

3. Existing Conditions and Environmental Consequences

3.5.5.3 What were the results of the feasibility and reasonableness considerations for the RPA?

A summary of the results of the preliminary evaluation of feasibility and reasonableness for barriers identified under the RPA can be found in Table 3.5-4. Under the preliminary analysis, barriers that shielded a single receptor all referenced the same analysis (Barrier C). For the detailed analysis, all barriers were fully investigated.

Table 3.5-4 Summary of Preliminary Noise Mitigation Analysis for the RPA

Barrier	Dimensions (length x avg. height, feet)	Cost ⁶	Feasible	Reasonable	Proposed
A	1,800x25	\$1,575,035	Yes	No	No
B1	See C				
C	229x10	\$80,150	Yes	No	No
E1	1,312x15	N/A	Yes	No	No
F	See C				
G1	2,604x20	\$1,823,395	Yes	Yes	Yes
H1	4,085x20	\$2,859,500	Yes	No	No
H2	845x25	N/A	No	N/A	No
I1	2,006x20	\$1,403,465	Yes	No	No
I2	6,405x20	\$4,481,400	Yes	Yes	Yes
J1	2,600x15	\$1,365,245	Yes	No	No
J2	3,210x15	\$1,685,600	Yes	Yes	Yes
K1	4,742x25	\$4,146,170	Yes	Yes	Yes
L1/L2	2,054x25	N/A	No	N/A	No
N1	2,200x15	\$1,155,014	Yes	No	No
N2	See C				
O	2,200x15	\$1,154,930	Yes	Yes	Yes
Q1	5,327x20	\$3,731,665	Yes	Yes	Yes
R1	5,200x15	\$2,729,860	Yes	Yes	Yes
S	4,999x25	\$4,375,595	Yes	Yes	Yes
T1	4,569x25	\$3,998,225	Yes	No	No
U1	2,833x25	N/A	No	N/A	No
V1/V2	2,916x25	N/A	Yes	No	No
W	2,000x25	\$1,749,650	Yes	Yes	Yes
X2	6,851x20	\$4,795,280	Yes	No	No

⁶ Note: Cost is marked N/A if the Noise Reduction Design Goal portion of the reasonableness assessment was not met. Instances where the noise wall cost does not exactly equal to the wall area multiplied by \$35/sq ft. are due to rounding that occurs during barrier dimension calculations performed by TNM.

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Barrier	Dimensions (length x avg. height, feet)	Cost ⁶	Feasible	Reasonable	Proposed
Y1	3,508x25	N/A	Yes	No	No
Z1	3,535x20	\$2,474,395	Yes	Yes	Yes

Based on the preliminary analysis of the RPA, of the 28 walls assessed for feasibility and reasonableness criteria, fourteen barriers were determined to be feasible but not reasonable; ten barriers were determined to be reasonable and feasible; and three barriers were determined to not be feasible (and therefore no reasonableness assessment occurred). The location of the preliminary proposed noise walls are shown on Figure 3.5-2.

3.5.6 WHAT ARE THE RESULTS OF THE DETAILED NOISE ANALYSIS?

3.5.6.1 How did we assess expected noise under the detailed analysis?

Per the SCDOT *Traffic Noise Abatement Policy*, a detailed traffic noise analysis was performed on the Refined RPA. Refinements included in the detailed analysis include the following features of the Refined RPA and study area: elevations of sensitive receivers; elevations for existing roadways; elevations for the refined RPA; existing and proposed roadway shoulders, and; building rows, terrain lines, ground zones, or tree zones. The detailed traffic noise analysis is therefore more refined than the preliminary traffic noise analysis, and the results are considered to be more accurate and suitable for making final decisions about traffic noise mitigation measures.

Noise receptors in the project area within approximately 500 feet of the outside lane were identified through field reconnaissance and GIS parcel map information. A total of 2,772 individual noise receptors were identified in the project area. More receptors were identified than in the preliminary analysis due to changes to the study area associated with the refinements in design. The SCDOT defines a noise receptor as a discrete or representative location of a noise sensitive area. For Category C and D receptors, equivalent dwelling units are calculated based on usage information per SCDOT's *Traffic Noise Abatement Policy*. The 2,772 individual receptors represented a total of 3,354 equivalent dwelling units. Usage information collected for each Category C and D receptor can be found in the Noise Technical Report included as Appendix J of this FEIS.

The Saluda Riverwalk Extension is a Section 4(f) resource currently under construction in the project study area adjacent to I-126 and I-26 (refer to Section 3.11 for further information). Based on usage information, the trail was modeled as three receptors representing five equivalent dwelling units each. The receptors were located at the beginning, middle, and end of the portion of trail within the study area.

3.5.6.1.1 Existing Condition

The Federal Highway Administration (FHWA) Traffic Noise Model (TNM version 2.5) was used to calculate existing noise levels and predict future design year noise levels. Inputs to this model include noise sensitive receiver locations, existing and future roadway alignments, traffic volumes and posted speeds, and features such as ground zones, terrain lines, buildings and building rows, and jersey barriers. The following was assumed:

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- Where required, multiple travel lanes were included in the TNM model.
- Peak hour traffic volumes and truck percentages were provided by STV Inc.
- All requirements of the SCDOT noise policy were followed:
 - Terrain features larger than 5 feet were defined by terrain lines.
 - Building rows were included only for the first two rows of buildings.
 - Ground zones were included where there is a non-default ground type between the roadway and a receptor
 - Shoulders and medians were modeled as no-traffic roadways, or as ground zones if jersey barriers are present.
- Features including building rows, barriers, terrain lines and ground zones were included only between receptors and roadways.
- Ground elevations for all inputs to the model, including roadways, receptors, terrain lines, building rows, jersey barriers, building barriers, and barriers in the barrier analyses were defined.
- A land use survey was conducted for the project area. The corresponding Noise Abatement Criteria (NAC) category from the SCDOT Traffic Noise Abatement Policy was used.

