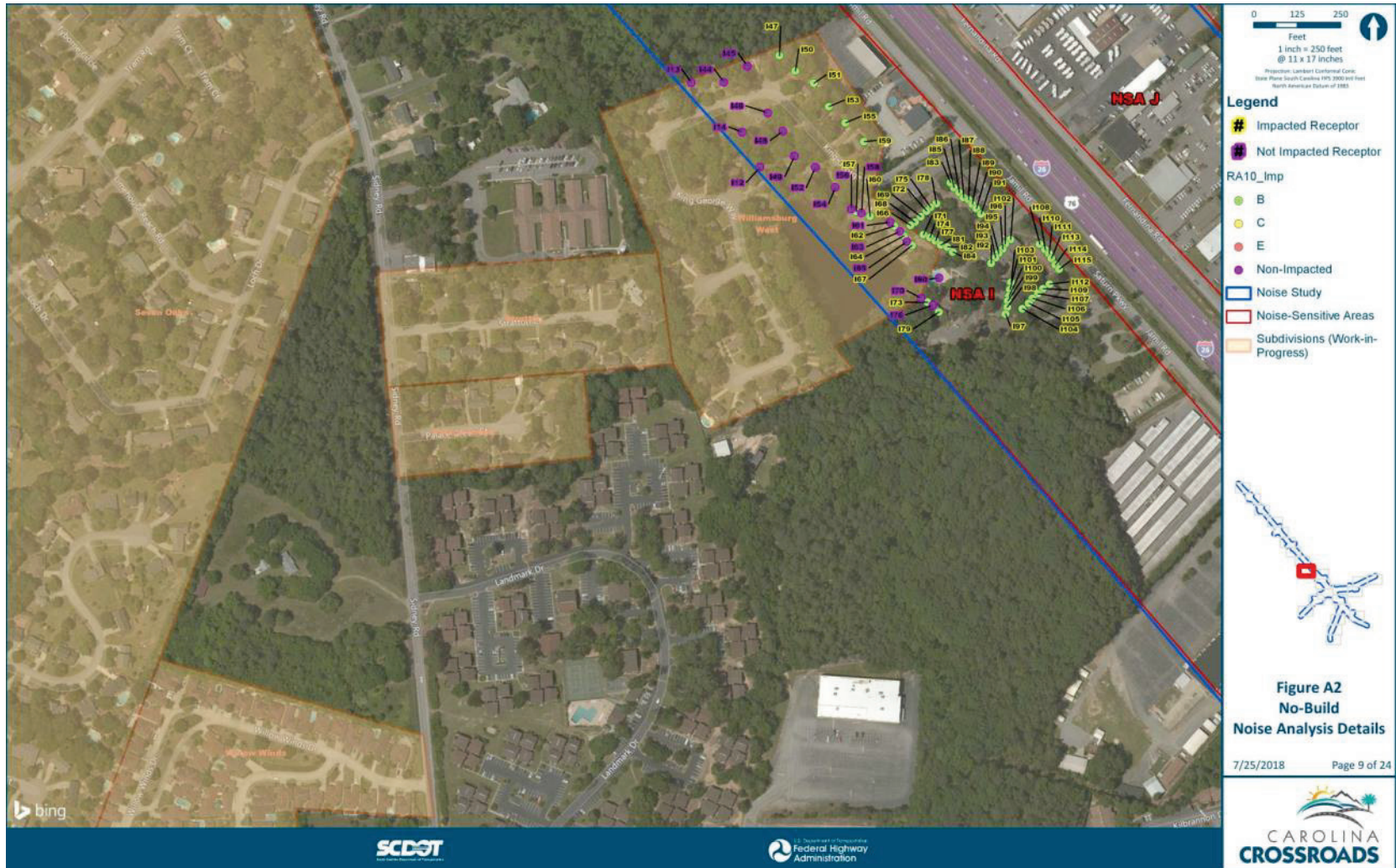


Appendix I—Noise Technical Report

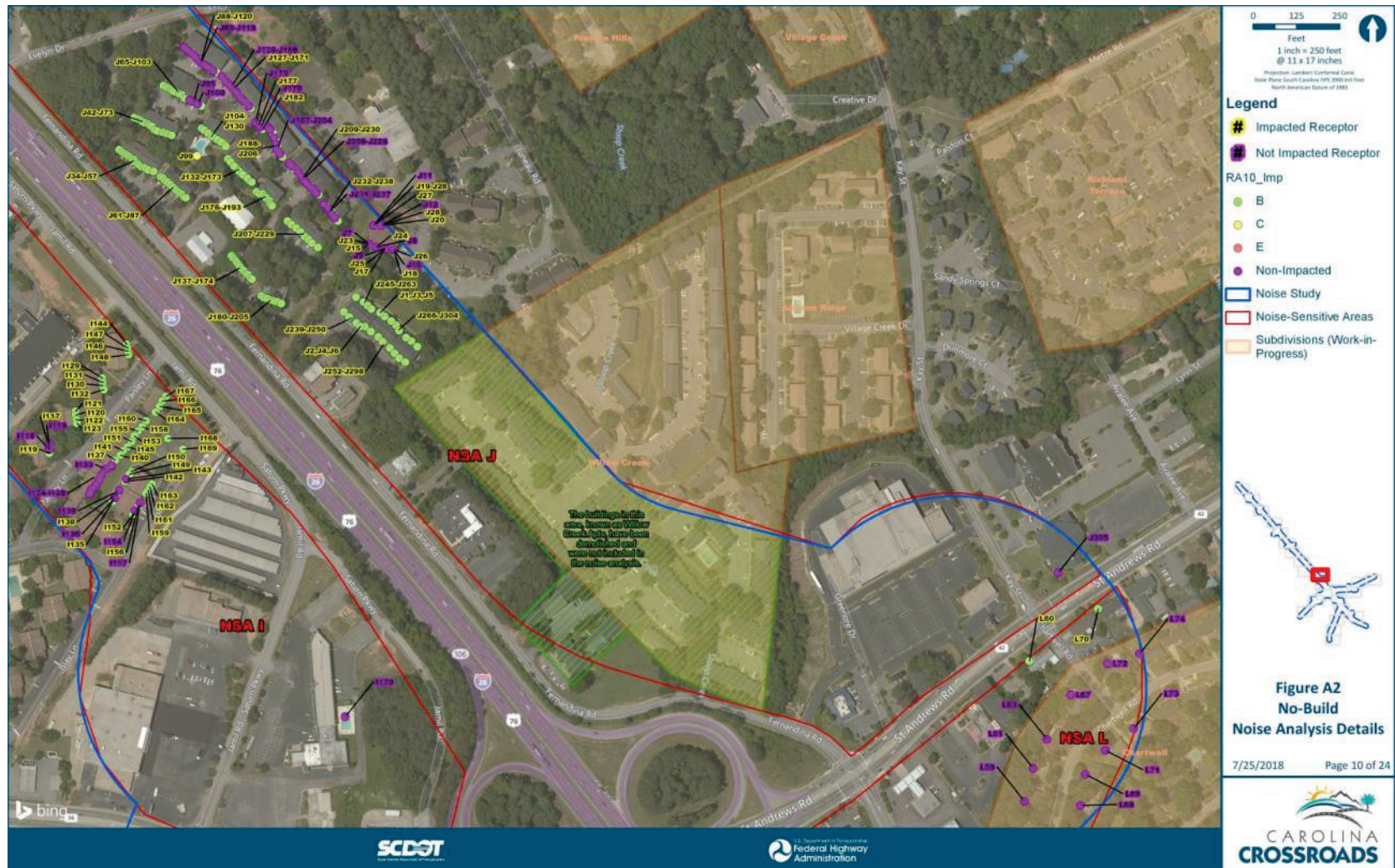
Part 2

Appendix A—Figures (continued)

