



NORTH CAROLINA
Department of Transportation



Traffic Noise Policy

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February 21st & 23rd, 2017

Introduction

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Type I v. Type III Projects

Type I Projects

- Alterations to the road that may increase noise
- New through lanes including HOV, HOT, restriping existing pavement for new lanes
- New auxiliary lanes that are 2,500 feet long or longer

**NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
TRAFFIC NOISE POLICY**



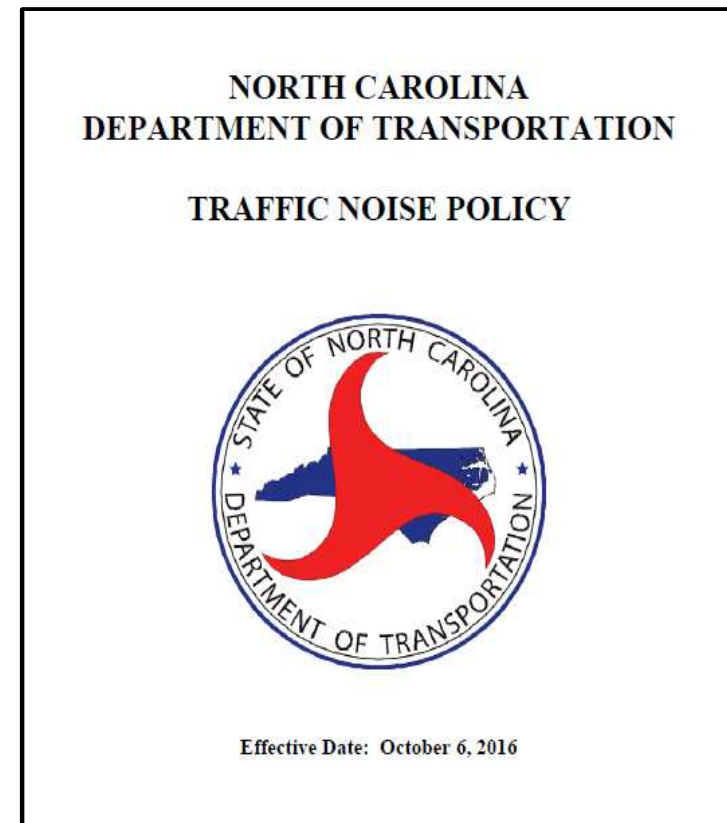
Effective Date: October 6, 2016

Type I v. Type III Projects

Type I Projects (Cont.)

- Substantial change to the horizontal or vertical alignment
- Substantially altered or new rest areas, park and ride/share facilities, or toll plazas

If any part of the project is Type I, the entire project as defined in the environmental document is Type I.



Type I v. Type III Projects

Type III

- In general are exempt from NEPA and noise analysis and include:
 - Maintenance activities
 - Guardrail replacement
 - Bridge replacement on the same alignment
 - KEY: The project activity determines the need for the noise analysis; not the class of environmental document
 - Be mindful of scope creep!



Type I Project Scope of Work

The key factors to consider for the scope are:

- Proposed project activity
- Funding source
- FHWA approval action

If FHWA funds or approval, then noise regulations apply

Some state funded projects require a noise analysis



Type I Project Scope of Work

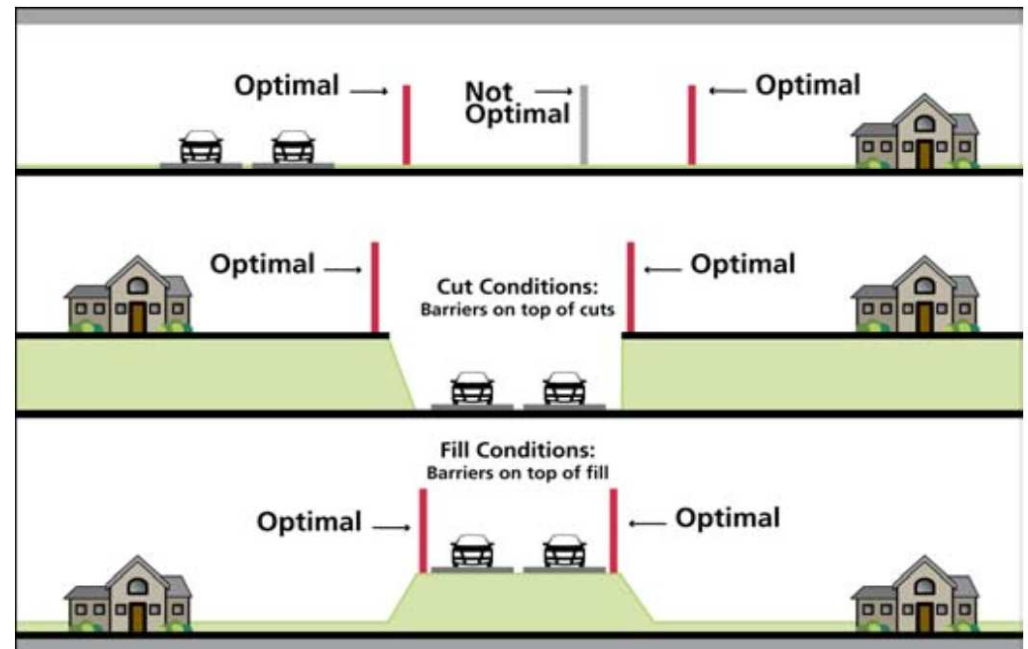
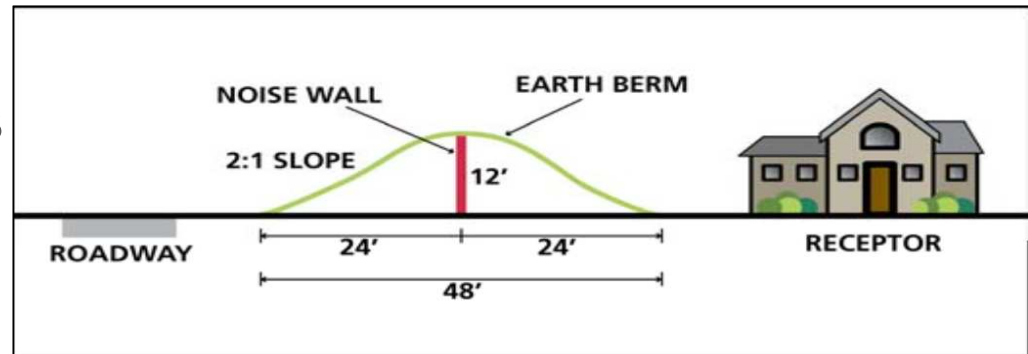
- If any Type I activity occurs the project requires a noise study
- Common error: assuming that because noise walls are not possible there is no need for a noise study
- Identify impacts, then consider abatement



