A.Lanfranco & Associates Inc.
Environmental Consultants

Prepared for

All Roads Construction Ltd.

Coquitlam, B.C.

EMISSION MONITORING REPORT

September 2025 COMPLIANCE SURVEY

Permit: GVA1145

Prepared by: Mr. C. Lanfranco

Issued on: September 24, 2025

CERTIFICATION

The field monitoring for this survey was conducted by certified stack test technicians as required by the British Columbia Ministry of Environment and Parks (BC MOE) Field Sampling Manual.

The field crew consisted of:

Mr. J. Ching (certified), Mr. J. Gibbs (certified), and Mr. D. Sampson (certified).

The report was prepared by Mr. C. Lanfranco (certified) using reporting principles and guidelines generally acceptable to B.C. MOE and Metro Vancouver (MV).

The field crew and A. Lanfranco and Associates Inc. certify that the test methods used were MOE/MV approved reference methods for the parameters investigated.

Report reviewed on September 24 2025, by:

Mr. Mark Lanfranco
President | Owner

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SUMMARY

The following table presents the average emission results for the listed parameters. The emission survey was conducted at the All-Roads Construction hot mix asphalt plant in Coquitlam, B.C. on September 11, 2025.

PARAMETER	RESULT	PERMITTED LEVEL
Particulate (mg/Sm^3 @ 16% O_2)	0.37	30
Carbon Monoxide (mg/Sm^3 @ 16% O_2)	65.4	200
Total Hydrocarbons (mg/Sm^3 @ 16% O_2)	13.5	40
Flowrate (Sm^3/min)	529	870
Temperature (°C)	86	

All results are at standard conditions of 20 °C and 101.325 kPa (dry)

There are no permit exceedances, and the results are like previous testing. The differences year to year are in a normal range of outcomes for this process.

1 TEST PROGRAM ORGANIZATION and INTRODUCTION

Plant Test Coordinator:	Mr. Dennis Eby Plant Manager All Roads Construction Ltd. D.Eby@allroadsconstruction.com
Sampling Coordinator:	Mr. Mark Lanfranco President | Owner A. Lanfranco and Associates Inc. (604) 881-2582 mark.lanfranco@alanfranco.com
Sampling Crew:	Mr. D. Sampson – A. Lanfranco and Associates Inc. Mr. J. Gibbs – A. Lanfranco and Associates Inc. Mr. J. Ching – A. Lanfranco and Associates Inc.

In September 2025, All Roads commissioned A. Lanfranco and Associates Inc. of Surrey, B.C. to conduct an emission survey on the baghouse stack at their Coquitlam asphalt plant.

The purpose of the survey was to measure and report various emission parameters from the asphalt manufacturing process. The testing was conducted to determine compliance with permitted particulate matter, carbon monoxide, and organics discharges at 16% O_2. The emission limits are stipulated in All Roads Permit GVA1145.

This report documents the methods used and results found for the triplicate one-hour emission tests that were conducted on September 11th, 2025.

2 PROCESS DESCRIPTION

The All Roads hot mix asphalt plant, located at 2320 Rogers Avenue in Coquitlam, B.C. is a rotary drum mix asphalt plant. The unit is a natural gas fired Gencor Ultra II drum burner.

Dust laden flue gases generated in the mixer and dryer are cleaned by a Gencor CFS151 Baghouse. Following the fabric filtration, cleaned flue gases are discharged to atmosphere through a 1.37-meter stack which is monitored by a Dwyer real time particulate monitoring system. An ID fan is employed in the system.

On September 11, 2025, the plant maintained an average production rate of about 210 tonnes/ hr during the monitoring.

3 METHODOLOGY

The sampling and analytical methods used throughout this survey conform to the procedures outlined in the B.C. "Source Testing Code" 2020 Edition and the B.C. air analytical manual.

3.1 Sampling Techniques

Samples from the main stack were collected from two ports located at 90 degrees to each other. Particulate samples were taken with an APEX sample train (Fig. 1) equipped with a heated five-foot stainless-steel probe and heated filter assembly. The sample ports were about 3.5 diameters downstream and 1.0 diameters upstream of the nearest disturbances. From these criteria a 24-point, two traverse sampling regime was established for the particulate tests (Fig. 2 and 2a). Each point was sampled for two and one-half minutes resulting in the final sample volumes of about 1.2 cubic meters.

Velocities were measured with an S-type pitot tube and oil manometer. The probe and connecting glassware were brushed and rinsed with distilled water and acetone into a glass sample bottle after sample completion. Flue gas analysis (O_2 and CO_2) was conducted with Fyrite analysers and an on-line CEM system. Cyclonic flow was not present in the stack.

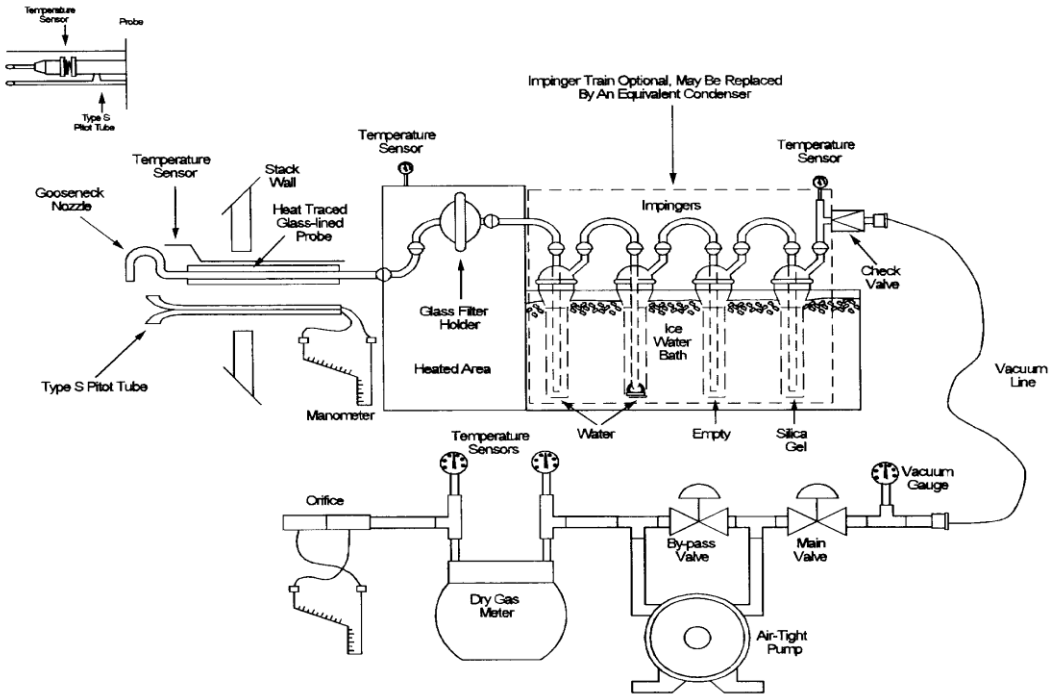


Figure 1: EPA Method 5 Particulate Sampling Train

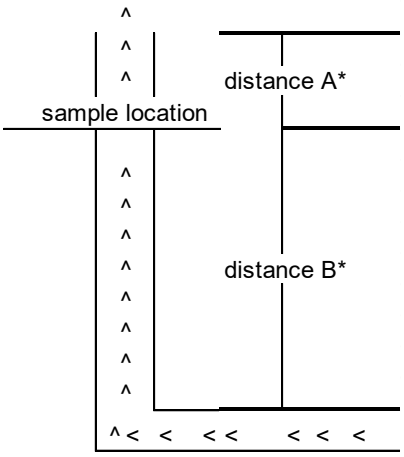
Figure - 2 Location of Traverse Points in Circular Stacks

(inches from inside w all to traverse point)

Client Stack I.D.: All Roads - Baghouse

Diameter (inches)	54		
Total Points	24	Diameters Upstream:	1
# of Ports Used	2		
Points / Traverse	12	Diameters Downstream:	3.5

Point	Distance from Wall
1	1.1
2	3.6
3	6.4
4	9.6
5	13.5
6	19.2
7	34.8
8	40.5
9	44.4
10	47.6
11	50.4
12	52.9



* distance A : duct diameters upstream from flow disturbance
* distance B : duct diameters downstream from flow disturbance
< < < < : flow direction

Figure 2a Location of Traverse Points in Circular Stacks

(percent of diameter from inside w all to traverse point)

Traverse Point Number on a Diameter	Number of Traverse Points on a Diameter					
	2	4	6	8	10	12
1	14.6%	6.7%	4.4%	3.2%	2.6%	2.1%
2	85.4%	25.0%	14.6%	10.5%	8.2%	6.7%
3		75.0%	29.6%	19.4%	14.6%	11.8%
4		93.3%	70.4%	32.3%	22.6%	17.7%
5			85.4%	67.7%	34.2%	25.0%
6			95.6%	80.6%	65.8%	35.6%
7				89.5%	77.4%	64.4%
8				96.8%	85.4%	75.0%
9					91.8%	82.3%
10					97.4%	88.2%
11						93.3%
12						97.9%

CEM System for Organics, CO and O_2

Continuous emission monitoring (CEM) was conducted for Organics (THC)/CO/O_2/CO_2 using A. Lanfranco and Associates Inc. CEM mobile laboratory. This unit is a trailer with the following instrumentation:

Name	CAI ZPA Analyzer	VIG FID	NOxygen
Manufacturer	California Analytical Instruments	Vig Industries, Inc.	California Analytical Instruments
Model	ZPA	20SHy10NAQT	650 NOxygen
Serial Number	N0C0606	7860819	U06080
Parameters	O_2, SO_2, CO_2, CO	THC, VOC	NO_x, O_2
Ranges	O_2: 0-25%, CO_2: 0-40%, SO_2: 0-200 or 0-2000 ppm, CO: 0-500 or 0-2500 ppm	0-10, 0-100, 0-1000, or 0-10000 ppm	NO/NO_x: 0-1 to 3000 ppm (user defined), O_2: 0-25%
Analyzer Type	NDIR (non-dispersive infrared) and paramagnetic	FID - Flame Ionizing Detector	Chemilumunescent and paramagnetic
Description	This instrument measures the concentration of SO_2, CO_2, and CO contained in sampling gas on the principle that different atomic molecules have an absorption spectrum in the wave band of infrared rays, and the intensity of absorption is determined by the Lambert-Beer law. O_2 is measrued with a separate paramagnetic sensor	The Total Hydrocarbon Analyzer Model-20-S measures concentrations of a wide variety of hydrocarbons in gas mixtures and in air using a Heated Flame Ionization Detector (FID). The process starts with a hydrogen flame. The resulting flame burns such a temperature as to pyrolyze most organic compounds producing ions and electrons in proportion to the concentration of carbon atoms present. Two plates are presented to the ions, one plate is electrically charged, the other plate, the collector is attached to a current to voltage amplifier. The ions are attracted to the collector where upon the ions cause a current to be induced.	The CAI Model 650 NOx/O2 Analyzer is a highly sensitive chemiluminescent (CLD) gas analyzer and a reliable paramagnetic oxygen analyzer. It measures oxides of nitrogen gas and dry basis oxygen concentrations in industrial and vehicle emission applications.

A diagram of the sampling, conditioning and analyzer system is provided in Figure 3. With this system the stack gas is withdrawn from the source through a coarse filter and stainless steel probe with associated pumps, filters and water removal components. The THC analyzer withdrew a side-stream of the filtered gas for hot FID analysis.

Prior to compliance testing and between each test all measuring instrumentation was calibrated with Protocol 1 and NIST Traceable, 1% certified calibration gas standards. Calibration gas certificates are appended.

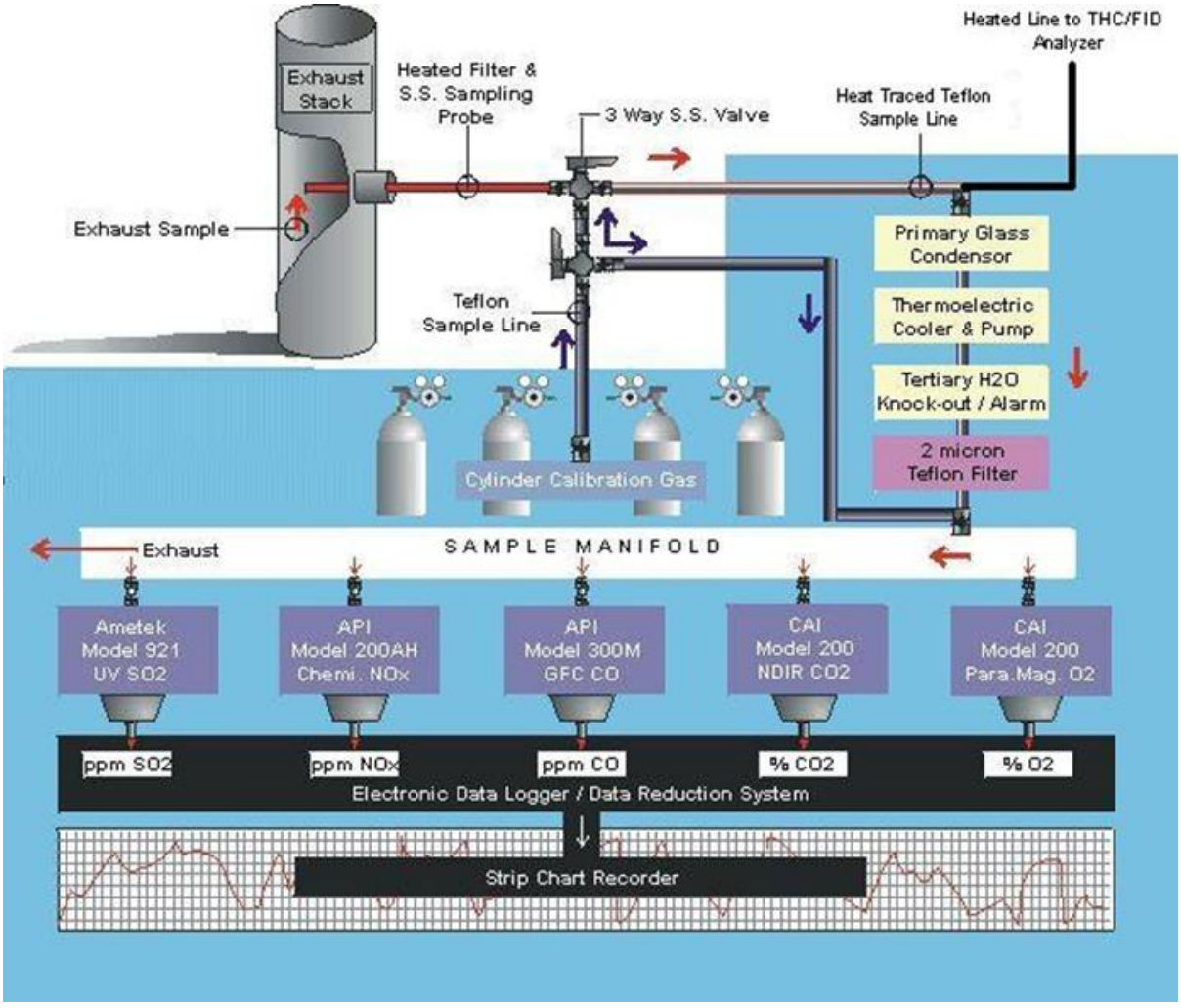


Figure 3 – CEM Measurement System Schematic

3.2 Analytical Techniques

Gravimetric analysis of the particulate samples was conducted by A. Lanfranco and Associates Inc. at their Surrey laboratory. The filters were conditioned by drying at 105 °C and desiccating for 24 hours. Final weighing of the filter occurred after the conditioning process, at which time the initial weight of the filter was subtracted. Probe washings were evaporated to dryness in porcelain dishes, desiccated for 24 hours and weighed. Blanks were carried through all procedures

CEM data was collected by data acquisition system by comparing stack gas responses to calibration gas responses.

Calibration gas mixtures used were:

Cylinder Name	Cylinder NIST Number	Expiry Date	Pressure (PSI)	THC (ppm)	CO (ppm)	O_2 (Vol. %)	CO_2 (Vol. %)
Zero Gas (N_2)	4695672Y	1-May-30	1300	0	0	0	0
1 Gas	T2Y1K9P	15-Apr-32	200	-	494.2	-	-
2 Gas	T267UHE	20-May-28	1300	-	243.5	-	-
Mid Meth	CC137247	6-Feb-32	1125	45.05	-	-	-
High Meth	CC341054	18-Jan-26	950	87.5	-	-	-
O_2/CO_2	T47DLD9	7-Jul-33	1600	-	-	11.05	10.91

4 RESULTS

The results of the particulate and stack parameters were calculated using a computer program consistent with reporting requirements of Metro Vancouver. Standard conditions used were 20 °C and 101.325 kPa (dry).

Detailed test results are presented in Table 1. Supporting data is presented in Tables 2, 3 and the Appendices. CEM minutely averages are presented in Appendix 1. Corrections to 16% O_2 were made with CEM data. Total Hydrocarbons are expressed as Methane (CH_4).

