

RAILWAY VIBRATION STUDY

**JOHN STREET AND ONTARIO STREET**

Proposed Mixed-use Development  
1–21 John Street and 46–50 Ontario Street  
Town of Grimsby

APRIL 23, 2026



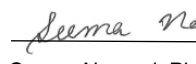

PROJECT: 0257210.0029

**PREPARED FOR:**  
1000104674 Ontario Inc.  
70 Mapledowns Way  
Vaughan, Ontario L6A 4A8

## Version History

Version #	Date	Comments
1.0	April 23, 2026	Prepared for Client Submission

## Authors

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# **Railway Vibration Study**

## **John Street and Ontario Street**

### **Proposed Mixed-use Development**

1–21 John Street and 46–50 Ontario Street  
Town of Grimsby

#### **EXECUTIVE SUMMARY**

Trinity Consultants Canada Inc. / Valcoustics was retained to prepare a Railway Vibration Study to support the Official Plan Amendment (OPA) / Zoning By law Amendment (ZBA) application submission to the Town of Grimsby. The proposed development will consist of a 16-storey mixed-use building. The building will have one level of underground parking under the entirety of the site, as well as five levels of above-grade parking in the northern portion of the podium.

The primary source of ground-borne vibration with potential impact on the proposed development is rail traffic on the Canadian National Railway (CN) Grimsby Subdivision / GO Transit Lakeshore West corridor, located immediately north of the site. On-site measurements of ground-borne railway vibration were completed, and the vibration velocity magnitudes induced by rail traffic were found to exceed the applicable guideline limits at the proposed building.

Vibration mitigation measures are required for the proposed development.

#### **1.0 INTRODUCTION**

Valcoustics was retained to prepare a Railway Vibration Study to support the OPA and ZBA application submission to the Town of Grimsby. The ground-borne vibration on site due to the train pass.bys was measured and compared with the vibration guidelines to determine the need for mitigation. The results are outlined herein.

#### **1.1 THE SITE AND THE SURROUNDING AREA**

The site is located at the northeast corner of the intersection of Ontario Street and John Street in the Town of Grimsby. The site is bounded by:

- The CN Grimsby Subdivision / GO Transit Lakeshore West, with Clarke Street beyond, to the north;
- Future residential development, with Robinson Street North and existing residential dwellings beyond, to the east;

- John Street, with existing residential development beyond, to the south; and
- An existing restaurant and Ontario Street, with a VIA train station, a child care facility/school and existing residential uses beyond, to the west.

A Key Plan is included as Figure 1.

## **1.2 THE PROPOSED DEVELOPMENT**

The proposed development comprises an “L”-shaped 16-storey building with a podium. The northern portion of the podium is five-storeys and will contain above-grade parking spaces on all levels. The south/west portion of the podium will be six storeys and will have commercial/retail and amenity uses on the ground floor, office uses on the second floor, and residential uses on the 2<sup>nd</sup> floor and above. The tower will have residential suites. Amenity spaces will also be provided on the 6<sup>rd</sup> and 7<sup>th</sup> floors.

This report was prepared using architectural drawings by Caricari Lee Architects Inc., dated April 15, 2026. The drawings are included as Appendix A. Figure 2 shows the site plan from the architectural drawings overlaid on aerial imagery from Google Maps.

## **1.3 SOURCES OF VIBRATION**

As illustrated in Figure 2, the existing railway corridor comprises two tracks. During the site visit on February 26, 2026, Valcoustics staff observed GO Transit, CN freight and VIA passenger trains passing by the subject site.

Ground-borne vibration from vehicular movements on surrounding roadways is not expected to significantly impact the proposed development and has therefore not been considered further in the analysis. No other sources of vibration were identified in the vicinity of the site.

## **2.0 VIBRATION GUIDELINES**

The Federation of Canadian Municipalities and the Railway Association of Canada jointly developed “Guidelines for New Development in Proximity to Railway Operations”, dated May 2013 (herein referred to as the FCM/RAC guidelines). For residential developments, the FCM/RAC Guideline recommends the following:

- Vibration measurements should be conducted for all proposed residential/institutional type developments, if dwellings within 75 m of the railway right-of-way (ROW); and
- The maximum vibration threshold is 0.14 mm/s root mean square (RMS, using a 1 second averaging time) between 4 Hz and 200 Hz (Reference 1).
- Vibration mitigation is needed when the threshold is exceeded.

## **3.0 METHOD**

### **3.1 MEASUREMENT LOCATIONS**

Railway-induced ground-borne vibration was measured at four (4) locations. Figure 2 shows the measurement locations on aerial imagery from Google Maps, overlaid with the Site Plan.

Locations A and B are situated along the north façade of the proposed 5-storey podium and underground parking structure. These locations are approximately 15 m south of the rail right-of-way (ROW), i.e. approximately 20 m south of centreline of the closest rail track. Location B is at the northeast corner of the building. Location A is approximately at midpoint of the north façade, 20 m west of Location B. Both locations correspond to the portion of the proposed building facade closest to the railway.

Location C is approximately 15 m south of Location A, and approximately 30 m south of the rail ROW (approximately 35 m south of the centreline of the closest rail track).

Location D is approximately 25 m south of Location C, and approximately 55 m south of the rail ROW (approximately 60 m south of the centreline of the closest rail track).

### **3.2 TRANSDUCER PLACEMENT**

Geophones were used to measure the vibration velocity produced by the train pass-bys. At each of Locations A and B, the geophone was placed into a small hole dug approximately 50 mm below grade. The geophones were set on compacted soil and securely anchored with metal ground spikes. At each of locations C and D, the geophone was placed on the asphalt surface of the existing parking area.

### **3.3 DATA ACQUISITION**

A total of six (6) train pass-bys were monitored on February 26, 2026, including two (2) CN freight trains, one (1) CN passenger (VIA) train, and three (3) GO Transit trains. Detailed train information is summarized in Table 1.

Vibration signals were recorded simultaneously at all 4 locations for each train pass-by. The vertical axis signal from each geophone was digitally recorded using a MetricPro Plus Model MPV3C21 vibration data acquisition and analysis system. Vibration velocities were recorded in millimetres per second (mm/s).

At each location, the vibration data acquisition system continuously recorded the ground-borne vibration throughout the monitoring period at a sampling rate of 1,000 samples per second.

**TABLE 1: SUMMARY OF TRAIN PASS-BYS MEASURED ON 2026-02-26**

Pass-by #	Time/Period	Train Type	Direction	# of Locomotives	# of Cars	Maximum Vibration Velocity <sup>(1)</sup> (mm/s) at each Location <sup>(2)</sup>			
						A	B	C	D
1	7:19 – 07:20	GO	Westbound	1	12	0.12	0.09	0.03	0.02
2	7:42 – 7:45	CN	Eastbound	2	98	0.14	0.09	0.02	0.02
3	8:27 – 8:30	CN	Westbound	2	143	0.27	0.19	0.06	0.05
4	9:40 – 9:41	VIA	Eastbound	1	5	0.05	0.04	0.02	0.01
5	10:42	GO	Eastbound	1	12	0.09	0.09	0.03	0.02
6	15:50 – 13:51	GO	Westbound	1	12	0.13	0.12	0.03	0.02

Notes:

- (1) Type: CN – CN freights; VIA – CN passengers; GO – GO trains.
- (2) Maximum overall vibration velocity occurring for the entire pass-by, one second RMS averaging.
- (3) See Figure 2.

### 3.4 DATA ANALYSIS

Time histories of the vibration velocity produced by each train pass-by were plotted using an RMS (root-mean-square) averaging routine with a time constant of one second. The analysis procedure conforms with the FCM/RAC guidelines.

### 4.0 RESULTS

Table 1 also summarizes the maximum measured overall vibration velocity (1-second RMS) for each of the train pass-bys measured at each location. Appendix B contains the overall time histories recorded at each location for all railway train pass-bys.

The maximum overall vibration velocity magnitudes were:

- Location A: 0.27 mm/s;
- Location B: 0.19 mm/s.
- Location C: 0.06 mm/s; and
- Location D: 0.05 mm/s.

The measured maximum vibration velocity magnitude of 0.27 mm/s, due to the freight train movements, exceeded the FCM/RAC Guideline limit of 0.14 mm/s for residential uses at the closest building façade. Therefore, vibration mitigation is required for the proposed development.

## 5.0 MITIGATION MEASURES

Since the maximum measured vibration velocities exceed the FCM/RAC Guideline limits, mitigation measures must be incorporated for the proposed development. It is premature to develop detailed vibration-mitigation design at this stage, as the building design has not yet been finalized. Therefore, these measures should be developed during the detailed design phase and reviewed once finalized.

Potential mitigation options include:

- Perimeter and/or footing isolation of the underground parking structure;
- Acoustic isolation joints between the residential portion of the building and the underground parking structure;
- Increased setback of the underground structure from the railway; or
- A combination of these and other vibration-isolation strategies.

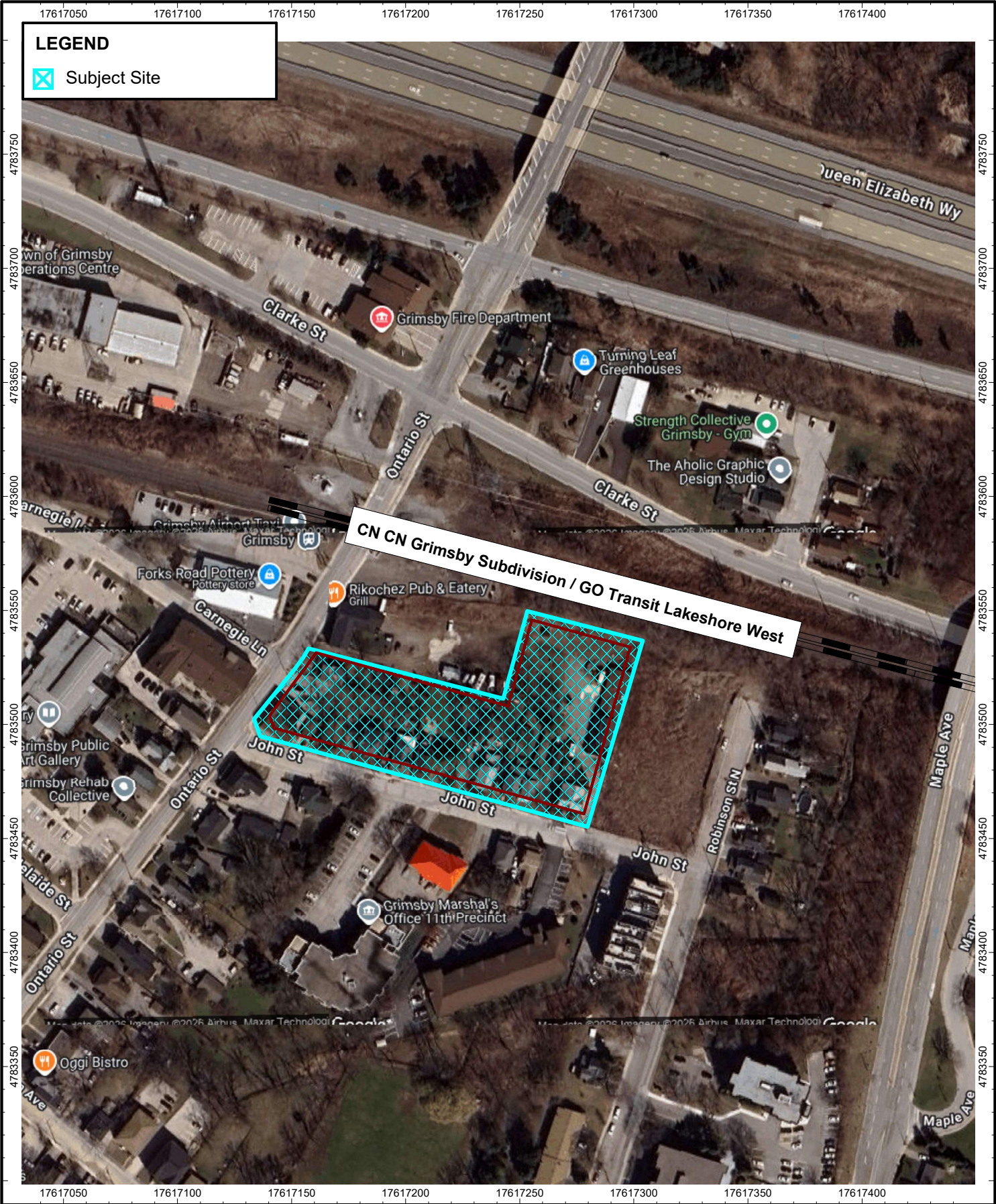
## 6.0 CONCLUSIONS

The measured ground-borne vibration velocity magnitudes at the proposed development, due to railway traffic on the CN Grimsby Subdivision / GO Transit Lakeshore West corridor, exceeded the FCM/RAC Guideline limits for residential uses. Therefore, vibration mitigation measures are required and should be integrated into the detailed design of the development.

## 7.0 REFERENCES

- 1) "Guidelines for New Development in Proximity to Railway Operations", Prepared for The Federation of Canadian Municipalities and the Railway Association of Canada, May 2013.