Federal v. State Funding

FHWA Funds or FHWA Approval

- Type I activity
- The project determines whether noise study is needed, NOT the document type



Federal v. State Funding

State Funds Only

- Type I activity for:
 - US or Interstate Route, *and*
 - full control of access, *and*
 - adding a new through-lane
- All other Type I projects with a state EA or EIS
 - Analysis required
 - Division Engineer determines if abatement is practicable



Practicable: Available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes.

- State Minimum Criteria projects do not require a noise study

We Are Here to Help

The Traffic Noise & Air Quality Group is available to:

- Assist in determining whether a noise study is needed; if in doubt, please ask
 - Review scopes of work
 - Prepare in-house estimates
 - Negotiate estimates with private firms
 - Conduct QA/QC of Traffic Noise Reports (TNRs) and Design Noise Reports (DNRs)
- Our Group must accept all TNRs and DNRs
- For federal projects, FHWA must accept DNRs only

Preliminary v. Final Design Processes

Traffic Noise Report (TNR)

- Preliminary design noise analysis
- Basis for the DNR
- During Project Development Phase

Design Noise Report (DNR)

- Final design noise analysis
- Follows the recommendations from the TNR
- During Final Design (usually post-NEPA); Design-Build
- Completed without a TNR if abatement is very likely



TNM Receptor Modeling

TNM Receptors represent exterior areas of frequent human use

- Specific location of outdoor activity, or
- The corner of a representative structure
- Indoor noise levels apply in limited situations



Noise Abatement Determinations

Feasibility

- *Acoustic feasibility*: 5 dB(A) insertion loss for at least 2 impacted receptors
- *Engineering feasibility*: adverse impacts to property access, drainage, topography, utilities, safety, and maintenance
- Effects of secondary traffic
- Stop consideration for noise abatement if it is not feasible



Noise Abatement Determinations

Reasonableness

- Property Owner and Tenant Preferences
- Cost effectiveness
- One receptor with a 7 dB(A) reduction



Noise Abatement Determinations

Table 11.1

Allowable Noise Abatement Base Quantities

		Noise Wall	Berm	Buffer Zone
Maximum Allowable Base Quantity	Noise Level Consideration	1,500 ft ²	4,200 yd ³	\$22,500
Average dB(A) Increase Between Existing and Future Build for All Impacted Receptors	< 5 dB(A)	+ 0 ft ²	+ 0 yd ³	+ \$0
	5-10 dB(A)	+ 500 ft ²	+ 1,400 yd ³	+ \$7,500
	> 10 dB(A)	+ 1,000 ft ²	+ 2,800 yd ³	+ \$15,000
Average Exposure to Absolute Noise Levels for All Impacted Receptors	5-10 dB(A) Over NAC Activity Category	+ 500 ft ²	+ 1,400 yd ³	+ \$7,500
	> 10 dB(A) Over NAC Activity Category	+ 1,000 ft ²	+ 2,800 yd ³	+ \$15,000

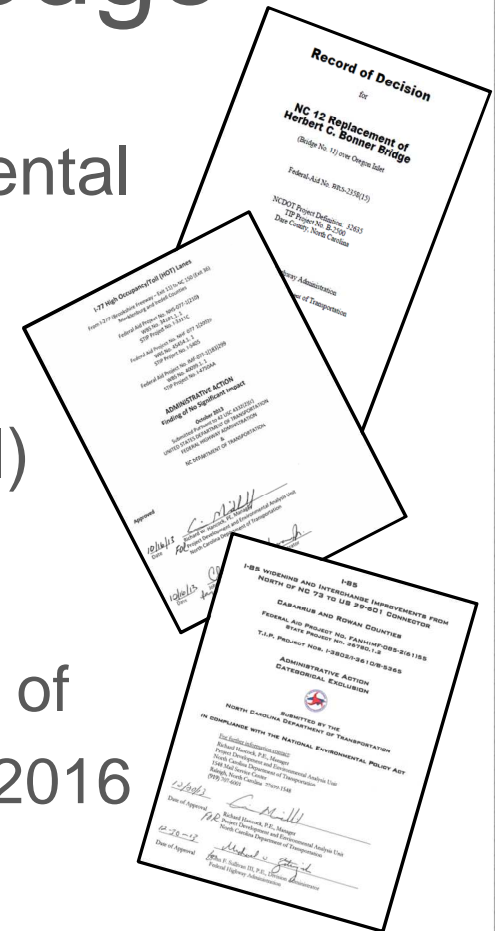
Date of Public Knowledge

The date of approval of the final environmental document:

- Categorical Exclusion (CE)
- Finding of No Significant Impact (FONSI)
- Record of Decision (ROD).

