FINAL REPORT

CORNERSTONE
5309 & 5310 LEYTON STREET

WANSTEAD, ONTARIO

ODOUR ASSESSMENT REPORT
RWDI # 2409207
February 6, 2025

SUBMITTED TO

Pat Belanger
pat@cornerstonepressurewashing.ca
5310 Leyton Street
Wanstead, Ontario N0N 1T0

T: 519.402.2316

SUBMITTED BY

Anthony Vanderheyden, B.A.Sc.
Project Manager
Anthony.Vanderheyden@rwdi.com

Sarah Pellatt, B.Sc.
Senior Air Quality Scientist, Associate
Sarah.Pellatt@rwdi.com

RWDI AIR Inc.
Climate & Performance Engineering
600 Southgate Drive
Guelph, Ontario N1G 4P6

T: 519.823.1311 | ext. 2059
C: 226.962.4394
F: 519.823.1316

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1 INTRODUCTION

RWDI AIR Inc. (RWDI) was retained by Cornerstone Group (Cornerstone) to conduct an odour assessment of a proposed commercial livestock transportation washing facility at 5309 and 5310 Leyton Street in Wanstead, Ontario (the Site). The assessment involved conducting an odour source testing program and using the collected data with dispersion modelling to determine whether odour impacts from the proposed facility fall within levels generally accepted by the Ministry of the Environment, Conservation and Parks (MECP).

This report was prepared in order to assess odour impacts from the facility on surrounding receptors of interest and to determine whether Cornerstone's operations are compatible with the existing surroundings.

1.1 Facility Description

The proposed Cornerstone facility is a commercial livestock transportation washing facility, where cattle and pig trailers for livestock transportation are to be washed and sanitized after use. A site plan for the Cornerstone facility is provided as **Appendix A**. The livestock trailers will be empty when arriving at the Cornerstone facility and will have been scraped out prior to arrival on site. Upon arrival, the trailers would be backed into the proposed trailer parking building on 5309 Leyton Street and the bay parking door would be closed. Bay doors will remain closed at all times unless trailers are being parked or removed from the building. The trailer parking building will be equipped with a ventilation fan on the western side of the building, away from residences, that will be fitted with a carbon filter to control odours. The trailer parking building will have capacity to accommodate up to 5 trailers.

As soon as a wash bay is available, a trailer would be shuttled to 5310 Leyton Street and backed into one of two wash bays in the proposed washing building. The washing building contains two other bays that would be used for storage and the repair of vehicles or equipment. Ventilation for the washing building would vent out on the eastern side of the building away from existing dwellings. Each of the two wash bays will have its own ventilation fan, which will be equipped with a carbon filter to control odours. The trailer washing process will occur completely within the building and wastewater is captured and directed into an enclosed water treatment and recycling system.

After washing, the clean trailer would be shuttled back to 5309 Leyton Street where it would be backed into the existing building on the north side of the property. The existing building has four bays, with one of the four bays being proposed to contain what is called a "baking unit". Once a trailer is backed in, the bay is sealed off and air is heated to a very high temperature and circulated within the bay. This dries the trailer and completes the sanitization process by killing any remaining bacteria. Once dried, fans would ventilate the hot air out of the bay. No odours would be expected from this process, as it occurs after the washing stage.

The clean trailer will be removed from the building and would then be delivered to the client or to a separate location where it would be picked up.

2 SOURCE TESTING

RWDI conducted source testing of a cattle truck on September 18, 2024. The following sections describe the odour sampling methodology, analysis and results.

2.1 Odour Sampling Method

Samples were taken from three locations inside of a cattle trailer (lower deck, upper deck, and rear of trailer) in accordance with Ontario Stack Testing Code Method ON-6. Prior to sampling, the truck was fully enclosed with impermeable tarps to prevent outside influences on the sampling. Undiluted (neat) samples were collected from each of the three locations using an evacuated lung sampler, containing a Teflon® bag. The air was drawn from within the interior of the trailer via a Teflon® line. The sample bag was monitored to ensure no condensation forms in the bag during sampling.

Once the samples were collected in the Teflon® bag, they were covered to avoid exposing the sample to light and minimize potential photochemical reactions. A blank sample was also submitted to the laboratory.

2.2 Odour Sampling Analysis

Once collected, the samples were submitted to St. Croix Sensory Inc. for subsequent analysis by an odour panel within 24-hours of testing. The panel is tested prior to the odour analysis and the members are screened to have normal odour sensitivity. The laboratory analysis included the determination of detection threshold for odour and this value will be used to calculate odour emission rates as outlined in the Reference Method.

2.3 Odour Sampling Results

The sample results are summarized in **Appendix B** and copies of the field notes are provided in **Appendix C**.

3 METHODOLOGY

3.1 Odour Background

Ontario Regulation 419/05 (O. Reg. 419/05) provides air quality standards for use in Ontario. However, O. Reg. 419/05 does not include a standard for “odour” as a mixture of compounds. The MECP provides some guidance with the Technical Bulletin “Methodology for Modelling Assessments of Contaminants with 10-Minute Average Standards and Guidelines under O. Reg. 419/05”, September 2016 (Technical Bulletin). This guidance document indicates that concentrations of odourous contaminants need only be assessed at odour-sensitive receptor locations, such as residences, schools, health care facilities, and community centers.

Odours as mixtures of compounds are measured using odour units. An odour unit is defined as the quantity of odourous substance that, when dispersed in 1 m^3 of odour free air, becomes just detectable by a "normal" human observer whose sensitivity to the odourant represents the mean of the population. The average odour detection threshold is 1 OU/m^3, although odours at this level are not necessarily a nuisance. Odour concentrations that may cause a complaint due to their ability to annoy typically range from 3 to 5 OU/m^3.

For the purposes of this assessment, the site-wide odours from Cornerstone's proposed livestock trailer washing and sanitizing operation were compared to the 1 OU/m^3 detection threshold, the 3 OU/m^3 recognition threshold, and the nuisance threshold of 5 OU/m^3.

The MECP does not have a published criterion for the assessment of odours. However, the MECP generally accepts odour levels that are modelled to be less than 1 OU/m^3 greater than 99.5% of the time at an odour sensitive receptor location.

3.2 Emission Calculations

Odour emissions from the facility were based on data from source testing carried out by RWDI on September 18, 2024. The average odour concentration across the three samples collected was used in the assessment. Based on the source testing results, the average odour concentration within the trailer was 112 OU/m^3.

Odours were assessed from the ventilation fans from the trailer parking building and the washing building. The trailer parking building was assumed to contain 5 trailers, 24 hours per day. Since there are five trailers present, the measured odour concentration was multiplied by a factor of 5, to a value of 560 OU/m^3. As a conservative approach, this odour concentration was applied to the output of the ventilation fan, with no accounting for any internal dilution within the trailer parking building. The ventilation fan from the trailer parking building will be 24 inches in diameter with a flow rate of 3.17 m^3/s (6710 cfm). The ventilation fan will be fitted with a carbon filter to control odours; the carbon filter was assumed to have an odour control efficiency of 90%.

For each wash bay, only one trailer would be present at a time; therefore, the odour concentration of 112 OU/m^3 was applied. Each wash bay was assumed to contain one trailer, in a dirty condition, 24 hours per day. As a conservative approach, this odour concentration was applied to the output of each wash bay ventilation fan, with no accounting for any internal dilution within the wash bay. Each wash bay ventilation fan will be 18 inches in diameter with a flow rate of 1.66 m^3/s (3522 cfm). The ventilation fans will be fitted with carbon filters to control odours; the carbon filter was assumed to have an odour control efficiency of 90%.

