## **Noise Impact Assessment**

# **Williams Parkway Improvements**

## North Park Drive to Torbram Road

City of Brampton Regional Municipality of Peel

> August 2, 2024 Project: 122-0038

> > Prepared for

## Parsons Inc.





# **Version History**

Version #	Date	Comments
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## Noise Impact Assessment

# **Williams Parkway Improvements**

## North Park Drive to Torbram Road

City of Brampton Regional Municipality of Peel

## 1.0 INTRODUCTION

The City of Brampton plans to improve the Williams Parkway corridor from North Park Drive to Torbram Road. The improvements do not include widening Williams Parkway.

This report summarizes the noise impact from road traffic on Williams Parkway that the existing residences receive. The requirements for the new noise barrier wall have been determined using the requirements of the Ministry of Transportation (MTO)/Ministry of the Environment, Conservation and Parks (MECP) protocol and the Regional Municipality of Peel.

## 2.0 ENVIRONMENTAL NOISE GUIDELINES

This section discusses the guidelines and criteria to be used in the noise impact assessment.

## 2.1 MECP/MTO PROTOCOL

The MECP does not have noise guidelines specifically relating to the retrofit of noise barrier walls along existing roadways. However, the MECP does have a protocol with the MTO relating to Provincial Highway Expansions. The MTO developed Quality & Standards Directive A-1 based on the requirements outlined in the above protocol. Directive A-1 states that retrofit noise control measures will be considered where noise sensitive receptors (typically the rear yard amenity area associated with residential uses) receive daytime sound levels above 60 dBA and where such noise control measures can reduce the existing daytime sound levels by at least 5 dBA.

MTO has replaced the Quality and Standards Directive A-1 with the Environmental Guide for Noise. Appendix B contains the noise barrier retrofit policy. The policy is consistent with the earlier directive in that noise sensitive receptors must receive daytime sound levels above 60 dBA and that the mitigation measures must provide at least 5 dBA of attenuation for the mitigation measures to be consistent. The objective is to reduce the daytime sound levels in the rear yard amenity areas as close to the provincial sound level objective of 55 dBA as practical.

## 2.2 REGIONAL MUNICIPALITY OF PEEL

The Region of Peel Corporate Policy Manual has a section on Noise Attenuation Walls (ref.6). The Region of Peel policy indicates that for local improvement or retrofit noise barrier walls to be considered, the daytime sound level at noise sensitive receptors must exceed 60 dBA. As per the MECP/MTO protocol, the noise barrier wall must be shown to provide at least 5 dBA of attenuation. Unlike the protocol, a specific sound level objective is not explicitly provided within the guideline.

## 3.0 NOISE SENSITIVE AREAS

Land uses designated as noise sensitive by the MECP/MTO consist of residential developments, hospitals, nursing/retirement homes, etc. Figures 2 to 9 identify the receptor locations which were analyzed in detail. These residential dwellings are representative of the noise sensitive areas within the study area, in accordance with Section 7.1 of the MTO Noise Guide. Other dwellings with similar setback and orientation to the noise source will receive similar sound levels and noise impacts. Dwellings further removed from the roadway will receive lower sound levels due to increased distance attenuation.

Receptor locations were identified on drawings provided by Parsons Inc. The receptor locations were confirmed during a site visit to the study area.

## 4.0 NOISE IMPACT ASSESSMENT

## 4.1 TRAFFIC DATA

Existing and future traffic information for Williams Parkway was provided by Parsons Inc. AM and PM peak traffic volumes were provided for multiple sections of Williams Parkway through the study area. Since the differences in traffic volume for the smaller sections between major roadways, the volumes at the major roadways were used. The minor traffic volume differences have no impact this noise impact assessment. The 24-hour volumes were calculated by adding the AM and PM peak volumes and multiplying by 5. This assumes that approximately 10% of the total traffic volume occurs during the peak hour.

Information regarding the percentages of heavy trucks for the AM and PM peaks was also provided by Parsons Inc. The average of the AM and PM peak truck percentage was used in to complete the noise impact assessment. It was assumed that the percentage of medium trucks is the same as the percentage of heavy trucks.

