

## **CANADIAN NATIONAL RAILWAY'S PRELIMINARY COMMENTS**

**RE: Request for Comments - OP.20.017 & Z.20.044 - 1st Submission for 9291 Jane Street**

**Re: CN MacMillan Rail Yard, Vaughan**

**PAPAZIAN HEISEY MYERS**

Barristers & Solicitors  
510-121 King Street West  
Toronto, ON M5H 3T9

**Alan M. Heisey (LSUC No. 19542B)**

416.601.2702

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Lawyers for Canadian National Railway

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## Lorna Groves

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**From:** Alan Heisey  
**Sent:** Friday, January 22, 2021 5:57 PM  
**To:** Torres, Michael; Fera, Eugene  
**Subject:** RE: Request for Comments - OP.20.017 & Z.20.044 - 1st Submission for 9291 Jane Street  
**Attachments:** Letter to Vaughan re Solmar Revised Applicatoin MacMillan Yard January 22, 2021 .pdf; November 23, 2004 OMB decision Jane Rutherford.pdf; Jane Rutherford OMB Decision 2005.pdf

Mess'rs Fera and Torres

I act for Canadian National Railway in respect of the above referenced applications.

Attached please find correspondence in this matter providing CN's preliminary comments.

We also attach below the link to the Railway Association of Canada website where the FCM/RAC Proximity Guidelines can be accessed.

Please provide the author and [monika.pezdek@cn.ca](mailto:monika.pezdek@cn.ca) of notice of any future meetings considering these applications.

Please acknowledge receipt of this correspondence and enclosures in writing.

A. Milliken Heisey Q.C.  
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**From:** Torres, Michael [<mailto:Michael.Torres@vaughan.ca>]  
**Sent:** Friday, January 15, 2021 4:01 PM  
**To:** Morea, Francesco <[Francesco.Morea@vaughan.ca](mailto:Francesco.Morea@vaughan.ca)>; Valente, Elvio <[Elvio.Valente@vaughan.ca](mailto:Elvio.Valente@vaughan.ca)>; Michaels, Gus <[Gus.Michaels@vaughan.ca](mailto:Gus.Michaels@vaughan.ca)>; Harnum, Jim <[Jim.Harnum@vaughan.ca](mailto:Jim.Harnum@vaughan.ca)>; Kiru, Bill <[Bill.Kiru@vaughan.ca](mailto:Bill.Kiru@vaughan.ca)>; Peverini, Mauro <[MAURO.PEVERINI@vaughan.ca](mailto:MAURO.PEVERINI@vaughan.ca)>; Tuckett, Nancy <[Nancy.Tuckett@vaughan.ca](mailto:Nancy.Tuckett@vaughan.ca)>; Bayley, Rob <[Rob.Bayley@vaughan.ca](mailto:Rob.Bayley@vaughan.ca)>; Davoudi-Strike, Shahrzad <[Shahrzad.Davoudi-Strike@vaughan.ca](mailto:Shahrzad.Davoudi-Strike@vaughan.ca)>; Rohani, Shirin <[Shirin.Rohani@vaughan.ca](mailto:Shirin.Rohani@vaughan.ca)>; Caputo, Mary <[Mary.Caputo@vaughan.ca](mailto:Mary.Caputo@vaughan.ca)>; Cascone, Nicholas <[Nicholas.Cascone@vaughan.ca](mailto:Nicholas.Cascone@vaughan.ca)>; Iacobelli, Tony <[Tony.Iacobelli@vaughan.ca](mailto:Tony.Iacobelli@vaughan.ca)>; Mongiovi, Finuzza <[Finuzza.Mongiovi@vaughan.ca](mailto:Finuzza.Mongiovi@vaughan.ca)>; Tavares, Martin <[Martin.Tavares@vaughan.ca](mailto:Martin.Tavares@vaughan.ca)>; Huang, Kevin <[Kevin.Huang@vaughan.ca](mailto:Kevin.Huang@vaughan.ca)>; Costa, Raphael <[Raphael.Costa@vaughan.ca](mailto:Raphael.Costa@vaughan.ca)>; Saadi Nejad, Samar

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Cc: Fera, Eugene <EUGENE.FERA@vaughan.ca>  
Subject: Request for Comments - OP.20.017 & Z.20.044 - 1st Submission for 9291 Jane Street

external email – be cautious  
Hello,

This is a request for comment on City of Vaughan Development Applications (1<sup>st</sup> Submission – OP.20.017 & Z.20.044) for 9291 Jane Street.

**Within five business days of receiving this electronic circulation, please advise if your application requirements have been met. Please note that formalized comments are due within three weeks of the date of this email (February 05, 2021).**

The electronic drawings and documents can be accessed through [OneDrive](#).

Please forward your comments and questions to Eugene Fera at [Eugene.Fera@vaughan.ca](mailto:Eugene.Fera@vaughan.ca).

Thank You,

**Michael Torres**  
**Planning Technician**  
905-832-8565, ext. 8933  
[michael.torres@vaughan.ca](mailto:michael.torres@vaughan.ca)

**City of Vaughan | Development Planning Department**  
2141 Major Mackenzie Dr., Vaughan, ON L6A 1T1  
[vaughan.ca](http://vaughan.ca)



January 21, 2021

*Via Email Michael.Torres@vaughan.ca and Eugene.Fera@vaughan.ca*

**David Torres and Eugene Fera**  
**City of Vaughan 1 Development Planning Department**  
2141 Major Mackenzie Dr.,  
Vaughan, ON L6A 1T1

Dear Sirs:

**RE: Request for Comments - OP.20.017 & Z.20.044 - 1st Submission for 9291  
Jane Street**

**Re: CN MacMillan Rail Yard, Vaughan**

Further to your email of 4 pm January 15, 2021 concerning this matter please be advised we are the solicitors for Canadian National Railway.

CNR is the owner of the MacMillan Yard located to the north of Highway 7, north and south of Rutherford Road, east of Jane Street and west of Keele Street in the City of Vaughan in the Region of York on the main east west rail corridor in Eastern Canada at the confluence of many important rail lines and highways that form part of the North American transportation network.

MacMillan Yard is 1,300 acres in size and was established approximately 56 years ago in 1964. The Yard employs approximately 1,000 employees and is one of the most important transportation terminals in Canada and North America.

The MacMillan Yard is identified as Rail Facilities (Schedule 1) and designated as General Employment (Schedule 13) of the 2010 Vaughan Official Plan. The MacMillan Yard is identified as a Provincially Significant Employment Zone in the Growth Plan 2020.

The proposed development is located immediately to the south of and abutting the MacMillan Yard's Pull Back Track. The Pull Back Track currently has 2 tracks located within the Yard property boundaries. CN participated in a lengthy hearing before the Ontario Municipal Board in 2004. In the decision, a copy of which is attached, the

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Board established a 150 metre setback in its decision residential development from the nearest most southerly track located within the pullback track.

CN has plans to develop an additional 2 tracks within the MacMillan Yard's Pull Back Track in the near to intermediate term. A fifth track is also contemplated between the lands at 9291 Jane Street and the most southerly existing track. These additional tracks inter alia will facilitate significantly increased volumes of rail cars processed by the MacMillan Yard and increase the volume of traffic in the Pull Back track.

The proposed residential Tower A is only setback 30 metres from the Yard Property boundary and 65 metres from the most southerly existing track. The parking structure is set back 0 metres from the property boundary. The addition of an additional fifth track in the MacMillan Yard's between the subject property and the existing most southerly track will reduce these setbacks further an additional 6-10 metres.

The proposed setbacks are inadequate from a land use compatibility perspective and insufficient separated from the existing tracks, let alone the proposed 5<sup>th</sup> track in the event there is a derailment in the MacMillan Yards pullback track.

It is CN's position that the within applications do not address CN's requirements or those of applicable guidelines and policies.

1. There does not appear to be a land use compatibility assessment that has been completed per the MECP D-Series Guidelines. MacMillan Yard and the Pullback Track, in our opinion, would be considered a Class III Industrial use per the MECP D-Series Guidelines for land use compatibility. A Noise and Vibration Assessment have been completed, but these reports are only a component of an overall land use compatibility assessment per provincial guidelines. It is noted that the Planning Justification Report does not address the D-series guidelines directly.
2. It is our opinion that the MacMillan Yard and Pullback Track should be considered as a Major Facility(ies), Major Goods Movement Facility(ies) and Corridor(s), Infrastructure, Transportation System and a Rail Facility(ies) located within an Employment Area. The MacMillan Yard, per its function, should also be reviewed relative to the freight-supportive policies. The proposed development represents a Sensitive Land Use. All definitions are per the 2020 Provincial Policy Statement (PPS).
3. There is no structural engineers report establishing the parking garage is structurally separate and isolated from the residential towers.

4. Based on a preliminary review of the Planning Justification Report prepared by SGL dated December 2020 we note the following relative to the 2020 PPS:
  - a. The 2020 PPS review does not correctly reference the land use compatibility policies of the PPS. Specifically, Section 1.2.6.1 of the 2020 PPS references that “Major facilities and sensitive land uses shall be planned and developed to avoid, or if avoidance is not possible, minimize and mitigate any potential adverse effects ...”. This section also references needing to address these requirements per provincial guidelines.
  - (a) The 2020 PPS review does not correctly reference the land use compatibility policies of the PPS. Specifically, Section 1.2.6.1 of the 2020 PPS references that “Major facilities and sensitive land uses shall be planned and developed to avoid, or if avoidance is not possible, minimize and mitigate any potential adverse effects ...”. This section also references needing to address these requirements per provincial guidelines.
  - (b) Section 1.2.6.2 of the PPS has not been reviewed or assessed. It is noted that there does not appear to be any evaluation of need or alternatives as required by this section of the PPS.
  - (c) There is no reference to section 1.3 of the PPS for Employment Areas, which is noted given the designation of the MacMillan Yard and Pullback Track lands as General Employment.
  - (d) There is no reference to section 1.6.8 and 1.6.9 of the PPS.
  - (e) There is no reference to the Province of Ontario’s Freight Supportive Guidelines.
  - (f) There is no reference to the Land Needs Assessment Methodology for the Greater Golden Horseshoe, which in our opinion is relevant given Section 1.2.6.2 of the PPS and the location of the site within a municipality subject to the Growth Plan.
  - (g) There is no reference to the 150 metre setback from the MacMillan Yard as noted in OPA 626.
  - (h) There is no Development Feasibility Assessment as required by the FCM/RAC Proximity Guidelines.
  - (i) Based upon a cursory review of the Growth Plan section of the Planning Justification Report, there appear to be similar policy

gaps relative to the Growth Plan for the Greater Golden Horseshoe.

5. An odour air emissions report is not included as part of the application and should be required in order to assess land use compatibility.
6. Vibration
  - (a) Unclear whether proponent captured worst-case trains as measurements were only over a couple days and not coordinated within CN and appear to not have captured future predictable worst case scenarios.
  - (b) The study should have assessed transverse vibration as vibration can change direction in structures.
7. Noise
  - (a) Should be required to model a 4 and 5 track scenario in the MacMillan
  - (b) The projected sound levels for existing locomotives is too low and larger hp locomotives need to be modelled as well as part of a predictable worst case
  - (c) The applicant should be required to address NPC 300 Class 1 noise level limits
  - (d) CN does not agree with the designation of the subject property as a Class 4 Area
  - (e) Enclosed noise buffers are not an appropriate mitigation technique

These are only CN's preliminary comments and we reserve the right to provide further comments. The time provided from your notice 5 days is not adequate to allow a detailed review and response.

Kindly acknowledge receipt of this response in writing.

Yours very truly,

A. Milliken Heisey, Q.C.  
AMH/lg

*cc. Canadian National Railway*

ISSUE DATE:

**NOV. 23, 2004**

DECISION/ORDER NO:

**1815**



Ontario

Ontario Municipal Board

Commission des affaires municipales de l'Ontario

PL030635

Jane-Ruth Development Inc. has appealed to the Ontario Municipal Board under subsection 34(11) of the *Planning Act*, R.S.O. 1990, c. P.13, as amended, from Council's refusal or neglect to enact a proposed amendment to Zoning By-law 1-88 of the City of Vaughan to rezone lands respecting 2920 Rutherford Road and 9291 Jane Street from Open Space 1 and Agriculture to "AR3" and "Open Space 1" to permit the development of five apartment buildings  
O.M.B. File No. Z030092

Jane-Ruth Development Inc. has appealed to the Ontario Municipal Board under subsection 22(7) of the *Planning Act*, R.S.O. 1990, c. P.13, as amended, from Council's refusal or neglect to enact a proposed amendment to the Official Plan for the City of Vaughan to redesignate land at the northeast corner of Jane Street and Rutherford Road from Rural to High Density Residential/Commercial, Valleylands and Stormwater Management to permit residential uses  
O.M.B. File No. O030114

Jane-Ruth Development Inc. has appealed to the Ontario Municipal Board under subsection 38(4) of the *Planning Act*, R.S.O. 1990, c. P. 13, as amended, against Interim Control By-law 81-2004 of the City of Vaughan  
O.M.B. File No. R040079

## **APPEARANCES:**

### **Parties**

City of Vaughan

Canadian National Properties

Jane-Ruth Developments Inc.

### **Counsel**

S. Zakem

A. M. Heisey

T. R. Lederer  
K. O'Neil

## **DECISION DELIVERED BY S. D. ROGERS AND PARTIAL ORDER OF THE BOARD**

### **Site and Site Context**

Jane-Ruth Developments Inc. owns 9.565 hectares of land on the northeast corner of Jane Street and Rutherford Road in the City of Vaughan. The property comprises two parcels of land and has 374 metres of frontage on Jane Street and 288

metres of frontage on Rutherford Road. A detailed description of the site and the larger planned and existing land uses in the area, is crucial to an understanding of the issues and the decision of this Board.

Two single detached dwellings currently occupy the site, but otherwise the site is vacant. The property is traversed by a tributary of the West Don River, and is bordered on the east by a large ravine. Immediately abutting the site to the north is a CN Rail right-of-way, on which are located two rail lines which run east-west at this point, and end at Jane Street. These rails are used as a classification pull-back track for the MacMillan rail yard to the southeast.

The pull back track is used to classify train cars that arrived at the MacMillan yard and need to be sorted into other train car combinations, for other destinations. Unmanned engines pull cuts of train cars out of the MacMillan yard and then push the train cars back into the yard, over a hump, where the cars then roll onto different tracks to create new train cut combinations. The length of the train car cuts pulled along this track varies widely over the day and over the week. Thus, the point at which the engines stop on the pull back track can vary throughout the day, as can the number of trains that are pulled in any one day. The Jane-Ruth property is located at the very end of this track, and not every train cut will travel as far as the Jane-Ruth property.

The pull-back track runs from Jane Street, east to Melville Road, where it begins curving south towards the MacMillan rail yard. The rail yard is located south of Rutherford Road, and approximately 950 metres from the closest property line of the subject site.

To the east of the site, past the ravine, which also carries a tributary of the West Don River, are the Works Yard, Joint Operations Centre and Police Administration buildings for the City of Vaughan. Beyond those buildings is Melville Road, which runs north-south through the residential Maple Community subdivision. Adjacent to that road is part of the pull-back track as it curves south. To the east of that portion of the pull-back track there is a large community center and district park, including a hockey arena, and a lighted outdoor baseball diamond. Located within the recreational complex grounds, to the east of the pull-back track is a 5 storey residential retirement home known as Villa Giardino.

To the south of the site is a large Employment Industrial Area, which borders the MacMillan rail yard. Immediately on the southeast corner, across Rutherford Road from the site, a new Prestige Industrial Plaza is being built to include office and light industrial uses.

On the southwest corner of Rutherford Road and Jane Street, the new Vaughan Mills shopping center is under construction. This mall will have more than 1 million square feet of specialty retail shops. The property extends from Jane Street to Highway 400 and a regional transit center is planned as part of the construction of that mall. More office and retail buildings are planned along the south side of Rutherford Road.

The northwest corner of Rutherford Road and Jane Street is vacant, but there is an application for a retail plaza with some office. To the west is a Canadian Tire and gas bar, and west of that property along Rutherford Road, a large grocery store is being constructed. Some freestanding retail and restaurant uses are also planned for that property and along the Rutherford Road frontage. North of the commercial uses along Rutherford Road is a low density residential area, which extends up to the edge of the Paramount Wonderland amusement park. To the east of that residential area, along the east edge of Jane Street, a large automotive park is planned and under construction.

To the north and east of the pull-back track is a low density residential area known as the Maple Community. It consists of two and three storey townhouses and single detached dwellings.

### **Proposal**

Jane-Ruth applied to the City of Vaughan for approval to construct a residential development on the property. While originally the proposal included townhouses abutting the pull-back track, that proposal was amended during the period leading up to the hearing of this matter, to eliminate the townhouse component.

The proposal before the Board includes 5 high-rise residential apartment buildings, ranging from 12 to 18 storeys in height containing 967 condominium apartment units. All of the buildings will be located more than 150 metres away from the south track of the CN right-of-way. Between the apartment buildings and the pull-back track, Jane-Ruth is proposing to provide for commercial uses, including a banquet hall. A banquet hall is the specific use currently proposed for that portion of the site.

The proposal involves the removal of the storm water management pond currently located in the tributary, which traverses the site near the southwest corner, and rehabilitating the valley and tributary. One of the apartment buildings will be located on the immediate northeast corner of Jane Street and Rutherford Road, south of the rehabilitated valley, and four of the proposed buildings will be located north of that valley, but 150 metres away from the pull-back track. The residential buildings are to be connected by a system of internal roads, and walkways.

### **Applications**

The site is currently designated under the Vaughan Official Plan as part of the Vaughan Centre. The Vaughan Centre extends north and south of Rutherford Road, from Highway 400 to approximately the western boundary of the subject property, north to the Wonderland Park and south to the southern boundary of the Vaughan Mills property. The Jane-Ruth property and the property to the north of the pull-back track, remain the only properties in the Vaughan Centre in need of an approved secondary plan. The Jane-Ruth property is zoned agricultural.

Jane-Ruth has applied for approval of an Official Plan Amendment to designate this property High Density Residential Commercial under the Vaughan Official Plan, and for a Zoning By-law amendment to rezone the property to High Density Residential, Commercial and Open Space. There is also an appeal in front of the Board of the Interim Control By-law passed by the City of Vaughan with respect to these lands, and a referral of a Site Plan Approval Application.

The original applications were submitted to the City in January of 2003. A public meeting took place in April of 2003. The report to council at that meeting indicated that a technical report was forthcoming. In the meantime, Jane-Ruth appealed the matters to the Ontario Municipal Board. At the pre-hearing conference before the Board in October of 2003, no planning report had been completed. The City requested that the Board defer a hearing date, because the City needed more time to complete a technical review of the merits of the proposal and to report on that review to Council. The Board granted the City time and set down a further prehearing conference in February of 2004.

Some weeks before the second prehearing conference, in January of 2004, one year after Jane-Ruth submitted its application, a planning report was brought forward to City council that provided no technical analysis of the proposal but that raised the need

for a secondary plan study with respect to the remaining, undesignated lands in the Vaughan Centre, including the Jane-Ruth property. The City brought a motion before the Ontario Municipal Board at the February prehearing conference to adjourn the hearing of the matter for six months in order for the City to carry out a secondary plan study. The Board, otherwise constituted, determined that the request was "clearly unreasonable" in view of the lapse of time between the original application and the report indicating the need for a secondary plan study. On March 8, 2004, the City then passed an Interim Control By-law affecting the Jane-Ruth lands and the lands to the north of the pull-back track, which Interim Control By-law was to expire six months from the date of enactment, that is September 8, 2004. That Interim Control By-law was also appealed to this Board.

The matters progressed toward a Board hearing. The City proceeded with a secondary plan assessment for those lands in the Vaughan Centre that were not designated under a secondary plan, including the Jane-Ruth lands. The applicant proceeded to change its plans by eliminating the townhouse component and including a 150 metre setback from the rail tracks.

The secondary plan study was completed and an Official Plan Amendment was adopted by the City of Vaughan before the commencement of the hearing. However, that amendment required the approval of the Region of York, and/or an appeal, for the amendment to be formally before the Board. Procedurally, that could not take place before the commencement of the hearing on August 16, 2004. The Board therefore seized itself of the matter of the OPA adopted by the City as Official Plan Amendment 607, and permitted the City to present the land uses proposed in that amendment as the preferred land use plan of the City during the hearing of the Jane-Ruth application.

### **Hearing**

The hearing took place over the course of seven weeks. The Board heard from 12 expert witnesses, including planners and noise experts called on behalf of each of the parties, the architect of the Jane-Ruth proposal and two market consultants called on behalf of Jane-Ruth, two experts on rail operations called on behalf of CN and Jane-Ruth, and an expert on odour called on behalf of Jane-Ruth. The Board also held an evening session to hear from residents in the area who had filed participant statements. At that session, the Board heard from 12 residents in the area, some in support of the

Jane-Ruth application and some opposed. The Board also heard a lengthy submission from Mr. L. Tinaz, an interested resident, during the course of the hearing.

The Board considered carefully all of the information and submissions provided to it in coming to its findings and decision.

### **Issues**

There was a lengthy issues list composed by the parties, and addressed by the witnesses. However, as the evidence evolved, the overarching issues became clear. Jane-Ruth, of course, was seeking approval of its proposed plan. CN was seeking an approval that ensured that any residential development on the Jane-Ruth lands would only take place beyond 300 metres of its pull-back track located to the north of the site. This is a separation distance, which is referred to in the Ministry of Environment Land Use Compatibility Guidelines, which guidelines address land use compatibility issues between land uses that are nuisance creators and land uses, which are particularly sensitive to such nuisances.

Vaughan was seeking a rejection of the Jane-Ruth proposal and related planning documents, and an acceptance, (and ultimate approval) of the land use policies outlined in OPA 607. Those land use policies designate the Jane-Ruth property for hotel and commercial uses, with the acceptance of high-rise residential uses on the immediate northeast corner of Rutherford Road and Jane Street, should it be demonstrated that a hotel use or some other gateway office building, is not feasible at that location.

As it happens, the immediate northeast corner of the intersection of Jane Avenue and Rutherford Road is beyond the 300 metre separation distance advocated by CN. Thus, there was general agreement among the parties that a high-rise residential use on the immediate northeast corner of Jane Street and Rutherford Road was an acceptable land use. There was also general agreement that there should be commercial uses between the north property line and a line 150 metres distant from the south track of the pull-back track. The area in dispute in terms of land use therefore, were the lands north of the valley that traverses the southwest corner of the site and south of a line 150 metres from the pull-back track.

The Board will identify the issues slightly differently from the way in which they were articulated in the Issues List, in order to accord with its findings in this matter.

1. Is there a generally accepted planning principle or some character inherent in rail operations, and specifically a rail yard that renders such operations predominant to any other use, in land use planning matters?
2. Is there special consideration given to rail yards for land use planning purposes in the Provincial Policy Statement? Does the Jane-Ruth proposal meet the intent of the Provincial Policy Statement with respect to protecting the integrity of the pull-back track rail corridor, and ensuring compatibility with adjacent rail corridor operations?
3. Do the High Density/Commercial uses proposed by Jane-Ruth conform to the intent and vision of the Region of York Official Plan, and the City of Vaughan Official Plan?
4. Do the Commercial Uses proposed in OPA 607 for the Jane-Ruth lands conform to the intent and vision of the Region of York Official Plan and the City of Vaughan Official Plan?
5. Which land use proposal should be preferred?
6. Does the height and density of the residential buildings in the Jane-Ruth proposal represent good planning?
7. How does the Ministry of the Environment Land Use Compatibility Guidelines apply to this proposal?
8. Does the Jane-Ruth proposal meet the intent of the Ministry of the Environment Land Use Compatibility Guidelines?
9. Will the Jane-Ruth proposal provide a reasonable living environment for future residents in terms of noise?
10. Can the noise mitigation measures proposed by Jane-Ruth be implemented by the Board?

## **Findings**

1. The Board finds that there is no generally applicable planning principle, or characteristic inherent in the operations of a rail yard that render all adjacent land uses subordinate to it in terms of land use planning.
2. The Board finds that there is nothing in the Provincial Policy Statement that provides special protection or predominance to a rail yard operation in terms of land use planning in the province. The Board finds that it is the impact of the rail corridor use in the pull-back track that must be considered in this case, and that the Jane-Ruth proposal, with modifications directed by the

Board, will meet the intent of the Provincial Policy Statement as set out in Sections 1.1.3(g) and 1.3.3.1.

3. The Board finds that the high density-commercial uses proposed by Jane-Ruth conform to the intent and vision of the Region of York Official Plan and the Vaughan Official Plan.
4. The Board finds that the commercial uses proposed by OPA 607 also conform to the intent and vision of the Region of York Official Plan and the Vaughan Official Plan.
5. In view of the evidence before this Board as to the absence of high density residential uses in the Vaughan Centre, when such uses were anticipated and envisioned in the Vaughan Official Plan; and in view of the evidence with respect to the need for, and market for, high density residential uses versus commercial or hotel uses in the City of Vaughan; and in view of the unique siting of the property within the Vaughan Centre community and its proximity to employment, shopping, entertainment, transit, and community services, the Board finds that the Jane-Ruth proposal, with the exception of the banquet hall use, provides a preferable mix of land uses for this site, over the uses proposed in OPA 607 for these lands.
6. The Board finds that the manner in which the Jane-Ruth proposal implements the density calculations in the Official Plan is incorrect and that the density of the proposed residential density is excessive for the site. The Board finds therefore, that the scale of the development must be reduced.
7. The Board finds that the Ministry of Environment Land Use Compatibility Guidelines are guidelines only, and are neither law, nor regulation, nor policy and should not be considered or treated as such, unless elements of the guidelines are incorporated into the applicable planning policies of a municipality. This is not the case here. To that end, the Board finds as follows:
  - The guidelines are intended to articulate the manner in which the Ministry of Environment suggests municipalities and landowners ensure compatibility between land uses, which are noise or nuisance creators, and noise or nuisance receptors. If appropriate, the standards and planning approach can be incorporated into Official Plan policies. If not, then the intent of the policies is to ensure compatibility of nuisance and sensitive land uses, as required in the Provincial Policy Statement. To that extent, the Jane-Ruth proposal should meet the intent of these guidelines, and the Board should have reference to the suggested methodology and the objective standards contained in the guidelines, in determining land use compatibility as between the high density residential uses proposed for the site and the

activity on the adjacent pull-back track.

- The Board finds that the activities on the CN Rail pull-back track, although part of the rail yard activities, should be assessed independently of the rail yard, as a discrete type of activity, in determining compatibility between that land use and the proposed residential land use.
  - The Board finds that the distance separation proposed by Jane-Ruth between the pull-back track and the proposed residential uses is satisfactory as part of a package of mitigation measures to ensure that residents of the proposed development, experience an acceptable level of noise in the living units.
  - The Board finds that mitigation, beyond what is proposed by Jane-Ruth, is required to ensure that acceptable outside noise levels are achieved on the grounds of the residential development.
  - The Board finds that the Jane-Ruth proposal, with some additional mitigation, meets the intent of the MOE noise mitigation guidelines.
8. The Board finds that the Jane-Ruth proposal, with some amendments will ensure compatibility between the activities of the CN pull-back track and the proposed residential development and will provide a reasonable and acceptable noise environment for the future residents.
9. The Board finds that the proposed noise mitigation measures can be implemented by any combination of provisions in the zoning by-law, conditions of condominium approval, and site plan agreement.

## **Decision**

The Board will therefore allow the appeals and approve the Jane-Ruth proposal subject to the following changes:

1. A banquet hall will not be a permitted commercial use on the site.
2. The property will be zoned so as to permit only commercial uses on the lands closest to the pull-back track and high density residential/commercial uses permitted only beyond a certain distance from the CN property line.
3. The distance from the CN property line within which residential uses shall not be permitted will equate to 150 metres from the south track of the pull-back track.

4. The Zoning By-law and/or Site Plan Agreement will provide for a berm and/or fencing along the northerly property line adjacent to the pull-back track, to reach a height of no less than 6 metres.
5. The Zoning By-law and Official Plan will require a minimum height of any commercial building adjacent to the pull-back track of no less than three storeys.
7. The Zoning By-law and Official Plan will provide for a total residential density of no more than 200 units per hectare, a total building floor area of 2.7 f.s.i., and a maximum building height of 16 storeys. The density and f.s.i. will be calculated over the lands used for the residential portion of the site only. Any one of these standards may operate to limit the amount of floor space, height of the buildings, and number of buildings.
8. The Zoning By-law and the Official Plan will be amended to accord with this Decision and as directed by the Board at the conclusion of this decision.

### **Order**

The Board will therefore allow the appeal with respect to the Interim Control By-law, and refuse to approve that by-law. So orders the Board.

The Board will withhold its order with respect to the Official Plan Amendment and the Zoning By-law, pending, in the case of the Official Plan Amendment, the submission of an amendment modified to reflect the decision of this Board, and, in the case of the Zoning By-law, pending the finalization of the Site Plan and a corresponding Zoning By-law.

The Board will remain seized of all matters related to this development, including the Official Plan Amendment, Zoning By-law Amendment, Site Plan approval, draft approval of a Plan of Condominium (should that matter proceed to this Board) and the approval of OPA 607, which will have to be amended to reflect the decision of this Board.

### **Reasons**

*Is there a generally accepted planning principle or some character inherent in rail operations, and specifically a rail yard, that renders such operations predominant to any other use in land use planning matters?*

Although not identified in the Issues List, a determination of this issue is required by the Board in order to respond to the thrust of the case put to the Board by CN.

The Board heard considerable evidence from CN's witnesses as to the national economic importance of CN Rail operations and the Macmillan Yard in particular. The Board also heard how provincial and municipal noise, nuisance and environmental laws do not apply to a CN operation. The intent was to demonstrate that if residents in the area were bothered by the noise, odor or other nuisance created by nearby CN operations, they would have no recourse against CN. The implication was also that there would be nothing to motivate CN to respond to their concerns.

Paradoxically, the Board also heard evidence and submissions with respect to the complaints from residents living near the MacMillan Yard and other CN rail yards, and the annoyance, nuisance and inconvenience this caused CN's management. The result, in the case of the MacMillan yard and the pull-back track, was the construction of a 6 metre high berm along the pull-back track between the pull-back track and the community center/ Villa Giardino retirement residence to the east; and between the pull-back track and the Maple Community subdivision to the north. There was also evidence of lawsuits and complaints to the Canadian Transport Board in respect of another rail yard.

The Board heard surprising evidence from the Superintendent of the MacMillan Rail Yard and the planner called on behalf of CN. It was the evidence of the Superintendent of the Macmillan Rail Yard that as an operator of the yard, he was not aware of any obligation CN may have towards adjacent land uses. He confirmed that he felt no responsibility to modify his operations in any way to mitigate any nuisance impacts or safety risks that the operations may pose to surrounding land uses.

Whether a modification involved track safety, such as manning the engines of the train cuts using the pull-back track; or issues of nuisance, such as using low level lighting to minimize light impacts on adjacent residents and investigating new types of lubricants that minimize wheel squeal while ensuring the safety of the train cars, the Superintendent felt no obligation to consider externally initiated change. The bottom line appeared to be, that the achievement of efficiencies and cost savings for CN operations should, and does, take complete precedence over the experience and enjoyment of the owners of adjacent lands.

Most astonishing was the statement by the Superintendent of the MacMillan Rail Yard, that the construction of high-rise residential units within 150 metres of the pull-back track would necessitate drastic measures to protect the security of the pull-back track, including high-powered, high level tower lighting which could create discomfort to any users of adjacent lands. However, over the course of this witness's evidence, it became clear that this witness was completely unaware of the kinds of uses that currently existed adjacent to the pull-back track, such as a community center, a hockey arena, a retirement residence and low density residential uses, all within 300 metres of the pull-back track. All of these uses had existed for some time adjacent to the pull-back track, with no increase in security.

The Superintendent's evidence was echoed by the planner called by CN. The essence of this planner's evidence was that because CN was unfettered by provincial and municipal controls, it could, and would operate without regard to the impact on adjacent properties. This approach was justified by the significance of the railway operations in the national economy, which overshadowed any other land use planning considerations. The evidence boiled down to a simple proposition. If CN does not want high-rise residential development within 300 metres of its track, then it should not happen. Public policy, planning and landowner interests are either secondary, or irrelevant.

The difficulty with this approach is that the same argument can be made on behalf of any number of large economic interests. To accept such an argument would raise the specter of future investigations into whether an industry is of such economic importance that it should be allowed to dictate the use of land in the vicinity of its operations and continue to operate in complete disregard of adjacent land uses.

While it is indisputable, and the Board accepts, that the rail industry, and the MacMillan Yard in particular, is of critical importance to the national economy, that fact does not lead to the inevitable conclusion that its economic importance alone should allow it to dictate what land uses should or should not be located near its operations.

The Board finds that unless an applicable planning policy has been adopted which establishes a unique role for rail operations in the planning hierarchy and the planning process in Ontario, rail operations should be considered as any other land use,

and the impacts of its operations on adjacent land uses should be accounted for and mitigated as required.

As well, the fact that CN operations are free from municipal and provincial controls is of limited assistance to this Board in making its decision. It is a consideration only in the sense that it underlines the importance of making planning decisions that ensure that land uses located near or adjacent to CN rail operations are only approved if the impacts of the operation can be satisfactorily mitigated, and an adequate environment created for the type of land use that is being proposed.

Finally, the Board finds that the Board cases cited by CN in relation to other rail yards in the province do not demonstrate any consistent Board principle, which enshrines the pre-eminence of rail yard operations in matters of land use planning. The Board also finds that the cases cited by CN are of little relevance to the case before the Board, because not one of them involves the activities of a pull-back track. The noise and nuisance emitted by the MacMillan Yard proper was not an issue in this hearing.

*Is there special consideration given to rail yards for land use planning purposes in the Provincial Policy Statement? Does the Jane-Ruth proposal meet the intent of the Provincial Policy Statement with respect to protecting the integrity of the pull back track rail corridor and ensuring compatibility with adjacent rail corridor operations?*

There are two key provisions in the Provincial Policy Statement that are relevant to the matters before the Board. The first section is 1.3.3.1. It is contained within the Section termed "Infrastructure", which deals with service infrastructure such as sewage, water, waste management and transportation.

Section 1.3.3.1 states:

"Corridors and rights-of-way for significant transportation and infrastructure facilities will be protected"

Infrastructure is defined as meaning sewage and water works, waste management systems and transit and transportation corridors and facilities, to name a few.

It was suggested to the Board that this clause gives infrastructure facilities, including rail yards, pre-eminence in land use planning, because it accords special protection to these facilities.

The Board is at a loss to understand how this statement can be construed as according special protection to rail facilities. The statement quite clearly affords protection to the corridors and rights-of-way, which accommodate transportation and infrastructure facilities. This makes perfect sense, because corridors and rights-of-way are a unique and difficult land use configuration to create and maintain. The reference in this statement to significant transportation and infrastructure facilities serves to identify the kinds of corridors and rights-of-way to be protected, as opposed to, for example, wildlife corridors and rights-of-way.

The Board accepts the argument that the statement is intended to ensure that development does not proceed to the detriment of identified corridors and rights-of-way for future transportation and service infrastructure. However, the Board also accepts that these corridors remain protected once they are established and being used by the infrastructure works. Thus, such corridors should only be encroached upon in a manner which respects the corridor and ensures the preservation of that corridor for the uses being made of it. Simple principles of good land use planning dictate that adjacent land uses must be protected from any safety hazards posed by the activities in such corridors.

The Board, however, rejects the suggestion by counsel for CN that this provision in the Provincial Policy Statement articulates a policy of protection that includes the constraint of adjacent uses where those uses pose no identifiable risk to the integrity of such a corridor, and where the safety and comfort of the adjacent land uses is assured. Thus, the Board rejects the argument of counsel for CN that no land uses should be built in the vicinity of such facilities that might raise the risk of complaints being brought against such facilities, or which might result in some minor protective modifications being made to the operations taking place in such a corridor.

