>The pool area is not predicted to have future noise levels exceeding the Activity Category B NAC.</b>	
<b>Line</b>	<b>For an Average Single Family Residential Unit in North Carolina</b>	
A	People per Residence	3
B	Hours Available for Use per Year	8,760
C	<b>Person-hours per Year Available for Use = A x B</b>	<b>26,280</b>
	<b>For the Apartment Pool Area</b>	
D	Average Hourly Occupancy for Pool Area	10
E	Hours Per Day Pool is Available for Use	12
F	Days per Month Pool is Available for Use	30
G	Months per Year Pool is Available for Use	5
H	<b>Person-hours per Year Available for Use = D x E x F x G</b>	<b>18,000</b>
I	<b>Equivalent Receptor Unit Value for Pool Area = H/C</b>	<b>0.7</b>
J	For most pool areas in apartment complexes, using one receptor point in TNM placed closest to the proposed highway project is sufficient. If more than one exterior receptor point was used to model large pool areas, enter the number of receptor points.	1
K	<b>Equivalent Receptor Value Assigned to Each Receiver = I/J</b>	<b>0.7</b>
L	Number of Votes Assigned to Pool Area in Barrier Voting Process = I	1
<b>KEY:</b>	<b>Notes:</b> Contacted HOA 9/7/2019, pool is open a week or two before memorial day until a week or two after labor day. Hours are from 6am until 8:30pm. Can get crowded in late afternoons until dinner time.	

**NSA 8\_The Grove's Townhome Community Pool (Activity Category B)**

<b>CASE:</b>	The Grove's Townhome community has an outdoor pool area, located north of Ten Ten Road, along Old Grove Lane. According to the townhome management, the pool has an average hourly use of five (5) persons and operates 12 hours a day, 7 days a week for 5 months. <b>The pool area is expected to not be impacted by traffic noise associated with the project.</b>	
Line	<b>For an Average Single Family Residential Unit in North Carolina</b>	
A	People per Residence	3
B	Hours Available for Use per Year	8,760
C	<b>Person-hours per Year Available for Use = A x B</b>	<b>26,280</b>
	<b>For the Apartment Pool Area</b>	
D	Average Hourly Occupancy for Pool Area	5
E	Hours Per Day Pool is Available for Use	12
F	Days per Month Pool is Available for Use	30
G	Months per Year Pool is Available for Use	5
H	<b>Person-hours per Year Available for Use = D x E x F x G</b>	<b>9,000</b>
I	<b>Equivalent Receptor Unit Value for Pool Area = H/C</b>	<b>0.3</b>
J	For most pool areas in apartment complexes, using one receptor point in TNM placed closest to the proposed highway project is sufficient. If more than one exterior receptor point was used to model large pool areas, enter the number of receptor points.	1
K	<b>Equivalent Receptor Value Assigned to Each Receiver = I/J</b>	<b>0.3</b>
L	Number of Votes Assigned to Pool Area in Barrier Voting Process = I	0
<b>KEY:</b>	<b>Notes:</b> Call to Groves Townhome Association, July, 2/7/2019 - relayed information about opening and closing of the pool area. Opens in May, closes in September. Typically a small crowd.	

<b>NSA 9 Seagrove Park (Activity Category C)</b>		
<b>CASE:</b>	Seagrove Park, a city park in Apex, is located north of Old Ten Ten Road and west of Parkfield Drive. The park consists of a walking trail and a playground area. The trail was modeled with receivers every 100 feet along the trail and a receiver at the pavillion located just past the parking lot area. It is estimated that each visitor uses the park for an average of three (3) hours per day. Hours of operation are assumed to be the hours of daylight and area approximated at 10 hours per day year round. No area of the park is predicted to be impacted traffic noise associated with the project.	
<b>Line</b>	<b>For an Average Single Family Residential Unit in North Carolina</b>	
A	People per Residence	3.0
B	Hours Available for Use per Year	8760
C	<b>Person-hours per Year Available for Use = A x B</b>	<b>26280</b>
	<b>For the Park Area Being Evaluated</b>	
D	Percent of Usable Area of Park Impacted by Project Noise	0%
E	Percent of Usable Area of Park Benefited by Proposed Noise Wall	0%
F	<b>Maximum of D and E</b>	<b>0%</b>
G	Average Number of Visitors per Day	12
H	Number of Park Staff	0
I	<b>Total Number of Occupants per Day = G + H</b>	<b>12</b>
J	Average Hours per Day Used by Each Visitor	3
K	Operational Days per Week	7
L	Operational Weeks per Year	52
M	<b>Person-hours per Year Available for Use = F x I x J x K x L</b>	<b>0</b>
N	<b>EQUIVALENT RESIDENCE VALUE = M/C</b>	<b>0.0</b>
O	A grid of receptor points at 100-foot spacing (represented by 30 points in this example) was developed to represent the impacted or benefited park usage area.	30
P	<b>Equivalent Residence Value Assigned to Each Grid Point = N/O</b>	<b>0.00</b>
Q	Number of Votes Assigned to Park in Barrier Voting Process = N	0
<b>KEY:</b>	<b>Notes:</b> Notes: <a href="https://www.apexnc.org/796/Neighborhood-Parks">https://www.apexnc.org/796/Neighborhood-Parks</a> Hours of operation: 7:00 AM until 8:00 PM (March through October) and 7:00 AM until 6:00 PM (November through February). Open to the general public.	

**NSA 9\_Old Mill Village Community Pool (Activity Category B)**

<b>CASE:</b>	The Old Mill Village Townhome community has a pool area, located north of Ten Ten Road and west of Apex Peakway. It is estimated that the pool has an average hourly use of eight (8) persons. NCDOT assumes that the pool is open 12 hours a day, 7 days a week for 5 months. <b>The pool area is expected to be not impacted by traffic noise associated with the project.</b>	
<b>Line</b>	<b>For an Average Single Family Residential Unit in North Carolina</b>	
A	People per Residence	3
B	Hours Available for Use per Year	8,760
C	<b>Person-hours per Year Available for Use = A x B</b>	<b>26,280</b>
	<b>For the Apartment Pool Area</b>	
D	Average Hourly Occupancy for Pool Area	8
E	Hours Per Day Pool is Available for Use	12
F	Days per Month Pool is Available for Use	30
G	Months per Year Pool is Available for Use	5
H	<b>Person-hours per Year Available for Use = D x E x F x G</b>	<b>14,400</b>
I	<b>Equivalent Receptor Unit Value for Pool Area = H/C</b>	<b>0.5</b>
J	For most pool areas in apartment complexes, using one receptor point in TNM placed closest to the proposed highway project is sufficient. If more than one exterior receptor point was used to model large pool areas, enter the number of receptor points.	1
K	<b>Equivalent Receptor Value Assigned to Each Receiver = I/J</b>	<b>0.5</b>
L	Number of Votes Assigned to Pool Area in Barrier Voting Process = I	1
<b>KEY:</b>	<b>Notes:</b> Tried contacting on 2/7 and 2/8 HOA, no response. Estimates are based on community pool use nearby.	



**NSA 10\_ Audreystone Community Playground (Activity Category B)**

<b>CASE:</b>	The Audreystone Subdivision has an associated playground area, located east of Kildaire Farm Road and south of Franks Creek Drive. Based on the size of the community, it is assumed that the park is used by five (5) persons per hour during the daylight hours, seven days a week, and five months per year.	
<b>Line</b>	<b>For an Average Single Family Residential Unit in North Carolina</b>	
A	People per Residence	3
B	Hours Available for Use per Year	8,760
C	<b>Person-hours per Year Available for Use = A x B</b>	<b>26,280</b>
	<b>For the Apartment Pool Area</b>	
D	Average Hourly Occupancy for Pool Area	5
E	Hours Per Day Pool is Available for Use	12
F	Days per Month Pool is Available for Use	30
G	Months per Year Pool is Available for Use	5
H	<b>Person-hours per Year Available for Use = D x E x F x G</b>	<b>9,000</b>
I	<b>Equivalent Receptor Unit Value for Pool Area = H/C</b>	<b>0.3</b>
J	For most pool areas in apartment complexes, using one receptor point in TNM placed closest to the proposed highway project is sufficient. If more than one exterior receptor point was used to model large pool areas, enter the number of receptor points.	1
K	<b>Equivalent Receptor Value Assigned to Each Receiver = I/J</b>	<b>0.3</b>

**NSA 11\_ Arium Kildaire Community Pool (Activity Category B)**

<b>CASE:</b>	The ARIUM Kildaire apartment complex has an associated pool area, located south of Ten Ten Road and west of Kildaire Farms Road. According to the apartment manager, the pool has an average hourly use of eight (8) persons. Management has stated the pool is open for 10 hours a day, 7 days a week for 5 months out of the year. <b>The pool area is expected to not be impacted by traffic noise associated with the project.</b>	
<b>Line</b>	<b>For an Average Single Family Residential Unit in North Carolina</b>	
A	People per Residence	3
B	Hours Available for Use per Year	8,760
C	<b>Person-hours per Year Available for Use = A x B</b>	<b>26,280</b>
	<b>For the Apartment Pool Area</b>	
D	Average Hourly Occupancy for Pool Area	8
E	Hours Per Day Pool is Available for Use	10
F	Days per Month Pool is Available for Use	30
G	Months per Year Pool is Available for Use	5
H	<b>Person-hours per Year Available for Use = D x E x F x G</b>	<b>12,000</b>
I	<b>Equivalent Receptor Unit Value for Pool Area = H/C</b>	<b>0.5</b>
J	For most pool areas in apartment complexes, using one receptor point in TNM placed closest to the proposed highway project is sufficient. If more than one exterior receptor point was used to model large pool areas, enter the number of receptor points.	1
K	<b>Equivalent Receptor Value Assigned to Each Receiver = I/J</b>	<b>0.5</b>
L	Number of Votes Assigned to Pool Area in Barrier Voting Process = I	0
<b>KEY:</b>	<b>Notes:</b> Called 2/8 spoke to Michelle, like to open pool as soon as it is warm, generally from early May until September. Average hours are 9am until dusk. Crowded on weekends, otherwise daily is small crowds. Pool party to start season.	

**NSA 11\_ Arium Kildaire Community Playground (Activity Category B)**

<b>CASE:</b>	The ARIUM Kildaire apartment complex has an associated playground area for its residents, located south of Ten Ten Road and west of Kildaire Farms Road. According to the apartment manager, the playground has an average hourly use of six (6) persons. Management has stated the pool is open for 10 hours a day, 7 days a week for 5 months out of the year. <b>The playground area is expected to not be impacted by traffic noise associated with the project.</b>	
<b>Line</b>	<b>For an Average Single Family Residential Unit in North Carolina</b>	
A	People per Residence	3
B	Hours Available for Use per Year	8,760
C	<b>Person-hours per Year Available for Use = A x B</b>	<b>26,280</b>
	<b>For the Apartment Pool Area</b>	
D	Average Hourly Occupancy for Pool Area	6
E	Hours Per Day Pool is Available for Use	10
F	Days per Month Pool is Available for Use	30
G	Months per Year Pool is Available for Use	5
H	<b>Person-hours per Year Available for Use = D x E x F x G</b>	<b>9,000</b>
I	<b>Equivalent Receptor Unit Value for Pool Area = H/C</b>	<b>0.3</b>
J	For most pool areas in apartment complexes, using one receptor point in TNM placed closest to the proposed highway project is sufficient. If more than one exterior receptor point was used to model large pool areas, enter the number of receptor points.	1
K	<b>Equivalent Receptor Value Assigned to Each Receiver = I/J</b>	<b>0.3</b>
<b>KEY:</b>	<b>Notes:</b> Contacted Michelle 2/8, small crowd of people, larger on weekends but generally fairly small.	

