Fleming College
Sutherland Campus
599 Brealey Drive
Peterborough, ON

January 14, 2025

Attention: Marriah Wickert - Manager, Health & Safety

Subject: Limited Indoor Air Quality (IAQ) Assessment
599 Brealey Drive, Peterborough, Ontario

Englobe File No.: 02412900.000

Executive Summary

Limited Indoor Air Quality assessment was completed on January 9, 2025. The assessment is being done in advance of construction work.

Airborne Parameter & Location	Results
Carbon Monoxide (CO), Carbon Dioxide (CO_2), Total Volatile Organic Compounds (TVOCs), Particulate Matter (PM), Relative Humidity (RH), and temperature were measured at the following 5 locations: Computer Lab B2101, Washroom B3170, Washroom B3174, Washroom C2128, and Washroom C2126.	While the majority of indoor air quality (IAQ) parameters were within acceptable ranges, there are areas of concern, including elevated CO_2 and TVOC levels in the C2 Washrooms (C2126 and C2128) and generally low relative humidity (RH) levels observed throughout the tested locations. It is important to note that the low RH levels were measured during the cold winter months (January), which may account for readings below the recommended target of 30%. These results suggest that further assessment may be warranted to address potential occupant discomfort. Enhancing ventilation and implementing humidity control measures could be necessary to achieve optimal indoor air quality.

Introduction

Englobe Corporation was retained by Fleming College (the Client) to conduct a Limited Indoor Air Quality (IAQ) Assessment, of select areas of Fleming College, located at 599 Brealey Drive, Peterborough, Ontario. This baseline air sampling was performed prior to the commencement of construction work within the project-specific work areas.

Air monitoring was conducted by Englobe at the following five locations: Computer Lab B2101, Washroom B3170, Washroom B3174, Washroom C2128, and Washroom C2126.

Methodology

As part of the Limited Indoor Air Quality assessment, the following tasks were performed:

- Real-time air monitoring for Carbon Monoxide (CO), carbon dioxide (CO_2), Relative Humidity (RH), and Temperature (T) was performed using a Quest EVM 7 CO-PPB Advanced Particulate Air Quality Monitor, measuring the concentration of each parameter at 10-15 minute intervals over a one-hour period at each of the five (5) locations.
- Real-time air monitoring for Total Volatile Organic Compounds (TVOCs) was performed using a RAE Systems MiniRAE 3000 PID monitor, measuring the concentration at a 10-15 minute intervals over a one-hour period at each of the five (5) locations.
- Real-time air monitoring for particulate matter (PM) for particle sizes of up to 2.5 and 10 micrometers ($PM_{2.5}$ and PM_{10}, respectively) was performed using a DustTRAK DRX Desktop Aerosol Monitor 8533 measuring it at 10-15 minute intervals over a one-hour period at each of the five (5) locations.

The Quest EVM 7 CO-PPB Advanced Particulate Air Quality Monitor, RAE Systems MiniRAE 3000 PID monitor and the DustTRAK DRX Desktop Aerosol Monitor 8533 were calibrated by a third-party supplier (Pine Environmental Services LLC (Pine)) prior to use, in accordance with the manufacturer's methods and industry procedures.

The below sections detail information for the parameters measured:

- **Carbon Monoxide (CO):**
  - Measured in parts per million (ppm).
  - Acceptable levels indoors are typically below 9 ppm for long-term exposure (EPA standard).
- **Carbon Dioxide (CO_2):**
  - Measured in parts per million (ppm).
  - Normal indoor levels range between 400 – 1,000 ppm; levels above 1,000 ppm may indicate inadequate ventilation.
- **Total Volatile Organic Compounds (TVOCs):**
  - Measured in micrograms per metres ($\mu g/m^3$).
  - Common indoors due to paints, adhesives, and cleaning agents; concentrations should be minimized.
- **Particulate Matter (PM):**
  - Measured in micrograms per cubic meter ($\mu g/m^3$).
  - PM2.5 levels are critical for assessing dust and small airborne particles.
- **Relative Humidity (RH):**
  - Measured as a percentage.
  - Ideal indoor RH levels are between 30 – 50% to prevent mold growth and discomfort.
- **Temperature:**
  - Measured in °C.
  - Indoor temperatures should generally range from 68–76°F (20–24°C) for comfort and system efficiency.