The Board finds that there is no particular protection or pre-eminence given to a rail yard in the Provincial Policy Statement, and that rail corridors fall within the general protection provided in Section 1.3.3.1.

This conclusion is reinforced by the fact that there is special protection from incompatible adjacent development specifically afforded to airports contained in Section 1.1.3(g) of the Provincial Policy Statement. There is a specific reference to prohibiting certain development within certain noise contours around such airports. No such protection is given to rail yards.

The Board also finds that there is no threat to the integrity of the pull-back track corridor, or its use, inherent in the Jane-Ruth proposal. The Board finds that there are no safety risks posed to the residential use by the activities in the pull-back track, particularly in view of the 150 metre separation distance that is being proposed between the residential uses and the pull-back track and the intervening commercial use located between the track and the residential uses.

The Board is guided in its deliberations in this matter by Section 1.1.3(g), which provides:

Long term economic prosperity will be supported by planning so that major facilities (such as airports, transportation corridors, sewage treatment facilities, waste management systems, industries and aggregate activities) and sensitive land uses are appropriately designed, buffered and/or separated from each other to prevent adverse effects from odour, noise and other contaminants.

The Provincial Policy Statement directs that sensitive land uses be protected from nuisances created by major infrastructure or industrial activities through proper design, buffering and separation. The Board finds that with some additional buffering, the comfort of the residents of the Jane-Ruth proposal will be assured. The Board therefore finds that the Jane-Ruth proposal meets the direction set out in the Provincial Policy Statement.

*Do the High Density/Commercial uses proposed by Jane-Ruth conform to the intent and vision of the Region of York Official Plan and the City of Vaughan Official Plan?*

*Do the Commercial Uses proposed in OPA 607 for the Jane-Ruth lands conform to the intent and vision of the Region of York Official Plan and the City of Vaughan Official Plan?*

*Which land use proposal should be preferred?*

*Does the height and density of the residential portion of the Jane-Ruth proposal represent good planning?*

It is evident from the positions of the parties and it is the evidence of the planners, that both high density residential uses and commercial uses are appropriate for the site and do, therefore, comply with the applicable Official Plans. The planner for the City of Vaughan is proposing in OPA 607 that the site be primarily office/commercial uses with provision for a hotel use. The office/commercial/hotel combination of uses, is preferred by the City, however, OPA 607, also permits a high density residential use on the immediate corner of Jane Street and Rutherford Road. The issue appears to be therefore, how much of the site should be used for high density residential uses, and how intense the residential use should be on this site.

The position of CN on this matter is simply that no high-rise residential uses should be closer to the pull-back track than 300 metres. CN claims that this will eliminate any noise impacts on the residential uses, and therefore the risk of any complaints to CN with respect to their operations.

The position of the planner for the City is that the high density mixed use vision for the Rutherford frontage of the Vaughan Centre has not been realized. Rather, a less dense commercial character has emerged, both along the north side of Rutherford Road, and the west side of Jane Street. It is the planner's view therefore, that the more suburban, commercial character of development that has emerged along the Vaughan Centre's major roads should be acknowledged and extended into the remaining unplanned area of the Centre.

This view was vigorously disputed by Jane-Ruth. Through cross-examination and direct evidence, Jane-Ruth put forward the proposition that the Centre was developing as envisioned, and that when a center evolves, it often develops with less intensive commercial uses first, and then, over time intensifies with more high density residential and commercial office development taking the place of the less intense commercial malls and plazas.

It is the Board's view that it must look to the vision of the Centre as articulated in the Official Plans, and determine how the land under consideration here can best meet the goals and objectives of those plans, in view of the manner in which the Centre has developed to date.

Thus, if high density residential development is envisioned and has not been realized in the Vaughan Centre, and if such development can be appropriately located on this site without impact on other uses, and without any loss of quality in the residential living environment, then high density residential is an appropriate use. Similarly, the combination of commercial uses, either with a hotel or with a high density residential use, if envisioned in the Official Plan policies for the Vaughan Centre, could be an equally acceptable use, if established without impact on other uses and without any loss in the quality of the Vaughan Centre community.

The Regional Official Plan establishes the land use planning strategy for the region. It establishes as objectives the need to promote a transit supportive urban structure that includes compact, diverse and efficient communities and a system of urban centers and corridors. It encourages mixed use areas, focused in centers and corridors, and requires that industrial and commercial uses requiring separation are located so as not to interfere with potential mixed use areas or other uses that may be affected. It promotes the creation of a broad mix and range of housing including different housing forms, types, and tenures, to satisfy the needs of the Regions residents.

The Regional Plan sets out a Regional Growth Management Strategy. It establishes a system of centers and corridors that are to provide a focus for compact, transit supportive residential and commercial development. Centres are to be the point of concentration of residential, human service, commercial and office activity, at the heart of a community.

There is to be a hierarchy of centers. Regional centers are to have the highest concentration and intensity of uses in the Region. The Plan states: "These areas would be a focus of business, government, entertainment and culture within the Region with complementary medium-density and high density development." The Plan then provides for a series of urban and local centers to be identified in the area municipal plans. Urban centers are to be areas of concentrated development in the urban area, while local centers are to "serve towns and villages as well as rural and agricultural areas".

The Regional Plan states that urban centers are to have the same kind of uses as in the regional center, "with greater emphasis on residential and local employment

uses". Urban centers are to have the highest density and mix of uses with the exception of regional centers. The Plan also states that urban centers can "vary in size, scope, role and function".

The Regional Plan also has policies, which relate directly to rail activities. Under Section 6.6, dealing with "Goods Movement", the Plan states:

It is the policy of Council....

3. To support a safe and efficient railway network by:

- a) recognizing the importance of the Region's rail classification facilities as key components of the rail network;
- d) ensuring that noise, vibration and safety issues are addressed for land uses adjacent to railway corridors and terminal facilities; and
- e) encouraging rail operators to place a greater emphasis on improving the technology for the design and operation of railway facilities and improving the maintenance and inspection of these facilities, where possible.

The Regional Plan clearly directs that noise vibration, and safety issues be addressed for land uses adjacent to railway corridors. It also encourages rail operators to review their operations, facility design, maintenance and inspection procedures. Therefore, although the Superintendent of the MacMillan Yard may not believe that the rail yard operation has any responsibility to the landowners and uses around it, the Regional Plan, by addressing rail operations in a land use planning document, clearly articulates the view that, in fact, the railway does have such a responsibility.

The Vaughan Official Plan, which applies to these lands, is OPA 600. OPA 600 is an updated version of Official Plan Amendment 400 for the City of Vaughan. OPA 400 provided planning policies for the development of four of the older municipalities, as well as a number of new communities, which combined to make up much of the City of Vaughan. The consolidated version of OPA 600 is an amalgam of the original OPA 400 and other secondary plans, which implement the overarching policies of OPA 400. To understand the Plan, one must be carefully guided through the history of the development of the plan, and the secondary plans which were passed and which further amended the plan as it applied to specific areas of the municipality. The Board will not

repeat the exercise in this decision, but has reviewed and is familiar with, the historical context, which informs how this Plan is to be read.

The Plan notes in Section 4.1 Urban Structure Plan that the Vaughan Official Plan anticipates a strong market for low-density housing in the foreseeable future, and that the Official Plan anticipates this demand, "while also providing sufficient medium and higher density housing to achieve the City's transit objectives".

In Section 3.0 of the Plan, the Urban Structure Concept is articulated. Section 3.2 states:

This Plan envisions an urban structure for Vaughan in which Vaughan Corporate Centre, containing a Regional Centre..... and Vaughan Centre, an urban center, play central roles reflecting the City's civic and corporate image. These centers will serve all parts of the City with a high order of retail, cultural, recreational community and civic facilities and services.

In outlining the role of other communities in the plan, Section 3.3 states:

For City-wide facilities, however, the communities will rely upon and be supportive of Vaughan Centre and Vaughan Corporate Centre.

In Section 3.8 "Supportive Role of Transportation System", it states:

The City's transportation and public transit system will be designed to facilitate efficient linkages between the two Centres and the communities and to encourage the evolution of Vaughan Centre and Vaughan Corporate Centre toward the achievement of their planned roles as the focal points of Vaughan.

It is clear therefore, that the Plan envisions Vaughan Centre, within which the subject lands are located, as the central urban centre in Vaughan, second only to the regional centre of Vaughan Corporate Centre. There was much debate in this hearing as to the relative importance of Vaughan Centre as an urban centre. The above-cited policies in the Vaughan Official Plan, combined with the policies about urban centers in the Regional Plan, make it clear that there can be any number of urban centers in an area municipality, which may vary in size, scope, role and function. It is also clear from the policies set out in Section 3 of the Vaughan Official Plan, that Vaughan Centre is a centre of City-wide importance. As a centre for the City as a whole, it must therefore be the centre having the largest size, the broadest scope, the biggest role and the most significant function for the City, next to the regional centre of Vaughan Corporate Centre.

Section 4.1.1(iv) states that "Vaughan Centre shall be an urban centre as defined in the Regional Official Plan including a mix of high and medium density residential uses, retail, office, community, cultural, recreational, civic, entertainment and tourism oriented ..... In 4.1.1(vi), the Plan states that: "Vaughan Centre is expected to accommodate approximately 3000 residents at full development, in predominantly medium and high density housing forms."

There are other, more specific policies for the Vaughan Centre, but these relate to the areas of the Vaughan Centre for which specific secondary plans have been passed.

Reviewing the policies, it is clear that the Vaughan Official Plan anticipates both commercial/office uses, hotel uses, as well as high density residential uses. Thus, absent any site constraint that cannot be properly mitigated, both the policies of proposed OPA 607, with permitted land uses of office, commercial, hotel, and some high density residential, and the policies proposed by Jane-Ruth which would permit more high density residential with some commercial/office uses, would meet the intent of the current policies of the Regional and Vaughan Official Plan.

The planner in support of OPA 607 offered the opinion that a commercial/office/hotel use was preferable, to reflect the commercial uses that had developed thus far in the Vaughan Centre along the major arterial roads. He suggested that in light of the proximity of Paramount Canada's Wonderland, and the Vaughan Mills Centre Mall, a hotel would be appropriate for the site.

He offered some evidence that there was no demand or lack of supply of high density housing, now or in the future, and that the lands should support and reflect the employment uses to the south of the subject site, and the commercial uses developed, and or developing, along Jane Street and Rutherford Road. He pointed to the rezoning of the Canadian Tire site on Rutherford Road from high density residential to commercial, as evidence that the Vaughan Centre would not, and should not now, or in the future, accommodate much high density residential use. He does, however, provide in OPA 607, for a high density use on the immediate corner of Rutherford Road and Jane Street, in the event a hotel use or landmark office use, is not deemed feasible.

The difficulty in this thesis is simply that the Official Plan clearly anticipates high-density residential uses within the Vaughan Centre, and although no such development

has occurred to date, the approval of the Jane-Ruth proposal will provide such uses in the near future. Furthermore, this planner admitted that a hotel use would not be a transit-supportive use and that some high density residential use on the land was appropriate.

In addition, the Board heard from two experts in land use economics and demand. The Board accepts their evidence that there is more than enough land available for intense office and retail uses in Vaughan and very limited demand. The Board also accepts these witnesses' evidence that there is a limited demand for a hotel use, and that the Jane-Ruth site would not be the most desirable site for such a use given its distance from Highway 400. The Board also accepts the evidence of these experts that there is a need for high density residential housing in Vaughan, and that there is a credible projected deficiency in the supply of such housing to meet future needs in Vaughan.

The Board refers to a number of reports prepared for the Region with respect to housing and cited in Mr. Feldgaier's witness statement. These reports speak to the lack of appropriate housing in the Region to meet the needs of many sectors of the population, especially young persons, seniors, lone parent families and single person households. In particular, a report prepared by Advisory Services/ GPA on behalf of the Region of York, entitled "Competitive Assessment of York Region, Final Report", states:

A number of senior representatives that were interviewed also pointed out that the region in general and their community in particular lacked suitable housing to meet the needs of the majority of their labour pool.... The lack of apartments and affordable housing gives the majority of these employees no alternative but to commute and the lack of good public transit limited their options forcing most to drive. This has exacerbated the traffic and congestion in the Region and given some presidents and senior officials a reason to rethink their location options within the GTA.

This observation was reinforced for the Board when the Board heard from residents in the area. A number of residents, who were part of the Islamic community who attend and center their social, spiritual and cultural life around the mosque to the north of the subject site, pleaded with the Board to approve the development. In their view, it would provide affordable and appropriate housing within an easy bus ride to the mosque, for members of their community. These residents cited the lack of such housing in the area and in the City, in general.

In addition, there is an existing low density residential subdivision between Highway 400 and Jane Street, with parks and schools. This area is surrounded by commercial development. If residential development does not occur on the Jane Ruth site, there is no other site in the Vaughan Centre for which residential uses are currently planned. This existing residential area, then, will be completely isolated, and not part of a vibrant mixed use City Centre. The Jane-Ruth residential development will inject some diversity in the housing stock and yet add some continuity in the residential nature of the uses in the area.

The planner supporting the uses proposed in OPA 607 cited the fact that the Jane-Ruth site would be isolated from the other residential communities. The Board finds that, far from being isolated, it will continue the theme of mixing residential uses with commercial uses outlined in the Vaughan Official Plan. Furthermore, the Board finds that the one residential building suggested by this planner could, in fact, run the risk of being an isolated entity. Thus, further residential buildings are preferred, to create the sense of a high rise residential community in the area.

The property is near a school in the low-density residential area to the west, and near the district park to the east. The site is adjacent to an employment area to the south, and in the center of an area, which can provide all manner of shopping and entertainment experiences. Furthermore, there is a regional transit centre planned on the southwest corner of the Jane and Rutherford intersection, in conjunction with the Vaughan Mills development. A high density residential development on this site will fulfill the planning policy objectives of being transit supportive, while that transit centre will meet the transit needs of the residents. There are community services such as churches, mosques, parks and other public schools a short distance to the north and the northwest.

The Board finds that, absent any site constraints, the site is uniquely suited to support a high density residential development in an evolving urban mixed use area. The Board also finds that, in general, the proposal for commercial uses on the northerly portion of the Jane-Ruth lands between the pull-back track and the residential uses is appropriate and in line with the vision set out in the Official Plan. However, the Board is not persuaded that a banquet hall or any similar facility is an appropriate use on these lands, given the proximity of the pull-back track, and the residential uses nearby.

Therefore, based on the evidence before this Board as to the absence of high density residential uses in the Vaughan Centre, when such uses are anticipated and envisioned in the Vaughan Official Plan; and in view of the evidence with respect to the need for, and market for, high density residential uses versus commercial or hotel uses in the City of Vaughan; and in view of the unique siting of the property within the Vaughan Centre community and its proximity to employment, shopping, entertainment, transit, and community services, the Board finds that the Jane-Ruth proposal, with the exception of the banquet hall use, provides a preferable mix of land uses for this site, over the uses proposed in OPA 607.

The issue then becomes whether the proposed height and density of the residential development is appropriate for the site.

There is an issue that needs resolution in order to determine the actual density being created by the Jane-Ruth proposal. The proposal as presented to this Board will result in a total of 967 units. The proponent claims that that number of units represents a density of 194 units per hectare (uph), or 2.05 floor space index (fsi). However, the City claims that the actual density is 307 uph and a 3.1 floor space index. The distinction lies in the interpretation of the density calculation provisions in OPA 600.

Jane-Ruth is proposing to have the buildable portion of the site (excluding the ravine) designated High-Density Residential-Commercial under the Official Plan. The south portion of the site is currently proposed for residential uses only, and the area next to the pull-back track is to be used exclusively for commercial uses.

However, Jane-Ruth applies the density calculation for the residential portion of the site to the whole of the site, including that area within which only commercial uses are permitted, on the assumption that the entire site is Residential/Commercial.

The City argues that a density calculation across an entire site as proposed by Jane-Ruth is appropriate only when the commercial and residential uses are vertically integrated.

The Board accepts the position of the City in this regard. The Board finds it inappropriate to calculate density across the entire site, when the commercial portion of the development is not functionally or physically related to, or integrated with, the residential portion of the density. The Board is not persuaded by what appeared to be

an example of the approach advanced by Jane-Ruth, in another City report. The Board was not clear on the physical or functional relationship between the residential and commercial portions of the development in that report.

In any event, the Board finds that the Official Plan specifically directs a different method for calculating density for a mixed use site. Section 4.2.1.4(iv) of OPA 400 states:

The area included in the calculation of residential density shall include the land for the buildings, private roads, and roadways, parking areas and landscaping, and amenity areas related to the specific high density development, but shall exclude all other lands.

Jane-Ruth argued that another provision related to the calculation of the commercial density supports its method of density calculation. The Board finds that the above section of OPA 400 is clear and definitive, and that Jane-Ruth cannot calculate density across the entirety of its site. Thus, those lands exclusively used for commercial purposes must be excluded when determining residential density.

The Board therefore finds from the evidence that the actual density for the residential portion of the site is 307 uph. The fsi for the residential portion of the site is 3.172 fsi.

As indicated above, the Board finds that Vaughan Centre is intended to be the most significant urban centre in the City, according to OPA 600. Thus the residential densities should reflect the central, focal role Vaughan Centre is intended to play in the City as a whole, as well as the capability of the site to support the proposed density.

The parties agreed that there were no traffic issues occasioned by the density proposed for the site. There was no claim to adverse impacts on other commercial or residential land uses, with the exception of the adjacent pull-back track. Thus, there are no functional impacts from the proposal that would constrain the density or height.

While the City pointed to the heights and densities set out in other Official Plan Amendments affecting the Vaughan Centre as determinative of what should be permitted on this site, the Board does not find these references particularly helpful. None of the high density residential objectives set out in those amendments were met and thus there is no particular high density character identifiable within the Vaughan Centre. The Board must therefore assess the role of the Vaughan Centre in the context

of the other, lesser, urban centers in Vaughan, and relate the heights and densities permitted here with the heights and densities permitted in what are intended to be smaller urban centers.

The maximum density permitted in other urban centers cited to the Board is not greater than 150 uph. There was no evidence as to the actual unit density of high rise buildings in other urban centers. The Board finds that a somewhat higher density of units than is permitted in other centers, would be appropriate.

There was little to no use of the fsi measure in other centers. The fsi measure is helpful to the Board in assessing the massing of the buildings on the site. There was reference to a building having an fsi as high as 2.69 in the Thornhill Town Centre. As well, it was the evidence of the planner for the City that an fsi of 2.5 would be appropriate as a limiting factor for the massing of the building on the corner, so that it does not dominate the street. It would seem, therefore, that an fsi somewhat larger than 2.5 for the whole of the site would be appropriate.

With respect to heights, the Official Plan provisions ranged from 8 storeys to 12 storeys for parts of the Vaughan Centre, although there is provision on the Vaughan Mill's site for a 50 metre hotel building. There was also evidence of a 16 storey residential building in the Thornhill Town Center.

The Board finds that the current proposal represents an excess of residential density for the site, even given its location in an important urban centre. Furthermore, the Board is mindful of the evidence of the acoustical consultants who have indicated that the issues with noise increase with the height of the building.

The Board finds that the density should be greater than that permitted for other urban centers, and therefore finds that a density of 200 uph and an over all f.s.i of 2.7, for the residential portion of the site would be appropriate. This would result in approximately 600 units, which would be appropriate, considering the site and the general population projections for the area. Although the Vaughan Centre can certainly contain more high density units, they need not all be on this site.

As well, the Board finds that the height of the buildings should be limited, so as to lower the number of upper floors exposed to the noise from the pull-back track.

Accordingly, the Board will limit the height of the buildings to 16 storeys, equivalent to one of the highest buildings currently existing in the City.

Thus, the Board finds that a maximum density of 200 uph is appropriate for this development, with a maximum fsi of 2.7, the maximum fsi in Vaughan as indicated by the evidence, together with a height limit of 16 storeys. All density calculations are to be made according to the Board's findings on the correct interpretation of the Official Plan. Any one of these indicators may be the limiting factor on the number of units, the height and the amount of floor space in the development.

*How does the Ministry of the Environment Land Use Compatibility Guidelines apply to this proposal?*

*Does the Jane-Ruth proposal meet the intent of the Ministry of the Environment Land Use Compatibility Guidelines?*

*Will the Jane-Ruth proposal provide a reasonable living environment for the future residents in terms of noise?*

Having determined that the proposed development is appropriate for the site, and conforms with the vision of the area as established in the Regional and Vaughan Official Plans, the Board must then look to the site constraints. The only site constraint at issue before the Board was the issue of the pull-back track immediately north of the subject site. Both of the opponents of the proposal are of the view that the existence of the pull-back track and the noise occasioned by the activity therein, constrain the site to the point that residential is not appropriate on the site, other than on the immediate corner of Jane and Rutherford.

The parties were in agreement that vibration and odour were not in issue in terms of constraining development on the site. The key impact was noise. Furthermore, it was not the noise generated by the MacMillan Rail Yard southeast of the site which was in issue, but rather the noise occasioned by the train cuts which made use of the pull-back track in servicing the rail yard.

In dealing with this issue, the parties focused almost entirely on the provisions of a number of land use compatibility guidelines issued by the Ministry of the Environment. These guidelines address land use conflict issues that can arise when nuisance-

generating activities are located adjacent to or in proximity to sensitive uses, such as residential uses.

A great deal of evidence and argument focused on the application of these guidelines to the matter at hand. Much of the argument was aimed at interpreting the precise wording of the guideline and then insisting that the words be applied exactly to the issues at hand.

The Board notes that this guideline is just that – a guideline, which is useful and ought to be referenced by proponents of development, their consultants and by government decision makers. It is useful in interpreting the policy and regulations that govern land use planning decisions. The standards can also be included in municipal planning documents, if appropriate.

However, a guideline does not bind a decision maker. It is useful in determining the intent of the applicable planning policies, both provincial and municipal, and in ensuring that the planning policies are met.

To this end, therefore, the Board is guided by Section 1.1.3(g) of the Provincial Policy Statement, and by Section 6.6.3 of the Regional Official Plan. Both of these Sections require that impacts from noise, vibration and other nuisances must be properly mitigated before planning for sensitive uses adjacent to, or in the vicinity of, large nuisance-generating industrial or transportation operations. The guideline assists decision makers in ensuring that this takes place.

The guideline offers various approaches to mitigation, and outlines the standards that the guidelines suggest should be met in order to ensure that land use incompatibility is avoided. In particular, in this case, the guideline assists in determining whether an acceptable living environment can be achieved for the residents of the proposed development.

The Board was referred to the following guidelines:

D-1 – Land Use Compatibility Guideline - intended to assist in the preparation of land use policies and in the review of general and specific development plans to ensure the mitigation of adverse effects arising from the nuisance aspects of certain facilities

D-1-1 – Land Use Compatibility Implementation Guideline – to ensure the identification, separation and protection of nuisance creating facilities and sensitive land uses.

**D-1-3 – Definitions used in the Guidelines**

**D-6 – Compatibility between Industrial Facilities and Sensitive Land Uses – to ensure the minimization or prevention of the encroachment of sensitive land uses on industrial land uses and vice versa.**

The above guidelines deal primarily with separation distances as the means of mitigating the adverse impacts of nuisances on sensitive land uses.

The Board was also referred to

Publication LU-131 – Noise Assessment Criteria in Land Use Planning

Annex to Publication LU-131

Noise Assessment Criteria in Land Use Planning: Requirements, Procedures and Implementation.

As is obvious, there are a bewildering array of "guidelines"; all of which apparently deal with the same topic – mitigating the impact of nuisance emanating from industrial or transportation related operations; all with slight variations in how one might approach these issues. The wording of each of these guidelines was parsed and opined upon by many of the witnesses, and applied as if the provisions were law. The Board cannot help but note that some rationalization of these guidelines by the Ministry would be of more assistance to land use planners and decision makers.

The Board will not attempt to rationalize or make sense of this multitude of guidelines and will certainly not attempt to interpret each one. The Board relies on the evidence of two eminent acoustical experts, one called by Jane-Ruth and one called by CN. Both of these experts stated that when approaching a problem of the compatibility of a sensitive use and a noise source, they looked to the provisions of Publication LU-131. That guideline requires that site specific testing take place to determine the levels of potential noise to be generated; that a set of noise standards included in the guideline should be met at various adjacent land use receptors; and that mitigation measures should be implemented in order to meet those noise standards.

Both the City and CN urged upon the Board to find that the MacMillan Rail Yard, including the pull-back track meet the definition of a Class III Industrial Use, and that a nearby residential use must therefore meet the recommended minimum distance separation distance of 300 metres from the noise source set out in Guideline D-6.

The Board rejects this approach for the following reasons:

1. The Board is of the view that the separation distance mitigation measures are intended to assist municipalities in developing broad land use policies applicable to situations where there could be nuisance creators near nuisance receptors. These mitigation measures are also of assistance where site-specific studies of the area of influence, the type of impact and the means of mitigating that impact, are not available. Specific studies are available in this situation.
2. These guidelines deal with separation distance as the major mitigation measure – in particular when more detailed information is not available. The Board accepts the evidence of Dr. Lightstone that separation distance is but one of a number of mitigation measures that can be taken to minimize adverse noise effects.
3. The Board does not need to determine whether or not the MacMillan Yard is a Class III Industrial Use, because it is the activities of the pull-back track alone that are relevant here. The activities in the rail yard are only relevant insofar as they affect the nature and frequency of activity in the pull-back track. The activities in the rail yard do not directly impact the property. The Board finds that it is the pull-back track activities as a discrete noise source that are important. The classification of the pull-back track activities as an "industrial facility" would be an artificial construct which would be of no assistance here.
4. Section 4.6.1 of the Guideline D-6 states: "Noise shall be addressed through Ministry Publication LU-131 for all situations applicable to this guideline." This accords with the opinions given by two of the three acoustical experts called in this hearing.
5. CN and the City were urging upon the Board that a separation distance be applied that equated to 300 metres from the south pull-back track. The guideline requires that the separation distance be measured from the property line of the land on which the activity is taking place. If the separation distance were measured from the property line, it would eliminate the possibility of a residential building *anywhere* on the property.

The opponents are, therefore, urging the Board to accept a separation distance that is less than is suggested by the guideline. The opponents offered no logical, scientific or planning rationale, to justify the acceptance of a lesser separation distance here, than is suggested in the guideline. This calls into question the rationality of blindly applying a separation distance specified by the guideline, and confirms to the Board that a 300 metre separation distance is not a helpful construct in this situation.

The Board therefore takes LU-131 as the most helpful of the guidelines put before the Board.

There was no dispute among the parties as to the adequacy of the work completed by the acoustical expert acting for Jane-Ruth. All parties and experts agreed that the assumptions, the methodology, the modeling and the results were appropriate, complete and accurate.

It is important however to understand that the modeling of predicted noise levels was based on an activity level on the track which is approximately 25% higher than the highest level of activity that has been achieved to date on the pull-back track. This was confirmed by the evidence of the Superintendent of the MacMillan Rail Yard, and was agreed to in order to anticipate any future increase in activity on the pull-back track.

The noise modeling also assumes that each and every train cut that travels the pull-back track will travel to the end of the track adjacent to the Jane-Ruth property, when in fact the evidence shows that only about 50% of the train cuts will actually reach the Jane-Ruth property. This level of activity around the Jane-Ruth property is significantly lower than the level of activity towards the more easterly portion of the pull-back track, near the Villa Giardino retirement residence or the single family residential community around Melville Street.

There was an agreement among the parties that the assessment of impact would be based on an assumption that the source of noise was a "Stationary Noise Source". This implies a different set of noise impact criteria.

For many reasons, including the evidence put to the Board of the frequency of train cut activity adjacent to the Jane-Ruth property and the definition of "Stationary Source" set out in Guideline LU-131, the Board is not persuaded that the activities on the pull-back track fit within the characterization of a stationary noise source as it is described in the guideline. After much questioning of the expert witnesses called at this hearing, the Board is of the view that the nature of the activity on this track is much more in the nature of a transportation corridor noise source, rather than in the nature of an industrial or commercial activity.

However, the Board accepts the agreement of the parties in this regard. It provides for a more stringent approach in the standard, which must be met to mitigate

noise for the proposed development. If the Board is assured that the proposed mitigation is appropriate, then the Board can be confident that the mitigation measures will provide an acceptable living environment for any residents of the development.

The result of the testing, completed by Dr. Lightstone, the acoustical consultant for Jane-Ruth, indicated exceedances over the standards set out for a stationary noise source of between 1 and 7.5 dBa for three of the buildings during the quietest day time hour; and exceedances of between 3 and 12 dBa for all of the buildings during the quietest night hour. The exceedances were detected at the plane of the walls of the buildings facing the pull-back track.

Paradoxically, the agreement among the parties to treat the noise generated by the pull-back track as a stationary noise source is the basis for a fundamental disagreement between the parties as to whether the noise can be appropriately mitigated. Had the noise source been treated as a transportation noise source, the noise standard would be an indoor sound level criteria. Because the noise is treated as a stationary noise source, the criteria are established at the plane of a living area window during the day, and at the plane of a bedroom window during the evening.

CN and the City therefore argue that once the acoustical modeling demonstrates exceedances over the LU-131 criteria at the building face, or at any window, then prima facie, the residential development cannot proceed, because the sound cannot be mitigated.

Jane-Ruth on the other hand maintains that, in fact the noise can be mitigated for the residents by a number of means that are contemplated in LU-131 as follows:

- Distance separation of 150 metres from the south track.
- Intervening use in the nature of a commercial use.
- The construction of an enclosed balcony along building walls where there are noise exceedances. The enclosure would act as a barrier to the sound experienced on the balcony and at the window of any adjacent living room windows or bedroom windows. All of the living rooms and bedrooms facing the balcony would have windowed doors or other window treatments, and the noise levels at the pane of these windows would meet the noise criteria set out in LU- 131 for a stationary noise source.

- The use of window material designed to reduce the full spectrum of noise on the balcony to meet the guideline.

There was a great deal of evidence as to the nature of the space which would be created on the balcony as a result of the proposed design, and about the use residents would make of it. Fundamentally, the City and CN maintain that the balcony, once enclosed, becomes a living space, and will be used as a living space. Based on this prediction of the behaviour and actions of the residents, the development should be refused because the noise levels on the outside of the windows of the balconies will exceed the guideline.

The Board does not accept these arguments. It relies on the clear wording of LU-131 and in particular the following sections:

#### 1.1 Scope

This Publication defines criteria for noise impact assessment of proposed residential or other noise sensitive land uses..... The Publication also specifies procedures for the establishment of sound levels on the site of proposed noise sensitive uses due to transportation sources (road, rail, and air traffic) as well as stationary sources (such as industrial and commercial activities). Acceptable noise control measures are enumerated.

Responsibilities for achieving the sound level criteria that ensure a comfortable living environment are assigned. Guidance in the form of good planning criteria and procedures is provided for development of noise sensitive land uses adjacent to industrial or commercial uses.

This section sets out the purpose of the guideline and confirms that the goal of the guidelines is to ensure that a comfortable living environment is created for residential uses.

## 2 Definitions

“Control measure” refers to action which can be taken to achieve compatibility for the specific land use or activity. The control measure should be permanent in nature and not be readily removable or alterable by the future occupants. Control measures may include, but are not limited to, the following:

Acoustical Barriers – berms, walls, favourable topographical features, other intervening structures:

Building Construction – acoustical treatment of walls, ceilings, selection of acoustical materials and other control devices. Provision for air conditioning;

Site Planning – orientation of buildings and Outdoor Living Areas with respect to noise sources, spatial separation such as the insertion of noise insensitive land uses between source and receiver, appropriate setbacks and the use of intervening service roads;

Windows/Doors – acoustically designed windows or doors that provide the required noise reduction. In order to allow the windows and doors to remain closed, air conditioning, i.e. mechanical ventilation and climatic control system, is necessary.

This section establishes a number of things. Firstly, it establishes that the concern about noise levels at the pane of window relates to the potential for occupants to remove or replace special acoustically designed windows and doors. It establishes the fact that acoustically designed windows and doors are acceptable mitigation measures, as is acoustical building construction measures and the design of residences. It establishes that air and climate control are part of the measures that are necessary when doors and/or windows are used as a noise barrier.

Publication LU-131 specifies that the daytime plane of window criteria apply to living/ dining rooms, and that the nighttime plane of window criteria apply to bedrooms. The Board has also carefully considered Section A.2.1.4 of the Annex to Publication LU-131 and finds that it specifically contemplates sealed, inoperable windows and air conditioning as a potential mitigation measure for multiple unit high-rise residential buildings. The Board finds that the reference to inoperable windows means bedroom windows and living room/dining room windows. In this case, the bedroom and dining room/living room windows will not be sealed or inoperable.

The Board has carefully considered the provisions of LU-131 and the Annex to LU-131, and Exhibit 53 filed with this Board, which outlines the reduction in noise levels, which can occur with a normal window used to enclose a balcony, even with open windows. The Board finds that the mitigation measures proposed by Jane-Ruth are specifically contemplated by the Guideline Publications and that they can successfully operate to achieve the goal of mitigating the noise at the relevant points in the residences and meet the noise level criteria set out in the guidelines.

The Board finds that it is irrelevant how future residents choose to use the balcony space to be provided in these residential units. The balcony space is provided as a balcony. The designs of the units were provided to the Board, and there were

clearly bedrooms, living rooms, kitchens, dining rooms and, in some units, dens provided in the units. Some bedrooms and living rooms were accessible to the balcony by French or sliding windowed doors. Should the residents choose to make the balcony a living space, then one must assume that they are comfortable with the noise levels on that balcony. The balcony is an optional space, which may or may not be used year round. Suitable and adequate living, dining and bedroom space is provided in the unit, and therefore, no resident is forced to make use of a space where noise levels might be higher.

Finally, the Board finds that the caveats contained in Publication LU-131 with respect to sealed and inoperable windows as a noise mitigation measure are aimed at the use of these measures in ground level housing, where the resident's ability to open windows and remove or replace windows is unlimited. In high-rise residential buildings, it is rarely open to the residents to replace the acoustical window material enclosing the balcony or to force windows installed as part of the enclosure to open wider than they are designed to do.

The Board therefore finds that the applicant has demonstrated to the satisfaction of the Board that the mitigation measures can achieve the MOE noise mitigation criteria set out in the guidelines. The Board is therefore satisfied that these measures, properly implemented will meet the intent of the guidelines and provide a comfortable living environment for the residents.

The Board is not however, prepared to allow the 5 dBa flexibility that is suggested in the guideline. It is suggested in the guideline that a 5 dBa latitude may be applied when it is not technically feasible to achieve the criteria. The evidence before the Board is that it is technically feasible to achieve the stationary source noise level criteria on the balcony and at the pane of window of the bedrooms and living rooms. The Board will hold the proponent to that evidence, and is approving the development on that basis.

The proponent will be required to design the building and use construction materials, windows and doors that will achieve the required noise level criteria on the balcony. The proponent will not be required to provide only windows that are sealed or inoperable. Provided the enclosure of the balcony reduces the noise to levels that meet

the criteria set out for stationary noise sources in LU-131 and the Annex, then a window opening is acceptable. This allows the residents choice in their balcony environment.

The Board is however concerned about the outdoor noise level for the ground related outdoor amenity space. The Board is not satisfied that the Sound Level Criteria for an Outdoor Point of Reception can be met on all areas of the residential development.

The Board will therefore require additional ground-related mitigation measures, unless the proponent can demonstrate to the Board that in the absence of such mitigation measures the sound level criteria can be met, or that the mitigation measures will clearly not operate to reduce noise levels on the grounds of the residential lands. To that end, the Board will require the following:

....A berm or combination berm/fence to a height of 6 metres shall be constructed along the common property line between the CN pull-back track and the Jane-Ruth property.

....The zoning by-law and Official Plan will provide that any commercial building constructed on the lands between the pull-back track and the residential lands shall be a minimum of three storeys high, in order to ensure a substantial intervening use in that space, and in order to shield the residential grounds from noise.

