Air Quality Assessment – Proposed Evergreen Community Development
Dundas Street and Tremaine Road
City of Burlington

Novus Reference No. 14-0192 July 16th, 2015

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Appendix A – Draft Plan of Subdivision

1.0 Introduction and Purpose

Novus Environmental Inc. was retained by Evergreen Community (Burlington) Ltd. to assess the compatibility of a proposed residential component of a mixed use development with the surrounding land uses from an air quality perspective. The Evergreen Community development is proposed along the northwest side of the Tremaine Road and Dundas Street intersection along the municipal border between the City of Burlington and the Town of Oakville. The study focusses on two aspects;

1. Compatibility of the proposed development with existing land uses in the local area; and,
2. Compatibility between the proposed development and potential employment (industrial/commercial) uses on lands on the east side of Tremaine Road located within the Town of Oakville which are located within the North Oakville West Secondary Plan (2009).

1.1 Description of proposed Evergreen Community

The proposed development is located within the Region of Halton, in the City of Burlington. The subject lands of the proposed development have a total area of approximately 67 hectares. The subject lands are located west of Tremaine Road and north of Dundas Street. The west boundary of the property is adjacent to Bronte Creek which is designated under the provincial Greenbelt Plan area. The northern boundary is Highway 407.

There are currently two residential properties on the subject lands located at 5453 Dundas Street and 3232 Tremaine Road. The remaining lands are currently used for agricultural purposes.

The current proposed development plan has mixed-use condominiums (3 and 4 storeys) and office buildings (2 and 3 storeys) abutting the Tremaine Road corridor. Townhouses and single family homes are planned west of the mixed-use features. **Figure 1** illustrates the location of the subject lands and attached in **Appendix A** is a draft plan of subdivision for the proposed development.

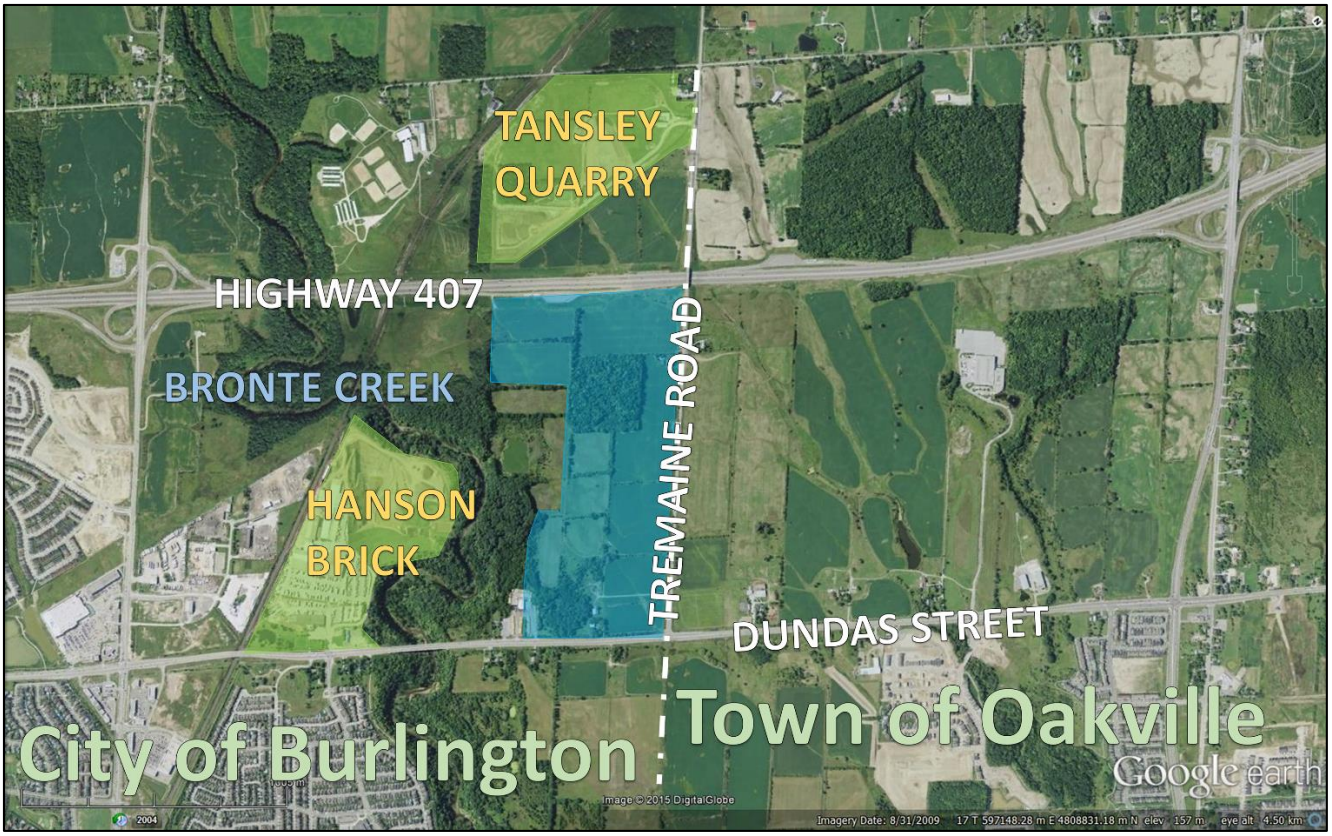


Figure 1: Subject Site (Blue) and Surrounding Area

1.2 Summary of Surrounding Lands

The land uses surrounding the subject lands in the City of Burlington include agriculture, residential, commercial, and natural heritage. There are two existing, aggregate related facilities in the local vicinity; Hanson Brick Ltd. located west of Bronte Creek, north of Dundas Street, and the Tansley Quarry (owned and operated by Hanson Brick) located north of Highway 407 (**Figure 1**). The Hanson Brick facility manufactures brick. Some of the material used in the brick production is extracted from the Tansley Quarry.

1.3 Summary of Oakville Lands

East of Tremaine Road is the Town of Oakville. South of Dundas, east of Tremaine, the lands are mostly residential and commercial with some agriculture. To the north of Dundas, east of Tremaine, the lands are currently used for agriculture. However, it is understood through planning documentation and consultation by Evergreen representatives with the Town of Oakville that the area east of Tremaine is planned for industrial/commercial uses in the future. These plans are documented in the Town of Oakville's North Oakville West Secondary Plan, dated 2009. Details of the land use designations within the Secondary Plan are discussed

further in subsequent sections. **Figure 2** illustrates official plan designations of the lands located east of Tremaine Road as taken from the North Oakville West Secondary Plan.