Noise Technical Report



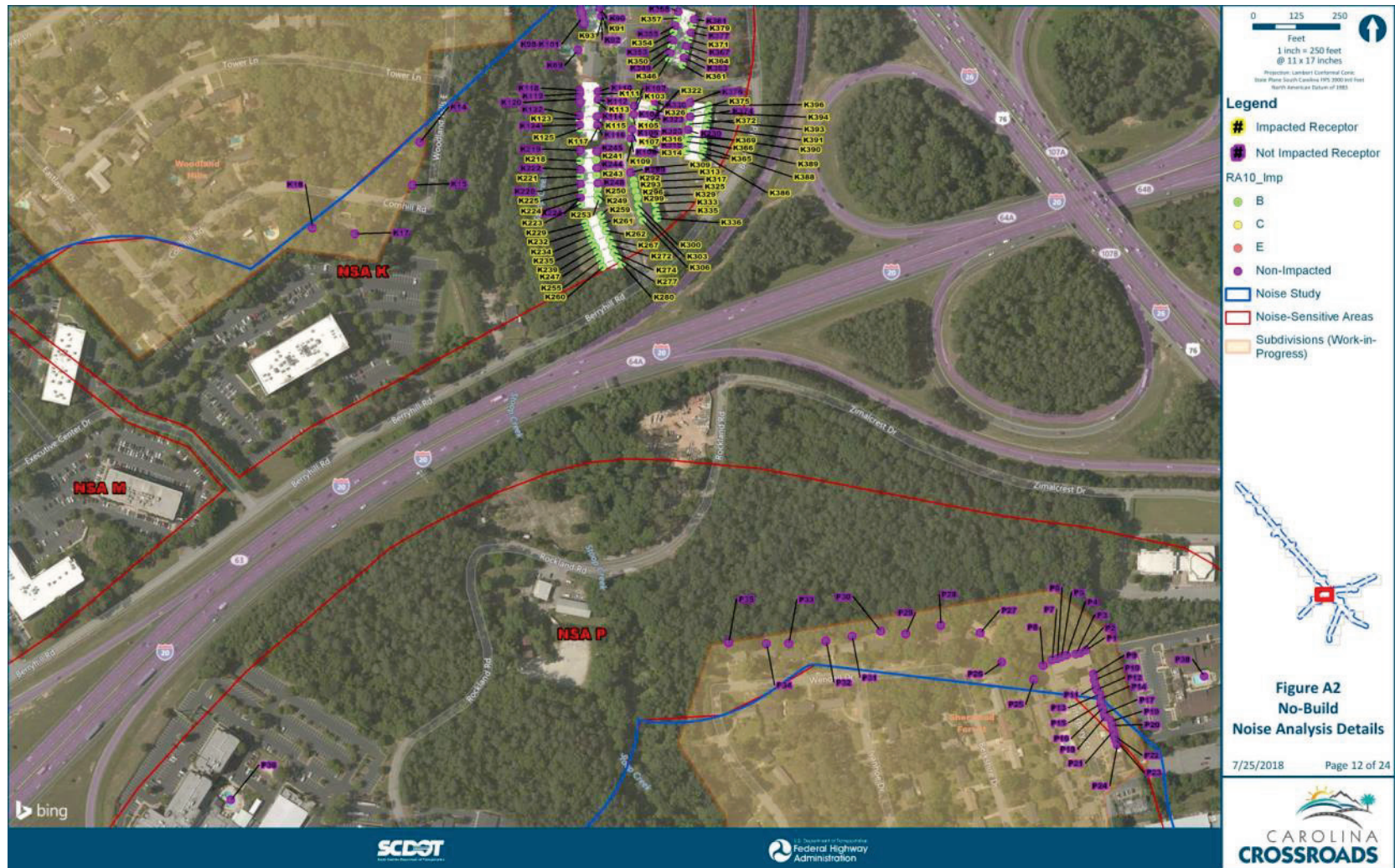
Noise Technical Report



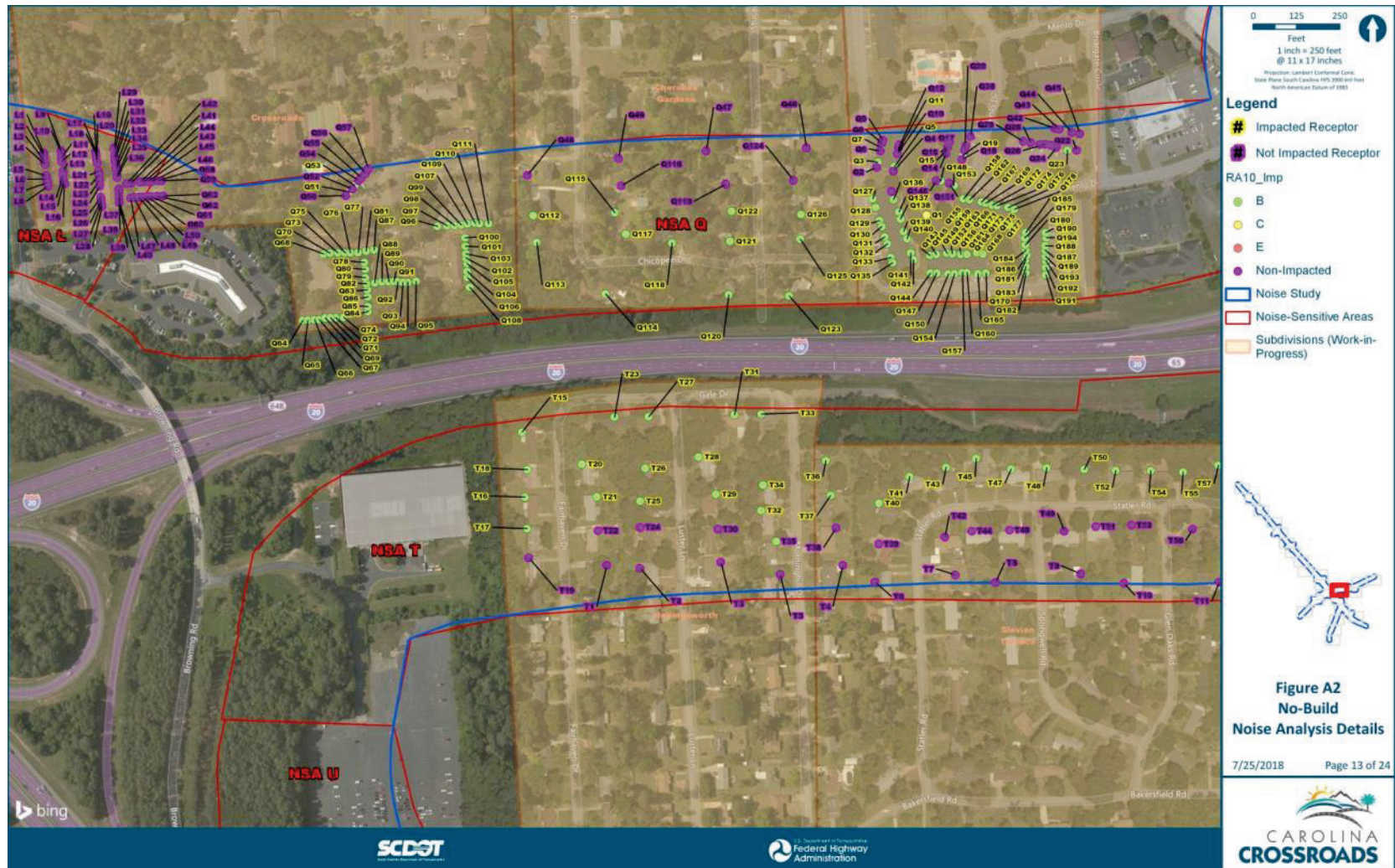
Noise Technical Report



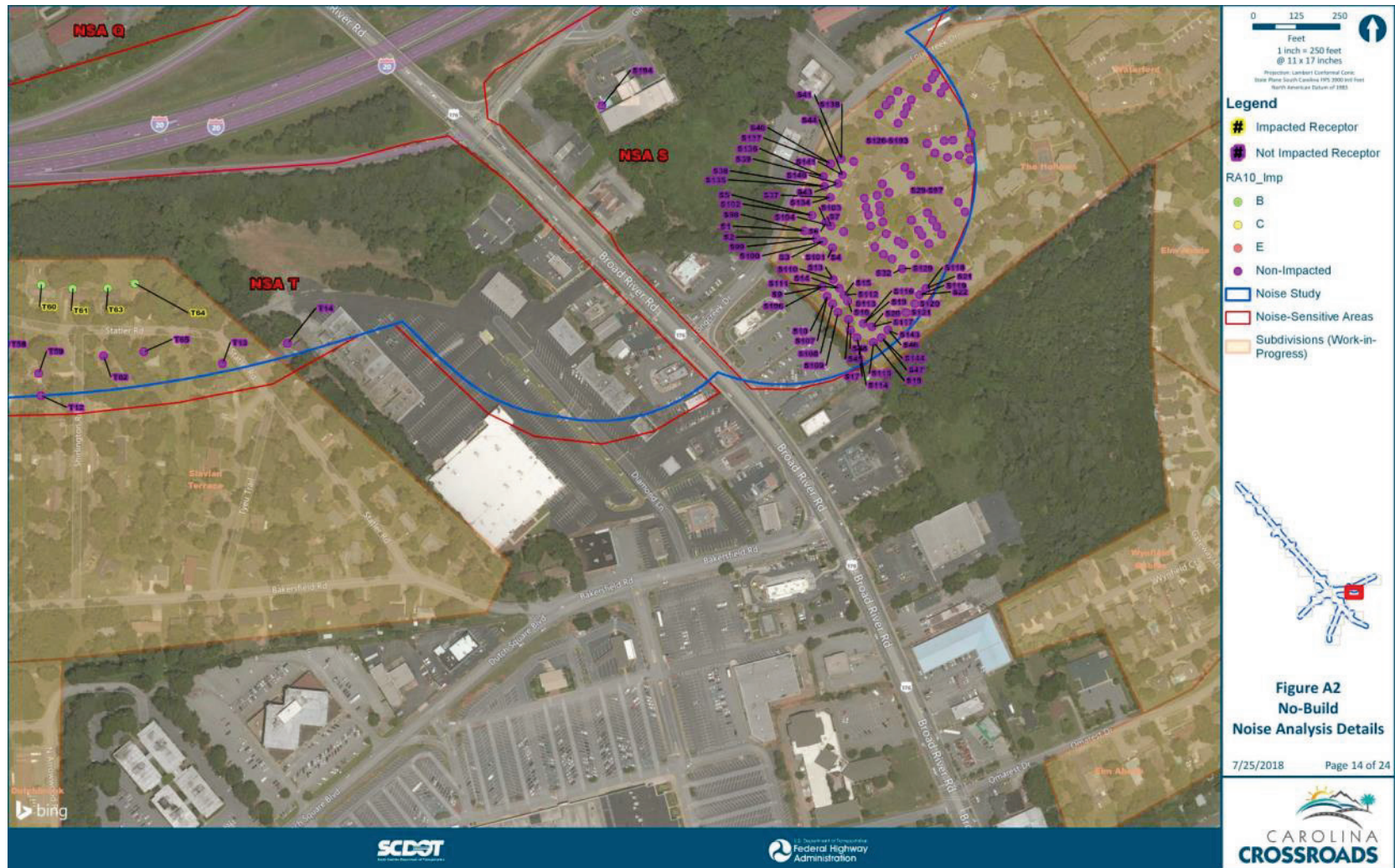
Noise Technical Report



Noise Technical Report



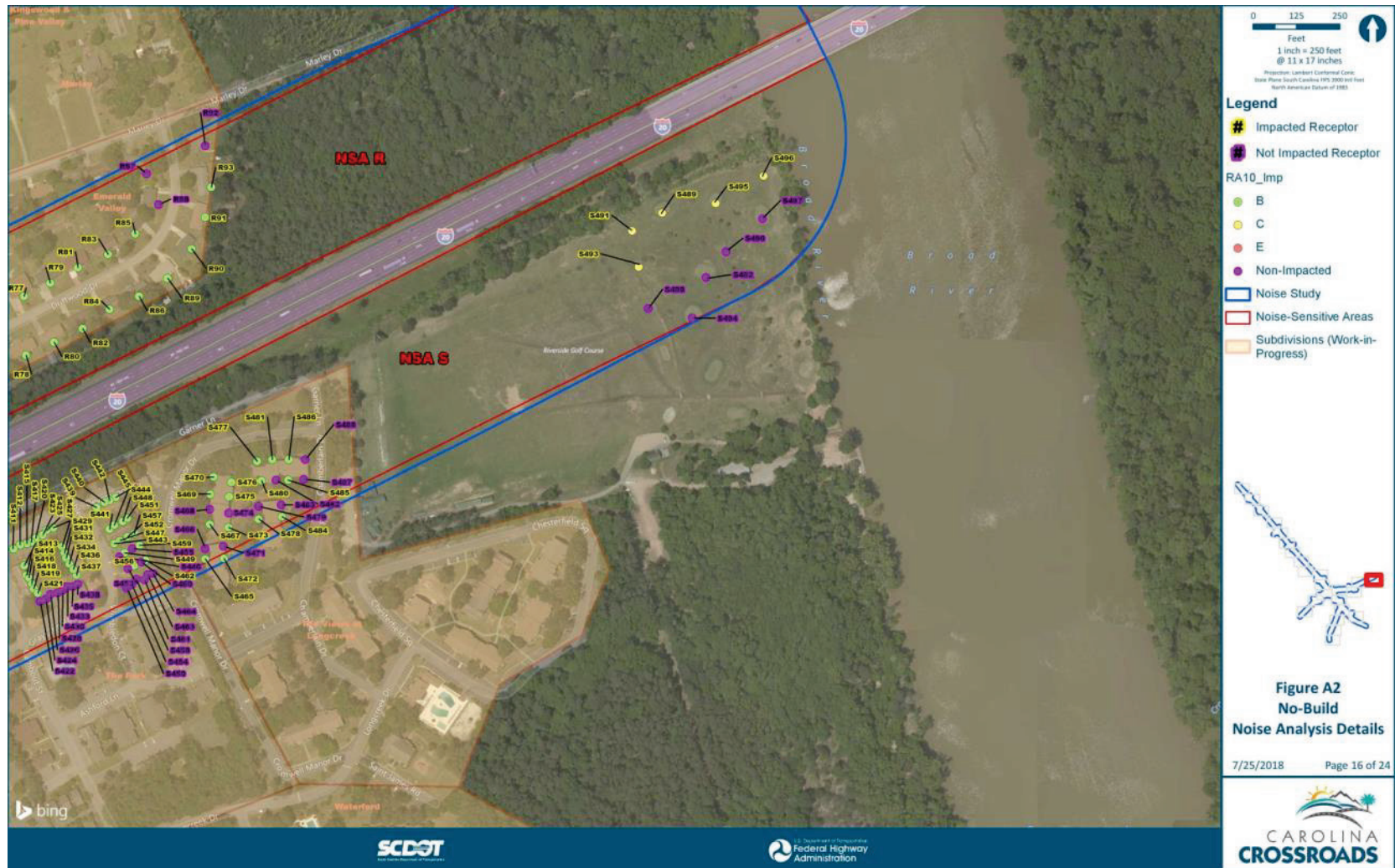
Noise Technical Report



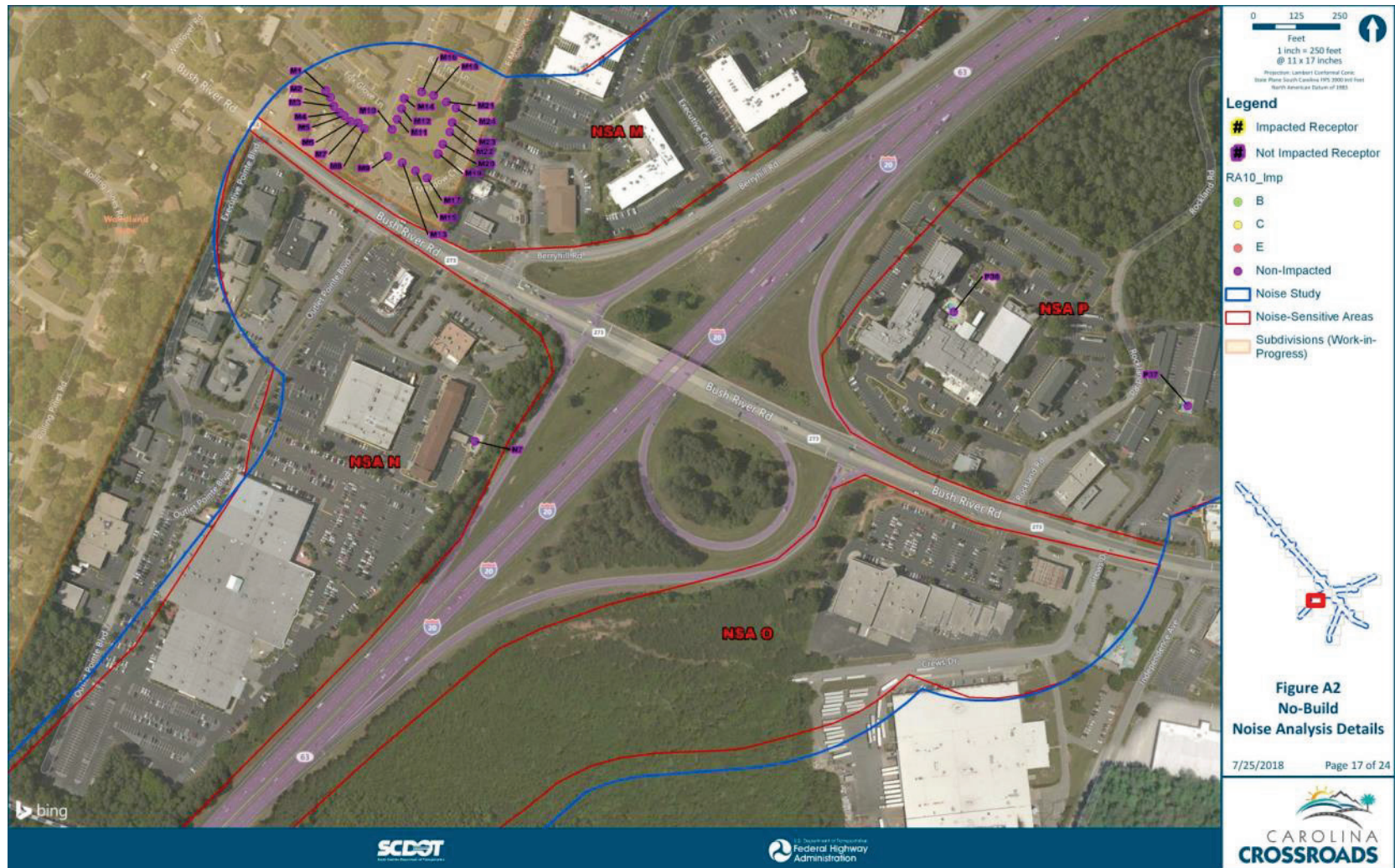
Noise Technical Report



Noise Technical Report



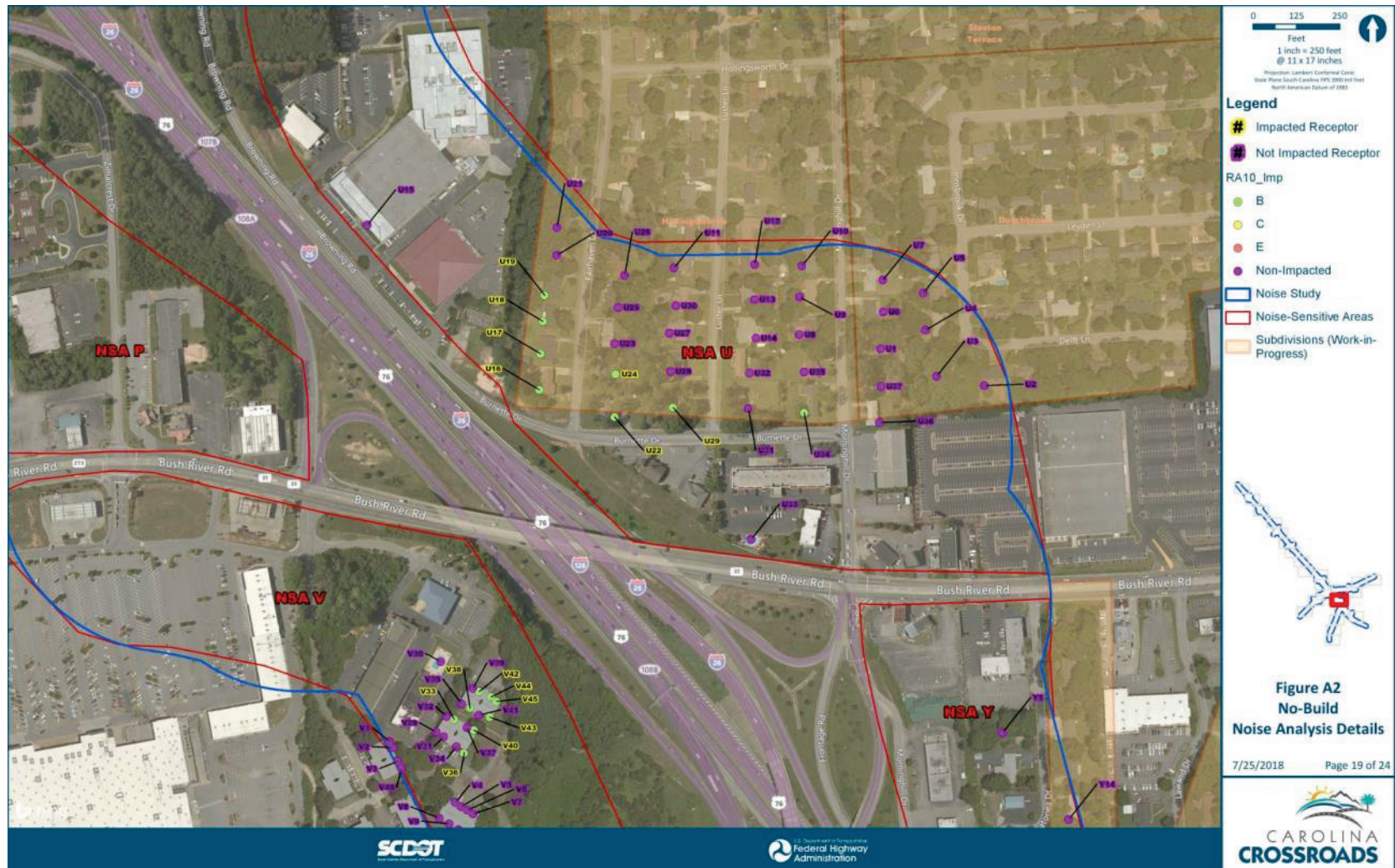
Noise Technical Report



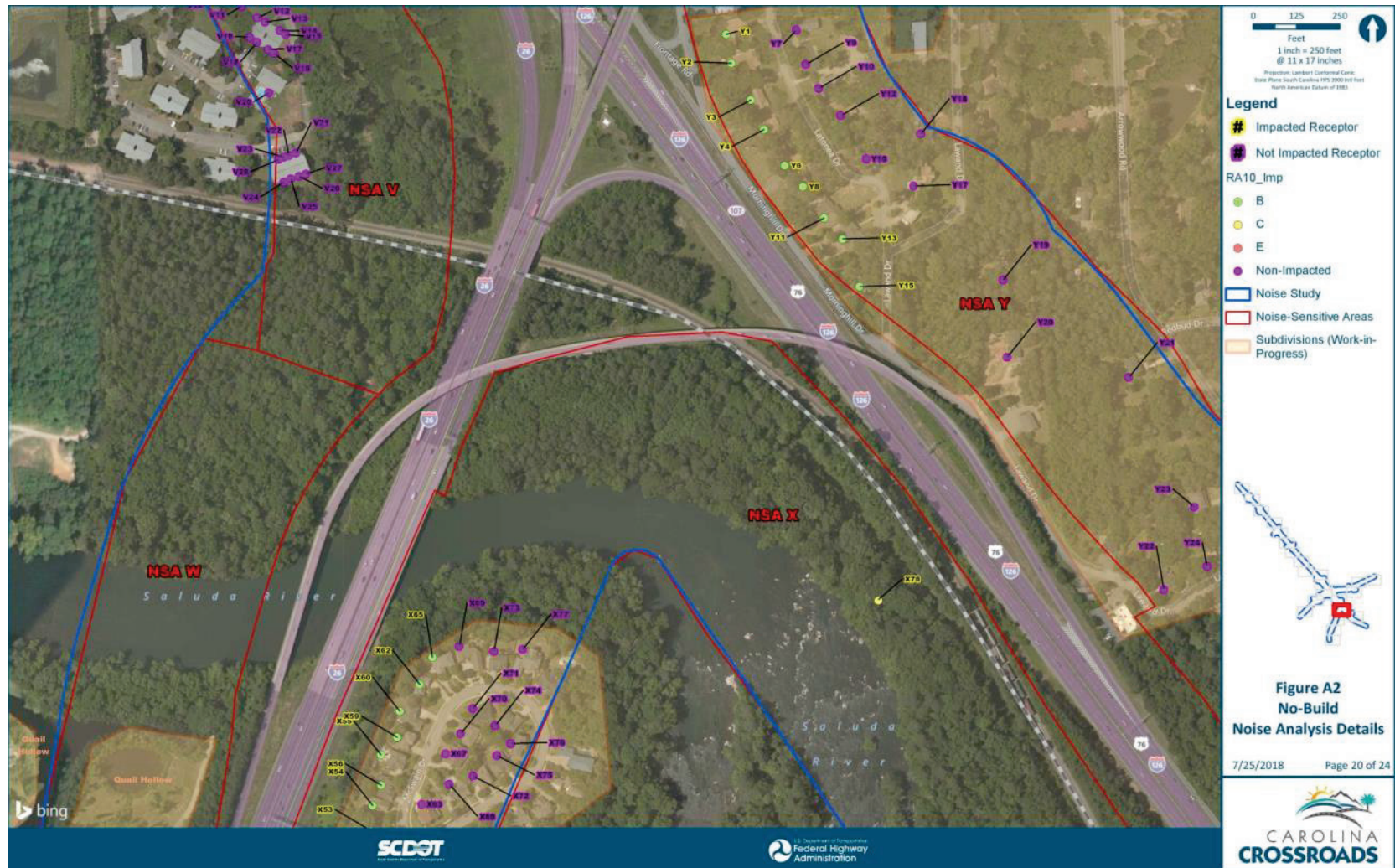
Noise Technical Report



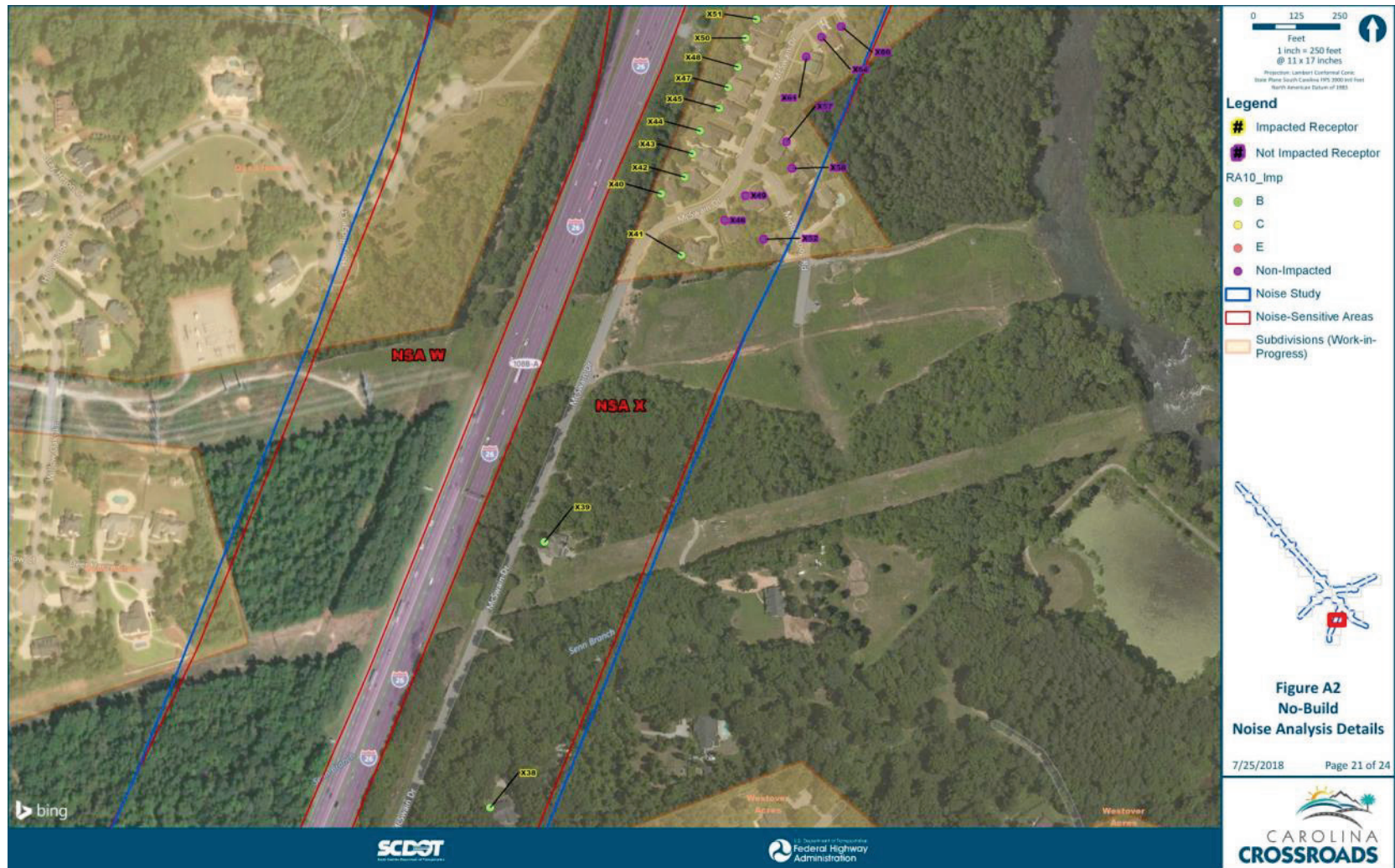
Noise Technical Report



Noise Technical Report



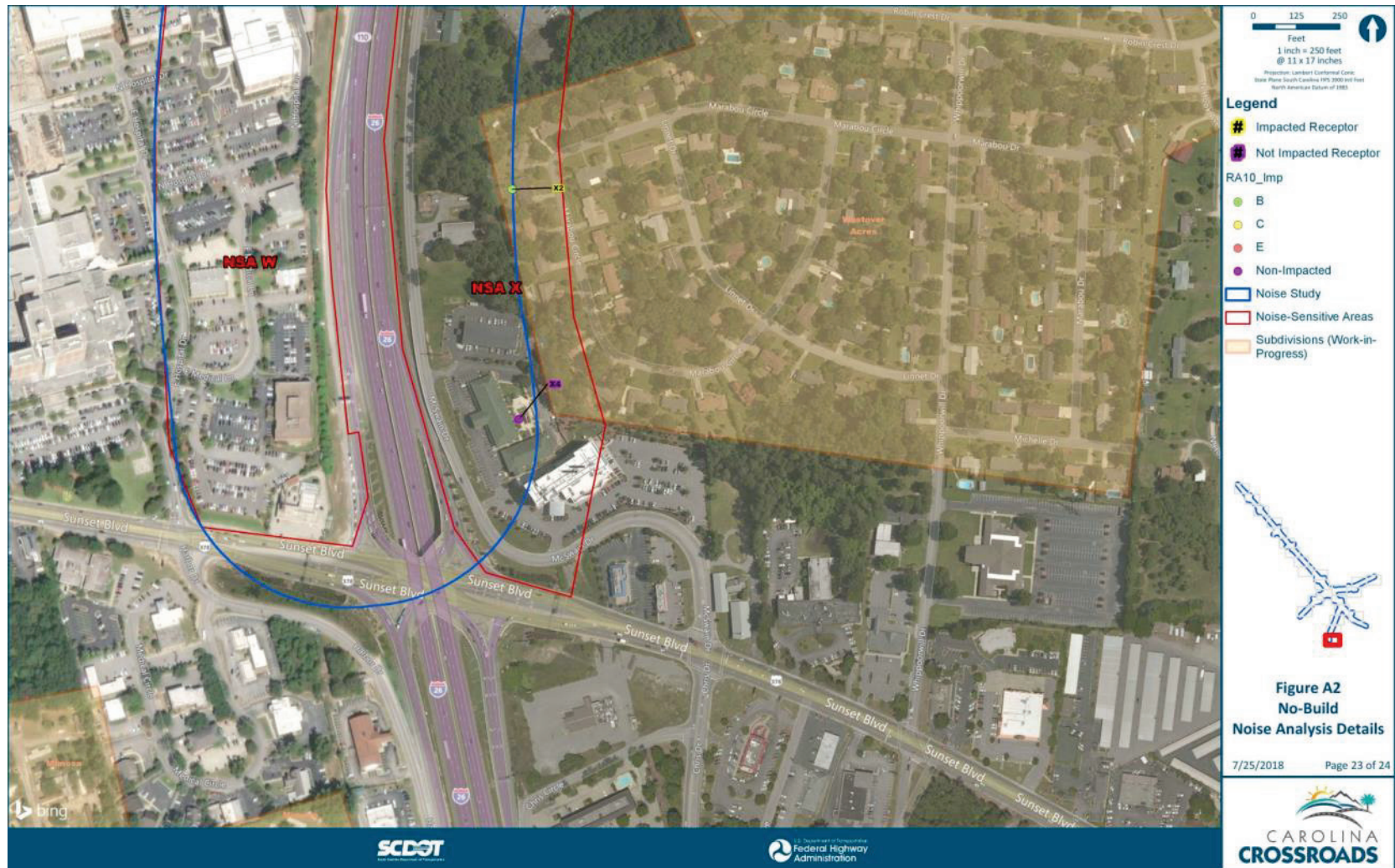
Noise Technical Report

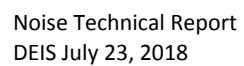


Noise Technical Report



Noise Technical Report





Noise Technical Report



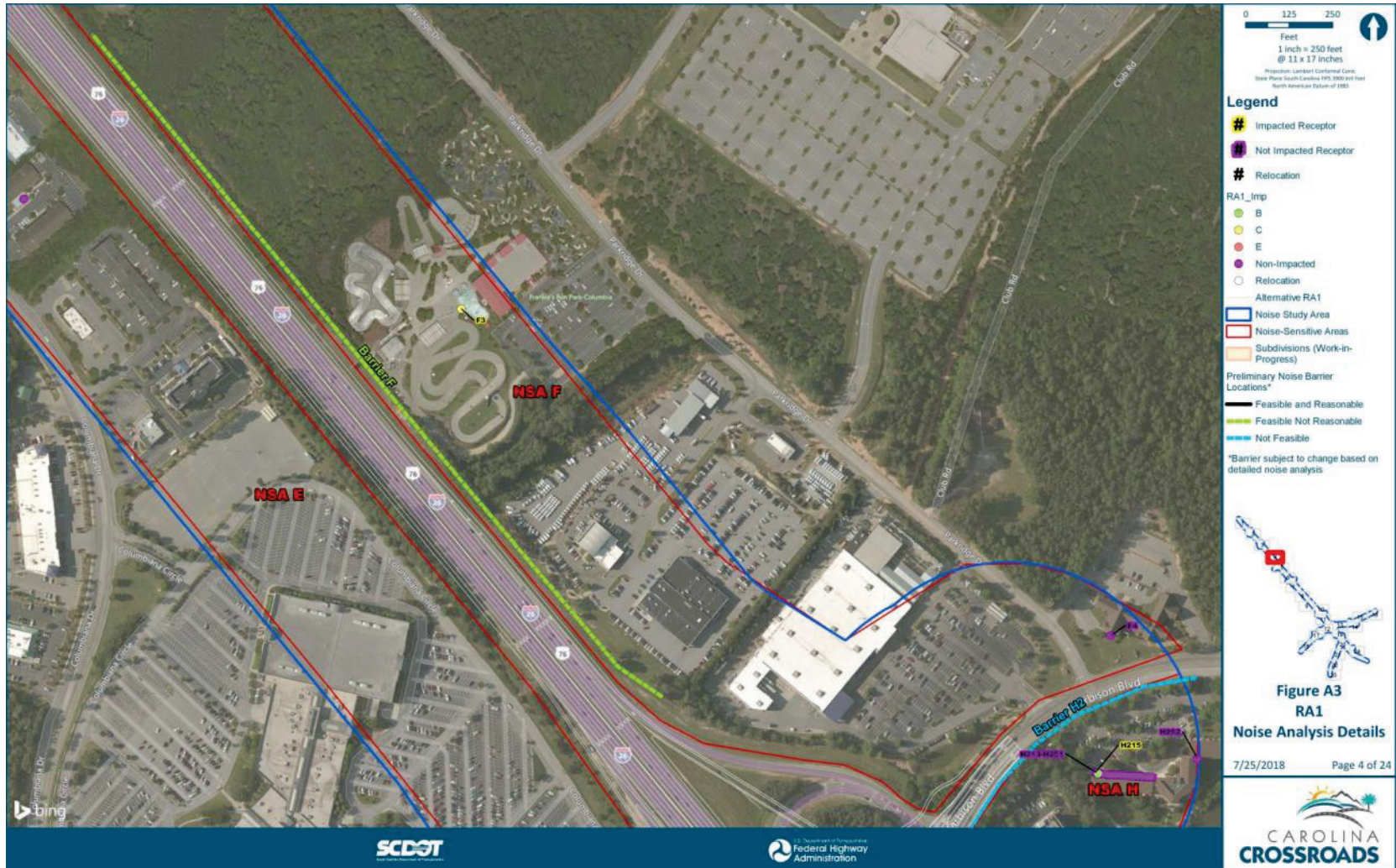
Noise Technical Report



Noise Technical Report



Noise Technical Report



Noise Technical Report



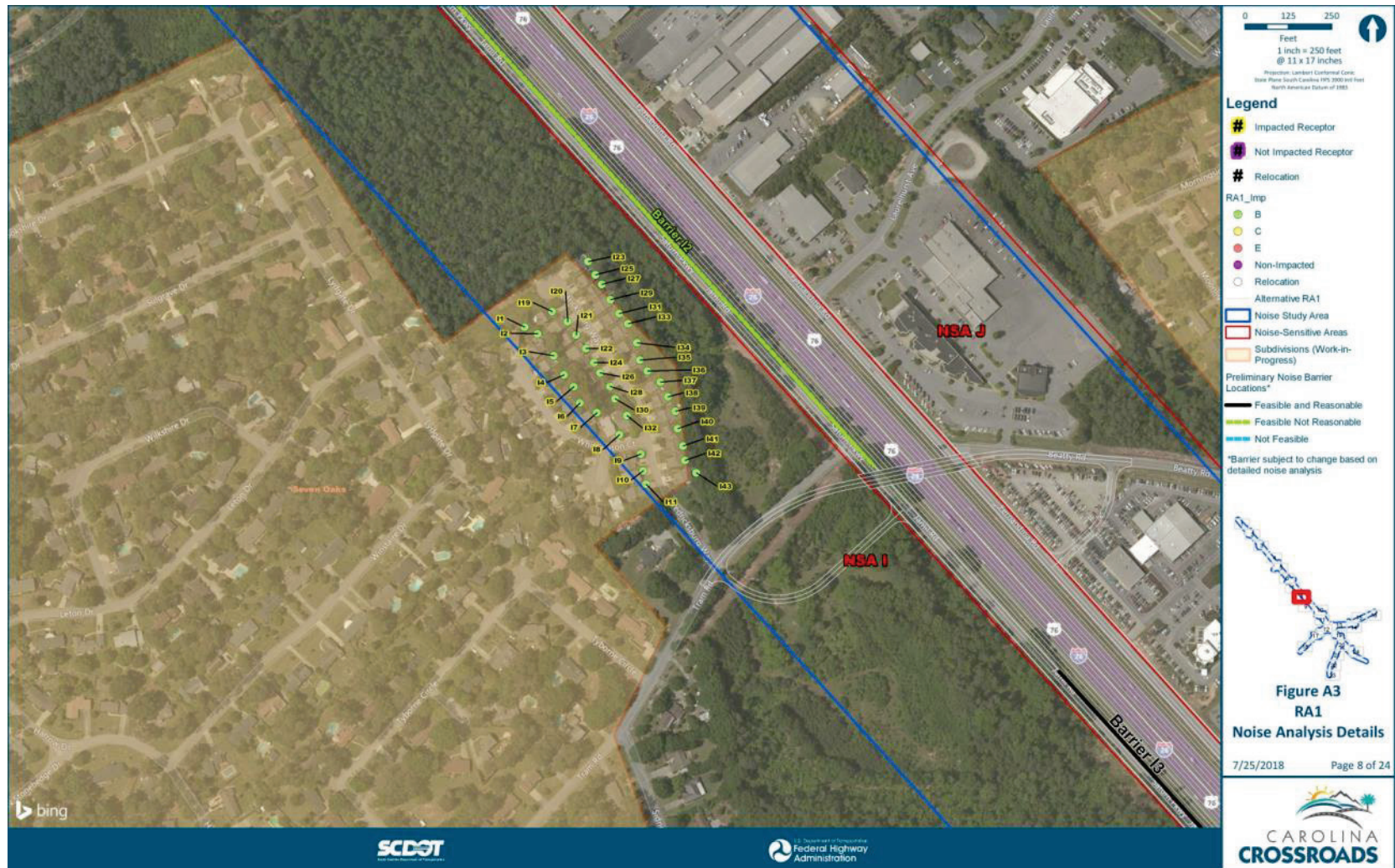
Noise Technical Report



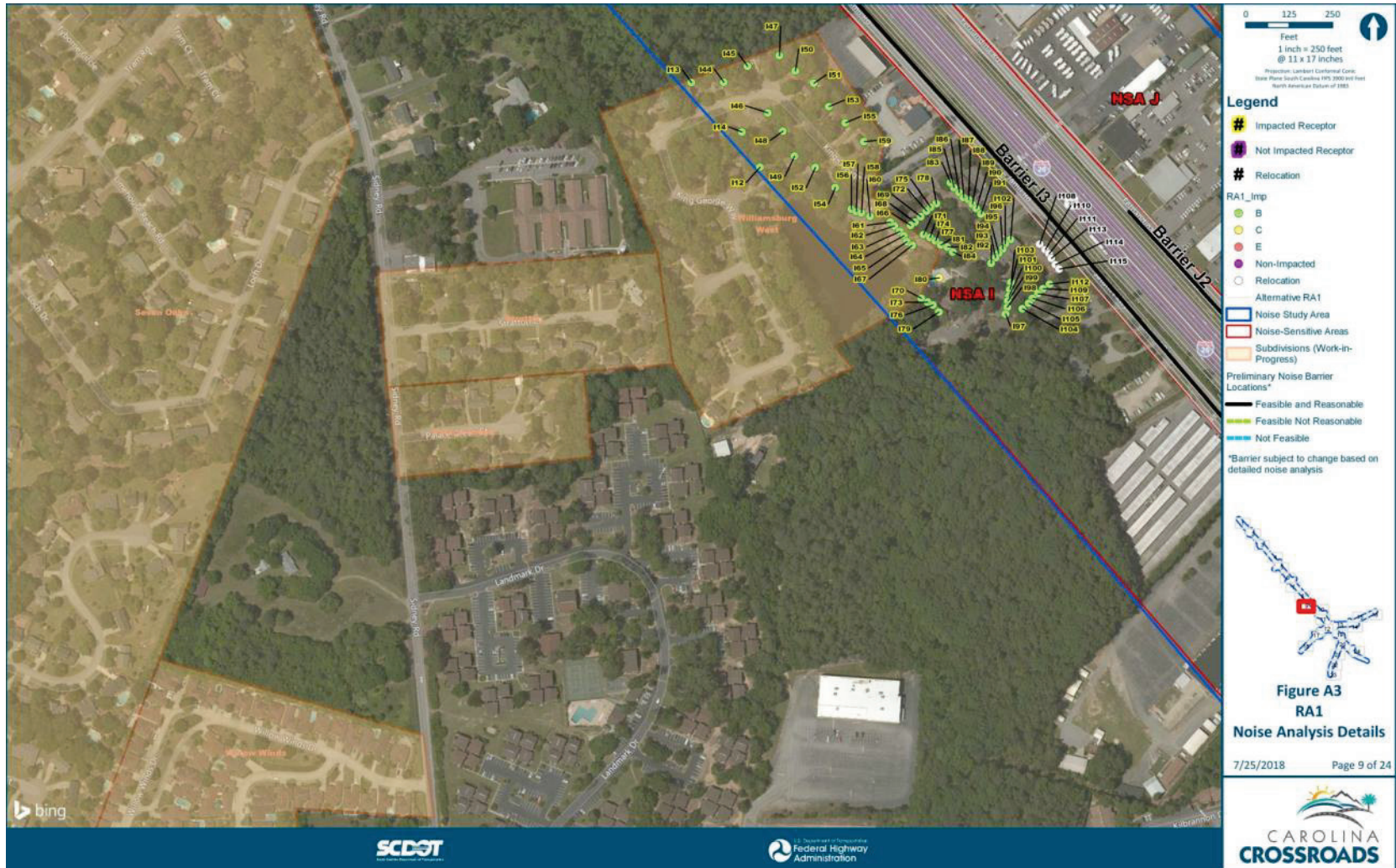
Noise Technical Report



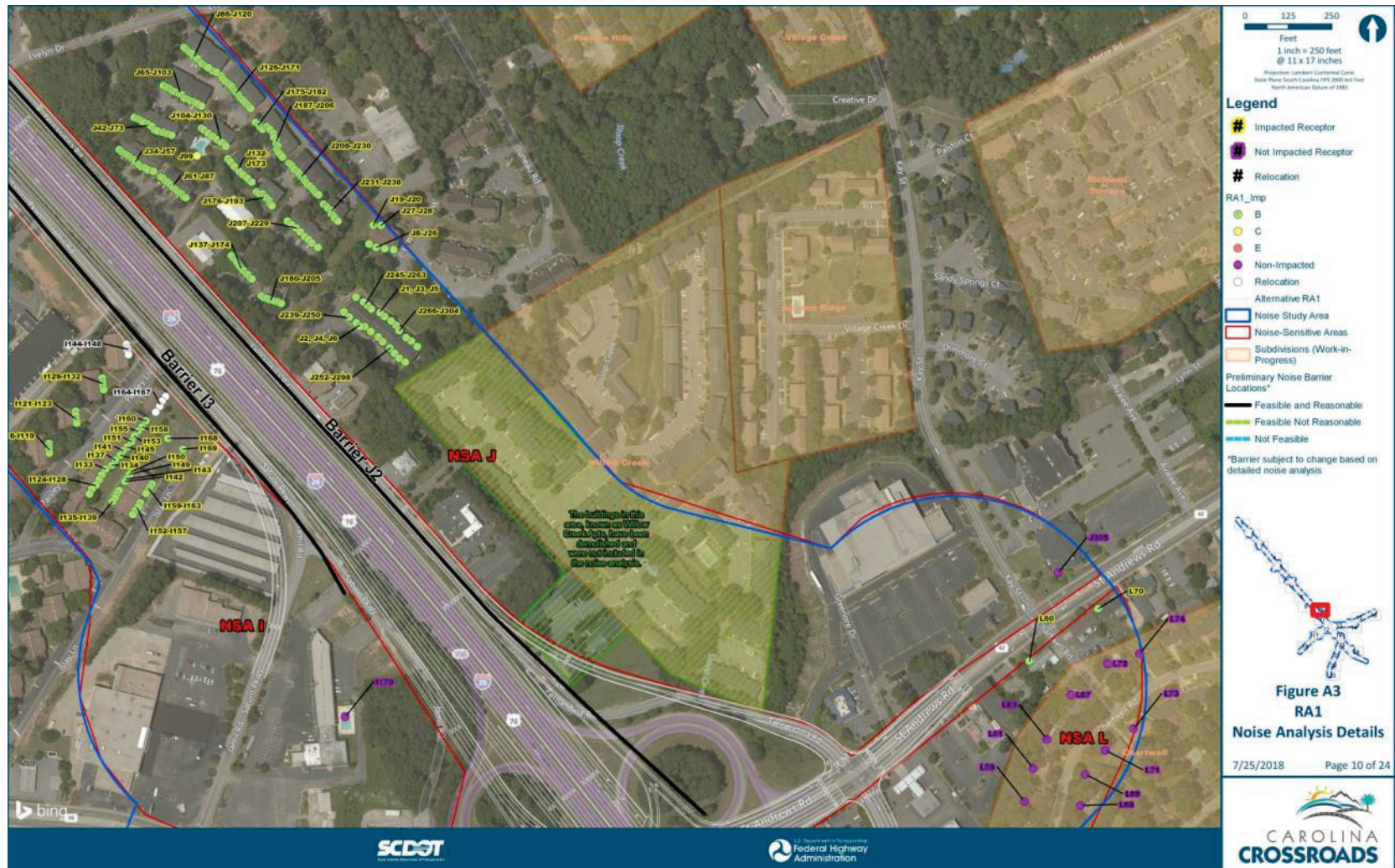
Noise Technical Report



Noise Technical Report



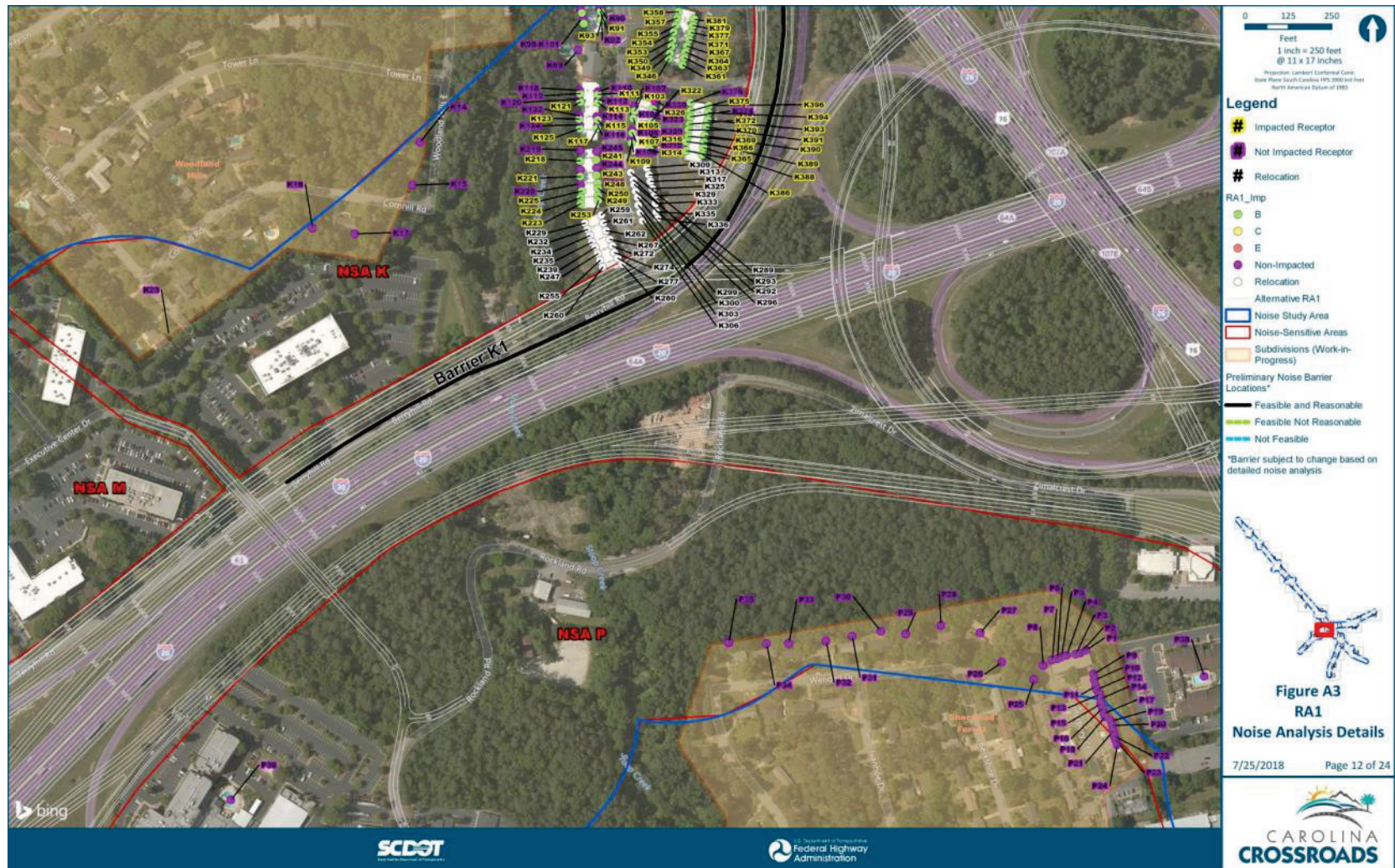
Noise Technical Report



