



April 13, 2021

Toronto Catholic District School Board
80 Sheppard Avenue East
Toronto, Ontario, M2N 6E8

E-mail: Deborah.Friesen@tcdsb.org

Attention: Deborah Friesen, OAA, LEED AP
Superintendent, Capital Development, Asset Management and Renewal

Re: Phase II IAQ Data Summary St. Raphael
St. Raphael, 3 Gade Drive, North York, Ontario
Pinchin File: 281161

Pinchin Ltd. (Pinchin) was retained by the Toronto Catholic District School Board (TCDSB, the Client) to investigate ventilation rates in three schools and to understand how mechanical HVAC systems and window opening time / window style impacted ventilation. Phase II of the investigation included ongoing measurements at St. Raphael following changes to how windows were being used to provide natural ventilation in the classroom. Pinchin also understands that some maintenance was undertaken to ensure exhaust fans were operating properly in classrooms where equipped.

1.0 METHODOLOGY

Indoor air quality measurements were collected approximately every 15 minutes, 24 hours / day, seven days a week. Door and window activation data was transmitted at the time of each event.

The time period examined as part of Phase II included 00:01 February 26, 2021 to 23:59 March 26, 2021.

For the purposes of this report, Pinchin looked at three factors to determine if the window operating procedures and exhaust fan maintenance had impacted indoor air quality at St. Raphael:

1. Total measurements in each room in exceedance of 800 ppm CO₂.
2. Total measurements in each room in exceedance of 1200 ppm CO₂.
3. Total number of open window hours in each classroom. This was calculated by summing the number of hours each window in a classroom was open for through the study period. For example, if three windows in Classroom 101 were open for two hours each that would total six window hours.

It is our understanding that occupancy levels during this round of testing were similar to those during the initial period.



2.0 FINDINGS

A summary of the carbon dioxide concentrations in the window opening times are presented below. The tables include the Phase II data and a summary of the Phase I data for comparison purposes.

Table I – Legend

Data from Phase I Assessment Period – 00:01 November 12, 2020 to 23:59 December 12, 2020.

Data from Phase II Assessment Period – 00:01 February 26, 2021 to 23:59 March 26, 2021.

Table II – St. Raphael CO₂ Summary

Location / Grade	Occupancy	CO ₂ measurements greater than 800 ppm	CO ₂ measurements greater than 1200 ppm	Total Window Open Time
Room 202 – Grade 7/8	19 + Teacher	535	270	950 hours ¹
Room 202 – Grade 7/8	19 + Teacher	334	84	894 hours
		38% Improvement	69% Improvement	6% fewer window hours

co2

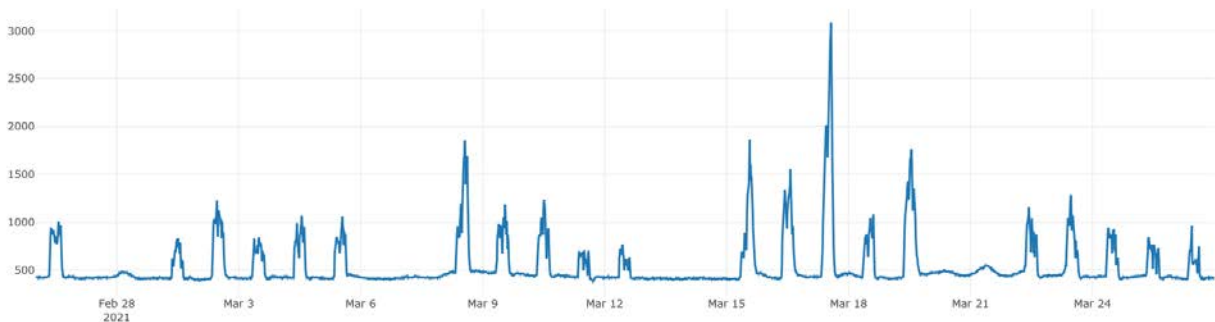
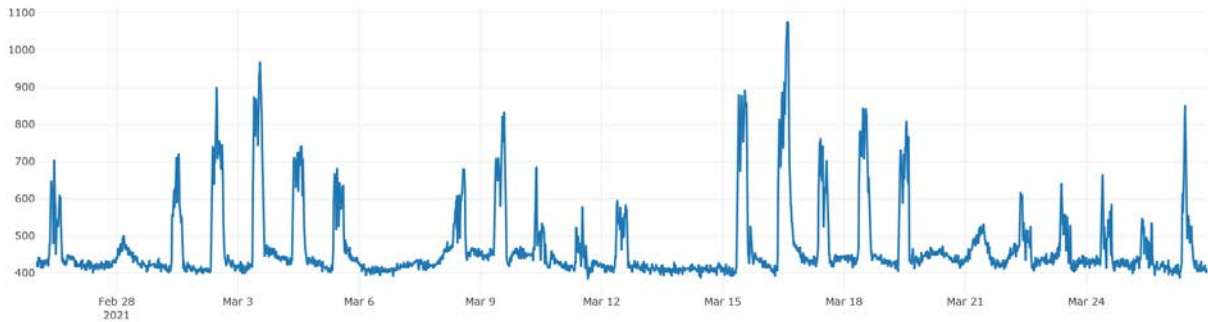