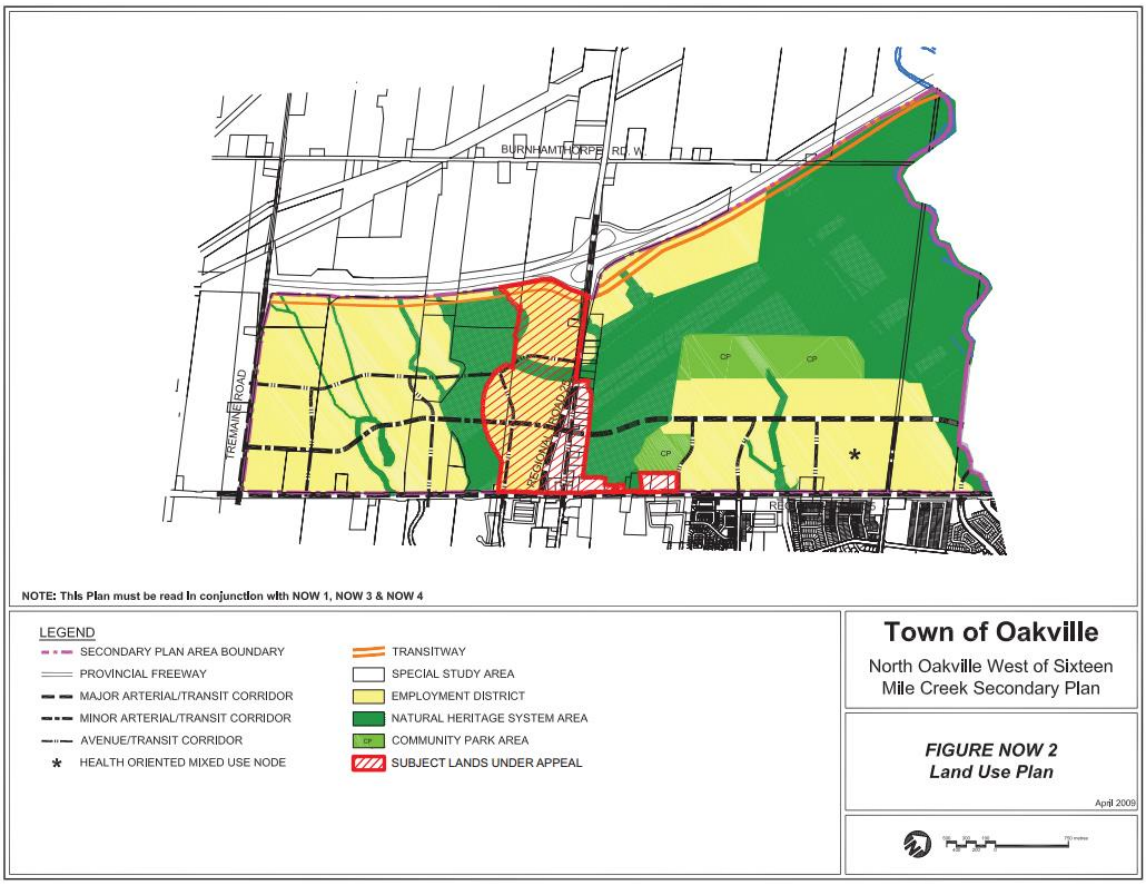


Figure 2: Oakville Development Lands with Land Use Designation[1]

2.0 Ambient Air Quality

In 2011, Halton Region completed a detailed report summarizing the air quality conditions in the area based on monitoring and modelling from 2005. The purpose of the study, entitled "Air Quality in Halton: Airshed Modelling Report", dated March 2011, was to determine community-wide influences on air quality in the region. The report was used as reference by the Region when developing the Air Quality Guidelines (AQG) which are described in subsequent sections.

Contaminants studied were carbon monoxide (CO), nitrogen oxides (NO_X), volatile organic compounds (VOCs), sulphur dioxide (SO_2), and coarse and fine particulate matter (PM_{10} and

[1] http://www.oakville.ca/assets/2011%20planning/nco-EastWestMap.pdf

$PM_{2.5}$). The source sectors that were considered were industrial, commercial and residential, mobile, and biogenic.

The main findings from the study were as follows:

> *"Local sources, on average, contributed approximately 52% of the maximum annual ambient concentrations. This percentage however, varied considerably by pollutant and municipality. For example, local sources contribute over 60% of the maximum annual concentration of NO_2 but only about 30% of the maximum annual concentration of $PM_{2.5}$ in Halton."*
>
> *"For particulate matter, NO_X, and CO, the largest source of local emissions in Halton is the mobile sector. For NO_X and CO, the second largest contribution to emissions is from the commercial/residential sector, whereas the industrial sector contributes the second largest amount of particulate matter. For SO_2 and volatile organic compounds, the industrial sector contributes the most followed by the mobile sector. Residential wood burning (e.g., stoves, fireplaces) contributes significantly to CO and $PM_{2.5}$ emissions."*
>
> *"Modelling results indicate that nearly half (48%) of the air pollution in Halton Region originates from emission sources outside the Region. The contribution of background air pollution is greatest for PM2.5, with nearly 70% of the maximum annual average concentration in Halton attributable to background sources."*

The study found that a considerable contribution to the high ambient concentrations of certain contaminants of concern such as fine particulate matter ($PM_{2.5}$) were due to background levels, i.e. particulate matter from sources located outside of the Region, including trans-boundary contribution from sources located as far as the United States.

Given the potential for combined effects of $PM_{2.5}$ from the existing industries and the transportation features for $PM_{2.5}$, the ambient was considered further in this study.

Data from two MOECC monitoring stations located in Burlington and Oakville were considered as representative of the study area. The locations of the monitoring stations are illustrated in **Figure 3**. The stations are a similar distance from the proposed development, however, the Oakville monitoring station was selected for comparison as the air quality conditions at the station were determined to be more representative of the subject site based on review of the results from the Halton Region 2011 Air Quality Assessment (which studied data from 2005).

The monitoring data analysed in this study are displayed graphically in **Figure 4** and includes monitoring data from 2005 through to 2011 for comparison. In comparing the yearly levels of particulate, the annual 24-hour average, 90^{th} percentile, 98^{th} percentile, and maximum concentrations have decreased in the Region since 2007 with 2005 being a relatively high concentration year.