TABLE 1: Baghouse Stack Emission Test Results

Parameter		Test 1	Test 2	Test 3	Average
Test Date		11-Sep-25	11-Sep-25	11-Sep-25	
Test Time		19:00 - 20:02	20:15 - 21:17	21:36 - 22:38	
CEM Test Time		19:00 - 20:00	20:15 - 21:15	21:36 - 22:36	
Duration	(minutes)	60	60	60	
Particulate	(mg/Sm^3)	0.46	0.61	0.37	0.48
Particulate	(mg/Sm^3 @ 16% O_2)	0.35	0.49	0.28	0.37
Particulate	(kg/hr)	0.01	0.02	0.01	0.02
Particulate	(kg/day)	0.33	0.49	0.29	0.37
Flowrate	(Sm^3/min)	492	549	547	529
Flowrate	(Am^3/min)	889	863	867	873
Temperature	(°C)	87	85	87	86
CO	(mg/Sm^3 @ 16% O_2)	51.8	63.5	80.9	65.4
THC	(mg/Sm^3 @ 16% O_2)	9.6	11.6	19.4	13.5
O_2	(vol % dry)	14.5	14.8	14.4	14.6
CO_2	(vol % dry)	3.80	3.66	3.83	3.76
H_2O	(vol %)	32.0	22.3	22.6	25.6
Isokinetic Variation	(%)	105	97.0	97.3	100

Standard conditions (S) of 20 °C and 101.325 kPa dry

TABLE 2: PROCESS OPERATING CONDITIONS

Run	Date	Run Time	Production Rate (Tonnes/hr)	Mix Temp. (°C)	RAP
Run 1	11-Sep-25	19:00 - 20:02	210	158	18%
Run 2	11-Sep-25	20:15 - 21:17	210	157	18%
Run 3	11-Sep-25	21:36 - 22:38	220	155	18%
Average			213	157	18%

TABLE 3: GRAMS PER TONNE OF ASPHALT

Parameter	Mass Emission (grams/tonne of asphalt)
Particulate Matter	0.06
Carbon Monoxide	9.7
Total Hydrocarbons	2.02

5 DISCUSSION OF RESULTS

Particulate emissions from the asphalt plant ranged from 0.28 to 0.49 mg/Sm^3 at 16% O_2, averaging 0.37 mg/Sm^3 at 16% O_2. This is well below the permitted level of 30 mg/Sm^3 @ 16% O_2 and indicates that the particulate abatement system is functioning at an acceptable level.

The carbon monoxide, organics, volumetric flowrate and particulate for this survey are in compliance with All Roads Construction Ltd. Permit GVA1145 dated August 30, 2022.

There were no problems encountered in sample collection or analysis. Particulate samples were collected isokinetically at all points and the process operated in a normal manner during testing. The test results, therefore, are considered to be an accurate representation of emission characteristics for the process conditions maintained on the test date.

APPENDIX 1

COMPUTER OUTPUTS of

MEASURED and CALCULATED DATA

Client:	All Roads	**Date:**	11-Sep-25
Jobsite:	Coquitlam, BC	**Run:**	1 - Particulate
Source:	Baghouse Stack	**Run Time:**	19:00 - 20:02

Particulate Concentration:	**0.5**	**mg/dscm**	0.0002	gr/dscf
	0.3	mg/Acm	0.0001	gr/Acf
	0.4	mg/dscm (@ 16% O2)	0.0002	gr/dscf (@ 16% O2)
Emission Rate:	0.01	kg/hr	0.030	lb/hr
Sample Gas Volume:	1.1886	dscm	41.976	dscf
Total Sample Time:	60.0	minutes		
Average Isokineticity:	105.4	%		

Flue Gas Characteristics

Moisture:	31.99	%		
Temperature	87.4	oC	189.3	oF
Flow	491.9	dscm/min	17370	dscf/min
	8.20	dscm/sec	289.5	dscf/sec
	889.0	Acm/min	31394	Acf/min
Velocity	10.028	m/sec	32.90	f/sec
Gas Analysis	14.51	% O2	3.80	% CO2
	29.188	Mol. Wt (g/gmole) Dry	25.609	Mol. Wt (g/gmole) Wet

*** Standard Conditions:** Metric: 20 deg C, 101.325 kPa
Imperial: 68 deg F, 29.92 in.Hg

Client:	All Roads	**Date:**	11-Sep-25
Jobsite:	Coquitlam, BC	**Run:**	1 - Particulate
Source:	Baghouse Stack	**Run Time:**	19:00 - 20:02

Control Unit (Y)	1.0323
Nozzle Diameter (in.)	0.3338
Pitot Factor	0.8375
Baro. Press. (in. Hg)	29.95
Static Press. (in. H2O)	-0.15
Stack Height (ft)	40
Stack Diameter (in.)	54.0
Stack Area (sq.ft.)	15.904
Minutes Per Reading	2.5
Minutes Per Point	2.5
Port Length (inches)	3.5

Gas Analysis (Vol. %):

	CO2	O2
CEMS	3.80	14.51
Average =	**3.80**	**14.51**

Condensate Collection:

Impinger 1 (grams)	240.0
Impinger 2 (grams)	160.0
Impinger 3 (grams)	5.0
Impinger 4 (grams)	14.5
Total Gain (grams)	**419.5**

Collection:

Filter (grams)	**0.00005**
Washings (grams)	**0.00050**
Total (grams)	**0.00055**

Traverse	Point	Time (min.)	Dry Gas Meter (ft3)	Pitot ^P (in. H2O)	Orifice ^H (in. H2O)	Dry Gas Temperature Inlet (oF)	Outlet (oF)	Stack (oF)	Wall Dist. (in.)	Isokin. (%)
		0.0	225.255							
1	1	2.5	226.970	0.250	1.65	77	77	192	1.1	105.5
	2	5.0	228.720	0.260	1.72	77	77	190	3.6	105.4
	3	7.5	230.470	0.260	1.73	77	77	188	6.4	105.3
	4	10.0	232.300	0.280	1.88	78	78	185	9.6	105.7
	5	12.5	234.120	0.280	1.87	78	78	186	13.5	105.2
	6	15.0	235.980	0.290	1.94	79	79	188	19.2	105.6
	7	17.5	237.810	0.280	1.87	81	81	194	34.8	105.8
	8	20.0	239.600	0.270	1.80	81	81	193	40.5	105.3
	9	22.5	241.400	0.270	1.80	82	82	193	44.4	105.7
	10	25.0	243.230	0.280	1.86	83	83	196	47.6	105.6
	11	27.5	245.030	0.270	1.79	84	84	198	50.4	105.7
	12	30.0	246.690	0.230	1.52	85	85	200	52.9	105.5
		0.0	246.690							
2	1	2.5	248.350	0.230	1.53	84	84	195	1.1	105.3
	2	5.0	249.980	0.220	1.47	84	84	192	3.6	105.5
	3	7.5	251.570	0.210	1.41	83	83	190	6.4	105.3
	4	10.0	253.200	0.220	1.48	83	83	187	9.6	105.3
	5	12.5	254.830	0.220	1.49	83	83	185	13.5	105.1
	6	15.0	256.500	0.230	1.56	84	84	185	19.2	105.2
	7	17.5	258.210	0.240	1.63	84	84	184	34.8	105.4
	8	20.0	259.920	0.240	1.63	84	84	185	40.5	105.4
	9	22.5	261.660	0.250	1.69	84	84	185	44.4	105.1
	10	25.0	263.410	0.250	1.70	85	85	185	47.6	105.5
	11	27.5	265.190	0.260	1.76	85	85	185	50.4	105.3
	12	30.0	266.790	0.210	1.43	85	85	183	52.9	105.1
			Average:	0.250	1.675	82.1	82.1	189.3		105.4

Client:	All Roads	**Date:**	11-Sep-25
Jobsite:	Coquitlam, BC	**Run:**	2 - Particulate
Source:	Baghouse Stack	**Run Time:**	20:15 - 21:17

Particulate Concentration:	**0.6**	**mg/dscm**	0.0003	gr/dscf
	0.4	mg/Acm	0.0002	gr/Acf
	0.5	mg/dscm (@ 16% O2)	0.0002	gr/dscf (@ 16% O2)
Emission Rate:	0.02	kg/hr	0.045	lb/hr
Sample Gas Volume:	1.2219	dscm	43.150	dscf
Total Sample Time:	60.0	minutes		
Average Isokineticity:	97.0	%		

Flue Gas Characteristics

Moisture:	22.29	%		
Temperature	85.0	oC	184.9	oF
Flow	549.3	dscm/min	19400	dscf/min
	9.16	dscm/sec	323.3	dscf/sec
	863.0	Acm/min	30478	Acf/min
Velocity	9.735	m/sec	31.94	f/sec
Gas Analysis	14.75	% O2	3.66	% CO2
	29.175	Mol. Wt (g/gmole) Dry	26.684	Mol. Wt (g/gmole) Wet

*** Standard Conditions:** Metric: 20 deg C, 101.325 kPa
Imperial: 68 deg F, 29.92 in.Hg

Client:	All Roads	**Date:**	11-Sep-25
Jobsite:	Coquitlam, BC	**Run:**	2 - Particulate
Source:	Baghouse Stack	**Run Time:**	20:15 - 21:17

Control Unit (Y)	1.0323
Nozzle Diameter (in.)	0.3338
Pitot Factor	0.8375
Baro. Press. (in. Hg)	29.95
Static Press. (in. H2O)	-0.15
Stack Height (ft)	40
Stack Diameter (in.)	54.0
Stack Area (sq.ft.)	15.904
Minutes Per Reading	2.5
Minutes Per Point	2.5
Port Length (inches)	3.5

Gas Analysis (Vol. %):

	CO2	O2
CEMS	3.66	14.75
Average =	**3.66**	**14.75**

Condensate Collection:

Impinger 1 (grams)	205.0
Impinger 2 (grams)	40.0
Impinger 3 (grams)	5.0
Impinger 4 (grams)	13.0
Total Gain (grams)	**263.0**

Collection:

Filter (grams)	**0.00005**
Washings (grams)	**0.00070**
Total (grams)	**0.00075**

Traverse	Point	Time (min.)	Dry Gas Meter (ft3)	Pitot ^P (in. H2O)	Orifice ^H (in. H2O)	Dry Gas Temperature Inlet (oF)	Outlet (oF)	Stack (oF)	Wall Dist. (in.)	Isokin. (%)
		0.0	267.134							
1	1	2.5	268.850	0.230	1.65	80	80	182	1.1	97.0
	2	5.0	270.530	0.220	1.58	80	80	182	3.6	97.1
	3	7.5	272.130	0.200	1.43	80	80	183	6.4	97.1
	4	10.0	273.810	0.220	1.58	81	81	183	9.6	97.0
	5	12.5	275.490	0.220	1.58	81	81	183	13.5	97.0
	6	15.0	277.210	0.230	1.65	81	81	184	19.2	97.2
	7	17.5	278.970	0.240	1.72	82	82	184	34.8	97.3
	8	20.0	280.730	0.240	1.72	82	82	184	40.5	97.3
	9	22.5	282.530	0.250	1.80	83	83	184	44.4	97.3
	10	25.0	284.320	0.250	1.79	83	83	185	47.6	96.8
	11	27.5	286.150	0.260	1.86	83	83	185	50.4	97.1
	12	30.0	287.750	0.200	1.43	83	83	185	52.9	96.7
		0.0	287.750							
2	1	2.5	289.540	0.250	1.79	83	83	185	1.1	96.8
	2	5.0	291.370	0.260	1.86	83	83	185	3.6	97.1
	3	7.5	293.200	0.260	1.86	83	83	186	6.4	97.2
	4	10.0	295.100	0.280	2.01	84	84	186	9.6	97.1
	5	12.5	297.030	0.290	2.08	84	84	186	13.5	96.9
	6	15.0	298.930	0.280	2.01	84	84	186	19.2	97.1
	7	17.5	300.790	0.270	1.93	83	83	187	34.8	97.0
	8	20.0	302.650	0.274	1.93	83	83	187	40.5	96.3
	9	22.5	304.550	0.280	2.01	84	84	187	44.4	97.1
	10	25.0	306.380	0.260	1.86	84	84	187	47.6	97.1
	11	27.5	308.180	0.250	1.79	84	84	186	50.4	97.3
	12	30.0	309.860	0.220	1.58	84	84	186	52.9	96.7
			Average:	0.247	1.771	82.6	82.6	184.9		97.0

Client:	All Roads	**Date:**	11-Sep-25
Jobsite:	Coquitlam, BC	**Run:**	3 - Particulate
Source:	Baghouse Stack	**Run Time:**	21:36 - 22:38

Particulate Concentration:	**0.4**	**mg/dscm**	0.0002	gr/dscf
	0.2	mg/Acm	0.0001	gr/Acf
	0.3	mg/dscm (@ 16% O2)	0.0001	gr/dscf (@ 16% O2)
Emission Rate:	0.01	kg/hr	0.027	lb/hr
Sample Gas Volume:	1.2203	dscm	43.096	dscf
Total Sample Time:	60.0	minutes		
Average Isokineticity:	97.3	%		

Flue Gas Characteristics

Moisture:	22.58	%		
Temperature	87.1	oC	188.7	oF
Flow	546.7	dscm/min	19307	dscf/min
	9.11	dscm/sec	321.8	dscf/sec
	867.1	Acm/min	30622	Acf/min
Velocity	9.781	m/sec	32.09	f/sec
Gas Analysis	14.41	% O2	3.83	% CO2
	29.189	Mol. Wt (g/gmole) Dry	26.663	Mol. Wt (g/gmole) Wet

*** Standard Conditions:** Metric: 20 deg C, 101.325 kPa
Imperial: 68 deg F, 29.92 in.Hg

Client:	All Roads	**Date:**	11-Sep-25
Jobsite:	Coquitlam, BC	**Run:**	3 - Particulate
Source:	Baghouse Stack	**Run Time:**	21:36 - 22:38

Control Unit (Y)	1.0323
Nozzle Diameter (in.)	0.3338
Pitot Factor	0.8375
Baro. Press. (in. Hg)	29.95
Static Press. (in. H2O)	-0.15
Stack Height (ft)	40
Stack Diameter (in.)	54.0
Stack Area (sq.ft.)	15.904
Minutes Per Reading	2.5
Minutes Per Point	2.5
Port Length (inches)	3.5

Gas Analysis (Vol. %):

	CO2	O2
CEMS	3.83	14.41
Average =	**3.83**	**14.41**

Condensate Collection:

Impinger 1 (grams)	205.0
Impinger 2 (grams)	45.0
Impinger 3 (grams)	5.0
Impinger 4 (grams)	12.0
Total Gain (grams)	**267.0**

Collection:

Filter (grams)	**0.00005**
Washings (grams)	**0.00040**
Total (grams)	**0.00045**

Traverse	Point	Time (min.)	Dry Gas Meter (ft3)	Pitot ^P (in. H2O)	Orifice ^H (in. H2O)	Dry Gas Temperature Inlet (oF)	Outlet (oF)	Stack (oF)	Wall Dist. (in.)	Isokin. (%)
		0.0	310.255							
1	1	2.5	311.960	0.230	1.63	81	81	190	1.1	97.2
	2	5.0	313.630	0.220	1.56	81	81	190	3.6	97.3
	3	7.5	315.220	0.200	1.42	81	81	190	6.4	97.1
	4	10.0	316.890	0.220	1.55	80	80	191	9.6	97.5
	5	12.5	318.590	0.230	1.63	80	80	191	13.5	97.1
	6	15.0	320.330	0.240	1.70	80	80	191	19.2	97.3
	7	17.5	322.080	0.240	1.71	82	82	189	34.8	97.4
	8	20.0	323.870	0.250	1.78	82	82	189	40.5	97.6
	9	22.5	325.660	0.250	1.78	82	82	189	44.4	97.6
	10	25.0	327.480	0.260	1.85	83	83	189	47.6	97.2
	11	27.5	329.270	0.250	1.78	83	83	188	50.4	97.4
	12	30.0	330.870	0.200	1.43	84	84	188	52.9	97.0
		0.0	330.870							
	1	2.5	332.660	0.250	1.79	84	84	188	1.1	97.2
	2	5.0	334.490	0.260	1.86	84	84	188	3.6	97.4
	3	7.5	336.320	0.260	1.86	85	85	188	6.4	97.3
	4	10.0	338.190	0.270	1.93	85	85	188	9.6	97.6
	5	12.5	340.130	0.290	2.09	86	86	187	13.5	97.4
	6	15.0	342.040	0.280	2.01	86	86	187	19.2	97.6
	7	17.5	343.910	0.270	1.94	86	86	187	34.8	97.3
	8	20.0	345.780	0.270	1.94	85	85	187	40.5	97.5
	9	22.5	347.680	0.280	2.01	86	86	188	44.4	97.2
	10	25.0	349.520	0.260	1.87	87	87	188	47.6	97.4
	11	27.5	351.320	0.250	1.80	87	87	189	50.4	97.3
	12	30.0	353.010	0.220	1.58	87	87	189	52.9	97.3
			Average:	0.248	1.771	83.6	83.6	188.7		97.3

