1 Rosetta Street

Compatibility & Mitigation Study
Air Quality, Dust & Odour
Georgetown, ON

SLR Project No: 241.20210.00000
April 2022

This page intentionally left blank

for 2-sided printing purposes

Revised Compatibility & Mitigation Study
Air Quality, Dust & Odour
1 Rosetta Street
Georgetown, ON

SLR Project No.: 241.20210.00000

Prepared by
SLR Consulting (Canada) Ltd.
150 Research Lane, Suite 105
Guelph, ON N1G 4T2

for

1 Rosetta Street Inc.
500 Lawrence Avenue West, Suite 375
West Office Tower
Toronto, ON
M6A 3B4

April 25, 2022

Prepared by:

Alice Najjar, B.A.
Air Quality Scientist

Prepared by:

Nigel Taylor, M.Sc., EP
Principal, Air Quality

Reviewed by:

LICENSED PROFESSIONAL ENGINEER
D. L. FREEMAN
90385659
2022/04/25
PROVINCE OF ONTARIO

Diane Freeman, P.Eng. FEC, FCAE
Air Quality Specialist

Distribution: 1 copy – 1 Rosetta Street Inc.
1 copy – SLR Consulting (Canada) Ltd.

EXECUTIVE SUMMARY

SLR Consulting (Canada) Ltd. (SLR), was retained by 1 Rosetta Street Inc. (the Client) to conduct a Compatibility /Mitigation Study focusing on air quality, odour, and dust for their proposed residential development, to be located at 1 Rosetta Street in Georgetown, Ontario ("the Project").

This assessment has been completed in support of applications for an Official Plan Amendment (OPA), Zoning By-law Amendment and a future Site Plan Approval to be filed with the Town of Halton Hills. This assessment has considered:

- Industrial air quality, odour, and dust emissions; and
- Transportation-related air pollution.

Based on the review completed, adverse air quality emissions from surrounding industries are not anticipated at the Project. Furthermore, the Project is not anticipated to limit the operations of surrounding industries and their ability to obtain or maintain required Ministry of the Environment, Conservation & Parks permits and approvals.

Based on the review of transportation related air pollution there is the potential for diesel emissions and associated odour from the current layover yard operations adjacent to the Project. Mitigation measures have been recommended to address potential odour emissions, and include:

- placement of ventilation intakes in rooftop mechanical spaces, above-grade locations, or on the opposite side of the rail corridor (i.e., on the north façade) to provide separation distance from railway emissions and include MERV rated filters on fresh air intakes;
- positive pressurization following ASHRAE standards to help reduce the potential for outside air to passively enter the building; and
- Enclosed Noise Buffer Balconies (ENBB's), as per current Provincial guidance are recommended for noise mitigation. The ENBB should also help to reduce the potential for future complaints from potential odour emissions.

The recommended mitigation measures are intended to minimize the potential for future complaints from diesel emissions and associated odours at the Project site resulting from idling locomotives in the layover yard.

SLR understands a new Metrolinx Heritage Layover Yard is proposed at a location approximately 4 km east of the development. Based on information provided by Metrolinx, the Heritage Road Layover Yard is expected to replace the existing Georgetown Layover Yard, which is approaching the end of its serviceable life. This construction is tentatively scheduled to begin in spring 2023 and be completed in fall 2025. If the layover yard is removed from the current location in the future, the mitigation mentioned above would not be required.

.

TABLE OF CONTENTS

TABLES

FIGURES

APPENDIX

1. INTRODUCTION

SLR Consulting (Canada) Ltd. (SLR), was retained by 1 Rosetta Street Inc. to conduct a Compatibility /Mitigation Study for their proposed residential development, to be located at 1 Rosetta Street in Georgetown, Ontario ("the Project"). This assessment has been completed in support of an Official Plan Amendment (OPA), Zoning By-law Amendment ("ZBA"), and the future Site Plan Approval ("SPA") applications to be filed with the Town of Halton Hills.

Potential environmental impacts from the following sources have been considered:

- Industrial air quality, odour, and dust emissions; and
- Transportation-related air pollution.

In this assessment, SLR has reviewed the surrounding industrial land uses and major facilities in the area with respect to the following guidelines:

- The Provincial Policy Statement, 2020;
- Ministry of the Environment, Conservation and Parks ("MECP") Guidelines D-1 and D-6;
- Ontario Regulation 419/05: *Air Pollution – Local Air Quality* and its associated air quality standards and assessment requirements; and
- The MECP draft policies on odour impacts and assessment.

This report is intended to meet the requirement for an Air Quality Compatibility Study. It identifies existing and potential land use compatibility issues and identifies and evaluates options to achieve appropriate design, buffering and/or separation distances between the proposed sensitive land uses, including residential uses, and nearby employment areas and/or major facilities. Recommended measures intended to eliminate or mitigate negative impacts and adverse effects are provided.

Appendix A summarizes the required mitigation measures and warning clause recommendations developed in this report.

2. DESCRIPTION OF DEVELOPMENT AND SURROUNDINGS

2.1 PROPOSED DEVELOPMENT

The subject property, 1 Rosetta Street ("the Project") is currently occupied by a commercial building. It is located directly north of the Canadian National (CN) and the Metrolinx rail corridor. A context plan can be found in Figure 1. An excerpt from the site plan is shown in Figure 2. The site plan and available architectural drawings are provided in Appendix B.

The proposed Project development includes three condominium buildings:

- Building 1: 12 storeys along the south edge of the site
- Building 2: 12 storeys along the south and west edge of the site, with an eight-storey component and the northwest corner of the site
- Building 3: 8 storeys at the northeast corner of the site

The towers of buildings 1 and 2 will sit above a common podium structure, with two levels of underground parking. Outdoor Amenity space is planned for the rooftop of Building 3. The northwest edge of Building 2 will contain terraces on the 8th, 9th, and 10th floors. Each building will have balconies.

Enclosed Noise Buffer Balconies (ENBB's) will be added to the south facade, as per current Provincial guidance are recommended for noise mitigation. The ENBB should also help to reduce the potential for future complaints from potential odour emissions.

Note that the requirements for ENBB's is a result of idling trains in the layover yard. SLR understands a new Metrolinx Heritage Layover Yard is proposed at a location approximately 4 km east of the development. Based on information provided by Metrolinx, the Heritage Road Layover Yard is expected to replace the existing Georgetown Layover Yard, which is approaching the end of its serviceable life. This construction is tentatively scheduled to begin in spring 2023 and be completed in fall 2025. If that should occur, ENBB's would not be required, and odours are not expected to be a concern.

2.2 SURROUNDINGS

The Project is bounded by existing residential homes from west through north to the northeast directions. A commercial facility is located to the east of the Project. The GO/CN rail corridor and Georgetown Station including the Go Train Layover Yard is located to the south of the Project. A brewery and commercial developments are located on the south side of the rail corridor, with residences beyond.

The rail corridor currently consists of two tracks that are used by CN and GO Metrolinx. In addition to these tracks there is a GO Train Layover Yard where trains idle prior to entering into service.

2.3 LAND USE DESIGNATIONS IN THE AREA

The Town of Halton Hills Zoning Map for the area can be seen in Figure 3. The Project site is currently zoned as Development (D) and is surrounded by lands designated Low Density Residential (LDR1) to the northwest and northeast directions, and Transportation (T) to the south. However, the Project is also located within the North Precinct of the Georgetown GO Station Area Secondary Plan. Several parcels north of the transportation corridor including the Project are designated as High Density Residential Mixed-Use Area 2 within the Secondary Plan. Land use designations surrounding the Project include Medium Density Residential/Office Area, High Density Residential Mixed-Use Area 1 and Medium Density Residential.

3. ASSESSMENT FRAMEWORK

The intent of this report is to identify any existing and potential land use compatibility issues and to identify and evaluate options to achieve appropriate design, buffering and/or separation distances between the proposed sensitive land uses, including residential uses, and nearby employment areas and/or major facilities. Recommended measures intended to eliminate or mitigate negative impacts and adverse effects are provided.

The requirements of Ontario planning regime are organized such that generic policy is informed by specific policy, guidance, and legislation, as follows:

- The Provincial Policy Statement, 2020 ("PPS") sets out goals – making sure adjacent land uses are compatible from a health and safety perspective and are appropriately buffered; then
- The Ministry of the Environment, Conservation & Parks ("MECP") D-series of guidelines set out methods to determine if assessments are required (areas of influence, recommended separation distances, and the need for additional studies); then

- MECP and Municipal regulations, policies, standards, and guidelines that set out the requirements of additional air quality, noise and vibration studies and the applicable policies, standards, guidelines, and objectives to ensure that adverse effects do not occur.

3.1 PROVINCIAL POLICY STATEMENT

The PPS "provides policy direction on matters of provincial interest related to land use planning and development. As a key part of Ontario policy-led planning system, the Provincial Policy Statement sets the policy foundation for regulating the development and use of land. It also supports the provincial goal to enhance the quality of life for all Ontarians."

The PPS provides a consolidated statement of the government policies on land use planning and is issued under section 3 of the *Planning Act*. Municipalities are the primary implementers of the PPS through policies in their local official plans, zoning by-laws and other planning related decisions, such as Halton Region Regional Official Plan. The current 2020 PPS came into effect on May 1, 2020. Policy direction concerning land use compatibility is provided in Section 1.2.6 of the PPS.

From the current 2020 version:

> "1.2.6 Land Use Compatibility
>
> 1.2.6.1 Major facilities and sensitive land uses shall be planned and developed to avoid, or if avoidance is not possible, minimize and mitigate any potential adverse effects from odour, noise and other contaminants, minimize risk to public health and safety, and to ensure the long-term operational and economic viability of major facilities in accordance with provincial guidelines, standards and procedures.
>
> 1.2.6.2 Where avoidance is not possible in accordance with policy 1.2.6.1, planning authorities shall protect the long-term viability of existing or planned industrial, manufacturing or other uses that are vulnerable to encroachment by ensuring that the planning and development of proposed adjacent sensitive land uses are only permitted if the following are demonstrated in accordance with provincial guidelines, standards and procedures:
>
> a) there is an identified need for the proposed use;
>
> b) alternative locations for the proposed use have been evaluated and there are no reasonable alternative locations;
>
> c) adverse effects to the proposed sensitive land use are minimized and mitigated; and
>
> d) potential impacts to industrial, manufacturing or other uses are minimized and mitigated."

The goals of the PPS are implemented through Municipal and Provincial policies, as discussed below. Provided the Municipal and Provincial policies, guidelines, standards and procedures are met, the requirements of the PPS will be met.

3.2 D-SERIES OF GUIDELINES

The D-series of guidelines were developed by the MECP in 1995 as a means to assess Recommended Minimum Separation Distances and other control measures for land use planning proposals in an effort to prevent or minimize 'adverse effects' from the encroachment of incompatible land uses where a facility either exists or is proposed. D-series guidelines address sources including sewage treatment (Guideline D-2), gas and oil pipelines (Guideline D3), landfills (Guideline D-4), water services (Guideline D-5) and industries (Guideline D-6).

For this project, the applicable guideline is Guideline D-6 - *Compatibility between Industrial Facilities and*

Sensitive Land Uses. The guideline specifically addresses issues of air quality, odour, dust, noise and litter.

Adverse effect is a term defined in the *Environmental Protection Act* and "means one or more of

- impairment of the quality of the natural environment for any use that can be made of it,
- injury or damage to property or to plant or animal life,
- harm or material discomfort to any person,
- an adverse effect on the health of any person,
- impairment of the safety of any person,
- rendering any property or plant or animal life unfit for human use,
- loss of enjoyment of normal use of property, and
- interference with the normal conduct of business".

To minimize the potential to cause an adverse effect, Areas of Influence and Recommended Minimum Separation Distances are included within the guidelines. The Areas of Influence and Recommended Minimum Separation Distances from the guidelines are provided in the table below.

Table 1: Guideline D-6 - Potential Influence Areas and Recommended Minimum Separation Distances for Industrial Land Uses

Industry Classification	Area of Influence	Recommended Minimum Separation Distance
Class I – Light Industrial	70 m	20 m
Class II – Medium Industrial	300 m	70 m
Class III – Heavy Industrial	1000 m	300 m

Industrial categorization criteria are supplied in Guideline D-6-2, and are shown in the following table:

Table 2: Guideline D-6 - Industrial Categorization Criteria

Category	Outputs	Scale	Process	Operations / Intensity	Possible Examples
Class I Light Industry	• Noise: Sound not audible off-property • Dust: Infrequent and not intense • Odour: Infrequent and not intense • Vibration: No ground-borne vibration on plant property	• No outside storage • Small-scale plant or scale is irrelevant in relation to all other criteria for this Class	• Self-contained plant or building which produces/ stores a packaged product • Low probability of fugitive emissions	• Daytime operations only • Infrequent movement of products and/ or heavy trucks	• Electronics manufacturing and repair • Furniture repair and refinishing • Beverage bottling • Auto parts supply • Packaging and crafting services • Distribution of dairy products • Laundry and linen supply

Category	Outputs	Scale	Process	Operations / Intensity	Possible Examples
Class II Medium Industry	• Noise: Sound occasionally heard off-property • Dust: Frequent and occasionally intense • Odour: Frequent and occasionally intense • Vibration: Possible ground-borne vibration, but cannot be perceived off-property	• Outside storage permitted • Medium level of production allowed	• Open process • Periodic outputs of minor annoyance • Low probability of fugitive emissions	• Shift operations permitted • Frequent movements of products and/ or heavy trucks with the majority of movements during daytime hours	• Magazine printing • Paint spray booths • Metal command • Electrical production • Manufacturing of dairy products • Dry cleaning services • Feed packing plants
Class III Heavy Industry	• Noise: Sound frequently audible off property • Dust: Persistent and/ or intense • Odour: Persistent and/ or intense • Vibration: Ground-borne vibration can frequently be perceived off-property	• Outside storage of raw and finished products • Large production levels	• Open process • Frequent outputs of major annoyances • High probability of fugitive emissions	• Continuous movement of products and employees • Daily shift operations permitted	• Paint and varnish manufacturing • Organic chemical manufacturing • Breweries • Solvent recovery plants • Soaps and detergent manufacturing • Metal refining and manufacturing

3.2.1 REQUIREMENTS FOR ASSESSMENTS

Guideline D-6 requires that studies be conducted to assess impacts where sensitive land uses are proposed within the potential Area of Influence of an industrial facility. This report is intended to fulfill this requirement.

The D-series guidelines reference previous versions of the air quality regulation (Regulation 346) and noise guidelines (Publications NPC-205 and LU-131). However, the D-Series of guidelines are still recognized, still represent current MECP policy and are specifically referenced in numerous other current MECP policies. In applying the D-series guidelines, the current policies, regulations, standards, and guidelines have been used (e.g., Regulation 419, Publication NPC-300). As this report only assesses impacts on air quality, noise related guidelines are not addressed in this document but has been assessed by SLR Consulting Ltd. in a separate report.

3.2.2 REQUIREMENTS FOR MINIMUM SEPARATION DISTANCES

Guideline D-6 also *recommends* that no sensitive land use be placed within the Recommended Minimum Separation Distance. However, it should be noted that this is a recommendation, only. Section 4.10 of the Guideline allows for development within the separation distance, in cases of redevelopment, infilling, and transitions to mixed use, provided that the appropriate studies are conducted and that the relevant air quality and noise guidelines are met.

4. NEARBY INDUSTRIES

The Guideline D-6 Recommended Minimum Separation Distances from the Project are shown in Figure 4. SLR personnel conducted a site visit to the area November 20, 2020. The lands surrounding the Project are generally comprised of residential properties, and the rail corridor to the south. Local industries within 1 km of the Project were inventoried. Local industries in the immediate vicinity of the Project are identified as Class I Light Industries under the D-6 Guideline. No Class III (Heavy Industries) are located within 300 m of the Project.

Immediately to the south of the proposed Project development, is an existing rail line. The rail line is used for freight and passenger transport by CN Rail and Metrolinx. Diesel emissions from these railway operations have been considered in this assessment.

Within Ontario, facilities which emit significant amounts of air emissions to the environment are required to obtain and maintain an Environmental Compliance Approval (an "ECA") from the MECP or submit an Environmental Activity and Sector Registry ("EASR"). ECA/ EASR within 1 km of the Project were obtained from the MECP *Access Environment* website.

The following table outlines the industries that surround the proposed Project development. Only the industries which fall within the D-6 Guideline suggested Area of Influence and Recommended Minimum Separation Distances are discussed further.

INDUSTRY:	ADDRESS:	DESCRIPTION	D-6 CLASS:	DISTANCE TO PROJECT:
Applied Wiring Assemblies	2 Rosetta Street	Electrical Wire Manufacturer	I	15 m
A-Plus Canada Inc.	2 Rosetta Street	Self Storage Facility	I	15 m
Furnace Room Brewery	1A Elgin Street	Brewery	I	75 m
Minnow Environmental	2 Lamb Street	Environmental Consultant	I	170 m
Kuta Glass Accessories	2 Lamb Street	Decorative Glass Wholesaler	I	170 m
Communications & Power Industries Canada	45 River Drive	Electronic Medical Equipment Manufacturer	II	320
Cargill Chocolate	24 Ontario Street	Chocolate Manufacturer	II	400 m
Howmet Georgetown Casting Ltd.	93 Moutainview Road	Aerospace Casting	I	560 m
RestorFX Georgetown	53 Armstrong Avenue	Automotive Restoration	I	850 m
Artcast Inc.	14 Armstrong Avenue	Bronze Sculpture Manufacturer	I	845 m

4.1 APPLIED WIRING SSEMBLIES INC.

ADDRESS	2 Rosetta Street, Georgetown, ON
DISTANCE TO PROJECT:	15 m
D-6 CLASSIFICATION:	Class I light industry

Applied Wiring Assemblies Inc. is an electrical wire manufacturer and is located adjacent to the proposed Project development. A search of the MECP registry did not yield a permit or registration for this site. The following equipment at the facility is noted on the company website:

- 12 cut and strip machines
- 16 injection molding machines
- 40 + terminating machines
- De-reeling equipment
- Custom dyeing and striping equipment
- Splicing equipment
- Sonic welding
- Automatic taping machines
- Braiding equipment
- Solder stations

During the site visit on November 20 no odour was detected or visible dust observed from the facility. No outdoor storage was observed. Based on the size and nature of the facility operations, Applied Wiring Assemblies would be considered a Class I Light Industry (per the example electronics manufacturing in the D-6 Guideline).

The Applied Wiring Assemblies Inc. is located within the Class I Area of Influence and within the Recommended Minimum Separation Distance. Additional assessment is therefore warranted and provided later in this report.

4.2 A-PLUS CANADA INC.

ADDRESS	2 Rosetta Street, Georgetown, ON
DISTANCE TO PROJECT:	15 m
D-6 CLASSIFICATION:	Class I light industry

A-Plus Canada Inc. is self storage facility and is located adjacent to the proposed Project development. A search of the MECP registry did not yield a permit or registration for this site.

During the site visit on November 12 no odour was detected or visible dust observed from the facility. As a self-storage facility, this site could be considered a Class I Light Industry facility, however, it is considered more of a commercial facility than industrial. Activity onsite would include low levels of vehicle traffic. No other emission sources are expected from this facility. From an air quality perspective, potential exhaust sources from this type of facility are generally not considered significant. Given the commercial nature of this facility, further assessment is not required.

4.3 FURNACE ROOM BREWERY

ADDRESS	1A Elgin Street, Georgetown, ON
DISTANCE TO PROJECT:	75 m
D-6 CLASSIFICATION:	Class I light industry

The Furnace Room Brewery is a microbrewery with a restaurant and is identified as a Class I facility. Though breweries are listed as Class III uses under Table 2: Guideline D-6 - Industrial Categorization Criteria, this classification refers to large-scale commercial brewing operations such as Labatts or MolsonCoors. The Furnace Room Brewery is considered a restaurant and a microbrewery and is expected to produce only small batches of beer in comparison to a major brewery. Therefore, it has been identified as a Class I facility in this assessment. Possible odour emission sources include mechanical equipment and exhaust stacks associated with the brewing process.

During the site visit on November 20, SLR personnel visited The Furnace Room Brewery. The facility appeared to be operating during the time of the visit. Odours from the brewery were not present at the Project during the time visit.

The Furnace Room Brewery is located outside the Class I Area of Influence and outside of the Recommended Minimum Separation Distance. Given the potential for odour emissions from this facility, additional review is warranted and provided later in this report.

4.4 CN/METROLINX RAILWAY

In addition to the surrounding industries, potential transportation related air pollution from the CN/Metrolinx railway and layover yard was included in this assessment.

This rail corridor is used by CN for freight and passenger transport and used by Metrolinx for passenger transport. The Metrolinx GO Georgetown Station is located about 80 m from the Project, south of the railway. The GO layover yard is located on the north side of the tracks, approximately 15 m from the Project.

During the site visit, SLR personnel observed the train activity. The Metrolinx GO trains were observed to be idling on the switch tracks in the morning. Two trains were observed in the layover yard at 5:30am. The first train idled for up to 45 minutes before departing the layover tracks and picking up passengers at the station. The second train idled for a shorter period and departed around 6:30am. The closest track is approximately 15 m from the proposed Project development.

Given the rail station and layover yard level of activity, and the proximity to the Project, there is potential for air emissions from the CN/Meterolinx railway operations on the Project. Therefore, additional assessment is warranted and has been completed as part of this report.

4.5 SUMMARY

From the list of industries in Section 4, the Applied Wiring Assemblies Inc, and The Furnace Room Brewery were identified to require further analysis due to the proximity of these activities to the Project. The CN/Metrolinx railway also requires further analysis because of the potential for air emissions of the railway operations on the Project.

5. AIR QUALITY, DUST AND ODOUR ASSESSMENT

5.1 GUIDELINES AND REGULATIONS

Within Ontario, facilities which emit significant amounts of contaminants to the environment are required to obtain and maintain an ECA from the MECP or submit an EASR. Facilities with an ECA/EASR should already meet the MECP guidelines for air quality contaminants at their property line.

5.1.1 AIR QUALITY CONTAMINANTS

Under O.Reg. 419/05, a facility is required to meet prescribed standards for air emissions at their property boundary line and any location off-site. The introduction of a high-rise residential property may trigger a facility to re-assess compliance at new, elevated, receptor locations. The MECP does not require industries to assess their emissions at elevated points off-site, if a receptor does not exist at that location.

5.1.2 ODOUR

There are a select few compounds that are provincially regulated from an odour perspective; however, there is no formal regulation with respect to mixed odours. Impacts from mixed odours produced by industrial facilities are generally only considered and regulated by the MECP in the presence of persistent complaints (ECO 2010).

The MECP assesses mixed odours, in Odour Units, following draft guidelines. One odour unit (1 OU) has been used as a default threshold. This is the concentration at which 50 % of the population will just detect an odour (but not necessarily identify/recognize or object to it). Recognition of an odour will typically occur between 3 and 5 odour units. The following factors may be considered:

- Frequency – How often the odour occurs. The MECP typically allows odours to exceed 1 OU with a 0.5 % frequency.
- Intensity – The strength of the odour, in odour units. 1 OU is often used in odour assessments in Ontario.
- Duration – How long the odour occurs.
- Offensiveness – How objectionable the odour is. The MECP may allow for a higher concentration of pleasant smells such as baking as opposed to off-putting smells such as rotting garbage or rancid meat.
- Location – Where the odour occurs. The MECP assesses at odours where human activity is likely to occur.

The MECP has decided to apply odour-based standards to locations “where human activities regularly occur at a time when those activities regularly occur,” which is generally accepted to be places that would be considered sensitive such as residences and public meeting places. As a guide, the MECP has provided proposed clarification of human odour receptors, as shown in the following table:

Table 3: Proposed Clarification of Human Receptors (MECP 2008)

Receptor Category	Examples	Exposure Type	Type of Assessment
Permanent potential 24-hour sensitivity	Anywhere someone could sleep including any resident or house, motels, hospitals, senior citizen homes, campgrounds, farmhouse, etc.	Individual likely to receive multiple exposures	Considered sensitive 24 hours per day
Permanent daily hours but with definite periods of shutdown/closure	Schools, daycares, community centres, soccer fields, farmland, churches, bicycle paths, hiking areas, lakes, commercial or institutional facilities (with consideration of hours of operation such as night clubs, restaurants, etc.)	Individual could receive multiple exposures	Nighttime or daytime exclusion only (consider all other hours)
Seasonal variations with clear restrictions on accessibility during the off season	Golf courses, amusement parks, ski hills, other clearly seasonal private property	Short term potential for exposure	Exclusions allowed for non-seasonal use
Transient	Open fields, roadways, easements, driveways, parking lots, pump houses	Very short term potential for exposure, may not be a single resident exposed to multiple events	Generally would not be included as human receptors unless otherwise specified.

Note that commercial facilities are considered to be odour sensitive points of reception, as well as community spaces and residences.

5.1.3 DUST

Ontario Regulation 419/05 also provides limits for dust, including limits for suspended particulates and dust fall. Under Reg. 419/05, these air quality limits must be met at the property line and all points beyond. This is not changed by the addition of the Project. That is to say, the existing mutual property line is already a point of reception for dust, and the limits must already be met at that location.

5.1.4 CUMULATIVE ASSESSMENTS

Cumulative impact assessments, examining the combined effects of individual industries or the combined effects of industry and roadway emissions, are generally not required. Neither the PPS, the D-Series of guidelines, Regulation 419/05, or the current MECP odour assessment protocols require an assessment of cumulative impacts.

Which is not to say that such assessments are never warranted; rather, the need to do so must be considered on a case-by-case basis, depending on the nature and intensity of the industrial operation(s), and the nature of the pollutants released. Based on the types of pollutants released by the industries in this area, cumulative effects assessments are not warranted.

5.2 LOCAL METEOROLOGY

Surface wind data was obtained to generate a wind rose from data collected at the Pearson International Airport in Toronto from 1986 through 2015, as shown in Figure 5. As can be seen in the wind rose, predominant winds are from the west and northwestern quadrants, while winds from the northeast and southeast quadrants may be the least frequent.

5.3 SITE VISITS AND ODOUR AND DUST OBSERVATIONS

A site visit was conducted to the area on November 20, 2020 by SLR personnel to identify significant sources of air emissions and to identify any significant sources of odour or dust in the Project

neighbourhood. During the site visit, the staff members observed existing industries and rail operations from the sidewalks and other publicly accessible areas. Wind conditions during the site visit were noted as:

- November 20, 2020: southwesterly winds, 17 km/h, 13 °C, 47% RH

During the site visit to the area, CN/Metrolinx rail operations were observed. In the morning, one train was "started up" and it idled in the layover yard for 45 minutes. After the 45 minutes, the train pulled up to pick up passengers where it idled for another 15 minutes before it left. After that train had left another train started to idle for 45 minutes before it too moved up to pick up passengers and idle for another 15 minutes. Those were the only two instances where trains were observed to be idling.

During the site visit no odours or fugitive dust emissions were detected at the Project site nor in the surrounding neighbourhood.

5.4 ASSESSMENT OF POTENTIAL AIR QUALITY IMPACTS

5.4.1 APPLIED WIRING ASSEMBLIES INC.

Applied Wiring Assemblies Inc is a facility that assembles electrical wiring components and is located immediately to the east of the Project. A search of the MECP registry did not yield an "Air" permit or registration for this site. Based on the size and nature of the facility operations, Applied Wiring Assemblies is considered a Class I Light Industry. The facility is self-contained with a low likelihood for fugitive emissions. The industry is within the 20 m Recommended Minimum Separation Distance, and 70 m potential Area of Influence. Though a permit was not identified for this facility, the facility is required to meet applicable air emission thresholds at the property line for any air emissions exhausted to the atmosphere.

During the November 20 site visit the area surrounding the facility was observed.

Residential properties were identified immediately to the west and 15 m from the facility. These represent existing sensitive receptors in similar proximity to the industry as the Project. This suggests that that residential land-uses are currently compatible with the facility at a similar separation distance.

Given the presence of existing residences in similar proximity to the facility, and that no fugitive emissions of dust were observed and emissions of odour were not detected the separation distance between the Applied Wiring Assemblies Inc. facility and the Project is expected to be sufficient. It should be noted that the property boundary of the facilities lies right at the 20 m Recommended Minimum Separation Distance to the Project. The majority of the project and the proposed building lie outside of the 20 m Recommended Minimum Separation Distance. Based on the above, the Applied Wiring Assemblies Inc. facility is anticipated to be compatible with the Project from an air quality perspective.

5.5 TRANSPORTATION RELATED AIR POLLUTION

Common mitigation strategies for Transportation Related Air Pollution (TRAP) include filtration, strategic intake/amenity location, HVAC system operational procedures (i.e., timing around rush hour), physical barriers and vegetation buffers.

The CN/Metrolinx Railway runs adjacent to the Project's southern property line. The rail line serves as a railway corridor for freight and passenger transport. This section of rail line includes both a GO station and a layover yard. The trains are a source of Nitrogen oxides (NO_x) emissions and can produce odorous emissions from diesel combustion. Because of the proximity of the railway to the Project, dispersion modelling has been conducted to assess the NO_x emissions on the Project.

GO train volumes were obtained directly from Metrolinx in the form of ultimate volumes. A copy of the traffic data is included in Appendix C.

CN Rail train data for this track segment was grown to the future 2031 year assuming a typical growth rate of 2.5% per annum. A copy of applicable traffic data and calculations can be found in Appendix C.

The following table summarizes the railway traffic volumes used in the analysis:

Table 4: Rail Traffic Data

Rail	Train Type	No. of locomotives/Cars per Train	# of Trains		Modelled Speed (km/h)
			Daytime (7am to 11pm)	Night-time (11pm to 7am)	
CN Trains	Passenger	2/10	0	6	80
CN Trains	Freight	4/140	8	12	80
Metrolinx	GO	1/12	53	17	80
Metrolinx	GO	2/12	34	2	80

5.5.1 MODELLING ASSESSMENT

Version 19191 of the U.S. EPA AERMOD air dispersion model was used to predict worst-case concentrations of NO_x from railway emissions at the Project. NO_x was used as a surrogate for criteria air parameters associated with diesel combustion, since compared to other criteria air parameters, NO_x is considered a limiting parameter when evaluating combustion related emissions. Based on rail traffic data, a worst-case pass-by scenario of 10 locomotives per hour was conservatively used in the model. Even though there are two time-based standards for NO_x (1-h and 24-h), only the 1-h standard was assessed for the worst-case scenario as train movement over the 24-hour period is highly variable.

An emission factor approach was used to estimate the emission rate, based on the information presented in Table 5. Moving trains were assumed to operate at a 100% operating load.

Table 5: Pass-by Train Emission Rate

Locomotive Size (hp)	Train Speed (km/h)	Length of Railway Adjacent to Proposed Project development (km)	US EPA Tier Level	Contaminant	Emission Factor (g/bhp-h)	1 -Hour Emission Rate (g/s)
4,000 (operating at 100%) [1]	80 [2]	1	2, 3	NO_x	5.5	7.64×10^{-1}

Notes: [1]: Based on average power rating for line-haul locomotives
[2]: Speed of 80 km/h was provided by Metrolinx

Idling trains were also included in the model based on the observations made during the site visit. During the site visit SLR personnel identified two idling Metrolinx trains in the morning. The first train idled for 45 minutes, until it moved up the track and continued idling for 15 minutes as it waited for passengers to board. Once the first train left, the second train followed the same pattern. Based on these observations an emission rate was calculated to reflect one train idling for the entire 1-hour averaging period.

Locomotives operate at different power or "Notch" settings ranging from idle to Notch 8. The horsepower used in each setting was derived from the document - Fraser Surrey Docks Direct Coal Transfer Facility: Air Quality Assessment (Levelton Consultants, 2014), where each Notch setting operated at a certain percentage of the maximum power rating, ranging from 1% in idle mode to 100% at Notch 8. Based on these parameters, the idle emission rate was calculated and is presented in the following table.

Table 6: Idling Train Emission Rate

Locomotive Size (hp)	US EPA Tier Level	Contaminant	Emission Factor (g/bhp-h)	1 -Hour Emission Rate (g/s)
4,000 (operating at 1%) [1]	2, 3	NO_x	5.5	$6.11x10^{-2}$

Notes: [1]: Based on average power rating for line-haul locomotives

A line source approach, consisting of adjacent volume sources with a height and width of typical locomotives, was used to model emissions from locomotive pass-bys. A point source was used to model emissions from the idling locomotive. Pre-processed terrain data and meteorological data (Urban dataset) provided by the MECP for the site location was used in the model. In summary, the worst-case 1-hour emission scenario modelled includes one train (one locomotive, GO train) idling for one hour and six locomotives passing by at 100% load. This is a conservative worst-case hour as trains were only observed to idle for two hours of the day.

5.5.2 AIR DISPERSION MODELLING RESULTS

The maximum NO_x concentration at the Project is predicted to be below the applicable standard for the 1-hour averaging period. The maximum predicted NO_x concentration is presented below:

Table 7: Air Dispersion Modelling Results

Contaminant	Location of Point of Impingement	Averaging Period	MECP POI Concentration Limit (Schedule 3 Standard) ($\mu g/m^3$)	Predicted Maximum POI Concentration ($\mu g/m^3$)	Percentage of MECP POI Limit
Nitrogen Oxides	Receptor on south façade of Proposed Building	1-hour	400	51.14	12.79%

The maximum predicted point of impingement (POI) concentration is below the 1-hour NO_x standards under O. Reg. 419/05 at the Project. The maximum POI concentration at the Project was a located on the south façade of the proposed building. The maximum POI concentration predicted by AERMOD at the Project is 12.79% of the 1-hour standard of 400 $\mu g/m^3$.

5.5.3 DIESEL EMISSIONS AND ASSOCIATED ODOUR

Based on the dispersion modelling results there is a potential for diesel emissions and associated odour from the locomotive emissions to be detected at the Project. The main source of potential odour emissions is from the stationary idling trains. Although there is potential for odour emissions, they are expected to be faint to moderate in strength and infrequent in nature due to the fact that only two trains

are expected to idle, for a total of two hours of idling time each morning. Idling was observed to occur only very early in the morning when local residents are less likely to be outside.

The addition of noise buffer balconies (ENBB) is recommended for the south façade. These balconies, if designed according to MECP requirements, may assist with reducing the potential for future complaints from odour, as well as be required for noise abatement.

It is recommended that fresh air intakes be located in rooftop mechanical spaces, or at above-grade locations to provide separation distance from railway emissions and to include standard MERV rated filters on fresh air intakes.

Appendix A summarizes the potential mitigation measures and warning clause recommendations.

5.6 SUMMARY OF AIR QUALITY, DUST AND ODOUR CONCLUSIONS AND RECOMMENDATIONS

The potential for air quality emissions from adjacent land uses at the Project site, including dust and odour, have been assessed. Based on the review completed, adverse air quality emissions from surrounding industries are not anticipated at the Project. Furthermore, the Project is not anticipated to limit the operations of surrounding industries and their ability to obtain or maintain required Ministry of the Environment, Conservation & Parks permits and approvals.

Based on the review of transportation related air pollution there is the potential for diesel emissions and associated odour from the current layover yard operations adjacent to the Project. Mitigation measures have been recommended to address potential odour emissions.

- Placement of ventilation intakes in rooftop mechanical spaces, above-grade locations, or on the opposite side of the rail corridor (i.e., on the north façade) to provide separation distance from railway emissions and include MERV rated filters on fresh air intakes;
- Positive pressurization following ASHRAE standards to help reduce the potential for outside air to passively enter the building; and
- Enclosed Noise Buffer Balconies (ENBB's), as per current Provincial guidance are recommended for noise mitigation. The ENBB should also help to reduce the potential for future complaints from potential odour emissions.

SLR understands the Georgetown Layover Yard is reaching the end of its serviceable life, and it will be replaced with the proposed Heritage Road Layover Yard. Once the Heritage Road Layover Yard is fully operational, the Georgetown GO Layover Yard is not expected to be a stationary source with the potential to impact the Project, and the ENBBs will likely no longer be required. A reassessment of air quality control measures should be completed once the Heritage Road Layover is confirmed to proceed and the anticipated schedule for completion is available.

6. CONCLUSIONS

A compatibility/ mitigation assessment has been completed, examining the potential for air quality, dust and odour from road and rail sources and from nearby industrial land uses to affect the Project.

Based on the review completed, adverse air quality emissions from surrounding industries are not anticipated at the Project. Furthermore, the Project is not anticipated to limit the operations of surrounding industries and their ability to obtain or maintain required Ministry of the Environment, Conservation & Parks permits and approvals.

Based on the review of transportation related air pollution there is the potential for diesel emissions and associated odour from the current rail operations adjacent to the Project. Mitigation measures have been recommended to address potential odour emissions.

