

APPENDIX E EXAMPLE AIRPORT OVERLAY DISTRICT REGULATIONS

AIRPORT NOISE OVERLAY DISTRICTS

The following Airport Noise Overlay Districts are intended to provide regulations governing land uses and development around the Buffalo Niagara International Airport. The purpose of these regulations is to allow for the continued operation and vitality of the Airport and to minimize adverse impacts by regulating future encroachment of incompatible land uses on adjoining properties to the extent practicable and within the scope of federal regulations governing public use airports.

A. DEFINITIONS.

- (1) AIRPORT – The Buffalo Niagara International Airport.
- (2) AIRPORT NOISE OVERLAY ZONING DISTRICT – Areas within specific airport-generated average day/night noise level contour lines in which land use should be limited to activities that are not noise sensitive, or where appropriate noise level reduction measures for construction of certain buildings are required for land uses which may be otherwise acceptable.
- (3) DAY-NIGHT AVERAGE SOUND LEVEL (DNL) – The daily average noise metric in which noise occurring between 10:00 PM and 7:00 AM is penalized by 10 decibels. DNL is often expressed as annual average daily noise levels.
- (4) FAA – Federal Aviation Administration.
- (5) NOISE LEVEL REDUCTION (NLR) – A measurement standard for the reduction in sound level transmission, expressed in decibels (dBA), between two designated locations. It is used to evaluate the effectiveness of or to establish requirements for techniques to limit sound transmission to prevent or mitigate undesirable impacts.

Appendix E Example Airport Overlay District Regulations

- (6) RECOMMENDED NOISE EXPOSURE MAP – A map of future noise exposure around the Airport, using projected operations and implementation of operational procedures for noise abatement, computed through an FAA model called the Integrated Noise Model, and approved by the FAA in the latest version or update of the *Buffalo Niagara International Airport Part 150 Noise Compatibility Program*.

B. ESTABLISHMENT OF DISTRICT BOUNDARIES.

The Town of [NAME OF MUNICIPALITY] hereby establishes the following Airport Noise Overlay Districts in the vicinity of the Airport, derived from the Recommended Noise Exposure Map approved by the FAA:

- (1) NOISE ZONE 1, which applies to an area encompassing a projected noise impact of DNL 65 dBA to 70 dBA surrounding the Airport in the Town of [NAME of MUNICIPALITY], more particularly described as follows: [AS APPROPRIATE OR NECESSARY FOR LEGAL SUFFICIENCY].
- (2) NOISE ZONE 2, which applies to an area encompassing a projected noise impact of DNL 71 dBA to 75 dBA surrounding the Airport in the Town of [NAME of MUNICIPALITY], more particularly described as follows: [AS APPROPRIATE OR NECESSARY FOR LEGAL SUFFICIENCY].
- (3) NOISE ZONE 3, which applies to an area encompassing a projected noise impact of above DNL 75 dBA surrounding the Airport in the Town of [NAME of MUNICIPALITY], more particularly described as follows: [AS APPROPRIATE OR NECESSARY FOR LEGAL SUFFICIENCY].

C. APPLICATION OF AIRPORT NOISE OVERLAY DISTRICT REQUIREMENTS.

The provisions shall apply to the new construction, substantial alteration, moving, repair, replacement and use of any building or occupied permanent structure within the Town of

[NAME OF MUNICIPALITY] located within the various Airport Noise Overlay Districts. Specific interpretation of the applicability of these regulations shall be guided by the following:

- (1) Existing Buildings – General buildings or structures to which additions, alteration, or repairs are made shall comply with all the requirements of the regulations contained herein except as specifically provided below:
 - (a) When additions, alterations, or repairs within any three-year period exceed 50 percent of the value of an existing building or structure, such buildings or structures shall be made to conform to the requirements of these regulations.
 - (b) Alterations or repairs not exceeding 50 percent of the value of an existing building or structure and which are nonstructural may be made with the same materials of which the building or structure is constructed.
 - (c) Not more than 50 percent of the roof covering of any building or structure shall be replaced in any three-year period unless the next roof covering is made to conform to the requirements of these regulations.
 - (d) Buildings in existence at the time of the passage of this Ordinance may have their existing use or occupancy continued if such use or occupancy was legal at the time of passage provided such continued use does not jeopardize life or health.
- (2) Moved Buildings – Buildings or structures moved into or within the Town of [NAME OF MUNICIPALITY] shall comply with applicable provisions of these regulations.
- (3) New Buildings or Structures - Newly constructed buildings or structures within the Airport Noise Overlay Districts shall comply with the applicable provisions of these regulations before permanent occupancy is permitted.

D. PERMITTED AND RESTRICTED USES.

- (1) All land uses shall be permitted in the Airport Noise Overlay Districts as specified in the Compatible Land Use Chart attached to these regulations and made a part hereof as Attachment 1, provided that such uses are also permitted in the underlying general purpose zoning districts.
- (2) Land uses permitted in each of the Airport Noise Overlay Districts provided that they achieve an interior NLR for buildings of 25 or 30 dBA shall comply with standards attached to these regulations and made a part hereof as Attachment 2. These NLR requirements may be achieved by any suitable combination of building design, choice of building materials and construction techniques in accordance with established architectural and acoustical principles. The NLR requirements shall apply to all occupied rooms having one or more exterior walls or ceilings, when furnished in accordance with the intended final usage of the room.
- (3) Those activities and land uses not specifically listed in the Chart are permitted or restricted in the appropriate zones based on their similarity to noise tolerance and compatibility with normal airport operations as exhibited by the activities and land uses which are listed in the Chart at Attachment 1.

E. ADMINISTRATION AND ENFORCEMENT.

It shall be the duty of the Zoning Administrator [OR APPLICABLE OFFICIAL] to administer and enforce the requirements prescribed herein within the territorial limits over which the Town of [NAME OF MUNICIPALITY] has jurisdiction through the permitting process. Temporary or conditional permits pending completion of review, comment or approval by any other local, state or federal agency shall not be issued.

(1) In the event that the Zoning Administrator [OR APPLICABLE OFFICIAL] finds any violation of the requirements contained herein, he or she shall give notice to the person responsible for such violation in writing. Such notice shall indicate the nature of the violation and the necessary action to correct or abate the violation. A copy of said notice shall be sent to the Zoning Board of Appeals. The Zoning Administrator [OR APPLICABLE OFFICIAL] shall order discontinuance of any work being done; or shall take any or all other action necessary to correct violations and obtain compliance with all the provisions of these regulations.

(2) Building Permits Required

(a) No building or structure, for which a NLR OF 25 dBA or 30 dBA is required by the Compatible Land Use Chart at Attachment 1 may be constructed, altered, moved to, demolished, or repaired unless a building permit has been issued by the Zoning Administrator [OR APPLICABLE OFFICIAL]. No permit shall be issued unless construction plans and specifications for the building or structure reflect methods and materials either as recommended in Attachment 2 of these regulations or an acceptable alternative source and the combination of design, materials and methods will result in a NLR value specified in for the particular usage involved.

(b) Approval of Methods of Construction.

1. The Zoning Administrator [OR APPLICABLE OFFICIAL] may approve any method of construction at Attachment 2, provided that the proposed design is satisfactory and that it complies with the NLR requirements of the Compatible Land Use Chart at Attachment 1.
2. The Zoning Administrator [OR APPLICABLE OFFICIAL] shall require that certified professional documentation from an acoustical engineer or other appropriate data be submitted as evidence or proof to substantiate any claims

made as to the sound level reduction performance of submitted construction methods.

- (c) Subdivision and Site Plan Applications. For applications subject to subdivision and/or site plan approval as a prerequisite of the issuance of a building permit, the Planning Board and Town Board may require the subject application to include proposed methods by the applicant to meet the requirements and standards specified under these regulations, including but not limited to proposed design measures and professional evidence/documentation outlined in Section E. (3) (b).
- (d) Verification of Finished Construction. The Zoning Administrator [OR APPLICABLE OFFICIAL] may, prior to granting a certificate of occupancy for a finished building(s), require, at the expense of the owner, field tests by a Qualified Acoustical Consultant to verify required NLR measures employed for such building(s).

