



BURNSIDE

**Odour Emission Summary and
Dispersion Modelling Report
From Elora Waste Facility
6549 Gerrie Road, Elora, ON**

James Keating Construction Ltd.

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**September 24, 2018
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Odour Emission Summary and Dispersion Modelling
 Report 6549 Gerrie Road, Elora, ON
 September 24, 2018

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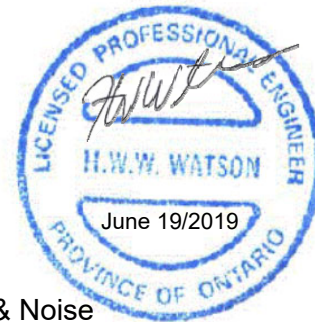
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R.J. Burnside & Associates Limited

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Definitions

Keating Homes Site ¹	James Keating Construction Ltd. 6531 Gerrie Road, Elora, ON
Acoustic Assessment	Procedure for assessing the noise impact of a Site on the local PORs
ADMGO	“Air Dispersion Modelling Guideline for Ontario”, dated February 2017, PIBS: 5165e03
Application	Environmental Compliance Approval Application form dated 2017/12 document PIBS: 8551e
This Application	This document containing all the information as required by the ESDM Procedure Document.
CAS#	Chemical Abstract Society reference number
EASR	Environmental Activity and Sector Registry
ECA	Environmental Compliance Approval as issued by the Ontario Ministry of the Environment, Conservation and Parks after 31 October 2011.
EC	Engineering Calculation
EF	Emission Factor
ESDM	Emissions Summary and Dispersion Model
ESDM Procedure Document	“Procedure for Preparing an Emission Summary and Dispersion Modelling Report” dated February 2017, PIBS: 3614e04
ESDM Report Checklist	“Emission Summary and Dispersion Modelling Checklist”, dated March 2017, PIBS: 5357e
Information for an MGLC	“Supporting Information for a Maximum Ground Level Concentration Acceptability Request Supplement to Application for Approval”, dated December 2017, PIBS: 4872e.pdf
Insignificant	Negligible
List of MECP POI Limits	The POI concentrations listed in the Emissions Summary Table were compared against the “Air Contaminants Benchmarks (ACB) List: Standards, guidelines and screening levels for assessing point of impingement concentrations of air contaminants” 2018.
MB	Mass Balance

¹ The term Site is used specifically to clearly indicate the difference between the term facility used in O. Reg. 419 and the term Site which refers to the specific address and everything inside the property boundary which is the focus of This Application. It was felt that using the term “Facility” for this specific location could lead to confusion. The term Site is consistent with the connotations in the “Environmental Compliance Approval”.

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MECP	Ontario Ministry of the Environment, Conservation and Parks
NO _x	Nitrogen Oxides
O. Reg. 1/17	Ontario Regulation 1/17 "Air Emissions EASR"
O. Reg. 419	Ontario Regulation 419/05
TSP	Total Suspended Particulate
PM	Particulate Matter
POI	Point of Impingement (Contaminant)
Products of Combustion	Contaminants emitted as a result of burning natural gas
Significant Source ID	Non-negligible The alphanumeric string assigned to a discharge point otherwise known as a "source reference number" in the "Acme Example" PIBS: 5987e.pdf.
VOC	Volatile Organic Compound

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Executive Summary

This Emission Summary and Dispersion Modelling (ESDM) report was prepared to assess the odour emissions from the Elora Waste Facility and the resulting impact of those emissions on the surrounding property proposed at in support an application for a zoning amendment. The ESDM report was prepared in accordance with s.26 of Ontario Regulation 419/05 (O. Reg. 419) and the ESDM Procedure Document to support the ECA application.

James Keating Construction Ltd. (Keating Homes) wishes to build a residential subdivision across the road from the Elora Waste Facility at 6531 Gerrie Road, Elora, ON. The Elora Waste Facility (Site) is located at 6549 Gerrie Road in Elora and is owned by The County of Wellington. The Site is located in an area zoned for service industrial use which allows waste collection and sorting.

The Site is subject to s.19 of O. Reg. 419/05. Therefore, the discharge of the Site has to meet the standards in Schedule 2 of O. Reg. 419/05 using one of the approved dispersion models listed in s.6 of O. Reg. 419/05. However, Burnside has chosen to use one of the approved dispersion models (AERMOD) to demonstrate compliance with Schedule 3 standards of O. Reg. 419/05 before the regulatory phase-in date of February 1, 2020. This determination is also based on the assessment that the Site stays in compliance after the speed up. Further, should the County of Wellington wish to submit this report as part of their odour modelling, this method is required any time after February 1, 2019.

The Site is expected to emit odour and landfill gas. This assessment only considers the odour emissions from the waste transfer operations and does not consider the landfill gas emissions from the closed landfill.

The maximum POI concentrations were calculated based on the operating conditions where all significant sources are operating simultaneously at their individual maximum rates of production. The maximum emission rates for each significant contaminant emitted from the significant sources were calculated in accordance with s.11 of O. Reg. 419 and the data quality assessment follows the process outlined in the requirements of the ESDM Procedure Document.

A POI concentration for odour was calculated based on the calculated emission rates and the output from the Air Dispersion Model; the results are presented in the following Emissions Summary Table in accordance with s.26 of O. Reg. 419.

The POI concentration is compared to the value of 1 OU. While this value is very conservative and is likely more stringent than required, the MECP has not provided

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another limit at this time. Note that the odour detection threshold of 1 OU is applied at sensitive receptors and not the property boundary of the facility.

The 1 OU contour for the maximum off-property concentrations crosses Gerrie Road but does not reach the edge of the proposed development.

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1.0 Introduction and Site Description

This Emission Summary and Dispersion Modelling (ESDM) report was prepared in accordance with s.26 of Ontario Regulation 419/05 (O. Reg. 419). In addition, guidance in the ministry publication “Procedure for Preparing an Emission Summary and Dispersion Modelling Report” dated February 2017 (ESDM Procedure Document) PIBS 3614e04 was followed, as appropriate.

For ease of review and to promote clarity, this ESDM report is structured to correspond to each of the items listed in the ESDM Report Checklist.

This section provides a description of the Site as required by sub paragraph 1 of s.26 (1) of O. Reg. 419.

1.1 Purpose and Scope of the ESDM Report

This ESDM report was prepared to support an application for rezoning of a property to allow a residential development.

James Keating Construction Ltd. (Keating Homes) would like to build a residential development across the road from the Elora Waste Facility at 6531 Gerrie Road, Elora, ON.

The Elora Waste Facility is owned and operated by the County of Wellington (The County). The Site is located in an area zoned for service industrial use which allows waste collection and sorting.

The location of the Site is presented in Figure 1: Site Location Map and the land use designation of the Site and surrounding area is presented in Figure 2: Zoning and Land Use Plan. The location of the discharges from each of the sources is presented in Figure 3: Site Plan; the location of each source is labelled with the Source ID.

1.2 Description of Processes and NAICS Code

Elora Waste Facility is a waste transfer facility where residents drop their solid waste and recyclable materials (not including yard waste).

The North American Industry Classification System (NAICS) code that applies to the Site is 56211 – Waste Collection. O. Reg 1/17 lists this code as exempt from the Air Emissions EASR registration, so the facility must prepare an Environmental Compliance Approval (ECA) Application.

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1.3 Description of Products and Raw Materials

The Elora Waste Facility is a waste transfer facility located on a closed landfill. The landfill was closed in 1987 so no new waste has been landfilled at this location in the last 30 years.

Currently, there is a waste transfer facility where residents drop their solid waste in bins that The County then transports off-Site for disposal.

On Friday, the Site is prepared for the largest activity day, Saturday. At that time, six empty garbage bins are located on the southwest side of the staging area ("In-Use" bins). On Saturday morning, the public fills the In-Use bins. Sometime in the first three hours, the haul truck will arrive on Site. If it is a particularly busy day, many of the six In-Use garbage bins could be full. If that is the case, the haul truck will move up to three (3) bins from the In-Use location to the Temporary Storage location in the northwest corner of the property. It will then refill the In-Use area with empty bins from the Empty Bin Storage location (in the north corner of the property). A fourth bin will be removed from Site.

When the haul truck returns, it will carry an empty bin. If capacity is needed in the "In-Use" area, that empty bin will be placed in the In-Use area and a full bin will be hauled off-Site. If existing capacity is sufficient, then the haul truck will place the empty bin in the Empty Bin Storage location and remove a full bin from the Temporary Storage location.

Over the rest of the day, the haul truck will take bins off-site and replace them with empty bins. On busy days, the empty bin will replace a bin in the In-Use area. On less busy days, the Empty Bin Storage location will be refilled and bins in the Temporary Storage location will be removed from Site.

Only on particularly busy days will the bins in the Temporary Storage location still be on-Site at the end of the day. Should this scenario occur on a long weekend, then it is possible for there to be nine full bins on Site for Saturday, Sunday and Monday. All the garbage bins would then be removed from the Site on Tuesday.