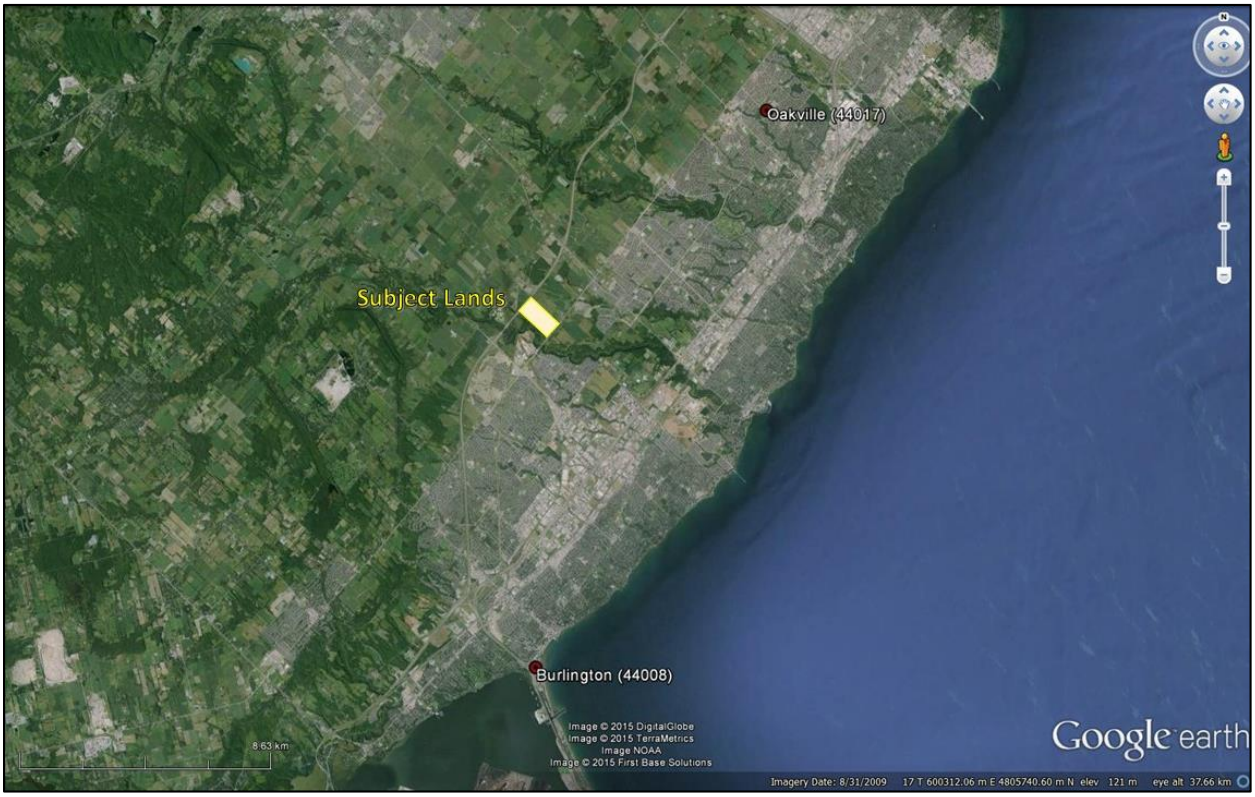


Figure 3: MOECC Ambient Monitoring Stations Within Range of the Study Area

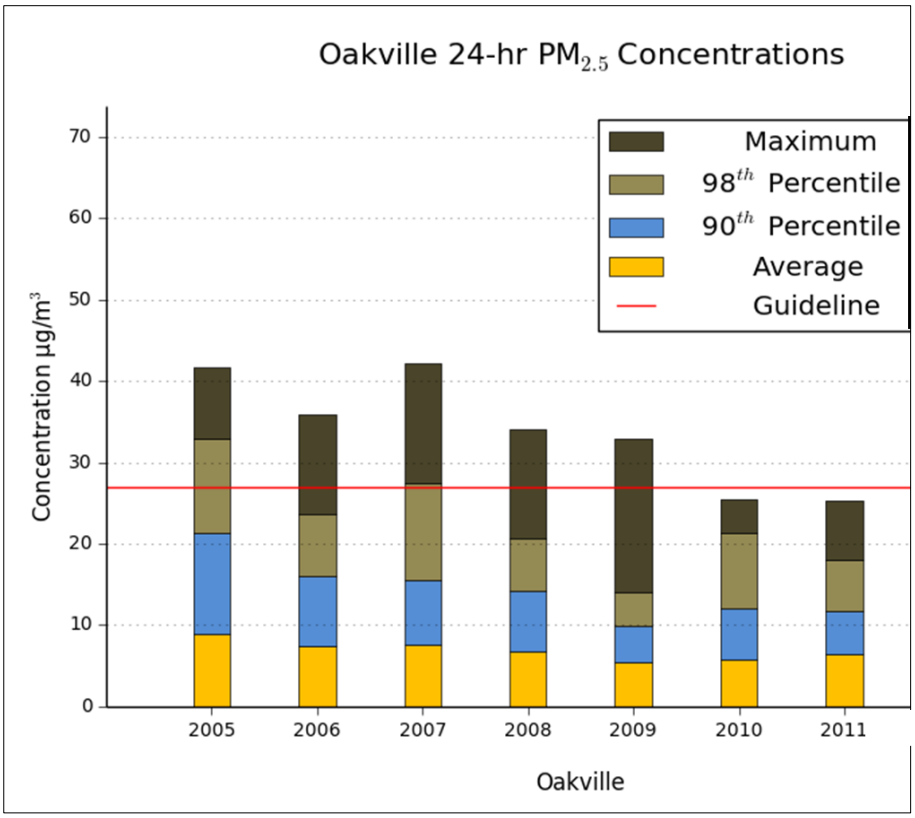


Figure 4: Oakville Measured PM2.5 Concentrations

Figure 4 illustrates that fine particulate has historically been high in Halton Region with maximum background concentrations exceeding the current Canada Wide Standard (CWS) for $PM_{2.5}$ of 28 µg/m^3. The ambient fine particulate matter concentrations have decreased significantly to ~ 18 µg/m^3 for the 98th percentile concentration and ~ 12 µg/m^3 when considering the 90th percentile concentration in 2011. For the five-years between 2007 and 2011 the average is ~21 µg/m^3 and 16 µg/m^3, respectively for the 98th and 90th percentiles. These values are important when considering the combined impacts an industry or roadway can have – typically an industry will compare their maximum predicted emissions and the 90th percentile background concentration against regulatory standards for a combined-effect.

The Region used the information from this report to justify the need to review air quality issues in the planning process, specifically, in the context of sensitive receptors in proximity to significant sources such as industry and major transportation routes.

3.0 Air Quality Related Planning Policy and Guidelines

The following describes the relevant air quality related, land use planning policies and guidelines which apply from provincial, regional and municipal levels to this project and have

been considered in this assessment. These policies and guidelines provide the framework for the air quality assessment and compatibility analysis for this project.

3.1 Provincial Policy Statement (2014)

The Provincial Policy Statement released by the Ontario Ministry of Municipal Affairs and Housing (2014) (PPS) is the statement of the Provincial government's policies on land use planning. Section 1.2.6 of the PPS addresses land use compatibility:

> *"Major facilities and sensitive land uses should be planned to ensure they are appropriately designed, buffered and/or separated from each other to prevent or mitigate adverse effects from odour, noise and other contaminants, minimize risk to public health and safety, and to ensure the long-term viability of major facilities."*

In order to effectively meet the objectives of this statement, an appropriate air quality assessment is required. The intention of this report is to address this statement within the context of the PPS provision. Details of the methods used to conduct an appropriate study are discussed in subsequent sections.

3.2 Halton's Regional Official Plan

The Halton Regional Official Plan (ROP) identifies policies concerning the environment and air quality issues in section 143. It is the policy of the Region to:

> *"143(2.1) Establish Air Quality Impact Assessment Guidelines to assist with the review of development applications to protect the health of Halton residents."*
>
> *"143(10) Develop, in consultation with the Local Municipalities, the Province, Federal government and the railway agencies, Land Use Compatibility Guidelines to minimize the adverse effects of noise, vibration, odour and air pollution from industrial, transportation and utility sources on sensitive land uses, including the application of separation distance between these non-compatible uses."*
>
> *"143(11) Encourage the Local Municipalities to permit in those areas adjacent to industrial, transportation and utility uses, primarily land uses that require minimal noise, vibration, odour and air pollution abatement measures and require the proponent of development in those areas to undertake, in accordance with Regional and Ministry of the Environment guidelines, the necessary impact analysis and implement, as a condition of approval, appropriate abatement measures."*
>
> *"143(12) Require the proponent of sensitive land uses in proximity to industrial, transportation and utility sources of noise, vibration, odour and air pollutants to complete appropriate studies and undertake necessary mitigating actions, in accordance with the Region's Land Use Compatibility Guidelines, Air Quality Impact Assessment Guidelines, and any applicable Ministry of the Environment guidelines. Specifically, an air quality study based on guidelines under Section 143(2.1) is required for such development proposals within 30m of a Major Arterial or Provincial Highway, or 150m of a Provincial Freeway, as defined by Map 3 of this Plan."*

The purpose of this report is to address the above policies. This assessment follows the methodology provided in the Region's Land Use Compatibility Guidelines and meets the conditions recommended in the Air Quality Guidelines (Halton Region).

3.2.1 Halton Region's Regional Official Plan Guidelines: Land Use Compatibility Guidelines

The purpose of Land Use Compatibility Guidelines development by the Region (LUCG) is to "identify how land use compatibility issues may be addressed by municipalities during a development proposal…" The LUCG were developed by the Region in consideration of the Provincial D-Series of Guidelines, prepared by the Ontario Ministry of the Environment and Climate Change (MOECC) in 1995 for planning guidance in evaluating land use compatibility. Section 2 of the LUCG identifies the relevant provincial guidelines and regulations which are to be considered in conducting air quality assessment in Ontario:

> *"The D-Series are used for development applications that require the re-designation (Official Plan Amendment) or rezoning of land uses (Zoning By-law amendment). The MOE's D-Series are only applicable when a:*
>
> - *New sensitive land use requires a land use amendment and is proposed to be located within the influence, or potential influence, area of an impacting use, such as an existing industrial land use; or when a*
> - *New industrial use requires a land use amendment and is proposed to be located near an existing sensitive residential use."*

Included in the Region's summary is a discussion of the "potential areas of influence" approach, as presented in the D-series of guidelines when assessing compatibility of industrial uses with more sensitive uses such as residences.

In preparing the LUCG, the Region has clarified an aspect concerning recommended minimum separation distances. In the LUCG, it is understood that areas of influence of various industrial processes will be site specific. Actual areas of influence are determined through appropriate studies allowing for industrial activities to be compatible with more sensitive land uses within the area of influence and within recommended minimum separation distances which are presented in **Table 1**. Appropriate studies can provide mitigation strategies, if required.

Table 1: Ministry of the Environment and Climate Change's Land Use Compatibility Setback Distances and Areas of Influence

Ministry of Environment: D-Series – INDUSTRIAL USES Potential Areas of Influence and Minimum separation Distances*		
Industrial Facility	Potential Area of Influence (metres)	Minimum Separation Distance (metres)
Class I	70	20
Class II	300	70
Class III	1000	300

[2]

[2] Halton Regional Official Plan Guidelines – Land Use Compatibility Guidelines (www.halton.ca/common/pages/UserFile.aspx?fileId=121105, accessed January, 2015)

A summary of the D-6 Industrial Categorization criteria considered in the LUCG is listed in **Table 2**. It is worth noting that the Region has made minor alterations to the table from what appears in the D-6 guidance.