<b>NSA 13 Knight's Play Golf Center (Activity Category C)</b>		
<b>CASE:</b>	The Knight's Play Golf Center is used by an average of 300 people per day. Each visitor uses the golf course for an average of 3 hours per day. An estimated 20 percent of the park's usable area is predicted to be impacted by noise from the highway project.	
<b>Line</b>	<b>For an Average Single Family Residential Unit in North Carolina</b>	
A	People per Residence	3.0
B	Hours Available for Use per Year	8760
C	<b>Person-hours per Year Available for Use = A x B</b>	<b>26280</b>
	<b>For the Park Area Being Evaluated</b>	
D	Percent of Usable Area of Park Impacted by Project Noise	20%
E	Percent of Usable Area of Park Benefited by Proposed Noise Wall	0%
F	<b>Maximum of D and E</b>	<b>20%</b>
G	Average Number of Visitors per Day	300
H	Number of Park Staff	30
I	<b>Total Number of Occupants per Day = G + H</b>	<b>330</b>
J	Average Hours per Day Used by Each Visitor	3
K	Operational Days per Week	7
L	Operational Weeks per Year	52
M	<b>Person-hours per Year Available for Use = F x I x J x K x L</b>	<b>72,072</b>
N	<b>EQUIVALENT RESIDENCE VALUE = M/C</b>	<b>2.7</b>
O	A grid of receptor points at 100-foot spacing (represented by 30 points in this example) was developed to represent the impacted or benefited park usage area.	30
P	<b>Equivalent Residence Value Assigned to Each Grid Point = N/O</b>	<b>0.09</b>
Q	Number of Votes Assigned to Park in Barrier Voting Process = N	3
<b>KEY:</b>	Input Values	
	Calculated Values in Bold Text	
	<b>Notes:</b> Contacted on 2/7 and 2/8, no response. Estimates are based on field observation. Hours are based on website/Google.	

NSA 13 Lufkin Middle School Interior (Activity Category D)		
<b>CASE:</b>	A multi-story school has a current enrollment of 1022 students and staff. NCDOT assumes that the number of students shall be assessed as the greater of the school's capacity or its existing enrollment. NCDOPT also assumes that schools are used for 12 hours per day. This school is a year-round facility, therefore the contact days are higher (roughly 220), versus a traditional facility. It is predicted that 0 percent of the school building's use areas will be impacted by noise from the project.	
<b>Line</b>	<b>For an Average Single Family Residential Unit in North Carolina</b>	
A	People per Residence	3.0
B	Hours Available for Use per Year	8760
C	<b>Person-hours per Year Available for Use = A x B</b>	<b>26280</b>
	<b>For the School Being Evaluated</b>	
D	Capacity of School (maximum occupancy, including students and staff)	1525
E	Current Enrollment at School (students and staff)	1022
F	<b>Total Number of Occupants per Day = Maximum of D and E</b>	<b>1525</b>
G	Daily Hours Used	12
H	Instructional Days per Week	5
I	Instructional Weeks per Year	44
J	<b>Instuctional Days per Year = H X I</b>	<b>220</b>
K	<b>Person-hours per Year Available for Use = F x G x J</b>	<b>4,026,000</b>
L	Percent of Building Use Areas Impacted by Project	0%
M	Percent of Building Use Areas Benefited by Project Abatement	0%
N	<b>Percentage of Building Use Value = Maximum of L and M</b>	<b>0%</b>
O	<b>EQUIVALENT RECEPTOR VALUE = (K/C) x N</b>	<b>0.0</b>
P	*If more than one exterior receptor point was used to model the school building, enter the number of receptor points (3 points assumed here).	3
Q	<b>Equivalent Receptor Value Assigned to Each Receptor = O/P</b>	<b>0.00</b>
R	Number of Votes Assigned to School Building in Barrier Voting Process = O	0
	*A receptor point is located at the building façade closest to the highway. This exterior noise level is then reduced by the appropriate building reduction factor to determine if there is an interior noise impact. Where there is an interior noise impact, a noise wall will be considered. If no interior areas of frequent human use are present in the building, further noise analysis is not required.	
<b>NOTE:</b>	Values obtained by contacting Lufkin Road Middle School. Enrollment is 1022, with school operation hours from 8:15am until 3:00pm. <a href="https://www.wcpss.net/cms/lib/NC01911451/Centricity/Domain/19/19-20%20YR.pdf">https://www.wcpss.net/cms/lib/NC01911451/Centricity/Domain/19/19-20%20YR.pdf</a> Operation for 44 weeks out of the year	

## **Appendix D**

### **Traffic Noise Models**

## **General**

This appendix documents the TNM Inputs used in this Traffic Noise Report (TNR). This model was divided into fifteen NSAs. This model utilized the following TNM object types to approximate the traffic segments assessed for the proposed Ten Ten Road widening project:

- Roadways
- Receivers/Receptors
- Barriers
- Ground Zones
- Terrain Lines

## **Coordinate System**

Each of the objects in the TNM model was plotted using the North American Datum 1983 (NAD83) horizontal coordinate system, and the North American Vertical Datum 1988 (NAVD88).

## **Modeling Procedure**

Roadways:

- The widths of all TNM roadway elements were based upon the MicroStation design files
- Each roadway element represents one or two lanes of traffic
- Each roadway element representing the mainline and significant Y-lines has vertices at approximately every 100ft
- Current Year 2016 peak hour traffic volumes were added to the roadway elements in TNM to determine current noise conditions
- Design Year 2040 peak hour traffic volumes were added to the roadway elements in TNM to determine potential noise impacts
- Traffic was modeled at the design speed of the project (50 mph)

Receivers/Receptors:

- Each noise sensitive area within the project area was assigned a receiver element in TNM
- Receiver elements were placed at the corner of the noise sensitive structure nearest to the noise source
- Ground-level or first-story receivers were assigned a height of 4.92ft above ground elevation
- Second-story receivers were assigned a height of 14.92ft above ground elevation
- Third-story receivers were assigned a height of 24.92ft above ground elevation
- Each receiver was analyzed for the year 2016 existing, year 2040 no-build, and year 2040 build traffic conditions

Barriers:

- All structures in the project area were modeled with TNM barrier elements
- Barriers were given various heights depending on the estimated height of the structure



#### Ground Zones:

- Ground zone elements were used to define intervening ground by type and acoustical characteristics wherever ground differed from the default ground type (grass)
- In the project area specifically, ground zones were used to define wide medians between roadway elements as well as shopping center parking lots

#### Terrain Lines

- Terrain line elements were added to define significant changes in grade and/or slope throughout the project area
- Coordinates for existing condition terrain lines were based on elevation data from the Triangulated Irregular Network (TIN) associated with the project
- Coordinates for build condition terrain lines were based on the MicroStation design files for the project

### **TNM Traffic Noise Level Assessment**

The TNM traffic noise assessment was divided into five tasks:

1. Creation of a baseline model of the project
2. Validating field measurements in this model
3. Creation of an existing condition model and assessment of peak-hour noise levels
4. Creation of a no-build condition model and assessment of peak-hour noise levels
5. Creation of a build condition model and assessment of peak-hour noise levels



Figure D.1: U-5825 – Existing (2016) Model



Figure D.2: U-5825 – Existing (2016) Model –Close Up



Figure D.3: U-5825 – No Build (2040) Model



Figure D.4: U-5825 – No Build (2040) Model – Close Up



Figure D.5: U-5825 – Build (2040) Model



Figure D.6: U-5825 – Build (2040) Model – Close Up

## **Appendix E**

### **Noise Barrier Analysis**

E-1 NOISE WALL NW3

Receptors					Noise Wall 3, Leq(h) (dB(A))			
Receptor Number	Address	NAC	Use	DUs	Build	With Barrier	Reduction	
3-12	504 CANON GATE DR	B	Single-Family Residential	1	59	58	1	
3-13	502 CANON GATE DR	B	Single-Family Residential	1	61	60	1	
3-14	500 CANON GATE DR	B	Single-Family Residential	1	62	60	2	
3-15	404 CANON GATE DR	B	Single-Family Residential	1	63	62	1	
3-16	402 CANON GATE DR	B	Single-Family Residential	1	63	60	3	
3-17	101 SILK LEAF CT	B	Single-Family Residential	1	60	58	2	
3-18	103 SILK LEAF CT	B	Single-Family Residential	1	68	61	7	
3-19	105 SILK LEAF CT	B	Single-Family Residential	1	69	61	8	
3-20	102 SILK LEAF CT	B	Single-Family Residential	1	66	59	7	
3-21	310 CANON GATE DR	B	Single-Family Residential	1	65	55	10	
3-22	308 CANON GATE DR	B	Single-Family Residential	1	60	54	6	
3-23	306 CANON GATE DR	B	Single-Family Residential	1	55	53	2	
3-24	304 CANON GATE DR	B	Single-Family Residential	1	53	52	1	
3-25	302 CANON GATE DR	B	Single-Family Residential	1	52	51	1	
					<b>Reduction Totals:</b>			5
								4
<b>Notes:</b> Right-of-Way Acquisitions = <span style="background-color: #8B4513; color: white; padding: 2px;">R/W</span> ≥ 5 dB(A) Reduction = <span style="background-color: #00BFFF; width: 20px; height: 10px; display: inline-block;"></span> Impacts = <span style="background-color: #FF0000; color: white; padding: 2px;">Impact</span> ≥ 7 dB(A) Reduction = <span style="background-color: #008000; width: 20px; height: 10px; display: inline-block;"></span>								

E-2 NOISE WALL NW4-5B (page 1 of 2)

