

Emission Summary and Dispersion Modelling Report for a Cremation Facility



In Support of an ECA Application

2020-10-16

Prepared for:
Dryden Community Funeral Home Ltd.

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CAMBIUM INC.
866.217.7900
cambium-inc.com

Peterborough | Barrie | Oshawa | Kingston



Version Control

Revision	Date	Revision Description	Prepared By:	Submitted To:
DRAFT	June 28, 2019	Draft Emission Summary and Dispersion Modelling Report for Review	Cambium Inc.	Dryden Community Funeral Home Ltd.
Final	October 16, 2020	Revised Emission Summary and Dispersion Modelling Report for current modelling requirements and surrounding area	Cambium Inc.	Dryden Community Funeral Home Ltd.

Emission Summary and Dispersion Modelling Report Checklist

Company Name

Dryden Community Funeral Home Ltd.

Company Address

Unit Number	Street Number	Street Name	PO Box
	249	Grand Trunk Ave.	
City/Town	Province		Postal Code
Dryden	Ontario		P8N 2X3

Location of Facility

249 Grand Trunk Ave., Dryden, ON.

The attached Emission Summary and Dispersion Modeling Report was prepared in accordance with s. 26 of O. Reg. 419/05 and the guidance in the MOE document "Procedure for Preparing an Emission Summary and Dispersion Modelling Report" dated March 2009 and "Air Dispersion Modelling Guideline for Ontario" dated March 2009 and the minimum required information identified in the check-list on the reverse of this sheet has been submitted.

Company Contact
Company Contact

Dryden Community Funeral Home Ltd.

Company Contact Name

Last Name	First Name	Middle Initial
Jonassen	Kayla	

Title

Funeral Director/Administration

Telephone Number

807 221-3000

Signature
Date (yyyy/mm/dd)
Technical Contact
Technical Contact

Cambium Inc.

Technical Contact Name

Last Name	First Name	Middle Initial
Bachynski	Sadie	

Representing

Dryden Community Funeral Home Ltd.

Telephone Number

705 742-7900

Signature

Date (yyyy/mm/dd)

2020/10/16

* This checklist is taken from the document titled "Procedure for Preparing an Emission Summary and Dispersion Modelling Report" dated March 2009.

Emission Summary and Dispersion Modelling Report Checklist

	Required Information	Submitted	Explanation/Reference
	Executive Summary and Emission Summary Table		
	1.1 Overview of ESDM Report	☒ Yes	
	1.2 Emission Summary Table	☒ Yes	
1.0	Introduction and Facility Description		
	1.1 Purpose and Scope of ESDM Report (when report only represents a portion of facility)	☒ Yes	
	1.2 Description of Processes and NAICS code(s)	☒ Yes	
	1.3 Description of Products and Raw Materials	☒ Yes	
	1.4 Process Flow Diagram	☒ Yes	
	1.5 Operating Schedule	☒ Yes	
2.0	Initial Identification of Sources and Contaminants		
	2.1 Sources and Contaminants Identification Table	☒ Yes	
3.0	Assessment of the Significance of Contaminants and Sources		
	3.1 Identification of Negligible Contaminants and Sources	☒ Yes	
	3.2 Rationale for Assessment	☒ Yes	
4.0	Operating Conditions, Emission Rate Estimating and Data Quality		
	4.1 Description of operating conditions, for each significant contaminant that results in the maximum POI concentration for that contaminant	☒ Yes	
	4.2 Explanation of Method used to calculate the emission rate for each contaminant	☒ Yes	
	4.3 Sample calculation for each method	☒ Yes	
	4.4 Assessment of Data Quality for each emission rate	☒ Yes	
5.0	Source Summary Table and Property Plan		
	5.1 Source Summary Table	☒ Yes	
	5.2 Site Plan (scalable)	☒ Yes	
6.0	Dispersion Modelling		
	6.1 Dispersion Modelling Input Summary Table	☒ Yes	
	6.2 Land Use Zoning Designation Plan	☒ Yes	
	6.3 Dispersion Modelling Input and Output Files	☒ Yes	
7.0	Emission Summary Table and Conclusions		
	7.1 Emission Summary Table	☒ Yes	
	7.2 Assessment of Contaminants with no MOE POI Limits	☒ Yes	
	7.3 Conclusions	☒ Yes	
	Appendices (Provide supporting information or details such as...)		
	See attached report	☒ Yes	
		☐ Yes	
		☐ Yes	



Executive Summary

The Dryden Community Funeral Home Ltd. facility complies with Ontario Regulation 419/05: *Air Pollution – Local Air Quality*. The modelling and calculations completed by Cambium Inc. (Cambium) demonstrate that the predicted point of impingement (POI) concentrations of process contaminants emitted at the Dryden Community Funeral Home Ltd. facility do not exceed the Ministry of the Environment, Conservation and Parks (the Ministry) prescribed limits at any of the required points of reception modelled.

Cambium has prepared this Emission Summary and Dispersion Modelling (ESDM) Report to support an application for an Environmental Compliance Approval consistent with section 26 of O. Reg. 419/05. This ESDM report follows the guidance provided in *Guideline A-10: Procedure for Preparing an ESDM Report* (The ESDM Procedure Document) (MOECC, 2019a).

Dryden Community Funeral Home Ltd. is proposing to operate a facility for the interment of human and small animal remains, and cremation of the deceased. Currently the Dryden Community Funeral Home Ltd. facility provides funeral services only. This facility is located at 249 Grand Truck Avenue, in Dryden, Ontario in an area zoned for commercial use and is adjacent to residential land use. The main processes consist of the preparation of the deceased for burial or interment (including embalming) off-site, and conducting funerals. The North American Industrial Classification System (NAICS) code that best applies to this facility is 812220 (Cemeteries and Crematoria).

All approvals are subject to section 20 of O. Reg. 419/05 as of February 2020. Therefore, Cambium has assessed compliance of the Dryden Community Funeral Home Ltd. facility using section 20 standards of O. Reg. 419/05 and the applicable limits listed in the *Air Contaminants Benchmarks List (ACBv2)* (MOECC, 2019b). We have modelled the impact of the contaminant emissions using the United States Environmental Protection Agency (USEPA) AERMOD dispersion model with the applicable time averaged maximum POI concentrations.

Cambium has found the significant sources of contaminant emissions from the Dryden Community Funeral Home Ltd. facility include the exhaust points of the two proposed cremator units and the exhaust servicing the embalming activities. The sources and contaminants we



have considered negligible consistent with section 8 of O. Reg. 419/05 include the internally vented dust collection system for the cremains grinder, chemicals used at room temperature (i.e. not heated) with vapour pressures less than 1 kPa; general building ventilation, and the comfort heating equipment

The Dryden Community Funeral Home Ltd. facility is expected to emit a number of contaminants with guidelines or screening levels in the ACBv2. Products of combustion, volatile compounds, and particulates are the major contaminant groups emitted at the Dryden Community Funeral Home Ltd. site. Cambium has not identified any contaminants significantly released by the Dryden Community Funeral Home Ltd. facility that are not found in ACBv2

Cambium calculated the emission rates of all contaminants at the operating conditions that would result in their maximum rate of emission, which is consistent with section 11 of O. Reg. 419/05. Our data quality assessment of the calculations follows the criteria defined in The ESDM Procedure Document. We have presented the predicted POI concentrations from the approved dispersion model in the following Emission Summary Table below consistent with section 26 of O. Reg. 419/05.



Table A Emission Summary Table

Contaminant	CAS #	Total Facility Emission Rate (g/s)	Averaging Period	Limiting Effect	Schedule	Ministry POI Limit (µg/m³)	Maximum AERMOD POI Concentration (µg/m³)	Percentage of Ministry POI Limit (%)
Acetaldehyde	75-07-0	1.09E-05	24 hour	Health	Standard	500	1.67E-03	0.00%
Acetaldehyde	75-07-0	1.09E-05	24 hour	URT	URT	5000	1.67E-03	0.00%
Acetaldehyde	75-07-0	1.09E-05	30 minute	Health	Standard	500	7.09E-03	0.00%
Antimony	7440-36-0	2.52E-06	24 hour	Health	Standard	25	3.85E-04	0.00%
Arsenic and compounds	7440-38-2	2.52E-06	24 hour	Health	Guideline	0.3	3.85E-04	0.13%
Barium - total water soluble	7440-39-3	2.02E-06	24 hour	Health	Guideline	10	3.09E-04	0.00%
Benzo(a)pyrene [as a surrogate of total Polycyclic Aromatic Hydrocarbons (PAHs)]	50-32-8	3.27E-09	24 hour	Health	DAV	0.005	5.02E-07	0.01%
Benzo(a)pyrene [as a surrogate of total Polycyclic Aromatic Hydrocarbons (PAHs)]	50-32-8	3.27E-09	24 hour	URT	URT	0.005	5.02E-07	0.01%
Benzo(a)pyrene [as a surrogate of total Polycyclic Aromatic Hydrocarbons (PAHs)]	50-32-8	3.27E-09	annual	Health	AAV	0.0001	3.86E-08	0.04%
Benzo(a)pyrene [as a surrogate of total Polycyclic Aromatic Hydrocarbons (PAHs)]	50-32-8	3.27E-09	annual	Health	Standard	0.00001	3.86E-08	0.39%
Beryllium and Beryllium Compounds	7440-41-7	1.18E-07	24 hour	Health	Standard	0.01	1.80E-05	0.18%
Cadmium and Cadmium Compounds	7440-43-9	9.24E-07	24 hour	Health	Standard	0.025	1.41E-04	0.56%
Cadmium and Cadmium Compounds	7440-43-9	9.24E-07	24 hour	URT	URT	0.25	1.41E-04	0.06%
Carbon monoxide	630-08-0	7.66E-02	30 minute	Health	Standard	6000	4.98E+01	0.83%
Chromium Compounds (hexavalent forms)	18540-29-9	1.13E-06	24 hour	Health	DAV	0.07	1.73E-04	0.25%
Chromium Compounds (hexavalent forms)	18540-29-9	1.13E-06	24 hour	URT	URT	0.07	1.73E-04	0.25%



Table A Emission Summary Table

Contaminant	CAS #	Total Facility Emission Rate (g/s)	Averaging Period	Limiting Effect	Schedule	Ministry POI Limit (µg/m ³)	Maximum AERMOD POI Concentration (µg/m ³)	Percentage of Ministry POI Limit (%)
Chromium Compounds (hexavalent forms)	18540-29-9	1.13E-06	annual	Health	AAV	0.0014	1.33E-05	0.95%
Chromium Compounds (hexavalent forms)	18540-29-9	1.13E-06	annual	Health	Standard	0.00014	1.33E-05	9.50%
Chromium Compounds (metallic, divalent and trivalent forms)	7440-47-3	2.51E-06	24 hour	Health	Standard	0.5	3.85E-04	0.08%
Chromium Compounds (metallic, divalent and trivalent forms)	7440-47-3	2.51E-06	24 hour	URT	URT	5	3.85E-04	0.01%
Cobalt	7440-48-4	1.47E-07	24 hour	Health	Guideline	0.1	2.25E-05	0.02%
Copper	7440-50-8	2.27E-06	24 hour	Health	Standard	50	3.46E-04	0.00%
Dioxins, Furans and Dioxin-like PCBs	N/A (diox)	1.71E-09	24 hour	Health	Standard	0.1	1.37E-08	0.00%
Dioxins, Furans and Dioxin-like PCBs	N/A (diox)	1.71E-09	24 hour	URT	URT	1	1.37E-08	0.00%
Fluorides (as HF) - Gaseous (Growing Season)	7664-39-3 (growing)	5.54E-05	24 hour	Vegetation	Standard	0.86	8.47E-03	0.99%
Fluorides (as HF) - Gaseous (Growing Season)	7664-39-3 (growing)	5.54E-05	30 day	Vegetation	Standard	0.34	1.28E-03	0.38%
Formaldehyde	50-00-0	2.92E-03	24 hour	Health	Standard	65	5.23E+00	8.05%
Formic acid	64-18-6	1.21E-04	24 hour	Health	Standard	500	2.20E-01	0.04%
Hydrogen chloride	7647-01-0	6.05E-03	24 hour	Health	Standard	20	9.25E-01	4.62%
Hydrogen chloride	7647-01-0	6.05E-03	24 hour	URT	URT	200	9.25E-01	0.46%
Lead and Lead Compounds	7439-92-1	5.54E-06	24 hour	Health	Standard	0.5	8.47E-04	0.17%
Lead and Lead Compounds	7439-92-1	5.54E-06	24 hour	URT	URT	2	8.47E-04	0.04%
Lead and Lead Compounds	7439-92-1	5.54E-06	30 day	Health	Standard	0.2	1.28E-04	0.06%
Mercury (Hg)	7439-97-6	2.86E-04	24 hour	Health	Standard	2.5	4.37E-02	1.75%



Table A Emission Summary Table

Contaminant	CAS #	Total Facility Emission Rate (g/s)	Averaging Period	Limiting Effect	Schedule	Ministry POI Limit ($\mu\text{g}/\text{m}^3$)	Maximum AERMOD POI Concentration ($\mu\text{g}/\text{m}^3$)	Percentage of Ministry POI Limit (%)
Methanol (Methyl alcohol)	67-56-1	4.09E-03	24 hour	Health	Standard	4000	7.46E+00	0.19%
Molybdenum	7439-98-7	1.40E-06	24 hour	Particulate	Guideline	120	2.14E-04	0.00%
Nickel and Nickel Compounds	7440-02-0	3.19E-06	24 hour	Health	DAV	2	4.89E-04	0.02%
Nickel and Nickel Compounds	7440-02-0	3.19E-06	24 hour	URT	URT	2	4.89E-04	0.02%
Nickel and Nickel Compounds	7440-02-0	3.19E-06	annual	Health	AAV	0.4	3.76E-05	0.01%
Nickel and Nickel Compounds	7440-02-0	3.19E-06	annual	Health	Standard	0.04	3.76E-05	0.09%
Nitrogen oxides	10102-44-0	1.66E-01	1 hour	Health	Standard	400	8.87E+01	22.17%
Nitrogen oxides	10102-44-0	1.66E-01	24 hour	Health	Standard	200	2.54E+01	12.68%
Perchloroethylene	127-18-4	2.31E-02	24 hour	Health	Standard	360	4.21E+01	11.69%
Perchloroethylene	127-18-4	2.31E-02	24 hour	URT	URT	3600	4.21E+01	1.17%
Phenol	108-95-2	4.05E-03	24 hour	Health	Standard	30	7.39E+00	24.64%
Phenol	108-95-2	4.05E-03	24 hour	URT	URT	300	7.39E+00	2.46%
Selenium	7782-49-2	3.70E-06	24 hour	Health	Guideline	10	5.66E-04	0.01%
Silver	7440-22-4	6.38E-07	24 hour	Health	Standard	1	9.76E-05	0.01%
Sulphur dioxide	7446-09-5	1.41E-02	1 hour	Health & Vegetation	Standard	790	7.54E+00	0.95%
Sulphur dioxide	7446-09-5	1.41E-02	1 hour	URT	URT	690	7.54E+00	1.09%
Sulphur dioxide	7446-09-5	1.41E-02	24 hour	Health & Vegetation	Standard	275	2.16E+00	0.78%
Sulphur dioxide	7446-09-5	1.41E-02	annual	Health & Vegetation	Standard	10	1.66E-01	1.66%



Table A Emission Summary Table

Contaminant	CAS #	Total Facility Emission Rate (g/s)	Averaging Period	Limiting Effect	Schedule	Ministry POI Limit ($\mu\text{g}/\text{m}^3$)	Maximum AERMOD POI Concentration ($\mu\text{g}/\text{m}^3$)	Percentage of Ministry POI Limit (%)
Suspended particulate matter (< 44 μm diameter)	N/A (tsp)	1.24E-02	24 hour	Visibility	Standard	120	1.90E+00	1.58%
Thallium	7440-28-0	7.16E-06	24 hour	Health	SL-JSL	0.5	1.09E-03	0.22%
Vanadium	7440-62-2	4.86E-06	24 hour	Health	Standard	2	7.43E-04	0.04%
Zinc	7440-66-6	2.94E-05	24 hour	Particulate	Standard	120	4.50E-03	0.00%

Notes:

¹ Benzo[a]pyrene (B[a]P) is a surrogate for all polycyclic aromatic hydrocarbons (PAHs). Therefore, the maximum modelled POI concentration of B[a]P was compared to the air standard, and because it meets the air standard all other PAHs which are emitted were considered to have negligible adverse effects. This methodology follows the guidance presented under note 7 of the ACB List (MOECC, 2018a).

² The air standard for dioxins, furans, and dioxin-like PCBs requires the calculation of the total toxicity equivalent (TEQ) concentration contributed by all dioxin-like compounds in the mixture. In accordance with subsection 1 (2.0.2) of O. Reg. 419/05, the following formula was used to calculate the total concentration of dioxins, furans and dioxin-like PCBs:

$$A = \sum (B \times C), \text{ where,}$$

A = the amount (or concentration) of total dioxins, furans and dioxin-like PCBs in TEQ,

B = the amount (or concentration) of each dioxin-like compound,

C = the corresponding TEF for each dioxin-like compound listed in Schedule 8 of O. Reg. 419/05.



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- Table 3 – Dispersion Modelling Input Summary Table
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- Appendix B – Assessment for Negligibility
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- Appendix E – Safety Data Sheets



1.0 Introduction and Facility Description

Either an Environmental Compliance Approval (ECA) or an Environmental Activity and Sector Registry (EASR) are required for a facility discharging a contaminant into any part of the natural environment, other than water. Businesses discharging to the air require an Emission Summary and Dispersion Modelling (ESDM) Report to demonstrate regulatory compliance, which is monitored through these environmental approvals.

Cambium Inc. (Cambium) has prepared this ESDM Report following the requirements of section 26 of Ontario Regulation 419/05: *Air Pollution – Local Air Quality*. Additionally, we have followed the guidance in *Guideline A-10: Procedure for Preparing an ESDM Report* (The ESDM Procedure Document) (MOECC, 2019a) as appropriate. The structure of this report corresponds with each of the items listed in the *ESDM Report Checklist* (MOECC, 2017a) attached to this report.

This introductory section provides a description of the facility as required by sub paragraph 1 of section 26(1) of O. Reg. 419/05.

1.1 Purpose and Scope of ESDM Report

All activities require an EASR unless they fall under the operations defined in section (2) subsection (2) of O. Reg. 1/17. The activities in this section apply to the Dryden Community Funeral Home Ltd. facility (the Facility) as it is part of a class identified by the North American Industry Classification System (NAICS) industry code 812220 (Cemeteries and Crematoria). Therefore, this ESDM Report was prepared to support an ECA application, which includes all sources of air emissions at the Facility.

The purpose of an ESDM report is to prove under Regulation 419/05 that all air emissions from the facility comply with the limits published in the regulation. Cambium is required to follow modelling requirement published by the Ministry to confirm that the predicted maximum ground level contaminant concentrations at any point beyond the property boundary are less than the prescribed standards. The standards are intended to show compliance under the intention of the Environmental Protection Act of Ontario, specifically proving that they are not expected to cause



an “adverse effect”. Therefore, at any location, including a property line of the proposed facility, contaminants may not be above the regulated concentration as set by the Ministry.

The Facility is a provider of funeral services and is proposing to also operate as a crematorium. The Facility is located at 249 Grand Truck Avenue, in Dryden, Ontario (the Site). The Site is located in an area zoned for commercial use with residential zoned areas nearby. The building is owned, operated, and solely inhabited by Dryden Community Funeral Home Ltd.

Cambium has presented the location of the Facility on Figure 1 – Site Location Plan, and the land use designation of the Site and surrounding area on Figure 2 – Land Use Zoning Designation Plan. The location of the discharge points for each source is illustrated on Figure 3 – Site Plan and Roof Layout, denoted by their corresponding assigned source identification codes.

1.2 Description of Processes and NAICS Code

The main processes at the Facility consists of the cremation and subsequent grinding of cremains. Cadavers may be embalmed prior to cremation as part of the funeral services offered. All other services offered do not contribute significantly to the air emissions because of the nature of the activities, and when compared to the overall emissions at the Site.

The NAICS industry code that best applies to the Facility 812220 (Cemeteries and Crematoria), which is part of NAICS subsector code 812 – Personal and Laundry Services.

1.3 Description of Products and Raw material

The Facility produces cremated and embalmed remains from human and animal cadavers. Air emissions are produced from the combustion of the natural gas heating the cremators, the volatilization and suspension of the materials from cadaver thermal decomposition, and the volatilization of the embalming chemicals.

The Facility operates the following significant equipment:

- Two C.B Combustion and Manufacturing Ltd. Thermogenic Series Cremation CU-150 Units.



- One natural gas heating unit.
- Two air handling units.
- One Walk-in Freezer.
- One Greenheck SP155 exhaust fan serving the embalming room.
- An internally dust controlled and ventilated remains grinder.

The product usages and process information are detailed in Appendix A – Supporting Calculations and Appendix B – Assessment for Negligibility. Table 1 – Sources and Contaminants Identification Table lists the individual sources of emissions at the Facility. Refer to Appendix C for the associated equipment specifications of the proposed cremation units and the embalming room exhaust.

1.4 Process Flow Diagram

Refer to Figure 4 – Process Flow Diagram for a graphical representation of the operational processes at the Facility.

1.5 Operating Schedule

The Facility is capable of operating 12 hours per day seven (7) days a week, 365 days a year. Operating hours are between 0700 and 1900 daily.

