ENTUITIVE

88 PARK STREET EAST
RAIL SAFETY REPORT
JUNE 2023

For Edenshaw Queen Developments Limited

Authored by:
Jonathan Hendricks, P.Eng.
Julia Pannolino, P.Eng.

Our Project Number:
EN021.02336

TABLE OF CONTENTS

INTRODUCTION

Entuitive was retained by Edenshaw Queen Developments Limited to review the site-specific safety of the development being proposed at 88 Park Street East. The site is located within proximity of the heavy rail corridor to the north and the Hurontario LRT to the east.

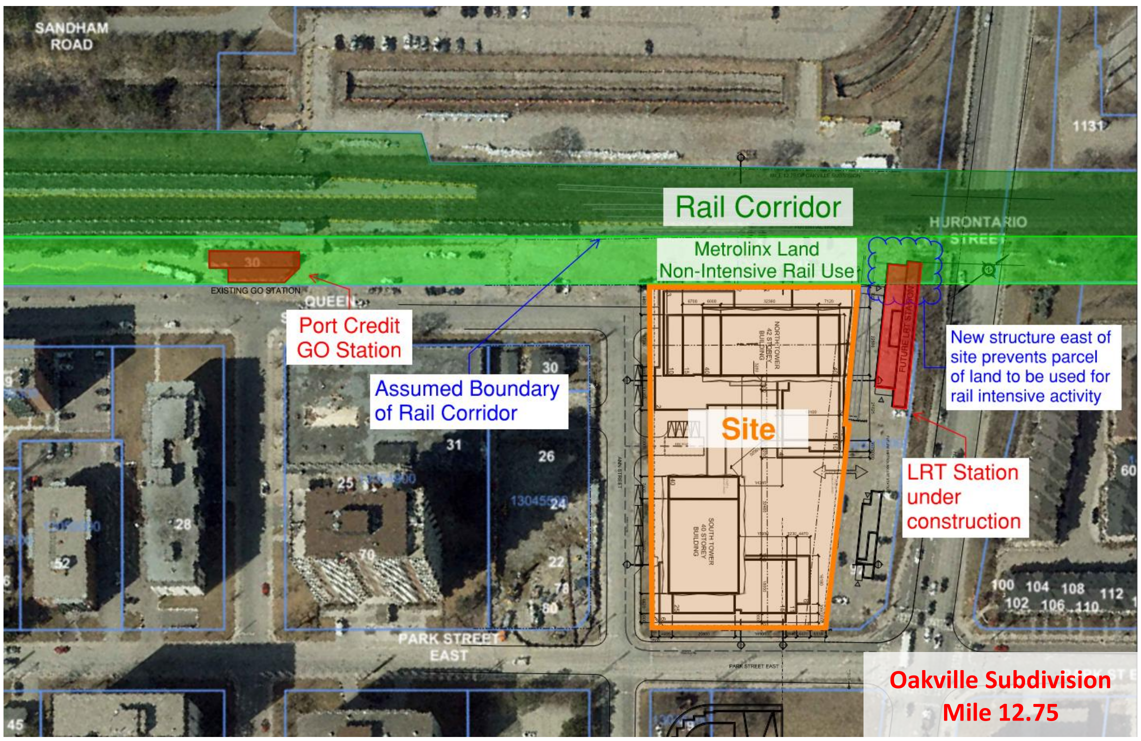
This report is limited to the safety aspects associated with the proximity of the development to rail activity and does not address ground-borne and/or airborne (acoustic) vibration and stormwater which are all dealt with separately.

This rail safety report will review the site-specific safety risks for the development which are associated with the nearby rail corridor. While the purpose of our report is to identify and mitigate the rail safety risks, there remains a residual risk to persons and property. The proposed mitigating measures are limited to the development on the subject site; the mitigating measures do not consider the safety of people or property beyond the subject site or on the rail corridor. The authors of this report assume that the mitigation measures will be competently constructed and adequately maintained.

Focus Area

SITE

The site location is shown in the figure below. To the north of the proposed site is Metrolinx Land, shown in both light and dark green. Looking at the area surrounding the site, to the west is the existing Port Credit GO Station building, and to the east is the Hurontario LRT Station currently being constructed. For these reasons and based upon our experience, we do not believe Metrolinx would construct additional tracks closer to the site property line, outside of the dark green area. We have assumed that the rail corridor is limited to the dark green and the light green area is owned by Metrolinx and will be used for activities other than rail. We have assumed that tracks may be added to the dark green area in the future; there is room for Metrolinx to add one track south of the existing tracks (closer to the development site).



Site Plan

Relationship to the Rail

The site is located within proximity of the heavy rail corridor. All rail information is shown in Appendix A.

Rail	
Rail Corridor	Oakville Subdivision
Classification	Principle Main Line
Mileage at Site Location	12.75
No of Tracks	3 tracks
Speed	Max Passenger: 95mph Max Freight: 60mph It should be noted that immediately west of the development, the posted passenger train speed is 85mph, meaning a passing train would either need to slow down before the development site or begin to speed up at the development site.
Alignment	Straight in the immediate vicinity
Elevation	Slight difference between rail and site, approx. 1.2m
Proposed Development	Mixed-use with majority residential

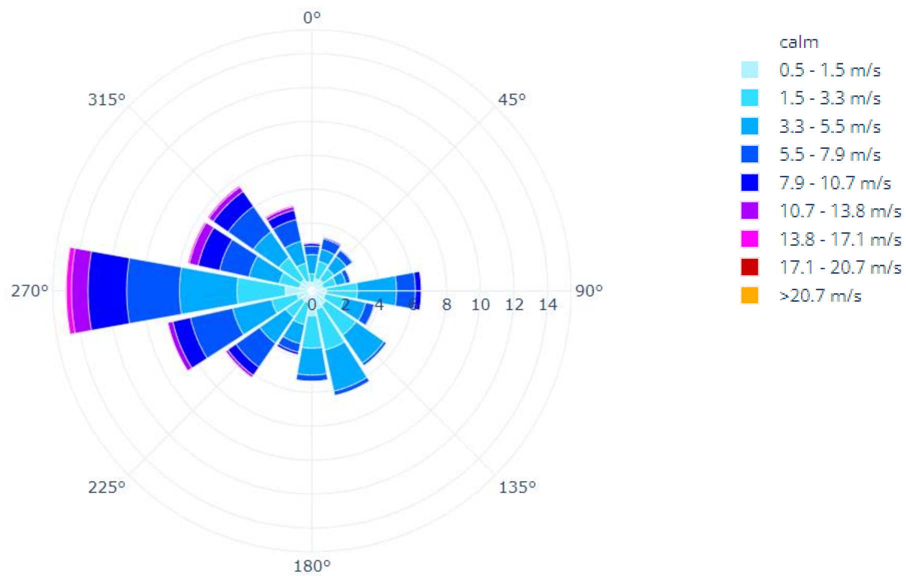
Safety Record of Rail Corridor

Based on data published by the Transportation Safety Board of Canada between the years of 2012-2022 and mileage 2.75-22.75, the frequency of incidents and accidents is shown in the table below. It is important to note that there are no derailments listed.