Receptors					Noise Wall 4-5, Leq(h) (dB(A))		
Receptor Number	Address	NAC	Use	DUs	Build	With Barrier	Reduction
4-48	101 ARBORDALE CT	B	Single-Family Residential	1	71	66	5
4-49	103 HASSELLWOOD DR	B	Single-Family Residential	1	68	58	10
4-50	105 HASSELLWOOD DR	B	Single-Family Residential	1	66	57	9
4-51	107 HASSELLWOOD DR	B	Single-Family Residential	1	64	56	8
4-52	109 HASSELLWOOD DR	B	Single-Family Residential	1	63	55	8
4-53	111 HASSELLWOOD DR	B	Single-Family Residential	1	63	53	10
4-54	113 HASSELLWOOD DR	B	Single-Family Residential	1	62	52	10
4-55	115 HASSELLWOOD DR	B	Single-Family Residential	1	60	52	8
4-56	117 HASSELLWOOD DR	B	Single-Family Residential	1	58	50	8
4-57	119 HASSELLWOOD DR	B	Single-Family Residential	1	56	49	7
4-58	109 ARBORDALE CT	B	Single-Family Residential	1	56	56	0
4-59	107 ARBORDALE CT	B	Single-Family Residential	1	56	56	0
4-60	105 ARBORDALE CT	B	Single-Family Residential	1	59	58	1
4-61	102 HASSELLWOOD DR	B	Single-Family Residential	1	58	56	2
4-62	104 HASSELLWOOD DR	B	Single-Family Residential	1	57	53	4
4-63	106 HASSELLWOOD DR	B	Single-Family Residential	1	56	52	4
4-64	110 HASSELLWOOD DR	B	Single-Family Residential	1	54	50	4
4-65	112 HASSELLWOOD DR	B	Single-Family Residential	1	51	48	3
4-66	116 HASSELLWOOD DR	B	Single-Family Residential	1	50	47	3
5-01	200 SOLANDRA LN A1a 1st Floor	B	Multi-Family Residential	1	55	47	8
5-02	201 SOLANDRA LN A1b 2nd Floor	B	Multi-Family Residential	1	57	50	7
5-03	200 SOLANDRA LN A2a 1st Floor	B	Multi-Family Residential	1	60*	50	10
5-04	201 SOLANDRA LN A2b 2nd Floor	B	Multi-Family Residential	1	62*	52	10
5-05	200 SOLANDRA LN A3a 1st Floor	B	Multi-Family Residential	1	61	52	9
5-06	201 SOLANDRA LN A3b 2nd Floor	B	Multi-Family Residential	1	63	53	10
5-07	200 SOLANDRA LN A4a 1st Floor	B	Multi-Family Residential	1	62	52	10
5-08	201 SOLANDRA LN A4b 2nd Floor	B	Multi-Family Residential	1	63	54	9
5-09	200 SOLANDRA LN A5a 1st Floor	B	Multi-Family Residential	1	63	53	10
5-10	201 SOLANDRA LN A5b 2nd Floor	B	Multi-Family Residential	1	64	54	10
5-11	200 SOLANDRA LN A6a 1st Floor	B	Multi-Family Residential	1	63	53	10
5-12	201 SOLANDRA LN A6b 2nd Floor	B	Multi-Family Residential	1	65	55	10
5-13	200 SOLANDRA LN A7a 1st Floor	B	Multi-Family Residential	1	62*	52	10
5-14	201 SOLANDRA LN A7b 2nd Floor	B	Multi-Family Residential	1	63	54	9
5-15	200 SOLANDRA LN A8a 1st Floor	B	Multi-Family Residential	1	60	52	8
5-16	201 SOLANDRA LN A8b 2nd Floor	B	Multi-Family Residential	1	62	54	8
5-17	200 SOLANDRA LN B1a 1st Floor	B	Multi-Family Residential	1	60*	51	9
5-18	200 SOLANDRA LN B1b 2nd Floor	B	Multi-Family Residential	1	62	53	9
5-19	200 SOLANDRA LN B2a 1st Floor	B	Multi-Family Residential	1	65	54	11
5-20	200 SOLANDRA LN B2b 2nd Floor	B	Multi-Family Residential	1	67	56	11
5-21	200 SOLANDRA LN B3a 1st Floor	B	Multi-Family Residential	1	66	55	11
5-22	200 SOLANDRA LN B3b 2nd Floor	B	Multi-Family Residential	1	68	56	12
5-23	200 SOLANDRA LN B4a 1st Floor	B	Multi-Family Residential	1	68	56	12
5-24	200 SOLANDRA LN B4b 2nd Floor	B	Multi-Family Residential	1	70	58	12
5-25	200 SOLANDRA LN B5a 1st Floor	B	Multi-Family Residential	1	68	55	13
5-26	200 SOLANDRA LN B5b 2nd Floor	B	Multi-Family Residential	1	69	57	12
5-27	200 SOLANDRA LN C1a 1st Floor	B	Multi-Family Residential	1	68	55	13
5-28	200 SOLANDRA LN C1b 2nd Floor	B	Multi-Family Residential	1	70	58	12
5-29	200 SOLANDRA LN C2a 1st Floor	B	Multi-Family Residential	1	72	57	15
5-30	200 SOLANDRA LN C2b 2nd Floor	B	Multi-Family Residential	1	73	63	10
5-31	200 SOLANDRA LN C3a 1st Floor	B	Multi-Family Residential	1	73	57	16
5-32	200 SOLANDRA LN C3b 2nd Floor	B	Multi-Family Residential	1	74	67	7
5-33	200 SOLANDRA LN C4a 1st Floor	B	Multi-Family Residential	1	72	58	14
5-34	200 SOLANDRA LN C4b 2nd Floor	B	Multi-Family Residential	1	73	66	7
5-35	200 SOLANDRA LN C5a 1st Floor	B	Multi-Family Residential	1	71	59	12
5-36	200 SOLANDRA LN C5b 2nd Floor	B	Multi-Family Residential	1	72	65	7
5-37	200 SOLANDRA LN C6a 1st Floor	B	Multi-Family Residential	1	71	60	11
5-38	200 SOLANDRA LN C6b 2nd Floor	B	Multi-Family Residential	1	72	64	8
5-39	200 SOLANDRA LN C7a 1st Floor	B	Multi-Family Residential	1	68	62	6
5-40	200 SOLANDRA LN C7b 2nd Floor	B	Multi-Family Residential	1	70	64	6
5-41	200 SOLANDRA LN C8a 1st Floor	B	Multi-Family Residential	1	64	61	3
5-42	200 SOLANDRA LN C8b 2nd Floor	B	Multi-Family Residential	1	66	63	3

E-2 NOISE WALL NW4-5B (page 1 of 2)

Receptors					Noise Wall 4-5, Leq(h) (dB(A))		
Receptor Number	Address	NAC	Use	DUs	Build	With Barrier	Reduction
Reduction Totals:					≥ 5 dB(A)		50
					≥ 7 dB(A)		47
<p><b>Notes:</b></p> <p style="padding-left: 40px;">Right-of-Way Acquisitions = <span style="background-color: #800000; color: white; padding: 2px;">R/W</span>      ≥ 5 dB(A) Reduction = <span style="background-color: #00b0f0; width: 20px; height: 10px; display: inline-block;"></span></p> <p style="padding-left: 40px;">Impacts = <span style="background-color: #ff0000; color: white; padding: 2px;">Impact</span>      ≥ 7 dB(A) Reduction = <span style="background-color: #008000; width: 20px; height: 10px; display: inline-block;"></span></p> <p>* Indicated receptor impacted due to "Significant Impact" classificatior</p>							

E-3 NOISE WALL NW4-5C

Receptors					Build	Noise Wall 4-5, Leq(h) (dB(A))		
Receptor Number	Address	NAC	Use	DUs		With Barrier	Reduction	
5-78	200 SOLANDRA LN G1b 2nd Floor	B	Multi-Family Residential	1	65	55	10	
5-79	200 SOLANDRA LN G2a 1st Floor	B	Multi-Family Residential	1	66	62	4	
5-80	200 SOLANDRA LN G2b 2nd Floor	B	Multi-Family Residential	1	65	59	6	
5-81	200 SOLANDRA LN G3a 1st Floor	B	Multi-Family Residential	1	65	63	2	
5-82	200 SOLANDRA LN G3b 2nd Floor	B	Multi-Family Residential	1	65	58	7	
5-83	200 SOLANDRA LN G4a 1st Floor	B	Multi-Family Residential	1	65	61	4	
5-86	200 SOLANDRA LN H1b 2nd Floor	B	Multi-Family Residential	1	66	58	8	
5-87	200 SOLANDRA LN H2a 1st Floor	B	Multi-Family Residential	1	72	63	9	
5-88	200 SOLANDRA LN H2b 2nd Floor	B	Multi-Family Residential	1	65	58	7	
5-89	200 SOLANDRA LN H3a 1st Floor	B	Multi-Family Residential	1	72	62	10	
5-90	200 SOLANDRA LN H3b 2nd Floor	B	Multi-Family Residential	1	64	58	6	
5-91	200 SOLANDRA LN H4a 1st Floor	B	Multi-Family Residential	1	73	62	11	
5-92	200 SOLANDRA LN H4b 2nd Floor	B	Multi-Family Residential	1	63	58	5	
5-93	200 SOLANDRA LN H5a 1st Floor	B	Multi-Family Residential	1	70	63	7	
5-94	200 SOLANDRA LN H5b 2nd Floor	B	Multi-Family Residential	1	62	58	4	
5-95	200 SOLANDRA LN H6a 1st Floor	B	Multi-Family Residential	1	68	63	5	
5-96	200 SOLANDRA LN H6b 2nd Floor	B	Multi-Family Residential	1	61	58	3	
5-97	200 SOLANDRA LN H7a 1st Floor	B	Multi-Family Residential	1	67	63	4	
5-98	200 SOLANDRA LN H7b 2nd Floor	B	Multi-Family Residential	1	59	57	2	
5-99	200 SOLANDRA LN I1a 1st Floor	B	Multi-Family Residential	1	65	63	2	
					<b>Reduction Totals:</b>	≥ 5 dB(A)		<b>12</b>
						≥ 7 dB(A)		<b>8</b>
<b>Notes:</b>								
Right-of-Way Acquisitions = <b>R/W</b> ≥ 5 dB(A) Reduction = <span style="background-color: #00b0f0; display: inline-block; width: 20px; height: 10px;"></span>								
Impacts = <b>Impact</b> ≥ 7 dB(A) Reduction = <span style="background-color: #008000; display: inline-block; width: 20px; height: 10px;"></span>								



E-4 NOISE WALL NW6

Receptors					Build	Noise Wall 6, Leq(h) (dB(A))	
Receptor Number	Address	NAC	Use	DUs		With Barrier	Reduction
6-01	1915 MISTY WATER CT	B	Single-Family Residential	1	67	65	2
6-02	1913 MISTY WATER CT	B	Single-Family Residential	1	68	62	6
6-03	1911 MISTY WATER CT	B	Single-Family Residential	1	66	59	7
6-04	1909 MISTY WATER CT	B	Single-Family Residential	1	65	58	7
6-05	1907 MISTY WATER CT	B	Single-Family Residential	1	64	57	7
6-06	1905 MISTY WATER CT	B	Single-Family Residential	1	65	56	9
6-07	1903 MISTY WATER CT	B	Single-Family Residential	1	61	52	9
6-08	1810 MISTY HOLLOW LN	B	Single-Family Residential	1	58	51	7
6-09	1814 MISTY HOLLOW LN	B	Single-Family Residential	1	56	51	5
6-10	1816 MISTY HOLLOW LN	B	Single-Family Residential	1	65	54	11
6-11	1818 MISTY HOLLOW LN	B	Single-Family Residential	1	66	57	9
6-12	1915 MISTY WATER CT	B	Single-Family Residential	1	60	59	1
6-13	1916 MISTY WATER CT	B	Single-Family Residential	1	54	52	2
6-14	1914 MISTY WATER CT	B	Single-Family Residential	1	58	56	2
6-15	1910 MISTY WATER CT	B	Single-Family Residential	1	57	55	2
6-16	1906 MISTY WATER CT	B	Single-Family Residential	1	58	54	4
6-17	1902 MISTY WATER CT	B	Single-Family Residential	1	53	47	6
6-18	1900 MISTY WATER CT	B	Single-Family Residential	1	50	46	4
6-19	1804 MISTY HOLLOW LN	B	Single-Family Residential	1	50	45	5
6-20	1802 MISTY HOLLOW LN	B	Single-Family Residential	1	50	45	5
6-21	1800 MISTY HOLLOW LN	B	Single-Family Residential	1	50	49	1
6-22	1819 MISTY HOLLOW LN	B	Single-Family Residential	1	69	66	3
6-23	1817 MISTY HOLLOW LN	B	Single-Family Residential	1	65	64	1
6-24	1815 MISTY HOLLOW LN	B	Single-Family Residential	1	62	61	1
6-25	1813 MISTY HOLLOW LN	B	Single-Family Residential	1	60	60	0
6-26	1811 MISTY HOLLOW LN	B	Single-Family Residential	1	56	56	0
				<b>Reduction Totals:</b>		≥ 5 dB(A)	<b>13</b>
						≥ 7 dB(A)	<b>8</b>
<b>Notes:</b>							
Right-of-Way Acquisitions = <b>R/W</b> ≥ 5 dB(A) Reduction = <b>5</b>							
Impacts = <b>Impact</b> ≥ 7 dB(A) Reduction = <b>7</b>							