1.6 Facility Production Limit

The Facility is capable of processing four human and four pet cadavers in a production day. Emissions from cremated remains are based on emission factors developed for a cremation consisting of a total cadaver mass of 70 kg and a casket weighing 20 kg. Embalming production limits were not used in the emission calculations for the activity because of the small quantities used and the way they are applied. Instead, embalming emissions were based on a worst-case spill assumption of one of the products entirely spilling each operating day.

Cambium has estimated the emission rates for each process from their maximum relevant usage rate, which are detailed in Appendix A – Supporting Calculations.



2.0 Initial Identification of Sources and Contaminants

The following section provides an initial identification of all sources and contaminants emitted at the Facility, as required by sub paragraphs 2 through 5 of section 26(1) of O. Reg. 419/05.

Cambium has calculated metal compounds without specific

The *Air Contaminants Benchmarks List (ACBv2)* (MOECC, 2019b) limits for dioxins, furans, and dioxin-like PCBs require specific calculations of the individual contaminants making up the group. For this contaminant group, Cambium has calculated them in accordance with the methods presented in ACBv2. The concentration of each contaminant at a point of reception was multiplied by its respective equivalency factor and summed to determine the POI of the contaminant group as applicable. We have not shown this conversion from the individual contaminant emission rates to the total POI concentration.

There is general ventilation from the Facility that only discharges uncontaminated air from the workspaces or air from the workspace that include contaminants that come from commercial office supplies and building maintenance products, supplies, and activities. Cambium has considered these types of ventilation sources as negligible and did not identify them as sources at the Facility.

Cambium has deemed the ventilation located in the processing areas that do not directly vent process emissions as negligible; we have considered the ability of each source to contain and ventilate process emissions as adequate.

2.1 Source and Contaminants Identification Table

All the emission sources and their corresponding contaminants expected for the Facility are tabulated in Table 1 – Sources and Contaminants Identification Table. This table provides the information required to satisfy sub paragraphs 2 through 5 of section 26(1) of O. Reg. 419/05. The source identification codes for the significant sources defined in Table 1 have their discharge points depicted Figure 3 – Site Plan and Roof Layout. All of the significant sources of air emissions at the Facility are outlined below.



- **CR01 & CR02** – The vertical exhaust stack extending 7.0 m above the roof for each of the two (2) CU-150 cremation units. The stacks have a flowrate of 3610 cfm (1.70 m³/s), and a diameter of 20 in (0.51 m). Emissions from this source are from the combustion of the natural gas fuel, and from the thermal decomposition of cadavers.
- **EF01** – The vertical exhaust stack extending 1.0 m above the roof serving the embalming room. The stack has a flowrate of 501 cfm (0.24 m³/s), and a diameter of 6 in (0.15 m). Emissions from this source are produced from the evaporation of embalming chemicals.



3.0 Assessment of the Significance of Contaminants and Sources

In this section, Cambium's justification for each source and contaminant identified as negligible in Table 1 – Sources and Contaminants Identification Table has been detailed as required by sub paragraph 5 of subsection 26(1) of O. Reg. 419/05. Identifying negligible contaminants and sources allows a more detailed analysis of emissions and POI concentrations for facilities with many sources and contaminants to review.

Consistent with section 8 of O. Reg. 419/05, emission rate calculations and dispersion modelling are not required for emissions from negligible sources, or for the emission of negligible contaminants from significant sources.

3.1 Identification of Negligible Contaminants and Sources

Cambium has selected sources and contaminants from the Facility that are expected to discharge in negligible amounts by following the guidance in The ESDM Procedure Document, and the sources described in Ontario Regulation 524/98 (Environmental Compliance Approvals – Exemptions from Section 9 of the Act). We have deemed sources and contaminants negligible if they met the screening guidance provided in these documents, they are not expected to be the main contributor to the POI concentration, and if the nature of the contaminant(s) were not concerning.

Table 1 – Sources and Contaminants Identification Table lists each negligible source and contaminant. Cambium has identified some contaminants from sources that were considered significant as negligible. Each negligible contaminant from a significant source is tabulated in Table 1. An explanation regarding the determination for each negligible source or contaminant is also included in Table 1, as required by sub paragraph 5 of subsection 26(1) of O. Reg. 419/05. For detailed explanations, refer to Appendix B – Assessment for Negligibility. Cambium has considered the remaining sources and contaminants significant, and have therefore included them in the dispersion modelling for the Site.



Cambium has declared HVAC combustion sources at the Facility as insignificant following the guidance in Appendix B, Table B-3 of The ESDM Procedure Document. This analysis is detailed in Appendix B – Assessment for Negligibility.

3.2 Rationale for Assessment

As previously mentioned, Cambium's rationale for identifying each source or contaminant as being negligible is tabulated in Table 1. The technical information required to substantiate the justifications that each of the identified sources or contaminants is negligible are presented in Appendix B – Assessment for Negligibility.



4.0 Operating Conditions, Emission Estimating, and Data Quality

This section details the operating conditions used to estimate the site-wide emissions, and details the data quality assessment of emissions. Descriptions for each contaminant assessed for the Facility has been included, as required by sub paragraph 6 and 7 of section 26(1) of O. Reg. 419/05. Cambium did not perform emission rate calculations and dispersion modelling for emissions from negligible sources or for the emission of negligible contaminants from significant sources as per section 8 of O. Reg. 419/05.

4.1 Description of Operating Conditions

As identified in Section 1.2 of this report, the NAICS code that best applies to the Facility is 812220 (Cemeteries and Crematoria). This subsector is not listed in Schedule 4 or Schedule 5 of O. Reg. 419/05, and as of February 2020 is subject to section 20 of O. Reg. 419/05. Cambium has assessed the modeled impact of contaminant emissions using the United States Environmental Protection Agency (USEPA) AERMOD model as the applicable time averaged maximum POI concentrations and compared to Schedule 3 standards of O. Reg. 419/05; the standards are outlined in the *ACBv2*.

Section 10 of O. Reg. 419/05 states that an acceptable operating condition for a facility is a scenario that would result in the highest possible concentration of the relevant contaminant at the POI. Cambium has defined the operating scenario for the Facility, which corresponds to the maximum concentration at the POI, as when all significant sources are operating simultaneously at their individual maximum rates of production. Average operation will not include both cremators always operating simultaneously and at their maximum capacity as assessed in this study. The derivation of the maximum rates of production for each contaminant of a significant source is detailed in Appendix A – Supporting Calculations. The maximum rate of production corresponds to the maximum emission rate during each contaminant's corresponding averaging period.



4.2 Explanation of the Methods Used to Calculate Emission Rates

Cambium has calculated the maximum emission rates for each significant contaminant emitted from a significant source, consistent with requirements of The ESDM Procedure Document, and using the estimation technique documented in Table 2 – Source Summary Tables.

4.3 Sample Calculations

Cambium's technical rational and the sample calculations required to substantiate the emission rates presented in Table 2 – Source Summary Tables are documented in Appendix A – Supporting Calculations.

4.4 Assessment of Data Quality

A data quality assessment of the emission estimates for each significant contaminant from the Facility is required by sub paragraph 7iii of section 26 (1) of O. Reg. 419/05. The emission estimates used in this analysis are conservative overestimates of the emissions typically generated from these systems based on our extensive experience obtaining ECAs for crematoria.

The majority of the emissions from the thermal decomposition of a body used in this assessment are based on specific testing of crematoria completed on an American propane fired cremator unit in 1992 and published by the USEPA. American crematorium standards in many states are not as prescriptive and stringent as the standards that cremator technology in Ontario generally must meet.

At this time, it is our understanding that Ontario has some of the most stringent operating conditions in the world for incinerator technology. Specifically, Ontario cremators must be capable of providing a secondary combustion chamber temperature of 1000°C, and a retention time for that chamber of 1 second. Therefore, combustion by-products from the primary combustion chamber must be subjected to at least 1 second at 1000°C in the secondary chamber in order to complete as thorough of a combustion as possible. Typically, in the USA, the requirement would be around 800°C for a one-second retention time. In Cambium's practice,



cremators complying with Ontario's requirements generally have less emissions than what the emission factors used in this compliance assessment predict for this reason.

Further to this, in Ontario, the continued maintenance and quality of a cremator unit and its emission control capability is ensured by the requirement to use Continuous Emission Monitoring Systems (CEMS) on all cremators. The Ministry mandates that all new crematoria implement a system that actively monitors oxygen, carbon monoxide, and temperature at the primary chamber, and temperature at the secondary chamber at the point of 1-second retention. All of these sensors are given targets by the Ministry, and all parameters that need to meet such targets must be recorded and the records maintained for at least 5 years. The newest approvals also include audiovisual warning systems for crematorium operators to ensure that they are within the specified parameters to ensure optimal combustion. This helps to ensure that a cadaver is only introduced into the system once all parameters are optimal. Ontario ensures that crematoria must maintain their equipment, including the CMES system, in good working order.

More specifically related to mercury concentrations expected to be released, the emission factor for mercury was generated via an Australian survey of oral health completed in 2004-2006 based generally on the amount of mercury in the mouths of typical Australians. This is a conservative over-estimate since studies published by the USEPA indicate that overall sale of mercury dental amalgam in the USA nearly halved between 2001 and 2013 (IMERC Fact Sheet Mercury Use in Dental Amalgam, 2015). Therefore, mercury emissions from crematoria are expected to decrease over time as the population ages and demographics of the bodies being cremated change. We are not aware of any jurisdiction allowing the removal of cadaver teeth prior to cremation. Problems with implementing such measures go beyond jurisdictional issues for the training of the personnel conducting such preparation work.

Crematory emissions are linked directly to what is placed into the chamber; it is recommended that Dryden Community Funeral Home implement guidelines in order to ensure that the minimum amount of metals are introduced into the cremator unit. These guidelines may include:

- Encouraging the use of cardboard cremation containers.
- If caskets are used, ensuring their metal parts are removable prior to cremation.



- Requesting that minimal materials are placed into the cremation container with the body (e.g. jewelry, eye glasses, electronics, etc.)

In addition, while Cambium has used conservative emission factors to prove that it is possible for the cremator units to operate in compliance with Ministry guidelines for air contaminants, upon approval of the ECA the Ministry will also include a requirement for stack testing at the Facility. Stack testing will entail in depth sampling and testing of the actual emissions of the cremator unit on site as it operates. This testing will need to be completed within 3 months of starting the operations onsite and the results must be used to update the analysis of compliance and confirm the actual units comply with the Ministry limits for all contaminants of concern.

The data quality of each emission rate estimate is documented in Table 2 – Source Summary Tables. Cambium’s evaluation of the data quality for each source listed in Table 2 is detailed in Appendix A – Supporting Calculations. We have applied conservative assumptions that correspond to the operating scenario where all significant sources are emitting at their individual maximum rates. Assuming these maximum emission rates listed in Table 2, the rates are likely an overestimate of the actual emission quantities. We expect that the resulting calculated concentration at each POI will be greater than the actual concentrations because of applying these assumptions.



5.0 Source Summary and Site Plan

This section details the table and the site plan required by sub paragraphs 8 and 9 of section 26(1) of O. Reg. 419/05.

5.1 Source Summary Table

The emission rate estimates for each source of significant contaminants is tabulated in Table 2 – Source Summary Tables, consistent with the requirements of sub paragraph 8 of section 26(1) of O. Reg. 419/05.

5.2 Site Plan

The locations of the significant emission sources listed in Table 2 – Source Summary Tables are presented on Figure 3 – Site Plan and Roof Layout, denoted by their corresponding source identification value. The location of the property-line is also identified on Figure 3. Cambium has referenced the position of each source using the Universal Transverse Mercator (UTM) coordinates system under the Source Coordinates column in Table 2.

The Facility is one (1) single tiered building; the building height and location is detailed on Figure 3.



6.0 Dispersion Modelling

How the dispersion modelling was completed for the Facility to predict the maximum POI concentrations is described in this section, as required by sub paragraphs 10 to 13 of section 26(1) of O. Reg. 419/05. The Facility is subject to section 20 of O. Reg. 419/05, and as such, Cambium carried out the assessment of compliance with Schedule 3 standards using the USEPA, AERMOD atmospheric dispersion model.

The dispersion modelling completed for the Site conforms to Guideline A-11: *Air Dispersion Modelling Guideline for Ontario* (ADMGO) (MOECC, 2017b). A general description and summary of the input data for the dispersion model is provided in Table 3 – Dispersion Modelling Input Summary Table.

The Ministry has identified the AERMOD modelling system as one (1) of the approved dispersion models under O. Reg. 419/05. The software currently includes the Plume Rise Model Enhancement (PRIME) algorithms for assessing the effects of buildings on air dispersion.

The AERMOD modelling system is made up of the AERMOD dispersion model, the AERMET meteorological pre-processor, and the AERMAP terrain pre-processor.

Cambium used the following approved dispersion model and pre-processors in the assessment:

- AERMOD version 19191 dispersion model;
- AERMET version 19191 meteorological pre-processor; and
- BPIP building downwash pre-processor.

Cambium did not use AERMET in this assessment as a pre-processed Ministry meteorological dataset was used.

6.1 Dispersion Modelling Input Summary Table

Cambium's methodology used for the approved dispersion model is summarized in Table 3 – Dispersion Modelling Input Summary Table. This table meets both the requirements of sections 26(1)11 and 8 to 17 of O. Reg. 419/05, and follows the format provided in The ESDM Procedure Document.



Cambium has defined the source types as directed in Section 4.5 of the ADMGO and has classified the significant sources at the Facility as point sources. We determined the parameters required for each source according to the procedures in ADMGO. The locations of the sources and the property line are shown on Figure 3 – Site Plan and Roof Layout.

6.2 Coordinate System

Cambium used the UTM coordinate system to specify model object sources, buildings, and receptors, consistent with Section 5.2.2 of the ADMGO. We defined all coordinates in the North American Datum of 1983 (NAD83).

6.3 Meteorology and Land Use Data

In this assessment, Cambium used the currently approved version of AERMOD with preprocessed surface and profile files created by the Ministry for the updated AERMET algorithm. As the Facility is located in the geographical coverage of the Ministry's Kenora District, which is located in Northern Ontario, we used the meteorological dataset for the Northern Region (International Falls). The Facility's proximity to large water bodies and far distance from the International Falls regional data station should warrant the use of site-specific meteorological data available upon request from the Ministry. The data set used in this study should provide sufficient accuracy for the assessment of compatibility, but site-specific data should be obtained prior to submitting the ECA application.

Sub paragraph 10 of section 26(1) of O. Reg. 419/05 requires a description of the local land use conditions if meteorological data was used as described in paragraph 2 of section 13(l) of O. Reg. 419/05. Cambium has characterized the land use surrounding the Facility as "rural" because less than 50% of the area surrounding the Facility includes multi-family dwellings, industrial, and commercial use. The zoning of the surrounding area is depicted on Figure 2 – Land Use Zoning Designation Plan, and the land use detailed on Figure 5 – Three (3) Kilometre Satellite Image. With a lack of sufficient foresting, we have used the associated "crops" meteorological files.



6.4 Terrain

Cambium obtained the terrain data for this assessment from the Ministry's *Map: Regional Meteorological and Terrain Data for Air Dispersion Modelling* in GeoTIFF format (MOECC, 2019c). The GeoTIFF file used was cdem_dem_052F.

6.5 Receptors

Cambium chose receptors based on recommendations provided in Section 7.1 of the ADMGO, which is consistent with section 14 of O. Reg. 419/05. We selected a grid of nested receptors centered over the emission sources as follows:

1. 20 m spacing, within an area of 200 m by 200 m
2. 50 m spacing, within an area surrounding the area described in (1) with a boundary at 500 m by 500 m outside the boundary of the area described in (1)
3. 100 m spacing, within an area surrounding the area described in (2) with a boundary at 1000 m by 1000 m outside the boundary of the area described in (1)
4. 200 m spacing, within an area surrounding the area described in (3) with a boundary at 2000 m by 2000 m outside the boundary of the area described in (1)
5. 500 m spacing, within an area surrounding the area described in (4) with a boundary at 5000 m by 5000 m outside the boundary of the area described in (1)

Receptors were also placed every 10 m along the property line, in addition to using the nested receptor grid. The proposed residential development, and nearby daycare and school to the east of the Facility was modelled with additional receptor grids including at a flagpole height of 5 m.

There are no childcare facilities, health care facilities, senior's residences, long-term care facilities or any educational facilities located at the Facility; furthermore, the Facility does not share a building with another business. Cambium did not assess the impact of same structure contamination with the absence of these sensitive receptors.



6.6 Building Downwash

Cambium accounted for building wake effects in this assessment using the USEPA's Building Profile Input Program (BPIP-PRIME), another pre-processor to AERMOD. The inputs into this pre-processor include the coordinates and heights of the buildings and stacks. The output data from BPIP is used in the AERMOD building wake effect calculations.

The PRIME plume rise algorithms include vertical wind shear calculations, which are important for buoyant releases from short stacks (i.e., stacks at release heights within the recirculation zones of buildings). The PRIME algorithm also allows for the wind speed deficit induced by the building to change with respect to the distance from the building. These factors improve the accuracy of predicted concentrations within building wake zones that form in the lee of buildings.

The BPIP input file is provided in Appendix D – Dispersion Modelling Data and Electronic Files (on CD).

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 apply to this application; which are based on varying averaging times. In any case where a standard had an averaging period that differed from the model prediction capabilities, the appropriate averaging period was converted to using the Ministry's recommended factors, as documented in the ADMGO.

Please refer to Table 2 – Source Summary Tables for the averaging period associated with each contaminant.

6.8 Dispersion Modelling Options

The options used in the AERMOD dispersion model are summarized in the table below.

**Options Used in AERMOD**

Modelling Parameter	Description	Used in the Assessment?
DFAULT	Specified that regulatory default options will be used	Yes
CONC	Specifies that concentration values will be calculated	Yes
DDPLETE	Specified that dry deposition will be calculated	No
WDPLETE	Specified that wet deposition will be calculated	No
FLAT	Specifies that the non-default option of assuming flat terrain will be used	No, the model will use elevated terrain data files as detailed in the AERMAP output
NOSTD	Specified that the non-default option of no stack tip downwash will be used	No
RELEASE	Specifies that capped and horizontal stack releases will be used	No
AVERTIME	Time averaging periods calculated	1-hour, 24-hour, 30-day, annual
URBANOPT	Allows the model to incorporate the effects of increased surface heating from an urban area on pollutant dispersion under stable atmospheric conditions	No
URBANROUGHNESS	Specifies the urban roughness length (m)	No
FLAGPOLE	Specifies that receptor heights above local ground level are allowed on the receptors	No

6.9 Dispersion Modelling Input and Output Files

The dispersion model input data is summarized in Table 3 – Dispersion Modelling Input Summary Table . Cambium has provided electronic copies of all the input and output files for the AERMOD model in Appendix D on compact disc (CD).



7.0 Emission Summary Table and Conclusions

This section contains the table required by sub paragraph 14 of section 26(1) of O. Reg. 419/05. An interpretation of the results as required by The ESDM Procedure Document has also been provided.

Emission Summary Table

Cambium calculated a POI concentration for each significant contaminant using the emission rates listed in Table 2 – Source Summary Tables. We have provided the output from the approved dispersion model in Appendix D. The modelling results provided in Table 4 – Emission Summary Table conforms to The ESDM Procedure Document.

Cambium compared the POI concentrations listed in Table 4 against the ACBv2. All predicted POI concentrations do not exceed the corresponding limits in ACBv2.

7.1 Assessment of Contaminants with no POI Limits

It is a requirement of sub paragraph 14 subsection viii of section 26(1) O. Reg. 419/05 to indicate the likelihood, nature, and location of any adverse effect if a contaminant is not listed in Schedules 2 and 3. Cambium has determined this indication is redundant, as all emitted contaminants are within these Schedule designations.

Contaminants released by the Facility that are that are not found in ACBv2, are considered to be 'Contaminants with No Ministry Point of Impingement Limits'. There are no 'Contaminants with No Ministry POI Limits' emitted at the Facility.

7.2 Conclusions

Cambium prepared this ESDM Report to conform to sections 26 of O. Reg. 419/05. In addition, Cambium followed the guidance in The ESDM Procedure Document as applicable. The Facility is subject to section 20 of O. Reg. 419/05, and as such, we carried out the assessment of compliance with Schedule 3 standards using the USEPA, AERMOD atmospheric dispersion model.



Cambium has documented the emission rate estimates for each significant contaminant in Table 2 – Source Summary Tables. Inherent conservatism has been built into the emissions estimates by choosing maximum production capacity, simultaneous operation, and prudent parameters for use in the calculations. Therefore, we expect the actual emissions to be less than the modelled predictions for the Site.

A POI concentration for each significant contaminant emitted from the Facility was calculated using the conservative emission rates, and the output from the AERMOD model. The modelling results are presented in Table 4 – Emission Summary Table. The POI concentrations listed in Table 4 were then compared with ACBv2 limits. The predicted POI concentrations for all assessed contaminants listed in the Emissions Summary Table are less than O. Reg. 419/05 corresponding limits. However, site-specific meteorological data should be implemented when it is available to confirm the accuracy of this assessment.

Cambium has demonstrated in this ESDM Report that the Facility operated by Dryden Community Funeral Home Ltd. complies with Section 20 of O. Reg. 419/05. Cambium therefore recommends that an Environmental Compliance Approval for air be issued for the Facility.

Respectfully submitted,

Cambium Inc.

