U.S. Department of Transportation
Federal Highway Administration

South Carolina

1835 Assembly Street, Suite 1270
Columbia, South Carolina 29201
803-765-5411
803-253-3989

September 15, 2015

In Reply Refer To:
HDA-SC

Ms. Heather Robbins
Acting Director, Environmental Services Office
South Carolina Department of Transportation
955 Park Street, P.O. Box 191
Columbia, SC 29202

Dear Ms. Robbins:

The South Carolina Department of Transportation (SCDOT) recently submitted a Categorical Exclusion (CE) for the Proposed Interstate 20 (I-20) Widening in Lexington County, South Carolina (Federal Project Number P027003). The proposed project will construct a new through lane within the existing median in each direction from mile marker 60.6 on the eastern terminus to mile marker 49.8 on the western terminus. The FHWA has determined that the project will not have significant impacts and that there will be no effect on threatened or endangered species or adverse impacts to historic resources. Enclosed is the approved CE for the project.

Please ensure that the project commitments made during the NEPA process are included in the project construction proposal and ultimately carried out. Please address any questions you may have concerning this project to Mr. J. Shane Belcher at 803-253-3187 or jeffrey.belcher@dot.gov.

Sincerely,

J. Shane Belcher

(for) Emily O. Lawton
Division Administrator

Enclosure

ec: Mr. Ed Frierson, SCDOT NEPA Coordinator, RPG 3
Mr. Brad Reynolds, SCDOT Design-Build Program Manager

Interstate 20 Widening Project

South Carolina Department of Transportation

Categorical Exclusion Type C

Interstate 20 (I-20) Widening Project

Lexington County, South Carolina

September 2015

CATEGORICAL EXCLUSION TYPE C

Project No. P027003 County: Lexington
Date: September 2015

To: Federal Highway Administration

From: RPG 3 NEPA Coordinator Ed Frierson

Description: Interstate 20 (I-20) Widening Project

Project Description: The SCDOT proposes to widen I-20 from four to six travel lanes from mile point 60.6 (west of US 378) on the eastern terminus to approximately mile point 49.8 (west of Longs Pond Road) on the western terminus, for a total distance of approximately 10.8 miles (Appendix A). The project boundary includes a general corridor of approximately 120 feet from the centerline of the eastbound and westbound lanes. This corridor extends to 220 feet along the US 1 interchange and the Longs Pond Road interchange.

The scope of the project includes adding a travel lane in each direction, improving various interchanges, replacing or widening the parallel mainline bridges over Norfolk Southern Railroad near mile point 57, and a noise wall along Ginny Lane. The proposed widening would occur within the existing median to minimize right-of-way impacts. Interchange improvements would include: extending the US 1 westbound off-ramp approximately 650 feet; reconstructing ramps and remove the merge condition of right turns at the east and westbound termini of the I-20 exit ramps with US 1. The right turn lanes will be incorporated into the existing signalized intersection and the skewed approach angles will be removed; extending the SC 6 eastbound on-ramp approximately 1400 feet; reconstructing and widening the SC 6 eastbound on-ramp to provide a continuous two-lane entrance from the intersection and dropping the outside lane before the entrance curvature of the ramp; extending the SC 6 westbound off-ramp approximately 1650 feet; extending the Longs Pond Road westbound off-ramp approximately 1000 feet and widening of the westbound off-ramp terminal to form a right turn lane and left turn lane; reconstructing and widening the Longs Pond Road eastbound on-ramp to provide a continuous two-lane entrance from the intersection and dropping the outside lane before the entrance curvature of the ramp (Appendix B).

The typical section from west of US 378 to west of SC 6 would consist of three 12-foot travel lanes, 4.75-foot inside paved shoulders with concrete median barrier, and 10-foot outside paved shoulders leading to grassed side-slopes. The typical section from west of SC 6 to Longs Pond Road would consist of three 12-foot travel lanes, 10-foot inside paved shoulders with grass median and median cable barrier, and 10-foot outside paved shoulders leading to grassed side-slopes (Appendix C).

This environmental document is being prepared to support the SCDOT in the preparation of a design-build package for the construction of the project. The anticipated schedule is to award the contract to a design-build team in 2016 with construction being complete in 2019.

Purpose and Need: The purpose of the project is to improve the operational efficiency of I-20 and accommodate future traffic volumes by increasing the capacity of the interstate. The existing four-lane facility does not provide enough capacity for area traffic which results in frequent congestion. Traffic count data indicates that the 2015 average daily traffic (ADT) ranges up to 62,000 vehicles per day and is expected to increase to 94,000 vehicles per day by 2037.

Table 1: Average Daily Traffic Volumes and Levels of Service*

Roadway Section	2015		2037		
	Existing		No Build		Build
	ADT	LOS	ADT	LOS	LOS
US Route 378 to US Route 1	62,400	D	94,200	F	D
US Route 1 to SC Route 6	60,800	D	87,500	F	D
SC Route 6 to Longs Pond Road	45,800	C	62,300	E	C
West of Longs Pond Road	34,900	B	40,200	C	C

*Data obtained from SCDOT Traffic Engineering – Traffic Flow Diagrams were used and average daily volumes were interpolated from data – Levels of Service were derived from using HCS (Appendix D).

Under the 2015 existing conditions the facility is operating at a Level of Service (LOS) D or better. However, under the 2037 no-build scenario, the facility would operate at an LOS E or worse which is at or beyond capacity. The 2037 build condition would ensure that the facility continues to operate at an acceptable LOS of D or better.

The project termini are logical as the eastern terminus (west of the US 378 Interchange) will tie into an existing three-lane section and continue through to the Longs Pond Road Interchange. Traffic volumes west of Longs Pond Road drop to 40,200 in the 2037 design year, which indicates that a substantial number of vehicles would have origin/destinations within the section of I-20 proposed for widening.

The proposed project has independent utility since it provides the needed operational and capacity improvements within the project corridor. This would be achieved by providing additional capacity, providing additional separation between trucks and cars through the addition of travel lanes, and improving operational movements at various interchanges.

Project Funding: The total project cost is $86.2 million. Funding for the proposed project is included in the SCDOT's 2014-2019 State Transportation Improvement Program (STIP)[1] which identifies $154,701,000 dollars for preliminary engineering and construction.

This project is funded by Act 98 of 2013 which provided SCDOT additional funding for bridge, resurfacing, and mainline interstate projects. These projects were prioritized and selected based on Act 114 criteria. Act 98 provided annual appropriations to the SCDOT to transfer to the South Carolina Transportation Infrastructure Bank to be used for mainline interstate improvement projects.

Findings: The Department's environmental assessment has determined the effects of this proposed project are as described in the "General Support for Categorical Exclusion Determination" dated April 22, 1985, and is in compliance with the required findings reflected below. The proposed project has been assessed for possible effects on the human and natural environment with a determination that no significant environmental impact will occur. The class of action and impact determination documented by this statement would qualify this project as a categorical exclusion under 23 CFR 771, Section 115(b).

A determination has been made that the proposed project will have no effect on the continued existence of any listed endangered or threatened species, destroy or adversely modify critical habitat. Therefore, no further investigation under Section 7 of the Endangered Species Act is necessary. The project is located in an area designated as a transportation corridor. Based on the requirements of the Farmland Protection Policy Act of 1981 (FPPA) no assessment is required. In consultation with the State Historic Preservation Officer (SHPO), as appropriate, the proposed project will not adversely affect any properties identified as being on or eligible for inclusion in the National Register of Historic Places under 36 CFR 800. Tribal coordination also occurred with three North American Tribes, including; the Catawba, the Eastern Band of Cherokee, and the United Keetoowah Band of Cherokee. No Section 4(f)/6(f) properties were identified within the project boundaries. Based on preliminary design, the project has the potential to impact jurisdictional waters of the U.S; however, it is anticipated that these impacts will be avoided/minimized during final design and qualify for authorization under the SCDOT

[1] http://www.scdot.org/inside/stip.aspx

General Permit. A Noise Impact Assessment was completed for the proposed project using the Federal Highway Administration (FHWA) noise model prediction model (TNM 2.5). Based on the results of the model, traffic related impacts would occur to 192 receivers under the 2037 build alternative and 218 receivers would be impacted under the 2037 no-build alternative. No receivers were found to substantially exceed FHWA noise abatement criteria.

A Relocation Impact Study was not prepared due to the fact that the project would be constructed within the existing right-of-way. There are businesses, non-profits or farms located within the project boundaries. If displacements are found to be necessary based on final design, all acquisitions and relocations would be conducted in compliance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended, and all relocation resources will be made available without discrimination.

Sept. 14, 2015
Date

Edward W. Iverson
RPG 3 NEPA Coordinator

SEPT. 15, 2015
Date

Federal Highway Administration

Date: September, 2015	SCDOT NEPA ENVIRONMENTAL COMMITMENTS FORM	

Project ID : P027003 County : Lexington District : District 1 Total # of Commitments: 9

Project Name: I-20 Widening in Lexington County

The Environmental Commitment **Contractor Responsible** measures listed below **are to be included in the contract and must be implemented.** It is the responsibility of the Program Manager to make sure the Environmental Commitment **SCDOT Responsible** measures are adhered to. If there are questions regarding the commitments listed please contact:

CONTACT NAME: Mr. Brad Reynolds, P.E. **PHONE #:** (803)-737-1440

ENVIRONMENTAL COMMITMENTS FOR THE PROJECT

Water Quality Responsibility: SCDOT

The contractor will be required to minimize possible water quality impacts through implementation of construction BMPs, reflecting policies contained in 23 CFR 650B and the Department's Supplemental Specifications on Seeding and Erosion Control Measures (January 01, 2015). Other measures including seeding, silt fences, sediment basins, etc. as appropriate will be implemented during construction to minimize impacts to Water Quality.

Migratory Bird Treaty Act (all bridge and box culvert projects) Responsibility: CONTRACTOR

The federal Migratory Bird Treaty Act, 16 USC § 703-711, states that it is unlawful to pursue, hunt, take, capture or kill; attempt to take, capture or kill; possess, offer to or sell, barter, purchase, deliver or cause to be shipped, exported, imported, transported, carried or received any migratory bird, part, nest, egg or product, manufactured or not.

The Department will comply with the Migratory Bird Treaty Act of 1918 in regard to the avoidance of taking of individual migratory birds and the destruction of their active nests. Prior to construction/demolition of the bridges the Resident Construction Engineer (RCE) will coordinate with SCDOT Environmental Services Office to determine if there are any active nests on the bridge. After this coordination, it will be determined whether construction/demolition can begin. After construction/ demolition has begun, measures can be taken to prevent birds from nesting, such as screens, noise producers, and deterrents etc. If during construction or demolition a nest is observed on the bridge that was not discovered during the biological surveys, the contractor will cease work and immediately notify the SCDOT Environmental Services Office. SCDOT biologists will determine whether the nest is active and the species utilizing the nest. After this coordination, it will be determined whether construction/demolition can resume or whether a temporary moratorium will be put into effect. All costs for determining the need for, the placing of deterrents, and applying of all special actions including, but not limited to, removing nests and any costs associated with conducting work in compliance with the Migratory Bird Treaty Act as stated herein will not be paid for separately but will be considered to have been included with other items of work.

Noise Responsibility: SCDOT

SCDOT will inform local planning officials of future, generalized noise levels expected to occur in the project vicinity after FHWA has made a final decision on the Environmental document.

Project ID : P027003	SCDOT NEPA ENVIRONMENTAL COMMITMENTS FORM	SCDOT ENVIRONMENTAL SERVICES

ENVIRONMENTAL COMMITMENTS FOR THE PROJECT

Cultural Resources	Responsibility:	CONTRACTOR

The contractor and subcontractors must notify their workers to watch for the presence of any prehistoric or historic remains, including but not limited to arrowheads, pottery, ceramics,flakes, bones, graves, gravestones, or brick concentrations during the construction phase of the project, if any such remains are encountered, the Resident Construction Engineer (RCE) will be immediately notified and all work in the vicinity of the discovered materials and site work shall cease until the SCDOT Archaeologist directs otherwise.

USTs/Hazardous Materials	Responsibility:	SCDOT

If avoidance of hazardous materials is not a viable alternative and soils that appear to be contaminated are encountered during construction, the South Carolina Department of Health and Environmental Control (SCDHEC) will be informed. Hazardous materials will be tested and removed and/or treated in accordance with the United States Environmental Protection Agency and the SCDHEC requirements, if necessary.

Stormwater	Responsibility:	SCDOT

Stormwater control measures, both during construction and post-construction, are required for SCDOT projects with land disturbance and/or constructed in the vicinity of 303(d), TMDL, ORW, tidal, and other sensitive waters in accordance with the SCDOT's MS4 Permit. The selected contractor would be required to minimize potential stormwater impacts through implementation of construction best management practices, reflecting policies contained in 23 CFR 650 B and SCDOT's Supplemental Specifications on Seed and Erosion Control Measures (January 01, 2015).

Project ID : P027003	SCDOT NEPA ENVIRONMENTAL COMMITMENTS FORM	SCDOT ENVIRONMENTAL SERVICES

ENVIRONMENTAL COMMITMENTS FOR THE PROJECT

Floodplains — Responsibility: SCDOT

The selected contractor will send a set of final plans and request for floodplain management compliance to the local

County Floodplain Administrator.

Non-Standard Commitment — Responsibility: CONTRACTOR

Noise Barrier

A noise barrier will be constructed to abate noise at the Meadow Glen Elementary School, Meadow Glen Middle School, and the Wellesley Subdivision located on Ginny Lane west of the US 378 Interchange. The barrier wall will be approximately 5400 feet in length and 19 feet in height. The contractor will ensure that the wall is designed and constructed to provide the appropriate noise abatement based on the parameters stated in the noise assessment completed for this project, and in close coordination with SCDOT.

General Permit — Responsibility: SCDOT

Impacts to jurisdictional waters will be permitted under a Department of the Army Section 404 permit from the U.S. Army Corps of Engineers. Based on preliminary design, it is anticipated that the proposed project would be permitted under SCDOT's General Permit (GP). The required mitigation for this project will be determined through consultation with the USACE and other resource agencies.

SUPPORTING DOCUMENTATION

Noise Analysis: In compliance with Title 23 of the Code of Federal Regulations, Part 772 (23 CFR Part 772), and the SCDOT Traffic Noise Abatement Policy dated September 1, 2014, a noise assessment was completed for the project (Appendix D). The TNM 2.5 Noise Model was used to analyze the 2015 existing conditions, 2037 design year no-build alternative, and 2037 design year build alternative based on traffic data and preliminary designs. The current posted speed limit is 70 miles per hour (mph). The estimated average annual daily traffic (AADT) volume is 62,000 vehicles per day (vpd) in 2015, and is expected to increase to 94,000 (vpd) by 2037. An assumption of a 50/50 directional split was used for all scenarios, and twelve-foot wide traffic lane widths were used for the travel lanes for the existing, No-build and Build Alternatives. Ambient noise field measurements were taken at eleven (11) different locations along I-20 in accordance with the FHWA publication "Measurement of Highway-related Noise." Noise measurements were taken between 8:00 AM and 6:00 PM. Noise measurements were taken in the morning for eastbound traffic flowing into Columbia and in the afternoon for westbound traffic flowing out of Columbia to try and measure worst case traffic. The number of vehicles and the vehicle mix were noted during the field measurements. Using the ambient noise field measurements the TNM 2.5 model was validated for accuracy, per the requirements in 23 CFR §772.11(d)(2).

Based on the results of the model, no receptors would exceed the Noise Abatement Criteria (NAC) criteria for either the existing condition or the design year no-build alternative. The build alternative would impact 192 receivers from traffic noise with 218 receivers being impacted under the no-build alternative.

Noise abatement was considered for seven sites along the corridor that were identified during initial stages of project development, and/or subsequent field reviews. These seven sites were analyzed by TNM to determine if a noise wall would meet the reasonableness and feasibility criteria as outlined in the SCDOT Traffic Noise Assessment Policy. Six sites were subdivisions that had high numbers of receivers that could be potentially benefitted by noise abatement measures, and one site was a residential area that had a low density of receivers that were in close proximity to each other.

Only one site was found to meet the SCDOT Traffic Abatement Noise Policy criteria. The site extends from just east of Meadow Glen Middle School and continues westward past Meadow Glen Elementary School, and the Wellesley Subdivision, for approximately 5400 feet (Appendix E). The two schools represent multiple receivers based on student population and daily use. A total of 268 equivalent receivers would be benefited by Barrier 1. This includes 33 single-family residences in the Wellesley Subdivision, 128 equivalent receivers for Meadow Glen Elementary School, and 107 equivalent receivers for Meadow Glen Middle School. Based on SCDOT policy for estimating barrier costs at $35/square foot, the total cost of this barrier would be $3,641,540 or $13,588 per benefited receiver. This cost per benefited receiver is within SCDOT's limit of $30,000 per benefited receiver and, therefore, meets the SCDOT reasonableness standard.

A meeting was held at the Lexington County School District 1 Headquarters to discuss the potential construction of a noise barrier wall in front of Meadow Glen Middle School and Meadow Glen Elementary School. The meeting resulted in District 1 offering support for a noise barrier wall at this location. The Chief Operating Officer then presented the noise barrier wall to the District 1 School Board on May 19, 2015. The District 1 School Board was in favor of a noise barrier wall, and would like to incorporate green space behind the wall to maintain the aesthetics of the area surrounding the schools. The Wellesley Subdivision also expressed support for a noise barrier (Appendix K).

Mobile Source Air Toxics (MSATs): The project was evaluated with regard to the Clean Air Act Amendments of 1990. These amendments identify six criteria pollutants (ozone, particulate matter, carbon monoxide, sulfur dioxide, nitrogen oxides, and lead), along with the National Ambient Air Quality Standards (NAAQS) for each pollutant. The Environmental Protection Agency (EPA) designates geographical areas that have pollutant concentrations below the NAAQS as these pollutants vary, but automotive vehicles are considered a source for four (ozone, particulate matter, nitrogen oxides, and

carbon monoxide) of the criteria pollutants. A review of current air quality data determined that the EPA has designated Lexington County 'in attainment' for the criteria pollutants, and in compliance with the NAAQS.[1]

The proposed project is not expected to require any additional transportation control strategies to maintain the County's current attainment status, and the project is anticipated to be consistent with the State Air Quality Implementation Plan (SIP). However, the proposed project must be continually evaluated throughout project development to ensure compliance with the most current air quality regulations and attainment status.

In addition to the criteria air pollutants for which there are National Ambient Air Quality Standards (NAAQS), EPA also regulates air toxics. Most air toxics originate from human-made sources, including on-road mobile sources, non-road mobile sources (e.g., airplanes), area sources (e.g., dry cleaners) and stationary sources (e.g., factories or refineries).

Mobile Source Air Toxics (MSATs) are a subset of the 188 air toxics defined by the Clean Air Act. The MSATs are compounds emitted from highway vehicles and non-road equipment. Some toxic compounds are present in fuel and are emitted to the air when the fuel evaporates or passes through the engine unburned. Other toxics are emitted from the incomplete combustion of fuels or as secondary combustion products. Metal air toxics also result from engine wear or from impurities in oil or gasoline.

It is anticipated that the proposed project would have low potential for impacts to MSAT emissions. Due to the limited tools and techniques for assessing project-specific health impacts, the following evaluation includes a discussion of information that is incomplete or unavailable for a project specific assessment of MSAT impacts, along with a qualitative assessment of emission projections associated with the proposed project. The following MSAT evaluation is based on recent guidance from FHWA, and includes prototype language described at FHWA's web site.[2]

Moreover, EPA regulations for vehicle engines and fuels will cause overall MSATs to decline significantly over the next 20 years. The FHWA predicts MSATs will decline in the range of 57 percent to 87 percent, from 2000 to 2020, based on regulations now in effect, even with a projected 64 percent increase in VMT. This will both reduce the background level of MSATs as well as the possibility of even minor MSAT emissions from this project.

Incomplete/Unavailable Information Regarding MSATs

In FHWA's view, information is incomplete or unavailable to credibly predict the project-specific health impacts due to changes in MSAT emissions associated with a proposed set of highway alternatives. The outcome of such an assessment, adverse or not, would be influenced more by the uncertainty introduced into the process through assumption and speculation rather than any genuine insight into the actual health impacts directly attributable to MSAT exposure associated with a proposed action.

The U.S. Environmental Protection Agency (EPA) is responsible for protecting the public health and welfare from any known or anticipated effect of an air pollutant. The EPA is the lead authority for administering the Clean Air Act and its amendments and have specific statutory obligations with respect to hazardous air pollutants and MSAT. The EPA is in the continual process of assessing human health effects, exposures, and risks posed by air pollutants. They maintain the Integrated Risk Information System (IRIS), which is "a compilation of electronic reports on specific substances found in the environment and their potential to cause human health effects" (EPA, http://www.epa.gov/iris/). Each report contains assessments of non-cancerous and cancerous effects for individual compounds and quantitative estimates of risk levels from lifetime oral and inhalation exposures with uncertainty spanning perhaps an order of magnitude.

[1] U.S. EPA website. http://www.epa.gov/air/oaqps/greenbk/ancl.html.
[2] http://www.fhwa.dot.gov/environment/air_quality/air_toxics/policy_and_guidance/aqintguidmem.cfm

Other organizations are also active in the research and analyses of the human health effects of MSAT, including the Health Effects Institute (HEI). Among the adverse health effects linked to MSAT compounds at high exposures are; cancer in humans in occupational settings; cancer in animals; and irritation to the respiratory tract, including the exacerbation of asthma. Less obvious is the adverse human health effects of MSAT compounds at current environmental concentrations (HEI, http://pubs.healtheffects.org/view.php?id=282) or in the future as vehicle emissions substantially decrease (HEI, http://pubs.healtheffects.org/view.php?id=306).

The methodologies for forecasting health impacts include emissions modeling; dispersion modeling; exposure modeling; and then final determination of health impacts - each step in the process building on the model predictions obtained in the previous step. All are encumbered by technical shortcomings or uncertain science that prevents a more complete differentiation of the MSAT health impacts among a set of project alternatives. These difficulties are magnified for lifetime (i.e., 70 year) assessments, particularly because unsupportable assumptions would have to be made regarding changes in travel patterns and vehicle technology (which affects emissions rates) over that time frame, since such information is unavailable.

It is particularly difficult to reliably forecast 70-year lifetime MSAT concentrations and exposure near roadways; to determine the portion of time that people are actually exposed at a specific location; and to establish the extent attributable to a proposed action, especially given that some of the information needed is unavailable.

There are considerable uncertainties associated with the existing estimates of toxicity of the various MSAT, because of factors such as low-dose extrapolation and translation of occupational exposure data to the general population, a concern expressed by HEI (http://pubs.healtheffects.org/view.php?id=282). As a result, there is no national consensus on air dose-response values assumed to protect the public health and welfare for MSAT compounds, and in particular for diesel PM. The EPA http://www.epa.gov/risk/basicinformation.htm#g) and the HEI (http://pubs.healtheffects.org/getfile.php?u=395) have not established a basis for quantitative risk assessment of diesel PM in ambient settings.

There is also the lack of a national consensus on an acceptable level of risk. The current context is the process used by the EPA as provided by the Clean Air Act to determine whether more stringent controls are required in order to provide an ample margin of safety to protect public health or to prevent an adverse environmental effect for industrial sources subject to the maximum achievable control technology standards, such as benzene emissions from refineries. The decision framework is a two-step process. The first step requires EPA to determine an "acceptable" level of risk due to emissions from a source, which is generally no greater than approximately 100 in a million. Additional factors are considered in the second step, the goal of which is to maximize the number of people with risks less than 1 in a million due to emissions from a source. The results of this statutory two-step process do not guarantee that cancer risks from exposure to air toxics are less than 1 in a million; in some cases, the residual risk determination could result in maximum individual cancer risks that are as high as approximately 100 in a million. In a June 2008 decision, the U.S. Court of Appeals for the District of Columbia Circuit upheld EPA's approach to addressing risk in its two step decision framework. Information is incomplete or unavailable to establish that even the largest of highway projects would result in levels of risk greater than deemed acceptable.

Because of the limitations in the methodologies for forecasting health impacts described, any predicted difference in health impacts between alternatives is likely to be much smaller than the uncertainties associated with predicting the impacts. Consequently, the results of such assessments would not be useful to decision makers, who would need to weigh this information against project benefits, such as reducing traffic congestion, accident rates, and fatalities plus improved access for emergency response, that are better suited for quantitative analysis.

Qualitative Analysis
A qualitative analysis provides a basis for identifying and comparing the potential differences among MSAT emissions, if any, from the various alternatives. The qualitative assessment presented below is derived in part from a study conducted by the FHWA entitled *A Methodology for Evaluating Mobile Source Air Toxic Emissions among Transportation Project Alternatives*, found at: http://www.fhwa.dot.gov/environment/air_quality/air_toxics/policy_and_guidance/aqintguidapb.cfm.

For the preferred alternative in this CEC, the amount of MSAT emitted would be proportional to the vehicle miles traveled, or VMT, assuming that other variables such as fleet mix are the same for each alternative. Actual Build VMT may determine to be slightly higher than the No-Build VMT due to the attraction of the more efficient roadway and the rerouting of trips. This potential increase in VMT would lead to higher MSAT emissions for the preferred action alternative along the highway corridor, along with a corresponding decrease in MSAT emissions along the parallel routes. The emissions increase is offset somewhat by lower MSAT emission rates due to increased speeds; according to EPA's MOVES 2010b model, emissions of all of the priority MSAT decrease as speed increases. Because the estimated VMT under each of the Alternatives is the same, it is expected there would be no appreciable difference in overall MSAT emissions among the various alternatives. Also, regardless of the alternative chosen, emissions will likely be lower than present levels in the design year as a result of EPA's national control programs that are projected to reduce annual MSAT emissions by 80 percent between 2010 and 2050. Local conditions may differ from these national projections in terms of fleet mix and turnover, VMT growth rates, and local control measures. However, the magnitude of the EPA-projected reductions is so great (even after accounting for VMT growth) that MSAT emissions in the study area are likely to be lower in the future in nearly all cases.

Wetlands/Water Quality/Floodplains/Permits: The Natural Resources Technical Memorandum reports that the 521-acre project area associated with the proposed I-20 widening project improvement project includes various tributary systems and wetland areas largely associated with Red Bank Creek and Twelvemile Creek (Appendix H). The project area includes reaches from 13 defined tributary systems totaling approximately 3,977 LF of stream (3,087 LF of pRPW; 890 LF of sRPW) and nine (9) wetland areas totaling 2.92 acres that are directly associated with these systems. The tributary reaches exhibit various indicators of continuous flow and jurisdictional characteristics, including distinct bed and banks, flowing water, sand/gravel substrate, and sediment sorting. The wetland areas are assumed jurisdictional as they either directly 'abut' these tributaries or are considered 'adjacent to' due to geographic location or hydrologic connectivity (i.e. ditches, overland flow, etc.). A jurisdictional determination has been submitted to the Charleston District Corps of Engineers for their review and approval (Appendix F).

The project area is largely located within the Saluda River Watershed (03050109-14) with the western portion located within the Congaree Creek Watershed (03050110-01). The Saluda River watershed drains approximately 65,600 acres, with the majority of the area comprised of urban land uses. The Congaree Creek watershed drains approximately 91,300 acres, with the majority of the area comprised of forested and agricultural land uses. The project area includes the following mapped soils: Fuquay loamy sand, Lakeland soils, Johnston soils (hydric), Blaney sand, Vaucluse loamy sand, and Pelion loamy sand.

The project extends across a number of Flood Insurance Rate Maps including: 45063C0237G, 45063C0241G, 45063C0242G, 45063C0234G, 45063C0253G, 45063C0254G, 45063C0252G, 45063C0256G, and 45063C043C0143G, all effective February 9, 2000. FIRM # 45063C0241G documents a special flood hazard area (Zone A) associated with an unnamed tributary to Red Bank Creek. Zone A floodplains are areas within the 100 year floodplain (i.e. have a 1% annual chance of flooding), but without detailed analyses to identify specific depths or base flood elevations associated with these limits. The project is not expected to be a significant or longitudinal encroachment as defined under 23 CFR 650A, nor is it expected to have an appreciable environmental impact on this base floodplain. In addition, the project would be developed in accordance with Executive Order 11988 (Floodplain Management and 23 CFR 650 subpart A), and roadway/bridge design would comply with all appropriate

floodplain regulations and guidelines. The "South Carolina Department of Transportation – Location and Hydraulic Design of Encroachments of Floodplains Checklist" has been completed for the project (Appendix G).

Based on preliminary design, the proposed project has the potential to impact jurisdictional waters of the U.S. Specifically, the proposed ramp extension from I-20 westbound to U.S. 1 will extend across the existing culvert associated with Tributary 7. It is anticipated that impacts to Tributary 7 would be minimized, and potentially avoided during final design. In addition, there may be the need to improve various outfalls along with the maintenance along existing culverts and crossline pipes which may result in minor impacts to jurisdictional waters. However, any impacts are expected to be minimal and qualify for the SCDOT General Permit which authorizes impacts up to three (3) acres of wetlands and 300 linear feet of stream.

Cultural Resources: Because the majority of the improvements to I-20 will only affect the median, no cultural resource survey was necessary, except where bridges crossed over the interstate at the two intersections to be improved, and at the noise barriers. The project's Area of Potential Effect (APE) consists of 300 feet from existing right of way (ROW) at the two interchanges to be improved. At I-20 and U.S. Highway 1, these improvements consist of an area 220 feet from the centerline of the eastbound and westbound lanes extending from a point 1,000 feet east of the westbound lane exit ramp to a point 3,000 feet west of the bridges over the Norfolk Southern Railroad. At I-20 and Longs Pond Road, these improvements consist of an area 220 feet from the centerline of the eastbound and westbound lanes extending from a point 1,000 feet east of the westbound lane exit ramp to approximately 50 feet west of the eastbound exit ramp. The area of archaeological emphasis consisted of the area of direct effects, while the architectural survey examined the entire APE in these locations. Because the noise barriers will be located in existing ROW, no archaeological survey was conducted in these locations. However, the 300-foot APE was applied in these locations since the barriers may affect the viewshed. For the remainder of the 11-mile long corridor, since improvements will only occur in the median, the only resources requiring evaluation were the four previously mentioned bridges and a railroad that intersects I-20. This study was designed to identify any historic properties or archaeological sites, new or previously recorded that might be affected by the proposed project.

Archaeological Resources

Background research was conducted at the Site Files housed at the South Carolina Institute of Archaeology and Anthropology (SCIAA). Two previously recorded sites were located within 0-25 miles of the APE including 38LX177 and 38LX198. Little information is available for either site. The official site form for 38LX177 indicates that the site has unknown prehistoric and historic components, and that the site was probably not eligible for listing on the National Register of Historic Places (NRHP). The site is located just outside of the APE at the far northern extent of the Highway 1 interchange on the westbound side of I-20. Site 38LX198 lies just south of 38LX177 on the westbound side of I-20. The site form provides little information beyond a NRHP recommendation of probably not eligible. During the current survey, the field crew noted that a medical supplies facility was built on the property. Much of the area where 38LX198 was once located is now occupied by a building and parking lot. Shovel testing in the remaining grassy areas showed extensive construction disturbance with subsoil at or just below the surface. No cultural material was recovered. Site 38LX198 was not successfully relocated during the survey.

A Phase I Archaeological Survey was conducted on September 29-October 3, 2014. The survey consisted of two shovel test transects along each side of I-20 from Highway 1 west to Longs Pond Road for a distance of approximately 12 miles. Tests were dug at 100-foot (30-m) intervals. A total of 446 shovel tests locations were investigated. Of those, 197 shovel tests were not excavated due to extensive disturbance associated with residential, commercial, and road development. Fill from all shovel tests were screened through 0.25-inch mesh hardware cloth to ensure systematic artifact recovery. In addition, a reconnaissance survey was conducted of the median of I-20 to determine whether intact soils may still exist. A visual inspection of the median found that a concrete ditch was present for the entire length of the APE and that intact deposits were highly unlikely. As a result of the survey, one new archaeological site

was identified. Site 38LX644 is a small prehistoric lithic scatter located along a remnant strip of land between the cut-fill section of the eastbound lane of I-20 and Cedar Road, northeast of the U.S. Highway 1 and I-20 interchange. The site is situated at the northwest corner of a parking lot associated with a commercial property. Extensive disturbance associated with the building and parking lot construction was observed during testing. Vegetation consists primarily of low grasses with a few native pioneer plants and ornamental landscaping along the periphery. The grasses offered little ground visibility. Sixteen shovel tests were excavated at the site, two of which were positive for cultural material. Artifacts were recovered from 0-60 centimeters below surface. The typical soil profile in undisturbed contexts showed 0-20 centimeters of grayish brown (10YR 5/2) sandy loam over yellow (10YR 7/6) sand. Three quartz flakes were recovered from the two positive shovel tests. Based on the two positive shovel tests, it was determined that the site measures approximately 5x10 meters. Based on the paucity of artifacts and their undiagnostic nature, the site was recommended as not eligible for listing on the NRHP.

Architectural Resources

The files at SCIAA were consulted in an attempt to identify any previously recorded sites within or near the project area. No previously recorded resources were identified. The statewide bridge survey conducted by Lichtenstein Consulting Services (2005) was also consulted, and four bridges within the project area were documented. These bridges were re-evaluated and assigned a site number during this survey. On Thursday, October 9, 2014, an architectural historian surveyed the APE for previously unrecorded resources 50 years of age or older. Four buildings, four bridges, and a railroad corridor were identified and surveyed in accordance with the South Carolina State Historic Preservation Office's *Survey Manual: South Carolina Statewide Survey of Historic Places* (2013). These resources are listed in the table below, with their recommended eligibility for the NRHP, and are also described individually.

Table 2: Evaluated Architectural Resources

Resource Number	Name/Address	Date of Construction	Recommended NRHP Eligibility
U/63/0859	Mineral Springs Road Bridge over I-20	1964	Not Eligible
U/63/0860	149 Monroe Lane	circa 1900	Not Eligible
U/63/0861	Monroe Lane	1964	Not Eligible
U/63/0862	US 1/Augusta Road Bridge over I-20	1965	Not Eligible
U/63/0863	Dooley Road	1950	Not Eligible
U/63/0864	Dooley Road	1955	Not Eligible
U/63/0865	I-20 Bridge over Norfolk Southern Railroad	Circa 1965	Not Eligible
U/63/0866	Columbia & Augusta Railroad	1869	Not Eligible
U/63/0867	Cedarcrest Drive Bridge over I-20	1964	Not Eligible

One archaeological site (38LX644) was identified northeast of the U.S. Highway 1 and I-20 interchange. Based on the paucity of artifacts and undiagnostic nature of the site, it is recommended not eligible for listing on the NRHP. There are nine historic resources within the project area that were evaluated as part of this study. Four of these resources are bridges that were recorded by Lichtenstein Consulting Services (2005) in a statewide bridge survey, but were not given a site number at the time. The other five are newly recorded. None of these resources are recommended eligible for listing in the NRHP. The State Historic Preservation Officer (SHPO) concurred with these recommendations (Appendix G).

Tribal Coordination

As part of Section 106 of the National Historic Preservation Act (NHPA) review process all Federal agencies are required to consult with federally recognized Native American tribes when activities may affect properties of religious or cultural importance. As part of the I-20 widening project, the FHWA coordinated with the Catawba, Eastern Band of Cherokee, and the United Keetoowah Band of Cherokee Native American tribes. Response letters are included in Appendix H.

Section 4(f)/6(f) Properties: No section 4(f) or 6(f) properties were identified within the project boundaries.

Endangered Species: Pursuant to Section 7 of the Endangered Species Act of 1973 (16 USC, Section 1531, et seq., see also 50 CFR part 402, the project area was evaluated for the potential presence of any federally protected species currently listed for Lexington County.

Federally Protected Species

A list of protected species for Lexington County was obtained from the U.S. Fish and Wildlife Service, which was last updated in February 2015. In addition, the S.C. Rare, Threatened, and Endangered Species Inventory was evaluated to determine any previous known occurrences of protected species within the project area. These records were last updated by the SCDNR on January 17, 2006. Lastly, field observations were conducted within the project area during the various extensive field investigators between September and November 2014. Table 3 lists the federally protected species and their associated status.

Table 3: Threatened and Endangered Species

Category	Common Name	Scientific Name	Status
Bird	Bald Eagle	*Haliaeetus leucocephalus*	BGEPA*
	American wood stork	*Mycteria americana*	Threatened
	Red-Cockaded Woodpecker	*Picoides borealis*	Endangered
Plant	Smooth coneflower	*Echinacea laevigata*	Endangered

* Federally protected under the Bald and Golden Eagle Protection Act.

At Risk Species (ARS)

In addition to the above listed species, the USFWS has identified 12 "at-risk species" (ARS) species for Lexington County. ARS are those that have either been proposed for listing, are candidates for listing, or have been petitioned for listing. The ARS listing is provided for conservation actions in an effort to keep these species from becoming listed under the Endangered Species Act. Therefore, there are no existing federal protections associates with ARS.

The following provides the list of ARS for Lexington County. Based upon a review of the required habitats associated with the following species, the project is not anticipated to impact any ARS. The majority of the species required unique habitats that are not available within the project boundary, including cypress swamps, pine flatwoods, wet savannahs, and aquatic habitats. However, there is minimal habitat for the spotted turtle which prefers clean shallow water, standing to slow moving water; no individuals were observed during the site visits.

Common Name - Animals	**Scientific Name**	**Status**
American eel	*Anguilla rostrata*	ARS
Blueback herring	*Alosa aestivalis*	ARS
Robust redhorse	*Moxostoma robustum*	ARS
Tri-colored bat	*Perimyotis subflavus*	ARS
Savannah lilliput	*Toxolasma pullus*	ARS
Bog spice	*Lindera subcoriacea*	ARS
Ciliate-leaf tickseed	*Coreopsis integrifolia*	ARS
Long Beach seedbox	*Ludwigia brevipes*	ARS
Spathulate seedbox	*Ludwigia spathulata*	ARS
Wire-leaved dropseed	*Sporobolus teretifolius*	ARS
Southern hognose snake	*Heterdon simus*	ARS
Spotted turtle	*Clemmys guttata*	ARS

The review of the habitat requirements and previous records for the federally listed species for Lexington County, along with the field observations conclude that there is very low potential for the presence of any federally protected species due to the lack of suitable habitat, the disturbed nature of the project area, and scope of improvements. As such, the proposed roadway improvements are expected to have **NO EFFECT** on the federally protected species listed for Lexington County (Appendix I).

Socio-Economic: The U.S. Census data was evaluated to determine the demographic composition of the proposed project area. The I-20 corridor is located within the Lexington County Census County Division (CCD). The census data is summarized in the Table 4.

Table 4 - Summary of US Census Data.

Demographic Characteristic	South Carolina	Lexington County	Lexington County CCD
Total Population	4,561,242	273,752	84,273
White	3,147,257	221,562	72,610
Black/African American	1,277,148	41,245	7364
Hispanic or Latino	182,450	15,556	3422
Median Household Income	$44,695	$54,061	$53,316

Source: US Census 2000 American Fact Finder

Social

It is not anticipated that the proposed action and associated relocations would result in any appreciable change in local population and employment patterns in the area. Right of way acquisitions from residential properties is not expected; therefore, there would be no change in existing land uses. If additional right-of-way is required, then property owners would be compensated for the right of way taking and any damages to remaining property, in accordance with SCDOT policy and the Uniform Relocation Assistance and Real Property Acquisition Policies Act, as amended.

Traffic services would be maintained throughout project construction with no anticipated adverse effects on emergency services in the area. The contractor would be responsible for maintaining two lanes of traffic during construction. If the roadway must be reduced to one-way traffic for a short period, appropriate traffic control measures would be implemented and notice would be given to the public through variable message signs, media news releases, and/or other outlets. After the proposed project's completion, improved traffic service for both public and private uses would be realized.

Economic

The proposed project was evaluated for potential economic impacts to the surrounding communities. The economic impacts considered include the anticipated impacts to local businesses, employment, tax base, and property values. As a result, it is anticipated that the proposed project would result in both positive and negative economic impacts. The cost of the proposed project is estimated at $86.2 million, which would be a direct cost to the local and regional governments.

Environmental Justice

The proposed project was evaluated in accordance with Executive Order 12898 (Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations). As summarized in Table 2, the demographics of the Lexington County CCD includes an approximate 13% minority population as compared with 21% in Lexington County. The census data also reveals that the median household income in 2009 within the Lexington County CCD is $53,316 as compared to $54,061 for Lexington County. This median income level is also substantially greater than the $15,800.00 (household size of 2.5) poverty guideline established for 2000 by the U.S. Department of Health and Human Services. These findings are consistent with the field observations of the immediate project area. Therefore, the project is not expected to specifically benefit, harm, or disproportionately impact, any social group, including low-income, elderly, handicapped, non-drivers, minority, or ethnic groups.

The project is not expected to change neighborhood or community cohesion, school districts, police and fire protection, emergency medical services, highway traffic and safety, minority or other social groups, or permanently affect existing travel patterns and accessibility.

Displacements: Due to the project occurring within the existing right-of-way, there would be no residential, business, non-profit, or farm displacements. If the final design results in additional impacts, then all acquisition and relocation, if any, will be conducted in compliance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended, and all relocation resources will be made available to displacees without discrimination.

Farmlands: This project is located in a transportation corridor and would not require any additional right-of-way for construction of the project. Therefore the project is not required to be evaluated under the provisions of the FPPA.

Land Use: The project is centered along a corridor between Lexington and Columbia in an area of various urbanized land uses including, commercial, industrial, transportation, and residential, with interspersed natural communities. Due to the project construction being within an existing transportation right-of-way, the project is not expected to modify existing land uses or change the timing or density of development in the area.

Asbestos and Lead-Based Paints: Since the widening would occur within the existing transportation corridor and not require additional right-of-way, a hazardous materials survey was not completed to determine the presence of above ground or underground storage tanks. However, the bridges over the Norfolk-Southern Railroad (Structure Nos. 3210002020300, 3210002040300) were surveyed for the presence of lead-based paint and asbestos. The exterior surface areas were examined that included the piers, beams, bridge decks, end bents, and other visible components of the bridge. No lead-based paint was observed during the inspection; therefore, no suspect samples were collected for analysis.

Six samples of suspected asbestos containing materials (ACM) were collected and analyzed. The analysis concluded that no ACM was present in the structure. It is possible that renovation or demolition activities would uncover ACM that was not accessible during the survey. Any material encountered during renovation and/or demolition activities that is not identified in the Asbestos Inspection Report as being non-ACM should be assumed to be ACM unless sample results prove otherwise (Appendix J).

Public Involvement: A Public Information Meeting (PIM) was held at Meadow Glen Middle School located at 440 Ginny Lane in Lexington, SC. The purpose of the meeting was to provide information and solicit input from area residents on the proposed project. A total of 53 people registered their attendance at the meeting. A total of 17 comments were received either at the meeting or within the 15 day comment period. No changes were made as a result of comments received at the PIM. A summary of the comments are included in Appendix K.

Date: September 2015 Prepared by: J. Wayne Hall

APPENDIX A
Location Map

FED. RD. DIV. NO.	STATE	COUNTY	PROJECT ID	ROAD/ROUTE NO.	SHEET NO.
3	S.C.	LEXINGTON	0032098	I-20	

Begin Project
(Approx.) Sta. 213+90

US-378E
(Sunset Blvd.)

INTERSTATE 20

S-106
(Mineral Springs Rd.)

INTERSTATE 20

S-106
(Mineral Springs Rd.)

Legend

– Project Boundary

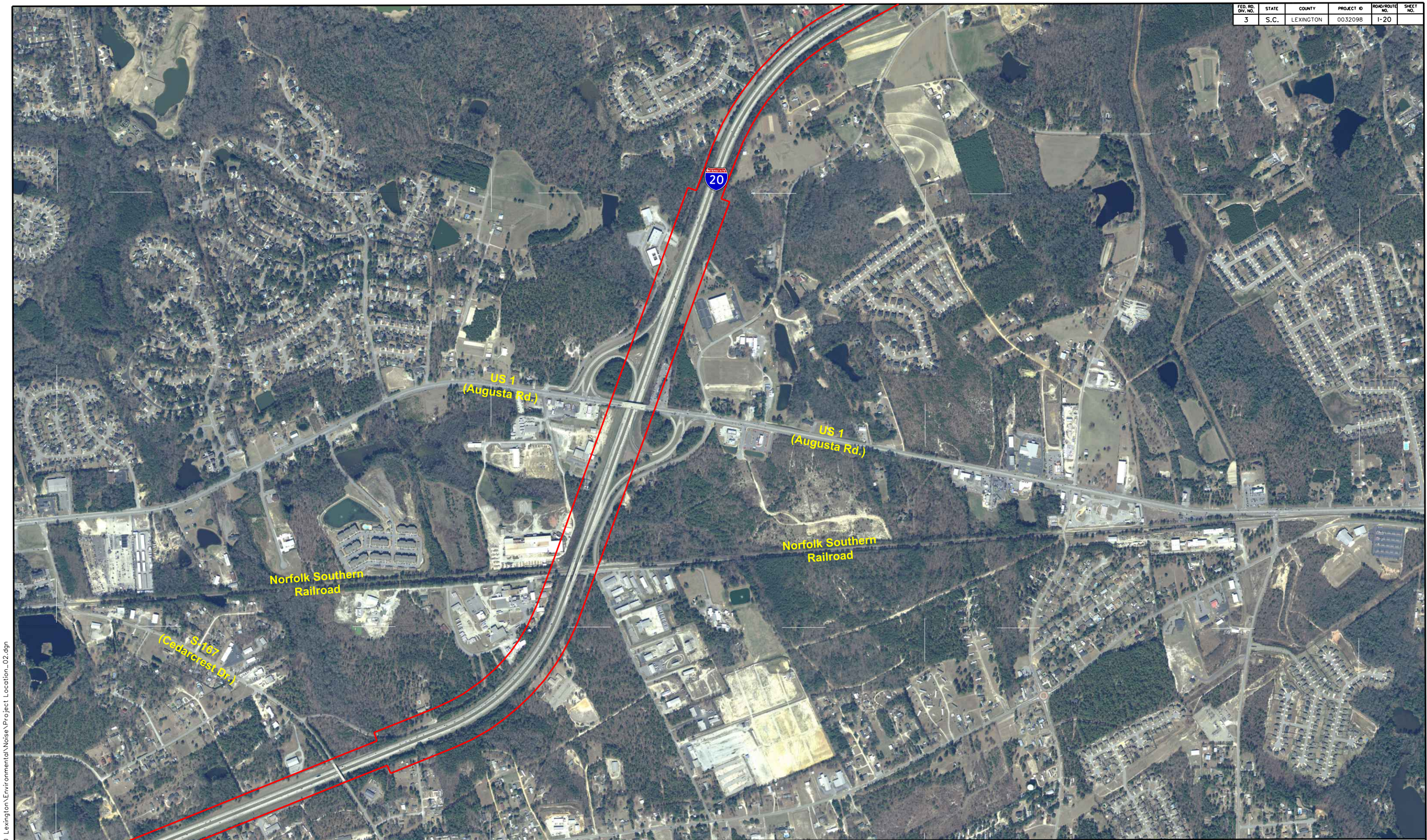
Interstate 20
Widening Project
Project Location
Lexington County, S.C.

0 500 1000
SCALE FEET
Aerial Map Source - USDA 2013

N

9/11/2015
L:\1404601 \I-20 Lexington\Environmental\Noise\Project Location_01.dgn

FED. RD. DIV. NO.	STATE	COUNTY	PROJECT ID	ROAD/ROUTE NO.	SHEET NO.
3	S.C.	LEXINGTON	0032098	I-20	



Legend

– Project Boundary

Interstate 20
Widening Project
Project Location
Lexington County, S.C.

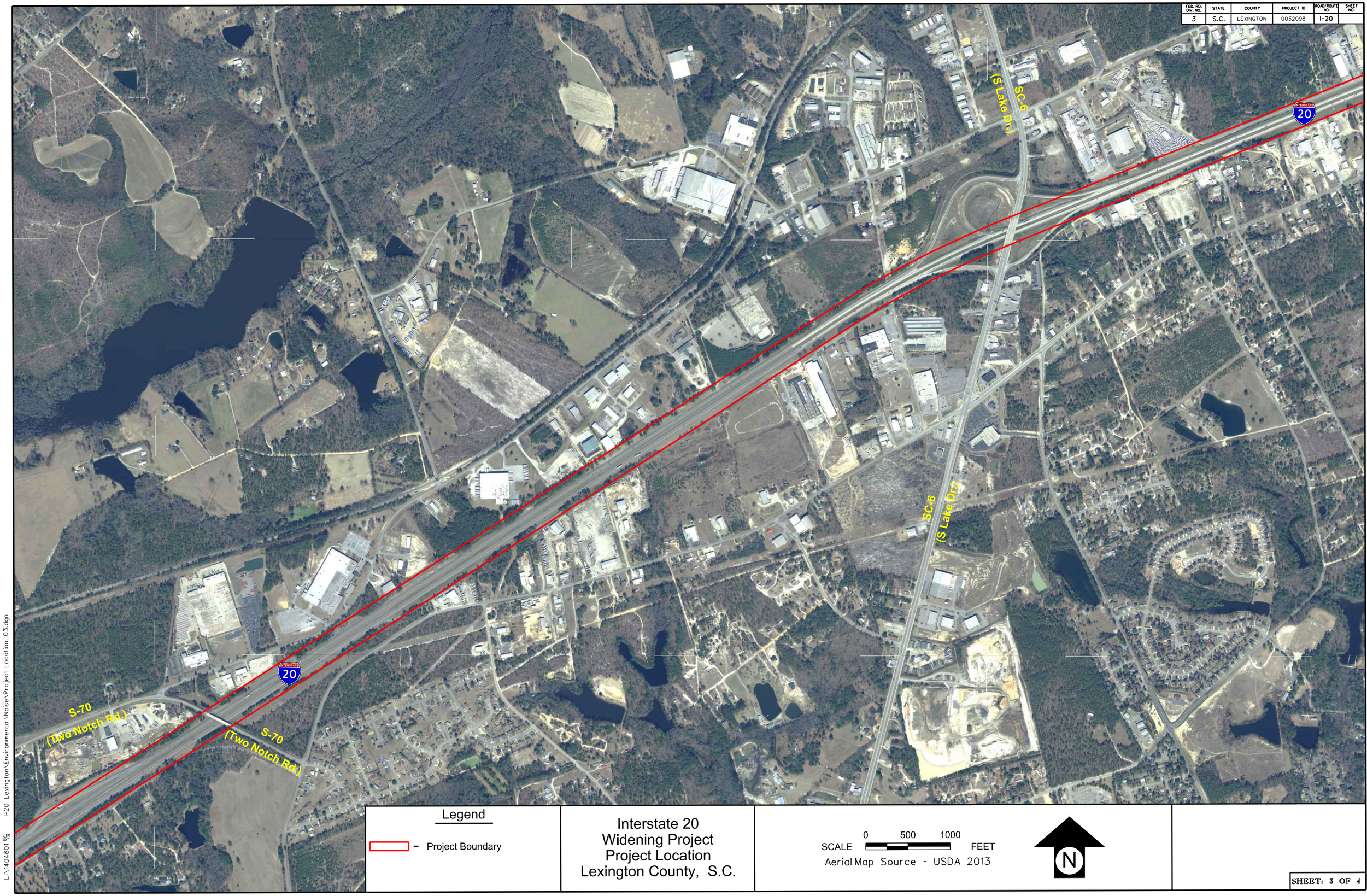
SCALE 0 500 1000 FEET

Aerial Map Source - USDA 2013

N

9/11/2015
L:\1404601 ½
I-20 Lexington\Environmental\Noise\Project Location_02.dgn

FED. RD. DIV. NO.	STATE	COUNTY	PROJECT ID	ROAD/ROUTE NO.	SHEET NO.
3	S.C.	LEXINGTON	0032098	I-20	



Legend

– Project Boundary

Interstate 20
Widening Project
Project Location
Lexington County, S.C.

SCALE 0 500 1000 FEET

Aerial Map Source - USDA 2013

N

SHEET: 3 OF 4

9/11/2015 L:\1404601 I-20 Lexington\Environmental\Noise\Project Location_03.dgn

FED. RD. DIV. NO.	STATE	COUNTY	PROJECT ID	ROAD/ROUTE NO.	SHEET NO.
3	S.C.	LEXINGTON	0032098	I-20	

End Project
(Approx.) Sta. 770+80

S-204
(Longs Pond Rd.)

INTERSTATE
20

S-204
(Longs Pond Rd.)

INTERSTATE
20

Legend

– Project Boundary

Interstate 20
Widening Project
Project Location
Lexington County, S.C.

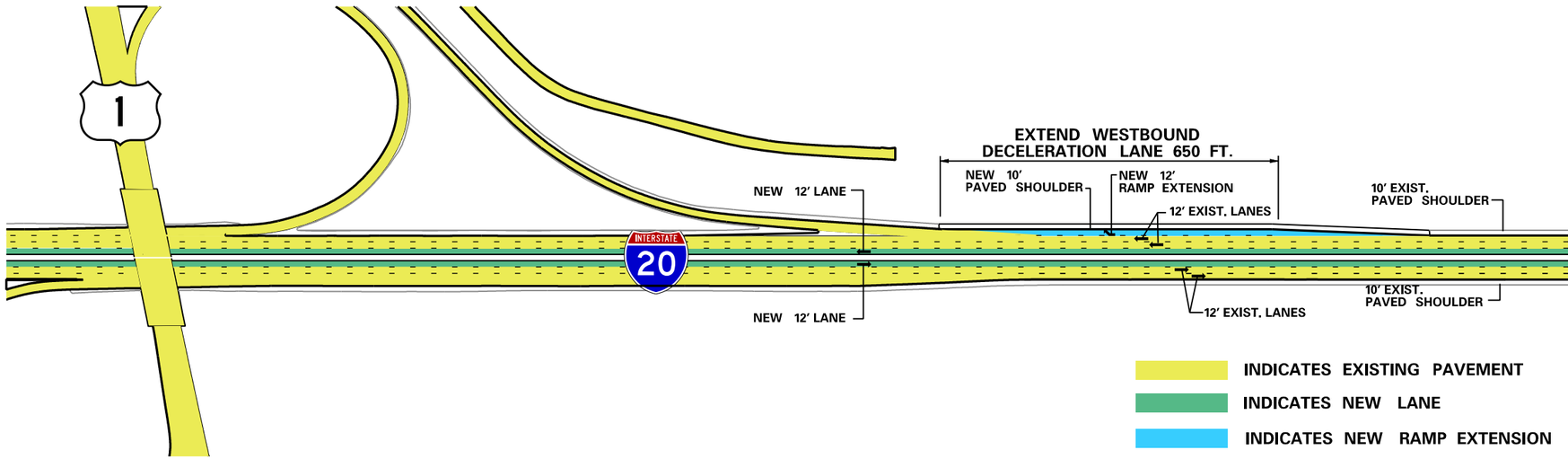
0 500 1000
SCALE FEET
Aerial Map Source - USDA 2013

N

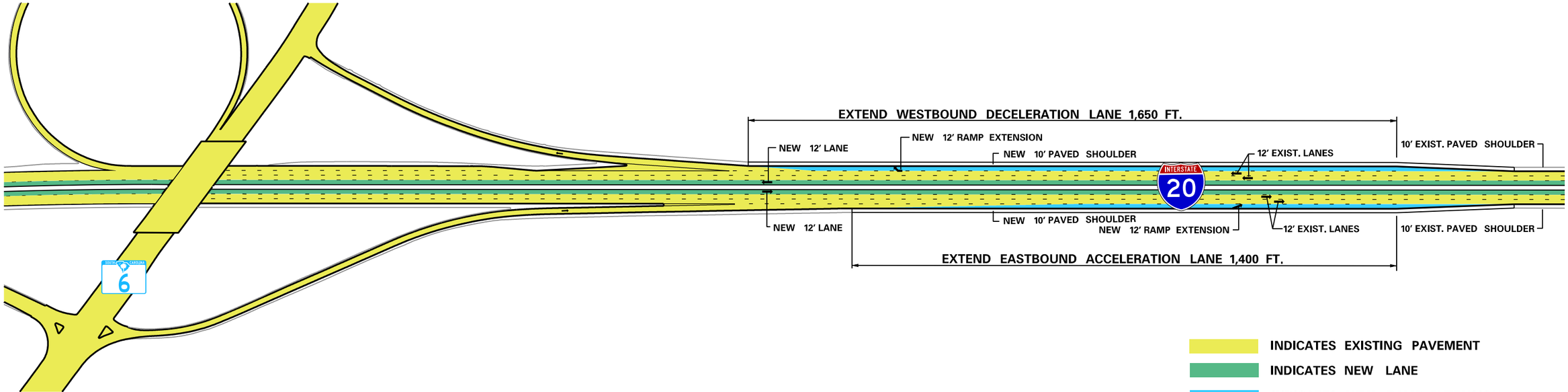
SHEET: 4 OF 4

9/11/2015
L:\1404601 ⁰⁄₀₀
I-20 Lexington\Environmental\Noise\Project Location_04.dgn

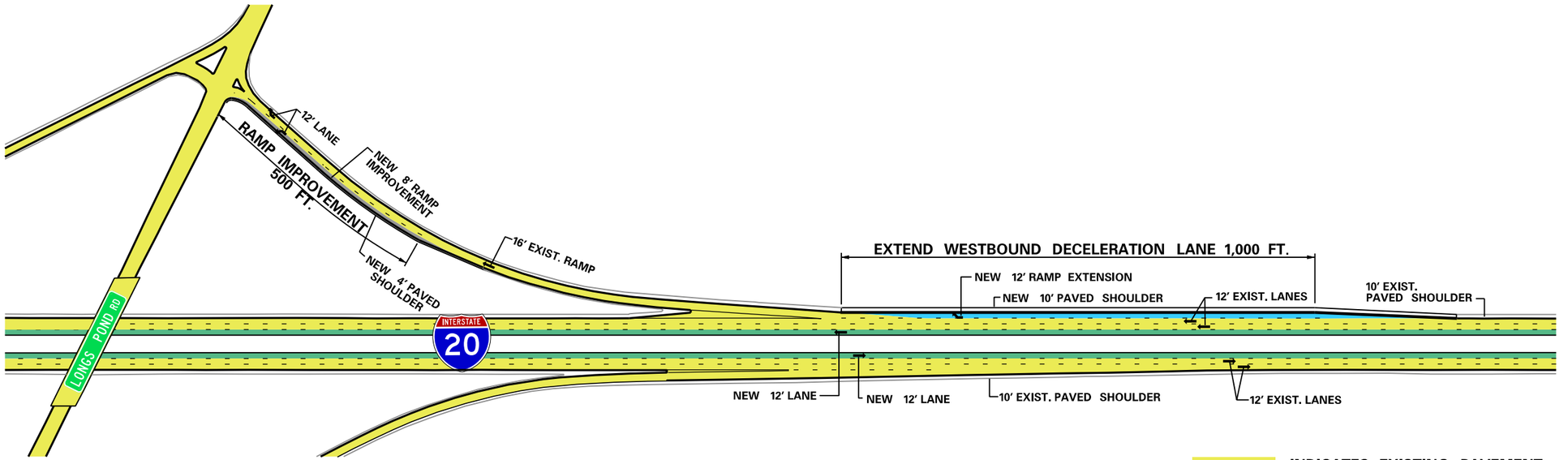
APPENDIX B
Interchange Improvements



U.S. RTE. 1 INTERCHANGE RAMP IMPROVEMENTS



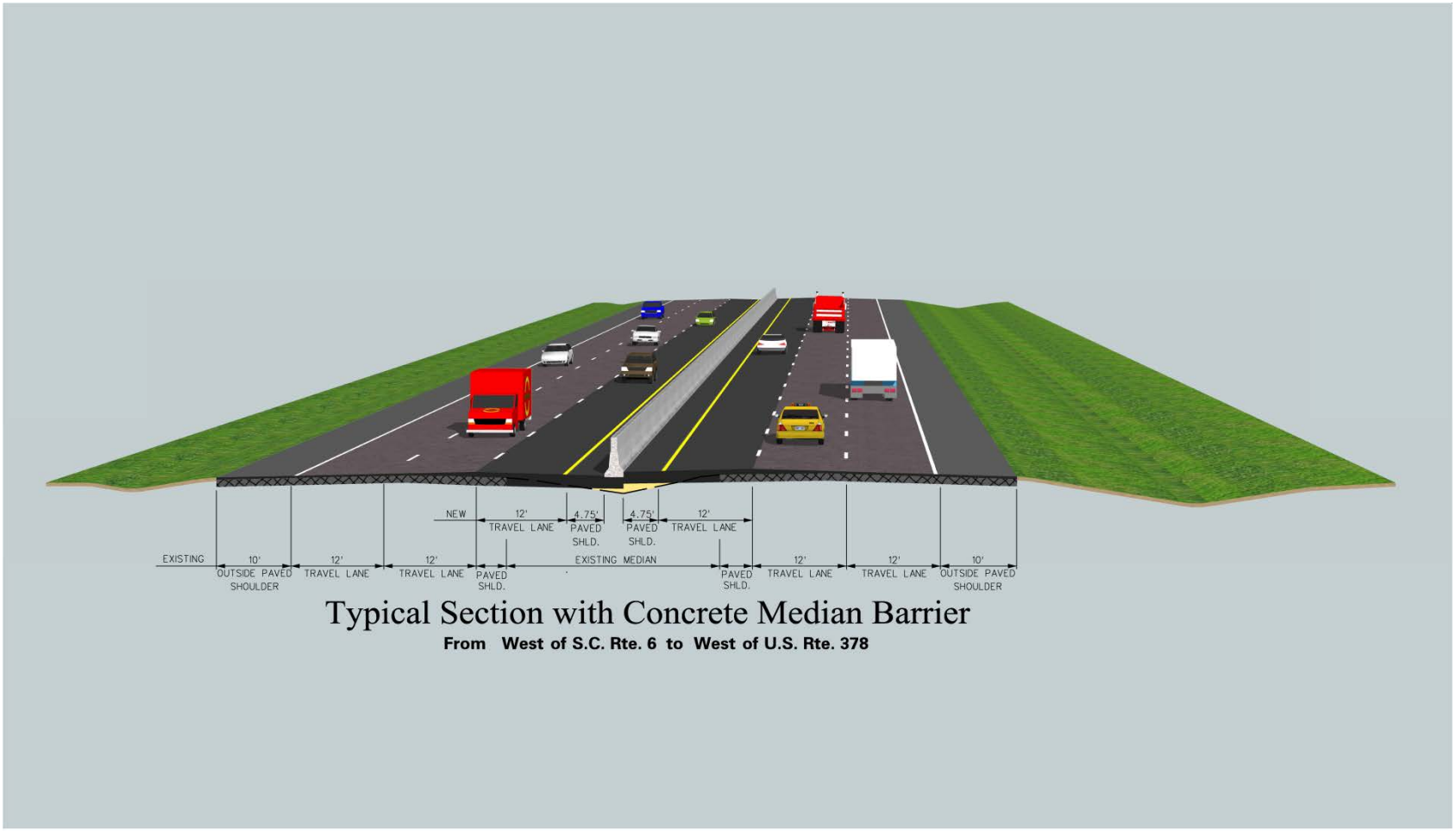
S.C. RTE. 6 INTERCHANGE RAMP IMPROVEMENTS



LONGS POND RD. INTERCHANGE RAMP IMPROVEMENTS


US 1/I-20 Interchange Improvements

APPENDIX C
Typical Sections



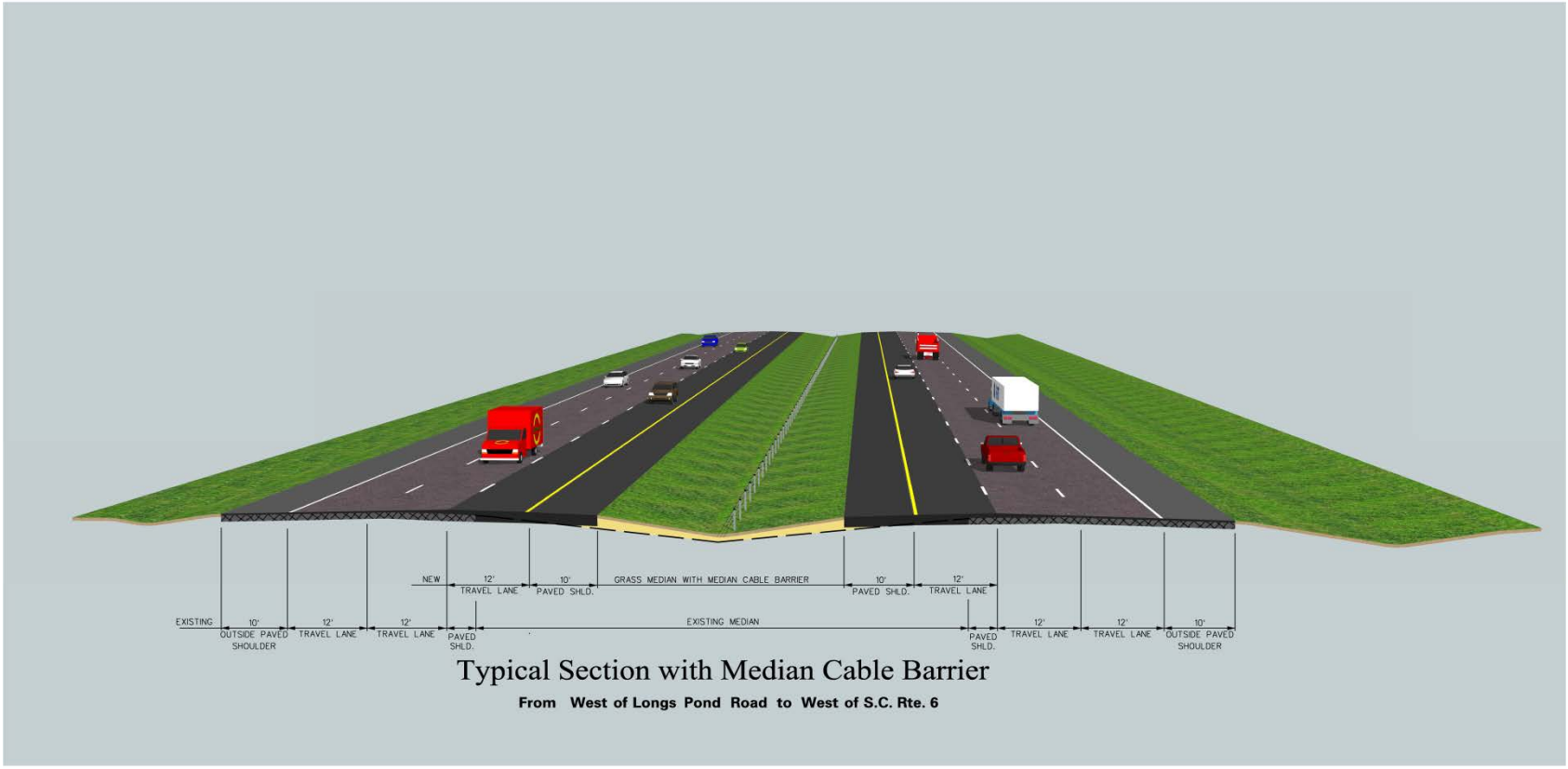
Typical Section with Concrete Median Barrier

From West of S.C. Rte. 6 to West of U.S. Rte. 378

Typical Sections

I-20 Widening

Lexington County



Typical Section with Median Cable Barrier

From West of Longs Pond Road to West of S.C. Rte. 6

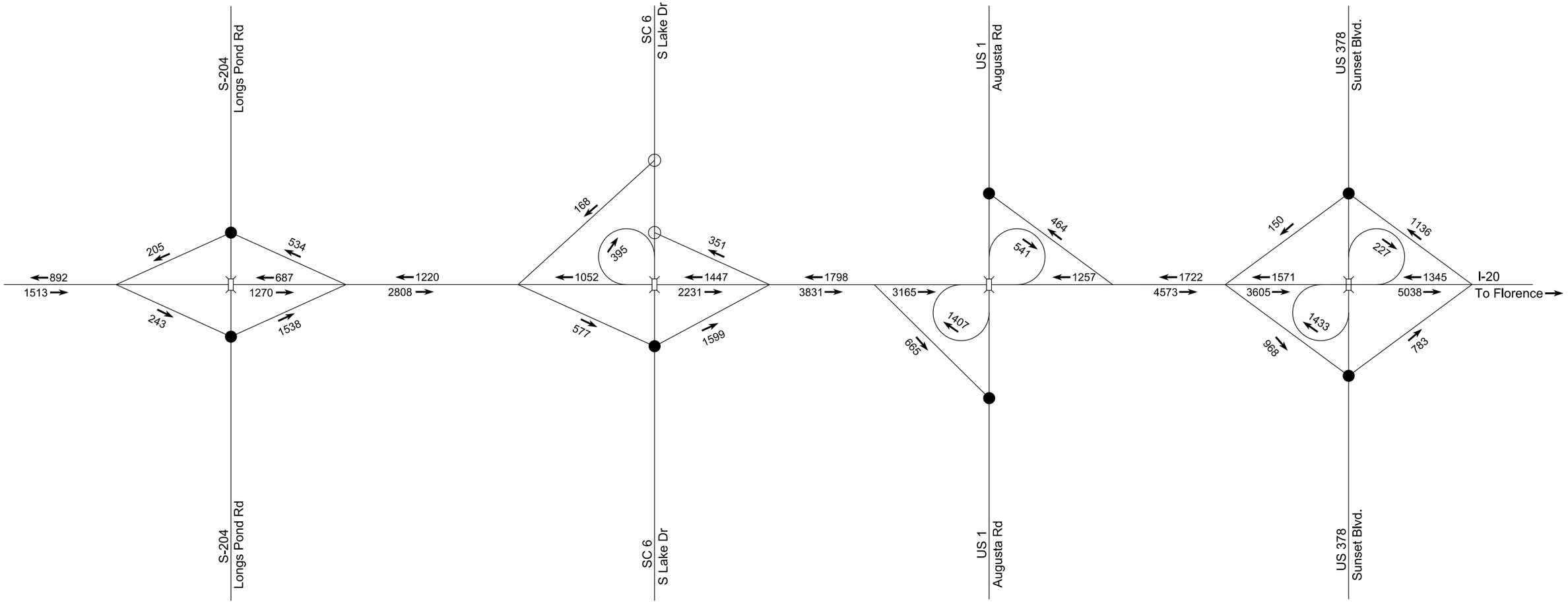
Typical Sections

I-20 Widening

Lexington County

APPENDIX D
Traffic Flow Diagrams

NOT TO SCALE



= Unsignalized Intersection

= Signalized Intersection

$$user$$
$$$$$$path$$$$$$$$filename$$$$$$$$
$$$date$$$$

SCDOT
South Carolina Department of Transportation

TRAFFIC ENGINEERING
COLUMBIA,S.C.

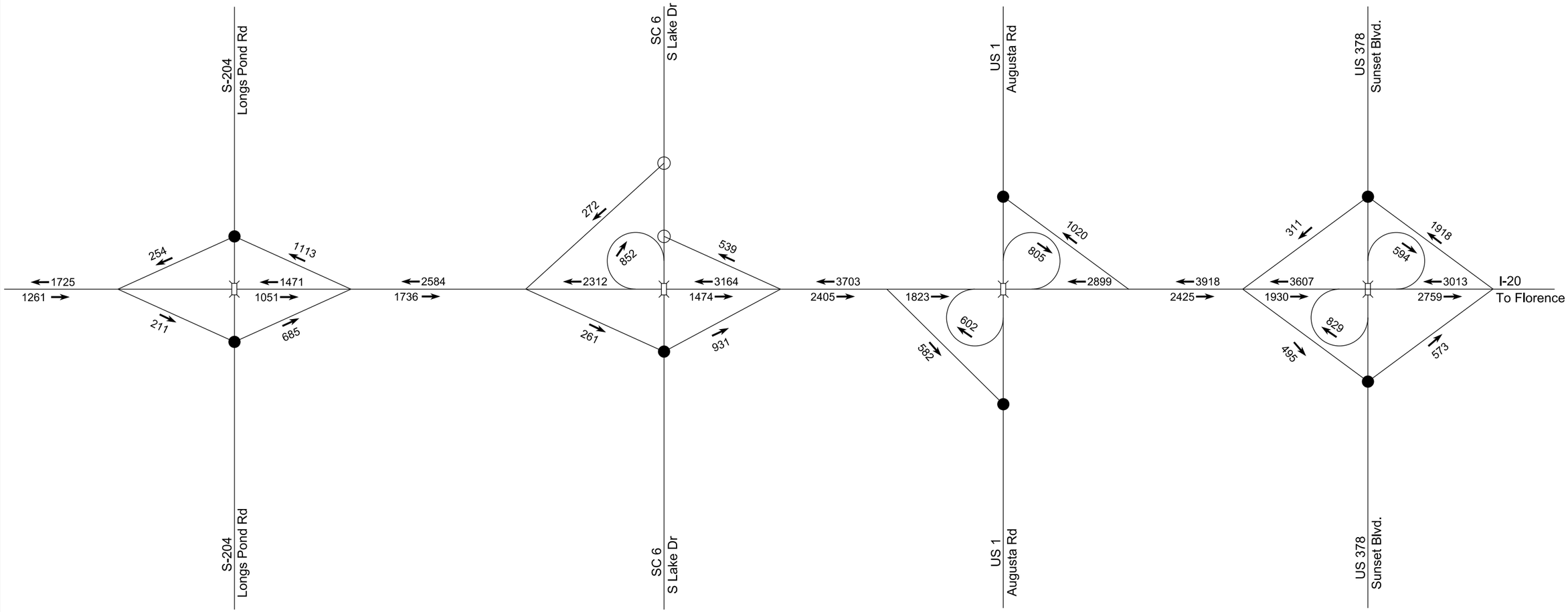
2017 AM PEAK HOUR VOLUMES

SPECIFIC LOCATION

I-20 FROM LONGS POND ROAD TO US 378

CITY	COUNTY	
	LEXINGTON	
DIAGRAM NO.	DATE	PAGE NO.
	12/22/2014	1 OF 1

NOT TO SCALE



= Unsignalized Intersection

= Signalized Intersection

$$user$$
$$$$$$path$$$$$$$$filename$$$$$$$$
$$$date$$$$

SCDOT
South Carolina Department of Transportation

TRAFFIC ENGINEERING
COLUMBIA,S.C.

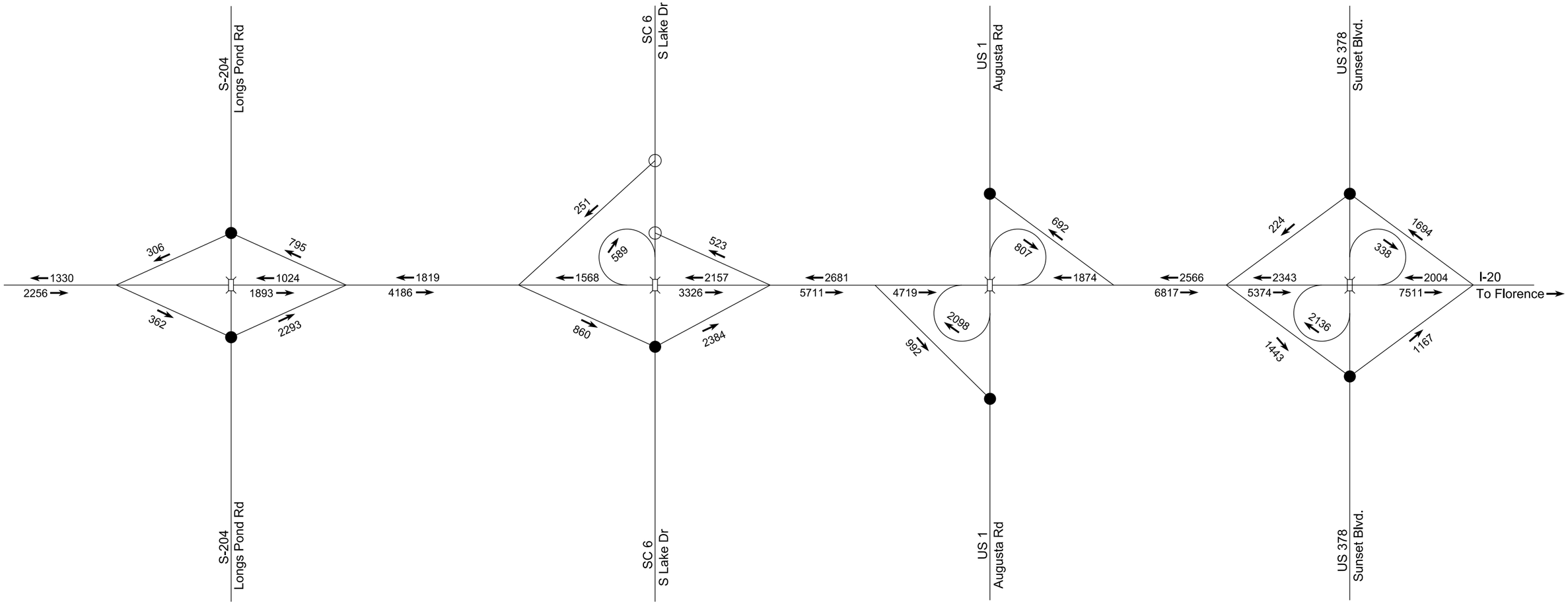
2017 PM PEAK HOUR VOLUMES

SPECIFIC LOCATION

I-20 FROM LONGS POND ROAD TO US 378

CITY		COUNTY LEXINGTON	
DIAGRAM NO.	DATE	PAGE NO.	
	12/22/2014	1 OF 1	

NOT TO SCALE



= Unsignalized Intersection

= Signalized Intersection

$$user$$
$$$$$$path$$$$$$$$filename$$$$$$$$
$$$date$$$$

SCDOT
South Carolina Department of Transportation

TRAFFIC ENGINEERING
COLUMBIA,S.C.

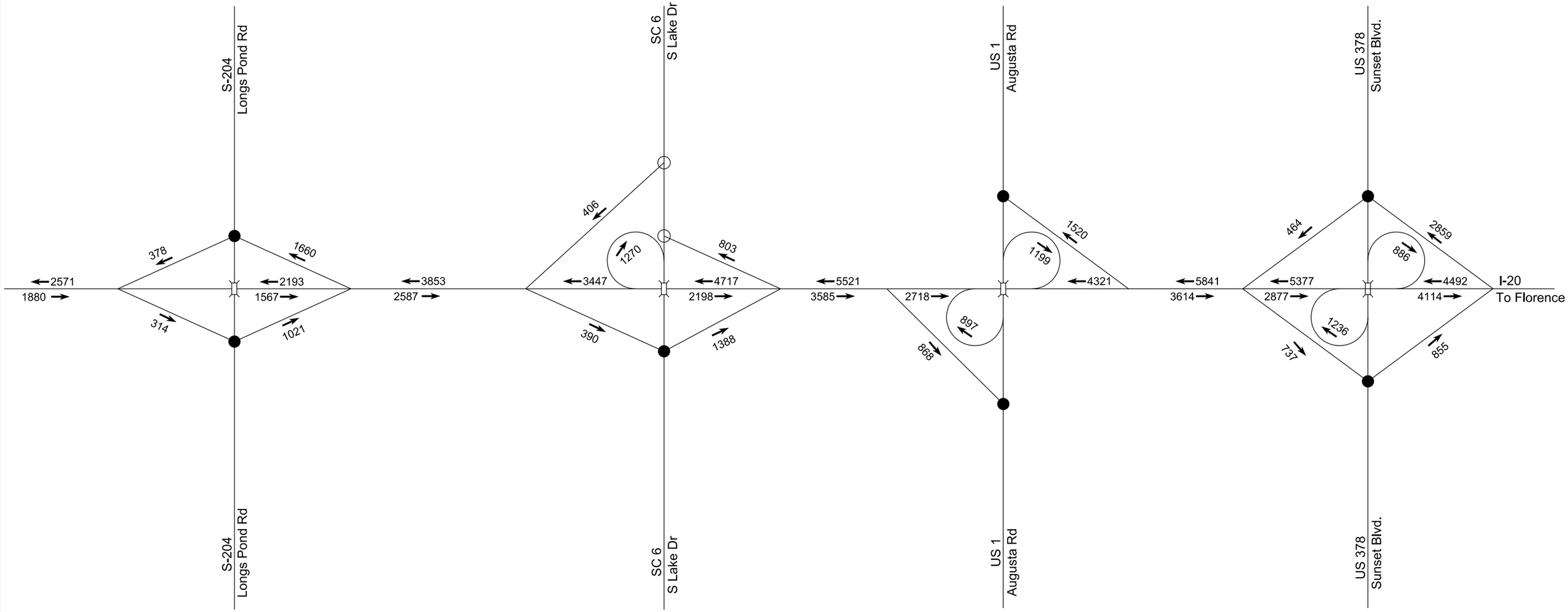
2037 AM PEAK HOUR VOLUMES

SPECIFIC LOCATION

I-20 FROM LONGS POND ROAD TO US 378

CITY		COUNTY LEXINGTON	
DIAGRAM NO.	DATE	PAGE NO.	
	12/22/2014	1 OF 1	

NOT TO SCALE



○ = Unsignalized Intersection

● = Signalized Intersection

$$user$$
$$$$$$path$$$$$$$$filename$$$$$$$$
$$$date$$$$

SCDOT
South Carolina Department of Transportation

TRAFFIC ENGINEERING
COLUMBIA,S.C.

2037 PM PEAK HOUR VOLUMES

SPECIFIC LOCATION

I-20 FROM LONGS POND ROAD TO US 378

CITY		COUNTY LEXINGTON	
DIAGRAM NO.	DATE	PAGE NO.	
	12/22/2014	1 OF 1	

APPENDIX E
Noise Analysis Report

Interstate 20 Improvement Project

South Carolina Department of Transportation

Traffic Noise Analysis Report

Interstate 20 Improvement Project

Lexington County, South Carolina

Prepared by:

ICA Engineering

June 2015

Revised September 2015

TRAFFIC NOISE ANALYSIS SUMMARY REPORT
Interstate 20 Widening
(US Route 378 to Longs Pond Road)
Lexington County, South Carolina

EXECUTIVE SUMMARY

The Code of Federal Regulations (CFR) Section 23, Part 772 contains the Federal Highway Administration (FHWA) traffic noise standards. The South Carolina Department of Transportation (SCDOT) has implemented these standards in its Traffic Noise Abatement Policy. A traffic noise analysis is required for proposed Federal-aid highway projects that will construct a highway on new location or physically alter an existing highway, which will significantly change either the horizontal or vertical alignment of the road or increase the number of through-traffic lanes. Traffic noise impacts are predicted for this project. Noise abatement measures have been considered for reducing or eliminating the traffic noise impacts in accordance SCDOT's Traffic Noise Abatement Policy.

A noise analysis was completed for this project in February/March of 2015. The noise analysis has been prepared to comply with the SCDOT Traffic Noise Abatement Policy implemented in August of 2014.

An analysis was performed on Interstate 20 (I-20) from US Route 378 to Longs Pond Road in Lexington County, South Carolina to determine the effect of the project on traffic noise levels in the immediate area (Attachment 1). This investigation includes an inventory of existing noise sensitive land uses, and a field survey of background (existing) noise levels in the project study area. It also includes a comparison of the predicted noise levels and the background noise levels to determine if traffic noise impacts can be expected resulting from the proposed project. Traffic noise impacts are predicted for this project.

TNM version 2.5, a FHWA traffic noise prediction model, was used in the analysis to compare existing and future Leq(h) noise levels. Leq(h) is the average energy of a sound level over a one hour period. A-weighted decibels (dBa) are the units of measurement used in the study.

Existing noise measurements were taken in the vicinity of the project to quantify the existing acoustic environment and to provide a base for assessing the impact of noise level increases. Model inputs included existing and proposed roadway characteristics,

estimated traffic volumes, and receiver locations. Table 1 lists the traffic data used to estimate Leq(h) noise levels expected to occur in the project area by the year 2037.

Table 1 - Traffic Data for Noise Analysis

Roadway Section	Speed (mph)	Two Way Design Hourly Traffic	One Way Hourly Traffic	Hourly Volume Cars (vph)	Hourly Volume Medium Trucks (vph)	Hourly Heavy Trucks (vph)
2015 Traffic Computations						
US Route 378 to US Route 1	70	6240	3120	2683	94	343
US Route 1 to SC Route 6	70	6080	3040	2615	91	334
SC Route 6 to Longs Pond Road	70	4580	2290	1969	69	252
2037 Traffic Computations						
US Route 378 to US Route 1	70	9420	4710	4051	141	518
US Route 1 to SC Route 6	70	8750	4375	3763	131	481
SC Route 6 to Longs Pond Road	70	6230	3115	2679	93	343

Source: SCDOT Traffic Division

Table 2 shows the comparison of field measurements versus modeled noise levels. The calculated noise levels for the measurement sites range from 61.0 to 72.5 dBA. The difference between field measured and calculated noise levels at 10 of the 11 locations is less than 3 dBA, validating the results of the TNM model.

Table 2 - Existing TNM Calculated Noise Levels vs. Field Measurements

Site-Receiver	Location	Field Measurement Noise Level (dBA)	TNM Calculated Noise Level (dBA)	Difference (dBA)
1	222 Cromer Road	66.6	71.8	5.2
2	Meadow Glenn Elementary School	67.5	68.6	1.1
3	100 Chamfort Road	72.5	72.7	0.2
4	198 Woodside Road	72.2	70.7	-1.5
5	763 Cromer Road	69.3	68.7	-0.6
6	101 Winterberry Road	66.0	68.9	2.9
8	Gethsemane Baptist Church	64.8	67.0	2.2
9	136 Elvington Lane	69.0	67.9	-1.1
10	105 B Old Orangeburg Road	68.6	70.6	2.0
11	106 Hidden Springs Road	61.0	62.4	1.4
13	218 Glenforest Court	61.8	63.8	2.0

Difference = Measured Leq minus Modeled Leq

The FHWA has developed Noise Abatement Criteria (NAC) and procedures to be used in the planning and design of highways to determine whether highway noise levels are or

are not compatible with various land uses (Table 3). The abatement criteria and procedures are set forth in the aforementioned Federal reference (Title 23 CFR Part 772).