Hourly traffic counts were also provided by Parsons Inc. The hourly counts were used to calculate a day/night traffic volume split of 85%/15%. This day/night split was used for all sections of Williams Parkway for both the existing and future scenarios.

The road traffic data is summarized in Table 1. Road traffic data correspondence is included as Appendix A.

## 4.2 PROCEDURE

Daytime sound levels were calculated using STAMSON V5.04-ORNAMENT, the computerized road traffic noise prediction model of the MECP. This is an accepted approach by the MTO, as outlined in their Environmental Office Manual Technical Areas – Noise.

Based on the traffic data, daytime sound levels were calculated at each receptor location. The receptor location was selected in the rear yard amenity area in accordance with the guideline requirements. The actual receptor location used in the analysis is as described in MECP Publication NPC-300, "Environmental Noise Guideline - Stationary and Transportation Sources - Approval and Planning". The point of assessment is:

- 3 m from the rear facade of the dwelling;
- 1.5 m above grade; and
- aligned with the midpoint of the rear facade.

Since the ambient sound environment in the vicinity of the noise sensitive areas is dominated by road traffic on Williams Parkway, noise from other roadways, such as Dixie Road was ignored in the assessment. This is a conservative approach since, in the noise impact assessment, the inclusion of Dixie Road would tend to reduce the significance of the sound from Williams Parkway. However, the major roadways within the study area (i.e., North Park Drive, Dixie Road, Bramalea Road and Torbram Road) carry significant traffic volumes which result in the receptors in the vicinity of these other major roadways receiving higher sound levels than those outlined herein.

## 4.3 RESULTS

Table 2 shows, for each receptor, the existing and the future daytime sound levels. The existing and future daytime sound level is generally above 60 dBA since there are no existing noise walls. Some receptors are setback further from Williams Parkway due to natural buffers (such as walkways and green space) where the existing and future daytime sound levels do not exceed 60 dBA.

Since the daytime sound levels exceed 60 dBA without noise mitigation at many locations, noise barrier walls are needed in accordance with the retrofit policies of the MTO and the Region of Peel.

## 4.4 NOISE MITIGATION

As outlined herein, noise mitigation measures need to be considered for receptors where the daytime sound level is greater than 60 dBA. Noise barrier walls must be shown to provide at least 5 dBA of attenuation to be implemented. In accordance with the MTO policy, the objective is to mitigate the daytime sound levels as close to the provincial objective of 55 dBA as possible.

In addition to the acoustical performance requirements, other factors must also be considered in determining the noise barrier walls that will be provided. These other factors include:

- economic feasibility;
- municipal By-law restrictions;
- aesthetics and streetscape; and
- constructability.

People's perception to increases and decreases in sound level also must be considered. Changes of 0 to 3 dBA are not perceptible to most people and the impact of this change is nil. Changes of 4 to 5 dBA are noticeable to most people and the impact is considered low. Changes of 6 to 9 dBA are perceived to be almost twice as or half as loud and the impact is medium. Changes of 10 dB and above are perceived as a doubling of loudness or greater and the impact is considered high.

To mitigate the daytime sound levels to below 60 dBA and to provide at least 5 dBA of sound attenuation, as is required by the policies, minimum 2.0 high sound barrier walls are recommended. This recommended height is relative to the existing grade elevation at the proposed sound barrier location and will provide a uniform noise wall height. Table 2 also shows the elevation difference between the top of the noise wall and the centreline elevation of Williams Parkway.

The locations where sound barriers are recommended are shown on Figures 9 to 15. The sound barriers are shown conceptually and their final position can be adjusted somewhat to accommodate the final design. However, the sound barrier wall should be placed 0.3 m from the property line on the City Right of Way Side. In addition, the extent of the recommended sound barriers shown on the figures needs to consider where they end. To protect all of the rear yard amenity areas, at the ends of the sound barriers, they can either return to entirely eliminate any view to Williams Parkway from the rear yard or, in some cases, they can extend beyond the rear yard being protected. Typically, we recommend the extension be three time the depth of the rear yard being protected. The final sound barrier requirements (height and extent) can be confirmed once detailed design information and the final sound barrier locations are known.