Recycle bins have very little odour and are located on the northeast side of the staging area so they are not expected to contribute to the off-property odour. Recycle bins contain cardboard (up to 3 bins), metal (1 bin), and glass and plastic bottles (up to 3 bins).

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1.4 Process Flow

Garbage and recycle materials are delivered to the Site by residents and sorted into various bins. These bins are removed from Site by the County. This process is not considered complex enough to warrant a process flow diagram.

1.5 Operating Schedule

The facility is open to the public Tuesdays, Thursdays, and Saturdays from 8:00 am to 4:00 pm.

The County typically works at the Site from Monday to Saturday between 7:00 am and 7:00 pm. The frequency of intermittent activities depends on materials dropped by residents. The modelling assumes that the Site operates 24 hours a day, 7 days a week, all year.

2.0 Initial Identification of Sources and Contaminants

This report was written to assess the odorous emissions from the Site. No other contaminants are considered in this report.

All odour sources are considered but only sources of significance are modelled.

2.1 Sources and Contaminants Identification Table

Table 1 – Sources and Contaminants Identification Table tabulates all the emission sources at the Site, for example, AREA1 – Garbage Bin is identified as a source. Table 1 provides the information required by sub paragraphs 2 to 4 of s.26 (1) of O. Reg. 419.

The expected contaminants emitted from each source are also identified in Table 1; for example, the expected contaminants emitted from AREA1 – Garbage Bin are identified as odour. Each of the identified sources has been assigned a Source ID, for example Garbage Bin source has been identified as AREA1.

The location of each discharge point is presented in Figure 3: Site Plan; the discharge point is labelled with its Source ID.

3.0 Assessment of the Significance of Contaminants and Sources

This section provides an explanation for each source and contaminant identified in Table 1 – Sources and Contaminants Identification Table, as required by sub paragraph 5 of s.26 (1) of O. Reg. 419.

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In accordance with s.8 of O. Reg. 419, emission rate calculations, and dispersion modelling does not have to be performed for emissions from negligible sources or for the emission of negligible contaminants from significant sources.

3.1 Identification of Negligible Contaminants and Sources

Of the processes listed on Table 1 - Sources and Contaminants Identification Table, some of the processes have been identified as negligible. Each negligible process is identified in the table, for example, A-02 – Recycle Bins (N/A) has been labelled as negligible. The remaining processes are considered significant. For example, A-01 – Garbage Bin (AREA1 through AERA9) is considered a significant process. These significant processes are included in the dispersion modelling for the Site.

Of the sources listed on Table 1 - Sources and Contaminants Identification Table, only the emission points associated with negligible processes have considered negligible.

Of the products listed on Table 1 - Sources and Contaminants Identification Table, all are considered significant.

Of the contaminants listed on Table 1 - Sources and Contaminants Identification Table, none have been identified as negligible.

3.2 Rationale for Assessment

The only sources considered negligible are the bins containing recycled cardboard, recycled bottles and can, and recycled scrap metal. These sources are observed to have a negligible amount of odour and so have not been modelled.

4.0 Operating Conditions, Emissions Estimating and Data Quality Emissions

This section provides a description of the operating conditions used in the calculation of the emission estimates and an assessment of the data quality of the emission estimates for each significant contaminant from the Site as required by sub paragraphs 6 and 7 of s.26 (1) of O. Reg. 419. In accordance with s.8 of O. Reg. 419, emission rate calculations and dispersion modelling does not have to be performed for emissions from negligible sources or for the emission of negligible contaminants from significant sources.

4.1 Description of Operating Conditions

As noted in Section 1.2, The NAICS code that applies to this facility is 56211 Waste Collection.

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Section 10 of O. Reg. 419 states “A scenario that assumes operating conditions for the Facility that would result, for the relevant contaminant, in the highest concentration of the contaminant at a point of impingement that the Facility is capable of”. The operating condition described in this ESDM Report meets this requirement.

The averaging time for the operating condition is 10 minutes. The operating condition used for this Site that results in the maximum concentration at a POI is the scenario where all significant sources are operating simultaneously at their individual maximum rates of production. The individual maximum rates of production for each significant source of emissions correspond to the maximum emission rate during any 10 minute period. The individual maximum rates of production for each significant source of emissions are explicitly described in Appendix A – Supporting Calculations.

The assessment of all operating conditions included transient, start-up, shut-down and continuous operation modes. Continuous operation is expected to provide the largest POI concentration estimate so that method is used as the basis of calculations in This Application.

4.2 Explanation of the Method Used to Calculate Emission Rates

The maximum emission rates for each significant contaminant emitted from the significant sources were calculated in accordance with requirements of the ESDM Procedure Document.

The emission rate for each significant contaminant emitted from a significant source was estimated and the methodology for the calculation is documented in Table 2 – Source Summary Table. For example, the emission of odour was calculated using a Stack Testing (ST) technique (in this case odour sampling). The information for Table 2 can be found in either Table 2-1 (sorted by Source ID) or Table 2-2 (sorted by contaminant).

4.3 Sample Calculations

The technical rationale, including sample calculations, required to substantiate the emission rates presented in Table 2 – Source Summary Table is documented in Appendix A – Supporting Calculations.

4.4 Assessment of Data Quality

This section provides a description of the assessment of the data quality of the emission estimates for each significant contaminant from the Site, as required by sub paragraph 7iii of s.26 (1) of O. Reg. 419.

The assessment of data quality of the emission rate estimates for each significant contaminant emitted from significant sources was performed in accordance with the

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requirements of sub paragraph 7iii of s.26 (1) of O. Reg. 419. For example, the ST technique used to calculate the emissions from A-01 is based on the odour sampling report "Report for an Emission Testing Program for Region of Peel" by Pinchin Environmental. The data quality of that emission factor considered "Average" because the factor was determined for a very similar set of conditions under validated testing conditions. Had the same test been done at this facility, the data quality would be "above-Average" or "Highest".

Therefore, the emission rate estimate is not likely to be an underestimate of the actual emission rate and use of these emission rates will result in a calculated concentration at a POI greater than the actual concentrations. This source was documented as having a Data Quality of "Average", which is generally acceptable according to requirements of the ESDM Procedure Document.

For each contaminant, the emission rate was estimated and the data quality of the estimate is documented in Table 2 – Source Summary Table. The assessment of data quality for each type of source listed in Table 2 is documented in Appendix A – Supporting Calculations.

All the emission rates listed in Table 2 are documented as having Average Data Quality and correspond to the operating scenario where all significant sources are operating simultaneously at their individual maximum rates averaged over the appropriate averaging time for that contaminant. Therefore, the emission rate estimates listed in Table 2 are not likely to be an underestimate of the actual emission rates and use of those emission rates will result in a calculated POI concentration greater than the actual concentrations.

5.0 Source Summary Table and Site Plan

This section provides the table required by sub paragraph 8 and the site plan required by sub paragraph 9 of s.26 (1) O. Reg. 419.

5.1 Source Summary Table

The emission rate estimates for each source of significant contaminants are documented in Table 2 – Source Summary Table in accordance with the requirements of sub paragraph 8 of s.26 (1) of O. Reg. 419.

For each source of significant contaminants, the following parameters are referenced:

- Contaminant name,
- Chemical Abstract Society (CAS) reference number,
- Source ID,
- Source description,

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- Stack parameters (flow rate, exhaust temperature, diameter, height above grade, height above roof),
- Location referenced to a Cartesian coordinate system presented on Figure 3 – Site Plan,
- Averaging period,
- Emission estimating technique,
- Estimation of data quality, and
- Percentage of overall emission.

5.2 Site Plan

The locations of the emission sources listed in Table 2 – Source Summary Table are presented in Figure 3: Site Plan; the location of each of the sources is specified with the Source ID. The location of the property line is indicated on Figure 3, with the end points of each section of the property line clearly referenced to a Cartesian coordinate system.

The location of each source is referenced to this Cartesian coordinate system under a column in Table 2 – Source Summary Table.

The heights of the structures that are part of the Site are labelled as “H” in Figure 3: Site Plan.

6.0 Dispersion Modelling

This section provides a description of how the dispersion modelling was conducted at the Site to calculate the maximum concentration at a POI, as required by sub paragraphs 10 to 13 of s.26 of O. Reg. 419.

Dispersion modelling was completed in accordance with the MECP’s “Air Dispersion Modelling Guideline for Ontario” PIBS 5165e03 (ADMGO). A general description of the input data used in the dispersion model is provided below and summarized in Table 3.

The Site is subject to s.19 of O. Reg. 419/05. Therefore, the discharge of the Site has to meet the standards in Schedule 2 of O. Reg. 419/05 using one of the approved dispersion models listed in s.6 of O. Reg. 419/05. However, Burnside has chosen to use one of the approved dispersion models (AERMOD) to demonstrate compliance with Schedule 3 standards of O. Reg. 419/05 before the regulatory phase-in date of February 1, 2020. This determination is also based on the assessment that the Site stays in compliance after the speed up. Further, should the County of Wellington wish to submit this report as part of their odour modelling, this method is required any time after February 1, 2019.