Table 3 – FHWA Noise Abatement Criteria

Activity Category	Activity Criteria\2\		Evaluation Location	Activity Description
	Leq(h)	L10(h)		
A	57	60	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 purpose.
B\3\	67	70	Exterior	Residential
C\3\	67	70	Exterior	Active sport areas, amphitheaters, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails, and trail crossings
D	52	55	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\3\	72	75	Exterior	Motels, hotels, offices, restaurant/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

\1\ Either Leq(h) or L10(h) (but not both) may be used on a project

\2\ The Leq(h) and L10(h) Activity Criteria values are for impact determination only, and are not design standards for noise abatement measures

\3\ Includes undeveloped lands permitted for this activity category

Traffic noise impacts occur when the predicted traffic noise levels either: (a) approach or exceed the FHWA noise abatement criteria ("approach" meaning within 1 dBA of the value listed in Table 3), or (b) substantially exceed the existing noise levels. According to the SCDOT Traffic Noise Abatement Policy, a 15 dBA increase is deemed to be a "substantial increase." Consideration for noise abatement measures must be given to receivers that fall in either category.

The results of the noise analysis indicate that traffic related noise impacts would occur to 192 receivers under the 2037 build alternative. However, 218 receivers would be impacted under 2037 no-build alternative. No receivers were found to substantially exceed the FHWA noise abatement criteria. Table 4 provides a summary of the noise analysis results.

Table 4: Summary of Noise Impact Analysis

ROADWAY LOCATION	TOTAL NO. OF RECEIVERS	APPROXIMATE # OF IMPACTED RECEIVERS ACCORDING TO TITLE 23 CFR PART 772 / SCDOT POLICY				
		A	B	C	D	E
2037 Year No-Build Alternative						
SC 6 to Longs Pond Road	88	---	48	---	---	---
US 1 to SC 6	89	---	89	---	---	---
US 378 to US 1	93	---	81	---	---	---
Total	270	**---**	**218**	**---**	**---**	**---**
2037 Year Build Alternative						
SC 6 to Longs Pond Road	88	---	58	---	---	---
US 1 to SC 6	89	---	68	---	---	---
US 378 to US 1	93	---	66	---	---	---
Total	**270**	**---**	**192**	**---**	**---**	**---**

Noise Barrier Analysis Areas

If traffic noise impacts are predicted, noise abatement measures for reducing or eliminating the noise impacts must be considered. Seven potential barrier locations were identified and were evaluated as part of the preliminary noise analysis. This barrier analysis was prepared in accordance with the SCDOT Traffic Abatement Noise Policy for feasibility and reasonableness. Six of seven barrier locations were found to meet the feasibility criteria for acoustics and engineering. However, these barrier locations were found not to be reasonable. Barrier 1 located near the US 378 Interchange at Meadow Glenn Middle School was found to be both reasonable and feasible.

TABLE OF CONTENTS

INTERSTATE 20 WIDENING NOISE ANALYSIS
(U.S. ROUTE 378 TO LONGS POND ROAD)
LEXINGTON COUNTY, SOUTH CAROLINA

LIST OF TABLES

ATTACHMENTS

I. HIGHWAY TRAFFIC NOISE ANALYSIS

A. Introduction

The Code of Federal Regulations (CFR) Section 23, Part 772 contains the FHWA traffic noise standards. The SCDOT has implemented these standards in its Traffic Noise Abatement Policy. A traffic noise analysis is required for proposed Federal-aid highway projects that will construct a highway on new location or physically alter an existing highway, which will significantly change either the horizontal or vertical alignment of the road or increase the number of through-traffic lanes. Traffic noise impacts are predicted for this project. Noise abatement measures have been considered for reducing or eliminating the traffic noise impacts in accordance SCDOT's Traffic Noise Abatement Policy.

An analysis was performed on Interstate 20 (I-20) from US Route 378 to Longs Pond Road in Lexington County, South Carolina to determine the effect of the project on traffic noise levels in the immediate area (Attachment 1). This investigation includes an inventory of existing noise sensitive land uses, and a field survey of background (existing) noise levels in the project study area. It also includes a comparison of the predicted noise levels and the background noise levels to determine if traffic noise impacts can be expected resulting from the proposed project. Traffic noise impacts are predicted for this project.

B. Project Description

The SCDOT proposes to widen I-20 from four to six travel lanes from mile point 60.2 (west of US 378) on the eastern terminus to approximately mile point 49 (west of Longs Pond Road) on the western terminus for a total distance of approximately 11 miles (Figure 1). The scope of the project includes adding a travel lane in each direction, improving various exit ramps, replacing or widening the parallel mainline bridges over Norfolk Southern Railroad near mile point 57, safety improvements at the intersections of US 1 and off ramps, and a potential noise wall along Ginny Lane. The proposed widening would occur within the existing median to minimize right-of-way impacts. Interchange improvements would include: extending the US 1 westbound off-ramp approximately 650 feet; extending the SC 6 eastbound on-ramp approximately 1400 feet and the westbound off-ramp approximately 1650 feet; extending the Longs Pond Road westbound off-ramp approximately 1000 feet and widening of the westbound off-ramp terminal to form a right turn lane and left turn lane. The project boundary includes a corridor of approximately 120 feet from the centerline of the eastbound and westbound lanes. This corridor extends to 220 feet along the US 1 interchange and the Longs Pond

Road interchange. The purpose of the project is to improve the operational efficiency of I-20 by increasing the capacity of the interstate.

For this noise analysis the project was divided into three sections based on the varying traffic counts identified throughout the corridor. The sections are listed below.

- Section 1 – US 378 to US 1 (Receivers 156-219, 252-285, 294)
- Section 2 – US 1 to SC 6 (Receivers 53-155)
- Section 3 – SC 6 to Longs Pond Road (Receivers 1-52, 220-251, 286-293)

C. Characteristics of Noise

Noise is basically defined as unwanted sound. It is emitted from many sources including airplanes, factories, railroads, commercial businesses, and highway vehicles. Highway traffic noise is usually a composite of noises from engine exhaust, drive train, and tire-roadway interaction. Of these sources, tire noise is typically the most offensive at unimpeded travel speeds.

The magnitude of noise is usually described by its sound pressure. Since the range of sound pressure varies greatly, a logarithmic scale is used to relate sound pressures to some common reference level, usually the decibel (dB). Sound pressures described in decibels are called sound pressure levels and are often defined in terms of frequency weighted scales (A, B, C, or D).

The weighted-A decibel scale is used almost exclusively in vehicle noise measurements because it places the most emphasis on the frequency range to which the human ear is most sensitive (1,000-6,000 Hertz). Sound levels measured using a weighted-A decibel scale are often expressed as dBA. Throughout this report, all noise levels will be expressed in dBA's.

Most individuals are exposed to fairly high noise levels from many sources as they go about their daily activities. Sound levels experienced by individuals on a daily basis are listed in Table 1.

Table 1 – Daily Sounds

DECIBELS		
140	Shotgun blast, jet 100' away at takeoff	PAIN
	Motor test chamber	HUMAN EAR PAIN THRESHOLD
130	---	---
	Firecrackers	
120	Severe thunder, pneumatic jackhammer	
	Hockey crowd	
	Amplified rock music	UNCOMFORTABLY LOUD
110	---	---
	Textile loom	
100	Subway train, elevated train, farm tractor	
	Power lawn mower, newspaper press	
	Heavy city traffic, noisy factory	LOUD
90	---	---
	Diesel truck 40 mph at 50' away	
80	Crowded restaurant, garbage disposal	
	Average factory, vacuum cleaner	
	Passenger car 50 mph at 50' away	MODERATELY LOUD
70	---	---
	Quiet typewriter	
60	Singing birds, window air-conditioner	
	Quiet automobile	
	Normal conversation, average office	QUIET
50	---	---
	Household refrigerator	
	Quiet office	VERY QUIET
40	---	---
	Average home	
30	Dripping faucet	
	Whisper at 5' away	
20	Light rainfall, rustle of leaves	
	AVERAGE PERSON'S THRESHOLD OF HEARING	
	Whisper	JUST AUDIBLE
10	---	---
0	THRESHOLD FOR ACUTE HEARING	

Sources: World Book, Rand McNally Atlas of the Human Body, Encyclopedia America, "Industrial Noise and Hearing Conversation" by J. B. Olishifski and E. R. Harford (Researched by N. Jane Hunt and published in the Chicago Tribune in an illustrated graphic by Tom Heinz.)

The degree of disturbance or annoyance of unwanted sound depends essentially on three things:

1. The amount and nature of the intruding noise.
2. The relationship between the background noise and the intruding noise.
3. The type of activity occurring when the noise is heard.

In considering the first of these factors, it is important to note that individuals have different sensitivity to noise. Loud noises disturb some individuals more than others and

some individuals become upset if an unwanted noise persists. The time patterns of noise also enter into an individual's judgment of whether or not a noise is offensive. For example, noises that occur during sleeping hours are usually considered to be more offensive than the same noises in the daytime.

With regard to 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). The blowing of a car horn at night when background noise levels are approximately 45 dBA would generally be more objectionable than the blowing in the afternoon when background noises might be 55 dBA.

The third factor is related to the interference of noise with activities of individuals. In a 60 dBA environment, normal conversation would be possible while sleep might be difficult. Work activities requiring high levels of concentration may be interrupted by loud noises while activities requiring manual effort may not be interrupted to the same degree.

Over time, particularly if the noises occur at predicted intervals and are expected, individuals tend to accept the noises that intrude into their lives. Attempts have been made to regulate many of these types of noises including airplane noise, factory noise, railroad noise, and highway noise. In relation to highway traffic noise, methods of analysis and control have developed rapidly over the past few years.

D. Noise Abatement Criteria

The FHWA has developed NAC and procedures to be used in the planning and design of highways to determine whether highway noise levels are or are not compatible with various land uses. The abatement criteria and procedures are set forth in the aforementioned Federal reference (Title 23 CFR Part 772). A summary of the noise abatement criteria for various land uses is presented in Table 2.

Table 2 – FHWA Noise Abatement Criteria

Activity Category	Activity Criteria\2\		Evaluation Location	Activity Description
	Leq(h)	L10(h)		
A	57	60	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 purpose.
B\3\	67	70	Exterior	Residential
C\3\	67	70	Exterior	Active sport areas, amphitheaters, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails, and trail crossings
D	52	55	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\3\	72	75	Exterior	Motels, hotels, offices, restaurant/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

\1\ Either Leq(h) or L10(h) (but not both) may be used on a project

\2\ The Leq(h) and L10(h) Activity Criteria values are for impact determination only, and are not design standards for noise abatement measures

\3\ Includes undeveloped lands permitted for this activity category

Activity Category A consists of tracts of land that are locally significant for their serenity and quiet surroundings. Activity Category B consists of residential properties. Activity Category C consists of exterior locations of public outdoor areas, places of worship, cemeteries, recreational areas, etc. Activity Category D consists primarily of the same activities as Activity Category C but is for interior locations. Activity Category E

consists of hotel/motels, offices, restaurants, and other developed land with activities not included in Activity Categories A-D. Activity F consists of agricultural lands, airports, and commercial/industrial facilities. Activity G is for undeveloped lands not presently permitted. Activity Categories adjacent to the project are mostly residential category (B).

Sound pressure levels in this report are referred to as Leq(h). The hourly Leq, or equivalent sound level, is the level of constant sound in a one-hour time period that would have the same energy as a time-varying sound. In other words, the fluctuating sound levels of traffic noise are represented in terms of a steady noise level with the same energy content.

E. Existing Noise Levels

Existing noise measurements were taken in the vicinity of the project to quantify the existing acoustic environment and to provide a base for assessing the impact of noise level increases. For all locations, the measurement device was set at approximately 60 inches above the existing ground elevation. There are 11 traffic noise measurement sites which are in Table 3:

The existing Leq(h) traffic noise levels, as measured at each site, and the type of ground conditions identified at each site can be found in Table 3.

Table 3 - Existing Noise Levels [Leq(h)]

Site-Rec.	Location	Description	Noise Level (dBA)
1	222 Cromer Road	Grass	66.6
2	Meadow Glenn Middle School	Grass	67.5
3	100 Chamfort Drive	Grass	72.7
4	198 Woodside Road	Grass	72.2
5	763 Cromer Road	Grass	69.3
6	101 Winterberry Drive	Grass	66.0
8	300 Alliance Road	Grass	64.8
9	136 Elvington Lane	Grass	69.0
10	105B Old Orangeburg Road	Dirt	68.6
11	106 Hidden Springs Road	Grass	61.0
13	218 Glenforest Court	Grass	61.8

Note: See Attachments for noise measurement data sheets.

The existing roadway and traffic conditions were used with the current traffic noise prediction model (TNM version 2.5, February 2004) to calculate existing noise levels for comparison with actual measured noise levels. Project-related traffic noise level increases are based upon the existing loudest-hour noise levels. See Table 4 for traffic

counts during field measurements. All measurements were performed on October 27, 2014.

Table 4 - Field Noise Measurements

Site-Rec.	Time Period	Hourly Traffic Based on Concurrent Traffic Counts										Measured Leq
		Eastbound Lanes					*Westbound Lanes*					
		Autos	MT	HT	Bus	MC	Autos	MT	HT	Bus	MC	
1	1:08PM-1:22PM	348	11	43	0	1	334	12	48	0	0	66.6
2	5:07PM-5:21PM	476	6	55	2	0	915	6	30	0	0	67.5
3	4:38PM-4:52PM	386	12	49	0	0	815	21	44	0	1	72.7
4	12:04PM-12:18PM	320	5	42	0	2	329	8	37	2	0	72.2
5	11:31AM-11:45AM	420	18	38	0	1	234	8	52	1	0	69.3
6	4:01PM-4:15PM	365	8	48	0	2	450	19	53	0	1	66.0
8	10:53AM-11:07AM	319	10	23	0	0	260	16	55	0	0	64.8
9	10:20AM-10:34AM	380	13	48	0	0	235	16	46	2	0	69.0
10	9:43AM-9:57AM	361	18	43	0	1	270	18	30	0	2	68.6
11	8:56AM-9:10AM	288	10	37	0	0	190	10	31	0	0	61.0
13	8:12AM-8:26AM	217	4	23	0	0	162	11	33	0	0	61.8

MT = Medium Trucks; HT = Heavy Trucks; MC = Motorcycles - Data was obtained on October 27-28, 2014.

Table 5 shows the comparison of field measurements versus modeled noise levels. The calculated noise levels for the measurement sites range from 45.4 to 63.1 dBA. The difference between field measured and calculated noise levels at 12 of the 13 locations is less than 3 dBA, validating the results of the TNM model.

Table 5 - Existing TNM Calculated Noise Levels vs. Field Measurements

Site-Receiver	Location	Field Measurement Noise Level (dBA)	TNM Calculated Noise Level (dBA)	Difference (dBA)
1	222 Cromer Road	66.6	71.8	5.2
2	Meadow Glenn Middle School	67.5	68.6	1.1
3	100 Chamfort Drive	72.5	72.7	0.2
4	198 Woodside Road	72.2	70.7	-1.5
5	763 Cromer Road	69.3	68.7	-0.6
6	101 Winterberry Drive	66.0	68.9	2.9

8	300 Alliance Road	64.8	67.0	2.2
9	136 Elvington Lane	69.0	67.9	-1.1
10	105B Old Orangeburg Road	68.6	70.6	2.0
11	106 Hidden Springs Road	61.0	62.4	1.4
13	218 Glenforest Court	61.8	63.8	2.0

Difference = Measured Leq minus Modeled Leq

F. Procedure for Predicting Future Noise Levels

Based on the SCDOT Traffic Noise Abatement Policy, a preliminary noise analysis is required for all build alternatives and under consideration in a project's NEPA document. The preliminary analysis models the most conservative noise environment to determine if there will be noise impacts, and if there are, the feasibility and reasonableness of noise abatement to mitigate the impacts. Once a preferred alternative has been identified, a detailed noise analysis is required for any noise abatement that was recommended for that alternative in the preliminary analysis.

Traffic noise is not constant; it varies in time depending upon the number, speed, type, and frequency of vehicles that pass by a given receiver. Furthermore, since traffic noise emissions are different for various types of vehicles, the TNM model distinguishes between the source emissions from the following vehicle types: automobiles, medium trucks, heavy trucks, buses, and motorcycles. The TNM traffic noise prediction model uses the number and type of vehicles on the planned roadway, their speeds, the physical characteristics of the road (curves, hills, depressed, elevated, etc.), receiver location and height, and, if applicable, barrier type, barrier ground elevation, and barrier top elevation.

Preliminary designs, aerial photography, and contour mapping were used to model the proposed roadway and receiver elevations and represent the topographical conditions. The noise predictions made in this report are highway-related noise predictions for the traffic conditions during the year 2037. They do not include other noises related to the excessive background noises (trains, airplanes and construction, etc.) that were measured during the existing conditions.

According to FHWA guidance, the predictions documented in this report are based upon the proposed roadway alignment design and traffic conditions for the year 2037 that result in the loudest predicted hourly-equivalent traffic noise levels for each receiver. Traffic noise level and location spreadsheets are included in the Attachments and contain a list of all receivers in close proximity to the project along with aerials showing the receiver locations, and summarize the loudest hour equivalent noise levels for the Existing, No-Build, and Build conditions in the year 2037 under traffic conditions within the project site. The land uses of receivers were determined by field observations and

reviewing available GIS parcel data. Table 6 lists the traffic data used in the analysis build conditions. This data is based on field observations and data obtained from SCDOT.

Table 6 - Traffic Data for Noise Analysis

Roadway Section	Speed (mph)	Two Way Design Hourly Traffic	One Way Hourly Traffic (vph)	Hourly Volume Cars (vph)	Hourly Volume Medium Trucks (vph)	Hourly Heavy Trucks (vph)
2015 Traffic Computations						
US Route 378 to US Route 1	70	6240	3120	2683	94	343
US Route 1 to SC Route 6	70	6080	3040	2615	91	334
SC Route 6 to Longs Pond Road	70	4580	2290	1969	69	252
2037 Traffic Computations						
US Route 378 to US Route 1	70	9420	4710	4051	141	518
US Route 1 to SC Route 6	70	8750	4375	3763	131	481
SC Route 6 to Longs Pond Road	70	6230	3115	2679	93	343

- mph = miles per hour
- vph = vehicles per hour
- Design hourly traffic volumes were obtained using 10% of average daily traffic provided by SCDOT.

G. Traffic Noise Impacts and Noise Thresholds

Traffic noise impacts occur when the predicted traffic noise levels either: (a) approach or exceed the FHWA noise abatement criteria ("approach" meaning within 1 dBA of the value listed in Table 2), or (b) substantially exceed the existing noise levels. According to the SCDOT Traffic Noise Abatement Policy, a 15 dBA increase is deemed to be a "substantial increase." Consideration for noise abatement measures must be given to receivers that fall in either category. The results of the noise analysis indicate that traffic related noise impacts would occur to 192 receivers under the 2037 Build Alternative. However, 218 receivers would be impacted under the 2037 No-Build Alternative. No receivers in the project area would substantially exceed the FHWA noise abatement criteria. 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 undeveloped areas. Table 7 summarizes the noise analysis results and lists the predicted distances to the 72, 67, and 66 dBA noise level contours for pertinent activity categories.

Table 7: Activity Category Critical Distances and Noise Impact Analysis

STUDY AREA	Leq(h) NOISE LEVELS[1]			ACTIVITY CATEGORY DISTANCES TO CENTERLINE		
	25 ft	50 ft	100 ft	72 dBA	67 dBA	66dBA
SC 6 to Longs Pond Road	80.5	78.5	75.8	246	417	467
US 1 to SC 6	80.7	78.4	75.6	232	451	502
US 378 to US 1	81.7	80	76.9	268	458	503

ROADWAY LOCATION	TOTAL NO. OF RECEIVERS	APPROXIMATE # OF IMPACTED RECEIVERS ACCORDING TO TITLE 23 CFR PART 772 / SCDOT POLICY				
		A	B	C	D	E
2037 Year No-Build Alternative						
SC 6 to Longs Pond Road	88	---	48	---	---	---
US 1 to SC 6	89	---	89	---	---	---
US 378 to US 1	93	---	81	---	---	---
Total	**270**	**---**	**218**	**---**	**---**	**---**
2037 Year Build Alternative						
SC 6 to Longs Pond Road	88	---	58	---	---	---
US 1 to SC 6	89	---	68	---	---	---
US 378 to US 1	93	---	66	---	---	---
Total	**270**	**---**	**192**	**---**	**---**	**---**

1. 50ft, 100 ft & 200 ft distances are measured from the outside edge of pavement
2. 72 dBA, 67 dBA and 66 dBA activity category distances are measured from the proposed centerline of the roadway

II. TRAFFIC NOISE ABATEMENT MEASURES

If traffic noise impacts are predicted, noise abatement measures for reducing or eliminating the noise impacts must be considered. Consideration for noise abatement measures have been given to impacted receivers along each alternative. The following discussion addresses the applicability of these measures to the proposed project.

A. Noise Barriers

Physical measures to abate anticipated traffic noise levels are often applied on fully controlled facilities using solid mass berms or walls strategically placed between the traffic sound source and the receivers to diffract, absorb, and reflect highway traffic noise emissions. To be effective, a noise barrier must be long enough and tall enough to shield the impacted receiver(s). Generally, the noise wall length must be eight times the distance from the barrier to the receiver. For example, if a receiver is 200 feet from the roadway, an effective barrier would be approximately 1,600 feet long – with the receiver in the horizontal center. Due to the requisite lengths for effectiveness, noise walls are

typically not economical for isolated or most low-density areas, or for most uncontrolled access facilities. On facilities where access is allowed for driveways, openings will be needed in the walls. An access opening of 40 feet in a 400-foot wall will make the wall ineffective.

According to the SCDOT's Traffic Noise Abatement Policy, a noise wall must be considered both reasonable and feasible. The feasibility of a wall is determined by constructability of the wall given the topography, presence of other dominant noise sources, and at least a 5 dBA noise reduction must be achieved for 75% of the impacted receivers. Construction of a noise wall is considered reasonable if the cost per benefited receiver is less than $30,000 and if other applicable criteria are met.

B. Highway Alignment Selection

Highway alignment selection involves the horizontal or vertical orientation of the proposed improvements in such a way as to minimize impacts and costs. 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 constructing the proposed roadway at a sufficient distance from noise sensitive areas. The selected alternative has been located to minimize impacts to human and natural resources. Raising or lowering of the roadway grade is not feasible or practical as a change in grade would require additional new right-of-way and constitute a large cost versus small benefit in reduced noise levels. Alignment shifts are not practical due to safety considerations and potential displacements.

C. Traffic System Management Measures

Traffic system management (TSM) measures, which limit vehicle type, speed, volume and time of operations are often effective noise abatement measures. Past project experience has shown that a reduction in the speed limit of 10 mph would result in a noise level reduction of approximately 1 to 2 dBA. Further reducing the speed limit would not be appropriate for the functional classification for this project. Truck lane designation is not a viable alternative of noise abatement on this project, given the limited scope of the proposed improvements.

D. Other Mitigation Measures Considered

The acquisition of property in order to provide buffer zones to minimize noise impacts is not considered to be a feasible noise mitigation measure. The cost to acquire impacted receivers for buffer zones would exceed the abatement threshold of $30,000 per benefited receiver. The use of buffer zones to minimize impacts to future sensitive areas is not

recommended because this could be accomplished through land use controls and the noise critical distances as predicted in Table 7. The use of vegetation for noise mitigation is not considered reasonable for projects such as this one due to the substantial amount of right-of-way necessary to make vegetative barriers effective. FHWA research has shown that a vegetative barrier should be approximately 100 feet wide to provide a 3 dBA reduction in noise levels.

E. Barrier Analysis

Reasonable and Feasible Barrier

Barrier 1 (Meadow Glenn Elementary/Meadow Glenn Middle School/Wellesley Subdivision)

Barrier 1 was modeled to abate noise impacts at Meadow Glenn Elementary School (and day care), Meadow Glenn Middle School and the Wellesley subdivision. Under the future build scenario, a total of 28 receivers (representing 261 equivalent receivers) would be impacted. Barrier 1 would be located along the shoulder of westbound I-20. The barrier would begin 330 feet west of Northside Boulevard and extend to approximately 1,600 feet west of Allenbrooke Way. The total length of the barrier would be 5,476 feet with a uniform height of 19 feet and a total area of 104,044 square feet (see Attachments).

For the purpose of estimating barrier reasonableness, SCDOT has determined that each impacted single-family residence equals one receiver. Two schools are represented by multiple receivers based on student population and daily use. A total of 268 equivalent receivers would be benefited by Barrier 1. This includes 33 single-family residences, 128 equivalent receivers for Meadow Glenn Elementary School, and 107 equivalent receivers for Meadow Glenn Middle School.

Based on SCDOT policy for estimating barrier costs at $35/square foot, the total cost of this barrier would be $3,641,540 or $13,588 per benefited receiver. This cost per benefited receiver is within SCDOT's limit of $30,000 per benefited receiver and, therefore, meets the SCDOT reasonableness standard.

Barriers Not Reasonable or Feasible

Barrier 2 – Baskin Hills Road/ Hawthorne Subdivision

Barrier 2 was modeled to abate noise impacts in the vicinity of Baskin Hills Road and the Hawthorne subdivision. Under the future build scenario, a total of 18 receivers would be impacted.

Barrier 2 was modeled along the right of way and roadway shoulder of westbound I-20 from 620 feet west of Mineral Springs Road to 2,000 feet east of Augusta Road. The total of length of the modeled barrier was 3,998 feet, with height of 17 and 19 feet and a total area of 71,566 square feet. A barrier of these dimensions would benefit 30 receivers.

Barrier 2 would cost $2,504,810, resulting in an estimated cost of $83,494 per benefitted receiver. This cost per receiver exceeds the SCDOT allowable cost of $30,000 per benefitted receiver, and therefore, is not reasonable.

Barrier 3 - Elvington Lane

Barrier 3 was modeled to abate noise impacts in the vicinity of Elvington Lane. Under the future build scenario, a total of 25 receivers would be impacted.

Barrier 3 was modeled along the right of way line adjacent to eastbound I-20 from 660 feet west of Cedarcrest Drive to 3,100 feet west of Cedarcrest Drive. The length of the modeled barrier was 2,600 feet with heights of 15 and 17 feet and a total area of 41,001 square feet. A barrier with these dimensions would benefit a total of 25 receivers.

Barrier 3 would cost $1,435,035, resulting in an estimated cost of $57,401 per benefitted receiver. This cost per receiver exceeds the SCDOT allowable cost of $30,000 per benefitted receiver and therefore is not reasonable.

Barrier 4 - Pleasant Hill Subdivision

Barrier 4 was modeled to abate noise impacts in the vicinity of the Pleasant Hill subdivision. Under the future build scenario, a total of 21 receivers would be impacted.

Barrier 4 was modeled along I-20 westbound from 3,000 feet west of Long Pond Road to 5,200 feet east of Calks Ferry Road. The total length of this barrier was 3,995 feet with a height of 17 feet and a total area of 67,915 square feet. A barrier with these dimensions would benefit 38 receivers.

Barrier 4 would cost $2,377,025, resulting in an estimated cost of $62,553 per benefitted receiver. This cost per receiver exceeds the SCDOT allowable cost of $30,000 per benefitted receiver and therefore is not reasonable.

Barrier 5 - Larkin Woods Subdivision

Barrier 5 was modeled to abate noise in the vicinity of the Larkin Woods subdivision. Under the future Build scenario, a total of 12 receivers would be impacted.

Barrier 5 was modeled along I-20 eastbound from Mineral Springs Road to approximately 2,000 feet north of Mineral Springs Road. The total length of the barrier was 2,250 feet with a height varying between 17 and 25 feet and a total area of 52,340 square feet. A barrier of these dimensions would be benefit 12 receivers.

Barrier 5 would cost $1,831,935, resulting in an estimated cost of $152,660 per benefitted receiver. This cost per receiver exceeds the SCDOT allowable cost of $30,000 per benefitted receiver and therefore is not reasonable.

Barrier 6 - Hidden Springs Road

Barrier 6 was modeled to abate noise impacts on Hidden Springs Road. Under the future Build scenario, a total of 6 receivers would be impacted.

Barrier 6 was modeled along I-20 eastbound from approximately ¾-mile west of Two Notch Road to just south of Two Notch Road. The total length of this barrier was 2,400 feet with heights varying between 19 and 25 feet. This barrier has a total area of 57,583 square feet. A barrier with these dimensions would benefit 7 receivers.

Barrier 6 would cost $2,022,405, resulting in an estimated cost of $288,915 per benefitted receiver. This cost per receiver exceeds the SCDOT allowable cost of $30,000 per benefitted receiver and therefore is not reasonable.

Barrier 7 – South Brook Subdivision

Barrier 7 was modeled to abate noise in the South Brook Subdivision. Under the future Build scenario, a total of 15 receivers would be impacted.

Barrier 7 was modeled along I-20 eastbound and the I-20 on-ramp from Longs Pond Road. The total length of the barrier is 1,563 feet with heights varying between 19 and 25 feet. This barrier has a total area of 36,380 square feet. A barrier with these dimensions would benefit 17 receivers.

Barrier 7 would cost $1,273,300, resulting in an estimated cost of $74,900 per benefitted receiver. This cost per receiver exceeds the SCDOT allowable cost of $30,000 per benefitted receiver and therefore is not reasonable.

III. CONSTRUCTION NOISE

The major construction elements of this project are expected to be earth removal, hauling, grading, and paving. General construction noise impacts, such as temporary speech interference for passers-by and those individuals living or working near the project, can be expected particularly from paving operations, and earth moving equipment during construction. However, considering the relatively short-term nature of construction noise and the likely limitation of construction to daytime hours, these impacts are not expected to be substantial. The contractor would be required to comply with applicable local noise ordinances and OSHA regulations concerning noise attenuation devices on construction equipment.

IV. LEXINGTON COUNTY PLANNING OFFCIAL

Lexington County Planning Commission
212 South Lake Drive, Suite 302
Lexington, S.C. 29072\

V. PUBLIC INVOLVEMENT

A meeting was held at the Lexington County School District 1 (District 1) Headquarters to discuss the potential construction of a noise barrier wall in front of Meadow Glenn Middle School and Meadow Glenn Elementary School. These schools represent approximately 235 equivalent receivers that would be benefitted by a noise barrier wall. As per requirements listed in the SC Department of Transportation's (SCDOT) Traffic Noise Abatement Policy, the SCDOT is required to solicit the viewpoints of all of the benefited receivers and document a decision on either desiring or not desiring the noise abatement measure.

The meeting resulted in District 1 offering support for a noise barrier wall at this location. The Chief Operating Officer then presented the noise barrier wall to the District 1 School Board on May 19, 2015. The District 1 School Board was in favor of a noise barrier wall, and would like to incorporate green space behind the wall to maintain the aesthetics of the area surrounding the schools.

The noise barrier wall would also benefit approximately 33 residential receivers located in the Wellesley Subdivision just west of the two schools. A petition of support for the noise barrier wall was sent to the SCDOT by this subdivision. Based on the school

support (offering a majority vote in favor of the wall) a meeting was not scheduled with the Wellesley Subdivision.

VI. SUMMARY

The results of the noise analysis indicate that traffic related noise impacts would occur to 192 receivers under the 2037 Build Alternative and 218 receivers would be impacted under the 2037 No-Build Alternative. No receivers in the project area would substantially exceed the FHWA noise abatement criteria. Seven potential barrier locations were evaluated as part of the noise analysis. This barrier analysis was prepared in accordance with the SCDOT Traffic Abatement Noise Policy for feasibility and reasonableness. Six of seven barrier locations were found to meet the feasibility criteria for acoustics and engineering. However, these barrier locations were found not to be reasonable. Barrier 1 located near the US 378 Interchange at Meadow Glenn Middle School was found to be both reasonable and feasible.

This evaluation completes the highway traffic noise requirements of Title 23 CFR Part 772.

APPENDIX

Traffic Noise Impacts and Locations

Predicted Traffic Noise Levels - Interstate 20 - Lexington County - From US 378 to Longs Pond Road

RECEIVER INFORMATION					2015 EXISTING		2037 NO-BUILD ALTERNATIVE		2037 BUILD ALTERNATIVE		DIFFERENCE
Receiver ID #	LAND USE	23 CFR PART 772 NOISE ABATEMENT CRITERIA (NAC) CATEGORY	23 CFR PART 772 NOISE ABATEMENT CRITERIA (NAC) (dBA)	EQUIVALENT NO. OF RECEIVERS	ESTIMATED Leq (dBA)	NOISE IMPACT (YES/NO)	ESTIMATED Leq (dBA)	NOISE IMPACT (YES/NO)	ESTIMATED Leq (dBA)	NOISE IMPACT (YES/NO)	2037 BUILD - 2015 EXIST [Leq (dBA)]
1	Residential	B	67	1	73	Yes	76	Yes	75	Yes	2
2	Residential	B	67	1	61	No	64	No	63	No	2
3	Residential	B	67	1	62	No	66	Yes	64	No	2
4	Residential	B	67	1	67	Yes	71	Yes	69	Yes	2
5	Residential	B	67	1	62	No	65	No	63	No	1
7	Residential	B	67	1	70	Yes	73	Yes	71	Yes	1
8	Residential	B	67	1	63	No	66	Yes	64	No	1
9	Residential	B	67	1	63	No	62	No	65	No	2
10	Residential	B	67	1	65	No	64	No	67	Yes	2
11	Residential	B	67	1	61	No	64	No	62	No	1
12	Residential	B	67	1	64	No	67	Yes	65	No	1
13	Residential	B	67	1	63	No	63	No	74	Yes	11
14	Residential	B	67	1	71	Yes	70	Yes	72	Yes	1
15	Residential	B	67	1	65	No	64	No	66	Yes	1
16	Residential	B	67	1	67	Yes	70	Yes	68	Yes	1
17	Residential	B	67	1	65	Yes	64	No	66	Yes	1
18	Residential	B	67	1	63	No	66	Yes	64	No	1
19	Residential	B	67	1	71	Yes	75	Yes	71	Yes	0
20	Residential	B	67	1	64	No	67	Yes	66	Yes	2
21	Residential	B	67	1	63	No	66	Yes	65	No	2
22	Residential	B	67	1	63	No	66	Yes	65	No	2
23	Residential	B	67	1	63	No	66	Yes	66	Yes	3
24	Residential	B	67	1	63	No	66	Yes	66	Yes	3
25	Residential	B	67	1	64	No	67	Yes	66	Yes	2
26	Residential	B	67	1	64	No	67	Yes	66	Yes	2
27	Residential	B	67	1	64	No	67	Yes	66	Yes	2
28	Residential	B	67	1	64	No	67	Yes	66	Yes	2
29	Residential	B	67	1	65	No	68	Yes	67	Yes	2
30	Residential	B	67	1	67	Yes	70	Yes	68	Yes	1
31	Residential	B	67	1	67	Yes	71	Yes	69	Yes	2
32	Residential	B	67	1	67	Yes	70	Yes	69	Yes	2
33	Residential	B	67	1	66	Yes	69	Yes	69	Yes	3
34	Residential	B	67	1	69	Yes	72	Yes	71	Yes	2
35	Residential	B	67	1	66	Yes	69	Yes	68	Yes	2
36	Residential	B	67	1	67	Yes	70	Yes	69	Yes	2
37	Residential	B	67	1	64	No	67	Yes	65	No	1
39	Residential	B	67	1	73	Yes	76	Yes	75	Yes	2
40	Residential	B	67	1	71	Yes	74	Yes	73	Yes	2
41	Residential	B	67	1	70	Yes	73	Yes	71	Yes	1
42	Commercial	E	72	1	75	Yes	78	Yes	77	Yes	2
43	Residential	B	67	1	68	Yes	71	Yes	70	Yes	2
44	Commercial	E	72	1	74	Yes	77	Yes	76	Yes	2
45	Commercial	E	72	1	70	Yes	73	Yes	73	Yes	3

Predicted Traffic Noise Levels - Interstate 20 - Lexington County - From US 378 to Longs Pond Road

RECEIVER INFORMATION					2015 EXISTING		2037 NO-BUILD ALTERNATIVE		2037 BUILD ALTERNATIVE		DIFFERENCE
Receiver ID #	LAND USE	23 CFR PART 772 NOISE ABATEMENT CRITERIA (NAC) CATEGORY	23 CFR PART 772 NOISE ABATEMENT CRITERIA (NAC) (dBA)	EQUIVALENT NO. OF RECEIVERS	ESTIMATED Leq (dBA)	NOISE IMPACT (YES/NO)	ESTIMATED Leq (dBA)	NOISE IMPACT (YES/NO)	ESTIMATED Leq (dBA)	NOISE IMPACT (YES/NO)	2037 BUILD - 2015 EXIST [Leq (dBA)]
46	Residential	B	67	1	64	No	67	Yes	66	Yes	2
47	Commercial	E	72	1	74	Yes	77	Yes	75	Yes	1
48	Residential	B	67	1	66	Yes	69	Yes	68	Yes	3
49	Commercial	E	72	1	74	Yes	78	Yes	77	Yes	3
50	Residential	B	67	1	66	Yes	70	Yes	68	Yes	2
52	Residential	B	67	1	65	No	68	Yes	67	Yes	2
53	Commercial	E	72	1	69	Yes	71	Yes	70	Yes	1
54	Commercial	E	72	1	71	Yes	73	Yes	71	Yes	0
56	Commercial	E	72	1	74	Yes	75	Yes	74	Yes	0
58	Commercial	E	72	1	73	Yes	75	Yes	73	Yes	0
60	Commercial	E	72	1	73	Yes	74	Yes	73	Yes	0
61	Commercial	E	72	1	71	Yes	73	Yes	72	Yes	1
62	Commercial	E	72	1	69	Yes	71	Yes	71	Yes	2
63	Residential	B	67	1	70	Yes	72	Yes	72	Yes	2
65	Residential	B	67	1	68	Yes	69	Yes	69	Yes	1
67	Commercial	E	72	1	67	Yes	69	Yes	69	Yes	2
68	Commercial	E	72	1	65	No	67	Yes	67	Yes	2
70	Commercial	E	72	1	67	Yes	68	Yes	69	Yes	2
74	Residential	B	67	1	70	Yes	72	Yes	72	Yes	2
75	Residential	B	67	1	71	Yes	72	Yes	72	Yes	1
76	Residential	B	67	1	73	Yes	75	Yes	74	Yes	1
77	Residential	B	67	1	75	Yes	76	Yes	75	Yes	0
78	Residential	B	67	1	71	Yes	73	Yes	72	Yes	1
80	Commercial	E	72	1	74	Yes	76	Yes	75	Yes	1
82	Residential	B	67	1	73	Yes	75	Yes	74	Yes	1
83	Commercial	E	72	1	76	Yes	78	Yes	77	Yes	1
84	Commercial	E	72	1	69	Yes	70	Yes	70	Yes	1
85	Commercial	E	72	1	71	Yes	72	Yes	72	Yes	1
87	Residential	B	67	1	65	No	67	Yes	67	Yes	2
89	Commercial	E	72	1	77	Yes	78	Yes	77	Yes	0
90	Residential	B	67	1	69	Yes	71	Yes	70	Yes	1
91	Residential	B	67	1	66	Yes	68	Yes	68	Yes	2
92	Residential	B	67	1	76	Yes	77	Yes	76	Yes	0
93	Residential	B	67	1	74	Yes	75	Yes	74	Yes	0
95	Residential	B	67	1	66	Yes	68	Yes	68	Yes	2
96	Residential	B	67	1	71	Yes	72	Yes	71	Yes	0
97	Commercial	E	72	1	72	Yes	73	Yes	72	Yes	0
98	Residential	B	67	1	67	Yes	68	Yes	68	Yes	1
99	Commercial	E	72	1	73	Yes	74	Yes	74	Yes	1
100	Commercial	E	72	1	74	Yes	75	Yes	74	Yes	0
101	Residential	B	67	1	69	Yes	70	Yes	70	Yes	1
102	Commercial	E	72	1	72	Yes	73	Yes	73	Yes	1
103	Residential	B	67	1	66	Yes	68	Yes	67	Yes	1
104	Residential	B	67	1	72	Yes	74	Yes	72	Yes	0

Predicted Traffic Noise Levels - Interstate 20 - Lexington County - From US 378 to Longs Pond Road

RECEIVER INFORMATION					2015 EXISTING		2037 NO-BUILD ALTERNATIVE		2037 BUILD ALTERNATIVE		DIFFERENCE
Receiver ID #	LAND USE	23 CFR PART 772 NOISE ABATEMENT CRITERIA (NAC) CATEGORY	23 CFR PART 772 NOISE ABATEMENT CRITERIA (NAC) (dBA)	EQUIVALENT NO. OF RECEIVERS	ESTIMATED Leq (dBA)	NOISE IMPACT (YES/NO)	ESTIMATED Leq (dBA)	NOISE IMPACT (YES/NO)	ESTIMATED Leq (dBA)	NOISE IMPACT (YES/NO)	2037 BUILD - 2015 EXIST [Leq (dBA)]
105	Commercial	E	72	1	68	Yes	70	Yes	68	Yes	0
106	Commercial	E	72	1	69	Yes	71	Yes	69	Yes	0
107	Residential	B	67	1	76	Yes	77	Yes	76	Yes	0
108	Residential	B	67	1	69	Yes	71	Yes	70	Yes	1
109	Residential	B	67	1	68	Yes	69	Yes	69	Yes	1
110	Residential	B	67	1	69	Yes	70	Yes	70	Yes	1
111	Residential	B	67	1	66	Yes	68	Yes	66	Yes	0
112	Residential	B	67	1	72	Yes	73	Yes	72	Yes	0
113	Residential	B	67	1	68	Yes	70	Yes	70	Yes	2
114	Residential	B	67	1	74	Yes	75	Yes	74	Yes	0
115	Residential	B	67	1	73	Yes	75	Yes	74	Yes	1
116	Residential	B	67	1	67	Yes	68	Yes	68	Yes	1
117	Residential	B	67	1	73	Yes	75	Yes	74	Yes	1
118	Residential	B	67	1	74	Yes	76	Yes	74	Yes	0
119	Residential	B	67	1	73	Yes	75	Yes	73	Yes	0
120	Residential	B	67	1	67	Yes	68	Yes	68	Yes	1
121	Residential	B	67	1	65	No	67	Yes	67	Yes	2
122	Residential	B	67	1	74	Yes	75	Yes	74	Yes	0
123	Residential	B	67	1	67	Yes	69	Yes	69	Yes	2
124	Residential	B	67	1	72	Yes	74	Yes	73	Yes	1
125	Residential	B	67	1	71	Yes	73	Yes	72	Yes	1
126	Residential	B	67	1	67	Yes	69	Yes	69	Yes	2
127	Residential	B	67	1	65	No	66	Yes	67	Yes	2
128	Residential	B	67	1	73	Yes	74	Yes	73	Yes	0
129	Residential	B	67	1	67	Yes	68	Yes	67	Yes	0
130	Residential	B	67	1	75	Yes	76	Yes	75	Yes	0
131	Residential	B	67	1	72	Yes	73	Yes	72	Yes	0
132	Residential	B	67	1	68	Yes	70	Yes	70	Yes	2
133	Commercial	E	72	1	74	Yes	76	Yes	75	Yes	1
134	Residential	B	67	1	66	Yes	67	Yes	67	Yes	1
135	Residential	B	67	1	66	Yes	68	Yes	68	Yes	2
136	Commercial	E	72	1	73	Yes	74	Yes	73	Yes	0
137	Residential	B	67	1	74	Yes	75	Yes	74	Yes	0
138	Residential	B	67	1	72	Yes	74	Yes	73	Yes	1
139	Residential	B	67	1	69	Yes	70	Yes	69	Yes	0
140	Residential	B	67	1	66	Yes	67	Yes	67	Yes	1
141	Residential	B	67	1	71	Yes	72	Yes	71	Yes	0
142	Residential	B	67	1	71	Yes	73	Yes	71	Yes	0
143	Residential	B	67	1	68	Yes	69	Yes	68	Yes	0
144	Residential	B	67	1	65	No	67	Yes	66	Yes	1
145	Residential	B	67	1	66	Yes	67	Yes	67	Yes	1
146	Commercial	E	72	1	75	Yes	77	Yes	77	Yes	2
147	Residential	B	67	1	72	Yes	73	Yes	72	Yes	0
148	Commercial	E	72	1	66	Yes	67	Yes	68	Yes	2

Predicted Traffic Noise Levels - Interstate 20 - Lexington County - From US 378 to Longs Pond Road

RECEIVER INFORMATION					2015 EXISTING		2037 NO-BUILD ALTERNATIVE		2037 BUILD ALTERNATIVE		DIFFERENCE
Receiver ID #	LAND USE	23 CFR PART 772 NOISE ABATEMENT CRITERIA (NAC) CATEGORY	23 CFR PART 772 NOISE ABATEMENT CRITERIA (NAC) (dBA)	EQUIVALENT NO. OF RECEIVERS	ESTIMATED Leq (dBA)	NOISE IMPACT (YES/NO)	ESTIMATED Leq (dBA)	NOISE IMPACT (YES/NO)	ESTIMATED Leq (dBA)	NOISE IMPACT (YES/NO)	2037 BUILD - 2015 EXIST [Leq (dBA)]
149	Commercial	E	72	1	67	Yes	69	Yes	69	Yes	2
150	Commercial	E	72	1	73	Yes	75	Yes	74	Yes	1
151	Commercial	E	72	1	66	Yes	68	Yes	67	Yes	1
152	Residential	B	67	1	70	Yes	71	Yes	71	Yes	1
153	Residential	B	67	1	66	Yes	68	Yes	68	Yes	2
154	Residential	B	67	1	75	Yes	77	Yes	76	Yes	1
155	Residential	B	67	1	69	Yes	70	Yes	69	Yes	0
156	Commercial	E	72	1	72	Yes	74	Yes	73	Yes	2
157	Residential	B	67	1	62	No	65	No	63	No	1
158	Residential	B	67	1	63	No	66	Yes	64	No	1
159	Residential	B	67	1	64	No	66	Yes	64	No	0
160	Residential	B	67	1	68	Yes	70	Yes	68	Yes	0
161	Commercial	E	72	1	70	Yes	71	Yes	71	Yes	1
162	Residential	B	67	1	64	No	66	Yes	64	No	0
163	Residential	B	67	1	64	No	65	No	64	No	0
164	Residential	B	67	1	65	No	67	Yes	65	No	0
165	Residential	B	67	1	72	Yes	74	Yes	72	Yes	0
166	Residential	B	67	1	64	No	66	Yes	64	No	0
167	Residential	B	67	1	67	Yes	68	Yes	66	Yes	1
168	Residential	B	67	1	64	No	66	Yes	64	No	0
169	Residential	B	67	1	68	Yes	69	Yes	68	Yes	0
170	Residential	B	67	1	65	No	67	Yes	65	No	0
171	Residential	B	67	1	69	Yes	71	Yes	69	Yes	0
172	Residential	B	67	1	65	No	66	Yes	64	No	1
173	Residential	B	67	1	69	Yes	71	Yes	69	Yes	0
174	Residential	B	67	1	74	Yes	76	Yes	73	Yes	1
175	Residential	B	67	1	63	No	65	No	63	No	0
176	Residential	B	67	1	71	Yes	73	Yes	71	Yes	0
177	Residential	B	67	1	65	No	67	Yes	65	No	0
178	Residential	B	67	1	68	Yes	70	Yes	68	Yes	0
179	Residential	B	67	1	73	Yes	75	Yes	73	Yes	0
180	Residential	B	67	1	63	No	65	No	63	No	0
181	Residential	B	67	1	64	No	66	Yes	64	No	0
182	Residential	B	67	1	69	Yes	70	Yes	69	Yes	0
183	Residential	B	67	1	73	Yes	75	Yes	73	Yes	0
184	Residential	B	67	1	71	Yes	72	Yes	71	Yes	0
185	Residential	B	67	1	69	Yes	70	Yes	70	Yes	1
186	Residential	B	67	1	67	Yes	69	Yes	68	Yes	1
189	Residential	B	67	1	68	Yes	70	Yes	68	Yes	0
190	Residential	B	67	1	75	Yes	77	Yes	75	Yes	0
191	Residential	B	67	1	68	Yes	70	Yes	68	Yes	0
192	Residential	B	67	1	70	Yes	71	Yes	71	Yes	1
193	Residential	B	67	1	68	Yes	70	Yes	71	Yes	3
194	Residential	B	67	1	71	Yes	73	Yes	71	Yes	0

Predicted Traffic Noise Levels - Interstate 20 - Lexington County - From US 378 to Longs Pond Road

RECEIVER INFORMATION					2015 EXISTING		2037 NO-BUILD ALTERNATIVE		2037 BUILD ALTERNATIVE		DIFFERENCE
Receiver ID #	LAND USE	23 CFR PART 772 NOISE ABATEMENT CRITERIA (NAC) CATEGORY	23 CFR PART 772 NOISE ABATEMENT CRITERIA (NAC) (dBA)	EQUIVALENT NO. OF RECEIVERS	ESTIMATED Leq (dBA)	NOISE IMPACT (YES/NO)	ESTIMATED Leq (dBA)	NOISE IMPACT (YES/NO)	ESTIMATED Leq (dBA)	NOISE IMPACT (YES/NO)	2037 BUILD - 2015 EXIST [Leq (dBA)]
195	Residential	B	67	1	66	Yes	68	Yes	67	Yes	1
196	Residential	B	67	1	73	Yes	74	Yes	73	Yes	0
197	Residential	B	67	1	71	Yes	73	Yes	72	Yes	1
199	Residential	B	67	1	75	Yes	77	Yes	75	Yes	1
200	Residential	B	67	1	66	Yes	67	Yes	66	Yes	0
201	Residential	B	67	1	66	Yes	68	Yes	67	Yes	1
202	Residential	B	67	1	70	Yes	72	Yes	70	Yes	0
203	Residential	B	67	1	73	Yes	75	Yes	74	Yes	1
204	Residential	B	67	1	75	Yes	76	Yes	75	Yes	0
205	Commercial	E	72	1	71	Yes	72	Yes	72	Yes	1
206	Residential	B	67	1	73	Yes	75	Yes	74	Yes	1
207	Residential	B	67	1	64	No	66	Yes	64	No	0
208	Residential	B	67	1	66	Yes	67	Yes	66	Yes	0
209	Residential	B	67	1	65	No	67	Yes	65	No	0
210	Residential	B	67	1	65	No	67	Yes	66	Yes	1
211	Residential	B	67	1	64	No	66	Yes	66	Yes	2
212	Residential	B	67	1	66	Yes	67	Yes	67	Yes	1
213	Residential	B	67	1	69	Yes	71	Yes	70	Yes	1
214	Residential	B	67	1	65	No	67	Yes	66	Yes	1
215	Residential	B	67	1	67	Yes	68	Yes	68	Yes	1
218	Residential	B	67	1	70	Yes	72	Yes	70	Yes	0
219	Residential	B	67	1	70	Yes	72	Yes	67	Yes	3
221	Residential	B	67	1	69	Yes	68	Yes	70	Yes	1
222	Residential	B	67	1	68	Yes	67	Yes	69	Yes	1
223	Residential	B	67	1	68	Yes	67	Yes	69	Yes	1
224	Residential	B	67	1	67	Yes	66	Yes	68	Yes	1
225	Residential	B	67	1	66	Yes	66	Yes	68	Yes	2
226	Residential	B	67	1	66	Yes	65	No	68	Yes	2
227	Residential	B	67	1	66	Yes	65	No	67	Yes	1
228	Residential	B	67	1	65	No	65	No	67	Yes	2
229	Residential	B	67	1	64	No	64	No	66	Yes	2
230	Residential	B	67	1	64	No	63	No	65	No	1
231	Residential	B	67	1	62	No	61	No	65	No	3
232	Residential	B	67	1	68	Yes	67	Yes	69	Yes	1
233	Residential	B	67	1	65	No	64	No	67	Yes	2
234	Residential	B	67	1	63	No	63	No	65	No	2
235	Residential	B	67	1	66	Yes	65	No	67	Yes	1
236	Residential	B	67	1	65	No	65	No	67	Yes	2
237	Residential	B	67	1	65	No	64	No	66	Yes	1
238	Residential	B	67	1	65	No	64	No	66	Yes	1
239	Residential	B	67	1	63	No	63	No	65	No	2
240	Residential	B	67	1	63	No	63	No	65	No	2
241	Residential	B	67	1	62	No	62	No	64	No	1
242	Residential	B	67	1	62	No	61	No	64	No	2

Predicted Traffic Noise Levels - Interstate 20 - Lexington County - From US 378 to Longs Pond Road

RECEIVER INFORMATION					2015 EXISTING		2037 NO-BUILD ALTERNATIVE		2037 BUILD ALTERNATIVE		DIFFERENCE
Receiver ID #	LAND USE	23 CFR PART 772 NOISE ABATEMENT CRITERIA (NAC) CATEGORY	23 CFR PART 772 NOISE ABATEMENT CRITERIA (NAC) (dBA)	EQUIVALENT NO. OF RECEIVERS	ESTIMATED Leq (dBA)	NOISE IMPACT (YES/NO)	ESTIMATED Leq (dBA)	NOISE IMPACT (YES/NO)	ESTIMATED Leq (dBA)	NOISE IMPACT (YES/NO)	2037 BUILD - 2015 EXIST [Leq (dBA)]
243	Residential	B	67	1	62	No	61	No	64	No	2
244	Residential	B	67	1	61	No	61	No	63	No	2
245	Residential	B	67	1	61	No	60	No	63	No	2
246	Residential	B	67	1	60	No	60	No	62	No	2
247	Residential	B	67	1	59	No	59	No	61	No	2
248	Residential	B	67	1	59	No	58	No	61	No	2
249	Residential	B	67	1	59	No	58	No	61	No	2
250	Residential	B	67	1	61	No	60	No	63	No	2
251	Residential	B	67	1	62	No	62	No	64	No	2
253	Residential	B	67	1	68	Yes	72	Yes	67	Yes	1
254	Residential	B	67	1	68	Yes	70	Yes	67	Yes	1
255	Residential	B	67	1	68	Yes	70	Yes	64	No	4
256	Residential	B	67	1	64	No	66	Yes	64	No	0
257	Residential	B	67	1	65	No	66	Yes	65	No	0
258	Residential	B	67	1	65	No	67	Yes	66	Yes	1
259	Residential	B	67	1	66	Yes	68	Yes	67	Yes	1
260	Residential	B	67	1	68	Yes	70	Yes	73	Yes	5
261	Residential	B	67	1	72	Yes	74	Yes	74	Yes	2
262	Residential	B	67	1	73	Yes	75	Yes	74	Yes	1
263	Residential	B	67	1	73	Yes	75	Yes	74	Yes	1
264	Residential	B	67	1	73	Yes	75	Yes	74	Yes	1
265	Residential	B	67	1	73	Yes	74	Yes	73	Yes	0
266	Residential	B	67	1	71	Yes	72	Yes	72	Yes	1
267	Residential	B	67	1	69	Yes	71	Yes	70	Yes	1
268	Residential	B	67	1	67	Yes	69	Yes	69	Yes	2
269	Residential	B	67	1	69	Yes	71	Yes	70	Yes	1
270	Residential	B	67	1	68	Yes	69	Yes	69	Yes	1
271	Residential	B	67	1	66	Yes	68	Yes	67	Yes	1
272	Residential	B	67	1	65	No	67	Yes	66	Yes	1
273	Residential	B	67	1	66	Yes	68	Yes	66	Yes	0
274	Residential	B	67	1	65	No	67	Yes	66	Yes	1
275	Residential	B	67	1	65	No	67	Yes	65	No	0
276	Residential	B	67	1	64	No	66	Yes	64	No	0
277	Residential	B	67	1	64	No	65	No	69	Yes	5
278	Residential	B	67	1	66	Yes	67	Yes	68	Yes	2
279	Residential	B	67	1	64	No	66	Yes	65	No	1
280	Residential	B	67	1	67	Yes	69	Yes	69	Yes	2
281	Residential	B	67	1	66	Yes	68	Yes	68	Yes	2
282	Residential	B	67	1	69	Yes	71	Yes	71	Yes	2
283	Residential	B	67	1	72	Yes	73	Yes	73	Yes	1
284	Residential	B	67	1	68	Yes	70	Yes	66	Yes	2
285	Residential	B	67	1	67	Yes	69	Yes	70	Yes	3
286	Residential	B	67	1	60	No	62	No	68	Yes	8
287	Residential	B	67	1	67	Yes	68	Yes	69	Yes	2

Predicted Traffic Noise Levels - Interstate 20 - Lexington County - From US 378 to Longs Pond Road

RECEIVER INFORMATION					2015 EXISTING		2037 NO-BUILD ALTERNATIVE		2037 BUILD ALTERNATIVE		DIFFERENCE
Receiver ID #	LAND USE	23 CFR PART 772 NOISE ABATEMENT CRITERIA (NAC) CATEGORY	23 CFR PART 772 NOISE ABATEMENT CRITERIA (NAC) (dBA)	EQUIVALENT NO. OF RECEIVERS	ESTIMATED Leq (dBA)	NOISE IMPACT (YES/NO)	ESTIMATED Leq (dBA)	NOISE IMPACT (YES/NO)	ESTIMATED Leq (dBA)	NOISE IMPACT (YES/NO)	2037 BUILD - 2015 EXIST [Leq (dBA)]
288	Residential	B	67	1	68	Yes	70	Yes	70	Yes	2
289	Residential	B	67	1	69	Yes	71	Yes	71	Yes	2
290	Residential	B	67	1	70	Yes	71	Yes	72	Yes	2
291	Residential	B	67	1	70	Yes	71	Yes	71	Yes	1
292	Residential	B	67	1	67	Yes	69	Yes	69	Yes	2
293	Residential	B	67	1	66	Yes	67	Yes	68	Yes	2
294	Residential	B	67	1	71	Yes	73	Yes	70	Yes	1

FED. RD. DIV. NO.	STATE	COUNTY	PROJECT ID	ROAD/ROUTE NO.	SHEET NO.
3	S.C.	LEXINGTON	0032098	I-20	

Begin Project
(Approx.) Sta. 213+90

US-378E
(Sunset Blvd.)

INTERSTATE 20

1

2

3

4

5

S-106
(Mineral Springs Rd.)

Noise Barrier Site 1

Noise Barrier Site 5

Noise Barrier Site 2

S-106
(Mineral Springs Rd.)

Legend

- Impacted Receiver
- Non Impacted Receiver
- Noise Measurement Site

Interstate 20
Widening Project
Lexington County, S.C.

SCALE 0 500 1000 FEET

Aerial Map Source - USDA 2013

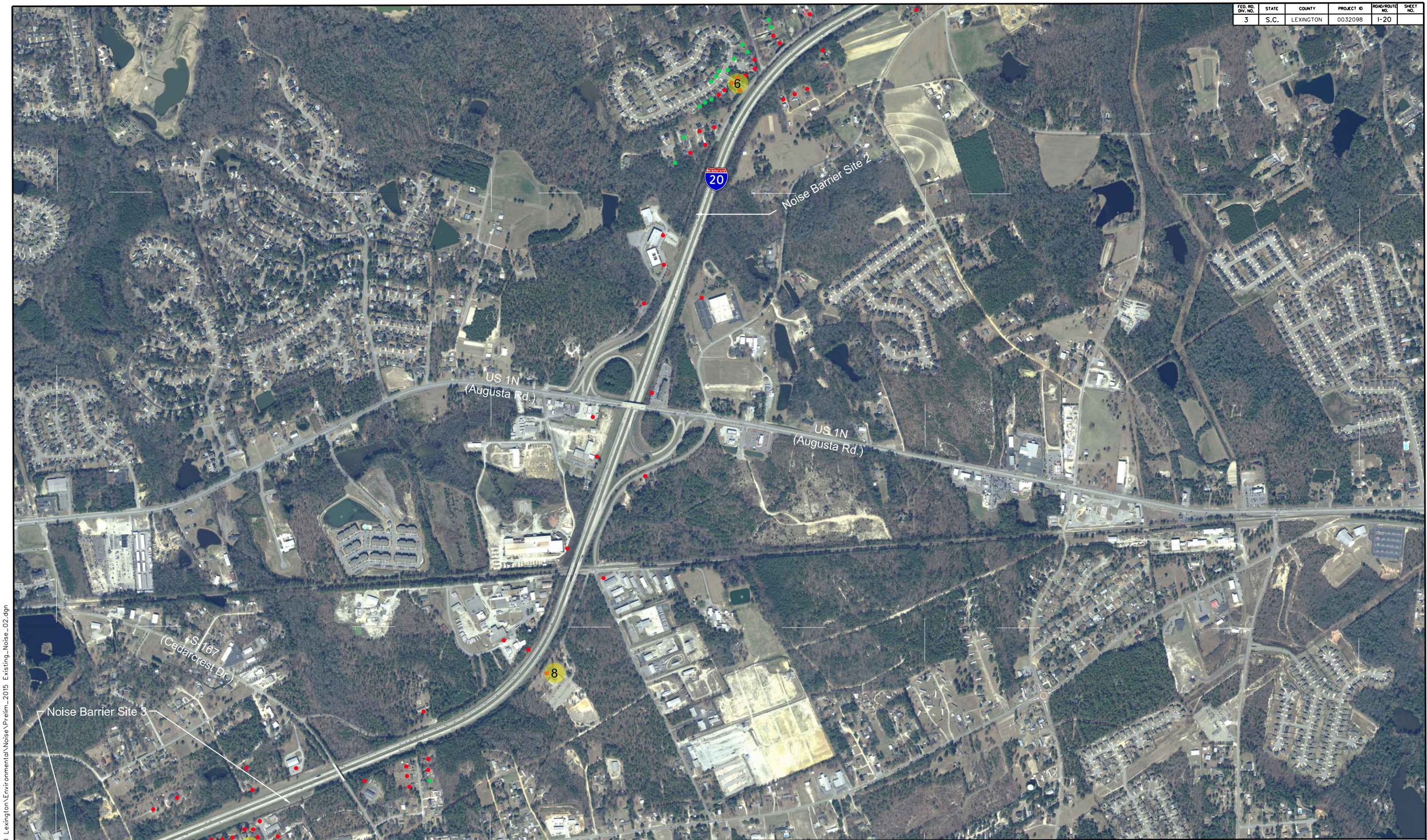
N

2015 EXISTING NOISE IMPACTS

SHEET: 1 OF 4

9/11/2015
L:\1404601 ⁰⁄₀₂
I-20 Lexington\Environmental\Noise\Prelim_2015 Existing_Noise_01.dgn

FED. RD. DIV. NO.	STATE	COUNTY	PROJECT ID	ROAD/ROUTE NO.	SHEET NO.
3	S.C.	LEXINGTON	0032098	I-20	



Legend

- Impacted Receiver
- Non Impacted Receiver
- Noise Measurement Site

Interstate 20
Widening Project
Lexington County, S.C.

0 500 1000 FEET
SCALE
Aerial Map Source - USDA 2013

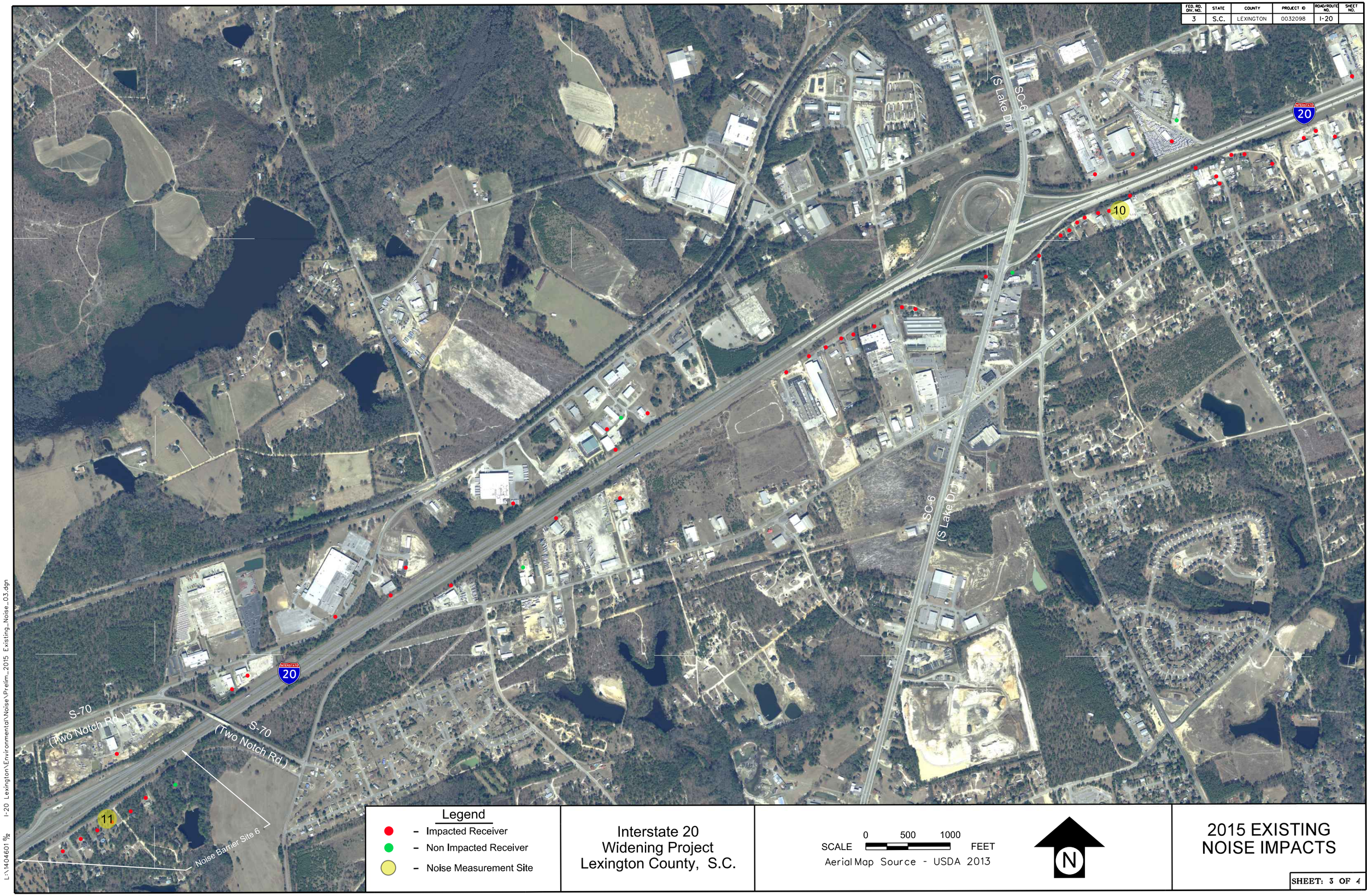
N

2015 EXISTING NOISE IMPACTS

SHEET: 2 OF 4

9/11/2015
L:\1404601 ®\2 I-20 Lexington\Environmental\Noise\Prelim_2015 Existing_Noise_02.dgn

FED. RD. DIV. NO.	STATE	COUNTY	PROJECT ID	ROAD/ROUTE NO.	SHEET NO.
3	S.C.	LEXINGTON	0032098	I-20	



Legend

- Impacted Receiver
- Non Impacted Receiver
- Noise Measurement Site

Interstate 20
Widening Project
Lexington County, S.C.

SCALE 0 500 1000 FEET

Aerial Map Source - USDA 2013

N

2015 EXISTING NOISE IMPACTS

SHEET: 3 OF 4

9/11/2015
L:\1404601 \Lexington\Environmental\Noise\Prelim_2015 Existing_Noise_03.dgn

FED. RD. DIV. NO.	STATE	COUNTY	PROJECT ID	ROAD/ROUTE NO.	SHEET NO.
3	S.C.	LEXINGTON	0032098	I-20	

End Project
(Approx.) Sta. 770+80

Noise Barrier Site 7

Noise Barrier Site 4

S-204
(Longs Pond Rd.)

13

20

Legend

- Impacted Receiver
- Non Impacted Receiver
- Noise Measurement Site

Interstate 20
Widening Project
Lexington County, S.C.

SCALE 0 500 1000 FEET

Aerial Map Source - USDA 2013

N

2015 EXISTING NOISE IMPACTS

SHEET: 4 OF 4

9/11/2015
L:\1404601 ⁰⁄₀
I-20 Lexington\Environmental\Noise\Prelim_2015 Existing_Noise_04.dgn

FED. RD. DIV. NO.	STATE	COUNTY	PROJECT ID	ROAD/ROUTE NO.	SHEET NO.
3	S.C.	LEXINGTON	0032098	I-20	

Begin Project
(Approx.) Sta. 213+90

US-378E
(Sunset Blvd.)

INTERSTATE 20

Noise Barrier Site 1

S-106
(Mineral Springs Rd.)

Noise Barrier Site 5

Noise Barrier Site 2

S-106
(Mineral Springs Rd.)

Legend

- Impacted Receiver
- Non Impacted Receiver

Interstate 20
Widening Project
Lexington County, S.C.

SCALE 0 500 1000 FEET

Aerial Map Source - USDA 2013

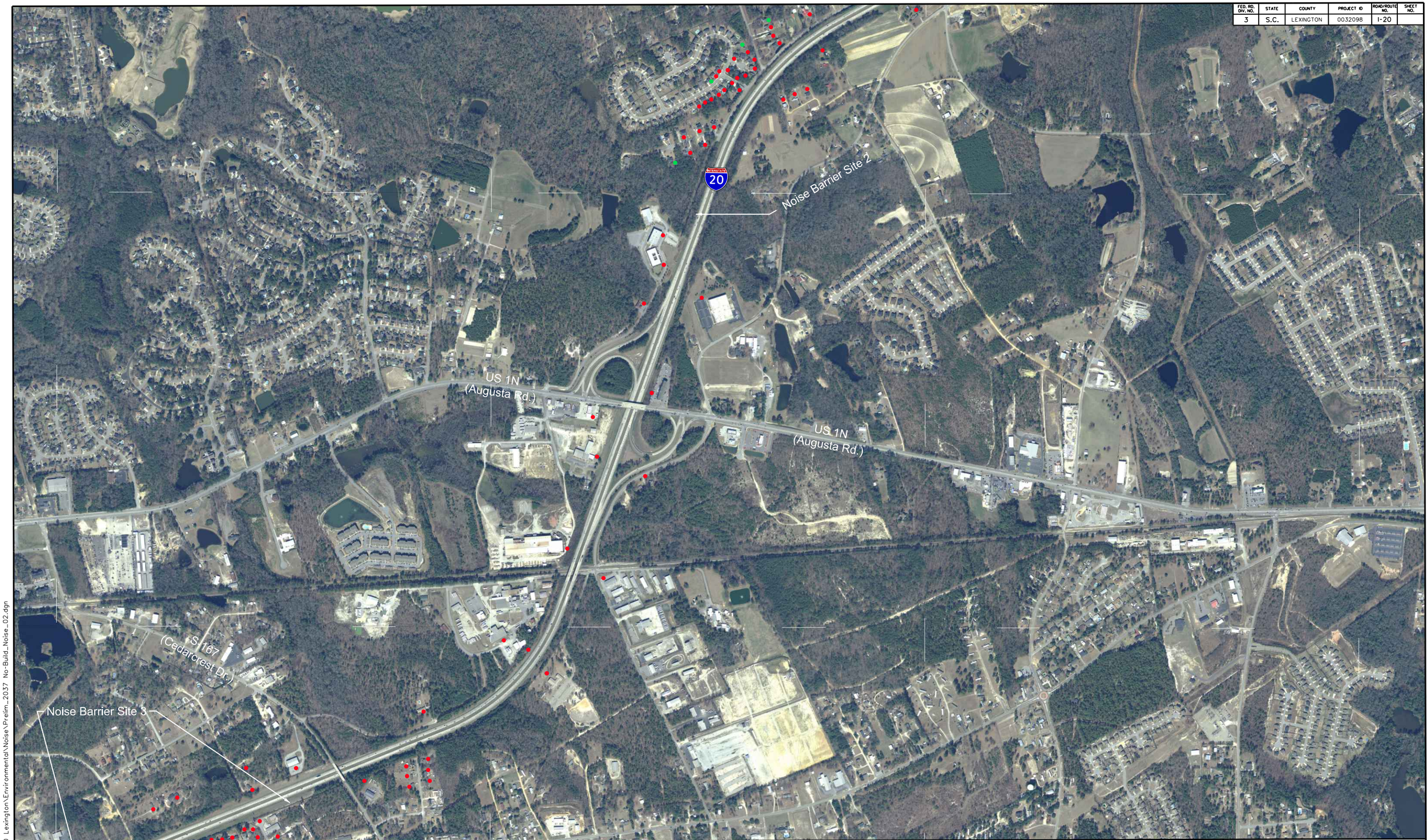
N

2037 NO-BUILD NOISE IMPACTS

SHEET: 1 OF 4

9/11/2015
L:\1404601 \I-20 Lexington\Environmental\Noise\Prelim_2037 No-Build_Noise_01.dgn

FED. RD. DIV. NO.	STATE	COUNTY	PROJECT ID	ROAD/ROUTE NO.	SHEET NO.
3	S.C.	LEXINGTON	0032098	I-20	



Legend

- Impacted Receiver
- Non Impacted Receiver

Interstate 20
Widening Project
Lexington County, S.C.

SCALE 0 500 1000 FEET

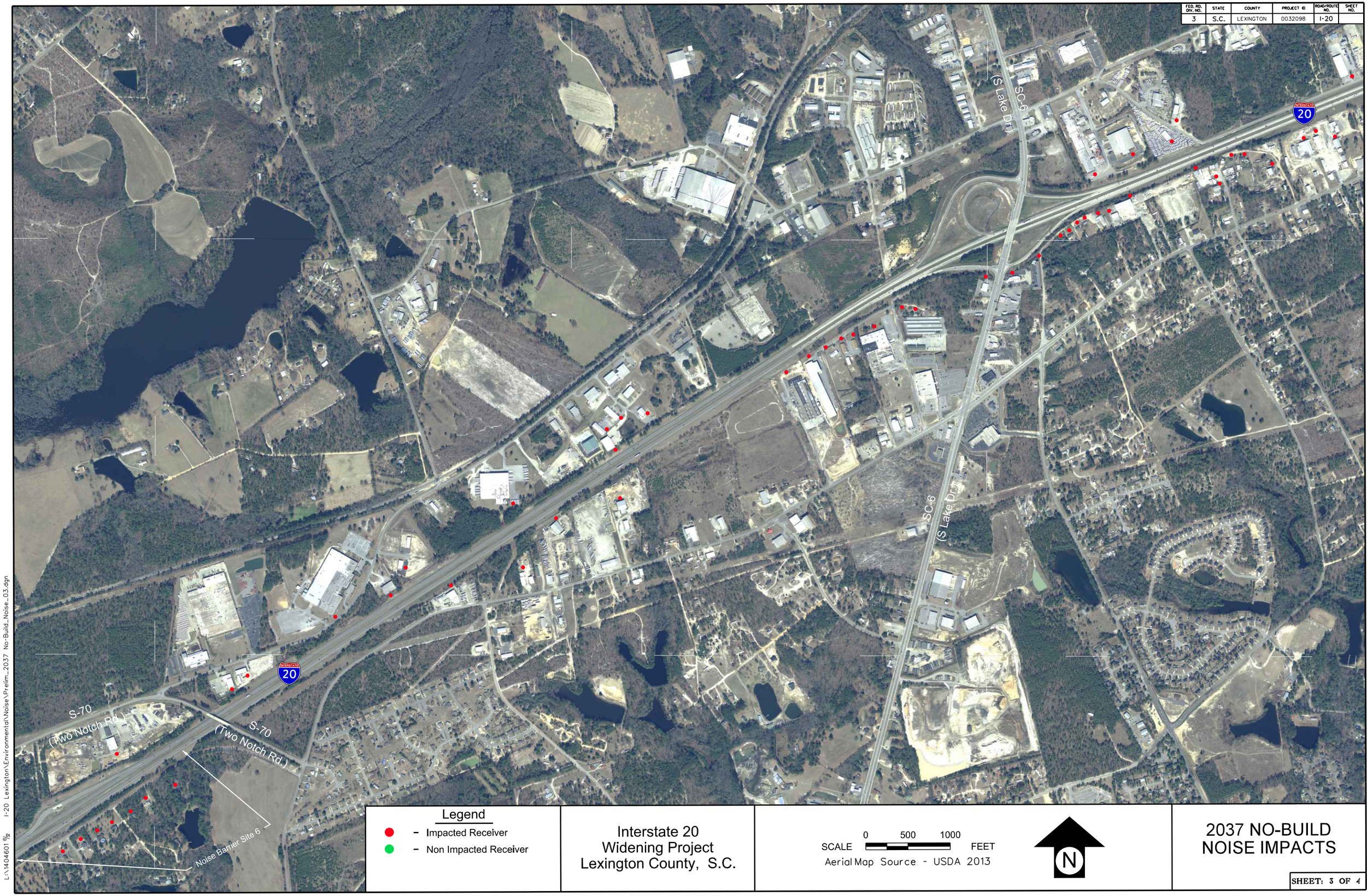
Aerial Map Source - USDA 2013

2037 NO-BUILD NOISE IMPACTS

SHEET: 2 OF 4

9/11/2015
L:\1404601 \%2 I-20 Lexington\Environmental\Noise\Prelim_2037 No-Build_Noise_02.dgn

FED. RD. DIV. NO.	STATE	COUNTY	PROJECT ID	ROAD/ROUTE NO.	SHEET NO.
3	S.C.	LEXINGTON	0032098	I-20	



Legend

- Impacted Receiver
- Non Impacted Receiver

Interstate 20
Widening Project
Lexington County, S.C.

SCALE 0 500 1000 FEET

Aerial Map Source - USDA 2013

N

2037 NO-BUILD NOISE IMPACTS

SHEET: 3 OF 4

9/11/2015
L:\1404601 ⅜g I-20 Lexington\Environmental\Noise\Prelim_2037 No-Build_Noise_03.dgn

FED. RD. DIV. NO.	STATE	COUNTY	PROJECT ID	ROAD/ROUTE NO.	SHEET NO.
3	S.C.	LEXINGTON	0032098	I-20	

End Project
(Approx.) Sta. 770+80

Noise Barrier Site 7

Noise Barrier Site 4

S-204
(Longs Pond Rd.)

S-204
(Longs Pond Rd.)

I-20

I-20

Legend

- Impacted Receiver
- Non Impacted Receiver

Interstate 20
Widening Project
Lexington County, S.C.

0 500 1000
SCALE FEET
Aerial Map Source - USDA 2013

N

2037 NO-BUILD NOISE IMPACTS

SHEET: 4 OF 4

9/11/2015
L:\1404601 ⁰⁄₀
I-20 Lexington\Environmental\Noise\Prelim_2037 No-Build_Noise_04.dgn

FED. RD. DIV. NO.	STATE	COUNTY	PROJECT ID	ROAD/ROUTE NO.	SHEET NO.
3	S.C.	LEXINGTON	0032098	I-20	

Begin Project
(Approx.) Sta. 213+90

US-378E
(Sunset Blvd.)

INTERSTATE 20

Noise Barrier Site 1

S-106
(Mineral Springs Rd.)

INTERSTATE 20

Noise Barrier Site 5

Noise Barrier Site 2

S-106
(Mineral Springs Rd.)

Legend

- Impacted Receiver
- Non Impacted Receiver

Interstate 20
Widening Project
Lexington County, S.C.

SCALE 0 500 1000 FEET

Aerial Map Source - USDA 2013

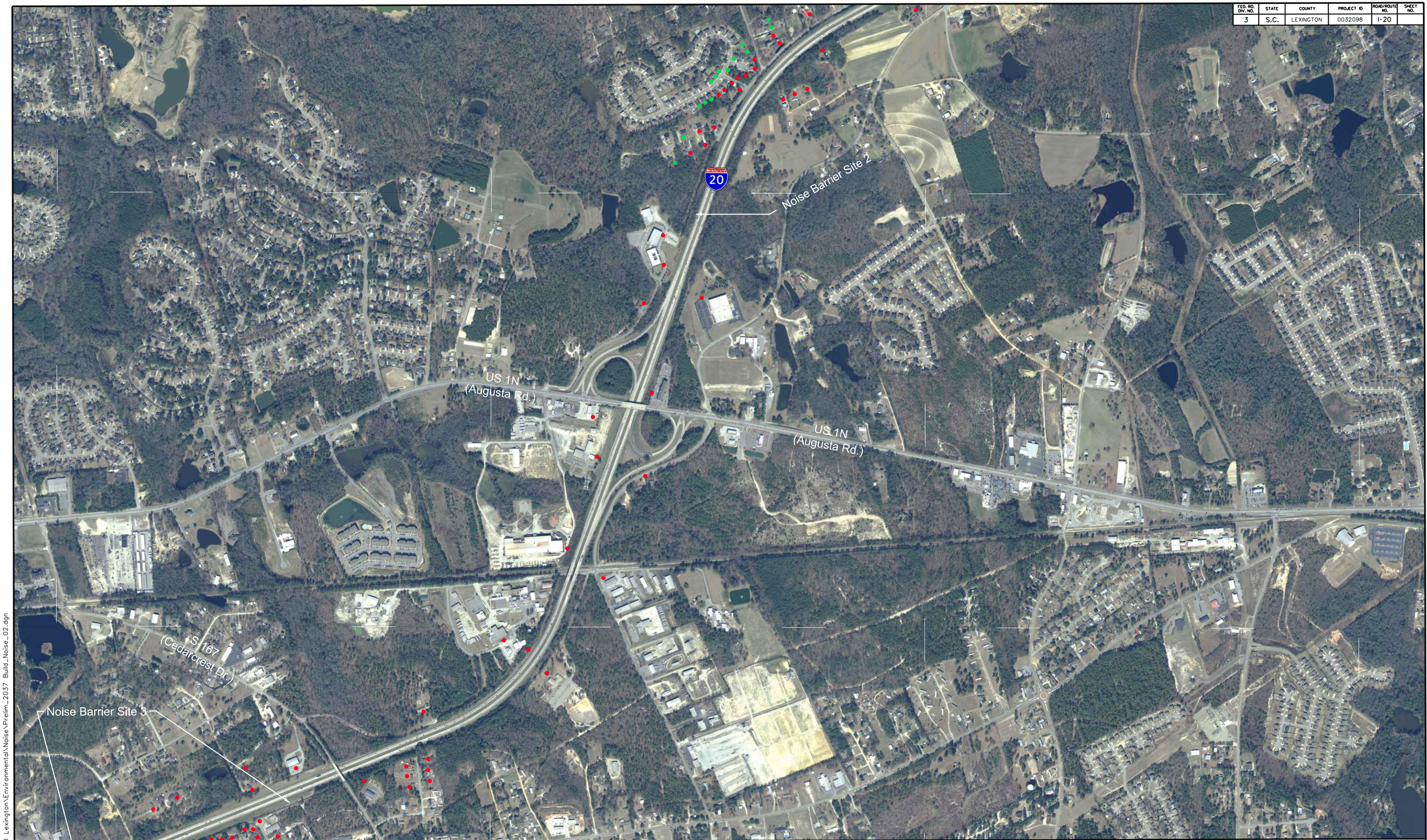
N

2037 BUILD NOISE IMPACTS

SHEET: 1 OF 4

9/11/2015
L:\1404601 \I-20 Lexington\Environmental\Noise\Prelim_2037 Build_Noise_01.dgn

FED. RD. DIV. NO.	STATE	COUNTY	PROJECT ID	ROAD/ROUTE NO.	SHEET NO.
3	S.C.	LEXINGTON	0032098	I-20	



Legend

- Impacted Receiver
- Non Impacted Receiver

Interstate 20
Widening Project
Lexington County, S.C.

0 500 1000
SCALE FEET
Aerial Map Source - USDA 2013

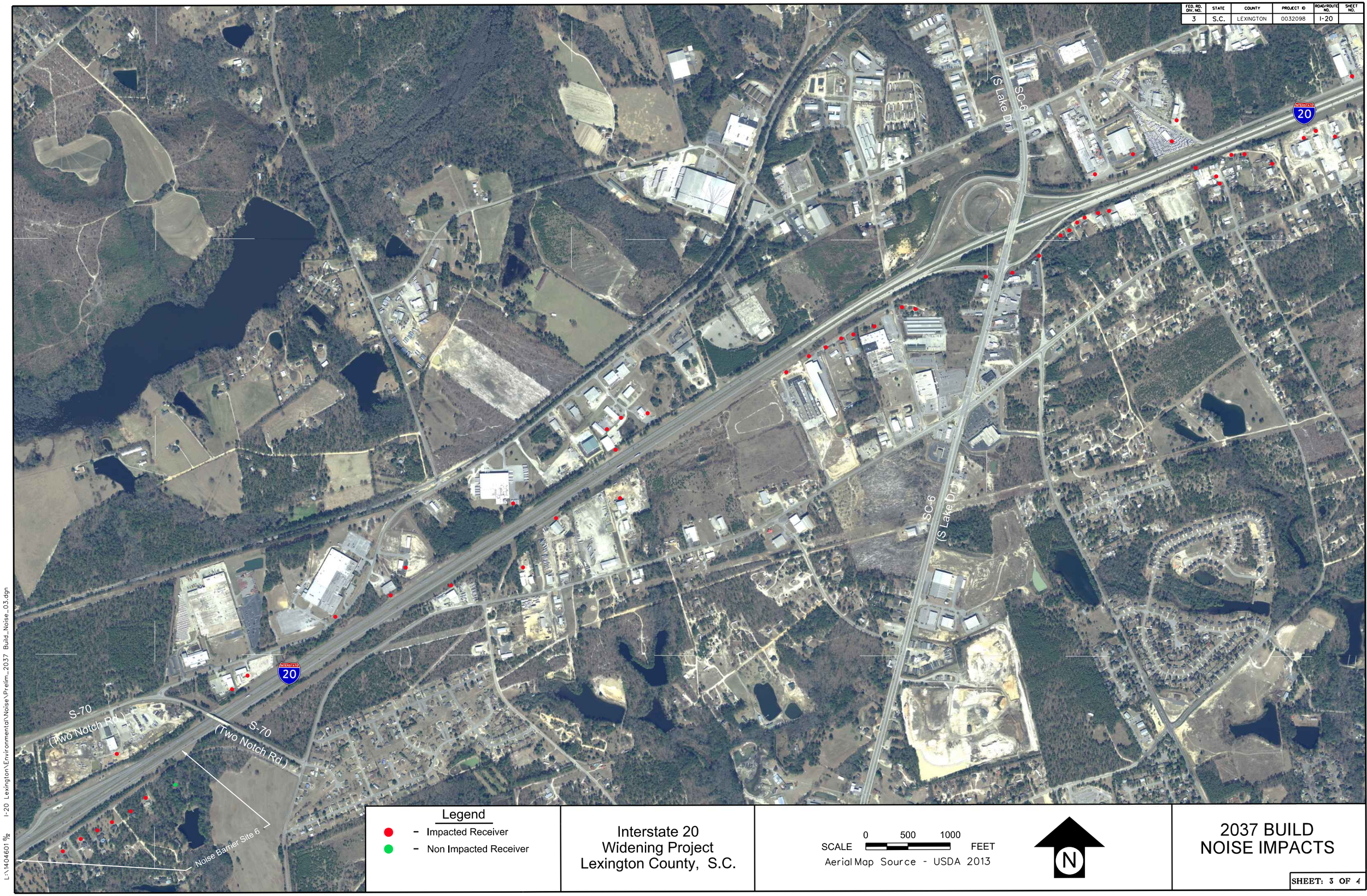
N

2037 BUILD NOISE IMPACTS

SHEET: 2 OF 4

9/11/2015
L:\1404601 \I-20 Lexington\Environmental\Noise\Prelim_2037 Build_Noise_02.dgn

FED. RD. DIV. NO.	STATE	COUNTY	PROJECT ID	ROAD/ROUTE NO.	SHEET NO.
3	S.C.	LEXINGTON	0032098	I-20	



Legend

- Impacted Receiver
- Non Impacted Receiver

Interstate 20
Widening Project
Lexington County, S.C.

