

**POLICY ON THE ENVIRONMENTAL  
PROTECTION  
OF  
NEW RESIDENTIAL DEVELOPMENT  
ADJACENT TO  
THE ORANGEVILLE – BRAMPTON  
RAILWAY**



Prepared by:

**ORANGEVILLE RAILWAY  
DEVELOPMENT CORPORATION  
(ORDC)**

**– JANUARY 2001 –  
REVISED: OCTOBER 2001**

## 1.0 THE ENVIRONMENTAL PROTECTION POLICY

The Orangeville Railway Development Corporation (ORDC) prepared this policy for the environmental protection of adjacent residential development to guide land developers and affected municipalities. This policy applies to proposals for new residential development adjacent to the Orangeville-Brampton Railway corridor. It describes standards and procedures that would be appropriate for determining the measures to be incorporated into such developments to minimize the danger posed by the possibility of derailment, collision or spillage and to mitigate the impact of railway noise and vibration. The measures required for these purposes are interlocking; all environmental factors must be considered together in order to determine what measures are necessary.

The standards, procedures and measures described have been developed and recommended by Canadian Pacific Railway, former owners of the Orangeville-Brampton Railway corridor. They take into account various government and professional policies and recommendations that have been applied in practice to developments for several years with good results.

## 2.0 BACKGROUND

### 2.1 Noise Standards and Prediction of Noise Levels

Acceptable noise exposure levels are:

	Equivalent sound Level (Leq)	
	Day: 0700 to 2300	Night: 2300 to 0700
<b>Bedrooms, Sleeping Quarters</b>	<b>35 dbA</b>	<b>35 dbA</b>
<b>Living Rooms</b>	<b>40 dbA</b>	<b>40 dbA</b>
<b>Outdoor Recreation Areas</b>	<b>55 dbA</b>	<b>50 dbA</b>

These noise exposure levels are the maximum that should be permitted at the site of any dwelling, without any exception or concession. Where predictions indicate that higher levels will result, measures should be adopted to reduce the levels to or below these maximums.

The prediction of noise levels should be made in accordance with the method prescribed by the Ministry of the Environment as set out in the report Publication LU-131 entitled "*Noise Assessment Criteria in Land Use Planning*" and Guideline D-6 entitled "*Compatibility Between Industrial Facilities and Sensitive Land Uses*". This method is the same as that set out in Canada Mortgage and Housing Corporation report 5156 81110 entitled "*Road and Rail Noise: Effects on Housing*".

### 2.2 Vibration Standards and Prediction of Vibration Levels

Vibration of a dwelling may result from both ground-borne vibration and airborne sound waves caused by passing trains.

The prediction of ground-borne vibration levels is to be made by taking measurements of the ground surface vertical vibration at the location of the proposed basement or main structure wall

closest to the railway corridor, or at the minimum setback distance where the location of buildings has not been decided, and allowing for anticipated future changes, in accordance with methods recommended by the Ministry of the Environment.

In the case of vibration induced by airborne sound waves, adequate protection may be provided by intervening structures between the railway source of the sound waves and the receptor in accordance with methods recommended by the Ministry of the Environment.

### **2.3 Railway Classification for Application of Standard Impact Mitigation Measures**

Railway lines in Ontario are classified by the railway companies into five classes described in "*Railway Classifications for Application of Standard Impact Mitigation Measures*". The Classification is based on the present and potential traffic using the lines, and other operating characteristics. Given the volumes and speeds of traffic on the line, the Orangeville-Brampton Railway line is classified as a **Principal Branch Line** which is described as:

#### *Principal Branch Lines*

- Regular scheduled traffic, usually less than 5 trains per day.
- Low speeds limited to 50 k.p.h.(30 m.p.h.).
- Generally of light or moderate weight, with 1 or 2 power units per train, but may include heavier trains with more units.

