

TECHNICAL NOTE

PRINCE OF WALES DR. DEVELOPMENT

Railway Proximity
Assessment Review

SYSTRA Canada Reference: 24619-10-GETN-0001_A



VIA Rail Canada

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Table of Contents

1. INTRODUCTION	1
1.1 Scope	1
1.2 References, norms, and regulations	3
2. FEDERAL REGULATIONS	4
3. REVIEW OF THE RAILWAY PROXIMITY IMPACTS TO THE PROPOSED DEVELOPMENT	4
3.1 Railway operations.....	4
3.2 Railway setback	4
3.3 Ground-born vibration	4
3.4 ground-born noise.....	5
3.5 Surface transportation noise	5
3.6 Noise barrier	7
3.7 Stationary noise	9
3.8 Whistling at the crossing	9
3.9 Traffic at the crossing	9
3.10 Fencing	9
4. IMPACTS OF THE CIVIL WORKS TO THE RAILWAY CORRIDOR	9
4.1 Stormwater management.....	9
4.2 Water, sanitary, and storm servicing.....	10
4.3 Demolition and excavation works	10
5. CONCLUSION AND RECOMMENDATIONS	10

List of Tables

Table 3-1: Sound Level Criteria for Residential Areas (Rail).....	6
Table 3-2: Noise Levels Presented in the Transportation Noise and Vibration Assessment	6
Table 3-3: Sound Barrier Heights	7

List of Figures

Figure 1-1: Site Location (Source: Canadian Rail Atlas)	1
Figure 1-2: Railway Crossing at Prince of Wales Dr. (Facing North)	2
Figure 3-1: Vibration Monitoring Points	5
Figure 3-3: FCM/RAC's Standard Noise Mitigation Measure	7
Figure 3-4: Elevated Railway Track (Facing North)	8
Figure 3-6: 3D Rendering of the Proposed Residential Development	8
Figure 3-7: Receptor's Line of Sight	9

1. INTRODUCTION

1.1 SCOPE

SYSTRA Canada has been mandated by VIA Rail (VIA) to perform a railway proximity compliance review of for the proposed Prince of Wales Dr. Development to current Canadian railway safety and regulatory requirements.

The site of the proposed residential development is boarded to the east by Rideau River, to the south by VIA's railway corridor between MP 5.8 and MP 5.9 of Beachburg subdivision, to the west by a general industrial, and to the north by a church. The proposed development will preserve the existing dwelling at 2009 Prince of Wales and will demolish the existing detached dwelling and garage at 2013 Prince of Wales and subdivide the remaining land creating 6 new residential lots.



Figure 1-1: Site Location (Source: Canadian Rail Atlas)



Figure 1-2: Railway Crossing at Prince of Wales Dr. (Facing North)

SYSTRA Canada's scope of work includes the review of the following documents received from VIA on January 7, 2025 and the subsequent documents revised based on SYSTRA Canada's comments, and other documents (if required) to ensure that the proposed development located in proximity of VIA's mainline track comply with Canadian federal railway regulatory requirements.

- Drawing C1 « Site Servicing Plan » for « Proposed 7 Lot Development 2009-2013 Prince of Wales Dr » prepared by D.B. Gary Engineering Inc. on August 2nd, 2024.
- Drawing C2 « Grading Plan » for « Proposed 7 Lot Development 2009-2013 Prince of Wales Dr » prepared by D.B. Gary Engineering Inc. on August 2nd, 2024.
- Drawing C3 « Existing Conditions & Decommissioning Plan » for « Proposed 7 Lot Development 2009-2013 Prince of Wales Dr » prepared by D.B. Gary Engineering Inc. on August 2nd, 2024.
- Drawing C4 « Erosion & Sedimentation Plan » for « Proposed 7 Lot Development 2009-2013 Prince of Wales Dr » prepared by D.B. Gary Engineering Inc. on August 2nd, 2024.
- Drawing C5 « Plan & Profile STA 0+000.0 TO 0+052.5 » for « Proposed 7 Lot Development 2009-2013 Prince of Wales Dr » prepared by D.B. Gary Engineering Inc. on August 2nd, 2024.
- Drawing C6 « Details & Schedules » for « Proposed 7 Lot Development 2009-2013 Prince of Wales Dr » prepared by D.B. Gary Engineering Inc. on August 2nd, 2024.
- Drawing C7 « Notes » for « Proposed 7 Lot Development 2009-2013 Prince of Wales Dr » prepared by D.B. Gary Engineering Inc. on August 2nd, 2024.
- Topographic Plan of Survey of Lot 12 and Part of Lot 11 Registered Plan 404 City of Ottawa (File No. 531-20) prepared by Farley, Smith & Denis Surveying Ltd. on March 17, 2021 and revised November 24, 2022.
- Landscape Plan (PL-1) dated 2024-07-25 prepared by Arcadis.
- Concept Site Plan (A101) prepared by Jane Thompson Architect on July 16, 2024.
- 2009 & 2013 Prince of Wales Drive Development Viability Assessment dated July 22, 2024.

