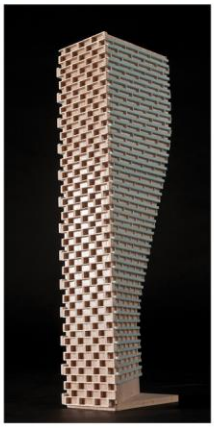
GRADIENTWIND
ENGINEERS & SCIENTISTS

LAND USE COMPATIBILITY/MITIGATION, AIR QUALITY, & ODOUR ASSESSMENT

380 Hagey Boulevard
Waterloo, Ontario

Report: 25-032 – LUC & AQ







April 21, 2025

PREPARED FOR

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EXECUTIVE SUMMARY

This report describes a land use compatibility/mitigation, air quality, and odour assessment for the proposed development located at 380 Hagey Boulevard in Waterloo, Ontario (hereinafter referred to as the "subject site", "study site", or "proposed development").

The proposed Hotel development comprises a nominally rectangular nine-storey mixed-use building comprising 216 guestrooms atop a one-storey 'L'-shaped conference centre. Drop-off areas are included at the rear of the building and a surface parking lot extends throughout the remainder of the study site to the east and south. Access to these noted areas is provided by a drive aisle extending from Hagey Boulevard and Wes Graham Way. This study is based on the site plan prepared by Chamberlain Architect Services Limited, dated April 2025.

The subject site is located within *Academic (UC81) Zone* zoning as per the City of Waterloo by-law 2018-050.

Our survey revealed that there are no Class 1 or 3 facilities, and only 1 Class 2 facility which is located outside of the minimum recommended separation distance of the subject site. Additionally, there are several facilities without an Environmental Compliance Approval (ECA) around the study site. Therefore, no nearby facilities are expected to have adverse impacts on the site regarding emissions, noise and vibrations, and odour. No land compatibility issues or conflicts with the existing or future employment lands are expected. The assessment of the surrounding facilities can be seen in Section 4.4.

The dominant Traffic-Related Air Pollution (TRAP) and transportation noise sources include Wes Graham Way and Hagey Boulevard. The GRT light train line located to the west of the study site is not considered as a TRAP source as the train runs on electricity. The TRAP impacts from these sources are outlined in this study while transportation noise impacts are assessed in detail in a separate study. The NPC-300 guidelines are followed in the transportation noise. The proposed development is considered compatible with existing TRAP sources as it will incorporate mitigation measures. The recommended mitigation measures can be seen in Section 5.

The stationary noise impacts from the surrounding industries on the study site as well as the potential impacts of the proposed development on the surroundings are assessed in Section 6.

The site was assessed for noise, vibration, dust, odour, and air quality concerns. The development is considered from a land use compatibility perspective, as well as for potential air quality and odour impacts, to be feasible. There will be no new constraints placed upon employment areas or future developments.

TABLE OF CONTENTS

1. INTRODUCTION 1

2. TERMS OF REFERENCE 1

3. OBJECTIVES 2

4. METHODOLOGY 2

4.1 Identifying Critical Points of Impingement 3

4.2 Identifying Sources of Emissions 6

4.3 Meteorological Data Analysis 4

4.4 Sources of Emission in the Vicinity of the Subject Site 7

4.4.1 Class I Industries 7

4.4.2 Class II Industries 7

4.4.3 Class III Industries 8

4.5 Obsolete Industries ..... Error! Bookmark not defined.

5. TRANSPORTATION SOURCES AIR QUALITY IMPACT 9

6. STATIONARY NOISE 10

6.1 Stationary Noise Impacts from the Surroundings on the Study Site 10

6.2 Stationary Noise Impacts on New & Existing Buildings from the Study Site 10

7. CONCLUSIONS AND RECOMMENDATIONS 11

FIGURES

1. INTRODUCTION

Gradient Wind Engineering Inc. (Gradient Wind) has been retained by Kothari Group to undertake a land use compatibility/mitigation, air quality, and odour study for the development located at 380 Hagey Boulevard in Waterloo, Ontario.

The scope of work within our mandate for this study includes a preliminary review and a professional opinion in terms of anticipated noise, vibration, odour, and air pollution impacts on the development, such as the emissions from nearby commercial and industrial sources, as applicable. The study is based on the Ontario Ministry of Environment, Conservation and Parks (MECP) Land Use Compatibility Guidelines (D-Series), and other relevant MECP guidelines as well as the City of Waterloo guidelines.

