ENTUITIVE

70 PARK STREET EAST, MISSISSAUGA
RAIL SAFETY REPORT
JANUARY 2023

For MPCT DIF 70 Park Street East LP

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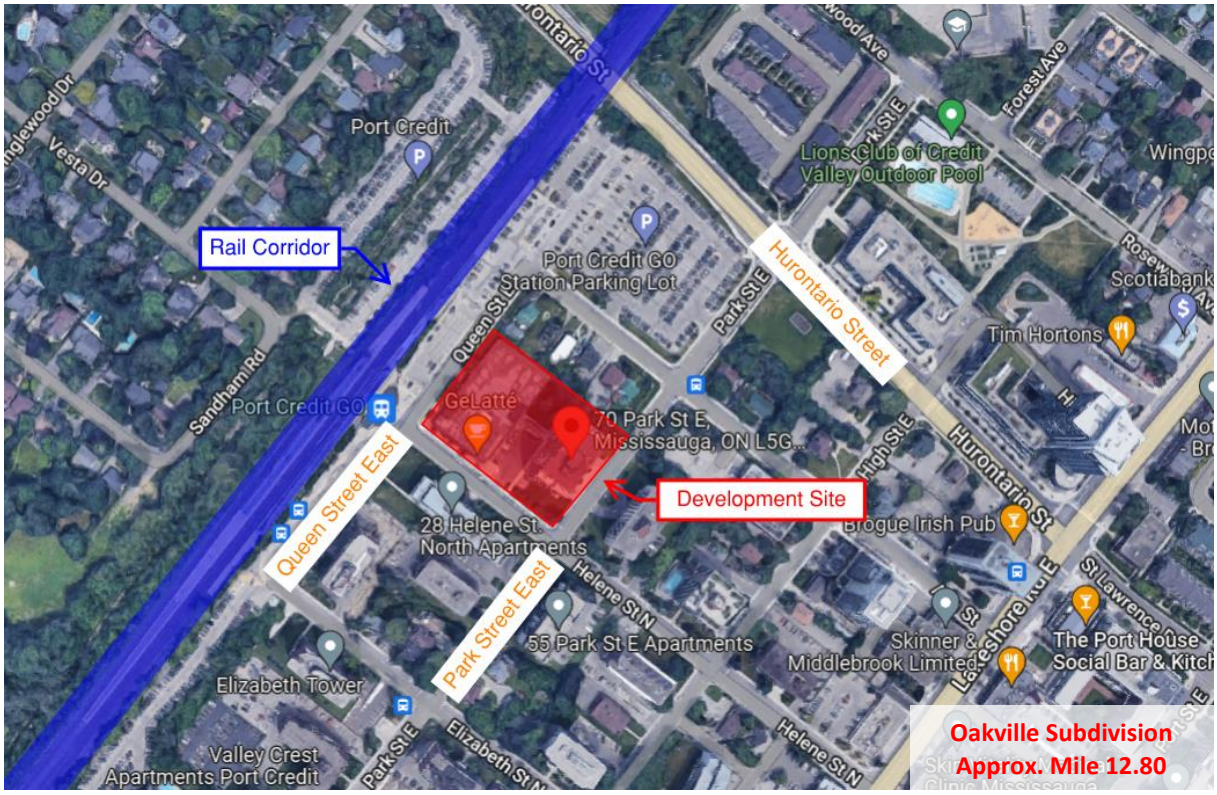
Our Project Number:
EN022.01970

Table of Contents

INTRODUCTION

Entuitive was retained by MPCT DIF 70 Park Street East LP to review the site-specific safety of the development being proposed at 23, 25, 27, 29, and 31 Helene Street North, 53 Queen Street East, and 70 Park Street East, in Mississauga. Immediately northwest of the site lands is the Port Credit GO Station and the Oakville subdivision rail corridor which is owned and operated by GO Transit.

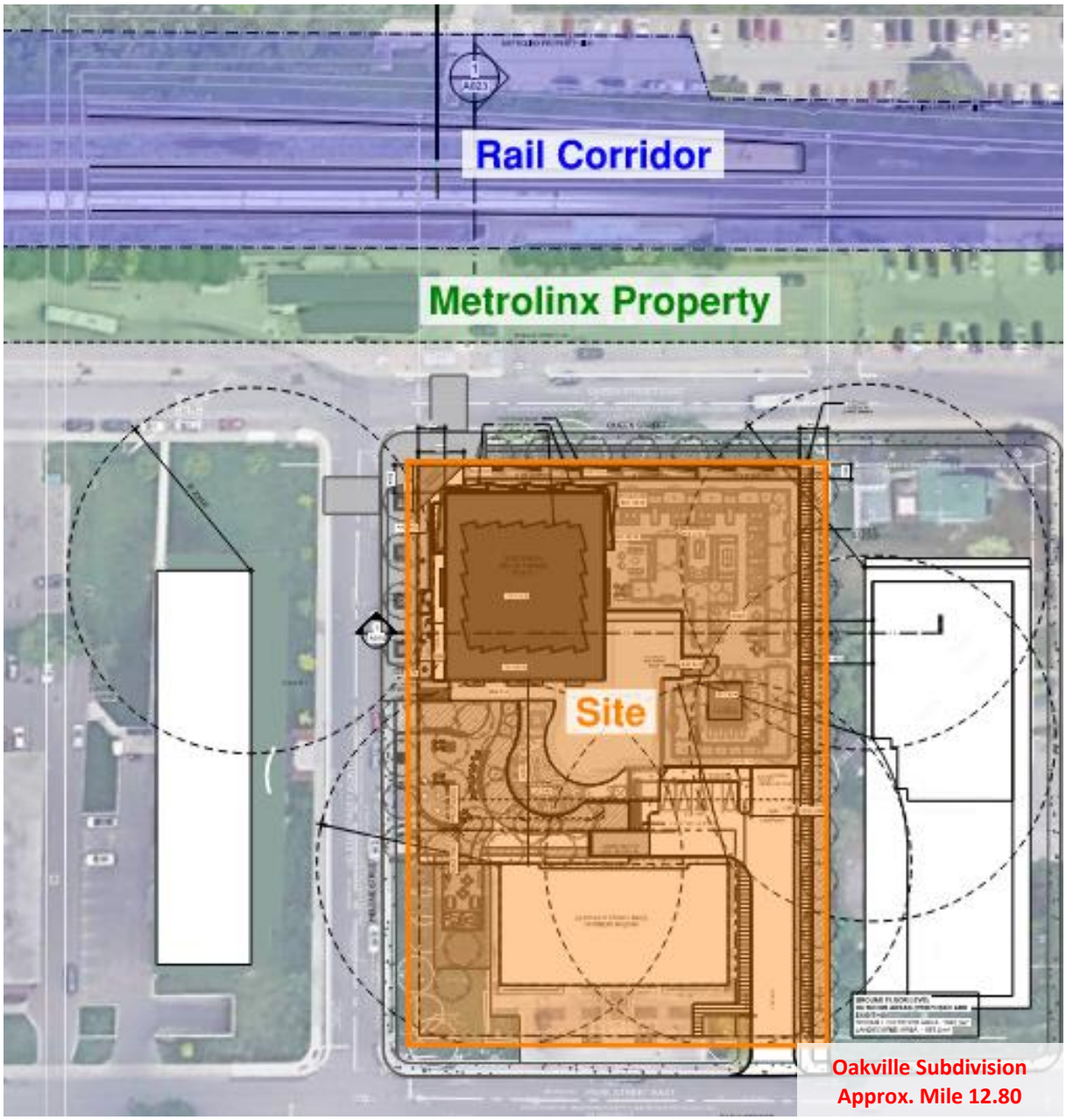
This rail safety report reviews the site-specific safety risks for the development associated with the nearby rail corridor along with mitigating measures. The report is limited to the safety aspects associated with the proximity of the development to rail activity and does not address ground-borne and/or airborne (acoustic) vibration and stormwater which are all dealt with separately.



