



Updated Noise Regulations in New York City

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ABSTRACT

New York City has three types of noise regulations for evaluating noise impacts, each promulgated by a different authority and dealing with different types of noise sources (mobile traffic, rail, aircraft, construction, and stationary sources). These regulations are the New York City Noise Code¹, the New York City Zoning Resolution², and the New York City Environmental Quality Review (CEQR) Standards³. The CEQR Standards were revised in 2001, the New York City Noise Code was amended in 2005, and a Noise Mitigation Plan⁴ for construction noise required as part of the New York City Noise Code took effect on July 1, 2007. Since noise complaints have continued to be the number -one quality of life issue for New York City residents, using appropriate noise regulations to evaluate noise impacts is important. This paper will illustrate these updated regulations in uses of noise descriptors, acceptable levels, and impact criteria in terms of different types of noise sources; noise assessment methods will also be briefly addressed. The purpose of the study is to demonstrate the ability of the updated New York City Noise Control Policy on noise environment.

1 INTRODUCTION

New York City has three types of noise regulations for evaluating noise impacts: the New York City Noise Code, the New York City Zoning Resolution, and the New York City Environmental Quality Review (CEQR) Standards. The New York City Noise Code deals with noise from motor vehicles, refuse collection and emergency vehicles, circulation devices, construction devices, commercial music, and animals. The New York City Zoning Resolution monitors noise from industrial activities only. The CEQR Standards assess noise from vehicular traffic, rail, aircraft, and construction activities.

The New York City Noise Code, first adopted in 1972 as the New York City Administrative Code, was amended in 2005. A Noise Mitigation Plan for construction noise required as part of the New York City Noise Code took effect on July 1, 2007. Noise limits for associated noise sources were updated to reflect current noise conditions. In addition, the Noise Mitigation Plan established standards and procedures to reduce noise levels from construction activities, and established methods of noise control for specific construction-related noise sources.

The New York City Zoning Resolution established the Performance Standards to assess industrial noise in 1961; these Standards have not been updated since then. However, the "old" octave band values of noise limits have been converted to the current preferred values. The Standards specified different noise limits for different types of manufacturing districts, and defined correction factors for adjacent residential districts and impulsive noise sources.

The New York City Department of Environmental Protection (NYCDEP) adopted City Environmental Protection Order-City Environmental Quality Review (CEPO-CEQR) noise standards for environmental impact review in 1983. These standards were revised in 2001.

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The objective of the revisions was to update noise analysis methodologies and analysis procedures for related noise sources to reflect the current noise environment. Four categories of acceptability were established based upon noise limits and land use, and mitigation requirements were listed based on the noise category.

The New York City Noise Code and the New York City Zoning Resolution deal with the effects of existing noise sources and a proposed project on noise-sensitive locations. The CEQR standards deal with the effects of a proposed project and noise sources on noise-sensitive locations. The following sections present each of noise regulations in terms of descriptors, noise criteria and standards, analysis methods, and mitigation requirements.

2 NEW YORK CITY NOISE CODE

2.1 Descriptors

The New York City Noise Code uses maximum instantaneous sound pressure level (SPL) in dBA for motor vehicles, construction devices, circulation devices, lawn care devices, and power tools. The SPL in dB(C) is used for commercial music, and maximum instantaneous 1/3-octave band SPL in dB is used for residential and commercial interior noise limits.

2.2 Impact Criteria and Analysis Method

The amended noise code prohibits all unnecessary noise adjacent to noise-sensitive locations. The noise code establishes general prohibitions in noise limits as follows:

- *Sound, other than impulsive sound, attributable to the source, measured at a level of 7 dB(A) or more above the ambient sound level at or after 10:00 PM and before 7:00 AM., as measured at any point within a receiving property or as measured at a distance of 15 feet or more from the source on a public right-of-way.*
- *Sound, other than impulsive sound, attributable to the source, measured at a level of 10 dB(A) or more above the ambient sound level at or after 7:00 AM and before 10:00 PM, as measured at any point within a receiving property or as measured at a distance of 15 feet or more from the source on a public right-of-way.*
- *Impulsive sound, attributable to the source, measured at a level of 15 dB(A) or more above the ambient sound level, as measured at any point within a receiving property or as measured at a distance of 15 feet or more from the source on a public right-of-way. Impulsive sound levels shall be measured in the A-weighting network with the sound level meter set to fast response. The ambient sound level shall be taken in the A-weighting network with the sound level meter set to slow response.*
- *Commercial music that causes a 6 dB(C) or more increase in the total sound level above the ambient sound level as measured in decibels in the "C" weighting network, provided that the ambient sound level is in excess of 62 dB(C).*
- *Animals. No person having charge, care, custody, or control of any animal shall cause or permit such animal to cause unreasonable noise including, but not limited to, any sound that is plainly audible at any location within any residential receiving property as set forth below: (a) At or after 7 AM and before 10 PM, continuously for a period of 10 minutes or more; (b) at or after 10 PM and before 7 AM, continuously for a period of 5 minutes or more.*

In terms of specific noise sources, the noise code limits noise levels at certain distances, as shown in Table 1.

In addition, the amended noise code specifies that no sound source operating in connection with any commercial or business enterprise may exceed the decibel levels in the designated octave bands shown in Table 2 at the residential or commercial receiving

properties. The measurement shall be taken an inside receiving property with the window or terrace door open at a point three feet from the open portion of the window or terrace door.

Table 1: Noise Level Limits for Specific Noise Sources in dBA

Noise Source	Distance in feet	Maximum SPL
All non-impulsive devices	50	85
Refuse collection vehicles with compacter	35	80
Paving breakers	3	95
Authorized emergency vehicles	50	90
Air compressors and lawn care devices	Property line*	75
Circulation devices and commercial music	Interior**	42
* . The property line of noise-sensitive locations.		
** . The measurement shall be taken inside a receiving property dwelling unit with the window or terrace door open at a point three feet from the open portion of the window or terrace door.		

Table 2: Interior Maximum Sound Pressure Levels in dB

Octave Band Frequency (Hz)	Inside Residential Buildings	Inside Commercial Buildings
31.5	70	74
63	61	64
125	53	56
250	46	50
500	40	45
1000	36	41
2000	34	39
4000	33	38
8000	32	37

The noise code specifies certain distances or locations on exterior or interior noise levels for each type of noise source. Unreasonable noise is also defined at noise-sensitive locations. The absolute noise limits are provided, but no preferred assessment methods are indicated.

2.3 Construction Noise Mitigation Plan

The Construction Noise Mitigation Plan, as part of the New York City Noise Code, is required to be implemented on each construction site. The plan limits construction periods to weekdays between the hours of 7:00 AM and 6:00 PM, and sets noise limits for certain specific pieces of construction equipment. Construction activities occurring after hours (weekdays between 6:00 PM and 7:00 AM, and on weekends) may be authorized in the following circumstances: (1) emergency conditions; (2) public safety; (3) construction projects by or on behalf of City agencies; (4) construction activities with minimal noise impacts; and (5) where there is a claim of undue hardship resulting from unique site characteristics, unforeseen conditions, scheduling conflicts, and/or financial considerations. In addition, the plan requirements mandate that certain classifications of construction equipment meet specified noise emissions standards.

Mitigation measures for dominated noise equipment (e.g., pile drivers, jackhammers, pavement breakers, hoe rams, blasting, earth moving equipment, construction trucks and vehicles, cranes, auger drills, etc.) are divided into three controls: authorized work hour control, source control, and noise pathway control. The authorized work hour control indicates that construction equipment shall be used only during the hours of 7:00 AM and 6:00 PM on weekdays unless an after-hours work authorization is obtained. The source control includes using quieter models and mufflers. The noise pathway control requires using noise barriers and enclosures.

3 NEW YORK CITY ZONING RESOLUTION

3.1 Descriptors

The New York City Zoning Resolution uses maximum instantaneous 1/3-octave band SPL in dB as the descriptor for industrial noise sources.

3.2 Impact Criteria and Analysis Method

In the 1961 New York City Zoning Resolution, manufacturing districts were subdivided into M1, M2, and M3 categories according to the level of objectionable hazards caused by industrial activities. The Zoning Resolution established Performance Standards in maximum permitted noise levels for each manufacturing district. These Performance Standards have not been updated since their inception in 1961. It is noted that the previous permitted noise levels were specified in “old” octave band values. These values have not been used for a few decades, and instrumentation is no longer available to measure per these specifications. American National Standards Institute (ANSI)⁵ has promulgated a standard on the conversion of old octave bands to the current preferred values, to allow measurements and assessments. The converted permitted sound pressure levels are provided in Table 3.