Use 2011 manual/policy for projects with Date of Public Knowledge (DoPK) prior to October 6, 2016

Must determine impacts for lands permitted prior to DoPK



Construction Noise

Must include assessment of construction noise

Level of detail depends on:

- Scale of the project
- Project activities
- Proximity of sensitive land uses to the project

Typically a qualitative analysis



Noise Study Documentation

The NEPA/SEPA document must identify:

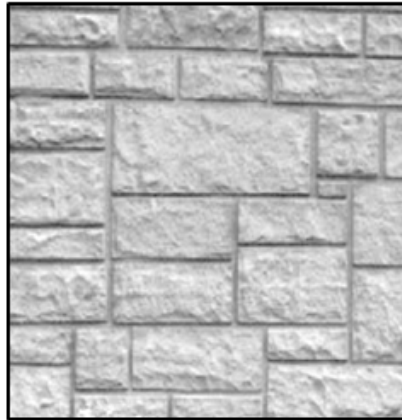
- Land uses impacted by noise
- Locations where abatement is preliminarily feasible and reasonable and “likely” to be included in the project

No impacts for existing and no build – only occur with a project



Noise Wall Aesthetics

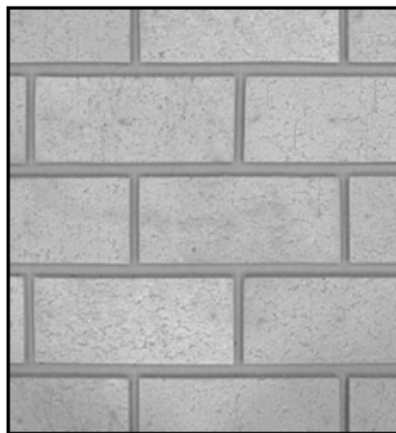
Texture Options:



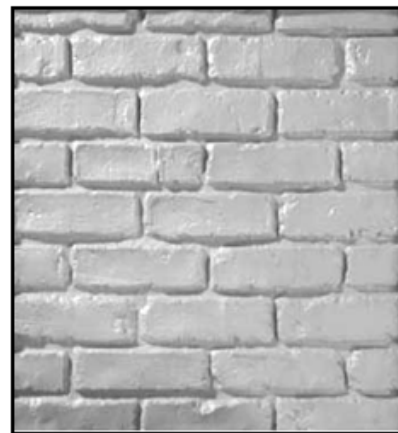
1. Ashlar Stone



2. Dry Stack Stone



3. Standard Brick



4. Old Brick

Other Options Available

Noise Wall Aesthetics

Stain Options: Federal Standard 595 Paint Colors

30032	30040	30045	30049	30051
30055	30059	30061	30062	30070
30075	30076	30080	30091	30095
30097	30098	30100	30108	30109
30111	30116	30117	30118	30122
30139	30140	30141	30152	30160
30166	30205	30210	30219	30227
30233	30252	30257	30260	30266
30277	30279	30313	30315	30318
30324	30371	30372	30400	30450
30475				