Focus Area

SITE

The site of the proposed development lies immediately southeast of the Port Credit GO Station. The development will be mixed-use with mainly residential units. The ground floor will feature a residential lobby and retail uses fronting Helene Street North, and retail partially wrapping the corner onto the Queen Street East frontage, closest to the GO Station. The image below shows the site boundary in orange, the rail corridor in blue, and the remaining Metrolinx station property in green.



Site Plan

Relationship to the Rail

The site is located adjacent to a rail corridor. All rail information is shown in Appendix A.

Rail	
Rail Corridor	Oakville Subdivision
Classification	Main Line
Mileage at Site Location	12.80
No of Tracks	3 main line tracks
Speed	Max. speed on track #1: 45mph Max. speed on track #2 & 3 (freight): 60 mph Max. speed on track #2 & 3 (passenger): 85 mph
Alignment	Track #2 &3 are straight in the immediate vicinity Track #1 slightly curves, but speed of train is reduced Site is located on the inside of the Track #1 curve
Elevation	Tracks are 3.7m higher than the grade of the proposed development site
Proposed Development	Mixed-use, primarily residential

Safety Record of Rail Corridor

The Transportation Safety Board of Canada defines a railway accident and incident as the following[1]:

Railway Accident – an occurrence resulting directly from the operation of rolling stock in which

a) a person is killed or sustains a serious injury as a result of
    i. getting on or off or being on board the rolling stock, or
    ii. coming into direct contact with any part of the rolling stock or its contents;
b) the rolling stock or its contents
    i. are involved in a collision and/or a derailment resulting in damages to rolling stock and/or track infrastructure,
    ii. sustain damage that affects the safe operation of the rolling stock,
    iii. cause or sustain a fire or explosion,
    iv. cause damage to the railway that poses a threat to the safe passage of rolling stock or to the safety of any person, property or the environment; or
c) there is an accidental release on board or from rolling stock that results in any of the events listed in subsection 8.4(2) of the Transportation of Dangerous Goods Regulations.

Railway Incident – an occurrence resulting directly from the operation of rolling stock in which

a) the rolling stock is involved in a minor collision and/or minor derailment (1 or 2 cars) resulting in no damages,
b) a risk of collision occurs between rolling stock,
c) an unprotected main track switch or subdivision track switch is left in an abnormal position,
d) a railway signal displays a less restrictive indication than that required for the intended movement of rolling stock,
e) rolling stock occupies a main track or subdivision track, or track work takes place, in contravention of the Rules or any regulations made under the Railway Safety Act,

[1] https://www.bst-tsb.gc.ca/eng/lois-acts/evenements-occurrences.html

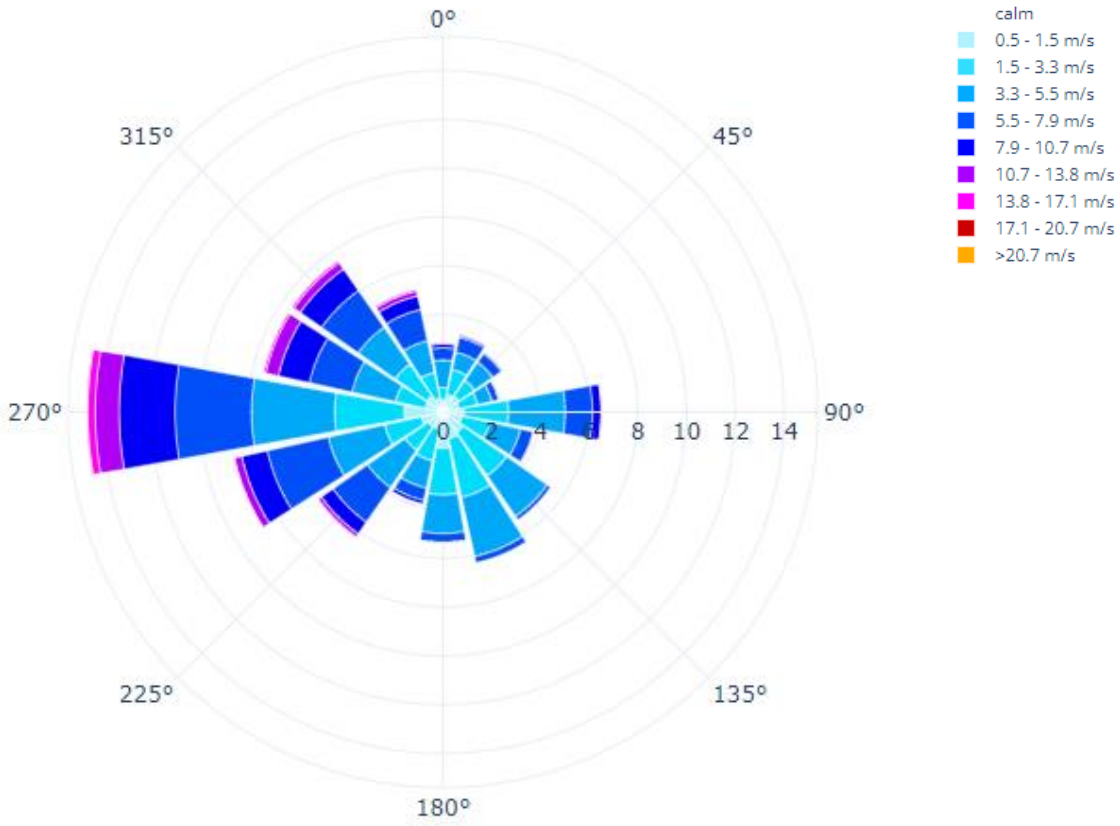
f) rolling stock passes a signal indicating stop in contravention of the Rules or any regulations made under the Railway Safety Act,
g) there is an unplanned and uncontrolled movement of rolling stock, or
h) a crew member whose duties are directly related to the safe operation of the rolling stock is unable to perform their duties as a result of a physical incapacitation which poses a threat to the safety of persons, property or the environment.

Based on data published by the Transportation Safety Board of Canada between the years of 2011-2021 and at mileage 2.80-22.80 of the Oakville Subdivision, the frequency of events is as follows:

Period Start	2011
Period End	2021
Total Number of Events	5
Total Number of Incidents	2
Total Number of Accidents	3
Breakdown:	
TRESPASSER	3
MAIN-TRACK DERAILMENT	0
MOVEMENT EXCEEDS LIMITS OF AUTHORITY	2

Weather

Based on the Wind Rose diagram for the years 2004-2018 shown below, the site location experiences winds mostly from the west direction. The data shown below was collected at Toronto Pearson International Airport.