Table 2: Ministry of the Environment and Climate Change's Land Use Compatibility Guideline D-Series Classifications

Ministry of Environment: D-Series' Industrial Categorization Criteria			
Item	**Class 1**	**Class 2**	**Class 3**
Noise	• Sound not audible off property	• Sound occasionally audible off property	• Sound frequently audible off property
Dust and /or Odour	• Infrequent and not intense	• Frequent and occasionally intense	• Persistent and/or intense
Vibration	• No ground-borne vibration on plant property	• Possible ground-borne vibration, but cannot be perceived off property	• Ground-borne vibration can frequently be perceived off property
Air Quality	• Low probability of fugitive emissions	• Occasional outputs of either point source or fugitive emissions	• High probability of fugitive emissions
Scale of Production	• Small scale plant or scale is irrelevant in relation to all other criteria for this Class	• Medium level of production allowed	• Large production levels
Outside Storage	• Minimal storage	• Outside storage permitted	• Outside storage of raw and finished products
Process	• Self-contained plant or building	• Open process – outdoor storage of wastes or materials	• Open process – outdoor storage of wastes or materials
Process Outputs	• Produces/stores a packaged product	• Periodic outputs of minor annoyance	• Frequent outputs of major annoyances
Possibility of Fugitive Emissions	• Low probability of fugitive emissions	• Low probability of fugitive emissions	• High probability of fugitive emission
Hours of Operation	• Daytime operations only	• Shift operations permitted	• Daily shift operations permitted
On-site Movement	• Infrequent movement of products and/or heavy trucks	• Frequent movement of products and/or heavy trucks with the majority of movements during daytime hours	• Continuous movement of products and employees
Examples (not comprehensive)	• Electronics manufacturing and repair • Furniture repair and refinishing • Beverages bottling • Auto parts supply • Packaging and crafting services • Distribution of dairy products • Laundry and linen supply	• Magazine printing • Paint spray booths • Metal command • Electrical production manufacturing • Manufacturing of dairy products • Dry cleaning services • Feed packing plant	• Manufacturing of paint and varnish • Organic chemicals manufacturing • Breweries • Solvent recovery plants Soaps and detergent manufacturing • Manufacturing of resins and costing • Metal manufacturing

[3]

[3] Halton Regional Official Plan Guidelines – Land Use Compatibility Guidelines (www.halton.ca/common/pages/UserFile.aspx?fileId=121105, accessed January, 2015)

Evaluation Process

Section 3 of the Regions LUCG provides the region-specific guidelines which are meant to be followed for evaluating a new sensitive land use, as shown in **Figure 5**.

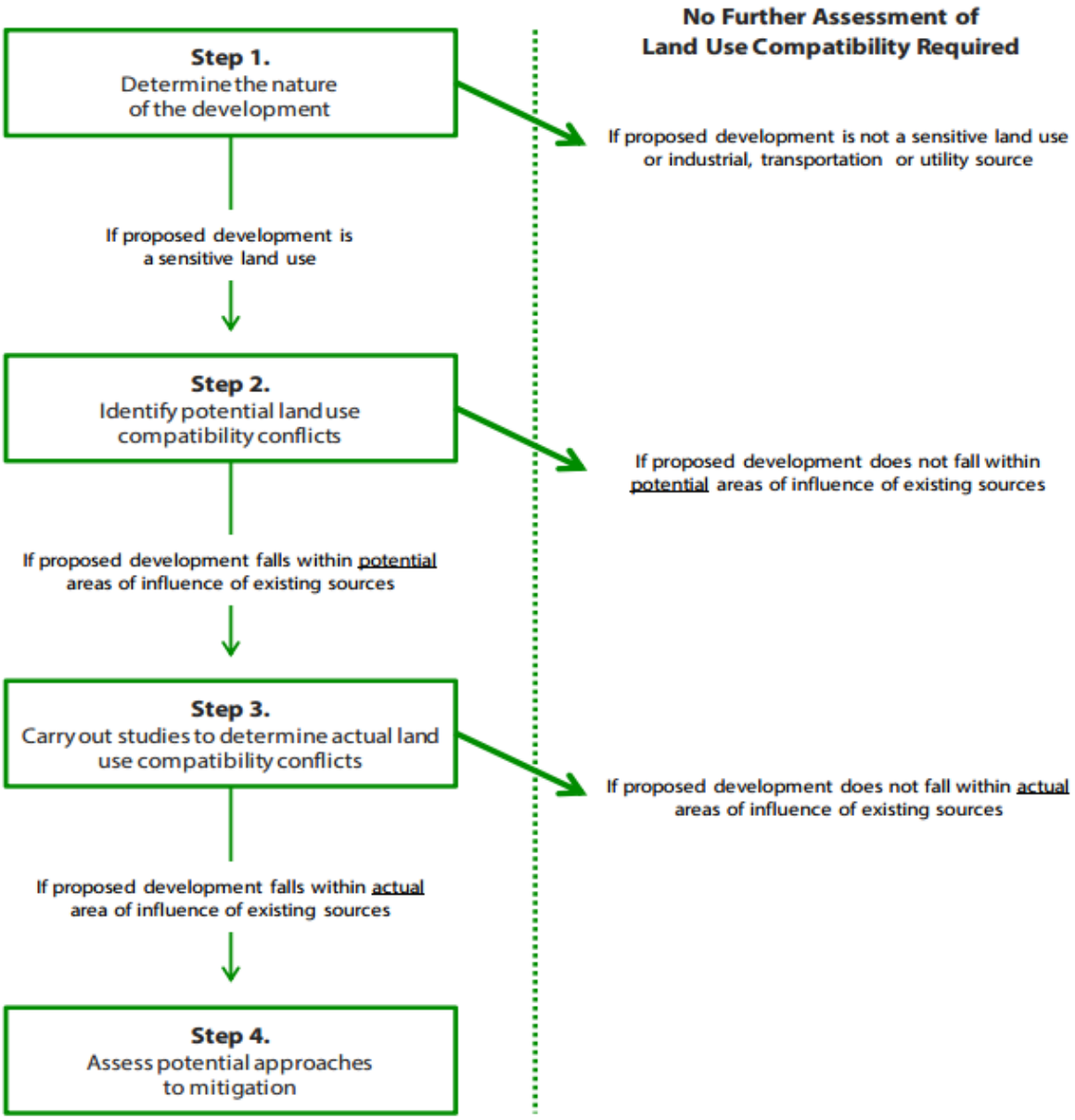


Figure 5: Halton Region's Land Use Compatibility Assessment Methods[4]

[4] Halton Regional Official Plan Guidelines – Land Use Compatibility Guidelines (www.halton.ca/common/pages/UserFile.aspx?fileId=121105, accessed January, 2015)

The above decision tree was followed in preparing the land use compatibility assessment for this study, as outlined in **Section 4**. It should be noted that the Region's decision tree shows a departure from the D-6 guidance in that 'minimum separation distances' are not included in the evaluation. It is our understanding that the intention of the Region's guideline is to require a study of land-use compatibility whenever two land uses are situated such that the potential exists for compatibility issues. Step 3 of the Region's decision tree is to determine an 'actual area of influence' through an appropriate assessment which is site specific. This process was followed in this report.

3.2.2 Halton Region's Regional Official Plan Guidelines: Air Quality Guidelines

The Region's Air Quality Guidelines (AQG) were developed along with a number of other guidelines for land use planning which came out of the Regional Official Plan Amendment (ROPA 38). The air quality study that was completed by the Region (discussed in **Section 2.0**) provided background information to help develop the AQG. In general terms, the AQG recommends consideration of local industrial sources and transportation features when evaluating the siting of a residential land use.

The AQG acts as a summary document of the applicable guidelines for a particular undertaking.

> *"2.1 Under the Region's policy 143(12), any source emission studies may only be applicable when sensitive land uses (residential, natural heritage) are proposed with these 3 conditions present:*
>
> 1) *Within 30 m of a major arterial road or provincial highway or within 150 m of provincial freeway;*
> 2) *In proximity to an industrial use; and a*
> 3) *Utility use"*

Novus conducted the study to address transportation related air quality issues referred to in item 1) of Section 2.1. Novus also conducted a review of identified industrial uses, as referred to in item 2) of Section 2.1.

> *"2.2 Undertaking studies to justify sensitive land uses in proximity to industrial, transportation and utility sources may be required under the following situations:*
>
> - *Official Plan Amendment (OPA)*
> - *Residential designation within Employment Area*
> - *Zoning By-law Amendment (ZBA)*
> - *Industrial Zone to Residential Zone*
> - *Consents (severances) with potential need for an OPA and ZBA*

- *Residential zone parcel severed with severed parcel proposed as an industrial or utility use"*

"2.3 Given the above land use application 'trigger' [Novus note: see 2.2 above], the following is a checklist that local development authorities may reference:

- *Local Official Plan policies and development criteria;*
- *Complete application requirements;*
- *Applicable municipal by-laws (e.g. local air quality by-law);*
- *Local engineering standards; and*
- *Local urban design guidelines"*

This report has been prepared with the intention to satisfy the requirements of the checklist by considering the applicable guidelines and applicable municipal by-laws in our assessment methods.