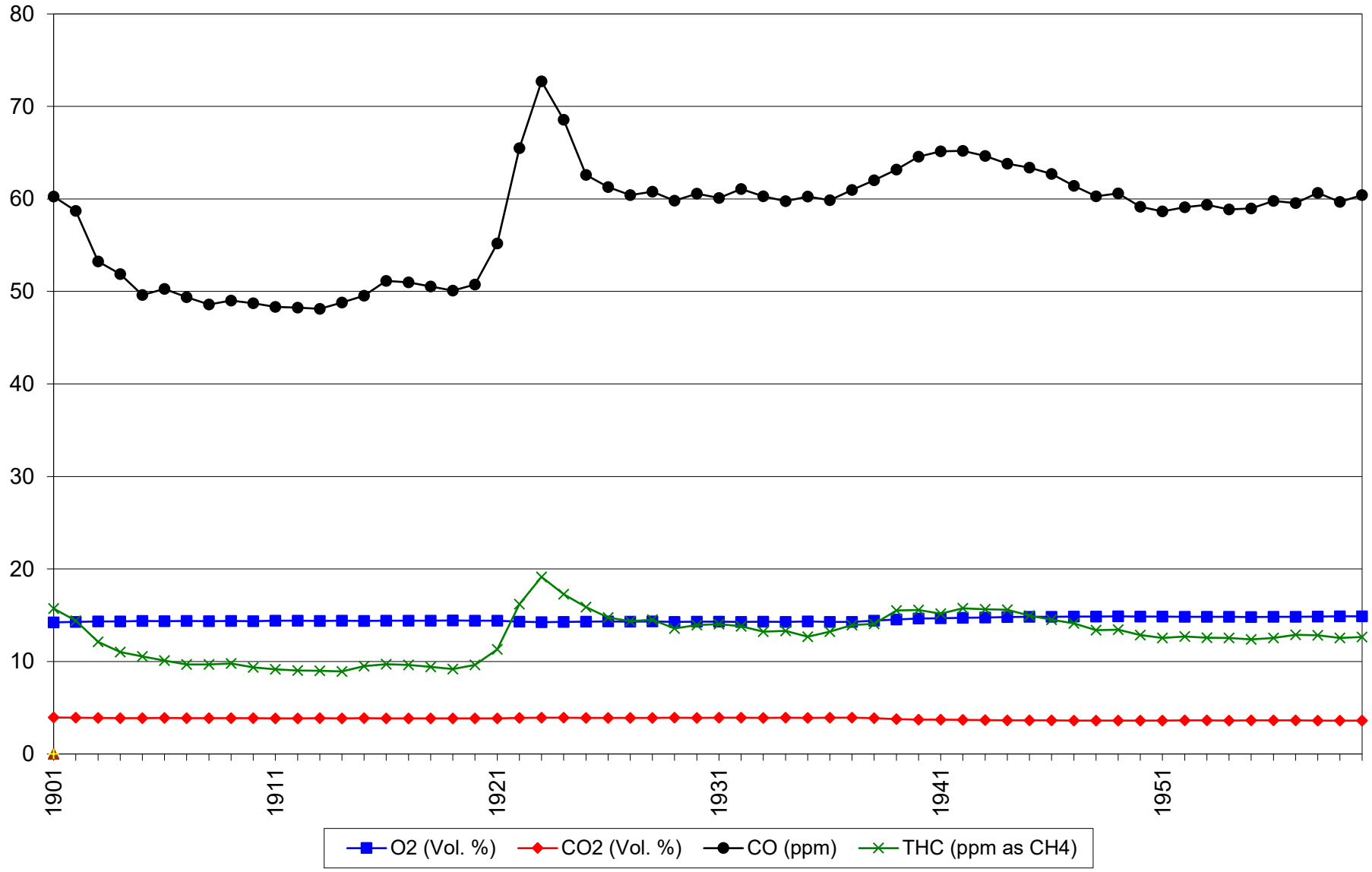
A. Lanfranco and Associates Inc.
METLab CEM Report

Client:	All Roads - Coquitlam, BC				Moisture % =
Source:	Baghouse	**O2 Correction**	16		31.99
Run:	1	**Year:**	2025		
		O_2	**CO_2**	**CO**	**THC**
Date	**Time**	(Vol. %)	(Vol. %)	(ppm)	(ppm as CH_4)
11-Sep	1901	14.23	3.94	60.26	15.71
11-Sep	1902	14.28	3.92	58.71	14.41
11-Sep	1903	14.32	3.90	53.26	12.12
11-Sep	1904	14.33	3.88	51.87	11.02
11-Sep	1905	14.39	3.87	49.61	10.54
11-Sep	1906	14.35	3.89	50.27	10.10
11-Sep	1907	14.38	3.87	49.39	9.69
11-Sep	1908	14.35	3.88	48.59	9.67
11-Sep	1909	14.39	3.87	49.02	9.79
11-Sep	1910	14.37	3.87	48.72	9.38
11-Sep	1911	14.40	3.85	48.33	9.14
11-Sep	1912	14.42	3.84	48.26	9.03
11-Sep	1913	14.38	3.86	48.12	9.01
11-Sep	1914	14.42	3.84	48.81	8.92
11-Sep	1915	14.39	3.87	49.54	9.50
11-Sep	1916	14.41	3.85	51.15	9.69
11-Sep	1917	14.41	3.85	50.99	9.61
11-Sep	1918	14.41	3.85	50.54	9.41
11-Sep	1919	14.43	3.84	50.09	9.18
11-Sep	1920	14.40	3.86	50.74	9.61
11-Sep	1921	14.42	3.85	55.18	11.30
11-Sep	1922	14.30	3.91	65.49	16.19
11-Sep	1923	14.26	3.93	72.71	19.15
11-Sep	1924	14.28	3.92	68.55	17.28
11-Sep	1925	14.29	3.91	62.61	15.88
11-Sep	1926	14.32	3.90	61.28	14.76
11-Sep	1927	14.29	3.91	60.41	14.35
11-Sep	1928	14.32	3.89	60.79	14.51
11-Sep	1929	14.27	3.92	59.81	13.55
11-Sep	1930	14.30	3.91	60.57	13.93
11-Sep	1931	14.29	3.91	60.09	14.04
11-Sep	1932	14.28	3.92	61.07	13.80
11-Sep	1933	14.31	3.90	60.29	13.23
11-Sep	1934	14.28	3.92	59.77	13.30
11-Sep	1935	14.32	3.90	60.26	12.67
11-Sep	1936	14.28	3.92	59.86	13.23
11-Sep	1937	14.28	3.92	60.96	13.94
11-Sep	1938	14.41	3.86	62.02	14.07
11-Sep	1939	14.55	3.78	63.18	15.52
11-Sep	1940	14.64	3.73	64.57	15.57
11-Sep	1941	14.67	3.71	65.16	15.18
11-Sep	1942	14.73	3.68	65.19	15.76
11-Sep	1943	14.75	3.67	64.66	15.65
11-Sep	1944	14.79	3.65	63.80	15.59
11-Sep	1945	14.82	3.62	63.40	14.97
11-Sep	1946	14.82	3.63	62.72	14.51
11-Sep	1947	14.85	3.61	61.41	14.11
11-Sep	1948	14.85	3.61	60.29	13.40
11-Sep	1949	14.87	3.60	60.61	13.44
11-Sep	1950	14.84	3.62	59.14	12.86
11-Sep	1951	14.84	3.62	58.65	12.54
11-Sep	1952	14.83	3.63	59.09	12.70
11-Sep	1953	14.82	3.63	59.36	12.56
11-Sep	1954	14.83	3.62	58.86	12.54
11-Sep	1955	14.81	3.64	58.97	12.38
11-Sep	1956	14.82	3.63	59.80	12.55
11-Sep	1957	14.83	3.62	59.54	12.88
11-Sep	1958	14.84	3.61	60.65	12.84
11-Sep	1959	14.88	3.60	59.69	12.54
11-Sep	2000	14.87	3.60	60.42	12.65
	Average	14.51	3.80	58.0	12.8
	Minimum	14.23	3.60	48.1	8.9
	Maximum	14.88	3.94	72.7	19.1
Mass Concentration (mg/m3 dry)		**n/a**	**n/a**	**67.5**	**12.6**
Mass Concentration (mg/m3 dry) Corrected to 16% O2				**51.8**	**9.6**
	Range	*25.0*	*20.00*	*500.0*	*100.0*
Calibration Summary		**O2**	**CO2**	**CO**	**THC**
Gas (Cert. Value)		**11.05**	**10.91**	**243.5**	**45.1**
Analyzer Initial Span		10.90	11.04	245.7	44.99
Analyzer Initial Zero		0.00	0.08	2.49	0.04
Initial Gas Response		10.89	11.04	247.2	45.0
Final Gas Response		10.87	11.04	252.8	42.0
Initial Zero Response		0.03	0.08	1.8	0.04
Final Zero Response		0.00	0.10	6.0	0.75
Error Summary					
Analyzer Cal. Erro	(+/- 2% or 5% THC)	-0.6%	0.6%	0.4%	-0.1%
Analyzer Zero Err	(+/- 2% or 5% THC)	0.0%	0.4%	0.5%	0.0%
Initial Span Syste	(+/- 5%)	0.0%	0.0%	0.3%	0.0%
Final Span Syster	(+/- 5%)	-0.1%	0.0%	1.4%	-3.0%
Initial Zero Systen	(+/- 5%)	0.1%	0.0%	-0.1%	0.0%
Final Zero Systen	(+/- 5%)	0.0%	0.1%	0.7%	0.7%
Test Span Drift	(+/- 3%)	-0.1%	0.0%	1.1%	-3.0%
Test Zero Drift	(+/- 3%)	-0.1%	0.1%	0.8%	0.7%

Baghouse Stack - Run 1 (September 11, 2025)

All Roads - Coquitlam, BC

METLab CEM Results



A. Lanfranco and Associates Inc.

A. Lanfranco and Associates Inc.
METLab CEM Report

Client:	All Roads - Coquitlam, BC			Moisture % =	
Source:	Baghouse	**O2 Correction**	16		22.29
Run:	2	**Year:**	2025		

Date	Time	O_2 (Vol. %)	CO_2 (Vol. %)	CO (ppm)	THC (ppm as CH_4)
11-Sep	2016	14.77	3.64	65.27	18.52
11-Sep	2017	14.83	3.61	62.47	16.86
11-Sep	2018	14.83	3.60	60.47	15.77
11-Sep	2019	14.83	3.61	60.57	15.00
11-Sep	2020	14.79	3.63	61.67	15.38
11-Sep	2021	14.72	3.67	63.67	15.71
11-Sep	2022	14.75	3.65	63.07	15.72
11-Sep	2023	14.75	3.65	62.07	14.85
11-Sep	2024	14.78	3.64	61.07	14.21
11-Sep	2025	14.74	3.65	61.77	14.30
11-Sep	2026	14.78	3.63	61.47	14.25
11-Sep	2027	14.78	3.63	61.67	14.01
11-Sep	2028	14.77	3.65	59.80	13.37
11-Sep	2029	14.84	3.60	60.57	13.42
11-Sep	2030	14.78	3.64	61.57	14.28
11-Sep	2031	14.77	3.63	63.57	14.79
11-Sep	2032	14.72	3.67	64.27	15.80
11-Sep	2033	14.74	3.66	67.37	16.92
11-Sep	2034	14.75	3.65	68.07	17.31
11-Sep	2035	14.69	3.67	70.57	18.25
11-Sep	2036	14.68	3.69	70.27	18.35
11-Sep	2037	14.70	3.68	71.47	18.64
11-Sep	2038	14.78	3.64	70.07	18.30
11-Sep	2039	14.82	3.62	70.07	18.48
11-Sep	2040	14.82	3.61	68.77	17.90
11-Sep	2041	14.82	3.62	68.67	17.29
11-Sep	2042	14.77	3.64	67.27	16.13
11-Sep	2043	14.72	3.67	67.07	14.97
11-Sep	2044	14.74	3.66	67.07	15.20
11-Sep	2045	14.78	3.63	66.97	16.02
11-Sep	2046	14.77	3.64	66.57	16.06
11-Sep	2047	14.79	3.63	66.87	15.84
11-Sep	2048	14.75	3.65	66.87	15.10
11-Sep	2049	14.70	3.68	66.77	15.39
11-Sep	2050	14.75	3.65	67.07	15.31
11-Sep	2051	14.77	3.64	65.97	15.26
11-Sep	2052	14.77	3.65	65.47	14.38
11-Sep	2053	14.77	3.64	65.57	14.39
11-Sep	2054	14.76	3.65	66.07	15.14
11-Sep	2055	14.74	3.67	67.17	15.01
11-Sep	2056	14.70	3.69	68.97	15.46
11-Sep	2057	14.73	3.67	68.07	15.66
11-Sep	2058	14.75	3.65	66.97	14.99
11-Sep	2059	14.75	3.65	67.77	15.49
11-Sep	2100	14.72	3.67	67.87	15.26
11-Sep	2101	14.72	3.68	67.87	15.27
11-Sep	2102	14.73	3.67	68.97	15.96
11-Sep	2103	14.73	3.67	70.37	16.57
11-Sep	2104	14.76	3.66	70.97	17.14
11-Sep	2105	14.72	3.68	73.27	18.64
11-Sep	2106	14.75	3.66	74.87	19.27
11-Sep	2107	14.72	3.67	75.67	20.47
11-Sep	2108	14.67	3.71	78.67	20.02
11-Sep	2109	14.69	3.69	78.17	20.40
11-Sep	2110	14.71	3.68	80.17	22.26
11-Sep	2111	14.64	3.72	82.16	23.43
11-Sep	2112	14.63	3.73	82.06	23.54
11-Sep	2113	14.70	3.69	83.56	24.40
11-Sep	2114	14.76	3.65	82.86	24.61
11-Sep	2115	14.73	3.67	82.46	23.46
	Average	14.75	3.66	68.4	16.9
	Minimum	14.63	3.60	59.8	13.4
	Maximum	14.84	3.73	83.6	24.6
Mass Concentration (mg/m3 dry)		**n/a**	**n/a**	**79.7**	**14.5**
Mass Concentration (mg/m3 dry) Corrected to 16% O2				**63.5**	**11.6**
	Range	*25.0*	*20.00*	*500.0*	*100.0*

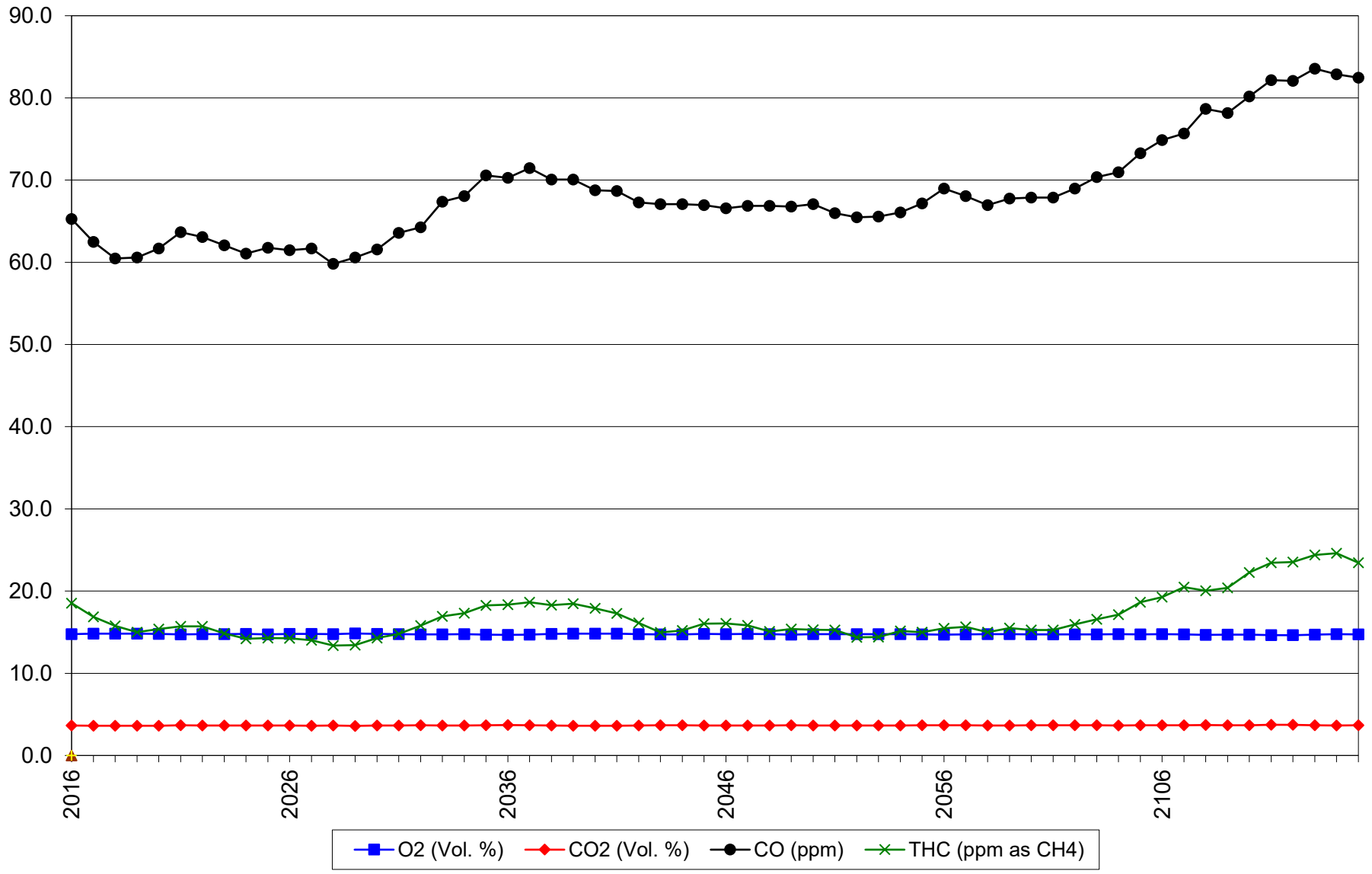
Calibration Summary	**O2**	**CO2**	**CO**	**THC**
Gas (Cert. Value)	**11.05**	**10.91**	**243.5**	**45.1**
Analyzer Initial Span	10.90	11.04	245.7	44.99
Analyzer Initial Zero	0.00	0.08	2.49	0.04
Initial Gas Response	10.87	11.04	252.8	42.0
Final Gas Response	10.88	11.10	254.2	41.7
Initial Zero Response	0.00	0.10	6.0	0.75
Final Zero Response	-0.01	0.10	13.8	0.98