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Since the Schedule 3 standards of O. Reg. 419/05 apply, the modelled impacts of contaminant emissions are assessed as 10-minute maximum POI concentrations. The appropriate model to assess the maximum POI impact is the USEPA AERMOD model. The following dispersion model and pre-processors were used in the assessment:

- AERMOD dispersion model (v. AERMOD_MPI_Lakes_16216r);
- AERMAP surface pre-processor (v. AERMAP_EPA_16216r); and
- BPIP building downwash pre-processor (v. 0474).

The Meteorological Regional Data set as published by the MECP for the West Central Region (London Crops) was used. AERMET was not used as a result.

There is no child care facility, senior's residence, health care facility, long-term care facility, or educational facility located at the Site and no other tenant at the Site. As such, same structure contamination was not considered.

6.1 Meteorology and Land Use Data

A land use zoning plan is provided on Figure 2: Zoning and Land Use Plan. Figure 2: Zoning and Land Use Plan also illustrates the extent of the Site property boundary and provides the zoning of adjacent land uses. The Site is located in an area zoned for service industrial use (M1). It is surrounded mainly by Agricultural (A) use areas. An Environmental Protection (EP) area crosses the site on the north and east side. Residential Area (R1A) is located south of the Site across the road.

The MECP has created, and periodically updates, AERMOD-ready regional meteorological datasets for use with dispersion modelling using AERMOD. Depending upon the local land use of the Site, the dataset used can be urban, crops, or forest. As the Site is situated within the geographical coverage of MECP Guelph District Office and based on the land-use characteristics around the site, the "Crops" dataset (last updated using version 16216r (London_crops_16216.SFC and London_crops_16216.PFL)) was used. The surface data is from the London Station and the Upper Air Data is from White Lake, Michigan. The meteorological data covers the dates from January 1, 1996 to December 31, 2000. The hourly data includes many factors which affect the dispersion of air contaminants including wind speed, wind direction, temperature, ceiling height, and atmospheric stability.

Subparagraph 10 of s.26 (1) of O. Reg. 419/05 requires a description of the local land use conditions if meteorological data described in paragraph 2 of s.13 (1) of O. Reg. 419/05 was used. In this assessment, MECP's regional meteorological dataset described in paragraph 1 of s. 13(1) of O. Reg. 419/05 was used.

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6.2 Coordinate System

The Universal Transverse Mercator (UTM) coordinate system, as per Section 5.2.2 of the ADMGO, was used to specify model object sources, buildings, and receptors. All coordinates were defined in the North American Datum of 1983 (NAD83).

All source, building, and property line coordinates are shown in Figure 3 with exact coordinates in Table C-1 (see Appendix C).

6.3 Terrain

Section 16 of O. Reg. 419/05 sets out when terrain must be considered. In this assessment, terrain elevation contour data was downloaded from Ontario Digital Elevation Model Data set and processed using the AERMOD terrain processor AERMAP. AERMAP determines base terrain elevation using the DEM data for all sources, receptors and buildings, and provides the user with a suitable input file for use with AERMOD.

6.4 Dispersion Modelling Input Summary Table

A description of the way in which the approved dispersion model was performed is included in Table 3 – Dispersion Modelling Input Summary Table. This table meets both the requirements of s.26 (1) 11 and Sections 8-17 of O. Reg. 419/05 and follows the format provided in the ESDM Procedure Document.

The Site was modelled as multiple area sources, with the release height based on the bin heights and the location of those bins. A summary of the AERMOD source input parameters is provided in Table 2-1 and 2-2. Property Boundary and building locations are listed in Table C-1 found in Appendix C. The locations of all emission points are shown in Figure 3: Site Plan. The location of the property-line in relation to the dispersion modelling sources is also presented in Figure 3: Site Plan.

The emission rates used in the dispersion model meet the requirements of s. 11(1) 1 of O. Reg. 419/05, which requires that the emission rate used in the dispersion model is at least as high as the maximum emission rate that the source of contaminant is reasonably capable of for the relevant contaminant. These emission rates are further described in Appendix A – Supporting Calculations. A summary of the modelled emission rates for each point source is provided in Tables 2-1 and 2-2.

The emission rates input into the model are maximum 10-minute emission rates because the criteria have a 10-minute averaging period.

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6.5 Building Downwash

The Site buildings were entered into the model using the USEPA Building Profile Input Program (BPIP) and run to evaluate any building cavity downwashing that may be occurring. Cavity downwash can result in air contaminants being forced to ground level prematurely under certain meteorological conditions. The roof height of on-site buildings was modelled using the height of each individual building.

6.6 Deposition

AERMOD has the capability to account for wet and dry deposition of substances that would reduce airborne concentrations. The deposition algorithm in the AERMOD model was not used for this assessment and therefore the predicted modelled POI concentrations are considered to be conservative.

6.7 Averaging Time and Conversions

The shortest time scale that AERMOD predicts is a 1-hour average value. Schedule 3 standards of O.Reg. 419/05 are being applied to this Site. Many of these standards are based on 1-hour and 24 hour averaging times, which are averaging times that are easily provided by AERMOD. In cases where a standard has an averaging period of less than 1-hour (e.g., 10 minutes), a conversion to the appropriate averaging period was completed using the MECP recommended conversion factors, as documented in the ADMGO.

6.8 Area of Modelling Coverage

Receptors were chosen based on recommendations provided in Section 7.1 of the ADMGO, which is in accordance with s.14 of O. Reg. 419/05. Specifically, a nested receptor grid, generally centered on the center of the building, was placed as follows:

- A bounding box was created that encompasses all the sources at the Site.
- 20 m spacing within 200 m of the edge of the bounding box;
- 50 m spacing from 200 m to 500 m;
- 100 m spacing from 500 to 1000 m;
- 200 m spacing from 1000 to 2000 m; and
- 500 m spacing from 2000 m to 5000 m.

In addition to using the nested grid, receptors were placed every 10 m along the property boundary. No receptors were placed inside the Site's property line.

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6.9 Dispersion Modelling Input and Output Files

The information entered into the approved dispersion model is recorded in Appendix C. AERMOD dispersion model data of all the contaminants is provided in electronic form on the CD in Appendix C. As an illustration, a copy of the contour plot and the model output file for the contaminant Odour is also contained in Appendix C.

7.0 Odour Impact Verification

To verify the odour model, a validated odour panelist walked around the Site on Tuesday September 11, 2018 to see where odour could be detected.

This date was chosen because the garbage collected at Site on Saturday would have had a chance to get smelly over the intervening 3 days and so would provide the highest odour emission rate. Unfortunately, the weather over those three days was not as warm as hoped given the warmth of the rest of the summer. On September 11, the forecast for the next two weeks did not show significantly higher temperatures so there was no opportunity to wait for the next week with any hope of a more odorous emission from the bins.

The weather data recorded at the nearby Elora RCS weather station is shown in Appendix B: Weather Data. Since that station does not record weather observations, the corresponding observations from the Kitchener/Waterloo station (next closest station with observations) are provided immediately to the right.

The weather from Saturday to Tuesday was generally in the low teens with an average relative humidity of 78 %. While the temperature was not ideal to produce the maximum odour emission, the humidity was ideal. There was significant amounts of rain and fog over the three days so any odour producing bacteria would have ideal water conditions for growth. The rain would increase the water available to the bacteria as well.

The odour observations were taken without any equipment, so they represent the approximate location at which the impact is 1 OU or higher. It is acknowledged that these observations were taken by a single person, so the results can only be used as an indication of approximate impact not a measurement of impact.

On September 11, 2018 between 10:00 and 11:00, there were 5 bins on Site. All 5 of these bins had been filled on Saturday and were in the process of being removed.

The observer started at a location considered to be a long distance down wind and then walked up wind stopping at various locations to take observations. This method ensured that the observer's nose was not saturated by odours at nearby locations which would make detection of low levels farther away difficult.

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The intension of the observations was to provide an indication of whether the model was reasonable or not. Detecting odours closer than provided in the model would verify the model. Detecting odours farther than predicted under the worst case would indicate that the model was under predicting the odour. During the observations, the wind was approximately 10 km/h from the north (10°), the temperature was approximately 16°C and the relative humidity was approximately 80 %.

These conditions are expected to result in conditions approximating the worst-case because the wind will be laminar (not well mixed) which will transport odours further than if the day were warm, which would result in significant mixing from thermals.

The location of observations is shown on Figure 4: Odour Observations.

The observations made are tabulated below:

Location	Distance to Closest Bin (m)	Observation
1	70	Smell of wet grass and cedar but no garbage
2	45	Wet dirt
3	36	Odour detected but not identifiable (estimate 1 OU). Odour may not be garbage.
4	18	Odour detected. Odour may have been garbage but not clearly identifiable (estimate 1 OU).
5	7	Clear garbage odour
6	20	Clear garbage odour

Note that the MECP considers an odour impact to occur for 10 minutes while the observations on Site were recorded if the odour was detected for a few seconds. This heightened sensitivity meant that odours were detected at farther distances than would otherwise be considered significant.