3.3 Burlington Official Plan

The Burlington Official Plan outlines the conditions requiring the completion of an air quality assessment.

"(Part II, 2.7.3 n) Exposure of residential and other land uses sensitive to vibration, noise, dust, odours or other effects caused by transportation or industrial facilities, and likewise, the encroachment of sensitive land uses on these facilities, shall be avoided through the use of separation distances, the placement of non-sensitive land uses in buffer areas, and/or other means. Proponents may be required to submit studies and undertake necessary mitigating actions to address compatibility issues to the satisfaction of the City and Region. Provincial guidelines shall be referred to for direction in land use planning decisions."

As per the above guidance, the proposed development requires an appropriate assessment, which is provided by this report. Furthermore, the guideline allows for the application of other mitigation strategies in addition to separation distances to improve compatibility.

3.4 Oakville By-Law 2010-035

The Oakville By-law enacts measures to restrict the potential concentrations of air quality contaminants – especially of fine particulate matter from significant industrial operations – below the levels enforced by the provincial air quality guidelines (O.Reg. 419).

"(2) The purposes of this by-law are:

a) To take measures, including collecting information, implementing regulatory controls and monitoring, to protect human health from fine particulate matter;

b) To designate specified sources of major emissions of health-risk air pollutants as public nuisances; and…

d) To reduce over time the levels of fine particulate matter in the ambient air of the Town."

This by-law does not impose any additional assessment requirements on the proposed Evergreen Community. The restrictions placed on particulate matter emissions from any new industries which are considered for development in the future in the neighbouring Town of Oakville will be subject to this by-law. It is presumed this by-law will assist in reducing the likelihood of impacts on the proposed Evergreen development due to industrial operations in the Town of Oakville.

3.5 Ontario Regulation 419/05 (O.Reg. 419)

The current air quality regulation in the Province of Ontario is Ontario Regulation 419/05 (O.Reg. 419) which came into effect December 1, 2005. The regulation specifies requirements that must be met by facilities which have the potential to emit contaminants. This includes recommendations for the preparation of a best management practices plan for the management of dust for instances of fugitive particulate emissions, draft guidance for the assessment of odour and a comprehensive methodology for the assessment of general air quality contaminants.

3.5.1 Air Quality Contaminants

Under O. Reg.419, a facility is required to meet prescribed standards for air quality contaminants at any ground-level location off-site (i.e. at the property line of the facility and beyond). Impacts are assessed irrespective of the contribution of other facilities and are compared against standards which were conservatively developed by the Province of Ontario.

The conventional method for assessing compliance is to compare maximum ground-level concentrations of selected emitted compounds and compare to the air quality standards. However, it is has been recognized in the air quality regulation that elevated features such as high-rise condominiums and apartment buildings are also points of reception for sensitive uses. Residences which will have ventilation systems and in many cases operable windows and balconies are an example. Typically, industry practice is to treat land-uses greater than three stories as 'elevated'.

Elevated points of reception are important when assessing an industry which utilizes stacks for ducting process gases to help disperse emissions. The stack emissions, depending on the point of release, may be appropriately dispersed above neighbouring low rise features but the same emissions may adversely impact points of reception on an adjacent high-rise building, depending on the characteristics of the emission source, plume effects and meteorological conditions.

3.5.2 Dust

Airborne particulate matter and dust in the local area will come from sources such as vehicles, agricultural practices, construction, industrial operations, as well as a significant contribution from long range transport from outside of Halton, including Southern Ontario and the United States as is documented in Halton Region's, 2011 Air Quality Report.

In general, dust refers to a subset of particulate matter generated from fugitive processes. With respect to industrial dust emissions, sources of fugitive emissions may come from material handling and onsite road traffic. The "Procedure for Preparing an Emission Summary and Dispersion Modelling Report", Version 3.0, MOE, March 2009 (Guideline A-10) is required to be followed by industries when complying with the Environmental Compliance Approval process. In Section 7.4 of Guideline A-10, the Ontario Ministry of the Environment addresses the contribution of fugitive sources from on-site roadways and storage piles which are typical sources associated with the aggregate industry. These sources, according to MOECC guidance, are excluded from the compliance assessment and comparison to MOECC standards. The activities associated with fugitive emissions are typically included in a facilities best management plan for emissions control which reviewed and approved by the MOECC.

The two identified industries in the area, Hanson Brick and Tansley Quarry, operate under a dust management plan. It is also expected that any future industry which has outdoor bulk handling and stockpiling materials or other sources of dust and odour would be required to obtain an environmental compliance approval (ECA), as per Section 9.0 of the Provincial Environmental Protection Act (EPA) and would also need to follow a best practices plan to manage odour and/or dust.

Best Management Practices Plans for dust control are further discussed with respect to the Hanson Brick and related Tansley Quarry operations in sections to follow.

3.5.3 Odour

There are a select few compounds that are provincially regulated from an odour perspective; there is no formal regulation with respect to mixed odours.

The MOECC has decided to apply odour-based standards to locations "where human activities regularly occur at a time when those activities regularly occur," which is generally accepted to be places that would be considered sensitive such as residences and public meeting places.

As stated by the Environmental Commissioner of Ontario, impacts from mixed odours produced by industrial facilities are generally only considered and regulated by the MOECC in the presence of persistent complaints (ECO 2010). Regardless, there are draft policies and

guidelines that have been released by the MOECC to help assess odours, and which consider both the intensity and frequency of impacts.

4.0 Evaluation Method

Considering the above referenced policies and guidelines, the evaluation methodology laid out in the Halton Land Use Compatibility Guidelines is followed in this assessment. This methodology, as described in section 3.2.1 is as follows:

Step 1. Determine the nature of the development. If the development is not a sensitive land use or industrial, transportation or utility source no further assessment is required.

Considering the proposed development plan, a majority of the development (e.g. single unit detached homes, townhomes, mixed-use features with residential uses) would be considered sensitive receptors.

Step2. Identify potential land use compatibility conflicts. If the proposed development does not fall within potential areas of influence of existing sources, no further assessment is required. Three aspects of potential conflicting features were identified and reviewed in the study.

i) In regard to transportation facilities, section 2.1 of the AQG provides that

"2.1)Under the Region's policy 143(12), any source emission studies may only be applicable when sensitive land uses (residential, natural heritage) are proposed…(i) Within 30 m of a major arterial road or provincial highway or within 150 m of provincial freeway…;"

To address section (2.1), the following transportation facilities were identified: as being within the specified distances (see Table 3)

- Dundas street
- Tremaine Road
- Highway 407

ii) In regard to industrial facilities, section 2.1 of the AQG provides that

"2.1 Under the Region's policy 143(12), any source emission studies may only be applicable when sensitive land uses (residential, natural heritage) are proposed … (ii) in proximity to an industrial use; "

To address the AQG with respect to industrial uses within proximity of the proposed residential development, two significant existing industries were identified to be within the Potential Area of Influence which triggers the recommendation to conduct a study: Hanson Brick, located west of the proposed development on Dundas Street and the Tansley Quarry (operated by Hanson Brick) located north of Highway 407 on Tremaine Road (see Table 3) are both conservatively categorized in this study as Class 2-3 industries and are within 1000 m of the proposed development.

With respect to the current proposed Evergreen development, there are mixed-use / business related segments identified in the proposed Secondary Plan and incorporated into the draft plan of subdivision, as illustrated in **Appendix A**. It is expected that any future activities would be commercial or light industrial in nature. These activities would be subject to Section 9 of the Ontario Environmental Protection Act (EPA), if there are sources of contaminant emissions, as defined in the EPA, which require an Environmental Compliance Approval. Any future business will take into consideration sensitive receptors when determining compliance, including those in the future Evergreen development. Any required mitigation would be determined at the time of application by the operator and would take into consideration potential impacts due air contaminants, noise, vibration or other contaminant as defined in the Act.

iii) Although there are no current proposals, the Town of Oakville raised concerns in respect of their plans for lands located east of the proposed development on the east side of Tremaine Road. As per the North Oakville West Secondary Plan's Land Use Plan, these lands are planned as an Employment District. Although there is no zoning in place for these uses, this study has considered these future plans to the extent possible.

