Responses to Feb. 18, 2021 Motions APPENDIX 'A'

1) *That staff continue to monitor CO2 / ventilation rates at Mother Cabrini to confirm performance as colder weather arrives;*	***Monitoring has continued at Mother Cabrini Catholic School*** o Data collected from the return of in person learning Feb. 16 until the end of March. o ***A detailed analysis has not yet been completed*** o Preliminary findings indicate no exceedances of CO2 over 1200ppm and very few above 800 ppm. o Ministry of Labour standard is 5,000 ppm or less. o The consultant's report will be provided once analysis is completed. ***Monitoring at St. Jerome to begin.*** o a school with no mechanical ventilation and new awning windows. o Monitoring at this school will provide ***a comparison of two different types of windows in non-mechanically ventilated schools***. o St. Jerome is ***one of two pilot projects*** for installation of a new mechanical ventilation system, anticipated to be completed by December 31, 2021. o Sensors will remain in place so that air quality can be monitored following installation of the ventilation system. o The results of this pilot will inform future planning to address ventilation upgrades.
2) *That staff implement window operation changes in select classrooms at St. Raphael. Monitor CO2 and temperature over a 15-30 day period and compare to the time frame evaluated during this report*;	***All windows at St. Raphael are now mandated to be kept open from the end of the school day until the custodian leaves at 11:00 p.m***. o Maintenance ***work was carried out on all existing exhaust fans*** to ensure they were operating properly o Sensor data collected from Feb. 26 to March 26 indicate ***significantly increased window opening time and improvements in CO2 levels since the first report***. o CO2 levels over 1200 ppm reported only in ***one room*** in the second test period. o The number of instances over 1200 ppm ***in this one room*** dropped from 207 to 84.

	○ CO2 levels over 800 ppm still occurred, but less often, with improvements ranging from 38% to 99%. ○ Refer to Appendix 'B' for the full results from Pinchin Ltd.
3) *That staff ensure the maximum efficiency filters (highest MERV rating) recommended by the manufacturer are installed in all HVAC systems;*	***MERV 13 filters were installed in all existing ventilation systems in TCDSB schools in the fall of 2020.*** ○ ***frequency*** of filter changes has ***been increased*** from two to four times per year.
4) *That staff review HVAC systems at all TCDSB schools and ensure they are properly balanced;*	***Staff are in the process of identifying TCDSB schools that could benefit from HVAC system balancing***. ○ A list is being compiled and prioritized after eliminating recently completed new schools, schools being replaced, and schools with recently completed HVAC projects and HVAC projects underway or planned. ○ This process is nearly complete and next step will be to issue a Request for Quotation (RFQ) for a consultant to carry out the balancing. ○ Given the number of schools, ***a phased approach*** to this work will be required. ***A Variable Frequency Drive (VFD) replacement project including full re-commissioning and balancing has just been completed at St. Jane Francis*** ○ one of the subject schools recommended for system balancing in the Pinchin Air Quality study ○ Analysis of the CO2 level data collected after balancing was completed to be ***provided at a later date when students return to in-person learning***.
5) *That staff ensure TCDSB school humidification systems are functioning properly;*	***Humidification in schools is generally not recommended due to the potential for mould growth and Legionella bacteria***. ○ The system was not installed at St. Jane Francis because of these concerns.