2. TERMS OF REFERENCE

The subject site is located at 380 Hagey Boulevard in Waterloo, situated on a parcel of land bounded by Wes Graham Way to the north and Hagey Boulevard to the west.

The proposed development consists of a nine-storey mixed-use building, featuring 216 hotel rooms above a one-storey 'L'-shaped conference center. Drop-off areas are included at the rear of the building and a surface parking lot extends throughout the remainder of the study site to the east and south. Access to these noted areas is provided by a drive aisle extending from Hagey Boulevard and Wes Graham Way. This study is based on the site plan prepared by Chamberlain Architect Services Limited, dated April 2025.

The development is located within *University College (UC81)* zoning as per the City of Waterloo by-law 2018-050.

The development is surrounded by institutional buildings and the research and technology station (CRT) to the northwest.

The dominant Traffic-Related Air Pollution (TRAP) and transportation noise sources include Wes Graham Way and Hagey Boulevard. The Grand River Transit ION light rail transit line to the west of the study site is not considered as a TRAP source as the train runs on electricity. The TRAP impacts from these sources are outlined in this study while transportation noise impacts are assessed in detail in a separate study.

The NPC-300 guidelines are followed in the transportation noise. The proposed development is considered compatible with existing TRAP sources as it will incorporate mitigation measures. The incorporated mitigation measures can be seen in Section 5.

The current land use compatibility/mitigation, air quality, and odour assessment also provides commentary on the potential impact of existing nearby stationary sources on the subject site as well as the proposed development's potential impact on the surrounding buildings. The commentary was provided to satisfy the City of Waterloo requirements for application support materials for compatibility/mitigation studies.

3. OBJECTIVES

The main goals of this work are to (i) identify critical points of impingement and sources of emissions (odour, dust), (ii) identify transportation and stationary noise sources, (iii) identify sources of vibration, and (iv) provide measures to comply with the requirements of Ministry of the Environment, Conservation and Parks (MECP) *Guideline D-6 – Compatibility Between Industrial Facilities and Sensitive Land Uses*, and Section 9 of the *Environmental Protection Act* (EPA) R.S.O 1990 and *Ontario Regulation* (O. Reg.) 419/05 - *Air Pollution and Local Air Quality*.

4. METHODOLOGY

The assessment is based on the desktop review of satellite imagery, street views, official plan and zoning maps, and a search of the MECP "Access Environment" database of registered Environmental Compliance Approval (ECA) and Environmental Activity and Sector Registry (EASR) permit holders.

The report is prepared in general conformance to the City of Waterloo Terms of Reference for Compatibility / Mitigation Studies, and Air Quality and Odour studies.

Related to land use compatibility, the Provincial Policy Statement (PPS 2024) Section *3.5 Land Use Compatibility* states:

> *Major facilities and sensitive land uses shall be planned and developed to avoid, or if avoidance is not possible, minimize and mitigate any potential adverse effects from odour, noise and other contaminants, minimize risk to public health and safety, and to ensure the*

> *long-term operational and economic viability of major facilities in accordance with provincial guidelines, standards and procedures.*

Where *major facilities* are defined as*:*

> *Facilities which may require separation from sensitive land uses, including but not limited to airports, manufacturing uses, transportation infrastructure and corridors, rail facilities, marine facilities, sewage treatment facilities, waste management systems, oil and gas pipelines, industries, energy generation facilities and transmission systems, and resource extraction activities.*

The PPS requires separation between *major facilities* and *sensitive land uses*, such as residential, so that among other things, excessive emissions, dust, and odour noise do not adversely impact individuals in the *sensitive land uses*.

Based on a review of the surroundings, the only major facilities, as defined by the PPS, in proximity to the development are roads, GRT ION LRT line station.

Provincial Policy Statement (PPS 2024) Section *3.4 Airports, Rail and Marine Facilities* states:

> *Planning for land uses in the vicinity of airports, rail facilities and marine facilities shall be undertaken so that:*
>
> *a) Their long-term operation and economic role are protected.*
>
> *b) Airports, rail facilities and marine facilities and sensitive land uses are appropriately designed, buffered and/or separated from each other, in accordance with policy 3.5.*

The site is not close to an active airport's Noise Exposure Forecast (NEF) lines and there are no marine facilities within the influence zone of the subject lands that noise, emission, dust, or odour would be of concern for the development site. Therefore, no adverse effects from odour, noise and other contaminants are anticipated from the rail yard.

