

## **GENERAL INFORMATION FOR NOISE STUDY SUBMISSIONS**

### **INTRODUCTION**

On July 24, 2000, the Board of Supervisors adopted Zoning Ordinance Amendment ZO 00-330, which permits noise barriers, in excess of the Zoning Ordinance fence/wall height limitations, to reduce adverse impacts of highway noise on properties located adjacent to major thoroughfares, or to reduce adverse noise impacts of commercial and industrial uses on adjacent properties. Such barriers may be approved by the Board of Supervisors in conjunction with the approval of a proffered rezoning for any zoning district, including P districts, or in conjunction with the approval of a special exception application, or by the Board of Zoning Appeals as a special permit use. Pursuant to Par. 1 of Sect. 8-919 or Par. 3F of Sect. 10-104 of the Zoning Ordinance, a noise impact study is required to demonstrate the need for the noise barrier and the proposed height and the level of mitigation to be achieved by the noise barrier.

In conjunction with the adoption of ZO 00-330, the Planning Commission and Board of Supervisors requested staff to develop standardized noise study submission guidelines which would be submitted to the Planning Commission for review and comment prior to their implementation. On March 14, 2002, the Planning Commission Environment Committee reviewed and endorsed the attached noise study submission guidelines and on March 20, 2002, the Planning Commission endorsed the attached guidelines.

In order to have standardized information to be provided in conjunction with requests for noise barriers, the attached forms must be completed and submitted by applicants with their noise study submissions. The purpose of this form is to assist the review of the information contained in the noise analysis and to ensure that the information provided on all noise studies is generally consistent. However, it is not the intent for this form to replace the submission of an individual noise study.

### **INSTRUCTIONS**

The form entitled "Noise Study Summary Information" must be completed and provided with any noise study which is used to satisfy the requirements of Par. 1 of Sect. 8-919 or Par. 3F of Sect. 10-104 of the Zoning Ordinance, except for noise barriers on a single residential lot. The form entitled "Noise Study Summary Information for Individual Residential Lots" may be used in conjunction with a noise study submission on a single residential lot. It is ultimately the responsibility of the applicant to provide all of the requested information.

The requested information which is contained on the Noise Study Information Summary form is the basic information which is required to run most noise models which have been deemed acceptable by the County. However, any noise model may be used in the projection of future noise levels, provided that such model can project noise levels both before and after mitigation. At a minimum, any noise model must project both unmitigated and mitigated noise levels on the property and must account for topographic variations on the site, the impacts of noise on the second or higher levels of a building, different vehicle types, and the impact of wrap around noise

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at the edge of the barrier. In addition, the noise model must have its results validated against measurements based on current conditions. If the noise model that is used does not require all of the information contained on the form and the guidelines provided below, a narrative must be provided that (1) provides a detailed description of and justifications for the methodologies and assumptions used; and (2) includes a statement as to why the County should accept the use of these methods. The Federal Highway Administration's Stamina 2.0/Optima and Traffic Noise Model (TNM) are acceptable models to the County and no further justification is required if these models are used.

In order to clearly delineate the projected noise impacts on the property, a map or plat of the property is required in conjunction with the Noise Study Summary Information form which shows both the projected unmitigated and mitigated DNL 65, 70 and 75 dBA noise contours at both the ground and above ground levels. The unmitigated noise contours are those contours which exist on the property prior to construction of the barrier. The above ground level is defined at the second story as approximately 15 feet above ground. If the proposed building(s) has more than two stories, the contours for all of the upper stories must also be provided, or documentation must be provided that demonstrates that there will be no change in noise levels above a certain elevation. The above ground level at the third story is approximately 27 feet above ground, with 12 feet being added for each additional story.