Table 1 provides a summary of the source parameters used in the dispersion model. **Table 2** provides a summary of the emissions data measured for each source. Detailed emission calculations are provided in **Appendix D**.

Table 1: Summary of Source Parameters

Source ID	Stack Volumetric Flow Rate (Am^3/s)	Stack Exit Gas Temp. (°C)	Stack Inner Diameter (m)	Stack Exit Velocity (m/s)	Stack Height Above Grade (m)	Source Coordinates	
						X (m)	Y (m)
PARK	3.17	20	0.61	10.9	4.5	414537	4755632
WASH1	1.66	20	0.46	10.1	4.5	414685	4755658
WASH2	1.66	20	0.46	10.1	4.5	414684	4755653

Table 2: Summary of Emissions Data

Source ID	Uncontrolled Odour Emission Rate (OU/s)	Control Efficiency	Controlled Odour Emission Rate (OU/s)
PARK	1773	90%	177
WASH1	186	90%	19
WASH2	186	90%	19

3.3 Dispersion Modelling

For dispersion modelling of the odour emissions, the U.S. EPA AERMOD model, version 22112, was used. AERMOD is a dispersion model approved by the MECP. The ventilation exhausts for the trailer parking building and the washing building were included in the model as horizontal point sources. **Figure 1** in the **Figures Section** shows a scalable site plan with the modelled sources and buildings.

Site-specific meteorological data developed by RWDI was used for this assessment. As the facility is located in Wanstead, Ontario, surface data from Sarnia Chris Hadfield Airport in Sarnia, Ontario and upper air data from Detroit, Michigan were used. The data was developed following procedures set out by the MECP based on hourly data from 2019 to 2023. Information on land use surrounding the proposed development was used to develop land surface characteristics for the processing of the meteorological data. The area surrounding the facility is primarily agricultural, commercial, and residential; this was taken into consideration when developing the site-specific meteorological dataset.

The sensitive receptors used in the AERMOD modelling were carefully selected based on Section 2.5 of the Technical Bulletin. **Table 3** summarizes the sensitive receptor locations and descriptions, and **Figure 1** in the **Figures Section** shows the locations of the receptors in relation to the facility. These receptors represent nearby odour-sensitive locations such as residences, schools, child-care facilities, places of worship, and long-term care centres.

Table 3: Dispersion Modelling Sensitive Receptors

Receptor ID	Location			Description
	X (m)	Y (m)	Z (m) [1]	
R1	414756	4755642	1.5	Residence East of Woodford Street
R2	414660	4755601	1.5	Residence West of Woodford Street and North of Elevator Street
R3	414599	4755591	1.5	Residence East of Leyton Street and North of Elevator Street
R4	414555	4755603	1.5	Residence West of Leyton Street and South of 5309 Leyton Street
R5	414516	4755550	1.5	Residence West of Leyton Street and South of Elevator Street
R6	414621	4755712	1.5	Residence East of Leyton Street and North of Co-op Street
R7	414572	4755727	1.5	Residence North of 5310 Leyton Street
R8	414324	4755790	1.5	Residence East of Wanstead Road and Northwest of 5309 Leyton Street
R9	414327	4755885	1.5	Residence East of Wanstead Road and North of R8
R10	414521	4755885	1.5	Residence West of Leyton Street and North of 5309 Leyton Street
R11	414756	4755642	1.5	Residence West of Leyton Street and North of R10

Note: [1] Height in metres above grade.

The 1-hour odour concentration results from the AERMOD modelling were converted to 10-minute odour concentrations using a factor of 1.65 as outlined in MECP Guideline A-10, "Procedure for Preparing an ESDM Report".

4 RESULTS & DISCUSSION

Odour modelling was completed for the facility's livestock trailer washing and sanitization processes, and odour was assessed at 11 discrete receptors surrounding the facility. A frequency analysis was conducted for each sensitive receptor to determine the number of times the 1 OU/m^3 threshold was exceeded, and the results were then compared to the acceptable exceedance frequency of 0.5%. The maximum modelled odour concentration at the sensitive receptors was less than the 3 OU/m^3 recognition threshold and the 5 OU/m^3 annoyance threshold. The maximum odour concentration and frequency analysis for each receptor is presented in **Table 4**.

Table 4: Odour Results

Receptor ID	Maximum Predicted 10-minute Odour Concentration (OU/m³)	Events > 1 OU		Events > 3 OU		Events > 5 OU	
		Count	Frequency	Count	Frequency	Count	Frequency
R1	0.4	0	0%	0	0%	0	0%
R2	0.4	0	0%	0	0%	0	0%
R3	0.5	0	0%	0	0%	0	0%
R4	1.3	59	0.14%	0	0%	0	0%
R5	0.4	0	0%	0	0%	0	0%
R6	0.3	0	0%	0	0%	0	0%
R7	0.4	0	0%	0	0%	0	0%
R8	0.2	0	0%	0	0%	0	0%
R9	0.2	0	0%	0	0%	0	0%
R10	0.2	0	0%	0	0%	0	0%
R11	0.2	0	0%	0	0%	0	0%

The results indicate predicted odour concentrations greater than 1 OU/m^3 at a frequency lower than 0.5% at each of the identified sensitive receptors. As shown in **Table 4**, the frequency of exceedance at the most frequently impacted sensitive receptor is 0.14%.

The predicted concentrations are based on a conservative operating scenario, which assumed five trucks present in the parking building and two trucks present in the wash bays at all times. Since specifications for the odour control from the carbon filters was not available at the time of the odour assessment, an assumed 90% control efficiency was considered to enable maximum operational flexibility. The control efficiency of the carbon filter should be confirmed by the supplier. If the control efficiency from the supplier is less than the 90% considered in this study, operational restrictions, such as a limitation on the number of trailers in the parking building during overnight hours, would need to be considered.

5 CONCLUSION

Odour impacts from the livestock wash bays and trailer parking from Cornerstone's proposed operations at 5309 and 5310 Leyton Street were assessed based on a combination of source testing and dispersion modelling. Predicted odour concentrations fall within levels that are generally deemed acceptable by the MECP. Based on this modelling assessment, this facility is considered compatible with the existing surroundings.

