Confederation Line Level 1 Proximity Study

Proposed Multi-Storey Building

294-300 Tremblay Road
Ottawa, Ontario

Prepared for TC United Development Corporation
c/o ZW Project Management

Report PG5407-2 Revision 1 dated October 4, 2023

Table of Contents

Appendices

1.0 Introduction

Paterson Group (Paterson) was commissioned by ZW Project Management on behalf of TC United Development to conduct a Level 1 Confederation Line Proximity Study for the proposed multi-storey building to be located at the intersection between Tremblay Road and Belfast Road, in the City of Ottawa, Ontario.

The objectives of the current study were to:

- Review all current information available from the City of Ottawa with regards to the infrastructure of the Confederation Rail Line (O-Train Rail), Alexandria Rail Line and Station (VIA Rail Canada), Tremblay Station, and O-Train Railway MSF Connector Tunnel, in the vicinity of the subject site.

- Liaison between the City of Ottawa and ZW Project Management on behalf of TC United Development team involved with the aforementioned project.

The following report has been prepared specifically and solely for the aforementioned project which is described herein. It contains a collaboration of architectural, civil, structural, and geotechnical information as they pertain to the aforementioned project.

2.0 Development Details

Based on current plans, it is understood that the proposed development at the subject site will consist of a multi-storey building. This structure will have six (6) storeys above-grade with a roof top patio and one (1) level below-grade. Associated at-grade parking areas, access lanes, and landscaped areas are further anticipated surrounding the proposed building. The underground level structure for the proposed multi-storey building is to be setback approximately 0.9 m from the northern property limit along Tremblay Road, 1.6 m from the southern property limit adjacent to 550 Belfast Road, 1.5 m from the northern half of the west property limit along of Avenue L, to the southern half of the west property limit along Avenue L, and to the east property limit along Belfast Road.

The existing average ground surface elevation at the subject site is at an approximate geodetic elevation of 65.7 m. The design underside of footing (USF) elevation of the proposed multi-storey residential building is at an approximate geodetic elevation of 60.6 m and will be founded on compact glacial till, with the exception of the elevator pit location which extends to an approximate geodetic elevation of 59.4 m. Therefore, the elevator pit is anticipated to be founded on compact glacial till.

The following is known about the Confederation Line and VIA Rail Canada in the vicinity of the subject site:

- ❑ The subject site is proposed to be located to the south of the existing Confederation Rail Line (O-Train Rail) which is located at an approximate geodetic elevation of 62 m.
- ❑ The subject site is proposed to be located to the north of the existing Alexandria Rail Line (VIA Rail Canada) which is located at an approximate geodetic elevation of 64 m.
- ❑ The subject site is proposed to be located to the east of the existing O-Train Railway MSF Connector Tunnel which is located at an approximate geodetic elevation of 62 m.
- ❑ The proposed multi-storey building is anticipated to be located approximately 58 m south of the existing Confederation Line (O-Train Rail), 241 m north of the existing Alexandria Rail Line (VIA Rail Canada), and approximately 20m east of the existing O-Train Railway MSF Connector Tunnel.
- ❑ The existing Tremblay Station is located approximately 450 m south-west of the proposed development, and the existing Ottawa Train Station (VIA Rail Station) is located approximately 260 m south-west of the proposed multi-storey building.
- ❑ Based on the subsurface profile encountered within the boreholes at 294-300 Tremblay Road, and our experience in the general area, bedrock is expected at depths of about 7 to 10 m below the existing ground surface, which corresponds to approximate geodetic elevations of 58.7 m to 55.7 m, and which is below the USF elevation for the proposed building.

3.0 Construction Methodology and Impact Review

Paterson has prepared a construction methodology summary along with possible impacts on the adjacent segment of Confederation Rail Line (O-Train Rail), Alexandria Rail Line and Station (VIA Rail Canada), Tremblay Station, and O-Train Railway MSF Connector Tunnel, based on the current building design details. The Construction Methodology and Impact Review is provided in Appendix A and presents the anticipated construction items, impact review, and mitigation program recommended for the proposed multi-storey residential building. Based on the subsurface conditions encountered at the test hole locations and the founding depth of the proposed multi-storey residential building, bedrock removal is not anticipated at the subject site. Therefore, the primary issue will be vibrations associated with the construction operations, such as compactor, dozer, crane, truck traffic, installation of the temporary shoring system (if required), etc. It is recommended that a vibration monitoring program be implemented to ensure vibration levels remain below recommended tolerances. Details of the recommended vibration monitoring program are presented below.

3.1 Vibration Monitoring and Control Program

Proposed Vibration Limits

Due to the presence of the Confederation Rail Line (O-Train Rail), Alexandria Rail Line and Station (VIA Rail Canada), Tremblay Station, and O-Train Railway MSF Connector Tunnel in the vicinity of the subject site, the contractor should take extra precaution to minimize vibrations. The monitoring program will be required for the full duration of the construction operations and the shoring installation (if required). The purpose of the vibration monitoring and control program (VMCP) is to provide a description of the measures to be applied by the contractor to manage excavation operations and any other vibration sources during the construction for the proposed development. The VMCP will also provide a guideline for assessing results against the relevant vibration impact assessment criteria and recommendations to meet the required limits.

The monitoring program will incorporate real time results at the Confederation Line (O-Train Rail), Alexandria Rail Line (VIA Rail Canada), Tremblay Station, and O-Train Railway MSF Connector Tunnel located in the vicinity of the subject site. The monitoring equipment should consist of a tri-axial seismograph, capable of measuring vibration intensities up to 254 mm/s at a frequency response of 2 to 250 Hz.

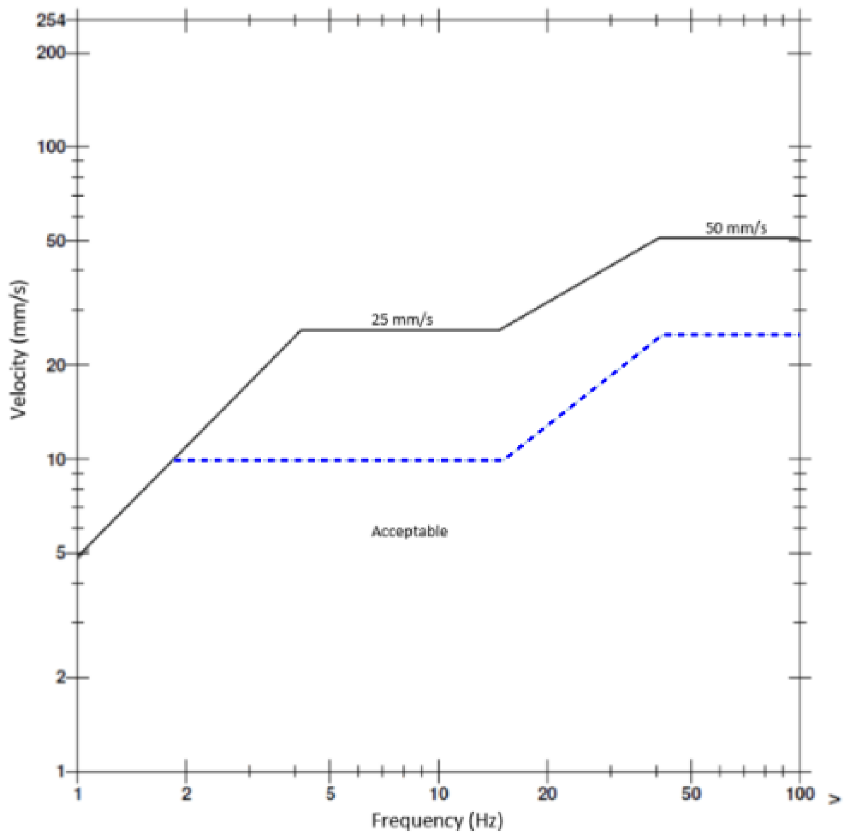
The location of the seismograph should be reviewed periodically throughout construction to ensure that the monitoring equipment remains along the alignment of the proposed Confederation Rail Line (O-Train Rail), Alexandria Rail Line and Station (VIA Rail Canada), Tremblay Station, and O-Train Railway MSF Connector Tunnel, with the closest radius to the construction activities. The seismograph locations should be approved by the project manager prior to installation.

During construction, the vibration monitor will be relocated for the ‘worst case’ location for each construction activity. When an event is triggered, Paterson will review the results and provide any necessary feedback. Otherwise, the vibration results will be summarized in the weekly report.

Proposed Vibration Limits

The following figure outlines the recommended vibration limits for the Confederation Rail Line (O-Train Rail), Alexandria Rail Line and Station (VIA Rail Canada), Tremblay Station, and O-Train Railway MSF Connector Tunnel.

Figure 1 - Proposed Vibration Limits at the Confederation Line (O-Train Rail) Alexandria Rail Line (VIA Rail Canada), Tremblay Station, and O-Train Railway MSF Connector Tunnel



Monitoring Data

The monitoring protocol should include the following information:

Warning Level Event (indicated by the blue line on Figure 1)

- ❑ Paterson will review all vibrations over the established warning level, and
- ❑ Paterson will notify the contractor if any vibrations occur due to construction activities and are close to exceedance level.

Exceedance Level Event (indicated by the black line on Figure 1)

- ❑ Paterson will notify all the relevant stakeholders via email
- ❑ Ensure monitors are functioning
- ❑ Issue the vibration exceedance result

The data collected will include the following:

- ❑ Measured vibration levels
- ❑ Distance from the construction activity to monitoring location
- ❑ Vibration type

Monitoring should be in compliance with all related regulations.

3.2 Incident/Exceedance Reporting

In case an exceedance occurs from construction activities, the Senior Project Management and any relevant personnel should be notified immediately. A report should be completed which contains the following:

- ❑ Identify the location of vibration exceedance
- ❑ The date, time and nature of the exceedance
- ❑ Purpose of the exceeded monitor and current vibration criteria
- ❑ Identify the likely cause of the exceedance
- ❑ Describe the response action that has been completed to date
- ❑ Describe the proposed measures to address the exceedance.

The contractor should implement mitigation measures for future excavation or any construction activities as necessary and provide updates on the effectiveness of the improvement. Response actions should be pre-determined prior to excavation, depending on the approach provided to protect elements. Processes and procedures should be in-place prior to completing any vibrations to identify issues and react in a quick manner in the event of an exceedance.

4.0 Proximity Study Requirement Responses

Based on the O-Train System Proximity Study Guidelines dated April 2022, a Level 1 Confederation Line Proximity Study is considered to be required for the proposed development. A Level 1 Proximity Study is required where the proposed development is located within the City of Ottawa's Development Zone of Influence. The following Table 1, on the next page, lists the applicable requirements for a Level 1 study and the additional requirements requested by the City of Ottawa on September 19, 2023, for each item and our associated responses:

Table 1
List of Level 1 Proximity Study Requirements

Level 1 Projects	Response
A site plan of the development;	See Confederation Line and Alexandria Rail Line Proximity Plan (Drawing No. PG5704-2 dated September 2023) presented in Appendix A.
Floor Plan of the development;	Refer to the Architectural Drawings, by Project1 Studio Inc (Floor Plans, Project No. 2008 - Drawing No. A100 and A101, Revision 13 dated October 2, 2023) presented in Appendix A.
Development Cross Section;	Refer to Cross-Section A-A' (Drawing No. PG5407-2 dated August 2023), Section B-B' (Drawing No. PG5407-3 dated August 2023) presented in Appendix A. and Section C-C' (Drawing No. PG5407-4 dated September 2023) presented in Appendix A.
Geotechnical Report prepared in accordance with the City's Geotechnical Investigation and Reporting Guidelines for Development Applications;	Refer to Geotechnical Investigation: Paterson Group Report PG5407-1 Revision 4 dated August 31, 2023 presented in Appendix B.
Up-to-date property survey of existing and proposed property lines prepared to strata reference plan standards, signed and sealed by an Ontario Land Surveyor;	Refer to the Survey Plan prepared by J.D.Barnes Ltd. (Reference No. 20-10-028-00) presented in Appendix A
Utility Service Plan;	Refer to the Site Grading, Drainage, Servicing and Erosion & Sediment Control Plan (Drawing No. C-101 Revision 6 dated July 29, 2023) prepared by Mcintosh Perry presented in Appendix A.
Stormwater Management Plan and Grading Plan	Refer to the Site Grading, Drainage, Servicing and Erosion & Sediment Control Plan (Drawing No. C-101 Revision 6 dated July 29, 2023) prepared by Mcintosh Perry presented in Appendix A.

Architectural Drawings and Landscape Plans	Refer to the Architectural Drawings, by Project1 Studio Inc (Project No. 2008 - Drawing No. A100 and A101, A201 to A204, Revision 13 dated October 2, 2023) presented in Appendix A.
Noise and Vibration Study prepared in accordance with the City's environmental noise control guidelines (required for all applications within 75m of light rail transit)	Please refer to the Environmental Noise Control Study: Paterson Group Report Number PG5406-1 Revision 1 Dated September 29, 2023 presented in Appendix C.
Additional requirements requested by the City of Ottawa on September 19, 2023	**Response**
Fire/life safety and HVAC Report (as applicable) i. Demonstrate that HVAC and fire/life safety design requirements of Ontario Building Code and NFPA 130 are met, as applicable. ii. If close to limiting distances, provide mechanical drawings and conduct a fire/smoke dispersion analysis.	The proposed development is sufficiently setback from the O-Train, at a distance of 58 m, such that a fire/smoke from the proposed development would not impact the O-Train. Accordingly, a fire/smoke dispersion analysis is not considered to be required.
Excavation Plan (as applicable) i. Identify excavation methods and support systems, including shoring design. ii. Identify whether any blasting, pile driving, or dynamic compaction will be conducted. iii. Provide a dewatering and groundwater control plan.	- The temporary shoring system for the proposed development is anticipated to consist of soldier piling and lagging or interlocking steel sheet piling. Additional shoring design criteria are provided in the aforementioned Geotechnical Investigation Report. The temporary shoring drawings will be submitted once they are finalized. - blasting, or dynamic compaction is not anticipated to be conducted at the subject site. Soldier piling installation or interlocking steel sheet piling for the shoring system is anticipated. - Groundwater observations during the geotechnical investigation indicated groundwater levels between approximately 3 to 4 m below the existing ground surface. Based on the existing groundwater level and low permeability of the native soils, the extent of any significant groundwater lowering will take place within a limited range of the proposed building.

	Therefore, as all structures are, or will be, founded on native soil, and base on minimal zone impacted by the groundwater lowering, groundwater lowering which may occur would not negatively impact these structures (Confederation Line (O-Train Rail), Alexandria Rail Line (VIA Rail Canada), Tremblay Station, and O-Train Railway MSF Connector Tunnel).
Construction Plan (as applicable) i. Provide a high-level construction schedule and construction Staging Plan.	At the time of writing this report, the construction plan, including construction schedule and construction staging plan, is not available, but will be provided closer to the construction stage of the project.
ii. Location of any construction cranes and area of swing.	The proposed development is sufficiently setback from the O-Train, at a distance of 58 m, such that the swing radius of the construction cranes are not anticipated to extend over the O-Train alignment.

We trust that this information satisfies your immediate request.

Best Regards,

Paterson Group Inc.

Zubaida Al-Moselly, P.Eng.

LICENSED PROFESSIONAL ENGINEER
Oct. 4, 2023
S. S. DENNIS
100519516
PROVINCE OF ONTARIO

Scott S. Dennis, P.Eng.

APPENDIX A

Confederation Line and VIA Rail Line Proximity Plan

Cross Section A-A’

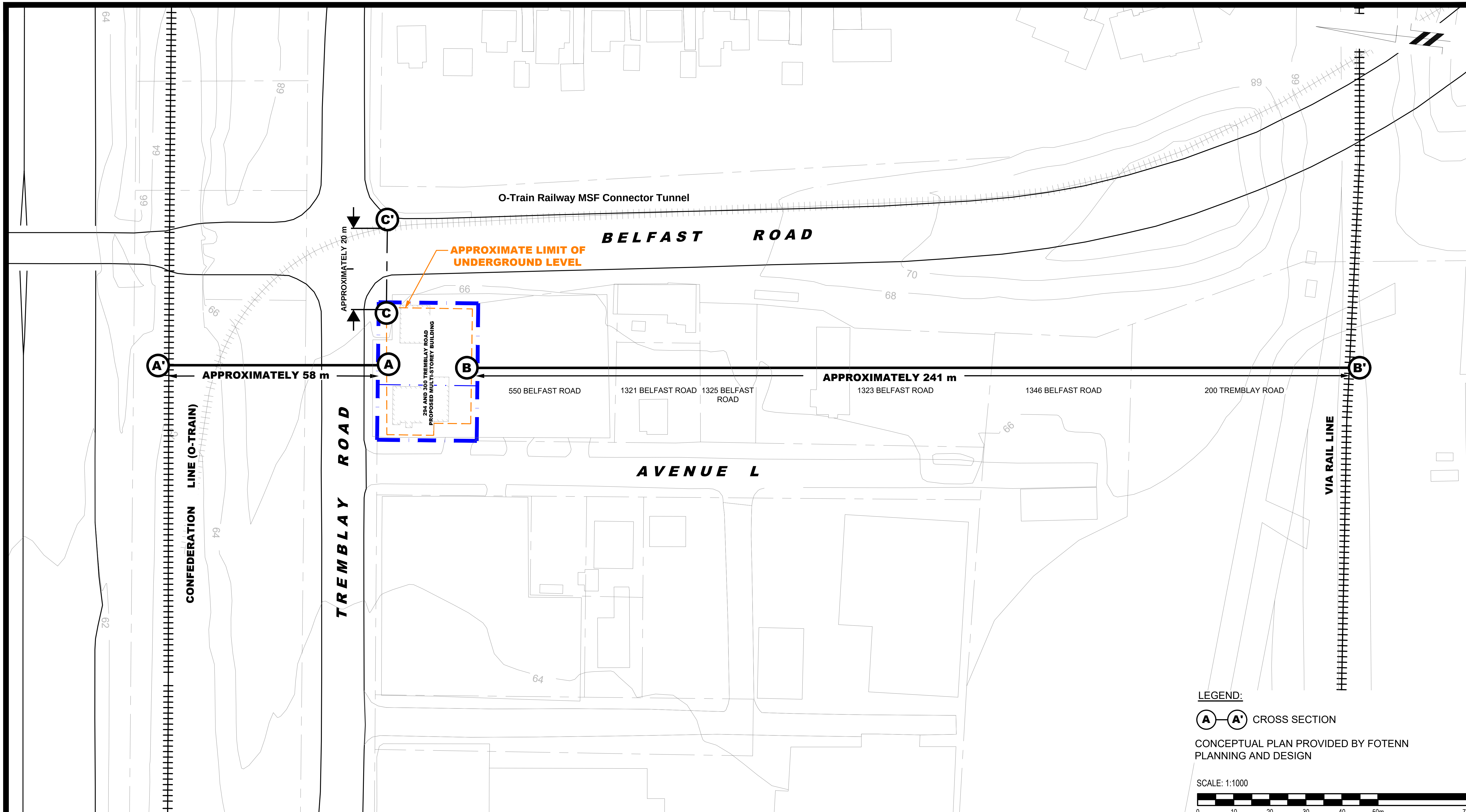
Cross Section B-B’

Cross Section C-C’

Construction Methodology and Impact Review

Topographic Plan of Survey by others

Relevant Architectural & Civil Drawings prepared by others



PATERSON GROUP
9 AURIGA DRIVE
OTTAWA, ON
K2E 7T9
TEL: (613) 226-7381

NO.	REVISIONS	DATE	INITIAL
1	NEW SECTION ADDED CROSS THE MSF CONNECTOR TUNNEL	09/2023	ZA

TC UNITED DEVELOPMENT CORP.

GEOTECHNICAL INVESTIGATION

PROPOSED MULTI-STOREY BUILDING - 294 AND 300 TREMBLAY ROAD

OTTAWA, ONTARIO

Title:

CONFEDERATION LINE AND VIA RAIL LINE PROXIMITY PLAN

Scale: 1:1000	Date: 08/2023
Drawn by: GK	Report No.: PG5407-2
Checked by: ZA	Dwg. No.: PG5407-2
Approved by: MS	Revision No.: 1

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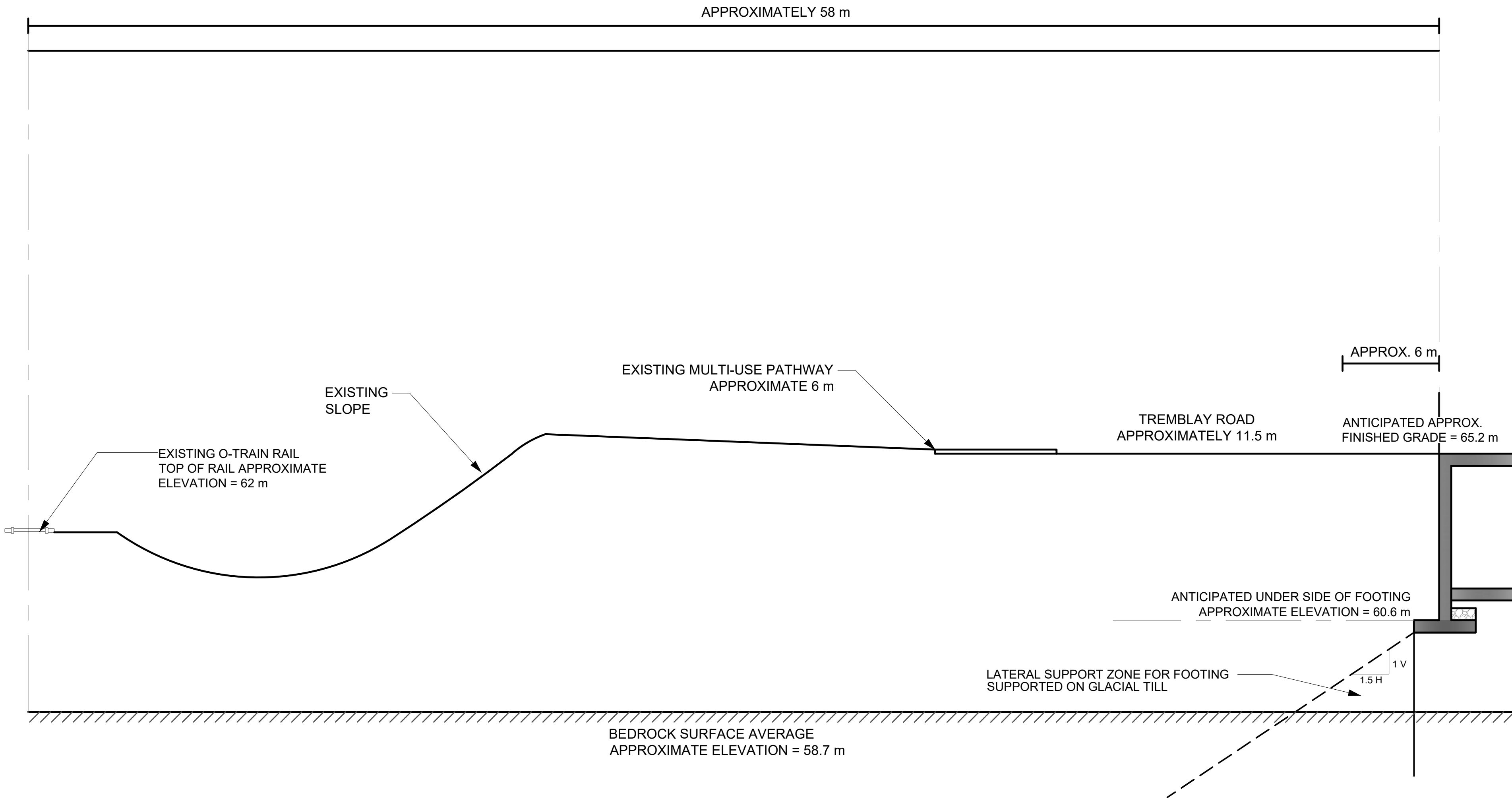
CROSS SECTION A -A '



PATERSON GROUP

9 AURIGA DRIVE
OTTAWA, ON
K2E 7T9
TEL: (613) 226-7381

TC UNITED DEVELOPMENT CORP.

CONFEDERATION LINE PROXIMITY STUDY
294 AND 300 TREMBLAY ROAD

OTTAWA, ONTARIO

Title:

CROSS SECTION A-A'

Scale: N.T.S.	Date: 08/2023
Drawn by: GK	Report No.: PG5407-2
Checked by: ZA	Drawing No.: PG5407-2
Approved by: MS	Revision No.:

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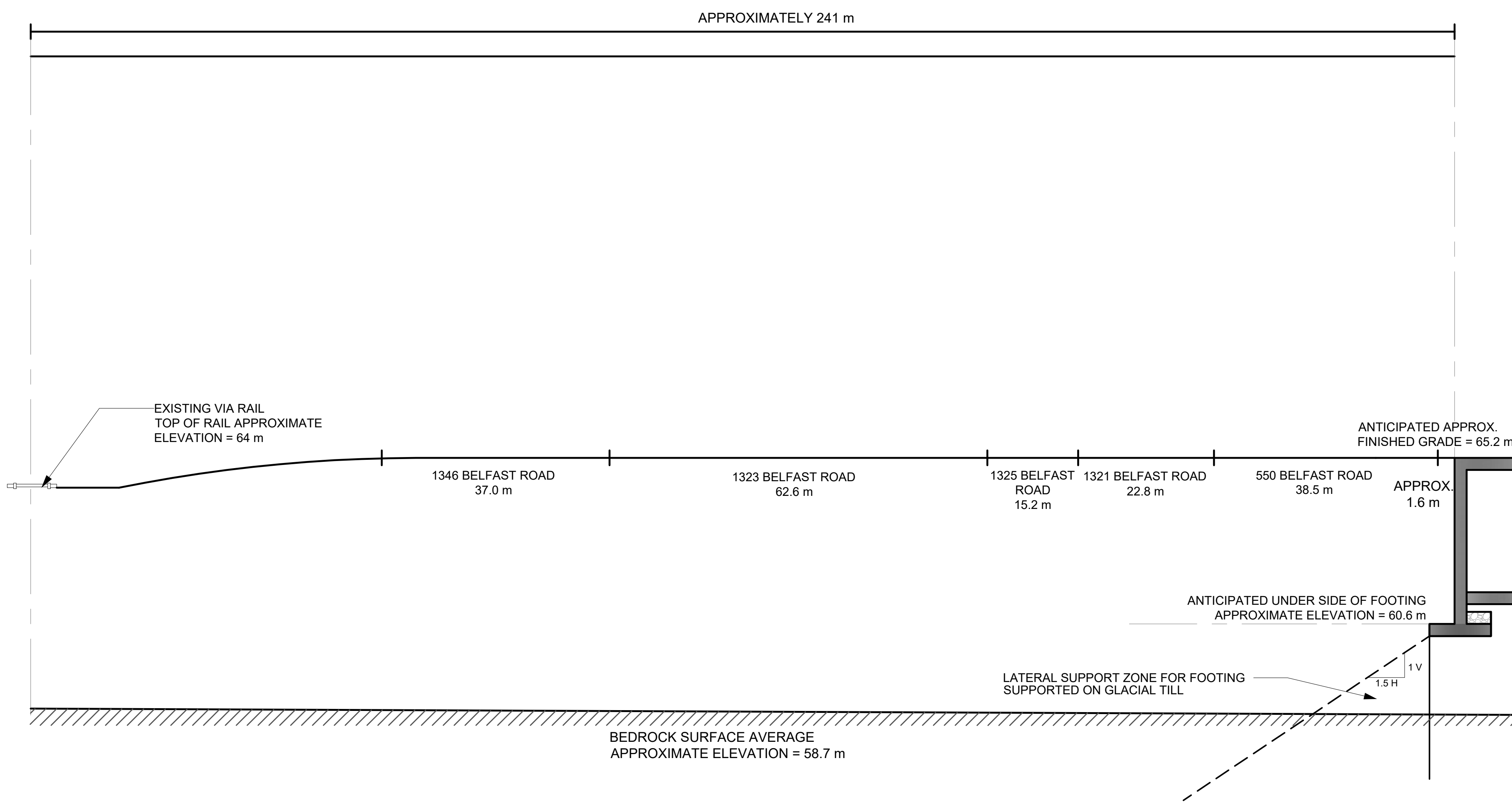
CROSS SECTION B -B '



PATERSON GROUP
9 AURIGA DRIVE
OTTAWA, ON
K2E 7T9
TEL: (613) 226-7381

TC UNITED DEVELOPMENT CORP.

CONFEDERATION LINE PROXIMITY STUDY
294 AND 300 TREMBLAY ROAD

OTTAWA, ONTARIO

Title:

CROSS SECTION B-B'

Scale: N.T.S.	Date: 08/2023
Drawn by: GK	Report No.: PG5407-2
Checked by: ZA	Drawing No.: PG5407-2
Approved by: MS	Revision No.:

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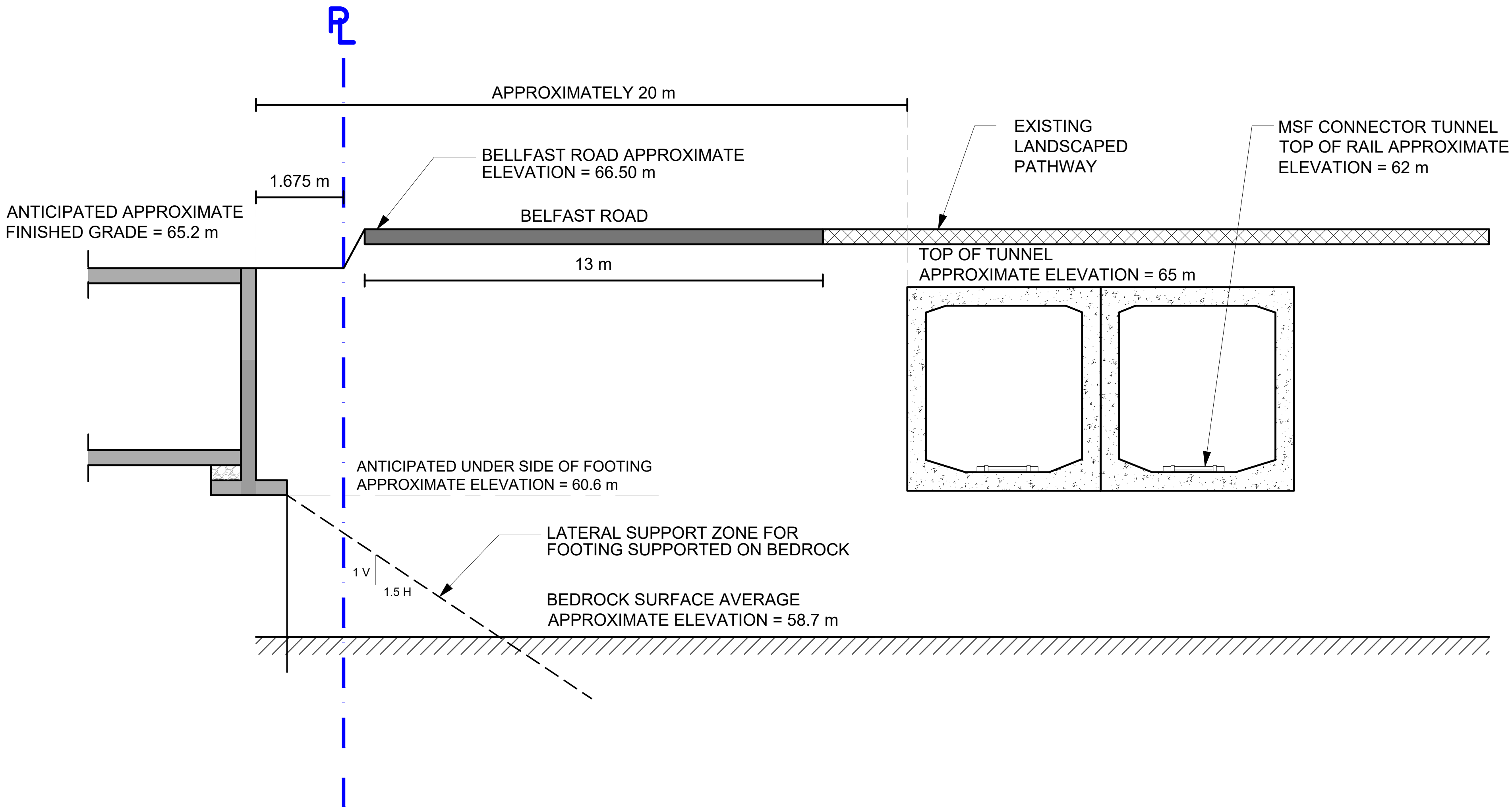
CROSS SECTION C -C '



PATERSON GROUP 9 AURIGA DRIVE OTTAWA, ON K2E 7T9 TEL: (613) 226-7381	TC UNITED DEVELOPMENT CORP. CONFEDERATION LINE PROXIMITY STUDY 294 AND 300 TREMBLAY ROAD OTTAWA, ONTARIO	Scale: N.T.S.	Date: 09/2023
		Drawn by: ZS	Report No.: PG5407-2
	Title: CROSS SECTION C-C'	Checked by: ZA	Drawing No.: PG5407-4
		Approved by: MS	Revision No.:

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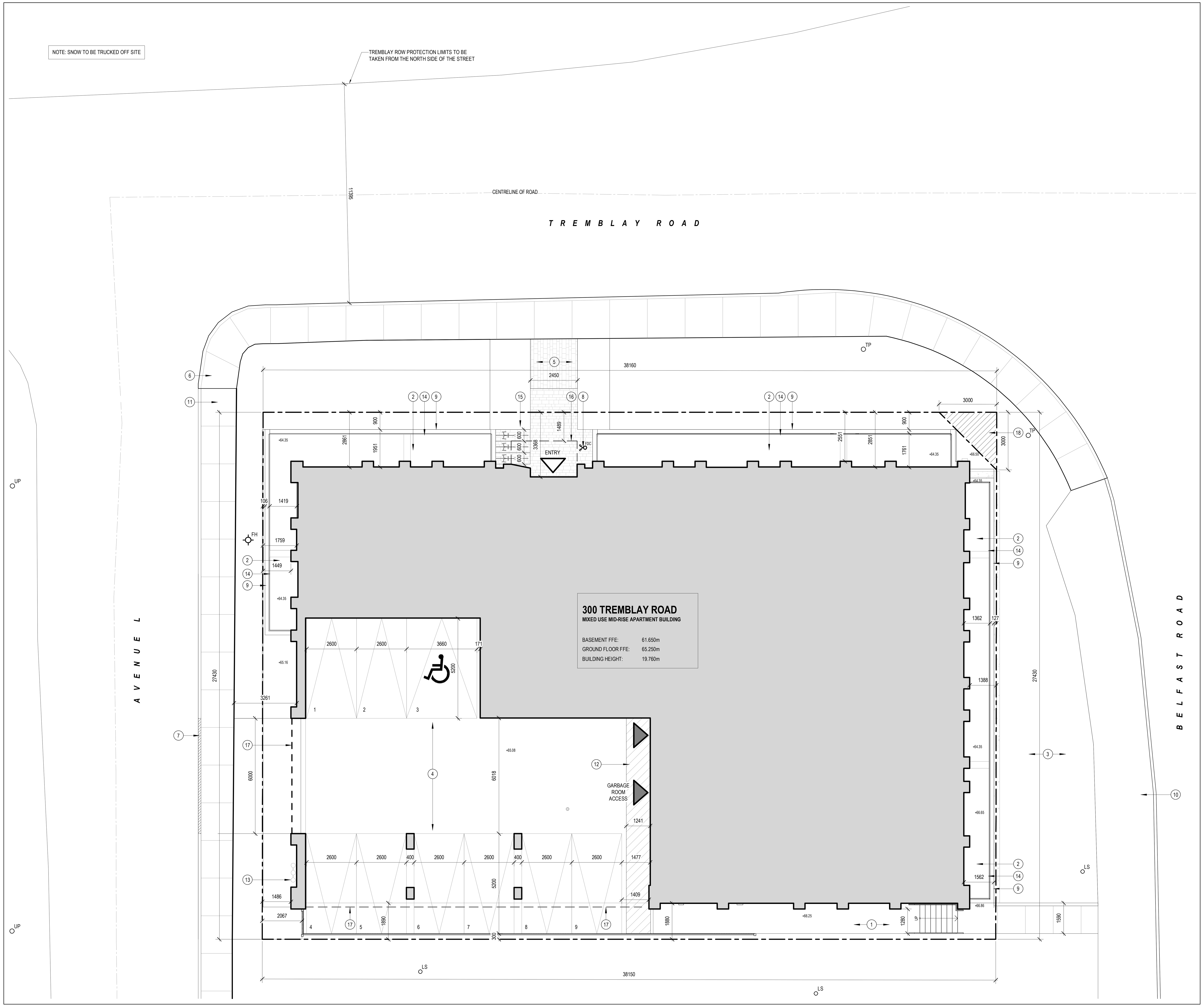
Construction Methodology and Impact Review		
Construction Item	**Potential Impact**	**Mitigation Program**
Item A - Installation of Temporary Shoring System - Where adequate space is not available for the overburden to be sloped, the overburden along the perimeter of the proposed building footprint will need to be shored in order to complete the construction of the partial basement level. The shoring system is anticipated to consist of a soldier pile and lagging or interlocking sheet pile system.	Vibration issues during shoring system installation	Design of the temporary shoring system, in particular vibrations during installation, will take into consideration the presence of the proposed Confederation Line (O-Train Rail), Alexandria Rail Line (VIA Rail Canada), aTremblay Station, and O-Train Railway MSF Connector Tunnel. Installation of the shoring system, if required, is not anticipated to have an adverse impact on the Confederation Line (O-Train Rail), Alexandria Rail Line (VIA Rail Canada), Tremblay Station, and O-Train Railway MSF Connector Tunnel, nonetheless, a vibration monitoring device is recommended to be installed to monitor vibrations. The vibration monitor would be remotely connected to permit real time monitoring and a vibration monitoring program would be implemented as detailed in Subsection 3.1 - Vibration Monitoring and Control Program of Paterson Group Report PG5407-2 Revision 1 dated October 2, 2023.
Item B - Construction of Footings and Foundation Walls - The proposed building will include 1 underground level. Therefore, the footings will be placed over an undisturbed compact glacial tilll bearing surface.	Building footing loading on adjacent Confederation Line (O-Train Rail), Alexandria Rail Line (VIA Rail Canada), and MSF Connector tunnel excavation within the lateral support zone of the Confederation Line (O-Train Rail), Alexandria Rail Line (VIA Rail Canada), Tremblay Station, and MSF Connector tunnel.	Due to the distance between the proposed building and the Confederation Line (O-Train Rail), Alexandria Rail Line (VIA Rail Canada), and O-Train Railway MSF Connector Tunnel, the zone of influence from the proposed footings will not intersect the rail line structures. Further, although the underground level for the proposed building will extend approximately to depths between 5.1 m to 6.3 m below existing ground surface, due to the approximate 58 m distance between the proposed building and Confederation (O-Train Rail) line structure, 241 m distance between the proposed building and Alexandria Rail (VIA Rail Canada) line structure, 450 m distance between the proposed building and Tremblay Station, and 20 m distance between the proposed building and the O-Train Railway MSF Connector Tunnel, the building excavation will not impact the lateral support zones of both Confederation Line (O-Train Rail), Alexandria Rail Line (VIA Rail Canada), Tremblay Station, and O-Train Railway MSF Connector Tunnel.
Item C - Construction Opertions - The proposed building will include six (6) storeys above grade with roof top patio and one (1) below grade level. Associated at-grade parking areas, access lanes, and landscaped areas. Therefore, the following construction equipment could be the source of vibrations: compactor, dozer, crane, truck traffic, etc.	Structural damage of Confederation Line (O-Train Rail), Alexandria Rail Line (VIA Rail Canada), and Tremblay Station, and O-Train Railway MSF Connector Tunnel due to vibrations from construction opertions.	Structural damage to the Confederation Line (O-Train Rail), Alexandria Rail Line (VIA Rail Canada), Tremblay Station, and O-Train Railway MSF Connector Tunnel during construction opertions is not anticipated, nonetheless, a vibration monitoring device is recommended to be installed along the rail corridor of Confederation Line (O-Train Rail), Alexandria Rail Line (VIA Rail Canada), Tremblay Station, and O-Train Railway MSF Connector Tunnel to monitor vibrations. The vibration monitor would be remotely connected to permit real time monitoring and a vibration monitoring program would be implemented as detailed in Subsection 3.1 - Vibration Monitoring and Control Program of Paterson Group Report PG5407-2 Revision 1 dated October 2, 2023.

SURVEYOR'S REAL PROPERTY REPORT WITH TOPOGRAPHIC DETAILS
PART 1 - PLAN SHOWING
LOTS 79, 80, 81, 82, AND 83
REGISTERED PLAN No. 320
CITY OF OTTAWA
J.D. BARNES LIMITED



1 SP-01 **SITE PLAN**
SCALE: 1 : 100

2 SP-01 **LOCATION PLAN**
SCALE: N.T.S

DEVELOPER:
TCU DEVELOPMENT CORPORATION
150 ISABELLA STREET, UNIT 1207
OTTAWA, ON K1S 5H3

PLANNER:
FOTENN PLANNING + DESIGN
396 COOPER STREET, SUITE 300
OTTAWA, ON K2P2H7

SURVEYOR:
J.D. BARNES LIMITED
62 STEACIE DRIVE, SUITE 103
KANATA, ON K2K 2A9

CIVIL ENGINEER:
MCINTOSH PERRY
115 WALGREEN ROAD
CARP, ON K0A 1L0

LANDSCAPE ARCHITECT:
JAMES B. LENNOX & ASSOC. INC.
3332 CARLING AVENUE
OTTAWA, ON K2H 5A8

BUILDING ENTRANCE
BUILDING EXIT
PROPERTY LINE
SETBACK LINE
OVERHEAD WIRES
INTERLOCKING STONE PAVERS
FIRE DEPARTMENT CONNECTION
FIRE HYDRANT
EXISTING UTILITY POLE TO REMAIN
EXISTING TRAFFIC LIGHT POLE TO REMAIN
EXISTING LIGHT POST TO REMAIN
BICYCLE PARKING

SITE PLAN SYMBOLS
SCALE: NTS

KEYNOTE LEGEND:

1 CONCRETE WALKWAY
2 WINDOW WELL
3 SOFT LANDSCAPING
4 ASPHALT
5 INTERLOCKING CONCRETE PAVERS
6 EXISITNG CONCRETE SIDEWALK
7 DEPRESSED CURB
8 FIRE DEPARTMENT CONNECTION
9 RETAINING WALL
10 EXISTING MULTI-USE PATHWAY
11 NEW CONCRETE SIDEWALK
12 PAINTED LINES
13 GAS BLOW-OFF STATION
14 PAINTED STEEL GUARD
15 VISITOR BIKE PARKING
16 LINE OF CANOPY ABOVE
17 LINE OF BUILDING ABOVE
18 CORNER SITE TRIANGLE

UNIT COUNT

NAME	LVL 00	LVL 01	LVL 02	LVL 03	LVL 04	LVL 05	LVL 06	TOTAL COUNT	PERCENTAGE
1 BEDROOM	1	2	4	4	4	4	4	23	23%
STUDIO	7	5	13	13	13	13	13	77	77%
TOTAL	8	7	17	17	17	17	17	100	100%

Site Statistics

Current Zoning Designation:	TD1
Lot Width:	38.16m
Total Lot Area:	1046.6m²
Gross Floor Area:	3985.36m²
Building Area:	796.892m²
Retail Unit Area:	69.40m²
Floor Space Index:	3.81
Number of Units:	100 units

Proposed Development - Mixed-Use mid-Rise Apartment Building

Zoning Mechanism	Required	Provided
Minimum Lot Area *195(a)*	No Minimum	0.10 ha
Minimum Lot Width *195(b)*	No Minimum	38.16m
Min. Front Yard Setback *195(c)(v)*	0.5m	2.8m
Corner Side Yard Setback *195(c)(v)*	0.5m	1.3m East 1.7m West
Min. Rear Yard Setback *195(3)(iii)*	No Minimum	1.9m
Maximum Building Height *196(14)(e)*	20m	19.8m
Parking Space Rates (Residents) *101 (Sch. 1A - Area Z)*	0 Spaces *Section 101(2)*	0 Spaces
Minimum Visitor Parking Rates *102 (Sch. 1A - Area Z)*	9 Spaces *0 spaces for first 12 units - Section 102(2)* *0.1 spaces / unit for 88 units - Table 102*	9 Spaces
Parking Space Rates (Retail) *101 (Sch. 1A - Area Z)*	0 Spaces *Section 101(2)*	0 Spaces
Bicycle Parking Rates (Residents) *Table 111A (Sch. 1 - Area B)*	50 Spaces *0.5 spaces / unit for 100 units[111A(b)(i)]*	51 Spaces
Bicycle Parking Rates (Retail) *Table 111A (Sch. 1 - Area B)*	0 Spaces *1 space / 250m² x 100m² [111A(e)]*	0 Spaces
Total Amenity Area *Table 137(4)(II)*	600m² *6m² / unit for 100 units*	659m²
Communal Amenity Area *Table 137(4)(III)*	300m² *Min. 50% of Total Amenity Area*	522m² Roof Top Terrace 137m² Basement Lounge

3 SP-01 **SITE & PROJECT STATISTICS**
SCALE: N.T.S.

GENERAL ARCHITECTURAL NOTES:

1. This drawing is the property of the Architect and may not be reproduced or used without the expressed consent of the Architect.
2. Drawings are not to be scaled. The Contractor is responsible for checking and verifying all levels and dimensions and shall report all discrepancies to the Architect and obtain clarification prior to commencing work.
3. Upon notice in writing, the Architect will provide written/graphic clarification or supplementary information regarding the intent of the Contract Documents.
4. The Architectural drawings are to be read in conjuction with all other Contract Documents including Project Manuals and the Structural, Mechanical and Electrical Drawings.
5. Positions of exposed or finished Mechanical or Electrical devices, fittings and fixtures are indicated on the Architectural Drawings. Locations shown on the Architectural Drawings shall govern over Mechanical and Electrical Drawings. Mechanical and Electrical items not clearly located will be located as directed by the Architect.
6. These documents are not to be used for construction unless specifically noted for such purpose.

TCU
TC UNITED GROUP

13	RE-ISSUED FOR SITE PLAN CONTROL	2023-10-02
11	ISSUED FOR ADDENDUM 001	2023-09-08
9	RE-ISSUED FOR TENDER	2023-08-04
7	ISSUED FOR TENDER	2023-07-05
3	RE-ISSUED FOR BUILDING PERMIT	2023-05-25
2	ISSUED FOR COORDINATION	2023-05-03
1	ISSUED FOR BUILDING PERMIT	2021-06-12

ISSUE RECORD

project1 studio
Project1 Studio Incorporated
| 613.884.3939 | mail@project1studio.ca

300 TREMBLAY

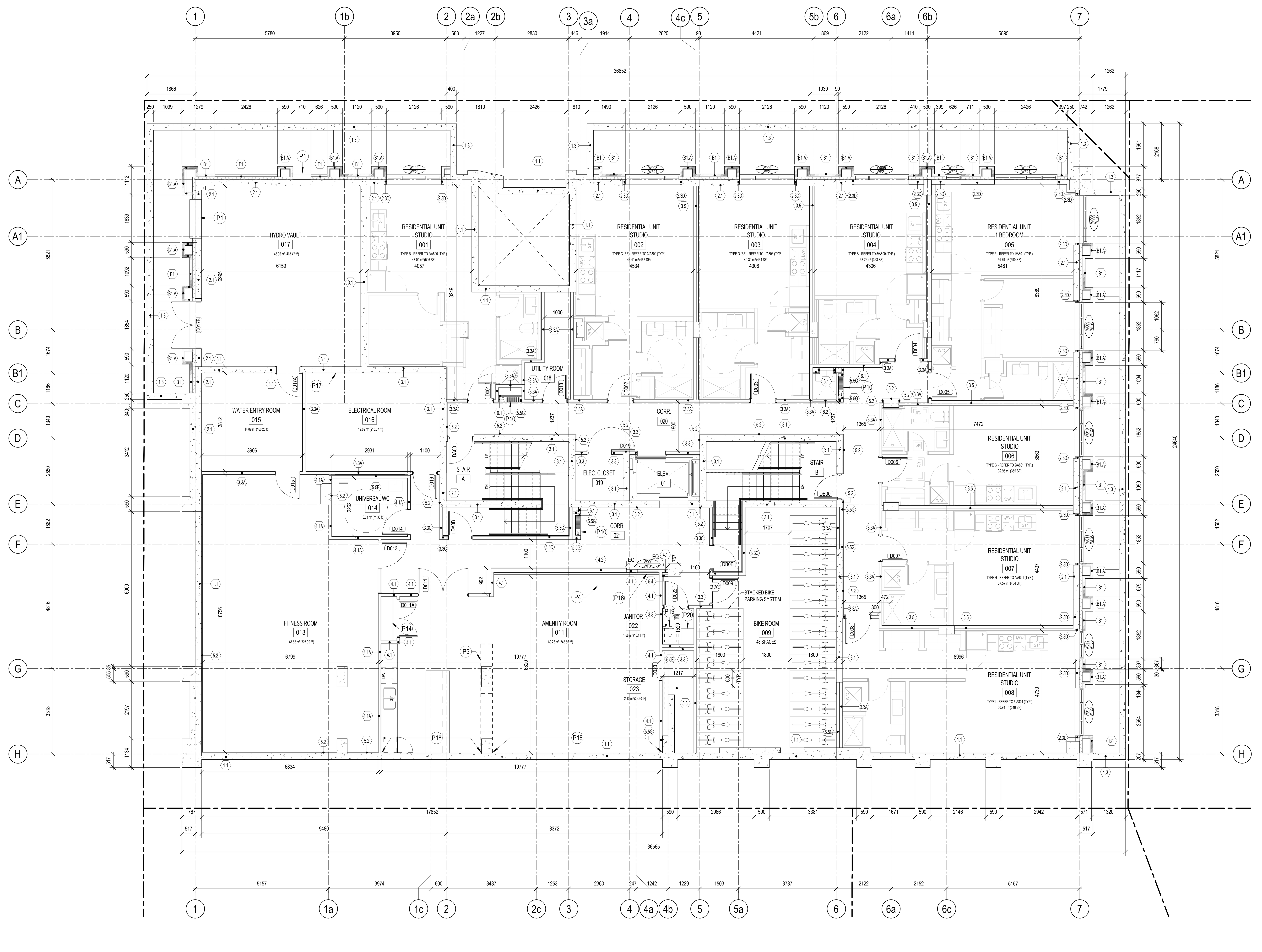
300 Tremblay Road
Ottawa, ON

PROJ	SCALE	DRAWN	REVIEWED
2008	NOTED	BH	RMK

SITE PLAN

SP-01

D07-12-20-0159



1 LEVEL 00 - FLOOR PLAN
A100 SCALE: 1 : 75

GENERAL FLOOR PLAN NOTES

1. ALL DIMENSIONS ARE FROM THE FINISH FACE OF WALL OR OPENING. UNLESS OTHERWISE NOTED
2. UNLESS OTHERWISE NOTED, ALL DIMENSIONS MARKED 'CLEAR' OR 'CLR' SHALL BE MAINTAINED AND SHALL ALLOW FOR THICKNESS OF THE COMPLETE WALL ASSEMBLY INCLUDING FINISHES, SHALL BE ACCURATELY MAINTAINED AND SHALL NOT VARY MORE THAN ±3mm WITHOUT WRITTEN CONSENT FROM THE ARCHITECT.
3. ALL DOORS TO BE 100mm FROM THE ADJACENT PERPENDICULAR PARTITION, UNLESS OTHERWISE NOTED.
4. ALL EQUIPMENT IS SUPPLIED AND INSTALLED BY CONTRACTOR, UNLESS OTHERWISE NOTED. CONTRACTOR TO COORDINATE AND SUPPLY REQUIRED SERVICES FOR EQUIPMENT.
5. CONTRACTOR RESPONSIBLE TO COORDINATE DIMENSIONS OF OPENINGS WITH SPECIFICATIONS FOR EQUIPMENT SUPPLIED AND INSTALLED BY OTHERS.
6. TILE BACKER BOARD TO REPLACE GYPSUM BOARD WHERE CERAMIC TILE FINISH IS TO BE INSTALLED. ENSURE FIRE RESISTANCE RATING IS MAINTAINED.
7. ALL WASHROOMS TO HAVE WATER-RESISTANT GYPSUM BOARD, UNLESS OTHERWISE NOTED (EX. TILE BACKER BOARD)
8. MAXIMUM DISTANCE OF 9100mm BETWEEN CONTROL JOINTS IN GYPSUM SURFACES.
9. CAULK AND SEAL AT ALL MECHANICAL AND ELECTRICAL PENETRATIONS.
10. ALL PARTITIONS THAT EXTEND FROM SLAB TO SLAB ARE TO BE ALIGNED WITH GEOMETRY OF THE SLABS IN ORDER TO ENSURE THAT THE ENTIRE PERIMETER BE APPROPRIATELY SEALED AS REQUIRED TO ATTAIN THE NECESSARY FIRE RESISTANCE RATING AND ACOUSTICAL PERFORMANCE.
11. SUPPLY AND INSTALL NON-COMBUSTIBLE BLOCKING AND NAILERS FOR ALL PARTITIONS SUPPORTING ELECTRICAL PANELS, ELECTRICAL & MECHANICAL DEVICES, MILLWORK, SHELVING, SIGNAGE, ACCESSORIES, EQUIPMENT. ETC.

