

Acoustic Requirements for Multifamily Residential Complexes

The purpose of this document is to provide developers with information on acoustical requirements for developing residential buildings in Burnaby. It outlines the accepted design criteria for performance standards of the building being constructed.

The information contained within this guide is for convenience only and does not serve to substitute or supersede applicable City Bylaws, governing Provincial / Federal Codes, and laws. Any references to Bylaws, Codes and laws pertain to those effective at the time of this guide's creation or revision. If the date on this guide exceeds three (3) years, the information contained may be outdated- in such circumstance, refer to the current Bylaws, Codes and laws. Building Owners are responsible for ensuring that any existing or proposed construction, and other works, comply with all applicable Bylaws, Codes and laws.

Overview

The following acoustic requirements are implemented to address the growing population and densification of urban centres while ensuring health and lifestyle concerns of the community are taken into consideration.

Development Permit applications that involve the construction of residential units or livable spaces should include an acoustic assessment of the sound implications at the location of the proposed development, with the building constructed complying with the acoustic engineer's recommendations. The acoustical assessment and accompanying report should be completed by a Professional Engineer with a recognized specialty in acoustical design (Acoustical Professional of Record). The objectives of the report are to demonstrate that the constructed building will include mitigation measures to reduce the effect of disruptive external sounds and to ensure the building constructed is compliant with the City of Burnaby design criteria.

1.0 General Requirements

Section 219 Covenant will be required at Rezoning to ensure that an acoustic report is submitted at the Development Permit stage and demonstrates compliance with the approved acoustic assessment.

It is at the discretion of the General Manager of Planning and Development to identify if an acoustical assessment is to be submitted for any residential development permits for higher density developments. If an Acoustic Report is required, the applicant will be required to submit an electronic copy of the report to the Planning and Development Department at Planning@burnaby.ca in order to complete the development permit requirement for the application.

The Acoustical Report is to be prepared, signed and sealed by the Acoustical Professional of Record. The following items must be included in your submission:

- ☐ Cover page to include Development Permit number and site address
- ☐ Project description and site conditions
- ☐ Acoustic assessment
- ☐ Design criteria
- ☐ Acoustic recommendations
- ☐ Conclusions
- ☐ Appendices (supporting documentation)

2.0 Acoustic Assessment

Exterior noise that is disruptive, such as traffic, mechanical equipment, SkyTrain or rail car movement, is to be mitigated through appropriate acoustic design of the exterior facade, walls, and windows. To determine the existing environment, as it relates to sound levels, an acoustic assessment of the proposed project location is required.

2.1 Sampling Requirements

Traffic count data from the City of Burnaby Engineering Transportation Division should be used in conjunction with sound measurements taken at the location of the proposed development.

Selection for the location of the sound reading shall be the best representation of all instances causing disturbance with a clear line of sight from the sound reading location to the disruptive sounds. Multiple locations of readings may be required, given the location of the disturbances relative to the property.

All sound readings are to be taken on weekdays (excluding statutory holidays) between the hours of 0800 and 1700. If transportation data is available, then two, 1 hour sound reading shall be taken between the aforementioned times. If transportation data is not available, then an 8-hour sound

reading shall be taken. If transportation data is older than 5 years, a full traffic count study will need to be completed and included as an appendix to this report.

Transportation data available	No transportation data available
1-hr reading (morning starting at 8 am) 1-hr reading (evening before 5 pm)	8-hr reading

A site plan shall be included to confirm the location of the sound reading device or reading location which includes the outputs around the building envelope (in dBA). Method, procedures and equipment used to take readings shall be explained to support sampling techniques. The raw data generated from the readings (outputs) are to be provided as an appendix to the report.

2.2 Traffic Noise Exposure

Transportation Planning requires the following growth factors to be applied:

Developments within Town Centres	Developments outside Town Centres
4%	2%

A copy of the communication with the Engineering Transportation Division shall be provided in the appendix of the report. Emails can be sent to transportation@burnaby.ca to request this information.

2.3 SkyTrain Noise Exposures

For developments near the SkyTrain guideway, designs shall be based on acoustic measurements collected from the nearest SkyTrain station with unobstructed views of the guideway. For developments between Skytrain stations, the nearest station to the development site shall be used for the acoustic measurement. SkyTrain data shall be included as an appendix and include confirmation on frequency of train cars and track maintenance schedules.

2.4 Future Considerations

Consideration of future influences that generate noise, other than traffic, must be examined and included in the report. These sound sources may be related, but is not limited to, rail noise, mechanical equipment, activities from existing or proposed operating facilities, public gathering areas, and final build out condition as reflected in the Official Community Plan (OCP).