*Can the noise mitigation measures proposed by Jane-Ruth be implemented by the Board?*

This issue was raised as a result of the concern of CN and the City as to the ability of the Board and the municipality to implement those noise mitigation measures which involve the form, type, and materials of windows and doors required to mitigate the noise. In particular, the parties advised the Board that warning clauses cannot be registered on title in site plan agreements.

The Board does not view warning clauses as a mitigation measure. This view accords with the provisions of the MOE noise guidelines. The MOE guidelines state that warning clauses should not be relied on as a mitigation measure.

However, noise warning clauses do provide information to prospective residents of the community to allow them to make informed decisions when purchasing

residences. During this hearing, the Board heard of people who had been duly warned of the potential for noise in areas near the pull-back track, and disregarded those warnings, or failed to make their own investigations as to whether they were sufficiently comfortable with the noise levels to proceed with a purchase. The Board finds that such complaints do not attract sympathy.

The Board heard sufficient evidence of ways in which these mitigation measures can be assured, some of which are standard practice in the City of Vaughan. The Board therefore finds that the mitigation measures can be implemented as follows:

1. A provision in the site plan agreement that requires that further noise studies be completed to recommend the materials and construction methods to be employed to meet the stationary noise source criteria in all areas of the proposed buildings.
2. A provision in the site plan agreement that requires that before a building permit is issued, an engineer certify that the building plans implement the recommendations contained in those noise reports.
3. A provision in the Zoning By-law that the residential development must proceed by way of plan of condominium. The insertion of a holding provision in the Zoning By-law would not be necessary if there is such a provision in the Zoning By-law. No building permit could issue without a condominium application.
4. The inclusion in the conditions of condominium approval of a condition requiring that the noise mitigation measures recommended by the required noise studies be implemented and certified, as well as a condition requiring the inclusion of a noise warning clause in the condominium documents.

The Board finds that any or all of the above measures will properly and adequately ensure that the noise mitigation measures presented to this Board will be implemented, and that any and all of the above means of implementation can be enforced.

#### **Provisions of the Official Plan Amendment and the Zoning By-law**

The Board was taken through the provisions of the Official Plan Amendment and the Zoning By-law Amendment. It was agreed that many of the provisions contained in the proposed Zoning By-law Amendment would likely be amended once the site plan for

the development had been finalized. There were a number of issues raised, which have been otherwise addressed in this decision. The Board anticipates that the Official Plan Amendment and Zoning By-law Amendment will have to be rewritten to accord with the findings in this decision. However, there were a number of specific issues that were raised, and considered by the Board and which should be addressed in this decision.

With respect to the Official Plan Amendment, the Board suggests the following specific changes:

- Section 2 (a), (b), (c) will have to be rewritten based on the Board's decision.
- Section 2(d)(ix) is satisfactory, except that it must be clear that the siting of the residential building on the immediate corner of Jane and Rutherford should be substantially as demonstrated in Exhibit 62 filed in this hearing. It is not appropriate for this building to be brought closer to the street. Based on the evidence before the Board, there is a need to make the front of the building attractive and pedestrian friendly. Given the width of the adjacent arterial roads, and the mass of the building, the building should be set back from the roads, with pedestrian walkways and large sidewalks in the area, which will accommodate pedestrians and bicycles.
- Section 2(d)(x) addressing the setback of residential development from the pull-back track should be amended to provide for a setback from the CN property line which is equivalent to the setback of 150 metres from the south track.
- Section 2(d)(xii) shall refer to the Tables in LU-131, which include the criteria which must be met, and there will be no provision for a 5dBa excess.
- Section 2(f) shall be deleted, subject to the applicant applying to this panel of the Board for a full hearing, based on motion material, into why this property should or should not be exempt from the Woodlot Acquisition Charge.

With respect to the proposed Zoning By-law, the Board will only make the following comments:

- The By-law shall zone the residential lands high density commercial residential, and the lands between the residential lands and the pull-back track shall be zoned commercial.
- There will be no need for an H symbol, provided the By-law states that the residential development must proceed by way of plan of condominium. Issues with respect to servicing and noise mitigation can be resolved through the condominium process.
- The commercial zoning shall provide for a building having a minimum height of three storeys.
- The By-law shall provide for a 6 metre high berm or berm/fence combination along the northerly property line adjacent to the pull-back track up to the ravine.
- There shall be no permission for a banquet hall on this site.
- The By-law should reflect the site plan design that is approved.

"S. D. Rogers"

S. D. ROGERS  
MEMBER

ISSUE DATE:

**September 23,  
2005**

DECISION/ORDER NO:

**2494**



Ontario

Ontario Municipal Board

Commission des affaires municipales de l'Ontario

PL030635

Jane-Ruth Development Inc. has appealed to the Ontario Municipal Board under subsection 34(11) of the *Planning Act*, R.S.O. 1990, c. P.13, as amended, from Council's refusal or neglect to enact a proposed amendment to Zoning By-law 1-88 of the City of Vaughan to rezone lands respecting 2920 Rutherford Road and 9291 Jane Street from Open Space 1 and Agriculture to "AR3" and "Open Space 1" to permit the development of five apartment buildings  
O.M.B. File No. Z030092

Jane-Ruth Development Inc. has appealed to the Ontario Municipal Board under subsection 22(7) of the *Planning Act*, R.S.O. 1990, c. P.13, as amended, from Council's refusal or neglect to enact a proposed amendment to the Official Plan for the City of Vaughan to redesignate land at the northeast corner of Jane Street and Rutherford Road from Rural to High Density Residential/Commercial, Valleylands and Stormwater Management to permit residential uses  
O.M.B. File No. O030114

Jane-Ruth Development Inc. has referred to the Ontario Municipal Board under subsection 41(12) of the *Planning Act*, R.S.O. 1990, c. P.13, as amended, determination and settlement of details of a site plan for lands comprised of Part Lot 16, Concession 4, E.J.S., and Parts 1, 2 & 3 of Reference Plan 65R-12865, in the City of Vaughan  
O.M.B. File No. M040071

#### **APPEARANCES:**

##### **Parties**

Jane-Ruth Developments Inc.

CN Rail Properties

City of Vaughan

##### **Counsel**

T. Lederer  
K. O'Neill

A. Heisey

A. Paton

#### **MEMORANDUM OF ORAL DECISION DELIVERED BY S. D. ROGERS ON AUGUST 18, 2005 AND ORDER OF THE BOARD**

This is the continuation of a hearing, for which the Board issued a decision on November 23, 2004 (Decision No. 1815) after a seven-week hearing. On April 19, 2005, the Board issued a further decision (Decision 0982), which provided clarification on the directions contained in Decision No. 1815, and which approved the Official Plan for the lands in question.

It remains therefore to finalise the zoning by-law and the site plan for the property. The hearing was reconvened, in order for the Board to approve the zoning by-law and site plan for the first two buildings proposed to be constructed, Buildings A and B. As well, there were certain issues which required resolution by the Board, including a debate between the parties with respect to the appropriate resolution of certain questions which were left open by the Board in its prior decisions.

Specifically, in Decision No. 1815, the Board stated:

*The Board is however concerned about the outdoor noise level for the ground related outdoor amenity space. The Board is not satisfied that the Sound Level Criteria for an Outdoor Point of Reception can be met on all areas of the residential development.*

*The Board will therefore require additional ground-related mitigation measures, unless the proponent can demonstrate to the Board that in the absence of such mitigation measures the sound level criteria can be met, or that the mitigation measures will clearly not operate to reduce noise levels on the grounds of the residential lands. To that end, the Board will require the following:*

*....A berm or combination berm/fence to a height of 6 metres shall be constructed along the common property line between the CN pull-back track and the Jane-Ruth property.*

*....The zoning by-law and Official Plan will provide that any commercial building constructed on the lands between the pull-back track and the residential lands shall be a minimum of three storeys high, in order to ensure a substantial intervening use in that space, and in order to shield the residential grounds from noise.*

Jane-Ruth called evidence which was contained in a report dated June 2, 2005, prepared by their acoustical consultant, Dr. Lightstone. The evidence of Dr. Lightstone demonstrated that a 6 metre berm located along the north property line adjacent to the pull back track, resulted in a very minimum of improvement in sound levels for the grounds of the residential development, over a 3 metre berm. Dr. Lightstone viewed any improvement of a 3 metre berm over

a 6 metre berm as insignificant, given the small area of the property which would experience any sort of improvement.

Dr. Lightstone also noted that the locations of the buildings had been somewhat revised, and that the revised lay out would substantially shield the formal amenity areas for the buildings from unacceptable noise from the pull back track.

The City called an acoustical expert who attempted to dispute Dr. Lightstone's recommendations, but not the results of his report. Specifically, this expert disputed Dr. Lightstone's conclusion that a 6 metre berm was not required, and maintained that a substantial intervening building should be constructed prior to the construction of the residential development.

This expert was not present at the original hearing of the matter. The expert had been retained to complete a peer review of Dr. Lightstones' June 2005 work. It appears that the expert may not have been properly instructed as to the parameters of such a peer review, given that the work was done in the context of certain findings of the Board and was not an opportunity to re-open the substantial number of issues canvassed by the Board at the original hearing, nor to introduce new issues. For example, it was never the intent of the Board decision to require a commercial use to be constructed on the property before the residential development was constructed. Furthermore, this expert claimed that a 6 metre berm was preferable to a 3 metre berm, but had done no independent work that contradicted Dr. Lightstones' study.

The City's witness did confirm however, that the height of the building to be constructed to the north of the residential building was immaterial in shielding the northerly grounds of the residential development from the noise from the pull back track. He confirmed that any building on this site would operate to mitigate the noise.

Furthermore, a review of the zoning by-law demonstrated that a substantial building envelope is provided for the commercial lands to the north of the residential development.

The Board is therefore persuaded from the evidence of Dr. Lightstone, that a 3 metre berm on the north portion of the property, adjacent to the pull back track, is sufficient to provide substantial mitigation of the noise from the pull-back track on the northerly grounds of the residential development. The Board is also satisfied that the zoning by-law has provided for a substantial intervening commercial use, and that the requirement for a three storey height for the intervening commercial building, as suggested by the Board in its decision No. 1815, is not necessary or useful.

On a review of the zoning by-law with the planning witness for Jane-Ruth, the Board noted that the by-law included two additional uses for the commercial lands, over the uses normally permitted in a C1 residential zone. These uses were a convention centre and a motel. None of these additional uses were supported by evidence at the hearing. Just as with the banquet hall use, which the Board declined to permit on the commercial lands, the Board refuses to include these uses, at this time, as adjuncts to the C1 uses permitted on the property. The Board refuses to do so, because the Board was not presented with evidence which would justify the inclusion of such uses adjacent to a high density residential use, as part of the C1 zone. In particular, the Board is concerned that there may not be appropriate zoning standards in place in the C1 zone for these particular uses, which would sufficiently address the impacts of such uses on a high density residential development.

However, this refusal is without prejudice to any future development proposal which may include a banquet hall, convention centre or motel, which properly and fully justifies the uses in terms of compatibility with the residential development.

Therefore, in reliance on the noise studies contained in the reports presented to this Board as Exhibit 3 ("Updated Environmental Noise Analysis for Residential Grounds At-Grade, June 2, 2005") and Exhibit 4 ("Rooftop Terrace Sound Exposures, August 10, 2005), and the evidence of Dr. Lightstone, Mr. Gidamy and Mr. Yaranton, the Board will approve the zoning by-law, and site plans for Buildings A and B. The Board remains seized with respect to the

remainder of the site plan appeal, and with respect to any issues which may arise from the conditions of site plan approval of Buildings A and B.

The Board therefore:

1. Amends the zoning by-law for the City of Vaughan in accordance with the by-law appended as Attachment "1" to this decision. The City may assign a by-law number to this by-law, in accordance with its normal procedures.
2. Approves the site plans for Buildings A and B as appended as Attachment "2" to this decision, subject to the conditions contained in Attachment "3" to this decision.

This is the order of the Board.

"Susan D. Rogers"

SUSAN D. ROGERS  
MEMBER

**<<To view the Mentioned Attachments please refer to the original file>>**

# GUIDELINES

## for New Development in Proximity to Railway Operations

PREPARED FOR  
THE FEDERATION OF CANADIAN MUNICIPALITIES  
AND THE RAILWAY ASSOCIATION OF CANADA

May 2013





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# Guidelines for New Development in Proximity to Railway Operations

May 2013

These guidelines were developed through the collaboration of the Railway Association of Canada and the Federation of Canadian Municipalities, who work together through the FCM/RAC Proximity Initiative. For further information, please visit our joint website at [www.proximityissues.ca](http://www.proximityissues.ca), or contact:

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COVER PHOTOS COURTESY OF THE RAILWAY ASSOCIATION OF CANADA

## FCM/RAC Proximity Initiative

May, 2013

We are very pleased to present the new *Guidelines for New Development in Proximity to Railway Operations*.

These new guidelines are intended to replace and build on the FCM/RAC Proximity Guidelines and Best Practices Report, which was originally prepared and published in 2004 and reprinted in 2007. Since that time, there have been significant changes in both federal legislation and some provincial land use acts. The original guidelines have been reviewed, edited, and updated with the help and participation of stakeholders from railways, municipalities, and government to reflect the new legislative framework as well as to add a new section of guidelines and best practices that can be applied when converting industrial/commercial property into residential use when in proximity to railway operations.

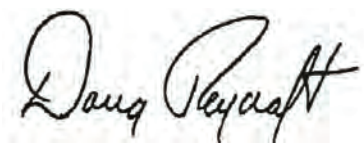
The *Guidelines for New Development in Proximity to Railway Operations* is intended for use by municipalities and provincial governments, municipal staff, railways, developers, and property owners when developing lands in proximity to railway operations. They are meant to assist municipal governments and railways in reviewing and determining general planning policies when developing on lands in proximity to railway facilities, as well to establish a process for making site specific recommendations and decisions to reduce land-use incompatibilities for developments in proximity to railway operations. A key component is a model review process for new residential development, infill, and conversions in proximity to railways.

The guiding philosophy of this document is that, by building better today, we can avoid conflicts in the future.

Sincere Regards,



Sean Finn  
FCM-RAC Proximity Co-Chair  
Executive VP Corporate Services  
and Chief Legal Officer, CN



Doug Reycraft  
FCM-RAC Proximity Co-Chair  
Mayor, Southwest Middlesex, ON

# ACKNOWLEDGMENTS//

These guidelines and best practices were developed by the FCM/RAC Proximity Initiative with the help and participation of stakeholders from government, freight, passenger, and commuter railway operators, municipal councillors and mayors, municipal urban planners, the Federation of Canadian Municipalities and the Railway Association of Canada.

I would like to especially acknowledge the members of the Guidelines Working Group who gave their time, expertise, and insight in vetting the research, developing the format, and editing the product from start to finish.

Adam Snow (Chair)	Third Party Projects Officer - GO Transit
Nick Coleman	Manager, Community Planning & Development, CN
Orest Rojik	Right-of-Way Representative, CPR
Giulio Cescato	Planner, City of Toronto

And also Daniel Fusca of DIALOG who worked with the team.

The project was initiated and approved through the Steering Committee of the FCM/RAC Proximity Initiative:

Doug Reycraft - FCM Co-chair, Mayor, Southwest Middlesex, Ontario	Frank Butzelaar - President & CEO, Southern Railway BC Ltd.
Sean Finn - RAC Co-chair, Executive VP & Chief Legal Officer, CN	Louis Machado - Vice-président adjoint Exploitation, AMT
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Cynthia Lulham - Project Manager, FCM/RAC Proximity Initiative	Lynda Macleod - Manager, Legislative Affairs, CN
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Pauline Quinlan - Mairesse, Ville de Bromont, QC	Mee Lan Wong - Policy Advisor, Transport Canada
Gary Price - City Councillor, Cambridge, ON	Nick Coleman - Manager, Community Planning & Development, CN

We gratefully acknowledge their valued input and support.



Cynthia Lulham  
Project Manager, FCM/RAC Proximity Initiative

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As cities in Canada continue to urbanize, and as they place a greater emphasis on curbing urban sprawl, demand for new forms of infill development is growing, including on sites in proximity to railway corridors.

In particular, commercial and industrial properties in proximity to railway operations, and in some cases the buildings situated on those properties, are increasingly being converted to residential uses. At the same time, both the passenger and freight operations of railways are growing steadily, leading to an increasing potential for conflicts between rail operations and adjacent land uses.

Areas in proximity to railway operations are challenging settings for new development, and in particular, for residential development. It is often difficult to reconcile the expectation and concerns of residents with railway operations. For this reason, developments must be carefully planned so as not to unduly expose residents to railway activities as well as not to interfere with the continued operation of the corridor itself, or the potential for future expansion, as railways play an important economic role in society that must be safeguarded.

This report strongly recommends that municipalities should take a proactive approach to identifying and planning for potential conflicts between rail operations and new developments in proximity to railway corridors. Prior to the receipt of an application for a specific project, the municipality should have already have identified key sites for potential redevelopment, conversion, or future rail crossings, and will have generated site-specific policies to manage such future change.

To further assist municipalities and other stakeholders, this report provides a comprehensive set of guidelines for use when developing on lands in proximity to railway operations. The intent of the guidelines is to:

- promote awareness around the issues (noise, vibration, safety) and mitigation measures associated with development near railway operations, particularly those associated with residential development;
- promote greater consistency in the application of relevant standards across the country;

- establish an effective approvals process for new residential development, infill, and conversions from industrial/commercial uses that allows municipal planners to effectively evaluate such proposals with an eye to ensuring that appropriate sound, vibration, and safety mitigation is secured; and
- enhance the quality of living environments in close proximity to railway operations.

The report builds on the 2004 FCM/RAC Proximity Guidelines and is intended for use by municipalities and provincial governments, municipal staff, railways, developers, and property owners when new developments in proximity to railway operations are proposed. Information has been assembled through a comprehensive literature/best practices review from national and international sources as well as a consultation process involving planners, architects, developers, and other professionals from across Canada, the USA, and Australia, as well as members of RAC and FCM.

In addition to the detailed guidelines, the report offers a set of implementation tools and recommendations that are meant to establish a clear framework for the dissemination, promotion, and adoption of the guidelines; as well as suggested improvements to the development approval process. A key recommendation is for a new development assessment tool, called a Development Viability Assessment, which will allow municipal planners to better evaluate proposals for residential development in areas where standard mitigation cannot be accommodated due to site constraints.





# INTRODUCTION

- 1.1 Purpose of the Report
- 1.2 Sources
- 1.3 Intended Audience
- 1.4 Understanding Stakeholder Roles



# 1.0 // INTRODUCTION

Cities are the economic engines of Canada, and our quality of life and economic competitiveness depend on strong municipalities and sustainable municipal growth and development.

Equally important to the economy of Canada, railways ensure the efficient movement of goods and people. In so doing, railways make a vital contribution to the Canadian economy and to the success of Canadian communities. As cities across Canada begin to realize the benefits of curbing urban sprawl, and as consumer demand for more housing in urban centres grows, the push to intensify existing built-up areas, including sites in proximity to railway operations, has grown steadily stronger. At the same time, increased demand for rail service, the high cost of transport fuel, and new sustainability objectives have added new pressure to the railway industry, which is expanding rapidly. When issues related to proximity to railway operations are not properly understood and addressed, the resulting problems can often be intractable and long lasting.

Rail/municipal proximity issues typically occur in three principle situations: land development near rail operations; new or expanded rail facilities; and road/rail crossings. The nature and integrity of railway corridors and yards need to be respected and protected. In addition to noise and vibration, safety, trespass, drainage, and/or blocked crossings are other inherent issues generated when both communities and railways grow in proximity to one another. The lack of a comprehensive set of proximity management guidelines, applied consistently across municipal jurisdictions, has greatly amplified these proximity issues in recent years, resulting in some cases in (real and perceived) social, health, economic, and safety issues for people, municipalities, and railways.

In 2003, the FCM and RAC began an important partnership to develop common approaches to the prevention and resolution of issues arising from development occurring in close proximity to railway corridors and other rail operations. Under a Memorandum of Understanding (MOU) agreed to by both parties, a Community-Rail Proximity Initiative was established and a Steering Committee was formed with a mandate to develop and implement a strategy to reduce misunderstanding and avoid unnecessary conflicts arising from railway-community proximity. The result was a framework for a proximity initiative, with the following areas requiring action:

- develop commonly understood proximity guidelines;
- improve awareness among all stakeholders regarding the need for effective planning and management; and
- develop dispute resolution protocols to guide concerned parties when issues emerge.

In 2004 the FCM and RAC Proximity Initiative published

a report identifying best practices and guidelines for new developments in proximity to railway operations (reprinted 2007). This document is intended to update and replace that original document, and includes additional best practices and guidelines dealing specifically with residential conversion or infill projects on former industrial or commercial lands. The intent of this report is to provide municipalities with the necessary tools to facilitate decision-making, and to provide a framework for ensuring that new development in proximity to railway corridors is suitably configured to address the various risks and constraints present in railway environments.

Additionally, this report is intended to address the variable nature in the delivery of mitigative measures for new developments in proximity to railway operations across Canadian jurisdictions. A site-specific process is identified whereby the specific site conditions related to a proposed development can be assessed by municipalities in order to determine the mitigation measures most appropriate for that site, especially in locations where standard mitigation cannot be accommodated in a reasonable manner. Additionally, when a development application involves a residential component, the process will help municipalities to decide whether the site is appropriate for such a use. When it comes to safety, all parties must be aware that there are inherent safety implications associated with new developments in proximity to a railway line, and that these implications can often be mitigated, but typically not entirely eliminated. The goal is to establish a common, standardized process, whereby potential impacts to safety in the context of development applications in proximity to rail corridors can be assessed.

Finally, it is desirable for municipalities to take a proactive approach to identifying and planning for potential rail-oriented conflicts prior to the receipt of an application



PHOTO SOURCE: RAILWAY ASSOCIATION OF CANADA

for a specific project. In the context of creating municipal and secondary plans, it behooves planners to identify key sites for potential redevelopment, conversion, or future rail crossings, and to generate site-specific policies to manage this future change.

## 1.1 // PURPOSE OF THE REPORT

The main objective of this report is to provide a set of guidelines that can be applied to mitigate the impacts of locating new development in proximity to railway operations. It is important to note that these guidelines are not intended to be applied to existing locations where proximity issues already exist, as these locations present their own unique challenges which must be addressed on site specific basis.

The report will:

- provide a framework to better facilitate municipal and railway growth;
- develop awareness around the issues associated with new development along railway corridors, including residential conversion or infill projects, particularly in terms of noise, vibration, and safety;
- provide model development guidelines, policies, and regulations, and illustrate best practices for use and adaptation as appropriate by all stakeholders, most particularly railways, municipalities, and land developers;
- establish a mechanism that allows municipal planners to effectively evaluate the appropriateness of an application to convert industrial or commercial lands in proximity to railway corridors to residential uses, and of other residential infill projects near railway corridors;
- establish a balance between the railway operational

needs and the desire of municipalities to facilitate residential and other intensification in existing built-up areas;

- inform and influence railway and municipal planning practices and procedures through the provision of guidelines that ensure planning systems and development approval processes more effectively anticipate and manage proximity conflicts;
- promote greater consistency in the application of guidelines across the country;
- identify strategies to enhance the quality of living environments while reducing incompatibility; and
- inform and influence federal and provincial governments with respect to the development and implementation of applicable policies, guidelines, and regulations.

## 1.2 // SOURCES

The information in this report has been derived from two primary sources:

- a thorough review of academic literature as well as municipal, state, provincial, and federal policy documents from Canada, the USA, and Australia; and
- extensive stakeholder interviews with municipal planners, railways, provincial and state bureaucrats, developers, and professionals with expertise in a variety of fields including property law, noise and vibration mitigation, and crash wall and berm construction.

A full list of references is provided at the end of this report (**Appendix I**), in addition to a list of organizations consulted as part of the stakeholder interview process (**Appendix H**).



FIGURE 1 // OUTCOMES OF THE GUIDELINES FOR VARIOUS STAKEHOLDER GROUPS.

### 1.3 // INTENDED AUDIENCE

This report is intended to be used by:

- **Municipalities and Provincial Governments**, to create or update their policies, regulations, and standards related to new development along railway corridors, in order to create more consistency across the country.
- **Municipal staff**, as a tool to better understand the safety, vibration, noise, and other issues related to new development along railway corridors, and to more effectively evaluate and provide feedback on development proposals, particularly when they involve a residential component.
- **Railways**, to update their internal policies regarding development in proximity to railway corridors, particularly residential infill development and conversions, and to provide opportunities for collaboration with stakeholders.
- **Developers and property owners**, of sites in proximity to railway corridors to better understand the development approval process and the types of mitigation measures that might be required.

### 1.4 // UNDERSTANDING STAKEHOLDER ROLES

The research associated with this report has revealed the complexity of interaction between public and private agencies and individuals. It further indicated that a lack of understanding of roles and responsibilities has contributed to the problems identified. This section provides a brief overview of these roles. Recommendations for how each stakeholder can assist in the advancement of the goal of reducing proximity issues are found in **Section 4.2 Advancing Stakeholder Roles**.

#### 1.4.1 Federal

The federal government regulates the activities of CN, CPR, and VIA Rail Canada, and some short line railways that operate interprovincially or internationally. These federal railways are regulated by such legislation as the *Railway Safety Act* (RSA), and the *Canada Transportation Act* (CTA). Applicable legislation, regulations, and guidelines are available from the respective websites.

#### 1.4.2 Provincial

Provinces provide the land use regulatory framework for municipalities through Planning Acts, Provincial Policy Statements or Statements of Provincial Interest, Environmental Assessment Acts, and air quality and noise guidelines (such as the Ontario Ministry of the Environment Noise Assessment in Land Use Planning documents). This legislation generally provides direction on ensuring efficient and appropriate land use allocation and on tying land use planning to sound transportation and planning principles. Generally, provinces also have jurisdiction to establish land use tribunals to adjudicate disputes, although the approach taken by provinces with respect to establishing and empowering such tribunals varies across the country. Additionally, some provinces regulate shortline railways.

#### 1.4.3 Municipal

Municipalities are responsible for ensuring efficient and effective land use and transportation planning within their territory, including consultation with neighbouring property owners (such as railways), in carrying out their planning responsibilities. Municipal planning instruments include various community-wide and area plans, Zoning By-law/ Ordinances, Development Guidelines, Transportation Plans, Conditions of Development Approval, and Development

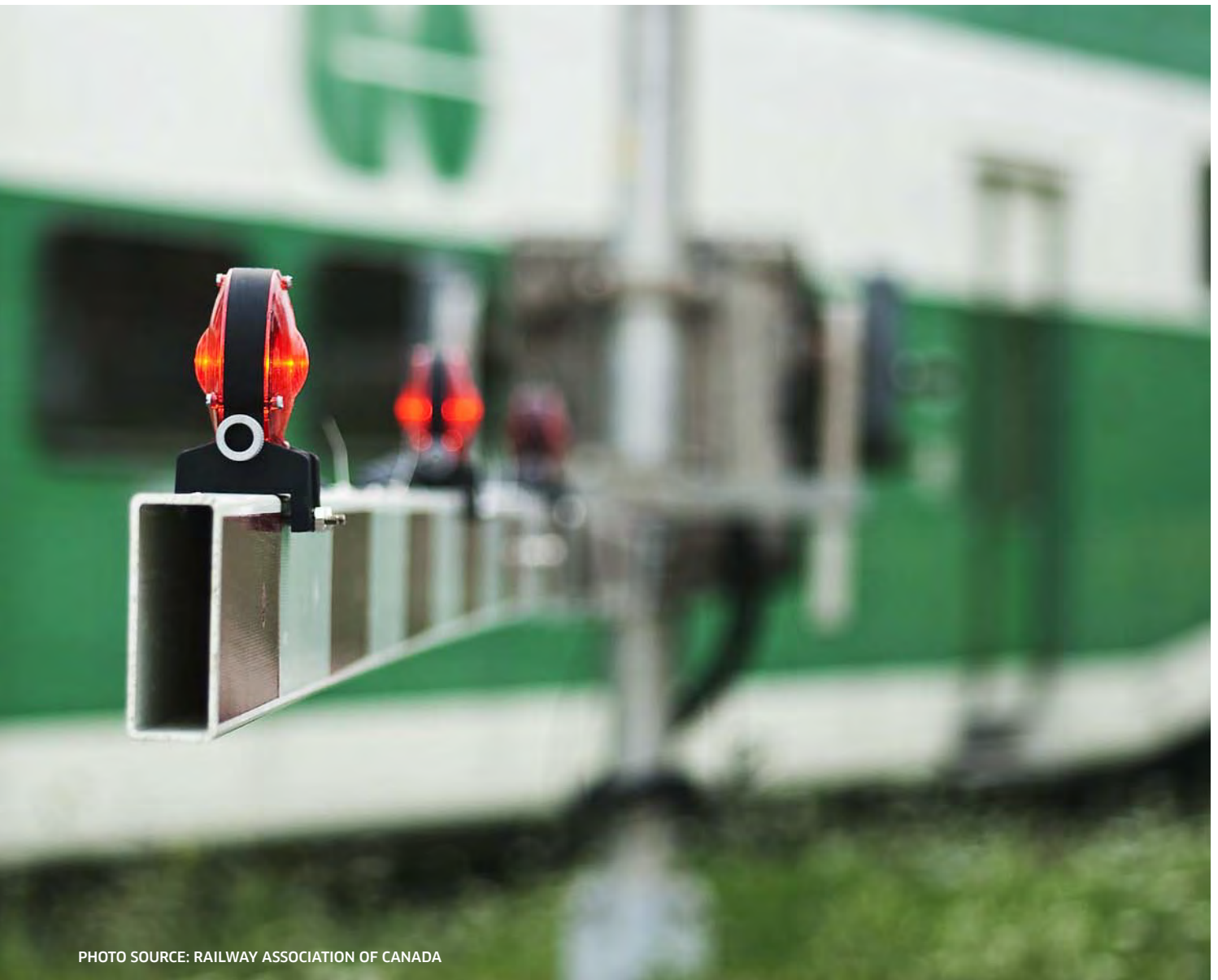


PHOTO SOURCE: RAILWAY ASSOCIATION OF CANADA

Agreements to secure developer obligations and requirements. Municipal governments have a role to play in proximity issues management by ensuring responsible land use planning policies, guidelines, and regulatory frameworks, as well as by providing a development approvals process that reduces the potential for future conflicts between land uses.

#### **1.4.4 Railway**

Federally regulated railways are governed, in part, by the requirements of the *Canada Transportation Act* (CTA). Under the CTA, railways are required to obtain an approval from the Canadian Transportation Agency for certain new railway construction projects. Through this process, railways must give notification and consult with interested parties. For existing railway operations, the CTA requires that railways make only such noise and vibration as is reasonable, taking into consideration their operational requirements and the need for the railway to meet its obligation to move passengers and the goods entrusted to it for carriage. Additionally, federal railways are required to adhere to the requirements of the *Railway Safety Act* (RSA), which promotes public safety and the protection of property and the environment in the operation of a railway. Railways also typically establish formal company environmental management policies and participate in voluntary programs and multi-party initiatives such as Direction 2006, Operation Lifesaver, TransCAER, and Responsible Care®.

Both CN and CPR, as well as VIA Rail Canada, and many short line railways across the country, have established guidelines for new development in proximity to their railway corridors, and they have a significant role to play in providing knowledge and expertise to municipal and provincial authorities, as well as developers and property owners.

#### **1.4.5 Land Developer / Property Owner**

Land developers are responsible for respecting land use development policies and regulations to achieve development that considers and respects the needs of surrounding existing and future land uses. As initiators of urban developments, they also have the responsibility to ensure that development projects are adequately integrated in existing environment.

#### **1.4.6 Real Estate Sales / Marketing and Transfer Agents**

Real estate sales people and property transfer agents (notaries and lawyers) are often the first and only contacts for people purchasing property, and therefore have a professional obligation to seek out and provide accurate information to buyers and sellers.

#### **1.4.7 Academia and Specialized Training Programs**

Academic institutions provide training in all fields related to land use planning, development, and railway engineering.

#### **1.4.8 Industry Associations**

Industry associations include bodies such as the RAC, FCM, Canadian Association of Municipal Administrators (CAMA), Canadian Institute of Planners (CIP), provincial planning associations, the Canadian Acoustical Association (CAA), and land development groups such as the Urban Development Institute.





# 2

## COMMON ISSUES AND CONSTRAINTS

- 2.1 Safety
- 2.2 Noise and Vibration
- 2.3 Standard Mitigation
- 2.4 Challenges Associated with New Residential Development



## 2.0 // COMMON ISSUES AND CONSTRAINTS

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, including:

- the desire to promote excellence in urban design;
- the need, in some cases, to preserve employment lands and protect them from encroaching residential development;
- the growing demand for infill development that promotes the principles of sustainability and smart growth;
- the need to provide sufficient noise and vibration mitigation and safety measures;
- the desire of developers for consistency and clarity in the development process;
- the desire of developers and municipalities to see an improved and streamlined development review process for residential projects in proximity to railway corridors; and
- the necessity of recognizing the significant economic contributions of the railways, and of ensuring their continued ability to provide their services unimpeded.

In addition, it is important to recognize that areas in proximity to railway operations are challenging settings for new development, and in particular, residential development. Railway operations can generate concerns, such as blocked crossings, dangers to trespassers, as well as impacts on the quality of life of nearby residents due to the effects of inherent noise, vibration, and railway incidents. Conversely, developments must be carefully planned so as not to interfere with the continued operation of railway activities, or the potential for future expansion, as railways play an important economic role in society that must be safeguarded.

The most significant constraints related to railway

proximity can be broadly categorized as follows:

1. **Inadequate communication** - both formal and informal notification and consultation is lacking between and among stakeholders.
2. **Lack of understanding and awareness of rail/municipal proximity issues** - the issues and regulations affecting rail operations and municipal land use decisions are complex and involve every level of government. Individual stakeholders are not always familiar with the mandate and operating realities of other stakeholder agencies. Rail/municipal proximity issues only arise infrequently for many municipalities, particularly smaller ones, and staff may not be aware of required or appropriate mitigation measures.
3. **Absence of comprehensive or consistent development review** - policies, regulations, and approaches for dealing with land use decisions involving rail proximity issues vary greatly from municipality to municipality, and are lacking detail in most cases. In particular, there is a need for a new development review process that deals specifically with residential development proposals, especially those involving a conversion from commercial or industrial uses, or which are to be located on tight infill sites.