When assessing the odours above, recognize that observations at location O3 and O4 may not be garbage odour as there was the smell of cedar, wet grass, and wet dirt at locations farther from the bins. Recognizing an odour (1 OU) does not allow the observer to distinguish the source of the odour. At 1 OU, the smell of baking bread is the same as garbage.

The observations indicate that the odour appears to be at approximately 1 OU at 20 m directly downwind of four garbage bins in a row. This condition is one of the most likely to cause a significant impact because the bin is picking up odour and carrying that odour to the next bin where it picks up more. The four bins then all contribute to the odour. Despite this arrangement, the odour was still only detected at approximately 20 m.

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This value is less than the distance predicted from the closest bin to the 1 OU contour line for the Site which is 50 m from the closest bin.

To further verify this observation, a single run of the 5 bins on site on September 11, 2018 was performed which indicated that the 1 OU contour line would be on the property at 30 m downwind of the closest bin which is where the observations were made. Given that the observations found the odour at 20 m when the model predicted 30 m also confirms that the model is reasonable.

8.0 Emissions Summary Table and Conclusions

This section provides the table required by sub paragraph 14 of s.26 of O. Reg. 419 and provides the interpretation of the results as required by the ESDM Procedure Document.

8.1 Emissions Summary Table

A POI concentration for each significant contaminant emitted from the Site was calculated based on the emission rates listed in Table 2 – Source Summary Table and the output from the approved dispersion model presented in Appendix C. The results are presented in Table 4 – Emissions Summary Table. This table follows the format provided in the ESDM Procedure Document. For each source of significant contaminants, the following parameters are referenced:

- Contaminant name,
- Chemical Abstract Society (CAS) reference number,
- Total Site emission rate,
- Approved dispersion model used,
- Max POI concentration,
- Averaging period for the dispersion modelling,
- MECP POI limit,
- Indication of the limiting effect,
- Schedule in O. Reg. 419/05, and
- The percentage of standard or indication of the likelihood of an adverse effect.

Since odour is assessed at sensitive receptors, the POI concentration listed in Table 4 – Emission Summary Table is the highest concentration calculated by the model as observed from the contour plot.

8.2 Assessment of Contaminants with no MECP POI Limits

Sub paragraph 14 subsection viii of s.26 (1) O. Reg. 419 requires an indication of the likelihood, nature, and location of any adverse effect if the contaminant is not listed in any of Schedules 1, 2, and 3 (or the List of Ministry POI Limits).

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While odour does not have a published criterion, historically, 1 OU has been used to give an indication of whether the odour is likely to cause an adverse effect. This value has subsequently shown to be too conservative because the value corresponds to the level at which 50 % of the populations detects the odour.

8.3 Conclusions

This ESDM Report was prepared in accordance with s.26 of O. Reg. 419. In addition, guidance in the ESDM Procedure Document was followed as appropriate.

The Site is subject to s.19 of O. Reg. 419/05. Therefore, the discharge of the Site has to meet the standards in Schedule 2 of O. Reg. 419/05 using one of the approved dispersion models listed in s.6 of O. Reg. 419/05. However, Burnside has chosen to use one of the approved dispersion models (AERMOD) to demonstrate compliance with Schedule 3 standards of O. Reg. 419/05 before the regulatory phase-in date of February 1, 2020. This determination is also based on the assessment that the Site stays in compliance after the speed up. Further, should the County of Wellington wish to submit this report as part of their odour modelling, this method is required any time after February 1, 2019.

The emission rate estimates for each source of significant contaminants are documented in Table 2 – Source Summary Table. All the emission rates listed in Table 2 correspond to the operating scenario where all sources are operating simultaneously at their individual maximum rates of production. Therefore, these emission rate estimates listed in Table 2 – Source Summary Table, are not likely to be an underestimate of the actual emission rates.

A POI concentration for each contaminant emitted from the Site was calculated based on the calculated emission rates and the output from the model; the results are presented in Table 4 – Emissions Summary Table.

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9.0 Limitations and Use of Report

R. J. Burnside & Associates Limited (Burnside) has completed this report in accordance with generally accepted standards and practices. The conclusions and recommendations in this report are professional opinions based upon our understanding of anticipated Site conditions at the time of this assessment. To the best of our knowledge, the information contained in our report is accurate however Burnside does not guarantee the accuracy and reliability of the information provided by other persons or agencies. Burnside is not responsible for environmental concerns that are not visible or otherwise disclosed to us.

This report was prepared for the exclusive use of James Keating Construction Ltd. and the Ministry of the Environment, Conservation and Parks. Any use or reliance on or decisions based on this report by a third party, are the responsibility of such third parties. Burnside accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.



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Tables

Table 1:
Sources and Contaminants Identification Table
(Rev1)

Source Information			Expected Contaminants	Significant	
Process ID	Unit Name	Stack IDs	Contaminants	Yes or No?	Rate / Rationale
A-01	Garbage Bin	AREA1, AREA2, AREA3, AREA4, AREA5, AREA6, AREA7, AREA8, AREA9	Odour	Yes	1.022 E02 OU/s
A-02	Recycle Bin		N/A	No	No Odour
A-03	Scrap Metal Bins		N/A	No	No Odour

Source ID	Source Description	General Location	Contaminants	Yes or No?	Rate / Rationale
AREA1	Garbage Bin		Odour	Yes	See A-01
AREA2	Garbage Bin		Odour	Yes	See A-01
AREA3	Garbage Bin		Odour	Yes	See A-01
AREA4	Garbage Bin		Odour	Yes	See A-01
AREA5	Garbage Bin		Odour	Yes	See A-01
AREA6	Garbage Bin		Odour	Yes	See A-01
AREA7	Garbage Bin		Odour	Yes	See A-01
AREA8	Garbage Bin		Odour	Yes	See A-01
AREA9	Garbage Bin		Odour	Yes	See A-01

MSDS	Supplier	Product	Contaminants	Yes or No?	Rate / Rationale
4	Odour	Odour		Yes	

CAS#	Contaminant Name	Yes or No?	Rate / Rationale
------	------------------	------------	------------------

Source Summary Table by Stack ID

Source ID	Description	Volumetric Emission Rate (m ³ /s)	Emission Temperature (K)	Stack Dimensions (dia. or X by Y) (m)	Emission Height above Grade (m)	Height above or below Building Roof (m)	Stack Location X	Stack Location Y	CAS	Contaminant Name	Averaging Period (h)	Estimation Method	Accuracy	Emission Rate (g/s)	Percent of total Emission (%)
AREA1	Garbage Bin	0.00047195	293.15	6.10 x 2.44	2.4384	2.4384	546599.326	4838542.67	0-02-2	Odour	24	ST	Above-Average	11.352177	11.11%
AREA2	Garbage Bin	0.00047195	293.15	6.10 x 2.44	2.4384	2.4384	546546.698	4838589.34	0-02-2	Odour	24	ST	Above-Average	11.352177	11.11%
AREA3	Garbage Bin	0.00047195	293.15	6.10 x 2.44	2.4384	2.4384	546592.283	4838550.13	0-02-2	Odour	24	ST	Above-Average	11.352177	11.11%
AREA4	Garbage Bin	0.00047195	293.15	6.10 x 2.44	2.4384	2.4384	546585.063	4838558.06	0-02-2	Odour	24	ST	Above-Average	11.352177	11.11%
AREA5	Garbage Bin	0.00047195	293.15	6.10 x 2.44	2.4384	2.4384	546576.611	4838566.16	0-02-2	Odour	24	ST	Above-Average	11.352177	11.11%
AREA6	Garbage Bin	0.00047195	293.15	6.10 x 2.44	2.4384	2.4384	546568.117	4838576.56	0-02-2	Odour	24	ST	Above-Average	11.352177	11.11%
AREA7	Garbage Bin	0.00047195	293.15	6.10 x 2.44	2.4384	2.4384	546561.602	4838589.76	0-02-2	Odour	24	ST	Above-Average	11.352177	11.11%
AREA8	Garbage Bin	0.00047195	293.15	6.10 x 2.44	2.4384	2.4384	546542.559	4838592.94	0-02-2	Odour	24	ST	Above-Average	11.352177	11.11%
AREA9	Garbage Bin	0.00047195	293.15	6.10 x 2.44	2.4384	2.4384	546538.509	4838597.52	0-02-2	Odour	24	ST	Above-Average	11.352177	11.11%

Table 2/2/2016:
Source Summary Table - Contaminant
(Rev1)

