Feasibility Noise Study

105 Elmira Road North, Guelph, Ontario

Killam Apartment Subsidiary II Limited Partnership

June 06, 2025

→ **The Power of Commitment**

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Executive Summary

GHD Limited (GHD) was retained by Killam Apartment Subsidiary II Limited Partnership and HIP Investments Inc. to prepare a Feasibility Noise Study for the proposed residential development (Development) located at 105 Elmira Road North, Guelph, Ontario (Site). This Study has been prepared in support of the planning approvals for the Development.

The Development consists of one 6-storey residential building with 126 residential units, three outdoor amenity spaces at grade, and surface parking at the rear.

The purpose of this Study is to assess the following potential impacts:

– Noise impacts at the Development due to future road traffic
– Stationary noise impacts from on-site HVAC equipment

GHD reviewed the area surrounding the Development for the potential for noise impacts from nearby commercial/industrial uses. Since the Development is surrounded by residential uses, parks, and natural heritage land uses, it has been concluded that the noise impacts experienced at the Development from off-site stationary noise are negligible. Thus, detailed noise assessment of off-site stationary noise is note required.

Predicted ambient noise levels at the Development due to future road traffic is sufficiently high that noise mitigation is required in the form of provisions for the installation of central air conditioning in the future and warning clauses.

This report is subject to, and must be read in conjunction with, the limitations set out in Section 1.3 and the assumptions and qualifications contained throughout the Report.

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1. Introduction

1.1 Purpose of this Report

GHD Limited (GHD) was retained by Killam Apartment Subsidiary II Limited Partnership and HIP Investments Inc. to prepare a Feasibility Noise Study for the proposed residential development (Development) located at 105 Elmira Road North, Guelph, Ontario (Site). This Study has been prepared in support of the planning approvals for the Development.

A previous version of this Study (Rev.01) was submitted to the City of Guelph, and the City provided their review comments in the form of a mark-up of the Study. This revised version of the Study (Rev.02) includes updates to address the City's comments and is based on the current version of the concept plan.

1.2 Site and Development Description

The Site is located at 105 Elmira Road North, just off the intersection of Elmira Road North and Willow Road. A key plan is included as Figure 1.1, which shows the location of the Site in relation to these transportation corridors.

The Site is currently zoned as Commercial (NC). The lands surrounding the Site include properties zoned as Residential (R.1A, R.1B, R.1C, and R.1D) on all sides, Park (P.1 and P.3) to the southeast, and Natural Heritage (WL) to the west. A zoning map is included in Figure A.1 of Appendix A.

The area surrounding the Site includes minor terrain elevation changes but is essentially flat.

The Development consists of one 6-storey residential building with 126 residential units, three outdoor amenity spaces at grade, and surface parking at the rear. The Development drawings are included in Appendix A.

1.3 Scope and Limitations

This report: has been prepared by GHD for Killam Apartment Subsidiary II Limited Partnership and HIP Investments Inc. and may only be used and relied on by Killam Apartment Subsidiary II Limited Partnership and HIP Investments Inc. for the purpose agreed between GHD and Killam Apartment Subsidiary II Limited Partnership and HIP Investments Inc. as set out in section 1.1 of this report.

GHD otherwise disclaims responsibility to any person other than Killam Apartment Subsidiary II Limited Partnership and HIP Investments Inc. arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report. GHD disclaims liability arising from any of the assumptions being incorrect.

2. Sound Criteria

2.1 Municipal Ordinances

City of Guelph By-Law Number (2000)-16366 (Noise By-Law) includes specific requirements and prohibitions of noise emissions based on source type during certain time periods, including:

Noise emissions from a residential air conditioner are required to comply with MECP guideline NPC-216 “Residential Air Conditioners”

The Guelph Noise Control Guidelines Version 1.0 (GNCG), dated November 2018, have been reviewed in the context of this Study. The GNCG makes direct reference to the Ministry of the Environment, Conservation and Parks (MECP) guideline NPC-300.

This Study has been prepared in accordance with both the GNCG and NPC-300, and references the requirements of NPC-216.

2.2 Road Noise Criteria

Under NPC-300, road traffic noise impacts are evaluated separately for exterior receptors and interior receptors based on the average day (07:00 to 23:00) and night (23:00 to 07:00) noise impacts. The sound levels are expressed in terms of A-weighted equivalent sound levels (Leq).

NPC-300 and the GNCG defines two categories of receivers for transportation noise:

– Plane of Window (POW): Point corresponding with the centre of a window of a sensitive space.
– Outdoor Living Area or “OLA” or “Outdoor Amenity Area”: Means that part of a noise sensitive land use that is intended and designed for the quiet enjoyment of the outdoor environment and is readily accessible from the building. The OLA includes, but is not limited to, the following:
    - Backyard and side yard areas of single family, semi-detached and townhouse dwellings;
    - Gardens, terraces and patios;
    - Balconies and elevated terraces (e.g. rooftops) that are not enclosed, with a minimum depth of 4 metres;
    - Common outdoor areas associated with high-rise and other multi-unit buildings, including designated outdoor amenity areas required under Zoning provisions;
    - Passive recreational areas such as parks if identified by the City.
– The OLA does not include the front yard areas of single family, semi-detached and townhouse dwellings. For the purposes of noise impact assessment in an OLA, the point of assessment is typically:
    - For rectangular and regularly shaped OLAs: 3 metres from the building façade, 1.5 metres above grade or floor level and aligned with the midpoint of the subject façade;
    - For unusually shaped OLAs: a reasonably central location, biased toward a conservative assessment of the noise source, (e.g. at the area centroid);
    - For elevated OLAs, the point of assessment is typically the middle of the OLA however more conservative locations may be necessary.
– The noise impact assessment at an OLA excludes the effect of sound reflection from the façade. In general, the point of assessment in the OLA is a point used for prediction (including extrapolation), rather than measurement, of sound levels.

NPC-300 specifies sound level limits for POW and OLA receivers as summarized in Table 2.1 below.

Table 2.1 Road and Rail Traffic – Outdoor Sound Level Limits

Receiver Category	Sound Level Limit (dBA)	
	Day (16-hour Leq)	Night (8-hour Leq)
Plane-of-Window (POW)	55	50
Outdoor Living Area (OLA)	55	N/A

For POWs, combined road traffic sound levels exceeding the corresponding criteria above would require additional controls for MECP compliance. Depending on the magnitude of the exceedances, additional controls may include ventilation requirements, requirements for building envelope elements, and/or noise warning clauses. For sound levels greater than 55 dBA and less than or equal to 65 dBA during the day or greater than 50 dBA and less than or equal to 60 dBA during the night, the building should be designed with a provision for the installation of central air conditioning in the future, at the occupant's discretion with the inclusion of **Warning Clause C**. If the sound levels are greater than 65 dBA during the day or greater than 60 dBA at night, installation of central air conditioning should be implemented with the inclusion of **Warning Clause D**.

For OLAs, road traffic sound levels exceeding the daytime limit indicated above would require design of noise barriers to achieve the target, and/or warning clauses. NPC-300 states that sound levels up to 5 dBA above the OLA sound level limit (i.e., up to 60 dBA) may be mitigated with noise control measures to reduce the sound levels to 55 dBA. If measures are not provided, prospective purchasers or tenants should be informed of potential noise problems by a **Warning Clause A**.

If POW sound levels from future road traffic exceed 65 dBA during the day or 60 dBA at night, or if sound levels from future rail traffic exceed 60 dBA during the day or 55 dBA at night, building envelope components must be designed to achieve the indoor sound level limits of NPC-300. The indoor sound level limits for road and rail traffic are summarized in Table 2.2 below.

Table 2.2 Road Traffic – Indoor Sound Level Limits (Residential uses)

Receiver Category	Road Sound Level Limits (dBA)	
	Day (16-hour Leq)	Night (8-hour Leq)
Indoor living areas (excluding sleeping quarters)	45	45
Sleeping quarters	45	40

NPC-300 also includes supplementary road traffic indoor sound level limits for non-residential sensitive land uses, which are summarized in Table 2.3 below.

Table 2.3 Road Traffic – Indoor Sound Level Limits (Non-Residential uses)

Receiver Category	Road Sound Level Limits (dBA)	
	Day (16-hour Leq)	Night (8-hour Leq)
General offices, reception areas, retail stores, etc.	50	-
Hospitals, schools, nursing/retirement homes, daycare centres, theatres, places of worship, libraries, individual or semi-private offices, conference rooms, reading rooms, etc.	45	-
Sleeping quarters of hotels/motels	-	45
Sleeping quarters of hospitals, nursing/retirement homes, etc.	-	40

2.3 Stationary Noise Limits

2.3.1 MECP Standard Limits

NPC-300 defines stationary noise sources as sound from all sources that are normally operated within the property lines of a facility. The noise impact from stationary sources is evaluated based on operations during a predictable worst-case hour. Stationary noise assessment criteria are generally determined based on the MECP's minimum exclusionary sound level limits, as presented in NPC-300, in comparison to the background sound levels experienced in the area.

The Site is in what may conservatively be considered a Class 2 acoustic environment, which NPC-300 defines as an acoustic environment with a mix of Class 1 and Class 3 characteristics; that is:

– Sound levels that are dominated by human activities (i.e., road traffic) during the daytime (07:00 to 19:00 or to 23:00 hours); and,
– Low evening and night background sound level defined by natural environment and infrequent human activity starting as early as 19:00 hours (19:00 or 23:00 to 07:00 hours).

Table 2.4 below summarizes the MECP's minimum exclusionary sound level limits for Class 2 areas, which are expressed in terms of 1-hour equivalent sound levels (1-hour Leq):

Table 2.4 MECP Minimum Exclusionary Sound Level Limits for Steady Sound – Class 2 Area

Point of Reception Type	Class 2 Sound Level Limits (dBA)		
	Day (7am – 7pm)	Evening (7pm – 11 pm)	Night (11pm – 7am)
Plane of window	50	50	45
Outdoor space	50	45	--

2.3.2 Residential Air Conditioners

The Ontario Ministry of Environment, Conservation and Parks (MECP) guideline NPC-216 “Residential Air Conditioning Devices" (1993) contains noise level criteria for stationary noise sources (e.g., rooftop mechanical equipment, etc.). The assessment criteria are determined for a point-of-reception based on the minimum exclusionary limits presented in Table 216-2 of NPC-216 in comparison with the existing background sound levels (plus 5 dBA) experienced in the area (whichever is higher):

Table 2.5 NPC-216 Criteria for Central Air Conditioning Devices

Area Type	One Hour Leq
Class 2	45
Class 1	50*

Note:

* When central air conditioners are requirements for noise control in the interior living spaces of new developments, the specific sound level limit is increased to 55 dBA.

3. Transportation Noise Impact Assessment

3.1 Methodology

The roadways near the Site were modelled as sources of sound using the STAMSON model that is the standard in Ontario. The model takes into account the geometry, exposure angles, ground absorption, speed, and traffic volumes/mix. Road traffic noise levels were predicted at the worst-case POWs of the Development and at all OLAs. The worst-case POWs were selected as the points on the façade with the greatest exposure to the road noise sources, with all POW and OLA receiver locations shown in Figure 3.2. The STAMSON calculations are provided in Appendix B.