E-5 NOISE WALL NW7

Receptors					Noise Wall 7, Leq(h) (dB(A))			
Receptor Number	Address	NAC	Use	DUs	Build	With Barrier	Reduction	
7-20	720 HILLSFORD LN	B	Single-Family Residential	1	49	49	0	
7-21	722 HILLSFORD LN	B	Single-Family Residential	1	49	48	1	
7-22	724 HILLSFORD LN	B	Single-Family Residential	1	49	48	1	
7-23	726 HILLSFORD LN	B	Single-Family Residential	1	51	49	2	
7-24	728 HILLSFORD LN	B	Single-Family Residential	1	56	53	3	
7-25	730 HILLSFORD LN	B	Single-Family Residential	1	55	51	4	
7-26	732 HILLSFORD LN	B	Single-Family Residential	1	58	58	0	
7-27	734 HILLSFORD LN	B	Single-Family Residential	1	67	65	2	
7-28	735 HILLSFORD LN	B	Single-Family Residential	1	68	61	7	
7-29	733 HILLSFORD LN	B	Single-Family Residential	1	65	59	6	
7-30	731 HILLSFORD LN	B	Single-Family Residential	1	60	57	3	
7-31	729 HILLSFORD LN	B	Single-Family Residential	1	61	56	5	
7-32	727 HILLSFORD LN	B	Single-Family Residential	1	58	55	3	
7-33	725 HILLSFORD LN	B	Single-Family Residential	1	54	52	2	
7-34	723 HILLSFORD LN	B	Single-Family Residential	1	52	51	1	
7-35	721 HILLSFORD LN	B	Single-Family Residential	1	51	50	1	
					<b>Reduction Totals:</b>			<b>3</b>
							≥ 5 dB(A)	
							≥ 7 dB(A)	<b>1</b>
<b>Notes:</b>								
Right-of-Way Acquisitions = <span style="background-color: #FFD700; padding: 2px;">R/W</span> ≥ 5 dB(A) Reduction = <span style="background-color: #00BFFF; display: inline-block; width: 20px; height: 10px;"></span>								
Impacts = <span style="background-color: #FF4500; padding: 2px;">Impact</span> ≥ 7 dB(A) Reduction = <span style="background-color: #008000; display: inline-block; width: 20px; height: 10px;"></span>								

E-6 NOISE WALL NW8

Receptors					Noise Wall 8, Leq(h) (dB(A))		
Receptor Number	Address	NAC	Use	DUs	Build	With Barrier	Reduction
8-17	850 MYRTLE GROVE LN	B	Multi-Family Residential	1	66	63	3
8-18	848 MYRTLE GROVE LN	B	Multi-Family Residential	1	66	62	4
8-19	846 MYRTLE GROVE LN	B	Multi-Family Residential	1	67	60	7
8-20	844 MYRTLE GROVE LN	B	Multi-Family Residential	1	67	59	8
8-21	842 MYRTLE GROVE LN	B	Multi-Family Residential	1	67	58	9
8-22	838 MYRTLE GROVE LN	B	Multi-Family Residential	1	67	58	9
8-23	836 MYRTLE GROVE LN	B	Multi-Family Residential	1	67	58	9
8-24	834 MYRTLE GROVE LN	B	Multi-Family Residential	1	67	58	9
8-25	832 MYRTLE GROVE LN	B	Multi-Family Residential	1	67	59	8
8-26	828 MYRTLE GROVE LN	B	Multi-Family Residential	1	67	59	8
8-27	826 MYRTLE GROVE LN	B	Multi-Family Residential	1	67	60	7
8-28	824 MYRTLE GROVE LN	B	Multi-Family Residential	1	67	60	7
8-29	822 MYRTLE GROVE LN	B	Multi-Family Residential	1	67	61	6
8-30	848 MYRTLE GROVE LN	B	Multi-Family Residential	1	66	62	4
<b>Reduction Totals:</b>					≥ 5 dB(A)		11
					≥ 7 dB(A)		10
<b>Notes:</b>							
Right-of-Way Acquisitions = <span style="background-color: #8B4513; color: white; padding: 2px;">R/W</span> ≥ 5 dB(A) Reduction = <span style="background-color: #00BFFF; width: 20px; height: 10px; display: inline-block;"></span>							
Impacts = <span style="background-color: #FF4500; color: white; padding: 2px;">Impact</span> ≥ 7 dB(A) Reduction = <span style="background-color: #008000; width: 20px; height: 10px; display: inline-block;"></span>							

E-7 NOISE WALL NW11A



Receptors						Noise Wall 11, Leq(h) (dB(A))		
Receptor Number	Address	NAC	Use	DUs	Build	With Barrier	Reduction	
11-01	400A1 AFTON MEADOW LN First Floor	B	Multi-Family Residential	1	65	54	11	
11-02	400A2 AFTON MEADOW LN Second Floor	B	Multi-Family Residential	1	67	56	11	
11-03	400A3 AFTON MEADOW LN Third Floor	B	Multi-Family Residential	1	68	61	7	
11-04	400B1 AFTON MEADOW LN First Floor	B	Multi-Family Residential	1	59	52	7	
11-05	400B2 AFTON MEADOW LN Second Floor	B	Multi-Family Residential	1	61	54	7	
11-06	400B3 AFTON MEADOW LN Third Floor	B	Multi-Family Residential	1	62	57	5	
11-07	400C1 AFTON MEADOW LN First Floor	B	Multi-Family Residential	1	56	51	5	
11-08	400C2 AFTON MEADOW LN Second Floor	B	Multi-Family Residential	1	58	54	4	
11-09	400C3 AFTON MEADOW LN Third Floor	B	Multi-Family Residential	1	60	57	3	
11-10	400D1 AFTON MEADOW LN First Floor	B	Multi-Family Residential	1	57	57	0	
11-11	400D2 AFTON MEADOW LN Second Floor	B	Multi-Family Residential	1	60	60	0	
11-12	400D3 AFTON MEADOW LN Third Floor	B	Multi-Family Residential	1	62	62	0	
11-13	400E1 AFTON MEADOW LN First Floor	B	Multi-Family Residential	1	67	59	8	
11-14	400E2 AFTON MEADOW LN Second Floor	B	Multi-Family Residential	1	69	61	8	
11-15	400E3 AFTON MEADOW LN Third Floor	B	Multi-Family Residential	1	70	65	5	
11-16	400F1 AFTON MEADOW LN First Floor	B	Multi-Family Residential	1	66	59	7	
11-17	400F2 AFTON MEADOW LN Second Floor	B	Multi-Family Residential	1	68	62	6	
11-18	400F3 AFTON MEADOW LN Third Floor	B	Multi-Family Residential	1	69	65	4	
11-19	400G1 AFTON MEADOW LN First Floor	B	Multi-Family Residential	1	65	60	5	
11-20	400G2 AFTON MEADOW LN Second Floor	B	Multi-Family Residential	1	67	63	4	
11-21	400G3 AFTON MEADOW LN Third Floor	B	Multi-Family Residential	1	68	65	3	
11-22	400H1 AFTON MEADOW LN First Floor	B	Multi-Family Residential	1	64	61	3	
11-23	400H2 AFTON MEADOW LN Second Floor	B	Multi-Family Residential	1	66	63	3	
11-24	400H3 AFTON MEADOW LN Third Floor	B	Multi-Family Residential	1	67	65	2	
11-25	200A1 AFTON MEADOW LN First Floor	B	Multi-Family Residential	1	65	61	4	
11-26	200A2 AFTON MEADOW LN Second Floor	B	Multi-Family Residential	1	71	67	4	
11-27	200A3 AFTON MEADOW LN Third Floor	B	Multi-Family Residential	1	72	69	3	
11-28	200B1 AFTON MEADOW LN First Floor	B	Multi-Family Residential	1	72	56	16	
11-29	200B2 AFTON MEADOW LN Second Floor	B	Multi-Family Residential	1	72	63	9	
11-30	200B3 AFTON MEADOW LN Third Floor	B	Multi-Family Residential	1	72	68	4	
11-31	200C1 AFTON MEADOW LN First Floor	B	Multi-Family Residential	1	72	56	16	
11-32	200C2 AFTON MEADOW LN Second Floor	B	Multi-Family Residential	1	72	60	12	
11-33	200C3 AFTON MEADOW LN Third Floor	B	Multi-Family Residential	1	72	66	6	
11-34	200D1 AFTON MEADOW LN First Floor	B	Multi-Family Residential	1	71	56	15	
11-35	200D2 AFTON MEADOW LN Second Floor	B	Multi-Family Residential	1	72	59	13	
11-36	200D3 AFTON MEADOW LN Third Floor	B	Multi-Family Residential	1	72	65	7	
11-37	200E1 AFTON MEADOW LN First Floor	B	Multi-Family Residential	1	61	60	1	
11-38	200E2 AFTON MEADOW LN Second Floor	B	Multi-Family Residential	1	65	63	2	
11-39	200E3 AFTON MEADOW LN Third Floor	B	Multi-Family Residential	1	65	64	1	
11-40	200F1 AFTON MEADOW LN First Floor	B	Multi-Family Residential	1	54	51	3	
11-41	200F2 AFTON MEADOW LN Second Floor	B	Multi-Family Residential	1	58	54	4	
11-42	200F3 AFTON MEADOW LN Third Floor	B	Multi-Family Residential	1	59	56	3	
11-43	200G1 AFTON MEADOW LN First Floor	B	Multi-Family Residential	1	57	50	7	
11-44	200G2 AFTON MEADOW LN Second Floor	B	Multi-Family Residential	1	60	52	8	
11-45	200G3 AFTON MEADOW LN Third Floor	B	Multi-Family Residential	1	61	55	6	
11-46	200H1 AFTON MEADOW LN First Floor	B	Multi-Family Residential	1	65	53	12	
11-47	200H2 AFTON MEADOW LN Second Floor	B	Multi-Family Residential	1	67	54	13	
11-48	200H3 AFTON MEADOW LN Third Floor	B	Multi-Family Residential	1	68	59	9	
Reduction Totals:					≥ 5 dB(A)		27	
					≥ 7 dB(A)		20	

Notes:

Right-of-Way Acquisitions = R/W      ≥ 5 dB(A) Reduction =

Impacts = Impact      ≥ 7 dB(A) Reduction =

E-8 NOISE WALL 11B

Receptors						Noise Wall 11, Leq(h) (dB(A))		
Receptor Number	Address	NAC	Use	DUs	Build	With Barrier	Reduction	
11-49	2290A1 REXFORD LN First Floor	B	Multi-Family Residential	1	65	62	3	
11-50	290A2 REXFORD LN Second Floor	B	Multi-Family Residential	1	68	64	4	
11-51	2290A3 REXFORD LN Third Floor	B	Multi-Family Residential	1	69	65	4	
11-52	2290B1 REXFORD LN First Floor	B	Multi-Family Residential	1	65	60	5	
11-53	290B2 REXFORD LN Second Floor	B	Multi-Family Residential	1	68	63	5	
11-54	2290B3 REXFORD LN Third Floor	B	Multi-Family Residential	1	69	64	5	
11-55	2290C1 REXFORD LN First Floor	B	Multi-Family Residential	1	48	46	2	
11-56	290C2 REXFORD LN Second Floor	B	Multi-Family Residential	1	53	52	1	
11-57	2290C3 REXFORD LN Third Floor	B	Multi-Family Residential	1	64	62	2	
11-58	2290D1 REXFORD LN First Floor	B	Multi-Family Residential	1	51	46	5	
11-59	290D2 REXFORD LN Second Floor	B	Multi-Family Residential	1	55	50	5	
11-60	2290D3 REXFORD LN Third Floor	B	Multi-Family Residential	1	63	60	3	
11-90	500J3 GRIST VALLEY LN Third Floor	B	Multi-Family Residential	1	54	53	1	
11-91	2400A1 REXFORD LN First Floor	B	Multi-Family Residential	1	64	59	5	
11-92	2400A2 REXFORD LN Second Floor	B	Multi-Family Residential	1	69	62	7	
11-93	2400A3 REXFORD LN Third Floor	B	Multi-Family Residential	1	69	63	6	
11-94	2400B1 REXFORD LN First Floor	B	Multi-Family Residential	1	65	59	6	
11-95	2400B2 REXFORD LN Second Floor	B	Multi-Family Residential	1	69	61	8	
11-96	2400B3 REXFORD LN Third Floor	B	Multi-Family Residential	1	69	63	6	
11-97	2400C1 REXFORD LN First Floor	B	Multi-Family Residential	1	58	56	2	
11-98	2400C2 REXFORD LN Second Floor	B	Multi-Family Residential	1	62	59	3	
11-99	2400C3 REXFORD LN Third Floor	B	Multi-Family Residential	1	65	62	3	
11-100	2400D1 REXFORD LN First Floor	B	Multi-Family Residential	1	58	54	4	
11-101	2400D2 REXFORD LN Second Floor	B	Multi-Family Residential	1	62	56	6	
11-102	2400D3 REXFORD LN Third Floor	B	Multi-Family Residential	1	64	60	4	
					<b>Reduction Totals:</b>	≥ 5 dB(A)	<b>12</b>	
						≥ 7 dB(A)	<b>2</b>	
<b>Notes:</b>								
Right-of-Way Acquisitions = <b>R/W</b> ≥ 5 dB(A) Reduction = 								
Impacts = <b>Impact</b> ≥ 5 dB(A) Reduction = 								

E-9 NOISE WALL NW12A

Receptors					Noise Wall 12, Leq(h) (dB(A))			
Receptor Number	Address	NAC	Use	DUs	Build	With Barrier	Reduction	
12-25	7824 LITTLEMAN LN	B	Single-Family Residential	1	52	51	1	
12-26	7820 LITTLEMAN LN	B	Single-Family Residential	1	54	52	2	
12-27	7816 LITTLEMAN LN	B	Single-Family Residential	1	61	58	3	
12-28	7808 LITTLEMAN LN	B	Single-Family Residential	1	70	62	8	
12-29	2601 SWEETGUM DR	B	Single-Family Residential	1	55	50	5	
12-30	2521A SWEETGUM DR	B	Single-Family Residential	1	59	52	7	
12-31	2521B SWEETGUM DR	B	Single-Family Residential	1	61	53	8	
12-32	2509 SWEETGUM DR	B	Single-Family Residential	1	66	57	9	
12-33	4801 JESSIE DR	B	Single-Family Residential	1	70	64	6	
12-34	2500 SWEETGUM DR	B	Single-Family Residential	1	58	55	3	
12-35	2512 SWEETGUM DR	B	Single-Family Residential	1	53	50	3	
12-36	2528 SWEETGUM DR	B	Single-Family Residential	1	55	50	5	
					<b>Reduction Totals:</b>			<b>7</b>
							<b>≥ 5 dB(A)</b>	<b>4</b>
<b>Notes:</b> Right-of-Way Acquisitions = <b>R/W</b> ≥ 5 dB(A) Reduction = <span style="background-color: #00b0f0; color: white; padding: 2px;"> </span> Impacts = <b>Impact</b> ≥ 7 dB(A) Reduction = <span style="background-color: #008000; color: white; padding: 2px;"> </span>								

**E.8 NOISE WALL 12B**

Receptors					Noise Wall 12, Leq(h) (dB(A))		
Receptor Number	Address	NAC	Use	DUs	Build	With Barrier	Reduction
12-07	2916 TEN TEN RD	B	Single-Family Residential	1	70	64	6
12-08	7812 SMITH RD	B	Single-Family Residential	1	68	68	0
12-18	7809 LITTLEMAN LN	B	Single-Family Residential	1	66	61	5
12-19	7813 LITTLEMAN LN	B	Single-Family Residential	1	61	54	7
12-20	7817 LITTLEMAN LN	B	Single-Family Residential	1	58	53	5
12-21	7821 LITTLEMAN LN	B	Single-Family Residential	1	57	54	3
12-22	7829 LITTLEMAN LN	B	Single-Family Residential	1	53	52	1
					<b>Reduction Totals:</b>		
					≥ 5 dB(A)		
				≥ 7 dB(A)			1
<b>Notes:</b>							
Right-of-Way Acquisitions = <b>R/W</b> ≥ 5 dB(A) Reduction = <span style="background-color: #00bfff; border: 1px solid black; display: inline-block; width: 20px; height: 10px;"></span>							
Impacts = <b>Impact</b> ≥ 7 dB(A) Reduction = <span style="background-color: #008000; border: 1px solid black; display: inline-block; width: 20px; height: 10px;"></span>							

**NCDOT NOISE WALL  
FEASIBILITY & REASONABLENESS WORKSHEET**

**PROJECT** - Ten Ten Road Widening **TIP#** - U-5825

**NOISE WALL #** - NW3 **COUNTY(IES)** - Wake NC

**# IMPACTS** - 3 **# BENEFITS** - 5 **NAC:**  A  B  C  D  E

**A. FEASIBILITY:**

- |    |  |            |
|----|--|------------|
| 1. | Can a 5-dB(A) reduction in traffic noise levels be achieved for at least two impacted receptors?                 | <u>YES</u> |
| 2. | Does topography negatively affect the proposed noise wall?   | <u>NO</u>  |
| 3. | Does the proposed noise wall negatively affect property access, drainage, utilities or maintenance requirements? | <u>NO</u>  |
| 4. | Is there control of access in the vicinity of the proposed noise wall?   | <u>NO</u>  |

**B. REASONABLENESS**

- |    |   |            |
|----|---|------------|
| 1. | Can a 7- dB(A) reduction in traffic noise levels be achieved for at least one benefited receptor?   | <u>YES</u> |
| 2. | Is the quantity per benefited receptor of <u>1060</u> square feet less than the maximum allowable quantity per benefited receptor of <u>1500</u> square feet? | <u>YES</u> |

**C. NOISE WALL PRELIMINARY DECISION**

- |    |   |            |
|----|---|------------|
| 1. | Is the noise wall preliminarily feasible?   | <u>YES</u> |
| 2. | Is the noise wall preliminarily reasonable? | <u>YES</u> |
| 3. | Is the noise wall likely?                   | <u>YES</u> |

**PREPARED BY:** Lauren Triebert **DATE PREPARED:** 06/12/19



**NCDOT NOISE WALL  
FEASIBILITY & REASONABLENESS WORKSHEET**

**PROJECT** - Ten Ten Road Widening **TIP#** - U-5825

**NOISE WALL #** - NW4-5B **COUNTY(IES)** - Wake NC

**# IMPACTS** - 29 **# BENEFITS** - 50 **NAC:**  A  B  C  D  E

**A. FEASIBILITY:**

- |    |  |            |
|----|--|------------|
| 1. | Can a 5-dB(A) reduction in traffic noise levels be achieved for at least two impacted receptors?                 | <u>YES</u> |
| 2. | Does topography negatively affect the proposed noise wall?   | <u>NO</u>  |
| 3. | Does the proposed noise wall negatively affect property access, drainage, utilities or maintenance requirements? | <u>NO</u>  |
| 4. | Is there control of access in the vicinity of the proposed noise wall?   | <u>NO</u>  |

**B. REASONABLENESS**

- |    |  |            |
|----|--|------------|
| 1. | Can a 7- dB(A) reduction in traffic noise levels be achieved for at least one benefited receptor?  | <u>YES</u> |
| 2. | Is the quantity per benefited receptor of <u>409</u> square feet less than the maximum allowable quantity per benefited receptor of <u>1500</u> square feet? | <u>YES</u> |

**C. NOISE WALL PRELIMINARY DECISION**

- |    |   |            |
|----|---|------------|
| 1. | Is the noise wall preliminarily feasible?   | <u>YES</u> |
| 2. | Is the noise wall preliminarily reasonable? | <u>YES</u> |
| 3. | Is the noise wall likely?                   | <u>YES</u> |

**PREPARED BY:** Lauren Triebert **DATE PREPARED:** 06/12/19

**NCDOT NOISE WALL  
FEASIBILITY & REASONABLENESS WORKSHEET**

**PROJECT** - Ten Ten Road Widening **TIP#** - U-5825

**NOISE WALL #** - NW4-5C **COUNTY(IES)** - Wake NC

**# IMPACTS** - 8 **# BENEFITS** - 12 **NAC:**  A  B  C  D  E

**A. FEASIBILITY:**

- |    |  |            |
|----|--|------------|
| 1. | Can a 5-dB(A) reduction in traffic noise levels be achieved for at least two impacted receptors?                 | <u>YES</u> |
| 2. | Does topography negatively affect the proposed noise wall?   | <u>NO</u>  |
| 3. | Does the proposed noise wall negatively affect property access, drainage, utilities or maintenance requirements? | <u>NO</u>  |
| 4. | Is there control of access in the vicinity of the proposed noise wall?   | <u>NO</u>  |

**B. REASONABLENESS**

- |    |  |            |
|----|--|------------|
| 1. | Can a 7- dB(A) reduction in traffic noise levels be achieved for at least one benefited receptor?  | <u>YES</u> |
| 2. | Is the quantity per benefited receptor of <u>410</u> square feet less than the maximum allowable quantity per benefited receptor of <u>1500</u> square feet? | <u>YES</u> |

**C. NOISE WALL PRELIMINARY DECISION**

- |    |   |            |
|----|---|------------|
| 1. | Is the noise wall preliminarily feasible?   | <u>YES</u> |
| 2. | Is the noise wall preliminarily reasonable? | <u>YES</u> |
| 3. | Is the noise wall likely?                   | <u>YES</u> |

**PREPARED BY:** Lauren Triebert **DATE PREPARED:** 06/12/19

**NCDOT NOISE WALL  
FEASIBILITY & REASONABLENESS WORKSHEET**

**PROJECT** - Ten Ten Road Widening **TIP#** - U-5825

**NOISE WALL #** - NW6 **COUNTY(IES)** - Wake NC

**# IMPACTS** - 5 **# BENEFITS** - 13 **NAC:**  A  B  C  D  E

**A. FEASIBILITY:**

- |    |  |            |
|----|--|------------|
| 1. | Can a 5-dB(A) reduction in traffic noise levels be achieved for at least two impacted receptors?                 | <u>YES</u> |
| 2. | Does topography negatively affect the proposed noise wall?   | <u>NO</u>  |
| 3. | Does the proposed noise wall negatively affect property access, drainage, utilities or maintenance requirements? | <u>NO</u>  |
| 4. | Is there control of access in the vicinity of the proposed noise wall?   | <u>NO</u>  |

**B. REASONABLENESS**

- |    |  |            |
|----|--|------------|
| 1. | Can a 7- dB(A) reduction in traffic noise levels be achieved for at least one benefited receptor?  | <u>YES</u> |
| 2. | Is the quantity per benefited receptor of <u>923</u> square feet less than the maximum allowable quantity per benefited receptor of <u>1500</u> square feet? | <u>YES</u> |

**C. NOISE WALL PRELIMINARY DECISION**

- |    |   |            |
|----|---|------------|
| 1. | Is the noise wall preliminarily feasible?   | <u>YES</u> |
| 2. | Is the noise wall preliminarily reasonable? | <u>YES</u> |
| 3. | Is the noise wall likely?                   | <u>YES</u> |

