Guidelines for New Development in Proximity to Railway Operations

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SUMMARY

In May 2003, the Federation of Canadian Municipalities (FCM) and the Railway Association of Canada (RAC) signed a memorandum of understanding (MOU) to build common approaches to the prevention and resolution of issues that arise when people live and work in close proximity to railway operations.

In an effort to enable better communications and understanding, the FCM and RAC have developed a Community-Rail Proximity Initiative Steering Committee, whose members include elected officials and senior railway representatives from across Canada, to develop and implement strategies aimed at reducing misunderstanding, increasing safety and avoiding unnecessary conflict arising from railway-community proximity. Areas for action include developing commonly understood proximity guidelines and improving awareness among all stakeholders regarding the need for effective land planning and management.

The practice of developing land in close proximity to rail operations, as well as the expansion of rail operations in urban areas have generated a variety of opportunities as well as challenges for municipalities, developers and railways, who must work together to balance a variety of sometimes competing goals and aspirations.

The FCM-RAC Proximity Initiative launched *Guidelines for New Development in Proximity to Railway Operations* in May 2013. These new guidelines will assist municipal governments and railways in reviewing and determining general planning policies and provisions for conversion of lands in proximity to rail operations, addressing such issues as noise, vibration, emissions and safety.

INTRODUCTION

How can we build better to avoid proximity safety issues inherent when urban development and railways are in close proximity? The push to avoid urban sprawl by intensifying urban development has led to increased development on lands in close proximity to rail operations. These new developments include the conversions of industrial or commercial properties to residential ones, and are usually sited next to major railway corridors and built without any mitigation measures. This absence of mitigation measures creates serious safety issues for residents due to the lack of crash walls, noise and vibration mitigation and proper separation barriers, which can lead to trespass issues. When proximity issues arising from the growth and expansion of rail facilities and/or municipalities are not understood and addressed, problems can often be intractable and long-lasting.

THE FCM-RAC PROXIMITY INITIATIVE

The Federation of Canadian Municipalities has been recognized since 1901 as the national voice of municipal governments. It represents the interests of all municipalities on policy and program matters within federal jurisdiction. Members include Canada's largest cities, small urban and rural communities and provincial and territorial municipal associations. Municipal leaders from all parts of Canada assemble annually to establish FCM policy on key issues.

The Railway Association of Canada represents some 54 goods, tourist, commuter and intercity rail businesses in Canada, their more than 33,000 employees and has more than 60 associate member suppliers and partners. The RAC acts to inform officials, develop programs, policies and resources and respectfully communicate with the public and media to strengthen the role and capacity of rail to deliver leading services that are economically viable, socially cohesive, future-focused and environmentally sustainable.

The RAC is proud to have tourist, passenger, commuter, short line and regional railways and Class 1 freight railways among its members. In total, members operate approximately 60,969 km of main line track (RAC: Rail Trends 2012¹).

The Federation of Canadian Municipalities and the Railway Association of Canada are committed to building common approaches to the prevention and resolution of issues that may arise when people live and work in close proximity to railway operations. Building on back-to-back memorandums of understanding (MOU), both organizations continue to work in sync with the most recent, open-ended MOU signed in January 2009.

Through the original MOU signed in 2003, the FCM–RAC Proximity Initiative Steering Committee was established with equal representation from the FCM (elected officials) and RAC (senior railway representatives) and includes members from the Canadian Association of Municipal Administrators (CAMA) and observers from Transport Canada and the Canadian Transportation Agency.

The three main goals of the MOU are to; build awareness, establish guidelines and develop dispute resolution protocols and processes.

GUIDELINES

The relationship between Canada's railways and local communities is as rooted in the nation's history as the tracks themselves. To this day, Canada and its communities rely on railways to ensure the efficient movement of goods and people. The nature and integrity of rail corridors and yards need to be protected in order to support this function, while, at the same time, Canada's quality of life and competitiveness also depend on strong and sustainable municipal growth and development.