GENERAL NOTES

- DETAIL REFERENCE
- GRID LINE REFERENCE
- CONSTRUCTION ASSEMBLY REFERENCE
- DOOR REFERENCE
- BUILDING SECTION/DETAIL SECTION REFERENCE
- LEVEL AND HEIGHT ELEVATION REFERENCE
- EXTERIOR FINISH REFERENCE
- FLOOR PLAN KEYNOTE TAG, REFER TO KEYNOTE LEGEND
- ELEVATION REFERENCE
- INTERIOR ELEVATION REFERENCE
- ROOM NAME & NUMBER
- WINDOW AND FRAME TYPE REFERENCE

NOTATION LEGEND
SCALE: NTS

KEYNOTE LEGEND - FLOOR PLANS

P1	MECHANICAL LOUVER - REFER TO MECHANICAL DRAWINGS
P4	BANQUETTE
P5	DASHED LINE OF METAL SHELVING DIVIDER. FINAL DESIGN, DETAILING, MANUFACTURING & INSTALL BY METAL FABRICATOR (COORDINATE WITH CLIENT AND ARCHITECT). CONTRACTOR TO PROVIDE BLOCKING WITHIN WALLS AND CEILING TO SUPPORT AND ENSURE FLOOR AND CEILING IN THIS AREA ARE LEVEL.
P10	FIRE HOSE CABINET
P14	CLOSET SHELF AND ROD, REFER TO DETAIL ON SHEET A970
P16	ALUMINUM FRAMED WINDOW, REFER TO INTERIOR ELEVATIONS
P17	500mm x 200mm WALL OPENING
P18	BOARD FORMED CONCRETE WALL
P19	JANITOR'S MOP SINK, COORDINATE WITH MECHANICAL FOR SIZE AND LOCATION
P20	610mm DEEP SHELVING ABOVE

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13	RE-ISSUED FOR SITE PLAN CONTROL	2023-10-02
12	ISSUED FOR ADDENDUM 002	2023-09-12
11	ISSUED FOR ADDENDUM 001	2023-09-08
10	RE-ISSUED FOR BUILDING PERMIT	2023-08-31
9	RE-ISSUED FOR TENDER	2023-08-04
7	ISSUED FOR TENDER	2023-07-05
3	RE-ISSUED FOR BUILDING PERMIT	2023-05-25
2	ISSUED FOR COORDINATION	2023-05-03
1	ISSUED FOR BUILDING PERMIT	2021-06-12

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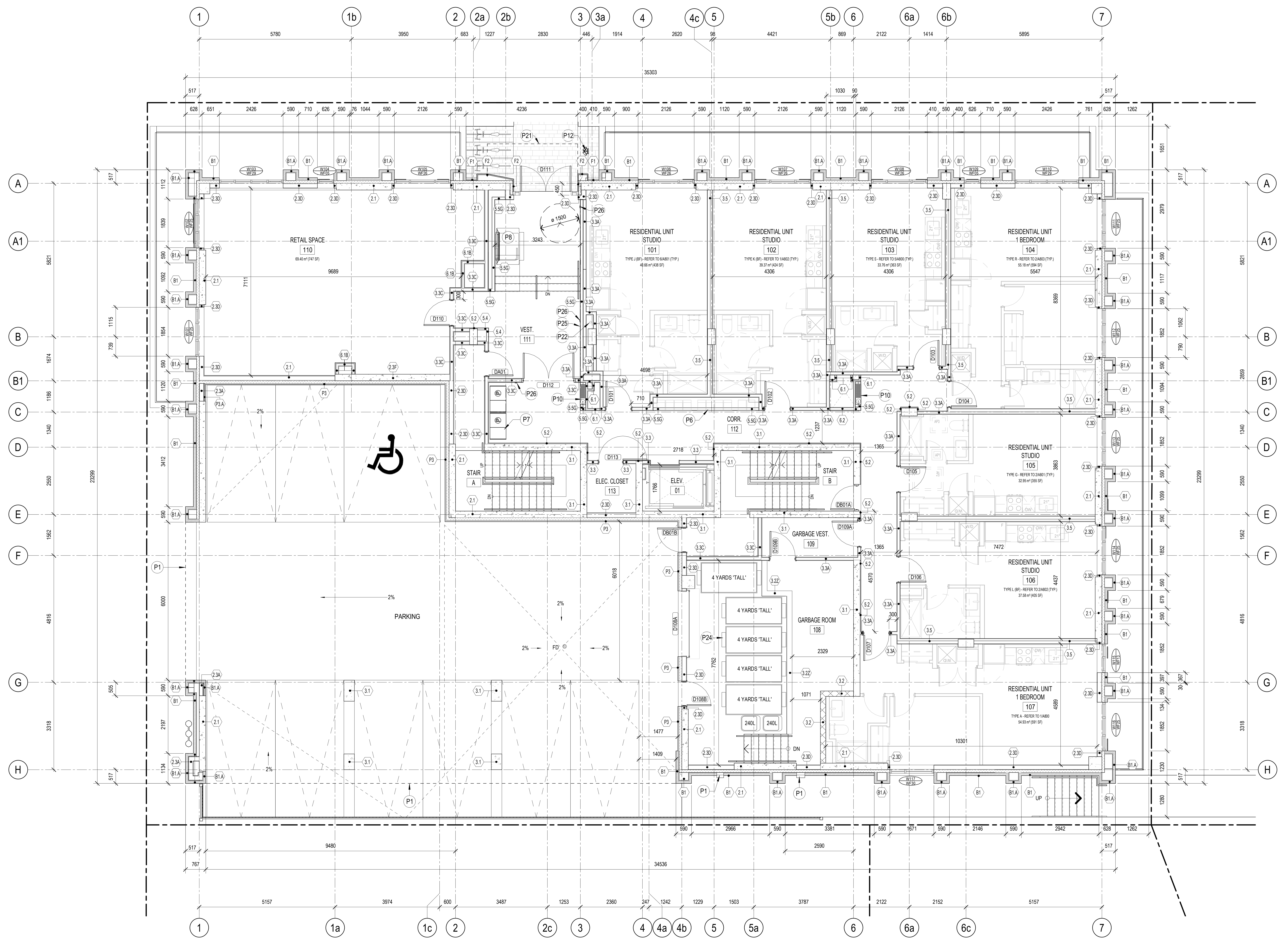
2008	NOTED	DM	RMK

LEVEL 00 - FLOOR PLAN

A100



1
A101
LEVEL 01 - FLOOR PLAN
SCALE: 1 : 75

GENERAL FLOOR PLAN NOTES

1. ALL DIMENSIONS ARE FROM THE FINISH FACE OF WALL OR OPENING. UNLESS OTHERWISE NOTED
2. UNLESS OTHERWISE NOTED, ALL DIMENSIONS MARKED 'CLEAR' OR 'CLR' SHALL BE MAINTAINED AND SHALL ALLOW FOR THICKNESS OF THE COMPLETE WALL ASSEMBLY INCLUDING FINISHES, SHALL BE ACCURATELY MAINTAINED AND SHALL NOT VARY MORE THAN ±3mm WITHOUT WRITTEN CONSENT FROM THE ARCHITECT.
3. ALL DOORS TO BE 100mm FROM THE ADJACENT PERPENDICULAR PARTITION, UNLESS OTHERWISE NOTED.
4. ALL EQUIPMENT IS SUPPLIED AND INSTALLED BY CONTRACTOR, UNLESS OTHERWISE NOTED. CONTRACTOR TO COORDINATE AND SUPPLY REQUIRED SERVICES FOR EQUIPMENT.
5. CONTRACTOR RESPONSIBLE TO COORDINATE DIMENSIONS OF OPENINGS WITH SPECIFICATIONS FOR EQUIPMENT SUPPLIED AND INSTALLED BY OTHERS.
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GENERAL NOTES

X / XXX	DETAIL REFERENCE
X	GRID LINE REFERENCE
X.X	CONSTRUCTION ASSEMBLY REFERENCE
DXXX	DOOR REFERENCE
X / X	BUILDING SECTION/DETAIL SECTION REFERENCE
XX.XXm	LEVEL AND HEIGHT ELEVATION REFERENCE
XX	EXTERIOR FINISH REFERENCE
Px	FLOOR PLAN KEYNOTE TAG, REFER TO KEYNOTE LEGEND
X / X	ELEVATION REFERENCE
X X X X	INTERIOR ELEVATION REFERENCE
XXXX / XXX	ROOM NAME & NUMBER
WXXX / WFXX	WINDOW AND FRAME TYPE REFERENCE

NOTATION LEGEND

SCALE: NTS

KEYNOTE LEGEND - FLOOR PLANS

P1	MECHANICAL LOUVER - REFER TO MECHANICAL DRAWINGS
P6	MAIL LOCK BOXES
P7	PARCEL LOCKER
P8	INCLINED PLATFORM LIFT TO BE DIRECT MOUNTED. COORDINATE LOCATION OF WALL MOUNTED CALL BUTTONS ON SITE
P10	FIRE HOSE CABINET
P12	SIAMESE CONNECTION
P21	CANOPY ABOVE
P22	CHASE, COORDINATE WITH MECHANICAL
P24	WASTE BIN
P25	INTERCOM SYSTEM
P26	ADO

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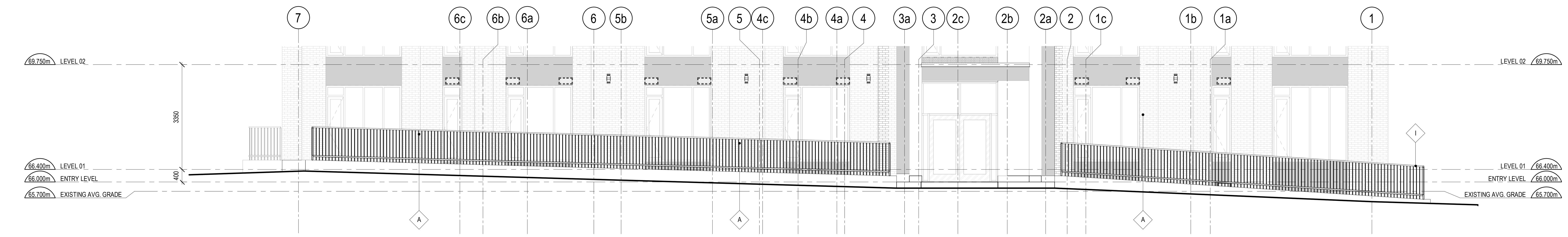
2008	NOTED	DM	RMK

LEVEL 01 - FLOOR PLAN

A101



2 A201 NORTH ELEVATION - GUARD
SCALE: 1 : 75

1 A201 NORTH ELEVATION
SCALE: 1 : 75

CLADDING LEGEND:

- A — BRICK MASONRY, COLOUR: RED, TYPE: 1
- B — ALUMINUM COMPOSITE PANEL, COLOUR: CHARCOAL, TYPE: ACM-1
- C — CORRUGATED METAL SIDING, COLOUR: GREY, TYPE: SS-1
- D — FIBER CEMENT PANEL, COLOUR: LIGHT GREY, TYPE: FC-2
- E — FIBER CEMENT PANEL, COLOUR: CHARCOAL, TYPE: FC-1
- F — METAL SIDING WITH PERFORATED PANEL SCREEN, COLOUR: GREY, SIDING TYPE: SS-2, SCREEN TYPE: MP-1 (50% OPEN)
- G — RETAINING WALL, TYPE: CAST IN PLACE CONCRETE
- H — METAL HANDRAIL, COLOUR: DARK GREY
- I — METAL PICKET GUARD, COLOUR: CHARCOAL, TYPE: STEEL

GENERAL ARCHITECTURAL NOTES:

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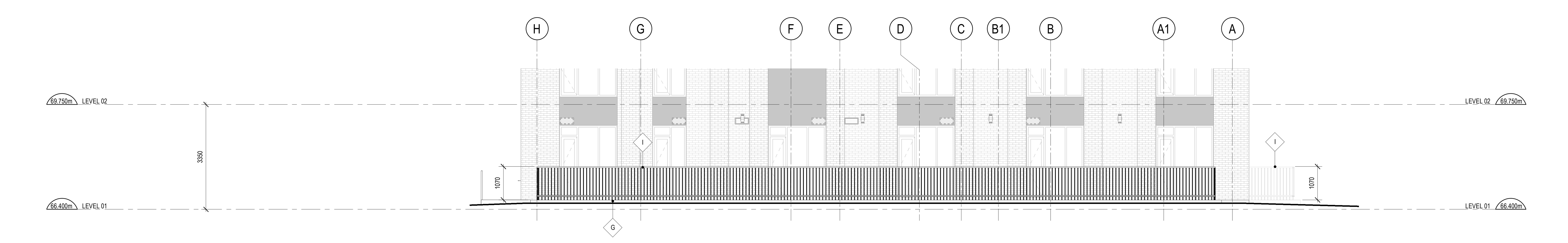
NORTH ELEVATION

A201

D07-12-20-0159



2 A202 EAST ELEVATION - GUARD
SCALE: 1 : 75

1 A202 EAST ELEVATION
SCALE: 1 : 75

CLADDING LEGEND:

- A — BRICK MASONRY, COLOUR: RED, TYPE: 1
- B — ALUMINUM COMPOSITE PANEL, COLOUR: CHARCOAL, TYPE: ACM-1
- C — CORRUGATED METAL SIDING, COLOUR: GREY, TYPE: SS-1
- D — FIBER CEMENT PANEL, COLOUR: LIGHT GREY, TYPE: FC-2
- E — FIBER CEMENT PANEL, COLOUR: CHARCOAL, TYPE: FC-1
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- G — RETAINING WALL, TYPE: CAST IN PLACE CONCRETE
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EAST ELEVATION

A202

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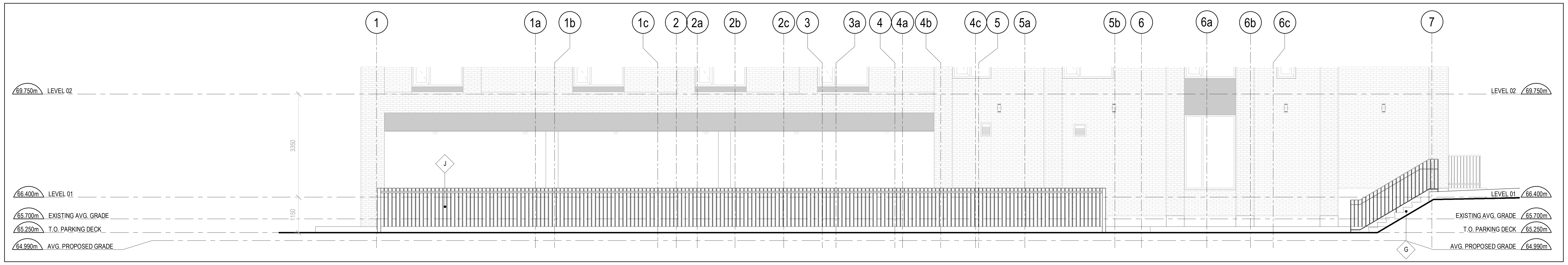
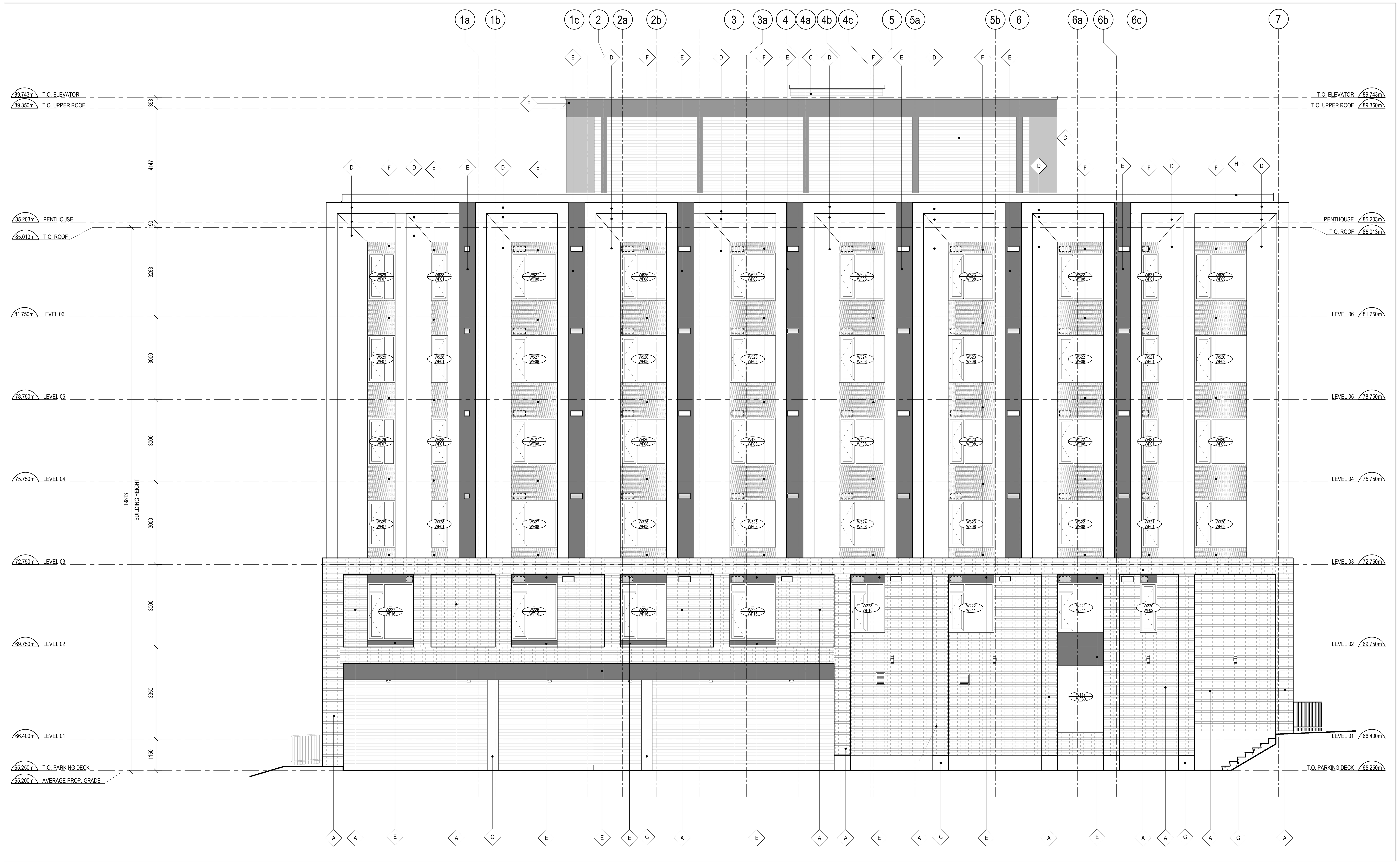


2 A203 SOUTH ELEVATION - FENCE
SCALE: 1 : 75



1 A203 SOUTH ELEVATION
SCALE: 1 : 75

CLADDING LEGEND:

- A — BRICK MASONRY; COLOUR: RED; TYPE: 1
- B — ALUMINUM COMPOSITE PANEL; COLOUR: CHARCOAL; TYPE: ACM-1
- C — CORRUGATED METAL SIDING; COLOUR: GREY; TYPE: SS-1
- D — FIBER CEMENT PANEL; COLOUR: LIGHT GREY; TYPE: FC-2
- E — FIBER CEMENT PANEL; COLOUR: CHARCOAL; TYPE: FC-1
- F — METAL SIDING WITH PERFORATED PANEL SCREEN; COLOUR: GREY; SIDING TYPE: SS-2; SCREEN TYPE: MP-1 (50% OPEN)
- G — RETAINING WALL; TYPE: CAST IN PLACE CONCRETE
- H — METAL HANDRAIL; COLOUR: DARK GREY
- I — METAL PICKET GUARD; COLOUR: CHARCOAL; TYPE: STEEL

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SOUTH ELEVATION

A203

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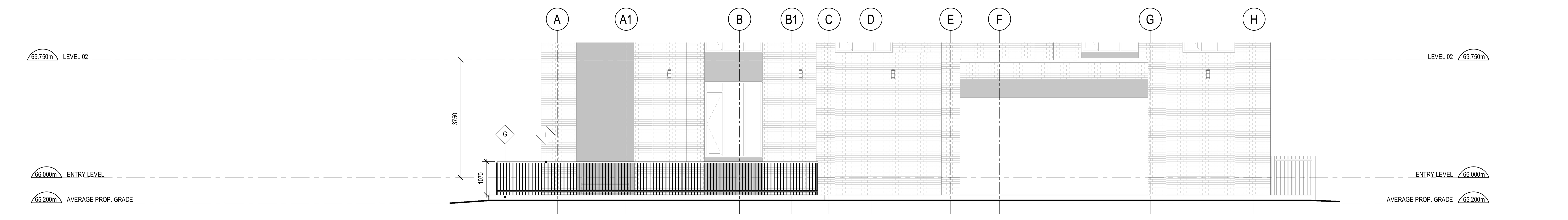

2 A204 WEST ELEVATION - GUARD
SCALE: 1 : 75

1 A204 WEST ELEVATION
SCALE: 1 : 75

CLADDING LEGEND:

- A — BRICK MASONRY, COLOUR: RED, TYPE: 1
- B — ALUMINUM COMPOSITE PANEL, COLOUR: CHARCOAL, TYPE: ACM-1
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- E — FIBER CEMENT PANEL, COLOUR: CHARCOAL, TYPE: FC-1
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WEST ELEVATION

A204

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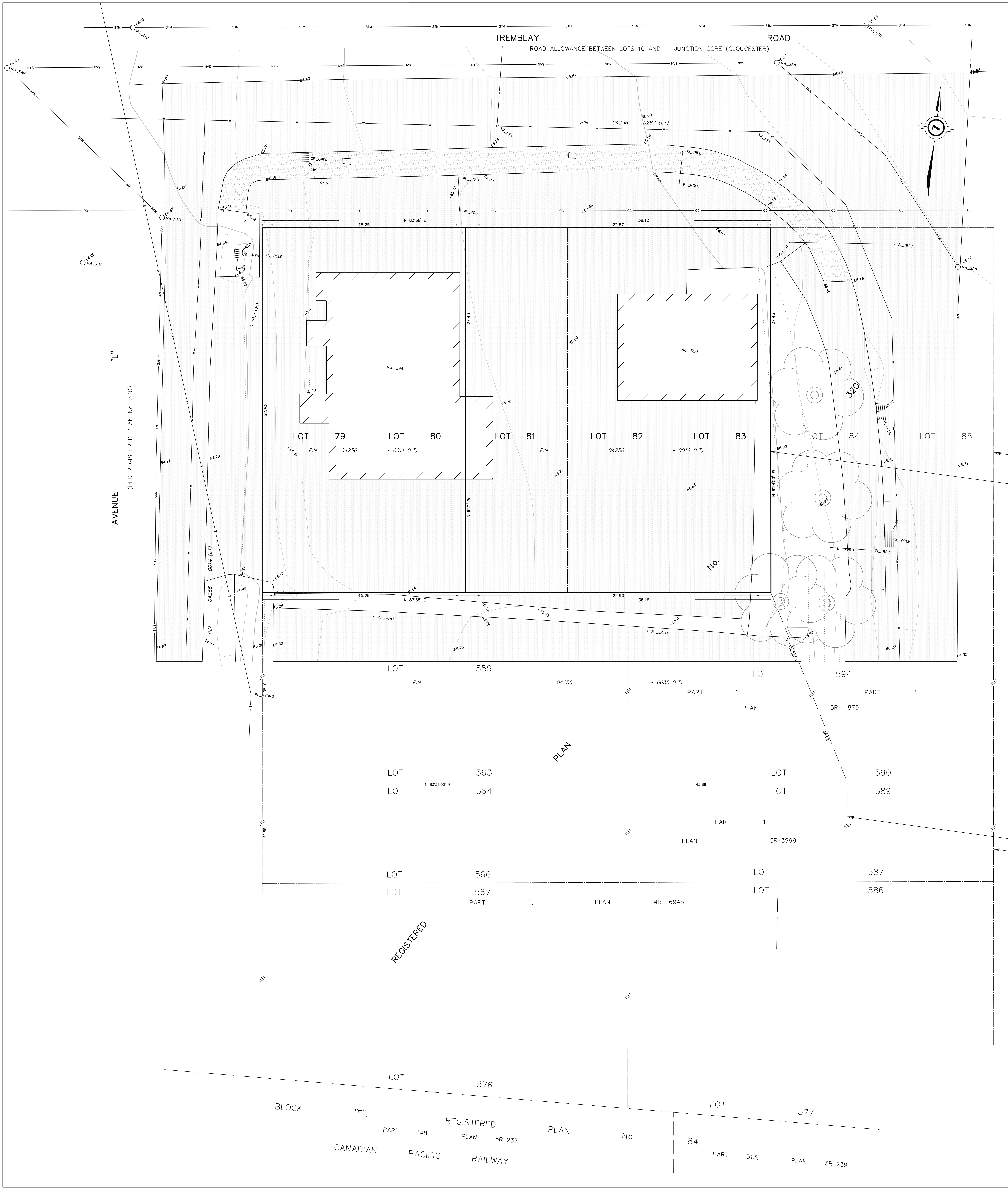


PRELIMINARY SITE PLAN OF

LOTS 79, 80, 81, 82 AND 83 REGISTERED PLAN No. 320

CITY OF OTTAWA

J.D. BARNES LIMITED

SCALE 1 : 100

5 0 5 metres

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

NOTES

BEARINGS ARE MTM GRID, AND DERIVED FROM GLOBAL NAVIGATION SATELLITE SYSTEMS (GNSS) BY REAL TIME NETWORK (RTN) OBSERVATIONS, MTM ZONE 9, NAD 83, (CSRS) (2010).

DISTANCES ARE GROUND.

COMPLIANCE WITH ONTARIO BUILDING CODE SETBACK REQUIREMENTS ARE NOT VERIFIED BY THIS SURVEY.

ALL BUIDING TIES ARE TAKEN TO CONCRETE FOUNDATION.

THIS SITE PLAN IS FOR SEVERANCE APPLICATION PURPOSES ONLY AND NOT FOR CONSTRUCTION.

THIS SITE PLAN IS NOT A LEGAL PLAN OF SURVEY, INFORMATION SHOWN HEREON IS COMPILED FROM VARIOUS SOURCES AND IS SUBJECT TO A FIELD SURVEY FOR CONFIRMATION OF VALUES AND INFORMATION.

ELEVATIONS

1. ELEVATIONS ARE GEODETIC AND WERE ESTABLISHED USING GLOBAL NAVIGATION SATELLITE SYSTEMS (GNSS) EQUIPMENT TO ESTABLISH ELLIPSOIDAL HEIGHTS. ELLIPSOIDAL HEIGHTS WERE TRANSFORMED TO CGVD-1928:78 DATUM (GEODETIC) USING THE FEDERAL HT 2.0 HEIGHT TRANSFORMATION MODEL
2. IT IS THE RESPONSIBILITY OF THE USER OF THIS INFORMATION TO VERIFY THAT THE SITE BENCHMARKS HAVE NOTE BEEN ALTERED OR DISTURBED AND THAT IT'S RELATIVE ELEVATION AND DESCRIPTION AGREES WITH THE INFORMATION SHOWN ON THIS DRAWING

LEGEND

■	DENOTES	SURVEY MONUMENT FOUND
□	DENOTES	SURVEY MONUMENT SET
SIB	DENOTES	STANDARD IRON BAR
SSIB	DENOTES	SHORT STANDARD IRON BAR
IB	DENOTES	IRON BAR
CPW	DENOTES	CONCRETE PIN & WASHER
MEAS	DENOTES	MEASURED
PROP	DENOTES	PROPORTION
OU	DENOTES	ORIGIN UNKNOWN
━━	DENOTES	PROPERTY LINE

N=NORTH / S=SOUTH / E=EAST / W=WEST

ALL SET SSIB AND PB MONUMENTS WERE USED DUE TO LACK OF OVERBURDEN AND/OR PROXIMITY OF UNDERGROUND UTILITIES IN ACCORDANCE WITH SECTION 11 (4) OF O.REG. 525/91.

TOPOGRAPHIC LEGEND

CONC	DENOTES CONCRETE
FDN	DENOTES FOUNDATION
	DENOTES SIGN
WA_HYDNT	DENOTES FIRE HYDRANT
WA_KEY	DENOTES WATER KEY
PL_LIGHT	DENOTES STREET LIGHT
PL_HYDRO	DENOTES HYDRO POLE
PL_POLE	DENOTES POLE
SI_TRFC	DENOTES TRAFFIC SIGNAL
C/L	DENOTES CENTERLINE
ø	DENOTES DIAMETER
CB_OPEN	DENOTES CATCH BASIN
MH_STM	DENOTES STORM MANHOLE
MH_SAN	DENOTES SANITARY MANHOLE
—— E ——	DENOTES OVERHEAD HYDRO CABLE
—— T ——	DENOTES OVERHEAD TELEPHONE CABLE
—— OC ——	DENOTES OVERHEAD UTILITY CABLE
—— SAN ——	DENOTES UNDERGROUND SANITARY SEWER
—— STM ——	DENOTES UNDERGROUND STORM SEWER
—— W ——	DENOTES UNDERGROUND WATER
	DENOTES TREE
	CONTOUR INTERVALS ARE SHOWN AS 1.00m FOR MAJOR AND 0.25m FOR MINOR
	DENOTES MAJOR CONTOUR
	DENOTES MINOR CONTOUR
XX.XX	DENOTES SPOT ELEVATION

J.D.BARNES LIMITED
SURVEYING
MAPPING
GIS
LAND INFORMATION SPECIALISTS
2430 DON REID DRIVE, SUITE 204, OTTAWA, ON K1H 1E1
T: (613) 731-7244 F: (613) 731-8955 www.jdbarnes.com

DRAWN BY:	CHECKED BY:	REFERENCE NO.:
RP	GZ	20-10-028-00

FILE: G:\20-10-043\00\Drawing\20-10-043-00_SRPR-TOPO.dgn DATED: 04/02/20

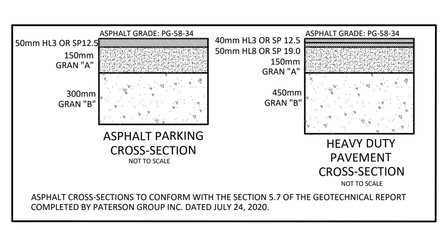
PLOTTED: 4/24/2020

GENERAL NOTES

1. THE ORIGINAL TOPOGRAPHY, GROUND ELEVATION AND SURVEY DATA SHOWN ARE SUPPLIED FOR INFORMATION PURPOSES ONLY, AND IMPLY NO GUARANTEE OF ACCURACY. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY ALL INFORMATION SHOWN.
2. THIS PLAN IS NOT A CADASTRAL SURVEY SHOWING LEGAL PROPERTY BOUNDARIES AND EASEMENTS. THE PROPERTY BOUNDARIES SHOWN HEREON HAVE BEEN DERIVED INFORMATION SUPPLIED BY (OR SHOWN ON) FARLEY, SMITH & DENIS SURVEYING LTD. SURVEY PLAN #233-18, DATED JUNE 8, 2018 AND CANNOT BE RELIED UPON TO BE ACCURATE OR COMPLETE. THE PRECISE LOCATION OF THE CURRENT PROPERTY BOUNDARIES AND EASEMENTS CAN ONLY BE DETERMINED BY AN UP-TO-DATE LAND TITLES SEARCH AND A SUBSEQUENT CADASTRAL SURVEY PERFORMED AND CERTIFIED BY AN ONTARIO LAND SURVEYOR.
3. THE CONTRACTOR IS TO OBTAIN AND PAY FOR ALL NECESSARY PERMITS AND APPROVALS FROM THE CITY OR TOWNSHIP BEFORE COMMENCING CONSTRUCTION.
4. THE CONTRACTOR IS RESPONSIBLE FOR ALL LAYOUT.
5. THE CONTRACTOR IS TO DETERMINE THE EXACT LOCATION, SIZE, MATERIAL AND ELEVATION OF ALL EXISTING UTILITIES PRIOR TO COMMENCING CONSTRUCTION. PROTECT AND ASSUME ALL RESPONSIBILITY FOR EXISTING UTILITIES WHETHER OR NOT SHOWN ON THESE DRAWINGS. IF THERE IS ANY DISCREPANCY THE CONTRACTOR IS TO NOTIFY THE ENGINEER PROMPTLY.
6. RESTORE ALL TRENCHES AND SURFACES OF PUBLIC ROAD ALLOWANCES TO CONDITION EQUAL OR BETTER THAN ORIGINAL CONDITION AND TO THE SATISFACTION OF THE CITY OR TOWNSHIP AUTHORITIES.
7. EXCAVATE AND DISPOSE OF ALL EXCESS EXCAVATED MATERIAL, SUCH AS ASPHALT, CURBING AND DEBRIS, OFF SITE AS DIRECTED BY THE ENGINEER AND THE CITY OR TOWNSHIP.
8. TOPSOIL TO BE STRIPPED AND STOCKPILED FOR REHABILITATION. CLEAN FILL TO BE PLACED IN FILL AREAS AND COMPACTED TO 95% STANDARD PROCTOR DENSITY.
9. ALL DISTURBED AREAS TO BE RESTORED TO ORIGINAL CONDITION OR BETTER UNLESS OTHERWISE SPECIFIED.
10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TRAFFIC CONTROL AND SAFETY MEASURES DURING THE CONSTRUCTION PERIOD, INCLUDING THE SUPPLY, INSTALLATION, AND REMOVAL OF ALL NECESSARY SIGNAGE, DELINEATORS, MARKERS AND BARRIERS.
11. DO NOT ALTER GRADING OF THE SITE WITHOUT PRIOR APPROVAL OF THE CITY OR TOWNSHIP.
12. ALL ROADWAY, PARKING LOT, AND GRADING WORKS TO BE UNDERTAKEN IN ACCORDANCE WITH CITY OR TOWNSHIP STANDARDS AND SPECIFICATIONS. THE CONTRACTOR IS TO PROVIDE POSITIVE DRAINAGE AWAY FROM THE BUILDING.
13. CONTACT THE CITY OR TOWNSHIP FOR INSPECTION OF ROUGH GRADING OF PARKING LOTS, ROADWAYS AND LANDSCAPED AREAS PRIOR TO PLACEMENT OF ASPHALT AND TOPSOIL. ALL DEFICIENCIES NOTED SHALL BE RECTIFIED TO THE CITY OR TOWNSHIP SATISFACTION PRIOR TO PLACEMENT OF ANY ASPHALT, TOPSOIL, SEED & MULCH AND/OR SOD.
14. ALL DIMENSIONS AND INVERTS MUST BE VERIFIED PRIOR TO CONSTRUCTION, IF THERE IS ANY DISCREPANCY THE CONTRACTOR IS TO NOTIFY THE ENGINEER PROMPTLY.
15. ELECTRICAL, GAS, TELEPHONE AND TELEVISION SERVICE LOCATIONS ARE SUBJECT TO THE INDIVIDUAL AGENCY:
    - ELECTRICAL SERVICE - HYDRO OTTAWA,
    - GAS SERVICE - ENBRIDGE,
    - TELEPHONE SERVICE - BELL CANADA,
    - TELEVISION SERVICE - ROGERS.
16. INSTALLATION TO BE IN ACCORDANCE WITH CURRENT CODES AND STANDARDS OF APPROVAL AGENCIES HYDRO OTTAWA, BELL AND THE CITY OR TOWNSHIP.
17. ALL PROPOSED CURB SHALL BE CONCRETE BARRIER CURB UNLESS SPECIFIED.
18. ALL EXISTING REDUNDANT PRIVATE APPROACHES FRONTING THIS DEVELOPMENT MUST BE REMOVED TO THE SATISFACTION OF THE CITY OR TOWNSHIP.
19. THIS PLAN MUST BE READ IN CONJUNCTION WITH GEOTECHNICAL REPORT BY PATERSON GROUP, DATED JULY 24, 2020 #PG5407-1 AND THE SITE SERVICING REPORT BY McINTOSH PERRY REPORT #CP-20-0190, DATED MARCH 01, 2021.

EROSION AND SEDIMENT CONTROL

1. THE CONTRACTOR SHALL IMPLEMENT BEST MANAGEMENT PRACTICES, TO PROVIDE FOR PROTECTION OF THE AREA DRAINAGE SYSTEM AND THE RECEIVING WATERCOURSE, DURING CONSTRUCTION ACTIVITIES. THIS INCLUDES LIMITING THE AMOUNT OF EXPOSED SOIL, TEMPORARY SEDIMENT CONTROL (GEOSOCK INSERTS WITH AN OVERFLOW UNDER GRATE OR COVER) TO BE IMPLEMENTED DURING CONSTRUCTION ON ALL PROPOSED ROAD CATCHBASINS, REARYARD CATCHBASINS AND CATCHBASIN MANHOLES AND OTHER SEDIMENT TRAPS. NO RECYCLED GEOSOCK MATERIAL SHALL BE PERMITTED FOR USE ON SITE.
2. AT THE DISCRETION OF THE PROJECT MANAGER OR MUNICIPAL STAFF, ADDITIONAL SILT CONTROL DEVICES SHALL BE INSTALLED AT DESIGNATED LOCATIONS.
3. FOR SILT FENCE BARRIER, USE OPSD 219.110. GEOTEXTILE FOR SILT FENCE AS PER OPSS 1860, TABLE 3.
4. EXCEPT AS PROVIDED IN PARAGRAPHS 4.1., and 4.2. BELOW, STABILIZATION MEASURES SHALL BE INITIATED AS SOON AS FEASIBLE IN PORTIONS OF THE SITE WHERE CONSTRUCTION ACTIVITIES HAVE TEMPORARILY OR PERMANENTLY CEASED, BUT IN NO CASE MORE THAN 14 DAYS AFTER THE CONSTRUCTION ACTIVITY HAS TEMPORARILY OR PERMANENTLY CEASED.
   - 4.1. WHERE THE INITIATION OF STABILIZATION MEASURES BY THE 14TH DAY AFTER CONSTRUCTION ACTIVITY TEMPORARILY OR PERMANENTLY CEASE IS PRECLUDED BY SNOW COVER, STABILIZATION MEASURES SHALL BE INITIATED AS SOON AS FEASIBLE.
   - 4.2. WHERE CONSTRUCTION ACTIVITY WILL RESUME ON A PORTION OF THE SITE WITHIN 21 DAYS FROM WHEN ACTIVITIES CEASED, (E.G. THE TOTAL TIME PERIOD THAT CONSTRUCTION ACTIVITY IS TEMPORARILY CEASED IS LESS THAN 21 DAYS) THEN STABILIZATION MEASURES DO NOT HAVE TO BE INITIATED ON THAT PORTION OF SITE BY THE 14TH DAY AFTER CONSTRUCTION ACTIVITY TEMPORARILY CEASED.
5. SEDIMENT THAT IS ACCUMULATED BY THE TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES SHALL BE REMOVED IN A MANNER THAT AVOIDS ESCAPE OF THE SEDIMENT TO THE DOWNSTREAM SIDE OF THE CONTROL MEASURE AND AVOIDS DAMAGE TO THE CONTROL MEASURE. SEDIMENT SHALL BE REMOVED TO THE LEVEL OF THE GRADE EXISTING AT THE TIME THE CONTROL MEASURE WAS CONSTRUCTED AND BE ACCORDING TO THE FOLLOWING:
   - 5.1. FOR LIGHT-DUTY SEDIMENT BARRIERS, ACCUMULATED SEDIMENT SHALL BE REMOVED ONCE IT REACHES THE LESSER OF THE FOLLOWING:
     - 5.1.1. A DEPTH OF ONE-HALF THE EFFECTIVE HEIGHT OF THE CONTROL MEASURE.
     - 5.1.2. A DEPTH OF 300 MM IMMEDIATELY UPSTREAM OF THE CONTROL MEASURE.
   - 5.2. FOR ALL CONTROL MEASURES, ACCUMULATED SEDIMENT SHALL BE REMOVED AS NECESSARY TO PERFORM MAINTENANCE REPAIRS.
   - 5.3. ACCUMULATED SEDIMENT SHALL BE REMOVED PRIOR TO THE REMOVAL OF THE CONTROL MEASURE.
   - 5.4. ACCUMULATED SEDIMENT IS TO BE REMOVED AND DISPOSED OF AS PER OPSS 180.
6. ALL TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES SHALL BE MONITORED TO ENSURE THEY ARE IN EFFECTIVE WORKING ORDER. THE CONDITION OF THE CONTROL MEASURES SHALL BE MONITORED PRIOR TO ANY FORECAST STORM EVENT AND FOLLOWING A STORM EVENT.
7. DUST CONTROL MEASURES SHOULD BE CONSIDERED PRIOR TO CLEARING AND GRADING. THE USE OF WATER, CALCIUM CHLORIDE FLAKES/SOLUTION OR MAGNESIUM CHLORIDE FLAKES/SOLUTION SHALL BE USED AS DUST SUPPRESSANTS AS PER OPSS 506. THIS IS TO LIMIT WIND EROSION OF SOILS WHICH MAY TRANSPORT SEDIMENTS OFFSITE, WHERE THEY MAY BE WASHED INTO THE RECEIVING WATER BY THE NEXT RAINSTORM.
8. ALL 'GREEN AREAS' TO BE TREATED WITH 150mm TOPSOIL AND SOD AS SOON AS FEASIBLE, AS PER OPSS 570.
9. TOPSOIL TO BE STRIPPED AND STOCKPILED FOR REHABILITATION. CLEAN FILL TO BE PLACED IN FILL AREAS AND COMPACTED TO 95% STANDARD PROCTOR DENSITY.
10. ALL DISTURBED AREAS TO BE RESTORED TO ORIGINAL CONDITION OR BETTER UNLESS OTHERWISE SPECIFIED.
11. STOCKPILED MATERIAL IS TO BE STORED AWAY FROM POTENTIAL RECEIVERS (E.G. STORM CATCHBASINS, MANHOLES), AND BE SURROUNDED BY EROSION CONTROL MEASURES WHERE MATERIAL IS LEFT IN PLACE IN EXCESS OF 14 DAYS.
12. IF REQUIRED, DEWATERING/SETTLING BASINS SHALL BE CONSTRUCTED AS PER OPSD 219.240 AND LOCATED ON FLAT GRADE UPSTREAM OF OTHER EXISTING MITIGATION MEASURES. WATERCOURSES SHALL NOT BE DIVERTED, OR BLOCKED, AND TEMPORARY WATERCOURSES CROSSINGS SHALL NOT BE CONSTRUCTED OR UTILIZED, UNLESS OTHERWISE SPECIFIED IN THE CONTRACT. IF CLOSURE OF ANY PERMANENT WATER PASSAGE IS NECESSARY, THE CONTRACTOR SHALL RELEASE ANY STRANDED FISH TO THE OPEN PORTION OF THE WATERCOURSE WITHOUT HARM.
13. ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL CONFORM TO OPSS 577
14. WHERE DEWATERING IS REQUIRED, THE DISCHARGED WATER SHALL BE CONTROLLED IN ACCORDANCE WITH OPSS 518.
15. ALL SETTLING/FILTRATION BASINS SHALL BE EQUIPPED WITH TERRAFIX 270R GEOTEXTILE (OR APPROVED EQUIVALENT) AND SHALL BE CLEANED AND REPLACED AS REQUIRED.

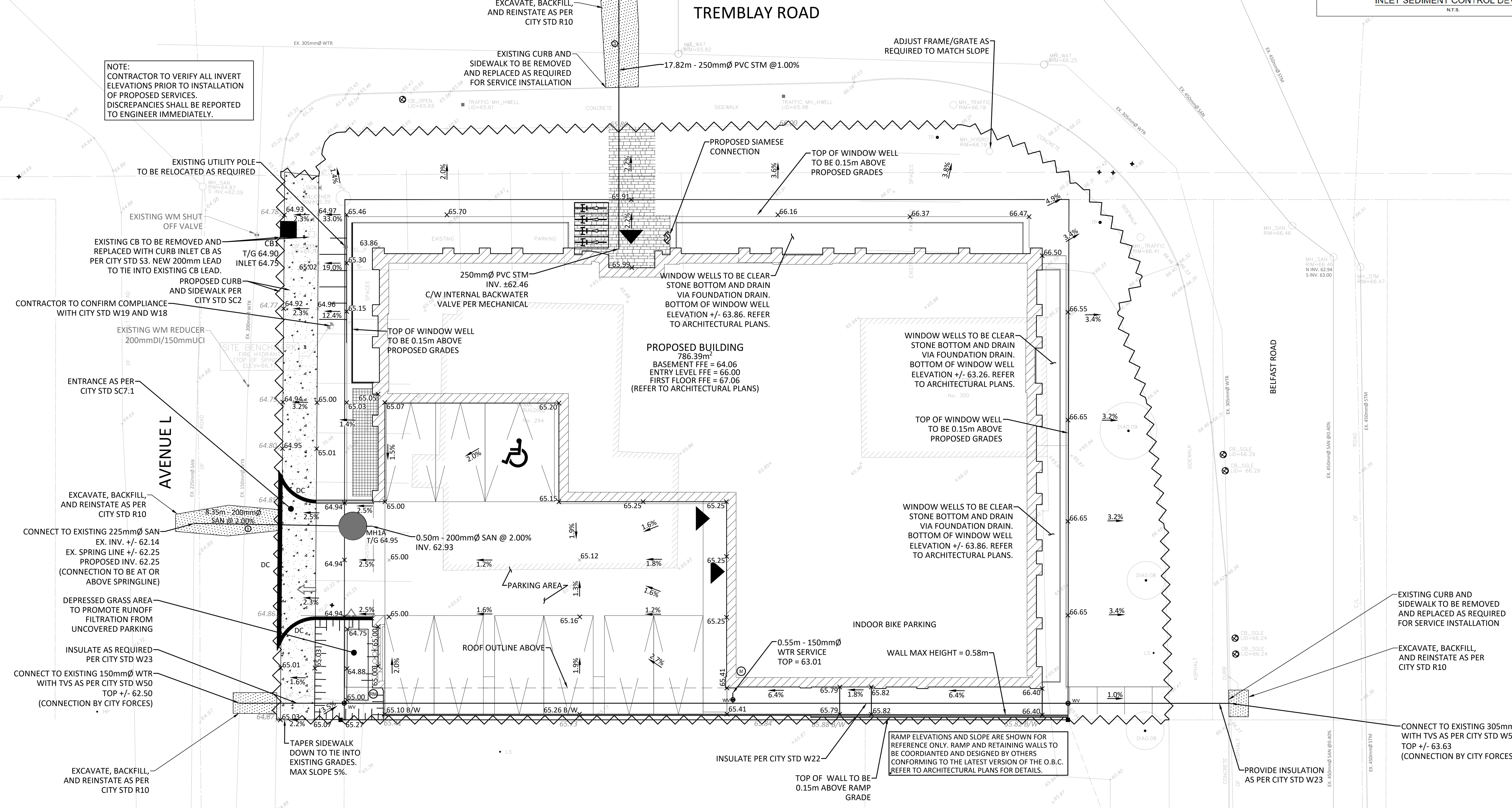


WATERMAIN NOTES

1. CONSTRUCT ALL WATERMAINS AND APPURTENANCES IN ACCORDANCE WITH OPSD STANDARDS AND SPECIFICATIONS, AS WELL AS CITY OR TOWNSHIP STANDARDS.
2. INDUSTRIAL/COMMERCIAL SERVICE CONNECTIONS TO BE 50mm COPPER PIPING AND SHALL CONFORM TO ASTM B88 TYPE 'K' SOFT.
3. WATERMAINS AND/OR WATER SERVICES ARE TO HAVE A MINIMUM COVER OF 2.4m. OTHERWISE THERMAL INSULATION IS REQUIRED AS PER CITY OR TOWNSHIP STANDARDS (IF AVAILABLE) OR OPSD 1109.030.
4. IF THE WATERMAIN MUST BE DEFLECTED TO MEET ALIGNMENT, ENSURE THAT THE AMOUNT OF DEFLECTION USED IS EQUAL TO OR LESS THAN THAT WHICH IS RECOMMENDED BY THE MANUFACTURER.
5. USE APPROVED SADDLE CONNECTION WITH MAIN (CORPORATION) STOP AS PER CITY OF OTTAWA STANDARD DRAWING 'W26'.
6. CONNECTION TO EXISTING BY CITY OR TOWNSHIP FORCES. EXCAVATION, BACKFILLING AND REINSTATEMENT IS TO BE COMPLETED BY THE CONTRACTOR.
7. THERMAL INSULATION OF WATERMAINS AT OPEN STRUCTURES AS PER CITY OR TOWNSHIP STANDARDS (IF AVAILABLE) OR OPSD 1109.030.
8. THERMAL INSULATION OF WATERMAINS UNDER ROAD SIDE DITCHES AS PER CITY OF OTTAWA STANDARD DRAWING 'W21'.
9. SWABING, CHLORINATION AND CONTINUITY TESTING FOR PROPOSED WATER SERVICES IS TO FOLLOW CITY OF OTTAWA SPECIAL PROVISIONS #SP-4491 & SP-4494.

SEWER NOTES

1. CONSTRUCT ALL SEWERS AND APPURTENANCES TO CITY OR TOWNSHIP STANDARDS (IF AVAILABLE) OR AS PER OPSD STANDARDS.
2. SEWER TRENCHING AND BEDDING SHALL CONFORM TO OPSD 802.010 AND 802.013 UNLESS NOTED OTHERWISE.
3. BEDDING SHALL BE A MINIMUM 150mm OF GRANULAR "A", COMPACTED TO MINIMUM 95% STANDARD PROCTOR DRY DENSITY. CLEAR STONE BEDDING SHALL NOT BE PERMITTED.
4. SUB-BEDDING, IF REQUIRED SHALL BE AS PER THE DIRECTION OF A GEOTECHNICAL ENGINEER.
5. BACKFILL TO AT LEAST 300mm ABOVE TOP OF PIPE WITH GRANULAR "A" OR SAND.
6. TO MINIMIZE DIFFERENTIAL FROST HEAVING, TRENCH BACKFILL (FROM PAVEMENT SUBGRADE TO 2.0m BELOW FINISHED GRADE) SHALL MATCH EXISTING SOIL CONDITIONS.
7. SEWERS AND CONNECTIONS 150mm DIAMETER AND SMALLER TO BE PVC SDR 28 OR APPROVED EQUIVALENT. SEWERS AND CONNECTIONS 200mm DIAMETER AND LARGER TO BE PVC SDR 35 OR APPROVED EQUIVALENT.
8. INSULATE ALL SEWERS AND/OR SERVICES THAT HAVE LESS THAN 1.5m OF COVER WITH THERMAL INSULATION AS PER OPSD 1109.030.
9. SUPPLY AND INSTALL ALL PIPING AND APPURTENANCES AS SHOWN AND DETAILED TO WITHIN 1.0m OF BUILDING. ALL ENDS OF SERVICES TO BE PROPERLY CAPPED AND LOCATED WITH 2"x4"x8' LONG MARKER.
10. CONTRACTOR TO TELEVISE (CCTV) ALL PROPOSED SEWERS ONSITE, OUTLET CONNECTION TO THE MAIN AND PIPES 150mmØ OR GREATER PRIOR TO BASE COURSE ASPHALT. UPON COMPLETION OF CONTRACT, THE CONTRACTOR IS RESPONSIBLE TO FLUSH AND CLEAN ALL SEWERS & APPURTENANCES.
11. DYE TESTING IS TO BE COMPLETED ON SANITARY SERVICE TO CONFIRM PROPER CONNECTION TO THE SANITARY SEWER MAIN.
12. ALL CATCHBASIN AND CATHCBASIN MANHOLE LEADS ARE TO BE MINIMUM 200mmØ WITH MINIMUM 1.0% SLOPE UNLESS OTHERWISE NOTED.
13. ALL CATCHBASINS EXCLUDING LANDSCAPE CATCHBASINS ARE TO HAVE 150 mmØ PERFORATED PIPE FOR 3.0m ON ALL AVAILABLE SIDES AS PER CITY OF OTTAWA STANDARD DRAWING 'R1'.



ROOF DRAIN (B2)		
TYPE OF CONTROL DEVICE	WATTS DRAINAGE RD-100-A-ADJ (FULLY EXPOSED)	
NUMBER OF ROOF DRAINS	1	
	5-YEAR	100-YR
ROOFTOP STORAGE (m³)	1.3	2.3
DEPTH OF FLOW (m)	0.025	0.045
FLOW PER ROOF DRAIN (L/s)	0.30	0.54
TOTAL FLOW	0.30	0.54

ROOF DRAINS (B3)		
TYPE OF CONTROL DEVICE	WATTS DRAINAGE RD-100-A-ADJ (FULLY EXPOSED)	
NUMBER OF ROOF DRAINS	5	
	5-YEAR	100-YR
ROOFTOP STORAGE (m³)	15.3	29.2
DEPTH OF FLOW (m)	0.030	0.055
FLOW PER ROOF DRAIN (L/s)	0.36	0.66
TOTAL FLOW	1.80	3.30

SAN STRUCTURE TABLE

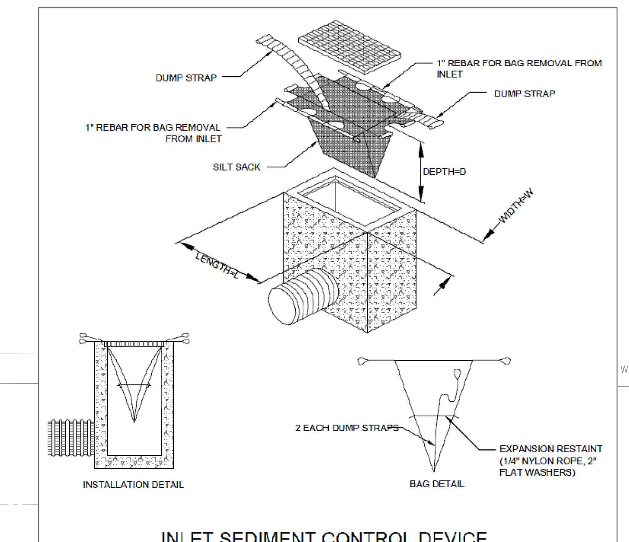
NAME	RIM ELEV.	INVERT IN	INVERT OUT	DESCRIPTION
MH1A	64.95	E62.910	W62.890	MONITORING MANHOLE COVER CITY STD S24 FRAME CITY STD S25 STRUC. OPSD 701.010

STM STRUCTURE TABLE

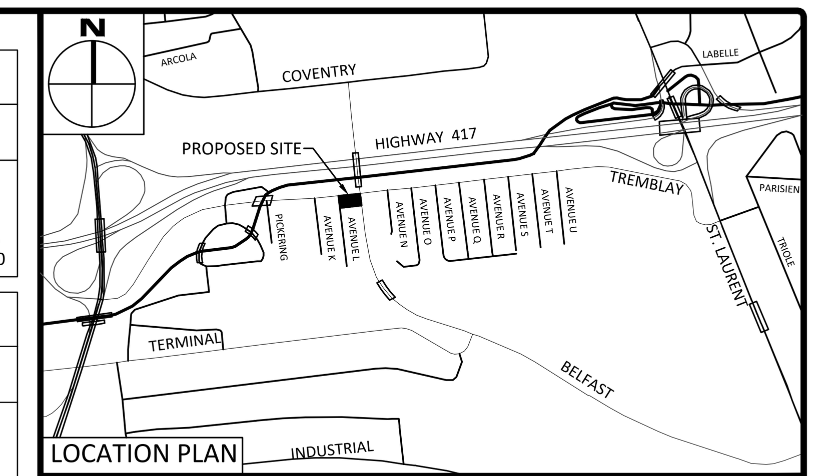
NAME	RIM ELEV.	INVERT IN	INVERT OUT	DESCRIPTION
CB1	64.75			FRAME AS PER CITY STD S22 COVER AS PER CITY STD S23

CROSSING CONFLICT TABLE

LOCATION	DESCRIPTION	SEPARATION
1	150mmØ WTR MAIN TOP 62.45 200mmØ SAN SEWER INV 62.73	0.28
2	250mmØ STM SERVICE TOP 62.59 300mmØ WTR MAIN INV 62.90	0.31
3	600mmØ SAN SEWER TOP 60.54 250mmØ STM SERVICE INV 62.30	1.76



INLET SEDIMENT CONTROL DEVICE



LOCATION PLAN

LEGEND

- BARRIER CURB / CURB DEPRESION (DC)
- MOUNTABLE CURB
- EASEMENT
- HEAVY DUTY ASPHALT
- CONCRETE SIDEWALK
- PAVING STONE
- MH7 STORM MANHOLE
- CB6 DI6 CATCHBASIN OR DITCH INLET
- ECB4 LANDSCAPE CATCHBASIN
- MH7A SANITARY MANHOLE
- PERFORATED PIPE IN SWALES
- WATER VALVE/CHAMBER
- FIRE HYDRANT
- CENTRELINE OF SWALE
- SLOPING AT 3:1 (UNLESS SPECIFIED)
- 95.94 / 93.20 PROPOSED ELEVATION / EXISTING ELEVATION
- 95.94 (S) SWALE ELEVATION
- T/W100.50 / B/W90.50 TOP OF WALL ELEVATION / BOTTOM OF WALL ELEVATION
- EMERGENCY OVERLAND FLOW ROUTE
- (RM) (M) REMOTE METRE/WATER METRE
- SILT FENCE (AS PER OPSD 219.130)
- STRAW BALE CHECK DAM (AS PER OPSD 219.180)
- O/H BUILDING ENTRANCES (MAIN, SIDE, OVERHEAD)
- INLET SEDIMENT CONTROL DEVICE PER DETAIL

FOR REVIEW ONLY
NOT FOR CONSTRUCTION

No.	Revisions	Date
6	ISSUED FOR TENDER	JUN 29, 2023
5	ISSUED FOR APPROVAL	AUG 12, 2022
4	ISSUED FOR APPROVAL	MAY 14, 2021
3	ISSUED FOR APPROVAL	MAR. 01, 2021
2	ISSUED FOR COORDINATION	FEB. 26, 2021
1	ISSUED FOR APPROVAL	OCT. 01, 2020

Check and verify all dimensions before proceeding with the work — Do not scale drawings

SCALE 1 : 150 (0, 5, 10, 15 Metres)

McINTOSH PERRY
115 Walgreen Road, RR3, Carp, ON K0A 1L0
Tel: 613-836-2184 Fax: 613-836-3742
www.mcintoshperry.com

Stamp:

Client:
ZW Project Managment Inc.
150 RICHMOND ROAD
OTTAWA, ON K1Z 6W2

Project:
300 TREMBLAY
300 TREMBLAY ROAD

Drawing Title:
SITE GRADING, DRAINAGE, SERVICING AND EROSION & SEDIMENT CONTROL PLAN

Scale: 1:150	Project Number: CP-20-0190	
Drawn By: C.D.H.		
Checked By: R.P.K.	Drawing Number: C101	
Designed By: C.D.H.		

D07-12-XX-XXXX
#XXXXX

FILENAME: U:\Ottawa\01 Project - Proposals\2020 Jobs\CP\0CP-Projects\0CP-20-0190 P15_Apartment Building_300 Tremblay Road\12 - Drawings\CP-20-0190_Presentation.dwg
LAST SAVED: Thursday, June 29, 2023 LAST SAVED BY: r.robineau
LAST PLOTTED: Thursday, June 29, 2023 CTB FILE USED: ----

APPENDIX B

Geotechnical Investigation:

Paterson Group Report Number PG5407-1 Revision 4 Dated August 31, 2023

Geotechnical Investigation

Proposed Multi-Storey Building

294-300 Tremblay Road
Ottawa, Ontario

Prepared for TC United Development Corporation
c/o ZW Project Management

Report PG5407-1 Revision 4 dated August 31, 2023

Table of Contents

Appendices

1.0 Introduction

Paterson Group (Paterson) was commissioned by ZW Project Management on behalf of TC United Development to conduct a geotechnical investigation for the proposed multi-storey building to be located at the intersection between Tremblay Road and Belfast Road, in the City of Ottawa, Ontario (refer to Figure 1 – Key Plan presented in Appendix 2 of this report).

The objectives of the investigation were to:

- ❑ Determine the subsoil and groundwater conditions at this site by means of boreholes.
- ❑ Provide geotechnical recommendations for the design of the proposed development including construction considerations which may affect the design.

The following report has been prepared specifically and solely for the aforementioned project which is described herein. It contains our findings and includes geotechnical recommendations pertaining to the design and construction of the subject development as they are understood at the time of writing this report.

Investigating the presence or potential presence of contamination on the subject property was not part of the scope of work of this present investigation. A report addressing environmental issues for the subject site was prepared under separate cover.

2.0 Proposed Development

Based on our current drawings, it is understood that the proposed project will consist of a mixed-use multi-storey building with one (1) underground level. It is further understood that the existing buildings have been demolished as part of the proposed redevelopment at the subject site. Associated access lanes, and landscaped areas are further anticipated. It is expected that the proposed building will be municipally serviced.

3.0 Method of Investigation

3.1 Field Investigation

Field Program

The field program for the geotechnical investigation was carried out on July 7, 2020 and consisted of advancing three (3) boreholes (BH 1 to BH 3) to a maximum depth of 6.7 m below existing ground surface. The borehole locations were determined in the field by Paterson personnel taking into consideration site features and underground services. The locations of the boreholes are shown on Drawing PG5407-1 - Test Hole Location Plan included in Appendix 2.

The boreholes were advanced using a truck-mounted auger drill rig operated by a two-person crew. All fieldwork was conducted under the full-time supervision of Paterson personnel under the direction of a senior engineer. The test hole procedures consisted of advancing the boreholes to the required depths at the selected locations and sampling the overburden.

Sampling and In Situ Testing

Soil samples were collected from the boreholes using three different techniques, namely, sampled directly from the auger flights (AU) or collected using a 50 mm diameter split-spoon (SS) sampler. All soil samples were visually inspected and initially classified on site. The auger and split-spoon samples were placed in sealed plastic bags and transported to our laboratory for further examination and classification. The depths at which the auger and split spoon samples were recovered from the boreholes are shown as AU and SS, respectively, on the Soil Profile and Test Data sheets presented in Appendix 1.

The Standard Penetration Test (SPT) was conducted in conjunction with the recovery of the split-spoon samples. The SPT results are recorded as “N” values on the Soil Profile and Test Data sheets. The “N” value is the number of blows required to drive the split-spoon sampler 300 mm into the soil after a 150 mm initial penetration using a 63.5 kg hammer falling from a height of 760 mm.

Overburden thickness was evaluated by dynamic cone penetration testing (DCPT) at BH 1. The DCPT consists of driving a steel drill rod, equipped with a 50 mm diameter cone at the tip, using a 63.5 kg hammer falling from a height of 760 mm. The number of blows required to drive the cone into the soil is recorded for each 300 mm increment. Due to the low resistance exerted by the silty clay in some boreholes, the cone was pushed using the hydraulic head of the drill rig until resistance to penetration was encountered. The hammer was then used to further advance the cone to practical refusal.

The subsurface conditions observed in the test holes were recorded in detail in the field. The soil profiles are presented on the Soil Profile and Test Data sheets in Appendix 1 of this report.

Groundwater

Groundwater monitoring wells were installed in BH 1 and BH 3, and flexible standpipe was installed in BH 2 to permit monitoring of the groundwater levels subsequent to the completion of the sampling program.

Sample Storage

All samples will be stored in the laboratory for a period of one month after issuance of this report. They will then be discarded unless we are otherwise directed.

3.2 Field Survey

The test holes were located and surveyed in the field by Paterson personnel. The locations and ground surface elevations were determined using a handheld GPS incorporating a geodetic datum. The borehole locations and ground surface elevation at each borehole location are presented on Drawing PG5407-1 - Test Hole Location Plan in Appendix 2.

3.3 Laboratory Testing

Soil samples were recovered from the boreholes and visually examined in our laboratory to review the field logs.

3.4 Analytical Testing

One (1) soil sample was submitted for analytical testing to assess the corrosion potential for exposed ferrous metals and the potential of sulphate attacks against subsurface concrete structures. The sample was submitted to determine the concentration of sulphate and chloride, the resistivity and the pH of the sample. The results are presented in Appendix 1 and are discussed further in Subsection 6.7.

4.0 Observations

4.1 Surface Conditions

The subject site is currently occupied by one single family home and one commercial building, the remainder of the site is occupied by parking lots, grass covered areas and mature trees. The existing ground surface across the site is relatively flat and at grade with the surrounding roadways and neighbouring properties.

The site is bordered to the north by Tremblay Road, to the east by Belfast Road, to the west by Avenue L and to the south by an asphalt covered parking area.

4.2 Subsurface Profile

Overburden

Generally, the subsurface profile encountered at the borehole locations consists of asphaltic concrete underlain by fill consisting of brown silty clay with trace silt and gravel. The fill is underlain by very stiff clayey silt overlying loose to compact brown sandy silty. Glacial till was encountered below the above noted layer consisting of compact grey sandy silt with gravel, cobbles and boulders. Practical refusal to the DCPT was encountered at a depth of 7.3 m below existing grade at BH 1.

Reference should be made to the Soil Profile and Test Data sheets in Appendix 1 for specific details of the soil profiles encountered at each test hole location.

Bedrock

Based on available geological mapping, the bedrock in this area consists of gray shale of the Carlsbad Formation with an overburden drift thickness of 7 to 10 m depth.

4.3 Groundwater

Groundwater levels were measured at the monitoring wells in the borehole locations of the current investigation on July 16, 2020. The measured groundwater levels in the piezometers at the borehole locations are presented in Table 1. The long-term groundwater level can also be estimated based on the recovered soil samples' moisture levels and consistency. Based on these observations, the long-term groundwater table is anticipated to be at a **3 to 4 m** depth.

Table 1 - Summary of Groundwater Levels

Borehole Number	Measured Groundwater Level		Recording Date
	Depth (m)	Elevation (m)	
Groundwater Levels Based on Current Investigation (Report PG5407)			
BH 1	4.08	61.84	July 16, 2020
BH 2	4.15	61.81	July 16, 2020
BH 3	3.41	62.29	July 16, 2020

It should be noted that groundwater levels are subject to seasonal fluctuations. Therefore, the groundwater level could vary at the time of construction.

5.0 Discussion

5.1 Geotechnical Assessment

From a geotechnical perspective, the subject site is satisfactory for the proposed multi-storey building. It is recommended that the proposed building be founded over conventional shallow foundation placed on an undisturbed, stiff clayey silt, compact sandy silt, and/or compact glacial till bearing surface.

The above and other considerations are further discussed in the following sections.

5.2 Site Grading and Preparation

Stripping Depth

Topsoil, asphalt, and deleterious fill, such as material containing high content of organic materials or construction remnants, should be stripped from under the proposed building footprint and other settlement sensitive structures.

Fill Placement

Fill used for grading beneath the proposed building should consist of clean imported granular fill, such as Ontario Provincial Standard Specifications (OPSS) Granular A or Granular B Type II. This material should be tested and approved prior to delivery to the site. The fill should be placed in lifts no greater than 300 mm thick and compacted using suitable compaction equipment for the lift thickness. Fill placed beneath the building and paved areas should be compacted to at least 98% of the material's standard Proctor maximum dry density (SPMDD).

Non-specified existing fill, along with site-excavated soil, can be used as general landscaping fill where settlement of the ground surface is of minor concern. This material should be spread in thin lifts and at least compacted by the tracks of the spreading equipment to minimize voids. If this material is to be used to build up the subgrade level for areas to be paved, it should be compacted in thin lifts to at least 95% of the material's SPMDD.

Non-specified existing fill and site-excavated soils are not suitable for use as backfill against foundation walls unless used in conjunction with a composite drainage membrane.

Existing Fill Treatment

Based on the proposed building, a basement level is proposed which will result in the removal of the majority of the existing fill if not the entire fill layer. However, if portions of the existing fill is to remain in place outside the footprint of the proposed footings, it is recommended that the existing fill be proof-rolled under dry conditions and above freezing temperatures using suitable vibratory compaction equipment, making several passes and approved by Paterson personnel. Any poor performing areas should be sub excavated and replaced with OPSS Granular material as specified above.

5.3 Foundation Design

Bearing Resistance Values

Using continuously applied loads, footings placed over stiff clayey silt, compact sandy silt, compact glacial till bearing surfaces can be designed using the following bearing resistance values at serviceability limit states (SLS) and factored resistance values as ultimate limit states (ULS) incorporating a geotechnical factor of 0.5, presented in Table 2 below.

Table 2 - Bearing Resistance Values		
Undisturbed Bearing Surface	**Bearing Resistance Value at SLS (kPa)**	**Factored Bearing Resistance Value at ULS (kPa)**
Stiff Clayey Silt	125	225
Compact Sandy Silt	125	225
Compact Glacial Till	150	225
Engineered Fill	100	150

If the sandy silt subgrade is observed to be in a loose state of compactness, the material should be proof rolled using suitable vibratory equipment making several passes under dry conditions and above freezing temperatures and approved by Paterson at the time of construction.