Brown Palette

<http://www.colorserver.net/showpalette.asp?group=0&cmd=append%20-%20search>

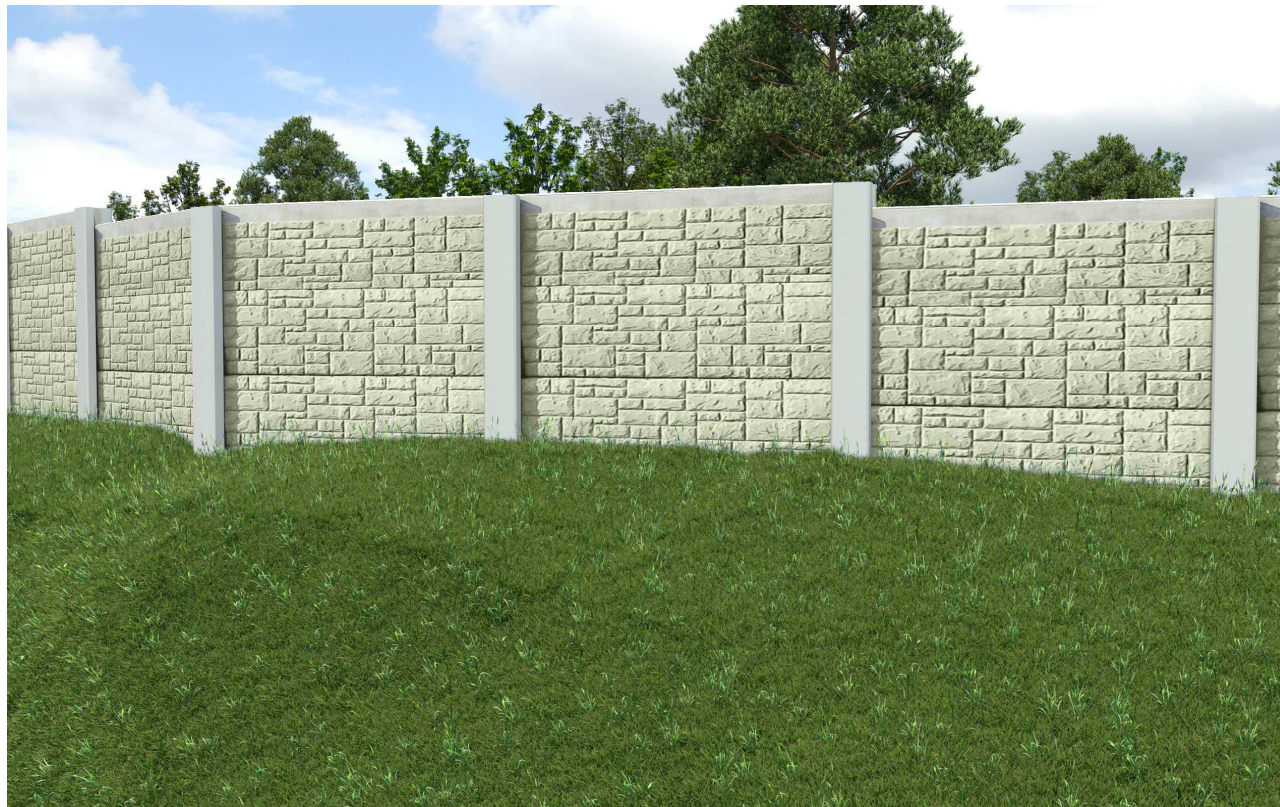
36008	36044	36076	36081	36099
36116	36120	36122	36132	36134
36152	36160	36161	36173	36176
36187	36231	36250	36251	36270
36280	36293	36300	36306	36307
36314	36320	36329	36350	36357
36360	36373	36375	36376	36400
36405	36408	36415	36424	36440
36463	36473	36492	36493	36495
36496	36515	36521	36555	36559
36586	36595	36622	36628	36642

Gray Palette

<http://www.colorserver.net/showpalette.asp?group=6>

Noise Wall Aesthetics

Division Engineer Determines Texture and Stain Color



Ashlar Stone with FS 36559 Stain, depicted in this visualization, is being used throughout Division 7.

Public Involvement and Balloting

Stakeholder/project scoping

- Nature of highway traffic noise
- Types and effects of noise abatement measures
- Invite traffic noise staff; utilize traffic noise PI materials



Public Involvement and Balloting

Public Hearings

- Preliminary noise study
- EA, DEIS is complete
- Noise Study Areas on maps;
noise walls not shown



Public Involvement and Balloting

Final design

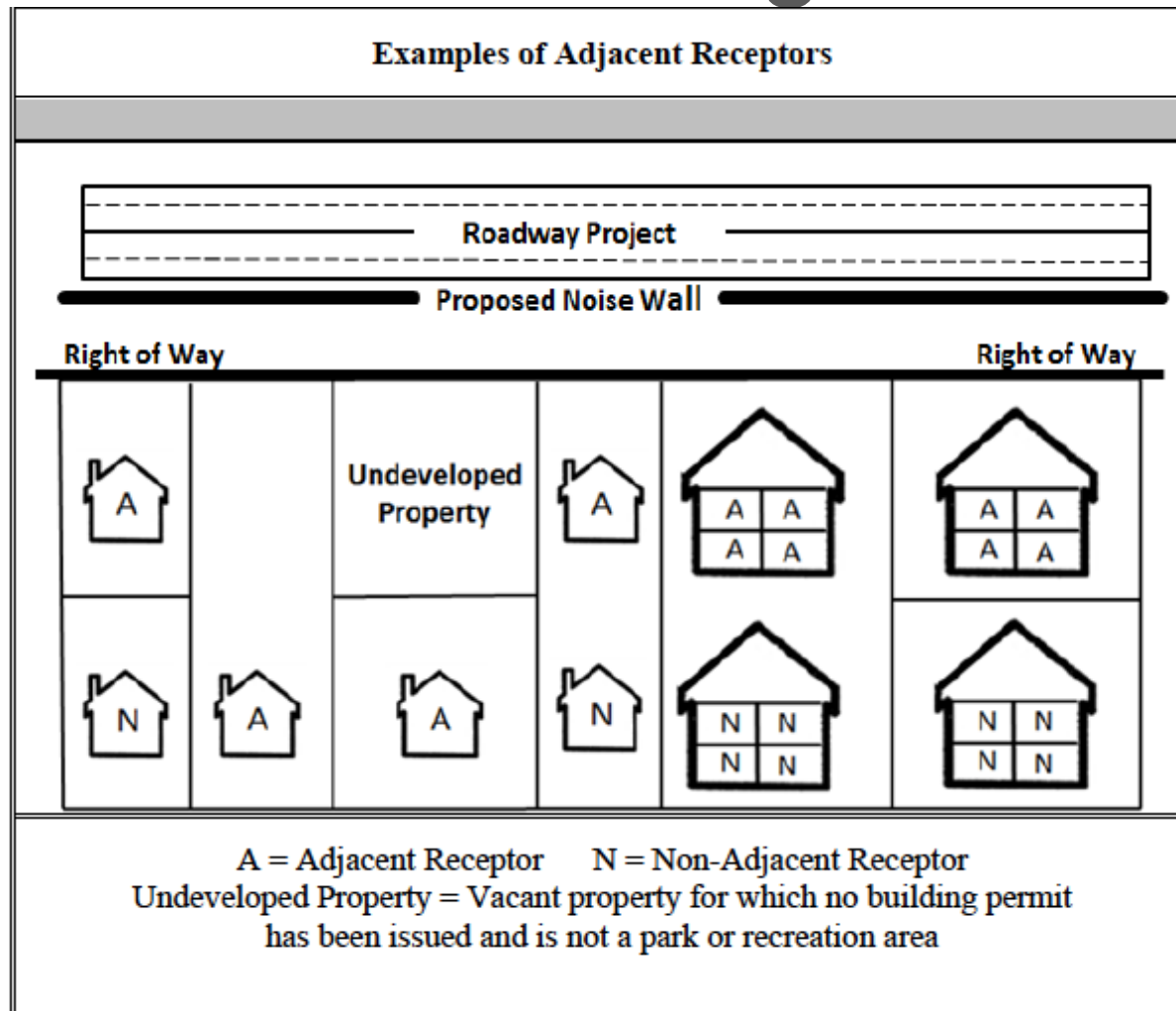
- Detailed noise abatement study
- Noise walls are shown on maps
- Balloting occurs for benefited receptors



