Blauson Assets Management Ltd.
c/o Ling Kee Group

Proposed Residential Development

320 McCowan Road

Toronto, Ontario

Derailment Protection Report

Metrolinx Kingston Subdivision
(Mile 323.65-324.0)

Prepared by:

Consulting Engineers and Landscape Architects
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Richmond Hill, Ontario, L4B 1G6

May 18th, 2023
Project No. 19-62

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(in support of Rezoning Application and Site Plan Application)

Summary of Issues/Revisions

No.	Date	By	Checked	Description
1	February 18, 2020	L.R.	T.G.	1st Submission to the City of Toronto and Metrolinx
2	June 10, 2021	L.R.	T.G	2nd Submission to the City of Toronto and Metrolinx based on Metrolinx comments dated July 7, 2020, and WSP comments dated August 7th, 2020
3	May 18th, 2023	S.B.	M.M.	3rd Submission to the City of Toronto and Metrolinx

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1.0 INTRODUCTION

1.1 Objectives

Blauson Assets Management Ltd. c/o Ling Kee Group (Blauson) is proposing the redevelopment at 320 McCowan Road in Toronto. The site is adjacent to an existing Metrolinx rail corridor. Presently there are three (3) sets of main tracks running along this section of rail corridor. With the property being immediately adjacent to the rail corridor, derailment protection is a requirement as part of the proposed redevelopment of the site. To assist Blauson in assessing the derailment protection measures required, Blauson has retained the services of JSW + Associates.

1.2 Scope of Report

The 1.689 ha. (4.174 ac.) site is located on the northwest side of the rail corridor and west of McCowan Road. The site currently consists of a four (4) storey parking garage. (see **Figure No. 1**, Key Plan).

Metrolinx and other railway companies have established a set of criteria for new developments adjacent to their respective rail corridors. Railway tracks have been classified into different categories based on their function, track design speed and volume of train traffic. The section of rail corridor which runs along the south side of the property is classified as a principal main line track. The principal main line has specific criteria with regard to setback requirements and the form of derailment protection (see **Figure No. 3** in **Section 2.2**). The specifics to this classification are included in subsequent sections of this report. The criteria have also evolved over the years to address site specific conditions.

Recently the Federation of Canadian Municipalities (FCM) and the Railway Association of Canada (RAC) commissioned the preparation of a guideline document for development adjacent to rail corridors entitled “Guidelines for New Development in Proximity to Railway Operations, May 2013” (FCM/RAC 2013). The reason for this updated document is summarized in Section 5.0 of the Guidelines which states, “As the shift continues towards curbing urban sprawl and intensifying existing built-up areas, lands close to railway corridors will continue to

become more desirable for development". This document recognizes the use of the typical berm as well as crash berms and crash walls as being methods for providing derailment protection to new developments".

Blauson proposed redevelopment of the 320 McCowan Road site is illustrated on Quadrangle Architects Site Plan and Building Elevations and Sections (see **Appendix 'A'**), which includes a method of derailment protection to comply with the FCM/RAC 2013 Guidelines noted above. This report presents further details on how the proposed development does provide the required protection to the proposed residential portion of the development. The documentation for this file has been issued for rezoning and site plan approval.

Figure 1 - Key Plan

1.3 Study Area

The 1.689 ha. site currently has a four (4) storey parking garage adjacent the rail corridor. Northwest of the parking garage structure is a private roadway and north of the roadway is an existing 19 storey apartment building. To the east of the site is McCowan Road which passes under the Metrolinx rail corridor (see **Figure No. 2** - Existing Conditions).

The elevation of the closest track is approximately 163.66 m in elevation. The grade at the property line is approximately a similar elevation at 163.55 m.

The distance to the closest track from the property line is approximately 24.1 m. The site slopes northwest from the grade along the rail corridor. The existing elevation at the southwest corner of the site is 162.46 m and the elevation at the roadway is 160.30 m. At the mid point of the site along the rail corridor, the existing grade at the property line is 163.62 m and the existing elevation at the roadway is 161.83 m. The existing elevation at the southeast corner of the site is 162.14 m and at the existing roadway the elevation is 162.11 m (Landmark Boulevard). Further east of the site, the Metrolinx rail corridor is an overpass to McCowan Road, which is approximately 5.5m higher than the underpass.

Figure 2 - Existing Conditions

Rail traffic data was obtained from Metrolinx (refer to the Metrolinx rail data correspondence in **Appendix 'C'** for details). Metrolinx utilizes all three (3) tracks that run adjacent to the site. They have also granted CN running rights in which, from time to time, freight trains are operational within this rail corridor The rail traffic is summarized in the table below.

Table 1 - Rail Corridor Traffic Data

Rail Subdivision	*Train Type*	*No. of Engines*	*No. of Cars*	*Daytime (1) (7am to 11pm)*	*Nighttime (1) (11pm to 7 am)*	*Maximum Speed (mph)*
GO Kingston Subdivision	Diesel GO Train Commuter	1	12	8	0	100
GO Kingston Subdivision	Electric GO Train Commuter	1	12	173	28	100
CN Kingston Subdivision	Freight	-	-	-	-	60

(1) **Number of Trains** (see **Appendix 'C'** – Email from Metrolinx)

1.4 Development Concept

Blauson is proposing to redevelop the site with a five (5) storey podium, a landscaped roof at the 6th floor level, internal parking spaces and two (2) high rise residential towers. One (1) tower is proposed to be 25 storeys in elevation (Tower 'A') whereas the other tower is 29 storeys (Tower 'B') in elevation (see the Architectural Site Plan and Building Sections in **Appendix 'A'** for details).

The proposed derailment protection for the site is a reinforced concrete crash wall. Please see Derailment Protection Plan Drawing DP-1 that is enclosed at the back of the report for further information. Along the southeast and southwest corner of the site, there are proposed return crash walls that provide derailment protection to the site from the flanks. Additionally, there is an existing underpass to the east of the site, which is McCowan Road; this provides additional protection to the development through the natural topography of the surrounding area. The extent of the crash wall is discussed further in **Section 2.3** - Crash Wall Returns.

The high-rise west tower is setback 20.28 m and 20.0 m for the east tower from the property line. The concrete crash wall will run along the full length of the southern limits of the property line (i.e. 204 m total length) with a minimum thickness of 450mm and a height of 5.0 m above the existing grade along the property line. The minimum thickness is 450mm based on a potential future track that is a minimum of 7.6m away from the subject site's property line (as confirmed by Metrolinx – see **Appendix 'C'** for details).

2.0 DERAILMENT PROTECTION AND SETBACK

2.1 Derailment Protection Criteria

The railway companies' criteria for derailment protection are based on the classification of the track to which the development is adjacent. The starting point is an expectation that a combination of a berm and building setback would be used for derailment protection. The track classification indicates the height of berm and the setback distance from the property line to the proposed building. The 320 McCowan Road site is adjacent to a principal main line which typically requires a 2.5 m high earth berm with a 30 m setback from the property line (see **Figure No. 3** – Option 1) where there is space to provide the berm and setback. Reductions to the 30 m setback have typically been approved with a reduction of up to 5.0 m to the setback distance (i.e. 25 m), by the relevant railway company, provided that the height of the berm is increased by 0.5 m to 3.0 m (see **Figure No. 4** – Option 2). Berm height is taken relative to the grade along the property line. **Figure No. 4** illustrates the typical berm and setback requested by Metrolinx and other railway companies.

To reduce the setback further requires satisfying the "Alternative Safety Measures" which requires the following (the "alternative structure").

The alternative structure is to be designed, subject to the criteria set out in the FCM/RAC Guidelines and to AECOM's memorandum referenced below, to accommodate four (4) load cases considered representative of a derailed train, as follows:

- ***Method 1 (Minimum Point Load)***
  - The wall may be designed for a minimum point load of 600 kip (2700 kN) applied horizontally and normal to the face at any point along the wall.

- The point load shall be applied at a height of 6 feet (1.8 meters) above the top of rail for walls up to 25 feet (7.6 meters) from the centerline of track, or a height of 6 feet (1.8 meters) above the groundline for walls farther than 25 feet (7.6 meters) from the centerline of the track.

- This method may be applied where track speeds do not exceed 50 mph (80 km/hr) for freight of 70 mph (112 km/hr) for passenger trains; where speeds exceed these limits, Method 2 shall be used.

➢ ***Method 2 (Energy balance approach)***

- An energy balance approach considering collision by glancing blow and single car rotation may be used to determine the design load. The following four (4) cases must be considered:

- *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.

- *Freight Train Load Case 2* – Single Car Impact: single weighing 143 tons (129,700 kg) impacting the wall as it undergoes rotation about its center. The angle of rotation at impact is:

  $\Theta_f = \text{asin}\left(\frac{d_{CL}}{8.5}\right)$ **[Equation 1]**

  Where;

  D_{CL} is the distance from the cash wall to the centerline of track in meters. The closest existing or future track is to be used. Where d_{CL} is greater than 8.5 meters, this load case need not be considered.

- *Passenger Train Load Case 3* – Glancing Blow eight (8) cars weighing 74 tons (67,120 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.

- *Passenger Train Load Case 4* – Single Car Impact: single car weighing 74 tons (67,120 kg) impacting the wall as it undergoes rotation about its center. The angle of rotation at impact is:

  $\Theta_f = \text{asin}\left(\frac{d_{CL}}{13}\right)$ **[Equation 2]**

  Where D_{CL} is greater than 13 meters, this load case need not be considered.

- In all of the above cases, the following parameters are to be taken into account:
- Speed of derailed units impacting the wall must be equivalent to the track speed.

- Height of the application of impact force must be applied at 1.8 m (6 feet) above the ground.

- For energy dissipation assume:
- Plastic deformation of individual cars due to direct impact are applied at a maximum of 0.3 m (1 foot).
- Compression of linkages of three (3) locomotives and six (6) cars consist of a maximum of 1.5 m (5 feet).
- Deflection of the wall is to be determined by the designer. The design must incorporate horizontal and vertical continuity to distribute the impact loads from the derailed train.

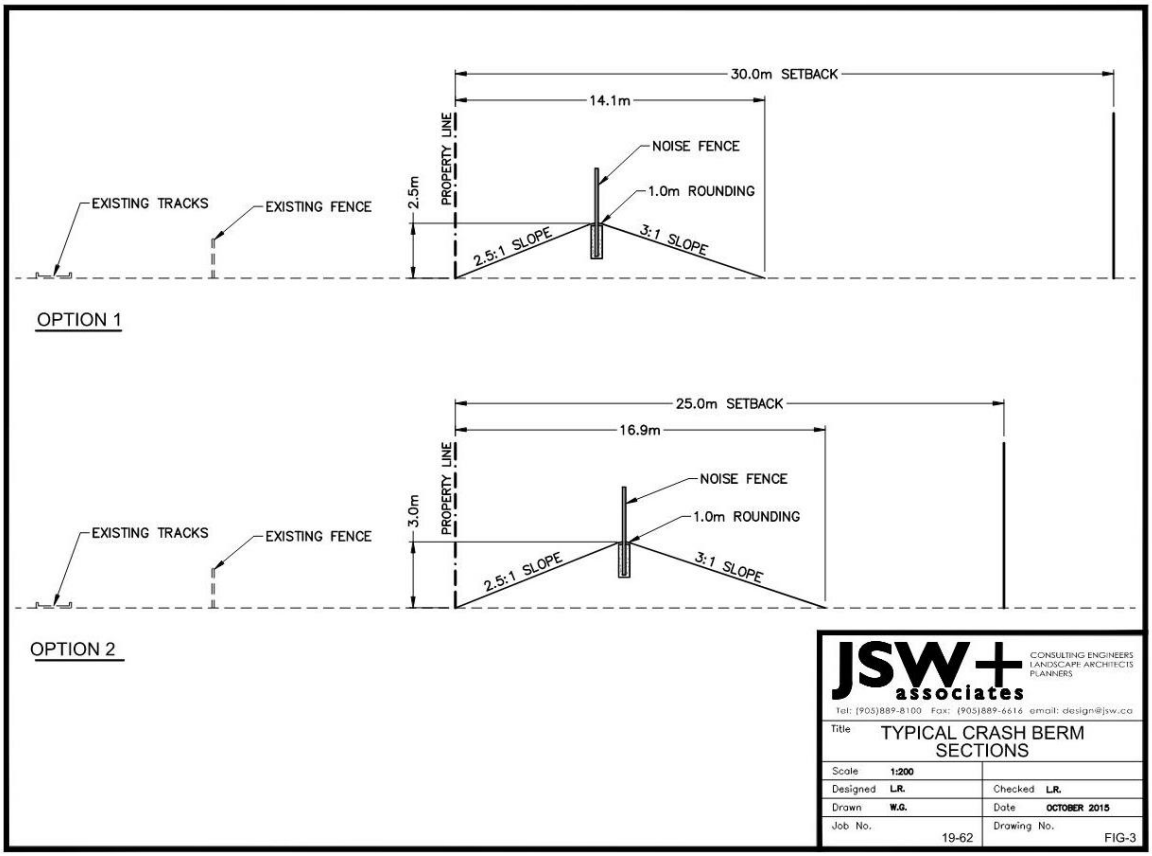
AECOM's memorandum dated July 29, 2014 Crash Wall Guidelines Revision 2, (see copy in **Appendix 'D'**) refines the structural assessment criteria presented above. Jablonsky, Ast and Partners Consulting Engineers are the structural engineers for the development and the crash wall (see there 'Crash Wall Response to Peer Review Comments' letter, dated June 9, 2021 in **Appendix 'B'**)

2.2 Setback Criteria and Protection Feature(s)

As indicated previously in this report, where derailment protection is to be provided by a berm and setback, the setback distance from the property line is typically 30m when using a 2.5m berm (see **Figure 3** for details). If the proposed setback is less than 25m then the derailment protection system should be designed to a system which will prevent the locomotives or rail cars from penetrating to or beyond the protection system. This is not a requirement in the AECOM design guidelines but is the typical approach by industry standards regarding a crash wall system. In the case of a crash berm, cars or locomotives should be contained within the berm mass and or not travel beyond the 30 m setback. With a crash wall, the impacting car(s) or locomotive(s) should not breach the wall system or cause damage to the residential portion of the building structure beyond the crash wall. The wall will act to deflect the impacting locomotive and/or railcar. This is why the crash wall is often referred to as a deflection wall rather than a crash wall. Additionally, the crash wall has been designed with consideration for the possibility of a future proposed track. As confirmed by the City of Toronto (through coordination with Metrolinx – see **Appendix 'C'**), it was confirmed that a potential future track will not be installed

closer than 7.6m to the subject development's property line. Thus, the minimum crash wall height will be 450mm in thickness (see Drawing No. DP-1 for details).