3.2 Traffic Input Parameters

3.2.1 Road Traffic Data

The estimated year of construction completion is 2027; therefore, future road traffic noise levels are predicted based on future 2037 forecast traffic volumes per the GNCG. Future road traffic model parameters used in this Study are summarized as follows:

Table 3.1 Future (2037) Road Traffic Input Parameters

Road Segment	Future AADT	Speed Limit (km/h)	Day/Night Split	Commercial Vehicle Rates (medium trucks/heavy trucks)
Elmira Road North	12,565	50	90% / 10%	0% / 1%
Willow Road (west of Elmira Road North)	1,947	40	90% / 10%	0% / 1%
Willow Road (east of Elmira Road North)	4,717	50	90% / 10%	0% / 2%

Road traffic volumes for Elmira Road North and Willow Road were obtained from the City of Guelph in the form of Turning Movement Counts (TMC) from the year 2019. GHD applied an assumed growth rate of 2.5% to estimate the future 2037 AADT. A day / night split of 90% / 10% was assumed. Commercial vehicle rates were determined based on the TMC report. AADT values were estimated from the TMC counts using equations found in Book 12 Section 4.11 of the Ontario Traffic Manual (Ontario, 2024). A sample AADT calculation using these equations is included in Appendix C.

GHD notes that the forecast traffic volumes for Willow Road west of Elmira Road North are below 40 vehicles per hour during the nighttime, which is the minimum value allowed for input in STAMSON. Therefore, the nighttime traffic volume for this road segment was doubled to allow for input in STAMSON, and the resulting partial sound levels at the POW receivers were reduced by 3 dB to account for the effect of doubling the traffic volume. That is, doubling the traffic volume input increases the associated sound pressure level by 3 dB if all other input parameters are kept constant, based on equation 12 of the MECP publication titled “ORNAMENT: Ontario Road Noise Analysis Method for Environment and Transportation” (MECP, 1989).

Figure 1.1 shows the location of the roadways noted above in relation to the Site. All road traffic data referenced in this Study is included in Appendix C.

3.3 Results

3.3.1 Road Traffic

3.3.1.1 Plane of Window Receivers

Predicted future road traffic noise impacts at the worst-case POW receivers of the Development are summarized as follows:

Table 3.2 Future Road Noise Levels – Plane of Window

POW Receiver ID	Façade	Future Road Noise Levels (dBA)		Limits Exceeded?
		Day	Night	
POW_SW	Southwest	**61**	**54**	**Yes**
POW_SE	Southeast	**59**	**53**	**Yes**
POW_NW	Northwest	**57**	51	**Yes**
POW_NE	Northeast	55	48	No

As seen above, future road and rail noise levels at the façades generally range from 55 dBA to 61 dBA during the day and 48 dBA to 54 dBA at night. These sound levels are sufficiently high that the Development must incorporate, at a minimum, provisions for the future installation of central air conditioning and noise warning clauses in accordance with NPC-300, which are described further in Section 5.2. Figure 3.1 shows the worst-case POW receiver locations used in the STAMSON calculations.

3.3.1.2 Outdoor Living Areas

Predicted future road traffic noise impacts at the worst-case OLA receivers of the Development are summarized as follows:

Table 3.3 Future Road Noise Levels – Outdoor Living Area

Receiver ID	Receiver Description	Future Road Daytime Noise Levels (dBA)	Limit Exceeded?
OLA-01	Shared outdoor amenity space at Ground floor level, adjacent to southeast façade (1.5 metres Above Grade [m AG])	**58**	**Yes**
OLA-02	Shared outdoor amenity terrace at Ground floor level, adjacent to northwest façade (1.5 m AG)	**56**	**Yes**
OLA-03	Shared common outdoor amenity space at Ground floor level, adjacent to the amenity terrace (1.5 m AG)	51	No

As seen above, the daytime road noise levels at the OLAs range from 40 dBA to 59 dBA. OLA receiver locations are shown in Figure 3.2.

The noise levels at OLA-01 and OLA-02 are sufficiently high that physical mitigation may be provided to achieve a sound level of 55 dBA or lower. However, an acoustic barrier to shield OLA-01 is not considered practical, due to the small size of the amenity terrace (OLA-01) and to preserve architectural design consistency with the remainder of the façade; therefore, in accordance with the GNCG, an appropriate noise warning clause should be used, as described in Section 5.3.

Consideration could be given to constructing an acoustic barrier along the southwest side of OLA-02. Based on the mitigated STAMSON prediction included in Appendix B, an acoustic barrier 1.8 metres tall (i.e., the maximum height permitted by the GNCG without special approval) achieves a sound level of 53 dBA at OLA-02. The preliminary layout

of this barrier is shown in Figure 3.3. If this barrier is not constructed, then an appropriate noise warning clause should be used, as described in Section 5.3.

3.4 Road Noise Mitigation

3.4.1 Ventilation

Predicted future traffic noise levels at the façades of the Development are sufficiently high that, at a minimum, provisions must be made to enable installation of central air conditioning at the occupant's discretion (i.e., ductwork must be designed and installed to accommodate a future central air conditioning system installation). This will allow windows and doors to remain closed to help ensure that the indoor sound level limits of NPC-300 are met. **Warning Clause C** would be required in the case that central air conditioning is not installed prior to occupancy. However, if central air conditioning systems are installed prior to occupancy, then **Warning Clause D** should be used instead. Recommended warning clause wording is included in Section 5.3.

4. Stationary Noise Impact Assessment

GHD reviewed the area surrounding the Development for the potential for noise impacts from nearby commercial/industrial uses. Since the Development is surrounded by residential uses, parks, and natural heritage land uses, it has been concluded that the noise impacts experienced at the Development from off-site stationary noise are negligible. Thus, detailed noise assessment of off-site stationary noise is note required.

4.1 Noise Impacts from the Development

4.1.1 Outdoor Noise Impacts

Base building cooling and ventilation systems for the Development have the potential to result in noise impacts on noise sensitive spaces within the Development itself and at existing residential uses surrounding the Site. The specific equipment selections are not available at the time of writing; therefore, it is anticipated that noise emissions from rooftop equipment will be evaluated as part of the detailed design of the Development. GHD recommends that the Developer carry the necessary contingencies for the following noise controls, which may be necessary to achieve compliance with the sound level limits of NPC-300 at all worst-case points of reception both on-site and off-site:

– Acoustic louvers and/or barriers to surround large mechanical equipment (e.g., cooling towers, chillers, make up air units, transformers). Cost contingencies should account for structural requirements due to snow and wind loads associated with the barriers.
– Acoustic enclosures for any outdoor standby generator sets (Level 2 minimum).
– Exhaust muffler and ventilation silencers for any indoor standby generator sets.

Performance specifications for the above controls are dependent on equipment locations and sound power levels, which may vary. Therefore, the full scope and details of the required noise mitigation should be evaluated during detailed design.

If each residential dwelling will be supplied with its own residential air conditioning unit(s) or similar, these units must comply with the sound level limits of NPC-216, "Residential Air Conditioners".

4.1.2 Indoor Noise Impacts

Mechanical equipment and other building services also have the potential to cause annoyance due to noise and vibration transmission to residences. The American Society of Heating, Refrigerating, and Air conditioning Engineers (ASHRAE) guidelines specify acceptable noise levels from such equipment. Specification of noise controls

(e.g., silencers, floating concrete slabs, acoustic ceilings, vibration isolators) to achieve these criteria is typically completed as part of the detailed building design, once equipment selections are made and floor layouts are more developed.

The Ontario Building Code stipulates minimum STC and apparent sound transmission class (ASTC) rating requirements for demising partitions separating residential suites from other spaces inside the building. For demising partitions separating suites from elevator shafts or garbage chutes, constructions meeting a minimum STC-55 rating must be used. For demising partitions separating suites from any other space in the building, constructions meeting a minimum STC-50 rating must be used. Suite demising partitions must also achieve a minimum rating of ASTC-47.

5. Recommendations

The following recommendations are preliminary based on the current development concept and assumptions stated herein. If the Development concept changes in a way that would impact the results of the road traffic noise predilections, then these recommendations should be revisited.

5.1 Building Envelope Construction

For all façades at the Development, standard insulating glazing for the exterior windows and doors (i.e. ratings of STC-29 or higher) are sufficient to achieve the indoor sound level criteria of NPC-300.

5.2 Ventilation

Predicted future traffic noise levels at the façades of the Development are sufficiently high that, at a minimum, provisions must be made to enable installation of central air conditioning at the occupant's discretion (i.e., ductwork must be designed and installed to accommodate a future central air conditioning system installation). This will allow windows and doors to remain closed to help ensure that the indoor sound level limits of NPC-300 are met.

Warning Clause C would be required in the case that central air conditioning is not installed prior to occupancy. However, if central air conditioning systems are installed prior to occupancy, then **Warning Clause D** should be used instead. The City of Guelph's warning clause wording is included in Section 5.3.

5.3 Warning Clauses

The following warning clauses are provided as examples of what may need to be included in agreements of Offers of Purchase and Sale, lease/rental agreements, and condominium declarations for all residential dwellings of the Development. If the concept of the Development changes in a way that would impact the results, then the corresponding warning clauses may need to be revised.

> **City of Guelph, Mandatory Warning Clause**: "The Transferee covenants with the Transferor that the below clause, verbatim, will be included in all subsequent Agreements of Purchase of sale or lease and Sale and Deeds conveying the lands described herein, which covenant shall run with the said lands and is for the benefit of the subsequent owners and renters of the said lands and the owner of the adjacent road."
>
> **Warning Clause A:** "The Transferee of the dwelling unit, for himself, his heirs, executors, administrators, successors and assigns acknowledge being advised that despite the inclusion of noise control features in the development and/or within the building unit sound levels due to increasing road traffic may occasionally interfere with some indoor and/or outdoor activities of the dwelling occupants as the sound levels may at times exceed the sound level limits of the municipal and provincial noise criteria."
>
> "This development includes a number of measures to help reduce noise impacts, listed below. To ensure that provincial and municipal sound level limits are not exceeded and/or to keep sound levels as low as possible it is important to maintain the sound attenuation features provided."

"This development includes building and street orientation to help increase setback distances to major noise sources and shield some rear yards from excessive noise levels."

Applicable only if central air conditioning is <u>not</u> installed prior to occupancy:

Warning Clause C: "This dwelling unit has been designed with the provision for adding central air conditioning at the occupant's discretion. Installation of central air conditioning by the occupant in low and medium density developments will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the sound level limits of the Municipality and the Ministry of the Environment, Conservation and Parks."

"The building components of this dwelling unit (walls, windows and exterior doors) have been designed to provide acoustic insulation so that, when windows and exterior doors are closed, the indoor sound levels are within the municipal and provincial sound level limits. The details of this building component design are available by contacting the builder of this unit."

Applicable only if central air conditioning <u>is</u> installed prior to occupancy:

Warning Clause 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, Conservation and Parks."

"The building components of this dwelling unit (walls, windows and exterior doors) have been designed to provide acoustic insulation so that, when windows and exterior doors are closed, the indoor sound levels are within the municipal and provincial sound level limits. The details of this building component design are available by contacting the builder of this unit."

6. Conclusions

The Study concludes that the proposed residential development at 105 Elmira Road North, Guelph, Ontario (Development) is feasible and will not be restricted by the surrounding noise impact exposures, provided that the proposed Development adheres to the recommendations of this Study. The recommendations include provisions for installation of central air conditioning in the future, noise warning clauses.