6 STATEMENT OF LIMITATIONS

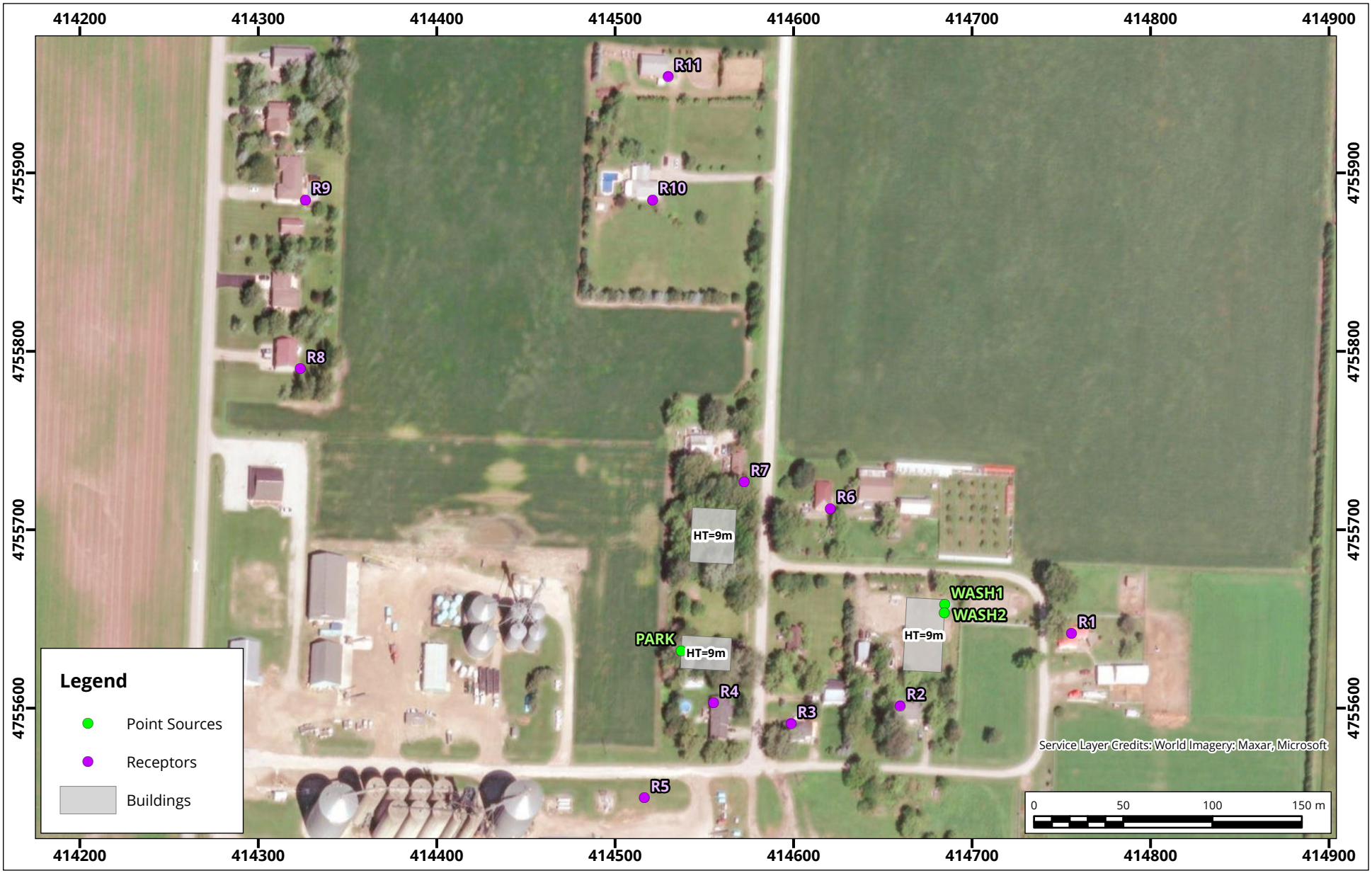
This report entitled **Odour Assessment Report – Cornerstone 5309 & 5310 Leyton Street** was prepared by RWDI AIR Inc. ("RWDI") for Cornerstone Group, ("Client"). The findings and conclusions presented in this report have been prepared for the Client and are specific to the project described herein ("Project"). The conclusions and recommendations contained in this report are based on the information available to RWDI when this report was prepared. Because the contents of this report may not reflect the final design of the Project or subsequent changes made after the date of this report, RWDI recommends that it be retained by Client during the final stages of the project to verify that the results and recommendations provided in this report have been correctly interpreted in the final design of the Project.

The conclusions and recommendations contained in this report have also been made for the specific purpose(s) set out herein. Should the Client or any other third party utilize the report and/or implement the conclusions and recommendations contained therein for any other purpose or project without the involvement of RWDI, the Client or such third party assumes any and all risk of any and all consequences arising from such use and RWDI accepts no responsibility for any liability, loss, or damage of any kind suffered by Client or any other third party arising therefrom.

Finally, it is imperative that the Client and/or any party relying on the conclusions and recommendations in this report carefully review the stated assumptions contained herein and to understand the different factors which may impact the conclusions and recommendations provided.

RWDI aims to accommodate. If you require this document in a different format in order to aid accessibility, please contact the sender of this document, email solutions@rwdi.com or call +1.519.823.1311

FIGURES



Site Plan Showing Significant Sources, Receptors, and Buildings

True North

Drawn by: AKG | Figure: 1

Exact Scale: 1:3,000

Date Revised: Jan 31, 2025

Map Projection: NAD 1983 UTM Zone 17N

5309 & 5310 Leyton Street - Wanstead, Ontario

Project #: 2409207

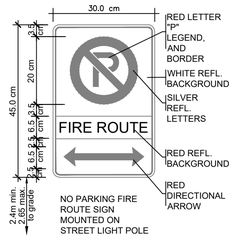
Map Document: C:\Cornerstone\Cornerstone.aprx

APPENDIX A

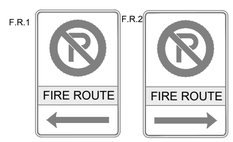
FIRE ROUTE SIGNAGE

N.T.S.

FIRE ROUTE PARKING SIGN F.R.3



NO PARKING FIRE ROUTE SIGN MOUNTED ON STREET LIGHT POLE

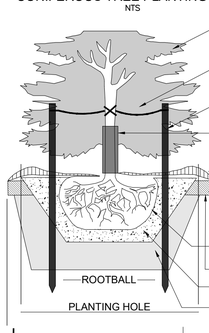


NO PARKING FIRE ROUTE SIGN DETAILS ACCORDING TO CITY OF LONDON STANDARDS (MAXIMUM 30m SPACING)
ALL SIGNAGE SHALL CONFORM TO BY-LAW NO. 06-243

FIRE ROUTE WILL NOT HAVE ANY CENTREX LINE TURNING RADII OF LESS THAN 12m OR A CHANGE OF GRADIENT NOT MORE THAN 1 IN 12.5 OVER A MINIMUM DISTANCE OF 15m.

CONIFEROUS TREE PLANTING DETAIL

NTS



- PRUNE ONLY DAMAGED AND/OR BROKEN BRANCHES. NO NOT REMOVE LEADER. REMOVE ALL NURSERY TAGS, PLASTIC, METAL, LABELS, STRING, TRUNK WRAPPING AND ALL OTHER FOREIGN MATERIALS.
- UNTREATED JUTE TWINE WHICH WHILL PHOTO DEGRADE WITHIN TWO YEARS, OR APPROVED EQUAL. TWINE TIE SHALL BE SECURED TIGHTLY TO STAKE BUT LOOSELY AROUND THE TRUNK.
- 50mm X50mm X2400mm WOOD STAKES SHALL BE POUNDED INTO 600mm MIN. OF UNDISTURBED SUBGRADE. STAKE SHALL NOT PENETRATE ROOTBALL AND SHALL NOT INTERFERE WITH BRANCHES. THREE STAKES PER CONIFEROUS TREE.
- DIMEX ARBORGUARD TREE PROTECTORS OR EQUIVALENT AS APPROVED BY THE COUNTY. SET ON GRADE AND INSTALLED PRIOR TO THE INSTALLATION OF WOOD MULCH. NOT TO BE LOCKED IN ANY WAY THAT WOULD IMPEDE DIAMETER TREE GROWTH.
- 75mm MIN. DEPTH OF HARDWOOD MULCH BASE OF TREE TRUNK SHALL NOT BE COVERED WITH MULCH.
- FINISHED GRADE
- FORM A 100mm HIGH SOIL RING TO DIRECT WATER TO ROOTBALL.
- APPROVED PLANTING MEDIUM
- CUT AND REMOVE ALL ROPE, BURLAP AND WIRE FROM TOP OF 1/3 ROOTBALL, COMPLETELY REMOVE DRUM LACING.
- BED PREPARATION AREA, SOIL FRACTURED TO DEPTH OF 150mm.
- SCARIFY EXISTING SOIL AROUND PERIMETER OF PLANTING HOLE TO A MIN. DEPTH OF 100mm.
- UNDISTURBED SUBGRADE