Table 3: Maximum Permitted Sound Pressure Levels (dB)

Octave Band (Hz)	Manufacturing M1*	Manufacturing M2**	Manufacturing M3***
20 to 75	78	78	79
75 to 150	72	73	74
150 to 300	64	67	69
300 to 600	58	61	63
600 to 1200	52	55	57
1200 to 2400	46	50	52
2400 to 4800	41	46	48
Above 4800	39	43	45

* Light manufacturing district with high performance.
** Medium manufacturing district with medium performance.
*** Heavy manufacturing district with low performance.

The Zoning Resolution indicates that SPL resulting from manufacturing activities at any point on or beyond any lot line can not exceed the maximum permitted SPL values in Table 3. When a manufacturing district adjoins a residential district, at any point at the district boundary or within the residential district, the maximum permitted sound pressure levels in all octave bands shall be reduced by 6 decibels. For impulsive sounds, the maximum permitted sound pressure levels are increased by 6 decibels.

The New York City Zoning Resolution sets at any point of the manufacturing district boundary as the study point. The absolute noise limits in octave bands are provided, but no preferred assessment method is provided.

4 CITY ENVIRONMENTAL QUALITY REVIEW (CEQR)

4.1 Descriptors

The hourly peak $L_{eq(1)}$ and $L_{10(1)}$ are the noise descriptors recommended for use in the *CEQR Technical Manual* noise impact evaluations, and the hourly peak $L_{10(1)}$ is also the noise descriptor for determining window/wall noise attenuation requirements.

4.2 Impact Criteria

New Noise-Sensitive Locations

When a new project is built, the new project may be a new noise-sensitive receptor. The *CEQR Technical Manual* sets external noise exposure standards for new noise-sensitive receptors. These standards are shown in Table 4. Noise exposure is classified into four categories: acceptable, marginally acceptable, marginally unacceptable, and clearly unacceptable for vehicular traffic, rail, and aircraft sources. These categories and associated noise limits are for exterior levels only. The exterior levels are based on an interior maximum noise level goal of 45 dBA, assuming that exterior window/wall noise attenuation value is 20 to 25 dBA.

Table 4: Noise Exposure Guidelines for Use in City Environmental Impact Review

Receptor Type	Time Period	Acceptable General External Exposure	Airport ³ Exposure	Marginally Acceptable General External Exposure	Airport ³ Exposure	Marginally Unacceptable General External Exposure	Airport ³ Exposure	Clearly Unacceptable General External Exposure	Airport ³ Exposure
1. Outdoor area requiring serenity and quiet ²		$L_{10} \leq 55$ dBA	Ldn ≤ 60 dBA	NA	A	NA	A	NA	A
2. Hospital, nursing home		$L_{10} \leq 55$ dBA		$55 < L_{10} \leq 65$ dBA	$65 < L_{10} \leq 80$ dBA	$65 < L_{10} \leq 80$ dBA	$L_{10} > 80$ dBA	Ldn ≤ 75 dBA	
3. Residence, residential hotel, or motel	7 AM to 10 PM	$L_{10} \leq 65$ dBA		$65 < L_{10} \leq 70$ dBA	$70 < L_{10} \leq 80$ dBA	$70 < L_{10} \leq 80$ dBA	$L_{10} > 80$ dBA		
	10 PM to 7 AM	$L_{10} \leq 55$ dBA		$55 < L_{10} \leq 70$ dBA	$70 < L_{10} \leq 80$ dBA	$70 < L_{10} \leq 80$ dBA	$L_{10} > 80$ dBA		
4. School, museum, library, courthouse house of worship, transient hotel or motel, public meeting room, auditorium, outpatient public health facility		Same as Residential Day (7 AM-11 PM)		Same as Residential Day (7 AM-11 PM)	Same as Residential Day (7 AM-11 PM)	Same as Residential Day (7 AM-11 PM)	Same as Residential Day (7 AM-11 PM)		
		Same as Residential Day (7 AM-11 PM)		Same as Residential Day (7 AM-11 PM)	Same as Residential Day (7 AM-11 PM)	Same as Residential Day (7 AM-11 PM)	Same as Residential Day (7 AM-11 PM)		
5. Commercial or office		Same as Residential Day (7 AM-11 PM)	Same as Residential Day (7 AM-11 PM)	Same as Residential Day (7 AM-11 PM)	Same as Residential Day (7 AM-11 PM)	Same as Residential Day (7 AM-11 PM)			
6. Industrial, public areas only ⁴	Note 4	Note 4	Note 4	Note 4	Note 4	Note 4			