Figure 3 - Potential Derailment Protection Approaches

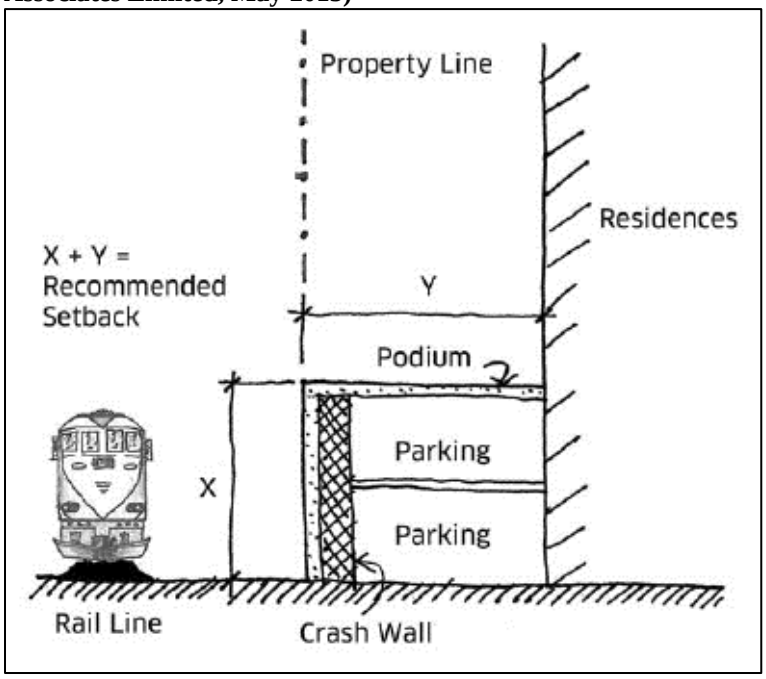


The proposed horizontal setback distance from the property line is 20.28 m for the west tower and 20.0 m for the east tower (see Drawing No. DP-1). The proposed crash wall will be designed to accommodate the estimated impact loads under the various case conditions. The wall height is proposed to be 5.0 m above the existing grade along the property line and will be designed to be a minimum of 450mm thick, as previously mentioned.

Typically, when a protection feature (earth berm or crash wall) satisfies the vertical requirements, reviewing agencies can authorize a reduction in horizontal setback limits (Guidelines for new Development in Proximity to Railway Operations – Prepared for the FCM and the RAC, May 2013). Since the railway corridor is a principal mainline, the required building setback from the property line is to be 30 meters. In accordance with page 27 of the FCM/RAC Guidelines, horizontal

setback requirements may be substantially reduced with the construction of a crash wall. Based on this clause, a reduction in horizontal set back requirements is plausible for this site as the proposed protection feature is a crash wall. Thus, by utilizing a crash wall, the total setback can be reduced to 25 meters. Furthermore, to satisfy the minimum total setback, a combination of horizontal setbacks, and vertical or protection feature setbacks (whichever setback is greater) will be provided to satisfy this criterion (see ***Figure 4*** below).

Figure 4 - Incorporating a Crash Wall into a Development (J.E. Coulter Associates Limited, May 2013)



In order to further understand the setback limits throughout the subject site, ***Table 2*** has been prepared below to provide additional clarity. The *Protection Feature Setback*[1] defines the setback from the centerline of the northernmost existing track to the rail corridor's property line. Although this setback distance is not accounted for in the required setback limits, this supplemental information is helpful because it provides additional levels of safety when the existing track is setback further from the subject property line. The *Minimum Horizontal Setback*[2] defines the minimum horizontal distance from the rail corridor's property line to the building façade (referencing the closest point of the building to the property line). The *Vertical Setback*[3] defines the vertical height of each floor, of the proposed development, above the *ground floor*. The *Protection Feature Height*[4] defines the vertical height

of the protection feature. The *Minimum Total Setback*[5] is defined by the combination of the *Minimum Horizontal Setback*[2] and the *Vertical Setback*[3] or *Protection Feature Height*[4] (whichever setback is greater). It is also to be noted that the setback criteria(s) were measured as the worst-case condition for each building (the closest points).

Table 2 - Proposed Site Setbacks (Governing Building)

Building Level (Tower 'B')	*Protection Feature Setback[1] (m)*	*Minimum Horizontal Setback[2] (m)*	*Vertical Setback[3] (m)*	*Protection Feature Height[4] (m)*	*Minimum Total Setback[5] (m)*
1st Level	23.37	20.0	0	5.0	**25.0m**
2nd Level	23.37	20.0	4.9	5.0	**25.0m**
3rd Level and above	23.37	20.0	8.9	5.0	**28.9m**

The setbacks were determined for the residential tower to ensure that the entirety of the sensitive use areas complied with the 25 m total setback requirement. As seen above in ***Table 2,*** the *Minimum Total Setback*[5] to the residential tower's ground floor is 25.0m. Therefore, the entirety of the subject site meets or exceeds the 25m required total setback.

2.3 Crash Wall Returns

In terms of derailment protection from the flank, the site will be equipped with two (2) return crash walls. These return crash walls will be continuations of the proposed crash wall. The first return crash wall will begin at the western limit of the proposed crash wall and will traverse along the western property line for 26.5m. The second return crash wall will begin at the eastern limit of the proposed crash wall and will traverse along the eastern property line for 7.1m. Both return walls will be 5m in height and a minimum of 450 mm in thickness.

The subject site is presently orientated just west of the McCowan Road underpass. In addition to the proposed return crash walls, the underpass will provide additional derailment protection to the development, from the flank. In the event that the locomotive or cars do depart from the track alignment, the train would fall onto to

the road below. The retaining walls and abutment of the underpass would be impacted before the train would impact the side of the proposed building. Lastly, the north and south tracks of the three (3) sets of tracks are equipped with Jordan rail system, this will be an extra deterrent for derailment within the rail corridor.

2.1 Rail Corridor Security

To safeguard against trespassing, the rail corridor will be cordoned off with a chain link security fence traversing along the subject site's western property line. This chain link fence will be 2.43m in height and will possess non-cut and non-climb chain link fabric (see ***Appendix 'E'*** for details).

2.2 Risk Assessment

As outlined in the 2013 FCM Guidelines the individual risks must be identified and evaluated. Each risk shall outline the mitigation measures that are proposed or planned to address these risks. Such risks may include injury or loss of life and damage to public or private infrastructure.

The 5.0 m high crash wall will be installed along the property line. Beyond the limits of the crash wall, a 2.4 m high Metrolinx security fence (see **Appendix 'E'**) will be installed for the balance of the property. With the 5.0 m high crash wall and 2.4 m high security fence, trespassing from the development site into the Metrolinx corridor will be prevented.

Table No. 4 summarizes the potential risk adjacent a rail corridor and the risk level for the proposed development at 320 McCowan Road.

2.3 Life Cycle and Operations

To ensure that the derailment protection feature(s) continuously operate as per the intended design, scheduled inspection will be required on an ongoing basis to determine the adequacy of said item(s). Although a majority (if not all) of the design features are 'set-it-and-forget it' items, it is prudent to investigate any deficiencies that may occur due to weathering, erosion, fatigue and/or human interference. Based on the aforementioned, the table seen below has been prepared as a rough

approximation in terms of life cycle, inspection frequency and maintenance requirements.

Table 3 - Protection Feature Life Cycle and Requirements

Item	*Life Expectancy (years)*	*Required Inspection Frequency*	*Maintenance/Inspection Requirements*
Chain Link Fence	35	Monthly	-Repair visible cuts or openings in fence fabric, as soon they are evident. -Repaint fence with rust paint every 5 years -Ensure fence posts are upright
Crash Walls	100+	Biannually	-Inspect for over excessive wall batter -Analyze wall for crumbling, structural fractures and warping

3.0 CONCLUSIONS AND SUMMARY

a) The derailment protection must offer the same level of safety as “the required 30 m setback and berm”. The proposed setback and crash wall does provide the similar level of protection as the earth berm and a 30 m setback.

b) A reinforced concrete crash wall is proposed. The proposed crash wall will span the southern limits of the subject site. The proposed crash wall will be designed to be 5m high, and a minimum of 450 mm thick and 222 m long.

c) Crash wall returns are proposed on the east and west sides of the property and will be continuations of the proposed crash wall. The first return crash wall will begin at the western limit of the proposed crash wall and will traverse along the western property line for 26.5m. The second return crash wall will begin at the eastern limit of the proposed crash wall and will traverse along the eastern property line for 7.1m. Both return walls will be 5m in height and 450mm in thickness. The McCowan Road underpass will also provide additional derailment protection to the easterly side of the building.

JOHNSON SUSTRONK WEINSTEIN + ASSOCIATES

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Risk Assessment Matrix

Table No. 4.0

Prepared by (name & company):	JSW+ Associates
Site:	320 McCowan Road, Toronto, Ontario
Adjacent Rail Corridor:	Metrolinx Kingston Subdivision
Date:	Friday, May 5, 2023
Revision:	2

1) The Kingston Subdivision provided running rights to other freight companies, and hazardous and flammable materials are transported on it regularly.
2) Dangerous good trains operate at reduced mainline speeds compared to other freight trains.
3) Crash wall design only intended to restrain physical forces of train derailment. Crash wall provides little or no protection against explosion, fire, or releases of hazardous goods. Emergency forces may decide evacuation is required in this event.
4) Mainline track in this area is tangent with no crossover switches.

#	Frequency	Severity
1	Improbable	Negligible
2	Remote	Marginal
3	Occasional	Serious
4	Probable	Critical
5	Frequent	Catastrophic

Ref	Pre-Development Risks						Post Development Risks					
	Hazard	Consequence	Frequency	Severity	Pre-Development Risk	Risk Classification	Safeguard/ Mitigation Measure (Describe the measure put in place which results in a reduction in likelihood and/or severity of the hazard)	Assumptions/Comments (Provide additional information relevant to the assessment of the revised ratings for Frequency and severity, as relevant)	Frequency	Severity	Post Development Risk Ranking Rank	Risk Classification
1	Derailment of freight train carrying flammable or hazardous materials.	On collision with proposed wall on site, rail cars with flammable/hazardous materials cause explosion ignite, explode or are released adjacent to the building causing injuries and/or fatalities to occupants.	2	5	10	Intolerable	Crash wall in place to retain train in the rail corridor. Only low occupancy use in area adjacent to crash wall. The setback distance to the residential units from the rail corridor property line is 20.28 m west Tower and 20.0 m east Tower	1) Dangerous good trains operate at reduced mainline speeds compared to other freight trains. 2) Crash wall design only intended to restrain physical forces of train derailment. Crash wall provides little or no protection against explosion, fire, or releases of hazardous goods. Emergency services may decide evacuation is required in this event. 3) Mainline track in this area is straight 4) The crash wall will be constructed to a 5.0 m height above the existing grade along the property line.	2	3	6	Tolerable
2	Derailment of freight or passenger train at speed greater than maximum line speed with berm/crash wall in place.	Collision of freight or passenger train with crash wall could deflect more than design allowance. The Wall and connecting sacrificial structures experience more damage than design expectation.	2	5	10	Intolerable	The crash wall will be designed to specified railway design loading limits. The crash wall will be structurally independant to the underground parking garage. In addition, a temporary shoring wall will be installed north of the crash wall, along the south edge of the rail corridor. The crash wall and underground garage structure will be structurally isolated to prevent the transfer of any potential derailment forces/energies into the residential structure. The shoring wall will have tie-backs into Metrolinx rail corridor subject to receiving Metrolinx's approval.	See comments in item 1. Crash Wall design criteria assumes posted track speeds for the corridor. Note that train speeds in excess of posted maximum mainline speeds can only be mitigated through the action by the railway company (Metrolinx).	2	2	4	Tolerable
3	Derailment of freight train	Transfer of derailment loads/forces to the auxiliary and principal building structures causes moderate to significant damage and possible collapse.	2	5	10	Intolerable	Crash wall in place to retain train within the 20 m horizontal setback. The residential is 20 m or greater away from the property line. See item 2 mitigation measures.	See comments in item 1.	2	2	4	Tolerable
4	Energy of derailed train deflected back from the crash wall into rail cars.	Transfer of forces caused by sudden deceleration results in higher risk of equipment rupture and/or sparking, potentially causing fire or explosion.	2	5	10	Intolerable	See item 2 mitigation measures.	See comments in item 1.	2	2	4	Tolerable
5	Derailment of freight train into corners of proposed development property or berm/crash wall.	Derailed freight cars or passenger cars enter the site from an angle (i.e. either from east or west approaches), bypassing the protection along the property line, and colliding with buildings on the site or hitting the corner of the crash wall.	2	5	10	Intolerable	Crash wall returns are proposed beyond the west and east ends of the building.	The crash wall will be extended beyond the building along the southwest and northeast sides along the property line. Additionally at the east side is the McCowan Road underpass which will provide protection to the east side of the development	2	2	4	Tolerable
6	Top level of sea-can (double stack intermodal) freight car becomes airborne in a derailment.	Airborne freight car over sails the crash wall and collides with the building.	2	5	10	Intolerable	The height of the crash wall is 5.0m above the top of the existing grade elevation along the property line. The buildings are setback 20.28 m and 20.0 m or more from the rail corridor.	See comments in item 1.	2	2	4	Tolerable
7	Trespassing onto railroad	Interference with railway operations, vandalism, and danger to the trespasser(s) from moving trains.	2	5	10	Intolerable	No access will be available from the 320 McCowan Road development. The crash wall is in accordance with the FCM/RAC Guidelines, a 2.4 m high Metrolinx security fence is required along the property line and tied into existing adjacent property fencing at either end in such a way as to prevent trespassing onto the rail property.	No access from the development site to the rail corridor will be available. Access is controlled by a 2.4 m high fence and the crash wall. No access will be permitted from the development site.	1	4	4	Tolerable

Table 1 - Risk Classification Matrix

			SEVERITY				
			Catastrophic	Critical	Serious	Marginal	Negligible
			5	4	3	2	1
FREQUENCY	Frequent	5	25	20	15	10	5
	Probable	4	20	16	12	8	4
	Occasional	3	15	12	9	6	3
	Remote	2	10	8	6	4	2
	Improbable	1	5	4	3	2	1

Table 1 - Risk Category & Mitigation Strategy

Risk (Frequency x Severity)		Risk Category	Mitigation Strategy
Low	1 to 4	Broadly Acceptable	Risk is acceptable. No further mitigation required.
Medium	4 to 10	Tolerable	Risk is considered tolerable if agreed that the risk is reduced to a level considered ALARP*
High	10 to 25	Intolerable	Risk shall be eliminated/reduced.