BED PREPARATION AREA

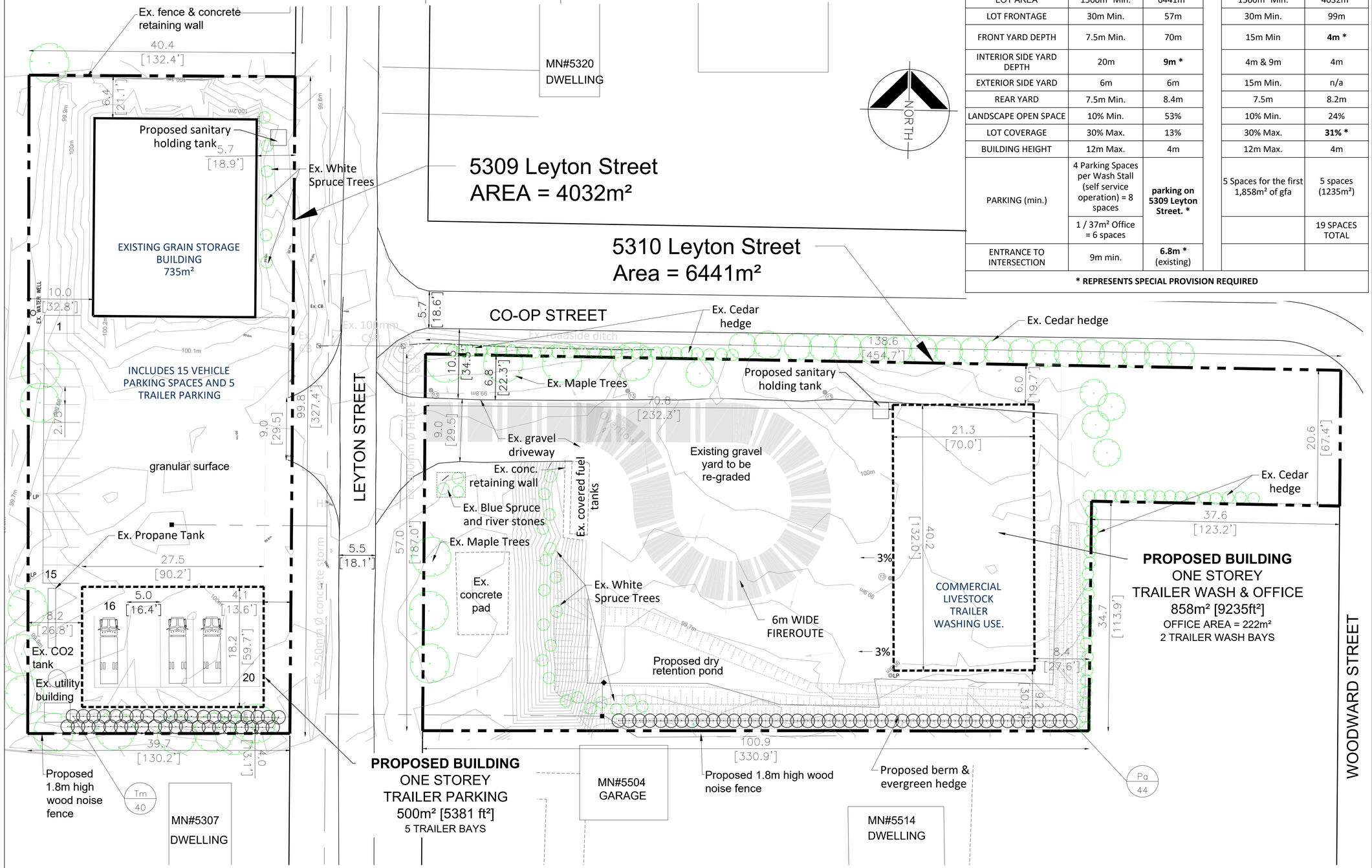
NOTES

1. ROOT FLARE TO BE PLANTED 50-100mm HIGHER THAN FINISHED GRADE TO ALLOW FOR SETTLING.
2. SAUCER TO BE SOAKED WITH WATER AND MULCHED IMMEDIATELY FOLLOWING PLANTING.
3. ALL DIMENSIONS IN MILLIMETERS UNLESS OTHERWISE NOTED.
4. ALL TWINE AND BURLAP AROUND ROOTBALL MUST BE BIO-DEGRADABLE, NYLON ROPE WILL NOT BE ACCEPTED.
5. CALIPER OR HEIGHT OF TREE MUST MEET CONTRACT REQUIREMENTS.
6. PLANTING DETAIL TO BE READ IN CONJUNCTION WITH TREE PLANTING SPECIFICATIONS.
7. ALL STAKES AND SUPPORT SYSTEMS TO BE REMOVED AFTER ONE FULL GROWING SEASON.

TOWN OF PLYMPTON-WYOMING ZONING BY-LAW
SITE DATA TABLE

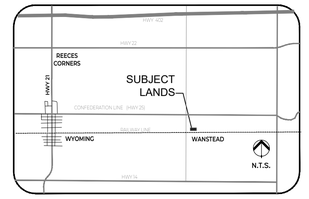
REGULATED	ZONE **C3-2**	MN# 5310 **REVISE ZONE C3-2**	ZONE **C3**	MN# 5309 **REZONE C3-***
PERMITTED USES	warehouse, no outside storage	warehouse & **truck wash ***	abattoir, agricultural service establishment, agricultural supply establishment, agricultural implement sales establishment, animal hospital, bulk fuel depot, flea market, farmers market, stock yard	drying unit for trailers, agricultural storage, and agricultural service establishment
LOT AREA	1500m² Min.	6441m²	1500m² Min.	4032m²
LOT FRONTAGE	30m Min.	57m	30m Min.	99m
FRONT YARD DEPTH	7.5m Min.	70m	15m Min	**4m ***
INTERIOR SIDE YARD DEPTH	20m	**9m ***	4m & 9m	4m
EXTERIOR SIDE YARD	6m	6m	15m Min.	n/a
REAR YARD	7.5m Min.	8.4m	7.5m	8.2m
LANDSCAPE OPEN SPACE	10% Min.	53%	10% Min.	24%
LOT COVERAGE	30% Max.	13%	30% Max.	**31% ***
BUILDING HEIGHT	12m Max.	4m	12m Max.	4m
PARKING (min.)	4 Parking Spaces per Wash Stall (self service operation) = 8 spaces	**parking on 5309 Leyton Street. ***	5 Spaces for the first 1,858m² of gfa	5 spaces (1235m²)
	1 / 37m² Office = 6 spaces			19 SPACES TOTAL
ENTRANCE TO INTERSECTION	9m min.	**6.8m *** (existing)		

*** REPRESENTS SPECIAL PROVISION REQUIRED**



mbpc
Monteith+Brown
planning consultants
219 OXFORD STREET WEST, UNIT 302, LONDON ONTARIO, N6H 1S5
Tel. (519) 686-1300 E-mail: mbpc@mbpc.ca

KEY PLAN:



NOTES:

1. GARBAGE COLLECTION WILL BE STORED FOR PRIVATE PICK UP.
2. FOR DETAILS ON SITE GRADING AND SERVICING, SEE PLANS BLACK CREEK ENGINEERING INC.
3. LIGHT POSTS ARE EXISTING AND THE LIGHTS ARE ORIENTED DOWNWARDS AND AWAY FROM ADJACENT RESIDENTIAL USES.