The requirements established by this environmental protection policy are based on the Orangeville-Brampton Railway being classified as a Principal Branch Line.

The line has been classified for the purpose of applying the "*Standard Impact Mitigation Measures to be Incorporated in the New Residential Development Adjacent to Railways*". The measures are graduated in accordance with the operating characteristics of the rail line, adjacent to which the dwellings are to be built. Five categories are established for the "normal" situation of a fairly flat tract of land with the houses at roughly the same elevation as the railway tracks. Variation would then apply for the cases where the tracks were in cut or on embankment, with the houses at a higher or lower level, and for larger residential buildings.

## **3.0 MINIMUM MITIGATION MEASURES**

### **3.1 Minimum Berm and Setback Requirements for Safety Purposes**

To minimize the possibility of residents being affected by a derailment, collision or spillage and to provide a useful degree of protection against railway noise and vibration, no dwelling should be allowed within 30m (100ft) of the railway corridor, and a berm or embankment with a minimum height of 2.0m (6.5ft) should be constructed adjacent to the railway corridor.

The height of the berm is to be measured from the elevation of the top of rail or, where tracks are elevated from the ground level at the toe of the berm closest to the tracks. The side slopes must be stable and drainage must be satisfactory.

Where the railway line is in a cut, the minimum dwelling setback may be measured from the bottom of the cut embankment, allowance being made for potential changes in track configuration.

### 3.2 Standard Impact Mitigation Measures for Noise and Vibration

The following minimum mitigation measures have been developed to reduce the impact of railway noise and vibration on adjacent residential developments. They are set out in the CPR memorandum "*Standard Impact Mitigation Measures, to be Incorporated in the New Residential Developments Alongside Railways*".

Environmental insulation against railway noise and vibration impact shall be determined by undertaking a noise and/or vibration analysis. Any proposals for residential buildings or structures within 300 metres (984ft) of the Orangeville-Brampton Railway will necessitate the preparation and approval of a Noise Impact Study. Any form of building or structure within 75 metres (246ft) will require the preparation and approval of a Noise Impact Study and a Vibration Analysis. These reports, as required, shall be submitted to the municipality and to ORDC for review and a peer review commissioned at the Owner's expense prior to final approval of the development.

The following are Standard Impact Mitigation Measures are required **in addition to** the minimum berm and setback requirements previously stated under Section 3.1. Please note that the Noise Impact Study and Vibration Analysis, as required, may conclude that additional mitigation measures are needed depending on the site specific conditions of the proposed development.

- a) Berm or combination berm and fence, adjoining and parallel to the railway corridor and having extensions or returns at the ends:
  - i. Minimum total height: 4.0 metres above top-of-rail;
  - ii. Berm minimum height: 2.0 metres and side slopes not steeper than 2.5 to 1; and,
  - iii. Fence, or wall, to be constructed without openings and of a durable material weighing not less than 20kg per square metre (4 lb/sq.ft.) of surface area.
  
- b) Ground vibration transmission to be estimated through site testing and evaluation to determine whether it will produce unsatisfactory vibration conditions in dwellings, in excess of the acceptable level. If so, residential buildings within 75 metres from the railway corridor to be protected so as to reduce vibration to the acceptable level. The measures employed may be:
  - i. Support the building on rubber pads between the foundation and the occupied structure so that the maximum vertical natural frequency of the structure on the pad is 12 Hz;
  - ii. Insulate the building from vibration originating at the railway tracks by an intervening discontinuity or by installing adequate insulation outside the building, protected from compaction that would reduce its effectiveness so that vibration in the building would become unacceptable; or,
  - iii. Other suitable and adequate measures that will retain their effectiveness over time.

### **3.3 Procedures by Applicants**

Applicants are required to have an evaluation made by professional noise and vibration consultants as set out in Section 3.2 above. Once these studies are completed, a peer review will be commissioned by ORDC at the Owner's expense prior to final approval of the development. The noise and vibration mitigation measures, as recommended, must be incorporated together with the required safety measures under Sections 3.1 and 3.2 into their developments. The construction of the dwellings closest to the railway shall meet specifications in accordance with those prescribed by of the Ministry of the Environment for noise and vibration reduction measures.