**As low as reasonably practicable.*

Table 3 - Definition of Safety Hazard Severity Criteria

Hazard Rating		Consequence to Personnel or General Public	Consequence to the Environment	Consequence to the Rail System and Operation
1	Negligible	Non-reportable injury	None	Monetary loss less than $10k.
2	Marginal	Single minor injury	Reversible minor environmental impact	Minor operational delays Dangerous goods involved without release of product; Monetary loss between $10 k and $100 k.
3	Serious	Single permanent partial or temporary total disabling injury; Multiple minor injuries.	Reversible moderate environmental impact	Significant system loss, severely restricting operations; Dangerous goods release not resulting in evacuation; Monetary loss between $100 k and $1 million.
4	Critical	Single fatality; Single instances of permanent total disability; Multiple instances of permanent partial or temporary total disabling injuries.	Reversible significant environmental impact	Major loss of system / sub-system resulting in not being able to continue operations; Dangerous goods release resulting in evacuation; Monetary loss between $1 million and $10 million.
5	Catastrophic	Multiple fatalities; Multiple instances of permanent total disability	Irreversible significant environmental impact	Total loss of services; Dangerous goods release resulting in major evacuation; Monetary loss esceeding $10million.

Table 4 - Definition of Hazard Frequency Criteria

Rating		Qualitative Interpretation	Interpreted for Lifecycle
1	**Improbable**	Unlikely to occur, but possible. It can be assumed the event is unlikely to occur.	100 years to 1000 years
2	**Remote**	Likely to occur sometime in the rail system lifecycle. It can reasonably be expected to occur several times.	10 years to 100 years
3	**Occasional**	Likely to occur several times. The event can be expected to occur several times.	Yearly to every 10 years
4	**Probable**	Will occur several times. The event can be expected to occur frequently.	Monthly to yearly
5	**Frequent**	The event will be continually experienced	Daily to monthly

APPENDIX ‘A’

Architectural Drawing Set

BDP. Quadrangle

Quadrangle Architects Limited
901 King Street West, Suite 701 Toronto, ON M5V 3H5
t 416 598 1240 www.bdpquadrangle.com

320 McCowan Road

Toronto, Ontario

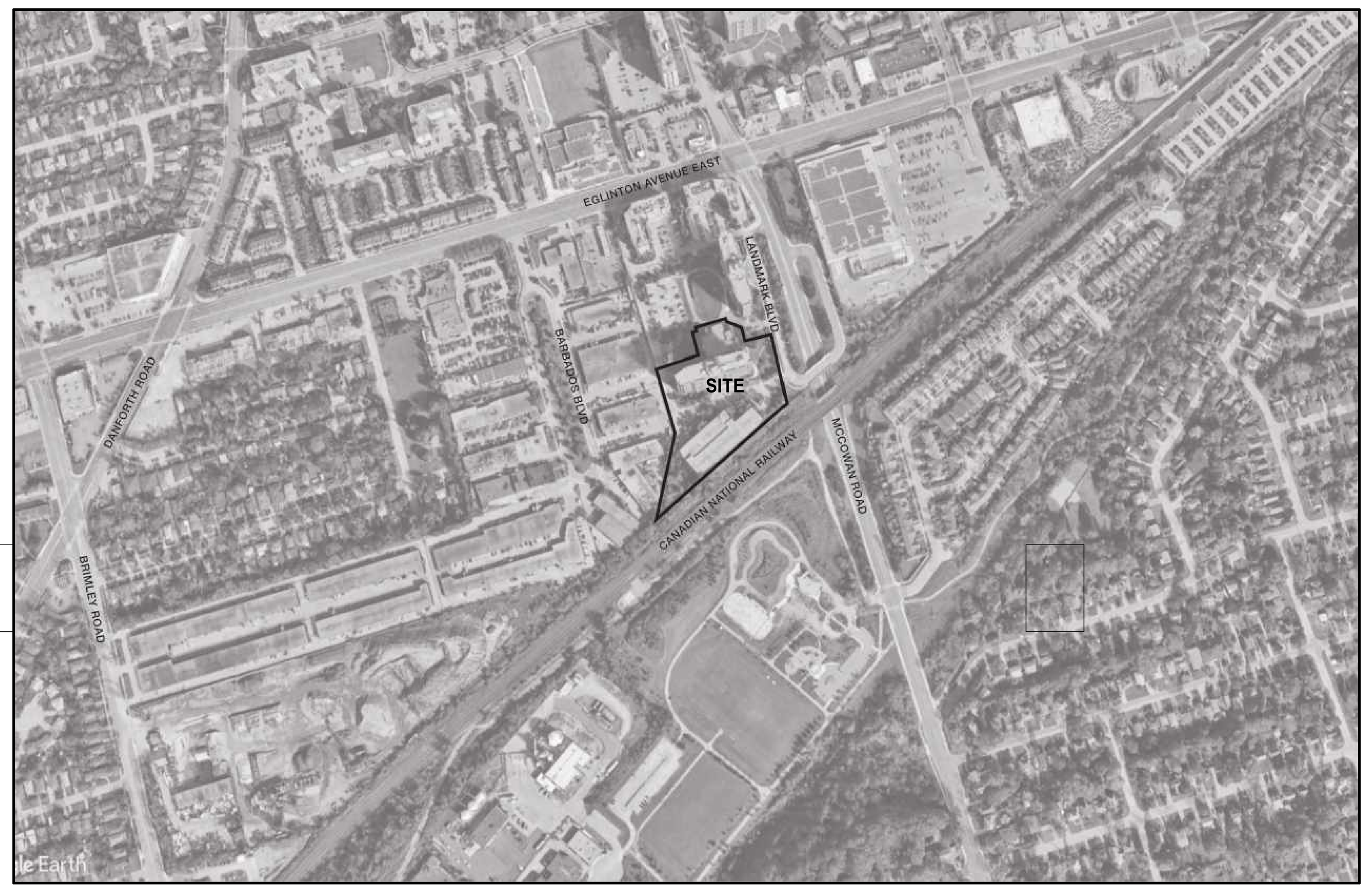
for
Blauson Assets Management Ltd. c/o Ling Kee Group

Project No. 18005
Date 2023-05-18
Issued for Rezoning Resubmission

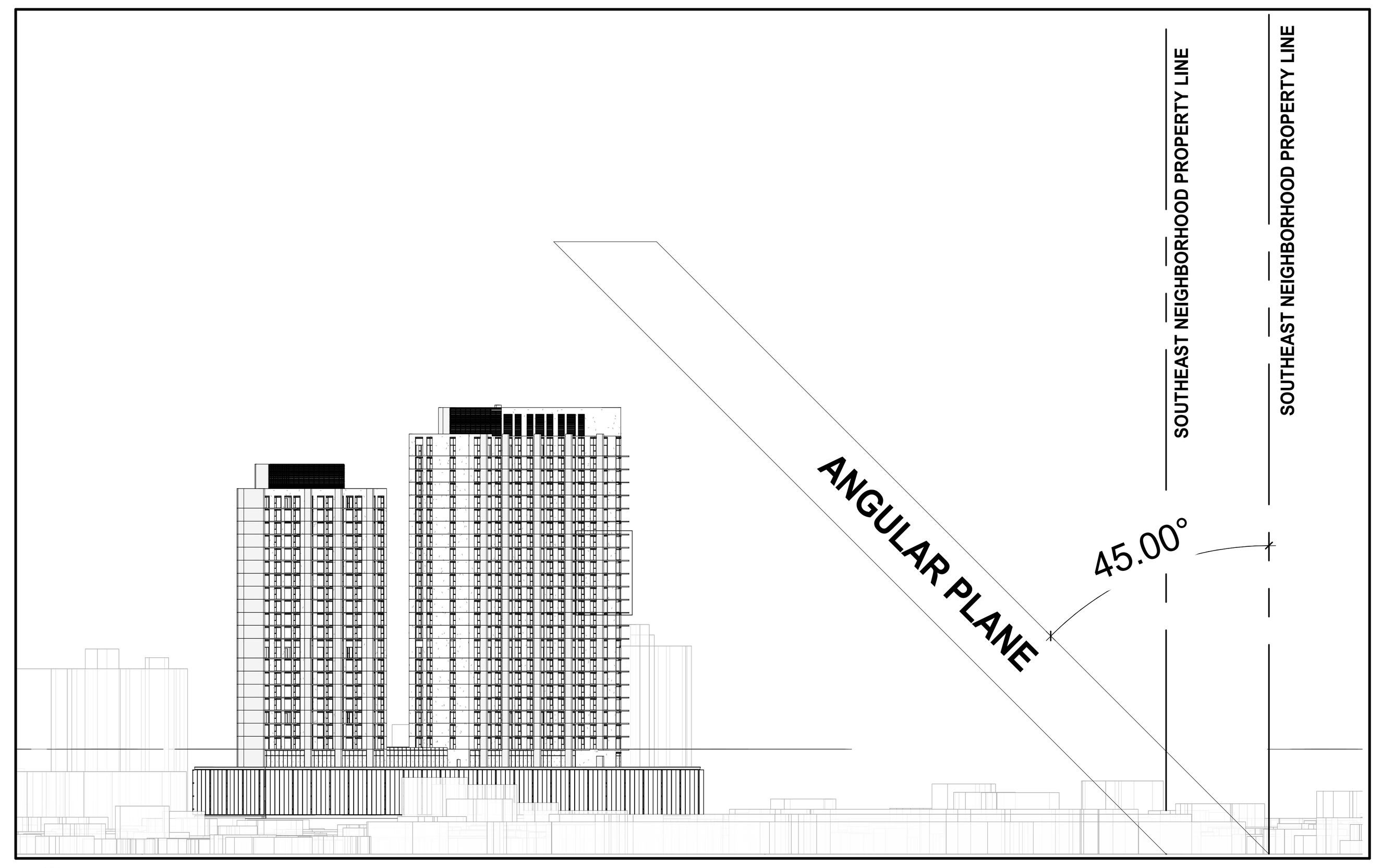
ARCHITECTURAL DRAWINGS

LANDSCAPE ARCHITECT

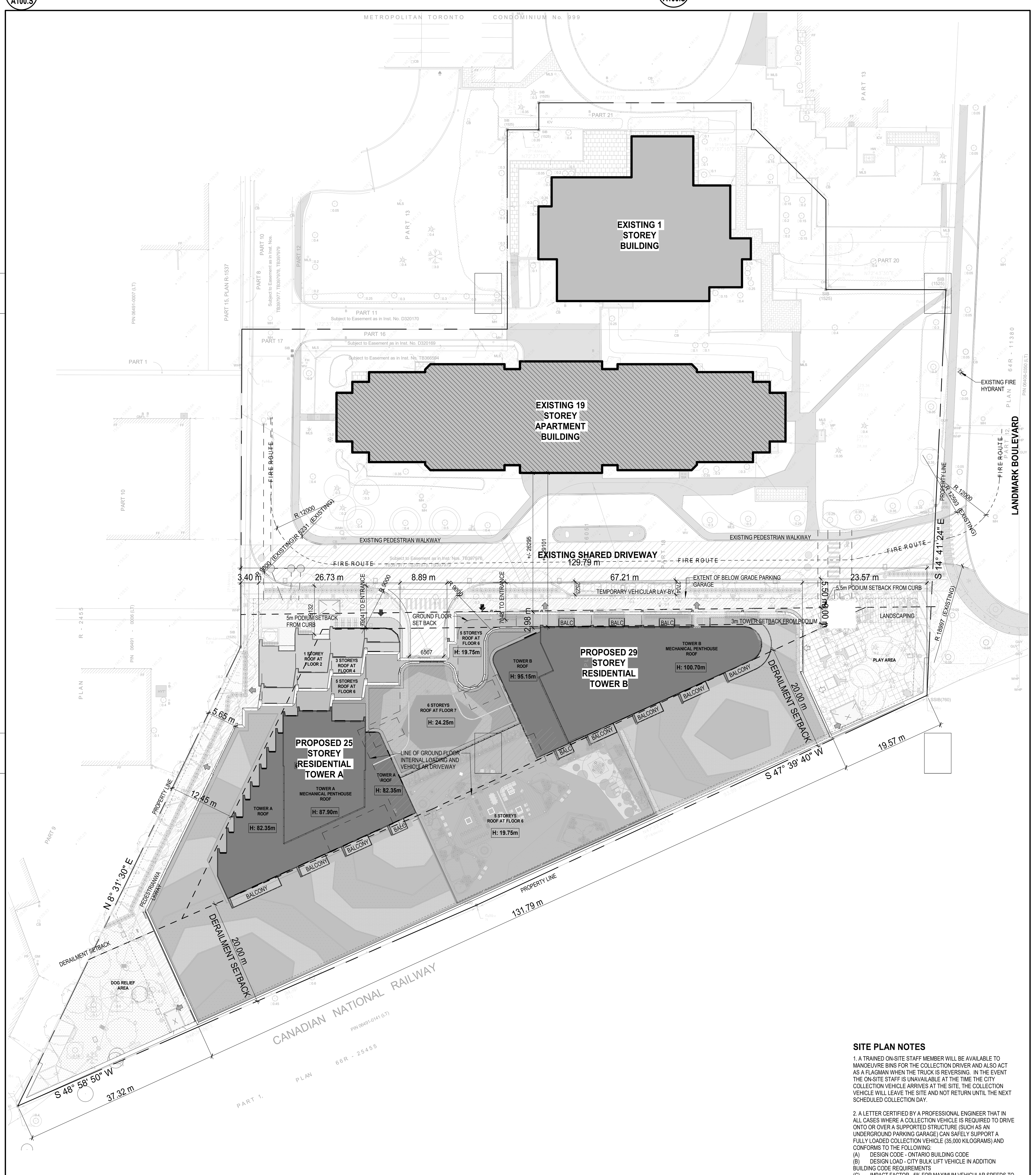
MBTW WAI
255 Wicksteed Ave., Unit 1A
Toronto, ON, Canada M4H 1G8
T 416 449 7767



7 A100.S Key Map



6 A100.S South Elevation Angular Plane Study



SITE PLAN NOTES

1. A TRAINED ON-SITE STAFF MEMBER WILL BE AVAILABLE TO MANOEUVRE BINS FOR THE COLLECTION DRIVER AND ALSO ACT AS A FLAGMAN WHEN THE TRUCK IS REVERSING. IN THE EVENT THE ON-SITE STAFF IS UNAVAILABLE AT THE TIME THE CITY COLLECTION VEHICLE ARRIVES AT THE SITE, THE COLLECTION VEHICLE WILL LEAVE THE SITE AND NOT RETURN UNTIL THE NEXT SCHEDULED COLLECTION DAY.