LEGEND

- SUBJECT LANDS
- POTENTIAL DOOR
- FIRE & GARBAGE ROUTE
- FIRE ROUTE SIGN
- LIGHT POST

PLANT LIST

SYMBOL	QUANTITY	COMMON & BOTANICAL NAME	CONDITION
Pa	44	ACROCONA NORWAY SPRUCE Picea Abies Acrocona	150 cm HT
Pg	5	WHITE SPRUCE Picea glauca	150 cm HT
Tm	43	HICKS YEW Taxus x media 'hicksii'	100cm HT

RECORD OF SUBMISSION

No.	REMARKS	DATE
1	SITE PLAN REVIEW	SEP 2023
2	REVISED AS PER SITE PLAN REVIEW	FEB 2024
3	AS PER COMMENTS RECIEVED	MAY 2024
4	ADDED BUILDING	JAN 2025

NOTES: DISTANCES SHOWN ON THIS PLAN ARE IN METERS AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048

SCALE 1 : 300 0 5 10 15m

CLIENT:

CORNERSTONE PRESSURE WASHING

PAGE TITLE:

Site & Landscape Plan

5309 & 5310 LEYTON STREET
WANSTEAD
PLYMPTON-WYOMING, LAMBTON COUNTY

Warehouse Development

Prepared by:	bs	Drawn by:	bs
Checked by:	es	Surveyed by:	
Approved:	jmc	Date:	2025-01-07
Scale:	1:300 (24"36")	Drawing No.	SP1
CITY No.		FILE No.	22-100

APPENDIX B

Sampling for Odour

Client:	Cornerstone Group
Location:	5309 & 5310 Leyton Street
Project #:	2409207
Date:	19-Sep-24

Source	Sample ID	Lab Results		Average Odour Concentration (ou/m^3)
		DT	RT	
Cattle Trailer	Cattle T1	36	20	112
	Cattle T2	152	44	
	Cattle T3	148	72	
Blank	Blank	80	44	80

Notes:

St. Croix Sensory, Inc.

Odour Evaluation Report

Report Number: C2426301

Project Name: 5309 Leyton

Samples Collected: 9-18-24
Samples Received: 9-18-24
Samples Evaluated: 9-19-24

Report Prepared For: RWDI
600 Southgate Drive
Guelph, Ontario, N1G 4P6
Canada

Report Prepared By: St. Croix Sensory Canada, Inc.
1005 Skyview Drive, Suite 175
Burlington, ON L7P 5B1 Canada
905-635-0064
tvallarino@fivesenses.com

Data Release Authorization:

Alicia Tran, M.Sc.
Laboratory Coordinator

Reviewed and Approved:

Thomas Vallarino, A.Sc.T.
Laboratory Director

St. Croix Sensory is ISO/IEC 17025:2017 Accredited

Perry Johnson Laboratory Accreditation, Inc.
Certificate No.: L24-186-2

Accreditation No.: 81047
Initial Accreditation Date: 10 March 2024

Odour Evaluation Report

St. Croix Sensory, Inc.

Client: **RWDI**
Project Name: **5309 Leyton**

Report Number: **C2426301**
Samples Evaluated: **9/19/24**

#	Field No.	Sample Description	DT	RT	I	HT	DR	Comments
1	Cattle T1	Livestock Trailer	36	20	- - -	-2.0	- - -	
2	Cattle T2	Livestock Trailer	152	44	- - -	-1.3	- - -	
3	Cattle T3	Livestock Trailer	148	72	- - -	-0.7	- - -	
4	Blank	Blank	80	44	- - -	-1.0	- - -	

Comment: Field pre-dilution values not available.

Odour Detection Threshold Testing (Evaluations) conducted in compliance with and under all conditions specified or required by ASTM E679 and EN13725 unless noted in report "Comments" column. The Client Chain of Custody (COC) attached to the Odour Evaluation Report provides information that may include sampling location(s), methods, and/or environmental conditions during sampling. Client, designated agents, and/or reviewers provide interpretation of results based on sampling conditions.

DT - Detection Threshold as determined by ASTM E679 and EN13725. The Practical Detection Limit (PDL) of DT is 12, based on the nominal lowest dilution presentation ratio of 8. Result is dimensionless dilution ratio at which half the assessors detect the diluted air as different from the blank air. Odour Units (OU) or Odour Units per cubic meters (OU/m3) are commonly used as pseudo-units.

RT - Recognition Threshold as determined by ASTM E679 and EN13725. Result is dimensionless dilution ratio at which half the assessors recognize a character in the diluted odourous air. Odour Units (OU) or Odour Units per cubic meter (OU/m3) are commonly used pseudo-units.

I - Perceived odour intensity as determined by ASTM E544. Intensity is expressed as average reported scale value on 10pt n-butanol in water static scale.

HT – Hedonic Tone value. Average rating of assessors' opinion of odour pleasantness on scale of -10 (most unpleasant) to +10 (most pleasant).

DR – the slope of the dose-response relationship of odour intensity with dilution (persistency of odour).

St. Croix Sensory, Inc.

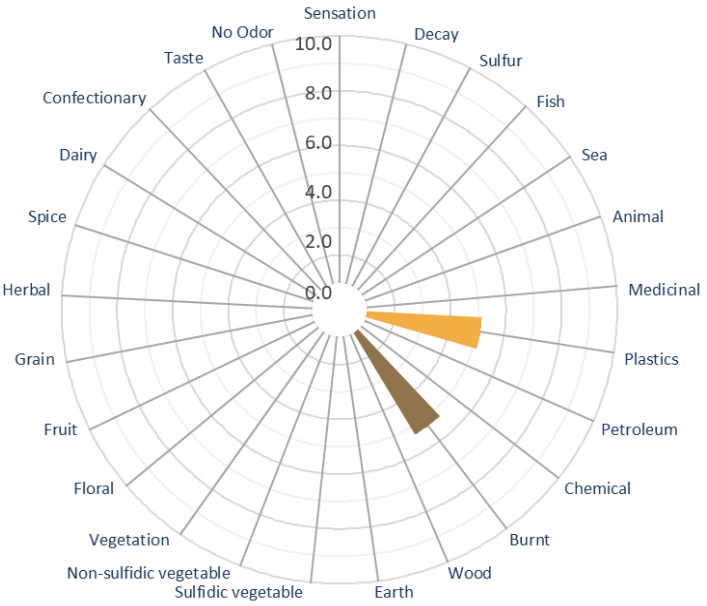
Report Number: C2426301
Client: RWDI
Project Name: 5309 Leyton
Samples Evaluated: 9/19/2024

Field No: Cattle T1
Description: Livestock Trailer

DT: 36
RT: 20
I: - - -
HT: -2.0
DR: - - -

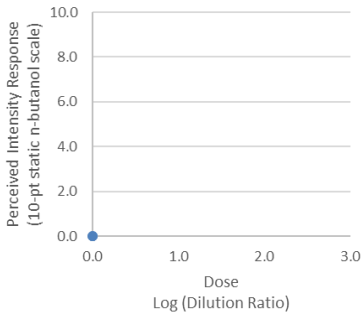
Comments:

Odour Descriptors



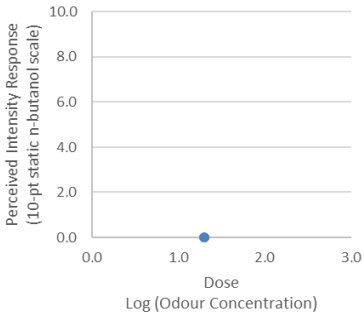
Strength	Descriptor	% of assessors (n=8)
	Sensation	
	Decay	
	Sulfur	
	Fish	
	Sea	
	Animal	
	Medicinal	
5.1	Plastics	
	Petroleum	
	Chemical	
5.3	Burnt	
	Wood	
	Earth	
	Sulfidic vegetable	
	Non-sulfidic vegetable	
	Vegetation	
	Floral	
	Fruit	
	Grain	
	Herbal	
	Spice	
	Dairy	
	Confectionary	
	Taste	
	No Odor	

Dose-Response



Log I = n Log C + Log k

Dose-Response as Power Law



Log I = n' Log (RT/C) + Log k'

DT - Detection Threshold as determined by ASTM E679 and EN13725.
RT - Recognition Threshold as determined by ASTM E679 and EN13725.
I - Perceived odour intensity as determined by ASTM E544.
HT – Hedonic Tone value (pleasantness rating).
DR – The slope of the dose-response (dilution–intensity) relationship.
C – Dilution ratio of the odour sample presentation.
n, k, n', and k' – computed constants for the specific odour sample.