The existing land use consists of primarily single-family and multi-family residences (Category B) as well as some apartment pools, golf courses, and trails (Category C), interiors of medical facilities, schools, and places of worship (Category D – interior⁷) and hotel pools and restaurant patios (Category E). For the Carolina Crossroads project, noise sensitive receivers were assigned a NAC category B, C, D, or E. Based on this detailed noise analysis for the existing condition, noise levels would approach or exceed the NAC established in the *SCDOT Traffic Noise Abatement Policy* for 640 receivers. The majority of the impacts are to NAC Category B (residences). Noise levels for the existing condition ranged from 47 to 75 dBA. A detailed figure is in Appendix A of the Noise Technical Report, which is Appendix J of the FEIS (Figure A1, Page 1-27). Table 3.5-5 presents a summary of impacts by alternative.

⁷ Interior impacts are only considered if exterior impacts cannot be addressed by a feasible and reasonable abatement feature.

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Table 3.5-5 Summary of Impacts by Alternative (Detailed Analysis, Number of Receivers)

Activity Category	Existing	Future No-build	Refined Recommended Preferred Alternative
A	0	0	0
B	539	546	651
C	25	25	26
D	74	74	97
E	2	2	1
Total	640	647	775

Fewer impacts were identified in the detailed noise analysis than in the preliminary noise analysis, primarily due to the inclusion of elevation and obstacles such as jersey barriers and building rows, which shield noise from reaching receptors farther away from the interstate.

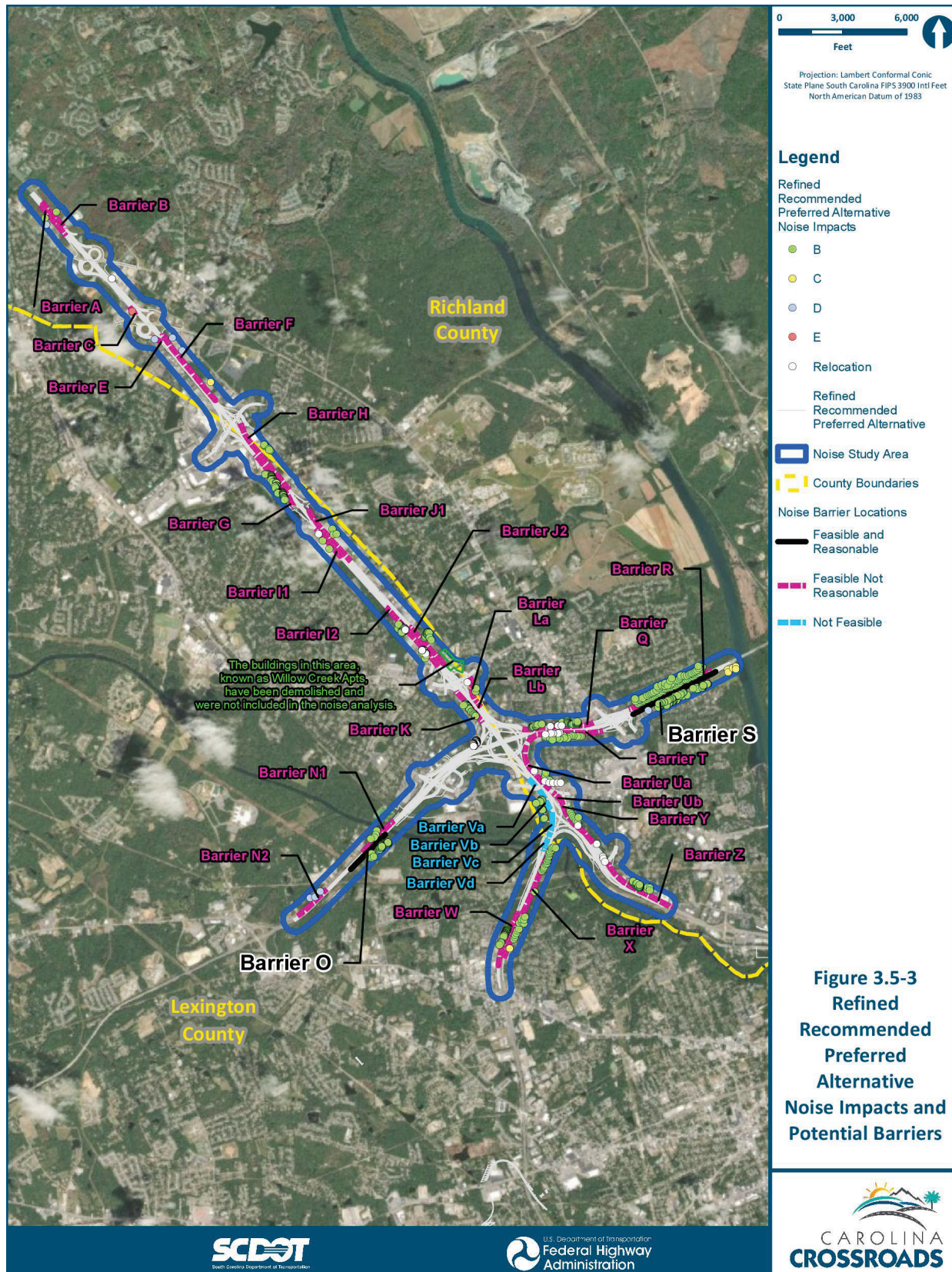
3.5.6.1.2 No-Build Alternative

Based on the detailed noise analysis for the future No-Build alternative, noise levels would approach or exceed the NAC established in the *SCDOT Traffic Noise Abatement Policy* for 647 receivers. The majority of the impacts are to NAC Category B (residences). Noise levels for the No-build alternative ranged from 47 to 76 dBA. A detailed figure is in Appendix A of the Noise Technical Report, which is Appendix J of the FEIS (Figure A2, Pages 1 through 27).