4.1 Identifying Critical Points of Impingement

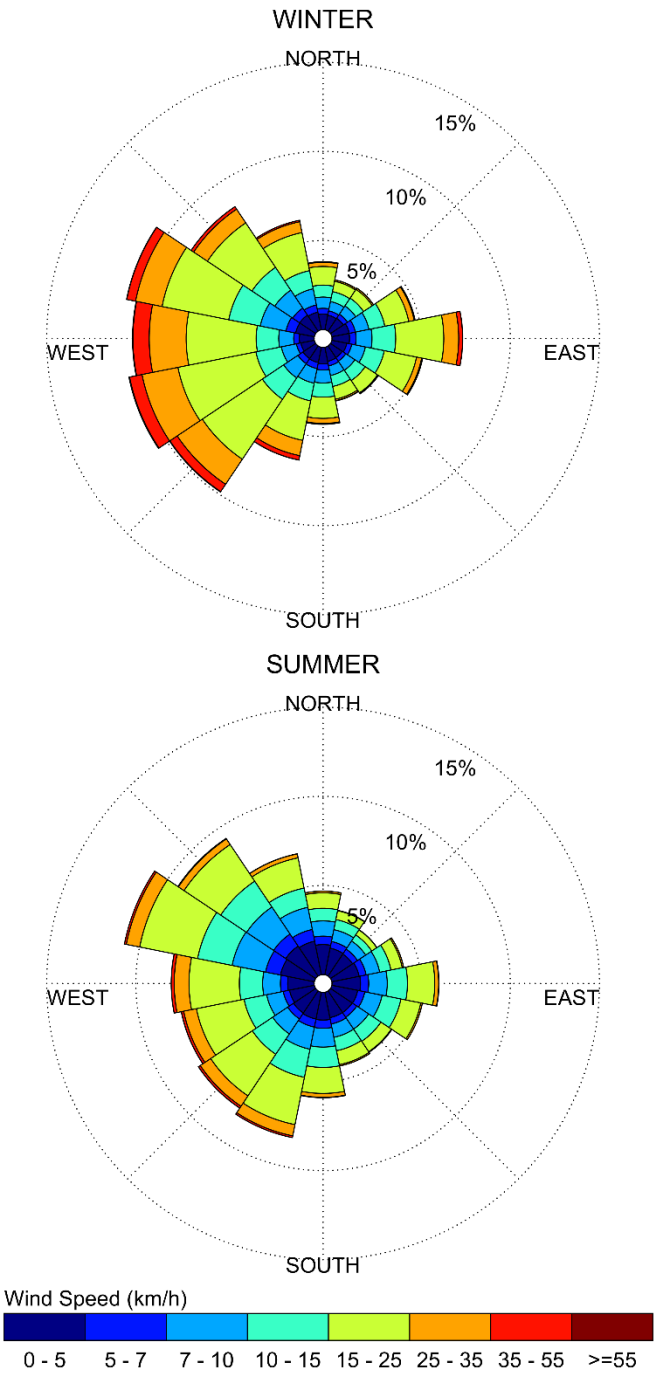
The critical points of impingement for this study include fresh-air intakes, public sidewalks, walkways, building entrances, balconies, and terraces/green roofs devoted to common amenity space. Different receiver location types can have varying exposure times and sensitivities to pollutants. For instance, fresh-air intakes, which continuously provide air to the building's mechanical systems and can affect a large number of the building's occupants, are the most sensitive receivers. Main entrances operate intermittently, predominantly during daytime hours; therefore, the sensitivity of these locations is lower.

4.2 Meteorological Data Analysis

A statistical model for winds in Waterloo was developed from 44 years of hourly meteorological wind data recorded at Region of Waterloo International Airport and obtained from Environment and Climate Change Canada. Wind speed and direction data were analyzed during the appropriate hours of pedestrian usage (that is, between 06:00 and 23:00) and divided into two distinct seasons, as stipulated in the wind criteria. Specifically, the summer season is defined as May through October, while the winter season is defined as November through April, inclusive.