St. Croix Sensory, Inc.

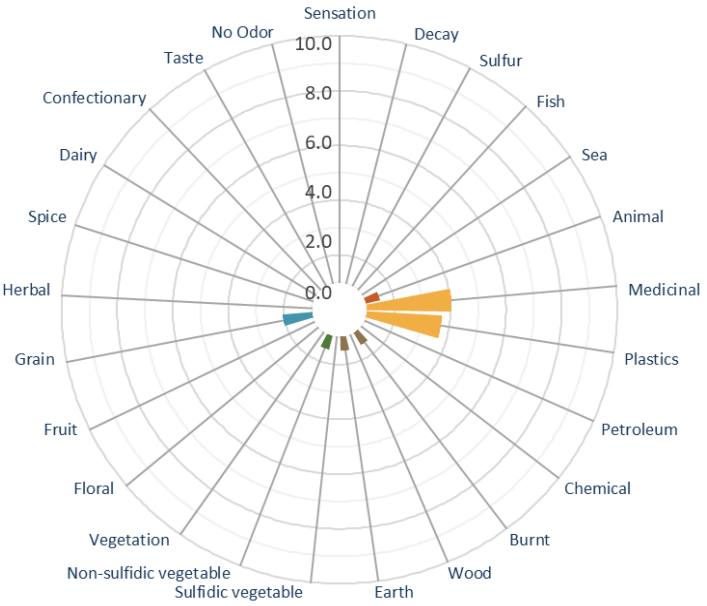
Report Number: C2426301
Client: RWDI
Project Name: 5309 Leyton
Samples Evaluated: 9/19/2024

Field No: Cattle T2
Description: Livestock Trailer

DT: 152
RT: 44
I: - - -
HT: -1.3
DR: - - -

Comments:

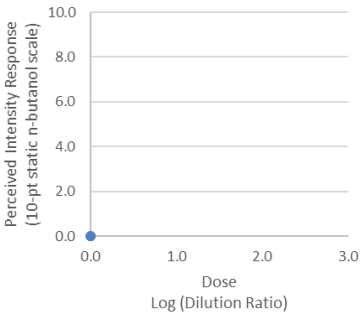
Odour Descriptors



Strength	Descriptor	% of assessors (n=8)
	Sensation	
	Decay	
	Sulfur	
	Fish	
	Sea	
1.0	Animal	
4.1	Medicinal	
3.7	Plastics	
	Petroleum	
	Chemical	
1.3	Burnt	
	Wood	
1.5	Earth	
	Sulfidic vegetable	
0.8	Non-sulfidic vegetable	
	Vegetation	
	Floral	
	Fruit	
2.1	Grain	
	Herbal	
	Spice	
	Dairy	
	Confectionary	
	Taste	
	No Odor	

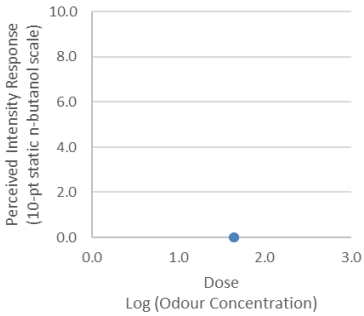
0% 20% 40% 60% 80% 100%

Dose-Response



Log I = n Log C + Log k

Dose-Response as Power Law



Log I = n' Log (RT/C) + Log k'

DT - Detection Threshold as determined by ASTM E679 and EN13725.
RT - Recognition Threshold as determined by ASTM E679 and EN13725.
I - Perceived odour intensity as determined by ASTM E544.
HT – Hedonic Tone value (pleasantness rating).
DR – The slope of the dose-response (dilution–intensity) relationship.
C – Dilution ratio of the odour sample presentation.
n, k, n', and k' – computed constants for the specific odour sample.

St. Croix Sensory, Inc.

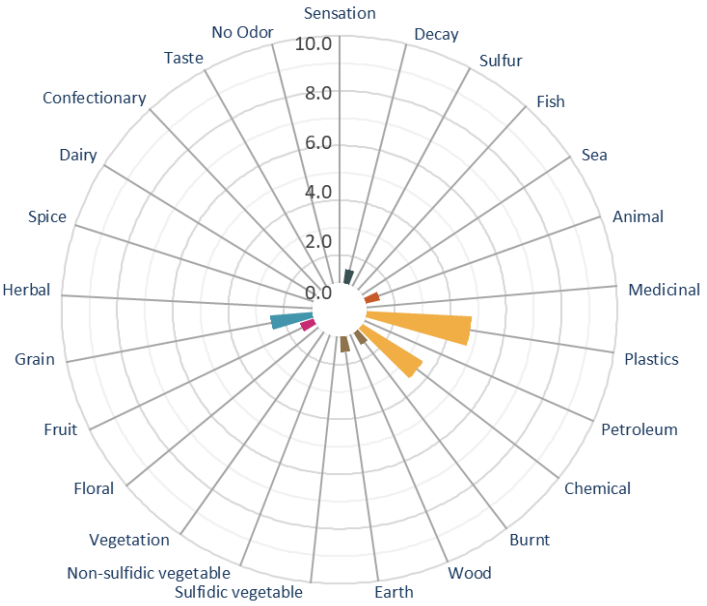
Report Number: C2426301
Client: RWDI
Project Name: 5309 Leyton
Samples Evaluated: 9/19/2024

Field No: Cattle T3
Description: Livestock Trailer

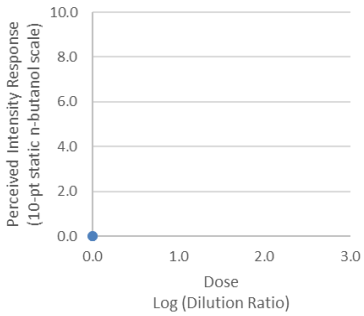
DT: 148
RT: 72
I: - - -
HT: -0.7
DR: - - -

Comments:

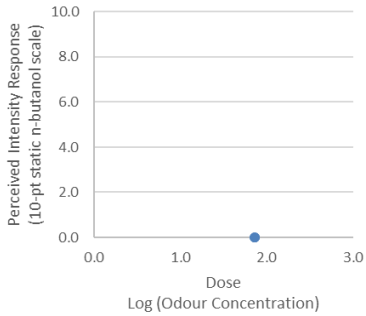
Odour Descriptors



Strength	Descriptor	% of assessors (n=8)
	Sensation	
1.0	Decay	
	Sulfur	
	Fish	
	Sea	
1.0	Animal	
	Medicinal	
4.8	Plastics	
	Petroleum	
3.6	Chemical	
1.0	Burnt	
	Wood	
1.6	Earth	
	Sulfidic vegetable	
	Non-sulfidic vegetable	
	Vegetation	
	Floral	
1.2	Fruit	
2.5	Grain	
	Herbal	
	Spice	
	Dairy	
	Confectionary	
	Taste	
	No Odor	



Log I = n Log C + Log k



Log I = n' Log (RT/C) + Log k'

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RT - Recognition Threshold as determined by ASTM E679 and EN13725.
I - Perceived odour intensity as determined by ASTM E544.
HT – Hedonic Tone value (pleasantness rating).
DR – The slope of the dose-response (dilution–intensity) relationship.
C – Dilution ratio of the odour sample presentation.
n, k, n', and k' – computed constants for the specific odour sample.