- Placement of ventilation intakes in rooftop mechanical spaces, above-grade locations, or on the opposite side of the rail corridor (i.e., on the north façade) to provide separation distance from railway emissions and include MERV rated filters on fresh air intakes;
- Positive pressurization following ASHRAE standards to help reduce the potential for outside air to passively enter the building; and
- Enclosed Noise Buffer Balconies (ENBB's), as per current Provincial guidance are recommended for noise mitigation. The ENBB should also help to reduce the potential for future complaints from potential odour emissions.

The recommended mitigation measures are intended to minimize the potential for future complaints from diesel emissions and associated odours at the Project site resulting from idling locomotives in the nearby layover yard. Should the Georgetown GO Layover Yard move to the Heritage Road Layover Yard, it is expected that these controls will no longer be required**.** A reassessment of air quality control measures should be completed once the Heritage Road Layover is confirmed to proceed and the anticipated schedule for completion is available.

7. REFERENCES

Environmental Commissioner of Ontario (ECO, 2010), *Review of Posted Decision: Developing an Odour Policy Framework*, April 2010.

Canadian National Railways (CN), 2008, *Principal Main Line Requirements*

Canadian Pacific Railways (CP), 2002, *Guidelines For The Environmental Protection Of New Residential Development Adjacent To Railways*

GO Transit / Metrolinx, 2010, *Principal Main Line Requirements For New Development*

International Organization for Standardization, (ISO, 1989), ISO 2631-2: 2003 (1989) *Evaluation of human exposure to whole-body vibration — Part 2: Continuous and shock-induced vibrations in buildings (1 to 80 Hz)*

Ontario Ministry of the Environment, Conservation & Parks (MECP, 1995), Guideline D-6: *Compatibility Between Industrial Facilities and Sensitive Land Uses*

Ontario Ministry of the Environment, Conservation & Parks (MECP, 2008), *Technical Bulletin, Standards Development Branch, Methodology For Modelling Assessments Of Contaminants With 10-Minute Average Standards And Guidelines Under O. Reg. 419/05*, April 2008.

Ontario Ministry of Municipal Affairs and Housing (MMAH, 2014). *Provincial Policy Statement*

Ontario Ministry of Municipal Affairs and Housing (MMAH, 2019). Draft *Provincial Policy Statement.*

Ontario Regulation 419/01 – *Local Air Quality.*

Railway Association of Canada/ Federation of Canadian Municipalities (RAC/ FCM), 2013, *Guidelines for New Development in Proximity to Railway Operations*

8. STATEMENT OF LIMITATIONS

This report has been prepared and the work referred to in this report has been undertaken by SLR Consulting (Canada) Ltd. (SLR) for 1 Rosetta Street (Halton Hills) GP Ltd., hereafter referred to as the "Client". It is intended for the sole and exclusive use of the Client. The report has been prepared in accordance with the Scope of Work and agreement between SLR and the Client. Other than by the Client and as set out herein, copying or distribution of this report or use of or reliance on the information contained herein, in whole or in part, is not permitted unless payment for the work has been made in full and express written permission has been obtained from SLR.

This report has been prepared in a manner generally accepted by professional consulting principles and practices for the same locality and under similar conditions. No other representations or warranties, expressed or implied, are made.

Opinions and recommendations contained in this report are based on conditions that existed at the time the services were performed and are intended only for the client, purposes, locations, time frames and project parameters as outlined in the Scope or Work and agreement between SLR and the Client. The data reported, findings, observations and conclusions expressed are limited by the Scope of Work. SLR is not responsible for the impacts of any changes in environmental standards, practices, or regulations subsequent to performance of services. SLR does not warranty the accuracy of information provided by third party sources.

FIGURES

Aerial Photography from Google Earth

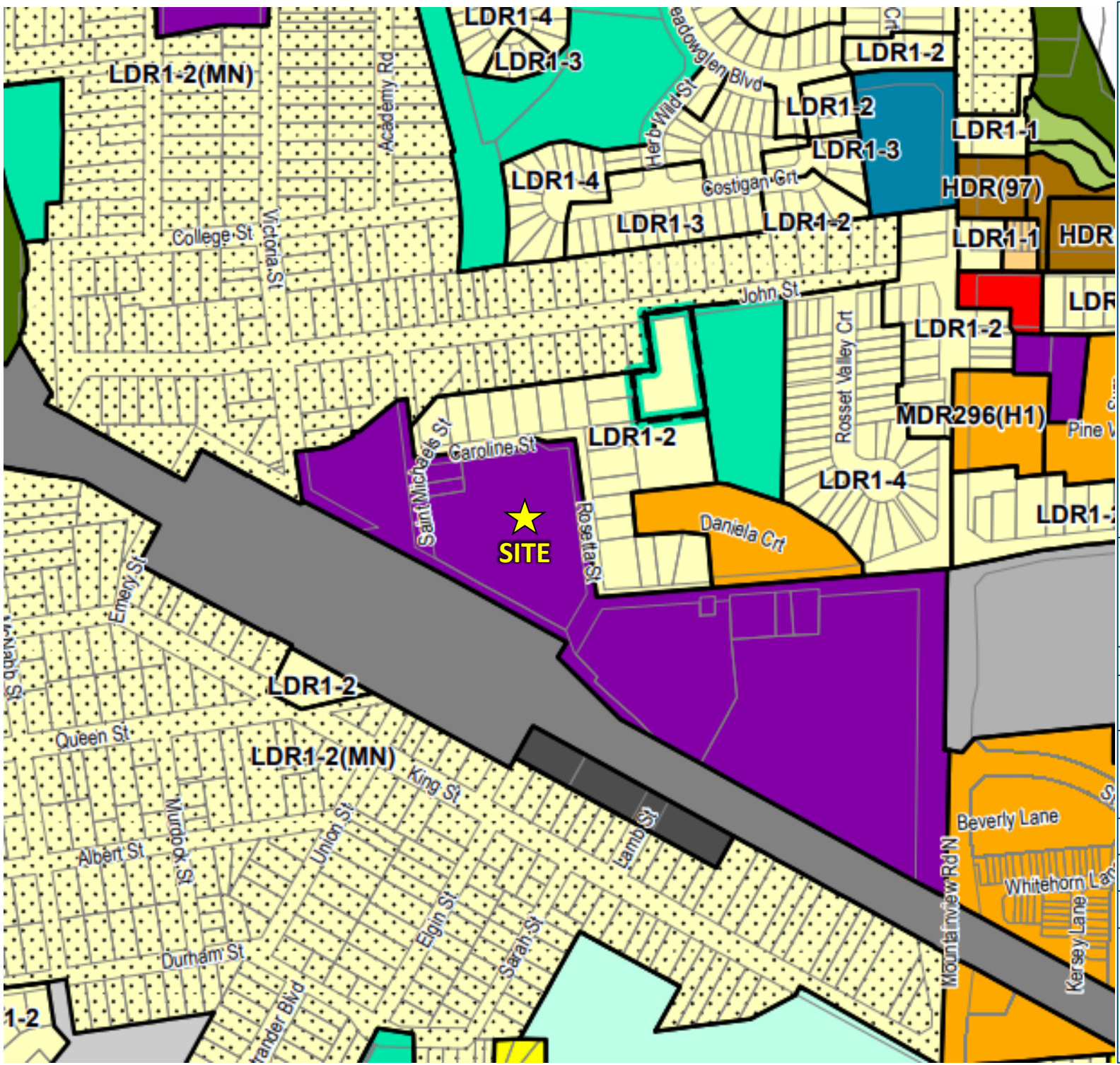
1 ROSETTA STREET (HALTON HILLS) GP LTD.	True North	Scale: 1:5,800	METRES	SLR global environmental solutions
1 ROSETTA STREET DEVELOPMENT- GEORGETOWN, ONTARIO		Date: Dec 2, 2020 Rev 0.0	Figure No. 1	
SITE AND CONTEXT PLAN		Project No. 241.20210.00000		

KEY PLAN _ NTS

DEVELOPMENT DETAILS HIGH DENSITY RESIDENTIAL ZONE (HDR) - EXCEPTION			
	Required	Proposed	Amendments
MINIMUM LOT FRONTAGE (Rosetta Street)	11.8 m	117.60	
MIN. FRONT YARD (Rosetta Street)	4.5 m	0.00 m	
MIN. REAR YARD (St. Michael's Street)	7.5 m	0.80 m	
MIN. INTERIOR SIDE YARD (River Street)	7.5 m	0.80 m	
MIN. SETBACK FROM A RAILWAY	30.0 m	30 m Measured from the building face to the centerline of the active railway line.	
MAX. BUILDING HEIGHT	25.0 m	Building 1 = TBD Building 2 = TBD Building 3 = TBD	
MAX. LOT COVERAGE		42%	
OUTDOOR AMENITY AREA INCLUDING PRIVATE TERRACES AND BALCONIES		3006.30 sq.m	
MIN. OUTDOOR AMENITY AREA (PARK)		1,480.30 sq.m	
MIN. LANDSCAPE OPENSPACE (%)		32.70 %	
MIN. PARKING SETBACK BETWEEN A BUILDING AND AN AT-GRADE PARKING AREA	1.2 M	11.78 M	
PARKING REQUIREMENTS			
628 APPARTMENT UNITS	1.3 spaces per unit. Plus 0.25 spaces per unit for visitor parking 648 x 1.3 = 842 spaces 648 x 0.25 = 162 spaces Total = 1128 spaces	1.0 spaces per unit Plus 0.10 spaces per unit for visitor parking 648 x 1.0 = 648 spaces 648 x 0.10 = 64 spaces Total = 704 spaces	
TOTAL PARKING	1130 spaces	784 spaces	
BARRIER FREE PARKING	2 parking spaces +2% of required parking spaces	2+ (784 x 0.02) = 15.68 or 16 Spaces	
MINIMUM SURFACE PARKING STALL SIZE	2.75 m width 5.5 m length	2.75 m width 5.5 m length	
MINIMUM WIDTH OF DRIVE AISLE ACCESSING SURFACE PARKING SPACES	6.7m	6.7m	
BICYCLE PARKING SPACES		472 Spaces	

ZONING CHART

1 ROSETTA STREET (HALTON HILLS) GP LTD.	True North	Scale: n/a	METRES	SLR global environmental solutions
1 ROSETTA STREET DEVELOPMENT- GEORGETOWN, ONTARIO		Date: March 8, 2022 Rev 0.0	Figure No. **2**	
EXCERPTS FROM SITE PLAN		Project No. 241.20210.00000		



Zoning Categories

- Low Density Residential One, LDR1
- Low Density Residential Two, LDR2
- Medium Density Residential One, MDR1
- Medium Density Residential Two, MDR2
- High Density Residential, HDR
- Environmental Protection One, EP1
- Environmental Protection Two, EP2
- Open Space One, OS1
- Open Space Two, OS2
- Open Space Three, OS3
- Employment One, EMP1
- Institutional, I
- Development, D
- Local Commercial, LC
- Residential Commercial, RCO
- Transportation,
- Lands Subject to By-law 57-91 as Amended
- Under Appeal
- Low Density Residential One Mature Neighbourhood, LDR1(MN)

True North

1 ROSETTA STREET (HALTON HILLS) GP LTD.

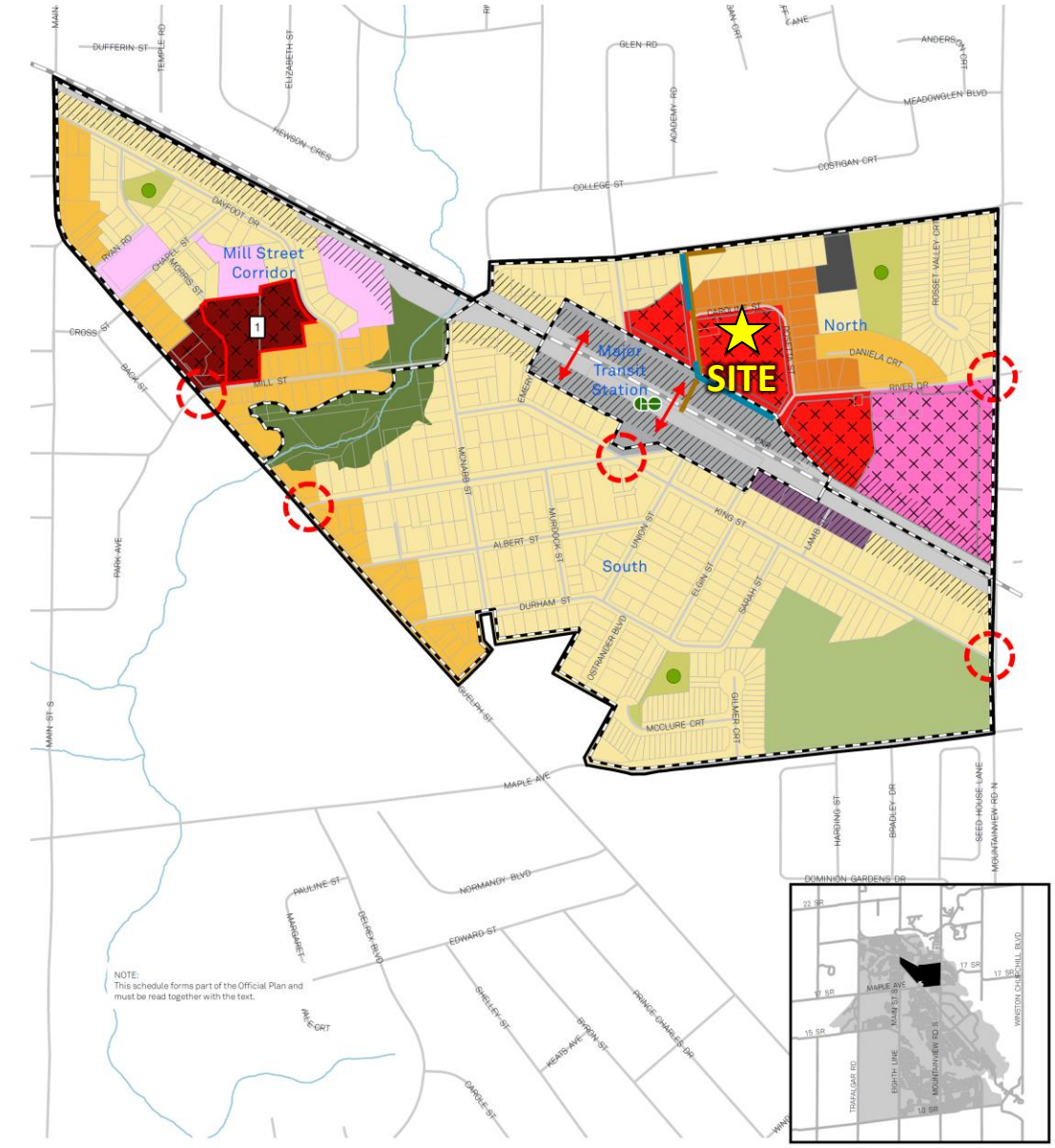
1 ROSETTA STREET DEVELOPMENT-GEORGETOWN, ONTARIO

AREA ZONING MAP

https://map.haltonhills.ca/HT5/Index.html?viewer=p.HT5&LayerTheme=9

Scale: n/a		METRES
Date: Dec 2, 2020	Rev 0.0	Figure No. **3a**
Project No. 241.20210.00000		

SLR global environmental solutions



True North

1 ROSETTA STREET (HALTON HILLS) GP LTD.

1 ROSETTA STREET DEVELOPMENT-GEORGETOWN, ONTARIO

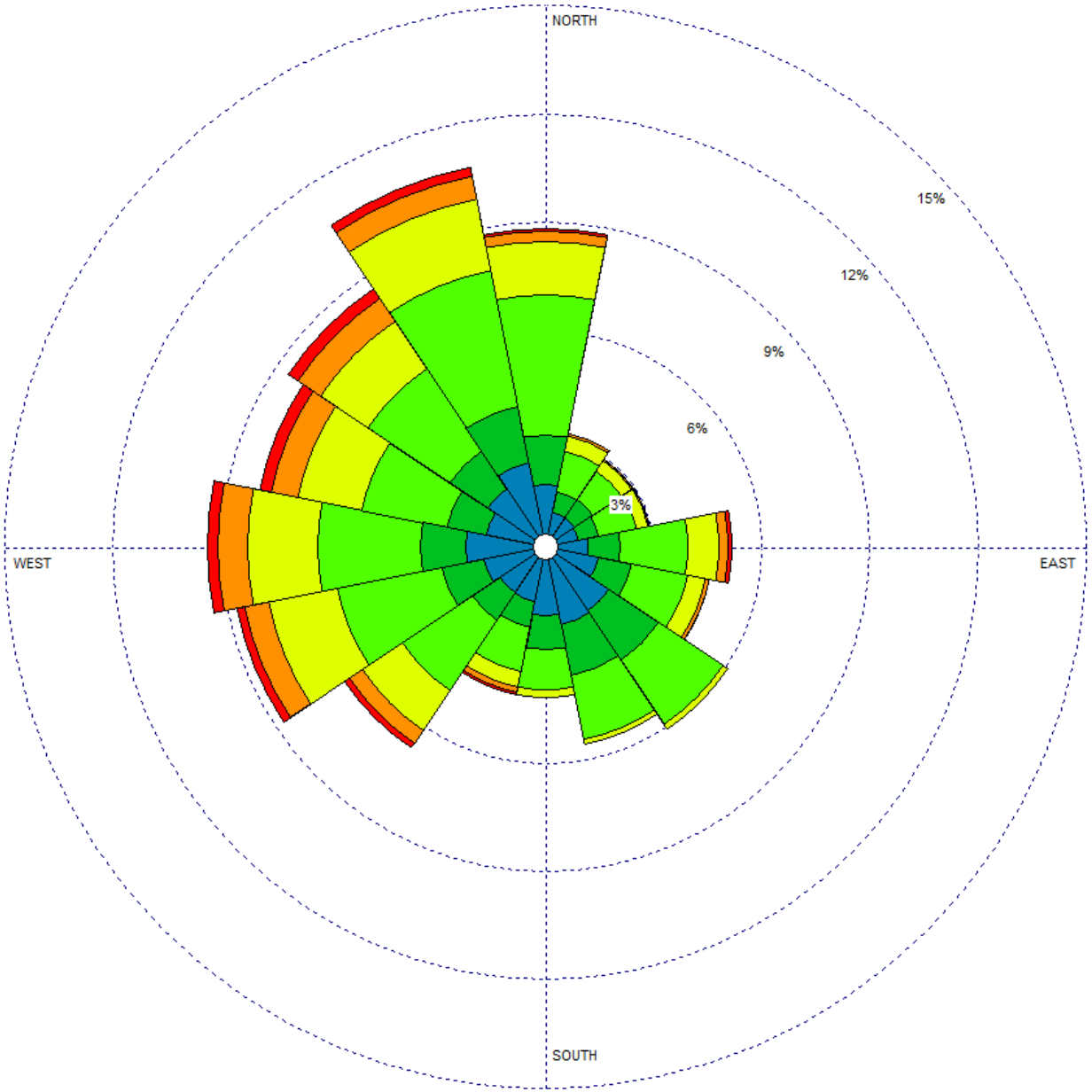
TOWN OF HALTON HILLS OFFICIAL PLAN

Scale: n/a		METRES
Date: Dec 2, 2020	Rev 0.0	Figure No. **3b**
Project No. 241.20210.00000		

SLR global environmental solutions

Aerial Photography from Google Earth

1 ROSETTA STREET (HALTON HILLS) GP LTD.	True North	Scale: 1:8,750	METRES	SLR global environmental solutions
1 ROSETTA STREET DEVELOPMENT- GEORGETOWN, ONTARIO		Date: Dec 2, 2020 Rev 0.0	Figure No. **4**	
GUIDELINE D-6 SEPARATION DISTANCES TO 300 METRES		Project No. 241.20210.00000		



WIND SPEED
(m/s)

- >= 11.10
- 8.80 - 11.10
- 5.70 - 8.80
- 3.60 - 5.70
- 2.10 - 3.60
- 0.50 - 2.10

Calms: 0.00%

True North

1 ROSETTA STREET (HALTON HILLS) GP LTD.

1 ROSETTA STREET DEVELOPMENT-
GEORGETOWN, ONTARIO

WIND FREQUENCY
DISTRIBUTION DIAGRAM
(WIND ROSE)
TORONTO LESTER B.
PEARSON INT' L AIRPORT

Scale: n/a		METRES
Date: Dec 2, 2020	Rev 0.0	Figure No. **5**
Project No. 241.20210.00000		

SLR
global environmental solutions

APPENDIX A
MITIGATION AND WANRING CLAUSE SUMMARY

SUMMARY OF MITIGATION MEASURES AND WARNING CLAUSES

Warning Clauses

Warning Clauses may be used individually or in combination. The following Warning Clauses should be included in agreements registered on Title for the residential units, and included in all agreements of purchase and sale or lease, and all rental agreements:

Transportation Sources (Road and Rail)

Canadian National Railways Warning Clause

"Purchasers are advised that the Canadian National Railway Company or its assigns or successors in interest has or have a right-of-way within 300 metres from the land the subject thereof. There may be alterations to or expansions of the rail facilities on such right-of-way in the future, including the possibility that the railway or its assigns or successors as aforesaid may expand its operations, which expansion may affect the living environment of the residents in the vicinity, notwithstanding the inclusion of any noise and vibration attenuating measures in the design of the development and individual dwelling(s). CNR will not be responsible for any complaints or claims arising from use of such facilities and/or operations on, over or under the aforesaid right-of-way."

Canadian National Railways Warning Clause

"Purchasers are advised that the Canadian National Railway Company is the owner of certain lands known as the Metrolinx GO Georgetown Station (the "CN Lands") located within a kilometer of the Subject Lands, and that the CN Lands are now and will continue to be used for the present and future railway and trucking facilities and operations of CN and its customers on a continuous basis (24 hours of each day in each year) including, without limitation, the operation and idling of diesel locomotives and trucks with the generation of diesel fumes and odours, 24 hours a day artificial lighting of the CN Lands which may illuminate the sky, the classification, loading, unloading, braking and switching of rail cars containing bulk and other commodities including hazardous substances and/or goods containing the same which can make wheel squeal, noise, vibration, odours, airborne particulate matter and/or dust and the operation of various processes for the maintenance of rail and truck equipment. CN may in the future renovate, add to, expand or otherwise change its facilities on the CN Lands and/or expand, extend, increase, enlarge or otherwise change the operations conducted upon the CN Lands. CN, its customers, invitees, lessees and/or licensees will not be responsible for any complaints or claims by or on behalf of the owners and/or occupants of the Subject Lands from time to time arising from or out of or in any way in connection with the operation of the CN Lands and all effects thereof upon the use and enjoyment of the Subject Lands or any part thereof, and whether arising from the presently existing facilities and operations of CN, its customers, invitees, lessees or licensees, upon or from any and all future renovations,

additions, expansions and other changes to such facilities and/or future expansions, extensions, increases, enlargements and other changes to such operations."

Metrolinx Warning Clause

"Metrolinx, carrying on business as GO Transit, and its assigns and successors in interest are the owners of lands within 300 metres from the land which is the subject hereof. In addition to the current use of the lands owned by Metrolinx, there may be alterations to or expansions of the rail and other facilities on such lands in the future including the possibility that GO Transit or any railway entering into an agreement with GO Transit to use the Metrolinx lands or Metrolinx and their respective assigns or successors as aforesaid may expand their operations, which expansion may affect the living environment of the residents in the vicinity, notwithstanding the inclusion of any noise and vibration attenuating measures in the design of the development and individual dwellings. Metrolinx will not be responsible for any complaints or claims arising from use of such facilities and/or operations on, over or under its lands."

Receptor-Based Physical Mitigation Measures

Ventilation System Design

Forced Air Heating Systems / Future Air Conditioning

The above listed unit should be designed with a provision for the installation of central air conditioning in the future, at the occupant's discretion.

Mandatory Air Conditioning

The above listed units should be designed with central air conditioning systems, will allow windows and exterior doors to remain closed.

Air Intake Locations

All air intakes for building mechanical systems, central air conditioning units and heat recovery units shall be located in areas of least impact, on the lea-side of the building (north facade), facing away from the rail corridor to the south of the development, or behind a significant intervening building or structure.

Provisions for Carbon/ Dust Filters

All air intakes for building mechanical systems, make-up air units, HVAC units, central air conditioning units and heat recovery units shall include space for the future installation of carbon and/or dust filters. The filtration system is to be designed to supply the space with 100% odour filtered air drawn from outside the building envelope.

Mandatory Carbon/ Dust Filters

All air intakes for building mechanical systems, make-up air units, HVAC units, central air conditioning units and heat recovery units shall include carbon and/or dust filters. The filtration system is to be designed to supply the space with 100% odour filtered air drawn from outside the building envelope.

Positive Pressurization

The building mechanical systems, make-up air units, HVAC units, central air conditioning units and heat recovery units shall be designed to maintain positive pressurization under normal weather conditions of all occupied areas, in accordance with current ASHRAE recommendations.

Automatic Door Closers

All door accessing the exterior (outdoors) of the Units must be outfitted with an automatic door closer that is designed to operate under normal weather conditions and exclude any mechanisms that would allow the doors to be left in an open position.

APPENDIX B
DEVELOPMENT PLANS

KEY PLAN _ NTS

SITE PLAN _ SCALE: 1/400

ZONING CHART

DEVELOPMENT DETAILS
HIGH DENSITY RESIDENTIAL ZONE (HDR) - EXCEPTION

	Required	Proposed	Amendment Needed
MINIMUM LOT FRONTAGE (Rosetta Street)	11.0 m	117.60	
MIN. FRONT YARD (Rosetta Street)	4.5 m	0.93 m	X
MIN. REAR YARD (St. Michael's Street)	7.5 m	3.91 m	X
MIN. INTERIOR SIDE YARD (River Street)	7.5 m	0.81 m	X
MIN. SETBACK FROM A RAILWAY	30.0 m	30 m Measured from the building face to the centerline of the active layby lane	X
MAX. BUILDING HEIGHT	25.0 m	Building 1 = TBD Building 2 = TBD Building 3 = TBD	X
MAX. LOT COVERAGE		52%	
OUTDOOR AMENITY AREA INCLUDING PRIVATE TERRACES AND BALCONIES		7006.30 sq.m	
MIN. OUTDOOR AMENITY AREA (PARK)		1,489.30 sq.m	
MIN. LANDSCAPE OPENSPACE (%)		32.70 %	
MIN. PARKING SETBACK BETWEEN A BUILDING AND AN AT-GRADE PARKING AREA	1.2 M	11.78 M	
PARKING REQUIREMENTS			
638 APPARTMENT UNITS	1.5 spaces per unit Plus 0.25 spaces per unit for visitor parking 640 x 1.5 = 960 spaces 640 x 0.25 = 160 spaces Total = 1120 spaces	1.0 spaces per unit Plus 0.10 spaces per unit for visitor parking 640 x 1.0 = 640 spaces 640 x 0.10 = 64 spaces Total = 704 spaces	X
TOTAL PARKING	1120 spaces	704 spaces	X
BARRIER FREE PARKING	2 parking spaces +2% of required parking spaces	2+ (704 x 0.02) = 16.08 or 16 Spaces	
MINIMUM SURFACE PARKING STALL SIZE	2.75 m width 5.5 m length	2.75 m width 5.5 m length	
MINIMUM WIDTH OF DRIVE AISLE ACCESSING SURFACE PARKING SPACES	6.7m	6.7m	
BICYCLE PARKING SPACES		472 Spaces	

PROJECT STATISTICS

1 ROSETTA STREET

PRELIMINARY STATS

		m2	ft2	hectare
Gross Site Area		14355.50	154,521.2	1.44
Net Site Area		13,424.80	144,503.2	1.34
Total GFA		48,276.00	519,638.0	
FSI (based on Gross Site Area)	3.36			
Density (units/hectare)	476.73			
Total Units	640			
Lot Coverage	52%			
Landscape Area	32.7%	4,388.60	47,238.5	

BUILDING - 01

Floors	GFA m2	GFA ft2	Units 1B	1B+D+1BTH	1B+D+2BTH	2B+2BTH	2B+D+2BTH	3B	Total
UG2	484.00	5,209.7							
UG1	516.20	5,556.3							
GROUND FLOOR	1,151.20	12,391.4							
2ND FLOOR	1,464.70	15,765.9	5	6	4	2	2	1	20
3RD FLOOR	1,608.20	17,310.5	5	8	4	3	2	1	23
4TH FLOOR	1,608.20	17,310.5	5	8	4	3	2	1	23
5TH FLOOR	1,608.20	17,310.5	5	8	4	3	2	1	23
6TH FLOOR	1,608.20	17,310.5	5	8	4	3	2	1	23
7TH FLOOR	1,608.20	17,310.5	5	8	4	3	2	1	23
8TH FLOOR	1,614.10	17,374.0	4	9	4	3	2	1	23
9TH FLOOR	1,614.10	17,374.0	4	9	4	3	2	1	23
10TH FLOOR	1,614.10	17,374.0	4	9	4	3	2	1	23
11TH FLOOR	1,614.10	17,374.0	4	9	4	3	2	1	23
12TH FLOOR	1,614.10	17,374.0	4	9	4	3	2	1	23
Total	19,727.60	212,345.9	50	91	44	32	22	11	**250**

BUILDING - 02

Floors	GFA m2	GFA ft2	Units 1B	1B+D+1BTH	1B+D+2BTH	2B+2BTH	2B+D+2BTH	3B	Total
UG2	331.70	3,570.4							
UG1	372.70	4,011.7							
GROUND FLOOR	1,002.30	10,788.7							
2ND FLOOR	1,491.90	16,058.7	6	7	4	1	2	2	22
3RD FLOOR	1,540.00	16,576.4	6	8	4	1	2	2	23
4TH FLOOR	1,540.00	16,576.4	6	8	4	1	2	2	23
5TH FLOOR	1,540.00	16,576.4	6	8	4	1	2	2	23
6TH FLOOR	1,540.00	16,576.4	6	8	4	1	2	2	23
7TH FLOOR	1,540.00	16,576.4	6	8	4	1	2	2	23
8TH FLOOR	1,488.30	16,019.9	7	9	4	1	2	0	23
9TH FLOOR	1,438.80	15,487.1	4	9	4	2	2	0	21
10TH FLOOR	1,333.50	14,353.7	3	7	4	2	3	0	19
11TH FLOOR	1,333.50	14,353.7	3	7	4	2	3	0	19
12TH FLOOR	1,278.90	13,766.0	4	8	4	1	2	0	19
Total	17,771.60	191,291.7	57	87	44	14	24	12	**238**

BUILDING - 03

Floors	GFA m2	GFA ft2	Units 1B	1B+D+1BTH	1B+D+2BTH	2B+2BTH	2B+D+2BTH	3B	Total
UG2	174.90	1,882.6							
UG1	466.90	5,025.7							
GROUND FLOOR	1,336.30	14,383.8	4	3	2	0	1	1	11
2ND FLOOR	1,248.60	13,439.8	5	8	2	2	2	1	20
3RD FLOOR	1,304.40	14,040.4	5	8	3	2	2	1	21
4TH FLOOR	1,304.40	14,040.4	5	8	3	2	2	1	21
5TH FLOOR	1,304.40	14,040.4	5	8	3	2	2	1	21
6TH FLOOR	1,304.40	14,040.4	5	8	3	2	2	1	21
7TH FLOOR	1,304.40	14,040.4	5	8	3	2	2	1	21
8TH FLOOR	1,028.10	11,066.4	3	7	3	2	1	0	16
Total	10,776.80	116,000.4	37	58	22	14	14	7	**152**

ALL BUILDINGS COMBINED

Floors	BUILDING 1 m2	BUILDING 1 ft2	BUILDING 2 m2	BUILDING 2 ft2	BUILDING 3 m2	BUILDING 3 ft2	TOTAL GFA m2	TOTAL GFA ft2
UG2	484.00	5,209.7	331.70	3,570.4	174.90	1,882.6	990.60	10,662.7
UG1	516.20	5,556.3	372.70	4,011.7	466.90	5,025.7	1,355.80	14,593.7
GROUND FLOOR	1,151.20	12,391.4	1,002.30	10,788.7	1,336.30	14,383.8	3,489.80	37,563.9
2ND FLOOR	1,464.70	15,765.9	1,491.90	16,058.7	1,248.60	13,439.8	4,205.20	45,264.4
3RD FLOOR	1,608.20	17,310.5	1,540.00	16,576.4	1,304.40	14,040.4	4,452.60	47,927.3
4TH FLOOR	1,608.20	17,310.5	1,540.00	16,576.4	1,304.40	14,040.4	4,452.60	47,927.3
5TH FLOOR	1,608.20	17,310.5	1,540.00	16,576.4	1,304.40	14,040.4	4,452.60	47,927.3
6TH FLOOR	1,608.20	17,310.5	1,540.00	16,576.4	1,304.40	14,040.4	4,452.60	47,927.3
7TH FLOOR	1,608.20	17,310.5	1,540.00	16,576.4	1,304.40	14,040.4	4,452.60	47,927.3
8TH FLOOR	1,614.10	17,374.0	1,488.30	16,019.9	1,028.10	11,066.4	4,130.50	44,460.3
9TH FLOOR	1,614.10	17,374.0	1,438.80	15,487.1			3,052.90	32,861.1
10TH FLOOR	1,614.10	17,374.0	1,333.50	14,353.7			2,947.60	31,727.7
11TH FLOOR	1,614.10	17,374.0	1,333.50	14,353.7			2,947.60	31,727.7
12TH FLOOR	1,614.10	17,374.0	1,278.90	13,766.0			2,893.00	31,140.0
Total GFA							48,276.00	519,638.0

PARKING REQUIRED

	Units	Ratio	Required
Residential	640	1.0	640
Visitor	640	0.1	64
TOTAL			704

PARKING PROVIDED

	Visitors	Residents
Grade	64	22
UG1	0	329
UG2	0	292
	64	643
TOTAL	707	

ACCESSIBLE PARKING AS PER AODA

RATIO	REQUIRED PARKING	REQUIRED ACCESSIBLE PARKING	PROVIDED ACCESSIBLE PARKING
2 PARKING SPACES + 2% OF REQUIRED			
PARKING SPACES	704	16	16
TOTAL			16

FLOOR AREA, GROSS

The aggregate of the areas of each floor of a building or structure above or below established grade, measured between the exterior faces of the exterior walls of the building or structure excluding the sum of the areas of each floor used, or designed or intended for use for the parking of motor vehicles, unless the parking of motor vehicles is the principle use of the building or structure.

FLOOR AREA, NET

The aggregate of the floor areas of a building above or below established grade, but excluding car parking areas within the building, stairways, elevator shafts, service or mechanical rooms and penthouses, washrooms, garbage or recycling rooms, staff locker and lunch rooms, loading areas, any space with a floor to ceiling height of less than 1.8 metres and any part of a basement that is unfinished, is used solely for storage purposes and is not accessible to the public.

NO.	REVISION/ISSUE	DATE

CONTRACTORS MUST CHECK ALL WORK AND DIMENSIONS ON SITE AND REPORT ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK. ALL RIGHTS AND DESIGNS ARE THE PROPERTY OF THIS ARCHITECT AND MUST BE RETURNED IF THE CONTENTS OF THE WORK DRAWINGS CANNOT BE SCALED.