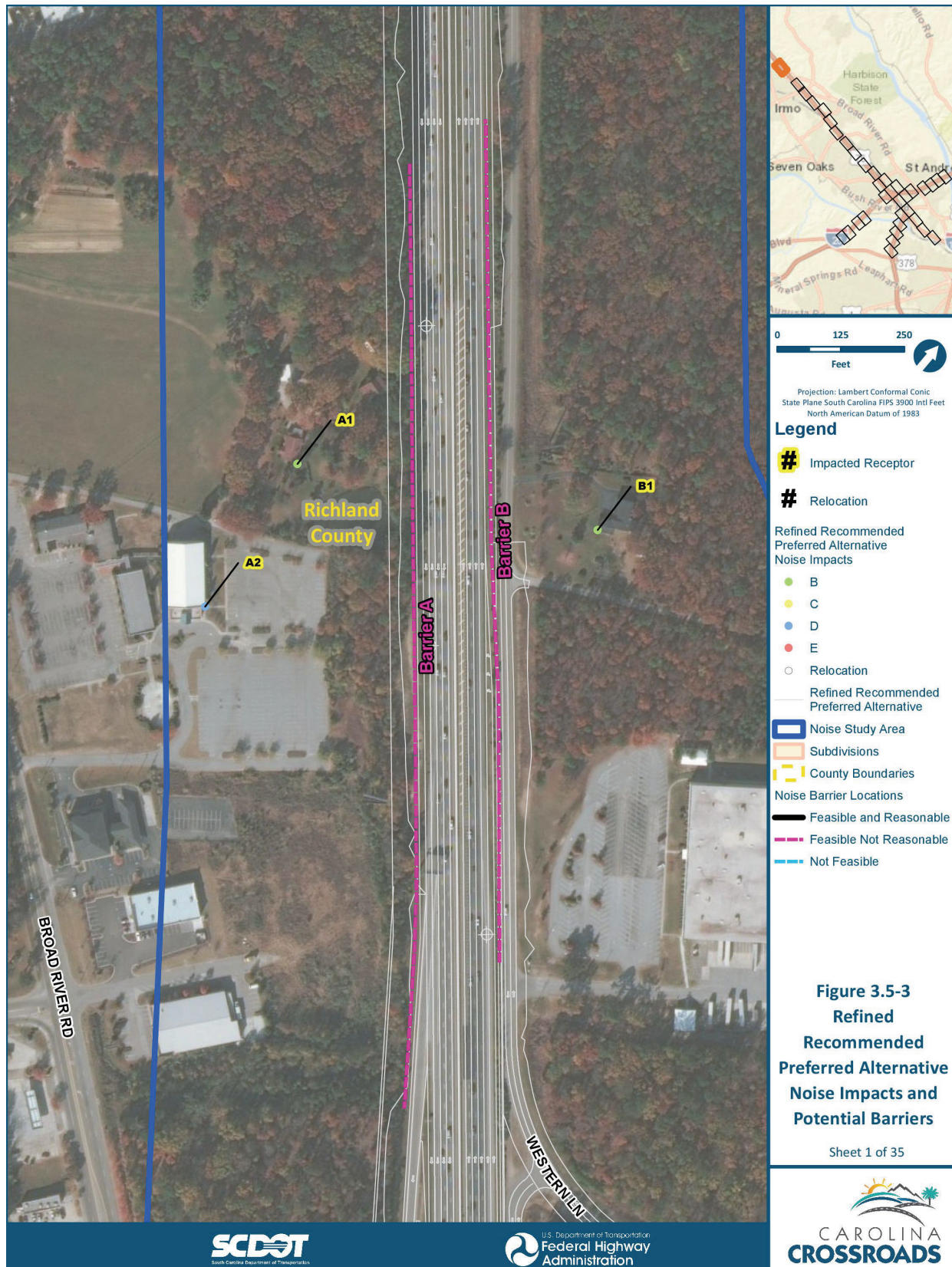
3.5.6.1.3 Refined Recommended Preferred Alternative

For the Refined RPA, 2040 noise levels would approach or exceed the NAC established in the *SCDOT Traffic Noise Abatement Policy* for 775 receivers. Receivers that would be relocated are not included in the impact count; refer to Appendix I for additional information on relocated properties. The majority of the impacts would be to NAC Category B (residences). Noise levels for the Refined RPA ranged from 48 to 78 dBA and are predicted to increase over existing noise levels from 0 to 8 dBA. There would be no substantial increase impact (i.e., a 15 dBA increase as described in Section 3.5.5.1). Figure 3.5-3 presents the noise receptors in the Refined RPA that are predicted to approach or exceed the NAC, and shows the locations of noise walls that were studied in the detailed analysis. A detailed figure is in Appendix A of the Noise Technical Report, which is Appendix J of the FEIS (Figure A3, Page 1 – 27).