Noise Technical Report



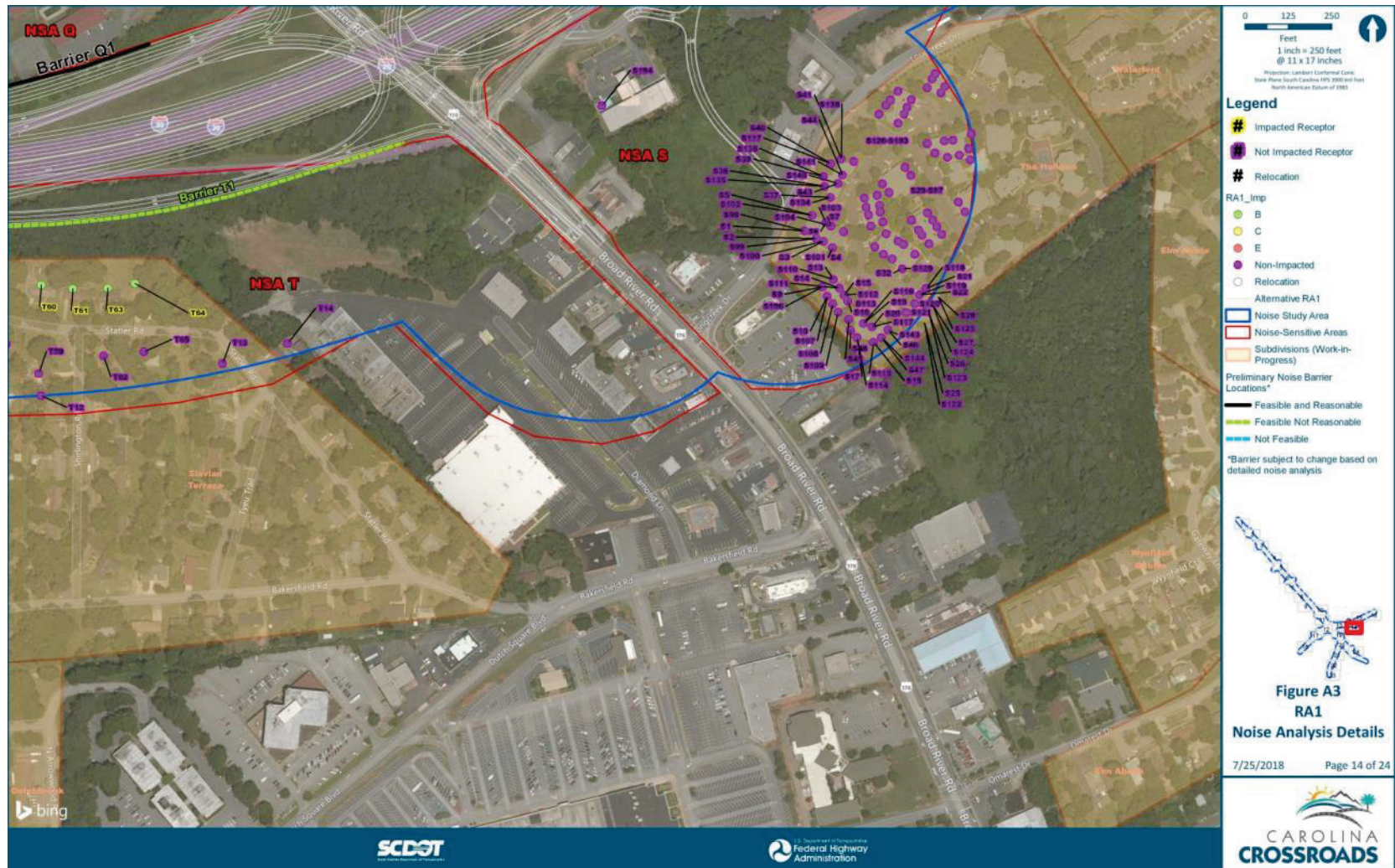
Noise Technical Report



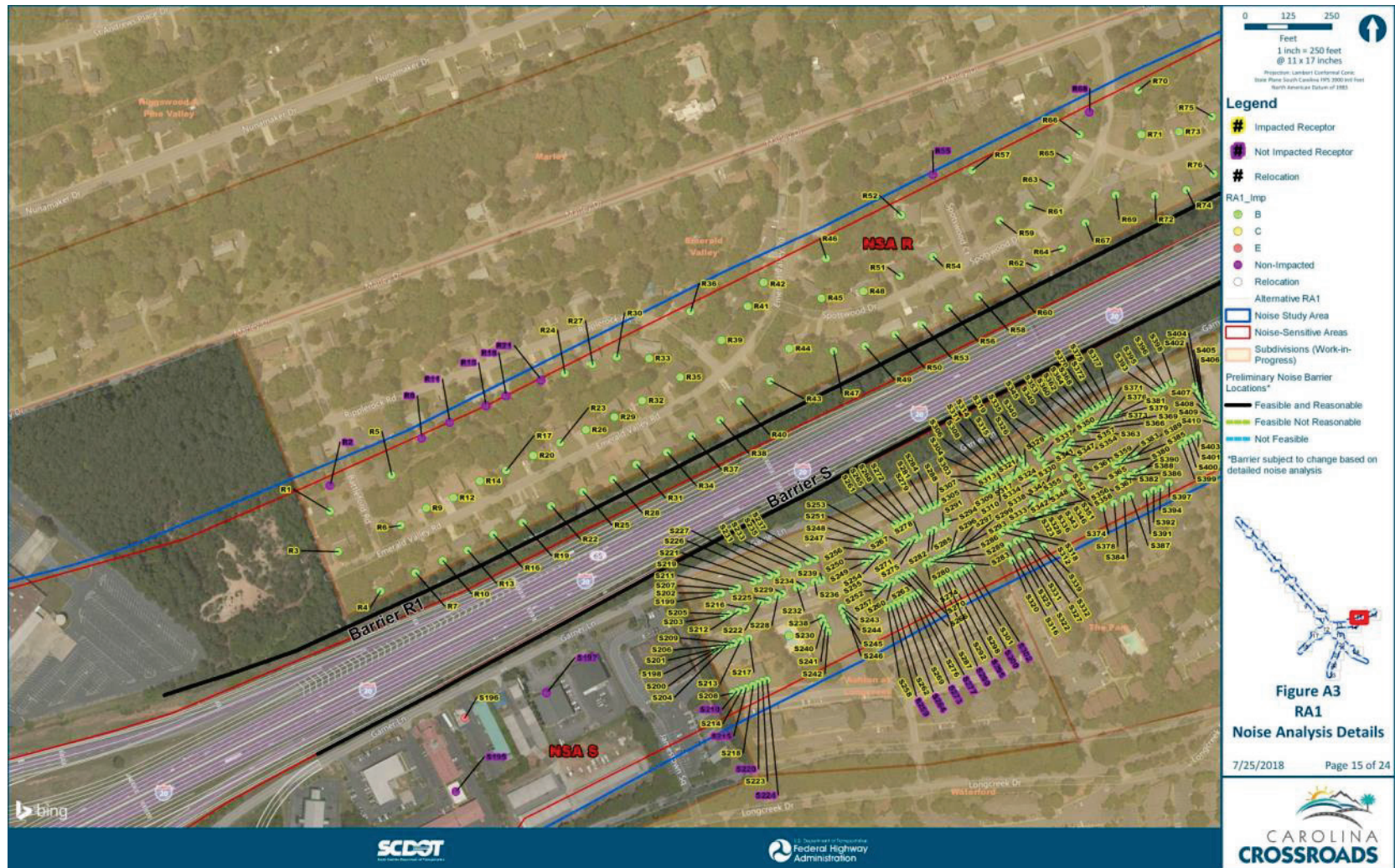
Noise Technical Report



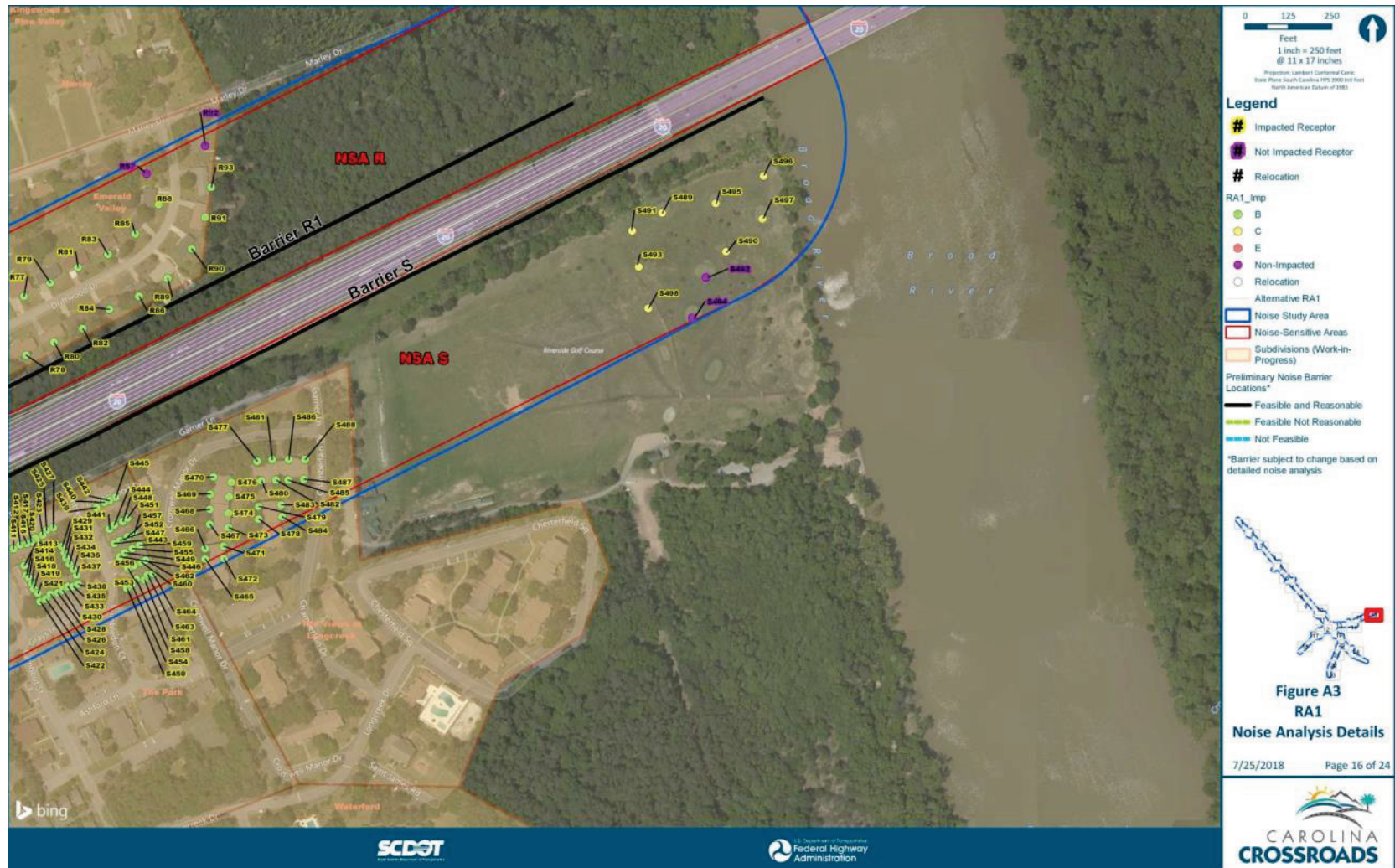
Noise Technical Report



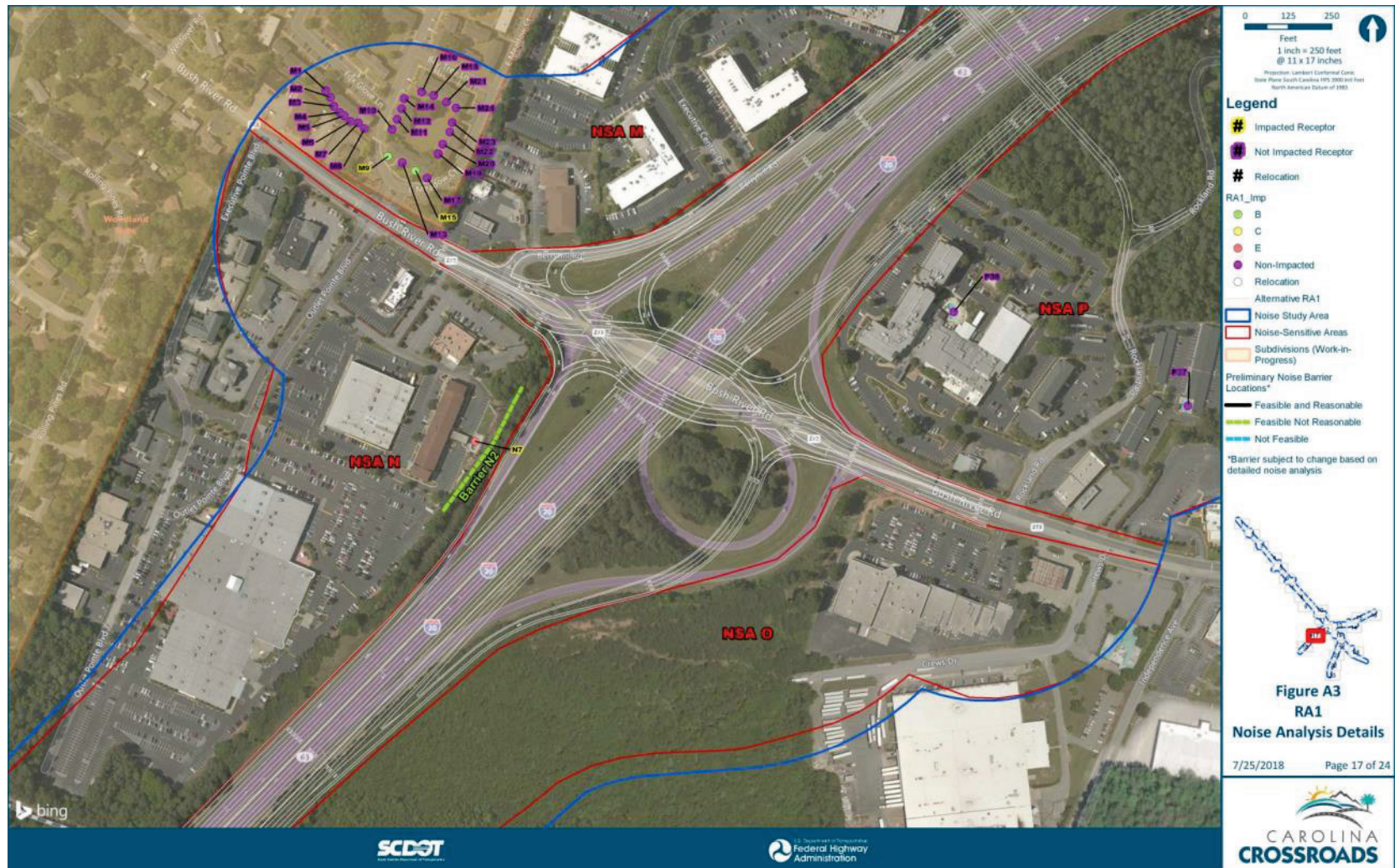
Noise Technical Report



Noise Technical Report



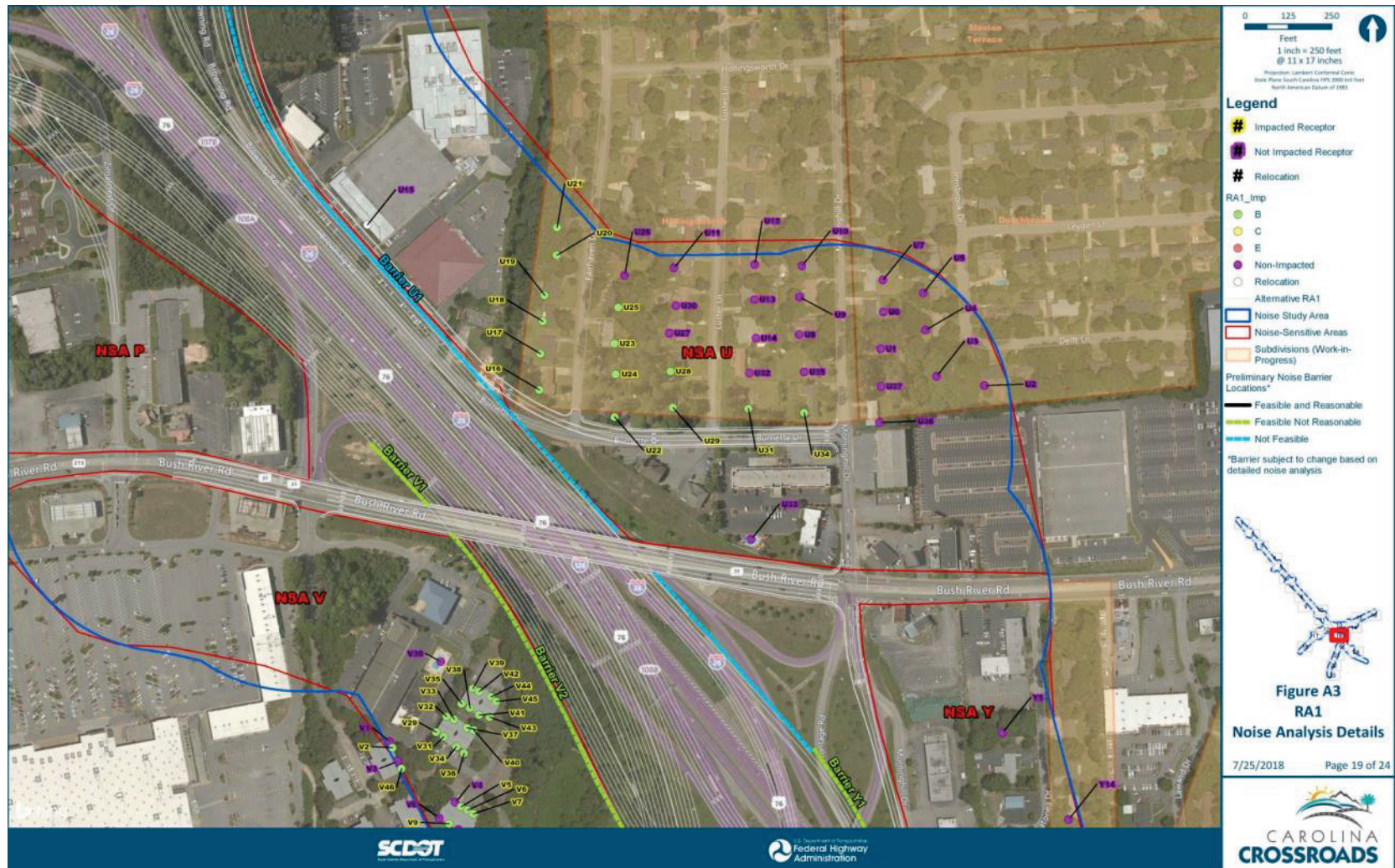
Noise Technical Report



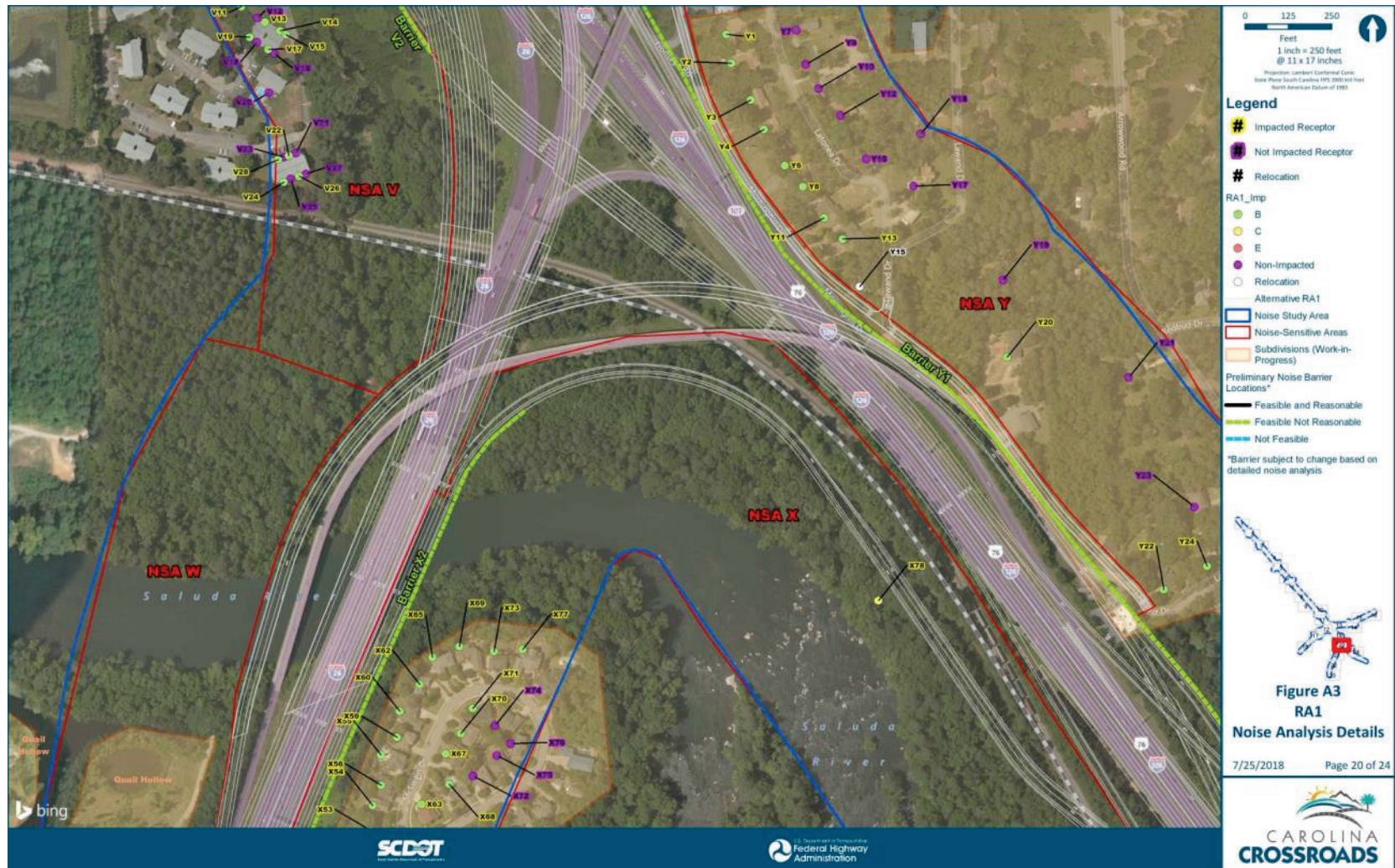
Noise Technical Report



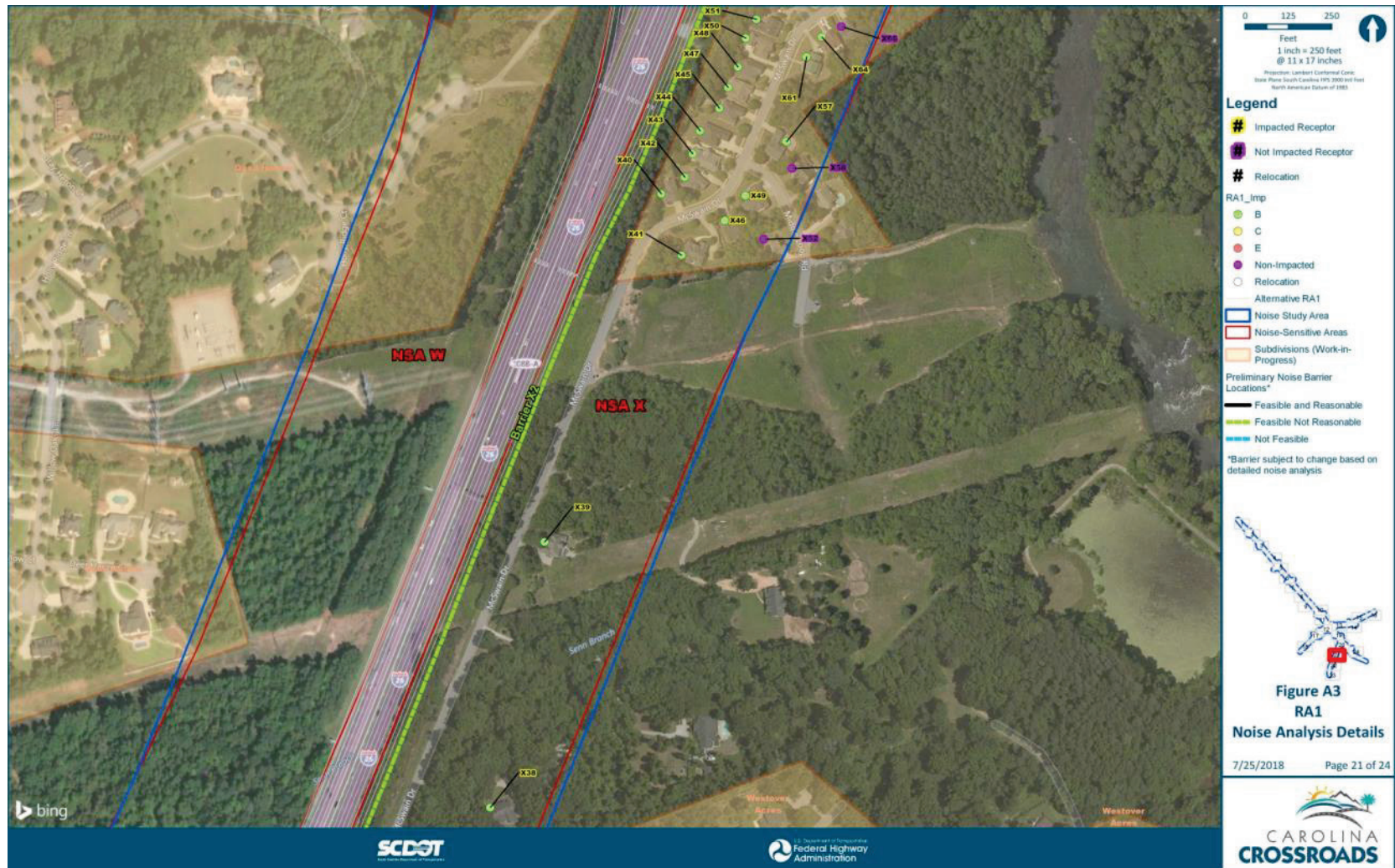
Noise Technical Report



Noise Technical Report



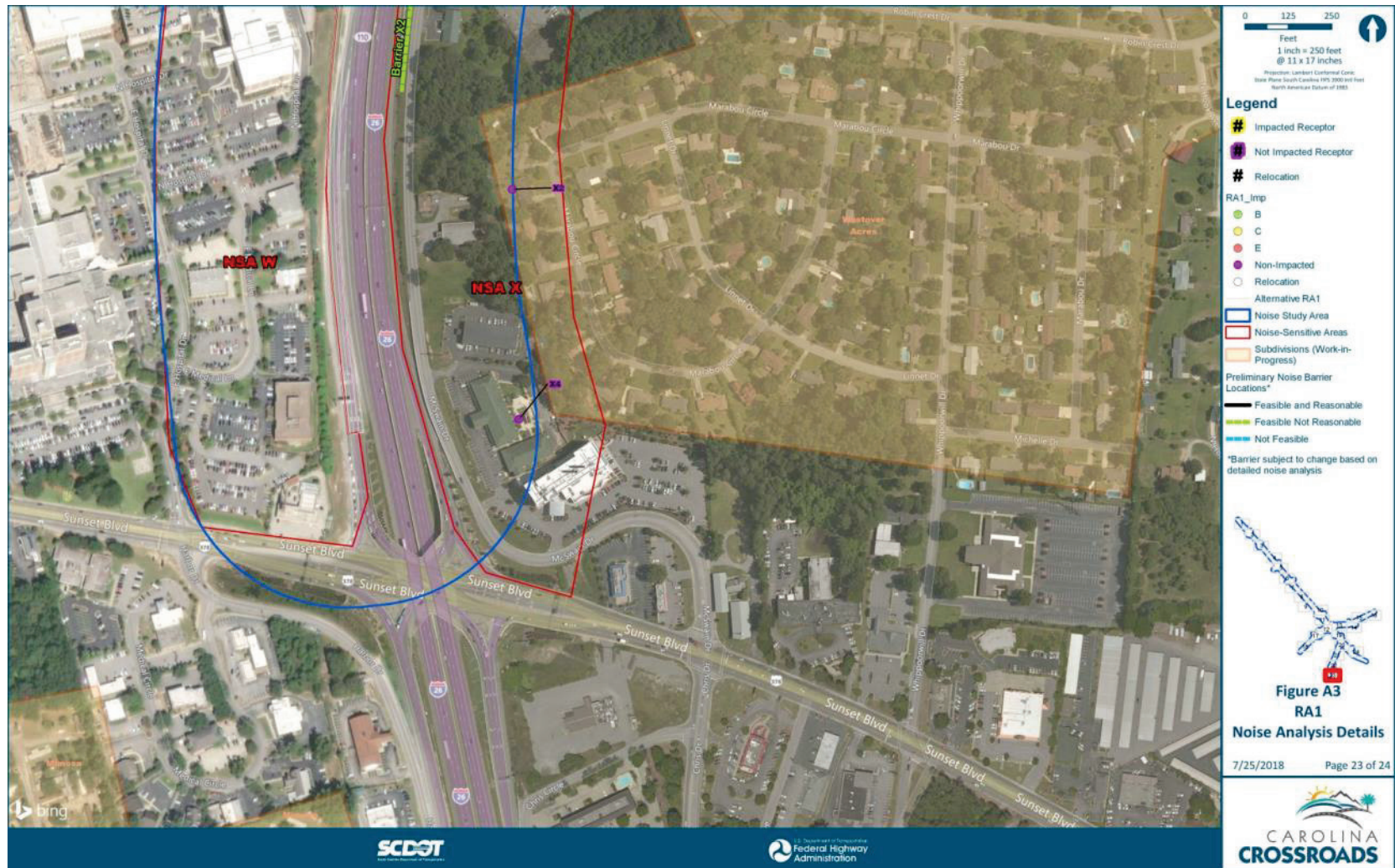
Noise Technical Report



Noise Technical Report



Noise Technical Report



Noise Technical Report



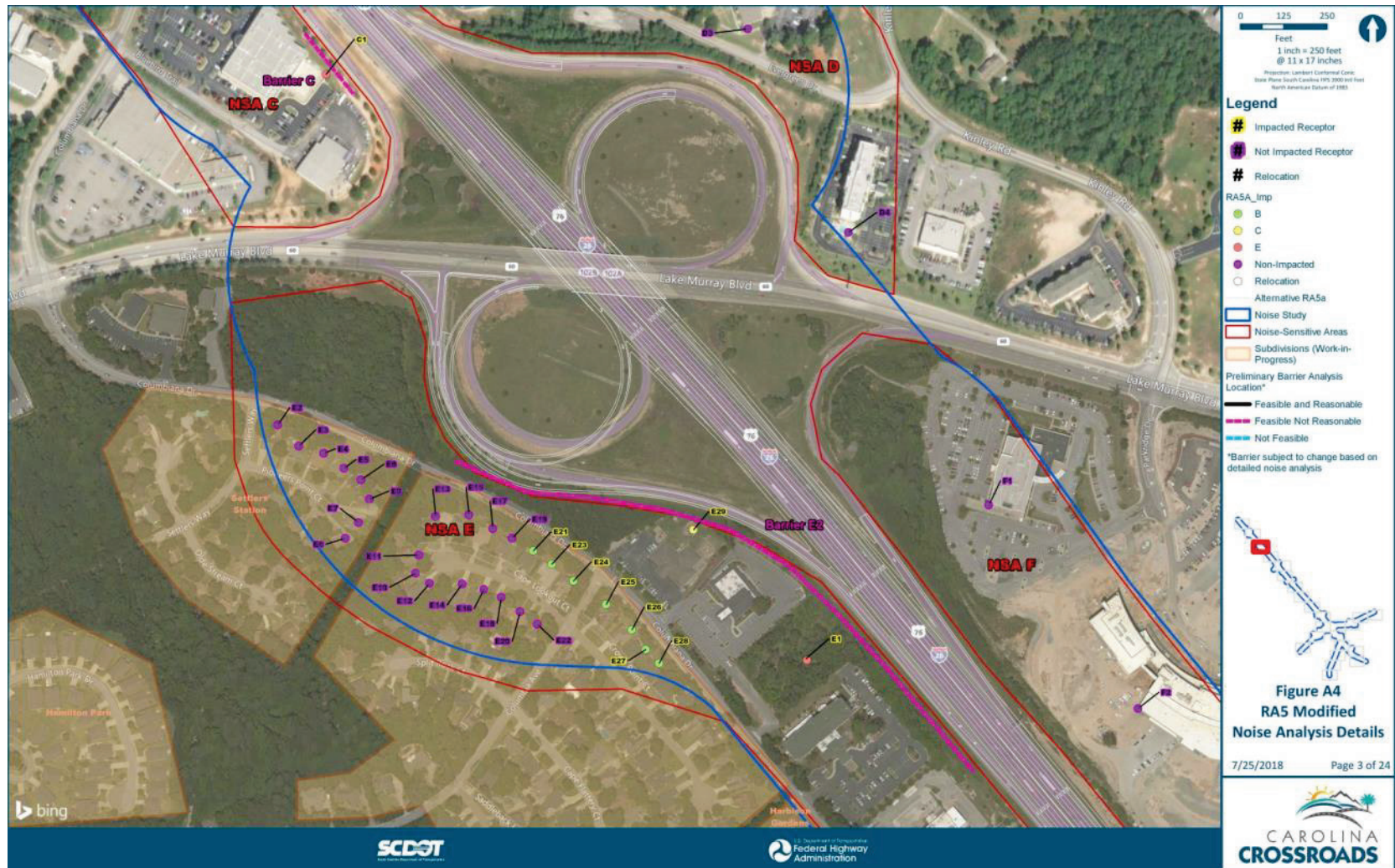
Noise Technical Report



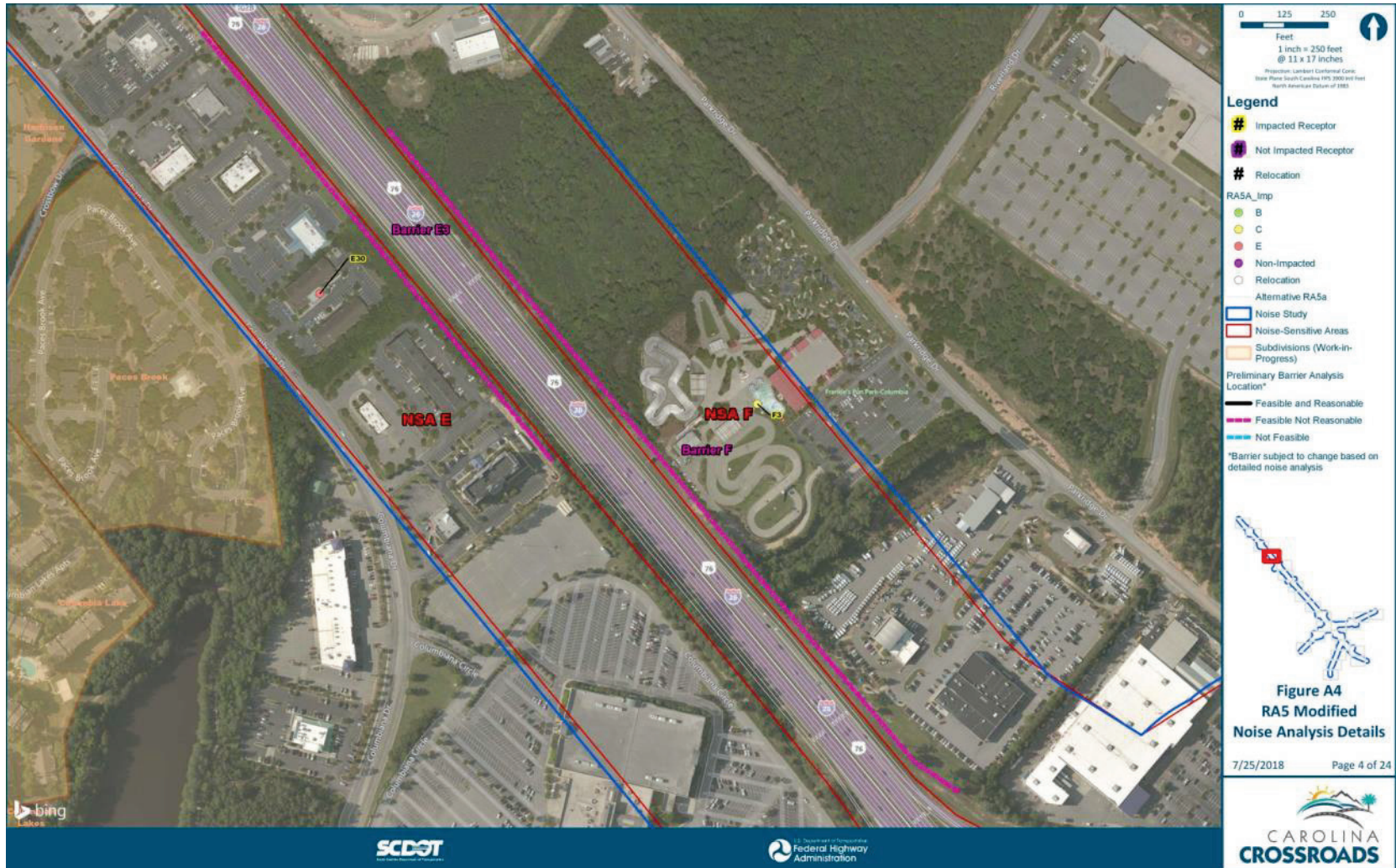
Noise Technical Report



Noise Technical Report



Noise Technical Report



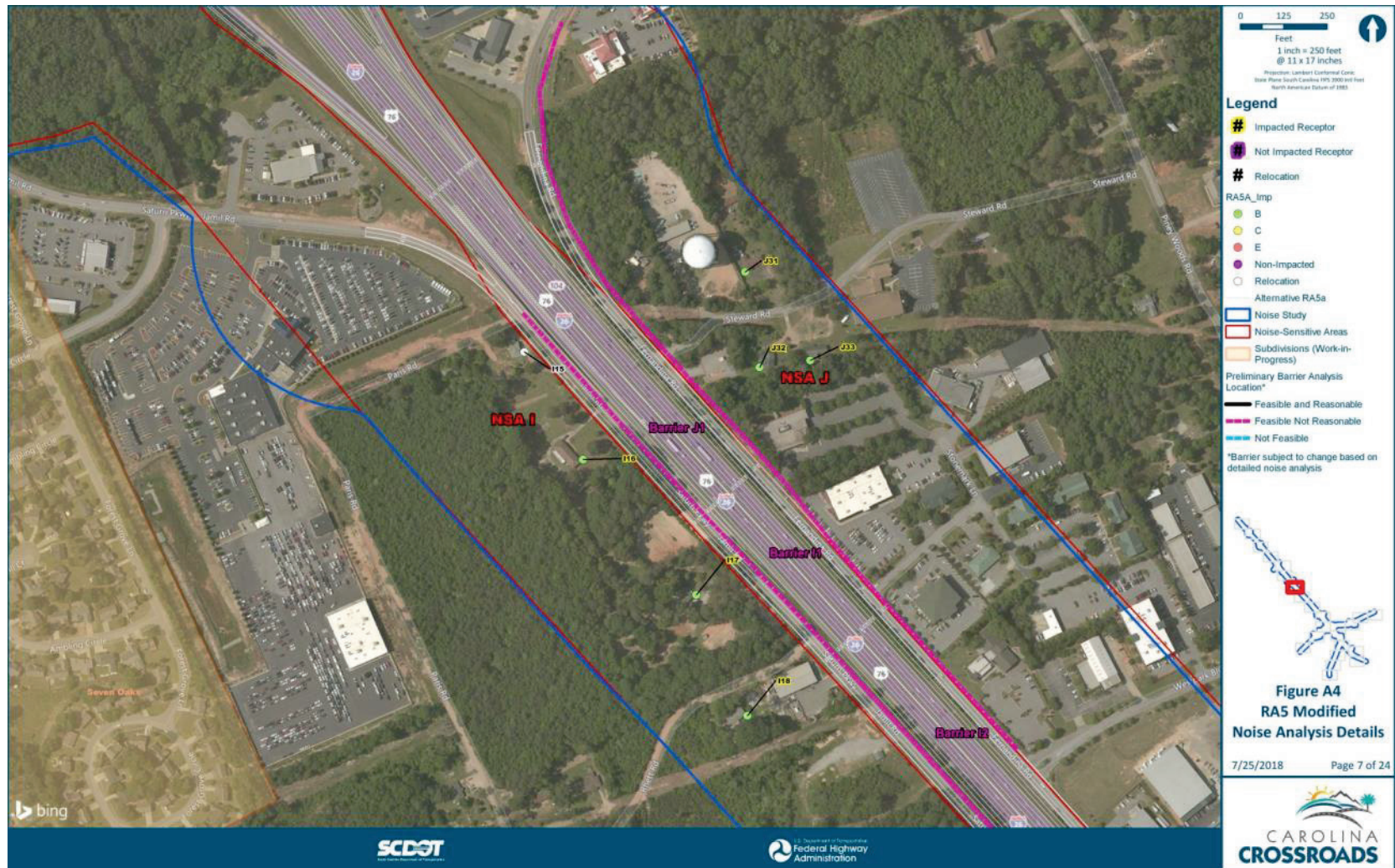
Noise Technical Report



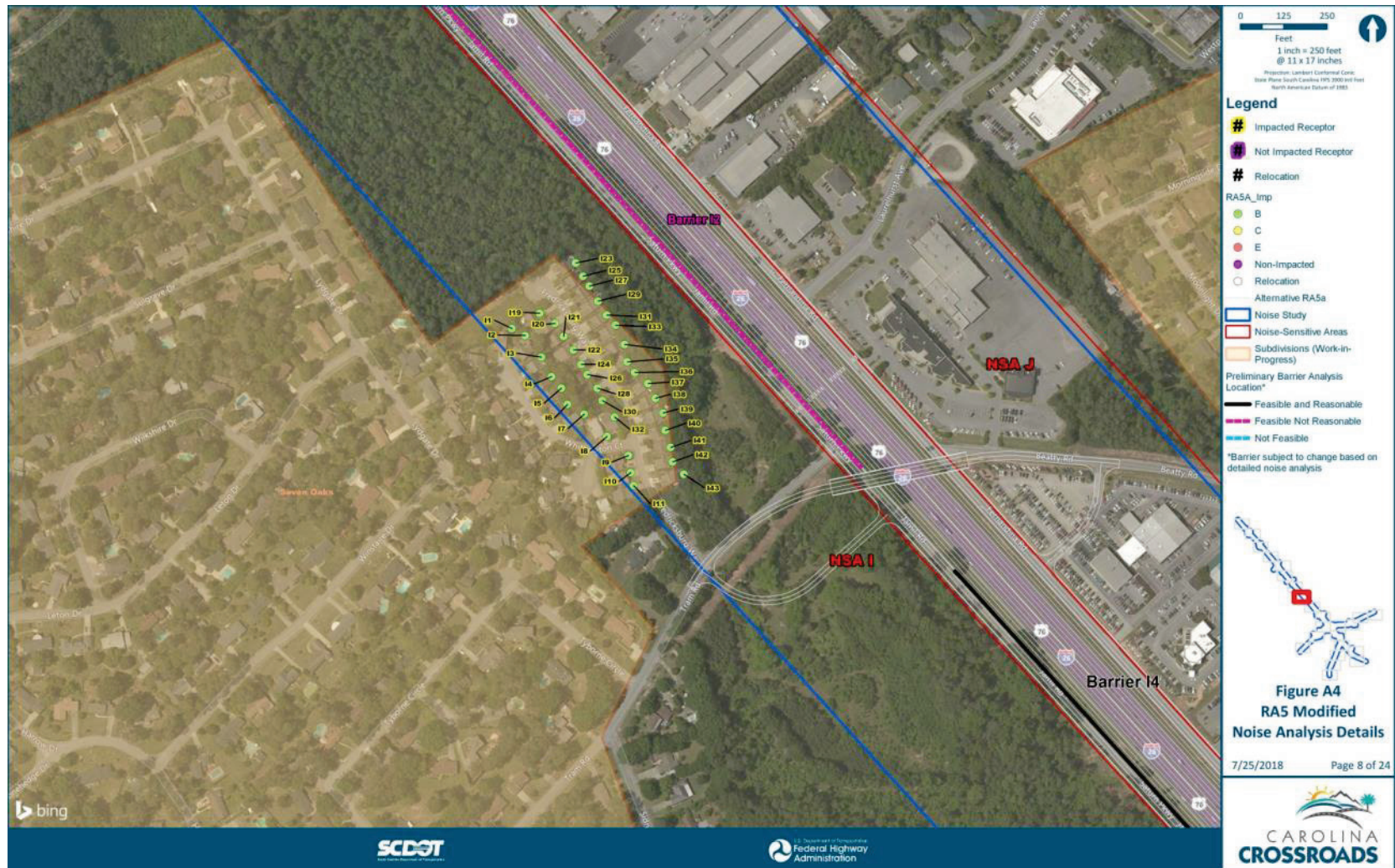
Noise Technical Report



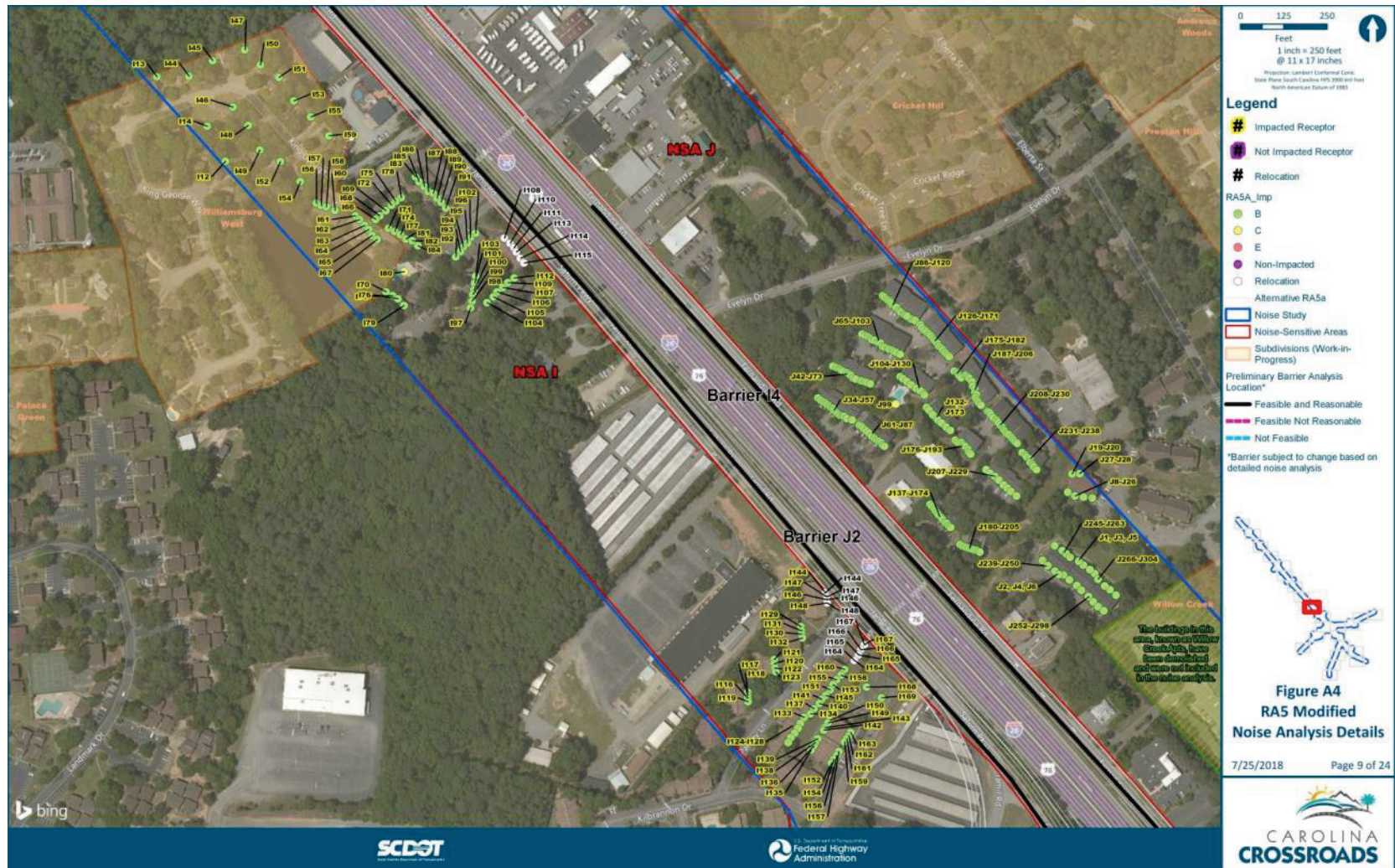
Noise Technical Report



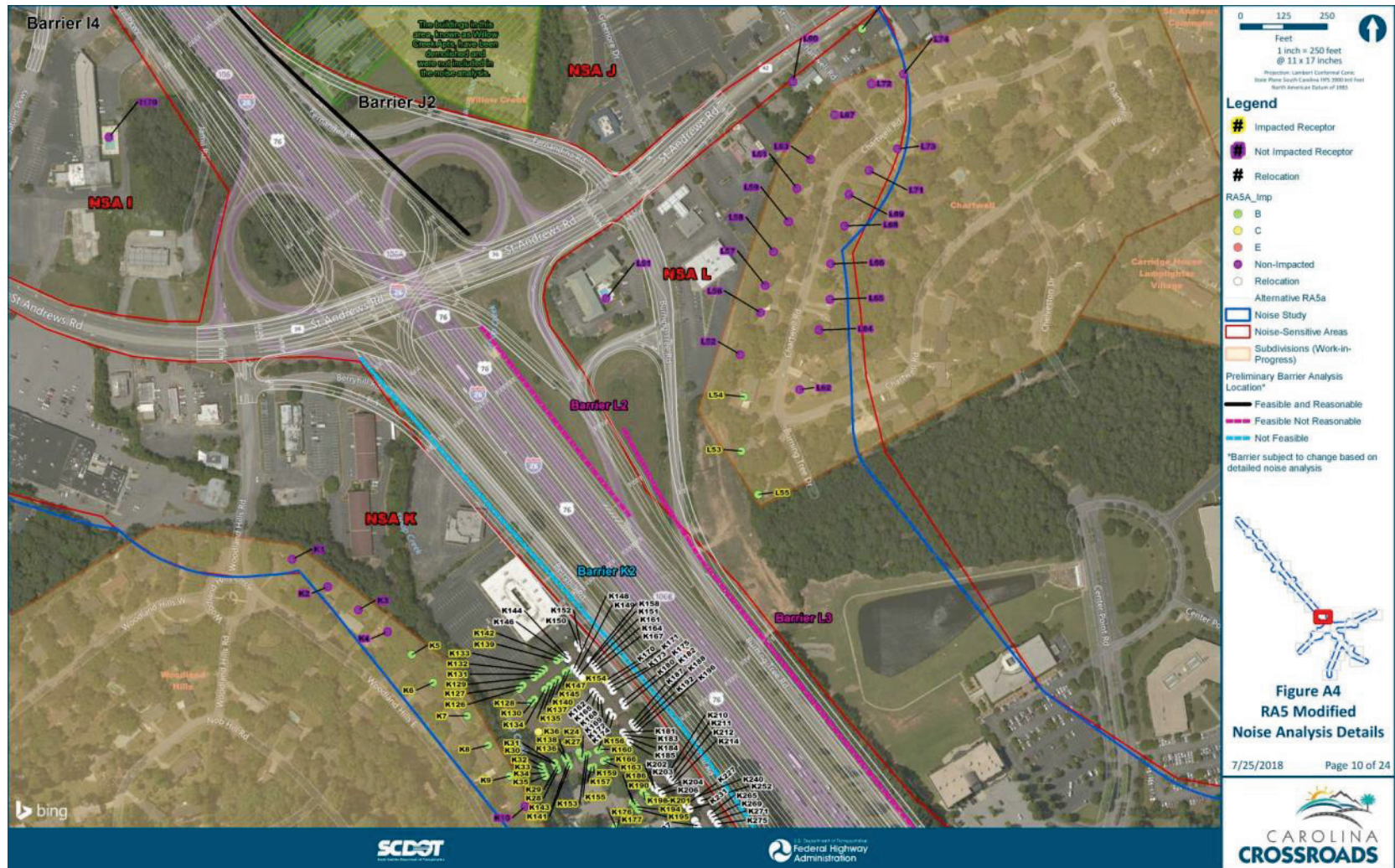
Noise Technical Report



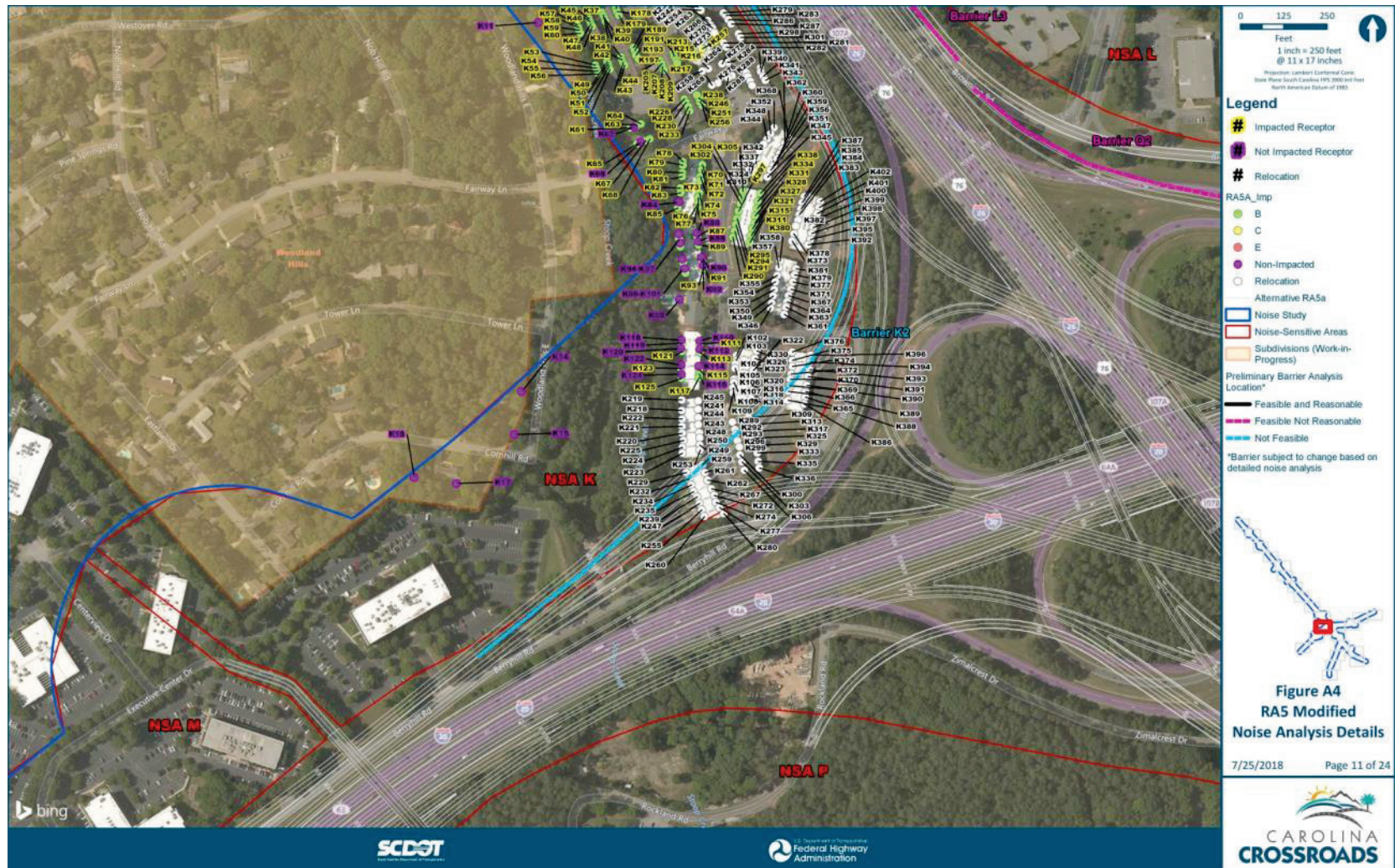
Noise Technical Report



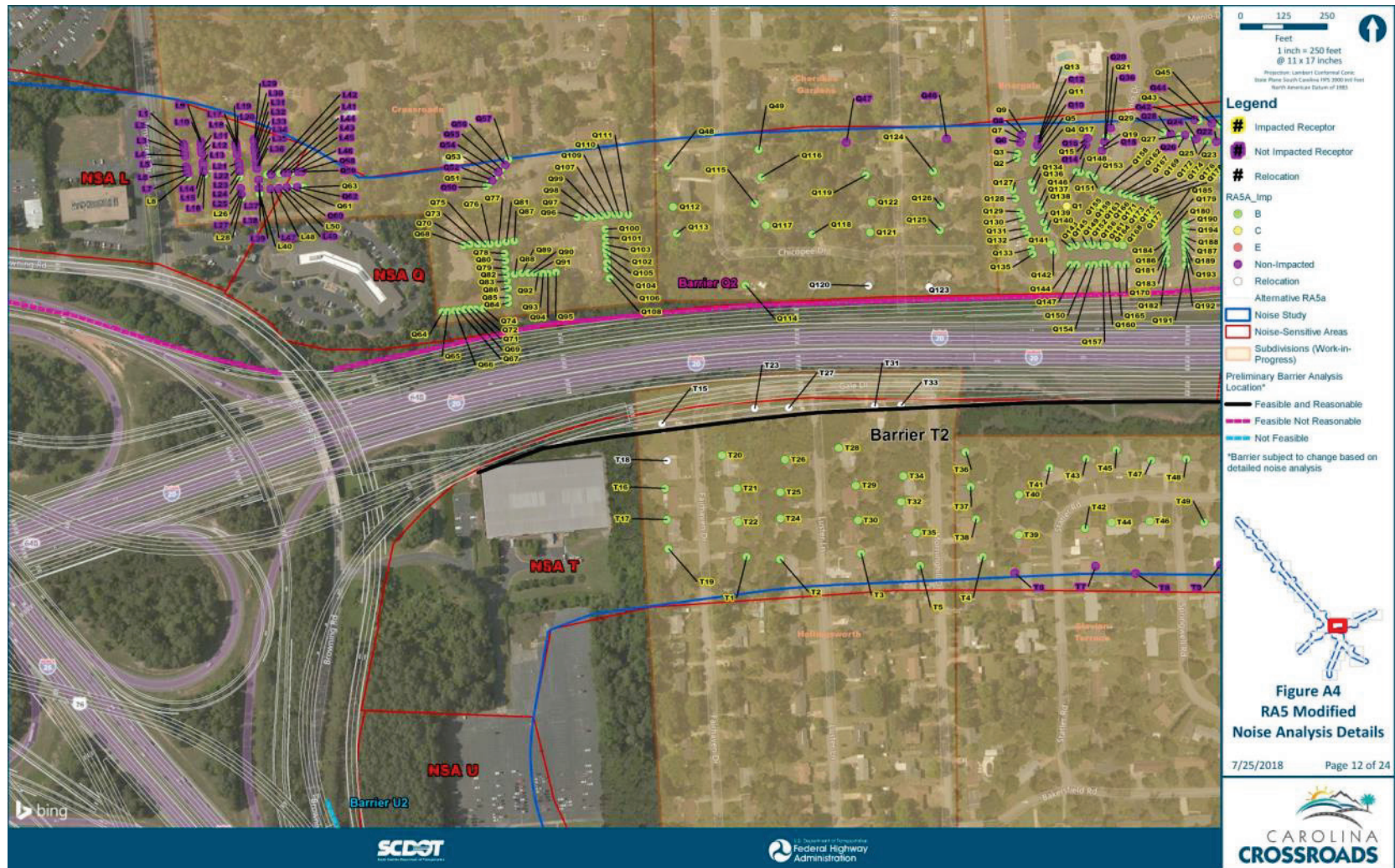