Public Involvement and Balloting

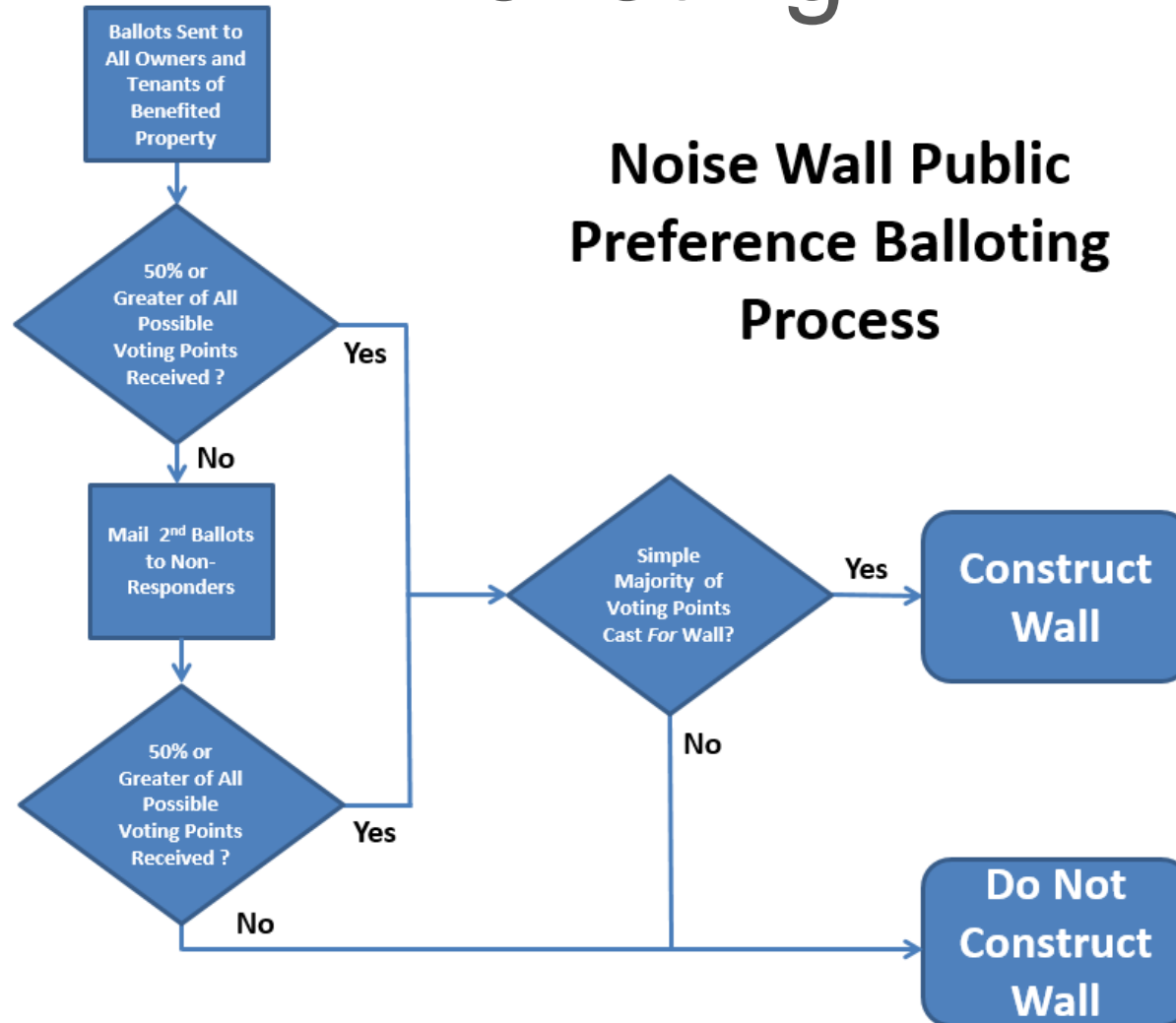
- Obtain views from property owners and tenants of benefited receptors
- Weight ballots as follows:
 - 5 points/ballot for adjacent property owners who reside at property
 - 4 points/ballot for adjacent property owners who rent property to others
 - 3 points/ballot for all non-adjacent property owners who reside at property
 - 2 points/ballot for all non-adjacent property owners who rent property to others
 - 1 point/ballot vote for all tenants of rental property
- Adjacent Receptor is a benefited receptor that
 - 1) represents a property that abuts the highway right of way or
 - 2) has no benefited receptor between it and the highway.