In addition to these common constraints, there are a number of very specific issues which, in some cases, are a result of the constraints, and in others, fuel them. These include issues around safety, noise, vibration, the accommodation of safety mitigation measures, and the accommodation of residential development near railway corridors. Following is a brief summary of some of the

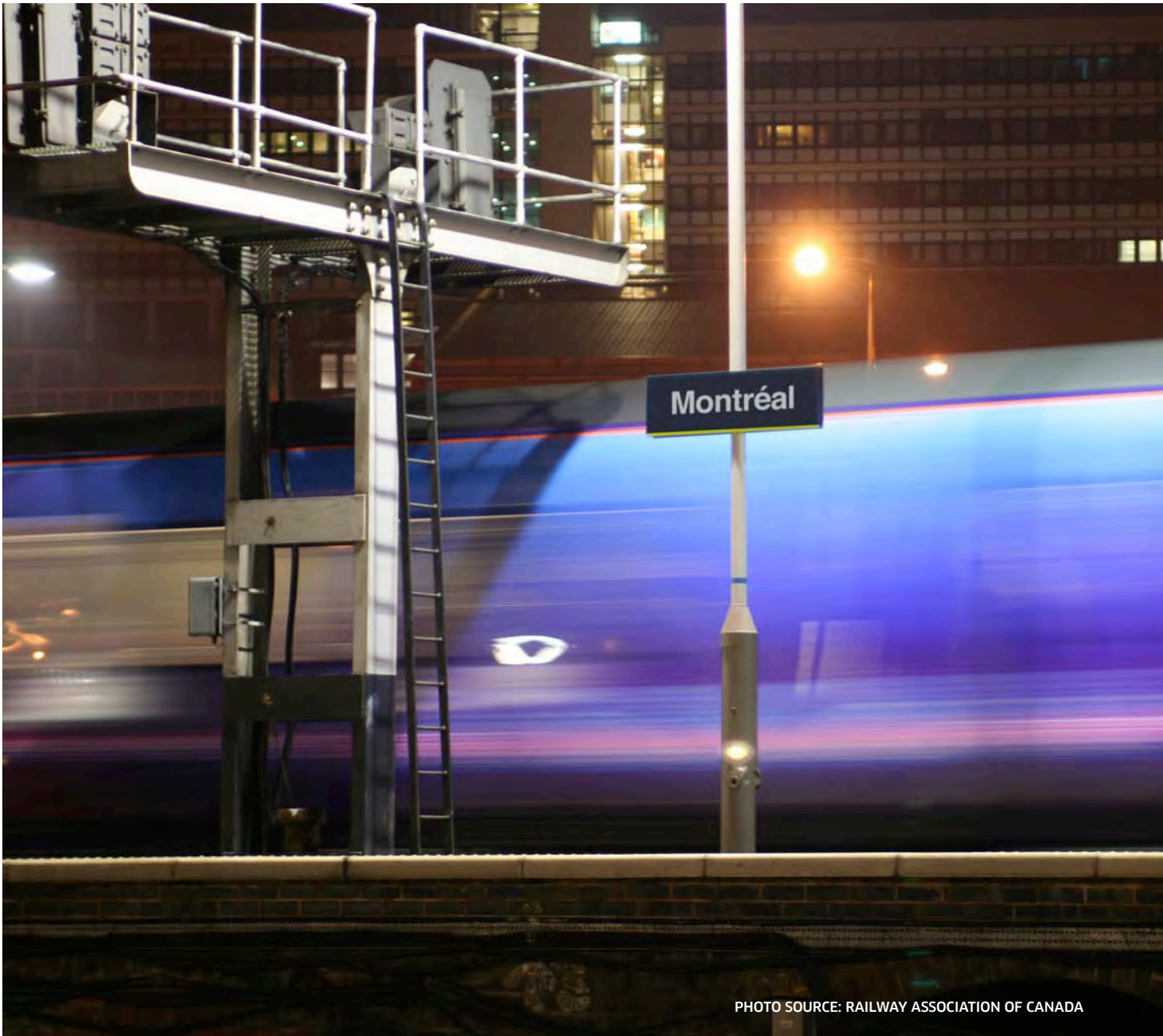


PHOTO SOURCE: RAILWAY ASSOCIATION OF CANADA

more specific issues associated with new development in proximity to railway operations.

## 2.1 // SAFETY

Safety is a concern which has been expressed by residents living in proximity to railways. In *Stronger Ties: A Shared Commitment to Railway Safety* (2007), a report commissioned as part of a review of the Railway Safety Act, it is noted that rail is one of the safest modes of transportation, and that Canada's railways are among the safest in North America. When accidents do occur, the vast majority are non-main track collisions and derailments occurring primarily in yards or terminals. Only slightly more than 10 percent of railway accidents are collisions or derailments that occur on track between stations or terminals, including branch and feeder lines, although these are the accidents with the greatest consequences in terms of property and environmental damage. Additionally, the number of accidents involving the transportation of dangerous goods has been falling steadily since 1996, even as rail transport of regulated dangerous goods has grown by as much as 60 percent. By far, the greatest number of annual fatalities resulting from railway accidents involves trespassers or vehicle occupants or pedestrians being struck at crossings.<sup>1</sup> As a result, trespassing is at least as great, if not greater a safety concern than is derailment.

### 2.1.1 Train Derailments

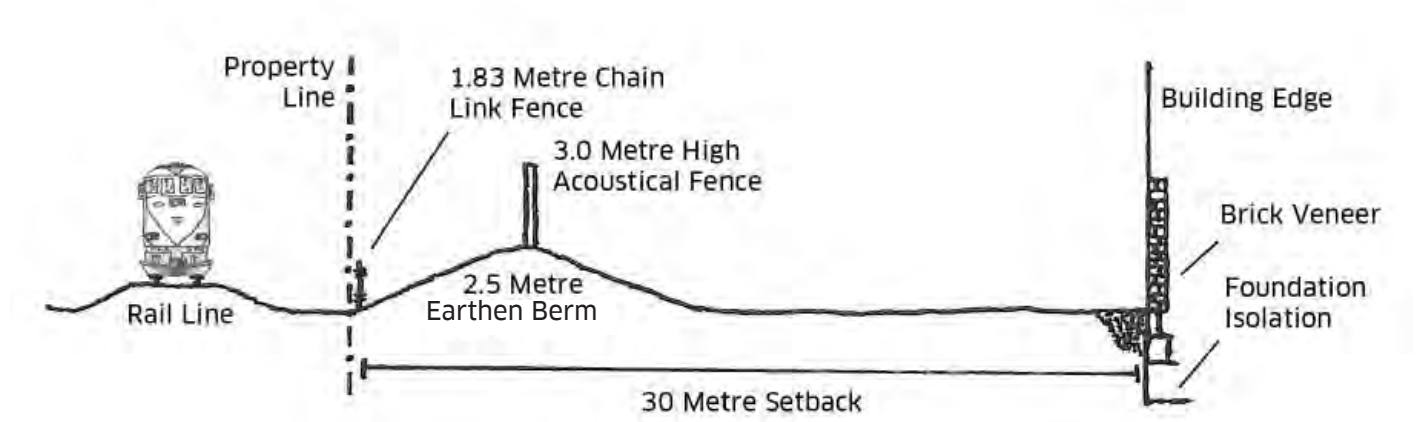
The desire to ensure safety and promote a high quality of life for people living and working in close proximity to railway corridors is a principal objective of railways.

As part of that objective, railways have, since the early 1980s, promoted mitigation in the form of a standard setback and berm. These measures have been developed based on a detailed analysis of past incidents and derailments. Together, they contain the derailed cars and allow a derailed train enough room to come to a complete stop. In addition, setbacks and berms also allow for the dissipation of noise and vibration, and have typically been effective at ameliorating the proximity concerns perceived by residents living near railway operations. While these measures are recommended for all types of new development in proximity to railway operations, they have typically only been considered by the railways as a mandatory requirement for residential development. Nevertheless, in some cases where conversion or infill sites are small and cannot 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.

Most jurisdictions across Canada have yet to establish a formal requirement for rail corridor building setbacks. In some cases, minimum setback requirements are considered to be too onerous, and are either ignored or subjectively reduced. Ontario, which mandates the involvement of railways on any development proposal in proximity to railway facilities, is the only province where standard setbacks are typically achieved. This creates a perception that developers in that province are treated differently since they bear the additional costs associated with implementing safety mitigation, whereas developers in other provinces do not. In reality, this is simply an outcome of Ontario's stronger regulatory framework for dealing with development in railway environments.

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<sup>1</sup> 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](http://www.tc.gc.ca/tcss/RSA_Review-Examen_LSF)



**FIGURE 2 // STANDARD MITIGATION FOR NEW RESIDENTIAL DEVELOPMENT IN PROXIMITY TO A MAIN LINE RAILWAY**

### 2.1.2 Crossings

As urban areas grow in proximity to railway corridors, road traffic at existing crossings increases and can lead to demands for improvements to such crossings, demands for additional crossings, or demands for grade separations to accommodate the flow of the traffic from the new development to areas on the other side of the railway. Conversely, Transport Canada and the railways strive to reduce the number of at-grade crossings since each new crossing increases the risk exposure for potential vehicle/train and pedestrian accidents, as well as the related road traffic delays. Grade-separated crossings address both these issues, but are expensive to construct. Safety at railway crossings is a concern for all stakeholders and planning is necessary to consider alternatives to creating new grade crossings, including upgrading and improving safety at existing crossings and grade-separated crossings.

## 2.2 // NOISE AND VIBRATION

Noise and vibration from rail operations are two of the primary sources of complaints from residents living near railway corridors. Airborne noise at low frequencies (caused by locomotives) can also induce vibration in lightweight elements of a building, which may be perceived to be ground-borne vibration.

There are two sources of rail noise: noise from pass-by trains, and noise from rail yard activities, including shunting. Pass-by noise is typically intermittent, of limited duration and primarily from locomotives. Other sources of pass-by noise include whistles at level crossings<sup>2</sup>, and car wheels on the tracks.

Freight rail yard noises tend to be frequent and of longer duration, including shunting cars, idling locomotives, wheel and brake retarder squeal, clamps used to secure containers, bulk loading/unloading operations, shakers, and many others.

Beyond the obvious annoyance, some studies have found that the sleep disturbance induced by adverse levels of noise can affect cardiovascular, physiological, and mental health, and physical performance.<sup>3</sup> However, there is no clear consensus as to the real affects of adverse levels of noise on health.

Ground borne vibration from the wheel-rail interface passes through the track structure into the ground and can transfer and propagate through the ground to nearby buildings. Vibration is more difficult to predict and mitigate than noise and there is no universally accepted method of measurement or applicable guidelines. Vibration evaluation methods are generally based on the human response to vibration. The effects of vibration on occupants include fear of damage to the occupied structure, and interference with sleep, conversation, and other activities.

## 2.3 // STANDARD MITIGATION

In order to reduce incompatibility issues associated with locating new development (particularly new residential development) in proximity to railway corridors, the railways suggest a package of mitigation measures that have been designed to ameliorate the inherent potential

required to sound their whistles for at least 400 metres before entering a public crossing, unless relief has been granted in accordance with the regulatory process.

3 Berglund, B., Lindvall, T., & Schwela, D. H., eds. (1999). Guidelines for community noise [Research Report]. Retrieved from World Health Organization website: <http://www.who.int/docstore/peh/noise/guidelines2.html>

2 Applicable to federally regulated railways and some provincially regulated railways (notably in Quebec and Ontario). Trains are

for the occurrence of safety, security, noise, vibration, and trespass issues. These mitigation measures (illustrated in [FIGURE 2](#)) include a minimum setback, earthen berm, acoustical and/or chain link security fence, as well as additional measures for sound and vibration attenuation.

It should be noted that many of these measures are most effective only when they are implemented together as part of the entire package of standard mitigation measures. For example, the setback contributes to mitigation against the potential impact of a railway incident as well as noise and vibration, through distance separation. The earthen berm, in turn, can protect against the physical components of a derailment (in conjunction with the setback), and provides mitigation of wheel and rail noise, reduces the masonry or wood component (and cost) of the overall noise barrier height, and offers an opportunity for the productive use of foundation excavations. Implementation of the entire package of mitigation measures is, therefore, highly desirable, as it provides the highest possible overall attenuation of incompatibility issues. It should also be noted that implementation of such measures is easiest to achieve for new greenfield development. For this reason, these measures are not intended as retrofits for existing residential neighbourhoods in proximity to railway operations. As well, challenges may be encountered in the case of conversions or infill projects on small or constrained sites, and any implications related to the use of alternative mitigation measures need to be carefully evaluated.

### **2.3.1 Maintenance**

A common issue that emerged through this process was that of the responsibility for maintaining mitigation infrastructure. Currently, there is no standard approach to

dealing with the maintenance of mitigation infrastructure. In some cases, as is the current practice in Saskatoon, the municipality takes on this responsibility. Increasingly, however, this is seen as an undue burden on municipal coffers, particularly within the current difficult budgetary climate. In Ontario, there was a time when the railways occasionally took possession of the portion of the berm beyond the fence facing onto the railway corridor, but this land attracted property taxes at residential rates. As such, this practice has largely ended. Commonly, property owners maintain ownership of this portion of land, and are expected to maintain the mitigation infrastructure themselves. This strategy can work for commercial or industrial developments, or in the case of condominium developments, where the land becomes part of the common areas of the condominium and maintenance becomes the responsibility of the corporation. In the case of freehold developments, however, where the responsibility for maintenance lies with individual property owners, it is virtually impossible for them to easily access the side of the berm facing onto the railway corridor, and would be dangerous for them to do so in any case. Recommendations regarding a Mitigation Infrastructure Maintenance Strategy are included in **Section 4.1.2** of this report.

## **2.4 // CHALLENGES ASSOCIATED WITH NEW RESIDENTIAL DEVELOPMENT**

Residential development is particularly challenging in the context of a railway environment. As noted above, safety, noise, and vibration issues become more significant when dealing with residential development. Partly, this is because people are more sensitive to these issues in the context of their own homes than in other contexts (work, leisure, etc.). It is also because the negative effects of noise and vibration become more

pronounced when they disturb normal sleeping patterns.

When residential development in proximity to railway corridors occurs on large greenfield sites, dealing with these issues is typically not a challenge, as standard mitigation measures can be easily accommodated, and are quite effective. Residential development becomes significantly more challenging, however, when the context is a small infill site, such as those typically associated with the conversion of commercial or industrial properties. In addition to their small size, these sites are also often oddly shaped, and do not easily accommodate standard mitigation measures such as a setback and berm. In addition, existing commercial buildings that are typically associated with conversions to residential use may not meet current residential building code specifications and for this reason it is very important that proper mitigation measures are implemented for these buildings.

In the case of high-density development, crash walls and extensive vibration isolation become economically feasible, negating the problems associated with small sites. However, where high-density development is not appropriate given the site context, these solutions are not financially feasible for the developer, and a different approach is required. Across Canada, there have been inconsistencies in the way these sites are dealt with, and in some cases, residential development has been allowed with little to no mitigation, which could present proximity issues and concerns to residents in the future.

A major contributing factor with respect to inconsistencies in the application of mitigation measures across Canada is the lack of a clear development approval process for residential development in proximity to railway corridors in most jurisdictions outside of Ontario. A new approach is required that will ensure more consistent

outcomes across the country. In particular, municipalities will need to carefully consider the viability of sites for conversion to residential uses, based on criteria such as: existing contextual land use, size of site, appropriateness of high-density development, and the demonstrated effectiveness of alternative mitigation measures. Recommendations regarding a Model Review Process for Residential Development, Infill, and Conversions Adjacent to Railway Corridors can be found in **Section 4.1.1** of this report.





# GUIDELINES

- 3.1 Principles for Mitigation Design
- 3.2 Consultation with the Railway
- 3.3 Building Setbacks
- 3.4 Noise Mitigation
- 3.5 Vibration Mitigation
- 3.6 Safety Barriers
- 3.7 Security Fencing
- 3.8 Stormwater Management and Drainage
- 3.9 Warning Clauses and Other Legal Agreements
- 3.10 Construction Issues



## 3.0 // GUIDELINES

The intention of these guidelines is to provide a level of consistency in the approach to the design of buildings and their context in proximity to railway corridors, and the type of mitigation that is provided across the country.

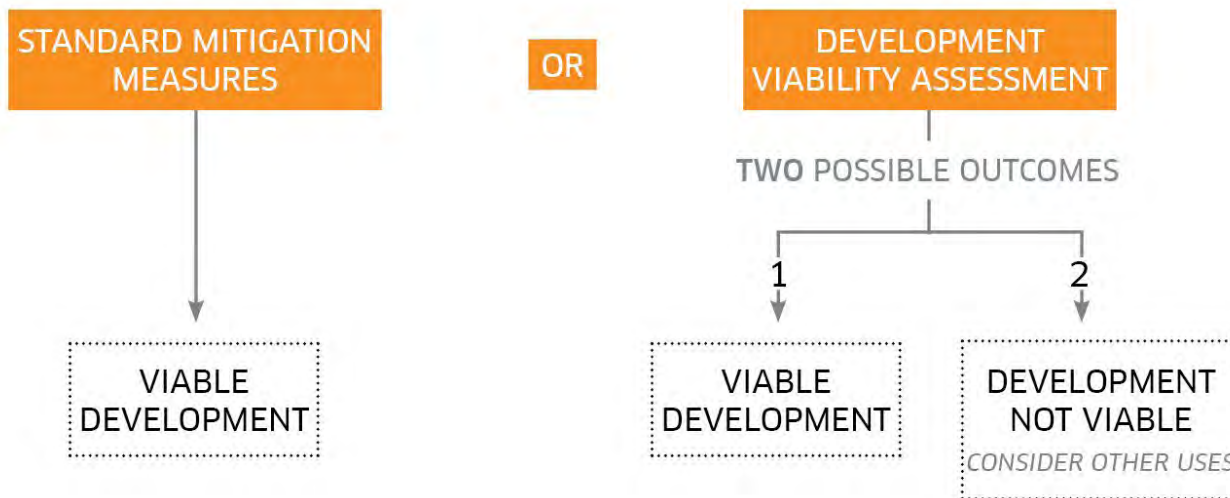


FIGURE 3 // THE DEVELOPMENT VIABILITY ASSESSMENT TOOL IS TO BE USED WHERE STANDARD MITIGATION MEASURES CANNOT BE ACCOMMODATED

The main objective is to mitigate railway-oriented impacts such as noise, vibration, and safety hazards, to ensure that the quality of life of a building's residents and users is not negatively affected. The guidelines are intended to be applied primarily to new residential development but may be useful for all other types of new development as well.

### 3.1 // PRINCIPLES FOR MITIGATION DESIGN

The following principles for mitigation design should be considered when applying the guidelines below. They are an expression of the intent of the guidelines, and both developers as well as municipalities should have regard for them when designing or assessing new residential development in proximity to a railway corridor.

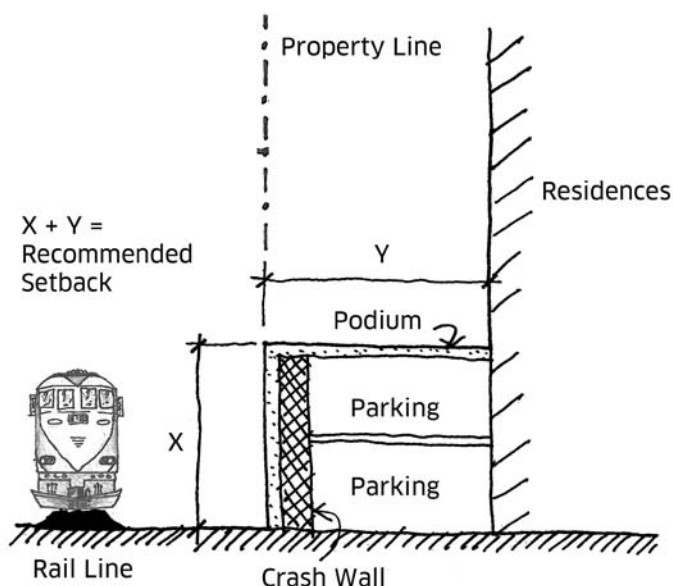
1. Standard mitigation measures are desired as a minimum requirement.
2. In instances where standard mitigation measures are not viable, alternative development solutions may be introduced in keeping with the Development Viability Assessment process (SEE FIGURE 3).
3. All mitigation measures should be designed to the highest possible urban design standards. Mitigation solutions, as developed through the Development Viability Assessment process, should not create an onerous, highly engineered condition that overwhelms the aesthetic quality of an environment.

### 3.2 // CONSULTATION WITH THE RAILWAY

Consultation with all stakeholders, including the railways, at the outset of a planning process is imperative to building understanding and informing nearby neighbours. In addition, initiating a conversation with railways can confirm the feasibility of a project and the practicality

of proceeding. Key issues or concerns that may need to be addressed will be identified.

- Early contact between the proponent and the railway (preferably in the project's early design phase), is highly recommended, especially for sites in close proximity to railway corridors. 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.



**FIGURE 4** // INCORPORATING A CRASH WALL INTO A DEVELOPMENT CAN REDUCE THE RECOMMENDED SETBACK.

### 3.3 // BUILDING SETBACKS FOR NEW DEVELOPMENTS

A setback from the railway corridor, or railway freight yard, is a highly desirable development condition, particularly in the case of new residential development. It provides a buffer from railway operations; permits dissipation of rail-oriented emissions, vibrations, and noise; and accommodates a safety barrier. Residential separation distances from freight rail yards are intended to address the fundamental land use incompatibilities. Proponents are encouraged to consult with the railway early in the development process to determine the capacity of the site to accommodate standard setbacks (see below). On smaller sites, reduced setbacks should be considered in conjunction with alternative safety measures. Where the recommended setbacks are not technically or practically feasible due, for example, to site conditions or constraints, then a Development Viability Assessment should be undertaken by the proponent to evaluate the conditions specific to the site, determine its suitability for new development, and suggest options for mitigation. Development Viability Assessments are explained in detail in **Appendix A**.

#### 3.3.1 Guidelines

- The standard recommended building setbacks for new residential development in proximity to railway operations are as follows:
  - » Freight Rail Yard: 300 metres
  - » Principle Main Line: 30 metres
  - » Secondary Main Line: 30 metres
  - » Principle Branch Line: 15 metres
  - » Secondary Branch Line: 15 metres
  - » Spur Line: 15 metres

- Setback distances must be measured from the mutual property line to the building face. This will ensure that the entire railway right-of-way is protected for potential rail expansion in the future.

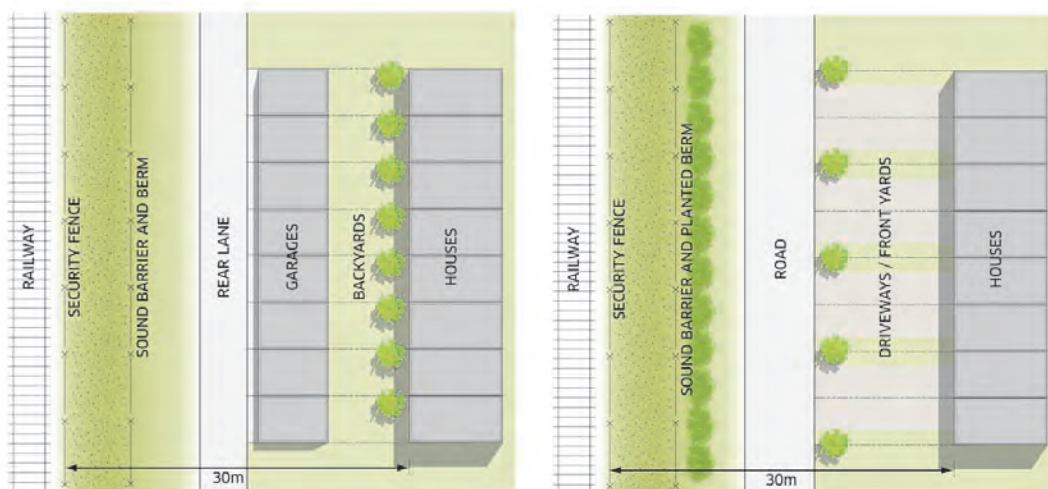
#### » Policy Recommendation

**Municipalities should establish minimum setback requirements through a zoning bylaw amendment.**

- Under typical conditions, the setback is measured as a straight-line horizontal distance.
- Where larger building setbacks are proposed (or are more practicable, such as in rural situations), reduced berm heights should be considered.
- Marginal reductions in the recommended setback of up to 5 metres may be achieved through a reciprocal increase in the height of the safety berm (see Section 3.6 Safety Barriers)
- Horizontal setback requirements may be substantially reduced with the construction of a crash wall (see Section 3.6 Safety Barriers). For example, where a crash wall is incorporated into a low-occupancy podium below a residential tower, the setback distance may be measured as a combination of horizontal and vertical distances, as long as the horizontal and vertical value add up to the recommended setback. This concept is illustrated in **FIGURE 4**.
- Where there are elevation differences between the railway and a subject development property, appropriate variations in the minimum setback should be determined in consultation with the affected railway. For example, should the railway

**FIGURES 5 (LEFT) & 6 (RIGHT)**  
**// SETBACK CONFIGURATION**  
**OPTIONS FOR OPTIMUM**  
**SITE DESIGN**

Note that in both scenarios displayed in Figures 5 & 6, the presence of intervening structures between the railway and the outdoor amenity areas may negate the need for a sound barrier. Where a barrier is not required for noise, vegetative or other screening is recommended to provide a visual barrier to the sometimes frightening onset of a high speed passenger train.



tracks be located in a cut, reduced setbacks may be appropriate.

- Appropriate uses within the setback area include public and private roads; parkland and other outdoor recreational space including backyards, swimming pools, and tennis courts; unenclosed gazebos; garages and other parking structures; and storage sheds.

Example setback configurations are illustrated in **FIGURES 5 AND 6**.

### 3.4 // NOISE MITIGATION

Noise resulting from rail operations is a key issue with regards to the liveability of residential developments in proximity to railway facilities, and may also be problematic for other types of sensitive uses, including schools, daycares, recording studios, etc. As well as being a major source of annoyance for residents, noise can also have impacts on physical and mental health, particularly if it interferes with normal sleeping patterns.<sup>1</sup> The rail noise issue is site-specific in nature, as the level and impact of noise varies depending on the type of train operations. (see Appendix B for a sample rail classification system). Proponents will have to carefully plan any new development in proximity to a railway corridor to ensure that noise impacts are minimized as much as possible. Generally, during the day, noise should be contained to a level conducive to comfortable speech communication or listening to soft music, and at night it should not interfere with normal sleeping patterns.<sup>2</sup> For

<sup>1</sup> Berglund, B., Lindvall, T., & Schwela, D. H., eds. (1999). Guidelines for community noise [Research Report]. Retrieved from World Health Organization website: <http://www.who.int/docstore/peh/noise/guidelines2.html>

<sup>2</sup> Canada Mortgage and Housing Corporation. (1986). Road and rail noise: Effects on housing [Canada]: Author.

building retrofits, while the majority of the guidelines below will apply, special attention should be paid to windows, doors, and the exterior cladding of the building.

#### 3.4.1 Guidelines

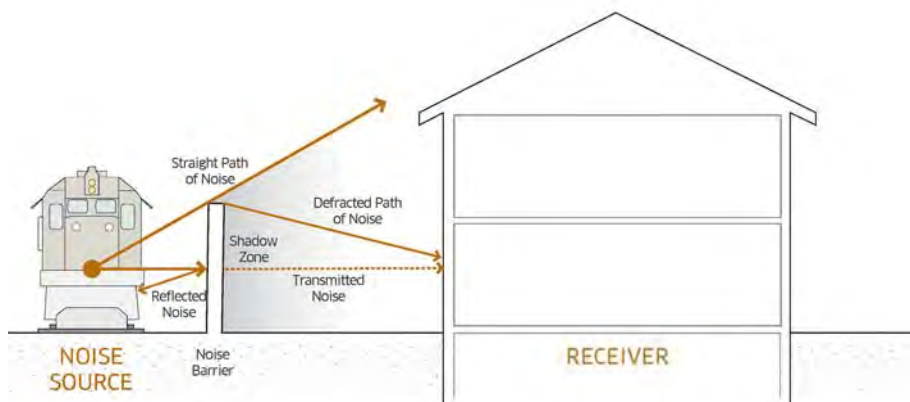
- Since rail noise is site-specific in nature, the level and impact of noise on a given site should be accurately assessed by a qualified acoustic consultant through the preparation of a noise impact study. The objective of the noise impact study is to assess the impact of all noise sources affecting the subject lands and to determine the appropriate layout, design, and required control measures. Noise studies should be undertaken by the proponent early in the development process, and should be submitted with the initial proposal.

#### » Policy Recommendation

**Municipalities should consider amending their Official Plan or other appropriate legislation to require noise impact studies as part of any rezoning or Official Plan amendment near railway operations.**

- The recommended minimum noise influence areas to be considered for railway corridors when undertaking noise studies are:
 

» Freight Rail Yards:	1,000 metres
» Principal Main Lines:	300 metres
» Secondary Main Lines:	250 metres
» Principal Branch Lines:	150 metres
» Secondary Branch Lines:	75 metres
» Spur Lines:	75 metres



**FIGURE 7 // EFFECT OF A NOISE BARRIER ON THE PATH OF NOISE FROM THE RECEIVER TO THE SOURCE. A NOISE BARRIER REDUCES NOISE LEVELS IN THREE WAYS: BY DEFLECTING NOISE OFF OF IT, BY DAMPENING THE NOISE THAT IS TRANSMITTED THROUGH IT, AND BY BENDING, OR DIFFRACTING NOISE OVER IT. THE AREA RECEIVING THE MOST PROTECTION BY THE NOISE BARRIER IS TYPICALLY REFERRED TO AS THE "SHADOW ZONE".**

- The acoustic consultant should calculate the external noise exposure, confirm with measurements if there are special conditions, and calculate the resultant internal sound 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 in the foreseeable future at the particular site or location. The study report should include details of assessment methods, summarize the results, and recommend the required outdoor as well as indoor control measures.
- To achieve an appropriate level of liveability, and to reduce the potential for complaints due to noise emitted from rail operations, new residential buildings in proximity to railway operations should be designed and constructed to comply with the sound level limits criteria shown in **AC.1.4** (see **AC.1.6** for sound limit criteria for residential buildings in proximity to freight rail shunting yards). Habitable rooms should be designed to meet the criteria when their external windows and doors are closed. If sound levels with the windows or doors open exceed these criteria by more than 10 dBA, the design of ventilation for these rooms should be such that the occupants can leave the windows closed to mitigate against noise (e.g. through the provision of central air conditioning systems).
- In Appendix C, recommended procedures for the preparation of noise impact studies are provided, as well as detailed information on noise measurement. These should be observed.
- It is recommended that proponents consult Section 2.4 of the Canadian Transportation Agency (CTA) report, *Railway Noise Measurement and Reporting Methodology* (2011) for guidance on the recommended content and format of a noise impact study.

#### 3.4.1.1 Avoiding Adverse Noise Impacts through Good Design

Many of the adverse impacts of railway noise can be avoided or minimized through good design practices. Careful consideration of the location and orientation of buildings, as well as their internal layout can minimize the exposure of sensitive spaces to railway noise. Site design should take into consideration the location of the rail corridor, existing sound levels, topography, and nearby buildings. Noise barriers, acoustic shielding from other structures, and the use of appropriate windows, doors, ventilation, and façade materials can all minimize the acoustic impacts of railway operations. Note that many of the design options recommended below have cost and market acceptability liabilities that should be evaluated at the outset of the design process.

#### 3.4.1.2 Noise Barriers

- 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. Noise barriers provide significant noise reductions only when they block the line of sight between the noise source and the receiver. Minimum noise barrier heights vary by the classification of the neighbouring rail line.<sup>3</sup> Though the required height will be determined by

<sup>3</sup> Note that the height of a noise barrier can be achieved in combination with that of a berm, if present.



**FIGURE 8 // PRECEDENT IMAGERY DEMONSTRATING THE INCORPORATION OF URBAN DESIGN AND LIVING WALLS INTO NOISE BARRIERS**

SOURCES: (LEFT) WESTFIELD WINDBREAK BY WILTSHIREBLOKE. CC BY-NC-ND 3.0. RETRIEVED FROM: [HTTP://WWW.FLICKR.COM/PHOTOS/WILTSHIREBLOKE/3580334228/](http://www.flickr.com/photos/wiltshirebloke/3580334228/). (MIDDLE) AUTUMN COLORS BY GEIR HALVORSEN. CC BY-NC-SA 3.0. RETRIEVED FROM: [HTTP://WWW.FLICKR.COM/PHOTOS/DAMIEL/47160698/](http://www.flickr.com/photos/daniel/47160698/). (RIGHT) IMAGE BY DIALOG.

an acoustic engineer in a noise report, they are typically at least:

- » **Principal Main Line:** 5.5 metres above top of rail
- » **Secondary Main Line:** 4.5 metres above top of rail
- » **Principal Branch Line:** 4.0 metres above top of rail
- » **Secondary Branch Line:** no minimum
- » **Spur Line:** no minimum

Differences in elevation between railway lands and development lands may significantly increase or decrease the required height of the barrier, which must at least break the line of sight. Thus, when not at the same grade, the typical barrier heights are measured from an inclined plane struck between the ground at the wall of the dwelling and the top of the highest rail.

- In keeping with existing railway guidelines for new developments, noise barriers must be constructed adjoining and parallel to the railway right-of-way with returns at each end. They must be constructed without holes or gaps and should be made of a durable material with sufficient mass to limit the noise transmission to at least 10dBA less than the noise that passes over the barrier,<sup>4</sup> at least 20 kg per square metre of surface area. Masonry, concrete, or other specialist construction is preferred in order to achieve the maximum noise reduction combined with longevity. Well-built wood fences are acceptable in most cases. Poorly constructed fences

of any type are an unnecessary burden on future residents.

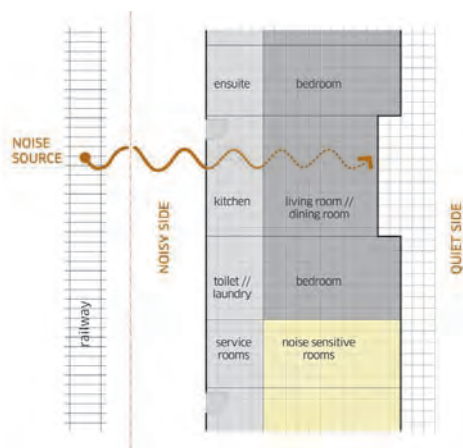
- Consideration should be made to limiting the visual impact of noise barriers in order to maintain a high level of urban design in all new developments, and to discourage vandalism. This can be accomplished by incorporating public art into the design of the barrier, or through the planting of trees and shrubs on the side of the barrier facing the development, particularly where it is exposed to regular sunlight.
- Alternatively, the barrier itself may be constructed as a living wall, which also has the benefit of providing additional noise attenuation. **FIGURE 8** provides some examples of how good design practices may be incorporated into the design of noise barriers.

**N.B.** New barriers constructed on one side of a railway opposite an older neighbourhood without barriers may lead to concerns from existing residents about the potential for noise increases due to barrier reflections. It is common for the characteristics of the noise to change due to frequency, duration, and time of onset, which, combined, may be perceived as a significant increase in noise levels. However, this is not generally supported through onsite measurement, as the train will act as its own barrier to any reflected noise during pass-by.

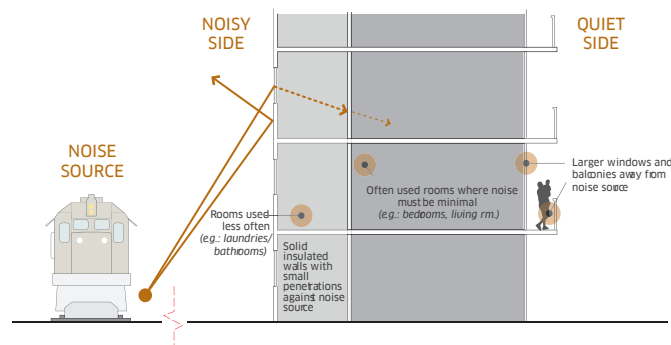
#### **3.4.1.3 Building Location, Design Orientation, and Room Layout**

While low-rise buildings may benefit from shielding provided by topography, barriers, or other buildings, high-rise buildings usually receive less noise shielding, and are, therefore, typically more exposed to noise from

<sup>4</sup> Rail Infrastructure Corporation. (November 2003). Interim guidelines for applicants: Consideration of rail noise and vibration in the planning process. Retrieved from [http://www.daydesign.com.au/downloads/Interim\\_guidelines\\_for\\_applicants.pdf](http://www.daydesign.com.au/downloads/Interim_guidelines_for_applicants.pdf)



**FIGURE 9 // LOCATING NOISE SENSITIVE ROOMS AWAY FROM RAIL NOISE IN DETACHED DWELLINGS; AND FIGURE 10 (RIGHT) - LOCATING NOISE SENSITIVE ROOMS AWAY FROM RAIL NOISE IN MULTI-UNIT DWELLINGS.** (SOURCE: ADAPTED FROM FIGURE 3.6 IN THE DEVELOPMENT NEAR RAIL CORRIDORS AND BUSY ROADS - INTERIM GUIDELINE BY THE STATE OF NEW SOUTH WALES, AUSTRALIA)



**FIGURE 10 // LOCATING NOISE SENSITIVE ROOMS AWAY FROM RAIL NOISE IN MULTI-UNIT DWELLINGS** (SOURCE: ADAPTED FROM FIGURES 3.5 & 3.6 IN THE DEVELOPMENT NEAR RAIL CORRIDORS AND BUSY ROADS - INTERIM GUIDELINE BY THE STATE OF NEW SOUTH WALES, AUSTRALIA)

## » Policy Recommendations

Urban Design Guidelines for development near railway corridors would be a valuable tool in suggesting building layout and design. Alternatively, municipal planners should pay close attention to these issues through a site planning process. Jurisdictions that do not allow comprehensive site planning may wish to consider amendments to their land use planning legislation.

