FINAL

Investigation of Indoor Air Quality

Kingston Secondary School
145 Kirkpatrick Street, Kingston, Ontario

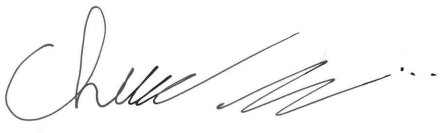
Prepared for:

Limestone District School Board
220 Portsmouth Avenue
Kingston, ON K7M 0G2

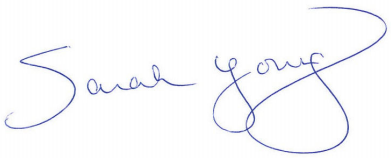
December 16, 2024

Pinchin File: 201262.340

Issued to:	**Limestone District School Board**
Issued on:	**December 16, 2024**
Pinchin File:	**201262.340**
Issuing Office:	**Kingston, ON**
Primary Pinchin Contact:	**Sarah Young**
	613.541.1013
	syoung@pinchin.com



Author: Chris Wright
Senior Project Technologist



Reviewer: Sarah Young, C.Tech.
Senior Technical Manager

TABLE OF CONTENTS

APPENDICES

LIST OF TABLES

1.0 INTRODUCTION AND SCOPE

1.1 Statement of Understanding

Pinchin Ltd. (Pinchin) was retained by Limestone District School Board (Client) to complete an investigation of indoor air quality (IAQ) at 145 Kirkpatrick Street, Kingston, Ontario. The investigation was performed in response to occupant concerns regarding carbon dioxide in the building.

1.2 Scope of Work

Pinchin performed the initial round of spot measurements and deployed three data logging monitors on November 21, 2024. Pinchin returned to the Site on November 29, 2024 to retrieve the data logging monitors and performed additional rounds of spot measurements throughout the building.

The investigation involved the following activities:

- A review of reported concerns.
- Walkthrough site reviews for factors that could degrade air quality.
- Spot measurements of carbon dioxide (CO_2)
- Data-logging of CO_2, in the following area(s):
  - Room 154
  - Room 212
  - Room 302

2.0 METHODOLOGY

2.1 Interview and Site Review

Pinchin interviewed building staff, occupants, health and safety representatives, and managers to discuss the history of the building, maintenance practices, and any indoor air quality complaints.

The investigator reviewed conditions within the subject area(s) for factors that could degrade air quality.

All fieldwork was completed using industry-accepted best practice and following Pinchin Standard Operating Procedures.

2.2 Test Methods and Criteria

The following table presents a summary of the parameters measured in this investigation, the instruments and sampling methods used, the applicable units of measurement, and the criteria selected by Pinchin for the evaluation of the results.

All direct-reading instruments were calibrated before use or in accordance with manufacturers instructions.

Table I – Parameters Tested, Recommended Limits and Instruments or Methods Used

Parameter	Unit of Measurement	Recommended Limit	Instrumentation
CO_2	Parts per million in air (ppm)	Outdoor Air ppm + 700 ppm[1]	TSI® Q-Trak IAQ monitor

[1]Pinchin compared the carbon dioxide measurement to the criteria outlined in the document entitled American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE): Ventilation for Acceptable Indoor Air Quality [ANSI/ASHRAE Standard 62.1-2016]. Atlanta, GA: ASHRAE, 2016.

Typical outdoor CO_2 levels range between 300 and 500 ppm. Indoor carbon dioxide concentrations consistently above 800-1,000 ppm can result in occupants experiencing symptoms such as itchy or sore eyes, drowsiness, and/or mild headaches. Exposure to much higher levels of indoor carbon dioxide concentrations (i.e. >5,000 ppm) can cause dizziness, headaches, elevated blood pressure, and increased heart rate. For additional information, refer to the Environmental Abatement Council of Canada (EACC) Indoor Air Quality Guideline For Non-Industrial Workplaces.

3.0 FINDINGS

3.1 Results of Interviews

The Site Representatives reported the following:

- The building was constructed in 2018 and all HVAC, AHU's etc are original. Building staff perform routine filter changes every 3 months.
- Occupants of the building have raised general concerns regard carbon dioxide in the building.
- An HVAC contractor was retained in November 2024, to review the HVAC system and perform routine maintenance.
- Occupants have not reported any adverse health effects while in the building.

1 American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE): Ventilation for Acceptable Indoor Air Quality [ANSI/ASHRAE Standard 62.1-2016]. Atlanta, GA: ASHRAE, 2016.

3.2 Facility Description

Below provides information as it relates to the area(s) assessed.

Table II – Facility Description

Item	Details
Construction Date	2018
Number of Floors	Three
Area Assessed	Approximately 60,000 square feet
HVAC	Boiler with hot water heating to radiators, indoor air handling unit
Flooring	Vinyl, wood, carpet and ceramic tiles
Interior Walls	Drywall and concrete block
Ceilings	Drywall and acoustic ceiling tiles

3.3 Results of Indoor Air Quality Tests

The results of IAQ spot measurements are provided in Appendix II. Appendix III presents the results of any data-logging of IAQ parameters. Appendix I presents the drawings.