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John Street & Ontario Street, Grimsby\_Vibration v1\_0.docx



**LEGEND**

  Subject Site

**CN CN Grimsby Subdivision / GO Transit Lakeshore West**

	<b>Title</b> <b>Key Plan</b>	<b>Date</b> <b>2026-02-26</b>	<b>Figure</b> <b>1</b>
	<b>Project Name</b> <b>John Street &amp; Ontario Street, Grimsby</b>	<b>Project No.</b> <b>0257210.0029</b>	



# APPENDIX A

## ARCHITECTURAL DRAWINGS

GFA (RESIDENTIAL)	
Level	Area
P1	6,871.48 m <sup>2</sup>
LEVEL 1	2,311.68 m <sup>2</sup>
LEVEL 2	2,311.68 m <sup>2</sup>
LEVEL 3	2,311.68 m <sup>2</sup>
LEVEL 4	2,311.68 m <sup>2</sup>
LEVEL 5	2,311.68 m <sup>2</sup>
EXCLUDED	18,429.88 m <sup>2</sup>

LEVEL 1	1,377.40 m <sup>2</sup>
LEVEL 2	1,078.80 m <sup>2</sup>
LEVEL 3	2,719.56 m <sup>2</sup>
LEVEL 4	2,719.56 m <sup>2</sup>
LEVEL 5	2,719.56 m <sup>2</sup>
LEVEL 6	3,719.76 m <sup>2</sup>
LEVEL 7	1,725.88 m <sup>2</sup>
LEVEL 8	1,416.64 m <sup>2</sup>
LEVEL 9	1,416.64 m <sup>2</sup>
LEVEL 10	1,416.64 m <sup>2</sup>
LEVEL 11	1,416.64 m <sup>2</sup>
LEVEL 12	1,416.64 m <sup>2</sup>
LEVEL 13	1,416.64 m <sup>2</sup>
LEVEL 14	1,416.64 m <sup>2</sup>
LEVEL 15	1,416.64 m <sup>2</sup>
LEVEL 16	1,416.64 m <sup>2</sup>
MECH P/H	179.60 m <sup>2</sup>
GFA	28,989.89 m <sup>2</sup>
TOTAL FLOOR AREA	47,419.77 m <sup>2</sup>

GFA (COMMERCIAL / RETAIL)	
Level	Area
LEVEL 1	708.06 m <sup>2</sup>
TOTAL GFA	708.06 m <sup>2</sup>

GFA (OFFICE)	
Level	Area

LEVEL 1	55.42 m <sup>2</sup>
LEVEL 2	1,123.06 m <sup>2</sup>
TOTAL GFA	1,178.48 m <sup>2</sup>

TOTAL FLOOR AREA (TFA/GCA)	
Building	Area

PARKING GARAGE	18,429.88 m <sup>2</sup>
EXCLUDED	18,429.88 m <sup>2</sup>

COMMERCIAL / RETAIL	708.06 m <sup>2</sup>
OFFICE	1,178.48 m <sup>2</sup>
RESIDENTIAL	28,989.89 m <sup>2</sup>
GFA	30,876.44 m <sup>2</sup>
TOTAL FLOOR AREA	49,306.31 m <sup>2</sup>

UNIT COUNT	
Unit Type	Unit Count

1B	152
2B	107
3B	46
TOTAL UNITS	305

AMENITY AREA	
Level	Area

Indoor Amenity	
LEVEL 1	555.55 m <sup>2</sup>
LEVEL 6	200.06 m <sup>2</sup>
LEVEL 7	254.84 m <sup>2</sup>
Indoor Amenity	1,010.45 m <sup>2</sup>

Outdoor Amenity	
LEVEL 6	591.36 m <sup>2</sup>
LEVEL 7	1,651.11 m <sup>2</sup>
Outdoor Amenity	2,242.47 m <sup>2</sup>
TOTAL AMENITY AREA	3,252.92 m <sup>2</sup>

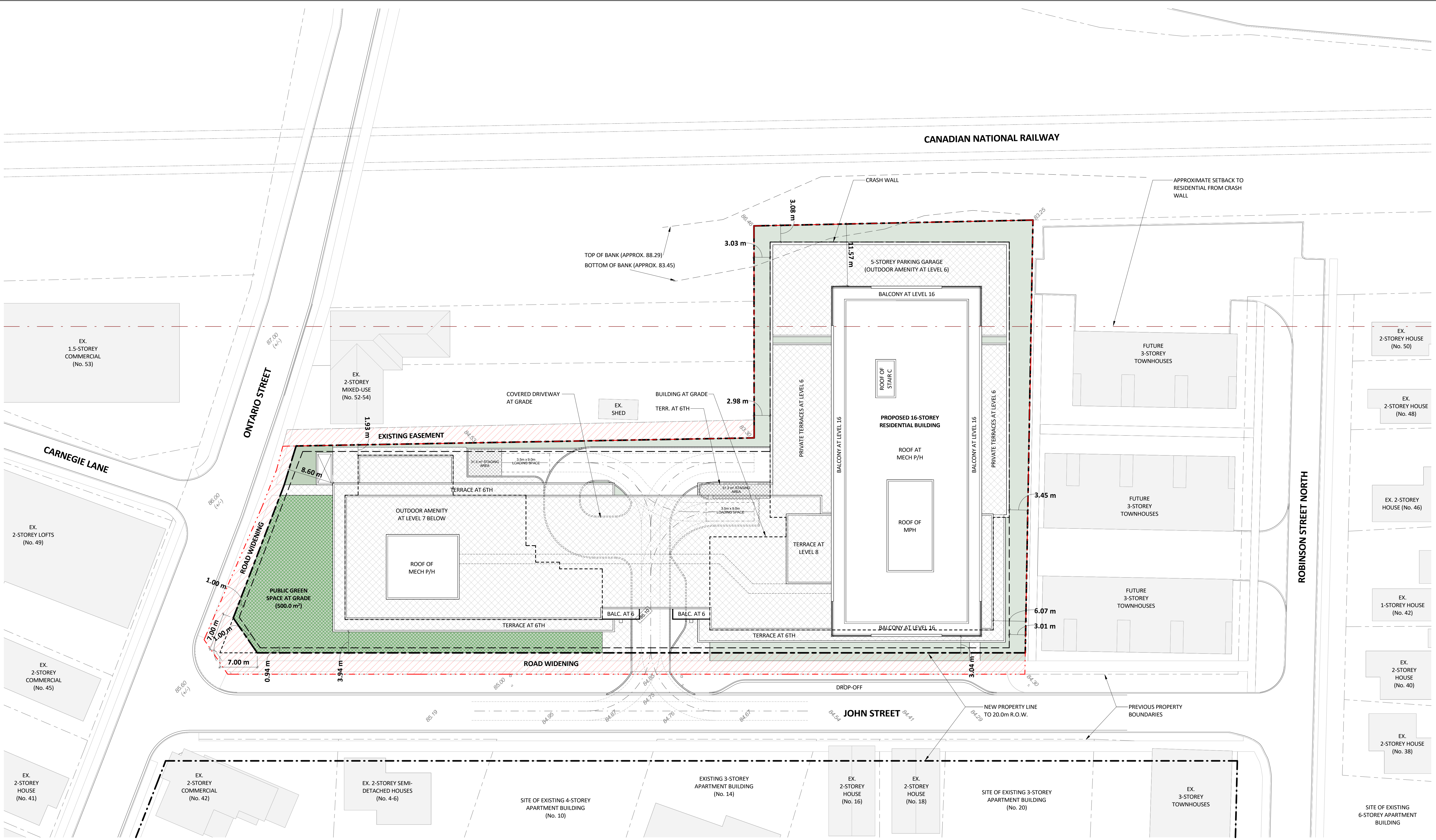
**SITE STATISTICS:**

SITE AREA	(0.778775 ha) 7,787.75 m <sup>2</sup>
GROSS FLOOR AREA (GFA)	30,876.44 m <sup>2</sup>
FLOOR SPACE INDEX (FSI)	3.97
UNIT COUNT	305
DENSITY (UPH)	391.65

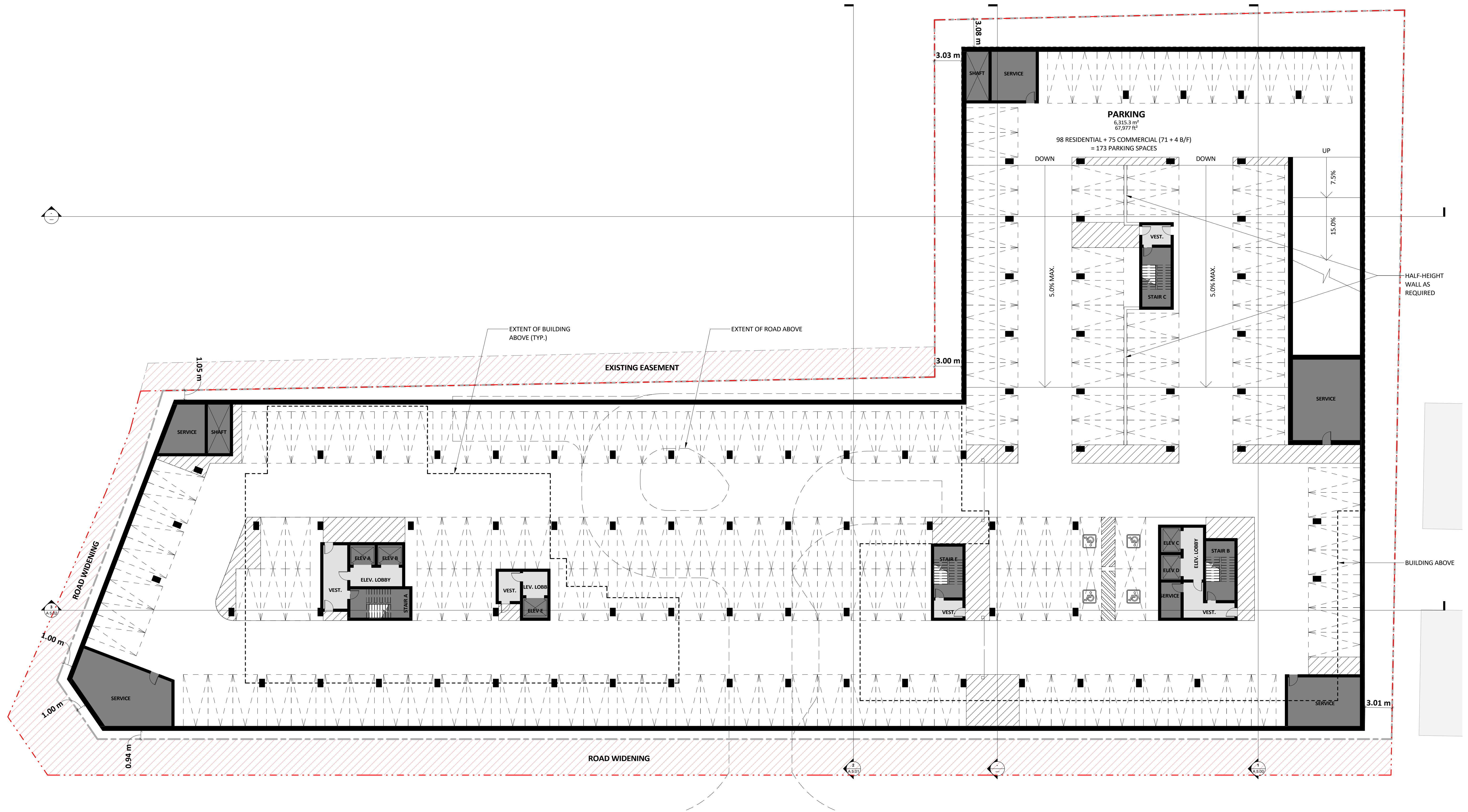
PARKING PROVIDED	RESIDENTIAL	COMMERCIAL	TOTAL
LEVEL P1	98	75	173
LEVEL 1	2	45	47
LEVEL 2	52	0	52
LEVEL 3	52	0	52
LEVEL 4	52	0	52
LEVEL 5	52	0	52
<b>TOTAL PARKING PROVIDED</b>	<b>308</b>	<b>120</b>	<b>428</b>

\*6 COMMERCIAL + 8 RES. OF THE TOTAL SPACES PROVIDED = BARRIER-FREE.