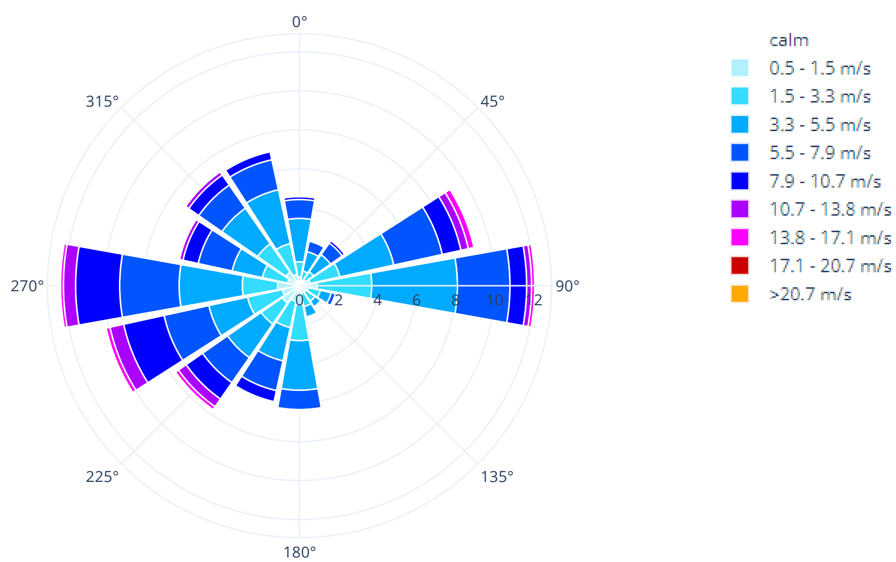
Period Start	2012
Period End	2022
Total Number of Events	5
Total Number of Incidents	2
Total Number of Accidents	3
Breakdown:	
TRESPASSER	3
MAIN-TRACK TRAIN DERAILMENT	0
MOVEMENT EXCEEDS LIMITS OF AUTHORITY	2

Weather

Based on the Wind Rose Diagrams for the years 2004-2018 shown below, the site location has experiences winds generally from the west to the east direction. The data shown below was collected at Toronto Pearson Airport which is approximately 13km north of the site location and Billy Bishop Airport which is approximately 17km east of the site location. Although Billy Bishop Airport is further from the site, it should be considered given the site's proximity to Lake Ontario. Due to the direction of the prevailing winds for this area, any smoke or exhaust coming from the rail corridor may be blown toward the development site.



Wind Rose Diagram – Toronto Pearson Airport



Wind Rose Diagram – Billy Bishop Airport

FCM / RAC PROXIMITY BASELINE REQUIREMENTS

New developments along the rail corridor should be designed and built to provide reasonable protection to the development against rail activities and accidents. The FCM (Federation of Canadian Municipalities) / RAC (Railway Association of Canada) Guidelines set out recommendations for:

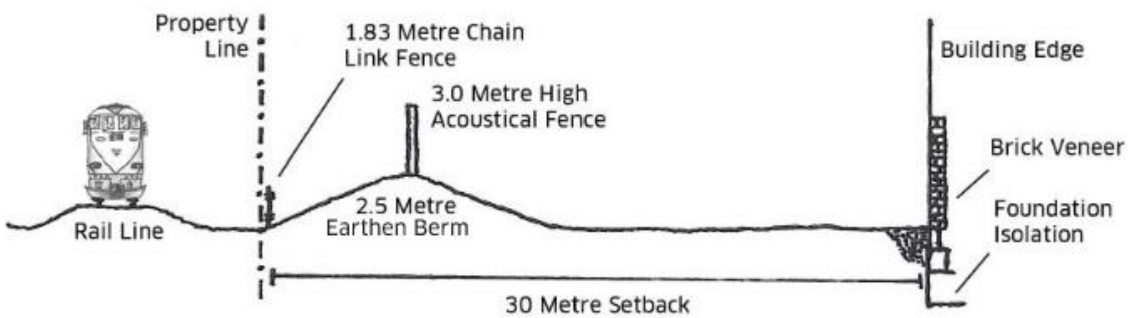
- Safety: Impact from a derailed train, fire, projectile elements, smoke; and
- Comfort: Noise and Vibration

This report deals primarily with Safety Issues.

The FCM/RAC Guidelines recommend the following setbacks:

Classification of line	Setback	Berm Height	Berm Slope
Freight Rail Yard	300m		
Principal Main Line	30m	2.5m	<= 2.5:1
Secondary Main Line	30m	2.0m	<= 2.5:1
Principal Branch Line	15m	2.0m	<= 2.5:1
Secondary Branch Line	15m	2.0m	<= 2.5:1
Spur Line	15m	0	

As stated in the FCM/RAC Guidelines (Section 3.3): “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.”



FCM/RAC Baseline Guideline

The FCM/RAC Guidelines (Section 3.3) indicate that “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.”

Chain Link Fence

To mitigate against the threat of trespasser incidents on the rail corridor the FCM/RAC Guidelines recommend a 1.83m high chain-link fence along the mutual property line entirely on the private side of the property line running continuously for the full width of the property. Metrolinx has enhanced requirements for anti-cut and anti-climb anti-trespassing fence which are explained further in this report.

Options to Mitigate Risk

In cases where a full setback can be provided, a berm may be constructed to mitigate the risks associated with derailment. Setbacks are typically provided together with a berm to achieve the maximum mitigation level. If the space required for a full berm cannot be provided, the FCM/RAC Guidelines (Section 3.3) note that the "Horizontal setback requirements may be substantially reduced with the construction of a crash wall". So, if the site-specific conditions do not allow for both a 30m setback and 2.5m high berm adjacent to a rail line, which is typical for urban sites, a robust crash wall can be used to mitigate the risks.

Crash Wall Requirements

Crash walls are robust concrete structures designed to provide similar energy absorption capacities as the standard berm. The wall is to be designed to the standards established by AECOM (Development of Crash Wall Design Loads from Theoretical Impact and CWguide Rev 2) looking at four derailment scenarios. (1) Freight train glancing blow (multiple car impact at deflection angle), (2) freight train direct impact (a single or pair of cars impacting the wall directly due to an accordion-type of derailment), (3) passenger train glancing blow and (4) passenger train direct impact.

In addition to being designed for the derailment scenarios set out above, the crash wall shall have the following characteristics:

- Thickness of:
    - 760mm if the wall is less than 7.6m from the centreline of the closest track.
    - 450mm if the wall is greater than or equal to 7.6m from the centreline of the track.
- Height of:
    - 3.6m from top of rail if the wall is less than 3.6m from the centreline of track.
    - 2.135m from top of rail if the wall is greater than or equal to 3.6m and less than 7.6m from the track.
    - 2.135m from top of grade if the wall is greater than or equal to 7.6m from the centreline of rail.
- The face of the crash wall shall be smooth and continuous and shall extend a minimum of 150mm beyond the face of the structure (such as a building column or bridge pier) parallel to the track.
- Construction shall be solid and heavy, with separate precast blocks or stones not acceptable.

Importantly, there is a reasonableness criterion in the FCM/RAC Guidelines suggesting that the risk-mitigating measures need not be disproportional to the development. The Third Principle for mitigation design is “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.” (FCM/RAC Guidelines Section 3.1).

ANALYSIS: ENERGY BALANCE METHOD

As per the AECOM Guidelines (Development of Crash Wall Design Loads from Theoretical Train Impact and CWguide Rev 2), an energy balance was performed to study the travelling length in case of derailment. There are four loading cases as shown below:

1. Freight Train Load Case #1: derailment of nine freight train cars.

> Freight Train Load Case 1 - Glancing Blow: nine cars weighing 143 tons (129 700 kg) each, impacting the wall at an angle, θ_G. The angle of impact will be a function of track curvature, and for tangent track may be taken as 3.5 degrees.