Noise Technical Report



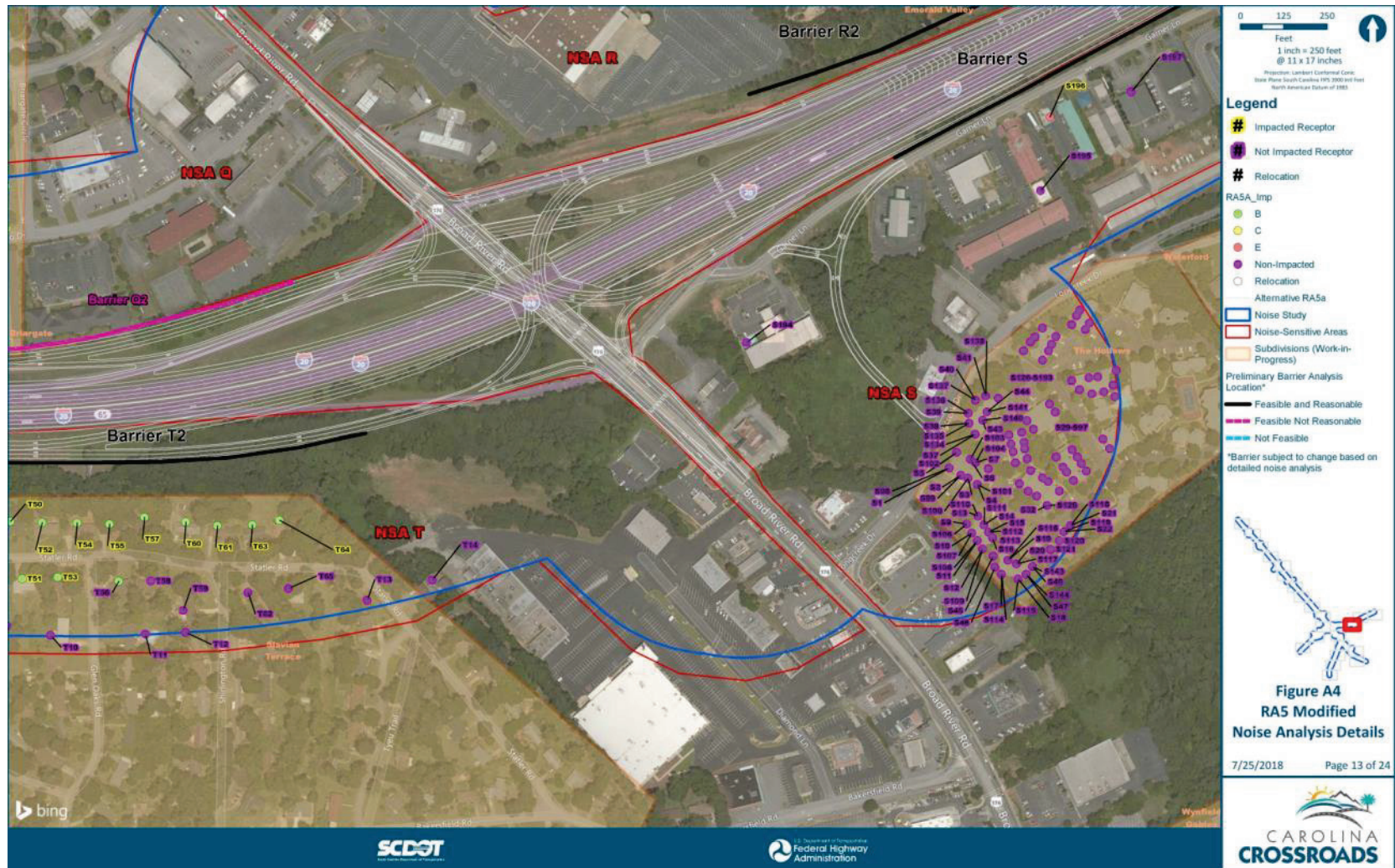
Noise Technical Report



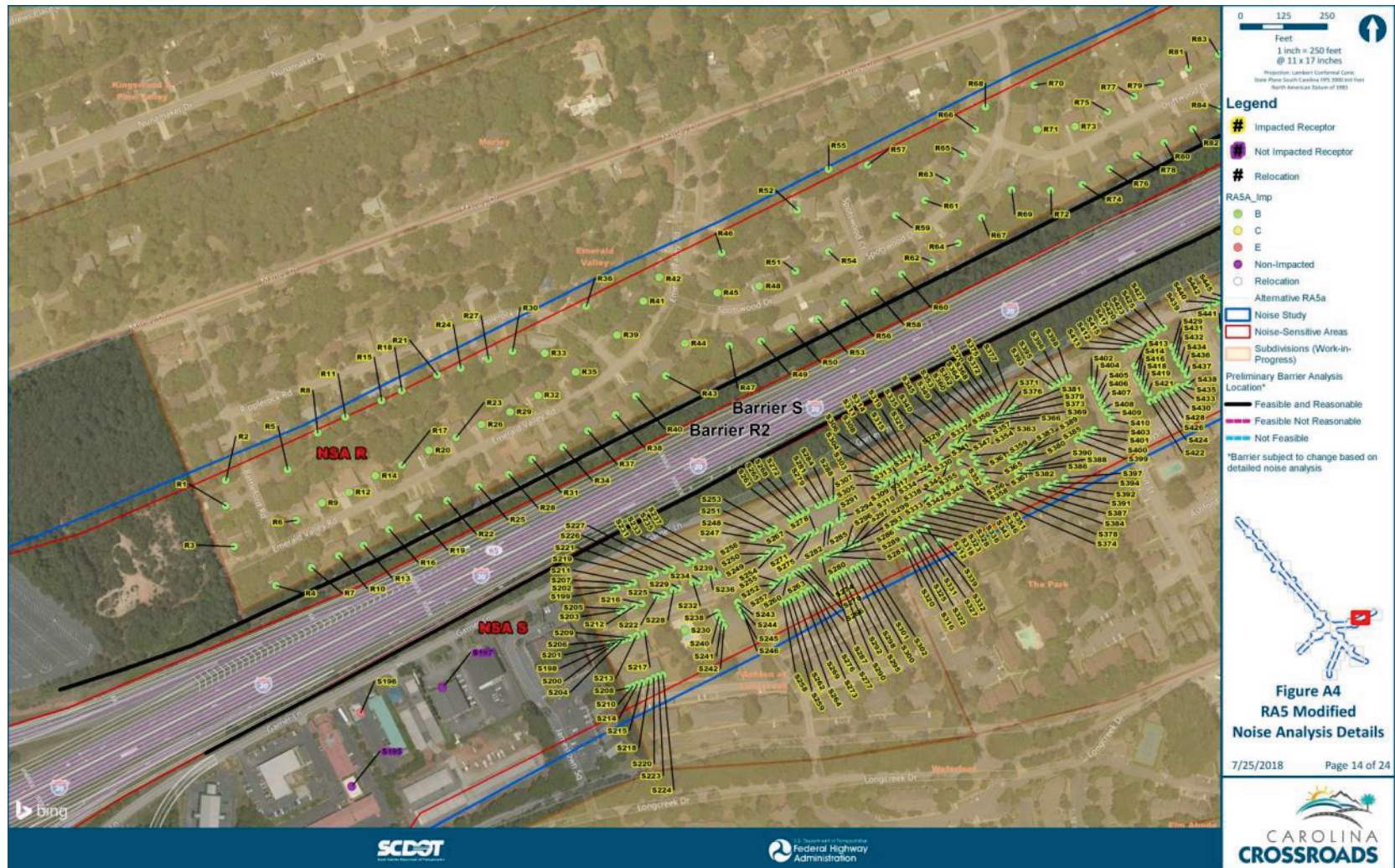
Noise Technical Report



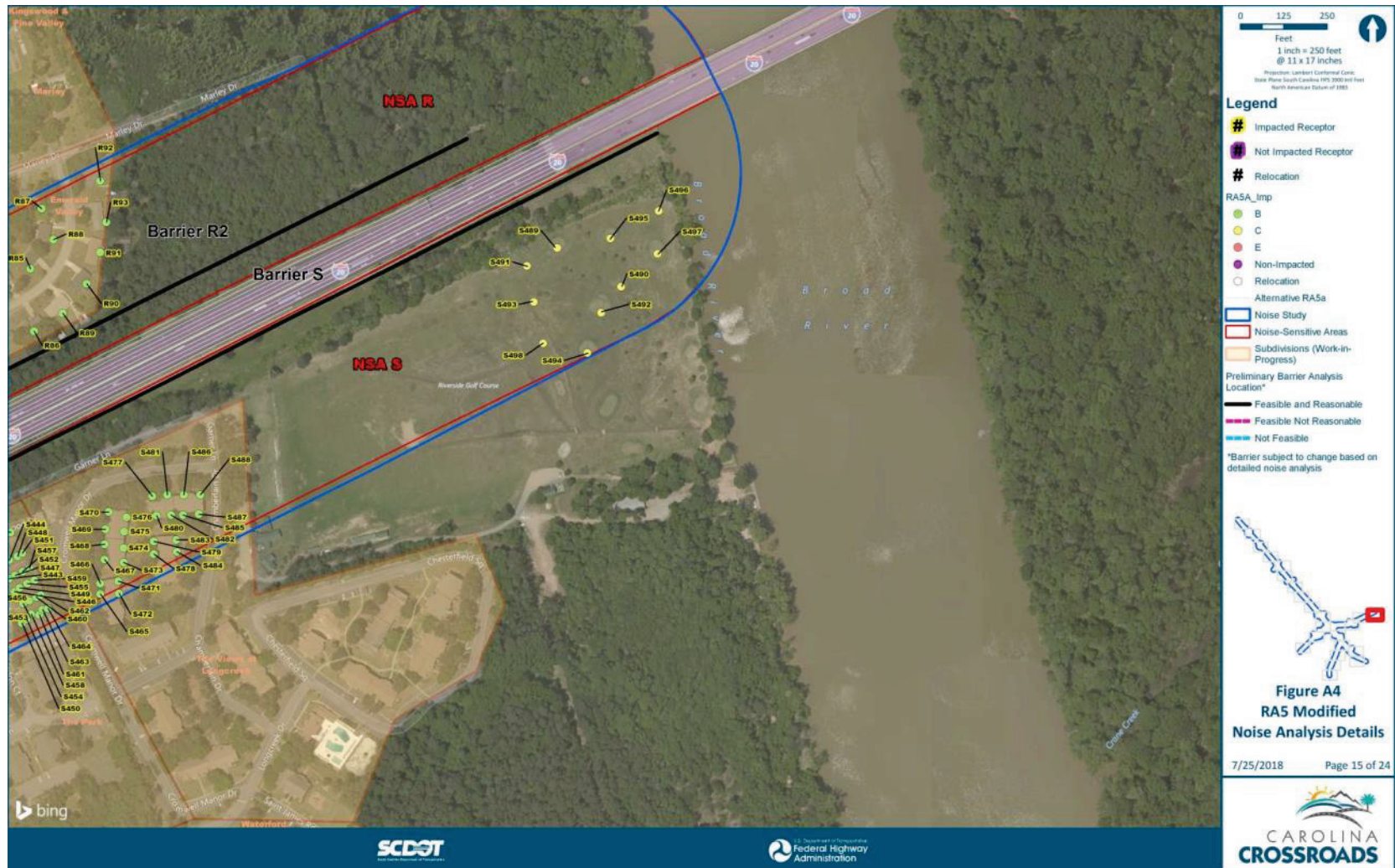
Noise Technical Report



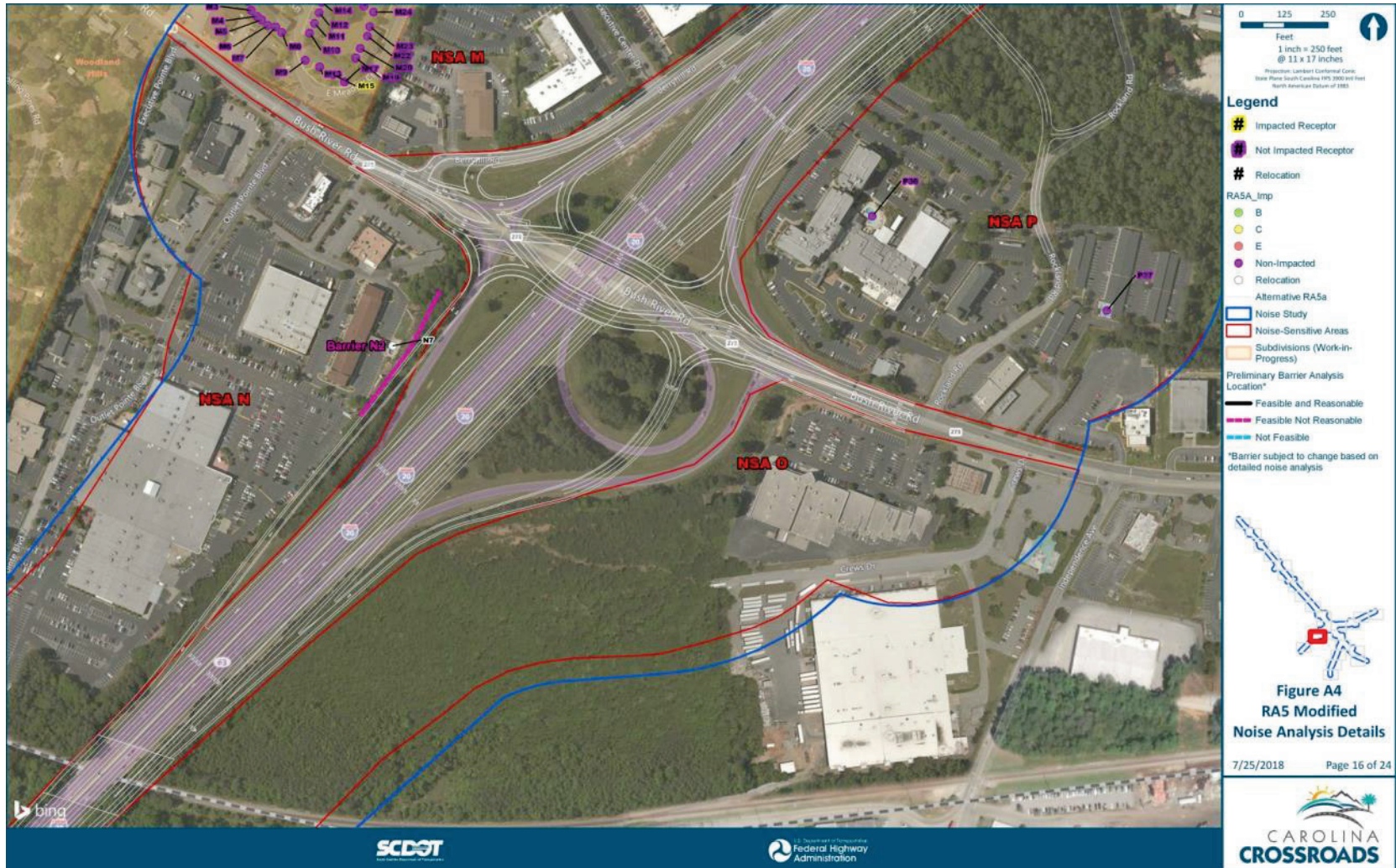
Noise Technical Report



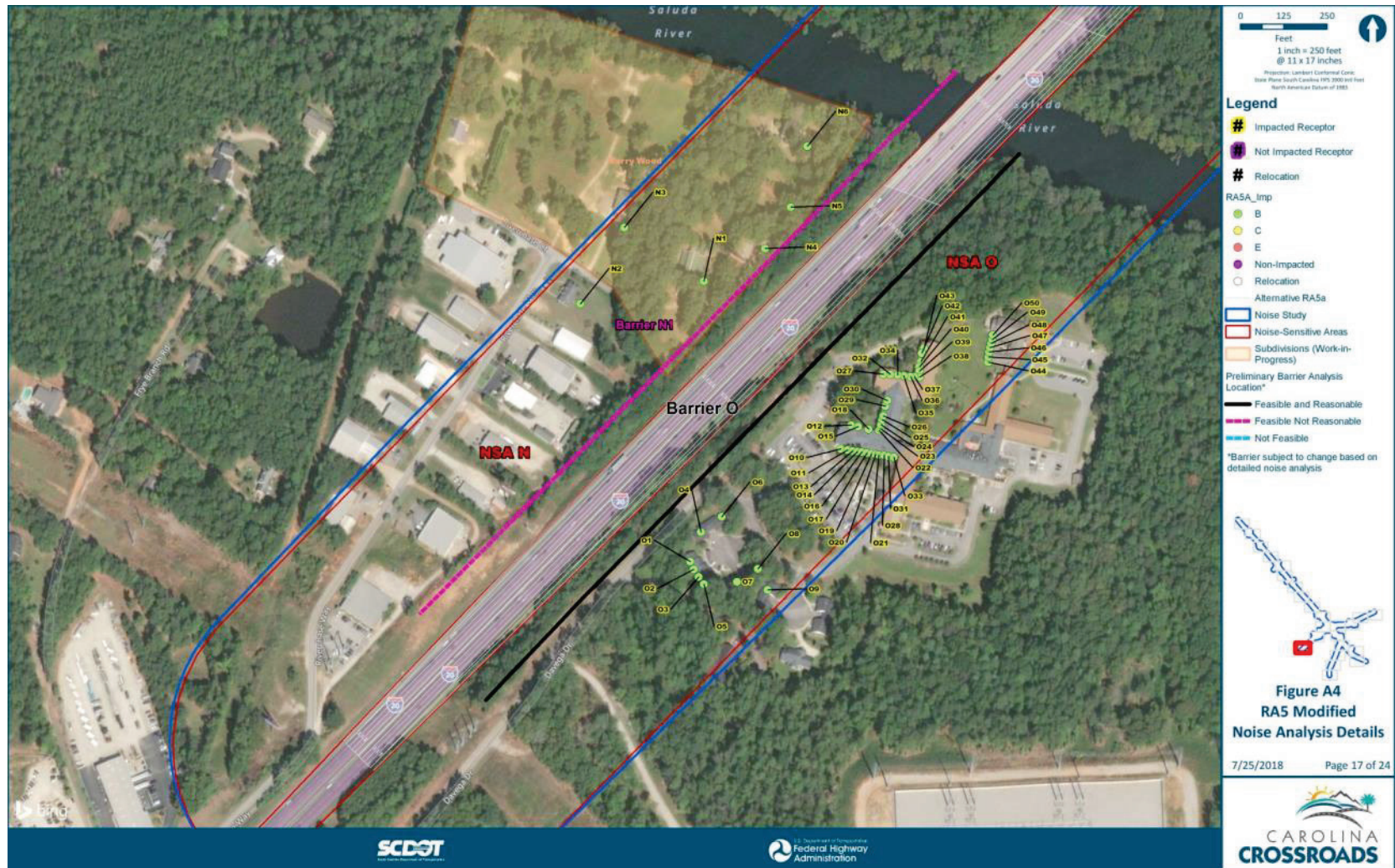
Noise Technical Report



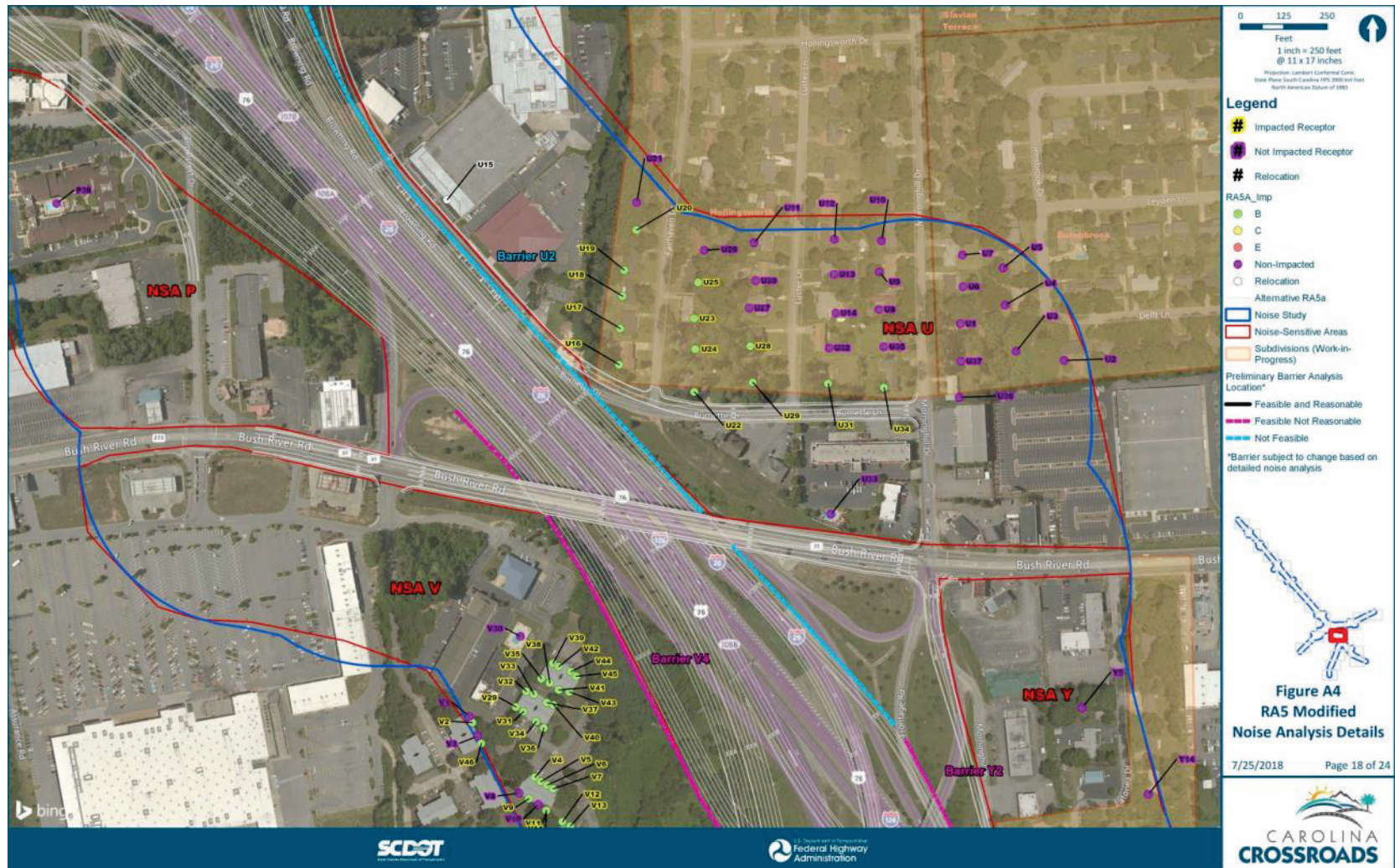
Noise Technical Report



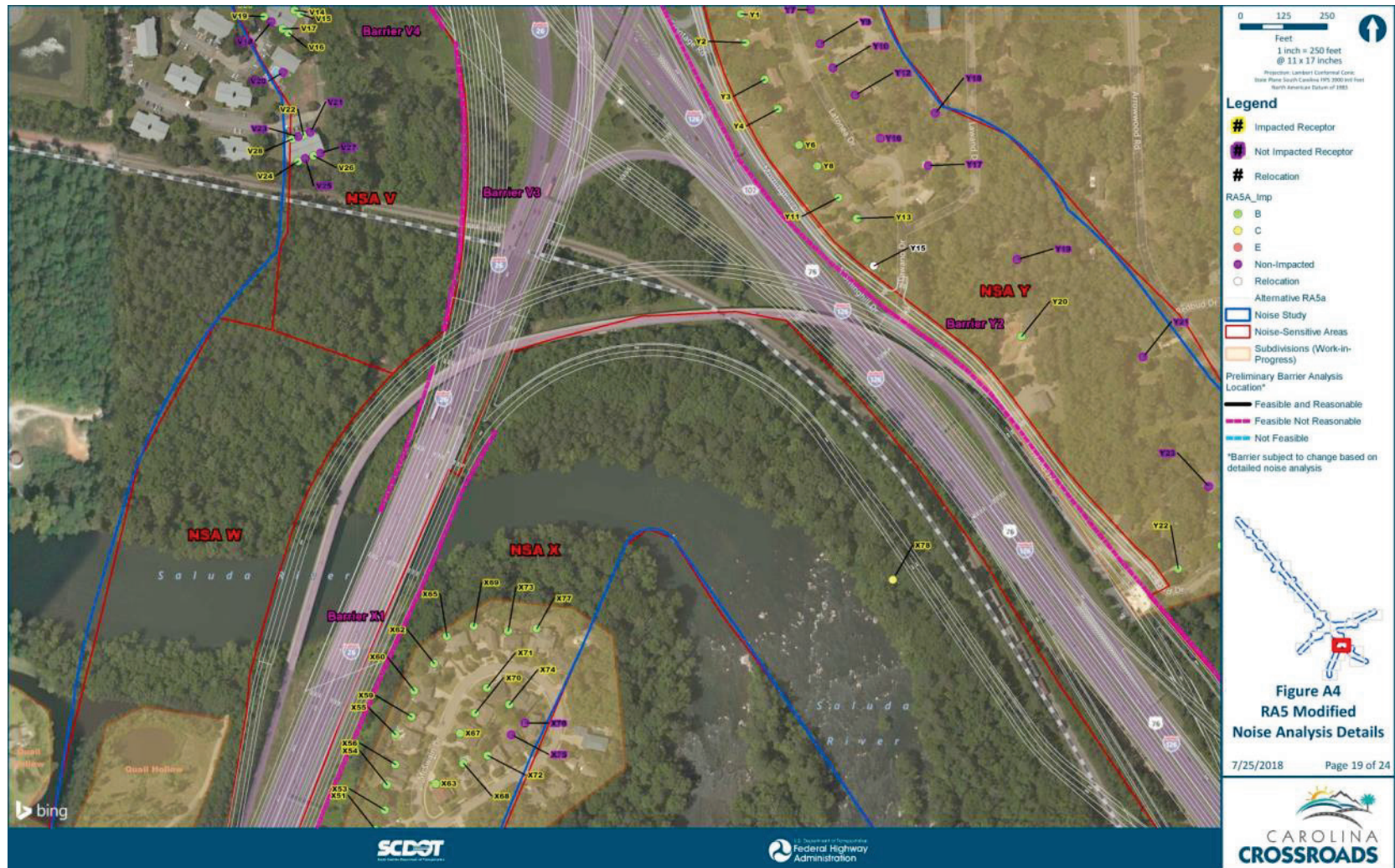
Noise Technical Report



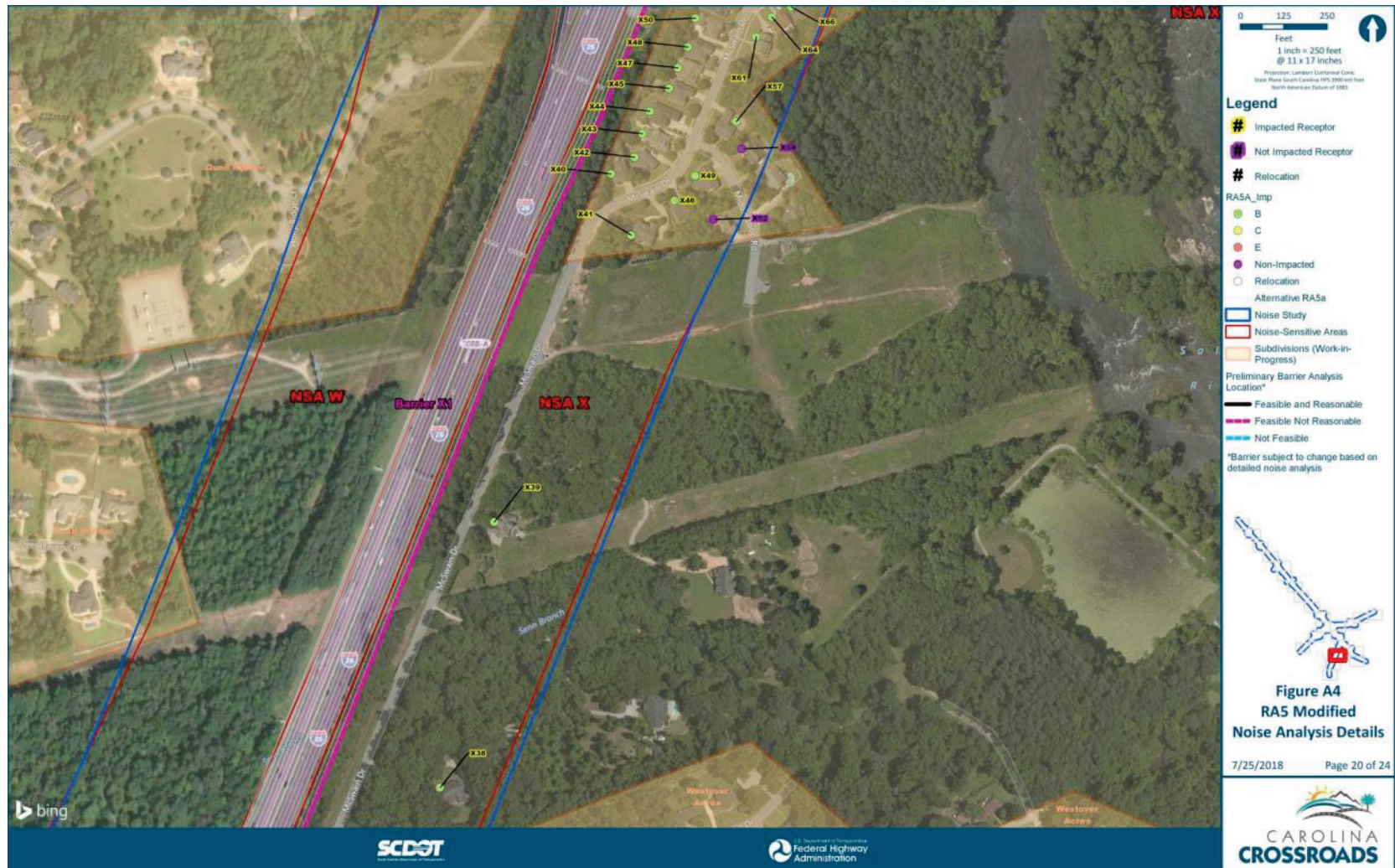
Noise Technical Report



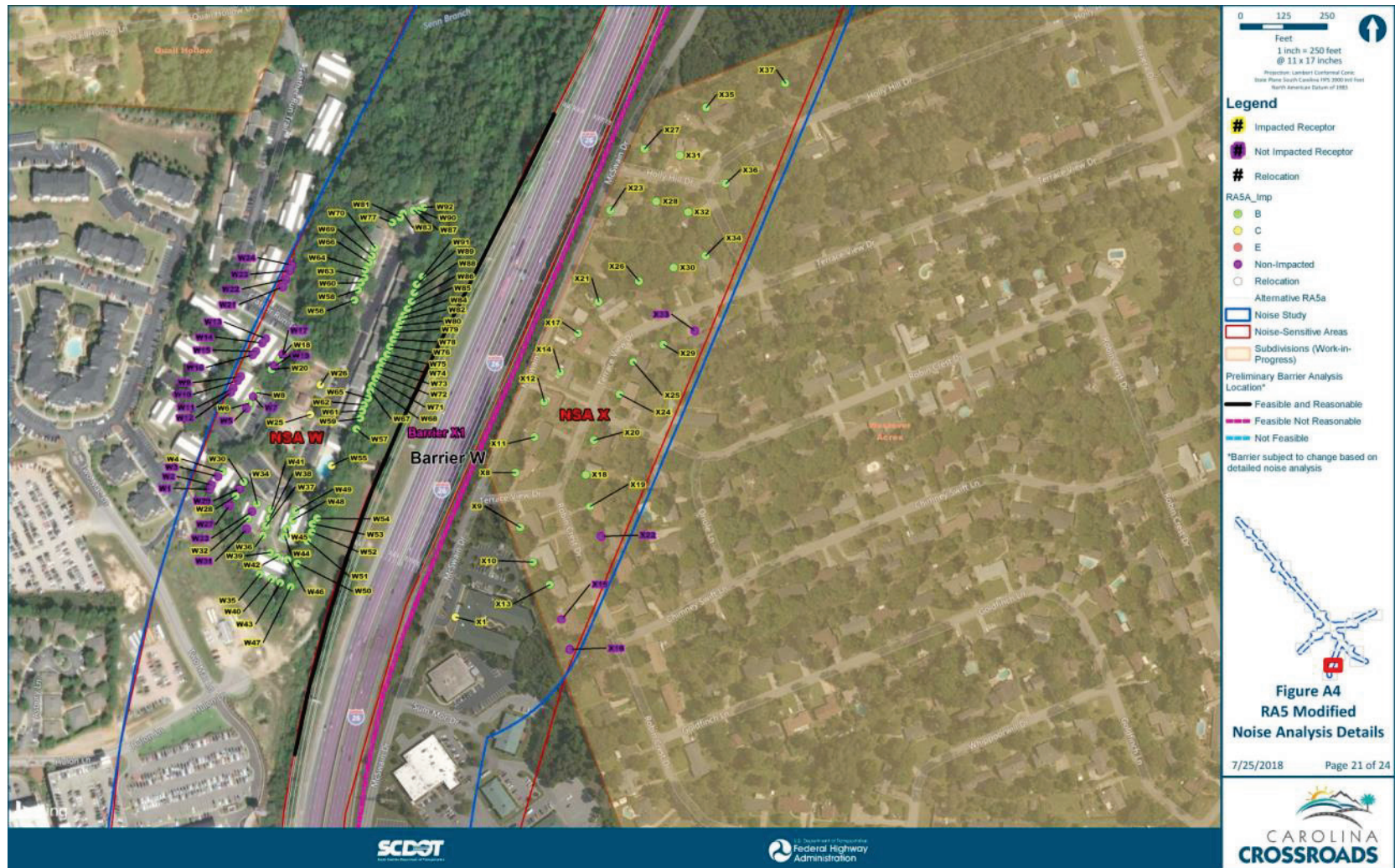
Noise Technical Report



Noise Technical Report

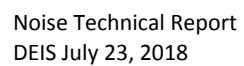


Noise Technical Report



Noise Technical Report





Noise Technical Report



Appendix B—Alternative 1 Noise Barrier Worksheets

Noise Technical Report

This page intentionally left blank.

Noise Technical Report

SCDOT Feasibility and Reasonableness Worksheet

Date: Jul 3, 2018

Project Name Carolina Crossroads

Highway Traffic Noise Abatement Measure Noise Barrier C

Feasibility

Number of Impacted Receivers 1 Number of Benefited Receivers 1

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.

Noise Technical Report

#1: Noise Reduction Design Goal