The statistical model of the Waterloo area wind climate, which indicates the directional character of local winds on a seasonal basis, is illustrated on the following page. The plots illustrate seasonal distribution of measured wind speeds and directions in kilometers per hour (km/h). Probabilities of occurrence of different wind speeds are represented as stacked polar bars in sixteen azimuth divisions. The radial direction shows the frequency distribution of wind speeds for each wind direction during the measurement period. The prominent wind speeds and directions can be identified by the longer length of the bars. For Waterloo, the common winds concerning pedestrian comfort occur from the south-southwest clockwise to north-northwest, as well as those from the east. The directional prominence and relative magnitude of the wind speed varies somewhat from season to season, with the summer months displaying the calmest winds relative to the remaining seasonal periods.

SEASONAL DISTRIBUTION OF WIND
REGION OF WATERLOO INTERNATIONAL AIRPORT



Notes:

1. Radial distances indicate the percentage of time of wind events.
2. Wind speeds are mean hourly in km/h, measured at 10 m above the ground.

4.3 Identifying Sources of Emissions

Following the definition of the critical points of impingement, a review of the study area was conducted to locate sources of airborne pollutants, dust, odours, and noise. In general, emission sources that are considered potentially influential to residential properties include nearby, existing institutional facilities.

Industrial processes are bound by the requirements of **Section 9** of the **Environmental Protection Act (EPA) R.S.O 1990** and **Ontario Regulation (O. Reg.) 419/05 - Air Pollution and Local Air Quality**. Section 9 of the Environmental Protection Act states that "*No person shall, except under and in accordance with an environmental compliance approval, use, operate, construct, alter, extend or replace any plant, structure, equipment, apparatus, mechanism or thing that may discharge, or from which may be discharged a contaminant into any part of the natural environment other than water*". Despite compliance with Section 9 of the EPA, a facility may be liable under Section 14 of the EPA if they permit the discharge of a contaminant, including odour, which causes an adverse effect. Under O. Reg 419/05 "*a person shall not discharge a contaminant or cause or permit the discharge of a contaminant into the natural environment, if the discharge causes or may cause an adverse effect*".

In order to obtain and maintain an Environmental Compliance Approval (ECA) or Environmental Compliance Activity Sector Registry (EASR), the emitting source must show compliance with O. Reg. 419/05. Compliance with O. Reg. 419/05 for air emissions is shown through an Emissions Summary and Dispersion Modelling (ESDM) report. An ESDM report quantifies all emissions from a facility and must demonstrate, through air dispersion modelling, that contaminant concentrations are below standards prescribed in O. Reg 419/05 at all points of impingement.

To minimize the potential for adverse impacts of industrial activities on sensitive land uses, the MECP has provided guidelines for adequate buffering of incompatible land uses under "Guideline D-6 Compatibility Between Industrial Facilities and Sensitive Land Uses". The minimum separation distances are based on both the size of a facility and the scope of industrial activities within the facility, classified as Class I, II, or III, for light, medium and heavy industrial uses, respectively. Table 1 summarizes the recommended separation distance and potential area of influence for each class (see Figure 1). A sensitive development may be permitted within an industrial influence zone if appropriate air quality studies are undertaken, and potential causes of adverse effects are mitigated.

TABLE 1: D-6 RECOMMENDED SEPARATION & INFLUENCE AREA

Class	Minimum Recommended Separation Distance (m)	Potential Influence Area (m)
I	20	70
II	70	300
III	300	1000

4.4 Sources of Emission in the Vicinity of the Subject Site

We conducted a survey of the surrounding facilities within the potential influence areas via aerial imagery and a search of the MECP "Access Environment" database of registered ECA and EASR permit holders. Only the facilities with an ECA or EASR related to air quality or noise are included in this assessment. Other types of ECA / EASR such as permit to take water, private sewage works, and others generally don't produce emissions, odour, noise or vibrations.

As per Ontario Regulation 524/98 Environmental Compliance Approvals - *Exemptions from Section 9 of the Act,* HVAC equipment is exempt from ECAs; therefore, the older ECAs related to HVAC equipment or emergency generators are not considered as significant sources..

4.4.1 Class I Industries

No Class I industries were identified within the Potential Influence Area of 70 m.

4.4.2 Class II Industries

Valley Blades limited, 435 Phillip St, Waterloo

Industry: Manufacturing
Environmental Compliance Approval (ECA) No/Date: 2038-CP5KY2 / December 15, 2023
Distance from the Proposed Development: Approx. 350 m to the east

The development includes approval of three (3) paint spray booths; one (1) pulse jet dust collector; two (2) natural gas-fired draw oven; and one (1) natural gas-fired heat-treating furnace.