2. Freight Single Car Load Case #2: assuming only one car is derailed.

> Freight Train Load Case 2 - Single Car Impact: single car weighing 143 tons (129 700 kg) impacting the wall as it undergoes rotation about its center. The angle of rotation at impact is defined in [9]:
>
> $$\theta_r = \operatorname{asin}\left(\frac{d_{CL}}{8.5}\right) \qquad \text{(metric)}$$
>
> Where d_{CL} is in feet (m). Where d_{CL} is greater than 28 feet (8.5 m), this load case need not be considered.

This loading case assumes a single car will be rotating around its center and should the clear distance d_{CL} exceed 8.5m then there is no need to include this loading case as the train car will not make contact with the safety barrier in this derailment scenario.

3. Passenger Train Load Case #3: derailment of eight passenger cars.

> Passenger Train Load Case 3 - Glancing Blow: eight cars weighing 74 tons (67120 kg) each impacting the wall at an angle, θ_G. The angle of impact will be a function of track curvature, and for tangent track may be taken as 3.5 degrees.

4. Passenger Single Car Load Case #4: assuming only one car is derailed.

> Passenger Train Load Case 4 - Single Car Impact: single car weighing 74 tons (67120 kg) impacting the wall as it undergoes rotation about its center. The angle of rotation at impact is defined in [10]:
>
> Where d_{CL} is in feet (m). Where d_{CL} is greater than 42'-6" (13 m), this load case need not be considered.

Similarly, this load case assumes a single car rotates around its center and should the clear distance d_{CL} exceed 13m then there is no need to include this loading case as the train car will not make contact with the safety barrier in this derailment scenario.

The angle of impact can be calculated as shown:

$\theta_f = \text{asin}\left(\frac{d_{CL}}{8.5}\right)$ (metric)

$\theta_f = \text{asin}\left(\frac{d_{CL}}{13.0}\right)$ (metric)

Changing the train weight due to different rail services is permissible as per the AECOM Guidelines.

Where a track is designed for dedicated service by a particular train consist, variations to the design trains may be permitted by the Railway.

The speed of derailed equipment for glancing blow load cases can be calculated as shown:

$$v_G = \sqrt{v_o^2 + 2a\left(\frac{d_{CL} - 1.625}{\sin\theta_G}\right)} \text{ [m/s]}$$

Where d_{CL} is the distance from the crash wall to the centerline of track in feet (m).
v_o is the track speed in ft/s (m/s)
a is the acceleration in ft/s^2, calculated as $-32(.25 + G)$
(in metric, acceleration is in m/s^2, calculated as $-9.8(.25 + G)$)
θ_G is the angle of impact defined in [4] or [5]
G is the grade in decimal unit of the groundline in the direction of travel defined by the angle of impact relative to the centerline of track; calculated as $\frac{\text{Groundline at wall} - \text{Base of Rail}}{d_{CL}/\sin\theta_G}$.

The speed of derailed equipment for single car load cases can be calculated as shown:

$v_A = \frac{2.3\theta_f}{\sqrt{1 - \cos\theta_f}}$ [m/s] for freight cars

$v_A = \frac{2.9\theta_f}{\sqrt{1 - \cos\theta_f}}$ [m/s] for passenger cars

Where θ_f is the angle of impact, in radians, defined in [9] and [10].

The design force for the glancing blow load cases is:

$$F_G = \frac{\frac{1}{2}m(v_G \sin\theta_G)^2}{32.17 d_G} \quad [14]$$

$$F_G = \frac{\frac{1}{2}m(v_G \sin\theta_G)^2}{d_G} \quad \text{(metric)} \quad [14M]$$

Where m is the mass of the derailed cars in lbm (kg).
v_G is the impact speed in ft/s (m/s), defined in [3]
θ_G is the angle of impact defined in [4] or [5]
d_G is the deformation of the consist in the direction of the applied force, and $d_G = 10\sin\theta_G$, in feet ($d_G = 3.048\sin\theta_G$, in m)

The design force for the single car load cases is:

$$F_A = \frac{\frac{1}{2}m(v_A \cos\theta_f)^2}{32.17 d_A} \quad [15]$$

$$F_A = \frac{\frac{1}{2}m(v_A \cos\theta_f)^2}{d_A} \quad \text{(metric)} \quad [15M]$$

Where m is the mass of the derailed cars in lbm (kg).
v_A is the impact speed in ft/s (m/s), defined in [7] or [8]
θ_f is the angle of rotation at impact defined in [9] or [10]
d_A is the deformation of the consist in the direction of the applied force, and $d_A = 1.0\cos\theta_f$, in feet ($d_A = .3048\cos\theta_f$, in m)

Results of the Energy Balance Method Evaluation of Derailment Scenarios

The table below shows the derailment scenarios set out in the Guidelines and the maximum distance from the centreline of track where derailed trains come to an at-rest state. This analysis includes freight trains running at a maximum speed of 60mph and passenger trains running at a maximum speed of 95mph. For this analysis, a derailment angle of 3.5° was used. Additionally, as the grade of the site is slightly lower than that of the tracks, we have used a grade difference of 1.2m in calculations.

Scenario	Max distance perpendicular to the track at which the train comes to rest
1. Freight Train Multi-Car Glancing Blow	< 11m
2. Freight Train Single Car Direct Impact	< 8.5m
3. Passenger Train Multi-Car Glancing Blow	< 25m
4. Passenger Train Single Car Direct Impact	< 13m

Due to the proximity to the rail corridor, the development site will include a crash wall. The crash wall will be designed to allow for the rail authority to add tracks to the rail corridor in the future. We have assumed that due to the location of the existing Port Credit GO Station building and Hurontario LRT Station building currently being constructed, the rail authority will not construct a new rail track less than 16.5m from the development site property line. We have assumed that Metrolinx may construct a future track approximately 4m south of the current closest track, which has been accepted by Metrolinx when analyzing other development sites.

The setbacks are measured and illustrated in the section that follows. Considering this future track scenario where the closest possible future track is 16.5m from the crash wall, the design impact forces were calculated and are summarized below. The Passenger Train Multi-Car Glancing Blow (Scenario 3) is the governing force and should be used when designing the crash wall.