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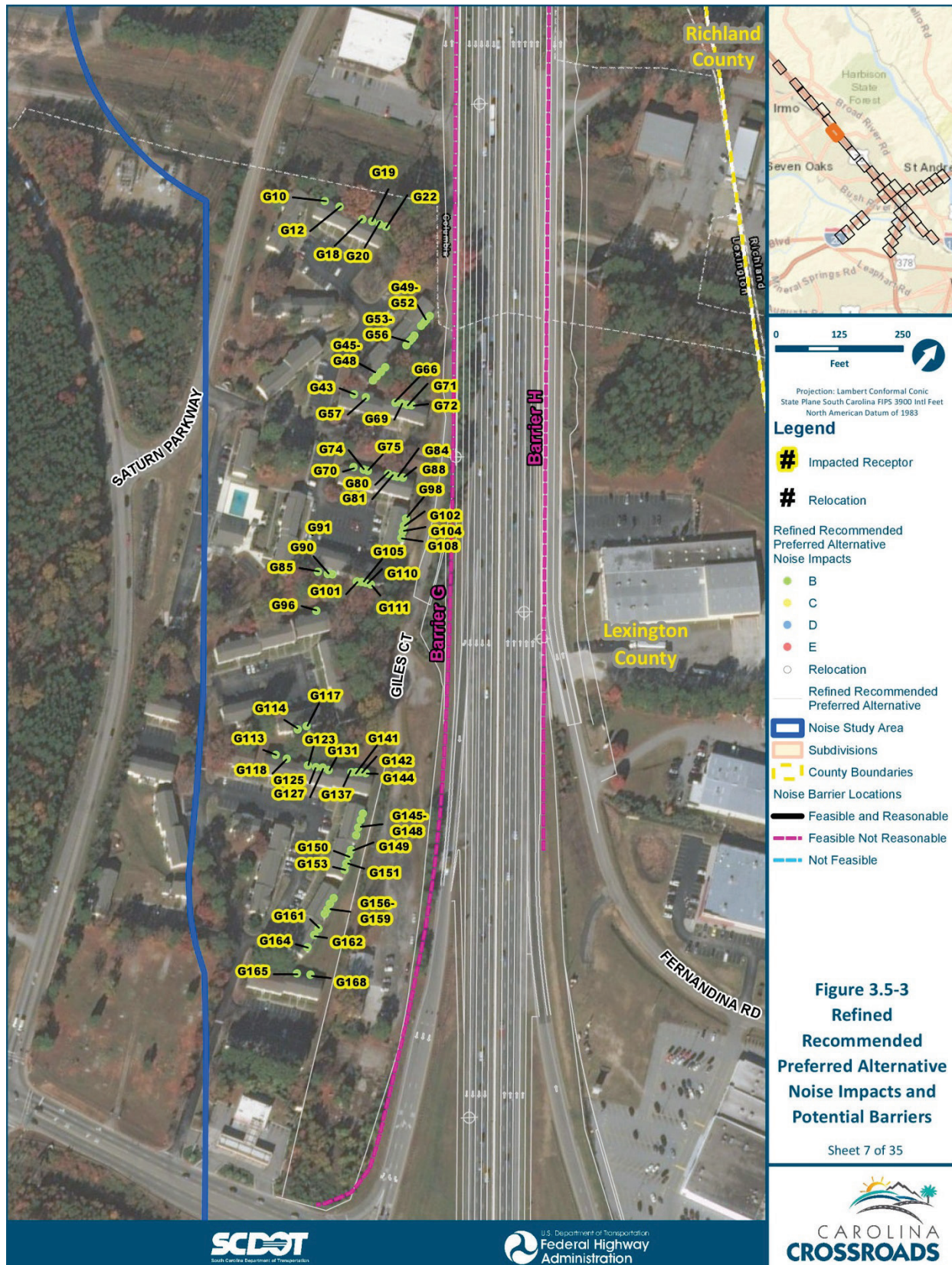
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