SCALE 0 500 1000 FEET

Aerial Map Source - USDA 2013

N

2037 BUILD NOISE IMPACTS

SHEET: 3 OF 4

9/11/2015
L:\1404601 I-20 Lexington\Environmental\Noise\Prelim_2037 Build_Noise_03.dgn

FED. RD. DIV. NO.	STATE	COUNTY	PROJECT ID	ROAD/ROUTE NO.	SHEET NO.
3	S.C.	LEXINGTON	0032098	I-20	

End Project
(Approx.) Sta. 770+80

Noise Barrier Site 7

Noise Barrier Site 4

S-204
(Longs Pond Rd.)

S-204
(Longs Pond Rd.)

I-20

I-20

Legend

- Impacted Receiver
- Non Impacted Receiver

Interstate 20
Widening Project
Lexington County, S.C.

0 500 1000
SCALE FEET
Aerial Map Source - USDA 2013

N

2037 BUILD NOISE IMPACTS

SHEET: 4 OF 4

9/11/2015
L:\1404601 I-20 Lexington\Environmental\Noise\Prelim_2037 Build_Noise_04.dgn

2015 Existing Noise Levels

ICA Engineering, Inc. 21 April 2015
Will Kerr/Wayne Hall TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: I-20 Widening
RUN: US 378 to US 1 Existing Conditions
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
Receiver1	1	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver2	2	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver3	3	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver4	4	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver5	5	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver7	7	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver8	8	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver9	9	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver10	10	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver11	11	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver12	12	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver13	13	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver14	14	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver15	15	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver16	16	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver17	17	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver18	18	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver19	19	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver20	20	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver21	21	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver22	22	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver23	23	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver24	24	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver25	25	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0

Receiver124	124	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver125	125	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver126	126	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver127	127	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver128	128	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver129	129	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver130	130	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver131	131	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver132	132	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver133	133	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver134	134	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver135	135	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver136	136	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver137	137	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver138	138	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver139	139	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver140	140	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver141	141	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver142	142	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver143	143	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver144	144	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver145	145	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver146	146	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver147	147	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver148	148	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver149	149	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver150	150	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver151	151	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver152	152	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver153	153	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver154	154	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver155	155	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver156	156	1	0.0	72.3	66	72.3	15	Snd Lvl	72.3	0.0	8	-8.0
Receiver157	157	1	0.0	63.0	66	63.0	15	----	63.0	0.0	8	-8.0
Receiver158	158	1	0.0	64.4	66	64.4	15	----	64.4	0.0	8	-8.0
Receiver159	159	1	0.0	63.7	66	63.7	15	----	63.7	0.0	8	-8.0
Receiver160	160	1	0.0	68.0	66	68.0	15	Snd Lvl	68.0	0.0	8	-8.0
Receiver161	161	1	0.0	69.6	66	69.6	15	Snd Lvl	69.6	0.0	8	-8.0
Receiver162	162	1	0.0	64.4	66	64.4	15	----	64.4	0.0	8	-8.0
Receiver163	163	1	0.0	63.5	66	63.5	15	----	63.5	0.0	8	-8.0
Receiver164	164	1	0.0	65.2	66	65.2	15	----	65.2	0.0	8	-8.0

Receiver165	165	1	0.0	71.9	66	71.9	15	Snd Lvl	71.9	0.0	8	-8.0
Receiver166	166	1	0.0	63.9	66	63.9	15	----	63.9	0.0	8	-8.0
Receiver167	167	1	0.0	66.5	66	66.5	15	Snd Lvl	66.5	0.0	8	-8.0
Receiver168	168	1	0.0	63.8	66	63.8	15	----	63.8	0.0	8	-8.0
Receiver169	169	1	0.0	67.5	66	67.5	15	Snd Lvl	67.5	0.0	8	-8.0
Receiver170	170	1	0.0	65.1	66	65.1	15	----	65.1	0.0	8	-8.0
Receiver171	171	1	0.0	68.8	66	68.8	15	Snd Lvl	68.8	0.0	8	-8.0
Receiver172	172	1	0.0	64.5	66	64.5	15	----	64.5	0.0	8	-8.0
Receiver173	173	1	0.0	69.2	66	69.2	15	Snd Lvl	69.2	0.0	8	-8.0
Receiver174	174	1	0.0	73.8	66	73.8	15	Snd Lvl	73.8	0.0	8	-8.0
Receiver175	175	1	0.0	63.2	66	63.2	15	----	63.2	0.0	8	-8.0
Receiver176	176	1	0.0	71.2	66	71.2	15	Snd Lvl	71.2	0.0	8	-8.0
Receiver177	177	1	0.0	65.1	66	65.1	15	----	65.1	0.0	8	-8.0
Receiver178	178	1	0.0	68.3	66	68.3	15	Snd Lvl	68.3	0.0	8	-8.0
Receiver179	179	1	0.0	73.1	66	73.1	15	Snd Lvl	73.1	0.0	8	-8.0
Receiver180	180	1	0.0	62.9	66	62.9	15	----	62.9	0.0	8	-8.0
Receiver181	181	1	0.0	64.4	66	64.4	15	----	64.4	0.0	8	-8.0
Receiver182	182	1	0.0	68.5	66	68.5	15	Snd Lvl	68.5	0.0	8	-8.0
Receiver183	183	1	0.0	73.2	66	73.2	15	Snd Lvl	73.2	0.0	8	-8.0
Receiver184	184	1	0.0	70.6	66	70.6	15	Snd Lvl	70.6	0.0	8	-8.0
Receiver185	185	1	0.0	68.5	66	68.5	15	Snd Lvl	68.5	0.0	8	-8.0
Receiver186	186	1	0.0	66.8	66	66.8	15	Snd Lvl	66.8	0.0	8	-8.0
Receiver189	189	1	0.0	68.2	66	68.2	15	Snd Lvl	68.2	0.0	8	-8.0
Receiver190	190	1	0.0	75.0	66	75.0	15	Snd Lvl	75.0	0.0	8	-8.0
Receiver191	191	1	0.0	67.8	66	67.8	15	Snd Lvl	67.8	0.0	8	-8.0
Receiver192	192	1	0.0	69.5	66	69.5	15	Snd Lvl	69.5	0.0	8	-8.0
Receiver193	193	1	0.0	68.2	66	68.2	15	Snd Lvl	68.2	0.0	8	-8.0
Receiver194	194	1	0.0	70.7	66	70.7	15	Snd Lvl	70.7	0.0	8	-8.0
Receiver195	195	1	0.0	65.9	66	65.9	15	----	65.9	0.0	8	-8.0
Receiver196	196	1	0.0	72.6	66	72.6	15	Snd Lvl	72.6	0.0	8	-8.0
Receiver197	197	1	0.0	71.0	66	71.0	15	Snd Lvl	71.0	0.0	8	-8.0
Receiver199	199	1	0.0	75.2	66	75.2	15	Snd Lvl	75.2	0.0	8	-8.0
Receiver200	200	1	0.0	65.6	66	65.6	15	----	65.6	0.0	8	-8.0
Receiver201	201	1	0.0	65.9	66	65.9	15	----	65.9	0.0	8	-8.0
Receiver202	202	1	0.0	70.1	66	70.1	15	Snd Lvl	70.1	0.0	8	-8.0
Receiver203	203	1	0.0	73.1	66	73.1	15	Snd Lvl	73.1	0.0	8	-8.0
Receiver204	204	1	0.0	74.5	66	74.5	15	Snd Lvl	74.5	0.0	8	-8.0
Receiver205	205	1	0.0	70.6	66	70.6	15	Snd Lvl	70.6	0.0	8	-8.0
Receiver206	206	1	0.0	73.3	66	73.3	15	Snd Lvl	73.3	0.0	8	-8.0
Receiver207	207	1	0.0	64.0	66	64.0	15	----	64.0	0.0	8	-8.0
Receiver208	208	1	0.0	65.5	66	65.5	15	----	65.5	0.0	8	-8.0

Receiver209	209	1	0.0	64.8	66	64.8	15	----	64.8	0.0	8	-8.0
Receiver210	210	1	0.0	65.3	66	65.3	15	----	65.3	0.0	8	-8.0
Receiver211	211	1	0.0	64.4	66	64.4	15	----	64.4	0.0	8	-8.0
Receiver212	212	1	0.0	65.5	66	65.5	15	----	65.5	0.0	8	-8.0
Receiver213	213	1	0.0	69.0	66	69.0	15	Snd Lvl	69.0	0.0	8	-8.0
Receiver214	214	1	0.0	65.0	66	65.0	15	----	65.0	0.0	8	-8.0
Receiver215	215	1	0.0	66.5	66	66.5	15	Snd Lvl	66.5	0.0	8	-8.0
Receiver218	218	1	0.0	69.7	66	69.7	15	Snd Lvl	69.7	0.0	8	-8.0
Receiver219	219	1	0.0	69.8	66	69.8	15	Snd Lvl	69.8	0.0	8	-8.0
Receiver221	221	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver222	222	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver223	223	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver224	224	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver225	225	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver226	226	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver227	227	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver228	228	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver229	229	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver230	230	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver231	231	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver232	232	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver233	233	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver234	234	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver235	235	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver236	236	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver237	237	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver238	238	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver239	239	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver240	240	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver241	241	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver242	242	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver243	243	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver244	244	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver245	245	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver246	246	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver247	247	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver248	248	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver249	249	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver250	250	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver251	251	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver253	252	1	0.0	69.8	66	69.8	15	Snd Lvl	69.8	0.0	8	-8.0

Receiver254	254	1	0.0	68.4	66	68.4	10	Snd Lvl	68.4	0.0	8	-8.0
Receiver255	255	1	0.0	67.7	66	67.7	10	Snd Lvl	67.7	0.0	8	-8.0
Receiver256	256	1	0.0	63.9	66	63.9	10	----	63.9	0.0	8	-8.0
Receiver257	257	1	0.0	64.7	66	64.7	10	----	64.7	0.0	8	-8.0
Receiver258	258	1	0.0	65.2	66	65.2	10	----	65.2	0.0	8	-8.0
Receiver259	259	1	0.0	65.9	66	65.9	10	----	65.9	0.0	8	-8.0
Receiver260	260	1	0.0	67.7	66	67.7	10	Snd Lvl	67.7	0.0	8	-8.0
Receiver261	261	1	0.0	72.2	66	72.2	10	Snd Lvl	72.2	0.0	8	-8.0
Receiver262	262	1	0.0	73.0	66	73.0	10	Snd Lvl	73.0	0.0	8	-8.0
Receiver263	263	1	0.0	73.4	66	73.4	10	Snd Lvl	73.4	0.0	8	-8.0
Receiver264	264	1	0.0	73.4	66	73.4	10	Snd Lvl	73.4	0.0	8	-8.0
Receiver265	265	1	0.0	72.5	66	72.5	10	Snd Lvl	72.5	0.0	8	-8.0
Receiver266	266	1	0.0	70.6	66	70.6	10	Snd Lvl	70.6	0.0	8	-8.0
Receiver267	267	1	0.0	68.9	66	68.9	10	Snd Lvl	68.9	0.0	8	-8.0
Receiver268	268	1	0.0	67.4	66	67.4	10	Snd Lvl	67.4	0.0	8	-8.0
Receiver269	269	1	0.0	69.1	66	69.1	10	Snd Lvl	69.1	0.0	8	-8.0
Receiver270	270	1	0.0	67.6	66	67.6	10	Snd Lvl	67.6	0.0	8	-8.0
Receiver271	271	1	0.0	66.1	66	66.1	10	Snd Lvl	66.1	0.0	8	-8.0
Receiver272	272	1	0.0	65.3	66	65.3	10	----	65.3	0.0	8	-8.0
Receiver273	273	1	0.0	65.7	66	65.7	10	----	65.7	0.0	8	-8.0
Receiver274	274	1	0.0	64.8	66	64.8	10	----	64.8	0.0	8	-8.0
Receiver275	275	1	0.0	65.0	66	65.0	10	----	65.0	0.0	8	-8.0
Receiver276	276	1	0.0	64.1	66	64.1	10	----	64.1	0.0	8	-8.0
Receiver277	277	1	0.0	63.6	66	63.6	10	----	63.6	0.0	8	-8.0
Receiver278	278	1	0.0	65.5	66	65.5	10	----	65.5	0.0	8	-8.0
Receiver279	279	1	0.0	63.8	66	63.8	10	----	63.8	0.0	8	-8.0
Receiver280	280	1	0.0	67.3	66	67.3	10	Snd Lvl	67.3	0.0	8	-8.0
Receiver281	281	1	0.0	65.8	66	65.8	10	----	65.8	0.0	8	-8.0
Receiver282	282	1	0.0	69.3	66	69.3	10	Snd Lvl	69.3	0.0	8	-8.0
Receiver283	283	1	0.0	71.7	66	71.7	10	Snd Lvl	71.7	0.0	8	-8.0
Receiver284	284	1	0.0	68.3	66	68.3	10	Snd Lvl	68.3	0.0	8	-8.0
Receiver285	285	1	0.0	67.4	66	67.4	10	Snd Lvl	67.4	0.0	8	-8.0
Receiver286	286	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver287	287	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver288	288	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver289	289	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver290	290	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver291	291	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver292	292	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver293	293	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver294	294	1	0.0	71.4	66	71.4	10	Snd Lvl	71.4	0.0	8	-8.0

Dwelling Units	**# DUs**	**Noise Reduction**		
		Min	**Avg**	**Max**
		dB	**dB**	**dB**
All Selected	270	0.0	0.0	0.0
All Impacted	56	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

ICA Engineering, Inc.
Will Kerr/Wayne Hall

22 April 2015
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS

PROJECT/CONTRACT: I-20 Widening
RUN: US 1 to SC 6 Existing Conditions
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h		Increase over existir		Type Impact	With Barrier Calculated LAeq1h	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n Sub'l Inc			Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
Receiver1	1	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver2	2	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver3	3	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver4	4	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver5	5	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver7	7	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver8	8	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver9	9	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver10	10	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver11	11	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver12	12	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver13	13	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver14	14	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver15	15	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver16	16	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver17	17	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0

Receiver18	18	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver19	19	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver20	20	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver21	21	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver22	22	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver23	23	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver24	24	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver25	25	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver26	26	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver27	27	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver28	28	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver29	29	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver30	30	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver31	31	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver32	32	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver33	33	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver34	34	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver35	35	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver36	36	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver37	37	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver39	39	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver40	40	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver41	41	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver42	42	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver43	43	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver44	44	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver45	45	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver46	46	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver47	47	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver48	48	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver49	49	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver50	50	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver52	52	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver53	53	1	0.0	69.4	66	69.4	15	Snd Lvl	69.4	0.0	8	-8.0

Receiver54	54	1	0.0	71.2	66	71.2	15	Snd Lvl	71.2	0.0	8	-8.0
Receiver56	56	1	0.0	74.0	66	74.0	15	Snd Lvl	74.0	0.0	8	-8.0
Receiver58	58	1	0.0	73.1	66	73.1	15	Snd Lvl	73.1	0.0	8	-8.0
Receiver60	60	1	0.0	72.6	66	72.6	15	Snd Lvl	72.6	0.0	8	-8.0
Receiver61	61	1	0.0	71.0	66	71.0	15	Snd Lvl	71.0	0.0	8	-8.0
Receiver62	62	1	0.0	69.2	66	69.2	15	Snd Lvl	69.2	0.0	8	-8.0
Receiver63	63	1	0.0	70.4	66	70.4	15	Snd Lvl	70.4	0.0	8	-8.0
Receiver65	65	1	0.0	67.7	66	67.7	15	Snd Lvl	67.7	0.0	8	-8.0
Receiver67	67	1	0.0	67.4	66	67.4	15	Snd Lvl	67.4	0.0	8	-8.0
Receiver68	68	1	0.0	65.4	66	65.4	15	----	65.4	0.0	8	-8.0
Receiver70	70	1	0.0	66.6	66	66.6	15	Snd Lvl	66.6	0.0	8	-8.0
Receiver74	74	1	0.0	70.0	66	70.0	15	Snd Lvl	70.0	0.0	8	-8.0
Receiver75	75	1	0.0	70.7	66	70.7	15	Snd Lvl	70.7	0.0	8	-8.0
Receiver76	76	1	0.0	73.2	66	73.2	15	Snd Lvl	73.2	0.0	8	-8.0
Receiver77	77	1	0.0	74.6	66	74.6	15	Snd Lvl	74.6	0.0	8	-8.0
Receiver78	78	1	0.0	71.3	66	71.3	15	Snd Lvl	71.3	0.0	8	-8.0
Receiver80	80	1	0.0	74.1	66	74.1	15	Snd Lvl	74.1	0.0	8	-8.0
Receiver82	82	1	0.0	73.0	66	73.0	15	Snd Lvl	73.0	0.0	8	-8.0
Receiver83	83	1	0.0	76.4	66	76.4	15	Snd Lvl	76.4	0.0	8	-8.0
Receiver84	84	1	0.0	68.9	66	68.9	15	Snd Lvl	68.9	0.0	8	-8.0
Receiver85	85	1	0.0	70.5	66	70.5	15	Snd Lvl	70.5	0.0	8	-8.0
Receiver87	87	1	0.0	65.1	66	65.1	15	----	65.1	0.0	8	-8.0
Receiver89	89	1	0.0	76.9	66	76.9	15	Snd Lvl	76.9	0.0	8	-8.0
Receiver90	90	1	0.0	69.0	66	69.0	15	Snd Lvl	69.0	0.0	8	-8.0
Receiver91	91	1	0.0	66.4	66	66.4	15	Snd Lvl	66.4	0.0	8	-8.0
Receiver92	92	1	0.0	75.9	66	75.9	15	Snd Lvl	75.9	0.0	8	-8.0
Receiver93	93	1	0.0	73.6	66	73.6	15	Snd Lvl	73.6	0.0	8	-8.0
Receiver95	95	1	0.0	66.2	66	66.2	15	Snd Lvl	66.2	0.0	8	-8.0
Receiver96	96	1	0.0	70.7	66	70.7	15	Snd Lvl	70.7	0.0	8	-8.0
Receiver97	97	1	0.0	71.6	66	71.6	15	Snd Lvl	71.6	0.0	8	-8.0
Receiver98	98	1	0.0	66.6	66	66.6	15	Snd Lvl	66.6	0.0	8	-8.0
Receiver99	99	1	0.0	72.6	66	72.6	15	Snd Lvl	72.6	0.0	8	-8.0
Receiver100	100	1	0.0	73.8	66	73.8	15	Snd Lvl	73.8	0.0	8	-8.0
Receiver101	101	1	0.0	68.9	66	68.9	15	Snd Lvl	68.9	0.0	8	-8.0

Receiver102	102	1	0.0	71.7	66	71.7	15	Snd Lvl	71.7	0.0	8	-8.0
Receiver103	103	1	0.0	66.4	66	66.4	15	Snd Lvl	66.4	0.0	8	-8.0
Receiver104	104	1	0.0	72.4	66	72.4	15	Snd Lvl	72.4	0.0	8	-8.0
Receiver105	105	1	0.0	68.1	66	68.1	15	Snd Lvl	68.1	0.0	8	-8.0
Receiver106	106	1	0.0	69.1	66	69.1	15	Snd Lvl	69.1	0.0	8	-8.0
Receiver107	107	1	0.0	75.7	66	75.7	15	Snd Lvl	75.7	0.0	8	-8.0
Receiver108	108	1	0.0	69.1	66	69.1	15	Snd Lvl	69.1	0.0	8	-8.0
Receiver109	109	1	0.0	67.7	66	67.7	15	Snd Lvl	67.7	0.0	8	-8.0
Receiver110	110	1	0.0	68.6	66	68.6	15	Snd Lvl	68.6	0.0	8	-8.0
Receiver111	111	1	0.0	66.2	66	66.2	15	Snd Lvl	66.2	0.0	8	-8.0
Receiver112	112	1	0.0	71.8	66	71.8	15	Snd Lvl	71.8	0.0	8	-8.0
Receiver113	113	1	0.0	68.2	66	68.2	15	Snd Lvl	68.2	0.0	8	-8.0
Receiver114	114	1	0.0	73.6	66	73.6	15	Snd Lvl	73.6	0.0	8	-8.0
Receiver115	115	1	0.0	73.4	66	73.4	15	Snd Lvl	73.4	0.0	8	-8.0
Receiver116	116	1	0.0	66.6	66	66.6	15	Snd Lvl	66.6	0.0	8	-8.0
Receiver117	117	1	0.0	73.2	66	73.2	15	Snd Lvl	73.2	0.0	8	-8.0
Receiver118	118	1	0.0	74.2	66	74.2	15	Snd Lvl	74.2	0.0	8	-8.0
Receiver119	119	1	0.0	73.2	66	73.2	15	Snd Lvl	73.2	0.0	8	-8.0
Receiver120	120	1	0.0	66.9	66	66.9	15	Snd Lvl	66.9	0.0	8	-8.0
Receiver121	121	1	0.0	65.0	66	65.0	15	----	65.0	0.0	8	-8.0
Receiver122	122	1	0.0	73.9	66	73.9	15	Snd Lvl	73.9	0.0	8	-8.0
Receiver123	123	1	0.0	67.3	66	67.3	15	Snd Lvl	67.3	0.0	8	-8.0
Receiver124	124	1	0.0	72.3	66	72.3	15	Snd Lvl	72.3	0.0	8	-8.0
Receiver125	125	1	0.0	71.4	66	71.4	15	Snd Lvl	71.4	0.0	8	-8.0
Receiver126	126	1	0.0	67.0	66	67.0	15	Snd Lvl	67.0	0.0	8	-8.0
Receiver127	127	1	0.0	64.9	66	64.9	15	----	64.9	0.0	8	-8.0
Receiver128	128	1	0.0	72.9	66	72.9	15	Snd Lvl	72.9	0.0	8	-8.0
Receiver129	129	1	0.0	66.7	66	66.7	15	Snd Lvl	66.7	0.0	8	-8.0
Receiver130	130	1	0.0	74.7	66	74.7	15	Snd Lvl	74.7	0.0	8	-8.0
Receiver131	131	1	0.0	71.5	66	71.5	15	Snd Lvl	71.5	0.0	8	-8.0
Receiver132	132	1	0.0	68.1	66	68.1	15	Snd Lvl	68.1	0.0	8	-8.0
Receiver133	133	1	0.0	74.1	66	74.1	15	Snd Lvl	74.1	0.0	8	-8.0
Receiver134	134	1	0.0	65.7	66	65.7	15	----	65.7	0.0	8	-8.0
Receiver135	135	1	0.0	66.4	66	66.4	15	Snd Lvl	66.4	0.0	8	-8.0

Receiver136	136	1	0.0	72.8	66	72.8	15	Snd Lvl	72.8	0.0	8	-8.0
Receiver137	137	1	0.0	73.7	66	73.7	15	Snd Lvl	73.7	0.0	8	-8.0
Receiver138	138	1	0.0	72.2	66	72.2	15	Snd Lvl	72.2	0.0	8	-8.0
Receiver139	139	1	0.0	68.9	66	68.9	15	Snd Lvl	68.9	0.0	8	-8.0
Receiver140	140	1	0.0	65.7	66	65.7	15	----	65.7	0.0	8	-8.0
Receiver141	141	1	0.0	70.6	66	70.6	15	Snd Lvl	70.6	0.0	8	-8.0
Receiver142	142	1	0.0	71.1	66	71.1	15	Snd Lvl	71.1	0.0	8	-8.0
Receiver143	143	1	0.0	67.9	66	67.9	15	Snd Lvl	67.9	0.0	8	-8.0
Receiver144	144	1	0.0	65.3	66	65.3	15	----	65.3	0.0	8	-8.0
Receiver145	145	1	0.0	65.9	66	65.9	15	----	65.9	0.0	8	-8.0
Receiver146	146	1	0.0	75.2	66	75.2	15	Snd Lvl	75.2	0.0	8	-8.0
Receiver147	147	1	0.0	71.5	66	71.5	15	Snd Lvl	71.5	0.0	8	-8.0
Receiver148	148	1	0.0	65.5	66	65.5	15	----	65.5	0.0	8	-8.0
Receiver149	149	1	0.0	67.1	66	67.1	15	Snd Lvl	67.1	0.0	8	-8.0
Receiver150	150	1	0.0	73.2	66	73.2	15	Snd Lvl	73.2	0.0	8	-8.0
Receiver151	151	1	0.0	66.4	66	66.4	15	Snd Lvl	66.4	0.0	8	-8.0
Receiver152	152	1	0.0	69.5	66	69.5	15	Snd Lvl	69.5	0.0	8	-8.0
Receiver153	153	1	0.0	66.3	66	66.3	15	Snd Lvl	66.3	0.0	8	-8.0
Receiver154	154	1	0.0	75.4	66	75.4	15	Snd Lvl	75.4	0.0	8	-8.0
Receiver155	155	1	0.0	68.9	66	68.9	15	Snd Lvl	68.9	0.0	8	-8.0
Receiver156	156	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver157	157	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver158	158	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver159	159	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver160	160	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver161	161	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver162	162	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver163	163	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver164	164	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver165	165	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver166	166	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver167	167	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver168	168	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver169	169	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0

Receiver279	279	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver280	280	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver281	281	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver282	282	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver283	283	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver284	284	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver285	285	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver286	286	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver287	287	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver288	288	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver289	289	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver290	290	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver291	291	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver292	292	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver293	293	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver294	294	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0

Dwelling Units	**# DUs**	**Noise Reduction**		
		Min	**Avg**	**Max**
		dB	**dB**	**dB**
All Selected	270	0.0	0.0	0.0
All Impacted	80	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

ICA Engineering, Inc. 23 April 2015
Will Kerr/Wayne Hall TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: I-20 Widening
RUN: SC 6 to LPR Existing Conditions
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
Receiver1	1	1	0.0	73.1	66	73.1	15	Snd Lvl	73.1	0.0	8	-8.0
Receiver2	2	1	0.0	61.2	66	61.2	15	----	61.2	0.0	8	-8.0
Receiver3	3	1	0.0	62.4	66	62.4	15	----	62.4	0.0	8	-8.0
Receiver4	4	1	0.0	67.3	66	67.3	15	Snd Lvl	67.3	0.0	8	-8.0
Receiver5	5	1	0.0	61.8	66	61.8	15	----	61.8	0.0	8	-8.0
Receiver7	7	1	0.0	69.5	66	69.5	15	Snd Lvl	69.5	0.0	8	-8.0
Receiver8	8	1	0.0	62.5	66	62.5	15	----	62.5	0.0	8	-8.0
Receiver9	9	1	0.0	63.0	66	63.0	15	----	63.0	0.0	8	-8.0
Receiver10	10	1	0.0	65.0	66	65.0	15	----	65.0	0.0	8	-8.0
Receiver11	11	1	0.0	61.0	66	61.0	15	----	61.0	0.0	8	-8.0
Receiver12	12	1	0.0	64.2	66	64.2	15	----	64.2	0.0	8	-8.0
Receiver13	13	1	0.0	63.4	66	63.4	15	----	63.4	0.0	8	-8.0
Receiver14	14	1	0.0	70.6	66	70.6	15	Snd Lvl	70.6	0.0	8	-8.0
Receiver15	15	1	0.0	64.6	66	64.6	15	----	64.6	0.0	8	-8.0
Receiver16	16	1	0.0	67.3	66	67.3	15	Snd Lvl	67.3	0.0	8	-8.0
Receiver17	17	1	0.0	65.0	66	65.0	15	----	65.0	0.0	8	-8.0
Receiver18	18	1	0.0	63.0	66	63.0	15	----	63.0	0.0	8	-8.0
Receiver19	19	1	0.0	71.4	66	71.4	15	Snd Lvl	71.4	0.0	8	-8.0
Receiver20	20	1	0.0	64.2	66	64.2	15	----	64.2	0.0	8	-8.0
Receiver21	21	1	0.0	62.6	66	62.6	15	----	62.6	0.0	8	-8.0
Receiver22	22	1	0.0	62.6	66	62.6	15	----	62.6	0.0	8	-8.0
Receiver23	23	1	0.0	63.2	66	63.2	15	----	63.2	0.0	8	-8.0
Receiver24	24	1	0.0	63.2	66	63.2	15	----	63.2	0.0	8	-8.0
Receiver25	25	1	0.0	63.5	66	63.5	15	----	63.5	0.0	8	-8.0

Receiver26	26	1	0.0	63.8	66	63.8	15	----	63.8	0.0	8	-8.0
Receiver27	27	1	0.0	64.1	66	64.1	15	----	64.1	0.0	8	-8.0
Receiver28	28	1	0.0	64.3	66	64.3	15	----	64.3	0.0	8	-8.0
Receiver29	29	1	0.0	64.8	66	64.8	15	----	64.8	0.0	8	-8.0
Receiver30	30	1	0.0	66.8	66	66.8	15	Snd Lvl	66.8	0.0	8	-8.0
Receiver31	31	1	0.0	67.4	66	67.4	15	Snd Lvl	67.4	0.0	8	-8.0
Receiver32	32	1	0.0	66.6	66	66.6	15	Snd Lvl	66.6	0.0	8	-8.0
Receiver33	33	1	0.0	66.3	66	66.3	15	Snd Lvl	66.3	0.0	8	-8.0
Receiver34	34	1	0.0	69.0	66	69.0	15	Snd Lvl	69.0	0.0	8	-8.0
Receiver35	35	1	0.0	65.9	66	65.9	15	----	65.9	0.0	8	-8.0
Receiver36	36	1	0.0	66.9	66	66.9	15	Snd Lvl	66.9	0.0	8	-8.0
Receiver37	37	1	0.0	64.0	66	64.0	15	----	64.0	0.0	8	-8.0
Receiver39	39	1	0.0	73.0	66	73.0	15	Snd Lvl	73.0	0.0	8	-8.0
Receiver40	40	1	0.0	71.0	66	71.0	15	Snd Lvl	71.0	0.0	8	-8.0
Receiver41	41	1	0.0	70.0	66	70.0	15	Snd Lvl	70.0	0.0	8	-8.0
Receiver42	42	1	0.0	75.2	66	75.2	15	Snd Lvl	75.2	0.0	8	-8.0
Receiver43	43	1	0.0	68.0	66	68.0	15	Snd Lvl	68.0	0.0	8	-8.0
Receiver44	44	1	0.0	74.2	66	74.2	15	Snd Lvl	74.2	0.0	8	-8.0
Receiver45	45	1	0.0	70.0	66	70.0	15	Snd Lvl	70.0	0.0	8	-8.0
Receiver46	46	1	0.0	64.2	66	64.2	15	----	64.2	0.0	8	-8.0
Receiver47	47	1	0.0	73.9	66	73.9	15	Snd Lvl	73.9	0.0	8	-8.0
Receiver48	48	1	0.0	65.7	66	65.7	15	----	65.7	0.0	8	-8.0
Receiver49	49	1	0.0	74.4	66	74.4	15	Snd Lvl	74.4	0.0	8	-8.0
Receiver50	50	1	0.0	66.4	66	66.4	15	Snd Lvl	66.4	0.0	8	-8.0
Receiver52	52	1	0.0	64.9	66	64.9	15	----	64.9	0.0	8	-8.0
Receiver53	53	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver54	54	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver56	56	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver58	58	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver60	60	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver61	61	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver62	62	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver63	63	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver65	65	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver67	67	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver68	68	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver70	70	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver74	74	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver75	75	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver76	76	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver77	77	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0

Receiver209	209	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver210	210	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver211	211	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver212	212	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver213	213	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver214	214	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver215	215	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver218	218	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver219	219	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver221	221	1	0.0	68.7	66	68.7	15	Snd Lvl	68.7	0.0	8	-8.0
Receiver222	222	1	0.0	67.8	66	67.8	15	Snd Lvl	67.8	0.0	8	-8.0
Receiver223	223	1	0.0	67.8	66	67.8	15	Snd Lvl	67.8	0.0	8	-8.0
Receiver224	224	1	0.0	67.0	66	67.0	15	Snd Lvl	67.0	0.0	8	-8.0
Receiver225	225	1	0.0	66.5	66	66.5	15	Snd Lvl	66.5	0.0	8	-8.0
Receiver226	226	1	0.0	66.0	66	66.0	15	Snd Lvl	66.0	0.0	8	-8.0
Receiver227	227	1	0.0	65.7	66	65.7	15	----	65.7	0.0	8	-8.0
Receiver228	228	1	0.0	65.1	66	65.1	15	----	65.1	0.0	8	-8.0
Receiver229	229	1	0.0	64.3	66	64.3	15	----	64.3	0.0	8	-8.0
Receiver230	230	1	0.0	63.5	66	63.5	15	----	63.5	0.0	8	-8.0
Receiver231	231	1	0.0	61.8	66	61.8	15	----	61.8	0.0	8	-8.0
Receiver232	232	1	0.0	67.5	66	67.5	15	Snd Lvl	67.5	0.0	8	-8.0
Receiver233	233	1	0.0	64.8	66	64.8	15	----	64.8	0.0	8	-8.0
Receiver234	234	1	0.0	63.4	66	63.4	15	----	63.4	0.0	8	-8.0
Receiver235	235	1	0.0	65.6	66	65.6	15	----	65.6	0.0	8	-8.0
Receiver236	236	1	0.0	65.3	66	65.3	15	----	65.3	0.0	8	-8.0
Receiver237	237	1	0.0	64.9	66	64.9	15	----	64.9	0.0	8	-8.0
Receiver238	238	1	0.0	64.5	66	64.5	15	----	64.5	0.0	8	-8.0
Receiver239	239	1	0.0	63.2	66	63.2	15	----	63.2	0.0	8	-8.0
Receiver240	240	1	0.0	63.1	66	63.1	15	----	63.1	0.0	8	-8.0
Receiver241	241	1	0.0	62.4	66	62.4	15	----	62.4	0.0	8	-8.0
Receiver242	242	1	0.0	62.0	66	62.0	15	----	62.0	0.0	8	-8.0
Receiver243	243	1	0.0	61.7	66	61.7	15	----	61.7	0.0	8	-8.0
Receiver244	244	1	0.0	61.4	66	61.4	15	----	61.4	0.0	8	-8.0
Receiver245	245	1	0.0	61.0	66	61.0	15	----	61.0	0.0	8	-8.0
Receiver246	246	1	0.0	60.0	66	60.0	15	----	60.0	0.0	8	-8.0
Receiver247	247	1	0.0	59.1	66	59.1	15	----	59.1	0.0	8	-8.0
Receiver248	248	1	0.0	58.7	66	58.7	15	----	58.7	0.0	8	-8.0
Receiver249	249	1	0.0	58.6	66	58.6	15	----	58.6	0.0	8	-8.0
Receiver250	250	1	0.0	60.7	66	60.7	15	----	60.7	0.0	8	-8.0
Receiver251	251	1	0.0	62.0	66	62.0	15	----	62.0	0.0	8	-8.0
Receiver253	252	1	0.0	68.4	66	68.4	15	Snd Lvl	68.4	0.0	8	-8.0

Receiver254	254	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver255	255	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver256	256	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver257	257	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver258	258	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver259	259	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver260	260	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver261	261	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver262	262	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver263	263	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver264	264	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver265	265	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver266	266	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver267	267	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver268	268	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver269	269	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver270	270	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver271	271	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver272	272	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver273	273	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver274	274	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver275	275	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver276	276	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver277	277	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver278	278	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver279	279	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver280	280	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver281	281	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver282	282	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver283	283	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver284	284	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver285	285	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver286	286	1	0.0	60.3	66	60.3	10	----	60.3	0.0	8	-8.0
Receiver287	287	1	0.0	66.9	66	66.9	10	Snd Lvl	66.9	0.0	8	-8.0
Receiver288	288	1	0.0	68.4	66	68.4	10	Snd Lvl	68.4	0.0	8	-8.0
Receiver289	289	1	0.0	69.2	66	69.2	10	Snd Lvl	69.2	0.0	8	-8.0
Receiver290	290	1	0.0	69.8	66	69.8	10	Snd Lvl	69.8	0.0	8	-8.0
Receiver291	291	1	0.0	69.9	66	69.9	10	Snd Lvl	69.9	0.0	8	-8.0
Receiver292	292	1	0.0	67.4	66	67.4	10	Snd Lvl	67.4	0.0	8	-8.0
Receiver293	293	1	0.0	65.5	66	65.5	10	----	65.5	0.0	8	-8.0
Receiver294	294	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0

Dwelling Units	**# DUs**	**Noise Reduction**		
		Min	**Avg**	**Max**
		dB	**dB**	**dB**
All Selected	270	0.0	0.0	0.0
All Impacted	36	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

2037 No-Build Noise Levels

ICA Engineering, Inc.
Will Kerr/Wayne Hall

22 April 2015
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS

PROJECT/CONTRACT: I-20 Widening
RUN: US 378 to US 1 No Build Conditions
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h		Increase over existir		Type Impact	With Barrier Calculated LAeq1h	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n Sub'l Inc			Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
Receiver1	1	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver2	2	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver3	3	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver4	4	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver5	5	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver7	7	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver8	8	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver9	9	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver10	10	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver11	11	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver12	12	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver13	13	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver14	14	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver15	15	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver16	16	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver17	17	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0

Receiver136	136	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver137	137	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver138	138	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver139	139	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver140	140	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver141	141	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver142	142	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver143	143	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver144	144	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver145	145	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver146	146	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver147	147	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver148	148	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver149	149	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver150	150	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver151	151	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver152	152	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver153	153	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver154	154	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver155	155	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver156	156	1	72.3	74.1	66	74.1	15	Snd Lvl	74.1	0.0	8	-8.0
Receiver157	157	1	63.0	64.8	66	64.8	15	----	64.8	0.0	8	-8.0
Receiver158	158	1	64.4	66.2	66	66.2	15	Snd Lvl	66.2	0.0	8	-8.0
Receiver159	159	1	63.7	65.5	66	65.5	15	----	65.5	0.0	8	-8.0
Receiver160	160	1	68.0	69.8	66	69.8	15	Snd Lvl	69.8	0.0	8	-8.0
Receiver161	161	1	69.6	71.4	66	71.4	15	Snd Lvl	71.4	0.0	8	-8.0
Receiver162	162	1	64.4	66.2	66	66.2	15	Snd Lvl	66.2	0.0	8	-8.0
Receiver163	163	1	63.5	65.2	66	65.2	15	----	65.2	0.0	8	-8.0
Receiver164	164	1	65.2	67.0	66	67.0	15	Snd Lvl	67.0	0.0	8	-8.0
Receiver165	165	1	71.9	73.7	66	73.7	15	Snd Lvl	73.7	0.0	8	-8.0
Receiver166	166	1	63.9	65.7	66	65.7	15	----	65.7	0.0	8	-8.0
Receiver167	167	1	66.5	68.2	66	68.2	15	Snd Lvl	68.2	0.0	8	-8.0
Receiver168	168	1	63.8	65.6	66	65.6	15	----	65.6	0.0	8	-8.0
Receiver169	169	1	67.5	69.3	66	69.3	15	Snd Lvl	69.3	0.0	8	-8.0

Receiver170	170	1	65.1	66.9	66	66.9	15	Snd Lvl	66.9	0.0	8	-8.0
Receiver171	171	1	68.8	70.6	66	70.6	15	Snd Lvl	70.6	0.0	8	-8.0
Receiver172	172	1	64.5	66.3	66	66.3	15	Snd Lvl	66.3	0.0	8	-8.0
Receiver173	173	1	69.2	71.0	66	71.0	15	Snd Lvl	71.0	0.0	8	-8.0
Receiver174	174	1	73.8	75.6	66	75.6	15	Snd Lvl	75.6	0.0	8	-8.0
Receiver175	175	1	63.2	65.0	66	65.0	15	----	65.0	0.0	8	-8.0
Receiver176	176	1	71.2	73.0	66	73.0	15	Snd Lvl	73.0	0.0	8	-8.0
Receiver177	177	1	65.1	66.9	66	66.9	15	Snd Lvl	66.9	0.0	8	-8.0
Receiver178	178	1	68.3	70.1	66	70.1	15	Snd Lvl	70.1	0.0	8	-8.0
Receiver179	179	1	73.1	74.8	66	74.8	15	Snd Lvl	74.8	0.0	8	-8.0
Receiver180	180	1	62.9	64.7	66	64.7	15	----	64.7	0.0	8	-8.0
Receiver181	181	1	64.4	66.2	66	66.2	15	Snd Lvl	66.2	0.0	8	-8.0
Receiver182	182	1	68.5	70.3	66	70.3	15	Snd Lvl	70.3	0.0	8	-8.0
Receiver183	183	1	73.2	75.0	66	75.0	15	Snd Lvl	75.0	0.0	8	-8.0
Receiver184	184	1	70.6	72.4	66	72.4	15	Snd Lvl	72.4	0.0	8	-8.0
Receiver185	185	1	68.5	70.3	66	70.3	15	Snd Lvl	70.3	0.0	8	-8.0
Receiver186	186	1	66.8	68.6	66	68.6	15	Snd Lvl	68.6	0.0	8	-8.0
Receiver189	189	1	68.2	70.0	66	70.0	15	Snd Lvl	70.0	0.0	8	-8.0
Receiver190	190	1	75.0	76.8	66	76.8	15	Snd Lvl	76.8	0.0	8	-8.0
Receiver191	191	1	67.8	69.6	66	69.6	15	Snd Lvl	69.6	0.0	8	-8.0
Receiver192	192	1	69.5	71.3	66	71.3	15	Snd Lvl	71.3	0.0	8	-8.0
Receiver193	193	1	68.2	70.0	66	70.0	15	Snd Lvl	70.0	0.0	8	-8.0
Receiver194	194	1	70.7	72.5	66	72.5	15	Snd Lvl	72.5	0.0	8	-8.0
Receiver195	195	1	65.9	67.7	66	67.7	15	Snd Lvl	67.7	0.0	8	-8.0
Receiver196	196	1	72.6	74.3	66	74.3	15	Snd Lvl	74.3	0.0	8	-8.0
Receiver197	197	1	71.0	72.7	66	72.7	15	Snd Lvl	72.7	0.0	8	-8.0
Receiver199	199	1	75.2	77.0	66	77.0	15	Snd Lvl	77.0	0.0	8	-8.0
Receiver200	200	1	65.6	67.4	66	67.4	15	Snd Lvl	67.4	0.0	8	-8.0
Receiver201	201	1	65.9	67.7	66	67.7	15	Snd Lvl	67.7	0.0	8	-8.0
Receiver202	202	1	70.1	71.9	66	71.9	15	Snd Lvl	71.9	0.0	8	-8.0
Receiver203	203	1	73.1	74.9	66	74.9	15	Snd Lvl	74.9	0.0	8	-8.0
Receiver204	204	1	74.5	76.2	66	76.2	15	Snd Lvl	76.2	0.0	8	-8.0
Receiver205	205	1	70.6	72.4	66	72.4	15	Snd Lvl	72.4	0.0	8	-8.0
Receiver206	206	1	73.3	75.0	66	75.0	15	Snd Lvl	75.0	0.0	8	-8.0

Receiver207	207	1	64.0	65.8	66	65.8	15	----	65.8	0.0	8	-8.0
Receiver208	208	1	65.5	67.3	66	67.3	15	Snd Lvl	67.3	0.0	8	-8.0
Receiver209	209	1	64.8	66.6	66	66.6	15	Snd Lvl	66.6	0.0	8	-8.0
Receiver210	210	1	65.3	67.1	66	67.1	15	Snd Lvl	67.1	0.0	8	-8.0
Receiver211	211	1	64.4	66.1	66	66.1	15	Snd Lvl	66.1	0.0	8	-8.0
Receiver212	212	1	65.5	67.3	66	67.3	15	Snd Lvl	67.3	0.0	8	-8.0
Receiver213	213	1	69.0	70.8	66	70.8	15	Snd Lvl	70.8	0.0	8	-8.0
Receiver214	214	1	65.0	66.8	66	66.8	15	Snd Lvl	66.8	0.0	8	-8.0
Receiver215	215	1	66.5	68.3	66	68.3	15	Snd Lvl	68.3	0.0	8	-8.0
Receiver218	218	1	69.7	71.5	66	71.5	15	Snd Lvl	71.5	0.0	8	-8.0
Receiver219	219	1	69.8	71.6	66	71.6	15	Snd Lvl	71.6	0.0	8	-8.0
Receiver221	221	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver222	222	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver223	223	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver224	224	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver225	225	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver226	226	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver227	227	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver228	228	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver229	229	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver230	230	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver231	231	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver232	232	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver233	233	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver234	234	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver235	235	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver236	236	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver237	237	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver238	238	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver239	239	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver240	240	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver241	241	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver242	242	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver243	243	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0

Receiver244	244	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver245	245	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver246	246	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver247	247	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver248	248	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver249	249	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver250	250	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver251	251	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver253	252	1	0.0	71.6	66	71.6	15	Snd Lvl	71.6	0.0	8	-8.0
Receiver254	254	1	0.0	70.2	66	70.2	10	Snd Lvl	70.2	0.0	8	-8.0
Receiver255	255	1	0.0	69.5	66	69.5	10	Snd Lvl	69.5	0.0	8	-8.0
Receiver256	256	1	0.0	65.7	66	65.7	10	----	65.7	0.0	8	-8.0
Receiver257	257	1	0.0	66.4	66	66.4	10	Snd Lvl	66.4	0.0	8	-8.0
Receiver258	258	1	0.0	67.0	66	67.0	10	Snd Lvl	67.0	0.0	8	-8.0
Receiver259	259	1	0.0	67.7	66	67.7	10	Snd Lvl	67.7	0.0	8	-8.0
Receiver260	260	1	0.0	69.5	66	69.5	10	Snd Lvl	69.5	0.0	8	-8.0
Receiver261	261	1	0.0	74.0	66	74.0	10	Snd Lvl	74.0	0.0	8	-8.0
Receiver262	262	1	0.0	74.8	66	74.8	10	Snd Lvl	74.8	0.0	8	-8.0
Receiver263	263	1	0.0	75.2	66	75.2	10	Snd Lvl	75.2	0.0	8	-8.0
Receiver264	264	1	0.0	75.2	66	75.2	10	Snd Lvl	75.2	0.0	8	-8.0
Receiver265	265	1	0.0	74.3	66	74.3	10	Snd Lvl	74.3	0.0	8	-8.0
Receiver266	266	1	0.0	72.3	66	72.3	10	Snd Lvl	72.3	0.0	8	-8.0
Receiver267	267	1	0.0	70.7	66	70.7	10	Snd Lvl	70.7	0.0	8	-8.0
Receiver268	268	1	0.0	69.2	66	69.2	10	Snd Lvl	69.2	0.0	8	-8.0
Receiver269	269	1	0.0	70.8	66	70.8	10	Snd Lvl	70.8	0.0	8	-8.0
Receiver270	270	1	0.0	69.4	66	69.4	10	Snd Lvl	69.4	0.0	8	-8.0
Receiver271	271	1	0.0	67.9	66	67.9	10	Snd Lvl	67.9	0.0	8	-8.0
Receiver272	272	1	0.0	67.1	66	67.1	10	Snd Lvl	67.1	0.0	8	-8.0
Receiver273	273	1	0.0	67.5	66	67.5	10	Snd Lvl	67.5	0.0	8	-8.0
Receiver274	274	1	0.0	66.6	66	66.6	10	Snd Lvl	66.6	0.0	8	-8.0
Receiver275	275	1	0.0	66.8	66	66.8	10	Snd Lvl	66.8	0.0	8	-8.0
Receiver276	276	1	0.0	65.9	66	65.9	10	----	65.9	0.0	8	-8.0
Receiver277	277	1	0.0	65.4	66	65.4	10	----	65.4	0.0	8	-8.0
Receiver278	278	1	0.0	67.3	66	67.3	10	Snd Lvl	67.3	0.0	8	-8.0

Receiver279	279	1	0.0	65.5	66	65.5	10	----	65.5	0.0	8	-8.0
Receiver280	280	1	0.0	69.0	66	69.0	10	Snd Lvl	69.0	0.0	8	-8.0
Receiver281	281	1	0.0	67.6	66	67.6	10	Snd Lvl	67.6	0.0	8	-8.0
Receiver282	282	1	0.0	71.1	66	71.1	10	Snd Lvl	71.1	0.0	8	-8.0
Receiver283	283	1	0.0	73.4	66	73.4	10	Snd Lvl	73.4	0.0	8	-8.0
Receiver284	284	1	0.0	70.1	66	70.1	10	Snd Lvl	70.1	0.0	8	-8.0
Receiver285	285	1	0.0	69.2	66	69.2	10	Snd Lvl	69.2	0.0	8	-8.0
Receiver286	286	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver287	287	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver288	288	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver289	289	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver290	290	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver291	291	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver292	292	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver293	293	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver294	294	1	0.0	73.2	66	73.2	10	Snd Lvl	73.2	0.0	8	-8.0

Dwelling Units	**# DUs**	**Noise Reduction**		
		Min	**Avg**	**Max**
		dB	**dB**	**dB**
All Selected	270	0.0	0.0	0.0
All Impacted	81	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

ICA Engineering, Inc.
Will Kerr/Wayne Hall

22 April 2015
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS

PROJECT/CONTRACT: I-20 Widening
RUN: US 1 to SC 6 No Build Conditions
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h		Increase over existir		Type Impact	With Barrier Calculated LAeq1h	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n Sub'l Inc			Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
Receiver1	1	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver2	2	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver3	3	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver4	4	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver5	5	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver7	7	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver8	8	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver9	9	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver10	10	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver11	11	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver12	12	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver13	13	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver14	14	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver15	15	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver16	16	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver17	17	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0

Receiver18	18	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver19	19	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver20	20	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver21	21	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver22	22	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver23	23	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver24	24	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver25	25	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver26	26	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver27	27	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver28	28	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver29	29	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver30	30	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver31	31	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver32	32	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver33	33	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver34	34	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver35	35	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver36	36	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver37	37	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver39	39	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver40	40	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver41	41	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver42	42	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver43	43	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver44	44	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver45	45	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver46	46	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver47	47	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver48	48	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver49	49	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver50	50	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver52	52	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver53	53	1	69.4	70.9	66	70.9	15	Snd Lvl	70.9	0.0	8	-8.0

Receiver54	54	1	71.2	72.7	66	72.7	15	Snd Lvl	72.7	0.0	8	-8.0
Receiver56	56	1	74.0	75.4	66	75.4	15	Snd Lvl	75.4	0.0	8	-8.0
Receiver58	58	1	73.1	74.6	66	74.6	15	Snd Lvl	74.6	0.0	8	-8.0
Receiver60	60	1	72.6	74.1	66	74.1	15	Snd Lvl	74.1	0.0	8	-8.0
Receiver61	61	1	71.0	72.5	66	72.5	15	Snd Lvl	72.5	0.0	8	-8.0
Receiver62	62	1	69.2	70.7	66	70.7	15	Snd Lvl	70.7	0.0	8	-8.0
Receiver63	63	1	70.4	71.9	66	71.9	15	Snd Lvl	71.9	0.0	8	-8.0
Receiver65	65	1	67.7	69.2	66	69.2	15	Snd Lvl	69.2	0.0	8	-8.0
Receiver67	67	1	67.4	68.9	66	68.9	15	Snd Lvl	68.9	0.0	8	-8.0
Receiver68	68	1	65.4	67.0	66	67.0	15	Snd Lvl	67.0	0.0	8	-8.0
Receiver70	70	1	66.6	68.1	66	68.1	15	Snd Lvl	68.1	0.0	8	-8.0
Receiver74	74	1	70.0	71.5	66	71.5	15	Snd Lvl	71.5	0.0	8	-8.0
Receiver75	75	1	70.7	72.2	66	72.2	15	Snd Lvl	72.2	0.0	8	-8.0
Receiver76	76	1	73.2	74.8	66	74.8	15	Snd Lvl	74.8	0.0	8	-8.0
Receiver77	77	1	74.6	76.1	66	76.1	15	Snd Lvl	76.1	0.0	8	-8.0
Receiver78	78	1	71.3	72.8	66	72.8	15	Snd Lvl	72.8	0.0	8	-8.0
Receiver80	80	1	74.1	75.6	66	75.6	15	Snd Lvl	75.6	0.0	8	-8.0
Receiver82	82	1	73.0	74.5	66	74.5	15	Snd Lvl	74.5	0.0	8	-8.0
Receiver83	83	1	76.4	77.9	66	77.9	15	Snd Lvl	77.9	0.0	8	-8.0
Receiver84	84	1	68.9	70.4	66	70.4	15	Snd Lvl	70.4	0.0	8	-8.0
Receiver85	85	1	70.5	72.1	66	72.1	15	Snd Lvl	72.1	0.0	8	-8.0
Receiver87	87	1	65.1	66.6	66	66.6	15	Snd Lvl	66.6	0.0	8	-8.0
Receiver89	89	1	76.9	78.4	66	78.4	15	Snd Lvl	78.4	0.0	8	-8.0
Receiver90	90	1	69.0	70.5	66	70.5	15	Snd Lvl	70.5	0.0	8	-8.0
Receiver91	91	1	66.4	68.0	66	68.0	15	Snd Lvl	68.0	0.0	8	-8.0
Receiver92	92	1	75.9	77.4	66	77.4	15	Snd Lvl	77.4	0.0	8	-8.0
Receiver93	93	1	73.6	75.1	66	75.1	15	Snd Lvl	75.1	0.0	8	-8.0
Receiver95	95	1	66.2	67.7	66	67.7	15	Snd Lvl	67.7	0.0	8	-8.0
Receiver96	96	1	70.7	72.2	66	72.2	15	Snd Lvl	72.2	0.0	8	-8.0
Receiver97	97	1	71.6	73.1	66	73.1	15	Snd Lvl	73.1	0.0	8	-8.0
Receiver98	98	1	66.6	68.1	66	68.1	15	Snd Lvl	68.1	0.0	8	-8.0
Receiver99	99	1	72.6	74.1	66	74.1	15	Snd Lvl	74.1	0.0	8	-8.0
Receiver100	100	1	73.8	75.3	66	75.3	15	Snd Lvl	75.3	0.0	8	-8.0
Receiver101	101	1	68.9	70.4	66	70.4	15	Snd Lvl	70.4	0.0	8	-8.0

Receiver102	102	1	71.7	73.3	66	73.3	15	Snd Lvl	73.3	0.0	8	-8.0
Receiver103	103	1	66.4	67.9	66	67.9	15	Snd Lvl	67.9	0.0	8	-8.0
Receiver104	104	1	72.4	73.9	66	73.9	15	Snd Lvl	73.9	0.0	8	-8.0
Receiver105	105	1	68.1	69.6	66	69.6	15	Snd Lvl	69.6	0.0	8	-8.0
Receiver106	106	1	69.1	70.6	66	70.6	15	Snd Lvl	70.6	0.0	8	-8.0
Receiver107	107	1	75.7	77.2	66	77.2	15	Snd Lvl	77.2	0.0	8	-8.0
Receiver108	108	1	69.1	70.6	66	70.6	15	Snd Lvl	70.6	0.0	8	-8.0
Receiver109	109	1	67.7	69.2	66	69.2	15	Snd Lvl	69.2	0.0	8	-8.0
Receiver110	110	1	68.6	70.1	66	70.1	15	Snd Lvl	70.1	0.0	8	-8.0
Receiver111	111	1	66.2	67.8	66	67.8	15	Snd Lvl	67.8	0.0	8	-8.0
Receiver112	112	1	71.8	73.3	66	73.3	15	Snd Lvl	73.3	0.0	8	-8.0
Receiver113	113	1	68.2	69.8	66	69.8	15	Snd Lvl	69.8	0.0	8	-8.0
Receiver114	114	1	73.6	75.1	66	75.1	15	Snd Lvl	75.1	0.0	8	-8.0
Receiver115	115	1	73.4	74.9	66	74.9	15	Snd Lvl	74.9	0.0	8	-8.0
Receiver116	116	1	66.6	68.2	66	68.2	15	Snd Lvl	68.2	0.0	8	-8.0
Receiver117	117	1	73.2	74.7	66	74.7	15	Snd Lvl	74.7	0.0	8	-8.0
Receiver118	118	1	74.2	75.6	66	75.6	15	Snd Lvl	75.6	0.0	8	-8.0
Receiver119	119	1	73.2	74.7	66	74.7	15	Snd Lvl	74.7	0.0	8	-8.0
Receiver120	120	1	66.9	68.4	66	68.4	15	Snd Lvl	68.4	0.0	8	-8.0
Receiver121	121	1	65.0	66.6	66	66.6	15	Snd Lvl	66.6	0.0	8	-8.0
Receiver122	122	1	73.9	75.4	66	75.4	15	Snd Lvl	75.4	0.0	8	-8.0
Receiver123	123	1	67.3	68.8	66	68.8	15	Snd Lvl	68.8	0.0	8	-8.0
Receiver124	124	1	72.3	73.8	66	73.8	15	Snd Lvl	73.8	0.0	8	-8.0
Receiver125	125	1	71.4	72.9	66	72.9	15	Snd Lvl	72.9	0.0	8	-8.0
Receiver126	126	1	67.0	68.5	66	68.5	15	Snd Lvl	68.5	0.0	8	-8.0
Receiver127	127	1	64.9	66.4	66	66.4	15	Snd Lvl	66.4	0.0	8	-8.0
Receiver128	128	1	72.9	74.4	66	74.4	15	Snd Lvl	74.4	0.0	8	-8.0
Receiver129	129	1	66.7	68.2	66	68.2	15	Snd Lvl	68.2	0.0	8	-8.0
Receiver130	130	1	74.7	76.2	66	76.2	15	Snd Lvl	76.2	0.0	8	-8.0
Receiver131	131	1	71.5	73.1	66	73.1	15	Snd Lvl	73.1	0.0	8	-8.0
Receiver132	132	1	68.1	69.7	66	69.7	15	Snd Lvl	69.7	0.0	8	-8.0
Receiver133	133	1	74.1	75.5	66	75.5	15	Snd Lvl	75.5	0.0	8	-8.0
Receiver134	134	1	65.7	67.3	66	67.3	15	Snd Lvl	67.3	0.0	8	-8.0
Receiver135	135	1	66.4	67.9	66	67.9	15	Snd Lvl	67.9	0.0	8	-8.0

Receiver136	136	1	72.8	74.3	66	74.3	15	Snd Lvl	74.3	0.0	8	-8.0
Receiver137	137	1	73.7	75.2	66	75.2	15	Snd Lvl	75.2	0.0	8	-8.0
Receiver138	138	1	72.2	73.7	66	73.7	15	Snd Lvl	73.7	0.0	8	-8.0
Receiver139	139	1	68.9	70.4	66	70.4	15	Snd Lvl	70.4	0.0	8	-8.0
Receiver140	140	1	65.7	67.3	66	67.3	15	Snd Lvl	67.3	0.0	8	-8.0
Receiver141	141	1	70.6	72.2	66	72.2	15	Snd Lvl	72.2	0.0	8	-8.0
Receiver142	142	1	71.1	72.6	66	72.6	15	Snd Lvl	72.6	0.0	8	-8.0
Receiver143	143	1	67.9	69.4	66	69.4	15	Snd Lvl	69.4	0.0	8	-8.0
Receiver144	144	1	65.3	66.9	66	66.9	15	Snd Lvl	66.9	0.0	8	-8.0
Receiver145	145	1	65.9	67.4	66	67.4	15	Snd Lvl	67.4	0.0	8	-8.0
Receiver146	146	1	75.2	76.8	66	76.8	15	Snd Lvl	76.8	0.0	8	-8.0
Receiver147	147	1	71.5	73.0	66	73.0	15	Snd Lvl	73.0	0.0	8	-8.0
Receiver148	148	1	65.5	67.0	66	67.0	15	Snd Lvl	67.0	0.0	8	-8.0
Receiver149	149	1	67.1	68.6	66	68.6	15	Snd Lvl	68.6	0.0	8	-8.0
Receiver150	150	1	73.2	74.8	66	74.8	15	Snd Lvl	74.8	0.0	8	-8.0
Receiver151	151	1	66.4	67.9	66	67.9	15	Snd Lvl	67.9	0.0	8	-8.0
Receiver152	152	1	69.5	71.1	66	71.1	15	Snd Lvl	71.1	0.0	8	-8.0
Receiver153	153	1	66.3	67.9	66	67.9	15	Snd Lvl	67.9	0.0	8	-8.0
Receiver154	154	1	75.4	76.9	66	76.9	15	Snd Lvl	76.9	0.0	8	-8.0
Receiver155	155	1	68.9	70.4	66	70.4	15	Snd Lvl	70.4	0.0	8	-8.0
Receiver156	156	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver157	157	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver158	158	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver159	159	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver160	160	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver161	161	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver162	162	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver163	163	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver164	164	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver165	165	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver166	166	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver167	167	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver168	168	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver169	169	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0

Receiver279	279	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver280	280	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver281	281	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver282	282	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver283	283	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver284	284	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver285	285	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver286	286	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver287	287	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver288	288	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver289	289	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver290	290	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver291	291	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver292	292	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver293	293	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver294	294	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0

Dwelling Units	**# DUs**	**Noise Reduction**		
		Min	**Avg**	**Max**
		dB	**dB**	**dB**
All Selected	270	0.0	0.0	0.0
All Impacted	89	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

ICA Engineering, Inc. 23 April 2015
Will Kerr/Wayne Hall TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: I-20 Widening
RUN: SC 6 to LPR No Build Conditions
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
Receiver1	1	1	73.1	74.4	66	74.4	15	Snd Lvl	74.4	0.0	8	-8.0
Receiver2	2	1	61.2	62.5	66	62.5	15	----	62.5	0.0	8	-8.0
Receiver3	3	1	62.4	63.7	66	63.7	15	----	63.7	0.0	8	-8.0
Receiver4	4	1	67.3	68.7	66	68.7	15	Snd Lvl	68.7	0.0	8	-8.0
Receiver5	5	1	61.8	63.1	66	63.1	15	----	63.1	0.0	8	-8.0
Receiver7	7	1	69.5	70.8	66	70.8	15	Snd Lvl	70.8	0.0	8	-8.0
Receiver8	8	1	62.5	63.8	66	63.8	15	----	63.8	0.0	8	-8.0
Receiver9	9	1	63.0	64.3	66	64.3	15	----	64.3	0.0	8	-8.0
Receiver10	10	1	65.0	66.4	66	66.4	15	Snd Lvl	66.4	0.0	8	-8.0
Receiver11	11	1	61.0	62.3	66	62.3	15	----	62.3	0.0	8	-8.0
Receiver12	12	1	64.2	65.5	66	65.5	15	----	65.5	0.0	8	-8.0
Receiver13	13	1	63.4	64.7	66	64.7	15	----	64.7	0.0	8	-8.0
Receiver14	14	1	70.6	72.0	66	72.0	15	Snd Lvl	72.0	0.0	8	-8.0
Receiver15	15	1	64.6	65.9	66	65.9	15	----	65.9	0.0	8	-8.0
Receiver16	16	1	67.3	68.6	66	68.6	15	Snd Lvl	68.6	0.0	8	-8.0
Receiver17	17	1	65.0	66.3	66	66.3	15	Snd Lvl	66.3	0.0	8	-8.0
Receiver18	18	1	63.0	64.4	66	64.4	15	----	64.4	0.0	8	-8.0
Receiver19	19	1	71.4	72.7	66	72.7	15	Snd Lvl	72.7	0.0	8	-8.0
Receiver20	20	1	64.2	65.5	66	65.5	15	----	65.5	0.0	8	-8.0
Receiver21	21	1	62.6	64.0	66	64.0	15	----	64.0	0.0	8	-8.0
Receiver22	22	1	62.6	63.9	66	63.9	15	----	63.9	0.0	8	-8.0
Receiver23	23	1	63.2	64.5	66	64.5	15	----	64.5	0.0	8	-8.0
Receiver24	24	1	63.2	64.6	66	64.6	15	----	64.6	0.0	8	-8.0
Receiver25	25	1	63.5	64.9	66	64.9	15	----	64.9	0.0	8	-8.0

Receiver26	26	1	63.8	65.1	66	65.1	15	----	65.1	0.0	8	-8.0
Receiver27	27	1	64.1	65.5	66	65.5	15	----	65.5	0.0	8	-8.0
Receiver28	28	1	64.3	65.6	66	65.6	15	----	65.6	0.0	8	-8.0
Receiver29	29	1	64.8	66.2	66	66.2	15	Snd Lvl	66.2	0.0	8	-8.0
Receiver30	30	1	66.8	68.2	66	68.2	15	Snd Lvl	68.2	0.0	8	-8.0
Receiver31	31	1	67.4	68.7	66	68.7	15	Snd Lvl	68.7	0.0	8	-8.0
Receiver32	32	1	66.6	67.9	66	67.9	15	Snd Lvl	67.9	0.0	8	-8.0
Receiver33	33	1	66.3	67.6	66	67.6	15	Snd Lvl	67.6	0.0	8	-8.0
Receiver34	34	1	69.0	70.3	66	70.3	15	Snd Lvl	70.3	0.0	8	-8.0
Receiver35	35	1	65.9	67.3	66	67.3	15	Snd Lvl	67.3	0.0	8	-8.0
Receiver36	36	1	66.9	68.3	66	68.3	15	Snd Lvl	68.3	0.0	8	-8.0
Receiver37	37	1	64.0	65.4	66	65.4	15	----	65.4	0.0	8	-8.0
Receiver39	39	1	73.0	74.3	66	74.3	15	Snd Lvl	74.3	0.0	8	-8.0
Receiver40	40	1	71.0	72.3	66	72.3	15	Snd Lvl	72.3	0.0	8	-8.0
Receiver41	41	1	70.0	71.3	66	71.3	15	Snd Lvl	71.3	0.0	8	-8.0
Receiver42	42	1	75.2	76.5	66	76.5	15	Snd Lvl	76.5	0.0	8	-8.0
Receiver43	43	1	68.0	69.3	66	69.3	15	Snd Lvl	69.3	0.0	8	-8.0
Receiver44	44	1	74.2	75.5	66	75.5	15	Snd Lvl	75.5	0.0	8	-8.0
Receiver45	45	1	70.0	71.4	66	71.4	15	Snd Lvl	71.4	0.0	8	-8.0
Receiver46	46	1	64.2	65.6	66	65.6	15	----	65.6	0.0	8	-8.0
Receiver47	47	1	73.9	75.2	66	75.2	15	Snd Lvl	75.2	0.0	8	-8.0
Receiver48	48	1	65.7	67.1	66	67.1	15	Snd Lvl	67.1	0.0	8	-8.0
Receiver49	49	1	74.4	75.8	66	75.8	15	Snd Lvl	75.8	0.0	8	-8.0
Receiver50	50	1	66.4	67.7	66	67.7	15	Snd Lvl	67.7	0.0	8	-8.0
Receiver52	52	1	64.9	66.3	66	66.3	15	Snd Lvl	66.3	0.0	8	-8.0
Receiver53	53	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver54	54	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver56	56	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver58	58	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver60	60	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver61	61	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver62	62	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver63	63	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver65	65	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver67	67	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver68	68	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver70	70	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver74	74	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver75	75	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver76	76	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver77	77	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0

Receiver209	209	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver210	210	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver211	211	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver212	212	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver213	213	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver214	214	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver215	215	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver218	218	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver219	219	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver221	221	1	68.7	70.0	66	70.0	15	Snd Lvl	70.0	0.0	8	-8.0
Receiver222	222	1	67.8	69.2	66	69.2	15	Snd Lvl	69.2	0.0	8	-8.0
Receiver223	223	1	67.8	69.1	66	69.1	15	Snd Lvl	69.1	0.0	8	-8.0
Receiver224	224	1	67.0	68.3	66	68.3	15	Snd Lvl	68.3	0.0	8	-8.0
Receiver225	225	1	66.5	67.9	66	67.9	15	Snd Lvl	67.9	0.0	8	-8.0
Receiver226	226	1	66.0	67.3	66	67.3	15	Snd Lvl	67.3	0.0	8	-8.0
Receiver227	227	1	65.7	67.1	66	67.1	15	Snd Lvl	67.1	0.0	8	-8.0
Receiver228	228	1	65.1	66.4	66	66.4	15	Snd Lvl	66.4	0.0	8	-8.0
Receiver229	229	1	64.3	65.6	66	65.6	15	----	65.6	0.0	8	-8.0
Receiver230	230	1	63.5	64.8	66	64.8	15	----	64.8	0.0	8	-8.0
Receiver231	231	1	61.8	63.1	66	63.1	15	----	63.1	0.0	8	-8.0
Receiver232	232	1	67.5	68.8	66	68.8	15	Snd Lvl	68.8	0.0	8	-8.0
Receiver233	233	1	64.8	66.1	66	66.1	15	Snd Lvl	66.1	0.0	8	-8.0
Receiver234	234	1	63.4	64.7	66	64.7	15	----	64.7	0.0	8	-8.0
Receiver235	235	1	65.6	67.0	66	67.0	15	Snd Lvl	67.0	0.0	8	-8.0
Receiver236	236	1	65.3	66.6	66	66.6	15	Snd Lvl	66.6	0.0	8	-8.0
Receiver237	237	1	64.9	66.2	66	66.2	15	Snd Lvl	66.2	0.0	8	-8.0
Receiver238	238	1	64.5	65.9	66	65.9	15	----	65.9	0.0	8	-8.0
Receiver239	239	1	63.2	64.5	66	64.5	15	----	64.5	0.0	8	-8.0
Receiver240	240	1	63.1	64.5	66	64.5	15	----	64.5	0.0	8	-8.0
Receiver241	241	1	62.4	63.7	66	63.7	15	----	63.7	0.0	8	-8.0
Receiver242	242	1	62.0	63.3	66	63.3	15	----	63.3	0.0	8	-8.0
Receiver243	243	1	61.7	63.0	66	63.0	15	----	63.0	0.0	8	-8.0
Receiver244	244	1	61.4	62.7	66	62.7	15	----	62.7	0.0	8	-8.0
Receiver245	245	1	61.0	62.3	66	62.3	15	----	62.3	0.0	8	-8.0
Receiver246	246	1	60.0	61.4	66	61.4	15	----	61.4	0.0	8	-8.0
Receiver247	247	1	59.1	60.4	66	60.4	15	----	60.4	0.0	8	-8.0
Receiver248	248	1	58.7	60.0	66	60.0	15	----	60.0	0.0	8	-8.0
Receiver249	249	1	58.6	59.9	66	59.9	15	----	59.9	0.0	8	-8.0
Receiver250	250	1	60.7	62.1	66	62.1	15	----	62.1	0.0	8	-8.0
Receiver251	251	1	62.0	63.4	66	63.4	15	----	63.4	0.0	8	-8.0
Receiver253	252	1	0.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0

Receiver254	254	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver255	255	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver256	256	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver257	257	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver258	258	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver259	259	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver260	260	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver261	261	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver262	262	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver263	263	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver264	264	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver265	265	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver266	266	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver267	267	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver268	268	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver269	269	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver270	270	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver271	271	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver272	272	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver273	273	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver274	274	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver275	275	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver276	276	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver277	277	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver278	278	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver279	279	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver280	280	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver281	281	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver282	282	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver283	283	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver284	284	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver285	285	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver286	286	1	60.3	61.7	66	61.7	10	----	61.7	0.0	8	-8.0
Receiver287	287	1	66.9	68.2	66	68.2	10	Snd Lvl	68.2	0.0	8	-8.0
Receiver288	288	1	68.4	69.7	66	69.7	10	Snd Lvl	69.7	0.0	8	-8.0
Receiver289	289	1	69.2	70.5	66	70.5	10	Snd Lvl	70.5	0.0	8	-8.0
Receiver290	290	1	69.8	71.2	66	71.2	10	Snd Lvl	71.2	0.0	8	-8.0
Receiver291	291	1	69.9	71.2	66	71.2	10	Snd Lvl	71.2	0.0	8	-8.0
Receiver292	292	1	67.4	68.8	66	68.8	10	Snd Lvl	68.8	0.0	8	-8.0
Receiver293	293	1	65.5	66.8	66	66.8	10	Snd Lvl	66.8	0.0	8	-8.0
Receiver294	294	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	270	0.0	0.0	0.0
All Impacted	48	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

2037 Build Noise Levels

ICA Engineeriing
11 May 2015
Will Kerr/Wayne Hall
TNM 2.5
Calculated with TNM 2.5
RESULTS: SOUND LEVELS
PROJECT/CONTRACT: I-20 Widening
RUN: Build - SC 378 to US 1
BARRIER DESIGN: INPUT HEIGHTS
Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.
ATMOSPHERICS: 68 deg F, 50% RH

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h		Increase over existing		Type Impact	With Barrier Calculated LAeq1h	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n Sub'l Inc			Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
Receiver152	152	1	70.0	70.7	66	0.7	15	Snd Lvl	70.7	0.0	8	-8.0
Receiver155	155	1	69.0	69.3	66	0.3	15	Snd Lvl	69.3	0.0	8	-8.0
Receiver156	156	1	72.0	73.1	66	1.1	15	Snd Lvl	73.1	0.0	8	-8.0
Receiver157	157	1	62.0	63.1	66	1.1	15	----	63.1	0.0	8	-8.0
Receiver158	158	1	63.0	64.3	66	1.3	15	----	64.3	0.0	8	-8.0
Receiver159	159	1	64.0	63.8	66	-0.2	15	----	63.8	0.0	8	-8.0
Receiver160	160	1	68.0	68.3	66	0.3	15	Snd Lvl	68.3	0.0	8	-8.0
Receiver161	161	1	70.0	70.5	66	0.5	15	Snd Lvl	70.5	0.0	8	-8.0
Receiver162	162	1	64.0	64.4	66	0.4	15	----	64.4	0.0	8	-8.0
Receiver163	163	1	64.0	63.5	66	-0.5	15	----	63.5	0.0	8	-8.0
Receiver164	164	1	65.0	65.3	66	0.3	15	----	65.3	0.0	8	-8.0
Receiver165	165	1	72.0	72.4	66	0.4	15	Snd Lvl	72.4	0.0	8	-8.0
Receiver166	166	1	64.0	64.0	66	0.0	15	----	64.0	0.0	8	-8.0
Receiver167	167	1	67.0	66.3	66	-0.7	15	Snd Lvl	66.3	0.0	8	-8.0
Receiver168	168	1	64.0	64.0	66	0.0	15	----	64.0	0.0	8	-8.0
Receiver169	169	1	68.0	67.6	66	-0.4	15	Snd Lvl	67.6	0.0	8	-8.0
Receiver170	170	1	65.0	65.2	66	0.2	15	----	65.2	0.0	8	-8.0
Receiver171	171	1	69.0	68.9	66	-0.1	15	Snd Lvl	68.9	0.0	8	-8.0
Receiver172	172	1	65.0	64.4	66	-0.6	15	----	64.4	0.0	8	-8.0
Receiver173	173	1	69.0	68.9	66	-0.1	15	Snd Lvl	68.9	0.0	8	-8.0
Receiver174	174	1	74.0	73.4	66	-0.6	15	Snd Lvl	73.4	0.0	8	-8.0
Receiver175	175	1	63.0	63.1	66	0.1	15	----	63.1	0.0	8	-8.0
Receiver176	176	1	71.0	70.9	66	-0.1	15	Snd Lvl	70.9	0.0	8	-8.0
Receiver177	177	1	65.0	64.9	66	-0.1	15	----	64.9	0.0	8	-8.0

Receiver178	178	1	68.0	68.2	66	0.2	15	Snd Lvl	68.2	0.0	8	-8.0
Receiver179	179	1	73.0	72.6	66	-0.4	15	Snd Lvl	72.6	0.0	8	-8.0
Receiver180	180	1	63.0	62.5	66	-0.5	15	----	62.5	0.0	8	-8.0
Receiver181	181	1	64.0	64.2	66	0.2	15	----	64.2	0.0	8	-8.0
Receiver182	182	1	69.0	68.6	66	-0.4	15	Snd Lvl	68.6	0.0	8	-8.0
Receiver183	183	1	73.0	72.8	66	-0.2	15	Snd Lvl	72.8	0.0	8	-8.0
Receiver184	184	1	71.0	71.2	66	0.2	15	Snd Lvl	71.2	0.0	8	-8.0
Receiver185	185	1	69.0	69.6	66	0.6	15	Snd Lvl	69.6	0.0	8	-8.0
Receiver186	186	1	67.0	68.3	66	1.3	15	Snd Lvl	68.3	0.0	8	-8.0
Receiver189	189	1	68.0	67.8	66	-0.2	15	Snd Lvl	67.8	0.0	8	-8.0
Receiver190	190	1	75.0	75.4	66	0.4	15	Snd Lvl	75.4	0.0	8	-8.0
Receiver191	191	1	68.0	67.5	66	-0.5	15	Snd Lvl	67.5	0.0	8	-8.0
Receiver192	192	1	70.0	70.6	66	0.6	15	Snd Lvl	70.6	0.0	8	-8.0
Receiver193	193	1	68.0	70.5	66	2.5	15	Snd Lvl	70.5	0.0	8	-8.0
Receiver194	194	1	71.0	71.4	66	0.4	15	Snd Lvl	71.4	0.0	8	-8.0
Receiver195	195	1	66.0	67.4	66	1.4	15	Snd Lvl	67.4	0.0	8	-8.0
Receiver196	196	1	73.0	73.3	66	0.3	15	Snd Lvl	73.3	0.0	8	-8.0
Receiver197	197	1	71.0	72.0	66	1.0	15	Snd Lvl	72.0	0.0	8	-8.0
Receiver199	199	1	75.0	75.4	66	0.4	15	Snd Lvl	75.4	0.0	8	-8.0
Receiver200	200	1	66.0	65.7	66	-0.3	15	----	65.7	0.0	8	-8.0
Receiver201	201	1	66.0	66.9	66	0.9	15	Snd Lvl	66.9	0.0	8	-8.0
Receiver202	202	1	70.0	70.3	66	0.3	15	Snd Lvl	70.3	0.0	8	-8.0
Receiver203	203	1	73.0	73.5	66	0.5	15	Snd Lvl	73.5	0.0	8	-8.0
Receiver204	204	1	75.0	74.5	66	-0.5	15	Snd Lvl	74.5	0.0	8	-8.0
Receiver205	205	1	71.0	71.5	66	0.5	15	Snd Lvl	71.5	0.0	8	-8.0
Receiver206	206	1	73.0	73.9	66	0.9	15	Snd Lvl	73.9	0.0	8	-8.0
Receiver207	207	1	64.0	64.2	66	0.2	15	----	64.2	0.0	8	-8.0
Receiver208	208	1	66.0	66.0	66	0.0	15	Snd Lvl	66.0	0.0	8	-8.0
Receiver209	209	1	65.0	65.1	66	0.1	15	----	65.1	0.0	8	-8.0
Receiver210	210	1	65.0	65.8	66	0.8	15	----	65.8	0.0	8	-8.0
Receiver211	211	1	64.0	65.6	66	1.6	15	----	65.6	0.0	8	-8.0
Receiver212	212	1	66.0	66.9	66	0.9	15	Snd Lvl	66.9	0.0	8	-8.0
Receiver213	213	1	69.0	69.8	66	0.8	15	Snd Lvl	69.8	0.0	8	-8.0
Receiver214	214	1	65.0	66.4	66	1.4	15	Snd Lvl	66.4	0.0	8	-8.0
Receiver215	215	1	67.0	67.9	66	0.9	15	Snd Lvl	67.9	0.0	8	-8.0
Receiver218	218	1	70.0	70.4	66	0.4	15	Snd Lvl	70.4	0.0	8	-8.0
Receiver219	219	1	70.0	67.0	66	-3.0	15	Snd Lvl	67.0	0.0	8	-8.0
Receiver253	226	1	68.0	66.8	66	-1.2	10	Snd Lvl	66.8	0.0	8	-8.0
Receiver254	227	1	68.0	66.8	66	-1.2	10	Snd Lvl	66.8	0.0	8	-8.0
Receiver255	228	1	68.0	64.0	66	-4.0	10	----	64.0	0.0	8	-8.0
Receiver256	229	1	64.0	64.4	66	0.4	10	----	64.4	0.0	8	-8.0

Receiver257	230	1	65.0	65.1	66	0.1	10	----	65.1	0.0	8	-8.0
Receiver258	231	1	65.0	65.5	66	0.5	10	----	65.5	0.0	8	-8.0
Receiver259	232	1	66.0	66.7	66	0.7	10	Snd Lvl	66.7	0.0	8	-8.0
Receiver260	233	1	68.0	73.1	66	5.1	10	Snd Lvl	73.1	0.0	8	-8.0
Receiver261	234	1	72.0	73.5	66	1.5	10	Snd Lvl	73.5	0.0	8	-8.0
Receiver262	235	1	73.0	73.8	66	0.8	10	Snd Lvl	73.8	0.0	8	-8.0
Receiver263	236	1	73.0	74.0	66	1.0	10	Snd Lvl	74.0	0.0	8	-8.0
Receiver264	237	1	73.0	73.9	66	0.9	10	Snd Lvl	73.9	0.0	8	-8.0
Receiver265	238	1	73.0	73.4	66	0.4	10	Snd Lvl	73.4	0.0	8	-8.0
Receiver266	239	1	71.0	71.7	66	0.7	10	Snd Lvl	71.7	0.0	8	-8.0
Receiver267	240	1	69.0	69.9	66	0.9	10	Snd Lvl	69.9	0.0	8	-8.0
Receiver268	241	1	67.0	68.9	66	1.9	10	Snd Lvl	68.9	0.0	8	-8.0
Receiver269	242	1	69.0	69.9	66	0.9	10	Snd Lvl	69.9	0.0	8	-8.0
Receiver270	243	1	68.0	68.8	66	0.8	10	Snd Lvl	68.8	0.0	8	-8.0
Receiver271	244	1	66.0	67.4	66	1.4	10	Snd Lvl	67.4	0.0	8	-8.0
Receiver272	245	1	65.0	66.4	66	1.4	10	Snd Lvl	66.4	0.0	8	-8.0
Receiver273	246	1	66.0	66.2	66	0.2	10	Snd Lvl	66.2	0.0	8	-8.0
Receiver274	247	1	65.0	65.5	66	0.5	10	----	65.5	0.0	8	-8.0
Receiver275	248	1	65.0	65.4	66	0.4	10	----	65.4	0.0	8	-8.0
Receiver276	249	1	64.0	64.5	66	0.5	10	----	64.5	0.0	8	-8.0
Receiver277	250	1	64.0	69.3	66	5.3	10	Snd Lvl	69.3	0.0	8	-8.0
Receiver278	251	1	66.0	67.5	66	1.5	10	Snd Lvl	67.5	0.0	8	-8.0
Receiver279	252	1	64.0	64.9	66	0.9	10	----	64.9	0.0	8	-8.0
Receiver280	253	1	67.0	68.9	66	1.9	10	Snd Lvl	68.9	0.0	8	-8.0
Receiver281	254	1	66.0	67.5	66	1.5	10	Snd Lvl	67.5	0.0	8	-8.0
Receiver282	255	1	69.0	71.2	66	2.2	10	Snd Lvl	71.2	0.0	8	-8.0
Receiver283	256	1	72.0	73.0	66	1.0	10	Snd Lvl	73.0	0.0	8	-8.0
Receiver284	257	1	68.0	66.1	66	-1.9	10	Snd Lvl	66.1	0.0	8	-8.0
Receiver285	258	1	67.0	70.2	66	3.2	10	Snd Lvl	70.2	0.0	8	-8.0
Receiver294	267	1	71.0	69.9	66	-1.1	10	Snd Lvl	69.9	0.0	8	-8.0

Dwelling Units	**# DUs**	**Noise Reduction**		
		Min	**Avg**	**Max**
		dB	**dB**	**dB**
All Selected	95	0.0	0.0	0.0
All Impacted	68	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