St. Croix Sensory, Inc.

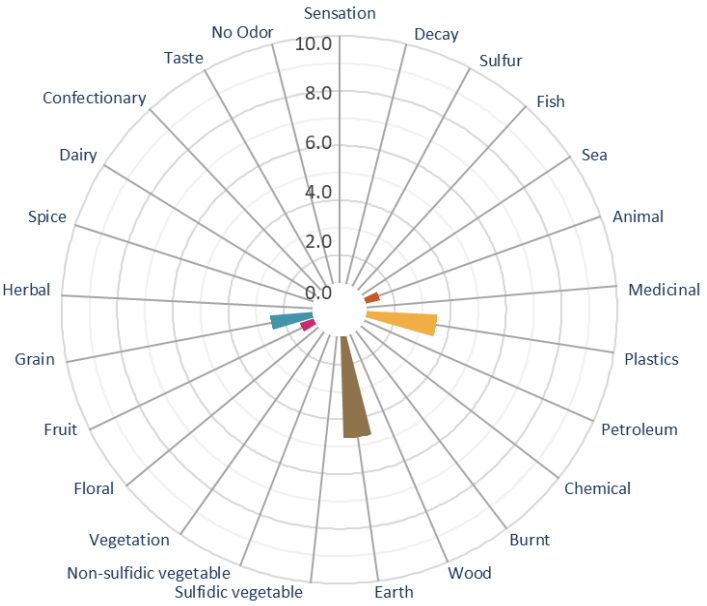
Report Number: C2426301
Client: RWDI
Project Name: 5309 Leyton
Samples Evaluated: 9/19/2024

Field No: Blank
Description: Blank

DT: 80
RT: 44
I: - - -
HT: -1.0
DR: - - -

Comments:

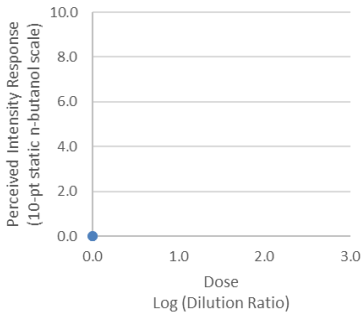
Odour Descriptors



Strength	Descriptor	% of assessors (n=8)
	Sensation	
	Decay	
	Sulfur	
	Fish	
	Sea	
0.5	Animal	
	Medicinal	
3.5	Plastics	
	Petroleum	
	Chemical	
	Burnt	
	Wood	
4.7	Earth	
	Sulfidic vegetable	
	Non-sulfidic vegetable	
	Vegetation	
	Floral	
0.6	Fruit	
2.5	Grain	
	Herbal	
	Spice	
	Dairy	
	Confectionary	
	Taste	
	No Odor	

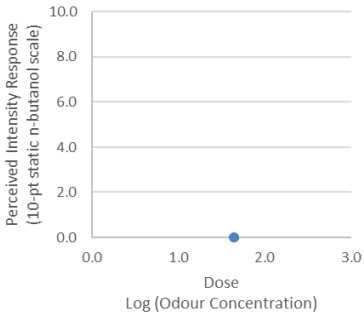
0% 20% 40% 60% 80% 100%

Dose-Response



Log I = n Log C + Log k

Dose-Response as Power Law



Log I = n' Log (RT/C) + Log k'

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RT - Recognition Threshold as determined by ASTM E679 and EN13725.
I - Perceived odour intensity as determined by ASTM E544.
HT – Hedonic Tone value (pleasantness rating).
DR – The slope of the dose-response (dilution–intensity) relationship.
C – Dilution ratio of the odour sample presentation.
n, k, n', and k' – computed constants for the specific odour sample.

Attachments

St. Croix Sensory

Chain of Custody - Canada

St. Croix Sensory • 1005 Skyview Drive, Suite 175, Burlington, ON L7P 5B1 • Tel: +1 905-580-3330 • Email: tvallarino@fivesenses.com

Client:	RWDI	**Contact Name:**	Oluwatobi Odumoye
Project/Site Name:	5309 Leyton	**Cell Number:**	519 710 0408
Collected By:	Jacob Hardwick	**Email:**	oluwatobi.odumoye@rwdi.com
Sample Date:	2024-09-18	**Project PO:**	2409207
Comments:	please follow-up via email about persistency odour evaluation		

Page 1 of 1

Scan for Odour Sampling Resources

Odour Evaluation Requests

(please check all that apply for each sample)

Line No.	Field No.	Sample Description	Sample Time	Field H_2S (ppm)	Thresholds Detection & Recognition ASTM E679 & EN13725	Intensity ASTM E544	Characterization Hedonic Tone & Descriptors	Persistency Dose Response	Predilution 10:1 (If DT>60,000)	Lab Use Only Evaluation Report No. C2426201 LAB	CODE
1	Cattle T1	Livestock trailer	12:10	N/A	✓	✓	✓			1	1
2	Cattle T2	↓	12:20	↓	✓	✓	✓			1	2
3	Cattle T3	↓	12:30	↓	✓	✓	✓			1	3
4	Blank		12:00		✓	✓	✓			1	4
5											
6											
7											
8											
9											
10											
11											
12											

Number of Boxes Shipped: _____

Carrier (check): Purolator ___ | FedEx ___ | UPS ___

DHL ___ | Other: _____

Relinquished by	Date	Time
Jacob Hardwick	2024-09-18	15:00

Received at Lab by	Date	Time
	9/18/24	15:00

Comments & Exceptions Noted

Prior to shipping, email a photo of this document to tvallarino@fivesenses.com

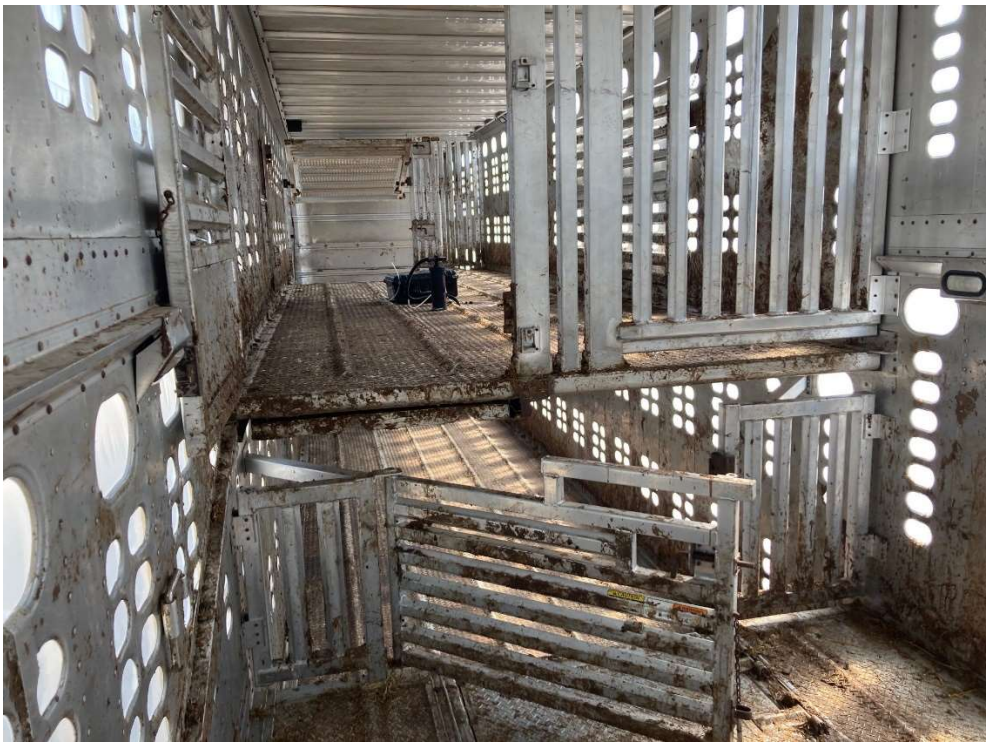
LAB COPIES WHITE & YELLOW *CLIENT COPY PINK*