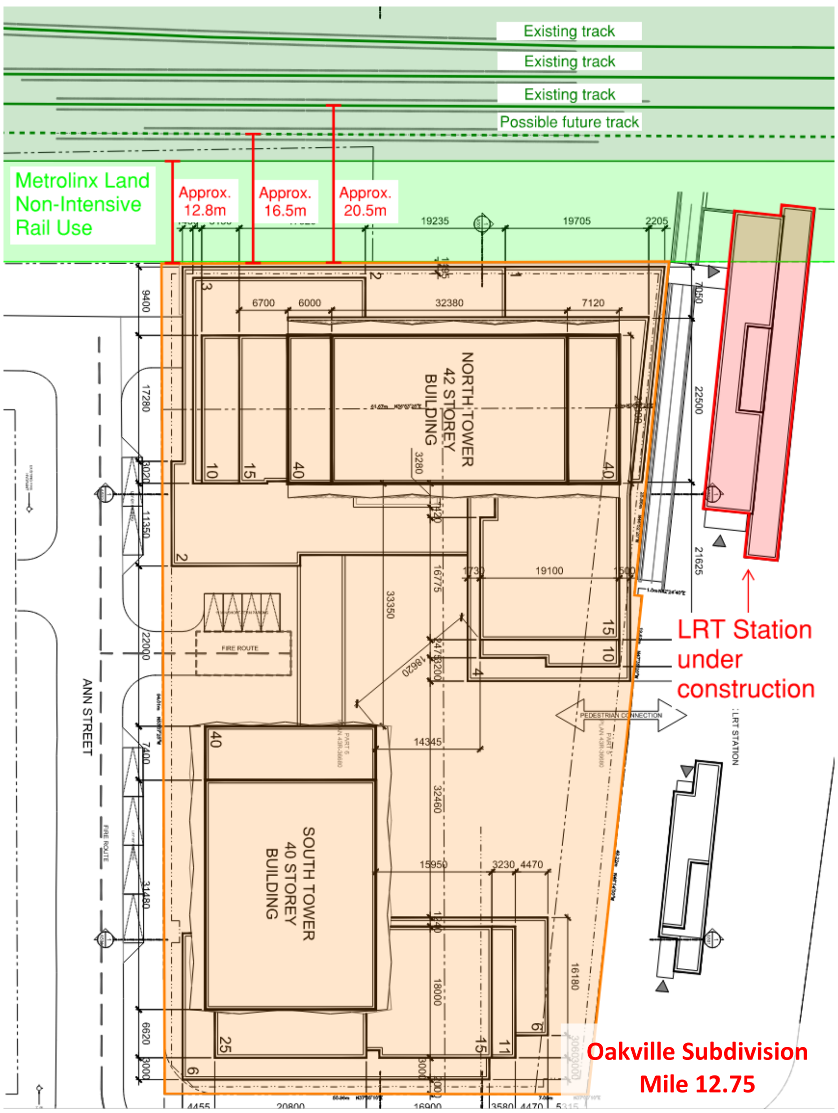
Scenario	Impact Force
1. Freight Train Multi-Car Glancing Blow	0kN
2. Freight Train Single Car Direct Impact	0kN
3. Passenger Train Multi-Car Glancing Blow	3387kN
4. Passenger Train Single Car Direct Impact	0kN

EVALUATION AND MITIGATING MEASURES

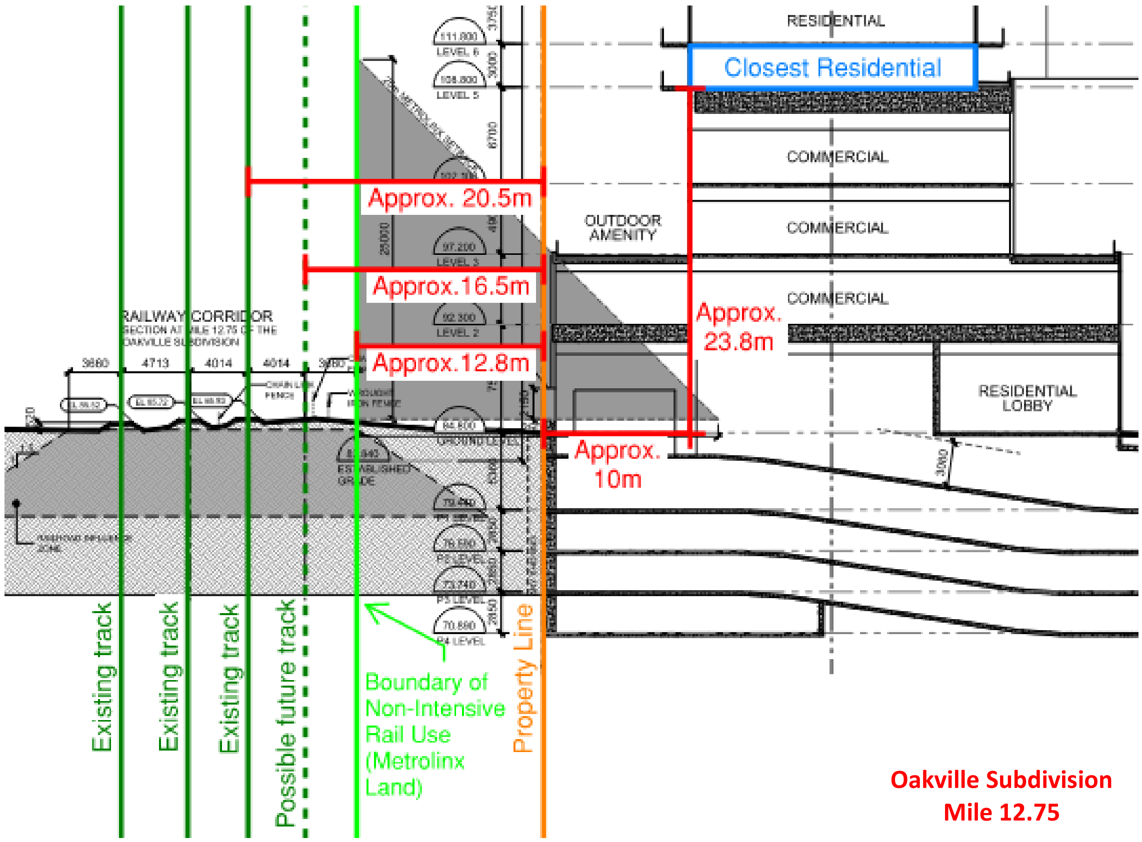
Setbacks

The setbacks for this site have been measured and are shown in the table and images below:

Setback	Distance (approx.)
Horizontal setback from property line to rail corridor	12.8m
Horizontal setback from property line to possible future track	16.5m
Horizontal setback from property line to closest residential unit	10m
Vertical setback to closest residential unit	23.8m
Combined horizontal and vertical setback from property line to closest residential unit	33.8m



Site Plan



Section at Rail Corridor

The towers' residential floors meet the minimum setback requirement of 30m from the rail corridor. This meets the recommendations of the FCM/RAC Guidelines for setbacks. However, the distance from the Metrolinx corridor to the site property line is less than 30m, and this site does not have enough space available for a berm; therefore, a crash wall is recommended to be constructed along the north property line of the site.

As stated in the Port Credit Build Form Guide [1], the Transportation Hub (vicinity of the Port Credit GO Station, parking lot, and future LRT) is categorized as a Place Making Opportunity. It is recommended in the Guide that "When reviewing development applications, consideration should be given to capitalizing on any opportunities that may foster place-making and would contribute to the urban form of Port Credit." Since the development site is located in a very urban area; requiring a 30m setback and a berm would be overly restrictive to the development and the public realm. We believe a crash wall at the site property line would provide the same level of risk mitigation as a berm while maintaining the urban design and place-making intents. It should be noted that this is not an unusual recommendation; many urban sites use the same risk mitigation measure of a crash wall rather than a berm.

[1] https://www.mississauga.ca/wp-content/uploads/2021/06/09104957/Port-Credit-Built-Form-Guidelines.pdf

Crash Wall

It is our recommendation that a crash wall be constructed along the north property line of the development site meeting the FCM/RAC Guidelines and the AECOM design procedures for the four scenarios of derailment of trains from the rail corridor. The crash wall in combination with the setback distance from the rail corridor provides a reasonable and appropriate solution to mitigating the risks associated with the development's proximity to the rail corridor. The risks associated with the rail corridor have been outlined and explained in Appendix C: Risk Assessment Matrix. As stated previously, we believe requiring more than the recommended crash wall would be overly restrictive and remove any possibility of an urban realm for this development site.