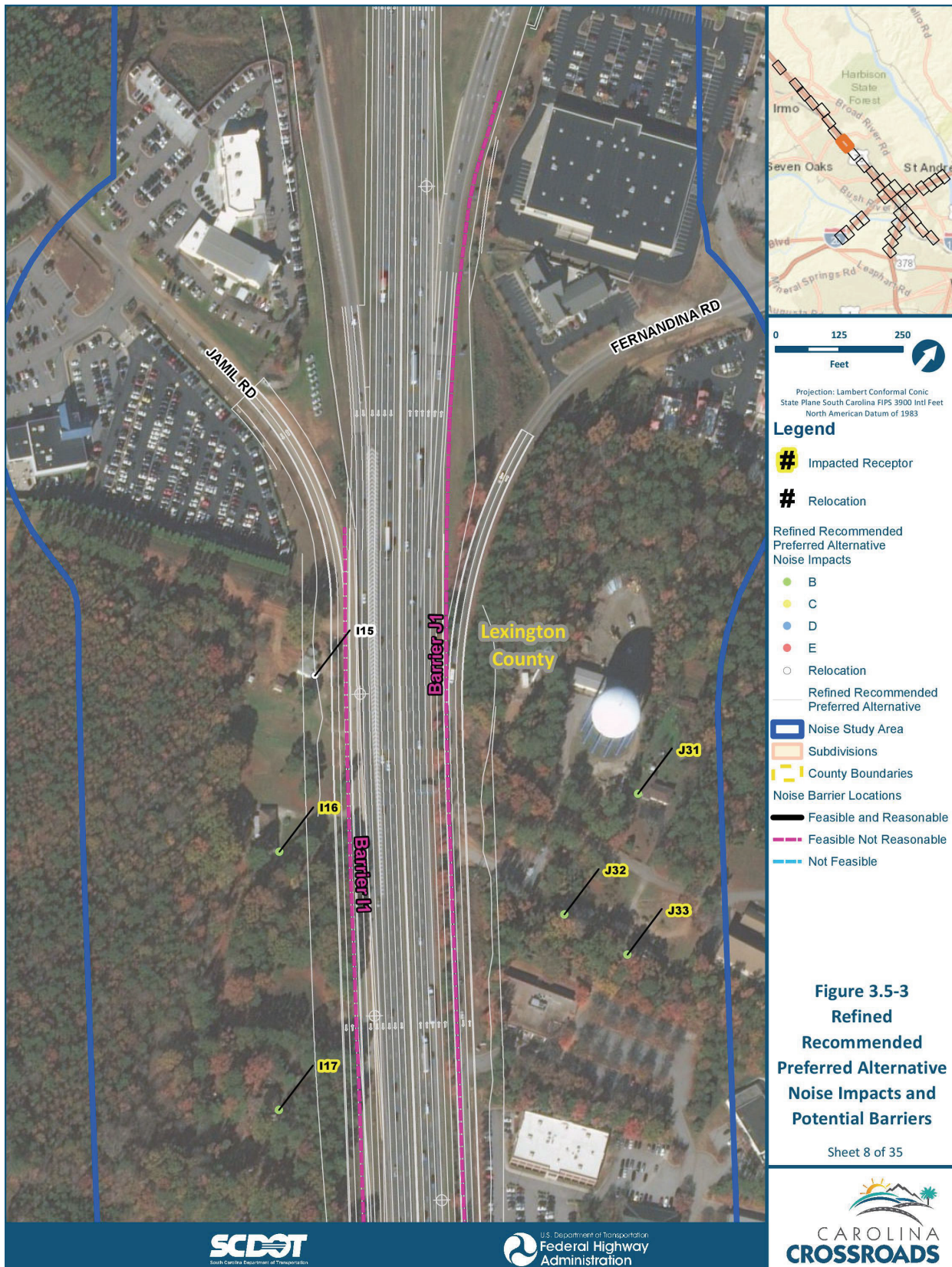
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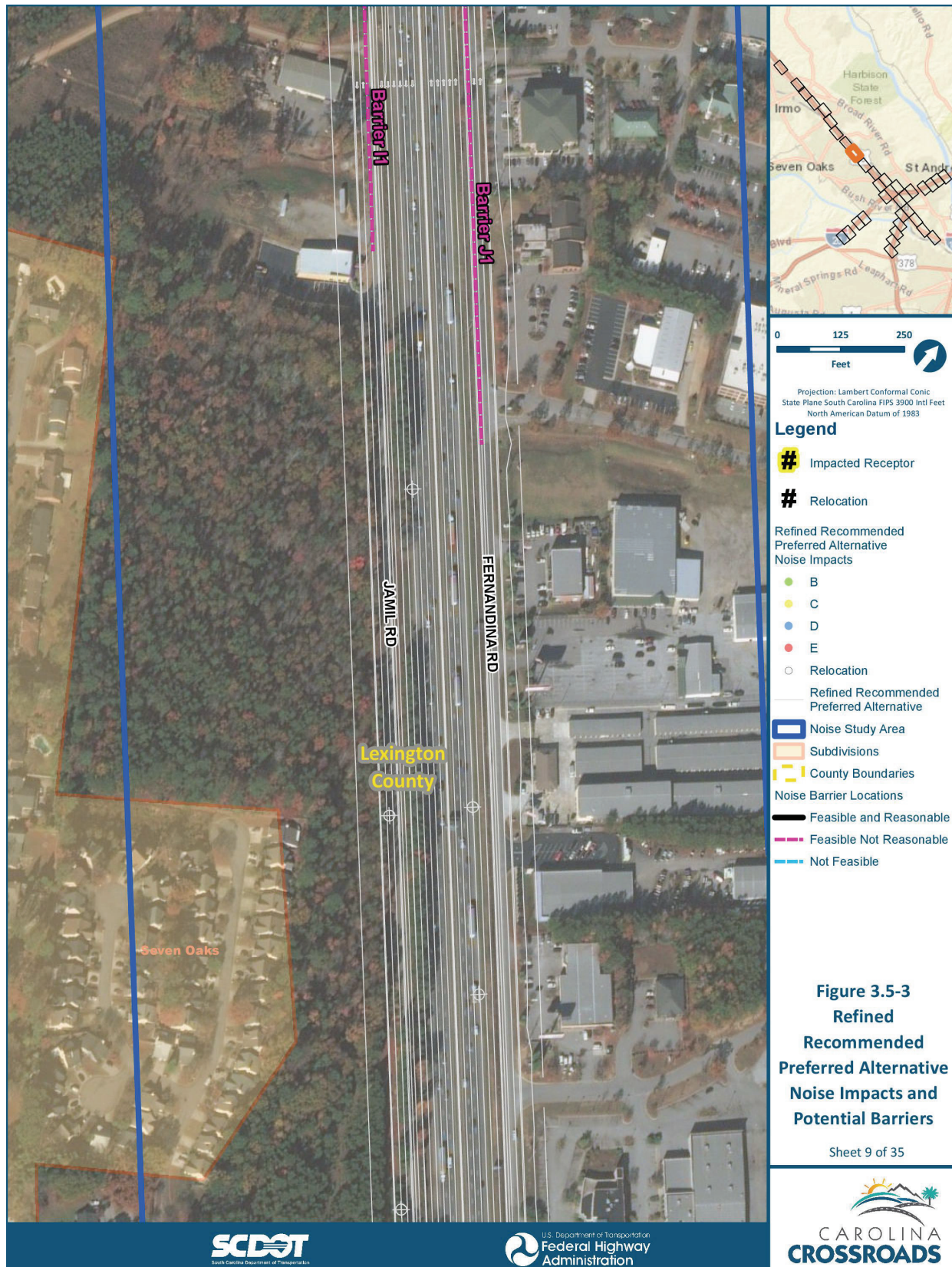
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