Increasing market pressures in many Canadian cities have resulted in conversion of commercial and industrial lands, and in some cases the buildings situated on them, to residential uses. Many of these sites are located in proximity to rail corridors and rail yards and are built without any mitigation for the potential safety risks, trespassing barriers or other proximity issues such as noise and vibration. The absence of comprehensive or consistent proximity land use development policies for new residential developments across Canada has lead to increased proximity complaints and safety issues.

The FCM and the RAC recognize that it is in Canada's economic interest to develop land use guidelines and best practices to inform and influence planning practices and provide for planning systems that more effectively facilitate safe and sustainable residential development.

In 2012, the FCM-RAC Proximity Initiative engaged the firm, DIALOG, to develop a comprehensive set of guidelines for municipal and provincial governments, municipal staff, railways, developers and property owners when new developments in proximity to railway operations are proposed. DIALOG developed the *Guidelines for New Development in Proximity to*

¹ Railway Association of Canada, 2012 Rail Trends, www.railcan.ca, Appendix A, 26.

Railway Operations with the help and participation of stakeholders from government, freight, passenger and commuter railway operators, municipal councillors and mayors, municipal urban planners, the FCM and the RAC. Information has been assembled through a comprehensive literature/best practices review from national and international sources, a consultation process involving planners, architects, developers and other professionals from across Canada, the USA and Australia, and in collaboration with the FCM-RAC Proximity Initiative Steering Committee.



Figure 1: Outcomes of the guidelines for various stakeholder groups

The final report provides implementation mechanisms with the objective of establishing a clear and effective process that ensures consistent application of these guidelines across all jurisdictions in Canada when dealing with new residential development, infill and conversions. Processes may be used to entrench these guidelines in policy, including a Model Review Process and Development Viability Assessment Tool.

Too often, railways are not included in discussions on proposed developments and only become aware of the project once construction has begun. The guidelines propose early contact between the proponent and the railway, preferably in the project's early design phase. The Model Review Process for New Development, Infill and Conversions in Proximity to Railway Corridors is meant to ensure clarity with respect to how railways are to be involved in a meaningful way at the outset of a planning process. This consultation is important in order to determine:

- the location of the site in relation to the rail corridor;
- the nature of the proposed development;
- the frequency, types and speeds of trains travelling within the corridor;
- the potential for expansion of train traffic within the corridor;
- any issues the railway may have with the new development or with specific uses proposed for the new development;
- the capacity for the site to accommodate standard mitigation measures;
- any suggestions for alternate mitigation measures that may be appropriate for the site and;
- the specifications to be applied to the project.

GUIDELINES – MITIGATION RECOMMENDATIONS FOR SAFETY

Typically the greatest number of annual fatalities resulting from railway accidents involves trespassers or vehicle occupants or pedestrians being struck at crossings.² As urban areas grow in proximity to railway corridors, traffic increases at existing crossings and creates demands for additional new crossings. Traffic at grade crossings increases the risk exposure for potential vehicle/train and pedestrian accidents. Grade separated crossings address these issues but are expensive to construct and not usually possible in the budgets of smaller communities. Safety at railway crossings is a concern for all stakeholders and planning is necessary to consider alternatives to creating new grade crossings. The planning process includes upgrading and improving safety at existing grade crossings and creating viable links for new residential developments to existing grade separated crossings.

Residents living in proximity to railways have also expressed safety as a concern. Yet, most jurisdictions in Canada have yet to establish a formal requirement for rail corridor building setbacks.

The new guidelines recommend a standard 30-metre setback and berm for new residential developments. These measures have been developed by the railways, based on a detailed analysis of past incidents and derailments. Together, the berm and setback contain the derailed cars and allow a derailed train enough room to come to a complete stop. In addition, they also allow for the dissipation of noise and vibration and can be effective at easing the proximity concerns of residents living near railway operations. These mitigation measures (SEE FIGURE 2) include a minimum setback, earthen berm, acoustical and/or chain link security fence (to mitigate trespassing), as well as additional measures for sound and vibration attenuation.

