

GUIDELINES FOR NEW DEVELOPMENT IN PROXIMITY TO RAILWAY OPERATIONS

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1 Background

In 2003, the Federation of Canadian Municipalities (FCM) and the Railway Association of Canada (RAC) identified a common desire to reduce proximity issues which arise from the construction of new development in proximity to railway operations. To this end, the FCM and the RAC signed a memorandum of understanding outlining the common goals of the partnership and established a Community-Rail Proximity Initiative with a mandate to develop and implement a strategy to reduce misunderstanding and avoid unnecessary conflicts arising from railway-community proximity.

In 2004, the FCM/RAC Proximity Initiative published a report identifying best practices and guidelines for new development in proximity to railway operations. In 2013, the Proximity Initiative updated that report, publishing the “Guidelines for New Development in Proximity to Railway Operations” ([1], referred to herein as “the Guideline”), the subject of this article.

2 Legislative Framework

The legislative framework regarding the planning and approval of new development in proximity to railway operations has been identified as lacking a consistent approach across the country. In the 2007 review of the Railway Act of Canada, *Recommendation 34* stated that “the Railway Safety act should be amended to require the developer and municipalities to engage in a process of consultation with railway companies prior to any decision respecting land use that may affect railway safety” [2]. However, regulation of the two sides of the equation noted here fall to two different jurisdictions:

- In general, railways and railway operations are regulated at the federal level under the Railway Safety Act [3] and the Canada Transportation Act [4].
- In general, decisions and legislation relating to land use planning fall to provincial jurisdiction, and in most cases, further on to municipal governments as the land use planning authority.

The jurisdictional ambiguity means that a national approach to addressing proximity issues is unlikely, and as such efforts by the Proximity Initiative are aimed at provincial and municipal governments.

2.1 Canada Transportation Act

The Canada Transportation Act [4] regulates transportation carriers under federal jurisdiction. In the context of this paper, the Act contains two specific sections which address Noise and Vibration specifically. Section 95.1 requires that “when constructing or operating a railway, a railway

company shall cause only such noise and vibration as is reasonable, taking into account its [level of service] obligations, its operational requirements, and the area in which the construction or operation takes place” [4]. Section 95.2 requires that the Canada Transportation Agency (under the authority provided in the Act) publish guidelines with respect to noise and vibration requirements as well as the dispute resolution process for complaints arising from railway operations.

2.2 Province of Ontario, Land Use Planning Regulations

The Province of Ontario is the only provincial authority across the country which specifically requires that a railway operation be notified of land use planning applications (Official Plan Amendments, Plans of Subdivision, Zoning By-laws, etc.) affecting lands in proximity to their railway operations.

2.3 Municipal Government Regulations

In the absence of provincial legislation across much of the country, municipal governments have begun to create legislation of their own in an attempt to require better communication between prospective land use applicants and the nearby railway operators – all in an attempt to reduce proximity issues. Specific municipalities with legislation include Montreal and Moncton with cities like Edmonton researching possible implementations as well.

3 Guideline Document

3.1 Noise and Vibration Proximity Issues

Various issues arise when new development is located in close proximity to railway operations. These can include safety issues, trespass issues, and storm water management issues, amongst others. However, perhaps the most notable of the issues related to the close relationship of rail and new development are noise and vibration.

Noise and vibration are, at least to some extent, inherent to rail operations. Vibration is generated as wheels roll over steel rail, and rail noise is produced wheel/rail interaction, locomotives, and whistles.

3.2 Standard Mitigation

The Guideline proposes a standard set of mitigation measures which are intended to deal with many noise and vibration scenarios arising from a railway line. See Figure 1. It should be noted that although these mitigation measures are referred to as “standard”, the Guideline still recommends that noise and vibration studies be prepared for a proposed development

site (the Guideline advocates the use of the “Railway Noise Measurement and Reporting Methodology” ([5], published by CTA) for the preparation of Noise and Vibration reports. The studies are to confirm that the standard mitigation will be sufficient to achieve the desired noise and vibration guideline levels for the new development while also providing a concrete communication tool for the approval authority (typically the municipality) as well as the railway operator itself. Alternatively, the noise/vibration studies need to determine what mitigation is needed if the standard mitigation is not appropriate.