Notes:
 (i) In addition, any new activity shall not increase the ambient noise level by 3 dBA or more; (ii) *CEQR Technical Manual* noise criteria for train noise are similar to the above aircraft noise standards: the noise category for train noise is found by taking the L_{dn} value for such train noise to be an L_{dn}^y (L_{dn} contour) value.

Table Notes:
¹ Measurements and projections of noise exposures are to be made at appropriate heights above site boundaries as given by American National Standards Institute (ANSI) Standards; all values are for the worst hour in the time period.
² Tracts of land where serenity and quiet are extraordinarily important and serve an important public need, and where the preservation of these qualities is essential for the area to serve its intended purpose. Such areas could include amphitheatres, particular parks or portions of parks, or open spaces dedicated or recognized by appropriate local officials for activities requiring special qualities of serenity and quiet. Examples are grounds for ambulatory hospital patients and patients and residents of sanitariums and nursing homes.
³ One may use the FAA-approved L_{dn} contours supplied by the Port Authority, or the noise contours may be computed from the federally approved INM Computer Model using flight data supplied by the Port Authority of New York and New Jersey.
⁴ External Noise Exposure standards for industrial areas of sounds produced by industrial operations other than operating motor vehicles or other transportation facilities are spelled out in the New York City Zoning Resolution, Sections 42-20 and 42-21. The referenced standards apply to M1, M2, and M3 manufacturing districts and to adjoining residence districts (performance standards are octave band standards).

Source: New York City Department of Environmental Protection (adopted policy 1983).

Existing Noise-Sensitive Locations

For existing sensitive noise receptors, the *CEQR Technical Manual* uses the following criteria to define a significant adverse noise impact at existing noise-sensitive locations:

- An increase of 5 dBA, or more, in Build condition (future with the project) $L_{eq(1)}$ noise levels at sensitive receptors over those calculated for the No Build condition (future without the project), if the No Build levels are less than 60 dBA $L_{eq(1)}$ and the analysis period is not a nighttime period.
- An increase of 4 dBA, or more, in Build $L_{eq(1)}$ noise levels at sensitive receptors over those calculated for the No Build condition, if the No Build levels are 61 dBA $L_{eq(1)}$ and the analysis period is not a nighttime period.

- An increase of 3 dBA, or more, in Build $L_{eq(1)}$ noise levels at sensitive receptors over those calculated for the No Build condition, if the No Build levels are greater than 62 dBA $L_{eq(1)}$ and the analysis period is not a nighttime period.
- An increase of 3 dBA or more in Build $L_{eq(1)}$ noise levels at sensitive receptors over those calculated for the No Build condition, if the analysis period is a nighttime period (defined by the *CEQR Technical Manual* criteria as being between 10:00 PM and 7:00 AM).

Construction Noise

The *CEQR Technical Manual* states that significant noise impacts due to construction would occur “only at sensitive receptors that would be subjected to high construction noise levels for an extensive period of time.” This has been interpreted to mean that such impacts would occur only at sensitive receptors where the activity with the potential to create high noise levels would occur for approximately two years or longer. In addition, the *CEQR Technical Manual* states that impact criteria for vehicular sources, using existing noise levels as the baseline, should be used for assessing construction impacts.

4.3 Analysis Method

Any noise-sensitive locations affected by noise from project-generated traffic, rail, aircraft, and construction activities can be defined as a noise study area. The *CEQR Technical Manual* provides different assessment methods and analysis techniques for different types of noise sources. For vehicular traffic noise, a proportional technique and Traffic Noise Model (TNM)⁶ are used for a screening analysis and a detailed analysis, respectively. The Federal Transit Administration (FTA) assessment method⁷ is used for rail noise, and the Federal Aviation Administration’s assessment method⁷ is used for aircraft noise.

