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Noise and Vibration Feasibility Study
Proposed Dain West Subdivision
Welland, Ontario

Prepared for:

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EXECUTIVE SUMMARY

555 Canal Bank Developments GP Inc. retained HGC Engineering to conduct a noise and vibration feasibility study for a proposed residential development in the Dain City neighbourhood of Welland, Ontario. The study utilizes guidelines for acceptable levels of road and rail traffic noise impacting residential developments in the MECP publication NPC-300, "Environmental Noise Guidelines Stationary and Transportation Sources – Approval and Planning".

The results of the assessment indicate that it is feasible to achieve the MECP/CN sound level guidelines at the proposed residential development. The following recommendations are provided for noise control purposes:

a) The dwelling units closest to the rail lines at the north will require forced air ventilation systems with the provision for the future installation of central air conditioning systems by the occupant.
b) The dwelling units closest to Canal Bank Street, at the west side of the development, will require central air conditioning systems. These units will also require upgraded building constructions and windows to address road traffic sound levels.
c) Warning clauses should be placed on property and tenancy agreements and offers of purchase and sale for all residential units within 300 m of the rail lines identifying the presence of the rail lines and that sound from railway operations may at times be audible and that railway operations may change in the future.
d) A detailed traffic noise study should be conducted prior to the registration of the western and northern portions of the draft approved subdivision for the lands adjacent to the Highway 58A/CN rail corridor and Canal Bank Street to determine the noise impact based on road and rail traffic information, grading information and lotting and phasing information available at that time.
e) The first row of lots adjacent to the CN Rail Canal Subdivision, operated by GIO Rail Holdings Inc, are assessed based on Class 4 designation and sound level criteria.
f) The berm/barrier as shown in Figure 8, should be constructed to shield two-storey homes along the eastern portion of the development.

g) Warning clauses should be placed on tenancy and property agreements and offers of purchase and sale for all residential lots with exposure to Verbio Diesel Canada informing the future residents of the presence of the industrial operations and that those operations could change in the future.

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1 INTRODUCTION

HGC Engineering was retained by 555 Canal Bank Developments GP Inc. to conduct a noise and vibration feasibility study for a proposed residential development in the Dain City neighbourhood of Welland, Ontario. The site is located to the east of the Welland Recreation Canal, to the south of a Canadian National ("CN") Railway secondary main line and Townline Tunnel Road (Highway 58A), to the northwest of an industrial operation (Verbio Diesel Canada) and to the west of CN Railway secondary main line operated by GIO Rail Holdings Corp, and to the north of St. Clair Drive.

The study is part of the planning and approvals process with regard to the proposed residential development and has been prepared to support a zoning change for the lands from industrial to mixed use, including residential. This assessment assumes the implementation of Class 4 sound level criteria to assess stationary noise sources for the first row of dwellings adjacent to the Canal Subdivision rail line.

The lands are presently zoned as General Industrial (G1) and previously included a John Deere manufacturing facility. The study follows the Ontario Ministry of the Environment, Conservation and Parks ("MECP") and CN guidelines with regard to the impact of noise and vibration.

A site visit was performed in November 2019, in order to identify potentially significant transportation and industrial noise sources in the vicinity of the development, to investigate the site topography, and to conduct noise and vibration measurements. This report considers noise and vibration from rail traffic, noise from road traffic (Highway 58A and Canal Bank Street) and noise from the neighbouring industry (Verbio Diesel Canada's biodiesel plant).

2 SITE DESCIPTION AND SOURCES OF SOUND

Figure 1 is a key plan of the proposed subdivision. The site is located to the east of the Welland Recreation Canal, to the south of a Canadian National (CN) Railway secondary main line and Townline Tunnel Road (Highway 58A), to the east of Canal Bank Street, northwest of Verbio Diesel Canada's biodiesel plant, north of St. Clair Drive and west of a CN secondary main line operated by the GIO Rail Holdings Corp. Further to the south are existing residential land uses in Dain City, a suburb of Welland, Ontario.

The proposed development lands will include a number of Phases of development including fully detached, semi-detached and multiple residential units, a potential school, a mixed-use block, parks, open space areas, a stormwater pond and associated roadways. A concept plan prepared by Armstrong Planning, dated July 9, 2020 is shown in Figure 2.

Verbio Diesel Canada operates a biodiesel production facility with some yard activity, southeast of the proposed residential site. The sound levels of the biodiesel facility are discussed in a following section of this report.

HGC Engineering personnel visited the site on numerous occasions to investigate the acoustic and topographic environment of the site. The acoustical environment surrounding the site is semi-urban comprised primarily of road traffic and industrial noise during most hours. Occasional rail traffic on the adjacent rail lines is audible from time to time. The internal roadways were not considered in the analysis due to their anticipated low volumes.

3 SOUND LEVEL CRITERIA

3.1 CRITERIA GOVERNING ROAD AND RAIL TRAFFIC NOISE

Guidelines for acceptable levels of road and rail traffic noise impacting residential developments are given in the MECP publication NPC-300, “Environmental Noise Guidelines Stationary and Transportation Sources – Approval and Planning”, release date October 2013. These criteria are listed in Table I below, as energy equivalent average sound levels [L_{EQ}] in units of A-weighted decibels [dBA]. As well, a copy of the CN rail line requirements for a principal mainline and a secondary line are included as Appendix A.

Table I: MECP Road and Rail Traffic Noise Criteria (dBA)

Area	Daytime L_{EQ} (16 hour) Road/Rail	Nighttime L_{EQ} (8 hour) Road/Rail
Inside Living/Dining Rooms	45 dBA / 40 dBA	45 dBA / 40 dBA
Inside Bedrooms	45 dBA / 40 dBA	40 dBA / 35 dBA
Outdoor Living Areas	55 dBA	--

Daytime refers to the period between 07:00 and 23:00, while nighttime refers to the period between 23:00 and 07:00. The term "Outdoor Living Area" (OLA) is used in reference to an

outdoor patio, a backyard, a terrace, a children's playground or other area designated for passive recreation.

The guidelines in the MECP publication allow the sound level in an Outdoor Living Area to be exceeded by up to 5 dBA, without mitigation, if warning clauses are placed in the purchase and rental agreements to the property. Where OLA sound levels exceed 60 dBA, physical noise control measures, such as an acoustical barrier or berm, are required. Mitigation is recommended to reduce the OLA sound level to below 60 dBA and as close to 55 dBA as technically, economically and administratively feasible. Where OLA's are adjacent to a CN rail line, CN requires the rail component of the sound level be mitigated to 55 dBA or less.

The indoor noise level criteria for rail noise are 5 dBA more stringent than for road noise. The more stringent criteria was applied to those dwellings exposed to appreciable rail noise. A central air conditioning system as an alternative means of ventilation to open windows is recommended for dwellings where nighttime sound levels outside bedroom or living/dining room windows exceed 60 dBA or daytime sound levels outside bedroom or living/dining room windows exceed 65 dBA. Forced air ventilation system with ducts sized for the future provision of central air conditioning, or some other alternative form of mechanical ventilation, is required where nighttime sound levels at bedroom or living/dining room windows are in the range of 51 to 60 dBA or when daytime sound levels at bedroom or living/dining room windows are in the range of 56 to 65 dBA.

Sound attenuating building constructions and the use of warning clauses to notify future residents of possible excesses are also required when nighttime sound levels exceed 55 dBA at the plane of the bedroom window due to rail traffic and when nighttime sound levels exceed 60 dBA at the plane of the bedroom window due to road traffic. Warning clauses to notify future residents of possible excesses are also required when daytime sound levels exceed 55 dBA in the outdoor living area.

The railways also provide minimum requirements for safety as well as sound and vibration for proposed residential developments located adjacent to their rights-of-way. These refer to minimum required setbacks, berms, fencing and warning clauses. The reader is referred to copies of CN requirements for new developments adjacent to their principal main lines and secondary main lines, which are located in Appendix A.

3.2 GROUND-BORNE VIBRATION FROM RAIL TRAFFIC

MECP and CN guidelines require measurements of ground-borne vibration when residential dwelling units are to be located within 75 metres of a principal main line or secondary main line such as the CN Stamford Subdivision or the CN Canal Subdivision.

Vibration is typically measured in terms of oscillatory velocity or acceleration. The CN guidelines are given in terms of ground-borne velocity. In this report, vibration levels are quoted in terms of RMS velocity levels (LV) in units of decibels [dB] relative to 1 mm/s (i.e., 1 mm/s = 0 dB). The CN guideline limit is 0.14 mm/s, which is equivalent to -17 dB re 1 mm/s. For ease of reference, this limit of -17 dB re 1 mm/s is identified on velocity plots in this report.

3.3 MECP GUIDELINES FOR LAND USE COMPATIBILITY AND DISTANCE SEPARATION

MECP Guidelines D-1, 'Land Use Compatibility' and D-6 'Compatibility Between Industrial Facilities and Sensitive Land Uses' were prepared to address the potential incompatibility of industrial land uses and noise sensitive land uses in relation to land use approvals under the Planning Act. They recommend that studies be conducted to investigate the feasibility of providing sufficient mitigation when noise sensitive land uses are proposed within the potential zone of influence of an existing industry. The mitigation can be provided at the source, or can be incorporated on the development lands where the industrial facility is operating in compliance with legislated Ministry requirements.

For planning purposes the potential zone of influence is 70 m for a Class I industrial use, 300 m for Class II industrial use and 1000 m for Class III industrial use. In addition, these guidelines recommend minimum distance setbacks within which noise sensitive uses should not be allowed. These minimum distance setbacks are 20 m, 70 m, and 300 m respectively.

The classifications are general, leaving some room for interpretation on a specific basis. For example, a Class I industry is categorized as a small scale plant with no outside storage, sound not audible off property, with daytime only operations and infrequent movement of products and/or heavy trucks. A Class II industry is categorized as a medium level of production with outside storage permitted. Sound may occasionally be audible off property, shift operations are permitted

and there are frequent movement of products and/or heavy trucks. A Class III industry is categorized as the wide range of heavy industrial uses with a significant potential for fugitive emissions.

Generally, these setbacks apply to the distance between the property lines of the industrial and sensitive land uses, unless a portion of the industrial lands is clearly identified or zoned to be of a non-noise producing nature, such as an employee parking lot, or storm water management pond for example.

The noise sensitive portions of the subject lands are the facades of the residential buildings and any useable outdoor space associated with a dwelling unit. Commercial buildings, parking lots, playing fields etc. are generally not considered to be noise sensitive and could be considered to be part of the distance setback.

The guidelines do allow for reductions in the minimum setback distances, based on the results of supporting technical studies such as this for infill developments or “Lands in Transition” with the implementation of noise mitigation features.

3.4 CRITERIA GOVERNING STATIONARY (INDUSTRIAL) NOISE SOURCES

Industrial or commercial facilities or activities are referred to as stationary sources. Noise impacts from such sources may also be assessed under MECP Guideline NPC-300. The proposed development is considered to be a noise sensitive land use.

In general, for assessments performed under NPC-300, sound level limits for stationary sources of sound are specified to be equal to the background sound from road traffic during the same time of day (or night) that the source may operate, subject to certain minimum exclusionary values which depend on the nature of the acoustic environment in the area of the site. In terms of background sound, the development is located in a semi-urban (Class 2) acoustical environment which is characterized by an acoustical environment dominated by road traffic and industrial noise (the urban hum). Portions of the site are proposed to be designated as a Class 4 acoustical environment; specifically, the first row of dwellings west of the Canal Subdivision rail line. The definition for a Class 4 area is reproduced below:

"Class 4 area" means an area or specific site that would otherwise be defined as Class 1 or 2 and which:

- *is an area intended for development with new noise sensitive land use(s) that are not yet built;*
- *is in proximity to existing, lawfully established stationary source(s); and*
- *has formal confirmation from the land use planning authority with the Class 4 area classification which is determined during the land use planning process.*

A Class 4 area is based on the principle of formal confirmation of the classification by the land use planning authority. Such confirmation would be issued at the discretion of the land use planning authority and under the procedures developed by the land use planning authority, in the exercise of its responsibility and authority under the Planning Act.

Appendix A includes correspondence from the City of Welland with regards to support for a Class 4 designation. Figure 3 shows the area considered as Class 4.

Publication NPC-300 stipulates that the sound level limit for a stationary source which operates continuously, 24 hours per day, in a Class 2 environment is the greater of the minimum one-hour energy-equivalent (L_{EQ}) background sound level, or the following exclusionary minimum limits:

Table II: Exclusion Limits, Non-Impulsive Sounds, Class 2 & 4 Areas, L_{EQ} [dBA]

Area Classification	Location	Daytime (07:00 – 19:00)	Evening (19:00 – 23:00)	Nighttime (23:00 – 07:00)
Class 2	Outdoor Points of Reception	50	45	--
	Plane of Window of Noise Sensitive Spaces/Vacant Lots	50	50	45
Class 4	Outdoor Points of Reception	55	55	--
	Plane of Window of Noise Sensitive Spaces/Vacant Lots	60	60	55

Based on our site visits and acoustic measurements in the area, background sound levels from road traffic fall below the minima, and thus the associated criteria are the exclusionary minima above.

The MECP guideline also stipulates that the noise assessment shall consider a *predictable worst-case hour*, which is defined as an hour when typically busy operation of the stationary sources under consideration could coincide with an hour of low background sound.