Since the wall will be greater than or equal to 7.6m from the centreline of the possible future rail track, the follow design criteria apply:

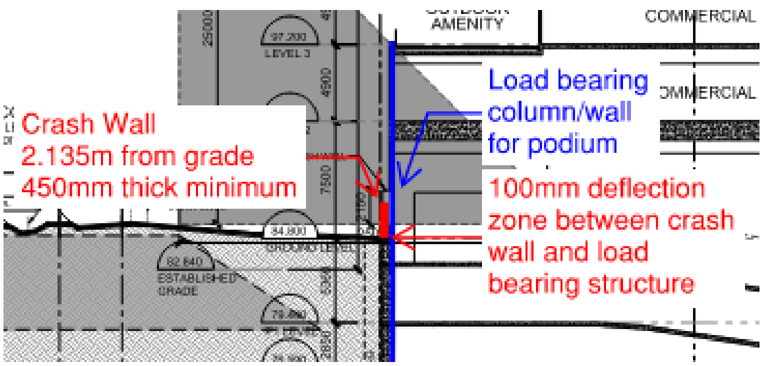
- Height of 2.135m from grade,
- The wall shall be a minimum of 450mm thick and be smooth and continuous,
- The applied impact load resulting from derailment will be at 1.8m from the top of rail, as per AECOM design guidelines,
- The wall shall be designed to incorporate both horizontal and vertical continuity reinforcement to distribute the impact loads of a derailed train.

Structure Supporting the Building

The crash wall will be integrated with the northern wall of the building, above the underground parking structure. No floor area of the parking structure will be supported by the crash wall, having independent columns inboard of the wall for support. The crash wall will be integrated and located on top of the building foundation wall, but the foundation wall will NOT be dependent on the crash wall. Should the crash wall be removed or destroyed, the structural integrity of the foundation wall and the building superstructure will not be compromised.

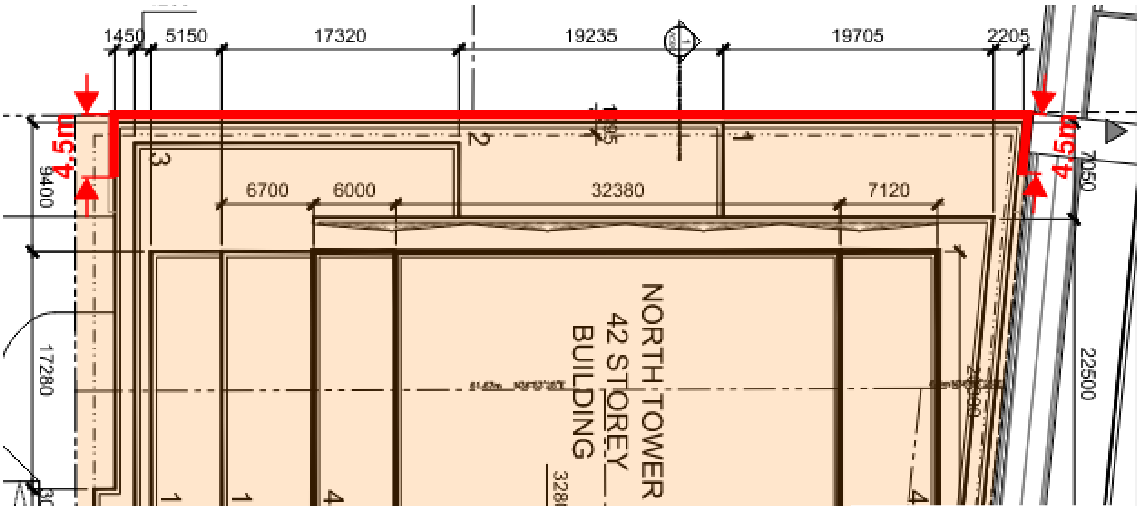
The structural elements supporting the building (columns and walls) should be sufficiently set back from the inside face of the crash wall to avoid contact between the wall deflected under impact loading and the elements supporting the building. Such a setback ensures that in the event of train impact the crash wall can be deflected without compromising the structural integrity of the building structure.

The suggested crash wall is shown below:



Crash Wall Extent

We recommend that the crash wall run the entire length of the north building face. The crash wall shall have 4.5m returns at each end, to prevent a train from derailing further away and ingressing the site.



Oakville Subdivision
Mile 12.75

Debris

With the provision of the setback and the crash wall extent and height, the risk of debris is sufficiently mitigated to reasonable levels.

Fire

Given the height of the crash wall and horizontal setback to sensitive occupancy, there are no additional restrictions to the proposed development beyond Fire Code requirements associated with the construction materials or detailing for fire.

Smoke

Due to the prevailing winds moving west to east and the site location being southeast of the rail corridor, smoke may be an issue. We recommend having no air intakes on the northwest side of the tower to avoid the potential ingestion of smoke or diesel exhaust into the mechanical HVAC systems serving the building.

Construction

Any construction considerations will be dealt with separately with the contractor's input.

Graffiti

Metrolinx requires an anti-graffiti silicone coating be applied to the railway side of the barrier to discourage and manage graffiti. The developer may decide to put artwork on the crash wall and will work with Metrolinx to understand the requirements.

Barrier Lifespan

The crash wall will be located on the development site. For this reason, all maintenance and inspection are the responsibility of the developer. When the developer transfers responsibility of the condo to the Condo Corporation, the maintenance and inspection responsibilities of the crash wall will also transfer.

Trespassing/Fence Requirements

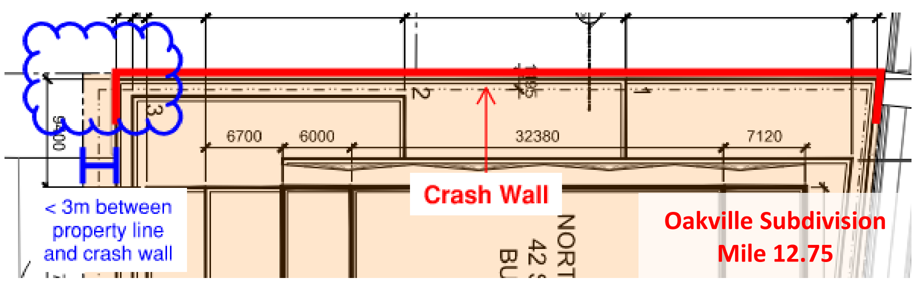
Adequate provisions to prevent the public from entering the rail corridor lands are recommended.

Where there is a crash wall along the property line that rises more than 1.83m above finished grade, this anti-trespassing requirement is fulfilled with no additional fence element. For the extent of the property line where there is no crash wall, or in phases of construction prior to the crash wall being built, a fence meeting the following recommendations is to be provided.

Metrolinx has an enhanced Fence standard High-Security Fencing:

a. The high-security fence height above ground shall be 2.4 m.
b. The panel mesh shall consist of a minimum 4mm diameter high tensile wire, with aperture sizes (openings) 76.2 x 12.7 mm centers or smaller fastened to suitable posts that allow for a minimum foundation depth of 1200 mm.
c. The fence panels shall be strengthened with factory-formed undulations within each mesh panel.
d. Specification sheets and breach testing results for any proposed alternate products and materials shall be submitted to Metrolinx staff for approval.
e. Mechanical Fasteners shall be tamperproof and factory galvanized. Fastening hardware shall be concealed from the face of each panel and post.
f. The mesh, posts, clamps and associated hardware are to be galvanized with an exterior finish coating capable of withstanding repeat climate variances within Southern Ontario.
g. A list of approved High-Security fencing manufacturers includes:
    a. Cochrane–ClearVu
    b. BETAFENCE- Securifor 3D
    c. CLD- Securus Profiled
    d. Bear Mountain – Bear Securi Mesh Barrier

The distance from the edge of the crash wall to the western property line is approximately 3m. Typically we would suggest an anti-trespassing fence at this location. However, Metrolinx is going to use the area immediately west of the property line as a pathway to the GO Station. For this reason, we believe an anti-trespassing fence should not be required and this area can be used to enhance the path to the GO Station.