F. NONCONFORMING USES OR CHARACTERISTICS.

The requirements prescribed by this section shall not be construed to necessitate the removal, lowering, alteration or other changes of any existing structure and/or use not conforming to the requirements as of the effective date of this local law.

Attachment 1

<i>COMPATIBLE USE CHART</i>			
<i>AIRPORT NOISE OVERLAY ZONING DISTRICTS</i>			
Land Use	Noise Zone 3 (Over DNL 75 dBA)	Noise Zone 2 (DNL 70-75 dBA)	Noise Zone 1 (DNL 65 – 70 dBA)
RESIDENTIAL			
Residential – single or multi-family	Incompatible/ Not Permitted	Note 1	Note 1
Mobile Homes or Mobile Home Parks	Incompatible/ Not Permitted	Incompatible/ Not Permitted	Incompatible/ Not Permitted
Transient Lodging (Hotels, Motels, Guest Houses, etc.)	Incompatible/ Not Permitted	Note 1	Note 1
PUBLIC/SEMI-PUBLIC			
Schools, Libraries	Incompatible/ Not Permitted	Note 1	Note 1
Hospitals, Nursing Homes	Incompatible/ Not Permitted	Note 3	Note 2
Churches, Auditoriums, Theaters, Concert halls	Incompatible/ Not Permitted	Note 3	Note 2
Governmental Services	Note 3	Note 2	Compatible/ Permitted
COMMERCIAL			
Office Buildings – business & professional	Note 3	Note 2	Compatible/ Permitted
Wholesale and Retail – building materials, hardware, farm equipment	Note 3	Note 2	Compatible/ Permitted
General Retail	Note 3	Note 2	Compatible/ Permitted
Utilities	Note 3	Note 2	Compatible/ Permitted
Communications	Note 3	Note 2	Compatible/ Permitted
MANUFACTURING AND PRODUCTION			
Manufacturing, general	Note 3	Note 2	Compatible/ Permitted

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Land Use	Noise Zone 3 (Over DNL 75 dBA)	Noise Zone 2 (DNL 70-75 dBA)	Noise Zone 1 (DNL 65 – 70 dBA)
Photographic and Optical	Note 3	Note 2	Compatible/ Permitted
Agriculture (excluding livestock)	Compatible/ Permitted (Note 5)	Compatible/ Permitted (Note 4)	Compatible/ Permitted (Note 4)
Livestock Farming	Incompatible/ Not Permitted	Compatible/ Permitted (Note 4)	Compatible/ Permitted (Note 4)
Mining and Extraction	Compatible/ Permitted	Compatible/ Permitted	Compatible/ Permitted
RECREATIONAL AND OPEN SPACE			
Outdoor Sports Facilities	Incompatible/ Not Permitted	Note 6	Note 6
Outdoor Music Shells, Amphitheaters	Incompatible/ Not Permitted	Incompatible/ Not Permitted	Incompatible/ Not Permitted
Nature Exhibits and Zoos	Incompatible/ Not Permitted	Incompatible/ Not Permitted	Not Permitted
Playgrounds/Parks	Incompatible/ Not Permitted	Compatible/ Permitted	Compatible/ Permitted
Golf Courses, Stables, Other Active Recreation	Compatible/ Permitted (Note 3)	Compatible/ Permitted (Note 2)	Compatible/ Permitted
Permanent Vacant/Open Space Areas (utility/road rights-of-way, closed landfills, etc.)	Compatible/ Permitted	Compatible/ Permitted	Compatible/ Permitted

Notes:

1. Residential uses in Noise Zones 1 and 2 are discouraged unless no better or viable use is available. In such cases, noise level reduction (NLR) measures of at least 25 dBA (Noise Zone 1) to 30 NLR (Noise Zone 2) are required. This could include, where applicable, outdoor measures such as construction of berms or sound barriers, and/or indoor measures such as acoustically-test doors/windows, HVAC improvements and wall insulation.
2. Measures to achieve NLR of at least 25 dBA are required for portions of buildings where the public is received, office areas, and learning spaces.
3. Measures to achieve NLR of at least 30 dBA are required for portions of buildings where the public is received, office areas, and learning spaces.
4. Restrictions on residential buildings – see Note 1.
5. Residential uses not permitted.
6. Sound reinforcement and/or amplification systems are recommended.

Attachment 2

Recommended Sound Insulation Design Standards for Use in the Vicinity of Buffalo Niagara International Airport

NOTE: This material has been developed by Wyle Laboratories and is considered proprietary material, for use only in the manner and for the project under which it is transmitted on 28 July 2004, the Part 150 Noise Compatibility Study at Buffalo Niagara International Airport.

SECTION 1: GENERAL REQUIREMENTS

- A. The Noise Level Reduction (NLR) requirements specified herein may be achieved by any suitable combination of building designs, choices of building materials, and execution of construction details in accordance with established architectural and acoustical principles. The NLR requirements should be applied to all occupied rooms having one or more exterior walls or ceiling. A room without any exterior walls, and which has an occupied space above it, will not be subject to these requirements.
- B. The following NLR standards are intended to be used based on the current, Recommended Future (2008) Noise Exposure Map for the Buffalo Niagara International Airport:

Day Night Average Sound Level (DNL) Zone	NLR Requirement
65 to 70	25 dBA
71 to 75	30 dBA

- C. Compliance with the construction standards herein is sufficient to comply with the NLR requirements specified in the various airport noise overlay zones. These standards are applicable to plans and specifications for any proposed residence or other use noted to require sound insulation. A variety of assumptions, many of which are conservative, were necessary to develop these standards. If the plans and specifications do not indicate compliance with the construction standards herein, the applicant shall provide a written statement from a qualified acoustical consultant certifying that the construction of the building as indicated in the plans and specifications will result in a NLR for appropriate occupied rooms at least as great as the NLR requirement specified herein.
- D. In this standard whenever the words “doors” or “windows” are used it shall be assumed that the standard provision applies only to exterior doors and exterior windows, unless the word “interior” is specifically used for that provision.

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- E. Sound Transmission Class (STC) ratings for windows and doors are valid only if they are determined by laboratory (not field) tests performed by an independent laboratory for the product. A rating estimated for glass alone is not an acceptable substitute for STC tests of windows or doors, except for determining the rating of sidelights and transoms. Likewise, ratings estimated for door leafs alone are not an acceptable substitute for STC ratings of doors. The installed products must have the same accessories and composition such as storm panels, glass type (laminated, tempered, or float glass), glass thickness, spacing between panes of insulated glass, door core, gaskets, weatherstripping, door bottom seals, thresholds, etc., and the same overall configuration as the tested assembly. The overall configuration includes the operational type (casement, double hung, fixed, slider, etc.) in the case of windows, and the general size of glazing (1/8-, 1/4-, 1/2-, or full-view) in the case of doors.

- F. Door sidelights and door and window transoms shall be considered “windows” and shall meet the provisions for windows. For these products it is acceptable to reference the laboratory STC rating of the glass alone. However, for the adjacent windows and doors it is still necessary to reference STC tests for the entire assembly, not just the glass.

- G. For this standard it can be assumed that the STC rating of a prime-and-storm window combination is at least 4 points greater than that of either the prime or storm window alone (whichever is greater), provided the airspace between the prime and storm window is at least 1-3/4”. It can also be assumed that the STC rating of a prime and the storm window combination is at least 8 points greater than that of either the prime or storm window alone (whichever is greater), provided the airspace between the prime and storm window is at least 2”, the storm window is comprised of laminated glass, and the storm window has weatherstripping.