### **3.4 Variations for Specific Site Conditions**

To take account of variations in topography and in the elevation of the railway tracks relative to the proposed dwellings (e.g. in a cut or on an embankment) the following variations to the Standard Impact Mitigation Measures should be employed where they apply.

#### a) Height of the Berm and Fence

- i. To establish the minimum overall height of the berm and fence:
  - Strike a plane from top-of-rail of the track nearest to the property line, where the track is above the dwellings, or furthest from the property line where it is below them, to the ground at the nearest wall of a residential building. Allow for potential new tracks. If the building location has not been established strike the plane from the top-of-rail to the ground at the minimum setback location.
  - Measure the minimum height of the berm and fence above this plane.
- ii. The elevation of the top of the berm should be at least the lesser of:
  - The minimum height of berm above the top-of-rail elevation, or
  - The minimum height of berm above the ground level at the toe of the berm closest to the tracks.

#### b) Setback of Dwellings

Where the railway tracks are in cut the minimum setback may be reduced by the length of the face of the cut measures on a vertical cross-section through the proposed dwelling. Allowance should be made for any potential changes in track configuration.

**Note:** Where railway tracks are on an embankment at an elevation substantially above the nearest dwelling, and it is not feasible to construct a berm and fence to the required height, block buildings beyond the minimum setback may be constructed provided the required berm is built. In such cases provision should be made for the required outdoor recreation area on the side of the buildings away from the tracks and the construction of the building should be designed to ensure that the indoor noise and

vibration levels are satisfactory, according to the requirements prescribed by the Ministry of the Environment.

### **3.5 Provisions for Building Construction**

- a) An unoccupied building (e.g. garage) may be built as close to the corridor as the fence location, and serve the purpose of the fence, provided:
- an earth berm embankment is provided between it and the corridor to the specifications required for the berm.
  - the wall facing the corridor is of solid masonry above the berm and without openings to at least the height required for the berm and fence.
- b) The construction of residential buildings should be designed to achieve the required reduction in noise and airborne-soundwave induced vibration from outdoor to indoor conditions in accordance with those prescribed by the Ministry of the Environment specifications. This applies to tall buildings and multiples as well as to detached homes.

### **3.6 Standard Conditions of Draft Approval**

The following conditions are typically requested by ORDC to be included in the conditions of draft approval of any adjacent residential development. These conditions are meant as a guide and are subject to the site specific situation of the proposed development.

1. The Zoning By-law shall require a minimum dwelling setback from the rail right-of-way of 30 metres.
2. The Owner is required to engage a consultant to undertake a noise and vibration analysis for all dwellings within 75 metres of the rail corridor in order to recommend abatement measures necessary to achieve the maximum level limits set by the Ministry of Environment. A noise impact analysis shall be completed for all dwellings within 300 metres of the rail corridor. Upon review and approval of the noise and vibration reports, all recommendations provided should be included in the Subdivision Agreement. These reports, as required, shall be submitted to ORDC for review and a peer review commissioned at the Owner's expense prior to final approval of the development.
3. The Owner shall agree in the Subdivision Agreement to the following, in wording satisfactory to ORDC:
  - a) to construct and maintain an earthen berm at a minimum of 2.0 metres above grade at the property line, having side slopes not steeper than 2.5 to 1, adjoining and parallel to the railway corridor with returns at the ends;
  - b) construct and maintain an acoustic barrier along the top of the berm of a minimum combined height of 4.0 metres above top-of-rail. The acoustic fence is to be constructed without openings and of a durable material weighing not less than 20 kg per square metre of surface area. Other measures may be considered subject to the recommendations of the noise report;