Sadie Bachynski, P.Eng.
Senior Project Manager

Cody Given, EIT.
Technician



8.0 Qualifications and Limitations

Limited Warranty

In performing work on behalf of a client, Cambium relies on its client to provide instructions on the scope of its retainer and, on that basis, Cambium determines the precise nature of the work to be performed. Cambium undertakes all work in accordance with applicable accepted industry practices and standards. Unless required under local laws, other than as expressly stated herein, no other warranties or conditions, either expressed or implied, are made regarding the services, work or reports provided.

Reliance on Materials and Information

The findings and results presented in reports prepared by Cambium are based on the materials and information provided by the client to Cambium and on the facts, conditions and circumstances encountered by Cambium during the performance of the work requested by the client. In formulating its findings and results into a report, Cambium assumes that the information and materials provided by the client or obtained by Cambium from the client or otherwise are factual, accurate and represent a true depiction of the circumstances that exist. Cambium relies on its client to inform Cambium if there are changes to any such information and materials. Cambium does not review, analyze or attempt to verify the accuracy or completeness of the information or materials provided, or circumstances encountered, other than in accordance with applicable accepted industry practice. Cambium will not be responsible for matters arising from incomplete, incorrect or misleading information or from facts or circumstances that are not fully disclosed to or that are concealed from Cambium during the provision of services, work or reports.

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Site Assessments

A site assessment is created using data and information collected during the investigation of a site and based on conditions encountered at the time and particular locations at which fieldwork is conducted. The information, sample results and data collected represent the conditions only at the specific times at which and at those specific locations from which the information, samples and data were obtained and the information, sample results and data may vary at other locations and times. To the extent that Cambium's work or report considers any locations or times other than those from which information, sample results and data was specifically received, the work or report is based on a reasonable extrapolation from such information, sample results and data but the actual conditions encountered may vary from those extrapolations.

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Personal Liability

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9.0 References

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Appended Figures

**EMISSION SUMMARY AND
DISPERSION MODELLING REPORT**
**DRYDEN COMMUNITY
FUNERAL HOME LTD.**
 249 Grand Trunk Ave.
 Dryden, Ontario

LEGEND

- Watercourse, Permanent
- Watercourse, Intermittent
- Major Road
- Minor Road
- Contour 5m Interval (Minor)
- Water Area
- Lot / Concession
- Wooded Area
- Subject Property (approximate)

Notes:

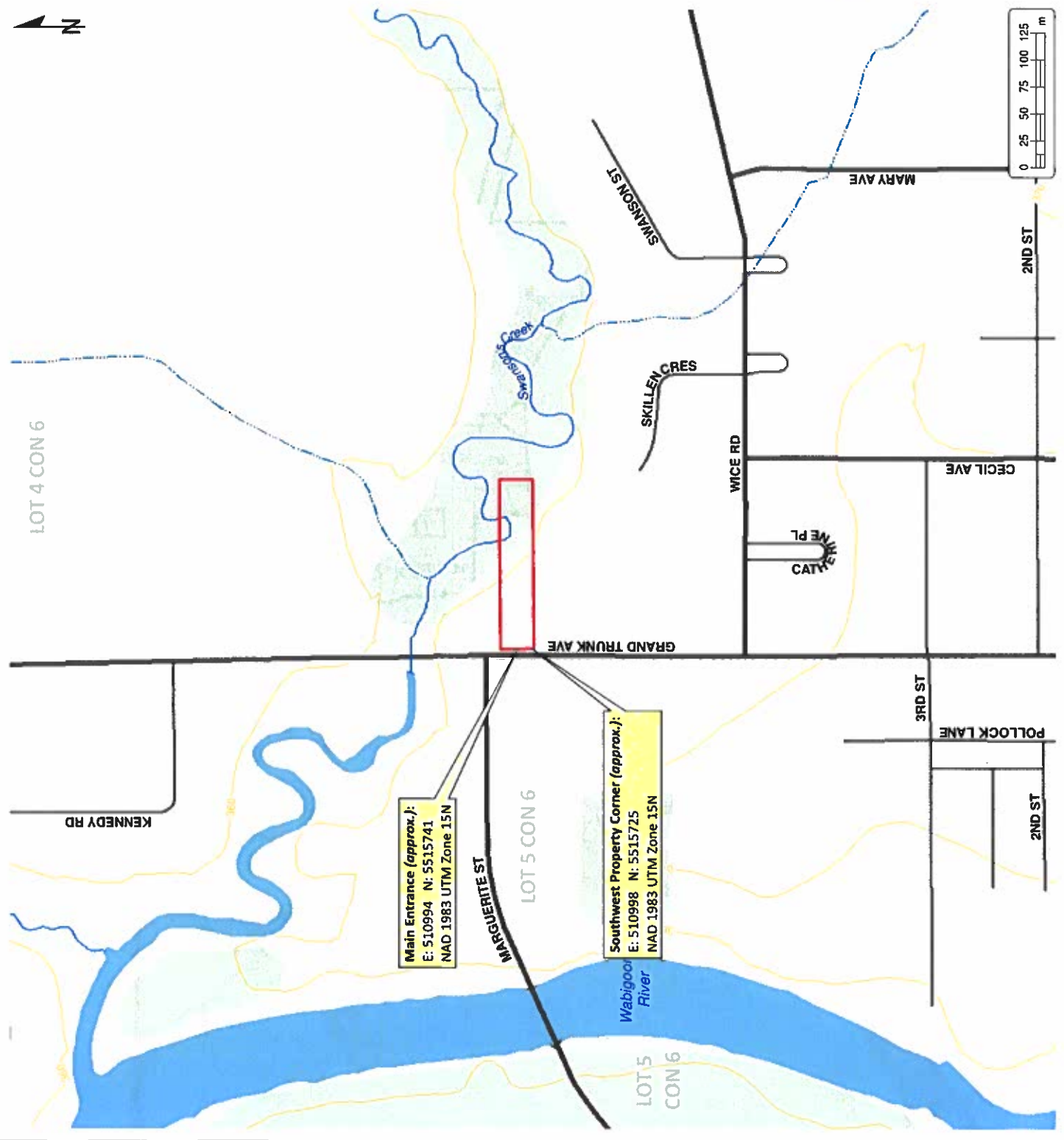
- Base mapping features are © Queen's Printer of Ontario, 2017 (this does not include the subject property, which is the property of the Dryden Community Funeral Home Ltd.).
- Distances on this plan are in meters and can be converted to feet by dividing by 0.3048.
- The user assumes every effort to ensure this map is free from errors but cannot be held responsible for any damages due to errors or omissions. This map should not be used for navigation or legal purposes. It is intended for general reference use only.



P.O. Box 325, 52 Hunter Street East
 Peterborough, Ontario K9H 1G5
 Tel: (705) 742-7900 Fax: (705) 742-7907
 www.cambium-inc.com

SITE LOCATION PLAN

Project No.:	8796-001	Date:	June 2019
Scale:	1:5,000	Projection:	NAD 1983 UTM Zone 18N
Created by:	TLC	Checked by:	SLB
		Figure:	1



EMISSION SUMMARY AND DISPERSION MODELLING REPORT

DRYDEN COMMUNITY FUNERAL HOME LTD.

249 Grand Trunk Ave.
Dryden, Ontario

LEGEND

Subject Property (approximate)

Legend

- CD DOWNTOWN COMMERCIAL
- MX EXTRACTIVE INDUSTRIAL
- CG GENERAL COMMERCIAL
- HZ HAZARD
- M2 HEAVY INDUSTRIAL
- CH HIGHWAY COMMERCIAL - HOLDING
- CH-H INSTITUTIONAL
- I INSTITUTIONAL RESIDENTIAL MULTIPLE
- I RM LIGHT INDUSTRIAL - HOLDING
- M1-M1 LIGHT INDUSTRIAL
- M1-M1 LOCAL COMMERCIAL
- M4 MILL INDUSTRIAL
- OS OPEN SPACE
- OS-1 OPEN SPACE - SITE SPECIFIC
- RMH RESIDENTIAL MODULAR DWELLING
- RM RESIDENTIAL MULTIPLE
- R1 RESIDENTIAL TYPE 1
- R1-H RESIDENTIAL TYPE 1 - HOLDING
- R2 RESIDENTIAL TYPE 2
- RU RURAL
- RU-H RURAL - HOLDING
- RR RURAL RESIDENTIAL
- RS SHORELINE RESIDENTIAL
- CTH TOURIST COMMERCIAL
- MD WASTE DISPOSAL INDUSTRIAL
- WMJ-H WATERFRONT MIXED USE - HOLDING

Notes:

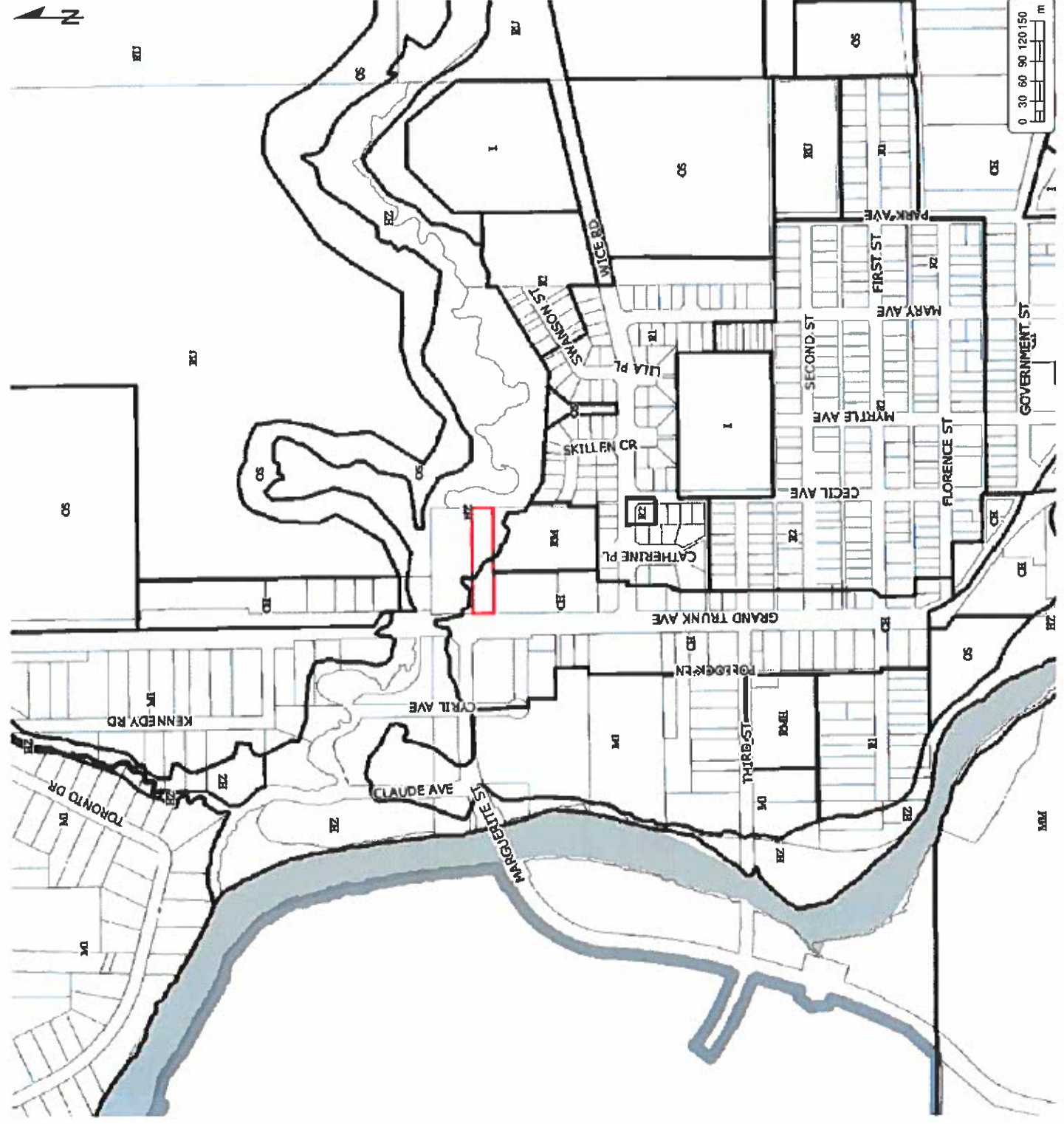
- Zoning was obtained from the City of Dryden, Zoning Schedule A - 1 Dated June 8, 2012.
- The information herein is for informational purposes only and does not constitute an endorsement by the Ministry of Natural Resources and Forestry or the Ontario Government.
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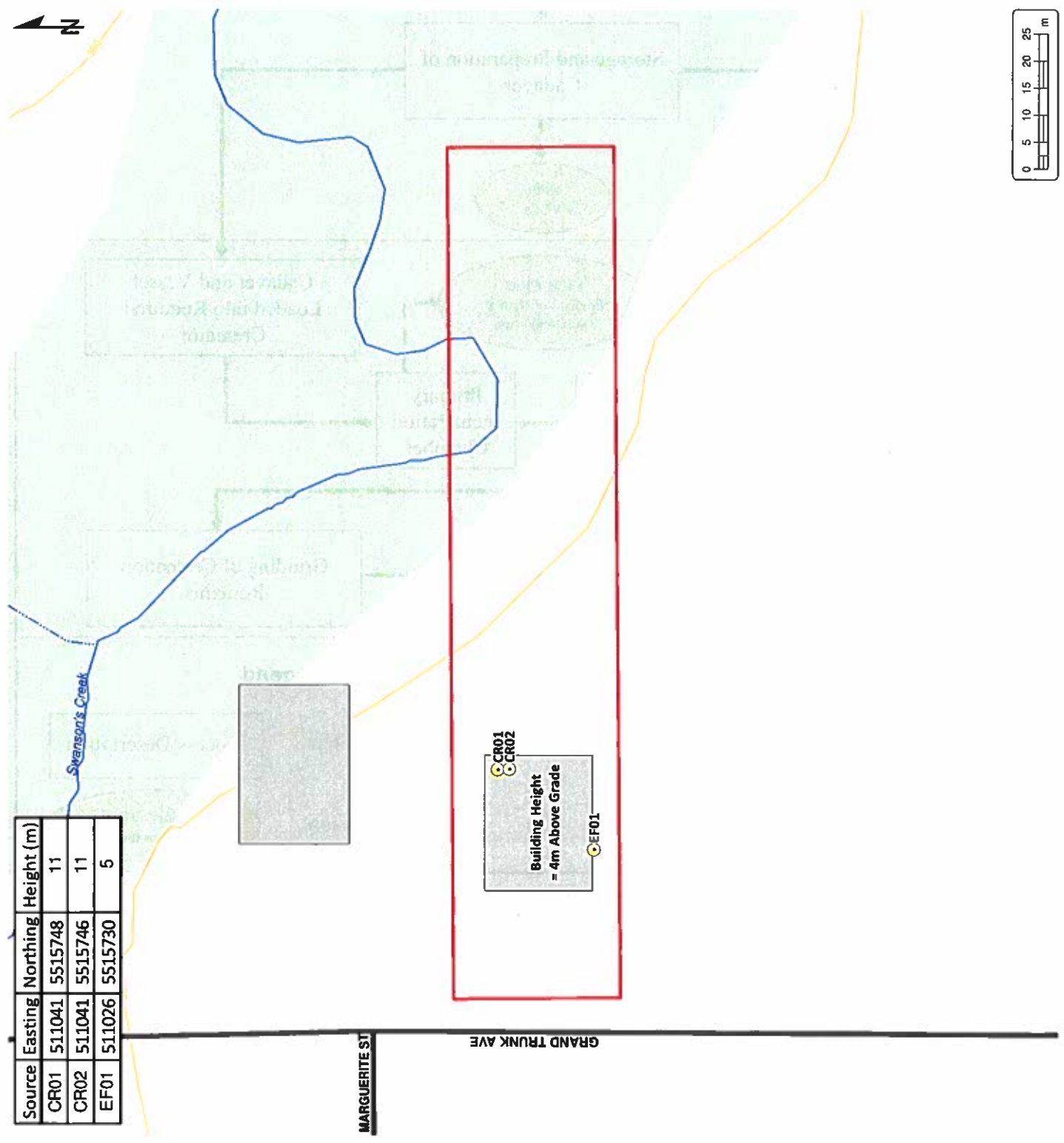
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LAND USE ZONING DESIGNATION PLAN

Project No:	8796-001	Date:	June 2019
Scale:	1:8,000	Rev:	
Projection:	NAD 1983 UTM Zone 18N	Created by:	TLC
Checked by:	SLB	Figure:	2



Source	Eastings	Northing	Height (m)
CR01	511041	5515748	11
CR02	511041	5515746	11
EF01	511026	5515730	5



EMISSION SUMMARY AND DISPERSION MODELLING REPORT
 DRYDEN COMMUNITY
 FUNERAL HOME LTD.
 249 Grand Trunk Ave.
 Dryden, Ontario

LEGEND

- Point Source
- Watercourse, Permanent
- Watercourse, Intermittent
- Major Road
- Contour 5m Interval (Minor)
- Wooded Area
- Building
- Subject Property (approximate)

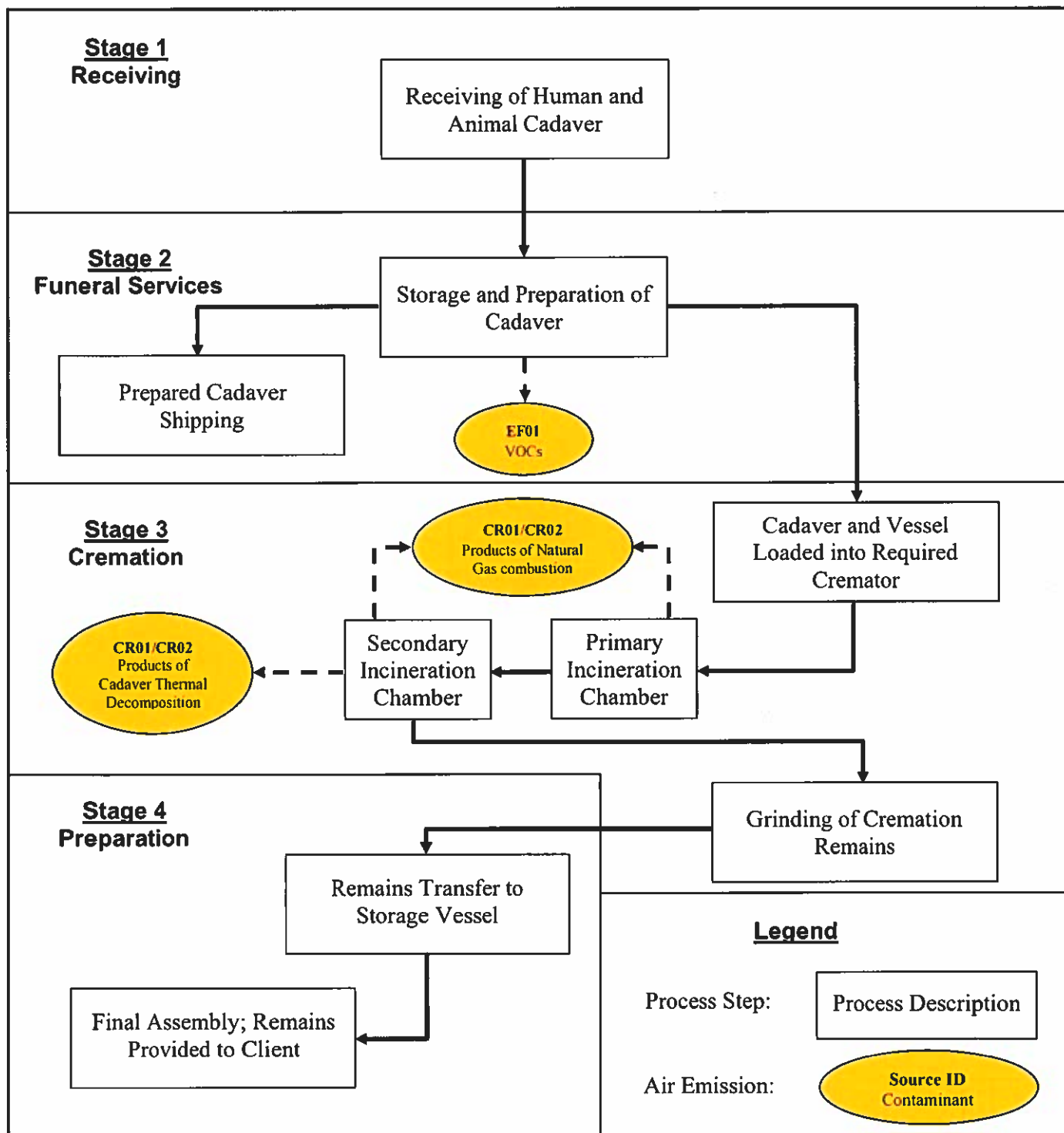
Notes:
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 - Distances on this plan are in metres and can be converted to feet by multiplying by 3.28.
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P.O. Box 325, 52 Hunter Street East
 Peterborough, Ontario, K9H 1G5
 Tel: (705) 742-7900 Fax: (705) 742-7907
 www.cambium-inc.com

SITE PLAN AND ROOF LAYOUT

Project No.:	8796-001	Date:	June 2019
Scale:	1:1,000	Rev.:	
Projection:	NAD 1983 UTM Zone 18N	Created by:	TLC
Figure:	3	Checked by:	SLB