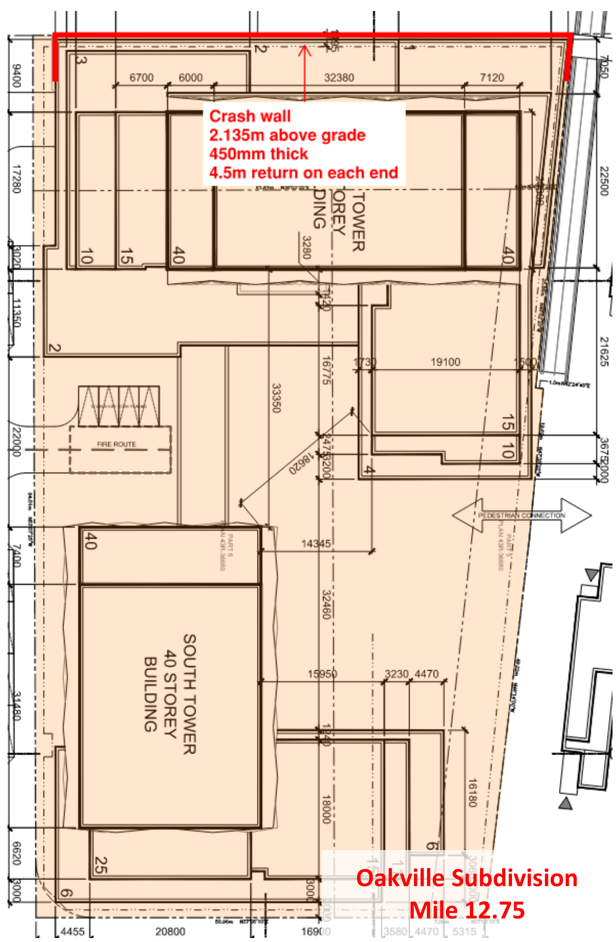


CONCLUSION

We have reviewed the site-specific safety aspects relating to the development's proximity to the rail corridor and believe that the measures proposed above reasonably mitigate the risks. The risk-mitigating measures include:

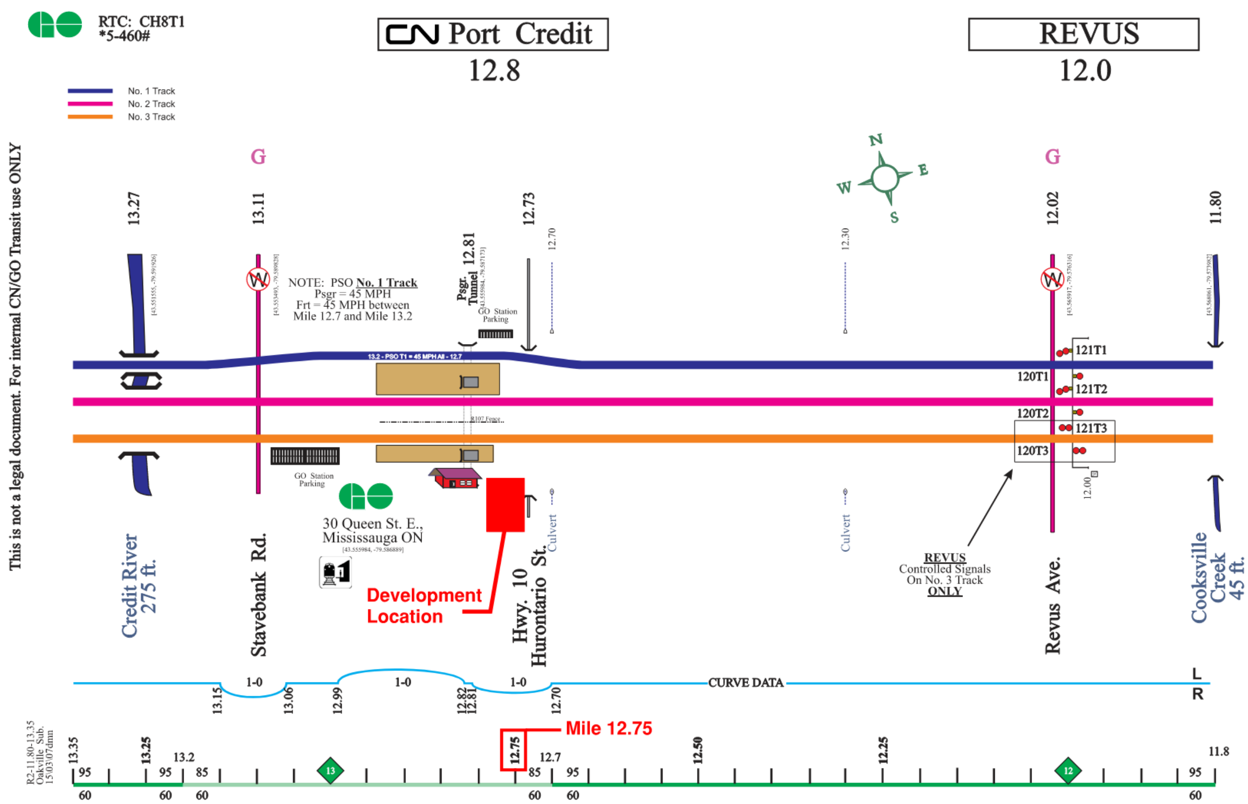
- Combined vertical and horizontal setback from the property line to the closest residential unit is 33.8m.
- Crash wall with a minimum height of 2.135m above grade and a minimum thickness of 450mm per the FCM/RAC and AECOM requirements. The structural design of the crash wall and details will be completed for the detailed submission.
- The crash wall shall extend along the full length of the northern building face, with a 4.5m return on each end.
- While the crash wall is integrated with the building's foundation wall and relies on propping from the floor slab, the building's structure is not dependent on the crash wall. The building's structural adequacy remains uncompromised if the crash wall is removed or destroyed.