NORTH

1 ROSETTA STREET
GEORGETOWN, ON

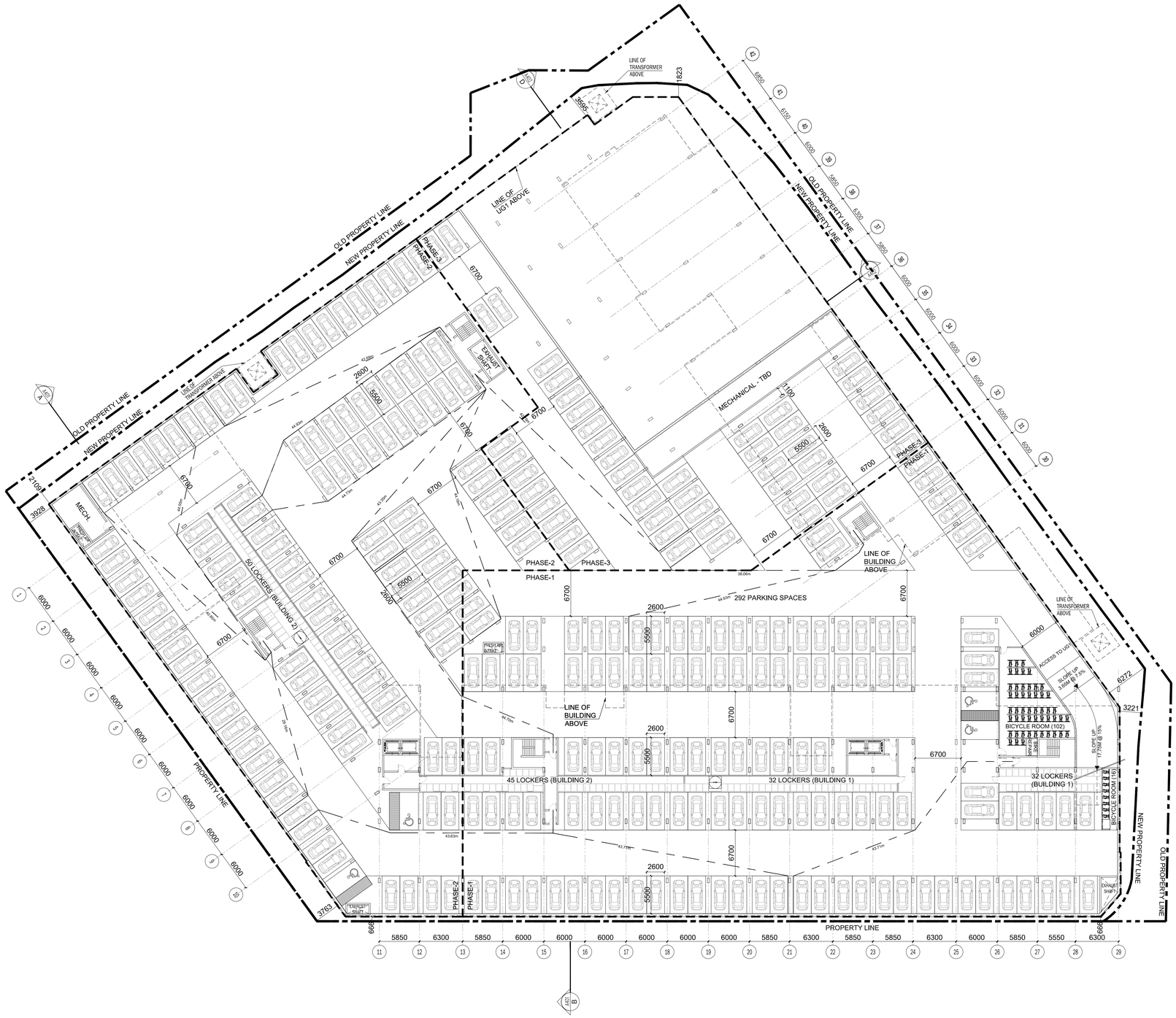
DRAWING TITLE
SITE PLAN & PROJECT STATS

Scale: 1/400
Date: MAR.01, 2022
Project No. 17127

Drawn by: RK
Checked by: RE
Drawing No. A101

813 - 4789 YONGE ST., TORONTO
ONTARIO, CANADA M2N 0G3
T:416-224-0606 F:416-224-0604

ICON ARCHITECTS



NO.	REVISION/ISSUE	DATE

CONTRACTORS MUST CHECK ALL THE DIMENSIONS ON SITE AND REPORT ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE ONTARIO BUILDING CODE AND ALL OTHER APPLICABLE BY-LAWS. ALL DRAWINGS AND RELATED DOCUMENTS ARE THE PROPERTY OF THE ARCHITECT AND MUST BE RETURNED IF SO CONTENTS OF THE WORK. DRAWINGS SHALL NOT BE SCALED.

NORTH

1 ROSETTA STREET
GEORGETOWN, ON

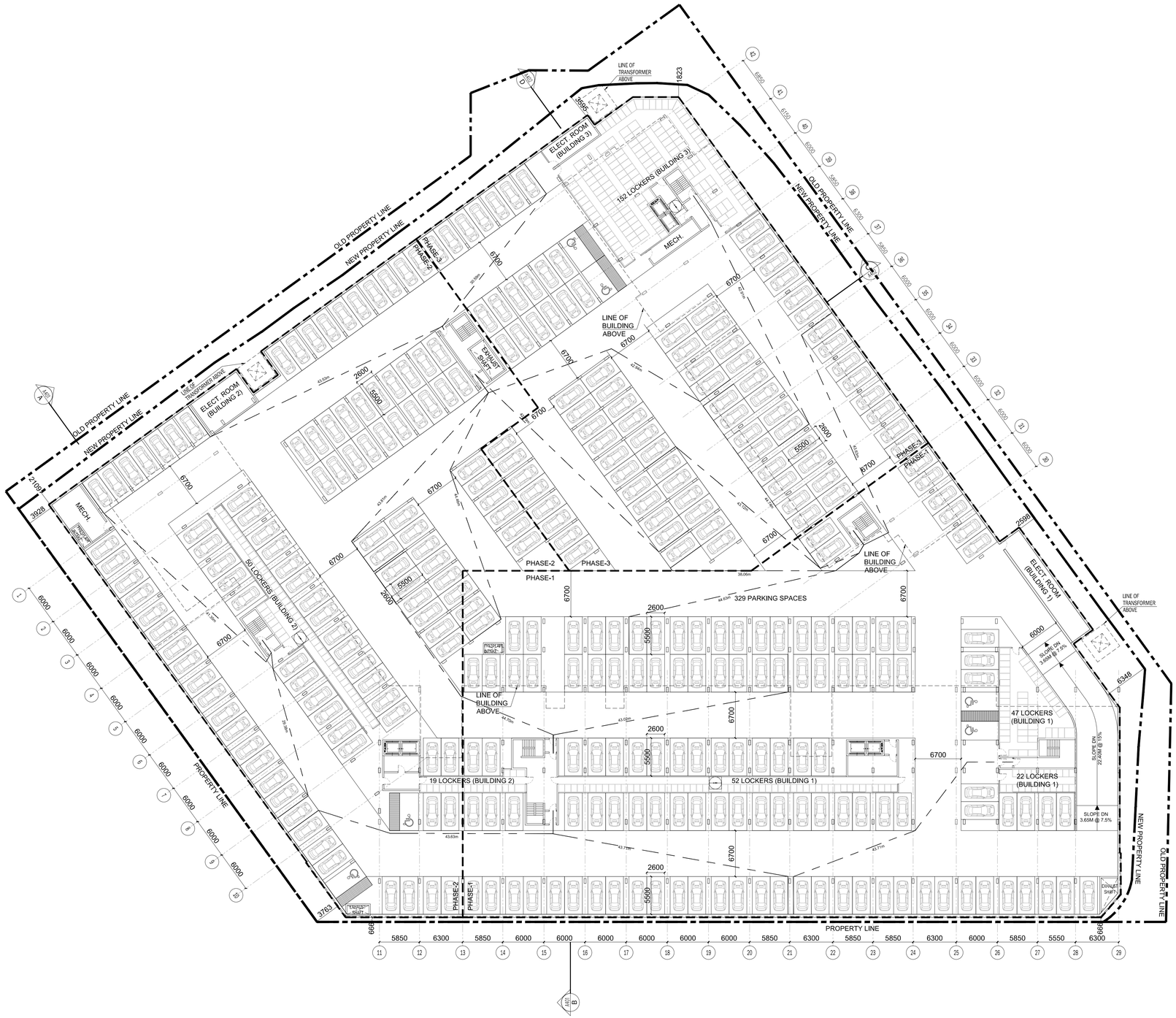
DRAWING TITLE
UG2 FLOOR PLAN

Scale: 1/300
Date: MAR.01, 2022
Project No. 17127

Drawn by: RK
Checked by: RE
Drawing No. A201

813 - 4789 YONGE ST., TORONTO
MARKHAM, ONTARIO L3R 0G5
T:416-224-0606 F:416-224-0604

ICON ARCHITECTS



ALL DRAWINGS AND RELATED DOCUMENTS ARE THE COPYRIGHT PROPERTY OF ICON ARCHITECTS INC. AND MUST BE RETURNED UPON REQUEST. REPRODUCTION OF DRAWINGS AND RELATED DOCUMENTS IN WHOLE OR IN PART IS FORBIDDEN WITHOUT WRITTEN PERMISSION OF ICON ARCHITECTS INC.
ALL DIMENSIONS AND MEASUREMENTS MUST BE CHECKED AND VERIFIED BY THE CONTRACTOR.
THE CONTRACTOR MUST REPORT ALL DISCREPANCIES AND ERRORS OR OMISSIONS TO THE ARCHITECT IN WRITING.
THIS DRAWING IS NOT FOR CONSTRUCTION UNLESS IT CLEARLY STATES "ISSUED FOR CONSTRUCTION" BY THE ARCHITECT ON THE REVISION COLUMN.
DO NOT SCALE DRAWINGS.

NO.	REVISION/ISSUE	DATE	NO.	REVISION/ISSUE	DATE

CONTRACTORS MUST CHECK AND VERIFY ALL DIMENSIONS ON THE JOB AND REPORT ANY DISCREPANCIES TO ARCHITECT BEFORE PROCEEDING WITH WORK. ALL PRINTS AND SPECIFICATIONS ARE THE PROPERTY OF THE ARCHITECT AND MUST BE RETURNED AT THE COMPLETION OF THE WORK. DRAWINGS SHOULD NOT BE SCALED.

NORTH

1 ROSETTA STREET
GEORGETOWN, ON

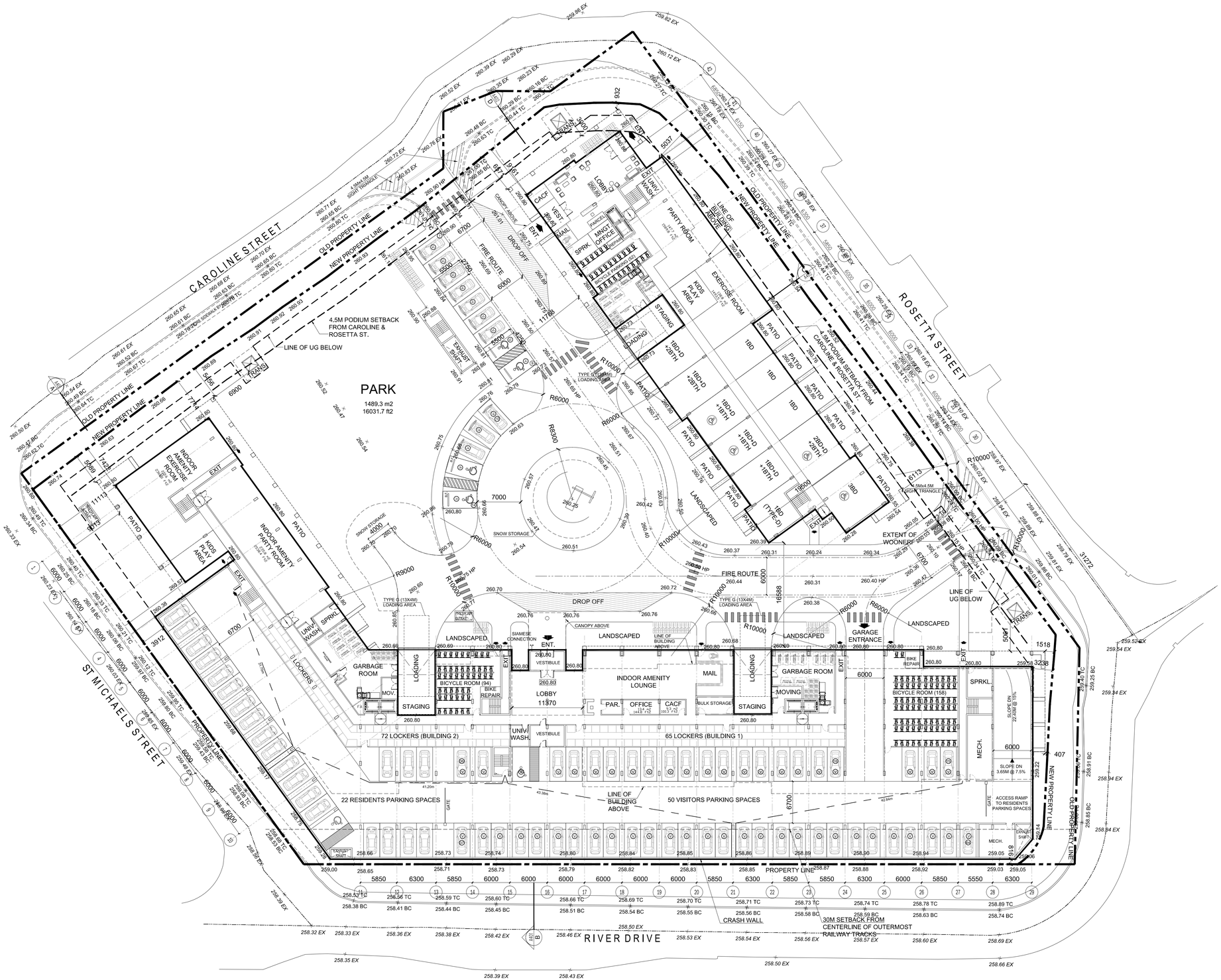
DRAWING TITLE
UG1 FLOOR PLAN

Scale:
1/300
Date:
MAR.01, 2022
Project No.
17127

Drawn by:
RK
Checked by:
RE
Drawing No.
A202

813 - 4789 YONGE ST. TORONTO
M2N 0G3 ICONARCHITECTS.CA
T:416-224-0505 F:416-224-0504

ICON
ARCHITECTS



ALL DRAWINGS AND RELATED DOCUMENTS ARE THE COPYRIGHT PROPERTY OF ICON ARCHITECTS INC. AND MUST BE RETURNED UPON REQUEST. REPRODUCTION OF DRAWINGS AND RELATED DOCUMENTS IN WHOLE OR IN PART IS FORBIDDEN WITHOUT WRITTEN PERMISSION OF ICON ARCHITECTS INC.
ALL DIMENSIONS AND MEASUREMENTS MUST BE CHECKED AND VERIFIED BY THE CONTRACTOR. THE CONTRACTOR MUST REPORT ALL DISCREPANCIES AND ERRORS OR OMISSIONS TO THE ARCHITECT IN WRITING.
THIS DRAWING IS NOT FOR CONSTRUCTION UNLESS IT CLEARLY STATES "ISSUED FOR CONSTRUCTION" BY THE ARCHITECT ON THE REVISION COLUMN. DO NOT SCALE DRAWINGS.

NO.	REVISION/ISSUE	DATE	NO.	REVISION/ISSUE	DATE

COPYRIGHT RESERVED. THIS DESIGN AND PLAN IS AND AT ALL TIMES REMAINS THE EXCLUSIVE PROPERTY OF ICON ARCHITECTS INC. AND CANNOT BE USED WITHOUT THE EXPRESS WRITTEN CONSENT OF THE ARCHITECT. ALL RIGHTS RESERVED UNDER THE COPYRIGHT ACT.

NORTH

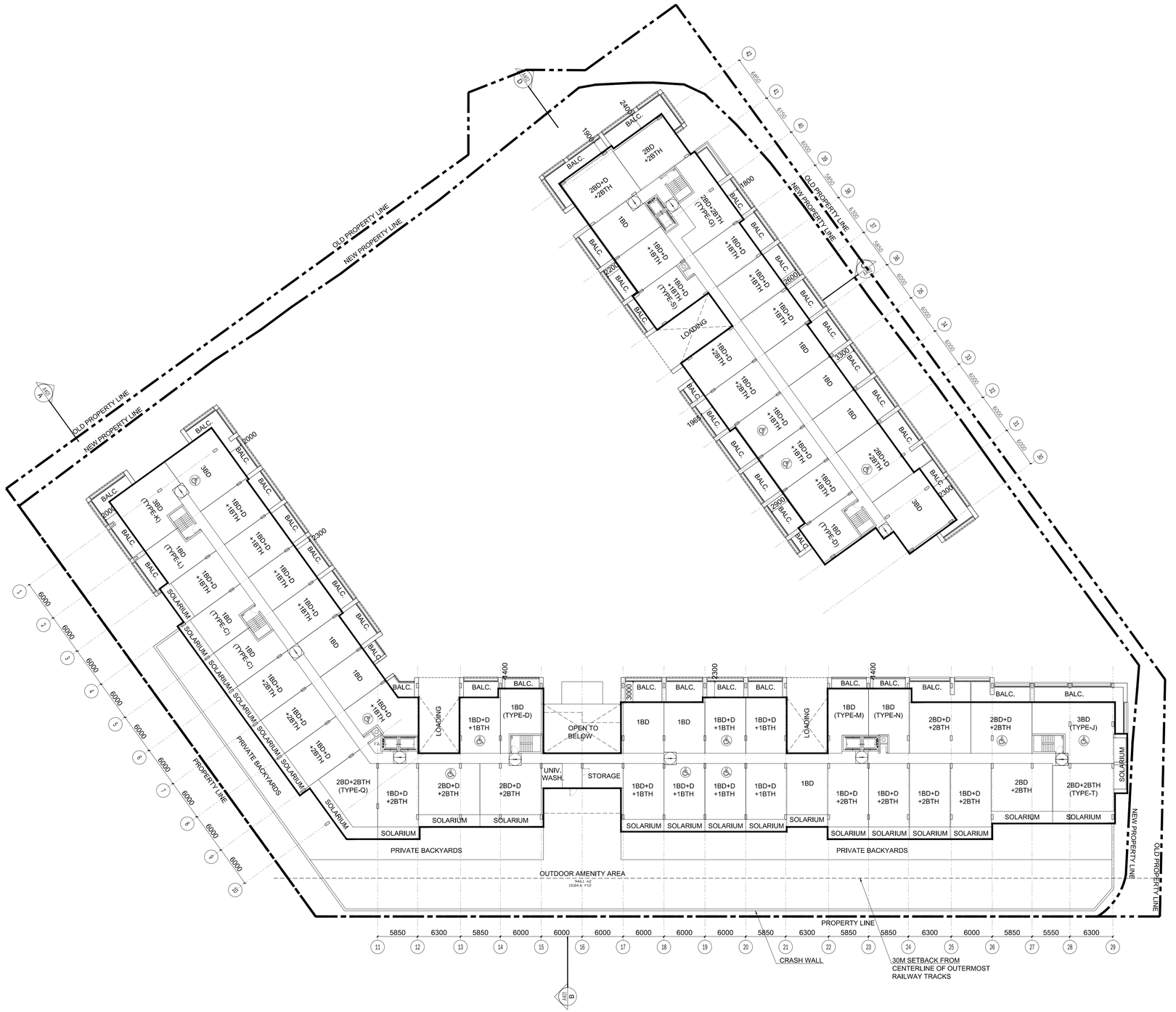
1 ROSETTA STREET
GEORGETOWN, ON

DRAWING TITLE
GROUND FLOOR PLAN

Scale: 1/300
Date: MAR.01, 2022
Project No. 17127

Drawn by: RK
Checked by: RE
Drawing No. A203

ICON ARCHITECTS
813 - 4789 YONGE ST., TORONTO
ONTARIO, CANADA M2N 0G3
T:416.224-0505 F:416.224-0504



NO.	REVISION/ISSUE	DATE	NO.	REVISION/ISSUE	DATE

COPYRIGHT RESERVED. THIS DESIGN AND DRAWING IS AND, AT ALL TIMES REMAINS THE EXCLUSIVE PROPERTY OF ICON ARCHITECTS INC. AND MAY NOT BE USED WITHOUT THE PERMISSION OF ICON ARCHITECTS INC. ALL DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY OF THE ARCHITECT AND MUST BE RETURNED AT THE COMPLETION OF THE WORK. DRAWINGS SHOULD NOT BE SCALED.

NORTH

1 ROSETTA STREET
GEORGETOWN, ON

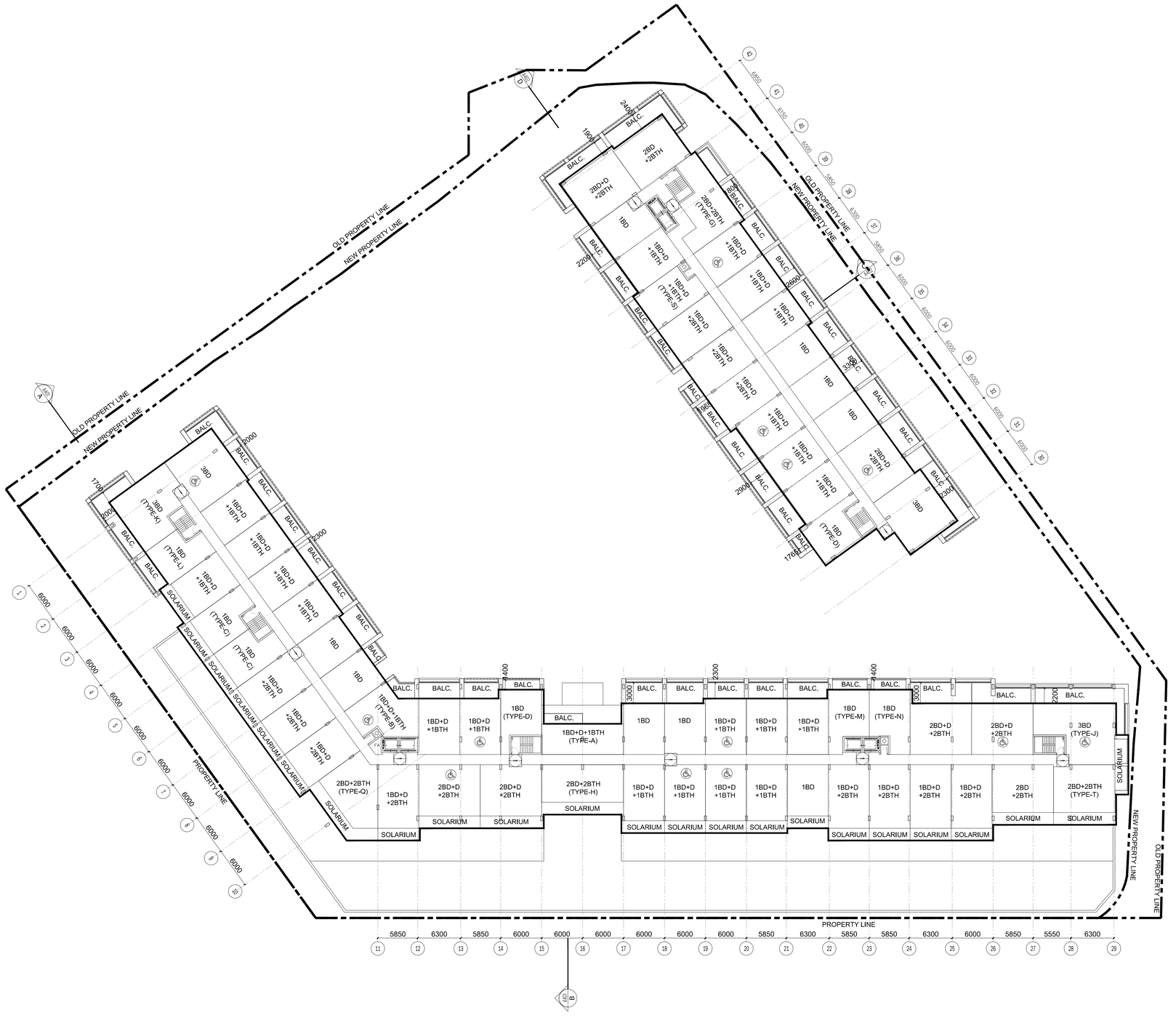
DRAWING TITLE
2ND FLOOR PLAN

Scale: 1/300
Date: MAR.01, 2022
Project No. 17127

Drawn by: RK
Checked by: RE
Drawing No. A204

813 - 4789 YONGE ST. TORONTO
M2N 0G3 ONTARIO, CANADA
T:416-224-0606 F:416-224-0604

ICON ARCHITECTS



ALL DRAWINGS AND RELATED DOCUMENTS ARE THE COPYRIGHT PROPERTY OF ICON ARCHITECTS INC. AND MUST BE RETURNED UPON REQUEST. REPRODUCTION OF DRAWINGS AND RELATED DOCUMENTS IN WHOLE OR IN PART IS FORBIDDEN WITHOUT WRITTEN PERMISSION OF ICON ARCHITECTS INC.
ALL DIMENSIONS AND MEASUREMENTS MUST BE CHECKED AND VERIFIED BY THE CONTRACTOR. THE CONTRACTOR MUST REPORT ALL DISCREPANCIES AND ERRORS OR OMISSIONS TO THE ARCHITECT IN WRITING.
THIS DRAWING IS NOT FOR CONSTRUCTION UNLESS IT CLEARLY STATES "ISSUED FOR CONSTRUCTION" BY THE ARCHITECT ON THE REVISION COLUMN.
DO NOT SCALE DRAWINGS.

NO.	REVISION/ISSUE	DATE

CONTRACTORS MUST CHECK ALL DIMENSIONS ON SITE AND REPORT ANY DISCREPANCIES BEFORE PROCEEDING WITH WORK. ALL PRINTS AND DESIGNS ARE THE PROPERTY OF THE ARCHITECT AND MUST BE RETURNED IF THE CONTENTS OF THE WORK DRAWING SHALL NOT BE SCALED.

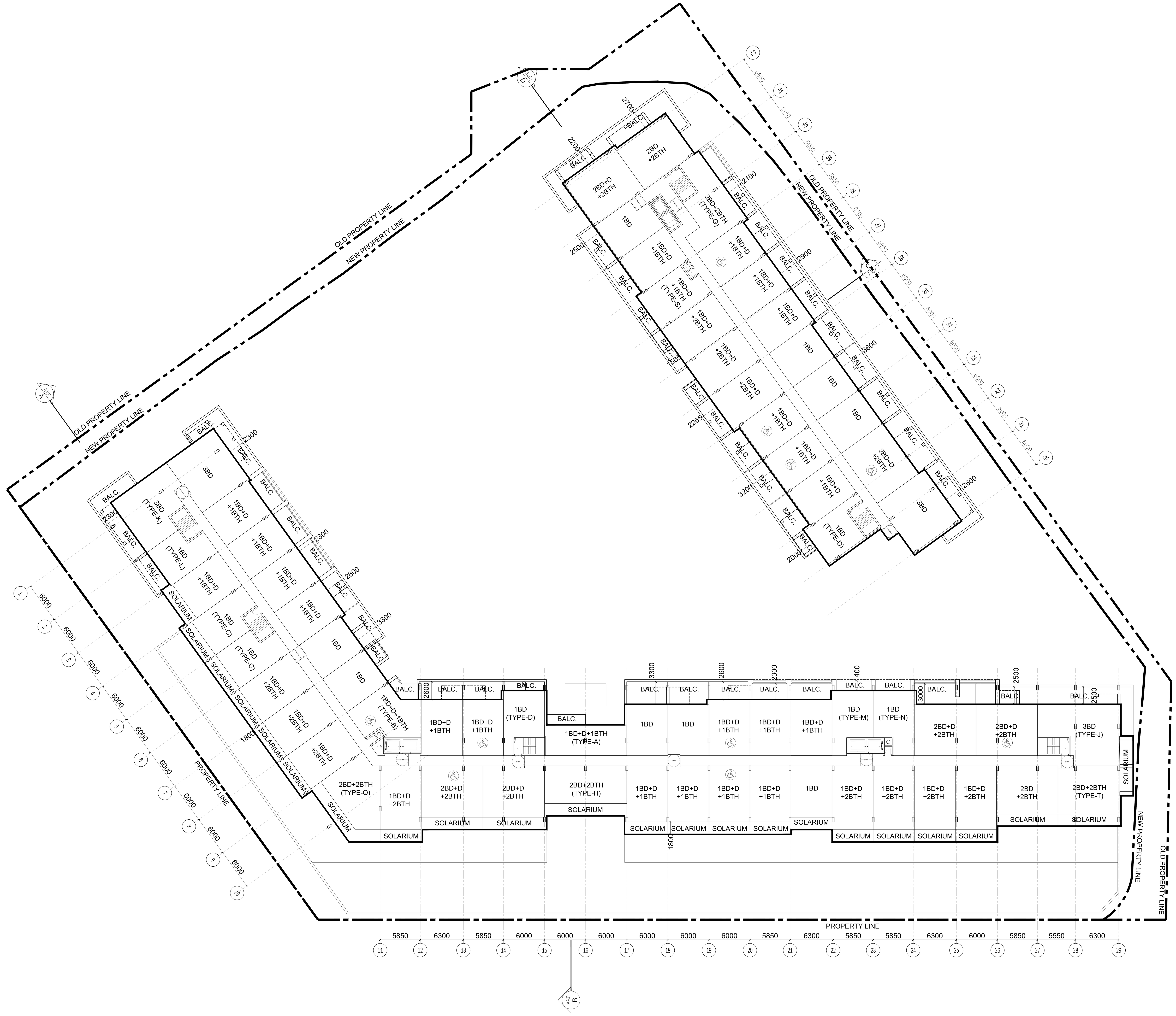
NORTH

1 ROSETTA STREET
GEORGETOWN, ON

DRAWING TITLE
3RD FLOOR PLAN

Scale: 1/300
Date: MAR.01, 2022
Project No. 17127
Drawn by: RK
Checked by: RE
Drawing No. A205

ICON ARCHITECTS
813 - 4789 YONGE ST., TORONTO
ONTARIO, CANADA M2N 0G3
T:416-224-0505 F:416-224-0504



ALL DRAWINGS AND RELATED DOCUMENTS ARE THE COPYRIGHT PROPERTY OF ICON ARCHITECTS INC. AND MUST BE RETURNED UPON REQUEST. REPRODUCTION OF DRAWINGS AND RELATED DOCUMENTS IN WHOLE OR IN PART IS FORBIDDEN WITHOUT WRITTEN PERMISSION OF ICON ARCHITECTS INC.
ALL DIMENSIONS AND MEASUREMENTS MUST BE CHECKED AND VERIFIED BY THE CONTRACTOR. THE CONTRACTOR MUST REPORT ALL DISCREPANCIES AND ERRORS OR OMISSIONS TO THE ARCHITECT IN WRITING.
THIS DRAWING IS NOT FOR CONSTRUCTION UNLESS IT CLEARLY STATES "ISSUED FOR CONSTRUCTION" BY THE ARCHITECT ON THE REVISION COLUMN.
DO NOT SCALE DRAWINGS.

NO.	REVISION/ISSUE	DATE	NO.	REVISION/ISSUE	DATE

NORTH

CONS. TRUE

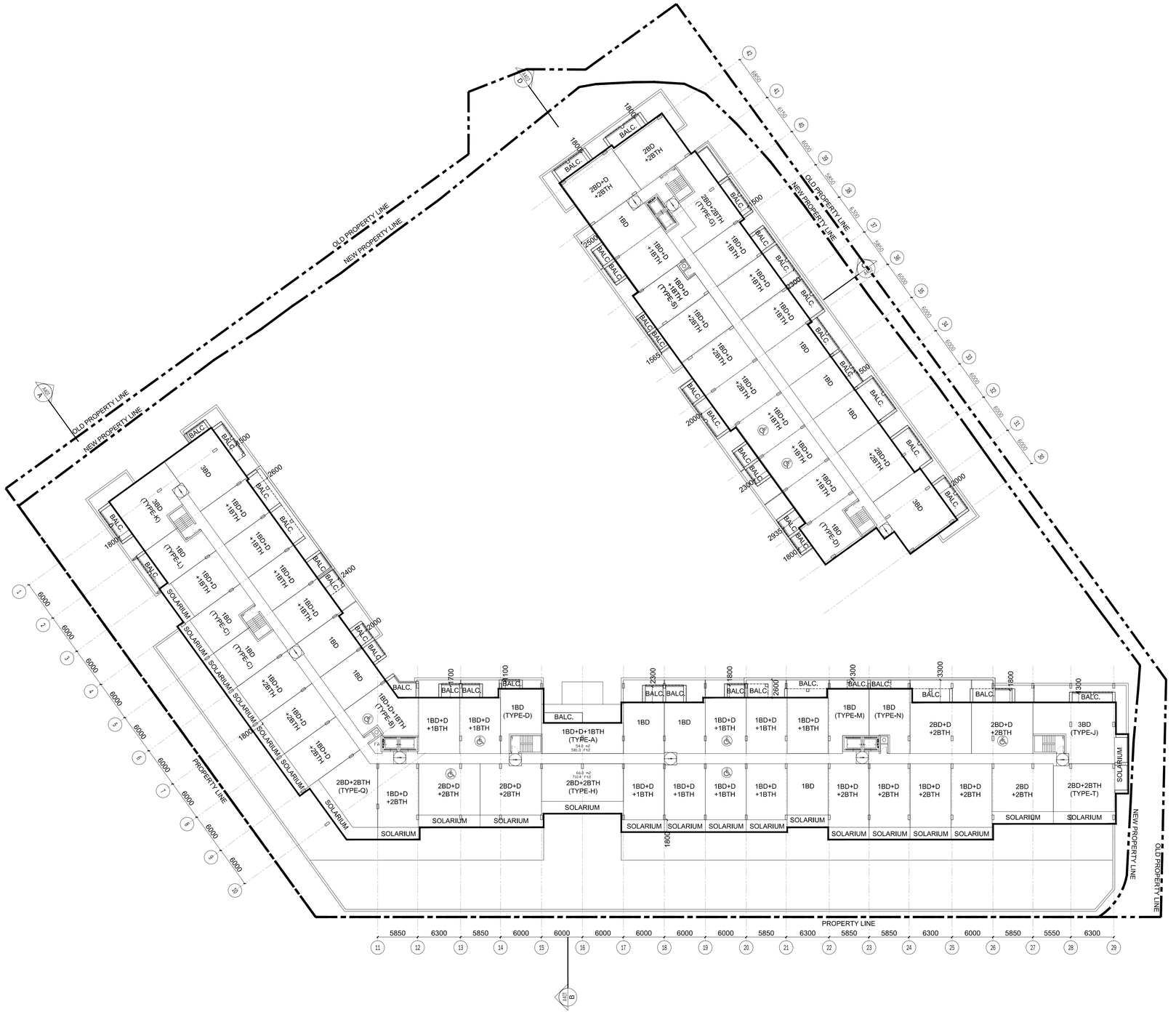
1 ROSETTA STREET
GEORGETOWN, ON

DRAWING TITLE
4TH FLOOR PLAN

Scale: 1/300
Date: MAR.01, 2022
Project No. 17127
Drawn by: RK
Checked by: RE
Drawing No. A206

813 - 4789 YONGE ST. TORONTO
M2N 0G3 ICONARCHITECTS.CA
T:416-224-0505 F:416-224-0504

ICON ARCHITECTS



ALL DRAWINGS AND RELATED DOCUMENTS ARE THE COPYRIGHT PROPERTY OF ICON ARCHITECTS INC. AND MUST BE RETURNED UPON REQUEST. REPRODUCTION OF DRAWINGS AND RELATED DOCUMENTS IN WHOLE OR IN PART IS FORBIDDEN WITHOUT WRITTEN PERMISSION OF ICON ARCHITECTS INC.
ALL DIMENSIONS AND MEASUREMENTS MUST BE CHECKED AND VERIFIED BY THE CONTRACTOR. THE CONTRACTOR MUST REPORT ALL DISCREPANCIES AND ERRORS OR OMISSIONS TO THE ARCHITECT IN WRITING.
THIS DRAWING IS NOT FOR CONSTRUCTION UNLESS IT CLEARLY STATES "ISSUED FOR CONSTRUCTION" BY THE ARCHITECT ON THE REVISION COLUMN.
DO NOT SCALE DRAWINGS.

NO.	REVISION/ISSUE	DATE	NO.	REVISION/ISSUE	DATE

CONTRACTORS MUST CHECK ALL DIMENSIONS ON SITE AND REPORT ANY DISCREPANCIES BEFORE PROCEEDING WITH WORK. ALL PRINTS AND DESIGNS ARE THE PROPERTY OF ICON ARCHITECTS AND MUST BE RETURNED IF SO CONTENTS OF THIS WORK DRAWING SHOULD NOT BE SCALED.