An undisturbed soil bearing surface consists of one from which all topsoil and deleterious materials, such as loose, frozen or disturbed soil, have been removed prior to the placement of concrete for footings.

The bearing resistance value at SLS given for footings will be subjected to potential post construction total and differential settlements of 25 and 20 mm, respectively.

Modulus of Subgrade

For spread footings placed on the compact grey sandy silt subgrade, the modulus of subgrade reaction can be taken as **10 MPa/m** for a contact pressure of **125 kPa**.

Lateral Support

The bearing medium under footing-supported structures is required to be provided with adequate lateral support with respect to excavations and different foundation levels. Adequate lateral support is provided to glacial till above the groundwater table when a plane extending down and out from the bottom edge of the footing at a minimum of 1.5H:1V passes only through in situ soil of the same or higher capacity as the bearing medium soil.

5.4 Design for Earthquakes

The site class for seismic site response can be taken as **Class C** for the foundations bearing on an undisturbed, compact glacial till. Soils underlying the subject site are not susceptible to liquefaction. Reference should be made to the latest revision of the 2012 Ontario Building Code for a full discussion of the earthquake design requirements.

5.5 Basement Slab Construction

With the removal of all topsoil and deleterious material, containing organic matter, within the footprint of the proposed building, the approved existing fill of native material as discussed in Subsection 5.3 will be considered to be an acceptable subgrade surface on which to commence backfilling for floor slab construction.

It is recommended that the upper 200 mm of sub-slab fill consists of 19 mm clear crushed stone. All backfill material within the footprint of the proposed building should be placed in maximum 300 mm thick loose layers and compacted to the minimum 98% of its SPMDD.

5.6 Basement Wall

There are several combinations of backfill materials and retained soils that could be applicable for the basement walls of the subject structure. However, the conditions can be well-represented by assuming the retained soil consists of a material with an angle of internal friction of 30 degrees and a bulk (drained) unit weight of 20 kN/m^3. The applicable effective (undrained) unit weight of the retained soil can be taken as 13 kN/m^3, where applicable. A hydrostatic pressure should be added to the total static earth pressure when using the effective unit weight.

Lateral Earth Pressures

The static horizontal earth pressure (p_o) can be calculated using a triangular earth pressure distribution equal to $K_o \cdot \gamma \cdot H$ where:

K_o = at-rest earth pressure coefficient of the applicable retained soil, 0.5
γ = unit weight of fill of the applicable retained soil (kN/m^3)
H = height of the wall (m)

An additional pressure having a magnitude equal to $K_o \cdot q$ and acting on the entire height of the wall should be added to the above diagram for any surcharge loading, q (kPa), that may be placed at ground surface adjacent to the wall. The surcharge pressure will only be applicable for static analyses and should not be used in conjunction with the seismic loading case.

Actual earth pressures could be higher than the "at-rest" case if care is not exercised during the compaction of the backfill materials to maintain a minimum separation of 0.3 m from the walls with the compaction equipment.

Seismic Earth Pressures

The total seismic force (P_{AE}) includes both the earth force component (P_o) and the seismic component (ΔP_{AE}). The seismic earth force (ΔP_{AE}) can be calculated using $0.375 \cdot a_c \cdot \gamma \cdot H^2/g$ where:

a_c = $(1.45-a_{max}/g)a_{max}$
γ = unit weight of fill of the applicable retained soil (kN/m^3)
H = height of the wall (m)
g = gravity, 9.81 m/s^2

The peak ground acceleration, (a_{max}), for the Ottawa area is 0.32g according to OBC 2012. Note that the vertical seismic coefficient is assumed to be zero.

The earth force component (P_o) under seismic conditions can be calculated using $P_o = 0.5\ K_o\ \gamma\ H^2$, where $K_o = 0.5$ for the soil conditions noted above.

The total earth force (P_{AE}) is considered to act at a height, h (m), from the base of the wall, where:

$$h = \{P_o \cdot (H/3) + \Delta P_{AE} \cdot (0.6 \cdot H)\}/P_{AE}$$

The earth forces calculated are unfactored. For the ULS case, the earth loads should be factored as live loads, as per OBC 2012.

5.7 Pavement Structure

Where required at the subject site, the recommended pavement structures for car only parking areas and access lanes are shown in Tables 3 and 4.

Table 3 - Recommended Pavement Structure - Car Only Parking Areas and Driveways

Thickness (mm)	Material Description
50	**Wear Course** - HL 3 or Superpave 12.5 Asphaltic Concrete
150	**BASE** - OPSS Granular A Crushed Stone
300	**SUBBASE** - OPSS Granular B Type II
SUBGRADE - Either fill, in situ soil or OPSS Granular B Type I or II material placed over in situ soil or fill.	

Table 4 - Recommended Pavement Structure - Access Lanes and Heavy Truck Parking/Loading Areas

Thickness (mm)	Material Description
40	**Wear Course** - HL3 or Superpave 12.5 Asphaltic Concrete
50	**Binder Course** - HL8 or Superpave 19.0 Asphaltic Concrete
150	**BASE** - OPSS Granular A Crushed Stone
450	**SUBBASE** - OPSS Granular B Type II
SUBGRADE - Either fill, in situ soil or OPSS Granular B Type I or II material placed over in situ soil or fill.	

Where a podium deck is located below the pavement structures, including parking areas and access lanes, can be designed using the pavement structure shown on Table 5 below.

Table 5 - Recommended Pavement Structure – Access Lanes and Heavy Truck Parking Areas

Thickness (mm)	Material Description
50	**Wear Course** - Superpave 12.5 Asphaltic Concrete
300	**BASE** - OPSS Granular A Crushed Stone
SUBGRADE - To consist of concrete podium deck including waterproofing and insulation.	

Minimum Performance Graded (PG) 58-34 asphalt cement should be used for this project.

The pavement granular base and subbase should be placed in maximum 300 mm thick lifts and compacted to a minimum of 100% of the material's SPMDD using suitable vibratory equipment.

Native Subgrades

If soft spots develop in the subgrade during compaction or due to construction traffic, the affected areas should be excavated and replaced with OPSS Granular B Type II material. Weak subgrade conditions may be experienced over service trench fill materials. This may require the use of a geotextile, such as Terratrack 200 or equivalent, thicker subbase or other measures that can be recommended at the time of construction as part of the field observation program.

6.0 Design and Construction Precautions

6.1 Foundation Drainage and Backfill

Foundation Drainage and Waterproofing System

It is recommended that a perimeter foundation drainage system be provided for the proposed structure. It is expected that the foundation wall will be cast as a blind-sided pour and/or double-sided pour against a shoring system. It is recommended that the groundwater drainage system consist of the following:

- ❑ A waterproofing membrane should be placed against the shoring system between underside of footings and 1 m above the groundwater elevation. A 150 MIL granular bentonite surfacing laminated to 20 MIL thick HDPE membrane should be installed in horizontal lifts to the manufacturer's specifications in a single fashion with the HDPE side facing applicator to an adequately prepared substrate surface. the waterproofing membrane can be terminated 1 m above the ground water table (approx. elevation of GWT is at 62.5 m). Furthermore, it is required that the waterproofing membrane should be extended at least 600 mm horizontally below underside of footings. It should be noted that termination elevation should be confirmed by Paterson once the excavation is completed.

- ❑ It is recommended that a composite foundation drainage membrane, such as 6000 series membrane by DeltaDrain, G100N by MiraDrain, or equivalent and approved other, be placed over the waterproofing membrane to divert water captured by the building foundation drainage system to the appropriate sump pump system. The composite foundation drainage membrane should extend from finished grade to the underside of footing level with the geotextile layer facing away from the foundation wall in a single fashion.

- ❑ It is highly recommended that the drainage boards be installed with a minimum horizontal and vertical overlap of 150 mm between the sheets (not the filter cloth) to minimize the joints between the sheets. The top 150 mm flap of each lower horizontal lift of the drainage board should be secured behind the bottom end lap of the overlying horizontal course of the drainage board to allow for proper shingling between lifts. This will mitigate the potential for water to drain behind the HDPE face of the drainage board and onto the concrete wall surface.

- 150 mm diameter sleeves placed should be cast in the foundation wall at the footing interface to allow the infiltration of water to flow to an interior drainage pipe. Further, the drainage sleeves should be mechanically connected to the exterior or interior perimeter drainage pipe and the underfloor drainage system. The perimeter and underfloor drainage pipes should direct water to the storm sump pit(s) within the lower basement area by gravity. It is recommended that an 'X' shaped incision through the composite foundation drainage board be cut to connect the sleeve. The sleeves should be fastened and secured into place at the footing/wall interface prior to casting concrete for the foundation wall. The incision in the drainage board should be sealed with 3M tape around the sleeve. Further, the waterproofing membrane should be sealed around the sleeve.

- All joints between drainage board sheets (i.e., overlaps) should be sealed using 3M Tape, or equivalent other product approved by Paterson. Further, all protrusions through the waterproofing and drainage board layers liner, such as fasteners or damage by materials such as concrete, should be sealed using 3M Tape or equivalent other products approved by Paterson to mitigate the potential for water to drain behind the HDPE face of the drainage board.

Underfloor Drainage

The underfloor drainage pipe shall consist of a 150 mm diameter perforated corrugated pipe spaced at approximately 6m and surrounded by well-graded granular fill having a maximum size of 100mm. The underfloor drainage system must have a positive gravity connection towards the building sump pit which is anticipated to be placed within the west area of the underground floor.

The exterior perimeter drainage shall consist of a 150 mm diameter perforated corrugated pipe wrapped in a geosock and surrounded by 150 mm of 19 mm clear crushed stone. The perimeter drainage pipe must have a positive gravity connection towards the underfloor drainage system and building sump pit. 150mm diameter drainage sleeves shall be cast in the foundation wall to connect the perimeter drainage pipe to the interior underfloor drainage system and building sump pit. The spacing of the underfloor drainage system should be confirmed by Paterson once the foundation layout and sump system location has been finalized.

Elevator Pit Waterproofing

To accommodate the elevator shaft within the lower level of the proposed structure, it is expected that the associated concrete base slab will be extended below the basement floor slab.

It is expected that the elevator shaft may extend below the invert level of the underfloor drainage system and will thus be theoretically designed under submerged conditions. As a result, the following elevator shaft waterproofing options should be considered:

Once the concrete slab and elevator pit sidewalls are poured in place, it is recommended that a waterproofing membrane, such as Colphene Torch'n Stick (or approved other) should be applied to the exterior of the elevator pit sidewalls and horizontally over the elevator slab in accordance with the manufacturer's specifications. A continuous PVC waterstop such as Southern waterstop 14RCB or equivalent should be installed within the concrete raft slab below the elevator pit sidewalls. An outlet for any trapped water should be installed through the elevator pit wall and connected to the elevator sump pump.

A protection board should be placed over the waterproofing membrane to protect the waterproofing membrane from damage during backfilling operations. It is recommended to backfill the elevator pit excavation with lean concrete to limit water contact with the elevator walls.

Foundation Backfill

Backfill against the exterior sides of the foundation walls should consist of free-draining non frost susceptible granular materials. The greater part of the site excavated materials will be frost susceptible and, as such, are not recommended for re-use as backfill against the foundation walls, unless used in conjunction with a drainage geocomposite, such as Miradrain G100N or Delta Drain 6000, connected to the perimeter foundation drainage system. Imported granular materials, such as clean sand or OPSS Granular B Type I granular material, should otherwise be used for this purpose.

6.2 Protection of Footings Against Frost Action

Perimeter footings of heated structures are required to be insulated against the deleterious effect of frost action. A minimum of 1.5 m thick soil cover (or equivalent) should be provided in this regard.

Exterior unheated footings, such as those for isolated exterior piers, are more prone to deleterious movement associated with frost action than the exterior walls of the heated structure and require additional protection, such as soil cover of 2.1 m or an equivalent combination of soil cover and foundation insulation.

6.3 Excavation Side Slopes

Unsupported Side Slopes

The side slopes of excavations in the soil and fill overburden materials should be either cut back at acceptable slopes or should be retained by shoring systems from the start of the excavation until the structure is backfilled. It is assumed that sufficient room will be available for the greater part of the excavation to be undertaken by open-cut methods (i.e. unsupported excavations).

The excavation side slopes above the groundwater level extending to a maximum depth of 3 m should be cut back at 1H:1V or flatter. The flatter slope is required for excavation below groundwater level. The subsurface soils at this site are considered to be a Type 2 and 3 soil according to the Occupational Health and Safety Act and Regulations for Construction Projects.

Excavated soil should not be stockpiled directly at the top of excavations and heavy equipment should be kept away from the excavation sides.

Slopes in excess of 3 m in height should be periodically inspected by the geotechnical consultant in order to detect if the slopes are exhibiting signs of distress.

It is recommended that a trench box be used at all times to protect personnel working in trenches with steep or vertical sides. It is expected that services will be installed by “cut and cover” methods and excavations will not be left open for extended periods of time.

Temporary Shoring

If a temporary shoring system is considered, the design and implementation of these temporary systems will be the responsibility of the excavation contractor and their design team. Inspections and approval of the temporary system will also be the responsibility of the designer. Geotechnical information provided below is to assist the designer in completing a suitable and safe shoring system. The designer should take into account the potential for a fully saturated condition following a significant precipitation event. Any changes to the approved shoring design system should be reported immediately to the owner’s representative prior to implementation.

Temporary shoring may be required to complete the required excavations where insufficient room is available for open cut methods. The shoring requirements will depend on the depth of the excavation, the proximity of the adjacent buildings and underground structures, and the elevation of the adjacent building foundations and underground services. Additional information can be provided when the above details are known.

For design purposes, the temporary system may consist of soldier pile and lagging system or interlocking steel sheet piling. Any additional loading due to street traffic, construction equipment, adjacent structures and facilities, etc., should be added to the earth pressures described below. These systems can be cantilevered, anchored or braced.

The earth pressures acting on the shoring system may be calculated using the following parameters provided in Table 6.

Table 6 - Soil Parameters for Shoring System Design

Parameters	Values
Active Earth Pressure Coefficient (K_a)	0.33
Passive Earth Pressure Coefficient (K_p)	3
At-Rest Earth Pressure Coefficient (K_o)	0.5
Total Unit Weight (γ), kN/m^3	20
Submerged Unit Weight (γ), kN/m^3	13

Generally, it is expected that the shoring systems will be provided with tie-back rock anchors to ensure their stability. It is further recommended that the toe of the shoring be adequately supported to resist toe failure.

The geotechnical design of grouted rock anchors in sedimentary bedrock is based upon two possible failure modes. The anchor can fail either by shear failure along the grout/rock interface or by pull-out of a 60 to 90 degree cone of rock with the apex of the cone near the middle of the bonded length of the anchor.

The anchor derives its capacity from the bonded portion, or fixed anchor length, at the base of the anchor. An unbonded portion, or free anchor length, is also usually provided between the rock surface and the start of the bonded length. A factored tensile grout to rock bond resistance value at ULS of **1.0 MPa**, incorporating a resistance factor of 0.3, can be used. A minimum grout strength of 40 MPa is recommended.

The design of the rock anchors for temporary shoring can be based on the values provided in Table 7. From a geotechnical perspective, the fixed anchor length will depend on the diameter of the drill holes.

Table 7 - Recommended Rock Anchor Lengths - Grouted Rock Anchor

Diameter of Drill Hole (mm)	Anchor Lengths (m)			Factored Tensile Resistance (kN)
	Bonded Length	Unbonded Length	Total Length	
75	4	1.2	5.2	250
	5.6	1.7	7.3	500
	7.9	2.4	10.3	1000
125	3.9	1.1	5	250
	5.3	1.6	6.9	500
	7.2	2.2	9.4	1000

It is recommended that the anchor drill hole diameter be within 1.5 to 2 times the rock anchor tendon diameter and the anchor drill holes be inspected by geotechnical personnel and should be flushed clean prior to grouting. The use of a grout tube to place grout from the bottom up in the anchor holes is further recommended.

The geotechnical capacity of each rock anchor should be proof tested at the time of construction. More information on testing can be provided upon request. Compressive strength testing is recommended to be completed for the rock anchor grout. A set of grout cubes should be tested for each day grout is prepared.

6.4 Pipe Bedding and Backfill

Bedding and backfill materials should be in accordance with the most recent Material Specifications & Standard Detail Drawings from the Department of Public Works and Services, Infrastructure Services Branch of the City of Ottawa.

A minimum of 150 mm of OPSS Granular A should be placed for bedding for sewer or water pipes when placed on soil subgrade. If the bedding is placed on bedrock, the thickness of the bedding should be increased to 300 mm for sewer pipes. The bedding should extend to the spring line of the pipe. The material should be placed in a maximum 300 mm thick loose lifts and compacted to a minimum of 95% of its SPMDD.

The cover material, which should consist of OPSS Granular A, should extend from the spring line of the pipe to at least 300 mm above the obvert of the pipe. The material should be placed in a maximum 300 mm thick loose lifts and compacted to a minimum of 95% of its SPMDD.

Where hard surface areas are considered above the trench backfill, the trench backfill material within the frost zone (about 1.8 m below finished grade) should match the soils exposed at the trench walls to minimize differential frost heaving. The trench backfill should be placed in a maximum 300 mm thick loose lifts and compacted to a minimum of 95% of the material's SPMDD.

6.5 Groundwater Control

Groundwater Control for Building Construction

Based on our observations, it is anticipated that groundwater infiltration into the excavations should be low to moderate and controllable using open sumps. Pumping from open sumps should be sufficient to control the groundwater influx through the sides of shallow excavations.

The contractor should be prepared to direct water away from all bearing surfaces and subgrades, regardless of the source, to prevent disturbance to the founding medium.

Permit to Take Water

It is anticipated that groundwater infiltration into the excavations should be low to moderate and controllable using open sumps. Pumping from open sumps should be sufficient to control the groundwater influx through the sides of the shallow excavation. The contractor should be prepared to direct water away from all bearing surfaces and subgrades, regardless of the source, to prevent disturbance to the founding medium.

A temporary Ministry of the Environment, Conservation and Parks (MECP) permit to take water (PTTW) may be required for this project if more than 400,000 L/day of ground and/or surface water is to be pumped during the construction phase. A minimum of 4 to 5 months should be allowed for completion of the PTTW application package and issuance of the permit by the MECP.

For typical ground or surface water volumes being pumped during the construction phase, typically between 50,000 to 400,000 L/day, it is required to register on the Environmental Activity and Sector Registry (EASR). A minimum of two to four weeks should be allotted for completion of the EASR registration and the Water Taking and Discharge Plan to be prepared by a Qualified Person as stipulated under O.Reg. 63/16. If a project qualifies for a PTTW based upon anticipated conditions, an EASR will not be allowed as a temporary dewatering measure while awaiting the MECP review of the PTTW application.

Long-term Groundwater Control

Our recommendations for the proposed building's long-term groundwater control are presented in Subsection 6.1. Any groundwater encountered along the building's perimeter or sub-slab drainage system will be directed to the proposed building's sump pit. It is expected that groundwater flow will be low (i.e.- less than 25,000 L/day) with peak periods noted after rain events. It is anticipated that the groundwater flow will be controllable using conventional open sumps.

Impacts on Neighbouring Structures

It is understood that one (1) underground level is included for the proposed building. Based on the existing groundwater level and low permeability of the native soils, the extent of any significant groundwater lowering will take place within a limited range of the proposed building. Based on the proximity of neighbouring buildings and minimal zone impacted by the groundwater lowering, the proposed development will not negatively impact the neighbouring structures. It should be noted that no issues are expected with respect to groundwater lowering that would cause long term damage to adjacent structures surrounding the proposed building.

6.6 Winter Construction

The subsoil conditions at this site mostly consist of frost susceptible materials. In presence of water and freezing conditions, ice could form within the soil mass. Heaving and settlement upon thawing could occur. Precautions should be taken if winter construction is considered for this project.

In the event of construction during below zero temperatures, the founding stratum should be protected from freezing temperatures by the use of straw, propane heaters, tarpaulins or other suitable means. In this regard, the base of the excavations should be insulated from sub-zero temperatures immediately upon exposure and until such time as heat is adequately supplied to the building and the footings are protected with sufficient soil cover to prevent freezing at founding level.

The trench excavations should be carried out in a manner that will avoid the introduction of frozen materials into the trenches. As well, pavement construction is difficult during winter. The subgrade consists of frost susceptible soils which will experience total and differential frost heaving as the work takes place. In addition, the introduction of frost, snow or ice into the pavement materials, which is difficult to avoid, could adversely affect the performance of the pavement structure. Additional information could be provided, if required.

6.7 Corrosion Potential and Sulphate

The results of analytical testing show that the sulphate content is less than 0.1%. The results are indicative that Type 10 Portland Cement would be appropriate for this site. The chloride content and the pH of the sample indicate that they are not significant factors in creating a corrosive environment for exposed ferrous metals at this site, whereas the resistivity in indicative of a moderate to slightly aggressive corrosive environment.

7.0 Recommendations

It is a requirement for the foundation design data provided herein to be applicable that the following material testing and observation program be performed by the geotechnical consultant.

- ❑ Review and inspection of the installation of the foundation drainage and waterproofing systems.
- ❑ Observation of all bearing surfaces prior to the placement of concrete.
- ❑ Sampling and testing of the concrete and fill materials used.
- ❑ Periodic observation of the condition of unsupported excavation side slopes in excess of 3 m in height, if applicable.
- ❑ Observation of all subgrades prior to backfilling.
- ❑ Field density tests to determine the level of compaction achieved.
- ❑ Sampling and testing of the bituminous concrete including mix design reviews.

A report confirming that these works have been conducted in general accordance with our recommendations could be issued, upon request, following the completion of a satisfactory material testing and observation program by the geotechnical consultant.

8.0 Statement of Limitations

The recommendations provided in this report are in accordance with our present understanding of the project. We request permission to review our recommendations when the drawings and specifications are completed.

A geotechnical investigation of this nature is a limited sampling of a site. Should any conditions at the site be encountered which differ from those at the test locations, we request immediate notification to permit reassessment of our recommendations.

The recommendations provided herein should only be used by the design professionals associated with this project. They are not intended for contractors bidding on or undertaking the work. The latter should evaluate the factual information provided in this report and determine its suitability and completeness for their intended construction schedule and methods. Additional testing may be required for their purposes.

The present report applies only to the project described in this document. Use of this report for purposes other than those described herein or by person(s) other than TC United Development or their agents is not authorized without review by Paterson Group for the applicability of our recommendations to the altered use of the report.

Paterson Group Inc.

LICENSED PROFESSIONAL ENGINEER
Aug. 31, 2023
M. SALEH
100507739
PROVINCE OF ONTARIO

Yashar Ziaeimehr

Maha K. Saleh, P.Eng.

Report Distribution:

- ❑ TC United Development (e-mail copy)
- ❑ Paterson Group (1 copy)

APPENDIX 1

SOIL PROFILE AND TEST DATA SHEETS

SYMBOLS AND TERMS

ANALYTICAL TESTING RESULTS

patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. Multi-Storey Building - 294-300 Tremblay Road
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY CME-55 Low Clearance Drill

DATE July 7, 2020

FILE NO. PG5407

HOLE NO. BH 1

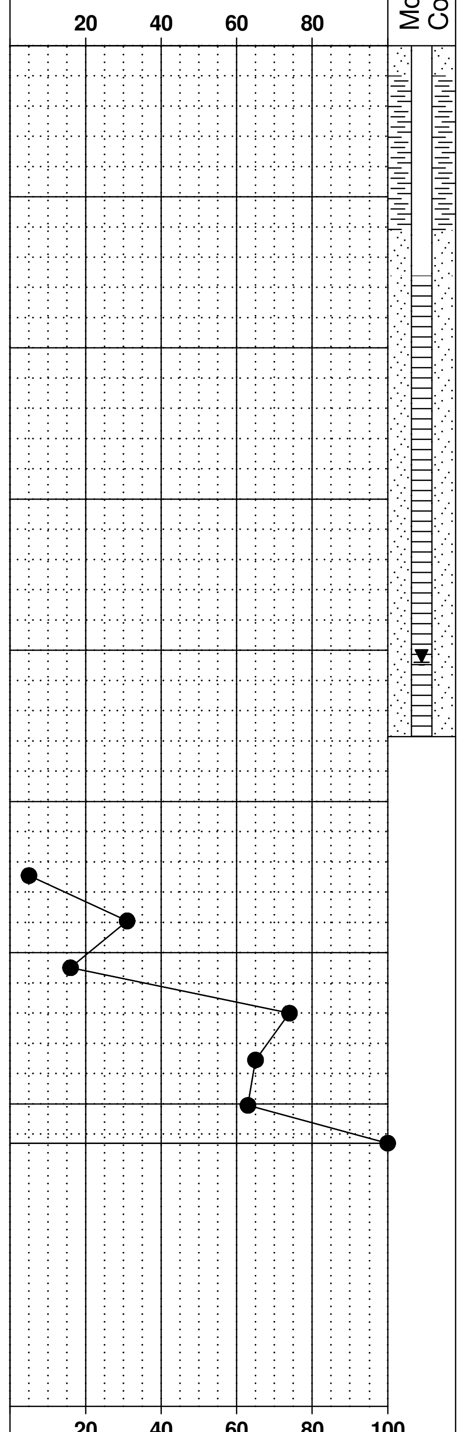
SOIL DESCRIPTION	Depth to base (m)	SAMPLE TYPE	NUMBER	% RECOVERY	N VALUE or RQD
GROUND SURFACE					
Asphaltic concrete	0.08				
FILL: Brown silty clay, trace sand, gravel and wood	0.51	AU	1		
FILL: Brown silty clay to clayey silt, trace sand - trace gravel by 1.5m depth	2.29	SS	2	54	8
		SS	3	67	7
Stiff, brown **CLAYEY SILT**	2.90	SS	4	71	11
Compact, grey **SANDY SILT**	3.66	SS	5	58	11
GLACIAL TILL: Grey sandy silt with gravel, cobbles and boulders	5.18	SS	6	46	6
		SS	7	42	2
Dynamic Cone Penetration Test commenced at 5.18m depth. Inferred **GLACIAL TILL**	7.26				
End of Borehole Practical DCPT refusal at 7.26m depth (GWL @ 4.08m - July 16, 2020)					

DEPTH (m)	ELEV. (m)
0	65.92
1	64.92
2	63.92
3	62.92
4	61.92
5	60.92
6	59.92
7	58.92

Pen. Resist. Blows/0.3m
● 50 mm Dia. Cone

○ Water Content %

Monitoring Well Construction



Shear Strength (kPa)

▲ Undisturbed △ Remoulded

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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. Multi-Storey Building - 294-300 Tremblay Road
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY CME-55 Low Clearance Drill

DATE July 7, 2020

FILE NO. PG5407

HOLE NO. BH 2

SOIL DESCRIPTION	Depth to base (m)	SAMPLE TYPE	NUMBER	% RECOVERY	N VALUE or RQD
GROUND SURFACE					
Asphaltic concrete	0.10				
FILL: Brown silty sand with gravel	0.56	AU	1		
FILL: Brown silty clay, trace sand	2.13	SS	2	33	6
		SS	3	79	7
Stiff, brown **CLAYEY SILT,** trace sand	3.05	SS	4	58	13
Loose to very loose, brown **SANDY SILT** - grey by 3.8m depth	4.42	SS	5	50	10
		SS	6	75	10
GLACIAL TILL: Compact, grey sandy silt with gravel, cobbles and boulders	6.70	SS	7	62	10
		SS	8	58	10
		SS	9	33	19
End of Borehole					
(GWL @ 4.15m - July 16, 2020)					

DEPTH (m)	ELEV. (m)
0	65.96
1	64.96
2	63.96
3	62.96
4	61.96
5	60.96
6	59.96

Pen. Resist. Blows/0.3m
● 50 mm Dia. Cone

○ Water Content %

20 40 60 80

Monitoring Well Construction

20 40 60 80 100
Shear Strength (kPa)
▲ Undisturbed △ Remoulded

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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. Multi-Storey Building - 294-300 Tremblay Road
Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY CME-55 Low Clearance Drill

DATE July 7, 2020

FILE NO. PG5407

HOLE NO. BH 3

SOIL DESCRIPTION	Depth to base (m)	SAMPLE TYPE	NUMBER	% RECOVERY	N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	65.70
Asphaltic concrete	0.10						
FILL: Brown silty clay, trace sand and gravel	2.29	AU	1				
		SS	2	29	6	1	64.70
		SS	3	38	8	2	63.70
Stiff, brown **CLAYEY SILT**	3.63	SS	4	62	4		
		SS	5	54	14	3	62.70
Loose, grey **SANDY SILT**	5.33	SS	6		6	4	61.70
		SS	7	50	7	5	60.70
GLACIAL TILL: Compact, grey sandy silt with gravel, cobbles and boulders	6.70	SS	6	75	17		
		SS	7	22	22	6	59.70

End of Borehole

(GWL @ 3.41m - July 16, 2020)

Pen. Resist. Blows/0.3m
● 50 mm Dia. Cone

○ Water Content %

20 40 60 80

Monitoring Well Construction

20 40 60 80 100
Shear Strength (kPa)
▲ Undisturbed △ Remoulded

SYMBOLS AND TERMS

SOIL DESCRIPTION

Behavioural properties, such as structure and strength, take precedence over particle gradation in describing soils. Terminology describing soil structure are as follows:

Desiccated	-	having visible signs of weathering by oxidation of clay minerals, shrinkage cracks, etc.
Fissured	-	having cracks, and hence a blocky structure.
Varved	-	composed of regular alternating layers of silt and clay.
Stratified	-	composed of alternating layers of different soil types, e.g. silt and sand or silt and clay.
Well-Graded	-	Having wide range in grain sizes and substantial amounts of all intermediate particle sizes (see Grain Size Distribution).
Uniformly-Graded	-	Predominantly of one grain size (see Grain Size Distribution).

The standard terminology to describe the strength of cohesionless soils is the relative density, usually inferred from the results of the Standard Penetration Test (SPT) 'N' value. The SPT N value is the number of blows of a 63.5 kg hammer, falling 760 mm, required to drive a 51 mm O.D. split spoon sampler 300 mm into the soil after an initial penetration of 150 mm.

Relative Density	'N' Value	Relative Density %
Very Loose	<4	<15
Loose	4-10	15-35
Compact	10-30	35-65
Dense	30-50	65-85
Very Dense	>50	>85

The standard terminology to describe the strength of cohesive soils is the consistency, which is based on the undisturbed undrained shear strength as measured by the in situ or laboratory vane tests, penetrometer tests, unconfined compression tests, or occasionally by Standard Penetration Tests.

Consistency	Undrained Shear Strength (kPa)	'N' Value
Very Soft	<12	<2
Soft	12-25	2-4
Firm	25-50	4-8
Stiff	50-100	8-15
Very Stiff	100-200	15-30
Hard	>200	>30

SYMBOLS AND TERMS (continued)

SOIL DESCRIPTION (continued)

Cohesive soils can also be classified according to their “sensitivity”. The sensitivity is the ratio between the undisturbed undrained shear strength and the remoulded undrained shear strength of the soil.

Terminology used for describing soil strata based upon texture, or the proportion of individual particle sizes present is provided on the Textural Soil Classification Chart at the end of this information package.

ROCK DESCRIPTION

The structural description of the bedrock mass is based on the Rock Quality Designation (RQD).

The RQD classification is based on a modified core recovery percentage in which all pieces of sound core over 100 mm long are counted as recovery. The smaller pieces are considered to be a result of closely-spaced discontinuities (resulting from shearing, jointing, faulting, or weathering) in the rock mass and are not counted. RQD is ideally determined from NXL size core. However, it can be used on smaller core sizes, such as BX, if the bulk of the fractures caused by drilling stresses (called “mechanical breaks”) are easily distinguishable from the normal in situ fractures.

RQD %	ROCK QUALITY
90-100	Excellent, intact, very sound
75-90	Good, massive, moderately jointed or sound
50-75	Fair, blocky and seamy, fractured
25-50	Poor, shattered and very seamy or blocky, severely fractured
0-25	Very poor, crushed, very severely fractured

SAMPLE TYPES

SS	-	Split spoon sample (obtained in conjunction with the performing of the Standard Penetration Test (SPT))
TW	-	Thin wall tube or Shelby tube
PS	-	Piston sample
AU	-	Auger sample or bulk sample
WS	-	Wash sample
RC	-	Rock core sample (Core bit size AXT, BXL, etc.). Rock core samples are obtained with the use of standard diamond drilling bits.

SYMBOLS AND TERMS (continued)

GRAIN SIZE DISTRIBUTION

MC%	-	Natural moisture content or water content of sample, %
LL	-	Liquid Limit, % (water content above which soil behaves as a liquid)
PL	-	Plastic limit, % (water content above which soil behaves plastically)
PI	-	Plasticity index, % (difference between LL and PL)
Dxx	-	Grain size which xx% of the soil, by weight, is of finer grain sizes These grain size descriptions are not used below 0.075 mm grain size
D10	-	Grain size at which 10% of the soil is finer (effective grain size)
D60	-	Grain size at which 60% of the soil is finer
Cc	-	Concavity coefficient = $(D30)^2$ / (D10 x D60)
Cu	-	Uniformity coefficient = D60 / D10

Cc and Cu are used to assess the grading of sands and gravels:
Well-graded gravels have: 1 < Cc < 3 and Cu > 4
Well-graded sands have: 1 < Cc < 3 and Cu > 6
Sands and gravels not meeting the above requirements are poorly-graded or uniformly-graded.
Cc and Cu are not applicable for the description of soils with more than 10% silt and clay (more than 10% finer than 0.075 mm or the #200 sieve)

CONSOLIDATION TEST

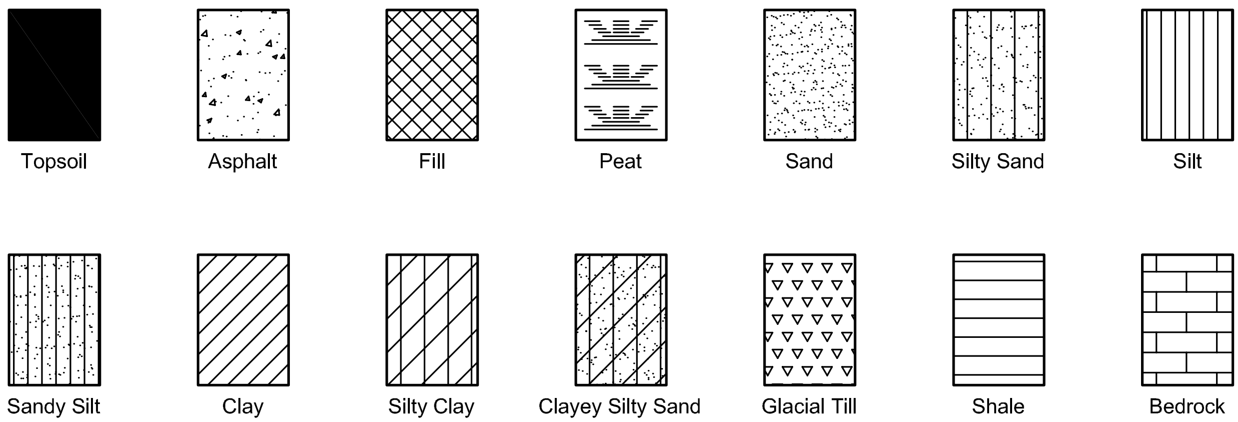
p'_o	-	Present effective overburden pressure at sample depth
p'_c	-	Preconsolidation pressure of (maximum past pressure on) sample
Ccr	-	Recompression index (in effect at pressures below p'_c)
Cc	-	Compression index (in effect at pressures above p'_c)
OC Ratio		Overconsolidaton ratio = p'_c / p'_o
Void Ratio		Initial sample void ratio = volume of voids / volume of solids
Wo	-	Initial water content (at start of consolidation test)

PERMEABILITY TEST

k	-	Coefficient of permeability or hydraulic conductivity is a measure of the ability of water to flow through the sample. The value of k is measured at a specified unit weight for (remoulded) cohesionless soil samples, because its value will vary with the unit weight or density of the sample during the test.

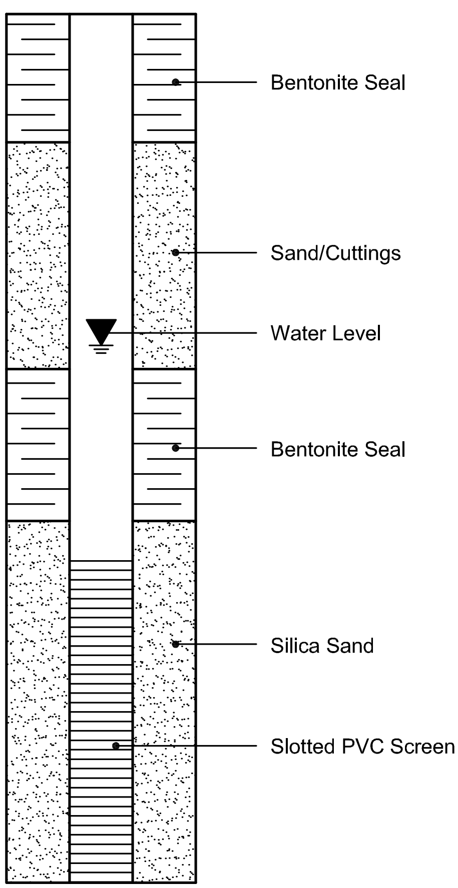
SYMBOLS AND TERMS (continued)

STRATA PLOT

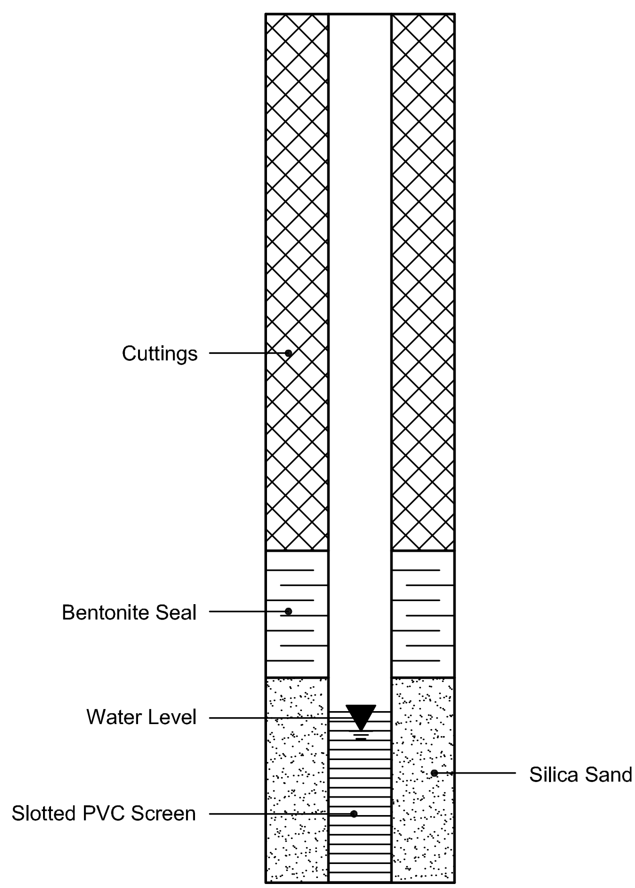


MONITORING WELL AND PIEZOMETER CONSTRUCTION

MONITORING WELL CONSTRUCTION



PIEZOMETER CONSTRUCTION



Certificate of Analysis

Client: Paterson Group Consulting Engineers

Client PO: 30335

Report Date: 14-Jul-2020

Order Date: 8-Jul-2020

Project Description: PG5407

	Client ID:	BH3-SS3	-	-	-
	Sample Date:	07-Jul-20 12:30	-	-	-
	Sample ID:	2028330-01	-	-	-
	MDL/Units	Soil	-	-	-
Physical Characteristics					
% Solids	0.1 % by Wt.	76.1	-	-	-
General Inorganics					
pH	0.05 pH Units	7.58	-	-	-
Resistivity	0.10 Ohm.m	12.9	-	-	-
Anions					
Chloride	5 ug/g dry	311	-	-	-
Sulphate	5 ug/g dry	66	-	-	-

APPENDIX 2

FIGURE 1 - KEY PLAN

DRAWING PG5407-1 – TEST HOLE LOCATION PLAN

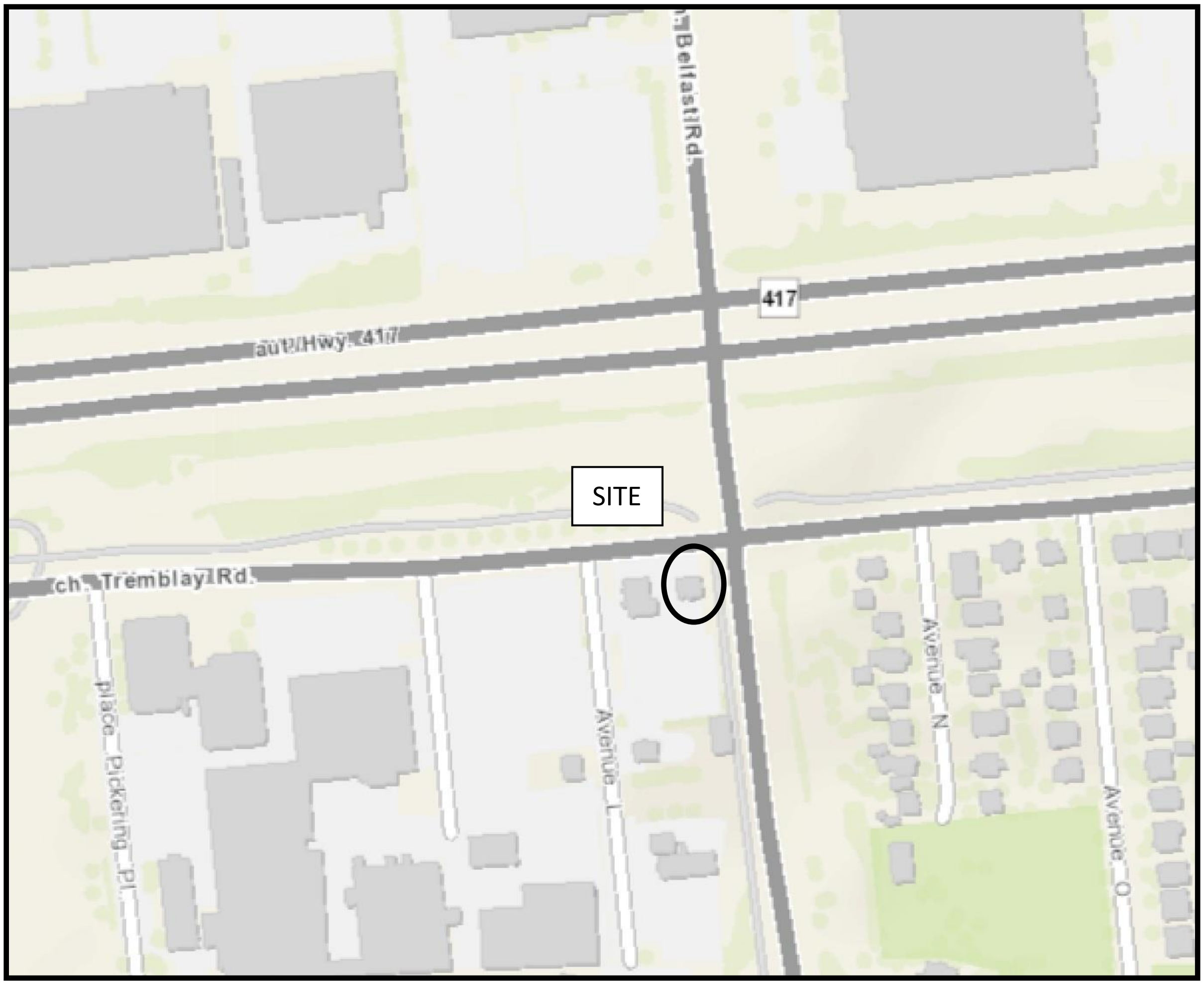
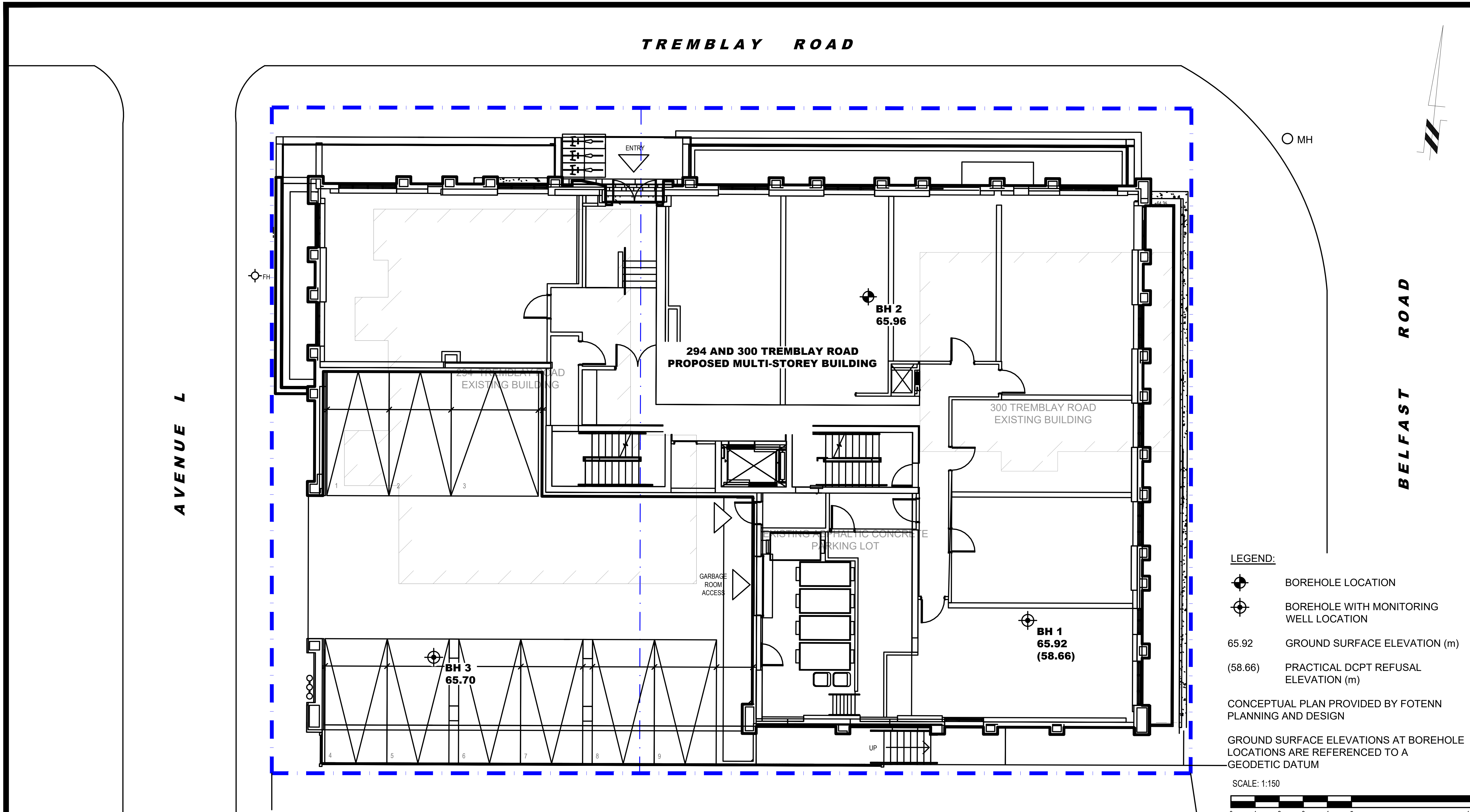


FIGURE 1

KEY PLAN

PATERSON GROUP



PATERSON GROUP

9 AURIGA DRIVE
OTTAWA, ON
K2E 7T9
TEL: (613) 226-7381

NO.	REVISIONS	DATE	INITIAL
1.	ADDED CONCEPTUAL PLAN	20/07/2023	YZ

TC UNITED DEVELOPMENT CORP.

GEOTECHNICAL INVESTIGATION

PROPOSED MULTI-STOREY BUILDING - 294 AND 300 TREMBLAY ROAD

OTTAWA, ONTARIO

Title:

TEST HOLE LOCATION PLAN

Scale: 1:150	Date: 07/2020
Drawn by: YA	Report No.: PG5407-1
Checked by: YT	Dwg. No.: PG5407-1
Approved by: FA	Revision No.: 1

p:\autocad drawings\geotechnical\pg54xx\pg5407\pg5407-1-test hole location plan (rev.01).dwg

APPENDIX C

Environmental Noise Control Study:

Paterson Group Report Number PG5406-1 Revision 1 Dated September 29, 2023

PATERSON GROUP

Environmental Noise Control Study
Proposed Multi-Storey Mixed-Use Building

294-300 Tremblay Road
Ottawa, Ontario

Prepared for TC United Development Corporation
c/o ZW Project Management

Report PG5406-1 Revision 1 dated September 29, 2023

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Appendix 2	STAMSON Results
Appendix 3	VIA Rail Train Count VIA Rail Correspondence O-Train Rail Train Count OLRT Schedule 15-2 Design and Construction Requirements – Part 2 Guideway
Appendix 4	Roof Plan Elevation Plans Exterior Wall and Typical Wall Construction Details

1.0 Introduction

Paterson Group (Paterson) was commissioned by ZW Project Management on behalf of TC United Development to conduct an environmental noise control study for the proposed multi-storey mixed-use apartment building to be located at 294 to 300 Tremblay Road, in the City of Ottawa.

The objectives of the current study are to:

- Determine the primary noise sources impacting the site and compare the projected sound levels to guidelines set out by the Ministry of Environment and Climate Change (MOECC) and the City of Ottawa.

- Review the projected noise levels and offer recommendations regarding warning classes, construction materials or alternative sound barriers.

The following report has been prepared specifically and solely for the aforementioned project which is described herein. It contains our findings and includes acoustical recommendations pertaining to the design and construction of the subject development as they are understood at the time of writing this report.

This study has been conducted according to City of Ottawa document – Engineering Noise Control Guidelines (ENCG), dated January 2016, and the Ontario Ministry of the Environment Guideline NPC-300.

2.0 Proposed Development

It is understood that the proposed development will consist of a six (6) storey mixed-use apartment building with one (1) basement level. The building will consist of 1 commercial unit and 100 residential units. The building will rise 20m above grade. Associated at-grade walkways, access lanes, and landscaped areas are further anticipated. Outdoor living area – rooftop amenity area is identified on the proposed site plan.

3.0 Methodology and Noise Assessment Criteria

The City of Ottawa outlines three (3) sources of environmental noise that must be analyzed separately:

- Surface Transportation Noise
- Stationary Noise
  - new noise-sensitive development applications (noise receptors) in proximity to existing or approved stationary sources of noise, and
  - new stationary sources of noise (noise generating) in proximity to existing or approved noise-sensitive developments
- Aircraft Noise

Surface Transportation Noise

Surface roadway traffic noise, equivalent to sound level energy L_{eq}, provides a measure of the time varying noise level over a period of time. For roadways, the L_{eq} is commonly calculated on the basis of 16-hour (L_{eq16}) daytime (07:00-23:00) and 8-hour (L_{eq8}) nighttime (23:00-7:00) split to assess its impact on residential, commercial and institutional buildings.

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

- Within 100 m of the right-of-way of an existing or proposed arterial, collector or major collector road; a light rail transit corridor; bus rapid transit, or transit priority corridor
- Within 250 m of the right-of-way for an existing or proposed highway or secondary rail line
- Within 300 m from the right of way of a proposed or existing rail corridor or a secondary main railway line
- Within 500 m of an existing 400 series provincial highway, freeway or principle main railway line.

The Environmental Noise Guidelines for Stationary and Transportation Sources – NPC-300 outlines the limitations of noise levels in relation to the location of the receptors. These can be found in the following tables:

Table 1 – Noise Level Limit for Outdoor Living Areas

Time Period	L_{eq} Level (dBA)
Daytime, 7:00-23:00	55

- Standard taken from Table 2.2a; Sound Level Limit for Outdoor Living Areas – Road and Rail

Table 2 – Noise Level Limits for Indoor Living Areas

Type of Space	Time Period	L_{eq} Level (dBA)	
		Road	Rail
General offices, reception areas, retail stores, etc.	Daytime 7:00-23:00	50	45
Theatres, places of worship, libraries, individual or semi-private offices, conference rooms, reading rooms, etc.	Daytime 7:00-23:00	45	40
Living/dining/den areas of **residences**, hospitals, nursing/retirement homes, schools, day-care centres	Daytime 7:00-23:00	45	40
Living/dining/den areas of **residences**, hospitals, nursing/retirement homes etc. (except schools or day-care centres)	Nighttime 23:00-7:00	45	40
Sleeping quarters of hotels/motels	Nighttime 23:00-7:00	45	40
Sleeping quarters of **residences**, hospitals, nursing/retirement homes, etc.	Nighttime 23:00-7:00	40	35

- Standards taken from Table 2.2b, Sound Level Limit for Indoor Living Areas – Road and Rail and Table 2.2c, Supplementary Sound Level Limits for Indoor Spaces – Road and Rail

Predicted noise levels at the pane of window dictate the action required to achieve recommended noise levels. It is noted in ENCG that the limits outlined in Table 2 are for the noise levels on the interior of the window glass pane. An open window is considered to provide a 10 dBA noise reduction, while a standard closed window is capable to provide a minimum 20 dBA noise reduction. The noise level limits of residential building are 45 dBA daytime and 40 dBA nighttime. Therefore, where noise levels exceed 55 dBA daytime and 50 dBA nighttime, the ventilation for the building should consider the provision for central air conditioning. Where noise levels exceed 65 dBA daytime and 60 dBA nighttime, central air conditioning will be required, and the building components will require higher levels of sound attenuation.

When the noise levels are equal to or less than the specified criteria, no noise attenuation (control) measures are required.

When the exceedance of the recommended noise level limits is between 1 dBA and 5 dBA for outdoor living areas (55 dBA < Leq ≤ 60 dBA), the proposed development can be completed with no noise control measures incorporated into the site, but the prospective purchasers / tenants should be made aware by suitable Warning Clauses. When the exceedance of recommended noise level limits is more than 5 dBA for outdoor living areas (Leq > 60 dBA), noise control measures are required to reduce Leq to below 60 dBA and as close as 55 dBA as it is technically and economically feasible.

Noise attenuation (control) measures include any or all of the following:

- Noise attenuation barrier
- Provisions for the installation of central air conditioning
- Central air conditioning
- Architectural components designed to provide additional acoustic insulation

In addition to the implementation of noise attenuation features, if required, the following Warning Clauses may be recommended to advise the prospective purchasers / tenants of affected units of potential environmental noise problem:

Table 3 – Warning Clauses for Outdoor Living Areas

Leq (dBA)	Warning Clause	Description
55 dBA < $L_{eq(16)}$ ≤ 60 dBA	Warning Clause Type A	"Purchasers/tenants are advised that sound levels due to increasing road traffic (rail traffic) (air traffic) may occasionally interfere with some activities of the dwelling occupants as the sound levels exceed the sound level limits of the Municipality and the Ministry of the Environment."
60 dBA < $L_{eq(16)}$	Warning Clause Type B	"Purchasers/tenants are advised that despite the inclusion of noise control features in the development and within the building units, sound levels due to increasing road traffic (rail traffic) (air traffic) may on occasions interfere with some activities of the dwelling occupants as the sound levels exceed the sound level limits of the Municipality and the Ministry of the Environment."

- Clauses taken from section C8 Warning Clauses; Environmental Noise Guidelines for Stationary and Transportation Sources - NPC-300

Table 4 – Warning Clauses for Indoor Living Areas

Leq (dBA)	Warning Clause	Description
55 dBA < $L_{eq(16)}$ ≤ 65 dBA 50 dBA < $L_{eq(8)}$ ≤ 60 dBA	Warning Clause Type C	"This dwelling unit has been designed with the provision for adding central air conditioning at the occupant's discretion. Installation of central air conditioning by the occupant in low and medium density developments will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the sound level limits of the Municipality and the Ministry of the Environment."
65 dBA < $L_{eq(16)}$ 60 dBA < $L_{eq(8)}$	Warning Clause Type D	"This dwelling unit has been supplied with a central air conditioning system which will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the sound level limits of the Municipality and the Ministry of the Environment."

- Clauses taken from section C8 Warning Clauses; Environmental Noise Guidelines for Stationary and Transportation Sources - NPC-300

Stationary Noise

Stationary noise sources include sources or facilities that are fixed or mobile and can cause a combination of sound and vibration levels emitted beyond the property line. These sources may include commercial air conditioner units, generators, and fans. Facilities that may contribute to stationary noise may include car washes, snow disposal sites, transit stations and manufacturing facilities.

The subject site is not in proximity to existing or approved stationary sources of noise. Therefore, a stationary noise analysis will not be required.

Aircraft / Airport Noise

The subject site is not located within the Airport Vicinity Development Zone. Therefore this project will not require an aircraft/airport noise analysis. No warning clauses regarding aircraft or airport noise will be required.

4.0 Methodology and Vibration Assessment Criteria

Due to the locations of the existing VIA-Train Railway Alexandria-Ottawa Corridor, O-train Railway Confederation Line, and O-train Railway Maintenance and Storage Facility (MSF) Connector Tunnel, a ground vibration and ground-borne noise review was also performed for this building.

Effects of the Rail Corridor on the Proposed Development

The human body can be affected by exposure to vibration, in particular ground-borne vibrations occurring at low frequencies. These can be caused by the surrounding vibration sources previously identified, such as wheels on a road or rail system. These ground-borne vibrations can cause the building to shake (ground-borne vibration) and/or cause rumbling sounds (ground-borne noise).

The methods of defining and measuring vibrations has its own challenges, based on the oscillatory motion identified as a vibration. Due to the nature of the oscillatory motion of the vibration, there is no net movement of the vibration element, and therefore motion descriptors are zero.

There are two (2) main methods of defining the magnitude of the overall vibration. The main one utilized in construction activities is the peak particle velocity (PPV). The PPV is defined as the maximum instantaneous positive or negative peak of the vibration signal and is often used when monitoring blasting vibrations and is ideal for evaluating the potential for building damage.

However, human responses require a different method of analysis as the human body requires time to respond to vibration signals. The average vibration amplitude would be an applicable method of reporting the ground-borne vibrations that humans would respond to, however, with the vibration being represented as a sine wave, the average vibration amplitude would be zero. Therefore, the root mean square (RMS) amplitude, typically calculated over a 1 second interval, is utilized for the analysis. The RMS value is always less than the PPV.

General factors that could affect the magnitude of the created vibrations include, but are not limited to, whether the rail is above grade or below grade, speed, vehicle suspension, wheel and track condition, track support system, depth of system and soil conditions. It should be noted that vibrations that travel through the bedrock surface should be minimal, but can travel a further distance.

The Federal Transit Administration's Transit Noise and Vibration Impact Assessment Manual: FTA Report No. 0123 dated September 2018 outlines the vibration standards caused by rail sources. Upon review of this document, the following standards were obtained that are applicable to this analysis.

Screening distances are set based on land-use categories and the type of project vehicles. VIA-Train Railway Alexandria-Ottawa Corridor is considered Locomotive Powered Passenger or Freight Vehicle, and O-Train Railway Confederation Line and O-Train Railway MSF Connector Tunnel are considered Rapid Transit or Light Rail Vehicle. The proposed building would be classified as a Vibration Category 2 - Residential. Therefore, the screening distance is 61 metres (200 ft) for Locomotive Powered Vehicle and 46 metres (150 ft) for Light Rail Vehicle. Vibration assessment is required only when the proposed building is located within the screening distance from the railway.

The criteria for the environmental impact from vibrations are based on the RMS vibration levels for repeated events. The proposed building would be classified as a Vibration Category 2 - Residential. The following table outlines the limits for ground-borne vibrations.

Table 5 - Ground-Borne Vibration (GBV) for General Assessment

Land Use Category	GBV Impact Levels (VdB re 1 micro-inch/sec)		
	Frequent Events	Occasional Events	Infrequent Events
Category 2	72 VdB	75 VdB	80 VdB

Notes:
- Standards taken from Table 6.3; Indoor Ground-Borne Vibration and Ground-Borne Noise Impact Criteria for General Vibration Assessment.
- Frequent events is defined as more than 70 vibration events of the same source per day. Most rapid transit projects fall into this category.
- Occasional events is define as between 30 and 70 vibration events of the same source per day. Most commuter trunk lines have this many operations.
- Infrequent events is defined as fewer than 30 vibration events of the same kind per day. This category includes most commuter rail branch lines.

Ground-borne vibration can also result in ground-borne noise. This is separate from the noise caused by the trains directly, and instead focuses on the vibration of objects to emit noise. Similar to ground-borne vibration, the noise impacts are based on a criteria for human annoyance and activity interference. For residential buildings, the criteria for acceptability is given in the table on the following page:

Table 6 - Ground-Borne Noise (GBN) for General Assessment

Land Use Category	GBN Impact Levels (dBA re 20 micro Pascals)		
	Frequent Events	Occasional Events	Infrequent Events
Category 2	35 dBA	38 dBA	43 dBA

Notes:
- Standards taken from Table 6.3; Indoor Ground-Borne Vibration and Ground-Borne Noise Impact Criteria for General Vibration Assessment.
- Frequent events is defined as more than 70 vibration events of the same source per day. Most rapid transit projects fall into this category.
- Occasional events is define as between 30 and 70 vibration events of the same source per day. Most commuter trunk lines have this many operations.
- Infrequent events is defined as fewer than 30 vibration events of the same kind per day. This category includes most commuter rail branch lines.