Given the above, where in some cases the potential for land-use compatibility conflicts was identified involving existing or proposed off-site uses, it is appropriate to move to Steps 3 and 4 below..

Step 3. Carry out studies to determine actual land use compatibility conflicts. If proposed development does not fall within actual areas of influence of existing sources, no further assessment is required.

This requirement is addressed in the technical section of the report.

Step 4. Assess potential approaches to mitigation.

This requirement is addressed in the technical section of the report.

5.0 Assessment of Land Use Compatibility

A review of the land uses surrounding the proposed development was undertaken. The surrounding land uses which were identified as requiring further assessment are summarized in **Table 3**.

Table 3: Land Use Features Considered for Further Study

Type	Feature	Reason for Consideration in Study
Existing Industries	Hanson Brick	Determined to be Class 2 to Class 3 facility, located within 1000 m of the proposed development. Recommended to be assessed as per LUCG criteria
	Tansley Quarry	Determined to be Class 2 to Class 3 facility, located within 1000 m of the proposed development. Recommended to be assessed as per LUCG criteria
Roadways	Highway 407	Residential features in the proposed development are within 150 m of Highway 407 which is a provincial highway. Halton Region AQG recommends a study be completed
	Tremaine Road	Residential features in the proposed development are within 30 m of Tremaine Road which is a provincial highway. Halton Region AQG recommends a study be completed
	Dundas Street	Residential features in the proposed development are within 30 m of Tremaine Road which is a provincial highway. Halton Region AQG recommends a study be completed
Future Planning Consideration	Potential future industrial operations located east of Tremaine Road in Town of Oakville	No current proposals were identified. Concern from Town of Oakville Planning in respect of protection of land designations documented in Town of Oakville West Secondary Plan (dated 2009)

5.1 Roadway Review

The basic methodology of the screening level assessment in regard to roadways which was followed is presented below.

The worst-case contaminant concentrations due to motor vehicle emissions from the selected roadways were predicted at nearby receptors using dispersion modelling software on an hourly basis for a five-year period (2005-2009). Historical meteorological data from Pearson International Airport was used in the modelling exercise. Five years were modelled in order to capture the worst-case meteorological conditions. Traffic volumes, fleet distributions and fuel technologies from modelling year 2025 were used to be consistent with the noise study completed by Valcoustics for the roadways.

Maximum 1-hour, and 24-hour predicted combined concentrations were determined for comparison with the applicable guidelines using emission and dispersion models published by the U.S. Environmental Protection Agency (EPA). The CAL3QHCR roadway model was used in this assessment. The worst-case predicted impacts are presented in this report, however, it is important to note that the worst-case impacts may only occur at one receptor for a short duration.

Based on Novus' experience with roadway modelling, NO_2, $PM_{2.5}$ and Benzene were chosen as the representative pollutants for modelling. Automobile emissions are comprised of other pollutants, however, the chosen pollutants typically have the highest contribution from a roadway when considering the provincial guideline.

2025 traffic volumes were provided by BA Group for the arterial roadways and the 407. Tremaine Road, Dundas Street and the 407 were modelled for this assessment. US EPA default heavy duty vehicle percentages, fleet composition, and hourly vehicle distributions were used.

Receptors were placed at representative locations throughout the development based on the proposed Evergreen Community plan.

Table 4 provides the predicted concentrations of the three representative contaminants, nitrogen dioxide (NO_2) as an indicator of total oxides of Nitrogen (NO_X) fine particulate matter ($PM_{2.5}$) and benzene (the relevant averaging periods are also provided in the table). The worst-case predicted concentrations were predicted at ground-level at the commercial receptors at the corner of Dundas Street and Tremaine Boulevard. The highest predicted concentration is for $PM_{2.5}$ and is 9% of the provincial standard. This area of the proposed development has been chosen for a commercial use. It should be noted that this maximum concentration may occur only once over the five-year period.

The residential units fronting Tremaine are mixed-use buildings and will be second story or higher. Roadway emissions are predicted to have a lower impact at these receptors, as the impacts from roadways will be higher at lower elevations. Additionally, the residences setback from Tremaine will have lower concentrations, as concentrations decrease with distance due to mixing. Given this, it is our opinion that the impacts of the roadway on the proposed development will be low and are not likely to be an issue.

Table 4: Predicted Concentrations of Representative Contaminants

Contaminant	Averaging Time	Maximum Predicted Concentration (µg/m³)	Applicable Guideline (µg/m³)	Max as percent of guideline	98th Percentile Predicted Concentration (µg/m³)	98th Percentile as percent of guideline	90th Percentile Predicted Concentration (µg/m³)	90th Percentile as percent of guideline	Average Predicted Concentration (µg/m³)	Average as Percent of guideline
NO_2	1hr	12.70	400	3%	-	-	1.75	0%	0.58	0%
	24hr	2.22	200	1%	-	-	1.22	1%	0.58	0%
$PM_{2.5}$	24hr	2.65	28*	9%	1.89	7%	1.45	5%	0.70	2%
Benzene	24hr	0.07	2.3	3%	-	-	0.04	2%	0.02	1%

5.2 Review of Existing Industries

In Burlington, Hanson Brick and Tansley Quarry were identified as existing industries which should be considered for further assessment based on setback distances stated in the Halton Region's LUCG.

5.2.1 Assessment of Compatibility with respect to Hanson Brick and Tansley Quarry

Hanson Brick, located at 5155 Dundas Street West, Burlington, manufactures clay bricks from shale and clay materials extracted from pits and quarries located in parts of Ontario, including the Tansley Quarry, located on Tremaine Road, which is owned and operated by Hanson Brick. Raw aggregate materials are processed in crushers and grinders, mixed with water, compacted and extruded into bricks and dried in kilns which use natural gas fuel for heat.

The Tansley Quarry located on Tremaine Road is a typical quarry from which shale is extracted and handled on site with various vehicles for transport by hauling equipment to end users.

Based on our understanding and experience with aggregate related industries, air quality concerns are mostly related to the potential for dust/particulate emissions impacting the surrounding environment. However, NO_X was also assessed as process heat is used in the brick manufacturing process and is an indicator of combustion emissions from the Hanson facility.

Figure 1 shows the location of the subject lands in relation to Hanson Brick and Tansley Quarry. The potential for impacts on the subject lands from Hanson Brick and Tansley Quarry has previously been assessed in a report by RWDI (2008) which found that the potential for impacts due to quarrying activities was low. All compounds assessed by RWDI were found to meet the respective standards. One compound in particular which has been the focus of the current study is $PM_{2.5}$ The assessment predicted the combined maximum $PM_{2.5}$ concentrations

levels from both facilities at the subject lands would be 4.4 µg/m^3 or 16 % of current standard of 28 µg/m^3.

The RWDI report also assessed the potential for NO_X impacts related to the brick baking. Concentrations were predicted to be 1% of the applicable standards and, therefore, are not anticipated to impact the proposed development.

Site Visits

The Hanson Brick and Tansley Quarry sites were visited by Nigel Taylor, Senior Specialist, Novus Environmental Inc. on December 12, 2014. The visit was hosted by Hanson Brick personnel.

Hanson Brick

The natural feature, the Bronte Creek ravine, between Hanson Brick and the subject lands is substantial with considerable vegetation on each side of the ravine to help reduce fugitive dust emissions. This feature provides an adequate separate distance of 300 m and greater between the industrial property and proposed mixed-use development.

Hanson Brick operations are also subject to terms and conditions prescribed in the Amended Environmental Compliance Approval, issued by the Ontario Ministry of the Environment (Number 6731-8KDKG2), dated April 3, 2012 (ECA). Section 10 of the ECA is dedicated to dust control at the facility. The facility is required to follow a Best Management Practices Plan which includes preventative control measures to minimize the likelihood of dust emissions from the following activities:

- on-site traffic;
- paved roads/areas;
- unpaved roads/areas;
- material stock piles;
- loading/unloading areas and loading/unloading techniques;
- material spills;
- material conveyance systems;
- exposed openings in process and storage buildings; and
- general work areas.