7. References

City of Guelph Engineering and Transportation Services (Guelph, 2018), *Guelph Noise Control Guidelines Version 1.0*

Ontario Ministry of Environment, Conservation and Parks (MECP, 2013), Publication NPC-300: *Environmental Noise Guideline: Stationary and Transportation Sources – Approval and Planning*

Province of Ontario (Ontario, 2024), Ontario Traffic Manual, Book 12, Traffic Signals, *Section 4.11, Justification 7 – Projected Volumes*

Ontario Ministry of the Environment, Conservation, and Parks (MECP 1989) *ORNAMENT: Ontario Road Noise Analysis Method for Environment and Transportation*

Paper Size ANSI B

0 20 40 60 80 100 m

Map Projection: Transverse Mercator
Horizontal Datum: North American 1983
Grid: NAD 83 UTM Zone 17N

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GHD

DETAILED NOISE IMPACT STUDY
KILLAM APARTMENT SUBSIDIARY II LIMITED PARTNERSHIP AND HIP INVESTMENTS INC.
105 ELMIRA ROAD NORTH, GUELPH, ONTARIO

KEY PLAN

Project No. **12654780**
Revision No. **-**
Date **06.06.2025**

FIGURE 1.1

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Data source: Google Satellite

Paper Size ANSI B

0 10 20 30 40 50 m

Map Projection: Transverse Mercator
Horizontal Datum: North American 1983
Grid: NAD 83 UTM Zone 17N

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DETAILED NOISE IMPACT STUDY
KILLAM APARTMENT SUBSIDIARY II LIMITED PARTNERSHIP AND HIP INVESTMENTS INC.
105 ELMIRA ROAD NORTH, GUELPH, ONTARIO

PLANE OF WINDOW ASSESSMENT LOCATIONS

Project No. **12654780**
Revision No. **-**
Date **06.06.2025**

FIGURE 3.1

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Data source: Google Satellite

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Map Projection: Transverse Mercator
Horizontal Datum: North American 1983
Grid: NAD 83 UTM Zone 17N

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DETAILED NOISE IMPACT STUDY
KILLAM APARTMENT SUBSIDIARY II LIMITED PARTNERSHIP AND HIP INVESTMENTS INC.
105 ELMIRA ROAD NORTH, GUELPH, ONTARIO

OUTDOOR LIVING AREA RECEIVER LOCATIONS

Project No. **12654780**
Revision No. **-**
Date **06.06.2025**

FIGURE 3.2

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Data source: Google Satellite

Paper Size ANSI B

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Map Projection: Transverse Mercator
Horizontal Datum: North American 1983
Grid: NAD 83 UTM Zone 17N

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DETAILED NOISE IMPACT STUDY
KILLAM APARTMENT SUBSIDIARY II LIMITED PARTNERSHIP AND HIP INVESTMENTS INC.
105 ELMIRA ROAD NORTH, GUELPH, ONTARIO

POTENTIAL ACOUSTIC BARRIER LOCATION PLAN

Project No. **12654780**
Revision No. **-**
Date **06.06.2025**

FIGURE 3.3

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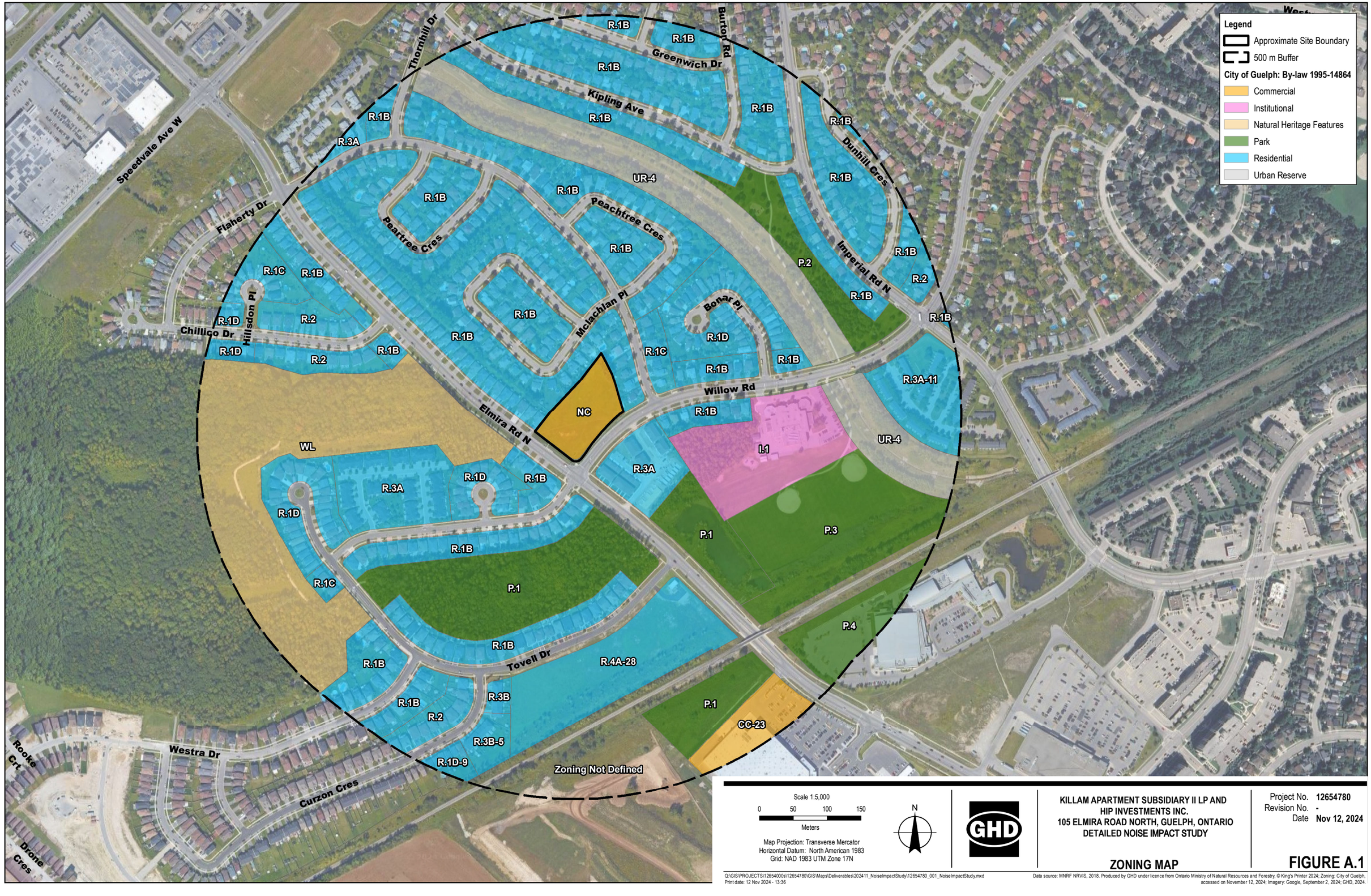
Data source: Google Satellite

Appendices

Appendix A

Zoning Map and Development Drawings



Scale 1:5,000

0 50 100 150

Meters

Map Projection: Transverse Mercator
Horizontal Datum: North American 1983
Grid: NAD 1983 UTM Zone 17N

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KILLAM APARTMENT SUBSIDIARY II LP AND HIP INVESTMENTS INC.
105 ELMIRA ROAD NORTH, GUELPH, ONTARIO
DETAILED NOISE IMPACT STUDY

ZONING MAP

Project No. **12654780**
Revision No. **-**
Date **Nov 12, 2024**

FIGURE A.1

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Print date: 12 Nov 2024 - 13:36

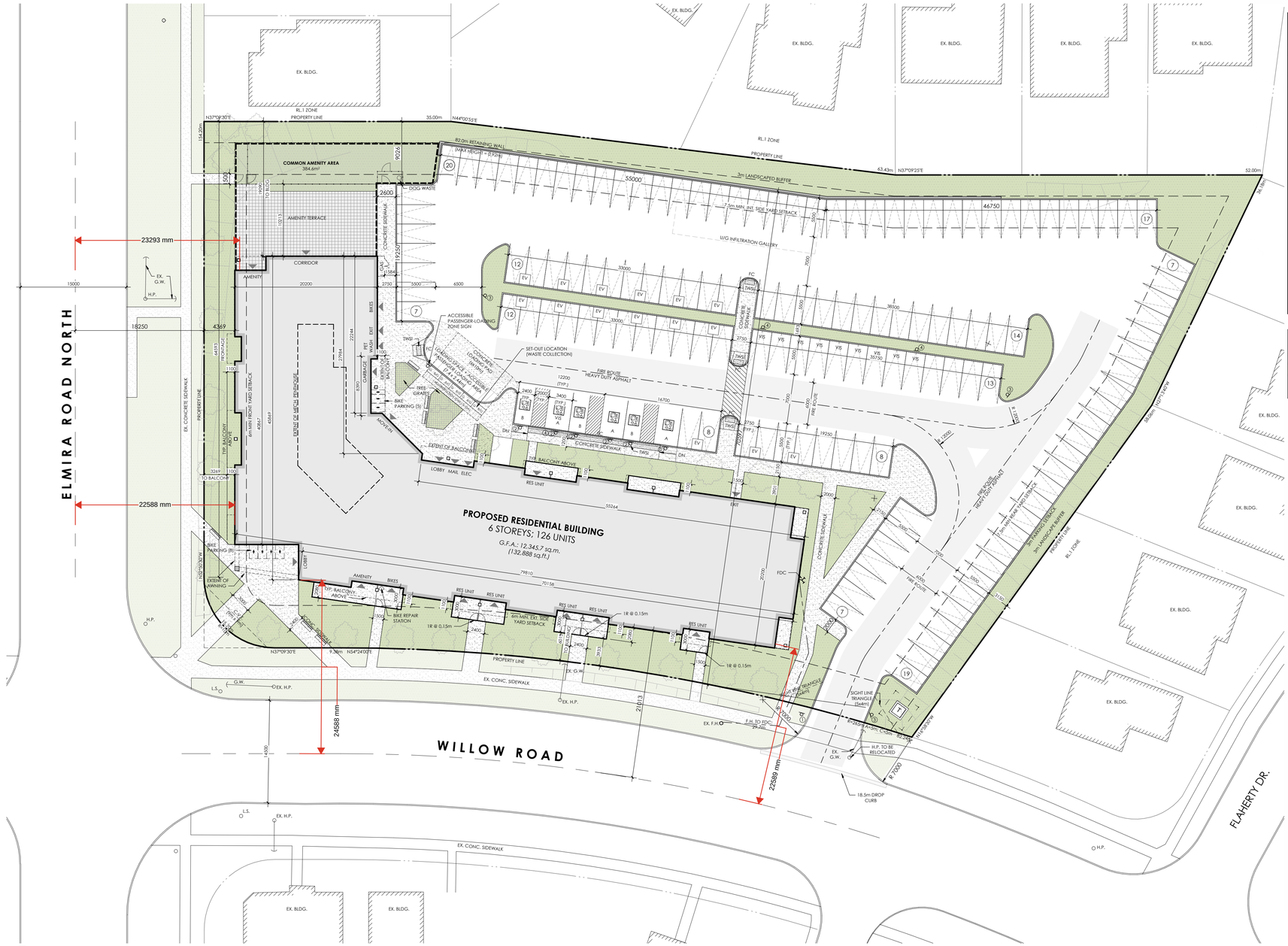
Data source: MNRF NRVIS, 2018. Produced by GHD under licence from Ontario Ministry of Natural Resources and Forestry, © King's Printer 2024; Zoning: City of Guelph, accessed on November 12, 2024; Imagery: Google, September 2, 2024; GHD, 2024.