Table III – Summary of IAQ Spot Measurements

Parameter	Concentration		Suggested Limit	Within Suggested Limit?
	Minimum	Maximum		
CO_2 November 21, 2024	420 ppm	955 ppm	Outdoor Air ppm + 700 ppm	Yes
CO_2 November 29, 2024	450 ppm	866 ppm	Outdoor Air ppm + 700 ppm	Yes

Pinchin deployed three monitors to data log the carbon dioxide in the building. The units were deployed from November 21 to November 29, 2024, with a log interval of one hour.

Table IV – Summary of IAQ Data Logging Measurements

Parameter	Concentration		Suggested Limit	Within Suggested Limit?
	Minimum	Maximum		
CO_2 Monitor #19867, Room 154	432 ppm	967 ppm	Outdoor Air ppm + 700 ppm	Yes

Table IV – Summary of IAQ Data Logging Measurements

CO_2 Monitor #13123, Room 212	413 ppm	923 ppm	Outdoor Air ppm + 700 ppm	Yes
CO_2 Monitor #12492, Room 302*	568 ppm	700ppm	Outdoor Air ppm + 700 ppm	Yes

*Due to an equipment internal power malfunction of Monitor #12492 deployed in Room 302, only four measurements were datalogger between 12:11 a.m. and 3:08 a.m. on November 22, 2024. All measurements were within the acceptable criteria. Pinchin has not prepared a summary graph for this data.

4.0 DISCUSSION

All spot measurements of carbon dioxide collected on November 21, 2024 and November 29, 2024 along with the datalogging data collected in three locations were within the acceptable criteria. It is Pinchin's understanding that the occupancy load of the building at the time of this investigation was typical to day to day use of the building with the exception of November 21-24, 2024. During November 21-24, 2024, occupancy load was higher than normal as a sporting event was hosted in the building.

Although one of the data logging monitors malfunctioned and limited data was collected, it is Pinchin's opinion that the methodology and sample locations were representative of the building and the data did not report any elevated concentrations of carbon dioxide.

5.0 RECOMMENDATIONS

Pinchin offers the following recommendations to improve air quality within the assessed area(s):

1. Communicate the findings of this report to staff, members of the joint health and safety committee, tenants, and any other vested parties.
2. Continue to perform routine maintenance on HVAC to ensure adequate fresh air is introduced into the building.

6.0 TERMS AND LIMITATIONS

This work was performed subject to the Terms and Limitations presented or referenced in the proposal for this project.

Information provided by Pinchin is intended for Client use only. Pinchin will not provide results or information to any party unless disclosure by Pinchin is required by law. Any use by a third party of reports or documents authored by Pinchin or any reliance by a third party on or decisions made by a third party based on the findings described in said documents, is the sole responsibility of such third parties.

Pinchin accepts no responsibility for damages suffered by any third party as a result of decisions made or actions conducted. No other warranties are implied or expressed.

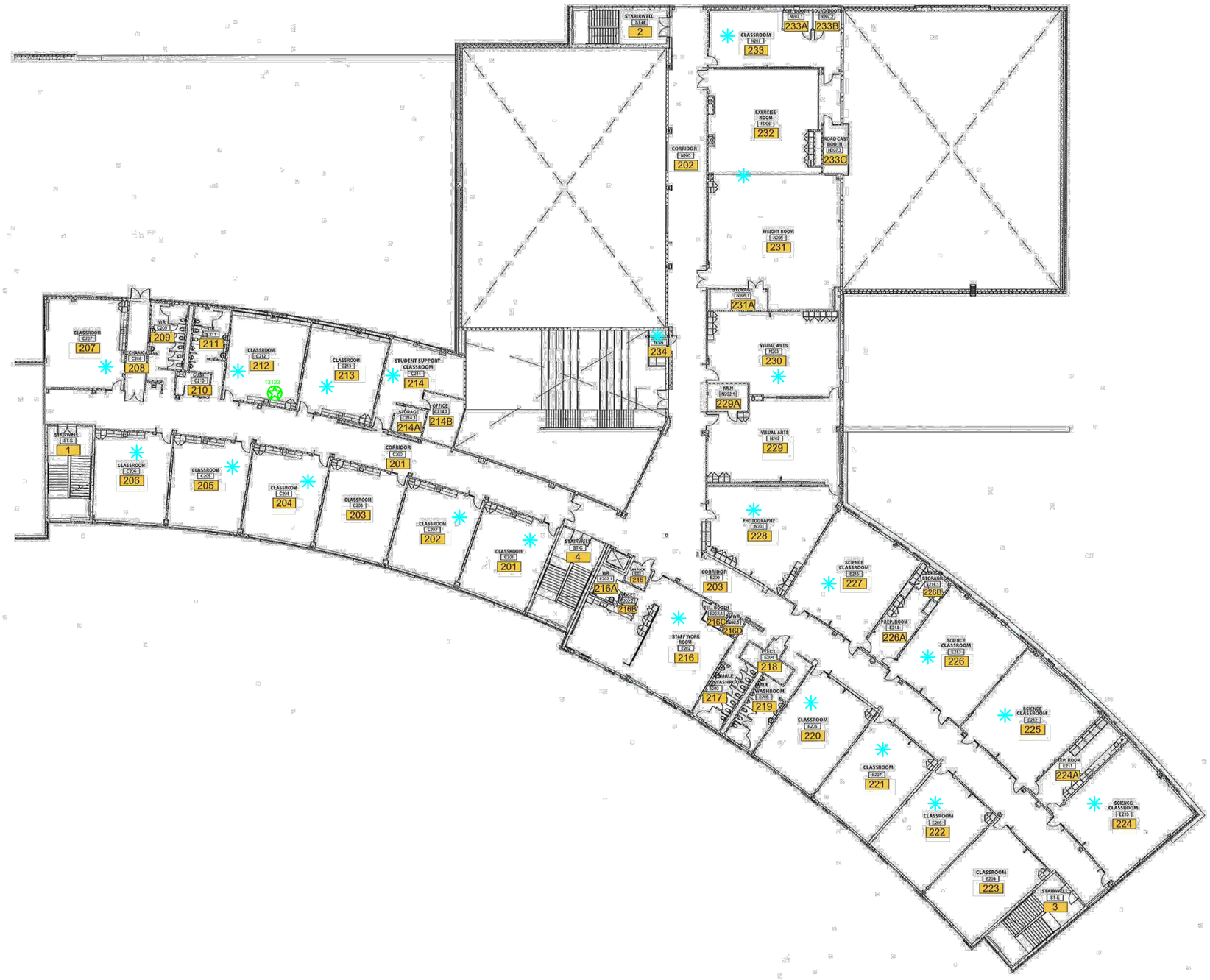
\\pinchin.com\kgn\Job\201000s\0201262.000 LIMESTONE,53VanOrderDr,KGN,DSR\0201262.340 LDSB,KSS,IEQ,Asmt\Deliverables\201262.340 IEQInvestigation KSS LDSB.docx