6) *That staff operate HVAC systems and portable HEPA filters for a minimum of 2.5 hours before and after occupancy to help flush / filter airborne particulate between school days;*	***Many schools, including St. Raphael, are already operating the portable HEPA filtration units continuously***. ○ At a minimum in all schools, ***they are operated 2.5 hours before and after occupancy*** as recommended.
7) *For schools without mechanical ventilation, open both the top and bottom segments and open all available windows to maximize window opening size. Where draft is an issue open the top section of the window only, and have staff open upper window prior to the start of the school day and to close at the end of the day*;	***Keeping the lower sections of windows open from the end of the school day until 11:00 p.m. has been effective at St. Raphael in lowering CO2 levels in classrooms***, as noted above. ○ In schools that do not have windows with upper sections that open or the upper section operators are inaccessible due to the height or millwork in front of the windows***, teachers are encouraged to open as many windows as possible as often as is safe and practical***.
8) *That staff consider prioritizing the deployment of portable air filters in classrooms where ventilation performance is not maintaining CO2 concentrations consistently below 800 ppm;*	***Approximately 2,500 portable HEPA filtration units were installed in all non-mechanically ventilated classrooms across the TCDSB system in the fall of 2020***. ***With additional Provincial funding received in February 2021, another 2,914 units were installed, addressing rooms of concern in mechanically ventilated schools as well.***
9) *That staff investigate measuring the classroom exhaust functionality and vents at St. Raphael to determine whether the exhaust fans and vents are running according to manufacturer specifications;*	***Maintenance carried out on all existing exhaust fans at St. Raphael has resulted in improved CO2 levels in classrooms***, along with increased window opening, as noted in # 2 above.

10) *That the TCDSB acquire portable CO2 testers to allow qualified staff to test ventilation remediations;*	***Pinchin Ltd. has been retained to investigate the availability and pricing of portable CO2 sensors***. ○ Pinchin will provide a ***recommendation to the Board as to which device would be most appropriate*** as well as training on the use and calibration of the selected device for up to 25 staff.
11) *That staff look to open more than one window in a class, preferably on opposite sides of the windowed wall to allow for airflow;*	***All windows at St. Raphael are now mandated to be kept open from the end of the school day until the custodian leaves at 11:00 p.m***. ***Keeping the lower sections of windows open from the end of the school day until 11:00 p.m. has been effective at St. Raphael in lowering CO2 levels in classrooms***, as noted above. In schools that do not have windows with upper sections that open or the upper section operators are inaccessible due to the height or millwork in front of the windows***, teachers are encouraged to open as many windows as possible as often as is safe and practical***.
12) *That staff consider flushing during lunch or vacant times by opening windows in schools without mechanical ventilation;*	***All windows at St. Raphael are now mandated to be kept open from the end of the school day until the custodian leaves at 11:00 p.m***.
13) *That during lunchtime, recess, breaks and other times when students are working independently, staff ensure that air purifiers are running on high;*	***The portable HEPA filtration units installed in TCDSB classrooms are run on high whenever possible***. ○ At a minimum in all schools, ***they are operated 2.5 hours before and after occupancy*** as recommended.
14) *That staff consider closing classrooms with no HVAC, vents*	***TCDSB has 49 schools with no mechanical ventilation system and about double that number that are partially ventilated***

or exhaust that only have windows for ventilation.	○ There are ***not enough ventilated classrooms available*** in the system to accommodate students. ○ The following information from the Pinchin Air Quality study should be kept in mind: • CO2 levels recorded in the non-mechanically ventilated classrooms ***never came close to reaching unsafe levels***; • CO2 levels in sample classrooms ***significantly improved with increased and systematic window opening***; and • ***Portable HEPA filtration units are providing the air changes required*** to effectively mitigate virus transmission in classrooms.
15) *All new window installations follow the recommendations eg. Awning, not 4" window openings; and* 16) *Top and bottom openings;*	***Large double awning (opening top and bottom) windows have been implemented as the Board standard for new schools and window replacement projects***.
17) *Pilot be conducted to install cages*	***Pinchin Ltd. has been retained to provide design, to meet Ontario Building Code requirements, and costing for window cages at St. Raphael Catholic School***.
18) *Power windows be considered for new schools/additions etc.*	***Motorized windows, both the BAS and the window operators, are very expensive and well beyond the benchmark school construction funding provided by the Ministry for new schools.*** ○ Although Motorized Windows have been used in some Net Zero Emissions buildings to make use of natural ventilation when conditions are optimal, ***they are connected to a sophisticated Building Automation System (BAS)*** that utilizes sensors for indoor and outdoor temperature and humidity to regulate the opening and closing of windows. ○ Staff are ***in the process of obtaining ballpark pricing***. ○ Motorized Windows may be considered in the future But will be highly dependent on capital funding allocations by the Ministry of Education