ICA Engineeriing
Will Kerr/Wayne Hall
11 May 2015
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: I-20 Widening
RUN: Build - US1 to SC6
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Increase over existing Crit'n Sub'l Inc	With Barrier Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
Receiver54	54	1	71.0	71.3	66	0.3	15	Snd Lvl	71.3	0.0	8	-8.0
Receiver56	56	1	74.0	73.9	66	-0.1	15	Snd Lvl	73.9	0.0	8	-8.0
Receiver58	58	1	73.0	73.2	66	0.2	15	Snd Lvl	73.2	0.0	8	-8.0
Receiver60	60	1	73.0	73.1	66	0.1	15	Snd Lvl	73.1	0.0	8	-8.0
Receiver61	61	1	71.0	72.0	66	1.0	15	Snd Lvl	72.0	0.0	8	-8.0
Receiver62	62	1	69.0	70.6	66	1.6	15	Snd Lvl	70.6	0.0	8	-8.0
Receiver63	63	1	70.0	71.6	66	1.6	15	Snd Lvl	71.6	0.0	8	-8.0
Receiver65	65	1	68.0	69.3	66	1.3	15	Snd Lvl	69.3	0.0	8	-8.0
Receiver67	67	1	67.0	69.0	66	2.0	15	Snd Lvl	69.0	0.0	8	-8.0
Receiver68	68	1	65.0	67.4	66	2.4	15	Snd Lvl	67.4	0.0	8	-8.0
Receiver70	70	1	67.0	69.0	66	2.0	15	Snd Lvl	69.0	0.0	8	-8.0
Receiver74	74	1	70.0	71.5	66	1.5	15	Snd Lvl	71.5	0.0	8	-8.0
Receiver75	75	1	71.0	72.0	66	1.0	15	Snd Lvl	72.0	0.0	8	-8.0
Receiver76	76	1	73.0	73.8	66	0.8	15	Snd Lvl	73.8	0.0	8	-8.0
Receiver77	77	1	75.0	75.0	66	0.0	15	Snd Lvl	75.0	0.0	8	-8.0
Receiver78	78	1	71.0	72.3	66	1.3	15	Snd Lvl	72.3	0.0	8	-8.0
Receiver80	80	1	74.0	74.7	66	0.7	15	Snd Lvl	74.7	0.0	8	-8.0
Receiver82	82	1	73.0	73.6	66	0.6	15	Snd Lvl	73.6	0.0	8	-8.0
Receiver83	83	1	76.0	76.8	66	0.8	15	Snd Lvl	76.8	0.0	8	-8.0
Receiver84	84	1	69.0	69.8	66	0.8	15	Snd Lvl	69.8	0.0	8	-8.0
Receiver85	85	1	71.0	71.6	66	0.6	15	Snd Lvl	71.6	0.0	8	-8.0
Receiver87	87	1	65.0	66.9	66	1.9	15	Snd Lvl	66.9	0.0	8	-8.0
Receiver89	89	1	77.0	77.0	66	0.0	15	Snd Lvl	77.0	0.0	8	-8.0
Receiver90	90	1	69.0	70.4	66	1.4	15	Snd Lvl	70.4	0.0	8	-8.0

Receiver91	91	1	66.0	68.3	66	2.3	15	Snd Lvl	68.3	0.0	8	-8.0
Receiver92	92	1	76.0	76.1	66	0.1	15	Snd Lvl	76.1	0.0	8	-8.0
Receiver93	93	1	74.0	74.0	66	0.0	15	Snd Lvl	74.0	0.0	8	-8.0
Receiver95	95	1	66.0	68.0	66	2.0	15	Snd Lvl	68.0	0.0	8	-8.0
Receiver96	96	1	71.0	71.4	66	0.4	15	Snd Lvl	71.4	0.0	8	-8.0
Receiver97	97	1	72.0	72.0	66	0.0	15	Snd Lvl	72.0	0.0	8	-8.0
Receiver98	98	1	67.0	68.2	66	1.2	15	Snd Lvl	68.2	0.0	8	-8.0
Receiver99	99	1	73.0	74.4	66	1.4	15	Snd Lvl	74.4	0.0	8	-8.0
Receiver100	100	1	74.0	74.3	66	0.3	15	Snd Lvl	74.3	0.0	8	-8.0
Receiver101	101	1	69.0	70.0	66	1.0	15	Snd Lvl	70.0	0.0	8	-8.0
Receiver102	102	1	72.0	73.4	66	1.4	15	Snd Lvl	73.4	0.0	8	-8.0
Receiver103	103	1	66.0	66.7	66	0.7	15	Snd Lvl	66.7	0.0	8	-8.0
Receiver104	104	1	72.0	72.4	66	0.4	15	Snd Lvl	72.4	0.0	8	-8.0
Receiver105	105	1	68.0	68.3	66	0.3	15	Snd Lvl	68.3	0.0	8	-8.0
Receiver106	106	1	69.0	69.3	66	0.3	15	Snd Lvl	69.3	0.0	8	-8.0
Receiver107	107	1	76.0	75.9	66	-0.1	15	Snd Lvl	75.9	0.0	8	-8.0
Receiver108	108	1	69.0	70.3	66	1.3	15	Snd Lvl	70.3	0.0	8	-8.0
Receiver109	109	1	68.0	69.1	66	1.1	15	Snd Lvl	69.1	0.0	8	-8.0
Receiver110	110	1	69.0	69.7	66	0.7	15	Snd Lvl	69.7	0.0	8	-8.0
Receiver111	111	1	66.0	66.2	66	0.2	15	Snd Lvl	66.2	0.0	8	-8.0
Receiver112	112	1	72.0	72.4	66	0.4	15	Snd Lvl	72.4	0.0	8	-8.0
Receiver113	113	1	68.0	69.5	66	1.5	15	Snd Lvl	69.5	0.0	8	-8.0
Receiver114	114	1	74.0	74.2	66	0.2	15	Snd Lvl	74.2	0.0	8	-8.0
Receiver115	115	1	73.0	73.8	66	0.8	15	Snd Lvl	73.8	0.0	8	-8.0
Receiver116	116	1	67.0	68.1	66	1.1	15	Snd Lvl	68.1	0.0	8	-8.0
Receiver117	117	1	73.0	73.6	66	0.6	15	Snd Lvl	73.6	0.0	8	-8.0
Receiver118	118	1	74.0	74.2	66	0.2	15	Snd Lvl	74.2	0.0	8	-8.0
Receiver119	119	1	73.0	73.4	66	0.4	15	Snd Lvl	73.4	0.0	8	-8.0
Receiver120	120	1	67.0	68.3	66	1.3	15	Snd Lvl	68.3	0.0	8	-8.0
Receiver121	121	1	65.0	66.5	66	1.5	15	Snd Lvl	66.5	0.0	8	-8.0
Receiver122	122	1	74.0	74.1	66	0.1	15	Snd Lvl	74.1	0.0	8	-8.0
Receiver123	123	1	67.0	68.7	66	1.7	15	Snd Lvl	68.7	0.0	8	-8.0
Receiver124	124	1	72.0	72.7	66	0.7	15	Snd Lvl	72.7	0.0	8	-8.0
Receiver125	125	1	71.0	71.9	66	0.9	15	Snd Lvl	71.9	0.0	8	-8.0
Receiver126	126	1	67.0	68.5	66	1.5	15	Snd Lvl	68.5	0.0	8	-8.0
Receiver127	127	1	65.0	66.5	66	1.5	15	Snd Lvl	66.5	0.0	8	-8.0
Receiver128	128	1	73.0	73.3	66	0.3	15	Snd Lvl	73.3	0.0	8	-8.0
Receiver129	129	1	67.0	67.2	66	0.2	15	Snd Lvl	67.2	0.0	8	-8.0
Receiver130	130	1	75.0	75.1	66	0.1	15	Snd Lvl	75.1	0.0	8	-8.0
Receiver131	131	1	72.0	72.2	66	0.2	15	Snd Lvl	72.2	0.0	8	-8.0
Receiver132	132	1	68.0	69.5	66	1.5	15	Snd Lvl	69.5	0.0	8	-8.0

Receiver133	133	1	74.0	74.5	66	0.5	15	Snd Lvl	74.5	0.0	8	-8.0
Receiver134	134	1	66.0	67.4	66	1.4	15	Snd Lvl	67.4	0.0	8	-8.0
Receiver135	135	1	66.0	68.1	66	2.1	15	Snd Lvl	68.1	0.0	8	-8.0
Receiver136	136	1	73.0	73.2	66	0.2	15	Snd Lvl	73.2	0.0	8	-8.0
Receiver137	137	1	74.0	74.3	66	0.3	15	Snd Lvl	74.3	0.0	8	-8.0
Receiver138	138	1	72.0	72.6	66	0.6	15	Snd Lvl	72.6	0.0	8	-8.0
Receiver139	139	1	69.0	69.4	66	0.4	15	Snd Lvl	69.4	0.0	8	-8.0
Receiver140	140	1	66.0	66.6	66	0.6	15	Snd Lvl	66.6	0.0	8	-8.0
Receiver141	141	1	71.0	71.1	66	0.1	15	Snd Lvl	71.1	0.0	8	-8.0
Receiver142	142	1	71.0	71.0	66	0.0	15	Snd Lvl	71.0	0.0	8	-8.0
Receiver143	143	1	68.0	68.1	66	0.1	15	Snd Lvl	68.1	0.0	8	-8.0
Receiver144	144	1	65.0	65.6	66	0.6	15	----	65.6	0.0	8	-8.0
Receiver145	145	1	66.0	66.7	66	0.7	15	Snd Lvl	66.7	0.0	8	-8.0
Receiver146	146	1	75.0	77.0	66	2.0	15	Snd Lvl	77.0	0.0	8	-8.0
Receiver147	147	1	72.0	71.8	66	-0.2	15	Snd Lvl	71.8	0.0	8	-8.0
Receiver148	148	1	66.0	68.1	66	2.1	15	Snd Lvl	68.1	0.0	8	-8.0
Receiver149	149	1	67.0	68.6	66	1.6	15	Snd Lvl	68.6	0.0	8	-8.0
Receiver150	150	1	73.0	74.2	66	1.2	15	Snd Lvl	74.2	0.0	8	-8.0
Receiver151	151	1	66.0	66.9	66	0.9	15	Snd Lvl	66.9	0.0	8	-8.0
Receiver153	153	1	66.0	68.2	66	2.2	15	Snd Lvl	68.2	0.0	8	-8.0
Receiver154	154	1	75.0	76.3	66	1.3	15	Snd Lvl	76.3	0.0	8	-8.0

Dwelling Units	**# DUs**	**Noise Reduction**		
		Min	**Avg**	**Max**
		dB	**dB**	**dB**
All Selected	86	0.0	0.0	0.0
All Impacted	85	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

ICA Engineeriing
Will Kerr/Wayne Hall
11 May 2015
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: I-20 Widening
RUN: Build - SC6 to Longs Pond
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	With Barrier Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Noise Reduction Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
Receiver1	1	1	73.0	74.9	66	1.9	15	Snd Lvl	74.9	0.0	8	-8.0
Receiver2	2	1	61.0	62.6	66	1.6	15	----	62.6	0.0	8	-8.0
Receiver3	3	1	62.0	63.5	66	1.5	15	----	63.5	0.0	8	-8.0
Receiver4	4	1	67.0	68.5	66	1.5	15	Snd Lvl	68.5	0.0	8	-8.0
Receiver5	5	1	62.0	62.9	66	0.9	15	----	62.9	0.0	8	-8.0
Receiver7	7	1	70.0	70.6	66	0.6	15	Snd Lvl	70.6	0.0	8	-8.0
Receiver8	8	1	63.0	63.8	66	0.8	15	----	63.8	0.0	8	-8.0
Receiver9	9	1	63.0	64.7	66	1.7	15	----	64.7	0.0	8	-8.0
Receiver10	10	1	65.0	66.5	66	1.5	15	Snd Lvl	66.5	0.0	8	-8.0
Receiver11	11	1	61.0	62.1	66	1.1	15	----	62.1	0.0	8	-8.0
Receiver12	12	1	64.0	65.2	66	1.2	15	----	65.2	0.0	8	-8.0
Receiver13	13	1	63.0	73.9	66	10.9	15	Snd Lvl	73.9	0.0	8	-8.0
Receiver14	14	1	71.0	71.5	66	0.5	15	Snd Lvl	71.5	0.0	8	-8.0
Receiver15	15	1	65.0	65.9	66	0.9	15	----	65.9	0.0	8	-8.0
Receiver16	16	1	67.0	68.4	66	1.4	15	Snd Lvl	68.4	0.0	8	-8.0
Receiver17	17	1	65.0	66.4	66	1.4	15	Snd Lvl	66.4	0.0	8	-8.0
Receiver18	18	1	63.0	64.0	66	1.0	15	----	64.0	0.0	8	-8.0
Receiver19	19	1	71.0	72.6	66	1.6	15	Snd Lvl	72.6	0.0	8	-8.0
Receiver20	20	1	64.0	66.1	66	2.1	15	Snd Lvl	66.1	0.0	8	-8.0
Receiver21	21	1	63.0	65.1	66	2.1	15	----	65.1	0.0	8	-8.0
Receiver22	22	1	63.0	65.3	66	2.3	15	----	65.3	0.0	8	-8.0
Receiver23	23	1	63.0	65.7	66	2.7	15	----	65.7	0.0	8	-8.0
Receiver24	24	1	63.0	65.8	66	2.8	15	----	65.8	0.0	8	-8.0
Receiver25	25	1	64.0	65.8	66	1.8	15	----	65.8	0.0	8	-8.0

Receiver26	26	1	64.0	66.1	66	2.1	15	Snd Lvl	66.1	0.0	8	-8.0
Receiver27	27	1	64.0	66.2	66	2.2	15	Snd Lvl	66.2	0.0	8	-8.0
Receiver28	28	1	64.0	66.4	66	2.4	15	Snd Lvl	66.4	0.0	8	-8.0
Receiver29	29	1	65.0	66.8	66	1.8	15	Snd Lvl	66.8	0.0	8	-8.0
Receiver30	30	1	67.0	68.3	66	1.3	15	Snd Lvl	68.3	0.0	8	-8.0
Receiver31	31	1	67.0	68.9	66	1.9	15	Snd Lvl	68.9	0.0	8	-8.0
Receiver32	32	1	67.0	68.9	66	1.9	15	Snd Lvl	68.9	0.0	8	-8.0
Receiver33	33	1	66.0	68.6	66	2.6	15	Snd Lvl	68.6	0.0	8	-8.0
Receiver34	34	1	69.0	70.9	66	1.9	15	Snd Lvl	70.9	0.0	8	-8.0
Receiver35	35	1	66.0	68.2	66	2.2	15	Snd Lvl	68.2	0.0	8	-8.0
Receiver36	36	1	67.0	68.7	66	1.7	15	Snd Lvl	68.7	0.0	8	-8.0
Receiver37	37	1	64.0	64.7	66	0.7	15	----	64.7	0.0	8	-8.0
Receiver39	39	1	73.0	74.7	66	1.7	15	Snd Lvl	74.7	0.0	8	-8.0
Receiver40	40	1	71.0	72.7	66	1.7	15	Snd Lvl	72.7	0.0	8	-8.0
Receiver41	41	1	70.0	71.3	66	1.3	15	Snd Lvl	71.3	0.0	8	-8.0
Receiver42	42	1	75.0	77.0	66	2.0	15	Snd Lvl	77.0	0.0	8	-8.0
Receiver43	43	1	68.0	69.9	66	1.9	15	Snd Lvl	69.9	0.0	8	-8.0
Receiver44	44	1	74.0	75.8	66	1.8	15	Snd Lvl	75.8	0.0	8	-8.0
Receiver45	45	1	70.0	72.6	66	2.6	15	Snd Lvl	72.6	0.0	8	-8.0
Receiver46	46	1	64.0	66.5	66	2.5	15	Snd Lvl	66.5	0.0	8	-8.0
Receiver47	47	1	74.0	75.1	66	1.1	15	Snd Lvl	75.1	0.0	8	-8.0
Receiver48	48	1	66.0	68.1	66	2.1	15	Snd Lvl	68.1	0.0	8	-8.0
Receiver49	49	1	74.0	77.1	66	3.1	15	Snd Lvl	77.1	0.0	8	-8.0
Receiver50	50	1	66.0	68.4	66	2.4	15	Snd Lvl	68.4	0.0	8	-8.0
Receiver52	52	1	65.0	67.1	66	2.1	15	Snd Lvl	67.1	0.0	8	-8.0
Receiver53	53	1	69.0	70.3	66	1.3	15	Snd Lvl	70.3	0.0	8	-8.0
Receiver54	54	1	71.0	71.1	66	0.1	15	Snd Lvl	71.1	0.0	8	-8.0
Receiver56	56	1	74.0	73.7	66	-0.3	15	Snd Lvl	73.7	0.0	8	-8.0
Receiver58	58	1	73.0	73.0	66	0.0	15	Snd Lvl	73.0	0.0	8	-8.0
Receiver60	60	1	73.0	73.0	66	0.0	15	Snd Lvl	73.0	0.0	8	-8.0
Receiver61	61	1	71.0	71.9	66	0.9	15	Snd Lvl	71.9	0.0	8	-8.0
Receiver62	62	1	69.0	70.5	66	1.5	15	Snd Lvl	70.5	0.0	8	-8.0
Receiver63	63	1	70.0	71.5	66	1.5	15	Snd Lvl	71.5	0.0	8	-8.0
Receiver65	65	1	68.0	69.3	66	1.3	15	Snd Lvl	69.3	0.0	8	-8.0
Receiver67	67	1	67.0	69.0	66	2.0	15	Snd Lvl	69.0	0.0	8	-8.0
Receiver68	68	1	65.0	67.4	66	2.4	15	Snd Lvl	67.4	0.0	8	-8.0
Receiver70	70	1	67.0	68.9	66	1.9	15	Snd Lvl	68.9	0.0	8	-8.0
Receiver221	221	1	69.0	69.6	66	0.6	10	Snd Lvl	69.6	0.0	8	-8.0
Receiver222	222	1	68.0	68.8	66	0.8	10	Snd Lvl	68.8	0.0	8	-8.0
Receiver223	223	1	68.0	68.9	66	0.9	10	Snd Lvl	68.9	0.0	8	-8.0
Receiver224	224	1	67.0	68.1	66	1.1	10	Snd Lvl	68.1	0.0	8	-8.0

Receiver225	225	1	66.0	67.9	66	1.9	10	Snd Lvl	67.9	0.0	8	-8.0
Receiver226	226	1	66.0	67.5	66	1.5	10	Snd Lvl	67.5	0.0	8	-8.0
Receiver227	227	1	66.0	67.3	66	1.3	10	Snd Lvl	67.3	0.0	8	-8.0
Receiver228	228	1	65.0	66.8	66	1.8	10	Snd Lvl	66.8	0.0	8	-8.0
Receiver229	229	1	64.0	66.1	66	2.1	10	Snd Lvl	66.1	0.0	8	-8.0
Receiver230	230	1	64.0	65.4	66	1.4	10	----	65.4	0.0	8	-8.0
Receiver231	231	1	62.0	64.5	66	2.5	10	----	64.5	0.0	8	-8.0
Receiver232	232	1	68.0	69.0	66	1.0	10	Snd Lvl	69.0	0.0	8	-8.0
Receiver233	233	1	65.0	66.5	66	1.5	10	Snd Lvl	66.5	0.0	8	-8.0
Receiver234	234	1	63.0	65.2	66	2.2	10	----	65.2	0.0	8	-8.0
Receiver235	235	1	66.0	66.9	66	0.9	10	Snd Lvl	66.9	0.0	8	-8.0
Receiver236	236	1	65.0	66.6	66	1.6	10	Snd Lvl	66.6	0.0	8	-8.0
Receiver237	237	1	65.0	66.2	66	1.2	10	Snd Lvl	66.2	0.0	8	-8.0
Receiver238	238	1	65.0	66.0	66	1.0	10	Snd Lvl	66.0	0.0	8	-8.0
Receiver239	239	1	63.0	64.9	66	1.9	10	----	64.9	0.0	8	-8.0
Receiver240	240	1	63.0	65.0	66	2.0	10	----	65.0	0.0	8	-8.0
Receiver241	241	1	62.0	64.2	66	2.2	10	----	64.2	0.0	8	-8.0
Receiver242	242	1	62.0	63.9	66	1.9	10	----	63.9	0.0	8	-8.0
Receiver243	243	1	62.0	63.7	66	1.7	10	----	63.7	0.0	8	-8.0
Receiver244	244	1	61.0	63.4	66	2.4	10	----	63.4	0.0	8	-8.0
Receiver245	245	1	61.0	62.9	66	1.9	10	----	62.9	0.0	8	-8.0
Receiver246	246	1	60.0	61.8	66	1.8	10	----	61.8	0.0	8	-8.0
Receiver247	247	1	59.0	61.1	66	2.1	10	----	61.1	0.0	8	-8.0
Receiver248	248	1	59.0	60.6	66	1.6	10	----	60.6	0.0	8	-8.0
Receiver249	249	1	59.0	60.5	66	1.5	10	----	60.5	0.0	8	-8.0
Receiver250	250	1	61.0	62.5	66	1.5	10	----	62.5	0.0	8	-8.0
Receiver251	251	1	62.0	63.8	66	1.8	10	----	63.8	0.0	8	-8.0
Receiver252	252	1	64.0	67.2	66	3.2	10	Snd Lvl	67.2	0.0	8	-8.0
Receiver286	254	1	60.0	68.3	66	8.3	10	Snd Lvl	68.3	0.0	8	-8.0
Receiver287	255	1	67.0	68.7	66	1.7	10	Snd Lvl	68.7	0.0	8	-8.0
Receiver288	256	1	68.0	70.1	66	2.1	10	Snd Lvl	70.1	0.0	8	-8.0
Receiver289	257	1	69.0	70.7	66	1.7	10	Snd Lvl	70.7	0.0	8	-8.0
Receiver290	258	1	70.0	71.5	66	1.5	10	Snd Lvl	71.5	0.0	8	-8.0
Receiver291	259	1	70.0	71.3	66	1.3	10	Snd Lvl	71.3	0.0	8	-8.0
Receiver292	260	1	67.0	69.1	66	2.1	10	Snd Lvl	69.1	0.0	8	-8.0
Receiver293	261	1	66.0	67.5	66	1.5	10	Snd Lvl	67.5	0.0	8	-8.0

Dwelling Units	**# DUs**	**Noise Reduction**		
		Min	**Avg**	**Max**
		dB	**dB**	**dB**
All Selected	101	0.0	0.0	0.0
All Impacted	70	0.0	0.0	0.0

All that meet NR Goal		0	0.0	0.0	0.0							

Noise Measurement Data Sheets

TRAFFIC NOISE FIELD MEASUREMENT WORKSHEET

Project Name: **I-20 Widening, Lexington County**		Site #: 1	Date: 10-27-14
Site Description: Single-Family Residential		Site Location: 222 Cromer Road	
Start Time:	1:08 pm	Sound Metric:	Level:
End Time:	1:22 pm	L_{eq}:	66.6
Temperature:	75	L_{min}:	51.9
Wind Speed:	1 mph	L_{max}:	81.6
Cloud Cover:	None		

Road Name: I-20 Notes: This is a second measurement period. The first ended early due to battery failure.	Traffic Counts	Direction (EB)	Direction (WB)
	Autos:	348	334
Typical Section: 3 lanes each direction	Medium Trucks:	11	12
	Heavy Trucks:	43	48
	Buses:	0	0
Speed Limit: 60 mph	Motorcycles:	1	0

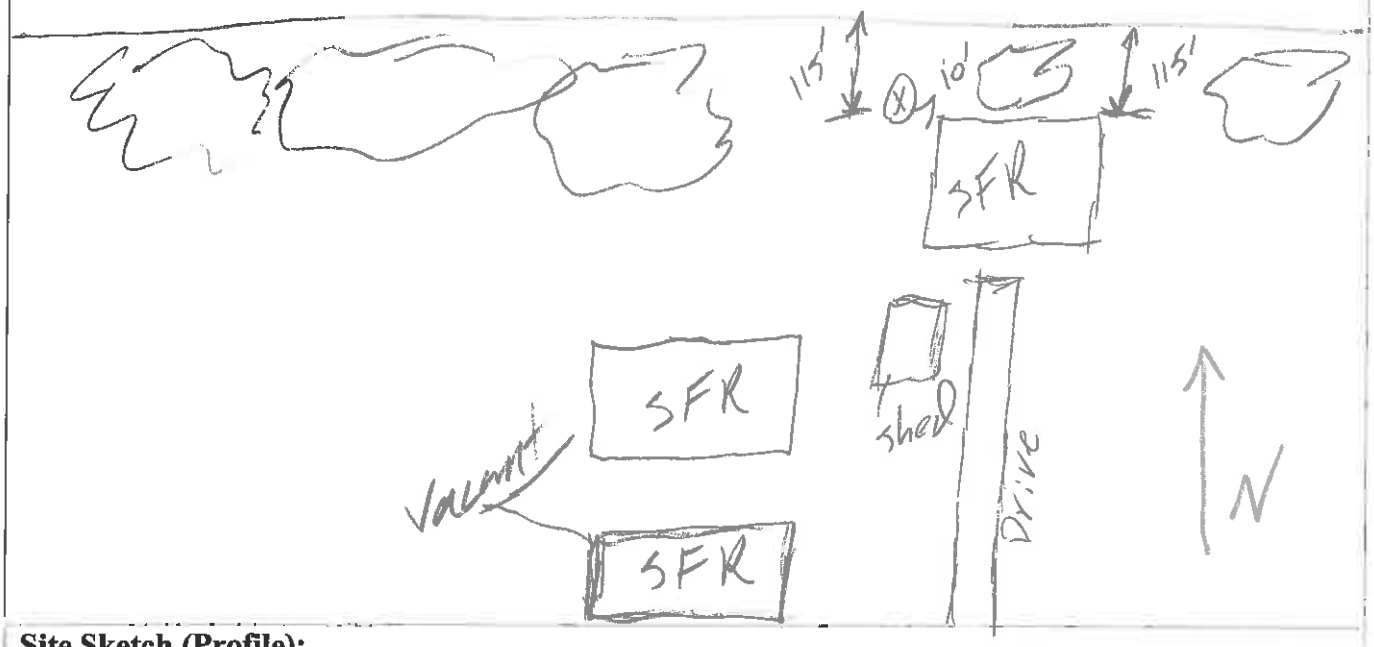
ICA Engineering, Inc.

Field Personnel: Will Kerr / Wayne Hall

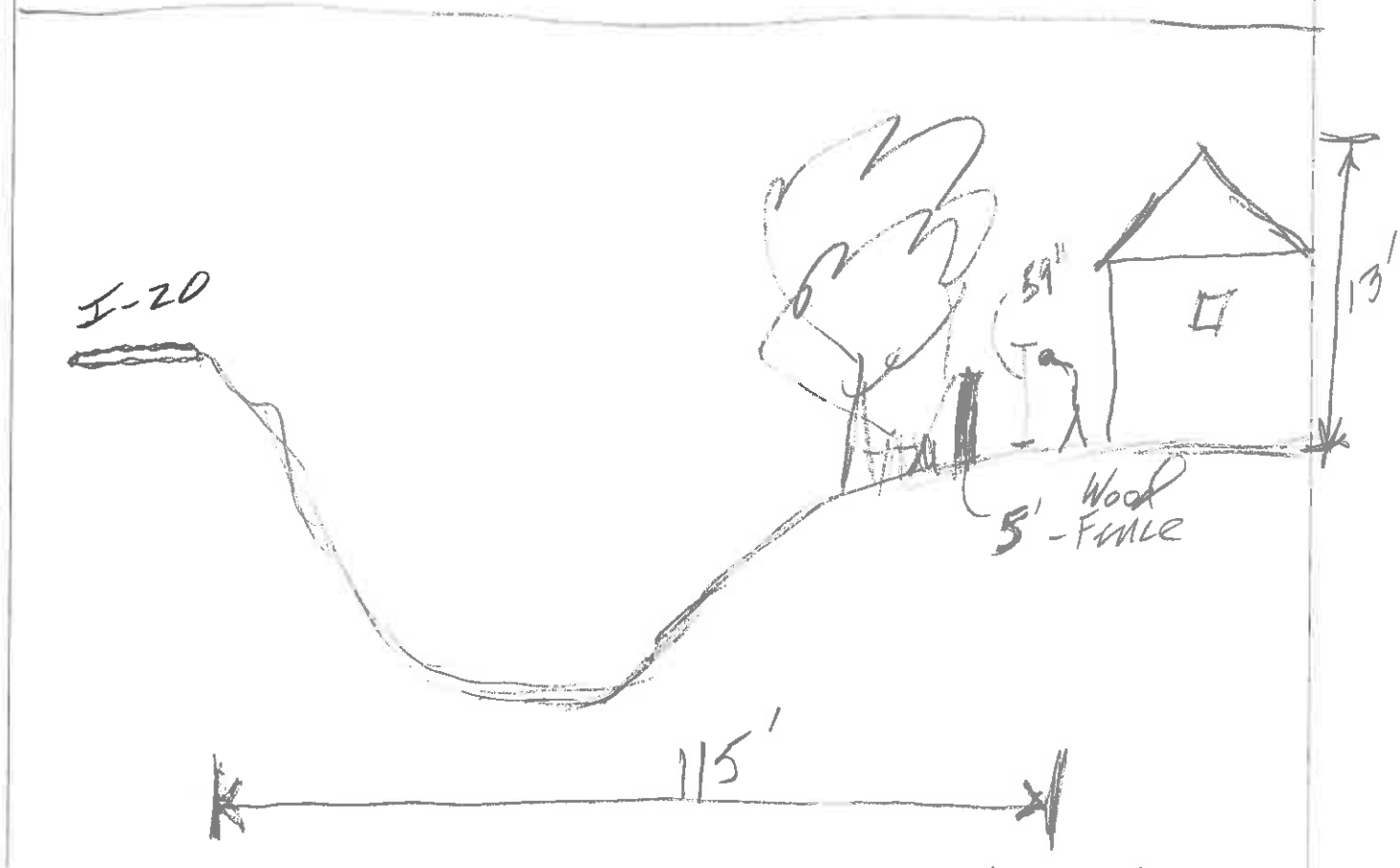
TRAFFIC NOISE FIELD MEASUREMENT WORKSHEET

Date: 10-27-14 **Project:** I-20 Improvements **Location:** ST-222 Cromer Road

Site Sketch (Plan View):



Site Sketch (Profile):



ICA Engineering, Inc.

Field Personnel: Will Kerr/Wayne Ha

SITE 1

		SITE 1					
		218 Glenforest Court (SN#30596-Nor118)					
Period:	Time:	**LAeq**	Despike?	SPL	LAS(max)	Lmax	LCpeak
		66.6			81.6	81.6	
0	(2014-10-27 13:08:39.000)	65.2		3311311.21	72.9	72.9	91.6
1	(2014-10-27 13:09:39.000)	65.6		3630780.55	73.6	73.6	92.6
2	(2014-10-27 13:10:39.000)	64.9		3090295.43	72.1	72.1	91.2
3	(2014-10-27 13:11:39.000)	69.7		9332543.01	81.6	81.6	96.5
4	(2014-10-27 13:12:39.000)	66.5		4466835.92	75.7	75.7	91.7
5	(2014-10-27 13:13:39.000)	66.4		4365158.32	74.0	74.0	94.3
6	(2014-10-27 13:14:39.000)	65.7		3715352.29	75.6	75.6	91.0
7	(2014-10-27 13:15:39.000)	66.8		4786300.92	73.6	73.6	96.6
8	(2014-10-27 13:16:39.000)	66		3981071.71	77.4	77.4	93.9
9	(2014-10-27 13:17:39.000)	67.1		5128613.84	74.5	74.5	92.0
10	(2014-10-27 13:18:39.000)	66.6		4570881.9	74.3	74.3	91.8
11	(2014-10-27 13:19:39.000)	64.8		3019951.72	70.6	70.6	86.8
12	(2014-10-27 13:20:39.000)	68.2		6606934.48	78.1	78.1	93.4
13	(2014-10-27 13:21:39.000)	67.2		5248074.6	73.3	73.3	91.4
14	(2014-10-27 13:22:39.000)	65.3		3388441.56	72.0	72.0	88.9

TRAFFIC NOISE FIELD MEASUREMENT WORKSHEET

Project Name: **I-20 Widening, Lexington County**		Site #: 2	Date: 10-27-14
Site Description: School		Site Location: Meadow Glen Elementary School, 510 Ginny Lane	
Start Time:	5:07 pm	Sound Metric:	Level:
End Time:	5:21 pm	L_{eq}:	67.5
Temperature:	73	L_{min}:	63.4
Wind Speed:	0	L_{max}:	72.7
Cloud Cover:	Clear		

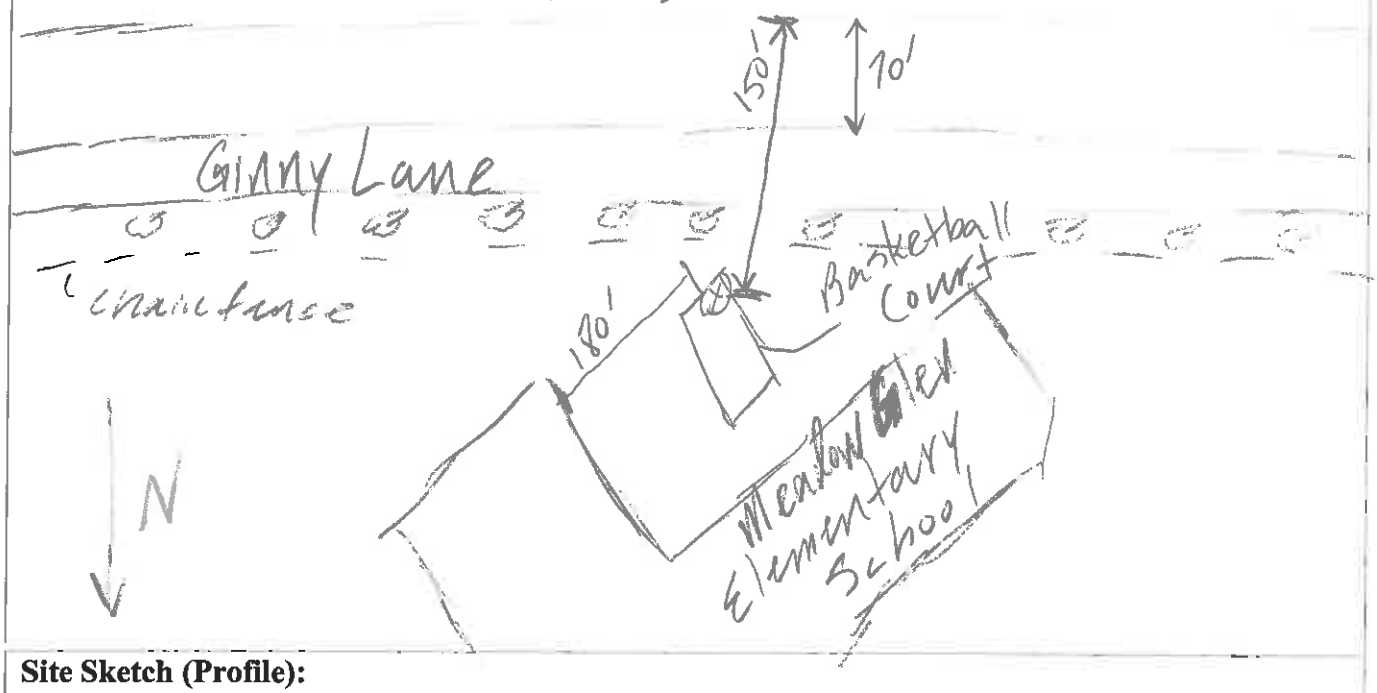
Road Name: I-20	Traffic Counts	Direction (EB)	Direction (WB)
	Autos:	476	915
Typical Section: 2 lanes each direction	Medium Trucks:	6	6
	Heavy Trucks:	55	30
	Buses:	2	0
Speed Limit: 60 mph	Motorcycles:	0	0

ICA Engineering, Inc. Field Personnel: Will Kerr / Wayne Hall

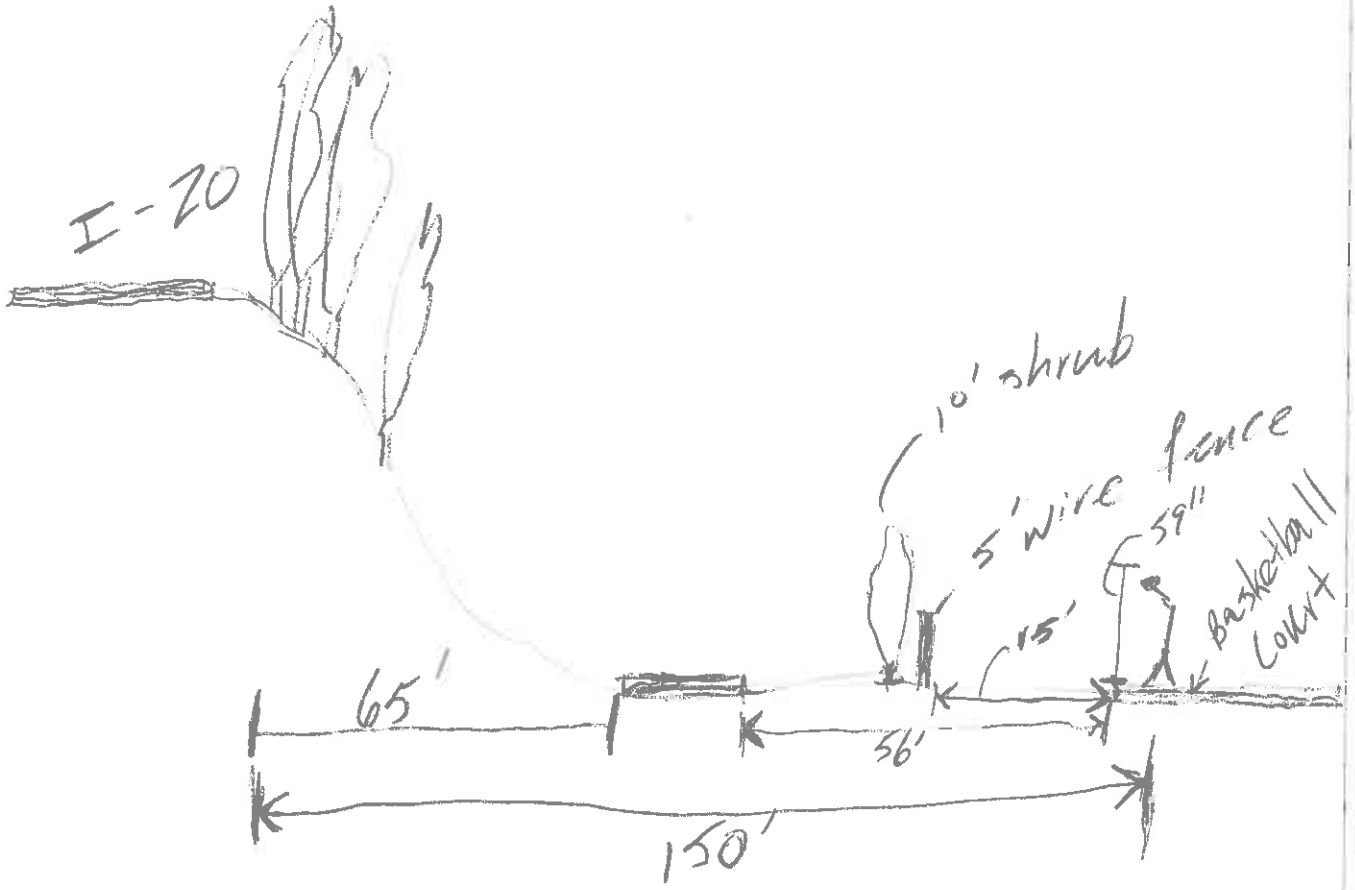
TRAFFIC NOISE FIELD MEASUREMENT WORKSHEET

Date: 10-27-14 **Project:** I-20 Improvements **Location:** ST2 - Meadow Glen Elem. School

Site Sketch (Plan View):



Site Sketch (Profile):



ICA Engineering, Inc.

Field Personnel: Will Kerr/Wayne Hall

SITE 2

		SITE 2					
		Meadow Glen Elementary School (SN#30596-Nor118)					
Period:	Time:	**LAeq**	Despike?	SPL	LAS(max)	Lmax	LCpeak
		67.5			72.7	72.7	
0	(2014-10-27 17:07:33.000)	68.6		7244359.6	72.7	72.7	90.7
1	(2014-10-27 17:08:33.000)	67.4		5495408.74	69.5	69.5	88.7
2	(2014-10-27 17:09:33.000)	67.6		5754399.37	69.5	69.5	91.0
3	(2014-10-27 17:10:33.000)	67.5		5623413.25	69.7	69.7	88.9
4	(2014-10-27 17:11:33.000)	67.8		6025595.86	70.7	70.7	90.1
5	(2014-10-27 17:12:33.000)	67.3		5370317.96	70.2	70.2	90.9
6	(2014-10-27 17:13:33.000)	67.6		5754399.37	69.4	69.4	89.8
7	(2014-10-27 17:14:33.000)	67.0		5011872.34	69.4	69.4	90.5
8	(2014-10-27 17:15:33.000)	67.7		5888436.55	70.7	70.7	90.8
9	(2014-10-27 17:16:33.000)	67.5		5623413.25	70.5	70.5	88.8
10	(2014-10-27 17:17:33.000)	68.1		6456542.29	71.2	71.2	90.9
11	(2014-10-27 17:18:33.000)	67.7		5888436.55	70.9	70.9	91.1
12	(2014-10-27 17:19:33.000)	67.3		5370317.96	70.2	70.2	89.5
13	(2014-10-27 17:20:33.000)	66.1		4073802.78	67.9	67.9	88.3
14	(2014-10-27 17:21:33.000)	67.0		5011872.34	69.1	69.1	91.6

TRAFFIC NOISE FIELD MEASUREMENT WORKSHEET

Project Name: **I-20 Widening, Lexington County**		Site #: 3	Date: 10-27-14
Site Description: Single Family Residence		Site Location: 100 Chamfort Drive	
Start Time:	4:38 pm	Sound Metric:	Level:
End Time:	4:52 pm	L_{eq}:	72.7
Temperature:	84	L_{min}:	67.5
Wind Speed:	0	L_{max}:	82.8
Cloud Cover:	Clear		

Road Name: I-20	Traffic Counts	Direction (EB)	Direction (WB)
	Autos:	386	815
Typical Section: 2 lanes each direction	Medium Trucks:	12	21
	Heavy Trucks:	49	44
	Buses:	0	0
Speed Limit: 60 mph	Motorcycles:	0	1

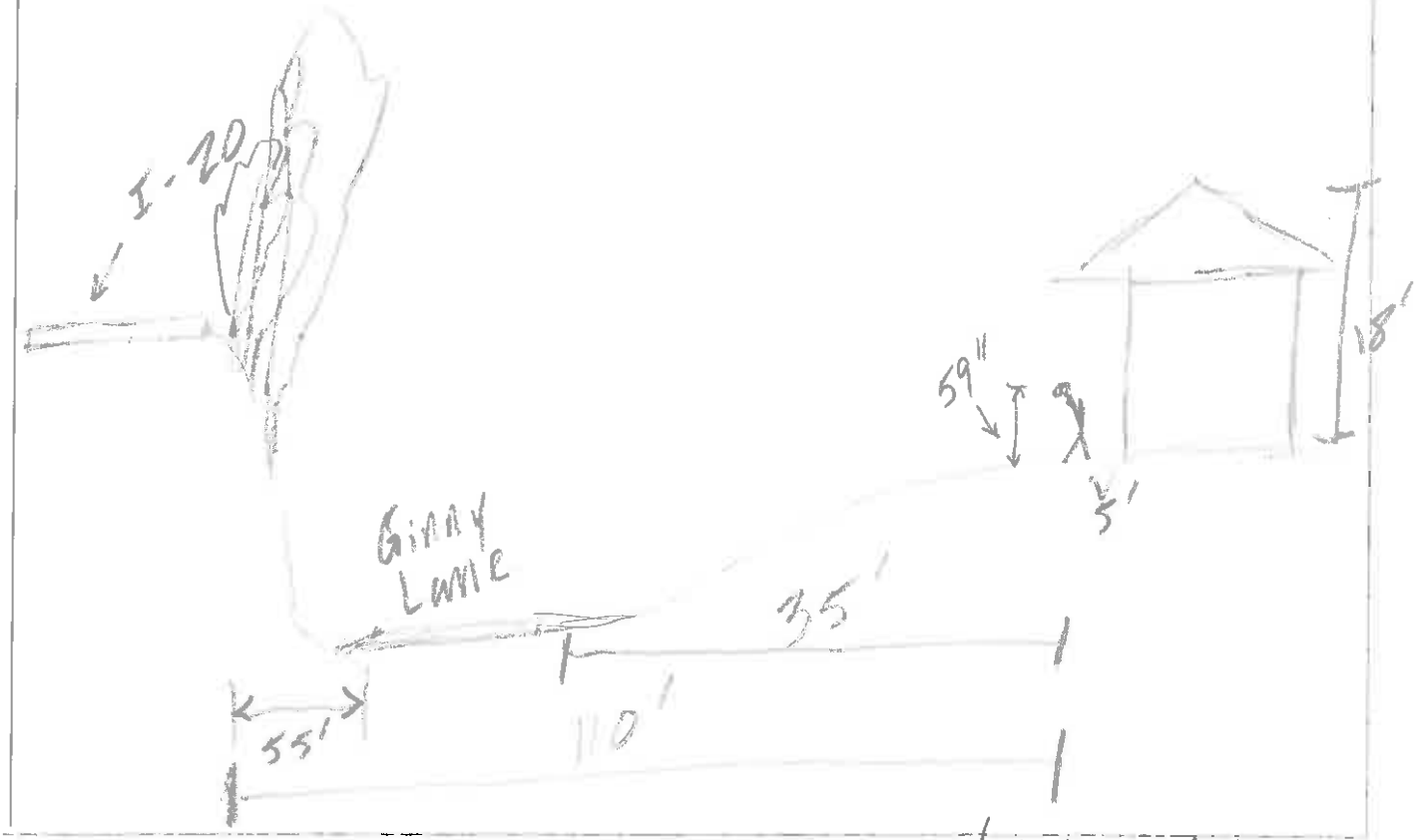
ICA Engineering, Inc. Field Personnel: Will Kerr / Wayne Hall

TRAFFIC NOISE FIELD MEASUREMENT WORKSHEET

Date:	Project:	Location:
10-27-14	I-20 Improvements	ST3- 100 Chamberl Drive

Site Sketch (Plan View):

Site Sketch (Profile):



ICA Engineering, Inc.

Field Personnel: Will Kerr/Wayne Hall

SITE 3							
		SITE 3					
		100 Chamfort Drive (SN#30596-Nor118)					
Period:	Time:	**LAeq**	Despike?	SPL	LAS(max)	Lmax	LCpeak
		72.7			82.8	82.8	
0	(2014-10-27 16:38:02.000)	73.6		22908676.5	82.8	82.8	94.3
1	(2014-10-27 16:39:02.000)	73.2		20892961.3	75.6	75.6	95.2
2	(2014-10-27 16:40:02.000)	72.0		15848931.9	74.4	74.4	93.0
3	(2014-10-27 16:41:02.000)	73.4		21877616.2	76.0	76.0	93.6
4	(2014-10-27 16:42:02.000)	72.9		19498446	75.3	75.3	95.9
5	(2014-10-27 16:43:02.000)	72.3		16982436.5	74.9	74.9	92.4
6	(2014-10-27 16:44:02.000)	73.0		19952623.1	75.3	75.3	94.1
7	(2014-10-27 16:45:02.000)	72.3		16982436.5	74.7	74.7	91.4
8	(2014-10-27 16:46:02.000)	72.5		17782794.1	74.8	74.8	92.6
9	(2014-10-27 16:47:02.000)	72.8		19054607.2	76.2	76.2	94.2
10	(2014-10-27 16:48:02.000)	72.9		19498446	75.6	75.6	93.6
11	(2014-10-27 16:49:02.000)	72.6		18197008.6	77.4	77.4	93.2
12	(2014-10-27 16:50:02.000)	72.1		16218101	74.5	74.5	91.0
13	(2014-10-27 16:51:02.000)	72.0		15848931.9	75.1	75.1	95.0
14	(2014-10-27 16:52:02.000)	71.8		15135612.5	74.5	74.5	91.2

TRAFFIC NOISE FIELD MEASUREMENT WORKSHEET

Project Name: **I-20 Widening, Lexington County**		Site #: 4	Date: 10-27-14
Site Description: Single Family Residence		Site Location: 198 Woodside Road	
Start Time:	12:04 pm	Sound Metric:	Level:
End Time:	12:18 pm	L_{eq}:	72.2
Temperature:	73	L_{min}:	63.4
Wind Speed:	0	L_{max}:	79.8
Cloud Cover:	Clear		

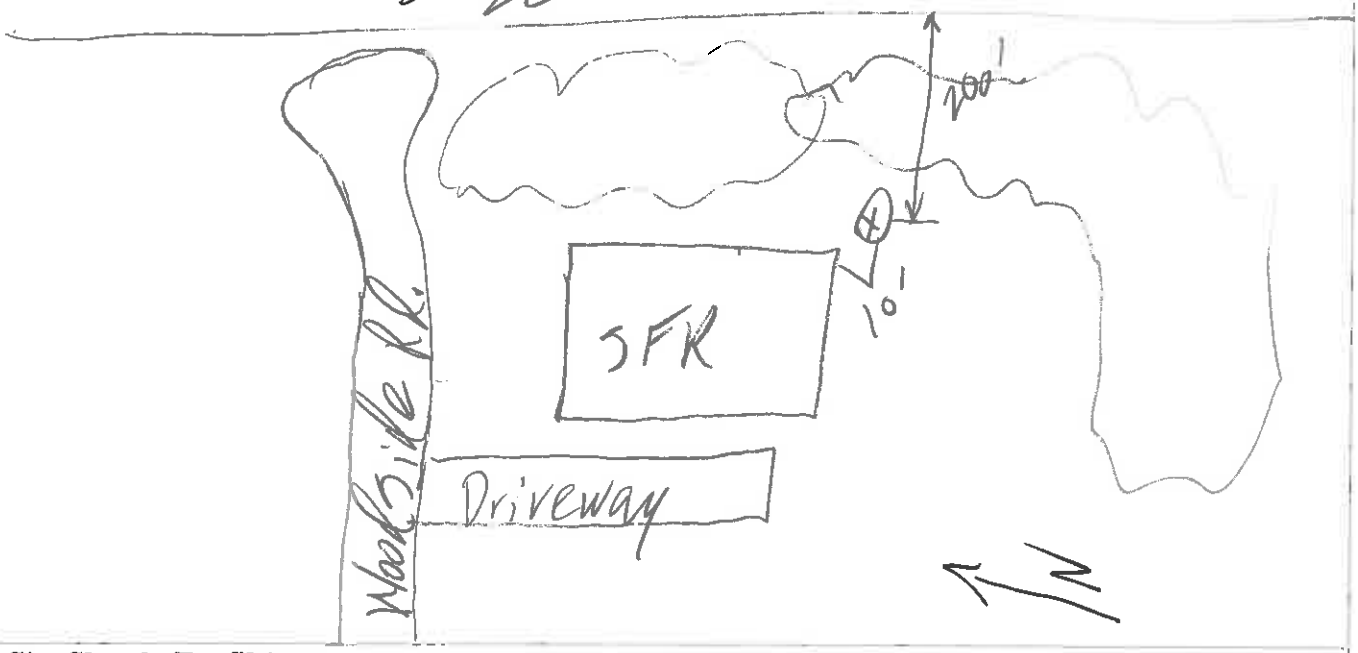
Road Name: I-20	Traffic Counts	Direction (EB)	Direction (WB)
	Autos:	320	329
Typical Section: 2 lanes each direction	Medium Trucks:	5	8
	Heavy Trucks:	42	37
	Buses:	0	2
Speed Limit: 70 mph	Motorcycles:	2	0

ICA Engineering, Inc. Field Personnel: Will Kerr / Wayne Hall

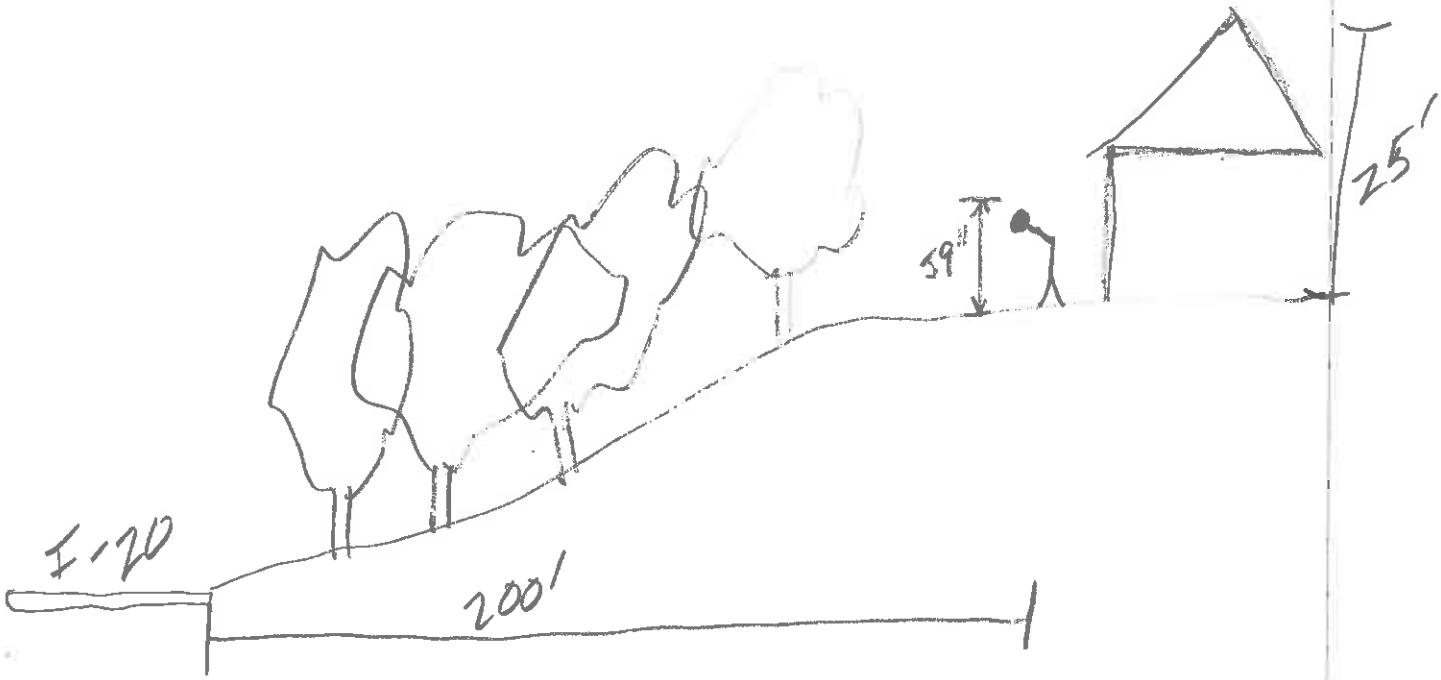
TRAFFIC NOISE FIELD MEASUREMENT WORKSHEET

Date: 10-27-14 **Project:** I-20 Improvements **Location:** STA-198 Woodside Rd.

Site Sketch (Plan View):



Site Sketch (Profile):



ICA Engineering, Inc.

Field Personnel: Will Kerr/Wayne Hall

SITE 4

		SITE 4					
		198 Woodside Road (SN#30596-Nor118)					
Period:	Time:	**LAeq**	Despike?	SPL	LAS(max)	Lmax	LCpeak
		72.2			79.8	79.8	
0	(2014-10-27 12:04:08.000)	72.4		17378008.3	75.6	75.6	93.8
1	(2014-10-27 12:05:08.000)	71.2		13182567.4	76.5	76.5	95.4
2	(2014-10-27 12:06:08.000)	72.4		17378008.3	76.5	76.5	95.6
3	(2014-10-27 12:07:08.000)	72.5		17782794.1	76.4	76.4	92.5
4	(2014-10-27 12:08:08.000)	71.6		14454397.7	74.9	74.9	94.1
5	(2014-10-27 12:09:08.000)	72.3		16982436.5	75.6	75.6	90.3
6	(2014-10-27 12:10:08.000)	71.1		12882495.5	75.3	75.3	95.0
7	(2014-10-27 12:11:08.000)	71.4		13803842.6	76.4	76.4	91.3
8	(2014-10-27 12:12:08.000)	73.0		19952623.1	76.6	76.6	93.4
9	(2014-10-27 12:13:08.000)	72.9		19498446	77.4	77.4	93.7
10	(2014-10-27 12:14:08.000)	73.8		23988329.2	79.8	79.8	96.8
11	(2014-10-27 12:15:08.000)	71.0		12589254.1	75.8	75.8	90.2
12	(2014-10-27 12:16:08.000)	73.2		20892961.3	77.6	77.6	96.1
13	(2014-10-27 12:17:08.000)	71.2		13182567.4	75.7	75.7	89.3
14	(2014-10-27 12:18:08.000)	71.7		14791083.9	75.2	75.2	95.3

TRAFFIC NOISE FIELD MEASUREMENT WORKSHEET

Project Name: **I-20 Widening, Lexington County**		Site #: 5	Date: 10-27-14
Site Description: Single Family Residence		Site Location: 763 Cromer Road	
Start Time:	11:30 am	Sound Metric:	Level:
End Time:	11:45 am	L_{eq}:	69.3
Temperature:	69	L_{min}:	59.7
Wind Speed:	0	L_{max}:	77.7
Cloud Cover:	Clear		

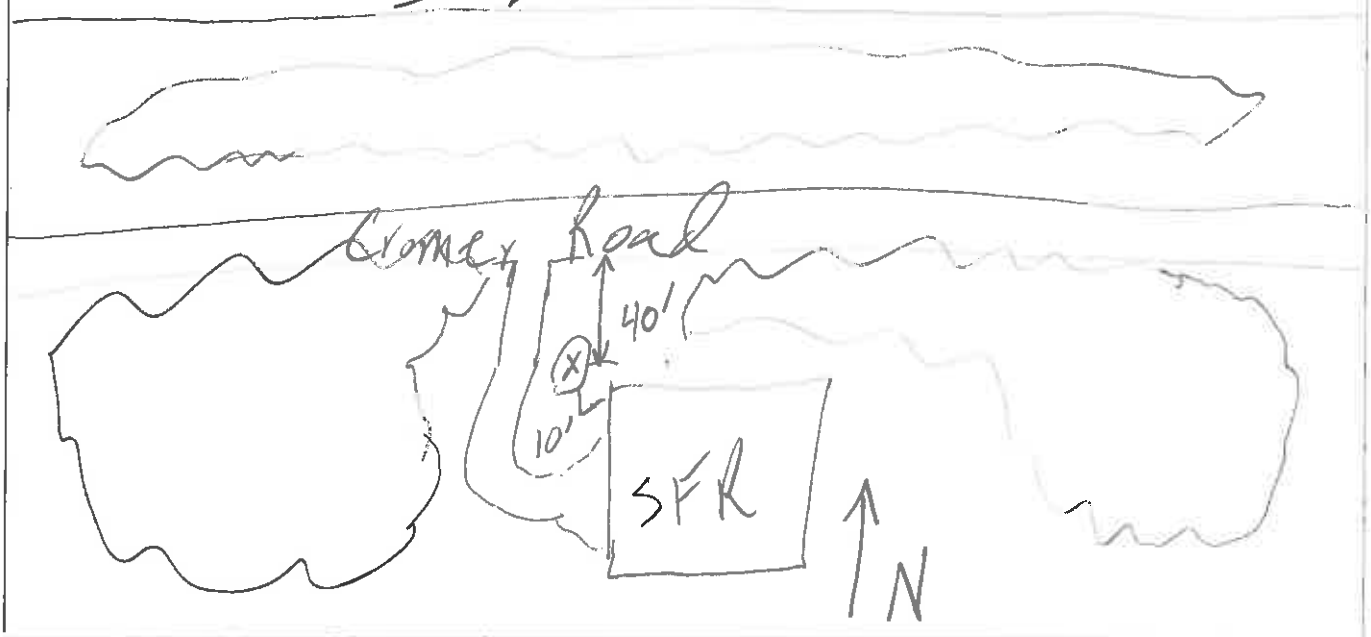
Road Name: I-20	Traffic Counts	I-20 Direction (EB)	I-20 Direction (WB)	Cromer Road (EB)	Cromer Road (WB)
	Autos:	420	234	18	12
Typical Section: 2 lanes each direction	Medium Trucks:	18	8	0	1
	Heavy Trucks:	38	52	1	0
	Buses:	0	1	0	0
Speed Limit: 70 mph (I-20) 35 mph (Cromer Road)	Motorcycles:	1	0	0	0

ICA Engineering, Inc. Field Personnel: Will Kerr / Wayne Hall

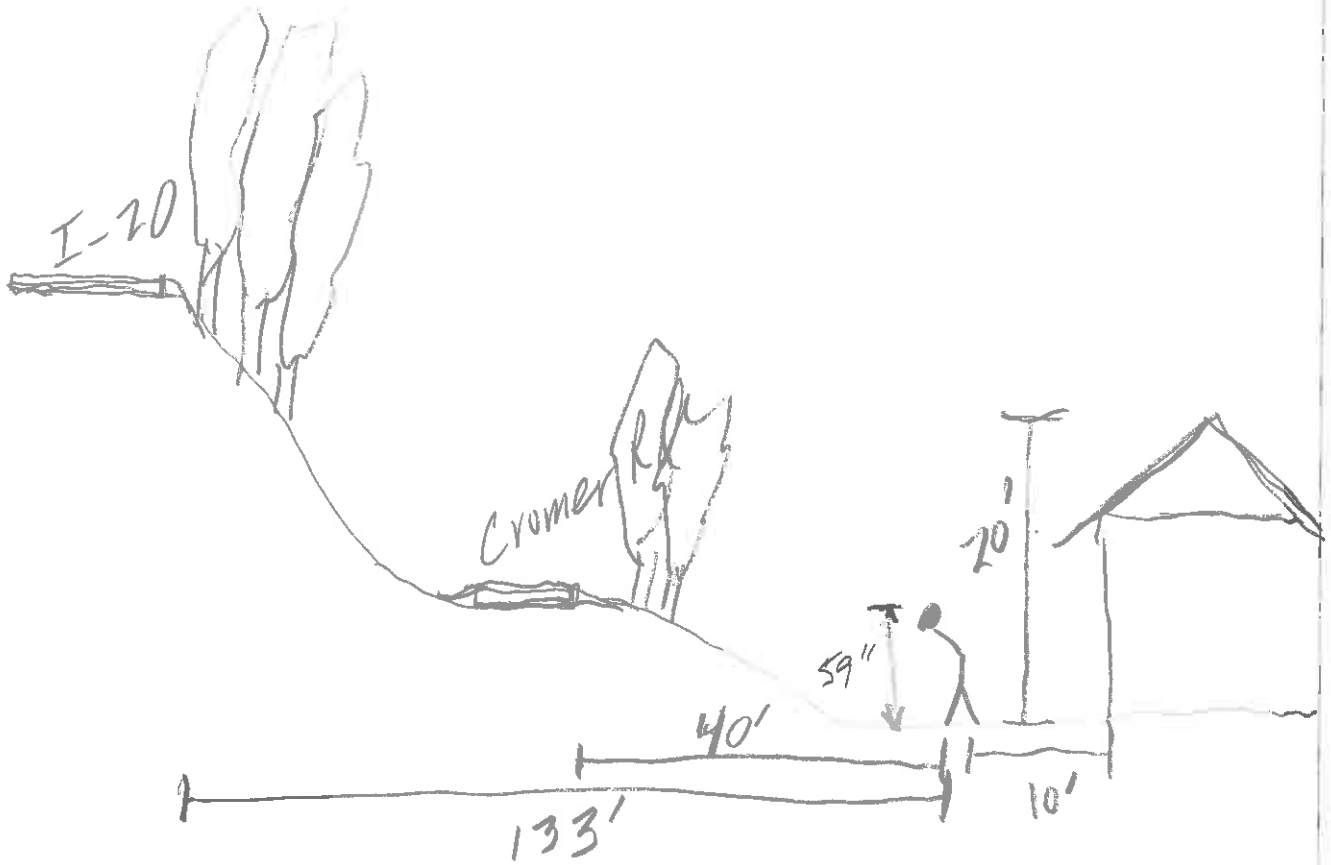
TRAFFIC NOISE FIELD MEASUREMENT WORKSHEET

Date: 10-27-14 **Project:** I-20 Improvements **Location:** STS-763 Cromer Rd.

Site Sketch (Plan View):



Site Sketch (Profile):



ICA Engineering, Inc.

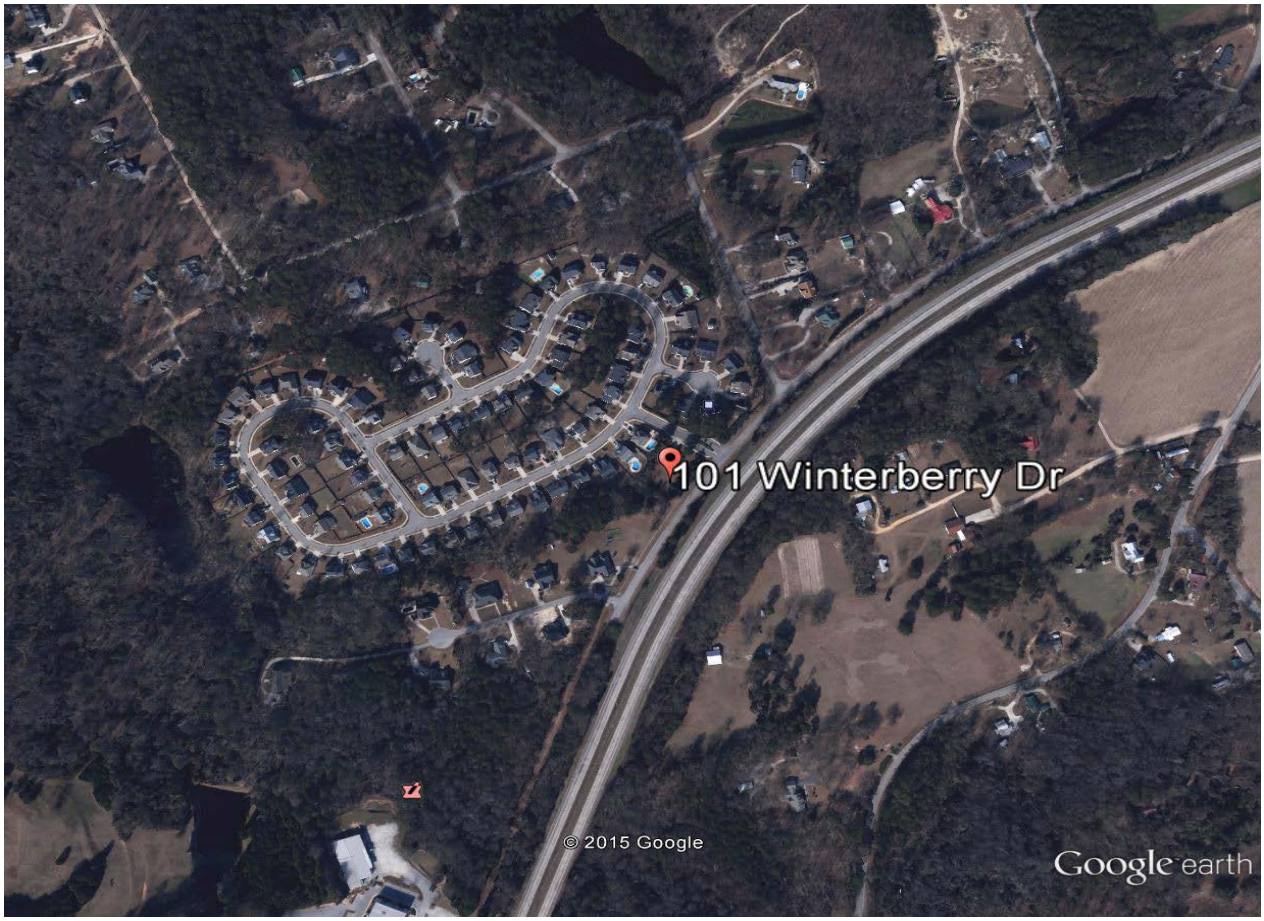
Field Personnel: Will Kerr / Wayne Hall

SITE 5

		SITE 5					
		763 Cromer Road (SN#30596-Nor118)					
Period:	Time:	**LAeq**	Despike?	SPL	LAS(max)	Lmax	LCpeak
		69.3			77.7	77.7	
0	(2014-10-27 11:31:23.000)	69.5		8912509.38	75.5	75.5	94.9
1	(2014-10-27 11:32:23.000)	70.1		10232929.9	73.9	73.9	91.1
2	(2014-10-27 11:33:23.000)	67.9		6165950.02	73.0	73.0	94.6
3	(2014-10-27 11:34:23.000)	68.5		7079457.84	74.8	74.8	93.5
4	(2014-10-27 11:35:23.000)	66.8		4786300.92	72.3	72.3	91.8
5	(2014-10-27 11:36:23.000)	71		12589254.1	75.4	75.4	93.0
6	(2014-10-27 11:37:23.000)	70.1		10232929.9	73.1	73.1	92.4
7	(2014-10-27 11:38:23.000)	69.8		9549925.86	73.7	73.7	94.3
8	(2014-10-27 11:39:23.000)	70.1		10232929.9	73.4	73.4	92.6
9	(2014-10-27 11:40:23.000)	69.9		9772372.21	77.7	77.7	93.2
10	(2014-10-27 11:41:23.000)	69.7		9332543.01	73.3	73.3	95.5
11	(2014-10-27 11:42:23.000)	70.2		10471285.5	76.2	76.2	92.9
12	(2014-10-27 11:43:23.000)	68.5		7079457.84	73.4	73.4	91.5
13	(2014-10-27 11:44:23.000)	69.4		8709635.9	72.4	72.4	88.8
14	(2014-10-27 11:45:23.000)	65.9		3890451.45	71.8	71.8	90.4

TRAFFIC NOISE FIELD MEASUREMENT WORKSHEET

Project Name: **I-20 Widening, Lexington County**		Site #: 6	Date: 10-27-14
Site Description: Single Family Residence		Site Location: 101 Winterberry Drive	
Start Time:	4:02 pm	Sound Metric:	Level:
End Time:	4:17 pm	L_{eq}:	66.0
Temperature:	84	L_{min}:	60.1
Wind Speed:	1 mph	L_{max}:	77.5
Cloud Cover:	Clear		



Road Name: I-20	Traffic Counts	Direction (EB)	Direction (WB)
	Autos:	365	450
Typical Section: 2 lanes each direction	Medium Trucks:	8	19
	Heavy Trucks:	48	53
	Buses:	0	0
Speed Limit: 70 mph	Motorcycles:	2	1

ICA Engineering, Inc.

Field Personnel: Will Kerr / Wayne Hall

TRAFFIC NOISE FIELD MEASUREMENT WORKSHEET

Date: 10-27-14 **Project:** I-20 Improvements **Location:** ST6 - Winter Berry Dr.

Site Sketch (Plan View):

Site Sketch (Profile):

ICA Engineering, Inc.

Field Personnel: Will Kerr / Wayne Hall

SITE 6

		SITE 6					
		101 Winterberry Drive (SN#30596-Nor118)					
Period:	Time:	**LAeq**	Despike?	SPL	LAS(max)	Lmax	LCpeak
		66			77.5	77.5	
0	(2014-10-27 16:01:54.000)	66.2		4168693.83	77.5	77.5	91.3
1	(2014-10-27 16:02:54.000)	66.1		4073802.78	70.4	70.4	94.2
2	(2014-10-27 16:03:54.000)	65.8		3801893.96	68.6	68.6	89.6
3	(2014-10-27 16:04:54.000)	66.2		4168693.83	70.4	70.4	92.1
4	(2014-10-27 16:05:54.000)	66.3		4265795.19	69.1	69.1	91.8
5	(2014-10-27 16:06:54.000)	66.6		4570881.9	71.2	71.2	94.2
6	(2014-10-27 16:07:54.000)	65.1		3235936.57	69.4	69.4	93.0
7	(2014-10-27 16:08:54.000)	65.7		3715352.29	70.1	70.1	90.8
8	(2014-10-27 16:09:54.000)	66.7		4677351.41	71.6	71.6	94.4
9	(2014-10-27 16:10:54.000)	65.6		3630780.55	68.7	68.7	90.5
10	(2014-10-27 16:11:54.000)	65.8		3801893.96	69.1	69.1	91.4
11	(2014-10-27 16:12:54.000)	65.8		3801893.96	68.5	68.5	90.8
12	(2014-10-27 16:13:54.000)	66.2		4168693.83	68.6	68.6	92.1
13	(2014-10-27 16:14:54.000)	65.5		3548133.89	68.6	68.6	90.1
14	(2014-10-27 16:15:54.000)	66.0		3981071.71	75.3	75.3	90.7

TRAFFIC NOISE FIELD MEASUREMENT WORKSHEET

Project Name: **I-20 Widening, Lexington County**		Site #: 8	Date: 10-27-14
Site Description: Church		Site Location: Gethsemane Baptist Church, Alliance Road	
Start Time:	10:53 am	Sound Metric:	Level:
End Time:	11:07 am	L_{eq}:	64.8
Temperature:	66	L_{min}:	42.5
Wind Speed:	None	L_{max}:	76.1
Cloud Cover:	Clear		

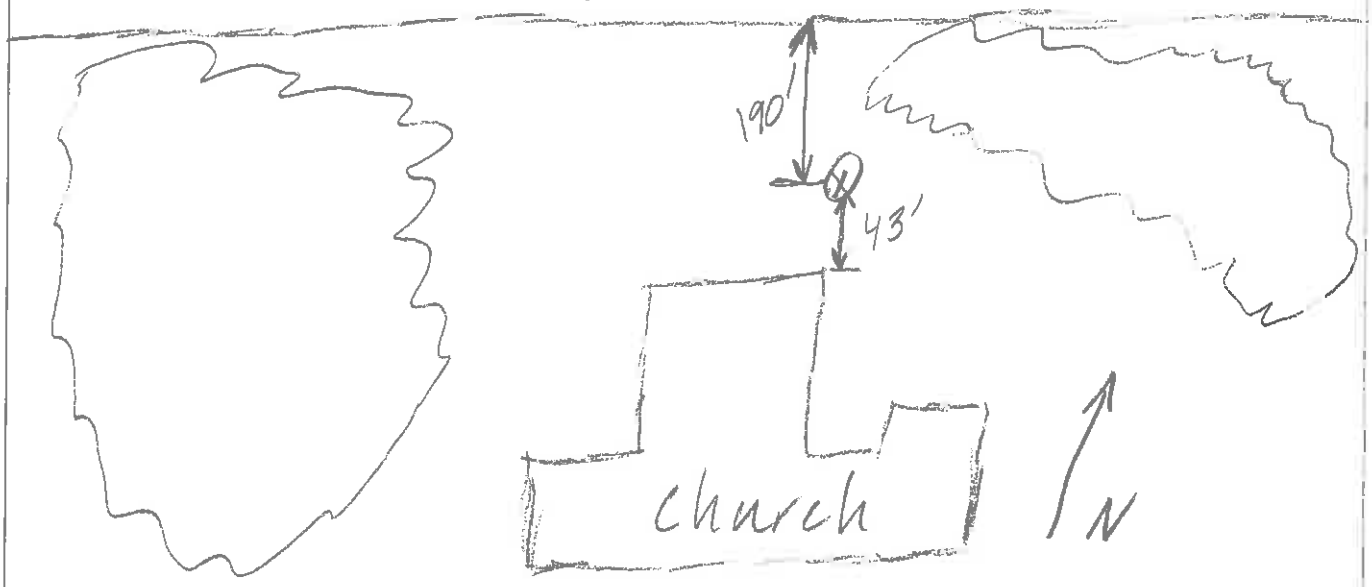
Road Name: I-20	Traffic Counts	Direction (EB)	Direction (WB)
	Autos:	319	260
Typical Section: 2 lanes each direction	Medium Trucks:	10	16
	Heavy Trucks:	23	55
	Buses:	0	0
Speed Limit: 70 mph	Motorcycles:	0	0

ICA Engineering, Inc. Field Personnel: Will Kerr / Wayne Hall

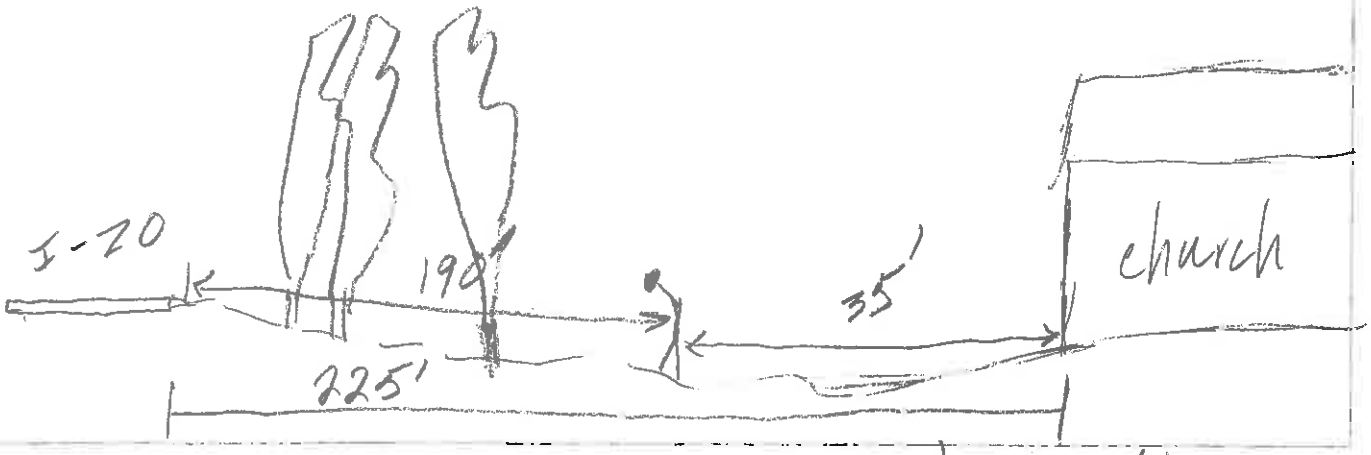
TRAFFIC NOISE FIELD MEASUREMENT WORKSHEET

Date:	Project:	Location:
10-27-14	I-20 Improvements	ST 8-Gethsemane Baptist Church

Site Sketch (Plan View):



Site Sketch (Profile):



ICA Engineering, Inc.

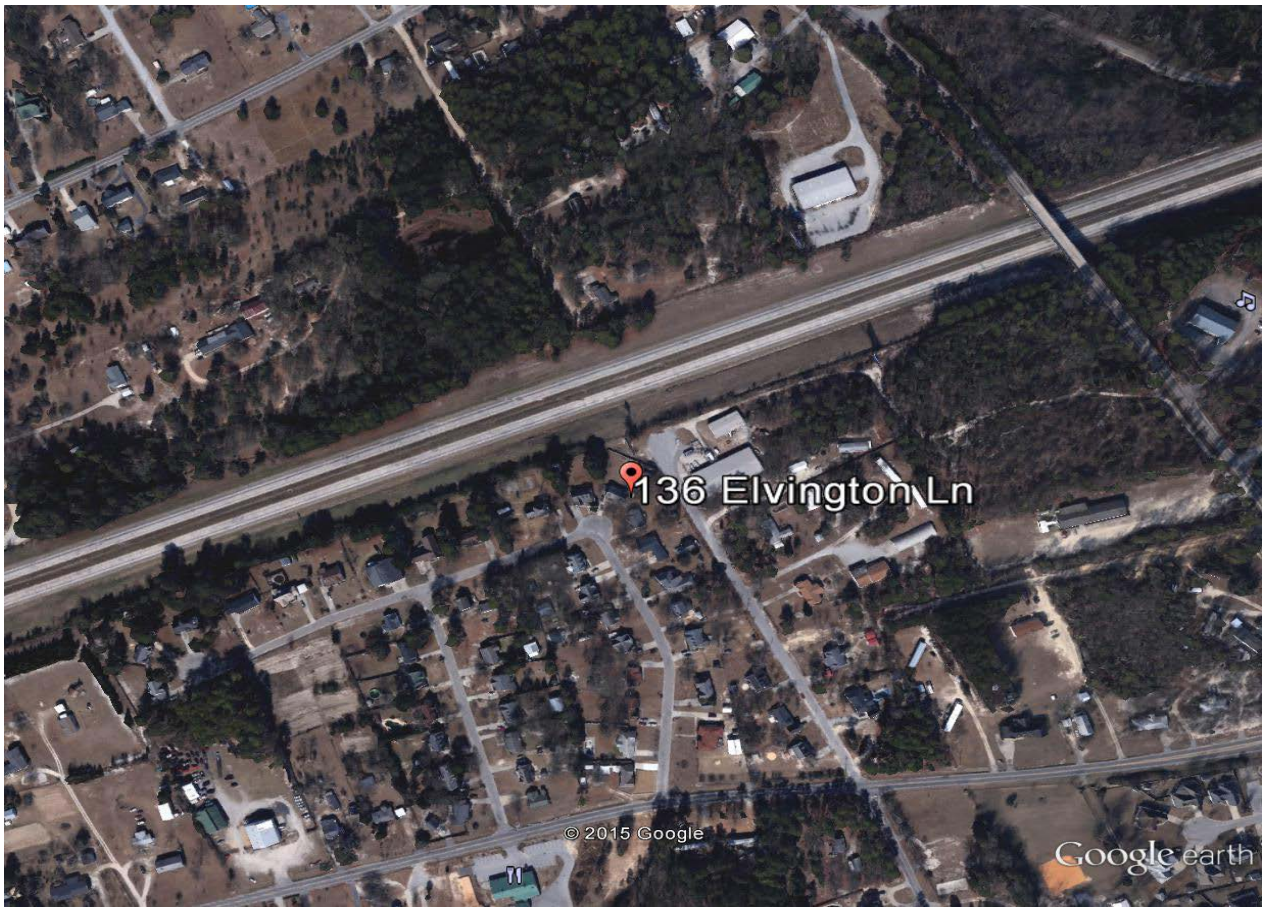
Field Personnel: Will Kerr/Wayne Hall

SITE 8

		SITE 8					
		Gethesemane Baptist Church (SN#30596-Nor118)					
Period:	Time:	LAeq	Despike?	SPL	LAS(max)	Lmax	LCpeak
		64.8			76.1	76.1	
0	(2014-10-27 10:53:59.000)	65.9		3890451.45	73.4	73.4	94.6
1	(2014-10-27 10:54:59.000)	66.3		4265795.19	73.7	73.7	92.5
2	(2014-10-27 10:55:59.000)	64.8		3019951.72	69.5	69.5	89.6
3	(2014-10-27 10:56:59.000)	62.9		1949844.6	68.0	68.0	92.9
4	(2014-10-27 10:57:59.000)	64.4		2754228.7	70.8	70.8	93.2
5	(2014-10-27 10:58:59.000)	64.7		2951209.23	68.9	68.9	94.9
6	(2014-10-27 10:59:59.000)	65		3162277.66	70.0	70.0	95.9
7	(2014-10-27 11:00:59.000)	64.8		3019951.72	70.7	70.7	92.4
8	(2014-10-27 11:01:59.000)	65.6		3630780.55	69.2	69.2	94.8
9	(2014-10-27 11:02:59.000)	61.5		1412537.54	65.6	65.6	90.1
10	(2014-10-27 11:03:59.000)	66		3981071.71	70.1	70.1	94.8
11	(2014-10-27 11:04:59.000)	64.4		2754228.7	69.4	69.4	92.2
12	(2014-10-27 11:05:59.000)	64.3		2691534.8	67.8	67.8	91.1
13	(2014-10-27 11:06:59.000)	65.1		3235936.57	69.4	69.4	91.8
14	(2014-10-27 11:07:59.000)	63.5		2238721.14	76.1	76.1	90.4

TRAFFIC NOISE FIELD MEASUREMENT WORKSHEET

Project Name: **I-20 Widening, Lexington County**		Site #: 9	Date: 10-27-14
Site Description: Residence		Site Location: 136 Elvington Lane	
Start Time:	10:20 am	Sound Metric:	Level:
End Time:	10:34 am	L_{eq}:	69.0
Temperature:	64	L_{min}:	45.6
Wind Speed:	None	L_{max}:	74.0
Cloud Cover:	Clear		



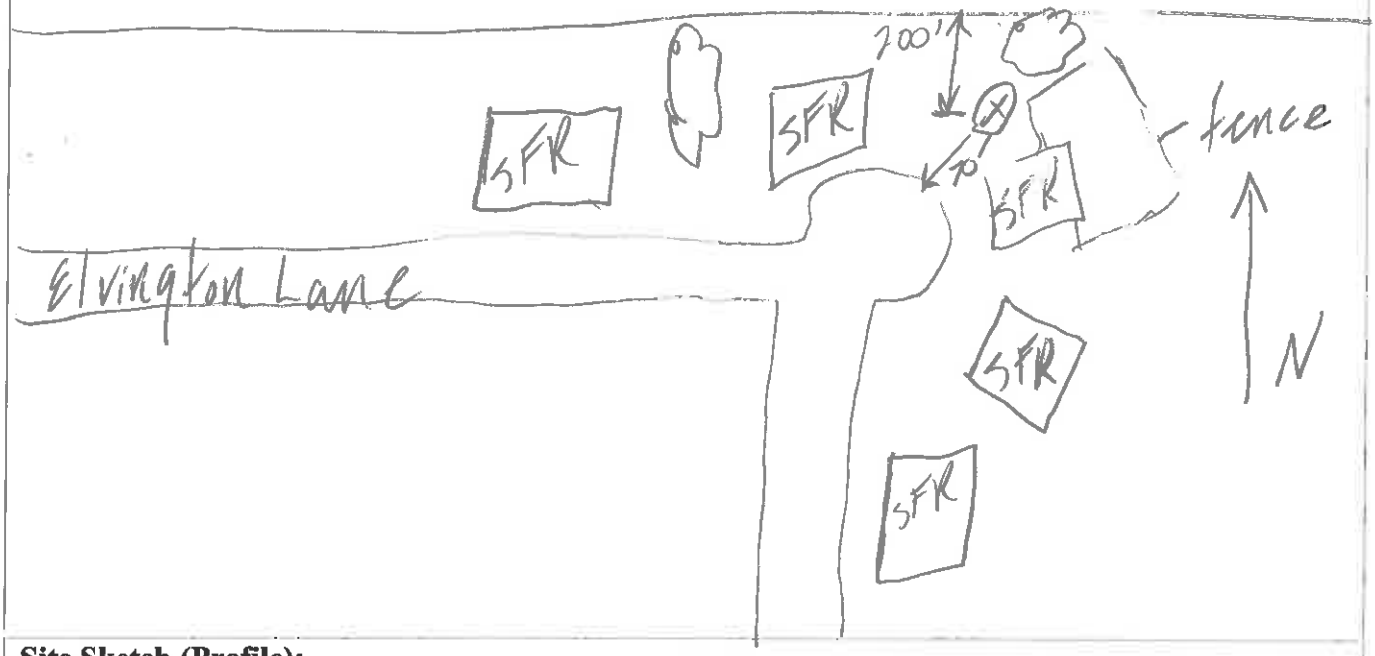
Road Name: I-20 Note: Man hammering 2 houses away, sprinkler next door.	Traffic Counts	Direction (EB)	Direction (WB)
	Autos:	380	235
Typical Section: 2 lanes each direction	Medium Trucks:	13	16
	Heavy Trucks:	48	46
	Buses:	0	2
Speed Limit: 70 mph	Motorcycles:	0	0

ICA Engineering, Inc. Field Personnel: Will Kerr / Wayne Hall

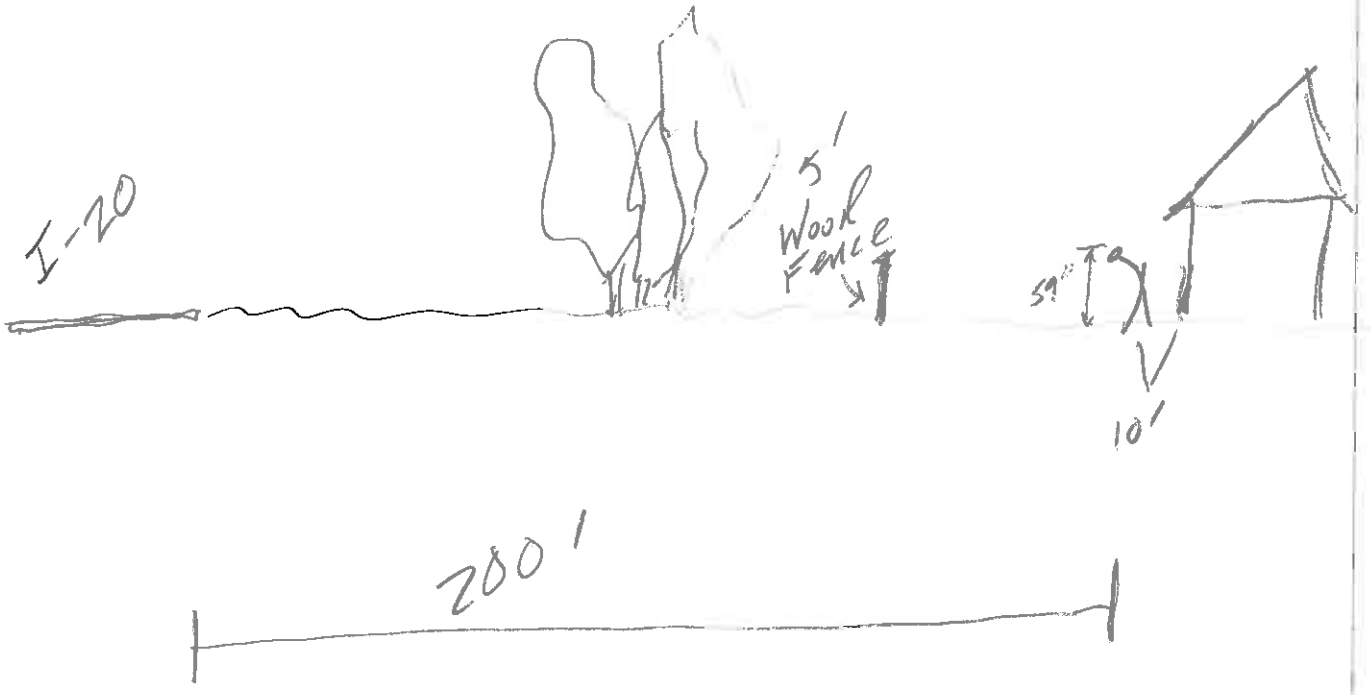
TRAFFIC NOISE FIELD MEASUREMENT WORKSHEET

Date: 10-27-14 **Project:** **Location:** ST9-136 Elvington Lane

Site Sketch (Plan View):



Site Sketch (Profile):



ICA Engineering, Inc.