Source Summary Table by Contaminant

CAS	Contaminant Name	Averaging Period (h)	Source ID	Description	Volumetric Emission Rate (m3/s)	Emission Temperature (K)	Stack Dimensions (dia. or X by Y) (m)	Emission Height above Grade (m)	Height above or below Building Roof (m)	Stack Location X	Stack Location Y	Estimation Method	Accuracy	Emission Rate (g/s)	Percent of total Emission (%)
0-02-2	Odour	24	AREA1	Garbage Bin	0.00047195	293.15	6.10 x 2.44	2.4384	2.4384	546599.326	4838542.67	ST	Above-Average	11.352177	11.11%
			AREA2	Garbage Bin	0.00047195	293.15	6.10 x 2.44	2.4384	2.4384	546546.698	4838589.34	ST	Above-Average	11.352177	11.11%
			AREA3	Garbage Bin	0.00047195	293.15	6.10 x 2.44	2.4384	2.4384	546592.283	4838550.13	ST	Above-Average	11.352177	11.11%
			AREA4	Garbage Bin	0.00047195	293.15	6.10 x 2.44	2.4384	2.4384	546585.063	4838558.06	ST	Above-Average	11.352177	11.11%
			AREA5	Garbage Bin	0.00047195	293.15	6.10 x 2.44	2.4384	2.4384	546576.611	4838566.16	ST	Above-Average	11.352177	11.11%
			AREA6	Garbage Bin	0.00047195	293.15	6.10 x 2.44	2.4384	2.4384	546568.117	4838576.56	ST	Above-Average	11.352177	11.11%
			AREA7	Garbage Bin	0.00047195	293.15	6.10 x 2.44	2.4384	2.4384	546561.602	4838589.76	ST	Above-Average	11.352177	11.11%
			AREA8	Garbage Bin	0.00047195	293.15	6.10 x 2.44	2.4384	2.4384	546542.559	4838592.94	ST	Above-Average	11.352177	11.11%
			AREA9	Garbage Bin	0.00047195	293.15	6.10 x 2.44	2.4384	2.4384	546538.509	4838597.52	ST	Above-Average	11.352177	11.11%

Table 3:
Dispersion Modeling Input Summary Table
(Rev1)

Relevant Section of the Regulation	Section Title	Description of How the Approved Dispersion Model Was Used
Section 6	Air Dispersion Model(s)	Regional Met Data by MECP v16216r AERMET v16216r (incl. in Met Data) AERMAP v11103 AERMOD version v16216r
Section 8	Negligible sources	The sources deemed negligible are discussed in the application document in Section 3 and Appendix EB.
Section 9	Same Structure contamination	Not applicable.
Section 10	Operating Conditions	See Section 4 and Appendix EA of the Application
Section 11	Source of Contaminant Emission rates	See Section 3 and Appendix EA of the Application
Section 12	Combined effect of Assumptions for Operating Conditions and Emission Rates	Not applicable (no values exceed their respective criterion)
Section 13	Meteorological Conditions	The Preprocessed Meteorological Data issued by the MECP titled "Rural - Crops" (AERMOD v16216r) was used.
Section 14	Area of Modelling Coverage	The entire grid specified by Section 14 of O.Reg.419/05 is used.
Section 15	Stack Height for Certain New Sources of Contaminant	No stack heights in this model (actual or modelled) exceed the restriction in Section 15 of O.Reg 419/05
Section 16	Terrain Data	Terrain elevation contour data used was downloaded from the MECP website http://www.applications.ene.gov.on.ca/archive/dem/index.html
Section 17	Averaging Periods	Emission rates were calculated based on averaging periods that matched the averaging period of the respective criterion. See Section 6.7, Appendix EA and Appendix EC.

Table 4:
Emissions Summary Table
(Rev1)

CAS#	Contaminant	Total Emission Rate (g/s)	Dispersion Model Used	Max POI Value ($\mu\text{g}/\text{m}^3$)	Location of		Averaging Period Modelled (h)	Averaging Period of Criterion (h)	Max POI Value Converted to Criterion Period ($\mu\text{g}/\text{m}^3$)	Criteria ($\mu\text{g}/\text{m}^3$)	Limiting Effect	Regulation Schedule #	Percentage of Criteria or Likelihood of adverse effect (%)
					X (m)	Y (m)							
0-02-2	Odour	102.16959	AERMOD-m	0.99	546510	4838569	24	24	0.99	1	0	Suggested	99.0%



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Figures

Figures

Elora Waste Station

Figure 1: Site Location Plan

Legend



Alma

Spier

Shands

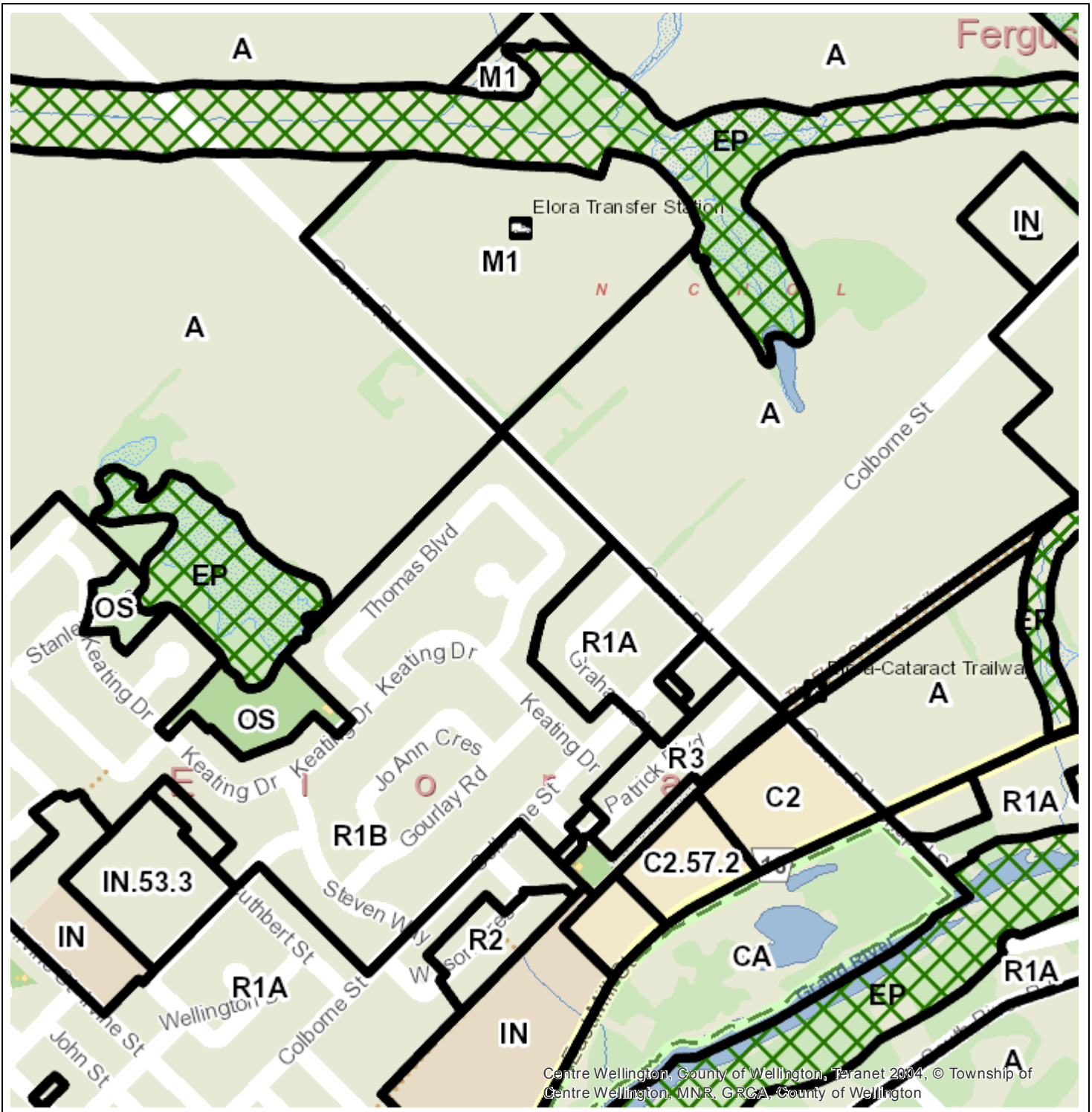
Eergus

Ainley Subdivision 043184

Salem






Elora



Ennotville



Centre Wellington, County of Wellington, Teranet 2004, © Township of Centre Wellington, MNR, GRCA, County of Wellington

Legend

-  Land not subject to By-Law 2009-045
-  Zone Boundaries
- Flood Line**
-  Floodplain
-  Flood Fringe
-  EP Zone Boundaries

0 0.1 0.2km
1:8,244
Date: 2018-09-24

Ainley Subdivision Zoning map

Data provided herein is derived from sources with varying levels of accuracy and currency. This is not a survey product. The Township of Centre Wellington disclaims all responsibility for the accuracy or completeness of information contained herein. The Township of Centre Wellington assumes no responsibility for errors arising from use of these mapping products. All rights reserved. May not be reproduced without permission.
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Elora Waste Station

Figure 3: Site Plan

Legend





O05

O04

O06

O03

O02

O01





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Appendix A

Supporting Calculations

Appendix A Supporting Calculations

1.0	Usage Rates	A 1
2.0	Equipment Emissions	A 1
2.1	Garbage Bins, AREA1 through AREA9	A 1

1.0 Usage Rates

Please see Table 1 for maximum usage rates corresponding to the operating conditions that would result in the maximum emission rate in accordance with s.10 and s.11 of O. Reg. 419/05.