Potential Impact: The facility is located approximately 350 m to the east of the study site. Therefore, no adverse noise, vibration, dust, emissions, or odour impact from the rail yard facility is expected to impact the study site.

4.4.3 Class III Industries

No Class I industries were identified within the Potential Influence Area.

COMMERCIAL FACILITIES WITHOUT ENVIRONMENTAL COMPLIANCE APPROVAL

Following a review of aerial imagery, commercial facilities without an ECA or EASR permit have been identified within 300 metres (m) of the subject site. Potential industries are listed below. Table 2 describes other commercial uses within 300 m of the site; but due to their mercantile-type use, they are not considered significant sources of emissions, odour, or noise. The identified facilities within 300 m of the study site are outlined below.

TABLE 2: THE FACILITIES WITHIN 300 METRES OF THE STUDY SITE

Business	Address	Type of Business	Distance and Location to the Proposed Development (m)	Potential, Emissions, Noise or Odour
Research and Technology Station	430 Wes Graham Way	Transit Station	>300 m to the east	None
TextNow	420 Wes Graham Way	Office	Approx. 150 m to the east	None
IMS	445 Wes Graham Way	Corporate Office	Approx. 100 m to the west	None
SSIMWAVE Inc.	375 Hagey Boulevard	Software Company	>100 m to the west	None
Toby Jenkins Applied Health Researching Building	Hagey Boulevard	School	>100 m to the south	None
Stantec	100-300 Hagey Boulevard	Engineering Consultant	>230 m to the south	None
DeepSubconscious	300 Hagey Boulevard	Software Office	>200 m to the south	None
NAVBLUE Inc.	295 Hagey Boulevard	Software Office	>230 m to the south	None

Universal Quantum Devices	295 Hagey Boulevard	Research	>230 m to the east	None
Accelerator Centre	295 Hagey Boulevard	Business Development	>230 m to the east	None
AGFA Healthcare Inc.	375 Hagey Boulevard,	Office	>50 m to the west	None

5. TRANSPORTATION SOURCES AIR QUALITY IMPACT

The dominant TRAP and transportation noise sources include Wes Graham Way and Hagey Boulevard. The ION LRT line located to the west of the study site is not considered as a TRAP source as the train runs on electricity. The TRAP impacts from these sources are outlined in this study while transportation noise impacts are assessed in detail in a separate study. The NPC-300 guidelines are followed in the transportation noise. The proposed development is considered compatible with existing TRAP sources as it will incorporate mitigation measures. The incorporated mitigation measures can be seen in Section 5.

The current land use compatibility/mitigation and air quality & odour assessment also provides commentary on the potential impact of existing nearby stationary sources on the subject site as well as the proposed development's potential impact on the surrounding buildings. The commentary was provided to satisfy the City of Waterloo requirements for application support materials for compatibility/mitigation studies.

The following is a list of a few suggested mitigation strategies presented in the TRAP report to address air pollution impacts from transportation sources:

- Mechanical building ventilation with Minimum Efficiency Reporting Value (MERV) 12 certification particulate filters.
- Where possible, only open windows on the side of buildings that face away from TRAP sources.
- Locating ventilation intakes away from transportation sources (i.e., the highest point of the building).
- Consideration for the location and orientation of buildings and outdoor amenity areas (i.e., position sensitive areas as far as possible from roadways and buffered by transitional uses).
- Where applicable, implementing barriers between sources and sensitive areas (i.e., physical or vegetation).

6. STATIONARY NOISE

6.1 Stationary Noise Impacts from the Surroundings on the Study Site

The development is surrounded by institutional buildings, the research and technology station (LRT) to the east. Gradient Wind conducted a survey of the study site, using the satellite view of the area. The impact of smaller mechanical equipment will be masked by roadway traffic noise. Moreover, the STC-rated exterior building components of the proposed development will mitigate the noise and maintain a comfortable indoor environment. Another potential stationary noise source is the GRT light train line. However, it is located more than 300 metres away from the study site, therefore is not a concern.

6.2 Stationary Noise Impacts on New & Existing Buildings from the Study Site

The primary noise-sensitive properties in the immediate vicinity of the site are the institutional buildings nearby, which are used as offices.