SITE PLAN LEGEND

- EXISTING HYDRO POLE
- EXISTING HYDRO POLE ANCHOR
- EXISTING SIGN
- EXISTING BELL BOX
- EXISTING STANDARD IRON BAR
- CATCH BASIN
- MANHOLE
- FIRE DEPARTMENT CONNECTION
- FIRE HYDRANT
- ENTRANCE/EXIT
- VEHICLE ENTRANCE/EXIT
- BARRIER FREE PARKING SPACE
- FLUSH CURBING (FC)
- CONCRETE CURB
- PROPERTY LINE
- PROPOSED FIRE ROUTE
- PROPOSED FENCE
- LANDSCAPED AREA
- CONCRETE AREA
- STOP SIGN RA-1 (60x60) cm SUPPORT: STEEL
- ACCESSIBLE PARKING SIGN RB-93 (30x45) cm SUPPORT: STEEL
- FIRE ROUTE SIGN S-5 (30x45) cm SUPPORT: STEEL
- VISITOR PARKING SIGN 30x45) cm SUPPORT: STEEL
- TRANSFORMER c/w CONCRETE PAD AND GROUNDING RODS
- PARKING COUNT BUBBLE
- PROPOSED LIGHT FIXTURES (REFER TO SITE ELECTRICAL PLAN)
- PROPOSED ELECTRICAL VEHICLE PARKING (EV)
- PROPOSED CURB RAMP c/w TACTILE WARNING STRIP INDICATOR (TWSI)
- TACTILE WARNING STRIP INDICATOR (TWSI)
- BIKE RACK (##)

SITE PLAN NOTES

1. LEGAL DESCRIPTION: BLOCK 180 ON PLAN 61M-68
2. SITE INFORMATION TAKEN FROM BSR&D LTD.
3. FOR SITE GRADING, SERVICES & STORM WATER MANAGEMENT REFER TO DRAWINGS PREPARED BY MTE
4. FOR LANDSCAPE WORK REFER TO DRAWINGS PREPARED BY GSP
5. FOR SITE LIGHTING REFER TO DRAWINGS PREPARED BY S+A
6. ALL ROADS & ISLANDS SHALL HAVE 150mm CURBS UNLESS NOTED OTHERWISE.
7. CURB RADIUS = 1.20m UNLESS OTHERWISE DIMENSIONED.
8. STANDARD PARKING STALLS TO BE 2.75m x 5.5m. BARRIER FREE PARKING STALLS TO MEET CITY OF GUELPH REQUIREMENTS FOR TYPE 'A' (3.4m x 5.5m) AND TYPE 'B'. (2.4m x 5.5m) INCLUDING ALL APPLICABLE ACCESS AISLES (2.0m WIDE).
9. LIGHT FIXTURES & BOLLARDS ARE NOT TO OBSTRUCT PEDESTRIAN MOVEMENT.
10. ALL OUTDOOR LIGHTING MUST BE FULL CUT-OFF & HAVE NO GLARE.
11. TREE PROTECTION FENCING SHOULD BE ERECTED AROUND ALL EXISTING LANDSCAPED AREAS AND SHOULD REMAIN ON SITE FOR THE DURATION OF THE CONSTRUCTION.
12. ALL ROOF-TOP EQUIPMENT TO BE SCREENED AND/OR LOCATED SO THAT IT CANNOT BE VIEWED FROM THE STREET.
13. SIGNAGE (BUILDING, PYLON & OTHERWISE) NOT APPROVED VIA THE SITE PLAN APPROVAL PROCESS.
14. ANY MULTIPLE UNIT IDENTIFICATION SIGNAGE TO HAVE REFLECTIVE LETTERING.
15. THERE WILL BE NO OUTDOOR STORAGE OF ANY ITEMS ON SITE.
16. ALL GARBAGE TO BE STORED INTERNALLY UNTIL SCHEDULED PICK-UP.
17. NO SNOW STORAGE ON-SITE. EXCESS SNOW TO BE REMOVED.



1 SP-1 SITE PLAN

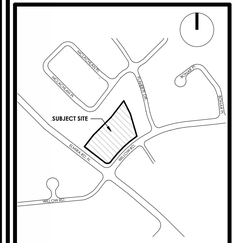
1 : 300

Residential Townhouse RM.6 Zone (Legal Description: BLOCK 180 on PLAN 61M-68)			Zoning Bylaw 2023-20790
Zoning Regulation RM.6 Zone	**Required**	**Provided**	**Compliance**
Maximum Density (units/ha)	100	130	No
Minimum Lot Frontage (m)	30	64.6	Yes
Minimum Front Yard (Elmira Rd.)	6	4.3m	No
Minimum Exterior Side Yard (Willow Rd.)	6	6.0m	Yes
Minimum Interior Side Yard	7.5	19.0m	Yes
Minimum Rear Yard	7.5	23.1m	Yes
Maximum Building Height (# storeys)	6	6	Yes
Minimum Common Amenity Area (20 sq.m./DU)	2,520.0	847.3	
Exterior Common Amenity Areas		*384.6*	No
Interior Common Amenity Areas		*462.7*	
Minimum Landscaped Open Space	40%	35%	No
Minimum Buffer Strips (m)	3	3	Yes
Garbage, Refuse Storage and Composters	Within main building or any accessory building	Within Main Building	Yes
Angular Plane from Front Lot Line (Elmira Road)	45 degrees	43 degrees	Yes
Angular Plane from Exterior Side Lot Line (Willow Rd.)	45 degrees	46 degrees	No
Angular Plane from Int. Side Yard (North)	45 degrees	49 degrees	No
Angular Plane from Rear Yard (East)	45 degrees	41 degrees	Yes
Parking Data			
Parking Dimensions	2.75m x 5.5m	2.75m x 5.5m	Yes
Off-Street Parking - Residential	163	144	No
Accessible Parking	Type A - Accessible Spaces = 3	3	Yes
	Type B - Accessible Spaces = 3	3	Yes
Bike Parking	139	139	
Short Term (Exterior)		*13*	Yes
Long Term - Horizontal (Interior)		*32*	
Long Term - Stacked (Interior)		*94*	

Units	Front End Bins (Yd3) Grey	Blue	Total	240 L Carts Green
126	20	30	50	5
6 Yd3 Bins	3.4	5.0	8	
4 Yd3 Bins	5.1	7.5	13	

PROJECT NORTH

No.	REVISIONS	DATE
1	ZBA/OPA REVISIONS	2025.06.02



KEY PLAN

ZBA/OPA SUBMISSION	2025.01.31
SPA PRECONSULTATION	2024.11.18
CHRONOLOGY	DATE

aba architects inc.
101 Riverbend Drive, Unit 8, Kitchener ON, N2K 3S2 (519) 804-2777 | www.abaarchitects.ca

CLIENT

HIP Developments
74 GRAND AVE SOUTH, SUITE 201
CAMBRIDGE ON, N1S 0B7
TEL: 519.886.8855

PROJECT NAME

105 ELMIRA ROAD
105 ELMIRA ROAD NORTH, GUELPH, ON. N1K 1Z1

DRAWING TITLE

SITE PLAN

SCALE	DRAWING NUMBER
1:300	SP-1
SHEET SIZE: 24X36	
PROJECT NUMBER: 2024-069	

2025-06-02 3:14:29 PM C:\Users\AshleighC\Documents\2024-069 105 Elmira Rd_Central_ocschlb@abaarchitect.co.vwf

Appendix B

Sample STAMSON Calculation

STAMSON 5.0 SUMMARY REPORT Date: 06-06-2025 14:15:28
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: ola01.te Time Period: Day/Night 16/8 hours
Description: OLA-01 STAMSON CALCULATION

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

Car traffic volume : 11241/1249 veh/TimePeriod
Medium truck volume : 0/0 veh/TimePeriod
Heavy truck volume : 68/8 veh/TimePeriod
Posted speed limit : 50 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

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

Angle1 Angle2 : -65.00 deg 11.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 40.82 / 40.82 m
Receiver height : 1.50 / 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 2: Willow East (day/night)

Car traffic volume : 4178/465 veh/TimePeriod
Medium truck volume : 0/0 veh/TimePeriod
Heavy truck volume : 68/8 veh/TimePeriod
Posted speed limit : 50 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 2: Willow East (day/night)

Angle1 Angle2 : -60.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 22.49 / 22.49 m
Receiver height : 1.50 / 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 3: Willow West (day/night)

```
-----------------------------------------------
Car traffic volume  :  1735/386   veh/TimePeriod
Medium truck volume :     0/0     veh/TimePeriod
Heavy truck volume  :    17/4     veh/TimePeriod
Posted speed limit  :    40 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

Data for Segment # 3: Willow West (day/night)
-----------------------------------------------
Angle1   Angle2           : -90.00 deg   -60.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  22.49 / 22.49  m
Receiver height           :   1.50 / 1.50   m
Topography                :      1       (Flat/gentle slope; no
barrier)
Reference angle           :   0.00

Result summary (day)
--------------------
                     !  source  !   Road   !  Total
                     !  height  !   Leq    !   Leq
                     !   (m)    !  (dBA)   !  (dBA)
---------------------+----------+----------+----------
 1.Elmira Rd N       !     0.88 !    50.43 !    50.43
 2.Willow East       !     1.12 !    56.77 !    56.77
 3.Willow West       !     0.99 !    42.81 !    42.81
---------------------+----------+----------+----------
                       Total                   57.82 dBA
Result summary (night)
----------------------
                     !  source  !   Road   !  Total
                     !  height  !   Leq    !   Leq
                     !   (m)    !  (dBA)   !  (dBA)
---------------------+----------+----------+----------
 1.Elmira Rd N       !     0.89 !    43.97 !    43.97
 2.Willow East       !     1.14 !    50.37 !    50.37
 3.Willow West       !     1.01 !    39.41 !    39.41
---------------------+----------+----------+----------
                       Total                   51.54 dBA
TOTAL Leq FROM ALL SOURCES (DAY): 57.82
                           (NIGHT): 51.54
```

STAMSON 5.0 SUMMARY REPORT Date: 06-06-2025 14:16:08
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: ola02.te Time Period: Day/Night 16/8 hours
Description: OLA-02 STAMSON CALCULATION

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

Car traffic volume : 11241/1249 veh/TimePeriod
Medium truck volume : 0/0 veh/TimePeriod
Heavy truck volume : 68/8 veh/TimePeriod
Posted speed limit : 50 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

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

Angle1 Angle2 : -60.00 deg 35.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 32.76 / 32.76 m
Receiver height : 1.50 / 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Result summary (day)
---

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.Elmira Rd N	0.88	55.79	55.79
Total			55.79 dBA

Result summary (night)
---

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.Elmira Rd N	0.89	49.33	49.33
Total			49.33 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 55.79
(NIGHT): 49.33

STAMSON 5.0 SUMMARY REPORT Date: 06-06-2025 14:12:31
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: ola2M.te Time Period: Day/Night 16/8 hours
Description: OLA-02 BARRIER MITIGATION CALC

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

Car traffic volume : 11241/1249 veh/TimePeriod
Medium truck volume : 0/0 veh/TimePeriod
Heavy truck volume : 68/8 veh/TimePeriod
Posted speed limit : 50 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

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

Angle1 Angle2 : -60.00 deg 35.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 32.76 / 32.76 m
Receiver height : 1.50 / 1.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -27.00 deg Angle2 : 35.00 deg
Barrier height : 1.80 m
Barrier receiver distance : 10.14 / 10.14 m
Source elevation : 0.00 m
Receiver elevation : 0.00 m
Barrier elevation : 0.00 m
Reference angle : 0.00

Result summary (day)
---

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.Elmira Rd N	0.88	52.94	52.94
Total			52.94 dBA

Result summary (night)
---

	source height (m)	Road Leq (dBA)	Total Leq (dBA)

1.Elmira Rd N	0.89	46.48	46.48
Total			46.48 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 52.94
(NIGHT): 46.48