- Geotechnical Investigation (File No.: 220528) prepared by L R L Engineering in December 2022, revised in April 2024.
- Transportation Noise and Vibration Assessment prepared by Gradientwind Engineers & Scientists on July 23, 2024.
- Transportation Impact Assessment (Ref: R-2022-201) prepared by Novatech in June 2023 and revised in November 2023.
- Site Servicing Study & SWM Report (No. 22055) prepared by D.B. Gary Engineering Inc. on June 29, 2023 and revised on December 8, 2024.

This review does not constitute a review of the design and construction method outside the regulatory compliance assessment. SYSTRA Canada does not warrant or represent that the information contained in the reviewed documents is accurate or complete. Sole responsibility for correct design, details and dimensions shall remain with the party that created the document being reviewed by SYSTRA Canada.

1.2 REFERENCES, NORMS, AND REGULATIONS

The federal references, norms and regulations that SYSTRA Canada used to review the current railway proximity study for the proposed multi-storey buildings were:

- Railway Safety Act R.S.C. 1985, c. 32 (4th Supp.);
- Canadian Transportation Act S.C. 1996, c. 10;
- Canadian Environmental Assessment Act S.C. 2012, c. 19, s. 52;
- Guidance for Evaluation Human Health Impacts in Environmental Assessment: Noise;
- Railway Noise Measurement and Reporting Methodology;
- Guidelines for the Resolution of Complaints Concerning Railway Noise and Vibration.

The other Canadian regulations and guidelines that specify requirements and provide guidance on railway proximity assessment include:

- City of Ottawa Engineering Noise Control Guidelines (ENCG);
- Ontario Ministry of the Environment (MOE) Noise Guideline (NPC-300);
- Ministry of the Environment of Ontario (MOE) Noise Assessment Criteria in Land Use Planning Publication LU-131;
- CN Rail and CP Rail Land Use Guidelines;
- Federation of Canadian Municipalities/Railway Association of Canada (FCM/RAC) Guidelines for New Development in Proximity to Railway Operations (May 2013);
- Canadian Transportation Agency Railway Noise Measurement Reporting Methodology (Catalogue No. TT4-20/2011E-PDF);
- Transit Noise and Vibration Impact Assessment (TNVIA) published by the Department of Transportation of the United States of America.

2. FEDERAL REGULATIONS

Under Section 95.1 of the Canada Transportation Act A.C., 1996, c.10 (CTA), railway noise and vibration must be reasonable. Under Section 95.3 of that same act, on receipt of a complaint made by any person that a railway company is not complying with section 95.1, the Canadian Transportation Agency may order the railway company to undertake any changes in its railway construction or operation that the Agency considers reasonable to ensure compliance with that section.

The rail operations or expansions of Canadian National (CN), Canadian Pacific Railway (CPR), and VIA Rail Canada, along with some shortline operators are regulated by the federal government under the Canadian Environmental Assessment Act (CEAA), the Railway Safety Act, and the Canada Transportation Act (CTA).

3. REVIEW OF THE RAILWAY PROXIMITY IMPACTS TO THE PROPOSED DEVELOPMENT

3.1 RAILWAY OPERATIONS

The railway operation information listed below used by GradientWind Engineers & Scientists for the Transportation Noise and Vibration Assessment for the proposed residential development was provided by VIA on October 27, 2023. However, VIA is planning to increase the operating speed from 45 MPH to 60 MPH.

Train Speeds: Passenger train currently in a 45 MPH zone.

Train Volumes: Passenger currently 16 movements per day.

TrainType: Diesel

Train Configuration: Typically, 1-2 locomotives and up to five (5) train cars.