- c) install and maintain a black vinyl chain link fence a minimum of 1.8 metres high along the mutual property line at no cost to ORDC; and,
  - d) that any proposed alterations to the existing drainage pattern affecting Railway property must receive written acceptance from ORDC and be substantiated by a drainage report to the satisfaction of ORDC.
4. The following warning clause shall be included in the Subdivision agreement and included in all Agreements of Purchase and Sale or Lease for each dwelling unit. Provisions must be included in the Subdivision Agreement to ensure that the warning clause survives the release if the Owner's obligations under the subdivision agreement and remains on title:
- “WARNING: the Orangeville-Brampton Railway operates a railway right-of-way within 300 metres of these lands. There may be alterations to or expansions of railway facilities or operations in the future. This expansion may affect the living environment of the residents in the vicinity, notwithstanding the inclusion of any noise and vibration control attenuating measures in the design of the development and individual dwellings. The Orangeville-Brampton Railway or the Town of Orangeville will not be responsible for any complaints or claims arising from the use of, or noise generated from, such facilities and/or operations on, over or under the rail right-of-way.”
5. The Owner shall, through restrictive covenants to be registered on title and included in all Agreements of Purchase and Sale or Lease, provide notice to the public that the safety berm, fencing and vibration measures implemented are not to be tampered with or altered and further that the Owner shall have sole responsibility for and shall maintain these measures to the satisfaction of ORDC.
6. The Owner is required to provide an engineer's or architect's certification to ORDC that the development has been carried out as approved, incorporating the required mitigation measures.

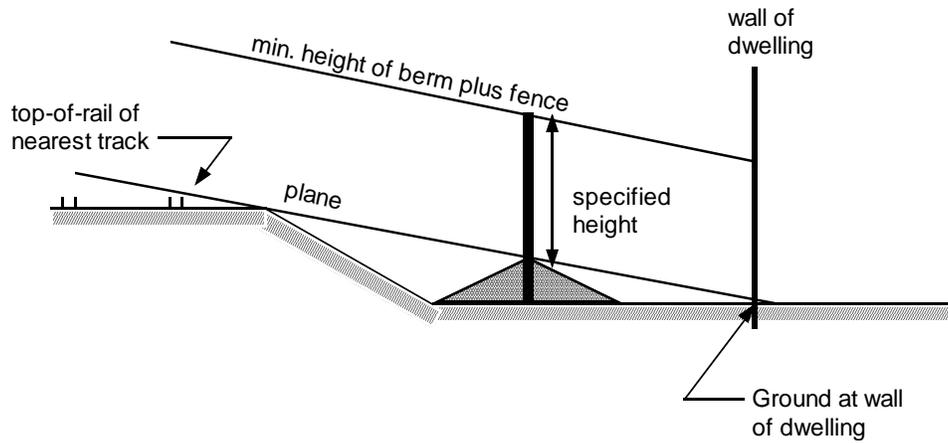
The municipality shall circulate ORDC a copy of the subdivision agreement once completed confirming that the required conditions and warning clauses have been incorporated into it.