APPENDIX C

Site Photo A: Image of Tarped Trailer

Site Photo B: Sampling Location 1

Site Photo C: Sampling Location 2



Site Photo D: Sampling Location 3

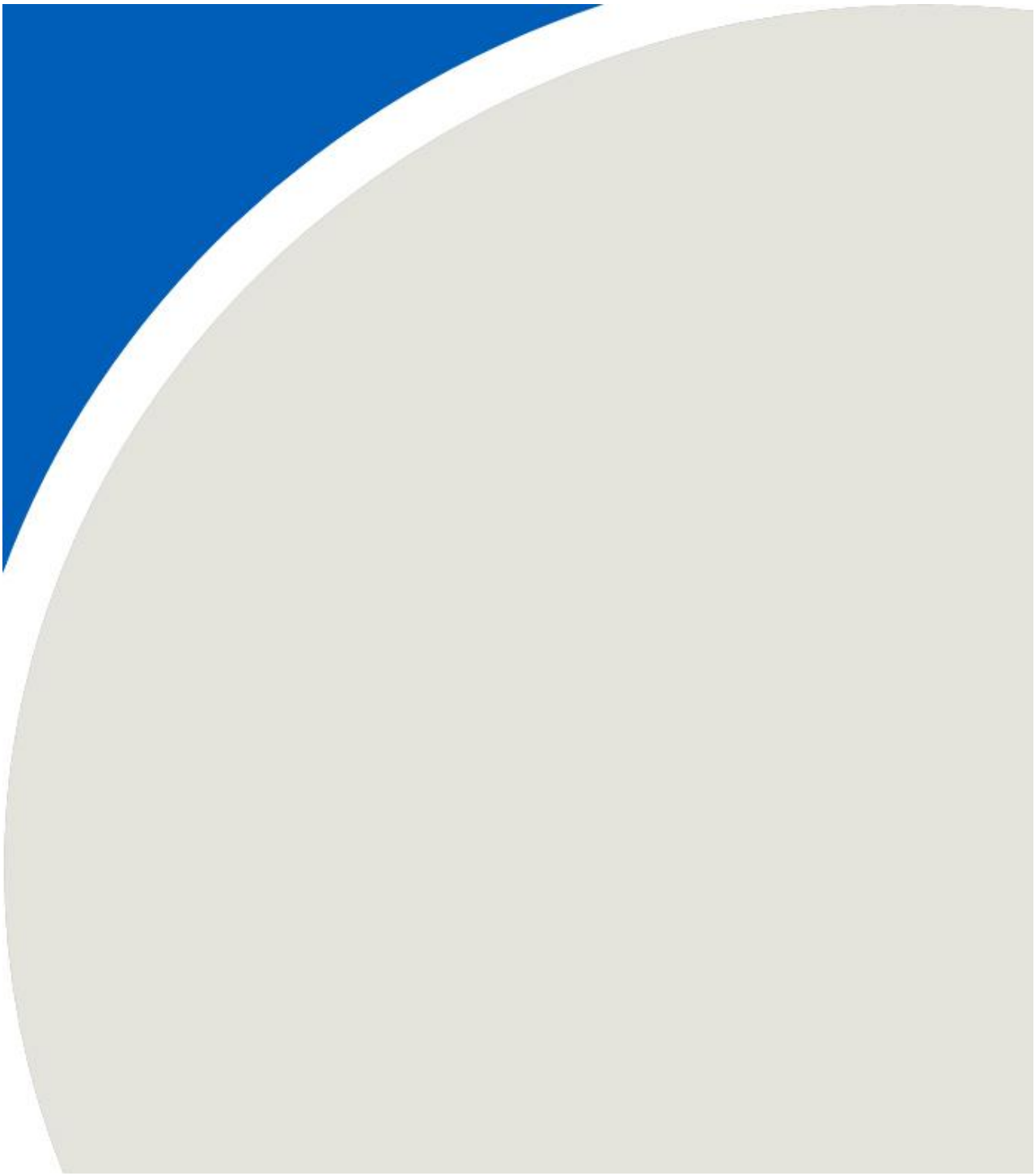
RWDI AIR Inc. Odour Sampling Datasheet

Date: 2024-09-18
Wind Direction: 8 km/h
Wind Speed: E
↳ interior wind = ø due to tarp

Project No.: 2409207
Client: 5309 Leyton St Business
Location: Wyoming, ON

Source ID	Sample ID	Bag ID	Dilution	Sample Time	Tedlar Bag QA: Moisture?	Tedlar Bag QA: Leak Check	Comments
Cattle truck	Cattle T1	Cattle T1	N/A	12:10	N	✓	Lower Level of Trailer - T=27°C
↓	Cattle T2	Cattle T2	↓	12:20	N	✓	Upper Trailer Level - T=33°C
↓	Cattle T3	Cattle T3	↓	12:30	N	✓	Back of Trailer (From entrance) - T=30°C
Blank	Blank	Blank	↓	12:00	N	✓	

APPENDIX D



Odour Emission Rate Calculations

RWDI# 2409207

5309 & 5310 Leyton Street

Client	Cornerstone Group
Location	5309 & 5310 Leyton Street
Project	2409207
Date	31-Jan-25

Source	Sample ID	Lab Results		Average Odour Concentration (ou/m³)
		DT	RT	
Cattle Trailer	Cattle T1	36	20	112
	Cattle T2	152	44	
	Cattle T3	148	72	
Blank	Blank	80	44	80

Source ID	Source Description	Stack Volumetric Flow Rate (Am³/s)	Uncontrolled Odour Emission Rate (ou/s)	Charcoal Filter Removal Efficiency (%)	Controlled Odour Emission Rate (ou/s)
PARK	Trailer Parking Building Exhaust Fan [1]	3.17	1773	90%	177
WASH1	Trailer Washing Building Exhaust Fan	1.66	186		19
WASH2	Trailer Washing Building Exhaust Fan	1.66	186		19

[1] Emission rate for trailer parking building assuming 5 trailers parked inside

Sample Calculation for Controlled Odour Emission Rate from Trailer Parking Building Exhaust Fan [1] (Source ID: PARK)

$$ER = \frac{\text{Flow Rate } \frac{m^3}{s} \quad | \quad \text{Odour Conc. } \frac{ou}{m^3} \quad | \quad 100\% - \text{Removal Efficiency} \quad | \quad \#\text{ of trailers}}{}$$

$$ER = \frac{3.17 \ \frac{m^3}{s} \quad | \quad 112 \ \frac{ou}{m^3} \quad | \quad 100\% - 90\% \quad | \quad 5}{}$$

$$ER = 177 \text{ ou/s}$$

Revision Date: 2025-01-31
Prepared By: AKG
Checked By: SJP