Template: Master Report Investigation of IAQ, IEQ, June 10, 2024

APPENDIX I

Drawings


N
LEGEND
DATA LOGGING LOCATION
SPOT MEASUREMENT
127 LDSB/ PINCHIN LOCATION
NOT ALL KNOWN OR SUSPECTED HAZARDOUS BUILDING MATERIALS MAY BE DEPICTED ON THE DRAWING. REFER TO THE HAZARDOUS BUILDING MATERIALS ASSESSMENT REPORT FOR A COMPLETE LIST OF KNOWN AND SUSPECTED HAZARDOUS BUILDING MATERIALS.
LEGEND IS COLOUR DEPENDENT. NON-COLOUR COPIES MAY ALTER INTERPRETATION.
BASE PLAN PROVIDED BY CLIENT.
PINCHIN
PROJECT NAME:
INDOOR AIR QUALITY ASSESSMENT
CLIENT NAME:
LIMESTONE DISTRICT SCHOOL BOARD
PROJECT LOCATION:
KINGSTON S.S.
145 KIRKPATRICK STREET
KINGSTON, ONTARIO
FIGURE NAME:
FIRST FLOOR
PROJECT NUMBER:
201262.340
SCALE:
NOT TO SCALE
DRAWN BY:
CW
REVIEWED BY:
SY
DATE:
DECEMBER 2024
FIGURE NUMBER:
1 OF 3



N

LEGEND

- DATA LOGGING LOCATION
- SPOT MEASUREMENT
- 127 LDSB/ PINCHIN LOCATION

NOT ALL KNOWN OR SUSPECTED HAZARDOUS BUILDING MATERIALS MAY BE DEPICTED ON THE DRAWING. REFER TO THE HAZARDOUS BUILDING MATERIALS ASSESSMENT REPORT FOR A COMPLETE LIST OF KNOWN AND SUSPECTED HAZARDOUS BUILDING MATERIALS.

LEGEND IS COLOUR DEPENDENT. NON-COLOUR COPIES MAY ALTER INTERPRETATION.

BASE PLAN PROVIDED BY CLIENT.