There is an existing residential neighbourhood located directly southeast of the Hanson Brick Facility, across Dundas Street. The facility will need to manage dust currently in consideration of this existing residential development.

Tansley Quarry

The Tansley Quarry is owned and operated by Hanson Brick. The continued expansion of the quarrying activities is progressing further in the opposite direction from the proposed development and therefore will gradually become more distant from the proposed development. There is a significant distance separating the two areas for most of the property boundaries with a major 400 series highway, Highway 407 dissecting the buffer distance.

An area which tends to be a significant source of dust is the entrance way of an aggregate facility. In this case, the entrance is more than 600 m from the closest position on the proposed development property. This is considered a substantial setback for particulate emissions.

Lastly, the Quarry has an Environmental Management & Monitoring Plan terms and conditions that are part of the facility's Operational Plan filed with the Ministry of Natural Resources (MNR). The conditions of the plan are as follows:

- Dust from Quarry operations will be mitigated by cleaning/sweeping paved surfaces, and application of water or approved suppressants to unpaved internal haul roads, active quarry areas & stock piles;
- On-site vehicles speed will be limited to 25 km/hr;
- A dust control monitoring program will be implemented within the first year of operations, it will include perimeter dustfall jars, and HI-VOL sampling and report with recommendations prepared by a qualified dust consultant, the monitoring program may change, as recommended by the dust consultant in consultation with the MNR [confirmed to be in place by Tansley Quarry personnel during site visit]; and
- Revisions to the dust control program will require a site plan amendment.

Novus agrees with the findings of the studies conducted by RWDI, considering the conservative methods used in the original assessment. Furthermore, these findings were confirmed based on the observations made during the site visit and through discussions with Hanson Brick personnel.

Given the above, neither facility is expected to have an adverse effect on the proposed development.

5.3 Review of Designated Lands in Town of Oakville planned for Industrial Use

As mentioned in the previous sections, the Town of Oakville's North Oakville West Secondary Plan (NOWSP) designates the lands east of Tremaine as an Employment District. The NOWSP permits a range of industrial and commercial uses within the Employment District, (identified in Schedule 1 in **Table 5** below). The NOWSP restricts heavier industrial uses, (identified in Schedule 2 in **Table 5)** to Employment District lands that do not abut major

arterial roads such as Tremaine Road. The NOWSP does not specify the distance for these heavier industrial uses from the major arterial roads.

At a meeting held September 23, 2014, the Town of Oakville provided guidance as to the expected range of lot depths along Tremaine Road where heavier industrial uses are not permitted. The Town of Oakville provided samples of lot depths in the range of 80 m to 110 m for industries and commercial operations which already exist in Oakville. With respect to the proposed development, the 80 m distance would mark the closest distance at which the heavier industrial uses might be located and thus would be considered a worst-case scenario with the potential for the more intensive industrial operations being in the area beyond 80 m, with the acknowledgement that the area of the heavier industrial uses might be beyond 110 m..

Since there are no current development plans and there is no zoning in place for the Oakville lands immediately east of Tremaine, this report identifies a list of possible usages based on land use designations set out in the NOWSP. The possible uses which act as surrogates to allow for a review have been divided into two Schedules; one area within 80 m of Tremaine Road and the second area outside of this 80 m setback within the Employment District designation. **Table 5** and **Table 6** present the probable class designation of each land use type in reference to the classes described in the MOE D-6 Guideline (referred to in Halton Region's LUCG).

Table 5: Allowable Land Uses within 80 m Setback Distance

Schedule 1 (Within 80 m Setback)	Probable Class Designation
Light industrial operations (e.g. light manufacturing, assembling, processing etc.)	Class 1
Business and professional offices	NA
Medical clinics	NA
Service establishments (e.g. print shops, restaurants, hotels etc.)	NA
Public uses including places of worship and schools	NA
Sports and recreation	NA
Automobile related uses	Class 1
Retail sale of products produced on premise	NA
Research and development	Class 1
Information processing, call centers	NA
Computer based services including design studios	Class I

Table 6: Allowable Land Uses outside 80 m Setback Distance

Schedule 2 (Outside 80 m Setback)	Probable Class Designation
General industrial operations within enclosed buildings (e.g. manufacturing, assembling, processing etc.)	Class 1 to Class 3
Outside storage and outside operations incidental to industrial operations	Class 2 to Class 3
Transportation terminal, works yard and outside storage yard	Class 2 to Class 3
Waste processing station	Class 2 to Class 3
Waste transfer station	Class 1 to Class 3

Employment Uses within 80 m of Tremaine Road

Based on the classifications presented in **Table 5** and **Table 6** the potential operations that might be developed in the 80 m buffer zone will be low intensity operations with a low potential for impacts.

Given there is a major road right-of-way and there will be a setback of the proposed Evergreen development from the roadway, there will be a significant buffer between the potential Class 1 facilities that may be developed in the Town of Oakville and the proposed Evergreen Community.

Furthermore, it is reasonable to expect that Class 1 facilities that might be located in the Schedule 1 area, would implement practical measures that are industry norms to reduce the potential for impacts from air quality emissions on the proposed development.

The potential land uses in the 80 m area directly adjacent to Tremaine are not expected to adversely impact the proposed development.

Employment Uses beyond 80 m of Tremaine Road

As for the Schedule 2 area, there is the potential for Class 2 to 3 category industries, if developed, to have the potential to influence beyond the property line of the facility.

Whether there are sensitive land uses within the Evergreen Community or not, all industries on the east side of Tremaine with the potential to emit contaminants including odour and dust from their sites will be required to obtain an Environmental Compliance Approval to operate. Operations that have fugitive emissions of dust or odour will need to consider best management practices to reduce the potential of off-site impacts. Any contaminants emitted will need to meet the air quality standards in Regulation 419/05 at the industry's property line and beyond.

Furthermore, there would also be a minimum 115 m buffer between the property line of the Class 2 or 3 facility and the proposed development, taking into consideration the Tremaine Road right-of-way of 35 m and the 80 m minimum lot depth identified by the Town of Oakville described above. It is also expected that there will be buildings in the 80 m frontage area which will provide some barrier to any fugitive emissions.

Therefore, it is reasonable to expect that fugitive emissions from Class 2 or 3 facilities that may be located in the Schedule 2 area will not impact the proposed development.

Potential future sources of emissions that require further consideration are active ducting of emissions through industrial exhaust stacks. As mentioned previously, dispersion of contaminants is often a practical means of reducing the ground level concentration of emitted compounds from an industrial source. The current development plans have residential components which are 4 storeys or less. It is expected that these low-rise components will not impede the ability of a facility that may be developed in the future in the Schedule 2 area of Oakville to utilize a stack solution to help meet Provincial air quality standards.

If there is a desire to increase the heights of buildings in the Evergreen development at a future time, a site specific air quality assessment should be considered and would require input as to the potential industrial source characteristics that might be implemented. In doing so, appropriate mitigation measures, which may include at-source or at-receptor strategies, can be evaluated and incorporated into the site plan.

6.0 Summary Discussion

Air quality was reviewed with respect to three land use features either planned or existing in the area surrounding the proposed development. These features are identified in **Table 3**.

Table 7 summarizes the findings from the review of these features and the potential impact on the proposed development.

Table 7: Predicted Impacts from Existing or Potential Land Uses on the Evergreen Community

Land Use Feature	Finding	Expected Impact
Existing Industries	Hanson Brick and Tansley Quarry were identified as industries within the potential area of influence based on industrial categorization, as per LUCG. Both facilities are required to meet Provincial regulations and follow best management practices. Using $PM_{2.5}$ as indicator, worst-case combined concentration is predicted to be 4.4 µg/m^3 at the proposed development.	No
Roadways	Tremaine Road, Dundas Street and Highway 407 were identified as requiring study, as per LUCG. Highest modelled concentration predicted at the corner of Tremaine and Dundas where development plans for a commercial feature i.e. no residential component. $PM_{2.5}$ used as an indicator of air quality impacts was predicted to be 2.65 µg/m^3. Concentrations are predicted to be lower at residential features on development.	No
Potential Industrial Development, Town of Oakville	Hypothetical Schedule 1 area - potential land designations are categorized as worst-case Class 1 and are not expected to impact the proposed development. Hypothetical Schedule 2 area - may have the potential to have Class 2 or 3 industries, however, these uses must meet MOE standards at ground-level locations on their property lines. Furthermore, there will be a 100 m minimum buffer between Schedule 2 area and proposed Evergreen Community which is expected to further reduce potential for impacts from low level emissions such as fugitives. Current plans for elevations of buildings features are four storeys or less, therefore, future use of stacks for dispersing industrial emissions are not expected to be hindered by proposed development. If significant changes in the proposed heights of the residential building features are considered in the future, an appropriate site-specific study should be considered to determine if mitigation is required at either the industrial facility or the sensitive use.	No

Based on the findings of the review summarized in **Table 7**, the nearby land use features considered are not expected to adversely impact the proposed Evergreen development.