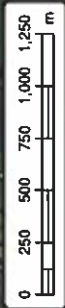
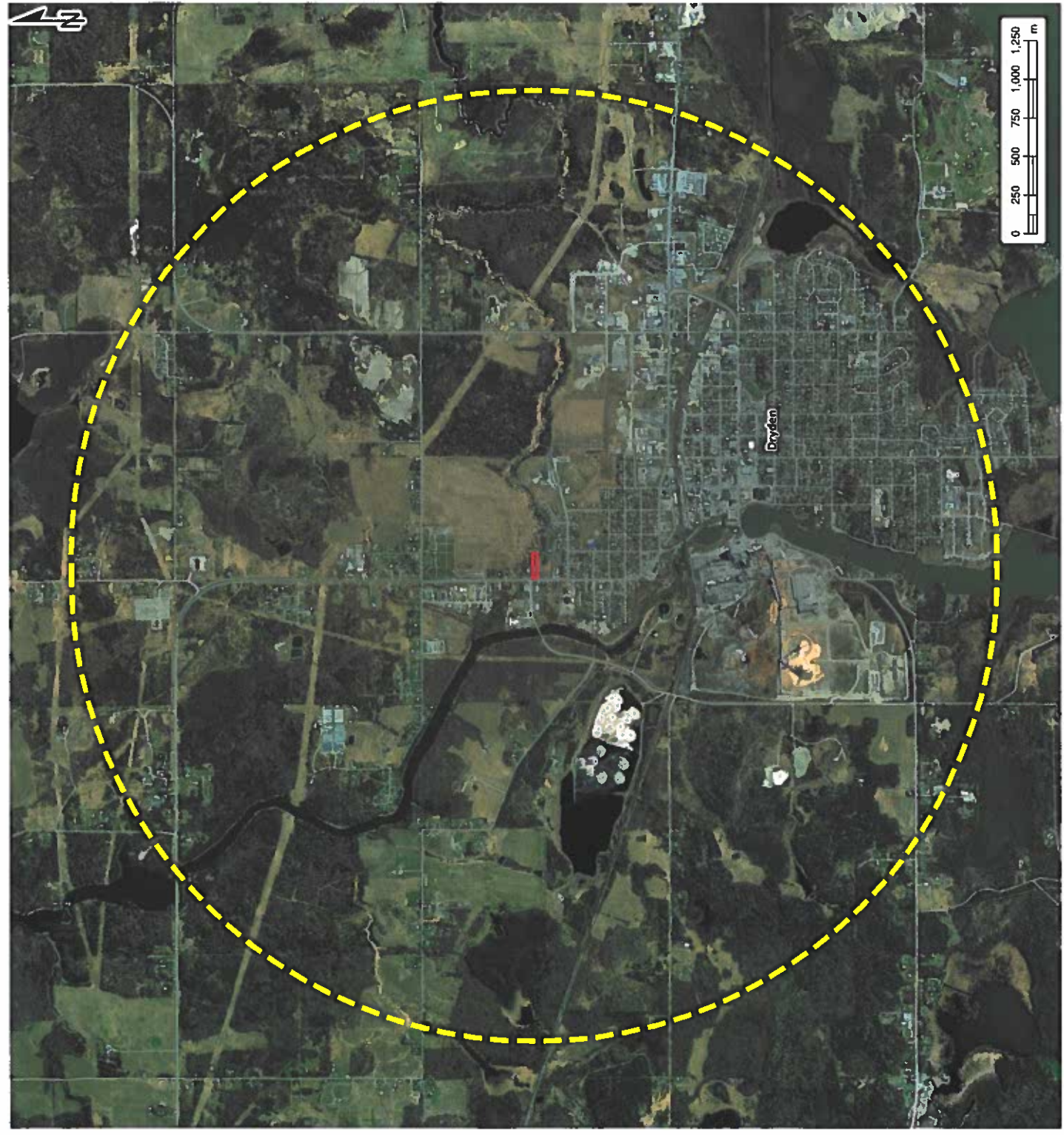
 P.O. Box 325, 52 Hunter Street East Peterborough, Ontario, K9H 1G5 Tel: 1 (705) 742.7900 Fax: 1 (705) 742.7907 www.cambium-inc.com	Created by: CWG	Project No.: 8796-001	OVERALL PROCESS FLOW DIAGRAM Dryden Community Funeral Home Ltd. Emission Summary and Dispersion Modeling Report Dryden, ON
	Checked by: SLB	Scale: N/A	
	Date: June 2019		

**EMISSION SUMMARY AND
DISPERSION MODELLING REPORT**
**DRYDEN COMMUNITY
FUNERAL HOME LTD.**
 249 Grand Trunk Ave.
 Dryden, Ontario

LEGEND


3 km Buffer


Subject Property (approximate)



Notes:

- Base mapping features are © Crown's Printer of Ontario, 2017 (the data is provided as a courtesy and is not to be used for any other purpose).
- Distances on this plan are in metres and can be converted to feet by multiplying by 3.281.
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P.O. Box 325, 52 Hunter Street East
 Peterborough, Ontario, K9H 1G5
 Tel: (705) 742-7900 Fax: (705) 742-7907
 www.cambium-inc.com

**THREE (3) KILOMETRE
SATELLITE IMAGE**

Project No.:	8796-001	Date:	June 2019
Scale:	1:35,000	Rev.:	
Projection:	NAD 1983 UTM Zone 18N		
Created by:	TLC	Checked by:	SLB
Figure:			5



Appended Tables

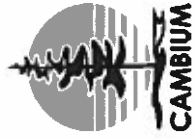


Table 1: Sources and Contaminants Identification Table

Source Information		Expected Contaminants		Included in Modelling?	
Source ID	Source Description	General Location	Contaminant	Significant (Yes/No)	Rationale
HVAC	Emissions due to all HVAC equipment at the facility	Facility-wide	Products of NG Combustion	No	As per Table B-3 of the ESDM Procedure Document (MECP, 2019), natural gas fired boilers, water heaters, space-heaters and make-up air units when the total facility-wide heat input usage for this equipment is less than 20 million kJ/hr can be considered insignificant.
BV	General ventilation including: open spaces, washrooms, offices, etc.	Facility-wide	N/A	No	Contaminant Insignificant (less than 5% of the total propertywide emissions) relative to total emissions as outlined in Section 7.2.2 from the ESDM Procedure Document (MECP, 2019)
RdDust	Fugitive dust from roadways, traffic, and storage piles	Facility-wide	Suspended particulate matter (< 44 µm diameter)	No	The Facility is not listed in Table 7-2 or 7-3 of Section 7.4 of the ESDM Procedure Document (MECP, 2019). Additionally, the nature and quantity of dust generated from these sources were not deemed likely to pose a significant health risk if present.
CR01	CU-150 Cremation Unit Exhaust	North-east corner of the Facility through the roof	1,2,3,4,6,7,8,9-Octachlorodibenzofuran [1,2,3,4,6,7,8,9-OCDF]	Yes	Not Applicable
CR01	CU-150 Cremation Unit Exhaust	North-east corner of the Facility through the roof	1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin [1,2,3,4,6,7,8,9-OCDD]	Yes	Not Applicable
CR01	CU-150 Cremation Unit Exhaust	North-east corner of the Facility through the roof	1,2,3,4,6,7,8-Heptachlorodibenzofuran [1,2,3,4,6,7,8-HpCDF]	Yes	Not Applicable
CR01	CU-150 Cremation Unit Exhaust	North-east corner of the Facility through the roof	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin [1,2,3,4,6,7,8-HpCDD]	Yes	Not Applicable
CR01	CU-150 Cremation Unit Exhaust	North-east corner of the Facility through the roof	1,2,3,4,7,8,9-Heptachlorodibenzofuran [1,2,3,4,7,8,9-HpCDF]	Yes	Not Applicable
CR01	CU-150 Cremation Unit Exhaust	North-east corner of the Facility through the roof	1,2,3,4,7,8,9-Hexachlorodibenzofuran [1,2,3,4,7,8-HxCDF]	Yes	Not Applicable
CR01	CU-150 Cremation Unit Exhaust	North-east corner of the Facility through the roof	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin [1,2,3,4,7,8-HxCDD]	Yes	Not Applicable
CR01	CU-150 Cremation Unit Exhaust	North-east corner of the Facility through the roof	1,2,3,6,7,8-Hexachlorodibenzofuran [1,2,3,6,7,8-HxCDF]	Yes	Not Applicable
CR01	CU-150 Cremation Unit Exhaust	North-east corner of the Facility through the roof	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin [1,2,3,6,7,8-HxCDD]	Yes	Not Applicable
CR01	CU-150 Cremation Unit Exhaust	North-east corner of the Facility through the roof	1,2,3,7,8,9-Hexachlorodibenzofuran [1,2,3,7,8,9-HxCDF]	Yes	Not Applicable
CR01	CU-150 Cremation Unit Exhaust	North-east corner of the Facility through the roof	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin [1,2,3,7,8,9-HxCDD]	Yes	Not Applicable
CR01	CU-150 Cremation Unit Exhaust	North-east corner of the Facility through the roof	1,2,3,7,8-Pentachlorodibenzofuran [1,2,3,7,8-PeCDF]	Yes	Not Applicable
CR01	CU-150 Cremation Unit Exhaust	North-east corner of the Facility through the roof	1,2,3,7,8-Pentachlorodibenzo-p-dioxin [1,2,3,7,8-PeCDD]	Yes	Not Applicable
CR01	CU-150 Cremation Unit Exhaust	North-east corner of the Facility through the roof	2,3,4,6,7,8-Hexachlorodibenzofuran [2,3,4,6,7,8-HxCDF]	Yes	Not Applicable
CR01	CU-150 Cremation Unit Exhaust	North-east corner of the Facility through the roof	2,3,4,7,8-Pentachlorodibenzofuran [2,3,4,7,8-PeCDF]	Yes	Not Applicable



Table 1: Sources and Contaminants Identification Table

Source Information			Expected Contaminants		Included in Modelling?	
Source ID	Source Description	General Location	Contaminant	Significant (Yes/No)	Rational	
CR01	CU-150 Cremation Unit Exhaust	North-east corner of the Facility through the roof	2,3,7,8-Tetrachlorodibenzofuran [2,3,7,8-TCDF]	Yes	Not Applicable	
CR01	CU-150 Cremation Unit Exhaust	North-east corner of the Facility through the roof	2,3,7,8-Tetrachlorodibenzo-p-dioxin [2,3,7,8-TCDD]	Yes	Not Applicable	
CR01	CU-150 Cremation Unit Exhaust	North-east corner of the Facility through the roof	Acetaldehyde	Yes	Not Applicable	
CR01	CU-150 Cremation Unit Exhaust	North-east corner of the Facility through the roof	Antimony	Yes	Not Applicable	
CR01	CU-150 Cremation Unit Exhaust	North-east corner of the Facility through the roof	Arsenic and compounds	Yes	Not Applicable	
CR01	CU-150 Cremation Unit Exhaust	North-east corner of the Facility through the roof	Barium - total water soluble	Yes	Not Applicable	
CR01	CU-150 Cremation Unit Exhaust	North-east corner of the Facility through the roof	Benzo(a)pyrene [as a surrogate of total Polycyclic Aromatic Hydrocarbons (PAHs)]	Yes	Not Applicable	
CR01	CU-150 Cremation Unit Exhaust	North-east corner of the Facility through the roof	Beryllium and Beryllium Compounds	Yes	Not Applicable	
CR01	CU-150 Cremation Unit Exhaust	North-east corner of the Facility through the roof	Cadmium and Cadmium Compounds	Yes	Not Applicable	
CR01	CU-150 Cremation Unit Exhaust	North-east corner of the Facility through the roof	Carbon monoxide	Yes	Not Applicable	
CR01	CU-150 Cremation Unit Exhaust	North-east corner of the Facility through the roof	Chromium Compounds (hexavalent forms)	Yes	Not Applicable	
CR01	CU-150 Cremation Unit Exhaust	North-east corner of the Facility through the roof	Chromium Compounds (metallic, divalent and trivalent forms)	Yes	Not Applicable	
CR01	CU-150 Cremation Unit Exhaust	North-east corner of the Facility through the roof	Cobalt	Yes	Not Applicable	
CR01	CU-150 Cremation Unit Exhaust	North-east corner of the Facility through the roof	Copper	Yes	Not Applicable	
CR01	CU-150 Cremation Unit Exhaust	North-east corner of the Facility through the roof	Fluorides (as HF) - Gaseous (Growing Season)	Yes	Not Applicable	
CR01	CU-150 Cremation Unit Exhaust	North-east corner of the Facility through the roof	Formaldehyde	Yes	Not Applicable	
CR01	CU-150 Cremation Unit Exhaust	North-east corner of the Facility through the roof	Hydrogen chloride	Yes	Not Applicable	
CR01	CU-150 Cremation Unit Exhaust	North-east corner of the Facility through the roof	Lead and Lead Compounds	Yes	Not Applicable	
CR01	CU-150 Cremation Unit Exhaust	North-east corner of the Facility through the roof	Mercury (Hg)	Yes	Not Applicable	
CR01	CU-150 Cremation Unit Exhaust	North-east corner of the Facility through the roof	Molybdenum	Yes	Not Applicable	
CR01	CU-150 Cremation Unit Exhaust	North-east corner of the Facility through the roof	Nickel and Nickel Compounds	Yes	Not Applicable	



Table 1: Sources and Contaminants Identification Table

Source Information			Expected Contaminants	Included in Modelling?	
Source ID	Source Description	General Location	Contaminant	Significant (Yes/No)	Rational
CR01	CU-150 Cremation Unit Exhaust	North-east corner of the Facility through the roof	Nitrogen oxides	Yes	Not Applicable
CR01	CU-150 Cremation Unit Exhaust	North-east corner of the Facility through the roof	Selenium	Yes	Not Applicable
CR01	CU-150 Cremation Unit Exhaust	North-east corner of the Facility through the roof	Silver	Yes	Not Applicable
CR01	CU-150 Cremation Unit Exhaust	North-east corner of the Facility through the roof	Sulphur dioxide	Yes	Not Applicable
CR01	CU-150 Cremation Unit Exhaust	North-east corner of the Facility through the roof	Suspended particulate matter (< 44 µm diameter)	Yes	Not Applicable
CR01	CU-150 Cremation Unit Exhaust	North-east corner of the Facility through the roof	Thallium	Yes	Not Applicable
CR01	CU-150 Cremation Unit Exhaust	North-east corner of the Facility through the roof	Vanadium	Yes	Not Applicable
CR01	CU-150 Cremation Unit Exhaust	North-east corner of the Facility through the roof	Zinc	Yes	Not Applicable
CR02	CU-150 Cremation Unit Exhaust	North-east corner of the Facility through the roof	1,2,3,4,6,7,8,9-Octachlorodibenzofuran [1,2,3,4,6,7,8,9-OCDF]	Yes	Not Applicable
CR02	CU-150 Cremation Unit Exhaust	North-east corner of the Facility through the roof	1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin [1,2,3,4,6,7,8,9-OCDD]	Yes	Not Applicable
CR02	CU-150 Cremation Unit Exhaust	North-east corner of the Facility through the roof	1,2,3,4,6,7,8-Heptachlorodibenzofuran [1,2,3,4,6,7,8-HpCDF]	Yes	Not Applicable
CR02	CU-150 Cremation Unit Exhaust	North-east corner of the Facility through the roof	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin [1,2,3,4,6,7,8-HpCDD]	Yes	Not Applicable
CR02	CU-150 Cremation Unit Exhaust	North-east corner of the Facility through the roof	1,2,3,4,7,8,9-Heptachlorodibenzofuran [1,2,3,4,7,8,9-HxCDF]	Yes	Not Applicable
CR02	CU-150 Cremation Unit Exhaust	North-east corner of the Facility through the roof	1,2,3,4,7,8,9-Hexachlorodibenzofuran [1,2,3,4,7,8,9-HxCDF]	Yes	Not Applicable
CR02	CU-150 Cremation Unit Exhaust	North-east corner of the Facility through the roof	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin [1,2,3,4,7,8-HxCDD]	Yes	Not Applicable
CR02	CU-150 Cremation Unit Exhaust	North-east corner of the Facility through the roof	1,2,3,6,7,8-Hexachlorodibenzofuran [1,2,3,6,7,8-HxCDF]	Yes	Not Applicable
CR02	CU-150 Cremation Unit Exhaust	North-east corner of the Facility through the roof	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin [1,2,3,6,7,8-HxCDD]	Yes	Not Applicable
CR02	CU-150 Cremation Unit Exhaust	North-east corner of the Facility through the roof	1,2,3,7,8,9-Hexachlorodibenzofuran [1,2,3,7,8,9-HxCDF]	Yes	Not Applicable
CR02	CU-150 Cremation Unit Exhaust	North-east corner of the Facility through the roof	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin [1,2,3,7,8,9-HxCDD]	Yes	Not Applicable
CR02	CU-150 Cremation Unit Exhaust	North-east corner of the Facility through the roof	1,2,3,7,8-Pentachlorodibenzofuran [1,2,3,7,8-PeCDF]	Yes	Not Applicable



Table 1: Sources and Contaminants Identification Table

Source Information			Expected Contaminants	Included in Modelling?	
Source ID	Source Description	General Location	Contaminant	Significant (Yes/No)	Rational
CR02	CU-150 Cremation Unit Exhaust	North-east corner of the Facility through the roof	1,2,3,7,8-Pentachlorodibenzo-p-dioxin [1,2,3,7,8-PeCDD]	Yes	Not Applicable
CR02	CU-150 Cremation Unit Exhaust	North-east corner of the Facility through the roof	2,3,4,6,7,8-Hexachlorodibenzofuran [2,3,4,6,7,8-HxCDF]	Yes	Not Applicable
CR02	CU-150 Cremation Unit Exhaust	North-east corner of the Facility through the roof	2,3,4,7,8-Pentachlorodibenzofuran [2,3,4,7,8-PeCDF]	Yes	Not Applicable
CR02	CU-150 Cremation Unit Exhaust	North-east corner of the Facility through the roof	2,3,7,8-Tetrachlorodibenzofuran [2,3,7,8-TCDF]	Yes	Not Applicable
CR02	CU-150 Cremation Unit Exhaust	North-east corner of the Facility through the roof	2,3,7,8-Tetrachlorodibenzo-p-dioxin [2,3,7,8-TCDD]	Yes	Not Applicable
CR02	CU-150 Cremation Unit Exhaust	North-east corner of the Facility through the roof	Acetaldehyde	Yes	Not Applicable
CR02	CU-150 Cremation Unit Exhaust	North-east corner of the Facility through the roof	Antimony	Yes	Not Applicable
CR02	CU-150 Cremation Unit Exhaust	North-east corner of the Facility through the roof	Arsenic and compounds	Yes	Not Applicable
CR02	CU-150 Cremation Unit Exhaust	North-east corner of the Facility through the roof	Barium - total water soluble	Yes	Not Applicable
CR02	CU-150 Cremation Unit Exhaust	North-east corner of the Facility through the roof	Benzo(a)pyrene [as a surrogate of total Polycyclic Aromatic Hydrocarbons (PAHs)]	Yes	Not Applicable
CR02	CU-150 Cremation Unit Exhaust	North-east corner of the Facility through the roof	Beryllium and Beryllium Compounds	Yes	Not Applicable
CR02	CU-150 Cremation Unit Exhaust	North-east corner of the Facility through the roof	Cadmium and Cadmium Compounds	Yes	Not Applicable
CR02	CU-150 Cremation Unit Exhaust	North-east corner of the Facility through the roof	Carbon monoxide	Yes	Not Applicable
CR02	CU-150 Cremation Unit Exhaust	North-east corner of the Facility through the roof	Chromium Compounds (hexavalent forms)	Yes	Not Applicable
CR02	CU-150 Cremation Unit Exhaust	North-east corner of the Facility through the roof	Chromium Compounds (metallic, divalent and trivalent forms)	Yes	Not Applicable
CR02	CU-150 Cremation Unit Exhaust	North-east corner of the Facility through the roof	Cobalt	Yes	Not Applicable
CR02	CU-150 Cremation Unit Exhaust	North-east corner of the Facility through the roof	Copper	Yes	Not Applicable
CR02	CU-150 Cremation Unit Exhaust	North-east corner of the Facility through the roof	Fluorides (as HF) - Gaseous (Growing Season)	Yes	Not Applicable
CR02	CU-150 Cremation Unit Exhaust	North-east corner of the Facility through the roof	Formaldehyde	Yes	Not Applicable
CR02	CU-150 Cremation Unit Exhaust	North-east corner of the Facility through the roof	Hydrogen chloride	Yes	Not Applicable
CR02	CU-150 Cremation Unit Exhaust	North-east corner of the Facility through the roof	Lead and Lead Compounds	Yes	Not Applicable