2. A LETTER CERTIFIED BY A PROFESSIONAL ENGINEER THAT IN ALL CASES WHERE A COLLECTION VEHICLE IS REQUIRED TO DRIVE ONTO OR OVER A SUPPORTED STRUCTURE (SUCH AS AN UNDERGROUND PARKING GARAGE) CAN SAFELY SUPPORT A FULLY LOADED COLLECTION VEHICLE (35,000 KILOGRAMS) AND CONFORMS TO THE FOLLOWING:
(A) DESIGN CODE - ONTARIO BUILDING CODE
(B) DESIGN LOAD - CITY BULK LIFT VEHICLE IN ADDITION BUILDING CODE REQUIREMENTS
(C) IMPACT FACTOR - 5% FOR MAXIMUM VEHICULAR SPEEDS TO 15 KM/H AND 30% FOR HIGHER SPEEDS

4 A100.S Site Plan Overall
SCALE: 1 : 400

	Floor	GBA/Typ. Floor (sm)	No. Typ. Floors	GBA Gross Building Area (no exclusions) sm	GBA sf	569-2013 GFA Exempt¹ (sm)	City By-Law 569-2013 GFA (Res) sm	GFA (Res) sf
TOWER B (EAST)	Mech Penthouse			577.0		577.0	0.0	
	Typical Floor 7-29	750	1	0.0		0.0	0.0	
	Total Typical 7-29		23	17,250.0	185,683.5	970.6	16,279.4	
TOWER A (WEST)	Mech Penthouse			272.0		272.0	0.0	
	Typical Floor 7-25	750	1	0.0		0.0	0.0	
	Total Typical 7-25		19	14,250.0	153,390.7	767.6	13,482.4	
	6th Floor (Amenity)		1	1,966.0	21,162.5	125.0	1,841.0	
	5th Floor		1	5,458.0	58,751.3	130.0	5,328.0	
	4th Floor		1	5,458.0	58,751.3	130.0	5,328.0	
	3rd Floor		1	5,561.5	59,865.4	130.0	5,431.5	
	2nd Floor		1	5,561.5	59,865.4	265.7	5,295.8	
	Ground		1	4,927.9	53,045.2	1,138.1	3,789.8	
BELOW GRADE	P1		1	7,127.9	76,726.6	6,981.9	146.0	
	P2		1	7,127.9	76,726.6	6,981.9	146.0	
TOTALS		Tower A	25				57,067.9	614,274
		Tower B	29	Indoor Amenity Deduction			966.0	
				75,537.7	813,081		56,101.9	603,876

Suite Breakdown		Bach	1 Bdrm	1 Bdrm +Den	2 Bdrm	2 Bdrm +Den	3 Bdrm	Total Suites	Residential Saleable/Rentable Area (sm)	Efficiency
Tower B										
Typical Floor 7-29			4		5		1	10	651	87%
Total Typical 7-29			92		115		23	230	14,973.0	
Tower A										
Typical Floor 7-25		1	3		5		1	9	660	88%
Total Typical 7-25		19	57		95		19	190	12,540.0	
6th Floor (Amenity)			5		2		1	8	452.0	
5th Floor			2		9		1	12	905.0	
4th Floor			2		9		1	12	905.0	
3rd Floor			2		8		2	12	919.0	
2nd Floor			1		8		3	12	925.0	
Ground			7		0		0	7	391.0	
TOTALS		19	168	0	246	0	50	483	32,010.0 / 344,553 sf	42%
% of Suite Type	0.0%	3.9%	34.8%	0.0%	50.9%	0.0%	10.4%	100%		

GFA USE Breakdown	GBA	GFA
Existing Residential Building	29,146.0 sm	27,688.7 sm
Existing Community Centre	904.3 sm	859.1 sm
Total New Residential (excluding above grade parking)	**75,537.7 sm**	**39,887.9**
Total with Existing Buildings	**105,588.0 sm**	**68,435.7**
Total New Residential (including above grade parking)	**75,537.7 sm**	**56,101.9 sm**
Total with Existing Buildings	**105,588.0 sm**	**84,649.7 sm**

Area Totals & FSI	
Building Height (m) 95.15	Site Area 16,888.0 sm
Total BUILDING GFA excl. above grade parking	68,435.7
Floor Space Index (FSI) excl. above grade parking	4.05
Total BUILDING GFA incl. above grade parking	84,649.7 by-law 569-2013
Floor Space Index (FSI) incl. above grade parking	5.0

The STATS below are based on requirements as per PA4 and the Toronto Green Standard V3

VEHICULAR PARKING — Based on Policy Area 4	Rate		Units	PA4	Provided
Residential - Occupant					
Bach <45sm (0.7/unit)	0.7	x	0	0	
Bach >45sm (1.0/unit)	1.0	x	19	19	
1 BD (0.8/unit)	0.8	x	168	134	
2 BD (0.9/unit)	0.9	x	246	221	
3 BD+ (1.1/unit)	1.0	x	50	50	
Residential - Occupant Total				424	439
Visitor (0.15/dwelling unit)	0.15	x	483	72	72
Subtotal New Building				496	511
Existing Visitor Parking				37	37
Existing Resident (and management) Parking				308	308
Existing Total to be Relocated				345	345
TOTAL PARKING REQUIRED				841	856
Included in the TOTAL above:					
Number of Accessible Parking Spaces				20	20
²Number of parking spaces dedicated for priority LEV parking				15	25
²Number of parking spaces with EVSE				171	173

BICYCLE PARKING — Bicycle Zone 2	Rate		Units	PA4	Provided
Residential					
Long Term	(0.68/unit)	0.68 x	483	329	393
Short Term	(0.07/unit)	0.07 x	483	34	42
Existing Bicycle Parking (Maintained for adjacent 19 storey apartment building)				30	30
TOTAL				393	465

LOADING / GARBAGE		Required	Provided	
Loading Spaces				
Residential 483	Type G	1	1	
	Type C	1	2	
TOTAL		2	3	
Building A Garbage Room Size		74.4**	105.9	sm
Building B Garbage Room Size		84.8**	113.9	sm
Building A Bulk Waste Storage Room		10	31.9	sm
Building B Bulk Waste Storage Room		10	20.9	sm

**Required areas per zoning comments

*Shared Loading: (if applicable)
As per 220.5.10.1(9) - Shared Loading between Retail and Office uses is assumed in above Required Total
As per 40.10.90.1(1) & (2) - One non-res Type B is satisfied by providing 1 Type G and one Residential Type C requirement is satisfied by providing a non-res Type A, B or C

PROPOSED VEHICULAR PARKING — Proposed Parking Space Breakdown

Level	EXISTING SPACES TO BE RELOCATED Occupant	EXISTING SPACES TO BE RELOCATED Visitor	PROPOSED BUILDING A & B Occupant	PROPOSED BUILDING A & B Visitor	TOTAL
P2	142	0	36	0	178
P1	166	0	0	0	166
Ground	0	37	0	0	37
2nd	0	0	42	72	114
3rd	0	0	122	0	122
4th	0	0	122	0	122
5th	0	0	117	0	117
TOTAL	308	37	439	72	856

AMENITY SPACE — Residential		Required	Provided
TOTAL Res Amenity = 4.0sm/dwelling unit		1,932.00 sm	2,782.20 sm
Interior Amenity	min. 2.0sm/dwelling unit	966.00 sm	1,116.00 sm
	Ground Floor Amenity		45.3 sm
	Level 6 Indoor Amenity Room 1		179 sm
	Level 6 Indoor Amenity Rooms 2, 3, 4		891.7 sm
Required Indoor Amenity Deducted from Gross Floor Area			966.00 sm
Outdoor Amenity	min. 2.0sm/dwelling unit	966.00 sm	1666.20 sm
	Ground Floor Dog Relief Area		457.60 sm*
	Ground Floor Play Area		232.00 sm
	Level 6 Outdoor Amenity Space		976.60 sm

*Dog Relief area is 17% of Total Outdoor Amenity

NOTES

GFA Exclusions assumed above:
¹as per By-law 569-2013, Gross Floor Area is reduced by;
Parking, Loading & Bicycle spaces below-ground; Storage rooms, Washrooms, Elec, Utility, Mech and Ventilation rooms in the Basement; required Shower & Change facilities; required Indoor Amenity space; Elevator shafts; Garbage shafts; Mech. Penthouse and Exit stairwells

²Required as per Toronto Green Standard
If providing more than the minimum parking required under the Zoning By-law, the excess spaces must be dedicated priority parking spaces for low-emitting vehicles (LEV). 20% of parking spaces are to be provided with electric vehicle supply equipment (EVSE).

1 A100.S Statistics

TORONTO GREEN STANDARD STATISTICS			
GENERAL PROJECT DESCRIPTION	**PROPOSED**		
TOTAL GROSS FLOOR AREA	56101.9 m²		
BREAKDOWN OF PROJECT COMPONENTS			
RESIDENTIAL	39887.9 m²		
RETAIL	N/A		
COMMERCIAL	N/A		
INDUSTRIAL	N/A		
INSTITUTIONAL/OTHER	N/A		
TOTAL NUMBER OF RESIDENTIAL UNITS (RESIDENTIAL ONLY)	483		
AUTOMOBILE INFRASTRUCTURE	**REQUIRED**	**PROPOSED**	**PROPOSED %**
NUMBER OF PARKING SPACES	842	856	100%
NUMBER OF PARKING SPACES DEDICATED FOR PRIORITY LEV PARKING	25	25	100%
NUMBER OF PARKING SPACES WITH EVSE	173	173	100%
CYCLING INFRASTRUCTURE	**REQUIRED**	**PROPOSED**	**PROPOSED %**
NUMBER OF LONG-TERM BICYCLE PARKING SPACES (RESIDENTIAL)	359	359	100%
NUMBER OF LONG-TERM BICYCLE PARKING SPACES (ALL OTHER USES)	--	--	--
NUMBER OF LONG-TERM BICYCLE PARKING (ALL USES) LOCATED ON:			
A) FIRST STOREY OF BUILDING	359	359	100%
B) SECOND STOREY OF BUILDLING	--	--	--
C) FIRST LEVEL BELOW-GROUND	--	--	--
D) SECOND LEVEL BELOW-GROUND	--	--	--
E) OTHER LEVELS BELOW-GROUND	--	--	--
NUMBER OF SHORT-TERM BICYCLE PARKING SPACES (RESIDENTIAL)	34	42	100%
NUMBER OF SHORT-TERM BICYCLE PARKING SPACES (ALL OTHER USES)	--	--	--
NUMBER OF MALE SHOWER AND CHANGE FACILITIES (NON-RESIDENTIAL)	--	--	--
NUMBER OF FEMALE SHOWER AND CHANGE FACILITIES (NON-RESIDENTIAL)	--	--	--
TREE PLANTING & SOIL VOLUME	**REQUIRED**	**PROPOSED**	**PROPOSED %**
TOTAL SOIL VOLUME (40% OF THE SITE AREA ÷ 66m² x 30m³)	1662.05	913.46	54.94%
CYCLING INFRASTRUCTURE	**REQUIRED**	**PROPOSED**	**PROPOSED %**
NUMBER OF SHORT-TERM BICYCLE PARKING SPACES (ALL USES) AT-GRADE OR ON FIRST LEVEL BELOW GRADE	34	42	100%
UHI NON-ROOF HARDSCAPE	**REQUIRED**	**PROPOSED**	**PROPOSED %**
TOTAL NON-ROOF HARDSCAPE AREA (m²)	--	845.4	--
TOTAL NON-ROOF HARDSCAPE AREA TREATED FOR URBAN HEAT ISLAND (MINIMUM 50%) (m²)	422.7	422.7	50%
AREA OF NON-ROOF HARDSCAPE TREATED WITH: (INDICATE m²)			
A) HIGH-ALBEDO SURFACE MATERIAL	--	422.7	50%
B) OPEN-GRID PAVEMENT	--	--	--
C) SHADE FROM TREE CANOPY	--	300	--
D) SHADE FROM HIGH-ALBEDO STRUCTURES	--	--	--
E) SHADE FROM ENERGY GENERATION STRUCTURES	--	--	--
PERCENTAGE OF REQUIRED CAR PARKING SPACES UNDER COVER (MINIMUM 75%) (NON-RESIDENTIAL ONLY)	--	--	--
GREEN & COOL ROOFS	**REQUIRED**	**PROPOSED**	**PROPOSED %**
AVAILABLE ROOF SPACE (m²)	--	2914.5 m²	100%
AVAILABLE ROOF SPACE PROVIDED AS GREEN ROOF (m²)	1748.7 m² (60%)	2360.07 m²	80%
AVAILABLE ROOF SPACE PROVIDED AS COOL ROOF (m²)	0.0m²	0.0m²	0%
AVAILABLE ROOF SPACE PROVIDED AS SOLAR PANELS (m²)	0.0m²	0.0m²	0%
WATER EFFICIENCY	**REQUIRED**	**PROPOSED**	**PROPOSED %**
TOTAL LANDSCAPED SITE AREA (m²)	--	4168.3 m²	--
LANDSCAPED SITE AREA PLANTED WITH DROUGHT-TOLERANT PLANTS (MINIMUM 50%) (m² AND %) (IF APPLICABLE)	2084.1 m²	628.9 m²	--
TREE PLANTING AREAS & SOIL VOLUME	**REQUIRED**	**PROPOSED**	**PROPOSED %**
TOTAL SITE AREA (m²)	--	9141.3 m²	--
TOTAL SOIL VOLUME (40% OF THE SITE AREA ÷ 66m² x 30m³)	1662 m³	1662.8 m³	--
TOTAL NUMBER OF PLANTING AREAS (MINIMUM OF 30m³ SOIL)	--	7	--
TOTAL NUMBER OF TREES PLANTED	56	36	--
NUMBER OF SURFACE PARKING SPACES (IF APPLICABLE)	0	0	--
NUMBER OF SHADE TREES LOCATED IN SURFACE PARKING AREA INTERIOR (MINIMUM 1 TREE FOR 5 PARKING SPACES)	--	--	--
NATIVE AND POLLINATOR SUPPORTIVE SPECIES	**REQUIRED**	**PROPOSED**	**PROPOSED %**
TOTAL NUMBER OF PLANTS	--	37	--
TOTAL NUMBER OF NATIVE PLANTS AND % OF TOTAL PLANTS (MIN. 50%)	19	20	54%