5.0 Analysis

Surface Transportation Noise

The proposed development is bordered to the north by Tremblay Road followed by a rail corridor and Highway 417, to the east by Belfast Road followed by an underground rail connector tunnel, residential dwellings, and roadways, to the west by a parking lot, commercial buildings, and roadways, and to the south by residential dwellings, commercial buildings, and a rail corridor. Tremblay Road, Belfast Road, Avenue N, Avenue L, and Avenue K are identified within the 100 m radius of the proposed building.

Based on the City of Ottawa Official Plan, Schedule C4, Tremblay Road is considered a 2-lane major collector road (2-UMCU). The section of Belfast Road north of Tremblay Road is also considered a 2-lane major collector road (2-UMCU). The section of Belfast Road south of Tremblay Road is considered a 2-lane urban collector road (2-UCU). All other roads within the 100 m radius are not classified as either arterial, collector or major collector roads and are therefore not included in this study. Additionally, the 4-lane Highway 417 Westbound, 4-lane Highway 417 Eastbound are located within the 500 m radius of the proposed building.

The VIA-Train Railway Alexandria-Ottawa Corridor and O-Train Railway Confederation Line are identified within 300 m of the proposed development. It is understood that the Alexandria-Ottawa Corridor is used by VIA-Train Rail, and Confederation Line is used by O-Train Rail. The volume of trains along the VIA rail line is provided in the email discussion with Mr. Paul Charbachi, P.Eng. of VIA Rail Canada. Based on a phone discussion with OC Transpo personnel, the method to determine the volume of trains along the rail line is to count the number of departures off of the rail schedules. The copies of train schedules are included in Appendix 3. It was further confirmed by VIA Rail Canada and OC Transpo, respectively, that each VIA train consists of two diesel locomotives pulling 8 cars and each O-train consists of an electronic locomotive pulling 1 car. An email confirming the Alexandria-Ottawa Rail Line information is included in Appendix 3.

The O-Train Railway MSF Connector Tunnel is also located within 300 m of the proposed building. It is understood that the MSF Connector Tunnel is a bored railway located below ground surface and therefore a surface transportation noise assessment is not required for the MSF Connector Tunnel.

All noise sources are presented in Drawing PG5406-3 - Site Geometry, located in Appendix 1.

The noise levels from road traffic are provided by the City of Ottawa, taking into consideration the right-of-way width and the implied roadway class. It is understood that these values represent the maximum allowable capacity of the proposed roadways. The parameters to be used for sound level predictions can be found below.

Table 7 – Traffic and Road Parameters

Road	Implied Roadway	AADT (Veh/day)	Posted Speed (km/h)	Day/Night Split %	Medium Truck %	Heavy Truck %
Highway 417 Eastbound	4-Queensway	73,332	100	92/8	7	5
Highway 417 Westbound	4-Queensway	73,332	100	92/8	7	5
Tremblay Road	2-UMCU	12,000	50	92/8	7	5
Belfast Road (North of Tremblay Road)	2-UMCU	12,000	50	92/8	7	5
Belfast Road (South of Tremblay Road)	2-UCU	8,000	50	92/8	7	5

➢ Data obtained from the City of Ottawa document ENCG

Table 8 - Rail Parameters - Daytime (0700-2300)

Rail Line	Engine Type	Maximum Speed (km/hr)	Number of Trips/day	Length of Train
VIA Train Rail	Diesel	160	16	10
O-Train Rail	Electric	80	352	2

Table 9 - Rail Parameters - Daytime (2300-0700)

Rail Line	Engine Type	Maximum Speed (km/hr)	Number of Trips/day	Length of Train
VIA Train Rail	Diesel	160	0	10
O-Train Rail	Electric	80	58	2

Three (3) levels of reception points were selected for this analysis. The following elevations were selected from the heights provided on the building elevation plans for the subject building.

Table 10 – Elevations of Reception Points			
Floor Number	**Elevation at Centre of Window (m)**	**Floor Use**	**Daytime / Nighttime Analysis**
First Floor	1.5	Living Area/Bedroom	Daytime / Nighttime
Sixth Floor	18.0	Living Area/Bedroom	Daytime / Nighttime
Rooftop Amenity Area	21.5	--	Outdoor Living Area

For this analysis, a reception point was taken at the centre of each floor, at the first floor and top floor. Outdoor living area – rooftop amenity area is anticipated at the proposed building. Reception points are detailed on Drawing PG5406-2 - Receptor Locations presented in Appendix 1.

All horizontal distances have been measured from the reception point to the edge of the right-of-way. The highway was analyzed where it intersected the 500 m buffer zone, the rail lines were analyzed where they intersected the 300 m buffer zone, and the roadways were analyzed where they intersected the 100 m buffer zone, which are reflected in the local angles described in Paterson Drawings PG5406-3A to 3E - Site Geometry in Appendix 1.

Table 12 - Summary of Reception Points and Geometry, located in Appendix 1, provides a summary of the points of reception and their geometry with respect to the noise sources. The analysis is completed so that no effects of sound reflection off of the building facade are considered, as stipulated by the ENGC.

The analysis was completed using STAMSON version 5.04, a computer program which uses the road and rail traffic noise prediction methods using ORNAMENT (Ontario Road Noise Analysis Method for Environment and Transportation) and STEAM (Sound from Trains Environment Analysis Method), publications from the Ontario Ministry of Environment and Energy.

The subject site is generally levelled and at grade with the neighbouring roads within the 500 m radius.

Ground-borne vibration assessment is required for the O-Train Railway MSF Connector Tunnel. However, it is noted that the distance between the VIA Railway Alexandria-Ottawa Corridor and the proposed building is 240 m (787 ft), and the distance between the O-Train Railway Confederation Line and the proposed building is 50 m (164 ft). These two distances are greater than the screening distances specified in The Federal Transit Administration's Transit Noise and Vibration Impact Assessment Manual. Therefore, ground-borne vibration assessment is not required for these two railways.

Ground-Borne Noise and Vibration

Details of rail traffic along the O-Train Railway MSF Connector Tunnel are available in the Ottawa Light Rail Transit (OLRT) Project document – Schedule 15-2 Design and Construction.

The O-Train Railway MSF Connector Tunnel is located along the eastern property line. Schedule 15-2, Part 2, Article 2 states that the maximum train speed is designed to be 30 km/hr (19 mph). The train frequency is not provided in Schedule 15-2. Based on the correspondence with City of Ottawa official, the train frequency at MSF Connector Tunnel is approximated to be the same as the train frequency between St. Laurent station to Tremblay station, which is 410 trains a day. It is understood that there will be a 30 m (98 ft) buffer zone from the centerline of MSF Connector Tunnel to the closest possible location of the proposed building.

The following figure is a base curve for ground surface vibration levels, assuming the equipment is in good condition and speeds of 80 km/hr (50 mph). Due to the nature of the Rail Line, identified as rapid transit vehicle, this figure is applicable for the proposed building.

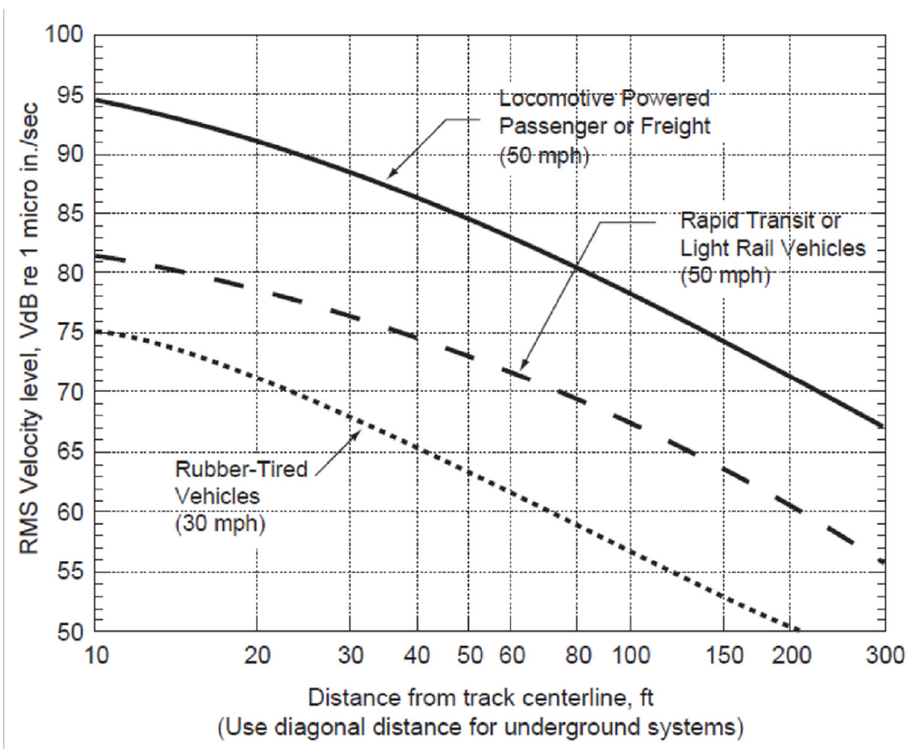


Figure 1 – Generalized Ground Surface Vibration Curve

Figure 1 provides the generalized ground surface vibration curve, but adjustments, noted in Tables 6-11, 6-12 and 6-13 of the Transit Noise and Vibration Impact Assessment, can be made to the ground-borne vibration parameters. The most common adjustments are noted below:

Speed:	Vehicle speed - 30 km/hr (19 mph)	-8.4 dB
Vehicle Parameter:	Stiff primary suspension	+8 dB
Track Treatments:	Ballast mats	-10 dB
	High-resistence fasteners	-5 dB
	Resiliently supported ties	-10 dB
Track Structure:	Bored subway tunnel in soil; Station	-5 dB
	Bored subway tunnel in soil; Cut and Cover	-3 dB
	Bored subway tunnel in soil; Rock-based	-15 dB
Ground-borne Propagation Effects:		
Geologic Conditions:	in Soil	+10 dB
	in Rock layer (50 ft bgs.)	+2 dB
Building Foundation:	1-2 Storey Masonry	-7 dB
	3-4 Storey Masonry	-10 dB
	Large Masonry on Spread Footings	-13 dB
	Foundation in rock	0 dB
Floor-to-Floor Attenuation:	1 to 5 Floors above Grade	-2 dB/Floor
	5 to 10 Floors above Grade	-1 dB/Floor
Amplification due to Resonances:		+6 dB

Details of track treatment are available in Schedule 15-2, Part 2, Article 3.
From the review of document, the following conditions were confirmed:

Vehicle speed - 30 km/hr (19 mph)
Soft Primary Suspension (resonance around 8-10 Hz)
Applied track treatment: Ballast Mats
No track treatment: Floating slab trackbed
No track treatment: High resilience fasteners
No track treatment: Resiliently supported ties
No Worn or Corrugated Track
Track is a bored subway tunnel in soil

From a review of the geotechnical founding conditions and the proposed building, the following conditions were confirmed:

No bedrock within 10 m below ground surface
Proposed building to be founded on compacted sandy silt and/or glacial till
The rail line to be constructed on (assumed) glacial till and/or bedrock
Proposed building to be 6-storey masonry with 1-storey basement

6.0 Results

Surface Transportation Noise

The primary descriptors are the 16-hour daytime (7:00-23:00) and the 8-hour nighttime (23:00-7:00) equivalent sound levels, $L_{eq(16)}$ and $L_{eq(8)}$ for City roads.

The exterior noise levels due to roadway traffic sources were analyzed with the STAMSON version 5.04 software at all reception points. The input and output data of the STAMSON modeling can be found in Appendix 2, and the summary of the results can be found in Table 11.

Table 11: Exterior Noise Levels due to Roadway Traffic Sources

Reception Point	Height Above Grade (m)	Receptor Location	Daytime $L_{eq(16)}$ (dBA)	Nighttime $L_{eq(8)}$ (dBA)
REC 1-1	1.5	Northern Elevation, 1st Floor	71	64
REC 1-6	18.0	Northern Elevation, 6th Floor	75	68
REC 2-1	1.5	Eastern Elevation, 1st Floor	69	61
REC 2-6	18.0	Eastern Elevation, 6th Floor	72	64
REC 3-1	1.5	Southern Elevation, 1st Floor	56	48
REC 3-6	18.0	Southern Elevation, 6th Floor	58	50
REC 4-1	1.5	Western Elevation, 1st Floor	67	59
REC 4-6	18.0	Western Elevation, 6th Floor	71	64
REC 5	21.5	Rooftop Amenity Area	62	--

Ground-Borne Noise and Vibration

Based on the site proximity to the rail line, the closest location of proposed building was selected for the analysis at 30 m (98'). Therefore, based on Figure 1, the ground-borne vibration before adjustments will be 68 VdB. The following adjustments are to be applied for this baseline calculation:

vehicle speed of 30 km/hr:	-8.4 dB
track treatment of ballast mats:	-10 dB
efficient propagation in soil:	+10 dB
construction of a 6-storey masonry:	-13 dB for coupling loss; -2 dB/floor for the propagation from 1 to 5 floors above grade and -1 dB/floor for the propagation from 5 to 6 floors above grade; +6 dB for the floor amplification

The result in the estimated ground-borne vibration will range between 53 VdB and 42 VdB, respectively, for the receivers at the basement floor and the sixth floor of proposed building. These values are below the 72 VdB for frequent event that is specified by the FTA and outlined in Table 5. Therefore, the ground-borne vibration satisfies the industry standards for residential uses at the proposed building.

Ground-borne noise is a common concern for buildings in close proximity to a rail line. The vibration of the transit structure excites the adjacent ground, creating vibration waves that propagate through the subsurface materials, and into the foundation of neighbouring buildings. This vibration will then be transferred throughout the building, often at the resonance frequency of the various components of the building. This ground-borne vibration of floors and walls may cause items to rattle, or it may manifest itself as a rumble, defined as ground-borne noise.

A conservative conversion from ground-borne vibration to ground-borne noise noted in Table 6-14 of the Transit Noise and Vibration Impact Assessment, can be made to the adjusted ground-borne vibration parameters. The conversion is as follow:

Low frequency (<30 Hz): -50 dB
Typical (peak 30 to 60 Hz): -35 dB
High frequency (>60 Hz): -20 dB

The proposed building will be founded on compacted sandy silt and/or glacial till, and the railway is assumed to be founded on glacial till and/or bedrock. Therefore, the peak frequency of ground vibration will be of low frequency (<30 Hz). The conservation from ground-borne vibration to ground-borne noise will result in an estimated ground-borne noise of 3 dB and 0 dB, respectively, for the receivers at the basement floor and the sixth floor of proposed building. These are below the 35 dBA for frequent event that is specified by the FTA and outlined in Table 6. Therefore, the ground-borne noise satisfies the industry standards for residential uses at the proposed building.

7.0 Discussion and Recommendations

7.1 Outdoor Living Areas

Outdoor living area – rooftop amenity area is anticipated at the proposed building. One receptor (REC 5) was selected in the centre of rooftop amenity area, 21.5 m. It is assumed that the rooftop amenity area will only be utilized as an outdoor living area provided that the proposed building is constructed. Based on the roof plan and the elevation plans presented in Appendix 4, it was understood that the stairwell and mechanical housing will be located on the northern part of the building rooftop, providing a noise shielded area for the rooftop amenity area. With the consideration of the stairwell and mechanical housing as a noise shielded zone, the proposed noise level at the rooftop amenity area will be 62 dBA, which exceeds the 55 dBA threshold value specified by the ENCG. Therefore, noise attenuation feature is required to reduce the noise level at the rooftop amenity area.

Upon review of the aforementioned result for the proposed building, a noise attenuation feature consisting of a 1 m high solid railing that will extend around the rooftop perimeter was considered. The 1 m high solid railing, in addition to utilizing the exteriors of the buildings as noise barriers, were completed as REC 5TR which is included in Appendix 2. The result of STAMSON modeling indicates that the combination of the application of exterior cladding and the 1 m high noise barrier could reduce the anticipated noise level at rooftop amenity area to 58 dBA during the daytime period (7:00-23:00), which slightly exceeds the 55 dBA threshold value specified by the ENCG. This exceedance is acceptable provided that a Warning Clause Type A is included on all deeds of sale.

7.2 Indoor Living Areas and Ventilation

The results of the STAMSON modeling indicate that the noise levels at proposed building will range between 56 dBA and 75 dBA during the daytime period (07:00-23:00) and between 48 dBA and 68 dBA during the nighttime period (23:00-07:00). The noise levels on the northern, western, southern, and eastern elevations of proposed building will exceed the limit for the exterior of the pane of glass (55 dBA) specified by the ENCG. It is also noted that the noise levels on the northern, western, and eastern elevations will exceed 65 dBA. Therefore, all units of proposed building should be supplied with a central air conditioning unit, along with the warning clause Type D, as outlined in Table 3.

This building does exceed the 65 dBA threshold for noise on the northern, western, and eastern elevations. Therefore, an analysis of the building materials is required. Based on the exterior wall and typical wall construction details received from the client, it is understood that the exterior cladding will consist of brick veneer on the first and second floor, and fibre cement panel on the third, fourth, fifth, and sixth floor. The brick veneer will consist of 90 mm brick, 25 mm air space, mortar dropping control, 102 mm semi-rigid board insulation, self-adhering air moisture barrier membrane, 13 to 16 mm glass-mat gypsum sheathing, and 13 to 16 mm Type X gypsum board. Fibre cement panel cladding will consist of 13 mm fibre cement panels, 22 mm sub-girts, 102 mm semi-rigid board insulation, 102 mm z-girts @ 400 mm O.C. MAX, self-adhering air moisture barrier membrane, 13 to 16 mm glass-mat gypsum sheathing, and 13 to 16 mm Type X gypsum board. The analysis for the acoustical properties of the proposed building was completed with all windows consisting of double pane glass, and the exterior cladding consisting of brick veneer on the first and second floor, and fibre cement panel on the third, fourth, fifth, and sixth floor. If alternative construction materials are proposed, a review will be required.

The exterior wall and typical wall construction details are presented in Appendix 4.

Proposed Construction Specifications

It is understood that typical window and wall details are proposed for the residential buildings. The effectiveness of the noise insulation can be expressed as the Acoustical Insulation Factor (AIF), calculated as follows:

$$AIF = L_{eq(16)(Exterior)} - L_{eq(16)(Interior)} + 10\log_{10}(N) + 2 \text{ dBA}$$

Where:

$L_{eq(16)(Exterior)}$ = Calculated value at the window pane
$L_{eq(16)(Interior)}$ = 45 dBA
N = number of components in the room

No floor plans or detailed design drawings were provided for this portion of the review. A conservative approach is to assume that there are 2 components per room. Therefore, the AIF would need to be at least 35 dBA.

A conversion from AIF to a Standard Transmission Class (STC) rating will require the knowledge of room dimensions in addition to the wall and window dimensions. However, a conservative approach would be to increase the AIF factor by 3. **Therefore, provided the building materials of either the windows and/or exterior walls have an STC rating of 38 or higher, this would be a sufficient noise attenuation device.**

Exterior wall and typical wall construction details have been provided to Paterson and are included in Appendix 4. A review of these details indicate that the exterior cladding will consist of brick veneer on the first and second floor, and fibre cement panel on the third, fourth, fifth, and sixth floor. A review of these construction materials indicates that the exterior cladding exceeds the STC rating of 38 and is suitable for proposed noise attenuation. If alternative construction materials are proposed, a review will be required.

8.0 Summary of Findings

The subject site is located at 294 to 300 Tremblay Road, in the City of Ottawa. It is understood that the proposed development will consist of a six (6) storey mixed-use apartment building with one (1) basement level. The building will rise 20 metres above grade. There are six major sources of surface transportation noise to the proposed building: 4-lane Highway 417 Westbound, 4-lane Highway 417 Eastbound, Tremblay Road, Belfast Road, VIA-Train Railway Alexandria-Ottawa Corridor, and O-Train Railway Confederation Line. It is noted that O-Train Railway Maintenance and Storage Facility (MSF) Connector Tunnel is a bored subway tunnel. Therefore, the MSF Connector Tunnel is not a major source of surface transportation noise.

Ground-borne vibration and noise assessment is required for O-Train Railway MSF Connector Tunnel. However, VIA-Train Railway Alexandria-Ottawa Corridor and O-Train Railway Confederation Line are located at distances greater than the screening distances specified in The Federal Transit Administration's Transit Noise and Vibration Impact Assessment Manual. Therefore, ground-borne vibration and noise assessment is not required for these two railways.

Several reception points were selected for the analysis, consisting of pane of glass reception points on both the first and top level of proposed building. The anticipated ground-borne vibrations for the receivers at the first floor and the sixth floor are below the 72 VdB threshold for frequent event that is specified by the FTA. The anticipated ground-borne noises for the receivers at the first floor and the sixth floor are below the 35 dBA threshold for frequent event that is specified by the FTA. Therefore, the anticipated ground-borne noises and vibrations of the proposed building are considered acceptable without additional mitigation measures.

Outdoor living area – rooftop amenity area is anticipated at the proposed building. Utilizing the exteriors of proposed residential building and the staircase and mechanical housing at the northern part of building rooftop as noise barrier, the result of STAMSON modeling indicates that the noise level at the rooftop amenity area is expected to be 62 dBA during daytime period, which exceeds the 55 dBA threshold value specified by the ENCG. An investigation including noise barriers, which included the exterior cladding of proposed building and the staircase and mechanical housing in addition to the installation of a solid 1.0 m solid railing around the rooftop perimeter found that the anticipated noise level at the rooftop amenity area will be 58 dBA, which slightly exceeds the 55 dBA threshold. This exceedance in noise level is considered acceptable provided that the warning clause Type A is included on all deeds of sale.

Several reception points were selected for the surface transportation noise analysis, consisting of the centre of first level and top level. The results of STAMSON modeling indicate that the noise levels at the northern, eastern, southern, and western elevations of proposed building are expected to exceed the 55 dBA threshold specified by the ENCG. Also, the noise levels at the northern, eastern, and western elevations of proposed building are expected to exceed 65 dBA. Therefore, the installation of a central air conditioning unit, along with a warning clause Type D, will be required for all units of the proposed building.

The results of the surface transportation noise indicates that the noise levels will be above 65 dBA on the northern, eastern, and western elevations. A review of the building materials was completed. Paterson reviewed the exterior wall and typical wall construction details. It was determined that the exterior cladding being brick veneer on the first and second floor, and fibre cement panel on the third, fourth, fifth, and sixth floor would be suitable for proposed noise attenuation. If alternative construction materials are proposed, a review will be required.

The following warning clause is to be included on all Offers of Purchase and Sale and/or lease agreements:

> " This dwelling unit has been supplied with a central air conditioning system which will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the sound level limits of the Municipality and the Ministry of the Environment."
>
> "Purchasers/tenants are advised that sound levels due to increasing road traffic may occasionally interfere with some activities of the dwelling occupants as the sound levels exceed the sound level limits of the Municipality and the Ministry of the Environment."

9.0 Statement of Limitations

The recommendations made in this report are in accordance with our present understanding of the project. Our recommendations should be reviewed when the project drawings and specifications are complete.

The present report applies only to the project described in this document. Use of this report for purposes other than those described herein or by person(s) other than TC United Development Corporation c/o ZW Project Management or their agent(s) is not authorized without review by this firm for the applicability of our recommendations to the altered use of the report.

Paterson Group Inc.

LICENSED PROFESSIONAL ENGINEER
Sept 29, 2023
S. A. BOISVENUE
100176631
PROVINCE OF ONTARIO

Yolanda Tang, M.A.Sc

Stephanie A. Boisvenue, P.Eng.

Report Distribution:

- ❑ TC United Development Corporation c/o ZW Project Management (email copy)
- ❑ Paterson Group (1 copy)

APPENDIX 1

TABLE 12 - SUMMARY OF RECEPTION POINTS AND GEOMETRY

DRAWING PG5406-1 - SITE PLAN

DRAWING PG5406-2 - RECEPTOR LOCATION PLAN

DRAWING PG5406-3 - SITE GEOMETRY

DRAWING PG5406-3A - SITE GEOMETRY (REC 1-1 AND REC 1-6)

DRAWING PG5406-3B - SITE GEOMETRY (REC 2-1 AND REC 2-6)

DRAWING PG5406-3C - SITE GEOMETRY (REC 3-1 AND REC 3-6)

DRAWING PG5406-3D - SITE GEOMETRY (REC 4-1 AND REC 4-6)

DRAWING PG5406-3E - SITE GEOMETRY (REC 5)

DRAWING PG5406-3F - SITE GEOMETRY (REC 5) - ENLARGED

Table 8 - Summary of Reception Points and Geometry
294 - 300 Tremblay Road

Point of Reception	Location	Leq Day (dBA)	Belfast Road (North of Tremblay Road)						Belfast Road (South of Tremblay Road)					
			Horizontal (m)	Vertical (m)	Total (m)	Local Angle (degree)	Number of Rows of Houses	Density (%)	Horizontal (m)	Vertical (m)	Total (m)	Local Angle (degree)	Number of Rows of Houses	Density (%)
REC 1-1	Northern Elevation, 1st Floor	71	35	1.5	35.0	-77, 0	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
REC 1-6	Northern Elevation, 6th Floor	75	35	18.0	39.4	-77, 0	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
REC 2-1	Eastern Elevation, 1st Floor	69	25	1.5	25.0	-84, -49	n/a	n/a	15	1.5	15.1	-49, 74	n/a	n/a
REC 2-6	Eastern Elevation, 6th Floor	72	25	18.0	30.8	-84, -49	n/a	n/a	15	18.0	23.4	-49, 74	n/a	n/a
REC 3-1	Southern Elevation, 1st Floor	56	n/a	n/a	n/a	n/a	n/a	n/a	30	1.5	30.0	0, 64	n/a	n/a
REC 3-6	Southern Elevation, 6th Floor	58	n/a	n/a	n/a	n/a	n/a	n/a	30	18.0	35.0	0, 64	n/a	n/a
REC 4-1	Western Elevation, 1st Floor	67	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
REC 4-6	Western Elevation, 6th Floor	72	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
REC 5	Rooftop Amenity Area	62	n/a	n/a	n/a	n/a	n/a	n/a	30	21.5	36.9	-32, 68	n/a	n/a

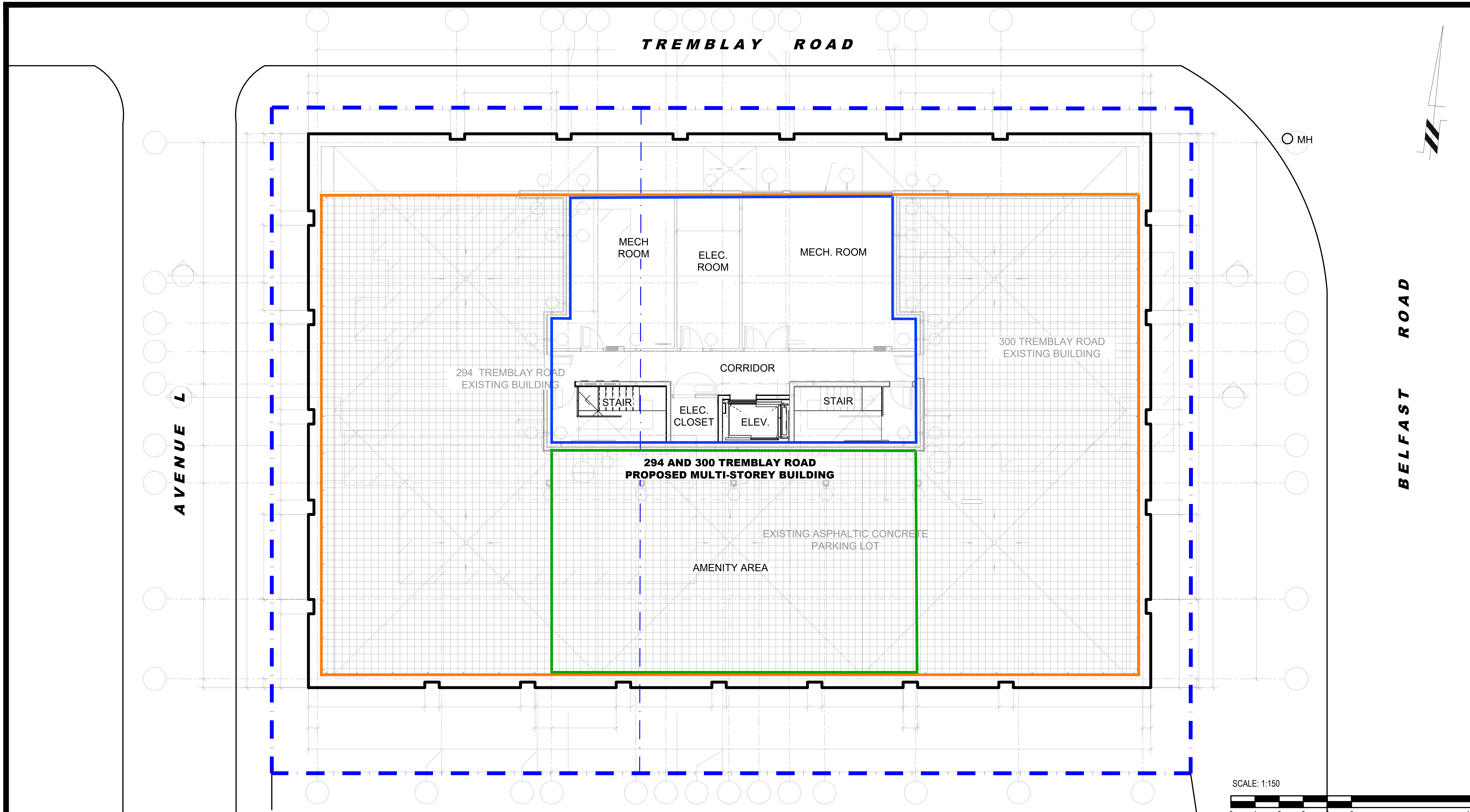
Table 8 - Summary of Reception Points and Geometry
294 - 300 Tremblay Road

Point of Reception	Location	Leq Day (dBA)	Tremblay Road					
			Horizontal (m)	Vertical (m)	Total (m)	Local Angle (degree)	Number of Rows of Houses	Density (%)
REC 1-1	Northern Elevation, 1st Floor	71	5	1.5	5.2	-87, 79	n/a	n/a
REC 1-6	Northern Elevation, 6th Floor	75	5	18.0	18.7	-87, 79	n/a	n/a
REC 2-1	Eastern Elevation, 1st Floor	69	20	1.5	20.1	0, 72	n/a	n/a
REC 2-6	Eastern Elevation, 6th Floor	72	20	18.0	26.9	0, 72	n/a	n/a
REC 3-1	Southern Elevation, 1st Floor	56	n/a	n/a	n/a	n/a	n/a	n/a
REC 3-6	Southern Elevation, 6th Floor	58	n/a	n/a	n/a	n/a	n/a	n/a
REC 4-1	Western Elevation, 1st Floor	67	20	1.5	20.1	-84, 0	n/a	n/a
REC 4-6	Western Elevation, 6th Floor	72	20	18.0	26.9	-84, 0	n/a	n/a
REC 5	Rooftop Amenity Area	62	85	21.5	87.7	-85, -73 58, 74	n/a	n/a

Table 8 - Summary of Reception Points and Geometry
294 - 300 Tremblay Road

Point of Reception	Location	Leq Day (dBA)	Highway 417 Westbound						Highway 417 Eastbound					
			Horizontal (m)	Vertical (m)	Total (m)	Local Angle (degree)	Number of Rows of Houses	Density (%)	Horizontal (m)	Vertical (m)	Total (m)	Local Angle (degree)	Number of Rows of Houses	Density (%)
REC 1-1	Northern Elevation, 1st Floor	71	110	1.5	110.0	-82, 72	n/a	n/a	85	1.5	85.0	-89, 74	n/a	n/a
REC 1-6	Northern Elevation, 6th Floor	75	110	18.0	111.5	-82, 72	n/a	n/a	85	18.0	86.9	-89, 74	n/a	n/a
REC 2-1	Eastern Elevation, 1st Floor	69	120	1.5	120.0	0, 70	n/a	n/a	100	1.5	100.0	0, 73	n/a	n/a
REC 2-6	Eastern Elevation, 6th Floor	72	120	18.0	121.3	0, 70	n/a	n/a	100	18.0	101.6	0, 73	n/a	n/a
REC 3-1	Southern Elevation, 1st Floor	56	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
REC 3-6	Southern Elevation, 6th Floor	58	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
REC 4-1	Western Elevation, 1st Floor	67	120	1.5	120.0	5, 90	n/a	n/a	100	1.5	100.0	2, 90	n/a	n/a
REC 4-6	Western Elevation, 6th Floor	72	120	18.0	121.3	5, 90	n/a	n/a	100	18.0	101.6	2, 90	n/a	n/a
REC 5	Rooftop Amenity Area	62	400	21.5	400.6	-87, -73 58, 71	n/a	n/a	330	21.5	330.7	-90, -73 58, 72	n/a	n/a

Point of Reception	Location	Leq Day (dBA)	VIA-Train Alexandria Rail Corridor						O-Train Confederation Line					
			Horizontal (m)	Vertical (m)	Total (m)	Local Angle (degree)	Barrier Height (m)	Distance (m)	Horizontal (m)	Vertical (m)	Total (m)	Local Angle (degree)	Barrier Height (m)	Distance (m)
REC 1-1	Northern Elevation, 1st Floor	71	n/a	n/a	n/a	n/a	n/a	n/a	50	1.5	50.0	-90, 73	n/a	n/a
REC 1-6	Northern Elevation, 6th Floor	75	n/a	n/a	n/a	n/a	n/a	n/a	50	18.0	53.1	-90, 73	n/a	n/a
REC 2-1	Eastern Elevation, 1st Floor	69	255	1.5	255.0	-43, 0	3	60	70	1.5	70.0	0, 72	n/a	n/a
REC 2-6	Eastern Elevation, 6th Floor	72	255	18.0	255.6	-43, 0	3	60	70	18.0	72.3	0, 72	n/a	n/a
REC 3-1	Southern Elevation, 1st Floor	56	240	1.5	240.0	-45, 30	3	60	n/a	n/a	n/a	n/a	n/a	n/a
REC 3-6	Southern Elevation, 6th Floor	58	240	18.0	240.7	-45, 30	3	60	n/a	n/a	n/a	n/a	n/a	n/a
REC 4-1	Western Elevation, 1st Floor	67	255	1.5	255.0	0, 31	3	60	70	1.5	70.0	-10, 90	n/a	n/a
REC 4-6	Western Elevation, 6th Floor	72	255	18.0	255.6	0, 31	3	60	70	18.0	72.3	-10, 90	n/a	n/a
REC 5	Rooftop Amenity Area	62	247	21.5	247.9	-43, 31	3	60	250	21.5	250.9	-10, 17	2	40



PATERSON GROUP

9 AURIGA DRIVE
OTTAWA, ON
K2E 7T9
TEL: (613) 226-7381

NO.	REVISIONS	DATE	INITIAL
1	REVISED AS PER CITY COMMENTS	27/09/2023	YT

TC UNITED DEVELOPMENT CORP.

NOISE ATTENUATION STUDY

PROPOSED MULTI-STOREY BUILDING - 294 AND 300 TREMBLAY ROAD

OTTAWA, ONTARIO

Title:

SITE PLAN

Scale: 1:150	Date: 09/2020
Drawn by: YA	Report No.: PG5406-1
Checked by: SB	Dwg. No.: PG5406-1
Approved by: DJG	Revision No.: 1

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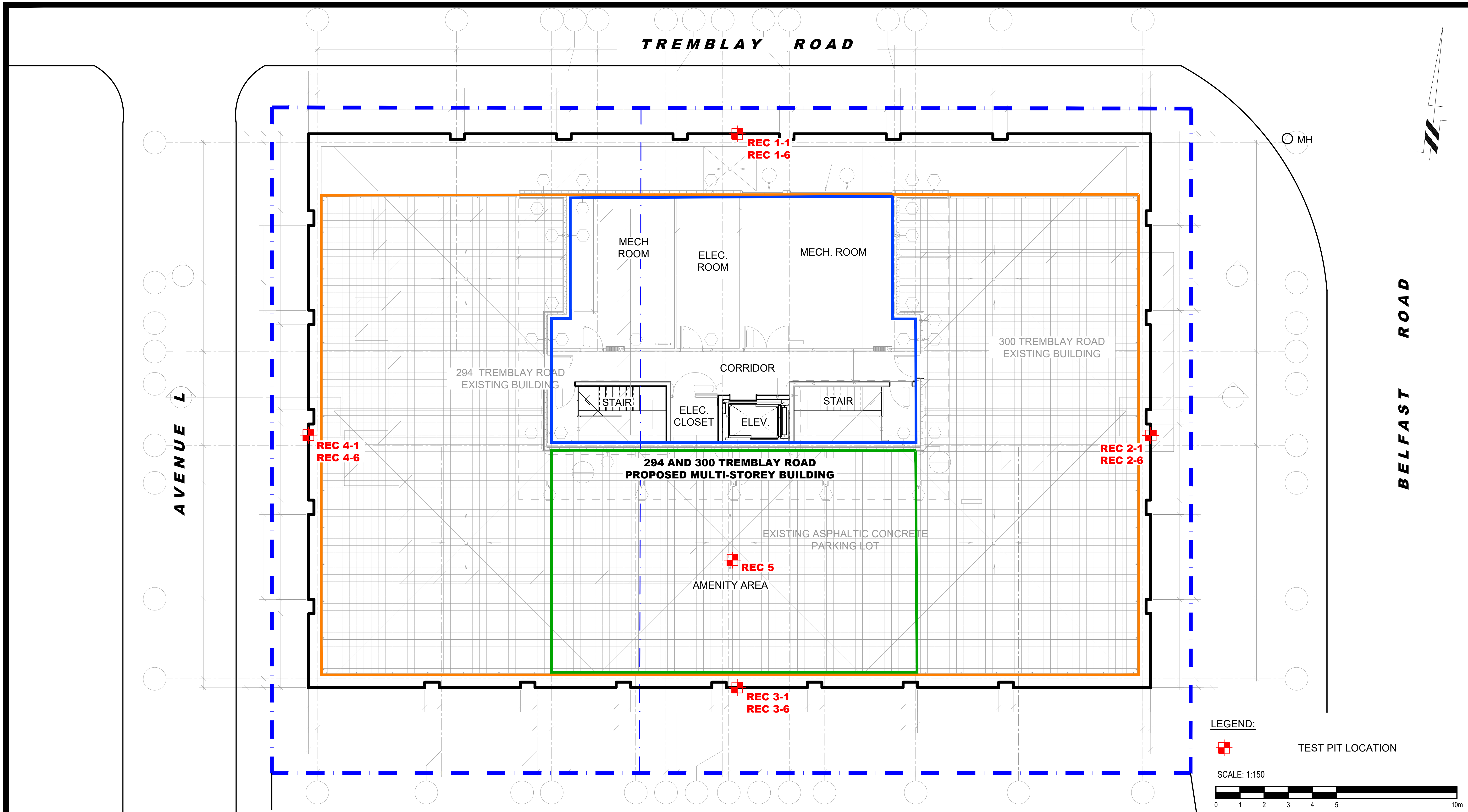

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9 AURIGA DRIVE
OTTAWA, ON
K2E 7T9
TEL: (613) 226-7381

NO.	REVISIONS	DATE	INITIAL
1	REVISED AS PER CITY COMMENTS	27/09/2023	YT

TC UNITED DEVELOPMENT CORP.

NOISE ATTENUATION STUDY

PROPOSED MULTI-STOREY BUILDING - 294 AND 300 TREMBLAY ROAD

OTTAWA, ONTARIO

Title:

RECEPTOR LOCATION PLAN

Scale: 1:150	Date: 09/2020
Drawn by: YA	Report No.: PG5406-1
Checked by: SB	Dwg. No.: PG5406-2
Approved by: DJG	Revision No.: 1

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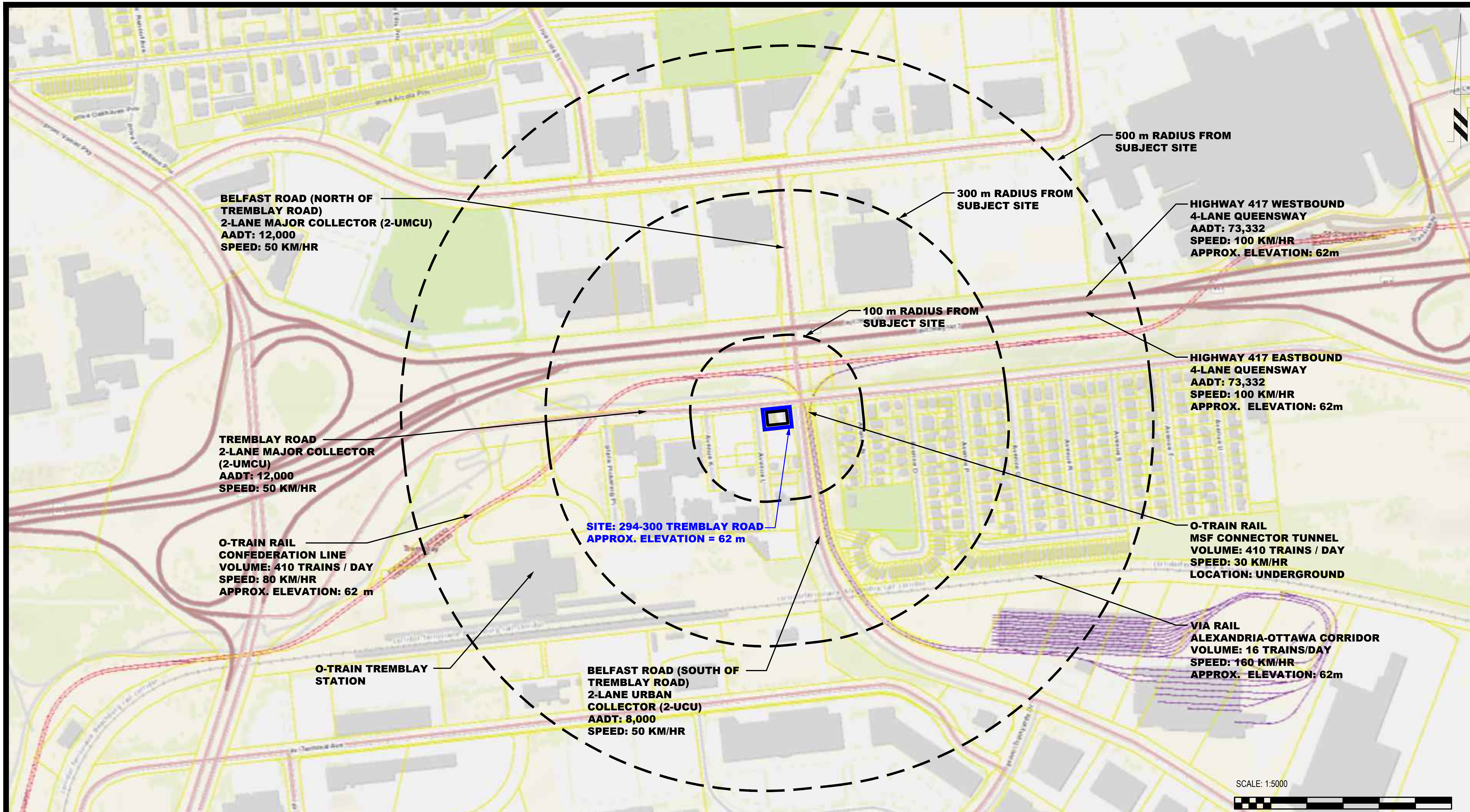

PATERSON GROUP
9 AURIGA DRIVE
OTTAWA, ON
K2E 7T9
TEL: (613) 226-7381

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1	REVISED AS PER CITY COMMENTS	27/09/2023	YT

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NOISE ATTENUATION STUDY

PROPOSED MULTI-STOREY BUILDING - 294 AND 300 TREMBLAY ROAD

OTTAWA, ONTARIO

Title:

SITE GEOMETRY

Scale: 1:5000	Date: 09/2020
Drawn by: YA	Report No.: PG5406-1
Checked by: SB	Dwg. No.: PG5406-3
Approved by: DJG	Revision No.: 1

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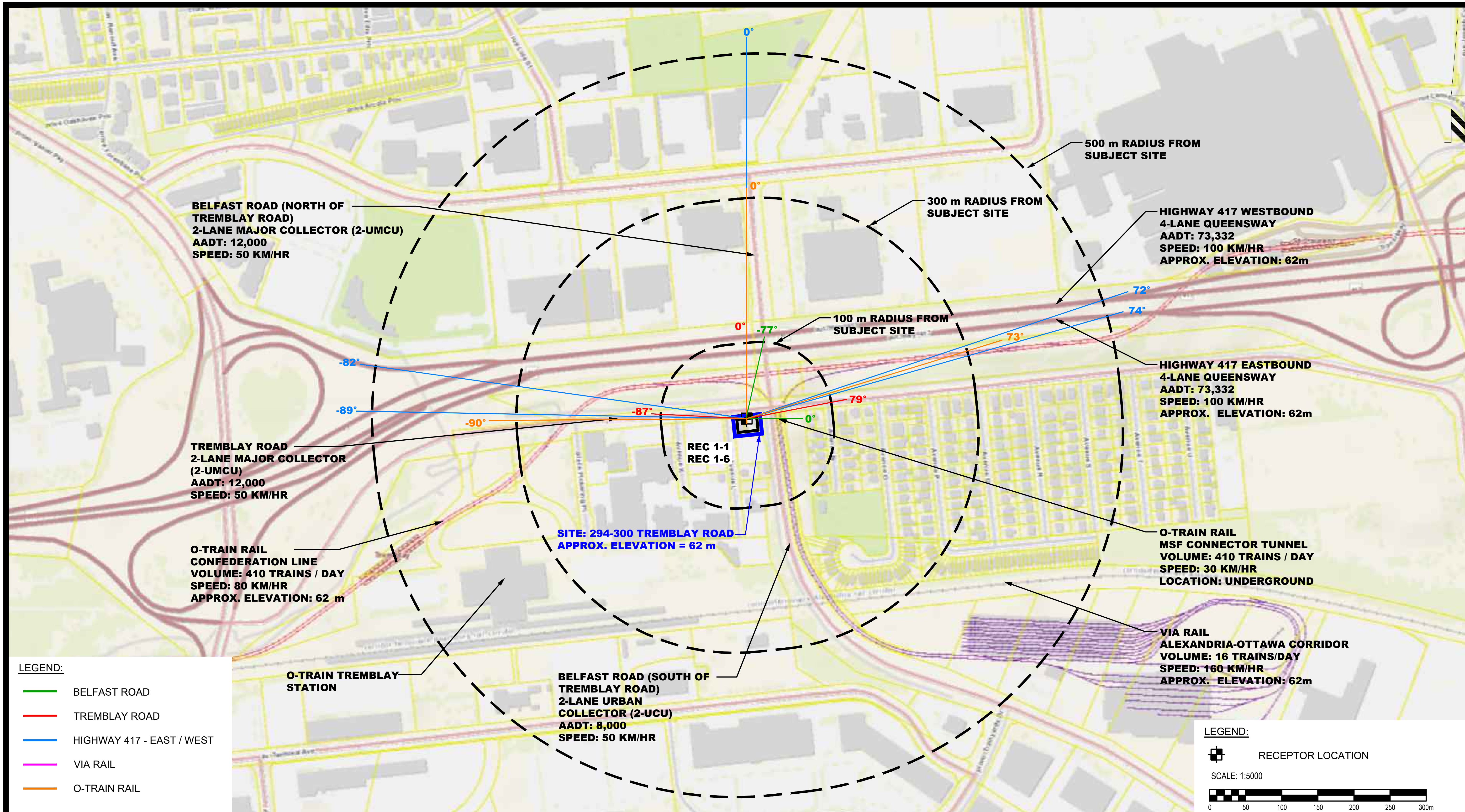

PATERSON GROUP
9 AURIGA DRIVE
OTTAWA, ON
K2E 7T9
TEL: (613) 226-7381

NO.	REVISIONS	DATE	INITIAL
1	REVISED AS PER CITY COMMENTS	27/09/2023	YT

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NOISE ATTENUATION STUDY

PROPOSED MULTI-STOREY BUILDING - 294 AND 300 TREMBLAY ROAD

OTTAWA, ONTARIO

Title:

SITE GEOMETRY REC 1-1 AND REC 1-6

Scale: 1:5000	Date: 09/2020
Drawn by: YA	Report No.: PG5406-1
Checked by: SB	Dwg. No.: PG5406-3A
Approved by: DJG	Revision No.: 1

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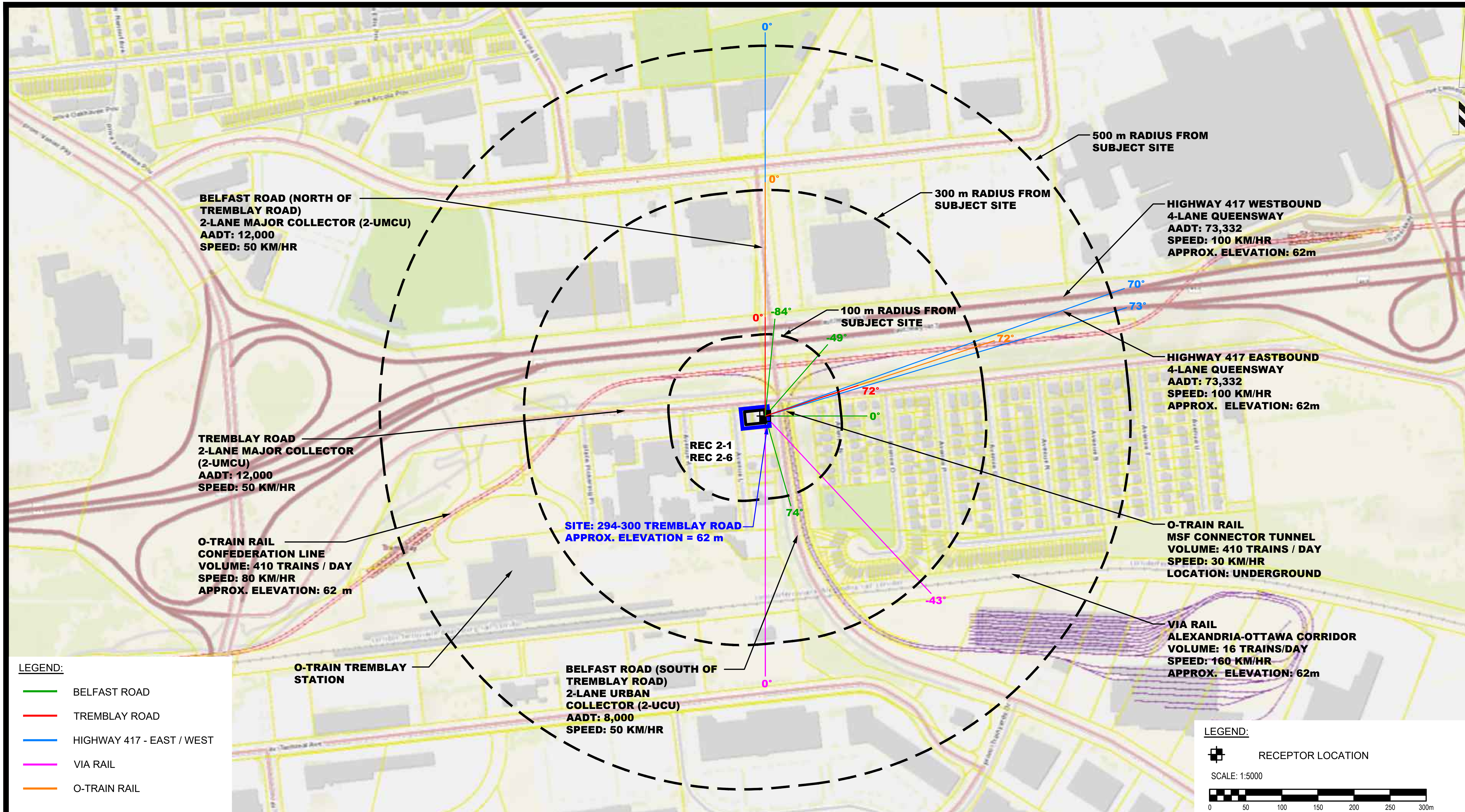

PATERSON GROUP
9 AURIGA DRIVE
OTTAWA, ON
K2E 7T9
TEL: (613) 226-7381

NO.	REVISIONS	DATE	INITIAL
1	REVISED AS PER CITY COMMENTS	27/09/2023	YT

TC UNITED DEVELOPMENT CORP.

NOISE ATTENUATION STUDY

PROPOSED MULTI-STOREY BUILDING - 294 AND 300 TREMBLAY ROAD

OTTAWA, ONTARIO

Title:

SITE GEOMETRY REC 2-1 AND REC 2-6

Scale: 1:5000	Date: 09/2020
Drawn by: YA	Report No.: PG5406-1
Checked by: SB	Dwg. No.: PG5406-3B
Approved by: DJG	Revision No.: 1

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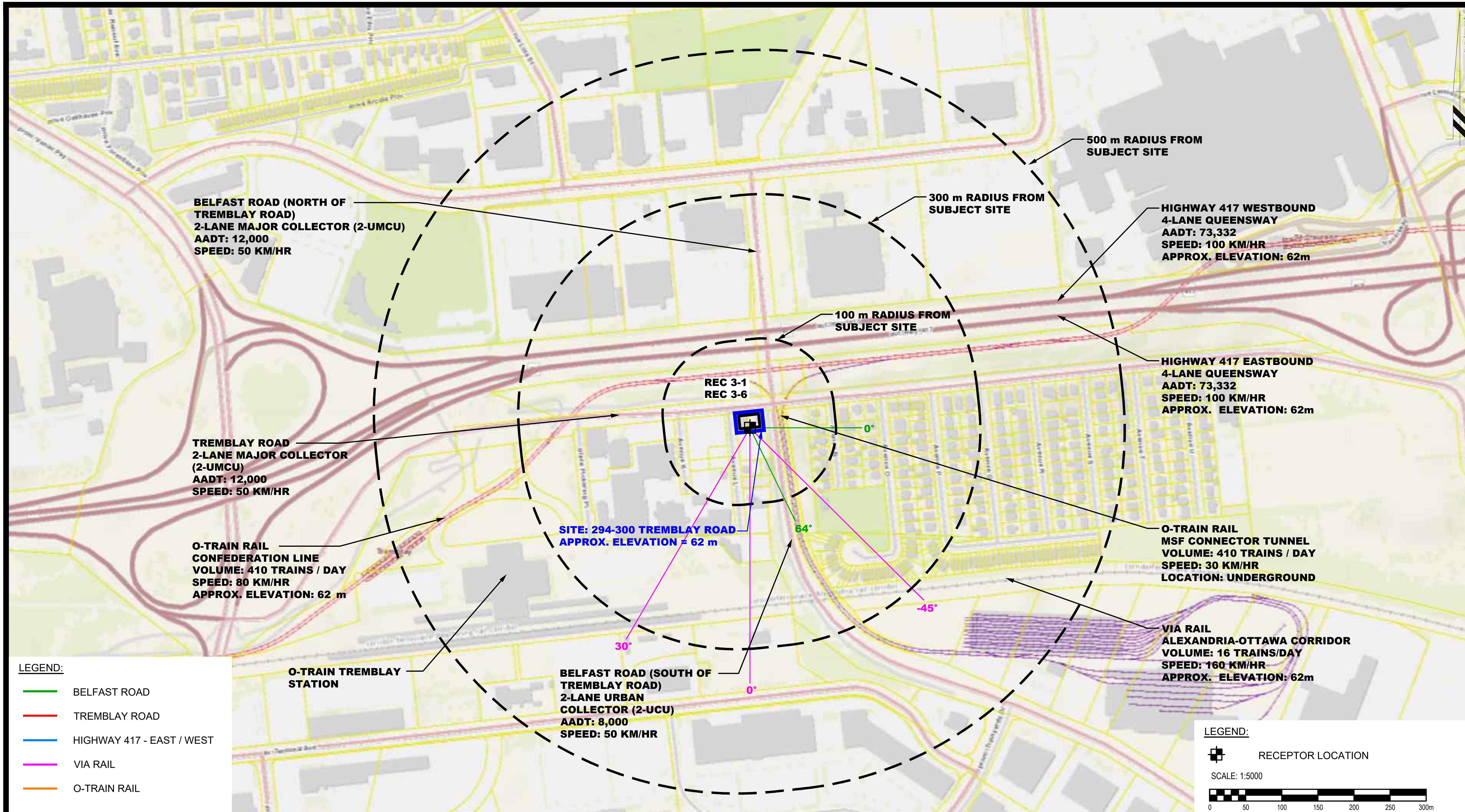

PATERSON GROUP

9 AURIGA DRIVE
OTTAWA, ON
K2E 7T9
TEL: (613) 226-7381

NO.	REVISIONS	DATE	INITIAL
1	REVISED AS PER CITY COMMENTS	27/09/2023	YT

TC UNITED DEVELOPMENT CORP.

NOISE ATTENUATION STUDY

PROPOSED MULTI-STOREY BUILDING - 294 AND 300 TREMBLAY ROAD

OTTAWA, ONTARIO

Title:

SITE GEOMETRY REC 3-1 AND REC 3-6

Scale: 1:5000	Date: 09/2020
Drawn by: YA	Report No.: PG5406-1
Checked by: SB	Dwg. No.: PG5406-3C
Approved by: DJG	Revision No.: 1

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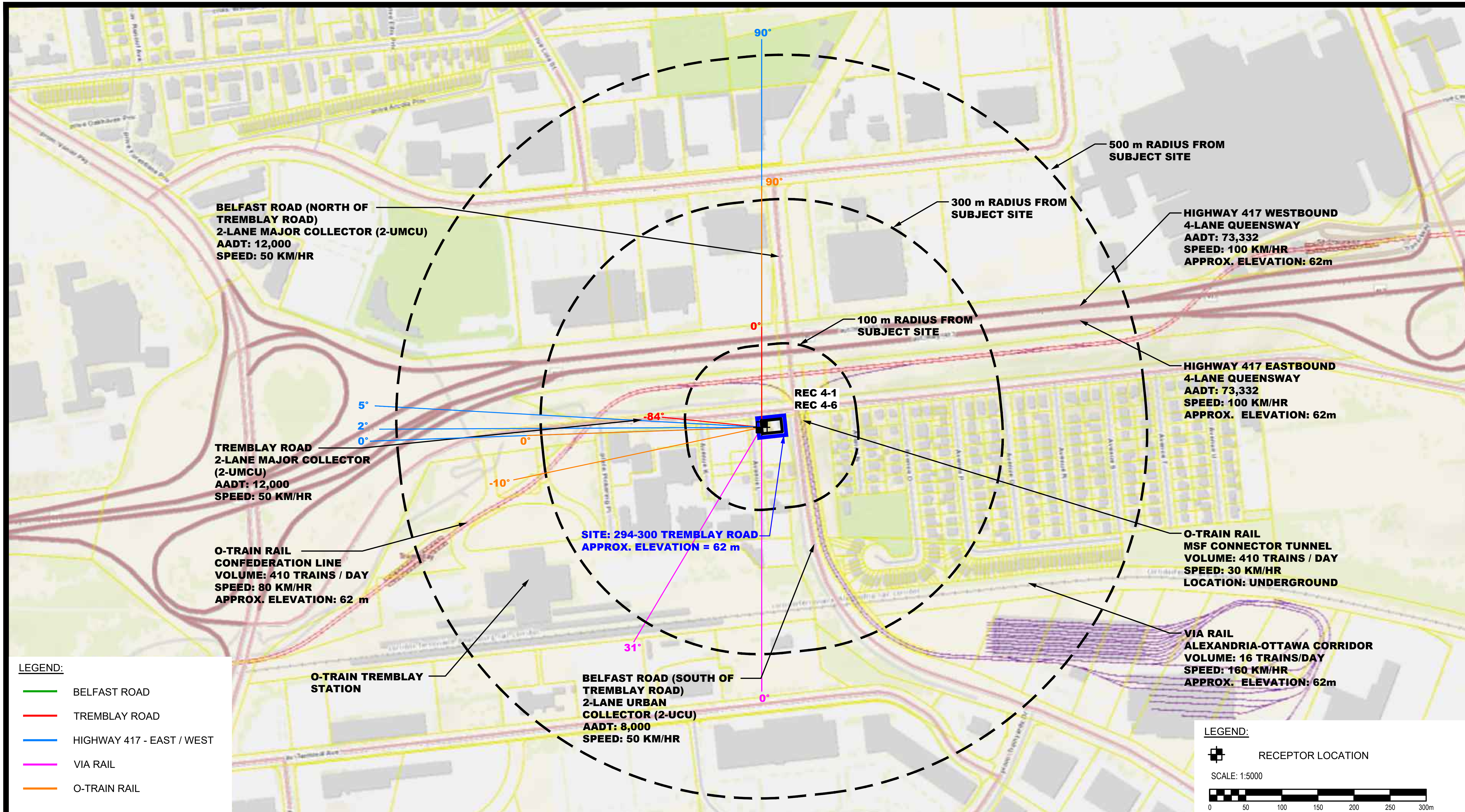

PATERSON GROUP

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TEL: (613) 226-7381

NO.	REVISIONS	DATE	INITIAL
1	REVISED AS PER CITY COMMENTS	27/09/2023	YT

TC UNITED DEVELOPMENT CORP.