**PREPARED BY:** Lauren Triebert **DATE PREPARED:** 06/12/19



**NCDOT NOISE WALL  
FEASIBILITY & REASONABLENESS WORKSHEET**

**PROJECT** - Ten Ten Road Widening **TIP#** - U-5825

**NOISE WALL #** - NW7 **COUNTY(IES)** - Wake, NC

**# IMPACTS** - 2 **# BENEFITS** - 5 **NAC:**  A  B  C  D  E

**A. FEASIBILITY:**

1. Can a 5-dB(A) reduction in traffic noise levels be achieved for at least two impacted receptors? NO
2. Does topography negatively affect the proposed noise wall? NO
3. Does the proposed noise wall negatively affect property access, drainage, utilities or maintenance requirements? NO
4. Is there control of access in the vicinity of the proposed noise wall? NO

**B. REASONABLENESS**

1. Can a 7- dB(A) reduction in traffic noise levels be achieved for at least one benefited receptor? YES
2. Is the quantity per benefited receptor of 984 square feet less than the maximum allowable quantity per benefited receptor of 1,500 square feet? YES

**C. NOISE WALL PRELIMINARY DECISION**

1. Is the noise wall preliminarily feasible? NO
2. Is the noise wall preliminarily reasonable? YES
3. Is the noise wall likely? NO

**PREPARED BY:** Lauren Triebert **DATE PREPARED:** 06/12/19

**NCDOT NOISE WALL  
FEASIBILITY & REASONABLENESS WORKSHEET**

**PROJECT** - Ten Ten Road Widening **TIP#** - U-5825

**NOISE WALL #** - NW8 **COUNTY(IES)** - Wake, NC

**# IMPACTS** - 14 **# BENEFITS** - 11 **NAC:**  A  B  C  D  E

**A. FEASIBILITY:**

- |    |  |            |
|----|--|------------|
| 1. | Can a 5-dB(A) reduction in traffic noise levels be achieved for at least two impacted receptors?                 | <u>YES</u> |
| 2. | Does topography negatively affect the proposed noise wall?   | <u>NO</u>  |
| 3. | Does the proposed noise wall negatively affect property access, drainage, utilities or maintenance requirements? | <u>YES</u> |
| 4. | Is there control of access in the vicinity of the proposed noise wall?   | <u>NO</u>  |

**B. REASONABLENESS**

- |    |   |            |
|----|---|------------|
| 1. | Can a 7- dB(A) reduction in traffic noise levels be achieved for at least one benefited receptor?   | <u>YES</u> |
| 2. | Is the quantity per benefited receptor of <u>349</u> square feet less than the maximum allowable quantity per benefited receptor of <u>1,500</u> square feet? | <u>YES</u> |

**C. NOISE WALL PRELIMINARY DECISION**

- |    |   |            |
|----|---|------------|
| 1. | Is the noise wall preliminarily feasible?   | <u>NO</u>  |
| 2. | Is the noise wall preliminarily reasonable? | <u>YES</u> |
| 3. | Is the noise wall likely?                   | <u>NO</u>  |

**PREPARED BY:** Lauren Triebert **DATE PREPARED:** 06/12/19

**NCDOT NOISE WALL  
FEASIBILITY & REASONABLENESS WORKSHEET**

**PROJECT** - Ten Ten Road Widening **TIP#** - U-5825

**NOISE WALL #** - NW11A **COUNTY(IES)** - Wake, NC

**# IMPACTS** - 25 **# BENEFITS** - 27 **NAC:**  A  B  C  D  E

**A. FEASIBILITY:**

- |    |  |            |
|----|--|------------|
| 1. | Can a 5-dB(A) reduction in traffic noise levels be achieved for at least two impacted receptors?                 | <u>YES</u> |
| 2. | Does topography negatively affect the proposed noise wall?   | <u>NO</u>  |
| 3. | Does the proposed noise wall negatively affect property access, drainage, utilities or maintenance requirements? | <u>NO</u>  |
| 4. | Is there control of access in the vicinity of the proposed noise wall?   | <u>NO</u>  |

**B. REASONABLENESS**

- |    |   |            |
|----|---|------------|
| 1. | Can a 7- dB(A) reduction in traffic noise levels be achieved for at least one benefited receptor?   | <u>YES</u> |
| 2. | Is the quantity per benefited receptor of <u>444</u> square feet less than the maximum allowable quantity per benefited receptor of <u>1,500</u> square feet? | <u>YES</u> |

**C. NOISE WALL PRELIMINARY DECISION**

- |    |   |            |
|----|---|------------|
| 1. | Is the noise wall preliminarily feasible?   | <u>YES</u> |
| 2. | Is the noise wall preliminarily reasonable? | <u>YES</u> |
| 3. | Is the noise wall likely?                   | <u>YES</u> |

**PREPARED BY:** Lauren Triebert **DATE PREPARED:** 06/12/19



**NCDOT NOISE WALL  
FEASIBILITY & REASONABLENESS WORKSHEET**

**PROJECT** - Ten Ten Road Widening **TIP#** - U-5825

**NOISE WALL #** - NW11B **COUNTY(IES)** - Wake, NC

**# IMPACTS** - 8 **# BENEFITS** - 12 **NAC:**  A  B  C  D  E

**A. FEASIBILITY:**

- |    |  |            |
|----|--|------------|
| 1. | Can a 5-dB(A) reduction in traffic noise levels be achieved for at least two impacted receptors?                 | <u>YES</u> |
| 2. | Does topography negatively affect the proposed noise wall?   | <u>NO</u>  |
| 3. | Does the proposed noise wall negatively affect property access, drainage, utilities or maintenance requirements? | <u>NO</u>  |
| 4. | Is there control of access in the vicinity of the proposed noise wall?   | <u>NO</u>  |

**B. REASONABLENESS**

- |    |   |            |
|----|---|------------|
| 1. | Can a 7- dB(A) reduction in traffic noise levels be achieved for at least one benefited receptor?   | <u>YES</u> |
| 2. | Is the quantity per benefited receptor of <u>420</u> square feet less than the maximum allowable quantity per benefited receptor of <u>1,500</u> square feet? | <u>YES</u> |

**C. NOISE WALL PRELIMINARY DECISION**

- |    |   |            |
|----|---|------------|
| 1. | Is the noise wall preliminarily feasible?   | <u>YES</u> |
| 2. | Is the noise wall preliminarily reasonable? | <u>YES</u> |
| 3. | Is the noise wall likely?                   | <u>YES</u> |

**PREPARED BY:** Lauren Triebert **DATE PREPARED:** 06/12/19

**NCDOT NOISE WALL  
FEASIBILITY & REASONABLENESS WORKSHEET**

**PROJECT** - Ten Ten Road Widening **TIP#** - U-5825  
**NOISE WALL #** - NW12A **COUNTY(IES)** - Wake, NC  
**# IMPACTS** - 3 **# BENEFITS** - 7 **NAC:**  A  B  C  D  E

**A. FEASIBILITY:**

- |   |            |
|---|------------|
| 1. Can a 5-dB(A) reduction in traffic noise levels be achieved for at least two impacted receptors?                 | <u>YES</u> |
| 2. Does topography negatively affect the proposed noise wall?   | <u>NO</u>  |
| 3. Does the proposed noise wall negatively affect property access, drainage, utilities or maintenance requirements? | <u>NO</u>  |
| 4. Is there control of access in the vicinity of the proposed noise wall?   | <u>NO</u>  |

**B. REASONABLENESS**

- |  |            |
|--|------------|
| 1. Can a 7- dB(A) reduction in traffic noise levels be achieved for at least one benefited receptor?   | <u>YES</u> |
| 2. Is the quantity per benefited receptor of <u>1654</u> square feet less than the maximum allowable quantity per benefited receptor of <u>2000</u> square feet? | <u>YES</u> |

**C. NOISE WALL PRELIMINARY DECISION**

- |  |            |
|--|------------|
| 1. Is the noise wall preliminarily feasible?   | <u>YES</u> |
| 2. Is the noise wall preliminarily reasonable? | <u>YES</u> |
| 3. Is the noise wall likely?                   | <u>YES</u> |

**PREPARED BY:** Lauren Triebert **DATE PREPARED:** 06/12/19

**NCDOT NOISE WALL  
FEASIBILITY & REASONABLENESS WORKSHEET**

**PROJECT** - Ten Ten Road Widening **TIP#** - U-5825  
**NOISE WALL #** - NW12B **COUNTY(IES)** - Wake, NC  
**# IMPACTS** - 3 **# BENEFITS** - 4 **NAC:**  A  B  C  D  E

**A. FEASIBILITY:**

- |    |  |            |
|----|--|------------|
| 1. | Can a 5-dB(A) reduction in traffic noise levels be achieved for at least two impacted receptors?                 | <u>YES</u> |
| 2. | Does topography negatively affect the proposed noise wall?   | <u>NO</u>  |
| 3. | Does the proposed noise wall negatively affect property access, drainage, utilities or maintenance requirements? | <u>NO</u>  |
| 4. | Is there control of access in the vicinity of the proposed noise wall?   | <u>NO</u>  |

**B. REASONABLENESS**

- |    |   |            |
|----|---|------------|
| 1. | Can a 7- dB(A) reduction in traffic noise levels be achieved for at least one benefited receptor?   | <u>YES</u> |
| 2. | Is the quantity per benefited receptor of <u>1650</u> square feet less than the maximum allowable quantity per benefited receptor of <u>2000</u> square feet? | <u>YES</u> |

**C. NOISE WALL PRELIMINARY DECISION**

- |    |   |            |
|----|---|------------|
| 1. | Is the noise wall preliminarily feasible?   | <u>YES</u> |
| 2. | Is the noise wall preliminarily reasonable? | <u>YES</u> |
| 3. | Is the noise wall likely?                   | <u>YES</u> |

**PREPARED BY:** Lauren Triebert **DATE PREPARED:** 06/12/19

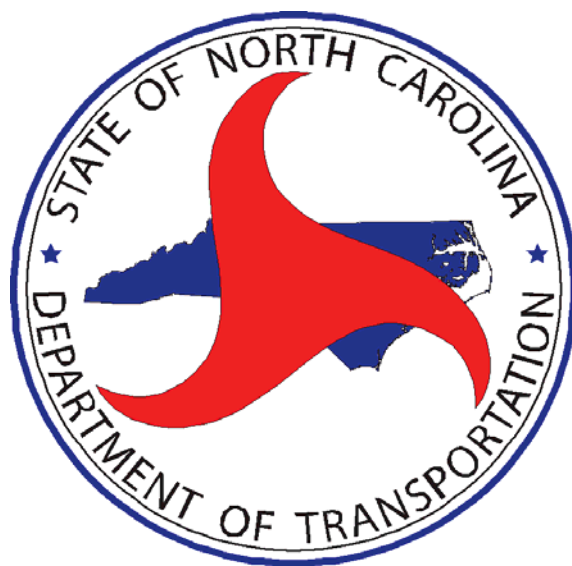


## **Appendix F**

### **North Carolina Department of Transportation Traffic Noise Policy**

**NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION**

**TRAFFIC NOISE POLICY**




**Effective Date: October 6, 2016**

**Noise Policy Committee:** Glenn Mumford, PE .....Roadway Design Unit  
Drew Joyner, PE.....Human Environment Section  
Brian Hanks, PE.....Structures Management Unit  
Daniel Keel, PE.....Division of Highways  
Mike Mills, PE.....Division Engineer  
Pat Ivey, PE.....Division Engineer  
Greg Smith, PE.....Human Environment Section