For impulsive noise, such as that generated by rail shunting activities, the criteria provided by the MECP guidelines are similar but are expressed in terms of the Logarithmic Mean Impulse Sound Level (L_{LM}) in dBAI. Under guideline NPC-300, the limits for impulsive sounds differ depending on how frequently the impulses occur, as summarized in the following tables:

Table III: Exclusion Limit, Impulsive Sounds, Class 2 and 4 Areas, L_{LM} [dBAI]

Number of Impulses per Hour	Class 2		Class 4		
	Daytime & Evening[1] (07:00 – 23:00)	Nighttime[2] (23:00 – 07:00)	Daytime & Evening[2] (07:00 – 23:00)	Nighttime[2] (23:00 – 07:00)	Outdoor (07:00-23:00)
9 or more	50	45	60	55	55
7 to 8	55	50	65	60	60
5 to 6	60	55	70	65	65
4	65	60	75	70	70
3	70	65	80	75	75
2	75	70	85	80	80
1	80	75	90	85	85

[1] Applicable at both planes of windows to noise sensitive spaces and outdoor points of reception.
[2] Applicable at planes of windows to noise sensitive spaces only.

The assessment of the biodiesel facility assumes during a predictable worst-case hour, one rail delivery could occur, consisting of a locomotive arriving at the site to drop off empty rail cars and/or retrieving full cars (infrequent impulses). For GIO Rail Holdings Corp impulsive sound from rail activity are considered to be frequent (more than 9 per hour). The applicable sound level limits are as indicated in Tables IV and V, below:

Table IV: Applicable Sound Level Limits at Selected Points of Reception, Class 2

Type of Sound	Point of Reception	Daytime (07:00 – 19:00)	Evening (19:00 – 23:00)	Nighttime (23:00 – 07:00)
All Sources Non-Impulsive, dBA	Façade	50	50	45
	OLA	50	45	--
Biodiesel Facility Impulsive, dBAI	Façade	80	80	75
	OLA	80	75	--
GIO Rail Railways Impulsive, dBAI	Façade	50	50	45
	OLA	50	45	--

Table V: Applicable Sound Level Limits at Selected Points of Reception, Class 4

Type of Sound	Point of Reception	Daytime (07:00 – 19:00)	Evening (19:00 – 23:00)	Nighttime (23:00 – 07:00)
All Sources Non-Impulsive, dBA	Façade	60	60	55
	OLA	55	55	--
Biodiesel Facility Impulsive, dBAI	Façade	90	90	85
	OLA	85	85	--
GIO Rail Railways Impulsive, dBAI	Façade	60	60	55
	OLA	55	55	--

It is a responsibility of industrial noise generators under the Environmental Protection Act, to ensure that sound levels emitted by their operations comply with MECP limits at existing residences and at residentially zoned lands, such as those presently located in Dain City. Since the lands in question are presently not zoned residential (general industrial), the industries are not constrained to control their emissions on those lands to a further extent than they are presently constrained by the existing residential land uses. This process is generally regulated through the Environmental Compliance Approval (formerly Certificate of Approval) process.

4 TRAFFIC NOISE PREDICTIONS

4.1 ROAD TRAFFIC DATA

Traffic data was obtained from the Ontario Ministry of Transportation ("MTO") and from the traffic consultant (WSP) in the form of annual average daily traffic ("AADT") for Highway 58A and Canal Bank Street, respectively. Commercial vehicle percentages of 5%/8% for medium/heavy trucks were used, per MTO standard. A day/night split of 85%/15% was used for Highway 58A as is typical for Provincial roadways and a day/night split of 90%/10% was used for Canal Bank Street as is typical for arterial collector roads. The posted speed limit is 80 km/h for Highway 58A and 60 km/h for Canal Bank Street. As per MTO guidelines the traffic data has been grown at 2.5% for ten years for Highway 58A. Future road traffic for Canal Bank Street was provided by WSP for a scenario where the bridge at Forks Road is open and the road is reconstructed. Table VI summarizes the traffic volume data used in this study.

Table VI: Projected Road Traffic Data (SADT for the year 2030)

Road Name		Cars	Medium Trucks	Heavy Trucks	Total
Highway 58 A	Daytime	9,874	567	908	**11,350**
	Nighttime	1,743	100	160	**2,003**
	Total	**11,617**	**668**	**1,068**	**13,353**
Canal Bank Street	Daytime	15,269	878	1,404	**17,550**
	Nighttime	1,697	98	156	**1,950**
	Total	**16,965**	**975**	**1,560**	**19,500**

4.2 RAIL TRAFFIC DATA

There are two railway lines in the vicinity of the proposed development, the CN Stamford subdivision line to the north and the CN Canal subdivision line to the west, a secondary main line presently operated by GIO Rail Holdings Corp. Rail traffic data for the CN Stamford subdivision line and the CN Canal subdivision line were obtained from CN Rail and GIO Rail, respectively.

In conformance with CN assessment requirements, the maximum speed, maximum number of cars and locomotives per train were used in the traffic noise analysis to yield a worst case estimate of train noise. Tables VII and VIII summarise the rail traffic data used in the analysis grown at 2.5% for 10 years in accordance with CN requirements.

Table VII: 2030 Projected Rail Traffic Data, CN Stamford Subdivision

Type of Train (No. of Trains Day/Night)	Number of locomotives (maximum)	Number of cars (maximum)	Maximum Speed (KPH)	Daytime (07:00-23:00) trains	Night-time (23:00-07:00) trains
Freight – (2/0)	4	140	64	2.7	0
Way Freight – (9/3)	4	25	64	12.1	4.0
Passenger – (0/0)	2	10	64	0	0

Table VIII: 2030 Projected Rail Traffic Data, CN Canal Subdivision

Type of Train (No. of Trains Day/Night)	Number of locomotives (maximum)	Number of cars (maximum)	Maximum Speed (KPH)	Daytime (07:00-23:00) trains	Night-time (23:00-07:00) trains
Freight – (4/0)	1	15	16	5.3	0

Whistles are blown at the public at-grade crossings along the CN Canal Subdivision and train whistle noise was included in the predictions at the dwelling facades to determine indoor sound levels. There are no at grade crossings for the Stamford Subdivision in the vicinity of the project.

4.3 TRAFFIC NOISE PREDICTIONS

Future road and rail traffic sound levels were predicted using STAMSON version 5.04, a computer algorithm developed by the MECP. Sound level predictions were made at six locations (see Figure 4). The results of these predictions are summarized in Tables IX and X.

Sound levels were predicted at ground level in the rear outdoor amenity areas during daytime hours to determine acoustical requirements. Sound levels were also predicted at the plane of second floor or third floor bedroom windows during nighttime hours to investigate ventilation requirements. Note that dwellings along Canal Bank Street are proposed to be three storey homes and dwellings along the northeastern portion of the site are being considered for two-storey walkouts (three-storey's facing road/rail).

Table IX: Predicted Future Daytime Sound Levels, [dBA]

Prediction Location	Description	Daytime – at the Façade $L_{EQ-16\ hr}$		Daytime at Façade Total $L_{EQ-16\ hr}$	Daytime in the OLA Total $L_{EQ-16\ hr}$
		Road	Rail		
R1	Dwellings siding onto Canal Bank Street and backing onto Stamford Rail line and Hwy 58A	67	56	68	66
R2	Dwellings backing onto Stamford and Canal Rail lines	57	59	62	61
R3	Dwellings siding onto Canal Bank Street	71	51	71	67
R4	Dwellings fronting onto Canal Bank Street	71	-	71	-
R5	Block 16			55	<55
R6	Block 40	53	56	58	<55

Table X: Predicted Future Nighttime Sound Levels, [dBA]

Prediction Location	Description	Night time – at the Façade $L_{EQ-8\ hr}$		Night time at Façade Total $L_{EQ-8\ hr}$
		Road	Rail	
R1	Dwellings siding onto Canal Bank Street and backing onto Stamford Rail line and Hwy 58A	64	52	65
R2	Dwellings backing onto Stamford and Canal Rail lines	53	55	57
R3	Dwellings fronting on to Canal Bank Street	65	45	65
R4	Dwellings fronting on to Canal Bank Street	65	-	65
R5	Block 16	49	-	49
R6	Block 40	49	52	54

The sound level predictions indicate that the future traffic sound levels will exceed MECP guidelines at some of the dwellings in the development. Recommendations to address these excesses are discussed below.

4.4 OUTDOOR LIVING AREA REQUIREMENTS

The general policies of CN rail for new residential development adjacent to a secondary main line stipulate the provision of a safety berm and sound wall totaling a minimum of 4.5 m in height (with respect to the top of rail, see Appendix B) subject to the review of a noise report.

The predicted daytime OLA sound levels near the rail lines, 10 years hence, may exceed MECP guidelines. It is expected that the excess will be minor and that physical mitigation may be required in the form of an acoustic berm/barrier on the order of 1.8 metres in height (locations represented by R2).

Lots with direct exposure to Canal Bank Street, which include outdoor living areas, will require physical mitigation. Preliminary plans for the development indicate the majority of the lots along Canal Bank Street will front onto the street and do not include OLAs (rear lane dwellings are proposed and balconies are less than 4 metres in depth). The predicted daytime sound levels, in the OLAs for lots similar to R1 and R3, are 66 dBA and 67 dBA respectively, which are up to a 12 dBA excess of the MECP's limit of 55 dBA. Physical mitigation in the form of an acoustic barrier will be required. A 2.8 m high barrier will reduce the sound levels in the rear yards to 60 dBA. The 5 dBA excess is acceptable to the MECP if it is acceptable to the Municipality. In

order to achieve 55 dBA in the rear yard an acoustic barrier greater than 5.0 meters in height would be required. Figure 5 shows the potential locations for acoustic barriers.

Noise warning clauses may be required to inform the future occupants of the noise issues and the proximity of the railway yard, railway lines and roadways. A safety berm is typically required adjacent to the railway right of way regardless of sound level. These requirements should also be considered in the future detailed noise impact study.

When detailed grading information and building envelopes are available, the acoustic barriers for the dwellings should be refined and a detailed noise study should be performed to specify detailed acoustic recommendations for the barriers, ventilation and building envelope constructions.

4.5 MINIMUM DISTANCE SETBACKS

For noise control and safety reasons, the CN policies stipulate that the minimum required setback between a new dwelling and principal main lines or secondary main lines is 30 meters. The nearest dwelling units in the proposed development will be located further than 30 metres from the railway rights-of-way, meeting this requirement.

4.6 INDOOR LIVING AREAS AND VENTILATION REQUIREMENTS

The predicted future night-time sound levels outside the second or third storey bedroom windows for those dwellings closest to Canal Bank Street (prediction locations R1, R3 and R4), will be greater than 60 dBA during the night and greater than 65 dBA during daytime hours. To address these excesses, the MECP guidelines recommend that these dwellings be equipped with central air conditioning systems, so that windows can be closed. Window or through-the-wall air conditioning units are not recommended because of the noise they produce and because the units penetrate through the exterior wall, which degrades the overall sound insulating properties of the envelope. The future location, installation and sound ratings of the outdoor air conditioning devices should minimize noise impacts and comply with criteria of MECP publication NPC-216, Residential Air Conditioning Devices.

The predicted sound levels at the plane of the windows of the future dwellings closest to the rail lines (Canal subdivision and Stamford subdivision) will be between 51 and 60 dBA during nighttime hours and between 56 to 65 dBA during daytime hours. To address these excesses, the

MECP guidelines recommend that these dwelling units be equipped with a forced air ventilation system with ducts sized to accommodate the future installation of air conditioning by the occupant. The guidelines also recommend warning clauses for these lots. Figure 6 shows the ventilation requirements.

4.7 BUILDING FACADE CONSTRUCTIONS

Future road traffic sound levels at facades with exposure to Canal Bank Street will be greater than 65 dBA and 60 dBA during daytime and nighttime hours, respectively. MECP guidelines recommend that windows, walls and doors be designed so that indoor sound levels comply with MECP noise criteria.

Preliminary calculations have been performed to determine the building envelope constructions likely to be required to maintain indoor sound levels within MECP guidelines. The calculation methods were developed by the National Research Council (NRC). They are based on the predicted future sound levels at the building façades, and the anticipated areas of the façades components (walls, doors and windows) relative to the floor area of the adjacent room.

Exterior Wall Construction

CN guidelines require brick veneer or masonry equivalent construction for exterior walls from foundation to rafters as a minimum construction for any dwellings that are in the first row of dwellings with exposure to the CN rail lines.

Glazing Construction

For the purposes of this analysis preliminary plans for the rear lane dwelling units provided by the proponent were reviewed. Window-to-floor areas were calculated to be 50% for the bedrooms and living/dining rooms. Based upon this assumption, the glazing for the dwellings with exposure to the roadway (Canal Bank Street) should achieve a sound transmission class rating of STC-34. This assumes sound enters through the window and the wall. Note that window glazing constructions can achieve these ratings, but vendor submittals with test data for the specific units proposed will be required to verify acceptable glazing products.

Further Analysis

When detailed floor plans and building elevations are finalized for all the blocks, an acoustical consultant should revise the glazing constructions based on actual window to floor area ratios.

4.8 WARNING CLAUSES

MECP and CN guidelines recommend that appropriate warning clauses be used in the Development Agreements and in purchase, sale and lease agreements (typically by reference to the Development Agreements), to inform future owners and occupants about noise concerns from transportation sources, commercial facilities/industrial facilities and nearby rail activities in the area. The following clauses are recommended:

Suggested wording for future dwellings sound level excesses is given below.

Type A:

> Purchasers and tenants are advised that sound levels due to increasing road/rail traffic may occasionally interfere with some activities of the dwelling occupants as the sound levels exceed the sound level limits of the Municipality and the Ministry of the Environment.