Table II – St. Raphael CO₂ Summary

Location / Grade	Occupancy	CO ₂ measurements greater than 800 ppm	CO ₂ measurements greater than 1200 ppm	Total Window Open Time
Room 209 - Grade 2	15 + Teacher	380	41	355 hours
Room 209 - Grade 2	15 + Teacher	59	0	942 hours
		84% Improvement	100% Improvement	2.60x more window hours

co2



Workroom 211	5 staff max.	295	6	87 hours
Workroom 211	5 staff max.	1	0	241 hours
		99% Improvement	100% Improvement	2.7x more window hours

co2

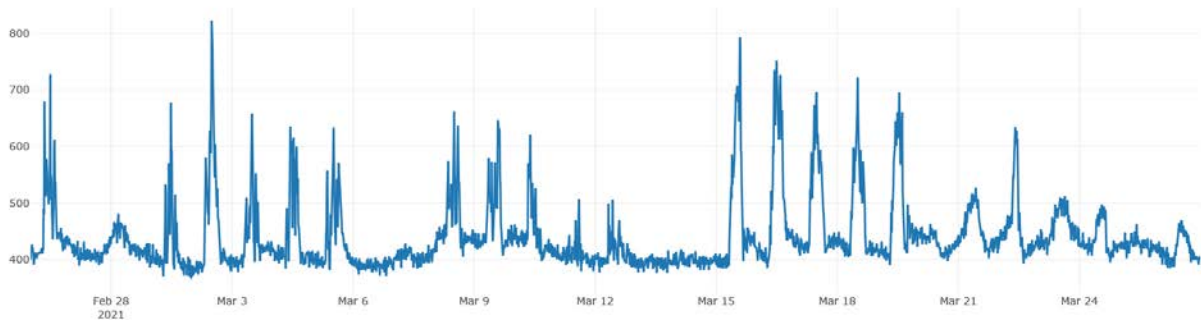
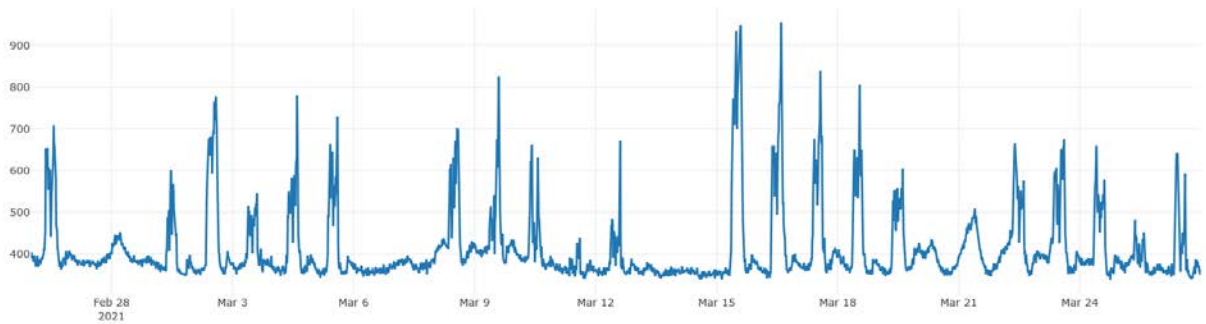




Table II – St. Raphael CO₂ Summary

Location / Grade	Occupancy	CO ₂ measurements greater than 800 ppm	CO ₂ measurements greater than 1200 ppm	Total Window Open Time
Room 103, Grade 1	13 + 1	297	47	326 hours
Room 103, Grade 1	13 + 1	19	0	625 hours
		93% Improvement	100% Improvement	1.9x more window hours

co2



Room 216 – Grade 3	14 + Teacher	260	15	432 hours
Room 216 – Grade 3	14 + Teacher	65	0	660 hours
		75% Improvement	100% Improvement	1.5x more window hours