Wind Rose Diagram for Site Location

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 requirements for:

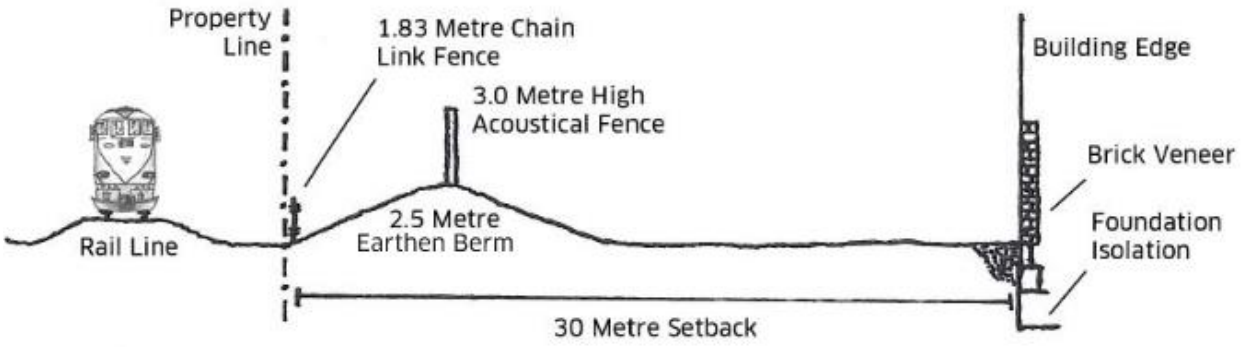
- Safety: Impact from a derailed train, fire, projectile elements, smoke
- Comfort: Noise and Vibration

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

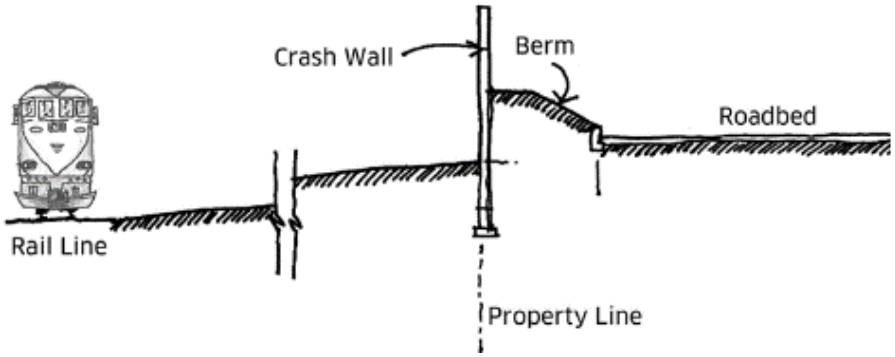
The FCM/RAC Guidelines (Section 3.3) indicate that "Appropriate uses within the setback area include public and private roads; parkland and other outdoor recreational space including backyards, swimming pools, and tennis courts; unenclosed gazebos; garages and other parking structures; and storage sheds."

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. Note that Metrolinx has specific fence requirements which are described further in this report.

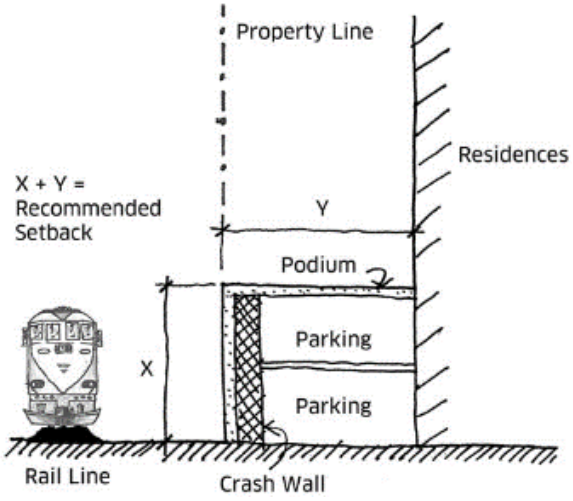
Options to Protect Development

In cases where a full setback can be provided, a berm may be constructed to protect the site, rather than a crash wall. Setbacks and berms are typically provided together to achieve the maximum mitigation level. If the space required for a full berm cannot be provided, a crash berm can be considered. Crash berms are highly effective in terms of protecting developments and saving costs.



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 the development can be protected instead by a robust crash wall.

With a crash wall "the setback distance may be measured as a combination of horizontal and vertical distances, as long as the horizontal and vertical value add up to the recommended setback" FCM/RAC Guidelines (Section 3.3).



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 looking at 4 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.

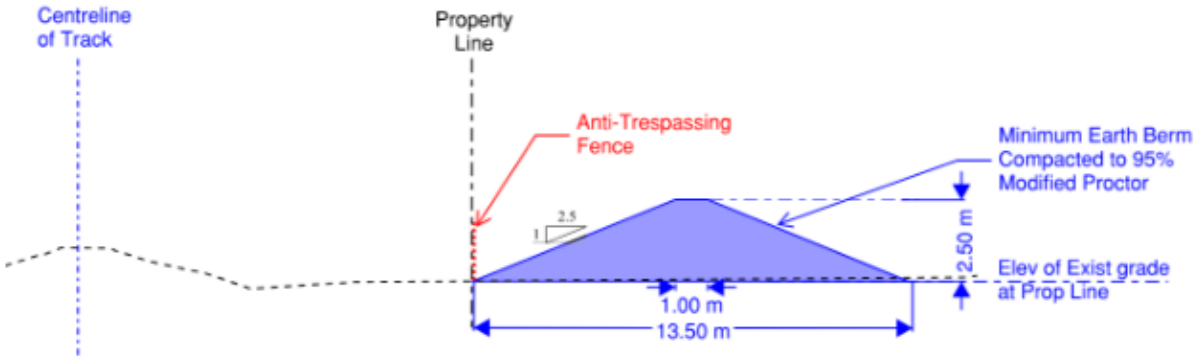
Importantly, there is a reasonableness criterion in the FCM/RAC Guidelines suggesting that the risk-mitigating measures need not be disproportional to the development. The Third Principle for mitigation design is “All mitigation measures should be designed to the highest possible urban design standards. 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).

Berm Requirements

Berms should be constructed parallel to the railway corridor and to the following specifications:

- Principal Main Line: 2.5m above grade with side slopes not steeper than 2.5 to 1
- Secondary Main Line: 2.0m above grade with side slopes not steeper than 2.5 to 1
- Principal Branch Line: 2.0m above grade with side slopes not steeper than 2.5 to 1
- Secondary Branch Line: 2.0m above grade with side slopes not steeper than 2.5 to 1
- Spur Line: not required

The berm shall be laid down in layers and compacted to 95% modified proctor. It should be noted that the berm can be expanded in height and/or width beyond the minimums outlined above to suit aesthetic and/or landscaping requirements. The height of the berm is to be measured from the existing grade at the property line. See example image below.



Berm section view

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 weighing 129,700 kg each.

> 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 weighing 129,700 kg.

> 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]:
>
> $$\theta_f = \text{asin}\left(\frac{d_{CL}}{8.5}\right) \qquad \text{(metric)}$$
>
> 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 one locomotive weighing 133,740 kg and seven bilevel coaches weighing 79,510 each.

> 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.

The AECOM guideline assumes eight cars; however, we have assumed seven passenger cars and one MP40 Locomotive to be conservative.

4. Passenger train Single Car Load Case #4: assuming one fully loaded bilevel coach is derailed weighing 79,510 kg.

> 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:

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

Where d_{CL} is in feet (m). Where d_{CL} is greater than 42'-6" (13 m), this load case need not be considered.

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

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 after derailment 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 $\frac{Groundline\ at\ wall - Base\ of\ Rail}{d_{CL}/\sin\theta_G}$.

obtained from the above equation with $R = 0.25$.