Type B:

> Purchasers and tenants are advised that despite the inclusion of noise control features in the development and within the building units, sound levels due to increasing road/rail traffic may on occasion interfere with some activities of the dwelling occupants as the sound levels exceed the sound level limits of the Municipality and the Ministry of the Environment.

Suitable wording for future dwellings requiring forced air ventilation systems is given below.

Type C:

> This dwelling unit has been fitted with a forced air heating system and the ducting etc., was sized to accommodate central air conditioning. Installation of central air conditioning will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the criteria of the Municipality and the Ministry of the Environment.

Suitable wording for future dwellings requiring forced air ventilation systems with air conditioning is given below:

Type D:

> This dwelling unit has been supplied with a central air conditioning system which will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the sound level limits of the Municipality and the Ministry of the Environment.

CN's standard warning clause for residential developments located near a secondary main line is provided below. The following sample clause is typical of those included in agreements of purchase and sale or lease on the Lands that are within 300 meters of the railway right-of-way.

Type E:

> Warning: Canadian National Railways Company or its assigns or successors in interest has or have a rights-of-way within 300 meters from the land subject hereof. There may be alteration to or expansions of the railway facilities on such rights-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 dwellings. 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 rights-of-way.

These are sample clauses obtained from MECP and CN guidelines and can be modified by the municipality or the owner's legal representative as needed subject to CN's approval.

4.9 GROUND-BORNE VIBRATION ASSESSMENT

Measurements of ground-borne vibration are required by the railways if residential units are to be constructed within 75 m of their rights of way. Measurements were therefore conducted at a distance of 40 m from the right of way of the CN Canal Subdivision operated by GIO Rail Holdings Corp. Ground-borne measurement locations are provided on Figure 4. The results are provided in Figure 7 along with the applicable MOE/CNR criteria. The measured levels are below the perceptibility limits and vibration isolation measures or warning clauses are not required. Measurements were not conducted adjacent to the CN line to the north due to the large distance setback (approximately 200 m) and large grade separation.

4.10 SUMMARY OF RECOMMENDATIONS FOR ROAD AND RAIL TRAFFIC NOISE CONTROL

Ground-borne vibration levels and future rail traffic sound levels are within CN and MECP guidelines in lands adjacent to the GIO Rail Canal Subdivision railway line. Future road and rail

sound levels are predicted to exceed the MECP guidelines at the lots adjacent to Highway 58A and the CN Stamford Subdivision railway line. Analysis based on the current plans indicates that the excesses are minor and physical mitigation in the form of a 1.8 meter high barrier may be required for OLAs. Future road sound levels are predicted to significantly exceed the MECP guidelines at the lots adjacent to Canal Bank Street. Analysis based on the current plans indicates that physical mitigation in the form of an acoustic barrier, approximately 2.8 metres in height is required for OLAs. A detailed noise study should be conducted prior to the registration of the northern and western portions of the draft approved subdivision for the lands adjacent to the road/rail corridor when detailed lotting information or phasing information is available to determine the noise impacts based on traffic/rail information available at the time. Recommendations are provided in Section 6. The reader is referred to the above sections of the report where these recommendations are discussed in more detail.

5 INDUSTRIAL (STATIONARY SOURCE) NOISE ASSESSMENT

This section contains a discussion of the industries located near the site and identifies significant industrial noise sources. The site was visited on numerous occasions and sound level measurements were conducted using a Norsonic type N140 sound level meter using methods contained in MECP Guideline NPC-103 “Procedures”. The equipment was field calibrated before and after the measurements using a Bruel & Kjaer model 4231 acoustical calibrator.

5.1 VERBIO DIESEL CANADA BIODIESEL FACILITY

This is a smaller facility located across the railway right-of-way along the southeast of the development lands. The site is comprised of a larger building enclosing most of the process equipment and a number of large storage tanks. Many of the noise sources at the facility are contained within the main building. Materials are shipped to and from the facility via transport truck, accessing the site from St. Clair Drive, and by rail. Rail activity on the site is limited to pick up and drop off by GIO Rail Holdings Corp. Additional activity by GIO Rail Holdings occurs on the tracks adjacent to the biodiesel facility and is not considered part of the predictable worst-case hour at Verbio Diesel Canada. Rail activity typically occurs during daytime hours only.

Discussions with former Atlantic Biodiesel personnel indicate that the existing Environmental Compliance Approval (Number 5717-ADLQ9D), dated September 21, 2016 and the supporting

Acoustic Assessment Report ("AAR"), prepared by CH2M Hill, dated January 2011 include details regarding the noise producing aspects of their operations.

A review of the Environmental Compliance Approval ("ECA"), the AAR and subsequent audit report, dated February 24, 2014, indicate the facility is operating in compliance with the MECP's sound level limits at the closest noise sensitive receptors.

Based on our site observations, and the Industrial Categorization Criteria contained in Appendix A of the D-6 Guideline, the Verbio Diesel Canada facility could be categorized as a Class II industrial operation. The minimum recommended setback distance from a Class II industry is 70 m and the actual influence area can be more. To investigate the actual zone of influence more fully, a predictive acoustic model was generated to assist with predicting sound levels from the operations at the facility. Noise source locations and sound levels were taken from the AAR and HGC Engineering files. Table XI summarizes the modelling scenarios for biodiesel facility.

Table XI: Summary of Verbio Diesel Canada Operations

Source Type/Name	Operating Status/Time or Quantity per Hour	
	Day	Night
Trucks Product/Feedstock	2 @ 15km/h	2 @ 15km/h
Trucks Process Chemical Terminal	1 @ 15km/h	1 @ 15km/h
Rail Delivery	1 @ 10km/h	-
All Else (Pumps, Cooling towers, etc.)	Continuous	Continuous
Rail Delivery Impulse	Infrequent (1)	-

Figure 8 shows the proposed acoustic berm/barrier heights proposed along the eastern portion of the development. The proposed berm/barrier will provide beneficial acoustical shielding for the future dwellings from industrial operations at Verbio Diesel Canada southeast of the rail line.

The sound level predictions indicate that with the proposed berm/barrier, sound levels from operations at Verbio Diesel Canada will be well within the MECP's sound level criteria during daytime and nighttime hours. Figures 9 and 10 show the sound level predictions of the steady and impulsive sources, respectively.

5.2 GIO RAIL HOLDINGS CORP

GIO Rail Holdings Corp operates the rail line immediately to the east of the proposed development. Activity on this section of line includes through trains west to north, deliveries/pickups from Verbio Diesel Canada and switching services for local customers. Switching services can be provided for up to 12 hours each day and typically only during daytime hours. Switching activities and movements to Verbio Diesel Canada include sorting of rail cars and building up of train segments which includes the coupling and decoupling of rail cars. Drop-off and pickup of rail cars by freight trains, as well as classification and sorting in the area typically occurs during daytime hours only.

The through operations of trains on CN railways is federally regulated and not considered under a stationary noise assessment. Where designated rail yards are specifically identified for shunting, some form of stationary assessment is typically completed for neighbouring noise sensitive uses. In this instance, the adjacent rail activities by GIO Rail Holdings are not in a designated switching yard, however, it is understood that these operations occur consistently during daytime hours and to consider a worst-case scenario from an assessment perspective, they have been treated as yard activities even though they occur primarily on main line trackage.

A predictive acoustic model was employed to determine the potential impact from rail yard operations. The model includes the operations summarized in Table XII.

Table XII: Summary of Operations for GIO Rail Holdings

Source Type/Name	Operating Status/Time or Quantity per Hour	
	Day	Night
Locomotive – Slow Acceleration	Continuously for 30 min	-
Locomotive Idling	30 minutes	-
Rail Shunting Impulses	Frequent	-

An acoustic barrier is proposed along the west side of the railway line (Figure 8). The sound level predictions indicate that with the proposed acoustic barrier and Class 4 designation for the first row of dwellings, the impulsive rail activities (shunting) will meet the daytime sound level criteria. Additionally, the sound level predictions indicate that the non-impulsive (steady) rail operations

are well within the daytime sound level criteria. Figures 11 and 12 show the sound level prediction results.

6 RECOMMENDATIONS FOR NOISE CONTROL

The following recommendations are provided for noise control purposes. The reader is referred to the previous sections of this report where these recommendations are discussed in more detail.

Transportation Noise

1. The following recommendations are provided in regard to through road traffic and rail noise mitigation:
    a. The dwelling units closest to the rail lines will require forced air ventilation systems with the provision for the future installation of central air conditioning systems by the occupant (see Figure 6).
    b. The dwelling units closest to Canal Bank Street will require central air conditioning systems. These units will also require upgraded building constructions and windows to address road traffic sound levels (see Figure 6).
    c. Warning clauses should be placed on tenancy and property agreements and offers of purchase and sale for all residential units within 300 m of the rail lines identifying the presence of the rail lines and that sound from railway operations may at times be audible and that railway operations may change in the future.
2. A detailed traffic noise study should be conducted prior to the registration of the northern and western portions of the draft approved subdivision for the lands adjacent to the Highway 58A/CN rail corridor and Canal Bank Street to determine the noise impact based on road and rail traffic information, grading information and lotting and phasing information available at that time, recommending any noise mitigation requirements and warning clauses which may be appropriate based on that information.
3. Warning clauses should be placed on tenancy and property agreements and offers of purchase and sale for all residential lots with exposure to the roadways and railway lines to inform the future residents of the presence of these transportation sources.

Stationary Noise

The following recommendations are provided in regard to stationary noise mitigation:

4. An acoustic barrier (earth berm and noise barrier) with minimum heights, as shown in Figure 8 should be constructed to provide beneficial acoustic shielding to residential lots on the eastern portion of the development. The first row of dwellings adjacent to the rail line are assumed to have a Class 4 designation.

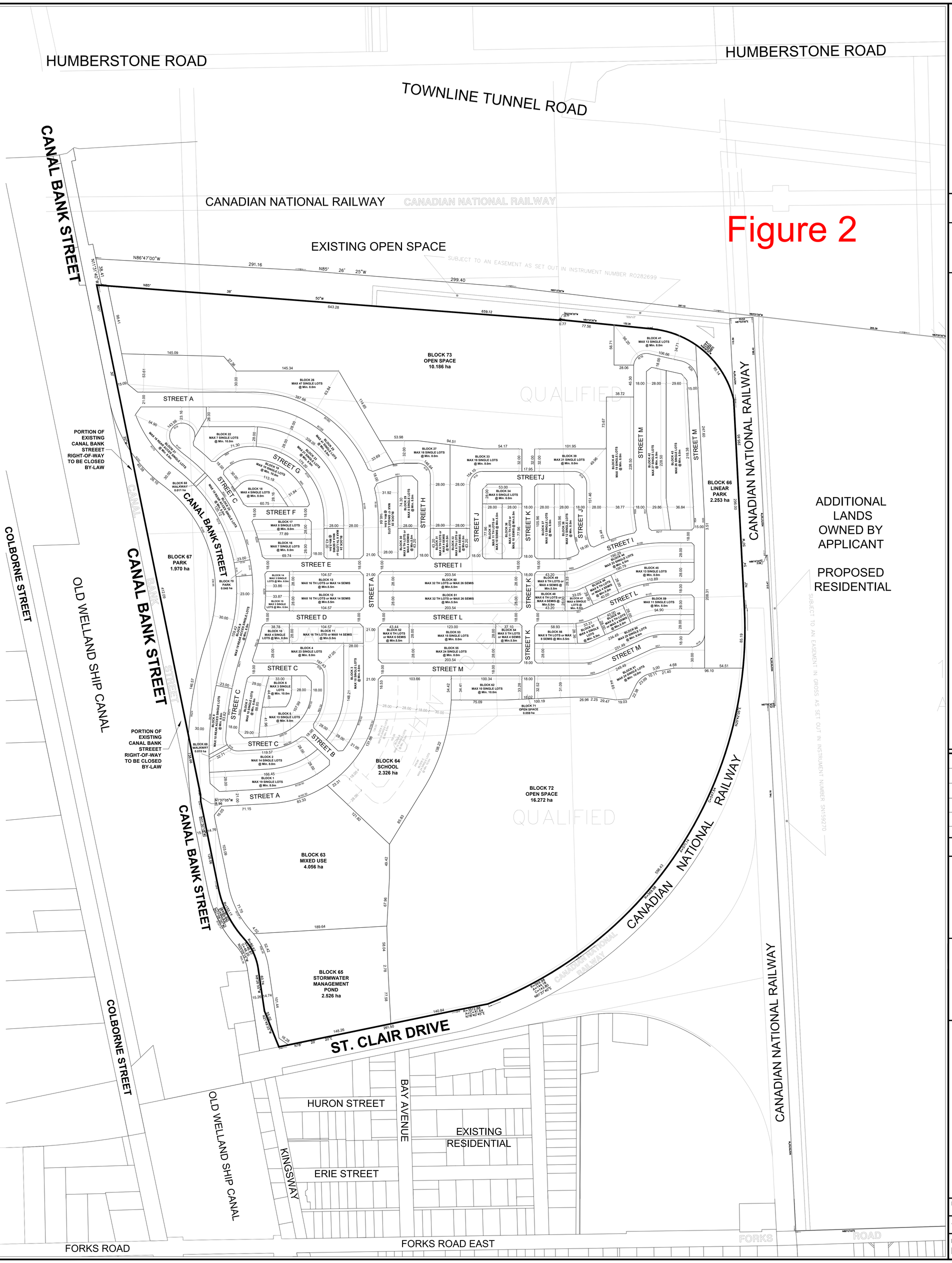
5. Warning clauses should be placed on tenancy and property agreements and offers of purchase and sale for all residential lots with exposure to Verbio Diesel Canada informing the future residents of the presence of the industrial operations and that those operations could change in the future.