Table 1: Sources and Contaminants Identification Table

Source Information			Expected Contaminants		Included in Modelling?	
Source ID	Source Description	General Location	Contaminant	Significant (Yes/No)		Rational
CR02	CU-150 Cremation Unit Exhaust	North-east corner of the Facility through the roof	Mercury (Hg)	Yes		Not Applicable
CR02	CU-150 Cremation Unit Exhaust	North-east corner of the Facility through the roof	Molybdenum	Yes		Not Applicable
CR02	CU-150 Cremation Unit Exhaust	North-east corner of the Facility through the roof	Nickel and Nickel Compounds	Yes		Not Applicable
CR02	CU-150 Cremation Unit Exhaust	North-east corner of the Facility through the roof	Nitrogen oxides	Yes		Not Applicable
CR02	CU-150 Cremation Unit Exhaust	North-east corner of the Facility through the roof	Selenium	Yes		Not Applicable
CR02	CU-150 Cremation Unit Exhaust	North-east corner of the Facility through the roof	Silver	Yes		Not Applicable
CR02	CU-150 Cremation Unit Exhaust	North-east corner of the Facility through the roof	Sulphur dioxide	Yes		Not Applicable
CR02	CU-150 Cremation Unit Exhaust	North-east corner of the Facility through the roof	Suspended particulate matter (< 44 µm diameter)	Yes		Not Applicable
CR02	CU-150 Cremation Unit Exhaust	North-east corner of the Facility through the roof	Thallium	Yes		Not Applicable
CR02	CU-150 Cremation Unit Exhaust	North-east corner of the Facility through the roof	Vanadium	Yes		Not Applicable
CR02	CU-150 Cremation Unit Exhaust	North-east corner of the Facility through the roof	Zinc	Yes		Not Applicable
EF01	Embalming room exhaust	West side of the Facility through the south wall	Formaldehyde	Yes		Not Applicable
EF01	Embalming room exhaust	West side of the Facility through the south wall	Formic acid	Yes		Not Applicable
EF01	Embalming room exhaust	West side of the Facility through the south wall	Methanol (Methyl alcohol)	Yes		Not Applicable
EF01	Embalming room exhaust	West side of the Facility through the south wall	Perchloroethylene	Yes		Not Applicable
EF01	Embalming room exhaust	West side of the Facility through the south wall	Phenol	Yes		Not Applicable



Emission Summary and Dispersion Modelling Report for a Cremation Facility
Dryden Community Funeral Home Ltd.
Cambium Ref. No.: 8796-001

Table 2a. Source Summary Table Sorted by Contaminant

Source Data										Emissions Data					
Contaminant	Chemical Number	Source ID	Source Description	Stack Volumetric Flow Rate (m³/s)	Stack Gas Temperature (°C)	Stack Inside Diameter (m)	Stack Height Above Grade (m)	Stack Height Above Roof (m)	Source Coordinates (x, y)	Maximum Emission Rate (g/s)	Averaging Period	Emission Estimating Technique	Sample Calculation ID	Data Quality	Percentage of Total Emissions (%)
1,2,3,4,6,7,8,9-Octachlorodibenzofuran [1,2,3,4,6,7,8,9-OCDF]	39001-02-0	CR01	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.00	7.00	S11041.09, S515747.76	6.80E-11	24 hour	EF	2	Marginal	50.00%
	39001-02-0	CR02	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.00	7.00	S11041.14, S515745.61	6.80E-11	24 hour	EF	2	Marginal	50.00%
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin [1,2,3,4,6,7,8,9-OCDD]	3768-87-9	CR01	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.00	7.00	S11041.09, S515747.76	2.55E-10	24 hour	EF	2	Marginal	50.00%
	3768-87-9	CR02	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.00	7.00	S11041.14, S515745.61	2.55E-10	24 hour	EF	2	Marginal	50.00%
1,2,3,4,6,7,8-Heptachlorodibenzofuran [1,2,3,4,6,7,8-HpCDF]	67562-39-4	CR01	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.00	7.00	S11041.09, S515747.76	9.60E-11	24 hour	EF	2	Marginal	50.00%
	67562-39-4	CR02	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.00	7.00	S11041.14, S515745.61	9.60E-11	24 hour	EF	2	Marginal	50.00%
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin [1,2,3,4,6,7,8-HpCDD]	35822-46-9	CR01	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.00	7.00	S11041.09, S515747.76	1.59E-10	24 hour	EF	2	Marginal	50.00%
	35822-46-9	CR02	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.00	7.00	S11041.14, S515745.61	1.59E-10	24 hour	EF	2	Marginal	50.00%
1,2,3,4,7,8,9-Heptachlorodibenzofuran [1,2,3,4,7,8,9-HpCDF]	55673-89-7	CR01	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.00	7.00	S11041.09, S515747.76	5.84E-12	24 hour	EF	2	Marginal	50.00%
	55673-89-7	CR02	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.00	7.00	S11041.14, S515745.61	5.84E-12	24 hour	EF	2	Marginal	50.00%
1,2,3,4,7,8-Hexachlorodibenzofuran [1,2,3,4,7,8-HxCDF]	70648-26-9	CR01	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.00	7.00	S11041.09, S515747.76	4.00E-11	24 hour	EF	2	Marginal	50.00%
	70648-26-9	CR02	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.00	7.00	S11041.14, S515745.61	4.00E-11	24 hour	EF	2	Marginal	50.00%
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin [1,2,3,4,7,8-HxCDD]	39227-28-6	CR01	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.00	7.00	S11041.09, S515747.76	1.15E-11	24 hour	EF	2	Marginal	50.00%
	39227-28-6	CR02	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.00	7.00	S11041.14, S515745.61	1.15E-11	24 hour	EF	2	Marginal	50.00%



Table 2a: Source Summary Table Sorted by Contaminant

Contaminant	EPA Number	Monitor ID	Source Description	Source Data					Emissions Data				
				Stack Volume Rate (m ³ /s)	Stack Gas Temperature (°C)	Stack Inside Diameter (m)	Stack Height Above Ground (m)	Stack Height Above Stack (m)	Source Emission Rate (g/s)	Mean Effective Emission Rate (g/s)	Operating Hours	Emission Uncertainty Factor	Sample Multiplication Factor
1,2,3,6,7,8-Hexachlorodibenzofuran [1,2,3,6,7,8-HxCDF]	57117-44-9	CR01	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.00	7.00	511041.09, 5515747.76	3,58E-11	24 hour	EF	2
1,2,3,6,7,8-Hexachlorodibenzofuran [1,2,3,6,7,8-HxCDF]	57117-44-9	CR02	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.00	7.00	511041.14, 5515745.61	3,58E-11	24 hour	EF	2
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin [1,2,3,6,7,8-HxCDD]	57653-85-7	CR01	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.00	7.00	511041.09, 5515747.76	1,67E-11	24 hour	EF	2
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin [1,2,3,6,7,8-HxCDD]	57653-85-7	CR02	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.00	7.00	511041.14, 5515745.61	1,67E-11	24 hour	EF	2
1,2,3,7,8,9-Hexachlorodibenzofuran [1,2,3,7,8,9-HxCDF]	72918-21-9	CR01	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.00	7.00	511041.09, 5515747.76	7,01E-11	24 hour	EF	2
1,2,3,7,8,9-Hexachlorodibenzofuran [1,2,3,7,8,9-HxCDF]	72918-21-9	CR02	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.00	7.00	511041.14, 5515745.61	7,01E-11	24 hour	EF	2
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin [1,2,3,7,8,9-HxCDD]	13408-74-3	CR01	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.00	7.00	511041.09, 5515747.76	2,07E-11	24 hour	EF	2
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin [1,2,3,7,8,9-HxCDD]	13408-74-3	CR02	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.00	7.00	511041.14, 5515745.61	2,07E-11	24 hour	EF	2
1,2,3,7,8-Pentachlorodibenzofuran [1,2,3,7,8-PeCDF]	57117-41-6	CR01	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.00	7.00	511041.09, 5515747.76	6,17E-12	24 hour	EF	2
1,2,3,7,8-Pentachlorodibenzofuran [1,2,3,7,8-PeCDF]	57117-41-6	CR02	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.00	7.00	511041.14, 5515745.61	6,17E-12	24 hour	EF	2
1,2,3,7,8-Pentachlorodibenzo-p-dioxin [1,2,3,7,8-PeCDD]	40321-76-4	CR01	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.00	7.00	511041.09, 5515747.76	9,79E-12	24 hour	EF	2
1,2,3,7,8-Pentachlorodibenzo-p-dioxin [1,2,3,7,8-PeCDD]	40321-76-4	CR02	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.00	7.00	511041.14, 5515745.61	9,79E-12	24 hour	EF	2
2,3,4,6,7,8-Hexachlorodibenzofuran [2,3,4,6,7,8-HxCDF]	60851-34-5	CR01	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.00	7.00	511041.09, 5515747.76	1,44E-11	24 hour	EF	2
2,3,4,6,7,8-Hexachlorodibenzofuran [2,3,4,6,7,8-HxCDF]	60851-34-5	CR02	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.00	7.00	511041.14, 5515745.61	1,44E-11	24 hour	EF	2



Emission Summary and Dispersion Modelling Report for a Cremation Facility
Dryden Community Funeral Home Ltd.
Cambium Ref. No.: 8796-001

Table 2a: Source Summary Table Sorted by Contaminant

Source Data										Emissions Data					
Contaminant	CAS Number	Source ID	Source Description	Stack Volume Rate (m³/s)	Stack Gas Temperature (°C)	Stack Inside Diameter (m)	Stack Height Above Grade (m)	Stack Height Above Roof (m)	Source Emission Factor (kg/hr)	Maximum Emission Rate (kg/hr)	Averaging Period	Intersion Polluting Fraction	Sample Calculation ID	Data Quality	Percentage of Total Emissions (%)
2,3,4,7,8-Pentachlorodibenzofuran [2,3,4,7,8-PeCDF]	57117-31-4	CR01	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.00	7.00	511041.09, 5515747.76	1.86E-11	24 hour	EF	2	Marginal	50.00%
2,3,4,7,8-Pentachlorodibenzofuran [2,3,4,7,8-PeCDF]	57117-31-4	CR02	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.00	7.00	511041.14, 5515745.61	1.86E-11	24 hour	EF	2	Marginal	50.00%
2,3,7,8-Tetrachlorodibenzofuran [2,3,7,8-TCDF]	51207-31-9	CR01	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.00	7.00	511041.09, 5515747.76	2.18E-11	24 hour	EF	2	Marginal	50.00%
2,3,7,8-Tetrachlorodibenzofuran [2,3,7,8-TCDF]	51207-31-9	CR02	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.00	7.00	511041.14, 5515745.61	2.18E-11	24 hour	EF	2	Marginal	50.00%
2,3,7,8-Tetrachlorodibenzo-p-dioxin [2,3,7,8-TCDD]	1746-01-6	CR01	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.00	7.00	511041.09, 5515747.76	3.33E-12	24 hour	EF	2	Marginal	50.00%
2,3,7,8-Tetrachlorodibenzo-p-dioxin [2,3,7,8-TCDD]	1746-01-6	CR02	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.00	7.00	511041.14, 5515745.61	3.33E-12	24 hour	EF	2	Marginal	50.00%
Acetaldehyde	75-07-0	CR01	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.00	7.00	511041.09, 5515747.76	5.46E-06	24 hour & 30 minute	EF	2	Marginal	50.00%
Acetaldehyde	75-07-0	CR02	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.00	7.00	511041.14, 5515745.61	5.46E-06	24 hour & 30 minute	EF	2	Marginal	50.00%
Antimony	7440-36-0	CR01	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.00	7.00	511041.09, 5515747.76	1.26E-06	24 hour	EF	2	Marginal	50.00%
Antimony	7440-36-0	CR02	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.00	7.00	511041.14, 5515745.61	1.26E-06	24 hour	EF	2	Marginal	50.00%
Arsenic and compounds	7440-38-2	CR01	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.00	7.00	511041.09, 5515747.76	1.26E-06	24 hour	EF	2	Marginal	50.00%
Arsenic and compounds	7440-38-2	CR02	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.00	7.00	511041.14, 5515745.61	1.26E-06	24 hour	EF	2	Marginal	50.00%
Barium - total water soluble	7440-38-3	CR01	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.00	7.00	511041.09, 5515747.76	1.01E-06	24 hour	EF	2	Marginal	50.00%
Barium - total water soluble	7440-38-3	CR02	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.00	7.00	511041.14, 5515745.61	1.01E-06	24 hour	EF	2	Marginal	50.00%
Benzofluorene [as a surrogate of total Polycyclic Aromatic Hydrocarbons (PAHs)]	50-32-8	CR01	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.00	7.00	511041.09, 5515747.76	1.64E-09	annual	EF	2	Marginal	50.00%
Benzofluorene [as a surrogate of total Polycyclic Aromatic Hydrocarbons (PAHs)]	50-32-8	CR02	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.00	7.00	511041.14, 5515745.61	1.64E-09	annual	EF	2	Marginal	50.00%



Table 2a: Source Summary Table Sorted by Contaminant

Contaminant	EPA Number	Source ID	Source Description	Max. Volume (m ³ /s)	Stack Gas Temperature (°C)	Stack Inside Diameter (m)	Stack Height Above Ground (m)	Stack Height Above Roof (m)	Source Coordinates (Easting, Northing)	Emissions Data				
										Maximum Emission Rate (kg/s)	Stacking Period	Length of Emission Period	Sample Calculations	Final Quality Data Quality
Beryllium and Beryllium Compounds	7440-41-7	CR01	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.00	7.00	511041.09, 5515747.76	5.88E-08	24 hour	EF	2	Marginal
Beryllium and Beryllium Compounds	7440-41-7	CR02	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.00	7.00	511041.14, 5515745.61	5.88E-08	24 hour	EF	2	Marginal
Cadmium and Cadmium Compounds	7440-43-9	CR01	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.00	7.00	511041.09, 5515747.76	4.62E-07	24 hour	EF	2	Marginal
Cadmium and Cadmium Compounds	7440-43-9	CR02	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.00	7.00	511041.14, 5515745.61	4.62E-07	24 hour	EF	2	Marginal
Carbon monoxide	630-08-0	CR01	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.00	7.00	511041.09, 5515747.76	3.83E-02	30 minute	EF	1 & 2	Marginal
Carbon monoxide	630-08-0	CR02	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.00	7.00	511041.14, 5515745.61	3.83E-02	30 minute	EF	1 & 2	Marginal
Chromium Compounds (hexavalent forms)	18540-29-9	CR01	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.00	7.00	511041.09, 5515747.76	5.67E-07	annual	EF	2	Marginal
Chromium Compounds (hexavalent forms)	18540-29-9	CR02	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.00	7.00	511041.14, 5515745.61	5.67E-07	annual	EF	2	Marginal
Chromium Compounds (metallic, divalent and trivalent forms)	7440-47-3	CR01	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.00	7.00	511041.09, 5515747.76	1.26E-06	24 hour	EF	2	Marginal
Chromium Compounds (metallic, divalent and trivalent forms)	7440-47-3	CR02	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.00	7.00	511041.14, 5515745.61	1.26E-06	24 hour	EF	2	Marginal
Cobalt	7440-48-4	CR01	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.00	7.00	511041.09, 5515747.76	7.35E-08	24 hour	EF	2	Marginal
Cobalt	7440-48-4	CR02	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.00	7.00	511041.14, 5515745.61	7.35E-08	24 hour	EF	2	Marginal
Copper	7440-50-8	CR01	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.00	7.00	511041.09, 5515747.76	1.13E-06	24 hour	EF	2	Marginal
Copper	7440-50-8	CR02	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.00	7.00	511041.14, 5515745.61	1.13E-06	24 hour	EF	2	Marginal
Fluorides (as HF) - Gaseous (Growing Season)	7664-39-3 (growing)	CR01	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.00	7.00	511041.09, 5515747.76	2.77E-05	24 hour & 30 day	EF	2	Marginal
Fluorides (as HF) - Gaseous (Growing Season)	7664-39-3 (growing)	CR02	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.00	7.00	511041.14, 5515745.61	2.77E-05	24 hour & 30 day	EF	2	Marginal
Formaldehyde	50-00-0	CR01	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.00	7.00	511041.09, 5515747.76	2.74E-05	24 hour	EF	1 & 2	Marginal
Formaldehyde	50-00-0	CR02	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.00	7.00	511041.14, 5515745.61	2.74E-05	24 hour	EF	1 & 2	Marginal



Emission Summary and Dispersion Modelling Report for a Cremation Facility
Dryden Community Funeral Home Ltd.
Cambium Ref. No.: 8796-001

Table 2a: Source Summary Table Sorted by Contaminant

Source Data										Emissions Data					
Contaminant	CAS Type (ref)	Source ID	Source Description	Stack Volumetric Flow Rate (m³/s)	Stack Gas Temperature (°C)	Stack Inside Diameter (m)	Stack Height Above Ground (m)	Stack Height Above Roof (m)	Smelter Coordinates (N, E) (m)	Maximum Emission Rate (g/s)	Sampling Period	Emission Estimating Technique	Sampling Calculation ID	Data Quality	Percentage of Overall Emissions (%)
Formaldehyde	50-00-0	EF01	Embalming room exhaust	0.24	21	0.15	5.0	1.0	511026.34, 5515729.98	2.87E-03	24 hour	MB	3	Above-Average	98.13%
Formic acid	64-18-6	EF01	Embalming room exhaust	0.24	21	0.15	5.00	1.00	511026.34, 5515729.98	1.21E-04	24 hour	MB	3	Above-Average	100.00%
Hydrogen chloride	7647-01-0	CR01	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.0	7.0	511041.09, 5515747.76	3.02E-03	24 hour	EF	2	Marginal	50.00%
Hydrogen chloride	7647-01-0	CR02	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.00	7.00	511041.14, 5515745.61	3.02E-03	24 hour	EF	2	Marginal	50.00%
Lead and Lead Compounds	7439-92-1	CR01	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.00	7.00	511041.09, 5515747.76	2.77E-06	24 hour & 30 day	EF	2	Marginal	50.00%
Lead and Lead Compounds	7439-92-1	CR02	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.00	7.00	511041.14, 5515745.61	2.77E-06	24 hour & 30 day	EF	2	Marginal	50.00%
Mercury (Hg)	7439-97-6	CR01	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.00	7.00	511041.09, 5515747.76	1.43E-04	24 hour	EF	2	Marginal	50.00%
Mercury (Hg)	7439-97-6	CR02	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.00	7.00	511041.14, 5515745.61	1.43E-04	24 hour	EF	2	Marginal	50.00%
Methanol (Methyl alcohol)	67-56-1	EF01	Embalming room exhaust	0.24	21	0.15	5.0	1.0	511026.34, 5515729.98	4.09E-03	24 hour	MB	3	Above-Average	100.00%
Molybdenum	7439-98-7	CR01	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.0	7.0	511041.09, 5515747.76	7.01E-07	24 hour	EF	2	Marginal	50.00%
Molybdenum	7439-98-7	CR02	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.00	7.00	511041.14, 5515745.61	7.01E-07	24 hour	EF	2	Marginal	50.00%
Nickel and Nickel Compounds	7440-02-0	CR01	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.00	7.00	511041.09, 5515747.76	1.60E-06	annual	EF	2	Marginal	50.00%
Nickel and Nickel Compounds	7440-02-0	CR02	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.00	7.00	511041.14, 5515745.61	1.60E-06	annual	EF	2	Marginal	50.00%
Nitrogen oxides	10102-44-0	CR01	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.00	7.00	511041.09, 5515747.76	8.29E-02	24 hour & 1 hour	EF	1 & 2	Marginal	50.00%
Nitrogen oxides	10102-44-0	CR02	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.00	7.00	511041.14, 5515745.61	8.29E-02	24 hour & 1 hour	EF	1 & 2	Marginal	50.00%
Perchloroethylene	127-18-4	EF01	Embalming room exhaust	0.24	21	0.15	5.0	1.0	511026.34, 5515729.98	2.31E-02	24 hour	MB	3	Above-Average	100.00%
Phenol	108-95-2	EF01	Embalming room exhaust	0.24	21	0.15	5.00	1.00	511026.34, 5515729.98	4.05E-03	24 hour	MB	3	Above-Average	100.00%
Selenium	7782-49-2	CR01	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.0	7.0	511041.09, 5515747.76	1.85E-06	24 hour	EF	2	Marginal	50.00%



Table 2a: Source Summary Table Sorted by Contaminant

Source Data										Emissions Data					
Contaminant	EPA Number	Source ID	Source Description	Stack Volumetric Flow Rate (m³/s)	Stack Gas Temperature (°C)	Stack Inside Diameter (mm)	Stack Height Above Grade (m)	Stack Height Above Foot (m)	Source Coordinates (Easting, Northing)	Stack Emission Rate (g/s)	Operating Period	Exhausting Technology	Sampling Calculations (lb)	Data Quality	Percentage of Overall Emissions (%)
Selenium	7782-49-2	CR02	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.00	7.00	511041.14, 5515745.61	1.85E-06	24 hour	EF	2	Marginal	50.00%
Silver	7440-22-4	CR01	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.00	7.00	511041.09, 5515747.76	3.19E-07	24 hour	EF	2	Marginal	50.00%
Silver	7440-22-4	CR02	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.00	7.00	511041.14, 5515745.61	3.19E-07	24 hour	EF	2	Marginal	50.00%
Sulphur dioxide	7446-09-5	CR01	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.00	7.00	511041.09, 5515747.76	7.05E-03	24 hour & 1 hour	EF	1 & 2	Marginal	50.00%
Sulphur dioxide	7446-09-5	CR02	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.00	7.00	511041.14, 5515745.61	7.05E-03	24 hour & 1 hour	EF	1 & 2	Marginal	50.00%
Suspended particulate matter (< 44 µm diameter)	N/A (top)	CR01	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.00	7.00	511041.09, 5515747.76	6.20E-03	24 hour	EF	1 & 2	Marginal	50.00%
Suspended particulate matter (< 44 µm diameter)	N/A (top)	CR02	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.00	7.00	511041.14, 5515745.61	6.20E-03	24 hour	EF	1 & 2	Marginal	50.00%
Thallium	7440-28-0	CR01	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.00	7.00	511041.09, 5515747.76	3.58E-06	24 hour	EF	2	Marginal	50.00%
Thallium	7440-28-0	CR02	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.00	7.00	511041.14, 5515745.61	3.58E-06	24 hour	EF	2	Marginal	50.00%
Vanadium	7440-62-2	CR01	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.0	7.0	511041.09, 5515747.76	2.43E-06	24 hour	EF	2	Marginal	50.00%
Vanadium	7440-62-2	CR02	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.00	7.00	511041.14, 5515745.61	2.43E-06	24 hour	EF	2	Marginal	50.00%
Zinc	7440-66-6	CR01	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.00	7.00	511041.09, 5515747.76	1.47E-05	24 hour	EF	2	Marginal	50.00%
Zinc	7440-66-6	CR02	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.00	7.00	511041.14, 5515745.61	1.47E-05	24 hour	EF	2	Marginal	50.00%