PINCHIN

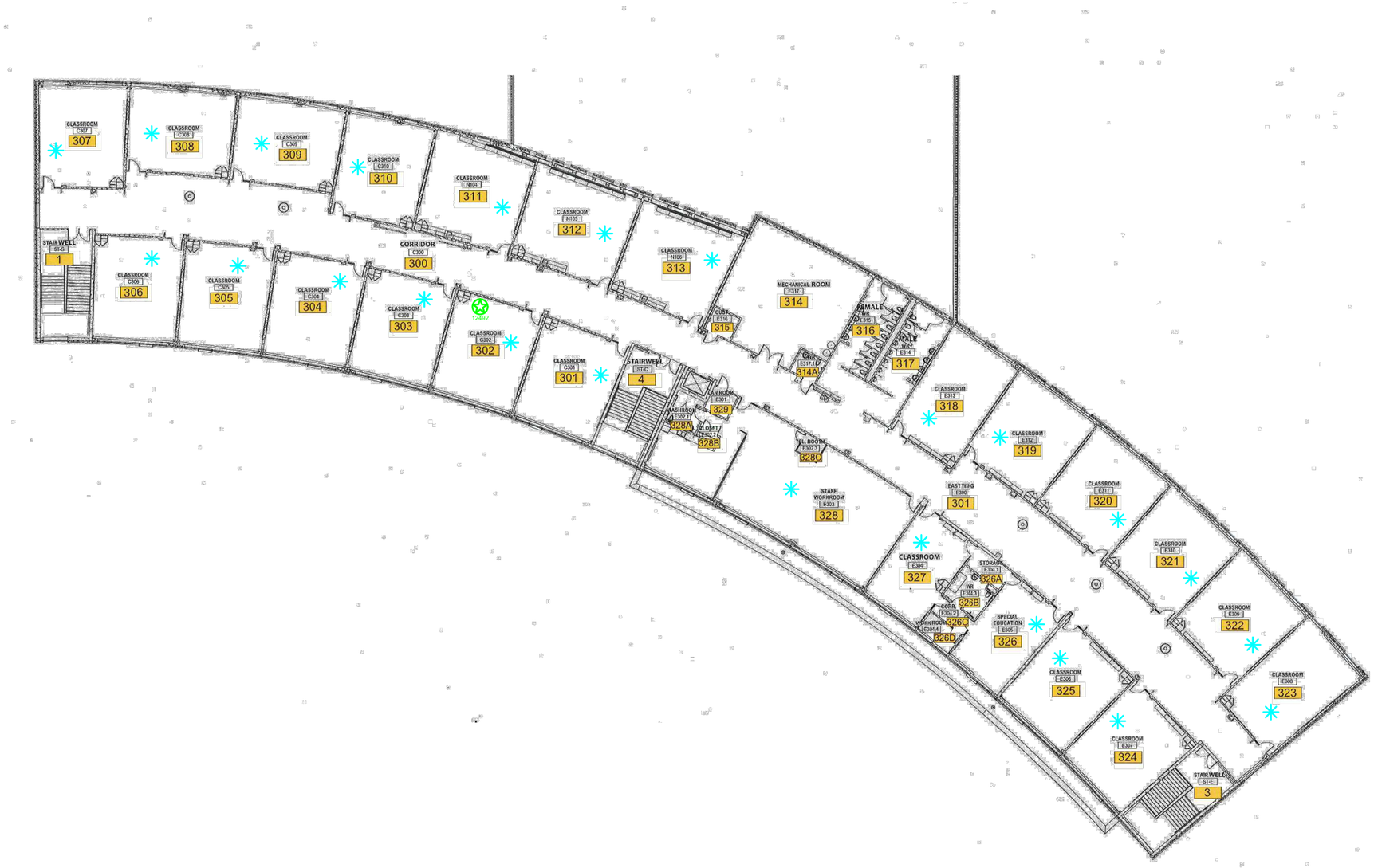
PROJECT NAME:
INDOOR AIR QUALITY ASSESSMENT

CLIENT NAME:
LIMESTONE DISTRICT SCHOOL BOARD

PROJECT LOCATION:
KINGSTON S.S.
145 KIRKPATRICK STREET
KINGSTON, ONTARIO

FIGURE NAME:
SECOND FLOOR

PROJECT NUMBER:	SCALE:
201262.340	NOT TO SCALE
DRAWN BY:	REVIEWED BY:
CW	SY
DATE:	FIGURE NUMBER:
DECEMBER 2024	2 OF 3



N

LEGEND

- DATA LOGGING LOCATION
- SPOT MEASUREMENT
- 127 LDSB/ PINCHIN LOCATION

NOT ALL KNOWN OR SUSPECTED HAZARDOUS BUILDING MATERIALS MAY BE DEPICTED ON THE DRAWING. REFER TO THE HAZARDOUS BUILDING MATERIALS ASSESSMENT REPORT FOR A COMPLETE LIST OF KNOWN AND SUSPECTED HAZARDOUS BUILDING MATERIALS.

LEGEND IS COLOUR DEPENDENT. NON-COLOUR COPIES MAY ALTER INTERPRETATION.

BASE PLAN PROVIDED BY CLIENT.

PINCHIN

PROJECT NAME:
INDOOR AIR QUALITY ASSESSMENT

CLIENT NAME:
LIMESTONE DISTRICT SCHOOL BOARD

PROJECT LOCATION:
KINGSTON S.S.
145 KIRKPATRICK STREET
KINGSTON, ONTARIO

FIGURE NAME:
THIRD FLOOR

PROJECT NUMBER:	SCALE:
201262.340	NOT TO SCALE
DRAWN BY:	REVIEWED BY:
CW	SY
DATE:	FIGURE NUMBER:
DECEMBER 2024	3 OF 3

APPENDIX II

Results of Direct-Reading Indoor Air Quality Measurements

Client Name: Limestone District School Board
Site Address: 145 Kirkpatrick Street, Kingston, ON
Pinchin File: 201262.340
Date 2024-11-21
Date 2024-11-29

Occupancy Density Definitions

Vacant The room/area was not occupied at the time of the measurement.
Design The occupancy of the room/area matched the designed intention of the room /area
Low The occupancy of the room/area was below the designed intention of the room /area
High The occupancy of the room/area was above the designed intention of the room /area