#### 4.0 SKETCHES ILLUSTRATING "VARIATIONS FOR SPECIFIC SITE CONDITIONS"

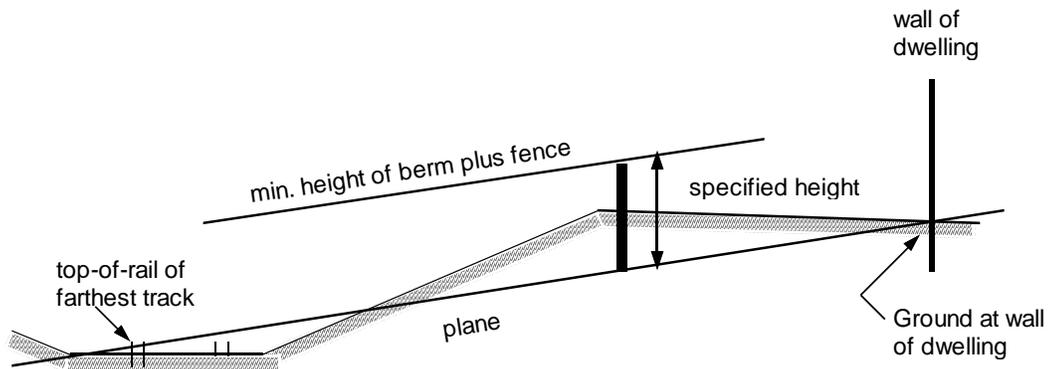
##### A. Height of the Berm and Fence

i. Minimum overall height of the berm and fence where tracks are at a different elevation from houses.

a) Where tracks are above dwellings:

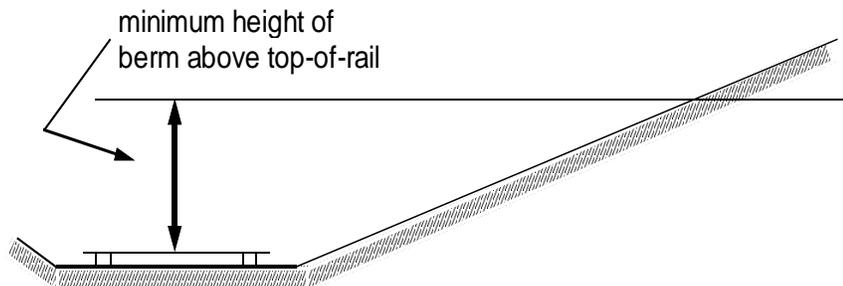


b) Where tracks are below dwellings:

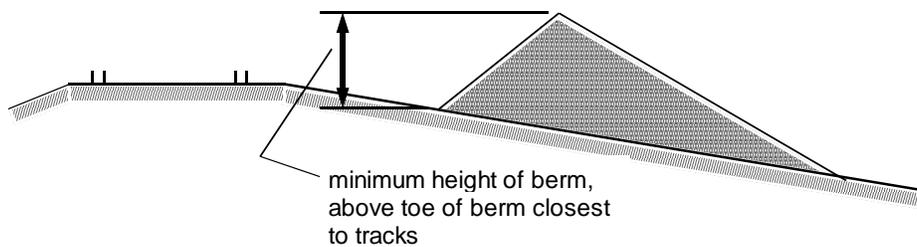


ii. Minimum height of the berm where tracks are at a different elevation from dwellings.

a) Where tracks are depressed:

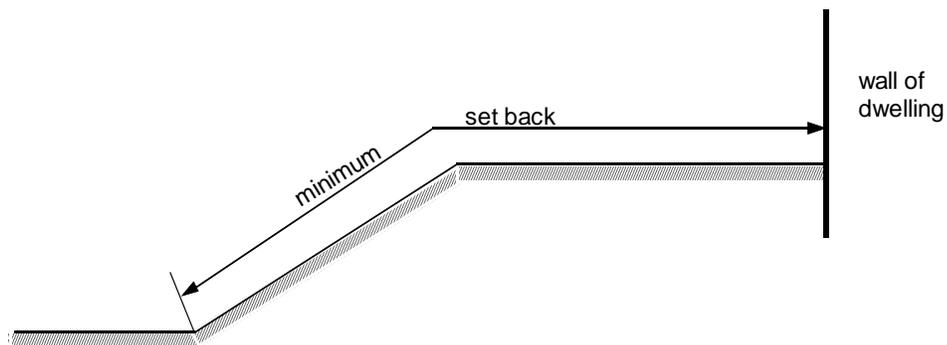


b) Where tracks are elevated:



## B. Setback of Dwellings.

a) Where tracks are in a cut:



Note: In all cases, allowance must be made for potential changes in track configuration.