Air Monitoring Results

Table 1: Summary of IAQ Assessment Results Computer Lab B2101 - B2						
Time	CO (ppm)	CO_2 (ppm)	TVOC ($\mu g/m^3$)	Temperature (°C)	RH %	PM 2.5 ($\mu g/m^3$)
9:52 am	0	595	126	20.4	7.7	0.008
10:03 am	0	548	163	21.3	6.6	0.014
10:15 am	0	510	211	21.8	6.3	0.001
10:23 am	0	521	241	22	6.9	0.009
10:32 am	0	525	247	22.2	6.1	0.001
10:40 am	0	530	249	22.3	6.1	0.001
10:51 am	0	525	236	22.4	6.2	0.001

Table 2: Summary of IAQ Assessment Results Washroom B3170 - B3						
Time	CO (ppm)	CO_2 (ppm)	TVOC ($\mu g/m^3$)	Temperature (°C)	RH %	PM 2.5 ($\mu g/m^3$)
10:57 am	0	740	151	21.9	12.4	0.003
11:09 am	0	766	141	22.5	14.0	0.005
11:21 am	1	770	90	22.7	12.5	0.003
11:33 am	1	785	154	22.9	14.9	0.001
11:44 am	1	769	143	22.7	14.3	0.002
11:55 am	0	763	152	22.7	12.9	0.004
12:03 pm	0	781	149	22.9	12.6	0.003

Table 3: Summary of IAQ Assessment Results Washroom B3174 - B3						
Time	CO (ppm)	CO_2 (ppm)	TVOC ($\mu g/m^3$)	Temperature (°C)	RH %	PM 2.5 ($\mu g/m^3$)
10:59 am	0	755	112	21.7	11.7	0.007
11:11 am	0	751	113	22.3	13.4	0.005
11:24 am	1	776	113	22.9	12.8	0.002
11:35 am	1	809	115	22.3	12.2	0.023

Table 3: Summary of IAQ Assessment Results Washroom B3174 - B3						
Time	CO (ppm)	CO_2 (ppm)	TVOC ($\mu g/m^3$)	Temperature (°C)	RH %	PM 2.5 ($\mu g/m^3$)
11:48 am	0	759	114	22.6	13.1	0.003
11:57 am	0	793	115	22.5	12.1	0.007
12:06 pm	0	749	130	22.6	12.3	0.002

Table 4: Summary of IAQ Assessment Results Washroom C2128 - C2						
Time	CO (ppm)	CO_2 (ppm)	TVOC ($\mu g/m^3$)	Temperature (°C)	RH %	PM 2.5 ($\mu g/m^3$)
12:10 pm	1	1631	220	21.5	22.7	0.011
12:22 pm	1	2225	340	21.8	24.9	0.005
12:35 pm	1	1133	330	22.3	20.2	0.011
12:45 am	1	1460	370	22.4	22.1	0.026
12:57 am	1	1346	680	22.4	23.4	0.024
1:09 am	2	1436	720	22.1	22.4	0.021
1:21 pm	1	1172	670	22.3	22.4	0.019

Table 5: Summary of IAQ Assessment Results Washroom C2126 - C2						
Time	CO (ppm)	CO_2 (ppm)	TVOC ($\mu g/m^3$)	Temperature (°C)	RH %	PM 2.5 ($\mu g/m^3$)
12:12 pm	1	2260	280	21.7	24	0.007
12:23 pm	0	2152	380	21.9	24.3	0.013
12:37 pm	0	2114	310	22.4	23.5	0.005
12:46 am	0	1534	300	22.5	22.9	0.017
12:59 am	0	1618	450	22.5	21.4	0.013
1:11 am	1	1630	390	22.3	22.3	0.016
1:24 pm	0	1233	321	22.1	22.4	0.017

Limited Indoor Air Quality Sampling Results:

- **Carbon Monoxide (CO)**
  CO levels remained consistently low across all locations, ranging from 0 to 2 ppm. These levels are well below the Health Canada recommended limit of 10 ppm for long term 24-hour exposure and 25 ppm for short term 1-hour exposure, indicating at the time of testing no significant concern regarding carbon monoxide exposure.

- **Carbon Dioxide (CO_2)**
  CO_2 concentrations varied between locations, with the highest measurements observed in Washrooms C2128 & C2126. Levels exceeding 1000 ppm, particularly in C2 washrooms, suggest potential inadequate ventilation in those areas.

- **Total Volatile Organic Compounds (TVOCs)**
  TVOCs displayed significant variation across the locations. Below 200 µg/m³ is generally considered acceptable and safe for indoor environments, with no noticeable health effects. 200–500 µg/m³ is typically seen as acceptable for most indoor settings, though sensitive individuals may experience mild irritation. 500–1,000 µg/m³ is considered elevated levels; further evaluation of air quality is suggested to avoid discomfort or irritation. Above 1,000 µg/m³ may cause irritation, discomfort, or other health effects. Action is needed to reduce VOC levels.