It is noted that there may be instances where the projected unmitigated noise contours may be difficult to determine and/or depict given the presence of existing structures or other features on the site. In addition, there may also be situations where the projected mitigated noise contours may be difficult to determine and/or depict given the future barrier(s) and other structures or features on the site. In such circumstances, it may be appropriate to provide noise data points for the critical areas on the site before construction of the barrier on the site and/or after construction on the site (including barrier construction) in lieu of providing the projected unmitigated and/or projected mitigated noise contours. A critical area is defined as an area that may be used for outdoor recreational activity, such as side and rear yards on residential lots, play areas, outdoor swimming pools and usable open space areas, which are not fully shielded by structures. If critical data point information is provided, a narrative must be provided that provides a detailed description of and justification for the methodologies and assumptions used. In addition, verifiable quantitative data which shows that the results are met must also be provided, such as the Stamina 2.0/Optima or TNM output.

The following guidelines should be considered when completing the forms:

- 1) Current Average Daily Traffic (ADT) and/or Peak Hour Traffic may be obtained from either actual traffic counts, the Virginia Department of Transportation (VDOT) or from other sources which are deemed acceptable by the Fairfax County Department of Transportation (DOT). The traffic counts must be deemed acceptable by DOT and based on the worst case scenario, which is generally the AM or PM peak period and not within a week of a major holiday. If actual traffic counts are used, the date and time of such counts should be noted under the "data source(s) for current and projected traffic and justification for projected traffic". It should be noted that current ADT and Peak

Hour Traffic are only required when a growth rate, as discussed below, is used.

- 2) Projected ADT and/or peak hour traffic may be obtained from the most recent VDOT projections or an alternative source which is acceptable to DOT. The Comprehensive Plan recommendations for future road improvements must be taken into consideration when projecting traffic. It may be appropriate in some circumstances, such as the absence of up-to-date traffic projections, to project future traffic levels based on a compounded growth rate which is acceptable to DOT. The typical formula for determining a compounded growth rate is:  $P = C(1+r)^n$  where  $P$  is projected traffic,  $C$  is current traffic,  $r$  is rate of growth and  $n$  is number of years. If the traffic projection is based on a compounded growth rate, this should be noted on the form under "data source(s) for current and projected traffic and justification for projected traffic". Unless another date is deemed acceptable by DOT, the traffic projection should be for a time frame that is at least 20 years into the future. The time frame for the traffic projection must be specified.
- 3) Information pertaining to the percentage of medium and heavy trucks of the ADT or peak hour traffic may not always be known for a particular location. In instances where such information is unavailable, the following breakdown may be used: 95% passenger cars; 3% medium trucks and 2% heavy trucks. This percentage breakdown cannot be used for any highway segment that is listed in VDOT's publication "Average Daily Traffic Volumes with Vehicle Classification Data on Interstate, Arterial and Primary Routes". For highway segments listed in VDOT's publication, the listed traffic mix must be used.
- 4) The on-site measurement of noise levels from several locations throughout the site over a period of time is generally necessary in order to obtain an accurate representation of the existing noise levels. Noise monitoring over a 24-hour period may be necessary to provide an accurate representation of existing noise levels particularly with respect to the weighted day and night average described by the DNL noise metric. A map which clearly shows the on-site location(s) and height(s) of all monitoring sites is required. The location(s) and height(s) of the on-site monitoring sites needed to provide an accurate representation of the existing on-site noise levels depend on a number of factors, including the size of the property, the amount of highway frontage, topography and the location(s) and height(s) of existing buildings or structures. It is recommended that a written statement which provides justification regarding the location(s) and height(s) of on-site monitoring sites and the time period that such monitoring occurred, if less than 24 hours, be provided.
- 5) Once existing noise levels are known, the noise model should be run using the existing conditions and that information should be used to calibrate the model for future projections. This calibration will generally improve the accuracy of the modeling effort, in that it will adjust model results to fit site specific, measured conditions. At a minimum, the noise model should be capable of the following: considers the effects of a noise barrier; considers noise from the edge of the barrier; accounts for 2<sup>nd</sup> and 3<sup>rd</sup>

story impacts (where applicable); and, accounts for topography and different vehicle types.