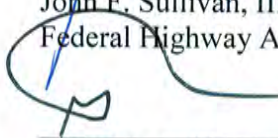
**Sponsors:** Clarence Coleman, PE .....Federal Highway Administration  
Felix Davila, PE.....Federal Highway Administration  
Edward L. Curran.....Board of Transportation

**APPROVED BY:**


10-6-16  
Date of Approval

  
\_\_\_\_\_  
John F. Sullivan, III, PE, Division Administrator  
Federal Highway Administration

10.6.16  
Date of Approval

  
\_\_\_\_\_  
Nicholas J. Tennyson  
Secretary of Transportation

10-8-16  
Date of Approval

  
\_\_\_\_\_  
Edward L. Curran, Chairman  
Board of Transportation

Person Responsible  
for Policy:

Traffic Noise & Air Quality Supervisor  
Human Environment Section  
1598 Mail Service Center  
Raleigh, North Carolina 27699-1598  
(919) 707-6087



## **DEFINITIONS**

- a) **Decibel (dB)** - The logarithmic unit for measuring sound pressure levels. For traffic noise measurements, decibels are most commonly reported in terms of the A-weighting frequency scale, which best includes the frequencies to which human hearing is typically most sensitive and is denoted by the abbreviation dB(A).
- b) **Leq** – The equivalent steady -state sound level which, in a defined period of time, contains the same amount of acoustic energy as a time-varying sound level during the same period of time.
- c) **Receptor** – Any location that receives traffic noise.
- d) **Impacted Receptor** – A receptor for which the predicted hourly equivalent traffic noise level 1) meets or exceeds the approach criteria value found in Table 1 of this policy or 2) exceeds the existing ambient noise level by 10 dB(A) or more.
- e) **Benefited Receptor** - All receptors, both impacted and non-impacted, that receive a noise level reduction of 5 dB(A) or more through placement of a noise abatement measure.
- f) **Noise Abatement Measure** – Any method used to reduce traffic noise levels, such as noise walls and earthen berms.
- g) **Worst Noise Hour** – The hour within a day in which the highest magnitude hourly equivalent sound level occurs. The worst traffic noise hour typically occurs when traffic is flowing freely at a high volume relative to the peak traffic hour volume, with a high percentage of trucks.
- h) **Practicable** – Available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes.

## **INTRODUCTION**

This document represents the North Carolina Department of Transportation (hereinafter NCDOT) policy on highway traffic noise and construction noise and describes the implementation of the requirements of the Federal Highway Administration (hereinafter FHWA) Noise Standard at 23 Code of Federal Regulations Part 772 (23 CFR 772) as they relate to federal-aid and select state-funded highway construction in North Carolina. This policy was developed by the NCDOT and reviewed and approved by the FHWA.

The North Carolina Department of Transportation Traffic Noise Manual and 23 CFR 772 are intended to be companion documents to this policy.

## **PURPOSE**

This policy describes the NCDOT process that is used in determining traffic noise impacts and abatement measures and the equitable and cost-effective expenditure of public funds for noise abatement. Where the FHWA has given highway agencies flexibility in implementing the 23 CFR 772 standards, this policy describes the NCDOT approach to implementation.

## **APPLICABILITY**

Projects with a Date of Public Knowledge on or after the effective date of this policy shall comply with the criteria of this policy.

### **Federal–Aid Projects**

This policy applies to all "Type I" federal or federal-aid highway projects in the State of North Carolina, including federal projects that are administered by local public agencies. Therefore, this policy applies to any highway project that is funded with federal-aid highway funds or requires FHWA approval regardless of funding sources. NCDOT does not participate in nor fund Type II (retrofit) projects along existing transportation facilities. Noise analyses are not required for Type III projects. Each of these project types are defined below. This policy shall be applied uniformly and consistently to all Type I federal projects throughout North Carolina.

### **Type I Project**

- (a) The construction of a highway on new location; or,
- (b) The physical alteration of an existing highway where there is either:
  - (i) Substantial Horizontal Alteration. A project that halves the distance between the traffic noise source and the closest receptor between the existing condition to the future build condition; or,
  - (ii) Substantial Vertical Alteration. A project that removes shielding, therefore exposing the line-of-sight between the receptor and the traffic noise source. This is done by either altering the vertical alignment of the highway or by altering the topography between the highway traffic noise source and the receptor; or,
- (c) The addition of a through-traffic lane(s). This includes the addition of a through-traffic lane that functions as a HOV lane, High-Occupancy Toll (HOT) lane, bus lane, or truck climbing lane; or,
- (d) The addition of an auxiliary lane, except for when the auxiliary lane is a turn lane; or,
- (e) The addition or relocation of interchange lanes or ramps added to a quadrant to complete an existing partial interchange; or,
- (f) Restriping existing pavement for the purpose of adding a through-traffic lane or an auxiliary lane; or,
- (g) The addition of a new or substantial alteration of a weigh station, rest stop, ride-share lot or toll plaza.
- (h) If a project is determined to be a Type I project under this definition then the entire project area as defined in the environmental document is a Type I project.

### **Type II Project.**

A Federal or Federal-aid highway project for noise abatement on an existing highway. For a Type II project to be eligible for Federal-aid funding, the highway agency must develop and implement a Type II program in accordance with 23 CFR 772.7(e).

### **Type III Project**

A Federal or Federal-aid highway project that does not meet the classifications of a Type I or Type II project. Type III projects do not require a noise analysis.

The highway traffic noise prediction requirements, noise analyses, noise abatement criteria, and requirements for informing local officials in 23 CFR 772 and this policy constitute the noise standards mandated by 23 U.S.C. 109(1). All federally-funded highway projects which are developed in conformance with this policy shall be deemed to be in accordance with the FHWA noise standards.

### **State-Funded Projects**

Projects that are State funded do not use the federal project type designation for applicability.

This policy will apply to State funded projects located on a US or Interstate route that is full control of access where the project involves adding a through-traffic lane.

All other State-funded projects for which a State Environmental Assessment (EA) or State Environmental Impact Statement (EIS) is prepared will comply with the North Carolina Environmental Policy Act (SEPA) and the North Carolina Administrative Code. For these projects, noise barriers will be considered where practicable.

### **DATE OF PUBLIC KNOWLEDGE**

The Date of Public Knowledge of the location and potential noise impacts of a proposed highway project is the approval date of the final environmental document, e.g., Categorical Exclusion (CE), State or Federal Finding of No Significant Impact (FONSI) or State or Federal Record of Decision (ROD).

NCDOT is not responsible for evaluating or implementing any noise barriers to protect developed lands that were not permitted before the Date of Public Knowledge.

The criterion for determining when undeveloped land is permitted for development is the approval date of a building permit for an individual lot or site. Approval of a development plat or any other development plan does not meet the permitted criteria.

NCDOT advocates use of local government authority to regulate land development, planning, design and construction in such a way that noise impacts are minimized.

### **TRAFFIC NOISE PREDICTION**

All traffic noise analyses performed by or for NCDOT must utilize the most current version of the FHWA Traffic Noise Model (TNM®) or any other model determined by the FHWA to be consistent with the methodology of the TNM® model, pursuant to 23 CFR 772.9.

Average pavement type shall be used in the FHWA TNM® for future noise level prediction.

Noise contour lines may be used only for project alternative screening or for providing information to local officials for their land use planning efforts associated with undeveloped lands as per 23 CFR 772.17. Noise contours shall not be used for determining highway traffic noise impacts or assessing noise barriers.



Traffic characteristics that yield the worst noise hour equivalent traffic noise levels, expressed in Leq(h), for the Design Year shall be used in predicting noise levels and assessing noise impacts.

Traffic noise prediction must adhere to all direction contained in the NCDOT Traffic Noise Manual.

### **NOISE IMPACT DETERMINATION**

Noise abatement measures for NCDOT highway projects must be considered when traffic noise impacts are created by either of the following two conditions:

- (a) The predicted worst noise hour Leq(h) traffic noise levels for the Design Year approach (reach one decibel less than) or exceed the Noise Abatement Criteria (NAC) contained in 23 CFR 772 and in Table 1, found on page 4 of this policy, OR
- (b) The predicted worst noise hour Leq(h) traffic noise levels for the Design Year substantially exceed existing noise by 10 dB(A) or more.

A receptor is a discrete or representative location within a noise sensitive area(s) for any of the land uses listed in Table 1. For multifamily dwellings, each residence shall be counted as one receptor when determining impacted and benefited receptors. Non-residential receptors shall be represented by Equivalent Receptors calculated according to direction contained in the NCDOT Traffic Noise Manual.

Primary consideration shall be given to exterior areas where frequent human use occurs in the determination of traffic noise impacts.

A traffic noise analysis shall be completed for each project alternative under detailed study and for all receptors and Equivalent Receptors defined to represent land use activities A, B, C, D, and E listed in Table 1 that are present in the study area. FHWA approval is required for designating a Category A Activity on federally-funded projects. Traffic noise analyses are not required for Activity Category F land uses. Noise predictions are required for Activity Category G land uses to the extent needed to develop estimated noise levels to provide to local officials for planning purposes.

<b>Table 1</b>			
<b>Noise Abatement Criteria</b>			
Hourly Equivalent A-Weighted Sound Level (decibels (dB(A)))			
Activity Category	Activity Criteria <sup>1</sup> Leq(h) <sup>2</sup>	Evaluation Location	Activity Description
A	57	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 <sup>3</sup>	67	Exterior	Residential
C <sup>3</sup>	67	Exterior	Active sport 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, Section4(f) sites, schools, television studios, trails, and trail crossings
D	52	Interior	Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios
E <sup>3</sup>	72	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

<sup>1</sup> The Leq(h) Activity Criteria values are for impact determination only, and are not design standards for noise abatement measures.

<sup>2</sup> 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.

<sup>3</sup> Includes undeveloped lands permitted for this activity category.

## **ANALYSIS OF NOISE ABATEMENT MEASURES**

When traffic noise impacts are identified, noise abatement measures shall be considered and evaluated for feasibility for all impacted receptors and reasonableness for all benefited receptors. All of the following conditions must be met in order for noise abatement measures to be justified and incorporated into project design, as applicable. Failure to achieve any single element of feasibility or reasonableness will result in the noise abatement measure being deemed not feasible or not reasonable, whichever applies.

NCDOT will provide noise barriers for all possible impacted receptors that meet the feasibility and reasonableness criteria found in this policy. Noise barriers will not be extended solely to provide noise reduction for non-impacted receptors. Benefits for non-impacted receptors will only occur when they are incidental in noise barriers designed for impacted receptors.

### **Feasibility**

The combination of acoustical and engineering factors considered in the evaluation of a noise barrier.

- (a) Any receptor that receives a minimum noise level reduction of five dB(A) due to a noise barrier shall be considered a benefited receptor. Noise reduction of five dB(A) must be achieved for at least two impacted receptors.
- (b) Engineering feasibility of noise barriers shall consider adverse impacts created by or upon property access, drainage, topography, utilities, safety, and maintenance requirements.