To evaluate potential combined effects from nearby sources and background conditions, the worst-case modelled $PM_{2.5}$ from the industries and roadways were summed with the 90th percentile 24-hour average concentration for the years 2007 to 2011 (provided in **Figure 4** of 16 µg/m^3) which gives a conservative combined estimate of 23 µg/m^3 which is less than the current Canada Wide Standard.

Mitigation strategies have been implemented by the proponent to further reduce the potential for impacts.

1. Features along Tremaine Road are mixed-use with commercial located on the ground floor. This will reduce the potential for roadway related emissions to impact sensitive uses.

2. Planned elevations are four storeys or lower reducing the potential to affect future industrial uses in the town of Oakville to use stacks for dispersion of emissions, specifically in the area outside of the hypothetical Class 1 buffer area.
3. Commercial block has been planned for the corner of Tremaine and Dundas where the worst-case roadway emissions were modelled. This is not required but further reduces the potential impact to the development sensitive points of reception.

7.0 Conclusions

A land use compatibility assessment was performed for the proposed Evergreen Community with reference to the following documents:

- The Ontario Provincial Policy Statement
- The Halton Regional Official Plan Guidelines
- The City of Burlington Official Plan
- The Town of Oakville By-Law 2010-035
- The Ontario Ministry of the Environment and Climate Change's Ontario Regulation 419/05

Table 8 provides a summary of how the policy and regulations were applied in the assessment.

Table 8: Summary of Tasks Completed to Address Relevant Policies and Regulations

Policy or Regulation	Completed Tasks
Provincial Policy Statement	Appropriate study completed
Halton Region Official Plan	Followed relevant Guidelines which address amendment ROPA 38, including LUCG and AQG
Halton Region Land Use Compatibility Guidelines (LUCG)	Process followed, including specific study of local industries and roadway features
Halton Region Air Quality Guidelines (AQG)	Specifically reviewed local industries and roadway features including plans from Town of Oakville.
City of Burlington Official Plan	Conducted an appropriate study and followed the LUCG
Town of Oakville By-Law 2010-035	The By-Law is not expected to affect the proposed development directly but indirectly will improve the air quality in the area by restricting types and levels of industrial emissions from the Town of Oakville
Provincial Air Quality Regulation – Ontario Regulation 419/05	Existing Industries meet standards at the proposed development. Any future industrial developments will be expected to meet the Provincial Regulations.

This assessment follows the recommendations and requirements of the above referenced documents for land use planning assessments and finds that unacceptable adverse effects are

unlikely to arise from the proposed Evergreen Community taking into consideration both existing and potential employment land uses in Oakville.

Appendix A – Site Plan



DRAFT PLAN OF SUBDIVISION

PARTS OF LOTS 1 AND 2
CONCESSION 1 NORTH OF DUNDAS STREET
GEOGRAPHIC TOWNSHIP OF NELSON NOW IN THE
CITY OF BURLINGTON
REGIONAL MUNICIPALITY OF HALTON

KEY PLAN



SUBJECT SITE NOT TO SCALE

PLANNING APPROVAL

APPROVED UNDER SECTION 51 OF THE PLANNING ACT, RSO 1990, AS AMENDED, BY THE DIRECTOR OF PLANNING FOR THE CITY OF BURLINGTON.

SIGNED: ______________ THIS ___ DAY OF ____________, 2015
DIRECTOR OF PLANNING

OWNER'S AUTHORIZATION

I HEREBY AUTHORIZE URBAN STRATEGIES INC. AND GERRARD DESIGN ASSOCIATES INC. TO PREPARE AND SUBMIT THIS DRAFT PLAN OF SUBDIVISION TO THE CITY OF BURLINGTON FOR APPROVAL.

SIGNED: [signature] DATE: June 4, 2015
FABIO J. MAZZOCCO
EVERGREEN COMMUNITY (BURLINGTON) LTD.

ACTING ON BEHALF OF:

ESTATE OF DAVID NORTON
PIN 07201-0082 (LT)
ALAN NORTON - EXECUTOR

3232 TREMAINE ROAD
PIN 07201-0073 (LT)
BRUCE M. STEVENSON - OWNER

5421 DUNDAS STREET PIN
07201-0061 (LT)
BRIAN D. STEVENSON - OWNER
BRUCE M. STEVENSON - OWNER
GLEN W. STEVENSON - OWNER
ALAN NORTON - P. O. A.

5463 DUNDAS STREET
PIN 07201-0093 (LT)
BRIAN D. STEVENSON - OWNER
BRUCE M. STEVENSON - OWNER
GLEN W. STEVENSON - OWNER

SURVEYOR'S CERTIFICATE

I HEREBY CERTIFY THAT THE BOUNDARY OF THE LAND ON THIS PLAN AND THEIR RELATIONSHIP TO THE ADJACENT LAND ARE ACCURATELY AND CORRECTLY SHOWN.

SIGNED: [signature] DATE: June 4, 2015
THOMAS J. SALB, B.Sc., OLIP
J.D. BARNES LTD.

ADDITIONAL INFORMATION

UNDER SECTION 51(17) OF THE PLANNING ACT

INFORMATION REQUIRED BY CLAUSES A, B, C, D, E, F, G, J ARE SHOWN ON THE DRAFT AND KEY PLAN

H - MUNICIPAL WATER
I - SILTY CLAY
K - MUNICIPAL SANITARY AND STORM SEWERS
L - SHOWN ON PLAN

LAND USE SCHEDULE

LAND USE / UNIT TYPE	LOTS / BLOCKS	AREA ha	AREA ac	UNITS
Business Corridor	396-398	4.57	11.29	
Mixed Use Corridor - Employment	399	1.48	3.66	
Mixed Use Corridor - General	400-403	5.81	14.36	410 *
Future Transit	404	0.66	1.63	
Parks	405-411	2.02	4.99	
LID / SWM / Naturalized Area	412-427	2.85	7.04	
NHS	428-432	19.61	48.46	
Road Widening	433-435	0.95	2.35	
0.3m Reserve	436-440	0.02	0.05	
Right of Way		13.38	33.06	
Special Right of Way (Eco Passage)		0.25	0.62	
Townhomes (6.10m / 20')	375-395	2.34	5.78	123
Single Detached WS (10.40m / 34')		2.26	5.58	75
Single Detached WS (11.60m / 38')		4.02	9.93	124
Single Detached WS (12.50m / 41')		3.69	9.12	101
Single Detached (12.50m / 41')		1.28	3.16	33
Single Detached (13.72m / 45')		0.74	1.83	18
Single Detached (15.24m / 50')		1.05	2.59	23
TOTAL		66.98	165.51	907

*Final unit count to be determined at a later date.

R.O.W. SCHEDULE

	m (width)	lin.m
Collector Road	27	370.0
Local Road	20	5420.3
Special Local Road (Eco Passage)	17	141.0
Minor Local Road	18.5	479.2
Lane	8.5	665.6
TOTAL		7076.1

NOTES

- ALL UNITS IN METRES UNLESS OTHERWISE NOTED.
- LOT FRONTAGE MEASURED AT 4.5M FRONT YARD SETBACK ON STANDARD DEPTH LOTS.
- CORNER RADIUS: 5m.
- CORNER CHAMFER AT INTERSECTIONS WITH LANES: 3m.
- DAYLIGHT TRIANGLES AS INDICATED ON PLAN.
- ROAD LENGTHS CALCULATED TO INTERSECTION EDGE.
- CONTOUR INTERVAL: 0.5m

PREPARED BY

GERRARD DESIGN ASSOCIATES INC
212-321 Carlaw Ave, Toronto, ON, M4M2S1 T 647 292 8750

No.	Date:	Issued
1	June 4-2015	Issued for Submission

SCALE: 1:2000

DWG DATE: June 4, 2015