Impacts from the development on the surroundings can be minimized by judicious placement of mechanical equipment or the incorporation of silencers and noise screens as necessary. It is also recommended that any large pieces of HVAC equipment, which is required to be situated outdoors, be placed closer to the penthouse avoiding the line of sight with the surrounding noise-sensitive buildings.

7. TRANSPORTATION NOISE

Minor and Major collectors are adjacent to the site. The dominant transportation noise sources include Wes Graham Way and Hagey Boulevard. Due to the lower traffic volumes and low speeds, and Gradient Wind's experience with similar projects, on these roadways, transportation noise impacts are not expected to be significant. The use of air conditioning inside the building will allow window to be kept closed to maintaining a comfortable and quiet environment.

The Grand River Transit ION LRT Station is more then 150 m to the east of the site, and at this distance will not be a significant source of noise or vibrations.

8. CONCLUSIONS AND RECOMMENDATIONS

The proposed development located at 380 Hagey Boulevard in Waterloo comprises nominally rectangular nine-storey mixed-use building comprising 216 hotel guestrooms and a one-storey 'L'-shaped conference centre. Drop-off areas are included at the rear of the building and a surface parking lot extends throughout the remainder of the study site to the east and south. Access to these noted areas is provided by a drive aisle extending from Hagey Boulevard and Wes Graham Way.

The development is surrounded by institutional buildings with the research and technology station (CRT) to the northwest, Hagey Boulevard to the west, and Wes Graham Way to the north. The site was assessed for noise, vibration, dust, odour, and air quality concerns. The conclusions of our assessment are summarized below.

Emissions, Odour, and Noise and Vibration Impacts from the Industrial Facilities:

Our survey revealed that there are industrial facilities without an ECA around the study site. Therefore, no nearby facilities are expected to have adverse impacts on the site regarding emissions, noise and vibrations, and odour. No land compatibility issues or conflicts with the existing or future employment lands are expected.

Transportation Sources Air Quality Impact:

The dominant TRAP and transportation noise sources include Wes Graham Way and Hagey Boulevard. The GRT light train line located to the east of the study site is not considered a TRAP source as the train runs on electricity.

The TRAP impacts from these sources are outlined in this study while transportation noise impacts are assessed in detail in a separate study. The NPC-300 guidelines are followed in the transportation noise study.

As noted in Section 5, implementing some mitigation measures to control TRAP will be sufficient to address air pollution impacts from transportation sources. In addition, the building is anticipated to have a central ventilation system or individual ventilation systems servicing the units. The primary recommended mitigation measure is providing the mechanical building ventilation with MERV 11 certification particulate filters.

Stationary Noise Source Impacts:

Any noise impacts from stationary sources will be masked by the ambient background noise generated by the surrounding transportation sources. Moreover, the STC-rated exterior building components of the proposed development will mitigate the noise and maintain a comfortable indoor environment. Therefore, we do not anticipate any adverse stationary noise impact from existing sources on the development site.

Impacts from the development on the surroundings can be minimized by judicious placement of mechanical equipment or the incorporation of silencers and noise screens as necessary.

Transportation Noise Source Impacts:

Regarding Transportation Noise Impacts Hagey Blvd is Major Collector and Wesh Graham Way is a minor collector. No significant impacts are anticipated and can be addressed by providing air conditioning to the building.

CONCLUSION:

In keeping with standard building construction and good engineering practice, as well as the provincial and city guidelines, the following comments and recommendations are provided to be incorporated into the design of the building to ensure indoor air quality and noise levels are maintained to acceptable standards for the proposed development:

(i) Based on the findings of this report, Gradient Wind concludes that the proposed hotel land use is feasible, as the proposed building would be complementary to the *University / College* zoning as per the City of Waterloo by-law 2018-050.

(ii) The identified industries operating with a valid ECA are out of the potential influence areas defined by Ontario Guideline D-6 Compatibility between Industrial Facilities.

(iii) In line with standard building practices, appropriate provisions include the design, installation, operation, and maintenance of air filtration at the fresh air intakes of the mechanical systems serving all habitable areas, including the addition of air conditioning. The areas that would not require filtered air would be parking garages and utility spaces. MERV 12 certification filters should

be used for this development in all occupied spaces. Details of the air filtration system will be designed by the mechanical engineers during the detailed design phase.

This concludes our assessment and report. If you have any questions or wish to discuss our findings, please advise us. In the interim, we thank you for the opportunity to be of service.

Sincerely,

Gradient Wind Engineering Inc.