Comprehensive zoning for podiums would be a valuable tool for areas in proximity to railway operations that municipalities have identified for redevelopment. Urban Design Guidelines can also speak to appropriate built form, including podium design, setbacks, step backs etc. At a minimum, municipal planners should secure podium massing as part of a site-specific zoning by-law amendment.

Balconies can be regulated through zoning if administered comprehensively and can be secured as part of a site-specific zoning by-law. Urban Design Guidelines should also speak to appropriate balcony design (e.g. recessed versus protruding balconies).

Urban Design Guidelines should contain comprehensive information on best practices for landscape design, and appropriate types and species of plants.

Urban Design Guidelines can speak to materiality. Some jurisdictions, such as Ontario, allow municipalities to regulate external materials through the site plan process. This practice should be encouraged and jurisdictions that do not currently allow for this should consider making appropriate amendments to their land use planning legislation.

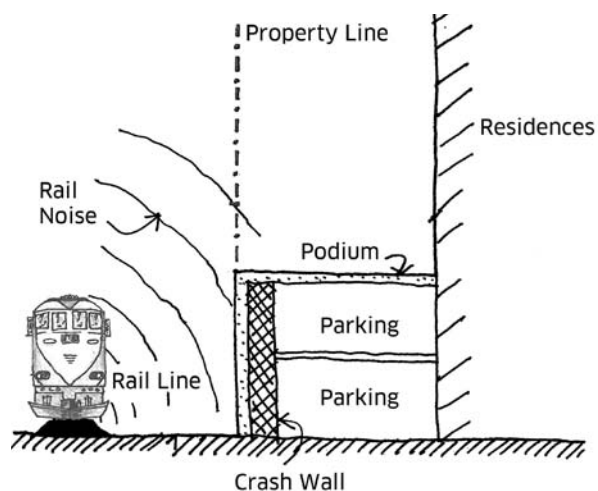
rail operations. In either case, noise mitigation needs to be considered at the outset of a development project, during the layout and design stage.

- One of the most effective ways of reducing the impact of rail noise is through the use of a setback, by increasing the separation between the source of noise and the noise sensitive area. Generally, doubling the distance from the noise source to the receiver will reduce the noise levels by between 3dBA and 6dBA.<sup>5</sup> (See Section 3.3 Building Setbacks)
- The layout of residential buildings can also be configured to reduce the impact of rail noise. For example, bedrooms and other habitable areas should be located on the side of the building furthest from the rail corridor. 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. This concept is illustrated in FIGURES 9 AND 10.
- Minimizing the number of doors and windows on the noisy side of the dwelling will help to reduce the intrusion of noise. In the case of multi-unit developments, a single-loaded building where the units are located on the side of the building facing away from the rail corridor is another potential solution for reducing noise penetration.

### 3.4.1.4 Podiums

- Outdoor rail noise can be substantially reduced by building residential apartments on top of a podium or commercial building space. If the residential

<sup>5</sup> 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>



**FIGURE 11** // PODIUMS CAN HELP REDUCE THE AMOUNT OF NOISE THAT REACHES RESIDENCES IF A SETBACK IS USED. (SOURCE: ADAPTED FROM FIGURE 3.13 IN THE DEVELOPMENT NEAR RAIL CORRIDORS AND BUSY ROADS - INTERIM GUIDELINE BY THE STATE OF NEW SOUTH WALES, AUSTRALIA).

tower is set back, then the podium acts to provide increased distance from the railway corridor, thus reducing the noise from the corridor and providing extra shielding to the lower apartments. This concept is illustrated in **FIGURE 11**.

#### 3.4.1.5 Balconies

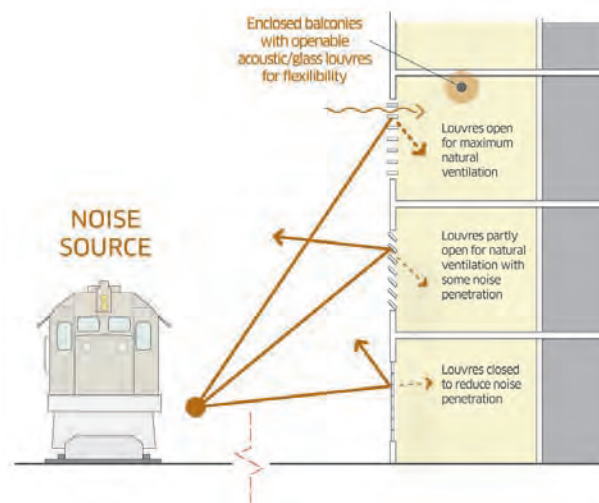
- Providing enclosed balconies can be an effective means of reducing the noise entering a building. Where enclosed balconies are used, acoustic louvres and possibly a fan to move air into and out of the balcony space may be installed to address ventilation requirements. This concept is illustrated in **FIGURE 12**.

#### 3.4.1.6 Vegetation

- While vegetation such as trees and shrubs does not actually limit the intrusion of noise, it has been shown to create the perception of reduced noise levels. Vegetation is also valuable for improving the aesthetics of noise barriers and for reducing the potential for visual intrusion from railway operations.

#### 3.4.1.7 Walls

- In order to reduce the transmission of noise into the building, it is recommended that masonry or concrete construction or another form of heavy wall be used for all buildings in close proximity to railway corridors. This will aid in controlling the sound-induced vibration of the walls that rattles windows, pictures, and loose items on shelving. Additionally, care should be taken to ensure that the insulation capacity of the wall is not weakened by exhaust fans, doors, or windows of a lesser insulation capacity. To improve insulation response, exhaust vents can be treated with sound-absorbing material or located on walls which are not directly



**FIGURE 12** // USING ENCLOSED BALCONIES FACING A RAILWAY CORRIDOR AS NOISE SHIELDS. (SOURCE: ADAPTED FROM FIGURE 3.16 IN THE DEVELOPMENT NEAR RAIL CORRIDORS AND BUSY ROADS - INTERIM GUIDELINE BY THE STATE OF NEW SOUTH WALES, AUSTRALIA).

exposed to the external noise.

#### 3.4.1.8 Windows

Acoustically, windows are among the weakest elements of a building façade. An open or acoustically weak window can severely negate the effect of an otherwise acoustically strong façade.<sup>6</sup> Therefore, it is extremely important to carefully consider the effects of windows on the acoustic performance of any building façade in proximity to a railway corridor. In addition to the recommendations below, proponents are advised to familiarize themselves with the Sound Transmission Class (STC) rating system, which allows for a comparison of the noise reduction that different windows provide.<sup>7</sup> In order to successfully ensure noise reduction from windows, proponents should:

- ensure windows are properly sealed by using a flexible caulking such as mastic or silicone on both the inside of the window and outside, between the wall opening and the window frame;
- use double-glazed windows with full acoustic seals. When using double-glazing, the wider the air space between the panes, the higher the insulation (50 mm to 100 mm is preferable in non-sealed windows and 25mm in sealed windows). It is also desirable in some cases to specify the panes with different thicknesses to avoid sympathetic resonance or to use at least one laminated lite to dampen the vibration within the window;
- consider reducing the size of windows (i.e. use punched windows instead of a window wall or curtain wall);

<sup>6</sup> 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>

<sup>7</sup> The STC rating of a soundproof window is typically in the range of 45 to 54.

- consider increasing the glass thickness;
- consider using absorbent materials on the window reveals in order to improve noise insulation in particularly awkward cases;
- consider using hinged or casement windows or fixed pane windows instead of sliding windows;
- ensure window frames and their insulation in the wall openings are air tight; and
- incorporate acoustic seals into operable windows for optimal noise insulation.

Note that window frame contributions to noise penetration are typically less for aluminum and wood windows than for vinyl frames, as above.<sup>8</sup>

#### 3.4.1.9 Doors

In order to ensure proper acoustic insulation of doors:

- airtight seals should be used around the perimeter of the door;
- cat flaps, letter box openings, and other apertures should be avoided;
- heavy, thick, and/or dense materials should be used in the construction of the door;
- there should be an airtight seal between the frame and the opening aperture in the façade;
- windows within doors should be considered as they exhibit a higher acoustic performance than the balance of the door material; and
- sliding patio doors should be treated as windows when assessing attenuation performance.

<sup>8</sup> Note that STC ratings should include the full window assembly with the frame, as frames have been shown to be a weak component, and may not perform as anticipated from the glazing specifications.

## 3.5 // VIBRATION MITIGATION

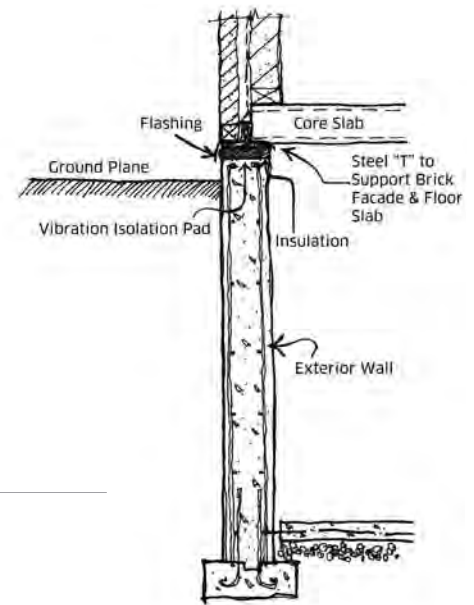
Vibration caused by passing trains is an issue that could affect the structure of a building as well as the liveability of the units inside residential structures. In most cases, structural integrity is not a factor. Like sound, the effects of vibration are site specific and are dependent on the soil and subsurface conditions, the frequency of trains and their speed, as well as the quantity and type of goods they are transporting.

The guidelines below are applicable only to new building construction. In the case of building retrofits, vibration isolation of the entire building is generally not possible. However, individual elevated floors may be stiffened through structural modifications in order to eliminate low-frequency resonances. Vibration isolation is also possible for individual rooms through the creation of a room-within-a-room, essentially by floating a second floor slab on a cushion (acting like springs), and supporting the inner room on top of it.<sup>9</sup> Additional information regarding vibration mitigation options for new and existing buildings can be found in the *FCM/RAC Railway Vibration Mitigation Report*, which can be found on the Proximity Project website.

### 3.5.1 Guidelines

- Since vibration is site-specific in nature, the level and impact of vibration on a given site can only be accurately assessed by a qualified acoustic or vibration consultant through the preparation of a vibration impact study. It is highly recommended that an acoustic or vibration consultant be obtained by the proponent early in the design process, as mitigation can be difficult. It is recommended

<sup>9</sup> Howe, B., & McCabe, N. (March 15 2012). *Railway vibration reduction study: Information on railway vibration mitigation* [Ottawa, ON]: Railway Association of Canada.



**FIGURE 13** // SHALLOW VIBRATION ISOLATION

that the consultant be used to determine whether vibration mitigation measures are necessary and what options are available given the particular conditions of the development site in question. The consultant will employ measurements to characterize the vibration affecting the site in question. In the absence of a future rail corridor not yet operating, estimates based on soil vibration testing are required, although such sites are quite rare.

#### » Policy Recommendation

**Municipalities should consider amendments to their Official Plan, where necessary, to make vibration studies a requirement for any zoning by-law amendment and Official Plan amendment applications.**

- The recommended minimum vibration influence area to be considered is 75 metres from a railway corridor or rail yard.
- The acoustic consultant should 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 report should include details of the assessment methods, summarize the results, and recommend the required control measures.
- See AC.2.5 for recommended procedures for the preparation of vibration impact studies. These should be observed.

- The important physical parameters that should be considered by the consultant for designing vibration control can be divided into the following four categories:
  - » Operational and vehicle factors: including speed, primary suspension on the vehicle, and flat or worn wheels.
  - » Guideway: the type and condition of the rails and the rail support system.
  - » Geology: soil and subsurface conditions are known to have a strong influence on the levels of ground-borne vibration. Among the most important factors are the stiffness and internal damping of the soil and the depth of bedrock. Experience with ground-borne vibration is that vibration propagation is more efficient in stiff soils. Shallow rock (within a metre or two of the surface) seems to prevent significant vibration. Additional factors such as layering of the soil and depth to the water table, including their seasonal fluctuation, can have significant effects on the propagation of ground-borne vibration.
  - » Receiving building: the vibration levels inside a building depend on the vibration energy that reaches the building foundations, the coupling of the building foundation to the soil, and the propagation of the vibration through the building. The general guideline is that the heavier a building is, the lower the response will be to the incident vibration energy.

#### 3.5.2 Examples of Vibration Mitigation Measures

Full vibration isolation requires a significant amount of specialist design input from both the acoustic consultant

and the structural engineer, and is therefore more suited to larger developments, which exhibit greater economies of scale.

#### 3.5.2.1 Low-rise Buildings

- Vibration isolation of lightweight structures is difficult but possible for below grade floors. Normally, the upper floors are isolated from the foundation wall and any internal column supports using rubber pads designed to deflect 5 to 20mm under load. This concept is illustrated in **FIGURE 13**. Additionally, the following factors should be taken into consideration when designing vibration isolation for lightweight structures:
  - » Using hollow core concrete or concrete construction for the first floor makes the isolation problem easier to solve.
  - » Thought must be given to temporary wind and earthquake horizontal loads.
  - » A seam is created around the foundation wall that must be water sealed and insulated.
  - » Finishing components such as wood furring cannot be attached either above or below the isolation joint.
  - » All of these special items would likely be carried out by trades untrained in vibration control and therefore, a good deal of site supervision is required.
- Minor vibration control (usually only a 30% reduction) can be achieved by lining the outside of the foundation walls with a resilient layer. This practice takes advantage of the fact that the waves of vibration from surface rail travel mostly on the surface, dying down with depth. To obtain reasonable

results, however, the lining must be quite soft and yet be able to withstand the lateral soil pressures present on the foundation wall.

#### 3.5.3.2 Deep Foundation Buildings

- In the case of deep concrete foundations near rail lines, the design of vibration isolation for the surface wave should consider whether or not it is necessary to isolate the base of the building columns and walls. Often, these structures are anchored well below the depth where the surface wave penetrates and there are several levels of parking that the vibration must climb to reach a floor where vibration is of concern. Therefore, unless the rail corridor is running in a tunnel, isolation of deep foundation buildings may only require isolation of the foundation wall away from the structure.
- In severe cases, or locations where the foundation is not deeper than the surface wave, vibration isolation may also be required beneath the columns and their foundations, though it may only be necessary to isolate those portions of the structure located closest to the rail line. Consideration should be given to the differential deflection from one column row to the next, if only part of the building is vibration isolated.
- This is an unusual type of construction, which requires considerable professional supervision. The design is usually a joint effort between the vibration and structural engineers. Some architectural expertise is also needed, particularly for waterproofing the gap at the top of the foundation wall below the grade slab and making sure that there are no inadvertent connections between internal walls on the parking slabs and the vibrating

foundation wall, or between the grade slab and the lowest parking slab if the columns are isolated.

### 3.6 // SAFETY BARRIERS

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, as well as to 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 derailed cars, slowing them down and limiting the distance they travel outside of the railway right-of-way. The berm works by intercepting the movement of a derailed car. As the car travels into the berm, it is pulled down by gravity, causing the car to begin to dig into the earth, and pulling it into the intervening earthen mass, slowing it down, and eventually bringing it to a stop.

#### 3.6.1 Guidelines

##### 3.6.1.1 Berms

- Where full setbacks are provided, safety barriers are constructed as berms, which are simple earthen mounds compacted to 95% modified proctor. Setbacks and berms should typically be provided together in order to afford a maximum level of mitigation. Berms are to be constructed adjoining and parallel to the railway right-of-way with returns at the ends and to the following specifications:
  - » Principle Main Line: 2.5 metres above grade with side slopes not steeper than 2.5 to 1
  - » Secondary Main Line: 2.0 metres above grade with side slopes not steeper than 2.5 to 1

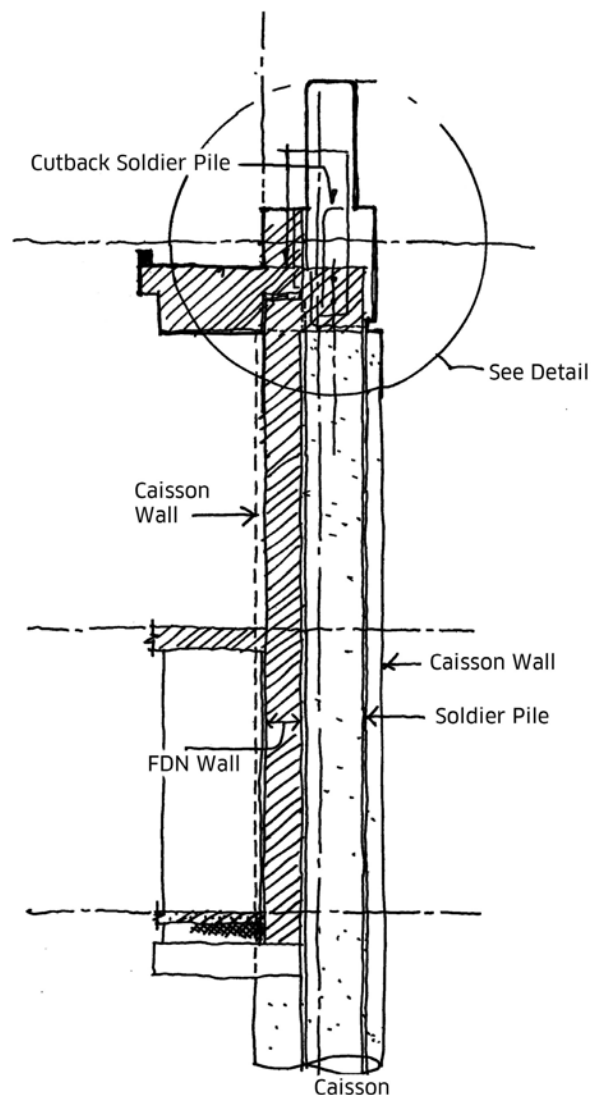


FIGURE 14A // DEEP VIBRATION ISOLATION, COMBINED WITH CRASH WALL.

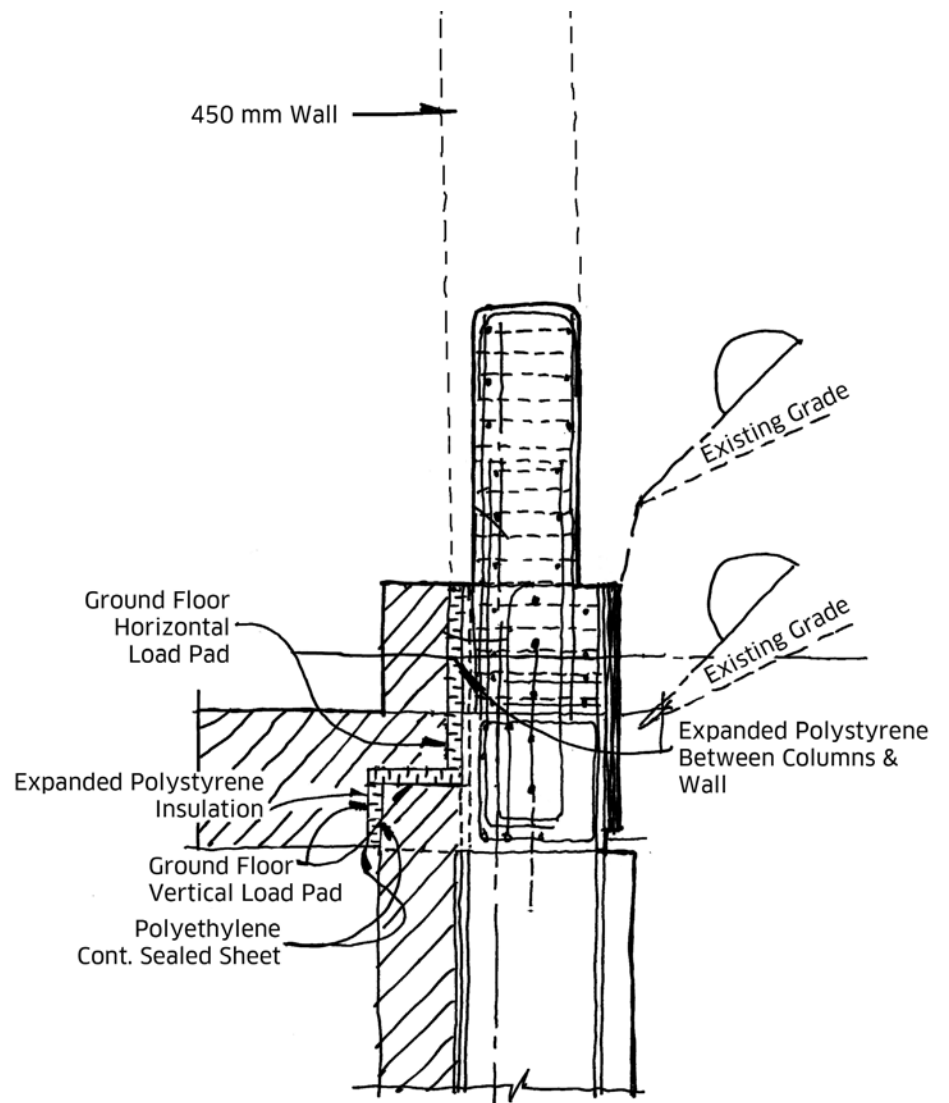
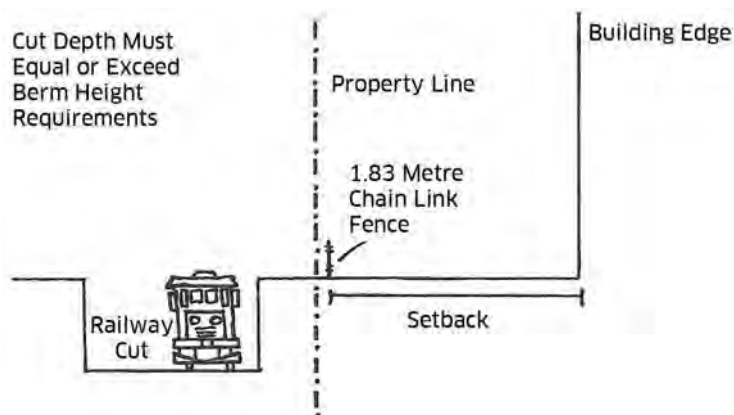
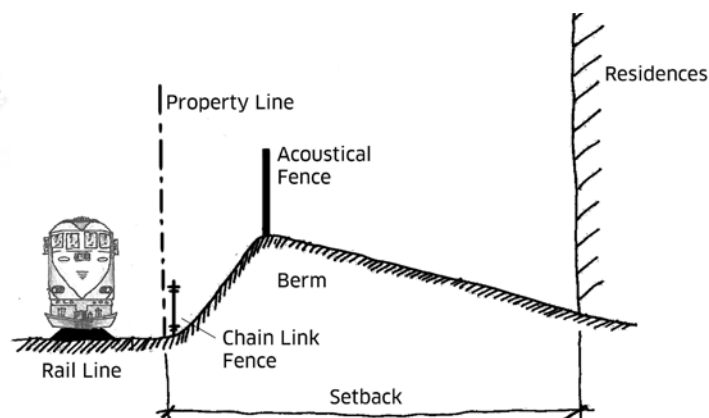


FIGURE 14B // DEEP VIBRATION ISOLATION DETAIL, COMBINED WITH CRASH WALL.



**FIGURE 15** // NO BERM IS REQUIRED WHERE THE RAILWAY IS IN A CUT OF EQUIVALENT DEPTH



**FIGURE 16** // GRADUALLY RETURNING TO GRADE FROM THE TOP OF THE BERM AVOIDS CREATING UNUSABLE BACKYARD SPACE OR BLOCKING SUNLIGHT

- » Principle Branch Line: 2.0 metres above grade with side slopes not steeper than 2.5 to 1
- » Secondary Branch Line: 2.0 metres above grade with side slopes not steeper than 2.5 to 1
- » Spur Line: no requirement

**N.B.** Berms built to the above specifications will have a full width of as many as 15 metres.

- Berm height is to be measured from grade at the property line. Reduced berm heights are possible where larger setbacks are proposed.
- Steeper slopes may be possible in tight situations, and should be negotiated with the affected railway.
- Where the railway line is in a cut of equivalent depth, no berm is required (**FIGURE 15**).
- There is no requirement for the proponent to drop back to grade on the side of the berm facing the subject development property. The entire grade of the development could be raised to the required height, or could be sloped more gradually. This may be desirable to avoid creating unusable backyard space, due to the otherwise steep slope of the berm. This concept is illustrated in **FIGURE 16**.
- Marginal reductions in the recommended setback of up to 5 metres may be achieved through a reciprocal increase in the height of the berm.
- If applicable to the site conditions, in lieu of the recommended berm, a ditch or valley between the railway and the subject new development property that is generally equivalent to or greater than the inverse of the berm could be considered (e.g. a ditch that is 2.5 metres deep and approximately 14

metres wide in the case of a property adjacent to a Principle Main Line). This concept is illustrated in **FIGURE 17**.

- Where the standard berm and setback are not technically or practically feasible, due for example, to site conditions or constraints, then a Development Viability Assessment should be undertaken by the proponent to evaluate the conditions specific to the site, determine its suitability for development, and suggest alternative safety measures such as crash walls or crash berms. Development Viability Assessments are explained in detail in **APPENDIX A**.

#### » Policy Recommendation

Urban Design Guidelines may be useful tools for establishing specifications for the proper use and design of berms.

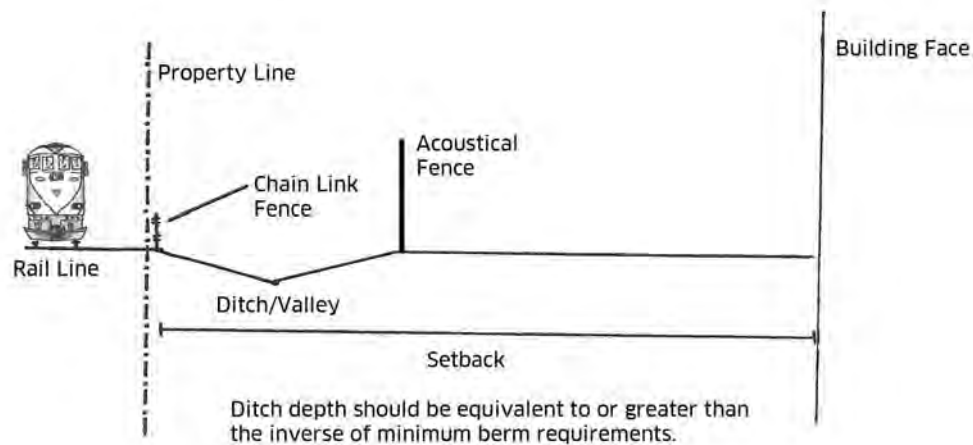
##### 3.6.1.2 Crash Berms

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. This results from both the berm's mass and the nature of the material of which it is composed. Crash berms are also highly cost effective and particularly useful in spatially constrained sites where a full berm cannot be accommodated.

In derailment scenarios other than a head-on or close to head-on interception, the standard earthen berm and setback distance will be more effective in absorbing the kinetic energy of the derailed train than a reinforced concrete crash wall. The reason for this is that anything other than a 90 degree interception of the crash wall will result in some deflection of the energy in the derailling



PHOTO SOURCE: RAILWAY ASSOCIATION OF CANADA



**FIGURE 17** // A DITCH OR VALLEY OF EQUIVALENT DEPTH CAN BE USED IN PLACE OF A STANDARD BERM ADJACENT TO A MAIN LINE RAILWAY

train back towards the corridor, thus extending the time and distance of the derailment event. This extension of derailment time and distance results in greater risk of damage to private property along a longer section of the rail corridor, to more lives, and results in more expensive clean up and restoration work within the rail corridor. The preference therefore, is to design “crash berms” which are typically concrete wall structures retaining more earth behind the wall that in-turn provide more energy absorption characteristics (see **FIGURE 18**).

### 3.6.1.3 Crash Walls

Crash walls are concrete structures that are designed to provide the equivalent resistance in the case of a train derailment as the standard berm, particularly in terms of its energy absorptive characteristics. The design of crash walls is dependent on variables such as train speed, weight, and the angle of impact, which will vary from case to case. Changes in these variables will affect the amount of energy that a given crash wall will have to absorb, to effectively stop the movement of the train. In addition, the load that a wall is designed to withstand will differ based on the flexibility of the structure, and therefore, on how much deflection that it provides under impact. For these reasons, it is not possible to specify design standards for crash walls. In keeping with existing guidelines developed by AECOM, the appropriate load that a crash wall will have to withstand must be derived from the criteria outlined below.

- When proposing a crash wall as part of a new residential development adjacent to a railway corridor, the proponent must undertake a detailed study that outlines both the site conditions as well as the design specifics of the proposed structure. This study must be submitted to the affected municipality for approval and must contain the following elements:

- » a location or key plan. This will be used to identify the mileage and subdivision, the classification of the rail line, and the maximum speed for freight and passenger rail traffic;
- » a Geotechnical Report of the site;
- » a site plan clearly indicating the property line, the location of the wall structure, and the centreline and elevation of the nearest rail track;
- » layout and structure details of the proposed crash wall structure, including all material notes and specifications, as well as construction procedures and sequences. All drawings and calculations must be signed and sealed by a professional engineer;
- » the extent and treatment of any temporary excavations on railway property; and
- » a crash wall analysis, reflecting the specified track speeds for passenger and/or freight applicable within the corridor, and which includes the following four load cases:
  - i. Freight Train Load Case 1 - Glancing Blow: three locomotives weighing 200 tonnes each plus six cars weighing 143 tonnes each, impacting the wall at 10 degrees to the wall;
  - ii. Freight Train Load Case 2 - Direct Impact: single car weighing 143 tonnes impacting the wall at 90 degrees to the wall;
  - iii. Passenger Train Load Case 3 - Glancing Blow: two locomotives weighing 148 tonnes each plus 6 cars weighing 74 tonnes each impacting the wall at 10 degrees to the wall; and
  - iv. Passenger Train Load Case 4 - Direct Impact: Single car weighing 74 tonnes impacting the

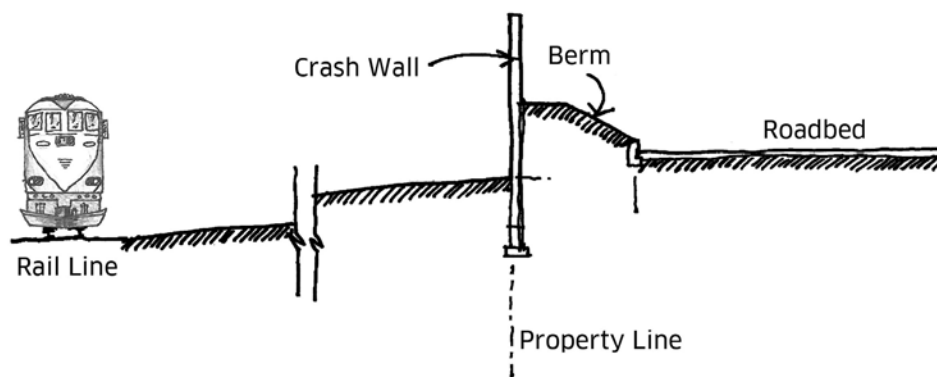


FIGURE 18 // EXAMPLE CONFIGURATION OF A CRASH BERM

wall at 90 degrees to the wall.

- The crash wall design must include horizontal and vertical continuity to distribute the loads from the derailed train.
- To assist in designing the crash wall safety structure, the following should be considered:
  - i. The speed of a derailed train or car impacting the wall is equal to the specified track speed;
  - ii. The height of the application of the impact force is equal to 0.914 m (3 feet) above ground; and
  - iii. The minimum height of the wall facing the tracks is equal to 2.13 m (7 feet) above the top of rail elevation.
- For energy dissipation calculations, assume:
  - i. Plastic deformation of individual car due to direct impact is equal to 0.3 m (1 foot) maximum;
  - ii. Total compression of linkages and equipment of the two or three locomotive and six cars is equal to 3.05 m (10 feet) maximum; and
  - iii. Deflection of the wall is to be determined by the designer, which would depend on material, wall dimensions and stiffness of crash wall.

### 3.7 // SECURITY FENCING

Trespassing onto a railway corridor can have dangerous consequences given the speed and frequency of trains, and their extremely large stopping distances, and every effort should be made to discourage it. This will save lives, reduce emergency whistling, and minimize

disruptions to rail service.

#### 3.7.1 GUIDELINES

- At a minimum, all new residential developments in proximity to railway corridors must include a 1.83 metre high chain link fence along the entire mutual property line, to be constructed by the owner entirely on private property. Other materials may also be considered, in consultation with the relevant 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.

#### » Policy Recommendation

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. For example, schools, commercial uses, parks or plazas should not be located in proximity to railway facilities without the provision of adequate pedestrian crossings.

- Due to common increased trespass problems associated with parks, trails, open space, community centres, and schools located in proximity to the railway right-of-way, increased safety/security measures should be considered, such as precast fencing and fencing perpendicular to the railway property line at the ends of a subject development property.



PHOTO SOURCE: DIALOG

### 3.8 // STORMWATER MANAGEMENT AND DRAINAGE

Stormwater management and drainage infrastructure associated with a development or railway corridor adjustments should not adversely impact on the function, operation, or maintenance of the corridor, or should not adversely affect area development.

#### 3.8.1 GUIDELINES

- The proponent should consult with the affected railway regarding any proposed development that may have impacts on existing drainage patterns. Railway corridors/properties with their relative flat profile are not typically designed to handle additional flows from neighbouring properties, and so development should not discharge or direct stormwater, roof water, or floodwater onto a railway corridor.
- Any proposed alterations to existing rail corridor drainage patterns must be substantiated by a suitable drainage report, as appropriate.
- Any development-related changes to drainage must be addressed using infrastructure and/or other means located entirely within the confines of the subject development site.
- Stormwater or floodwater flows should be designed to:
  - » maintain the structural integrity of the railway corridor infrastructure;
  - » avoid scour or deposition; and
  - » prevent obstruction of the railway corridor as a result of stormwater or flood debris.

- Drainage systems should be designed so that stormwater is captured on site for reuse or diverted away from the rail corridor to a drainage system, ensuring that existing drainage is not overloaded.
- Building design should ensure that gutters and balcony overflows do not discharge into rail infrastructure. Where drainage into the railway corridor is unavoidable due to site characteristics, discussion should be held early on with the railway. If upgrades are required to the drainage system solely due to nearby development, the costs involved should reasonably be met by the proponent. All disturbed surfaces must be stabilized.
- Similarly, railways should consult with municipalities where facility expansions or changes may impact drainage patterns.

### 3.9 // WARNING CLAUSES AND OTHER LEGAL AGREEMENTS

Warning clauses are considered an essential component of the stakeholder communication process, and ensure all parties interested in the selling, purchasing, or leasing of residential lands in proximity to railway corridors are aware of any property constraints and the potential implications associated with rail corridor activity.

#### 3.9.1 GUIDELINES

- Municipalities are encouraged to promote the use of appropriate specific rail operations warning clauses, if feasible, in consultation with the appropriate railway, to ensure that those who may acquire an interest in a subject property are notified of the existence and nature of the rail operations, the potential for increased rail activities, the potential for annoyance

or disruptions, and that complaints should not be directed to the railways. Such warning clauses should be registered on title if possible and be inserted into all agreements of purchase and sale or lease for the affected lots/units.