4 A100.S Toronto Green Standards

GREEN ROOF STATISTICS		
GENERAL PROJECT DESCRIPTION		**PROPOSED**
TOTAL GROSS FLOOR AREA		56101.9 m²
AVAILABLE ROOF SPACE CALCULATION		**PROPOSED**
TOTAL ROOF AREA (m²)		5373 m²
AREA OF RESIDENTIAL PRIVATE TERRACES (m²)		106 m²
ROOFTOP OUTDOOR AMENITY SPACE, IF IN A RESIDENTIAL BUILDING (m²)		976 m²
AREA OF RENEWABLE ENERGY DEVICES (m²)		0.0 m²
TOWER(S) ROOF AREA WITH FLOOR PLATE LESS THAN 750 m²		1376.5 m²
TOTAL AVAILABLE ROOF SPACE (m²)		2914.5 m²
GREEN ROOF COVERAGE	**REQUIRED**	**PROPOSED**
COVERAGE OF AVAILABLE ROOF SPACE (m²)	1748.7 m²	2360.07 m²
COVERAGE OF AVAILABLE ROOF SPACE (%)	60 %	80 %

3 A100.S Green Roof Statistics

Accessibility Design Standard Checklist
(Refer to legend/detail in drawing set)

Description	Location
Min 1500mm wide sidewalks	Site Landscaping
Exterior Path - stable, firm, slip resistant	Site Landscaping
Tactile indicators at curb cuts and depressed curbs leading into path of traffic	Site Landscaping
Accessible pedestrian signals	N/A
Overhead clearance and access aisles at passenger loading zones (where provided)	N/A
Overhead clearance of 2100mm from parking entrance to accessible parking spaces	P2 Level to Floor 5
Accessible parking space(s) with access aisles and signage	P1 Level, P2 Level
Minimum 1100mm clear width path of travel with required laybys	N/A
Accessible building entrance(s)	P2 Level to Floor 6
Vestibule with min. 1500mm diameter turning circle between door swings	A151.S, A152.S, A201.S, A206.S
Barrier free passenger elevator	P2 Level to Floor 29
Ramp with appropriate slope, handrails and landings	N/A
Stairs with appropriate rise and run, handrails, landings and tactile attention indicators	P2 Level to Floor 29
Latch side clearance of 600mm (pull side) and 300mm (push side) for amenity doors and barrier free suites	All doors in barrier free path of travel throughout building excluding Mechanical Penthouse and service rooms
Power door operators at barrier-free entrances to residential buildings, at retail entrances, universal washrooms, Group A amenity spaces, and where latch side clearance is insufficient along the barrier-free path	P2 Level to Floor 6
Universal washrooms provided as per Table 3.8.2.3.A of the OBC	Ground Floor, Floor 6
860mm clear door width along the barrier-path	All doors in barrier free path of travel throughout building excluding Mechanical Penthouse and service rooms
Operating controls at an accessible height	To be provided throughout barrier free path of travel
15% barrier free suites for each suite type; each has barrier-free path to minimum one washroom, one bedroom, the kitchen and living room. The washroom has 1500mm turning circle and wall reinforcement.	Ground Floor to Floor 29

** This checklist was developed internally and is based on the barrier-free requirements for a typical multi-unit residential or commercial building under the OBC and the Design of Public Spaces Standard (DoPS), part of the Accessibility for Ontarians with Disabilities Act (AODA).**

2 A100.S Accessibility Checklist

KEY PLAN

Date	No.	Description

REVISION RECORD

2023-05-18	Rezoning Resubmission
2021-07-09	Site Plan Approval Submission
2021-04-30	Rezoning Resubmission
2020-02-14	Rezoning Application

ISSUE RECORD

BDP. Quadrangle

Quadrangle Architects Limited
901 King Street West, Suite 701 Toronto, ON M5V 3H5
t 416 598 1240 www.bdpquadrangle.com

320 McCowan Road
Toronto, Ontario
for
Blauson Assets Management Ltd. c/o Ling Kee Group

18005 As indicated JT RL
PROJECT SCALE DRAWN REVIEWED

Statistics and Context Plan

A100.S

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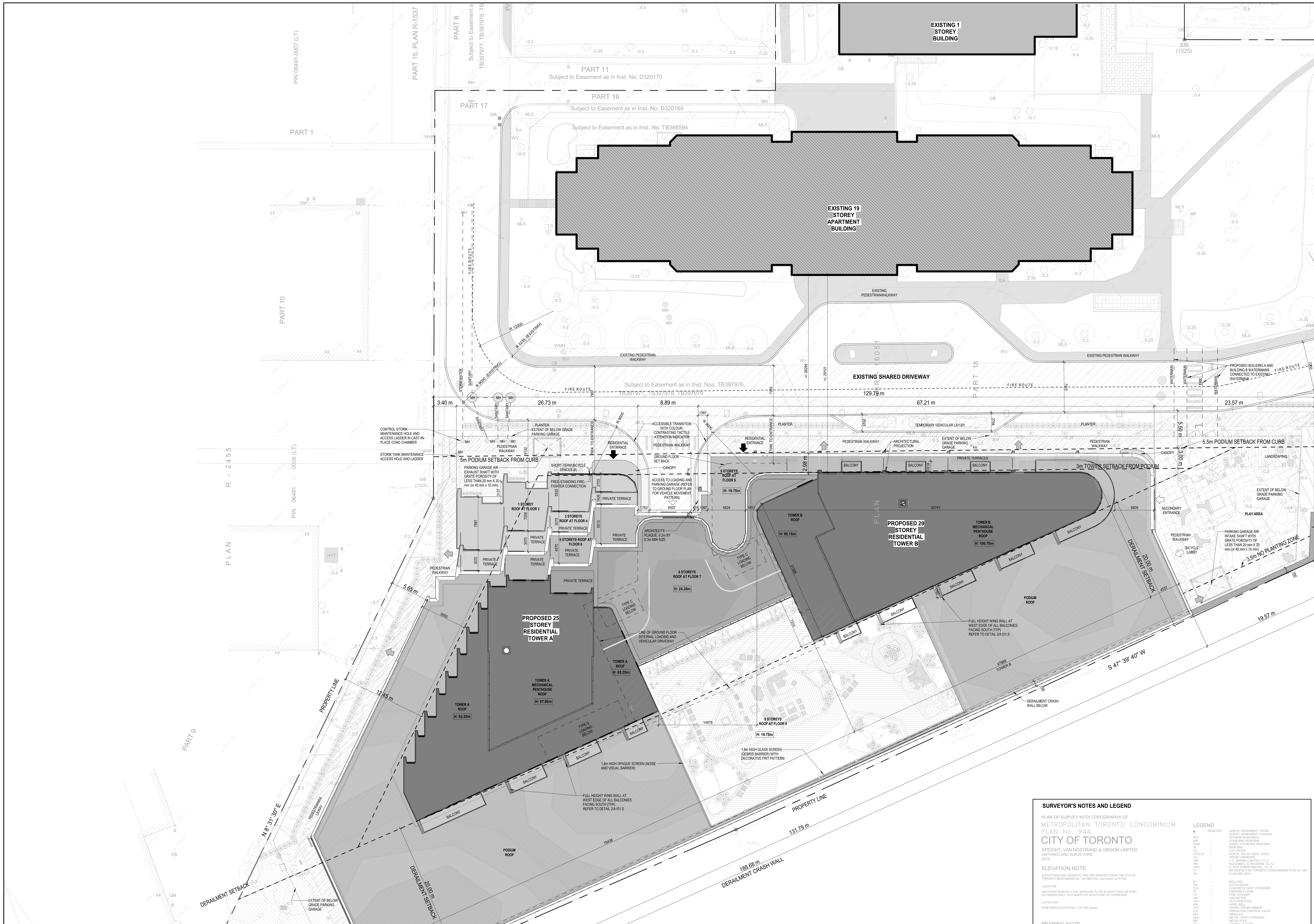

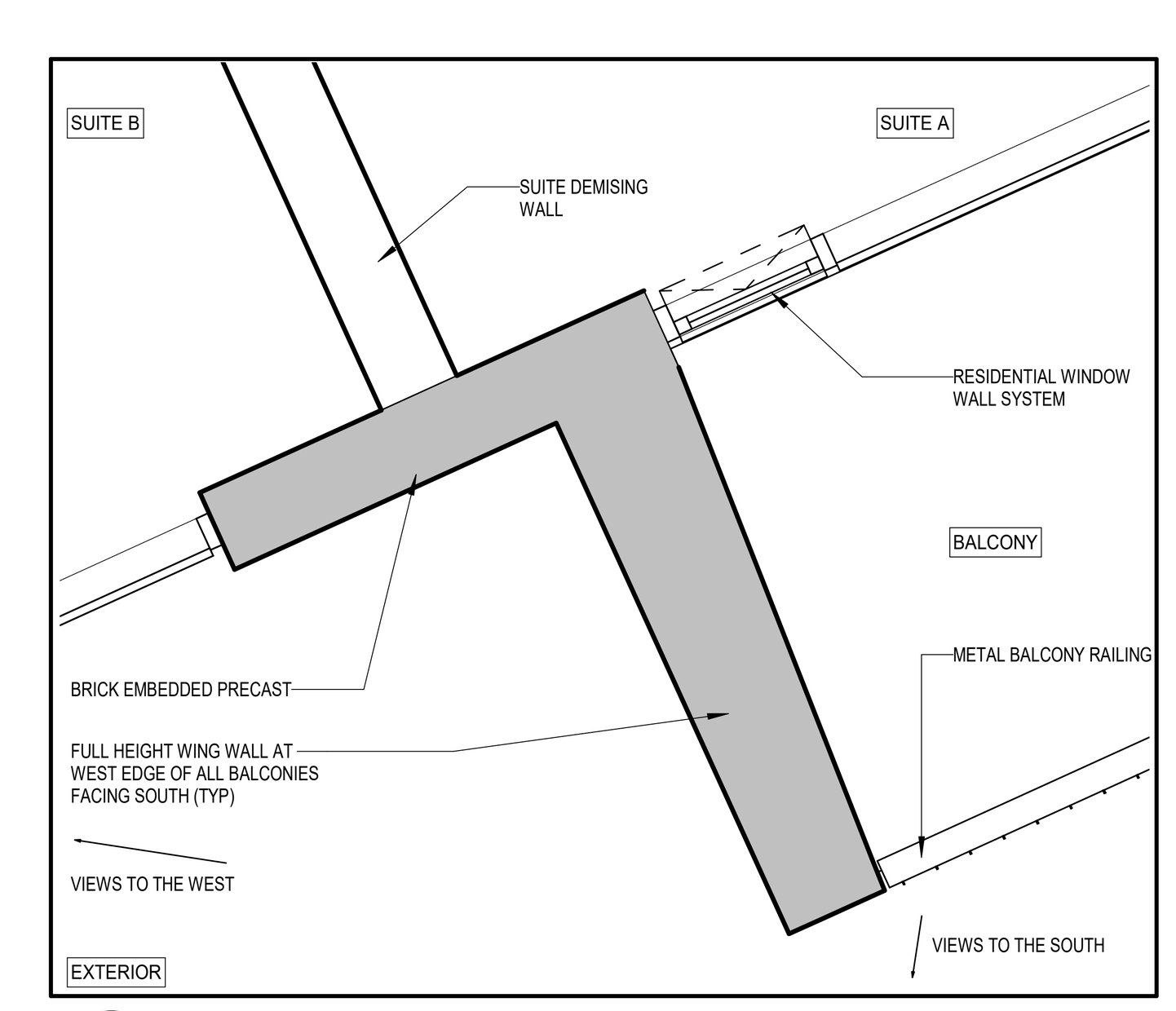

2 / A101.S South Balcony Architectural Wing Wall

SURVEYOR'S NOTES AND LEGEND

PLAN OF SURVEY WITH TOPOGRAPHY OF METROPOLITAN TORONTO CONDOMINIUM PLAN No. 944

CITY OF TORONTO

DISTANCES ARE GROUND AND CAN BE CONVERTED TO GRID BY MULTIPLYING BY THE COMBINED SCALE FACTOR OF 0.999883.