Public Involvement and Balloting



Public Involvement and Balloting

Noise Wall Public Preference Balloting Process



Public Involvement Displays and Handouts

HOW DOES NCDOT DECIDE WHICH COMMUNITIES GET NOISE WALLS?

EVALUATION

For the first step in the process, NCDOT goes to areas that may be affected by increased noise from a proposed highway project and uses special equipment to monitor existing noise.

Next, using complex computer modeling, we predict expected noise changes at these locations after the road is built and traffic increases. Vehicle types and speeds play a significant role in estimating loud noises. Trucks create more noise than cars. Additionally, the faster the vehicle speed, the louder the noise.

Then, we must determine which noise-sensitive locations were in place or had building permits issued before the Date of Public Knowledge and, therefore, are eligible for noise reduction.

If the anticipated noise increase is MORE than the levels defined by NCDOT policy, we begin to consider possible ways to reduce the noise, such as with noise walls and earth berms, at all eligible locations.

CONSIDERATIONS

Once NCDOT has completed the technical evaluation, they also consider the following questions:

- Will a noise wall reduce the noise enough to justify its construction?
Sometimes, a noise wall will not reduce the noise enough.
- Is a noise wall technically realistic?
Every road is different – sometimes the terrain makes building a wall very difficult.
- How many people will benefit from a noise wall? Is this number high enough to justify the cost?
Sometimes, the state cannot afford to build a wall because the cost is too high when compared to the benefits received.
- Do property owners and tenants who would receive a predicted noise level reduction with the proposed noise wall actually want the wall?

LIKELIHOOD OF QUALIFYING FOR A NOISE WALL

High Density



MORE LIKELY, BECAUSE A WALL COULD REDUCE NOISE AT MANY HOUSES.

Low Density



UNLIKELY, BECAUSE THE COST OF THE WALL WOULD BE HIGH WHEN CONSIDERING HOW FEW HOUSES WOULD BENEFIT

DISTANCE



UNLIKELY, BECAUSE EVEN THOUGH THERE ARE MANY HOUSES, THEY ARE TOO FAR FROM THE HIGHWAY FOR A NOISE WALL TO REDUCE ENOUGH NOISE.



Scan to Access the NCDOT Traffic Noise Policy



Public Involvement Displays and Handouts

MEASURES TO REDUCE TRAFFIC NOISE

There are many ways to reduce noise. Noise walls are one option, but berms and highway design can help reduce noise, as well. Sometimes, noise walls will not reduce the noise because of the location of the road. Each new road must be examined individually to determine what measures can be taken.

ARE THERE ALTERNATIVES TO NOISE WALLS?

Other options may also help reduce traffic noise. Some of these may be provided by NCDOT, and others are alternatives that might be considered by private developers or homeowners.

- Land use design—if homes are set back from the road or are separated from the road by other development, the noise levels may be lower.
- Earth Berm—a sloping mound of earth running parallel to the highway. Because of the amount of land required, a berm is not usually the most practical solution to highway noise.
- Pavement design—research is being conducted on how different types of pavement might reduce traffic noise.
- Types of vehicles/speed limits—noise can be reduced with lower speed limits and truck restrictions on a road. However, reducing the speed limit below the appropriate speed for which the road is designed will have only a moderate affect on traffic noise.
- Building insulation—noise insulation in buildings, such as replacing doors and windows or adding insulation to walls and attics.

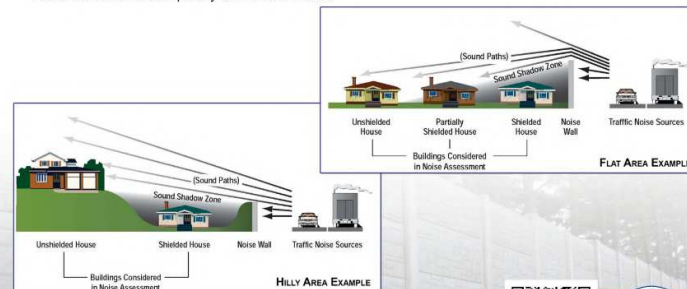
WHEN DO NOISE WALLS WORK?

Sound travels very much like water or light. It follows the easiest path over, under, and around things in its path. The farther away from the source of the sound, the lower the noise. Noise walls are usually only effective for buildings less than 500 feet from the highway.

Noise walls do not work if the source of the noise can be seen. The noise will simply travel through that opening much like water will flow through a crack in a dam. If a building is located higher than a noise wall, the noise will flow over the wall to the building.

The graphics below show two examples of noise walls located between buildings and a road. In both cases, the wall will shield one of the houses but will not shield them all.

Noise walls do not completely eliminate all noise.



Scan to Access the NCDOT Traffic Noise Policy

Public Involvement Displays and Handouts

WHEN IS TRAFFIC NOISE CONSIDERED?

Whenever a highway project uses state or federal funds, the potential for increased traffic noise—and how to reduce it—must be evaluated. Whenever traffic noise impacts are predicted, noise abatement (typically in the form of noise walls) must be considered.

Potential traffic noise increases are evaluated only for buildings permitted before the "Date of Public Knowledge."