- Municipalities are encouraged to pursue the minimum influence areas outlined in the report when using warning clauses or other notification mechanisms.
- Appropriate legal agreements and restrictive covenants registered on title are also recommended to be used, if feasible, to secure the construction and maintenance of any required mitigation measures, as well as the use of warning clauses and any other notification requirements.
- Where it is not feasible to secure warning clauses, every effort should be made to provide notification to those who may acquire an interest in a subject property. This can be accomplished through other legal agreements, property signage, and/or descriptions on websites associated with the subject property.
- Municipalities should consider the use of environmental easements for operational emissions, registered on title of development properties, to ensure clear notification to those who may acquire an interest in the property. Easements will provide the railway with a legal right to create emissions over a development property and reduce the potential for future land use conflicts.
- Stronger and clearer direction is recommended for real estate sales and marketing representatives, such as mandatory disclosure protocols to those who may acquire an interest in a subject property, with respect to the nature and extent of rail operations

in the vicinity and regarding any applicable warning clauses and mitigation measures. The site constraints and mitigation measures being implemented should be communicated through marketing and promotional material, signage, website descriptions, and informed sales staff committed to full disclosure.

- Municipalities are encouraged to require appropriate signage/documentation at development marketing and sales centres that:
  - » identifies the lots or blocks that have been identified by any noise and vibration studies and which may experience noise and vibration impacts;
  - » identifies the type and location of sound barriers and security fencing;
  - » identifies any required warning clause(s); and
  - » contains a statement that railways can operate on a 24 hour a day basis, 7 days a week.

Additionally, studies undertaken to assess and mitigate noise, vibration, and other emissions should be released to potential purchasers for review in order to enhance their understanding of the site constraints and to help minimize future conflict.

- Where title agreements, restrictive covenants, and/or warning clauses are not currently permitted, appropriate legislative amendments are recommended. This may require coordination at the provincial level to provide appropriate and/or improved direction to stakeholders.
- Warnings and easements provide notice to purchasers, but are not to be used as a complete alternative to the installation of mitigation measures.



PHOTO SOURCE: DIALOG

### 3.10 // CONSTRUCTION ISSUES

Planning for construction of new developments in proximity to railway corridors requires unique considerations that should aim to maintain safety while avoiding disruptions to rail service. The efficiency of the operation of railway services should be maintained and no adverse impacts on the corridor or railway operations should occur during the design and construction of a new development located in proximity to a railway corridor.

#### 3.10.1 GUIDELINES

- Prior to the start of construction of a new development, rail corridor-related infrastructure must be identified and plans adjusted as required to ensure that these features are not adversely affected by the proposed construction. Rail corridor-related infrastructure may include, but is not limited to:
  - » trackage;
  - » fibre optic cables;
  - » retaining walls;
  - » bridge abutments; and,
  - » signal bridge footings.
- No entry upon, below, or above the rail corridor shall be permitted without prior consent from the railway.
- Appropriate permits and flagging are required for work immediately adjacent to railway corridors. The proponent is responsible for any related costs.
- Temporary fencing / hoarding is required, as appropriate, to discourage unauthorized access to the rail corridor. Plans illustrating proposed fencing / hoarding locations as well as any other construction

related infrastructure, should be submitted to the approval authority and the relevant railway.

- Cranes, concrete pumps, and other equipment capable of moving into or across the airspace above railway corridors may cause safety and other issues if their operation is not strictly managed. This type of equipment must not be used in airspace over the rail corridor without prior approval from the railway.
- Existing services and utilities under a rail corridor must be protected from increased loads during the construction and operation of the development.
- Construction must not obstruct emergency access to the railway corridor.





# IMPLEMENTATION

- 4.1 Implementation Mechanisms
- 4.2 Advancing Stakeholder Roles
- 4.3 Dispute Resolution

4



# 4.0 // IMPLEMENTATION

The following implementation recommendations are intended to provide specific guidance to municipal and provincial governments...

...towards ensuring that the guidelines are consistently and effectively adopted in as many jurisdictions as possible. Processes are identified that may be employed to entrench these guidelines in policy.

## 4.1 // IMPLEMENTATION MECHANISMS

### 4.1.1 Model Review Process For New Residential Development, Infill & Conversions in Proximity to Railway Corridors

#### OBJECTIVE:

Establish 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.

#### RECOMMENDATION:

The Model Review Process for New Residential Development, Infill and Conversions in Proximity to Railway Corridors is outlined in **FIGURE 19**. It 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. Ultimately, the goal is to achieve a much greater level of consistency in the way proposals for new residential development in proximity to railway corridors are evaluated and approved across all Canadian provinces and territories.

The proposed process recognizes that there will be many sites that can easily accommodate the standard mitigation recommended by the railways. In instances where this is the case, it is expected that standard mitigation will be proposed. In urban areas land values and availability have placed greater development pressure on smaller sites close to railway corridors. These sites are less likely to be able to accommodate a standard berm and setback. In this case, a Development Viability Assessment report will be required.<sup>1</sup>

This report, which is explained in detail in **APPENDIX A**, will provide a comprehensive assessment of the site conditions of the property in question, including an evaluation of any potential conflicts with the new development that may result from its proximity to the railway corridor. It will also evaluate any potential impacts on the operation of the railway as a result of the new development, both during the construction phase and afterwards. It will take into consideration details of the proposed development site, including topography, soil conditions, and proximity to the railway corridor; details of the railway corridor, including track geometry or alignment, the existence of junctions, and track speed; details of the proposed development, including the number of potential residents, proposed collision protection in the event of a train derailment; construction details; and an identification of the potential hazards and risks associated with development on that particular site. Municipalities will use the Development Viability Assessment to determine whether development is appropriate given the site conditions and potential risks involved.

An important component of the new process is the requirement for pre-application consultation with the relevant railway. This will be a critical step towards ensuring a smooth and expedited approval process, and will be an important opportunity to have a frank discussion about development options, as well as to resolve any potential conflicts. It will be during these pre-application consultations that a decision will be made regarding the capacity of the site to accommodate standard mitigation. Where a Development Viability Assessment is required, this will also be an important opportunity for the

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<sup>1</sup> Again, this report does not recommend that all sites are appropriate for residential development. In cases where the standard setback and berm cannot be accommodated, municipalities should carefully consider the viability of the site for conversion to residential,

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based on criteria such as: existing contextual land use, size of site, appropriateness of high-density development, and the demonstrated effectiveness of alternative mitigation measures, as determined through the Development Viability Assessment.

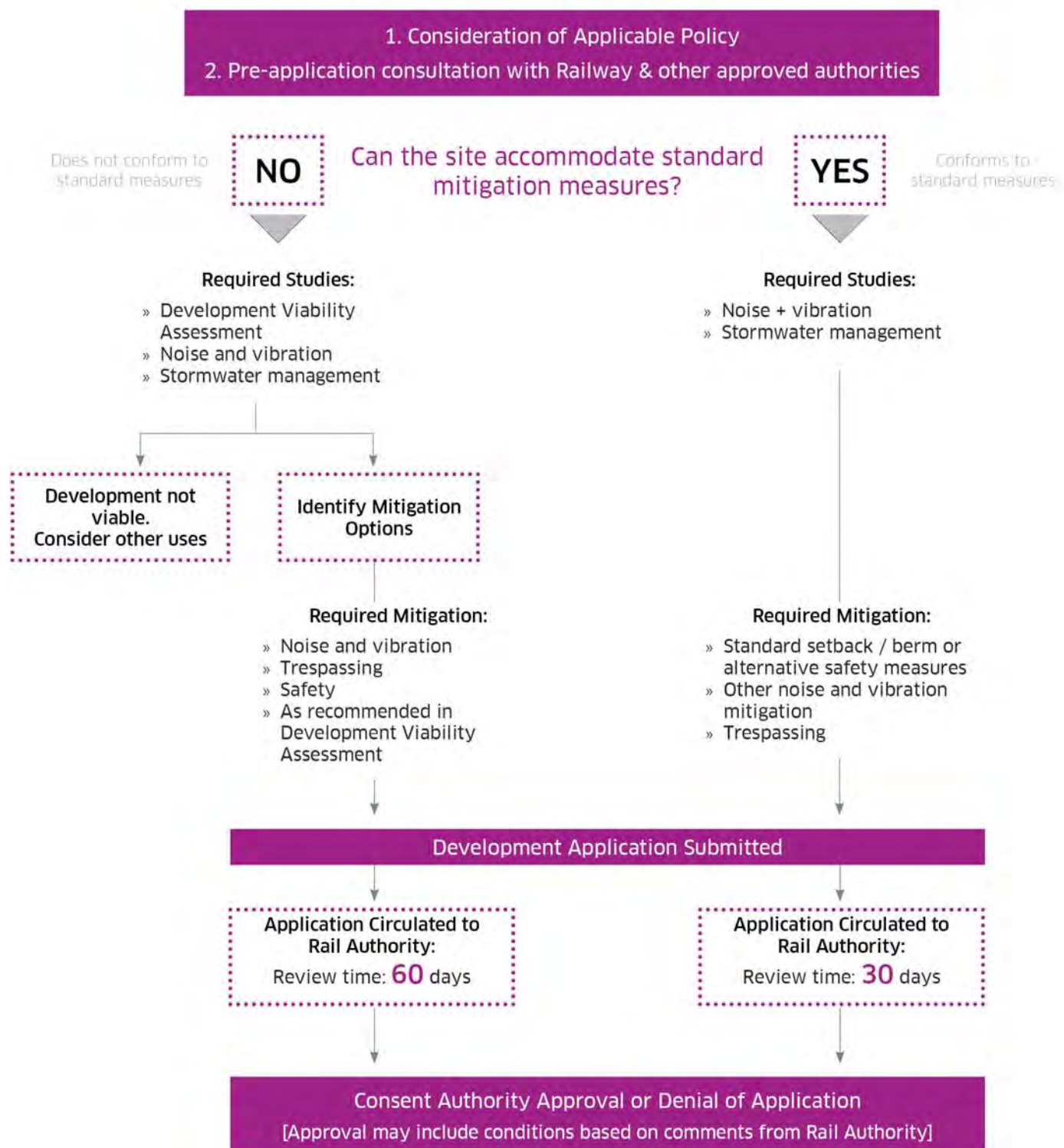


FIGURE 19 // MODEL REVIEW PROCESS FOR NEW RESIDENTIAL DEVELOPMENT, INFILL & CONVERSIONS IN PROXIMITY TO RAILWAY CORRIDORS

applicant to gain a better understanding of the process associated with developing one.

Once a development application has been submitted to the railway for review, it will have 30 days to respond (60 days in cases where a Development Viability Assessment has been required), and indicate any conditions for consideration and negotiation. The final decision as to whether or not to impose those conditions will lie with the approval authority (usually the municipality).

The Model Review Process for New Residential Development, Infill & Conversions in Proximity to Railway Corridors should be adopted by provincial governments, potentially through amendments to existing planning legislation, in order to ensure its consistent application across all municipalities. However, in the absence of provincial interest, the process could be adopted as a bylaw at the municipal level. It is recommended that this process be applicable to any residential development located on land within 300 metres of a railway right-of-way where an official plan amendment, plan of subdivision, or zoning bylaw amendment is required.

#### **4.1.2 Mitigation Infrastructure Maintenance Strategy**

##### **OBJECTIVE:**

Ensure a consistent and sensible approach to the future maintenance of mitigation infrastructure.

##### **RECOMMENDATION:**

Responsibility for the maintenance of berms, chainlink fences, and sound walls should be allocated as follows:

- Landowners should be responsible for maintaining the fence, the sound wall, and that portion of the berm contained within their site.

- In cases where a sound wall is erected, the portion of the berm situated on the side adjoining the railway corridor should be maintained by the railway. However, this should only occur if the property under that part of the berm becomes the property of the railway and has been exempted from all municipal property taxes as a concession to the railways for taking on a maintenance responsibility.

## **4.2 // ADVANCING STAKEHOLDER ROLES**

### **OBJECTIVE:**

To establish clarity regarding the roles and responsibilities of various stakeholders involved in reducing railway proximity issues.

### **RECOMMENDATIONS:**

#### **4.2.1 Federal**

- The federal government and the Canadian Transportation Agency are encouraged to use and have regard for this report in proximity dispute investigations with respect to new developments built close to railway operations, and in the development and implementation of any related guidelines, to facilitate a more comprehensive approach that appropriately considers the land use planning framework for new developments along with the rail operations issues.

#### **4.2.2 Provincial**

- Provincial Authorities should consider revising their land use planning legislation to incorporate mandatory requirements for early consultations between municipalities, railways, and landowners in advance of

proposed land use or transportation changes, projects, or works within 300 metres of railway operations. The objective of doing so is to facilitate a collaborative approach to site development.

- Provincial Authorities should consider requiring mandatory notice to railways in the case of proposed official plans or official plan amendments, plans of subdivision, zoning by-laws, holding by-laws, interim control by-laws, and/or consent to sever lands, where the subject lands fall within 300 metres of railway operations.
- Provincial Authorities may also wish to empower their municipalities with stronger site plan controls where appropriate, such as:
  - » control of materiality;
  - » site layout and design; and
  - » road widening and land conveyances.
- Provincial Authorities should consider establishing a provincial noise guideline framework that sets impact study requirements (how and when to assess noise sources), and establishes specific sound level criteria for noise sensitive land uses.
- Provincial Authorities should consider amendments to their building codes that support extra mitigation for developments near railway corridors, such as:
  - » vibration isolation & foundation design,
  - » balcony design,
  - » podium design,
  - » drainage,
  - » appropriate fenestration, and

» door placement and materiality.

- Provincial Authorities should monitor compliance with relevant regulations and sanction their breach.

#### **4.2.3 Municipal**

- Municipalities, land developers, property owners and railways all need to place a higher priority on information sharing and establishing better working relationships both informally and formally through consultation protocols and procedures.
- Municipalities should ensure that planning staff are aware of and familiar with any applicable policies for development in proximity to railway operations (e.g. railway policies and/or guidelines).
- Municipalities are encouraged to provide clear direction and strong regulatory frameworks (e.g. through District Plans, Official Plans, Official Community Plans, Zoning By-laws, etc) to ensure that land development respects and protects rail infrastructure and will not lead to future conflicts. This may include:
  - » Undertaking a comprehensive evaluation of land uses in proximity to railway operations, with a view to minimizing potential conflicts due to proximity, including those related to safety, vibration, and noise. For example, residential development may not be appropriate in low-density areas where lot sizes preclude the possibility of incorporating standard mitigation measures. Additionally, schools or commercial uses located across a railway corridor from residential uses are likely to result in trespassing issues if there are no public crossings in the immediate vicinity;

- » Establishing a clear process for evaluating the viability of development proposals on sites that cannot accommodate standard mitigation measures, with a view to determining the appropriateness of the development, and identifying appropriate alternate mitigation measures. See **Section 4.1.1** for recommendations on a Development Viability Assessment;
  - » Establishing implementation mechanisms for mitigation measures, including long-term maintenance requirements if applicable (e.g. legal agreements registered on title). See **Section 4.1.2** for recommendations on a Mitigation Infrastructure Maintenance Strategy;
  - » Undertaking a comprehensive review of site access and railway crossings with a view to ensuring adequate site access setbacks from at-grade crossings (to prevent vehicular blockage of crossings), protecting at-grade road/rail crossing sightlines, implementing crossing improvements, and discouraging new at-grade road crossings;
  - » Entrenching in policy the protection of railway corridors and yards for the movement of freight and people, including allowing for future expansion capacity, if applicable;
  - » Planning and protecting for future infrastructure improvements (e.g. grade separations and rail corridor widenings); and
  - » Respecting safe transportation principles. For example, the assessment of new, at-grade rail crossings should consider safe community planning principles and whether other alternatives are possible, not just simply whether a crossing is technically feasible.
- Municipalities are encouraged to use their planning policy and regulatory instruments (e.g. District Plans, Official Plans, Official Community Plans, Secondary Plans, Transportation Plans, Zoning By-laws/Ordinances, etc.) to secure appropriate railway consultation protocols as well as mitigation procedures and measures.
  - As soon as planning is initiated or proposals are known by municipalities, notification and consultation should be initiated for:
    - » Development or redevelopment proposals within 300 metres of rail operations, or for proposals for rail-serviced industrial parks; and
    - » Infrastructure works, which may affect a rail facility, such as roads, utilities, etc.
  - Municipal Authorities should consider amendments to their municipal regulatory documents (e.g. Official Plan, Official Community Plan, etc.) as required to implement mandatory noise and vibration studies for developments near railway operations, and to establish specific sound and vibration level criteria for sensitive land uses.
  - Municipal Authorities should consider zoning by-law amendments as required to implement aspects of these guidelines, including securing appropriate mitigation measures.
- N.B.** A note of caution is required for any systematic zoning by-law amendment. Blanket zoning by-law amendments should only be used to implement portions of this study in areas municipalities have already identified for redevelopment. This should

be applied comprehensively and with study as to their affect. For example, it makes little sense to employ a 30 metre setback in areas that do not have lot depths which can support them. In many cases, it may be more desirable for municipalities to secure mitigation measures in a site-specific manner, through the use of the Development Viability Assessment Tool. However, in employing such an approach, Municipal Planners should be mindful to secure appropriate mitigation measures in a site-specific by-law.

- Municipalities should consider and respect the plans, requirements, and operating realities of railways and work cooperatively with them to increase awareness regarding the railway legislative, regulatory, and operating environment, and to implement consultation planning protocols and procedures for land development proposals and applications.
- Municipalities should work with railways and other levels of government to increase coordination for development approvals that also require rail regulatory approvals (e.g. new road crossings) to ensure that the respective approvals are not dealt with in isolation and/or prematurely.
- Municipalities should be aware of and implement, where feasible, Transport Canada's safety recommendations with respect to sightlines for at-grade crossings. The recommendations include a minimum 30 metre distance between the railway right-of-way and any vehicular ingress/egress. In addition, trees, utility poles, mitigation measures, etc. are not to block sightlines or views of the crossing warning signs or systems.
- Municipal Authorities should consider developing

Urban Design Guidelines for infill development near railway corridors. This document already contains a number of suggestions on what such a document could include and how it could be usefully employed.

#### **4.2.4 Railway**

- Municipalities, land developers, property owners and railways all need to place a higher priority on information sharing and establishing better working relationships both informally and formally through consultation protocols and procedures.
- As soon as planning is initiated or proposals are known by railways, communication should be initiated to discuss:
  - » transportation plans that incorporate freight transportation issues; and
  - » all new, expanded, or modified rail facilities.
- Railways are encouraged to be proactive in identifying, planning, and protecting for the optimized use of railway corridors and yards.
- Railways are encouraged to develop and/or modify company procedures and practices with respect to increased consultation and formal proximity issues management protocols with the following guidance:
  - » Undertake consultation for projects prior to seeking CTA approval;
  - » When new facilities are built or significant expansions are undertaken, implement on-going community advisory panel discussions with regular meetings. Such panels typically include representation from the railway, the municipality, the community, other levels of government, if applicable, and possibly industry; and,

- » Railway initiation of long-term business and infrastructure planning exercises, in consultation with municipalities, can facilitate stronger and more effective relationships and partnerships.
- Railways are encouraged to work with municipalities, landowners, and other stakeholders in evaluating and implementing appropriate mitigation measures, where feasible, with respect to new rail facilities located in proximity to existing sensitive development.
- Railways should work cooperatively with municipalities to increase awareness regarding the railway legislative, regulatory, and operating environment.
- Railways should utilize opportunities to get involved in land-use planning processes and matters. Municipal planning instruments can be effective tools in implementing, or at least facilitating the implementation, of long-term rail transportation planning objectives.
- Railways are encouraged to work with industry associations and all levels of government to establish standardized agreements and procedures with respect to all types of crossings.
- Railways are encouraged to pursue implementation of the RAC Railroad Emission Guidelines (See **AE.1.1** for more information).
- Railways are encouraged to integrate transportation planning involving provincial, municipal, Port Authorities, and multiple railways, which is critical to balancing rail capacity upgrades, minimizing community impacts, and ensuring that economic benefits occur.

#### ***4.2.5 Land Developer/Property Owner***

- Ideally, prospective land developers should consult with the appropriate railway prior to finalizing any agreement to purchase a property in proximity to railway operations. Otherwise, property owners should consult with municipalities and railways as early as possible on development applications and proposals to ensure compliance with policies, guidelines, and regulations, and in order to fulfill obligations of development approvals.
- Enter into agreements with municipalities and/or railways as required to ensure proximity issues are addressed now and into the future and comply with those requirements.
- Property owners should be informed, understand, acknowledge, and respect any mitigation maintenance obligations and/or warning clauses.

#### ***4.2.6 Real Estate Sales/Marketing and Transfer Agents***

- Real estate sales people and property transfer agents should ensure that potential purchasers are made fully aware of the existence and nature of rail operations and are aware of and understand the mitigation measures to be implemented and maintained.

#### ***4.2.7 Academia and Specialized Training Programs***

- These institutions should ensure that curriculums incorporate the latest research available to provide future land use planners, land developers, and railway engineers with better and more comprehensive tools and practices to anticipate and prevent proximity conflicts.

#### 4.2.8 Industry Associations

- FCM, having undertaken to produce these guidelines, should continue to act as their steward. As such, a comprehensive strategy should be established to disseminate them to provincial and municipal planners and regulatory bodies, railways, developers, and other property owners. A component of this strategy may include integration at professional events and conferences. A key objective will be to promote their integration into regulatory policy frameworks.
- Other industry associations should ensure their membership is informed and involved in the latest research and proactively engaged in raising awareness and educating their members through seminars and other training programs.

### 4.3 // DISPUTE RESOLUTION

#### 4.3.1 Background

In the vast majority of cases in Canada, railway company tracks and their stakeholder neighbours coexist seamlessly. However, disputes between railways and stakeholders can occasionally occur. These disputes provide insight into the issues that some stakeholders have experienced with noise, vibration, accidents, historical land use conflicts, and a variety of site-specific conditions that can result from railway operations. These disputes are often expressed through letters of complaint directed to railway, municipal and federal government officials, appeals to the Ontario Municipal Board, court cases, as well as complaints before the Canadian Transportation Agency (Agency).

#### 4.3.2 Local Dispute Resolution Framework

In most disputes, complainants and railways can independently resolve matters by negotiating agreements amongst themselves. Stakeholders are encouraged to have regard for and utilize, where applicable, the Local Dispute Resolution Framework established by the RAC/FCM Dispute Resolution Subcommittee. This dispute resolution process should be considered prior to involving the Agency.

**A. The following guiding principles should be considered through the local dispute resolution process:**

1. Identify issues of concern to each party.
2. Ensure representatives within the dispute resolution process have negotiating authority. Decision making authority should also be declared.
3. Establish in-person dialogue and share all relevant information among parties.

**B. Dispute Resolution Escalation Process**

Municipal and railway representatives should attempt resolution in an escalating manner as prescribed below, recognizing that each of these steps would be time consuming for all parties.

1. Resolve locally between two parties using the Generic Local Dispute Resolution Process.
2. Proceed to third-party mediation/facilitation support if resolution not achieved.
3. Proceed to other available legal steps.

### **C. Generic Local Dispute Escalation Process**

1. Face-to-face meeting to determine specific process steps to be used in resolution attempt. A Community Advisory Panel formation should be considered at this point.
2. Determination of which functions and individuals will represent the respective parties. Generally this would include the municipality, the railway, and other appropriate stakeholders.
3. Issue identification:
  - a) Raised through community to railway. This type of issues could be the result of an unresolved outstanding proximity issue, operational modifications, or changes in rail customer operation (misdirected to railway).
  - b) Planned railway development that may impact community in the future.
  - c) Raised through the railway to community. This type of issue could be the result of a municipal government action (rezoning, etc.).
4. Exploration of the elements of the issue. Ensure each party is made aware of the other's view of the issue – a listing of the various aspects/impacts related to the issue.
5. Consult any existing relevant proximity guidelines or related best practices (e.g. this report).
6. Face-to-face meetings between parties representing the issue to initiate dialogue for dispute resolution process. Education, advocacy of respective positions.

7. Attempt compromise/jointly agreed solution. (If not proceed to step B2 above).

8. For Jointly agreed solutions; determine necessary internal, external communication requirements and or requisite public involvement strategies for implementation of compromise.

#### ***4.3.3 The Canadian Transportation Agency's Mandate on Noise & Vibration***

##### ***4.3.3.1 Agency Mandate Under the Canadian Transportation Act (CTA)***

The Agency is a quasi-judicial administrative tribunal of the federal government that can assist individuals, municipalities, railways, and other parties in resolving disputes.

The amendments to the Act now authorize the Agency to resolve complaints regarding *noise and vibration* caused by the construction and operation of railways under its jurisdiction.

Section 95.1 of the CTA states that a railway shall cause only such noise and vibration as is reasonable, taking into account:

- its obligations under sections 113 and 114 of the CTA, if applicable;
- its operational requirements; and
- the area where the construction or operation is taking place.

If the Agency determines that the noise or vibration is not reasonable, it may order a railway to undertake any change in its railway construction or operation that the Agency considers reasonable to comply with the noise and vibration provisions set out in section 95.1 of the

CTA. Agency decisions are legally binding on the parties involved, subject to the appeal rights.

The amendments to the CTA also grant power to the Agency to mediate or arbitrate certain railway disputes with the agreement of all parties involved, and in some cases in matters that fall outside of the Agency's jurisdiction.

The Agency has developed *Guidelines for the Resolution of Complaints Concerning Railway Noise and Vibration* (Guidelines) They explain the process to be followed and include a complaint form, and can be found through the following link: [www.otc-cta.gc.ca/eng/rail-noise-and-vibration-complaints](http://www.otc-cta.gc.ca/eng/rail-noise-and-vibration-complaints).

#### **4.3.4 Collaborative Resolution of Complaints**

The CTA specifies that before the Agency can investigate a complaint regarding railway noise or vibrations, it must be satisfied that the collaborative measures set out in the Guidelines have been exhausted.

Collaboration allows both complainants and railways to have a say in resolving an issue. A solution in which both parties have had input is more likely to constitute a long-term solution and is one that can often be implemented more effectively and efficiently than a decision rendered through an adjudicative process.

Under the Agency's Guidelines, collaborative measures are expected to be completed within 60 days of the railway receiving a written complaint - unless the parties agree to extend the process (The railway must respond to a written complaint within 30 days, and agree on a date within the following 30 days to meet and discuss the resolution of the complaint). To satisfy the collaborative measures requirements of the CTA, the following measures must be undertaken:

- Direct communication shall be established among the parties.
- A meaningful dialogue shall take place.
- Proposed solutions shall be constructive and feasible.
- Facilitation and mediation shall be considered.

Mediation is a collaborative approach to solving disputes in which a neutral third party helps to keep the discussion focused and assists the parties in finding a mutually beneficial solution. The parties jointly make decisions to resolve the disputed issues and ultimately determine the outcome. The mediation process is described below.

##### **4.3.4.1 Mediation**

Mediation has successfully resolved disputes with major rail and air carriers, airport authorities, and private citizens. It provides an opportunity for the parties involved to understand each other's perspective, identify facts, check assumptions, recognize common ground, and test possible solutions.

Mediation is an informal alternative to the Agency's formal decision-making process. It can be faster and less expensive, with the opportunity to reach an agreement that benefits both sides. Mediation tends to work well in disputes involving several major transportation service providers. In fact, a number of carriers have mentioned in recent years that they consider mediation their first alternative for dispute resolution.

To initiate a mediation process, contact the Agency and it will contact the other parties to determine if they are willing to participate. If all parties agree to join the process, an Agency-appointed mediator will manage the process. Discussions will take place in an informal setting. Collectively, all of the conflicting issues are addressed in

an attempt to negotiate a settlement.

Mediation must take place within a 30-day statutory deadline, which is much shorter than the 120-day deadline established in the CTA for the Agency's formal dispute-resolution process. The deadline can be extended if all parties agree. A settlement Agreement that is reached as a result of mediation may be filed with the Agency and, after filing, is enforceable as if it were an Order of the Agency. A complete description of the mediation process can be found on the Agency's web site.

All mediation discussions remain confidential, unless both parties agree otherwise. If the dispute is not settled and requires formal adjudication, confidentiality will be maintained and the mediator will be excluded from the formal process.

#### **4.3.4.3 Filing a Complaint with the Agency**

The Agency will only conduct an investigation or hear a complaint once it is satisfied that the parties have tried and exhausted the collaborative measures set out above. Should one of the parties fail to collaborate, the Agency may accept the filing of a complaint before the expiry of the above-noted 60 day collaborative period.

In cases where the parties are not able to resolve the issues between themselves or by way of facilitation or mediation, a complaint may be filed with the Agency requesting a determination under the formal adjudication process. The complaint must include evidence that the parties have tried and exhausted, or that one of the parties has failed to participate in, the collaborative measures set out above.

Formal complaints may be filed by individuals, institutions, local groups, or municipalities. When the Agency reviews a complaint, it will ensure that the municipal government

is informed of the complaint and will seek its comments.

To avoid reviewing numerous complaints for the same concern(s), the Agency encourages complainants to consult others potentially affected before filing a complaint. This may save time and effort for all parties.

For such group complaints, parties should confirm the list of complainant(s) and who is represented under the group; provide contact information and evidence of authorization to represent; provide a list of the members of the association and their contact information, where there is an organization/association; provide, in the case of an organization/association, the incorporation documents and the a description of the organization/association and its members' interest in the complaint.

The *Guidelines for the Resolution of Complaints Concerning Railway Noise and Vibration* are primarily meant to address noise and vibration disputes with regard to existing railway infrastructure or facilities. For railway construction projects that require Agency approval under subsection 98(1) of the CTA, railways must evaluate various issues, including noise and vibration.

#### **4.3.4.4 Formal Process**

In accordance with its General Rules, after receiving a complaint, the Agency ensures that each interested party has the opportunity to comment on the complaint and any disputed issues. In general, the Agency invites the other interested parties to file their answer within 30 days, and then allows the complainant 10 days to reply.

Both complainants and railways are responsible for presenting evidence to support their position before the Agency. The Agency may pose its own questions, request further information, and conduct a site visit

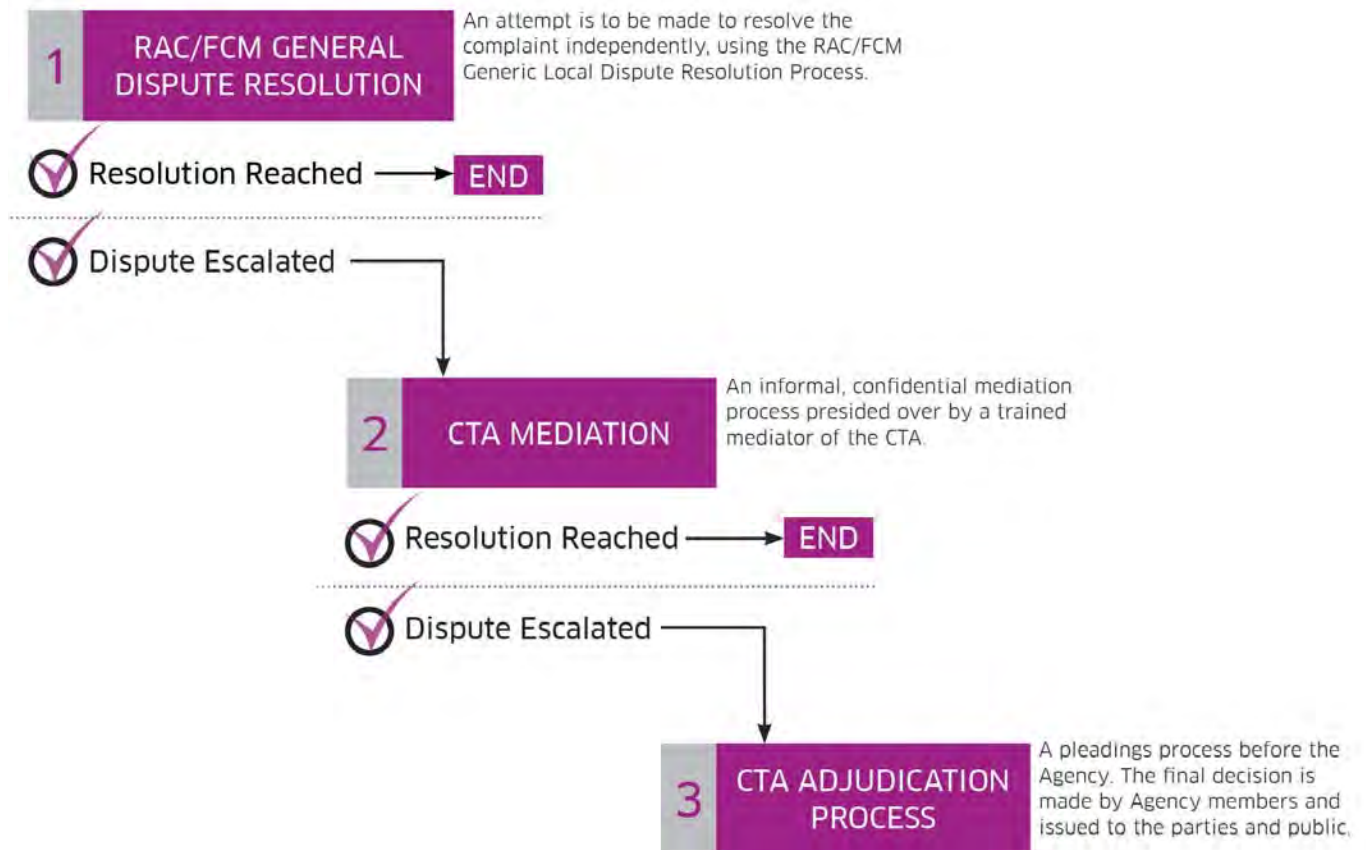


FIGURE 20 // DISPUTE RESOLUTION PROCESS

investigation where necessary.

As an impartial body, the Agency cannot prepare or document a complaint nor can it provide funding to any party for the preparation of a complaint, answer, or reply. The Agency reviews all evidence that it has obtained through its investigation to develop a comprehensive understanding of the circumstances of each case, before rendering its decision or determination.

The Agency strives to process complaints within 120 days of receiving a complete application. However, given the complexities or the number of parties involved in some noise or vibration complaints, this goal may not always be met. In such cases, the Agency will act as expeditiously as possible. Parties are encouraged to continue to work together to seek a resolution even though a complaint may be before the Agency.

When the Agency has reached a decision, the Agency provides it to all parties of the case and posts it on its public web site.

#### ***4.3.4.5 More Information***

Canadian Transportation Agency  
Ottawa, Ontario K1A 0N9  
Telephone: 1-888-222-2592  
TTY: 1-800-669-5575  
Facsimile: 819-997-6727  
E-mail: [info@otc-cta.gc.ca](mailto:info@otc-cta.gc.ca)  
Web site: [www.cta.gc.ca](http://www.cta.gc.ca)

For more information on the CTA, the Agency and its responsibilities, or Agency Decisions, and Orders, you can access the Agency's web site at [www.cta.gc.ca](http://www.cta.gc.ca).

Web site addresses and information on the Agency are subject to change without notice and were accurate at the time of publication. For the most up-to-date information, visit the Agency's web site.



PHOTO SOURCE: RAILWAY ASSOCIATION OF CANADA





# 5

## CONCLUSION



## 5.0 // CONCLUSION

As the shift continues towards curbing urban sprawl and intensifying existing built-up areas, lands close to railway corridors will continue to become more desirable for development.