Table 2 shows the resultant daytime sound level accounting for the recommended noise wall heights and the amount of sound reduction provided relative to the existing unmitigated daytime sound level.

To meet MECP requirements, noise barrier walls must be of solid construction, with no holes, gaps or cracks and must have a minimum surface density of 20 kg/m<sup>2</sup>. A variety of materials are available, including wood, masonry, composites, etc.

In accordance with Peel Region requirements, "local improvements or retrofit noise walls abutting arterial and collector roads shall be constructed of either masonry, wood or approved composite materials with due consideration to streetscape, and future maintenance requirements at the discretion of the municipality" (Ref.6).

## 5.0 CONSTRUCTION NOISE

Construction noise is temporary noise and depends on the type of work required. The impact of construction noise depends on the type of equipment used, number of pieces of equipment, time and duration of operation and the proximity to noise sensitive receivers in question.

## 5.1 RECOMMENDATIONS

- The applicable noise control by-laws must be obeyed. Exemptions, where required, will be applied for through the municipality and, if granted, included in the contract documents.
- General noise control measures will be referred to, or placed into contract documents. A noise control section should be included in any contract where noise sensitive areas have been identified during the Environmental Assessment process. This section should contain the following standard constraints addressing construction equipment operation and maintenance:
  - Equipment Maintenance: Equipment shall be maintained in an operating condition that prevents unnecessary noise, including but not limited to non-defective muffling systems, properly secured components and the lubrication of moving parts.
  - Equipment Operation: Idling of equipment shall be restricted to the minimum necessary to perform the specified work.

Additional noise constraints may be included at the discretion of the Environmental Planner. They could include, for example, the siting of the contractor's yard.

- Any initial complaint from the public will require verification that the general noise control measures agreed to are in effect. Any noise concerns will be investigated, the contractor warned of any problems, and the contract enforced.
- Notwithstanding compliance with the "general noise control measures", a persistent complaint
  will require a contractor to comply with the MOE sound level criteria for construction equipment
  contained in the MOE Model Municipal Noise Control By-law. Subject to the results of field
  investigation, alternative noise control measures will be required, where these are reasonably
  available.

## 6.0 CONCLUSION

Future sound levels at many of the existing dwellings adjacent to Williams Parkway within the study area exceed 60 dBA. Thus, noise mitigation is needed to reduce the daytime sound level in accordance with the retrofit policies of the MTO and the Region of Peel. To mitigate the daytime sound levels, 2.0 m high sound barriers, relative to the existing grade at the proposed sound barrier location, are recommended where the future daytime sound levels are predicted to exceed 60 dBA.

## 7.0 REFERENCES

- 1. "MTO/MOE Protocol Dealing in Noise Concerns of New Highway Projects", Ontario Ministry of Transportation/Ontario Ministry of the Environment, 1986.
- 2. "Directive QST A-1 (Noise Policy and Acoustic Standards for Provincial Highways)", Ontario Ministry of Transportation, 1992.
- 3. "Environmental Guide for Noise", Ontario Ministry of Transportation, October 2006.
- 4. PC STAMSON 5.04, "Computer Program for Road Traffic Noise Assessment", Ontario Ministry of the Environment.
- 5. "Environmental Office Manual Technical Areas Noise", Ontario Ministry of Transportation, 1992.
- 6. "Noise Attenuation Walls Corporate Policy Manual Noise Attenuation Barriers", Region of Peel Policy No: W30-04, June 13, 1996.