- H. For this standard it can be assumed that the STC rating of a prime-and-storm door combination is at least 5 points greater than that of either the prime or storm door alone (whichever is greater), provided the airspace between the prime and storm door is at least 2”. It can also be assumed that the STC rating of a prime-and-storm door combination is at least 9 points greater than that of either the prime or storm door alone (whichever is greater), provided the airspace between the prime and storm door is at least 2-1/4”, and the storm door is a full-view door comprised of laminated glass with weatherstripping.

- I. In order to achieve the STC ratings specified herein special measures are necessary to install doors and windows. These include the use of non-hardening (acoustical) caulk at all hidden surfaces, flexible caulk at all exposed surfaces, and solid continuous blocking to fill all voids over 1/4” around windows and doors.

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- J. The phrase “Total Exterior Wall Area” as used in this standard includes the exterior wall area of the room as well as the area of all windows, doors, or other penetrations contained within the exterior walls.
- K. Small rooms with a proportionately large exterior wall, door, and window area will require additional treatment. For the purposes of this standard such rooms shall be called “Sunrooms”, since sunrooms are the most common example of such rooms. A Sunroom is defined as a room with a Total Exterior Wall Area of at least 150 square feet, and with a floor area that is less than 60 percent of the Total Exterior Wall Area.
- L. The phrase “Vaulted Ceiling” in this standard shall refer to a ceiling attached to the bottom edge of roof members that are less than 24” deep on average, with the roof deck attached to the top edge of the roof members. This includes most flat roofs and most sloped ceilings.
- M. In various places in this standard the ratio of the exterior window and door area to the Total Exterior Wall Area is referenced. Skylights and roof windows shall not be included in the calculation of this ratio.

SECTION 2: BUILDING REQUIREMENTS FOR A MINIMUM NLR OF 25 dBA.

A. Exterior Walls

- 1. The interior surface of exterior walls shall be of gypsum board, cement board, or plaster at least ½“ thick. Paneling may be used over these materials.
- 2. Fiberglass or mineral fiber batt or blanket insulation shall be installed continuously and completely throughout the stud or furring cavity. Batts or blankets should be held firmly in place between studs or furring, with fasteners if necessary, to prevent sagging; however, packing the insulation such that it is compressed may slightly *reduce* its acoustical (and thermal) performance.
- 3. The exterior walls shall include at least one of the following five options in order to achieve a laboratory sound transmission class rating of at least STC 43:
 - i. The interior surface shall be hung using resilient channels. The channels shall be installed horizontally across the studs 24” on center in accordance with the manufacturer’s instructions. No fastener used to hang the interior finish shall contact the studs or furring.

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- ii. 2x6 wood studs or metal equivalents shall be spaced no closer together than 24" on center, and an interior finish shall consist of two layers of ½" gypsum board.
- iii. 2x4 wood studs or metal equivalents shall be staggered on a 2x6 base plate. One row of studs shall support the sheathing and a separate row of studs shall support the interior surface. No stud shall contact both the interior surface and the sheathing.
- iv. 2" minimum thickness brick or stone veneer shall be used with 2x4 minimum wood studs.
- v. 6" minimum thickness concrete block walls shall be used.

B. Windows

1. Windows other than as described in this section shall have a laboratory sound transmission class rating of at least STC 30 (STC 33 if the room has a Vaulted Ceiling).
2. If the exterior windows and doors together comprise 25 percent or more of the Total Exterior Wall Area the windows shall have a laboratory sound transmission class rating of at least STC 32 (STC 35 if the room has a Vaulted Ceiling).
3. Windows in Sunrooms shall have a laboratory sound transmission class rating of at least STC 34 (STC 38 if the room has a Vaulted Ceiling).
4. For Sunrooms, if the exterior windows and doors together comprise 25 percent or more of the Total Exterior Wall Area the windows shall have a laboratory sound transmission class rating of at least STC 36 (STC 38 if the room has a Vaulted Ceiling).