For rail noise (Skytrain and railway), please refer to **Appendix A** in this attachment for the Noise Assessment sheet.

3.0 Design Criteria

3.1 Introduction

The City of Burnaby Acoustic Policy Guidelines shall be met when considering design criteria. The transportation noise study must be prepared to meet the requirements of Section (b), Item 9, Manager's Report No. 67, forming part of Item 8, Manager's Report No. 19, as adopted by Burnaby Council on 1977 March 14. The following are required under Section (b):

- i. A determination of the existing acoustical environment in terms of HUD criteria.
- ii. An examination of alternatives available to reach specified standards of sound levels from sources external to the site within indoor and outdoor living spaces such as private outdoor areas.
- iii. A translation of the selected appropriate methods of noise attenuation into specific physical terms.
- iv. Of the above implementation should include a notation on the drawings which reads:
"Recommendation contained within the acoustical report shall be incorporated into the working drawings and specifications, as concurred with or amended by Burnaby."

3.2 City of Burnaby Design Criteria

The City of Burnaby Planning and Development Department recommends the use of the United States Department of Housing and Urban Development (HUD) design guideline criteria as an appropriate guide for the determination of the suitability of development sites for residential development permit proposals with respect to indoor and outdoor noise environments. Policy guidelines in the Managers Report No. 67 (Section F), require that HUD criteria be adopted. The HUD guidelines criteria shall be used when evaluating the effects of external noise on a specific residential development site which is the subject of the development permit proposal.

HUD Criteria (1979)	The 1979 HUD requirements are based on Ldn, the day/night sound level. Based on the relationship $Leq=Ldn-3$, the HUD criteria are essentially to provide 5 dBA additional noise reduction (relative to 'normal construction'), if the exterior $Leq(24)$ is above 62 dB (but less than 67 dB), and 10 dB if the exterior $Leq(24)$ exceeds 67 dB. For "normal construction", providing a 20-25 dB noise reduction, these criteria are essentially the same as CMHC criteria.
CMHC Criteria	As discussed above, CMHC criteria are essentially equivalent to the 1979 HUD criteria, and to current Burnaby criteria, with the exception of a requirement for alternate ventilation at relatively low noise levels and a more stringent criterion of 35 dB for bedrooms relative to Burnaby's implied single number indoor criterion of 39 dB.

The City of Burnaby has specific design criteria for outdoor and indoor residential areas, which approximates the 1979 HUD Criterion (see **Appendix B**).

Outdoor criteria	Indoor criteria
$Leq(24) = 62$ dBA (or less)	$Leq(24) = 49$ dBA (or less)*

**Based on a 49 dBA outside exposure, and at least 10 dB noise reduction through an open window, the implied indoor criterion is 39 dBA, with windows open. Environment Canada and World Health Organization requires a 39 dB for indoor noise.*

Criteria used in the design must be included as an appendix to the report and be compliant with the above noted acceptable levels. Criteria not listed in this document may be submitted for review. Other criteria that may be considered for review must be of equal or greater value. All assumptions are to be provided and clearly described in order to be considered as acceptable design criteria.

4.0 Acoustic Recommendations

Following the acoustical assessment, the Acoustical Professional of Record must provide acoustical recommendations for the final building design that is compliant with the indoor and outdoor design criteria. This section should identify the appropriate methods of noise attenuation that have been applied where acoustic assessment results exceed 62 dBA or the indoor criteria. These recommendations are to be included in the engineered drawings to ensure that the final constructed design will include the acoustic measures as identified by the Professional of Record in the accepted Acoustic Report.

4.1 Building Occupancy

Building(s) must be constructed in accordance with the acoustic engineer's recommendations. Upon completion of the project, a letter from the Registered Professional of Record must be submitted to Climate Action and Environment prior to occupancy, confirming that the acoustic engineer's recommendations have been implemented.

5.0 Supporting Documentation

The following documentation is required to be included as an appendix to the Acoustic Report to support the evidence and data included in the body of the report. Please ensure the following items are included in the submission, otherwise the submission package will be considered incomplete and rejected.

- ☐ Data to support the selection of the day/times sound readings were taken
- ☐ Site plan to show microphone location and outputs around the building envelope
- ☐ Traffic count data (include communication with Engineering Transportation Division) and traffic count study (if applicable)
- ☐ SkyTrain data (if applicable) as outlined in section 1.3
- ☐ Raw data (outputs) from acoustical measurement device (include section to demonstrate how data was analyzed)
- ☐ Architectural drawings to incorporate acoustical recommendations as identified from the assessment and notation as outline in Item iv in section 2.1 of this document
- ☐ Design criteria used in analysis

6.0 Noise Bylaw

At time of building permit stage, Climate Action and Environment will require a signed and sealed letter with accompanying cut sheets from a qualified professional confirming compliance with the *Noise or Sound Abatement Bylaw 1979*.