NORTH

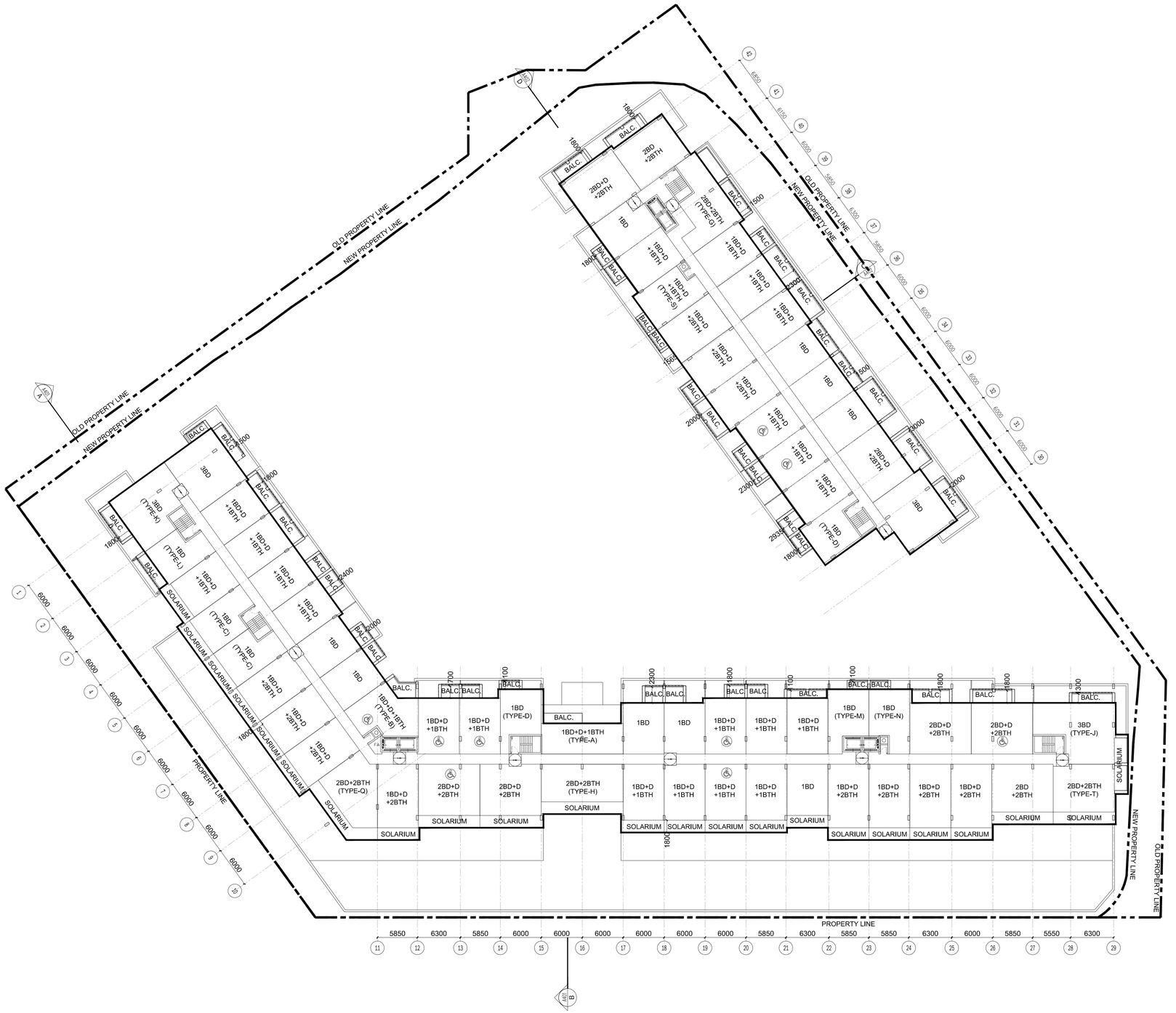
1 ROSETTA STREET
GEORGETOWN, ON

DRAWING TITLE
5TH FLOOR PLAN

Scale: 1/300
Date: MAR.01, 2022
Project No. 17127
Drawn by: RK
Checked by: RE
Drawing No. A207

813 - 4789 YONGE ST., TORONTO
ONTARIO, CANADA M2N 0G3
T:416-224-0505 F:416-224-0504

ICON ARCHITECTS



NO.	REVISION/ISSUE	DATE	NO.	REVISION/ISSUE	DATE

NORTH

COORD. TRUE

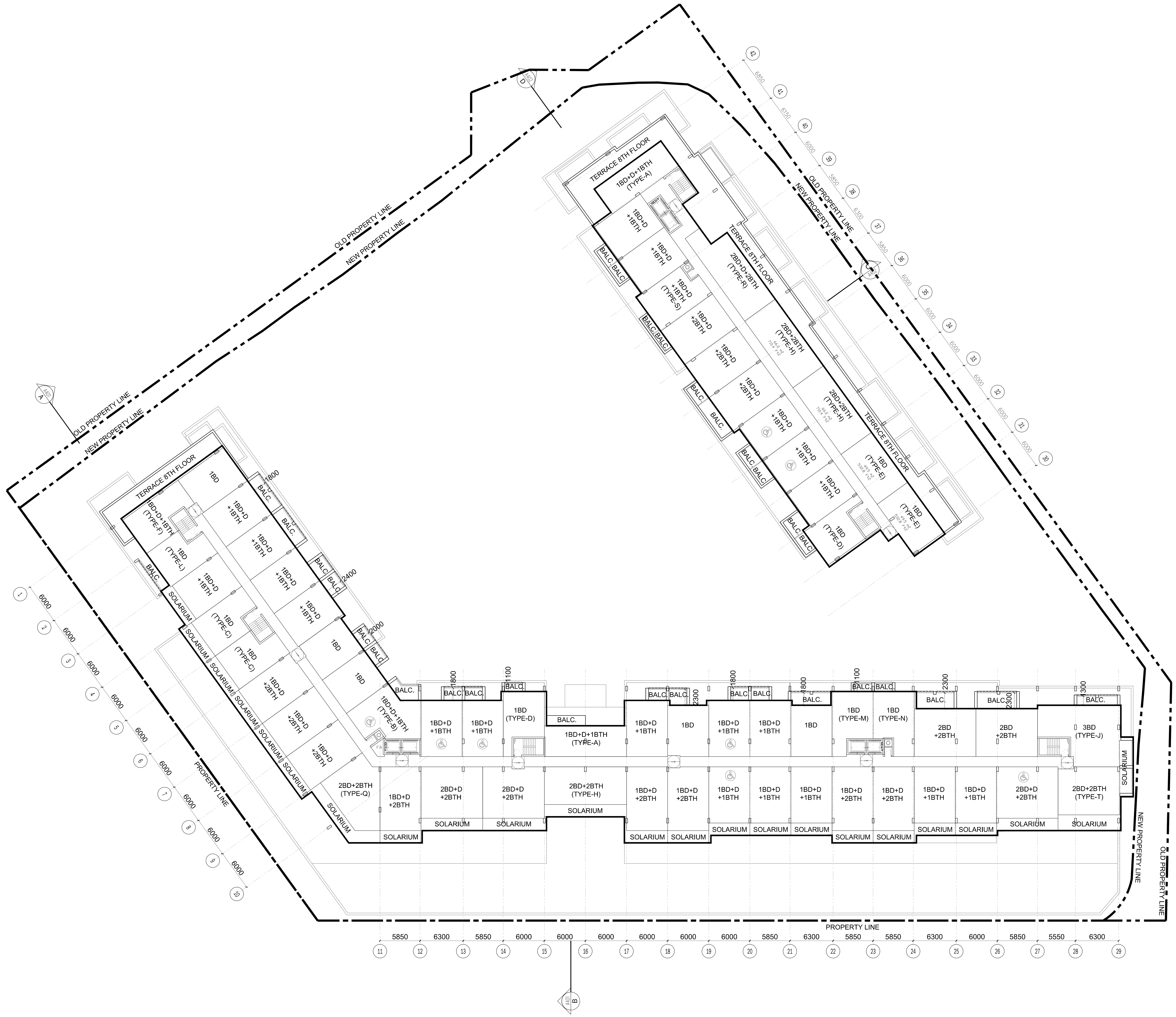
1 ROSETTA STREET
GEORGETOWN, ON

DRAWING TITLE
6TH & 7TH FLOOR PLANS

Scale: 1/300
Date: MAR.01, 2022
Project No. 17127
Drawn by: RK
Checked by: RE
Drawing No. A208

813 - 4789 YONGE ST, TORONTO
M4N 0A5, ONTARIO, CANADA
T:416-224-0505 F:416-224-0504

ICON ARCHITECTS



NO.	REVISION/ISSUE	DATE	NO.	REVISION/ISSUE	DATE

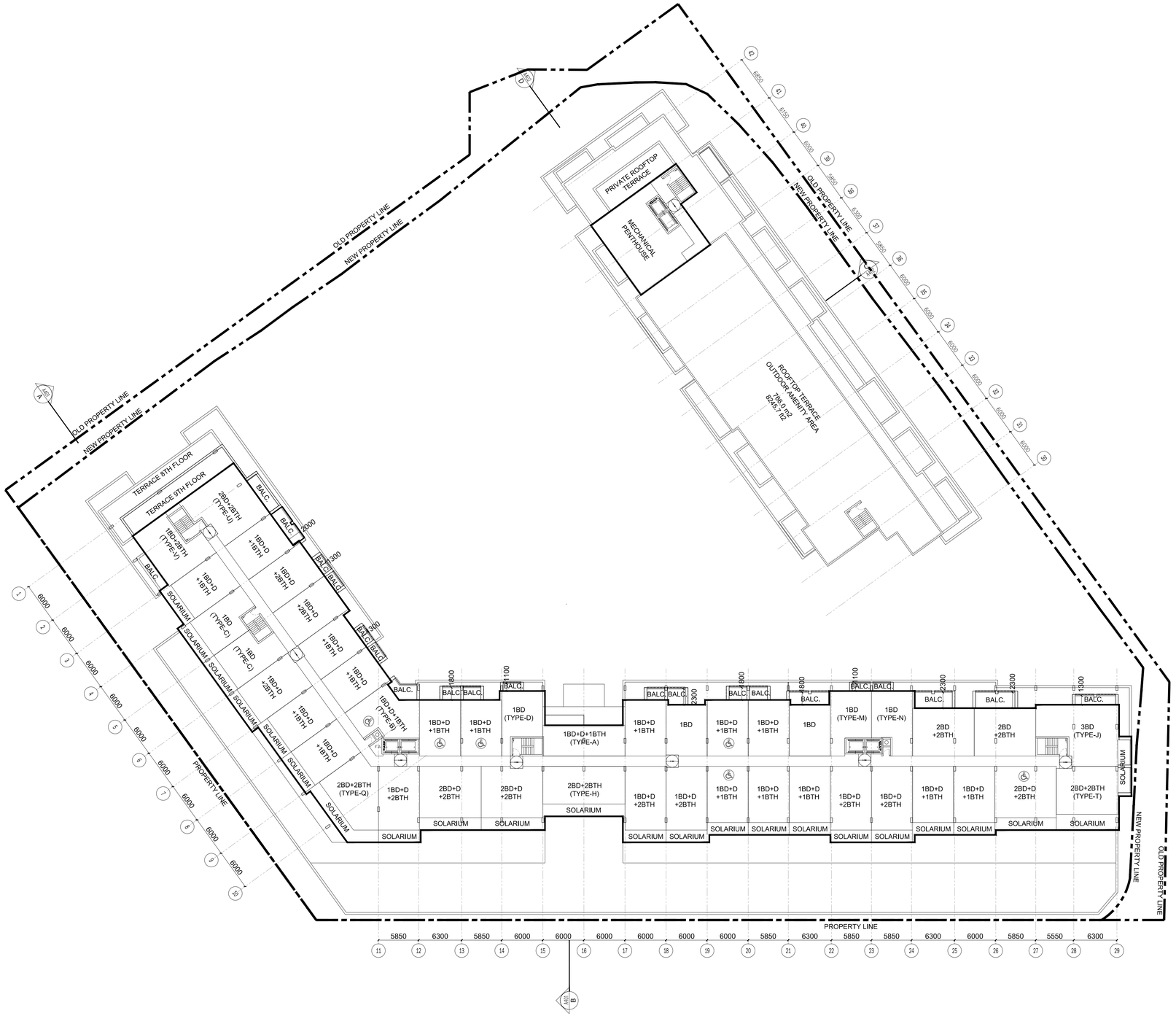
NORTH

1 ROSETTA STREET
GEORGETOWN, ON

DRAWING TITLE
8TH FLOOR PLAN

Scale: 1/300
Date: MAR.01, 2022
Project No. 17127
Drawn by: RK
Checked by: RE
Drawing No. A209

813 - 4789 YONGE ST. TORONTO
M2N 0G3 ICONARCHITECTS.CA
T:416-224-0505 F:416-224-0504
ICON ARCHITECTS



NO.	REVISION/ISSUE	DATE	NO.	REVISION/ISSUE	DATE

ALL DRAWINGS AS WELL AS THE IDEAS AND DESIGNS INCORPORATED HEREIN, EXPRESSED OR IMPLIED, HAVE BEEN PREPARED BY AND ARE THE PROPERTY OF THE ARCHITECT AND MUST BE RETURNED AT THE COMPLETION OF THE WORK. DRAWINGS SHOULD NOT BE SCALED.

NORTH

1 ROSETTA STREET
GEORGETOWN, ON

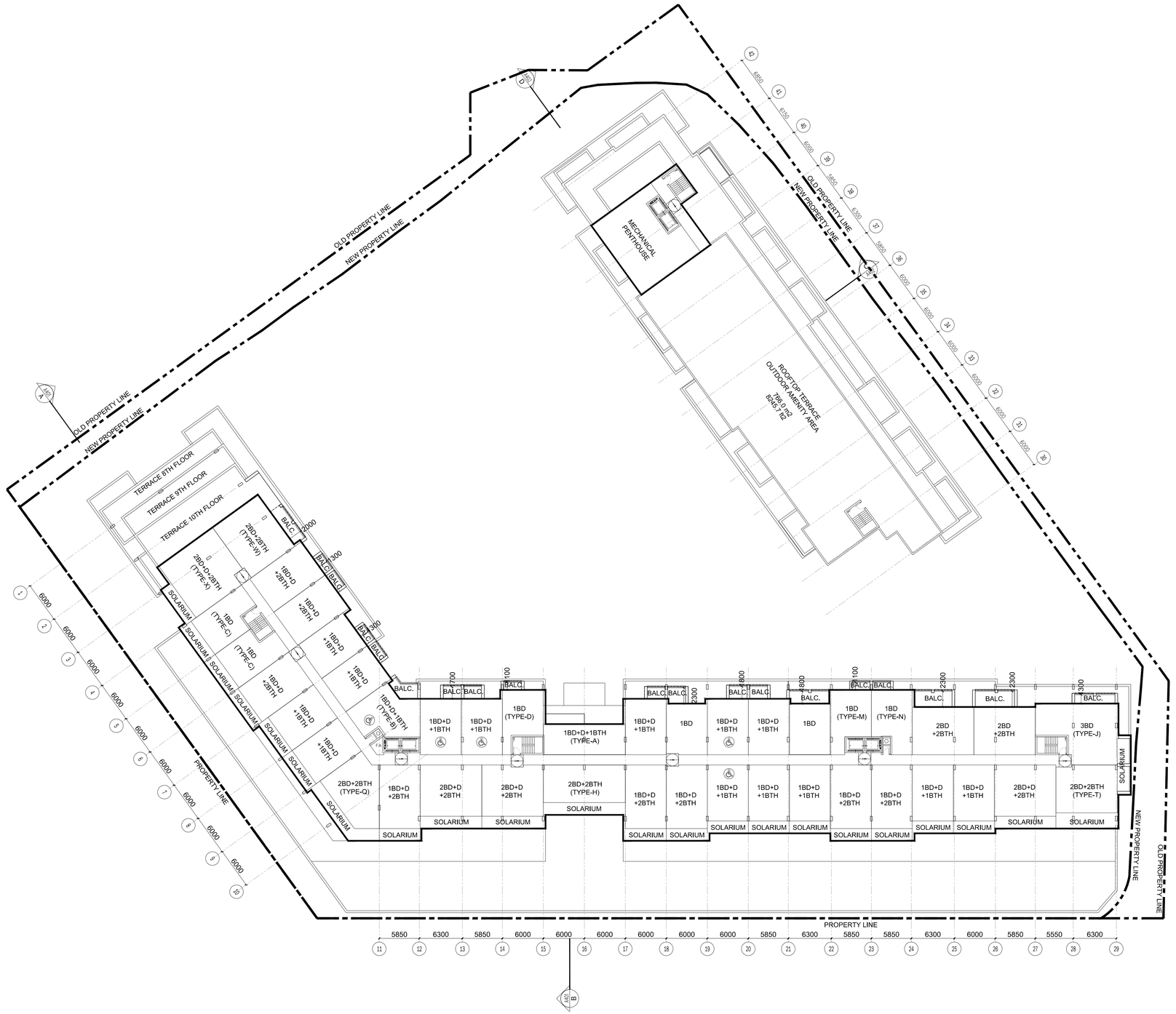
DRAWING TITLE
9TH FLOOR PLAN

Scale: 1/300
Date: MAR.01, 2022
Project No. 17127

Drawn by: RK
Checked by: RE
Drawing No. A210

813 - 4789 YONGE ST. TORONTO
M2N 0G3, ONTARIO, CANADA
T:416-224-0505 F:416-224-0504

ICON ARCHITECTS



ALL DRAWINGS AND RELATED DOCUMENTS ARE THE COPYRIGHT PROPERTY OF ICON ARCHITECTS INC. AND MUST BE RETURNED UPON REQUEST. REPRODUCTION OF DRAWINGS AND RELATED DOCUMENTS IN WHOLE OR IN PART IS FORBIDDEN WITHOUT WRITTEN PERMISSION OF ICON ARCHITECTS INC.
ALL DIMENSIONS AND MEASUREMENTS MUST BE CHECKED AND VERIFIED BY THE CONTRACTOR. THE CONTRACTOR MUST REPORT ALL DISCREPANCIES AND ERRORS OR OMISSIONS TO THE ARCHITECT IN WRITING.
THIS DRAWING IS NOT FOR CONSTRUCTION UNLESS IT CLEARLY STATES "ISSUED FOR CONSTRUCTION" BY THE ARCHITECT ON THE REVISION COLUMN.
DO NOT SCALE DRAWINGS.

NO.	REVISION/ISSUE	DATE	NO.	REVISION/ISSUE	DATE

COPYRIGHT RESERVED. THIS DESIGN AND DRAWING IS AND SHALL REMAIN THE EXCLUSIVE PROPERTY OF ICON ARCHITECTS INC. AND THE INFORMATION CONTAINED HEREON MAY NOT BE USED WITHOUT THE AUTHORIZATION OF ICON ARCHITECTS INC. ALL RIGHTS AND OBLIGATIONS ARE THE PROPERTY OF THE ARCHITECT AND MUST BE RETURNED IF THE CONTENTS OF THE WORK DRAWINGS SHOULD NOT BE SCALED.

NORTH

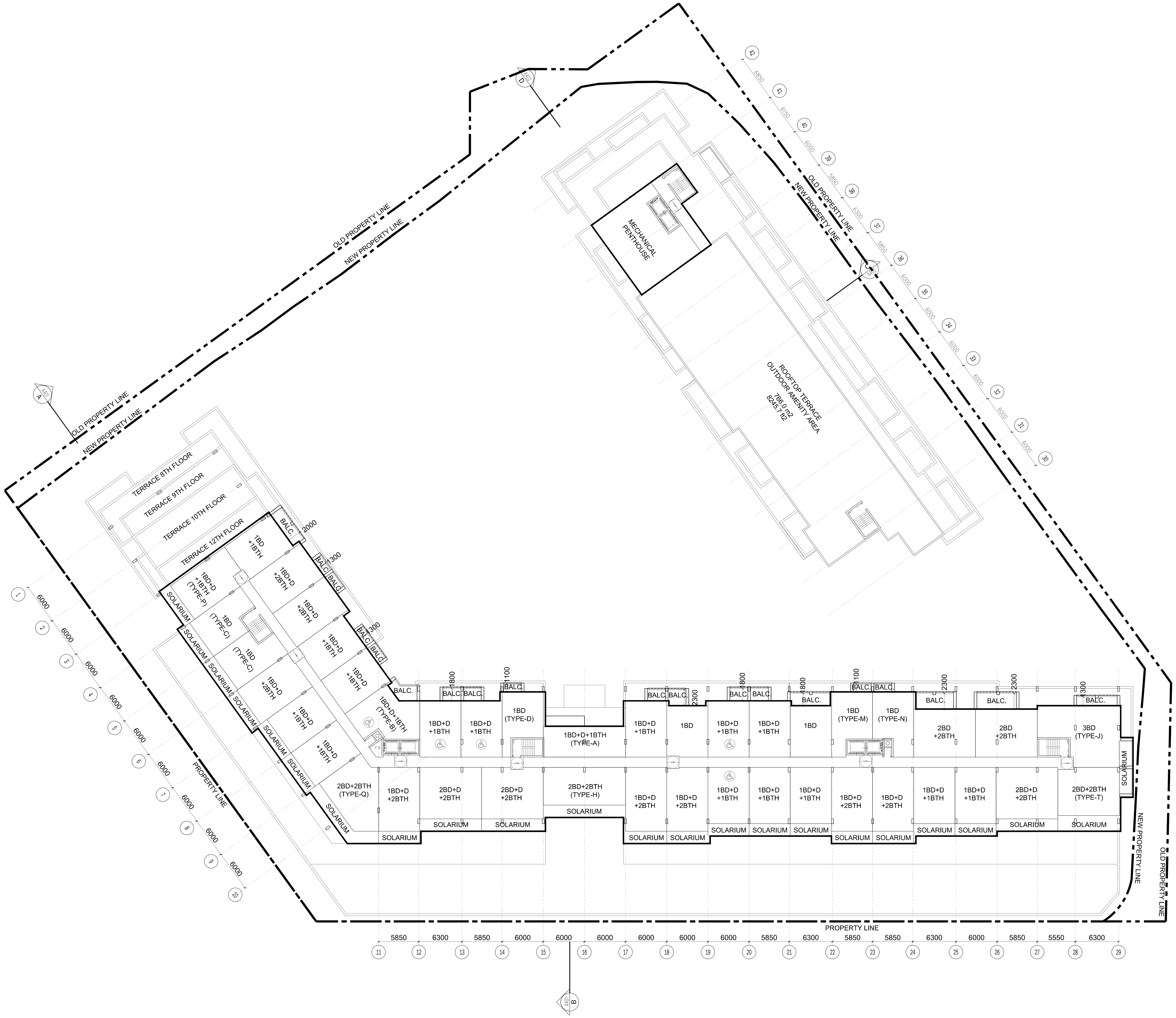
1 ROSETTA STREET
GEORGETOWN, ON

DRAWING TITLE
10TH–11TH TYPICAL FLOOR PLAN

Scale: 1/300
Date: MAR.01, 2022
Project No. 17127
Drawn by: RK
Checked by: RE
Drawing No. A211

813 - 4789 YONGE ST. TORONTO
M2N 0G3, ONTARIO, CANADA
T:416-224-0505 F:416-224-0504

ICON ARCHITECTS



ALL DRAWINGS AND RELATED DOCUMENTS ARE THE COPYRIGHT PROPERTY OF ICON ARCHITECTS INC. AND MUST BE RETURNED UPON REQUEST. REPRODUCTION OF DRAWINGS AND RELATED DOCUMENTS IN WHOLE OR IN PART IS FORBIDDEN WITHOUT WRITTEN PERMISSION OF ICON ARCHITECTS INC.

ALL DIMENSIONS AND MEASUREMENTS MUST BE CHECKED AND VERIFIED BY THE CONTRACTOR. THE CONTRACTOR MUST REPORT ALL DISCREPANCIES AND ERRORS OR OMISSIONS TO THE ARCHITECT IN WRITING. THIS DRAWING IS NOT FOR CONSTRUCTION UNLESS IT CLEARLY STATES "ISSUED FOR CONSTRUCTION" BY THE ARCHITECT ON THE REVISION COLUMN. DO NOT SCALE DRAWINGS.

NO.	REVISION/ISSUE	DATE	NO.	REVISION/ISSUE	DATE

NORTH

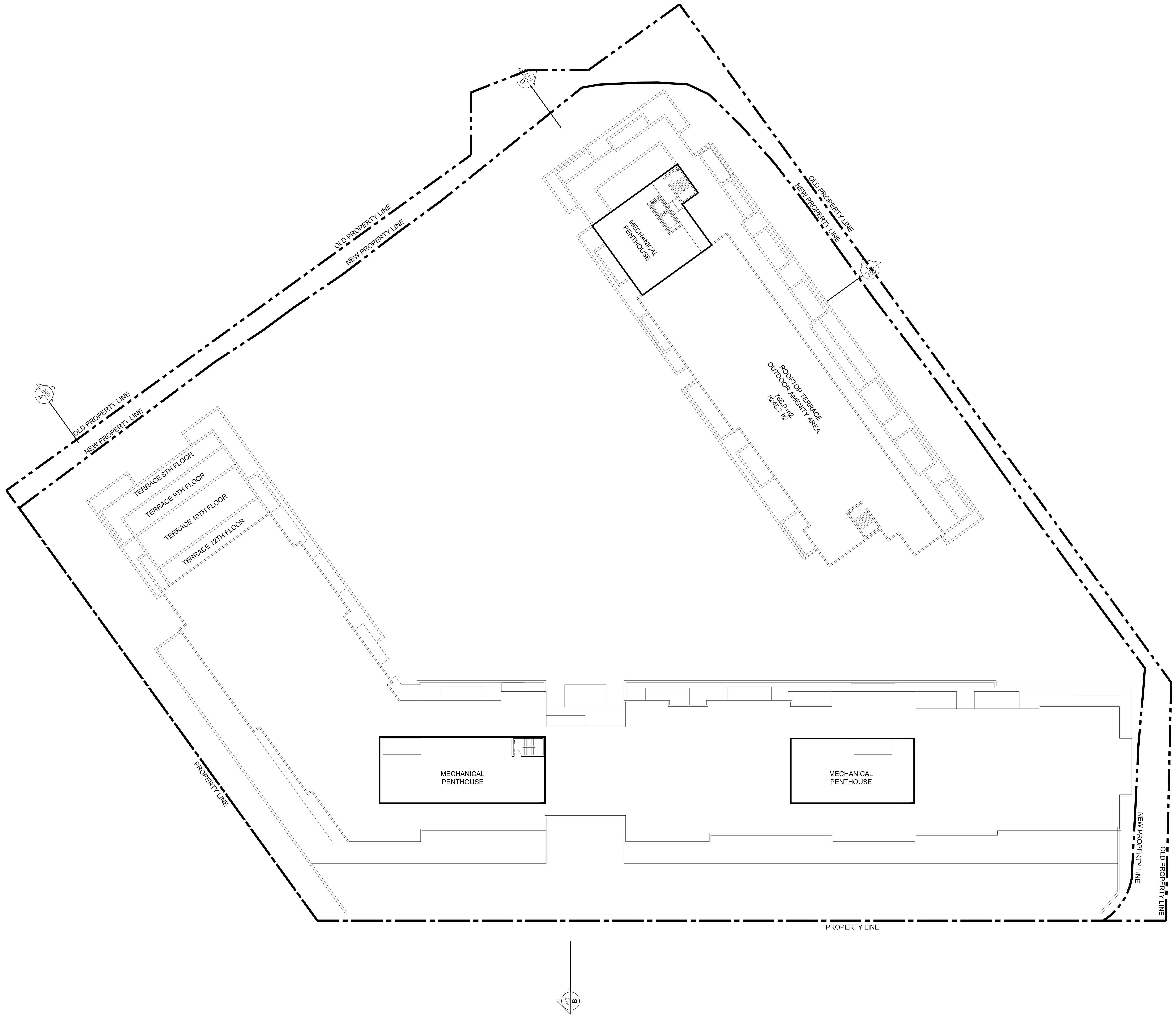
1 ROSETTA STREET
GEORGETOWN, ON

DRAWING TITLE

12TH FLOOR PLAN

Scale: 1/300
Date: MAR.01, 2022
Project No. 17127
Drawn by: RK
Checked by: RE
Drawing No. A212

813 - 4789 YONGE ST. TORONTO
M2N 0G3 ICONARCHITECTS.CA
T:416-224-0505 F:416-224-0504
ICON ARCHITECTS



NO.	REVISION/ISSUE	DATE	NO.	REVISION/ISSUE	DATE

NORTH

1 ROSETTA STREET
GEORGETOWN, ON

DRAWING TITLE
ROOF FLOOR PLAN

Scale: 1/300
Date: MAR.01, 2022
Project No. 17127
Drawn by: RK
Checked by: RE
Drawing No. A213

813 - 4789 YONGE ST. TORONTO
M2N 0G3 ICONARCHITECTS.CA
T:416-224-0505 F:416-224-0504
ICON ARCHITECTS

BUILDING - 1&2 _ NORTH ELEVATION _ SCALE 1:200

BUILDING - 1&2 _ SOUTH ELEVATION _ SCALE 1:200

NO.	REVISION/ISSUE	DATE	NO.	REVISION/ISSUE	DATE

NORTH

CONS. REV.

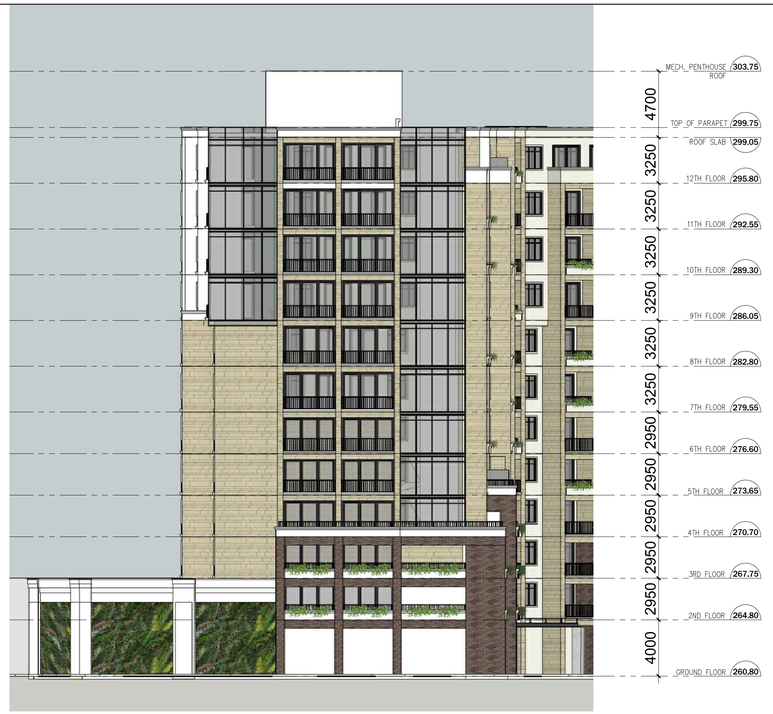
1 ROSETTA STREET
GEORGETOWN, ON

DRAWING TITLE
ELEVATIONS (BUILDINGS-1&2)

Scale: 1/200
Date: MAR.01, 2022
Project No. 17127

Drawn by: RK
Checked by: RE
Drawing No. A301

ICON ARCHITECTS
813 - 4789 YONGE ST., TORONTO
ONTARIO, M2N 0G3, CANADA
T:416.224-0505 F:416.224-0504



BUILDING - 1 _ EAST ELEVATION _ SCALE 1:200

BUILDING - 2 _ EAST ELEVATION _ SCALE 1:200

BUILDING - 2 _ NORTH ELEVATION _ SCALE 1:200

BUILDING - 2 _ WEST ELEVATION _ SCALE 1:200

NO.	REVISION/ISSUE	DATE

CONTRACTORS MUST CHECK ALL DIMENSIONS ON JOB AND REPORT ANY DISCREPANCIES BEFORE PROCEEDING WITH WORK. ALL PRINTS AND DRAWINGS ARE THE PROPERTY OF THE ARCHITECT AND MUST BE RETURNED AT THE COMPLETION OF THE WORK. DRAWINGS SHALL NOT BE SCALED.

NORTH

CONSENT REVIEW

1 ROSETTA STREET
GEORGETOWN, ON

DRAWING TITLE
ELEVATIONS (BUILDINGS-1&2)

Scale: 1/200
Date: MAR.01, 2022
Project No. 17127

Drawn by: RK
Checked by: RE
Drawing No. A302

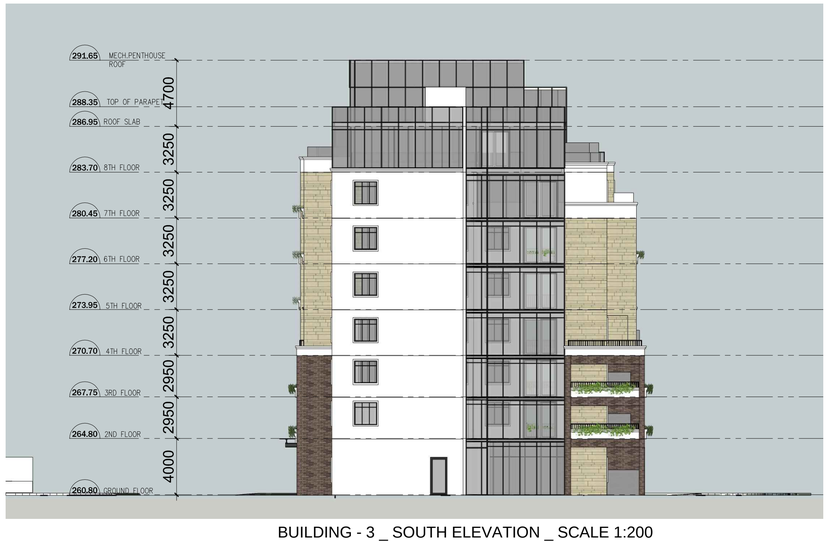
813 - 4789 YONGE ST., TORONTO
M2N 0G3, ONTARIO, CANADA
T:416-224-0606 F:416-224-0604

ICON ARCHITECTS

BUILDING - 3 _ EAST ELEVATION _ SCALE 1:200

BUILDING - 3 _ NORTH ELEVATION _ SCALE 1:200

BUILDING - 3 _ WEST ELEVATION _ SCALE 1:200



BUILDING - 3 _ SOUTH ELEVATION _ SCALE 1:200

NO.	REVISION/ISSUE	DATE	NO.	REVISION/ISSUE	DATE

CONTRACTORS SHALL CHECK AND VERIFY ALL LEVELS AND DIMENSIONS ON THE JOB AND REPORT ANY DISCREPANCIES TO THE ARCHITECT BEFORE PROCEEDING WITH THE WORK. ALL DRAWINGS AND THE DESIGNS THEREIN ARE THE PROPERTY OF THE ARCHITECT AND MUST BE RETURNED AT THE COMPLETION OF THE WORK. DRAWINGS SHOULD NOT BE SCALED.