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## TABLE 1ROAD TRAFFIC VOLUME DATA

Section of Williams	Existing 24	Ultimate	Ultimate % Trucks		Day/Night	Posted
Parkway	Hour Volume <sup>(1)</sup>	24 Hour Volume <sup>(1)</sup>	Heavy <sup>(2)</sup>	Medium <sup>(3)</sup>	Split <sup>(4)</sup>	Speed Limit (kph)
East of Howden	20 295	22 065	2.5	2.5	85/15	50
West of Dixie	19 800	21 535	2.5	2.5	85/15	60
East of Dixie	18 345	19 920	5.5	5.5	85/15	60
West of Bramalea	17 870	19 300	5	5	85/15	60
East of Bramalea	15 570	16 885	3.5	3.5	85/15	60
West of Torbram	13 975	15 110	4.5	4.5	85/15	60

Notes:

(1) Calculated from AM and PM Peak hour volumes provided by Parsons.

(2) Average of the AM and PM Peak hour heavy truck percentages.

- (3) Medium truck percentage assumed to be the same as the heavy truck percentage.
- (4) Day is the percentage of road traffic that occurs between 0700 and 2300 hours. Night is the percentage of road traffic that occurs between 2300 and 0700 hours.

		Future L <sub>eq Day</sub> (dBA)		Sound Level		
Location	Existing L <sub>eq Day</sub> (dBA) <sup>(1)</sup>	Without Noise Wall	With Recommended Noise Wall <sup>(2)</sup>	Reduction Provided by Noise Wall <sup>(2)</sup> (dBA)	Noise Wall Height (m) <sup>(3)</sup>	
R1	57	57				
R2	60	60 <sup>(4)</sup>	55	5	2.0/2.7	
R3	57	57				
R4	60	60 <sup>(4)</sup>	54	6	2.0/2.8	
R5	61	61	55	6	2.0/2.5	
R6	58	58	53	5	2.0/2.6	
R7	62	62	56	6	2.0/3.1	
R8	63	63	58	6	2.0/3.0	
R9	64	64	58	6	2.0/2.5	
R10	64	64	58	6	2.0/2.2	
R11	62	62	58	5	2.0/2.2	
R12	61	61	55	7	2.0/2.8	
R13	64	64	59	6	2.0/2.4	
R14	64	64	58	6	2.0/2.4	
R15	62	63	57	6	2.0/3.0	
R16	62	62	57	6	2.0/2.3	
R17	58	58				
R18	60	60 <sup>(4)</sup>	55	5	2.0/2.8	
R19	65	65	59	6	2.0/2.8	
R20	62	62	56	6	2.0/2.1	
R21	63	64	58	6	2.0/2.5	
R22	63	64	58	6	2.0/2.6	
R23	63	63	58	6	2.0/2.6	
R24	63	64	58	6	2.0/3.1	
R25	58	59				
R26	60	60				

.../cont'd

		Future L <sub>eq Day</sub> (dBA)		Sound Level	
Location	Existing L <sub>eq Day</sub> (dBA) <sup>(1)</sup>	Without Noise Wall	With Recommended Noise Wall <sup>(2)</sup>	Reduction Provided by Noise Wall <sup>(2)</sup> (dBA)	Noise Wall Height (m) <sup>(3)</sup>
R27	59	60			
R28	60	61	55	6	2.0/3.0
R29	61	61	56	6	2.0/2.5
R30	60	61	56	5	2.0/2.7
R31	61	61	56	5	2.0/2.2
R32	60	61	56	5	2.0/2.4
R33	65	65	58	7	2.0/2.1
R34	64	65	58	7	2.0/2.2
R35	63	64	58	6	2.0/1.7
R36	64	65	58	6	2.0/2.2
R37	65	65	60	6	2.0/2.0
R38	62	62	57	5	2.0/2.0
R39	64	64	59	5	2.0/2.1
R40	61	62	57	5	2.0/2.3
R41	61	61	55	6	2.0/2.3
R42	61	61	56	5	2.0/2.4
R43	57	57			
R44	60	61	56	5	2.0/2.3
R45	58	58			
R46	60	60			
R47	57	57			

## TABLE 2 NOISE ASSESSMENT RESULTS (continued)

Notes:

(1) Existing daytime sound levels account for existing noise walls where present.