Error Summary				
Analyzer Cal. Erro (+/- 2% or 5% TH	-0.6%	0.6%	0.4%	-0.1%
Analyzer Zero Err (+/- 2% or 5% TH	0.0%	0.4%	0.5%	0.0%
Initial Span Syster (+/- 5%)	-0.1%	0.0%	1.4%	-3.0%
Final Span Systen (+/- 5%)	-0.1%	0.3%	1.7%	-3.3%
Initial Zero Systen (+/- 5%)	0.0%	0.1%	0.7%	0.7%
Final Zero System (+/- 5%)	0.0%	0.1%	2.3%	0.9%
Test Span Drift (+/- 3%)	0.0%	0.3%	0.3%	-0.3%

Baghouse Stack - Run 2 (September 11, 2025)

All Roads - Coquitlam, BC

METLab CEM Results



A. Lanfranco and Associates Inc.

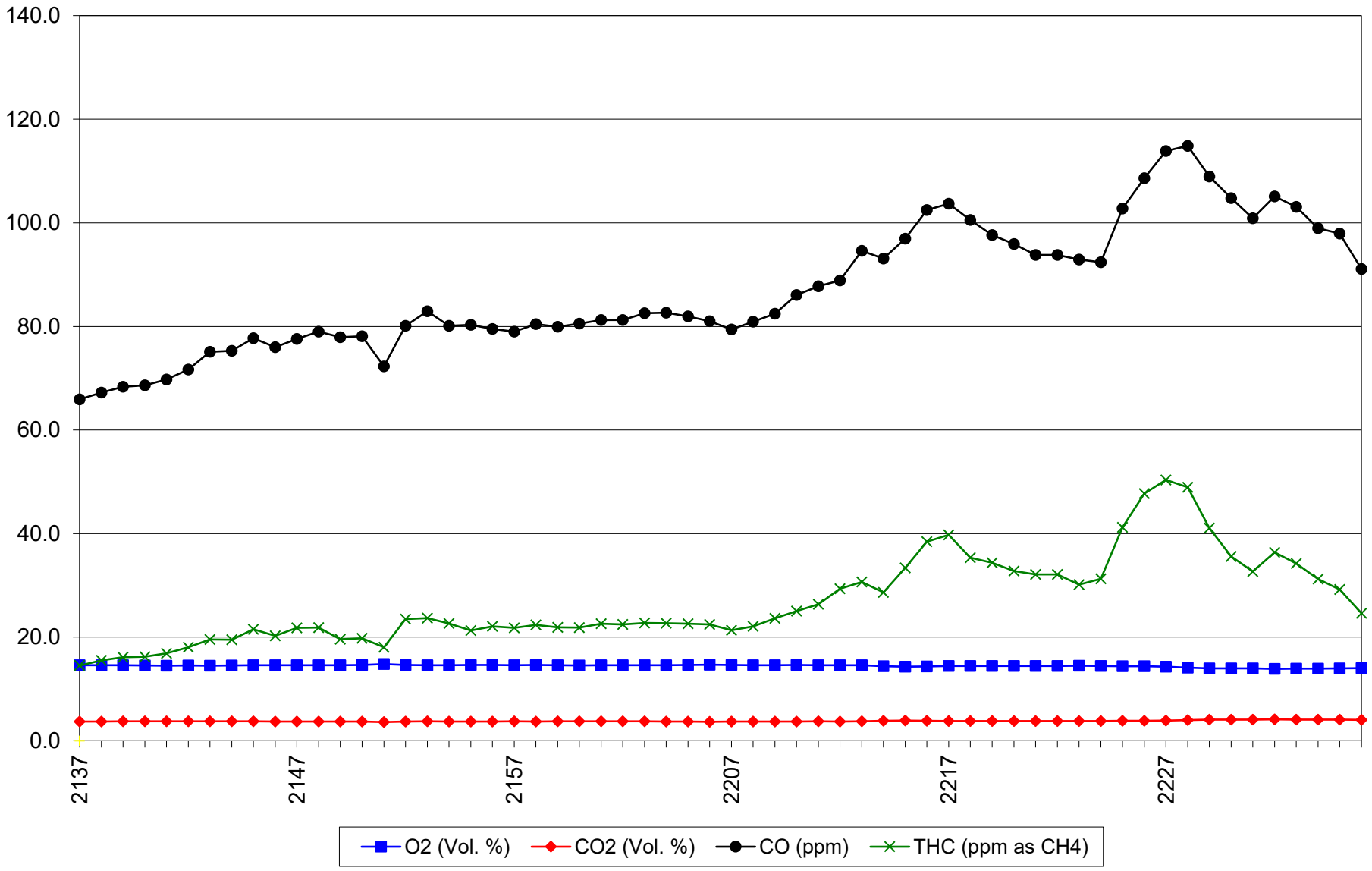
A. Lanfranco and Associates Inc.
METLab CEM Report

Client:	All Roads - Coquitlam, BC			Moisture % =	
Source:	Baghouse	**O2 Correction**	16		22.58
Run:	3	**Year:**	2025		
		O_2	**CO_2**	**CO**	**THC**
Date	**Time**	(Vol. %)	(Vol. %)	(ppm)	(ppm as CH_4)
11-Sep	2137	14.58	3.73	65.93	14.52
11-Sep	2138	14.58	3.73	67.23	15.54
11-Sep	2139	14.57	3.74	68.34	16.12
11-Sep	2140	14.53	3.76	68.64	16.22
11-Sep	2141	14.51	3.77	69.75	16.87
11-Sep	2142	14.54	3.75	71.67	18.06
11-Sep	2143	14.51	3.77	75.09	19.57
11-Sep	2144	14.54	3.75	75.29	19.53
11-Sep	2145	14.57	3.73	77.71	21.52
11-Sep	2146	14.58	3.73	76.00	20.28
11-Sep	2147	14.59	3.72	77.61	21.78
11-Sep	2148	14.58	3.72	79.02	21.83
11-Sep	2149	14.59	3.72	77.91	19.62
11-Sep	2150	14.64	3.70	78.11	19.78
11-Sep	2151	14.81	3.61	72.27	18.08
11-Sep	2152	14.65	3.69	80.12	23.51
11-Sep	2153	14.58	3.73	82.94	23.67
11-Sep	2154	14.59	3.72	80.12	22.65
11-Sep	2155	14.61	3.71	80.33	21.31
11-Sep	2156	14.61	3.71	79.52	22.10
11-Sep	2157	14.57	3.74	79.02	21.78
11-Sep	2158	14.62	3.71	80.43	22.35
11-Sep	2159	14.58	3.74	79.92	21.88
11-Sep	2200	14.55	3.74	80.53	21.86
11-Sep	2201	14.56	3.75	81.23	22.59
11-Sep	2202	14.57	3.74	81.23	22.48
11-Sep	2203	14.57	3.74	82.54	22.74
11-Sep	2204	14.58	3.73	82.64	22.71
11-Sep	2205	14.61	3.71	81.94	22.58
11-Sep	2206	14.68	3.69	81.03	22.44
11-Sep	2207	14.65	3.70	79.42	21.35
11-Sep	2208	14.60	3.72	80.93	22.09
11-Sep	2209	14.58	3.73	82.44	23.61
11-Sep	2210	14.62	3.71	86.07	25.06
11-Sep	2211	14.57	3.74	87.78	26.35
11-Sep	2212	14.59	3.72	88.89	29.35
11-Sep	2213	14.58	3.73	94.63	30.66
11-Sep	2214	14.41	3.83	93.12	28.66
11-Sep	2215	14.31	3.88	96.94	33.39
11-Sep	2216	14.33	3.87	102.48	38.42
11-Sep	2217	14.43	3.81	103.69	39.76
11-Sep	2218	14.46	3.80	100.57	35.36
11-Sep	2219	14.44	3.81	97.65	34.36
11-Sep	2220	14.42	3.82	95.93	32.78
11-Sep	2221	14.45	3.80	93.82	32.09
11-Sep	2222	14.44	3.81	93.82	32.10
11-Sep	2223	14.48	3.78	92.91	30.16
11-Sep	2224	14.45	3.80	92.41	31.27
11-Sep	2225	14.40	3.83	102.78	41.21
11-Sep	2226	14.39	3.84	108.62	47.71
11-Sep	2227	14.31	3.89	113.86	50.37
11-Sep	2228	14.14	3.99	114.87	48.96
11-Sep	2229	13.96	4.08	108.93	41.06
11-Sep	2230	13.97	4.08	104.80	35.61
11-Sep	2231	13.96	4.09	100.87	32.66
11-Sep	2232	13.87	4.14	105.10	36.40
11-Sep	2233	13.94	4.09	103.08	34.21
11-Sep	2234	13.94	4.10	98.96	31.21
11-Sep	2235	13.97	4.08	97.95	29.20
11-Sep	2236	14.02	4.05	91.10	24.61
	Average	14.41	3.83	92.00	29.85
	Minimum	13.87	3.69	79.02	21.31
	Maximum	14.68	4.14	114.87	50.37
Mass Concentration (mg/m3 dry)		**n/a**	**n/a**	**107.2**	**25.7**
Mass Concentration (mg/m3 dry) Corrected to 16% O2				**80.9**	**19.4**
	Range	*25.0*	*20.00*	*500.0*	*100.0*
Calibration Summary		**O2**	**CO2**	**CO**	**THC**
Gas (Cert. Value)		**11.05**	**10.91**	**243.5**	**45.1**
Analyzer Initial Span		10.90	11.04	245.7	44.99
Analyzer Initial Zero		0.00	0.08	2.49	0.04
Initial Gas Response		10.88	11.10	254.2	41.7
Final Gas Response		10.87	11.12	257.5	41.8
Initial Zero Response		-0.01	0.10	13.8	0.98
Final Zero Response		0.03	0.15	14.3	0.96
Error Summary					
Analyzer Cal. Erro	(+/- 2% or 5% TH	-0.6%	0.6%	0.4%	-0.1%
Analyzer Zero Err	(+/- 2% or 5% TH	0.0%	0.4%	0.5%	0.0%
Initial Span Syster	(+/- 5%)	-0.1%	0.3%	1.7%	-3.3%
Final Span Systen	(+/- 5%)	-0.1%	0.4%	2.4%	-3.2%
Initial Zero Systen	(+/- 5%)	0.0%	0.1%	2.3%	0.9%
Final Zero System	(+/- 5%)	0.1%	0.4%	2.4%	0.9%
Test Span Drift	(+/- 3%)	0.0%	0.1%	0.6%	0.1%

Baghouse Stack - Run 3 (September 11, 2025)

All Roads - Coquitlam, BC

METLab CEM Results



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APPENDIX 2

CALCULATIONS

The following sections show the equations and define the variables that were used for this survey. The equations are organized in four sections. Equations 1-11 were used to calculate particulate concentration at standard conditions on a dry basis and with an Oxygen correction. Equations 11-26 were used to sample within the 100 ± 10% isokinetic variation and to confirm that sampling meets this isokinetic variation threshold. Equations 26-28 were used to calculate the volumetric flowrate of the stack flue gas. Equations 29-36 were used to calculate the results from the CEM system.

A2.1 Contaminant Concentration Calculations

$$c = \frac{m}{V_{std}} \quad \textbf{Equation 1}$$

$$m_{part} = m_{filter} + m_{pw} + m_{cond} \quad \textbf{Equation 2}$$

$$m_i = m_{ana,i} - m_{blank} \quad \textbf{Equation 3}$$

$$V_{std} = \frac{V_{std(imp)}}{35.315} \quad \textbf{Equation 4}$$

$$V_{std(imp)} = \frac{V_{samp} \times y \times P_m \times (T_{std} + 459.67)}{P_{std} \times (T_{m(ave)} + 459.67)} \quad \textbf{Equation 5}$$

$$V_{samp} = V_{final} - V_{init} \quad \textbf{Equation 6}$$

$$P_m = P_B + \frac{\Delta H_{ave}}{13.6} \quad \textbf{Equation 7}$$

$$\Delta H_{ave} = \frac{1}{n}\sum_{i=1}^{n} \Delta H_{i(act)}, where\ n = the\ number\ of\ points \quad \textbf{Equation 8}$$

$$OC = \frac{20.9 - \%O_{2c}}{20.9 - \%O_{2m}} \quad \textbf{Equation 9}$$

$$\%O_{2m} = \frac{1}{n}\sum_{i=1}^{n} \%O_{2i}, where\ n = the\ number\ of\ O_2\ measurements \quad \textbf{Equation 10}$$

$$\%CO_{2m} = \frac{1}{n}\sum_{i=1}^{n} \%CO_{2i}, where\ n = the\ number\ of\ CO_2\ measurements \quad \textbf{Equation 11}$$

Where,

c	= *Contaminant concentration*
m	= *Contaminant mass*
m_i	= *Net analytical mass (mg, ng, or µg)*
$m_{ana,i}$	= *Analytical mass (mg, ng, or µg)*
m_{blank}	= *Blank analytical mass (mg, ng, or µg)*
m_{part}	= *Total particulate mass (mg)*
m_{filter}	= *Net particulate gain from filter (mg)*
m_{pw}	= *Net particulate gain from probe wash (mg)*
m_{cond}	= *Net condensable particulate from lab analysis (mg)*
$V_{std(imp)}$	= *Sample volume at standard conditions (ft^3)*
V_{std}	= *Sample volume at standard conditions (m^3)*
V_{samp}	= *Sample volume at actual conditions (ft^3)*
V_{final}	= *Final gas meter reading (ft^3)*
V_{init}	= *Initial gas meter reading (ft^3)*
T_{std}	= *Standard temperature (68 °F)*
T_m	= *Gas meter temperature (°F)*
$T_{m(ave)}$	= *Average gas meter temperature (°F)*
P_m	= *Absolute meter pressure (inches of Hg)*
P_B	= *Barometric pressure (inches of Hg)*
ΔH_{ave}	= *Average of individual point orifice pressures (inches of H_2O)*
$\Delta H_{i(act)}$	= *Individual recorded point orifice pressures (inches of H_2O)*
OC	= *Oxygen correction factor (dimensionless)*
$\%O_{2c}$	= *Oxygen concentration to correct to (% dry basis)*
$\%O_{2m}$	= *Average measured stack gas oxygen concentration (% dry basis)*
$\%CO_{2m}$	= *Average measured stack gas oxygen concentration (% dry basis)*

Equation 1 is the general concentration calculation used for all contaminants. The contaminant mass, *m*, is the net analytic mass for the given contaminant. For particulate, *m* is the sum of the mass contributed from probe washing and filter particulate.