WHAT IS THE "DATE OF PUBLIC KNOWLEDGE?"

This is the date that the public and local government is officially notified of a future project. After this date, the federal and state governments are no longer responsible for providing noise reduction for new development along the proposed highway project. NCDOT strongly encourages local governments and private landowners to ensure that noise-compatible designs are used for development permitted after the "Date of Public Knowledge."

- If a road project was approved BEFORE September 2, 2004—this date is based on either the approval of the Final Environmental Document or the Design Public Hearing (whichever is later).
- If a road project was approved ON or AFTER September 2, 2004, this date is the same as the Final Environmental Document.

WHERE DO I FIND MORE INFORMATION?

For more information about NCDOT's noise policy and how it is applied, or about how noise is measured, call or email us

Detailed noise analysis information can also be found at the Federal Highway Administration's website, <http://www.fhwa.dot.gov/environment/noise>.

North Carolina Department of Transportation
Traffic Noise & Air Quality Group
Human Environment Section
1598 Mail Service Center
Raleigh, N.C. 27699-1598

Phone: 919-707-6000
E-mail: www.ncdot.gov/contact



Scan to Access the NCDOT Traffic Noise Policy



Public Involvement Displays and Handouts

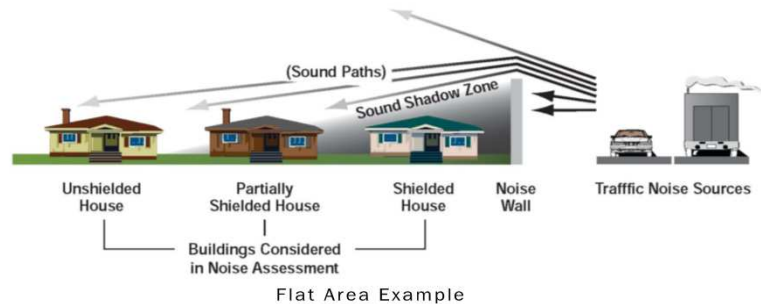
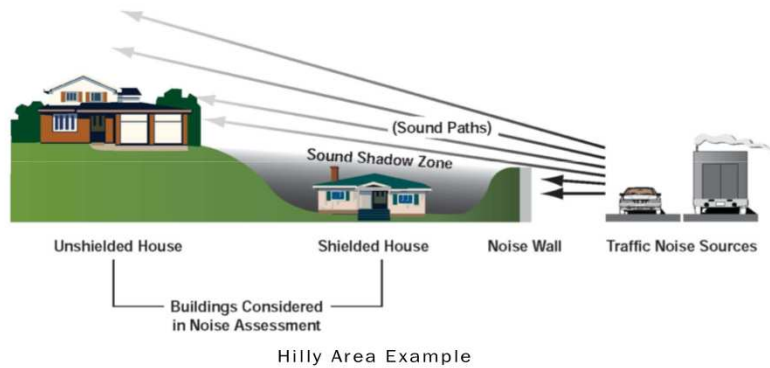
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North Carolina Department of Transportation

Answering Your Questions About HIGHWAY TRAFFIC NOISE



MEASURES TO REDUCE TRAFFIC NOISE

There are many ways to reduce noise. Noise walls are one tool, but berms and highway design can help reduce noise as well. Sometimes, noise walls will not reduce the noise because of the location of the road. Each new road must be examined individually to determine what measures can be taken. This pamphlet will briefly describe how NCDOT determines when a noise wall should be built, and provides contact information if you have more questions.

WHERE DO I FIND MORE INFORMATION ABOUT NCDOT'S TRAFFIC NOISE POLICY?

For more information about NCDOT's noise policy and how it is applied, or about how noise is measured, call or email us. Detailed noise analysis information can also be found at Federal Highway's website, <http://www.fhwa.dot.gov/environment/noise>.

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WHEN ARE NOISE WALLS CONSIDERED?

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- Potential traffic noise increases are evaluated for any building permit-tee before the “Date of Public Knowledge.”

WHAT IS THE “DATE OF PUBLIC KNOWLEDGE?”

This is the date that the public (and local government) is notified of the future path of the road.

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The Final Environmental Document could be a Categorical Exclusion (CE), State or Federal Finding of No Significant Impact (FONSI), or State or Federal Record of Decision (ROD).

HOW IS TRAFFIC NOISE EVALUATED?

- For the first step in the process, NCDOT experts go to homes, churches, businesses, etc. that may be affected by a proposed highway project and use special equipment to monitor existing noise.
- Next, using complex computer modeling, we predict expected noise changes at these locations once the road is built and traffic increases.
- Then we must determine which noise-sensitive locations were permitted before the Date of Public Knowledge and, therefore, are eligible for noise reduction.
- If the anticipated noise increase is MORE than the level defined by NCDOT policy, we begin to consider possible ways to reduce the noise, such as with noise walls and earth berms, at all eligible locations.

ARE THERE ALTERNATIVES TO NOISE WALLS?

Other options may also help reduce traffic noise. Some of these may be provided by NCDOT, and others are alternatives that might be considered by private developers or homeowners.