### **Reasonableness**

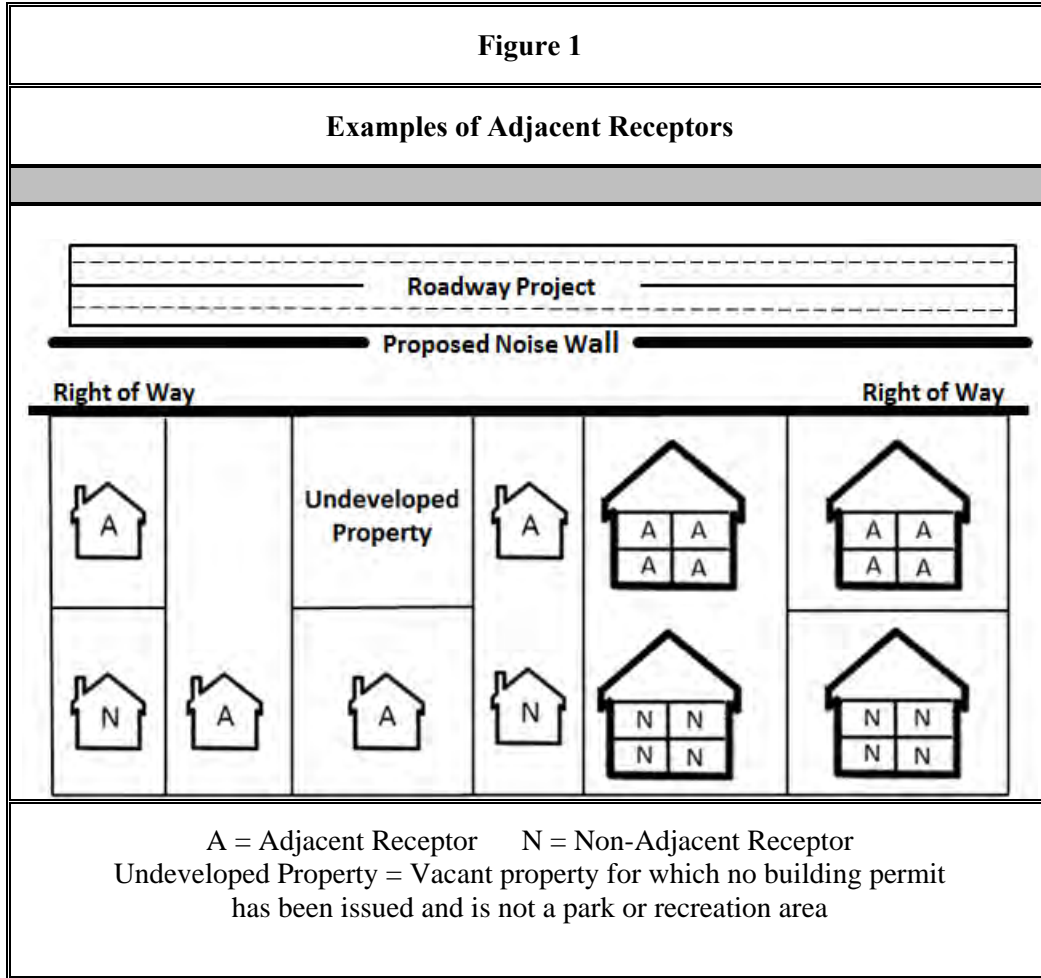
The combination of social, economic, and environmental factors considered in the evaluation of a noise barrier.

- (a) Property owners and tenants of all benefited receptors shall be solicited to obtain their preferences for or against a proposed noise barrier. No tenant ballots are distributed for vacant rental property. Points per ballot shall be distributed in the following weighted manner:
  - 5 points/ballot for adjacent property owners who reside at property
  - 4 points/ballot for adjacent property owners who rent property to others
  - 3 points/ballot for all non-adjacent property owners who reside at property
  - 2 points/ballot for all non-adjacent property owners who rent property to others
  - 1 point/ballot vote for all tenants of rental property

Adjacent Receptor is a benefited receptor that 1) represents a property that abuts the highway right of way or 2) has no benefited receptor between it and the highway. Where multiple buildings containing benefited receptors are on the same property, such as an apartment or condominium complex, only the building closest to the highway is an adjacent receptor. Adjacent receptors will most often, but not always, be part of the front row of benefited receptors. Figure 1 provides graphic examples of Adjacent Receptors.

Owners of multi-unit rental locations will receive the applicable number of owner points for each individual benefited receptor (rental unit) owned.





If 50% or greater of all possible voting points from benefited receptors for each noise barrier are received on the first solicitation, a simple majority of voting points cast will be used to determine if the proposed noise barrier will be constructed.

If less than 50% of all possible points for each noise barrier are received on the first solicitation, a second solicitation will be sent to benefited receptors who did not respond to the first solicitation.

If a second solicitation is conducted and 50% or greater of all possible voting points for each noise barrier are received after the second solicitation, a simple majority of voting points cast will be used to determine whether or not the proposed noise barrier will be constructed.

If less than 50% of total possible points for a noise barrier are received after the second solicitation, the noise barrier will not be constructed.

Noise barriers will be constructed in the case of a tie (equal number of points for and against a noise barrier).

All balloting soliciting the viewpoints of benefited property owners and applicable residents/tenants that occurs after the effective date of this policy, regardless of the Date of Public Knowledge, shall comply with the criteria of this policy.

- (b) The allowable quantities for noise barriers per benefited receptor, with allowances for incremental increases based upon existing and predicted noise levels of all impacted receptors within each noise study area, are shown in Table 2.

For the purpose of calculating the incremental increase, the Noise Abatement Criteria (NAC) values for Activity Categories A, B, C, D, and E, as shown in Table 1, are to be used and not the NCDOT “approach” values used in traffic noise impact determinations.

<b>Table 2</b>			
<b>Allowable Noise Barrier Base Quantities</b>			
Maximum Allowable Base Quantity	Noise Level Consideration	Noise Wall	Earthen Berm
		1,500 ft <sup>2</sup>	4,200 yd <sup>3</sup>
Average dB(A) Increase Between Existing and Future Build for All Impacted Receptors	< 5 dB(A)	+ 0 ft <sup>2</sup>	+ 0 yd <sup>3</sup>
	5-10 dB(A)	+ 500 ft <sup>2</sup>	+ 1,400 yd <sup>3</sup>
	> 10 dB(A)	+ 1,000 ft <sup>2</sup>	+ 2,800 yd <sup>3</sup>
Average Exposure to Absolute Noise Levels for All Impacted Receptors	< 5 dB(A) Over NAC Activity Category	+ 0 ft <sup>2</sup>	+ 0 yd <sup>3</sup>
	5-10 dB(A) Over NAC Activity Category	+ 500 ft <sup>2</sup>	+ 1,400 yd <sup>3</sup>
	> 10 dB(A) Over NAC Activity Category	+ 1,000 ft <sup>2</sup>	+ 2,800 yd <sup>3</sup>

- (c) A noise reduction design goal of at least 7 dB(A) must be evaluated for all benefited receptors. At least one benefited receptor must achieve the noise reduction design goal of 7 dB(A) to indicate the proposed noise barrier effectively reduces traffic noise.

**Other Considerations**

Prior to CE approval or issuance of a FONSI or ROD, NCDOT shall identify in all applicable environmental documents:

- (a) Noise barriers that are feasible and reasonable,
- (b) Noise impacts for which no noise barrier appears to be feasible and reasonable;

- (c) Locations where noise impacts will occur, where noise barriers are feasible and reasonable, and the locations that have no feasible and reasonable noise barriers.
- (d) Whether it is “likely” or “unlikely” that noise barriers will be installed for each noise sensitive area identified. “Likely” does not mean a firm commitment. The final decision on the installation of noise barriers shall be made upon completion of the project design, the public involvement process, compliance with the NCDOT Policy, and FHWA approval.

### **Third Party Participation**

- (a) Third party funding of noise barriers cannot be used to make up the difference between the reasonable quantity allowance and the actual quantity of noise barriers. Third party funding is allowed only by local, state and federal government agencies, and can only be used to pay for additional features such as landscaping and aesthetic treatments for noise barriers that meet all feasible and reasonable criteria previously detailed in this policy. Private parties may freely enter into agreements with government agencies to develop noise barrier enhancements; however, all funding for enhancements paid to NCDOT must come from government agencies
- (b) Traditional highway construction resources pay for required noise barriers. Should a local government request that materials be used that are more costly than the standard materials proposed by NCDOT, the requesting entity must assume 100% of the actual additional construction cost.
- (c) If a local government insists on the provision of a noise barrier deemed not reasonable by NCDOT, a noise barrier may be installed provided the local government assumes 100% of the costs and obtains an encroachment permit from NCDOT to perform the work. These costs include, but are not limited to, preliminary and final engineering, actual construction and all related maintenance. In addition, local governments must ensure that NCDOT's material, design and construction specifications are met. The local government must also assume 100% of the liability associated with the measure and hold harmless the NCDOT.
- (d) For (b) and (c) above, the settlement agreement shall be signed before third party noise barrier design begins and payment shall be made to NCDOT in accordance with N.C.G.S. 136-66.3(e).

### **ARCHITECTURAL TREATMENT OF NOISE WALLS**

The standard noise wall architectural treatment consists of:

- (a) Concrete columns; Steel piles may be used when necessary to address site conditions adverse to the use of concrete columns;
- (b) Precast concrete panels textured on both sides;
- (c) No texture on the uppermost foot of each wall segment;
- (d) A single color of stain in brown or gray tones applied to both sides of textured panels;
- (e) No stain applied to the uppermost foot of each wall segment and the concrete columns.

All enhancements to this standard noise wall must be paid for in accordance with Third Party Participation provisions in this policy.



NCDOT Division Engineers are responsible for determining noise wall textures and colors in their respective Divisions.

### **PUBLIC INVOLVEMENT**

Communication with the community regarding noise impacts and possible noise abatement shall occur at the start of the noise study process and continue throughout the development of the project. NCDOT will communicate with citizens to present information on the nature of highway traffic noise and discuss the effects of noise abatement and how public preferences for noise abatement is solicited via a balloting process.

Noise study areas showing “likely” noise barriers and/or proposed locations of any “recommended” noise barriers will be presented and discussed when holding Public Hearings and Public Meetings. Likely noise barriers are based on preliminary design traffic noise analyses and are described in environmental documents. Recommended noise barriers are based on final design noise analyses and are usually identified after the environmental document is completed. Property owners and tenants who are being balloted for a recommended noise barrier will be provided a visual of the noise barrier location prior to their casting a ballot.

### **COORDINATION WITH LOCAL OFFICIALS**

NCDOT will provide all traffic noise analyses to local government officials within whose jurisdiction a highway project is proposed as early in the project planning process as possible to protect future development from becoming incompatible with traffic noise levels. Specifically, environmental documents and design noise reports will contain information identifying areas that may be impacted by traffic noise, predicted noise level contour information, the best estimation of future noise levels for developed and undeveloped lands or properties in the immediate vicinity of the project and other appropriate design information. If requested, NCDOT will assist local officials with coordination and distribution of this information to residents, property owners and developers. NCDOT will provide information to assist local jurisdictions in the development of local noise controls, when requested. NCDOT strongly advocates the planning, design and construction of noise-compatible development and encourage its practice among planners, building officials, developers and others.

### **CONSTRUCTION NOISE**

To minimize the impacts of construction noise on the public, NCDOT shall:

- (a) Identify land uses or activities that may be affected by noise from construction of the project.
- (b) Determine the measures that are needed in the plans and specifications to minimize or eliminate adverse construction noise impacts to the community. This determination shall consider the benefits achieved and the overall adverse social, economic, and environmental effects and costs of the abatement measures.
- (c) Consider construction techniques and scheduling to reduce construction noise impacts to nearby receptors and incorporate the needed abatement measures in the project plans and specifications.

**FEDERAL PARTICIPATION**

The costs of noise barriers may be included in federal-aid participating project costs with the federal share being the same as that for the system on which the project is located when:

- (a) Traffic noise impacts have been identified; and
- (b) Noise barriers have been determined to be feasible and reasonable pursuant to 23 CFR 772 and this policy.

**REVIEW OF POLICY**

This policy shall be reviewed by the NCDOT Board of Transportation at least every five years.