NOISE ATTENUATION STUDY

PROPOSED MULTI-STOREY BUILDING - 294 AND 300 TREMBLAY ROAD

OTTAWA, ONTARIO

Title:

SITE GEOMETRY REC 4-1 AND REC 4-6

Scale:	1:5000	Date:	09/2020
Drawn by:	YA	Report No.:	PG5406-1
Checked by:	SB	Dwg. No.:	PG5406-3D
Approved by:	DJG	Revision No.:	1

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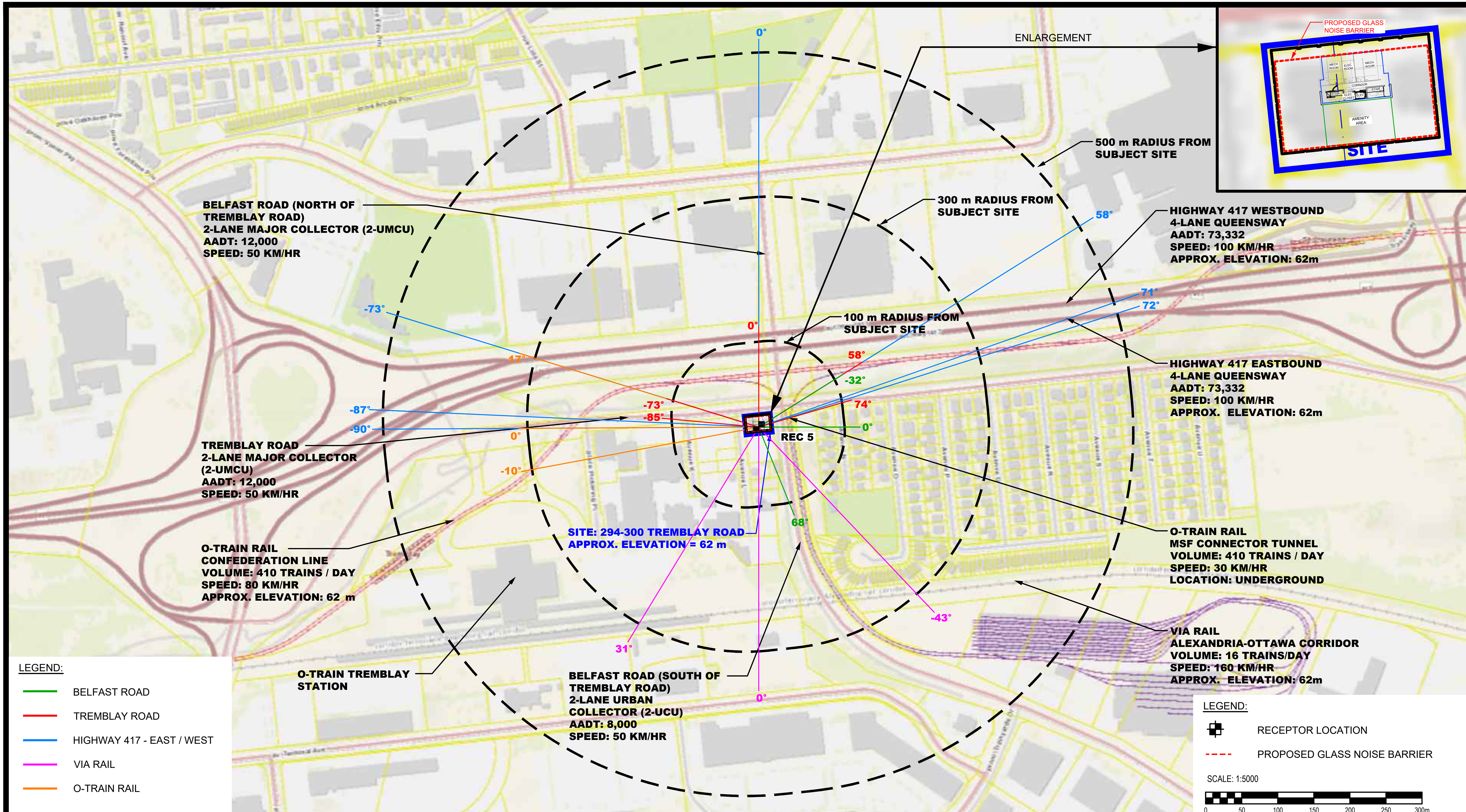

PATERSON GROUP
9 AURIGA DRIVE
OTTAWA, ON
K2E 7T9
TEL: (613) 226-7381

NO.	REVISIONS	DATE	INITIAL
1	REVISED AS PER CITY COMMENTS	27/09/2023	YT

TC UNITED DEVELOPMENT CORP.

NOISE ATTENUATION STUDY

PROPOSED MULTI-STOREY BUILDING - 294 AND 300 TREMBLAY ROAD

OTTAWA, ONTARIO

Title:

SITE GEOMETRY REC 5

Scale: 1:5000	Date: 09/2020
Drawn by: YA	Report No.: PG5406-1
Checked by: SB	Dwg. No.: PG5406-3E
Approved by: DJG	Revision No.: 1

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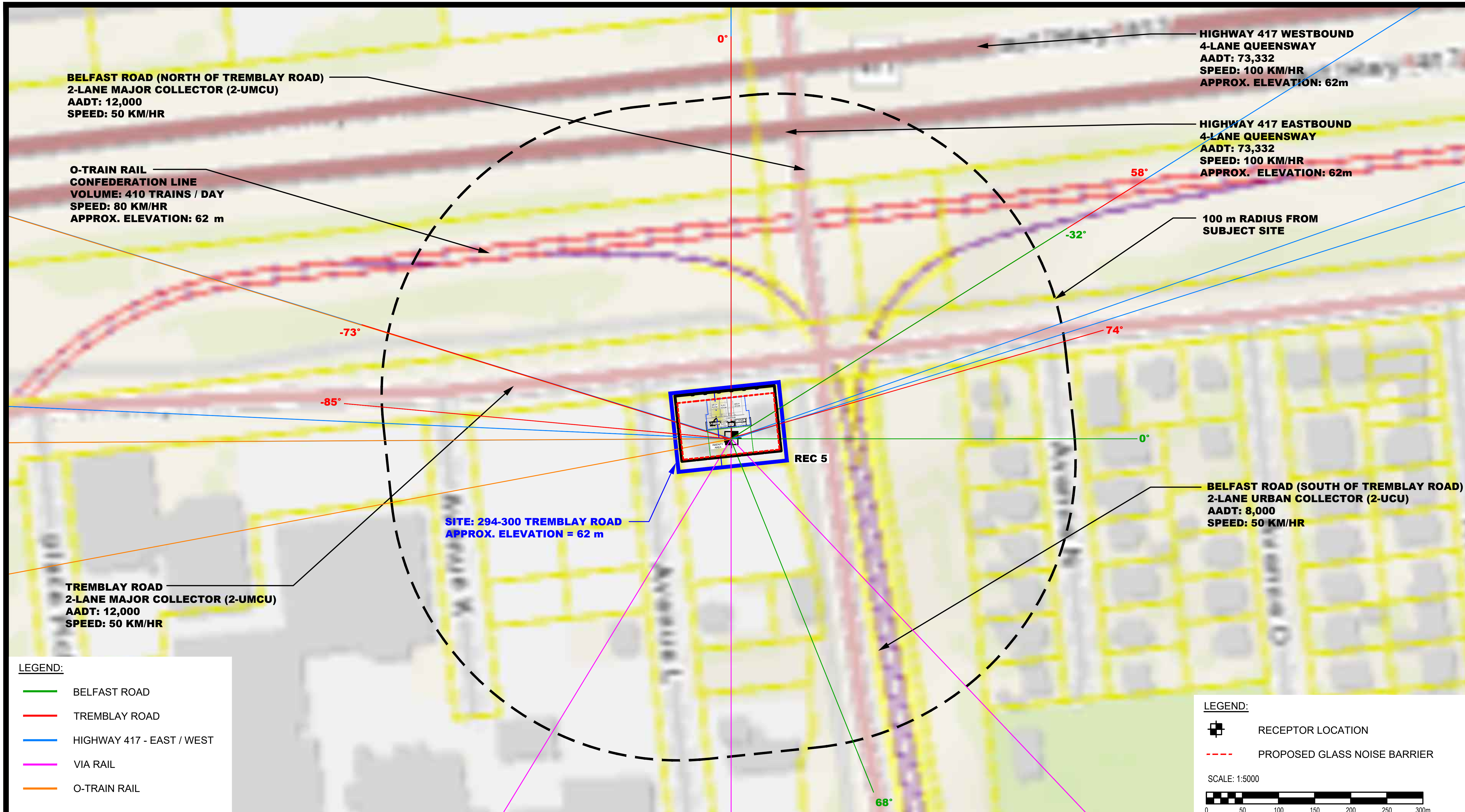

PATERSON GROUP

9 AURIGA DRIVE
OTTAWA, ON
K2E 7T9
TEL: (613) 226-7381

NO.	REVISIONS	DATE	INITIAL
1	REVISED AS PER CITY COMMENTS	27/09/2023	YT

TC UNITED DEVELOPMENT CORP.

NOISE ATTENUATION STUDY

PROPOSED MULTI-STOREY BUILDING - 294 AND 300 TREMBLAY ROAD

OTTAWA, ONTARIO

Title:

SITE GEOMETRY REC 5 - ENLARGEMENT

Scale: 1:1250	Date: 09/2020
Drawn by: YA	Report No.: PG5406-1
Checked by: SB	Dwg. No.: PG5406-3F
Approved by: DJG	Revision No.: 1

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APPENDIX 2

STAMSON RESULTS

```
STAMSON 5.0        NORMAL REPORT        Date: 27-09-2023 15:47:06
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rec11.te             Time Period: Day/Night 16/8 hours
Description: Receptor Point 1-1


Rail data, segment # 1: O-train Rail (day/night)
------------------------------------------------
Train            ! Trains      ! Speed !# loc !# Cars! Eng  !Cont
Type             !             !(km/h) !/Train!/Train! type !weld
-----------------+-------------+-------+------+------+------+----
  1. O-train Rail! 352.0/58.0  !  80.0 !  1.0 !  1.0 !  Elec! Yes

Data for Segment # 1: O-train Rail (day/night)
----------------------------------------------
Angle1   Angle2           : -90.00 deg   73.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  50.00 / 50.00  m
Receiver height           :   1.50 / 1.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
No Whistle
Reference angle           :   0.00

↑
Results segment # 1: O-train Rail (day)
---------------------------------------

LOCOMOTIVE (0.00 + 53.41 + 0.00) = 53.41 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
----------------------------------------------------------------------
   -90     73   0.58  63.20  -8.29  -1.50   0.00   0.00   0.00  53.41
----------------------------------------------------------------------

WHEEL (0.00 + 52.92 + 0.00) = 52.92 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
----------------------------------------------------------------------
   -90     73   0.66  63.22  -8.68  -1.61   0.00   0.00   0.00  52.92
----------------------------------------------------------------------

Segment Leq : 56.18 dBA

Total Leq All Segments: 56.18 dBA

↑
Results segment # 1: O-train Rail (night)
-----------------------------------------
```

```
LOCOMOTIVE (0.00 + 48.59 + 0.00) = 48.59 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
----------------------------------------------------------------------
   -90     73   0.58  58.38  -8.29  -1.50   0.00   0.00   0.00  48.59
----------------------------------------------------------------------

WHEEL (0.00 + 48.10 + 0.00) = 48.10 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
----------------------------------------------------------------------
   -90     73   0.66  58.39  -8.68  -1.61   0.00   0.00   0.00  48.10
----------------------------------------------------------------------

Segment Leq : 51.36 dBA

Total Leq All Segments: 51.36 dBA

↑
Road data, segment # 1: Belfast Rd N (day/night)
------------------------------------------------
Car traffic volume  :  9715/845   veh/TimePeriod  *
Medium truck volume :   773/67    veh/TimePeriod  *
Heavy truck volume  :   552/48    veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):  12000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 1: Belfast Rd N (day/night)
----------------------------------------------
Angle1   Angle2           : -77.00 deg   0.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  35.00 / 35.00  m
Receiver height           :   1.50 / 1.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

↑
Road data, segment # 2: Tremblay Rd (day/night)
-----------------------------------------------
Car traffic volume  :  9715/845   veh/TimePeriod  *
```

```
Medium truck volume :   773/67    veh/TimePeriod  *
Heavy truck volume  :   552/48    veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):  12000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 2: Tremblay Rd (day/night)
---------------------------------------------
Angle1   Angle2           : -87.00 deg   79.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  15.00 / 15.00  m
Receiver height           :   1.50 / 1.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

↑
Road data, segment # 3: Hwy 417 West (day/night)
------------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
Posted speed limit  :   100 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):  73332
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 3: Hwy 417 West (day/night)
----------------------------------------------
Angle1   Angle2           : -82.00 deg   72.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
```

```
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 110.00 / 110.00 m
Receiver height           :   1.50 / 1.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00
```

🡅

```
Road data, segment # 4: Hwy 417 East (day/night)
------------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
Posted speed limit  :   100 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):  73332
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 4: Hwy 417 East (day/night)
----------------------------------------------
Angle1   Angle2           : -89.00 deg   74.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  85.00 / 85.00  m
Receiver height           :   1.50 / 1.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00
```

🡅

```
Results segment # 1: Belfast Rd N (day)
---------------------------------------

Source height = 1.50 m

ROAD (0.00 + 56.73 + 0.00) = 56.73 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-----------------------------------------------------------------------------
   -77      0   0.66  67.51   0.00  -6.11  -4.67   0.00   0.00   0.00  56.73
-----------------------------------------------------------------------------

Segment Leq : 56.73 dBA
```

↑
Results segment # 2: Tremblay Rd (day)

Source height = 1.50 m

ROAD (0.00 + 65.97 + 0.00) = 65.97 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-87	79	0.66	67.51	0.00	0.00	-1.54	0.00	0.00	0.00	65.97

Segment Leq : 65.97 dBA

↑
Results segment # 3: Hwy 417 West (day)

Source height = 1.50 m

ROAD (0.00 + 65.36 + 0.00) = 65.36 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-82	72	0.66	81.40	0.00	-14.36	-1.68	0.00	0.00	0.00	65.36

Segment Leq : 65.36 dBA

↑
Results segment # 4: Hwy 417 East (day)

Source height = 1.50 m

ROAD (0.00 + 67.29 + 0.00) = 67.29 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-89	74	0.66	81.40	0.00	-12.51	-1.60	0.00	0.00	0.00	67.29

Segment Leq : 67.29 dBA

Total Leq All Segments: 71.21 dBA

↑
Results segment # 1: Belfast Rd N (night)

Source height = 1.50 m

ROAD (0.00 + 49.13 + 0.00) = 49.13 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-77	0	0.66	59.91	0.00	-6.11	-4.67	0.00	0.00	0.00	49.13

Segment Leq : 49.13 dBA

↑
Results segment # 2: Tremblay Rd (night)

Source height = 1.50 m

ROAD (0.00 + 58.37 + 0.00) = 58.37 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-87	79	0.66	59.91	0.00	0.00	-1.54	0.00	0.00	0.00	58.37

Segment Leq : 58.37 dBA

↑
Results segment # 3: Hwy 417 West (night)

Source height = 1.49 m

ROAD (0.00 + 57.76 + 0.00) = 57.76 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-82	72	0.66	73.80	0.00	-14.36	-1.68	0.00	0.00	0.00	57.76

Segment Leq : 57.76 dBA

↑
Results segment # 4: Hwy 417 East (night)

Source height = 1.49 m

ROAD (0.00 + 59.69 + 0.00) = 59.69 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-89	74	0.66	73.80	0.00	-12.51	-1.60	0.00	0.00	0.00	59.69

Segment Leq : 59.69 dBA

Total Leq All Segments: 63.61 dBA

🡅

TOTAL Leq FROM ALL SOURCES (DAY): 71.35
(NIGHT): 63.86

🡅
🡅

```
STAMSON 5.0        NORMAL REPORT        Date: 28-09-2023 10:41:34
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rec16.te             Time Period: Day/Night 16/8 hours
Description: Receptor Point 1-6


Rail data, segment # 1: O-train Rail (day/night)
------------------------------------------------
Train            ! Trains      ! Speed !# loc !# Cars! Eng  !Cont
Type             !             !(km/h) !/Train!/Train! type !weld
-----------------+-------------+-------+------+------+------+----
  1. O-train Rail! 352.0/58.0  !  80.0 !  1.0 !  1.0 !  Elec! Yes

Data for Segment # 1: O-train Rail (day/night)
----------------------------------------------
Angle1   Angle2           : -90.00 deg   73.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  50.00 / 50.00  m
Receiver height           :  18.00 / 18.00  m
Topography                :      1       (Flat/gentle slope; no barrier)
No Whistle
Reference angle           :   0.00

↑
Results segment # 1: O-train Rail (day)
---------------------------------------

LOCOMOTIVE (0.00 + 56.88 + 0.00) = 56.88 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
----------------------------------------------------------------------
   -90     73   0.09  63.20  -5.70  -0.63   0.00   0.00   0.00  56.88
----------------------------------------------------------------------

WHEEL (0.00 + 56.12 + 0.00) = 56.12 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
----------------------------------------------------------------------
   -90     73   0.19  63.22  -6.25  -0.84   0.00   0.00   0.00  56.12
----------------------------------------------------------------------

Segment Leq : 59.53 dBA

Total Leq All Segments: 59.53 dBA

↑
Results segment # 1: O-train Rail (night)
-----------------------------------------
```

```
LOCOMOTIVE (0.00 + 52.05 + 0.00) = 52.05 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
----------------------------------------------------------------------
   -90     73   0.09  58.38  -5.70  -0.63   0.00   0.00   0.00  52.05
----------------------------------------------------------------------

WHEEL (0.00 + 51.30 + 0.00) = 51.30 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
----------------------------------------------------------------------
   -90     73   0.19  58.39  -6.25  -0.84   0.00   0.00   0.00  51.30
----------------------------------------------------------------------

Segment Leq : 54.70 dBA

Total Leq All Segments: 54.70 dBA

↑
Road data, segment # 1: Belfast Rd N (day/night)
------------------------------------------------
Car traffic volume  :  9715/845   veh/TimePeriod  *
Medium truck volume :   773/67    veh/TimePeriod  *
Heavy truck volume  :   552/48    veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):  12000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 1: Belfast Rd N (day/night)
----------------------------------------------
Angle1   Angle2           : -77.00 deg   0.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  35.00 / 35.00  m
Receiver height           :  18.00 / 18.00  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

↑
Road data, segment # 2: Tremblay Rd (day/night)
-----------------------------------------------
Car traffic volume  :  9715/845   veh/TimePeriod  *
```

```
Medium truck volume :   773/67    veh/TimePeriod  *
Heavy truck volume  :   552/48    veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):  12000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 2: Tremblay Rd (day/night)
---------------------------------------------
Angle1   Angle2           : -87.00 deg   79.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  15.00 / 15.00  m
Receiver height           :  18.00 / 18.00  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

↑
Road data, segment # 3: Hwy 417 West (day/night)
------------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
Posted speed limit  :   100 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):  73332
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 3: Hwy 417 West (day/night)
----------------------------------------------
Angle1   Angle2           : -82.00 deg   72.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
```

```
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 110.00 / 110.00 m
Receiver height           :  18.00 / 18.00  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00
```

🡅
Road data, segment # 4: Hwy 417 East (day/night)

```
------------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
Posted speed limit  :   100 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):  73332
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00
```

Data for Segment # 4: Hwy 417 East (day/night)

```
----------------------------------------------
Angle1   Angle2           : -89.00 deg   74.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  85.00 / 85.00  m
Receiver height           :  18.00 / 18.00  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00
```

🡅
Results segment # 1: Belfast Rd N (day)

```
---------------------------------------

Source height = 1.50 m

ROAD (0.00 + 59.27 + 0.00) = 59.27 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
----------------------------------------------------------------------------
   -77      0   0.17  67.51   0.00  -4.29  -3.96   0.00   0.00   0.00  59.27
----------------------------------------------------------------------------

Segment Leq : 59.27 dBA
```

```
↑
Results segment # 2: Tremblay Rd (day)
--------------------------------------

Source height = 1.50 m

ROAD (0.00 + 66.82 + 0.00) = 66.82 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
----------------------------------------------------------------------------
   -87     79   0.17  67.51   0.00   0.00  -0.70   0.00   0.00   0.00  66.82
----------------------------------------------------------------------------

Segment Leq : 66.82 dBA

↑
Results segment # 3: Hwy 417 West (day)
---------------------------------------

Source height = 1.50 m

ROAD (0.00 + 70.36 + 0.00) = 70.36 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
----------------------------------------------------------------------------
   -82     72   0.17  81.40   0.00 -10.08  -0.96   0.00   0.00   0.00  70.36
----------------------------------------------------------------------------

Segment Leq : 70.36 dBA

↑
Results segment # 4: Hwy 417 East (day)
---------------------------------------

Source height = 1.50 m

ROAD (0.00 + 71.84 + 0.00) = 71.84 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
----------------------------------------------------------------------------
   -89     74   0.17  81.40   0.00  -8.78  -0.77   0.00   0.00   0.00  71.84
----------------------------------------------------------------------------

Segment Leq : 71.84 dBA

Total Leq All Segments: 75.02 dBA

↑
Results segment # 1: Belfast Rd N (night)
-----------------------------------------

Source height = 1.50 m
```

ROAD (0.00 + 51.67 + 0.00) = 51.67 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-77	0	0.17	59.91	0.00	-4.29	-3.96	0.00	0.00	0.00	51.67

Segment Leq : 51.67 dBA

↑

Results segment # 2: Tremblay Rd (night)

Source height = 1.50 m

ROAD (0.00 + 59.22 + 0.00) = 59.22 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-87	79	0.17	59.91	0.00	0.00	-0.70	0.00	0.00	0.00	59.22

Segment Leq : 59.22 dBA

↑

Results segment # 3: Hwy 417 West (night)

Source height = 1.49 m

ROAD (0.00 + 62.76 + 0.00) = 62.76 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-82	72	0.17	73.80	0.00	-10.08	-0.96	0.00	0.00	0.00	62.76

Segment Leq : 62.76 dBA

↑

Results segment # 4: Hwy 417 East (night)

Source height = 1.49 m

ROAD (0.00 + 64.25 + 0.00) = 64.25 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-89	74	0.17	73.80	0.00	-8.78	-0.77	0.00	0.00	0.00	64.25

Segment Leq : 64.25 dBA

Total Leq All Segments: 67.43 dBA

🡅

TOTAL Leq FROM ALL SOURCES (DAY): 75.14
(NIGHT): 67.65

🡅

🡅

```
STAMSON 5.0        NORMAL REPORT        Date: 26-09-2023 16:57:06
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rec21.te             Time Period: Day/Night 16/8 hours
Description: Receptor Point 2-1


Rail data, segment # 1: VIA Rail (day/night)
--------------------------------------------
Train            ! Trains      ! Speed !# loc !# Cars! Eng  !Cont
Type             !             !(km/h) !/Train!/Train! type !weld
-----------------+-------------+-------+------+------+------+----
  1. VIA Rail    !  16.0/0.0   ! 150.0 !  2.0 !  8.0 !Diesel! Yes

Data for Segment # 1: VIA Rail (day/night)
------------------------------------------
Angle1   Angle2           : -43.00 deg   0.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      3 / 3
House density             :     60 %
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 255.00 / 255.00 m
Receiver height           :   1.50 / 1.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
No Whistle
Reference angle           :   0.00

↑
Rail data, segment # 2: O-train Rail (day/night)
------------------------------------------------
Train            ! Trains      ! Speed !# loc !# Cars! Eng  !Cont
Type             !             !(km/h) !/Train!/Train! type !weld
-----------------+-------------+-------+------+------+------+----
  1. O-train Rail! 352.0/58.0  !  80.0 !  1.0 !  1.0 !  Elec! Yes

Data for Segment # 2: O-train Rail (day/night)
----------------------------------------------
Angle1   Angle2           :   0.00 deg   72.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  70.00 / 70.00  m
Receiver height           :   1.50 / 1.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
No Whistle
Reference angle           :   0.00

↑
Results segment # 1: VIA Rail (day)
-----------------------------------
```

LOCOMOTIVE (0.00 + 38.83 + 0.00) = 38.83 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-43	0	0.58	70.99	-19.50	-6.47	0.00	-6.19	0.00	38.83

WHEEL (0.00 + 27.96 + 0.00) = 27.96 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-43	0	0.66	61.07	-20.43	-6.50	0.00	-6.19	0.00	27.96

Segment Leq : 39.17 dBA

Results segment # 2: O-train Rail (day)

LOCOMOTIVE (0.00 + 47.87 + 0.00) = 47.87 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	72	0.58	63.20	-10.60	-4.73	0.00	0.00	0.00	47.87

WHEEL (0.00 + 47.29 + 0.00) = 47.29 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	72	0.66	63.22	-11.11	-4.82	0.00	0.00	0.00	47.29

Segment Leq : 50.60 dBA

Total Leq All Segments: 50.90 dBA

Results segment # 1: VIA Rail (night)

LOCOMOTIVE (0.00 + -32.16 + 0.00) = 0.00 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-43	0	0.58	0.00	-19.50	-6.47	0.00	-6.19	0.00	-32.16

WHEEL (0.00 + -33.11 + 0.00) = 0.00 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-43	0	0.66	0.00	-20.43	-6.50	0.00	-6.19	0.00	-33.11

```
Segment Leq : 0.00 dBA

↑
Results segment # 2: O-train Rail (night)
-----------------------------------------

LOCOMOTIVE (0.00 + 43.05 + 0.00) = 43.05 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
----------------------------------------------------------------------
     0     72   0.58  58.38 -10.60  -4.73   0.00   0.00   0.00  43.05
----------------------------------------------------------------------

WHEEL (0.00 + 42.47 + 0.00) = 42.47 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
----------------------------------------------------------------------
     0     72   0.66  58.39 -11.11  -4.82   0.00   0.00   0.00  42.47
----------------------------------------------------------------------

Segment Leq : 45.78 dBA

Total Leq All Segments: 45.78 dBA

↑
Road data, segment # 1: Belfast Rd N (day/night)
------------------------------------------------
Car traffic volume  :  9715/845   veh/TimePeriod  *
Medium truck volume :   773/67    veh/TimePeriod  *
Heavy truck volume  :   552/48    veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):  12000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 1: Belfast Rd N (day/night)
----------------------------------------------
Angle1   Angle2           : -84.00 deg   -49.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  25.00 / 25.00  m
Receiver height           :   1.50 / 1.50   m
```

```
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

🡅
Road data, segment # 2: Belfast Rd S (day/night)
------------------------------------------------
Car traffic volume  :  6477/563   veh/TimePeriod  *
Medium truck volume :   515/45    veh/TimePeriod  *
Heavy truck volume  :   368/32    veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 2: Belfast Rd S (day/night)
----------------------------------------------
Angle1   Angle2           : -49.00 deg   74.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  15.00 / 15.00  m
Receiver height           :   1.50 / 1.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

🡅
Road data, segment # 3: Tremblay Rd (day/night)
-----------------------------------------------
Car traffic volume  :  9715/845   veh/TimePeriod  *
Medium truck volume :   773/67    veh/TimePeriod  *
Heavy truck volume  :   552/48    veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):  12000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
```

```
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 3: Tremblay Rd (day/night)
---------------------------------------------
Angle1   Angle2           :   0.00 deg   72.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  20.00 / 20.00  m
Receiver height           :   1.50 / 1.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

↑
Road data, segment # 4: Hwy 417 West (day/night)
------------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
Posted speed limit  :   100 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):  73332
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 4: Hwy 417 West (day/night)
----------------------------------------------
Angle1   Angle2           :   0.00 deg   70.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 120.00 / 120.00 m
Receiver height           :   1.50 / 1.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

↑
Road data, segment # 5: Hwy 417 East (day/night)
------------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
Posted speed limit  :   100 km/h
```

```
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):  73332
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 5: Hwy 417 East (day/night)
----------------------------------------------
Angle1   Angle2           :   0.00 deg   73.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 100.00 / 100.00 m
Receiver height           :   1.50 / 1.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

↑
Results segment # 1: Belfast Rd N (day)
---------------------------------------

Source height = 1.50 m

ROAD (0.00 + 53.94 + 0.00) = 53.94 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
----------------------------------------------------------------------------
   -84    -49   0.66  67.51   0.00  -3.68  -9.88   0.00   0.00   0.00  53.94
----------------------------------------------------------------------------

Segment Leq : 53.94 dBA

↑
Results segment # 2: Belfast Rd S (day)
---------------------------------------

Source height = 1.50 m

ROAD (0.00 + 63.42 + 0.00) = 63.42 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
----------------------------------------------------------------------------
   -49     74   0.66  65.75   0.00   0.00  -2.33   0.00   0.00   0.00  63.42
----------------------------------------------------------------------------

Segment Leq : 63.42 dBA
```

```
↑
Results segment # 3: Tremblay Rd (day)
--------------------------------------

Source height = 1.50 m

ROAD (0.00 + 60.62 + 0.00) = 60.62 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
--------------------------------------------------------------------------
     0     72   0.66  67.51   0.00  -2.07  -4.82   0.00   0.00   0.00  60.62
--------------------------------------------------------------------------

Segment Leq : 60.62 dBA

↑
Results segment # 4: Hwy 417 West (day)
---------------------------------------

Source height = 1.50 m

ROAD (0.00 + 61.51 + 0.00) = 61.51 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
--------------------------------------------------------------------------
     0     70   0.66  81.40   0.00 -14.99  -4.89   0.00   0.00   0.00  61.51
--------------------------------------------------------------------------

Segment Leq : 61.51 dBA

↑
Results segment # 5: Hwy 417 East (day)
---------------------------------------

Source height = 1.50 m

ROAD (0.00 + 62.93 + 0.00) = 62.93 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
--------------------------------------------------------------------------
     0     73   0.66  81.40   0.00 -13.68  -4.79   0.00   0.00   0.00  62.93
--------------------------------------------------------------------------

Segment Leq : 62.93 dBA

Total Leq All Segments: 68.44 dBA

↑
Results segment # 1: Belfast Rd N (night)
-----------------------------------------

Source height = 1.50 m
```

ROAD (0.00 + 46.35 + 0.00) = 46.35 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-84	-49	0.66	59.91	0.00	-3.68	-9.88	0.00	0.00	0.00	46.35

Segment Leq : 46.35 dBA

Results segment # 2: Belfast Rd S (night)

Source height = 1.50 m

ROAD (0.00 + 55.83 + 0.00) = 55.83 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-49	74	0.66	58.16	0.00	0.00	-2.33	0.00	0.00	0.00	55.83

Segment Leq : 55.83 dBA

Results segment # 3: Tremblay Rd (night)

Source height = 1.50 m

ROAD (0.00 + 53.02 + 0.00) = 53.02 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	72	0.66	59.91	0.00	-2.07	-4.82	0.00	0.00	0.00	53.02

Segment Leq : 53.02 dBA

Results segment # 4: Hwy 417 West (night)

Source height = 1.49 m

ROAD (0.00 + 53.92 + 0.00) = 53.92 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	70	0.66	73.80	0.00	-14.99	-4.89	0.00	0.00	0.00	53.92

Segment Leq : 53.92 dBA

↑
Results segment # 5: Hwy 417 East (night)

Source height = 1.49 m

ROAD (0.00 + 55.33 + 0.00) = 55.33 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	73	0.66	73.80	0.00	-13.68	-4.79	0.00	0.00	0.00	55.33

Segment Leq : 55.33 dBA

Total Leq All Segments: 60.84 dBA

↑

TOTAL Leq FROM ALL SOURCES (DAY): 68.51
(NIGHT): 60.98

↑
↑

```
STAMSON 5.0        NORMAL REPORT        Date: 28-09-2023 10:45:07
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rec26.te             Time Period: Day/Night 16/8 hours
Description: Receptor Point 2-6


Rail data, segment # 1: VIA Rail (day/night)
--------------------------------------------
Train            ! Trains      ! Speed !# loc !# Cars! Eng  !Cont
Type             !             !(km/h) !/Train!/Train! type !weld
-----------------+-------------+-------+------+------+------+----
  1. VIA Rail    !  16.0/0.0   ! 150.0 !  2.0 !  8.0 !Diesel! Yes

Data for Segment # 1: VIA Rail (day/night)
------------------------------------------
Angle1   Angle2           : -43.00 deg   0.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      3 / 3
House density             :     60 %
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 255.00 / 255.00 m
Receiver height           :  18.00 / 18.00  m
Topography                :      1       (Flat/gentle slope; no barrier)
No Whistle
Reference angle           :   0.00

^
Rail data, segment # 2: O-train Rail (day/night)
------------------------------------------------
Train            ! Trains      ! Speed !# loc !# Cars! Eng  !Cont
Type             !             !(km/h) !/Train!/Train! type !weld
-----------------+-------------+-------+------+------+------+----
  1. O-train Rail! 352.0/58.0  !  80.0 !  1.0 !  1.0 !  Elec! Yes

Data for Segment # 2: O-train Rail (day/night)
----------------------------------------------
Angle1   Angle2           :   0.00 deg   72.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  70.00 / 70.00  m
Receiver height           :  18.00 / 18.00  m
Topography                :      1       (Flat/gentle slope; no barrier)
No Whistle
Reference angle           :   0.00

^
Results segment # 1: VIA Rail (day)
-----------------------------------
```

LOCOMOTIVE (0.00 + 45.13 + 0.00) = 45.13 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-43	0	0.09	70.99	-13.41	-6.26	0.00	-6.19	0.00	45.13

WHEEL (0.00 + 33.87 + 0.00) = 33.87 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-43	0	0.19	61.07	-14.70	-6.30	0.00	-6.19	0.00	33.87

Segment Leq : 45.44 dBA

↑

Results segment # 2: O-train Rail (day)

LOCOMOTIVE (0.00 + 51.81 + 0.00) = 51.81 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	72	0.09	63.20	-7.29	-4.10	0.00	0.00	0.00	51.81

WHEEL (0.00 + 50.97 + 0.00) = 50.97 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	72	0.19	63.22	-7.99	-4.25	0.00	0.00	0.00	50.97

Segment Leq : 54.42 dBA

Total Leq All Segments: 54.94 dBA

↑

Results segment # 1: VIA Rail (night)

LOCOMOTIVE (0.00 + -25.86 + 0.00) = 0.00 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-43	0	0.09	0.00	-13.41	-6.26	0.00	-6.19	0.00	-25.86

WHEEL (0.00 + -27.19 + 0.00) = 0.00 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-43	0	0.19	0.00	-14.70	-6.30	0.00	-6.19	0.00	-27.19

Segment Leq : 0.00 dBA

↑
Results segment # 2: O-train Rail (night)

LOCOMOTIVE (0.00 + 46.99 + 0.00) = 46.99 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	72	0.09	58.38	-7.29	-4.10	0.00	0.00	0.00	46.99

WHEEL (0.00 + 46.15 + 0.00) = 46.15 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	72	0.19	58.39	-7.99	-4.25	0.00	0.00	0.00	46.15

Segment Leq : 49.60 dBA

Total Leq All Segments: 49.60 dBA

↑
Road data, segment # 1: Belfast Rd N (day/night)

```
Car traffic volume  :  9715/845   veh/TimePeriod  *
Medium truck volume :   773/67    veh/TimePeriod  *
Heavy truck volume  :   552/48    veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)
```

* Refers to calculated road volumes based on the following input:

```
    24 hr Traffic Volume (AADT or SADT):  12000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00
```

Data for Segment # 1: Belfast Rd N (day/night)

```
Angle1   Angle2           : -84.00 deg   -49.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  25.00 / 25.00  m
Receiver height           :  18.00 / 18.00  m
```

```
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

🡅
Road data, segment # 2: Belfast Rd S (day/night)
------------------------------------------------
Car traffic volume  :  6477/563   veh/TimePeriod  *
Medium truck volume :   515/45    veh/TimePeriod  *
Heavy truck volume  :   368/32    veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 2: Belfast Rd S (day/night)
----------------------------------------------
Angle1   Angle2           : -49.00 deg   74.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  15.00 / 15.00  m
Receiver height           :  18.00 / 18.00  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

🡅
Road data, segment # 3: Tremblay Rd (day/night)
-----------------------------------------------
Car traffic volume  :  9715/845   veh/TimePeriod  *
Medium truck volume :   773/67    veh/TimePeriod  *
Heavy truck volume  :   552/48    veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):  12000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
```

```
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 3: Tremblay Rd (day/night)
---------------------------------------------
Angle1   Angle2           :   0.00 deg   72.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  20.00 / 20.00  m
Receiver height           :  18.00 / 18.00  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

↑
Road data, segment # 4: Hwy 417 West (day/night)
------------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
Posted speed limit  :   100 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):  73332
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 4: Hwy 417 West (day/night)
----------------------------------------------
Angle1   Angle2           :   0.00 deg   70.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 120.00 / 120.00 m
Receiver height           :  18.00 / 18.00  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

↑
Road data, segment # 5: Hwy 417 East (day/night)
------------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
Posted speed limit  :   100 km/h
```

```
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):  73332
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 5: Hwy 417 East (day/night)
----------------------------------------------
Angle1   Angle2           :   0.00 deg   73.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 100.00 / 100.00 m
Receiver height           :  18.00 / 18.00  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

↑
Results segment # 1: Belfast Rd N (day)
---------------------------------------

Source height = 1.50 m

ROAD (0.00 + 57.08 + 0.00) = 57.08 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
----------------------------------------------------------------------------
   -84    -49   0.17  67.51   0.00  -2.58  -7.84   0.00   0.00   0.00  57.08
----------------------------------------------------------------------------

Segment Leq : 57.08 dBA

↑
Results segment # 2: Belfast Rd S (day)
---------------------------------------

Source height = 1.50 m

ROAD (0.00 + 63.91 + 0.00) = 63.91 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
----------------------------------------------------------------------------
   -49     74   0.17  65.75   0.00   0.00  -1.84   0.00   0.00   0.00  63.91
----------------------------------------------------------------------------

Segment Leq : 63.91 dBA
```

↑
Results segment # 3: Tremblay Rd (day)

Source height = 1.50 m

ROAD (0.00 + 61.85 + 0.00) = 61.85 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	72	0.17	67.51	0.00	-1.46	-4.21	0.00	0.00	0.00	61.85

Segment Leq : 61.85 dBA

↑
Results segment # 4: Hwy 417 West (day)

Source height = 1.50 m

ROAD (0.00 + 66.56 + 0.00) = 66.56 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	70	0.17	81.40	0.00	-10.52	-4.31	0.00	0.00	0.00	66.56

Segment Leq : 66.56 dBA

↑
Results segment # 5: Hwy 417 East (day)

Source height = 1.50 m

ROAD (0.00 + 67.64 + 0.00) = 67.64 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	73	0.17	81.40	0.00	-9.60	-4.16	0.00	0.00	0.00	67.64

Segment Leq : 67.64 dBA

Total Leq All Segments: 71.71 dBA

↑
Results segment # 1: Belfast Rd N (night)

Source height = 1.50 m

ROAD (0.00 + 49.48 + 0.00) = 49.48 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-84	-49	0.17	59.91	0.00	-2.58	-7.84	0.00	0.00	0.00	49.48

Segment Leq : 49.48 dBA

↑
Results segment # 2: Belfast Rd S (night)

Source height = 1.50 m

ROAD (0.00 + 56.32 + 0.00) = 56.32 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-49	74	0.17	58.16	0.00	0.00	-1.84	0.00	0.00	0.00	56.32

Segment Leq : 56.32 dBA

↑
Results segment # 3: Tremblay Rd (night)

Source height = 1.50 m

ROAD (0.00 + 54.25 + 0.00) = 54.25 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	72	0.17	59.91	0.00	-1.46	-4.21	0.00	0.00	0.00	54.25

Segment Leq : 54.25 dBA

↑
Results segment # 4: Hwy 417 West (night)

Source height = 1.49 m

ROAD (0.00 + 58.96 + 0.00) = 58.96 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	70	0.17	73.80	0.00	-10.52	-4.31	0.00	0.00	0.00	58.96

Segment Leq : 58.96 dBA

↑
Results segment # 5: Hwy 417 East (night)

Source height = 1.49 m

ROAD (0.00 + 60.04 + 0.00) = 60.04 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	73	0.17	73.80	0.00	-9.60	-4.16	0.00	0.00	0.00	60.04

Segment Leq : 60.04 dBA

Total Leq All Segments: 64.12 dBA

↑

TOTAL Leq FROM ALL SOURCES (DAY): 71.80
(NIGHT): 64.27

↑
↑

```
STAMSON 5.0        NORMAL REPORT       Date: 26-09-2023 17:17:28
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rec31.te              Time Period: Day/Night 16/8 hours
Description: Receptor Point 3-1


Rail data, segment # 1: VIA Rail (day/night)
--------------------------------------------
Train            ! Trains      ! Speed !# loc !# Cars! Eng  !Cont
Type             !             !(km/h) !/Train!/Train! type !weld
-----------------+-------------+-------+------+------+------+----
  1. VIA Rail    !  16.0/0.0   ! 150.0 !  2.0 !  8.0 !Diesel!  No

Data for Segment # 1: VIA Rail (day/night)
------------------------------------------
Angle1   Angle2           : -45.00 deg   30.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      3 / 3
House density             :     60 %
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 240.00 / 240.00 m
Receiver height           :   1.50 / 1.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
No Whistle
Reference angle           :   0.00

↑
Results segment # 1: VIA Rail (day)
-----------------------------------

LOCOMOTIVE (0.00 + 41.69 + 0.00) = 41.69 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
----------------------------------------------------------------------
   -45     30   0.58  70.99 -19.09  -4.01   0.00  -6.20   0.00  41.69
----------------------------------------------------------------------

WHEEL (0.00 + 33.84 + 0.00) = 33.84 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
----------------------------------------------------------------------
   -45     30   0.66  64.07 -19.99  -4.04   0.00  -6.20   0.00  33.84
----------------------------------------------------------------------

Segment Leq : 42.35 dBA

Total Leq All Segments: 42.35 dBA

↑
Results segment # 1: VIA Rail (night)
-------------------------------------
```

```
LOCOMOTIVE (0.00 + -29.30 + 0.00) = 0.00 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
----------------------------------------------------------------------
   -45     30   0.58   0.00 -19.09  -4.01   0.00  -6.20   0.00 -29.30
----------------------------------------------------------------------

WHEEL (0.00 + -30.23 + 0.00) = 0.00 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
----------------------------------------------------------------------
   -45     30   0.66   0.00 -19.99  -4.04   0.00  -6.20   0.00 -30.23
----------------------------------------------------------------------

Segment Leq : 0.00 dBA

Total Leq All Segments: 0.00 dBA
```

↑

```
Road data, segment # 1: Belfast Rd S (day/night)
------------------------------------------------
Car traffic volume  :  6477/563   veh/TimePeriod  *
Medium truck volume :   515/45    veh/TimePeriod  *
Heavy truck volume  :   368/32    veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 1: Belfast Rd S (day/night)
----------------------------------------------
Angle1   Angle2           :   0.00 deg   64.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  30.00 / 30.00  m
Receiver height           :   1.50 / 1.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00
```

↑

```
Results segment # 1: Belfast Rd S (day)
---------------------------------------
```

Source height = 1.50 m

ROAD (0.00 + 55.62 + 0.00) = 55.62 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	64	0.66	65.75	0.00	-5.00	-5.14	0.00	0.00	0.00	55.62

Segment Leq : 55.62 dBA

Total Leq All Segments: 55.62 dBA

↑
Results segment # 1: Belfast Rd S (night)

Source height = 1.50 m

ROAD (0.00 + 48.02 + 0.00) = 48.02 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	64	0.66	58.16	0.00	-5.00	-5.14	0.00	0.00	0.00	48.02

Segment Leq : 48.02 dBA

Total Leq All Segments: 48.02 dBA

↑

TOTAL Leq FROM ALL SOURCES (DAY): 55.82
(NIGHT): 48.02

↑
↑

```
STAMSON 5.0        NORMAL REPORT       Date: 28-09-2023 10:45:57
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rec36.te             Time Period: Day/Night 16/8 hours
Description: Receptor Point 3-6


Rail data, segment # 1: VIA Rail (day/night)
--------------------------------------------
Train            ! Trains      ! Speed !# loc !# Cars! Eng  !Cont
Type             !             !(km/h) !/Train!/Train! type !weld
-----------------+-------------+-------+------+------+------+----
  1. VIA Rail    !  16.0/0.0   ! 150.0 !  2.0 !  8.0 !Diesel!  No

Data for Segment # 1: VIA Rail (day/night)
------------------------------------------
Angle1   Angle2           : -45.00 deg   30.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      3 / 3
House density             :     60 %
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 240.00 / 240.00 m
Receiver height           :  18.00 / 18.00  m
Topography                :      1       (Flat/gentle slope; no barrier)
No Whistle
Reference angle           :   0.00

↑
Results segment # 1: VIA Rail (day)
-----------------------------------

LOCOMOTIVE (0.00 + 47.83 + 0.00) = 47.83 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
----------------------------------------------------------------------
   -45     30   0.09  70.99 -13.12  -3.84   0.00  -6.20   0.00  47.83
----------------------------------------------------------------------

WHEEL (0.00 + 39.60 + 0.00) = 39.60 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
----------------------------------------------------------------------
   -45     30   0.19  64.07 -14.39  -3.87   0.00  -6.20   0.00  39.60
----------------------------------------------------------------------

Segment Leq : 48.44 dBA

Total Leq All Segments: 48.44 dBA

↑
Results segment # 1: VIA Rail (night)
-------------------------------------
```

```
LOCOMOTIVE (0.00 + -23.16 + 0.00) = 0.00 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
----------------------------------------------------------------------
   -45     30   0.09   0.00 -13.12  -3.84   0.00  -6.20   0.00 -23.16
----------------------------------------------------------------------

WHEEL (0.00 + -24.46 + 0.00) = 0.00 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
----------------------------------------------------------------------
   -45     30   0.19   0.00 -14.39  -3.87   0.00  -6.20   0.00 -24.46
----------------------------------------------------------------------

Segment Leq : 0.00 dBA

Total Leq All Segments: 0.00 dBA

↑
Road data, segment # 1: Belfast Rd S (day/night)
------------------------------------------------
Car traffic volume  :  6477/563   veh/TimePeriod  *
Medium truck volume :   515/45    veh/TimePeriod  *
Heavy truck volume  :   368/32    veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 1: Belfast Rd S (day/night)
----------------------------------------------
Angle1   Angle2           :   0.00 deg   64.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  30.00 / 30.00  m
Receiver height           :  18.00 / 18.00  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

↑
Results segment # 1: Belfast Rd S (day)
---------------------------------------
```

Source height = 1.50 m

ROAD (0.00 + 57.58 + 0.00) = 57.58 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	64	0.17	65.75	0.00	-3.51	-4.66	0.00	0.00	0.00	57.58

Segment Leq : 57.58 dBA

Total Leq All Segments: 57.58 dBA

↑

Results segment # 1: Belfast Rd S (night)

Source height = 1.50 m

ROAD (0.00 + 49.99 + 0.00) = 49.99 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	64	0.17	58.16	0.00	-3.51	-4.66	0.00	0.00	0.00	49.99

Segment Leq : 49.99 dBA

Total Leq All Segments: 49.99 dBA

↑

TOTAL Leq FROM ALL SOURCES (DAY): 58.08
(NIGHT): 49.99

↑
↑

```
STAMSON 5.0        NORMAL REPORT        Date: 27-09-2023 16:23:47
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rec41.te             Time Period: Day/Night 16/8 hours
Description: Receptor Point 4-1


Rail data, segment # 1: VIA Rail (day/night)
--------------------------------------------
Train            ! Trains      ! Speed !# loc !# Cars! Eng  !Cont
Type             !             !(km/h) !/Train!/Train! type !weld
-----------------+-------------+-------+------+------+------+----
  1. VIA Rail    !  16.0/0.0   ! 150.0 !  2.0 !  8.0 !Diesel!  No

Data for Segment # 1: VIA Rail (day/night)
------------------------------------------
Angle1   Angle2           :   0.00 deg   31.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      3 / 3
House density             :     60 %
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 255.00 / 255.00 m
Receiver height           :   1.50 / 1.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
No Whistle
Reference angle           :   0.00

↑
Rail data, segment # 2: O-train Rail (day/night)
------------------------------------------------
Train            ! Trains      ! Speed !# loc !# Cars! Eng  !Cont
Type             !             !(km/h) !/Train!/Train! type !weld
-----------------+-------------+-------+------+------+------+----
  1. O-train Rail! 352.0/58.0  !  80.0 !  1.0 !  1.0 !  Elec! Yes

Data for Segment # 2: O-train Rail (day/night)
----------------------------------------------
Angle1   Angle2           : -10.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  70.00 / 70.00  m
Receiver height           :   1.50 / 1.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
No Whistle
Reference angle           :   0.00

↑
Results segment # 1: VIA Rail (day)
-----------------------------------
```

LOCOMOTIVE (0.00 + 37.53 + 0.00) = 37.53 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	31	0.58	70.99	-19.50	-7.77	0.00	-6.19	0.00	37.53

WHEEL (0.00 + 29.67 + 0.00) = 29.67 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	31	0.66	64.07	-20.43	-7.78	0.00	-6.19	0.00	29.67

Segment Leq : 38.19 dBA

↑
Results segment # 2: O-train Rail (day)

LOCOMOTIVE (0.00 + 48.87 + 0.00) = 48.87 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-10	90	0.58	63.20	-10.60	-3.73	0.00	0.00	0.00	48.87

WHEEL (0.00 + 48.27 + 0.00) = 48.27 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-10	90	0.66	63.22	-11.11	-3.84	0.00	0.00	0.00	48.27

Segment Leq : 51.59 dBA

Total Leq All Segments: 51.78 dBA

↑
Results segment # 1: VIA Rail (night)

LOCOMOTIVE (0.00 + -33.46 + 0.00) = 0.00 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	31	0.58	0.00	-19.50	-7.77	0.00	-6.19	0.00	-33.46

WHEEL (0.00 + -34.39 + 0.00) = 0.00 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	31	0.66	0.00	-20.43	-7.78	0.00	-6.19	0.00	-34.39

Segment Leq : 0.00 dBA

↑
Results segment # 2: O-train Rail (night)

LOCOMOTIVE (0.00 + 44.05 + 0.00) = 44.05 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-10	90	0.58	58.38	-10.60	-3.73	0.00	0.00	0.00	44.05

WHEEL (0.00 + 43.45 + 0.00) = 43.45 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-10	90	0.66	58.39	-11.11	-3.84	0.00	0.00	0.00	43.45

Segment Leq : 46.77 dBA

Total Leq All Segments: 46.77 dBA

↑
Road data, segment # 1: Tremblay Rd (day/night)

```
Car traffic volume  :  9715/845   veh/TimePeriod  *
Medium truck volume :   773/67    veh/TimePeriod  *
Heavy truck volume  :   552/48    veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)
```

* Refers to calculated road volumes based on the following input:

```
    24 hr Traffic Volume (AADT or SADT):  12000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00
```

Data for Segment # 1: Tremblay Rd (day/night)

```
Angle1   Angle2           : -84.00 deg   0.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  20.00 / 20.00  m
Receiver height           :   1.50 / 1.50   m
```

```
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

🡅
Road data, segment # 2: Hwy 417 West (day/night)
------------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
Posted speed limit  :   100 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):  73332
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 2: Hwy 417 West (day/night)
----------------------------------------------
Angle1   Angle2           :   5.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 120.00 / 120.00 m
Receiver height           :   1.50 / 1.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

🡅
Road data, segment # 3: Hwy 417 East (day/night)
------------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
Posted speed limit  :   100 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):  73332
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
```

```
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 3: Hwy 417 East (day/night)
----------------------------------------------
Angle1   Angle2           :   2.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 100.00 / 100.00 m
Receiver height           :   1.50 / 1.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Results segment # 1: Tremblay Rd (day)
--------------------------------------

Source height = 1.50 m

ROAD (0.00 + 60.91 + 0.00) = 60.91 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
----------------------------------------------------------------------------
   -84      0   0.66  67.51   0.00  -2.07  -4.52   0.00   0.00   0.00  60.91
----------------------------------------------------------------------------

Segment Leq : 60.91 dBA

Results segment # 2: Hwy 417 West (day)
---------------------------------------

Source height = 1.50 m

ROAD (0.00 + 61.59 + 0.00) = 61.59 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
----------------------------------------------------------------------------
     5     90   0.66  81.40   0.00 -14.99  -4.82   0.00   0.00   0.00  61.59
----------------------------------------------------------------------------

Segment Leq : 61.59 dBA

Results segment # 3: Hwy 417 East (day)
---------------------------------------

Source height = 1.50 m

ROAD (0.00 + 63.12 + 0.00) = 63.12 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
----------------------------------------------------------------------------
```

```
     2     90   0.66  81.40   0.00 -13.68  -4.60   0.00   0.00   0.00  63.12
----------------------------------------------------------------------------

Segment Leq : 63.12 dBA

Total Leq All Segments: 66.75 dBA
```

🡅
Results segment # 1: Tremblay Rd (night)

```
----------------------------------------

Source height = 1.50 m

ROAD (0.00 + 53.32 + 0.00) = 53.32 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
----------------------------------------------------------------------------
   -84      0   0.66  59.91   0.00  -2.07  -4.52   0.00   0.00   0.00  53.32
----------------------------------------------------------------------------

Segment Leq : 53.32 dBA
```

🡅
Results segment # 2: Hwy 417 West (night)

```
-----------------------------------------

Source height = 1.49 m

ROAD (0.00 + 53.99 + 0.00) = 53.99 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
----------------------------------------------------------------------------
     5     90   0.66  73.80   0.00 -14.99  -4.82   0.00   0.00   0.00  53.99
----------------------------------------------------------------------------

Segment Leq : 53.99 dBA
```

🡅
Results segment # 3: Hwy 417 East (night)

```
-----------------------------------------

Source height = 1.49 m

ROAD (0.00 + 55.52 + 0.00) = 55.52 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
----------------------------------------------------------------------------
     2     90   0.66  73.80   0.00 -13.68  -4.60   0.00   0.00   0.00  55.52
----------------------------------------------------------------------------

Segment Leq : 55.52 dBA

Total Leq All Segments: 59.15 dBA
```

↑

TOTAL Leq FROM ALL SOURCES (DAY): 66.88
(NIGHT): 59.39

↑

↑

```
STAMSON 5.0        NORMAL REPORT       Date: 28-09-2023 10:47:37
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rec46.te             Time Period: Day/Night 16/8 hours
Description: Receptor Point 4-6


Rail data, segment # 1: VIA Rail (day/night)
--------------------------------------------
Train            ! Trains      ! Speed !# loc !# Cars! Eng  !Cont
Type             !             !(km/h) !/Train!/Train! type !weld
-----------------+-------------+-------+------+------+------+----
  1. VIA Rail    !  16.0/0.0   ! 150.0 !  2.0 !  8.0 !Diesel!  No

Data for Segment # 1: VIA Rail (day/night)
------------------------------------------
Angle1   Angle2           :   0.00 deg   31.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      3 / 3
House density             :     60 %
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 255.00 / 255.00 m
Receiver height           :  18.00 / 18.00  m
Topography                :      1       (Flat/gentle slope; no barrier)
No Whistle
Reference angle           :   0.00

↑
Rail data, segment # 2: O-train Rail (day/night)
------------------------------------------------
Train            ! Trains      ! Speed !# loc !# Cars! Eng  !Cont
Type             !             !(km/h) !/Train!/Train! type !weld
-----------------+-------------+-------+------+------+------+----
  1. O-train Rail! 352.0/58.0  !  80.0 !  1.0 !  1.0 !  Elec! Yes

Data for Segment # 2: O-train Rail (day/night)
----------------------------------------------
Angle1   Angle2           : -10.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  70.00 / 70.00  m
Receiver height           :  18.00 / 18.00  m
Topography                :      1       (Flat/gentle slope; no barrier)
No Whistle
Reference angle           :   0.00

↑
Results segment # 1: VIA Rail (day)
-----------------------------------
```

LOCOMOTIVE (0.00 + 43.73 + 0.00) = 43.73 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	31	0.09	70.99	-13.41	-7.66	0.00	-6.19	0.00	43.73

WHEEL (0.00 + 35.49 + 0.00) = 35.49 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	31	0.19	64.07	-14.70	-7.68	0.00	-6.19	0.00	35.49

Segment Leq : 44.34 dBA

↑
Results segment # 2: O-train Rail (day)

LOCOMOTIVE (0.00 + 53.13 + 0.00) = 53.13 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-10	90	0.09	63.20	-7.29	-2.78	0.00	0.00	0.00	53.13

WHEEL (0.00 + 52.20 + 0.00) = 52.20 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-10	90	0.19	63.22	-7.99	-3.02	0.00	0.00	0.00	52.20

Segment Leq : 55.70 dBA

Total Leq All Segments: 56.01 dBA

↑
Results segment # 1: VIA Rail (night)

LOCOMOTIVE (0.00 + -27.26 + 0.00) = 0.00 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	31	0.09	0.00	-13.41	-7.66	0.00	-6.19	0.00	-27.26

WHEEL (0.00 + -28.57 + 0.00) = 0.00 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	31	0.19	0.00	-14.70	-7.68	0.00	-6.19	0.00	-28.57

```
Segment Leq : 0.00 dBA

↑
Results segment # 2: O-train Rail (night)
-----------------------------------------

LOCOMOTIVE (0.00 + 48.31 + 0.00) = 48.31 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
----------------------------------------------------------------------
   -10     90   0.09  58.38  -7.29  -2.78   0.00   0.00   0.00  48.31
----------------------------------------------------------------------

WHEEL (0.00 + 47.38 + 0.00) = 47.38 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
----------------------------------------------------------------------
   -10     90   0.19  58.39  -7.99  -3.02   0.00   0.00   0.00  47.38
----------------------------------------------------------------------

Segment Leq : 50.88 dBA

Total Leq All Segments: 50.88 dBA

↑
Road data, segment # 1: Tremblay Rd (day/night)
-----------------------------------------------
Car traffic volume  :  9715/845   veh/TimePeriod  *
Medium truck volume :   773/67    veh/TimePeriod  *
Heavy truck volume  :   552/48    veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):  12000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 1: Tremblay Rd (day/night)
---------------------------------------------
Angle1   Angle2           : -84.00 deg   0.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  20.00 / 20.00  m
Receiver height           :  18.00 / 18.00  m
```

```
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

↑
Road data, segment # 2: Hwy 417 West (day/night)
------------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
Posted speed limit  :   100 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):  73332
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 2: Hwy 417 West (day/night)
----------------------------------------------
Angle1   Angle2           :   5.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 120.00 / 120.00 m
Receiver height           :  18.00 / 18.00  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

↑
Road data, segment # 3: Hwy 417 East (day/night)
------------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
Posted speed limit  :   100 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):  73332
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
```

```
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 3: Hwy 417 East (day/night)
----------------------------------------------
Angle1   Angle2           :   2.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 100.00 / 100.00 m
Receiver height           :  18.00 / 18.00  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00
```

↑

```
Results segment # 1: Tremblay Rd (day)
--------------------------------------

Source height = 1.50 m

ROAD (0.00 + 62.40 + 0.00) = 62.40 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
----------------------------------------------------------------------------
   -84      0   0.17  67.51   0.00  -1.46  -3.66   0.00   0.00   0.00  62.40
----------------------------------------------------------------------------

Segment Leq : 62.40 dBA
```

↑

```
Results segment # 2: Hwy 417 West (day)
---------------------------------------

Source height = 1.50 m

ROAD (0.00 + 67.14 + 0.00) = 67.14 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
----------------------------------------------------------------------------
     5     90   0.17  81.40   0.00 -10.52  -3.74   0.00   0.00   0.00  67.14
----------------------------------------------------------------------------

Segment Leq : 67.14 dBA
```

↑

```
Results segment # 3: Hwy 417 East (day)
---------------------------------------

Source height = 1.50 m

ROAD (0.00 + 68.23 + 0.00) = 68.23 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
----------------------------------------------------------------------------
```

2	90	0.17	81.40	0.00	-9.60	-3.57	0.00	0.00	0.00	68.23

Segment Leq : 68.23 dBA

Total Leq All Segments: 71.32 dBA

↑
Results segment # 1: Tremblay Rd (night)

Source height = 1.50 m

ROAD (0.00 + 54.80 + 0.00) = 54.80 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-84	0	0.17	59.91	0.00	-1.46	-3.66	0.00	0.00	0.00	54.80

Segment Leq : 54.80 dBA

↑
Results segment # 2: Hwy 417 West (night)

Source height = 1.49 m

ROAD (0.00 + 59.54 + 0.00) = 59.54 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
5	90	0.17	73.80	0.00	-10.52	-3.74	0.00	0.00	0.00	59.54

Segment Leq : 59.54 dBA

↑
Results segment # 3: Hwy 417 East (night)

Source height = 1.49 m

ROAD (0.00 + 60.63 + 0.00) = 60.63 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
2	90	0.17	73.80	0.00	-9.60	-3.57	0.00	0.00	0.00	60.63

Segment Leq : 60.63 dBA

Total Leq All Segments: 63.72 dBA

🡅

TOTAL Leq FROM ALL SOURCES (DAY): 71.45
(NIGHT): 63.94

🡅

🡅

```
STAMSON 5.0        NORMAL REPORT        Date: 28-09-2023 09:43:54
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rec5.te              Time Period: Day/Night 16/8 hours
Description: Receptor Point 5


Rail data, segment # 1: VIA Rail (day/night)
--------------------------------------------
Train            ! Trains      ! Speed !# loc !# Cars! Eng  !Cont
Type             !             !(km/h) !/Train!/Train! type !weld
-----------------+-------------+-------+------+------+------+----
  1. VIA Rail    !  16.0/0.0   ! 150.0 !  2.0 !  8.0 !Diesel!  No

Data for Segment # 1: VIA Rail (day/night)
------------------------------------------
Angle1   Angle2           : -43.00 deg   31.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      3 / 3
House density             :     60 %
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 247.00 / 247.00 m
Receiver height           :  21.50 / 21.50  m
Topography                :      2       (Flat/gentle slope; with barrier)
No Whistle
Barrier angle1            : -43.00 deg   Angle2 : 31.00 deg
Barrier height            :  20.00 m
Barrier receiver distance :   7.00 / 7.00   m
Source elevation          :  62.00 m
Receiver elevation        :  62.00 m
Barrier elevation         :  62.00 m
Reference angle           :   0.00

↑
Rail data, segment # 2: O-train Rail (day/night)
------------------------------------------------
Train            ! Trains      ! Speed !# loc !# Cars! Eng  !Cont
Type             !             !(km/h) !/Train!/Train! type !weld
-----------------+-------------+-------+------+------+------+----
  1. O-train Rail! 352.0/58.0  !  80.0 !  1.0 !  1.0 !  Elec! Yes

Data for Segment # 2: O-train Rail (day/night)
----------------------------------------------
Angle1   Angle2           : -10.00 deg   17.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      2 / 2
House density             :     40 %
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 250.00 / 250.00 m
Receiver height           :  21.50 / 21.50  m
```

```
Topography                 :      2       (Flat/gentle slope; with barrier)
No Whistle
Barrier angle1             : -10.00 deg   Angle2 : 17.00 deg
Barrier height             :  20.00 m
Barrier receiver distance :  15.00 / 15.00  m
Source elevation           :  62.00 m
Receiver elevation         :  62.00 m
Barrier elevation          :  62.00 m
Reference angle            :   0.00
```

↑

```
Results segment # 1: VIA Rail (day)
-----------------------------------

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       4.00 !       21.50 !       21.00 !        83.00
       0.50 !       21.50 !       20.90 !        82.90

LOCOMOTIVE (0.00 + 48.77 + 0.00) = 48.77 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
----------------------------------------------------------------------
   -43     31   0.00  70.99 -12.17  -3.86   0.00  -6.19   0.00  48.77
   -43     31   0.00  70.99 -12.17  -3.86   0.00   0.00  -0.16  54.81*
   -43     31   0.00  70.99 -12.17  -3.86   0.00   0.00   0.00  54.96
----------------------------------------------------------------------

 * Bright Zone !

WHEEL (0.00 + 40.72 + 0.00) = 40.72 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
----------------------------------------------------------------------
   -43     31   0.09  64.07 -13.26  -3.89   0.00  -6.19   0.00  40.72
   -43     31   0.00  64.07 -12.17  -3.86   0.00   0.00  -1.14  46.90*
   -43     31   0.09  64.07 -13.26  -3.89   0.00   0.00   0.00  46.91
----------------------------------------------------------------------

 * Bright Zone !

Segment Leq : 49.40 dBA
```

↑

```
Results segment # 2: O-train Rail (day)
---------------------------------------

Barrier height for grazing incidence
------------------------------------
```

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
4.00	21.50	20.45	82.45
0.50	21.50	20.24	82.24

LOCOMOTIVE (0.00 + 39.35 + 0.00) = 39.35 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-10	17	0.00	63.20	-12.22	-8.24	0.00	-3.40	0.00	39.35
-10	17	0.00	63.20	-12.22	-8.24	0.00	0.00	-4.62	38.13*
-10	17	0.00	63.20	-12.22	-8.24	0.00	0.00	0.00	42.75

* Bright Zone !