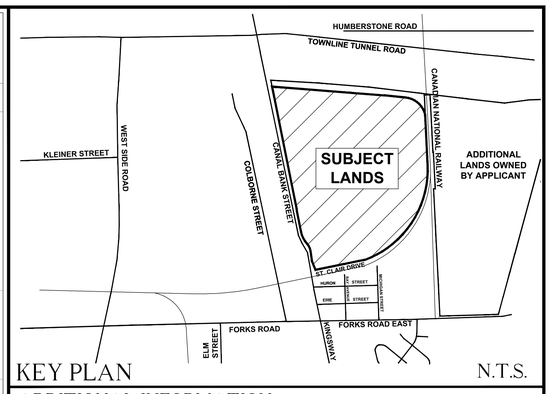
6. Warning clause for properties with a Class 4 designation should include the following:

   "Purchasers/tenants are advised that sound levels due to the adjacent industry and rail operations are required to comply with sound level limits that are protective of indoor areas and are based on the assumption that windows and exterior doors are closed. This dwelling unit has been supplied with a ventilation/air conditioning system which will allow windows and exterior doors to remain closed."

Figure 1: Key Site Plan

Figure 2





KEY PLAN N.T.S.

ADDITIONAL INFORMATION

Required Under Section 51(17)
Of The Planning Act R.S.O. 1990 c.P.13

a. SHOWN ON DRAFT PLAN
b. SHOWN ON DRAFT AND KEY PLANS
c. SHOWN ON KEY PLAN
d. LAND TO BE USED IN ACCORDANCE WITH LAND USE SCHEDULE
e. SHOWN ON DRAFT PLAN
f. SHOWN ON DRAFT PLAN
g. SHOWN ON DRAFT PLAN AND KEY PLAN
h. MUNICIPAL PIPED WATER TO BE PROVIDED
i. SOIL IS SILTY CLAY
j. SHOWN ON DRAFT PLAN
k. ALL MUNICIPAL SERVICES TO BE PROVIDED
l. SHOWN ON DRAFT PLAN

SCHEDULE OF LAND USE

TOTAL SITE AREA - 74.729 ha

Proposed Land Use	Units	Reference	Area (Ha.)
Residential Singles 10.0m	54	Blocks 6,19,22,61-62	2.052
Residential Singles 8.0m	554	Blocks 1-5,7,10,14-18,23,25-29,33,34,37-45,47,53,55,57,59,60	15.429
Residential Rear Access Singles 8.0m	60	Blocks 8,9,20,21	1.398
Residential Townhomes 5.5m	202	Blocks 11-13,24,30,31, 32,35-36,46,48,49,50,51, 52, 54,56,58	3.791
Mixed Use		Block 63	4.056
School		Block 64	2.326
Stormwater Management Pond		Block 65	2.526
Park / Linear Park		Blocks 66-67, 70	4.271
Walkway		Blocks 68-69	0.026
Open Space		Blocks 71-73	26.518
ROADS			
30m R.O.W. (Canal Bank Street)			2.475
21m R.O.W. (Street A)			2.108
18m R.O.W. (Streets B-M)			7.753
TOTAL	870		74.729

Proposed Summary Yield		
Proposed Unit Mix	Unit Count with Alternate 5.50m Townhouse Units	Unit Count with Alternate 5.50m Semi-Detached Units
Residential Singles 10.0m	54	54
Residential Singles 8.0m	554	554
Residential Rear Lane Access Singles 8.0m	60	60
Residential Townhomes 5.5m	202	
Residential Semi-Detached 5.5m		164
TOTAL	870	832

No.	REVISION	DATE
5		
4		
3		
2		
1		

REVISIONS

OWNER'S CERTIFICATE

WE, BEING THE REGISTERED OWNER OF THE SUBJECT LANDS HEREBY AUTHORIZE ARMSTRONG PLANNING AND PROJECT MANAGEMENT TO PREPARE AND SUBMIT A DRAFT PLAN OF SUBDIVISION FOR APPROVAL.

SIGNED _____ DATE _____

SURVEYOR'S CERTIFICATE

I HEREBY CERTIFY THAT THE BOUNDARIES OF THE SUBJECT LANDS AND THEIR RELATIONSHIP TO THE ADJACENT LANDS ARE ACCURATELY AND CORRECTLY SHOWN ON THIS PLAN.

SIGNED _____ DATE _____

PAUL EDWARD, O.L.S.
R-PE SURVEYING LTD.
643 CHRISLEA ROAD, SUITE 7,
WOODBRIDGE, ONTARIO, L4L 8A3

DAIN CITY WEST
DRAFT PLAN OF SUBDIVISION

PART LOTS 21, 22 AND 23, CONCESSION 5,
PART OF THE ROAD ALLOWANCE BETWEEN
LOTS 22 AND 23, CONCESSION 5,
(CLOSED BY BY-LAW 855, INST NO. HU8243)
GEOGRAPHIC TOWNSHIP OF HUMBERSTONE)
THE CITY OF WELLAND
REGIONAL MUNICIPALITY OF NIAGARA

armstrong
planning | project management

DESIGN:	DRAWN:	SCALE 1: 2000
APPROVED	DATE: July 9, 2020	PROJECT No. 20.2699.00

DRAWING No. Dain City West Subdivison.dwg PHASES 1-2

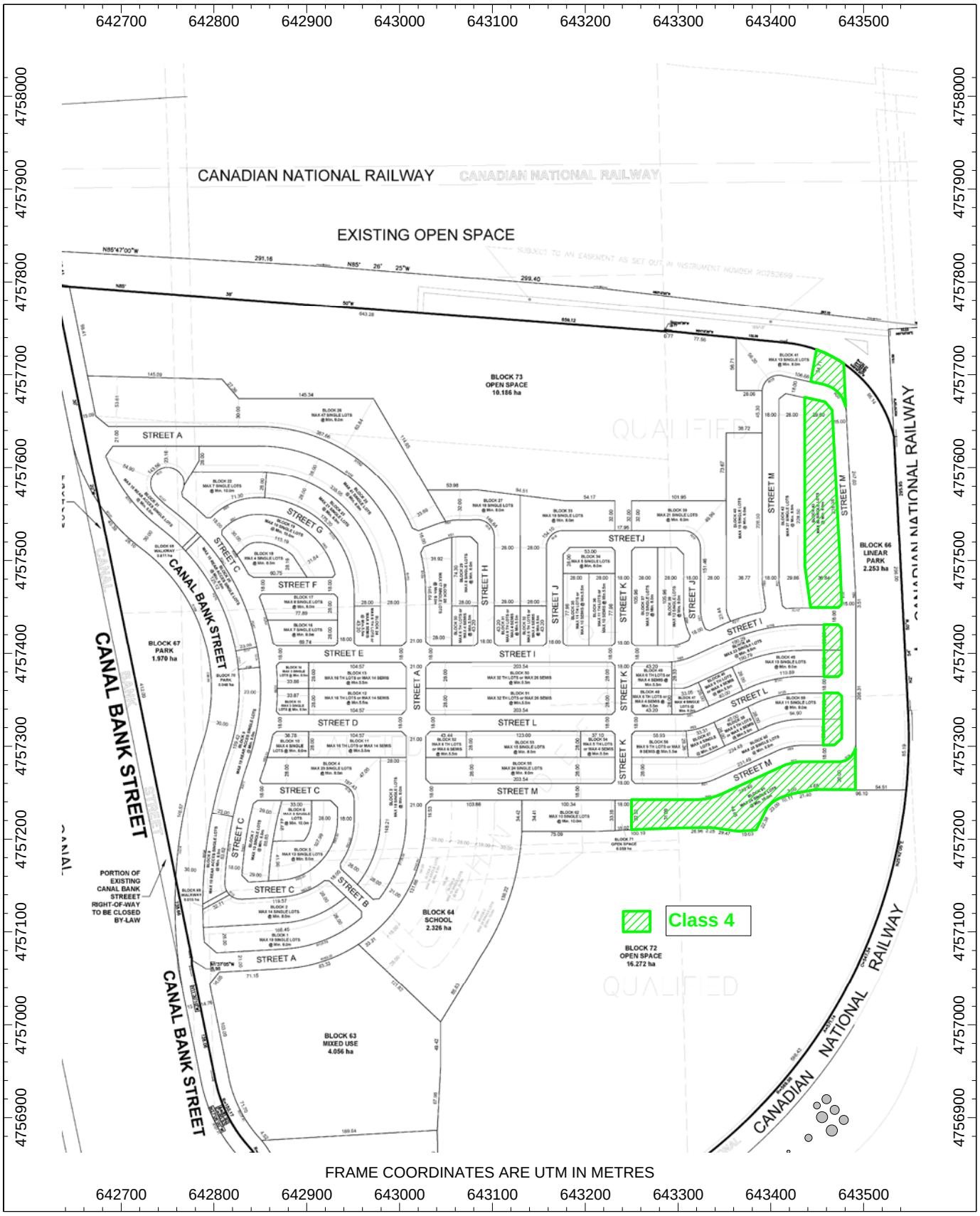


Figure 3: Designated Class 4 Area
Dain West Development, Welland

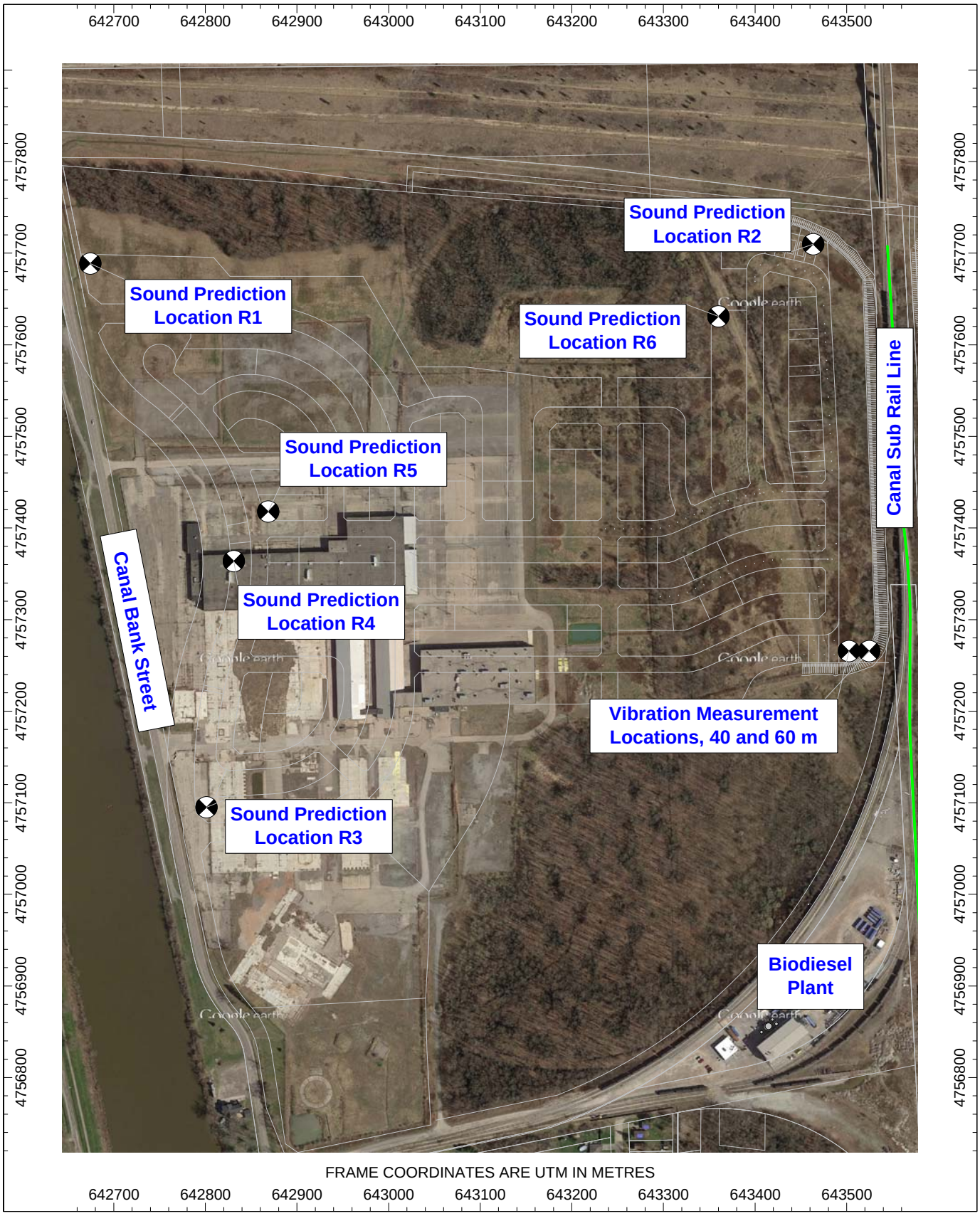


Figure 4: Sound Prediction and Vibration Measurement Locations
Dain West Development, Welland