It should be noted that no proposed barrier should be located in an area which is needed for future road improvements. To obtain information regarding the Comprehensive Plan recommendations for future road improvements and the timing of such improvements, please contact DOT. In addition, the location of any barrier within VDOT right-of-way must be approved by VDOT. VDOT must be contacted and permission obtained prior to construction of a barrier within future or proposed right-of-way.

It should also be noted that construction of a wall with a footing system requires a Building Permit. Walls made entirely of stone, brick and masonry block require a footing system. A wall constructed of wood with intermittent pillars or a wrought iron fence with intermittent pillars will also require a footing system. Although a wooden fence may have some footings for support, it is not deemed a footing system and, thus, a Building Permit would not usually be required for such a fence. However, there may be some instances where a Building Permit may be required for a wooden fence because of structural/safety concerns. Information pertaining to Building Permits should be obtained from the Office of Building Code Services of the Department of Public Works and Environmental Services (DPWES).

## CONTACTS

- 1) For information on the Fairfax County Comprehensive Plan's transportation recommendations, the timing of planned road improvements and traffic growth rates:

Fairfax County Department of Transportation  
12055 Government Center Parkway, Suite 1034  
Fairfax, Virginia 22035  
(703) 324-1145

- 2) For information on growth rates and current or projected ADT and Peak Hour Traffic:

VDOT, Northern Virginia District Office  
Transportation Planning Section  
14685 Avion Parkway  
Chantilly, Virginia 20151-1104  
(703) 383-2200

- 3) For information on acceptable noise models, critical noise areas and on-site noise monitoring activities:

Environment and Development Review Branch, DPZ  
12055 Government Center Parkway, Suite 730  
Fairfax, Virginia 22035  
(703) 324-1210 or (703) 324-1380

- 4) For information on the rezoning, special exception or special permit approval process:

Zoning Evaluation Division  
Department of Planning and Zoning (DPZ)  
12055 Government Center Parkway, Suite 801  
Fairfax, Virginia 22035  
(703) 324-1290

- 5) For information on Building Permits:

Office of Building Code Services, DPWES  
12055 Government Center Parkway, Suite 444  
Fairfax, Virginia 22035  
(703) 324-1980

## Noise Study Summary Information

The following form must be completed and provided with any noise study which is used to satisfy the requirements of Par. 1 of Sect. 8-919 or Par. 3F of Sect. 10-104 of the Zoning Ordinance, except for noise barriers on a single residential lot.

Tax Map Number and/or Address of Property

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Proposed Use of the Property

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Name(s) and Route Number(s) of Road(s) for which Noise Barrier is Proposed

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Comprehensive Plan Recommendation for Portion of Road(s) which Abut(s) the Property and for which Noise Barrier is Proposed (i.e. improve to six lanes, service road, future right-of-way width, etc.)

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Current Average Daily Traffic (ADT) and/or Peak Hour Traffic (please specify which) per road

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Projected ADT and/or Peak Hour Traffic (please note time horizon, i.e. 20 years into the future) per road

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Data source(s) for current and projected traffic and justification for projected traffic

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Posted Speed Limit (mph) \_\_\_\_\_

Passenger Vehicles as a % of the ADT and/or Peak Hour \_\_\_\_\_

Medium Trucks as a % of the ADT and/or Peak Hour \_\_\_\_\_

Heavy Trucks as a % of the ADT and/or Peak Hour \_\_\_\_\_

Source of Vehicle Mix Information \_\_\_\_\_

Characteristics of Traffic Flow during on-site monitoring (i.e. free flowing at posted speed, moving below posted speed, stand still) \_\_\_\_\_

Weather and road conditions during on-site monitoring (i.e. wet pavement, dry pavement, snow cover, wind speed) \_\_\_\_\_

Dates and times (including duration) of on-site monitoring \_\_\_\_\_

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Provide a map showing the locations of all on-site monitoring sites.

Noise Model Used \_\_\_\_\_

Run noise model using existing conditions and discuss how that information was used to calibrate future predictions.