WHEEL (0.00 + 38.26 + 0.00) = 38.26 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-10	17	0.09	63.22	-13.32	-8.24	0.00	-3.40	0.00	38.26
-10	17	0.00	63.22	-12.22	-8.24	0.00	0.00	-4.89	37.86*
-10	17	0.09	63.22	-13.32	-8.24	0.00	0.00	0.00	41.65

* Bright Zone !

Segment Leq : 41.85 dBA

Total Leq All Segments: 50.10 dBA

Results segment # 1: VIA Rail (night)

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
4.00	21.50	21.00	83.00
0.50	21.50	20.90	82.90

LOCOMOTIVE (0.00 + -22.22 + 0.00) = 0.00 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-43	31	0.00	0.00	-12.17	-3.86	0.00	-6.19	0.00	-22.22
-43	31	0.00	0.00	-12.17	-3.86	0.00	0.00	-0.16	-16.18*
-43	31	0.00	0.00	-12.17	-3.86	0.00	0.00	0.00	-16.03

* Bright Zone !

WHEEL (0.00 + -23.35 + 0.00) = 0.00 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-43	31	0.09	0.00	-13.26	-3.89	0.00	-6.19	0.00	-23.35
-43	31	0.00	0.00	-12.17	-3.86	0.00	0.00	-1.14	-17.17*
-43	31	0.09	0.00	-13.26	-3.89	0.00	0.00	0.00	-17.15

* Bright Zone !

Segment Leq : 0.00 dBA

↑

Results segment # 2: O-train Rail (night)

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
4.00	21.50	20.45	82.45
0.50	21.50	20.24	82.24

LOCOMOTIVE (0.00 + 34.53 + 0.00) = 34.53 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-10	17	0.00	58.38	-12.22	-8.24	0.00	-3.40	0.00	34.53
-10	17	0.00	58.38	-12.22	-8.24	0.00	0.00	-4.62	33.31*
-10	17	0.00	58.38	-12.22	-8.24	0.00	0.00	0.00	37.93

* Bright Zone !

WHEEL (0.00 + 33.44 + 0.00) = 33.44 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-10	17	0.09	58.39	-13.32	-8.24	0.00	-3.40	0.00	33.44
-10	17	0.00	58.39	-12.22	-8.24	0.00	0.00	-4.89	33.04*
-10	17	0.09	58.39	-13.32	-8.24	0.00	0.00	0.00	36.83

* Bright Zone !

Segment Leq : 37.03 dBA

Total Leq All Segments: 37.03 dBA

```
↑
Road data, segment # 1: TremblayRd A (day/night)
------------------------------------------------
Car traffic volume  :  9715/845   veh/TimePeriod  *
Medium truck volume :   773/67    veh/TimePeriod  *
Heavy truck volume  :   552/48    veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):  12000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 1: TremblayRd A (day/night)
----------------------------------------------
Angle1   Angle2            : -85.00 deg   -73.00 deg
Wood depth                 :      0       (No woods.)
No of house rows           :      0 / 0
Surface                    :      1       (Absorptive ground surface)
Receiver source distance   :  85.00 / 85.00  m
Receiver height            :  21.50 / 21.50  m
Topography                 :      2       (Flat/gentle slope; with barrier)
Barrier angle1             : -85.00 deg   Angle2 : -73.00 deg
Barrier height             :  20.00 m
Barrier receiver distance  :  15.00 / 15.00  m
Source elevation           :  62.00 m
Receiver elevation         :  62.00 m
Barrier elevation          :  62.00 m
Reference angle            :   0.00

↑
Road data, segment # 2: TremblayRd B (day/night)
------------------------------------------------
Car traffic volume  :  9715/845   veh/TimePeriod  *
Medium truck volume :   773/67    veh/TimePeriod  *
Heavy truck volume  :   552/48    veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):  12000
    Percentage of Annual Growth        :   0.00
```

```
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 2: TremblayRd B (day/night)
----------------------------------------------
Angle1   Angle2           :  58.00 deg   74.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  85.00 / 85.00  m
Receiver height           :  21.50 / 21.50  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :  58.00 deg   Angle2 : 74.00 deg
Barrier height            :  20.00 m
Barrier receiver distance :  15.00 / 15.00  m
Source elevation          :  62.00 m
Receiver elevation        :  62.00 m
Barrier elevation         :  62.00 m
Reference angle           :   0.00

Road data, segment # 3: Belfast S (day/night)
---------------------------------------------
Car traffic volume  :  6477/563   veh/TimePeriod  *
Medium truck volume :   515/45    veh/TimePeriod  *
Heavy truck volume  :   368/32    veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 3: Belfast S (day/night)
-------------------------------------------
Angle1   Angle2           : -32.00 deg   68.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  30.00 / 30.00  m
Receiver height           :  21.50 / 21.50  m
Topography                :      2       (Flat/gentle slope; with barrier)
```

```
Barrier angle1            : -32.00 deg   Angle2 : 68.00 deg
Barrier height            :  20.00 m
Barrier receiver distance :  15.00 / 15.00  m
Source elevation          :  62.00 m
Receiver elevation        :  62.00 m
Barrier elevation         :  62.00 m
Reference angle           :   0.00
```

↑

```
Road data, segment # 4: Hwy417 W A (day/night)
----------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
Posted speed limit  :   100 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):  73332
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 4: Hwy417 W A (day/night)
--------------------------------------------
Angle1   Angle2           : -87.00 deg   -73.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 400.00 / 400.00 m
Receiver height           :  21.50 / 21.50  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -87.00 deg   Angle2 : -73.00 deg
Barrier height            :  20.00 m
Barrier receiver distance :  15.00 / 15.00  m
Source elevation          :  62.00 m
Receiver elevation        :  62.00 m
Barrier elevation         :  62.00 m
Reference angle           :   0.00
```

↑

```
Road data, segment # 5: Hwy417 W B (day/night)
----------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
```

```
Posted speed limit  :   100 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):  73332
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 5: Hwy417 W B (day/night)
--------------------------------------------
Angle1   Angle2           :  58.00 deg   71.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 400.00 / 400.00 m
Receiver height           :  21.50 / 21.50  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :  58.00 deg   Angle2 : 71.00 deg
Barrier height            :  20.00 m
Barrier receiver distance :  15.00 / 15.00  m
Source elevation          :  62.00 m
Receiver elevation        :  62.00 m
Barrier elevation         :  62.00 m
Reference angle           :   0.00

↑
Road data, segment # 6: Hwy417 E A (day/night)
----------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
Posted speed limit  :   100 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):  73332
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 6: Hwy417 E A (day/night)
```

```
--------------------------------------------
Angle1   Angle2           : -90.00 deg   -73.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 330.00 / 330.00 m
Receiver height           :  21.50 / 21.50  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : -73.00 deg
Barrier height            :  20.00 m
Barrier receiver distance :  15.00 / 15.00  m
Source elevation          :  62.00 m
Receiver elevation        :  62.00 m
Barrier elevation         :  62.00 m
Reference angle           :   0.00
```

↑

```
Road data, segment # 7: Hwy417 E B (day/night)
----------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
Posted speed limit  :   100 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):  73332
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 7: Hwy417 E B (day/night)
--------------------------------------------
Angle1   Angle2           :  58.00 deg   72.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 330.00 / 330.00 m
Receiver height           :  21.50 / 21.50  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :  58.00 deg   Angle2 : 72.00 deg
Barrier height            :  20.00 m
Barrier receiver distance :  15.00 / 15.00  m
Source elevation          :  62.00 m
Receiver elevation        :  62.00 m
Barrier elevation         :  62.00 m
```

Reference angle : 0.00

↑
Results segment # 1: TremblayRd A (day)

Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	21.50	17.97	79.97

ROAD (0.00 + 41.84 + 0.00) = 41.84 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-85	-73	0.00	67.51	0.00	-7.53	-11.76	0.00	0.00	-6.38	41.84

Segment Leq : 41.84 dBA

↑
Results segment # 2: TremblayRd B (day)

Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	21.50	17.97	79.97

ROAD (0.00 + 41.82 + 0.00) = 41.82 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
58	74	0.00	67.51	0.00	-7.53	-10.51	0.00	0.00	-7.65	41.82

Segment Leq : 41.82 dBA

↑
Results segment # 3: Belfast S (day)

Source height = 1.50 m

```
Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.50 !       21.50 !       11.50 !        73.50

ROAD (0.00 + 40.35 + 0.00) = 40.35 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
--------------------------------------------------------------------------
   -32     68   0.00  65.75   0.00  -3.01  -2.55   0.00   0.00 -19.83  40.35
--------------------------------------------------------------------------

Segment Leq : 40.35 dBA

↑
Results segment # 4: Hwy417 W A (day)
-------------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.50 !       21.50 !       20.75 !        82.75

ROAD (0.00 + 54.71 + 0.00) = 54.71 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
--------------------------------------------------------------------------
   -87    -73   0.00  81.40   0.00 -14.26 -11.09   0.00   0.00  -4.82  51.23*
   -87    -73   0.06  81.40   0.00 -15.12 -11.57   0.00   0.00   0.00  54.71
--------------------------------------------------------------------------

 * Bright Zone !

Segment Leq : 54.71 dBA

↑
Results segment # 5: Hwy417 W B (day)
-------------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
```

```
       1.50 !       21.50 !       20.75 !        82.75

ROAD (0.00 + 54.64 + 0.00) = 54.64 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
----------------------------------------------------------------------------
    58     71   0.00  81.40   0.00 -14.26 -11.41   0.00   0.00  -4.54  51.18*
    58     71   0.06  81.40   0.00 -15.12 -11.64   0.00   0.00   0.00  54.64
----------------------------------------------------------------------------

 * Bright Zone !

Segment Leq : 54.64 dBA
```

↑
Results segment # 6: Hwy417 E A (day)

```
-------------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.50 !       21.50 !       20.59 !        82.59

ROAD (0.00 + 56.35 + 0.00) = 56.35 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
----------------------------------------------------------------------------
   -90    -73   0.00  81.40   0.00 -13.42 -10.25   0.00   0.00  -4.90  52.82*
   -90    -73   0.06  81.40   0.00 -14.23 -10.82   0.00   0.00   0.00  56.35
----------------------------------------------------------------------------

 * Bright Zone !

Segment Leq : 56.35 dBA
```

↑
Results segment # 7: Hwy417 E B (day)

```
-------------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.50 !       21.50 !       20.59 !        82.59
```

```
ROAD (0.00 + 55.85 + 0.00) = 55.85 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
----------------------------------------------------------------------------
    58     72   0.00  81.40   0.00 -13.42 -11.09   0.00   0.00  -4.72  52.16*
    58     72   0.06  81.40   0.00 -14.23 -11.32   0.00   0.00   0.00  55.85
----------------------------------------------------------------------------

 * Bright Zone !

Segment Leq : 55.85 dBA

Total Leq All Segments: 61.60 dBA

🡅
Results segment # 1: TremblayRd A (night)
-----------------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.50 !       21.50 !       17.97 !        79.97

ROAD (0.00 + 34.24 + 0.00) = 34.24 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
----------------------------------------------------------------------------
   -85    -73   0.00  59.91   0.00  -7.53 -11.76   0.00   0.00  -6.38  34.24
----------------------------------------------------------------------------

Segment Leq : 34.24 dBA

🡅
Results segment # 2: TremblayRd B (night)
-----------------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.50 !       21.50 !       17.97 !        79.97

ROAD (0.00 + 34.22 + 0.00) = 34.22 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
----------------------------------------------------------------------------
```

```
    58     74   0.00  59.91   0.00  -7.53 -10.51   0.00   0.00  -7.65  34.22
--------------------------------------------------------------------------------

Segment Leq : 34.22 dBA

↑
Results segment # 3: Belfast S (night)
--------------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.50 !       21.50 !       11.50 !        73.50

ROAD (0.00 + 32.76 + 0.00) = 32.76 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
--------------------------------------------------------------------------------
   -32     68   0.00  58.16   0.00  -3.01  -2.55   0.00   0.00 -19.83  32.76
--------------------------------------------------------------------------------

Segment Leq : 32.76 dBA

↑
Results segment # 4: Hwy417 W A (night)
---------------------------------------

Source height = 1.49 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.49 !       21.50 !       20.75 !        82.75

ROAD (0.00 + 47.11 + 0.00) = 47.11 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
--------------------------------------------------------------------------------
   -87    -73   0.00  73.80   0.00 -14.26 -11.09   0.00   0.00  -4.82  43.63*
   -87    -73   0.06  73.80   0.00 -15.12 -11.57   0.00   0.00   0.00  47.11
--------------------------------------------------------------------------------

 * Bright Zone !

Segment Leq : 47.11 dBA
```

↑
Results segment # 5: Hwy417 W B (night)

Source height = 1.49 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.49	21.50	20.75	82.75

ROAD (0.00 + 47.05 + 0.00) = 47.05 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
58	71	0.00	73.80	0.00	-14.26	-11.41	0.00	0.00	-4.54	43.58*
58	71	0.06	73.80	0.00	-15.12	-11.64	0.00	0.00	0.00	47.05

* Bright Zone !

Segment Leq : 47.05 dBA

↑
Results segment # 6: Hwy417 E A (night)

Source height = 1.49 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.49	21.50	20.59	82.59

ROAD (0.00 + 48.75 + 0.00) = 48.75 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-73	0.00	73.80	0.00	-13.42	-10.25	0.00	0.00	-4.90	45.22*
-90	-73	0.06	73.80	0.00	-14.23	-10.82	0.00	0.00	0.00	48.75

* Bright Zone !

Segment Leq : 48.75 dBA

↑
Results segment # 7: Hwy417 E B (night)

```
---------------------------------------

Source height = 1.49 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.49 !       21.50 !       20.59 !        82.59

ROAD (0.00 + 48.25 + 0.00) = 48.25 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
----------------------------------------------------------------------------
    58     72   0.00  73.80   0.00 -13.42 -11.09   0.00   0.00  -4.72  44.56*
    58     72   0.06  73.80   0.00 -14.23 -11.32   0.00   0.00   0.00  48.25
----------------------------------------------------------------------------

 * Bright Zone !

Segment Leq : 48.25 dBA

Total Leq All Segments: 54.00 dBA

↑



TOTAL Leq FROM ALL SOURCES (DAY): 61.89
                         (NIGHT): 54.09
↑
↑
```

```
STAMSON 5.0        NORMAL REPORT        Date: 28-09-2023 09:41:59
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rec5tr.te            Time Period: Day/Night 16/8 hours
Description: Receptor Point 5tr


Rail data, segment # 1: VIA Rail (day/night)
--------------------------------------------
Train            ! Trains      ! Speed !# loc !# Cars! Eng  !Cont
Type             !             !(km/h) !/Train!/Train! type !weld
-----------------+-------------+-------+------+------+------+----
  1. VIA Rail    !  16.0/0.0   ! 150.0 !  2.0 !  8.0 !Diesel!  No

Data for Segment # 1: VIA Rail (day/night)
------------------------------------------
Angle1   Angle2           : -43.00 deg   31.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      3 / 3
House density             :     60 %
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 247.00 / 247.00 m
Receiver height           :  21.50 / 21.50  m
Topography                :      2       (Flat/gentle slope; with barrier)
No Whistle
Barrier angle1            : -43.00 deg   Angle2 : 31.00 deg
Barrier height            :  21.00 m
Barrier receiver distance :   7.00 / 7.00   m
Source elevation          :  62.00 m
Receiver elevation        :  62.00 m
Barrier elevation         :  62.00 m
Reference angle           :   0.00

↑
Rail data, segment # 2: O-train Rail (day/night)
------------------------------------------------
Train            ! Trains      ! Speed !# loc !# Cars! Eng  !Cont
Type             !             !(km/h) !/Train!/Train! type !weld
-----------------+-------------+-------+------+------+------+----
  1. O-train Rail! 352.0/58.0  !  80.0 !  1.0 !  1.0 !  Elec! Yes

Data for Segment # 2: O-train Rail (day/night)
----------------------------------------------
Angle1   Angle2           : -10.00 deg   17.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      2 / 2
House density             :     40 %
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 250.00 / 250.00 m
Receiver height           :  21.50 / 21.50  m
```

```
Topography                 :      2       (Flat/gentle slope; with barrier)
No Whistle
Barrier angle1             : -10.00 deg   Angle2 : 17.00 deg
Barrier height             :  21.00 m
Barrier receiver distance :  15.00 / 15.00  m
Source elevation           :  62.00 m
Receiver elevation         :  62.00 m
Barrier elevation          :  62.00 m
Reference angle            :   0.00

↑
Results segment # 1: VIA Rail (day)
-----------------------------------

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       4.00 !       21.50 !       21.00 !        83.00
       0.50 !       21.50 !       20.90 !        82.90

LOCOMOTIVE (0.00 + 48.77 + 0.00) = 48.77 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
----------------------------------------------------------------------
   -43     31   0.00  70.99 -12.17  -3.86   0.00  -6.19   0.00  48.77
   -43     31   0.00  70.99 -12.17  -3.86   0.00   0.00  -5.00  49.96*
   -43     31   0.00  70.99 -12.17  -3.86   0.00   0.00   0.00  54.96
----------------------------------------------------------------------

 * Bright Zone !

WHEEL (0.00 + 40.72 + 0.00) = 40.72 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
----------------------------------------------------------------------
   -43     31   0.09  64.07 -13.26  -3.89   0.00  -6.19   0.00  40.72
   -43     31   0.00  64.07 -12.17  -3.86   0.00   0.00  -5.03  43.01
----------------------------------------------------------------------

Segment Leq : 49.40 dBA

↑
Results segment # 2: O-train Rail (day)
---------------------------------------

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
```

4.00 !	21.50 !	20.45 !	82.45
0.50 !	21.50 !	20.24 !	82.24

LOCOMOTIVE (0.00 + 37.21 + 0.00) = 37.21 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-10	17	0.00	63.20	-12.22	-8.24	0.00	-3.40	0.00	39.35
-10	17	0.00	63.20	-12.22	-8.24	0.00	0.00	-5.54	37.21

WHEEL (0.00 + 36.77 + 0.00) = 36.77 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-10	17	0.09	63.22	-13.32	-8.24	0.00	-3.40	0.00	38.26
-10	17	0.00	63.22	-12.22	-8.24	0.00	0.00	-5.98	36.77

Segment Leq : 40.01 dBA

Total Leq All Segments: 49.87 dBA

↑

Results segment # 1: VIA Rail (night)

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
4.00	21.50	21.00	83.00
0.50	21.50	20.90	82.90

LOCOMOTIVE (0.00 + -22.22 + 0.00) = 0.00 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-43	31	0.00	0.00	-12.17	-3.86	0.00	-6.19	0.00	-22.22
-43	31	0.00	0.00	-12.17	-3.86	0.00	0.00	-5.00	-21.03*
-43	31	0.00	0.00	-12.17	-3.86	0.00	0.00	0.00	-16.03

* Bright Zone !

WHEEL (0.00 + -23.35 + 0.00) = 0.00 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-43	31	0.09	0.00	-13.26	-3.89	0.00	-6.19	0.00	-23.35
-43	31	0.00	0.00	-12.17	-3.86	0.00	0.00	-5.03	-21.06

```
Segment Leq : 0.00 dBA

↑
Results segment # 2: O-train Rail (night)
-----------------------------------------

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       4.00 !       21.50 !       20.45 !        82.45
       0.50 !       21.50 !       20.24 !        82.24

LOCOMOTIVE (0.00 + 32.39 + 0.00) = 32.39 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
----------------------------------------------------------------------
   -10     17   0.00  58.38 -12.22  -8.24   0.00  -3.40   0.00  34.53
   -10     17   0.00  58.38 -12.22  -8.24   0.00   0.00  -5.54  32.39
----------------------------------------------------------------------

WHEEL (0.00 + 31.95 + 0.00) = 31.95 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
----------------------------------------------------------------------
   -10     17   0.09  58.39 -13.32  -8.24   0.00  -3.40   0.00  33.44
   -10     17   0.00  58.39 -12.22  -8.24   0.00   0.00  -5.98  31.95
----------------------------------------------------------------------

Segment Leq : 35.19 dBA

Total Leq All Segments: 35.19 dBA

↑
Road data, segment # 1: TremblayRd A (day/night)
------------------------------------------------
Car traffic volume  :  9715/845   veh/TimePeriod  *
Medium truck volume :   773/67    veh/TimePeriod  *
Heavy truck volume  :   552/48    veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):  12000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00
```

```
Data for Segment # 1: TremblayRd A (day/night)
----------------------------------------------
Angle1   Angle2           : -85.00 deg   -73.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  85.00 / 85.00  m
Receiver height           :  21.50 / 21.50  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -85.00 deg   Angle2 : -73.00 deg
Barrier height            :  21.00 m
Barrier receiver distance :  15.00 / 15.00  m
Source elevation          :  62.00 m
Receiver elevation        :  62.00 m
Barrier elevation         :  62.00 m
Reference angle           :   0.00
```

🡅

```
Road data, segment # 2: TremblayRd B (day/night)
------------------------------------------------
Car traffic volume  :  9715/845   veh/TimePeriod  *
Medium truck volume :   773/67    veh/TimePeriod  *
Heavy truck volume  :   552/48    veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):  12000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 2: TremblayRd B (day/night)
----------------------------------------------
Angle1   Angle2           :  58.00 deg   74.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  85.00 / 85.00  m
Receiver height           :  21.50 / 21.50  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :  58.00 deg   Angle2 : 74.00 deg
Barrier height            :  21.00 m
Barrier receiver distance :  15.00 / 15.00  m
Source elevation          :  62.00 m
```

```
Receiver elevation        :  62.00 m
Barrier elevation         :  62.00 m
Reference angle           :   0.00
```

↑

```
Road data, segment # 3: Belfast S (day/night)
---------------------------------------------
Car traffic volume  :  6477/563   veh/TimePeriod  *
Medium truck volume :   515/45    veh/TimePeriod  *
Heavy truck volume  :   368/32    veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):   8000
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 3: Belfast S (day/night)
-------------------------------------------
Angle1   Angle2           : -32.00 deg   68.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  30.00 / 30.00  m
Receiver height           :  21.50 / 21.50  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -32.00 deg   Angle2 : 68.00 deg
Barrier height            :  21.00 m
Barrier receiver distance :  15.00 / 15.00  m
Source elevation          :  62.00 m
Receiver elevation        :  62.00 m
Barrier elevation         :  62.00 m
Reference angle           :   0.00
```

↑

```
Road data, segment # 4: Hwy417 W A (day/night)
----------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
Posted speed limit  :   100 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)
```

```
* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):  73332
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 4: Hwy417 W A (day/night)
--------------------------------------------
Angle1   Angle2           : -87.00 deg   -73.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 400.00 / 400.00 m
Receiver height           :  21.50 / 21.50  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -87.00 deg   Angle2 : -73.00 deg
Barrier height            :  21.00 m
Barrier receiver distance :  15.00 / 15.00  m
Source elevation          :  62.00 m
Receiver elevation        :  62.00 m
Barrier elevation         :  62.00 m
Reference angle           :   0.00

Road data, segment # 5: Hwy417 W B (day/night)
----------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
Posted speed limit  :   100 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):  73332
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 5: Hwy417 W B (day/night)
--------------------------------------------
Angle1   Angle2           :  58.00 deg   71.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
```

```
Surface                     :      1       (Absorptive ground surface)
Receiver source distance  : 400.00 / 400.00 m
Receiver height             :  21.50 / 21.50  m
Topography                  :      2       (Flat/gentle slope; with barrier)
Barrier angle1              :  58.00 deg   Angle2 : 71.00 deg
Barrier height              :  21.00 m
Barrier receiver distance :  15.00 / 15.00  m
Source elevation            :  62.00 m
Receiver elevation          :  62.00 m
Barrier elevation           :  62.00 m
Reference angle             :   0.00
```

↑

```
Road data, segment # 6: Hwy417 E A (day/night)
----------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
Posted speed limit  :   100 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):  73332
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 6: Hwy417 E A (day/night)
--------------------------------------------
Angle1   Angle2             : -90.00 deg   -73.00 deg
Wood depth                  :      0       (No woods.)
No of house rows            :      0 / 0
Surface                     :      1       (Absorptive ground surface)
Receiver source distance  : 330.00 / 330.00 m
Receiver height             :  21.50 / 21.50  m
Topography                  :      2       (Flat/gentle slope; with barrier)
Barrier angle1              : -90.00 deg   Angle2 : -73.00 deg
Barrier height              :  21.00 m
Barrier receiver distance :  15.00 / 15.00  m
Source elevation            :  62.00 m
Receiver elevation          :  62.00 m
Barrier elevation           :  62.00 m
Reference angle             :   0.00
```

↑

```
Road data, segment # 7: Hwy417 E B (day/night)
```

```
----------------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
Posted speed limit  :   100 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):  73332
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 7: Hwy417 E B (day/night)
--------------------------------------------
Angle1   Angle2           :  58.00 deg   72.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 330.00 / 330.00 m
Receiver height           :  21.50 / 21.50  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :  58.00 deg   Angle2 : 72.00 deg
Barrier height            :  21.00 m
Barrier receiver distance :  15.00 / 15.00  m
Source elevation          :  62.00 m
Receiver elevation        :  62.00 m
Barrier elevation         :  62.00 m
Reference angle           :   0.00

↑
Results segment # 1: TremblayRd A (day)
---------------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.50 !       21.50 !       17.97 !        79.97

ROAD (0.00 + 40.52 + 0.00) = 40.52 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
------------------------------------------------------------------------------
```

```
   -85    -73   0.00  67.51   0.00  -7.53 -11.76   0.00   0.00  -7.70  40.52
--------------------------------------------------------------------------------

Segment Leq : 40.52 dBA

↑
Results segment # 2: TremblayRd B (day)
---------------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.50 !       21.50 !       17.97 !        79.97

ROAD (0.00 + 39.68 + 0.00) = 39.68 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
--------------------------------------------------------------------------------
    58     74   0.00  67.51   0.00  -7.53 -10.51   0.00   0.00  -9.79  39.68
--------------------------------------------------------------------------------

Segment Leq : 39.68 dBA

↑
Results segment # 3: Belfast S (day)
------------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.50 !       21.50 !       11.50 !        73.50

ROAD (0.00 + 40.23 + 0.00) = 40.23 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
--------------------------------------------------------------------------------
   -32     68   0.00  65.75   0.00  -3.01  -2.55   0.00   0.00 -19.96  40.23
--------------------------------------------------------------------------------

Segment Leq : 40.23 dBA

↑
Results segment # 4: Hwy417 W A (day)
-------------------------------------
```

```
Source height = 1.50 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.50 !       21.50 !       20.75 !        82.75

ROAD (0.00 + 51.03 + 0.00) = 51.03 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
--------------------------------------------------------------------------
   -87    -73   0.00  81.40   0.00 -14.26 -11.09   0.00   0.00  -5.02  51.03
--------------------------------------------------------------------------

Segment Leq : 51.03 dBA

↑
Results segment # 5: Hwy417 W B (day)
-------------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.50 !       21.50 !       20.75 !        82.75

ROAD (0.00 + 50.67 + 0.00) = 50.67 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
--------------------------------------------------------------------------
    58     71   0.00  81.40   0.00 -14.26 -11.41   0.00   0.00  -5.05  50.67
--------------------------------------------------------------------------

Segment Leq : 50.67 dBA

↑
Results segment # 6: Hwy417 E A (day)
-------------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
```

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	21.50	20.59	82.59

ROAD (0.00 + 52.68 + 0.00) = 52.68 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-73	0.00	81.40	0.00	-13.42	-10.25	0.00	0.00	-5.05	52.68

Segment Leq : 52.68 dBA

↑
Results segment # 7: Hwy417 E B (day)

Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	21.50	20.59	82.59

ROAD (0.00 + 51.75 + 0.00) = 51.75 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
58	72	0.00	81.40	0.00	-13.42	-11.09	0.00	0.00	-5.13	51.75

Segment Leq : 51.75 dBA

Total Leq All Segments: 57.85 dBA

↑
Results segment # 1: TremblayRd A (night)

Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	21.50	17.97	79.97

ROAD (0.00 + 32.92 + 0.00) = 32.92 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-85	-73	0.00	59.91	0.00	-7.53	-11.76	0.00	0.00	-7.70	32.92

Segment Leq : 32.92 dBA

↑
Results segment # 2: TremblayRd B (night)

Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	21.50	17.97	79.97

ROAD (0.00 + 32.08 + 0.00) = 32.08 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
58	74	0.00	59.91	0.00	-7.53	-10.51	0.00	0.00	-9.79	32.08

Segment Leq : 32.08 dBA

↑
Results segment # 3: Belfast S (night)

Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	21.50	11.50	73.50

ROAD (0.00 + 32.63 + 0.00) = 32.63 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-32	68	0.00	58.16	0.00	-3.01	-2.55	0.00	0.00	-19.96	32.63

Segment Leq : 32.63 dBA

↑
Results segment # 4: Hwy417 W A (night)

Source height = 1.49 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.49	21.50	20.75	82.75

ROAD (0.00 + 43.43 + 0.00) = 43.43 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-87	-73	0.00	73.80	0.00	-14.26	-11.09	0.00	0.00	-5.02	43.43

Segment Leq : 43.43 dBA

↑

Results segment # 5: Hwy417 W B (night)

Source height = 1.49 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.49	21.50	20.75	82.75

ROAD (0.00 + 43.08 + 0.00) = 43.08 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
58	71	0.00	73.80	0.00	-14.26	-11.41	0.00	0.00	-5.05	43.08

Segment Leq : 43.08 dBA

↑

Results segment # 6: Hwy417 E A (night)

Source height = 1.49 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.49	21.50	20.59	82.59

```
ROAD (0.00 + 45.08 + 0.00) = 45.08 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
--------------------------------------------------------------------------
   -90    -73   0.00  73.80   0.00 -13.42 -10.25   0.00   0.00  -5.05  45.08
--------------------------------------------------------------------------

Segment Leq : 45.08 dBA

↑
Results segment # 7: Hwy417 E B (night)
---------------------------------------

Source height = 1.49 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.49 !       21.50 !       20.59 !        82.59

ROAD (0.00 + 44.15 + 0.00) = 44.15 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
--------------------------------------------------------------------------
    58     72   0.00  73.80   0.00 -13.42 -11.09   0.00   0.00  -5.13  44.15
--------------------------------------------------------------------------

Segment Leq : 44.15 dBA

Total Leq All Segments: 50.25 dBA

↑



TOTAL Leq FROM ALL SOURCES (DAY): 58.49
                         (NIGHT): 50.39
↑
↑
```

APPENDIX 3

VIA-RAIL TRAIN COUNT

VIA-RAIL CORRESPONDENCE

O-TRAIN RAIL TRAIN COUNT

OLRT SCHEDULE 15-2 DESIGN AND CONSTRUCTION REQUIREMENTS – PART 2 GUIDEWAY

Train Schedule:

Ottawa - Montréal - Sainte Foy - Québec

- Locations in bold indicate a possible connection.
- No local service between Montréal and Saint-Lambert
- No local service between Québec City, Sainte-Foy and Charny
- For a stop at this station, reservations are required at least 40 minutes before the train departs from its station of origin. Train 22 stops in Saint-Hyacinthe on Saturdays and Sundays only.
- No local service between Montreal and Dorval
- No local service between Dorval and Montreal

# Train	22	22	20	622	622	24	26	28	38	38
Business class	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Baggage check-in	Yes	Yes	No	No	No	No	No	No	No	No
Dates	From 2022-06-19 to 2023-06-18	From 2023-06-19 to 2033-05-01	All year round	From 2022-06-19 to 2023-06-18	From 2023-06-19 to 2033-05-01	All year round	All year round	All year round	From 2022-06-19 to 2023-06-18	From 2023-06-19 to 2033-05-01

# Train		22	22	20	622	622	24	26	28	38	38
		Time	**Time**				**Time**	**Time**	**Time**	**Time**	**Time**
Casselman, ON Reservations are required at least 40 minutes before the train departure from its original station for a stop at Casselman.	Departure	06:56	06:35	-	-	-	-	-	16:37	19:22	18:27
Alexandria, ON	Departure	07:18	06:58	-	-	-	11:07	15:08	16:59	19:46	18:51
Coteau, QC Fridays only	Departure	07:46	07:23	-	-	-	11:33	15:29	17:19	-	19:12
Dorval, QC Shuttle service runs between the station and the airport. Stops to disembark. Conditional stop	Departure	**08:11**	**07:51**	-	-	-	**11:55**	**15:55**	**17:44**	**20:37**	**19:27**
Days		-	-	Day 1 MTWTF~~SS~~	Day 1 ~~MTWTF~~SS	Day 1 ~~MTWTF~~SS	-	-	-	-	-
Montréal, QC	Arrival	**08:31**	**08:11**	- **06:25**	- **09:06**	- **08:46**	**12:15**	**16:15**	**18:04**	**20:57**	**19:57**

Saturdays and Sundays only # Train		22	22	20	622	622	24	26	28	38	38
Drummondville, QC	Departure	10:12	09:54	07:38	10:12	09:52	14:03	18:15	19:45	-	-
Charny, QC	Departure	-	-	-	-	-	15:46	19:54	21:24	-	-
Sainte-Foy, QC Shuttle operates between Ste-Foy and Québec city (Gare du Palais) in both directions. Reservations are required. Conditional stop	Arrival Departure	11:55 11:58	11:25 11:28	- 09:19	11:54 11:57	11:24 11:27	- 15:54	- 20:03	**-** **21:32**	-	-
Québec, QC	Arrival	**12:22 Eastern Time**	**11:52 Eastern Time**	**09:43 Eastern Time**	**12:22 Eastern Time**	**11:52 Eastern Time**	**16:18 Eastern Time**	**20:26 Eastern Time**	**21:56 Eastern Time**	-	-

Train Schedule:

Québec - Sainte Foy - Montréal - Ottawa

- Locations in bold indicate a possible connection.
- No local service between Québec City, Sainte-Foy and Charny
- No local service between Ottawa and Fallowfield

# Train	51	31	33	35	35	633	37	37	39	39	29
Business class	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Baggage check-in	No	No	No	No	No	No	No	No	No	No	Yes
Dates	From 2022-06-19 to 2023-06-18	From 2023-06-19 to 2032-04-25	All year round	From 2022-06-19 to 2023-06-18	From 2023-06-19 to 2033-05-01	All year round	From 2022-06-19 to 2023-06-18	From 2023-06-19 to 2033-05-01	All year round	From 2023-06-19 to 2033-05-01	All year round
Days	-	-	Day 1 MTWTF~~SS~~	Day 1 MTWTFSS	Day 1 MTWTFSS	-	Day 1 MTWTFSS	Day 1 MTWTFSS	Day 1 MTWTFSS	Day 1 MTWTFSS	Day 1 MTWTFSS

# Train		51	31	33	35	35	633	37	37	39	39	29
Shuttle operates between Ste-Foy and Québec city (Gare du Palais) in both directions. Reservations are required.												
Charny, QC	Departure	-	-	06:00	08:44	08:44	-	-	-	-	-	-
Drummondville, QC	Arrival Departure	-	-	- 07:28	10:12 10:15	10:12 10:15	-	- 14:45	- 14:45	- 16:54	- 16:54	- 19:43
Saint-Hyacinthe, QC	Departure	-	-	08:00	10:48	10:48	-	15:16	15:16	-	-	20:21
Saint-Lambert, QC Conditional stop No local service between Saint-Lambert and Montreal.	Departure	-	-	08:26	11:15	11:15	-	15:43	15:44	18:00	18:00	20:49
Days		Day 1 MTWTF~~SS~~	Day 1 MTWTF~~SS~~	-	-	-	Day 1 ~~MTWTF~~SS	-	-	-	-	-
Montréal, QC	Arrival Departure	**- 06:20 Eastern Time**	**- 06:20 Eastern Time**	**08:37 09:00**	**11:26 11:54**	**11:26 11:54**	**- 09:00 Eastern Time**	**15:54 16:30**	**15:54 16:30**	**18:11 18:50**	**18:11 18:50**	**21:00 - Eastern Time**

# Train		51	31	33	35	35	633	37	37	39	39	29
Coteau, QC	Departure	-	07:07	-	12:53	12:53	-	17:29	17:29	19:51	19:51	-
Alexandria, ON	Departure	07:28	07:33	10:22	13:17	13:18	10:11	17:51	17:51	20:18	20:13	-
Casselman, ON Conditional stop For a stop at this station, reservations are required at least 40 minutes before the train departs from its station of origin.	Departure	07:55	07:55	10:44	13:40	13:41	10:33	-	-	-	-	-
Ottawa, ON	Arrival Departure	**08:20** **08:35**	**08:20 - Eastern Time**	**11:14 - Eastern Time**	**14:05 - Eastern Time**	**14:07 - Eastern Time**	**11:04 - Eastern Time**	**18:35 - Eastern Time**	**18:40 - Eastern Time**	**21:02 - Eastern Time**	**20:57 - Eastern Time**	-
Fallowfield, ON	Arrival Departure	08:52 08:55 Eastern Time	-	-	-	-	-	-	-	-	-	-

Yolanda Tang

From: Paul Charbachi <Paul_Charbachi@viarail.ca>
Sent: Friday, June 9, 2023 11:24 AM
To: Yolanda Tang
Cc: Stephanie Boisvenue
Subject: RE: Request For Rail Information

Hello,
My answers are below, and please keep in mind it`s based on current operations and could change any time.
Pc

From: Yolanda Tang <YTang@patersongroup.ca>
Sent: Friday, June 9, 2023 11:11 AM
To: Paul Charbachi <Paul_Charbachi@viarail.ca>
Cc: Stephanie Boisvenue <SBoisvenue@patersongroup.ca>
Subject: Request For Rail Information

Good morning Paul,

Paterson is currently working on the noise study for the proposed development at 1346 Avenue Q, Ottawa, Ontario, in close proximity to the VIA's mainline track at Ottawa.
It is located at the rail line that connects the Alexandria and Ottawa Train Stations. I was wondering if you could fill in some information for me.

Rail Line: Alexandria - Ottawa Rail Corridor (Ottawa, Ontario)
Number of trains a day: 16 trains
Number of Engines: 2 engines
Type of Engine: P42 , Charger Siemens
Number of Cars: 6 to 8 cars , welded rail
Approximate Speed:100 MPH

Thanks for your time.

Best Regards
Yolanda

PATERSON GROUP
SOLUTION ORIENTED ENGINEERING

YOLANDA TANG, M.A.Sc.
JUNIOR PROJECT MANAGER

DIRECT: (613) 800-0148

9 AURIGA DRIVE
OTTAWA ON K2E 7T9
patersongroup.ca

Schedules & Maps

The next service change is on Sunday, April 23.

Schedule times are based on typical driving conditions and may vary. Please arrive at your stop a few minutes early to allow for any fluctuations in schedule.

Mon, Jun 12

1 Blair

[S] Ends at Parliament

[a] O-Train Line 1 will experience partial closures from June 5-19 for planned maintenance. Read more

TUNNEY'S PASTURE O-TRAIN EAST / EST	BAYVIEW O-TRAIN EAST / EST	PIMISI O-TRAIN EAST / EST	LYON O-TRAIN EAST / EST	PARLIAMENT / PARLEMENT O-TRAIN EAST / EST	HURDMAN O-TRAIN EAST / EST	TREMBLAY O-TRAIN EAST / EST	ST-LAURENT O-TRAIN EAST / EST	CYRVILLE O-TRAIN EAST / EST	BLAIR O-TRAIN
04:56[S]	04:59[S]	05:01[S]	05:03[S]	05:05[S]					
05:04[S]	05:07[S]	05:09[S]	05:11[S]	05:13[S]					
							05:06	05:08	05:10
05:12[S]	05:15[S]	05:17[S]	05:19[S]	05:21[S]					
					05:14	05:17	05:20	05:22	05:24
05:22[S]	05:25[S]	05:27[S]	05:29[S]	05:31[S]					
					05:22	05:25	05:28	05:30	05:32
					05:30	05:33	05:36	05:38	05:40
05:32[S]	05:35[S]	05:37[S]	05:39[S]	05:41[S]					
					05:40	05:43	05:46	05:48	05:50
05:41[S]	05:44[S]	05:46[S]	05:48[S]	05:50[S]					
05:50[S]	05:53[S]	05:55[S]	05:57[S]	05:59[S]					
					05:50	05:53	05:56	05:58	06:00
					05:59	06:02	06:05	06:07	06:09
06:00[S]	06:03[S]	06:05[S]	06:07[S]	06:09[S]					
06:09[S]	06:12[S]	06:14[S]	06:16[S]	06:18[S]					
							06:09	06:11	06:13
					06:08	06:11	06:14	06:16	06:18
06:15[S]	06:18[S]	06:20[S]	06:22[S]	06:24[S]					
							06:20	06:22	06:24
					06:18	06:21	06:24	06:26	06:28
06:22[S]	06:25[S]	06:27[S]	06:29[S]	06:31[S]					
06:28[S]	06:31[S]	06:33[S]	06:35[S]	06:37[S]					
							06:29	06:31	06:33
					06:27	06:30	06:33	06:35	06:37
06:31[S]	06:34[S]	06:36[S]	06:38[S]	06:40[S]					
					06:33	06:36	06:40	06:42	06:44

TUNNEY'S PASTURE O-TRAIN EAST / EST	BAYVIEW O-TRAIN EAST / EST	PIMISI O-TRAIN EAST / EST	LYON O-TRAIN EAST / EST	PARLIAMENT / PARLEMENT O-TRAIN EAST / EST	HURDMAN O-TRAIN EAST / EST	TREMBLAY O-TRAIN EAST / EST	ST-LAURENT O-TRAIN EAST / EST	CYRVILLE O-TRAIN EAST / EST	BLAIR O-TRAIN
06:36[S]	06:39[S]	06:41[S]	06:43[S]	06:45[S]					
					06:40	06:43	06:47	06:49	06:51
06:41[S]	06:44[S]	06:46[S]	06:48[S]	06:50[S]					
06:46[S]	06:49[S]	06:51[S]	06:53[S]	06:55[S]					
					06:46	06:49	06:53	06:55	06:57
					06:49	06:52	06:56	06:58	07:00
06:51[S]	06:54[S]	06:56[S]	06:58[S]	07:00[S]					
					06:54	06:57	07:01	07:03	07:05
06:56[S]	06:59[S]	07:01[S]	07:03[S]	07:05[S]					
					06:59	07:02	07:06	07:08	07:10
07:01[S]	07:04[S]	07:06[S]	07:08[S]	07:10[S]					
					07:04	07:07	07:11	07:13	07:15
07:06[S]	07:09[S]	07:11[S]	07:13[S]	07:15[S]					
					07:09	07:12	07:16	07:18	07:20
07:11[S]	07:14[S]	07:16[S]	07:18[S]	07:20[S]					
					07:14	07:17	07:21	07:23	07:25
07:16[S]	07:19[S]	07:21[S]	07:23[S]	07:25[S]					
					07:19	07:22	07:26	07:28	07:30
07:21[S]	07:24[S]	07:26[S]	07:28[S]	07:30[S]					
					07:24	07:27	07:31	07:33	07:35
07:26[S]	07:29[S]	07:31[S]	07:33[S]	07:35[S]					
					07:29	07:32	07:36	07:38	07:40
07:31[S]	07:34[S]	07:36[S]	07:38[S]	07:40[S]					
					07:34	07:37	07:41	07:43	07:45
07:36[S]	07:39[S]	07:41[S]	07:43[S]	07:45[S]					
					07:39	07:42	07:46	07:48	07:50
07:41[S]	07:44[S]	07:46[S]	07:48[S]	07:50[S]					
					07:44	07:47	07:51	07:53	07:55
07:46[S]	07:49[S]	07:51[S]	07:53[S]	07:55[S]					
					07:49	07:52	07:56	07:58	08:00
07:51[S]	07:54[S]	07:56[S]	07:58[S]	08:00[S]					
					07:54	07:57	08:01	08:03	08:05
07:56[S]	07:59[S]	08:01[S]	08:03[S]	08:05[S]					
					07:59	08:02	08:06	08:08	08:10
08:01[S]	08:04[S]	08:06[S]	08:08[S]	08:10[S]					
					08:04	08:07	08:11	08:13	08:15
08:06[S]	08:09[S]	08:11[S]	08:13[S]	08:15[S]					
					08:09	08:12	08:16	08:18	08:20
08:11[S]	08:14[S]	08:16[S]	08:18[S]	08:20[S]					
					08:14	08:17	08:21	08:23	08:25
08:16[S]	08:19[S]	08:21[S]	08:23[S]	08:25[S]					
					08:19	08:22	08:26	08:28	08:30
08:21[S]	08:24[S]	08:26[S]	08:28[S]	08:30[S]					
					08:24	08:27	08:31	08:33	08:35
08:26[S]	08:29[S]	08:31[S]	08:33[S]	08:35[S]					
					08:29	08:32	08:36	08:38	08:40
08:31[S]	08:34[S]	08:36[S]	08:38[S]	08:40[S]					
					08:34	08:37	08:41	08:43	08:45
08:36[S]	08:39[S]	08:41[S]	08:43[S]	08:45[S]					

TUNNEY'S PASTURE O-TRAIN EAST / EST	BAYVIEW O-TRAIN EAST / EST	PIMISI O-TRAIN EAST / EST	LYON O-TRAIN EAST / EST	PARLIAMENT / PARLEMENT O-TRAIN EAST / EST	HURDMAN O-TRAIN EAST / EST	TREMBLAY O-TRAIN EAST / EST	ST-LAURENT O-TRAIN EAST / EST	CYRVILLE O-TRAIN EAST / EST	BLAIR O-TRAIN
					08:39	08:42	08:46	08:48	08:50
08:41[S]	08:44[S]	08:46[S]	08:48[S]	08:50[S]					
					08:44	08:47	08:51	08:53	08:55
08:46[S]	08:49[S]	08:51[S]	08:53[S]	08:55[S]					
					08:49	08:52	08:56	08:58	09:00
08:51[S]	08:54[S]	08:56[S]	08:58[S]	09:00[S]					
					08:54	08:57	09:01	09:03	09:05
08:56[S]	08:59[S]	09:01[S]	09:03[S]	09:05[S]					
					08:59	09:02	09:06	09:08	09:10
09:01[S]	09:04[S]	09:06[S]	09:08[S]	09:10[S]					
					09:04	09:07	09:11	09:13	09:15
09:06[S]	09:09[S]	09:11[S]	09:13[S]	09:15[S]					
					09:09	09:12	09:16	09:18	09:20
09:11[S]	09:14[S]	09:16[S]	09:18[S]	09:20[S]					
					09:14	09:17	09:21	09:23	09:25
09:16[S]	09:19[S]	09:21[S]	09:23[S]	09:25[S]					
					09:19	09:22	09:26	09:28	09:30
09:22[S]	09:25[S]	09:27[S]	09:29[S]	09:31[S]					
					09:24	09:27	09:31	09:33	09:35
09:28[S]	09:31[S]	09:33[S]	09:35[S]	09:37[S]					
					09:29	09:32	09:36	09:38	09:40
					09:34	09:37	09:40	09:42	09:44
09:35[S]	09:38[S]	09:40[S]	09:42[S]	09:44[S]					
					09:40	09:43	09:46	09:48	09:50
09:42[S]	09:45[S]	09:47[S]	09:49[S]	09:51[S]					
					09:46	09:49	09:52	09:54	09:56
09:47[S]	09:50[S]	09:52[S]	09:54[S]	09:56[S]					
09:53[S]	09:56[S]	09:58[S]	10:00[S]	10:02[S]					
					09:53	09:56	09:59	10:01	10:03
09:59[S]	10:02[S]	10:04[S]	10:06[S]	10:08[S]					
					10:00	10:03	10:06	10:08	10:10
10:04[S]	10:07[S]	10:09[S]	10:11[S]	10:13[S]					
					10:05	10:08	10:11	10:13	10:15
10:10[S]	10:13[S]	10:15[S]	10:17[S]	10:19[S]					
					10:11	10:14	10:17	10:19	10:21
10:16[S]	10:19[S]	10:21[S]	10:23[S]	10:25[S]					
					10:17	10:20	10:23	10:25	10:27
10:21[S]	10:24[S]	10:26[S]	10:28[S]	10:30[S]					
					10:22	10:25	10:28	10:30	10:32
10:27[S]	10:30[S]	10:32[S]	10:34[S]	10:36[S]					
					10:28	10:31	10:34	10:36	10:38
10:33[S]	10:36[S]	10:38[S]	10:40[S]	10:42[S]					
					10:34	10:37	10:40	10:42	10:44
10:38[S]	10:41[S]	10:43[S]	10:45[S]	10:47[S]					
					10:39	10:42	10:45	10:47	10:49
10:44[S]	10:47[S]	10:49[S]	10:51[S]	10:53[S]					
					10:45	10:48	10:51	10:53	10:55
10:50[S]	10:53[S]	10:55[S]	10:57[S]	10:59[S]					
					10:51	10:54	10:57	10:59	11:01

TUNNEY'S PASTURE O-TRAIN EAST / EST	BAYVIEW O-TRAIN EAST / EST	PIMISI O-TRAIN EAST / EST	LYON O-TRAIN EAST / EST	PARLIAMENT / PARLEMENT O-TRAIN EAST / EST	HURDMAN O-TRAIN EAST / EST	TREMBLAY O-TRAIN EAST / EST	ST-LAURENT O-TRAIN EAST / EST	CYRVILLE O-TRAIN EAST / EST	BLAIR O-TRAIN
10:55[S]	10:58[S]	11:00[S]	11:02[S]	11:04[S]					
					10:56	10:59	11:02	11:04	11:06
11:01[S]	11:04[S]	11:06[S]	11:08[S]	11:10[S]					
					11:02	11:05	11:08	11:10	11:12
11:07[S]	11:10[S]	11:12[S]	11:14[S]	11:16[S]					
					11:08	11:11	11:14	11:16	11:18
11:12[S]	11:15[S]	11:17[S]	11:19[S]	11:21[S]					
					11:13	11:16	11:19	11:21	11:23
11:18[S]	11:21[S]	11:23[S]	11:25[S]	11:27[S]					
					11:19	11:22	11:25	11:27	11:29
11:24[S]	11:27[S]	11:29[S]	11:31[S]	11:33[S]					
					11:25	11:28	11:31	11:33	11:35
11:29[S]	11:32[S]	11:34[S]	11:36[S]	11:38[S]					
					11:30	11:33	11:36	11:38	11:40
11:35[S]	11:38[S]	11:40[S]	11:42[S]	11:44[S]					
					11:36	11:39	11:42	11:44	11:46
11:41[S]	11:44[S]	11:46[S]	11:48[S]	11:50[S]					
					11:42	11:45	11:48	11:50	11:52
11:46[S]	11:49[S]	11:51[S]	11:53[S]	11:55[S]					
					11:47	11:50	11:53	11:55	11:57
11:52[S]	11:55[S]	11:57[S]	11:59[S]	12:01[S]					
					11:53	11:56	11:59	12:01	12:03
11:58[S]	12:01[S]	12:03[S]	12:05[S]	12:07[S]					
					11:59	12:02	12:05	12:07	12:09
12:03[S]	12:06[S]	12:08[S]	12:10[S]	12:12[S]					
					12:04	12:07	12:10	12:12	12:14
12:09[S]	12:12[S]	12:14[S]	12:16[S]	12:18[S]					
					12:10	12:13	12:16	12:18	12:20
12:15[S]	12:18[S]	12:20[S]	12:22[S]	12:24[S]					
					12:16	12:19	12:22	12:24	12:26
12:20[S]	12:23[S]	12:25[S]	12:27[S]	12:29[S]					
					12:21	12:24	12:27	12:29	12:31
12:26[S]	12:29[S]	12:31[S]	12:33[S]	12:35[S]					
					12:27	12:30	12:33	12:35	12:37
12:32[S]	12:35[S]	12:37[S]	12:39[S]	12:41[S]					
					12:33	12:36	12:39	12:41	12:43
12:37[S]	12:40[S]	12:42[S]	12:44[S]	12:46[S]					
					12:38	12:41	12:44	12:46	12:48
12:43[S]	12:46[S]	12:48[S]	12:50[S]	12:52[S]					
					12:44	12:47	12:50	12:52	12:54
12:49[S]	12:52[S]	12:54[S]	12:56[S]	12:58[S]					
					12:50	12:53	12:56	12:58	13:00
12:54[S]	12:57[S]	12:59[S]	13:01[S]	13:03[S]					
					12:55	12:58	13:01	13:03	13:05
13:00[S]	13:03[S]	13:05[S]	13:07[S]	13:09[S]					
					13:01	13:04	13:07	13:09	13:11
13:06[S]	13:09[S]	13:11[S]	13:13[S]	13:15[S]					
					13:07	13:10	13:13	13:15	13:17
13:11[S]	13:14[S]	13:16[S]	13:18[S]	13:20[S]					

TUNNEY'S PASTURE O-TRAIN EAST / EST	BAYVIEW O-TRAIN EAST / EST	PIMISI O-TRAIN EAST / EST	LYON O-TRAIN EAST / EST	PARLIAMENT / PARLEMENT O-TRAIN EAST / EST	HURDMAN O-TRAIN EAST / EST	TREMBLAY O-TRAIN EAST / EST	ST-LAURENT O-TRAIN EAST / EST	CYRVILLE O-TRAIN EAST / EST	BLAIR O-TRAIN
					13:12	13:15	13:18	13:20	13:22
13:17[S]	13:20[S]	13:22[S]	13:24[S]	13:26[S]					
					13:18	13:21	13:24	13:26	13:28
13:23[S]	13:26[S]	13:28[S]	13:30[S]	13:32[S]					
					13:24	13:27	13:30	13:32	13:34
13:28[S]	13:31[S]	13:33[S]	13:35[S]	13:37[S]					
					13:29	13:32	13:35	13:37	13:39
13:34[S]	13:37[S]	13:39[S]	13:41[S]	13:43[S]					
					13:35	13:38	13:41	13:43	13:45
13:40[S]	13:43[S]	13:45[S]	13:47[S]	13:49[S]					
					13:41	13:44	13:47	13:49	13:51
13:45[S]	13:48[S]	13:50[S]	13:52[S]	13:54[S]					
					13:46	13:49	13:52	13:54	13:56
13:51[S]	13:54[S]	13:56[S]	13:58[S]	14:00[S]					
					13:52	13:55	13:58	14:00	14:02
13:56[S]	13:59[S]	14:01[S]	14:03[S]	14:05[S]					
					13:58	14:01	14:04	14:06	14:08
14:02[S]	14:05[S]	14:07[S]	14:09[S]	14:11[S]					
					14:03	14:06	14:09	14:11	14:13
14:08[S]	14:11[S]	14:13[S]	14:15[S]	14:17[S]					
					14:09	14:12	14:15	14:17	14:19
					14:14	14:17	14:20	14:22	14:24
14:15[S]	14:18[S]	14:20[S]	14:22[S]	14:24[S]					
14:19[S]	14:22[S]	14:24[S]	14:26[S]	14:28[S]					
					14:20	14:23	14:26	14:28	14:30
14:25[S]	14:28[S]	14:30[S]	14:32[S]	14:34[S]					
					14:26	14:29	14:32	14:34	14:36
14:31[S]	14:34[S]	14:36[S]	14:38[S]	14:40[S]					
							14:35	14:37	14:39
					14:33	14:36	14:39	14:41	14:43
14:36[S]	14:39[S]	14:41[S]	14:43[S]	14:45[S]					
					14:37	14:40	14:43	14:45	14:47
14:42[S]	14:45[S]	14:47[S]	14:49[S]	14:51[S]					
					14:43	14:46	14:49	14:51	14:53
14:48[S]	14:51[S]	14:53[S]	14:55[S]	14:57[S]					
					14:49	14:52	14:55	14:57	14:59
14:53[S]	14:56[S]	14:58[S]	15:00[S]	15:02[S]					
					14:54	14:57	15:00	15:02	15:04
14:58[S]	15:01[S]	15:03[S]	15:05[S]	15:07[S]					
					15:00	15:03	15:07	15:09	15:11
15:02[S]	15:05[S]	15:07[S]	15:09[S]	15:11[S]					
15:06[S]	15:09[S]	15:11[S]	15:13[S]	15:15[S]					
					15:06	15:09	15:13	15:15	15:17
15:11[S]	15:14[S]	15:16[S]	15:18[S]	15:20[S]					
					15:11	15:14	15:18	15:20	15:22
15:16[S]	15:19[S]	15:21[S]	15:23[S]	15:25[S]					
					15:16	15:19	15:23	15:25	15:27
					15:20	15:23	15:27	15:29	15:31
15:21[S]	15:24[S]	15:26[S]	15:28[S]	15:30[S]					