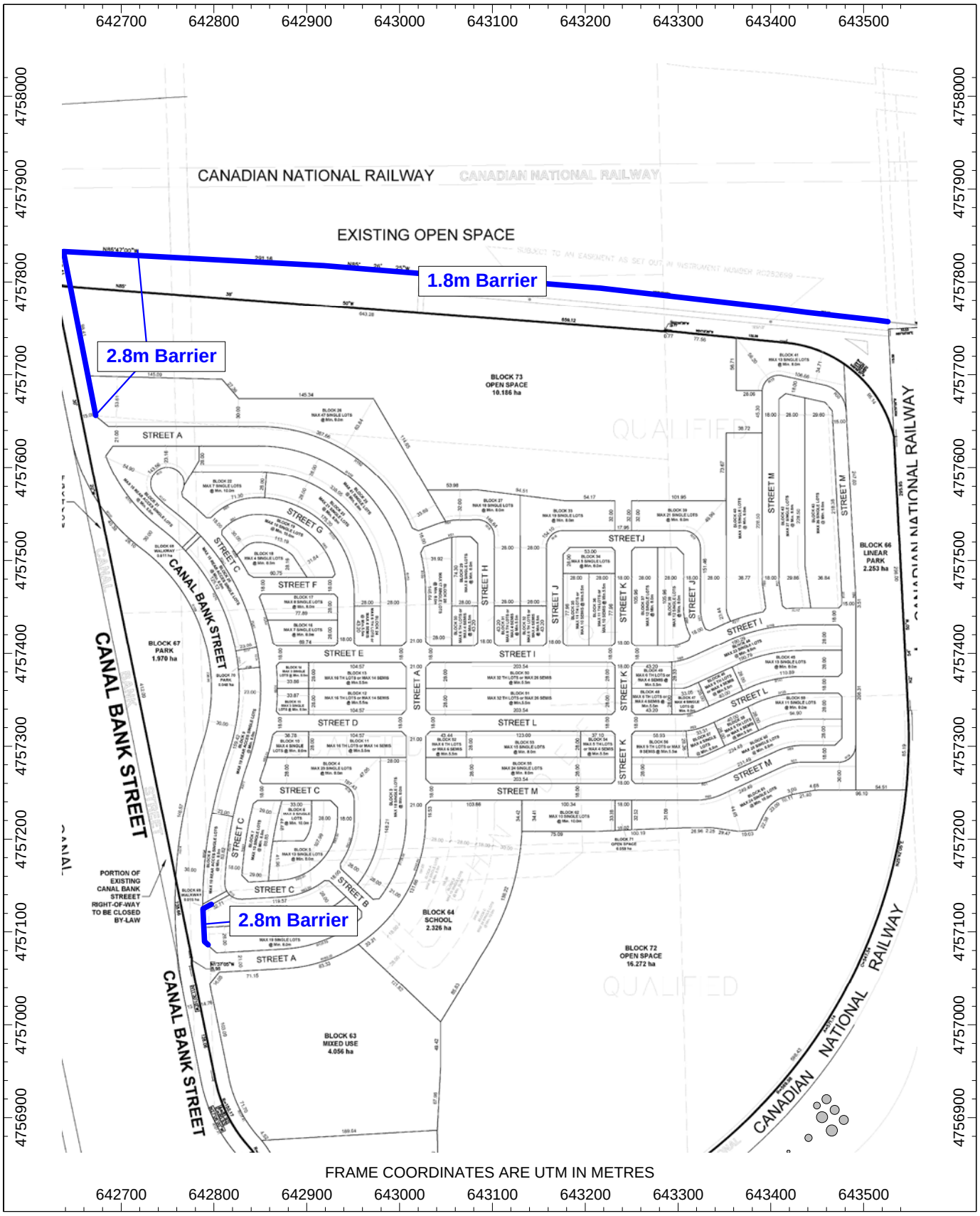


Figure 5: Barriers Required for Transportation Sources
Dain West Development, Welland

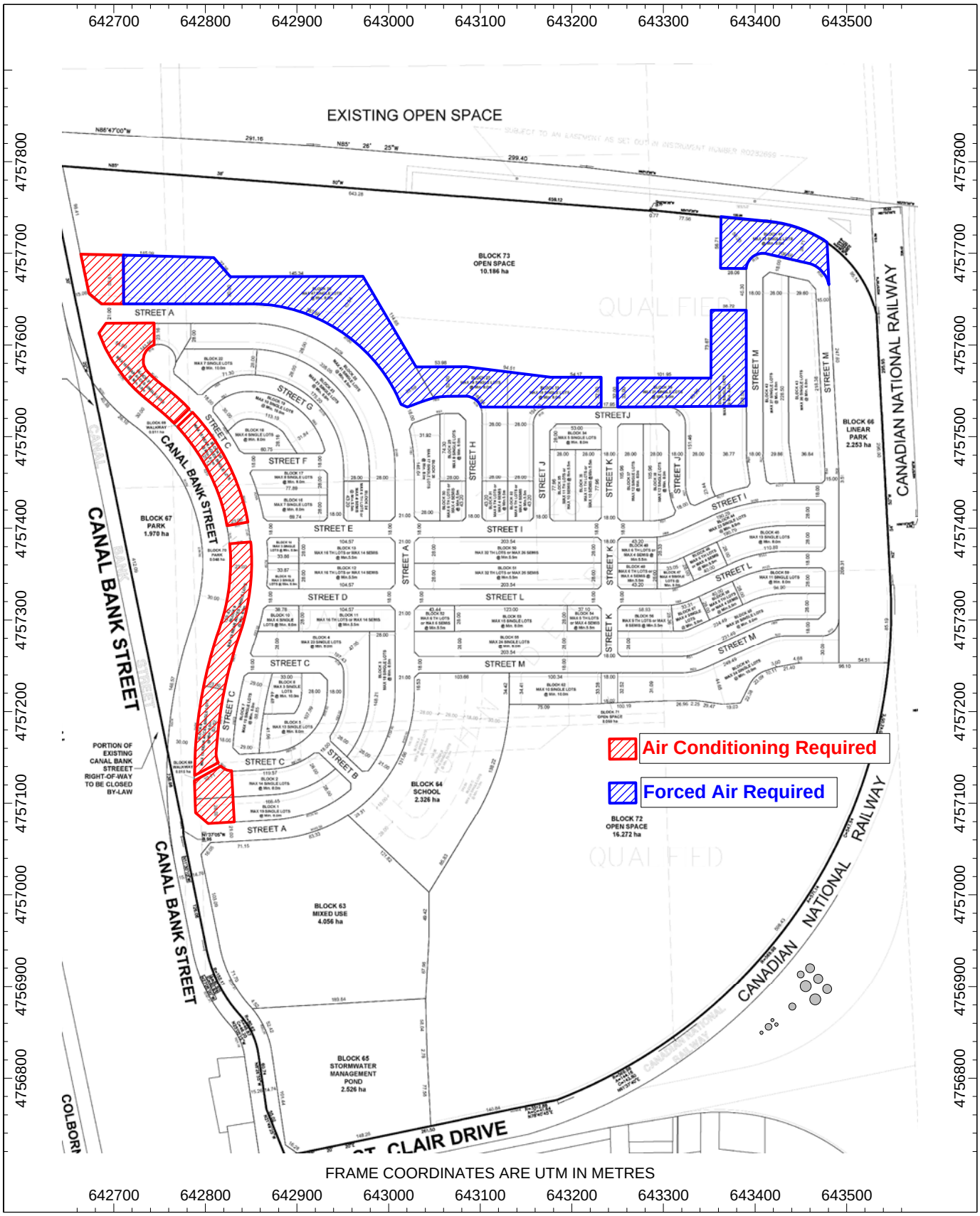


Figure 6a: Ventilation Requirements
Dain West Development, Welland

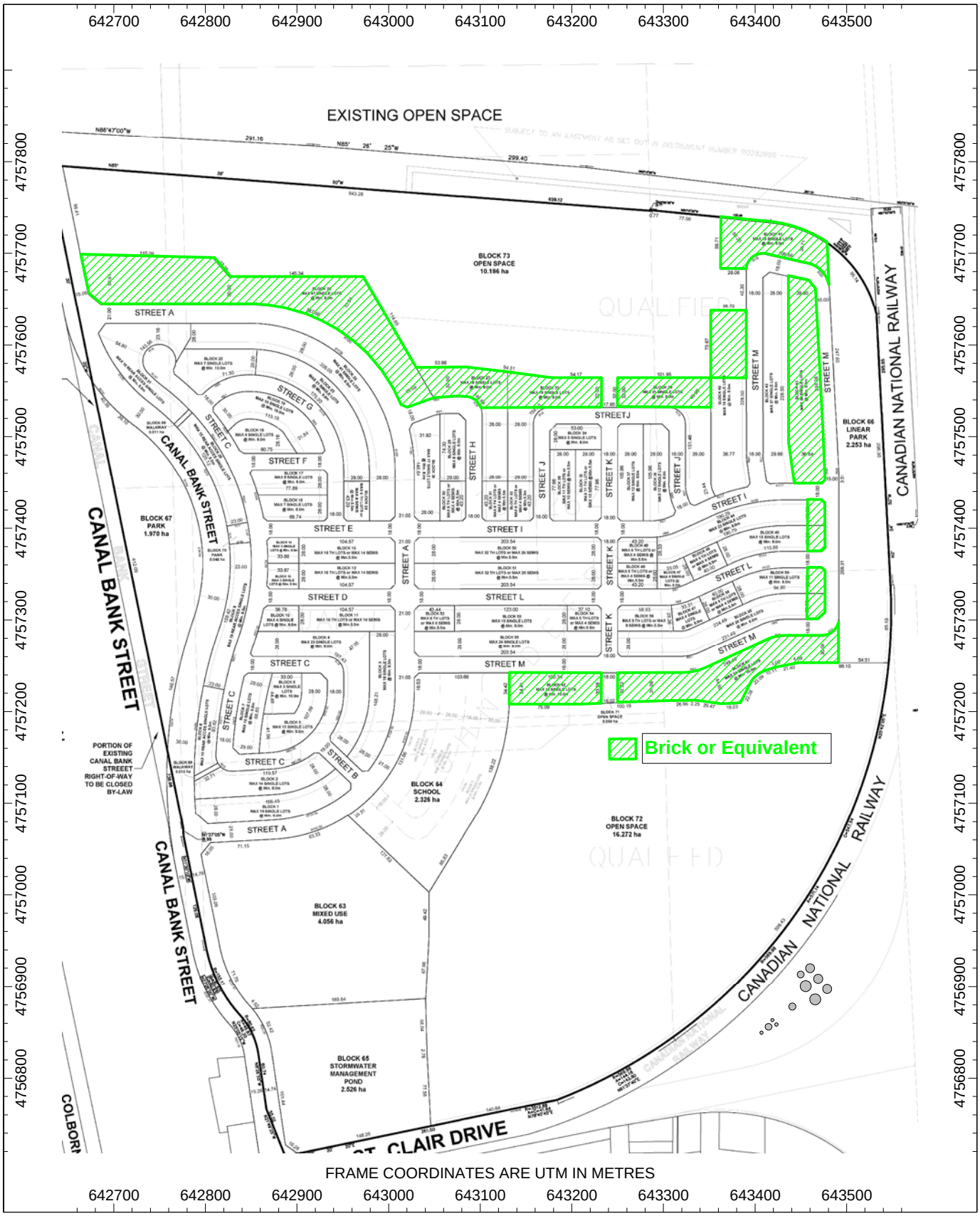


Figure 6b: Lots Requiring Brick or Equivalent Facade
Dain West Development, Welland

Figure 7a: Pass-by 1 - 40 m from Rail Line
Measured Vibratory Velocity Level, November 28, 2019

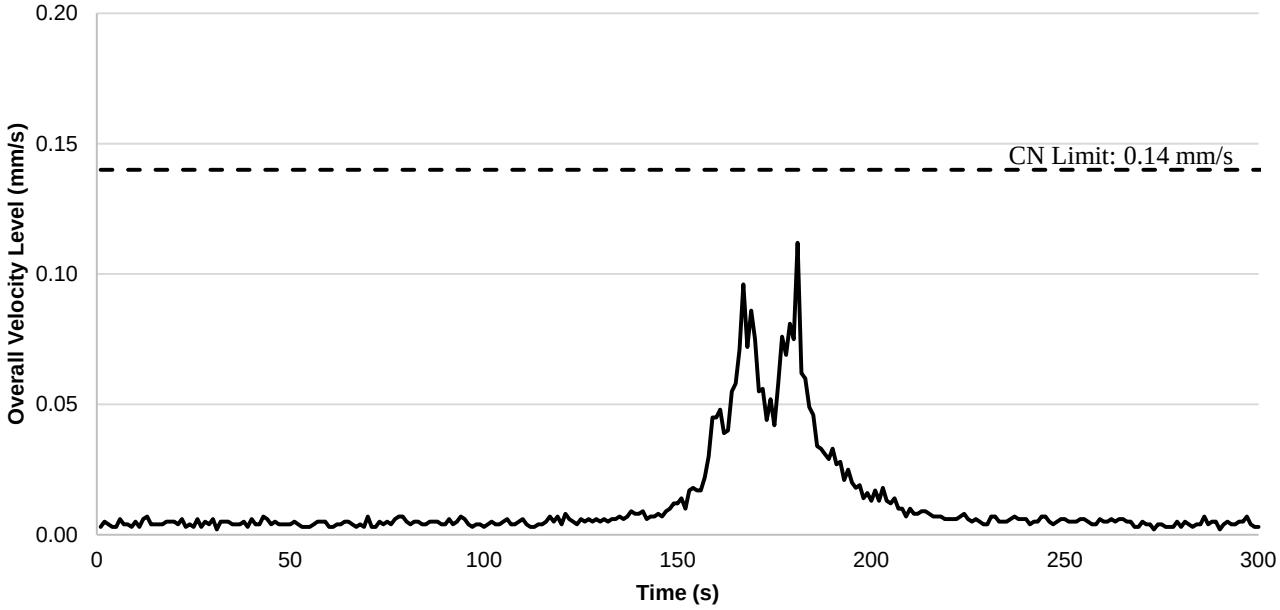


Figure 7b: Pass-by 1- 40 m from Rail Line
Acceleration Spectrum @ Peak Level (1 sec. Duration)