3.2 RAILWAY SETBACK

The proposed building setback distance is 30m from the railway right-of-way. This meets the minimum 30m setback recommended in FCM/RAC's Guidelines for New Development in Proximity to Railway Operations (as per the guidelines, the setback distance must be measured as a straight-line horizontal distance from the mutual property line to the building face).

3.3 GROUND-BORN VIBRATION

Ground-born vibration generated by repetitive motion of the train wheels on the track is a common concern for buildings in close proximity to a rail line. The vibration of the transit structure excites the adjacent ground, creating vibration waves that propagate through the subsurface materials, and into the foundation of neighbouring buildings.

Human response to ground vibrations is dependent on the magnitude of the vibrations, which is measured by the root mean square (RMS) of the movement of a particle on a surface. Typical units of ground vibration measures are millimeters per second (mm/s), or inch per second (in/s).

As the main vibration source is due to a mainline railway, the 0.14 mm/s RMS (75 dBV) vibration criterion was adopted.



Figure 3-1: Vibration Monitoring Points

According to the data and the analysis presented in the Transportation Noise and Vibration Assessment, the worst-case measured RMS value for events along the property line were found to be 0.51 mm/s (86 dBV). For events along the 30 m setback line, the worst-case RMS value was found to be 0.14 mm/s (75 dBV). Since measured vibration levels do not exceed the criterion of 0.14 mm/s RMS at the potential foundation of the dwellings, concerns due to vibration impacts on the site are not expected.

3.4 GROUND-BORN NOISE

Once ground-born vibrations propagate through the soil and encounter a building, vibrations pass along the structure of the building beginning at the foundation and propagating to all floors and wall. The floors and walls may cause items to rattle, or they may manifest themselves as a rumble, defined as ground-born noise. As the main vibration source is due to a mainline railway, the 35 dBA ground borne noise criterion was adopted.

3.5 SURFACE TRANSPORTATION NOISE

The City of Ottawa's Official Plan, in addition to the ENCG dictate that the influence area must contain any of the following conditions to classify as a surface transportation noise source for a subject site:

1. Within 100m of the right-of-way of an existing or proposed arterial, collector or major collector road; a light rail transit corridor; bus rapid transit, or transit priority corridor
2. Within 250m of the right-of-way for an existing or proposed highway or secondary rail line.
3. Within 300m from the right-of-way of a proposed or existing rail corridor or a secondary main railway line.

4. Within 500m of an existing 400 series provincial highway, freeway or principal main railway line.

Since the proposed development is located within 300m from the right-of-way of VIA Rail's railway corridor, a surface transportation noise analysis is required.

The noise level criteria specified in Engineering Noise Control Guidelines (ENCG) of City of Ottawa and the results of the surface transportation noise analysis presented in the Transportation Noise and Vibration Assessment are shown in the figures below.

Table 3-1: Sound Level Criteria for Residential Areas (Rail)

Type of Space	Time Period	Sound Level Limit Leq (dBA)
Sleeping Quarters	0700 to 2300 hr	40
Sleeping Quarters	2300 to 0700 hr	35
Living/dining, den areas of residences	0700 to 2300 hr	40
Living/dining, den areas of residences	2300 to 0700 hr	40
Outdoor Living Areas (OLA)	0700 to 2300 hr	55
Outside Bedroom Windows and Sleeping Quarters	2300 to 0700 hr	50

Table 3-2: Noise Levels Presented in the Transportation Noise and Vibration Assessment

Receptor Number	Receptor Height Above Grade (m)	Receptor Location	Roadway Noise Level (dBA)		Railway Noise Level (dBA)		Combined Noise Level (dBA)	
			Day	Night	Day	Night	Day	Night
1	4.5	POW — Lot 7 North Façade	63	55	-	-	63	55
2	4.5	POW — Lot 7 West Façade	66	58	56	53	66	59
3	4.5	POW — Lot 7 South Façade	62	54	61	58	64	59
4	4.5	POW — Lot 3 South Façade	51	44	62	58	62	58
5	1.5	OLA — Lot 7 Rear Yard	63	N/a*	61	N/a*	65	N/a*
6	1.5	OLA — Lot 2 Rear Yard	-	-	60	N/a*	60	N/a*
7	1.5	OLA — Lot 3 Rear Yard	-	-	62	N/a*	62	N/a*

Since the railway noise and the roadway noise may occur simultaneously, the combined noise level should be considered.