Emission Summary and Dispersion Modelling Report for a Cremation Facility
Dryden Community Funeral Home Ltd.
Cambium Ref. No.: 8796-001

Table 2b: Source Summary Table Sorted by Source

Source Data															Emissions Data				
Source ID	Source Description	Stack Volume (m³/hr)	Stack Gas Temp (°C)	Stack Inside Diameter (m)	Stack Height Above Flue (m)	Source Coordinate (x, y)	Concentration (µg/m³)	CAS Number	Concentration (µg/m³)	Exposure Point (µg/m³)	Exposure Frequency (hr/yr)	Exposure Point (µg/m³)	Exposure Frequency (hr/yr)	Exposure Point (µg/m³)					
CR01	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.0	7.0	511041.09, 5515747.76	1,2,3,4,6,7,8-Octachlorodibenzofuran [1,2,3,4,6,7,8,9-OCDF]	39001-02-0	6.80E-11	24 hour	EF	2	Marginal	50.00%				
CR01	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.0	7.0	511041.09, 5515747.76	1,2,3,4,6,7,8,9-Octachlorodibenzop-dioxin [1,2,3,4,6,7,8,9-OCDD]	3268-87-9	2.55E-10	24 hour	EF	2	Marginal	50.00%				
CR01	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.0	7.0	511041.09, 5515747.76	1,2,3,4,6,7,8-Heptachlorodibenzofuran [1,2,3,4,6,7,8-HpCDF]	67562-39-4	9.60E-11	24 hour	EF	2	Marginal	50.00%				
CR01	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.0	7.0	511041.09, 5515747.76	1,2,3,4,6,7,8-Heptachlorodibenzop-dioxin [1,2,3,4,6,7,8-HpCDD]	35822-46-9	1.59E-10	24 hour	EF	2	Marginal	50.00%				
CR02	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.0	7.0	511041.09, 5515747.76	1,2,3,4,7,8-Heptachlorodibenzofuran [1,2,3,4,7,8-HpCDF]	55673-49-7	5.84E-12	24 hour	EF	2	Marginal	50.00%				
CR01	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.0	7.0	511041.09, 5515747.76	1,2,3,4,7,8-Hexachlorodibenzofuran [1,2,3,4,7,8-HxCDF]	70648-26-9	4.00E-11	24 hour	EF	2	Marginal	50.00%				
CR01	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.0	7.0	511041.09, 5515747.76	1,2,3,4,7,8-Hexachlorodibenzop-dioxin [1,2,3,4,7,8-HxCDD]	39227-28-6	1.15E-11	24 hour	EF	2	Marginal	50.00%				
CR01	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.0	7.0	511041.09, 5515747.76	1,2,3,6,7,8-Hexachlorodibenzofuran [1,2,3,6,7,8-HxCDF]	57117-44-9	3.58E-11	24 hour	EF	2	Marginal	50.00%				
CR01	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.0	7.0	511041.09, 5515747.76	1,2,3,6,7,8-Hexachlorodibenzop-dioxin [1,2,3,6,7,8-HxCDD]	57653-46-7	1.67E-11	24 hour	EF	2	Marginal	50.00%				
CR01	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.0	7.0	511041.09, 5515747.76	1,2,3,7,8,9-Hexachlorodibenzofuran [1,2,3,7,8,9-HxCDF]	72918-21-9	7.01E-11	24 hour	EF	2	Marginal	50.00%				
CR01	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.0	7.0	511041.09, 5515747.76	1,2,3,7,8,9-Hexachlorodibenzop-dioxin [1,2,3,7,8,9-HxCDD]	19408-74-3	2.07E-11	24 hour	EF	2	Marginal	50.00%				
CR01	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.0	7.0	511041.09, 5515747.76	1,2,3,7,8-Pentachlorodibenzofuran [1,2,3,7,8-PeCDF]	57117-41-6	6.17E-12	24 hour	EF	2	Marginal	50.00%				
CR01	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.0	7.0	511041.09, 5515747.76	1,2,3,7,8-Pentachlorodibenzop-dioxin [1,2,3,7,8-PeCDD]	49321-76-4	9.79E-12	24 hour	EF	2	Marginal	50.00%				
CR01	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.0	7.0	511041.09, 5515747.76	2,3,4,6,7,8-Hexachlorodibenzofuran [2,3,4,6,7,8-HxCDF]	60851-34-5	1.44E-11	24 hour	EF	2	Marginal	50.00%				
CR01	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.0	7.0	511041.09, 5515747.76	2,3,4,7,8-Pentachlorodibenzofuran [2,3,4,7,8-PeCDF]	57117-31-4	1.86E-12	24 hour	EF	2	Marginal	50.00%				
CR01	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.0	7.0	511041.09, 5515747.76	2,3,7,8-Tetrachlorodibenzofuran [2,3,7,8-TCDF]	51207-31-9	2.18E-11	24 hour	EF	2	Marginal	50.00%				



Table 2b: Source Summary Table Sorted by Source

Source Data															Emissions Data				
Source ID	Source Description	Stack Volume (m³/s)	Stack Gas Temperature (°C)	Stack Height (m)	Stack Diameter (m)	Stack Height Above Grade (m)	Source Coordinates (lat, lon)	Contaminant	CAN Timeline	Maximum Rate (g/s)	Averaging Period	Control Technology	Sample Calculation (B)	Total Daily (g)	Percentage of Overall Emissions (B)				
CR01	CU-150 Cremation Unit Exhaust	1.70	600	11.0	0.51	7.0	511041.09, 5515747.76	2,3,7,8-Tetrachlorodibenzo-p-dioxin [2,3,7,8-TCDD]	1746-01-6	3.33E-12	24 hour	EF	2	Marginal	50.00%				
CR01	CU-150 Cremation Unit Exhaust	1.70	600	11.0	0.51	7.0	511041.09, 5515747.76	Acetaldehyde	75-07-0	5.46E-06	24 hour & 30 minute	EF	2	Marginal	50.00%				
CR01	CU-150 Cremation Unit Exhaust	1.70	600	11.0	0.51	7.0	511041.09, 5515747.76	Antimony	7440-36-0	1.26E-06	24 hour	EF	2	Marginal	50.00%				
CR01	CU-150 Cremation Unit Exhaust	1.70	600	11.0	0.51	7.0	511041.09, 5515747.76	Arsenic and compounds	7440-36-2	1.26E-06	24 hour	EF	2	Marginal	50.00%				
CR01	CU-150 Cremation Unit Exhaust	1.70	600	11.0	0.51	7.0	511041.09, 5515747.76	Barium - total water soluble	7440-39-3	1.01E-06	24 hour	EF	2	Marginal	50.00%				
CR01	CU-150 Cremation Unit Exhaust	1.70	600	11.0	0.51	7.0	511041.09, 5515747.76	Benzo[a]pyrene (as a surrogate of total Polycyclic Aromatic Hydrocarbons (PAHs))	50-32-8	1.64E-09	annual	EF	2	Marginal	50.00%				
CR01	CU-150 Cremation Unit Exhaust	1.70	600	11.0	0.51	7.0	511041.09, 5515747.76	Beryllium and Beryllium Compounds	7440-41-7	5.88E-08	24 hour	EF	2	Marginal	50.00%				
CR01	CU-150 Cremation Unit Exhaust	1.70	600	11.0	0.51	7.0	511041.09, 5515747.76	Cadmium and Cadmium Compounds	7440-43-9	4.62E-07	24 hour	EF	2	Marginal	50.00%				
CR01	CU-150 Cremation Unit Exhaust	1.70	600	11.0	0.51	7.0	511041.09, 5515747.76	Carbon monoxide	630-08-0	3.83E-02	30 minute	EF	1 & 2	Marginal	50.00%				
CR01	CU-150 Cremation Unit Exhaust	1.70	600	11.0	0.51	7.0	511041.09, 5515747.76	Chromium Compounds (hexavalent forms)	18540-29-9	5.67E-07	annual	EF	2	Marginal	50.00%				
CR01	CU-150 Cremation Unit Exhaust	1.70	600	11.0	0.51	7.0	511041.09, 5515747.76	Chromium Compounds (metallic, divalent and trivalent forms)	7440-47-3	1.26E-06	24 hour	EF	2	Marginal	50.00%				
CR01	CU-150 Cremation Unit Exhaust	1.70	600	11.0	0.51	7.0	511041.09, 5515747.76	Cobalt	7440-48-4	7.35E-08	24 hour	EF	2	Marginal	50.00%				
CR01	CU-150 Cremation Unit Exhaust	1.70	600	11.0	0.51	7.0	511041.09, 5515747.76	Copper	7440-50-8	1.13E-06	24 hour	EF	2	Marginal	50.00%				
CR01	CU-150 Cremation Unit Exhaust	1.70	600	11.0	0.51	7.0	511041.09, 5515747.76	Fluorides (as HF) - Gaseous (Growing Season)	7664-39-3 (growing)	2.77E-05	24 hour & 30 day	EF	2	Marginal	50.00%				
CR01	CU-150 Cremation Unit Exhaust	1.70	600	11.0	0.51	7.0	511041.09, 5515747.76	Formaldehyde	50-00-0	2.74E-05	24 hour	EF	1 & 2	Marginal	0.94%				
CR01	CU-150 Cremation Unit Exhaust	1.70	600	11.0	0.51	7.0	511041.09, 5515747.76	Hydrogen chloride	7647-01-0	3.02E-03	24 hour	EF	2	Marginal	50.00%				



Emission Summary and Dispersion Modelling Report for a Cremation Facility
Dryden Community Funeral Home Ltd.
Cambium Ref. No.: 8796-001

Table 2b: Source Summary Table Sorted by Source

Source ID	Source Description	Source Data						Emissions Data						Percentage of Overall Emissions (%)	
		Stack Volume (m³/sec)	Stack Gas Temperature (°C)	Stack Inside Diameter (m)	Stack Height Above Grade (m)	Stack Height Above Roof (m)	Source Coordinates (x, y)	Contaminant	CAS Number	Concentration (µg/m³)	Exposure Period	Emission Factor (EF)	Sample Calculation ID		Data Quality
CR01	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.0	7.0	511041.09, 5515747.76	Lead and Lead Compounds	7439-92-1	2.77E-06	24 hour & 30 day	EF	2	Marginal	50.00%
CR01	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.0	7.0	511041.09, 5515747.76	Mercury (Hg)	7439-97-6	1.43E-04	24 hour	EF	2	Marginal	50.00%
CR01	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.0	7.0	511041.09, 5515747.76	Molybdenum	7439-98-7	7.01E-07	24 hour	EF	2	Marginal	50.00%
CR01	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.0	7.0	511041.09, 5515747.76	Nickel and Nickel Compounds	7440-02-0	1.60E-06	annual	EF	2	Marginal	50.00%
CR01	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.0	7.0	511041.09, 5515747.76	Nitrogen oxides	10101-44-0	8.29E-02	24 hour & 1 hour	EF	1 & 2	Marginal	50.00%
CR01	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.0	7.0	511041.09, 5515747.76	Selenium	7782-49-2	1.85E-06	24 hour	EF	2	Marginal	50.00%
CR01	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.0	7.0	511041.09, 5515747.76	Silver	7440-22-4	3.19E-07	24 hour	EF	2	Marginal	50.00%
CR01	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.0	7.0	511041.09, 5515747.76	Sulphur dioxide	7446-09-5	7.05E-03	24 hour & 1 hour	EF	1 & 2	Marginal	50.00%
CR01	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.0	7.0	511041.09, 5515747.76	Suspended particulate matter (< 4.4 µm diameter)	N/A (tsp)	6.20E-03	24 hour	EF	1 & 2	Marginal	50.00%
CR01	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.0	7.0	511041.09, 5515747.76	Thallium	7440-28-0	3.58E-06	24 hour	EF	2	Marginal	50.00%
CR01	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.0	7.0	511041.09, 5515747.76	Vanadium	7440-62-2	2.43E-06	24 hour	EF	2	Marginal	50.00%
CR01	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.0	7.0	511041.09, 5515747.76	Zinc	7440-66-6	1.47E-05	24 hour	EF	2	Marginal	50.00%
CR02	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.00	7.00	511041.14, 5515745.61	1,2,3,4,6,7,8,9-Octachlorodibenzofuran [1,2,3,4,6,7,8,9-OCDF]	39001-02-0	6.80E-11	24 hour	EF	2	Marginal	50.00%
CR02	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.00	7.00	511041.14, 5515745.61	1,2,3,4,6,7,8-Octachlorodibenzo-p-dioxin [1,2,3,4,6,7,8,9-OCDD]	3268-87-9	2.55E-10	24 hour	EF	2	Marginal	50.00%
CR02	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.00	7.00	511041.14, 5515745.61	1,2,3,4,6,7,8-Heptachlorodibenzofuran [1,2,3,4,6,7,8-HpCDF]	67562-39-4	9.60E-11	24 hour	EF	2	Marginal	50.00%
CR02	CU-150 Cremation Unit Exhaust	1.70	600	0.51	11.00	7.00	511041.14, 5515745.61	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin [1,2,3,4,6,7,8-HpCDD]	35822-46-9	1.59E-10	24 hour	EF	2	Marginal	50.00%



Table 2b: Source Summary Table Sorted by Source

Source Data										Emissions Data					
Source ID	Source Designation	Stack Volume (m³/s)	Stack Gas Temperature (°C)	Stack Gas Diameter (m)	Stack Height Above Grade (m)	Stack Height Above Stack (m)	Source Coordinates (Easting, Northing)	Contaminant	CES Facility	Default Emission Rate (g/s)	Average Period	Emission Estimation Method	Sample Calculations (g/s)	Data Quality	Percentage of Default Emissions (%)
CR02	CU-150 Cremation Unit	1.70	600	0.51	11.00	7.00	511041.14, 5515745.61	1,2,3,4,7,8,9-Hexachlorodibenzofuran [1,2,3,4,7,8,9-HxCDF]	55673.49-7	5.84E-12	24 hour	EF	2	Marginal	50.00%
CR02	CU-150 Cremation Unit	1.70	600	0.51	11.00	7.00	511041.14, 5515745.61	1,2,3,4,7,8-Hexachlorodibenzofuran [1,2,3,4,7,8-HxCDF]	70648.26-9	4.00E-11	24 hour	EF	2	Marginal	50.00%
CR02	CU-150 Cremation Unit	1.70	600	0.51	11.00	7.00	511041.14, 5515745.61	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin [1,2,3,4,7,8-HxCDD]	39227.28-6	1.15E-11	24 hour	EF	2	Marginal	50.00%
CR02	CU-150 Cremation Unit	1.70	600	0.51	11.00	7.00	511041.14, 5515745.61	1,2,3,6,7,8-Hexachlorodibenzofuran [1,2,3,6,7,8-HxCDF]	57117.44-9	3.58E-11	24 hour	EF	2	Marginal	50.00%
CR02	CU-150 Cremation Unit	1.70	600	0.51	11.00	7.00	511041.14, 5515745.61	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin [1,2,3,6,7,8-HxCDD]	57653.85-7	1.67E-11	24 hour	EF	2	Marginal	50.00%
CR02	CU-150 Cremation Unit	1.70	600	0.51	11.00	7.00	511041.14, 5515745.61	1,2,3,7,8,9-Hexachlorodibenzofuran [1,2,3,7,8,9-HxCDF]	72918.21-9	7.01E-11	24 hour	EF	2	Marginal	50.00%
CR02	CU-150 Cremation Unit	1.70	600	0.51	11.00	7.00	511041.14, 5515745.61	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin [1,2,3,7,8,9-HxCDD]	19408.74-3	2.07E-11	24 hour	EF	2	Marginal	50.00%
CR02	CU-150 Cremation Unit	1.70	600	0.51	11.00	7.00	511041.14, 5515745.61	1,2,3,7,8-Pentachlorodibenzofuran [1,2,3,7,8-PeCDF]	57117.41-6	6.17E-12	24 hour	EF	2	Marginal	50.00%
CR02	CU-150 Cremation Unit	1.70	600	0.51	11.00	7.00	511041.14, 5515745.61	1,2,3,7,8-Pentachlorodibenzo-p-dioxin [1,2,3,7,8-PeCDD]	40321.76-4	9.79E-12	24 hour	EF	2	Marginal	50.00%
CR02	CU-150 Cremation Unit	1.70	600	0.51	11.00	7.00	511041.14, 5515745.61	2,3,4,6,7,8-Hexachlorodibenzofuran [2,3,4,6,7,8-HxCDF]	60851.34-5	1.44E-11	24 hour	EF	2	Marginal	50.00%
CR02	CU-150 Cremation Unit	1.70	600	0.51	11.00	7.00	511041.14, 5515745.61	2,3,4,7,8-Pentachlorodibenzofuran [2,3,4,7,8-PeCDF]	57117.31-4	1.86E-11	24 hour	EF	2	Marginal	50.00%
CR02	CU-150 Cremation Unit	1.70	600	0.51	11.00	7.00	511041.14, 5515745.61	2,3,7,8-Tetrachlorodibenzofuran (2,3,7,8-TCDF)	51207.31-9	2.18E-11	24 hour	EF	2	Marginal	50.00%
CR02	CU-150 Cremation Unit	1.70	600	0.51	11.00	7.00	511041.14, 5515745.61	2,3,7,8-Tetrachlorodibenzo-p-dioxin [2,3,7,8-TCDD]	1745.01-6	3.33E-12	24 hour	EF	2	Marginal	50.00%
CR02	CU-150 Cremation Unit	1.70	600	0.51	11.00	7.00	511041.14, 5515745.61	Acetaldehyde	75.07-0	5.46E-06	24 hour & 30 minute	EF	2	Marginal	50.00%
CR02	CU-150 Cremation Unit	1.70	600	0.51	11.00	7.00	511041.14, 5515745.61	Antimony	7440.36-0	1.26E-06	24 hour	EF	2	Marginal	50.00%
CR02	CU-150 Cremation Unit	1.70	600	0.51	11.00	7.00	511041.14, 5515745.61	Arsenic and compounds	7440.38-2	1.26E-06	24 hour	EF	2	Marginal	50.00%



Emission Summary and Dispersion Modelling Report for a Cremation Facility
Dryden Community Funeral Home Ltd.
Cambium Ref. No.: 8796-001

Table 2b: Source Summary Table Sorted by Source

Source Data										Emissions Data					
Source ID	Source Description	Stack Volumetric Flow Rate (m³/s)	Stack Gas Temperature (°C)	Stack Inside Diameter (m)	Stack Height Above Grade (m)	Stack Height Above Roof (m)	Source Coordinates (Easting, Northing)	Contaminant	CAS Number	Maximum Emission Rate (g/s)	Averaging Period	Emission Estimating Refinement	Sample Calculation(s)	Data Quality	Percentage of Overall Emissions (%)
CR02	CU-150 Cremation Unit	1.70	600	0.51	11.00	7.00	511041.14, 5515745.61	Barium - total water soluble	7440-39-3	1.01E-06	24 hour	EF	2	Marginal	50.00%
CR02	CU-150 Cremation Unit	1.70	600	0.51	11.00	7.00	511041.14, 5515745.61	Benzo(a)pyrene (as a surrogate of total Polycyclic Aromatic Hydrocarbons (PAHs))	50-32-8	1.64E-09	annual	EF	2	Marginal	50.00%
CR02	CU-150 Cremation Unit	1.70	600	0.51	11.00	7.00	511041.14, 5515745.61	Beryllium and Beryllium Compounds	7440-41-7	5.88E-08	24 hour	EF	2	Marginal	50.00%
CR02	CU-150 Cremation Unit	1.70	600	0.51	11.00	7.00	511041.14, 5515745.61	Cadmium and Cadmium Compounds	7440-43-9	4.62E-07	24 hour	EF	2	Marginal	50.00%
CR02	CU-150 Cremation Unit	1.70	600	0.51	11.00	7.00	511041.14, 5515745.61	Carbon monoxide	630-08-0	3.83E-02	30 minute	EF	1 & 2	Marginal	50.00%
CR02	CU-150 Cremation Unit	1.70	600	0.51	11.00	7.00	511041.14, 5515745.61	Chromium Compounds (hexavalent forms)	18540-29-9	5.67E-07	annual	EF	2	Marginal	50.00%
CR02	CU-150 Cremation Unit	1.70	600	0.51	11.00	7.00	511041.14, 5515745.61	Chromium Compounds (metallic, divalent and trivalent forms)	7440-47-3	1.26E-06	24 hour	EF	2	Marginal	50.00%
CR02	CU-150 Cremation Unit	1.70	600	0.51	11.00	7.00	511041.14, 5515745.61	Cobalt	7440-48-4	7.35E-08	24 hour	EF	2	Marginal	50.00%
CR02	CU-150 Cremation Unit	1.70	600	0.51	11.00	7.00	511041.14, 5515745.61	Copper	7440-50-8	1.13E-06	24 hour	EF	2	Marginal	50.00%
CR02	CU-150 Cremation Unit	1.70	600	0.51	11.00	7.00	511041.14, 5515745.61	Fluorides (as HF) - Gaseous (Growing Season)	7664-39-3 (growing)	2.77E-05	24 hour & 30 day	EF	2	Marginal	50.00%
CR02	CU-150 Cremation Unit	1.70	600	0.51	11.00	7.00	511041.14, 5515745.61	Formaldehyde	50-00-0	2.74E-05	24 hour	EF	1 & 2	Marginal	0.94%
CR02	CU-150 Cremation Unit	1.70	600	0.51	11.00	7.00	511041.14, 5515745.61	Hydrogen chloride	7647-01-0	3.02E-03	24 hour	EF	2	Marginal	50.00%
CR02	CU-150 Cremation Unit	1.70	600	0.51	11.00	7.00	511041.14, 5515745.61	Lead and Lead Compounds	7439-92-1	2.77E-06	24 hour & 30 day	EF	2	Marginal	50.00%
CR02	CU-150 Cremation Unit	1.70	600	0.51	11.00	7.00	511041.14, 5515745.61	Mercury (Hg)	7439-97-6	1.43E-04	24 hour	EF	2	Marginal	50.00%
CR02	CU-150 Cremation Unit	1.70	600	0.51	11.00	7.00	511041.14, 5515745.61	Molybdenum	7439-98-7	7.01E-07	24 hour	EF	2	Marginal	50.00%
CR02	CU-150 Cremation Unit	1.70	600	0.51	11.00	7.00	511041.14, 5515745.61	Nickel and Nickel Compounds	7440-02-0	1.60E-06	annual	EF	2	Marginal	50.00%