- **Particulate Matter 2.5 (PM)**
  PM concentrations remained minimal across all monitored locations, with readings ranging from 0.001 mg/m³ to 0.026 mg/m³. These values indicate very low airborne particulate presence, suggesting effective control of dust and other airborne particles in the assessed areas.

- **Relative Humidity (RH)**
  RH levels varied between 6.1% and 24.9%. The recommended RH is a minimum of 30% for indoor environments. Low humidity levels could contribute to discomfort and dry air conditions.

- **Temperature**
  Temperature measurements were relatively consistent across all monitored areas, ranging between 20.4°C and 22.9°C. These values fall within the recommended indoor comfort range of 20-24°C, suggesting adequate thermal comfort throughout the assessment period.

Conclusion

While the majority of indoor air quality (IAQ) parameters were within acceptable ranges, there are areas of concern, including elevated CO_2 and TVOC levels in the C2 Washrooms (C2126 and C2128) and generally low relative humidity (RH) levels observed throughout the tested locations. It is important to note that the low RH levels were measured during the cold winter months (January), which may account for readings below the recommended target of 30%. These results suggest that further assessment may be warranted to address potential occupant discomfort. Enhancing ventilation and implementing humidity control measures could be necessary to achieve optimal indoor air quality.

Closure

A Statement of Limitations, which forms an integral part of this report, is attached.

We trust that the information contained herein meets your needs. Should you have any questions or comments, please do not hesitate to contact us.

Englobe Corp.

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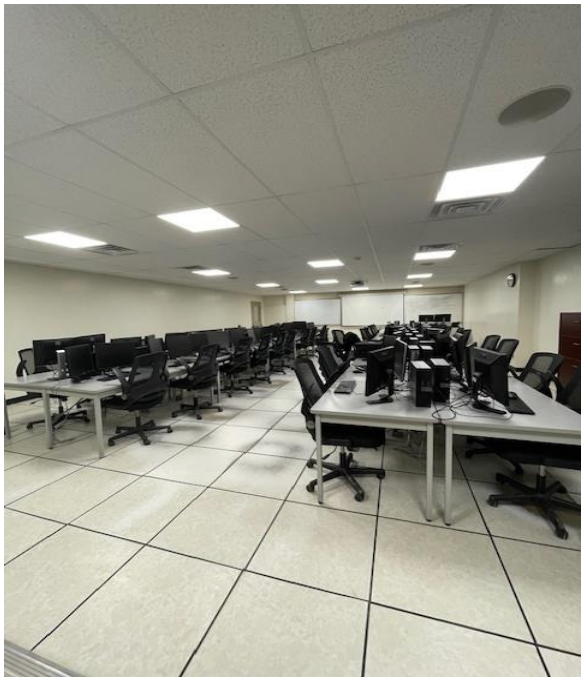
APPENDIX A
Representative Photographs



Photograph 1: Representative photograph of Computer Lab B2101 - B2 where limited IAQ was conducted.

Photograph 2: Representative photograph of a typical Washroom where limited IAQ was conducted.

APPENDIX B

Statement of Limitations

STATEMENT OF LIMITATIONS

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Since the passage of time, natural occurrences, and direct or indirect human intervention may affect the views, conclusions and recommendations (if any) provided in this Report, it is intended for immediate use.

This Statement of Limitations forms an integral part of the Report.

The assessment should not be considered a comprehensive audit that covers and eliminates all present, past, and future risks. The information presented in this Report is based on data collected during the completion of the site assessment conducted. The overall site/building conditions were extrapolated based on information collected at specific sampling locations. Professional judgement was exercised in gathering and analyzing data; however, no sampling methodology can completely eliminate the possibility of obtaining partially imprecise or incomplete information; it can only reduce the possibility to an acceptable level. Consequently, the actual site/building conditions between the sampling points may vary. In addition, analysis has been carried out only for the parameters identified, and it should not be inferred that other hazardous materials are not present.

It is recommended practice that the Company be retained during subsequent phases of the project, to confirm that the conditions throughout the site do not deviate materially from those encountered throughout the sampling program.

Any description of the site and its physical setting documented in this Report is presented for informational purposes only, to provide the reader a better understanding of the site and scope of work.

Any results from a third-party laboratory or other subcontractors reported herein have been carried out by others, and the Company cannot warrant their accuracy.

This Report is based on the assumption that the design features relevant to our work will be in accordance with applicable codes, standards, and guidelines of practice and constructed substantially in accordance with the Report. If there are any changes to the site development or building construction features, or there is any additional information that was not otherwise available at the time the work was performed, the Company should be retained to review the implications thereof to the contents of this Report. The design recommendations expressed in this Report are applicable only to the project described therein.

No attempt was made to dismantle, inspect, or test existing equipment other than that which is specifically noted in the report.