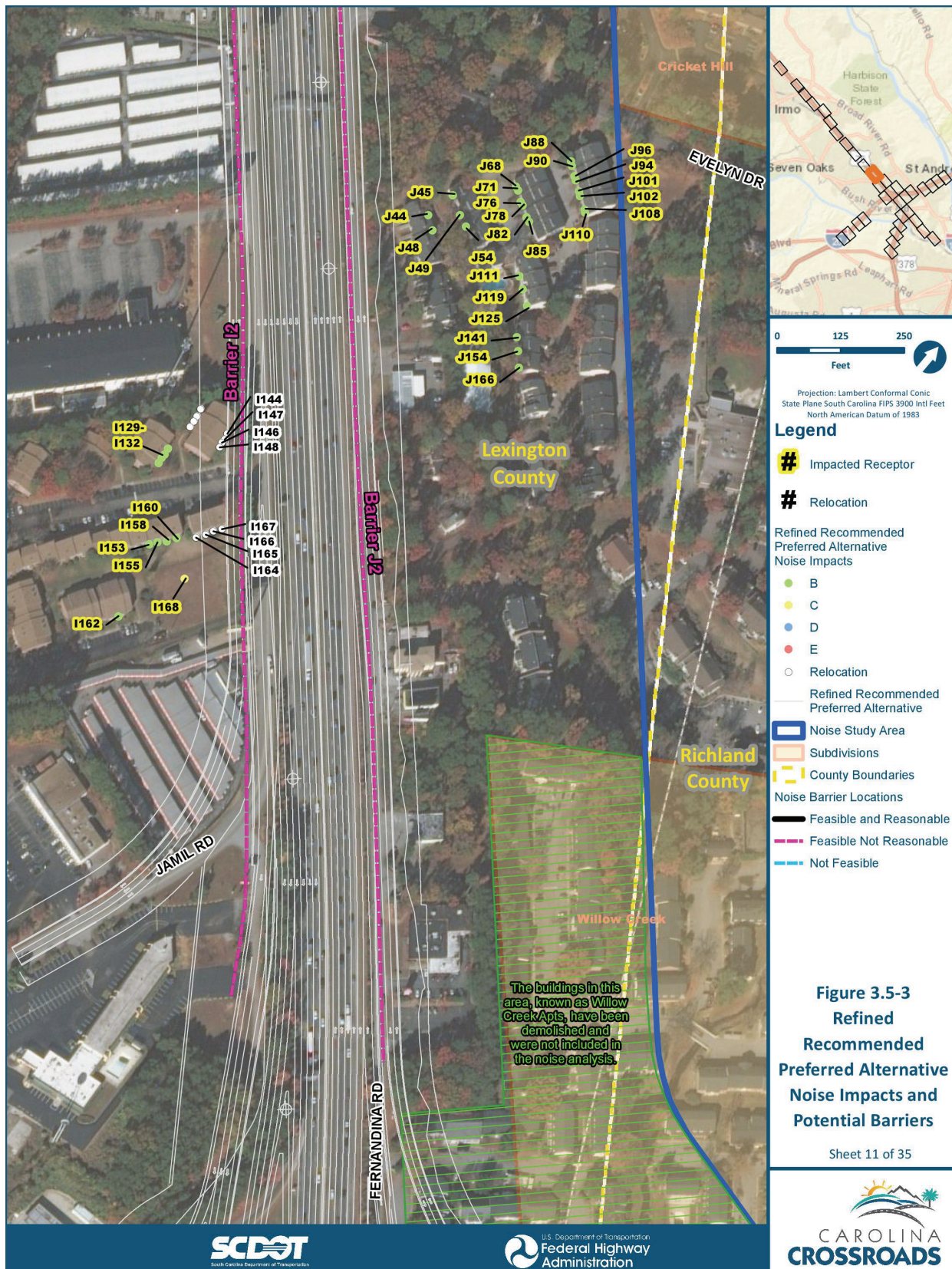
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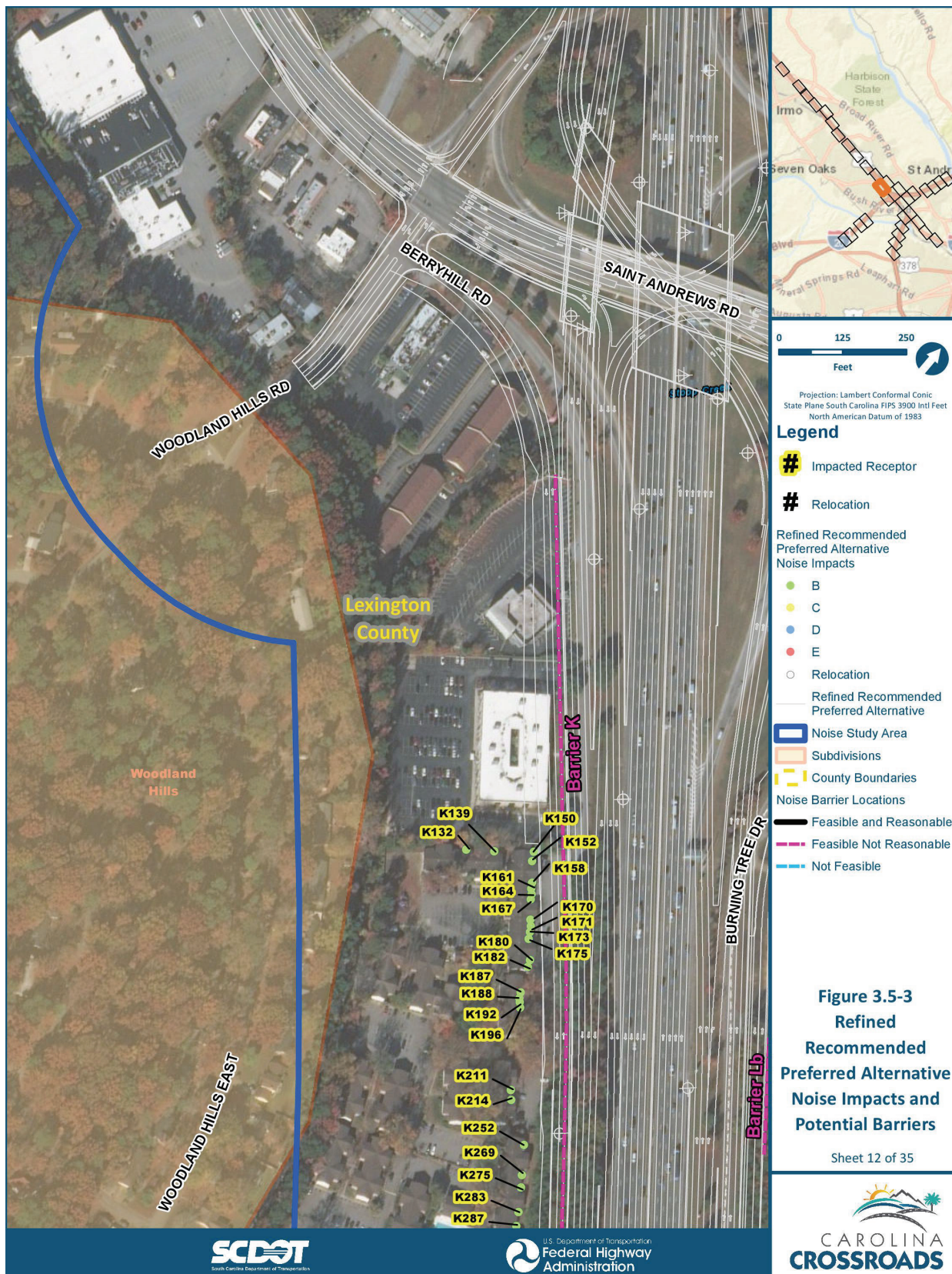