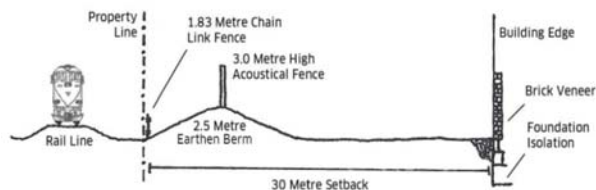


Figure 1 - Standard Mitigation Measures

3.3 Measurement and Prediction

The approaches to quantifying noise and vibration are typically treated differently. In the case of noise, sound exposure levels (L_{eq}) are typically determined by prediction rather than measurement. There are several reasons for this approach:

- Sound exposures are based on future train volumes and train traffic levels that may not be realized on any given day (thus, precluding measurement); and
- Models allow for the prediction of sound exposures at many locations throughout a proposed development that does not yet exist, allowing sound reflections and screening by future buildings as well as for specific determination of mitigation requirements for specific receptor locations.

As per the “Railway Noise Measurement and Reporting Methodology” document, the most commonly used model for the assessment of rail pass-by noise is “Sound from Trains Environmental Analysis Method” (STEAM, [6]). This model is prescribed by the Ontario Ministry of the Environment and Climate Change for use in Ontario, but can be used in any jurisdiction in Canada.

Unlike noise, vibration mitigation requirements are typically determined by measurement, largely because vibration prediction models are not as reliable as those for noise. Since vibration requirements are based on a “worst-case” vibration magnitude (rather than time-averaged as in noise), train traffic on any busy day usually yields sufficient data for determination of mitigation requirements. Measurements of the vibration magnitude should be done at several setback distances (relative to the rail right-of-way) as well as several lateral positions along the length of the rail right-of-way in order to determine:

- The site-specific decay rate with distance; and
- The variation in vibration decay along the interface with the rail right-of-way.

3.4 Noise Guidelines

Appendix AC1.4 of the Guideline provides noise criteria for indoor spaces as well as outdoor living areas as shown in Table 1.

Table 1 – Noise Criteria

Type of Space	Time Period	Sound Level Limit, 1hr L_{eq} , dBA	Outdoor Sound Level Limit, 1hr L_{eq} , dBA
Bedrooms	2300 to 0700 hours	35	50
Living Rooms	0700 to 2300 hours	40	55
Outdoor Living Areas	0700 to 2300 hours	55	N/A

The indoor sound levels limits are used to determine the architectural components required for the structure(s). The outside (façade) sound level limits are used to determine the air conditioning requirements.

It should be noted that the numerical criteria provided above are consistent with the previous Ontario noise guideline, LU-131. The new Ontario noise Guideline, NPC-300, contains the same criteria noted above but also provides daytime/evening (0700 to 2300 hours) criteria for bedrooms and nighttime (2300 to 0700 hours) criteria for living rooms.

3.5 Vibration Guidelines

Appendix AC2.5 of the Guideline provides a vibration limit of 0.14 mm/s RMS (1-second average, between 4 and 200 Hz) at a receptor location. If the rail vibration magnitude is above this limit, the Guideline states that appropriate vibration isolation measures are recommended at the receptor location (dwelling) such that the vibration magnitude inside the dwelling at the first floor (and above) is below the guideline limit.

4 Conclusions

If implemented across the country, the “Guidelines for New Development in Proximity to Railway Operations” would be expected to provide a unified approach for addressing issues related to new development in proximity to railway operations.

References

- [1] Railway Association of Canada, The, & Federation of Canadian Municipalities, The. Guidelines for New Development in Proximity to Railway Operations, 2013.
- [2] Railway Safety Act Review Secretariat. Stronger ties: A shared commitment to railway safety, 2007.
- [3] Railway Safety Act, R.S.C. 1985, c. 32 (4th Supp).
- [4] Canada Transportation Act, S.C. 1996, c. 10.
- [5] Canadian Transportation Agency. Railway noise measurement and reporting methodology, August 2011.
- [6] Ontario Ministry of the Environment (MOE). Sound from Trains Environmental Analysis Method (STEAM), 1990.