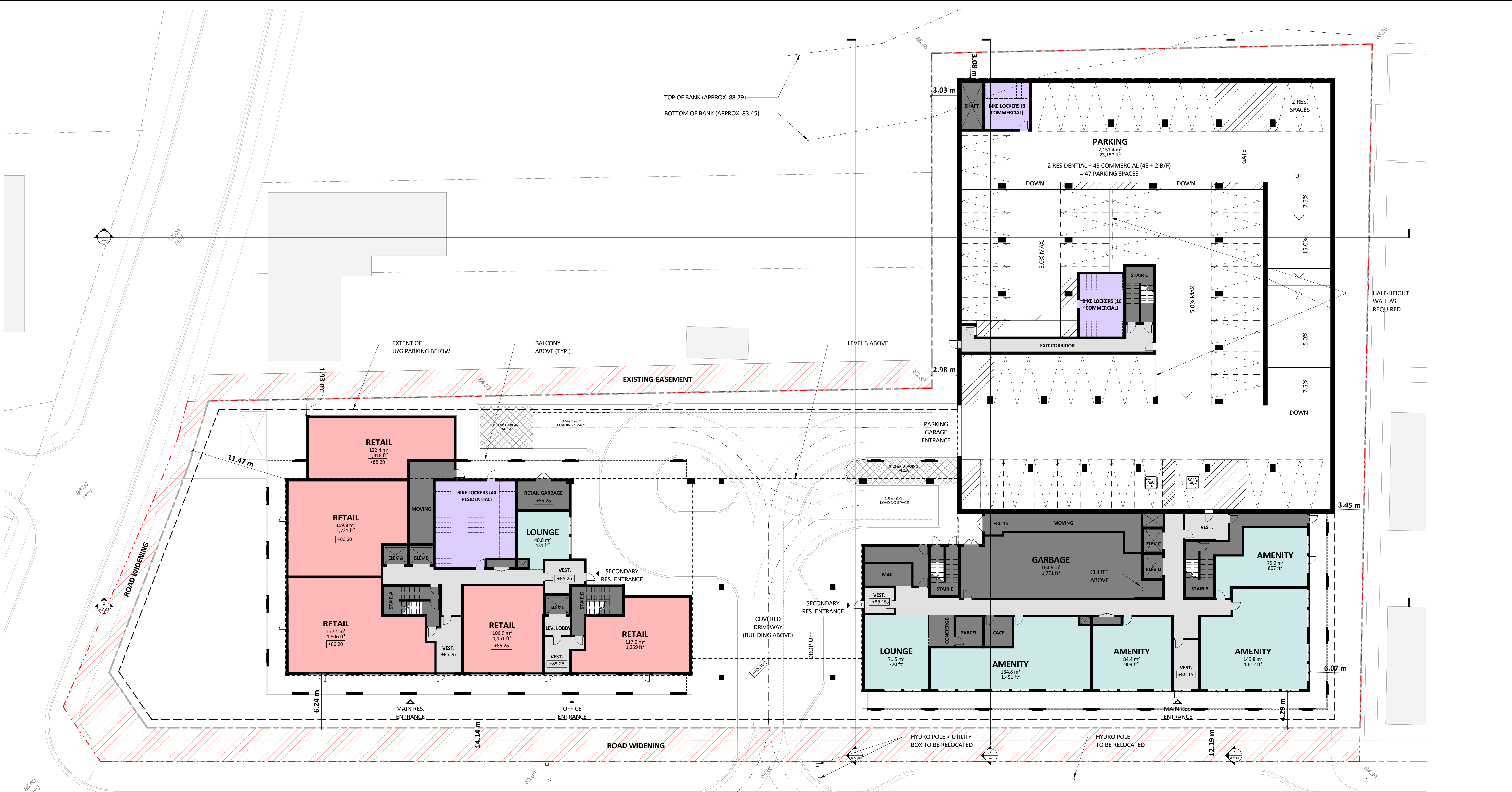
# 46, 48 + 50 ONTARIO STREET, AND 1, 3, 5, 7, 11, 13, 15, 17 + 21 JOHN STREET