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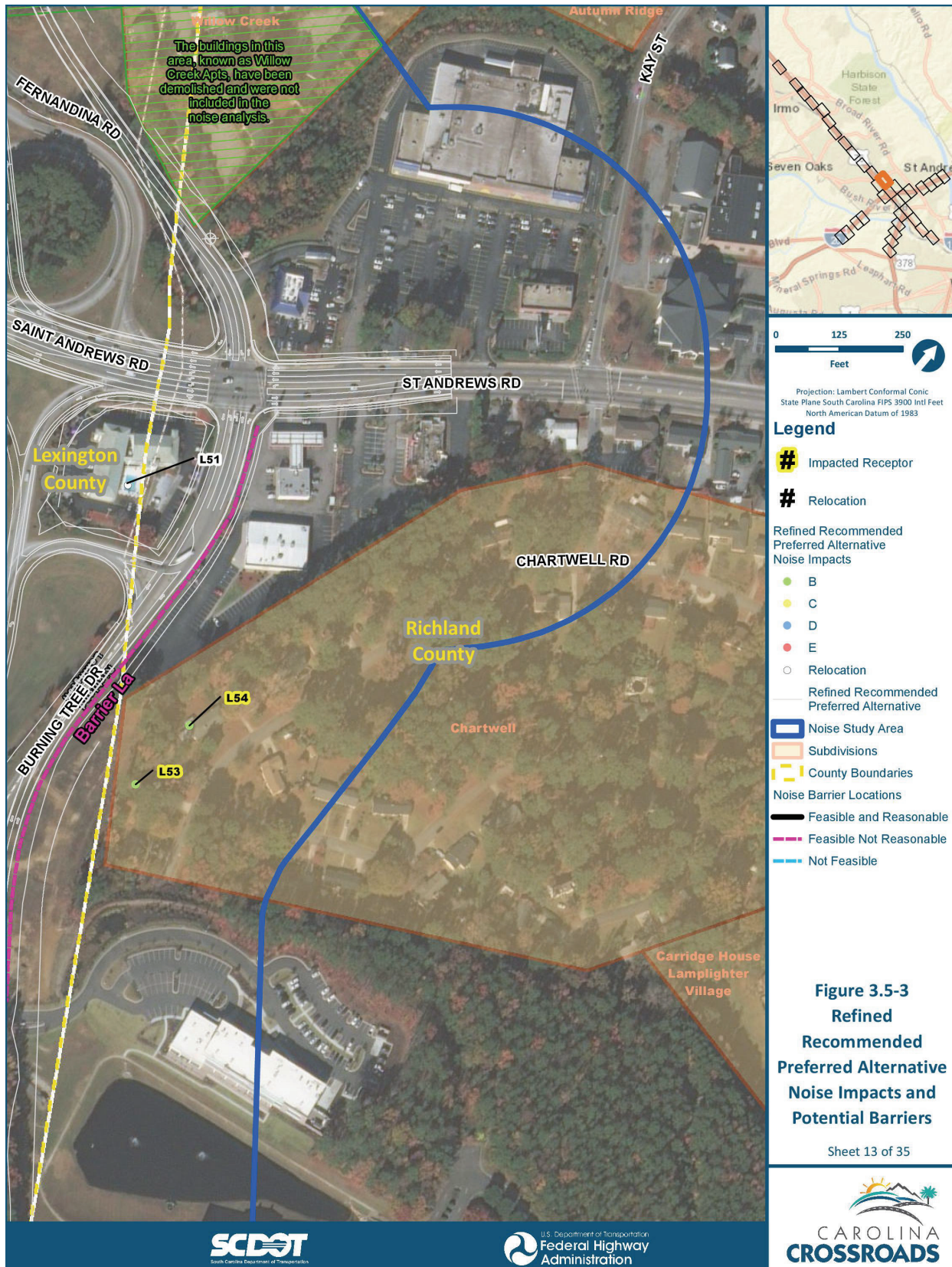
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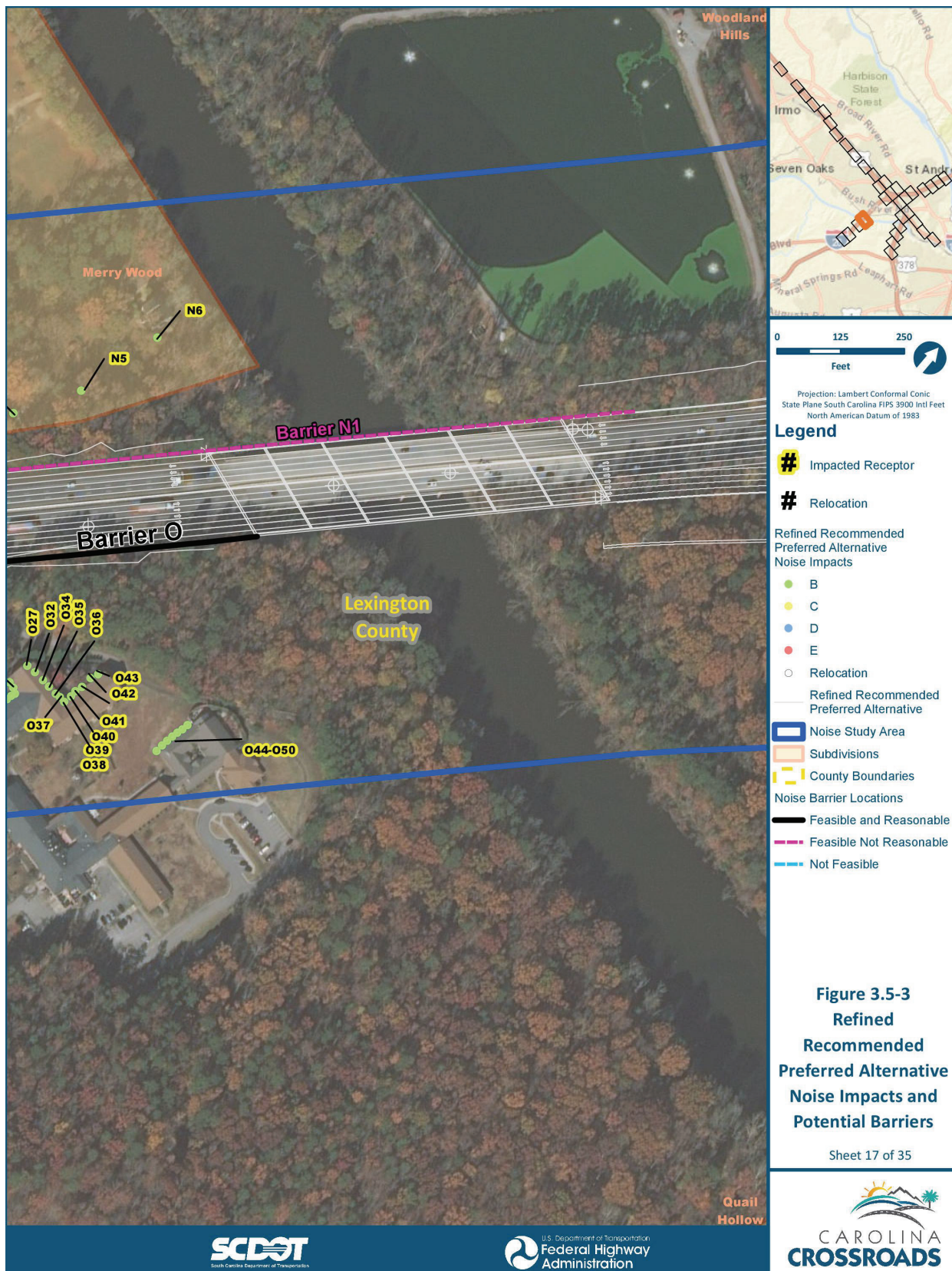
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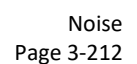


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