Table 2b: Source Summary Table Sorted by Source

Emissions Data														
Source ID	Source Description	Source Data					Emissions Data							
		Stack Height Above Ground (m)	Stack Height Above Stack (m)	Stack Exit Temperature (°C)	Stack Exit Diameter (m)	Source Coordinates (x, y)	Contaminant	CAS Number	Maximum Emission Rate (kg/s)	Operating Hours (hr/yr)	Intemum. Emission Factor (lb/hr)	Sample Frequency (times/yr)	Data Quality	Percentage of Total Emissions (%)
CR02	CU-150 Cremation Unit	1.70	0.51	600	0.51	511041.14, 5515745.61	Nitrogen oxides	10102-44-0	8.29E-02	24 hour & 1 hour	EF	1 & 2	Marginal	50.00%
CR02	CU-150 Cremation Unit	1.70	0.51	600	0.51	511041.14, 5515745.61	Selenium	7782-49-2	1.85E-06	24 hour	EF	2	Marginal	50.00%
CR02	CU-150 Cremation Unit	1.70	0.51	600	0.51	511041.14, 5515745.61	Silver	7440-22-4	3.19E-07	24 hour	EF	2	Marginal	50.00%
CR02	CU-150 Cremation Unit	1.70	0.51	600	0.51	511041.14, 5515745.61	Sulphur dioxide	7446-09-5	7.05E-03	24 hour & 1 hour	EF	1 & 2	Marginal	50.00%
CR02	CU-150 Cremation Unit	1.70	0.51	600	0.51	511041.14, 5515745.61	Suspended particulate matter (< 44 µm diameter)	N/A (tip)	6.20E-03	24 hour	EF	1 & 2	Marginal	50.00%
CR02	CU-150 Cremation Unit	1.70	0.51	600	0.51	511041.14, 5515745.61	Thallium	7440-28-0	3.58E-06	24 hour	EF	2	Marginal	50.00%
CR02	CU-150 Cremation Unit	1.70	0.51	600	0.51	511041.14, 5515745.61	Vanadium	7440-62-2	2.43E-06	24 hour	EF	2	Marginal	50.00%
CR02	CU-150 Cremation Unit	1.70	0.51	600	0.51	511041.14, 5515745.61	Zinc	7440-66-6	1.47E-05	24 hour	EF	2	Marginal	50.00%
EF01	Embalming room exhaust	0.24	0.15	21	0.15	511026.34, 5515729.98	Formaldehyde	50-00-0	2.87E-03	24 hour	MB	3	Above-Average	98.13%
EF01	Embalming room exhaust	0.24	0.15	21	0.15	511026.34, 5515729.98	Formic acid	64-18-6	1.21E-04	24 hour	MB	3	Above-Average	100.00%
EF01	Embalming room exhaust	0.24	0.15	21	0.15	511026.34, 5515729.98	Methanol (Methyl alcohol)	67-56-1	4.05E-03	24 hour	MB	3	Above-Average	100.00%
EF01	Embalming room exhaust	0.24	0.15	21	0.15	511026.34, 5515729.98	Perchloroethylene	127-18-4	2.31E-02	24 hour	MB	3	Above-Average	100.00%
EF01	Embalming room exhaust	0.24	0.15	21	0.15	511026.34, 5515729.98	Phenol	108-95-2	4.05E-03	24 hour	MB	3	Above-Average	100.00%



Table 3: Dispersion Modelling Input Summary Table

Relevant Section of the Regulation	Section Title	Description of How the Approved Dispersion Model was Used
Section 6	Approved Air Dispersion (include Model Versions)	Regional pre-processed meteorological data by MECP v19191 AERMET v19191 (incl. in Met Data) BPIP v04274 AERMAP v18081 AERMOD v19191
Section 8	Negligible Sources	If any sources are deemed negligible they are discussed in Section 3 and Appendix B of the ESDM Report. Any negligible sources identified using the guidance provided in section 7 of The ESDM Procedure Document were not included in modelling as per section 8 of O. Reg. 419/05
Section 9	Same Structure Contamination	Same Structure Contamination has not been assessed as the Facility is not in a multi-tenant building.
Section 10	Operating Conditions	All equipment was assumed to be operating at the maximum production rates at the same time during their applicable hours of operation. See section 4.1 and Appendix A of the ESDM report.
Section 11	Source of Contaminant Emission Rates	See section 4.2 and Appendix A of the ESDM Report for more information.
Section 12	Combined Effect of Assumptions for Operating Conditions and Emission Rates	See section 4.1 and Appendix A of the ESDM Report for more information.
Section 13	Meteorological Conditions (include AERMET Version)	The preprocessed meteorological data (AERMOD v19191) was used as provided from the MECP website for the Northern region. The meteorological data set consists of five years (1996-2000) of hourly readings for surface and upper air conditions.
Section 14	Area of Modelling Coverage	The area of modelling coverage was designed to meet the requirements outlined in O. Reg. 419/05, s 14. A multi-tiered receptor grid was developed with reference to section 7.2 of the ADMGO; therefore interval spacing was dependent on the receptor distance from on-site sources.
Section 15	Stack Height for Certain New Sources of Contaminant	See Table 2 - Source Summary Table; no stack heights in this model (actual or modelled) exceed the restriction in section 15 of O. Reg. 419/05.
Section 16	Terrain Data	See Section 6.4 of the report; Terrain information for the area surrounding the facility was obtained from the MECP Ontario Digital Elevation Model Data web site. The terrain data is based on the North American Datum 1983 (NAD83) horizontal reference datum. These data were run through the AERMAP terrain pre-processor to estimate base elevations for receptors and to help the model account for changes in elevation of the surrounding terrain.
Section 17	Averaging Periods	The appropriate averaging periods (as defined by the regulatory limits outlined in Schedule 3, and the listing of the MECP Guidelines) were modelled for each contaminant. Emission rates were calculated based on averaging periods that matched the averaging period of the respective criterion. See section 6.7 of O. Reg. 419/05.



Table 4: Emission Summary Table

Contaminant	CAS #	Total Facility Emission Rate (g/s)	Averaging Period	Limiting Effect	Schedule	Ministry POI Limit (µg/m ³)	Maximum AERMOD POI Concentration (µg/m ³)	Percentage of Ministry POI Limit (%)	Air Dispersion Model Used
Acetaldehyde	75-07-0	1.09E-05	24 hour	Health	Standard	500	1.67E-03	0.00%	AERMOD 19191
Acetaldehyde	75-07-0	1.09E-05	24 hour	URT	URT	5000	1.67E-03	0.00%	AERMOD 19191
Acetaldehyde	75-07-0	1.09E-05	30 minute	Health	Standard	500	7.09E-03	0.00%	AERMOD 19191
Antimony	7440-36-0	2.52E-06	24 hour	Health	Standard	25	3.85E-04	0.00%	AERMOD 19191
Arsenic and compounds	7440-38-2	2.52E-06	24 hour	Health	Guideline	0.3	3.85E-04	0.13%	AERMOD 19191
Barium - total water soluble	7440-39-3	2.02E-06	24 hour	Health	Guideline	10	3.09E-04	0.00%	AERMOD 19191
Benzo[a]pyrene (as a surrogate of total Polycyclic Aromatic Hydrocarbons (PAHs))	50-32-8	3.27E-09	24 hour	Health	DAV	0.005	5.02E-07	0.01%	AERMOD 19191
Benzo[a]pyrene (as a surrogate of total Polycyclic Aromatic Hydrocarbons (PAHs))	50-32-8	3.27E-09	24 hour	URT	URT	0.005	5.02E-07	0.01%	AERMOD 19191
Benzo[a]pyrene (as a surrogate of total Polycyclic Aromatic Hydrocarbons (PAHs))	50-32-8	3.27E-09	annual	Health	AAV	0.0001	3.86E-08	0.04%	AERMOD 19191
Benzo[a]pyrene (as a surrogate of total Polycyclic Aromatic Hydrocarbons (PAHs))	50-32-8	3.27E-09	annual	Health	Standard	0.00001	3.86E-08	0.39%	AERMOD 19191
Beryllium and Beryllium Compounds	7440-41-7	1.18E-07	24 hour	Health	Standard	0.01	1.80E-05	0.18%	AERMOD 19191
Cadmium and Cadmium Compounds	7440-43-9	9.24E-07	24 hour	Health	Standard	0.025	1.41E-04	0.56%	AERMOD 19191
Cadmium and Cadmium Compounds	7440-43-9	9.24E-07	24 hour	URT	URT	0.25	1.41E-04	0.06%	AERMOD 19191



Table 4: Emission Summary Table

Contaminant	CAS #	Total Facility Emission Rate (g/s)	Averaging Period	Limiting Effect	Schedule	Ministry POI Limit (µg/m ³)	Maximum AERMOD POI Concentration (µg/m ³)	Percentage of Ministry POI Limit (%)	Air Dispersion Model Used
Carbon monoxide	630-08-0	7.66E-02	30 minute	Health	Standard	6000	4.98E+01	0.83%	AERMOD 19191
Chromium Compounds (hexavalent forms)	18540-29-9	1.13E-06	24 hour	Health	DAV	0.07	1.73E-04	0.25%	AERMOD 19191
Chromium Compounds (hexavalent forms)	18540-29-9	1.13E-06	24 hour	URT	URT	0.07	1.73E-04	0.25%	AERMOD 19191
Chromium Compounds (hexavalent forms)	18540-29-9	1.13E-06	annual	Health	AAV	0.0014	1.33E-05	0.95%	AERMOD 19191
Chromium Compounds (hexavalent forms)	18540-29-9	1.13E-06	annual	Health	Standard	0.00014	1.33E-05	9.50%	AERMOD 19191
Chromium Compounds (metallic, divalent and trivalent forms)	7440-47-3	2.51E-06	24 hour	Health	Standard	0.5	3.85E-04	0.08%	AERMOD 19191
Chromium Compounds (metallic, divalent and trivalent forms)	7440-47-3	2.51E-06	24 hour	URT	URT	5	3.85E-04	0.01%	AERMOD 19191
Cobalt	7440-48-4	1.47E-07	24 hour	Health	Guideline	0.1	2.25E-05	0.02%	AERMOD 19191
Copper	7440-50-8	2.27E-06	24 hour	Health	Standard	50	3.46E-04	0.00%	AERMOD 19191
Dioxins, Furans and Dioxin-like PCBs	N/A (diox)	1.71E-09	24 hour	Health	Standard	0.1	1.37E-08	0.00%	AERMOD 19191
Dioxins, Furans and Dioxin-like PCBs	N/A (diox)	1.71E-09	24 hour	URT	URT	1	1.37E-08	0.00%	AERMOD 19191
Fluorides (as HF) - Gaseous (Growing Season)	7664-39-3 (growing)	5.54E-05	24 hour	Vegetation	Standard	0.86	8.47E-03	0.99%	AERMOD 19191
Fluorides (as HF) - Gaseous (Growing Season)	7664-39-3 (growing)	5.54E-05	30 day	Vegetation	Standard	0.34	1.28E-03	0.38%	AERMOD 19191
Formaldehyde	50-00-0	2.92E-03	24 hour	Health	Standard	65	5.23E+00	8.05%	AERMOD 19191
Formic acid	64-18-6	1.21E-04	24 hour	Health	Standard	500	2.20E-01	0.04%	AERMOD 19191
Hydrogen chloride	7647-01-0	6.05E-03	24 hour	Health	Standard	20	9.25E-01	4.62%	AERMOD 19191



Table 4: Emission Summary Table

Contaminant	CAS #	Total Facility Emission Rate (g/s)	Averaging Period	Limiting Effect	Schedule	Ministry POI Limit (µg/m ³)	Maximum AERMOD POI Concentration (µg/m ³)	Percentage of Ministry POI Limit (%)	Air Dispersion Model Used
Hydrogen chloride	7647-01-0	6.05E-03	24 hour	URT	URT	200	9.25E-01	0.46%	AERMOD 19191
Lead and Lead Compounds	7439-92-1	5.54E-06	24 hour	Health	Standard	0.5	8.47E-04	0.17%	AERMOD 19191
Lead and Lead Compounds	7439-92-1	5.54E-06	24 hour	URT	URT	2	8.47E-04	0.04%	AERMOD 19191
Lead and Lead Compounds	7439-92-1	5.54E-06	30 day	Health	Standard	0.2	1.28E-04	0.06%	AERMOD 19191
Mercury (Hg)	7439-97-6	2.86E-04	24 hour	Health	Standard	2.5	4.37E-02	1.75%	AERMOD 19191
Methanol (Methyl alcohol)	67-56-1	4.09E-03	24 hour	Health	Standard	4000	7.46E+00	0.19%	AERMOD 19191
Molybdenum	7439-98-7	1.40E-06	24 hour	Particulate	Guideline	120	2.14E-04	0.00%	AERMOD 19191
Nickel and Nickel Compounds	7440-02-0	3.19E-06	24 hour	Health	DAV	2	4.89E-04	0.02%	AERMOD 19191
Nickel and Nickel Compounds	7440-02-0	3.19E-06	24 hour	URT	URT	2	4.89E-04	0.02%	AERMOD 19191
Nickel and Nickel Compounds	7440-02-0	3.19E-06	annual	Health	AAV	0.4	3.76E-05	0.01%	AERMOD 19191
Nickel and Nickel Compounds	7440-02-0	3.19E-06	annual	Health	Standard	0.04	3.76E-05	0.09%	AERMOD 19191
Nitrogen oxides	10102-44-0	1.66E-01	1 hour	Health	Standard	400	8.87E+01	22.17%	AERMOD 19191
Nitrogen oxides	10102-44-0	1.66E-01	24 hour	Health	Standard	200	2.54E+01	12.68%	AERMOD 19191
Perchloroethylene	127-18-4	2.31E-02	24 hour	Health	Standard	360	4.21E+01	11.69%	AERMOD 19191
Perchloroethylene	127-18-4	2.31E-02	24 hour	URT	URT	3600	4.21E+01	1.17%	AERMOD 19191
Phenol	108-95-2	4.05E-03	24 hour	Health	Standard	30	7.39E+00	24.64%	AERMOD 19191
Phenol	108-95-2	4.05E-03	24 hour	URT	URT	300	7.39E+00	2.46%	AERMOD 19191



Table 4: Emission Summary Table

Contaminant	CAS #	Total Facility Emission Rate (g/s)	Averaging Period	Limiting Effect	Schedule	Ministry POI Limit (µg/m ³)	Maximum AERMOD POI Concentration (µg/m ³)	Percentage of Ministry POI Limit (%)	Air Dispersion Model Used
Selenium	7782-49-2	3.70E-06	24 hour	Health	Guideline	10	5.66E-04	0.01%	AERMOD 19191
Silver	7440-22-4	6.38E-07	24 hour	Health	Standard	1	9.76E-05	0.01%	AERMOD 19191
Sulphur dioxide	7446-09-5	1.41E-02	1 hour	Health & Vegetation	Standard	790	7.54E+00	0.95%	AERMOD 19191
Sulphur dioxide	7446-09-5	1.41E-02	1 hour	URT	URT	690	7.54E+00	1.09%	AERMOD 19191
Sulphur dioxide	7446-09-5	1.41E-02	24 hour	Health & Vegetation	Standard	275	2.16E+00	0.78%	AERMOD 19191
Sulphur dioxide	7446-09-5	1.41E-02	annual	Health & Vegetation	Standard	10	1.66E-01	1.66%	AERMOD 19191
Suspended particulate matter (< 44 µm)	N/A (tsp)	1.24E-02	24 hour	Visibility	Standard	120	1.90E+00	1.58%	AERMOD 19191
Thallium	7440-28-0	7.16E-06	24 hour	Health	SL-JSL	0.5	1.09E-03	0.22%	AERMOD 19191
Vanadium	7440-62-2	4.86E-06	24 hour	Health	Standard	2	7.43E-04	0.04%	AERMOD 19191
Zinc	7440-66-6	2.94E-05	24 hour	Particulate	Standard	120	4.50E-03	0.00%	AERMOD 19191

Notes

¹ Benzo(a)pyrene (B(a)P) is a surrogate for all polycyclic aromatic hydrocarbons (PAHs). Therefore, the maximum modelled POI concentration of B(a)P was compared to the air standard, and because it meets the air standard all other PAHs which are emitted were considered to have negligible adverse effects. This methodology follows the guidance presented under note 7 of the ACB List (MOECC, 2018a).

² The air standard for dioxins, furans, and dioxin-like PCBs requires the calculation of the total toxicity equivalent (TEQ) concentration contributed by all dioxin-like compounds in the mixture. In accordance with subsection 1 (2.0.2) of O. Reg. 419/05, the following formula was used to calculate the total concentration of dioxins, furans and dioxin-like PCBs.

$A = \sum(B \times C)$, where,

A = the amount (or concentration) of total dioxins, furans and dioxin-like PCBs in TEQ,

B = the amount (or concentration) of each dioxin-like compound,

C = the corresponding TEF for each dioxin-like compound listed in Schedule 8 of O. Reg. 419/05.



Appendix A – Supporting Calculations



Calculation 1: Cremator Emissions From Natural Gas Combustion Heating

Maximum Burner Fuel Input¹ = 2.8 MMBTU/hr

Major contaminant emissions in natural gas combustion

Contaminant	CAS #	Emission Factor ² (lb/10 ⁶ scf)	Emission Rate ³ (g/s)	Emission Factor Rating
Nitrogen Oxides	10102-44-0	100	3.46E-02	B
Carbon Monoxide	630-08-0	84	2.91E-02	B
Suspended particulate matter ($< 44 \mu\text{m}$ diameter)	N/A (tsp)	7.6	2.63E-03	D
Sulphur Dioxide	7446-09-5	0.6	2.08E-04	A

Less significant contaminant emissions from natural gas combustion⁴

Contaminant	CAS #	Emission Factor ² (lb/10 ⁶ scf)	Emission Rate ³ (g/s)	Emission Factor Rating ⁵
Acenaphthene	83-32-9	1.80E-06	6.23E-10	E (Below MLD)
Anthracene	120-12-7	2.40E-06	8.30E-10	E (Below MLD)
Benz(a)anthracene	56-55-3	1.80E-06	6.23E-10	E (Below MLD)
Benzo(a)pyrene [as a surrogate of total Polycyclic Aromatic Hydrocarbons (PAHs)]	50-32-8	1.20E-06	4.15E-10	E (Below MLD)
Benzo(b)fluoranthene	205-99-2	1.80E-06	6.23E-10	E (Below MLD)
Benzo(g,h,i)perylene	191-24-2	1.20E-06	4.15E-10	E (Below MLD)
Benzo(k)fluoranthene	207-08-9	1.80E-06	6.23E-10	E (Below MLD)
Chrysene	218-01-9	1.80E-06	6.23E-10	E (Below MLD)
Dibenzo(a,h)anthracene	53-70-3	1.20E-06	4.15E-10	E (Below MLD)
Fluoranthene	206-44-0	3.00E-06	1.04E-09	E
Fluorene	86-73-7	2.80E-06	9.68E-10	E
Formaldehyde	50-00-0	7.50E-02	2.59E-05	B
Indeno(1,2,3-cd)pyrene	193-39-5	1.80E-06	6.23E-10	E (Below MLD)
Phenanthrene	85-01-8	1.70E-05	5.88E-09	D
Pyrene	129-00-0	5.00E-06	1.73E-09	E

Notes:

- ¹ Heat input rate obtained from equipment manufacturing specifications.
- ² Emission Factors from USEPA AP-42 Emission Factors, Fifth Edition, Volume 1 Chapter 1: External Combustion Sources for a small uncontrolled boiler $< 100 \text{ MMBtu/hr}$.
- ³ Emission factor based on a natural gas heating value of 1,020 Btu/scf. Conversions of 453.59 g/lb and 3600 s/hr, were also applied.
- ⁴ Less significant contaminant emissions assessed because of the possible compounding affects with other cremation activities.
- ⁵ Emission Factor ratings follow the convention in the US EPA's AP-42 Compilation of Air Pollutant Emission Factors, Volume I document; a rating of "U" denotes an unrated emission factor. Emission factors denoted "Below MLD" corresponds to a factor that is below the limit of detection during testing.