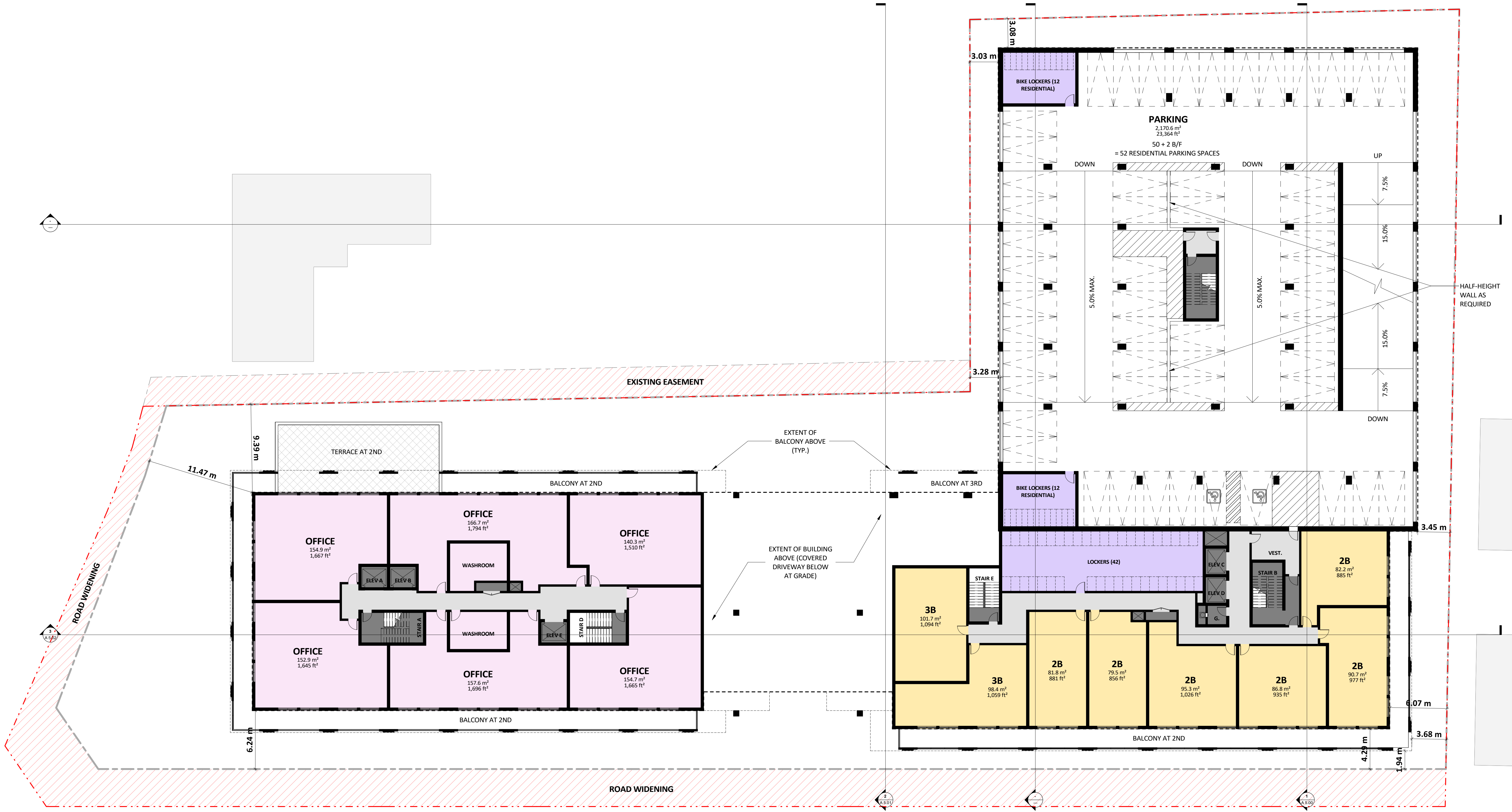
1 SITE PLAN  
1 : 300



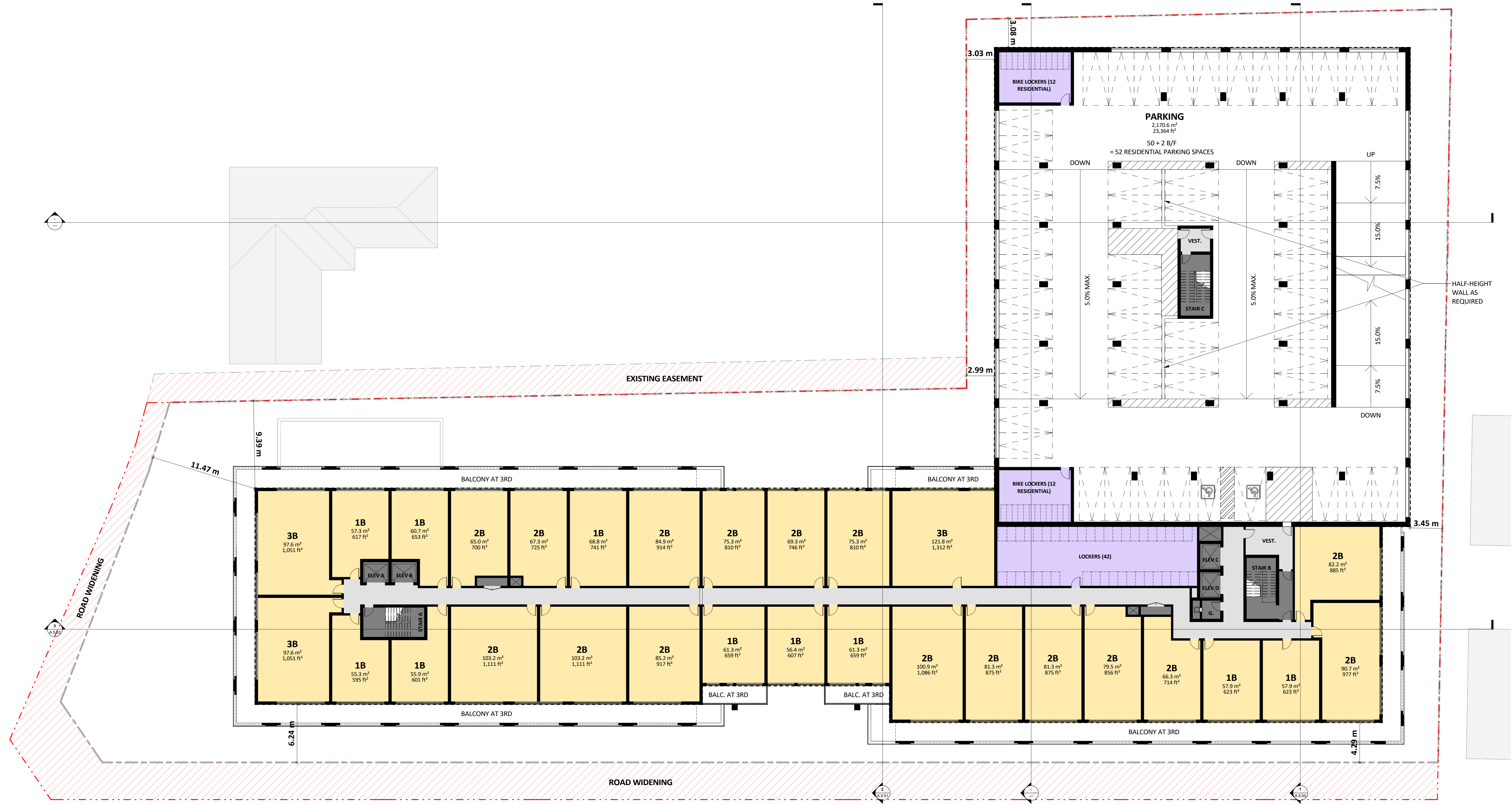
② P1 LEVEL  
1 : 200



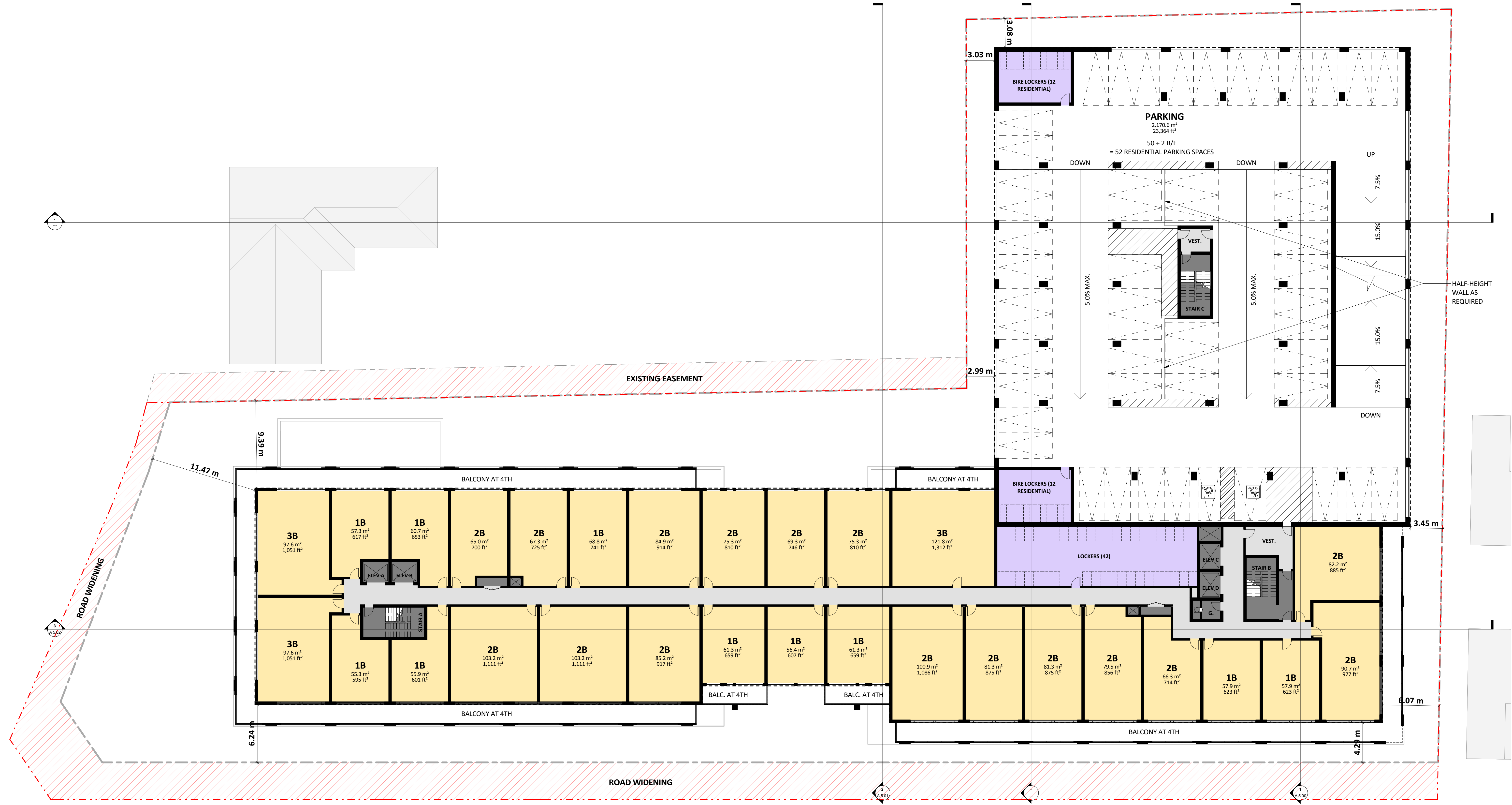
1 LEVEL 1  
1 : 200



1 LEVEL 2  
1 : 200



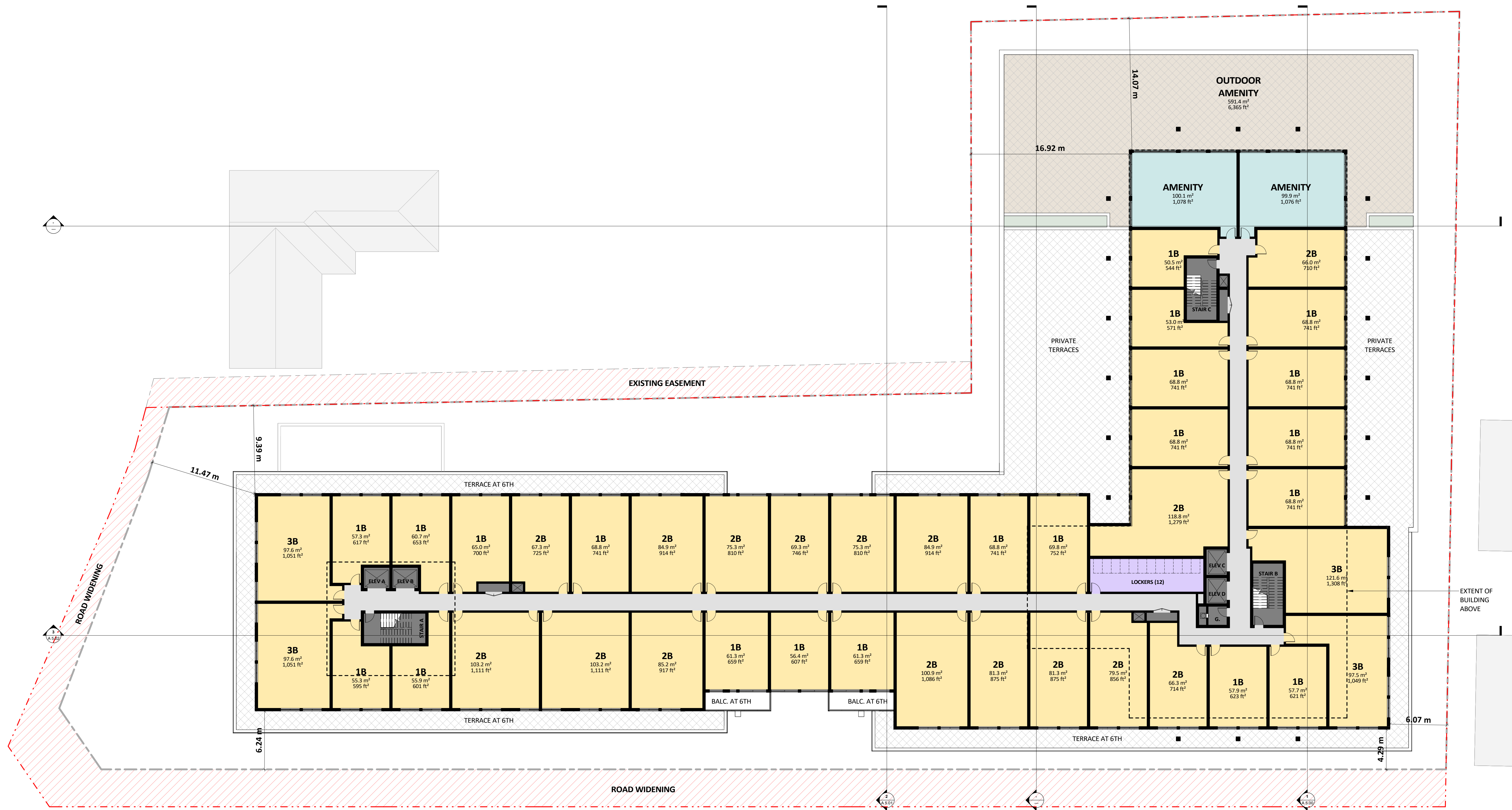
1 LEVEL 3  
1 : 200



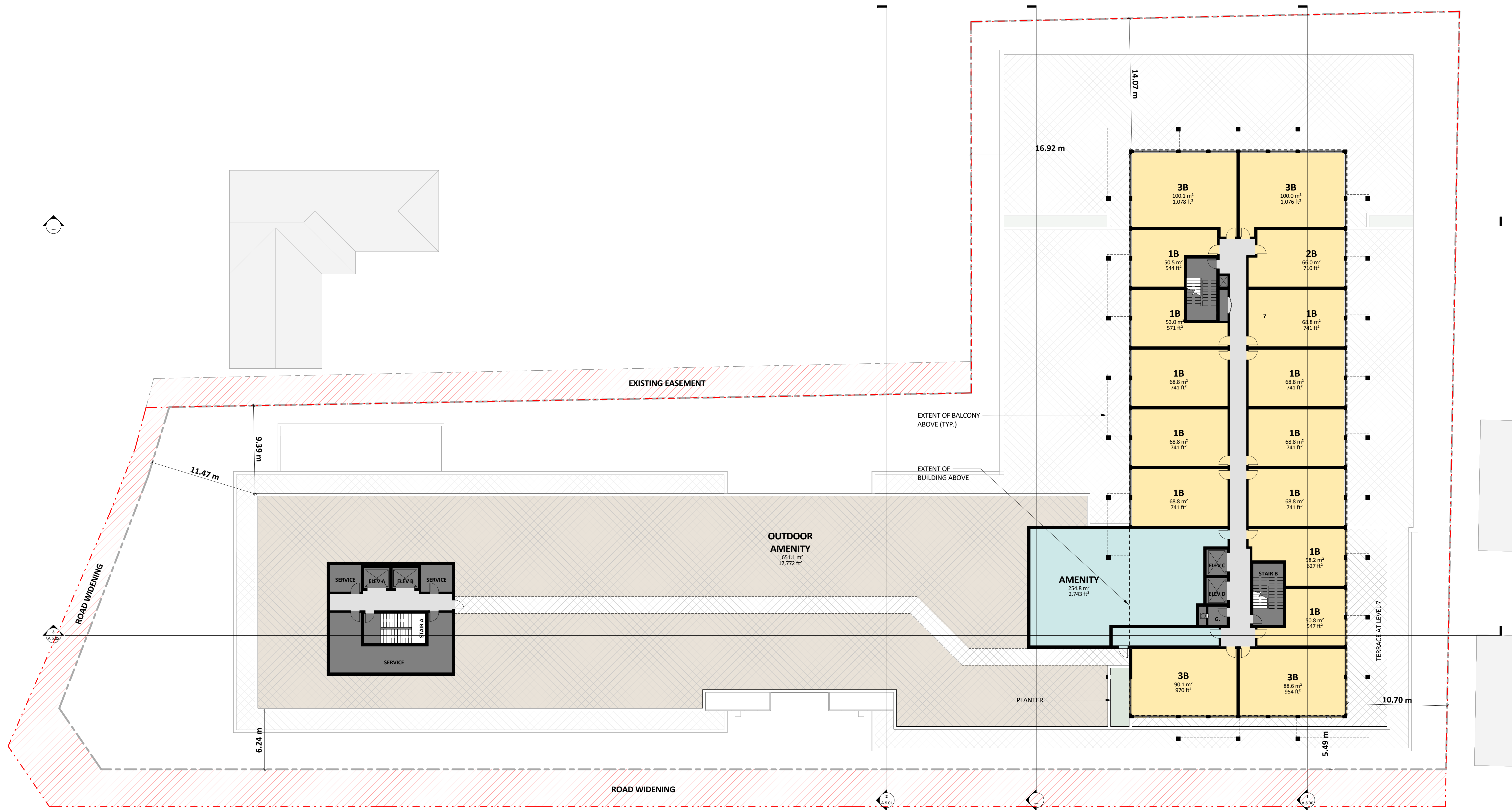
1 LEVEL 4  
1 : 200

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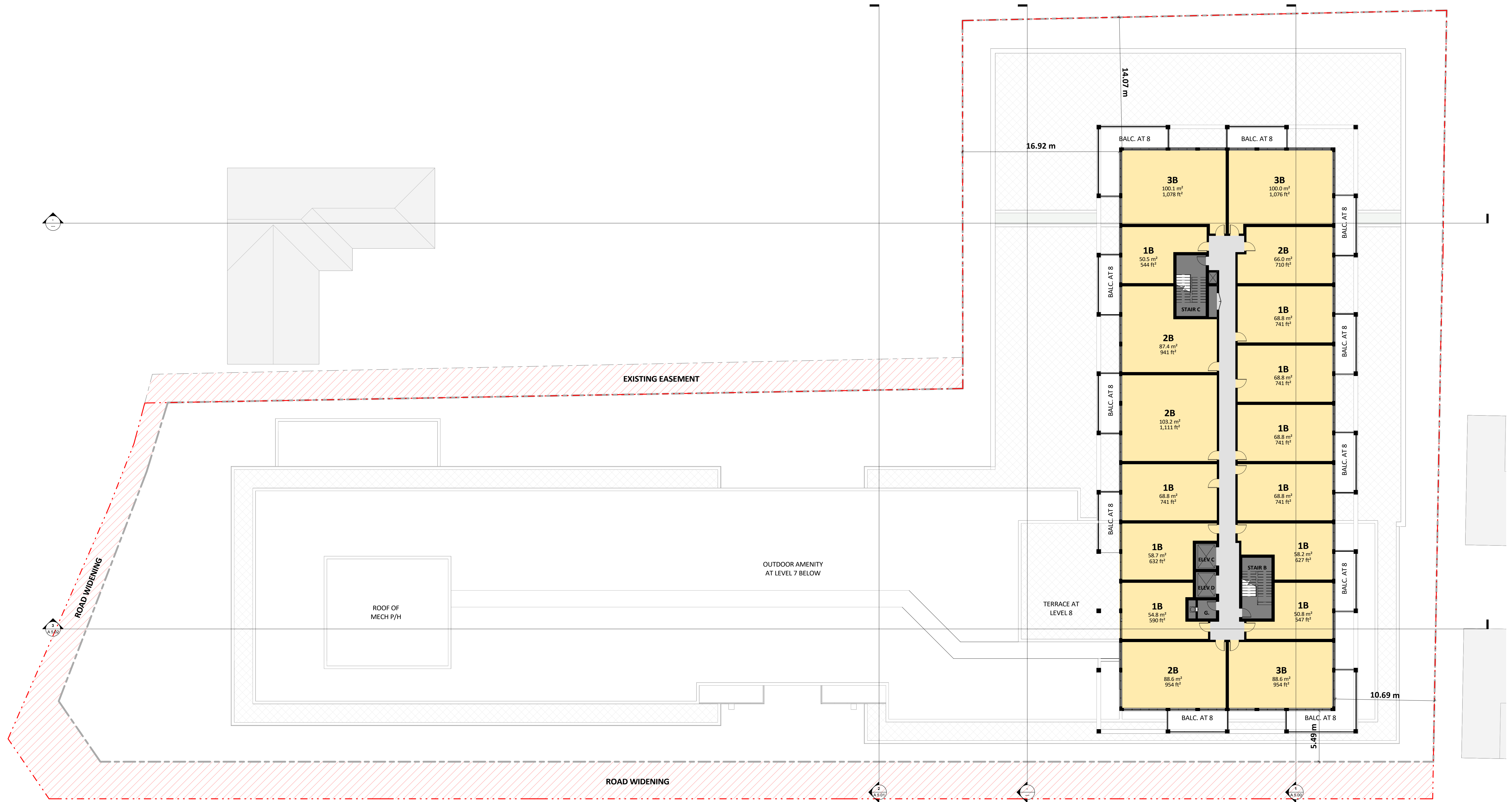