TUNNEY'S PASTURE O-TRAIN EAST / EST	BAYVIEW O-TRAIN EAST / EST	PIMISI O-TRAIN EAST / EST	LYON O-TRAIN EAST / EST	PARLIAMENT / PARLEMENT O-TRAIN EAST / EST	HURDMAN O-TRAIN EAST / EST	TREMBLAY O-TRAIN EAST / EST	ST-LAURENT O-TRAIN EAST / EST	CYRVILLE O-TRAIN EAST / EST	BLAIR O-TRAIN
					15:24	15:27	15:31	15:33	15:35
15:26[S]	15:29[S]	15:31[S]	15:33[S]	15:35[S]					
					15:29	15:32	15:36	15:38	15:40
15:31[S]	15:34[S]	15:36[S]	15:38[S]	15:40[S]					
					15:34	15:37	15:41	15:43	15:45
15:36[S]	15:39[S]	15:41[S]	15:43[S]	15:45[S]					
					15:39	15:42	15:46	15:48	15:50
15:41[S]	15:44[S]	15:46[S]	15:48[S]	15:50[S]					
					15:44	15:47	15:51	15:53	15:55
15:46[S]	15:49[S]	15:51[S]	15:53[S]	15:55[S]					
					15:49	15:52	15:56	15:58	16:00
15:51[S]	15:54[S]	15:56[S]	15:58[S]	16:00[S]					
					15:54	15:57	16:01	16:03	16:05
15:56[S]	15:59[S]	16:01[S]	16:03[S]	16:05[S]					
					15:59	16:02	16:06	16:08	16:10
16:01[S]	16:04[S]	16:06[S]	16:08[S]	16:10[S]					
					16:04	16:07	16:11	16:13	16:15
16:06[S]	16:09[S]	16:11[S]	16:13[S]	16:15[S]					
					16:09	16:12	16:16	16:18	16:20
16:11[S]	16:14[S]	16:16[S]	16:18[S]	16:20[S]					
					16:14	16:17	16:21	16:23	16:25
16:16[S]	16:19[S]	16:21[S]	16:23[S]	16:25[S]					
					16:19	16:22	16:26	16:28	16:30
16:21[S]	16:24[S]	16:26[S]	16:28[S]	16:30[S]					
					16:24	16:27	16:31	16:33	16:35
16:26[S]	16:29[S]	16:31[S]	16:33[S]	16:35[S]					
					16:29	16:32	16:36	16:38	16:40
16:31[S]	16:34[S]	16:36[S]	16:38[S]	16:40[S]					
					16:34	16:37	16:41	16:43	16:45
16:36[S]	16:39[S]	16:41[S]	16:43[S]	16:45[S]					
					16:39	16:42	16:46	16:48	16:50
16:41[S]	16:44[S]	16:46[S]	16:48[S]	16:50[S]					
					16:44	16:47	16:51	16:53	16:55
16:46[S]	16:49[S]	16:51[S]	16:53[S]	16:55[S]					
					16:49	16:52	16:56	16:58	17:00
16:51[S]	16:54[S]	16:56[S]	16:58[S]	17:00[S]					
					16:54	16:57	17:01	17:03	17:05
16:56[S]	16:59[S]	17:01[S]	17:03[S]	17:05[S]					
					16:59	17:02	17:06	17:08	17:10
17:01[S]	17:04[S]	17:06[S]	17:08[S]	17:10[S]					
					17:04	17:07	17:11	17:13	17:15
17:06[S]	17:09[S]	17:11[S]	17:13[S]	17:15[S]					
					17:09	17:12	17:16	17:18	17:20
17:11[S]	17:14[S]	17:16[S]	17:18[S]	17:20[S]					
					17:14	17:17	17:21	17:23	17:25
17:16[S]	17:19[S]	17:21[S]	17:23[S]	17:25[S]					
					17:19	17:22	17:26	17:28	17:30
17:21[S]	17:24[S]	17:26[S]	17:28[S]	17:30[S]					
					17:24	17:27	17:31	17:33	17:35

TUNNEY'S PASTURE O-TRAIN EAST / EST	BAYVIEW O-TRAIN EAST / EST	PIMISI O-TRAIN EAST / EST	LYON O-TRAIN EAST / EST	PARLIAMENT / PARLEMENT O-TRAIN EAST / EST	HURDMAN O-TRAIN EAST / EST	TREMBLAY O-TRAIN EAST / EST	ST-LAURENT O-TRAIN EAST / EST	CYRVILLE O-TRAIN EAST / EST	BLAIR O-TRAIN
17:26[S]	17:29[S]	17:31[S]	17:33[S]	17:35[S]					
					17:29	17:32	17:36	17:38	17:40
17:31[S]	17:34[S]	17:36[S]	17:38[S]	17:40[S]					
					17:34	17:37	17:41	17:43	17:45
17:36[S]	17:39[S]	17:41[S]	17:43[S]	17:45[S]					
					17:39	17:42	17:46	17:48	17:50
17:41[S]	17:44[S]	17:46[S]	17:48[S]	17:50[S]					
					17:44	17:47	17:51	17:53	17:55
17:46[S]	17:49[S]	17:51[S]	17:53[S]	17:55[S]					
					17:49	17:52	17:56	17:58	18:00
17:51[S]	17:54[S]	17:56[S]	17:58[S]	18:00[S]					
					17:54	17:57	18:01	18:03	18:05
17:56[S]	17:59[S]	18:01[S]	18:03[S]	18:05[S]					
					17:59	18:02	18:06	18:08	18:10
18:01[S]	18:04[S]	18:06[S]	18:08[S]	18:10[S]					
					18:04	18:07	18:11	18:13	18:15
18:06[S]	18:09[S]	18:11[S]	18:13[S]	18:15[S]					
					18:09	18:12	18:16	18:18	18:20
18:11[S]	18:14[S]	18:16[S]	18:18[S]	18:20[S]					
					18:14	18:17	18:21	18:23	18:25
18:16[S]	18:19[S]	18:21[S]	18:23[S]	18:25[S]					
					18:19	18:22	18:26	18:28	18:30
18:22[S]	18:25[S]	18:27[S]	18:29[S]	18:31[S]					
					18:24	18:27	18:31	18:33	18:35
18:28[S]	18:31[S]	18:33[S]	18:35[S]	18:37[S]					
					18:29	18:32	18:36	18:38	18:40
18:34[S]	18:37[S]	18:39[S]	18:41[S]	18:43[S]					
					18:34	18:37	18:40	18:42	18:44
18:40[S]	18:43[S]	18:45[S]	18:47[S]	18:49[S]					
					18:40	18:43	18:46	18:48	18:50
					18:46	18:49	18:52	18:54	18:56
18:47[S]	18:50[S]	18:52[S]	18:54[S]	18:56[S]					
					18:52	18:55	18:58	19:00	19:02
18:53[S]	18:56[S]	18:58[S]	19:00[S]	19:02[S]					
					18:58	19:01	19:04	19:06	19:08
18:59[S]	19:02[S]	19:04[S]	19:06[S]	19:08[S]					
19:04[S]	19:07[S]	19:09[S]	19:11[S]	19:13[S]					
					19:05	19:08	19:11	19:13	19:15
19:10[S]	19:13[S]	19:15[S]	19:17[S]	19:19[S]					
					19:11	19:14	19:17	19:19	19:21
19:16[S]	19:19[S]	19:21[S]	19:23[S]	19:25[S]					
					19:17	19:20	19:23	19:25	19:27
19:21[S]	19:24[S]	19:26[S]	19:28[S]	19:30[S]					
					19:22	19:25	19:28	19:30	19:32
19:27[S]	19:30[S]	19:32[S]	19:34[S]	19:36[S]					
					19:28	19:31	19:34	19:36	19:38
19:33[S]	19:36[S]	19:38[S]	19:40[S]	19:42[S]					
					19:34	19:37	19:40	19:42	19:44
19:38[S]	19:41[S]	19:43[S]	19:45[S]	19:47[S]					

TUNNEY'S PASTURE O-TRAIN EAST / EST	BAYVIEW O-TRAIN EAST / EST	PIMISI O-TRAIN EAST / EST	LYON O-TRAIN EAST / EST	PARLIAMENT / PARLEMENT O-TRAIN EAST / EST	HURDMAN O-TRAIN EAST / EST	TREMBLAY O-TRAIN EAST / EST	ST-LAURENT O-TRAIN EAST / EST	CYRVILLE O-TRAIN EAST / EST	BLAIR O-TRAIN
					19:39	19:42	19:45	19:47	19:49
19:44[S]	19:47[S]	19:49[S]	19:51[S]	19:53[S]					
					19:45	19:48	19:51	19:53	19:55
19:50[S]	19:53[S]	19:55[S]	19:57[S]	19:59[S]					
					19:51	19:54	19:57	19:59	20:01
19:55[S]	19:58[S]	20:00[S]	20:02[S]	20:04[S]					
					19:56	19:59	20:02	20:04	20:06
					20:02	20:05	20:08	20:10	20:12
					20:08	20:11	20:14	20:16	20:18
					20:13	20:16	20:19	20:21	20:23
					20:19	20:22	20:25	20:27	20:29
					20:25	20:28	20:31	20:33	20:35
					20:30	20:33	20:36	20:38	20:40
					20:36	20:39	20:42	20:44	20:46
					20:42	20:45	20:48	20:50	20:52
					20:47	20:50	20:53	20:55	20:57
					20:53	20:56	20:59	21:01	21:03
					20:59	21:02	21:05	21:07	21:09
					21:04	21:07	21:10	21:12	21:14
					21:10	21:13	21:16	21:18	21:20
					21:16	21:19	21:22	21:24	21:26
					21:21	21:24	21:27	21:29	21:31
					21:27	21:30	21:33	21:35	21:37
					21:33	21:36	21:39	21:41	21:43
					21:38	21:41	21:44	21:46	21:48
					21:44	21:47	21:50	21:52	21:54
					21:50	21:53	21:56	21:58	22:00
					21:55	21:58	22:01	22:03	22:05
					22:01	22:04	22:07	22:09	22:11
					22:07	22:10	22:13	22:15	22:17
					22:12	22:15	22:18	22:20	22:22
					22:19	22:22	22:25	22:27	22:29
					22:29	22:32	22:35	22:37	22:39
					22:38	22:41	22:44	22:46	22:48
					22:47	22:50	22:53	22:55	22:57
					22:57	23:00	23:03	23:05	23:07
					23:06	23:09	23:12	23:14	23:16
					23:15	23:18	23:21	23:23	23:25
					23:25	23:28	23:31	23:33	23:35
					23:34	23:37	23:40	23:42	23:44
					23:43	23:46	23:49	23:51	23:53
					23:55	23:58	00:01	00:03	00:05
					00:08	00:11	00:14	00:16	00:18
					00:22	00:25	00:28	00:30	00:32
					00:40	00:43	00:46	00:48	00:50
					01:03	01:06	01:09	01:11	01:13
					01:18	01:21	01:24	01:26	01:28

Schedules & Maps

The next service change is on Sunday, April 23.

Schedule times are based on typical driving conditions and may vary. Please arrive at your stop a few minutes early to allow for any fluctuations in schedule.

Mon, Jun 12

1 Tunney's Pasture

[S] Ends at Hurdman

[a] O-Train Line 1 will experience partial closures from June 5-19 for planned maintenance. Read more

BLAIR O-TRAIN WEST / OUEST	CYRVILLE O-TRAIN WEST / OUEST	ST-LAURENT O-TRAIN WEST / OUEST	TREMBLAY O-TRAIN WEST / OUEST	HURDMAN O-TRAIN WEST / OUEST	PARLIAMENT / PARLEMENT O-TRAIN WEST / OUEST	LYON O-TRAIN WEST / OUEST	PIMISI O-TRAIN WEST / OUEST	BAYVIEW O-TRAIN WEST / OUEST	TUNNEY'S PASTURE O-TRAIN
			05:00[S]	05:03[S]					
05:00[S]	05:02[S]	05:04[S]	05:07[S]	05:10[S]					
					05:02	05:04	05:06	05:08	05:10
05:09[S]	05:11[S]	05:13[S]	05:16[S]	05:19[S]					
					05:13	05:15	05:17	05:19	05:21
05:18[S]	05:20[S]	05:22[S]	05:25[S]	05:28[S]					
					05:20	05:22	05:24	05:26	05:28
05:28[S]	05:30[S]	05:32[S]	05:35[S]	05:38[S]					
					05:29	05:31	05:33	05:35	05:37
05:37[S]	05:39[S]	05:41[S]	05:44[S]	05:47[S]					
					05:38	05:40	05:42	05:44	05:46
05:44[S]	05:46[S]	05:48[S]	05:51[S]	05:54[S]					
					05:48	05:50	05:52	05:54	05:56
					05:57	05:59	06:01	06:03	06:05
			05:59[S]	06:02[S]					
05:56[S]	05:58[S]	06:00[S]	06:03[S]	06:06[S]					
					06:04	06:06	06:08	06:10	06:12
			06:08[S]	06:11[S]					
06:05[S]	06:07[S]	06:09[S]	06:12[S]	06:15[S]					
					06:12	06:14	06:16	06:18	06:20
					06:16	06:18	06:20	06:22	06:24
			06:18[S]	06:21[S]					
06:15[S]	06:17[S]	06:19[S]	06:22[S]	06:25[S]					
06:19[S]	06:21[S]	06:23[S]	06:26[S]	06:29[S]					
					06:21	06:23	06:25	06:27	06:29
					06:25	06:27	06:29	06:31	06:33
06:25[S]	06:27[S]	06:29[S]	06:32[S]	06:35[S]					

BLAIR O-TRAIN WEST / OUEST	CYRVILLE O-TRAIN WEST / OUEST	ST-LAURENT O-TRAIN WEST / OUEST	TREMBLAY O-TRAIN WEST / OUEST	HURDMAN O-TRAIN WEST / OUEST	PARLIAMENT / PARLEMENT O-TRAIN WEST / OUEST	LYON O-TRAIN WEST / OUEST	PIMISI O-TRAIN WEST / OUEST	BAYVIEW O-TRAIN WEST / OUEST	TUNNEY'S PASTURE O-TRAIN
06:29[S]	06:31[S]	06:33[S]	06:36[S]	06:39[S]					
					06:31	06:33	06:35	06:37	06:39
					06:35	06:37	06:39	06:41	06:43
06:35[S]	06:37[S]	06:39[S]	06:42[S]	06:45[S]					
					06:39	06:41	06:43	06:45	06:47
06:39[S]	06:41[S]	06:43[S]	06:46[S]	06:49[S]					
					06:45	06:47	06:49	06:51	06:53
06:45[S]	06:47[S]	06:49[S]	06:52[S]	06:55[S]					
					06:49	06:51	06:53	06:55	06:57
06:49[S]	06:51[S]	06:53[S]	06:56[S]	06:59[S]					
					06:55	06:57	06:59	07:01	07:03
06:55[S]	06:57[S]	06:59[S]	07:02[S]	07:05[S]					
					06:59	07:01	07:03	07:05	07:07
07:00[S]	07:02[S]	07:04[S]	07:07[S]	07:10[S]					
					07:05	07:07	07:09	07:11	07:13
07:05[S]	07:07[S]	07:09[S]	07:12[S]	07:15[S]					
					07:09	07:11	07:13	07:15	07:17
07:10[S]	07:12[S]	07:14[S]	07:17[S]	07:20[S]					
					07:15	07:17	07:19	07:21	07:23
07:15[S]	07:17[S]	07:19[S]	07:22[S]	07:25[S]					
					07:20	07:22	07:24	07:26	07:28
07:20[S]	07:22[S]	07:24[S]	07:27[S]	07:30[S]					
					07:25	07:27	07:29	07:31	07:33
07:25[S]	07:27[S]	07:29[S]	07:32[S]	07:35[S]					
					07:30	07:32	07:34	07:36	07:38
07:30[S]	07:32[S]	07:34[S]	07:37[S]	07:40[S]					
					07:35	07:37	07:39	07:41	07:43
07:35[S]	07:37[S]	07:39[S]	07:42[S]	07:45[S]					
					07:40	07:42	07:44	07:46	07:48
07:40[S]	07:42[S]	07:44[S]	07:47[S]	07:50[S]					
					07:45	07:47	07:49	07:51	07:53
07:45[S]	07:47[S]	07:49[S]	07:52[S]	07:55[S]					
					07:50	07:52	07:54	07:56	07:58
07:50[S]	07:52[S]	07:54[S]	07:57[S]	08:00[S]					
					07:55	07:57	07:59	08:01	08:03
07:55[S]	07:57[S]	07:59[S]	08:02[S]	08:05[S]					
					08:00	08:02	08:04	08:06	08:08
08:00[S]	08:02[S]	08:04[S]	08:07[S]	08:10[S]					
					08:05	08:07	08:09	08:11	08:13
08:05[S]	08:07[S]	08:09[S]	08:12[S]	08:15[S]					
					08:10	08:12	08:14	08:16	08:18
08:10[S]	08:12[S]	08:14[S]	08:17[S]	08:20[S]					
					08:15	08:17	08:19	08:21	08:23
08:15[S]	08:17[S]	08:19[S]	08:22[S]	08:25[S]					
					08:20	08:22	08:24	08:26	08:28
08:20[S]	08:22[S]	08:24[S]	08:27[S]	08:30[S]					
					08:25	08:27	08:29	08:31	08:33
08:25[S]	08:27[S]	08:29[S]	08:32[S]	08:35[S]					

BLAIR O-TRAIN WEST / OUEST	CYRVILLE O-TRAIN WEST / OUEST	ST-LAURENT O-TRAIN WEST / OUEST	TREMBLAY O-TRAIN WEST / OUEST	HURDMAN O-TRAIN WEST / OUEST	PARLIAMENT / PARLEMENT O-TRAIN WEST / OUEST	LYON O-TRAIN WEST / OUEST	PIMISI O-TRAIN WEST / OUEST	BAYVIEW O-TRAIN WEST / OUEST	TUNNEY'S PASTURE O-TRAIN
					08:30	08:32	08:34	08:36	08:38
08:30[S]	08:32[S]	08:34[S]	08:37[S]	08:40[S]					
					08:35	08:37	08:39	08:41	08:43
08:35[S]	08:37[S]	08:39[S]	08:42[S]	08:45[S]					
					08:40	08:42	08:44	08:46	08:48
08:40[S]	08:42[S]	08:44[S]	08:47[S]	08:50[S]					
					08:45	08:47	08:49	08:51	08:53
08:45[S]	08:47[S]	08:49[S]	08:52[S]	08:55[S]					
					08:50	08:52	08:54	08:56	08:58
08:50[S]	08:52[S]	08:54[S]	08:57[S]	09:00[S]					
					08:55	08:57	08:59	09:01	09:03
08:56[S]	08:58[S]	09:00[S]	09:03[S]	09:06[S]					
					09:00	09:02	09:04	09:06	09:08
09:03[S]	09:05[S]	09:07[S]	09:10[S]	09:13[S]					
					09:05	09:07	09:09	09:11	09:13
					09:10	09:12	09:14	09:16	09:18
09:10[S]	09:12[S]	09:14[S]	09:17[S]	09:20[S]					
					09:16	09:18	09:20	09:22	09:24
09:16[S]	09:18[S]	09:20[S]	09:23[S]	09:26[S]					
					09:22	09:24	09:26	09:28	09:30
09:22[S]	09:24[S]	09:26[S]	09:29[S]	09:32[S]					
					09:29	09:31	09:33	09:35	09:37
09:29[S]	09:31[S]	09:33[S]	09:36[S]	09:39[S]					
09:34[S]	09:36[S]	09:38[S]	09:41[S]	09:44[S]					
					09:35	09:37	09:39	09:41	09:43
09:39[S]	09:41[S]	09:43[S]	09:46[S]	09:49[S]					
					09:41	09:43	09:45	09:47	09:49
09:45[S]	09:47[S]	09:49[S]	09:52[S]	09:55[S]					
					09:48	09:50	09:52	09:54	09:56
09:51[S]	09:53[S]	09:55[S]	09:58[S]	10:01[S]					
					09:53	09:55	09:57	09:59	10:01
09:56[S]	09:58[S]	10:00[S]	10:03[S]	10:06[S]					
					09:58	10:00	10:02	10:04	10:06
10:02[S]	10:04[S]	10:06[S]	10:09[S]	10:12[S]					
					10:04	10:06	10:08	10:10	10:12
10:08[S]	10:10[S]	10:12[S]	10:15[S]	10:18[S]					
					10:10	10:12	10:14	10:16	10:18
10:13[S]	10:15[S]	10:17[S]	10:20[S]	10:23[S]					
					10:15	10:17	10:19	10:21	10:23
10:19[S]	10:21[S]	10:23[S]	10:26[S]	10:29[S]					
					10:21	10:23	10:25	10:27	10:29
10:25[S]	10:27[S]	10:29[S]	10:32[S]	10:35[S]					
					10:27	10:29	10:31	10:33	10:35
10:30[S]	10:32[S]	10:34[S]	10:37[S]	10:40[S]					
					10:32	10:34	10:36	10:38	10:40
10:36[S]	10:38[S]	10:40[S]	10:43[S]	10:46[S]					
					10:38	10:40	10:42	10:44	10:46
10:42[S]	10:44[S]	10:46[S]	10:49[S]	10:52[S]					

BLAIR O-TRAIN WEST / OUEST	CYRVILLE O-TRAIN WEST / OUEST	ST-LAURENT O-TRAIN WEST / OUEST	TREMBLAY O-TRAIN WEST / OUEST	HURDMAN O-TRAIN WEST / OUEST	PARLIAMENT / PARLEMENT O-TRAIN WEST / OUEST	LYON O-TRAIN WEST / OUEST	PIMISI O-TRAIN WEST / OUEST	BAYVIEW O-TRAIN WEST / OUEST	TUNNEY'S PASTURE O-TRAIN
					10:44	10:46	10:48	10:50	10:52
10:47[S]	10:49[S]	10:51[S]	10:54[S]	10:57[S]					
					10:49	10:51	10:53	10:55	10:57
10:53[S]	10:55[S]	10:57[S]	11:00[S]	11:03[S]					
					10:55	10:57	10:59	11:01	11:03
10:59[S]	11:01[S]	11:03[S]	11:06[S]	11:09[S]					
					11:01	11:03	11:05	11:07	11:09
11:04[S]	11:06[S]	11:08[S]	11:11[S]	11:14[S]					
					11:06	11:08	11:10	11:12	11:14
11:10[S]	11:12[S]	11:14[S]	11:17[S]	11:20[S]					
					11:12	11:14	11:16	11:18	11:20
11:16[S]	11:18[S]	11:20[S]	11:23[S]	11:26[S]					
					11:18	11:20	11:22	11:24	11:26
11:21[S]	11:23[S]	11:25[S]	11:28[S]	11:31[S]					
					11:23	11:25	11:27	11:29	11:31
11:27[S]	11:29[S]	11:31[S]	11:34[S]	11:37[S]					
					11:29	11:31	11:33	11:35	11:37
11:33[S]	11:35[S]	11:37[S]	11:40[S]	11:43[S]					
					11:35	11:37	11:39	11:41	11:43
11:38[S]	11:40[S]	11:42[S]	11:45[S]	11:48[S]					
					11:40	11:42	11:44	11:46	11:48
11:44[S]	11:46[S]	11:48[S]	11:51[S]	11:54[S]					
					11:46	11:48	11:50	11:52	11:54
11:50[S]	11:52[S]	11:54[S]	11:57[S]	12:00[S]					
					11:52	11:54	11:56	11:58	12:00
11:55[S]	11:57[S]	11:59[S]	12:02[S]	12:05[S]					
					11:57	11:59	12:01	12:03	12:05
12:01[S]	12:03[S]	12:05[S]	12:08[S]	12:11[S]					
					12:03	12:05	12:07	12:09	12:11
12:07[S]	12:09[S]	12:11[S]	12:14[S]	12:17[S]					
					12:09	12:11	12:13	12:15	12:17
12:12[S]	12:14[S]	12:16[S]	12:19[S]	12:22[S]					
					12:14	12:16	12:18	12:20	12:22
12:18[S]	12:20[S]	12:22[S]	12:25[S]	12:28[S]					
					12:20	12:22	12:24	12:26	12:28
12:24[S]	12:26[S]	12:28[S]	12:31[S]	12:34[S]					
					12:26	12:28	12:30	12:32	12:34
12:29[S]	12:31[S]	12:33[S]	12:36[S]	12:39[S]					
					12:31	12:33	12:35	12:37	12:39
12:35[S]	12:37[S]	12:39[S]	12:42[S]	12:45[S]					
					12:37	12:39	12:41	12:43	12:45
12:41[S]	12:43[S]	12:45[S]	12:48[S]	12:51[S]					
					12:43	12:45	12:47	12:49	12:51
12:46[S]	12:48[S]	12:50[S]	12:53[S]	12:56[S]					
					12:48	12:50	12:52	12:54	12:56
12:52[S]	12:54[S]	12:56[S]	12:59[S]	13:02[S]					
					12:54	12:56	12:58	13:00	13:02
12:58[S]	13:00[S]	13:02[S]	13:05[S]	13:08[S]					

BLAIR O-TRAIN WEST / OUEST	CYRVILLE O-TRAIN WEST / OUEST	ST-LAURENT O-TRAIN WEST / OUEST	TREMBLAY O-TRAIN WEST / OUEST	HURDMAN O-TRAIN WEST / OUEST	PARLIAMENT / PARLEMENT O-TRAIN WEST / OUEST	LYON O-TRAIN WEST / OUEST	PIMISI O-TRAIN WEST / OUEST	BAYVIEW O-TRAIN WEST / OUEST	TUNNEY'S PASTURE O-TRAIN
					13:00	13:02	13:04	13:06	13:08
13:03[S]	13:05[S]	13:07[S]	13:10[S]	13:13[S]					
					13:05	13:07	13:09	13:11	13:13
13:09[S]	13:11[S]	13:13[S]	13:16[S]	13:19[S]					
					13:11	13:13	13:15	13:17	13:19
13:15[S]	13:17[S]	13:19[S]	13:22[S]	13:25[S]					
					13:17	13:19	13:21	13:23	13:25
13:20[S]	13:22[S]	13:24[S]	13:27[S]	13:30[S]					
					13:22	13:24	13:26	13:28	13:30
13:26[S]	13:28[S]	13:30[S]	13:33[S]	13:36[S]					
					13:28	13:30	13:32	13:34	13:36
13:32[S]	13:34[S]	13:36[S]	13:39[S]	13:42[S]					
					13:34	13:36	13:38	13:40	13:42
13:37[S]	13:39[S]	13:41[S]	13:44[S]	13:47[S]					
					13:39	13:41	13:43	13:45	13:47
13:43[S]	13:45[S]	13:47[S]	13:50[S]	13:53[S]					
					13:45	13:47	13:49	13:51	13:53
13:49[S]	13:51[S]	13:53[S]	13:56[S]	13:59[S]					
					13:51	13:53	13:55	13:57	13:59
13:54[S]	13:56[S]	13:58[S]	14:01[S]	14:04[S]					
					13:56	13:58	14:00	14:02	14:04
14:00[S]	14:02[S]	14:04[S]	14:07[S]	14:10[S]					
					14:02	14:04	14:06	14:08	14:10
14:06[S]	14:08[S]	14:10[S]	14:13[S]	14:16[S]					
					14:08	14:10	14:12	14:14	14:16
14:11[S]	14:13[S]	14:15[S]	14:18[S]	14:21[S]					
					14:13	14:15	14:17	14:19	14:21
14:17[S]	14:19[S]	14:21[S]	14:24[S]	14:27[S]					
					14:19	14:21	14:23	14:25	14:27
14:23[S]	14:25[S]	14:27[S]	14:30[S]	14:33[S]					
					14:25	14:27	14:29	14:31	14:33
14:28[S]	14:30[S]	14:32[S]	14:35[S]	14:38[S]					
					14:30	14:32	14:34	14:36	14:38
					14:36	14:38	14:40	14:42	14:44
			14:39[S]	14:42[S]					
14:35[S]	14:37[S]	14:39[S]	14:42[S]	14:45[S]					
14:40[S]	14:42[S]	14:44[S]	14:47[S]	14:50[S]					
					14:42	14:44	14:46	14:48	14:50
14:44[S]	14:46[S]	14:48[S]	14:51[S]	14:54[S]					
					14:47	14:49	14:51	14:53	14:55
14:50[S]	14:52[S]	14:54[S]	14:57[S]	15:00[S]					
					14:52	14:54	14:56	14:58	15:00
14:54[S]	14:56[S]	14:58[S]	15:01[S]	15:04[S]					
					14:55	14:57	14:59	15:01	15:03
					15:00	15:02	15:04	15:06	15:08
15:00[S]	15:02[S]	15:04[S]	15:07[S]	15:10[S]					
					15:04	15:06	15:08	15:10	15:12
15:04[S]	15:06[S]	15:08[S]	15:11[S]	15:14[S]					

BLAIR O-TRAIN WEST / OUEST	CYRVILLE O-TRAIN WEST / OUEST	ST-LAURENT O-TRAIN WEST / OUEST	TREMBLAY O-TRAIN WEST / OUEST	HURDMAN O-TRAIN WEST / OUEST	PARLIAMENT / PARLEMENT O-TRAIN WEST / OUEST	LYON O-TRAIN WEST / OUEST	PIMISI O-TRAIN WEST / OUEST	BAYVIEW O-TRAIN WEST / OUEST	TUNNEY'S PASTURE O-TRAIN
					15:10	15:12	15:14	15:16	15:18
15:10[S]	15:12[S]	15:14[S]	15:17[S]	15:20[S]					
					15:14	15:16	15:18	15:20	15:22
15:15[S]	15:17[S]	15:19[S]	15:22[S]	15:25[S]					
					15:20	15:22	15:24	15:26	15:28
15:20[S]	15:22[S]	15:24[S]	15:27[S]	15:30[S]					
					15:24	15:26	15:28	15:30	15:32
15:25[S]	15:27[S]	15:29[S]	15:32[S]	15:35[S]					
					15:30	15:32	15:34	15:36	15:38
15:30[S]	15:32[S]	15:34[S]	15:37[S]	15:40[S]					
					15:35	15:37	15:39	15:41	15:43
15:35[S]	15:37[S]	15:39[S]	15:42[S]	15:45[S]					
					15:40	15:42	15:44	15:46	15:48
15:40[S]	15:42[S]	15:44[S]	15:47[S]	15:50[S]					
					15:45	15:47	15:49	15:51	15:53
15:45[S]	15:47[S]	15:49[S]	15:52[S]	15:55[S]					
					15:50	15:52	15:54	15:56	15:58
15:50[S]	15:52[S]	15:54[S]	15:57[S]	16:00[S]					
					15:55	15:57	15:59	16:01	16:03
15:55[S]	15:57[S]	15:59[S]	16:02[S]	16:05[S]					
					16:00	16:02	16:04	16:06	16:08
16:00[S]	16:02[S]	16:04[S]	16:07[S]	16:10[S]					
					16:05	16:07	16:09	16:11	16:13
16:05[S]	16:07[S]	16:09[S]	16:12[S]	16:15[S]					
					16:10	16:12	16:14	16:16	16:18
16:10[S]	16:12[S]	16:14[S]	16:17[S]	16:20[S]					
					16:15	16:17	16:19	16:21	16:23
16:15[S]	16:17[S]	16:19[S]	16:22[S]	16:25[S]					
					16:20	16:22	16:24	16:26	16:28
16:20[S]	16:22[S]	16:24[S]	16:27[S]	16:30[S]					
					16:25	16:27	16:29	16:31	16:33
16:25[S]	16:27[S]	16:29[S]	16:32[S]	16:35[S]					
					16:30	16:32	16:34	16:36	16:38
16:30[S]	16:32[S]	16:34[S]	16:37[S]	16:40[S]					
					16:35	16:37	16:39	16:41	16:43
16:35[S]	16:37[S]	16:39[S]	16:42[S]	16:45[S]					
					16:40	16:42	16:44	16:46	16:48
16:40[S]	16:42[S]	16:44[S]	16:47[S]	16:50[S]					
					16:45	16:47	16:49	16:51	16:53
16:45[S]	16:47[S]	16:49[S]	16:52[S]	16:55[S]					
					16:50	16:52	16:54	16:56	16:58
16:50[S]	16:52[S]	16:54[S]	16:57[S]	17:00[S]					
					16:55	16:57	16:59	17:01	17:03
16:55[S]	16:57[S]	16:59[S]	17:02[S]	17:05[S]					
					17:00	17:02	17:04	17:06	17:08
17:00[S]	17:02[S]	17:04[S]	17:07[S]	17:10[S]					
					17:05	17:07	17:09	17:11	17:13
17:05[S]	17:07[S]	17:09[S]	17:12[S]	17:15[S]					

BLAIR O-TRAIN WEST / OUEST	CYRVILLE O-TRAIN WEST / OUEST	ST-LAURENT O-TRAIN WEST / OUEST	TREMBLAY O-TRAIN WEST / OUEST	HURDMAN O-TRAIN WEST / OUEST	PARLIAMENT / PARLEMENT O-TRAIN WEST / OUEST	LYON O-TRAIN WEST / OUEST	PIMISI O-TRAIN WEST / OUEST	BAYVIEW O-TRAIN WEST / OUEST	TUNNEY'S PASTURE O-TRAIN
					17:10	17:12	17:14	17:16	17:18
17:10[S]	17:12[S]	17:14[S]	17:17[S]	17:20[S]					
					17:15	17:17	17:19	17:21	17:23
17:15[S]	17:17[S]	17:19[S]	17:22[S]	17:25[S]					
					17:20	17:22	17:24	17:26	17:28
17:20[S]	17:22[S]	17:24[S]	17:27[S]	17:30[S]					
					17:25	17:27	17:29	17:31	17:33
17:25[S]	17:27[S]	17:29[S]	17:32[S]	17:35[S]					
					17:30	17:32	17:34	17:36	17:38
17:30[S]	17:32[S]	17:34[S]	17:37[S]	17:40[S]					
					17:35	17:37	17:39	17:41	17:43
17:35[S]	17:37[S]	17:39[S]	17:42[S]	17:45[S]					
					17:40	17:42	17:44	17:46	17:48
17:40[S]	17:42[S]	17:44[S]	17:47[S]	17:50[S]					
					17:45	17:47	17:49	17:51	17:53
17:45[S]	17:47[S]	17:49[S]	17:52[S]	17:55[S]					
					17:50	17:52	17:54	17:56	17:58
17:50[S]	17:52[S]	17:54[S]	17:57[S]	18:00[S]					
					17:55	17:57	17:59	18:01	18:03
17:56[S]	17:58[S]	18:00[S]	18:03[S]	18:06[S]					
					18:00	18:02	18:04	18:06	18:08
18:03[S]	18:05[S]	18:07[S]	18:10[S]	18:13[S]					
					18:05	18:07	18:09	18:11	18:13
18:09[S]	18:11[S]	18:13[S]	18:16[S]	18:19[S]					
					18:10	18:12	18:14	18:16	18:18
					18:16	18:18	18:20	18:22	18:24
18:16[S]	18:18[S]	18:20[S]	18:23[S]	18:26[S]					
18:22[S]	18:24[S]	18:26[S]	18:29[S]	18:32[S]					
					18:23	18:25	18:27	18:29	18:31
18:28[S]	18:30[S]	18:32[S]	18:35[S]	18:38[S]					
					18:29	18:31	18:33	18:35	18:37
18:34[S]	18:36[S]	18:38[S]	18:41[S]	18:44[S]					
					18:36	18:38	18:40	18:42	18:44
18:39[S]	18:41[S]	18:43[S]	18:46[S]	18:49[S]					
					18:42	18:44	18:46	18:48	18:50
18:45[S]	18:47[S]	18:49[S]	18:52[S]	18:55[S]					
					18:48	18:50	18:52	18:54	18:56
18:51[S]	18:53[S]	18:55[S]	18:58[S]	19:01[S]					
					18:54	18:56	18:58	19:00	19:02
18:56[S]	18:58[S]	19:00[S]	19:03[S]	19:06[S]					
					18:59	19:01	19:03	19:05	19:07
19:02[S]	19:04[S]	19:06[S]	19:09[S]	19:12[S]					
					19:05	19:07	19:09	19:11	19:13
19:08[S]	19:10[S]	19:12[S]	19:15[S]	19:18[S]					
					19:11	19:13	19:15	19:17	19:19
19:13[S]	19:15[S]	19:17[S]	19:20[S]	19:23[S]					
					19:16	19:18	19:20	19:22	19:24
19:19[S]	19:21[S]	19:23[S]	19:26[S]	19:29[S]					

BLAIR O-TRAIN WEST / OUEST	CYRVILLE O-TRAIN WEST / OUEST	ST-LAURENT O-TRAIN WEST / OUEST	TREMBLAY O-TRAIN WEST / OUEST	HURDMAN O-TRAIN WEST / OUEST	PARLIAMENT / PARLEMENT O-TRAIN WEST / OUEST	LYON O-TRAIN WEST / OUEST	PIMISI O-TRAIN WEST / OUEST	BAYVIEW O-TRAIN WEST / OUEST	TUNNEY'S PASTURE O-TRAIN
					19:22	19:24	19:26	19:28	19:30
19:25[S]	19:27[S]	19:29[S]	19:32[S]	19:35[S]					
					19:28	19:30	19:32	19:34	19:36
19:30[S]	19:32[S]	19:34[S]	19:37[S]	19:40[S]					
					19:33	19:35	19:37	19:39	19:41
19:36[S]	19:38[S]	19:40[S]	19:43[S]	19:46[S]					
					19:39	19:41	19:43	19:45	19:47
19:42[S]	19:44[S]	19:46[S]	19:49[S]	19:52[S]					
					19:45	19:47	19:49	19:51	19:53
19:47[S]	19:49[S]	19:51[S]	19:54[S]	19:57[S]					
					19:50	19:52	19:54	19:56	19:58
19:53[S]	19:55[S]	19:57[S]	20:00[S]	20:03[S]					
					19:56	19:58	20:00	20:02	20:04
19:59[S]	20:01[S]	20:03[S]	20:06[S]	20:09[S]					
20:04[S]	20:06[S]	20:08[S]	20:11[S]	20:14[S]					
20:10[S]	20:12[S]	20:14[S]	20:17[S]	20:20[S]					
20:16[S]	20:18[S]	20:20[S]	20:23[S]	20:26[S]					
20:21[S]	20:23[S]	20:25[S]	20:28[S]	20:31[S]					
20:27[S]	20:29[S]	20:31[S]	20:34[S]	20:37[S]					
20:33[S]	20:35[S]	20:37[S]	20:40[S]	20:43[S]					
20:38[S]	20:40[S]	20:42[S]	20:45[S]	20:48[S]					
20:44[S]	20:46[S]	20:48[S]	20:51[S]	20:54[S]					
20:50[S]	20:52[S]	20:54[S]	20:57[S]	21:00[S]					
20:55[S]	20:57[S]	20:59[S]	21:02[S]	21:05[S]					
21:01[S]	21:03[S]	21:05[S]	21:08[S]	21:11[S]					
21:07[S]	21:09[S]	21:11[S]	21:14[S]	21:17[S]					
21:12[S]	21:14[S]	21:16[S]	21:19[S]	21:22[S]					
21:18[S]	21:20[S]	21:22[S]	21:25[S]	21:28[S]					
21:24[S]	21:26[S]	21:28[S]	21:31[S]	21:34[S]					
21:30[S]	21:32[S]	21:34[S]	21:37[S]	21:40[S]					
21:39[S]	21:41[S]	21:43[S]	21:46[S]	21:49[S]					
21:48[S]	21:50[S]	21:52[S]	21:55[S]	21:58[S]					
21:58[S]	22:00[S]	22:02[S]	22:05[S]	22:08[S]					
22:06[S]	22:08[S]	22:10[S]	22:13[S]	22:16[S]					
22:16[S]	22:18[S]	22:20[S]	22:23[S]	22:26[S]					
22:24[S]	22:26[S]	22:28[S]	22:31[S]	22:34[S]					
22:35[S]	22:37[S]	22:39[S]	22:42[S]	22:45[S]					
22:44[S]	22:46[S]	22:48[S]	22:51[S]	22:54[S]					
22:54[S]	22:56[S]	22:58[S]	23:01[S]	23:04[S]					
23:05[S]	23:07[S]	23:09[S]	23:12[S]	23:15[S]					
23:18[S]	23:20[S]	23:22[S]	23:25[S]	23:28[S]					
23:32[S]	23:34[S]	23:36[S]	23:39[S]	23:42[S]					
23:49[S]	23:51[S]	23:53[S]	23:56[S]	23:59[S]					
00:09[S]	00:11[S]	00:13[S]	00:16[S]	00:19[S]					
00:25[S]	00:27[S]	00:29[S]	00:32[S]	00:35[S]					
00:40[S]	00:42[S]	00:44[S]	00:47[S]	00:50[S]					
01:00[S]	01:02[S]	01:04[S]	01:07[S]	01:10[S]					

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SCHEDULE 15-2
DESIGN AND CONSTRUCTION REQUIREMENTS

PART 2
DESIGN AND CONSTRUCTION REQUIREMENTS − GUIDEWAY

ARTICLE 1 INTRODUCTION

1.1 General Description of the Guideway and Guideway Requirements

(a) The Guideway shall:

(i) Provide for two Tracks for approximately 12.5km from Tunney’s Pasture Station in the west to Blair Station in the east; between Train Station and St. Laurent Station provide two tracks that shall branch off the mainline for approximately 0.8km to provide connections to the proposed MSF;

(ii) Generally follow the existing BRT alignment between Tunney’s Pasture Station and Blair Station, the exception being for approximately 2.7km through the Downtown Area between Lebreton Station and Campus Station where the Guideway will descend underground and be in a Tunnel below Queen Street, Rideau Street and Waller Street crossing under the Rideau Canal near the National Arts Centre and the Rideau Centre, the Alignment shall be within the right of way of Queen Street from Bronson Avenue to Metcalfe Street; and

(iii) Provide an MSF connection that shall branch off of the mainline west and east of Belfast Road crossing Tremblay Road at the intersection with Belfast Road. The two Tracks shall stay within the Lands of Belfast Road from Tremblay to the Bridge over the VIA railroad, then cross the VIA rail tracks adjacent to the Bridge Structure and connect to the yard Tracks in the MSF.

(b) The Guideway shall consist of:

(i) Track sections built on the existing BRT;

(ii) Track sections built off the existing BRT;

(iii) Track sections on Bridge Structures and Tunnel Structures; and

(iv) Track sections through Stations.

(c) The Guideway shall include components for:

(i) Traction Power;

(ii) OCS;

(iii) Communications ductbanks;

(iv) Signal and control Systems;

(v) Drainage systems and Stormwater Management; and

(vi) Other appurtenances as required by Project Co's design.

(d) The Guideway shall be fenced or otherwise enclosed for security.

(e) The Guideway shall not have continuous lighting. Lighting shall be limited to areas of Passenger interactions with buses and Stations and in other areas requiring lighting for Safety or operational needs.

(f) The property limits for the Guideway are defined as the Lands.

ARTICLE 2 ALIGNMENT AND GEOMETRIC DESIGN CRITERIA

2.1 Horizontal Alignment

(a) General

(i) The horizontal Track Alignment shall be designed in accordance with the requirements of Schedule 15 – Output Specifications, and shall be such that all of the Works is contained within the OLRT Lands.

(ii) The maximum Track design speed for the mainline and the MSF connection shall be 100km/h and 30km/h, respectively. Project Co shall Design the mainline Track so as to maximize the operating speed.

(iii) The horizontal alignment shall be tangent through station platform limits and for a minimum of 15m beyond the end of platforms. If site conditions do not provide sufficient length, then the spiral transition curve may begin closer to the platform provided sufficient running clearances between the selected LRV and Platform are achieved.

(iv) All non-track related construction details shall be related to or dimensioned from the centreline of the eastbound Track, unless otherwise noted.

(b) Track Centres

(i) The typical Track centre spacing is 4500mm. The mainline Track centre spacing may be reduced to an absolute minimum based on the selected LRV dynamic envelope and provided sufficient running clearances and tolerances under all operating conditions are maintained.

(c) Horizontal Curves

(i) Circular curves shall be defined by the arc definition of curvature and specified by their radius in metres to three decimal places.

(ii) For mainline Tracks, the curves shall be designed to maintain the maximum possible operating speed as dictated by existing topography, permanent physical features, property, and Alignment constraints. The absolute minimum radius used shall accommodate the turning capability of the selected LRV.

(d) Reverse Curves

(i) All locations that require a reversal in alignment shall be separated by a tangent.

(ii) The minimum tangent length between reversing curves shall be 25m.

(e) Compound Curves

(i) Compound curves may be used on the mainline Track Design.

(ii) Where two or more circular curves will be connected into a compound curve, the circular curves shall be joined by a spiral curve. The superelevation of each circular curve shall be adjusted to ensure that the maximum permissible speeds for all parts of the compound curve are identical.

(f) Spirals

(i) Spiral transition curves shall be used on all mainline and MSF connection Tracks to connect circular curves to tangents, with the exception that spirals are not required where both actual superelevation is zero and unbalanced superelevation is less than 50mm.

(ii) The minimum length of a spiral transition curve (L, m) shall be calculated using the actual superelevation (Ea, mm), unbalanced superelevation (Eu, mm), and design speed (V, km/h) and shall be determined by selecting the greater value of the following formulas:

A. L = EaV/108; and

B. L = EuV/180.

(iii) The absolute minimum length of spiral shall be 10m.

(g) Superelevation

(i) Superelevation shall be linearly attained throughout the full length of the spiral curve by raising the rail farthest from the curve centre, while maintaining the top of the inside rail at profile grade.

(ii) For mainline Tracks, the maximum actual superelevation shall be 150mm for ballasted Track and direct fixation or embedded Track. The maximum unbalanced superelevation shall be 115mm. These values may be modified for the selected LRV provided the 0.1g limit that passengers can tolerate comfortably is achieved. The total superelevation (E, mm) shall be based on the design speed (V, km/h) and equivalent radius (R, m), per the formula $E = 11.83V^2/R$.

2.2 Vertical Alignment

(a) General

(i) The vertical Track Alignment shall be set to respect constraints such as clearances over roads and fixed elevations such as at Station Platforms and other adjacent Infrastructure. The vertical Track Alignment shall be designed in accordance with the requirements of this Schedule 15 – Output Specifications. All references to profile in the vertical Alignment shall represent the top of the low rail for a given Track.

(b) Grades

(i) The maximum allowable grade through Stations shall be 1.5%.

(ii) No changes in grade or vertical curves shall encroach within the limits of Station Platforms.

(iii) A minimum distance of 15m shall be maintained between Platform limits and any point of vertical curvature. If site conditions do not provide sufficient length, then the spiral transition curve may begin closer to the Platform provided sufficient running clearances between the selected LRV and Platform are achieved.

(iv) The maximum grade for mainline and MSF connection Tracks shall be 4.5%, where unachievable the absolute maximum grade for mainline and MSF connection Tracks shall be no greater than 6%.

(c) Vertical Curves

(i) Parabolic vertical curves shall be provided for all grade changes.

(ii) The length of a vertical curve shall be as long as practicable, but no less than shown below.

(iii) The minimum length of vertical curve (LVC, m) for mainline and connection Tracks shall be determined by the following equations:

A. $LVC = 0.005AV^2$, for crest curves; and

B. $LVC = 0.003AV^2$, for sag curves.

2.3 Special Trackwork

(a) Special trackwork shall conform to AREMA requirements.

(b) The horizontal Alignment shall be tangent through special trackwork and for a minimum of 5m ahead of the point of switch and beyond the last long ties. In constrained conditions, the tangent shall extend a minimum of 2m beyond the heel of frog.

(c) For profile Design, all turnouts shall be located on a constant grade that shall extend a minimum of 3m beyond the point of switch and beyond the last long ties.

(d) A minimum tangent length of 20m shall be inserted between the back to back switch points where the turnout arrangement may entail a reverse movement through turnouts.

(e) Special trackwork shall not be located within 15m from the end of the Station Platform and not within a Station Platform.

(f) Special trackwork shall not be located within 50m of the transition between ballasted and direct fixation Track as outlined in the TCRP Light Rail Handbook. Project Co shall provide for special accommodations to mitigate the effects of different Track modulus under various geometric conditions.

2.4 Other Alignment Requirements

(a) Combined horizontal and vertical curvature: Overlapping horizontal and vertical curvature shall be avoided where possible. Where this situation is unavoidable, Project Co shall include justification in its Trackwork Design Report with reference to alignment Safety at the design speed.

2.5 Clearances

(a) Vehicle Clearances

(i) Horizontal clearance dimensions shall always be measured perpendicular to the Track centreline accounting for any superelevation in the Track.

(ii) On tangent Track the typical side clearance shall be a minimum of 1690mm measured perpendicular from the Track centreline. The mainline Track side clearance me be reduced to an absolute minimum based on the selected LRV dynamic envelope and provided sufficient running clearances and tolerances under all operating conditions are maintained.

(iii) Where no walkway is present, a typical minimum side clearance of 1890mm from Track centreline to any physical feature shall be maintained on tangent at-grade and retained cut Track. The mainline Track side clearance may be reduced to an absolute minimum based on the selected LRV dynamic envelope and provided sufficient running clearances and tolerances under all operating conditions are maintained.

(iv) Under cut-and-cover conditions, a typical minimum side clearance of 2150mm shall be provided from Track centreline. The mainline Track side clearance may be reduced to an absolute minimum based on the selected LRV dynamic envelope and provided sufficient running clearances and tolerances under all operating conditions are maintained.

(v) Where emergency walkways are present, tangent Track shall maintain minimum typical side clearances of 2300mm from the Track centreline to an outbound curb, railing fence, or other physical feature. The mainline Track side clearance may be reduced to an absolute minimum based on the selected LRV dynamic envelope and provided sufficient running clearances and tolerances under all operating conditions are maintained.

(vi) Additional clearances shall be provided on the inside of curves due to superelevation effects at the rate of 18mm for every 10mm of superelevation, to provide clearance for tilt-in. On curved Track the Vehicle side clearance shall be measured perpendicular to the superelevated Track centreline (axis of the Track measured perpendicular to the plan of the top of rails).

(vii) The typical horizontal clearance distance from the centreline of Track to the finished edge of Station Platform shall be 1405mm, or as otherwise required for the selected LRV such that a gap no greater than 75mm is maintained.

(viii) Vertical clearance dimensions shall always be measured in a vertical plane irrespective of any superelevation or profile grade. When superelevation is present, the top of low rail shall be used as the reference elevation when calculating vertical clearance.

(b) Other Clearance Requirements

(i) Signal and trackwork equipment mounted on Track slab along the Alignment shall be kept clear of the under car clearance envelope of the Vehicle.

(ii) Temporary clearance requirements for construction shall be assessed on an individual basis.

ARTICLE 3 TRACKWORK

3.1 Order of Precedence

(a) General

(i) The Design and Construction of trackwork shall be in accordance with the criteria contained in this Article, and all standards, regulations, policies, Applicable Law, guidelines or practices applicable to the Project, including but not limited to each of the following Reference Documents. If the event of a conflict between the criteria, commitments or requirements contained within one document when compared with another, the more stringent shall apply:

A. Requirements of this Article;

B. AREMA Track Standards, or equivalent; and

C. The criteria in TCRP Report 57.

3.2 General Requirements

(a) The scope of the trackwork includes all Works related to the Construction of a complete LRT System as specified herein.

(b) The scope of the special trackwork consists of all Works related to the complete Construction of special trackwork as described in this Schedule 15 – Output Specifications. This includes, but is not limited to, the Design, supply, installation, and testing of special trackwork, including all turnouts, crossover components, adjoining trackwork, fastening components, and all other Track materials.

(c) Project Co shall be responsible for control and any mitigation which may be a result of wheel-rail noise throughout the OLRT System in accordance with Schedule 17-Environmental Obligations.

3.3 Track Types

(a) General

(i) The Track structure shall be built to 1435mm Track gauge. Direct fixation Track shall be used in Tunnels, on aerial structures. Ballasted Track or direct fixation Track shall be permissible through Station Platforms and at all other locations on the Alignment where performance is not compromised and maintenance can be achieved.

(ii) The running rails of all mainline Track, including special trackwork, shall be electrically isolated from the ground.

(b) Ballasted Track

(i) Ballasted Track shall utilize timber or precast concrete crossties with a resilient rail fastening system.

(ii) Crushed stone or other material shall conform to AREMA ballast specifications.

(iii) The particle size requirements shall conform to AREMA requirements in relation to the crushed stone ballast, class number 4A.

(iv) Minimum depth of ballast below the bottom of ties under the running rail shall be 225mm. Shoulder ballast shall extend a minimum of 300mm beyond the ends of ties before sloping at 2:1 to the sub-ballast.

(v) Ballast shall be well drained and shall not contact the running rails for mitigation of stray current and loss of shunting or calibration with signal systems.

(vi) Track bed shall be of sufficient stability to permit operation of track circuits under all climatic conditions.

(c) Direct Fixation Track

(i) Direct Fixation Track

A. Direct fixation Track shall consist of a resilient direct fixation rail fastener system anchored or embedded into a concrete plinth or base slab.

B. The direct fixation Track fastening system shall be designed to support required loading and avoid accumulation of runoff in the rail support areas.

(ii) Track Transition Area

A. Transitions from ballasted Track sections to direct fixation Track shall use a 6m long variable-depth reinforced concrete approach slab to accommodate the change from the solid support of the Track slab to the semi-solid support of the change in Track modulus of the ballast.

3.4 Track Materials

(a) General

(i) Materials identified in the following sections shall be used for all Track Construction.

(b) Rail/115 lb RE

(i) Supply rail that meets:

A. AREMA Volume 1, Chapter 4, Part 2; and

B. ASTM A1.

(ii) Rail Lengths

A. Standard rail lengths shall be used wherever possible.

B. All rail shall be CWR.

(c) Restraining Rails

(i) Project Co shall install restraining rails along the gauge side of the low rail for all mainline horizontal curves with a radius of 145m or less.

(ii) Restraining rail shall be electrically isolated from running rail in order to maintain broken rail protection.

(d) Direct Fixation Fasteners

(i) Project Co shall provide DFF that shall meet the requirements of this Schedule 15 – Output Specification.

(ii) The DFF shall be part of an engineered direct fixation system and shall be designed to meet the required rail loading.

(iii) Project Co shall design the DFF system to resist all slip forces as determined by design.

(iv) The DFF shall:

A. Provide vertical and lateral stability to the rail;

B. Restrain the rail movement during rail break incidents limiting the rail break gap to 50mm;

C. Distribute rail loadings to the concrete support structures;

D. Electrically insulate the rail from the Guideway;

E. Accommodate CWR and structural interface forces;

F. Prevent rail buckling under high temperature conditions; and

G. Provide means for achieving a minimum of 12mm rail lateral adjustment in 3mm maximum increments.

(e) Rail Joints

(i) Project Co shall supply insulated glued joints for 115lb RE rail manufactured to AREMA standards.

(ii) Rail joints shall be electrically tested prior to and after placement in Track.

(f) Rail Bonding

(i) Project Co shall supply and install rail bonds that meet AREMA specifications in Volume 3, Chapter 33, Part 7 and 12.

(ii) Rails shall be welded in continuous lengths and bolted joints shall be electrically bonded.

(iii) At locations requiring insulated joints, the Traction Power direct current continuity of negative rails shall be maintained by use of impedance bonds.

(g) Switch Clearing Device

(i) Switch clearing devices shall be supplied and installed by Project Co at special trackwork locations. Project Co shall also provide conduits and junction boxes and other supporting Infrastructure for these devices.

(ii) Project Co shall provide switch clearing devices that are proven in similar climatic conditions and meet accepted industry standards and do not compromise safety.

(iii) No gas powered switch heaters shall be permitted in tunnels or enclosed areas.

(h) Switch Machines and other Turnout Appliances

(i) Switch machines and other associated equipment shall be provided and installed by Project Co.

(ii) Project Co shall provide for the location of trackside terminal boxes, which shall be located near the switch machine. Terminal boxes shall not be located within a position that would constrict the ability of Maintenance personnel to maintain or manually throw the switch.

(iii) Switch machines shall be able to be manually operated with minimal physical effort, as a backup to powered operation.

(i) End-of-Track Devices (Buffer Stops)

(i) End-of-Track shock-absorbing devices for use at terminal station Tracks shall be included in the Trackwork Design Report and be which shall be submitted as part of the Works Submittals according to Schedule 10 – Review Procedure. These devices shall be mounted near the end of Track on both Station Platform Tracks. Project Co shall procure and install the approved end-of-Track devices as part of the Works.

(j) Rail Expansion Joints

(i) The anticipated rail movement within the full range of rail temperatures shall be handled by the direct fixation assembly.

(k) Noise and Vibration Mitigation

(i) Project Co shall install a site-specific Track structure where it is required to control levels of noise and vibration, as described in Schedule 17 – Environmental Obligations.

3.5 Special Trackwork

(a) General

(i) All special trackwork shall be supplied and installed by Project Co. Special trackwork assemblages include all materials necessary for Construction.

(ii) All special trackwork joints shall be butt welded in-field except where Project Co can demonstrate that space does not permit. At these locations thermite welds performed in accordance with manufacturer's weld procedures are acceptable. Compromise welds shall be considered part of the mainline Track conditions and installation. No holes, for temporary joint installation, or otherwise, shall be permitted within 150mm of the weld location. All thermite welds shall be tested ultrasonically.

(iii) All turnouts shall utilize tangential geometry with curved switch points. All mainline special trackwork shall be configured with 115lb RE rail.

(iv) Special trackwork components shall be based on AREMA specifications for turnout.

(v) All components shall be designed so that the specified tolerances can be maintained throughout the operating life of the special trackwork with minimal Maintenance.

(vi) Crossover locations shall be integrated with signaling and OCS system designs.

(vii) All mainline turnouts and crossovers shall be optimized to meet or exceed the Operations Performance Requirements outlined in Schedule 15-2 Part 1 Article 2.

(viii) Locations for OCS poles shall be provided at all crossover locations.

(ix) Tail Tracks and pocket Tracks shall be maximized to accommodate at least a minimum length consistent with additional length to improve approach speeds where feasible.

(b) Project Co shall undertake the Design of the OLRT Project and systems and shall provide the following minimum required operational Track facilities:

(i) Tail Tracks west of Tunney’s Pasture Station sufficient to facilitate the reversing of trains and to maximize approach speeds into the Terminal Station;

(ii) Optimized crossovers adjacent to the MSF west and MSF east connecting tracks that maximize operational flexibility into and out of the yard and minimize operational impacts to mainline revenue operations during loading and unloading of the line;

(iii) Tail Tracks east of Blair Station sufficient to facilitate the reversing of trains and to maximize approach speeds into the Terminal Station; and

(iv) Interlockings and special trackwork at locations necessary to meet or exceed the requirements of the Operations Performance Requirements (Schedule 15-2 Part 1, Article 2).

3.6 Track Construction Tolerances

(a) Verification of the Track installation shall include a Trackstar Geometry Test (or equivalent).

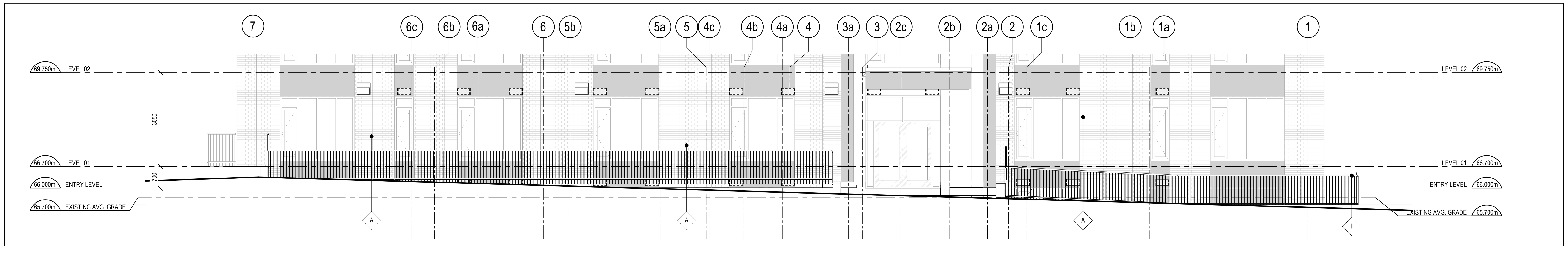
(b) Clearances shall be verified by laser measurement using an L-Kopia vehicle (or equivalent).