The design force for the glancing blow load cases is:

$$F_G = \frac{\frac{1}{2}m(v_G \sin\theta_G)^2}{d_G} \qquad \text{(metric)}$$

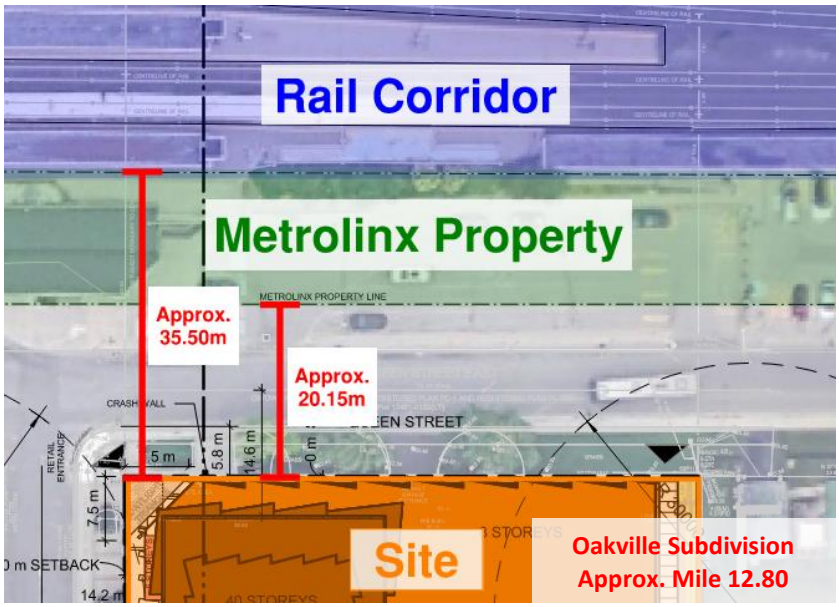
Where m is the mass of the derailed cars in lbm (kg).
v_G is the impact speed in ft/s (m/s), defined in [3]
θ_G is the angle of impact defined in [4] or [5]
d_G is the deformation of the consist in the direction of the applied force, and $d_G = 10 \sin\theta_G$, in feet ($d_G = 3.048 \sin\theta_G$, in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

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 85mph.

Scenario	Max. distance perpendicular to the track at which the train comes to rest
1. Freight Train Multi-Car Glancing Blow	< 11.4m
2. Freight Train Single Car Direct Impact	< 8.5m
3. Passenger Train Multi-Car Glancing Blow	< 20.5m
4. Passenger Train Single Car Direct Impact	< 13m

The crash wall will be designed to allow for the rail authority to add tracks to the rail corridor in the future. This site is adjacent to both the rail corridor and the Metrolinx owned GO Station property. We assume that Metrolinx will not be adding tracks to their property outside of the existing rail corridor; however, this exercise has been completed with the knowledge that this scenario is possible. If Metrolinx added a track to their property, the closest a track could possible be is 3.6m from the property line, or 23.75m from the development site property line. Therefore, if a train were to derail from the closest possible future track, it would still not ingress the development site.



Due to the horizontal setback distance, none of the derailment scenarios would impact the site located approximately 23.75m from the closest possible future track. However, we recommend an impact load of 200kN (relates to barrier load from the CSA S6-14: Canadian Highway Bridge Code).

The governing impact force should be used in the design of the crash wall and based on AECOM design guidelines equation 6, and the impact force is to be applied over 3.1m horizontal length (as shown below) and at a height of 1.8m above the existing grade.

3.1.3 Length of action of impact force

The length of wall, l_G, along which the impact force should act was calculated from the length of deformation specified by the 2011 AECOM guidelines and the angle of impact as shown in Figure 4:

$$l_G = \frac{10}{\cos \theta_G} \quad [6]$$

$$l_G = \frac{3.048}{\cos \theta_G} \quad [6M]$$

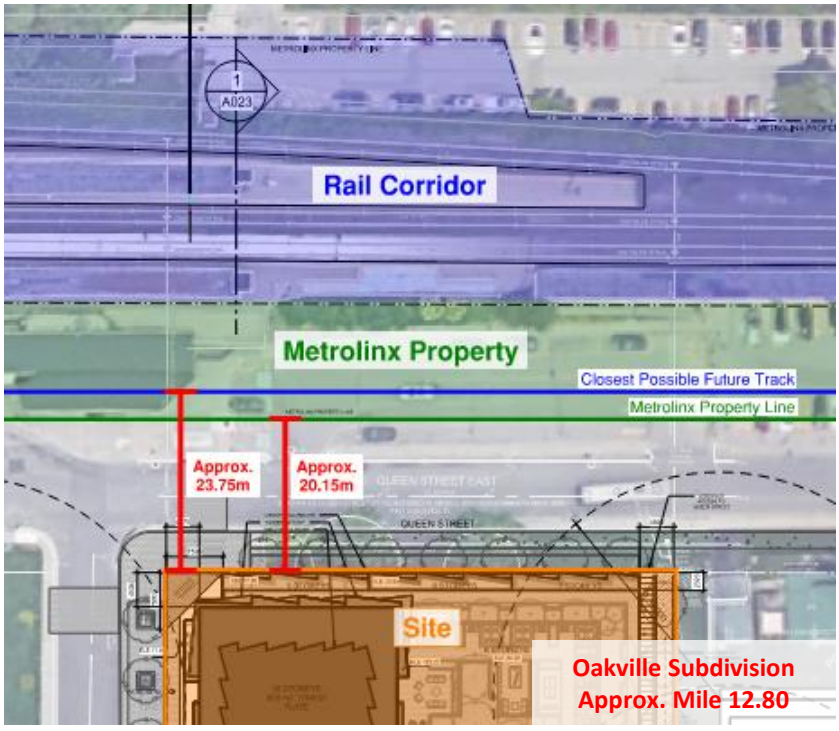
where l_G is in feet (m). For an angle of 3.5 degrees, the length along which the force acts is 10 feet (3.1 m). Due to the forward momentum of the train, it is likely that the length of impact along the wall is still being conservatively estimated.

EVALUATION AND MITIGATING MEASURES

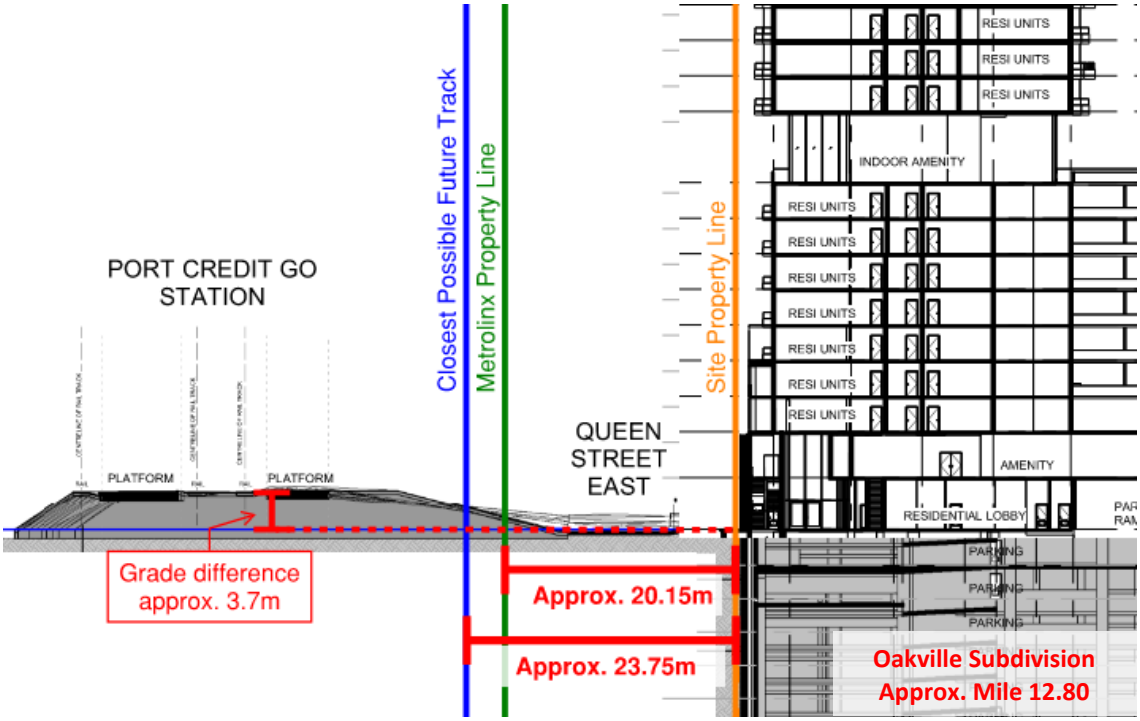
Setbacks

The setbacks to the sensitive-use areas of this site have been measured and are shown in the table and images that follow:

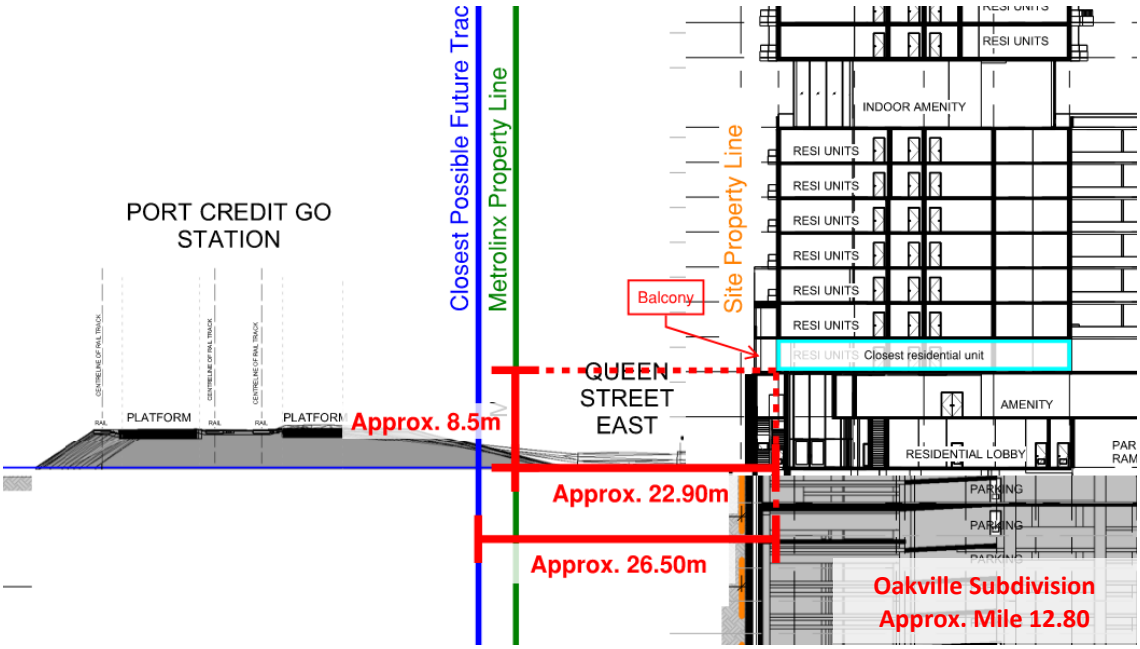
Setback Description	Distance (approximate)
Horizontal setback from the site property line to the Metrolinx station property line	20.15m
Horizontal setback from the site property line to the closest possible future track	23.75m
Horizontal setback from the closest residential unit to the Metrolinx station property line	22.90m
Horizontal setback from the closest residential unit to the closest possible future track	26.50m
Vertical setback from adjacent grade to the closest residential unit	8.50m
Combined vertical and horizontal setback from the closest residential unit to the Metrolinx station property line	31.40m
Combined vertical and horizontal setback from the closest residential unit to the closest possible future track	35.00m



Site Plan



Section view: setbacks to site



Section view: setbacks to closet residential unit

The towers' residential floors do not meet the minimum requirements of both a 30m setback from the rail corridor and a 2.5m high berm. Since a berm would overly restrict the site plan layout of the site area, a crash wall is recommended as set out in the FCM/RAC Guidelines.

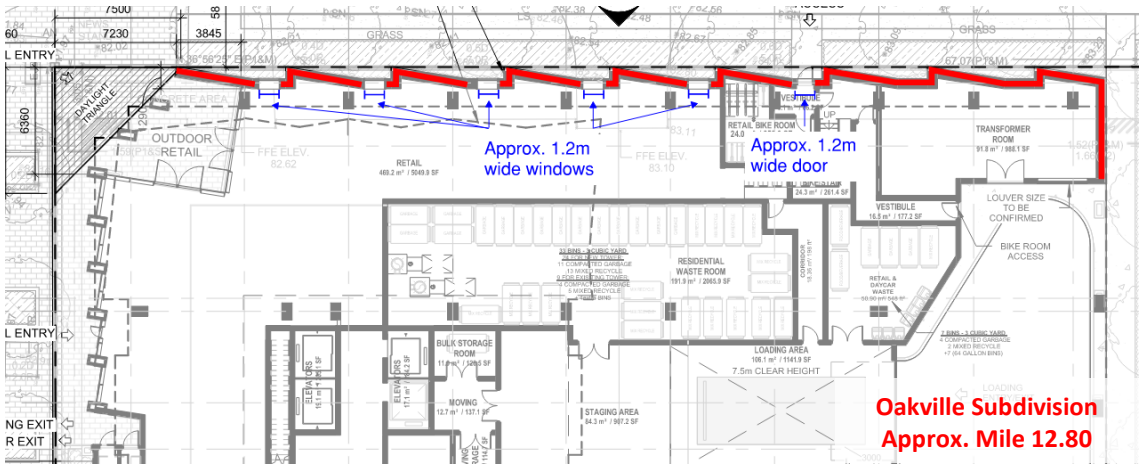
Crash Wall

It is our recommendation that a crash wall be constructed along the northwest edge of the tower meeting the FCM/RAC Guidelines and the AECOM design procedures for the 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 mitigate the risks associated with the development's proximity to the rail corridor.

The crash wall will be designed to allow for tracks to be added to the rail corridor or to the Metrolinx station property. Although the latter is unlikely, the crash wall is being designed for any future track location within Metrolinx property. Since the wall will always be at least 7.6m from the centreline of future tracks, we recommend a crash wall with the following requirements:

- Height of 2.135m from top of grade, which meets the minimum requirements of the FCM/AECOM guidelines,
- 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.

An illustration of the crash wall location is shown below in red:



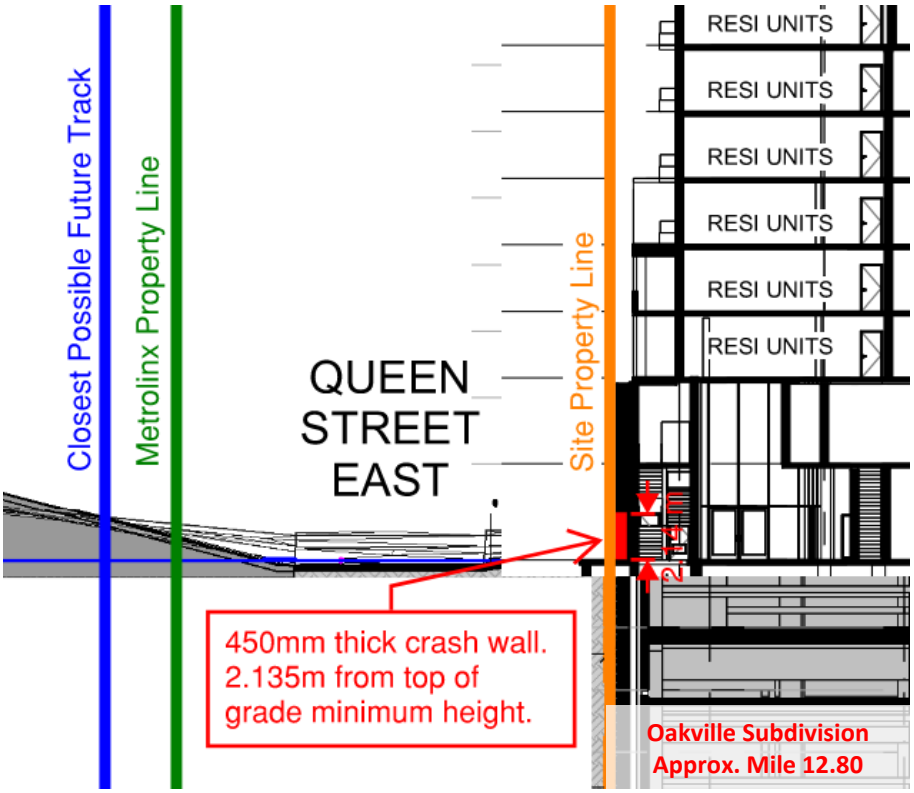
The crash wall is proposed to feature a sawtooth pattern that is reflective of the overall podium façade articulation, and that will increase the aesthetic quality of the Queen Street East frontage. There will be a total of 6 openings in the crash wall. Each opening will be less than 1.25m wide and located with the inner nook of the sawtooth wall layout shielding the opening. The location of the walls and openings have been arranged to protect the building columns mitigating the risk arising from eastbound or westbound train derailment. Five of the openings are windows and will allow light to enter the retail area of the development. The sixth opening in the crash wall will be a doorway to the bike storage room. The openings will create an inviting façade facing the GO Station and improve the public realm surrounding the development. The crash wall will be designed to meet the impact load and requirements previously mentioned in this report.