POINT ID	NORTHING	EASTING
SCP 00119633048	4843730.215	327811.382
SCP 02019660001	4841217.947	321166.284

COORDINATES CANNOT, IN THEMSELVES, BE USED TO RE-ESTABLISH CORNERS OR BOUNDARIES SHOWN ON THIS PLAN.

METRIC

DISTANCES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.

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1. A TRAINED ON-SITE STAFF MEMBER WILL BE AVAILABLE TO MANOEUVRE BINS FOR THE COLLECTION DRIVER AND ALSO ACT AS A FLAGMAN WHEN THE TRUCK IS REVERSING. IN THE EVENT THE ON-SITE STAFF IS UNAVAILABLE AT THE TIME THE CITY COLLECTION VEHICLE ARRIVES AT THE SITE, THE COLLECTION VEHICLE WILL LEAVE THE SITE AND NOT RETURN UNTIL THE NEXT SCHEDULED COLLECTION DAY.

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(B) DESIGN LOAD - CITY BULK LIFT VEHICLE IN ADDITION BUILDING CODE REQUIREMENTS
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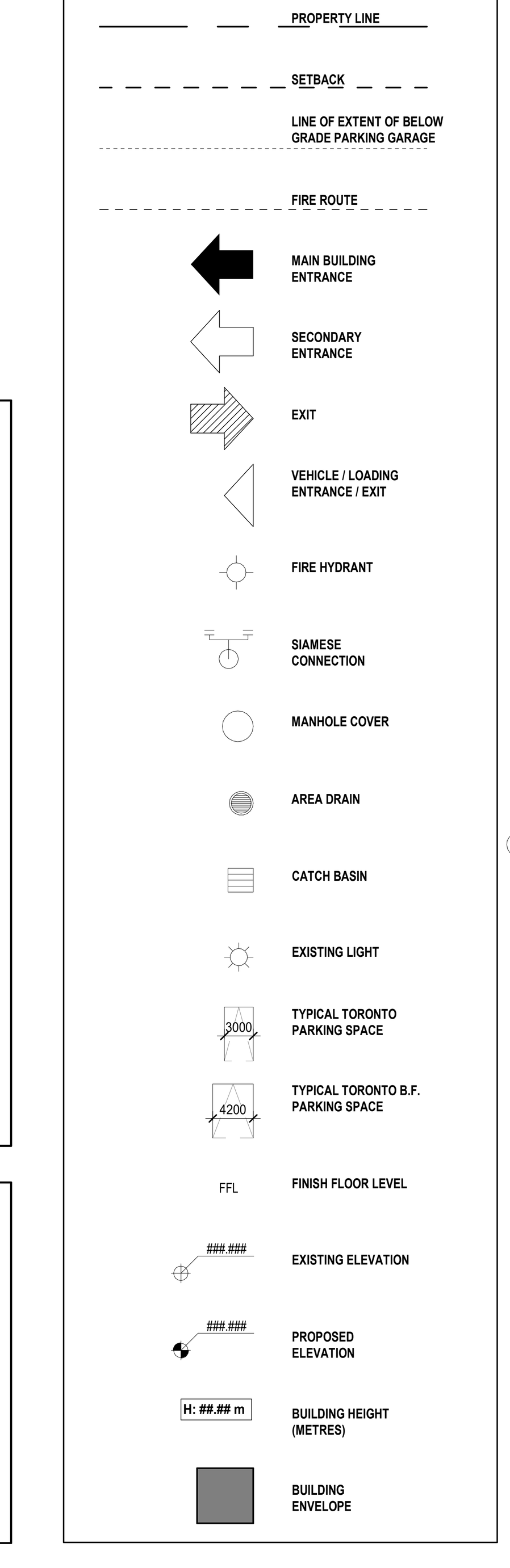
SITE PLAN LEGEND



1 / A101.S Site Plan
SCALE: 1 : 200

KEY PLAN

Date	No.	Description

REVISION RECORD

2023-05-18	Rezoning Resubmission
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ISSUE RECORD

BDP. Quadrangle

Quadrangle Architects Limited
901 King Street West, Suite 701 Toronto, ON M5V 3H5
t 416 598 1240 www.bdpquadrangle.com

320 McCowan Road
Toronto, Ontario
for
Blauson Assets Management Ltd. c/o Ling Kee Group

PROJECT	SCALE	DRAWN	REVIEWED
18005	As indicated	JT	RL

Site Plan

A101.S

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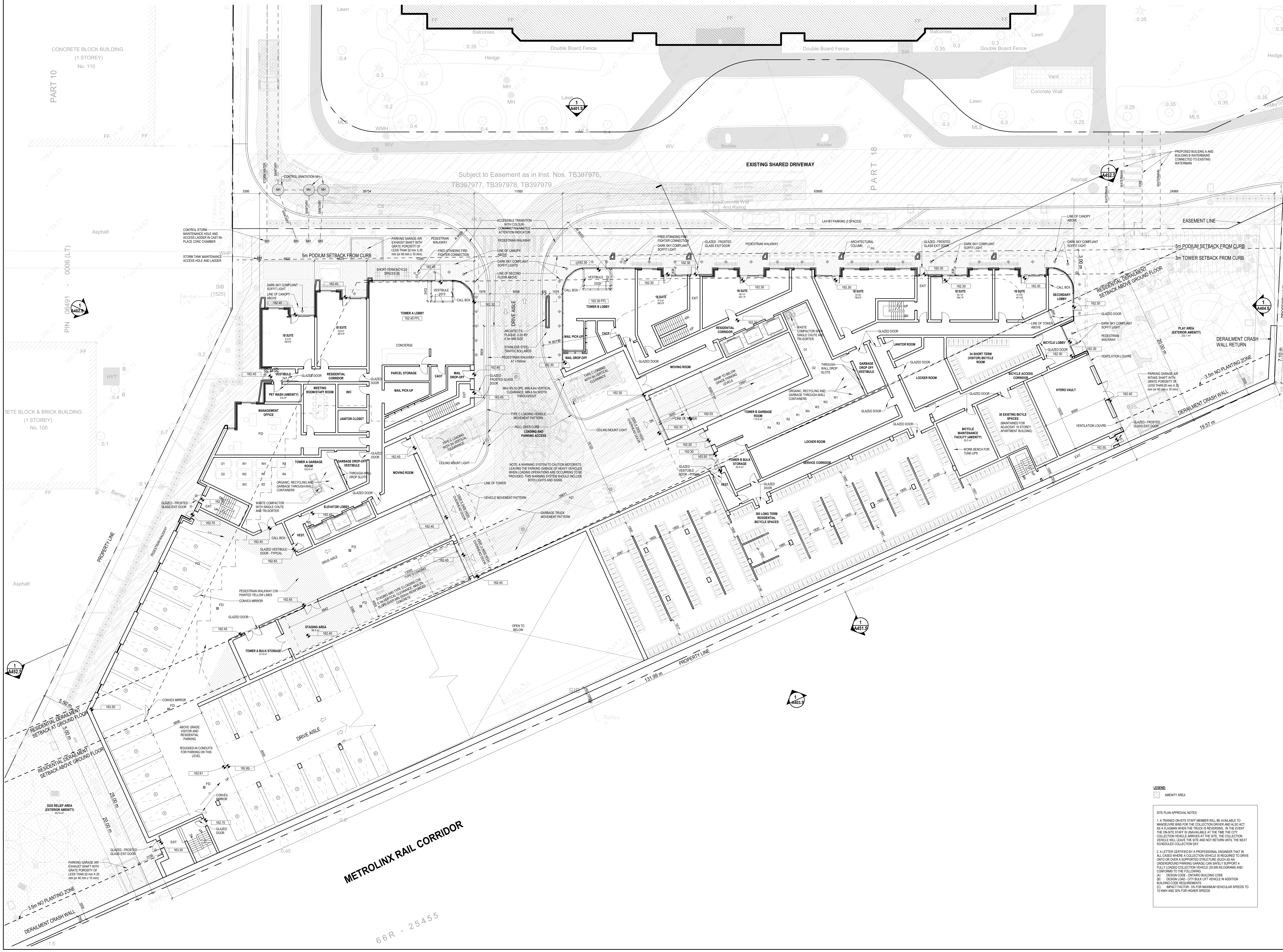


1 A201.S Ground Floor Plan
SCALE: 1 : 150

KEY PLAN

PARKING NOTES:

1. MINIMUM PARKING SPACE SIZES (UNLESS OTHERWISE NOTED):
   - 2600mm WIDE X 5600mm LONG (NO SIDES OBSTRUCTED)
   - 2900mm WIDE X 5600mm LONG (ONE SIDE OBSTRUCTED)
   - 3200mm WIDE X 5600mm LONG (TWO SIDES OBSTRUCTED)
2. MAINTAIN MININUM DRIVE AISLE WIDTH OF 6000mm UNLESS OTHERWISE NOTED.
3. MAINTAIN MINIMUM HEADROOM CLEARANCE OF 2100mm THROUGHOUT.

PARKING LEGEND:

PARKING SPACE

C=COMMERCIAL PARKING
R=RESIDENTIAL PARKING
V=VISITOR PARKING
E=EXISTING PARKING

EVSE = ELECTRICAL VEHICLE SUPPLY EQUIPMENT PARKING
LEV = LOW EMITTING VEHICLE PARKING

2600 × 5600 TYPICAL
2900 × 5600 ONE SIDE OBSTRUCTED
2600 × 6700 PARALLEL PARKING
3900 × 5600 ACCESSIBLE
3400 + 1500 × 5600 ACCESSIBLE VISITOR - TYPE A
2400 + 1500 × 5600 ACCESSIBLE VISITOR - TYPE B

Date	No.	Description

REVISION RECORD

2023-05-18	Rezoning Resubmission
2021-07-09	Site Plan Approval Submission
2021-04-30	Rezoning Resubmission
2020-02-14	Rezoning Application

ISSUE RECORD

LEGEND:

AMENITY AREA

SITE PLAN APPROVAL NOTES:

1. A TRAINED ON-SITE STAFF MEMBER WILL BE AVAILABLE TO MANOEUVRE BINS FOR THE COLLECTION DRIVER AND ALSO ACT AS A FLAGMAN WHEN THE TRUCK IS REVERSING. IN THE EVENT THE ON-SITE STAFF IS UNAVAILABLE AT THE TIME THE CITY COLLECTION VEHICLE ARRIVES AT THE SITE, THE COLLECTION VEHICLE WILL LEAVE THE SITE AND NOT RETURN UNTIL THE NEXT SCHEDULED COLLECTION DAY.

2. A LETTER CERTIFIED BY A PROFESSIONAL ENGINEER THAT IN ALL CASES WHERE A COLLECTION VEHICLE IS REQUIRED TO DRIVE ONTO OR OVER A SUPPORTED STRUCTURE (SUCH AS AN UNDERGROUND PARKING GARAGE) CAN SAFELY SUPPORT A FULLY LOADED COLLECTION VEHICLE (35,000 KILOGRAMS) AND CONFORMS TO THE FOLLOWING:
(A) DESIGN CODE - ONTARIO BUILDING CODE
(B) DESIGN LOAD - CITY BULK LIFT VEHICLE IN ADDITION BUILDING CODE REQUIREMENTS
(C) IMPACT FACTOR - 5% FOR MAXIMUM VEHICULAR SPEEDS TO 15 KM/H AND 30% FOR HIGHER SPEEDS

BDP. Quadrangle

Quadrangle Architects Limited
901 King Street West, Suite 701 Toronto, ON M5V 3H5
t 416 598 1240 www.bdpquadrangle.com

320 McCowan Road
Toronto, Ontario
for
Blauson Assets Management
Ltd. c/o Ling Kee Group

PROJECT	SCALE	DRAWN	REVIEWED
18005	As indicated	JT	RL

Ground Floor Plan

A201.S

5/18/2023 3:08:32 PM

APPENDIX ‘B’

Structural Drawing Set

Jablonsky, Ast and Partners – Crash Wall Response to Peer Review Comments – Letter dated June 9, 2021

JABLONSKY, AST AND PARTNERS
Consulting Engineers

400 - 3 Concorde Gate
Toronto, ON M3C 3N7
Telephone (416) 447-7405
Fax (416) 447-2771
www.astint.on.ca
Email jap@astint.on.ca

June 9, 2021

Bousfields Inc.
3 Church St., Suite 200
Toronto, ON M5E 1M2

Attn: Mr. Ryan Doherty

Re: 320 McCowan Road – Crash Wall
Response to Peer Review Comments
Our Project No. 19358

Dear Sir,

We are in receipt of a series of peer review comments by WSP on behalf of the City of Toronto regarding the above project and have the following responses. We have used the numbering of the peer review from WSP in our response.

4. **E. It is further recommended that the developer ensures that no structural load bearing elements supporting the sensitive use spaces are located within the setback zone (unless they are designed to withstand the crash load or with sufficient structural redundancy) and that the proposed crash wall is structurally isolated from those load bearing elements.**

Noted, the proposed crash wall will be isolated in terms of vertical load and track induced vibration from the base building.

6. **No load calculations or energy balance analysis were provided in the DPR report which is not in conformance with AECOM guidelines. It is recommended that these calculations are included in the revised DPR to describe the design criteria of the crash wall.**

Please see attached calculations for the crash wall in accordance with the AECOM guidelines.