STAMSON 5.0 SUMMARY REPORT Date: 06-06-2025 14:16:36
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: ola03.te Time Period: Day/Night 16/8 hours
Description: OLA-03 STAMSON CALCULATION

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

Car traffic volume : 11241/1249 veh/TimePeriod
Medium truck volume : 0/0 veh/TimePeriod
Heavy truck volume : 68/8 veh/TimePeriod
Posted speed limit : 50 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

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

Angle1 Angle2 : -48.00 deg 20.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 36.88 / 36.88 m
Receiver height : 1.50 / 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Result summary (day)
---

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.Elmira Rd N	0.88	50.99	50.99
Total			50.99 dBA

Result summary (night)
---

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.Elmira Rd N	0.89	44.53	44.53
Total			44.53 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 50.99
(NIGHT): 44.53

STAMSON 5.0 SUMMARY REPORT Date: 06-06-2025 15:12:00
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: pow_ne.te Time Period: Day/Night 16/8 hours
Description: POW_NE STAMSON CALCULATION

Road data, segment # 1: WILLOW EAST (day/night)

Car traffic volume : 4178/465 veh/TimePeriod
Medium truck volume : 0/0 veh/TimePeriod
Heavy truck volume : 68/8 veh/TimePeriod
Posted speed limit : 50 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 1: WILLOW EAST (day/night)

Angle1 Angle2 : 0.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 22.59 / 22.59 m
Receiver height : 10.50 / 10.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Result summary (day)
---

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.WILLOW EAST	1.12	54.53	54.53
Total			54.53 dBA

Result summary (night)
---

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.WILLOW EAST	1.14	48.13	48.13
Total			48.13 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 54.53
(NIGHT): 48.13

STAMSON 5.0 SUMMARY REPORT Date: 06-06-2025 15:11:03
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: pow_nw.te Time Period: Day/Night 16/8 hours
Description: POW_NW STAMSON CALCULATION

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

Car traffic volume : 11241/1249 veh/TimePeriod
Medium truck volume : 0/0 veh/TimePeriod
Heavy truck volume : 68/8 veh/TimePeriod
Posted speed limit : 50 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

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

Angle1 Angle2 : 0.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 23.29 / 23.29 m
Receiver height : 10.50 / 10.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Result summary (day)
---

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.Elmira Rd N	0.88	57.04	57.04
Total			57.04 dBA

Result summary (night)
---

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.Elmira Rd N	0.89	50.58	50.58
Total			50.58 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 57.04
(NIGHT): 50.58

MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: pow_se.te Time Period: Day/Night 16/8 hours
Description: POW_SE STAMSON CALCULATION

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

Car traffic volume : 11241/1249 veh/TimePeriod
Medium truck volume : 0/0 veh/TimePeriod
Heavy truck volume : 68/8 veh/TimePeriod
Posted speed limit : 50 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

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

Angle1 Angle2 : -7.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 31.37 / 31.37 m
Receiver height : 10.50 / 10.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 2: Willow East (day/night)

Car traffic volume : 4178/465 veh/TimePeriod
Medium truck volume : 0/0 veh/TimePeriod
Heavy truck volume : 68/8 veh/TimePeriod
Posted speed limit : 50 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 2: Willow East (day/night)

Angle1 Angle2 : -90.00 deg 52.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 24.59 / 24.59 m
Receiver height : 10.50 / 10.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 3: Willow West (day/night)

```
Car traffic volume  :  1735/386   veh/TimePeriod
Medium truck volume :     0/0     veh/TimePeriod
Heavy truck volume  :    17/4     veh/TimePeriod
Posted speed limit  :    40 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

Data for Segment # 3: Willow West (day/night)
-------------------------------------------
Angle1   Angle2           : -90.00 deg   -52.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  24.59 / 24.59  m
Receiver height           :  10.50 / 10.50  m
Topography                :      1       (Flat/gentle slope; no
barrier)
Reference angle           :   0.00

Result summary (day)
--------------------
                     !  source  !   Road   !  Total
                     !  height  !   Leq    !   Leq
                     !   (m)    !  (dBA)   !  (dBA)
---------------------+----------+----------+----------
 1.Elmira Rd N       !     0.88 !    56.07 !    56.07
 2.Willow East       !     1.12 !    56.14 !    56.14
 3.Willow West       !     0.99 !    43.45 !    43.45
---------------------+----------+----------+----------
                       Total                  59.23 dBA

Result summary (night)
----------------------
                     !  source  !   Road   !  Total
                     !  height  !   Leq    !   Leq
                     !   (m)    !  (dBA)   !  (dBA)
---------------------+----------+----------+----------
 1.Elmira Rd N       !     0.89 !    49.61 !    49.61
 2.Willow East       !     1.14 !    49.74 !    49.74
 3.Willow West       !     1.01 !    40.05 !    40.05
---------------------+----------+----------+----------
                       Total                  52.92 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 59.23
                           (NIGHT): 52.92
```

STAMSON 5.0 SUMMARY REPORT Date: 06-06-2025 15:09:33
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: pow_sw.te Time Period: Day/Night 16/8 hours
Description: POW_SW STAMSON CALCULATION

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

Car traffic volume : 11241/1249 veh/TimePeriod
Medium truck volume : 0/0 veh/TimePeriod
Heavy truck volume : 68/8 veh/TimePeriod
Posted speed limit : 50 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

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

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 22.59 / 22.35 m
Receiver height : 10.50 / 10.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 2: Willow East (day/night)

Car traffic volume : 4178/465 veh/TimePeriod
Medium truck volume : 0/0 veh/TimePeriod
Heavy truck volume : 68/8 veh/TimePeriod
Posted speed limit : 50 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 2: Willow East (day/night)

Angle1 Angle2 : -35.00 deg 0.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 29.58 / 29.58 m
Receiver height : 10.50 / 10.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 3: Willow West (day/night)

```
-----------------------------------------------
Car traffic volume  :  1735/386   veh/TimePeriod
Medium truck volume :     0/0     veh/TimePeriod
Heavy truck volume  :    17/4     veh/TimePeriod
Posted speed limit  :    40 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

Data for Segment # 3: Willow West (day/night)
-----------------------------------------------
Angle1   Angle2           : -90.00 deg   -35.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  29.58 / 29.58  m
Receiver height           :  10.50 / 10.50  m
Topography                :      1       (Flat/gentle slope; no
barrier)
Reference angle           :   0.00

Result summary (day)
--------------------
                     !  source  !   Road   !  Total
                     !  height  !   Leq    !   Leq
                     !   (m)    !  (dBA)   !  (dBA)
---------------------+----------+----------+----------
 1.Elmira Rd N       !     0.88 !    60.18 !    60.18
 2.Willow East       !     1.12 !    49.26 !    49.26
 3.Willow West       !     0.99 !    44.25 !    44.25
---------------------+----------+----------+----------
                       Total                   60.62 dBA

Result summary (night)
----------------------
                     !  source  !   Road   !  Total
                     !  height  !   Leq    !   Leq
                     !   (m)    !  (dBA)   !  (dBA)
---------------------+----------+----------+----------
 1.Elmira Rd N       !     0.89 !    53.77 !    53.77
 2.Willow East       !     1.14 !    42.86 !    42.86
 3.Willow West       !     1.01 !    40.85 !    40.85
---------------------+----------+----------+----------
                       Total                   54.31 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 60.62
                           (NIGHT): 54.31
```

STAMSON ASJUSTMENT TO ACCOUNT FOR WILLOW ROAD W NIGHTTIME <40 VEH/HR

It should be noted that the nighttime road traffic volumes on Willow West are below 40 vehicles/hour STAMSON (as this is the minimum value STAMSON allows). Therefore, an adjustment was used by doubling the traffic volume, and subsequently, subtracting 3 dB from the partial sound pressure level of Willow Road West. The result after the adjustment correction was then logarithmically added to the sound pressure levels of the other roads to obtain the accurate total predicted sound pressure level in accordance with ORNAMENT. These final corrections are shown below in red for the applicable receivers:

Outdoor Living Area 1 Correction (OLA_01)

Result summary (night)

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.Elmira Rd N	0.89	43.97	43.97
2.Willow East	1.14	50.37	50.37
3.Willow West	1.01	36.41	36.41
Total			51.41 dBA

Southeast Plane of Window Correction (POW_SE)

Result summary (night)

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.Elmira Rd N	0.89	49.61	49.61
2.Willow East	1.14	49.74	49.74
3.Willow West	1.01	37.05	37.05
Total			52.80 dBA

Southwest Plane of Window Correction (POW_SW)

Result summary (night)

	source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.Elmira Rd N	0.89	53.77	53.77
2.Willow East	1.14	42.86	42.86
3.Willow West	1.01	37.85	37.85
Total			54.21 dBA

Appendix C

Road Traffic Data and Sample Calculation

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Accu-Traffic Inc.

Morning Peak Diagram

Specified Period
From: 7:00:00
To: 9:00:00

One Hour Peak
From: 7:30:00
To: 8:30:00

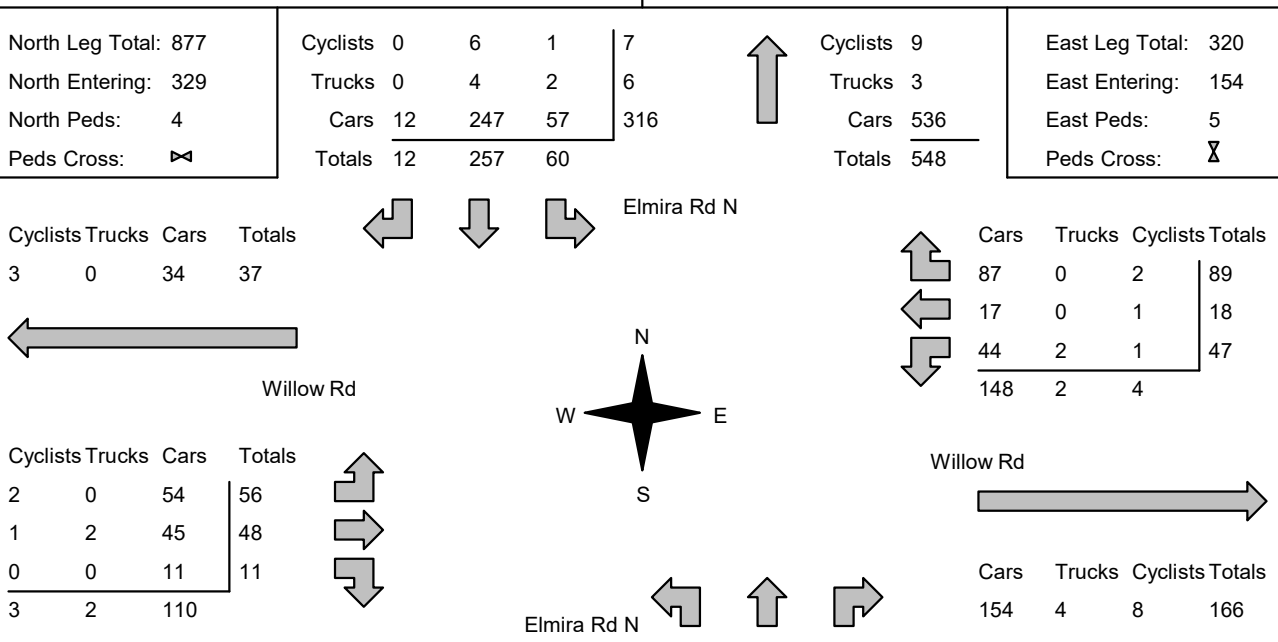
Municipality: Guelph
Site #: 1906000018
Intersection: Elmira Rd N & Willow Rd
TFR File #: 1
Count date: 22-Oct-19

Weather conditions: Rainy

Person counted: NataliaS
Person prepared:
Person checked:

**** Non-Signalized Intersection ****

Major Road: Elmira Rd N runs N/S



Comments

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Accu-Traffic Inc.