The result of the analysis indicates that plane of window noise levels will range between 62 and 66 dBA during the daytime period (07:00-23:00) and between 55 and 59 dBA during the nighttime period (23:00-07:00). The highest noise level (66 dBA) occurs at Lot 7, which is nearest and most exposed to Prince of Wales Drive and the VIA Rail corridor.

The noise levels exceed the ENCG criteria requiring the need for upgraded building components. Furthermore, the results indicate that the buildings associated with each lot would require central air conditioning which will

allow occupants to keep windows closed and maintain a comfortable living environment. In addition to ventilation requirements, upgraded building components with a higher Sound Transmission Class (STC) rating will be required to mitigate surface transportation noise. As the OLAs are also expected to exceed the ENCG noise criteria, noise mitigation will also be required for select lots.

3.6 NOISE BARRIER

The noise levels at the rear yards are expected to exceed 55 dBA during the daytime period without a noise barrier. If these areas are to be used as outdoor living areas, noise control measures are required to reduce noise levels to as close as possible to 55 dBA.

For a standard noise mitigation, FCM/RAC's Guidelines for New Development in Proximity to Railway Operations recommends a 3-m-high acoustical fence installed on a 2.5-m-tall earthen berm for building having 30-metre set-back from the right-of-way (ROW) line.

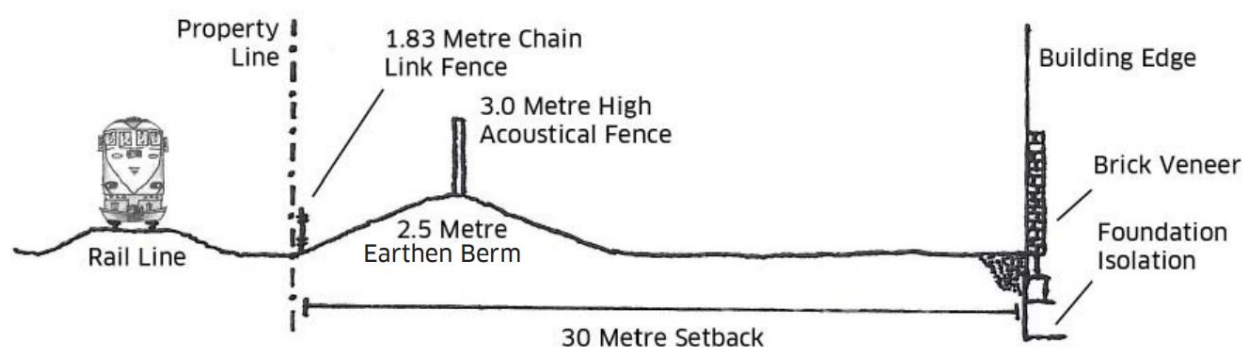


Figure 3-2: FCM/RAC's Standard Noise Mitigation Measure

Generally, noise barriers provide significant noise reductions only when they block the line of sight between the noise source and the receiver.

The figure below illustrates the noise levels with heights of sound barrier implemented at the local grade (bottom of slope).

Table 3-3: Sound Barrier Heights

Receptor Number	Receptor Height Above Grade (m)	Receptor Location	Daytime L_{eq} Noise Levels (dBA)				
			No Barrier	With 2.2 m Barrier	With 3 m Barrier	With 4 m Barrier	With 7 m Barrier
5	1.5	OLA — Lot 7 Rear Yard	63	62	61	61	60

Since the railway track is approximately 6.5 m above the study site's average grade, it was determined by the Transportation Noise and Vibration Assessment that the implementation of a noise barrier is not considered technically, economically, and administratively feasible for the lots backing onto the VIA Rail corridor, and a Warning Clause will be required in all Lease, Purchase and Sale Agreements.



Figure 3-3: Elevated Railway Track (Facing North)