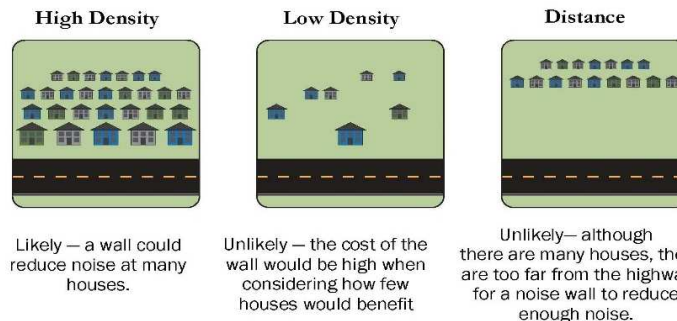
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- Types of vehicles/speed limits—noise can be reduced with lower speed limits and truck restrictions on a road. However, reducing the speed limit below the appropriate speed based on the design will have only a moderate affect on traffic noise and may actually increase the number of accidents on the roadway.
- Building insulation—noise insulation in buildings, such as replacing doors and windows or adding insulation to walls and attics.

HOW DOES NCDOT DECIDE WHICH COMMUNITIES GET NOISE WALLS AND WHICH DO NOT?

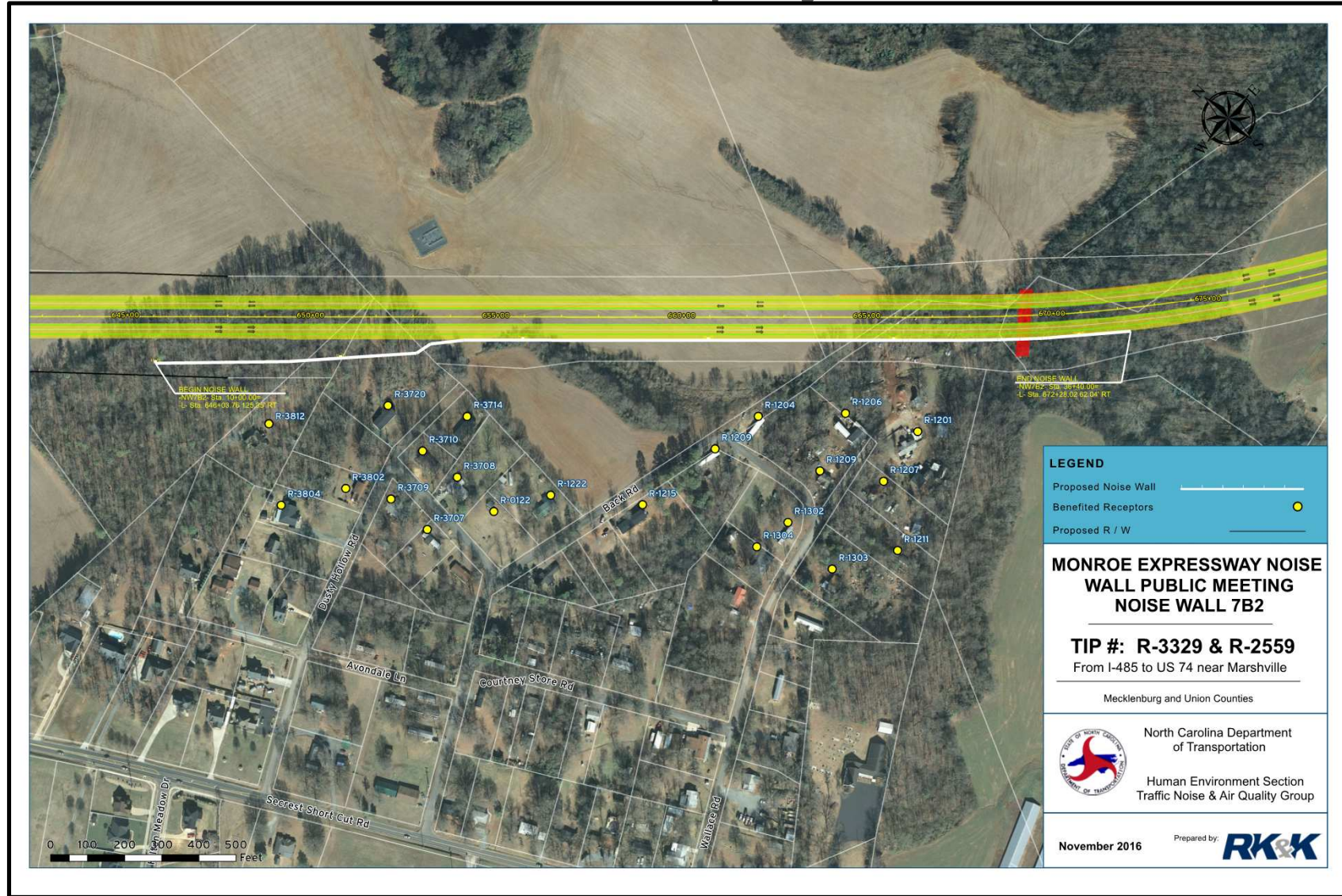
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- Will a noise wall reduce the noise enough to justify its construction? Sometimes, a noise wall will not reduce the noise enough.
- Is a noise wall technically realistic? Every road is different – sometimes the terrain makes building a wall difficult.
- How many people will hear a difference in noise? Is that number high enough to justify the cost? Sometimes, the state just cannot afford to build a wall because the cost is too high when compared to the benefits received.
- Does a simple majority of property owners and tenants who receive a predicted noise level reduction due to construction of a noise wall actually want the wall? Public preference for or against a wall is obtained through a balloting process.
- Are alternatives to noise walls available?

LIKELIHOOD OF QUALIFYING FOR A NOISE WALL:



Public Involvement Displays and Handouts



Additional Information?

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