(2) Where entry is blank, a noise barrier wall is not required.

(3) Noise wall height is the height of the actual noise wall (difference between existing grade at base of the wall and the top of the wall) / the elevation difference between the top of the recommended noise wall and the centreline of Williams Parkway at the receptor location.

(4) Predicted sound level exceeds 60 dBA by a fraction of a dBA.

## TABLE 3 APPROXIMATE LENGTH OF RECOMMENDED NOISE WALLS

Road Section	North Side (m)	South Side (m)	Total Length (m)	Figure
Newcastle Park to Dixie	140	285	425	9
Dixie to Mansfield	515	435	950	10
Mansfield to MacKay	220	40	260	11
MacKay to Bramalea	375	-	375	12
Bramalea to Glen Forest Park North	175	405	580	13
Glen Forest Park North to Graymar	350	480	830	14
Graymar to Torbram	-	360	360	15
Totals	1775	2005	3780	





VALCOUSTICS	<sup>Title</sup> Study Area	Date Aug. 2, 2024	Figure
Canada Ltd.	Project Name Williams Parkway Improvements	Project No. 122-0038	2





VALCOUSTICS	Title Receptors	Date Aug. 2, 2024	Figure	
Canada Ltd.	Project Name Williams Parkway Improvements	Project No. 122-0038	4	



VALCOUSTICS	Title Receptors	Date Aug, 2, 2024	Figure
Canada Ltd.	Project Name Williams Parkway Improvements	Project No. 122-0038	5



VALCOUSTICS	Title Receptors	Date Aug. 2, 2024	Figure
Canada Ltd.	Project Name Williams Parkway Improvements	Project No. 122-0038	6



VALCOUSTICS	Title Receptors	Date Aug. 2, 2024	Figure
Canada Ltd.	Project Name Williams Parkway Improvements	Project No. 122-0038	7



VALCOUSTICS	Title Receptors	Date Aug. 2, 2024	Figure
Canada Ltd.	Project Name Williams Parkway Improvements	Project No. 122-0038	8





Title Recommended Sound Barriers	Date Aug. 2, 2024	Figure
Project Name Williams Parkway Improvements	Project No. 122-0038	9





Title Recommended Sound Barriers	Date Aug. 2, 2024	Figure
Project Name Williams Parkway Improvements	Project No. 122-0038	10





5	Title Recommended Sound Barriers	Date Aug. 2, 2024	Figure
d.	Project Name Williams Parkway Improvements	Project No. 122-0038	11





	Title Recommended Sound Barriers	Date Aug. 2, 2024	Figure
-	Project Name Williams Parkway Improvements	Project No. 122-0038	12





**Recommended Sound Barriers** Project Name Williams Parkway Improvements Aug. 2, 2024

Date

Project No.

122-0038

13

Figure









	Title Recommended Sound Barriers	Date Aug. 2, 2024	Figure
-	Project Name Williams Parkway Improvements	Project No. 122-0038	15

# APPENDIX A ROAD TRAFFIC DATA

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Sensitive

# Williams Parkway EA Heavy Vehicles %



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	1342 ( <b>2022</b> ) ← ↓ ↓ ↓ 61 (60) 971 (161	<b>4)</b> 815 (1471) ← ↓ └→ ↓ 110 (86) 695 (1282)	848 (1337) <b>4</b> (10) 823 (1332)	802 (1308) <b>Г</b> 7 (42) 791 (	<b>1333)</b> 799 <b>(1364) ↔ ↓ ↔ ↓</b> 25 <b>(4)</b> 678 <b>(1405)</b>
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# APPENDIX B

## MTO NOISE BARRIER RETROFIT POLICY



## **MINISTRY OF TRANSPORTATION**

# **APPENDIX B:**

# **NOISE BARRIER RETROFIT POLICY**

**Environmental Guide for Noise** 

Version: April 2007

# VERSION HISTORY

VERSION #	DATE	DESCRIPTION OF MAJOR CHANGE

## <u>Policy</u>

On February 8, 1977, the Ministries of Housing (now Ministry of Municipal Affairs and Housing) and Transportation and Communications (now Ministry of Transportation (MTO)) jointly released a policy statement regarding noise associated with major freeways. On May 29, 1979, the Ministry of Housing released a supplementary guideline for noise on behalf of the Government.