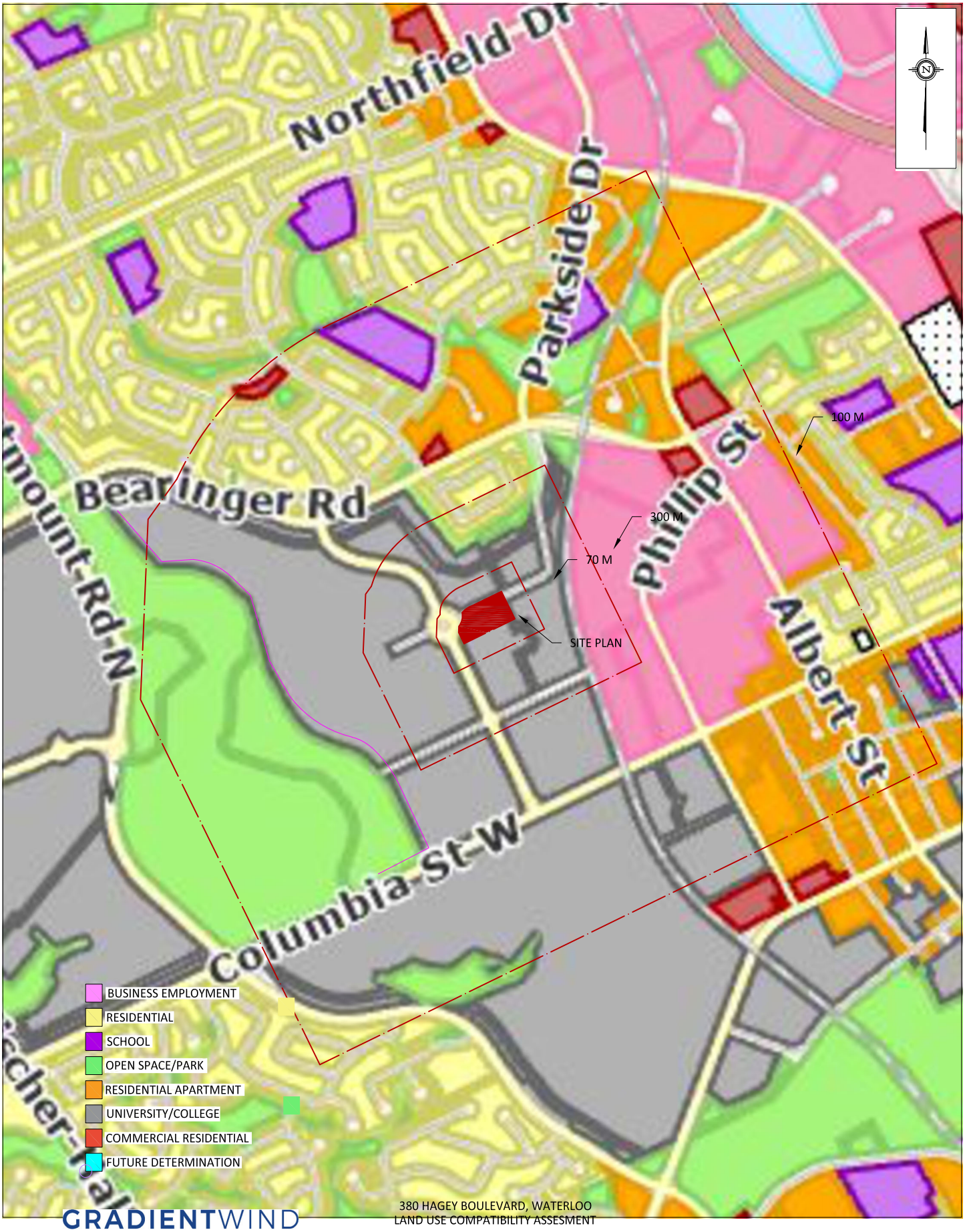
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Gradient Wind File #25-032 – LUC & AQ



380 HAGEY BOULEVARD, WATERLOO
LAND USE COMPATIBILITY ASSESMENT

GRADIENTWIND
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SCALE	DRAWING NO.
1:16000 (APPROX.)	25-032-LUC-1
DATE	DRAWN BY
MARCH 21, 2025	N.M.P.

DESCRIPTION

FIGURE 1:
SITE PLAN AND SURROUNDING CONTEXT