Calculation 2: Emissions per Cremation Unit

Maximum Daily Usage¹ = 4 cadavers/day
 Averaged Maximum Hourly Usage² = 0.33 cadavers/hr

Major contaminant emissions from cremation

Contaminant	CAS #	Emission Factor ³ (lb/cadaver)	Emission Rate ⁴ (g/s)	Emission Factor Rating ⁵
Carbon Monoxide	630-08-0	2.20E-01	9.26E-03	U
Nitrogen Oxides	10102-44-0	1.15E+00	4.83E-02	U
Suspended particulate matter ($< 44 \mu\text{m}$ diameter)	N/A (tsp)	8.50E-02	3.57E-03	U
Sulphur Dioxide	7446-09-5	1.63E-01	6.84E-03	U

Less significant contaminant emissions from cremation

Contaminant	CAS #	Emission Factor ³ (lb/cadaver)	Emission Rate ⁴ (g/s)	Emission Factor Rating ⁵
Acenaphthene	83-32-9	1.11E-07	4.66E-09	U
Acenaphthylene	208-96-8	1.22E-07	5.12E-09	U
Anthracene	120-12-7	3.24E-07	1.36E-08	U
Acetaldehyde	75-07-0	1.30E-04	5.46E-06	U
Antimony	7440-36-0	3.00E-05	1.26E-06	Below LOD
Arsenic and compounds	7440-38-2	3.00E-05	1.26E-06	Below LOD
Barium - total water soluble	7440-39-3	2.40E-05	1.01E-06	U
Benzo(a)anthracene	56-55-3	9.76E-09	4.10E-10	Below LOD
Benzo(p)fluoranthene	205-99-2	1.59E-08	6.68E-10	Below LOD
Benzo(ghi)perylene	191-24-2	2.91E-08	1.22E-09	Below LOD
Benzo(k)fluoranthene	207-08-9	1.42E-08	5.96E-10	Below LOD
Beryllium and Beryllium compounds	7440-41-7	1.40E-06	5.88E-08	U
Cadmium and Cadmium Compounds	7440-43-9	1.10E-05	4.62E-07	U
Chromium Compounds (metallic, divalent and trivalent forms)	7440-47-3	2.99E-05	1.26E-06	U
Chromium Compounds (hexavalent forms)	18540-29-9	1.35E-05	5.67E-07	U
Chrysene	218-01-9	1.75E-06	7.35E-08	Below LOD
Cobalt	7440-48-4	1.75E-06	7.35E-08	Below LOD
Copper	7440-50-8	2.70E-05	1.13E-06	U
Dibenzo(ah)anthracene	53-70-3	1.27E-08	5.33E-10	Below LOD
Fluoranthene	206-44-0	2.05E-07	8.61E-09	U
Fluorene	86-73-7	4.17E-07	1.75E-08	U
Formaldehyde ⁶	50-00-0	3.40E-05	1.43E-06	U
Hydrogen Chloride	7647-01-0	7.20E-02	3.02E-03	U
Fluorides (as HF) - Gaseous (Growing Season)	7664-39-3	6.60E-04	2.77E-05	U
Indeno(123-cd)pyrene	193-39-5	1.54E-08	6.47E-10	Below LOD
Lead and Lead Compounds	7439-92-1	6.60E-05	2.77E-06	U
Mercury (Hg)	7439-97-6	3.40E-03	1.43E-04	U



Contaminant	CAS #	Emission Factor ³ (lb/cadaver)	Emission Rate ⁴ (g/s)	Emission Factor Rating ⁵
Molybdenum	7439-98-7	1.67E-05	7.01E-07	Below LOD
Nickel and Nickel Compounds	7440-02-0	3.80E-05	1.60E-06	U
Phenanthrene	85-01-8	2.29E-06	9.62E-08	U
Pyrene	129-00-0	1.62E-07	6.80E-09	U
Selenium	7782-49-2	4.40E-05	1.85E-06	U
Silver	7440-22-4	7.60E-06	3.19E-07	U
Thallium	7440-28-0	8.52E-05	3.58E-06	Below MLD
Vanadium	7440-62-2	5.79E-05	2.43E-06	U
Zinc	7440-66-6	3.50E-04	1.47E-05	U
Benzo(a)pyrene [as a surrogate of total Polycyclic Aromatic Hydrocarbons (PAHs)]	50-32-8	2.91E-08	1.22E-09	Below MLD

Notes:

- ¹ Maximum daily cremation rate provided by client. Including preheating, cooling, and handling times, the processing time per cadaver is three (3) hours on average. Emission factors are for human cadavers, and not small pets. For the cremator dedicated to pets the emission rate is expected to be more conservative given the absence mercury fillings and the smaller mass that would be processed per cadaver.
- ² The maximum usage rate was converted to the appropriate one (1) hour averaging time using the hours of operation per day of 12 hours.
- ³ Pollutant emission factors, with the exception of formaldehyde, are from EPA's FIRE database for crematoriums (SCC = 31502101). These factors are also provided in the National Pollutant Inventory Emission Estimation Technique Manual for Crematoria, Version 1.0 (March 2011).
- ⁴ Conversions of 453.59g/lb and 3600s/hr applied to obtain emission rates.
- ⁵ Emission Factor ratings follow the convention in the US EPA's AP-42 Compilation of Air Pollutant Emission Factors, Volume I document; a rating of "U" denotes an unrated emission factor. Emission factors denoted "Below MLD" corresponds to a factor that is below the limit of detection during testing.
- ⁶ Emission factor obtained from the data in CARB's Test Report No. C-90-004, *Evaluation Test on Two Propane Fired Crematories Cammellia Memorial Lawn Cemetery*.



Calculation 2: Emissions From Cremation

Maximum Daily Usage¹ = 4 cadavers/day
Averaged Maximum Hourly Usage² = 0.33 cadavers/hr

Breakdown of dioxin and furan emissions from cremation

Contaminant	CAS #	Emission Factor ³ (lb/cadaver)	Emission Rate ⁴ (g/s)	Emission Factor Rating ⁵
2,3,7,8-Tetrachlorodibenzo-p-dioxin [2,3,7,8-TCDD]	1746-01-6	7.94E-11	3.33E-12	U
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin [1,2,3,4,6,7,8,9-OCDD]	3268-87-9	6.07E-09	2.55E-10	U
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin [1,2,3,7,8,9-HxCDD]	19408-74-3	4.92E-10	2.07E-11	U
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin [1,2,3,4,6,7,8-HpCDD]	35822-46-9	3.79E-09	1.59E-10	U
1,2,3,4,6,7,8,9-Octachlorodibenzofuran [1,2,3,4,6,7,8,9-OCDF]	39001-02-0	1.62E-09	6.80E-11	U
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin [1,2,3,4,7,8-HxCDD]	39227-28-6	2.75E-10	1.15E-11	U
1,2,3,7,8-Pentachlorodibenzo-p-dioxin [1,2,3,7,8-PeCDD]	40321-76-4	2.33E-10	9.79E-12	U
2,3,7,8-Tetrachlorodibenzofuran [2,3,7,8-TCDF]	51207-31-9	5.19E-10	2.18E-11	U
1,2,3,4,7,8,9-Heptachlorodibenzofuran [1,2,3,4,7,8,9-HpCDF]	55673-89-7	2.78E-10	5.84E-12	Below MLD
2,3,4,7,8-Pentachlorodibenzofuran [2,3,4,7,8-PeCDF]	57117-31-4	8.85E-10	1.86E-11	Below MLD
1,2,3,7,8-Pentachlorodibenzofuran [1,2,3,7,8-PeCDF]	57117-41-6	2.94E-10	6.17E-12	Below MLD
1,2,3,6,7,8-Hexachlorodibenzofuran [1,2,3,6,7,8-HxCDF]	57117-44-9	8.52E-10	3.58E-11	U
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin [1,2,3,6,7,8-HxCDD]	57653-85-7	3.97E-10	1.67E-11	U
2,3,4,6,7,8-Hexachlorodibenzofuran [2,3,4,6,7,8-HxCDF]	60851-34-5	3.44E-10	1.44E-11	U
1,2,3,4,6,7,8-Heptachlorodibenzofuran [1,2,3,4,6,7,8-HpCDF]	67562-39-4	4.57E-09	9.60E-11	Below MLD
1,2,3,4,7,8-Hexachlorodibenzofuran [1,2,3,4,7,8-HxCDF]	70648-26-9	9.53E-10	4.00E-11	U
1,2,3,7,8,9-Hexachlorodibenzofuran [1,2,3,7,8,9-HxCDF]	72918-21-9	1.67E-09	7.01E-11	U

Notes:

¹ Maximum daily cremation rate provided by client. Including preheating, cooling, and handling times, the processing time per cadaver is three (3) hours on average. Emission factors are for human cadavers, and not small pets. For the cremator dedicated to pets the emission rate is expected to be more conservative given the absence mercury fillings and the smaller mass that would be processed per cadaver.

² The maximum usage rate was converted to the appropriate one (1) hour averaging time using the hours of operation per day of 12 hours.

³ Pollutant emission factors are from EPA's FIRE database for crematoriums (SCC = 31502101). These factors are also provided in the National Pollutant Inventory Emission Estimation Technique Manual for Crematoria, Version 1.0 (March 2011).

⁴ Conversions of 453.59g/lb and 3600s/hr applied to obtain emission rates.

⁵ Emission Factor ratings follow the convention in the US EPA's AP-42 Compilation of Air Pollutant Emission Factors, Volume I document; a rating of "U" denotes an unrated emission factor. Emission factors denoted "Below MLD" corresponds to a factor that is below the limit of detection during testing. Following the guidance in the MECP ACBv2 (May 2018) under Note 8, for the purpose of calculating the total TEQ concentration for a mixture of dioxin-like compounds, a value of half the minimum detection limit (MDL) should be substituted for concentrations less than the MDL.



Emission Summary and Dispersion Modelling Report for a Cremation Facility
Dryden Community Funeral Home Ltd.
Cambium Ref. No.: 8796-001

Calculation 3: Emissions from Chemical Preparation

Commercial Product	Amount of Product Spilled ¹ (L/product)	Density ² (kg/m ³)	Compound	CAS No.	Concentration ² (%w/w)	Volatile (Yes/No)	Emission Rate ³ (g/s)
Cadisol Gel	8.81E-01	1030	Phenol	108-95-2	19.30%	Yes	4.05E-03
			Methanol	67-56-1	19.50%	Yes	4.09E-03
Disinfectant Soap	N/A	1014	Iodine	7553-56-2	0.05%	No	0.00E+00
Dry Seal	N/A	N/A	Silicon dioxide	14808-60-7	80.00%	No	0.00E+00
Eckels Epibond	N/A	1043	Ethyl cyanoacrylate	7085-85-0	99.00%	No	0.00E+00
			Polymethyl methacrylate	9011-12-07	30.00%	No	0.00E+00
			Hydroquinone	123-31-9	1.00%	No	0.00E+00
Emollient Cream	N/A	N/A	White Mineral Oil	8042-47-5	50.14%	No	0.00E+00
Epic Cavity	4.73E-01	1000	Formaldehyde	50-00-0	26.00%	Yes	2.85E-03
			Methanol	67-56-1	4.60%	Yes	5.04E-04
Epic Drainage	4.73E-01	1030	Ethylene glycol	107-21-1	12.40%	No	0.00E+00
			Methanol	67-56-1	8.60%	Yes	9.70E-04
Epic Tan	4.73E-01	1059	Formaldehyde	50-00-0	18.00%	Yes	2.09E-03
			Methanol	67-56-1	3.30%	Yes	3.83E-04
Fluid Color Tan	4.73E-01	990	Methanol	67-56-1	8.10%	Yes	8.78E-04
Hexaphene	4.73E-01	1040	Formaldehyde	50-00-0	24.00%	Yes	2.73E-03
			Methanol	67-56-1	8.00%	Yes	9.11E-04
			Ethylene glycol	107-21-1	1.06%	No	0.00E+00
Leaf Plus 25 Special Tan	4.73E-01	1048	Formaldehyde	50-00-0	25.00%	Yes	2.87E-03
			Methanol	67-56-1	4.50%	Yes	5.17E-04
Leaf Arterial	4.73E-01	1050	Formaldehyde	50-00-0	20.00%	Yes	2.30E-03
			Methanol	67-56-1	2.50%	Yes	2.88E-04
Surface Sealer & Pore Closer	2.37E-01	1320	Tetrasodium ethylenediaminetetraacetate	64-02-8	50.00%	No	0.00E+00
			Sodium hydroxide	1310-73-2	3.00%	No	0.00E+00
			Trisodium nitrilotriacetate	5064-31-3	1.00%	No	0.00E+00
Nu-Leco	4.73E-01	1104	Formaldehyde	50-00-0	2.00%	Yes	2.42E-04
			Phenol	108-95-2	8.00%	Yes	9.67E-04
			Formic acid	64-18-6	1.00%	Yes	1.21E-04
San Veino Gel	2.96E-01	1623	Perchloroethylene	127-18-4	90.00%	Yes	1.00E-02
			Camphor Oil	8008-15-3	4.60%	No	0.00E+00
			Phenol	108-95-2	2.40%	Yes	2.67E-04
			Formaldehyde	50-00-0	0.70%	Yes	7.78E-05
			Camphor-synthetic	76-22-2	0.60%	No	0.00E+00
			Methanol	67-56-1	0.40%	Yes	4.44E-05
San Veino Powder	9.46E-01	1623	Silicon dioxide	7631-86-9	1.30%	No	0.00E+00
			Perchloroethylene	127-18-4	64.90%	Yes	2.31E-02
			Calcium silicate	1344-85-2	24.60%	No	0.00E+00
			Formaldehyde	50-00-0	5.10%	Yes	1.81E-03
			Camphor Oil	8008-15-3	3.30%	No	0.00E+00
			Phenol	108-95-2	1.70%	Yes	6.04E-04
Super-Absorb	1 lb	N/A	Camphor-synthetic	76-22-2	0.40%	No	0.00E+00
			p-dichlorobenzene	106-46-7	5.00%	No	0.00E+00

Notes

¹ The amount of product that could be spilled was assumed to be a maximum of one (1) product container. Only the product that would result in the highest contaminant emission rate was considered. A spill was assumed to represent the worst-case evaporation conditions as only small quantities from the containers are used during embalming, and most remain in the body cavity.

² As provided in the attached SDS for the products

³ All volatiles (vapour pressure > 1kPa) were assumed to be released over 12-hr, which corresponds to half of the shortest contaminant averaging time. All other contaminants were assumed to have insignificant emissions.



Appendix B – Assessment for Negligibility



Supporting Information for Assessment of Negligibility

Sources were screened for negligibility using the following screening protocols listed in The ESDM Procedure Document:

- Fugitive dust from on-site roadways (Section 7.4)
- Combustion of natural gas and propane (Section 7.1.1)
- Sources listed on Table B-3 (Section 7.2.1)
- Sources that are insignificant relative to total emissions (Section 7.2.2.)

The results of the screening are discussed in greater detail below.

Fugitive Dust:

The Facility is not listed in Table 7-2 or 7-3 of Section 7.4 of The ESDM Procedure Document and accordingly dust emissions from on-site roadways, storage piles, and on-site traffic were considered as insignificant. Additionally, the nature and quantity of dust generated from these sources was not deemed likely to pose a significant health risk if present.

Combustion of Natural Gas and Propane:

Natural gas comfort heating equipment was screened and found to be insignificant according to Appendix B, Table B-3 of The ESDM Procedure Document. No units existed or were modified prior to 1989 and the total Facility-wide heat input usage is less than 20 million kilojoules/hr. The following table displays the quantity and type of comfort heating sources in operation at the Site. Conservatively, a maximum heat input rating was assumed for this screening as a conservative estimate of the heat input ratings.



Unit Type	Quantity	Max Power Rating per Unit (Btu/hr)
Air Handling Unit	2	300,000
Space Heaters	1	100,000
Maximum Facility-Wide Heat Input Usage (kJ/hr)		738,542

Sources Listed on Table B-3

Table B-3 of The ESDM Procedure Document lists sources that can be considered to be insignificant; the following sources at the Facility are listed on Table B-3:

- Chemical storage room ventilation
- Natural gas fired boilers, water heaters, space-heaters and make-up air units when the total facility-wide input usage for this equipment is less than 20 million kilojoules per hour
- Low temperature handling of compounds with a vapour pressure less than 1 kiloPascal
- Small maintenance and janitorial activities

Sources that are Insignificant Relative to Total Emissions:

It is understood that a source may be considered negligible if:

- The emission from one source of contaminants are similar (same contaminants and same relative proportions of contaminants) to another source of contaminants AND;
- One of the sources would have much higher emissions rates than the other AND;
- The nature of their emission is similar (resultant dispersion impact from either source are the same) then the smaller source can be classified as insignificant provided the resultant POI impact of all the contaminants does not result in non-compliance OR;
 - That the margin of compliance is so slight that if the smaller source or sources were included the aggregate POI impacts of all the contaminants would result in non-compliance.



Therefore, sources of contaminants are determined to be negligible by comparing the difference in usage rates between sources at a Facility. If the usage rate of materials in the process are much less than the usage rates in other significant sources at the same facility than the lesser source may be considered negligible.

Building ventilation not directly involved with process emissions (i.e. office spaces, washrooms, etc.) were deemed to be negligible because of the low expected quantity and risk associated with their contaminant emissions relative to the site-wide releases. The remains grinder is equipped with an internally vented dust collection system, and therefore the emissions from this source were deemed insignificant in comparison to the other particulate matter sources.



Appendix C – Equipment Specifications

HEAT AND MASS BALANCE CALCULATIONS

THERMOGENIC SERIES CREMATION UNIT

Model: CU-150

C.B. Combustion and Manufacturing Ltd.

May 2013.

Thermogenics Specifications:

Fuel	Natural Gas
Rate of Consumption	100 LBS/HR
Stack Diameter	20 INCH (ID)
Primary Burner Fuel Consumption	600,000 BTU/HR
Primary Chamber Volume	86 CU.FT.
Secondary Burner Fuel Consumption	2,200,000 BTU/HR
Secondary Chamber Volume	91 CU.FT.
S.C. Cross-sectional Area	2.9 SQ.FT.

Hourly Consumption of Waste:

Type 0 Waste (Container)	5.0 LBS/HR *
Type 4 Waste (Tissue)	95.0 LBS/HR *

* Reference: Incinerator Institute of America

1. TOTAL PRODUCTS OF COMBUSTION (POC)

A. Primary Burner Natural Gas Consumption

$$\frac{600,000 \text{ BTU/HR}}{1000 \text{ BTU/CF}} = 600 \text{ CFH}$$
$$= 10 \text{ CFM}$$

B. Primary Burner Combustion Air

$$600 \text{ CFH} \times 10 = 6,000 \text{ CFH (Stoichiometric)}$$
$$= 100 \text{ CFM}$$

C. Secondary Burner Natural Gas Consumption

$$\frac{2,200,000 \text{ BTU/HR}}{1,000 \text{ BTU/CF}} = 2,200 \text{ CFH}$$
$$= 36 \text{ CFM}$$

D. Secondary Burner Combustion Air

$$2,200 \text{ CFH} \times 10 = 22,000 \text{ CFH (Stoichiometric)}$$
$$22,000 \text{ CFH} \times 40\% = 30,800 \text{ CFH (Excess Air)}$$

$$= 513 \text{ CFM}$$

E. POC from Type 0 Waste

$$\begin{aligned} 0.95 \text{ LBS/LB Consumed} \times 5 \text{ LB/HR Burn Rate} &= 5 \text{ LBS/HR} \\ &= 63 \text{ CFH} \\ &= 1 \text{ CFM} \end{aligned}$$

F. POC from Type 4 Waste

$$\begin{aligned} 0.95 \text{ LBS/LB Waste} \times 95 \text{ LB/HR Burn Rate} &= 90 \text{ LBS/HR} \\ &= 1200 \text{ CFH} \\ &= 20 \text{ CFM} \end{aligned}$$

G. Additional Combustion Air

$$\begin{aligned} \text{Primary Chamber} &= 12,000 \text{ CFH} \\ &= 200 \text{ CFM} \\ \text{Secondary Chamber} &= 6,000 \text{ CFH} \\ &= 100 \text{ CFM} \\ \frac{200 \text{ CFM} + 100 \text{ CFM}}{2} &= 150 \text{ CFM/ CREMATION} \end{aligned}$$

$$\text{H. Total Products of Combustion (POC)} = \underline{830 \text{ SCFM}}$$

2. RESIDENCE TIME CALCULATION

A. Total POC ACFM @ 1,850 F

$$\text{Coef.} = \frac{1850 \text{ F} + 460}{70 \text{ F} + 460} = 4.35$$

$$4.35 \times 830 \text{ SCFM} = 3,610 \text{ ACFM}$$

B. Residence Time

$$\begin{aligned} \frac{91 \text{ CU.FT.}}{3,610 \text{ ACFM}} \times \frac{60 \text{ SEC.}}{1 \text{ MIN.}} &= \frac{5,460}{3,610} \\ &= 1.5 \text{ SECS} \end{aligned}$$



Appendix D – Dispersion Modelling Data and Electronic Files (on CD)



Appendix E – Safety Data Sheets