4.4 Mitigation

The *CEQR Technical Manual* provides mitigation requirements in terms of the exterior level noise category and noise from associated noise sources, shown in Table 5. The composite window-wall attenuation values are for residential dwellings. Commercial office spaces and meeting rooms would be 5 dB(A) less in each category. All the categories require a closed window situation and alternative ventilation.

Table 5: Required Attenuation Values to Achieve Acceptable Interior Noise Levels

	Marginally Acceptable	Marginally Unacceptable		Clearly Unacceptable		
	$65 < L_{10} \leq 70$	$70 < L_{10} \leq 75$	$75 < L_{10} \leq 80$	$80 < L_{10} \leq 85$	$85 < L_{10} \leq 90$	$90 < L_{10} \leq 95$
Noise level with proposed action	$65 < L_{10} \leq 70$	$70 < L_{10} \leq 75$	$75 < L_{10} \leq 80$	$80 < L_{10} \leq 85$	$85 < L_{10} \leq 90$	$90 < L_{10} \leq 95$
Window-wall attenuation	25 dB(A)	30dB(A)	35 dB(A)	40 dB(A)	45 dB(A)	50 dB(A)

5 SUMMARY

There are three types of noise regulations in New York City. The New York City Noise Code method assesses noise from motor vehicles, refuse collection and emergency vehicles, circulation devices, construction devices, commercial music, and animals. The New York City Zoning Resolution method evaluates noise from industrial activities only. The CEQR method assesses project-generated noise from vehicular traffic, rail, aircraft, and construction activities. The CEQR Standards were revised in 2001, the New York City Noise Code was amended in 2005, and a Noise Mitigation Plan (NMP) for construction noise required as part of

the New York City Noise Code took effect on July 1, 2007. Some findings used for noise analyses are summarized as follows:

- The New York City Noise Code uses maximum instantaneous SPL in dBA or dBC, or 1/3-octave bands in dB as the noise descriptors for different types of noise sources; the New York City Zoning Resolution uses maximum instantaneous 1/3-octave band SPL in dB as the noise descriptor for industrial noise sources; and the CEQR Standards use hourly peak $L_{eq(1)}$ and $L_{10(1)}$ as noise descriptors for project-generated noise sources.
- The New York City Noise Code indicates specific outdoor distances or indoor locations for associated noise sources as the beginning of study areas, the New York City Zoning Resolution specifies the study area beginning at any point at the manufacturing district boundary, and the CEQR Standards define a study area where any noise-sensitive locations affected by project-generated noise sources.
- The New York City Noise Code provides absolute noise limits of outdoor and indoor environment, the New York City Zoning Resolution also provides absolute noise limits of the three manufacturing districts, and the CEQR Standards provide absolute and related noise limits for different land uses.
- The New York City Noise Code and the New York City Zoning Resolution do not refer to assessment methodology, and the CEQR Standards provide screening and detailed assessment methods for vehicular traffic noise.
- The New York City Noise Code and the CEQR Standards require mitigation measures when noise impacts occur, and the New York City Zoning Resolution provides noise limits but does not refer methods of mitigation measures.

6 REFERENCES

- [1] *New York City Noise Code*, New York City Department of Environmental Protection, 2005.
- [2] *City of New York Zoning Resolution*, New York City Department of City Planning, Volumes I-III: Sect. 42-21, 1998.
- [3] *New York City Environmental Quality Review (CEQR) Technical Manual*, Chapter 3R Noise, New York City Department of Environmental Protection, New York, 2001.
- [4] *Citywide Construction Noise Mitigation*, Chapter 28, Department of Environmental Protection of New York City, 2007.
- [5] *American National Standard Specification for Octave, Half-Octave. And Third-Octave Band Filter Sets*. American National Standards Institute, S1.11-1966.
- [6] *FHWA Traffic Noise Model*, U.S. Department of Transportation, Federal Highway Administration, 2000.
- [7] *Transit Noise and Vibration Impact Assessment*, Federal Transit Administration, 2006.
- [8] *Airport Noise Compatibility Planning*, Department of Transportation Federal Aviation Administration (FAA), 1989.