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Provide a map or plat of the property which delineates the **projected unmitigated** DNL 65, 70 and 75 dba noise contours at both the ground and above ground levels. The above ground level is defined as the noise levels at the second story (approximately 15 feet above ground). If the proposed building(s) has more than two stories, the contours for the upper levels must also be provided, or documentation provided that demonstrates that there will be no change in noise levels above a certain elevation. The above ground level at the third story is approximately 27 feet above ground, with 12 feet being added for each additional story. It is noted that there may be instances where the projected unmitigated noise contours may be difficult to determine and/or depict given the presence of existing structures or other features on the site. In such circumstances, it may be appropriate to provide noise data points for the critical areas on the site before construction on the site in lieu of providing the projected unmitigated noise contours.

Provide a map or plat of the property which delineates the **projected mitigated** DNL 65, 70 and 75 dBA noise contours at both the ground and above ground levels. The above ground level is defined as the noise levels at the second story (approximately 15 feet above ground). If the proposed building(s) has more than two stories, the contours for the upper levels must also be provided, or documentation provided that demonstrates that there will be no change in noise levels above a certain elevation. The above ground level at the third story is approximately 27 feet above ground, with 12 feet being added for each additional story. It is noted that there may be instances where the projected mitigated noise contours may be difficult to determine and/or depict given the future barrier(s) and other structures or features on the site. In such circumstances, it may be appropriate to provide noise data points for the critical areas on the site after construction on the site (including barrier construction) in lieu of providing the projected mitigated noise contours.

Note: The projected mitigated and unmitigated noise contours may be depicted on the same map

or plat provided that it can be done in such a manner which is clear and legible.

Description and Illustration of the Proposed Noise Barrier. This discussion and illustration must include the height of the proposed barrier, the proposed location of the barrier on the property, the acoustical design and structural features of the barrier, building materials to be used in the construction of the barrier and any connections to an adjacent barrier(s). This description must also include a discussion of any future road improvements as recommended by the Comprehensive Plan and whether the proposed barrier location is impacted by such recommendations. Additional sheets and illustrations may be attached if necessary.

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Discuss How the Proposed Development Supports the Attainment of Exterior Noise Mitigation Recommendations of the Comprehensive Plan. The Comprehensive Plan recommends that new development should not expose people to an exterior noise level in excess of DNL 65 dBA for outdoor activity areas including outdoor recreation areas of homes. In addition, new residential development should not occur in areas with projected highway noise exposure exceeding DNL 75 dBA. As such, please describe how the proposed noise barrier addresses the Plan's recommendations for exterior noise mitigation. Additional sheets may be attached if necessary.

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Description and Illustration of Efforts to Mitigate the Visual Impacts of the Noise Barrier on Adjacent Properties. This description and illustration must describe/show the visual impacts on adjacent properties to include the location and design of the barrier, use of berms and landscaping. Additional sheets may be attached if necessary.

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**Noise Study Summary Information for Individual Residential Lots**

The following form must be completed and provided with any noise study which is used to satisfy the requirements of Par. 1 of Sect. 8-919 or Par. 3F of Sect. 10-104 of the Zoning Ordinance for noise barriers on a single residential lot. When appropriate, additional information may be requested by staff in order to complete their evaluation.

Tax Map Number and/or Address of Property

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Name(s) and Route Number(s) of Roads for which Noise Barrier is Proposed

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Justification for Noise Barrier. Provide written justification as to the reasons why the proposed noise barrier is needed at this location. Information pertaining to the existing on-site noise levels is highly desirable, but not required. Additional sheets may be attached if necessary.

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Description and Illustration of the Proposed Noise Barrier. This description and illustration must include the proposed height of the barrier, the proposed location of the barrier on the property, the acoustical design and structural features of the barrier, building materials to be used in the construction of the barrier and any connections to an adjacent barrier(s). Additional sheets and illustrations may be attached if necessary.

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Describe Efforts to Mitigate the Visual Impacts of the Noise Barrier on Adjacent Properties. This description must include a discussion of the visual impacts on adjacent properties to include the location and design of the barrier, use of berms and landscaping. Additional sheets and

illustrations may be attached if necessary.

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