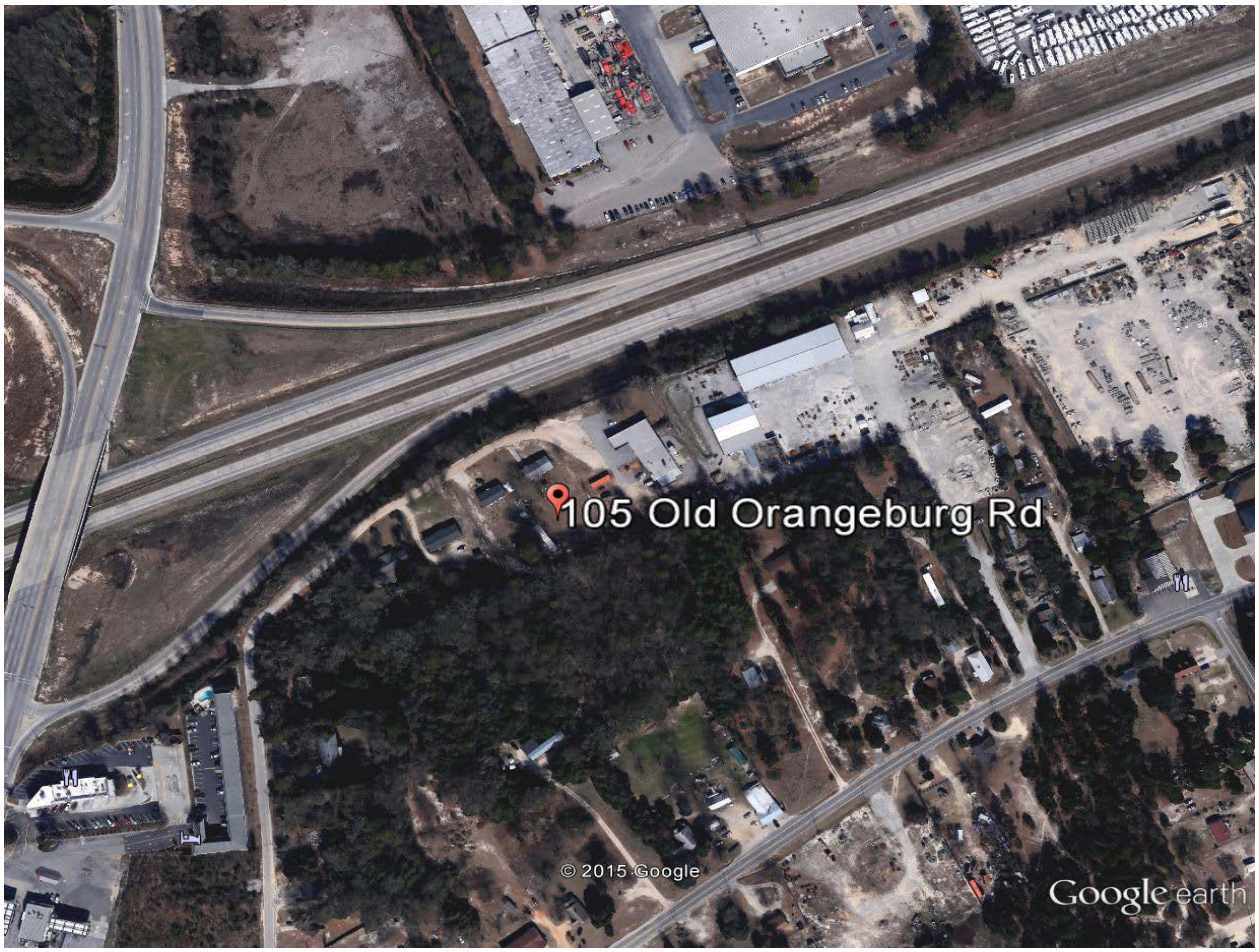
Field Personnel: Will Kerr / Wayne Hall

SITE 9

		SITE 9					
		136 Elvington Lane (SN#30596-Nor118)					
Period:	Time:	**LAeq**	Despike?	SPL	LAS(max)	Lmax	LCpeak
		67.5			83.3	83.3	
0	(2014-10-27 10:20:38.000)	69.3		8511380.38	83.3	83.3	96.5
1	(2014-10-27 10:21:38.000)	68.3		6760829.75	71.7	71.7	93.6
2	(2014-10-27 10:22:38.000)	68.9		7762471.17	71.8	71.8	90.0
3	(2014-10-27 10:23:38.000)	69.2		8317637.71	72.4	72.4	89.8
4	(2014-10-27 10:24:38.000)	69.0		7943282.35	73.7	73.7	89.9
5	(2014-10-27 10:25:38.000)	66.7		4677351.41	69.8	69.8	93.0
6	(2014-10-27 10:26:38.000)	64.3		2691534.8	68.5	68.5	87.0
7	(2014-10-27 10:27:38.000)	66.8		4786300.92	71.6	71.6	91.1
8	(2014-10-27 10:28:38.000)	65.7		3715352.29	70.6	70.6	90.4
9	(2014-10-27 10:29:38.000)	66.1		4073802.78	70.3	70.3	90.6
10	(2014-10-27 10:30:38.000)	65.5		3548133.89	71.4	71.4	90.6
11	(2014-10-27 10:31:38.000)	67.2		5248074.6	71.3	71.3	90.6
12	(2014-10-27 10:32:38.000)	67.7		5888436.55	72.2	72.2	91.9
13	(2014-10-27 10:33:38.000)	67.2		5248074.6	75.4	75.4	92.3
14	(2014-10-27 10:34:38.000)	67.7		5888436.55	70.3	70.3	91.2

TRAFFIC NOISE FIELD MEASUREMENT WORKSHEET

Project Name: **I-20 Widening, Lexington County**		Site #: 10	Date: 10-27-14
Site Description: Residential Duplex		Site Location: 105B Old Orangeburg Road	
Start Time:	9:43 am	Sound Metric:	Level:
End Time:	9:57 am	L_{eq}:	68.6
Temperature:	63	L_{min}:	60.4
Wind Speed:	None	L_{max}:	75.2
Cloud Cover:	Clear		



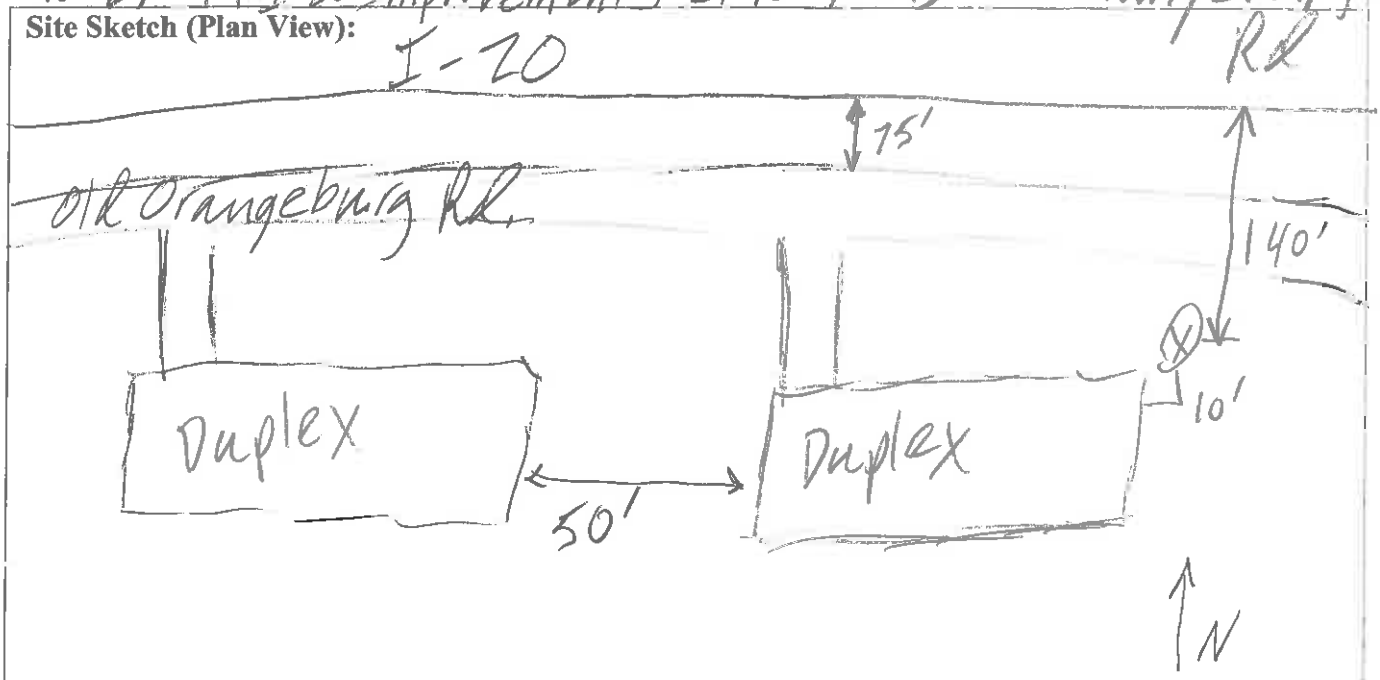
Road Name: I-20 Note: Siren at minute 10.	Traffic Counts	Direction (EB)	Direction (WB)
	Autos:	361	270
Typical Section: 2 lanes each direction with ramp.	Medium Trucks:	18	18
	Heavy Trucks:	43	30
	Buses:	0	0
Speed Limit: 70 mph	Motorcycles:	1	2

ICA Engineering, Inc. Field Personnel: Will Kerr / Wayne Hall

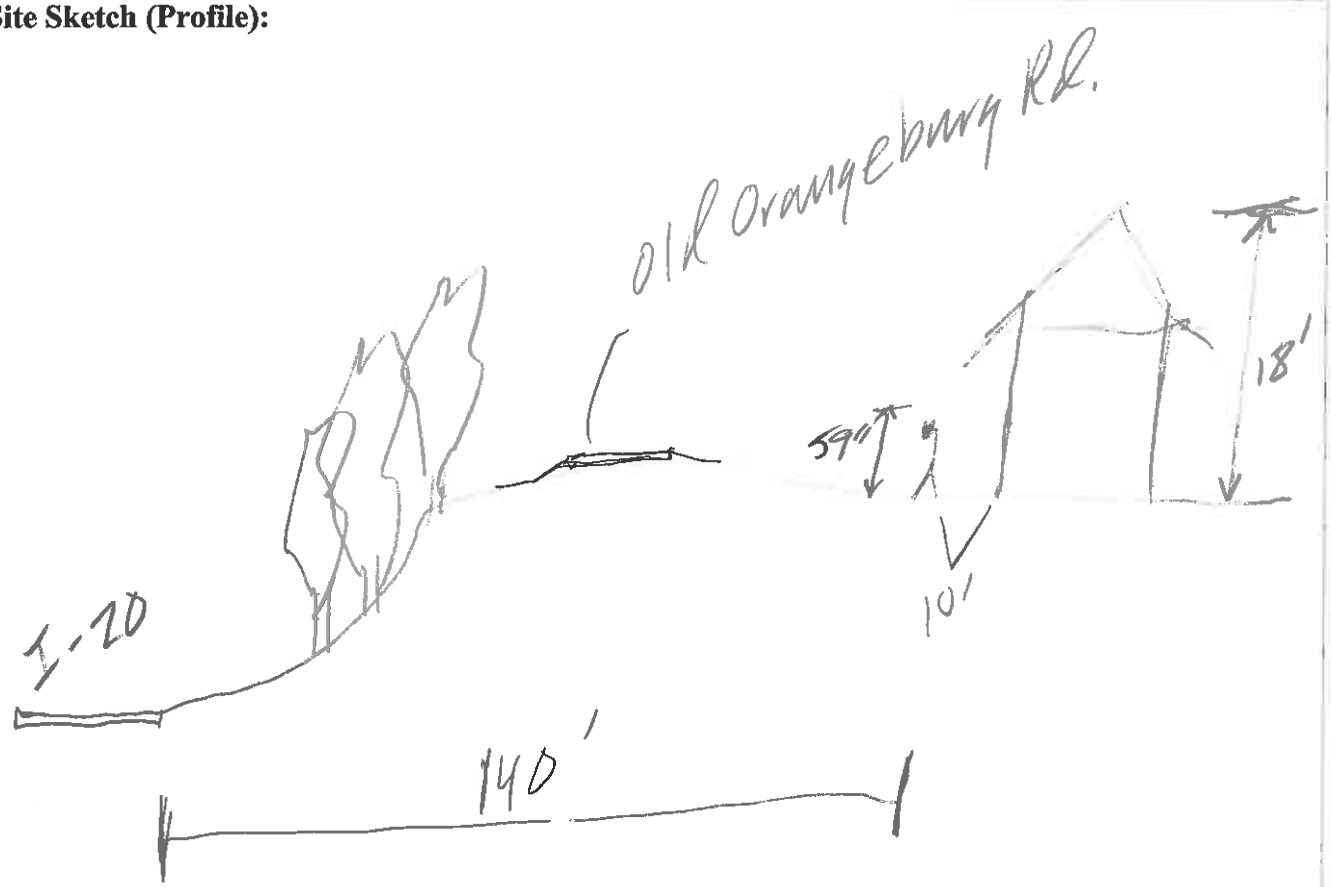
TRAFFIC NOISE FIELD MEASUREMENT WORKSHEET

Date:	Project:	Location:
10-27-14	I-20 Improvements	ST 10-105 B Old Orangeburg Rd

Site Sketch (Plan View):



Site Sketch (Profile):



ICA Engineering, Inc.

Field Personnel: Will Kerr / Wayne Hall

SITE 10

		SITE 10					
		105B Orangeburg Road (SN#30596-Nor118)					
Period:	Time:	**LAeq**	Despike?	SPL	LAS(max)	Lmax	LCpeak
		68.6			75.2	75.2	
0	(2014-10-27 09:43:51.000)	71.0		12589254.1	74.1	74.1	93.4
1	(2014-10-27 09:44:51.000)	70.1		10232929.9	74.6	74.6	94.9
2	(2014-10-27 09:45:51.000)	67.2		5248074.6	71.4	71.4	90.8
3	(2014-10-27 09:46:51.000)	67.8		6025595.86	71.3	71.3	92.0
4	(2014-10-27 09:47:51.000)	67.3		5370317.96	71.3	71.3	91.5
5	(2014-10-27 09:48:51.000)	68.3		6760829.75	74.2	74.2	93.8
6	(2014-10-27 09:49:51.000)	68.4		6918309.71	72.3	72.3	92.6
7	(2014-10-27 09:50:51.000)	67.6		5754399.37	70.7	70.7	90.1
8	(2014-10-27 09:51:51.000)	67.7		5888436.55	72.7	72.7	90.2
9	(2014-10-27 09:52:51.000)	68.0		6309573.44	72	72.0	90.6
10	(2014-10-27 09:53:51.000)	68.6		7244359.6	73.1	73.1	91.2
11	(2014-10-27 09:54:51.000)	68.6		7244359.6	72.7	72.7	89.8
12	(2014-10-27 09:55:51.000)	70.2		10471285.5	75.2	75.2	97.5
13	(2014-10-27 09:56:51.000)	68.9		7762471.17	72.6	72.6	94.4
14	(2014-10-27 09:57:51.000)	67.5		5623413.25	71.4	71.4	88.9

TRAFFIC NOISE FIELD MEASUREMENT WORKSHEET

Project Name: **I-20 Widening, Lexington County**		Site #: 11	Date: 10-27-14
Site Description: Single Family Residence		Site Location: 106 Hidden Springs Road	
Start Time:	8:56 am	Sound Metric:	Level:
End Time:	9:10 am	L_{eq}:	61.0
Temperature:	63	L_{min}:	53.8
Wind Speed:	None	L_{max}:	65.6
Cloud Cover:	Hazy		

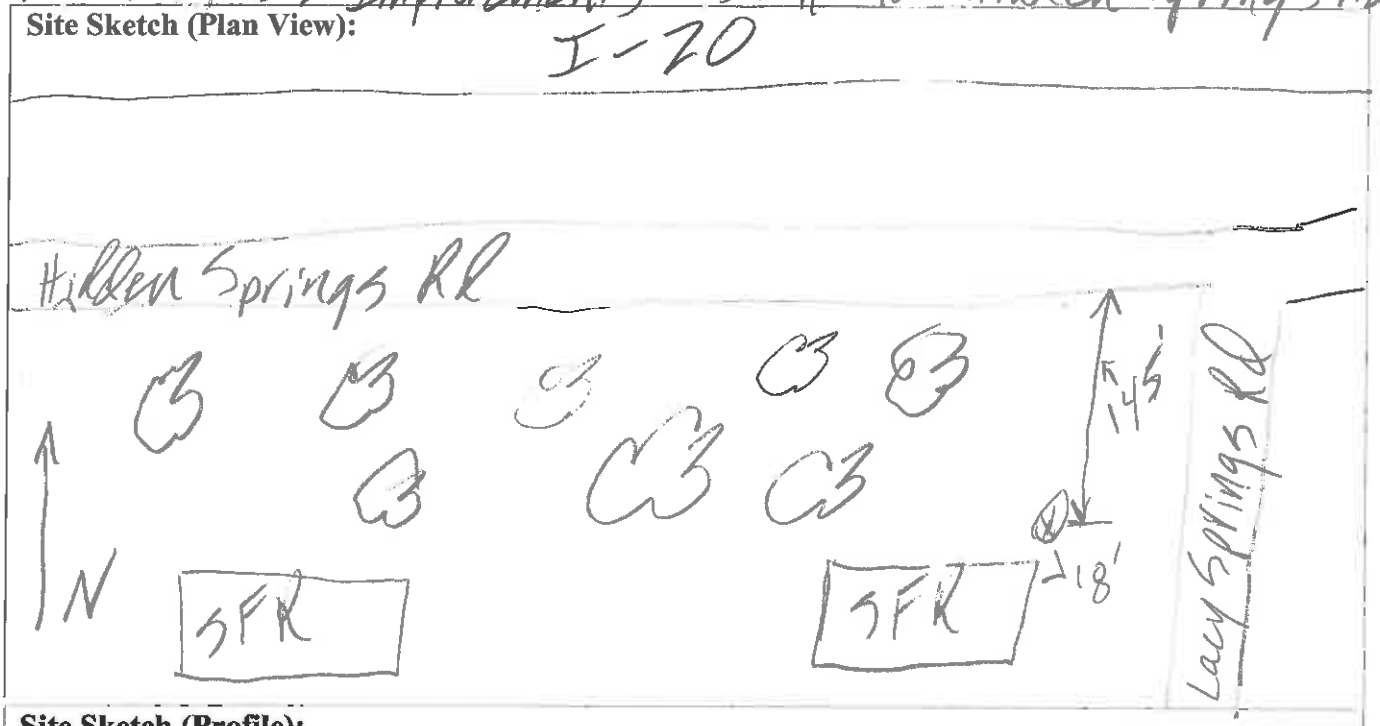
Road Name: I-20 Notes: Waste recycling plant with heavy equipment across the street.	Traffic Counts	Direction (EB)	Direction (WB)
	Autos:	288	190
Typical Section: 2 lanes each direction	Medium Trucks:	10	10
	Heavy Trucks:	37	31
	Buses:	0	0
Speed Limit: 70 mph	Motorcycles:	0	0

ICA Engineering, Inc. Field Personnel: Will Kerr / Wayne Hall

TRAFFIC NOISE FIELD MEASUREMENT WORKSHEET

Date:	Project:	Location:
10-27-14	I-20 Improvements	ST 11 - 106 Hillen Springs Rd.

Site Sketch (Plan View):



Site Sketch (Profile):

ICA Engineering, Inc.

Field Personnel: Will Kerr/Wayne Hall

SITE 11

		SITE 11					
		106 Springs Road (SN#30596-Nor118)					
Period:	Time:	**LAeq**	Despike?	SPL	LAS(max)	Lmax	LCpeak
		61			65.6	65.6	
0	(2014-10-27 08:56:16.000)	62.1		1621810.1	63.9	63.9	85.1
1	(2014-10-27 08:57:16.000)	60.7		1174897.55	64	64.0	83.0
2	(2014-10-27 08:58:16.000)	61.3		1348962.88	64	64.0	81.7
3	(2014-10-27 08:59:16.000)	59.8		954992.586	62.1	62.1	85.8
4	(2014-10-27 09:00:16.000)	60.2		1047128.55	63.6	63.6	83.9
5	(2014-10-27 09:01:16.000)	59.4		870963.59	62	62.0	87.4
6	(2014-10-27 09:02:16.000)	62.4		1737800.83	65.6	65.6	87.3
7	(2014-10-27 09:03:16.000)	61.0		1258925.41	63.9	63.9	86.5
8	(2014-10-27 09:04:16.000)	60.6		1148153.62	64.8	64.8	84.4
9	(2014-10-27 09:05:16.000)	61.5		1412537.54	65	65.0	86.2
10	(2014-10-27 09:06:16.000)	60.3		1071519.31	64.6	64.6	83.1
11	(2014-10-27 09:07:16.000)	61.7		1479108.39	64.7	64.7	87.9
12	(2014-10-27 09:08:16.000)	61.3		1348962.88	65	65.0	84.6
13	(2014-10-27 09:09:16.000)	60.4		1096478.2	63.8	63.8	84.2
14	(2014-10-27 09:10:16.000)	61.3		1348962.88	63.9	63.9	84.6

TRAFFIC NOISE FIELD MEASUREMENT WORKSHEET

Project Name: **I-20 Widening, Lexington County**		Site #: 13	Date: 10-27-14
Site Description: Single Family Residence		Site Location: 218 Glenforest Court	
Start Time:	8:56 am	Sound Metric:	Level:
End Time:	9:10 am	L_{eq}:	61.8
Temperature:	48	L_{min}:	48.6
Wind Speed:	None	L_{max}:	72.5
Cloud Cover:	Hazy		

Road Name: I-20	Traffic Counts	Direction (EB)	Direction (WB)
Notes: Birds in background.	Autos:	217	162
Typical Section: 2 lanes each direction	Medium Trucks:	4	11
	Heavy Trucks:	23	33
	Buses:	0	0
Speed Limit: 70 mph	Motorcycles:	0	0

ICA Engineering, Inc. Field Personnel: Will Kerr / Wayne Hall

TRAFFIC NOISE FIELD MEASUREMENT WORKSHEET

Date:	Project:	Location:
10-27-14	I-26 Improvements	5713-218 Glenforest Ct.

Site Sketch (Plan View):

Site Sketch (Profile):

ICA Engineering, Inc.

Field Personnel: Will Kerr/Wayne Hall

SITE 13

		SITE 13					
		218 Glenforest Court (SN#30596-Nor118)					
Period:	Time:	**LAeq**	Despike?	SPL	LAS(max)	Lmax	LCpeak
		61.8			72.5	72.5	
0	(2014-10-27 08:56:16.000)	63.6		2290867.65	70.9	70.9	87.7
1	(2014-10-27 08:57:16.000)	62.3		1698243.65	69	69.0	87.6
2	(2014-10-27 08:58:16.000)	61.8		1513561.25	69.9	69.9	90.6
3	(2014-10-27 08:59:16.000)	60.2		1047128.55	67.3	67.3	84.7
4	(2014-10-27 09:00:16.000)	62.9		1949844.6	72.5	72.5	90.5
5	(2014-10-27 09:01:16.000)	63.7		2344228.82	72.2	72.2	93.0
6	(2014-10-27 09:02:16.000)	61.2		1318256.74	69.4	69.4	86.5
7	(2014-10-27 09:03:16.000)	60.1		1023292.99	66.6	66.6	86.2
8	(2014-10-27 09:04:16.000)	61.1		1288249.55	67	67.0	87.8
9	(2014-10-27 09:05:16.000)	61.7		1479108.39	70.1	70.1	88.1
10	(2014-10-27 09:06:16.000)	61.2		1318256.74	68.3	68.3	87.8
11	(2014-10-27 09:07:16.000)	58.1		645654.229	64.6	64.6	85.1
12	(2014-10-27 09:08:16.000)	61.7		1479108.39	68.3	68.3	89.7
13	(2014-10-27 09:09:16.000)	62.9		1949844.6	69.6	69.6	89.5
14	(2014-10-27 09:10:16.000)	60.5		1122018.45	66.8	66.8	86.8

Traffic Data

PROJECT
I-20 Widening

TIP
####

Date	10.27.14		10.27.14		10.27.14		10.27.14		10.27.14			
Setup	ST1 - (SN#30596-Nor118)		ST2 - (SN#30596-Nor118)		ST3 - (SN#30596-Nor118)		ST4 - (SN#30596-Nor118)		ST5 - (SN#30596-Nor118)			
Time	ST1 - 1:08 - 1:22		ST2 - 5:07 - 5:21		ST3 - 4:38 - 4:52		ST4 - 12:04 - 12:18		ST5 - 11:31 - 11:45			
Location	222 Cromer Road		Meadow Glen Elementary School		100 Chamfort Drive		198 Woodside Road		763 Cromer Road			
Count Duration (Mins)	15		15		15		15		15			

LANE(s)	I-20 EB		I-20 WB		I-20 EB		I-20 WB		I-20 EB		I-20 WB		I-20 EB		I-20 WB		I-20 EB		I-20 WB		Cromer Road EB		Cromer Road WB	
	COUNT	HOURLY	COUNT	HOURLY	COUNT	HOURLY	COUNT	HOURLY	COUNT	HOURLY	COUNT	HOURLY	COUNT	HOURLY	COUNT	HOURLY	COUNT	HOURLY	COUNT	HOURLY	COUNT	HOURLY	COUNT	HOURLY
AUTOS	348	1392	334	1336	476	1904	915	3660	386	1544	815	3260	320	1280	329	1316	420	1680	234	936	18	72	12	48
DT / MED TRUCKS	11	44	12	48	6	24	6	24	12	48	21	84	5	20	8	32	18	72	8	32	0	0	1	4
TTST / HEAVY TRUCKS	43	172	48	192	55	220	30	120	49	196	44	176	42	168	37	148	38	152	52	208	1	4	0	0
BUSES	0	0	0	0	2	8	0	0	0	0	0	0	0	0	2	8	0	0	1	4	0	0	0	0
MOTORCYCLES	1	4	0	0	0	0	0	0	0	0	1	4	2	8	0	0	1	4	0	0	0	0	0	0
SPEED	60		60		60		60		60		60		70		70		70		70		35		35	

DIR DT / MED TRUCKS PCT	2.7%	3.0%	1.1%	0.6%	2.7%	2.4%	1.4%	2.1%	3.8%	2.7%	0.0%	7.7%
DIR TTST / HEAVY TRUCKS PCT	10.7%	12.2%	10.2%	3.2%	11.0%	5.0%	11.4%	9.9%	8.0%	17.7%	5.3%	0.0%
TOTAL DIR TRUCKS PCT	13.4%	15.2%	11.4%	3.8%	13.6%	7.4%	12.8%	12.0%	11.8%	20.4%	5.3%	7.7%

TOTAL RDY DT / MED TRUCKS PCT	2.9%	0.8%	2.5%	1.8%	3.4%	3.1%
TOTAL RDY TTST / HEAVY TRKS PCT	11.4%	5.7%	7.0%	10.7%	11.7%	3.1%
TOTAL RDY TRUCKS PCT	14.3%	6.5%	9.5%	12.4%	15.1%	6.3%

PROJECT
I-20 Widening

TIP
####

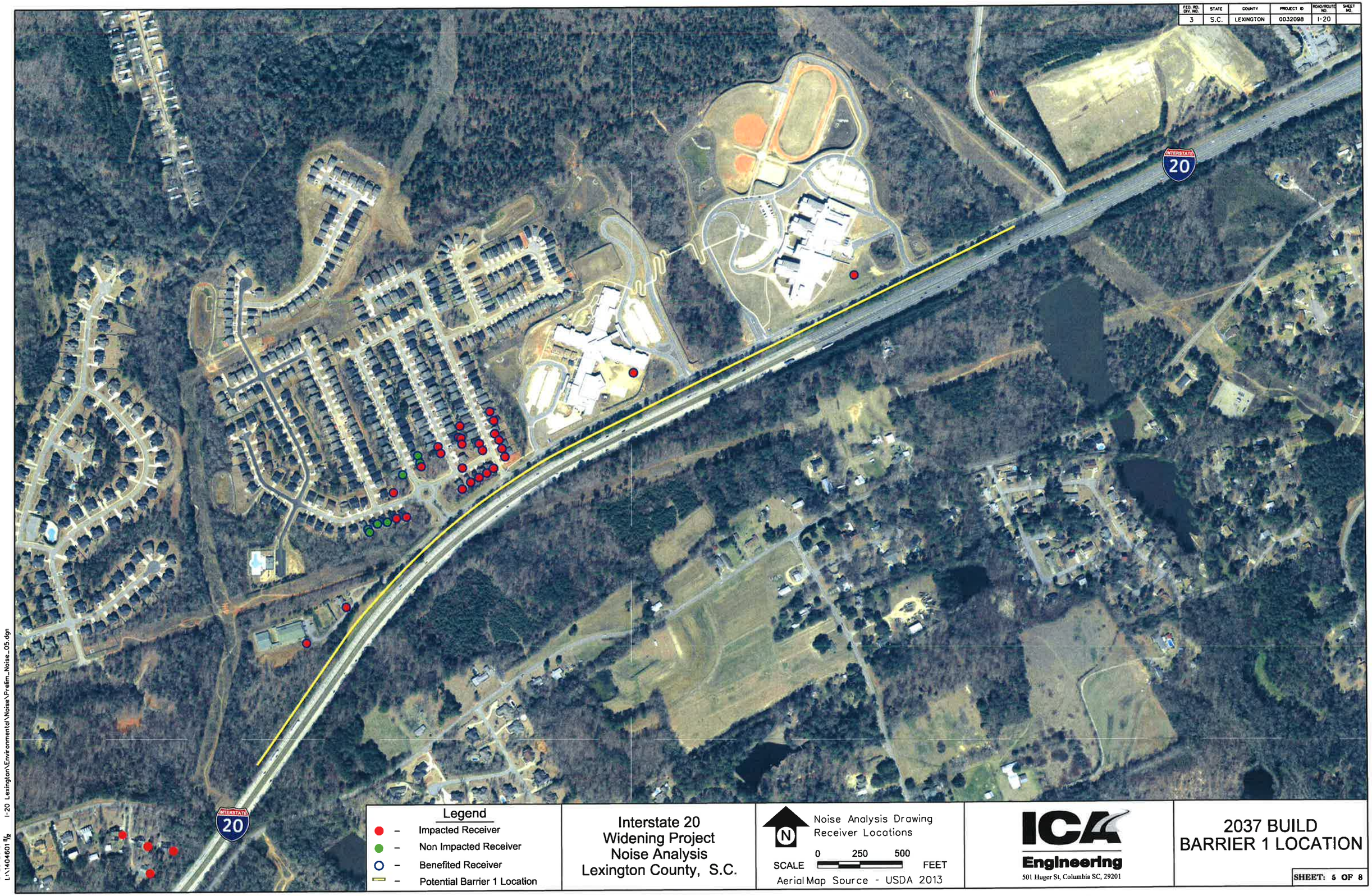
Date	10.27.14				10.27.14				10.27.14				10.27.14				10.27.14				10.27.14			
Setup	ST6 - (SN#30596-Nor118)				ST8 - (SN#30596-Nor118)				ST9 - (SN#30596-Nor118)				ST10 - (SN#30596-Nor118)				ST11 - (SN#30596-Nor118)				ST13 - (SN#30596-Nor118)			
Time	ST6 - 4:01 - 4:15				ST8 - 10:53 - 11:07				ST9 - 10:20 - 10:34				ST10 - 9:43 - 9:57				ST11 - 8:56 - 9:10				ST13 - 8:56 - 9:10			
Location	101 Winterberry Drive				Gethsemene Baptist Church, Alliance Road				136 Elvington Lane				105B Orangeburg Road				106 Hidden Springs Road				218 Glenforest Court			
Count Duration (Mins)	15				15				15				15				15				15			
LANE(s)	I-20 EB		I-20 WB		I-20 EB		I-20 WB		I-20 EB		I-20 WB		I-20 EB		I-20 WB		I-20 EB		I-20 WB		I-20 EB		I-20 WB	
	COUNT	HOURLY	COUNT	HOURLY	COUNT	HOURLY	COUNT	HOURLY	COUNT	HOURLY	COUNT	HOURLY	COUNT	HOURLY	COUNT	HOURLY	COUNT	HOURLY	COUNT	HOURLY	COUNT	HOURLY	COUNT	HOURLY
AUTOS	365	1460	450	1800	319	1276	260	1040	380	1520	235	940	361	1444	270	1080	288	1152	190	760	217	868	162	648
DT / MED TRUCKS	8	32	19	76	10	40	16	64	13	52	16	64	18	72	18	72	10	40	10	40	4	16	11	44
TTST / HEAVY TRUCKS	48	192	53	212	23	92	55	220	48	192	46	184	43	172	30	120	37	148	31	124	23	92	33	132
BUSES	0	0	0	0	0	0	0	0	0	0	2	8	0	0	0	0	0	0	0	0	0	0	0	0
MOTORCYCLES	2	8	1	4	0	0	0	0	0	0	0	0	1	4	2	8	0	0	0	0	0	0	0	0
SPEED	70		70		70		70		70		70		70		70		70		70		70		70	
DIR DT / MED TRUCKS PCT	1.9%		3.6%		2.8%		4.8%		2.9%		5.4%		4.3%		5.7%		3.0%		4.3%		1.6%		5.3%	
DIR TTST / HEAVY TRUCKS PCT	11.4%		10.2%		6.5%		16.6%		10.9%		15.5%		10.2%		9.4%		11.0%		13.4%		9.4%		16.0%	
TOTAL DIR TRUCKS PCT	13.3%		13.8%		9.4%		21.5%		13.8%		20.9%		14.5%		15.1%		14.0%		17.7%		11.1%		21.4%	
TOTAL RDY DT / MED TRUCKS PCT	2.9%				3.8%				3.9%				4.9%				3.5%				3.3%			
TOTAL RDY TTST / HEAVY TRKS PCT	10.7%				11.4%				12.7%				9.9%				12.0%				12.4%			
TOTAL RDY TRUCKS PCT	13.6%				15.2%				16.7%				14.7%				15.5%				15.8%			

TNM Validation

Model Validation: Measured vs. Calculated Noise Levels					
Site	**Meter Location**	**Measured dBA Leq**	**Modeled Leq**	**Difference Measured - Model**	**Validation Notes**
ST1	Rear of residence at 222 Cromer Road	66.6	71.8	5.2	SCDOT validation standard not achieved.
ST2	Basketball Court at Meadow Glen Elementary School	67.5	68.6	1.1	SCDOT validation standard achieved.
ST3	Side yard of residence at 100 Chamfort Drive	72.5	72.7	0.2	SCDOT validation standard achieved.
ST4	Front yard of residence at 198 Woodside Road	72.2	70.7	-1.5	SCDOT validation standard achieved.
ST5	Side yard of residence at 763 Cromer Road	69.3	68.7	-0.6	SCDOT validation standard achieved.
ST6	Side yard of residence at 101 Winterberry Drive	66.0	68.9	2.9	SCDOT validation standard achieved.
ST8	Rear yard of Gethsemane Baptist Church	64.8	67.0	2.2	SCDOT validation standard achieved.
ST9	Side yard of residence at 136 Elvington Lane	69.0	67.9	-1.1	SCDOT validation standard achieved.
ST10	Front yard of residence at 105B Old Orangeburg Road	68.6	70.6	2.0	SCDOT validation standard achieved.
ST11	Front yard of residence at 106 Hidden Springs Road	61.0	62.4	1.4	SCDOT validation standard achieved.
ST13	Side yard of residence at 218 Glenforest Court	61.8	63.8	2.0	SCDOT validation standard achieved.

Barrier Analysis and Locations

FED. ROD. DIV. NO.	STATE	COUNTY	PROJECT ID	ROAD/ROUTE NO.	SHEET NO.
3	S.C.	LEXINGTON	0032098	I-20	



Legend

- Impacted Receiver
- Non Impacted Receiver
- Benefited Receiver
- Potential Barrier 1 Location

Interstate 20
Widening Project
Noise Analysis
Lexington County, S.C.

N

Noise Analysis Drawing
Receiver Locations

SCALE 0 250 500 FEET

Aerial Map Source - USDA 2013

ICA Engineering
501 Huger St, Columbia SC, 29201

2037 BUILD BARRIER 1 LOCATION

SHEET: 5 OF 8

3/20/2015
L:\1404601 \I-20 Lexington\Environmental\Noise\Prelim_Noise_05.dgn

SCDOT Feasibility and Reasonableness Worksheet

Date: Mar 18, 2015

Project Name I-20 Widening, Lexington, SC

Highway Traffic Noise Abatement Measure Noise Barrier 1

Feasibility

Number of Impacted Receivers: 261

Number of Benefited Receivers: 268

Percentage of Impacted Receivers that would achieve a 5 dBA reduction from the proposed noise abatement measure: 100

Is the proposed noise abatement measure acoustically feasible?
NOTE:SCDOT Policy indicates that 75% of the impacted receivers must achieve at least a 5 dBA reduction for it to be acoustically feasible.

☒ Yes ☐ No

Would any of the following issues limit the ability of the abatement measure to achieve the noise reduction goal?

Topography	☐ Yes	☒ No
Safety	☐ Yes	☒ No
Drainage	☐ Yes	☒ No
Utilities	☐ Yes	☒ No
Maintenance	☐ Yes	☒ No
Access	☐ Yes	☒ No
Exposed Height of Wall	☐ Yes	☒ No

If "Yes" was marked for any of the questions above, please explain below.

Detailed Description

Reasonableness

According to 23 CFR 772.13(d)(2)(iv) the abatement measure must collectively achieve each of these criteria to be reasonable. Therefore if any of the three mandatory reasonable factors are not achieved, then the abatement measure is determined NOT to be reasonable. When completing the form it is not necessary to detail each of the criteria if one was determined not to be reasonable.

#1: Noise Reduction Design Goal

Number of Benefited Receivers: 268

Number of Benefited Receivers that achieve at least an 8 dBA reduction: 265

Percentage of Benefited Receivers in the first two building rows that would achieve at least a 8 dBA reduction from the proposed noise abatement measure. NOTE: SCDOT Policy indicates that 80% of the benefited receivers in the first two building rows must achieve at least a 8 dBA reduction for it to be reasonable.: 99

Does the proposed noise abatement measure meet the noise reduction design goal? ☒ Yes ☐ No

If "Yes" is marked, continue to #2. If "No" is marked, then abatement is determined NOT to be reasonable.

#2: Cost Effectiveness

Estimated cost per square foot for noise abatement measure: 35

Estimated construction cost for noise abatement measure: 3,641,540

Estimated cost per Benefited Receiver: 13,588

Based on the SCDOT policy of $30,000 per Benefited Receiver, would the abatement measure be reasonable? ☒ Yes ☐ No
NOTE: SCDOT Policy states that the preliminary noise analysis is based on $35.00 per square foot and a more project-specific construction cost should be applied at a cost per square foot basis during the detailed noise abatement evaluation.

If "Yes" is marked, continue to #3. If "No" is marked, then abatement is determined NOT to be reasonable.

#3: Viewpoints of the property owners and residents of the benefitted receivers

Number of Benefited Receivers (same as above):

Number of Benefited Receivers in **support** of noise abatement measure:

Percentage of Benefited Receivers in **support** of noise abatement measure:

Number of Benefited Receivers **opposed** to noise abatement measure:

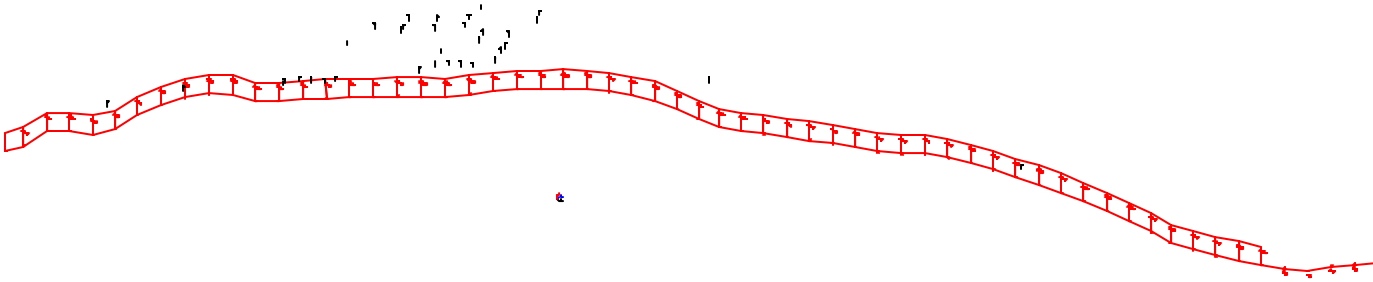
Percentage of Benefited Receivers **opposed** to noise abatement measure:

Number of Benefited Receivers **that did not respond** to solicitation on noise abatement measure:

Percentage of Benefited Receivers **that did not respond** to solicitation on noise abatement measure:

Based on the viewpoints of the property owners and residents of the Benefited Receivers, would the abatement measure be reasonable? NOTE: SCDOT Policy indicates that the noise abatement shall be constructed unless greater than 50% of the benefited receptors are opposed to noise abatement. ☐ Yes ☐ No

Final Determination for Noise Abatement Measure



2037 SC 6 to Longs Pond Road - Wall 1	Sheet 1 of 1	20 Apr 2015
	ICA Engineeriing	
Barrier View-Barrier 1	Project/Contract No. I-20 Widening	
Run name: Wall 1 - Schools	TNM Version 2.5, Feb 2004	
Scale: <DNA - due to perspective>	Analysis By: Will Kerr/Wayne Hall	

Roadway:		Ground Zone:	polygon
Receiver:		Tree Zone:	dashed polygon
Barrier:		Contour Zone:	polygon
Building Row:		Parallel Barrier:	
Terrain Line:		Skew Section:	

ICA Engineeriing
Will Kerr/Wayne Hall
11 May 2015
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: I-20 Widening
RUN: 2037 SC 6 to Longs Pond Road - Wall 1
BARRIER DESIGN: Barrier 1
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	With Barrier Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Noise Reduction Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
Receiver205	205	1	71.0	71.3	66	0.3	15	Snd Lvl	64.0	7.3	8	-0.7
Receiver206	206	1	73.0	72.2	66	-0.8	15	Snd Lvl	62.6	9.6	8	1.6
Receiver207	207	1	64.0	63.0	66	-1.0	15	----	57.0	6.0	8	-2.0
Receiver208	208	1	66.0	64.3	66	-1.7	15	----	57.0	7.3	8	-0.7
Receiver209	209	1	65.0	64.4	66	-0.6	15	----	56.7	7.7	8	-0.3
Receiver210	210	1	65.0	64.9	66	-0.1	15	----	57.0	7.9	8	-0.1
Receiver211	211	1	64.0	64.8	66	0.8	15	----	56.9	7.9	8	-0.1
Receiver212	212	1	66.0	66.3	66	0.3	15	Snd Lvl	57.8	8.5	8	0.5
Receiver213	213	1	69.0	69.1	66	0.1	15	Snd Lvl	59.3	9.8	8	1.8
Receiver214	214	1	65.0	65.0	66	0.0	15	----	57.4	7.6	8	-0.4
Receiver215	215	1	67.0	66.9	66	-0.1	15	Snd Lvl	58.7	8.2	8	0.2
Receiver218	218	1	70.0	68.4	66	-1.6	15	Snd Lvl	58.8	9.6	8	1.6
Receiver219	219	1	70.0	63.2	66	-6.8	15	----	58.4	4.8	8	-3.2
Receiver255	223	1	68.0	62.7	66	-5.3	10	----	56.9	5.8	8	-2.2
Receiver256	224	1	64.0	63.3	66	-0.7	10	----	57.0	6.3	8	-1.7
Receiver257	225	1	65.0	64.1	66	-0.9	10	----	57.3	6.8	8	-1.2
Receiver258	226	1	65.0	64.6	66	-0.4	10	----	57.4	7.2	8	-0.8
Receiver259	227	1	66.0	65.9	66	-0.1	10	----	57.7	8.2	8	0.2
Receiver260	228	1	68.0	72.7	66	4.7	10	Snd Lvl	60.7	12.0	8	4.0
Receiver261	229	1	72.0	73.3	66	1.3	10	Snd Lvl	61.5	11.8	8	3.8
Receiver262	230	1	73.0	73.7	66	0.7	10	Snd Lvl	62.1	11.6	8	3.6
Receiver263	231	1	73.0	73.9	66	0.9	10	Snd Lvl	62.2	11.7	8	3.7
Receiver264	232	1	73.0	73.7	66	0.7	10	Snd Lvl	62.0	11.7	8	3.7
Receiver265	233	1	73.0	72.9	66	-0.1	10	Snd Lvl	61.6	11.3	8	3.3

Receiver266	234	1	71.0	71.0	66	0.0	10	Snd Lvl	60.7	10.3	8	2.3
Receiver267	235	1	69.0	68.5	66	-0.5	10	Snd Lvl	59.3	9.2	8	1.2
Receiver268	236	1	67.0	68.0	66	1.0	10	Snd Lvl	59.6	8.4	8	0.4
Receiver269	237	1	69.0	69.4	66	0.4	10	Snd Lvl	59.9	9.5	8	1.5
Receiver270	238	1	68.0	68.2	66	0.2	10	Snd Lvl	59.2	9.0	8	1.0
Receiver271	239	1	66.0	66.8	66	0.8	10	Snd Lvl	58.0	8.8	8	0.8
Receiver272	240	1	65.0	65.8	66	0.8	10	----	57.4	8.4	8	0.4
Receiver273	241	1	66.0	65.4	66	-0.6	10	----	57.1	8.3	8	0.3
Receiver274	242	1	65.0	64.7	66	-0.3	10	----	56.8	7.9	8	-0.1
Receiver275	243	1	65.0	64.5	66	-0.5	10	----	56.7	7.8	8	-0.2
Receiver276	244	1	64.0	63.7	66	-0.3	10	----	56.3	7.4	8	-0.6

Dwelling Units	**# DUs**	**Noise Reduction**		
		Min	**Avg**	**Max**
		dB	**dB**	**dB**
All Selected	35	4.8	8.6	12.0
All Impacted	18	7.3	9.9	12.0
All that meet NR Goal	20	8.2	9.8	12.0

FED. RD. DIV. NO.	STATE	COUNTY	PROJECT ID	ROAD/ROUTE NO.	SHEET NO.
3	S.C.	LEXINGTON	0032098	I-20	

S-106
(Mineral Springs Rd.)

INTERSTATE 20

S-106
(Mineral Springs Rd.)

INTERSTATE 20

Legend
- Impacted Receiver
- Non Impacted Receiver
- Benefited Receiver
- Potential Barrier 2 Location

Interstate 20
Widening Project
Noise Analysis
Lexington County, S.C.

N

Noise Analysis Drawing
Receiver Locations

SCALE 0 250 500 FEET

Aerial Map Source - USDA 2013

ICA Engineering
501 Iluger St, Columbia SC, 29201

2037 BUILD BARRIER 2 LOCATION

SHEET: 6 OF 8

3/20/2015
L:\1404601\g I-20 Lexington\Environmental\Noise\Prelim_Noise_06.dgn

SCDOT Feasibility and Reasonableness Worksheet

Date: Mar 18, 2015

Project Name I-20 Widening, Lexington, SC

Highway Traffic Noise Abatement Measure Noise Barrier 2

Feasibility

Number of Impacted Receivers: 18

Number of Benefited Receivers: 30

Percentage of Impacted Receivers that would achieve a 5 dBA reduction from the proposed noise abatement measure: 89

Is the proposed noise abatement measure acoustically feasible?
NOTE:SCDOT Policy indicates that 75% of the impacted receivers must achieve at least a 5 dBA reduction for it to be acoustically feasible.

☒ Yes ☐ No

Would any of the following issues limit the ability of the abatement measure to achieve the noise reduction goal?

Topography	☐ Yes	☒ No
Safety	☐ Yes	☒ No
Drainage	☐ Yes	☒ No
Utilities	☐ Yes	☒ No
Maintenance	☐ Yes	☒ No
Access	☐ Yes	☒ No
Exposed Height of Wall	☐ Yes	☒ No

If "Yes" was marked for any of the questions above, please explain below.

Detailed Description

Reasonableness

According to 23 CFR 772.13(d)(2)(iv) the abatement measure must collectively achieve each of these criteria to be reasonable. Therefore if any of the three mandatory reasonable factors are not achieved, then the abatement measure is determined NOT to be reasonable. When completing the form it is not necessary to detail each of the criteria if one was determined not to be reasonable.

#1: Noise Reduction Design Goal

Number of Benefited Receivers: 30

Number of Benefited Receivers that achieve at least an 8 dBA reduction: 16

Percentage of Benefited Receivers in the first two building rows that would achieve at least a 8 dBA reduction from the proposed noise abatement measure. NOTE: SCDOT Policy indicates that 80% of the benefited receivers in the first two building rows must achieve at least a 8 dBA reduction for it to be reasonable.: 89

Does the proposed noise abatement measure meet the noise reduction design goal? ☒ Yes ☐ No

If "Yes" is marked, continue to #2. If "No" is marked, then abatement is determined NOT to be reasonable.

#2: Cost Effectiveness

Estimated cost per square foot for noise abatement measure: 35

Estimated construction cost for noise abatement measure: 2,504,810

Estimated cost per Benefited Receiver: 83,494

Based on the SCDOT policy of $30,000 per Benefited Receiver, would the abatement measure be reasonable? NOTE: SCDOT Policy states that the preliminary noise analysis is based on $35.00 per square foot and a more project-specific construction cost should be applied at a cost per square foot basis during the detailed noise abatement evaluation. ☐ Yes ☒ No

If "Yes" is marked, continue to #3. If "No" is marked, then abatement is determined NOT to be reasonable.

#3: Viewpoints of the property owners and residents of the benefitted receivers

Number of Benefited Receivers (same as above):

Number of Benefited Receivers in **support** of noise abatement measure:

Percentage of Benefited Receivers in **support** of noise abatement measure:

Number of Benefited Receivers **opposed** to noise abatement measure:

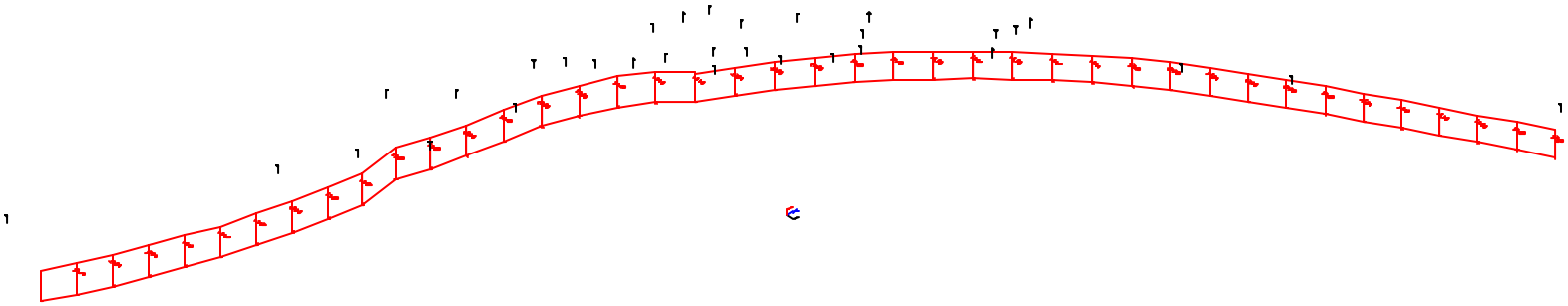
Percentage of Benefited Receivers **opposed** to noise abatement measure:

Number of Benefited Receivers **that did not respond** to solicitation on noise abatement measure:

Percentage of Benefited Receivers **that did not respond** to solicitation on noise abatement measure:

Based on the viewpoints of the property owners and residents of the Benefited Receivers, would the abatement measure be reasonable? NOTE: SCDOT Policy indicates that the noise abatement shall be constructed unless greater than 50% of the benefited receptors are opposed to noise abatement. ☐ Yes ☐ No

Final Determination for Noise Abatement Measure



2037 SC 6 to Longs Pond Road - Wall 2		Sheet 1 of 1	20 Apr 2015
		ICA Engineeriing	
Barrier View-Barrier 2		Project/Contract No. I-20 Widening	
Run name: Wall 2 - Baskin Hills		TNM Version 2.5, Feb 2004	
Scale: <DNA - due to perspective>		Analysis By: Will Kerr/Wayne Hall	
Roadway:		Ground Zone:	polygon
Receiver:		Tree Zone:	dashed polygon
Barrier:		Contour Zone:	polygon
Building Row:		Parallel Barrier:	
Terrain Line:		Skew Section:	

ICA Engineeriing
Will Kerr/Wayne Hall
11 May 2015
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: I-20 Widening
RUN: 2037 SC 6 to Longs Pond Road - Wall 2
BARRIER DESIGN: Barrier 2
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	With Barrier Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
Receiver155	155	1	69.0	69.5	66	0.5	15	Snd Lvl	66.4	3.1	8	-4.9
Receiver157	157	1	62.0	62.4	66	0.4	15	----	56.2	6.2	8	-1.8
Receiver158	158	1	63.0	63.1	66	0.1	15	----	57.2	5.9	8	-2.1
Receiver159	159	1	64.0	62.0	66	-2.0	15	----	56.4	5.6	8	-2.4
Receiver160	160	1	68.0	66.1	66	-1.9	15	Snd Lvl	59.0	7.1	8	-0.9
Receiver162	162	1	64.0	62.5	66	-1.5	15	----	56.8	5.7	8	-2.3
Receiver163	163	1	64.0	61.7	66	-2.3	15	----	56.1	5.6	8	-2.4
Receiver164	164	1	65.0	63.1	66	-1.9	15	----	57.3	5.8	8	-2.2
Receiver165	165	1	72.0	69.7	66	-2.3	15	Snd Lvl	60.9	8.8	8	0.8
Receiver166	166	1	64.0	62.4	66	-1.6	15	----	56.4	6.0	8	-2.0
Receiver167	167	1	67.0	64.2	66	-2.8	15	----	58.0	6.2	8	-1.8
Receiver168	168	1	64.0	62.4	66	-1.6	15	----	56.4	6.0	8	-2.0
Receiver169	169	1	68.0	65.0	66	-3.0	15	----	58.5	6.5	8	-1.5
Receiver170	170	1	65.0	63.3	66	-1.7	15	----	57.2	6.1	8	-1.9
Receiver171	171	1	69.0	65.9	66	-3.1	15	----	59.2	6.7	8	-1.3
Receiver172	172	1	65.0	62.7	66	-2.3	15	----	56.7	6.0	8	-2.0
Receiver173	173	1	69.0	66.1	66	-2.9	15	Snd Lvl	59.1	7.0	8	-1.0
Receiver174	174	1	74.0	73.2	66	-0.8	15	Snd Lvl	61.6	11.6	8	3.6
Receiver175	175	1	63.0	61.8	66	-1.2	15	----	55.9	5.9	8	-2.1
Receiver176	176	1	71.0	67.7	66	-3.3	15	Snd Lvl	60.0	7.7	8	-0.3
Receiver177	177	1	65.0	63.5	66	-1.5	15	----	57.2	6.3	8	-1.7
Receiver178	178	1	68.0	66.3	66	-1.7	15	Snd Lvl	59.1	7.2	8	-0.8
Receiver179	179	1	73.0	69.1	66	-3.9	15	Snd Lvl	61.0	8.1	8	0.1
Receiver180	180	1	63.0	61.7	66	-1.3	15	----	55.8	5.9	8	-2.1

Receiver181	181	1	64.0	63.2	66	-0.8	15	----	56.9	6.3	8	-1.7
Receiver182	182	1	69.0	65.7	66	-3.3	15	----	58.8	6.9	8	-1.1
Receiver183	183	1	73.0	69.1	66	-3.9	15	Snd Lvl	61.0	8.1	8	0.1
Receiver189	189	1	68.0	66.7	66	-1.3	15	Snd Lvl	59.5	7.2	8	-0.8
Receiver191	191	1	68.0	66.8	66	-1.2	15	Snd Lvl	59.9	6.9	8	-1.1
Receiver192	192	1	70.0	70.6	66	0.6	15	Snd Lvl	67.2	3.4	8	-4.6
Receiver284	252	1	68.0	65.1	66	-2.9	10	----	58.3	6.8	8	-1.2
Receiver285	253	1	67.0	68.1	66	1.1	10	Snd Lvl	60.1	8.0	8	0.0

Dwelling Units	**# DUs**	**Noise Reduction**		
		Min	**Avg**	**Max**
		dB	**dB**	**dB**
All Selected	32	3.1	6.6	11.6
All Impacted	13	3.1	7.2	11.6
All that meet NR Goal	5	8.0	8.9	11.6

FED. RD. DIV. NO.	STATE	COUNTY	PROJECT ID	ROAD/ROUTE NO.	SHEET NO.
3	S.C.	LEXINGTON	0032098	I-20	

S-167 (Cedarcrest Dr.)

S-167 (Cedarcrest Dr.)

INTERSTATE 20

INTERSTATE 20

Legend

- Impacted Receiver
- Non Impacted Receiver
- Benefited Receiver
- Potential Barrier 3 Location

Interstate 20
Widening Project
Noise Analysis
Lexington County, S.C.

N

Noise Analysis Drawing
Receiver Locations

SCALE 0 250 500 FEET

Aerial Map Source - USDA 2013

ICA Engineering
501 Huger St, Columbia SC, 29201

2037 BUILD BARRIER 3 LOCATION

SHEET: 7 OF 8

3/20/2015
I:\1404601\g I-20 Lexington\Environmental\Noise\Prelim_Noise_07.dgn

SCDOT Feasibility and Reasonableness Worksheet

Date: Mar 18, 2015

Project Name I-20 Widening, Lexington, SC

Highway Traffic Noise Abatement Measure Noise Barrier 3

Feasibility

Number of Impacted Receivers: 25

Number of Benefited Receivers: 25

Percentage of Impacted Receivers that would achieve a 5 dBA reduction from the proposed noise abatement measure: 100

Is the proposed noise abatement measure acoustically feasible?
NOTE:SCDOT Policy indicates that 75% of the impacted receivers must achieve at least a 5 dBA reduction for it to be acoustically feasible.

☒ Yes ☐ No

Would any of the following issues limit the ability of the abatement measure to achieve the noise reduction goal?

Topography	☐ Yes	☒ No
Safety	☐ Yes	☒ No
Drainage	☐ Yes	☒ No
Utilities	☐ Yes	☒ No
Maintenance	☐ Yes	☒ No
Access	☐ Yes	☒ No
Exposed Height of Wall	☐ Yes	☒ No

If "Yes" was marked for any of the questions above, please explain below.

Detailed Description

Reasonableness

According to 23 CFR 772.13(d)(2)(iv) the abatement measure must collectively achieve each of these criteria to be reasonable. Therefore if any of the three mandatory reasonable factors are not achieved, then the abatement measure is determined NOT to be reasonable. When completing the form it is not necessary to detail each of the criteria if one was determined not to be reasonable.

#1: Noise Reduction Design Goal

Number of Benefited Receivers: 25

Number of Benefited Receivers that achieve at least an 8 dBA reduction: 17

Percentage of Benefited Receivers in the first two building rows that would achieve at least a 8 dBA reduction from the proposed noise abatement measure. NOTE: SCDOT Policy indicates that 80% of the benefited receivers in the first two building rows must achieve at least a 8 dBA reduction for it to be reasonable.: 81

Does the proposed noise abatement measure meet the noise reduction design goal? ☒ Yes ☐ No

If "Yes" is marked, continue to #2. If "No" is marked, then abatement is determined NOT to be reasonable.

#2: Cost Effectiveness

Estimated cost per square foot for noise abatement measure: 35

Estimated construction cost for noise abatement measure: 1,435,035

Estimated cost per Benefited Receiver: 57,401

Based on the SCDOT policy of $30,000 per Benefited Receiver, would the abatement measure be reasonable? NOTE: SCDOT Policy states that the preliminary noise analysis is based on $35.00 per square foot and a more project-specific construction cost should be applied at a cost per square foot basis during the detailed noise abatement evaluation. ☐ Yes ☒ No

If "Yes" is marked, continue to #3. If "No" is marked, then abatement is determined NOT to be reasonable.

#3: Viewpoints of the property owners and residents of the benefitted receivers

Number of Benefited Receivers (same as above):

Number of Benefited Receivers in **support** of noise abatement measure:

Percentage of Benefited Receivers in **support** of noise abatement measure:

Number of Benefited Receivers **opposed** to noise abatement measure:

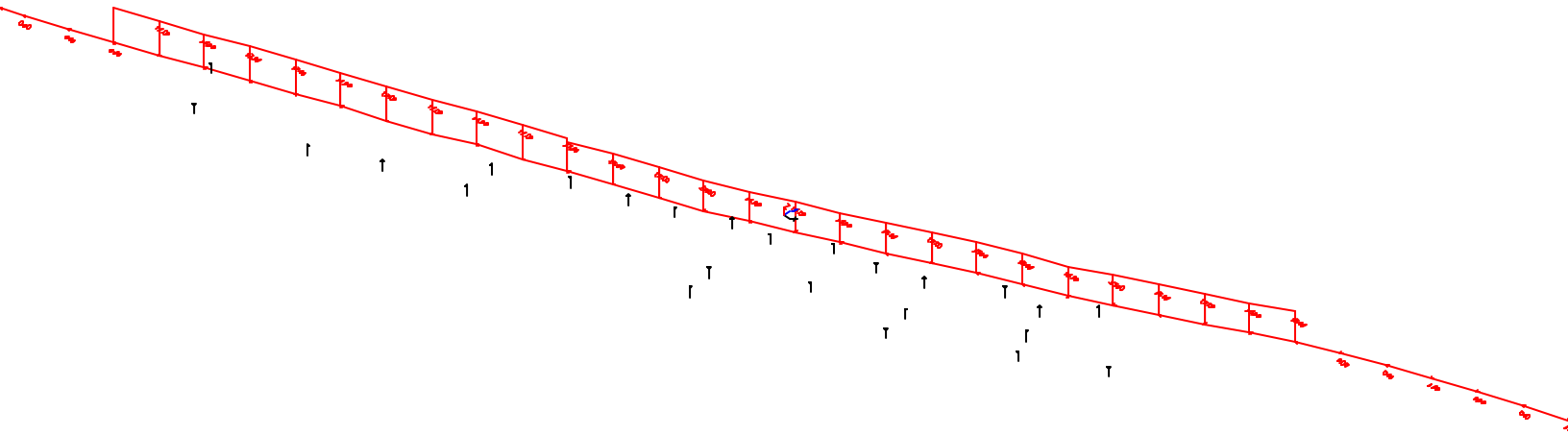
Percentage of Benefited Receivers **opposed** to noise abatement measure:

Number of Benefited Receivers **that did not respond** to solicitation on noise abatement measure:

Percentage of Benefited Receivers **that did not respond** to solicitation on noise abatement measure:

Based on the viewpoints of the property owners and residents of the Benefited Receivers, would the abatement measure be reasonable? NOTE: SCDOT Policy indicates that the noise abatement shall be constructed unless greater than 50% of the benefited receptors are opposed to noise abatement. ☐ Yes ☐ No

Final Determination for Noise Abatement Measure



2037 SC 6 to Longs Pond Road - Wall 3	Sheet 1 of 1	20 Apr 2015
	ICA Engineeriing	
Barrier View-Barrier 3	Project/Contract No. I-20 Widening	
Run name: Wall3-Elvington	TNM Version 2.5, Feb 2004	
Scale: <DNA - due to perspective>	Analysis By: Will Kerr/Wayne Hall	

Roadway:		Ground Zone:	polygon
Receiver:		Tree Zone:	dashed polygon
Barrier:		Contour Zone:	polygon
Building Row:		Parallel Barrier:	
Terrain Line:		Skew Section:	

ICA Engineeriing
20 April 2015
Will Kerr/Wayne Hall
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: I-20 Widening
RUN: 2037 SC 6 to Longs Pond Road - Wall 3
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	With Barrier Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Noise Reduction Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
Receiver54	54	1	74.6	71.3	66	-3.3	15	Snd Lvl	71.3	0.0	8	-8.0
Receiver56	56	1	75.6	73.9	66	-1.7	15	Snd Lvl	73.9	0.0	8	-8.0
Receiver58	58	1	75.2	73.2	66	-2.0	15	Snd Lvl	73.2	0.0	8	-8.0
Receiver60	60	1	74.9	73.1	66	-1.8	15	Snd Lvl	73.1	0.0	8	-8.0
Receiver61	61	1	74.2	72.0	66	-2.2	15	Snd Lvl	72.0	0.0	8	-8.0
Receiver62	62	1	73.5	70.6	66	-2.9	15	Snd Lvl	70.6	0.0	8	-8.0
Receiver63	63	1	74.0	71.6	66	-2.4	15	Snd Lvl	71.6	0.0	8	-8.0
Receiver65	65	1	72.9	69.3	66	-3.6	15	Snd Lvl	69.3	0.0	8	-8.0
Receiver67	67	1	72.7	69.0	66	-3.7	15	Snd Lvl	69.0	0.0	8	-8.0
Receiver68	68	1	71.4	67.4	66	-4.0	15	Snd Lvl	67.4	0.0	8	-8.0
Receiver70	70	1	72.3	69.0	66	-3.3	15	Snd Lvl	69.0	0.0	8	-8.0
Receiver74	74	1	74.5	71.5	66	-3.0	15	Snd Lvl	71.5	0.0	8	-8.0
Receiver75	75	1	74.7	72.0	66	-2.7	15	Snd Lvl	72.0	0.0	8	-8.0
Receiver76	76	1	75.4	73.8	66	-1.6	15	Snd Lvl	73.8	0.0	8	-8.0
Receiver77	77	1	75.7	75.0	66	-0.7	15	Snd Lvl	75.0	0.0	8	-8.0
Receiver78	78	1	74.3	72.3	66	-2.0	15	Snd Lvl	72.3	0.0	8	-8.0
Receiver80	80	1	75.3	74.7	66	-0.6	15	Snd Lvl	74.7	0.0	8	-8.0
Receiver82	82	1	74.8	73.6	66	-1.2	15	Snd Lvl	73.6	0.0	8	-8.0
Receiver83	83	1	76.5	76.8	66	0.3	15	Snd Lvl	76.8	0.0	8	-8.0
Receiver84	84	1	72.8	69.8	66	-3.0	15	Snd Lvl	69.8	0.0	8	-8.0
Receiver85	85	1	73.8	71.6	66	-2.2	15	Snd Lvl	71.6	0.0	8	-8.0
Receiver87	87	1	71.0	66.9	66	-4.1	15	Snd Lvl	66.9	0.0	8	-8.0
Receiver89	89	1	77.1	77.0	66	-0.1	15	Snd Lvl	77.0	0.0	8	-8.0
Receiver90	90	1	73.2	70.4	66	-2.8	15	Snd Lvl	70.4	0.0	8	-8.0

Receiver91	91	1	71.9	68.3	66	-3.6	15	Snd Lvl	68.3	0.0	8	-8.0
Receiver92	92	1	76.5	76.1	66	-0.4	15	Snd Lvl	76.1	0.0	8	-8.0
Receiver93	93	1	75.1	74.0	66	-1.1	15	Snd Lvl	74.0	0.0	8	-8.0
Receiver95	95	1	71.8	68.0	66	-3.8	15	Snd Lvl	68.0	0.0	8	-8.0
Receiver96	96	1	73.8	71.4	66	-2.4	15	Snd Lvl	71.4	0.0	8	-8.0
Receiver97	97	1	74.2	72.0	66	-2.2	15	Snd Lvl	72.0	0.0	8	-8.0
Receiver98	98	1	72.2	68.2	66	-4.0	15	Snd Lvl	68.1	0.1	8	-7.9
Receiver99	99	1	75.2	74.4	66	-0.8	15	Snd Lvl	74.4	0.0	8	-8.0
Receiver100	100	1	75.4	74.3	66	-1.1	15	Snd Lvl	74.2	0.1	8	-7.9
Receiver101	101	1	73.2	70.0	66	-3.2	15	Snd Lvl	69.7	0.3	8	-7.7
Receiver102	102	1	74.9	73.4	66	-1.5	15	Snd Lvl	73.4	0.0	8	-8.0
Receiver103	103	1	71.4	66.7	66	-4.7	15	Snd Lvl	66.7	0.0	8	-8.0
Receiver104	104	1	75.3	72.4	66	-2.9	15	Snd Lvl	72.4	0.0	8	-8.0
Receiver105	105	1	72.4	68.3	66	-4.1	15	Snd Lvl	68.3	0.0	8	-8.0
Receiver106	106	1	73.3	69.3	66	-4.0	15	Snd Lvl	69.3	0.0	8	-8.0
Receiver107	107	1	76.4	75.9	66	-0.5	15	Snd Lvl	55.4	20.5	8	12.5
Receiver108	108	1	73.2	70.3	66	-2.9	15	Snd Lvl	60.6	9.7	8	1.7
Receiver109	109	1	72.7	69.1	66	-3.6	15	Snd Lvl	59.6	9.5	8	1.5
Receiver110	110	1	73.1	69.7	66	-3.4	15	Snd Lvl	59.5	10.2	8	2.2
Receiver111	111	1	71.0	66.2	66	-4.8	15	Snd Lvl	66.2	0.0	8	-8.0
Receiver112	112	1	74.5	72.4	66	-2.1	15	Snd Lvl	60.2	12.2	8	4.2
Receiver113	113	1	73.0	69.6	66	-3.4	15	Snd Lvl	59.4	10.2	8	2.2
Receiver114	114	1	75.4	74.2	66	-1.2	15	Snd Lvl	60.1	14.1	8	6.1
Receiver115	115	1	75.2	73.8	66	-1.4	15	Snd Lvl	60.3	13.5	8	5.5
Receiver116	116	1	72.3	68.1	66	-4.2	15	Snd Lvl	68.1	0.0	8	-8.0
Receiver117	117	1	75.1	73.6	66	-1.5	15	Snd Lvl	60.5	13.1	8	5.1
Receiver118	118	1	75.6	74.2	66	-1.4	15	Snd Lvl	59.9	14.3	8	6.3
Receiver119	119	1	75.1	73.3	66	-1.8	15	Snd Lvl	60.1	13.2	8	5.2
Receiver120	120	1	72.4	68.2	66	-4.2	15	Snd Lvl	58.7	9.5	8	1.5
Receiver121	121	1	71.0	66.4	66	-4.6	15	Snd Lvl	57.8	8.6	8	0.6
Receiver122	122	1	75.6	74.1	66	-1.5	15	Snd Lvl	59.8	14.3	8	6.3
Receiver123	123	1	72.6	68.7	66	-3.9	15	Snd Lvl	58.9	9.8	8	1.8
Receiver124	124	1	74.7	72.6	66	-2.1	15	Snd Lvl	59.9	12.7	8	4.7
Receiver125	125	1	74.3	71.8	66	-2.5	15	Snd Lvl	59.8	12.0	8	4.0
Receiver126	126	1	72.5	68.1	66	-4.4	15	Snd Lvl	58.7	9.4	8	1.4
Receiver127	127	1	70.9	66.0	66	-4.9	15	Snd Lvl	57.9	8.1	8	0.1
Receiver128	128	1	75.0	73.2	66	-1.8	15	Snd Lvl	60.1	13.1	8	5.1
Receiver129	129	1	71.3	67.2	66	-4.1	15	Snd Lvl	67.2	0.0	8	-8.0
Receiver130	130	1	76.0	75.1	66	-0.9	15	Snd Lvl	75.1	0.0	8	-8.0
Receiver131	131	1	74.3	71.8	66	-2.5	15	Snd Lvl	59.5	12.3	8	4.3
Receiver132	132	1	73.0	68.3	66	-4.7	15	Snd Lvl	58.9	9.4	8	1.4

Receiver133	133	1	75.5	74.1	66	-1.4	15	Snd Lvl	59.8	14.3	8	6.3
Receiver134	134	1	71.5	66.2	66	-5.3	15	Snd Lvl	58.2	8.0	8	0.0
Receiver135	135	1	71.9	66.0	66	-5.9	15	Snd Lvl	58.6	7.4	8	-0.6
Receiver136	136	1	75.1	73.2	66	-1.9	15	Snd Lvl	73.2	0.0	8	-8.0
Receiver137	137	1	75.1	74.2	66	-0.9	15	Snd Lvl	74.2	0.0	8	-8.0
Receiver138	138	1	74.6	72.6	66	-2.0	15	Snd Lvl	72.6	0.0	8	-8.0
Receiver139	139	1	73.2	69.3	66	-3.9	15	Snd Lvl	69.3	0.0	8	-8.0
Receiver140	140	1	71.5	66.4	66	-5.1	15	Snd Lvl	66.4	0.0	8	-8.0
Receiver141	141	1	74.1	71.1	66	-3.0	15	Snd Lvl	71.1	0.0	8	-8.0
Receiver142	142	1	73.5	71.0	66	-2.5	15	Snd Lvl	71.0	0.0	8	-8.0
Receiver143	143	1	72.7	68.1	66	-4.6	15	Snd Lvl	68.1	0.0	8	-8.0
Receiver144	144	1	71.0	65.4	66	-5.6	15	----	65.4	0.0	8	-8.0
Receiver145	145	1	71.9	66.7	66	-5.2	15	Snd Lvl	66.7	0.0	8	-8.0
Receiver146	146	1	77.9	77.0	66	-0.9	15	Snd Lvl	77.0	0.0	8	-8.0
Receiver147	147	1	73.7	71.8	66	-1.9	15	Snd Lvl	71.8	0.0	8	-8.0
Receiver148	148	1	71.3	68.1	66	-3.2	15	Snd Lvl	68.1	0.0	8	-8.0
Receiver149	149	1	72.4	68.6	66	-3.8	15	Snd Lvl	68.6	0.0	8	-8.0
Receiver150	150	1	75.1	74.2	66	-0.9	15	Snd Lvl	74.2	0.0	8	-8.0
Receiver151	151	1	70.9	66.9	66	-4.0	15	Snd Lvl	66.9	0.0	8	-8.0
Receiver153	153	1	71.9	68.2	66	-3.7	15	Snd Lvl	68.2	0.0	8	-8.0
Receiver154	154	1	76.3	76.3	66	0.0	15	Snd Lvl	76.3	0.0	8	-8.0

Dwelling Units	**# DUs**	**Noise Reduction**		
		Min	**Avg**	**Max**
		dB	**dB**	**dB**
All Selected	86	0.0	3.4	20.5
All Impacted	85	0.0	3.4	20.5
All that meet NR Goal	23	8.1	11.9	20.5

FED. RD. DIV. NO.	STATE	COUNTY	PROJECT ID	ROAD/ROUTE NO.	SHEET NO.
3	S.C.	LEXINGTON	0032098	I-20	

Legend

- Impacted Receiver
- Non Impacted Receiver
- Benefited Receiver
- Potential Barrier 4 Location

Interstate 20
Widening Project
Noise Analysis
Lexington County, S.C.

N

Noise Analysis Drawing
Receiver Locations

SCALE 0 250 500 FEET

Aerial Map Source - USDA 2013

ICA Engineering
501 Huger St, Columbia SC, 29201

2037 BUILD
BARRIER 4 LOCATION

SHEET: 8 OF 8

3/20/2015
L:\1404601 \I-20 Lexington\Environmental\Noise\Prelim_Noise_08.dgn

SCDOT Feasibility and Reasonableness Worksheet

Date: Mar 18, 2015

Project Name I-20 Widening, Lexington, SC

Highway Traffic Noise Abatement Measure Noise Barrier 4

Feasibility

Number of Impacted Receivers: 21

Number of Benefited Receivers: 38

Percentage of Impacted Receivers that would achieve a 5 dBA reduction from the proposed noise abatement measure: 89

Is the proposed noise abatement measure acoustically feasible?
NOTE:SCDOT Policy indicates that 75% of the impacted receivers must achieve at least a 5 dBA reduction for it to be acoustically feasible.

☒ Yes ☐ No

Would any of the following issues limit the ability of the abatement measure to achieve the noise reduction goal?

Topography	☐ Yes	☒ No
Safety	☐ Yes	☒ No
Drainage	☐ Yes	☒ No
Utilities	☐ Yes	☒ No
Maintenance	☐ Yes	☒ No
Access	☐ Yes	☒ No
Exposed Height of Wall	☐ Yes	☒ No

If "Yes" was marked for any of the questions above, please explain below.

Detailed Description

Reasonableness

According to 23 CFR 772.13(d)(2)(iv) the abatement measure must collectively achieve each of these criteria to be reasonable. Therefore if any of the three mandatory reasonable factors are not achieved, then the abatement measure is determined NOT to be reasonable. When completing the form it is not necessary to detail each of the criteria if one was determined not to be reasonable.

#1: Noise Reduction Design Goal

Number of Benefited Receivers: 38

Number of Benefited Receivers that achieve at least an 8 dBA reduction: 24

Percentage of Benefited Receivers in the first two building rows that would achieve at least a 8 dBA reduction from the proposed noise abatement measure. NOTE: SCDOT Policy indicates that 80% of the benefited receivers in the first two building rows must achieve at least a 8 dBA reduction for it to be reasonable.: 89

Does the proposed noise abatement measure meet the noise reduction design goal? ☒ Yes ☐ No

If "Yes" is marked, continue to #2. If "No" is marked, then abatement is determined NOT to be reasonable.

#2: Cost Effectiveness

Estimated cost per square foot for noise abatement measure: 35

Estimated construction cost for noise abatement measure: 2,377,025

Estimated cost per Benefited Receiver: 62,553

Based on the SCDOT policy of $30,000 per Benefited Receiver, would the abatement measure be reasonable? NOTE: SCDOT Policy states that the preliminary noise analysis is based on $35.00 per square foot and a more project-specific construction cost should be applied at a cost per square foot basis during the detailed noise abatement evaluation. ☐ Yes ☒ No

If "Yes" is marked, continue to #3. If "No" is marked, then abatement is determined NOT to be reasonable.