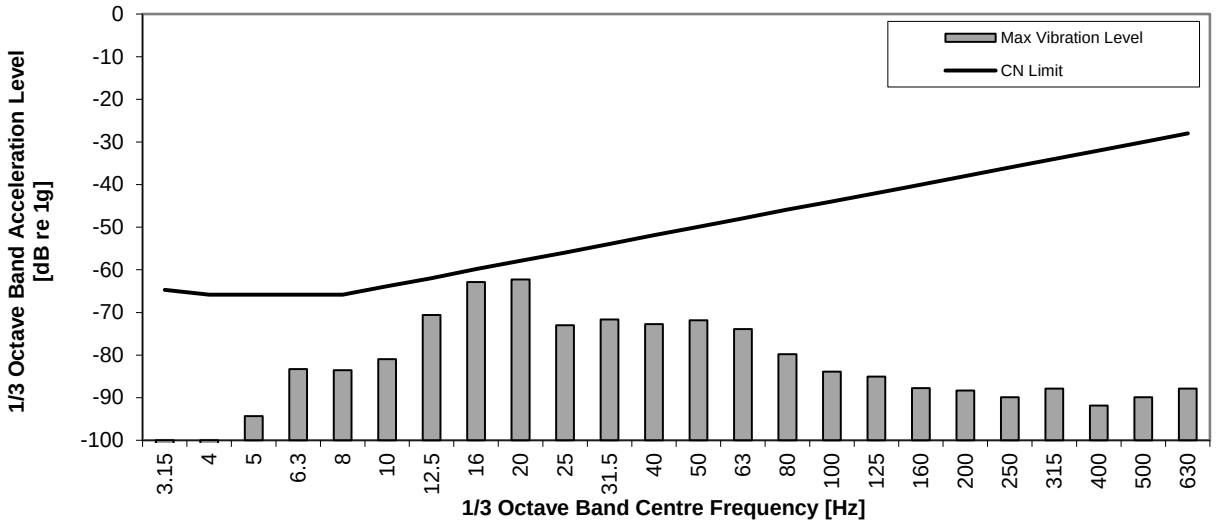


Figure 7c: Pass-by 1 - 60 m from Rail Line
Measured Vibratory Velocity Level

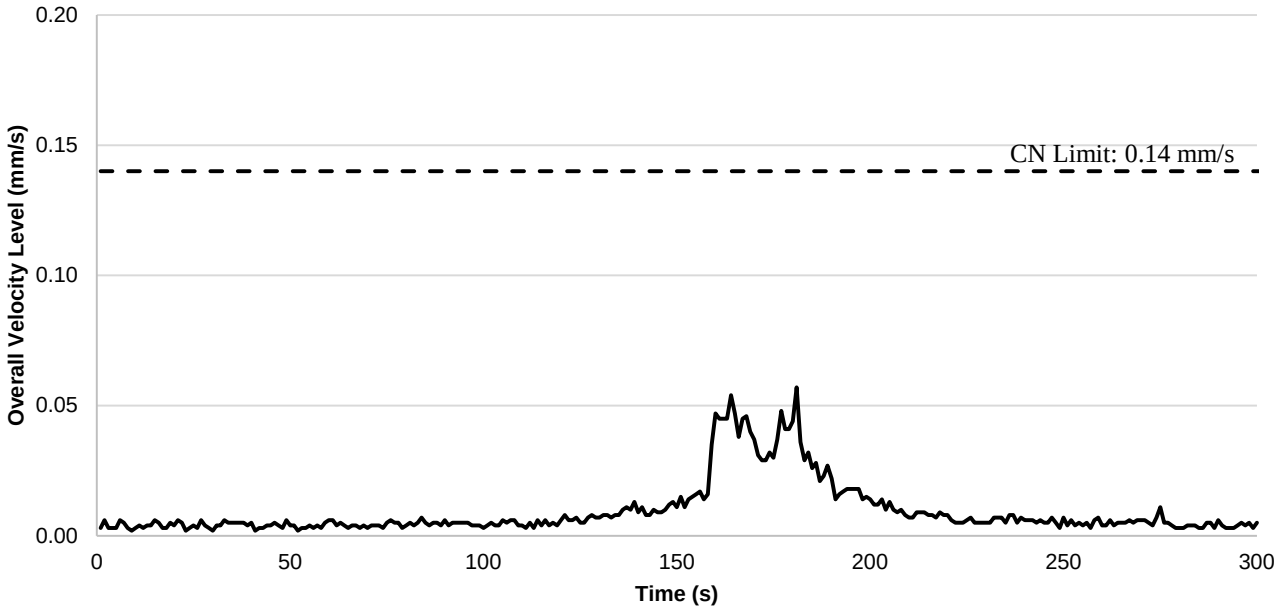
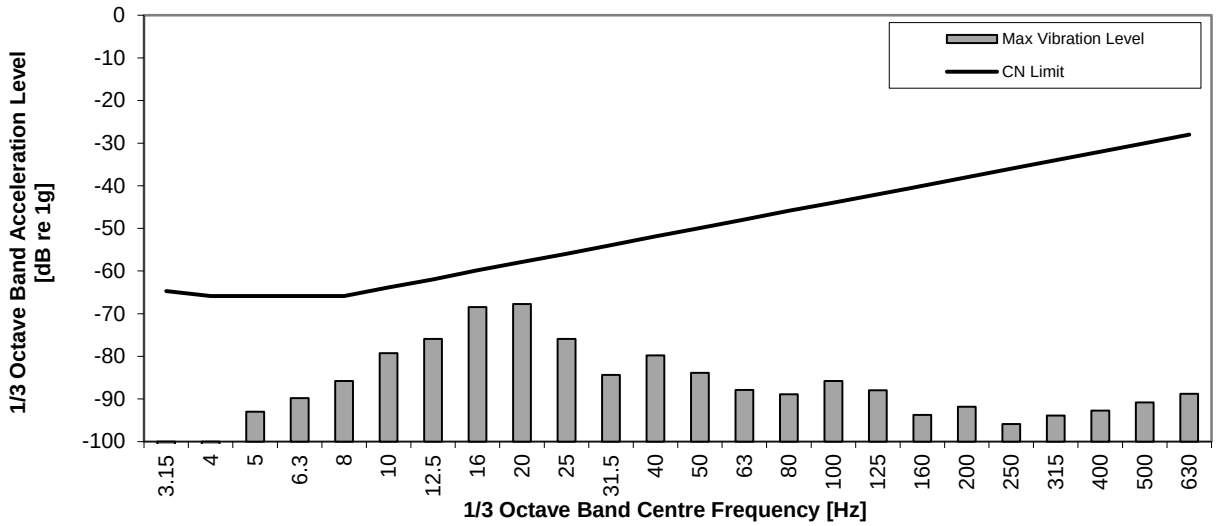


Figure 7d: Pass-by 1 - 60 m from Rail Line
Acceleration Spectrum @ Peak Level (1 sec. Duration)



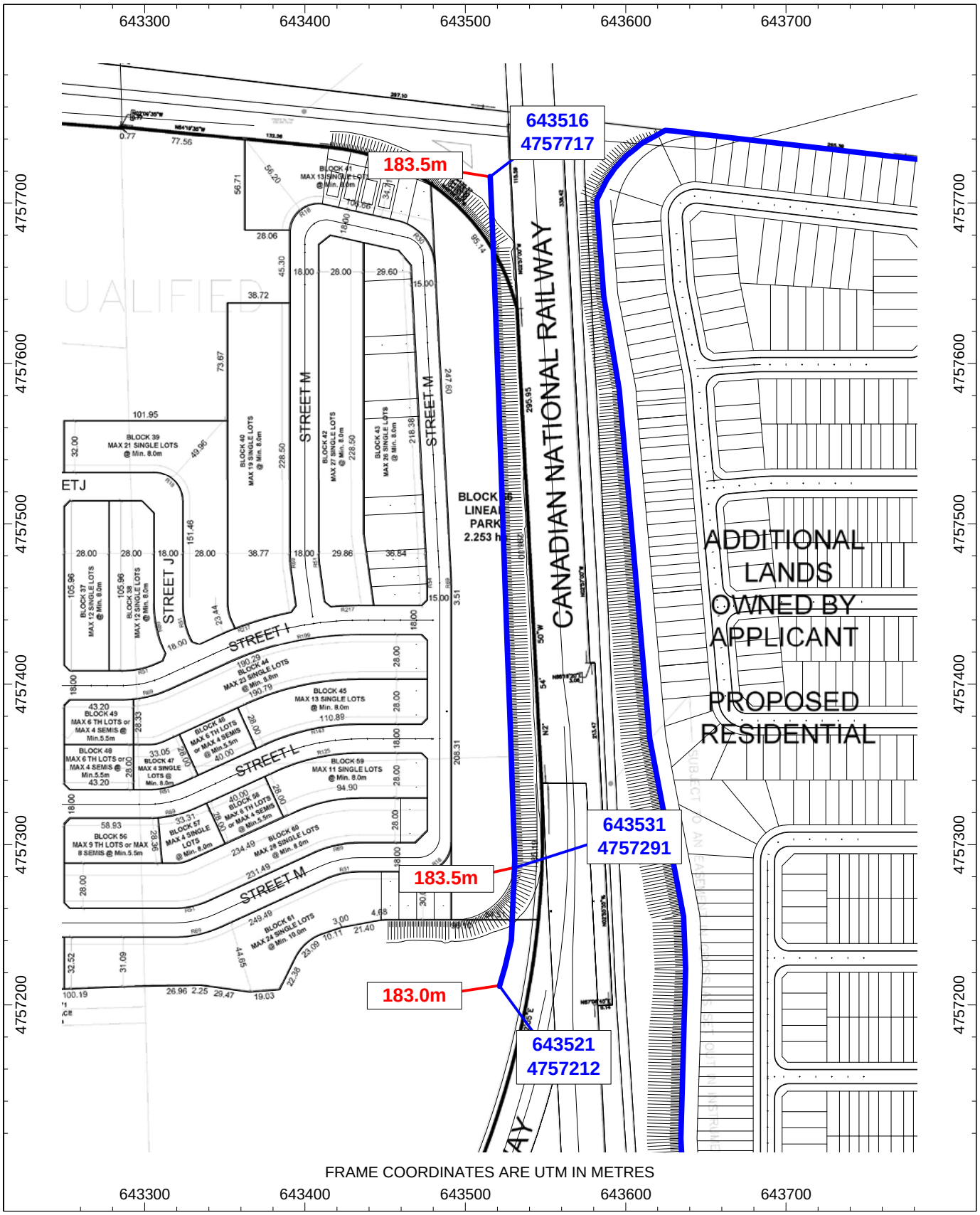


Figure 8: Berm/Barrier Extents and Heights
Dain West Development, Welland

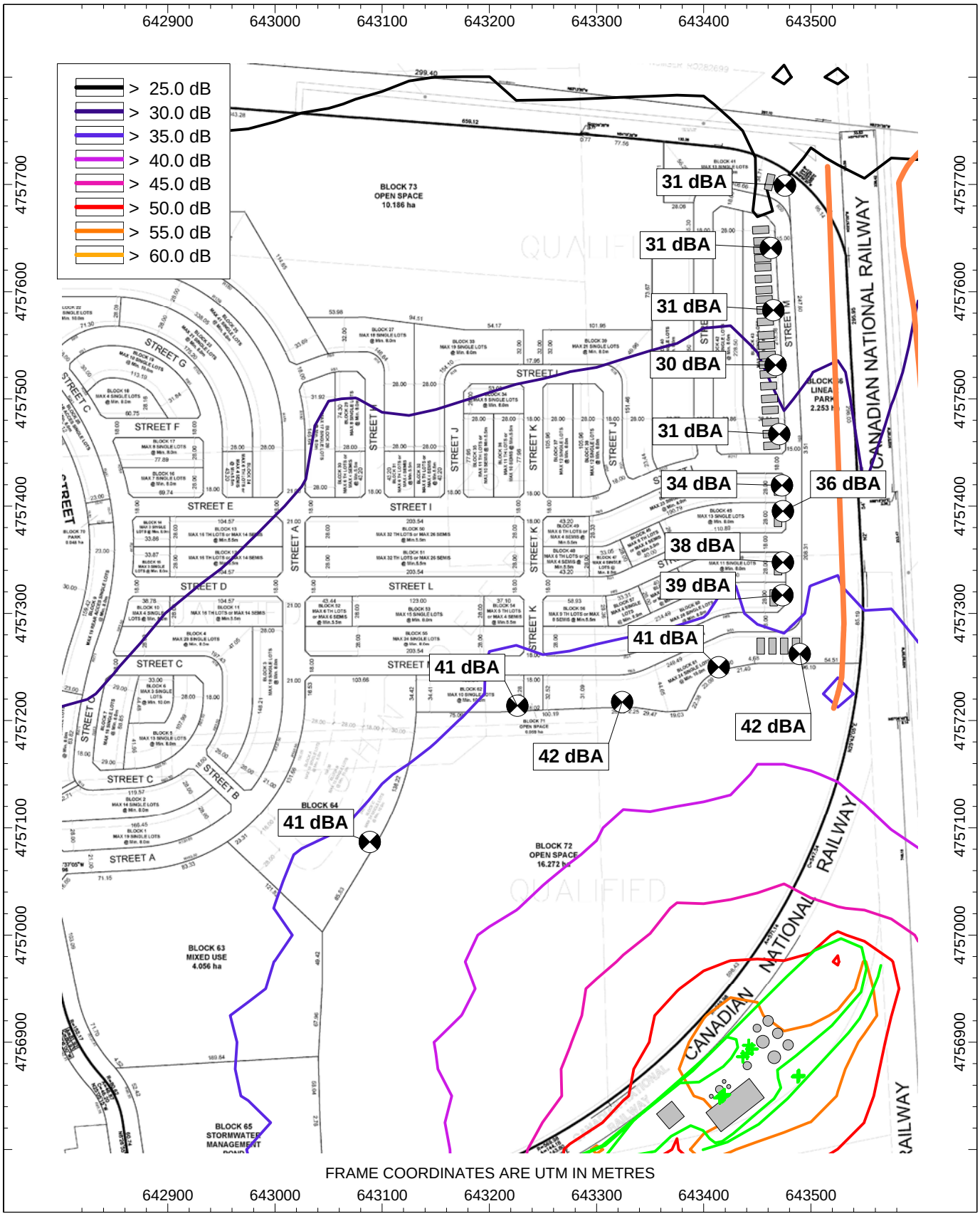


Figure 9: Non-Impulsive Sound Level Predictions, Leq [dBA] at 4.5 metres Above Grade
Verbio Diesel Canada