NORTH

CONTEXT PLAN

1 ROSETTA STREET
GEORGETOWN, ON

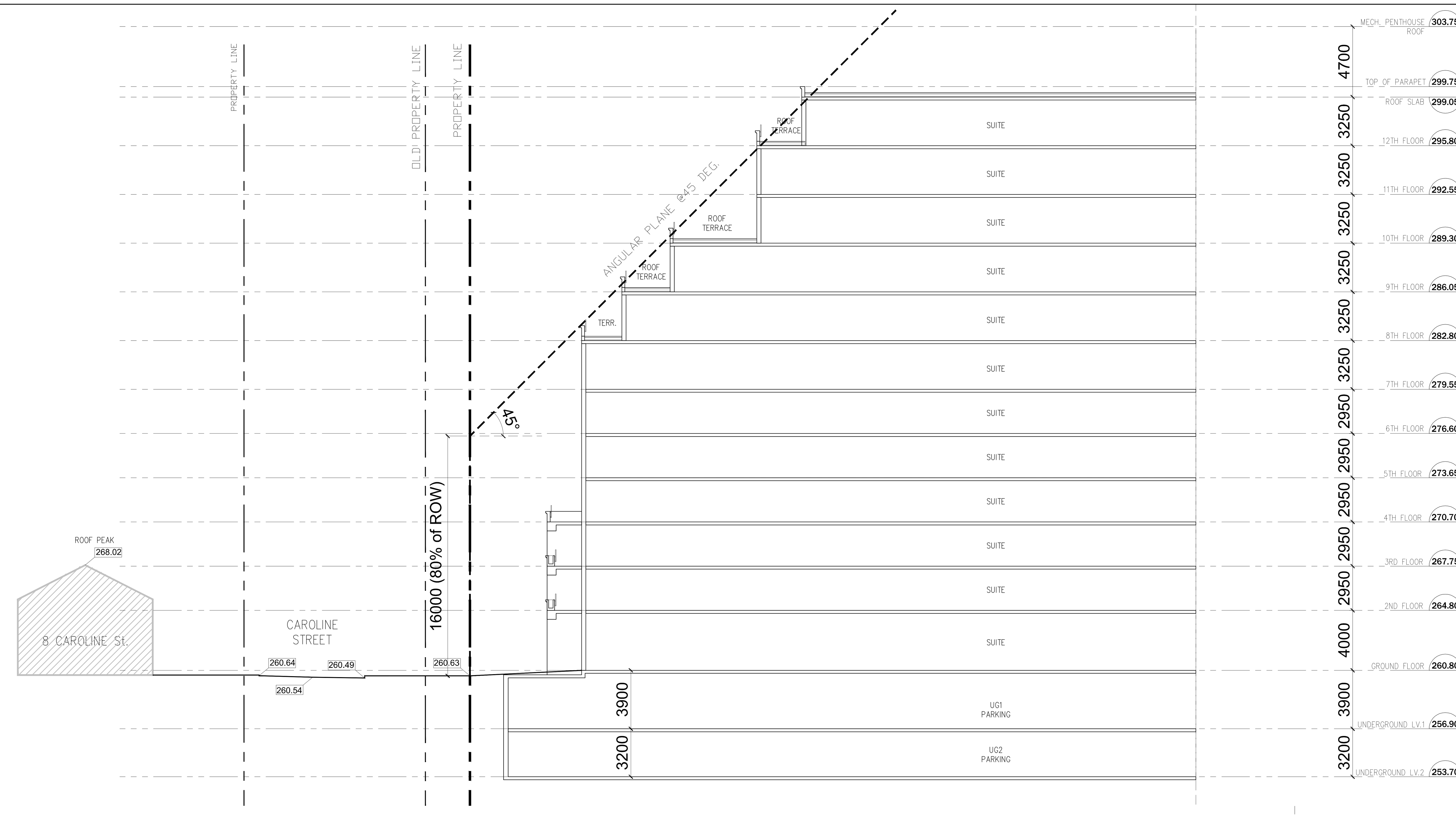
DRAWING TITLE
ELEVATIONS (BUILDING-3)

Scale: 1/200
Date: MAR.01, 2022
Project No. 17127

Drawn by: RK
Checked by: RE
Drawing No. A303

813 - 4789 YONGE ST., TORONTO
ONTARIO, CANADA M2N 0G3
T:416.224.0504

ICON ARCHITECTS



SECTION A _ SCALE 1:200

SECTION B _ SCALE 1:200

NO.	REVISION/ISSUE	DATE	NO.	REVISION/ISSUE	DATE

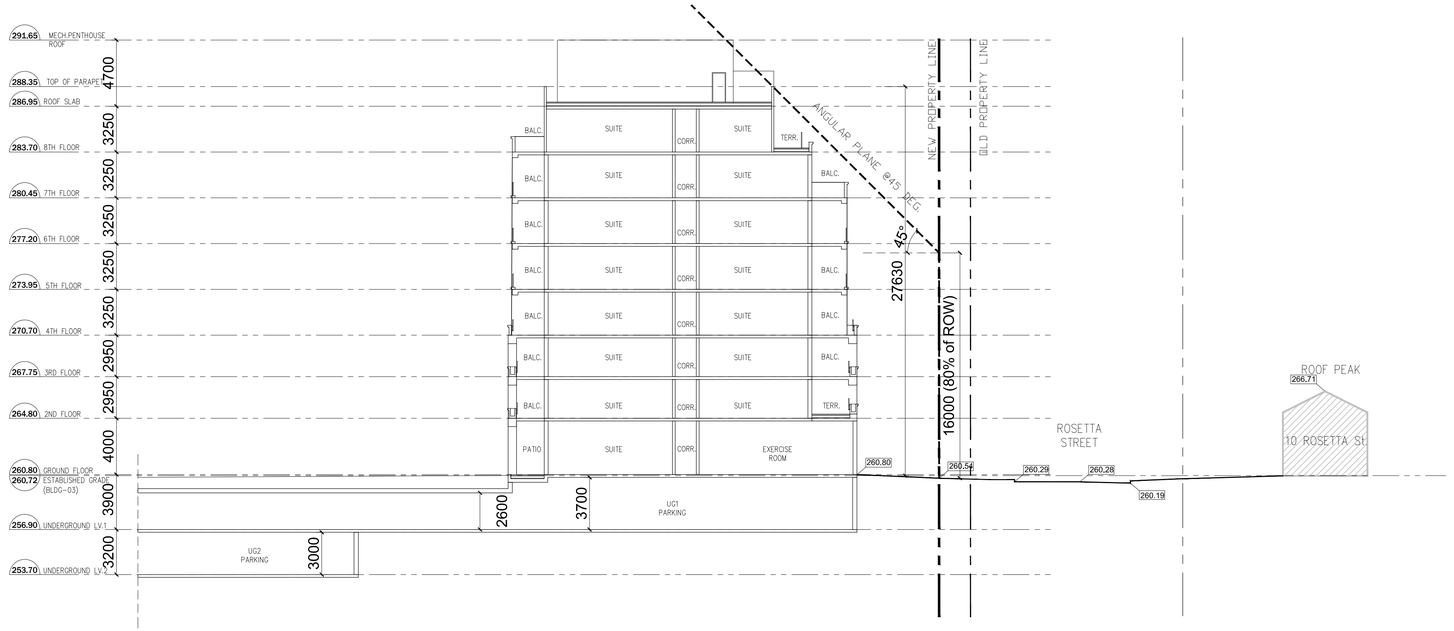
NORTH

1 ROSETTA STREET
GEORGETOWN, ON

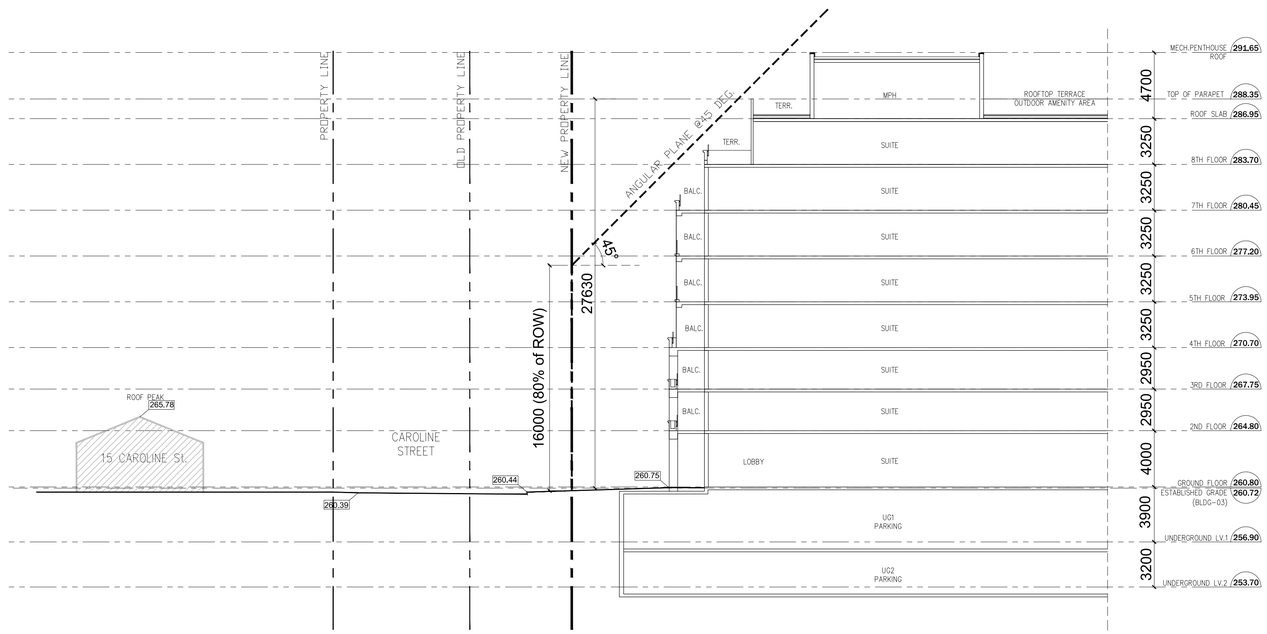
DRAWING TITLE
SECTIONS

Scale: 1/200
Date: MAR.01, 2022
Project No. 17127
Drawn by: RK
Checked by: RE
Drawing No. A401

813 - 4789 YONGE ST. TORONTO
M2N 0G3 ICONARCHITECTS.CA
T:416-224-0504 F:416-224-0505
ICON ARCHITECTS



SECTION C _ SCALE 1:200



SECTION D _ SCALE 1:200

NO.	REVISION/ISSUE	DATE	NO.	REVISION/ISSUE	DATE

NORTH

CONS.
REF.

1 ROSETTA STREET
GEORGETOWN, ON

DRAWING TITLE
SECTIONS

Scale: 1/200
Date: MAR.01, 2022
Project No. 17127

Drawn by: RK
Checked by: RE
Drawing No. A402

813 - 4789 YONGE ST. TORONTO
M2N 0G3, ONTARIO, CANADA
T:416-224-0504
F:416-224-0505

ICON ARCHITECTS

APPENDIX C
TRAIN DATA

Development of Detailed Railyard Emissions to Capture Activity, Technology and Operational Changes

Robert G. Ireson
Air Quality Management Consulting, 161 Vista Grande, Greenbrae, CA 94904
rob@AQMconsulting.com

M. J. (Jon) Germer and Lanny A. Schmid
Union Pacific Railroad Company, 1416 Dodge St., Omaha NE 68179
mjgermer@up.com

ABSTRACT

Railyard operations involve a variety of complex activities, including inbound and outbound train movements, classification (i.e., separating cars from inbound trains for redirection to multiple destinations, and building new trains), and servicing locomotives. Standard locomotive duty cycles provide long-term average activity patterns for locomotive operations, but they are not appropriate for the specialized activities that occur within railyards or at locations such as ports, and emission densities in such areas can be high relative to those of line haul activities. There are significant emission rate differences between locomotive models, and differences in the types of service for which specific models are used. Data for throttle-specific emissions, activity levels, and locomotive models and operating practices can be used to provide more accurate emissions estimates for such operations. Such data are needed to quantify actual emissions changes in these high activity areas. A calculation scheme has been developed to generate detailed emission inventories based on the types of data that are collected for managing rail operations. This scheme allows improved accuracy in emissions estimation, and also provides a more reliable basis for bottom-up tracking of emissions changes over time. Factors that can be addressed include: changes in the distribution of locomotive models and control technology levels (e.g., increasing fractions of Tier 0, 1, and 2 locomotives) for both line haul and local operations; actual in-yard idling duration and reductions associated with auto-start-stop technologies; fuel quality effects; and detailed operating practices for switching and train-building operations. By providing detailed disaggregation of activity and emissions data, the method also makes it possible to quantify and evaluate the effects of specific emission reduction alternatives.

INTRODUCTION

Freight movement by rail is a key component of the U.S. transportation infrastructure. The combination of rail's low rolling resistance and the fuel-efficient turbocharged diesel engines used in modern locomotives make rail the most efficient mode of transport from both an emissions and economic perspective. Railyards located strategically through the nation's rail network are used to assemble and direct goods movement to their destinations. Railyards may handle dozens of trains per day, each powered by a "consist" of several locomotives. While in railyards, these locomotives are serviced and regrouped into new consists as needed for specific departing trains. In addition to train arrivals and departures and locomotive servicing, so-called "classification" yards separate rail cars in inbound trains into segments with different destinations, and build new trains with a common destination. This work is accomplished by switcher locomotives (typically of lower horsepower than the locomotives used for "line-haul" operations). Some railyards also have major locomotive repair facilities whose activities include load testing of locomotives prior to or after maintenance. Collectively, the locomotive operations associated with these activities can result in relatively high localized emission densities.

The Union Pacific Railroad (UPRR) is the largest railroad in North America, operating throughout the western two-thirds of the United States. It operates a number of railyards throughout its system, including the J. R. Davis Yard in Roseville, California. The Davis Yard is UPRR's largest classification yard in the western U.S. It is approximately one-quarter mile wide and four miles long, and is visited by over 40,000 locomotives per year. The California Air Resources Board (CARB) recently completed a detailed dispersion modeling study to estimate concentrations of diesel particulate matter in the vicinity of the railyard.[1] UPRR cooperated closely with CARB in this study, including the identification, retrieval and analysis of data needed to assemble a detailed emission inventory for railyard operations. This effort produced the most detailed emission inventory for railyard operations to-date, including empirically developed train counts, locomotive model distributions, locomotive service and maintenance activities, and dedicated on-site switching operations. The results of this effort have been further adapted to allow UPRR to track the effect of locomotive fleet modernization, freight volume, and operational changes on emissions, and to identify opportunities for further emission reductions at the Davis Yard.

RAILYARD ACTIVITY ESTIMATION

At state and national levels, locomotive emissions have been estimated using locomotive fleet population data and average locomotive emission factors, expressed in g/bhp-hr, in conjunction with fuel efficiency estimates and fuel consumption. For freight locomotives, the emission factors are typically derived using both a switching duty cycle and a line haul duty cycle, each of which gives the fraction of operating time locomotives spend at different throttle settings, referred to as notch positions.[2] These throttle settings (see Table 1) include idle, notches 1 through 8, and dynamic braking (in which the locomotive traction motors are used to generate power which is dissipated through resistor grids). While this approach can provide reasonable estimates for larger regions, neither the overall locomotive fleet composition nor the standard duty cycles accurately reflect the specific activities that occur within an individual railyard. The g/bhp-hr emission factors vary substantially between throttle settings and between locomotive models. Other confounding factors include: speed limits within yards (which preclude the high throttle settings used for line-haul activity outside of yards); locomotive load (consists commonly move within yards with only one locomotive pulling and no trailing cars); and time spent either shut down or idling. Classification activities are carried out with duty cycles that are unique to yard operations and may vary from yard to yard. To develop more accurate emissions estimates, it is necessary to explicitly identify railyard activities at the level of individual locomotives.

Table 1. Locomotive Duty Cycles.

	Throttle Position (Percent Time in Notch)									
Duty Cycle	**D.B.**	**Idle**	**N1**	**N2**	**N3**	**N4**	**N5**	**N6**	**N7**	**N8**
EPA Line-Haul	12.5	38.0	6.5	6.5	5.2	4.4	3.8	3.9	3.0	16.2
EPA Switch	0.0	59.8	12.4	12.3	5.8	3.6	3.6	1.5	0.2	0.8
Trim Operations	0.0	44.2	5.0	25.0	2.3	21.5	1.5	0.6	0.0	0.0
Hump Pull-Back	0.0	60.4	12.5	12.4	5.9	3.6	3.6	1.5	0.0	0.0
Hump Push	0.0	0.0	0.0	100	0.0	0.0	0.0	0.0	0.0	0.0
Consist Movement	0.0	0.0	50.0	50.0	0.0	0.0	0.0	0.0	0.0	0.0
Load Tests:										
10-Minute	0.0	20.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	80.0
15-Minute	0.0	33.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	66.7
30-Minute	0.0	33.3	33.3	0.0	0.0	0.0	0.0	0.0	0.0	33.3

To accomplish this, UPRR reviewed the types of databases available for its operations to identify where explicit emission-related activity information could be generated for the Davis Yard. UPRR

operates approximately 7000 locomotives over a network spanning 23 states. Large amounts of data are generated and retained by UPRR for management purposes. These include tracking the location and status of capital assets (e.g., locomotives and rail cars), tracking performance of specific activities, and managing operations. These databases can be queried for data records specific to the Davis Yard, but their content does not directly relate to emissions. Where possible, data providing a complete record of emissions-related events (e.g., locomotive arrivals and departures) were identified and retrieved. Where 100 percent data for an activity could not be obtained (e.g., locomotive model number for each arriving locomotive), distributions were developed based on available data. In some cases, data are not available for specific types of emission events (e.g., the duration of idling for individual trains prior to departure). In these cases, UPRR yard personnel were consulted to derive estimates of averages or typical operating practices.

Railyard Operations – Inbound and Outbound Trains

The majority of locomotive activity in a railyard arises from inbound and outbound freight traffic. Following arrival, consists are decoupled from their trains in receiving areas and are either taken directly to outbound trains, or more commonly, are sent through servicing which can include washing, sanding, oiling, and minor maintenance prior to connecting to outbound trains. Some fraction of trains arriving at a yard simply pass through, possibly stopping briefly for a crew change. UPRR maintains a database that, when properly queried, can produce detailed information regarding both arriving and departing trains. Table 2 lists some of the key parameters that are available in this database. In this study, 12 months of data were obtained for all trains passing through the Davis Yard. The extracted data (over 60,000 records) included at least one record for every arriving and departing train, and each record contained specific information about a single locomotive, as well as other data for the train as a whole. The data were processed using a commercial relational database program and special purpose FORTRAN code to identify individual train arrivals and departures and train and consist characteristics.

Table 2. Selected Train Database Parameters.

	Used to Identify				
Parameter	Identification of Train Events	Location in Railyard	Consist Composition	Temporal Profile	Train Characteristics
Train Symbol	X	X			
Train Section	X				
Train Date	X				
Arrival or Departure	X	X			
Originating or Terminating	X	X			
Direction		X			
Crew Change?		X			
Arrival & Departure Times				X	
# of Locomotives			X		
# of Working Locomotives			X		
Trailing Tons					X
Locomotive ID #			X		
Locomotive Model			X		

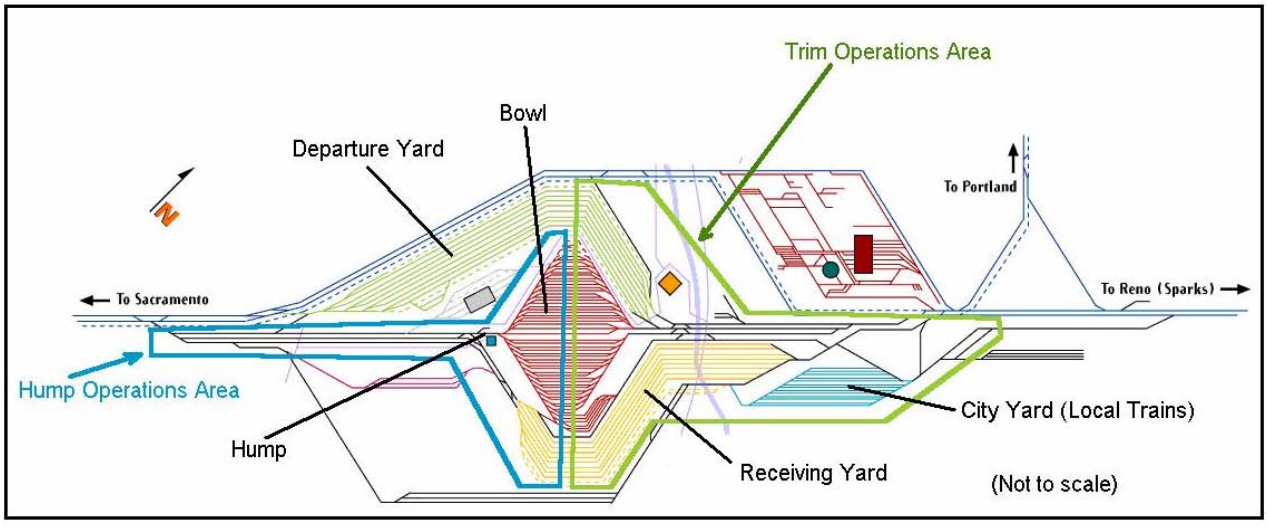
The parameters listed in Table 2 were used to calculate the number of trains by time of day arriving or departing from each area of the yard, as well as average composition of their consists (number of locomotives and distribution of locomotive models). The combination of train symbol, train segment, and train date provided a unique identifier for a single arrival or departure, and the individual locomotive models were tabulated to generate model distributions. Where necessary, working horsepower and total horsepower were used to estimate the number of working locomotives in the consist.

Emission calculations associated with inbound and outbound trains included both periods of movement within the yard boundaries and locomotive idling while consists we connected to their trains. Based on train direction and the location of its arrival or departure, moving emissions were based on calculations of time at different throttle settings based on distance traveled and estimated speed profiles, considering speed limits on different tracks. Yard operators provided estimates for the average duration of such idling for both inbound and outbound trains.

Railyard Operations – Classification

On arrival, inbound trains are "broken" into sections of rail cars destined for different outgoing trains. Figure 1 shows a schematic diagram of the Davis Yard including a large central "bowl" consisting of a large number of parallel tracks connected by automated switching controls to a single track to the west. Trains are pulled back to the west and then pushed to the "hump," a slightly elevated portion of track just west of the bowl. As cars pass over the hump, they are disconnected and roll by gravity into the appropriate track in the bowl. Dedicated special purpose locomotives, known as "hump sets," are used in this operation. Unlike most locomotives, these units have continuously variable throttles, rather than discrete throttle notch settings, to allow precise control of speed approaching the hump. Switching locomotives, known as "trim sets" are responsible for retrieving the train segments or trains being "built" in the bowl and moving them to the appropriate outbound track. The Davis Yard operates a fixed number of hump sets and trim sets at any given time, with backup sets standing by for shift changes and possible breakdowns.

Figure 1. Schematic of the J. R. Davis Yard.



Emission calculations for hump and trim operations were based on the number of working hump and trim sets at any given time, plus assumed idling times of standby units. For the hump sets, yard operators provided estimates of average pull-back and pushing times, and the duty cycles associated with these operations. For pull-back, based on distance and speed limits, the EPA switcher duty cycle,

excluding notch 7 and 8 was used. Pushing is conducted at the equivalent of notch 2. For the trim sets, speed limits within the Yard preclude any high throttle setting operation, but there is a greater time spent in mid-throttle settings than reflected in the EPA switcher cycle. A revised duty cycle was developed for these units based on the EPA switcher duty cycle, with high throttle fractions (notches 7 and 8) excluded, but with increased notch 1 and notch 4 operating time. These duty cycles are also shown in Table 1.

Railyard Operations – Consist Movement, Service, Repair and Testing

After disconnecting from inbound trains, consists move to one of several servicing locations for refueling and other maintenance, following designated routes in the yard. Typically, one locomotive in each consist will pull the others, with throttle settings at notch 1 or 2. Based on distance and speed limits, movement times were estimated for each route, and emissions calculated using the number of locomotives following each route.

While being serviced, locomotives may be either idling or shut down. Locomotives must be idling while oil and other routine checks are performed. In addition, since locomotive engines are water-cooled and do not use antifreeze, they are commonly left idling during cold weather conditions. New idling reduction technologies known as SmartStart and AESS provide computer-controlled engine shut down and restart as necessary, considering temperature, air pressure, battery charge, and other parameters. Yard personnel provided estimates of the average potential duration of idling associated with different servicing events. Databases for service and maintenance activities maintained by UPRR provide details on the number and types of service events at different locations in the yard. As for train activity, these data were processed with a commercial relational database program and special purpose FORTRAN code to characterize and tabulate service events. These results were used in conjunction with data for the number of inbound and outbound consists to estimate total idling emissions for different service event types and locations. Following service, consists are dispatched to outbound trains. The same procedures were followed for estimating idle time, number of locomotives moving to each outbound area of the yard, and the duration of each movement for emission calculations.

In addition to routine service, the databases include service codes indicating periodic inspections of various types, as well as major maintenance activities requiring load testing of stationary locomotives. Several types of load tests are conducted, including planned maintenance pre- and post-tests, quarterly maintenance tests, and unscheduled maintenance diagnostic and post-repair tests. Depending on the test type and locomotive model, these tests include some period of idling, notch 1 operation, and notch 8 operation. Data are not collected on the exact duration of individual tests, so estimates of average duration for each throttle setting were provided by shop personnel, as shown in Table 1. The number of tests of each type for each locomotive model group were tabulated based on the service codes in the database for each service event.

Trends in Activity and Technology

The initial study was based on data from December 1999 through November 2000. Since that time, UPRR's locomotive fleet modernization program as well as changes in freight volumes have occurred. A subsequent data retrieval for the period from May 2003 through April 2004 was made, and emission calculations updated. A number of significant changes occurred over this 40-month period. The distribution of locomotive models in line-haul operation showed a substantial shift from older, lower horsepower units to new high horsepower units. The average number of locomotives per consist remained the same at about 3, but the higher horsepower allowed an increase in train capacity (trailing tons per train). The decrease in older units also resulted in a decrease in the frequency of major maintenance load testing. In addition to updating activity inputs (number of locomotives by model) for

emission calculations, calculations were modified to reflect the penetration of new and retrofit technologies in the locomotive fleet, including SmartStart and AESS idling controls and Tier 0 and Tier 1 locomotives. UPRR data identifying the specific technologies installed on individual locomotives were matched with locomotive ID numbers in the train and servicing data retrievals to obtain a specific count of the number of locomotives of each model for which emissions reductions were achieved by these technologies. Historical temperature data for the Roseville area were used to estimate the fraction of time computer controls would require idling when the locomotive would otherwise be shut down.

EMISSION FACTORS

Data Sources

The study of the J. R. Davis Yard focused on diesel exhaust particulate matter emissions. At present, there is no unified database of emission test results for in-use locomotives. Appendix B of the USEPA's Regulatory Support Document for setting new emission standards for locomotives[2] contains a compilation of notch-specific emission factors. These data were supplemented by test data reported by Southwest Research Institute[3,4], as well as test data provided by locomotive manufacturers to assemble emission factors for each of 11 locomotive model groups.

There are dozens of specific locomotive model designations, and emissions tests are not available for all of them. However many models are expected to have nearly identical emission characteristics. Depending on their intended use, locomotives of different models may have different configurations (e.g., number of axles), but share a common diesel engine. For this project, 11 locomotive model groups were defined based on their engine models (manufacturer, horsepower, number of cylinders, and turbo- or super-charging of intake air). Table 3 lists these model groups and some of the typical locomotive models assigned to each group.

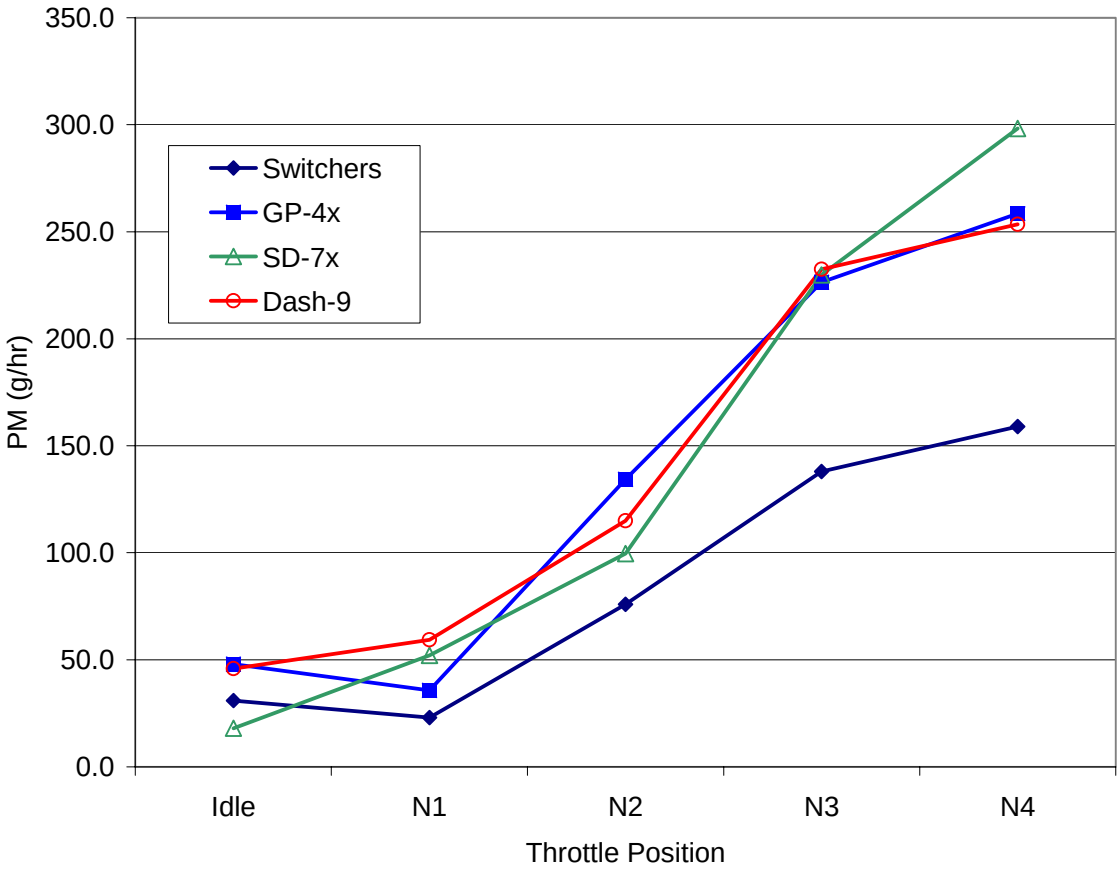
Table 3. Locomotive Model Groups

Model Group	Engine Family	Representative Models
Switchers	EMD 12-645E	GP-15, SW1500
GP-3x	EMD 16-645E	GP-30, GP-38
GP-4x	EMD 16-645E3B	GP-40, SD-40-2, SD-45-2
GP-50	EMD 16-645F3B	GP-50, SD-50M
GP-60	EMD 16-710G3A	GP-60, SD-60M
SD-7x	EMD 16-710G3B	SD-70MAC, SD-75
SD-90	EMD 16V265H	SD-90AC, SD-90-43AC
Dash-7	GE7FDL (12 cyl)	B23-7, B30-7, C36-7
Dash-8	GE7FDL (12 or 16 cyl)	B39-8, B40-8, C41-8
Dash-9	GE7FDL (16 cyl)	C44-9, C44AC
C60-A	GE7HDL	C60AC

Emission Factors and Fuel Effects

Figure 2 shows particulate matter (PM) emission factors for several of the more common locomotive model groups at the low to intermediate throttle settings typical of yard operations. As shown in the figure, emission rates generally increase with throttle setting. However, the older 3000 hp GP-4x series shows emissions comparable to (and in some cases, higher than) the newer 4000 to 4500 hp SD-7x and Dash-9 models. Due to the relatively large fraction of time locomotives spend at low throttle settings while in railyards, the relative differences in emission rates between models at these settings can significantly affect emissions estimates if locomotive model distributions change over time.

Figure 2. Locomotive PM Emission Factors (g/hr).



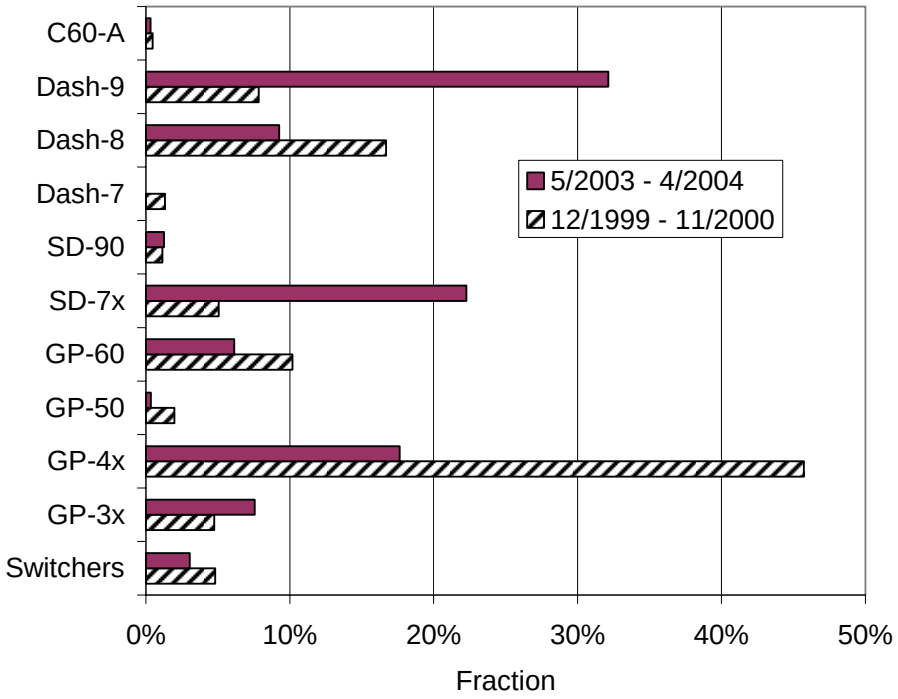
The emission factors used were based on tests using fuel typical of national off-road diesel. Initial emission estimates were derived by multiplying model-specific g/hr emission rates by the total hours of operation and locomotive model fraction for each activity within the yard. At the Davis Yard, over half of the diesel fuel dispensed to locomotives meets California on-road diesel fuel specifications (so-called "CARB diesel"). To account for the effect of fuel quality on emissions, estimates of the fraction of locally dispensed fuel burned by locomotives in different yard activities were developed. These ranged from 100 percent for hump and trim sets to zero percent for inbound line-haul units prior to refueling. These fractions were multiplied by the fraction of CARB diesel dispensed at the yard and an estimate of 14 percent reduction in PM emissions for locomotives burning CARB diesel to develop fuel effects adjustments for individual activities.

EMISSION TRENDS

Using the procedures described in the preceding sections, emissions estimates were developed for the December 1999 to November 2000 period, and the May 2003 to April 2004 period. During this period, significant changes in the UPRR locomotive fleet occurred, with the addition of new locomotives and the retirement of older units. Figure 3 shows the locomotive model distributions for all servicing events at the Davis Yard during these two periods. Service events include both the line-haul and local units arriving and departing on trains (which make up the bulk of these events), as well as the hump and trim sets. A significant increase in the relative fraction of high horsepower SD-7x and Dash-9 units is seen, and a corresponding decrease in the fraction of older GP-4x, GP-50, GP-60, Dash-7 and Dash-8 models. In addition to the fleet modernization, tabulations of specific emission control technologies on units serviced at the Davis Yard showed substantial penetration of new and retrofit

technologies. Approximately 31 percent of locomotives serviced at the yard were equipped with computer-controlled shut-down and restart technology, resulting in reduced idling times. Also, approximately 27 percent of servicings were for Tier 0 locomotives, and approximately 25 percent were Tier 1 units. Although the Tier 0 and Tier 1 technologies are not expected to substantially reduce PM emissions, their nitrogen oxides emissions are lower. A few prototype Tier 2 units were observed in 2003 – 2004 data, and their reduced PM emissions will show benefits in the future.

Figure 3. Changes in Locomotive Model Distributions.



The freight volume passing through the yard also changed between these periods. Table 4 lists the percent change in the number of arriving and departing trains, locomotives, and trailing tons (a measure of freight volume). The number of trains and locomotives showed little change, however the trailing tons increased by approximately 15 percent, implying that the average train weight (and correspondingly, the required consist horsepower) increased. This is a result of the increased availability of high horsepower units in the UPRR fleet. A higher fraction of trains bypass the yard, either not stopping, or stopping only for crew changes.

Table 4. Percent Change in Yard Activity Levels from 12/1999 – 11/2000 to 5/2003 – 4/2004.

	Trains	**Locomotives**	**Trailing Tons**
Arrivals	-5.2%	-3.5%	--
Departures	-7.0%	-7.3%	--
Throughs (Bypassing the yard)	8.0%	6.8%	--
Total Arrivals and Departures	-0.3%	-0.9%	15.1%

The newer locomotive fleet also affected the level of load testing activity required. Table 5 lists the percent change in the number of load tests of different types, and the corresponding change in total locomotive testing time at idle, notch 1, and notch 8. The extended 30-minute post-maintenance tests were substantially reduced, and total hours of testing were reduced for the various throttle settings between 12 and 43 percent.

Table 5. Percent Change in Load Test Activity from 12/1999 – 11/2000 to 5/2003 – 4/2004.

10-Minute Tests	-18.9%
15-Minute Tests	14.6%
30-Minute Tests	-43.2%
Total Tests	-12.3%
Idling Hours	-20.6%
Notch 1 Hours	-43.2%
Notch 8 Hours	-12.0%

The combined net result of these changes is shown in Table 6. Between November 2000 and April 2003, total estimated PM emissions in the yard decreased by approximately 15 percent. Reductions in idling and movement emissions of about 20 percent were calculated, due to the combination of a newer, lower emitting locomotive fleet and the computer-controlled shutdown technologies (both retrofits and standard equipment on newer units). Hump and trim emissions were reduced by about 6 percent, and load testing emissions by about 14 percent.

Table 6. Emissions Changes from 12/1999 – 11/2000 to 5/2003 – 4/2004.

	Estimated Emissions (tons per year)		**Percent Change**
	12/1999 – 11/2000	**5/2003 – 4/2004**	
Idling and Movement of Trains	5.2	4.2	-20.3%
Idling and Movement of Consists	8.5	6.8	-20.2%
Testing	1.5	1.3	-14.1%
Hump and Trim	7.0	6.6	-5.7%
Total	22.3	18.9	-15.3%

CONCLUSIONS

Because of the unique features of each individual railyard, top-down methods (e.g., based only on tons of freight handled or number of arriving locomotives) cannot provide reliable estimates of railyard emissions. Yard-specific data are needed. In-yard activity patterns (and emissions) will vary between yards depending on factors such as: the type of yard (e.g., hump or flat switching classification yards, or intermodal facilities); the presence and capabilities of service tracks or locomotive repair shops; the types of freight handled; the location of the yard in the rail network; and yard configuration. The development of procedures for retrieving and analyzing activity data and locomotive characteristics for a specific railyard is a substantial improvement of alternatives based on top-down estimation. By obtaining disaggregate data for the range of specific activities occurring within railyards, it is possible to reliably estimate historical trends in emissions, as well as to evaluate the potential effects of operational changes and new technologies. Railyard operations cannot be treated in isolation, since these yards are only one component of complex national level systems. Nevertheless, the ability to assess the details of yard operations and their emissions provides an improved basis for environmental management decisions at both local and larger scales.