#3: Viewpoints of the property owners and residents of the benefitted receivers

Number of Benefited Receivers (same as above):

Number of Benefited Receivers in **support** of noise abatement measure:

Percentage of Benefited Receivers in **support** of noise abatement measure:

Number of Benefited Receivers **opposed** to noise abatement measure:

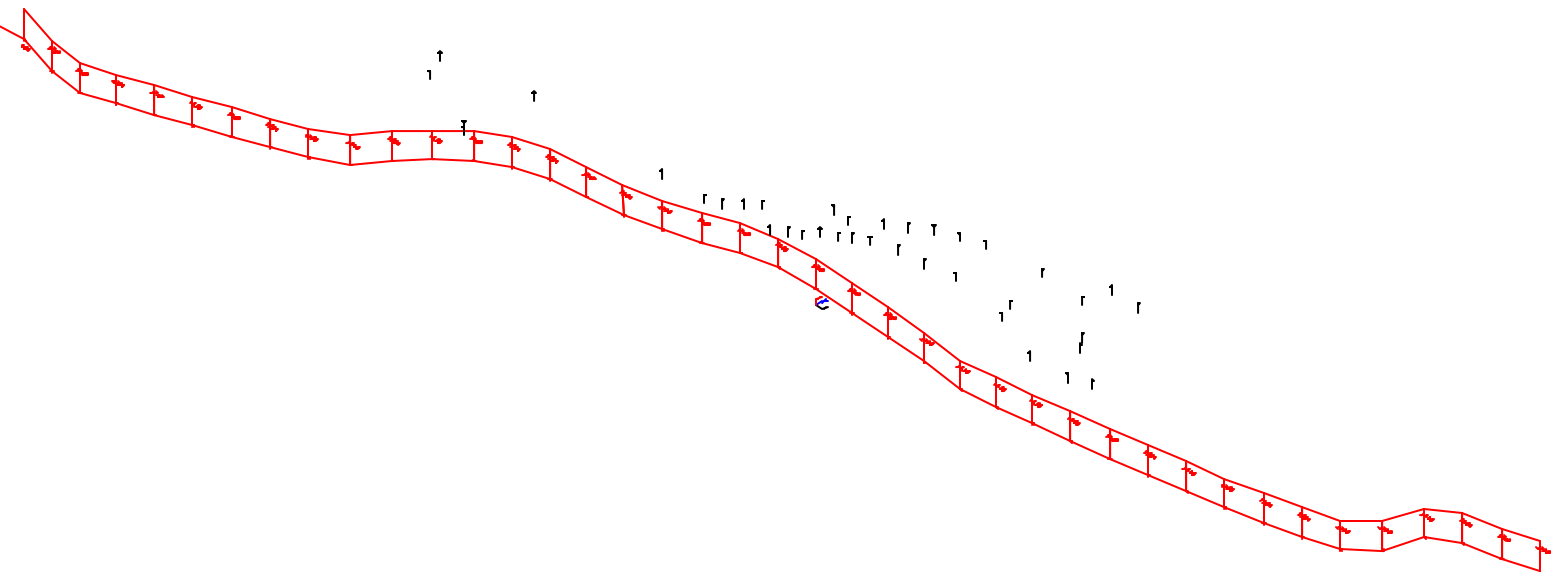
Percentage of Benefited Receivers **opposed** to noise abatement measure:

Number of Benefited Receivers **that did not respond** to solicitation on noise abatement measure:

Percentage of Benefited Receivers **that did not respond** to solicitation on noise abatement measure:

Based on the viewpoints of the property owners and residents of the Benefited Receivers, would the abatement measure be reasonable? NOTE: SCDOT Policy indicates that the noise abatement shall be constructed unless greater than 50% of the benefited receptors are opposed to noise abatement. ☐ Yes ☐ No

Final Determination for Noise Abatement Measure



2037 SC 6 to Longs Pond Road - Wall 4	Sheet 1 of 1	20 Apr 2015
	ICA Engineeriing	
Barrier View-Barrier 4	Project/Contract No. I-20 Widening	
Run name: Wall4-Pleasant	TNM Version 2.5, Feb 2004	
Scale: <DNA - due to perspective>	Analysis By: Will Kerr/Wayne Hall	

Roadway:		Ground Zone:	polygon
Receiver:		Tree Zone:	dashed polygon
Barrier:		Contour Zone:	polygon
Building Row:		Parallel Barrier:	
Terrain Line:		Skew Section:	

ICA Engineeriing
11 May 2015
Will Kerr/Wayne Hall
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: I-20 Widening
RUN: 2037 SC 6 to Longs Pond Road - Wall 4
BARRIER DESIGN: Barrier 4
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	With Barrier Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
Receiver9	9	1	63.0	63.8	66	0.8	15	----	58.2	5.6	8	-2.4
Receiver10	10	1	65.0	65.9	66	0.9	15	----	59.6	6.3	8	-1.7
Receiver13	13	1	63.0	74.0	66	11.0	15	Snd Lvl	64.5	9.5	8	1.5
Receiver14	14	1	71.0	71.0	66	0.0	15	Snd Lvl	62.2	8.8	8	0.8
Receiver15	15	1	65.0	64.2	66	-0.8	15	----	58.7	5.5	8	-2.5
Receiver17	17	1	65.0	60.2	66	-4.8	15	----	57.5	2.7	8	-5.3
Receiver221	221	1	69.0	64.3	66	-4.7	10	----	59.9	4.4	8	-3.6
Receiver222	222	1	68.0	63.6	66	-4.4	10	----	59.5	4.1	8	-3.9
Receiver223	223	1	68.0	64.4	66	-3.6	10	----	59.8	4.6	8	-3.4
Receiver224	224	1	67.0	64.8	66	-2.2	10	----	59.6	5.2	8	-2.8
Receiver225	225	1	66.0	64.7	66	-1.3	10	----	59.5	5.2	8	-2.8
Receiver226	226	1	66.0	64.8	66	-1.2	10	----	59.4	5.4	8	-2.6
Receiver227	227	1	66.0	65.0	66	-1.0	10	----	59.4	5.6	8	-2.4
Receiver228	228	1	65.0	64.8	66	-0.2	10	----	59.2	5.6	8	-2.4
Receiver229	229	1	64.0	63.9	66	-0.1	10	----	58.5	5.4	8	-2.6
Receiver230	230	1	64.0	63.3	66	-0.7	10	----	57.8	5.5	8	-2.5
Receiver231	231	1	62.0	62.7	66	0.7	10	----	56.6	6.1	8	-1.9
Receiver232	232	1	68.0	68.6	66	0.6	10	Snd Lvl	60.4	8.2	8	0.2
Receiver233	233	1	65.0	66.2	66	1.2	10	Snd Lvl	59.0	7.2	8	-0.8
Receiver234	234	1	63.0	64.8	66	1.8	10	----	57.9	6.9	8	-1.1
Receiver235	235	1	66.0	60.0	66	-6.0	10	----	57.8	2.2	8	-5.8
Receiver236	236	1	65.0	59.8	66	-5.2	10	----	57.6	2.2	8	-5.8
Receiver237	237	1	65.0	60.0	66	-5.0	10	----	57.6	2.4	8	-5.6
Receiver238	238	1	65.0	60.4	66	-4.6	10	----	57.5	2.9	8	-5.1

Receiver239	239	1	63.0	61.2	66	-1.8	10	----	57.3	3.9	8	-4.1
Receiver240	240	1	63.0	60.9	66	-2.1	10	----	56.8	4.1	8	-3.9
Receiver241	241	1	62.0	60.9	66	-1.1	10	----	56.6	4.3	8	-3.7
Receiver242	242	1	62.0	61.1	66	-0.9	10	----	56.5	4.6	8	-3.4
Receiver243	243	1	62.0	61.4	66	-0.6	10	----	56.6	4.8	8	-3.2
Receiver244	244	1	61.0	61.3	66	0.3	10	----	56.3	5.0	8	-3.0
Receiver245	245	1	61.0	61.0	66	0.0	10	----	56.0	5.0	8	-3.0
Receiver246	246	1	60.0	60.4	66	0.4	10	----	55.2	5.2	8	-2.8
Receiver247	247	1	59.0	59.8	66	0.8	10	----	54.6	5.2	8	-2.8
Receiver248	248	1	59.0	59.5	66	0.5	10	----	54.6	4.9	8	-3.1
Receiver249	249	1	59.0	59.5	66	0.5	10	----	54.4	5.1	8	-2.9
Receiver250	250	1	61.0	61.7	66	0.7	10	----	55.9	5.8	8	-2.2
Receiver251	251	1	62.0	63.2	66	1.2	10	----	56.8	6.4	8	-1.6
Receiver252	253	1	64.0	66.3	66	2.3	10	Snd Lvl	59.3	7.0	8	-1.0

Dwelling Units	**# DUs**	**Noise Reduction**		
		Min	**Avg**	**Max**
		dB	**dB**	**dB**
All Selected	38	2.2	5.2	9.5
All Impacted	5	7.0	8.1	9.5
All that meet NR Goal	3	8.2	8.8	9.5

FED. RD. DIV. NO.	STATE	COUNTY	PROJECT ID	ROAD/ROUTE NO.	SHEET NO.
3	S.C.	LEXINGTON	0032098	I-20	

INTERSTATE 20

S-106
(Mineral Springs Rd.)

INTERSTATE 20

Legend
- Impacted Receiver
- Non Impacted Receiver
- Benefited Receiver
- Potential Barrier 5 Location

Interstate 20
Widening Project
Lexington County, S.C.

SCALE 0 250 500 FEET
Aerial Map Source - USDA 2013

N

2037 BUILD BARRIER 5 LOCATION

SHEET: 5 OF 7

9/11/2015
L:\1404601 %g I-20 Lexington\Environmental\Noise\Barrier 5 Location.dgn

SCDOT Feasibility and Reasonableness Worksheet

Date: Sep 2, 2015

Project Name I-20 Widening, Lexington, SC

Highway Traffic Noise Abatement Measure Noise Barrier

Feasibility

Number of Impacted Receivers: 12

Number of Benefited Receivers: 12

Percentage of Impacted Receivers that would achieve a 5 dBA reduction from the proposed noise abatement measure: 92

Is the proposed noise abatement measure acoustically feasible?
NOTE:SCDOT Policy indicates that 75% of the impacted receivers must achieve at least a 5 dBA reduction for it to be acoustically feasible.

☒ Yes ☐ No

Would any of the following issues limit the ability of the abatement measure to achieve the noise reduction goal?

Topography	☒ Yes	☐ No
Safety	☒ Yes	☐ No
Drainage	☒ Yes	☐ No
Utilities	☒ Yes	☐ No
Maintenance	☒ Yes	☐ No
Access	☒ Yes	☐ No
Exposed Height of Wall	☒ Yes	☐ No

If "Yes" was marked for any of the questions above, please explain below.

Detailed Description

Reasonableness

According to 23 CFR 772.13(d)(2)(iv) the abatement measure must collectively achieve each of these criteria to be reasonable. Therefore if any of the three mandatory reasonable factors are not achieved, then the abatement measure is determined NOT to be reasonable. When completing the form it is not necessary to detail each of the criteria if one was determined not to be reasonable.

#1: Noise Reduction Design Goal

Number of Benefited Receivers: 12

Number of Benefited Receivers that achieve at least an 8 dBA reduction: 6

Percentage of Benefited Receivers in the first two building rows that would achieve at least a 8 dBA reduction from the proposed noise abatement measure. NOTE: SCDOT Policy indicates that 80% of the benefited receivers in the first two building rows must achieve at least a 8 dBA reduction for it to be reasonable.: 55

Does the proposed noise abatement measure meet the noise reduction design goal? ☐ Yes ☒ No

If "Yes" is marked, continue to #2. If "No" is marked, then abatement is determined NOT to be reasonable.

#2: Cost Effectiveness

Estimated cost per square foot for noise abatement measure: 35

Estimated construction cost for noise abatement measure: 1,831,935

Estimated cost per Benefited Receiver: 152,661

Based on the SCDOT policy of $30,000 per Benefited Receiver, would the abatement measure be reasonable? NOTE: SCDOT Policy states that the preliminary noise analysis is based on $35.00 per square foot and a more project-specific construction cost should be applied at a cost per square foot basis during the detailed noise abatement evaluation. ☐ Yes ☒ No

If "Yes" is marked, continue to #3. If "No" is marked, then abatement is determined NOT to be reasonable.

#3: Viewpoints of the property owners and residents of the benefitted receivers

Number of Benefited Receivers (same as above):

Number of Benefited Receivers in **support** of noise abatement measure:

Percentage of Benefited Receivers in **support** of noise abatement measure:

Number of Benefited Receivers **opposed** to noise abatement measure:

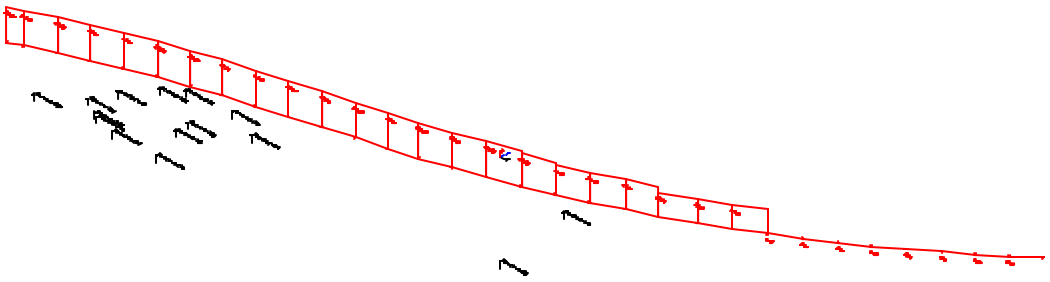
Percentage of Benefited Receivers **opposed** to noise abatement measure:

Number of Benefited Receivers **that did not respond** to solicitation on noise abatement measure:

Percentage of Benefited Receivers **that did not respond** to solicitation on noise abatement measure:

Based on the viewpoints of the property owners and residents of the Benefited Receivers, would the abatement measure be reasonable? NOTE: SCDOT Policy indicates that the noise abatement shall be constructed unless greater than 50% of the benefited receptors are opposed to noise abatement. ☐ Yes ☐ No

Final Determination for Noise Abatement Measure



Build - SC 378 to US 1		Sheet 1 of 1	2 Sep 2015
		ICA Engineeriing	
Barrier View-Wall Larkin Woods		Project/Contract No. I-20 Widening	
Run name: Wall Larkin Woods		TNM Version 2.5, Feb 2004	
Scale: <DNA - due to perspective>		Analysis By: Will Kerr/Wayne Hall	
Roadway:		Ground Zone:	polygon
Receiver:		Tree Zone:	dashed polygon
Barrier:		Contour Zone:	polygon
Building Row:		Parallel Barrier:	
Terrain Line:		Skew Section:	

ICA Engineeriing
2 September 2015
Will Kerr/Wayne Hall
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: I-20 Widening
RUN: Build - SC 378 to US 1
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Increase over existing Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Noise Reduction Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
Receiver152	152	1	70.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver155	155	1	69.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver156	156	1	72.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver157	157	1	62.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver158	158	1	63.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver159	159	1	64.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver160	160	1	68.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver161	161	1	70.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver162	162	1	64.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver163	163	1	64.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver164	164	1	65.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver165	165	1	72.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver166	166	1	64.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver167	167	1	67.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver168	168	1	64.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver169	169	1	68.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver170	170	1	65.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver171	171	1	69.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver172	172	1	65.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver173	173	1	69.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver174	174	1	74.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver175	175	1	63.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver176	176	1	71.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver177	177	1	65.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0

Receiver178	178	1	68.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver179	179	1	73.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver180	180	1	63.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver181	181	1	64.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver182	182	1	69.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver183	183	1	73.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver184	184	1	71.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver185	185	1	69.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver186	186	1	67.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver189	189	1	68.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver190	190	1	75.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver191	191	1	68.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver192	192	1	70.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver193	193	1	68.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver194	194	1	71.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver195	195	1	66.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver196	196	1	73.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver197	197	1	71.0	72.1	66	1.1	15	Snd Lvl	61.1	11.0	8	3.0
Receiver199	199	1	75.0	75.5	66	0.5	15	Snd Lvl	60.2	15.3	8	7.3
Receiver200	200	1	66.0	65.6	66	-0.4	15	----	56.4	9.2	8	1.2
Receiver201	201	1	66.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver202	202	1	70.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver203	203	1	73.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver204	204	1	75.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver205	205	1	71.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver206	206	1	73.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver207	207	1	64.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver208	208	1	66.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver209	209	1	65.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver210	210	1	65.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver211	211	1	64.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver212	212	1	66.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver213	213	1	69.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver214	214	1	65.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver215	215	1	67.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver218	218	1	70.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver219	219	1	70.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver253	226	1	68.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver254	227	1	68.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver255	228	1	68.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver256	229	1	64.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0

Receiver257	230	1	65.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver258	231	1	65.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver259	232	1	66.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver260	233	1	68.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver261	234	1	72.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver262	235	1	73.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver263	236	1	73.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver264	237	1	73.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver265	238	1	73.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver266	239	1	71.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver267	240	1	69.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver268	241	1	67.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver269	242	1	69.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver270	243	1	68.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver271	244	1	66.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver272	245	1	65.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver273	246	1	66.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver274	247	1	65.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver275	248	1	65.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver276	249	1	64.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver277	250	1	64.0	69.3	66	5.3	10	Snd Lvl	62.5	6.8	8	-1.2
Receiver278	251	1	66.0	67.5	66	1.5	10	Snd Lvl	61.3	6.2	8	-1.8
Receiver279	252	1	64.0	64.9	66	0.9	10	----	58.6	6.3	8	-1.7
Receiver280	253	1	67.0	68.9	66	1.9	10	Snd Lvl	60.3	8.6	8	0.6
Receiver281	254	1	66.0	67.5	66	1.5	10	Snd Lvl	59.8	7.7	8	-0.3
Receiver282	255	1	69.0	71.2	66	2.2	10	Snd Lvl	62.5	8.7	8	0.7
Receiver283	256	1	72.0	73.1	66	1.1	10	Snd Lvl	62.2	10.9	8	2.9
Receiver284	257	1	68.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver285	258	1	67.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver294	267	1	71.0	69.9	66	-1.1	10	Snd Lvl	59.9	10.0	8	2.0
Receiver295	306	1	0.0	67.8	66	67.8	10	Snd Lvl	63.4	4.4	8	-3.6
Receiver296	307	1	0.0	66.8	66	66.8	10	Snd Lvl	60.8	6.0	8	-2.0
Receiver297	308	1	0.0	66.2	66	66.2	10	Snd Lvl	60.0	6.2	8	-1.8
Receiver298	309	1	0.0	74.0	66	74.0	10	Snd Lvl	62.2	11.8	8	3.8

Dwelling Units	**# DUs**	**Noise Reduction**		
		Min	**Avg**	**Max**
		dB	**dB**	**dB**
All Selected	99	0.0	1.3	15.3
All Impacted	13	4.4	8.7	15.3
All that meet NR Goal	8	8.6	10.7	15.3

ICA Engineeriing 2 September 2015
Will Kerr/Wayne Hall TNM 2.5

RESULTS: BARRIER-SEGMENT DESCRIPTIONS
PROJECT/CONTRACT: I-20 Widening
RUN: Build - SC 378 to US 1
BARRIER DESIGN: INPUT HEIGHTS

Barriers		Segments										
Name	Type	Name	No.	Heights			Length	If Wall			If Berm	Cost
				First Point	Average	Second Point		Area	On Struc?	Important Reflections?	Volume	
				ft	ft	ft	ft	sq ft			cu yd	$
Barrier1	W	point39	39	25.00	25.00	25.00	50	1254				0
		299+00.00	2	25.00	25.00	25.00	100	2510				0
		298+00.00	3	25.00	25.00	25.00	100	2509				0
		297+00.00	4	25.00	25.00	25.00	100	2511				0
		296+00.00	5	25.00	25.00	25.00	100	2510				0
		295+00.00	6	25.00	25.00	25.00	100	2509				0
		294+00.00	7	25.00	25.00	25.00	93	2332				0
		293+00.00	8	25.00	25.00	25.00	101	2520				0
		292+00.00	9	25.00	25.00	25.00	99	2463				0
		291+00.00	10	25.00	25.00	25.00	101	2524				0
		290+00.00	11	25.00	25.00	25.00	98	2456				0
		289+00.00	12	25.00	25.00	25.00	100	2505				0
		288+00.00	13	25.00	25.00	25.00	90	2257				0
		287+00.00	15	25.00	25.00	25.00	100	2510				0
		286+00.00	16	25.00	25.00	25.00	100	2500				0
		285+00.00	17	25.00	25.00	25.00	101	2519				0
		284+00.00	18	25.00	25.00	25.00	102	2540				0
		283+00.00	19	25.00	25.00	25.00	98	2452				0
		282+00.00	20	25.00	25.00	25.00	104	2588				0
		281+00.00	21	25.00	25.00	25.00	97	2417				0
		280+00.00	22	25.00	25.00	25.00	111	2779				0
		279+00.00	23	25.00	25.00	25.00	102	2542				0
		278+00.00	24	25.00	25.00	25.00	102	2548				0
		277+00.00	25	25.00	25.00	25.00	101	2525				0
		276+00.00	26	25.00	25.00	25.00	103	2567				0
		275+00.00	27	25.00	25.00	25.00	98	2440				0

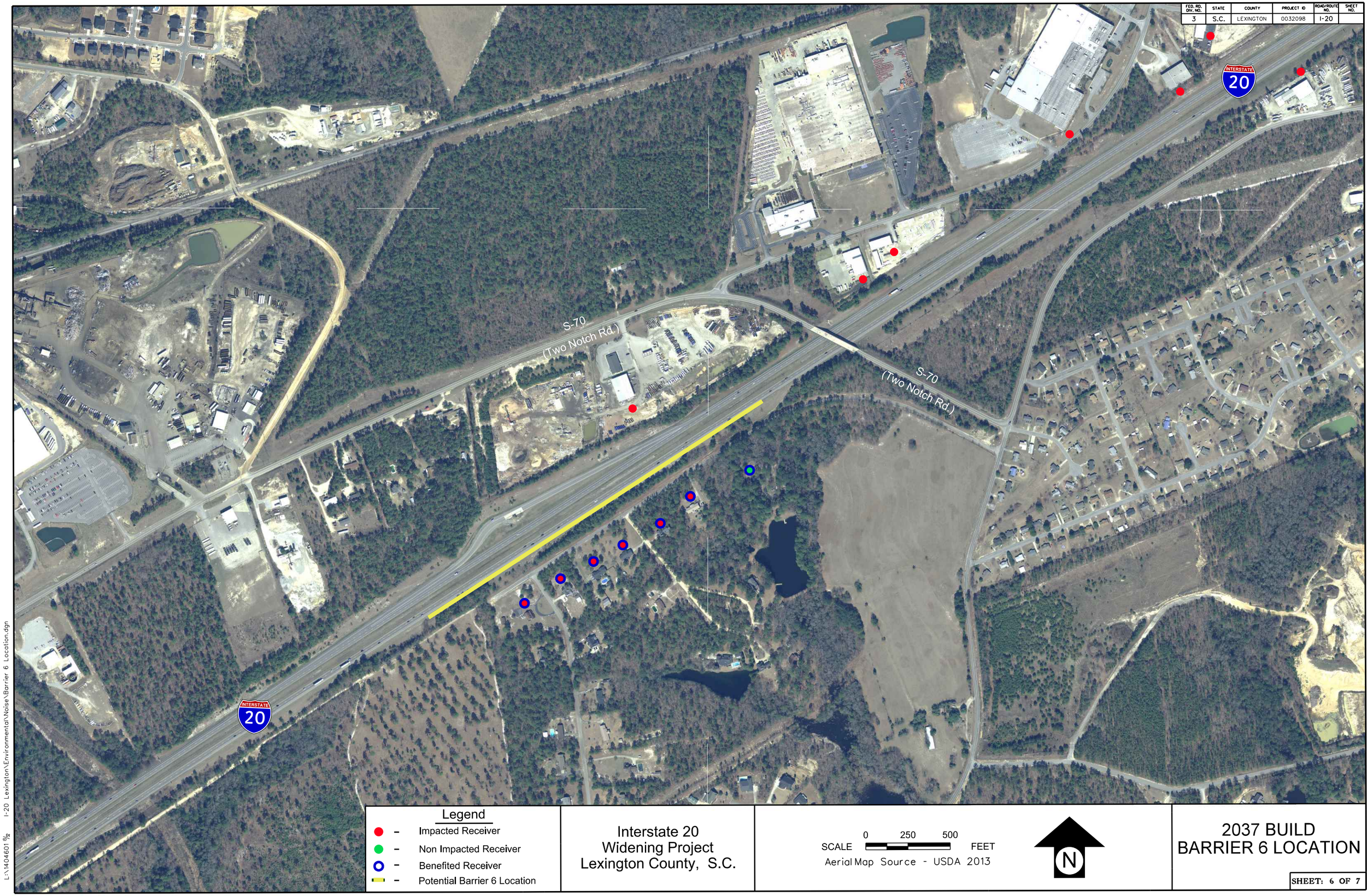
		274+00.00	28	25.00	25.00	25.00	99	2484				0
		273+00.00	29	25.00	25.00	25.00	101	2532				0
		272+00.00	30	25.00	25.00	25.00	100	2511				0
		271+00.00	31	25.00	25.00	25.00	98	2449				0
		270+00.00	32	25.00	25.00	25.00	101	2528				0

ICA Engineeriing 2 September 2015
Will Kerr/Wayne Hall TNM 2.5

INPUT: BARRIERS
PROJECT/CONTRACT: I-20 Widening
RUN: Build - SC 378 to US 1

Barrier									Points										
Name	Type	Height		If Wall	If Berm			Add'tnl	Name	No.	Coordinates (bottom)			Height	Segment				
		Min	Max	$ per	$ per	Top	Run:Rise	$ per			X	Y	Z	at	Seg Ht Perturbs			On	Important
				Unit	Unit	Width		Unit						Point	Incre-	#Up	#Dn	Struct?	Reflec-
				Area	Vol.			Length							ment				tions?
		ft	ft	$/sq ft	$/cu yd	ft	ft:ft	$/ft			ft	ft	ft	ft	ft				
Barrier1	W	0.00	99.99	0.00				0.00	point39	39	1,944,475.4	785,418.1	358.95	25.00	2.00	0	7		
									299+00.00	2	1,944,519.4	785,442.2	358.40	25.00	2.00	0	7		
									298+00.00	3	1,944,607.4	785,490.6	357.40	25.00	2.00	0	7		
									297+00.00	4	1,944,695.4	785,538.8	356.10	25.00	2.00	0	7		
									296+00.00	5	1,944,783.4	785,587.2	354.50	25.00	2.00	0	7		
									295+00.00	6	1,944,871.4	785,635.6	352.50	25.00	2.00	0	7		
									294+00.00	7	1,944,959.4	785,683.8	349.80	25.00	2.00	0	7		
									293+00.00	8	1,945,040.0	785,730.8	346.80	25.00	2.00	0	7		
									292+00.00	9	1,945,128.8	785,778.6	343.30	25.00	2.00	0	7		
									291+00.00	10	1,945,214.4	785,827.3	339.60	25.00	2.00	0	7		
									290+00.00	11	1,945,302.1	785,877.2	335.90	25.00	2.00	0	7		
									289+00.00	12	1,945,388.8	785,923.6	332.30	25.00	2.00	0	7		
									288+00.00	13	1,945,476.5	785,971.9	328.80	25.00	2.00	0	7		
									287+00.00	15	1,945,554.9	786,016.8	325.40	25.00	2.00	0	7		
									286+00.00	16	1,945,640.6	786,068.9	321.80	25.00	2.00	0	7		
									285+00.00	17	1,945,723.8	786,124.6	318.10	25.00	2.00	0	7		
									284+00.00	18	1,945,807.1	786,181.1	314.40	25.00	2.00	0	7		
									283+00.00	19	1,945,889.6	786,240.4	310.70	25.00	2.00	0	7		
									282+00.00	20	1,945,967.8	786,299.8	307.00	25.00	2.00	0	7		
									281+00.00	21	1,946,046.4	786,367.1	303.30	25.00	2.00	0	7		
									280+00.00	22	1,946,120.5	786,429.1	299.70	25.00	2.00	0	7		
									279+00.00	23	1,946,205.2	786,501.1	295.90	25.00	2.00	0	7		
									278+00.00	24	1,946,278.8	786,571.3	292.20	25.00	2.00	0	7		
									277+00.00	25	1,946,348.9	786,645.2	288.50	25.00	2.00	0	7		
									276+00.00	26	1,946,418.9	786,718.1	284.80	25.00	2.00	0	7		
									275+00.00	27	1,946,486.5	786,795.3	281.00	25.00	2.00	0	7		
									274+00.00	28	1,946,548.6	786,870.6	277.20	25.00	2.00	0	7		
									273+00.00	29	1,946,610.1	786,948.6	273.50	25.00	2.00	0	7		
									272+00.00	30	1,946,670.8	787,029.8	269.70	25.00	2.00	0	7		
									271+00.00	31	1,946,730.8	787,110.3	265.70	25.00	2.00	0	7		
									270+00.00	32	1,946,786.4	787,190.9	261.80	25.00	2.00	0	7		
									269+00.00	33	1,946,845.4	787,273.1	258.40	25.00					

FED. RD. DIV. NO.	STATE	COUNTY	PROJECT ID	ROAD/ROUTE NO.	SHEET NO.
3	S.C.	LEXINGTON	0032098	I-20	



Legend

- Impacted Receiver
- Non Impacted Receiver
- Benefited Receiver
- Potential Barrier 6 Location

Interstate 20
Widening Project
Lexington County, S.C.

SCALE 0 250 500 FEET

Aerial Map Source - USDA 2013

N

2037 BUILD BARRIER 6 LOCATION

SHEET: 6 OF 7

9/11/2015
I-20 Lexington\Environmental\Noise\Barrier 6 Location.dgn
L:\1404601 %g

SCDOT Feasibility and Reasonableness Worksheet

Date: Sep 2, 2015

Project Name I-20 Widening, Lexington, SC

Highway Traffic Noise Abatement Measure Noise Barrier

Feasibility

Number of Impacted Receivers: 6

Number of Benefited Receivers: 7

Percentage of Impacted Receivers that would achieve a 5 dBA reduction from the proposed noise abatement measure: 100

Is the proposed noise abatement measure acoustically feasible?
NOTE:SCDOT Policy indicates that 75% of the impacted receivers must achieve at least a 5 dBA reduction for it to be acoustically feasible.

☒ Yes ☐ No

Would any of the following issues limit the ability of the abatement measure to achieve the noise reduction goal?

Topography	☐ Yes	☒ No
Safety	☐ Yes	☒ No
Drainage	☐ Yes	☒ No
Utilities	☐ Yes	☒ No
Maintenance	☐ Yes	☒ No
Access	☐ Yes	☒ No
Exposed Height of Wall	☐ Yes	☒ No

If "Yes" was marked for any of the questions above, please explain below.

Detailed Description

Reasonableness

According to 23 CFR 772.13(d)(2)(iv) the abatement measure must collectively achieve each of these criteria to be reasonable. Therefore if any of the three mandatory reasonable factors are not achieved, then the abatement measure is determined NOT to be reasonable. When completing the form it is not necessary to detail each of the criteria if one was determined not to be reasonable.

#1: Noise Reduction Design Goal

Number of Benefited Receivers: 7

Number of Benefited Receivers that achieve at least an 8 dBA reduction: 6

Percentage of Benefited Receivers in the first two building rows that would achieve at least a 8 dBA reduction from the proposed noise abatement measure. NOTE: SCDOT Policy indicates that 80% of the benefited receivers in the first two building rows must achieve at least a 8 dBA reduction for it to be reasonable.: 86

Does the proposed noise abatement measure meet the noise reduction design goal? ☐ Yes ☒ No

If "Yes" is marked, continue to #2. If "No" is marked, then abatement is determined NOT to be reasonable.

#2: Cost Effectiveness

Estimated cost per square foot for noise abatement measure: 35

Estimated construction cost for noise abatement measure: 2,022,405

Estimated cost per Benefited Receiver: 288,915

Based on the SCDOT policy of $30,000 per Benefited Receiver, would the abatement measure be reasonable? NOTE: SCDOT Policy states that the preliminary noise analysis is based on $35.00 per square foot and a more project-specific construction cost should be applied at a cost per square foot basis during the detailed noise abatement evaluation. ☐ Yes ☒ No

If "Yes" is marked, continue to #3. If "No" is marked, then abatement is determined NOT to be reasonable.

#3: Viewpoints of the property owners and residents of the benefitted receivers

Number of Benefited Receivers (same as above):

Number of Benefited Receivers in **support** of noise abatement measure:

Percentage of Benefited Receivers in **support** of noise abatement measure:

Number of Benefited Receivers **opposed** to noise abatement measure:

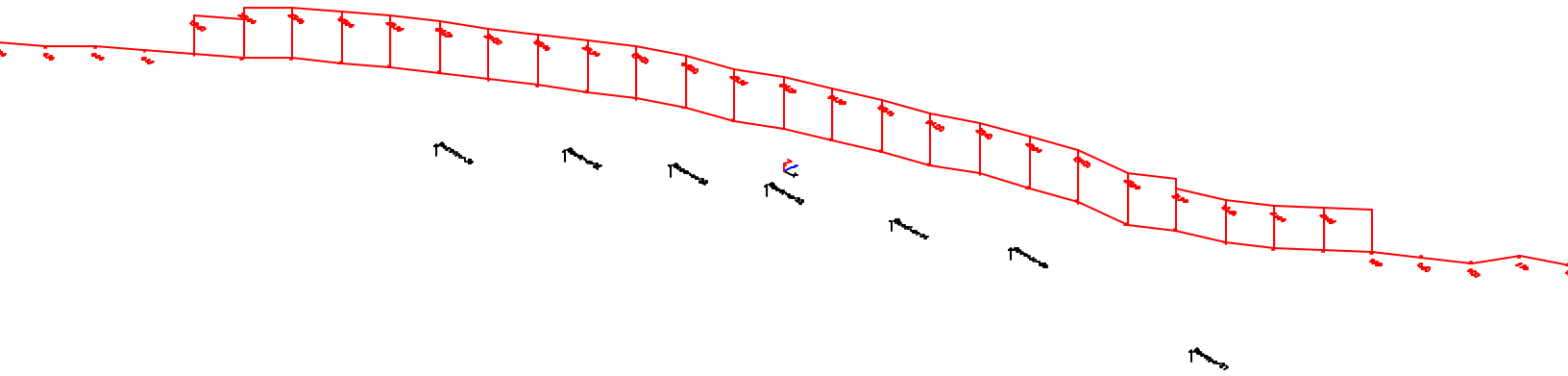
Percentage of Benefited Receivers **opposed** to noise abatement measure:

Number of Benefited Receivers **that did not respond** to solicitation on noise abatement measure:

Percentage of Benefited Receivers **that did not respond** to solicitation on noise abatement measure:

Based on the viewpoints of the property owners and residents of the Benefited Receivers, would the abatement measure be reasonable? NOTE: SCDOT Policy indicates that the noise abatement shall be constructed unless greater than 50% of the benefited receptors are opposed to noise abatement. ☐ Yes ☐ No

Final Determination for Noise Abatement Measure



Build - SC6 to Longs Pond	Sheet 1 of 1	2 Sep 2015
	ICA Engineeriing	
Barrier View-Hidden Springs Barrier	Project/Contract No. I-20 Widening	
Run name: Wall Hidden Springs	TNM Version 2.5, Feb 2004	
Scale: <DNA - due to perspective>	Analysis By: Will Kerr/Wayne Hall	

Roadway:		Ground Zone:	polygon
Receiver:		Tree Zone:	dashed polygon
Barrier:		Contour Zone:	polygon
Building Row:		Parallel Barrier:	
Terrain Line:		Skew Section:	

ICA Engineeriing
2 September 2015
Will Kerr/Wayne Hall
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: I-20 Widening
RUN: Build - SC6 to Longs Pond
BARRIER DESIGN: Hidden Springs Barrier
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
Receiver37	37	1	64.0	64.8	66	0.8	15	----	59.5	5.3	8	-2.7
Receiver36	36	1	67.0	69.0	66	2.0	15	Snd Lvl	60.9	8.1	8	0.1
Receiver35	35	1	66.0	68.4	66	2.4	15	Snd Lvl	60.3	8.1	8	0.1
Receiver33	33	1	66.0	68.8	66	2.8	15	Snd Lvl	59.9	8.9	8	0.9
Receiver32	32	1	67.0	69.0	66	2.0	15	Snd Lvl	59.8	9.2	8	1.2
Receiver31	31	1	67.0	69.1	66	2.1	15	Snd Lvl	59.7	9.4	8	1.4
Receiver30	30	1	67.0	67.4	66	0.4	15	Snd Lvl	60.5	6.9	8	-1.1

Dwelling Units	# DUs	Noise Reduction Min	Noise Reduction Avg	Noise Reduction Max
		dB	dB	dB
All Selected	7	5.3	8.0	9.4
All Impacted	6	6.9	8.4	9.4
All that meet NR Goal	5	8.1	8.7	9.4

ICA Engineeriing 2 September 2015
Will Kerr/Wayne Hall TNM 2.5

RESULTS: BARRIER-SEGMENT DESCRIPTIONS
PROJECT/CONTRACT: I-20 Widening
RUN: Build - SC6 to Longs Pond
BARRIER DESIGN: INPUT HEIGHTS

Barriers		Segments										
Name	Type	Name	No.	Heights			Length	If Wall			If Berm	Cost
				First Point	Average	Second Point		Area	On Struc?	Important Reflections?	Volume	
				ft	ft	ft	ft	sq ft			cu yd	$
Barr 2	W	655+00.00	1	25.00	25.00	25.00	100	2496				0
		654+00.00	3	25.00	25.00	25.00	100	2499				0
		653+00.00	4	25.00	25.00	25.00	100	2501				0
		652+00.00	5	25.00	25.00	25.00	100	2496				0
		651+00.00	6	25.00	25.00	25.00	100	2501				0
		650+00.00	7	25.00	25.00	25.00	100	2498				0
		649+00.00	8	25.00	25.00	25.00	100	2496				0
		648+00.00	9	25.00	25.00	25.00	100	2501				0
		647+00.00	10	25.00	25.00	25.00	100	2498				0
		646+00.00	11	25.00	25.00	25.00	100	2502				0
		645+00.00	12	25.00	25.00	25.00	100	2503				0
		644+00.00	13	25.00	25.00	25.00	100	2501				0
		643+00.00	14	25.00	25.00	25.00	100	2504				0
		642+00.00	15	25.00	25.00	25.00	100	2502				0
		641+00.00	16	25.00	25.00	25.00	100	2502				0
		640+00.00	17	25.00	25.00	25.00	100	2503				0
		639+00.00	18	25.00	25.00	25.00	100	2502				0
		638+00.00	19	25.00	25.00	25.00	100	2504				0
		637+00.00	20	25.00	25.00	25.00	100	2500				0
		636+00.00	21	25.00	25.00	25.00	100	2504				0
		635+00.00	22	25.00	25.00	25.00	100	2502				0
		634+00.00	23	25.00	25.00	25.00	100	2495				0
		633+00.00	24	25.00	25.00	25.00	100	2497				0
		632+00.00	25	25.00	25.00	25.00	100	2495				0
		631+00.00	26	25.00	25.00	25.00	100	2497				0
		630+00.00	27	25.00	25.00	25.00	100	2495				0

		629+00.00	28	25.00	25.00	25.00	100	2495				0
		628+00.00	29	25.00	25.00	25.00	100	2497				0
		627+00.00	30	25.00	25.00	25.00	100	2498				0
		626+00.00	31	25.00	25.00	25.00	100	2495				0
		625+00.00	32	25.00	25.00	25.00	100	2497				0
		624+00.00	33	25.00	25.00	25.00	100	2495				0
		623+00.00	34	25.00	25.00	25.00	100	2495				0
		622+00.00	35	25.00	25.00	25.00	100	2497				0
		621+00.00	36	25.00	25.00	25.00	100	2495				0
		620+00.00	37	25.00	25.00	25.00	100	2496				0
		619+00.00	38	25.00	25.00	25.00	100	2495				0
		618+00.00	41	25.00	25.00	25.00	100	2501				0

ICA Engineeriing
2 September 2015
Will Kerr/Wayne Hall
TNM 2.5

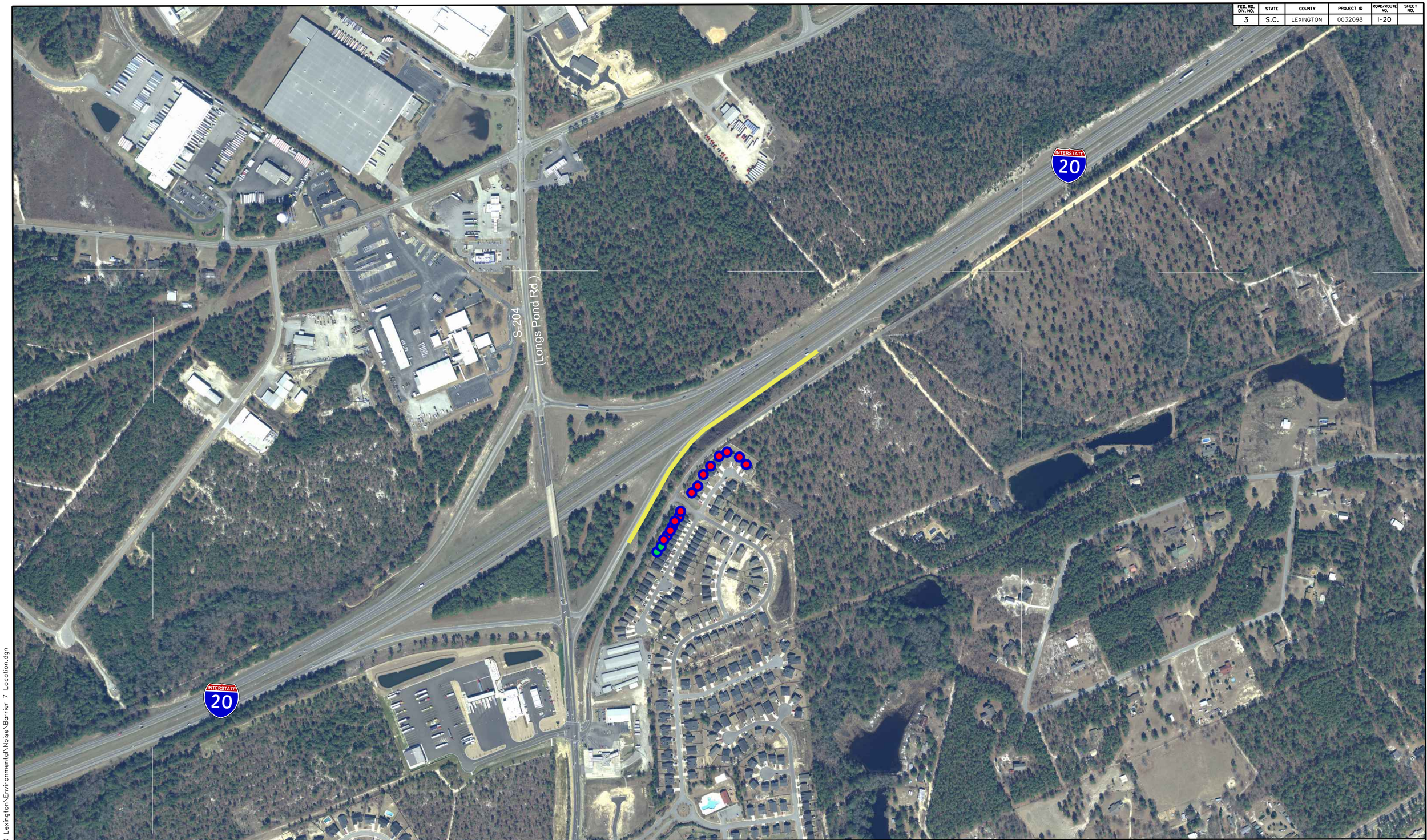
INPUT: BARRIERS
PROJECT/CONTRACT: I-20 Widening
RUN: Build - SC6 to Longs Pond

Barrier									Points										
Name	Type	Height		If Wall	If Berm			Add'tnl	Name	No.	Coordinates (bottom)			Height	Segment				
		Min	Max	$ per	$ per	Top	Run:Rise	$ per			X	Y	Z	at	Seg Ht Perturbs			On	Important
				Unit	Unit	Width		Unit						Point	Incre-	#Up	#Dn	Struct?	Reflec-
				Area	Vol.			Length							ment				tions?
		ft	ft	$/sq ft	$/cu yd	ft	ft:ft	$/ft			ft	ft	ft	ft	ft				
Barr 2	W	0.00	99.99	0.00				0.00	655+00.00	1	1,917,179.8	765,171.9	387.80	25.00	2.00	0	7		
									654+00.00	3	1,917,263.4	765,226.4	389.40	25.00	2.00	0	7		
									653+00.00	4	1,917,347.0	765,281.2	391.10	25.00	2.00	0	7		
									652+00.00	5	1,917,430.8	765,335.9	392.70	25.00	2.00	0	7		
									651+00.00	6	1,917,514.4	765,390.4	394.30	25.00	2.00	0	7		
									650+00.00	7	1,917,598.1	765,445.2	393.00	25.00	2.00	0	7		
									649+00.00	8	1,917,681.8	765,499.9	394.00	25.00	2.00	0	7		
									648+00.00	9	1,917,765.4	765,554.4	397.00	25.00	2.00	0	7		
									647+00.00	10	1,917,849.1	765,609.2	398.00	25.00	2.00	0	7		
									646+00.00	11	1,917,932.8	765,663.9	399.00	25.00	2.00	0	7		
									645+00.00	12	1,918,017.0	765,717.9	400.00	25.00	2.00	0	7		
									644+00.00	13	1,918,101.4	765,771.8	403.00	25.00	2.00	0	7		
									643+00.00	14	1,918,185.6	765,825.7	404.00	25.00	2.00	0	7		
									642+00.00	15	1,918,270.0	765,879.7	405.00	25.00	2.00	0	7		
									641+00.00	16	1,918,354.2	765,933.7	405.00	25.00	2.00	0	7		
									640+00.00	17	1,918,438.5	765,987.7	405.00	25.00	2.00	0	7		
									639+00.00	18	1,918,522.9	766,041.6	405.00	25.00	2.00	0	7		
									638+00.00	19	1,918,607.1	766,095.6	405.00	25.00	2.00	0	7		
									637+00.00	20	1,918,691.5	766,149.6	404.80	25.00	2.00	0	7		
									636+00.00	21	1,918,775.8	766,203.4	403.20	25.00	2.00	0	7		
									635+00.00	22	1,918,860.1	766,257.4	400.00	25.00	2.00	0	7		
									634+00.00	23	1,918,944.4	766,311.4	399.00	25.00	2.00	0	7		
									633+00.00	24	1,919,028.1	766,365.8	396.50	25.00	2.00	0	7		
									632+00.00	25	1,919,111.9	766,420.2	394.00	25.00	2.00	0	7		
									631+00.00	26	1,919,195.6	766,474.4	390.00	25.00	2.00	0	7		
									630+00.00	27	1,919,279.4	766,528.9	389.00	25.00	2.00	0	7		
									629+00.00	28	1,919,363.1	766,583.2	385.00	25.00	2.00	0	7		
									628+00.00	29	1,919,446.9	766,637.4	381.00	25.00	2.00	0	7		
									627+00.00	30	1,919,530.6	766,691.9	373.00	25.00	2.00	0	7		
									626+00.00	31	1,919,614.5	766,746.2	373.00	25.00	2.00	0	7		
									625+00.00	32	1,919,698.2	766,800.4	370.00	25.00	2.00	0	7		
									624+00.00	33	1,919,782.0	766,854.9	370.00	25.00	2.00	0	7		
									623+00.00	34	1,919,865.8	766,909.2	372.00	25.00	2.00	0	7		
									622+00.00	35	1,919,949.5	766,963.4	374.00	25.00	2.00	0	7		
									621+00.00	36	1,920,033.2	767,017.9	374.70	25.00	2.00	0	7		

									620+00.00	37	1,920,117.0	767,072.2	375.00	25.00	2.00	0	7		
									619+00.00	38	1,920,200.8	767,126.6	381.00	25.00	2.00	0	7		
									618+00.00	41	1,920,284.5	767,180.9	380.00	25.00	2.00	0	7		
									617+00.00	39	1,920,368.5	767,235.2	380.00	25.00					

ICA Engineeriing				**2 September 2015**						
Will Kerr/Wayne Hall				**TNM 2.5**						
RESULTS: BARRIER DESCRIPTIONS										
PROJECT/CONTRACT:	**I-20 Widening**									
RUN:	**Build - SC6 to Longs Pond**									
BARRIER DESIGN:	**INPUT HEIGHTS**									
Barriers										
Name	**Type**	**Heights along Barrier**			**Length**	**If Wall**	**If Berm**			**Cost**
		Min	**Avg**	**Max**		**Area**	**Volume**	**Top Width**	**Run:Rise**	
		ft	ft	ft	ft	sq ft	cu yd	ft	ft:ft	$
Barr 2	W	25.00	25.00	25.00	3798	94953				0
									Total Cost:	0

FED. RD. DIV. NO.	STATE	COUNTY	PROJECT ID	ROAD/ROUTE NO.	SHEET NO.
3	S.C.	LEXINGTON	0032098	I-20	



Legend

- Impacted Receiver
- Non Impacted Receiver
- Benefited Receiver
- Potential Barrier 7 Location

Interstate 20
Widening Project
Lexington County, S.C.

SCALE 0 250 500 FEET

Aerial Map Source - USDA 2013

N

2037 BUILD
BARRIER 7 LOCATION

SHEET: 7 OF 7

9/11/2015
L:\1404601 I-20 Lexington\Environmental\Noise\Barrier 7 Location.dgn

SCDOT Feasibility and Reasonableness Worksheet

Date: Sep 2, 2015

Project Name I-20 Widening, Lexington, SC

Highway Traffic Noise Abatement Measure Noise Barrier

Feasibility

Number of Impacted Receivers: 15

Number of Benefited Receivers: 17

Percentage of Impacted Receivers that would achieve a 5 dBA reduction from the proposed noise abatement measure: 100

Is the proposed noise abatement measure acoustically feasible?
NOTE:SCDOT Policy indicates that 75% of the impacted receivers must achieve at least a 5 dBA reduction for it to be acoustically feasible.

☒ Yes ☐ No

Would any of the following issues limit the ability of the abatement measure to achieve the noise reduction goal?

Topography	☐ Yes	☒ No
Safety	☐ Yes	☒ No
Drainage	☐ Yes	☒ No
Utilities	☐ Yes	☒ No
Maintenance	☐ Yes	☒ No
Access	☐ Yes	☒ No
Exposed Height of Wall	☐ Yes	☒ No

If "Yes" was marked for any of the questions above, please explain below.

Detailed Description

Reasonableness

According to 23 CFR 772.13(d)(2)(iv) the abatement measure must collectively achieve each of these criteria to be reasonable. Therefore if any of the three mandatory reasonable factors are not achieved, then the abatement measure is determined NOT to be reasonable. When completing the form it is not necessary to detail each of the criteria if one was determined not to be reasonable.

#1: Noise Reduction Design Goal

Number of Benefited Receivers: 17

Number of Benefited Receivers that achieve at least an 8 dBA reduction: 16

Percentage of Benefited Receivers in the first two building rows that would achieve at least a 8 dBA reduction from the proposed noise abatement measure. NOTE: SCDOT Policy indicates that 80% of the benefited receivers in the first two building rows must achieve at least a 8 dBA reduction for it to be reasonable.: 17

Does the proposed noise abatement measure meet the noise reduction design goal? ☒ Yes ☐ No

If "Yes" is marked, continue to #2. If "No" is marked, then abatement is determined NOT to be reasonable.

#2: Cost Effectiveness

Estimated cost per square foot for noise abatement measure: 35

Estimated construction cost for noise abatement measure: 1,273,300

Estimated cost per Benefited Receiver: 74,900

Based on the SCDOT policy of $30,000 per Benefited Receiver, would the abatement measure be reasonable? ☐ Yes ☒ No
NOTE: SCDOT Policy states that the preliminary noise analysis is based on $35.00 per square foot and a more project-specific construction cost should be applied at a cost per square foot basis during the detailed noise abatement evaluation.

If "Yes" is marked, continue to #3. If "No" is marked, then abatement is determined NOT to be reasonable.

#3: Viewpoints of the property owners and residents of the benefitted receivers

Number of Benefited Receivers (same as above):

Number of Benefited Receivers in **support** of noise abatement measure:

Percentage of Benefited Receivers in **support** of noise abatement measure:

Number of Benefited Receivers **opposed** to noise abatement measure:

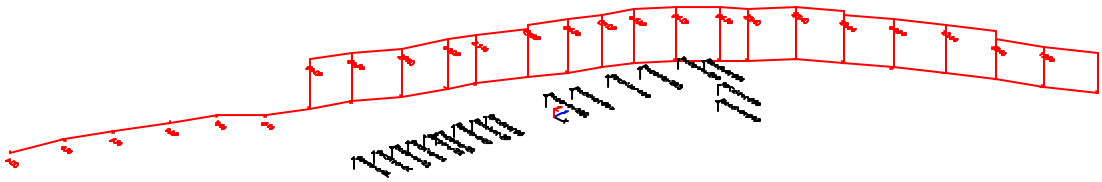
Percentage of Benefited Receivers **opposed** to noise abatement measure:

Number of Benefited Receivers **that did not respond** to solicitation on noise abatement measure:

Percentage of Benefited Receivers **that did not respond** to solicitation on noise abatement measure:

Based on the viewpoints of the property owners and residents of the Benefited Receivers, would the abatement measure be reasonable? NOTE: SCDOT Policy indicates that the noise abatement shall be constructed unless greater than 50% of the benefited receptors are opposed to noise abatement. ☐ Yes ☐ No

Final Determination for Noise Abatement Measure



Build - SC6 to Longs Pond		Sheet 1 of 1	2 Sep 2015
		ICA Engineeriing	
Barrier View-Wall South Brook		Project/Contract No. I-20 Widening	
Run name: Wall South Brook		TNM Version 2.5, Feb 2004	
Scale: <DNA - due to perspective>		Analysis By: Will Kerr/Wayne Hall	
Roadway:		Ground Zone:	polygon
Receiver:		Tree Zone:	dashed polygon
Barrier:		Contour Zone:	polygon
Building Row:		Parallel Barrier:	
Terrain Line:		Skew Section:	

ICA Engineeriing
2 September 2015
Will Kerr/Wayne Hall
TNM 2.5
Calculated with TNM 2.5
RESULTS: SOUND LEVELS
PROJECT/CONTRACT: I-20 Widening
RUN: Build - SC6 to Longs Pond
BARRIER DESIGN: INPUT HEIGHTS
Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.
ATMOSPHERICS: 68 deg F, 50% RH

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
Receiver1	1	1	73.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver2	2	1	61.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver3	3	1	62.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver4	4	1	67.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver5	5	1	62.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver7	7	1	70.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver8	8	1	63.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver9	9	1	63.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver10	10	1	65.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver11	11	1	61.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver12	12	1	64.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver13	13	1	63.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver14	14	1	71.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver15	15	1	65.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver16	16	1	67.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver17	17	1	65.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver18	18	1	63.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver19	19	1	71.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver20	20	1	64.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver21	21	1	63.0	62.4	66	-0.6	15	----	56.0	6.4	8	-1.6
Receiver22	22	1	63.0	63.6	66	0.6	15	----	56.4	7.2	8	-0.8
Receiver23	23	1	63.0	64.3	66	1.3	15	----	56.7	7.6	8	-0.4
Receiver24	24	1	63.0	65.2	66	2.2	15	----	57.0	8.2	8	0.2
Receiver25	25	1	64.0	66.0	66	2.0	15	Snd Lvl	57.4	8.6	8	0.6

Receiver26	26	1	64.0	66.3	66	2.3	15	Snd Lvl	57.5	8.8	8	0.8
Receiver27	27	1	64.0	66.4	66	2.4	15	Snd Lvl	57.9	8.5	8	0.5
Receiver28	28	1	64.0	66.7	66	2.7	15	Snd Lvl	58.3	8.4	8	0.4
Receiver29	29	1	65.0	67.2	66	2.2	15	Snd Lvl	58.5	8.7	8	0.7
Receiver30	30	1	67.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver31	31	1	67.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver32	32	1	67.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver33	33	1	66.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver34	34	1	69.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver35	35	1	66.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver36	36	1	67.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver37	37	1	64.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver39	39	1	73.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver40	40	1	71.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver41	41	1	70.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver42	42	1	75.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver43	43	1	68.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver44	44	1	74.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver45	45	1	70.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver46	46	1	64.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver47	47	1	74.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver48	48	1	66.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver49	49	1	74.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver50	50	1	66.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver52	52	1	65.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver53	53	1	69.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver54	54	1	71.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver56	56	1	74.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver58	58	1	73.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver60	60	1	73.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver61	61	1	71.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver62	62	1	69.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver63	63	1	70.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver65	65	1	68.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver67	67	1	67.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver68	68	1	65.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver70	70	1	67.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver221	221	1	69.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver222	222	1	68.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver223	223	1	68.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver224	224	1	67.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0

Receiver225	225	1	66.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver226	226	1	66.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver227	227	1	66.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver228	228	1	65.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver229	229	1	64.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver230	230	1	64.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver231	231	1	62.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver232	232	1	68.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver233	233	1	65.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver234	234	1	63.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver235	235	1	66.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver236	236	1	65.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver237	237	1	65.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver238	238	1	65.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver239	239	1	63.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver240	240	1	63.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver241	241	1	62.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver242	242	1	62.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver243	243	1	62.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver244	244	1	61.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver245	245	1	61.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver246	246	1	60.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver247	247	1	59.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver248	248	1	59.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver249	249	1	59.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver250	250	1	61.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver251	251	1	62.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver252	252	1	64.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver286	254	1	60.0	69.3	66	9.3	10	Snd Lvl	59.8	9.5	8	1.5
Receiver287	255	1	67.0	69.7	66	2.7	10	Snd Lvl	60.2	9.5	8	1.5
Receiver288	256	1	68.0	70.9	66	2.9	10	Snd Lvl	61.0	9.9	8	1.9
Receiver289	257	1	69.0	71.6	66	2.6	10	Snd Lvl	61.6	10.0	8	2.0
Receiver290	258	1	70.0	72.2	66	2.2	10	Snd Lvl	62.3	9.9	8	1.9
Receiver291	259	1	70.0	72.1	66	2.1	10	Snd Lvl	62.2	9.9	8	1.9
Receiver292	260	1	67.0	69.7	66	2.7	10	Snd Lvl	60.9	8.8	8	0.8
Receiver293	261	1	66.0	68.2	66	2.2	10	Snd Lvl	60.2	8.0	8	0.0

Dwelling Units	**# DUs**	**Noise Reduction**		
		Min	**Avg**	**Max**
		dB	**dB**	**dB**
All Selected	101	0.0	1.5	10.0
All Impacted	13	8.0	9.1	10.0

All that meet NR Goal		13	8.2	9.1	10.0							

ICA Engineeriing 2 September 2015
Will Kerr/Wayne Hall TNM 2.5

INPUT: BARRIERS
PROJECT/CONTRACT: I-20 Widening
RUN: Build - SC6 to Longs Pond

Barrier									Points										
Name	Type	Height		If Wall	If Berm			Add'tnl	Name	No.	Coordinates (bottom)			Height	Segment				
		Min	Max	$ per	$ per	Top	Run:Rise	$ per			X	Y	Z	at	Seg Ht Perturbs			On	Important
				Unit	Unit	Width		Unit						Point	Incre-	#Up	#Dn	Struct?	Reflec-
				Area	Vol.			Length							ment				tions?
		ft	ft	$/sq ft	$/cu yd	ft	ft:ft	$/ft			ft	ft	ft	ft	ft				
Barrier1	W	0.00	99.99	0.00				0.00	point1	1	1,912,156.5	761,094.9	435.00	25.00	2.00	0	7		
									point2	2	1,912,201.1	761,200.7	435.00	25.00	2.00	0	7		
									point3	3	1,912,250.4	761,287.6	435.00	25.00	2.00	0	7		
									point4	4	1,912,304.5	761,386.2	435.00	25.00	2.00	0	7		
									point5	5	1,912,353.8	761,470.9	435.00	25.00	2.00	0	7		
									point6	6	1,912,400.8	761,555.4	431.00	25.00	2.00	0	7		
									point7	7	1,912,443.1	761,632.9	431.00	25.00	2.00	0	7		
									point8	8	1,912,485.4	761,705.8	431.00	25.00	2.00	0	7		
									point9	9	1,912,537.0	761,792.7	430.00	25.00	2.00	0	7		
									point10	10	1,912,579.4	761,874.9	430.00	25.00	2.00	0	7		
									point11	11	1,912,608.0	761,926.2	430.00	25.00	2.00	0	7		
									point12	12	1,912,662.0	762,013.1	430.00	25.00	2.00	0	7		
									point13	13	1,912,706.6	762,078.9	430.00	25.00	2.00	0	7		
									point14	14	1,912,746.6	762,135.2	431.00	25.00	2.00	0	7		
									point15	15	1,912,784.2	762,182.2	432.00	25.00	2.00	0	7		
									point16	16	1,912,843.0	762,241.0	433.00	25.00	2.00	0	7		
									point17	17	1,912,908.8	762,297.4	434.00	25.00	2.00	0	7		
									point18	18	1,912,953.0	762,329.1	435.00	25.00	2.00	0	7		
									point25	25	1,913,029.5	762,383.8	438.10	25.00	2.00	0	7		
									point19	19	1,913,106.1	762,438.3	438.40	25.00	2.00	0	7		
									point20	20	1,913,186.0	762,494.7	438.40	25.00	2.00	0	7		
									point21	21	1,913,270.5	762,553.4	438.40	25.00	2.00	0	7		
									point22	22	1,913,352.8	762,609.8	438.10	25.00	2.00	0	7		
									point23	23	1,913,432.6	762,661.5	437.50	25.00	2.00	0	7		
									point24	24	1,913,519.5	762,724.9	436.80	25.00					

ICA Engineeriing				**2 September 2015**						
Will Kerr/Wayne Hall				**TNM 2.5**						
RESULTS: BARRIER DESCRIPTIONS										
PROJECT/CONTRACT:	**I-20 Widening**									
RUN:	**Build - SC6 to Longs Pond**									
BARRIER DESIGN:	**INPUT HEIGHTS**									
Barriers										
Name	**Type**	**Heights along Barrier**			**Length**	**If Wall**	**If Berm**			**Cost**
		Min	**Avg**	**Max**		**Area**	**Volume**	**Top Width**	**Run:Rise**	
		ft	ft	ft	ft	sq ft	cu yd	ft	ft:ft	$
Barrier1	W	25.00	25.00	25.00	2173	54329				0
									Total Cost:	0

ICA Engineeriing 2 September 2015
Will Kerr/Wayne Hall TNM 2.5

RESULTS: BARRIER-SEGMENT DESCRIPTIONS
PROJECT/CONTRACT: I-20 Widening
RUN: Build - SC6 to Longs Pond
BARRIER DESIGN: INPUT HEIGHTS

Barriers		Segments										
Name	Type	Name	No.	Heights			Length	If Wall			If Berm	Cost
				First Point	Average	Second Point		Area	On Struc?	Important Reflections?	Volume	
				ft	ft	ft	ft	sq ft			cu yd	$
Barrier1	W	point1	1	25.00	25.00	25.00	115	2870				0
		point2	2	25.00	25.00	25.00	100	2498				0
		point3	3	25.00	25.00	25.00	113	2813				0
		point4	4	25.00	25.00	25.00	98	2448				0
		point5	5	25.00	25.00	25.00	97	2419				0
		point6	6	25.00	25.00	25.00	88	2208				0
		point7	7	25.00	25.00	25.00	84	2105				0
		point8	8	25.00	25.00	25.00	101	2528				0
		point9	9	25.00	25.00	25.00	93	2313				0
		point10	10	25.00	25.00	25.00	59	1468				0
		point11	11	25.00	25.00	25.00	102	2557				0
		point12	12	25.00	25.00	25.00	80	1988				0
		point13	13	25.00	25.00	25.00	69	1728				0
		point14	14	25.00	25.00	25.00	60	1505				0
		point15	15	25.00	25.00	25.00	83	2077				0
		point16	16	25.00	25.00	25.00	87	2165				0
		point17	17	25.00	25.00	25.00	54	1362				0
		point18	18	25.00	25.00	25.00	94	2350				0
		point25	25	25.00	25.00	25.00	94	2352				0
		point19	19	25.00	25.00	25.00	98	2444				0
		point20	20	25.00	25.00	25.00	103	2573				0
		point21	21	25.00	25.00	25.00	100	2493				0
		point22	22	25.00	25.00	25.00	95	2378				0
		point23	23	25.00	25.00	25.00	108	2689				0

Table 1 – Barrier Analysis Areas

Location	Number of Predicted Impacted Receptors	Predicted Receptor Benefits	Potential Mitigation Specifications				Reasonable Mitigation Possible?	Comments
			Barrier Length (ft)	Area (ft^2)	Barrier Height (ft)	Barrier Cost/ Cost Per Benefit		
Barrier 1 **Meadow Glen Elementary/ Meadow Glen Middle School/ Wellesley Subdivision**	35 locations (268 Equivalent receptors)	268	5,476	104,044	19	$3,641,540/ $13,588	Yes	Cost of barrier meets SCDOT feasibility and reasonableness standards.
Barrier 2 **Baskin Hills Road/ Hawthorne Subdivision**	18	30	3,998	71,566	17 to 19	$2,504,810/ $83,494	No	Cost of barrier exceeds SCDOT reasonableness standards.
Barrier 3 **Elvington Lane**	25	25	2,600	41,001	15 to 17	$1,435,035/ $57,401	No	Cost of barrier exceeds SCDOT reasonableness standards.
Barrier 4 **Pleasant Hill Subdivision**	21	38	3,995	67,915	17	$2,377,025/ $62,553	No	Cost of barrier exceeds SCDOT reasonableness standards.
Barrier 5 **Larkin Woods Subdivision**	12	12	2,250	52,340	17 to 25	$1,831,935/ $152,661	No	Cost of barrier exceeds SCDOT reasonableness standards.
Barrier 6 **Hidden Springs Road**	6	7	2,400	57,583	19 to 25	$2,022,405/ $288,915	No	Cost of barrier exceeds SCDOT reasonableness standards.

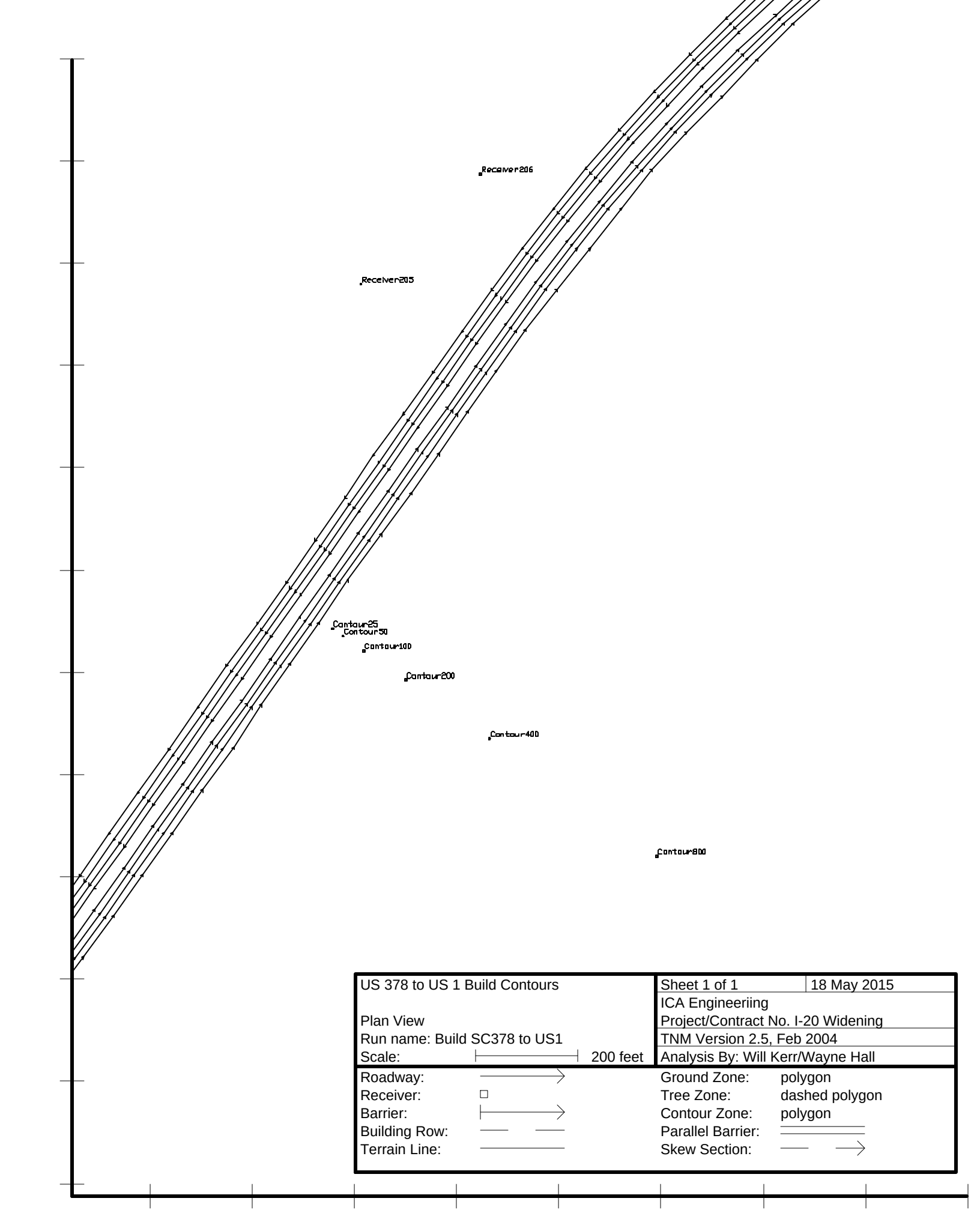
Table 1 – Barrier Analysis Areas

Location	Number of Predicted Impacted Receptors	Predicted Receptor Benefits	Potential Mitigation Specifications				Reasonable Mitigation Possible?	Comments
			Barrier Length (ft)	Area (ft^2)	Barrier Height (ft)	Barrier Cost/ Cost Per Benefit		
Barrier 7 **South Brook Subdivision**	15	17	1,563	36,380	19 to 25	$1,273,300/ $74,900	No	Cost of barrier exceeds SCDOT reasonableness standards.

Notes:

1. The mitigation measures assessed in conjunction with this analysis are in accordance with the SCDOT Traffic Noise Abatement Policy reasonableness criteria.
2. Reasonableness is based on the SCDOT policy of $30,000 per Benefited Receptor.
3. SCDOT Policy states that the preliminary noise barrier cost analysis is based on $35.00 per square foot and a more project-specific construction cost should be applied at a cost per square foot basis during the detailed noise abatement evaluation.

Sound Planning Contours



US 378 to US 1 Build Contours	Sheet 1 of 1 | 18 May 2015
	ICA Engineeriing
Plan View	Project/Contract No. I-20 Widening
Run name: Build SC378 to US1	TNM Version 2.5, Feb 2004
Scale: 200 feet	Analysis By: Will Kerr/Wayne Hall

Roadway:		Ground Zone:	polygon
Receiver:		Tree Zone:	dashed polygon
Barrier:		Contour Zone:	polygon
Building Row:		Parallel Barrier:	
Terrain Line:		Skew Section:	

ICA Engineeriing
Will Kerr/Wayne Hall
18 May 2015
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: I-20 Widening
RUN: US 378 to US 1 Build Contours
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
Receiver152	152	1	73.9	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver155	155	1	73.3	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver156	156	1	73.7	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver157	157	1	66.5	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver158	158	1	68.2	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver159	159	1	67.4	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver160	160	1	70.7	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver161	161	1	72.3	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver162	162	1	68.1	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver163	163	1	67.2	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver164	164	1	68.8	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver165	165	1	72.7	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver166	166	1	67.9	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver167	167	1	69.8	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver168	168	1	67.9	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver169	169	1	70.4	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver170	170	1	68.9	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver171	171	1	71.1	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver172	172	1	67.8	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver173	173	1	71.2	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver174	174	1	73.7	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver175	175	1	66.9	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver176	176	1	72.2	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver177	177	1	68.7	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0

Receiver178	178	1	71.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver179	179	1	73.1	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver180	180	1	66.7	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver181	181	1	68.1	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver182	182	1	70.8	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver183	183	1	73.1	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver184	184	1	72.8	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver185	185	1	72.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver186	186	1	71.1	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver189	189	1	71.2	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver190	190	1	74.6	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver191	191	1	70.9	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver192	192	1	72.2	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver193	193	1	72.5	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver194	194	1	72.6	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver195	195	1	70.4	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver196	196	1	73.6	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver197	197	1	73.7	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver199	199	1	74.9	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver200	200	1	68.5	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver201	201	1	70.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver202	202	1	72.5	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver203	203	1	74.1	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver204	204	1	74.5	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver205	205	1	72.8	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver206	206	1	74.4	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver207	207	1	67.7	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver208	208	1	68.8	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver209	209	1	68.9	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver210	210	1	69.5	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver211	211	1	69.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver212	212	1	70.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver213	213	1	72.3	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver214	214	1	68.5	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver215	215	1	70.5	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver218	218	1	72.4	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver219	219	1	72.6	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver253	226	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver254	227	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver255	228	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver256	229	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0

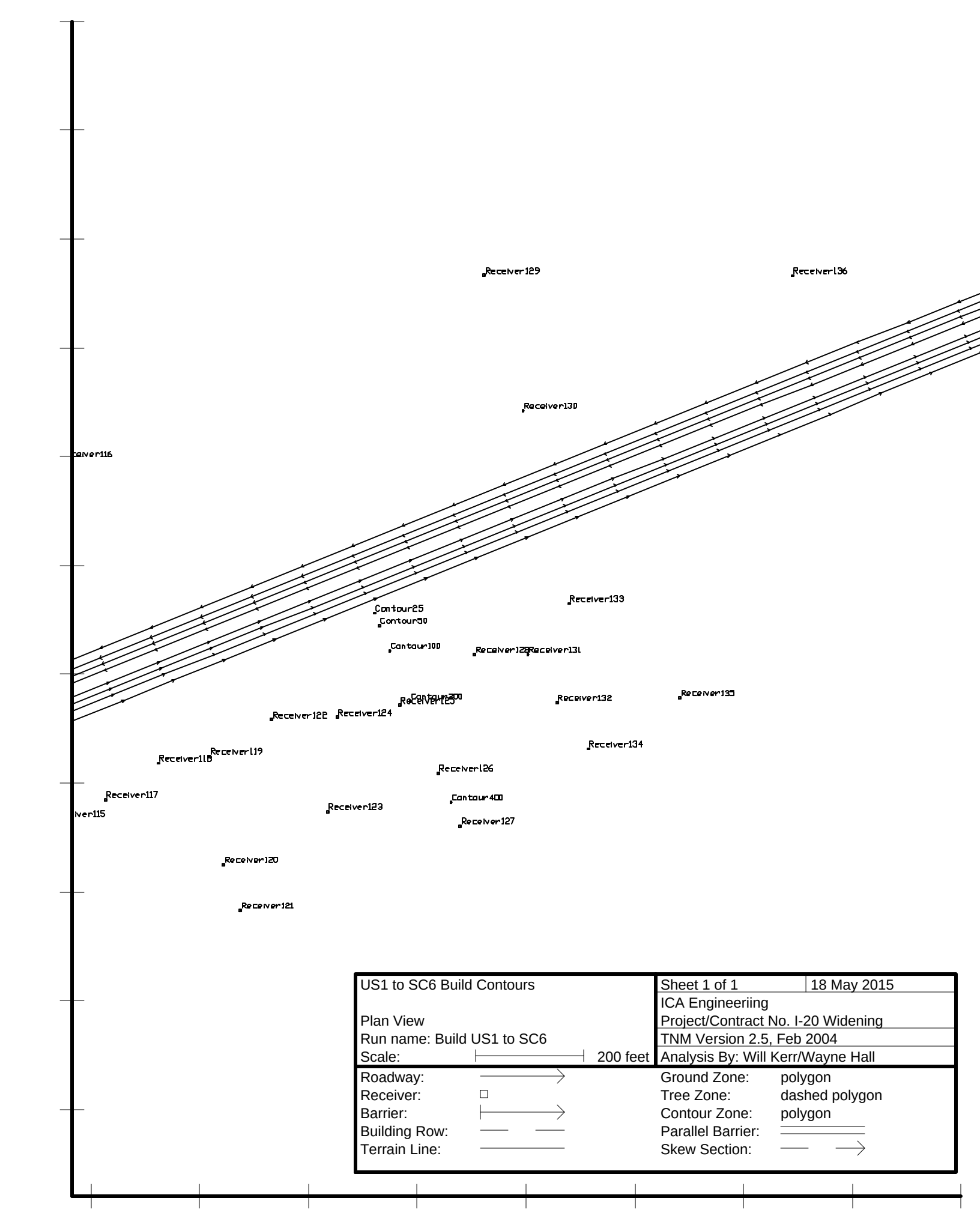
Receiver257	230	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver258	231	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver259	232	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver260	233	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver261	234	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver262	235	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver263	236	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver264	237	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver265	238	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver266	239	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver267	240	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver268	241	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver269	242	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver270	243	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver271	244	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver272	245	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver273	246	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver274	247	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver275	248	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver276	249	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver277	250	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver278	251	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver279	252	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver280	253	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver281	254	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver282	255	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver283	256	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver284	257	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver285	258	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver294	267	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Contour25	271	1	0.0	81.7	66	81.7	10	Snd Lvl	81.7	0.0	8	-8.0
Contour50	272	1	0.0	80.0	66	80.0	10	Snd Lvl	80.0	0.0	8	-8.0
Contour100	273	1	0.0	76.9	66	76.9	10	Snd Lvl	76.9	0.0	8	-8.0
Contour200	274	1	0.0	73.0	66	73.0	10	Snd Lvl	73.0	0.0	8	-8.0
Contour400	276	1	0.0	67.4	66	67.4	10	Snd Lvl	67.4	0.0	8	-8.0
Contour800	277	1	0.0	60.6	66	60.6	10	----	60.6	0.0	8	-8.0

Dwelling Units	**# DUs**	**Noise Reduction**		
		Min	**Avg**	**Max**
		dB	**dB**	**dB**
All Selected	101	0.0	0.0	0.0
All Impacted	5	0.0	0.0	0.0

All that meet NR Goal		0	0.0	0.0	0.0							

INPUTS FOR FUTURE NOISE LEVELS	2037 Build		NOISE	DISTANCE
I-20 Lexington County, SC	US 378-US 1		CONTOURS	TO CL (Ft)
Distance From Proposed I-20 EOP	PRD # 1	PRD # 2	72	268
25	81.7	0.0		268.00
50	80	0.0	67	458
100	76.9	0.0	66	503
200	73	0.0		
400	67.4	0.0	71	297
800	60.6	0.0	DESIRED	
1600		0.0	60	847
R0	41.0	0.0	dBA ^	

R0= Distance from Centerline to Edge of Pavement



US1 to SC6 Build Contours	Sheet 1 of 1 | 18 May 2015
	ICA Engineeriing
Plan View	Project/Contract No. I-20 Widening
Run name: Build US1 to SC6	TNM Version 2.5, Feb 2004
Scale: 200 feet	Analysis By: Will Kerr/Wayne Hall

Roadway:		Ground Zone:	polygon
Receiver:		Tree Zone:	dashed polygon
Barrier:		Contour Zone:	polygon
Building Row:		Parallel Barrier:	
Terrain Line:		Skew Section:	

ICA Engineeriing
18 May 2015
Will Kerr/Wayne Hall
TNM 2.5
Calculated with TNM 2.5
RESULTS: SOUND LEVELS
PROJECT/CONTRACT: I-20 Widening
RUN: US1 to SC6 Build Contours
BARRIER DESIGN: INPUT HEIGHTS
Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.
ATMOSPHERICS: 68 deg F, 50% RH

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	With Barrier Type Impact	Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
Receiver54	54	1	74.6	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver56	56	1	75.6	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver58	58	1	75.2	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver60	60	1	74.9	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver61	61	1	74.2	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver62	62	1	73.5	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver63	63	1	74.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver65	65	1	72.9	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver67	67	1	72.7	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver68	68	1	71.4	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver70	70	1	72.3	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver74	74	1	74.5	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver75	75	1	74.7	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver76	76	1	75.4	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver77	77	1	75.7	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver78	78	1	74.3	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver80	80	1	75.3	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver82	82	1	74.8	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver83	83	1	76.5	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver84	84	1	72.8	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver85	85	1	73.8	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver87	87	1	71.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver89	89	1	77.1	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver90	90	1	73.2	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0

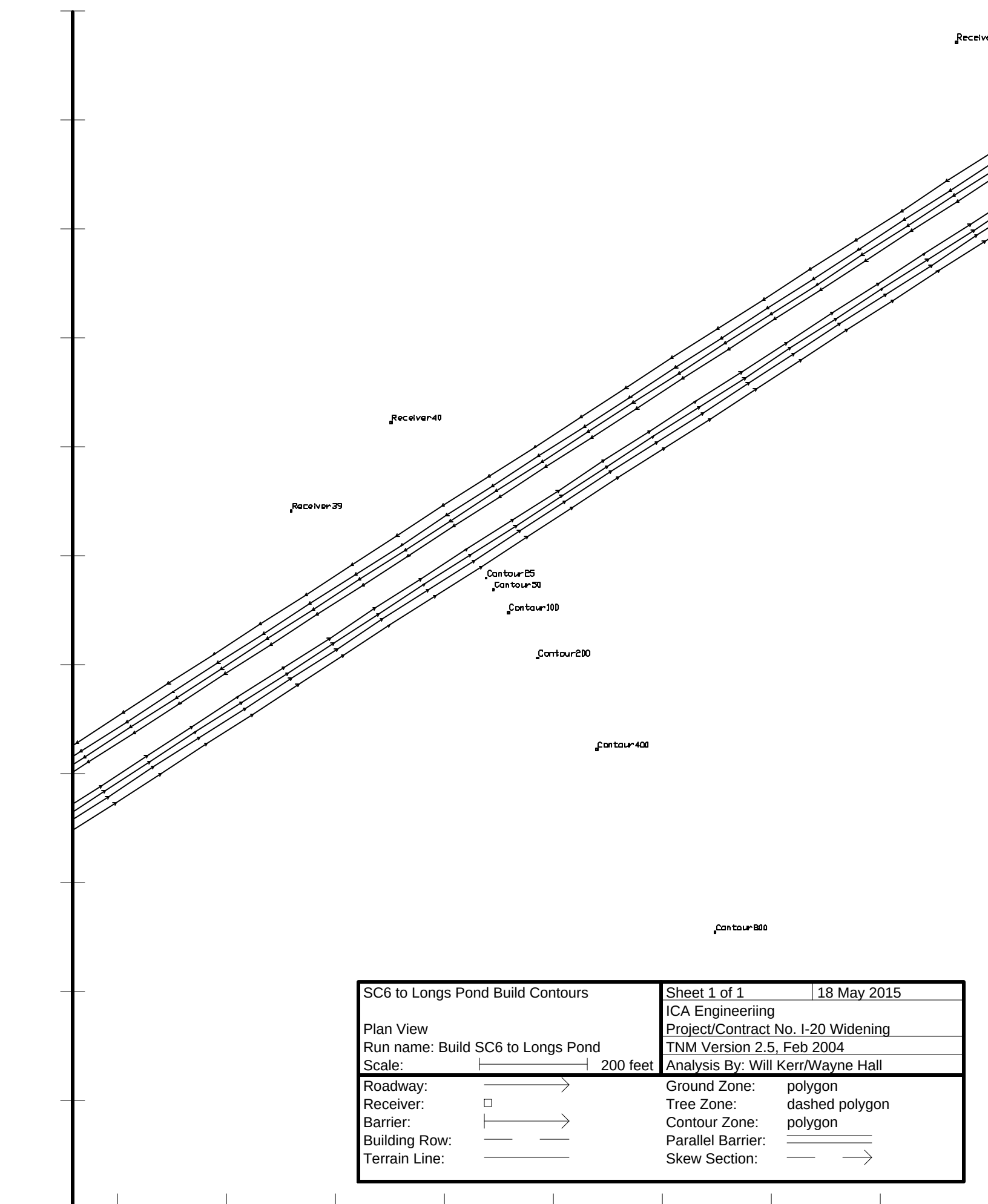
Receiver91	91	1	71.9	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver92	92	1	76.5	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver93	93	1	75.1	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver95	95	1	71.8	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver96	96	1	73.8	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver97	97	1	74.2	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver98	98	1	72.2	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver99	99	1	75.2	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver100	100	1	75.4	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver101	101	1	73.2	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver102	102	1	74.9	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver103	103	1	71.4	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver104	104	1	75.3	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver105	105	1	72.4	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver106	106	1	73.3	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver107	107	1	76.4	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver108	108	1	73.2	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver109	109	1	72.7	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver110	110	1	73.1	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver111	111	1	71.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver112	112	1	74.5	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver113	113	1	73.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver114	114	1	75.4	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver115	115	1	75.2	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver116	116	1	72.3	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver117	117	1	75.1	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver118	118	1	75.6	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver119	119	1	75.1	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver120	120	1	72.4	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver121	121	1	71.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver122	122	1	75.6	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver123	123	1	72.6	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver124	124	1	74.7	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver125	125	1	74.3	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver126	126	1	72.5	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver127	127	1	70.9	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver128	128	1	75.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver129	129	1	71.3	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver130	130	1	76.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver131	131	1	74.3	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver132	132	1	73.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0

Receiver133	133	1	75.5	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver134	134	1	71.5	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver135	135	1	71.9	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver136	136	1	75.1	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver137	137	1	75.1	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver138	138	1	74.6	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver139	139	1	73.2	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver140	140	1	71.5	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver141	141	1	74.1	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver142	142	1	73.5	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver143	143	1	72.7	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver144	144	1	71.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver145	145	1	71.9	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver146	146	1	77.9	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver147	147	1	73.7	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver148	148	1	71.3	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver149	149	1	72.4	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver150	150	1	75.1	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver151	151	1	70.9	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver153	153	1	71.9	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver154	154	1	76.3	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Contour25	221	1	0.0	80.7	66	80.7	10	Snd Lvl	80.7	0.0	8	-8.0
Contour50	222	1	0.0	78.4	66	78.4	10	Snd Lvl	78.4	0.0	8	-8.0
Contour100	223	1	0.0	75.6	66	75.6	10	Snd Lvl	75.6	0.0	8	-8.0
Contour200	224	1	0.0	71.9	66	71.9	10	Snd Lvl	71.9	0.0	8	-8.0
Contour400	227	1	0.0	67.3	66	67.3	10	Snd Lvl	67.3	0.0	8	-8.0
Contour800	228	1	0.0	61.4	66	61.4	10	----	61.4	0.0	8	-8.0

Dwelling Units	**# DUs**	**Noise Reduction**		
		Min	**Avg**	**Max**
		dB	**dB**	**dB**
All Selected	92	0.0	0.0	0.0
All Impacted	5	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

INPUTS FOR FUTURE NOISE LEVELS	2037 Build		NOISE	DISTANCE
I-20 Lexington County, SC	US 1-SC 6		CONTOURS	TO CL (Ft)
Distance From Proposed I-20 EOP	PRD # 1	PRD # 2	72	232
25	80.7	0.0		-
50	78.4	0.0	67	451
100	75.6	0.0	66	502
200	71.9	0.0		
400	67.3	0.0	71	265
800	61.4	0.0	DESIRED	
1600		0.0	60	849
R0	36.0	0.0	dBA ^	

R0= Distance from Centerline to Edge of Pavement



SC6 to Longs Pond Build Contours	Sheet 1 of 1 | 18 May 2015
	ICA Engineeriing
Plan View	Project/Contract No. I-20 Widening
Run name: Build SC6 to Longs Pond	TNM Version 2.5, Feb 2004
Scale: 200 feet	Analysis By: Will Kerr/Wayne Hall

Roadway:		Ground Zone:	polygon
Receiver:		Tree Zone:	dashed polygon
Barrier:		Contour Zone:	polygon
Building Row:		Parallel Barrier:	
Terrain Line:		Skew Section:	

ICA Engineeriing
Will Kerr/Wayne Hall

18 May 2015
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: I-20 Widening
RUN: SC6 to Longs Pond Build Contours
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h		Increase over existir		Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
				Calculated	Crit'n	Calculated	Crit'n Sub'l Inc					
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
Receiver1	1	1	75.4	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver2	2	1	67.9	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver3	3	1	68.2	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver4	4	1	72.9	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver5	5	1	67.8	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver7	7	1	73.6	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver8	8	1	68.8	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver9	9	1	70.8	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver10	10	1	72.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver11	11	1	67.2	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver12	12	1	69.7	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver13	13	1	70.9	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver14	14	1	74.2	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver15	15	1	71.7	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver16	16	1	72.2	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver17	17	1	71.8	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0

Receiver18	18	1	69.1	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver19	19	1	74.7	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver20	20	1	71.3	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver21	21	1	70.2	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver22	22	1	70.5	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver23	23	1	70.7	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver24	24	1	71.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver25	25	1	71.2	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver26	26	1	71.3	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver27	27	1	71.7	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver28	28	1	71.7	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver29	29	1	72.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver30	30	1	72.5	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver31	31	1	73.5	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver32	32	1	73.5	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver33	33	1	73.4	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver34	34	1	73.7	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver35	35	1	73.1	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver36	36	1	73.8	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver37	37	1	69.1	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver39	39	1	75.4	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver40	40	1	74.8	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver41	41	1	74.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver42	42	1	77.7	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver43	43	1	73.6	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver44	44	1	76.5	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver45	45	1	74.4	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver46	46	1	71.9	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver47	47	1	76.6	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver48	48	1	72.5	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver49	49	1	77.2	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver50	50	1	72.5	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver52	52	1	72.2	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver53	53	1	73.5	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0

Receiver54	54	1	74.6	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver56	56	1	75.6	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver58	58	1	75.2	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver60	60	1	74.9	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver61	61	1	74.2	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver62	62	1	73.5	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver63	63	1	74.0	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver65	65	1	72.9	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver67	67	1	72.7	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver68	68	1	71.4	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver70	70	1	72.3	0.0	66	0.0	15	inactive	0.0	0.0	8	0.0
Receiver221	221	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver222	222	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver223	223	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver224	224	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver225	225	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver226	226	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver227	227	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver228	228	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver229	229	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver230	230	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver231	231	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver232	232	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver233	233	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver234	234	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver235	235	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver236	236	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver237	237	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver238	238	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver239	239	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver240	240	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver241	241	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver242	242	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver243	243	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0

Receiver244	244	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver245	245	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver246	246	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver247	247	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver248	248	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver249	249	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver250	250	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver251	251	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver252	252	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver286	254	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver287	255	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver288	256	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver289	257	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver290	258	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver291	259	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver292	260	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Receiver293	261	1	0.0	0.0	66	0.0	10	inactive	0.0	0.0	8	0.0
Contour25	263	1	0.0	80.5	66	80.5	10	Snd Lvl	80.5	0.0	8	-8.0
Contour50	264	1	0.0	78.5	66	78.5	10	Snd Lvl	78.5	0.0	8	-8.0
Contour100	265	1	0.0	75.8	66	75.8	10	Snd Lvl	75.8	0.0	8	-8.0
Contour200	266	1	0.0	71.5	66	71.5	10	Snd Lvl	71.5	0.0	8	-8.0
Contour400	268	1	0.0	66.1	66	66.1	10	Snd Lvl	66.1	0.0	8	-8.0
Contour800	269	1	0.0	60.7	66	60.7	10	----	60.7	0.0	8	-8.0

Dwelling Units	**# DUs**	**Noise Reduction**		
		Min	**Avg**	**Max**
		dB	**dB**	**dB**
All Selected	107	0.0	0.0	0.0
All Impacted	5	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

INPUTS FOR FUTURE NOISE LEVELS	2037 Build		NOISE	DISTANCE
I-20 Lexington County, SC	SC 6-LPR		CONTOURS	TO CL (Ft)
Distance From Proposed I-20 EOP	PRD # 1	PRD # 2	72	246
25	80.5	0.0		-
50	78.5	0.0	67	417
100	75.8	0.0	66	467
200	71.5	0.0		
400	66.1	0.0	71	274
800	60.7	0.0	DESIRED	
1600		0.0	60	868
R0	61.0	0.0	dBA ^	

R0= Distance from Centerline to Edge of Pavement

APPENDIX F
Jurisdictional Determination

ICA Engineering

February 17, 2015

Ms. Siobhan Gordon
SCDOT – EMO
955 Park Street
Columbia, SC 29202

RE: **I-20 Widening Project; SCDOT Project No. P027003; Lexington County**
JD Request

Dear Ms. Gordon:

For your use and distribution, ICA Engineering is submitting two (2) copies of the jurisdictional determination (JD) package (requesting an "approximate-preliminary") in support of the I-20 Widening Project located in Lexington County. Specifically, a 521 acre project boundary was established with the identification of nine (9) wetland areas totaling 2.92 acres and 13 tributaries totaling 3,977 LF, including 3,087 LF of pRPW and 890 LF of sRPW.