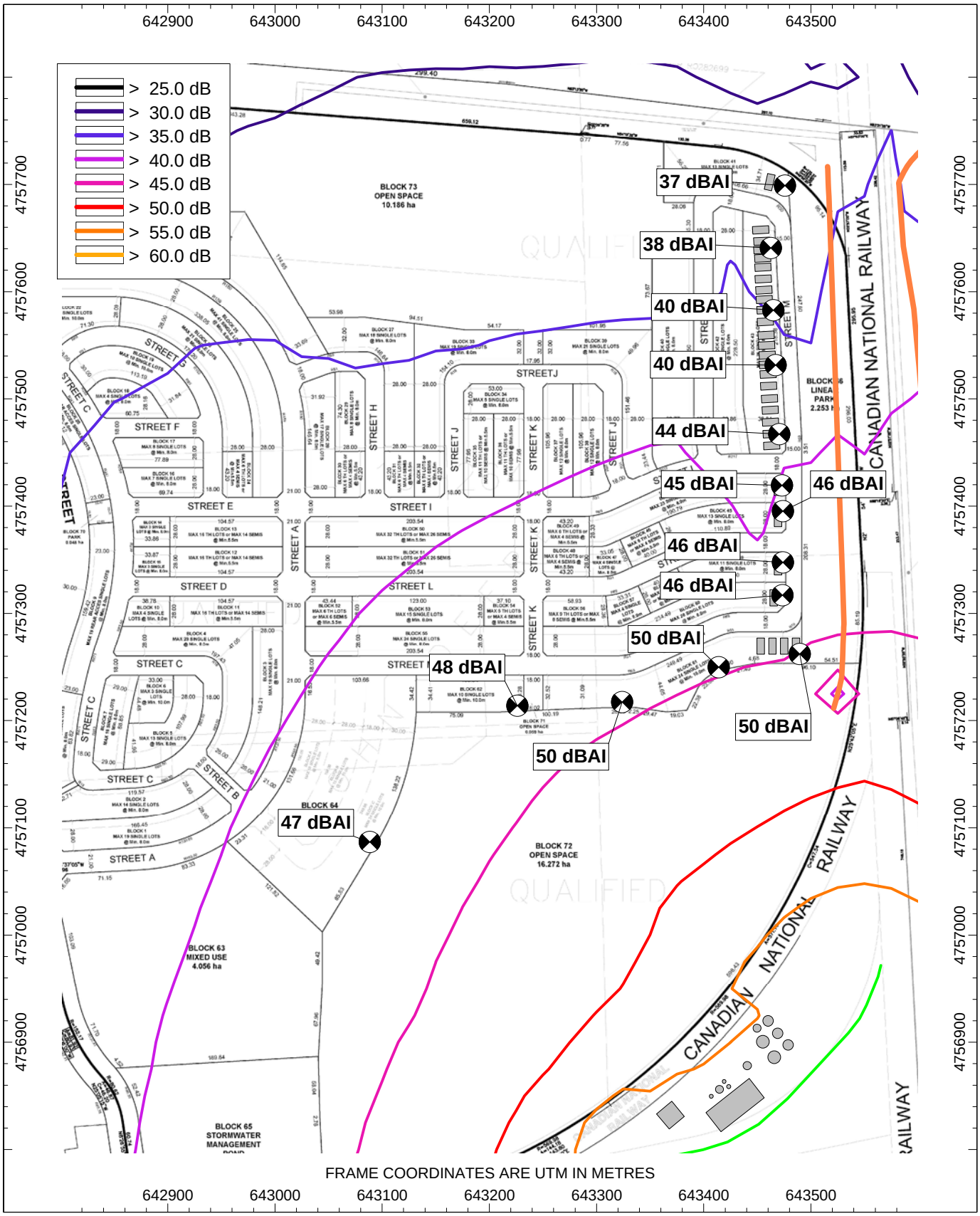


Figure 10: Impulsive Sound Level Predictions, LLM [dBAI] at 4.5 metres Above Grade
Verbio Diesel Canada

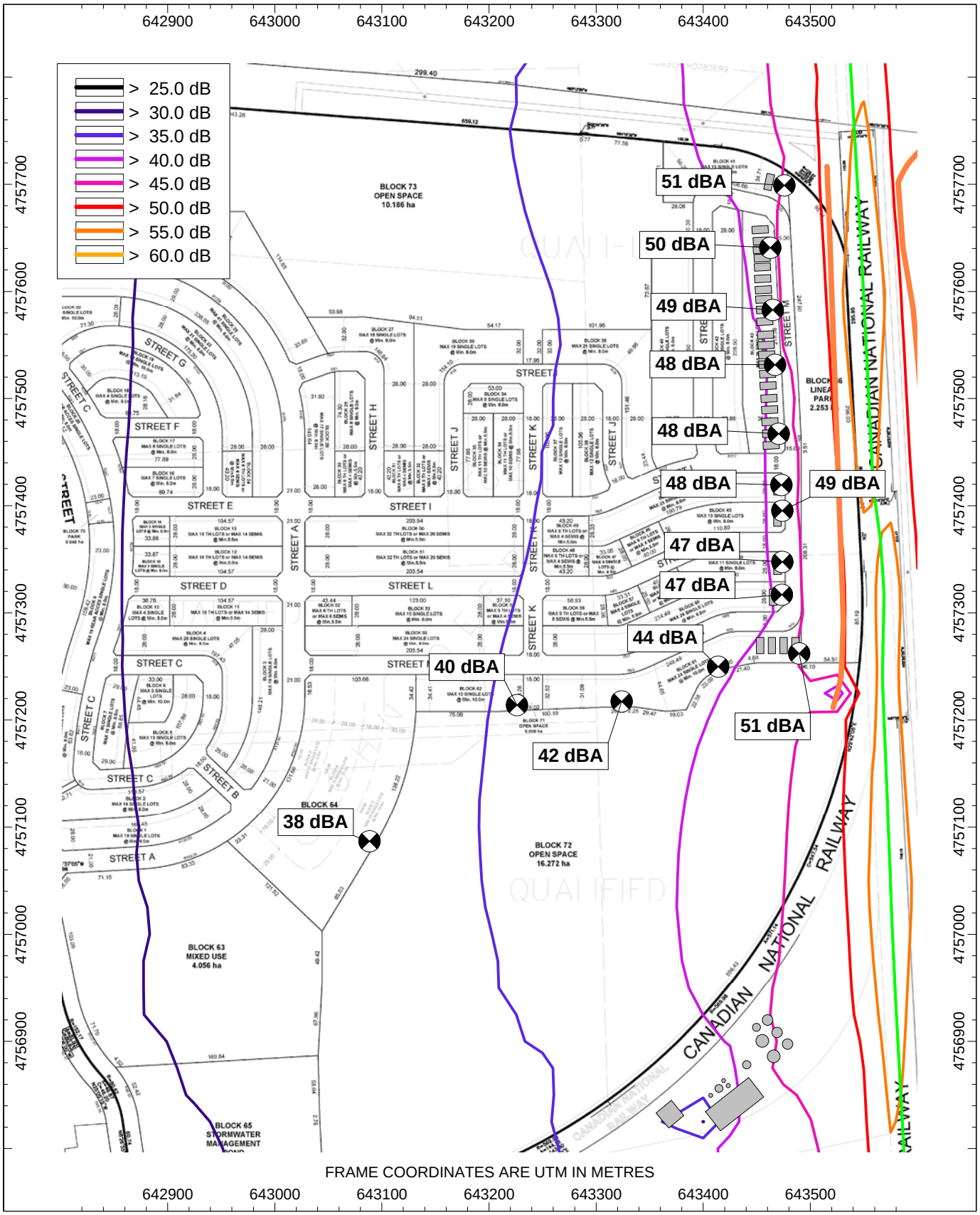


Figure 11: Non-Impulsive Sound Level Predictions, Leq [dBA] at 4.5 metres Above Grade
Gio Rail Holdings Corp

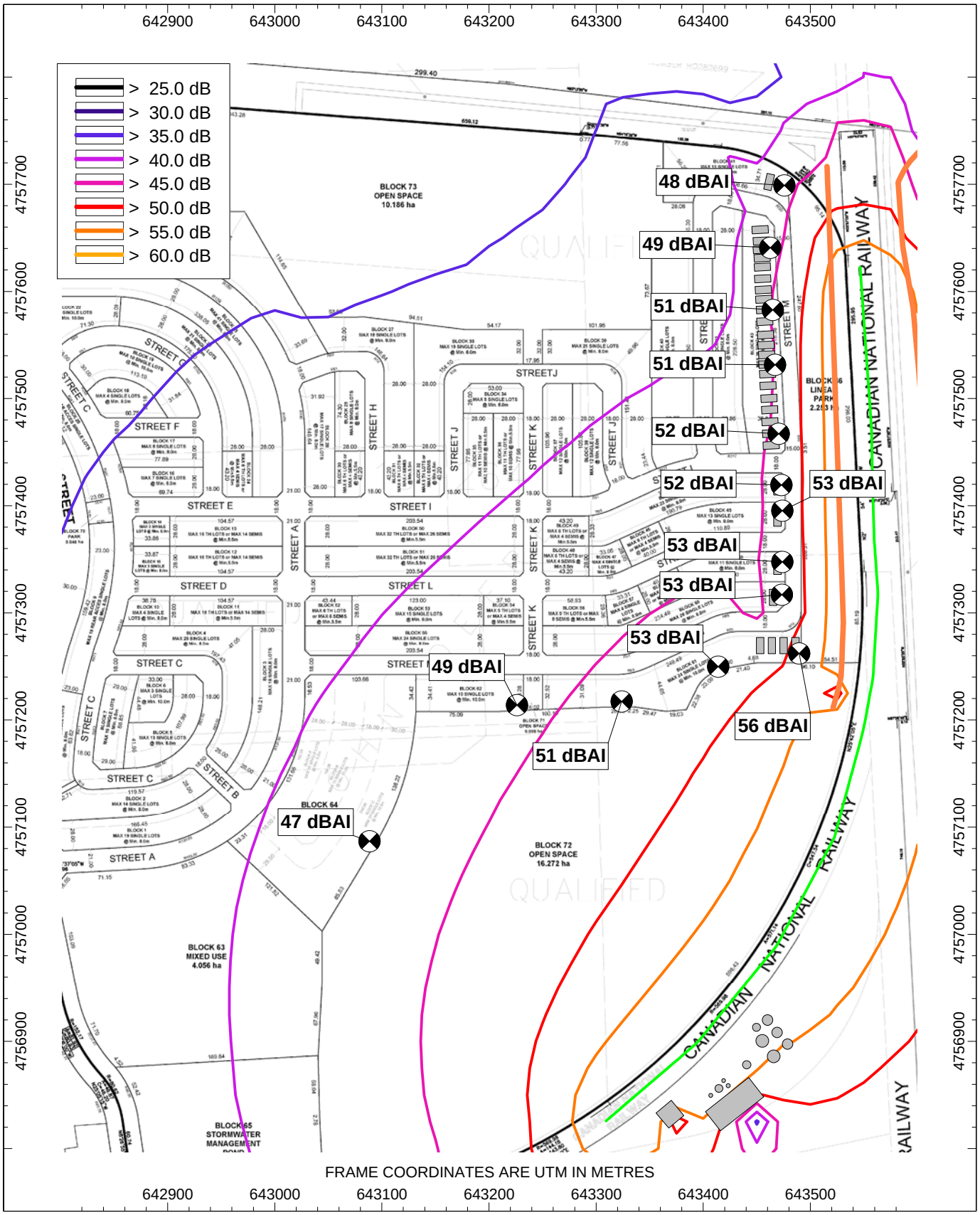


Figure 12: Impulsive Sound Level Predictions, LLM [dBAI] at 4.5 metres Above Grade
GIO Rail Holdings

Appendix A

Class 4 Correspondence

Ian Bonsma

From: Rachelle Larocque <rachelle.larocque@welland.ca>
Sent: April 9, 2020 10:47 AM
To: amanda@armstrongplan.ca
Cc: Grant Munday; Travers Fitzpatrick
Subject: Dain East Subdivision

Good afternoon Amanda,

We have had a chance to review the request for the Class 4 Designation for the Dain East as well as the John Deere lands, and are willing to support this request. We will, however, require that the Noise & Vibration Study that was submitted as part of the Redline Revision, OPA & ZBA be revised to reflect that it is now being considered Class 4 rather than Class 2.