REFERENCES

1. Hand, R.; Di, P.; Servin, A.; Hunsaker, L.; Suer, C. *Roseville Rail Yard Study*, California Air Resources Board, Stationary Source Division, Sacramento, CA, October 14, 2004.

2. U. S. Environmental Protection Agency. *Locomotive Emission Standards – Regulatory Support Document*, U. S. Environmental Protection Agency, Office of Mobile Sources, April 1998.

3. Fritz, S. “Emissions Measurements – Locomotives”, SwRI Project No. 08-5374-024, Prepared for the U.S. Environmental Protection Agency by Southwest Research Institute, San Antonio, TX, August 1995.

4. Fritz, S. “Diesel Fuel Effects on Locomotive Exhaust Emissions”, SwRI Proposal No. 08-23088C, Prepared for the California Air Resources Board by Southwest Research Institute, San Antonio, TX, October 2000.

KEY WORDS

Emission inventories
Locomotives
Railyards
Diesel

ACKNOWLEDGEMENTS

The authors gratefully acknowledge the assistance of numerous UPRR staff who assisted in data retrieval and interpretation, and in providing information on operating practices, including Deb Schafer, Punky Poff, Rob Cohee, Jim Diel, and Brock Nelson. In addition we acknowledge the contributions of Ron Hand of the California Air Resources Board.

APPENDIX D
INDUSTRIAL INFORMATION

Land Uses Surrounding 1 Rosetta Street

Zoning	Name	Address	Description	MECP ECA or EASR No. (Date)	MECP Guideline D-6					
					Class	A of I	R M S	Actual Dist.	Within A of I?	Within R M S?
	Applied Wiring Assemblies Inc	2 Rosetta Street	Electrical Manufacturer	-	I	70	20	10	Yes	Yes
	A-Plus Canada Inc.	2 Rosetta Street	Self Storage Facilty	-	I	70	20	10	Yes	Yes
	Furnace Room Brewery	1A Elgin Street	Brewery	-	I	70	20	75	-	-
	Communications & Power Industries Canada	45 River Drive	Electronic Medical Equpipment Manufacturing	8860-ADKLHS (2016)	II	300	70	320	-	-
	RestorFx Georgetown	2-53 Armstrong Ave	Auto Restoration Service	-	I	70	20	850	-	-
	Cargill Chocolate	24 Ontario Street	Chocolate Manufacturer	7037-9F6QVA (2014)	I	70	20	400	-	-
	Howmet Georgetown Casting Ltd.	93 Mountainview Road North		4504-9NNJHJ (2015)	I	70	20	560	-	-
	Artcast Inc.	14 Armstrong Ave.	Manufactures Bronze Sculptures	1899-7AEJ65 (2008)	I	70	20	845	-	-
	Minnow Environmental Inc.	2 Lamb Street	Environmental Consultanting	-	I	70	20	170	-	-
	Kuta Glass Acessories Ltd.	2 Lamb Street	Decorative Glass Wholesaler	-	I	70	20	170	-	-

Ontario

Ministry of the Environment **Ministère de l'Environnement**

CERTIFICATE OF APPROVAL
AIR
NUMBER 1899-7AEJ65
Issue Date: January 31, 2008

Artcast Inc.
14 Armstrong Ave.
Halton Hills, Ontario
L7G 4R9

Site Location: Artcast Inc.
14 Armstrong Ave.
Halton Hills Town, Regional Municipality of Halton
L7G 4R9

You have applied in accordance with Section 9 of the Environmental Protection Act for approval of:

Process equipment, serving the manufacturing of custom bronze sculptures, employing the process of plaster and silicone rubber shell preparation, wax mould preparation, ceramic and sand shell preparation, dewaxing in the autoclave, casting, shell removal, and sculpture finishing, including fifteen (15) exhaust systems discharging through separate stacks, as listed and described in the following table:

Stack No.	Description	Maximum Heat Input (Kj/hr)	Volume Flowrate (m3/s)	Stack Diameter (m)	Stack Height above grade (m)	Stack Height above roof (m)
1	**Boiler**	1,054,1168	-	0.30	8.4	1.5
2	**Preheat Furnace**	1,054,116	-	0.30	7.6	0.7
3	**Unit Heater**	179,964	-	0.18	7.4	0.5
4	**Autoclave**		-	0.05	8.0	1.1
5	**Water Heater**	37,944	-	0.15	8.1	1.2
6	**Rooftop Unit heater**	126,504	-	0.41 x 0.41	8.0	1.1
7	**Rooftop Unit heater**	131,760	-	0.41 x 0.41	8.0	1.1
8	**Rooftop Unit heater**	105,408	-	0.41 x 0.41	8.0	1.1
9	**Wax Room Exhaust**	-	1.00	0.43 x 0.46	2.64	-
10	**Mold Room Exhaust**	-	0.37	0.28 x 0.20	2.24	-
11	**Shell Room Exhaust**	-	0.25	0.30 x 0.41	2.24	-
12	**Casting and Mold Removal Exhaust**	-	-	1.22 x 0.81	4.67	-
13	**Welding Exhaust**	-	0.48	0.38 x 0.41	6.42	1.07
14	**Patina Exhaust 1**	-	0.28	0.20 x 0.25	2.64	
15	**Patina Exhaust 2**	-	0.48	0.38 x 0.41	6.42	1.07

all in accordance with the Application for Approval (Air) dated July 31, 2003 and signed by Mona Melancon, and the revised ESDM report dated December 13, 2007 and signed by Cathy Knoespel.

For the purpose of this Certificate of Approval and the terms and conditions specified below, the following definitions apply:

(1) "Act" means the Environmental Protection Act;

(2) "Certificate" means this Certificate of Approval issued in accordance with Section 9 of the Act;

(3) "Company" means Artcast Inc.;

(4) "Equipment" means the exhaust systems described in the Company's application, this Certificate and in the supporting documentation submitted with the application, to the extent approved by this Certificate;

(5) "Manual" means a document or a set of documents that provide written instructions to staff of the Company; and

(6) "Ministry" means the Ontario Ministry of the Environment.

You are hereby notified that this approval is issued to you subject to the terms and conditions outlined below:

TERMS AND CONDITIONS

1. The Company shall ensure that the Equipment is properly operated and maintained at all times. The Company shall:

(1) prepare, not later than three (3) months after the date of this Certificate, and update, as necessary, a Manual outlining the operating procedures and a maintenance program for the Equipment, including:

(a) routine operating and maintenance procedures in accordance with good engineering practices and as recommended by the Equipment suppliers;

(b) emergency procedures;

(c) procedures for any record keeping activities relating to operation and maintenance of the Equipment; and

(d) all appropriate measures to minimize noise and odorous emissions from all potential sources;

(2) implement the recommendations of the Manual; and

(3) retain, for a minimum of two (2) years from the date of their creation, all records on the maintenance, repair and inspection of the Equipment, and make these records available for review by staff of the Ministry upon request.

The reasons for the imposition of these terms and conditions are as follows:

1. Condition No. 1 is included to emphasize that the Equipment must be maintained and operated according to a procedure that will result in compliance with the Act, the regulations and this Certificate.

In addition, the Company is required to keep records and to provide information to staff of the Ministry so that compliance with the Act, the regulations and this Certificate can be verified.

In accordance with Section 139 of the Environmental Protection Act, R.S.O. 1990, Chapter E-19, as amended, you may by written notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 142 of the Environmental Protection Act, provides that the Notice requiring the hearing shall state:

1. The portions of the approval or each term or condition in the approval in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

The Notice should also include:

3. The name of the appellant;
4. The address of the appellant;

5. The Certificate of Approval number;
6. The date of the Certificate of Approval;
7. The name of the Director;
8. The municipality within which the works are located;

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

The Secretary*
Environmental Review Tribunal
2300 Yonge St., Suite 1700
P.O. Box 2382
Toronto, Ontario
M4P 1E4

AND

The Director
Section 9, *Environmental Protection Act*
Ministry of the Environment
2 St. Clair Avenue West, Floor 12A
Toronto, Ontario
M4V 1L5

*** Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 314-4600, Fax: (416) 314-4506 or www.ert.gov.on.ca**

The above noted works are approved under Section 9 of the Environmental Protection Act.

DATED AT TORONTO this 31st day of January, 2008

Victor Low, P.Eng.
Director
Section 9, *Environmental Protection Act*

FC/
c: District Manager, MOE Halton-Peel
Cathy Knoespel., Artcast Inc.

Ontario

Ministry of the Environment
Ministère de l'Environnement

AMENDED ENVIRONMENTAL COMPLIANCE APPROVAL
NUMBER 7037-9F6QVA
Issue Date: July 22, 2014

ADM Agri-Industries Company
24 Ontario Street
Halton Hills, Ontario
L7G 3K6

Site Location: 24 Ontario Street
Halton Hills Town, Regional Municipality of Halton
L7G 3K6

You have applied under section 20.2 of Part II.1 of the Environmental Protection Act, R.S.O. 1990, c. E. 19 (Environmental Protection Act) for approval of:

Description Section

A chocolate manufacturing facility, consisting of the following processes and support units:

- raw materials such as sugar, cocoa products, dairy powder, vegetable oils, etc. receiving and handling operations;

- grinding and mixing operations;

- heating and moulding operations;

- packaging and shipping;

including the *Equipment* and any other ancillary and support processes and activities, operating at a *Facility Production Limit* of up to **45,500 tonnes of chocolate produced per year,** discharging to the air as described in the *Original ESDM Report.*

For the purpose of this environmental compliance approval, the following definitions apply:

1. " *Acceptable Maximum Ground Level Concentration"* means a concentration accepted by the *Ministry,* as described in the Guide to Applying for Approval (Air & Noise), for a *Compound of Concern* listed in the *Original ESDM Report* that:

(a) has no *Ministry Point of Impingement Limit* and no *Jurisdictional Screening Level,* or

(b) has a concentration at a *Point of Impingement* that exceeds the *Jurisdictional Screening Level.*

2. "*Acoustic Assessment Report"* means the report, prepared in accordance with *Publication NPC-233* and Appendix A of the *Basic Comprehensive User Guide,*by Terry Harding of Valcoustics Canada Ltd., and dated February 28, 2014 submitted in support of the application, that documents all sources of noise emissions and *Noise Control Measures* present at the *Facility* and includes all up-dated *Acoustic Assessment Reports* as required by the Documentation Requirements conditions of this *Approval* to demonstrate continued compliance with the *Performance Limits* following the implementation of any *Modification.*

3. "*Acoustic Assessment Summary Table"* means a table prepared in accordance with the *Basic Comprehensive User Guide* summarising the results of the *Acoustic Assessment Report,* up-dated as required by the Documentation Requirements conditions of this *Approval.*

4. "*Air Standards Manager"* means the Manager, Human Toxicology and Air Standards Section, Standards Development Branch, or any other person who represents and carries out the duties of the Manager, Human Toxicology and Air Standards Section, Standards Development Branch, as those duties relate to the conditions of this *Approval.*

5. "*Approval"* means this entire Environmental Compliance Approval and any *Schedules* to it.

6. "*Basic Comprehensive User Guide"* means the *Ministry* document titled "Basic Comprehensive Certificates of Approval (Air) User Guide" dated March 2011, as amended.

7. "*Company"* means ADM Agri-Industries Company operating as ADM Agri-Industries Company that is responsible for the construction or operation of the *Facility* and includes any successors and assigns in accordance with section 19 of the *EPA.*

8. "*Compound of Concern"* means a contaminant that, based on generally available information, may be discharged to the air in a quantity from the *Facility* that:

(a) is non-negligible in accordance with section 26(1)4 of *O. Reg. 419/05* in comparison to the relevant *Ministry Point of Impingement Limit;* or

(b) if a *Ministry Point of Impingement Limit* is not available for the compound, may cause an adverse effect at a *Point of Impingement* based on generally available toxicological information.

9. "*Description Section"* means the section on page one of this *Approval* describing the *Company's* operations and the *Equipment* located at the *Facility* and specifying the *Facility Production Limit* for the *Facility.*

10. "*Director"* means a person appointed by the Minister pursuant to section 5 of the *EPA.*

11. "*District Manager"* means the District Manager of the appropriate local district office of the *Ministry,* where the *Facility* is geographically located.

12. "*Emission Summary Table"* means the most updated table contained in the *ESDM Report,* which is prepared in accordance with section 26 of *O. Reg. 419/05* and the *Procedure Document* listing the appropriate *Point of Impingement* concentration for each *Compound of Concern* from the *Facility* and providing comparison to the corresponding *Ministry Point of Impingement Limit* or *Maximum Concentration Level Assessment,* or *Jurisdictional Screening Level.*

13. "*Environmental Assessment Act"* means the Environmental Assessment Act, R.S.O. 1990, c.E.18, as amended.

14. "*EPA"* means the Environmental Protection Act, R.S.O. 1990, c.E.19, as amended.

15. "*Equipment"* means equipment or processes described in the *ESDM Report,* this *Approval* and in the *Schedules* referred to herein and any other equipment or processes.

16. "*Equipment with Specific Operational Limits"* means any *Equipment* related to the thermal oxidation of waste or waste derived fuels, fume incinerators or any other *Equipment* that is specifically referenced in any published *Ministry* document that outlines specific operational guidance that must be considered by the *Director* in issuing an *Approval.*

17. "*ESDM Report"* means the most current Emission Summary and Dispersion Modelling Report that describes the *Facility.* The *ESDM Report* is based on the *Original ESDM Report,* is prepared after the issuance of this *Approval* in accordance with section 26 of *O. Reg. 419/05* and the *Procedure*

Document by the *Company* or its consultant.

18. "*Facility"* means the entire operation located on the property where the *Equipment* is located.

19. "*Facility Production Limit"* means the production limit placed by the *Director* on the main product(s) or raw materials used by the *Facility.*

20. "*Jurisdictional Screening Level"* means a screening level for a *Compound of Concern* that is listed in the *Ministry* publication titled "Jurisdictional Screening Level (JSL) List, A Screening Tool for Ontario Regulation 419: Air Pollution - Local Air Quality", dated February 2008, as amended.

21. "*Log"* means the up-to-date log that is used to track all *Modifications* to the *Facility* since the date of this *Approval* as required by the Documentation Requirements conditions of this *Approval.*

22. "*Maximum Concentration Level Assessment"* means the Maximum Concentration Level Assessment for the purposes of an *Approval,* described in the *Basic Comprehensive User Guide,* prepared by a *Toxicologist* using currently available toxicological information, that demonstrates that the concentration at any *Point of Impingement* for a *Compound of Concern* that does not have a *Ministry Point of Impingement Limit* is not likely to cause an adverse effect as defined by the *EPA.*

23. "*Ministry"* means the ministry of the government of Ontario responsible for the *EPA* and its regulations and includes all officials, employees or other persons acting on its behalf.

24. "*Ministry Point of Impingement Limit"* means the applicable Standard set out in Schedule 2 or 3 of *O.Reg. 419/05* or a limit set out in the *Ministry* publication titled "Summary of Standards and Guidelines to support Ontario Regulation 419: Air Pollution - Local Air Quality (including Schedule 6 of O. Reg. 419 on Upper Risk Thresholds)", dated April 2012, as amended.

25. "*Modification"* means any construction, alteration, extension or replacement of any plant, structure, equipment, apparatus, mechanism or thing, or alteration of a process or rate of production at the *Facility* that may discharge or alter the rate or manner of discharge of a *Compound of Concern* to the air or discharge or alter noise or vibration emissions from the *Facility.*

26. "*Noise Control Measures"* means measures to reduce the noise emissions from the *Facility* and/or *Equipment* including, but not limited to, silencers, acoustic louvres, enclosures, absorptive treatment, plenums and barriers.

27. "*O. Reg. 419/05"* means the Ontario Regulation 419/05, Air Pollution – Local Air Quality, as amended.

28. "*Original ESDM Report"* means the Emission Summary and Dispersion Modelling Report which was prepared in accordance with section 26 of *O. Reg. 419/05* and the *Procedure Document* by Frank Cobbett (ADM Agri-Industries Company) and dated July 26, 2013 submitted in support of the application, and includes any changes to the report made up to the date of issuance of this *Approval.*

29. "*Performance Limits"* means the performance limits specified in Condition 3.2 of this *Approval* titled Performance Limits.

30. "*Point of Impingement"* has the same meaning as in section 2 of *O. Reg. 419/05.*

31. "*Point of Reception"* means Point of Reception as defined by *Publication NPC-205* and/or *Publication NPC-232,* as applicable.

32. "*Procedure Document"* means *Ministry* guidance document titled "Procedure for Preparing an Emission Summary and Dispersion Modelling Report" dated March 2009, as amended.

33. "*Processes with Significant Environmental Aspects"* means the *Equipment* which, during regular operation, would discharge a contaminant or contaminants into the air at an amount which is not

considered as negligible in accordance with section 26(1)4 of *O. Reg. 419/05* and the *Procedure Document.*

34. "*Publication NPC-207"* means the *Ministry* draft technical publication "Impulse Vibration in Residential Buildings", November 1983, supplementing the Model Municipal Noise Control By-Law, Final Report, published by the *Ministry,* August 1978, as amended.

35. "*Publication NPC-233"* means the *Ministry* Publication NPC-233, "Information to be Submitted for Approval of Stationary Sources of Sound", October, 1995, as amended.

36. "Publication NPC-300" means the Ministry Publication NPC-300, " Environmental Noise Guideline, Stationary and Transportation Sources – Approval and Planning, Publication NPC-300", August, 2013, as amended.

37. "*Schedules"* means the following schedules attached to this *Approval* and forming part of this *Approval* namely:

Schedule A - Supporting Documentation

38. "*Toxicologist"* means a qualified professional currently active in the field of risk assessment and toxicology that has a combination of formal university education, training and experience necessary to assess contaminants.

39. "*Written Summary Form"* means the electronic questionnaire form, available on the *Ministry* website, and supporting documentation, that documents the activities undertaken at the *Facility* in the previous calendar year that must be submitted annually to the *Ministry* as required by the section of this *Approval* titled Reporting Requirements.

You are hereby notified that this environmental compliance approval is issued to you subject to the terms and conditions outlined below:

TERMS AND CONDITIONS

1. GENERAL

1.1 Except as otherwise provided by this *Approval,* the *Facility* shall be designed, developed, built, operated and maintained in accordance with the terms and conditions of this *Approval* and in accordance with the following *Schedules* attached hereto:

Schedule A - Supporting Documentation

2. LIMITED OPERATIONAL FLEXIBILITY

2.1 Pursuant to section 20.6(1) of the *EPA* and subject to Conditions 2.2 and 2.3 of this *Approval,* future construction, alterations, extensions or replacements are approved in this *Approval* if the future construction, alterations, extensions or replacements are *Modifications* to the *Facility* that:

(a) are within the scope of the operations of the *Facility* as described in the *Description Section* of this *Approval;*

(b) do not result in an increase of the *Facility Production Limit* above the level specified in the *Description Section* of this *Approval;* and

(c) result in compliance with the *Performance Limits.*

2.2 Condition 2.1 does not apply to:

(a) the addition of any new *Equipment with Specific Operational Limits* or to the *Modification* of any existing *Equipment with Specific Operational Limits* at the *Facility;* or

(b) *Modifications* to the *Facility* that would be subject to the *Environmental Assessment Act.*

2.3 Condition 2.1 of this *Approval* shall expire on February 1, 2020, unless this *Approval* is revoked prior to the expiry date. The *Company* may apply for renewal of Condition 2.1 of this *Approval* by including an *ESDM Report* and an *Acoustic Assessment Report* that describes the *Facility* as of the date of the renewal application.

3. REQUEST FOR *MAXIMUM CONCENTRATION LEVEL ASSESSMENT* AND *PERFORMANCE LIMITS*

3.1 **REQUEST FOR *MAXIMUM CONCENTRATION LEVEL ASSESSMENT***

3.1.1 If the *Company* proposes to make a *Modification* to the *Facility,* the *Company* shall determine if the proposed *Modification* will result in:

(a) a discharge of a *Compound of Concern* that was not previously discharged; or

(b) an increase in the concentration at a *Point of Impingement* of a *Compound of Concern.*

3.1.2 If a proposed *Modification* mentioned in Condition 3.1.1 will result in the discharge of a *Compound of Concern* that was not previously discharged, the *Company* shall submit a *Maximum Concentration Level Assessment* to the *Director* for review by the *Air Standards Manager* in the following circumstances:

(a) The *Compound of Concern* does not have a *Ministry Point of Impingement Limit* or a *Jurisdictional Screening Level.*

(b) The *Compound of Concern* does not have a *Ministry Point of Impingement Limit* and the concentration at a *Point of Impingement* will exceed the *Jurisdictional Screening Level.*

(c) Prior to the proposed *Modification,* a contaminant was discharged in a negligible amount and the proposed *Modification* will result in the discharge of the contaminant being considered a *Compound of Concern* and the *Compound of Concern* does not have a *Ministry Point of Impingement Limit* or a *Jurisdictional Screening Level.*

(d) Prior to the proposed *Modification,* a contaminant was discharged in a negligible amount and the proposed *Modification* will result in the discharge of the contaminant being considered a *Compound of Concern.* Additionally, the *Compound of Concern* does not have a *Ministry Point of Impingement Limit* and the concentration at a *Point of Impingement* will exceed the *Jurisdictional Screening Level.*

3.1.3 If a proposed *Modification* mentioned in Condition 3.1.1 will result in an increase in the concentration at a *Point of Impingement* of a *Compound of Concern,* the *Company* shall submit a *Maximum Concentration Level Assessment* to the *Director* for review by the *Air Standards Manager* in the following circumstances:

(a) The *Compound of Concern* does not have a *Ministry Point of Impingement Limit* or a *Jurisdictional Screening Level* and the concentration at a *Point of Impingement* will exceed the *Acceptable Maximum Ground Level Concentration.*

(b) The *Compound of Concern* does not have a *Ministry Point of Impingement Limit* or a *Jurisdictional Screening Level* and the concentration at a *Point of Impingement* will exceed the most recently accepted *Maximum Concentration Level Assessment* submitted under Condition 3.1.2 or this Condition.

(c) The *Compound of Concern* does not have a *Ministry Point of Impingement Limit* and the concentration at a *Point of Impingement* will exceed the *Jurisdictional Screening Level* and the

Acceptable Maximum Ground Level Concentration.

(d) The *Compound of Concern* does not have a *Ministry Point of Impingement Limit* and the concentration at a *Point of Impingement* will exceed the *Jurisdictional Screening Level* and the most recently accepted *Maximum Concentration Level Assessment* submitted under Condition 3.1.2 or this Condition.

(e) The *Compound of Concern* does not have a *Ministry Point of Impingement Limit, Acceptable Maximum Ground Level Concentration* or a *Maximum Concentration Level Assessment* and the concentration at a *Point of Impingement* will exceed the *Jurisdictional Screening Level.*

3.1.4 Subject to the Operational Flexibility set out in Condition 2 of this *Approval,* the *Company* may make the *Modification* if the submission of a *Maximum Concentration Level Assessment* under Condition 3.1.2 or 3.1.3 is not required.

3.1.5 A *Company* that is required to submit an assessment under Condition 3.1.2 or 3.1.3 shall submit the assessment at least thirty (30) days before the proposed *Modification* occurs.

3.1.6 The *Ministry* shall provide to the *Company* written confirmation of the receipt of the assessment under Condition 3.1.2 or 3.1.3.

3.1.7 If an assessment is submitted under Condition 3.1.2 or 3.1.3, the *Company* shall not modify the *Facility* unless the *Ministry* accepts the assessment.

3.1.8 If the *Ministry* notifies the *Company* that it does not accept the assessment submitted under Condition 3.1.2 or 3.1.3, the *Company* shall:

(a) revise and resubmit the assessment; or

(b) notify the *Ministry* that the *Company* will not be modifying the *Facility.*

3.1.9 The re-submission under Condition 3.1.8 (a) is considered by the *Ministry* as a new submission.

3.2. ***PERFORMANCE LIMITS***

3.2.1 Subject to Condition 3.2.2, the *Company* shall, at all times, ensure that all *Equipment* that is a source of a *Compound of Concern* is operated to comply with the following *Performance Limits:*

(a) for a *Compound of Concern* that has a *Ministry Point of Impingement Limit,* the maximum concentration of that *Compound of Concern* at any *Point of Impingement* shall not exceed the corresponding *Ministry Point of Impingement Limit;*

(b) for a *Compound of Concern* that has an *Acceptable Maximum Ground Level Concentration* and no *Maximum Concentration Level Assessment,* the maximum concentration of that *Compound of Concern* at any *Point of Impingement* shall not exceed the corresponding *Acceptable Maximum Ground Level Concentration;* and

(c) for a *Compound of Concern* that has a *Maximum Concentration Level Assessment,* the maximum concentration of that *Compound of Concern* at any *Point of Impingement* shall not exceed the most recently accepted corresponding *Maximum Concentration Level Assessment.*

3.2.2 If the *Company* has modified the *Facility* and was not required to submit a *Maximum Concentration Level Assessment* with respect to a *Compound of Concern* under Condition 3.1.2 or 3.1.3, the *Company* shall, at all times, ensure that all *Equipment* that is a source of the *Compound of Concern* is operated such that the maximum concentration of the *Compound of Concern* shall not exceed the concentration listed for the *Compound of Concern* in the most recent version of the *ESDM Report.*

3.2.3 The *Company* shall, at all times, ensure that the noise emissions from the *Facility* comply with

the limits set out in *Ministry Publication NPC-300.*

3.2.4 The *Company* shall, at all times, ensure that the vibration emissions from the *Facility* comply with the limits set out in *Ministry Publication NPC-207.*

3.2.5 The *Company* shall, at all times, operate any *Equipment with Specific Operational Limits* approved by this *Approval* in accordance with the *Original ESDM Report* and Conditions in this *Approval.*

4. **DOCUMENTATION REQUIREMENTS**

4.1 The *Company* shall, at all times, maintain documentation that describes the current operations of the *Facility,* including but not limited to:

(a) an *ESDM Report* that demonstrates compliance with the *Performance Limits* for the *Facility;*

(b) an *Acoustic Assessment Report* that demonstrates compliance with the *Performance Limits* for the *Facility;*

(c) an up-to-date *Log* that describes each *Modification* to the *Facility;* and

(d) a record of the changes to the *ESDM Report* and the *Acoustic Assessment Report* that documents how each *Modification* is in compliance with the *Performance Limits.*

4.2 The *Company* shall, during regular business hours, make the current *Emission Summary Table* and *Acoustic Assessment Summary Table* available for inspection at the *Facility* by any interested member of the public.

4.3 Subject to Condition 4.5, the *Company* shall prepare and complete no later than April 15, of each year documentation that describes the activities undertaken at the *Facility* in the previous calendar year, including but not limited to:

(a) a list of all *Compounds of Concern* for which a *Maximum Concentration Level Assessment* was submitted to the *Director* for review by the *Air Standards Manager* pursuant to Condition 3.1.2 or 3.1.3 of this *Approval;*

(b) if the *Company* has modified the *Facility* and was not required to submit a *Maximum Concentration Level Assessment* with respect to a *Compound of Concern* under Condition 3.1.2 or 3.1.3, a list and concentration level of all such *Compounds of Concern;*

(c) a review of any changes to *Ministry Point of Impingement Limits* that affect any *Compounds of Concern* emitted from the *Facility;* and

(d) a table of the changes in the emission rate of any *Compound of Concern* and the resultant increase or decrease in the *Point of Impingement* concentration reported in the *ESDM Report.*

4.4 Subject to Condition 4.5, the *Company* shall, at all times, maintain the documentation described in Condition 4.3.

4.5 Conditions 4.3 and 4.4 do not apply if Condition 2.1 has expired.

4.6 The *Company* shall, within three (3) months after the expiry of Condition 2.1 of this *Approval,* update the *ESDM Report* and the *Acoustic Assessment Report* such that they describe the *Facility* as it was at the time that Condition 2.1 of this *Approval* expired.

5. REPORTING REQUIREMENTS

5.1 Subject to Condition 5.2, the *Company* shall provide the *Ministry* and the *Director* no later than April 15 of each year, a *Written Summary Form* that shall include the following:

(a) a declaration of whether the *Facility* was in compliance with section 9 of the *EPA, O.Reg. 419/05* and the conditions of this *Approval;*

(b) a summary of each *Modification* that took place in the previous calendar year that resulted in a change in the previously calculated concentration at the *Point of Impingement* for any *Compound of Concern* or resulted in a change in the sound levels reported in the *Acoustic Assessment Summary Table* at any *Point of Reception.*

5.2 Condition 5.1 does not apply if Condition 2.1 has expired.

6. OPERATION AND MAINTENANCE

6.1 The *Company* shall prepare and implement, not later than three (3) months from the date of this *Approval,* operating procedures and maintenance programs for all *Processes with Significant Environmental Aspects,* which shall specify as a minimum:

(a) frequency of inspections and scheduled preventative maintenance;

(b) procedures to prevent upset conditions;

(c) procedures to minimize all fugitive emissions;

(d) procedures to prevent and/or minimize odorous emissions;

(e) procedures to prevent and/or minimize noise emissions; and

(f) procedures for record keeping activities relating to the operation and maintenance programs.

6.2 The *Company* shall ensure that all *Processes with Significant Environmental Aspects* are operated and maintained at all times in accordance with this *Approval,* the operating procedures and maintenance programs.

7. COMPLAINTS RECORDING PROCEDURE

7.1 If at any time, the *Company* receives any environmental complaints from the public regarding the operation of the *Equipment* approved by this *Approval,* the *Company* shall respond to these complaints according to the following procedure:

(a) the *Company* shall record and number each complaint, either electronically or in a log book, and shall include the following information: the time and date of the complaint and incident to which the complaint relates, the nature of the complaint, wind direction at the time and date of the incident to which the complaint relates and, if known, the address of the complainant;

(b) the *Company,* upon notification of a complaint, shall initiate appropriate steps to determine all possible causes of the complaint, and shall proceed to take the necessary actions to appropriately deal with the cause of the subject matter of the complaint; and

(c) the *Company* shall complete and retain on-site a report written within one (1) week of the complaint date, listing the actions taken to appropriately deal with the cause of the subject matter of the complaint and any recommendations for remedial measures, and managerial or operational changes to reasonably avoid the recurrence of similar incidents**.**

8. RECORD KEEPING REQUIREMENTS

8.1 Any information requested by any employee in or agent of the *Ministry* concerning the *Facility* and its operation under this *Approval,* including, but not limited to, any records required to be kept by this *Approval,* shall be provided to the employee in or agent of the *Ministry,* upon request**,** in a timely manner.

8.2 The *Company* shall retain, for a minimum of five (5) years from the date of their creation, except as noted below, all reports, records and information described in this *Approval* and shall include but not be limited to:

(a) If the *Company* has updated the *ESDM Report* in order to comply with Condition 4.1(a) of this *Approval,* a copy of each new version of the *ESDM Report;*

(b) If the *Company* has updated the *Acoustic Assessment Report,* in order to comply with Condition 4.1(b) of this *Approval,* a copy of each new version of the *Acoustic Assessment Report;*

(c) supporting information used in the emission rate calculations performed in the *ESDM Reports* and *Acoustic Assessment Reports* to document compliance with the *Performance Limits*(superseded information must be retained for a period of three (3) years after *Modification);*

(d) the *Log* that describes each *Modification* to the *Facility;*

(e) all documentation prepared in accordance with Condition 4.3 of this *Approval;*

(f) copies of any *Written Summary Forms* provided to the *Ministry* under Condition 5.1 of this *Approval;*

(g) the operating procedures and maintenance programs, including records on the maintenance, repair and inspection of the *Equipment* related to all *Processes with Significant Environmental Aspects;* and

(h) the complaints recording procedure, including records related to all environmental complaints made by the public as required by Condition 7.1 of this *Approval.*

9. REVOCATION OF PREVIOUS APPROVALS

9.1 This *Approval* replaces and revokes all Certificates of Approval (Air) issued under section 9 *EPA* and Environmental Compliance Approvals issued under Part II.1 *EPA* to the *Facility* in regards to the activities mentioned in subsection 9(1) of the *EPA* and dated prior to the date of this *Approval.*

SCHEDULE A

Supporting Documentation

(a) Application for Approval (Air & Noise), dated June 11, 2013, signed by Stacy Robinson, Plant Manager, and submitted by the C *ompany;*

(b) Emission Summary and Dispersion Modelling Report, prepared by Frank Cobbett (ADM Agri-Industries Company) and dated July 26, 2013;

(c) The letter from ADM Agri-Industries Company dated June 11, 2013 and signed by Frank D. Cobbett, Ph.D., P.Eng.;

(d) Acoustic Assessment Report, prepared by Terry Harding, P.Eng. of Valcoustics Canada Ltd. and dated February 28, 2014; and

(e) The letter from Valcoustics Canada Ltd. dated June 18, 2014 and signed by Terry Harding, P.Eng. including details of the *Noise Control Measures.*

The reasons for the imposition of these terms and conditions are as follows:

GENERAL

1. Condition No. 1 is included to require the *Approval* holder to build, operate and maintain the *Facility* in accordance with the Supporting Documentation in Schedule A considered by the *Director* in issuing this *Approval.*

LIMITED OPERATIONAL FLEXIBILITY, REQUEST FOR *MAXIMUM CONCENTRATION LEVEL ASSESSMENT* AND *PERFORMANCE LIMITS*

2. Conditions No. 2 and 3 are included to limit and define the *Modifications* permitted by this *Approval,* and to set out the circumstances in which the *Company* shall submit a *Maximum Concentration Level Assessment* prior to making *Modifications.* The holder of the *Approval* is approved for operational flexibility for the *Facility* that is consistent with the description of the operations included with the application up to the *Facility Production Limit.* In return for the operational flexibility, the *Approval* places performance based limits that cannot be exceeded under the terms of this *Approval. Approval* holders will still have to obtain other relevant approvals required to operate the *Facility,* including requirements under other environmental legislation such as the *Environmental Assessment Act.*

DOCUMENTATION REQUIREMENTS

3. Condition No. 4 is included to require the *Company* to maintain ongoing documentation that demonstrates compliance with the *Performance Limits* of this *Approval* and allows the *Ministry* to monitor on-going compliance with these *Performance Limits.* The *Company* is required to have an up to date *ESDM Report* and *Acoustic Assessment Report* that describe the *Facility* at all times and make the *Emission Summary Table* and *Acoustic Assessment Summary Table* from these reports available to the public on an ongoing basis in order to maintain public communication with regard to the emissions from the *Facility.*

REPORTING REQUIREMENTS

4. Condition No. 5 is included to require the *Company* to provide a yearly *Written Summary Form* to the *Ministry,* to assist the *Ministry* with the review of the site's compliance with the *EPA,* the regulations and this *Approval.*

OPERATION AND MAINTENANCE

5. Condition No. 6 is included to require the *Company* to properly operate and maintain the *Processes with Significant Environmental Aspects* to minimize the impact to the environment from these processes.

COMPLAINTS RECORDING PROCEDURE

6. Condition No. 7 is included to require the *Company* to respond to any environmental complaints regarding the operation of the *Equipment,* according to a procedure that includes methods for preventing recurrence of similar incidents and a requirement to prepare and retain a written report.

RECORD KEEPING REQUIREMENTS

7. Condition No. 8 is included to require the *Company* to retain all documentation related to this *Approval* and provide access to employees in or agents of the *Ministry,* upon request, so that the *Ministry* can determine if a more detailed review of compliance with the *Performance Limits* is necessary.

REVOCATION OF PREVIOUS APPROVALS

8. Condition No. 9 is included to identify that this *Approval* replaces all Section 9 Certificate(s) of Approval and Part II.1 Approvals in regards to the activities mentioned in subsection 9(1) of the *EPA* and dated prior to the date of this *Approval.*

Upon issuance of the environmental compliance approval, I hereby revoke Approval No(s). 9705-7DYPRK issued on July 7, 2008.