A2.2 Isokinetic Variation Calculations

$$\Delta H_i = \frac{2.62 \times 10^7 \times c_p \times A_n \times (1 - B_{wo}) \times M_D \times (T_m + 459.67) \times \Delta p_i}{k_o \times M_w \times (T_{Stk} + 459.67)}$$ **Equation 11**

$$R_m = 85.49 \times c_p \times \sqrt{\Delta p_i} \times \sqrt{\frac{(T_{stk_i} + 459.67)}{M_w \times P_B}} \times 60 \times A_n \times \frac{(T_{m_i} + 459.67) \times (1 - B_{wo})}{(T_{stk_i} + 459.67) \times y}$$ **Equation 12**

$$A_n = \pi \left(\frac{d_n}{24}\right)^2$$ **Equation 13**

$$M_w = M_D \times (1 - B_{wo}) + 18 \times B_{wo}$$ **Equation 14**

$$M_D = 0.44 \times \%CO_2 + 0.32 \times \%O_2 + 0.28 \times (100 - \%CO_2 - \%O_2)$$ **Equation 15**

$$T_{Stk} = \frac{1}{n}\sum_{i=1}^{n} T_{Stk_i}, where\ n = the\ number\ of\ points$$ **Equation 16**

$$B_{wo} = \frac{V_{cond}}{V_{cond} + V_{std(imp)}}$$ **Equation 17**

$$V_{cond} = 0.04707 \times V_{gain}$$ **Equation 18**

$$Iso = \frac{1}{n}\sum_{i=1}^{n} Iso_i, where\ n = the\ number\ of\ points$$ **Equation 19**

$$Iso_i = \frac{v_{nzi}}{v_i}$$ **Equation 20**

$$v_i = 85.49 \times c_p \times \sqrt{\Delta p_i} \times \sqrt{\frac{(T_{Stk_i} + 459.67)}{(P_{Stk} \times M_W)}}$$ **Equation 21**

$$v_{nzi} = \frac{(V_i - V_{i-1}) \times y \times (T_{Stk_i} + 459.67) \times (P_B + \frac{\Delta H_{i(act)}}{13.6})}{A_n \times t_i \times 60 \times (T_{m(i)} + 459.67) \times P_{stk} \times (1 - B_{wo})}$$ **Equation 22**

$$P_{stk} = P_B + \frac{P_g}{13.6}$$ **Equation 23**

Equation 24

$$v_{stk} = \frac{1}{n}\sum_{i=1}^{n} v_i \text{ , where } n = \text{the number of points}$$

Equation 25

$$v_{nz} = \frac{1}{n}\sum_{i=1}^{n} v_{nzi} \text{ , where } n = \text{the number of points}$$

Where,

A_n	= *Nozzle area (ft^2)*
d_n	= *Diameter of nozzle (inches)*
c_p	= *Pitot coefficient (dimensionless)*
Δp_i	= *Individual point differential pressures (inches of H_2O)*
T_{Stk}	= *Average flue gas temperature (°F), second subscript i, indicates individual point measurements*
$\Delta H_{i(act)}$	= *Calculated individual point orifice pressures (inches of H_2O)*
P_g	= *Stack Static pressure (inches of H_2O)*
P_{stk}	= *Absolute stack pressure (inches of Hg)*
M_w	= *Wet gas molecular weight (g/gmol)*
M_D	= *Dry gas molecular weight (g/gmol)*
$\%CO_2$	= *Stack gas carbon dioxide concentration (% dry basis)*
$\%O_2$	= *Stack gas oxygen concentration (% dry basis)*
B_{wo}	= *Stack gas water vapour, proportion by volume*
V_{cond}	= *Total volume of water vapor collected, corrected to standard conditions (ft^3)*
V_{gain}	= *Condensate gain of impinger contents (mL)*
P_{std}	= *Standard pressure (29.92 inches of Hg)*
v_{stk}	= *Average flue gas velocity (ft/sec)*
v_i	= *Individual point flue gas velocity (ft/sec)*
v_{nz}	= *Average velocity at nozzle(ft/sec)*
v_{nzi}	= *Individual point velocity at nozzle(ft/sec)*
Iso_i	= *Individual point isokinetic variation (%)*
Iso	= *Average isokinetic variation (%)*
R_m	= *Isokinetic sampling rate (ft^3/min)*

A2.3 Volumetric Flowrate Calculations

$$Q_S = Q_A \times \frac{(T_{Std} + 459.67)}{(T_{Stk} + 459.67)} \times \frac{P_{Stk}}{P_{Std}}$$ **Equation 26**

$$Q_A = \frac{v_{stk} \times 60 \times A_{stk}}{35.315}$$ **Equation 27**

$$A_{stk} = \pi \left(\frac{d}{24}\right)^2$$ **Equation 28**

Where,

Q_A = *Actual flowrate (Am^3/min)*
Q_S = *Flowrate (m^3/min) at standard conditions on a dry basis*
A_{stk} = *Area of stack (ft^2)*
d = *Diameter of stack (inches)*

A2.4 CEM Calculations

$$[CEM]_i = \frac{(2 \times [CEM]_{mi} - (Z_F + Z_I))}{(S_I + S_F) - (Z_I + Z_F)} \times G_c$$ **Equation 29**

$$E_A = \left(\frac{A_{IS} - G_C}{G_C}\right) \times 100\%$$ **Equation 30**

$$B_{IS} = \left(\frac{S_I - A_{IS}}{R}\right) \times 100\%$$ **Equation 31**

$$B_{FS} = \left(\frac{S_F - A_{IS}}{R}\right) \times 100\%$$ **Equation 32**

$$B_{IZ} = \left(\frac{Z_I - A_{IZ}}{R}\right) \times 100\%$$ **Equation 33**

$$B_{FZ} = \left(\frac{Z_F - A_{IZ}}{R}\right) \times 100\%$$ **Equation 34**

$$D_S = \left(\frac{S_F - S_I}{R}\right) \times 100\%$$ **Equation 35**

$$D_Z = \left(\frac{Z_F - Z_I}{R}\right) \times 100\%$$ **Equation 36**

Where:

$[CEM]_i$ = One-minute average calibration corrected CEM parameter concentration (ppm or % vol)

$[CEM]_{mi}$ = One-minute average measured CEM parameter concentration (ppm or % vol)

S_I = Initial calibration span gas system response (ppm or % vol)

S_F = Final calibration span gas system response (ppm or % vol)

Z_I = Initial calibration zero gas system response (ppm or % vol)

Z_F = Final calibration zero gas system response (ppm or % vol)

A_{IS} = Initial calibration span gas analyzer response (ppm or % vol)

A_{IZ} = Final calibration zero gas analyzer response (ppm or % vol)

E_A = Analyzer calibration error (%)

B_{IS} = Initial system span bias (%)

B_{FS} = Final system span bias (%)

B_{IZ} = Initial system zero bias (%)

B_{FZ} = Final system zero bias (%)

D_S = Test span drift (%)

D_Z = Test zero drift (%)

G_c = Calibration span gas certified concentration (ppm or % vol)

R = Analyzer range (ppm or % vol)

APPENDIX 3

ANALYTICAL DATA

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Environmental Consultants

GRAVIMETRIC ANALYTICAL RESULTS

Client:	All Roads	**Sample Date:**	11-Sep-25
Source:	Baghouse Stack	**Location:**	Coquitlam, BC

A. Lanfranco & Associates Standard Operating Procedure:

SOP 1.2.1 Gravimetric determination of total particulate matter

	Initial (g)	Final (g)	Net (g)	Blank Corrected Net (g)
Filters				
Run 1	0.3487	0.3484	-0.0003	ND
Run 2	0.3508	0.3500	-0.0008	ND
Run 3	0.3490	0.3487	-0.0003	ND
Blank	0.3484	0.3487	0.0003	
Probe Washes				
Run 1	124.1108	124.1108	0.0000	0.0005
Run 2	119.9087	119.9089	0.0002	0.0007
Run 3	127.1318	127.1317	-0.0001	0.0004
Blank	119.0637	119.0632	-0.0005	
	Run 1	**Run 2**	**Run 3**	
Silica Gels	14.5	13.0	12.0	

Task	**Personnel**	**Date**	**Quality Control**	**Y/N**
Fiter Recovery:	S. Verby	12-Sep-25	Adequate PW volume:	Y
PW Initial Analysis:	S. Verby	12-Sep-25	No sample leakage:	Y
PW, Filter and Gel Final Analysis:	S. Verby	16-Sep-25	Filter not compromised:	Y
Data entered to computer:	C. Lanfranco	24-Sep-25		

Comments:

No problems encountered in sample analysis.

APPENDIX 4

FIELD DATA SHEETS

DSV (1 of 2)

CEM FIELD DATA SHEET

Client	All Roads – Coquillas	Technician	DS + JG + JC
Source	Before Stack	Ambient Temp (°C)	15°C – Sunny
Date	Sept. 11, 2025	Barometric Pressure (in. Hg)	29.93
		Trailer ID	Big Trailer

	N_2	H_2	1 Gas	2 Gas	3 Gas	4 Gas	5 Gas	O_2	Comb Air	Low Meth	Mid Meth	High Meth
Cylinder #	724		CGP	VHE				LD9			247	054
Pressure (psi)	1300	1125	200	1300				1600			1125	950
Expiry Date	5-1-30		4-15-32	5-30-28				7-733			2-6-32	1-18-26
O_2 (%)								11.05				
CO_2 (%)								10.91				
CO (ppm)			494.2	243.5								
THC (ppm)											45.05	87.5
SO_2 (ppm)												
NOx (ppm)												

Analyzer Range	O_2	CO_2	CO	THC	SO_2	NOx
	0-25%	0-20%	0-500	0-100		

CEM READINGS

Time	Source	O_2	CO_2	CO	THC	SO_2	NOx	Response Time (sec)
18^{00}	Ambient:	20.89						O_2 Up 45
MANIFOLD:	N_2	0.0	0.08	2.49				O_2 Dn 42
	1 Gas			493.75				CO_2 Up 38
	2 Gas			245.68				CO_2 Dn 39
	O_2/CO_2	10.98	11.04					CO Up 36
1810								CO Dn 38
STACK:	N_2	.03	.08	1.83	.04			THC Up 32
	1 Gas			495.80				THC Dn 33
	2 Gas			247.22				SO_2 Up
	O_2/CO_2	10.89	11.04					SO_2 Dn
	High Meth				87.47			NOx Up
	Mid Meth				44.89			NOx Dn
		Run #1: 1900 – 2000						
	N_2	0.0	0.10	6.02	.75			
	2 Gas			252.75				
	O_2/CO_2	10.87	11.04					
	Mid Meth				41.98			
		Run #2: 2015 – 2115						
	N_2	-.01	.10	13.8	0.98			
	2 Gas			254.22				
	O_2/CO_2	10.88	11.10					
	Mid Meth				41.73			

DSV (2 of 2)

CEM FIELD DATA SHEET

Client: All Roads – Coquitlam
Source: Baghouse STACK – Cont...
Date: Sept. 11, 2025

Technician: _____
Ambient Temp (°C): _____
Barometric Pressure (in. Hg): _____
Trailer ID: _____

	N_2	H_2	1 Gas	2 Gas	3 Gas	4 Gas	5 Gas	O_2	Comb Air	Low Meth	Mid Meth	High Meth
Cylinder #												
Pressure (psi)												
Expiry Date												
O_2 (%)												
CO_2 (%)												
CO (ppm)												
THC (ppm)												
SO_2 (ppm)												
NOx (ppm)												

Analyzer Range	O_2	CO_2	CO	THC	SO_2	NOx

CEM READINGS

Time	Source	O_2	CO_2	CO	THC	SO_2	NOx	Response Time (sec)
		RUN #3:		21:36 – 22:36				O_2 Up
	N2	.03	.15	14.27	0.96			O_2 Dn
	2 GRS			257.45				CO_2 Up
	O2/CO2	10.87	11.12					CO_2 Dn
	MID Meth				41.81			CO Up
								CO Dn
								THC Up
								THC Dn
								SO_2 Up
								SO_2 Dn
								NOx Up
								NOx Dn

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CLIENT	All Roads	NOZZLE	3r65
SOURCE	Baghouse	DIAMETER, IN.	.3338
PARAMETER / RUN No	Partic/R1	PROBE	SA-5
DATE	11Sept22	Cp	.8375
OPERATOR:	Sh, t, SC	PORT LENGTH	
CONTROL UNIT	FE18	STATIC PRESSURE, IN. H2O	-.15
Y	1.0323	STACK DIAMETER	54.0
ΔH@	1.875	STACK HEIGHT	40
BAROMETRIC PRESSURE, IN. Hg	29.95	INITIAL LEAK TEST	.001@15"
ASSUMED MOISTURE, Bw	28%	FINAL LEAK TEST	.001@15"

IMPINGER VOLUMES	INITIAL (mL)	FINAL (mL)	TOTAL GAIN (mL)
Imp. #1	100	240	
Imp. #2	100	160	
Imp. #3	0	5	
Imp. #4	Gel		
Imp. #5			
Imp. #6			

Upstream Diameters

Downstream Diameters

Testo #3

Point	Clock Time	Dry Gas Meter ft³	Pitot ΔP IN. H_2O	Orifice ΔH IN. H_2O	Temperature °F Dry Gas Outlet	Stack	Probe	Box	Impinger Exit	Pump Vac. IN. Hg	Fyrites CO_2 Vol. %	O_2 Vol. %		
	19:00	225.255												
1		226.97	.25	1.65	77	192	250	250	55	5.0				
2		228.72	.26	1.72	77	190					4.0	14		
3		230.47	.26	1.73	77	188	250	250	55	5.0				
4		232.30	.28	1.88	78	185								
5		234.12	.28	1.87	78	186	257	257	55	6.0				
6		235.98	.29	1.94	79	188								
7		237.81	.28	1.87	81	191	250	250	59	6.0				
8		239.60	.27	1.80	81	193								
9		241.40	.27	1.80	82	193	257	257	59	6.0	4.0	13.8		
10		243.23	.28	1.86	83	196								
11		245.03	.27	1.79	84	198	250	245	59	6.5				
12		246.69	.23	1.52	85	200								
1		248.35	.23	1.53	84	195	250	245	59	6.0				
2		249.98	.22	1.47	84	192								
3		251.57	.21	1.41	83	190	257	245	59	6.0	4.0	14.1		
4		253.20	.22	1.46	83	187								
5		254.83	.22	1.49	83	185	257	257	59	6.0				
6		256.50	.23	1.56	84	185								
7		258.21	.24	1.63	84	184	242	252	59	6.5				
8		259.92	.24	1.63	84	185								
9		261.66	.25	1.69	84	185	247	257	59	6.0	4.3	14.0		
10		263.46	.25	1.70	85	185								
11		265.1[illegible]	.26	1.76	85	183	255	257	57	6.0				
12		266.79	.21	1.43	85	183								
	20:02	END TEST												

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CLIENT	All Roads	NOZZLE	S-type DIAMETER, IN. .3338
SOURCE	Exhaust	PROBE	S-type Cp .8375
PARAMETER / RUN No	PM/HCl/HF	PORT LENGTH	
DATE	11 Sept 25	STATIC PRESSURE, IN. H2O	-.15
OPERATOR:	Skyler	STACK DIAMETER	54.0
CONTROL UNIT	17-18 Y 1.0325	STACK HEIGHT	210
	ΔH@ 1.875		
BAROMETRIC PRESSURE, IN. Hg	29.95	INITIAL LEAK TEST	.001@15"
ASSUMED MOISTURE, Bw		FINAL LEAK TEST	.001@15"

IMPINGER VOLUMES	INITIAL (mL)	FINAL (mL)	TOTAL GAIN (mL)
Imp. #1	100	305	
Imp. #2	100	140	
Imp. #3	~~0~~ Gel	5	
Imp. #4	Gel		
Imp. #5			
Imp. #6			
Upstream Diameters			
Downstream Diameters	test to #?		