For your convenience, this submittal includes:

- SCDOT JD Checklist
- JD Request Form
- JD exhibits, including USGS topography mapping; soil survey mapping; aerial mapping; and illustration of the WOUS
- Narrative of the project area and WOUS
- Preliminary JD table
- Site pictures
- PDF copy on CD

The enclosed JD package has been revised to incorporate your comments received via email dated February 6, 2015. This specifically includes a revised JD form; coordinates along the project area (See Figure 5); addition of pipes/culverts on the figures illustrating connectivity of tributaries; and revised data forms.

If you have any questions or wish to discuss, please feel free to call me at (803)254-5800.

Sincerely,

ICA Engineering,

Barrett Stone

enclosure

ec: Mr. Brad Reynolds, P.E., SCDOT, without attachments

U.S. Army Corps of Engineers – Charleston District - Regulatory Division

JURISDICTIONAL DETERMINATION REQUEST

For Identifying Waters of the U.S., Including Wetlands and Tributaries, and Jurisdictional Status

Project Name: I-20 Widening Project Date: 2/17/15 County: Lexington
Latitude/Longitude: 33.962737 / -81.218039 Acreage: 521
Property Address: I-20 Milepost 49-60.2 City/Town: Lexington

Property Owner Name*: SCDOT - Attn. Siobhan Gordon
Address PO Box 191
Columbia, SC 29202
Phone: 803.737.1337
Email: gordonso@scdot.org

*Current Legal Property Owner Name and Contact Information are required.

Agent Name: Barrett Stone
Company Name: ICA Engineering
Address 501 Huger Street
Columbia, SC 29201
Phone: 803.509.6615
Email: bstone@icaeng.com

I. Select the Type of Request: (Select one)

☑ **A.** I am submitting a wetland delineation for review and verification by the Corps. Please refer to pages 2-6 for the "Information Required for Wetland Delineations and Jurisdictional Determination Submittals."

☐ **B.** I am requesting that the Corps investigate the above property for the presence or absence of wetlands, tributaries, or other Waters of the U.S., and establish the geographic extent of these areas. *Please note that while the Corps offers wetland delineation services, time frames to fulfill requests are dependent on site size, property conditions, workload priorities, and staffing levels. To expedite the wetland delineation process, property owners are encouraged to hire an environmental consultant.* The first two items listed below must accompany your request. Complete only this page and disregard the following pages.

1. Accurate location maps (from County Map, USGS Quad Sheet, etc.), street address and directions to site from a nearby major intersection.
2. Copy of Survey Property Plat, Tax Map of Property, or depiction showing project/property boundary with GPS coordinates.
3. Additional information, such as soil survey information, aerial photographs, etc.

II. Select the Type of Jurisdictional Determination Requested: (Select One)

☐ **A.** Accurate-Approved ☐ **B.** Approximate-Approved ☐ **C.** Accurate-Preliminary * ☑ **D.** Approximate-Preliminary

Description of the Types of Jurisdictional Determinations:

Preliminary – Preliminary determinations will identify whether wetlands or other waters are present on the site and will presume that they are jurisdictional. Preliminary determinations may be completed more quickly than Approved determinations and do not expire.

Approved – Approved determinations will identify whether wetlands or other waters are present on the site and will include a determination of their jurisdictional status. Approved determinations expire in 5 years.

Description of the Types of Delineations:

Accurate: Location and extent (boundaries) of all Waters of the U.S. are identified and surveyed by a registered land surveyor. Project/property boundary must be surveyed or represented by a tax map (or by GPS points if no Waters of the U.S. are present).

Approximate: Location and extent (boundaries) of all Waters of the U.S. are identified and depicted approximately on a sketch. Project/property boundary must be surveyed or represented by a tax map or GPS coordinates.

***Note: For Accurate-Preliminary Jurisdictional Determinations, although the jurisdictional determination will not expire, the surveyed location and extent (boundaries) of wetlands and/or waters will expire after 5 years.**

III. Property Owner/Agent Name and Signature: (Complete)

IMPORTANT NOTE: Legible printed name and signature required. The person signing this form must be the present property owner or have the specific authority of the property owner to authorize Corps of Engineers employees or their agents to enter onto the property for on-site investigations if such is deemed necessary. Do not sign this form unless you are the owner, or have the specific authority of the property owner.

PRINTED NAME of person signing this form, below: Barrett Stone

Signature of Property Owner or Authorized Agent: Barrett Stone

DEPARTMENT OF THE ARMY
CHARLESTON DISTRICT, CORPS OF ENGINEERS
69A HAGOOD AVENUE
CHARLESTON, SOUTH CAROLINA 29403-5107

REPLY TO
ATTENTION OF

July 31, 2015

Regulatory Division

Mr. Sean Connolly
South Carolina Department of Transportation
P.O. Box 191
Columbia, South Carolina 29202-0191

Dear Mr. Connolly:

This is in response to your letter of February 19, 2015, requesting a Preliminary Jurisdictional Determination (Preliminary) for a 521 acre project area, located on and along an approximately 11 mile long segment of Interstate 20 (I-20), from a location near mile marker 49 to a location near mile marker 60.2 in Lexington County, South Carolina (SCDOT PIN P027003). The project area is depicted on the submitted sketches 5a to 5j (Plan View) entitled "I-20 Widening, Lexington County, SC" prepared by ICA Engineering and dated Revised July 28, 2015. A preliminary jurisdictional determination is used to indicate that this office has identified wetlands or other waters on the property and believes these waters may be jurisdictional waters of the United States. Since the Preliminary does not verify the actual jurisdictional status of wetlands and/or waters of the United States on the property, it relies on the presumption of jurisdiction for the purpose of expediting the request for a Preliminary.

Based on an on-site inspection, a review of aerial photography, topographic maps, National Wetland Inventory maps and soil survey information, it has been concluded that the boundaries shown on the referenced sketches are a reasonable approximation of the location and boundaries of the waters found on this site. The area in question contains approximately 2.92 acres and 3976.0 linear feet of federally defined freshwater wetlands or other waters. You are cautioned that this delineation is approximate, subject to change, and should be used for planning purposes only. This office should be contacted prior to performing any work in or around these wetlands or other waters. In order for a definitive determination to be provided, these areas should be located and marked on-site, sketched or surveyed, platted on a map, and should be accompanied by a request for an Approved Jurisdictional Determination. Upon receipt of such a request, this office can then issue an approved determination as to jurisdiction (rather than the presumption of jurisdiction). You should also be aware that the areas identified as wetlands or other waters may be subject to restrictions or requirements of other state or local government entities.

Please note that since this jurisdictional determination is a Preliminary, it is subject to change and therefore is not an appealable action under the Corps of Engineers administrative appeal procedures defined at 33 CFR 331. If a permit application is forthcoming as a result of this Preliminary, a copy of this letter, as well as the attached sketch or plat should be submitted as part of the application. Otherwise, a delay could occur in confirming that a preliminary jurisdictional determination was performed for the permit project area.

This preliminary jurisdictional determination is a non-binding action and as such has no expiration until it is superseded by an Approved Jurisdictional Determination. If you intend to request an Approved Jurisdictional Determination in the future, you are advised not to commence work in these wetlands and/or waters prior to receiving the Approved Jurisdictional Determination.

In future correspondence concerning this matter, please refer to SAC 2015-00306-DJS. You may still need state or local assent. Prior to performing any work, you should contact the South Carolina Department of Health and Environmental Control.

Enclosed are two copies of the Preliminary Jurisdictional Determination Form signed by our office. Please sign both copies, retain one copy for your records and return one signed copy to this office in the enclosed self-addressed envelope.

If you have any questions concerning this matter, please contact Stephen Brumagin at 803-253-3445.

Sincerely,

Travis G. Hughes
Chief, Special Projects Branch

Enclosure
Preliminary Jurisdictional Determination Form

Copy Furnished:

ICA Engineering
Attn: Mr. Barrett Stone
501 Huger Street
Columbia, South Carolina 29201

ATTACHMENT

PRELIMINARY JURISDICTIONAL DETERMINATION FORM

BACKGROUND INFORMATION

A. REPORT COMPLETION DATE FOR PRELIMINARY JURISDICTIONAL DETERMINATION (JD):
July 7, 2015

B. NAME AND ADDRESS OF PERSON REQUESTING PRELIMINARY JD:
Mr. Sean Connolly
South Carolina Department of Transportation
P.O. Box 191
Columbia, South Carolina 29202-0191

C. DISTRICT OFFICE, FILE NAME, AND NUMBER: Charleston District, SCDOT Interstate 20 widening project in Lexington County (SCODT PIN P027003), SAC 2015-00306-DS

D. PROJECT LOCATION(S) AND BACKGROUND INFORMATION: Project is located along an approximate 11 mile segment of Interstate 20 from a location near mile marker 49 (just west of I-20 and Longs Pond Road interchange) to a location near mile marker 60.2 (just west of the I-20 and US 378 interchange) in Lexington County.
(USE THE ATTACHED TABLE TO DOCUMENT MULTIPLE WATERBODIES AT DIFFERENT SITES)

State: South Carolina County/parish/borough: Lexington Co City:
Center coordinates of site (lat/long in degree decimal format):
Lat. 33.957802° N, Long. 81.232158° W. Universal Transverse Mercator: NAD 83

Name of nearest waterbody: Redbank Creek and Twelvemile Creek
Identify (estimate) amount of waters in the review area:

Non-wetland waters: 3976 linear feet: Variable width (ft) and/or acres.
Cowardin Class: Riverine Stream Flow: Perennial
Wetlands: 2.93 acres. Cowardin Class: Forested

Name of any water bodies on the site that have been identified as Section 10 waters:
Tidal: N/A
Non-Tidal: N/A

E. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):
☒ Office (Desk) Determination. Date: July 7, 2015 ☒ Field Determination. Date(s): May 28, 2015

1. The Corps of Engineers believes that there may be jurisdictional waters of the United States on the subject site, and the permit applicant or other affected party who requested this preliminary JD is hereby advised of his or her option to request and obtain an approved jurisdictional determination (JD) for that site. Nevertheless, the permit applicant or other person who requested this preliminary JD has declined to exercise the option to obtain an approved JD in this instance and at this time.

2. In any circumstance where a permit applicant obtains an individual permit, or a Nationwide General Permit (NWP) or other general permit verification requiring "pre-construction notification" (PCN), or requests verification for a non-reporting NWP or other general permit, and the permit applicant has not requested an approved JD for the activity, the permit applicant is hereby made aware of the following: (1) the permit applicant has elected to seek a permit authorization based on a preliminary JD, which does not make an official determination of jurisdictional waters; (2) that the applicant has the option to request an approved JD before accepting the terms and conditions of the permit authorization, and that basing a permit authorization on an approved JD could possibly result in less compensatory mitigation being required or different special conditions; (3) that the applicant has the right to request an individual permit rather than accepting the terms and conditions of the NWP or other general permit authorization; (4) that the applicant can accept a permit authorization and thereby agree to comply with all the terms and conditions of that permit, including whatever mitigation requirements the

Corps has determined to be necessary; (5) that undertaking any activity in reliance upon the subject permit authorization without requesting an approved JD constitutes the applicant's acceptance of the use of the preliminary JD, but that either form of JD will be processed as soon as is practicable; (6) accepting a permit authorization (e.g., signing a proffered individual permit) or undertaking any activity in reliance on any form of Corps permit authorization based on a preliminary JD constitutes agreement that all wetlands and other water bodies on the site affected in any way by that activity are jurisdictional waters of the United States, and precludes any challenge to such jurisdiction in any administrative or judicial compliance or enforcement action, or in any administrative appeal or in any Federal court; and (7) whether the applicant elects to use either an approved JD or a preliminary JD, that JD will be processed as soon as is practicable. Further, an approved JD, a proffered individual permit (and all terms and conditions contained therein), or individual permit denial can be administratively appealed pursuant to 33 C.F.R. Part 331, and that in any administrative appeal, jurisdictional issues can be raised (see 33 C.F.R. 331.5(a)(2)). If, during that administrative appeal, it becomes necessary to make an official determination whether CWA jurisdiction exists over a site, or to provide an official delineation of jurisdictional waters on the site, the Corps will provide an approved JD to accomplish that result, as soon as is practicable.

This preliminary JD finds that there *"may be"* waters of the United States on the subject project site, and identifies all aquatic features on the site that could be affected by the proposed activity, based on the following information:

SUPPORTING DATA. Data reviewed for preliminary JD (check all that apply - checked items should be included in case file and, where checked and requested, appropriately reference sources below):

- ☒ Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant: B. Stone-ICA.
- ☒ Data sheets prepared/submitted by or on behalf of the applicant/consultant.
  - ☐ Office concurs with data sheets/delineation report.
  - ☐ Office does not concur with data sheets/delineation report.

  Although the Corps may not agree with all the information provided by the agent, the Corps agrees with the conclusions and boundaries established from sit information documented.
- ☐ Data sheets prepared by the Corps: .
- ☐ Corps navigable waters' study: .
- ☒ U.S. Geological Survey Hydrologic Atlas: .
  - ☐ USGS NHD data.
  - ☒ USGS 8 and 12 digit HUC maps. Saluda River 03050109-14 & Congaree Creek 03050110-01
- ☒ U.S. Geological Survey map(s). Cite scale & quad name: Irmo, Lexington, & Barr Lake.
- ☒ USDA Natural Resources Conservation Service Soil Survey. Citation: Pages 18, 19, & 25: Lakeland, Fuquay, Johnston, Blaney, Vaucluse, Pelion, Alaga, Troup, Tatum, Georgeville, and Herndon series.
- ☒ National wetlands inventory map(s). Cite name:PFO4B, PFO1B, & PUBHh.
- ☐ State/Local wetland inventory map(s): .
- ☐ FEMA/FIRM maps: .
- ☐ 100-year Floodplain Elevation is: (National Geodectic Vertical Datum of 1929)
- ☒ Photographs: ☒ Aerial (Name & Date):(1999) 11207: 35, 11206:141, 11206:143, 11206:105. or ☒ Other (Name & Date):Photographs prepared by consultant.
- ☐ Previous determination(s). File no. and date of response letter: .
- ☒ Other information (please specify): Field view May 28, 2015

IMPORTANT NOTE: The information recorded on this form has not necessarily been verified by the Corps and should not be relied upon for later jurisdictional determinations.

Signature and date of
Regulatory Project Manager
(REQUIRED)

8-6-15

Signature and date of
person requesting preliminary JD
(REQUIRED, unless obtaining the signature is impracticable)

Site number or name	Latitude	Longitude	Cowardin Class	Estimated amount of aquatic resource in review area	Class of aquatic resource
Wetland 1	33.921603	-81.301204	Palustrine Forested Wetland	0.385 ac	non-section 10 – wetland
Wetland 2	33.922646	-81.301989	Palustrine Forested Wetland	0.514 ac	non-section 10 – wetland
Tributary 1	33.922408	-81.301594	Unconsolidated Bottom	319 LF	non-section 10 – tributary
Wetland 3	33.922454	-81.298683	Palustrine Forested Wetland	0.237 ac	non-section 10 – wetland
Wetland 4	33.923678	-81.298559	Palustrine Forested Wetland	1.160 ac	non-section 10 – wetland
Tributary 2	33.923543	-81.298258	Unconsolidated Bottom	581 LF	non-section 10 – tributary
Tributary 3	33.934220	-81.276229	Unconsolidated Bottom	98 LF	non-section 10 – tributary
Tributary 3a	33.934878	-81.276120	Unconsolidated Bottom	171 LF	non-section 10 – tributary
Wetland 5	33.935079	-81.276369	Palustrine Forested Wetland	0.110 ac	non-section 10 – wetland
Tributary 4	33.940625	-81.264513	Unconsolidated Bottom	42 LF	non-section 10 – tributary
Wetland 6	33.975142	-81.196999	Scrub-Shrub Wetland	0.284 ac	non-section 10 – wetland
Tributary 5	33.975369	-81.196656	Unconsolidated Bottom	252 LF	non-section 10 – tributary
Wetland 7	33.981684	-81.194357	Palustrine Forested Wetland	0.043 ac	non-section 10 – wetland
Wetland 7a	33.981231	-81.194351	Scrub-Shrub Wetland	0.144 ac	non-section 10 – wetland
Tributary 6	33.983682	-81.192371	Unconsolidated Bottom	336 LF	non-section 10 – tributary
Tributary 7	33.984205	-81.191992	Unconsolidated Bottom	339 LF	non-section 10 – tributary
Tributary 8	33.993093	-81.181794	Unconsolidated Bottom	639 LF	non-section 10 – tributary
Tributary 9	33.995762	-81.177277	Unconsolidated Bottom	756 LF	non-section 10 – tributary
Tributary 10	33.996686	-81.176314	Unconsolidated Bottom	86 LF	non-section 10 – tributary
Tributary 11	33.998266	-81.175110	Unconsolidated Bottom	140 LF	non-section 10 – tributary

Site number or name	Latitude	Longitude	Cowardin Class	Estimated amount of aquatic resource in review area	Class of aquatic resource
Tributary 12	34.001687	-81.170730	Unconsolidated Bottom	217 LF	non-section 10 – tributary
Wetland 8	34.001819	-81.170488	Palustrine Forested Wetland	0.051 ac	non-section 10 – wetland

APPENDIX G
Floodplain Checklist

South Carolina Department of Transportation
Location and Hydraulic Design of Encroachments on Floodplains Checklist

23 CFR 650, this regulation shall apply to all encroachments and to all actions which affect base floodplains, except for repairs made with emergency funds. Note: These studies shall be summarized in the environmental review documents prepared pursuant to 23 CFR 771.

I. PROJECT DESCRIPTION

The SCDOT proposes to widen I-20 from four to six travel lanes from mile point 60.2 (west of US 378) on the eastern terminus to approximately mile point 49 (west of Longs Pond Road) on the western terminus, for a total distance of approximately 11 miles. The project boundary includes a general corridor of approximately 120 feet from the centerline of the eastbound and westbound lanes. This corridor extends to 220 feet along the US 1 interchange and the Longs Pond Road interchange. The scope of the project includes adding a travel lane in each direction, improving various exit ramps, replacing or widening the parallel mainline bridges over Norfolk Southern Railroad near mile point 57, safety improvements at the intersections of US 1 and off ramps, and a noise wall along Ginny Lane. The proposed widening would occur within the existing median to minimize right-of-way impacts. Interchange improvements would include: extending the US 1 westbound off-ramp approximately 650 feet; extending the SC 6 eastbound on-ramp approximately 1400 feet and the westbound off-ramp approximately 1650 feet; extending the Longs Pond Road westbound off-ramp approximately 1000 feet and widening of the westbound off-ramp terminal to form a right turn lane and left turn lane.

A. Narrative Describing Purpose and Need for Project
   a. Relevant Project History:
   b. General Project Description and Nature of Work (attach Location and Project Map):
   c. Major Issues and Concerns:

The purpose of the project is to improve the operational efficiency of I-20 by increasing the capacity of the interstate.

The project extends across a number of Flood Insurance Rate Maps including: 45063C0237G, 45063C0241G, 45063C0242G, 45063C0234G, 45063C0253G, 45063C0254G, 45063C0252G, 45063C0256G, and 45063C0143G, all effective February 9, 2000. FIRM # 45063C0241G documents a special flood hazard area (Zone A) associated with an unnamed tributary to Red Bank Creek. Zone A floodplains are areas within the 100 year floodplain (i.e. have a 1% annual chance of flooding), but without detailed analyses to identify specific depths or base flood elevations associated with these limits. The project is not expected to be a significant or longitudinal encroachment as defined under 23 CFR 650A, nor is it expected to have an appreciable environmental impact on this base floodplain. In addition, the project would be developed in accordance with Executive Order 11988 (Floodplain Management and 23 CFR 650 subpart A), and roadway/bridge design would comply with all appropriate floodplain regulations and guidelines.

B. Are there any floodplain(s) regulated by FEMA located in the project area?
   Yes☒ No☐

C. Will the placing of fill occur within a 100-year floodplain?
   Yes☒ No☐

D. Will the existing profile grade be raised within the floodplain?

The existing grade will not be raised in the floodplain.

E. If applicable, please discuss the practicability of alternatives to any longitudinal encroachments.

The floodplain extends on both sides of the roadway and would be impacted by all alternatives.

F. Please include a discussion of the following: commensurate with the significance of the risk or environmental impact for all alternatives containing encroachments and those actions which would support base floodplain development:

a. What are the risks associated with implementation of the action?

No base floodplain impacts expected. Not a significant encroachment.

b. What are the impacts on the natural and beneficial floodplain values?

The project is not expected to impact the floodplain as the widening will occur to areas already incorporated as part of a transportation facility. The project is not expected to impact floodplain functions, water storage, or wildlife and fishery habitat.

c. The support of probable incompatible floodplain development.

Not applicable.

d. What measures were used to minimize floodplain impacts associated with the action?

Widening will occur within the existing median and not affect any resources outside of the existing right-of-way.

e. Were any measures used to restore and preserve the natural and beneficial floodplain values impacted by the action?

Not applicable.

G. Please discuss the practicability of alternatives to any significant encroachments or any support of incompatible floodplain development.

Not applicable.

H. Were local, state, and federal water resources and floodplain management agencies consulted to determine if the proposed highway action is consistent with existing watershed and floodplain management programs and to obtain current information on development and proposed actions in the affected? Please include agency documentation.

The proposed project will be designed and constructed in accordance with SCDOT Requirements. Zone A floodplain crossings require a detailed hydraulic analysis to verify the proposed project will not increase base flood elevations more than 1' above natural conditions or unrestricted floodplain. At the completion of the study and prior to construction, the SCDOT will provide a copy of the analysis and a summary letter to the local Floodplain Administrator. No additional coordination should be required for this crossing.

APPENDIX H
Cultural Resource Reports

ARCHAEOLOGICAL FIELD REPORT

SCDOT ENVIRONMENTAL SECTION

TITLE: Phase I Cultural Resource Survey of 12 miles of I-20 Southeast of Columbia, South Carolina
DATE OF RESEARCH: 9/30/14 **ARCHAEOLOGIST:** Valerie Davis
HISTORIAN: Summer Ciomek
COUNTY: Lexington **PROJECT**: P027003
F. A. No.: **File No.** **PIN**:

DESCRIPTION:

The South Carolina Department of Transportation (SCDOT) proposes to improve I-20 from near mile point 60.2 (West of US-378) on the eastern terminus to approximately mile point 49 (West of Longs Pond Road) on the western terminus. The project includes adding a travel lane in each direction, improving various exit ramps, and replacing or widening the parallel mainline bridges over Norfolk Southern Railroad near mile point 57 (Figure 1). This survey focuses on a portion of the project including improvements at two interchanges (I-20 and U.S. Highway 1, and I-20 and Longs Pond Road) and the installation of noise barrier walls at four locations. For the remaining area, improvements will only occur in the median. These improvements may affect four bridges and a railroad. The bridges include those at the intersections of I-20 and Mineral Springs Road, Augusta Road, Cedar Crest Drive, and over the Norfolk Southern Railroad. The noise barrier fencing will be installed along the westbound side of I-20 parallel to Chesterbrook Lane (approximately 2,800 ft.), Baskin Hills Road (approximately 1,300 ft.), and Ginny Lane (approximately 4,300 ft.), and along the east bound side of I-20 near Elvington Lane and Woodcraft Drive (approximately 2,300 ft.).

Because the majority of the improvements to I-20 will only affect the median, no cultural resource survey was necessary, except where bridges crossed over the interstate at the two intersections to be improved, and at the noise barriers. The project's Area of Potential Effect (APE) consists of 300 feet from existing right of way (ROW) at the two interchanges to be improved. At I-20 and U.S. Highway 1, these improvements consist of an area 220 feet from the centerline of the eastbound and westbound lanes extending from a point 1,000 feet east of the westbound lane exit ramp to a point 3,000 feet west of the bridges over the Norfolk Southern Railroad. At I-20 and Longs Pond Road, these improvements consist of an area 220 feet from the centerline of the eastbound and westbound lanes extending from a point 1,000 feet east of the westbound lane exit ramp to approximately 50 feet west of the eastbound exit ramp. The area of archaeological emphasis consisted of the area of direct effects, while the architectural survey examined the entire APE in these locations.

Because the noise barriers will be located in existing ROW, no archaeological survey was conducted in these locations. However, the 300-foot APE was applied in these locations since the barriers may affect the viewshed.

For the remainder of the 12-mile long corridor, since improvements will only occur in the median, the only resources requiring evaluation were the four previously mentioned bridges and a railroad that intersects I-20.

This study was designed to identify any historic properties or archaeological sites, new or previously recorded that might be affected by the proposed project.

LOCATION:

The project is located in Lexington County southwest of Columbia and south of Lexington between U.S. Highway 1 and Longs Pond Road.

USGS QUADRANGLE: Lexington **DATE:** 1983 **SCALE:** 7.5'
UTM: **ZONE:** 17 Northern Extent **EASTING:** 482228 **NORTHING:** 3760262
Southern Extent **EASTING:** 472737 **NORTHING:** 3753574

ENVIRONMENTAL SETTING:

The project area is situated in the Sandhills physiographic region, which separates the Coastal Plain from the Piedmont. Elevations in the Sandhills range from 250-500 feet above mean sea level. The project area focuses on a 12-mile segment of existing interstate south of the city of Lexington. The surrounding landscape has been partially developed with commercial industry and residential neighborhoods, while more than half of the remainder of the APE remains forested.

NEAREST RIVER/STREAM AND DISTANCE:

Twelvemile and Red Bank creeks are situated north and south of the project area, respectively. Small tributaries of Twelvemile Creek cross the APE along I-20 east and west of the Highway 1 interchange.

SOIL TYPE:

Table 1. Soil Series Represented in the Project Area

Soil Series	Type	Slope	Drainage
Blaney	Sand	2-10 percent	Well Drained
Dothan	Loamy Sand	0-6 percent	Well Drained
Fuquay	Loamy Sand	0-6 percent	Well Drained
Georgeville	Very Fine Sandy Loam	6-10 percent	Well Drained
Johnson Soils	Mucky or Sandy Loam	N/A	Very Poorly Drained
Lakeland Soils, Undulating	Sand	N/A	Excessively Drained
Lakeland	Sand	6-15 percent	Excessively Drained
Pelion	Loamy Sand	6-10 percent	Moderately Well Drained
Tatum	Silt Loam	15-25 percent	Well Drained
Troup	Sand	0-6 percent	Somewhat Excessively Drained

REFERENCE FOR SOILS INFORMATION: U.S. Department of Agriculture (USDA) National Resource Conservation Service Soil Survey Division (NRCS): http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx (Soil Survey Staff 2014)

GROUND SURFACE VISIBILITY: **0% ___ 1-25% _X__ 26-50% ___ 51-75% ___ 76-100% ___**

CURRENT VEGETATION:
Half of the project area is undeveloped, and vegetation consists of hard and soft woods with a moderate understory of scrub brush and vines. The remainder of the project area is primarily commercial with one relatively new residential neighborhood at the Longs Pond Road interchange. Vegetation in the commercial and residential areas consists of hard and soft woods, manicured laws, and ornamental plantings.

INVESTIGATION:

ARCHAEOLOGY

Background research was conducted at the Site Files housed at the South Carolina Institute of Archaeology and Anthropology (SCIAA). Two previously recorded sites were located within 0-25 miles of the APE including 38LX177 and 38LX198 (Figure 1). Little information is available for either site. The official site form for 38LX177 indicates that the site has unknown prehistoric and historic components, and that the site was probably not eligible for listing on the National Register of Historic Places (NRHP). The site is located just outside of the APE at the far northern extent of the Highway 1 interchange on the westbound side of I-20. Site 38LX198 lies just south of 38LX177 on the westbound side of I-20. The site form provides little information beyond a NRHP recommendation of probably not eligible. During the current survey, the field crew noted that a medical supplies facility was built on

the property. Much of the area where 38LX198 was once located is now occupied by a building and parking lot. Shovel testing in the remaining grassy areas showed extensive construction disturbance with subsoil at or just below the surface. No cultural material was recovered. Site 38LX198 was not successfully relocated during the survey.

New South Associates conducted a Phase I Archaeological Survey on September 29-October 3, 2014. The survey consisted of two shovel test transects along each side of I-20 from Highway 1 west to Longs Pond Road for a distance of approximately 12 miles. Tests were dug at 100-foot (30-m) intervals. A total of 446 shovel tests locations were investigated. Of those, 197 shovel tests were not excavated due to extensive disturbance associated with residential, commercial, and road development. Fill from all shovel tests were screened through 0.25-inch mesh hardware cloth to ensure systematic artifact recovery. In addition, a reconnaissance survey was conducted of the median of I-20 to determine whether intact soils may still exist. A visual inspection of the median found that a concrete ditch was present for the entire length of the APE and that intact deposits were highly unlikely.

As a result of the survey, one new archaeological site was identified. Site 38LX644 is a small prehistoric lithic scatter located along a remnant strip of land between the cut-fill section of the eastbound lane of I-20 and Cedar Road, northeast of the U.S. Highway 1 and I-20 interchange (Figure 2). The site is situated at the northwest corner of a parking lot associated with a commercial property. Extensive disturbance associated with the building and parking lot construction was observed during testing. Vegetation consists primarily of low grasses with a few native pioneer plants and ornamental landscaping along the periphery. The grasses offered little ground visibility. Sixteen shovel tests were excavated at the site, two of which were positive for cultural material. Artifacts were recovered from 0-60 centimeters below surface. The typical soil profile in undisturbed contexts showed 0-20 centimeters of grayish brown (10YR 5/2) sandy loam over yellow (10YR 7/6) sand. Three quartz flakes were recovered from the two positive shovel tests. Based on the two positive shovel tests, the site measures approximately 5x10 meters.

Based on the paucity of artifacts and their undiagnostic nature, New South recommends that the site as not eligible for listing on the NRHP.

ARCHITECTURAL HISTORY

The files at SCIAA were consulted in an attempt to identify any previously recorded sites within or near the project area. No previously recorded resources were identified. The statewide bridge survey conducted by Lichtenstein Consulting Services (2005) was also consulted, and four bridges within the project area were documented. These bridges were re-evaluated and assigned a site number during this survey.

On Thursday, October 9, 2014, an architectural historian surveyed the APE for previously unrecorded resources 50 years of age or older. Four buildings, four bridges, and a railroad corridor were identified and surveyed in accordance with the South Carolina State Historic Preservation Office's *Survey Manual: South Carolina Statewide Survey of Historic Places* (2013) (Figure 1). These resources are listed in the table below, with their recommended eligibility for the NRHP, and are also described individually.

Table 2. Evaluated Architectural Resources

Resource Number	Name/Address	Date of Construction	Recommended NRHP Eligibility
U/63/0859	Mineral Springs Road Bridge over I-20	1964	Not Eligible
U/63/0860	149 Monroe Lane	circa 1900	Not Eligible
U/63/0861	Monroe Lane	1964	Not Eligible
U/63/0862	US1/Augusta Road Bridge over I-20	1965	Not Eligible
U/63/0863	Dooley Road	1950	Not Eligible
U/63/0864	Dooley Road	1955	Not Eligible
U/63/0865	I-20 Bridge over Norfolk Southern Railroad and Meat Plant Road	circa 1965	Not Eligible
U/63/0866	Columbia & Augusta Railroad (Norfolk Southern Railroad)	1869	Not Eligible
U/63/0867	Cedarcrest Drive Bridge over I-20	1964	Not Eligible

Resource Number U/63/0859

Resource Number U/63/0859 is a reinforced concrete bridge carrying Mineral Springs Road over I-20 (Figure 1). Constructed in 1964, the four-span stringer bridge has concrete guardrails set between concrete posts, a concrete deck, reinforced concrete stringers, and reinforced concrete abutments and bents (Figure 3a). The bridge was built during the construction of I-20 through South Carolina in the 1960s to carry Mineral Springs Road over the limited access highway.

Resource Number U/63/0859 was documented and evaluated in 2005 during the bridge survey and it was found to be not eligible for the NRHP. This survey concurs with the 2005 recommendation as the bridge is not associated with any historic event or person of significance nor is it significant for its engineering, design, or materials.

Resource Number U/63/0860

Resource Number U/63/0860, located at 149 Monroe Lane, is a residence of frame construction and one-and-a-half stories in height (Figure 1). Constructed circa 1900, the house has a steeply pitched hip roof and is clad in vinyl siding (Figure 3b). The roof has a gable front on each elevation. The engaged front porch spans the front and right elevations. The porch consists of square wooden supports and a simple balustrade of a thin wooden railing and square wooden balusters supporting a square wooden railing. Additional architectural features include historic wooden doors with nine-lights and various types of replacement windows– fixed sash and one-over-one double hung sash windows. The house has two additions, a historic addition on the rear and a large, non-historic addition on the north elevation.

Although it is located on the north side of U.S. Highway 1, which is a developed commercial corridor, Monroe Lane only has two residences and a small office complex at the end. The house is located on the west side of Monroe Lane, which runs parallel to I-20. Landscape elements include a semi-circular driveway in front of the house and mature hardwoods and pines behind the house.

Resource Number U/63/0860 is recommended as not eligible for the NRHP as it is not associated with any historic event or person of significance nor is it an outstanding example of a type.

Resource Number U/63/0861

Resource Number U/63/0861 is a Linear Ranch House located on Monroe Lane (Figure 1). Constructed in 1964, the residence is of frame construction and has a hip roof and brick veneer exterior (Figure 3c). The front elevation features a recessed entry, a tripartite window, and a projecting bay towards the north end of the house. An engaged carport is located on the south elevation along with a screened side porch. Additional architectural features include two-over-two double hung sash windows, overhanging eaves, and an interior slab chimney.

Although it is located on the north side of U.S. Highway 1, which is a developed commercial corridor, Monroe Lane only has two residences and a small office complex at the end. The house is located on the west side of Monroe Lane, which runs parallel to I-20, and has a deep setback from road. The large front yard has an informal landscape featuring mature hardwood trees, while foundation plantings and shrubbery have been planted along the house.

Resource Number U/63/0861 is recommended as not eligible for the NRHP as it is not associated with any historic event or person of significance nor is it an outstanding example of a type.

Resource Number U/63/0862

Resource Number U/63/0562 is a reinforced concrete bridge carrying U.S. Highway 1 over I-20 (Figure 1). Constructed in 1965, the four-span stringer bridge has tubular metal guardrails set between concrete posts, a concrete deck, reinforced concrete stringers, and reinforced concrete abutments and bents (Figure 4a). The bridge was built during the construction of I-20 through South Carolina in the 1960s to carry U.S. Highway 1 over the limited access highway.

Resource Number U/63/0862 was documented and evaluated in 2005 during the bridge survey and it was found to be not eligible for the NRHP. This survey concurs with the 2005 recommendation as the bridge is not associated with any historic event or person of significance nor is it significant for its engineering, design, or materials.

Resource Number U/63/0863

Resource Number U/63/0863, located on the east side of Dooley Road, is a one-story residence (Figure 1). Constructed in 1950, the house is of frame construction with a brick veneer exterior and cross gable roof (Figure 4b). The engaged entry porch is located within the projecting front gable, which also features a two-over-two double hung sash window. Additional architectural features include a tripartite window, interior brick chimney, and two-over-two double hung sash windows throughout. The house is currently vacant.

Although it is located off the south side of U.S. Highway 1, which is a developed commercial corridor, Dooley Road is sparsely developed with residential and commercial buildings. The house is located on the east side of Monroe Lane, which runs parallel to I-20. The overgrown front yard has an informal landscape featuring mature hardwood and pine trees with foundation plantings and shrubbery along the house.

Resource Number U/63/0863 is recommended as not eligible for the NRHP as it is not associated with any historic event or person of significance nor is it an outstanding example of a type.

Resource Number U/63/0864

Resource Number U/63/0864, located on the east side of Dooley Road, is a one-story residence (Figure 1 and 4c). Constructed in 1955, the house is of frame construction with a brick veneer exterior and lateral gable roof. The entry porch has a gable roof and decorative aluminum supports. Additional architectural features include a 20-light fixed sash window flanked by four-over-four double hung sash windows and six-over-six and eight-over-eight double hung sash windows throughout. The house is currently vacant.

Although it is located off the south side of US.. Highway 1, which is a developed commercial corridor, Dooley Road is sparsely developed with residential and commercial buildings. The house is located on the east side of Monroe Lane, which runs parallel to I-20. The overgrown front yard has an informal landscape featuring mature hardwood and pine trees with foundation plantings and shrubbery along the house.

Resource Number U/63/0864 is recommended as not eligible for the NRHP as it is not associated with any historic event or person of significance nor is it an outstanding example of a type.

Resource Number U/63/0865

Resource Number U/63/0865 are paired, reinforced concrete bridges carrying I-20 over the Norfolk Southern Railroad corridor and Meat Plant Road; one bridge carries the eastbound lanes, the other the westbound lanes (Figure 1). Constructed circa 1965, the four-span stringer bridges have tubular metal guardrails set between concrete posts, a concrete deck, reinforced concrete stringers, and reinforced concrete abutments and bents (Figure 5a). The bridge was built during the construction of I-20 through South Carolina in the 1960s to carry the limited access highway over the railroad corridor.

Resource Number U/63/0865 was documented and evaluated in 2005 during the bridge survey and it was found to be not eligible for the NRHP. This survey concurs with the 2005 recommendation as the bridges are not associated with any historic event or person of significance nor are they significant for engineering, design, or materials.

Resource Number U/63/0866

Resource Number U/63/0866 is the former Columbia & Augusta (C&A) Railroad, now under the operation of Norfolk Southern Railroad (Figure 1). Established in 1869, the C&A provided a westward rail line from Columbia to Augusta. Within the same year, the fledgling rail line merged with the Charlotte & South Carolina Railroad to form the Charlotte, Columbia, and Augusta Railroad (CC&A). In 1878, the CC&A merged with the Richmond & Danville Railroad and was known as its South Carolina Division. In 1894, the Richmond & Danville Railroad merged with the East Tennessee, Virginia, & Georgia Railroad to create Southern Railway. Southern Railway continued to expand through the late 1800s, encompassing more than 7,700 miles by 1900. In 1982, Southern Railway merged with Norfolk & Western Railroad, creating Norfolk Southern Railroad.

Within the APE, the Norfolk Southern Railroad is a single track, linear railroad grade structure that runs under I-20 (Figure 1). It is an active corridor that features a ballast roadbed, a 4.70± gauge track, gravel, and railroad ties (Figure 5b). It appears that the alignment of the railroad bed has remained consistent since the date of construction. The railroad corridor has no historic structures affiliated with the line.

Resource Number U/63/0866 is recommended as not eligible for the NRHP as it is not associated with any historic event or person of significance nor is it significant for engineering, design, or materials.

Resource Number U/63/0867

Resource Number U/63/0867 is a reinforced concrete bridge carrying Cedarcrest Road over I-20 (Figure 1). Constructed in 1964, the four-span stringer bridge has concrete guardrails set between concrete posts, a concrete deck, reinforced concrete stringers, and reinforced concrete abutments and bents (Figure 5c). A modern metal guardrail has been installed on the interior of original concrete guardrail along both sides of the bridge. The bridge was built during the construction of I-20 through South Carolina in the 1960s to carry Cedarcrest Road over the limited access highway.

Resource Number U/63/0867 was documented and evaluated in 2005 during the bridge survey and it was found to be not eligible for the NRHP. This survey concurs with the 2005 recommendation as the bridge is not associated with any historic event or person of significance nor is it significant for its engineering, design, or materials.

REMARKS AND RECOMMENDATIONS:

One archaeological site (38LX644) was identified northeast of the U.S. Highway 1 and I-20 interchange. Based on the paucity of artifacts and undiagnostic nature of the site, it is recommended not eligible for listing on the NRHP. There are nine historic resources within the project area that were evaluated as part of this study. Four of these resources are bridges that were recorded by Lichtenstein Consulting Services (2005) in a statewide bridge survey, but were not given a site number at the time. The other five are newly recorded. None of these resources are recommended eligible for listing in the NRHP.

SIGNATURE: Valerie Davis **DATE:** October 28, 2014

REFERENCES CITED

Lichtenstein Consulting Services

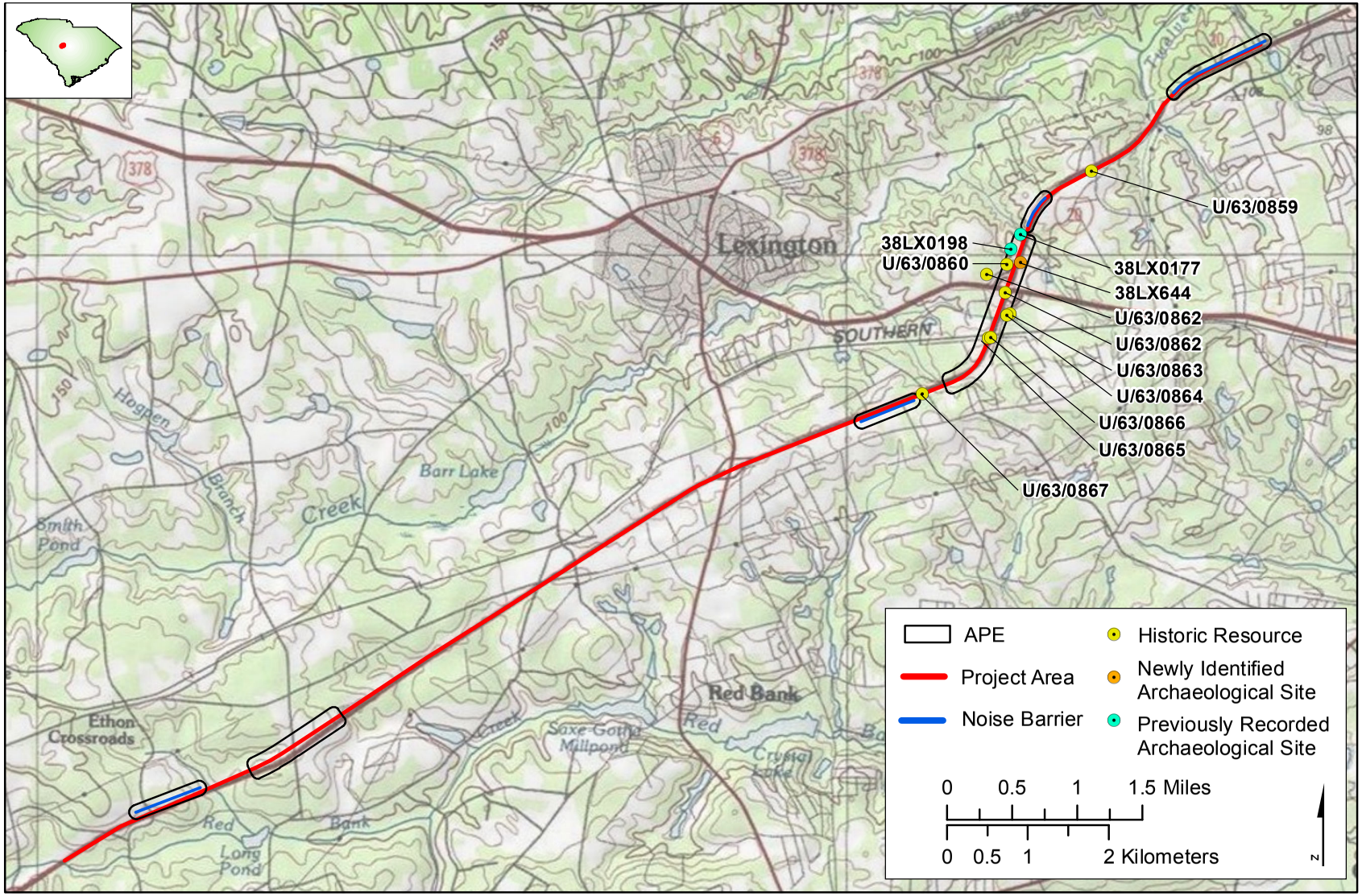
2005 *South Carolina State Bridge Survey*. Database.

Soil Survey Staff

2014 Web Soil Survey. *Natural Resources Conservation Service, United States Department of Agriculture*. Electronic document, http://websoilsurvey.nrcs.usda.gov/app/homepage.htm, accessed January 21, 2014.

South Carolina Department of Archives and History

2013 *Survey Manual: South Carolina Statewide Survey of Historic Places*. Report available from the South Carolina Department of Archives and History, Columbia, South Carolina.



Source: USGS 7.5 Minute Topographic Quadrangle Maps, Lake Murray East (1973), Irmo (1973), Barr Lake, and Lexington (1983)

Figure 1.
Project Location Map Showing Previously Recorded Sites and New Resources

Figure 2.
Sketch Map and Photograph of Site 38LX644

Figure 3.
Photographs of Historic Resources

A.
U/63/0859

B.
U/63/0860

C.
U/63/0861

Figure 4.
Photographs of Historic Resources

A.
U/63/0862

B.
U/63/0863

C.
U/63/0864

Figure 5.
Photographs of Historic Resources

A.
U/63/0865

B.
U/63/0866

C.
U/63/0867

South Carolina
Department of Transportation

FEB 27 2015

February 26, 2015

Ms. Elizabeth Johnson
Deputy State Historic Preservation Officer
South Carolina Department of Archives and History
8301 Parklane Road
Columbia, SC 29223-4905

RE: Phase I Cultural Resources Survey of 12 miles of I-20 Southeast of Columbia, South Carolina. Lexington County, South Carolina. Project: **P027003**

Dear Ms. Johnson:

Enclosed are two copies of a report that describes cultural resource investigations in Lexington County, South Carolina. The investigations were conducted in advance of the proposed widening of Interstate 20. The proposed project includes adding a travel lane in each direction, improving various exit ramps, and replacing or widening the parallel mainline bridges over Norfolk Southern Railroad.

As a result of the survey, one new archaeological site (38LX644) and nine historic resources were identified in the project's Area of Potential Effects. None of these resources were determined eligible for listing in the National Register of Historic Places. **No historic properties will be affected** by the proposed undertaking.

Per the terms of the Section 106 Programmatic Agreement executed on December 13, 2011, the Department is providing this information on behalf of the Federal Highway Administration. It is requested that you review the enclosed material and, if appropriate, indicate your concurrence in the Department's findings. Please respond within 30 days if you have any objections or if you have need of additional information.

Sincerely,

Chad C. Long
Archaeologist/Environmental Project Manager

I ([redacted]) concur in the above determination.

Signed: _____ Date: 3/3/2015

Enclosure

cc: Shane Belcher, FHWA
Dr. Wenonah Haire, CIN-THPO
Lisa LaRue Stopp, United Keetowah Band of Cherokee
Keith Derting, SCIAA

ec: Russell Townsend, EBCI
Tyler Howe, EBCI

Post Office Box 191
Columbia, South Carolina 29202-0191

Phone: (803) 737-2314
TTY: (803) 737-3870

SCDOT

South Carolina
Department of Transportation

February 26, 2015

Ms. Elizabeth Johnson
Deputy State Historic Preservation Officer
South Carolina Department of Archives and History
8301 Parklane Road
Columbia, SC 29223-4905

RE: Phase I Cultural Resources Survey of 12 miles of I-20 Southeast of Columbia, South Carolina. Lexington County, South Carolina. Project: **P027003**

Dear Ms. Johnson:

Enclosed are two copies of a report that describes cultural resource investigations in Lexington County, South Carolina. The investigations were conducted in advance of the proposed widening of Interstate 20. The proposed project includes adding a travel lane in each direction, improving various exit ramps, and replacing or widening the parallel mainline bridges over Norfolk Southern Railroad.

As a result of the survey, one new archaeological site (38LX644) and nine historic resources were identified in the project's Area of Potential Effects. None of these resources were determined eligible for listing in the National Register of Historic Places. **No historic properties will be affected** by the proposed undertaking.

Per the terms of the Section 106 Programmatic Agreement executed on December 13, 2011, the Department is providing this information on behalf of the Federal Highway Administration. It is requested that you review the enclosed material and, if appropriate, indicate your concurrence in the Department's findings. Please respond within 30 days if you have any objections or if you have need of additional information.

Sincerely,

Chad C. Long
Archaeologist/Environmental Project Manager

I (~~do not~~) concur in the above determination.

Signed: Wenonah Haire Date: 3/2/15

Enclosure

cc: Shane Belcher, FHWA
Dr. Wenonah Haire, CIN-THPO
Lisa LaRue Stopp, United Keetowah Band of Cherokee
Keith Derting, SCIAA

ec: Russell Townsend, EBCI
Tyler Howe, EBCI

Post Office Box 191
Columbia, South Carolina 29202-0191

Phone: (803) 737-2314
TTY: (803) 737-3870

APPENDIX I
Natural Resources Technical Memorandum

Natural Resources Technical Memorandum

I-20 Widening Project

Lexington County, SC

Project No. 1404601

Prepared for:

S.C. Department of Transportation

Prepared by:

June 2015

Introduction:

HDR|ICA Engineering (HDR|ICA) has been contracted by the S.C. Department of Transportation (SCDOT) to provide professional engineering support services for the proposed I-20 widening project located in Lexington County. Specifically, the project would extend from approximately mile point 49 (just west of Longs Pond Road) to mile point 60.2 (west of US 378) for a total distance of approximately 11 miles. The project includes adding a travel lane in each direction, improving various exit ramps, and replacing or widening the parallel mainline bridges over Norfolk Southern Railroad near mile point 57. The purpose of the project is to relieve traffic congestion along area transportation facilities by widening the existing I-20. A project boundary has been identified to include the anticipated improvements and includes a general corridor of approximately 120 feet from the centerline of the eastbound and westbound lanes. This corridor extends to 220 feet along the US 1 interchange and the Longs Pond Road interchange.

The purpose of this assessment is to: evaluate the project area to determine the potential presence and location of any jurisdictional waters of the U.S. (WOUS) regulated under the Clean Water Act; and to determine the presence, or potential presence, of any protected species that are listed as threatened, endangered, or proposed for listing pursuant to Section 7 of the Endangered Species Act of 1973 (50 CFR Part 402). The following assessment was conducted utilizing a variety of methods, including a review of available mapping, literature research, and field investigations as documented. In addition, Figures 1-6 are enclosed that illustrate the project location, topography, national wetland inventory, soils, and delineated WOUS.

Project Setting:

The project area spans two ecoregions including the “Sand Hills” region of the Southeastern Plains and the “Carolina Slate Belt” region of the Piedmont. Specifically, the project area is centered along a portion of the I-20 corridor between Lexington and Columbia and includes multiple interchanges that provide direct access to the town of Lexington. As such, the project corridor includes various urbanized land uses including transportation, commercial development, industrial, and residential land with very minimal natural communities.

The project area is largely located within the *Saluda River Watershed* (03050109-14) with the western portion located within the *Congaree Creek Watershed* (03050110-01). The Saluda River watershed drains approximately 65,600 acres, with the majority of the area comprised of urban land uses. The Congaree Creek watershed drains approximately 91,300 acres, with the majority of the area comprised of forested and agricultural land uses. The project area includes the following mapped soils: Fuquay loamy sand, Lakeland soils, Johnston soils (hydric), Blaney sand, Vaucluse loamy sand, and Pelion loamy sand. The project extends across a number of Flood Insurance Rate Maps including: 45063C0237G, 45063C0241G, 45063C0242G, 45063C0234G, 45063C0253G, 45063C0254G, 45063C0252G, 45063C0256G, and45063C043C0143G, all effective February 9, 2000. FIRM # 45063C0241G documents a special flood hazard area (Zone A) associated with an unnamed tributary to Red Bank Creek.

Project Area Description:

The 521 acre project area is largely comprised of the I-20 roadway corridor and other associated transportation and utility facilities, commercial/industrial lands uses, sparse

residential land uses, and undeveloped/forested land uses. The I-20 corridor provides direct access to various local municipalities including Lexington and West Columbia, along with access to I-26 just east of the project boundary. As such, this stretch of roadway is heavily traveled with the adjacent areas developed with typical transportation oriented business (i.e. restaurants, gas stations, retail, etc.). In addition, the project area includes sparse industrial/commercial developments and residential areas throughout the corridor. There are also undeveloped forested areas that are primarily dominated by *Pinus taeda* (loblolly pine) and stream crossings with adjacent hardwood riparian areas. As such, the following natural habitats and communities were identified along portions of the project area.

- Riverine
- Small Stream Forests
- Upland Planted Pine Forest/Oak-Hickory Forest
- Disturbed Habitat

Riverine

The project area includes various intermittent and perennial tributaries that provide riverine habitat within the project corridor. These tributaries generally consist of first to second order streams that are associated with Twelvemile Creek and Red Bank Creek. These systems include a defined bed and bank, with varying substrate including sand, silt, and gravel. In general, these tributaries are not considered State navigable waters and are classified by the S.C. Department of Health and Environmental Control (SCDHEC) as "Freshwaters (FW)", which are

> "suitable for primary and secondary contact recreation and as a source for drinking water supply after conventional treatment in accordance with the requirements of the Department. Suitable for fishing and the survival and propagation of a balanced indigenous aquatic community of flora and fauna."

Portions of Twelvemile Creek in the vicinity of the project area are listed on the State's *2012 303(d) List of Impaired Waters*. Specifically, Twelvemile Creek is listed as impaired for 'Aquatic Life Use' due to the results of biological macro-invertebrate sampling along the biological monitoring station (S-294) located at the crossing with U.S. 378. The portion of Red Bank Creek in the vicinity of the project area is in compliance with all water quality standards based on the nearest downstream monitoring station (C-066) located along Old Orangeburg Road, approximately four-miles downstream of the project area.

Small Stream Forest

The project area includes areas of small stream forests that directly abut the various tributaries. In most cases these areas provide a buffer from disturbed/developed areas. Many of these areas include forested wetlands with periodic overbank flooding from the tributaries. The vegetation along these areas includes, but is not limited to *Acer rubrum* (red maple), *Quercus laurifolia* (laurel oak), *Liriodendron tulipifera* (tulip poplar), *Cornus florida* (flowering dogwood), *Vaccinium corymbosum* (highbush blueberry), *Woodwardia areolata* (netted chain fern), and *Arundinaria gigantean* (giant cane). The small stream forest areas provide suitable habitat to various common birds, mammals and reptiles. The surrounding landuses and encroaching development increases the use and importance of this habitat as a buffer for stormwater runoff and travel corridors for various species.

Upland Planted Pine/Oak-Hickory Forest

The project area includes various forested upland areas dominated by *Pinus taeda* (loblolly pine) that appear to have converted in the past from primarily Oak-Hickory Forest. As such there are sparse areas of upland forested hardwoods consisting of *Quercus alba* (white oak), *Q. falcata* (red oak), *Q. nigra* (water oak), red maple, *Liquidambar styraciflua* (sweetgum), and tulip poplar. These areas are primarily located along the hill slopes adjacent to the small stream forests. These areas are highly fragmented by the existing infrastructure and development, but provide limited habitat for various common birds and mammals.

Disturbed Habitat

The project area consists of various disturbed land uses including transportation facilities, residential/commercial developments, and utility corridors. This includes the existing roadway and transportation right-of-way, which consists of the existing roadway fill, maintained medians, and maintained shoulders and embankment slopes. There are also various overhead utility corridors along the project area that are maintained (mowing, spraying) to prevent vegetative obstructions. In addition, the project area and general vicinity includes areas of dense residential and commercial developments located just beyond the existing transportation right-of-way. These areas have impacted the natural landscape through clearing, grading, filling, paving, and vertical building construction. As such, these areas provide very minimal habitat with routine maintenance.

Waters of the U.S.

The project area was evaluated to determine the potential presence of any jurisdictional WOUS. This evaluation included a review of available mapping, specifically the National Wetland Inventory (NWI) maps, soil surveys, USGS topographic quadrangles (*Irmo*, *Lexington, Barr Lake)* and 2006 NAPP false-color infrared aerial photography. The review of initial mapping identified various linear systems and potential wetland areas located within the project area that appear to be associated with tributaries to Twelvemile and Red Bank Creeks. Various site visits were conducted between September 2014 and November 2014 to further evaluate and document the potential WOUS. The field evaluation confirmed various wetland areas and tributaries located within the project boundary, which were field delineated and surveyed. It was determined that the 521 acre project area includes approximately 2.92 acres of jurisdictional wetlands and 3,977 LF of jurisdictional tributaries.

The WOUS within the project area are primarily associated with two large contiguous systems comprising of the headwaters of Twelvemile Creek and Red Bank Creek. The project area includes reaches from 13 tributary systems (Tributary 1-12, including 7a) and nine (9) wetland areas (Wetland 1-8, including 3a) that are directly associated with these systems. The tributaries along the site drain to either Twelvemile Creek with ultimate drainage to the Saluda River, approximately 2 miles downstream, or to Red Bank Creek with ultimate drainage to the Congaree River approximately 15 miles downstream. Based on the characteristics of the tributaries at the time of the site visit, it has been determined that these waters are considered WOUS as either ‘seasonal relatively permanent waters’ (sRPW) or ‘perennial relatively permanent waters’ (pRPW) that ultimately drain to ‘traditionally navigable water’ (TNW, i.e. Twelvemile Creek/Congaree Creek). In addition, the jurisdictional wetland areas were determined to be either directly ‘abutting’ or ‘adjacent’ to these RPWs. As such, these wetland

areas are considered under the jurisdiction of the U.S. Army Corps of Engineers (USACE), and subject to all applicable regulations. In addition, the existing roadway drainage system includes various linear drainage features/conveyances and retention areas located immediately adjacent to the roadway. These features convey stormwater runoff to various outfall locations along the project; however, these features did not exhibit characteristics of jurisdictional tributaries, and therefore are not considered WOUS.

Linear Systems

Tributary 1:

Tributary 1 (319 LF) is a second order tributary to Red Bank Creek, and is depicted as a 'blue line' stream on the *Barr Lake* USGS Topographic Quadrangle. The tributary flows southeastward through I-20 via a box culvert. The area appears to have been man altered through channelization/excavation and within this area the tributary has a bed and bank with an average width of approximately 4-6 feet and a height of 2 feet with continuous flow at an average depth of 6 inches at the time of the site visit on October 24, 2014. Within the natural reach of the channel, the width is 2-4 feet, 1-3 feet deep, and continuous water flow at a depth of 4-6 inches. The tributary exhibits numerous characteristics of flow, including but not limited to bed and bank, scour, silt/sand substrate, lack of terrestrial vegetation, and a clear and depressed line on the banks. It is largely bounded by a wetland forested buffer described below as Wetland 1 and Wetland 2. Wetland 2 directly abuts the channel on both banks north of I-20 and Wetland 1 abuts the western bank south of I-20. Based on the field assessment and system characteristics, Tributary 1 is assumed a "relatively permanent water" (RPW) and subject to all applicable USACE regulations.

Tributary 2:

Tributary 2 (581 LF) is a second order tributary to Red Bank Creek, but is not depicted on the *Barr Lake* USGS Topographic Quadrangle. The tributary flows southward through I-20 via a box culvert. Within the project area, the tributary has a bed and bank with an average width of approximately 3-6 feet and a height of 1-3 feet with continuous flow at an average depth of 8 inches at the time of the site visit on October 8, 2014. This tributary is bounded by Wetland 3 and Wetland 4 for its entirety through the project corridor except where culverted through I-20. The tributary exhibits numerous characteristics of flow, including but not limited to bed and bank, scour, silt/gravel substrate, lack of terrestrial vegetation, and a clear and depressed line on the banks. The area appears to have been man altered through channelization/excavation and is bounded by wetland forested buffers described below as Wetlands 3 and 4. Based on the field assessment and system characteristics, Tributary 2 is assumed a "relatively permanent water" (RPW) and subject to all applicable USACE regulations.

Tributary 3:

Tributary 3 (98 LF) is a second order tributary to Red Bank Creek, but is not depicted on the *Barr Lake* USGS Topographic Quadrangle. The tributary flows southward through the existing I-20 via a box culvert and exits the project boundary south of the existing roadway. Within the project area, the tributary has a distinct bed and bank with an average width of approximately 2-3 feet, height of 1-2 feet, and had flowing water at the time of the site visit on October 8, 2014. The tributary exhibits numerous characteristics of regular flow, including but not limited to bed and bank, scour, lack of terrestrial vegetation, sediment sorting, aquatic vegetation, and flowing water at the time of the site visit. Based on the field assessment and system characteristics,

Tributary 3 is assumed a "relatively permanent water" (RPW) and subject to all applicable USACE regulations.

Tributary 3a:

Tributary 3a (171 LF) is a tributary to Tributary 3, with ultimate drainage to Red Bank Creek. This tributary is not clearly depicted on the *Barr Lake* USGS Topographic Quadrangle, but flows southwest to converge with Tributary 3 approximately 300 feet southwest of Wetland 5. Within the project area, the tributary has a distinct bed and bank with an average width of approximately 2-3 feet, a height of 1-3 feet, and continuous flow present at an average depth of 3 inches at the time of the site visit on October 8, 2014. The tributary exhibits numerous characteristics of regular flow, including but not limited to bed and bank, sand substrate, scour, lack of terrestrial vegetation, sediment sorting, and surface water at the time of the site visit. The upstream portion directly abuts to Wetland 5 and receives roadside drainage via a concrete ditch. Based on the field assessment and system characteristics, Tributary 3a is assumed a "relatively permanent water" (RPW) and subject to all applicable USACE regulations.

Tributary 4:

Tributary 4 (42 LF) is a first order tributary to Red Bank Creek, but is not depicted on the *Barr Lake* USGS Topographic Quadrangle. The tributary flows eastward from an existing roadway storm water outfall. Within the project area, the tributary has a distinct bed and bank with an average width of approximately 12 feet, a height of 3 feet, and ponded water upstream of Hidden Springs Rd at the time of the site visit on October 24, 2014. The tributary collects run-off upstream from a concrete ditch. The banks are armored with brick walls and the area appears to have been man altered through channelization/excavation. The tributary exhibits numerous characteristics of flow, including but not limited to bed and bank, scour, silt/sand substrate, lack of terrestrial vegetation, and a clear and depressed line on the banks. Based on the field assessment and system characteristics, Tributary 4 is assumed a "relatively permanent water" (RPW) and subject to all applicable USACE regulations.

Tributary 5:

Tributary 5 (252 LF) is a first order tributary to Twelvemile Creek, and is depicted on the *Lexington* USGS Topographic Quadrangle as a blue line intermittent stream. The tributary flows westward from an existing roadway storm water outfall and through Wetland 6 and then exiting the project area. Within the project area, the tributary has a distinct bed and bank with an average width of approximately 2-3 feet, a height of <1 foot, and discontinuous flowing water at the time of the site visit on October 8, 2014. The tributary exhibits numerous characteristics of flow, including but not limited to bed and bank, sand substrate, scour, and lack of terrestrial vegetation, sediment sorting. However, continuous flow appears to be intermittent as dry conditions were observed during the site visit. Based on the field assessment and system characteristics, Tributary 5 is assumed a "seasonal relatively permanent water" (sRPW) that flows directly to a TNW. As such, Tributary 5 is subject to all applicable USACE regulations.

Tributary 6:

Tributary 6 (336 LF) is a first order tributary to Twelvemile Creek, but is not depicted as a 'blue line' stream on the *Lexington* USGS Topographic Quadrangle. The tributary flows northward along the toe of the existing I-20 roadway until converging with Tributary 7. Tributary 6 is fed from a natural spring that comes from the east bound shoulder of I-20 at mile marker 58. The

tributaries headwaters flow over and under what was historically a concrete storm water ditch. That concrete has failed in many places and the channel substrate in these areas is gravel, silt, and chunk concrete. Within the project area, the tributary has a distinct bed and bank with an average width of approximately 2-5 feet, a height of 1-4 feet, and had discontinuous surface water with a depth up to 4 inches at the time of the site visit on October 1, 2014. The tributary exhibits numerous characteristics of regular flow, including but not limited to bed and bank, sand substrate, scour, lack of terrestrial vegetation, and surface water at the time of the site visit. Based on the field assessment and system characteristics, Tributary 6 is assumed a "seasonal relatively permanent water" (sRPW) that flows directly to a TNW. As such, Tributary 6 is subject to all applicable USACE regulations.

Tributary 7:

Tributary 7 (339 LF) is a second order tributary to Twelvemile Creek, and is depicted as a 'blue line' stream on the *Lexington* USGS Topographic Quadrangle. The tributary flows westward through I-20 via an approximate 8 foot box culvert. Within the project area, the tributary has a bed and bank with an average width of approximately 3-6 feet and a height of 3-6 feet with continuous flow at an average depth of 5 inches at the time of the site visit on September 30, 2014. The tributary exhibits numerous characteristics of flow, including but not limited to bed and bank, scour, silt/gravel substrate, lack of terrestrial vegetation, and a clear and depressed line on the banks. The area appears to have been man altered through channelization/excavation and is bounded by an upland forested buffer dominated by loblolly pine. Based on the field assessment and system characteristics, Tributary 7 is assumed a "relatively permanent water" (RPW) and subject to all applicable USACE regulations.

Tributary 8:

Tributary 8 (639 LF) is a first order tributary to Twelvemile Creek, but is not depicted on the *Lexington* USGS Topographic Quadrangle. The tributary begins at a pipe outfall just east of Mineral Springs Rd. and flows northeasterly along the toe of the existing I-20 roadway until turning north and leaving the project boundary. Within the project area, the tributary has a distinct bed and bank with an average width of approximately 2-3 feet and a height of 1-4 feet with continuous water flow at an average depth of 2 inches at the time of the site visit on September 30, 2014. The tributary exhibits numerous characteristics of flow, including but not limited to bed and bank, scour, lack of terrestrial vegetation, and a clear and depressed line on the banks. The channel substrate consists of silt and sand. The area appears to have been man altered through channelization/excavation and is bounded by an upland forested areas. Based on the field assessment and system characteristics, Tributary 8 is assumed a "relatively permanent water" (RPW) and subject to all applicable USACE regulations.

Tributary 9:

Tributary 9 (756 LF) is a second order, unnamed tributary to Twelvemile Creek, and is depicted as a 'blue line' stream on the *Lexington* USGS Topographic Quadrangle. The tributary begins at a pond outfall and flows northeast along the toe of slope of the existing roadway through I-20 and Cromer Rd. via an approximately 4 foot box culvert where it flows offsite along Cromer Rd. north for approximately 250 feet. It then re-enters the project boundary under Cromer Rd. via an approximately 60 inch corrugated metal pipe, flows north along the toe of the existing roadway and converges with Tributary 11 and flows west back under I-20 via an approximately 8 foot box culvert. Within the project area, the tributary has a distinct bed and bank with a width of approximately 4-8 feet; height of 1-3 feet, and had continuous flow with a water depth of 2-4

inches at the time of the site visit on September 30, 2014. The tributary exhibits numerous characteristics of flow, including but not limited to bed and bank, scour, lack of terrestrial vegetation, and a clear depressed line along the bank at the time of the site visit. The area appears to have been man altered through channelization/excavation with an upland forested riparian area. Based on the field assessment and system characteristics, Tributary 9 is assumed a "relatively permanent water" (RPW) and subject to all applicable USACE regulations.

Tributary 10:

Tributary 10 (86 LF) is first order, unnamed tributary to Twelvemile Creek, but is not shown on the *Lexington* USGS Topographic Quadrangles. Within the project boundary, the tributary has a distinct bed and bank with a width of 2-3 feet, a height of 1-2 feet, and minimal water depth. There was minimal, discontinuous flow at the time of the site-visit September 30, 2014. The channel substrate consists of silt and gravel with evidence of scour and a clear OHWM. This system flows southeast through I-20 via a 24 inch concrete pipe. It then outfalls beyond the project boundary west of Cromer Rd and converges with Tributary 9. Based on the field assessment and system characteristics, Tributary 10 is assumed a "seasonal relatively permanent water" (sRPW) that flows directly to a TNW. As such, Tributary 10 is subject to all applicable USACE regulations.

Tributary 11:

Tributary 11 (140 LF) is a second order, unnamed tributary to Twelvemile Creek and is depicted as a 'blue line' stream on the *Lexington* USGS Topographic Quadrangle. The tributary flows through the existing roadway via a box culvert. Within the project area, the tributary has a distinct bed and bank with a bottom width of approximately 20-24 feet; height of 3-5 feet, and had a water depth no less than 4 inches at the time of the site visit on October 1, 2014. The substrate of this reach is silt, gravel and cobble. The tributary exhibits numerous characteristics of regular flow, including but not limited to bed and bank, scour, lack of terrestrial vegetation, and flowing water at the time of the site visit. The reach also exhibits the various other ordinary high water mark (OHWM) indicators along with upland forested riparian areas. This reach appears to have been man altered through channelization/excavation which eventually drains northerly into Twelvemile Creek beyond the project boundary. Based on the field assessment and system characteristics, Tributary 11 is assumed a "relatively permanent water" (RPW) and subject to all applicable USACE regulations.

Tributary 12:

Tributary 12 (217 LF) is a first order, unnamed tributary to Twelvemile Creek, but is not shown on the *Irmo* USGS Topographic Quadrangle. The tributary flows southward from Wetland 8 parallel to the existing roadway embankment for approximately 300 feet then turns west through the existing roadway via a 3-foot box culvert. That culvert extends under I-20 and Ginny Lane, then outfalls beyond the project boundary. Within the project area, the tributary has a distinct bed and bank with a bottom width of approximately 1-3 feet; height of 1-2 feet, and had a water depth of 0-3 inches at the time of the site visit on October 1, 2014. The tributary exhibits numerous characteristics of flow, including but not limited to bed and bank, silt/bedrock substrate, scour, and lack of terrestrial vegetation. There was discontinuous water flow at the time of the site visit. This system appears to be man altered system which eventually drains eastward to an unnamed tributary to Twelvemile Creek, beyond the project boundary. Based on the field assessment and system characteristics, Tributary 12 is assumed a "seasonal relatively

permanent water" (sRPW) that flows directly to a TNW. As such, Tributary 12 is subject to all applicable USACE regulations.

Wetlands

Wetland 1:

Wetland 1 (0.385 acres) is a palustrine forested wetland that is located immediately north of the existing roadway, and is bounded to the east and west by upland forested areas; and is bisected by Tributary 1. Wetland 1 is largely a forested wetland with vegetation consisting of, but is not limited to red maple, laurel oak, tulip poplar, flowering dogwood, highbush blueberry, netted chain fern, and giant cane. The soils in this area are mapped Johnston soils and Lakeland sand with hydric conditions indicated in the field by low chroma soils with a depleted matrix and redox (i.e. 'sandy redox'). Hydrology indicators within the project area include areas of saturation, water-stained leaves, vegetated concave surface, drainage patterns, and geomorphic position. The adjacent forested upland areas do not exhibit hydric soil indicators (i.e. high chroma soils). Wetland 1 is considered a jurisdictional wetland due to the direct hydrologic connection with Tributary 1 and other off-site WOUS.

Wetland 2:

Wetland 2 (0.514 acres) is a palustrine forested wetland that is located immediately south of the existing roadway, and is bounded to the east by upland forested areas, and to the west by Tributary 1. Wetland 2 is largely a forested wetland with vegetation consisting of, but is not limited to red maple, laurel oak, tulip poplar, flowering dogwood, highbush blueberry, netted chain fern, and giant cane. As such, wetland 2 is similar in community and structure as Wetland 1. The soils in this area are mapped Johnston soils and Lakeland sand with hydric conditions indicated in the field by low chroma soils with a depleted matrix and redox (i.e. 'sandy redox'). Hydrology indicators within the project area include areas of saturation, water-stained leaves, vegetated concave surface, drainage patterns, and geomorphic position. The adjacent forested upland areas do not exhibit hydric soil indicators (i.e. high chroma soils). Wetland 2 is considered a jurisdictional wetland due to the direct hydrologic connection with Tributary 1 and other off-site WOUS.

Wetland 3:

Wetland 3 (0.237 acres) is a palustrine forested wetland that is located immediately north of the existing roadway, and is bounded to the east and west by upland forested areas; to the north by commercial development; and is bisected by Tributary 2. Wetland 3 is largely a forested wetland with vegetation consisting of, but is not limited to red maple, laurel oak, tulip poplar, flowering dogwood, highbush blueberry, netted chain fern, and giant cane. As such, this area is similar in community type, structure and function as Wetlands 1 and 2. The soils in this area are mapped Johnston soils and Lakeland sand with hydric conditions indicated in the field by low chroma soils with a depleted matrix and redox (i.e. 'sandy redox'). Hydrology indicators within the project area include areas of saturation, water-stained leaves, vegetated concave surface, drainage patterns, and geomorphic position. The adjacent forested upland areas do not exhibit hydric soil indicators (i.e. high chroma soils). Wetland 3 is considered a jurisdictional wetland due to the direct hydrologic connection with Tributary 2 and other off-site WOUS.

Wetland 4:

Wetland 4 (1.160 acres) is a palustrine forested wetland that is located immediately south of the existing roadway, and is bounded to the east and west by upland forested areas, and is bisected by Tributary 2. Wetland 3 is largely a forested wetland with vegetation consisting of, but is not limited to red maple, laurel oak, tulip poplar, flowering dogwood, highbush blueberry, netted chain fern, and giant cane. As such, this area is similar in community type, structure and function as Wetlands 1, 2, and 3. The area receives drainage from the existing roadway system and surrounding developments. The soils in this area are mapped Johnston soils with hydric conditions indicated in the field by low chroma soils with a depleted matrix and redox (i.e. 'sandy redox'). Hydrology indicators within the project area include areas of saturation, water-stained leaves, vegetated concave surface, drainage patterns, and geomorphic position. The adjacent forested upland areas do not exhibit hydric soil indicators (i.e. high chroma soils). Wetland 4 is considered a jurisdictional wetland due to the direct hydrologic connection with Tributary 2 and other off-site WOUS.

Wetland 5:

Wetland 5 (0.110 acres) is a palustrine forested wetland that is located immediately northwest of the existing roadway, and is bounded to the northeast by upland forested areas; to the southwest by maintained power line right of way; to the northwest by commercial development; and is bisected by Tributary 3a. Wetland 5 is largely a forested wetland with vegetation along the wetland consisting of, but is not limited to red maple, loblolly pine, *Magnolia virginiana* (sweet-bay), highbush blueberry, and *Smilax rotundifolia* (horsebrier). The area receives drainage directly from the existing roadway system, including a concrete outfall ditch. The soils in this area are mapped Johnston soils and Blaney sand with hydric conditions indicated in the field by low chroma soils with a depleted matrix and redox (i.e. 'sandy redox'). Hydrology indicators within the project area include areas of saturation, water-stained leaves, vegetated concave surface, drainage patterns, and geomorphic position. The adjacent forested upland areas do not exhibit hydric soil indicators (i.e. high chroma soils). Wetland 5 is considered a jurisdictional wetland due to the direct hydrologic connection with Tributary 3a and other off-site WOUS.

Wetland 6:

Wetland 6 (0.284 acres) is a forested scrub-shrub wetland. The area is located immediately west of the existing roadway, and is bounded in all directions by commercial development, and is bisected by Tributary 5. Wetland 6 is largely a forested wetland with vegetation along the wetland consisting of, but is not limited to red maple, *Nyssa aquatica* (swamp tupelo), *Liquidambar styraciflua* (sweetgum), *Salix nigra* (black willow), *Carpinus caroliniana* (ironwood), *Ligustrum sinensis* (Chinese privet), tulip poplar, giant cane, netted-chain fern, and horsebrier. The area also exhibits characteristics of previous impounding/excavation suggesting that the majority of the wetland was historically ponded. The soils in this area are mapped Johnston soils and Blaney sand with hydric conditions indicated in the field by low chroma soils with a depleted matrix and redox (i.e. 'sandy redox'). Hydrology indicators within the project area include areas of saturation, water-stained leaves, vegetated concave surface, drainage patterns, and geomorphic position. The adjacent forested upland areas do not exhibit hydric soil indicators (i.e. high chroma soils). Wetland 6 is considered a jurisdictional wetland due to the direct hydrologic connection with Tributary 5 and other off-site WOUS.

Wetland 7:

Wetland 7 (0.043 acres) is a palustrine forested wetland that is located immediately west of the existing roadway, and is bounded to the east by Monroe Lane; to the north and south by existing commercial developments; and to the west by upland forested areas. Wetland 7 is largely a forested wetland with a small portion of the area is located along a maintained overhead utility. Vegetation along the wetland consists of, but is not limited to red maple, water oak, tulip poplar, sweetgum, ironwood, *Ilex opaca* (American holly), *Vitis rotundifolia* (muscadine), netted chain fern, *Carex sp.* (sedge), *Eupatorium capillifolium* (dog-fennel), and horsebrier. The area receives drainage from the existing roadway system and surrounding developments. The soils in this area are mapped Troup sand with hydric conditions indicated in the field by low chroma soils with a depleted matrix (i.e. 'depleted below dark surface'). Hydrology indicators within the project area include areas of saturation, water-stained leaves, vegetated concave surface, drainage patterns, and geomorphic position. The adjacent forested upland areas do not exhibit hydric soil indicators (i.e. high chroma soils). Wetland 7 is considered a jurisdictional wetland due to the direct hydrologic connection with other off-site WOUS.

Wetland 7a:

Wetland 7a (0.144 acres) is a small scrub-shrub wetland that is largely located within existing right-of-way and routinely maintained. The wetland is bounded to the west by Monroe Lane; to the north and south by maintained upland areas; and to the east by I-20. Wetland 7a is largely an emergent wetland with a small portion of the area being forested. Vegetation along the wetland consists of, but is not limited to red maple, water oak, tulip poplar, sweetgum, American holly, muscadine, netted chain fern, and horsebrier. The soils in this area are mapped Troup sand with hydric conditions indicated in the field by low chroma soils with a depleted matrix (i.e. 'depleted below dark surface'). Hydrology indicators within the project area include areas of saturation, water-stained leaves, vegetated concave surface, drainage patterns, and geomorphic position. In addition, there are various linear drainage features associated within this wetland that convey water to, and through the wetland. The adjacent forested upland areas do not exhibit hydric soil indicators (i.e. high chroma soils). Wetland 7a is considered a jurisdictional wetland due to the direct hydrologic connection with Wetland 7 and other off-site WOUS.

Wetland 8:

Wetland 8 (0.051 acres) is small scrub-shrub wetland located immediately east of I-20 within a maintained overhead utility corridor. The area is directly connected to Tributary 12. It is bounded to the west by I-20; to the east, south and north by upland areas. This area has soils mapped as Tatum silt loam. This area collects surface water drainage from the roadway and surrounding areas, and is located just east of the toe of slope for the existing roadway. Wetland 8 is characterized by low chroma soils with a depleted matrix (i.e. 'depleted below dark surface'), with vegetation consisting of, but not limited to sweetgum, red maple, tulip poplar, water oak, American holly, netted chain fern, giant cane*, Carya cordiformis* (bitternut hickory), white oak, and *Ulmus americana* (American elm). Wetland 8 provides stormwater retention, filtration, and other functions mainly related to flood control. As such Wetland 8 is considered a jurisdictional wetland due to the direct hydrologic connection and nexus with Tributary 12.

Federally Protected Species

The project area was evaluated for the potential presence of any federally protected species currently listed for Lexington County. A list of protected species for Lexington County was obtained from the U.S. Fish and Wildlife Service, which was last updated in February 2015. In addition, the S.C. Rare, Threatened, and Endangered Species Inventory was evaluated to determine any previous known occurrences of protected species within the project area. These records were last updated by the SCDNR on January 17, 2006. Lastly, field observations were conducted within the project area during the various extensive field investigators between September and November 2014. The following is a list of the federally protected species and a summary of the findings.

Category	Common Name	Scientific Name	Status
Bird	Bald Eagle	*Haliaeetus leucocephalus*	BGEPA*
	American wood stork	*Mycteria americana*	Threatened
	Red-Cockaded Woodpecker	*Picoides borealis*	Endangered
Plant	Smooth coneflower	*Echinacea laevigata*	Endangered

* Federally protected under the Bald and Golden Eagle Protection Act.

BGEPA:

Haliaeetus leucocephalus, Bald eagle:

The bald eagle is a large raptor that averages three feet from head to tail and weigh approximately 10-12 pounds, and can have a 7-foot wingspan. The bald eagle is characterized by a white head and tail with a dark brown body, and may take 5 to 6 years before obtaining the adult plumage. Fish are the primary food source; therefore nesting and foraging habitat are generally located near estuaries, bays, lakes, or other large, open water areas (*USFWS, 1993*).

A review of the SC Rare, Threatened, and Endangered Species Inventory concludes that there are historic documented bald eagle nesting sites located along the Saluda River and Congaree River. These sites are located approximately 4 miles north and 6.5 miles east, respectively, of the proposed project area. An active nest along the Saluda River was last observed in 2004, with the active nest along the Congaree/Broad River last observed in 1977. Due to the proximity of the project area with Lake Murray and the Saluda River, bald eagles my occur along the site as an occasional transient, however, no individuals, nests, or suitable nesting/foraging habitat were observed along the project area during the 2014 site visits.

Federally Endangered:

Picoides borealis, Red-cockaded Woodpecker:

The red-cockaded woodpecker (RCW) is characterized by black and white horizontal stripes on the back, white cheeks and underparts, and a black cap and stripe on the side of the neck and throat. In addition, the males have a small red spot on each side of the black cap. The RCW is 7-8 inches long with a 13-14 inch wingspan, and are dependent upon open old growth pine stands. Nesting habitat generally requires trees 80-120 years old, while stands older than 30 years provides suitable foraging habitat. Historically, long leaf pine stands are most commonly

used, but others may be acceptable. Understory requirements are most often maintained with prescribed burning (*USFWS, 1993*).

A review of the SC Rare, Threatened, and Endangered Species Inventory concludes that there are no documented records of the RCW within the immediate vicinity of the project area, which includes the *Lexington, Barr Lake, Irmo*, and *Columbia North* USGS topographic quadrangles. In addition, no individuals or suitable habitat were observed along the project area during the 2014 site visits.

Echinacea laevigata, Smooth Coneflower:

The smooth coneflower is an herbaceous perennial that is characterized by light pink to purple drooping flowers from May to July. The plant has smooth stems and few leaves. It is usually restricted to open sites with low competition that are maintained by fire, grazing, mowing, or other methods. Historically the plant was associated with prairie-like habitats or oak-savannas, but today most often occurs in openings in woods (i.e. clear-cuts), along roadsides, utility line rights-of-way, and on dry limestone bluffs. In addition, the plant is typically found on magnesium and calcium rich soils associated with diabase and marble. (*NatureServe, 2015).*

A review of the SC Rare, Threatened, and Endangered Species Inventory concludes that there are no documented records of the smooth coneflower within the immediate vicinity of the project area, which includes the *Lexington, Barr Lake, Irmo*, and *Columbia North* USGS topographic quadrangles. The project area includes open areas associated with transportation and utility right-of-way; however, the soil along the project derived largely from marine deposits and slate. Therefore the project area does not include preferred habitat, and no individuals were observed along the project area during the 2014 site visits.