In accordance with Section 139 of the Environmental Protection Act, you may by written Notice served upon me, the Environmental Review Tribunal and in accordance with Section 47 of the Environmental Bill of Rights, 1993 , S.O. 1993, c. 28 (Environmental Bill of Rights), the Environmental Commissioner, within 15 days after receipt of this Notice, require a hearing by the Tribunal. The Environmental Commissioner will place notice of your appeal on the Environmental Registry. Section 142 of the Environmental Protection Act provides that the Notice requiring the hearing shall state:

1. The portions of the environmental compliance approval or each term or condition in the environmental compliance approval in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

Pursuant to subsection 139(3) of the Environmental Protection Act, a hearing may not be required with respect to any terms and conditions in this environmental compliance approval, if the terms and conditions are substantially the same as those contained in an approval that is amended or revoked by this environmental compliance approval.

The Notice should also include:

3. The name of the appellant;
4. The address of the appellant;
5. The environmental compliance approval number;
6. The date of the environmental compliance approval;
7. The name of the Director, and;
8. The municipality or municipalities within which the project is to be engaged in.

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

The Secretary* Environmental Review Tribunal 655 Bay Street, Suite 1500 Toronto, Ontario M5G 1E5	AND	The Environmental Commissioner 1075 Bay Street, Suite 605 Toronto, Ontario M5S 2B1	AND	The Director appointed for the purposes of Part II.1 of the Environmental Protection Act Ministry of the Environment 2 St. Clair Avenue West, Floor 12A Toronto, Ontario M4V 1L5

*** Further information on the Environmental Review Tribunal 's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 212-6349, Fax: (416) 314-4506 or www.ert.gov.on.ca**

This instrument is subject to Section 38 of the Environmental Bill of Rights, 1993, that allows residents of Ontario to seek leave to appeal the decision on this instrument. Residents of Ontario may seek leave to appeal within 15 days from the date this decision is placed on the Environmental Registry. By accessing the Environmental Registry at www.ebr.gov.on.ca , you can determine when the leave to appeal period ends.

The above noted activity is approved under s.20.3 of Part II.1 of the Environmental Protection Act.

DATED AT TORONTO this 22nd day of July, 2014

Rudolf Wan, P.Eng.
Director
appointed for the purposes of Part II.1 of
the *Environmental Protection Act*

JK/
c: District Manager, MOE Halton-Peel
Frank Cobbett, ADM Agri-Industries

Ontario

Ministry of the Environment and Climate Change
Ministère de l'Environnement et de l'Action en matière de changement climatique

ENVIRONMENTAL COMPLIANCE APPROVAL
NUMBER 8860-ADKLHS
Issue Date: September 29, 2016

Communications & Power Industries Canada Inc.
45 River Drive
Georgetown, Ontario
L7G 2J4

Site Location: 45 River Drive
45 River Dr
Halton Hills Town, Regional Municipality of Halton
L7G 2J4

You have applied under section 20.2 of Part II.1 of the Environmental Protection Act , R.S.O. 1990, c. E. 19 (Environmental Protection Act) for approval of:

Description Section

A communication and electronic medical equipment manufacturing facility, consisting of the following processes and support units:

- electroplating;

- coating;
- potting;
- degreasing;
- soldering and brazing;
- laboratory operations;
- painting and drying;
- sandblasting;
- welding and general maintenance activities; and
- product assembly.

including the *Equipment* and any other ancillary and support processes and activities, operating at a *Facility Production Limit* of up to 60 units per shift per day discharging to the air as described in the *Original ESDM Report.*

For the purpose of this environmental compliance approval, the following definitions apply:

1. " *Acceptable Point of Impingement Concentration"* means a concentration accepted by the *Ministry* as not likely to cause an adverse effect for a *Compound of Concern* that,

(a) has no *Ministry Point of Impingement Limit* and no *Jurisdictional Screening Level,* or

(b) has a concentration at a *Point of Impingement* that exceeds the *Jurisdictional Screening Level.*

With respect to the *Original ESDM Report,* the *Acceptable Point of Impingement Concentration* for a

Compound of Concern mentioned above is the concentration set out in the *Original ESDM Report.*

2. "*Acoustic Assessment Report"* means the report, prepared in accordance with *Publication NPC-233* and Appendix A of the *Basic Comprehensive User Guide,* by John Coulter, P.Eng. / J.E. Coulter Associates Limited and dated September 8, 2011, submitted in support of the application, that documents all sources of noise emissions and *Noise Control Measures* present at the *Facility,* as updated in accordance with Condition 5 of this *Approval.*

3. "*Acoustic Assessment Summary Table"* means a table prepared in accordance with the *Basic Comprehensive User Guide* summarising the results of the *Acoustic Assessment Report,* as updated in accordance with Condition 5 of this *Approval.*

4. "*Acoustic Audit*" means an investigative procedure consisting of measurements and/or acoustic modelling of all sources of noise emissions due to the operation of the *Facility*, assessed to determine compliance with the Performance Limits for the *Facility* regarding noise emissions, completed in accordance with the procedures set in *Publication NPC-103* and reported in accordance with *Publication NPC-233.*

5. "*Acoustic Audit Report*" means a report presenting the results of an *Acoustic Audit,* prepared in accordance with *Publication NPC-233.*

6. "*Acoustical Consultant*" means a person currently active in the field of environmental acoustics and noise/vibration control, who is familiar with *Ministry* noise guidelines and procedures and has a combination of formal university education, training and experience necessary to assess noise emissions from a *Facility.*

7. "*Approval"* means this entire Environmental Compliance Approval and any *Schedules* to it.

8. "*Basic Comprehensive User Guide"* means the *Ministry* document titled "Basic Comprehensive Certificates of Approval (Air) User Guide" dated March 2011, as amended.

9. "*Company"* means Communications & Power Industries Canada Inc. that is responsible for the construction or operation of the *Facility* and includes any successors and assigns in accordance with section 19 of the *EPA.*

10. "*Compound of Concern"* means a contaminant described in paragraph 4 subsection 26 (1) of *O. Reg. 419/05,* namely, a contaminant that is discharged from the *Facility* in an amount that is not negligible.

11. "*Description Section"* means the section on page one of this *Approval* describing the *Company's* operations and the *Equipment* located at the *Facility* and specifying the *Facility Production Limit* for the *Facility.*

12. "*Director"* means a person appointed for the purpose of section 20.3 of the *EPA* by the *Minister* pursuant to section 5 of the *EPA.*

13. "*District Manager"* means the District Manager of the appropriate local district office of the *Ministry,* where the *Facility* is geographically located.

14. "*Emission Summary Table"* means a table described in paragraph 14 of subsection 26 (1) of *O. Reg. 419/05;* namely a table in the *ESDM Report* that compares the *Point of Impingement* concentration for each *Compound of Concern* to the corresponding *Ministry Point of Impingement Limit, Acceptable Point of Impingement Concentration,* or *Jurisdictional Screening Level.*

15. "*Environmental Assessment Act"* means the Environmental Assessment Act, R.S.O. 1990, c.E.18, as amended.

16. "*EPA"* means the Environmental Protection Act, R.S.O. 1990, c.E.19, as amended.

17. "*Equipment"* means equipment or processes described in the *ESDM Report,* this *Approval* and in the *Schedules* referred to herein and any other equipment or processes.

18. "*Equipment with Specific Operational Limits"* means any *Equipment* related to the thermal oxidation of waste or waste derived fuels, fume incinerators or any other *Equipment* that is specifically referenced in any published *Ministry* document that outlines specific operational guidance that must be considered by the *Director* in issuing an *Approval.*

19. "*ESDM Report"* means the most current Emission Summary and Dispersion Modelling Report that describes the *Facility.* The *ESDM Report* is based on the *Original ESDM Report* and is updated after the issuance of this *Approval* in accordance with section 26 of *O. Reg. 419/05* and the *Procedure Document.*

20. "*Facility"* means the entire operation located on the property where the *Equipment* is located.

21. "*Facility Production Limit"* means the production limit placed by the *Director* on the main product(s) or raw materials used by the *Facility.*

22. "*Independent Acoustical Consultant*" means an *Acoustical Consultant* who is not representing the *Company* and was not involved in preparing the *Acoustic Assessment Report* or the design/implementation of *Noise Control Measures* for the *Facility* and/or *Equipment*. The *Independent Acoustical Consultant* shall not be retained by the *Acoustical Consultant* involved in the noise impact assessment or the design/implementation of *Noise Control Measures* for the *Facility* and/or *Equipment.*

23. "*Jurisdictional Screening Level"* means a screening level for a *Compound of Concern* that is listed in the *Ministry* publication titled "Jurisdictional Screening Level (JSL) List, A Screening Tool for Ontario Regulation 419: Air Pollution - Local Air Quality", dated February 2008, as amended.

24. "*Log"* means a document that contains a record of each change that is required to be made to the *ESDM Report* and *Acoustic Assessment Report,* including the date on which the change occurred. For example, a record would have to be made of a more accurate emission rate for a source of contaminant, more accurate meteorological data, a more accurate value of a parameter that is related to a source of contaminant, a change to a *Point of Impingement* and all changes to information associated with a *Modification* to the *Facility* that satisfies Condition 2**.**

25. "*Minister"* means the Minister of the Environment and Climate Change or such other member of the Executive Council as may be assigned the administration of the *EPA* under the Executive Council Act.

26. "*Ministry"* means the ministry of the *Minister.*

27. "*Ministry Point of Impingement Limit"* means the applicable Standard set out in Schedule 2 or 3 of *O. Reg. 419/05* or a limit set out in the *Ministry* publication titled "Summary of Standards and Guidelines to support Ontario Regulation 419/05: Air Pollution - Local Air Quality (including Schedule 6 of *O. Reg. 419/05* on Upper Risk Thresholds", dated April 2012, as amended.

28. "*Modification"* means any construction, alteration, extension or replacement of any plant, structure, equipment, apparatus, mechanism or thing, or alteration of a process or rate of production at the *Facility* that may discharge or alter the rate or manner of discharge of a *Compound of Concern* to the air or discharge or alter noise or vibration emissions from the *Facility.*

29. "*Noise Control Measures"* means measures to reduce the noise emissions from the *Facility* and/or *Equipment* including, but not limited to, silencers, acoustic louvres, enclosures, absorptive treatment, plenums and barriers. It also means the noise control measures outlined in the *Acoustic Assessment Report.*

30. "*O. Reg. 419/05"* means Ontario Regulation 419/05, Air Pollution – Local Air Quality, as amended.

31. "*Original ESDM Report"* means the Emission Summary and Dispersion Modelling Report which was prepared in accordance with section 26 of *O. Reg. 419/05* and the *Procedure Document* by Watters Environmental Group Inc. and dated May 20, 2010 submitted in support of the application, and includes any changes to the report made up to the date of issuance of this *Approval.*

32. "*Point of Impingement"* has the same meaning as in section 2 of *O. Reg. 419/05.*

33. "*Point of Reception"* means Point of Reception as defined by *Publication NPC-205* and/or *Publication NPC-232,* as applicable.

34. "*Procedure Document"* means *Ministry* guidance document titled "Procedure for Preparing an Emission Summary and Dispersion Modelling Report" dated March 2009, as amended.

35. "*Processes with Significant Environmental Aspects"* means the *Equipment* which, during regular operation, would discharge one or more contaminants into the air in an amount which is not considered as negligible in accordance with section 26 (1) 4 of *O. Reg. 419/05* and the *Procedure Document.*

36. "*Publication NPC-103*" means the *Ministry* Publication NPC-103 of the Model Municipal Noise Control By-Law, Final Report, August 1978, published by the *Ministry* as amended.

37. "*Publication NPC-205"* means the *Ministry* Publication NPC-205, "Sound Level Limits for Stationary Sources in Class 1 & 2 Areas (Urban)", October, 1995, as amended.

38. "*Publication NPC-207"* means the *Ministry* draft technical publication "Impulse Vibration in Residential Buildings", November 1983, supplementing the Model Municipal Noise Control By-Law, Final Report, published by the *Ministry,* August 1978, as amended.

39. "*Publication NPC-232"* means the *Ministry* Publication NPC-232, "Sound Level Limits for Stationary Sources in Class 3 Areas (Rural)", October, 1995, as amended.

40. "*Publication NPC-233"* means the *Ministry* Publication NPC-233, "Information to be Submitted for Approval of Stationary Sources of Sound", October, 1995, as amended.

41. "*Schedules"* means the following schedules attached to this *Approval* and forming part of this *Approval* namely:

Schedule A - Supporting Documentation

42. "*Toxicologist"* means a qualified professional currently active in the field of risk assessment and toxicology that has a combination of formal university education, training and experience necessary to assess contaminants.

43. "*Written Summary Form"* means the electronic questionnaire form, available on the *Ministry* website, and supporting documentation, that documents the activities undertaken at the *Facility* in the previous calendar year.

You are hereby notified that this environmental compliance approval is issued to you subject to the terms and conditions outlined below:

TERMS AND CONDITIONS

1. GENERAL

1.1 Except as otherwise provided by this *Approval,* the *Facility* shall be designed, developed, built, operated and maintained in accordance with the terms and conditions of this *Approval* and in accordance with the following *Schedules* attached hereto:

2. LIMITED OPERATIONAL FLEXIBILITY

2.1 Pursuant to section 20.6 (1) of the *EPA* and subject to Conditions 2.2 and 2.3 of this *Approval,* future construction, alterations, extensions or replacements are approved in this *Approval* if the future construction, alterations, extensions or replacements are *Modifications* to the *Facility* that:

(a) are within the scope of the operations of the *Facility* as described in the *Description Section* of this *Approval;*

(b) do not result in an increase of the *Facility Production Limit* above the level specified in the *Description Section* of this *Approval;* and

(c) result in compliance with the performance limits as specified in Condition 4.

2.2 Condition 2.1 does not apply to,

(a) the addition of any new *Equipment with Specific Operational Limits* or to the *Modification* of any existing *Equipment with Specific Operational Limits* at the *Facility;* or

(b) *Modifications* to the *Facility* that would be subject to the *Environmental Assessment Act.*

2.3 Condition 2.1 of this *Approval* shall expire on February 1, 2020*,* unless this *Approval* is revoked prior to the expiry date. The *Company* may apply for renewal of Condition 2.1 of this *Approval* by including an *ESDM Report* and an *Acoustic Assessment Report* that describes the *Facility* as of the date of the renewal application.

3. REQUIREMENT TO REQUEST AN *ACCEPTABLE POINT OF IMPINGEMENT CONCENTRATION*

3.1 Prior to making a *Modification* to the *Facility* that satisfies Condition 2.1 (a) and (b), the *Company* shall prepare a proposed update to the *ESDM Report* to reflect the proposed *Modification.*

3.2 The *Company* shall request approval of an *Acceptable Point of Impingement Concentration* for a *Compound of Concern* if the *Compound of Concern* does not have a *Ministry Point of Impingement Limit* and a proposed update to an *ESDM Report* indicates that one of the following changes with respect to the concentration of the *Compound of Concern* may occur:

(a) The *Compound of Concern* was not a *Compound of Concern* in the previous version of the *ESDM Report* and

(i) the concentration of the *Compound of Concern* is higher than the *Jurisdictional Screening Level* for the contaminant; or

(ii) there is no *Jurisdictional Screening Level* for the contaminant .

(b) The concentration of the *Compound of Concern* in the updated *ESDM Report* is higher than:

(i) the most recent *Acceptable Point of Impingement Concentration,* and

(ii) the *Jurisdictional Screening Level* if a *Jurisdictional Screening Level* exists.

3.3 The request required by Condition 3.2 shall propose a concentration for the *Compound of Concern* and shall contain an assessment, performed by a *Toxicologist,* of the likelihood of the proposed concentration causing an adverse effect at *Points of Impingement.*

3.4 If the request required by Condition 3.2 is a result of a proposed *Modification* described in Condition 3.1, the *Company* shall submit the request, in writing, to the *Director* at least 30 days prior to commencing to make the *Modification.* The *Director* shall provide written confirmation of receipt of this request to the *Company.*

3.5 If a request is required to be made under Condition 3.2 in respect of a proposed *Modification* described in Condition 3.1, the *Company* shall not make the *Modification* mentioned in Condition 3.1 unless the request is approved in writing by the *Director.*

3.6 If the *Director* notifies the *Company* in writing that the *Director* does not approve the request, the *Company* shall,

(a) revise and resubmit the request; or

(b) notify the *Director* that it will not be making the *Modification.*

3.7 The re-submission mentioned in Condition 3.6 shall be deemed a new submission under Condition 3.2.

3.8 If the *Director* approves the request, the *Company* shall update the *ESDM Report* to reflect the *Modification.*

3.9 Condition 3 does not apply if Condition 2.1 has expired.

4. PERFORMANCE LIMITS

4.1. Subject to Condition 4.2, the *Company* shall not discharge or cause or permit the discharge of a *Compound of Concern* into the air if,

(a) the *Compound of Concern* has a *Ministry Point of Impingement Limit* and the discharge results in the concentration at a *Point of Impingement* exceeding the *Ministry Point of Impingement Limit;* or

(b) the *Compound of Concern* does not have a *Ministry Point of Impingement Limit* and the discharge results in the concentration at a *Point of Impingement* exceeding the higher of,

(i) if an *Acceptable Point of Impingement Concentration* exists the most recent *Acceptable Point of Impingement Concentration,* and

(ii) the *Jurisdictional Screening Level* if a *Jurisdictional Screening Level* exists.

4.2 Condition 4.1 does not apply if the *Ministry Point of Impingement Limit* has a 10-minute averaging period and no ambient monitor indicates an exceedance at a *Point of Impingement* where human activities regularly occur at a time when those activities regularly occur.

4.3 The *Company* shall:

(a) implement by not later than three (3) months after the date of this *Approval,* the *Noise Control Measures* outlined in the *Acoustic Assessment Report;*

(b) ensure, subsequent to the implementation of the proposed *Noise Control Measures* that the noise emissions from the *Facility* comply with the limits set in *Ministry Publication NPC-205; and*

(c) ensure that the *Noise Control Measures* are properly maintained and continue to provide the acoustical performance outlined in the *Acoustic Assessment Report.*.

4.4 The *Company* shall, at all times, ensure that the vibration emissions from the *Facility* comply with the limits set out in *Ministry Publication NPC-207.*

4.5 The *Company* shall operate any *Equipment with Specific Operational Limits* approved by this

Approval in accordance with the *Original ESDM Report.*

5. **DOCUMENTATION REQUIREMENTS**

5.1. The *Company* shall maintain an up-to-date *Log.*

5.2. No later than June 30 in each year, the *Company* shall update the *Acoustic Assessment Report* and shall update the *ESDM Report* in accordance with section 26 of *O. Reg. 419/05* so that the information in the reports is accurate as of December 31 in the previous year.

5.3. The *Company* shall make the *Emission Summary Table* (see section 27 of *O. Reg. 419/05)* and *Acoustic Assessment Summary Table* available for examination by any person, without charge, by posting it on the Internet or by making it available during regular business hours at the *Facility.*

5.4 The *Company* shall, within three (3) months after the expiry of Condition 2.1 of this *Approval,* update the *ESDM Report* and the *Acoustic Assessment Report* such that the information in the reports is accurate as of the date that Condition 2.1 of this *Approval* expired.

5.5. Conditions 5.1 and 5.2 do not apply if Condition 2.1 has expired.

6. REPORTING REQUIREMENTS

6.1 Subject to Condition 6.2, the *Company* shall provide the *Director* no later than August 31 of each year, a *Written Summary Form* to be submitted through the *Ministry's* website that shall include the following:

(a) a declaration of whether the *Facility* was in compliance with section 9 of the *EPA, O. Reg. 419/05* and the conditions of this *Approval;*

(b) a summary of each *Modification* satisfying Condition 2.1 (a) and (b) that took place in the previous calendar year that resulted in a change in the previously calculated concentration at a *Point of Impingement* for any *Compound of Concern* or resulted in a change in the sound levels reported in the *Acoustic Assessment Summary Table* at any *Point of Reception.*

6.2 Condition 6.1 does not apply if Condition 2.1 has expired.

7. OPERATION AND MAINTENANCE

7.1 The *Company* shall prepare and implement, not later than three (3) months from the date of this *Approval,* operating procedures and maintenance programs for all *Processes with Significant Environmental Aspects,* which shall specify as a minimum:

(a) frequency of inspections and scheduled preventative maintenance;

(b) procedures to prevent upset conditions;

(c) procedures to minimize all fugitive emissions;

(d) procedures to prevent and/or minimize odorous emissions;

(e) procedures to prevent and/or minimize noise emissions; and

(f) procedures for record keeping activities relating to the operation and maintenance programs.

7.2 The *Company* shall ensure that all *Processes with Significant Environmental Aspects* are operated and maintained in accordance with this *Approval,* the operating procedures and maintenance programs.

8. COMPLAINTS RECORDING AND REPORTING

8.1 If at any time, the *Company* receives an environmental complaint from the public regarding the operation of the *Equipment* approved by this *Approval,* the *Company* shall take the following steps:

(a) Record and number each complaint, either electronically or in a log book. The record shall include the following information: the time and date of the complaint and incident to which the complaint relates, the nature of the complaint, wind direction at the time and date of the incident to which the complaint relates and, if known, the address of the complainant.

(b) Notify the *District Manager* of the complaint within two (2) business days after the complaint is received, or in a manner acceptable to the *District Manager.*

(c) Initiate appropriate steps to determine all possible causes of the complaint, and take the necessary actions to appropriately deal with the cause of the subject matter of the complaint.

(d) Complete and retain on-site a report written within one (1) week of the complaint date. The report shall list the actions taken to appropriately deal with the cause of the complaint and set out steps to be taken to avoid the recurrence of similar incidents.

9. RECORD KEEPING REQUIREMENTS

9.1 Any information requested by any employee in or agent of the *Ministry* concerning the *Facility* and its operation under this *Approval,* including, but not limited to, any records required to be kept by this *Approval,* shall be provided to the employee in or agent of the *Ministry,* upon request**,** in a timely manner.

9.2 Unless otherwise specified in this *Approval,* the *Company* shall retain, for a minimum of five (5) years from the date of their creation all reports, records and information described in this *Approval,* including,

(a) a copy of the *Original ESDM Report* and each updated version*;*

(b) a copy of each version of the *Acoustic Assessment Report;*

(c) supporting information used in the emission rate calculations performed in the *ESDM Reports* and *Acoustic Assessment Reports;*

(d) the records in the *Log;*

(e) copies of each *Written Summary Form* provided to the *Ministry* under Condition 6.1 of this *Approval;*

(f) records of maintenance, repair and inspection of *Equipment* related to all *Processes with Significant Environmental Aspects;* and

(g) all records related to environmental complaints made by the public as required by Condition 8 of this *Approval.*

10. REVOCATION OF PREVIOUS APPROVALS

This *Approval* replaces and revokes all Certificates of Approval (Air) issued under section 9 *EPA* and Environmental Compliance Approvals issued under Part II.1 *EPA* to the *Facility* in regards to the activities mentioned in subsection 9(1) of the *EPA* and dated prior to the date of this *Approval.*

11. ACOUSTIC AUDIT

11.1 The *Company* shall carry out *Acoustic Audit* measurements on the actual noise emissions due to the operation of the *Facility*. The *Company:*

(a) shall carry out *Acoustic Audit* measurements in accordance with the procedures in *Publication NPC-103*;

(b) shall submit an *Acoustic Audit Report* on the results of the *Acoustic Audit*, prepared by an *Independent Acoustical Consultant*, in accordance with the requirements of *Publication NPC-233*, to the *District Manager* and the *Director,* not later than six (6) months after the date of this *Approval.*

11.2 The *Director:*

(a) may not accept the results of the *Acoustic Audit* if the requirements of *Publication NPC-233* were not followed;

(b) may require the *Company* to repeat the *Acoustic Audit* if the results of the *Acoustic Audit* are found unacceptable to the *Director.*

SCHEDULE A

Supporting Documentation

(a) Environmental Compliance Approval Application, dated May 20, 2010, signed by Gerald Paranczuk and submitted by the *Company;*
(b) Emission Summary and Dispersion Modelling Report, prepared by Watters Environmental Group Inc. and dated May 20, 2010;

(c) *Acoustic Assessment Report,* prepared by J.E. Coulter Associates Limited, dated September 8, 2011 and signed by John Coulter, P.Eng.;

(d) Addendum to an Approval of Air letters, prepared by Watters Environmental Group Inc., dated May 7, 2012 and October 30, 2013;

(e) Addendum to an Application for an Environmental Compliance Approval (Air) letter, prepared by Watters Environmental Group Inc. and dated November 24, 2015 and

(f) Answers to MOECC Questions letter, prepared by Watters Environmental Group Inc. and dated January 8, 2016.

The reasons for the imposition of these terms and conditions are as follows:

GENERAL

1. Condition No. 1 is included to require the *Approval* holder to build, operate and maintain the *Facility* in accordance with the Supporting Documentation in Schedule A considered by the *Director* in issuing this *Approval.*

LIMITED OPERATIONAL FLEXIBILITY, REQUIREMENT TO REQUEST AN *ACCEPTABLE POINT OF IMPINGEMENT CONCENTRATION* AND *PERFORMANCE LIMITS*

2. Conditions No. 2, 3 and 4 are included to limit and define the *Modifications* permitted by this *Approval,* and to set out the circumstances in which the *Company* shall request approval of an *Acceptable Point of Impingement Concentration* prior to making *Modifications.* The holder of the *Approval* is approved for operational flexibility for the *Facility* that is consistent with the description of the operations included with the application up to the *Facility Production Limit.* In return for the operational flexibility, the *Approval* places performance based limits that cannot be exceeded under the terms of this *Approval. Approval* holders will still have to obtain other relevant approvals required to operate the *Facility,* including requirements under other environmental legislation such as the *Environmental Assessment Act.*

DOCUMENTATION REQUIREMENTS

3. Condition No. 5 is included to require the *Company* to maintain ongoing documentation that demonstrates compliance with the *Performance Limits* of this *Approval* and allows the *Ministry* to monitor on-going compliance with these *Performance Limits.* The *Company* is required to have an up to date *ESDM Report* and *Acoustic Assessment Report* that describe the *Facility* at all times and make the *Emission Summary Table* and *Acoustic Assessment Summary Table* from these reports available to the public on an ongoing basis in order to maintain public communication with regard to the emissions from the *Facility.*

REPORTING REQUIREMENTS

4. Condition No. 6 is included to require the *Company* to provide a yearly *Written Summary Form* to the *Ministry,* to assist the *Ministry* with the review of the site's compliance with the *EPA,* the regulations and this *Approval.*

OPERATION AND MAINTENANCE

5. Condition No. 7 is included to require the *Company* to properly operate and maintain the *Processes with Significant Environmental Aspects* to minimize the impact to the environment from these processes.

COMPLAINTS RECORDING AND REPORTING PROCEDURE

6. Condition No. 8 is included to require the *Company* to respond to any environmental complaints regarding the operation of the *Equipment,* according to a procedure that includes methods for preventing recurrence of similar incidents and a requirement to prepare and retain a written report.

RECORD KEEPING REQUIREMENTS

7. Condition No. 9 is included to require the *Company* to retain all documentation related to this *Approval* and provide access to employees in or agents of the *Ministry,* upon request, so that the *Ministry* can determine if a more detailed review of compliance with the *Performance Limits* is necessary.

REVOCATION OF PREVIOUS APPROVALS

8. Condition No. 10 is included to identify that this *Approval* replaces all Section 9 Certificate(s) of Approval and Part II.1 Approvals in regards to the activities mentioned in subsection 9(1) of the *EPA* and dated prior to the date of this *Approval.*

ACOUSTIC AUDIT

9. Condition No. 11 is included to require the *Company* to gather accurate information and submit an *Acoustic Audit Report* in accordance with procedures set in the *Ministry*'s noise guidelines, so that the environmental impact and subsequent compliance with this *Approval* can be verified.

In accordance with Section 139 of the Environmental Protection Act, you may by written Notice served upon me, the Environmental Review Tribunal and in accordance with Section 47 of the Environmental Bill of Rights, 1993 , S.O. 1993, c. 28 (Environmental Bill of Rights), the Environmental Commissioner, within 15 days after receipt of this Notice, require a hearing by the Tribunal. The Environmental Commissioner will place notice of your appeal on the Environmental Registry. Section 142 of the Environmental Protection Act provides that the Notice requiring the hearing shall state:

1. The portions of the environmental compliance approval or each term or condition in the environmental compliance approval in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

The Notice should also include:

3. The name of the appellant;
4. The address of the appellant;
5. The environmental compliance approval number;
6. The date of the environmental compliance approval;
7. The name of the Director, and;
8. The municipality or municipalities within which the project is to be engaged in.

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

The Secretary*
Environmental Review Tribunal
655 Bay Street, Suite 1500
Toronto, Ontario
M5G 1E5

AND

The Environmental Commissioner
1075 Bay Street, Suite 605
Toronto, Ontario
M5S 2B1

AND

The Director appointed for the purposes of Part II.1 of the Environmental Protection Act
Ministry of the Environment and Climate Change
135 St. Clair Avenue West, 1st Floor
Toronto, Ontario
M4V 1P5

*** Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 212-6349, Fax: (416) 326-5370 or www.ert.gov.on.ca**

This instrument is subject to Section 38 of the Environmental Bill of Rights, 1993, that allows residents of Ontario to seek leave to appeal the decision on this instrument. Residents of Ontario may seek leave to appeal within 15 days from the date this decision is placed on the Environmental Registry. By accessing the Environmental Registry at www.ebr.gov.on.ca , you can determine when the leave to appeal period ends.

The above noted activity is approved under s.20.3 of Part II.1 of the Environmental Protection Act.

DATED AT TORONTO this 29th day of September, 2016

Ian Greason, P.Eng.
Director
appointed for the purposes of Part II.1 of the *Environmental Protection Act*

SM/
c: District Manager, MOECC Halton-Peel
Fatema Tawawala, Watters Environmental Group Inc.

Ontario

Ministry of the Environment
Ministère de l'Environnement

AMENDED ENVIRONMENTAL COMPLIANCE APPROVAL
NUMBER 4504-9NNJHJ
Issue Date: February 12, 2015

Howmet Georgetown Casting Ltd. / Moulage D'Aluminium Howmet Ltee.
93 Mountainview Road North, Georgetown
Halton Hills, Ontario
L7G 4J6

Site Location: 93 Mountainview Road N
Halton Hills Town, Regional Municipality of Halton
L7G 4J6

You have applied under section 20.2 of Part II.1 of the Environmental Protection Act, R.S.O. 1990, c. E. 19 (Environmental Protection Act) for approval of:

- one (1) baghouse dust collector, to control emissions from the shell department, complete with polyester filter material having a filtering area of 249 square metres and a mechanical shaker cleaning system, discharging into the air at a maximum volumetric flowrate of 1.36 actual cubic metres per second at an approximate temperature of 26 degrees Celsius, through a stack, having an exit diameter of 0.31, extending 10.0 metres above grade;

- one (1) baghouse dust collector, to control emissions from the finishing room, complete with polyester filter material having a filtering area of 145 square metres and a mechanical shaker cleaning system, discharging into the air at a maximum volumetric flowrate of 2.37 actual cubic metres per second at an approximate temperature of 22 degrees Celsius, through a stack, having an exit dimension of 0.53 metre by 0.53 metre, extending 3.66 metres above grade;

- one (1) exhaust system complete with a cyclone serving the investing area, discharging into the air at a maximum volumetric flowrate of 0.50 actual cubic metres per second at an approximate temperature of 22 degrees Celsius, through a stack, having an exit diameter of 0.15 metre, extending 2.13 metres above the roof and 10.06 metres above grade;

- one (1) exhaust system serving the drying tunnel, Shell Department, discharging into the air at a maximum volumetric flowrate of 0.04 actual cubic metres per second at an approximate temperature of 28 degrees Celsius, through a stack, having an exit diameter of 0.13 metre, extending 6.13 metres above grade;

- one (1) exhaust system serving the etching room, discharging into the air at a maximum volumetric flowrate of 1.89 actual cubic metres per second at an approximate temperature of 22 degrees Celsius, through a stack, having an exit diameter of 0.41 metre, extending 2.44 metres above the roof and 8.53 metres above grade;

- one (1) exhaust system serving the Wax Mounting area, discharging into the air at a maximum volumetric flowrate of 0.47 actual cubic metres per second at an approximate temperature of 24 degrees Celsius, through a stack, having an exit diameter of 0.20 metre, extending 6.00 metres above grade;

- one (1) exhaust system serving the Shell Mounting Area area, discharging into the air at a maximum

volumetric flowrate of 0.47 actual cubic metres per second at an approximate temperature of 24 degrees Celsius, through a stack, having an exit diameter of 0.20 metre, extending 6.00 metres above grade;

- two (2) exhaust systems, each serving six furnaces, discharging into the air at a maximum volumetric flowrate of 0.59 actual cubic metres per second at an approximate temperature of 275 degrees Celsius, through separate stacks, each having an exit diameter of 0.205 metre, extending 12.8 metres above grade;

- one (1) exhaust system serving the Autoclave, discharging into the air at a maximum volumetric flowrate of 0.003 actual cubic metres per second at an approximate temperature of 100 degrees Celsius, through a stack, having an exit diameter of 0.05 metre, extending 8.23 metres above grade;

all in accordance with an application for Certificate of Approval (Air), and all supporting information dated September 11, 2002 signed by Andreas Hack; and the application for Certificate of Approval (Air), and all supporting information dated December 19, 2006 signed by Andreas Hack; and the application for Environmental Compliance Approval (Air), and all supporting information dated September 15, 2011 signed by Bob Hesselink; and the document titled " ODOUR ASSESSMENT, ADDENDUM TO ENVIRONMENTAL COMPLIANCE APPROVAL APPLICATION, HOWMET GEORGETOWN CASTING, GEORGETOWN, ONTARIO" dated May 2, 2014 prepared by Tara Weerasuriya and Sean Capstick of Golder Associates; and the Acoustic Assessment Report dated November 21, 2014, prepared by Timothy Gully of Golder Associates Ltd., and an email dated October 14, 2014 from Timothy Gully of Golder Associates Ltd.

For the purpose of this environmental compliance approval, the following definitions apply:

1. "Acoustic Assessment Report" means the report, prepared in accordance with Publication NPC-233 and Appendix A of the Basic Comprehensive User Guide, by Golder Associates Ltd. and dated November 21, 2014 submitted in support of the application, that documents all sources of noise emissions and Noise Control Measures present at the Facility and includes all up-dated Acoustic Assessment Reports as required by the Documentation Requirements conditions of this Approval to demonstrate continued compliance with the Performance Limits following the implementation of any Modification;

2. "Approval" means this Environmental Compliance Approval and any Schedules to it;

3. "Company" means Howmet Georgetown Casting Ltd. that is responsible for the construction or operation of the Facility and includes any successors and assigns;

4. "Director" means any Ministry employee appointed by the Minister pursuant to Section 5 of the EPA as a Director for the purpose of Section 9 of the EPA;

5. "District Manager" means the District Manager, Halton-Peel District Office, Central Region of the Ministry;

6. "Emission Event" means an event when the Company or the Provincial Officer detects an emission of odour or any contaminant at an off-site location due to operation of the Facility;

7. "EPA" means the Environmental Protection Act, R.S.O. 1990, c.E.19, as amended;

8. "Equipment" means the equipment described in the Company's application, this Approval and in the supporting documentation submitted with the application, to the extent approved by this Approval;

9. "Facility" means the entire operation located on the property where the Equipment is located;

10. "Manual" means a document or a set of documents that provide written instructions to staff of the Company;

11. "Ministry" means the ministry of the government of Ontario responsible for the EPA and includes all officials, employees or other persons acting on its behalf;

12. "Noise Control Measures" means measures to reduce the noise emissions from the Facility and/or Equipment including, but not limited to, silencers, acoustic louvres, enclosures, absorptive treatment, plenums and barriers, described in the Company's application, and in the supporting documentation referred to herein, including the Acoustic Assessment Report, to the extent approved by this Approval;

13. "Odour Management Plan" means a document or a set of documents that provide written instructions to staff of the Company, for the purpose of meeting the requirements of terms and condition 2(3) of this Approval;

14. "Pre-Test Plan" means a plan for the Source Testing including the information required in Section 5 of the Source Testing Code;

15. "Provincial Officer" means any person designated in writing by the Ministry as a provincial officer;

16. "Publication NPC-233" means the Ministry Publication NPC-233, "Information to be Submitted for Approval of Stationary Sources of Sound", October, 1995 as amended;

17. "Publication NPC-300" means the Ministry Publication NPC-300, "Environmental Noise Guideline, Stationary and Transportation Sources – Approval and Planning, Publication NPC-300", August, 2013, as amended;

18. "Source Testing" means sampling and testing to measure emissions resulting from operating the Targeted Sources under conditions which yield the worst case emissions within the approved operating range of the Targeted Sources which satisfies paragraph 1 of subsection 11(1) of O. Reg. 419/05;

19. "Source Testing Code" means the Ontario Source Testing Code, dated June 2010, prepared by the Ministry, as amended;

20. "Substantiated Complaint" means a complaint received either by the Company or the District Manager that has been confirmed by staff of the Ministry and the cause of which is attributed to the Company's activities at the Facility;

21. "Targeted Sources" means the sources listed in Schedule "A"; and

22. "Test Contaminants" means the contaminants listed in Schedule "A".