C. Doors

1. If the total width of exterior doors in the room is less than four feet:
 - a. Exterior doors other than as described in this section shall have a laboratory sound transmission class rating of at least STC 26 (STC 29 if the room has a Vaulted Ceiling).
 - b. If the exterior windows and doors together comprise 25 percent or more of the Total Exterior Wall Area the doors shall have a laboratory sound transmission class rating of at least STC 28 (STC 30 if the room has a Vaulted Ceiling).
 - c. Exterior doors in Sunrooms shall have a laboratory sound transmission class rating of at least STC 30 (STC 34 if the room has a Vaulted Ceiling).

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2. If the total width of exterior doors in the room is at least four feet:
 - a. Exterior doors other than as described in this section shall have a laboratory sound transmission class rating of at least STC 28 (STC 30 if the room has a Vaulted Ceiling).
 - b. If the exterior windows and doors together comprise 25 percent or more of the Total Exterior Wall Area the doors shall have a laboratory sound transmission class rating of at least STC 29 (STC 32 if the room has a Vaulted Ceiling).
 - c. Exterior doors in Sunrooms shall have a laboratory sound transmission class rating of at least STC 32 (STC 36 if the room has a Vaulted Ceiling).
3. Interior doors between occupied spaces and attached garages or unfinished attic spaces shall be solid-core wood or 20-gauge insulated metal at least 1 $\frac{3}{4}$ " thick and shall be fully weatherstripped.

D. Roof-Ceiling Assembly

1. Skylights can only be used if they have a laboratory sound transmission class rating at least 4 points higher than required for the windows. Alternatively, a secondary panel of double pane glass or $\frac{1}{4}$ " thick safety glass can be used at the bottom of the skylight well at least 6" below the skylight.
2. Gypsum board or plaster ceilings at least $\frac{1}{2}$ " thick shall be provided. Ceilings shall be substantially airtight with a minimum number of penetrations.
3. Fiberglass, mineral fiber, or cellulose insulation shall be installed continuously and completely throughout the ceiling joist cavity to a depth of at least 6".

E. Floors, Foundations and Basements

1. If a basement is used as a habitable living area (as a recreation area, study, or additional sleeping area, for example), the doors and windows shall conform to the requirements stated in this standard.
2. Crawl spaces with masonry walls must have noise control louvers at the under-floor vents. If crawl spaces do not have masonry walls, a massive barrier panel must be used as a skirt connecting the bottom of the walls to the ground. 2" thick precast concrete panels are ideal barrier skirts. Alternatively, 2x4 pressure-treated wood studs with $\frac{3}{4}$ " pressure-treated plywood on each side may be used, as long as the joints between the plywood are covered with batten strips.

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F. Ventilation and Wall Penetrations

1. In-window, through-wall, or through-floor air-conditioning, ventilating, or heating units shall not be used.
2. Through-the-wall/door mailboxes or mail slots shall not be used.
3. A mechanical ventilation system shall be installed that will provide the minimum air circulation and fresh air supply requirements for various uses in occupied rooms, as specified in the New York state building code, without the need to open any windows, doors, or other openings to the exterior.
4. Gravity vent openings in attics shall not exceed the code minimum in number and size.
5. If an attic fan is used for forced ventilation, the attic inlet and discharge openings shall be fitted with sheet metal transfer ducts of at least 20 gauge steel at least 5 feet long with at least one 90° bend.
6. All vent ducts connecting the interior space to the outdoors, excepting bathroom exhaust ducts, shall contain at least two 90° bends.
7. Domestic range exhaust ducts connecting the interior space to the outdoors shall be at least 20 gauge steel and shall contain at least two 90° bends. Alternatively, unvented range exhaust fans may be used, if allowed by applicable codes.
8. Fireplaces, if present, shall be provided with glass doors and well-fitted dampers. Wood stoves shall not be used.
9. Dryer vents and other basement vents should be constructed of sheet metal to limit the amount of noise that will enter through them and then pass through the duct wall to the surrounding room.

Attachment 2

SECTION 3: BUILDING REQUIREMENTS FOR A MINIMUM NLR OF 30 dBA.