Federally Threatened:

Mycteria americana, American Wood Stork

The wood stork is characterized by its gray/black featherless head, white body, black tail, and the black trailing edges of the wings. The wood stork stands more than 3.5 feet tall, can have a wingspan greater than five feet, and is one of the largest wading birds in South Carolina. Wood storks nest in colonies, and generally prefer tree tops (mainly cypress, dead hardwoods) over or adjacent to water in the forested swamps of the coastal plain. Foraging habitat consists of open, shallow water where they feed primarily on small fish. This includes various freshwater marshes, swamps, lagoons, ponds, flooded pastures and ditches. The degradation and loss of feeding habitat is a major cause of their decline. Due to this, nesting wood storks may travel up 75 miles from the colony to suitable feeding habitat, while non-breeding individuals may travel even further (*Clemson University)*.

A review of the SC Rare, Threatened, and Endangered Species Inventory concludes that there has been no documented records of the wood stork within the immediate vicinity of the project area, which includes the *Lexington, Barr Lake, Irmo*, and *Columbia North* USGS topographic quadrangles. In addition, no individuals or suitable habitat were observed along the project area during the 2014 site visits.

At Risk Species (ARS):

In addition to the above listed species, the USFWS has identified 12 "at-risk species" (ARS) species for Lexington County. ARS are those that have either been proposed for listing, are candidates for listing, or have been petitioned for listing. The ARS listing is provided for conservation actions in an effort to keep these species from becoming listed under the Endangered Species Act. Therefore, there are no existing federal protections associates with ARS.

The following provides the list of ARS for Lexington County. Based upon a review of the required habitats associated with the following species, the project is not anticipated to impact any ARS. The majority of the species required unique habitats that are not available within the project boundary, including cypress swamps, pine flatwoods, wet savannahs, and aquatic habitats. However, there is minimal habitat for the spotted turtle which prefers clean shallow water, standing to slow moving water; no individuals were observed during the site visits.

Common Name - Animals	**Scientific Name**	**Status**
American eel	*Anguilla rostrata*	ARS
Blueback herring	*Alosa aestivalis*	ARS
Robust redhorse	*Moxostoma robustum*	ARS
Tri-colored bat	*Perimyotis subflavus*	ARS
Savannah lilliput	*Toxolasma pullus*	ARS
Bog spice	*Lindera subcoriacea*	ARS
Ciliate-leaf tickseed	*Coreopsis integrifolia*	ARS
Long Beach seedbox	*Ludwigia brevipes*	ARS
Spathulate seedbox	*Ludwigia spathulata*	ARS
Wire-leaved dropseed	*Sporobolus teretifolius*	ARS
Southern hognose snake	*Heterdon simus*	ARS
Spotted turtle	*Clemmys guttata*	ARS

Conclusion

The 521-acre project area associated with the proposed I-20 widening project improvement project includes various tributary systems and wetland areas largely associated with Red Bank Creek and Twelvemile Creek. The project area includes reaches from 13 defined tributary systems (Tributary 1-12, including 3a) totaling approximately 3,977 LF of stream (3,087 LF of pRPW; 890 LF of sRPW) and nine (9) wetland areas (Wetland 1-8, including 7a) totaling 2.92 acres that are directly associated with these systems. The tributary reaches exhibit various indicators of continuous flow and jurisdictional characteristics, including distinct bed and banks, flowing water, sand/gravel substrate, and sediment sorting. The wetland areas are assumed jurisdictional as they either directly 'abut' these tributaries or are considered 'adjacent to' due to geographic location or hydrologic connectivity (i.e. ditches, overland flow, etc.). The jurisdictional status/determination of these areas is based upon final review and verification by the Charleston District USACE.

The review of the habitat requirements and previous records for the federally listed species for Lexington County, along with the field observations conclude that there is very low potential for the presence of any federally protected species due to the lack of suitable habitat, the disturbed nature of the project area, and scope of improvements. As such, the proposed roadway improvements are expected to have **NO EFFECT** on the federally protected species listed for Lexington County.

References

Clemson University. “Canby’s Dropwort – An Endangered Plant in South Carolina”. Clemson University, Department of Pesticide Regulation. Pendleton, SC.

Clemson University. “Wood Stork – An Endangered Bird in South Carolina”. Clemson University, Department of Pesticide Regulation. Pendleton, SC.

NatureServe. 2015. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. Available http://explorer.natureserve.org. (Accessed: June 5, 2015).

South Carolina Department of Natural Resources – Marine Resources Division. “Sturgeon Research Program”. http://dnr.sc.gov/marine/mrri/sturgeon/sturgeon.htm. (Accessed February 22, 2011).

SCDNR – S.C. Heritage Trust. *Geographic Database of Rare and Endangered Species*. (Last Assessed April 30, 2015).

S.C. Department Health and Environmental Control. http://www.scdhec.gov/environment/water/ (Last Assessed April 30, 2015).

USFWS – Region 4. “Endangered and Threatened Species of the Southeastern United States (The Red Book)”. As of 1993.

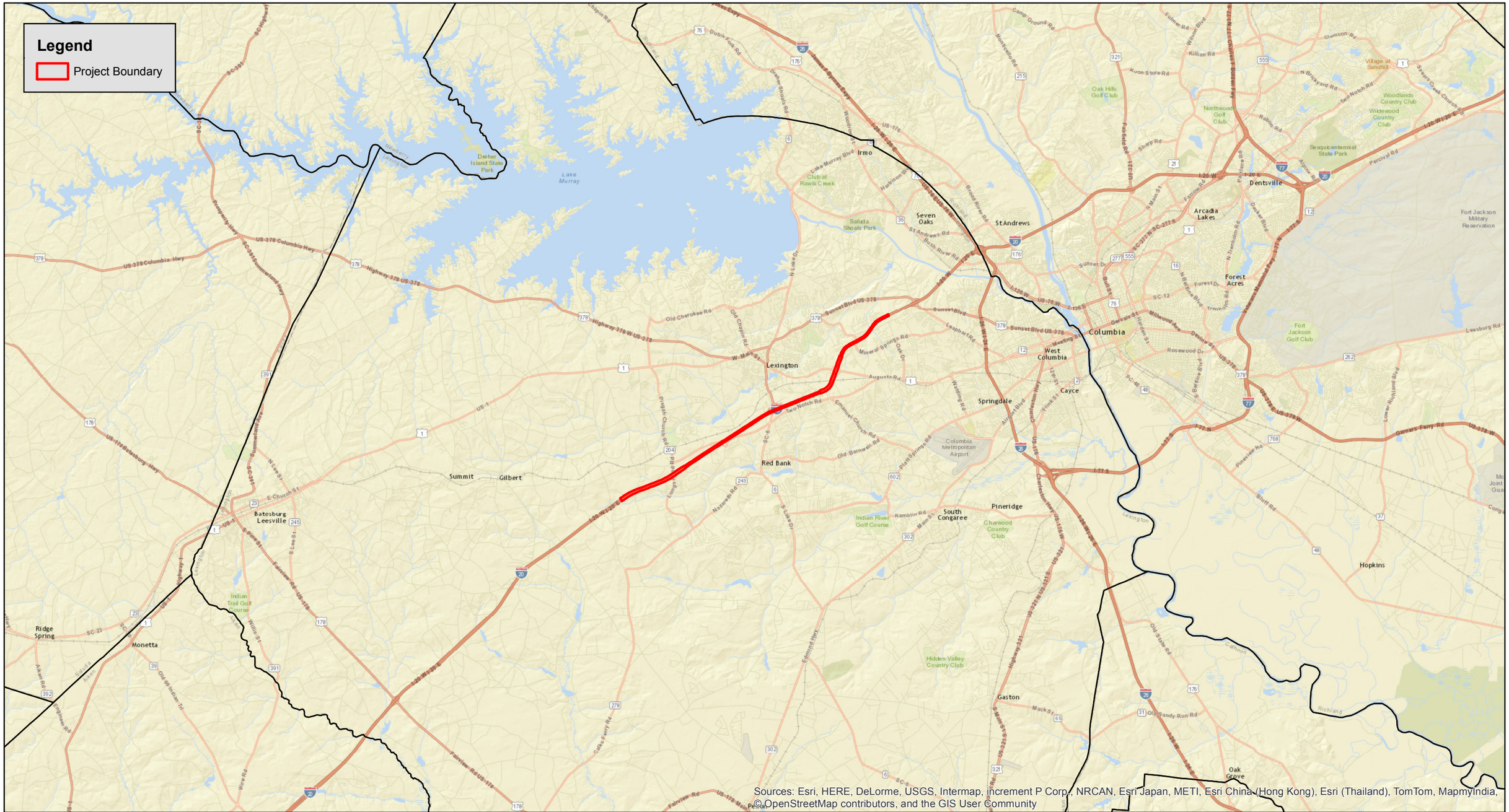
USFWS – Region 4. “Endangered and Threatened Species of the Southeastern United States (The Red Book)”. As of 1/1995.

Resources

Nelson, John B. The Natural Communities of South Carolina – Initial Classification and Description. South Carolina Wildlife & Marine Resources Department (SCDNR). February 1986.

Radford, Albert E., Ahles, Harry E., Bell, C. Ritchie. Manual of the Vascular Flora of the Carolinas. The University of North Carolina Press. Chapel Hill, NC. 1968.

US Department of Agriculture – Natural Resources Conservation Service, Web Soil Survey, http://websoilsurvey.nrcs.usda.gov/app/ (Last Assessed June 5, 2015).



Prepared By: HDR | ICA

Figure 1: Project Location

I-20 Widening
Lexington County, SC

0 1 2 4 Miles

N
W E
S

Prepared By: HDR | ICA

Figure 2: Aerial

I-20 Widening
Lexington County, SC

0 0.5 1 Miles

N W E S

Prepared By:

HDR | ICA

Figure 3: USGS Topographic Quadrangle

I-20 Widening
Lexington County, SC

0 0.5 1 2 Miles

N
W E
S

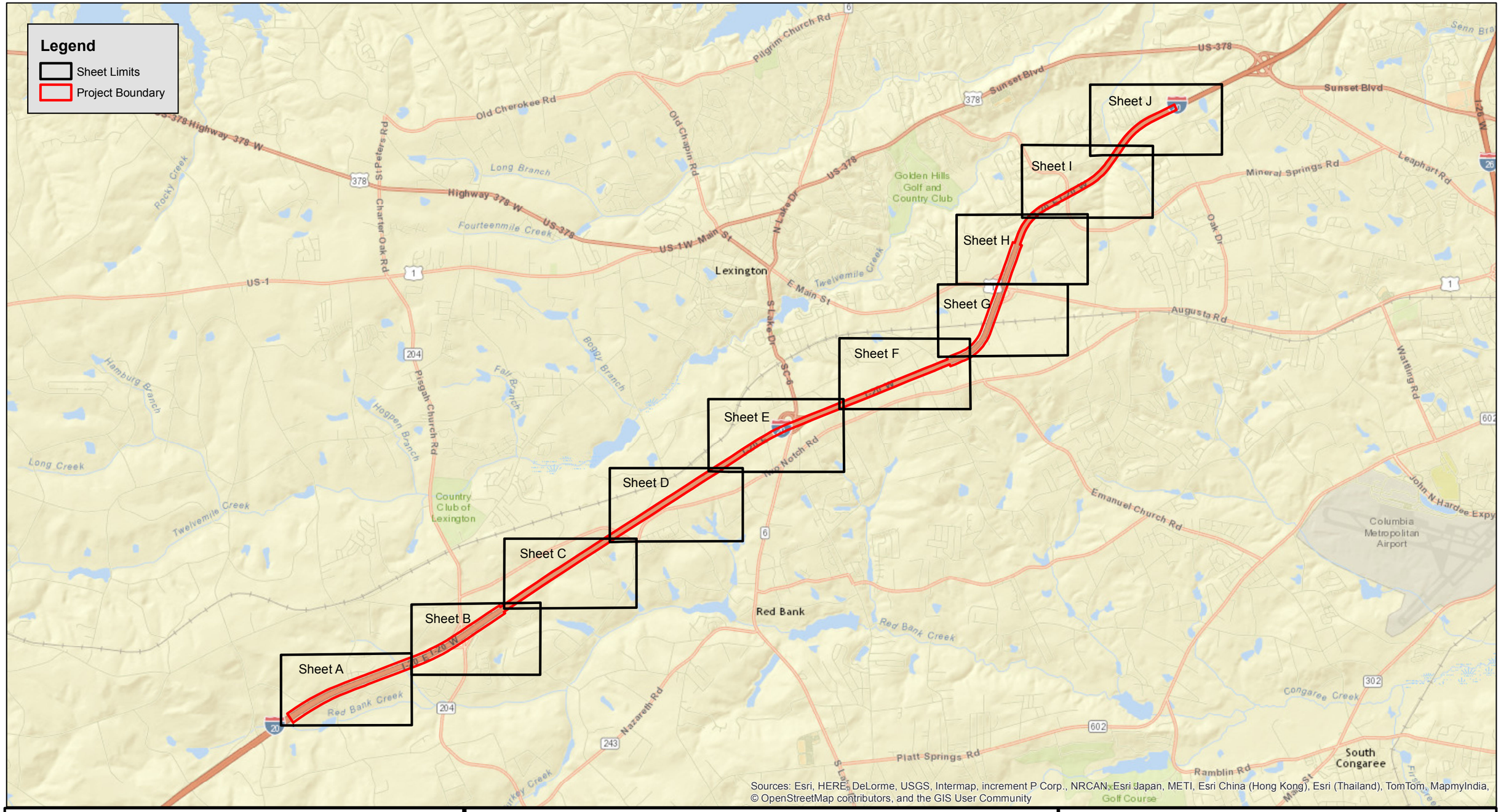
Prepared By: HDR | ICA

Figure 4: NWI Mapping

I-20 Widening
Lexington County, SC

0 0.5 1 Miles

N
W E
S



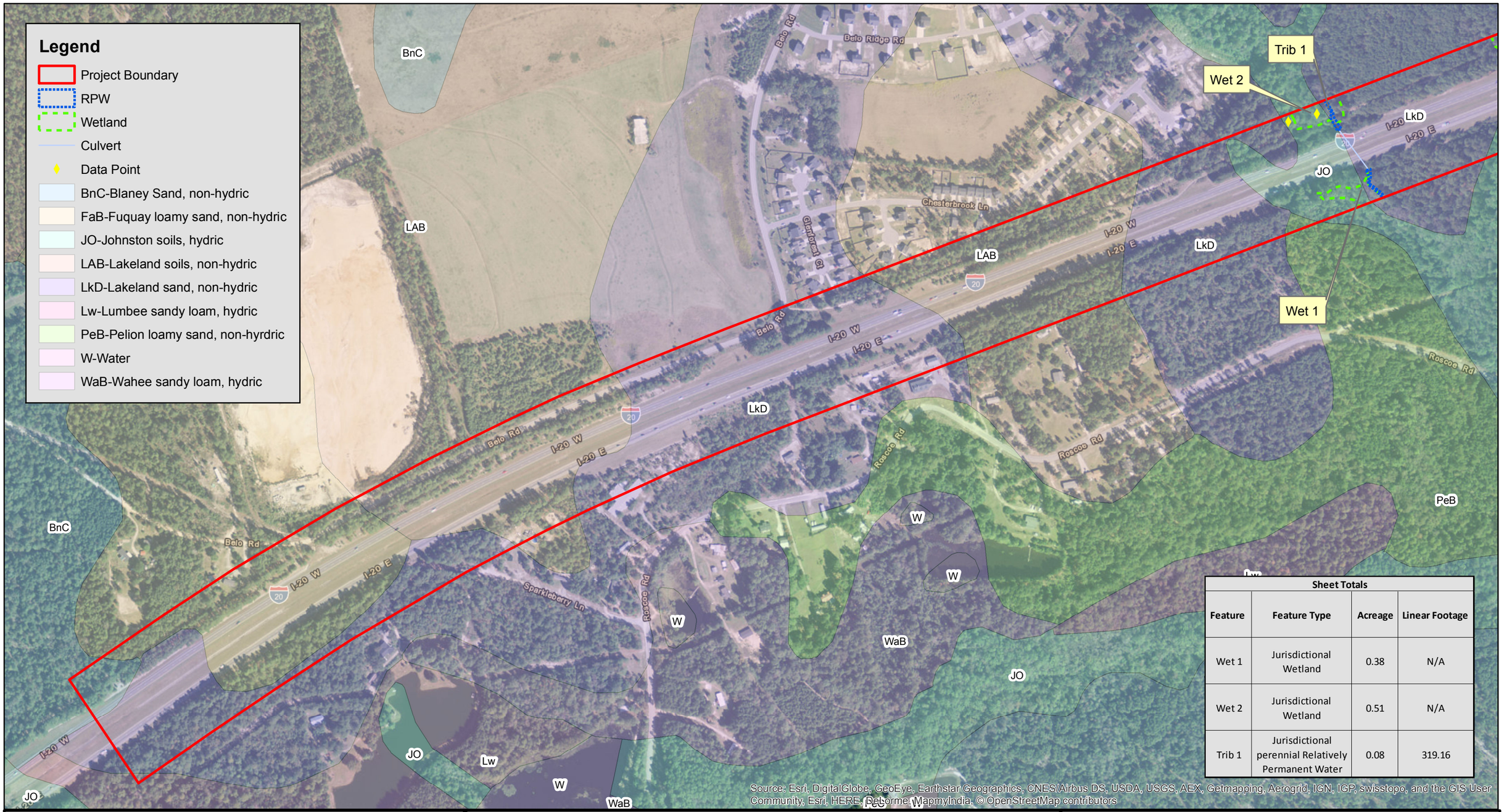
Prepared By: HDR | ICA

Figure 5: Sheet Locations

I-20 Widening
Lexington County, SC

0 0.3 0.6 1.2 Miles

N W E S



Sheet Totals			
Feature	**Feature Type**	**Acreage**	**Linear Footage**
Wet 1	Jurisdictional Wetland	0.38	N/A
Wet 2	Jurisdictional Wetland	0.51	N/A
Trib 1	Jurisdictional perennial Relatively Permanent Water	0.08	319.16

Prepared By: HDR | ICA

Figure 6a: Jurisdictional Features/Soils

I-20 Widening
Lexington County, SC

0 150 300 600 Feet

N W E S

Sheet Totals			
Feature	**Feature Type**	**Acreage**	**Linear Footage**
Wet 3	Jurisdictional Wetland	0.24	N/A
Wet 4	Jurisdictional Wetland	1.16	N/A
Trib 2	Jurisdictional perennial Relatively Permanent Water	0.14	581.43

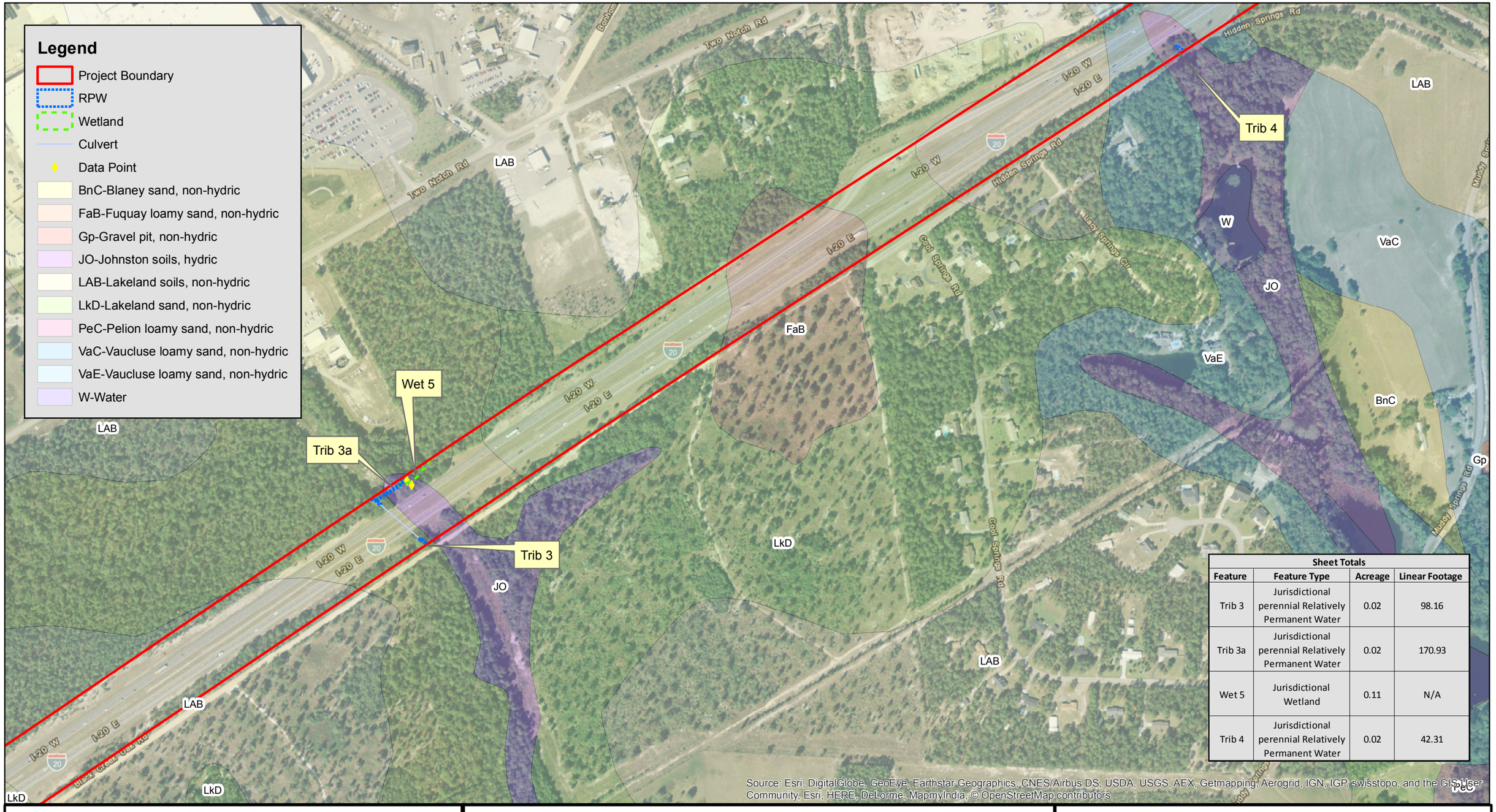
Prepared By: HDR | ICA

Figure 6b: Jurisdictional Features/Soils

I-20 Widening
Lexington County, SC

0 150 300 600 Feet

N W E S



Sheet Totals			
Feature	Feature Type	Acreage	Linear Footage
Trib 3	Jurisdictional perennial Relatively Permanent Water	0.02	98.16
Trib 3a	Jurisdictional perennial Relatively Permanent Water	0.02	170.93
Wet 5	Jurisdictional Wetland	0.11	N/A
Trib 4	Jurisdictional perennial Relatively Permanent Water	0.02	42.31

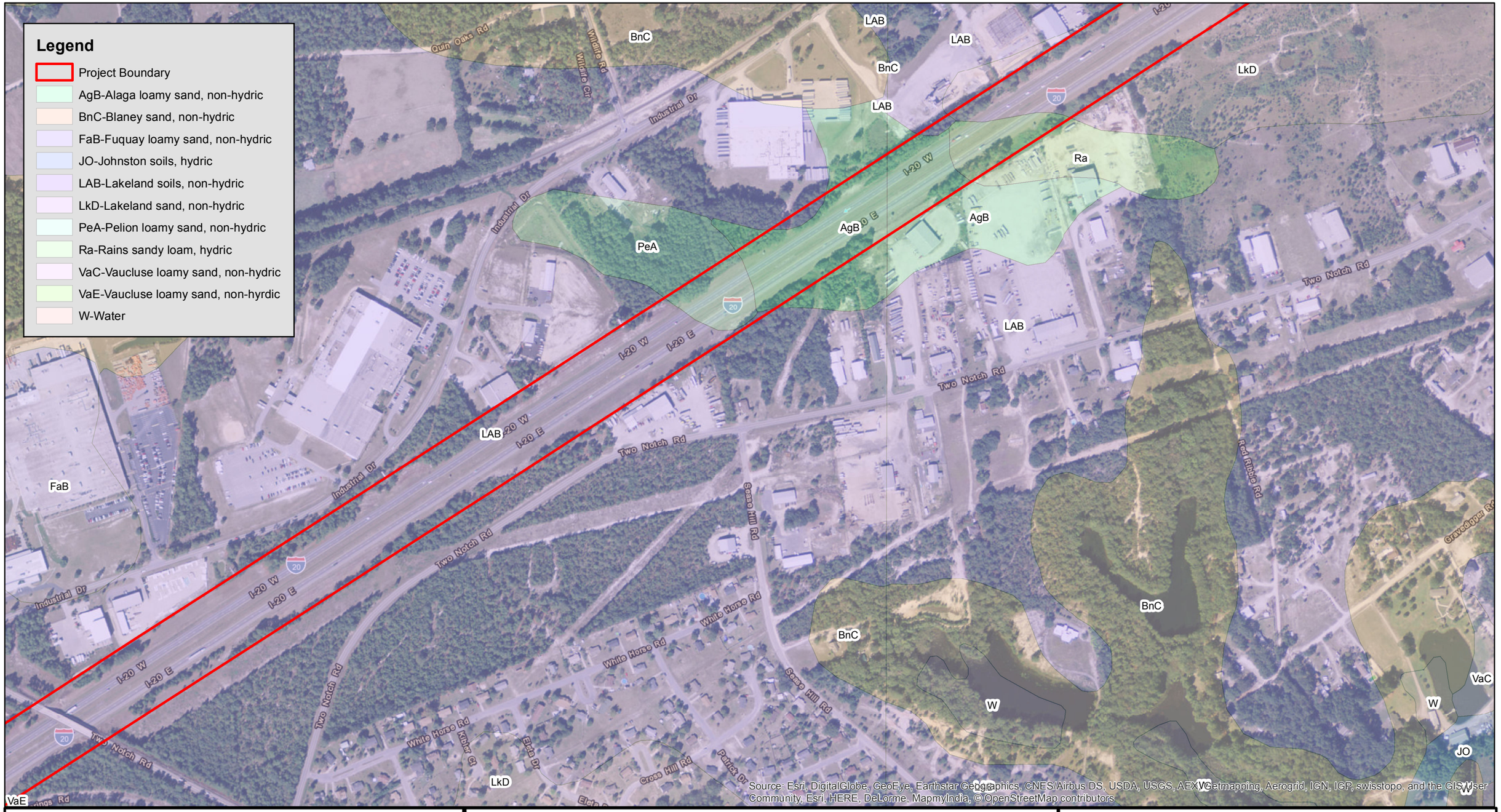
Prepared By: HDR | ICA

Figure 6c: Jurisdictional Features/Soils

I-20 Widening
Lexington County, SC

0 150 300 600 Feet

N W E S



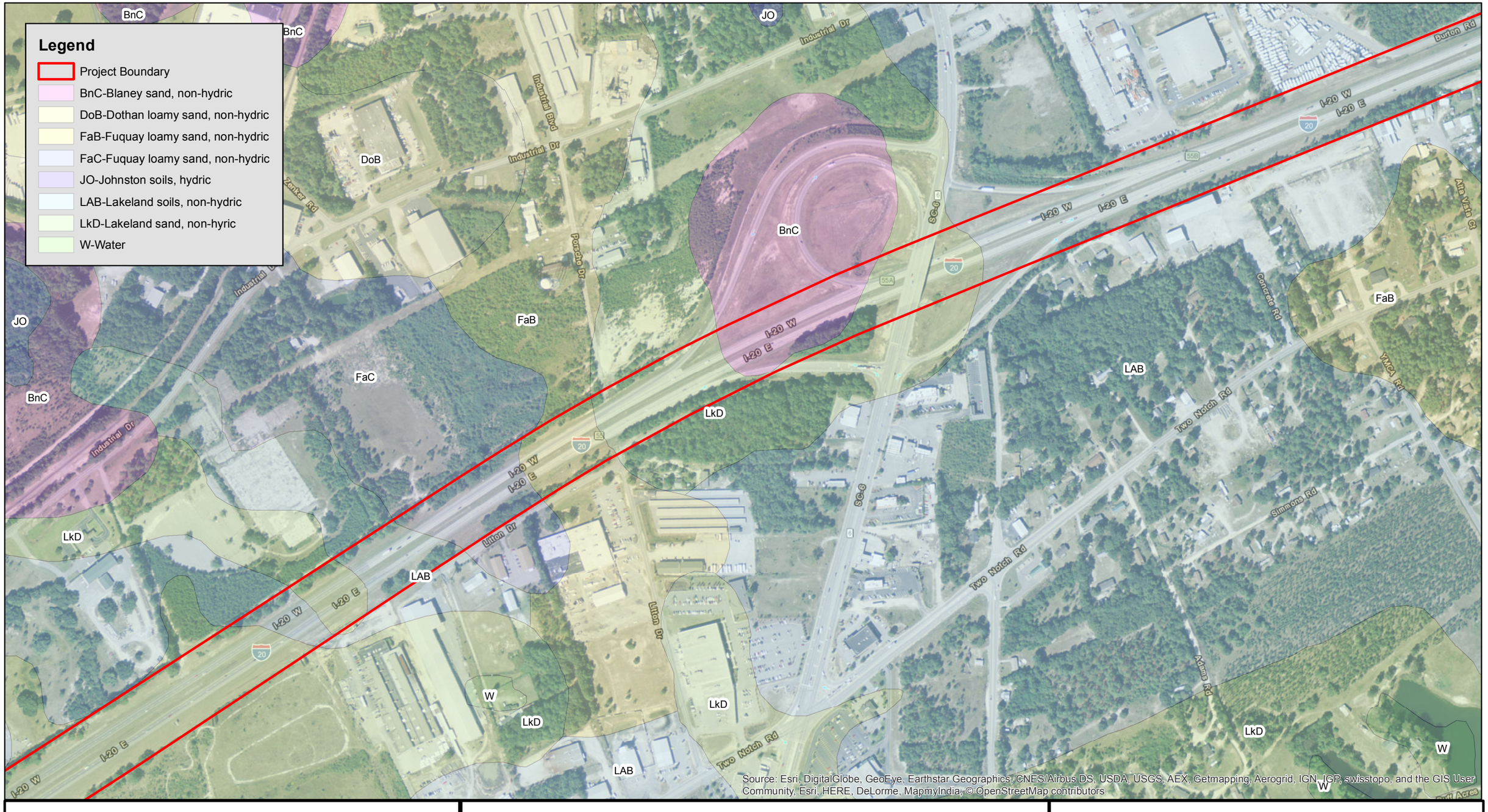
Prepared By: HDR | ICA

Figure 6d: Jurisdictional Features/Soils

I-20 Widening
Lexington County, SC

0 150 300 600 Feet

N W E S



Prepared By: HDR | ICA

Figure 6e: Jurisdictional Features/Soils

I-20 Widening
Lexington County, SC

0 150 300 600 Feet

N W E S

Prepared By: HDR | ICA

Figure 6f: Jurisdictional Features/Soils

I-20 Widening
Lexington County, SC

0 150 300 600 Feet

N W E S

Legend

- Project Boundary
- Seasonal RPW
- Wetland
- Data Point
- BnC-Blaney sand, non-hydric
- DoA-Dothan loamy sand, non-hydric
- DoB-Dothan loamy sand, non-hydric
- FaB-Fuquay loamy sand, non-hydric
- JO-Johnston soils, hydric
- LAB-Lakeland soils, non-hydric
- PeB-Pelion loamy sand, non-hydric
- PeC-Pelion loamy sand, non-hydric
- TrB-Troup sand, non-hydric
- VaC-Vaucluse loamy sand, non-hydric
- W-Water

Trib 5

Wet 6

Sheet Totals			
Feature	Feature Type	Acreage	Linear Footage
Wet 6	Jurisdictional Wetland	0.28	N/A
Trib 5	Jurisdictional seasonal Relatively Permanent Water	0.09	251.62

Prepared By: HDR | ICA

Figure 6g: Jurisdictional Features/Soils

I-20 Widening
Lexington County, SC

0 150 300 600 Feet

N W E S

Legend

- Project Boundary
- RPW
- Seasonal RPW
- Wetland
- Culvert
- Data Point
- BnC-Blaney sand, non-hydric
- DoA-Dothan loamy sand, non-hydric
- DoB-Dothan loamy sand, non-hydric
- Eo-Enoree silt loam, hydric
- FaB-Fuquay loamy sand, non-hydric
- GeC-Georgeville very fine sandy loam, non,hydric
- GeD-Georgeville very fine sandy loam, non-hydric
- JO-Johnston soils, hydric
- LAB-Lakeland soils, non-hydric
- PeC-Pelion loamy sand, non-hydric
- TaE-Tatum silt loam, non-hydric
- TrB-Troup sand, non-hydric
- W-Water

Trib 7

Trib 6

Wet 7

Wet 7a

Sheet Totals			
Feature	Feature Type	Acreage	Linear Footage
Wet 7a	Jurisdictional Wetland	0.14	N/A
Wet 7	Jurisdictional Wetland	0.04	N/A
Trib 6	Jurisdictional seasonal Relativley Permanent Water	0.08	336.34
Trib 7	Jurisdictional perennial Relatively Permanent Water	0.21	339.5

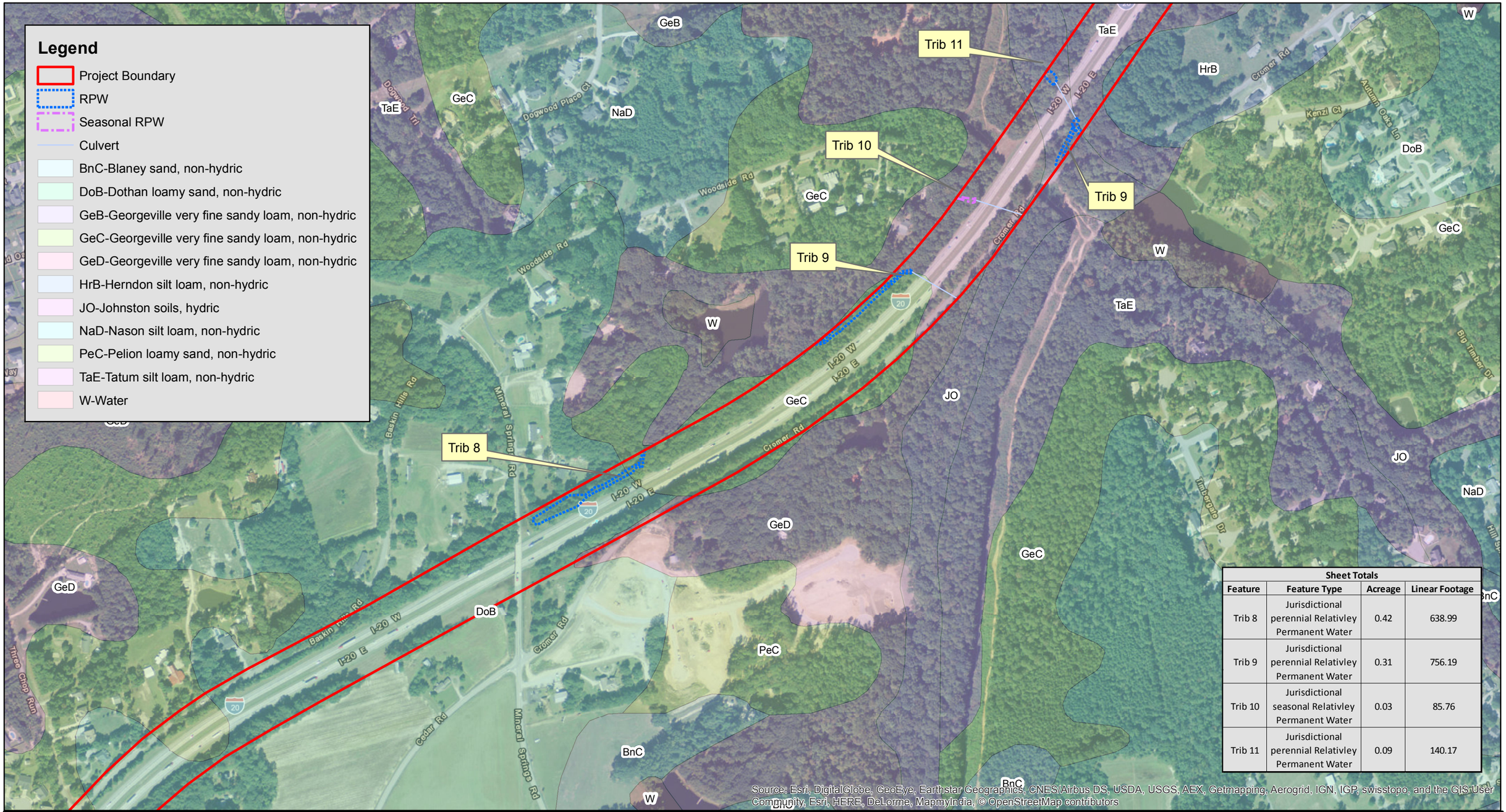
Prepared By: HDR | ICA

Figure 6h: Jurisdictional Features/Soils

I-20 Widening
Lexington County, SC

0 150 300 600 Feet

N W E S



Sheet Totals			
Feature	Feature Type	Acreage	Linear Footage
Trib 8	Jurisdictional perennial Relativley Permanent Water	0.42	638.99
Trib 9	Jurisdictional perennial Relativley Permanent Water	0.31	756.19
Trib 10	Jurisdictional seasonal Relativley Permanent Water	0.03	85.76
Trib 11	Jurisdictional perennial Relativley Permanent Water	0.09	140.17

Prepared By: HDR | ICA

Figure 6i: Jurisdictional Features/Soils

I-20 Widening
Lexington County, SC

0 150 300 600 Feet

N W E S

APPENDIX J
Asbestos and Lead Based Paint
Reports

Asbestos Inspection Report

I-20 Road Widening & Bridge Replacement Project
I-20 Bridges over Norfolk Southern Railroad
& Meat Plant Road
Lexington County, South Carolina

Prepared For:

ICA Engineering

Columbia, South Carolina

May 26, 2015

FUSS & O'NEILL

717 Lady Street, Suite E
Columbia, SC 29201
(803) 376-6034

____ **Yes, Asbestos was found**
__X__ **No, Asbestos was not found**

Project No. 20140615.A10

FUSS & O'NEILL

May 26, 2015

Mr. Greg M. Schuch
Senior Project Engineer
ICA Engineering
501 Huger Street
Columbia, SC 29201

RE: Asbestos Inspection Report
I-20 EB over NSRR - Structure No. 3210002020300
I-20 WB over NSRR - Structure No. 3210002040300
Lexington County, South Carolina

Dear Mr. Schuch:

We are pleased to submit the enclosed Asbestos Inspection report for the above-referenced site. The inspection was conducted in conformance with the South Carolina Department of Health and Environmental Control's (SCDHEC), Standards of Performance for Asbestos Projects, Regulation 61-86.1.

The inspection was performed on May 19, 2015 by a Fuss & O'Neill licensed inspector and included visual and physical inspection of accessible areas of the bridges and roadway.

The information summarized in this document is for the suspect asbestos-containing materials only. It does not include information on other hazardous materials that may exist in the property (such as lead-based paint, underground storage tanks, PCB-containing ballasts and possible mercury hazards).

If you have any questions regarding the contents of this report, please do not hesitate to contact us at (803) 376-6034. Thank you for this opportunity to have served your environmental needs.

Sincerely,

Reginald Butler
Environmental Scientist
Ext. 6109

Christine A. Cafagna
Project Manager
Ext. 6105

717 Lady Street,
Suite E
Columbia, SC
29201
t 803.376.6034
800.850.2348
f 803.376.6035

www.fando.com

Connecticut
Massachusetts
Rhode Island
South Carolina

F:\P2014\0615 SCDOT S-124-14 On-Call Hazmat\A10 I-20 Bridges Over NSRR\Deliverables\Report\Asbestos Inspection I-20 EB And WB Bridge Crossing.Docx

FUSS & O'NEILL

Table of Contents

Asbestos Inspection Report
I-20 Road Widening & Bridge Replacement Project
Lexington County, South Carolina

1 Introduction

Fuss & O'Neill was retained by ICA Engineering Inc., to perform an asbestos inspection of the bridges of interstate highway I-20, which spans the Norfolk Southern Railroad (NSRR) tracks and Meat Plant Road, in Lexington County, South Carolina. These structures are denoted as structure numbers 3210002020300 (eastbound or EB) and 3210002040300 (westbound or WB). Fuss & O'Neill's Reginald M. Butler, a State of South Carolina Licensed Asbestos Inspector, inspected the structure on May 19, 2015.

This inspection was performed in response to the South Carolina Department of Transportation's (SCDOT) planned road widening of I-20 and the replacement of two (2) existing bridges in Lexington County, South Carolina. The inspection consisted of a survey for asbestos-containing materials (ACM). Figures showing the bridge layout are included in *Appendix A*.

The structure consists of abutments, piers, bridge deck, beams, and all other components of the bridge. The east and westbound I-20 bridges are a section of interstate I-20 in Lexington, South Carolina, located just south of Exit 58 in Lexington County. The east and westbound bridges each consists of four (4) spans and are approximately 230' in total length. The existing east and west bound bridges were constructed in 1965. No records were available documenting the building materials used in construction of the structures.

2 Asbestos Inspection

During inspections, suspect ACM is separated into three United States Environmental Protection Agency (USEPA) categories. These categories are: Thermal System Insulation (TSI), Surfacing ACM, and Miscellaneous ACM. TSI includes all materials used to prevent heat loss or gain or water condensation on mechanical systems. Examples of TSI are pipe insulation, boiler insulation, duct insulation, and mudded insulation on pipe fittings. Surfacing ACM includes all ACM that is sprayed, troweled, or otherwise applied to an existing surface. Surfacing ACM is commonly used for fireproofing, decorative, and acoustical applications. Miscellaneous materials include all ACM not listed as TSI or surfacing ACM, such as linoleum, vinyl asbestos flooring, and ceiling tiles The USEPA defines any material that contains more than one percent (1%) asbestos, utilizing Polarized Light Microscopy (PLM), as being an ACM. Materials that are identified as "none detected" are specified as not containing asbestos.

The exterior surface areas of the bridges and roadway were examined which included the piers, bridge deck, beams guardrails, and end bents. These bridge structures measure approximately 230' in total length. The bridge deck consists of concrete approximately twelve-inches thick. The guardrails are constructed of concrete and metal. The bridge deck rests on concrete pier caps and abutments. The piers on which the bridge rests are constructed of concrete, which are secured in the subsurface soil.

All areas were visually inspected to assess the locations of suspect ACM. Suspect visible and accessible ACM was sampled and submitted for laboratory analysis by EMSL Analytical, Inc.

ACM were quantified in linear or square footage, depending on the nature of the material. The quantities, locations, ACM type, and asbestos content of ACM identified by lab analysis are listed in *Table 1* of *Section 2.3*.

2.1 Sampling

During the inspection of the I-20 eastbound and westbound bridges, samples of suspect ACM that were accessible were collected for laboratory analysis. The samples were collected and categorized according to the homogeneous building material being evaluated. The designation of a homogeneous material was made by the Fuss & O'Neill inspector and the location of the suspect ACM is displayed on the figures in *Appendix A*. Once suspect homogeneous materials were identified, samples were collected in conformance with the USEPA and SCDHEC protocols.

Destructive sampling techniques (i.e., suspect material removal) were used to collect samples from the structure during this inspection. Sampling techniques generally involve collecting one full thickness sample of materials such as pipe insulation or expansion joint material collected by core boring or breaking off an end piece of the material.

Samples were given a unique sample number and placed in sample containers for transportation to EMSL Analytical, Inc. for laboratory analysis. The location of each sample is listed in *Table 1 in Section 2.3*.

2.2 Analytical Protocol

Samples collected during this facility asbestos survey were transported to EMSL Analytical, Inc. laboratory. EMSL Analytical, Inc., is accredited by the National Institute for Standards and Technology (NIST) under the National Voluntary Laboratory Accreditation Program (NVLAP) for bulk asbestos analysis as required under USEPA and SCDHEC regulations. After being logged in by the laboratory and prepared for analysis, samples were analyzed following the USEPA-recommended method of bulk sample analysis by PLM using the "Method for the Determination of Asbestos in Bulk Building Materials" (EPA/600/R-93/116).

Sample results were reported either as ND (not detected) if no asbestos was found or by type and percent composition if any form of asbestos was observed. The USEPA recognizes a level of greater than one percent (1%) asbestos by weight content as the minimum level for requiring a material to be treated as asbestos-containing.

2.3 Results

Utilizing the USEPA and SCDHEC protocol and criteria, the following materials were determined to be ***suspect ACM,*** but **not found to be ACM** by laboratory analysis:

Table 1

Material Type	Sample ID	Location	% Asbestos	Approximate Quantity	ACM Type
Exterior					
Expansion Joint Material / Black	EB-1	Between bridge spans	ND	250 SF	M
Expansion Joint Material / Black	EB-2	Between bridge spans	ND	250 SF	M
Expansion Joint Material / Black	EB-3	Between bridge spans	ND	250 SF	M
Expansion Joint Material / Black	WB-1	Between bridge spans	ND	250 SF	M
Expansion Joint Material / Black	WB-2	Between bridge spans	ND	250 SF	M
Expansion Joint Material / Black	WB-3	Between bridge spans	ND	250 SF	M

SF = Square feet
ACM Type: M= Miscellaneous
Note: See *Figure 1* for locations

Homogeneous material was determined by similarity of size, color, and age; if determinable.

Asbestos was not detected by PLM analysis in samples EB-1, EB-2, EB-3, WB-1, WB-2, and WB-3. In accordance with ASTM E2356, and any subsequent amendments and editions, and SCDHEC's Standards of Performance for Asbestos Projects, Regulation 61-86.1, negative results for non-friable organically bound materials such as samples EB-1, EB-2, EB-3, WB-1, WB-2, and WB-3 shall be verified with at least one (1) transmission electron microscopy (TEM) analysis per homogeneous area. TEM verification analysis was conducted on samples EB-1 and WB-1. TEM verification analysis results also returned a not detected or "ND" result. Each of the sampled material is associated with the expansion joint material found between the concrete deck spans.

Laboratory results and chain of custody are presented in *Appendix B*. Site photographs are included in *Appendix D*.

2.4 Conclusion

An asbestos inspection was performed for two (2) I-20 bridges spanning the NSRR and Meat Plant located in Lexington County, South Carolina. The results of the asbestos survey indicated that no ACM was found to be present in the structure. If the structure is to be demolished, a copy of this report and a

notification of demolition or renovation forms must be submitted to South Carolina Department of Health and Environmental Control at least ten (10) working days prior to these activities taking place.

During the course of the inspection, samples of suspect ACM were collected. No friable ACM was identified during the survey. Friability defines the condition of ACM and its potential to release asbestos fibers into the air. Friable ACM can be crumbled under moderate hand pressure and has the potential to release fibers into the air. Conversely, non-friable ACM cannot be crumbled under moderate hand pressure and, hence, does not release fibers into the air.

It is possible that renovation or demolition activities will uncover suspect ACM that were not accessible to the inspector during this inspection. **Any suspect material encountered during renovation/demolition that is not identified in this report as being non-ACM should be assumed to be ACM unless sample results prove otherwise.**

3 Report Certification

Fuss & O'Neill is pleased to provide environmental consulting services for the SCDOT, ICA Engineering, Inc., and its agents. Please contact this office at 803-376-6034 with any questions or comments regarding the findings submitted in this report.

This document, entitled *Asbestos Inspection Report,* was prepared for ICA Engineering, Inc., the SCDOT, and its agents, and the SCDHEC with sound practices and procedures and in accordance with USEPA, National Emissions Standards for Hazardous Air Pollutants (NESHAP) and Title II of the Toxic Substance Control Act (TSCA), SCDHEC Regulation 61-86.1, 40 CFR 61, and 40 CFR 763 for ACM guidance. The results obtained by the work documented in this report fulfill the requirements of federal, state, and local regulations regarding Asbestos Containing Materials.

Reginald Butler — Date: 05/26/2015

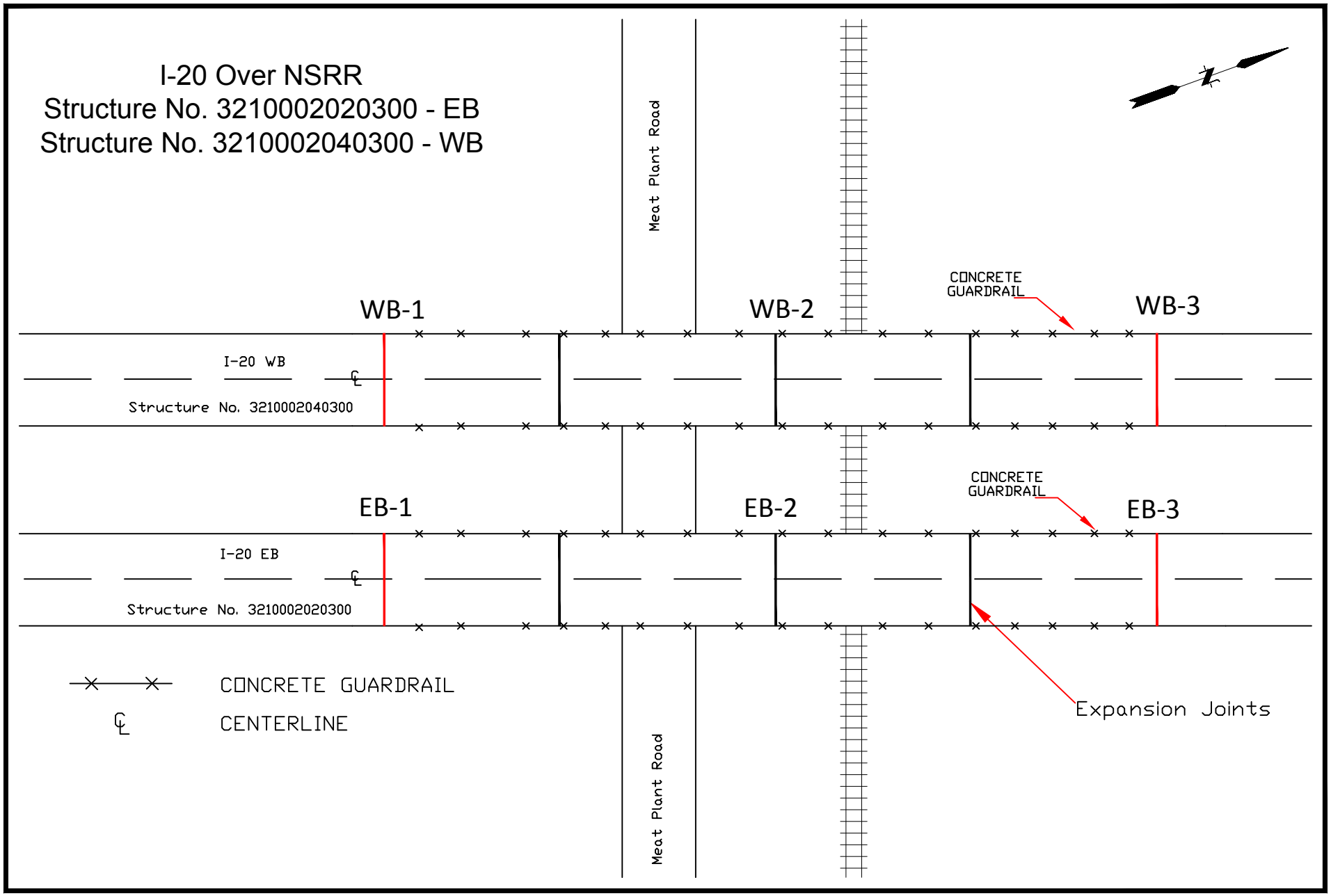
SCDHEC AHERA Asbestos Building Inspector BI 01065
Expiration Date: May 3, 2016

Reviewed by:

Christine A. Cafagna
Project Manager

Appendix A

Figures



SCALE:	
HORZ.:	Not to Scale
VERT.:	
DATUM:	
HORZ.:	
VERT.:	
0	
GRAPHIC SCALE	

FUSS & O'NEILL
717 LADY ST, SUITE E
COLUMBIA, SOUTH CAROLINA 29201
803.376.6034
www.fando.com

ICA Engineering

Bridges over NSRR (Aerial View)

Hazardous Material Survey

I-20 East & West Bound

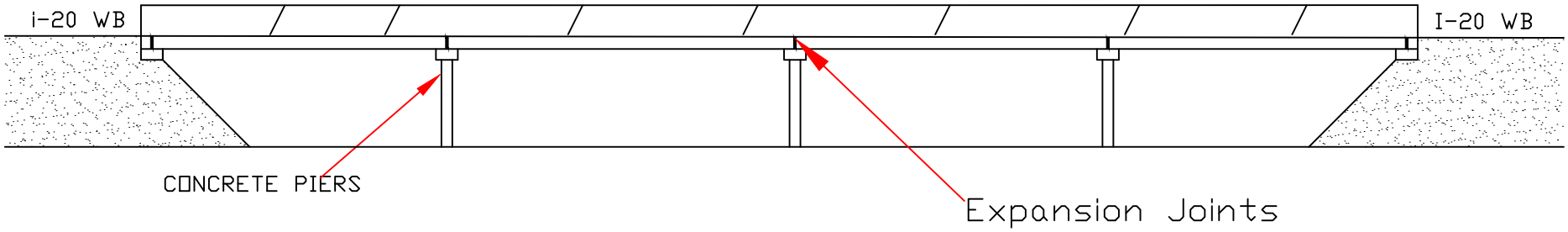
Lexington County, SC

PROJ. No.: 20140615.A10
DATE: May 2015

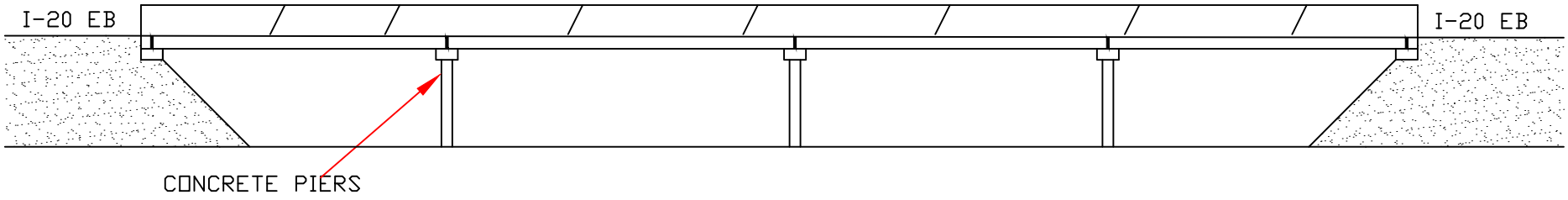
Figure 1

I-20 Over NSRR
Structure No. 3210002020300 - EB
Structure No. 3210002040300 - WB

I-20 WB
Structure No. 3210002040300



I-20 EB
Structure No. 3210002020300



SCALE:	
HORZ.:	Not to Scale
VERT.:	
DATUM:	
HORZ.:	
VERT.:	

0
GRAPHIC SCALE

FUSS & O'NEILL
717 LADY ST, SUITE E
COLUMBIA, SOUTH CAROLINA 29201
803.376.6034
www.fando.com

ICA Engineering

Bridges over NSRR (Profile View)

Hazardous Material Survey

I-20 East & West Bound

Lexington County, SC

PROJ. No.:	20140615.A10
DATE:	May 2015

Figure 2

Appendix B

Laboratory Analytical Package

EMSL Analytical, Inc.
376 Crompton Street, Charlotte, NC 28273
Phone/Fax: (704) 525-2205 / (704) 525-2382
http://www.EMSL.com charlottelab@emsl.com

EMSL Order:	411503299
CustomerID:	FUSS85
CustomerPO:	
ProjectID:	

Attn: **Reginald Butler**
Fuss & O'Neill, Inc.
717 Lady Street
Suite E
Columbia, SC 29201

Project: **20140615.A10**

Phone:	(803) 622-5346
Fax:	(803) 376-6035
Received:	05/20/15 9:15 AM
Analysis Date:	5/20/2015
Collected:	

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
EB-1 *411503299-0001*	Bridge Expansion Joints East Bound - Black Expansion Joint Material	Gray/Black Non-Fibrous Homogeneous		15% Ca Carbonate 85% Non-fibrous (other)	**None Detected**
EB-2 *411503299-0002*	Bridge Expansion Joints East Bound - Black Expansion Joint Material	Black Non-Fibrous Homogeneous		20% Ca Carbonate 80% Non-fibrous (other)	**None Detected**
EB-3 *411503299-0003*	Bridge Expansion Joints East Bound - Black Expansion Joint Material	Black Non-Fibrous Homogeneous		10% Ca Carbonate 90% Non-fibrous (other)	**None Detected**
WB-1 *411503299-0004*	Bridge Expansion Joints West Bound - Black Expansion Joint Material	Black Non-Fibrous Homogeneous		15% Ca Carbonate 85% Non-fibrous (other)	**None Detected**
WB-2 *411503299-0005*	Bridge Expansion Joints West Bound - Black Expansion Joint Material	Black Non-Fibrous Homogeneous		15% Ca Carbonate 85% Non-fibrous (other)	**None Detected**
WB-3 *411503299-0006*	Bridge Expansion Joints West Bound - Black Expansion Joint Material	Black Non-Fibrous Homogeneous		10% Ca Carbonate 90% Non-fibrous (other)	**None Detected**

Analyst(s)

Aaron Hartley (2)
Eric Loomis (4)

Evan L Plumley

Lee Plumley, Laboratory Manager
or other approved signatory

Initial report from 05/21/2015 08:08:55

EMSL Analytical, Inc.
376 Crompton Street, Charlotte, NC 28273
Phone/Fax: (704) 525-2205 / (704) 525-2382
http://www.EMSL.com charlottelab@emsl.com

EMSL Order:	411503299
CustomerID:	FUSS85
CustomerPO:	
ProjectID:	

Attn: **Reginald Butler**
Fuss & O'Neill, Inc.
717 Lady Street
Suite E
Columbia, SC 29201

Phone:	(803) 622-5346
Fax:	(803) 376-6035
Received:	05/21/15 8:30 AM
Analysis Date:	5/21/2015
Collected:	

Project: **20140615.A10**

Test Report: Asbestos Analysis of Non-Friable Organically Bound Materials by TEM via EPA/600/R-93/116 Section 2.5.5.1

SAMPLE ID	DESCRIPTION	APPEARANCE	% MATRIX MATERIAL	% NON-ASBESTOS FIBERS	ASBESTOS TYPES
EB-1 *411503299-0007*	Bridge Expansion Joints East Bound - Black Expansion Joint Material	Black Non-Fibrous Homogeneous	100	<0.1 Fibrous (other)	No Asbestos Detected
WB-1 *411503299-0008*	Bridge Expansion Joints West Bound - Black Expansion Joint Material	Black Non-Fibrous Homogeneous	100	<0.1 Fibrous (other)	No Asbestos Detected

Analyst(s)

Charles Harris (2)

Lee Plumley, Laboratory Manager
or other approved signatory

This laboratory is not responsible for % asbestos in total sample when the residue only is submitted for analysis. The above report relates only to the items tested. This report may not be reproduced, except in full, without written approval by EMSL Analytical, Inc. Samples received in good condition unless otherwise noted. Unless requested by the client, building materials manufactured with multiple layers (i.e. linoleum, wallboard, etc.) are reported as a single sample.

Samples analyzed by EMSL Analytical, Inc. Charlotte, NC

Initial report from 05/22/2015 07:19:50

OrderID: 411503299

EMSL ANALYTICAL, INC.
LABORATORY • PRODUCTS • TRAINING

Asbestos Bulk Building Material Chain of Custody

EMSL Order Number (*Lab Use Only*): 411503299

EMSL ANALYTICAL, INC.
376 Crompton St Charlotte, NC 28273
~~200 ROUTE 130 NORTH~~
~~CINNAMINSON, NJ 08077~~
PHONE: ~~(800) 220-3675~~
FAX: ~~(856) 786-5974~~

Company : Fuss & O'Neill	**EMSL-Bill to:** ☑ Same ☐ Different If Bill to is Different note instructions in Comments**
Street: 717 Lady Street, Suite E	*Third Party Billing requires written authorization from third party*
City: Columbia **State/Province:** SC	**Zip/Postal Code:** 29201 **Country:** US
Report To (Name): Reginald Butler	**Telephone #:** 8033766034 ext 6109
Email Address: rbutler@fando.com	**Fax #:** 8033766035 **Purchase Order:**
Project Name/Number: 20140615.A10	**Please Provide Results:** ☐ Fax ☑ Email
U.S. State Samples Taken: South Carolina	**CT Samples:** ☐ Commercial/Taxable ☐ Residential/Tax Exempt

Turnaround Time (TAT) Options* – Please Check

☐ 3 Hour ☐ 6 Hour ☑ 24 Hour ☐ 48 Hour ☐ 72 Hour ☐ 96 Hour ☐ 1 Week ☐ 2 Week

**For TEM Air 3 hr through 6 hr, please call ahead to schedule.*There is a premium charge for 3 Hour TEM AHERA or EPA Level II TAT. You will be asked to sign an authorization form for this service. Analysis completed in accordance with EMSL's Terms and Conditions located in the Analytical Price Guide.*

PLM - Bulk (reporting limit)	TEM – Bulk
☑ PLM EPA 600/R-93/116 (<1%)	☐ TEM EPA NOB – EPA 600/R-93/116 Section 2.5.5.1
☐ PLM EPA NOB (<1%)	☐ NY ELAP Method 198.4 (TEM)
Point Count ☐ 400 (<0.25%) ☐ 1000 (<0.1%)	☐ Chatfield Protocol (semi-quantitative)
Point Count w/Gravimetric ☐ 400 (<0.25%) ☐ 1000 (<0.1%)	☐ TEM % by Mass – EPA 600/R-93/116 Section 2.5.5.2
☐ NIOSH 9002 (<1%)	☐ TEM Qualitative via Filtration Prep Technique
☐ NY ELAP Method 198.1 (friable in NY)	☐ TEM Qualitative via Drop Mount Prep Technique
☐ NY ELAP Method 198.6 NOB (non-friable-NY)	**Other**
☐ OSHA ID-191 Modified	☐
☐ Standard Addition Method	

☑ **Check For Positive Stop – Clearly Identify Homogenous Group** **Date Sampled:**

Samplers Name: **Samplers Signature:**

Sample #	HA #	Sample Location	Material Description
EB-1	1	Bridge expansion joints east Bound	Black expansion joint Material
EB-2	1	"	"
EB-3	1	"	"
WB-1	2	Bridge expansion joints west Bound	"
WB-2	2	"	"
WB-3	2	"	"

Client Sample # (s): - **Total # of Samples:** 6

Relinquished (Client): Fuss & O'Neill/Reggie Butler **Date:** 05/19/15 **Time:** 1400

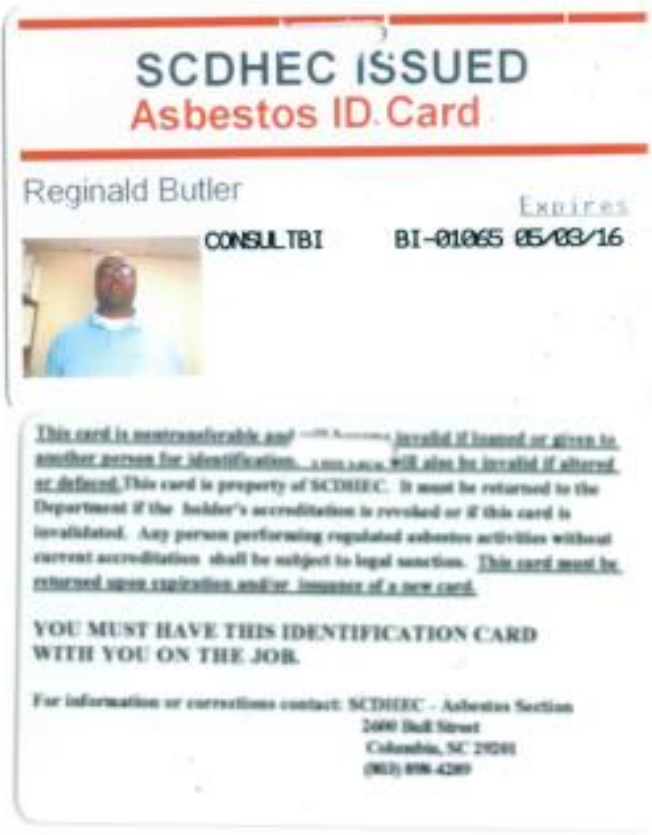
Received (Lab): [signature] **Date:** 5/20/15 **Time:** 9:15AM FE

Comments/Special Instructions: 24 Hs TAT. If no positive result by PLM perform one TEM analysis per homogeneous group.

7736 3564 8511

Appendix C

Asbestos Inspector's License



SCDHEC ISSUED
Asbestos ID Card

Reginald Butler

Expires

CONSULTBI BI-01065 05/03/16

This card is nontransferable and invalid if loaned or given to another person for identification. It will also be invalid if altered or defaced. This card is property of SCDHEC. It must be returned to the Department if the holder's accreditation is revoked or if this card is invalidated. Any person performing regulated asbestos activities without current accreditation shall be subject to legal sanction. This card must be returned upon expiration and/or issuance of a new card.

YOU MUST HAVE THIS IDENTIFICATION CARD WITH YOU ON THE JOB.

For information or corrections contact: SCDHEC - Asbestos Section
2600 Bull Street
Columbia, SC 29201
(803) 898-4289

Appendix D

Site Photographs

FUSS & O'NEILL		**Site Photographs**
Client Name: ICA Engineering	**Site Location:** I-20 Bridges over NSRR	**Project No.** 20140615.A10

Photo No. 1 **Direction of Photo:** West **Description:** I-20 Bridges over NSRR	

Photo No. 2 **Direction of Photo:** North **Description:** Underneath I-20 Bridges over NSRR	

FUSS & O'NEILL		**Site Photographs**
Client Name: ICA Engineering	**Site Location:** I-20 Bridges over NSRR	**Project No.** 20140615.A10

Photo No. 3	
Direction of Photo: North	
Description: I-20 Bridges over NSRR	

Photo No. 4	
Direction of Photo: North	
Description: Bridge Deck	

FUSS & O'NEILL		Site Photographs
Client Name: ICA Engineering	**Site Location:** I-20 Bridges over NSRR	**Project No.** 20140615.A10

Photo No. 5	
Direction of Photo: East	
Description: Expansion Joint	

Photo No. 6	
Direction of Photo: West	
Description: Expansion Joint	

FUSS & O'NEILL

May 26, 2015

Mr. Greg M. Schuch
Senior Project Engineer
ICA Engineering
501 Huger Street
Columbia, SC 29201

RE: Lead Based Paint Inspection Report
I-20 EB over NSRR - Structure No. 3210002020300
I-20 WB over NSRR - Structure No. 3210002040300
Lexington County, South Carolina

Dear Mr. Schuch:

On May 19, 2015, Fuss & O'Neill, Inc. performed a Lead Based Paint Inspection on the interstate highway I-20 east and westbound bridges that span the Norfolk Southern Railroad (NSRR) tracks in Lexington County, South Carolina, identified as Structure No. 3210002020300 and Structure No. 3210002040300, respectively.

The bridges serve a busy section of I-20 just south of Exit 58 in Lexington County. The east and westbound bridges each consists of four (4) spans and are approximately 230' in total length. The existing bridges were constructed in 1965 over Norfolk Southern Railroad tracks and Meat Plant Road, in Lexington County, South Carolina.

The purpose of the site inspection was to examine the bridge structures for the presence of Lead Based Paint (LBP). No construction records were available to determine the building materials used in construction of the bridges. The exterior surface areas were examined which included the piers, beams, bridge deck, end bents, and other visible components of the bridges.

No suspect Lead Based Paint was observed during the inspection, and therefore, no suspect LBP samples were collected for laboratory analysis.

____ Yes, Lead Based Paint was found
__X__ No, Lead Based Paint was not found

Figures 1 and 2 depicting an aerial and profile view of the bridge structures are included along with this letter for your use. As always, please call if you have any questions or require additional information.

Sincerely,

Reginald Butler
Environmental Scientist
Ext. 6109

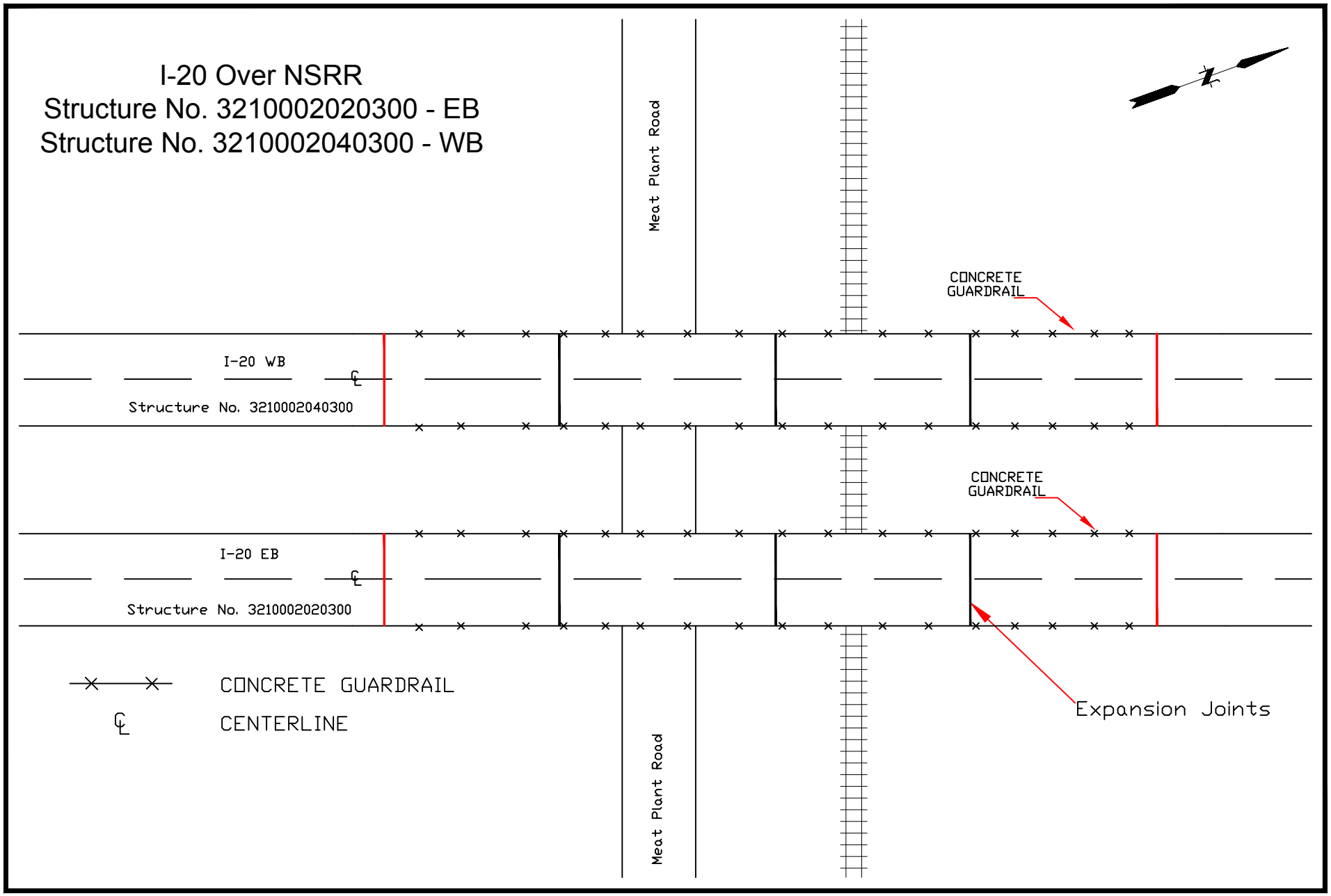
Christine A. Cafagna
Project Manager
Ext. 6105

Enclosure: *Figures 1 and 2*

717 Lady Street,
Suite E
Columbia, SC
29201
t 803.376.6034
800.850.2348
f 803.376.6035

www.fando.com

Connecticut
Massachusetts
Rhode Island
South Carolina



SCALE:	
HORZ.:	Not to Scale
VERT.:	
DATUM:	
HORZ.:	
VERT.:	

0
GRAPHIC SCALE

FUSS & O'NEILL
717 LADY ST, SUITE E
COLUMBIA, SOUTH CAROLINA 29201
803.376.6034
www.fando.com

ICA Engineering

Bridges over NSRR (Aerial View)

Hazardous Material Survey

I-20 East & West Bound

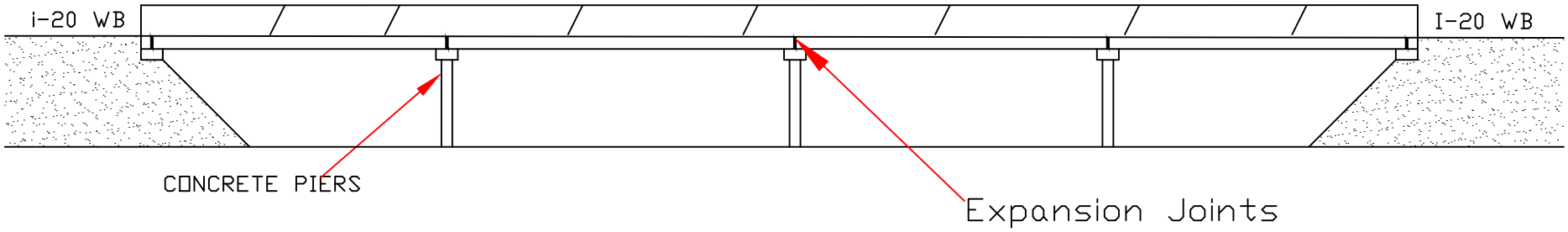
Lexington County, SC

PROJ. No.: 20140615.A10
DATE: May 2015

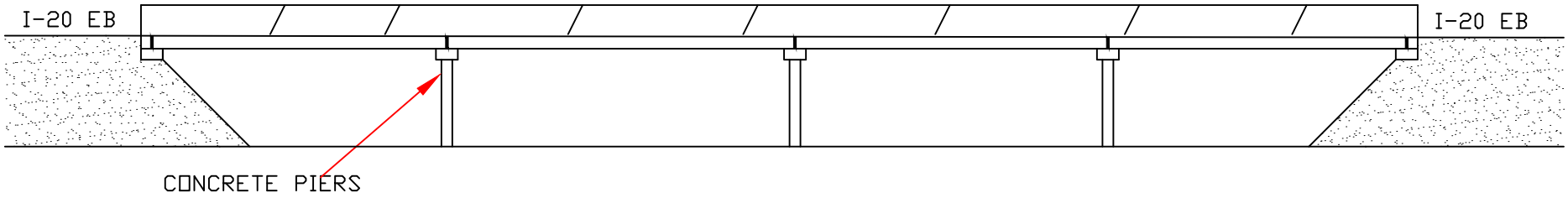
Figure 1

I-20 Over NSRR
Structure No. 3210002020300 - EB
Structure No. 3210002040300 - WB

I-20 WB
Structure No. 3210002040300



I-20 EB
Structure No. 3210002020300



SCALE:	
HORZ.:	Not to Scale
VERT.:	
DATUM:	
HORZ.:	
VERT.:	

0
GRAPHIC SCALE

FUSS & O'NEILL
717 LADY ST, SUITE E
COLUMBIA, SOUTH CAROLINA 29201
803.376.6034
www.fando.com

ICA Engineering

Bridges over NSRR (Profile View)

Hazardous Material Survey

I-20 East & West Bound

Lexington County, SC

PROJ. No.: 20140615.A10
DATE: May 2015

Figure 2

APPENDIX K
Public Involvement

I-20 Widening

PIM Comment Summary

No. of Comments	Comment
1	Consider extending the US 378 westbound offramp as traffic backups are common in the evenings and this affects the outside lane flow.
1	Concerns noted about noise impacts to vacant land opposite of Glenn Meadow Middle School – wants to develop property in the future.
5	Supports noise wall at the schools and Wellesley Subdivision.
1	Supports widening and noise barriers where reasonable and feasible. Support for eastbound onramp from southbound US 1. Need improvements at Cedar Road and US 1 eastbound offramp.
1	Concrete median barrier needs to be high as possible to prevent night blindness from oncoming traffic.
1	Re-consider a noise barrier along Cromer Road in the Autumn Oaks area.
1	Replace vegetation on school side of Ginny Lane if removed due to noise barrier construction. Extend proposed noise barrier towards US 378 to provide distraction from oncoming nighttime headlights.
3	Supports project.
1	Please phase project into three sections: US 378 to US 1; US 1 to SC 6; SC 6 to Longs Pond Road. This would better accommodate traffic as it is heavier at US 378 and is lighter as you travel westward.
1	If funding becomes available, please re-consider noise barrier at Baskin Hills.
1	Supports widening but is wary of narrow medians and cable barriers. Prefers more secure barrier options.

Lexington
SCHOOL DISTRICT ONE
Where Children and Learning Are One

May 29, 2015

Bradley S. Reynolds, P.E.
Program Manager
SC Department of Transportation
955 Park Street, Room 216
Columbia, SC 29202

Subject: Noise reduction wall

Dear Mr. Reynolds,

The purpose of this letter is to express Lexington County School District One's support of the noise reduction wall proposed as part of the I-20 expansion in front of Meadow Glen Elementary and Meadow Glen Middle schools. We would ask that SCDOT preserve as much "green space" as possible behind the wall in the areas in front of our schools. Alternatively, we would ask SCDOT to provide a finished look to the back of the wall in front of our schools if appropriate "green space" is not an option in this area.

Please contact me if you need any additional information regarding this request. Thank you.

Sincerely,

Jeff Salters
Chief Operations Officer
Lexington School District One
803-821-1212

Wellesley

200 Tolbert Court Lexington, SC 29072
HOAWellesley@gmail.com

We, the residents of Wellesley neighborhood as noted below, are petitioning the SCDOT to show our support of the installation of the sound barrier proposed in the I-20 expansion project.

	Name	Address	Signature
1)	PAULA KAUFFMANN	201 ALLENBROOKE WAY	Paula Kauffmann
2)	Andrew Gibson	145 Bartram Way	
3)	Renetta Gibson	145 Bartram Way	
4)	Wayne Russ	101 Allenbrooke Dr.	
5)	Joyce Russ	101 Allenbrooke Dr.	
6)	Li Yu	109 Herrick CT	
7)	Yan Lin	109 Herrick CT	
8)	Lindsey Geddings	124 Tolbert St	
9)	Savanna Whaley	101 Berenham St	
10)	Courtney Golder	232 Ashmore Ln	
11)	Patricia Hartrick	213 Allenbrooke Way	
12)	George Hartrick	213 Allenbrooke Way	
13)	Margaret Combs	105 Allenbrooke Dr. Lexington 29072	Margaret Combs
14)	Cris Cockrell	212 Allenbrooke Way	
15)	Dan Burnette	144 Bartram Way	

Wellesley

200 Tolbert Court Lexington, SC 29072
HOAWellesley@gmail.com

We, the residents of Wellesley neighborhood as noted below, are petitioning the SCDOT to show our support of the installation of the sound barrier proposed in the I-20 expansion project.

	Name	Address	Signature
16)	Julie Benr	224 Allenbrooke Way	
17)	Daniel Bartels	224 Allenbrooke Way	
18)	John McCutchen	232 Allenbrooke way	
19)	Scott Johns	337 allenbrooke Dr S	
20)	MICHAEL DALTON	213 ENDICOT ST.	
21)	Tabitha Dalton	213 Endicot ST	
22)	[illegible]	314 Ashmore Lane	
23)	Austin Jones	314 Ashmore Lane	
24)	Janelle Thorsen	111 Ashford Way	
25)	WILL THORSEN	111 ASHFORD WAY	
26)	KRISTEN Z. BECKHAM	205 ENDICOT	
27)	MATT PRO	205 ENDICOT	
28)	Brian Grant	132 Tolbert	
29)	Jennifer Grant	132 Tolbert	
30)	Jake Grant	133 tolbert st	

Wellesley

200 Tolbert Court Lexington, SC 29072
HOAWellesley@gmail.com

We, the residents of Wellesley neighborhood as noted below, are petitioning the SCDOT to show our support of the installation of the sound barrier proposed in the I-20 expansion project.

	Name	Address	Signature
31)	BRIAN HARTLEY	316 ALLENBROOKE DR	
32)	Terri Baudo	232 Ashmore Ln	
33)	David Allred	140 Ashford st	
34)	Clarita Roche	320 Allenbrooke Dr	
35)	Stacie Edgar	141 Herrick Crt	
36)	Chandler Coggeshall	108 Caley Court	
37)	Tracie Ransrom	133 Herrick ct	
38)	KRIS RANSROM	4	
39)	Tim Kirsten	153 Ashford St	
40)		328 Allenbrooke Dr	
41)		88 Ashford St.	
42)	Lawrence Donnelly	301 Allenbrooke Drive	
43)		116 BARTRAM ST	
44)	Katie McCown	120 Tolbert St.	
45)	Michael McCown	120 Tolbert St.	

Wellesley

200 Tolbert Court Lexington, SC 29072
HOAWellesley@gmail.com

We, the residents of Wellesley neighborhood as noted below, are petitioning the SCDOT to show our support of the installation of the sound barrier proposed in the I-20 expansion project.

	Name	Address	Signature
46)	Ashley Robertson	120 Ashford St Lexington, SC 29072	
47)	Matthew Robertson	120 Ashford St Lexington SC 29072	
48)	Patricia Collins	326 Allenbrook Dr Lexington SC 29072	
49)	Chris Bardale	228 Ashmore Lane Lex, SC 29072	
50)	Molly Goodwin	129 Badham Way	
51)	Kyle Himmelwright	104 Ashford Way	
52)	Jayme Himmelwright	104 Ashford Way	Jayme Himmelwright
53)	Leandre Abelcter	205 Beckenham St.	
54)	Wayne Duffie	217 Allenbrooke Dr	
55)	Matt Hanson	152 Herrick Ct	
56)	Lindsay Weathers	100 Herrick Ct	
57)	Stepher Weathers	100 Herrick Ct.	
58)	Don Culp	201 Beckenham St	
59)	Carmen Johns	337 Allenbrooke Dr	
60)	Catherine Chartrand	121 Herrick Ct	

Wellesley

200 Tolbert Court Lexington, SC 29072
HOAWellesley@gmail.com

We, the residents of Wellesley neighborhood as noted below, are petitioning the SCDOT to show our support of the installation of the sound barrier proposed in the I-20 expansion project.

	Name	Address	Signature
61)	Arthur Chartrand	121 Herrick Ct.	Arthur Chartrand
62)	Haylee Korn	121 Ashford Way	Haylee Korn
63)	Matthew Korn	121 Ashford Way	
64)	ADAM MATTHEWS	321 ASHMORE LN	
65)	Patricia K Banks	172 Ashford St	P. Banks
66)	Terry Banks	172 Ashford St	Terry Banks
67)	Nelis Soto-Ramirez	204 Bartram St.	
68)	Justin Ferren	325 Allenbrooke Dr.	
69)	Dorothy arnold	216 chamfort Dr	
70)		216 Chamfort Pl	Sam Arnold
71)	John Kiernan	108 Bartram Way	
72)	Mary Robbins	105 Beckenham St.	Mary E Robbins
73)	Mark Robbins	105 Beckenham St	
74)	Cynthia Schools	124 ASHFORD WAY	Cynthia Schools
75)	Gary Schools	124 Ashford Way	

Wellesley

200 Tolbert Court Lexington, SC 29072
HOAWellesley@gmail.com

We, the residents of Wellesley neighborhood as noted below, are petitioning the SCDOT to show our support of the installation of the sound barrier proposed in the I-20 expansion project.

	Name	Address	Signature
76)	Charlotte Rhett	112 Ashmore Lane	
77)	Peterson Kristian	212 Ashmore Ln	
78)	Waddell, Chris	220 Ashmore Ln	
79)	Broome, Chris	213 Ashmore Ln	
80)	Reilly, Sean	116 Ashmore Lane	
81)	Erin White	307 If already budgeted - Erin	
82)	Deborah Churchill	265 Ashmore Ln	
83)	Lauren Robbins	100 Caley Ct	
84)	Matthew Robbins	100 Caley Ct	
85)	Nikki Broome	213 Ashmore Ln	
86)	Bren Mercer	224 Ashmore Lane	
87)	Dylan Keels	224 Ashmore Ln	
88)	Donald Mercer	2224 Ashmore Lane	
89)	Melissa Abbott	209 Allenbrooke Way	
90)	Steven Sansonetti	225 Allenbrooke Way	

Wellesley

200 Tolbert Court Lexington, SC 29072
HOAWellesley@gmail.com

We, the residents of Wellesley neighborhood as noted below, are petitioning the SCDOT to show our support of the installation of the sound barrier proposed in the I-20 expansion project.

	Name	Address	Signature
91)	Daniel Whittington	208 Allenbrooke Dr	
92)	Carolyn Whittington	208 Allenbrooke Dr	
93)	Barron Keel	215 Allenbrooke DR	
94)	Christy Keel	215 Allenbrooke DR	
95)	Peterson, Edon	212 Ashmore	
96)	Randy Crews	104 Caley Ct	
97)	Christopher Barkley	216 Caley Ct	
98)	Josh Nichols	148 Herrick Ct	
99)	Marcelo Frias Reyes	333 Ashmore Ln	
100)	Susan Jennings	120 Ashmore Ln	
101)	Katie Guerry	324 Ashmore Ln	
102)	Michael Smith	248 Ashmore Ln.	
103)	Amanda Smith	248 Ashmore Ln.	
104)	Jerald Robertson	101 Endicott St.	
105)	CHERYL RIDGE	145 HERRICK CT	

Wellesley

200 Tolbert Court Lexington, SC 29071
HOAWellesley@gmail.com

We, the residents of Wellesley neighborhood as noted below, are petitioning the SCDOT to show our support of the installation of the sound barrier proposed in the I-20 expansion project.

	Name	Address	Signature
106)	Chris Redel	128 Ashford St.	
107)	Bobby Couch	242 Chanfort Dr.	
108)	April Byrd	209 ENDICOT	
109)	Philip Rhett	112 Ashmore Ln	
110)	EDITH HERSHFIELD	145 HERRICK CT.	Edith Hershfield