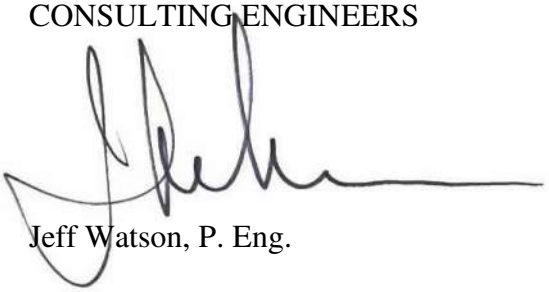
8. **The DPR proposed crash wall thickness of 0.45m is in compliance with the minimum requirements of the AECOM guidelines as the distance between the crash wall and the closest track centerline is 24.3m. However, the consultant shall provide analysis to show that the proposed crash wall thickness is sufficient to withstand the design crash loads. The structural calculations and design drawings for the crash wall shall be provided to the governing body for review during the design phase. All structural drawings and calculations shall be signed and sealed by a registered professional engineer in Ontario.**

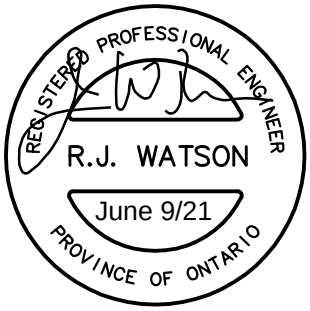
Please see attached calculations for the crash wall load capacity base on the above-mentioned loads. Also see attached updated structural section with reinforcement indicated.

Should you have any questions or require anything further, please don't hesitate to contact this office.

Yours very truly,

JABLONSKY, AST AND PARTNERS
CONSULTING ENGINEERS





Jeff Watson, P. Eng.

Enclosures: Impact Energy Calculation
Crash Wall Design Calculations
SK-2

cc: Lawrence Rutledge, JSW
Michael Mikhail, JSW
Gordon Tattle, JAP

SOUTH CRASH WALL - IMPACT ENERGY

TOR	163.60	masl	top of rail elevation
Grade	164.00	masl	grade at base of wall
2nd TOS	168.40	masl	second floor top of slab elevation
Grd TOS	164.50	masl	ground floor top of slab elevation
h	3.90	m	height between supports
x	1.01	m	minimum distance from support to point of impact

d_{CL}	24.10	m	distance from centerline of track to wall
t_{WALL}	450	mm	thickness of wall
v_O	30	mph	track speed (freight)
v_O	13.41	m/s	
v_O	100	mph	track speed (passenger)
v_O	44.7	m/s	

CASE 1

m	1,167,300	kg	mass of 9 cars
θ_1	3.50	degrees	angle of impact (3.5 degrees for tangent track)
d_F	-	mm	deflection of wall in flexure
G	0.0010		grade of the groundline
a	- 2.46	m/s^2	acceleration
v_1	-	m/s	speed of derailed equipment
E_1	-	N.m	collision energy
d_1	186	mm	plastic deformation of 9 cars
F_1	-	kN	
l_G	3.05	m	length of collision
l_{TOTAL}	4.85	m	total length of wall engaged
$F_{1\ per\ m}$	-	kN/m	force per metre length of wall

SOUTH CRASH WALL - IMPACT ENERGY

TOR	163.60	masl	top of rail elevation
Grade	164.00	masl	grade at base of wall
2nd TOS	168.40	masl	second floor top of slab elevation
Grd TOS	164.50	masl	ground floor top of slab elevation
h	3.90	m	height between supports
x	1.01	m	minimum distance from support to point of impact

d_{CL}	24.10	m	distance from centerline of track to wall
t_{WALL}	450	mm	thickness of wall
v_O	30	mph	track speed (freight)
v_O	13.41	m/s	
v_O	100	mph	track speed (passenger)
v_O	44.7	m/s	

CASE 2

*** Not Considered since dcl > 8.5m***

m	129,700	kg	mass of one car
θ_2	-	degrees	angle of rotation at impact
d_F	-	mm	deflection of wall in flexure
v_2	-	m/s	speed of derailed equipment
E_2	-	N.m	collision energy
d_2	304.80	mm	plastic deformation of one car
F_2	-	kN	
l_A	#DIV/0!	m	length of collision
l_{TOTAL}	#DIV/0!	m	total length of wall engaged
$F_{2\ per\ m}$	-	kN/m	force per metre length of wall

SOUTH CRASH WALL - IMPACT ENERGY

TOR	163.60	masl	top of rail elevation
Grade	164.00	masl	grade at base of wall
2nd TOS	168.40	masl	second floor top of slab elevation
Grd TOS	164.50	masl	ground floor top of slab elevation
h	3.90	m	height between supports
x	1.01	m	minimum distance from support to point of impact

d_{CL}	24.10	m	distance from centerline of track to wall
t_{WALL}	450	mm	thickness of wall
v_O	30	mph	track speed (freight)
v_O	13.41	m/s	
v_O	100	mph	track speed (passenger)
v_O	44.7	m/s	

CASE 3

m	536,960	kg	mass of 8 cars
θ_3	3.50	degrees	angle of impact (3.5 degrees for tangent track)
d_F	-	mm	deflection of wall in flexure
G	0.0010		grade of the groundline
a	- 2.46	m/s^2	acceleration
v_3	13.67	m/s	speed of derailed equipment
E_3	186,958	N.m	collision energy
d_3	186	mm	plastic deformation of 9 cars
F_3	1,005	kN	
l_G	3.05	m	length of collision
l_{TOTAL}	4.85	m	total length of wall engaged
$F_{3\ per\ m}$	207	kN/m	force per metre length of wall

SOUTH CRASH WALL - IMPACT ENERGY

TOR	163.60	masl	top of rail elevation
Grade	164.00	masl	grade at base of wall
2nd TOS	168.40	masl	second floor top of slab elevation
Grd TOS	164.50	masl	ground floor top of slab elevation
h	3.90	m	height between supports
x	1.01	m	minimum distance from support to point of impact

d_{CL}	24.10	m	distance from centerline of track to wall
t_{WALL}	450	mm	thickness of wall
v_O	30	mph	track speed (freight)
v_O	13.41	m/s	
v_O	100	mph	track speed (passenger)
v_O	44.7	m/s	

CASE 4

*** Not Considered since dcl > 13.0m***

m	67,120	kg	mass of one car
θ_4	-	degrees	angle of rotation at impact
d_F	-	mm	deflection of wall in flexure
v_4	-	m/s	speed of derailed equipment
E_4	-	N.m	collision energy
d_4	304.80	mm	plastic deformation of one car
F_4	-	kN	
l_A	#DIV/0!	m	length of collision
l_{TOTAL}	#DIV/0!	m	total length of wall engaged
$F_{4\ per\ m}$	-	kN/m	force per metre length of wall

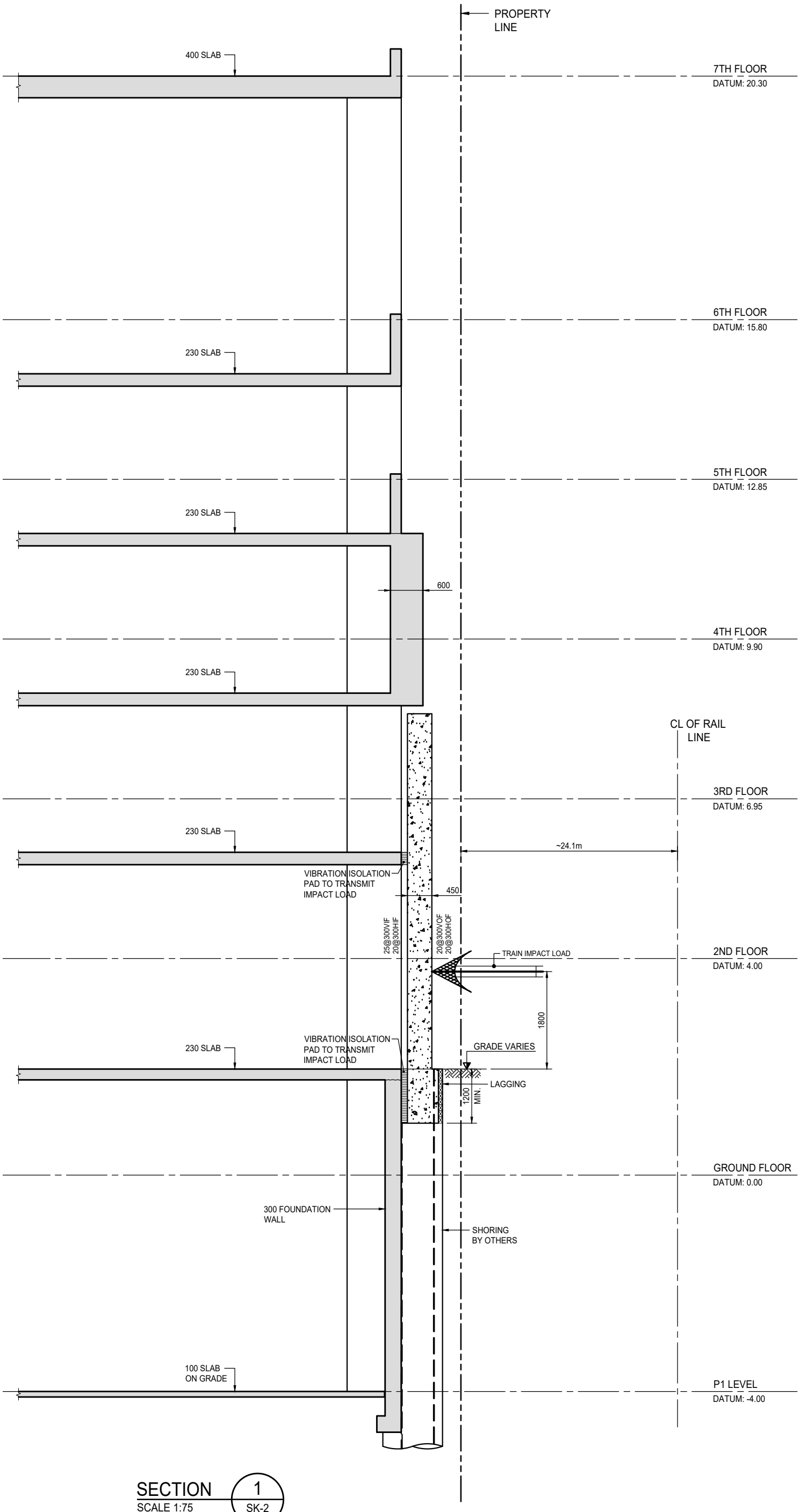
SOUTH CRASH WALL - WALL DESIGN

x	1.01	m	minimum distance from support to point of impact
h	3.90	m	height between supports
F_{MAX}	207	kN/m	maximum force per metre length of wall
t_{WALL}	450	mm	thickness of wall
M_f	155	kN.m	applied moment
Vf	154	kN	applied shear

cover	55	mm	clear cover to reinforcing
φ_s	0.85		resistance factor for reinforcing bars
φ_c	0.65		resistance factor for concrete
f'_c	35	MPa	specified compressive strength of concrete
f_y	400	MPa	specified yield strength of reinforcing

Flexural Steel			
Bar Size	25	M	diameter of longitudinal reinforcing
Spacing	300	mm	spacing of longitudinal reinforcing
d	383	mm	depth from extreme compression fibre to reinforcing
A_s	1,667	mm2/m	area of longitudinal reinforcing
ρ	0.44%		ratio of flexural reinforcing
K_r	1.42	MPa	
M_r	208	kN.m	factored moment resistance
A_{sMIN}	1,331	mm2/m	
$A_s > A_{sMIN}$	OK		
$M_r > M_f$	OK		

Shear			
d_v	344.25	mm	effective shear depth
β	0.17		
V_c	227	kN	factored shear resistance of concrete
V_r	227	kN	factored shear resistance
V_{rMAX}	1,958	kN	
$V_{rMAX} > V_r$	OK		
$V_r > V_f$	OK		



SECTION 1
SCALE 1:75 SK-2

LICENCED PROFESSIONAL ENGINEER
R.J. WATSON
#19358
PROVINCE OF ONTARIO

Jablonsky, Ast and Partners
CONSULTING ENGINEERS
400-3 CONCORDE GATE
TORONTO, ON., M3C 3N7
TEL. 416-447 7405
FAX 416-447 2771

PROJECT/DWG. TITLE
320 McCOWAN ROAD
- CRASH WALL SECTION

JOB NUMBER	19358
DRAWN C.C.	DATE 2021-06-09
SCALE 1:75	SKETCH No. SK-2

APPENDIX ‘C’

Metrolinx Email dated February 11, 2020 – Track Speeds

Lawrence Rutledge

From: Brandon Gaffoor <Brandon.Gaffoor@metrolinx.com>
Sent: February 11, 2020 11:40 AM
To: Lawrence Rutledge
Cc: Terri Cowan
Subject: RE: 320 McCowan Road, Scarborough - Rail Traffic Information

Hi Lawrence, can you please confirm if this is for a rail safety assessment? I have provided the requested information below;

Speeds
Passenger Speed – 100 MPH
Freight Speed – 60 MPH

GO Train Volumes (10-year forecast)
208 (200 Electric (173 day, 28 night); 8 Desiel (8 day, 0 night))

Let me know if you need anything else,
Brandon

BRANDON GAFFOOR
Third Party Projects Officer
Third Party Projects Review, Capital Projects Group
Metrolinx | 20 Bay Street | Suite 600 | Toronto | Ontario | M5J 2W3
T: 416.202.7294 C: 647.289.1958
METROLINX

From: Lawrence Rutledge [mailto:lrutledge@jsw.ca]
Sent: February-08-20 3:34 PM
To: Brandon Gaffoor
Subject: 320 McCowan Road, Scarborough - Rail Traffic Information

Brandon,

Could you please advise on the rail traffic volumes and speeds for this section of track. See attached Google Earth image.

Thank you,

Lawrence Rutledge, C.E.T.
Principal
Civil Engineering
Tel. 905.889.8100 ext. 226
www.jsw.ca
JSW + associates

From: Jason Park <jpark@ksllp.ca>
Sent: Thursday, May 4, 2023 2:35 PM
To: Ryan Doherty <rdoherty@bousfields.ca>; Lindsay Dale-Harris <ldaleharris@bousfields.ca>; mmikhail@jsw.ca; Angela BLEL <angela@bakling.com>; allen@lingkee.com
Subject: FW: 320 McCowan Road - Rail Safety and Metrolinx Plans for 4th Track in the Adjacent Corridor

Hi everyone,

Please see the following email from Mark Piel. This is great news. We can now revert back to the previous thickness for the crash wall. Thanks.