2.0 Equipment Emissions

2.1 Garbage Bins, AREA1 through AREA9

Garbage Bins hold garbage provided by residents. Currently, the bins are located on the southwest side of the staging area.

The emission calculations for this source are shown on Table A-01: Odour Emissions From Garbage Bins.

Methodology: Emission Factor (EF)

The emission of odour from garbage bins is a common occurrence at waste transfer stations.

A more detailed description of the bins and their location is provided in Section 1.3 of the report.

The "Report for an Emission Testing Program for Region of Peel", Pinchin Environmental, 2005 did a detailed study of the odour from the Peel Waste transfer station. To be conservative, the following adjustments were included:

- The maximum odour content measured was used instead of the average. The two measured values were 8.37 and 4.43 OU/s (page 12 of 20). Therefore, the value used is significantly larger than the other value or the average.
- The worst-case scenario described in Section 1.3 assumes every garbage bin location is filled with a garbage and emitting the maximum odour above.

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- The scenario above only happens once a week and then only if the Site experiences a large amount of traffic on that day. Normal operation (Tuesday and Thursday) will not experience this level of potential.

The Pinchin study provides emission rates for both the exposed surface area and mass of the waste. In this case, the area is more reasonable because of surface area for evaporation is how the odour is emitted. At a waste transfer station, more odour is emitted when the waste is disturbed, whereupon the mass can become more relevant.

Bins are likely to give off less odour since odorous compounds will drain to the bottom where they are not available for evaporation due to a lack of contact with moving air.

The Pinchin Study also indicates that they heated the waste to simulate the higher emissions of the waste during the summer. This higher rate is used throughout the year in the simulations.

The MECP's technical bulletin "Methodology for Modelling Assessments of Contaminants with 10-Minute Averaging Standards and Guidelines under O.Reg. 419/05" indicates that it is not directly applicable to mixed odours but is the only published guidance on odours and the removal of 0.1 % of the top values is generally accepted by MECP. This removal was not done so the contours provided are conservative.

Sample Calculation:

Source Mass [SM]:	1.17	tonne
Source Area [SA]:	18.1	m ²
Source Odour [SO]:	8.37	OU
Bin Length [L]:	20	ft
Bin Length [L]:	6.096	m
Bin Width [W]:	8	ft
Bin Width [W]:	2.4384	m
Bin Height [H]:	8	ft
Bin Height [H]:	2.4384	m
Odour emission [OE=SO/SA]	0.46243094	OU/m ²
Conversion Factor so Model shows 10-min Avg:	1.65151434	
Modelled Odour emission [MOE]:	0.76371133	OU/m ²
Bin Area [BA=L x W]:	14.86	m ²
Number of Bins [n]:	9	
Overall Site Emission Rate [OSER = BA x n x MOE]:	102.16959	ou/s

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The green highlighted value is the value modelled in AERMOD since it requires emission rate input in OU/m². The overall Site emission is provided so the reader can check the overall emission rate shown in Table 4.

Data Quality: Average

Data quality for this calculation is best characterized by the following paragraph from Section 8.3.3 of the ESDM Procedure Document titled “Average Data Quality” Emission Estimating Techniques states:

Partially Validated Source Testing at One Specific Operating Condition: emission rate estimates that are from source testing where the testing has only been partially validated (e.g., pre-test plan approval or post-testing assessment and documentation, by a regulatory agency, of the quality of the final source testing report) at a specific operating condition are anticipated to provide an average data quality estimate of emission rates.

While the data was validated, it was validated for a different facility with a similar source of garbage.

Operating Condition, Individual Maximum Rates of Production:

The emission rate calculations for these sources are based on the conservative worst case assumptions from a similar site.



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Appendix B

Weather Data

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Supporting Information for Assessment of Negligibility
September 24, 2018

Appendix B

Supporting Information for Assessment of Negligibility

All Sources of odour were simulated. Recycle bins were not odorous.

Station Name ELORA RCS
 Province ONTARIO
 Current Station O Environment and Climate Change Canada - Meteorological Service of Canada
 Latitude 43.65
 Longitude -80.42
 Elevation 376.4
 Climate Identifier 6142286
 WMO Identifier 71352
 TC Identifier ZEL

All times are specified in Local Standard Time (LST). Add 1 hour to adjust for Daylight Saving Time where and when it is observed.

Legend

E Estimated
 M Missing
 NA Not Available

Date/Time	Year	Month	Day	Time	Temp (°C)	Dew Point Temp (°C)	Rel Hum (%)	Wind Dir (10s deg)	Wind Spd (km/h)	Stn Press (kPa)	Weather	Kitchener Weather
9/8/2018 0:00	2018	9	8	0:00	14.2	8.1	67	4	13	97.99	NA	NA
9/8/2018 1:00	2018	9	8	1:00	13.9	7.3	64	3	14	97.96	NA	NA
9/8/2018 2:00	2018	9	8	2:00	14.1	7.1	63	4	17	97.93	NA	NA
9/8/2018 3:00	2018	9	8	3:00	13.3	8.4	72	4	19	97.93	NA	NA
9/8/2018 4:00	2018	9	8	4:00	12.3	8.9	80	5	19	97.96	NA	NA
9/8/2018 5:00	2018	9	8	5:00	11.5	8.7	83	5	17	97.98	NA	NA
9/8/2018 6:00	2018	9	8	6:00	10.9	8.3	84	5	20	98.00	NA	NA
9/8/2018 7:00	2018	9	8	7:00	10.9	7.9	82	5	20	98.07	NA	NA
9/8/2018 8:00	2018	9	8	8:00	12	6.7	70	6	21	98.09	NA	NA
9/8/2018 9:00	2018	9	8	9:00	12.3	5	61	7	21	98.12	NA	NA
9/8/2018 10:00	2018	9	8	10:00	13	5.1	59	7	21	98.16	NA	NA
9/8/2018 11:00	2018	9	8	11:00	13.5	4.3	54	7	20	98.13	NA	NA
9/8/2018 12:00	2018	9	8	12:00	14.1	3.5	49	9	17	98.09	NA	NA
9/8/2018 13:00	2018	9	8	13:00	14.7	3.2	46	7	17	98.07	NA	NA
9/8/2018 14:00	2018	9	8	14:00	14.7	4.7	51	8	14	98.04	NA	NA
9/8/2018 15:00	2018	9	8	15:00	14.7	3.3	46	10	15	98.01	NA	NA
9/8/2018 16:00	2018	9	8	16:00	14.6	4.3	50	7	13	98.01	NA	NA
9/8/2018 17:00	2018	9	8	17:00	14	4	51	7	16	97.98	NA	NA
9/8/2018 18:00	2018	9	8	18:00	12.6	5.9	64	6	9	97.97	NA	NA
9/8/2018 19:00	2018	9	8	19:00	10.8	5.5	70	5	11	97.96	NA	NA
9/8/2018 20:00	2018	9	8	20:00	10.2	5.5	73	5	12	97.99	NA	NA
9/8/2018 21:00	2018	9	8	21:00	9.2	5.4	77	5	12	97.99	NA	NA
9/8/2018 22:00	2018	9	8	22:00	8.2	5.3	82	5	10	98.02	NA	NA
9/8/2018 23:00	2018	9	8	23:00	8	5.2	83	6	10	98.00	NA	NA
9/9/2018 0:00	2018	9	9	0:00	8.3	5	80	5	13	97.98	NA	NA
9/9/2018 1:00	2018	9	9	1:00	8.8	4.4	74	6	16	97.98	NA	NA
9/9/2018 2:00	2018	9	9	2:00	8.7	4	72	7	17	97.93	NA	NA
9/9/2018 3:00	2018	9	9	3:00	9.1	3.4	68	7	19	97.88	NA	NA
9/9/2018 4:00	2018	9	9	4:00	8.6	3.6	71	7	19	97.88	NA	NA
9/9/2018 5:00	2018	9	9	5:00	8.3	3.6	72	6	19	97.86	NA	NA
9/9/2018 6:00	2018	9	9	6:00	8.4	3.7	72	7	17	97.85	NA	NA
9/9/2018 7:00	2018	9	9	7:00	8.6	4.1	73	6	19	97.81	NA	NA
9/9/2018 8:00	2018	9	9	8:00	9.6	4.7	72	6	23	97.86	NA	NA
9/9/2018 9:00	2018	9	9	9:00	10.7	6.2	74	7	23	97.86	NA	NA
9/9/2018 10:00	2018	9	9	10:00	11.8	7.7	76	8	25	97.87	NA	NA
9/9/2018 11:00	2018	9	9	11:00	12.1	7.4	73	8	24	97.86	NA	NA
9/9/2018 12:00	2018	9	9	12:00	13.3	8.8	74	9	29	97.82	NA	NA
9/9/2018 13:00	2018	9	9	13:00	14.3	9.5	73	9	28	97.80	NA	NA
9/9/2018 14:00	2018	9	9	14:00	14.4	9	70	10	29	97.78	NA	NA
9/9/2018 15:00	2018	9	9	15:00	14.2	8.9	70	9	32	97.76	NA	NA
9/9/2018 16:00	2018	9	9	16:00	14.1	8.3	68	8	30	97.74	NA	NA
9/9/2018 17:00	2018	9	9	17:00	13.4	7.5	68	9	28	97.76	NA	NA
9/9/2018 18:00	2018	9	9	18:00	12.6	6.8	67	8	23	97.73	NA	NA
9/9/2018 19:00	2018	9	9	19:00	11.3	5.4	67	7	20	97.73	NA	NA
9/9/2018 20:00	2018	9	9	20:00	10.7	4.5	65	8	19	97.75	NA	NA
9/9/2018 21:00	2018	9	9	21:00	10	4.5	69	8	17	97.70	NA	NA
9/9/2018 22:00	2018	9	9	22:00	9.4	4.7	73	7	15	97.70	NA	NA
9/9/2018 23:00	2018	9	9	23:00	9.9	5.6	75	8	18	97.65	NA	NA
9/10/2018 0:00	2018	9	10	0:00	11.9	7.5	74	8	22	97.62	NA	Rain
9/10/2018 1:00	2018	9	10	1:00	11.3	7.9	79	8	21	97.52	NA	Rain
9/10/2018 2:00	2018	9	10	2:00	10.5	8.4	87	8	14	97.53	NA	Moderate Rain
9/10/2018 3:00	2018	9	10	3:00	10.6	9.5	93	8	23	97.38	NA	Rain
9/10/2018 4:00	2018	9	10	4:00	11.5	10.6	94	9	23	97.35	NA	Rain,Fog