co2

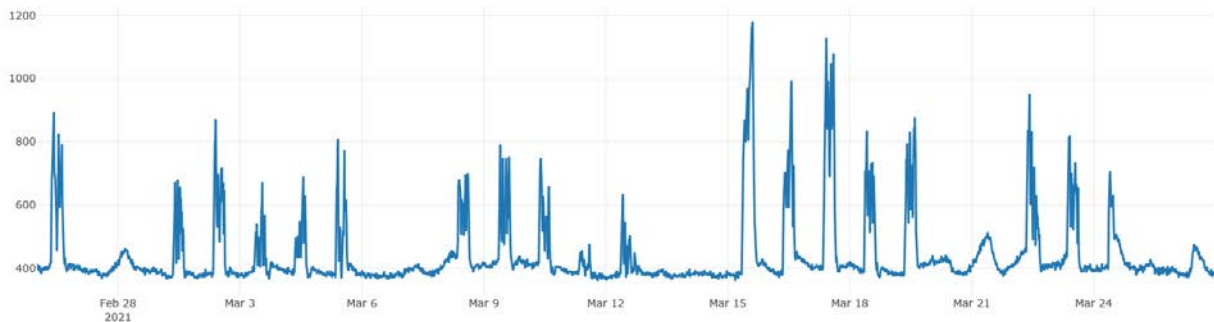
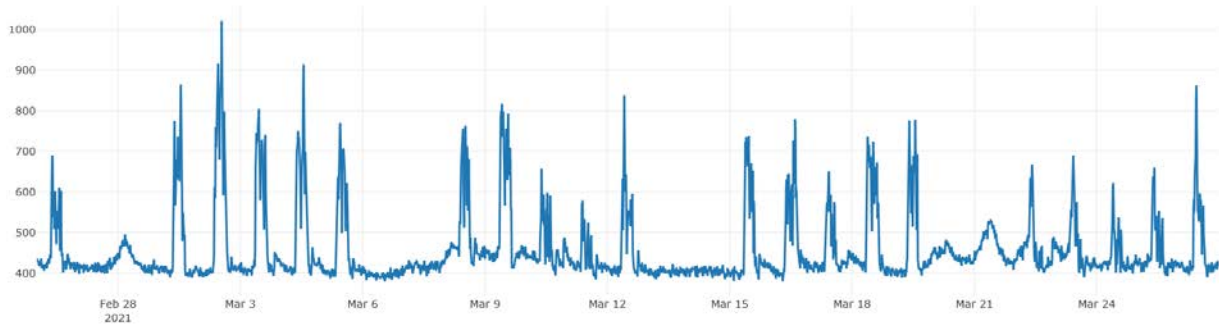




Table II – St. Raphael CO₂ Summary

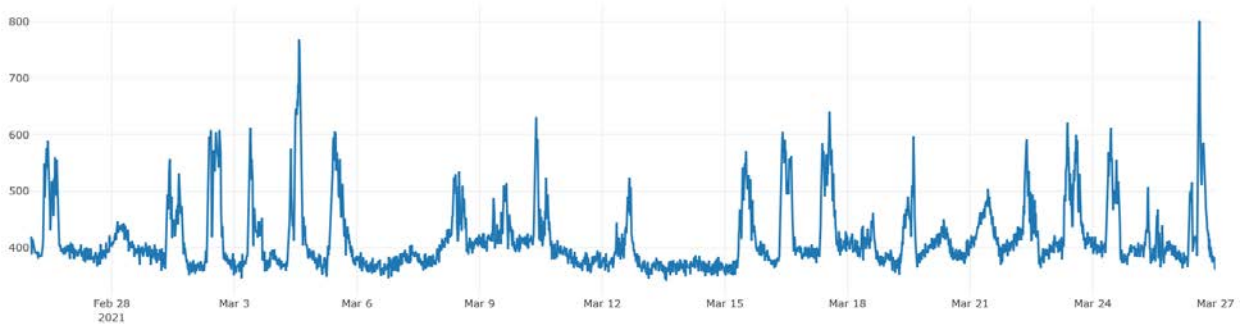
Location / Grade	Occupancy	CO ₂ measurements greater than 800 ppm	CO ₂ measurements greater than 1200 ppm	Total Window Open Time
Room 117 – Kindergarten	15 + 5	107	0	626 hours
Room 117 – Kindergarten	15 + 5	19	0	1113 hours
		82% Improvement	No change	1.8x more window hours

co2



Admin Office Room 123		163	0	-
Admin Office Room 123		1	0	-
		99% Improvement	No change	-

co2



Note 1 – During the Phase I test period, window Sensors 3 & 4 in Classroom 202 came off their mounting following the installation. These sensors were reinstalled on November 25, 2020. As a result, the window open time in Classroom 202 during Phase I was an estimate.



3.0 DISCUSSION

Changes to window operation and maintenance of the exhaust fans present in some of the classrooms have resulted in an improvement to ventilation rates in the subject rooms. Exceedances over 1200 ppm occurred in six of seven rooms during the Phase I testing period. Exceedances over 1200 ppm were identified only in Classroom 202 during the Phase II round of testing. In Classroom 202, measurements above 1200 ppm were reduced to 84 from the previous 270. Exceedances over 800 ppm still occurred in each room, but less than during the prior round. Exceedances over 800 ppm saw a 38% – 99% improvement.

4.0 TERMS AND LIMITATIONS

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

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5.0 CLOSURE

Should you have any questions or concerns regarding the contents of this letter, please contact the undersigned.

Yours truly,

Pinchin Ltd.

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