Point	Clock Time	Dry Gas Meter ft³	Pitot ΔP IN. H_2O	Orifice ΔH IN. H_2O	Temperature °F: Dry Gas Outlet	Stack	Probe	Box	Impinger Exit	Pump Vac. IN. Hg	Fyrites: CO_2 Vol. %	Fyrites: O_2 Vol. %		
	20:15	267.134												
1		268.85	.23	1.65	80	182	250	245	54	5.0				
2		270.53	.22	1.58	80	182					3.7	14.5		
3		272.13	.20	1.43	80	183	251	248	55	5.0				
4		273.81	.22	1.58	81	183								
5		275.49	.22	1.58	81	183	251	247	56	5.0				
6		277.21	.23	1.65	81	184								
7		278.97	.24	1.72	82	184	251	251	56	5.5				
8		280.73	.24	1.72	82	184					4.0	14.0		
9		282.53	.25	1.80	83	184	251	250	58	6.0				
10		284.32	.25	1.79	83	185								
11		286.15	.26	1.86	83	185	254	250	59	6.5				
12		287.75	.20	1.43	83	185								
1		289.54	.25	1.79	83	185	250	250	55	6.0				
2		291.37	.26	1.86	83	185					3.8	14.3		
3		293.20	.26	1.86	83	186	250	250	54	6.0				
4		295.10	.28	2.01	84	186								
5		297.03	.29	2.08	84	186	251	250	55	6.5				
6		298.93	.28	2.01	84	186								
7		300.77	.27	1.93	83	187	249	248	57	7.0	3.9	14.1		
8		302.65	.27	1.93	83	187								
9		304.55	.28	2.01	84	187	249	251	55	6.5				
10		306.38	.26	1.86	84	187								
11		308.18	.25	1.79	84	186	252	251	58					
12		309.80	.22	1.58	84	186								
	21:17													

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CLIENT	All Roads	NOZZLE / DIAMETER, IN.	.3338
SOURCE	Bathouse	PROBE Cp	.8375
PARAMETER / RUN No	Partic 123		
DATE	11 Sept 25	PORT LENGTH	
OPERATOR:	SG+JC	STATIC PRESSURE, IN. H2O	-.15
CONTROL UNIT Y	1.0323	STACK DIAMETER	54.0
ΔH@	1.875	STACK HEIGHT	40.0
BAROMETRIC PRESSURE, IN. Hg	29.95	INITIAL LEAK TEST	.001 @ 15"
ASSUMED MOISTURE, Bw		FINAL LEAK TEST	.000 @ 15"

IMPINGER VOLUMES	INITIAL (mL)	FINAL (mL)	TOTAL GAIN (mL)
Imp. #1	100	305	
Imp. #2	100	345	
Imp. #3	0	5	
Imp. #4	gel		
Imp. #5			
Imp. #6			

Upstream Diameters

Downstream Diameters

testo #3

Point	Clock Time	Dry Gas Meter ft³	Pitot ΔP IN. H_2O	Orifice ΔH IN. H_2O	Temperature °F: Dry Gas Outlet	Stack	Probe	Box	Impinger Exit	Pump Vac. IN. Hg	Fyrites: CO_2 Vol. %	Fyrites: O_2 Vol. %		
	21:36	310.255												
1		311.96	.23	1.63	81	190	250	251	58	5.5				
2		313.63	.22	1.56	81	190					4.0	14.1		
3		315.22	.20	1.42	81	190	257	250	58	5.5				
4		316.84	.22	1.55	80	191								
5		318.59	.23	1.63	80	191	257	250	58	6.0				
6		320.33	.24	1.70	80	191								
7		322.06	.24	1.71	82	189	252	257	58	6.0				
8		323.87	.25	1.78	82	189								
9		325.66	.25	1.78	82	187	253	250	58	5.5	3.8	14.3		
10		327.48	.26	1.85	83	188								
11		329.27	.25	1.78	83	188	250	250	58	5.0				
12		330.87	.20	1.43	84	188								
1		332.66	.25	1.79	84	188	257	257	58	5.5				
2		334.49	.26	1.86	84	188					4.1	14.3		
3		336.32	.26	1.86	85	188	251	248	58	5.5				
4		338.19	.27	1.93	85	188								
5		340.13	.29	2.09	86	187	253	245	58	6.0				
6		342.04	.28	2.01	86	187								
7		343.91	.27	1.94	86	187	253	250	58	6.5				
8		345.78	.27	1.94	85	187								
9		347.68	.28	2.01	86	188	254	250	58	6.0	4.3	14.2		
10		349.57	.26	1.87	87	188								
11		351.37	.25	1.80	87	189	255	250	58	6.0				
12	22:38	353.01	.22	1.58	87	189								

APPENDIX 5

CALIBRATION DATA and CERTIFICATIONS

A.Lanfranco & Associates inc.

EPA Method 5

Meter Box Calibration

English Meter Box Units, English K' Factor

Model #: FE 18

Serial #: 0028-020118-1

Date: 2-Jul-25

Barometric Pressure: 29.84 (in. Hg)

Theoretical Critical Vacuum: 14.08 (in. Hg)

!!!!!!!!!
IMPORTANT For valid test results, the Actual Vacuum should be 1 to 2 in. Hg greater than the Theoretical Critical Vacuum shown above.
IMPORTANT The Critical Orifice Coefficient, K', must be entered in English units, (ft)^3*(deg R)^0.5/((in.Hg)*(min)).
!!!!!!!!!

---------- DRY GAS METER READINGS ----------

dH (in H2O)	Time (min)	Volume Initial (cu ft)	Volume Final (cu ft)	Volume Total (cu ft)	Initial Temps. Inlet (deg F)	Initial Temps. Outlet (deg F)	Final Temps. Inlet (deg F)	Final Temps. Outlet (deg F)
3.75	24.00	558.207	583.030	24.823	71.0	71.0	75.0	75.0
1.95	48.00	583.030	619.120	36.090	75.0	75.0	80.0	80.0
1.20	25.00	619.120	633.836	14.716	80.0	80.0	81.0	81.0
0.69	25.00	633.836	645.061	11.225	81.0	81.0	82.0	82.0
0.35	19.00	645.061	650.963	5.902	82.0	82.0	83.0	83.0

-CRITICAL ORIFICE READINGS-

Orifice Serial# (number)	K' Orifice Coefficient (see above)	Actual Vacuum (in Hg)	-- Ambient Temperature -- Initial (deg F)	Final (deg F)	Average (deg F)
73	0.8185	16.0	73.0	75.0	74.0
63	0.5956	17.0	75.0	78.0	76.5
55	0.4606	18.0	78.0	79.0	78.5
48	0.3560	20.0	79.0	81.0	80.0
40	0.2408	21.0	81.0	83.0	82.0

********** **RESULTS** **********

--- DRY GAS METER --- VOLUME CORRECTED Vm(std) (cu ft)	VOLUME CORRECTED Vm(std) (liters)	--------- ORIFICE --------- VOLUME CORRECTED Vcr(std) (cu ft)	VOLUME CORRECTED Vcr(std) (liters)	VOLUME NOMINAL Vcr (cu ft)	-- DRY GAS METER -- CALIBRATION FACTOR Y Value (number)	Variation (number)	--------- ORIFICE --------- CALIBRATION FACTOR dH@ Value (in H2O)	Value (mm H2O)	Variation (in H2O)	Ko (value)
24.741	700.7	25.366	718.4	25.734	1.025	-0.007	1.866	47.38	-0.010	0.705
35.513	1005.7	36.831	1043.0	37.539	1.037	0.005	1.825	46.36	-0.050	0.706
14.374	407.1	14.807	419.3	15.148	1.030	-0.002	1.875	47.62	-0.001	0.702
10.930	309.5	11.429	323.7	11.724	1.046	0.013	1.806	45.87	-0.069	0.705
5.732	162.3	5.864	166.1	6.038	1.023	-0.009	2.006	50.95	0.131	0.684
				Average Y---------->	**1.0323**		**Average dH@----->**	**1.875**	**47.6**	**Average Ko----->** **0.701**

TEMPERATURE CALIBRATION

Calibration Standard -------> Omega Model CL23A S/N:T-218768

Reference Set-Point (deg F)	Temperature Device Reading Stack (deg F)	Stack (% diff)	Hot Box (deg F)	Hot Box (% diff)	Probe (deg F)	Probe (% diff)	Imp Out (deg F)	Imp Out (% diff)	Aux (deg F)	Aux (% diff)
32	32	0.00%	32	0.00%	31	-0.20%	31	-0.20%	31	-0.20%
100	99	-0.18%	99	-0.18%	99	-0.18%	98	-0.36%	98	-0.36%
300	298	-0.26%	299	-0.13%	299	-0.13%	298	-0.26%	298	-0.26%
500	499	-0.10%	498	-0.21%	498	-0.21%	497	-0.31%	498	-0.21%
1000	998	-0.14%	998	-0.14%	997	-0.21%	997	-0.21%	998	-0.14%

Note: For Calibration Factor Y, the ratio of the reading of the calibration meter to the dry gas meter, acceptable tolerance of individual values from the average is +-0.02.
For Orifice Calibration Factor dH@, the orifice differential pressure in inches of H20 that equates to 0.75 cfm of air at 68 F and 29.92 inches of Hg, acceptable tolerance of individual values from the average is +-0.2.
For Temperature Devicee, the reading must be within 1.5% of certified calibration standard (absolute temperature) to be acceptable.

Calibrated by: Justin Ching

Signature: Carter Lanfranco

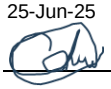
Date: July 2, 2025

A. LANFRANCO and ASSOCIATES INC.

ENVIRONMENTAL CONSULTANTS

NOZZLE DIAMETER CALIBRATION FORM

Calibrated by: Christian De La O
Date: 25-Jun-25

Signature: 

Nozzle I.D.	d1 (inch)	d2 (inch)	d3 (inch)	difference (inch)	average dia. (inch)	average area (ft^2)
ST01	0.1280	0.1264	0.1280	0.0016	0.1275	0.0000886
ST05	0.1700	0.1720	0.1716	0.0020	0.1712	0.0001599
SS-1	0.1710	0.1714	0.1693	0.0021	0.1706	0.0001587
SS-7	0.1711	0.1685	0.1701	0.0026	0.1699	0.0001574
ST11	0.2113	0.2120	0.2115	0.0007	0.2116	0.0002442
SS-8	0.2070	0.2080	0.2065	0.0015	0.2072	0.0002341
ST10	0.2110	0.2109	0.2120	0.0011	0.2113	0.0002435
SS-18	0.2295	0.2310	0.2318	0.0023	0.2308	0.0002905
ST15	0.2409	0.2390	0.2400	0.0019	0.2400	0.0003141
SS-2	0.2370	0.2390	0.2380	0.0020	0.2380	0.0003089
SS-3	0.2415	0.2426	0.2435	0.0020	0.2425	0.0003208
SS-24	0.2417	0.2415	0.2420	0.0005	0.2417	0.0003187
B	0.2413	0.2408	0.2421	0.0013	0.2414	0.0003178
SS-14	0.2450	0.2445	0.2475	0.0030	0.2457	0.0003292
ST30	0.2465	0.2458	0.2441	0.0024	0.2455	0.0003286
ST20	0.2502	0.2498	0.2514	0.0016	0.2505	0.0003422
A	0.2515	0.2521	0.2506	0.0015	0.2514	0.0003447
SS-9	0.2675	0.2669	0.2706	0.0037	0.2683	0.0003927
ST40	0.2830	0.2835	0.2810	0.0025	0.2825	0.0004353
SS-30	0.2915	0.2919	0.2950	0.0035	0.2928	0.0004676
SS-13	0.3003	0.2996	0.3027	0.0031	0.3009	0.0004937
ST60	0.2999	0.3020	0.2990	0.0030	0.3003	0.0004919
ST50	0.3030	0.3044	0.3039	0.0014	0.3038	0.0005033
SS-10	0.3171	0.3209	0.3195	0.0038	0.3192	0.0005556
SS-327	0.3250	0.3278	0.3265	0.0028	0.3264	0.0005812
ST65	0.3332	0.3339	0.3343	0.0011	0.3338	0.0006077
ST66	0.3345	0.3365	0.3350	0.0020	0.3353	0.0006133
ST80	0.3630	0.3665	0.3652	0.0035	0.3649	0.0007262
ST75	0.3656	0.3642	0.3645	0.0014	0.3648	0.0007257
SS-5	0.3661	0.3687	0.3698	0.0037	0.3682	0.0007394
SS-16	0.3719	0.3721	0.3730	0.0011	0.3723	0.0007561
ST76	0.3758	0.3740	0.3745	0.0018	0.3748	0.0007660
ST85	0.3981	0.3960	0.3988	0.0028	0.3976	0.0008624
SS-15	0.4000	0.3986	0.4005	0.0019	0.3997	0.0008714
DD	0.4040	0.4045	0.4039	0.0006	0.4041	0.0008908
SS11	0.4150	0.4178	0.4190	0.0040	0.4173	0.0009496
ST70	0.4250	0.4255	0.4260	0.0010	0.4255	0.0009875
ST86	0.4550	0.4538	0.4562	0.0024	0.4550	0.0011291
C	0.4940	0.4928	0.4951	0.0023	0.4940	0.0013308
SS-491	0.4890	0.4930	0.4928	0.0040	0.4916	0.0013181
SS-49	0.4959	0.4965	0.4954	0.0011	0.4959	0.0013414
SS-6	0.4943	0.4965	0.4950	0.0022	0.4953	0.0013378
SS-492	0.4825	0.4862	0.4839	0.0037	0.4842	0.0012787
ST90	0.4925	0.4932	0.4952	0.0027	0.4936	0.0013290
ST92	0.5001	0.5015	0.5020	0.0019	0.5012	0.0013701
SS-558	0.5535	0.5550	0.5520	0.0030	0.5535	0.0016709
ST96	0.5565	0.5550	0.5525	0.0040	0.5547	0.0016780
SS-635	0.6350	0.6370	0.6330	0.0040	0.6350	0.0021993
SS-12	0.7411	0.7406	0.7400	0.0011	0.7406	0.0029913

Where:

(a) D1, D2, D3 = three different nozzle diameters; each diameter must be measured to within (0.025mm) 0.001 in.

(b) Difference = maximum difference between any two diameters; must be less than or equal to (0.1mm) 0.004 in.

(c) Average = average of D1, D2 and D3

Pitot Tube Calibration

Date: 2-Jul-25
Pbar (in.Hg): 29.94
Temp (R): 539
Dn (in.): 0.25

Pitot ID: **5A-1**

Reference Pitot (in H2O)	S-Type Pitot (in H2O)	Air Velocity (ft/s)	Pitot Coeff. Cp	Deviation (absolute)
0.070	0.095	17.7	0.8498	0.0054
0.170	0.230	27.5	0.8511	0.0041
0.315	0.420	37.5	0.8574	0.0021
0.595	0.790	51.5	0.8592	0.0039
0.790	1.050	59.3	0.8587	0.0035
		Average :	0.8552	0.0038

Pitot ID: **5A-2**

Reference Pitot (in H2O)	S-Type Pitot (in H2O)	Air Velocity (ft/s)	Pitot Coeff. Cp	Deviation (absolute)
0.030	0.040	11.6	0.8574	0.0055
0.150	0.200	25.8	0.8574	0.0055
0.315	0.430	37.5	0.8473	0.0045
0.515	0.700	47.9	0.8492	0.0027
0.800	1.090	59.7	0.8481	0.0037
		Average :	0.8519	0.0044

Pitot ID: **ST 5A**

Reference Pitot (in H2O)	S-Type Pitot (in H2O)	Air Velocity (ft/s)	Pitot Coeff. Cp	Deviation (absolute)
0.210	0.290	30.6	0.8425	0.0003
0.375	0.520	40.9	0.8407	0.0020
0.480	0.660	46.2	0.8443	0.0015
0.545	0.750	49.3	0.8439	0.0012
0.630	0.870	53.0	0.8425	0.0003
		Average :	0.8428	0.0011

Pitot ID: **ST 5B**

Reference Pitot (in H2O)	S-Type Pitot (in H2O)	Air Velocity (ft/s)	Pitot Coeff. Cp	Deviation (absolute)
0.210	0.290	30.6	0.8425	0.0017
0.360	0.500	40.0	0.8400	0.0007
0.490	0.670	46.7	0.8466	0.0059
0.610	0.860	52.1	0.8338	0.0070
0.700	0.970	55.8	0.8410	0.0002
		Average :	0.8408	0.0031

Pitot ID: **5A-3**

Reference Pitot (in H2O)	S-Type Pitot (in H2O)	Air Velocity (ft/s)	Pitot Coeff. Cp	Deviation (absolute)
0.045	0.060	14.2	0.8574	0.0025
0.170	0.230	27.5	0.8511	0.0037
0.300	0.400	36.6	0.8574	0.0025
0.490	0.650	46.7	0.8596	0.0047
0.750	1.020	57.8	0.8489	0.0059
		Average :	0.8549	0.0039

Pitot ID: **5A-4**

Reference Pitot (in H2O)	S-Type Pitot (in H2O)	Air Velocity (ft/s)	Pitot Coeff. Cp	Deviation (absolute)
0.030	0.040	11.6	0.8574	0.0078
0.200	0.270	29.8	0.8521	0.0025
0.390	0.540	41.7	0.8413	0.0082
0.610	0.830	52.1	0.8487	0.0009
0.830	1.130	60.8	0.8485	0.0011
		Average :	0.8496	0.0041

Pitot ID: **5A-5**

Reference Pitot (in H2O)	S-Type Pitot (in H2O)	Air Velocity (ft/s)	Pitot Coeff. Cp	Deviation (absolute)
0.025	0.035	10.6	0.8367	0.0008
0.180	0.250	28.3	0.8400	0.0025
0.310	0.430	37.2	0.8406	0.0031
0.470	0.660	45.8	0.8354	0.0021
0.775	1.090	58.8	0.8348	0.0027
		Average :	0.8375	0.0022

Pitot ID:

Reference Pitot (in H2O)	S-Type Pitot (in H2O)	Air Velocity (ft/s)	Pitot Coeff. Cp	Deviation (absolute)
		Average :		

* Average absolute deviation must not exceed 0.01.