Where conversion or infill sites are too small to accommodate standard setbacks, reduced setbacks may be possible under certain conditions (for example, if the railway line is located in a cut), but in the majority of cases, an alternate form of safety barrier (such as a crash wall) will be required. It is recommended that the Development Viability Assessment (SEE *Guidelines for New Development in Proximity to Railway Operation*, APENDIX A,) be used by the proponent to evaluate conditions specific to the site, determine its suitability for new development and determine other options for mitigation.



Figure 2: Standard mitigation for new residential development in proximity to a main line railway

² Railway Safety Act Review Secretariat,(2007). Stronger ties: A shared commitment to railway safety. Retrieved from the Transport Canada website: www.tc.gc.ca/tcss/RSA_Review-Examen_LSF

The guidelines include the following recommended building setbacks for new residential development in proximity to railway operations:

Freight Rail Yard:	300 metres
Main Line:	30 metres
Branch Line:	15 metres
Spur Line:	15 metres



Figure 3: Setback configuration options for optimum site design.

These setback distances must be measured from the mutual property line to the building face and under typical conditions are measured as a straight-line horizontal distance. Appropriate uses within the setback area include public and private roads, parkland and other outdoor recreational uses, garages and other parking structures and storage sheds.

Noise resulting from rail operations is a key issue with regards to the liveability of residential developments in proximity to railway facilities. Since noise is site-specific in nature, the level and impact of noise on a given site should be accurately assessed by a qualified acoustic consultant through the preparation of a noise impact study. The report includes a chart of minimum noise influence areas to be considered for railway corridors and yards when undertaking noise studies. The objective of the noise impact study is to assess the impact of all noise sources affecting the subject lands and to determine the appropriate layout, design and required control measures.

These measures could include increasing the setback and/or building a noise barrier. Generally doubling the distance from the noise source to the receiver will reduce the noise levels by between 3dBA to 6dBA.³ A noise barrier can effectively reduce outdoor rail noise by between 5dBA and 15dBA, although the largest noise reductions are difficult to achieve without very high barriers. The height and noise reduction of a barrier can be increased when built in combination with a berm.

Many of the adverse impacts of railway noise can be avoided or minimized by using good design practices in the location and orientation of the building (SEE FIGURE 3) and the internal layout. Site design should take into consideration the location of the rail corridor, existing sound levels, topography, noise barriers, and acoustic shielding provided by other structures. The use of masonry façade materials, minimizing window and door openings on the rail side and using windows with a high Sound Transmission Class (STC) rating can reduce acoustic impacts of railway noise. The layout of residential buildings can also be configured with the noise sensitive rooms, such as bedrooms on the non rail side of the building. Conversely, rooms that are less sensitive to noise (such as laundry rooms, bathrooms, storage rooms, corridors and stairwells) can be located on the noisy side of the building to act as a noise buffer (SEE FIGURE 4).



Figure 4: Locating noise-sensitive rooms away from rail noise (Source: Adapted from Figure 3.6 in Development near Rail Corridors and Busy Roads – Interim Guideline by The State Of New South Wales, Australia)

For Infill and conversion projects where it is not possible to use standard mitigation setbacks and berms, outdoor rail noise can be reduced by building residential apartments or condos on top of a podium. The area in the podium can be used for parking or recreational activities (non-inhabitable

³ State Government of New South Wales, Department of Planning. (2008). Development near rail corridors and busy roads – interim guideline. Retrieved from

http://www.planning.nsw.gov.au/rdaguidelines/documents/DevelopmentNearBusyRoadsandRailCorridors.pdf

space). The tower is then set back from the podium locating the residential units from the railway corridor. The wall of the podium can include a crash wall increasing safety. (SEE FIGURE 5)



Figure 5: Podiums can help reduce the amount of noise that reaches residences if a setback is used (Source: Adapted From Figure 3.13 in Development near Rail Corridors and Busy Roads – Interim Guideline by The State Of New South Wales, Australia)

Vibration caused by passing trains is an issue that could affect the liveability of residential developments. Like sound, the effects of vibration are site-specific and are also dependent on the soil, subsurface conditions, frequency of trains, their speed, as well as the quantity and type of goods they are transporting. A qualified acoustic or vibration consultant should be engaged to carry out vibration measurements and calculate the resultant internal vibration levels. This should take into account the particular features of the proposed development. The measurements and calculations should be representative of the full range of trains and operating conditions likely to occur at the particular site or location. The study should include details of the assessment methods, summarize the results and recommend the required control measures. The recommended minimum vibration influence area to be considered is 75 metres from a railway corridor or a railway yard.