The proposed mitigating measures are shown below:

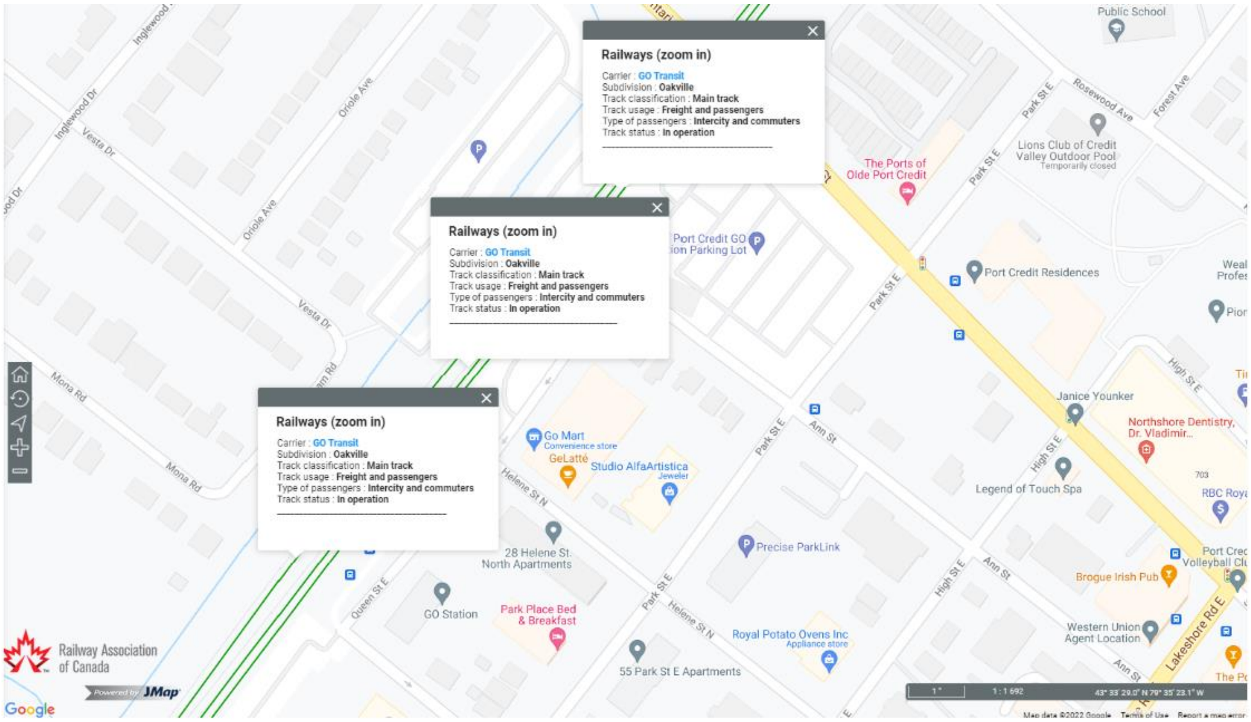


APPENDIX A: RAIL INFORMATION

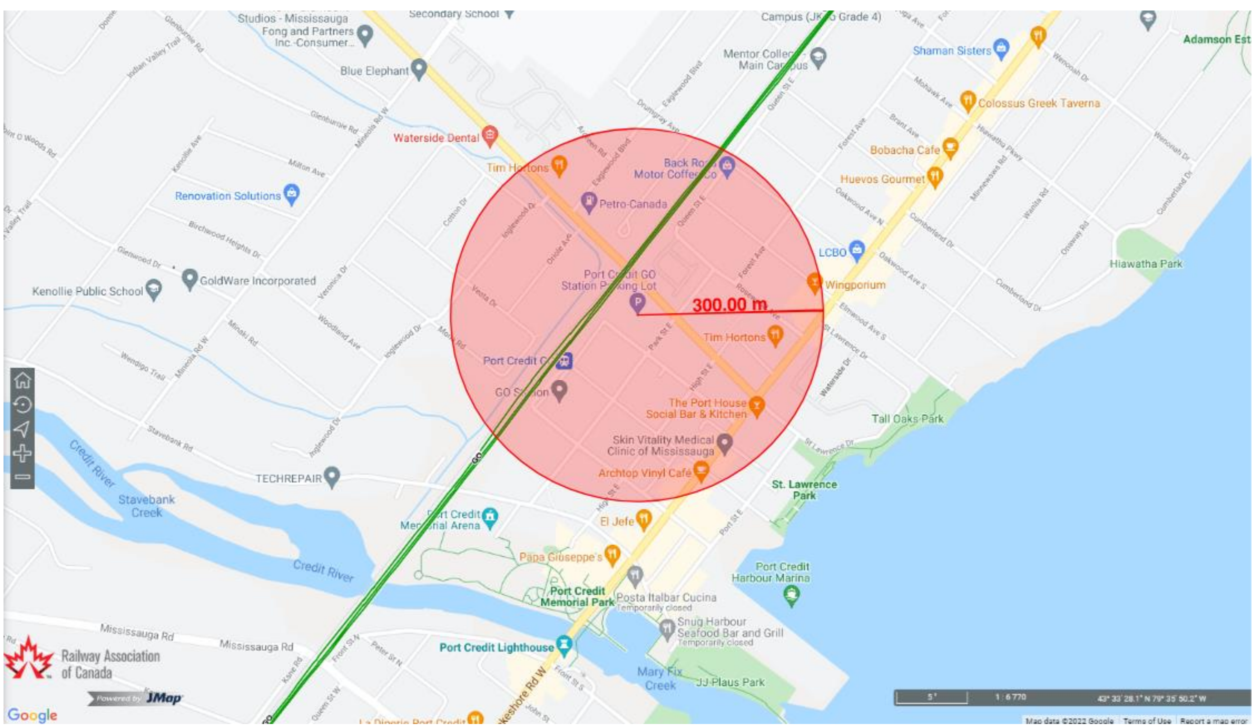
Track Diagram:



Railway Association of Canada Track Information:



No rail yards within 300m radius of site location:



APPENDIX B: CORRESPONDENCE

Good afternoon,

Further to your request dated April 28 , 2023, the subject lands (88 Park Street East, Mississauga) are located within 300 metres of the Metrolinx Oakville Subdivision (which carries Lakeshore West GO rail service).

It's anticipated that GO rail service on this Subdivision will be comprised of diesel and electric trains. The GO rail fleet combination on this Subdivision will consist of up to 2 locomotives and 12 passenger cars. The typical GO rail weekday train volume forecast near the subject lands, including both revenue and equipment trips is in the order of 408 trains. The planned detailed trip breakdown is listed below:

	1 Diesel Locomotive	2 Diesel Locomotives	1 Electric Locomotive	2 Electric Locomotives		1 Diesel Locomotive	2 Diesel Locomotives	1 Electric Locomotive	2 Electric Locomotives
Day (0700-2300)	132	0	222	0	Night (2300-0700)	20	0	34	0

The current track design speed near the subject lands is 95 mph (153 km/h).

There are *anti-whistling by-laws* in affect near the subject lands at Stevebank Rd and Revus Ave.
With respect to future electrified rail service, Metrolinx is committed to finding the most sustainable solution for electrifying the GO rail network and we are currently working towards the next phase.
Options have been studied as part of the Transit Project Assessment Process (TPAP) for the GO Expansion program, currently in the procurement phase. The successful proponent team will be responsible for selecting and delivering the right trains and infrastructure to unlock the benefits of GO Expansion. The contract is in a multi-year procurement process and teams have submitted their bids to Infrastructure Ontario and Metrolinx for evaluation and contract award. GO Expansion construction will get underway in late 2023.
However, we can advise that train noise is dominated by the powertrain at lower speeds and by the wheel- track interaction at higher speeds. Hence, the noise level and spectrum of electric trains is expected to be very similar at higher speeds, if not identical, to those of equivalent diesel trains.
Given the above considerations, it would be prudent at this time, for the purposes of acoustical analyses for development in proximity to Metrolinx corridors, to assume that the acoustical characteristics of electrified and diesel trains are equivalent. In light of the aforementioned information, acoustical models should employ diesel train parameters as the basis for analyses. We anticipate that additional information regarding specific operational parameters for electrified trains will become available in the future once the proponent team is selected.
Operational information is subject to change and may be influenced by, among other factors, service planning priorities, operational considerations, funding availability and passenger demand.

It should be noted that this information only pertains to Metrolinx rail service. It would be prudent to contact other rail operators in the area directly for rail traffic information pertaining to non-Metrolinx rail service.