For More Information

For more information on acoustic requirements, please contact the Climate Action and Environment team at 604-294-7850, or climateactionandenergy@burnaby.ca.

For more information regarding the building permitting process, please contact the Building Division at 604-294-7130 or permits@burnaby.ca.

Appendix A

Noise Assessment Railway or Skytrain Data Sheet

List all railways and SkyTrain lines within 500 metres of the site:	Notes
1. _____	
2. _____	
3. _____	

Necessary Information	Railway or Skytrain No. 1	Railway or Skytrain No. 2	Railway or Skytrain No. 3	
1. Effective distance:	_____	_____	_____	Measured in metres from property line to center of track
2. Number of Trains in 24 hours:				
a. diesel	_____	_____	_____	
b. electrified	_____	_____	_____	
3. Fraction of operations occurring at night:	_____	_____	_____	10 p.m. - 7 a.m.
4. Number of diesel locomotives per train:	_____	_____	_____	
5. Number of rail cars per train:				
a. diesel trains	_____	_____	_____	
b. electrified trains	_____	_____	_____	Include locomotive for electrified trains
6. Average train speed:	_____	_____	_____	
7. Is track welded or bolted?	_____	_____	_____	
8. Is the site opposite a section of tracks between whistle stops, or a Skytrain station?	_____	_____	_____	
9. Estimated Railway and Skytrain noise levels	_____	_____	_____	in dBA

Signed _____ Date _____

Appendix B

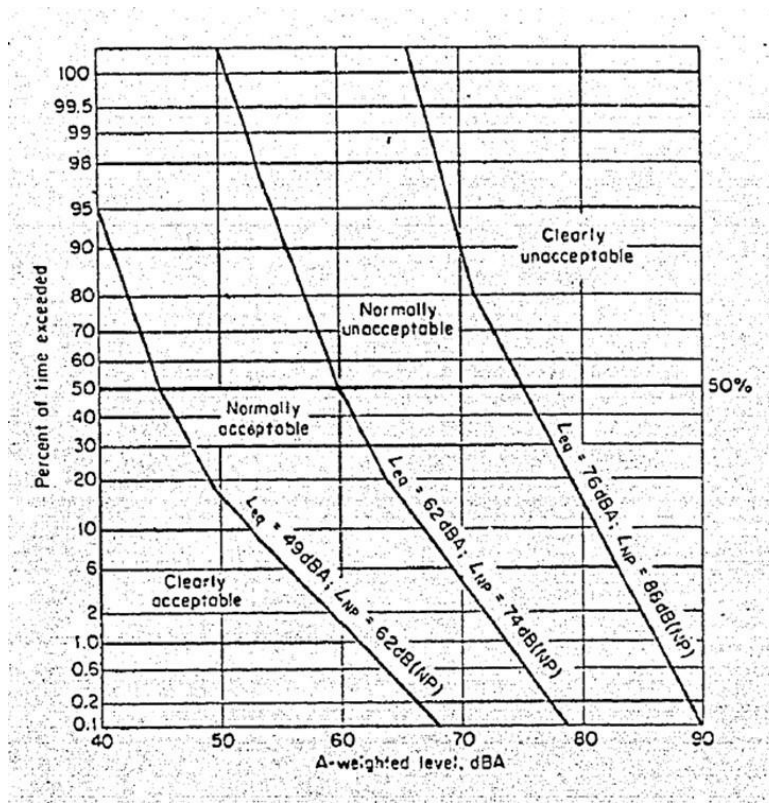


Figure 1. Criteria adopted by U.S. Department of Housing and Urban Development for non-aircraft noise measured outdoors in residential areas. L_{eq} is the mean-square A-weighted sound level. L_{NP} is the noise pollution level. (Source: Beranek, P. 580)

HUDs Acceptability Categories for Proposed Housing Sites (Source: Shultz, P. 149)

Clearly Acceptable:	The noise exposure is such that both the indoor and outdoor environments are pleasant.
Normally Acceptable:	The noise exposure is great enough to be of some concern but common building construction will make the indoor environment acceptable, even for sleeping quarters, and the outdoor environment will be reasonably pleasant for recreation and play.
Normally Unacceptable:	The noise exposure is significantly more severe so that special building constrictions are necessary to ensure some tranquility indoors, and barriers should be erected between the site and prominent noise sources to make the outdoor environment acceptable.
Clearly Unacceptable:	The noise exposure at the site is so severe that the construction costs to make the indoor environment acceptable would be prohibitive and the outdoor environment would still be intolerable.