Location No: 0	**Location Name: Outdoor**	
Time	Occupant Density	CO2 (ppm)
11/21 08:20 AM	Low	492
11/21 10:36 AM	Vacant	431
11/21 11:54 AM	Vacant	454
11/21 02:13 PM	Vacant	440
11/21 03:46 PM	Vacant	431
11/29 08:11 AM	Low	490
11/29 09:47 AM	Vacant	454
11/29 11:20 AM	Vacant	466
Notes:	Raining	
	Nov 21 Average	450
	Nov 29 Average	470

Location No: 1	**Location Name: Gym**	
Time	Occupant Density	CO2 (ppm)
11/21 09:05 AM	Design	779
11/21 12:05 PM	Design	810
11/21 02:18 PM	High	842
11/29 08:24 AM	Low	491
11/29 10:01 AM	Low	657

Location No: 2	Location Name: Gym	
Time	Occupant Density	CO2 (ppm)
11/21 09:08 AM	High	926
11/21 12:02 PM	Design	818
11/21 02:16 PM	High	824
11/29 08:19 AM	Low	456
11/29 09:59 AM	Low	630

Location No: 100	Location Name: Admin Office	
Time	Occupant Density	CO2 (ppm)
11/21 08:26 AM	Design	860
11/21 12:22 PM	Design	702
11/21 02:35 PM	Design	689
11/29 08:37 AM	Design	589
11/29 10:16 AM	Design	574

Location No: 101	Location Name: Foyer	
Time	Occupant Density	CO2 (ppm)
11/21 08:35 AM	Design	751
11/21 12:07 PM	Design	816
11/21 02:19 PM	Low	743
11/29 08:36 AM	Low	610
11/29 10:02 AM	Low	618

Location No: 107	Location Name: Meeting Room	
Time	Occupant Density	CO2 (ppm)
11/21 08:28 AM	Low	630
11/21 12:23 PM	Vacant	504
11/21 02:37 PM	Low	519
11/29 08:39 AM	Low	485
11/29 10:17 AM	Vacant	472

Location No: 114	Location Name: Library	
Time	Occupant Density	CO2 (ppm)
11/21 08:30 AM	Low	545
11/21 12:25 PM	Low	703
11/21 02:39 PM	Low	689
11/29 08:40 AM	Low	500

Location No: 124	Location Name: Theater Arts	
Time	Occupant Density	CO2 (ppm)
11/21 08:32 AM	Vacant	560
11/21 12:27 PM	Low	614
11/21 02:41 PM	Vacant	575
11/29 08:41 AM	Low	450
11/29 10:20 AM	Low	493

Location No: 125	Location Name: Music Room	
Time	Occupant Density	CO2 (ppm)
11/21 08:48 AM	Design	761
11/21 12:29 PM	Low	955
11/29 08:44 AM	Design	740

Location No: 126	Location Name: Music Room	
Time	Occupant Density	CO2 (ppm)
11/21 08:47 AM	Low	676
11/21 12:31 PM	Low	721
11/21 02:45 PM	Low	720
11/29 08:46 AM	Design	604
11/29 10:18 AM	Design	661

Location No: 130	Location Name: Cafeteria	
Time	Occupant Density	CO2 (ppm)
11/21 08:41 AM	Vacant	540
11/21 12:33 PM	Low	718
11/21 02:48 PM	Low	614
11/29 08:49 AM	Low	519
11/29 10:23 AM	Low	501

Location No: 132	Location Name: Culinary	
Time	Occupant Density	CO2 (ppm)
11/21 08:45 AM	Design	641
11/21 12:32 PM	Design	847
11/29 08:48 AM	Design	597
11/29 10:22 AM	Design	562

Location No: 141	Location Name: Classroom	
Time	Occupant Density	CO2 (ppm)
11/21 12:04 PM	Low	584
11/29 08:20 AM	Low	478
11/29 10:00 AM	Design	593

Location No: 142	Location Name: Classroom	
Time	Occupant Density	CO2 (ppm)
11/21 09:10 AM	Low	651
11/21 12:01 PM	Low	672
11/21 02:15 PM	Low	711

Location No: 143	Location Name: Technology Classroom	
Time	Occupant Density	CO2 (ppm)
11/21 09:13 AM	Design	611
11/21 12:00 PM	Vacant	585
11/21 02:10 PM	Low	672
11/29 08:18 AM	Low	477
11/29 09:58 AM	Design	630

Location No: 144	Location Name: Technology Classroom	
Time	Occupant Density	CO2 (ppm)
11/21 09:14 AM	Design	755
11/21 11:59 AM	Design	719
11/21 02:10 PM	Design	733
11/29 09:56 AM	Design	642

Location No: 145	Location Name: Technology Classroom	
Time	Occupant Density	CO2 (ppm)
11/21 09:17 AM	Vacant	673
11/21 11:58 AM	Design	758
11/21 02:09 PM	Low	688
11/29 09:55 AM	Low	588

Location No: 147	Location Name: Custodian	
Time	Occupant Density	CO2 (ppm)
11/21 09:19 AM	Design	825
11/21 11:57 AM	Design	741
11/21 02:01 PM	Design	761
11/29 08:15 AM	Low	537
11/29 09:54 AM	Vacant	576