① LEVEL 6  
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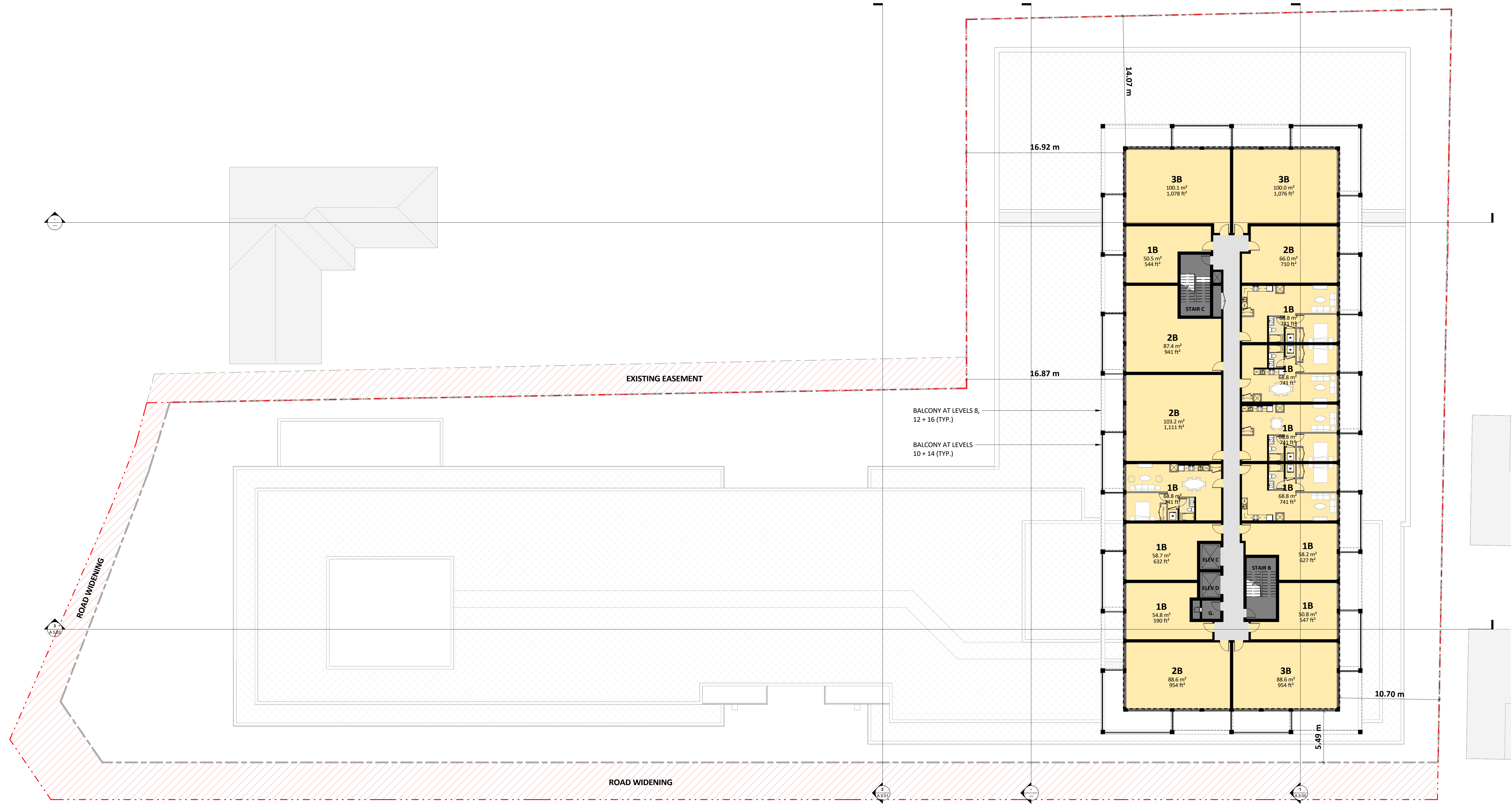


① LEVEL 7  
1 : 200



1 LEVEL 8  
1 : 200

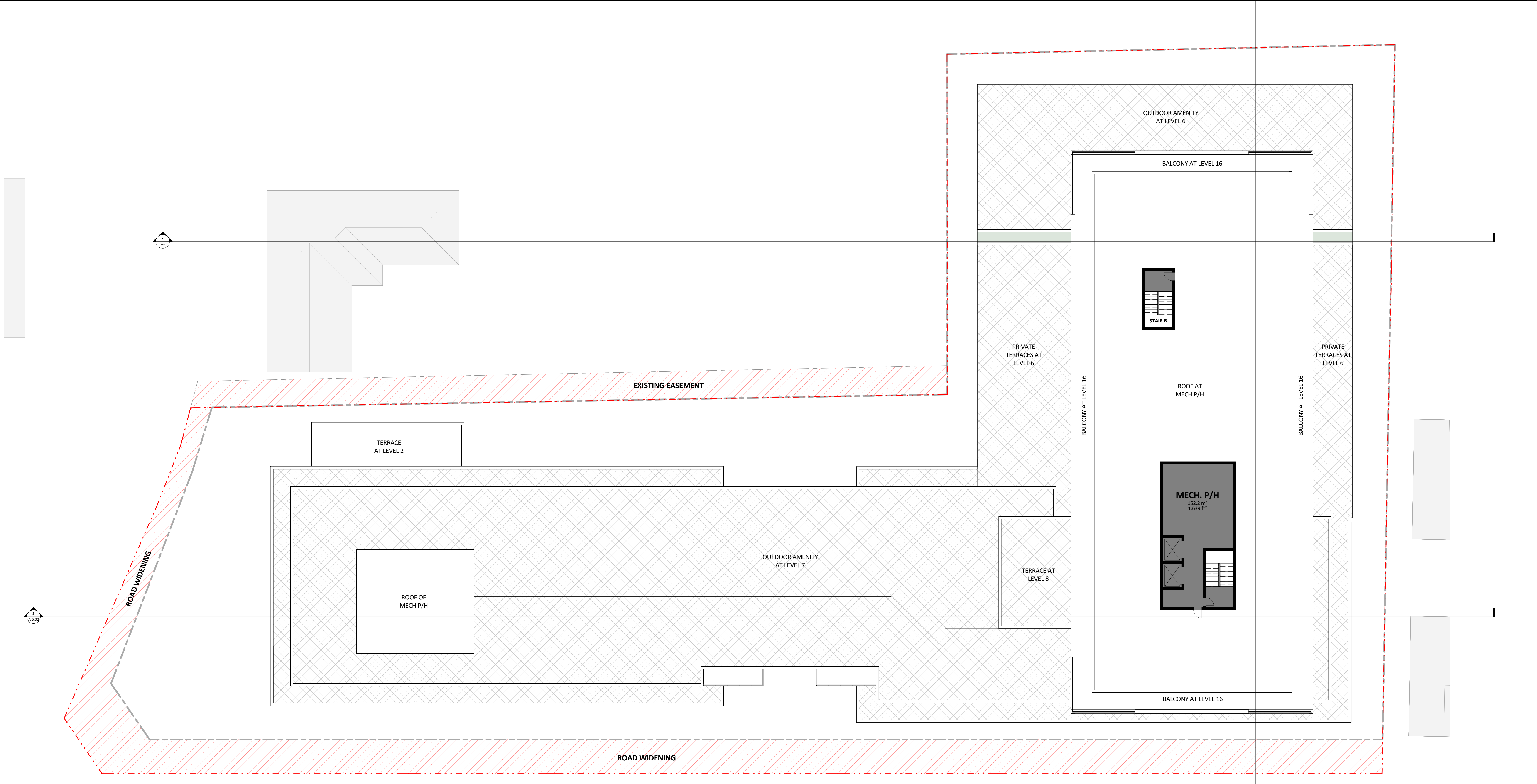
No.	Date	Issued / Revision	By



① LEVEL 9 - 16  
1 : 200

No.	Date	Issued / Revision	By

<small>CONTRACTOR TO VERIFY ALL DIMENSIONS ON THE SITE AND REPORT ANY DISCREPANCIES TO THE ARCHITECT BEFORE PROCEEDING WITH THE WORK. ALL DRAWINGS ARE THE PROPERTY OF THE ARCHITECT AND MUST BE RETURNED AT THE COMPLETION OF THE WORK. THIS DRAWING IS NOT TO BE USED FOR CONSTRUCTION UNTIL COUNTERSIGNED.</small>	<small>SCALE</small> 1 : 200 <small>PROJECT NO.</small> 21033 <small>DATE</small> APR 2026 <small>DRAWN BY</small> Author <small>CHECKED BY</small> Checker
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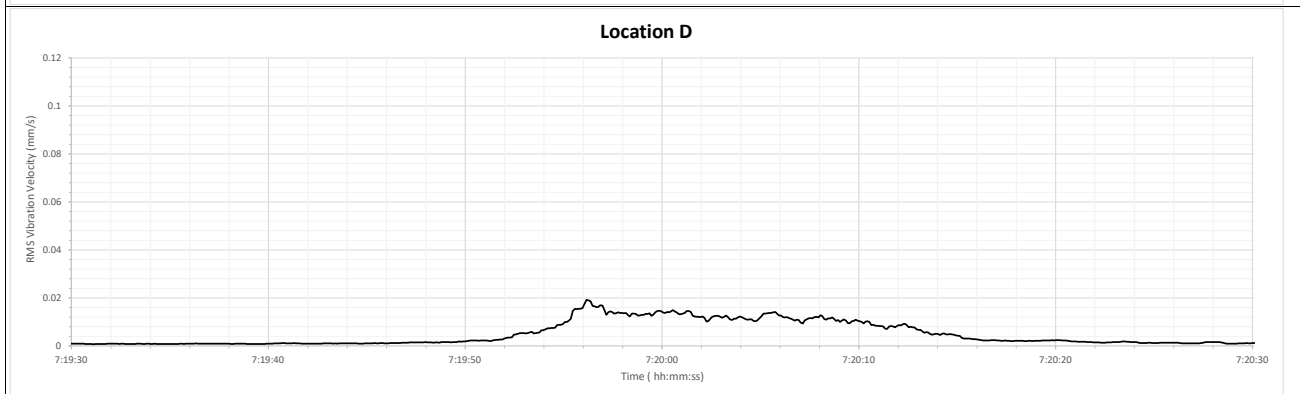
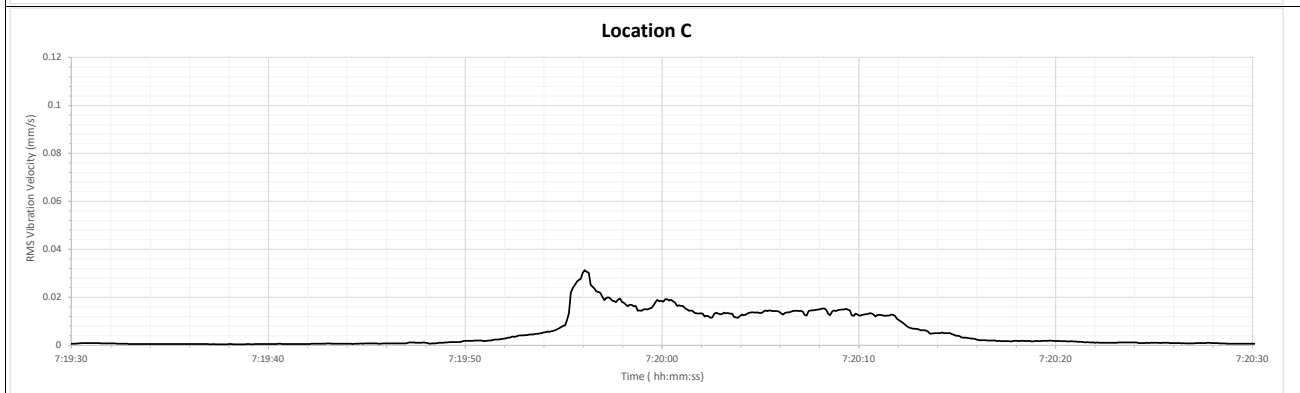
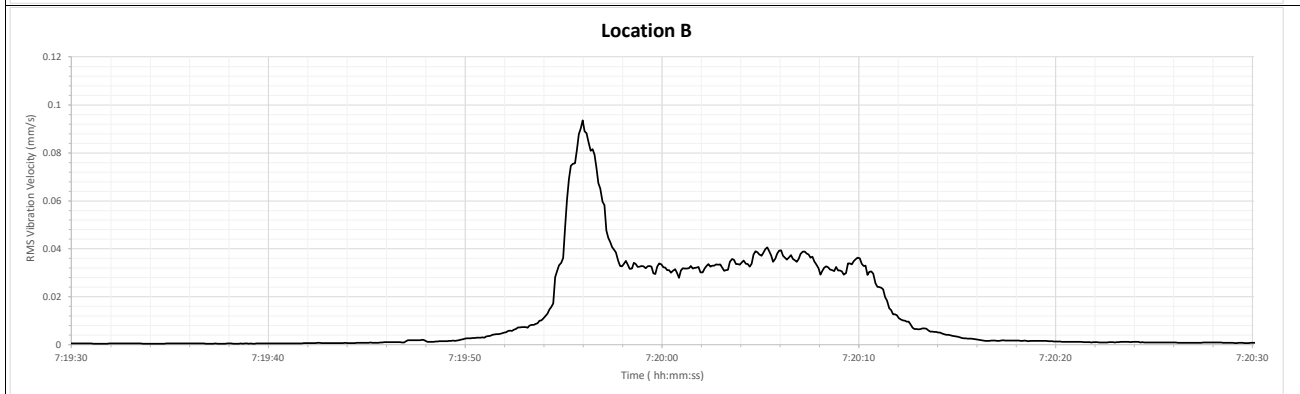
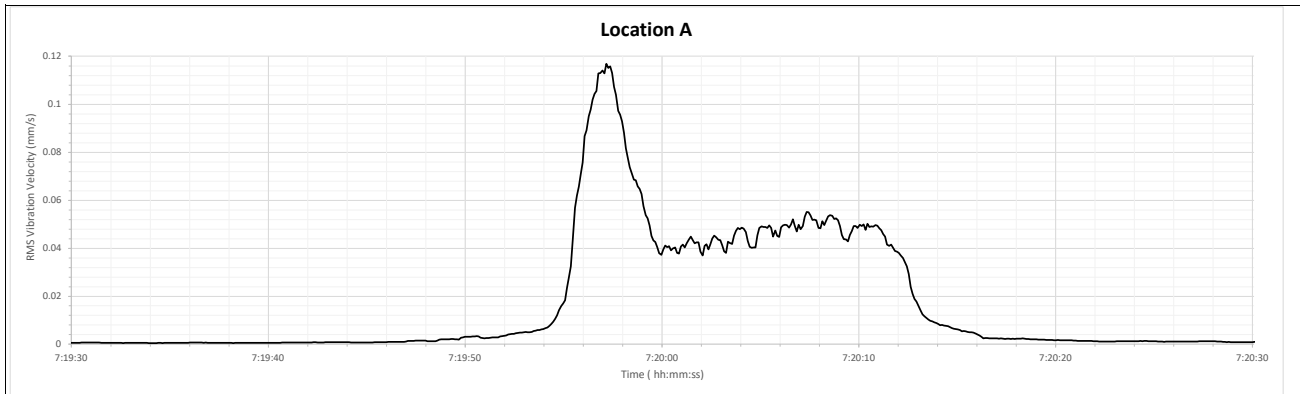