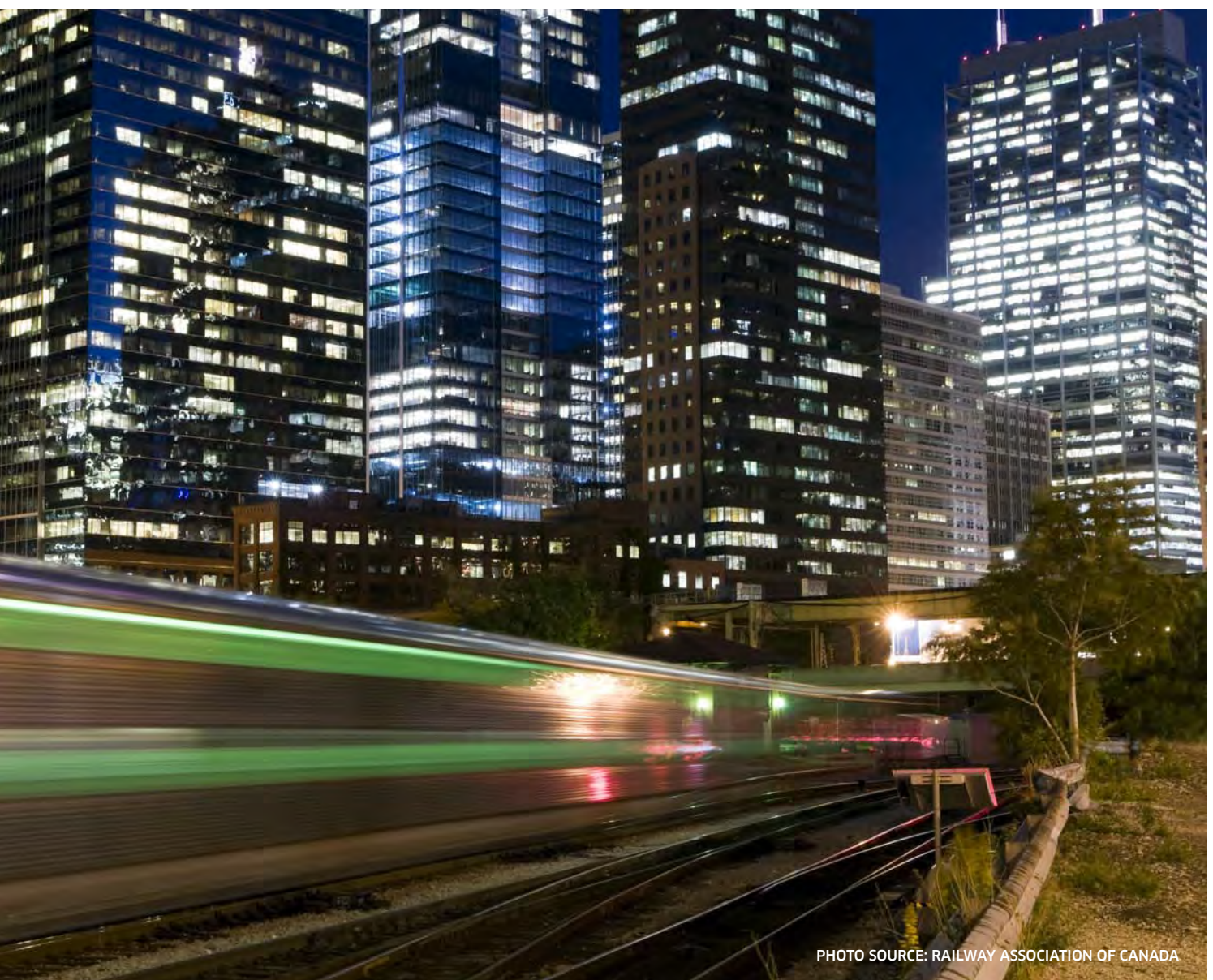


PHOTO SOURCE: RAILWAY ASSOCIATION OF CANADA

The proximity guidelines provided here are intended to help anticipate potential conflicts, improve awareness of development issues around railway operations, and clarify the requirements for new development in proximity to railway operations and activities. They provide strategies that will help to reduce misunderstanding and avoid unnecessary conflicts arising between railway operations and nearby new development. The guidelines further provide recommendations to promote a higher level of consistency nationwide with respect to new development approval processes as well as the design of new development projects in proximity to railway operations and their respective mitigation measures.

Topics covered include:

- Common issues and constraints;
- A series of guidelines addressing mitigation design, consultation, setbacks, noise, vibration, safety barriers, security fencing, stormwater management and drainage, warning clauses and other legal agreements, and construction issues;
- Understanding of stakeholder roles; and
- Implementation.

Additionally, the report appendices contain the following:

- A Development Viability Assessment;
- A sample rail classification system;
- Noise and vibration procedures and criteria;
- Recommendations for the evaluation of new rail facilities or significant expansions to existing rail facilities in proximity to residential or other sensitive land uses; and
- A series of national and international best practices.

Careful consideration has been given to provide a balanced approach to new development in proximity to railway corridors that provides a thoughtful response to site-specific constraints, safety, and land-use compatibility. Ultimately it is in the interest of the public and all other parties involved to ensure that when new development is deemed to be appropriate near a railway corridor, the mitigation measures outlined in this report are taken to ensure they are both compatible and safe.

The various stakeholders identified are encouraged to review and establish or update, as necessary, their respective planning instruments and company practices/procedures. Opportunities should be explored to inject these guidelines into relevant curriculum at education institutions teaching land use planning, civil engineering, and railway engineering, as well as disseminating this information through relevant professional associations.





# APPENDICES

APPENDIX A	Development Viability Assessment
APPENDIX B	Sample Rail Classification System
APPENDIX C	Noise & Vibration Procedures & Criteria
APPENDIX D	New Rail Facilities & Significant Expansions in Proximity to Residential or Other Sensitive Uses
APPENDIX E	Best Practices
APPENDIX F	Glossary
APPENDIX G	Links & Other Resources
APPENDIX H	List of Stakeholders Consulted
APPENDIX I	References

APPENDIX A //

DEVELOPMENT

VIABILITY

ASSESSMENT

## APPENDIX

### GUIDELINES FOR NEW DEVELOPMENT IN PROXIMITY TO RAILWAY OPERATIONS

#### AA.1 // INTRODUCTION

Development of residential structures in proximity to railway corridors can pose many challenges, particularly in terms of successfully mitigating the various vibration, noise, and safety impacts associated with railway operations. The standard mitigation measures, illustrated below, have been designed to provide proponents with the simplest and most effective solution for dealing with these common issues.

However, in some cases, particularly in already built-up areas of the country's largest cities, development proposals will be put forward for smaller or constrained sites that are not able to accommodate these measures, particularly the full setback and berm. In cases where municipalities have already determined that residential is the best use for these sites, such proposals will be subject to a Development Viability Assessment, the intent of which is to evaluate any potential conflicts that may result from the proximity of the development to the neighbouring rail corridor, as well as any potential impacts on the operation of the railway as a result of the new development, both during the construction phase and afterwards. The proposed development will not be permitted to proceed unless the impacts on both the railway and the development itself are appropriately managed and mitigated. It must be noted that the intention of the Development Viability Assessment tool is not to justify the absence of mitigation in any given development proposal. Rather, it is to allow for an assessment based on the specific and inherent characteristics of a site, and therefore, the identification of appropriate mitigation measures.

As such, the Development Viability Assessment is a tool to assist developers who cannot accommodate standard mitigation measures in assessing the viability of their

site for development and in designing the appropriate mitigation to effectively address the potential impacts associated with building near railway operations. The development viability assessment exercise, which should be carried out by a qualified planner or engineer in close consultation with the affected railway, must:

- i. identify all potential hazards to the operational railway, its staff, customers, and the future residents of the development;
- ii. take into account the operational requirements of the railway facilities and the whole life cycle of the development;
- iii. identify design and construction issues that may impact on the feasibility of the new development;
- iv. identify the potential risks and necessary safety controls and design measures required to reduce the risks to the safety and operational integrity of the railway corridor and avoid long-term disruptions to railway operations that would arise from a defect or failure of structure elements; and
- v. identify how an incident could be managed if it were to occur.

It is strongly recommended that proponents consult with the affected railway when preparing a Development Viability Assessment to ensure that all relevant matters are addressed.

This document establishes the minimum generic requirements that must be addressed as part of a Development Viability Assessment accompanying a development application for land in proximity to railway operations. Proponents should note that there

may be additional topics that will need to be addressed in a Development Viability Assessment, depending on the unique nature of the subject site and proposed development. These additional topics should be determined in consultation with the affected railway and local municipality.

Municipalities should use the results of the Development Viability Assessment to determine whether proposed mitigation measures are appropriate.

The following sections outline basic content requirements for a standard Development Viability Assessment.

## **AA.2 // SITE DETAILS**

The Assessment must include a detailed understanding of the conditions of the subject site in order to generate a strong understanding of the context through which conflicts may arise. At a minimum, the factors to be considered are:

- i. site condition (cutting, embankments, etc.);
- ii. soil type, geology;
- iii. topography;
- iv. prevailing drainage patterns over the site; and
- v. proximity to the railway corridor and other railway infrastructure/utilities.

## **AA.3 // RAILWAY DETAILS**

It is imperative that details of the railway corridor (or other facility) itself also be evaluated in order to properly determine the potential conflicts associated with a new development in close proximity to railway activities. At a minimum, the factors to be considered are:

- i. track geometry and alignment (i.e. is the track straight or curved?);
- ii. the existence of switches or junctions;
- iii. track speed, including any potential or anticipated changes to the track speed;
- iv. derailment history of the site and of other sites similar in nature;
- v. current and future estimated usage and growth in patronage (10-year horizon);
- vi. details of any future/planned corridor upgrades/works, or any protection of the corridor for future expansion, where no plans are in existence; and
- vii. topography of the track (i.e. is it in a cut, on an embankment, or at grade?).

## **AA.4 // DEVELOPMENT DETAILS**

Details of the development itself, including its design and operational components, are important in understanding whether the building has been designed to withstand potential conflicts as a result of the railway corridor, as well as ensuring that the new development will not pose any adverse impacts upon the railway operations and infrastructure. At a minimum, the following information must be provided:

- i. proximity of the proposed development to the railway corridor or other railway infrastructure;
- ii. clearances and setbacks of the proposed development to the railway corridor; and
- iii. any collision protection features proposed for the new development, to protect it in the case of a train derailment.

## AA.5 // CONSTRUCTION DETAILS

While it is understood that construction details will not be finalized at the development application stage, there are a number of impacts associated with construction on a site in proximity to a railway corridor that need to be considered prior to development approval. These construction impacts need to be considered as part of the Development Viability Assessment. This portion of the assessment is intended to ensure that the railway corridor, infrastructure, staff, and users can be adequately protected from activities associated with the construction of the development. At a minimum, the following information must be provided:

- i. corridor encroachment - provide details with regard to:
  - a. whether access to the railway corridor will be required;
  - b. whether any materials will be lifted over the railway corridor;
  - c. whether any temporary vehicle-crossing or access points are required; and
  - d. whether there will be any disruption to services or other railway operations as a result of construction;

Generally, encroachment within a railway corridor for construction purposes is not permitted and alternative construction options will need to be identified.

- i. provide details of how the security of the railway corridor will be maintained during construction, (i.e. by providing details about the type and height of security fencing to be used);

- ii. provide details of any planned demolition, excavation and retaining works within 30 metres of the railway corridor and specify the type and quantity of works to be undertaken;
- iii. services and utilities - provide details of:
  - a. whether any services or utilities will be required to cross the railway corridor; and
  - b. whether any existing railway services/ utilities will be interfered with; and
- iv. stormwater, drainage, sediment, and erosion control - provide details of how any temporary stormwater and drainage will operate during construction, and how sediment and erosion control will be managed.

## AA.6 // IDENTIFY HAZARDS AND RISKS

Once details unique to the site, railway corridor, development design, and construction have been determined, the individual risks must be identified and evaluated with individual mitigation measures planned for each. Such risks may include injury or loss of life and damage to public and private infrastructure. At a minimum, consideration must be given to:

- i. the safety of people occupying the development and the potential for the loss of life in the event of a train derailment;
- ii. potential structural damage to the proposed development resulting from a collision by a derailed train; and
- iii. the ability of trespassers to enter into the railway corridor.

# APPENDIX B //

## SAMPLE RAIL CLASSIFICATION SYSTEM

The following table is a general sample classification of rail line types. Proponents are advised to consult with the relevant railway to obtain information on the classification, traffic volume, and traffic speed, of the railway lines in proximity to any proposed development. Contact information for railways is available from the Proximity Project's website (see **APPENDIX G**).

**SAMPLE RAIL CLASSIFICATION SYSTEM\*** (\*TO BE CONFIRMED BY RELEVANT RAILWAY)

Main Line <i>(typically separated into "Principal" and "Secondary" Main Line)</i>	<ul style="list-style-type: none"><li>• Volume generally exceeds 5 trains per day</li><li>• High speeds, frequently exceeding 80 km/h</li><li>• Crossings, gradients, etc. may increase normal railway noise and vibration</li></ul>
Branch Line	<ul style="list-style-type: none"><li>• Volume generally has less than 5 trains per day</li><li>• Slower speeds usually limited to 50 km/h</li><li>• Trains of light to moderate weight</li></ul>
Spur Line	<ul style="list-style-type: none"><li>• Unscheduled traffic on demand basis only</li><li>• Slower speeds limited to 24 km/h</li><li>• Short trains of light weight</li></ul>

# APPENDIX C //

## NOISE & VIBRATION PROCEDURES & CRITERIA

## AC.1 // NOISE

The rail noise issue is site-specific in nature, as the level and impact of noise varies depending on the frequency and speed of the trains, but more importantly, the impact of noise varies depending on the distance of the receptor to the railway operations. The distance from rail operations where impacts may be experienced can vary considerably depending on the type of rail facility and other factors such as topography and intervening structures.

### AC.1.1 // SOUND MEASUREMENT

The type of sound has a bearing on how it is measured. Typical sound level descriptors/metrics for non-impulsive sound events are summarized as follows:

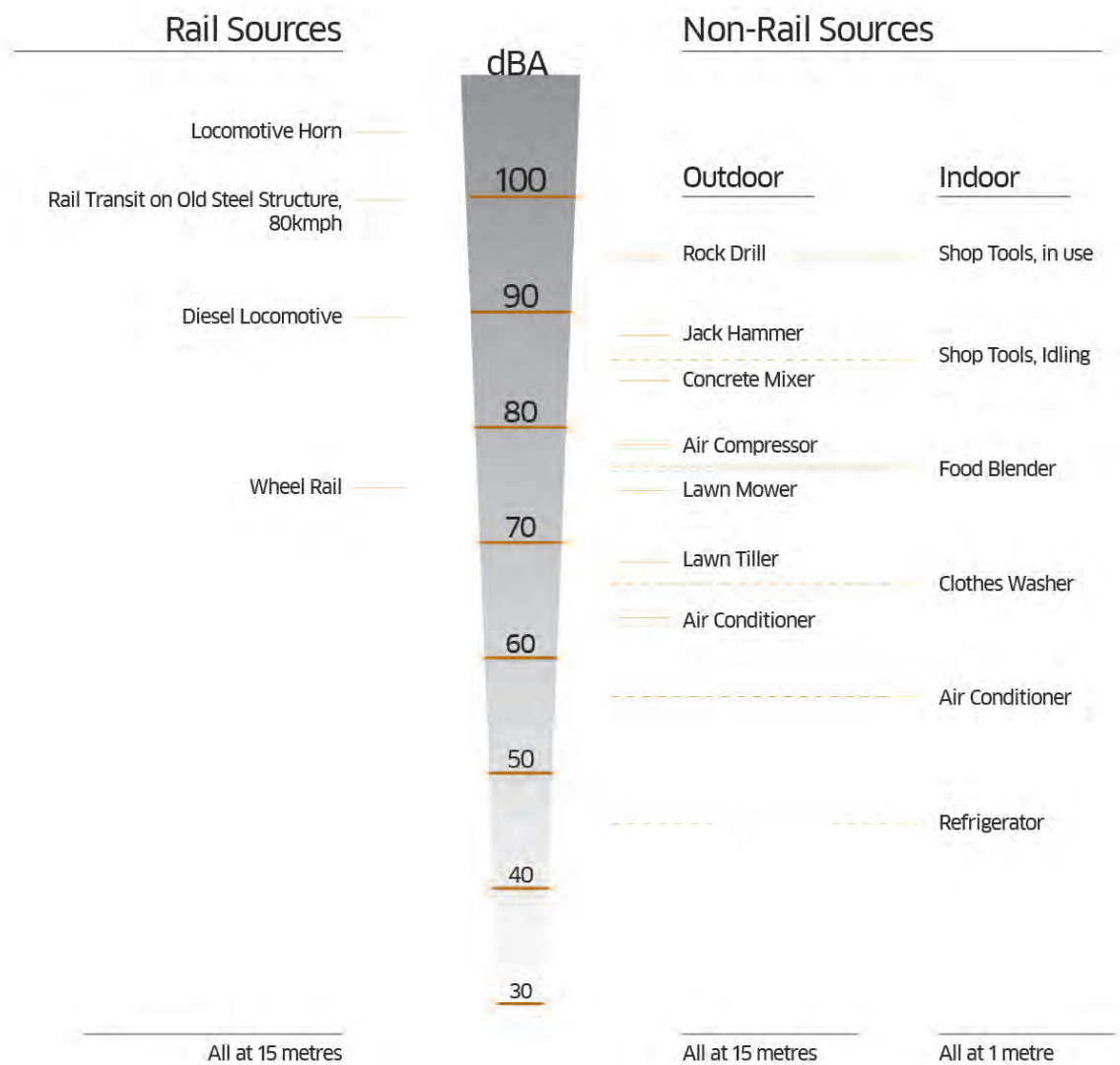
- the A-weighted Sound Level (dBA) is an overall measurement of sound over all frequencies - but with higher weighting given to mid- and higher-frequencies - and provides a reasonable approximation of people's actual judgment of the loudness or annoyance of rail noise at moderate sound levels. Generally, an increase of 10dBA in sound level is equivalent to a doubling in the apparent loudness of the noise;<sup>1</sup>
- the Equivalent Sound Level (Leq), measured in A-weighted decibels (dBA), is an exposure-based descriptor that reflects a receiver's cumulative noise exposure from all events over a specified period of time (e.g. 1 hour, 16 hour day, 8 hour night or 24 hour day). It is the value of the constant sound level that would result in exposure to the same total sound energy as would the specified time varying

sound, if the sound level persisted over an equal time interval. This is the commonly used descriptor for impact assessment purposes, and correlates well with the effects of noise on people;

- the Maximum Sound Level (Lmax) is the highest A-weighted sound level occurring during a single noise event. It is typically used in night-time emission limits, as a means of ensuring sleep protection.
- the Sound Exposure Level (SEL) describes the sound level from a single noise event and is used to compare the energy of noise events which have different time durations. It is equivalent to Leq but normalized to 1 second;
- Statistical Sound Levels (Ln%) describe the percentage of time a sound level is exceeded, for example L10%, L50%, etc
- Percent Highly Annoyed (%HA) is an indicator developed by Health Canada to assess the health implications of operational noise in the range of 45 - 75 dB. It is suggested that mitigation be proposed if the predicted change in %HA at a specific receptor is greater than 6.5% between project and baseline noise environments, or when the baseline-plus-project-related noise is in excess of 75 dB.<sup>2</sup>

<sup>1</sup> Canada Mortgage and Housing Corporation. (1986). Road and rail noise: Effects on housing [Canada]: Author.

<sup>2</sup> Health Canada. (2010). Useful information for environmental assessments. Retrieved from [http://www.hc-sc.gc.ca/ewh-semt/alt\\_formats/hecs-sesc/pdf/pubs/eval/envIRON\\_assess-eval/envIRON\\_assess-eval-eng.pdf](http://www.hc-sc.gc.ca/ewh-semt/alt_formats/hecs-sesc/pdf/pubs/eval/envIRON_assess-eval/envIRON_assess-eval-eng.pdf)



**FIGURE 21 - TYPICAL TRANSIT AND NON-TRANSIT SOURCES OF NOISE, AND THEIR ASSOCIATED DBA** (SOURCE: ADAPTED FROM FIGURE 2-11 IN TRANSIT NOISE AND VIBRATION IMPACT ASSESSMENT BY THE FEDERAL TRANSIT ADMINISTRATION).

### **AC.1.2 // SOURCES OF SOUND FROM RAILWAY OPERATIONS**

Principal sources of noise from existing railway infrastructure include:

- wheels and rails;
- diesel locomotives – much of the noise is emitted at the top of the locomotive and in some cases the noise has a distinctive low-frequency character. Both of these factors make locomotive noise difficult to control by means of barriers such as noise walls or earth mounds, because they have to be quite high in order to break the line of sight, and therefore provide noise attenuation;
- special track forms, such as at switches, crossings, diamonds, signals, and wayside detection equipment, cause higher levels of noise and vibration and tend to be more impulsive;
- bridges and elevated structures due to the reverberation in the structures; and
- other sources including brake squeal, curve squeal, train whistling at railway crossings, bells at stations, shunting of rail cars, coupling, idling locomotives, compression or “stretching” of trains, jointed vs. welded tracks, and track maintenance.

### **AC.1.3 // RECOMMENDED PROCEDURES FOR THE PREPARATION OF NOISE ASSESSMENT REPORTS FOR NEW RESIDENTIAL OR OTHER SENSITIVE LAND USES IN PROXIMITY TO RAILWAY CORRIDORS**

1. Studies should be undertaken by a qualified consultant using an approved prediction model.

2. Where studies are not economically or practically feasible, due for example to the scale of a development or the absence of an available mechanism to secure a study, reasonable and practical measures should be undertaken to minimize potential noise impacts, such as increased building setbacks, noise fencing, and building construction techniques (e.g. brick veneer, air conditioning), etc.
3. Obtain existing rail traffic volumes from railway.
4. Use most current draft plan/site plan and grading plans for analysis.
5. Escalate rail traffic volume data by 2.5% compounded annually for a minimum of 10 years, unless future traffic projections are available.
6. Conduct analysis at closest proposed sensitive receptor. The minimum setback distances based on the classification of the rail line, as specified by the railway should be used for the analysis (see Appendix B for a sample rail classification system). If the closest proposed residential receptor is at the greater distance than the minimum setback distance, then the greater distance may be used.
7. The analysis needs to be conducted at the following locations:
  - Outdoor amenity area receptor. This is usually in the rear yard at a point that is 3 m away from the rear wall of the house. This is typically a daytime calculation;
  - 1st, 2nd, and 3rd storey receptor for

low-rise dwellings. The nighttime calculation should be conducted at the façade where a bedroom could be located. The daytime calculation should be conducted at the façade where the living/dining/family areas could be located; and

- If the building is a multi-storey building the calculations should be conducted at the outdoor amenity areas and at the highest floor of the building.
8. The typical receptor heights are summarized below. These are to be used as a guide only. If the actual receptor heights are known they should be used.
    - Outdoor amenity area: 1.5 m above the amenity area elevation;
    - 1st storey receptor: 1.5 m above the 1st floor finished grade elevation;
    - 2nd storey receptor: 4.5 m above the 1st floor finished grade elevation; and
    - 3rd storey receptor: 7.5 m above the 1st floor finished grade elevation.
  9. The analysis should be conducted assuming a 16 hour day (LeqDay) and an 8 hour night (LeqNight).
  10. When no relief from whistling has been authorized they should be included in the analysis to determine the mitigation measures to achieve the indoor sound level limits. Whistles are not required to be included in the determination of sound barrier requirements.
  11. Any topographical differences between the source and receiver should be taken into account.
  12. The attenuation provided by dense, evergreen forest of more than 50 m in depth can also be included in the analysis (assuming it will remain intact).
  13. Intervening structures that may provide some barrier effect may also be included in the analysis.
  14. The results of this analysis should be compared to the applicable sound level limits listed in AC.1.4 to determine the required mitigative measures for both the outdoor amenity areas and the dwelling. Mitigative measures could include noise barriers, architectural and ventilation components (eg. brick veneer, air conditioning, forced air ventilation, window glazing requirements, etc.)
  15. The required sound barrier heights to achieve the guidelines at the outdoor amenity areas can be determined using an appropriate model. The relative location with respect to the source and the receiver is required as well as the grades of the tracks, barrier location, and receptor.
  16. The sound barrier needs to be designed taking into consideration the minimum safety requirements of the railway.
  17. The architectural component requirements must include the minimum requirements of the railways. The remainder of the components can be determined using the AIF procedures found in the CMHC publication, "Road and Rail Noise: Effects on Housing", (NHA 5156 08/86)

or the BPN 56 procedures found in the National Research Council publication “Building Practice Note 56, Controlling Sound Transmission into Buildings”, September 1995.

18. In preparing the report all of the above information must be included so that the report can be appropriately reviewed. In addition to the above, the report should include the following:

- Key plan;
- Site plan/draft plan;
- Summary of the rail traffic data, including the correspondence from the railways;
- Figure depicting the location of the sound barrier, including any extensions or wraparounds;

- Top of barrier elevations;
- Sample calculations with and without the sound barrier;
- Sample calculations of how the architectural requirements were determined;
- Summary table of lots/blocks/units requiring mitigation measures, including lots that require air conditioning and warning clauses; and
- Any other information relevant to the site and the proposed mitigation.

#### AC1.4 // RECOMMENDED NOISE CRITERIA FOR NEW RESIDENTIAL OR OTHER SENSITIVE LAND USES IN PROXIMITY TO FREIGHT RAILWAY CORRIDORS

TYPE OF SPACE	TIME PERIOD	SOUND LEVEL LIMIT Leq* (dBA) Rail**	OUTDOOR SOUND LEVEL LIMIT Leq * (dBA)
Bedrooms	2300 to 0700 hrs	35	50
Living/dining rooms	0700 to 2300 hrs	40	55
Outdoor Living Area	0700 to 2300 hrs	***55	N/A

\* Applicable to transportation noise sources only.

\*\* The indoor sound level limits are used only to determine the architectural component requirements. The outside façade sound level limits are used to determine the air conditioning requirements.

\*\* Mitigation is recommended between 55dBA and 60dBA and if levels are 60dBA or above, mitigation should be implemented to reduce the levels as close as practicable to 55dBA.

(SOURCE: ADAPTED FROM THE ONTARIO MINISTRY OF THE ENVIRONMENT LU-131 GUIDELINE)

**AC.1.5 // RECOMMENDED PROCEDURES FOR THE PREPARATION OF NOISE IMPACT STUDIES FOR NEW RESIDENTIAL OR OTHER SENSITIVE LAND USES IN PROXIMITY TO RAIL YARDS**

1. Studies should be undertaken by a qualified consultant.
2. Obtain information from the railway regarding the operations of the freight rail yard in question. This information should include existing operations as well as potential future modifications to the rail facility.
3. Obtain minimum sound levels to be used for each source from the railway, if available. These data should also be verified by on-site observations and on-site sound measurements.
4. Calculate the potential impact of all the sources at the closest proposed residential receptor. This should be at a minimum of 300 m from the closest property line of the freight rail yard.
5. The analysis should be conducted for the worst case hour (Leq 1hr).
6. The calculation may be conducted using ISO 2613-2 or other approved model.
7. Impulsive activities, such as train coupling/uncoupling and stretching should be analyzed using a Logarithmic Mean Impulse Sound Level (LLM) and not included as part of the 1 hour Leq.
8. The analysis may include any attenuation provided by permanent intervening structures as well as vegetation as set out by the prediction model. Topographical differences between the source and receiver should be taken into account.
9. Any tonal characteristics of the sound should be taken into consideration.
10. All analyses should take the proposed grading of the site as well as the grading at the rail yard, particularly when determining the sound barrier heights.
11. The source positions should be determined in consultation with the railway. They should be based on the most likely and reasonable location for that activity.
12. The consultant report shall include the following:
  - Key plan;
  - Site plan/draft plan of the proposed development;
  - Figure depicting the location of each of the sources modeled within the rail yard;
  - Summary table of the source sound levels used in the analysis;
  - Results of the predicted sound levels at various receptors;
  - Results of any on-site sound measurements;
  - Sample calculations with and without any proposed mitigation;
  - Summary table of all lots requiring mitigation;
  - Top of sound barrier elevations, if sound barriers are proposed; and
  - Any other information relevant to the site and the proposed mitigation.

13. The results of the analysis should be compared to the sound level criteria found in **AC.1.6**. Where an excess exists, mitigation that conforms to

applicable stationary source guidelines should be recommended.

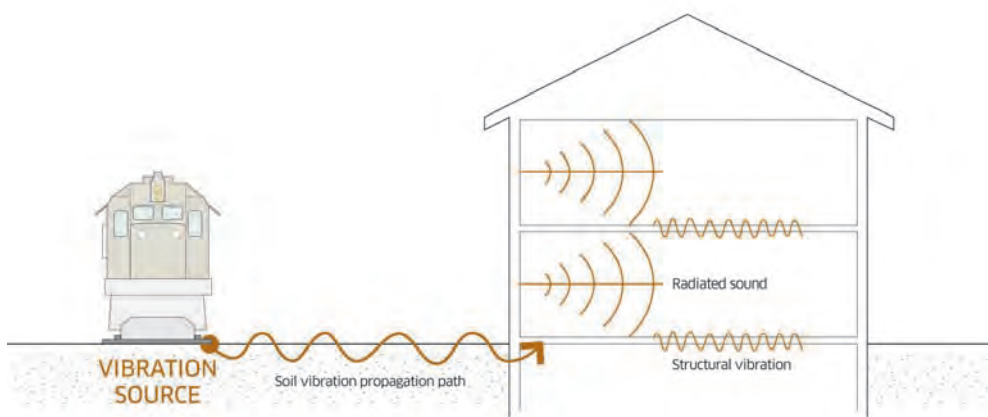
#### **AC.1.6 // RECOMMENDED NOISE CRITERIA - RESIDENTIAL OR OTHER SENSITIVE LAND USES IN PROXIMITY TO FREIGHT RAIL SHUNTING YARDS**

TIME OF DAY	ONE HOUR Leq (dBA) OR L <sub>LM</sub> (dBAI)	
	Class 1 Area	Class 2 Area
0700 - 1900	50	50
1900 - 2300	47	45
2300 - 0700	45	45

\*These criteria are applicable to any usable portion of the lot or dwelling.

\*\*Class 1 and 2 Areas refer to the typical acoustical environment that can be expected within the development zone. Class 1 Areas are acoustic environments dominated by an urban hum, and Class 2 Areas have the acoustic qualities of both Class 1 and Class 3 Areas (which are rural) For more information, refer to Section 2 of the LU-131 Guidelines issued by the Ontario Ministry of the Environment.

(SOURCE: ADAPTED FROM THE ONTARIO MINISTRY OF ENVIRONMENT LU-131 GUIDELINE)



**FIGURE 22 // GROUND-BORNE VIBRATION PROPAGATION** (SOURCE: ADAPTED FROM FIGURE 7-1 IN TRANSIT NOISE AND VIBRATION IMPACT ASSESSMENT BY THE FEDERAL TRANSIT ADMINISTRATION).

## AC.2 // VIBRATION

Vibration caused by passing trains is an issue that affects the structure of a building as well as the liveability of the units inside. In most cases, structural integrity is not a factor. Like sound, the effects of vibration are site-specific and are dependent on the soil and subsurface conditions, the frequency of trains and their speed, as well as the quantity and type of goods they are transporting.

Vibration is caused by the friction of the wheels of a train along a track, which generates a vibration energy that is transmitted through the track support system, exciting the adjacent ground and creating vibration waves that spread through the various soil and rock strata to the foundations of nearby buildings. The vibration can then disseminate from the foundation throughout the remainder of the building structure. Experience has shown that vibration levels only slightly above the human perception threshold are likely to result in complaints from residents.

Vibration in buildings in proximity to railway corridors can reach levels that may not be acceptable to building occupants for one or more of the following reasons:

- irritating physical sensations that vibration may cause in the human body;
- interference with activities such as sleep, conversation, and work;
- annoying noise caused by “rattling” of windowpanes, walls, and loose objects. Noise radiated from the motion of the room surfaces can also create a rumble. In essence, the room acts like a giant loudspeaker;
- interference with the proper operation of sensitive

instruments (or) processes; and

- misplaced concern about the potential for structural or foundation damage.

Mitigation of vibration and ground-borne noise requires the transmission of the vibration to be inhibited at some point in the path between the railway track and the building. In some instances, sufficient attenuation of ground vibration is provided by the distance from the track (vibration is rarely an issue at distances greater than 50 metres from the track), or by the vibration ‘coupling loss’ which occurs at the footings of buildings. However, these factors may not be adequate to achieve compliance with the guidelines, and consideration may need to be given to other vibration mitigation measures. However, railway vibration is not normally associated with foundation damage.

### AC.2.1 // GROUND-BORNE VIBRATION NOISE

Vibration is an oscillatory motion, which can be described in terms of its displacement, velocity, or acceleration. Because the motion is oscillatory, there is no net displacement of the vibration element and the average of any of the motion descriptors is zero. The response of humans, buildings, and equipment to vibration is more accurately described using velocity or acceleration. The concepts of ground-borne vibration for a rail system are illustrated in **FIGURE 22**.

### AC.2.2 // PEAK PARTICLE VELOCITY AND THE ROOT MEAN SQUARE

The peak particle velocity (PPV) is defined as the maximum instantaneous positive or negative peak of the vibration signal. Although PPV is appropriate for

evaluating the potential of building damage, it is not suitable for evaluating human responses, as it takes some time for the human body to respond to vibration signals. Because the net average of a vibration signal is zero, the root mean square (RMS) amplitude is used to describe the vibration amplitude.

The criteria for acceptable ground-borne vibration are expressed in terms of RMS velocity in decibels or mm/sec, and the criteria for acceptable ground-borne noise are expressed in terms of A-weighted sound levels.

### **AC.2.3 // HUMAN PERCEPTION OF GROUND-BORNE VIBRATION AND NOISE**

The background vibration velocity level (typically caused by passing vehicles, trucks, buses, etc.) in residential areas is usually less than 0.03mm/sec RMS, well below the threshold of perception for humans, which is around 0.1 mm/sec RMS. In the some cases, depending on the distance, intervening soils, and type of rail infrastructure, the vibration from trains can reach 0.4mm/sec RMS or more. Even high levels of perception, however, are typically an order of magnitude below the minimum levels required for structural or even cosmetic damage in fragile buildings.

Typical levels of ground-borne vibrations are shown in **FIGURE 23**.