Calibrated by: Jack Dennis Signature:  Date: July 2, 2025

BAROMETER CALIBRATION FORM						
		Pbar Env Canada		Device (inches of Hg)		Difference
Device	Cal Date	(kPa)	(inches of Hg)	Reading	Elevation Corrected	(Env Can - Elv Corr)
LA	2-Jul-25	101.4	29.95	29.88	29.95	0.00
DS	2-Jul-25	101.4	29.95	29.86	29.93	0.02
CL	2-Jul-25	101.4	29.95	29.88	29.95	0.00
JC	2-Jul-25	101.4	29.95	29.88	29.95	0.00
LF	2-Jul-25	101.4	29.95	29.85	29.92	0.03
SV	2-Jul-25	101.4	29.95	29.85	29.92	0.03
CDO	2-Jul-25	101.4	29.95	29.85	29.92	0.03
JG	2-Jul-25	101.4	29.95	29.85	29.92	0.03
ML	2-Jul-25	101.4	29.95	29.85	29.92	0.03
JD	2-Jul-25	101.4	29.95	29.87	29.94	0.01

Calibrated by: Louis Agassiz Signature:  Date: 02-Jul-25

Performance Specification is
Device Corrected for Elevation must be +/- 0.1 " Hg of ENV CANADA SEA-LEVEL Pbar
Enter Environment canada Pressure from their website for Vancouver (link below)
and the reading from your barometer on the ground floor of the office.

https://weather.gc.ca/city/pages/bc-74_metric_e.html

Calibration Certificate

Date: 02-Jul-25
Calibrated by: Louis Agassiz
Authorizing Signature:

Insrtument Calibrated: Testo 3 (340)
Serial #: 64057016
Customer: ALA

Ambient Conditions: Temperature: 8 °C Barometric Pressure: 102.1 kPa Relative Humidity: 77%

A. Lanfranco and Associates Inc. certifies that the described instrument has been inspected and tested following calibration procedures in the Environment Canada Report EPS 1/PG/7 (Revised 2005). Below are the observed readings after calibrations are complete. Calibration checks should be completed at least every 6 months.

O_2	Initial Evaluation				After Calibration				
Gas	Instrument Reading (vol %)	Calibration Error	Pass/Fail	Notes	Instrument Reading (vol %)	Calibration Error	Pass/Fail	Notes	Certified Value (vol %)
Zero	0.1	0.10	Pass		0.1	0.10	Pass		0
O_2	10.90	0.07	Pass		10.90	0.07	Pass		10.83
Ambient	20.94	0.02	Pass		20.94	0.02	Pass		20.96

Performance Specification: +/- 1% O_2 (absolute diff)

CO	Initial Evaluation				After Calibration				
Gas	Instrument Reading (ppm)	% Calibration Error	Pass/Fail	Notes	Instrument Reading (ppm)	% Calibration Error	Pass/Fail	Notes	Certified Value (ppm)
Zero	1	0.3%	Pass		0	0.0%	Pass		0
1 Gas	251	1.2%	Pass		254	0.0%	Pass		254
2 Gas	495	0.2%	Pass		497	0.6%	Pass		494
3 Gas	947	0.6%	Pass		955	0.2%	Pass		953

Performance Specification: +/- 5% of Certified Gas Value

NO	Initial Evaluation				After Calibration				
Gas	Instrument Reading (ppm)	% Calibration Error	Pass/Fail	Notes	Instrument Reading (ppm)	% Calibration Error	Pass/Fail	Notes	Certified Value (ppm)
Zero	1	0.3%	Pass		0	0.0%	Pass		0
1 Gas	43	4.0%	Pass		45	0.4%	Pass		44.8
2 Gas	85	4.6%	Pass		90	1.0%	Pass		89.1
3 Gas	241	3.4%	Pass		250	0.2%	Pass		249.6

Performance Specification: +/- 5% of Certified Gas Value

NIST Traceable Calibration Gases:

Cylinder	Cylinder ID Number	Certification Date	Expiration Date	Cylinder Pressure (PSI)	NO (ppm)	O_2 (Vol. %)	CO (ppm)
Zero Gas (N_2)	353			500	0	0	0
1 Gas	435	2023-12-19	2031-12-20	250	44.81	0	254.1
2 Gas	K9P	2024-04-15	2032-04-15	1200	89.11	0	494.2
3 Gas	K2H	2024-05-22	2032-05-22	1600	249.6	0	952.9
O_2/CO_2	A1M	2024-03-14	2032-03-14	500	0	10.83	0

Note: National Institute of Standards and Technology traceable certificates are available upon request.

A. LANFRANCO and ASSOCIATES INC.

ENVIRONMENTAL CONSULTANTS

TEMPERATURE CALIBRATION FORM

Calibrated by: Christian De La O

Date: 2-Jul-25

Signature: Carter Lanfranco

TEMPERATURE DEVICE CALIBRATIONS

Reference Device Model CL23A Calibrator			Temperature Settings (degrees F)													
			32		100		200		300		500		800		1700	
Device	**ALA #**	**Serial #**	**Reading**	**Variation**	**Reading**	**Variation**	**Reading**	**Variation**	**Reading**	**Variation**	**Reading**	**Variation**	**Reading**	**Variation**	**Reading**	**Variation**
TPI 341K	7	20314590036		-6.51%		-17.87%		-30.32%		-39.49%		-52.10%		-63.51%		-78.72%
TPI 341K	8	20313490047	30.8	-0.24%	99.1	-0.16%	198.6	-0.21%	298.1	-0.25%	497.7	-0.24%	796.9	-0.25%	1695	-0.23%
TPI 341K	11	20345510024	31.6	-0.08%	99.7	-0.05%	199.7	-0.05%	299.1	-0.12%	498.5	-0.16%	798.5	-0.12%	1696	-0.19%
TPI 341K	12	20345510031		-6.51%		-17.87%		-30.32%		-39.49%		-52.10%		-63.51%		-78.72%
TPI 341K	18	20329480036		-6.51%		-17.87%		-30.32%		-39.49%		-52.10%		-63.51%		-78.72%
TPI 341K	20	20329480013	31	-0.20%	99.5	-0.09%	199.1	-0.14%	298.6	-0.18%	498.6	-0.15%	798.2	-0.14%	1698	-0.09%
TPI 341K	22	20329480041	30.4	-0.33%	98.4	-0.29%	198	-0.30%	298.1	-0.25%	497.4	-0.27%	797.3	-0.21%	1696	-0.19%
TPI 341K	24	20142030017		-6.51%		-17.87%		-30.32%		-39.49%		-52.10%		-63.51%		-78.72%
TPI 341K	26	20345510036		-6.51%		-17.87%		-30.32%		-39.49%		-52.10%		-63.51%		-78.72%
TPI 341K	28	20142030009		-6.51%		-17.87%		-30.32%		-39.49%		-52.10%		-63.51%		-78.72%
TPI 341K	30	20345510023		-6.51%		-17.87%		-30.32%		-39.49%		-52.10%		-63.51%		-78.72%
TPI 341K	32	20142030028	28.9	-0.63%	97.6	-0.43%	198.4	-0.24%	298.4	-0.21%	498.5	-0.16%	798.4	-0.13%	1697	-0.14%
Reference device is a NIST certified digital thermocouple calibrator																
Variation expressed as a percentage of the absolute temperature must be within 1.5 %																

MOUNT ROYAL UNIVERSITY

Faculty of Continuing Education and Extension

Jeremy Shawn Gibbs

has successfully completed

Stack Sampling

35 Hours / 2019

May 22, 2019

Date

Dean
Faculty of Continuing Education and Extension

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1910

BRITISH COLUMBIA | Ministry of Environment and Climate Change Strategy

Conflict of Interest Disclosure Statement

A qualified professional [1] providing services to either the Ministry of Environment and Climate Change Strategy ("ministry"), or to a regulated person for the purpose of obtaining an authorization from the ministry, or pursuant to a requirement imposed under the *Environmental Management Act,* the *Integrated Pest Management Act* or the *Park Act* has a real or perceived conflict of interest when the qualified professional, or their relatives, close associates or personal friends have a financial or other interest in the outcome of the work being performed.

A real or perceived conflict of interest occurs when a qualified professional has

a) an ownership interest in the regulated person's business;

b) an opportunity to influence a decision that leads to financial benefits from the regulated person or their business other than a standard fee for service (e.g. bonuses, stock options, other profit sharing arrangements);

c) a personal or professional interest in a specific outcome;

d) the promise of a long term or ongoing business relationship with the regulated person, that is contingent upon a specific outcome of work;

e) a spouse or other family member who will benefit from a specific outcome; or

f) any other interest that could be perceived as a threat to the independence or objectivity of the qualified professional in performing a duty or function.

Qualified professionals who work under ministry legislation must take care in the conduct of their work that potential conflicts of interest within their control are avoided or mitigated. Precise rules in conflict of interest are not possible and professionals must rely on guidance of their professional associations, their common sense, conscience and sense of personal integrity.

Declaration

I Jeremy Gibbs, as a member of **Air and Waste Management Association** declare

Select one of the following:

☒ Absence from conflict of interest

Other than the standard fee I will receive for my professional services, I have no financial or other interest in the outcome of this **project**. I further declare that should a conflict of interest arise in the future during the course of this work, I will fully disclose the circumstances in writing and without delay to **Mr. Sajid Barlas**, erring on the side of caution.

☐ Real or perceived conflict of interest

Description and nature of conflict(s):

_____

_____

_____

I will maintain my objectivity, conducting my work in accordance with my Code of Ethics and standards of practice.

In addition, I will take the following steps to mitigate the real or perceived conflict(s) I have disclosed, to ensure the public interest remains paramount:

_____

_____

_____

Further, I acknowledge that this disclosure may be interpreted as a threat to my independence and will be considered by the statutory decision maker accordingly.

This conflict of interest disclosure statement is collected under section 26(c) of the *Freedom of Information and Protection of Privacy Act* for the purposes of increasing government transparency and ensuring professional ethics and accountability. By signing and submitting this statement you consent to its publication and its disclosure outside of Canada. This consent is valid from the date submitted and cannot be revoked. If you have any questions about the collection, use or disclosure of your personal information please contact the Ministry of Environment and Climate Change Strategy Headquarters Office at 1-800-663-7867.

Signature:

X _____

Print name: Jeremy Gross

Witnessed by:

X _____

Print name: Mark Lanfranco

Date: Dec.16, 2020

[1]*Qualified Professional, in relation to a duty or function under ministry legislation, means an individual who*

a) *is registered in British Columbia with a professional association, is acting under that organization's code of ethics, and is subject to disciplinary action by that association, and*

b) *through suitable education, experience, accreditation and knowledge, may reasonably be relied on to provide advice within his or her area of expertise, which area of expertise is applicable to the duty or function.*

BRITISH COLUMBIA | Ministry of Environment and Climate Change Strategy

Declaration of Competency

The Ministry of Environment and Climate Change Strategy relies on the work, advice, recommendations and in some cases decision making of qualified professionals[1], under government's professional reliance regime. With this comes an assumption that professionals who undertake work in relation to ministry legislation, regulations and codes of practice have the knowledge, experience and objectivity necessary to fulfill this role.

1. Name of Qualified Professional Jeremy Gibbs

   Title Environmental technician

2. Are you a registered member of a professional association in B.C.? ☐ Yes ☑ No

   Name of Association: _____ Registration # _____

3. Brief description of professional services:
   Environmental Consultant Specialize in air and atmospheric sciences

This declaration of competency is collected under section 26(c) of the *Freedom of Information and Protection of Privacy Act* for the purposes of increasing government transparency and ensuring professional ethics and accountability. By signing and submitting this statement you consent to its publication and its disclosure outside of Canada. This consent is valid from the date submitted and cannot be revoked. If you have any questions about the collection, use or disclosure of your personal information please contact the Ministry of Environment and Climate Change Strategy Headquarters Office at 1-800-663-7867.

Declaration

I am a qualified professional with the knowledge, skills and experience to provide expert information, advice and/or recommendations in relation to the specific work described above.

Signature:

X _____

Print Name: Jeremy Gibbs

Witnessed by:

X _____

Print Name: Connor Laan

Date signed: Nov 1, 2020

[1] *Qualified Professional, in relation to a duty or function under ministry legislation, means an individual who*

a) *is registered in British Columbia with a professional association, is acting under that organization's code of ethics, and is subject to disciplinary action by that association, and*

b) *through suitable education, experience, accreditation and knowledge, may reasonably be relied on to provide advice within his or her area of expertise, which area of expertise is applicable to the duty or function.*

MOUNT ROYAL UNIVERSITY
Faculty of Continuing Education

MOUNT ROYAL
UNIVERSITY
1910
CALGARY, ALBERTA

Justin Ching

has successfully completed

Stack Sampling

The Faculty of Continuing Education
Mount Royal University

30 hours | May 26, 2023

Dimitra Fotopoulos, Vice Dean
Professional and Continuing Education

BRITISH COLUMBIA | Ministry of Environment and Climate Change Strategy

Conflict of Interest Disclosure Statement

A qualified professional [1] providing services to either the Ministry of Environment and Climate Change Strategy ("ministry"), or to a regulated person for the purpose of obtaining an authorization from the ministry, or pursuant to a requirement imposed under the *Environmental Management Act,* the *Integrated Pest Management Act* or the *Park Act* has a real or perceived conflict of interest when the qualified professional, or their relatives, close associates or personal friends have a financial or other interest in the outcome of the work being performed.

A real or perceived conflict of interest occurs when a qualified professional has

a) an ownership interest in the regulated person's business;

b) an opportunity to influence a decision that leads to financial benefits from the regulated person or their business other than a standard fee for service (e.g. bonuses, stock options, other profit sharing arrangements);

c) a personal or professional interest in a specific outcome;

d) the promise of a long term or ongoing business relationship with the regulated person, that is contingent upon a specific outcome of work;

e) a spouse or other family member who will benefit from a specific outcome; or

f) any other interest that could be perceived as a threat to the independence or objectivity of the qualified professional in performing a duty or function.

Qualified professionals who work under ministry legislation must take care in the conduct of their work that potential conflicts of interest within their control are avoided or mitigated. Precise rules in conflict of interest are not possible and professionals must rely on guidance of their professional associations, their common sense, conscience and sense of personal integrity.

Declaration

I Justin Ching, as a member of **Air and Waste Management Association** declare

Select one of the following:

☒ Absence from conflict of interest

Other than the standard fee I will receive for my professional services, I have no financial or other interest in the outcome of this **project**. I further declare that should a conflict of interest arise in the future during the course of this work, I will fully disclose the circumstances in writing and without delay to **Mr. Sajid Barlas**, erring on the side of caution.

☐ Real or perceived conflict of interest

Description and nature of conflict(s):

I will maintain my objectivity, conducting my work in accordance with my Code of Ethics and standards of practice.

In addition, I will take the following steps to mitigate the real or perceived conflict(s) I have disclosed, to ensure the public interest remains paramount:

Further, I acknowledge that this disclosure may be interpreted as a threat to my independence and will be considered by the statutory decision maker accordingly.

This conflict of interest disclosure statement is collected under section 26(c) of the *Freedom of Information and Protection of Privacy Act* for the purposes of increasing government transparency and ensuring professional ethics and accountability. By signing and submitting this statement you consent to its publication and its disclosure outside of Canada. This consent is valid from the date submitted and cannot be revoked. If you have any questions about the collection, use or disclosure of your personal information please contact the Ministry of Environment and Climate Change Strategy Headquarters Office at 1-800-663-7867.

Signature:

X Justin Ching

Print name: Justin Ching

Witnessed by:

X

Print name: Mark Lanfranco

Date: June 28, 2023

[1]*Qualified Professional, in relation to a duty or function under ministry legislation, means an individual who*

a) is registered in British Columbia with a professional association, is acting under that organization's code of ethics, and is subject to disciplinary action by that association, and

b) *through suitable education, experience, accreditation and knowledge, may reasonably be relied on to provide advice within his or her area of expertise, which area of expertise is applicable to the duty or function.*

BRITISH COLUMBIA | Ministry of Environment and Climate Change Strategy

Declaration of Competency

The Ministry of Environment and Climate Change Strategy relies on the work, advice, recommendations and in some cases decision making of qualified professionals[1], under government's professional reliance regime. With this comes an assumption that professionals who undertake work in relation to ministry legislation, regulations and codes of practice have the knowledge, experience and objectivity necessary to fulfill this role.

1. Name of Qualified Professional Justin Ching

Title Environmental Technician

2. Are you a registered member of a professional association in B.C.? ☐ Yes ☑ No

Name of Association: _____ Registration # _____

3. Brief description of professional services:

Environmental Technician - specialising in air and atmospheric sciences

This declaration of competency is collected under section 26(c) of the *Freedom of Information and Protection of Privacy Act* for the purposes of increasing government transparency and ensuring professional ethics and accountability. By signing and submitting this statement you consent to its publication and its disclosure outside of Canada. This consent is valid from the date submitted and cannot be revoked. If you have any questions about the collection, use or disclosure of your personal information please contact the Ministry of Environment and Climate Change Strategy Headquarters Office at 1-800-663-7867.

Declaration

I am a qualified professional with the knowledge, skills and experience to provide expert information, advice and/or recommendations in relation to the specific work described above.

Signature: Witnessed by:

X Justin Ching **X** Daryl Sampson

Print Name: Justin Ching Print Name: Daryl Sampson

Date signed: June 28, 2023

[1] *Qualified Professional, in relation to a duty or function under ministry legislation, means an individual who*

a) is registered in British Columbia with a professional association, is acting under that organization's code of ethics, and is subject to disciplinary action by that association, and

b) *through suitable education, experience, accreditation and knowledge, may reasonably be relied on to provide advice within his or her area of expertise, which area of expertise is applicable to the duty or function.*

MOUNT ROYAL COLLEGE

Faculty of Continuing Education and Extension

Daryl Sampson

has successfully completed

The program of studies and is awarded the certificate in

STACK SAMPLING

May 2005
Date

Donna Spaulding
Dean
Faculty of Continuing Education and Extension

BRITISH COLUMBIA | Ministry of Environment and Climate Change Strategy

Conflict of Interest Disclosure Statement

A qualified professional [1] providing services to either the Ministry of Environment and Climate Change Strategy ("ministry"), or to a regulated person for the purpose of obtaining an authorization from the ministry, or pursuant to a requirement imposed under the *Environmental Management Act,* the *Integrated Pest Management Act* or the *Park Act* has a real or perceived conflict of interest when the qualified professional, or their relatives, close associates or personal friends have a financial or other interest in the outcome of the work being performed.