It is highly recommended that both the sound and vibration studies be undertaken by the proponent early in the design process and be shared in the consultations with the railway.

Safety barriers reduce the risks associated with railway incidents by intercepting or deflecting derailed cars in order to reduce or eliminate potential loss of life and damage to property. They

also minimize the lateral spread or width in which the rail cars and their contents can travel. The standard safety barrier is an earthen berm, which is intended to absorb the energy of the derailed cars, slowing them down and limiting the distance they travel outside of the rail right-of-way. Where full-set backs are provided, safety barriers are constructed as berms which are simple earthen mounds of compacted to 95% modified proctor. Setbacks and berms should be provided together to provide a maximum level of mitigation.

Where the standard berm and setback are not technically or practically feasible, due for example to site conditions or constraints, then the Development Viability Assessment (See the *Guidelines for New Development in Proximity to Railway Operations*, Appendix A) should be used by the proponent to evaluate the conditions specific to the site, determine its suitability for development, and suggest alternate safety measures such as crash walls or crash berms. Crash berms are reinforced berms – essentially a hybrid of a regular berm and a crash wall. They are generally preferable to crash walls, because they are more effective at absorbing the impact of a train derailment. Crash berms are also highly cost-effective and particularly useful in spatially constrained sites where a full berm cannot be accommodated.



Figure 6: Example configuration of a crash berm

Trespassing on railway property is dangerous and illegal, yet according to 2012 statistics, there were 33 trespassing accidents in Canada that caused 24 fatalities and 11 cases of serious injuries.⁴ Trespass issues can be avoided through careful land use planning. Land uses on each side of a railway corridor or yard should be evaluated with a view to minimizing potential trespass problems. Municipalities should zone appropriately to avoid the location of schools, parks, commercial uses or plazas adjacent to rail corridors without safe pedestrian crossings. Increased safety/security measures should be considered, such as precast fencing and fencing perpendicular to the railway property line as the ends of a subject development property. All new developments must include a 1.83 metre high chain link fence along the entire mutual property line, to be constructed by the property owner entirely on their property. Other materials may also be considered, in consultation with the railway and the municipality. Noise barriers and crash walls are generally acceptable substitutes for standard fencing, although additional standard fencing may be required in any location with direct exposure to the rail corridor, in order to ensure there is a continuous barrier to trespassing.

⁴ Operation Lifesaver. Railway crossing and trespasser accidents by province. Table 2. Retrieved from http://www.operationlifesaver.ca/wp-content/uploads/2013/7/June-Stats-Eng.pdf.

CONCLUSION

Careful consideration has been given to provide a balanced approach to new development in proximity to railway operations that provides a thoughtful response to site-specific constraints, safety and land-use compatibility. Ultimately, it is in all parties' interest to make certain that when a new development is deemed appropriate to be near a railway operation, the mitigation measures are taken to ensure compatibility and safety. The guidelines also provide recommendations to promote a higher level of consistency nationwide with regard to land use planning and appropriate mitigation methodology.

The FCM-RAC Proximity Initiative has undertaken to engage in outreach activities with various stakeholders to ensure that they are aware of the new guidelines and to encourage them to adopt them into their official planning protocols. The initiative was also presented to urban planning schools, in hopes of having the guidelines become part of relevant curriculums.

By working together, railways and communities can build safe, sustainable communities. The guiding philosophy of the *Guidelines for New Development in Proximity to Railway Operations* is that, by building better today, we can avoid conflicts in the future.