A. Exterior Walls

1. The interior surface of exterior walls shall be of gypsum board, cement board, or plaster at least ½” thick. Paneling may be used over these materials.
2. Fiberglass or mineral fiber batt or blanket insulation shall be installed continuously and completely throughout the stud or furring cavity. Batts or blankets should be held firmly in place between studs or furring, with fasteners if necessary, to prevent sagging; however, packing the insulation such that it is compressed may slightly *reduce* its acoustical (and thermal) performance.
3. The exterior walls shall include at least one of the following four options in order to achieve a laboratory sound transmission class rating of at least STC 47:
 - i. 2x6 wood studs or metal equivalents shall be used. The interior surface shall be hung using resilient channels. The channels shall be installed horizontally across the studs 24” on center in accordance with the manufacturer’s instructions. No fastener used to hang the interior finish shall contact the studs.
 - ii. 2x4 wood studs or metal equivalents shall be staggered on a 2x6 base plate. One row of studs shall support the sheathing and a separate row of studs shall support the interior surface. No stud shall contact both the interior surface and the sheathing.
 - iii. 3” minimum thickness brick or stone veneer shall be used with 2x4 minimum wood studs or metal equivalents.
 - iv. 8” minimum thickness concrete block walls shall be used.

B. Windows

1. Windows other than as described in this section shall have a laboratory sound transmission class rating of at least STC 35 (STC 36 if there are doors in the room).
2. If the exterior windows and doors together comprise 25 percent or more of the Total Exterior Wall Area the windows shall have a laboratory sound transmission class rating of at least STC 38.

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3. Windows in Sunrooms shall have a laboratory sound transmission class rating of at least STC 37.

SECTION 3: BUILDING REQUIREMENTS FOR A MINIMUM NLR OF 30 dBA.

A. Exterior Walls

1. The interior surface of exterior walls shall be of gypsum board, cement board, or plaster at least ½” thick. Paneling may be used over these materials.
2. Fiberglass or mineral fiber batt or blanket insulation shall be installed continuously and completely throughout the stud or furring cavity. Batts or blankets should be held firmly in place between studs or furring, with fasteners if necessary, to prevent sagging; however, packing the insulation such that it is compressed may slightly *reduce* its acoustical (and thermal) performance.
3. The exterior walls shall include at least one of the following four options in order to achieve a laboratory sound transmission class rating of at least STC 47:
 - i. 2x6 wood studs or metal equivalents shall be used. The interior surface shall be hung using resilient channels. The channels shall be installed horizontally across the studs 24” on center in accordance with the manufacturer’s instructions. No fastener used to hang the interior finish shall contact the studs.
 - ii. 2x4 wood studs or metal equivalents shall be staggered on a 2x6 base plate. One row of studs shall support the sheathing and a separate row of studs shall support the interior surface. No stud shall contact both the interior surface and the sheathing.
 - iii. 3” minimum thickness brick or stone veneer shall be used with 2x4 minimum wood studs or metal equivalents.
 - iv. 8” minimum thickness concrete block walls shall be used.

B. Windows

1. Windows other than as described in this section shall have a laboratory sound transmission class rating of at least STC 35 (STC 36 if there are doors in the room).

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2. If the exterior windows and doors together comprise 25 percent or more of the Total Exterior Wall Area the windows shall have a laboratory sound transmission class rating of at least STC 38.
3. Windows in Sunrooms shall have a laboratory sound transmission class rating of at least STC 37.
4. For Sunrooms, if the exterior windows and doors together comprise 25 percent or more of the Total Exterior Wall Area the windows shall have a laboratory sound transmission class rating of at least STC 39 (STC 40 if there are doors in the room).
5. For Sunrooms, if the room has a floor area that is less than 45 percent of the Total Exterior Wall Area the windows shall have a laboratory sound transmission class rating of at least STC 41 (STC 42 if there are doors in the room).