In keeping with Government policy, MTO developed a Retrofit Noise Barrier Program to alleviate noise impacts on existing noise sensitive areas adjacent to existing freeways. This policy is based on the principle that existing Noise Sensitive Areas (NSAs) exposed to high noise levels due to their proximity to a freeway should receive some consideration. Similarly, to avoid future noise problems, developers must design new residential areas in an acoustically sensitive manner in accordance with the guidelines issued by the Ministries of Municipal Affairs and Housing and Environment and in consultation with the affected municipality.

It is not the intent of the retrofit program to provide noise barriers at all sites on the Candidate Sites for Noise Barrier Retrofit List. Some sites may not be constructed for a number of reasons such as the inability to achieve perceptible attenuation, excessive costs to provide mitigation for a few homes, or physical limitations. Full implementation of this policy is dependent upon budget allocations and subject to prioritization of candidate sites.

- 1. NSAs for Retrofit
  - a) NSAs shall be interpreted to mean areas that are either:
  - Adjacent to existing freeways and are existing residential areas where approvals were received under the *Planning Act* prior to February 8, 1977. Except as noted below, residential developments approved after the announcement in 1977 of the policy for noise and new residential developments adjacent to freeways do not qualify;
  - Adjacent to new freeways and are existing residential developments where approvals were received under the *Planning Act* prior to the designation of the proposed freeway route under the *Public Transportation and Highway Improvement Act*; or
  - Adjacent to expanding freeways and are existing residential developments where approvals were received under the *Planning Act* prior to the implementation of the highway expansions and where noise control measures were not required at the time of highway construction.

b) The majority of the residences in the area must be zoned as residential and taxed as principal residences to ensure that funds are directed to areas of greatest need (i.e. principal residences).

c) There is no minimum number of residences that define a NSA. Therefore, all noise sensitive land uses, regardless of size or location (urban or rural), should be assessed for application of noise control measures.

d) Discretion should be exercised for situations where there is a potential for the zoning to be changed from a noise sensitive land use to a non-sensitive land use.

e) NSAs must have an Outdoor Living Area (OLA) associated with the residential unit (see Appendix A).

f) The following land uses, with OLAs associated with them would qualify as NSAs under the above criteria:

- Private homes such as single-family residences;
- Townhouses;
- Multiple unit buildings, such as apartments with OLAs for use by all occupants; and
- Hospitals, nursing homes for the aged, where there are OLAs for the patients.
- g) Land uses listed below, by themselves do not qualify as NSAs:
- Apartment balconies above ground floor;
- Educational facilities (except dormitories with common OLAs);
- Churches;
- Cemeteries;
- Parks and picnic areas that are not inherently part of a NSA;
- Day care centres;
- All commercial;
- All industrial.

### 2. <u>Candidate Site</u>

This includes NSAs, which meet the criteria for inclusion on the Candidate Sites for Noise Barrier Retrofit List. This does not necessarily mean that the site will satisfy all warrants for noise barrier construction.

3. <u>Retrofit Barrier Site</u>

This includes barrier candidate sites that satisfy all warrants for construction and therefore qualify for inclusion on the capital construction program when priorities dictate and funds become available.