You are hereby notified that this environmental compliance approval is issued to you subject to the terms and conditions outlined below:

TERMS AND CONDITIONS

PERFORMANCE

1. The Company shall ensure, subsequent to the completion of the Noise Control Measures, that the

noise emissions from the Facility comply with the limits set out in Ministry Publication NPC-300.

OPERATION AND MAINTENANCE

2. The Company shall ensure that the Facility and the Equipment are properly operated and maintained at all times. The Company shall:

(1) prepare a Manual, and review annually, and update, as necessary, outlining the operating procedures for the Facility that relate to noise, as well as the operating procedures and a maintenance program for the Equipment in accordance with good engineering practice, including:

(a) routine operating and maintenance procedures in accordance with good engineering practices and as recommended by the Equipment suppliers;

(b) emergency procedures;

(c) frequency of inspection and replacement of the filter materials in the baghouses;

(c) procedures for any record keeping activities relating to the operation and maintenance of the Equipment and noise related activities at the Facility,

(d) all appropriate measures to minimize odour and noise emissions from all potential sources, including but not limited to a contingency plan when the Facility is shut down.

(2) submit the Manual to the District Manager, not later than three (3) months following the date of this Approval, or within a period as directed or agreed by the District Manager.

(3) prepare and submit to the District Manager, three (3) months following the date of this Approval or within a period as directed or agreed by the District Manager and update, as necessary or as a minimum annually, an Odour Management Plan, identifying fugitive odour emission sources from the operation of the Facility and outlining the physical and procedural controls such as policies and standard operating procedures required in order to prevent or mitigate fugitive odour emissions from the operation of the Facility.

(4) implement the procedures/recommendations of the accepted and updated operation and maintenance Manual and Odour Management Plan.

(5) The District Manager may not accept the Odour Management Plan if the requirements of Condition No. 2(3) were not followed.

(6) If the District Manager does not accept the Odour Management Plan, the District Manager may require the Odour Management Plan to be revised and re-submitted.

COMPLAINTS / ODOUR-CONTAMINANT EMISSIONS RESPONSE PROCEDURE

3. If at any time, the Company or the Ministry receives a complaint or the Company or the Provincial Officer detects an Emission Event, the Company shall record all relevant information in the computerized tracking system and shall respond to the complaint/Emission Event according to the following procedure:

Step 1: Record of complaint/Emission Event

(1) (a) The Company shall record each complaint/Emission Event and each record shall include the following:

(A) name, address and the telephone number of the complainant, if known;
(B) time and date of the complaint/Emission Event;
(C) details of the complaint/Emission Event; and

(b) After the complaint/Emission Event has been recorded in the tracking system, the Company shall immediately report to the District Manager by phone or e-mail during office hours and to the Ministry's Spills Actions Centre at 1-800-268-6060 after office hours on the receipt of the complaint or occurrence of the Emission event.

Step 2: Investigation and Handling of complaint/Emission Event

(2) The Company shall immediately initiate investigation of the complaint/Emission Event. As a minimum, the investigation shall include the following:

(a) determination of the activities being undertaken at the Facility at the time of the complaint/Emission Event;
(b) meteorological conditions including, but not limited to the ambient temperature, approximate wind speed and its direction;
(c) determination if the complaint is attributed to activities being undertaken at the Facility and if so, the possible cause(s) of the complaint/Emission Event; and
(d) determination of the remedial action(s) to address the cause(s) of the Substantiated Complaint/Emission Event, and the schedule for the implementation of the necessary remedial action(s).

(3) The Company shall respond to the complainant, if known, and the response shall include the results of the investigation of the Substantiated Complaint, the action(s) taken or planned to be taken to address the cause(s) of the Substantiated Complaint, and if any follow-up response(s) will be provided.

(4) Upon completed investigation of the Substantiated Complaint/Emission event, the Company shall, within three (3) business days, submit a report to the District Manager on the Substantiated Complaint, on the action(s) taken or planned to be taken to address the cause(s) of the Substantiated Complaint and on all proposed action(s) to prevent recurrence of the Substantiated Complaint/Emission Event in the future.

4. If, in the opinion of the District Manager, failure of any process or Equipment upset or malfunction results in off-site Substantiated Complaint/Emission Event, confirmed by the Company or a Provincial Officer of the Ministry, the Company shall, immediately upon notification from the District Manager, implement any necessary additional control measures **.**

5. If the District Manager deems the additional control measures taken as per condition 4 to be unsuitable, insufficient or ineffective, the District Manager may direct the Company, in writing, to take further measures to address the noted failure, upset or malfunction including making repairs or modifications to Equipment or processes.

6. **SOURCE TESTING**

6.1 The Company shall perform Source Testing in accordance with the procedures in Schedule "B" to determine the rates of emissions of the Test Contaminants from the Targeted Sources listed in

Schedule "A".

NOISE CONTROL MEASURES

7. The Company shall:

(1) fully implement the Noise Control Measures specified in the Acoustic Assessment Report not later than twelve (12) months after the date noted on this Approval;

(2) ensure that the Noise Control Measures are properly maintained and continue to provide the acoustical performance outlined in the Acoustic Assessment Report.

RECORD RETENTION

8. The Company shall retain, for a minimum of two (2) years from the date of their creation, all records and information related to or resulting from the recording activities required by this Approval, and make these records available for review by staff of the Ministry upon request. The Company shall retain:

(1) all records on the maintenance, repair and inspection of the Equipment; and

(2) all reports of the Source Testing ,

(3) all measures taken to minimize odour emissions from all potential sources, and

(4) all records on environmental complaints and record created in accordance with condition 3 of the Approval.

SCHEDULE "A"

Source Testing
Targeted Sources* and *Test Contaminants

Targeted Sources		*Test Contaminants*	
Source ID	**Source Description**	**CAS Number**	**Chemical Name**
PS12	**Drying Tunnel**	**N/A**	**Odour**
PS4	**Hot Wax Exhaust (Vertical)**	**N/A**	**Odour**
PS7	**Hot Wax Exhaust**	**N/A**	**Odour**
PS13	**Shell DC**	**N/A**	**Odour**
PS10	**Autoclave Exhaust**	**N/A**	**Odour**
PS20A	**Combined Furnaces 1**	**N/A**	**Odour**
PS21A	**Combined**	**N/A**	**Odour**

SCHEDULE "B"

Source Testing Procedures

1. The Company shall submit, not later than three (3) months after commencement of operation of sources PS13, PS20A, ans PS21A listed in the Targeted Sources, to the Manager a Pre-Test Plan for the Source Testing required under this Approval. The Company shall finalize the Pre-Test Plan in consultation with the Manager.

2. The Company shall not commence the Source Testing required under this Approval until the Manager has approved the Pre-Test Plan.

3. The Company shall complete the Source Testing not later than three (3) months after the Manager has approved the Pre-Test Plan.

4. The Company shall notify the Manager, the District Manager and the Director in writing of the location, date and time of any impending Source Testing required by this Approval, at least fifteen (15) days prior to the Source Testing.

5. The Company shall submit a report (hardcopy and electronic format) on the Source Testing to the Manager, the District Manager and the Director not later than three (3) months after completing the Source Testing. The report shall be in the format described in the Source Testing Code, and shall also include, but not be limited to:

(1) an executive summary;
(2) an identification of the applicable North American Industry Classification System code (NAICS) for the Facility;
(3) records of operating conditions at the time of Source Testing, including but not limited to the following:

- production data;
- Facility/process information related to the operation of the Targeted Sources;
- description of the emission sources controlled by the Targeted Sources at the time of testing; and
- operational description of the general building ventilation at the time of testing;

(4) results of Source Testing, including the emission rate, emission concentration, and relevant emission factor of the Test Contaminants from the Targeted Sources; and

(5) a tabular comparison of Source Testing results for the Targeted Sources and Test Contaminants to original emission estimates described in the Company's application and the ESDM Report.

6. The Director may not accept the results of the Source Testing if:

(1) the Source Testing Code or the requirements of the Manager were not followed;
(2) the Company did not notify the Manager, the District Manager and Director of the Source Testing; or
(3) the Company failed to provide a complete report on the Source Testing.

7. If the Director does not accept the results of the Source Testing, the Director may require re-testing.

If re-testing is required, the Pre-Test Plan strategies need to be revised and submitted to the Manager for approval. The actions taken to minimize the possibility of the Source Testing results not being accepted by the Director must be noted in the revision.

8. If the Source Testing results are higher than the emission estimates in the Company's ESDM Report, the Company shall update their ESDM Report in accordance with Section 26 of O. Reg. 419/05 with the results from the Source Testing report and make these records available for review by staff of the Ministry upon request. The updated Emission Summary Table from the updated ESDM Report shall be submitted with the report on the Source Testing.

The reasons for the imposition of these terms and conditions are as follows:

1. Conditions No. 1 and 2 are included to provide the minimum performance requirement considered necessary to prevent an adverse effect resulting from the operation of the Facility;

2. Conditions Nos. 3 to 6, inclusive, are included to require the Company to gather accurate information so that compliance with the EPA, the regulations and this Approval can be verified.

3. Condition No. 7 is included to require the Company to implement a Noise Control Measures designed to ensure that the noise emissions from the Facility will be in compliance with applicable limits set in the Ministry's noise guidelines.

4. Condition No. 8 is included to require the Company to retain records and provide information to the Ministry so that compliance with the EPA, the regulations and this Approval can be verified.

Upon issuance of the environmental compliance approval, I hereby revoke Approval No(s). 7810-7RMK58 issued on June 26, 2009.

In accordance with Section 139 of the Environmental Protection Act, you may by written Notice served upon me, the Environmental Review Tribunal and in accordance with Section 47 of the Environmental Bill of Rights, 1993 , S.O. 1993, c. 28 (Environmental Bill of Rights), the Environmental Commissioner, within 15 days after receipt of this Notice, require a hearing by the Tribunal. The Environmental Commissioner will place notice of your appeal on the Environmental Registry. Section 142 of the Environmental Protection Act provides that the Notice requiring the hearing shall state:

1. The portions of the environmental compliance approval or each term or condition in the environmental compliance approval in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

Pursuant to subsection 139(3) of the Environmental Protection Act, a hearing may not be required with respect to any terms and conditions in this environmental compliance approval, if the terms and conditions are substantially the same as those contained in an approval that is amended or revoked by this environmental compliance approval.

The Notice should also include:

3. The name of the appellant;
4. The address of the appellant;
5. The environmental compliance approval number;
6. The date of the environmental compliance approval;
7. The name of the Director, and;
8. The municipality or municipalities within which the project is to be engaged in.

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

The Secretary*
Environmental Review Tribunal
655 Bay Street, Suite 1500
Toronto, Ontario
M5G 1E5

AND

The Environmental Commissioner
1075 Bay Street, Suite 605
Toronto, Ontario
M5S 2B1

AND

The Director appointed for the purposes of Part II.1 of the Environmental Protection Act
Ministry of the Environment
2 St. Clair Avenue West, Floor 12A
Toronto, Ontario
M4V 1L5

*** Further information on the Environmental Review Tribunal 's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 212-6349, Fax: (416) 314-4506 or www.ert.gov.on.ca**

This instrument is subject to Section 38 of the Environmental Bill of Rights, 1993, that allows residents of Ontario to seek leave to appeal the decision on this instrument. Residents of Ontario may seek leave to appeal within 15 days from the date this decision is placed on the Environmental Registry. By accessing the Environmental Registry at www.ebr.gov.on.ca , you can determine when the leave to appeal period ends.

The above noted activity is approved under s.20.3 of Part II.1 of the Environmental Protection Act.

DATED AT TORONTO this 12th day of February, 2015

Rudolf Wan, P.Eng.
Director
appointed for the purposes of Part II.1 of the *Environmental Protection Act*

FC/
c: District Manager, MOE Halton-Peel
Tara Weerasuriya and Katie Armstrong, Golder Associates

APPENDIX E
AERMOD MODELING INPUT FILES

```
**
**************************************
**
** AERMOD Input Produced by:
** AERMOD View Ver. 9.9.0
** Lakes Environmental Software Inc.
** Date: 1/12/2022
** File: C:\Users\anajjar\OneDrive - SLR Consulting Limited\Documents\AERMOD\Rosetta\220110 Update\Rosetta -1
hr\Rosetta  1 hr.ADI
**
**************************************
**
**
**************************************
** AERMOD Control Pathway
**************************************
**
**
CO STARTING
   TITLEONE C:\Users\anajjar\Documents\AERMOD\Rosetta  1 hr\Rosetta  1 hr.isc
   MODELOPT DFAULT CONC
   AVERTIME 1
   URBANOPT 42123
   POLLUTID NOX
   FLAGPOLE 0.00
   RUNORNOT RUN
   ERRORFIL "Rosetta  1 hr.err"
CO FINISHED
**
**************************************
** AERMOD Source Pathway
**************************************
**
**
SO STARTING
** Source Location **
** Source ID - Type - X Coord. - Y Coord. **
** ----------------------------------------------------------------
** Line Source Represented by Adjacent Volume Sources
** LINE VOLUME Source ID = SLINE1
** DESCRSRC
** PREFIX
** Length of Side = 9.20
** Configuration = Adjacent
** Emission Rate = 0.764
** Vertical Dimension = 8.02
** SZINIT = 3.73
** Nodes = 2
** 586780.044, 4834068.527, 247.11, 4.00, 4.28
** 587738.810, 4834353.900, 260.00, 4.00, 4.28
** ----------------------------------------------------------------
   LOCATION L0000001     VOLUME   586784.452 4834069.840 247.26
   LOCATION L0000002     VOLUME   586793.270 4834072.464 246.93
```

LOCATION L0000003 VOLUME 586802.088 4834075.089 246.39
LOCATION L0000004 VOLUME 586810.905 4834077.713 245.16
LOCATION L0000005 VOLUME 586819.723 4834080.338 244.02
LOCATION L0000006 VOLUME 586828.541 4834082.962 243.28
LOCATION L0000007 VOLUME 586837.359 4834085.587 243.14
LOCATION L0000008 VOLUME 586846.176 4834088.212 244.07
LOCATION L0000009 VOLUME 586854.994 4834090.836 245.37
LOCATION L0000010 VOLUME 586863.812 4834093.461 247.49
LOCATION L0000011 VOLUME 586872.629 4834096.085 249.38
LOCATION L0000012 VOLUME 586881.447 4834098.710 251.22
LOCATION L0000013 VOLUME 586890.265 4834101.334 252.56
LOCATION L0000014 VOLUME 586899.082 4834103.959 253.12
LOCATION L0000015 VOLUME 586907.900 4834106.583 253.29
LOCATION L0000016 VOLUME 586916.718 4834109.208 253.17
LOCATION L0000017 VOLUME 586925.535 4834111.833 253.28
LOCATION L0000018 VOLUME 586934.353 4834114.457 253.50
LOCATION L0000019 VOLUME 586943.171 4834117.082 253.42
LOCATION L0000020 VOLUME 586951.989 4834119.706 253.09
LOCATION L0000021 VOLUME 586960.806 4834122.331 253.15
LOCATION L0000022 VOLUME 586969.624 4834124.955 253.37
LOCATION L0000023 VOLUME 586978.442 4834127.580 253.58
LOCATION L0000024 VOLUME 586987.259 4834130.204 253.80
LOCATION L0000025 VOLUME 586996.077 4834132.829 254.02
LOCATION L0000026 VOLUME 587004.895 4834135.454 254.24
LOCATION L0000027 VOLUME 587013.712 4834138.078 254.45
LOCATION L0000028 VOLUME 587022.530 4834140.703 254.67
LOCATION L0000029 VOLUME 587031.348 4834143.327 254.89
LOCATION L0000030 VOLUME 587040.166 4834145.952 255.05
LOCATION L0000031 VOLUME 587048.983 4834148.576 255.16
LOCATION L0000032 VOLUME 587057.801 4834151.201 255.27
LOCATION L0000033 VOLUME 587066.619 4834153.825 255.38
LOCATION L0000034 VOLUME 587075.436 4834156.450 255.49
LOCATION L0000035 VOLUME 587084.254 4834159.074 255.59
LOCATION L0000036 VOLUME 587093.072 4834161.699 255.70
LOCATION L0000037 VOLUME 587101.889 4834164.324 255.81
LOCATION L0000038 VOLUME 587110.707 4834166.948 256.28
LOCATION L0000039 VOLUME 587119.525 4834169.573 256.89
LOCATION L0000040 VOLUME 587128.342 4834172.197 257.06
LOCATION L0000041 VOLUME 587137.160 4834174.822 257.23
LOCATION L0000042 VOLUME 587145.978 4834177.446 257.65
LOCATION L0000043 VOLUME 587154.796 4834180.071 258.00
LOCATION L0000044 VOLUME 587163.613 4834182.695 258.30
LOCATION L0000045 VOLUME 587172.431 4834185.320 258.68
LOCATION L0000046 VOLUME 587181.249 4834187.945 258.79
LOCATION L0000047 VOLUME 587190.066 4834190.569 258.91
LOCATION L0000048 VOLUME 587198.884 4834193.194 259.00
LOCATION L0000049 VOLUME 587207.702 4834195.818 259.00
LOCATION L0000050 VOLUME 587216.519 4834198.443 259.00
LOCATION L0000051 VOLUME 587225.337 4834201.067 259.07
LOCATION L0000052 VOLUME 587234.155 4834203.692 259.32
LOCATION L0000053 VOLUME 587242.972 4834206.316 259.66
LOCATION L0000054 VOLUME 587251.790 4834208.941 259.93
LOCATION L0000055 VOLUME 587260.608 4834211.566 260.00
LOCATION L0000056 VOLUME 587269.426 4834214.190 260.00

```
  LOCATION L0000057     VOLUME   587278.243 4834216.815 260.00
  LOCATION L0000058     VOLUME   587287.061 4834219.439 260.00
  LOCATION L0000059     VOLUME   587295.879 4834222.064 260.00
  LOCATION L0000060     VOLUME   587304.696 4834224.688 260.00
  LOCATION L0000061     VOLUME   587313.514 4834227.313 260.00
  LOCATION L0000062     VOLUME   587322.332 4834229.937 260.00
  LOCATION L0000063     VOLUME   587331.149 4834232.562 260.00
  LOCATION L0000064     VOLUME   587339.967 4834235.187 260.00
  LOCATION L0000065     VOLUME   587348.785 4834237.811 260.00
  LOCATION L0000066     VOLUME   587357.602 4834240.436 259.90
  LOCATION L0000067     VOLUME   587366.420 4834243.060 259.36
  LOCATION L0000068     VOLUME   587375.238 4834245.685 259.00
  LOCATION L0000069     VOLUME   587384.056 4834248.309 259.00
  LOCATION L0000070     VOLUME   587392.873 4834250.934 258.92
  LOCATION L0000071     VOLUME   587401.691 4834253.558 258.63
  LOCATION L0000072     VOLUME   587410.509 4834256.183 258.29
  LOCATION L0000073     VOLUME   587419.326 4834258.807 258.06
  LOCATION L0000074     VOLUME   587428.144 4834261.432 258.00
  LOCATION L0000075     VOLUME   587436.962 4834264.057 258.00
  LOCATION L0000076     VOLUME   587445.779 4834266.681 258.34
  LOCATION L0000077     VOLUME   587454.597 4834269.306 258.76
  LOCATION L0000078     VOLUME   587463.415 4834271.930 258.74
  LOCATION L0000079     VOLUME   587472.233 4834274.555 258.63
  LOCATION L0000080     VOLUME   587481.050 4834277.179 259.01
  LOCATION L0000081     VOLUME   587489.868 4834279.804 259.42
  LOCATION L0000082     VOLUME   587498.686 4834282.428 259.31
  LOCATION L0000083     VOLUME   587507.503 4834285.053 259.20
  LOCATION L0000084     VOLUME   587516.321 4834287.678 259.09
  LOCATION L0000085     VOLUME   587525.139 4834290.302 259.10
  LOCATION L0000086     VOLUME   587533.956 4834292.927 259.52
  LOCATION L0000087     VOLUME   587542.774 4834295.551 259.77
  LOCATION L0000088     VOLUME   587551.592 4834298.176 259.66
  LOCATION L0000089     VOLUME   587560.409 4834300.800 259.65
  LOCATION L0000090     VOLUME   587569.227 4834303.425 259.86
  LOCATION L0000091     VOLUME   587578.045 4834306.049 260.00
  LOCATION L0000092     VOLUME   587586.863 4834308.674 260.00
  LOCATION L0000093     VOLUME   587595.680 4834311.299 260.00
  LOCATION L0000094     VOLUME   587604.498 4834313.923 260.00
  LOCATION L0000095     VOLUME   587613.316 4834316.548 260.00
  LOCATION L0000096     VOLUME   587622.133 4834319.172 260.00
  LOCATION L0000097     VOLUME   587630.951 4834321.797 260.00
  LOCATION L0000098     VOLUME   587639.769 4834324.421 260.00
  LOCATION L0000099     VOLUME   587648.586 4834327.046 260.00
  LOCATION L0000100     VOLUME   587657.404 4834329.670 260.00
  LOCATION L0000101     VOLUME   587666.222 4834332.295 260.00
  LOCATION L0000102     VOLUME   587675.039 4834334.920 260.00
  LOCATION L0000103     VOLUME   587683.857 4834337.544 260.00
  LOCATION L0000104     VOLUME   587692.675 4834340.169 260.00
  LOCATION L0000105     VOLUME   587701.493 4834342.793 260.00
  LOCATION L0000106     VOLUME   587710.310 4834345.418 260.00
  LOCATION L0000107     VOLUME   587719.128 4834348.042 260.00
  LOCATION L0000108     VOLUME   587727.946 4834350.667 260.00
  LOCATION L0000109     VOLUME   587736.763 4834353.291 260.00
** End of LINE VOLUME Source ID = SLINE1
```

```
  LOCATION IDLE        POINT     587269.899  4834240.573     260.000
** Source Parameters **
** LINE VOLUME Source ID = SLINE1
  SRCPARAM L0000001    0.0070091743    4.00    4.28    3.73
  SRCPARAM L0000002    0.0070091743    4.00    4.28    3.73
  SRCPARAM L0000003    0.0070091743    4.00    4.28    3.73
  SRCPARAM L0000004    0.0070091743    4.00    4.28    3.73
  SRCPARAM L0000005    0.0070091743    4.00    4.28    3.73
  SRCPARAM L0000006    0.0070091743    4.00    4.28    3.73
  SRCPARAM L0000007    0.0070091743    4.00    4.28    3.73
  SRCPARAM L0000008    0.0070091743    4.00    4.28    3.73
  SRCPARAM L0000009    0.0070091743    4.00    4.28    3.73
  SRCPARAM L0000010    0.0070091743    4.00    4.28    3.73
  SRCPARAM L0000011    0.0070091743    4.00    4.28    3.73
  SRCPARAM L0000012    0.0070091743    4.00    4.28    3.73
  SRCPARAM L0000013    0.0070091743    4.00    4.28    3.73
  SRCPARAM L0000014    0.0070091743    4.00    4.28    3.73
  SRCPARAM L0000015    0.0070091743    4.00    4.28    3.73
  SRCPARAM L0000016    0.0070091743    4.00    4.28    3.73
  SRCPARAM L0000017    0.0070091743    4.00    4.28    3.73
  SRCPARAM L0000018    0.0070091743    4.00    4.28    3.73
  SRCPARAM L0000019    0.0070091743    4.00    4.28    3.73
  SRCPARAM L0000020    0.0070091743    4.00    4.28    3.73
  SRCPARAM L0000021    0.0070091743    4.00    4.28    3.73
  SRCPARAM L0000022    0.0070091743    4.00    4.28    3.73
  SRCPARAM L0000023    0.0070091743    4.00    4.28    3.73
  SRCPARAM L0000024    0.0070091743    4.00    4.28    3.73
  SRCPARAM L0000025    0.0070091743    4.00    4.28    3.73
  SRCPARAM L0000026    0.0070091743    4.00    4.28    3.73
  SRCPARAM L0000027    0.0070091743    4.00    4.28    3.73
  SRCPARAM L0000028    0.0070091743    4.00    4.28    3.73
  SRCPARAM L0000029    0.0070091743    4.00    4.28    3.73
  SRCPARAM L0000030    0.0070091743    4.00    4.28    3.73
  SRCPARAM L0000031    0.0070091743    4.00    4.28    3.73
  SRCPARAM L0000032    0.0070091743    4.00    4.28    3.73
  SRCPARAM L0000033    0.0070091743    4.00    4.28    3.73
  SRCPARAM L0000034    0.0070091743    4.00    4.28    3.73
  SRCPARAM L0000035    0.0070091743    4.00    4.28    3.73
  SRCPARAM L0000036    0.0070091743    4.00    4.28    3.73
  SRCPARAM L0000037    0.0070091743    4.00    4.28    3.73
  SRCPARAM L0000038    0.0070091743    4.00    4.28    3.73
  SRCPARAM L0000039    0.0070091743    4.00    4.28    3.73
  SRCPARAM L0000040    0.0070091743    4.00    4.28    3.73
  SRCPARAM L0000041    0.0070091743    4.00    4.28    3.73
  SRCPARAM L0000042    0.0070091743    4.00    4.28    3.73
  SRCPARAM L0000043    0.0070091743    4.00    4.28    3.73
  SRCPARAM L0000044    0.0070091743    4.00    4.28    3.73
  SRCPARAM L0000045    0.0070091743    4.00    4.28    3.73
  SRCPARAM L0000046    0.0070091743    4.00    4.28    3.73
  SRCPARAM L0000047    0.0070091743    4.00    4.28    3.73
  SRCPARAM L0000048    0.0070091743    4.00    4.28    3.73
  SRCPARAM L0000049    0.0070091743    4.00    4.28    3.73
  SRCPARAM L0000050    0.0070091743    4.00    4.28    3.73
  SRCPARAM L0000051    0.0070091743    4.00    4.28    3.73
```

SRCPARAM L0000052 0.0070091743 4.00 4.28 3.73
SRCPARAM L0000053 0.0070091743 4.00 4.28 3.73
SRCPARAM L0000054 0.0070091743 4.00 4.28 3.73
SRCPARAM L0000055 0.0070091743 4.00 4.28 3.73
SRCPARAM L0000056 0.0070091743 4.00 4.28 3.73
SRCPARAM L0000057 0.0070091743 4.00 4.28 3.73
SRCPARAM L0000058 0.0070091743 4.00 4.28 3.73
SRCPARAM L0000059 0.0070091743 4.00 4.28 3.73
SRCPARAM L0000060 0.0070091743 4.00 4.28 3.73
SRCPARAM L0000061 0.0070091743 4.00 4.28 3.73
SRCPARAM L0000062 0.0070091743 4.00 4.28 3.73
SRCPARAM L0000063 0.0070091743 4.00 4.28 3.73
SRCPARAM L0000064 0.0070091743 4.00 4.28 3.73
SRCPARAM L0000065 0.0070091743 4.00 4.28 3.73
SRCPARAM L0000066 0.0070091743 4.00 4.28 3.73
SRCPARAM L0000067 0.0070091743 4.00 4.28 3.73
SRCPARAM L0000068 0.0070091743 4.00 4.28 3.73
SRCPARAM L0000069 0.0070091743 4.00 4.28 3.73
SRCPARAM L0000070 0.0070091743 4.00 4.28 3.73
SRCPARAM L0000071 0.0070091743 4.00 4.28 3.73
SRCPARAM L0000072 0.0070091743 4.00 4.28 3.73
SRCPARAM L0000073 0.0070091743 4.00 4.28 3.73
SRCPARAM L0000074 0.0070091743 4.00 4.28 3.73
SRCPARAM L0000075 0.0070091743 4.00 4.28 3.73
SRCPARAM L0000076 0.0070091743 4.00 4.28 3.73
SRCPARAM L0000077 0.0070091743 4.00 4.28 3.73
SRCPARAM L0000078 0.0070091743 4.00 4.28 3.73
SRCPARAM L0000079 0.0070091743 4.00 4.28 3.73
SRCPARAM L0000080 0.0070091743 4.00 4.28 3.73
SRCPARAM L0000081 0.0070091743 4.00 4.28 3.73
SRCPARAM L0000082 0.0070091743 4.00 4.28 3.73
SRCPARAM L0000083 0.0070091743 4.00 4.28 3.73
SRCPARAM L0000084 0.0070091743 4.00 4.28 3.73
SRCPARAM L0000085 0.0070091743 4.00 4.28 3.73
SRCPARAM L0000086 0.0070091743 4.00 4.28 3.73
SRCPARAM L0000087 0.0070091743 4.00 4.28 3.73
SRCPARAM L0000088 0.0070091743 4.00 4.28 3.73
SRCPARAM L0000089 0.0070091743 4.00 4.28 3.73
SRCPARAM L0000090 0.0070091743 4.00 4.28 3.73
SRCPARAM L0000091 0.0070091743 4.00 4.28 3.73
SRCPARAM L0000092 0.0070091743 4.00 4.28 3.73
SRCPARAM L0000093 0.0070091743 4.00 4.28 3.73
SRCPARAM L0000094 0.0070091743 4.00 4.28 3.73
SRCPARAM L0000095 0.0070091743 4.00 4.28 3.73
SRCPARAM L0000096 0.0070091743 4.00 4.28 3.73
SRCPARAM L0000097 0.0070091743 4.00 4.28 3.73
SRCPARAM L0000098 0.0070091743 4.00 4.28 3.73
SRCPARAM L0000099 0.0070091743 4.00 4.28 3.73
SRCPARAM L0000100 0.0070091743 4.00 4.28 3.73
SRCPARAM L0000101 0.0070091743 4.00 4.28 3.73
SRCPARAM L0000102 0.0070091743 4.00 4.28 3.73
SRCPARAM L0000103 0.0070091743 4.00 4.28 3.73
SRCPARAM L0000104 0.0070091743 4.00 4.28 3.73
SRCPARAM L0000105 0.0070091743 4.00 4.28 3.73

```
  SRCPARAM L0000106    0.0070091743     4.00     4.28     3.73
  SRCPARAM L0000107    0.0070091743     4.00     4.28     3.73
  SRCPARAM L0000108    0.0070091743     4.00     4.28     3.73
  SRCPARAM L0000109    0.0070091743     4.00     4.28     3.73
** ---------------------------------------------------------------
  SRCPARAM IDLE           0.06    4.720  360.000 15.00000    0.300

** Building Downwash **
  BUILDHGT IDLE         36.00   36.00   36.00   36.00    0.00    0.00
  BUILDHGT IDLE          0.00    0.00   36.00   36.00   36.00   36.00
  BUILDHGT IDLE         36.00   36.00   36.00   36.00   36.00   36.00
  BUILDHGT IDLE         36.00   36.00   36.00   36.00    0.00    0.00
  BUILDHGT IDLE          0.00    0.00   36.00   36.00   36.00   36.00
  BUILDHGT IDLE         36.00   36.00   36.00   36.00   36.00   36.00

  BUILDWID IDLE        137.23  130.14  119.10  106.42    0.00    0.00
  BUILDWID IDLE          0.00    0.00   59.81   75.79   89.46  100.41
  BUILDWID IDLE        108.32  120.63  129.83  135.09  138.81  140.15
  BUILDWID IDLE        137.23  130.14  119.10  106.42    0.00    0.00
  BUILDWID IDLE          0.00    0.00   59.81   75.79   89.46  100.41
  BUILDWID IDLE        108.32  120.63  129.83  135.09  138.81  140.15

  BUILDLEN IDLE         75.79   89.46  100.41  108.32    0.00    0.00
  BUILDLEN IDLE          0.00    0.00  140.15  137.23  130.14  119.10
  BUILDLEN IDLE        106.42   92.77   76.30   57.51   53.85   59.81
  BUILDLEN IDLE         75.79   89.46  100.41  108.32    0.00    0.00
  BUILDLEN IDLE          0.00    0.00  140.15  137.23  130.14  119.10
  BUILDLEN IDLE        106.42   92.77   76.30   57.51   53.85   59.81

  XBADJ   IDLE           0.57  -12.92  -26.00  -38.30    0.00    0.00
  XBADJ   IDLE           0.00    0.00 -112.33 -118.43 -120.94 -119.77
  XBADJ   IDLE        -116.94 -112.82 -105.28  -94.53  -80.92  -73.84
  XBADJ   IDLE         -76.35  -76.54  -74.41  -70.01    0.00    0.00
  XBADJ   IDLE           0.00    0.00  -27.82  -18.80   -9.21    0.67
  XBADJ   IDLE          10.52   20.05   28.98   37.02   27.07   14.03

  YBADJ   IDLE          49.82   55.87   60.22   63.73    0.00    0.00
  YBADJ   IDLE           0.00    0.00   43.93   38.46   31.81   24.20
  YBADJ   IDLE          15.85    3.17   -9.88  -22.63  -33.41  -42.26
  YBADJ   IDLE         -49.82  -55.87  -60.22  -63.73    0.00    0.00
  YBADJ   IDLE           0.00    0.00  -43.93  -38.46  -31.81  -24.20
  YBADJ   IDLE         -15.85   -3.17    9.88   22.63   33.41   42.26

  URBANSRC ALL
  SRCGROUP Idle    IDLE
  SRCGROUP Moving  L0000001 L0000002 L0000003 L0000004 L0000005 L0000006
  SRCGROUP Moving  L0000007 L0000008 L0000009 L0000010 L0000011 L0000012
  SRCGROUP Moving  L0000013 L0000014 L0000015 L0000016 L0000017 L0000018
  SRCGROUP Moving  L0000019 L0000020 L0000021 L0000022 L0000023 L0000024
  SRCGROUP Moving  L0000025 L0000026 L0000027 L0000028 L0000029 L0000030
  SRCGROUP Moving  L0000031 L0000032 L0000033 L0000034 L0000035 L0000036
  SRCGROUP Moving  L0000037 L0000038 L0000039 L0000040 L0000041 L0000042
  SRCGROUP Moving  L0000043 L0000044 L0000045 L0000046 L0000047 L0000048
  SRCGROUP Moving  L0000049 L0000050 L0000051 L0000052 L0000053 L0000054
```

```
  SRCGROUP Moving   L0000055 L0000056 L0000057 L0000058 L0000059 L0000060
  SRCGROUP Moving   L0000061 L0000062 L0000063 L0000064 L0000065 L0000066
  SRCGROUP Moving   L0000067 L0000068 L0000069 L0000070 L0000071 L0000072
  SRCGROUP Moving   L0000073 L0000074 L0000075 L0000076 L0000077 L0000078
  SRCGROUP Moving   L0000079 L0000080 L0000081 L0000082 L0000083 L0000084
  SRCGROUP Moving   L0000085 L0000086 L0000087 L0000088 L0000089 L0000090
  SRCGROUP Moving   L0000091 L0000092 L0000093 L0000094 L0000095 L0000096
  SRCGROUP Moving   L0000097 L0000098 L0000099 L0000100 L0000101 L0000102
  SRCGROUP Moving   L0000103 L0000104 L0000105 L0000106 L0000107 L0000108
  SRCGROUP Moving   L0000109
  SRCGROUP ALL
SO FINISHED
**
**********************************
** AERMOD Receptor Pathway
**********************************
**
**
RE STARTING
  INCLUDED "Rosetta  1 hr.rou"
RE FINISHED
**
**********************************
** AERMOD Meteorology Pathway
**********************************
**
**
ME STARTING
  SURFFILE Central_Urban\Toronto_urban_19191.SFC
  PROFFILE Central_Urban\Toronto_urban_19191.PFL
  SURFDATA 61587 1996 TORONTO
  UAIRDATA 725280 1996 BUFFALO
  PROFBASE 173.0 METERS
ME FINISHED
**
**********************************
** AERMOD Output Pathway
**********************************
**
**
OU STARTING
  RECTABLE ALLAVE 1ST
  RECTABLE 1 1ST
** Auto-Generated Plotfiles
  PLOTFILE 1 ALL 1ST "ROSETTA  1 HR.AD\01H1GALL.PLT" 31
  PLOTFILE 1 Idle 1ST "ROSETTA  1 HR.AD\01H1G001.PLT" 32
  PLOTFILE 1 Moving 1ST "ROSETTA  1 HR.AD\01H1G002.PLT" 33
  SUMMFILE "Rosetta  1 hr.sum"
OU FINISHED
**
**********************************
** Project Parameters
**********************************
** PROJCTN  CoordinateSystemUTM
```

** DESCPTN UTM: Universal Transverse Mercator
** DATUM   World Geodetic System 1984
** DTMRGN   Global Definition
** UNITS   m
** ZONE   17
** ZONEINX 0
**