Number of Benefited Receivers	1	Number of Benefited Receivers that achieve at least an 8 dBA reduction	1
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.		100	

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	80,150
Estimated cost per Benefited Receiver	80,150		

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

Barrier wall is 229 feet in width by 10 feet in height.

Based on the above results from the preliminary analysis, this abatement features is feasible, but not reasonable.

Additionally, this calculation was used as the sample mitigation model run for other similar conditions. These results apply to similar isolated receptor conditions for receptors B1, F, and N2.

Noise Technical Report

SCDOT Feasibility and Reasonableness Worksheet

Date: Jul 3, 2018

Project Name Carolina Crossroads

Highway Traffic Noise Abatement Measure Noise Barrier E1

Feasibility

Number of Impacted Receivers 2 Number of Benefited Receivers 3

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.

Noise Technical Report

#1: Noise Reduction Design Goal			
Number of Benefited Receivers 3	Number of Benefited Receivers that achieve at least an 8 dBA reduction 2		
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. 67			
Does the proposed noise abatement measure meet the noise reduction design goal? ☐ Yes ☒ No			
<i>If "Yes" is marked, continue to #2. If "No" is marked, then abatement is determined NOT to be reasonable.</i>			
#2: Cost Effectiveness			
Estimated cost per square foot for noise abatement measure 	Estimated construction cost for noise abatement measure 		
Estimated cost per Benefited Receiver 			
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.			
<i>If "Yes" is marked, continue to #3. If "No" is marked, then abatement is determined NOT to be reasonable.</i>			
#3: Viewpoints of the property owners and residents of the benefitted receivers			
Number of Benefited Receivers (same as above) 	Percentage of Benefited Receivers in support of noise abatement measure 		
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			
Barrier wall is 1,312 feet in width by 15 feet in height.			
Based on the above results from preliminary analysis, this abatement feature is feasible but not reasonable.			

Noise Technical Report

SCDOT Feasibility and Reasonableness Worksheet

Date: Jul 3, 2018

Project Name

Highway Traffic Noise Abatement Measure

Feasibility

Number of Impacted Receivers Number of Benefited Receivers

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