Mid-day Peak Diagram

Specified Period
From: 11:00:00
To: 14:00:00

One Hour Peak
From: 11:45:00
To: 12:45:00

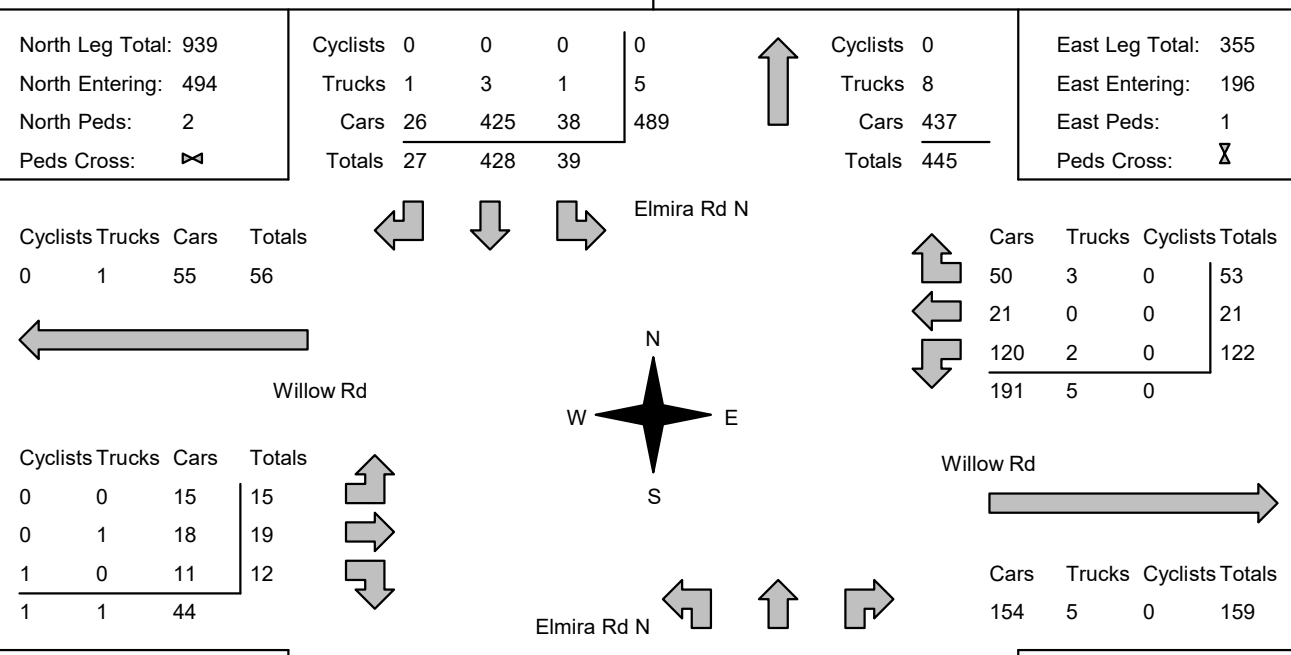
Municipality: Guelph
Site #: 1906000018
Intersection: Elmira Rd N & Willow Rd
TFR File #: 1
Count date: 22-Oct-19

Weather conditions: Rainy

Person counted: NataliaS
Person prepared:
Person checked:

**** Non-Signalized Intersection ****

Major Road: Elmira Rd N runs N/S



Comments

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Accu-Traffic Inc.

Afternoon Peak Diagram

Specified Period
From: 15:00:00
To: 18:00:00

One Hour Peak
From: 16:30:00
To: 17:30:00

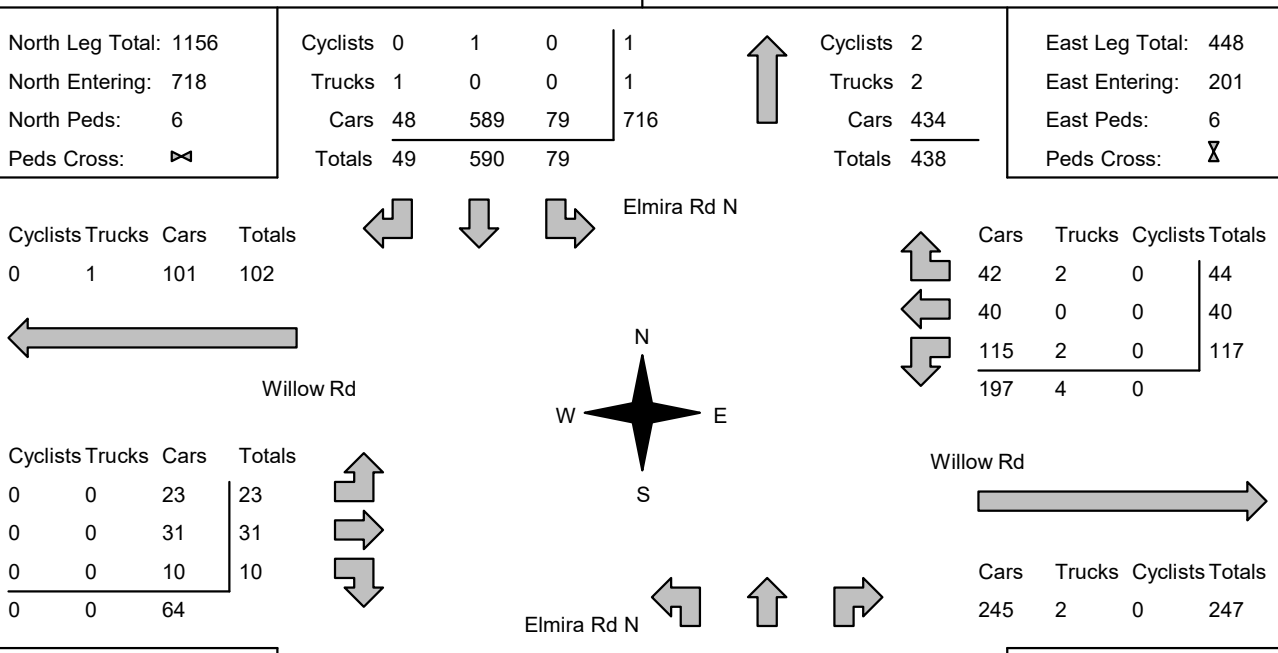
Municipality: Guelph
Site #: 1906000018
Intersection: Elmira Rd N & Willow Rd
TFR File #: 1
Count date: 22-Oct-19

Weather conditions: Rainy

Person counted: NataliaS
Person prepared:
Person checked:

**** Non-Signalized Intersection ****

Major Road: Elmira Rd N runs N/S



Comments

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Accu-Traffic Inc.

Eight Hour Peak Diagram

Eight Hour Peak
From: 7:45:00
To: 15:45:00

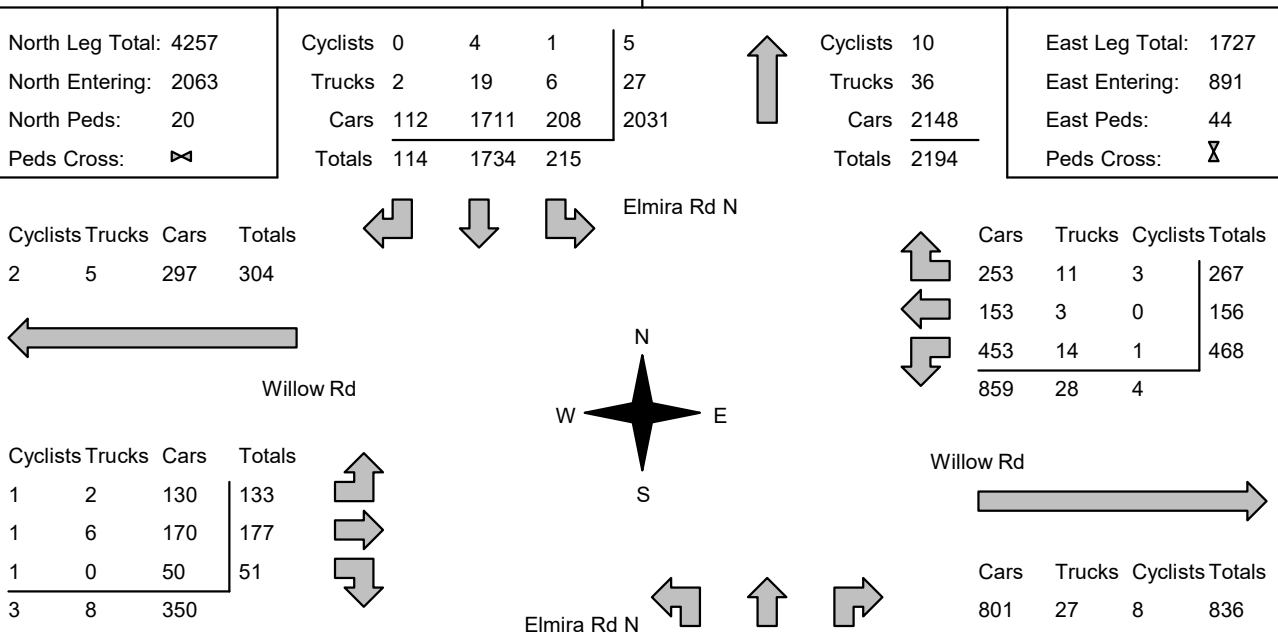
Municipality: Guelph
Site #: 1906000018
Intersection: Elmira Rd N & Willow Rd
TFR File #: 1
Count date: 22-Oct-19

Weather conditions: Rainy

Person counted: NataliaS
Person prepared:
Person checked:

**** Non-Signalized Intersection ****

Major Road: Elmira Rd N runs N/S



Comments

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Accu-Traffic Inc.

Total Count Diagram

Municipality: Guelph
Site #: 1906000018
Intersection: Elmira Rd N & Willow Rd
TFR File #: 1
Count date: 22-Oct-19

Weather conditions: Rainy

Person counted: NataliaS
Person prepared:
Person checked:

**** Non-Signalized Intersection ****

Major Road: Elmira Rd N runs N/S

North Leg Total: 7259
North Entering: 3778
North Peds: 29
Peds Cross: ⋈

Cyclists	0	9	2	11
Trucks	4	25	6	35
Cars	228	3109	395	3732
Totals	232	3143	403	

Cyclists	16
Trucks	47
Cars	3418
Totals	3481

East Leg Total: 2865
East Entering: 1431
East Peds: 55
Peds Cross: ⧖

Elmira Rd N

Cyclists	Trucks	Cars	Totals
3	10	521	534

Willow Rd

Cyclists	Trucks	Cars	Totals
2	5	214	221
1	7	252	260
1	1	79	81
4	13	545	

Cars	Trucks	Cyclists	Totals
426	15	4	445
229	5	1	235
726	22	3	751
1381	42	8	

N
W E
S

Willow Rd

Cars	Trucks	Cyclists	Totals
1389	35	10	1434

Elmira Rd N

Peds Cross: ⧖
West Peds: 46
West Entering: 562
West Leg Total: 1096

Cars	3914
Trucks	48
Cyclists	13
Totals	3975

Cars	64	2778	742	3584
Trucks	1	27	22	50
Cyclists	2	10	7	19
Totals	67	2815	771	

Peds Cross: ⋈
South Peds: 162
South Entering: 3653
South Leg Total: 7628

Comments

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Accu-Traffic Inc.