Figure 3-4: 3D Rendering of the Proposed Residential Development

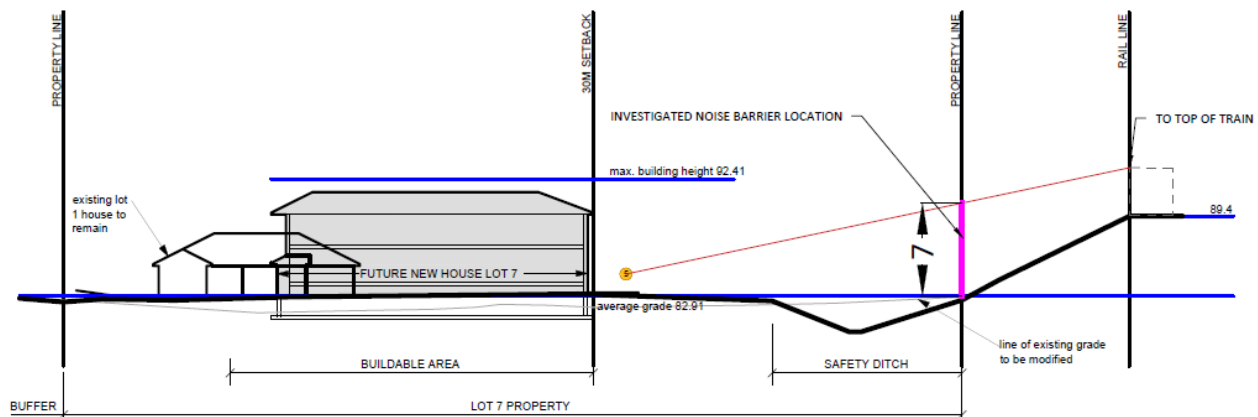


Figure 3-5: Receptor's Line of Sight

3.7 STATIONARY NOISE

Since there is no train station or yard found within 100m from the proposed site, stationary noise analysis for the proposed development was not required.

3.8 WHISTLING AT THE CROSSING

In addition to the surface transportation noise, whistle noise at road crossings shall be considered as contributing to railway noise. As shown in Figure 3.4, since the railway track crossing Prince of Wales Dr. on a grade separation, whistling shall not be used.

3.9 TRAFFIC AT THE CROSSING

Due to the presence of the grade separation at the Prince of Wales crossing, the railway operation should not be impacted due to the proposed 7 lot residential development.

3.10 FENCING

Since the railway track is approximately 6.5 m above the study site's average grade, trespassing may not be an issue. However, fence will be required for delineate the railway right-of-way.

4. IMPACTS OF THE CIVIL WORKS TO THE RAILWAY CORRIDOR

4.1 STORMWATER MANAGEMENT

According to the CN Rail and CP Rail Land Use Guidelines, any alterations to the existing drainage pattern affecting railway property required prior concurrence from the railway.

According to the Site Servicing Study & Stormwater Management Report, the storm sewer system is proposed to outlet near the southeast corner of the property and to the Rideau River, ensuring that water will not flow into the rail corridor. In addition, overland flow does not seem to affect the VIA Rail corridor since the proposed grading directs the emergency overland flow routes towards the Rideau River.

4.2 WATER, SANITARY, AND STORM SERVICING

A 150 mm watermain, connecting to the 400 mm municipal watermain, is proposed to serve the proposed residential development.

A proposed 200 mm sanitary sewer will connect to the existing 250 mm Prince of Wales Drive municipal sanitary sewer.

A proposed 375 mm storm sewer will be installed and outlet to the Rideau River.

The railway track will not be impacted by the construction of these works since they will not cross under the railway corridor.

4.3 DEMOLITION AND EXCAVATION WORKS

According to the geotechnical report LRL (File No.: 220528), the bedrock was found deep. In addition to the 30m railway setback distance. The impacts of the demolishing and the excavation works for the buildings will be less sensitive to the elevated railway track.

5. CONCLUSION AND RECOMMENDATIONS

This section is a summary of SYSTRA Canada's recommendations following its review of the railway proximity study for Prince of Wales Dr. residential development adjacent to VIA's railway mainline between MP 5.8 and MP 5.9 of the Beachburg subdivision.

- 1) "Canadian National Railway" shown on drawings C1, C2, C3, C4 for « Proposed 7 Lot Development 2009-2013 Prince of Wales Dr » and the drawing « Topographic Plan of Survey » needs to be changed to "VIA Rail".
- 2) "Ottawa Road 73" shown on drawing C5 needs to be changed to "Prince of Wales Drive".
- 3) The Railway Noise and Vibration Assessment has been performed based on the railway information provided by VIA on October 27, 2023, with a train operating speed running in the proximity of the site at 45 MPH. According to an email exchange between VIA and SYSTRA Canada on January 24, 2025, VIA is planning to increase the operating speed at the location between MP 5.8 and MP 5.9 of VIA's Beachburg subdivision from 45 MPH to 60 MPH. Please confirm the railway information with VIA and update the railway noise and vibration assessment in cooperating the future train operating speed increase.



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