APPENDIX 4

ROOF PLAN

ELEVATION PLANS

EXTERIOR WALL AND TYPICAL WALL CONSTRUCTION DETAILS



2 NORTH ELEVATION - GUARD
A201 SCALE: 1 : 75

1 NORTH ELEVATION
A201 SCALE: 1 : 75

CLADDING LEGEND:

A	BRICK MASONRY COLOUR: RED TYPE: 1
B	ALUMINUM COMPOSITE PANEL COLOUR: CHARCOAL TYPE: ACM-1
C	CORRUGATED METAL SIDING COLOUR: GREY TYPE: SS-1
D	FIBER CEMENT PANEL COLOUR: LIGHT GREY TYPE: FC-2
E	FIBER CEMENT PANEL COLOUR: CHARCOAL TYPE: FC-1
F	METAL SIDING WITH PERFORATED PANEL SCREEN COLOUR: GREY SIDING TYPE: SS-2 SCREEN TYPE: MP-1 (50% OPEN)
G	RETAINING WALL TYPE: CAST IN PLACE CONCRETE
H	METAL FRAME AND CLEAR GLASS GUARD COLOUR: DARK GREY
I	METAL PICKET GUARD COLOUR: CHARCOAL TYPE: STEEL
J	WOOD FENCE

CLADDING LEGEND

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7	ISSUED FOR TENDER	2023-07-05
3	RE-ISSUED FOR BUILDING PERMIT	2023-05-25
2	ISSUED FOR COORDINATION	2023-05-03
1	ISSUED FOR BUILDING PERMIT	2021-06-12

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Project1 Studio Incorporated
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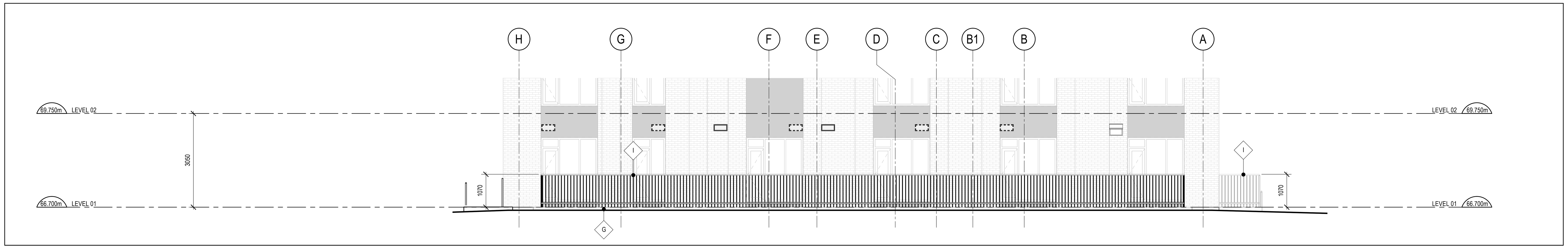
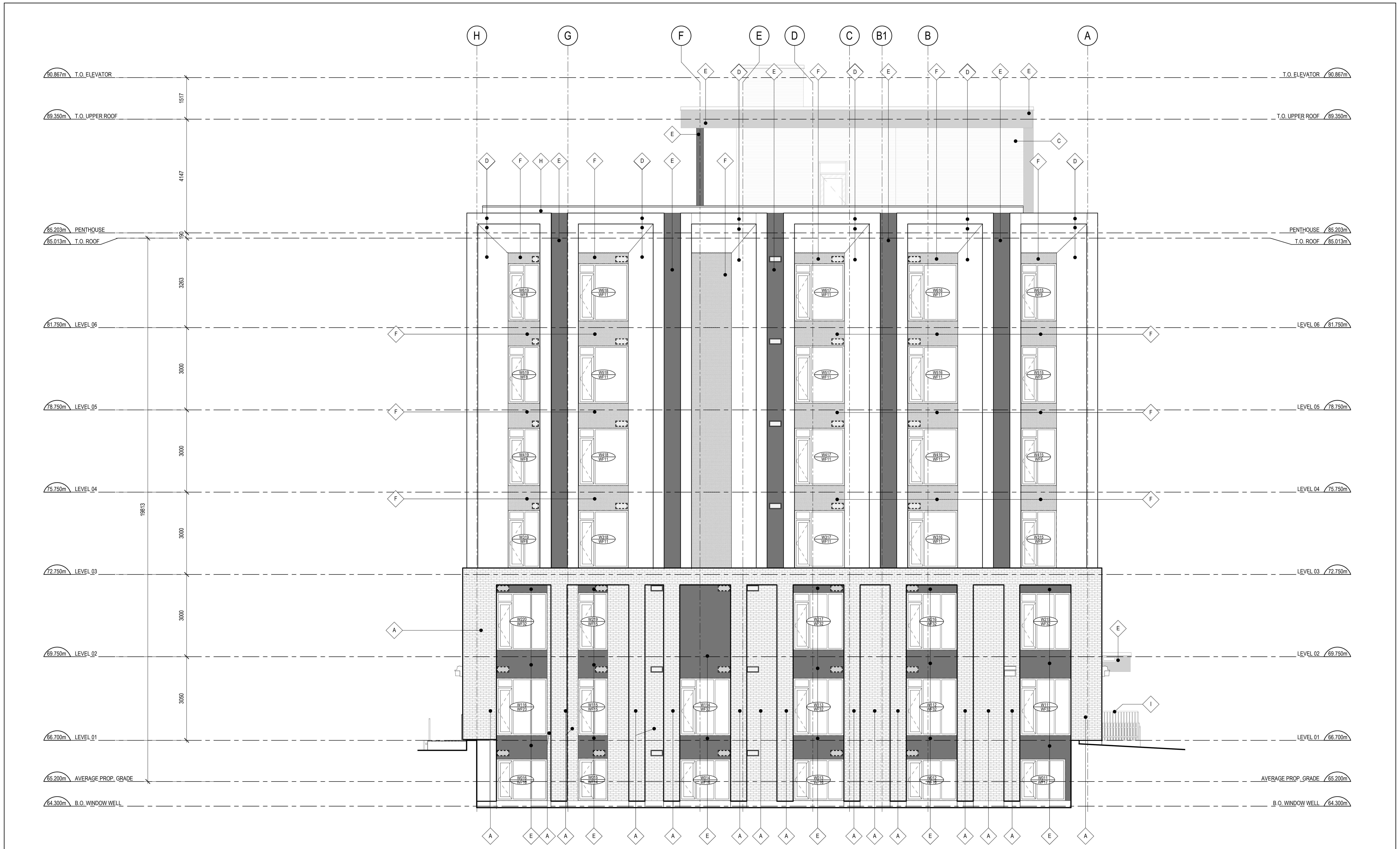
2008	NOTED	DM	RMK

NORTH ELEVATION

A201



2
A202
EAST ELEVATION - GUARD
SCALE: 1 : 75



1
A202
EAST ELEVATION
SCALE: 1 : 75

CLADDING LEGEND:

- A — BRICK MASONRY, COLOUR: RED, TYPE: 1
- B — ALUMINUM COMPOSITE PANEL, COLOUR: CHARCOAL, TYPE: ACM-1
- C — CORRUGATED METAL SIDING, COLOUR: GREY, TYPE: SS-1
- D — FIBER CEMENT PANEL, COLOUR: LIGHT GREY, TYPE: FC-2
- E — FIBER CEMENT PANEL, COLOUR: CHARCOAL, TYPE: FC-1
- F — METAL SIDING WITH PERFORATED PANEL SCREEN, COLOUR: GREY, SIDING TYPE: SS-2, SCREEN TYPE: MP-1 (50% OPEN)
- G — RETAINING WALL, TYPE: CAST IN PLACE CONCRETE
- H — METAL FRAME AND CLEAR GLASS GUARD, COLOUR: DARK GREY
- I — METAL PICKET GUARD, COLOUR: CHARCOAL, TYPE: STEEL
- J — WOOD FENCE

CLADDING LEGEND

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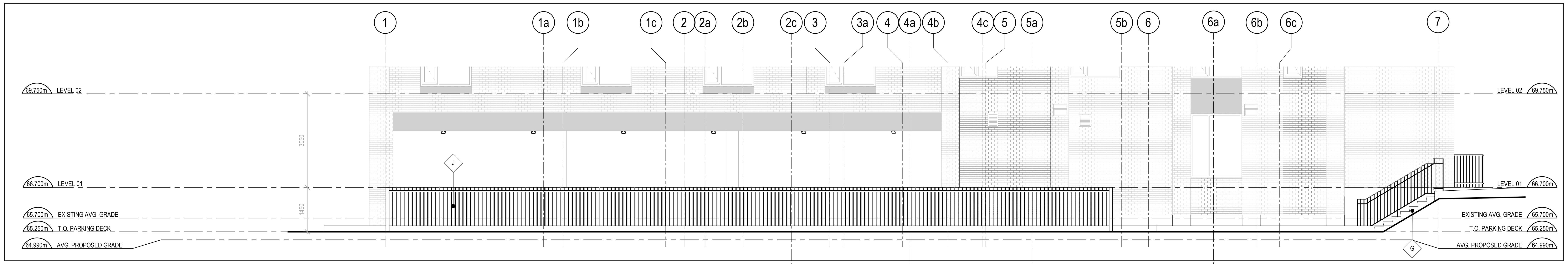
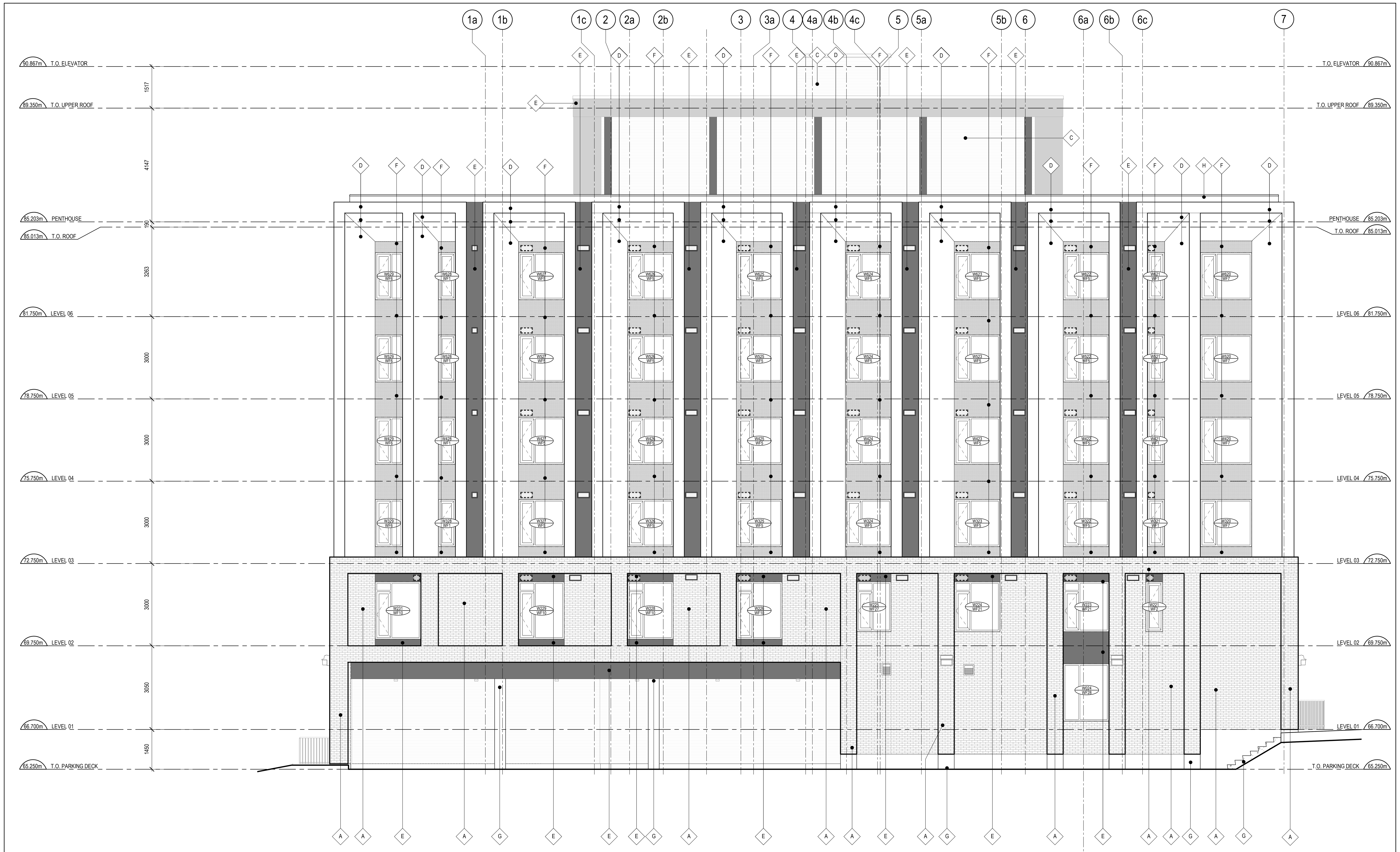
EAST ELEVATION

A202



2
A203
SOUTH ELEVATION - FENCE
SCALE: 1 : 75



1
A203
SOUTH ELEVATION
SCALE: 1 : 75

CLADDING LEGEND:

- A — BRICK MASONRY
  COLOUR: RED
  TYPE: 1
- B — ALUMINUM COMPOSITE PANEL
  COLOUR: CHARCOAL
  TYPE: ACM-1
- C — CORRUGATED METAL SIDING
  COLOUR: GREY
  TYPE: SS-1
- D — FIBER CEMENT PANEL
  COLOUR: LIGHT GREY
  TYPE: FC-2
- E — FIBER CEMENT PANEL
  COLOUR: CHARCOAL
  TYPE: FC-1
- F — METAL SIDING WITH PERFORATED PANEL SCREEN
  COLOUR: GREY
  SIDING TYPE: SS-2
  SCREEN TYPE: MP-1 (50% OPEN)
- G — RETAINING WALL
  TYPE: CAST IN PLACE CONCRETE
- H — METAL FRAME AND CLEAR GLASS GUARD
  COLOUR: DARK GREY
- I — METAL PICKET GUARD
  COLOUR: CHARCOAL
  TYPE: STEEL
- J — WOOD FENCE

CLADDING LEGEND

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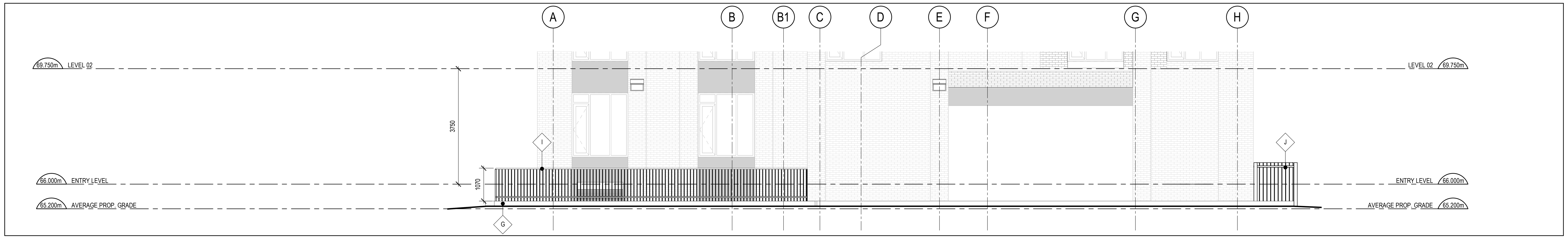
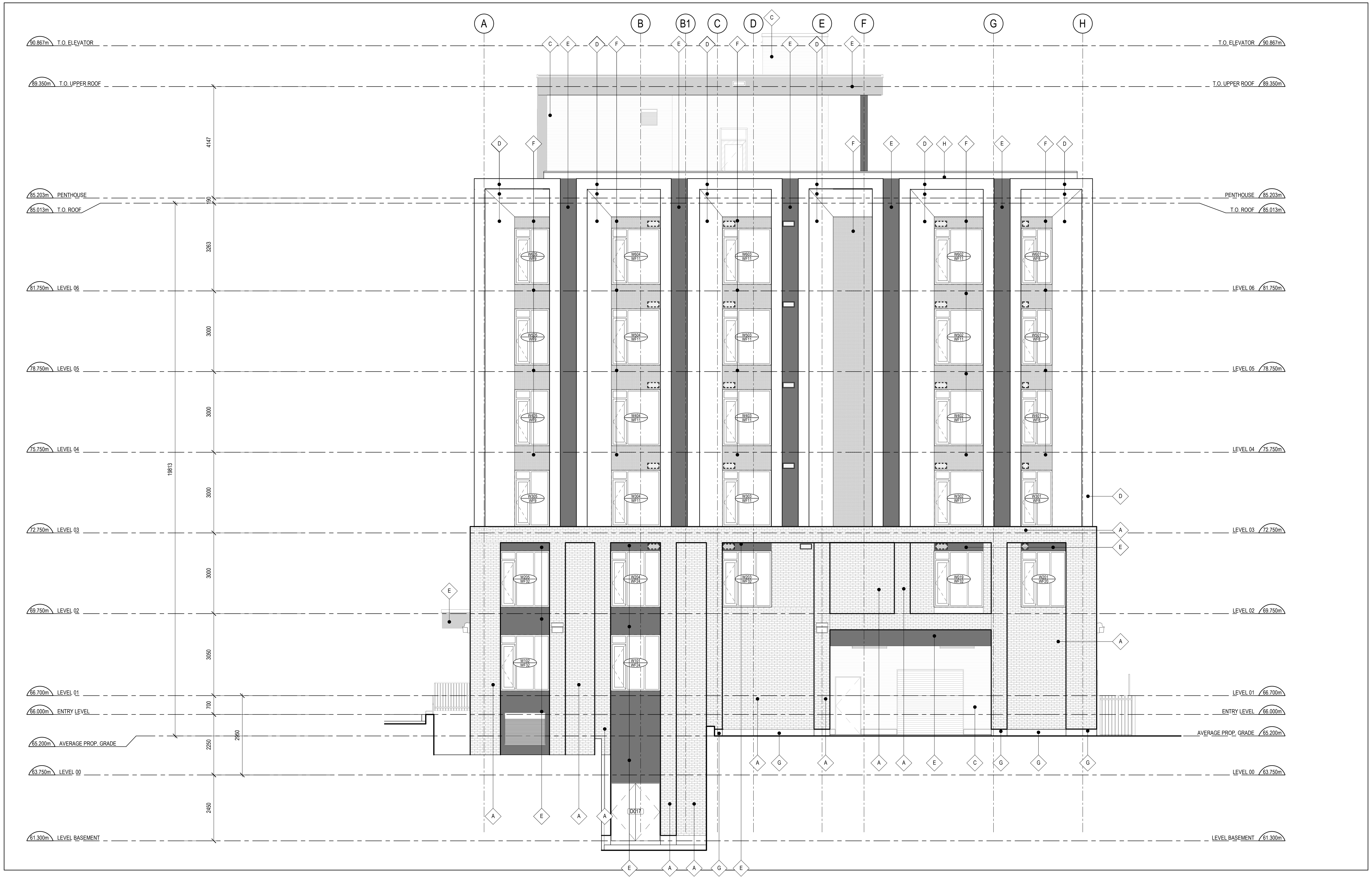
SOUTH ELEVATION

A203



WEST ELEVATION - GUARD

2 A204 SCALE: 1 : 75



WEST ELEVATION

1 A204 SCALE: 1 : 75

CLADDING LEGEND:

- A — BRICK MASONRY / COLOUR: RED / TYPE: 1
- B — ALUMINUM COMPOSITE PANEL / COLOUR: CHARCOAL / TYPE: ACM-1
- C — CORRUGATED METAL SIDING / COLOUR: GREY / TYPE: SS-1
- D — FIBER CEMENT PANEL / COLOUR: LIGHT GREY / TYPE: FC-2
- E — FIBER CEMENT PANEL / COLOUR: CHARCOAL / TYPE: FC-1
- F — METAL SIDING WITH PERFORATED PANEL SCREEN / COLOUR: GREY / SIDING TYPE: SS-2 / SCREEN TYPE: MP-1 (50% OPEN)
- G — RETAINING WALL / TYPE: CAST IN PLACE CONCRETE
- H — METAL FRAME AND CLEAR GLASS GUARD / COLOUR: DARK GREY
- I — METAL PICKET GUARD / COLOUR: CHARCOAL / TYPE: STEEL
- J — WOOD FENCE

CLADDING LEGEND

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WEST ELEVATION

A204

1.0 FOUNDATION WALLS

1.1 FOUNDATION WALL - TYPICAL
- GEOCOMPOSITE DRAINAGE BOARD (REFER TO GEOTECH)
- 50mm EXTRUDED POLYSTYRENE INSULATION (R-10 ci)
- WATERPROOFING MEMBRANE (REFER TO GEOTECH)
- CAST-IN PLACE CONCRETE FOUNDATION WALL (REFER TO STRUCTURAL)

1.3 FOUNDATION WALL - UNINSULATED
- GEOCOMPOSITE DRAINAGE BOARD (REFER TO GEOTECH)
- WATERPROOFING MEMBRANE (REFER TO GEOTECH)
- CAST-IN-PLACE CONCRETE FOUNDATION WALL (REFER TO STRUCTURAL)

2.0 EXTERIOR WALLS

2.1 CAST-IN-PLACE CONCRETE EXTERIOR WALL
- REFER TO EXTERIOR CLADDING ASSEMBLIES
- CAST-IN-PLACE CONCRETE WALL (REFER TO STRUCTURAL)

OBC SB-2 TABLE 2.1.1.
FRR: 2 HR (MIN. 124mm THICK)
3 HR (MIN. 150mm THICK)
4 HR (MIN. 171mm THICK)

2.3A 152mm STEEL STUD EXTERIOR WALL - EXTERIOR CLADDING ON BOTH SIDES
- REFER TO EXTERIOR CLADDING ASSEMBLIES
- 13mm GLASS-MAT GYPSUM SHEATHING
- 152mm STEEL STUDS @ 400mm O.C.
- 13mm GLASS-MAT GYPSUM SHEATHING
- REFER TO EXTERIOR CLADDING ASSEMBLIES

2.3D 152mm STEEL STUD EXTERIOR WALL - 1 HR
- REFER TO EXTERIOR CLADDING ASSEMBLIES
- 16mm TYPE X GLASS-MAT GYPSUM SHEATHING
- 152mm STEEL STUDS @ 400mm O.C.
- 16mm TYPE X GYPSUM BOARD

FRR: 1 HR (ULC BXUVC.W453) (NON-LOAD BEARING)

2.3F 152mm STEEL STUD EXTERIOR WALL - 2 HR
- REFER TO EXTERIOR CLADDING ASSEMBLIES
- 16mm TYPE X GLASS-MAT GYPSUM SHEATHING
- 152mm STEEL STUDS @ 400mm O.C.
- 16mm TYPE X GYPSUM BOARD
- 16mm TYPE X GYPSUM BOARD

FRR: 2 HR (ULC BXUVC.W453) (NON-LOADBEARING)

2.7Z 2x6" WOOD STUD EXTERIOR WALL - 1 HR
- REFER TO EXTERIOR CLADDING ASSEMBLIES
- 16mm GLASS-MAT GYPSUM SHEATHING OR STRUCTURAL SHEATHING WHERE REQUIRED (REFER TO STRUCTURAL)
- 2x6" WOOD STUDS @ 400mm O.C.
- 16mm TYPE X GYPSUM BOARD

FRR: 1 HR (OBC SB-2 SECTION 2.3.4) (LOADBEARING)

2.7A 2x6" WOOD STUD EXTERIOR WALL - EXTERIOR CLADDING ON BOTH SIDES
- REFER TO EXTERIOR CLADDING ASSEMBLIES
- 13mm GLASS-MAT GYPSUM SHEATHING OR STRUCTURAL SHEATHING WHERE REQUIRED (REFER TO STRUCTURAL)
- 2x6" WOOD STUDS @ 400mm O.C.
- 140mm MINERAL FIBER THERMAL BATT INSULATION (R-24)
- 13mm GLASS-MAT GYPSUM SHEATHING OR STRUCTURAL SHEATHING WHERE REQUIRED (REFER TO STRUCTURAL)
- REFER TO EXTERIOR CLADDING ASSEMBLIES

2.7D 2x6" WOOD STUD EXTERIOR WALL - 2 HR
- REFER TO EXTERIOR CLADDING ASSEMBLIES
- 16mm GLASS-MAT GYPSUM SHEATHING
- 16mm GLASS-MAT GYPSUM SHEATHING
- 2x6" WOOD STUDS @ 406mm O.C.
- 16mm TYPE X GYPSUM BOARD
- 16mm TYPE X GYPSUM BOARD

FRR: 2 HR (ULC BXUV7.U301)(LOADBEARING)

2.9Z 2x6" WOOD STUD UPSTAND WALL
- REFER TO SECTION(S) / SECTION DETAIL(S) FOR HEIGHT
- 2-PLY MODIFIED BITOMINOUS ROOFING MEMBRANE
- 13mm GLASS-MAT GYPSUM SHEATHING
- 2x6" WOOD STUDS @ 400mm O.C.
- 89mm MINERAL WOOL BATT INSULATION
- 13mm GLASS-MAT GYPSUM SHEATHING
- 2-PLY MODIFIED BITUMINOUS ROOFING MEMBRANE

EXTERIOR CLADDING

B1 BRICK CLADDING - RED
- 90mm BRICK
- 25mm AIR SPACE
- MORTAR DROPPING CONTROL
- 102mm SEMI-RIGID BOARD INSULATION (R-17.20 ci)
- SELF-ADHERING AIR MOISTURE BARRIER MEMBRANE (REFER TO CONSTRUCTION ASSEMBLIES NOTES 2 & 3)
- REFER TO EXTERIOR WALL ASSEMBLIES

B1.A BRICK CLADDING - UNINSULATED - RED
- 90mm BRICK
- 25mm AIR SPACE
- MORTAR DROPPING CONTROL
- SELF-ADHERING AIR MOISTURE BARRIER MEMBRANE (REFER TO CONSTRUCTION ASSEMBLIES NOTES 2 & 3)
- REFER TO EXTERIOR WALL ASSEMBLIES

F1 FIBER CEMENT PANEL CLADDING - DARK GREY

F2 FIBER CEMENT PANEL CLADDING - WHITE
- 13mm FIBER CEMENT PANELS
- 22mm SUB-GIRTS
- 102mm SEMI-RIGID BOARD INSULATION (R-17.20 ci)
- 102mm Z-GIRTS @ 400mm O.C. MAX
- SELF-ADHERING AIR MOISTURE BARRIER MEMBRANE (REFER TO CONSTRUCTION ASSEMBLIES NOTES 2 & 3)
- REFER TO EXTERIOR WALL ASSEMBLIES

F1.A FIBER CEMENT PANEL CLADDING - UNINSULATED - DARK GREY

F2.A FIBER CEMENT PANEL CLADDING - UNINSULATED - WHITE
- 13mm FIBER CEMENT PANELS
- 22mm SUB-GIRTS
- 22mm FURRING CHANNELS @ 400mm O.C. MAX
- SELF-ADHERING AIR MOISTURE BARRIER MEMBRANE (REFER TO CONSTRUCTION ASSEMBLIES NOTES 2 & 3)
- REFER TO EXTERIOR WALL ASSEMBLIES

P1.N PREFINISHED STEEL CLADDING DROPPED SOFFIT - DARK GREY
- SUSPENDED STEEL FRAMING (REFER TO SECTION AND/OR DETAIL FOR DEPTH)
- 13mm GLASS-MAT GYPSUM SHEATHING
- SELF-ADHERING AIR MOISTURE BARRIER MEMBRANE (REFER TO CONSTRUCTION ASSEMBLIES NOTES 2&3)
- 102mm Z-GIRTS @ 400mm O.C. MAX
- 102mm SEMI-RIGID BOARD INSULATION (R-17.20 ci)
- 38mm PREFINISHED STEEL CLADDING
- STRIP VENTS

P2 PREFINISHED STEEL CLADDING w/ PERFORATED METAL SHEET - DARK GREY
- PERFORATED METAL SHEET
- 25mm AIR SPACE
- 38mm PREFINISHED STEEL CLADDING
- 102mm SEMI-RIGID BOARD INSULATION (R-17.20 ci)
- 102mm Z-GIRTS @ 400mm O.C. MAX
- SELF-ADHERING AIR MOISTURE BARRIER MEMBRANE (REFER TO CONSTRUCTION ASSEMBLIES NOTES 2 & 3)
- REFER TO EXTERIOR WALL ASSEMBLIES

P3 PREFINISHED STEEL CLADDING - DARK GREY
- 22mm, 26 GAUGE, PRE-PAINTED GALVANIZED CORRUGATED STEEL SIDING
- 102mm SEMI-RIGID BOARD INSULATION (R-17.20 ci)
- 127mm VERTICAL Z-GIRTS @ 400mm O.C. MAX
- SELF-ADHERING AIR MOISTURE BARRIER MEMBRANE (REFER TO CONSTRUCTION ASSEMBLIES NOTES 2 & 3)
- REFER TO EXTERIOR WALL ASSEMBLIES

P3.A PREFINISHED STEEL CLADDING - UNINSULATED - DARK GREY
- 22mm, 26 GAUGE, PRE-PAINTED GALVANIZED CORRUGATED STEEL SIDING
- 22mm FURRING CHANNELS @ 400mm O.C. MAX
- SELF-ADHERING AIR MOISTURE BARRIER MEMBRANE (REFER TO CONSTRUCTION ASSEMBLIES NOTES 2 & 3)
- REFER TO EXTERIOR WALL ASSEMBLIES

3.0 INTERIOR PARTITIONS - FIRE-RATED

3.1 CAST-IN-PLACE CONCRETE PARTITION
- CAST-IN-PLACE CONCRETE WALL (REFER TO STRUCTURAL)

OBC SB-2 TABLE 2.1.1.
FRR: 2 HR (MIN. 124mm THICK)
3 HR (MIN. 150mm THICK)
4 HR (MIN. 171mm THICK)
STC: EXCEEDS 55

3.3 92mm STEEL STUD PARTITION - 1 HR
- 16mm TYPE X GYPSUM BOARD
- 92mm STEEL STUDS @ 400mm O.C.
- 16mm TYPE X GYPSUM BOARD

FRR: 1 HR (ULC BXUVC.W453) (NON-LOAD BEARING)
STC: 38 (NRC-TL-92-418)

3.3A 92mm STEEL STUD PARTITION - 1 HR, STC 50
- 16mm TYPE X GYPSUM BOARD
- 92mm STEEL STUDS @ 610mm O.C.
- 89mm GLASS FIBRE ACOUSTIC BATT INSULATION
- 16mm TYPE X GYPSUM BOARD

FRR: 1 HR (ULC BXUVC.W453) (NON-LOAD BEARING)
STC: 50 (RAL-TL-89-157)

3.3C 92mm STEEL STUD PARTITION - 2 HR
- 16mm TYPE X GYPSUM BOARD
- 16mm TYPE X GYPSUM BOARD
- 92mm STEEL STUDS @ 400mm O.C.
- 16mm TYPE X GYPSUM BOARD
- 16mm TYPE X GYPSUM BOARD

FRR: 2 HR (ULC BXUVC.W453) (NON-LOAD BEARING)

3.3D 92mm STEEL STUD PARTITION - 2 HR, STC 53
- 16mm TYPE X GYPSUM BOARD
- 16mm TYPE X GYPSUM BOARD
- 92mm STEEL STUDS @ 610mm O.C.
- 89mm FIBREGLASS BATT INSULATION
- 16mm TYPE X GYPSUM BOARD
- 16mm TYPE X GYPSUM BOARD

FRR: 2 HR (ULC BXUVC.W453) (NON-LOAD BEARING)
STC: 53 (USG-180604)

3.5 92mm & 64mm STAGGERED STEEL STUD PARTITION - 1 HR, STC 58
- 16mm TYPE X GYPSUM BOARD
- 92mm STEEL STUDS @ 400mm O.C.
- 92mm FIBERGLASS BATT INSULATION
- 25mm AIR SPACE
- 64mm STEEL STUDS @ 400mm O.C. (STAGGERED)
- 64mm FIBERGLASS BATT INSULATION
- 16mm TYPE X GYPSUM BOARD

FRR: 1 HR (ULC BXUV7.U493) (NON-LOAD BEARING)
STC: 58 (USG-180116)

3.6 2x4" WOOD STUD PARTITION - 1 HR
- 16mm TYPE X GYPSUM BOARD
- 2x4" WOOD STUDS @ 400mm O.C.
- 16mm TYPE X GYPSUM BOARD

FRR: 1 HR (ULC BXUV7.U305) (LOADBEARING)
STC: 33 (USG-151234)

3.7A 2x6" WOOD STUD PARTITION - 1 HR, STC 51
- 16mm TYPE X GYPSUM BOARD
- 13mm RESILIENT CHANNELS @ 610mm O.C.
- 2x6" WOOD STUDS @ 406mm O.C.
- 140mm FIBERGLASS BATT INSULATION
- 16mm TYPE X GYPSUM BOARD

FRR: 1 HR (ULC BXUV7.U305) (LOADBEARING)
STC: 51 (USG-161127)

3.7C 2x6" WOOD STUD PARTITION - 2 HR
- 16mm TYPE X GYPSUM BOARD
- 16mm TYPE X GYPSUM BOARD
- 2x6" WOOD STUDS @ 406mm O.C.
- 16mm TYPE X GYPSUM BOARD
- 16mm TYPE X GYPSUM BOARD

FRR: 2 HR (ULC BXUV7.U301)(LOADBEARING)

3.7D 2x6" WOOD STUD PARTITION - 2 HR, STC 56
- 16mm TYPE X GYPSUM BOARD
- 16mm TYPE X GYPSUM BOARD
- 13mm RESILIENT CHANNELS @ 610mm O.C.
- 2x6" WOOD STUDS @ 406mm O.C.
- 140mm FIBERGLASS BATT INSULATION
- 16mm TYPE X GYPSUM BOARD
- 16mm TYPE X GYPSUM BOARD

FRR: 2 HR (ULC BXUV7.U301)(LOADBEARING)
STC: 56 (USG-161205)

3.7Y 2x6" WOOD STUD PARTITION w/ STRUCTURAL SHEATHING - 2 HR
- 16mm TYPE X GYPSUM BOARD
- 16mm TYPE X GYPSUM BOARD
- 2x6" WOOD STUDS @ 406mm O.C.
- STRUCTURAL SHEATHING (REFER TO STRUCTURAL)
- 16mm TYPE X GYPSUM BOARD
- 16mm TYPE X GYPSUM BOARD

FRR: 2 HR (ULC BXUV7.U301)(LOADBEARING)

3.7Z 2x6" WOOD STUD PARTITION w/ STRUCTURAL SHEATHING - 2 HR, STC 56
- 16mm TYPE X GYPSUM BOARD
- 16mm TYPE X GYPSUM BOARD
- 13mm RESILIENT CHANNELS @ 610mm O.C.
- 2x6" WOOD STUDS @ 406mm O.C.
- 140mm FIBERGLASS BATT INSULATION
- STRUCTURAL SHEATHING (REFER TO STRUCTURAL)
- 16mm TYPE X GYPSUM BOARD
- 16mm TYPE X GYPSUM BOARD

FRR: 2 HR (ULC BXUV7.U301)(LOADBEARING)
STC: 56 (USG-161205)

3.9 2x4" & 2x6" WOOD STUD PARTITION - 1 HR, STC 57/54
- 16mm TYPE X GYPSUM BOARD
- 2x4" WOOD STUDS @ 400mm O.C.
- 89mm MINERAL FIBER ACOUSTIC FIRE BATT INSULATION
- 25mm AIR SPACE (REDUCED WHERE STRUCTURAL SHEATHING IN PLACE)
- STRUCTURAL SHEATHING WHERE REQUIRED (REFER TO STRUCTURAL)
- 2x6" WOOD STUDS @ 400mm O.C.
- 140mm MINERAL FIBER ACOUSTIC FIRE BATT INSULATION
- 16mm TYPE X GYPSUM BOARD

FRR: 1 HR (ULC BXUV7.U341)(LOADBEARING)
STC: 57 (OBC SB-3, TABLE 1, W13a)
54 (OBC SB-3, TABLE 1, W13a w/ STRUCTURAL SHEATHING (TABLE 1, NOTE 10))

4.0 INTERIOR PARTITIONS

4.1 92mm STEEL STUD PARTITION
- 13mm GYPSUM BOARD
- 92mm STEEL STUDS @ 400mm O.C.
- 13mm GYPSUM BOARD

4.1A 92mm STEEL STUD PARTITION - INSULATED
- 13mm GYPSUM BOARD
- 92mm STEEL STUDS @ 400mm O.C.
- 89mm MINERAL FIBER ACOUSTICAL FIRE BATT INSULATION
- 13mm GYPSUM BOARD

4.2 152mm STEEL STUD PARTITION
- 13mm GYPSUM BOARD
- 152mm STEEL STUDS @ 400mm O.C.
- 13mm GYPSUM BOARD

4.2A 152mm STEEL STUD PARTITION - INSULATED
- 13mm GYPSUM BOARD
- 152mm STEEL STUDS @ 400mm O.C.
- 152mm MINERAL FIBRE ACOUSTICAL FIRE BATT INSULATION
- 13mm GYPSUM BOARD

4.2B 152mm STEEL STUD PARTITION - PARTIAL HEIGHT

* WALL TERMNATES @ 1070mm AFF c/w 13mm GYPSUM BOARD CAP
- 13mm GYPSUM BOARD
- 152mm STEEL STUDS @ 400mm O.C.
- 13mm GYPSUM BOARD

4.3 2x4" WOOD STUD PARTITION
- 13mm GYPSUM BOARD
- 2x4" WOOD STUDS @ 400mm O.C.
- 13mm GYPSUM BOARD

4.3A 2x4" WOOD STUD PARTITION - INSULATED
- 13mm GYPSUM BOARD
- 2x4" WOOD STUDS @ 400mm O.C.
- 89mm MINERAL FIBER ACOUSTICAL FIRE BATT INSULATION
- 13mm GYPSUM BOARD

4.4 2x6" WOOD STUD PARTITION
- 13mm GYPSUM BOARD
- 2x6" WOOD STUDS @ 400mm O.C.
- 13mm GYPSUM BOARD

4.4A 2x6" WOOD STUD PARTITION - PARTIAL HEIGHT
- WALL TERMINATES @ 1070mm AFF c/w 13mm GYPSUM BOARD CAP
- 13mm GYPSUM BOARD
- 2x6" WOOD STUDS @ 400mm O.C.
- 13mm GYPSUM BOARD

4.4B 2x6" WOOD STUD PARTITION - INSULATED
- 13mm GYPSUM BOARD
- 2x6" WOOD STUDS @ 400mm O.C.
- 140mm MINERAL FIBER ACOUSTICAL FIRE BATT INSULATION
- 13mm GYPSUM BOARD

5.0 INTERIOR FURRED WALLS

5.2 FURRING CHANNEL, 13mm GYPSUM BOARD FURRED WALL
- 13mm GYPSUM BOARD
- 22mm STEEL FURRING CHANNELS @ 400mm O.C.

5.2A FURRING CHANNEL, 16mm GYPSUM BOARD FURRED WALL
- 16mm GYPSUM BOARD
- 22mm STEEL FURRING CHANNELS @ 400mm O.C.

5.4 64mm STEEL STUD FURRED WALL
- 13mm GYPSUM BOARD
- 64mm STEEL STUDS @ 400mm O.C.

5.5G 92mm STEEL STUD w/ VARYING AIR SPACE FURRED WALL
- 13mm GYPSUM BOARD
- 92mm STEEL STUDS @ 400mm O.C.
- VARYING AIR SPACE (REFER TO PLAN)

5.5E 92mm STEEL STUD w/ AIR SPACE FURRED WALL
- 13mm GYPSUM BOARD
- 92mm STEEL STUDS @ 400mm O.C.
- 35mm AIR SPACE

5.8 2x3" WOOD STUD FURRED WALL
- 13mm GYPSUM BOARD
- 2x3" WOOD STUDS @ 400mm O.C.

5.9C 2x4" WOOD STUD w/ AIR SPACE FURRED WALL
- 13mm GYPSUM BOARD
- 2x4" WOOD STUDS @ 400mm O.C.
- 51mm AIR SPACE

6.0 SHAFT ASSEMBLIES

6.1 64mm C-H STEEL STUD SHAFT WALL - 1 HR
- 25mm GYPSUM LINER PANEL
- 64mm C-H STEEL STUDS @ 600mm O.C.
- 16mm TYPE X GYPSUM BOARD

FRR: 1 HR (ULC BXUV7.U415 System A)

6.1B 64mm C-H STEEL STUD SHAFT WALL - 2 HR, STC 51
- 25mm GYPSUM LINER PANEL
- 64mm C-H STEEL STUDS @ 600mm O.C.
- 38mm FIBERGLASS BATT INSULATION
- 16mm TYPE X GYPSUM BOARD
- 16mm TYPE X GYPSUM BOARD
- 16mm TYPE X GYPSUM BOARD

FRR: 2 HR (ULC BXUV7.W415 System B)
STC: 51 (USG-170428)

6.2 102mm C-H STEEL STUD SHAFT WALL - 1 HR FRR
- 25mm GYPSUM LINER PANEL
- 102mm C-H STEEL STUDS @ 600mm O.C.
- 16mm TYPE X GYPSUM BOARD

FRR: 1 HR (ULC BXUV7.U415 System A)

7.0 FLOOR ASSEMBLIES

7.1B CAST-IN-PLACE CONCRETE SLAB ON GRADE - INSULATED
- CAST-IN-PLACE CONCRETE SLAB (REFER TO STRUCTURAL)
- 6mil POLYETHYLENE VAPOUR BARRIER (LAPPED 300mm MIN. AND JOINTS TAPED)
- 50mm EXTRUDED POLYSTYRENE INSULATION (R-10 ci)
- 200mm CRUSHED STONE (REFER TO GEOTECHNICAL REPORT)
- COMPACTED GRAVEL (REFER TO GEOTECHNICAL REPORT)

7.2 CAST-IN-PLACE CONCRETE FLOOR SLAB
- CAST-IN-PLACE CONCRETE SLAB (REFER TO STRUCTURAL)

OBC SB-2 TABLE 2.1.1.A.
FRR: 2 HR (MIN. 124mm THICK)
3 HR (MIN. 150mm THICK)
4 HR (MIN. 171mm THICK)
STC: EXCEEDS 55

7.4B "I" SHAPED WOOD JOIST FLOOR - 1 HR, STC 59
- 19mm ENGINEERED CEMENTITIOUS UNDERLAYMENT
- 3mm SOUND ATTENUATION MAT
- T&G PLYWOOD SHEATHING (REFER TO STRUCTURAL)
- "I" SHAPED WOOD JOISTS (REFER TO STRUCTURAL)
- 89mm FIBERGLASS BATT INSULATION
- 13mm RESILIENT CHANNELS @ 406mm O.C.
- 16mm TYPE X GYPSUM BOARD
- 16mm TYPE X GYPSUM BOARD

FRR: 1 HR (ULC BXUV7.L570 SYSTEM NO. 2)
STC: 59 (H5048.02 & H5048.05)

7.6 SPF WOOD JOIST RAISED FLOOR
- T&G PLYWOOD SHEATHING (REFER TO STRUCTURAL)
- SPF WOOD JOISTS (REFER TO STRUCTURAL)
- REFER TO FLOOR ASSEMBLIES

7.6Z SPF WOOD JOIST FLOOR
- T&G PLYWOOD SHEATHING (REFER TO STRUCTURAL)
- SPF WOOD JOISTS (REFER TO STRUCTURAL)

8.0 ROOF ASSEMBLIES

8.1B CAST-IN-PLACE CONCRETE ROOF w/ HARD LANDSCAPING
- HARD LANDSCAPING (REFER TO LANDSCAPE & CIVIL)
- COMPACTED GRAVEL (REFER TO GEOTECH)
- FILTER FABRIC
- GEOCOMPOSITE DRAINAGE BOARD (REFER TO GEOTECH)
- 50mm EXTRUDED POLYSTYRENE BOARD INSULATION (R-15ci)
- WATERPROOFING MEMBRANE (REFER TO GEOTECH)
- CAST-IN-PLACE CONCRETE SLAB, SLOPED TO DRAIN (REFER TO STRUCTURAL)

8.1Z CAST-IN-PLACE CONCRETE CANOPY w/ ALUMINUM COMPOSITE PANEL CLADDING SOFFIT
- 2-PLY MODIFIED BITUMINOUS ROOFING MEMBRANE
- 3.2mm ASPHALTIC ROOFING PROTECTION BOARD
- CAST IN PLACE CONCRETE SLAB, SLOPED TO DRAIN (REFER TO STRUCTURAL)
- SELF-ADHERING AIR MOISTURE BARRIER MEMBRANE
- (REFER TO CONSTRUCTION ASSEMBLIES NOTES 2 & 3)
- 92mm STEEL STUDS @ 400mm O.C.
- 75mm SEMI-RIGID BOARD INSULATION (R-12.6ci)
- 3mm ALUMINUM COMPOSITE PANEL c/w 24mm PANEL SYSTEM ALUMINUM FRAME COMPONENTS
- STRIP VENTS

8.3 PRE-ENGINEERED WOOD JOIST ROOF
- 2-PLY MODIFIED BITUMINOUS ROOFING MEMBRANE
- 3.2mm ASPHALTIC ROOFING PROTECTION BOARD
- VARYING THICKNESS POLYISOCYANURATE FOAM INSULATION BOARD, TAPERED TO DRAIN(S)
- EXTERIOR GRADE T&G PLYWOOD SHEATHING (REFER TO STRUCTURAL)
- PRE-ENGINEERED ROOF JOISTS (REFER TO STRUCTURAL)
- CLOSED CELL SPRAY FOAM INSULATION TO R-35 (APPLIED TO U/S OF ROOF SHEATHING)
- 13mm RESILIENT CHANNEL
- 2mil POLYAMIDE SMART VAPOUR RETARDER
- 13mm GYPSUM BOARD

8.3A PRE-ENGINEERED WOOD JOIST ROOF - 1 HR
- 2-PLY MODIFIED BITUMINOUS ROOFING MEMBRANE
- 3.2mm ASPHALTIC ROOFING PROTECTION BOARD
- VARYING THICKNESS POLYISOCYANURATE FOAM INSULATION BOARD, TAPERED TO DRAIN(S)
- EXTERIOR GRADE T&G PLYWOOD SHEATHING (REFER TO STRUCTURAL)
- PRE-ENGINEERED ROOF JOISTS (REFER TO STRUCTURAL)
- CLOSED CELL SPRAY FOAM INSULATION TO R-33 (APPLIED TO U/S OF ROOF SHEATHING)
- 1x4" WOOD STRAPPING @ 400mm O.C.
- 2mil POLYAMIDE SMART VAPOUR RETARDER
- 16mm TYPE X GYPSUM BOARD
- 16mm TYPE X GYPSUM BOARD

FRR: 1 HR (OBC SB-2 TABLE 2.3.12.) (CEILING MEMBRANE)

8.3D PRE-ENGINEERED WOOD JOIST ROOF w/ FIBER CEMENT PANEL SOFFIT
- 2-PLY MODIFIED BITUMINOUS ROOFING MEMBRANE
- 3.2mm ASPHALTIC ROOFING PROTECTION BOARD
- VARYING THICKNESS POLYISOCYANURATE FOAM INSULATION BOARD, TAPERED TO DRAIN(S)
- EXTERIOR GRADE T&G PLYWOOD SHEATHING (REFER TO STRUCTURAL)
- PRE-ENGINEERED ROOF JOISTS (REFER TO STRUCTURAL)
- 1x4" WOOD STRAPPING @ 400mm O.C.
- 22mm SUB-GIRTS
- 13mm FIBER CEMENT PANELS
- STRIP VENTS

8.8 COMPOSITE DECK w/ ADJUSTABLE PEDESTALS
- 25mm x 130mm COMPOSITE DECK BOARDS w/ HIDDEN FASTENERS
- PRESSURE TREATED WOOD JOISTS @ 300mm O.C.
- ADJUSTABLE PEDESTALS w/ SLOPE COMPENSATION
- REFER TO ROOF ASSEMBLIES

CONSTRUCTION ASSEMBLIES NOTES

1. EXTERIOR CLADDING ASSEMBLIES AND EXTERIOR WALL ASSEMBLIES MUST BE USED IN COMBINATION TO FORM A COMPLETE EXTERIOR WALL ASSEMBLY.
   X.X + 2.X = COMPLETE EXTERIOR WALL ASSEMBLY
   EXTERIOR WALL
   EXTERIOR CLADDING
2. SELF-ADHERING AIR / MOISTURE BARRIER MEMBRANE IN EXTERIOR CLADDING ASSEMBLIES TO BE NON-VAPOUR-PERMEABLE WHEN APPLIED OVER AN EXTERIOR WALL ASSEMBLY THAT DOES NOT INCLUDE A VAPOUR BARRIER, UNLESS INDICATED OTHERWISE.
3. SELF-ADHERING AIR / MOISTURE BARRIER MEMBRANE IN EXTERIOR CLADDING ASSEMBLIES TO BE VAPOUR-PERMEABLE WHEN APPLIED OVER AN EXTERIOR WALL ASSEMBLY THAT INCLUDES A VAPOUR BARRIER, UNLESS INDICATED OTHERWISE.
4. REFER TO ULC DESIGN DOCUMENTS AND STC TEST DOCUMENTS FOR FURTHER INFORMATION REGARDING SPECIFIC REQUIREMENTS OF THE LISTED ASSEMBLIES.
5. CONTINUITY OF FIRE SEPARATIONS IS TO BE MAINTAINED UNLESS OTHERWISE NOTED.
6. DIMENSIONS ARE TAKEN FROM OUTSIDE FACE OF GYPSUM BOARD TO OUTSIDE FACE OF GYPSUM BOARD UNLESS OTHERWISE NOTED
7. TILE BACKER BOARD TO REPLACE GYPSUM BOARD WHERE CERAMIC TILE FINISH IS TO BE INSTALLED - ENSURE FRR IS MAINTAINED.

1 / A001 CONSTRUCTION ASSEMBLIES
SCALE: 1 : 10

X / XXX DETAIL REFERENCE
ELEVATION REFERENCE
DETAIL SECTION REFERENCE
GRID LINE & REFERENCE
INTERIOR ELEVATION REFERENCE
CONSTRUCTION ASSEMBLY REFERENCE
XXXX [XXX] ROOM NAME & NUMBER
[XXXX] DOOR REFERENCE
WINDOW REFERENCE
BUILDING SECTION REFERENCE
REVISION REFERENCE
SPOT ELEVATION
HEIGHT ELEVATION REFERENCE
CEILING MATERIAL & HEIGHT
EXTERIOR FINISH REFERENCE
INTERIOR FINISH REFERENCE

2 / A001 NOTATION LEGEND
SCALE: NTS

GENERAL ARCHITECTURAL NOTES:

1. This drawing is the property of the Architect and may not be reproduced or used without the expressed consent of the Architect.
2. Drawings are not to be scaled. The Contractor is responsible for checking and verifying all levels and dimensions and shall report all discrepancies to the Architect and obtain clarification prior to commencing work.
3. Upon notice in writing, the Architect will provide written/graphic clarification or supplementary information regarding the intent of the Contract Documents.
4. The Architectural drawings are to be read in conjunction with all other Contract Documents including Project Manuals and the Structural, Mechanical and Electrical Drawings.
5. Positions of exposed or finished Mechanical or Electrical devices, fittings and fixtures are indicated on the Architectural Drawings. Locations shown on the Architectural Drawings shall govern over Mechanical and Electrical Drawings. Mechanical and Electrical items not clearly located will be located as directed by the Architect.
6. These documents are not to be used for construction unless specifically noted for such purpose.

TCU
TC UNITED GROUP

7	ISSUED FOR TENDER	2023-07-05
3	RE-ISSUED FOR BUILDING PERMIT	2023-05-25
2	ISSUED FOR COORDINATION	2023-05-03
1	ISSUED FOR BUILDING PERMIT	2021-06-12

ISSUE RECORD

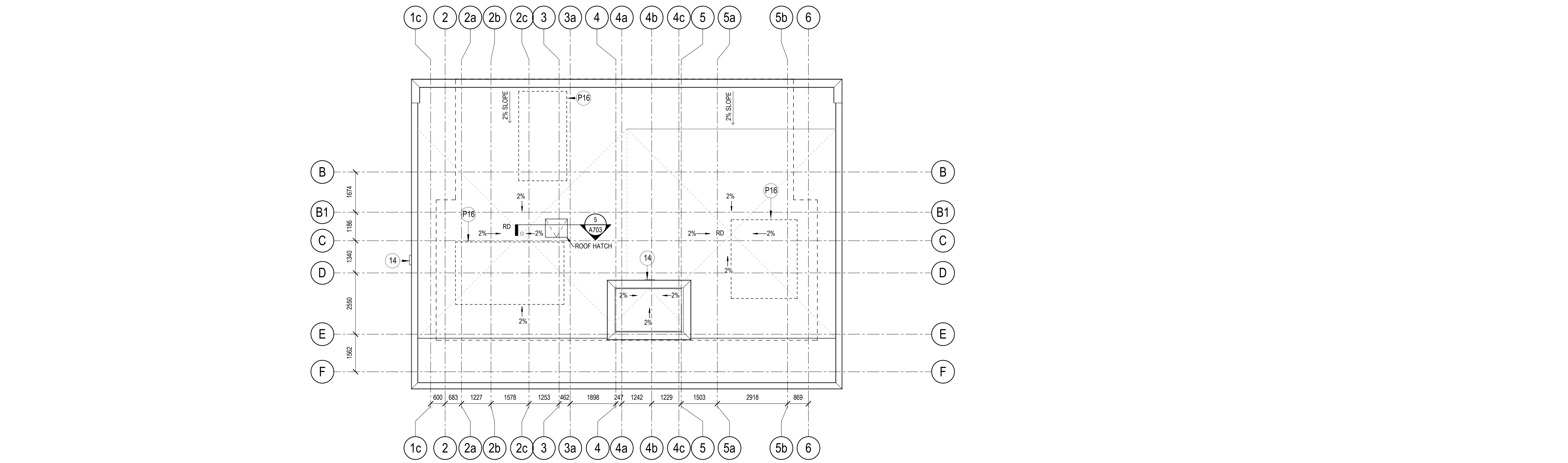
project1 studio
Project1 Studio Incorporated
| 613.884.3939 | mail@project1studio.ca

300 TREMBLAY
300 Tremblay Road
Ottawa, ON

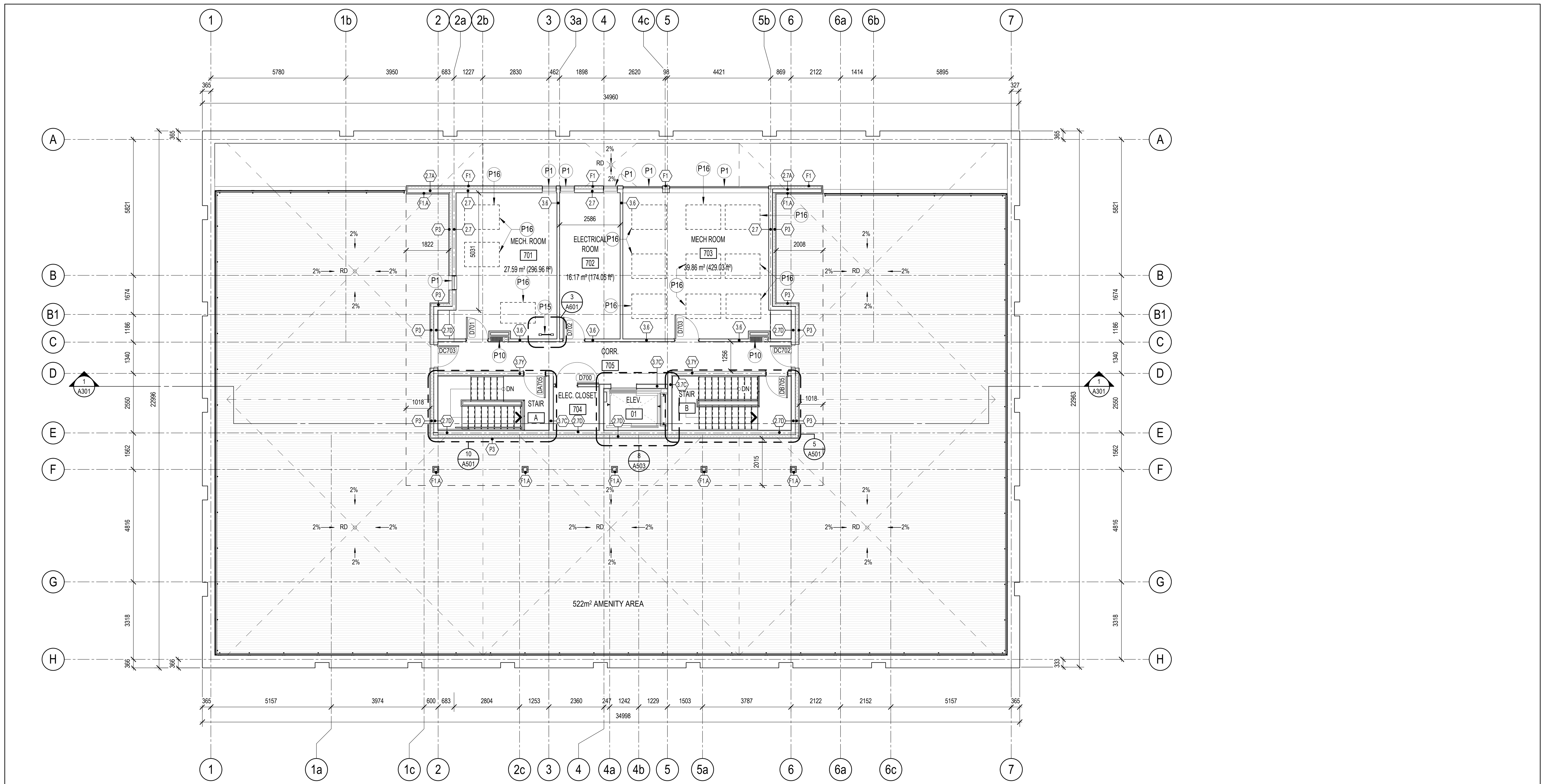
PROJ	SCALE	DRAWN	REVIEWED
2008	NOTED	DM	RMK

CONSTRUCTION ASSEMBLIES

A001



2 | A107 UPPER ROOF PLAN
SCALE: 1 : 100



1 | A107 ROOF PLAN
SCALE: 1 : 100

GENERAL FLOOR PLAN NOTES

1. ALL DIMENSIONS ARE FROM THE FINISH FACE OF WALL OR OPENING. UNLESS OTHERWISE NOTED
2. UNLESS OTHERWISE NOTED, ALL DIMENSIONS MARKED 'CLEAR' OR 'CLR' SHALL BE MAINTAINED AND SHALL ALLOW FOR THICKNESS OF THE COMPLETE WALL ASSEMBLY INCLUDING FINISHES, SHALL BE ACCURATELY MAINTAINED AND SHALL NOT VARY MORE THAN ±3mm WITHOUT WRITTEN CONSENT FROM THE ARCHITECT.
3. ALL DOORS TO BE 100mm FROM THE ADJACENT PERPENDICULAR PARTITION, UNLESS OTHERWISE NOTED.
4. ALL EQUIPMENT IS SUPPLIED AND INSTALLED BY CONTRACTOR, UNLESS OTHERWISE NOTED. CONTRACTOR TO COORDINATE AND SUPPLY REQUIRED SERVICES FOR EQUIPMENT.
5. CONTRACTOR RESPONSIBLE TO COORDINATE DIMENSIONS OF OPENINGS WITH SPECIFICATIONS FOR EQUIPMENT SUPPLIED AND INSTALLED BY OTHERS.
6. TILE BACKER BOARD TO REPLACE GYPSUM BOARD WHERE CERAMIC TILE FINISH IS TO BE INSTALLED. ENSURE FIRE RESISTANCE RATING IS MAINTAINED.
7. ALL WASHROOMS TO HAVE WATER-RESISTANT GYPSUM BOARD, UNLESS OTHERWISE NOTED (EX. TILE BACKER BOARD)
8. MAXIMUM DISTANCE OF 9100mm BETWEEN CONTROL JOINTS IN GYPSUM SURFACES.
9. CAULK AND SEAL AT ALL MECHANICAL AND ELECTRICAL PENETRATIONS.
10. ALL PARTITIONS THAT EXTEND FROM SLAB TO SLAB ARE TO BE ALIGNED WITH GEOMETRY OF THE SLABS IN ORDER TO ENSURE THAT THE ENTIRE PERIMETER BE APPROPRIATELY SEALED AS REQUIRED TO ATTAIN THE NECESSARY FIRE RESISTANCE RATING AND ACOUSTICAL PERFORMANCE.
11. SUPPLY AND INSTALL NON-COMBUSTIBLE BLOCKING AND NAILERS FOR ALL PARTITIONS SUPPORTING ELECTRICAL PANELS, ELECTRICAL & MECHANICAL DEVICES, MILLWORK, SHELVING, SIGNAGE, ACCESSORIES, EQUIPMENT. ETC.

GENERAL NOTES
SCALE: 1 : 75

Px FLOOR PLAN KEYNOTE TAG, REFER TO KEYNOTE LEGEND
--- DOOR TYPE REFERENCE
X.X CONSTRUCTION ASSEMBLY REFERENCE

SYMBOLS
SCALE: 1 : 75

KEYNOTE LEGEND - FLOOR PLANS

P1	MECHANICAL LOUVER - REFER TO MECHANICAL DRAWINGS
P10	FIRE HOSE CABINET
P15	ROOF ACCESS LADDER
P16	HOUSEKEEPING PAD. REFER TO MECHANICAL SPECIFICATIONS

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2008	NOTED	GS	RMK

ROOF PLANS

A107