1 MECH P/H / ROOF PLAN  
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# APPENDIX B

## VIBRATION VELOCITY TIME HISTORIES DUE TO TRAIN PASS-BYS

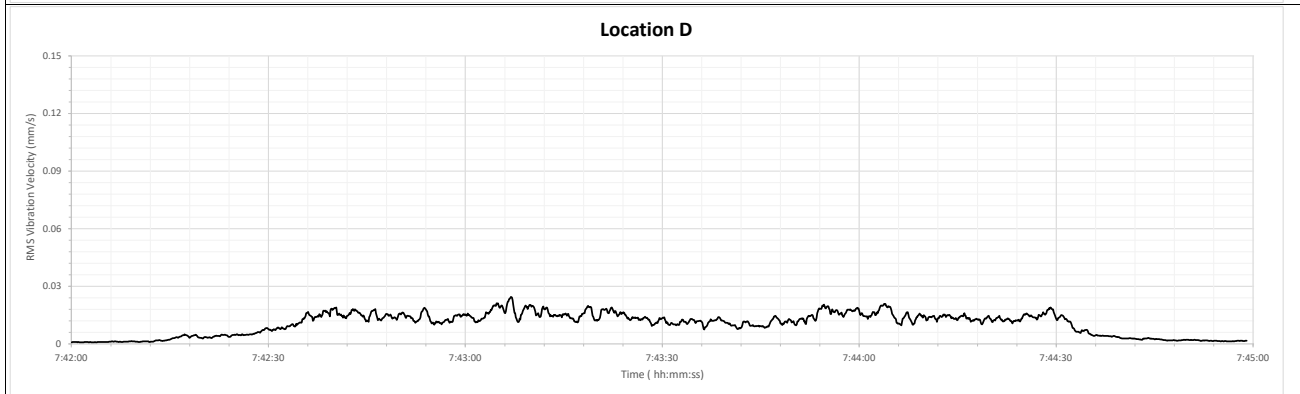
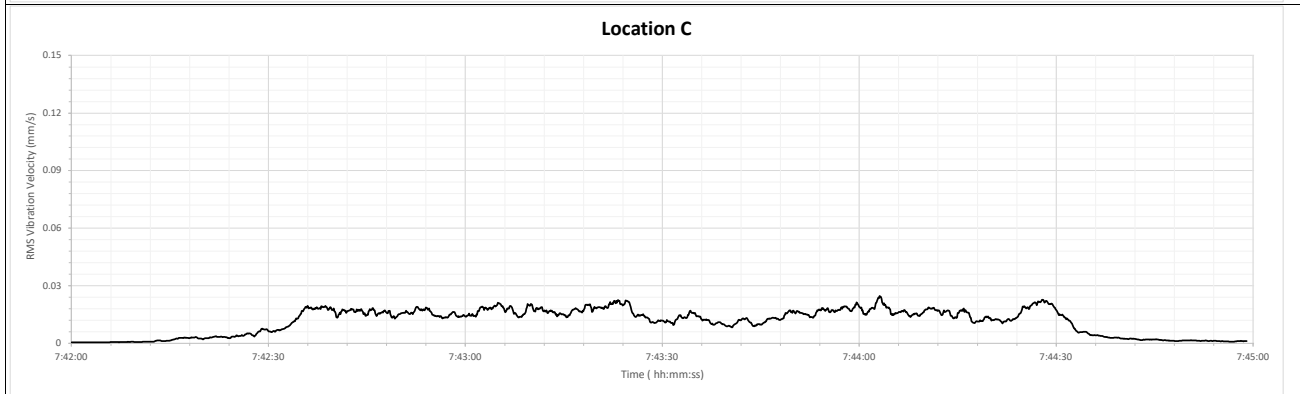
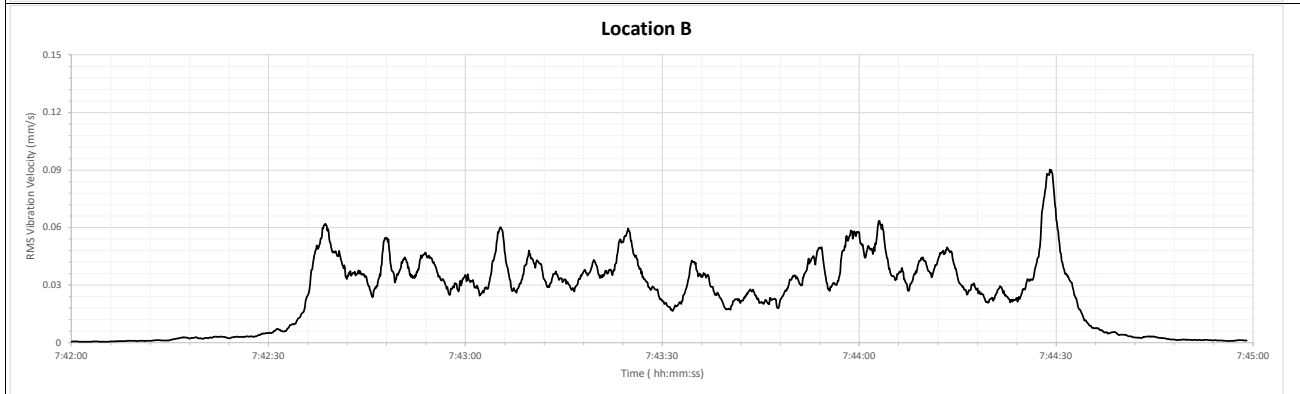
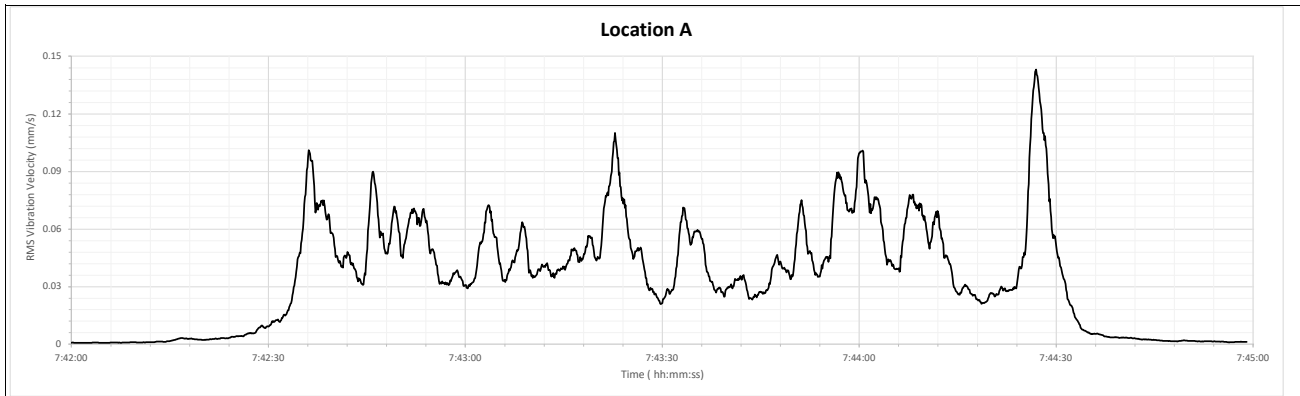
# Time History - Train Pass-by #1



	Title	Measurement Date	Figure
	Railway Vibration Measurements - Vertical (Z) RMS Velocity Time History Project Name John Street & Ontario Street, Grimsby	2026-02-26 Project No. 0257210.0029	