Traffic Count Summary

Intersection: Elmira Rd N & Willow Rd | **Count Date:** 22-Oct-19 | **Municipality:** Guelph

North Approach Totals

Hour Ending	Includes Cars, Trucks, & Cyclists				Total Peds
	Left	Thru	Right	Grand Total	
7:00:00	*0*	*0*	*0*	*0*	*0*
8:00:00	*46*	*271*	*18*	*335*	*1*
9:00:00	*68*	*212*	*6*	*286*	*4*
11:00:00	*0*	*0*	*0*	*0*	*0*
12:00:00	*24*	*329*	*20*	*373*	*2*
13:00:00	*32*	*406*	*30*	*468*	*3*
14:00:00	*25*	*327*	*16*	*368*	*6*
15:00:00	*0*	*0*	*0*	*0*	*0*
16:00:00	*67*	*508*	*52*	*627*	*5*
17:00:00	*56*	*537*	*46*	*639*	*2*
18:00:00	*85*	*553*	*44*	*682*	*6*
Totals:	403	3143	232	3778	29

North/South Total Approaches: *7431*

South Approach Totals

Hour Ending	Includes Cars, Trucks, & Cyclists				Total Peds
	Left	Thru	Right	Grand Total	
7:00:00	*0*	*0*	*0*	*0*	*0*
8:00:00	*7*	*356*	*35*	*398*	*2*
9:00:00	*4*	*326*	*72*	*402*	*40*
11:00:00	*0*	*0*	*0*	*0*	*0*
12:00:00	*6*	*315*	*82*	*403*	*1*
13:00:00	*8*	*407*	*96*	*511*	*4*
14:00:00	*5*	*349*	*92*	*446*	*17*
15:00:00	*0*	*0*	*0*	*0*	*0*
16:00:00	*12*	*345*	*114*	*471*	*78*
17:00:00	*11*	*372*	*122*	*505*	*10*
18:00:00	*14*	*345*	*158*	*517*	*10*
S Totals:	67	2815	771	3653	162

East Approach Totals

Hour Ending	Includes Cars, Trucks, & Cyclists				Total Peds
	Left	Thru	Right	Grand Total	
7:00:00	*0*	*0*	*0*	*0*	*0*
8:00:00	*39*	*8*	*79*	*126*	*4*
9:00:00	*57*	*39*	*79*	*175*	*8*
11:00:00	*0*	*0*	*0*	*0*	*0*
12:00:00	*96*	*18*	*29*	*143*	*1*
13:00:00	*117*	*22*	*51*	*190*	*1*
14:00:00	*101*	*18*	*35*	*154*	*3*
15:00:00	*0*	*0*	*0*	*0*	*0*
16:00:00	*114*	*62*	*62*	*238*	*32*
17:00:00	*115*	*32*	*57*	*204*	*3*
18:00:00	*112*	*36*	*53*	*201*	*3*
Totals:	751	235	445	1431	55

East/West Total Approaches: *1993*

West Approach Totals

Hour Ending	Includes Cars, Trucks, & Cyclists				Total Peds
	Left	Thru	Right	Grand Total	
7:00:00	*0*	*0*	*0*	*0*	*0*
8:00:00	*58*	*22*	*5*	*85*	*1*
9:00:00	*37*	*89*	*15*	*141*	*8*
11:00:00	*0*	*0*	*0*	*0*	*0*
12:00:00	*15*	*10*	*15*	*40*	*2*
13:00:00	*20*	*24*	*9*	*53*	*6*
14:00:00	*25*	*14*	*7*	*46*	*4*
15:00:00	*0*	*0*	*0*	*0*	*0*
16:00:00	*28*	*35*	*10*	*73*	*16*
17:00:00	*21*	*35*	*7*	*63*	*2*
18:00:00	*17*	*31*	*13*	*61*	*7*
W Totals:	221	260	81	562	46

Calculated Values for Traffic Crossing Major Street

Hours Ending:	*8:00*	*9:00*	*12:00*	*13:00*	*14:00*	*16:00*	*17:00*	*18:00*
Crossing Values:	*122*	*227*	*132*	*168*	*167*	*287*	*183*	*181*

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Accu-Traffic Inc.

Count Date: 22-Oct-19 Site #: 1906000018

Interval Time	Passenger Cars - North Approach						Trucks - North Approach						Cyclists - North Approach						Pedestrians	
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		North Cross	
	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr
7:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15:00	12	12	70	70	8	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30:00	20	8	135	65	10	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45:00	33	13	209	74	15	5	0	0	0	0	0	0	0	0	3	3	0	0	1	1
8:00:00	45	12	265	56	18	3	1	1	1	1	0	0	0	0	5	2	0	0	1	0
8:15:00	60	15	337	72	19	1	1	0	2	1	0	0	1	1	6	1	0	0	2	1
8:30:00	77	17	382	45	22	3	2	1	4	2	0	0	1	0	6	0	0	0	4	2
8:45:00	98	21	422	40	23	1	4	2	4	0	0	0	1	0	6	0	0	0	5	1
9:00:00	109	11	473	51	24	1	4	0	4	0	0	0	1	0	6	0	0	0	5	0
9:10:10	109	0	473	0	24	0	4	0	4	0	0	0	1	0	6	0	0	0	5	0
11:00:00	109	0	473	0	24	0	4	0	4	0	0	0	1	0	6	0	0	0	5	0
11:15:00	109	0	552	79	30	6	4	0	4	0	0	0	1	0	6	0	0	0	5	0
11:30:00	116	7	623	71	36	6	4	0	5	1	0	0	1	0	6	0	0	0	6	1
11:45:00	120	4	710	87	43	7	4	0	5	0	0	0	1	0	6	0	0	0	7	1
12:00:00	133	13	801	91	44	1	4	0	5	0	0	0	1	0	6	0	0	0	7	0
12:15:00	142	9	938	137	61	17	4	0	7	2	1	1	1	0	6	0	0	0	8	1
12:30:00	150	8	1033	95	65	4	5	1	7	0	1	0	1	0	6	0	0	0	9	1
12:45:00	158	8	1135	102	69	4	5	0	8	1	1	0	1	0	6	0	0	0	9	0
13:00:00	163	5	1200	65	73	4	6	1	12	4	1	0	1	0	6	0	0	0	10	1
13:15:00	172	9	1287	87	76	3	6	0	12	0	1	0	1	0	7	1	0	0	10	0
13:30:00	174	2	1378	91	82	6	6	0	13	1	1	0	1	0	7	0	0	0	10	0
13:45:00	180	6	1457	79	86	4	6	0	14	1	1	0	1	0	7	0	0	0	14	4
14:00:00	188	8	1522	65	89	3	6	0	16	2	1	0	1	0	7	0	0	0	16	2
14:10:10	188	0	1522	0	89	0	6	0	16	0	1	0	1	0	7	0	0	0	16	0
15:00:00	188	0	1522	0	89	0	6	0	16	0	1	0	1	0	7	0	0	0	16	0
15:15:00	211	23	1640	118	103	14	6	0	16	0	1	0	1	0	7	0	0	0	17	1
15:30:00	226	15	1777	137	114	11	6	0	17	1	1	0	1	0	7	0	0	0	21	4
15:45:00	241	15	1920	143	127	13	6	0	19	2	2	1	1	0	7	0	0	0	21	0
16:00:00	254	13	2024	104	139	12	6	0	21	2	3	1	2	1	8	1	0	0	21	0
16:15:00	261	7	2158	134	154	15	6	0	22	1	3	0	2	0	8	0	0	0	21	0
16:30:00	274	13	2292	134	164	10	6	0	24	2	3	0	2	0	8	0	0	0	21	0
16:45:00	288	14	2440	148	173	9	6	0	24	0	3	0	2	0	8	0	0	0	21	0
17:00:00	310	22	2558	118	185	12	6	0	24	0	3	0	2	0	8	0	0	0	23	2
17:15:00	334	24	2717	159	202	17	6	0	24	0	4	1	2	0	9	1	0	0	24	1
17:30:00	353	19	2881	164	212	10	6	0	24	0	4	0	2	0	9	0	0	0	27	3
17:45:00	377	24	3032	151	220	8	6	0	24	0	4	0	2	0	9	0	0	0	28	1
18:00:00	395	18	3109	77	228	8	6	0	25	1	4	0	2	0	9	0	0	0	29	1
18:10:10	395	0	3109	0	228	0	6	0	25	0	4	0	2	0	9	0	0	0	29	0
18:15:15	395	0	3109	0	228	0	6	0	25	0	4	0	2	0	9	0	0	0	29	0

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Accu-Traffic Inc.

Count Date: 22-Oct-19 Site #: 1906000018

Interval Time	Passenger Cars - East Approach						Trucks - East Approach						Cyclists - East Approach						Pedestrians	
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		East Cross	
	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr
7:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15:00	9	9	0	0	4	4	0	0	0	0	0	0	1	1	0	0	0	0	0	0
7:30:00	16	7	0	0	25	21	0	0	0	0	0	0	1	0	0	0	0	0	1	1
7:45:00	26	10	1	1	50	25	0	0	0	0	0	0	1	0	1	1	1	1	3	2
8:00:00	37	11	7	6	78	28	0	0	0	0	0	0	2	1	1	0	1	0	4	1
8:15:00	49	12	10	3	97	19	0	0	0	0	0	0	2	0	1	0	2	1	4	0
8:30:00	60	11	17	7	112	15	2	2	0	0	0	0	2	0	1	0	2	0	6	2
8:45:00	74	14	30	13	130	18	2	0	0	0	1	1	2	0	1	0	2	0	10	4
9:00:00	90	16	46	16	155	25	4	2	0	0	1	0	2	0	1	0	2	0	12	2
9:10:10	90	0	46	0	155	0	4	0	0	0	1	0	2	0	1	0	2	0	12	0
11:00:00	90	0	46	0	155	0	4	0	0	0	1	0	2	0	1	0	2	0	12	0
11:15:00	107	17	51	5	159	4	4	0	0	0	1	0	2	0	1	0	2	0	13	1
11:30:00	127	20	53	2	165	6	4	0	0	0	1	0	2	0	1	0	3	1	13	0
11:45:00	151	24	60	7	177	12	5	1	0	0	1	0	2	0	1	0	3	0	13	0
12:00:00	184	33	64	4	183	6	6	1	0	0	1	0	2	0	1	0	3	0	13	0
12:15:00	214	30	69	5	199	16	6	0	0	0	2	1	2	0	1	0	3	0	14	1
12:30:00	246	32	76	7	209	10	7	1	0	0	3	1	2	0	1	0	3	0	14	0
12:45:00	271	25	81	5	227	18	7	0	0	0	4	1	2	0	1	0	3	0	14	0
13:00:00	299	28	86	5	231	4	8	1	0	0	4	0	2	0	1	0	3	0	14	0
13:15:00	319	20	92	6	236	5	8	0	0	0	5	1	2	0	1	0	3	0	15	1
13:30:00	344	25	98	6	244	8	10	2	0	0	5	0	2	0	1	0	3	0	17	2
13:45:00	365	21	100	2	253	9	10	0	0	0	6	1	2	0	1	0	4	1	17	0
14:00:00	397	32	104	4	263	10	11	1	0	0	6	0	2	0	1	0	4	0	17	0
14:10:10	397	0	104	0	263	0	11	0	0	0	6	0	2	0	1	0	4	0	17	0
15:00:00	397	0	104	0	263	0	11	0	0	0	6	0	2	0	1	0	4	0	17	0
15:15:00	419	22	115	11	269	6	11	0	0	0	6	0	2	0	1	0	4	0	24	7
15:30:00	443	24	142	27	286	17	12	1	2	2	8	2	2	0	1	0	4	0	43	19
15:45:00	479	36	154	12	303	17	14	2	3	1	11	3	2	0	1	0	4	0	47	4
16:00:00	504	25	161	7	320	17	17	3	5	2	11	0	3	1	1	0	4	0	49	2
16:15:00	524	20	164	3	332	12	18	1	5	0	12	1	3	0	1	0	4	0	49	0
16:30:00	558	34	172	8	354	22	19	1	5	0	12	0	3	0	1	0	4	0	49	0
16:45:00	595	37	183	11	363	9	19	0	5	0	13	1	3	0	1	0	4	0	50	1
17:00:00	616	21	193	10	375	12	20	1	5	0	13	0	3	0	1	0	4	0	52	2
17:15:00	648	32	202	9	387	12	20	0	5	0	14	1	3	0	1	0	4	0	53	1
17:30:00	673	25	212	10	396	9	21	1	5	0	14	0	3	0	1	0	4	0	55	2
17:45:00	695	22	219	7	413	17	21	0	5	0	15	1	3	0	1	0	4	0	55	0
18:00:00	726	31	229	10	426	13	22	1	5	0	15	0	3	0	1	0	4	0	55	0
18:10:10	726	0	229	0	426	0	22	0	5	0	15	0	3	0	1	0	4	0	55	0
18:15:15	726	0	229	0	426	0	22	0	5	0	15	0	3	0	1	0	4	0	55	0

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Accu-Traffic Inc.