Please let me know if you have any questions.

Take care,

Rachelle Larocque, BES, M.Sc., MCIP, RPP
Planning Supervisor
Planning Division
Infrastructure and Development Services
Corporation of the City of Welland
60 East Main Street, Welland, Ontario L3B 3X4
Hours: 8:30am-4:30PM
Phone: (905)735-1700 Ext. 2310 **Fax:** (905)735-8772
www.welland.ca

Amanda Kosloski

From: Amanda Kosloski <amanda@armstrongplan.ca>
Sent: Wednesday, March 18, 2020 6:50 PM
To: Rachelle Larocque (rachelle.larocque@welland.ca)
Subject: Request for Class 4 Designation re: Noise
Attachments: Figure 1 - Dain City Class 4 Assessment 2020-03-12.pdf

Follow Up Flag: Follow up
Due By: Monday, March 23, 2020 2:00 PM
Flag Status: Completed

Hi Rachelle –

Further to our discussion last week on behalf of 555 Canal Bank Developments GP Inc. we'd like to formally request the City designate certain lands within the Dain East and John Deere subdivisions (in Dain City) as Class 4 lands as per MECP Noise Guidelines. This will allow us to minimize the height and overall impact of a mitigation berm and fence needed for each site (to mitigate noise generated by the rail line and Verbio biodiesel facility). Stationary noise sources directly adjacent to each site require that we study noise levels which have identified the need for berm/barrier mitigation (considering only the outdoor living area noise levels i.e. no amount of mitigation on or within the homes can be proposed to construction materials). Attached is a figure prepared by our noise consultant outlining the extent of the proposed berm/barrier on each site (note that the underlying block plan on the John Deere lands is being updated).

The Review -
Class 4 is a designation given to (1) lands that would otherwise be defined as Class 1 (major population centre) or Class 2 (major population centre by day and small community at night); (2) lands that are intended for development with noise sensitive uses (residential), and (3) are in proximity to existing, lawfully established stationary sources (like the rail line and Verbio Biodiesel). This designation must be approved by the City or it cannot be used.

A number of other sites in the GTHA have been granted this designation including in Toronto, Hamilton, Vaughan, Milton, Bolton, Kitchener and Richmond Hill (to name a few that our noise consultant has worked on).

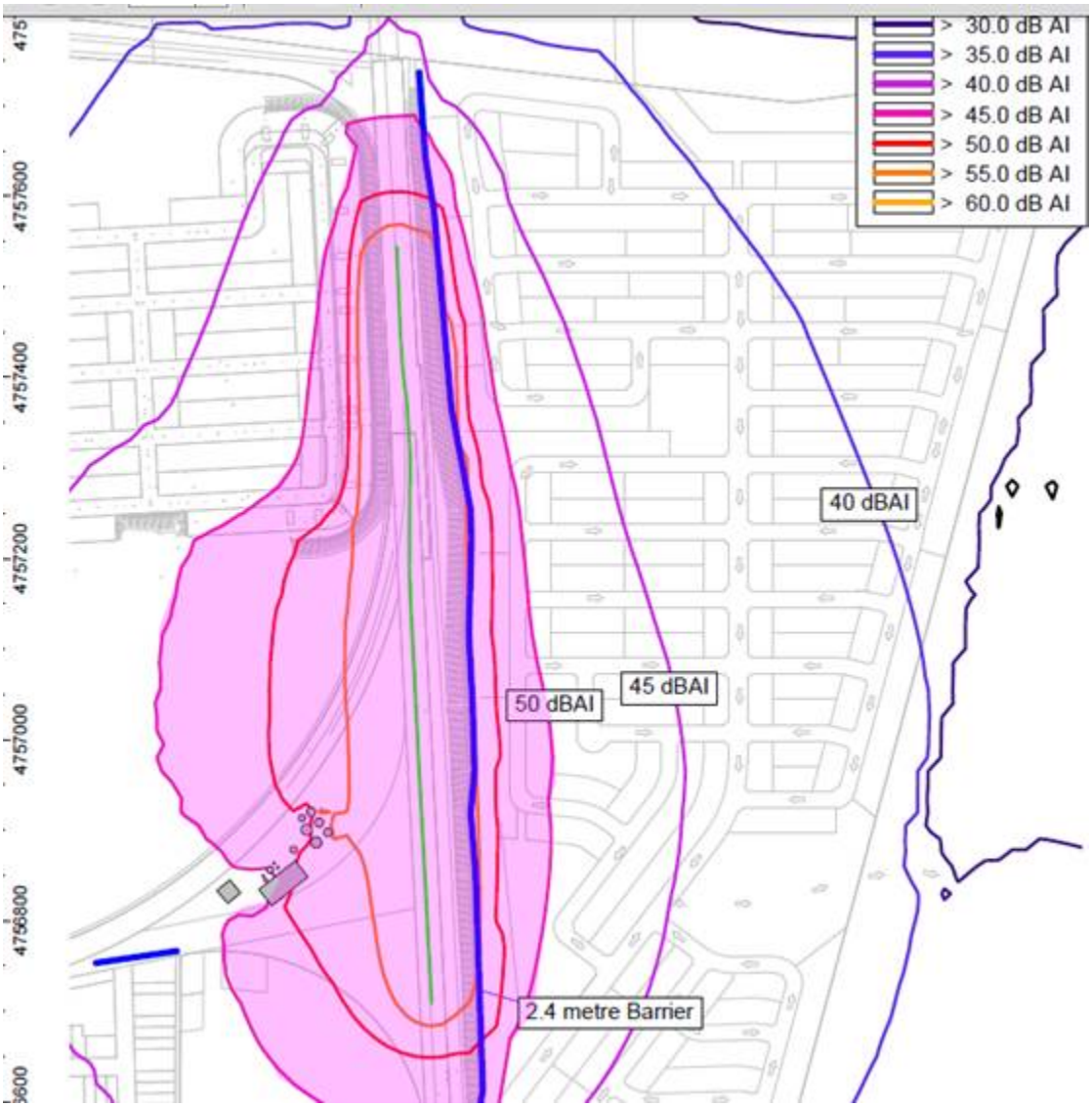
Essentially – a Class 4 designation will allow a higher daytime and nighttime noise level within the outdoor living area. For example, Class 1 allows 50dBA during the day and 45dBA at night; Class 4 would allow 60dBA during the day and 55dBA at night.

I've attached noise contours for each development site (John Deere and Dain East) so you can see existing and expected noise levels. On each you will see a pink line –our request to designate certain lands as "Class 4" would include all lots at this pink line and towards the railway lands; all lots on the other side of the pink line would remain Class 1. Additional noise clauses would be included in the APS and registered on title so the warnings would run with the land.

Having Class 4 approved on these lands would allow the Owner to provide additional amenity in the form of an improved linear park (John Deere) and trail (Dain East). In total, a Class 4 designation would reduce berm heights by 4m on the John Deere site and 3m on the Dain East site. For each 1m reduction in overall height the berm width can generally be reduced by 5.5m freeing up a significant amount of land. The idea is that on the Dain East site this additional land would still be within the City's Open Space block but could be used for a north south trail running from Forks Road to the Seaway lands; on the John Deere site the "additional" lands (resulting from a berm with a smaller width) would become part of a linear park and wildlife corridor. I've marked up the attached figure below. It shows the lands that would be impacted by the Class 4 (ie all lands from the pink line to the railway lands (that run north/south

between the two sites). Note -the John Deere block plan is being revised and so the base plan shown on this figure is out of date.

I can be reached on my cell at any time if you'd like to chat or need additional information.



Amanda Kosloski, RPP
Manager, Land Development
armstrong
planning | project management
125 Villarboit Cres Vaughan, ON L4K 4K2
416-444-3300 x3008

Appendix B

CN Requirements

Canadian National Railway Properties Inc.
Propriétés ferroviaires du Canadien National Inc.

277 Front Street West
Floor 8
Toronto, Ontario
M5V 2X7

Telephone: (416) 217-6961
Facsimile: (416) 217-6743

277, rue Front ouest
8e étage
Toronto (Ontario)
M5V 2X7

Téléphone: (416) 217-6961
Télécopieur: (416) 217-6743

PRINCIPAL MAIN LINE REQUIREMENTS

A. Safety setback of dwellings from the railway rights-of-way to be a minimum of 30 metres in conjunction with a safety berm. The safety berm shall be adjoining and parallel to the railway rights-of-way with returns at the ends, 2.5 metres above grade at the property line, with side slopes not steeper than 2.5 to 1.

B. The Owner shall engage a consultant to undertake an analysis of noise. At a minimum, a noise attenuation barrier shall be adjoining and parallel to the railway rights-of-way, having returns at the ends, and a minimum total height of 5.5 metres above top-of-rail. Acoustic fence to be constructed without openings and of a durable material weighing not less than 20 kg. per square metre of surface area. Subject to the review of the noise report, the Railway may consider other measures recommended by an approved Noise Consultant.

C. Ground-borne vibration transmission to be evaluated in a report through site testing to determine if dwellings within 75 metres of the railway rights-of-way will be impacted by vibration conditions in excess of 0.14 mm/sec RMS between 4 Hz and 200 Hz. The monitoring system should be capable of measuring frequencies between 4 Hz and 200 Hz, ±3 dB with an RMS averaging time constant of 1 second. If in excess, isolation measures will be required to ensure living areas do not exceed 0.14 mm/sec RMS on and above the first floor of the dwelling.

D. The Owner shall install and maintain a chain link fence of minimum 1.83 metre height along the mutual property line.

E. The following clause should be inserted in all development agreements, offers to purchase, and agreements of Purchase and Sale or Lease of each dwelling unit within 300m of the railway right-of-way: "Warning: Canadian National Railway Company or its assigns or successors in interest has or have a rights-of-way within 300 metres from the land the subject hereof. There may be alterations to or expansions of the railway facilities on such rights-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 rights-of-way."

F. Any proposed alterations to the existing drainage pattern affecting railway property must receive prior concurrence from the Railway and be substantiated by a drainage report to the satisfaction of the Railway.

G. The Owner shall through restrictive covenants to be registered on title and all agreements of purchase and sale or lease provide notice to the public that the safety berm, fencing and vibration isolation measures implemented are not to be tampered with or altered and further that the Owner shall have sole responsibility for and shall maintain these measures to the satisfaction of CN.

H. The Owner enter into an Agreement stipulating how CN's concerns will be resolved and will pay CN's reasonable costs in preparing and negotiating the agreement.

I. The Owner may be required to grant CN an environmental easement for operational noise and vibration emissions, registered against the subject property in favour of CN.

Canadian National Railway Properties Inc.
Propriétés ferroviaires du Canadien National Inc.

277 Front Street West
Floor 8
Toronto, Ontario
M5V 2X7

Telephone: (416) 217-6961
Facsimile: (416) 217-6743

277, rue Front ouest
8e étage
Toronto (Ontario)
M5V 2X7

Téléphone: (416) 217-6961
Télécopieur: (416) 217-6743

SECONDARY MAIN LINE REQUIREMENTS

A. Safety setback of dwellings from the railway rights-of-way to be a minimum of 30 metres in conjunction with a safety berm. The safety berm shall be adjoining and parallel to the railway rights-of-way with returns at the ends, 2.0 metres above grade at the property line, with side slopes not steeper than 2.5 to 1.

B. The Owner shall engage a consultant to undertake an analysis of noise. At a minimum, a noise attenuation barrier shall be adjoining and parallel to the railway rights-of-way, having returns at the ends, and a minimum total height of 4.5 metres above top-of-rail. Acoustic fence to be constructed without openings and of a durable material weighing not less than 20 kg. per square metre of surface area. Subject to the review of the noise report, the Railway may consider other measures recommended by an approved Noise Consultant.

C. Ground-borne vibration transmission to be evaluated in a report through site testing to determine if dwellings within 75 metres of the railway rights-of-way will be impacted by vibration conditions in excess of 0.14 mm/sec RMS between 4 Hz and 200 Hz. The monitoring system should be capable of measuring frequencies between 4 Hz and 200 Hz, ±3 dB with an RMS averaging time constant of 1 second. If in excess, isolation measures will be required to ensure living areas do not exceed 0.14 mm/sec RMS on and above the first floor of the dwelling.

D. The Owner shall install and maintain a chain link fence of minimum 1.83 metre height along the mutual property line.

E. The following clause should be inserted in all development agreements, offers to purchase, and agreements of Purchase and Sale or Lease of each dwelling unit within 300m of the railway right-of-way: "Warning: Canadian National Railway Company or its assigns or successors in interest has or have a rights-of-way within 300 metres from the land the subject hereof. There may be alterations to or expansions of the railway facilities on such rights-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 rights-of-way."

F. Any proposed alterations to the existing drainage pattern affecting railway property must receive prior concurrence from the Railway and be substantiated by a drainage report to the satisfaction of the Railway.

G. The Owner shall through restrictive covenants to be registered on title and all agreements of purchase and sale or lease provide notice to the public that the safety berm, fencing and vibration isolation measures implemented are not to be tampered with or altered and further that the Owner shall have sole responsibility for and shall maintain these measures to the satisfaction of CN.

H. The Owner enter into an Agreement stipulating how CN's concerns will be resolved and will pay CN's reasonable costs in preparing and negotiating the agreement.

I. The Owner may be required to grant CN an environmental easement for operational noise and vibration emissions, registered against the subject property in favour of CN.