Structure Supporting the Building

The crash wall will be integrated with the northwest wall of the proposed tower. No floor area of the building is supported by the crash wall, having independent columns inboard of the wall for support. The crash wall is integrated and located on top of the building foundation wall. The crash wall is designed to be dependent on the building foundation wall, but the foundation wall is NOT dependent on the crash wall. Should the crash wall be removed or destroyed, the structural integrity of the foundation wall and the building superstructure shall not be compromised. The foundation wall shall be designed locally for the capacity of the crash wall (i.e. in an extreme ULS condition, a hinge would form at the base of the wall and not in the building basement or superstructure).

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.

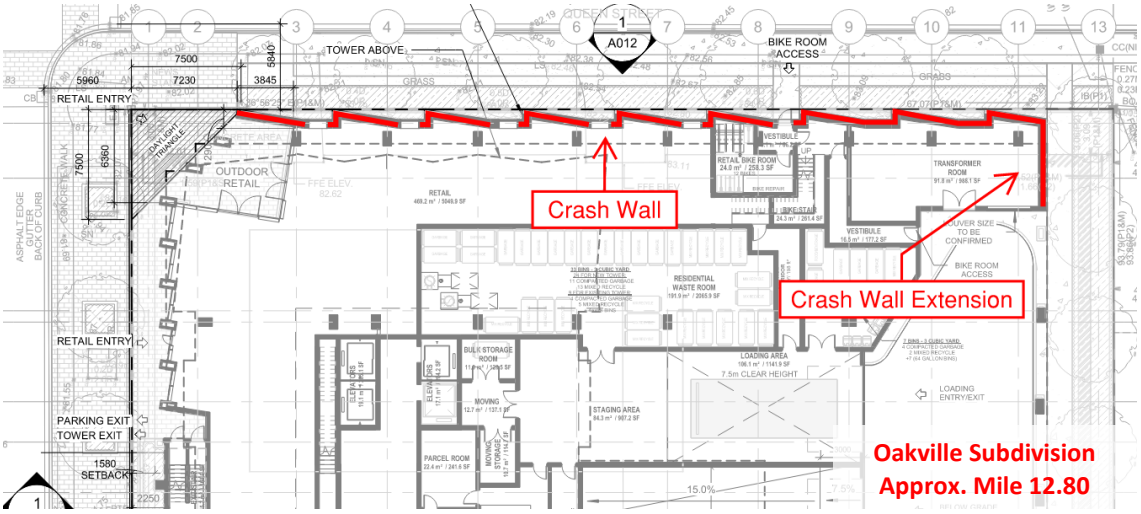
An example of the suggested crash wall is shown below:



Suggested crash wall

Crash Wall Extent

The crash wall will be integrated with the northwest wall of the proposed tower (the building foundation will not be dependent on the crash wall) and will extend 6m on the northeastern side of the building to protect the site from a derailed train. A crash wall extension on the southwestern side of the development would contradict the urban design intent of animating Queen Street East and the GO Station area; therefore, there will be no crash wall extension on this side of the development. Due to the distance from the rail corridor, it is our opinion that the development will be protected by the crash wall and the extension at the northeast corner.



Urban Design

Queen Street East is directly opposite the Port Credit GO Station and is a highly trafficked pedestrian route; however, the current condition is unfriendly to pedestrians and does not contribute to an attractive or safe public realm. The proposed development represents an opportunity to improve the current condition and provide a welcoming entry point to Port Credit.

Queen Street East is identified as a Transitional Street in the Port Credit Built Form Guide. Transitional Streets are intended to take on commercial, retail, or employment uses as Port Credit evolves into a more compact urban village; commercial retail buildings should be setback between 0.0 m to 3.0 m. Mississauga Official Plan and Port Credit Local Area Plan policies describe a desirable urban form that prioritizes an attractive, pedestrian-friendly public realm. Developments should face the street and incorporate active uses to improve the interface between developments and the public realm.

Given the City's urban design goals, a crash wall that permits an active use facing the street is the desirable alternative to a berm. As demonstrated in this report, a crash wall can be integrated into the façade of the building. The proposed crash wall allows the retail component of the building to be brought up to the street edge and allows for permeability in the interface between the development and the public realm. The proposed crash wall is integrated into the articulation of the podium façade. The sawtooth pattern, carried through the building design, will add to the attractiveness of the building as viewed from the Port Credit GO Station and Queen Street East.

Debris

The height of the crash wall at 2.135m above grade and the setback distance, reduces the risk of debris entering the site to a tolerable level and mitigates the risk from low flying debris. With the provision of the setback and the crash berm extent and height, the risk of debris is sufficiently mitigated to reasonable levels.

Fire

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

Smoke

As per the wind rose diagram, the wind would blow smoke away from the development. The setback from the tracks to the sensitive-use area of the site will also mitigate the risk due to smoke. Additionally, we recommend no air intakes on the northwest side of the building.

Trespassing/Fence Requirements

Since the site does not share a property line with the rail corridor, no fence is required on the proposed development site.

Construction

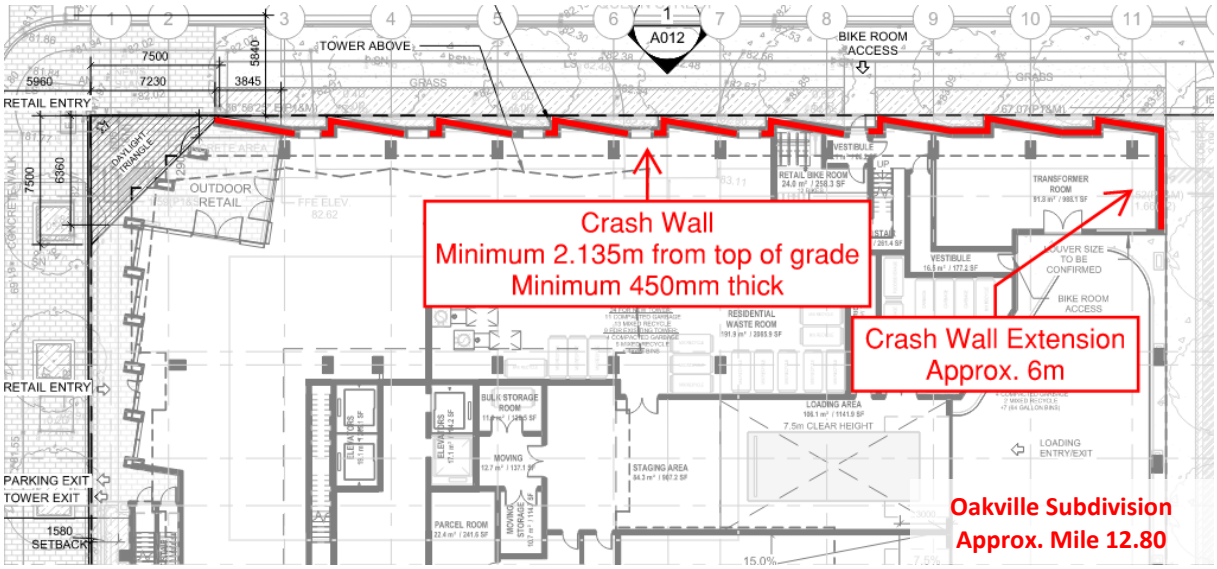
Any construction considerations will be dealt with separately with the contractor's input.