Count Date: 22-Oct-19 Site #: 1906000018

Interval Time	Passenger Cars - South Approach						Trucks - South Approach						Cyclists - South Approach						Pedestrians	
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		South Cross	
	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr
7:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15:00	0	0	57	57	5	5	0	0	0	0	0	0	0	0	0	0	1	1	1	1
7:30:00	2	2	123	66	10	5	0	0	0	0	0	0	0	0	1	1	1	0	1	0
7:45:00	4	2	217	94	22	12	0	0	0	0	0	0	0	0	2	1	1	0	2	1
8:00:00	6	2	351	134	32	10	0	0	1	1	0	0	1	1	4	2	3	2	2	0
8:15:00	6	0	433	82	41	9	0	0	1	0	0	0	2	1	5	1	5	2	4	2
8:30:00	7	1	518	85	62	21	0	0	3	2	0	0	2	0	6	1	7	2	14	10
8:45:00	7	0	587	69	83	21	0	0	6	3	1	1	2	0	6	0	7	0	33	19
9:00:00	9	2	669	82	97	14	0	0	6	0	3	2	2	0	7	1	7	0	42	9
9:10:10	9	0	669	0	97	0	0	0	6	0	3	0	2	0	7	0	7	0	42	0
11:00:00	9	0	669	0	97	0	0	0	6	0	3	0	2	0	7	0	7	0	42	0
11:15:00	11	2	756	87	115	18	0	0	8	2	4	1	2	0	7	0	7	0	42	0
11:30:00	11	0	805	49	134	19	0	0	10	2	4	0	2	0	7	0	7	0	42	0
11:45:00	13	2	882	77	151	17	0	0	11	1	6	2	2	0	7	0	7	0	43	1
12:00:00	15	2	977	95	176	25	0	0	13	2	6	0	2	0	7	0	7	0	43	0
12:15:00	18	3	1056	79	201	25	0	0	13	0	7	1	2	0	7	0	7	0	44	1
12:30:00	20	2	1158	102	231	30	0	0	13	0	8	1	2	0	7	0	7	0	45	1
12:45:00	21	1	1254	96	249	18	0	0	16	3	9	1	2	0	7	0	7	0	46	1
13:00:00	23	2	1381	127	269	20	0	0	16	0	9	0	2	0	7	0	7	0	47	1
13:15:00	26	3	1465	84	285	16	0	0	17	1	11	2	2	0	8	1	7	0	53	6
13:30:00	28	2	1551	86	319	34	0	0	17	0	12	1	2	0	8	0	7	0	56	3
13:45:00	28	0	1645	94	338	19	0	0	20	3	12	0	2	0	8	0	7	0	60	4
14:00:00	28	0	1724	79	357	19	0	0	21	1	13	1	2	0	8	0	7	0	64	4
14:10:10	28	0	1724	0	357	0	0	0	21	0	13	0	2	0	8	0	7	0	64	0
15:00:00	28	0	1724	0	357	0	0	0	21	0	13	0	2	0	8	0	7	0	64	0
15:15:00	32	4	1828	104	386	29	0	0	21	0	14	1	2	0	8	0	7	0	69	5
15:30:00	33	1	1911	83	422	36	0	0	21	0	15	1	2	0	8	0	7	0	135	66
15:45:00	36	3	1982	71	445	23	0	0	23	2	15	0	2	0	8	0	7	0	141	6
16:00:00	40	4	2065	83	467	22	0	0	25	2	17	2	2	0	8	0	7	0	142	1
16:15:00	42	2	2158	93	498	31	0	0	27	2	18	1	2	0	8	0	7	0	147	5
16:30:00	46	4	2243	85	530	32	0	0	27	0	19	1	2	0	8	0	7	0	148	1
16:45:00	47	1	2340	97	558	28	0	0	27	0	20	1	2	0	8	0	7	0	152	4
17:00:00	51	4	2435	95	586	28	0	0	27	0	20	0	2	0	8	0	7	0	152	0
17:15:00	57	6	2533	98	630	44	0	0	27	0	20	0	2	0	8	0	7	0	153	1
17:30:00	59	2	2612	79	665	35	0	0	27	0	21	1	2	0	10	2	7	0	157	4
17:45:00	61	2	2699	87	707	42	1	1	27	0	22	1	2	0	10	0	7	0	159	2
18:00:00	64	3	2778	79	742	35	1	0	27	0	22	0	2	0	10	0	7	0	162	3
18:10:10	64	0	2778	0	742	0	1	0	27	0	22	0	2	0	10	0	7	0	162	0
18:15:15	64	0	2778	0	742	0	1	0	27	0	22	0	2	0	10	0	7	0	162	0

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Accu-Traffic Inc.

Count Date: 22-Oct-19 Site #: 1906000018

Interval Time	Passenger Cars - West Approach						Trucks - West Approach						Cyclists - West Approach						Pedestrians	
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		West Cross	
	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr
7:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15:00	7	7	3	3	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30:00	21	14	4	1	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45:00	39	18	10	6	4	1	0	0	0	0	0	0	1	1	0	0	0	0	1	1
8:00:00	57	18	22	12	5	1	0	0	0	0	0	0	1	0	0	0	0	0	1	0
8:15:00	66	9	26	4	10	5	0	0	0	0	0	0	2	1	1	1	0	0	1	0
8:30:00	75	9	49	23	14	4	0	0	2	2	0	0	2	0	1	0	0	0	1	0
8:45:00	82	7	98	49	16	2	1	1	4	2	0	0	2	0	1	0	0	0	4	3
9:00:00	92	10	106	8	20	4	1	0	4	0	0	0	2	0	1	0	0	0	9	5
9:10:10	92	0	106	0	20	0	1	0	4	0	0	0	2	0	1	0	0	0	9	0
11:00:00	92	0	106	0	20	0	1	0	4	0	0	0	2	0	1	0	0	0	9	0
11:15:00	92	0	111	5	22	2	1	0	4	0	0	0	2	0	1	0	0	0	10	1
11:30:00	97	5	113	2	26	4	1	0	4	0	0	0	2	0	1	0	0	0	10	0
11:45:00	99	2	116	3	30	4	1	0	4	0	0	0	2	0	1	0	0	0	11	1
12:00:00	107	8	116	0	34	4	1	0	4	0	0	0	2	0	1	0	1	1	11	0
12:15:00	108	1	124	8	36	2	1	0	4	0	0	0	2	0	1	0	1	0	11	0
12:30:00	110	2	131	7	40	4	1	0	4	0	0	0	2	0	1	0	1	0	16	5
12:45:00	114	4	134	3	41	1	1	0	5	1	0	0	2	0	1	0	1	0	17	1
13:00:00	127	13	139	5	43	2	1	0	5	0	0	0	2	0	1	0	1	0	17	0
13:15:00	134	7	142	3	43	0	1	0	5	0	0	0	2	0	1	0	1	0	17	0
13:30:00	139	5	145	3	44	1	1	0	5	0	0	0	2	0	1	0	1	0	17	0
13:45:00	143	4	151	6	46	2	1	0	5	0	0	0	2	0	1	0	1	0	21	4
14:00:00	152	9	153	2	50	4	1	0	5	0	0	0	2	0	1	0	1	0	21	0
14:10:10	152	0	153	0	50	0	1	0	5	0	0	0	2	0	1	0	1	0	21	0
15:00:00	152	0	153	0	50	0	1	0	5	0	0	0	2	0	1	0	1	0	21	0
15:15:00	155	3	169	16	53	3	1	0	6	1	0	0	2	0	1	0	1	0	27	6
15:30:00	164	9	177	8	54	1	1	0	6	0	0	0	2	0	1	0	1	0	35	8
15:45:00	169	5	180	3	54	0	2	1	6	0	0	0	2	0	1	0	1	0	37	2
16:00:00	179	10	186	6	60	6	2	0	7	1	0	0	2	0	1	0	1	0	37	0
16:15:00	183	4	193	7	61	1	4	2	7	0	0	0	2	0	1	0	1	0	38	1
16:30:00	184	1	200	7	64	3	5	1	7	0	0	0	2	0	1	0	1	0	38	0
16:45:00	192	8	211	11	66	2	5	0	7	0	0	0	2	0	1	0	1	0	38	0
17:00:00	197	5	221	10	67	1	5	0	7	0	0	0	2	0	1	0	1	0	39	1
17:15:00	205	8	226	5	71	4	5	0	7	0	0	0	2	0	1	0	1	0	39	0
17:30:00	207	2	231	5	74	3	5	0	7	0	0	0	2	0	1	0	1	0	41	2
17:45:00	208	1	242	11	76	2	5	0	7	0	0	0	2	0	1	0	1	0	42	1
18:00:00	214	6	252	10	79	3	5	0	7	0	1	1	2	0	1	0	1	0	46	4
18:10:10	214	0	252	0	79	0	5	0	7	0	1	0	2	0	1	0	1	0	46	0
18:15:15	214	0	252	0	79	0	5	0	7	0	1	0	2	0	1	0	1	0	46	0

TMC Data to AADT Conversion and Sample Calculation

The method used to convert the road traffic data into future AADT is as follows:

The peak hourly vehicles are determined by adding the cumulative traffic for each cardinal direction provided in the TMC for AM and PM periods respectively. Subsequently, the AM and PM peaks are added and divided by four to calculate the average hourly vehicles (AHV) in accordance with the following formula provided in the Ontario Traffic Manual:

$$AHV = \frac{amPHV + pmPHV}{4}$$

After the AHV is calculated the average annual daily traffic (AADT) values can be calculated by rearranging the following equation provided in the Ontario Traffic Manual:

$$AHV = \frac{AADT}{16}$$

Multiplying the AHV value for each road will provide the AADT for each respective road.

For example, cumulative northbound (Elmira Road) AM and PM peaks are 1343 vehicles and 1798 vehicles respectively after applying the growth of 2.5% per year to 2037. After using the AHV formula the result is 785.288 as shown below:

$$785.288 = \frac{(1343 + 1798)}{4}$$

After this value is applied to the re-arranged AADT formula the result is an AADT of 12,564 as shown below:

$$12{,}564 = 785.288 * 16$$

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