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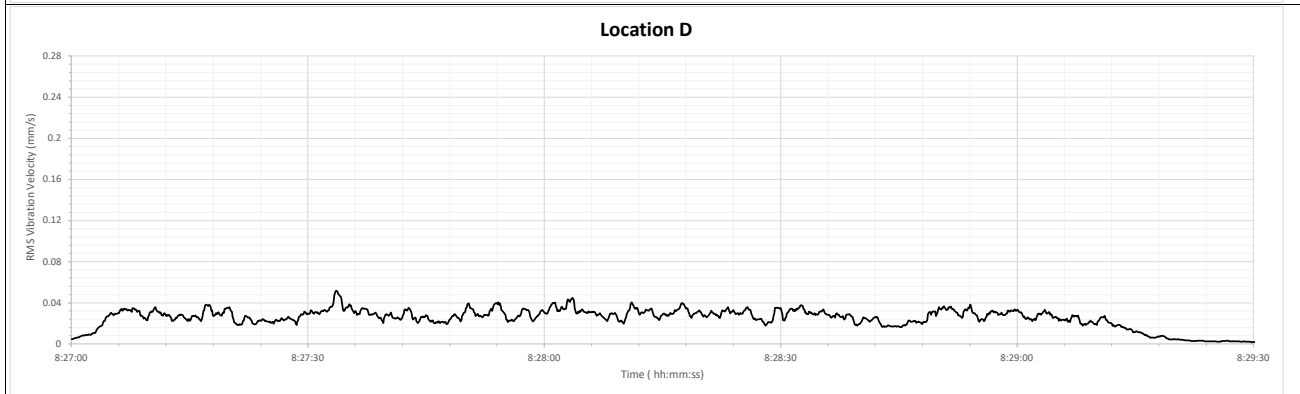
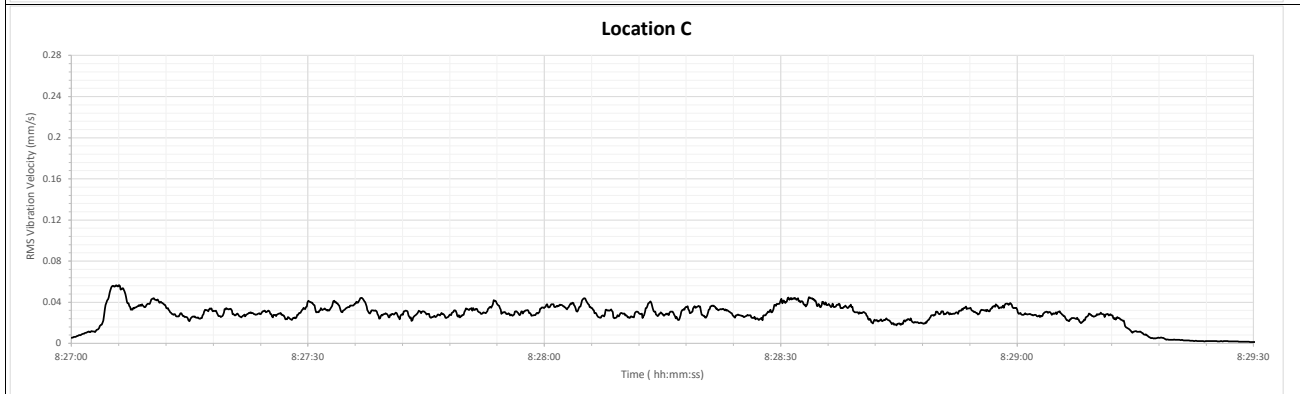
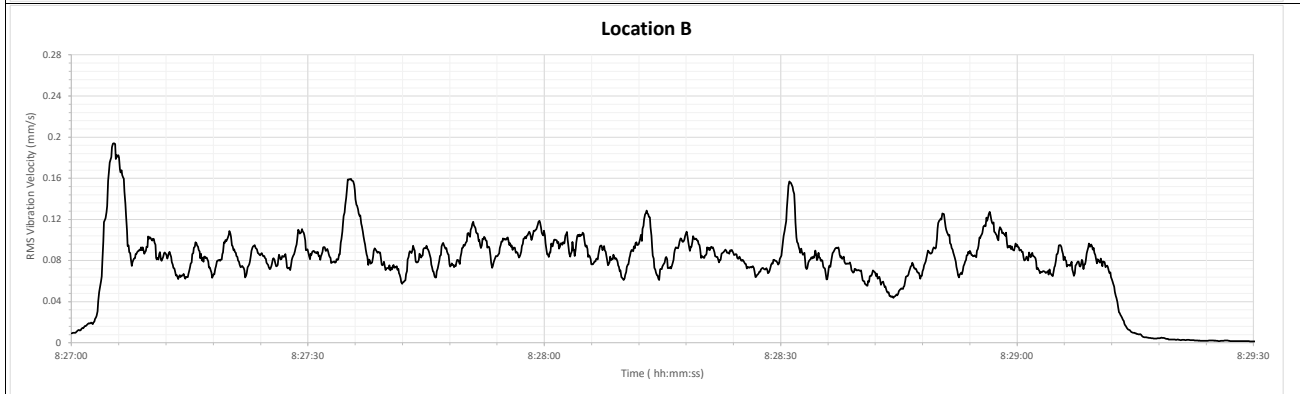
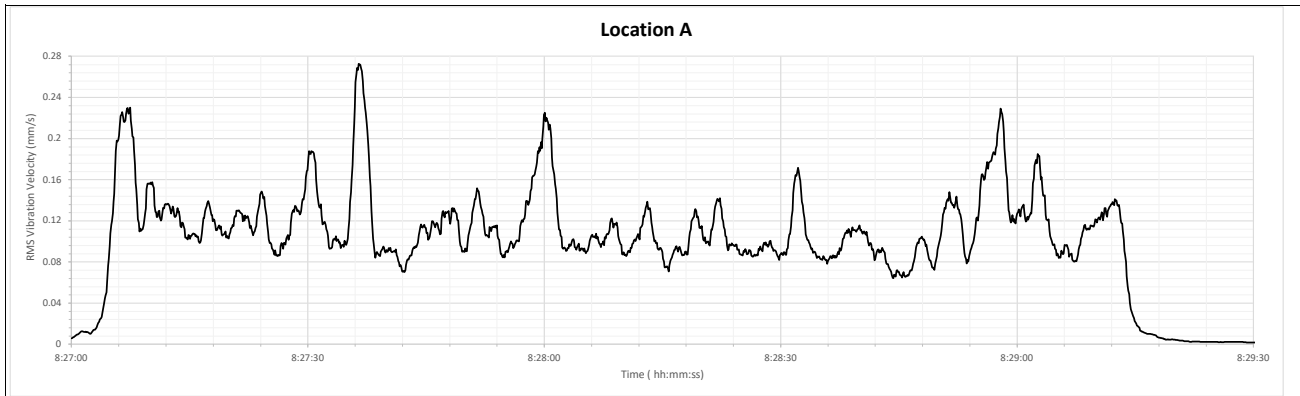
# Time History - Train Pass-by #2



	Title <b>Railway Vibration Measurements - Vertical (Z) RMS Velocity Time History</b>	Measurement Date <b>2026-02-26</b>	Figure <b>2</b>
	Project Name <b>John Street &amp; Ontario Street, Grimsby</b>	Project No. <b>0257210.0029</b>	

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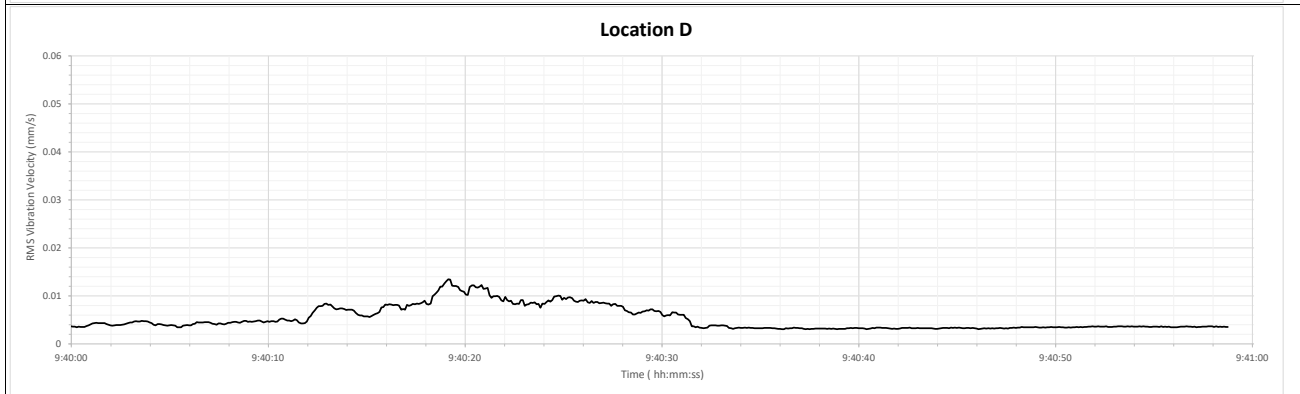
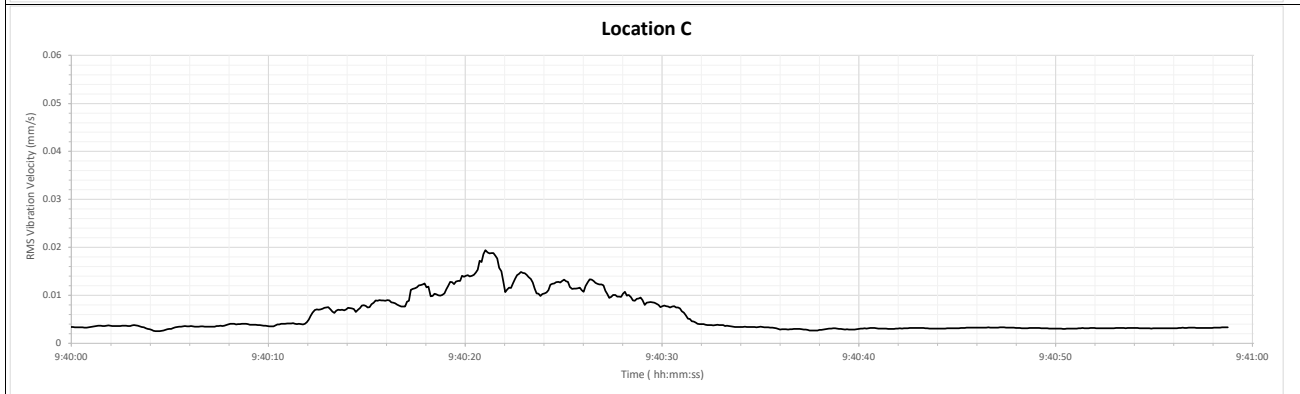
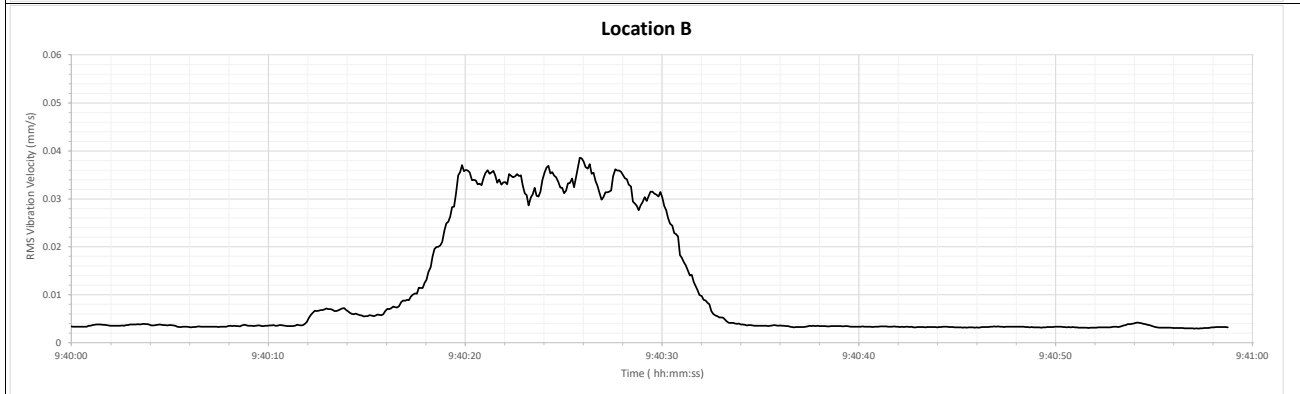
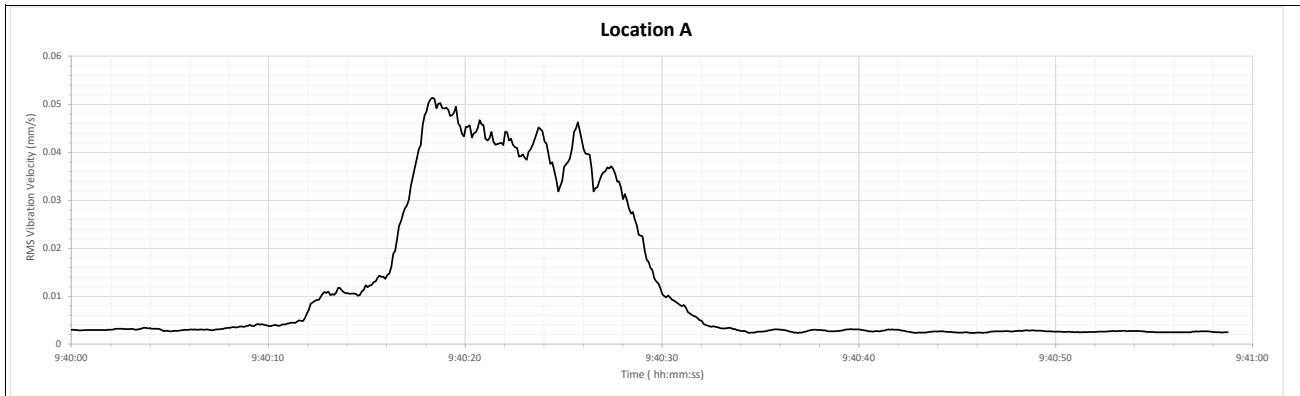
# Time History - Train Pass-by #3



	Title <b>Railway Vibration Measurements - Vertical (Z) RMS Velocity Time History</b>	Measurement Date 2026-02-26	Figure <b>3</b>
	Project Name <b>John Street &amp; Ontario Street, Grimsby</b>	Project No. 0257210.0029	