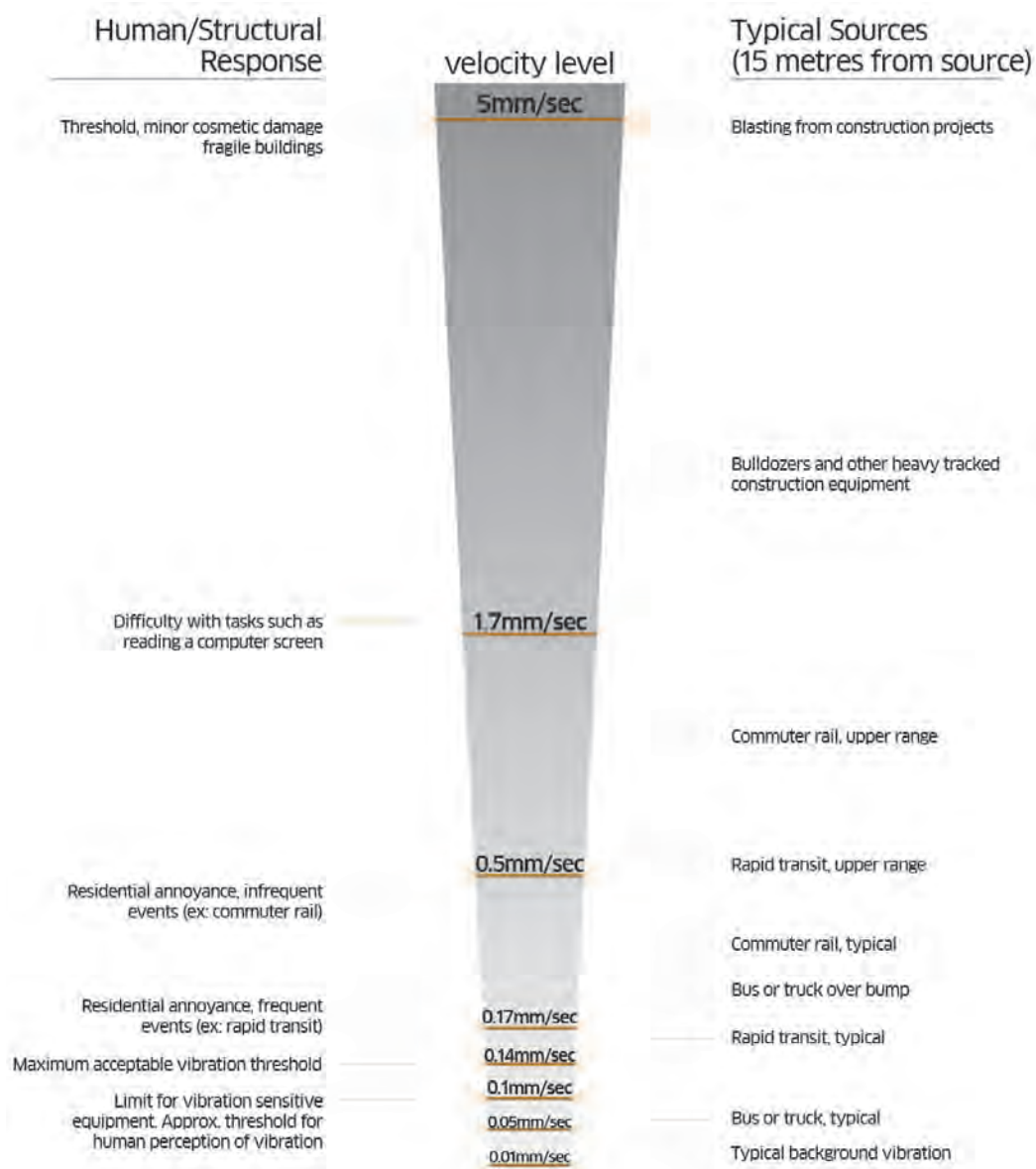
For surface heavy rail traffic, the sound made by the vibration travelling through the earth is rarely significant because of the relatively low frequency content being less audible than the higher vibration frequencies common to surface transit and subways.

The relationship between ground-borne vibration and ground-borne noise depends on the frequency content

of the vibration and the acoustical absorption of the receiving room. The more acoustical absorption in the room, the lower will be the noise level. This can be used to mitigate the ground-borne noise impact, but as noted above, is rarely required.

One of the problems in developing suitable criteria for ground-borne vibration is that there has been relatively little research into human response to vibration, in particular, human annoyance with building vibration. Nevertheless, there is some information available on human response to vibration as a function of vibration characteristics: its level, frequency, and direction with respect to the axes of the human body, and duration of exposure time. However, most of the studies on which this information is based were concerned with conditions in which the level and frequency of vibration are constant. Very few studies have addressed human response to complex intermittent vibration such as that induced in buildings by railway corridors. Nonetheless, several countries have published standards that provide guidance for evaluating human response to vibration in buildings. Proponents may utilize the following standards, used internationally, as a reference:

- International Standard ISO 2631-2: 2003 (1989)
- American Standard ANSI S2.71: 2006 (Formerly ANSI S3.29-1983)
- British Standard BS 6472-1: 2008 (1984)
- Norwegian Standard NS 8176.E: 2005
- New Zealand Standard NZS/ISO 2631-2: 1989
- Australian Standard AS 2670-2: 1990



**FIGURE 23 // TYPICAL VIBRATION SOURCES AND THEIR ASSOCIATED VELOCITY LEVELS** (SOURCE: ADAPTED FROM FIGURE 7-3 IN TRANSIT NOISE AND VIBRATION IMPACT ASSESSMENT BY THE FEDERAL TRANSIT ADMINISTRATION).

#### AC.2.4 // FACTORS INFLUENCING GROUND-BORNE VIBRATION AND NOISE

Factors that may influence levels of ground borne vibration and noise, and that should be considered by the acoustic consultant in the preparation of a vibration impact study are described in the table below.

FACTORS RELATED TO VIBRATION SOURCE	
Factors	Influence
Wheel Type and Condition	Wheel flats and general wheel roughness are the major cause of vibration from steel wheel/steel rail systems.
Track/Roadway Surface	Rough track or rough roads are often the cause of vibration problems.
Speed	As intuitively expected, higher speeds result in higher vibration levels. Doubling speed usually results in a vibration level increase of 4 to 6 decibels.
FACTORS RELATED TO VIBRATION PATH	
Factors	Influence
Soil Type	Vibration levels are generally higher in stiff clay or well-compacted sandy soils than in loose or poorly compacted or poorly consolidated soils.
Soil Layering	Soil layering will have a substantial, but unpredictable, effect on the vibration levels since each stratum can have significantly different dynamic characteristics.
Depth to Water Table	The depth to the water table may have a significant effect on ground-borne vibration, but a definite relationship has not been established.
FACTORS RELATED TO VIBRATION RECEIVER	
Factors	Influence
Foundation Type	Generally, the heavier the building foundation, the greater the coupling loss as the vibration propagates from the ground into the building.
Building Construction	Since ground-borne vibration and noise are almost always evaluated in terms of indoor receivers, the propagation of the vibration through the building must be considered. Each building has different characteristics relative to structure-borne vibration, although, generally, the more massive the building, the lower the levels of ground-borne vibration.
Acoustical Absorption	The amount of acoustical absorption in the receiver room affects the levels of ground-borne noise.

(SOURCE: ADAPTED FROM TABLE 7-2 IN TRANSIT NOISE AND VIBRATION IMPACT ASSESSMENT BY THE FEDERAL TRANSIT ADMINISTRATION).

#### **AC.2.5 // RECOMMENDED PROCEDURES FOR THE PREPARATION OF VIBRATION IMPACT STUDIES FOR NEW RESIDENTIAL OR OTHER SENSITIVE LAND USES IN PROXIMITY TO RAILWAY OPERATIONS**

Mitigation can take the form of perimeter foundation treatment and thicker foundation walls and in more severe cases the use of rubber inserts to separate the superstructure from the foundation.

1. Studies should be undertaken by a qualified consultant.
2. Where studies are not economically or practically feasible, due for example to the scale of the new development or the absence of an available mechanism to secure a study, reasonable and practical measures should be undertaken to minimize potential vibration impacts, such as increased building setbacks, perimeter foundation treatment (eg. thicker foundations) and/or other vibration isolation measures, etc.
3. Vibration measurements should be conducted for all proposed residential/ institutional type developments. It is not acceptable to use vibration measurements conducted at other locations such as on the opposite side of the tracks, further down the tracks, etc.
4. The vibration measurements should be conducted at the distance corresponding to the closest proposed residential receptor, or on the minimum setbacks based on classification of the rail line. If the proposed dwelling units are located more than 75 m from the railway

right-of-way, vibration measurements are not required.

5. Sufficient points parallel to the tracks should be chosen to provide a comprehensive representation of the potentially varying soil conditions.
6. A minimum of five (5) train passbys (comprised of all train types using the rail line) should be recorded at each measurement location.
7. The measurement equipment must be capable of measuring between 4 Hz and 200 Hz  $\pm$  3 dB with an RMS averaging time constant of 1 second.
8. All measured data shall be reported.
9. The report should include all of the above as well as:
  - Key plan;
  - Site/draft plan indicating the location of the measurements;
  - Summary of the equipment used to conduct the vibration measurements;
  - Direction, type, speed (if possible), and number of cars of each train measured;
  - Results of all the measurements conducted;
  - Exceedance, if any; and
  - Details of the proposed mitigation, if required.
10. Ground-borne vibration transmission is to be estimated through site testing and evaluation

to determine if dwellings within 75 metres of the railway right-of-way will be impacted by vibration conditions in excess of 0.14 mm/sec. RMS between 4 Hz. And 200 Hz. The monitoring system should be capable of measuring frequencies between 4 Hz and 200 Hz  $\pm$  3 dB, with an RMS averaging time constant of 1 second. If in excess, appropriate isolation measures are recommended to be undertaken to ensure living areas do not exceed 0.14 mm/sec. RMS on and above the first floor of the dwelling.

- Garg, N. and Sharma, O. (2010). "Investigations on transportation induced ground vibrations". Proceedings of 20th International Congress on Acoustics, ICA 2010, Sydney, Australia.

The following references provide additional insight on methods for measuring ground-borne vibration:

- Hunaidi, O. (1996). "Evaluation of human response to building vibration caused by transit buses". Journal of Low Frequency Noise and Vibration, Vol. 15 No.1, p. 25-42. NRCC Report No. 36963.
- Hunaidi, O. and Tremblay, M. (1997). "Traffic-induced building vibrations in Montreal". Canadian Journal of Civil Engineering, Vol. 24, p.736-753.
- Allen, D.E. and Pernica, G. (1998). "Control of floor vibration". Construction Technology Update No.22, Institute for Research in Construction, NRCC.
- Hanson, C.E., Towers, D.A. and Meister, L.D. (2006). "Transit Noise and vibration impact assessment". FTA-VA-90-1003-06, Office of Planning and Environment, Federal Transit Administration, USA.

# APPENDIX D //

## NEW RAIL FACILITIES AND SIGNIFICANT RAIL EXPANSIONS IN PROXIMITY TO RESIDENTIAL OR OTHER SENSITIVE LAND USES

Federally regulated railways are governed, in part, by the requirements of the Canada Transportation Act (CTA). Under the CTA, railways are required to obtain an approval from the Canadian Transportation Agency for certain railway construction projects. Additionally, federal railways are required to adhere to the requirements of the Railway Safety Act (RSA), which promotes public safety and protection of property and the environment in the operation of railways.

As such, evaluations of new rail facilities or significant rail expansions are conducted in accordance with applicable Federal regulations.

These include but are not limited to the following:

**1. Canadian Transportation Act - section 98**

<http://www.cta-otc.gc.ca/eng/railway-line-construction>

<http://laws-lois.justice.gc.ca/eng/acts/C-10.4/page-34.html#h-51>

**2. Railway Safety Act - Part 1 Construction or Alteration of Railway Works**

<http://laws-lois.justice.gc.ca/eng/acts/R-4.2/page-3.html#docCont>

<http://laws-lois.justice.gc.ca/eng/regulations/SOR-91-103/page-1.html>

**3. Railway Relocation and Crossing Act**

<https://www.otc-cta.gc.ca/eng/publication/relocation-railway-lines-urban-areas>

<http://laws-lois.justice.gc.ca/eng/acts/R-4/index.html>

**4. Canadian Environmental Assessment Act, 2012**

<http://laws-lois.justice.gc.ca/eng/acts/C-15.21/index.html>

# APPENDIX E //

## BEST PRACTICES

## **AE.1 // CURRENT BEST PRACTICES IN CANADA**

### **AE.1.1 // RAILWAY NOISE EMISSION GUIDELINES, RAC (CANADA)**

The Railway Association of Canada has prepared Noise Emission Guidelines that will assist in controlling noise emitted by moving rail cars and locomotives.

- The RAC initiative is the first attempt at such a guideline in Canada. Federal agencies have indicated that they support the RAC's efforts and look forward to working with all stakeholders on such initiatives and also that they encourage a blend of maximum levels of noise and annoyance-related approaches in the development of such guidelines.
- The RAC guidelines are based on the following United States Codes of Federal Regulations (CFR): CFR Title 40 - Protection of Environment - Part 201 Noise Emission Standards for Transportation Equipment; Interstate Rail Carriers - July 1, 2002; and, CFR Title 49 Transportation - Part 210 Railroad Noise Emission Compliance Regulations - Oct 1, 2002.
- The guidelines apply to the total sound emitted by moving rail cars and locomotives (including the sound produced by refrigeration and air conditioning units that are an integral element of such equipment), active retarders, switcher locomotives, car coupling operations, and load cell test stands, operated by a railway within Canada. There are exceptions where the guidelines do not apply, including steam locomotives, sound emitted from warning devices, special purpose equipment, and inert retarders.
- Railways and the RAC are encouraged to continue with proactive efforts and partnerships to undertake research and education initiatives that build on and improve the draft noise emission guideline, including incorporating aspects of the subject research.

A summary of the guidelines is below:

NOISE SOURCE	NOISE GUIDELINE - A-WEIGHTED SOUND LEVEL IN dB	NOISE MEASURE	MEASUREMENT LOCATION
<b>All locomotives manufactured on or before Dec. 31, 1979</b>			
Stationary, Idle Throttle setting	73	Lmax (slow) <sup>1/</sup>	30 m
Stationary, all other throttle settings	93	Lmax (slow)	30 m
Moving	96	Lmax (fast)	30 m
<b>All locomotives manufactured after Dec. 31, 1979</b>			
Stationary, Idle Throttle setting	70	Lmax (slow)	30 m
Stationary, all other throttle settings	87	Lmax (slow)	30 m
Moving	90	Lmax (fast)	30 m
Additional req't for switcher locos manufactured on or before Dec. 31, 1979 operating in yards where stationary switcher and other loco noise exceeds the receiving property limit of	65	L90 (fast) <sup>2/</sup>	Receiving property
Stationary, Idle Throttle setting	70	Lmax (slow)	30 m
Stationary, all other throttle settings	87	Lmax (slow)	30 m
Moving	90	Lmax (fast)	30 m
<b>Rail Cars</b>			
Moving at speeds of 45 mph or less	88	Lmax (fast)	30 m
Moving at speeds greater than 45 mph	93	Lmax (fast)	30 m
<b>Other Yard Equipment and Facilities</b>			
Retarders	83	Ladjavemax (fast)	Receiving property
Car-coupling operations	92	Ladjavemax (fast)	Receiving property
Loco load cell test stands, where the noise from loco load cell operations exceeds the receiving property limits of	65	L90 (fast) <sup>2/</sup>	Receiving property
Primary Guideline	78	Lmax (slow)	30 m
Secondary Guideline if 30 m measurement not feasible	65	Lmax (fast)	Receiving property located more than 120 m from Load Cell

<sup>1/</sup>Lmax= maximum sound level

L90= statistical sound level exceeded 90% of the time

Ladjavemax= adjusted average maximum sound level

<sup>2/</sup> L90 must be validated by determining that L10-L99 is less than or equal to 4 dB (A).

Receiving property essentially means any residential or commercial property that receives sound (not owned by the railroad).

### **AE.1.2 // NOISE ASSESSMENT CRITERIA IN LAND USE PLANNING PUBLICATION LU-131 (ONTARIO, CAN)**

This guideline outlines noise criteria to be considered in the planning of sensitive land uses adjacent to major facilities such as roads, airports, and railway corridors. It is the only provincial noise guideline applicable to residential development in Canada.<sup>1</sup> The document stipulates a maximum daytime outdoor sound level from rail noise of 55dBA; 35dBA for sleeping quarters at night; and 40dBA for living and dining rooms during the day. It also stipulates that a feasibility study is required within 100 metres of a Principal Main Line railway right-of-way, and 50 metres of a Secondary Main Line railway right-of-way. A detailed noise study is required when sound levels affecting proposed lands exceed the noise criteria by more than 5dBA. Finally, the guideline also outlines specific mitigation requirements when sound levels exceed certain limits.

### **AE.1.3 // PLANNING AND CONSERVATION LAND STATUTE LAW AMENDMENT ACT, 2006, BILL 51 (ONTARIO, CAN)**

The Planning and Conservation Land Statute Law Amendment Act, 2006, Bill 51 provides a more transparent, accessible, and effective land-use planning process, empowering municipalities with more tools to address a variety of land-use planning needs. The bill allows for greater dissemination of information, participation, and consultation to take place earlier on in the planning process, giving local residents and community leaders more opportunity to play their crucial role in shaping their communities.

Bill 51 requires that notice shall be given to railways in the case of proposed official plans or official plan amendments, plans of subdivision, zoning by-laws, holding by-laws, interim control by-laws, and/or consent to sever lands, where the subject lands fall within 300

metres of a railway line. This is the only piece of provincial legislation in Canada which triggers the notification of railways when land-use changes and/or development is proposed in close proximity to rail lands.

### **AE.1.4 // GUIDELINE D-6: COMPATIBILITY BETWEEN INDUSTRIAL FACILITIES AND SENSITIVE LAND USES (ONTARIO, CAN)**

The role of this guideline is to prevent or minimize the encroachment of sensitive land use upon industrial land use and vice versa. The incompatibility of these land uses is due to the possibility for adverse effects created by industrial operations on sensitive land uses.

Application of this guideline should occur during the land use planning process in an effort to prevent or minimize future land use conflicts. It is intended to apply when a change in land use is proposed. The guideline is a direct application of Ministry Guideline D-1, "Land Use Compatibility" (formerly Policy 07-03).

This guideline defines sensitive land uses as:

- recreational uses which are deemed by the municipality or provincial agency to be sensitive; and/or
- any building or associated amenity area which is not directly associated with the industrial use, where humans or the natural environment may be adversely affected by emissions generated by the operation of a nearby industrial facility. For example, residences, senior citizen homes, schools, day care facilities, hospitals, churches and other similar institutional uses, or campgrounds. Residential land is considered to be sensitive 24 hrs/day.

This guideline does not apply to railway corridors, but does apply to railway yards and other ancillary rail facilities.

Industrial facilities are categorized into three classes according to the objectionable nature of their emissions, physical size/scale, production volumes and/or the

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<sup>1</sup> Noise Guidelines exist in Alberta, but they are applicable only to the energy sector.

intensity and scheduling of operations. This guideline includes an implementation section that contains requirements or recommendations on the following:

- Potential influence area distances
- Land use planning considerations
- Recommended minimum separation distances
- How to measure separation distance
- Commenting or reviewing land use proposals
- Required studies: noise, dust, and odour
- Additional mitigation measures
- Legal agreements and financial assurance to ensure mitigation
- Redevelopment, infilling and mixed use areas requirements including official status, zoning, feasibility analysis, new use of existing buildings, public consultation, environmental warnings for sensitive land uses, phased/sequential development, and site clean-up & decommissioning.
- Accessory residential use

The recommendations or requirements for incompatible land uses are intended to supplement, not replace, controls which are required by legislation for both point source and fugitive emissions at the facility source.

#### **AE.1.5 // DIRECTION 2006 (CANADA)**

Community Trespass Prevention is an initiative of Direction 2006, a Government of Canada and public/private partnership initiated in 1996, with the goal of cutting the number of accidents and fatalities in half within 10 years, by 2006. As part of this initiative, the

document, *Trespassing on Railway Lines: A Community Problem-Solving Guide* was developed. This document describes the Community, Analysis, Response and Evaluation (C.A.R.E.) problem solving model that was developed to assist communities in identifying and addressing the underlying causes of trespassing. It provides a step-by-step method of identifying, analyzing and effectively addressing trespassing issues in the community.

Direction 2006 has identified four areas of concentration (the four E's) with respect to crossing and trespass prevention, namely:

#### **Education**

Operation Lifesaver's success as a safety program lies in educating people of all ages about the dangers of highway/railway crossings and the seriousness of trespassing on railway property. The methods used to reach the public include the production and distribution of educational related material, early elementary and driver education curriculum activities, civic presentations, as well as media coverage.

#### **Enforcement**

Laws are in place governing motorists' and pedestrians' rights and responsibilities at highway/railway crossings and on railway property. Without enforcement, however, they will be ignored and disregarded, and incidents will continue to happen. Therefore, provincial and municipal law enforcement agencies are urged to deal with motorists and pedestrians who disregard these laws and jeopardize their lives as well as the lives of others.

## Engineering

Highway/railway crossings, railway property and pedestrian crossings must be kept safe, both physically and operationally, and improvements must be made when needed. To ensure a high level of safety, the administrative process of improving railway rights-of-way needs to be reviewed and changed when needed. At the same time, the public needs to be made more aware of federal, provincial and other programs aimed at improving railway safety.

## Evaluation

To maintain the quality of Operation Lifesaver, its effect should be measured against its stated goals. Funds are available for technical and program assistance.

Lessons that can be learned from Direction 2006 include:

- The benefits of multi-stakeholder initiatives to raise awareness of public safety matters and reduce the potential for future incidents.
- Promotion of rail safety improvement, particularly improvement and elimination of at-grade crossings and provision of funding for safety initiatives.

## AE.2 // INTERNATIONAL BEST PRACTICES

The international case studies described here have been chosen because they represent examples of jurisdictions which employ a comprehensive approach towards mitigation of rail-related impacts on new residential development that includes the use of proximity guidelines. While Australia stands out as a model for Canadian jurisdictions to look towards when crafting their own policies for development adjacent to railway corridors, the differences between the two contexts

should be kept in mind. For example, the Australian context allows for a greater government role in its approach to mitigation because railway infrastructure is largely state owned and operated. This is also the reason why the rail authorities must bear a larger share of the responsibility when it comes to mitigation, than is the case in Canada.

### AE.2.1 // NEW SOUTH WALES, AUSTRALIA

New South Wales (NSW), located in southeastern Australia, is the largest Australian state by population, with over 7.2 million inhabitants. It is currently experiencing an extended period of urban renewal, particularly in and around Sydney, the state capital and the most populous city in the country. This renewal has led to increased pressure to develop urban infill sites along railway lines, particularly around existing passenger rail stations. At the same time, transportation by rail (both freight-based and passenger-based), has been growing steadily, generating a need to establish new railway lines in some parts of the state, and leading to an increase in the number of complaints about sound and vibration issues by residents living in proximity to existing lines.

In response to these circumstances, the government of NSW has developed a comprehensive strategy consisting of a series of complementary initiatives to address and manage the environmental impacts of noise and vibration from the state's rail system. These include:

- A ***Rail Infrastructure Noise Guideline*** that outlines a process for assessing the noise and vibration impacts of proposed rail infrastructure projects, and for determining appropriate mitigation.
- A ***new state policy***, called the State Environmental Planning Policy (Infrastructure) 2007 that clearly

articulates a process and requirements for the approval of new residential developments adjacent to existing railway corridors. The policy specifies internal noise levels of 35dBA for bedrooms between 10pm and 7am, and 40dBA for other habitable rooms. It also stipulates conditions under which a rail authority must be notified of a development adjacent to its railway corridors, and gives the authority 21 days to respond.

- New *planning guidelines* for development near railway corridors and busy roads that outline procedures for assessing the noise and vibration impacts of existing rail facilities on new residential development, and suggest potential mitigation options.
- New *national rolling stock noise emission standards*, currently under development by the Australasian Railway Association.

Although the *Development Near Rail Corridors and Busy Roads - Interim Guideline* includes recommendations for mitigating against the risk of a derailment, these do not include a mandatory or recommended setback. The State's Director of Policy Planning Systems and Reform suggests that this is because any setback width would be considered arbitrary. Additionally, it is argued that it would be inappropriate to sterilize land adjacent to railway corridors by imposing a setback requirement without compensation or acquisition. In the case of new rail lines under development, it is considered preferable for the infrastructure provider to acquire a corridor wide enough to make accommodations for a buffer. In existing built-up areas around older railway lines, safety is considered on a case-by-case basis through individual risk assessments, although the primary concern of

mitigation is the reduction of noise and vibration. It should be noted that developers of new residential buildings in NSW are responsible for all costs associated with providing safety, sound, and vibration mitigation in their developments.

The introduction of the new state policy and planning guidelines has significantly streamlined the development approvals process for new residential development adjacent to railway corridors across the state. The *State Environmental Planning Policy (Infrastructure)* 2007 takes precedence over existing municipal policies within the state, and municipalities must also 'have consideration' for the new guidelines when approving or denying a development application. Failure to do so may result in a decision being overturned by the courts. The privileged position of the rail authorities as adjacent landowners is recognized through the new process, but the 21-day period for providing comments ensures expediency. The state further encourages rail authorities to honour this time limitation through an annual publication of the names of those who consistently fail to meet the deadline. While the process allows for and encourages extensive negotiation, municipal Councils are free to reject the safety recommendations of rail authorities that they feel are unreasonable.

Although the state is still in the process of transitioning into this new system, overall, it is considered thus far, to be a success. The guidelines are heavily used, and new developments are seeing significant benefits, though there are still concerns expressed by residents living in existing housing stock.

### AE.2.2 // QUEENSLAND, AUSTRALIA

Queensland, located in northeastern Australia, is the second largest Australian state by area, and the third largest by population, with over 4.5 million inhabitants. It is also home to the country's third most populous city, Brisbane. Regional and metropolitan plans throughout Queensland are calling for Transit Oriented Development (TOD) to address the state's continuing growth and development. These plans typically prescribe more compact urban forms, with higher density development located in the places of greatest accessibility. Increasingly, as in NSW, this has led to greater pressure to develop sites adjacent to railway corridors, generating concerns not only about noise and vibration, but also about the potential impact of new development on railway operations.

In order to properly manage these concerns, a partnership was established between Queensland Rail, Transport and Main Roads (TMR), and the Department of Infrastructure and Planning (DIP), through Growth Management Queensland (GMQ). Through this collaboration, a Guide for development in a railway environment was developed and made available for use by local municipalities and developers. The Guide provides direction for those interested in developing, excavating, or carrying out any other construction activity in or adjacent to a railway corridor, facilities, or infrastructure. It outlines what information must be reviewed and accounted for when undertaking development in a railway environment, which agencies hold jurisdictional responsibility, the applicability of regulatory provisions, the consultation process, and related development parameters. A checklist approach ensures the appropriate steps have been taken to address the matters influencing development in a railway environment, and is complemented by a risk

assessment process to assist with the evaluation and refinement of development proposals.

### AE.2.3 // CODE OF PRACTICE, RAILWAY NOISE MANAGEMENT, QUEENSLAND RAIL (QUEENSLAND, AUSTRALIA)

Queensland Rail (QR), an Australian government owned corporation, has developed a Code of Practice for Railway Noise Management. The *Code of Practice* is generally a self-imposed set of rules to achieve compliance with the duty to mitigate environmental impacts such as noise and vibration. The self-regulation is similar to the approach to the environment that has been adopted by the Class 1 and other railway companies in Canada.

As part of this *Code of Practice*, QR has developed a "Network Noise Management Plan" that initially involves conducting a statewide noise audit. If "potential noise-affected receptors" are identified then a detailed noise assessment is carried out. Mitigation measures will be implemented where noise levels exceed the EPP levels or if QR cannot achieve compliance with these levels, the railway will strive to comply with QR nominated interim noise levels of 70 dB(A) (24-hour average equivalent continuous A-weighted sound pressure level) and 95 dB(A) (single event maximum sound pressure level).

Queensland Rail has prepared and made available to Queensland local governments "QR Guidelines for Local Governments (and/or other Assessment Managers under the Integrated Planning Act) for Assessing Development Likely to be Affected by Noise from the Operation of a Railway or Railway Activities". These guidelines encourage Queensland local governments to apply noise impact assessments to development applications requiring assessment under the Integrated Planning Act

and which are intended to be located near a railway. The noise impact assessment may require the imposition of conditions on the development to help achieve the required noise levels. Conditions may include devices such as sealed windows and/or double glazing; minimizing the window area facing a noise source; barriers for low level receivers; effective building orientation; or provision of a suitable buffer distance.

Although the Canadian environment differs somewhat from QR (the main difference being that QR is government owned), there are lessons that can be learned, including:

- QR has developed a comprehensive “Network Noise Management Plan” and carries out a detailed noise assessment if potential noise-affected receptors are identified.
- QR has prepared noise impact assessment guidelines to assist local governments in applying guidelines to development applications. The guidelines are comprehensively applied.

### **AE.3.1 // ROBERTS BANK RAIL CORRIDOR CASE STUDY (BRITISH COLUMBIA, CAN)**

The Roberts Bank Rail Corridor (RBRC) represents a 70-kilometre stretch of tracks, connecting Canada’s largest container facility and a major coal terminal at Roberts Bank (south of Vancouver) with the North American rail network. Increasing volumes of international freight are shipped as part of Canada’s Pacific Gateway, through communities in the Lower Mainland.

The Corridor is comprised primarily of single rail track and currently carries up to 18 trains per day, ranging from 6,000 to 9,500 feet in length. Train traffic volume is expected to increase to 28–38 trains per day by 2021,

and it is anticipated that some trains may exceed 12,000 feet in length.

### **Existing and Future Conditions**

The Corridor contains approximately 66 road-rail crossings, of which 12 are overpasses, 38 are public street-level crossings, and 16 are private street-level crossings. Roughly 388,000 vehicles cross the tracks daily, with expected increases to 560,000 vehicle crossings per day by 2021. Future increases in train traffic and vehicular traffic presented infrastructure challenges to the existing street-level rail crossings, impeding the operational efficiency of both rail and road networks. Additionally, the significant volume of trains passing through established communities presented many challenges with respect to noise, vibration, emissions, and safety.

### **Improving Network Efficiency and Addressing Proximity Issues**

In February 2007, the *Roberts Bank Rail Corridor: Road/Rail Interface Study* prioritized the optimal locations for investment in road-rail projects. Careful consideration was also given to selected road closures, network reconfigurations, and traffic management measures designed to maximize benefits to motorists, railways and neighbouring communities. The study also gave consideration to a number of proximity related issues including noise, vibration, emissions, and safety.

The study was a collaborative effort among Transport Canada, British Columbia Ministry of Transportation and Infrastructure, South Coast British Columbia Transportation Authority (TransLink), the Vancouver Fraser Port Authority, and the Greater Vancouver Gateway Council, with contributions from stakeholders

such as corridor municipalities and railway companies. The various agencies turned to the 2007 FCM RAC Proximity Guidelines for direction on addressing issues related to noise and vibration, safety, dispute resolution, and setbacks. The Guidelines were proven to be an effective measure and valuable resource for balancing the needs of the rail agencies, stakeholders, and community members.

Roberts Bank Railway Corridor improvements are intended to:

- Improve the flow of local traffic;
- Improve traffic safety;
- Provide for better access by emergency vehicles during train events;
- Reduce idling of vehicles at level crossings, energy use, and greenhouse gas emissions;
- Reduce or eliminate the necessity for train whistling;
- Enhance the efficiency and safety of rail operations;
- Accommodate the anticipated growth in trade-related traffic; and
- Increase national trade competitiveness by increasing goods-movement along the corridor.

## **Results and Outcomes**

The twelve partners are working proactively to improve road access and safety for local residents by providing alternate routes over increasingly busy railways. In total, eight overpasses and one rail siding project in the RBRC Program will be constructed by 2014. Additional rail improvements will reduce requirements for whistle blowing, close rail crossings to vehicular traffic, and

provide an advanced early warning system that will notify drivers of approaching trains.

# APPENDIX F //

## GLOSSARY

### **Berm**

A mound constructed of compacted earth that is situated within the setback area of a property adjacent to a railway line. Berms function of safety barriers, screen undesirable views, and reduce noise.

### **Crash Wall**

A concrete structure often incorporated into the podium of a high-density building adjacent to a railway line that is designed to provide the equivalent resistance in the case of a train derailment as a standard berm.

### **Noise Impact Study**

A study, undertaken by a qualified acoustic consultant, which assesses the impact of all noise sources on a subject property, and determines the appropriate layout, design, and required control measures.

### **Low Occupancy Podium**

A building podium containing non-sensitive uses such as parking, retail, or the common elements of a condominium. A low occupancy podium will never contain residential uses.

### **Railway Corridor**

The land which contains a railway track or tracks, measured from property line to property line.

### **Rail Crossing**

A crossing or intersection of a railway and a highway, at grade.

### **Railway**

Any company which owns and operates one or more railway lines.

### **Railway Line**

The physical tracks on which trains operate. Railway lines may be categorized as either a Main Line, Branch Line, or Spur Line, based on the speed and frequency of trains (see Appendix B for a sample rail classification system).

### **Railway Facility**

Any structure or associated lands related to the operation of a railway. Railway facilities include railway corridors, freight yards, and train stations.

### **Railway Operations**

Any activity related to the operation of a railway.

### **Recommended Setback**

The recommended separation distance between a rail corridor and a sensitive land use, such as a residence.

### **Sensitive Land Uses**

A land use where routine or normal activities occurring at reasonably expected times would experience adverse effects from the externalities, such as noise and vibration, generated from the operation of a railway. Sensitive land uses include, but are not limited to, residences or other facilities where people sleep, and institutional structures such as schools and daycares, etc.

### **STC Rating**

STC stands for Sound Transmission Class, and is a single-number rating of a material's or an assembly's ability to resist airborne noise transfer. In general, a higher STC rating indicates a greater ability to block the transmission of noise.

### **Vibration Impact Study**

A study, undertaken by a qualified acoustic or vibration consultant, which assesses the level and impact of vibration on a subject property, determines whether vibration mitigation is necessary, and recommends mitigation options based on the particular conditions of the development site in question.

# APPENDIX G //

## LINKS & OTHER RESOURCES

**Railway Association of Canada**

[www.railcan.ca](http://www.railcan.ca)

(includes relevant government links and links to member railway sites)

**Federation of Canadian Municipalities**

[www.fcm.ca](http://www.fcm.ca)

(includes links to provincial affiliate associations and municipal sites)

**RAC/FCM Proximity Project**

[www.proximityissues.ca](http://www.proximityissues.ca)

**Government of Canada**

[www.canada.gc.ca](http://www.canada.gc.ca)

**Transport Canada**

[www.tc.gc.ca](http://www.tc.gc.ca)

**Canadian Transportation Agency**

[www.cta-otc.gc.ca](http://www.cta-otc.gc.ca)

**Ontario Ministry of the Environment**

[www.ene.gov.on.ca](http://www.ene.gov.on.ca)

**Canada Mortgage & Housing Corporation**

[www.cmhc-schl.gc.ca](http://www.cmhc-schl.gc.ca)

**Operation Lifesaver**

[www.operationlifesaver.ca](http://www.operationlifesaver.ca)

**Safe Communities**

[www.safecommunities.ca](http://www.safecommunities.ca)

**Queensland Rail**

[www.corporate.qr.com.au](http://www.corporate.qr.com.au)

**Queensland Department of Transport and Main Roads**

[www.tmr.qld.gov.au](http://www.tmr.qld.gov.au)

**New South Wales Department of Planning**

[www.planning.nsw.gov.au](http://www.planning.nsw.gov.au)

# APPENDIX H //

## LIST OF STAKEHOLDERS CONSULTED

### **Municipalities**

Borough of Plateau Montreal, City of Montreal

Borough of Riviere-des-Prairies, Pointe-aux-Trembles, City of Montreal

Bureau du Plan, City of Montreal

City of Edmonton

City of Regina

City of Saskatoon

City of Toronto

City of Vancouver

City of Welland

City of Winnipeg

Greater Moncton Planning Commission

Town of Halton Hills

Town of Orangeville

### **Development Industry**

BILD, Policy & Government Relations

Canada Lands Company

Conservatory Group

Hullmark Development

Montreal Design Zone

Namara Developments

Ontario Homebuilders Association

Perimeter Development

### **Professionals**

Aecom

Evans Planning

Goodmans LLP

Jablonsky Ast & Partners

Jade Acoustics Inc.

JSW+ Associates

### **Canadian Railways & Railroad Operators**

Canadian National Railway

Canadian Pacific Railway

Metrolinx

Trillium Railway

### **International**

American Association of Railroads

City of Melbourne, Australia

City of Washington, DC

Government of New South Wales, Australia, Policy Planning Systems and Reform

Surface Transportation Board

### **Provincial & Federal Ministries & Regulating Agencies**

Canadian Transportation Agency

Ontario Ministry of Transportation, Goods Movement Policy Office

Province of Nova Scotia

Saskatchewan Ministry of Municipal Affairs

# APPENDIX I //

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FCM / RAC

# PROXIMITY INITIATIVE



FEDERATION  
OF CANADIAN  
MUNICIPALITIES

FÉDÉRATION  
CANADIENNE DES  
MUNICIPALITÉS



Railway Association  
of Canada