C. Doors

1. If the total width of exterior doors in the room is less than four feet:
 - i. Exterior doors other than as described in this section shall have a laboratory sound transmission class rating of at least STC 33.
 - ii. If the exterior windows and doors together comprise 25 percent or more of the Total Exterior Wall Area the doors shall have a laboratory sound transmission class rating of at least STC 36.
 - iii. Exterior doors in Sunrooms shall have a laboratory sound transmission class rating of at least STC 36.
 - iv. For Sunrooms, if the room has a floor area that is less than 45 percent of the Total Exterior Wall Area the exterior doors shall have a laboratory sound transmission class rating of at least STC 38.
2. If the total width of exterior doors in the room is at least four feet:
 - i. Exterior doors other than as described in this section shall have a laboratory sound transmission class rating of at least STC 36.
 - ii. In Sunrooms in which the exterior windows and doors together comprise 25 percent or more of the Total Exterior Wall Area the exterior doors shall have a laboratory sound transmission class rating of at least STC 37.
 - iii. For Sunrooms, if the room has a floor area that is less than 45 percent of the Total Exterior Wall Area the exterior doors shall have a laboratory sound transmission class rating of at least STC 39.

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3. Interior doors between occupied spaces and attached garages or unfinished attic spaces shall be solid-core wood or 20-gauge insulated metal at least 1¾" thick and shall be fully weatherstripped.

D. Roof-Ceiling Assemblies

1. Vaulted Ceilings shall not be used.
2. Skylights can only be used if they have a laboratory sound transmission class rating at least 4 points higher than required for the windows. Alternatively, a secondary panel of double pane glass or ¼" thick safety glass can be used at the bottom of the skylight well at least 6" below the skylight.
3. Gypsum board or plaster ceilings at least ½" thick shall be provided. Ceilings shall be substantially airtight with a minimum number of penetrations.
4. Fiberglass, mineral fiber, or cellulose insulation shall be installed continuously and completely throughout the ceiling joist cavity to a depth of at least 10".

E. Floors, Foundations and Basements

1. If a basement is used as a habitable living area (as a recreation area, study, or additional sleeping area, for example), the doors and windows shall conform to the requirements stated in this standard.
2. Crawl spaces with masonry walls must have noise control louvers at the under-floor vents. If crawl spaces do not have masonry walls, a massive barrier panel must be used as a skirt connecting the bottom of the walls to the ground. 2" thick precast concrete panels are ideal barrier skirts. Alternatively, 2x4 pressure-treated wood studs with ¾" pressure-treated plywood on each side may be used, as long as the joints between the plywood are covered with batten strips.

F. Ventilation and Wall Penetrations

1. In-window, through-wall, or through-floor air-conditioning, ventilating, or heating units shall not be used.
2. Through-the-wall/door mailboxes or mail slots shall not be used.

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3. A mechanical ventilation system shall be installed that will provide the minimum air circulation and fresh air supply requirements for various uses in occupied rooms, as specified in the New York State building code, without the need to open any windows, doors, or other openings to the exterior.
4. Gravity vent openings in attics shall not exceed the code minimum in number and size.
5. If an attic fan is used for forced ventilation, the attic inlet and discharge openings shall be fitted with sheet metal transfer ducts of at least 20 gauge steel at least 5 feet long with at least one 90° bend.
6. All vent ducts connecting the interior space to the outdoors, excepting domestic range exhaust and bathroom exhaust ducts, shall be at least 10 feet long and shall contain at least two 90° bends. It is recommended that in-line sound attenuators (silencers) be installed in fresh-air intake ducts larger than 3” in diameter.
7. Unvented range exhaust fans shall be used, if allowed by applicable codes. If unvented range exhaust fans are not allowed by applicable codes, range exhaust ducts connecting the interior space to the outdoors shall be at least 20 gauge steel and shall contain at least two 90° bends.
8. Operational vented fireplaces or wood stoves shall not be used.
9. Dryer vents and other basement vents should be constructed of sheet metal to limit the amount of noise that will enter through them and then pass through the duct wall to the surrounding room.