Regards,

Jason

Jason Park, B.Comm, LL.B.

Kagan | Shastri
DeMelo | Winer | Park
LAWYERS | LLP

250 Yonge Street, Suite 2302, PO Box 65,
Toronto, Ontario, Canada M5B 2L7
Direct Tel: 416.645.4572 Fax: 416.645.4569
Email: jpark@ksllp.ca
www.ksllp.ca

From: Mark Piel <Mark.Piel@toronto.ca>
Sent: May 4, 2023 5:19 PM
To: Jason Park <jpark@ksllp.ca>
Cc: Jeffery Sinclair <Jeffery.Sinclair@toronto.ca>
Subject: RE: 320 McCowan Road - Rail Safety and Metrolinx Plans for 4th Track in the Adjacent Corridor

Jason,

Metrolinx has now confirmed for the City that it will assume that a 4th track can be installed in such a manner that the centreline of this future track will be further away than 7.6 metres from the mutual property line. Accordingly, Metrolinx is satisfied that the design of the crash wall does not have to change to incorporate a minimum 760 mm thickness.

Trusting this puts to rest the concern raised below. If you have any questions, please do not hesitate to contact me.

Thank you.

M.

Mark Piel | Deputy Director, Planning & Administrative Tribunal Law Section
Legal Services Division | City of Toronto
T: (416) 392-2124 | F: (416) 397-5624 | E: Mark.Piel@toronto.ca

From: Mark Piel
Sent: May 2, 2023 4:37 PM
To: 'Jason Park' <jpark@ksllp.ca>
Subject: 320 McCowan Road - Rail Safety and Metrolinx Plans for 4th Track in the Adjacent Corridor

Jason,

Further to our call today:

Metrolinx has informed the City that it has plans to install a fourth track within the north half of the rail corridor adjacent to the site as close as 4 metres to the property line between the site and the rail corridor. I've asked for particulars regarding Metrolinx' plans (such as documentation confirming that these plans for a fourth corridor is available to the public) but they have not provided further information.

The City's peer reviewer has been asked to consider whether any aspect of the rail safety mitigation measures for the proposal may have to change on account of a fourth track. Their response was as follows:

> *At the time of the review, both the rail safety report and WSP's peer review report were done based on the existing 3 tracks only. In both reports, the setbacks were measured from the property line. The future 4th track would not change anything, as long as the centre line of the future track does not get closer than 7.6 m to the property line. If it does, then the crash wall thickness must be increased to 760 mm.*

In looking at the plans, the existing crash wall is proposed to be 0.45 metres thick. The crash wall would need to make up 0.31 metres of space for a total of 0.760 metres. This increased thickness of crash wall may mean a redesign of the parking garage is required, or potentially a large reduction in the number of zoning by-law compliant parking spaces to be supplied in the garage. I'm not sure whether it's technically feasible in these circumstances but I know that the City doesn't have in hand a rationale for the elimination or reduction of a large number of parking spaces for the site.

Please take this matter up with your client. Subject to information I may yet receive from Metrolinx, the City may have to seek changes to its issues list if the parties cannot resolve this situation.

Thank you.

M.

Mark Piel | Deputy Director, Planning & Administrative Tribunal Law Section
Legal Services Division | City of Toronto
Metro Hall, 55 John Street, 26th Floor, Toronto, Ontario, M5V 3C6
T: (416) 392-2124 | F: (416) 397-5624 | E: Mark.Piel@toronto.ca

have received this message but are not an intended recipient then please notify me immediately, do not print and delete this message.

APPENDIX ‘D’

AECOM Crash Wall Guidelines Revisions 2, dated July 29th, 2014

Submission Guidelines for Crash Walls

Crash walls may be required for the protection of overhead structures, and in some cases the Railway may consider a crash wall as an alternative to an earthen berm for the protection of structures or facilities adjacent to the track. When proposing or designing such a structure, the following components should be in the submission. Where there is a discrepancy between the requirements here and those provided by the client Railway or AREMA, the more stringent shall govern.

1. Covering Letter

- Summary of items enclosed,
- Location and date of previous, approved, similar designs by this designer, if any,
- Where the crash wall is proposed as an alternative to an earthen berm: alternative materials / configurations considered and benefits of this design,
- A Location or Key Plan. This will be used to identify the mileage and subdivision, the classification of the rail line, and the maximum speed for freight and passenger rail traffic, all obtained from AECOM Canada for CP and CN-owned corridors or from GO Transit for GO-owned corridors.
- Name, phone, fax and e-mail address of your contact.

2. Geotechnical Report - (2 copies)

- Soil properties used in design, and how determined,
- Borehole logs including location plan, if required to support these properties,
- Narrative report describing soil and ground water conditions, if required as above.

3. Design of Crash Walls

- One of the following methods may be chosen, or an alternative design load may be selected and if it can be justified by the engineer responsible for the design. The simplified approach of Method 1 may be used in most cases. Method 2 may be used to optimize the design, or where factors such as distance from the track to the wall, track speeds, side slopes along the track, consequences of collision or others may justify a different load.
- **Method 1**: The wall may be designed for a minimum point load of 600 kip (2700 kN) applied horizontally and normal to the face at any point along the wall
    - The point load shall be applied at a height of 6 feet (1.8 m) *above the top of rail* for walls up to 25 feet (7.6 m) from the centerline of track, or a height of 6 feet (1.8 m) *above the groundline* for walls farther than 25 feet (7.6 m) from the centerline of track.

  - This method may be applied where track speeds do not exceed 50 mph (80 km/hr) for freight or 70 mph (112 km/hr) for passenger trains; where speeds exceed these limits, Method 2 shall be used.

- **Method 2**: an energy balance approach considering collision by glancing blow and single car rotation may be used to determine the design load. The following four cases must be considered:

  - 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.

  - 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:

    $$\theta_f = \text{asin}\left(\frac{d_{CL}}{8.5}\right) \quad [1]$$

    where d_{CL} is the distance from the crash wall to the centerline of track in m. The closest existing or future track is to be used. Where d_{CL} is greater than 8.5 m, this load case need not be considered.

  - 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.

  - 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:

    $$\theta_f = asin\left(\frac{d_{CL}}{13}\right) \quad [2]$$

    Where d_{CL} is greater than 13 m, this load case need not be considered.

  - The analysis should reflect the specified track speeds for passenger and/or freight trains applicable within the subject corridor.

  - To assist in designing the structure for the above load cases, use:

    - For the glancing blow load cases, the speed of derailed equipment impacting the wall is reduced from the track speed, v_o, to

      $$v_G = \sqrt{v_o^2 + 2a\left(\frac{d_{CL}-1.625}{\sin\theta_G}\right)} \text{ [m/s]} \quad [3]$$

      Where d_{CL} is the distance from the crash wall to the centerline of track in m.

      v_o is the track speed in m/s

      θ_G is the angle of impact

a is the acceleration in m/s, calculated as $-9.8(.25 + \mathrm{G})$

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

- For the single car load cases, the speed of derailed equipment impacting the wall is

$$v_A = \frac{2.3\theta_f}{\sqrt{1-cos\,\theta_f}}\left[\frac{m}{s}\right] for\ freight\ cars \quad [4]$$

$$v_A = \frac{2.9\theta_f}{\sqrt{1-cos\,\theta_f}}\left[\frac{m}{s}\right] for\ passenger\ cars \quad [5]$$

Where θ_f is the angle of impact, in radians, defined in [1] and [2].

- For energy dissipation, assume:
  - Contact with the wall stops all movement in the direction perpendicular to the wall, but not along its length
  - Plastic deformation of individual car due to direct impact is 1 foot (.3048 m) maximum,
  - Total compression of linkages and equipment of the 8 or 9 car consist is 10 feet (3.048 m) maximum,
  - Deflection of wall is considered negligible in equations [6] to [9]. Where the designer wishes to include it, those equations may be modified.
  - In lieu of more rigorous analysis, these energy balance equations may be used to determine the design load perpendicular to the wall. The design load acts along the given length of wall.
    - For the glancing blow load cases

$$F_G = \frac{\frac{1}{2}m(v_G \sin\theta_G)^2}{d_G} \quad [6]$$

And the load is considered to act along the length l_G in m:

$$l_G = \frac{3.048}{\cos\theta_G} \quad [7]$$

Where m is the mass of the derailed cars in kg.

v_G is the impact speed in m/s, defined in [3]

$\theta_G$is the angle of impact

d_G is the deformation of the consist in the direction of the applied force, and $d_G = 3.048 \sin \theta_G$, in m

- For the single car impact

$$F_A = \frac{\frac{1}{2} m (v_A \cos \theta_f)^2}{d_A} \quad [8]$$

And the load is considered to act along the length l_A in m:

$$l_A = \frac{.3048}{\sin \theta_f} \quad [9]$$

Where m is the mass of the derailed cars in kg.

v_A is the impact speed in m/s, defined in [4] or [5]

θ_f is the angle of rotation at impact defined in [1] or [2]

d_A is the deformation of the consist in the direction of the applied force, and $d_A = .3048 \cos \theta_f$, in m

Where the influence areas of two sequential cars in an accordion style of derailment overlap, the wall must be designed for the simultaneous impact of both cars.

- Regardless of the method selected, the following guidelines must be followed:
    - The minimum thickness for walls up to 25 feet (7.6 m) from the centerline of track shall be 2'-6" (.760 m); minimum thickness for walls farther than 25 feet (7.6 m) from the centerline of track shall be 18 inches (.45 m).
    - Crash walls less than 12 feet (3.6 m) from the centerline of track shall be a minimum of 12 feet (3.6 m) above the top of rail. Crash walls between 12 feet (3.6 m) and 25 feet (7.6 m) from the centerline of track shall be a minimum of 7 feet (2.135 m) *above the top of rail*. Crash walls greater than 25 feet (7.6 m) from the centerline of track shall be a minimum of 7 feet (2.135 m) *above the adjacent groundline*.
    - The face of the crash wall shall be smooth and continuous, and shall extend a minimum of 6 inches (0.15 m) beyond the face of the structure (such as a building column or bridge pier) parallel to the track.
    - The design must incorporate horizontal and vertical continuity to distribute the loads from the derailed train.
    - The wall must be of solid, heavy construction, and separate precast blocks or stones will not be permitted.

4. Drawings - (2 hard copies as well as .pdf format)

- Site plan clearly showing property line, location of wall structure, centerline and elevation of nearest rail track,
- Layout and structural details of proposed structure, including all material notes and specs and construction procedures/phasing. All drawings signed and sealed by a professional engineer registered in the province having jurisdiction at the project location.
- Extent and treatment of any temporary excavations on railway property.

5. Cheque

- A cheque payable to AECOM will be required for the cost of this review. Please contact AECOM for current pricing. Cost will take into consideration number of submissions, site visits, meetings, and alternative or unusually complex designs.

6. Post-Construction Certificate - (1 copy)

- Engineer's certificate of completion describing actual construction, and certifying that the structure was built as per approved drawings,
- Copy of as-built drawings, as part of the engineer's certification of completion.

Access to Railway Operating Rights-of-Way

Permits **MUST** be obtained before entering into any Railway Operating right-of-way.

Some or all of the following may also be required: - proper railway flagging protection, cable locates, liability insurance, release of liability, safety training.

AECOM Canada Ltd. will provide guidance as to the proper process to be followed in this regard. Fees will be established based on the nature and extent of the work being proposed.

Communication for Submissions

All correspondence during the review process should be directed to AECOM Canada Ltd.

Upon completion of our review, a confidential report on our findings will be made to the railway company, who will subsequently contact the applicant.

The applicant will be notified when the report has been submitted to the railway.

Liability and Responsibility

The review will be undertaken with the understanding that neither the railway nor AECOM Canada Ltd. shall have any responsibility nor liability whatsoever for the design or adequacy of the crash wall, notwithstanding that any plans or specifications may have been reviewed by the railway nor AECOM Canada Ltd. No such review shall be deemed to limit the applicant's full responsibility for the design and construction adequacy of the works.

AECOM Canada Ltd.

Mississauga, Ont.

July 2005 Revised July 29, 2014

APPENDIX ‘E’

2.4 m High Metrolinx Security Fence – Product Information

High Security Fencing

The high security fence height above ground shall be 2.4 m.

The panel mesh shall consist of a minimum 4mm diameter high tensile wire, with aperture sizes (openings) 76.2mm x 12.7mm on centre or smaller fastened to suitable posts that allow for a minimum foundation depth of 1200 mm. The fence panels shall be strengthened with factory formed undulations within each mesh panel. Mechanical Fasteners shall be tamperproof, and factory galvanized. Fastening hardware shall be concealed from the face of each panel and post. 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.

1.1 High Security Fence

(a) When directed by Metrolinx the Contractor shall install high security fencing at ROW limits, at layover yards and at other locations instructed by Metrolinx. The manufacturer and product name of approved High Security fencing are listed below. Proposed equivalents recommended by the contractor will be subject to approval by Metrolinx prior to installation.

(i) Cochrane–ClearVu

(ii) BETAFENCE- Securifor 3D

(iii) CLD- Securus Profiled

(iv) Bear Mountain – Bear Securi Mesh Barrier

(b) The high security fence height above ground shall be 2.4 m.

(c) 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.

(d) The fence panels shall be strengthened with factory formed undulations within each mesh panel. Mechanical Fasteners – Shall be tamper proof and mechanically galvanized. Fastening Hardware shall be concealed from the non-rail side of each panel and post.

(e) Mesh to be galvanized with an exterior finish coating capable of withstanding typical climate variances within Southern Ontario.

(f) Specification sheets and breach testing results for any proposed alternate products and materials shall be submitted to Metrolinx staff for approval.