4. Noise Level

a) Noise levels are the 24-hour equivalent sound level ( $L_{Aeq 24 hr}$ ) expressed on the A-weighted decibel scale (dBA).

b) Noise predictions will be calculated using the United States Federal Highway Administration (FHWA) Noise Prediction Model. The Ministry does not rely on the use of noise measurements for the reasons set out in Section 4.3.1.3. The Ministry accepts the following computerized models:

- STAMINA 2.0,
- Traffic Noise Model (TNM<sup>©</sup>), Version 2.5
- Stamson<sup>©</sup>, Version 5.0, or
- other versions or programs subsequently approved for use by the Ministry.

c) When setting retrofit barrier priorities and undertaking noise barrier design the traffic volume shall be the higher of the Average Annual Daily Traffic (AADT) or Summer Average Daily Traffic (SADT) volume.

d) Vehicle speeds used in the evaluation of impacts shall be the posted speed limits.

e) Commercial vehicle percentage shall be those available from Regional Traffic Sections/Offices. Where unknown, the percentage can be assumed to be 20% (15% heavy trucks and 5% medium trucks).

f) Receivers shall be located in the OLA.

### 5. <u>Selection of Candidate Sites</u>

- a) The Ministry shall consider retrofit noise control measures for existing freeways where NSAs receive noise levels in excess of 60 dBA L<sub>Aeq24 hr</sub>, if such measures can reduce the noise levels by at least 5 dBA averaged in the first row.
- b) A benefit/cost analysis will be carried out for all candidate sites and will be used to establish a priority listing. The analysis will account for the absolute sound level, noise barrier insertion loss, number of NSAs and the barrier cost.
- c) Sites will be selected for inclusion on the multi-year capital construction program primarily on a priority basis.
- d) Retrofit barriers should be scheduled as part of another capital construction project only where there is a significant cost savings or where a serious construction problem is avoided. Only sites, which are already on the multi-year capital construction program, should be considered for possible inclusion with another project.

#### 6. <u>Mitigation Standards</u>

- a) The objective is to reduce noise levels as much as is technically and economically practicable towards the provincial noise level objective of 55 dBA.
- b) Noise barriers must achieve a minimum barrier insertion loss of 5 dBA averaged in the first row NSAs.
- c) Noise barrier retrofit sites approaching or exceeding 70 dBA, should be designed to provide additional attenuation, where technically feasible, and not economically prohibitive.
- d) When designing noise control measures, input on aesthetic treatments should be sought from the Regional Environmental Units/Offices. Consideration should be given to aesthetic impacts when considering increases in barrier height.

#### 7. Parallel Barriers

When it can be shown that a barrier will cause detrimental noise reflections to the opposing side of the highway, then the parallel sites should be constructed at the same time. Otherwise, barriers should be built in priority sequence. To reduce reflections, consideration should be given to specifying the use of absorptive noise barrier materials.

- 8. <u>Reconstruction/Maintenance of Barriers</u>
  - a) Previously constructed Ministry noise walls and additional walls on existing berms, will be reprioritized when the following criteria are met:
    - an existing barrier did not achieve a 5 dBA attenuation averaged over first row NSAs;
    - ii) there is a serious existing problem;
    - iii) there is ongoing public concern;
    - iv) a new barrier could reduce noise levels by an additional 3 dBA (over existing conditions) averaged over first row NSAs; and
    - v) all other warrants can be met.
  - b) When a barrier is to be completely rebuilt it shall be designed and constructed to current Ministry standards for noise barriers. Prior to reconstruction, an acoustical analysis must be conducted to determine the most effective location and height of the new barrier.
  - c) Where visually justified, and funds are available, consideration should be given to improving aesthetically undesirable features in existing barriers. These improvements could include, but are not limited to screening by vegetation, painting and texturing of barrier panels.

## 9. <u>Non-Barrier Noise Control Measures</u>

Each MTO region is encouraged to consider all forms of noise control measures within their Rights-of-Way when assessing a problem and is allowed the flexibility to make recommendations concerning this type of measure based on the specific circumstances associated with the project.

#### 10. Updating Noise Predictions

All acoustical reports are valid until site conditions change significantly. For example, if project construction is delayed, the noise barrier design recommendations should be re-examined; including using updated road traffic volume information.

### 11. Updating Candidate Sites For Noise Barrier Retrofit List

The Ministry maintains a Candidate Sites for Noise Barrier Retrofit List. The list is updated on an annual basis to remove constructed sites, add new sites and to reprioritize sites based on new road traffic volumes and site conditions.