Location No: 152	Location Name: Classroom	
Time	Occupant Density	CO2 (ppm)
11/21 09:01 AM	Design	681
11/21 12:20 PM	Low	548
11/21 02:32 PM	Low	533
11/29 08:34 AM	Low	523
11/29 10:14 AM	Low	515

Location No: 153	Location Name: Classroom	
Time	Occupant Density	CO2 (ppm)
11/21 08:59 AM	Design	855
11/21 12:16 PM	Vacant	529
11/21 02:29 PM	Vacant	594
11/29 08:31 AM	Design	714

Location No: 154	Location Name: Classroom	
Time	Occupant Density	CO2 (ppm)
11/21 08:58 AM	Vacant	633
11/21 12:11 PM	Design	802
11/21 02:26 PM	Low	765
11/29 08:26 AM	Design	612
11/29 10:06 AM	Design	846
Data Logging:	Q-TRAK19867	

Location No: 156	Location Name: Classroom	
Time	Occupant Density	CO2 (ppm)
11/21 08:56 AM	Low	639
11/21 12:10 PM	Low	596
11/21 02:25 PM	Low	662
11/29 08:27 AM	Low	575
11/29 10:04 AM	Low	662

Location No: 157	Location Name: Classroom	
Time	Occupant Density	CO2 (ppm)
11/21 08:55 AM	Design	844
11/21 12:09 PM	Design	762
11/21 02:21 PM	Design	853
11/29 10:05 AM	Design	795

Location No: 158	Location Name: Classroom	
Time	Occupant Density	CO2 (ppm)
11/21 08:53 AM	Low	766
11/21 12:12 PM	Design	830
11/29 08:29 AM	Design	568

Location No: 160	Location Name: Classroom	
Time	Occupant Density	CO2 (ppm)
11/21 09:00 AM	Low	626
11/21 12:15 PM	Design	630
11/21 02:30 PM	Low	615
11/29 08:32 AM	Low	574
11/29 10:13 AM	Vacant	524

Location No: 161	Location Name: Students Services	
Time	Occupant Density	CO2 (ppm)
11/21 08:50 AM	Design	741
11/21 12:19 PM	Design	605
11/21 02:33 PM	Design	654
11/29 08:35 AM	Low	564
11/29 10:15 AM	Design	543

Location No: 201	Location Name: Classroom	
Time	Occupant Density	CO2 (ppm)
11/21 09:23 AM	Vacant	549
11/21 12:50 PM	Design	858
11/21 02:51 PM	Vacant	561
11/29 09:02 AM	Low	583
11/29 10:39 AM	Design	726

Location No: 202	Location Name: Classroom	
Time	Occupant Density	CO2 (ppm)
11/21 09:25 AM	Design	809
11/21 12:49 PM	Low	570
11/29 09:01 AM	Design	655

Location No: 203	Location Name: Classroom	
Time	Occupant Density	CO2 (ppm)
11/29 10:37 AM	Vacant	551

Location No: 204	Location Name: Classroom	
Time	Occupant Density	CO2 (ppm)
11/21 09:26 AM	Low	542
11/21 12:46 PM	Vacant	576
11/21 02:57 PM	Low	521
11/29 08:59 AM	Low	561

Location No: 205	Location Name: Classroom	
Time	Occupant Density	CO2 (ppm)
11/21 09:27 AM	Design	707
11/21 12:44 PM	Vacant	566
11/21 02:55 PM	Vacant	565
11/29 08:57 AM	Design	707

Location No: 206	Location Name: Classroom	
Time	Occupant Density	CO2 (ppm)
11/21 09:28 AM	Design	706
11/21 12:42 PM	Low	576
11/21 02:52 PM	Vacant	581
11/29 08:54 AM	Low	540

Location No: 207	Location Name: Classroom	
Time	Occupant Density	CO2 (ppm)
11/21 09:30 AM	Design	707
11/21 12:39 PM	Design	670
11/29 08:53 AM	Low	621
11/29 10:30 AM	Design	840

Location No: 212	Location Name: Classroom	
Time	Occupant Density	CO2 (ppm)
11/21 09:31 AM	Design	766
11/21 12:43 PM	Vacant	616
11/21 02:54 PM	Vacant	564
11/29 08:55 AM	Design	656
11/29 10:32 AM	Design	727
Data Logging:	Q-Trak13123	

Location No: 213	Location Name: Classroom	
Time	Occupant Density	CO2 (ppm)
11/21 09:33 AM	Vacant	599
11/21 12:46 PM	Design	618
11/21 02:56 PM	Vacant	554
11/29 08:58 AM	Design	696
11/29 10:36 AM	Low	583

Location No: 214	Location Name: Student Support Classroom	
Time	Occupant Density	CO2 (ppm)
11/21 09:35 AM	Low	647
11/21 12:48 PM	Low	640
11/21 02:58 PM	Vacant	531
11/29 09:00 AM	Low	587
11/29 10:38 AM	Low	574