CONCLUSION

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

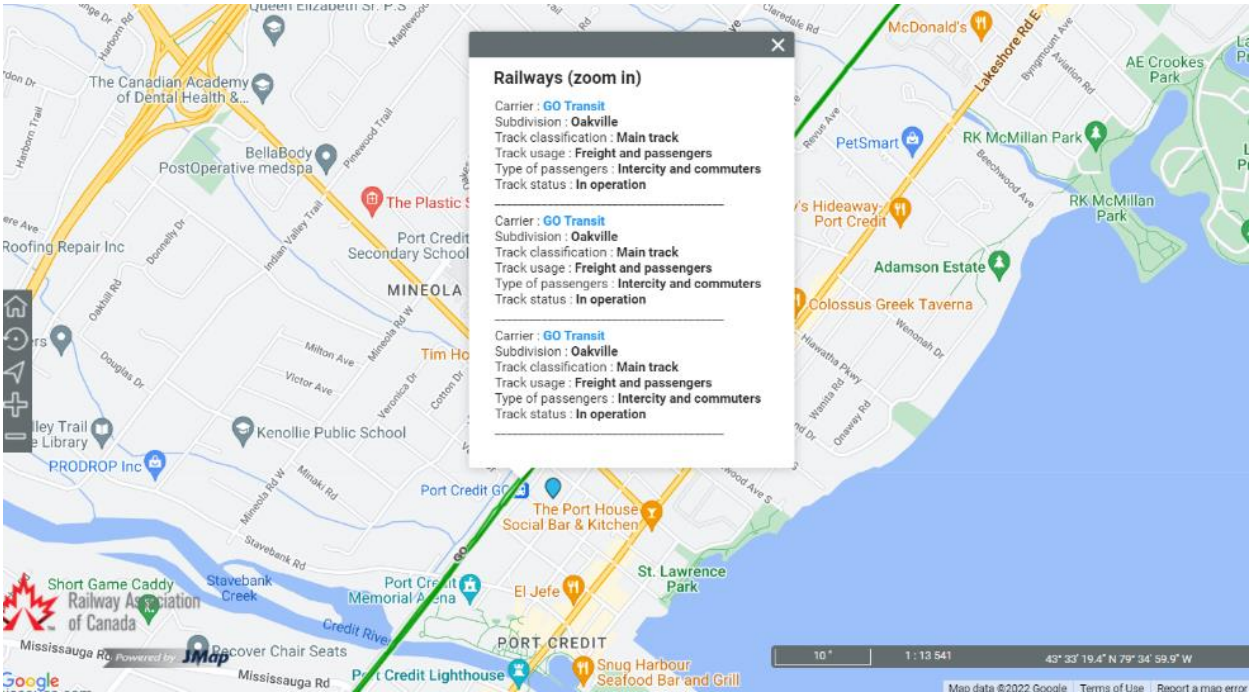
- Combined vertical and horizontal setback is approximately 31.40m from the closest residential unit to the Metrolinx station property line and approximately 35.00m from the closest residential unit to the closest possible future track.
- Crash wall with a minimum height of 2.135m from top of grade and 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 will be integrated with the northwest wall of the proposed tower and will have a 6m extension at the northeast corner.
- While the crash wall is integrated with the building's foundation wall and relies on propping from the floor slab, the structure is not structurally dependent on the wall. The building's structural adequacy remains uncompromised if the crash wall is removed or destroyed.
- The crash wall is to be built entirely on the development site.

An example of the proposed mitigating measures is shown below:

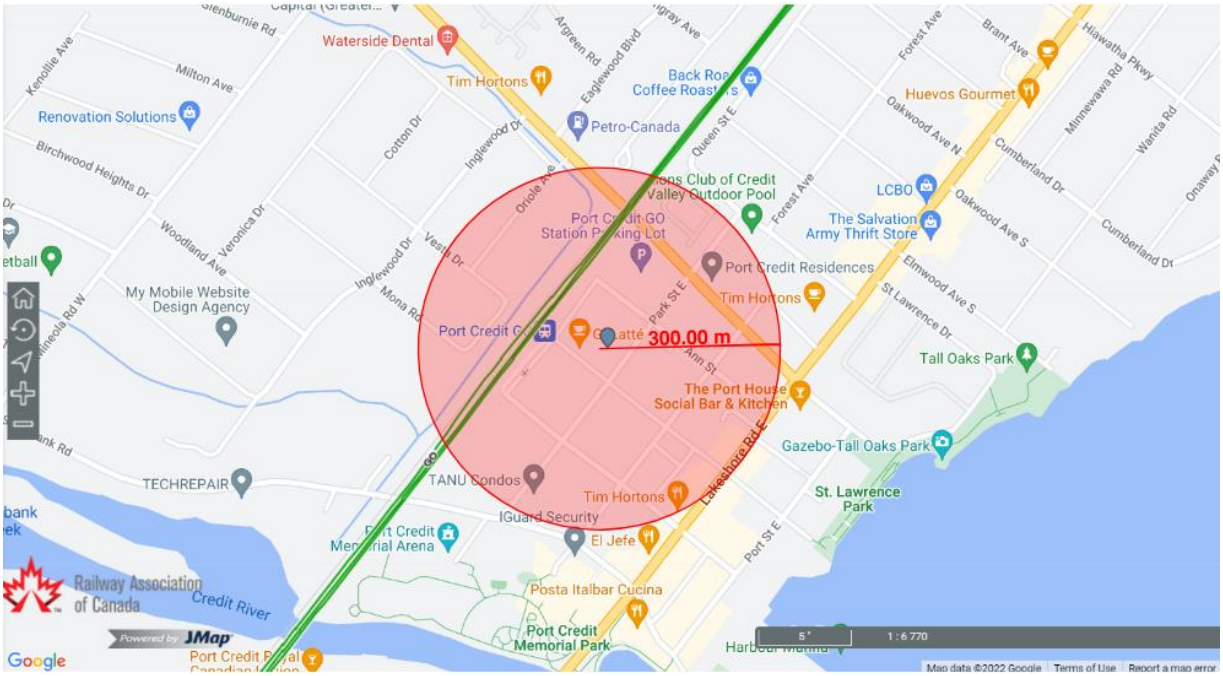


APPENDIX A: RAIL INFORMATION

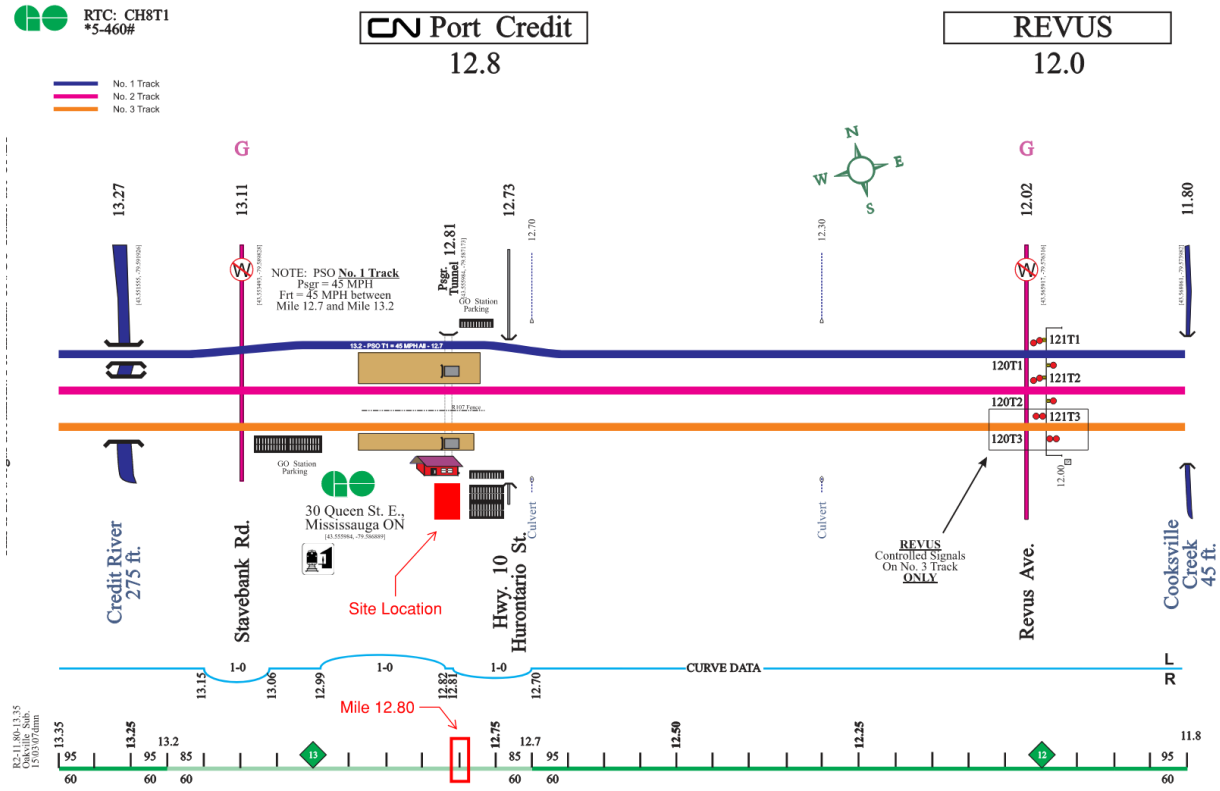
Railway Association of Canada Track Information:



No rail yards within 300m radius of site location:



Rail Corridor Information:



APPENDIX B: RISK ASSESSMENT MATRIX

Rail Safety Risk Assessment

No.	Hazard	Without Mitigating Measures				With Proposed Mitigating Measures				Net change of Risk Classification	Comments
		Frequency	Severity	Residual Risk	Risk Classification	Frequency	Severity	Residual Risk	Risk Classification		
1	Derailment Freight - Flammable or Hazardous materials *Derailment of frieght train transporting flammable/hazardous material*	2	5	10	Intolerable	2	3	6	Tolerable	-4	Crash wall and setback will mitigate the 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	Derailed freight train will not ingress site due to setback. Crash wall and setback will mitigate the risk.
3	Derailment Freight - Inert Direct Impact *Single freight car impact due to accordian style derailment*	2	2	4	Acceptable	2	2	4	Acceptable	0	Derailed freight train will not ingress site due to setback. Crash wall and setback will mitigate the risk.
4	Derailment Passenger - Glancing Blow *Multicar derailment of passenger train adjacent to site*	2	2	4	Acceptable	2	2	4	Acceptable	0	Derailed passenger train will not ingress site due to setback. Crash wall and setback will mitigate the risk.
5	Derailment Passenger - Direct Impact *Single freight car impact due to accordian style derailment*	2	2	4	Acceptable	2	2	4	Acceptable	0	Derailed passenger train will not ingress site due to setback. Crash wall and setback will mitigate the risk.
6	Excess Speed - Freight *Derailment of freight train travelling at speed in excess of track design speed*	2	5	10	Intolerable	2	3	6	Tolerable	-4	Crash wall and setback mitigates train ingress into site
7	Excess Speed - Passenger *Derailment of passenger train travelling at speed in excess of track design speed*	2	5	10	Intolerable	2	3	6	Tolerable	-4	Crash wall and setback mitigates train ingress into site
8	Airborn Debris - Freight *Top level sea-can of a double stacked intermodal freight car is launched due to a derailment*	2	3	6	Tolerable	2	2	4	Acceptable	-2	Crash wall will prevent impact from low flying debris, still possibility of debris over the wall. Setback will protect the sensitive-use areas
9	Groundborn 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	Crash wall protects development from low flying debris
10	Airborn Debris - Passenger *During a derailment, parts of the passenger train become airborn projectiles*	2	3	6	Tolerable	2	2	4	Acceptable	-2	Crash wall will prevent impact from low flying debris, still possibility of debris over the wall. Setback will protect the sensitive-use areas
11	Groundborn 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	Crash wall protects development from low flying debris
12	Smoke/Exhaust *Ingestion of smoke or diesel exhaust into a building's HVAC systems*	1	2	2	Acceptable	1	2	2	Acceptable	0	The setback distance to the residential towers and the prevailing winds will protect from smoke/exhaust. We recommend no air intakes on the northwest side of the tower
13	Trespassing *Ingress of non-authorised personel onto railway*	0	0	0	Acceptable	0	0	0	Acceptable	0	The site does not share a property line with the rail corridor
	Total Assessed Risk Score			72				52			

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

APPENDIX C: CORRESPONDENCE

Hi Julia,

Further to your request dated December 2, 2022, the subject lands (70 Park St E, 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 255 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)	60	11	101	42	Night (2300 - 0700)	8	4	21	8

The current track design speed near the subject lands is 85 mph (137 km/h).

There are *anti-whistling by-laws* in affect near the subject lands at Stavebank Rd.
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 2022 or 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

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

METROLINX

From: Julia Pannolino <julia.pannolino@entuitive.com>
Sent: December 1, 2022 4:56 PM
To: Rail Data Requests <RailDataRequests@metrolinx.com>
Subject: Rail Corridor Information - Mile 12.8 Oakville sub

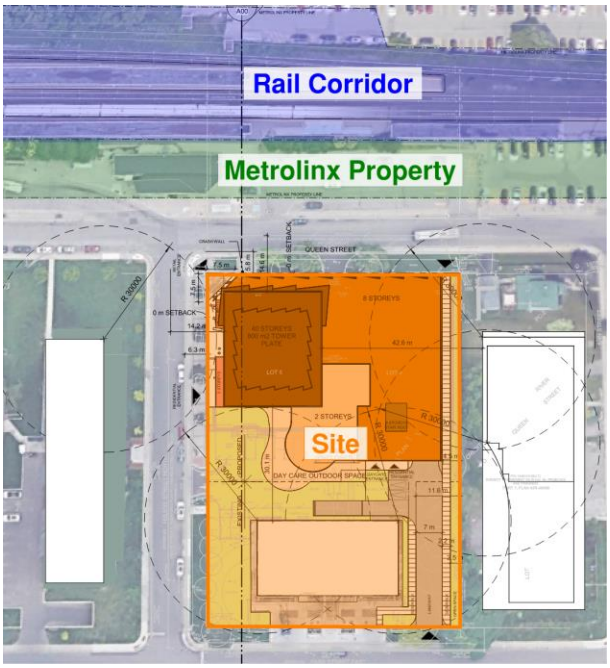
Hi,

Entuitive has been retained by Dream Unlimited to prepare a rail safety report for the proposed development at 70 Park St E, Mississauga (site image below). The site is located at approximately Mile 12.80 of the Metrolinx Oakville Subdivision, immediately south 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

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UNCOMPROMISING PERFORMANCE

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

Please note that I am sending you this email now because it is convenient for me. I do not expect you to answer it outside of your normal hours of work.