Station Name ELORA RCS
 Province ONTARIO
 Current Station O Environment and Climate Change Canada - Meteorological Service of Canada
 Latitude 43.65
 Longitude -80.42
 Elevation 376.4
 Climate Identifier 6142286
 WMO Identifier 71352
 TC Identifier ZEL

All times are specified in Local Standard Time (LST). Add 1 hour to adjust for Daylight Saving Time where and when it is observed.

Legend

E Estimated
 M Missing
 NA Not Available

Date/Time	Year	Month	Day	Time	Temp (°C)	Dew Point Temp (°C)	Rel Hum (%)	Wind Dir (10s deg)	Wind Spd (km/h)	Stn Press (kPa)	Weather	Kitchener Weather
9/10/2018 5:00	2018	9	10	5:00	11.8	11	95	9	25	97.3	NA	Rain
9/10/2018 6:00	2018	9	10	6:00	12	11.2	95	9	28	97.26	NA	Rain,Fog
9/10/2018 7:00	2018	9	10	7:00	12.1	11.3	95	9	29	97.25	NA	NA
9/10/2018 8:00	2018	9	10	8:00	12.3	11.5	95	9	26	97.26	NA	Rain,Fog
9/10/2018 9:00	2018	9	10	9:00	11.9	11	94	9	32	97.24	NA	Rain,Fog
9/10/2018 10:00	2018	9	10	10:00	12.1	11.4	95	10	32	97.21	NA	Rain,Fog
9/10/2018 11:00	2018	9	10	11:00	12.2	11.3	94	10	26	97.18	NA	Rain,Fog
9/10/2018 12:00	2018	9	10	12:00	12	10.8	93	10	28	97.15	NA	Fog
9/10/2018 13:00	2018	9	10	13:00	11.6	10.4	93	9	23	97.12	NA	Rain,Fog
9/10/2018 14:00	2018	9	10	14:00	11.7	10.6	93	8	21	97.09	NA	Rain,Fog
9/10/2018 15:00	2018	9	10	15:00	11.9	10.9	94	9	17	97.05	NA	Rain,Fog
9/10/2018 16:00	2018	9	10	16:00	12	11.1	94	9	18	97.02	NA	Rain,Fog
9/10/2018 17:00	2018	9	10	17:00	12	11.1	94	9	16	97.05	NA	Rain,Fog
9/10/2018 18:00	2018	9	10	18:00	12.1	11.3	95	9	12	97.06	NA	Rain,Fog
9/10/2018 19:00	2018	9	10	19:00	12.1	11.4	95	7	9	97.03	NA	Rain,Fog
9/10/2018 20:00	2018	9	10	20:00	12.4	11.7	95	7	11	97.07	NA	Rain,Fog
9/10/2018 21:00	2018	9	10	21:00	12.8	12.1	95	9	8	97.11	NA	Fog
9/10/2018 22:00	2018	9	10	22:00	12.9	12.3	96	3	2	97.14	NA	Fog
9/10/2018 23:00	2018	9	10	23:00	13	12.4	96	34	4	97.17	NA	Fog
9/11/2018 0:00	2018	9	11	0:00	13	12.4	96	33	5	97.2	NA	Fog
9/11/2018 1:00	2018	9	11	1:00	13	12.5	96	1	7	97.21	NA	Fog
9/11/2018 2:00	2018	9	11	2:00	13.3	12.7	96	34	6	97.23	NA	Fog
9/11/2018 3:00	2018	9	11	3:00	13.2	12.6	96	35	7	97.26	NA	Fog
9/11/2018 4:00	2018	9	11	4:00	13	12.3	96	33	8	97.32	NA	Fog
9/11/2018 5:00	2018	9	11	5:00	12.9	12.1	95	34	11	97.37	NA	NA
9/11/2018 6:00	2018	9	11	6:00	12.6	11.5	93	36	14	97.45	NA	NA
9/11/2018 7:00	2018	9	11	7:00	12.1	11.2	94	34	16	97.56	NA	NA
9/11/2018 8:00	2018	9	11	8:00	12.9	11.5	91	35	11	97.6	NA	NA
9/11/2018 9:00	2018	9	11	9:00	14	12	88	35	10	97.65	NA	NA
9/11/2018 10:00	2018	9	11	10:00	15.2	12.2	82	1	12	97.7	NA	NA
9/11/2018 11:00	2018	9	11	11:00	16	12.4	79	1	12	97.72	NA	NA
9/11/2018 12:00	2018	9	11	12:00	18.1	12.2	68	1	9	97.73	NA	NA



BURNSIDE

[THE DIFFERENCE IS OUR PEOPLE]

Appendix C

Dispersion Modelling Printouts

Modelling Input Values Table C-1
Contour Plot of Maximum Concentrations for Odour Figure C1
Contour Plot of Maximum Concentrations for Odour Figure C2
(expanded view)

Appendix C

Dispersion Modelling

1.0 Odour C 1

The property boundary points and all the building coordinates are listed in Table C-1. The emission rates organized by emission point are found in Table 2-1. The emission rates organized by contaminant are found in Table 2-2. Selected pages from the simulation output file for nitrogen oxides are shown at the end of this Appendix.

1.0 Odour

All contaminant simulations were done using Lakes' AERMOD View interface. The first highest predicted values are reported in Table 4.

This simulation uses a set of receptors centred on the garbage bins which are the source of odours at the Site. This contaminant was run as a single-contaminant simulation. The odour emissions are predicted from the maximum number of bins on Site. The first highest predicted values are reported in Table 4.