I trust this information is useful. Should you have any questions or concerns, please do not hesitate to contact me.

Regards,
Tara Kamal Ahmadi

Tara Kamal Ahmadi
Junior Analyst
Third Party Projects Review, Capital Projects Group
Metrolinx | 20 Bay Street | Suite 600 | Toronto | Ontario | M5J 2W3

From: Julia Pannolino <julia.pannolino@entuitive.com>
Sent: April 28, 2023 10:46 AM
To: Rail Data Requests <RailDataRequests@metrolinx.com>
Subject: Rail Information Request - 88 Park Street East, Mississauga (Mile 12.75 Oakville Sub)

Hi,

Entuitive has been retained by Edenshaw Developments Limited to prepare a rail safety report for a proposed development at 88 Park Street East, Mississauga. The site is located at approximately Mile 12.75 of the Metrolinx Oakville Subdivision, immediately east of Port Credit Station.

To properly review the safety aspects of the development, can you let us know any information Metrolinx can share on the following:

1. Number of current Metrolinx trains per day,
2. Number of current GO cars per train,
3. Number of current GO locomotives per train,
4. Current design speed for GO trains,
5. Typology of operation (Type A, B, C, D or E),
6. Physical characteristics of Type (elevated, at grade, below grade; straight vs. curved alignment),
7. Primary rail operation (freight, passenger, both),
8. Other operators with ownership rights to track (CN, CP, Via, etc.),

9. Operating characteristics (presence of switches, signals, track type (continuously welded, jointed), proximity to nearest station),
10. Rail corridor service expansion plans by all operators (10-Year Forecast),
11. Planned changes – any known upcoming planned changes to the above information?
12. Any other information relevant for rail safety.

Thank you,

Julia Pannolino P.Eng.

Transportation Planning Lead

(She/Her)

Mobile +1.647.284.5290

vCard | LinkedIn

Entuitive | Vancouver + Calgary + Edmonton + Toronto + Ottawa + New York

200 University Avenue, 7th Floor Toronto, ON M5H 3C6 CANADA | T.+1.416.477.5832

At Entuitive we are purpose-driven to build a better world. Watch here.

Aligning with the values of Entuitive and in the spirit of reconciliation, I acknowledge that I live, work, and play on the traditional territories of the Mississaugas of the Credit, Anishnabeg, Chippewa, Iroquois, and the Wyandot peoples.

Waterstone CANADA'S MOST ADMIRED CORPORATE CULTURES 2022

APPENDIX C: RISK ASSESSMENT MATRIX

Rail Safety Risk Assessment

No.	Hazard	Without Mitigating Measures: Frequency	Severity	Residual Risk	Risk Classification	With Proposed Mitigating Measures: Frequency	Severity	Residual Risk	Risk Classification	Net change of Risk Classification	Comments
1	Derailment Freight - Flammable or Hazardous materials *Derailment of frieght train transporting flammable/hazardous material*	2	3	6	Tolerable	2	2	4	Acceptable	-2	Setback distance and crash wall will mitigate risk of fire and explosion.
2	Derailment Freight - Inert Glancing Blow *Multicar derailment of freight train adjacent to site*	2	2	4	Acceptable	2	2	4	Acceptable	0	Setback distance and crash wall will mitigate risk of derailment.
3	Derailment Freight - Inert Direct Impact *Single freight car impact due to accordian style derailment*	2	2	4	Acceptable	2	2	4	Acceptable	0	Setback distance and crash wall will mitigate risk of derailment.
4	Derailment Passenger - Glancing Blow *Multicar derailment of passenger train adjacent to site*	2	5	10	Intolerable	2	3	6	Tolerable	-4	Setback distance and crash wall will mitigate risk of derailment.
5	Derailment Passenger - Direct Impact *Single freight car impact due to accordian style derailment*	2	2	4	Acceptable	2	2	4	Acceptable	0	Setback distance and crash wall will mitigate risk of derailment.
6	Excess Speed - Freight *Derailment of freight train travelling at speed in excess of track design speed*	3	4	12	Intolerable	3	3	9	Tolerable	-3	Setback distance and crash wall will mitigate risk of derailment at excess speed.
7	Excess Speed - Passenger *Derailment of passenger train travelling at speed in excess of track design speed*	3	5	15	Intolerable	3	3	9	Tolerable	-6	Setback distance and crash wall will mitigate risk of derailment at excess speed.
8	Airborne Debris - Freight *Top level sea-can of a double stacked intermodal freight car is launched due to a derailment*	2	4	8	Tolerable	2	3	6	Tolerable	-2	Setback distance and crash wall will mitigate risk of debris.
9	Groundborne Debris - Freight *As a result of derailment a sea-can or a part of the freight train become rolling or sliding debris along the ground*	2	3	6	Tolerable	2	2	4	Acceptable	-2	Setback distance and crash wall will mitigate risk of debris.
10	Airborne Debris - Passenger *During a derailment, parts of the passenger train become airborn projectiles*	2	4	8	Tolerable	2	3	6	Tolerable	-2	Setback distance and crash wall will mitigate risk of debris.
11	Groundborne Debris - Passenger *As a result of derailment a part of the passenger train become rolling or sliding debris along the ground*	2	3	6	Tolerable	2	2	4	Acceptable	-2	Setback distance and crash wall will mitigate risk of debris.
12	Smoke/Exhaust *Ingestion of smoke or diesel exhaust into a building's HVAC systems*	2	3	6	Tolerable	2	2	4	Acceptable	-2	Prevailing winds will push smoke/exhaust towards the site. We recommend no air intakes on the north west side of the building.
13	Trespassing *Ingress of non-authorised personel onto railway*	3	4	12	Intolerable	1	4	4	Acceptable	-8	Crash wall will mitigate risk of trespassing.
	Total Assessed Risk Score			101				68			

Risk Event Classification

Frequency of Event	Class	Severity of Event: Negligible	Marginal	Serious	Critical	Catastrophic
		1	2	3	4	5
Improbable	1	1	2	3	4	5
Remote	2	2	4	6	8	10
Occasional	3	3	6	9	12	15
Probable	4	4	8	12	16	20
Frequent	5	5	10	15	20	25

Risk Category

Risk	*(Frequency Class x Severity Class)*	Risk Assessment Category	Mitigation Measures Approach
Low	1 to 4	Acceptable	No further mitigation is required
Medium	6 to 9	Tolerable	Tolerable if ALARP* - mitigate to level that is reasonable
High	10 to 25	Intolerable	Risk shall be eliminated / reduced

*ALARP = As Low As Reasonably Practicable

Definition of Frequency Criteria

Fraquency Rating	Description
1. Improbable	Extremely unlikely to occur
2. Remote	Unlikely to occur in rail lifecycle
3. Occasional	Likley to occur several times in rail lifecycle
4. Probable	Expected to occur
5. Frequent	Expected to occur continuous

Definition of Severity Criteria

Severity Rating	Consequence to Person/Public	Consequence to Environment
1. Negligible	Non-reportable injury	None
2. Marginal	Single minor injury	Reversible minor environmental impact
3. Serious	Single permanent partial or tempory total disabling injury; multiple minor injury	Reversible moderate environmental impact
4. Critical	Single fatality; Single permanent total disability; Multiple permanent partial or temporay total disabling injury	Reversible significant environmental impact
5. Catastrophic	Multiple fatalities: Multiple permanent total disabling injuries	rreversible significant environmental impac