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.

Noise Technical Report

#1: Noise Reduction Design Goal

Number of Benefited Receivers	166	Number of Benefited Receivers that achieve at least an 8 dBA reduction	155
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.		93	

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	1,823,395
Estimated cost per Benefited Receiver	10,984		

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

Barrier wall is 2,604 feet in width by 20 feet in height.

Based on the above results from the preliminary analysis, this abatement feature is feasible and reasonable.

Barrier subject to change based on the detailed noise analysis.

Noise Technical Report

SCDOT Feasibility and Reasonableness Worksheet

Date: Jun 3, 2018

Project Name

Highway Traffic Noise Abatement Measure

Feasibility

Number of Impacted Receivers Number of Benefited Receivers

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

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.

Noise Technical Report

#1: Noise Reduction Design Goal

Number of Benefited Receivers	36	Number of Benefited Receivers that achieve at least an 8 dBA reduction	36
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.		100	

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	2,859,500
Estimated cost per Benefited Receiver	79,431		

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

Barrier wall is 4,085 feet in width by 20 feet in height.

Based on the above results from the preliminary analysis, this abatement feature is feasible but not reasonable.

Noise Technical Report

SCDOT Feasibility and Reasonableness Worksheet

Date: Jul 3, 2018

Project Name Carolina Crossroads

Highway Traffic Noise Abatement Measure Noise Barrier H2

Feasibility

Number of Impacted Receivers 1 Number of Benefited Receivers 0

Percentage of Impacted Receivers that would achieve a 5 dBA reduction from the proposed noise abatement measure 0

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.

Noise Technical Report

#1: Noise Reduction Design Goal

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

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		Estimated construction cost for noise abatement measure	
Estimated cost per Benefited Receiver			

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

Barrier wall is 845 feet in width by 25 feet in height.

Based on the results above from the preliminary analysis, this abatement feature is not feasible or reasonable.