Location No: 216	Location Name: Staff Work Room	
Time	Occupant Density	CO2 (ppm)
11/21 09:37 AM	Low	555
11/21 12:52 PM	Low	649
11/21 03:02 PM	Vacant	517
11/29 09:13 AM	Low	593

Location No: 220	Location Name: Classroom	
Time	Occupant Density	CO2 (ppm)
11/21 09:39 AM	Low	566
11/21 01:01 PM	Design	785
11/21 03:12 PM	Vacant	479

Location No: 221	Location Name: Classroom	
Time	Occupant Density	CO2 (ppm)
11/21 09:40 AM	Design	765
11/21 12:58 PM	Design	696
11/21 03:09 PM	Vacant	463
11/29 09:09 AM	Design	728
11/29 10:43 AM	Design	647

Location No: 222	Location Name: Classroom	
Time	Occupant Density	CO2 (ppm)
11/21 09:42 AM	Low	903
11/21 12:56 PM	Design	757
11/29 09:06 AM	Design	693

Location No: 224	Location Name: Classroom	
Time	Occupant Density	CO2 (ppm)
11/21 09:44 AM	Low	569
11/21 12:53 PM	Low	533
11/21 03:04 PM	Low	430
11/29 09:05 AM	Design	613
11/29 10:41 AM	Design	565

Location No: 225	Location Name: Classroom	
Time	Occupant Density	CO2 (ppm)
11/21 09:46 AM	Vacant	599
11/21 12:55 PM	Low	564
11/21 03:06 PM	Vacant	428
11/29 09:04 AM	Design	619

Location No: 226	Location Name: Classroom	
Time	Occupant Density	CO2 (ppm)
11/21 09:45 AM	Low	554
11/21 12:57 PM	Low	578
11/21 03:08 PM	Vacant	425
11/29 09:08 AM	Design	669
11/29 10:42 AM	Design	586

Location No: 227	Location Name: Classroom	
Time	Occupant Density	CO2 (ppm)
11/21 09:48 AM	Low	725
11/21 01:00 PM	Design	621
11/21 03:11 PM	Low	464
11/29 09:10 AM	Design	691
11/29 10:44 AM	Design	617

Location No: 228	Location Name: Photography Classroom	
Time	Occupant Density	CO2 (ppm)
11/21 09:50 AM	Design	807
11/21 01:02 PM	Design	731
11/29 09:14 AM	Design	668
11/29 10:45 AM	Design	672

Location No: 229	Location Name: Visual Art Classroom	
Time	Occupant Density	CO2 (ppm)
11/21 09:51 AM	Design	657
11/21 01:03 PM	Design	677
11/21 03:14 PM	Vacant	436
11/29 09:15 AM	Design	650

Location No: 230	Location Name: Visual Arts Classroom	
Time	Occupant Density	CO2 (ppm)
11/21 09:53 AM	Low	632
11/21 01:06 PM	Low	606
11/21 03:15 PM	Vacant	484
11/29 09:16 AM	Low	602
11/29 10:47 AM	Low	541

Location No: 232	Location Name: Exercise Room	
Time	Occupant Density	CO2 (ppm)
11/21 09:57 AM	Vacant	473
11/21 01:09 PM	Low	541
11/21 03:18 PM	Vacant	454
11/29 09:18 AM	Low	580
11/29 10:50 AM	Low	559

Location No: 233	Location Name: Classroom	
Time	Occupant Density	CO2 (ppm)
11/21 01:10 PM	Low	773
11/21 03:19 PM	Vacant	470
11/29 10:52 AM	Vacant	488

Location No: 234	Location Name: Radio Booth	
Time	Occupant Density	CO2 (ppm)
11/21 09:54 AM	Design	833
11/21 01:07 PM	Vacant	595
11/21 03:17 PM	Vacant	515
11/29 09:17 AM	Vacant	650

Location No: 301	Location Name: Classroom	
Time	Occupant Density	CO2 (ppm)
11/21 10:31 AM	Design	785
11/21 01:43 PM	Low	624
11/21 03:31 PM	Low	550
11/29 09:34 AM	Low	610

Location No: 302	Location Name: Classroom	
Time	Occupant Density	CO2 (ppm)
11/21 10:30 AM	Low	561
11/21 01:24 PM	Design	842
11/21 03:30 PM	Vacant	473
11/29 09:31 AM	Low	625
11/29 11:02 AM	Vacant	525
Data Logging:	Q-Trak12492	

Location No: 303	Location Name: Classroom	
Time	Occupant Density	CO2 (ppm)
11/21 10:28 AM	Design	455
11/21 01:22 PM	Low	758
11/29 09:30 AM	Design	741

Location No: 304	Location Name: Classroom	
Time	Occupant Density	CO2 (ppm)
11/21 10:27 AM	Design	784
11/21 01:19 PM	Design	939
11/21 03:29 PM	Vacant	468
11/29 09:29 AM	Design	688
11/29 10:58 AM	Design	698

Location No: 305	Location Name: Classroom	
Time	Occupant Density	CO2 (ppm)
11/21 10:26 AM	Design	873
11/21 01:18 PM	Design	928
11/21 03:25 PM	Vacant	466
11/29 09:27 AM	Design	775
11/29 10:56 AM	Design	749