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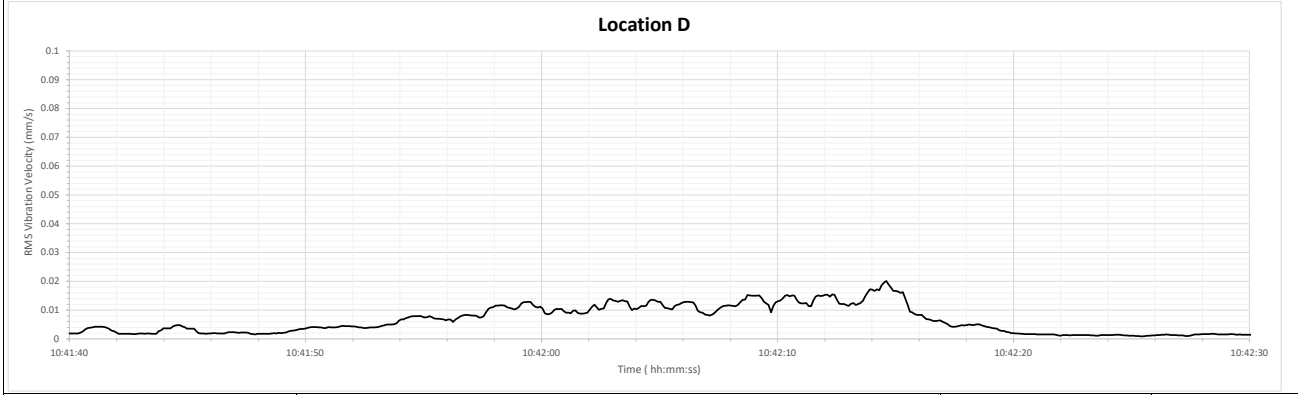
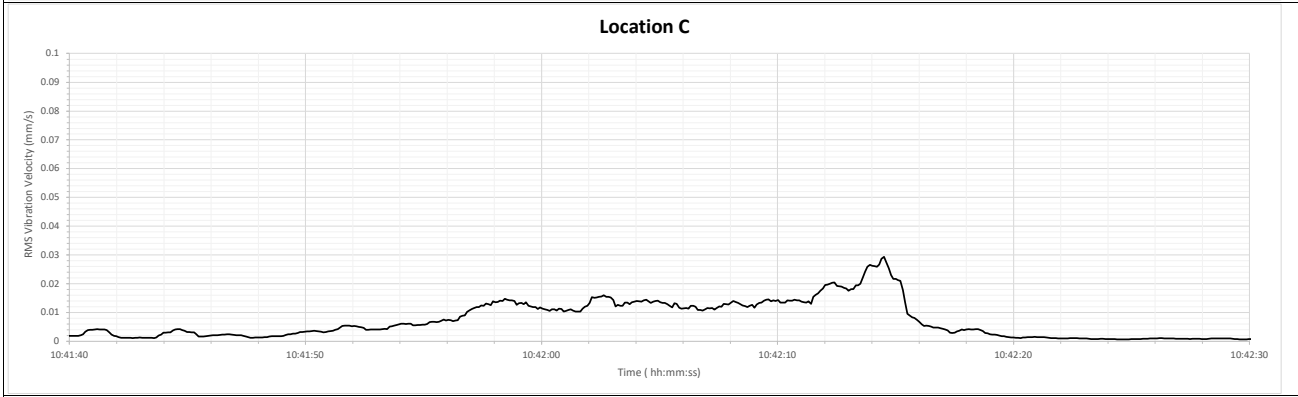
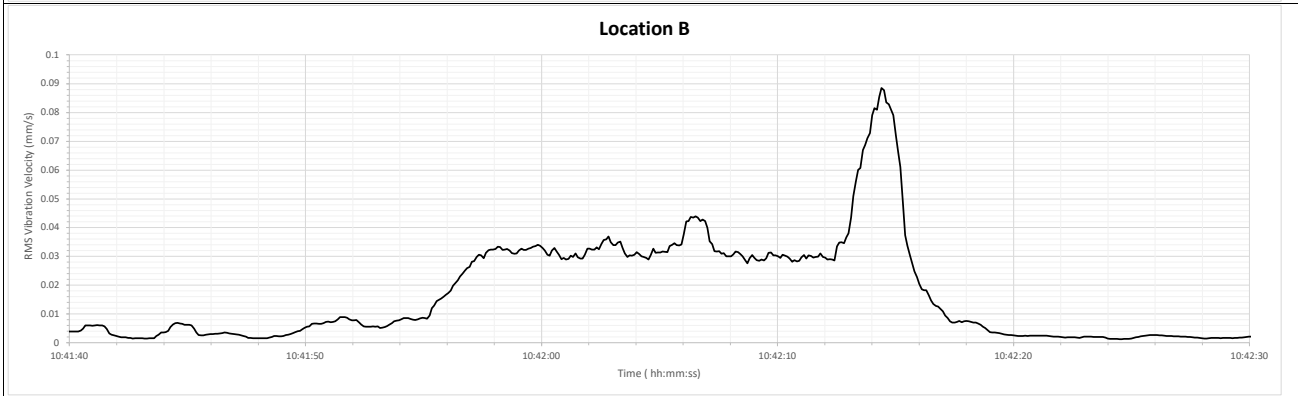
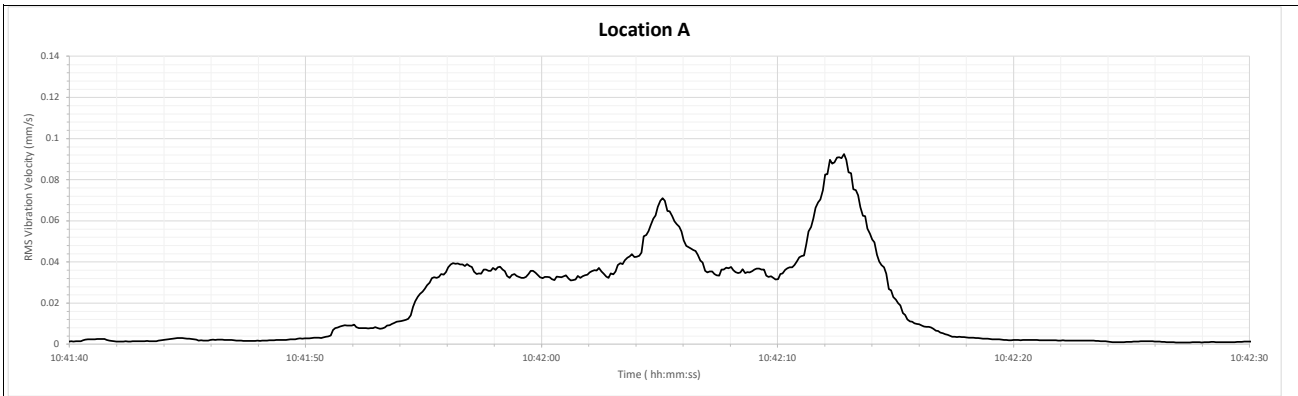
# Time History - Train Pass-by #4



	Title	Measurement Date	Figure
	Railway Vibration Measurements - Vertical (Z) RMS Velocity Time History Project Name John Street & Ontario Street, Grimsby	2026-02-26 Project No. 0257210.0029	

J:\2025\0257210.0029\14 Jurisdiction\94 Data For Analysis\Measurements\Pass-by\Time Histories (Z Only)\_John Street & Ontario Street, Grimsby\_RL.xlsx Plot (6)

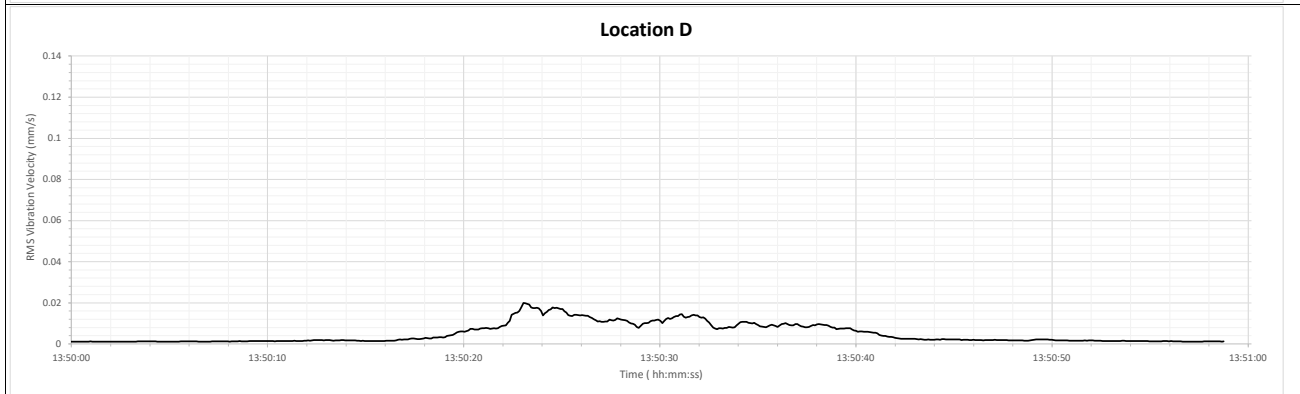
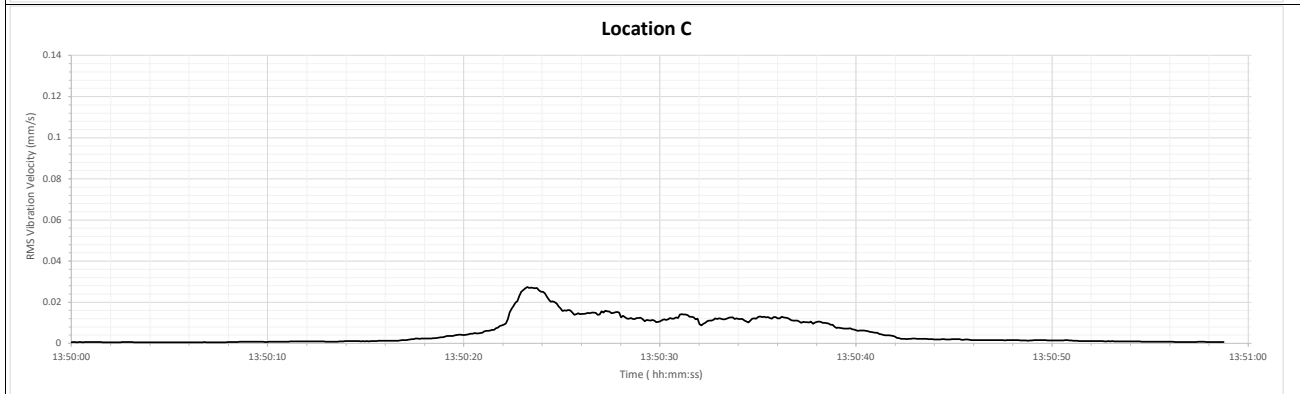
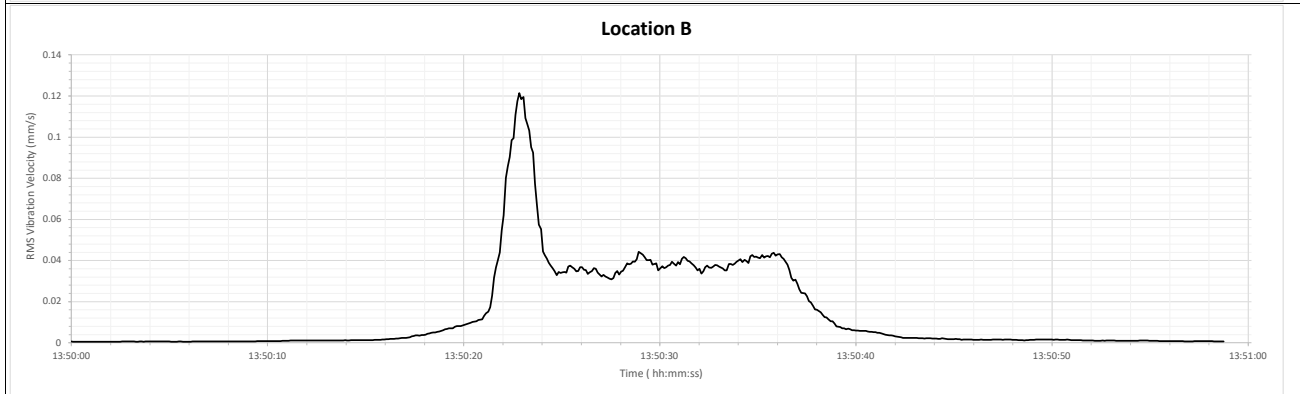
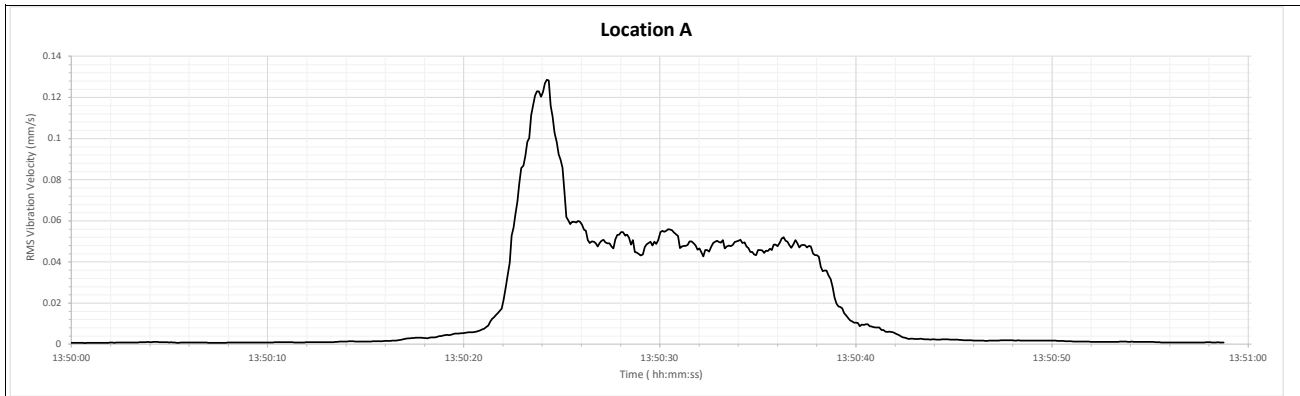
# Time History - Train Pass-by #5



	Title <b>Railway Vibration Measurements - Vertical (Z) RMS Velocity Time History</b>	Measurement Date 2026-02-26	<b>5</b>
	Project Name <b>John Street &amp; Ontario Street, Grimsby</b>	Project No. 0257210.0029	

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# Time History - Train Pass-by #6



	Title	Measurement Date	Figure
	Railway Vibration Measurements - Vertical (Z) RMS Velocity Time History Project Name John Street & Ontario Street, Grimsby	2026-02-26 Project No. 0257210.0029	

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