A real or perceived conflict of interest occurs when a qualified professional has

a) an ownership interest in the regulated person's business;

b) an opportunity to influence a decision that leads to financial benefits from the regulated person or their business other than a standard fee for service (e.g. bonuses, stock options, other profit sharing arrangements);

c) a personal or professional interest in a specific outcome;

d) the promise of a long term or ongoing business relationship with the regulated person, that is contingent upon a specific outcome of work;

e) a spouse or other family member who will benefit from a specific outcome; or

f) any other interest that could be perceived as a threat to the independence or objectivity of the qualified professional in performing a duty or function.

Qualified professionals who work under ministry legislation must take care in the conduct of their work that potential conflicts of interest within their control are avoided or mitigated. Precise rules in conflict of interest are not possible and professionals must rely on guidance of their professional associations, their common sense, conscience and sense of personal integrity.

Declaration

I Daryl Sampson, as a member of **Air and Waste Management Association** declare

Select one of the following:

☒ Absence from conflict of interest

Other than the standard fee I will receive for my professional services, I have no financial or other interest in the outcome of this **project**. I further declare that should a conflict of interest arise in the future during the course of this work, I will fully disclose the circumstances in writing and without delay to **Mr. Sajid Barlas**, erring on the side of caution.

☐ Real or perceived conflict of interest

Description and nature of conflict(s):

_____

_____

_____

I will maintain my objectivity, conducting my work in accordance with my Code of Ethics and standards of practice.

In addition, I will take the following steps to mitigate the real or perceived conflict(s) I have disclosed, to ensure the public interest remains paramount:

_____

_____

_____

Further, I acknowledge that this disclosure may be interpreted as a threat to my independence and will be considered by the statutory decision maker accordingly.

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Signature:

X Daryl Sampson

Print name: Daryl Sampson

Witnessed by:

X _____

Print name: Mark Lanfranco

Date: Dec.18, 2020

[1]*Qualified Professional, in relation to a duty or function under ministry legislation, means an individual who*

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BRITISH COLUMBIA | Ministry of Environment and Climate Change Strategy

Declaration of Competency

The Ministry of Environment and Climate Change Strategy relies on the work, advice, recommendations and in some cases decision making of qualified professionals[1], under government's professional reliance regime. With this comes an assumption that professionals who undertake work in relation to ministry legislation, regulations and codes of practice have the knowledge, experience and objectivity necessary to fulfill this role.

1. Name of Qualified Professional Daryl Sampson

   Title Senior Environmental Technician/Project Manager

2. Are you a registered member of a professional association in B.C.? ☐ Yes ☒ No

   Name of Association: _____ Registration # _____

3. Brief description of professional services:

   Environmental consulting, specializing in air and atmospheric sciences

This declaration of competency is collected under section 26(c) of the *Freedom of Information and Protection of Privacy Act* for the purposes of increasing government transparency and ensuring professional ethics and accountability. By signing and submitting this statement you consent to its publication and its disclosure outside of Canada. This consent is valid from the date submitted and cannot be revoked. If you have any questions about the collection, use or disclosure of your personal information please contact the Ministry of Environment and Climate Change Strategy Headquarters Office at 1-800-663-7867.

Declaration

I am a qualified professional with the knowledge, skills and experience to provide expert information, advice and/or recommendations in relation to the specific work described above.

Signature: Witnessed by:

X Daryl Sampson **X** _____

Print Name: Daryl Sampson Print Name: Louis Agassiz

Date signed: November 23, 2020

[1] *Qualified Professional, in relation to a duty or function under ministry legislation, means an individual who*

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PRAXAIR

Praxair
5700 South Alameda Street
Los Angeles, CA 90058
Tel: (323) 585-2154 Fax:(714) 542-6689
PGVPID: F22018

DocNumber: 000119242

CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

Customer & Order Information:

A LANFRANCO & ASSOC INC
101 9488 189TH ST
SURREY BC V4N 4

Praxair Order Number: 54230389
Customer P. O. Number:
Customer Reference Number:

Fill Date: 1/9/2018
Part Number: NI ME90ME-AS
Lot Number: 70086800906
Cylinder Style & Outlet: AS CGA 350
Cylinder Pressure & Volume: 2000 psig 140 cu. ft.

Certified Concentration:

Expiration Date:	**1/18/2026**		NIST Traceable
Cylinder Number:	**CC341054**		Analytical Uncertainty:
87.5	**ppm**	**METHANE**	± 1 %
	Balance	**NITROGEN**	

Certifcation Information: *Certification Date:* 1/18/2018 *Term:* 96 Months *Expiration Date:* 1/18/2026

This cylinder was certified according to the 2012 EPA Traceability Protocol, Document #EPA-600/R-12/531, using Procedure G1. Do Not Use this Standard if Pressure is less than 100 PSIG.

Analytical Data: *(R=Reference Standard, Z=Zero Gas, C=Gas Candidate)*

1. Component: METHANE

Requested Concentration: 90 ppm
Certified Concentration: 87.5 ppm
Instrument Used: HORIBA, FIA-510, 851135122
Analytical Method: Flame Ionization Detector
Last Multipoint Calibration: 12/19/2017

First Analysis Data:						**Date:**	1/18/2018
Z:	0	**R:**	100.3	**C:**	87.1	**Conc:**	87.506
R:	100.2	**Z:**	0	**C:**	87.2	**Conc:**	87.606
Z:	0	**C:**	87.1	**R:**	100.2	**Conc:**	87.506
UOM:	ppm			**Mean Test Assay:**			87.539 ppm

Reference Standard Type: GMIS
Ref. Std. Cylinder # : CC211670
Ref. Std. Conc: 100.7 ppm
Ref. Std. Traceable to SRM # : 2751
SRM Sample # : 212-09-AL
SRM Cylinder # : SX-20000

Second Analysis Data:						**Date:**	
Z:	0	**R:**	0	**C:**	0	**Conc:**	0
R:	0	**Z:**	0	**C:**	0	**Conc:**	0
Z:	0	**C:**	0	**R:**	0	**Conc:**	0
UOM:	ppm			**Mean Test Assay:**			0 ppm

Analyzed by: Jose Vasquez

Certified by: Danielle Burns

MESSER
Gases for Life | Gaz pour la vie

Whitby Spec Gas Plant/Usine
530 Watson Street East
Whitby, ON, L1N 5R9
1 888-256-7359

Material No.: 24068858
Lot No. : 2045297
Cylinder No. : 4695672Y

Cylinder Size : 300
Cylinder Valve Outlet : 580
Cylinder Pressure (70°F) : 2640 **PSIG**
Cylinder Contents : 8.3 M3

Certification Date : 05/02/2025
Expiration Date : 05/01/2030

Certificate of Analysis

NITROGEN CEM ZERO 300SZ PURE

Component	Requested Concentration	Actual Concentration
Nitrogen	100 %	99.9995 %
NOX <=0.1 ppm		
SO2 <= 0.1 ppm		
THC <= 0.1 ppm		
CO <= 0.5 ppm		
CO2 <= 0.5 ppm		
O2 < 5.0 ppm		
"Excluding Argon, and Neon"		

Analytical Details:

INMS and NIST traceability through Messer laboratory standard calibration mixtures.

Messer Canada Inc. plant management quality system is ISO 9001 registered.The product furnished under the referenced lot number is certified to contain the component concentration listed above. All values are mole/mole basis gas phase unless otherwise indicated. The reported uncertainty is at the 95% confidence level assuming a normal distribution. Messer Canada Inc. warrants that the above product conforms at time of shipment to the above description. The customers exclusive remedy should any of the products furnished under this certificate of analysis not conform to the manufacturers description shall be to receive replacement of the product or refund of the purchase price.

Digitally Signed & Approved By Analyst: Alberto Donzelli

MESSER
Gases for Life

Edmonton Spec Gas Plant/Usine
12143 68th Street
Edmonton AB T5B 1P9
Canada

MEPA METHANE 45PPM N2 BAL 152SZ/ MEPA MÉTHANE 45PPM N2 BAL 152SZ EPA PROTOCOL

Component Composant	Nominal Nominale	Certified Certifiée
Methane / MÉTHANE	45 PPM	45.05 PPM
Nitrogen / AZOTE	BAL	

Cylinder Details/ Détails - bouteille:
Cylinder Size/ Taille de la bouteille: 152 Contents/ Capacité: 4.000 M3 Valve Outlet/ Robinet de sortie: 350 Nominal Pressure/Pression nominale: 2,000 PSG

Analytical Details/ Détails d'analyse:
Certification Accuracy ± 1%
Certification de précision ± 1%

To reorder, please quote/ Pour renouveler une commande, veuillez indiquer le code: V24107503
Certificate Date (mm/dd/yy) / Date du certificat (mm/jj/aa) :02/07/2024 Use by / Utilisé par: 02/06/2032

Digitally signed and approved by/ signé électroniquement et approuvé par
Analyst/Analyste: Jed Verville

Lot No./ No. lot	Cylinder No./ No. bouteille	Code	Page
1817371	CC137247	V24107503	1/1

AIR LIQUIDE CANADA INC.
1250, Boul. René-Lévesque
West, #1700 – Montréal, QC
H3B 5E6
Phone: (514) 933-0303

PJLA
Testing
Accreditation #
80384

CERTIFICATE OF ANALYSIS
Grade: EPA Protocol

Work Order Number:	1869644	**Cylinder Number:**	T2Y1K9P
Part Number:	A1359010	**Cylinder Size:**	30AL
Laboratory:	SPG Calgary - AB	**Cylinder Volume:**	4.1 M3
Certification Date:	04/15/2024	**Cylinder Pressure:**	2000 PSI
Expiration Date:	04/15/2032	**Valve Outlet Connection:**	CGA 660

Certification performed in reference to EPA document 600/R-12/531 (EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards and G1 protocol (AA for NOX is included in the NO G1 protocol method) – May 2012), using the assay procedures listed and NIST/NTRM traceable standards.
Do not use this cylinder below 100 psi.

ANALYTICAL RESULTS

Component	Nominal Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
CARBON MONOXIDE	500 PPM	494.2 PPM	G1	+/- 0.09 %	04/15/2024
SULFUR DIOXIDE	90 PPM	90.84 PPM	G1	+/- 0.26 %	04/15/2024
NITRIC OXIDE	90 PPM	88.98 PPM	G1	+/- 0.21 %	04/15/2024
NOX	90 PPM	89.11 PPM	G1	+/- 0.21 %	04/15/2024
NITROGEN	BALANCE				

TRACEABILITY

Type	Lot ID	Cylinder #	Composition	Uncertainty	Expiration Date
GMIS	82-124614181-1	CC338627	894.5 PPM CO in N2	+/- 0.8 %	04/25/2025
GMIS	160-402793213-1	CC407330	303.1 PPM SO2 in N2	+/- 1.2 %	08/01/2031
GMIS	82-124614181-1	CC338627	88.01 PPM NO in N2	+/- 1.0 %	04/25/2025
GMIS	54-402589876-1	CC522261	3.209 PPM NO2 in N2	+/- 2.0 %	11/29/2025

ANALYTICAL EQUIPMENT

Instrument	Analytical Principle	Last Multipoint Calibration
MKS 2031 FT-IR	Fourier transform infrared spectroscopy	CO: 04/08/2024
MKS 2031 FT-IR	Fourier transform infrared spectroscopy	SO2: 03/26/2024
MKS 2031 FT-IR	Fourier transform infrared spectroscopy	NO: 04/05/2024

CERTIFIED BY: _____
STEVEN SHIEH
Lab Tech.

REVISED BY: _____
AYMEN OUESLATI
Lab Supervisor

AIR LIQUIDE CANADA INC.
1250, Boul. René-Lévesque
West, #1700 – Montréal, QC
H3B 5E6
Phone: (514) 933-0303

PJLA
Testing
Accreditation #
80384

CERTIFICATE OF ANALYSIS
Grade: EPA Protocol RATA Class

Work Order Number:	2039753	**Cylinder Number:**	T47DLD9
Part Number:	A1358979	**Cylinder Size:**	30AL
Laboratory:	SPG Calgary - AB	**Cylinder Volume:**	4.3 M3
Certification Date:	07/07/2025	**Cylinder Pressure:**	2000 PSI
Expiration Date:	07/07/2033	**Valve Outlet Connection:**	CGA 590

Certification performed in reference to EPA document 600/R-12/531 (EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards – May 2012), using the assay procedures listed and NIST/NTRM traceable standards.
Do not use this cylinder below 100 psi.

ANALYTICAL RESULTS

Component	Nominal Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
CARBON DIOXIDE	11 %	11.05 %	G1	+/- 0.06 %	07/07/2025
OXYGEN	11 %	10.91 %	G1	+/- 0.02 %	07/07/2025
NITROGEN	BALANCE				

TRACEABILITY

Type	Lot ID	Cylinder #	Composition		Uncertainty	Expiration Date
GMIS	160-402793209-1	ALM059645	10.07	% CO2 in N2	+/- 0.5 %	07/31/2031
NTRM	100106	K012714	9.967	% O2 in N2	+/- 0.03 %	03/22/2028

ANALYTICAL EQUIPMENT

Instrument	Analytical Principle	Last Multipoint Calibration
MKS 2031 FT-IR B	Fourier transform infrared spectroscopy	CO2: 06/23/2025
Servomex 5200 Multi purpose	Paramagnetic	O2: 07/07/2025

CERTIFIED BY: _____
TOBI ERINLE
Lab Tech.

REVISED BY: _____
JASON NGO
Lab Tech.

AIR LIQUIDE CANADA INC.
1250, Boul. René-Lévesque
West, #1700 – Montréal, QC
H3B 5E6
(514) 933-0303

PJLA
Testing
Accreditation #
80384

CERTIFICATE OF ANALYSIS
Grade: EPA Protocol

Work Order Number:	2014211	**Cylinder Number:**	T267UHE
Part Number:	A1359011	**Cylinder Size:**	30AL
Laboratory:	SPG Calgary - AB	**Cylinder Volume:**	4.1 M3
Certification Date:	05/30/2025	**Cylinder Pressure:**	2000 PSI
Expiration Date:	05/30/2028	**Valve Outlet Connection:**	CGA 660

Certification performed in reference to EPA document 600/R-12/531 (EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards and G1 protocol (AA for NOX is included in the NO G1 protocol method) – May 2012), using the assay procedures listed and NIST/NTRM traceable standards.
Do not use this cylinder below 100 psi.

ANALYTICAL RESULTS

Component	Nominal Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
CARBON MONOXIDE	250 ppm	243.5 ppm	G1	+/- 0.40 %	05/30/2025
SULFUR DIOXIDE	40 ppm	40.71 ppm	G1	+/- 0.52 %	05/30/2025
NITRIC OXIDE	45 ppm	44.33 ppm	G1	+/- 0.38 %	05/30/2025
NOX	45 ppm	44.33 ppm	G1	+/- 0.38 %	05/30/2025
NITROGEN	BALANCE				

TRACEABILITY

Type	Lot ID	Cylinder #	Composition		Uncertainty	Expiration Date
GMIS	1604029297181	CC189026	1005	ppm CO in N2	+/- 0.3 %	04/17/2032
NTRM	170604	CC484566	98.32	ppm SO2 in N2	+/- 0.81%	07/20/2028
PRIMARY	122-403300505-1	CC521584	3.200	ppm NO2 in N2	+/- 5.0 %	04/03/2028
GMIS	1604029297121	EB0062863	98.82	ppm NO in N2	+/- 1.0 %	04/16/2032

ANALYTICAL EQUIPMENT

Instrument	Analytical Principle	Last Multipoint Calibration
MKS 2031 FT-IR(A)	Fourier transform infrared spectroscopy	CO: 05/30/2025
MKS 2031 FT-IR(A)	Fourier transform infrared spectroscopy	SO2: 05/30/2025
MKS 2031 FT-IR(A)	Fourier transform infrared spectroscopy	NO: 05/29/2025

CERTIFIED BY: STEVEN SHIEH
Lab Tech.

REVISED BY: AYMEN OUESLATI
Lab Supervisor

Canadian Association for Laboratory Accreditation Inc.

Certificate of Accreditation

A. Lanfranco and Associates Inc.
101 - 9488 - 189th Street
Surrey, British Columbia

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017.
This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communiqué dated April 2017).

Accreditation No.: 1004232
Issued On: 4/11/2023
Accreditation Date: 2/5/2021
Expiry Date: 10/11/2025

President and CEO

For the specific tests to which this accreditation applies, please refer to the laboratory's scope of accreditation at www.cala.ca.