Location No: 306	Location Name: Classroom	
Time	Occupant Density	CO2 (ppm)
11/21 10:25 AM	Design	706
11/21 01:16 PM	Low	753
11/21 03:27 PM	Vacant	466
11/29 09:24 AM	Design	694

Location No: 307	Location Name: Classroom	
Time	Occupant Density	CO2 (ppm)
11/21 10:24 AM	Design	687
11/21 01:45 PM	Low	748
11/21 03:22 PM	Vacant	471
11/29 09:22 AM	Design	720

Location No: 308	Location Name: Classroom	
Time	Occupant Density	CO2 (ppm)
11/21 10:23 AM	Design	719
11/21 01:15 PM	Design	884
11/29 09:23 AM	Design	680
11/29 10:55 AM	Design	678

Location No: 309	Location Name: Classroom	
Time	Occupant Density	CO2 (ppm)
11/21 10:22 AM	Design	659
11/21 01:17 PM	Low	780
11/21 03:23 PM	Vacant	466
11/29 09:25 AM	Low	688

Location No: 310	Location Name: Classroom	
Time	Occupant Density	CO2 (ppm)
11/21 10:21 AM	Design	712
11/21 01:21 PM	Low	894
11/21 03:28 PM	Vacant	464
11/29 09:28 AM	Design	690
11/29 10:57 AM	Low	670

Location No: 311	Location Name: Classroom	
Time	Occupant Density	CO2 (ppm)
11/21 10:20 AM	Design	682
11/21 01:23 PM	Design	867
11/29 10:59 AM	Design	702

Location No: 312	Location Name: Classroom	
Time	Occupant Density	CO2 (ppm)
11/21 10:19 AM	Vacant	585
11/21 01:26 PM	Low	688
11/21 03:30 PM	Vacant	440
11/29 09:33 AM	Low	652
11/29 11:01 AM	Low	567

Location No: 313	Location Name: Classroom	
Time	Occupant Density	CO2 (ppm)
11/21 10:17 AM	Design	765
11/21 01:28 PM	Low	754
11/21 03:32 PM	Vacant	493
11/29 09:35 AM	Design	684

Location No: 318	Location Name: Classroom	
Time	Occupant Density	CO2 (ppm)
11/21 10:16 AM	Low	673
11/21 01:40 PM	Low	711
11/29 11:13 AM	Low	726

Location No: 319	Location Name: Classroom	
Time	Occupant Density	CO2 (ppm)
11/21 10:15 AM	Design	760
11/21 01:37 PM	Low	710
11/21 03:34 PM	Vacant	437
11/29 09:37 AM	Design	715

Location No: 320	Location Name: Classroom	
Time	Occupant Density	CO2 (ppm)
11/21 10:14 AM	Design	786
11/21 01:35 PM	Vacant	572
11/21 03:37 PM	Low	490
11/29 09:39 AM	Design	810
11/29 11:14 AM	Vacant	698

Location No: 321	Location Name: Classroom	
Time	Occupant Density	CO2 (ppm)
11/21 10:12 AM	Design	760
11/21 01:33 PM	Low	697
11/21 03:40 PM	Vacant	421

Location No: 322	Location Name: Classroom	
Time	Occupant Density	CO2 (ppm)
11/21 10:11 AM	Design	671
11/21 01:31 PM	Design	811
11/21 03:07 PM	Vacant	477
11/29 09:42 AM	Low	770

Location No: 323	Location Name: Classroom	
Time	Occupant Density	CO2 (ppm)
11/21 10:07 AM	Design	703
11/21 01:30 PM	Low	838
11/21 03:42 PM	Low	525
11/29 11:17 AM	Vacant	685

Location No: 324	Location Name: Classroom	
Time	Occupant Density	CO2 (ppm)
11/21 10:09 AM	Vacant	571
11/21 01:32 PM	Vacant	576
11/21 03:41 PM	Vacant	420
11/29 11:16 AM	Low	581

Location No: 325	Location Name: Classroom	
Time	Occupant Density	CO2 (ppm)
11/21 10:10 AM	Vacant	613
11/21 01:34 PM	Vacant	572
11/21 03:39 PM	Vacant	425
11/29 09:41 AM	Low	866
11/29 11:15 AM	Vacant	602

Location No: 326	Location Name: Special Education	
Time	Occupant Density	CO2 (ppm)
11/21 10:05 AM	Low	622
11/21 01:36 PM	Design	657
11/21 03:38 PM	Vacant	435

Location No: 327	Location Name: Classroom	
Time	Occupant Density	CO2 (ppm)
11/21 10:04 AM	Design	640
11/21 01:38 PM	Low	596
11/21 03:36 PM	Vacant	432
11/29 09:38 AM	Design	591

Location No: 328	Location Name: Staff Lounge	
Time	Occupant Density	CO2 (ppm)
11/21 10:02 AM	Low	596
11/21 01:41 PM	Low	613
11/21 03:33 PM	Low	422
11/29 09:36 AM	Low	554
11/29 11:11 AM	Design	619

APPENDIX III

Results of Data-Logging Indoor Air Quality Measurements