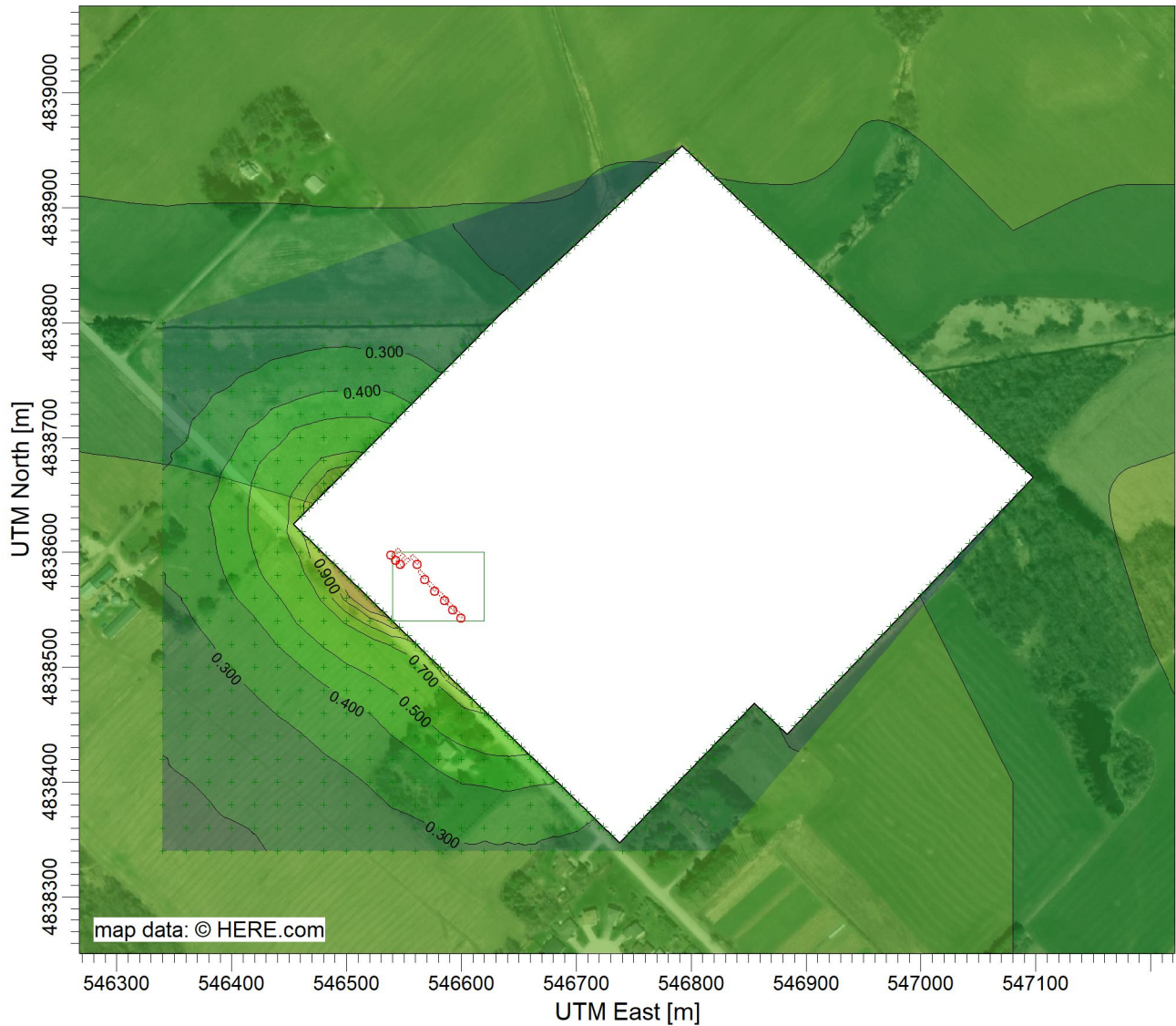
A contour plot showing the first highest values at all locations is shown in this Appendix labelled Figure C1. An expanded view showing only the section nearest the road is shown in Figure C2.

Table C-1:
Modelling Input Values
(Rev1)

Property Coordinates	UTM Coordinates	
	X (m)	Y (m)
Property Boundary	546457.3	4838625.2
Property Boundary	546732.3	4838352.6
Property Boundary	546850.7	4838464.0
Property Boundary	546616.9	4838776.9

PROJECT TITLE:

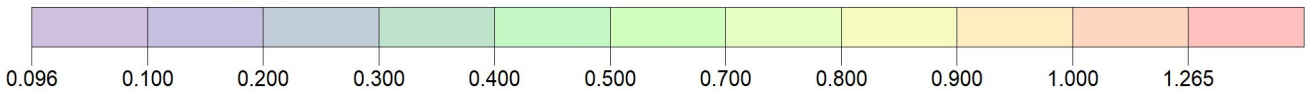
Figure C1: Maximum Off-Property Odour Contours for 9 bins.



PLOT FILE OF HIGH 1ST HIGH 1-HR VALUES FOR SOURCE GROUP: ALL

OU/M**3

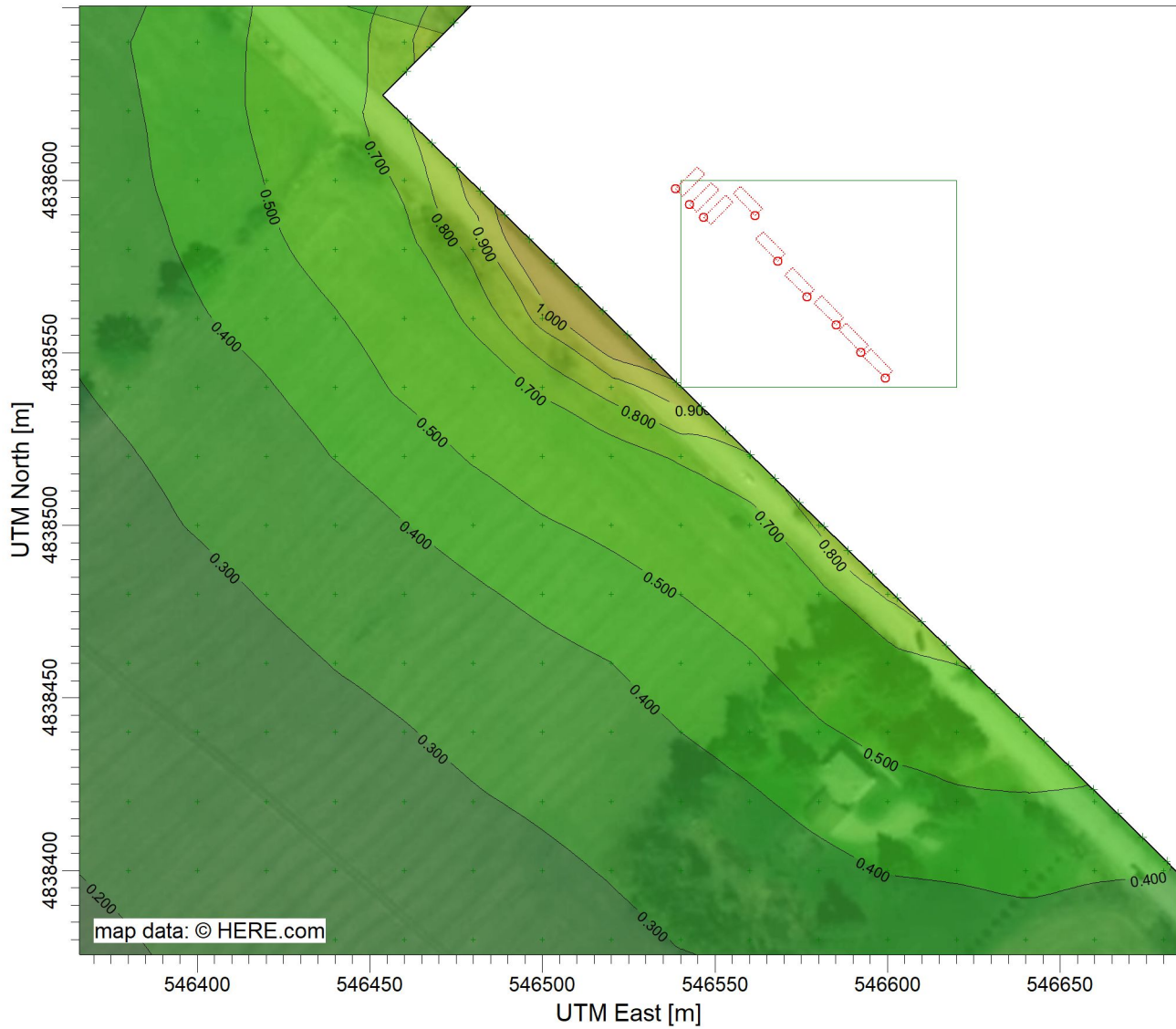
Max: 1.265 [OU/M**3] at (546510.49, 4838569.15)



<p>COMMENTS:</p> <p>Figure C1: Maximum Off-Property Odour Contours for 9 bins.</p>	<p>SOURCES:</p> <p>9</p>	<p>COMPANY NAME:</p>	
	<p>RECEPTORS:</p> <p>783</p>	<p>MODELER:</p>	
	<p>OUTPUT TYPE:</p> <p>Concentration</p>	<p>SCALE:</p> <p>1:6,000</p>	
	<p>MAX:</p> <p>1.265 OU/M**3</p>	<p>DATE:</p> <p>9/20/2018</p>	

PROJECT TITLE:

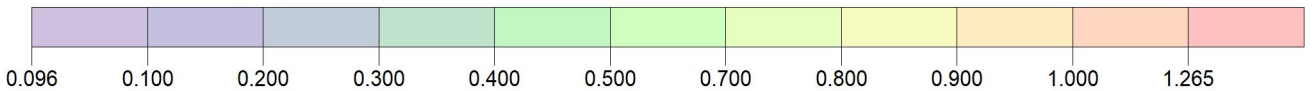
Figure C2: Maximum Off-Property Odour Contours for 9 bins Closeup



PLOT FILE OF HIGH 1ST HIGH 1-HR VALUES FOR SOURCE GROUP: ALL

OU/M**3

Max: 1.265 [OU/M**3] at (546510.49, 4838569.15)



<p>COMMENTS:</p> <p>Figure C1: Maximum Off-Property Odour Contours for 9 bins.</p>	<p>SOURCES:</p> <p>9</p>	<p>COMPANY NAME:</p>	
	<p>RECEPTORS:</p> <p>783</p>	<p>MODELER:</p>	
	<p>OUTPUT TYPE:</p> <p>Concentration</p>	<p>SCALE:</p> <p>1:2,000</p>	
	<p>MAX:</p> <p>1.265 OU/M**3</p>	<p>DATE:</p> <p>9/20/2018</p>	